# RF & MICROWAVE COMPONENTS

DATABOOK

2nd EDITION

JANUARY 1993

# TABLE OF CONTENTS

## SGS-THOMSON MICROELECTRONICS, RF PRODUCTS GROUP

**RF & MICROWAVE COMPONENTS DATABOOK, 2nd Edition**

This 2nd Edition DATABOOK of RF & Microwave Components represents a major revision from the 1st edition version.

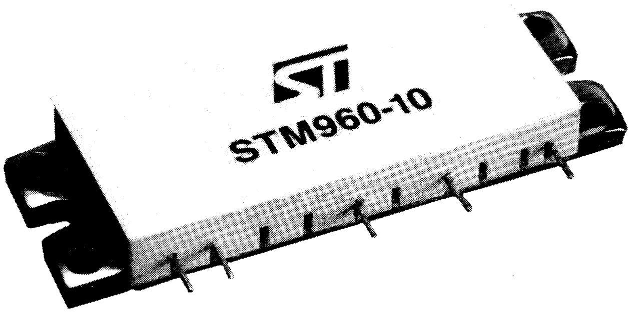
Included in the new edition are an extensive product line of silicon bipolar microwave power transistors previously manufactured by Microwave Semiconductor Corporation (MSC).

MSC was acquired by SGS-THOMSON and consolidated into the RF Products Group in Montgomeryville, Pennsylvania during 1990.

These products continue to carry their original "AM" and "MSC" part number nomenclatures in order to facilitate their identification in the new databook.

Also included are data sheets covering the newest SGS-THOMSON RF Products Group product line - hybrid power modules for Digital Cellular Telephone and Satellite Communications applications. Silicon RF power MOSFETs and bipolar transistors are combined with hybrid circuitry to yield high- performance, cost-effective amplifier modules easily integratable into new generations of portable, mobile and fixed equipment.

During the last half of 1991 and continuing into the first half of 1992, a product consolidation has taken place, resulting in the deletion from this 2nd edition DATABOOK of many parts which appeared in the 1st edition. On the other hand, many new products have been added along with the MSC product line discussed above.



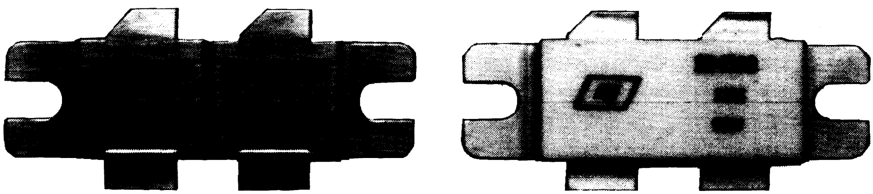

10watt linear hybrid power module Application:
Digital Cellular Base Stations

Another new addition is a comprehensive cross reference chart which lists both current as well as former competitors' part numbers and the nearest SGS-THOMSON equivalent. In some cases, an additional device is suggested as an alternate replacement.

If a part of interest, based on RF performance characteristics, is not shown in the catalog in the package style required for a specific application, please contact us directly or via an authorized sales representative or distributor as it is possible that other package configurations are readily available.

SGS-THOMSON has endeavored to provide complete, accurate technical information in this DATABOOK. We cannot, however, assume responsibility for inaccuracies or omissions.

Please contact an authorized SGS-THOMSON sales representative or distributor or the factory directly if additional information on any product in this DATABOOK is required.

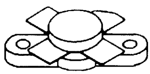


150 watt Class AB linear power transistor Application:
800/960 MHz Digital Cellular Base Stations

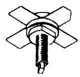
# ALPHANUMERICAL INDEX

# PRODUCTS GUIDE

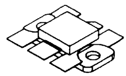
| | |
|---|---|
| $BV_{CBO}$ | Collector-base breakdown voltage |
| $BV_{CEO}$ | Collector-emitter breakdown voltage, base open |
| $BV_{CES}$ | Collector-emitter breakdown voltage |
| $BV_{EBO}$ | Emitter-base breakdown voltage |
| CB | Common base |
| CC | Common collector |
| CE | Common emitter |
| CS | Common source |
| $C_{OB}$ | Output capacitance |
| CMD | Cross modulation distortion |
| DC | Duty cycle |
| $f_O$ | Test frequency |
| $f_T$ | Transition frequency |
| $G_{fs}$ | Forward transconductance |
| $G_P$ | Power gain |
| $h_{FE}$ | DC Current gain |
| $I_B$ | Continuous base current |
| $I_C$ | Continuous collector current |
| $I_{CBO}$ | Collector-base cutoff current |
| $I_{CES}$ | Collector-emitter cutoff current |
| $I_{CQ}$ | Quiescent collector current |
| $I_{DSS}$ | Drain-source leakage current |
| $I_{GSS}$ | Gate-source leakage current |
| IMD | Intermodulation distortion |
| $\eta_C$ | Collector efficiency |
| $\eta_D$ | Drain efficiency |
| NF | Noise figure |
| $P_{DISS}$ | Total power dissipation |
| $P_{IN}$ | Input power |
| $P_{OUT}$ | Output power |
| $P_{OUT(PEP)}$ | Output peak envelope power |
| $P_{SYNC}$, $P_{REF}$ | Peak sync output power |
| PW | Pulse width |
| $R_{TH(j-c)}$ | Thermal resistance (junction-case) |
| $V_{CB}$ | Collector-base continuous voltage |
| $V_{CC}$ | Collector DC supply voltage |
| $V_{CE}$ | Collector-emitter continuous voltage |
| $V_{DS}$ | Drain-source continuous voltage |
| $V_{GS(th)}$ | Gate threshold voltage |



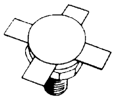
.380 4LFL
(M113)



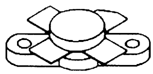
.380 4L STUD
(M135)



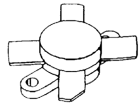
.400 x .425 6LFL
(M153)



.500 Dia - .550 4L STUD
(M164)



.500 4LFL
(M174)



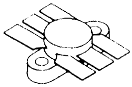
.550 4LFL
(M177)

## 2-30 MHz CLASS AB LINEAR, COMMON EMITTER, HF/SSB

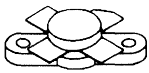
| PART NO. | FREQ. (MHz) | POUT (PEP) MIN (W) | PIN (W) | GAIN MIN (dB) | BIAS | | RTH(j-c) MAX (°C/W) | IMD 2 TONES (dBc) | PACKAGE STYLE |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | VCE (V) | ICQ (mA) | | | |
| SD1285* | 30 | 20 | 0.65 | 15 | 12.5 | 25 | 2.2 | –30 | M113 |
| SD1405* | 30 | 75 | 3.8 | 13 | 12.5 | 100 | 0.65 | –32 | M174 |
| SD1487 | 30 | 100 | 7.9 | 11 | 12.5 | 150 | 0.6 | –30 | M174 |
| SD1224-10* | 30 | 30 | 0.5 | 18 | 28 | 25 | 2.2 | –28 | M113 |
| SD1407* | 30 | 125 | 4 | 15 | 28 | 100 | 0.65 | –30 | M174 |
| SD1729 | 30 | 130 | 8.2 | 12 | 28 | 150 | 1.0 | –30 | M174 |
| SD1730 | 30 | 220 | 14 | 12 | 28 | 750 | 0.7 | –30 | M174 |
| SD1411 | 30 | 200 | 5 | 16 | 40 | 150 | 0.35 | –30 | M153 |
| SD1733 | 30 | 75 | 3 | 14 | 50 | — | 2.0 | –30 | M135 |
| SD1726 | 30 | 150 | 6 | 14 | 50 | 100 | 0.75 | –30 | M174 |
| SD1727 | 30 | 150 | 6 | 14 | 50 | 100 | 0.75 | –30 | M164 |
| SD1731 | 30 | 220 | 11 | 13 | 50 | 150 | 0.70 | –30 | M174 |
| SD1728 | 30 | 250 | 10 | 14 | 50 | 150 | 0.40 | –30 | M177 |

*Tested Class C

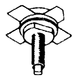
| P/N Cross Reference | |
|---|---|
| INDUSTRY P/N | SD P/N |
| TH416 | SD1729 |
| TH430 | SD1728 |
| TH513 | SD1733 |
| TH560 | SD1730 |
| TH562 | SD1731 |
| THA15 | SD1726 |
| THX15 | SD1727 |



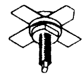
.500 6LFL
(M111)



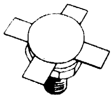
.380 4LFL
(M113)



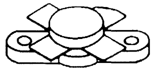
.500 4L STUD
(M130)



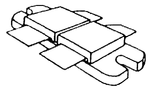
.380 4L STUD
(M135)



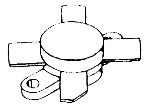
.500 Dia - .550 4L STUD
(M164)



.500 4LFL
(M174)



2 x .437 x .450 2LFL
(M175)



.550 4LFL
(M177)

## 27-88 MHz CLASS C, COMMON EMITTER, LOW & MID-BAND FM

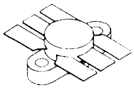
| PART NO. | FREQ. (MHz) | $P_{OUT}$ MIN. (W) | $P_{IN}$ (W) | GAIN MIN (dB) | $V_{CC}$ (V) | $R_{TH(j-c)}$ MAX (°C/W) | PACKAGE STYLE |
|---|---|---|---|---|---|---|---|
| SD1446 | 50 | 70 | 7 | 10 | 12.5 | 1.05 | M113 |
| SD1405 | 50 | 100 | 20 | 7 | 12.5 | 0.65 | M174 |
| SD1726 | 70 | 150 | 19 | 9 | 50 | 0.75 | M174 |
| SD1727 | 70 | 150 | 19 | 9 | 50 | 0.75 | M164 |
| SD1728 | 70 | 250 | 25 | 10 | 50 | 0.40 | M177 |

## 88-108 MHz CLASS C, COMMON EMITTER, FM BROADCAST

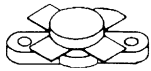
| PART NO. | FREQ. (MHz) | $P_{OUT}$ MIN. (W) | $P_{IN}$ (W) | GAIN MIN (dB) | $\eta_C$ MIN (%) | $V_{CC}$ (V) | $R_{TH(j-c)}$ MAX (°C/W) | PACKAGE STYLE |
|---|---|---|---|---|---|---|---|---|
| SD1457 | 108 | 75 | 7.5 | 10 | 70 | 28 | 1.5 | M174 |
| SD1460 | 108 | 150 | 18 | 9.2 | 70 | 28 | 0.75 | M174 |
| SD1483 | 108 | 300 | 30 | 10 | 60 | 28 | 0.45 | M175 |

## 108-150 MHz CLASS C, COMMON EMITTER, AIRCRAFT COMMUNICATIONS

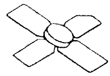
| PART NO. | FREQ. (MHz) | $P_{OUT}$ MIN. (W) | $P_{IN}$ (W) | GAIN MIN (dB) | $V_{CC}$ (V) | $R_{TH(j-c)}$ MAX (°C/W) | PACKAGE STYLE |
|---|---|---|---|---|---|---|---|
| SD1013 | 150 | 3 | 0.3 | 10 | 13.5 | 13.5 | M135 |
| SD1013-03 | 150 | 3 | 0.3 | 10 | 13.5 | 13.5 | M113 |
| SD1019 | 150 | 30 | 10.6 | 4.5 | 13.5 | 1.7 | M130 |
| SD1480 | 136-175 | 12.5 | 15 | 9.2 | 28 | 0.65 | M111 |



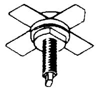
.500 6LFL
(M111)



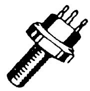
.380 4LFL
(M113)



.280 4LSL
(M123)



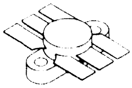
.380 4L STUD
(M135)



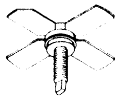
TO 60
(M137)

## 150-175 MHz CLASS C, COMMON EMITTER, HIGH BAND FM

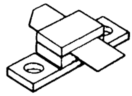
| PART NO. | FREQ. (MHz) | $P_{OUT}$ MIN. (W) | $P_{IN}$ (W) | GAIN MIN (dB) | $\eta_C$ MIN (%) | $V_{CC}$ (V) | $R_{TH(j-c)}$ MAX (°C/W) | PACKAGE STYLE |
|---|---|---|---|---|---|---|---|---|
| SD1134-05 | 150 | 1.4 | 0.1 | 11.5 | — | 7.5 | 35 | M123 |
| SD1135-03 | 150 | 2.5 | 0.2 | 11 | — | 7.5 | 11.6 | M123 |
| SD1274 | 160 | 30 | 3 | 10 | — | 13.6 | 1.2 | M135 |
| SD1274-01 | 160 | 30 | 3 | 10 | — | 13.6 | 1.2 | M113 |
| SD1275 | 160 | 40 | 5 | 9 | — | 13.6 | 1.2 | M135 |
| SD1275-01 | 160 | 40 | 5 | 9 | — | 13.6 | 1.2 | M113 |
| SD1273 | 160 | 40 | 5 | 9 | 55 | 13.6 | 2.5 | M135 |
| SD1012 | 175 | 4 | 0.25 | 12 | 50 | 12.5 | 15 | M135 |
| SD1012-03 | 175 | 6 | 0.75 | 9 | 50 | 12.5 | 8.75 | M113 |
| SD1143 | 175 | 10 | 1 | 10 | — | 12.5 | 8.75 | M135 |
| SD1143-01 | 175 | 10 | 1 | 10 | — | 12.5 | 8.75 | M113 |
| SD1014-02 | 175 | 15 | 3.5 | 6.3 | 60 | 12.5 | 5.6 | M135 |
| SD1014-06 | 175 | 15 | 3.5 | 6.3 | 60 | 12.5 | 5.6 | M113 |
| SD1018 | 175 | 40 | 14 | 4.5 | 70 | 12.5 | 2.2 | M135 |
| SD1018-06 | 175 | 40 | 14 | 4.5 | 70 | 12.5 | 2.2 | M113 |
| SD1428 | 175 | 45 | 10 | 6.5 | 50 | 12.5 | 1.2 | M111 |
| SD1477 | 175 | 100 | 25 | 6 | — | 12.5 | 0.65 | M111 |
| SD1070 | 175 | 13.5 | 3.5 | 5.8 | 70 | 28 | 7.6 | M137 |
| SD1224 | 175 | 40 | 7 | 7.6 | 60 | 28 | 2.9 | M135 |
| SD1224-02 | 175 | 40 | 7 | 7.6 | 60 | 28 | 2.9 | M113 |



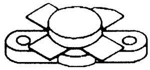
.500 6LFL
(M111)



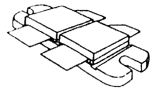
.280 4L STUD
(M122)



.230 x .360 2LFL
(M159)



.500 4LFL
(M174)



2 x .437 x .450 2LFL
(M176)

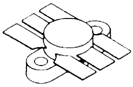
## 2-400 MHz COMMON SOURCE N CHANNEL MOSFETS

| PART NO. | FREQ. (MHz) | $P_{OUT}$ MIN (W) | $P_{IN}$ (W) | GAIN MIN (dB) | $\eta_D$ (%) | BIAS | | $R_{TH(j-c)}$ MAX. (°C/W) | PACKAGE STYLE |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | $V_{DD}$ (V) | $I_{DQ}$ (mA) | | |
| SD1920 | 150 | 150 | 24 | 8 | 45 | 50 | 250 | 0.7 | M174 |
| SD1920-02 | 150 | 300 | 47.5 | 8 | 45 | 50 | 2 x 250 | 0.7 | M176 |
| SD1930 | 400 | 5 | 0.3 | 12 | 45 | 28 | 50 | 5.0 | M159 |

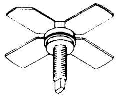
## 450-512 MHz CLASS C, COMMON EMITTER, FM MOBILE

| PART NO. | FREQ. (MHz) | $P_{OUT}$ MIN. (W) | $P_{IN}$ (W) | GAIN (dB) | $V_{CC}$ (V) | $R_{TH(j-c)}$ MAX (°C/W) | PACKAGE STYLE |
|---|---|---|---|---|---|---|---|
| SD1144 | 470 | 2 | 0.25 | 9.0 | 12.5 | 35.0 | M122 |
| SD1134 | 470 | 2 | 0.20 | 10.0 | 12.5 | 35.0 | M122 |
| SD1135 | 470 | 5 | 0.70 | 8.5 | 12.5 | 11.6 | M122 |
| SD1433 | 470 | 10 | 2.0 | 7.0 | 12.5 | 3.0 | M122 |
| SD1146 | 470 | 10 | 2.5 | 6.0 | 12.5 | 4.7 | M122 |
| SD1429 | 470 | 12 | 2.0 | 7.8 | 12.5 | 4.6 | M111 |
| SD1429-03 | 470 | 15 | 2.5 | 7.8 | 12.5 | 4.6 | M111 |
| SD1422 | 470 | 25 | 6.0 | 6.2 | 12.5 | 2.5 | M111 |
| SD1488 | 470 | 38 | 10.0 | 5.8 | 12.5 | 1.5 | M111 |
| SD1434 | 470 | 45 | 14.0 | 5.0 | 12.5 | 1.0 | M111 |

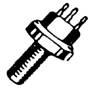
| P/N Cross Reference | |
|---|---|
| INDUSTRY P/N | SD P/N |
| 2N5944 | SD1144 |
| 2N5946 | SD1146 |



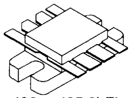
.500 6LFL
(M111)



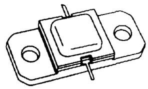
.280 4L STUD
(M122)



TO 60
(M137)



.400 x .425 8LFL
(M168)



.400 x .400 2NLFL
(S042)

## 100-500 MHz CLASS C, COMMON EMITTER

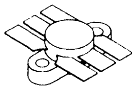
| PART NO. | FREQ. (MHz) | POUT MIN. (W) | PIN (W) | GAIN MIN (dB) | ηC MIN (%) | VCC (V) | RTH(j-c) MAX (°C/W) | COB MAX (pF) | PACKAGE STYLE |
|---|---|---|---|---|---|---|---|---|---|
| SD1050 | 400 | 3 | 1.0 | 4.7 | 40 | 28 | 15.0 | 10 | M137 |
| SD1060 | 400 | 5 | 1.7 | 4.7 | 45 | 28 | 15.1 | 10 | M137 |
| SD1075 | 400 | 10 | 4.0 | 4.0 | 45 | 28 | 7.6 | 20 | M137 |
| SD4012 | 225-400 | 3 | 0.2 | 11.7 | 60(1) | 28 | 16.0 | 6 | M122 |
| SD4013 | 225-400 | 25 | 3.15 | 9.0 | 50 | 28 | 2.5 | 30 | M111 |
| SD1462 | 225-400 | 70 | 8.8 | 9.0 | 60(1) | 28 | 0.8 | 65(1) | M111 |
| SD1468 | 225-400 | 70 | 10.0 | 8.4 | 60(1) | 28 | 1.25 | 80 | M111 |
| SD1470 | 225-400 | 100 | 20.0 | 7.0 | 60(1) | 28 | 0.70 | 100(1) | M111 |
| SD1463 | 225-400 | 125 | 25.0 | 7.0 | 60 | 28 | 0.65 | — | M168 |
| SD1464 | 100-500 | 100 | 28.2 | 5.5 | 55 | 28 | 0.67 | — | M168 |

(1)Typical value

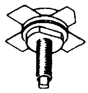
| P/N Cross Reference | |
|---|---|
| INDUSTRY P/N | SD P/N |
| 2N3375 | SD1050 |
| 2N4440 | SD1060 |
| 2N3733 | SD1075 |
| TCC0105-100 | SD1464 |
| TCC0204-125 | SD1463 |

## 500-1000 MHz CLASS C, COMMON BASE

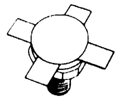
| PART NO. | FREQ. (MHz) | POUT MIN. (W) | PIN (W) | GAIN MIN (dB) | ηC MIN (%) | VCC (V) | RTH(j-c) MAX (°C/W) | PACKAGE STYLE |
|---|---|---|---|---|---|---|---|---|
| AM80610-018 | 620-960 | 18 | 2.5 | 8.6 | 48 | 28 | 4.0 | S042 |
| AM80610-030 | 620-960 | 30 | 4.2 | 8.5 | 50 | 28 | 2.6 | S042 |
| AM80610-050 | 750-960 | 50 | 7.0 | 8.5 | 50 | 28 | 1.8 | S042 |



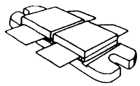
.500 6LFL
(M111)



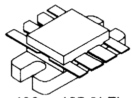
.500 4L STUD
(M130)



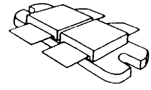
.500 Dia - .550 4L STUD
(M164)



2 x .437 x .450 2LFL
(M165)



.400 x .425 8LFL
(M168)



2 x .437 x .450 2LFL
(M175)

## 55-88 MHz CLASS AB, COMMON EMITTER, VHF TV BAND I

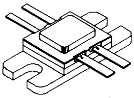
| PART NO. | FREQ. (MHz) | $P_{OUT}$ MIN. (W) | $P_{IN}$ (W) | GAIN MIN (dB) | $\eta_C$ MIN (%) | BIAS | | $R_{TH(j-c)}$ MAX (°C/W) | PACKAGE STYLE |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | $V_{CE}$ (V) | $I_C$ (mA) | | |
| SD1476 | 55-88 | 240 | 20 | 12.0 | 50 | 32 | 2 x 400 | 0.4 | M165 |

## 174-230 MHz CLASS A, COMMON EMITTER, VHF TV BAND III

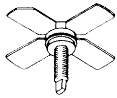
| PART NO. | FREQ. (MHz) | $P_{OUT}$ MIN (W) | $P_{IN}$ (W) | GAIN MIN (dB) | BIAS | | IMD 3 TONES (dBC) | $R_{TH(j-c)}$ MAX (°C/W) | $C_{OB}$ MAX (pF) | PACKAGE STYLE |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | $V_{CE}$ (V) | $I_C$ (mA) | | | | |
| SD1458 | 225 | 14 | 0.55 | 14 | 28 | 2500 | –55 | 1.5 | 80 | M111 |
| SD1455 | 225 | 20 | 3.2 | 8 | 25 | 2500 | –51 | 1.5 | 85 | M130 |
| SD1459 | 225 | 30 | 5.3 | 7.5 | 28 | 3500 | –53 | 1.2 | 150 | M164 |
| SD1456* | 225 | 100 | 8.0 | 11.0 | 28 | 2 x 100 | –51 | 1.2 | 80 | M168 |
| SD1485* | 230 | 200 | 16 | 11.0 | 32 | 2 x 500 | — | 0.45 | — | M175 |

*Class AB

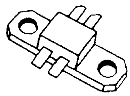
| P/N Cross Reference | |
|---|---|
| INDUSTRY P/N | SD P/N |
| TCC3100 | SD1456 |



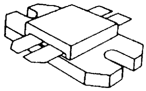
.400 x .425 4LFL
(M119)



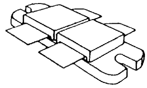
.280 4L STUD
(M122)



.250 x .320 4LFL
(M156)



.438 x .450 4LFL
(M173)



2 x .437 x .450 2LFL
(M175)

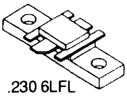
## 470-860 MHz CLASS A, COMMON EMITTER, UHF TV-BANDS

| PART NO. | FREQ. (MHz) | $P_{OUT}$ MIN (W) | $P_{IN}$ (W) | GAIN MIN (dB) | BIAS | | IMD 3 TONES (dBC) | $R_{TH(j-c)}$ MAX (°C/W) | $C_{OB}$ MAX (pF) | PACKAGE STYLE |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | $V_{CE}$ (V) | $I_C$ (mA) | | | | |
| SD1439 | 860 | .5 | 0.56 | 9.5 | 20 | 220 | –58 | 5.5 | 5 | M122 |
| SD1449 | 860 | 1 | 0.1 | 10 | 20 | 440 | –58 | 9.0 | 7 | M122 |
| SD1437 | 860 | 2 | 0.3 | 8.5 | 25 | 450 | –60 | 11 | 10 | M122 |
| SD1448 | 860 | 4 | 0.8 | 7 | 25 | 850 | –60 | 5.5 | 20 | M122 |
| SD4011 | 860 | 4 | 0.63 | 8.0 | 25 | 850 | –60 | 5.5 | 20 | M122 |
| SD1732 | 860 | 14 | 1.2 | 8.5 | 25 | 2 x 850 | –45 | 2.5 | 17.5(1) | M156 |
| SD4010 | 860 | 20 | 2.2 | 9.5 | 26.5 | 2 x 1350 | –48 | 1.9 | 36 | M119 |
| SD1490 | 860 | 25 | 4.0 | 8.0 | 25 | 2 x 1600 | –45 | 1.3 | 80 | M173 |
| SD1489* | 860 | 50 | 10.5 | 6.8 | 28 | 2 x 250 | — | 1.0 | 70(1) | M173 |
| SD1492* | 860 | 150 | 33.5 | 6.5 | 28 | 2 x 500 | — | 0.55 | 100 | M175 |

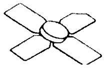
*Class AB (1)Typical value

| P/N Cross Reference | |
|---|---|
| INDUSTRY P/N | SD P/N |
| TCC596 | SD1439 |
| TCC597 | SD1449 |
| TCC593 | SD1437 |

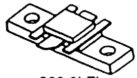
| P/N Cross Reference | |
|---|---|
| INDUSTRY P/N | SD P/N |
| TCC598 | SD1448 |
| TDS595 | SD1732 |



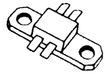
.230 6LFL
(M118)



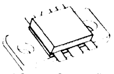
.280 4LSL
(M123)



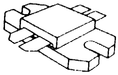
.230 6LFL
(M142)



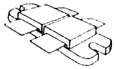
.250 x .320 4LFL
(M156)



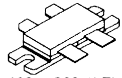
.400 x .425 6LFL
(M169)



.438 x .450 4LFL
(M173)



2 x .437 x .450 2LFL
(M175)



.400 x .860 4LFL
(M208)

## 806-960 MHz CLASS C, COMMON BASE, FM MOBILE/BASE STATION

| PART NO. | FREQ. (MHz) | $P_{OUT}$ MIN. (W) | $P_{IN}$ (W) | GAIN MIN (dB) | $\eta_C$ MIN (%) | $V_{CC}$ (V) | $R_{TH(j-c)}$ MAX (°C/W) | PACKAGE STYLE |
|---|---|---|---|---|---|---|---|---|
| SD1414 | 836 | 45 | 15 | 4.7 | — | 12.5 | 1.2 | M142 |
| SD1400-02 | 900 | 14 | 1.5 | 9.7 | 55(1) | 24 | 3.0 | M118 |
| SD1496 | 900 | 60 | 10.6 | 7.5 | 50(1) | 24 | 0.9 | M142 |
| SD1426 | 900 | 60 | 12 | 7.0 | 55 | 24 | 1.0 | M169 |
| SD1400-03 | 960 | 14 | 1.6 | 9.5 | 50 | 24 | 3.5 | M118 |
| SD1495-03 | 960 | 30 | 6 | 7.0 | 50 | 24 | 1.5 | M142 |
| SD1496-03 | 960 | 55 | 10 | 7.4 | 50(1) | 24 | 0.9 | M142 |

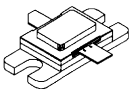
(1)Typical performance

## 860-960 MHz CLASS AB LINEAR, COMMON EMITTER, CELLULAR BASE STATION

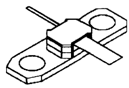
| PART NO. | FREQ. (MHz) | $P_{OUT}$ MIN (W) | $P_{IN}$ (W) | GAIN MIN (dB) | BIAS $V_{CE}$ (V) | BIAS $I_C$ (mA) | $R_{TH(j-c)}$ MAX (°C/W) | $C_{OB}$ MAX (pF) | PACKAGE STYLE |
|---|---|---|---|---|---|---|---|---|---|
| SD1420-01* | 860-960 | 0.9 | 0.10 | 9.5 | 24 | 125 | 20 | 5 | M123 |
| SD1420* | 860-960 | 2.1 | 0.27 | 9 | 24 | 200 | 20 | 5 | M122 |
| SD1398 | 860-960 | 6 | 0.60 | 10 | 24 | 25 | 3.3 | 8.5 | M142 |
| SD1423 | 860-960 | 15 | 2.4 | 8 | 24 | 75 | 6.0 | 25 | M118 |
| SD1424 | 860-960 | 30 | 5.3 | 7.5 | 24 | 150 | 3.0 | 25 | M156 |
| SD1425 | 860-960 | 30 | 5.3 | 7.5 | 24 | 150 | 3.0 | 48 | M142 |
| SD4017 | 860-960 | 30 | 5.3 | 7.5 | 25 | 60 | 2.0 | 42** | M142 |
| SD1658 | 860-900 | 40 | 10 | 6 | 24 | 2 x 250 | 1.0 | 80 | M173 |
| SD4701 | 860-960 | 45 | 7.15 | 8 | 26 | 200 | 1.0 | 45** | M169 |
| SD1650 | 860-960 | 60 | 12 | 7 | 24 | 300 | 1.5 | — | M169 |
| SD4600 | 860-960 | 60 | 10.5 | 7.5 | 26 | 200 | 1.2 | — | M173 |
| SD1660 | 860-900 | 120 | 30 | 6 | 24 | 2 x 400 | 0.55 | 100 | M175 |
| SD1680 | 915-960 | 100 | 25 | 6 | 24 | 2 x 400 | 0.55 | 100 | M175 |
| SD4590 | 800-960 | 150 | 24 | 8 | 26 | 2 x 150 | 0.60 | 75** | M208 |

* Class A ** Typical Value

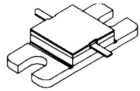
## SELECTION GUIDE



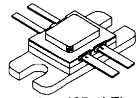
.400 x .500 2LFL
(M102)



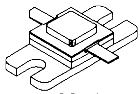
.250 SQ. 2LFL
(M105)



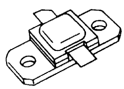
.400 x .400 2LFL
(M106)



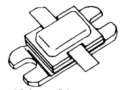
.400 x .425 4LFL
(M119)



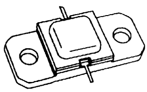
.400 SQ. 2LFL
(M138)



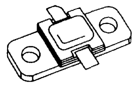
.400 x .400 2LFL
(S036)



.400 x .500 2LFL
(S038)



.400 x .400 2NLFL
(S042)

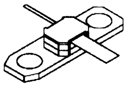


.310 x .310 2LFL
(S064)

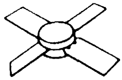
### 400-950 MHz CLASS C, COMMON BASE, PULSED, UHF RADAR APPLICATIONS

| PART NO. | FREQ. (MHz) | $P_{OUT}$ MIN (W) | $P_{IN}$ (W) | GAIN MIN (dB) | $\eta_C$ MIN (%) | $V_{CC}$ (V) | $R_{TH(j-c)}$ MAX (°C/W) | PULSE WIDTH (μSEC) | DUTY CYCLE (%) | PACKAGE STYLE |
|---|---|---|---|---|---|---|---|---|---|---|
| SD1511-08* | 425 | 10 | 1.2 | 9.2 | 50 | 28 | 3.0 | CW | CW | M105 |
| SD1474* | 425 | 48 | 10 | 6.8 | 50 | 28 | 2.0 | CW | CW | M138 |
| SD1563 | 400-500 | 300 | 33 | 9.6 | 50 | 40 | 0.20 | 250 | 10 | M106 |
| SD1564 | 400-500 | 400 | 80 | 7.0 | 50 | 40 | 0.15 | 60 | 2 | M119 |
| SD1565 | 400-500 | 500 | 54 | 9.7 | 50 | 40 | 0.15 | 250 | 10 | M102 |
| AM0405-030 | 420-450 | 30 | 3.5 | 9.3 | 60 | 32 | 4.0 | 10,000 | 20 | S042 |
| AM0405-100 | 420-450 | 100 | 16 | 8.0 | 60 | 32 | 1.5 | 10,000 | 20 | S042 |
| AM0608-020 | 600-750 | 20 | 2.5 | 9.0 | 40 | 35 | 1.5 | 10 | 1 | S064 |
| AM0608-070 | 600-750 | 70 | 13 | 7.3 | 35 | 50 | 0.60 | 10 | 1 | S064 |
| AM0608-200 | 600-750 | 220 | 30 | 8.7 | 40 | 50 | 0.20 | 10 | 1 | S042 |
| AM0608-450 | 600-750 | 445 | 90 | 6.9 | 40 | 50 | 0.13 | 10 | 1 | S038 |
| AM0710-300 | 750-950 | 300 | 40 | 8.8 | 40 | 50 | 0.22 | 10 | 10 | S036 |

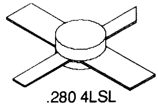
* Common Emitter



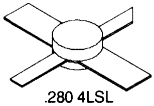
.250 SQ. 2LFL
(M105)



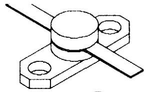
.280 4LSL
(M115)



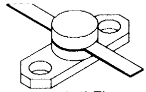
.280 4LSL
(S051)



.280 4LSL
(S053)



.280 4LFL
(S058)

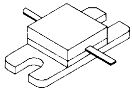


.280 4LFL
(S068)

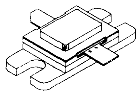
## 1025-1150 MHz CLASS C, COMMON BASE, PULSED, DME/TACAN

| PART NO. | FREQ. (MHz) | $P_{OUT}$ MIN (W) | $P_{IN}$ (W) | GAIN MIN (dB) | $\eta_C$ MIN (%) | $V_{CC}$ (V) | $R_{TH(j-c)}$ MAX (°C/W) | PACKAGE STYLE |
|---|---|---|---|---|---|---|---|---|
| MSC1000M* | 1025-1150 | 0.6 | 0.05 | 9.0 | CL.A | 18 | 35 | S058 |
| MSC1000MP* | 1025-1150 | 0.6 | 0.05 | 9.0 | CL.A | 18 | 35 | S053 |
| MSC1002M | 1025-1150 | 2 | 0.25 | 9.0 | 35 | 35 | 10 | S068 |
| MSC1002MP | 1025-1150 | 2 | 0.25 | 9.0 | 35 | 35 | 10 | S051 |
| SD1526-01 | 1025-1150 | 5 | 0.55 | 9.5 | — | 28 | 8 | M115 |
| SD1526-08 | 1025-1150 | 5 | 0.55 | 9.5 | — | 28 | 8 | M105 |
| SD1528-06 | 1025-1150 | 15 | 1.5 | 10.0 | 30 | 50 | 2 | M115 |
| SD1528-08 | 1025-1150 | 15 | 1.5 | 10.0 | 30 | 50 | 2 | M105 |
| MSC81035M | 1025-1150 | 35 | 3 | 10.6 | 43 | 50 | 1 | S068 |
| MSC81035MP | 1025-1150 | 35 | 3 | 10.6 | 43 | 50 | 1 | S051 |
| SD1530-01 | 1025-1150 | 35 | 5.6 | 8.0 | 30 | 50 | 2 | M115 |
| SD1530-08 | 1025-1150 | 35 | 5.0 | 8.5 | 30 | 50 | 2 | M105 |
| SD1534-01 | 1025-1150 | 75 | 13 | 7.6 | — | 50 | 0.8 | M115 |
| SD1534-08 | 1025-1150 | 75 | 13.5 | 7.4 | — | 50 | 0.8 | M105 |
| SD1536-03 | 1025-1150 | 90 | 13 | 8.4 | — | 50 | 0.6 | M115 |
| SD1536-08 | 1025-1150 | 90 | 13 | 8.4 | — | 50 | 0.6 | M105 |

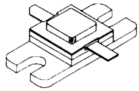
*Common Emitter, Tested CW
Pulse Conditions 10μSec, 1% Duty Cycle unless otherwise specified



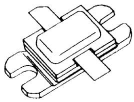
.400 SQ. 2LFL
(M103)



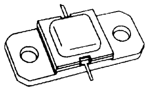
.400 x .500 2LFL
(M112)



.400 SQ. 2LFL
(M138)



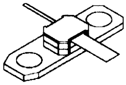
.400 x .500 2LFL
(S038)



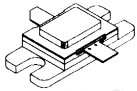
.400 x .400 2NLFL
(S042)

## 1025-1150 MHz CLASS C, COMMON BASE, PULSED, DME/TACAN (CONT'D)

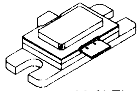
| PART NO. | FREQ. (MHz) | $P_{OUT}$ MIN (W) | $P_{IN}$ (W) | GAIN MIN (dB) | $\eta_C$ MIN (%) | $V_{CC}$ (V) | $R_{TH(j-c)}$ MAX (°C/W) | PACKAGE STYLE |
|---|---|---|---|---|---|---|---|---|
| SD1538-02 | 1025-1150 | 150 | 25 | 7.8 | — | 50 | 0.3 | M103 |
| SD1538-08 | 1025-1150 | 150 | 25 | 7.8 | — | 50 | 0.3 | M138 |
| MSC81150M | 1025-1150 | 150 | 25 | 7.7 | 40 | 50 | 0.3 | S042 |
| MSC81175M | 1025-1150 | 175 | 30 | 7.6 | 40 | 50 | 0.3 | S042 |
| MSC81250M | 1025-1150 | 250 | 60 | 6.2 | 40 | 50 | 0.2 | S042 |
| MSC81325M | 1025-1150 | 325 | 70 | 6.7 | 40 | 50 | 0.17 | S042 |
| SD1540 | 1025-1150 | 300 | 70 | 6.3 | 35 | 50 | 0.2 | M103 |
| SD1540-08 | 1025-1150 | 300 | 70 | 6.3 | 35 | 50 | 0.2 | M138 |
| SD1541-01 | 1025-1150 | 400 | 90 | 6.5 | — | 50 | 0.12 | M112 |
| MSC81400M | 1025-1150 | 400 | 90 | 6.5 | 40 | 50 | 0.12 | S038 |
| SD1542 | 1025-1150 | 550 | 150 | 5.6 | — | 50 | 0.06 | M112 |
| MSC81550M | 1025-1150 | 550 | 150 | 5.6 | 35 | 50 | 0.09 | S038 |
| Pulse Conditions 10µSec, 1% Duty Cycle unless otherwise specified | | | | | | | | |



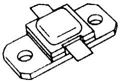
.250 SQ. 2LFL
(M105)



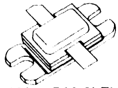
.400 x .500 2LFL
(M112)



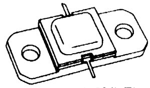
.400 x .600 2LFL
(M198)



.400 x .400 2LFL
(S036)



.400 x .500 2LFL
(S038)



.400 x .400 2NLFL
(S042)

## 1030/1090 MHz CLASS C, COMMON BASE PULSED, IFF APPLICATIONS

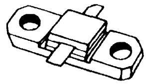
| PART NO. | FREQ. (MHz) | $P_{OUT}$ MIN (W) | $P_{IN}$ (W) | GAIN MIN (dB) | $\eta_C$ MIN (%) | $V_{CC}$ (V) | $R_{TH(j-c)}$ MAX (°C/W) | PACKAGE STYLE |
|---|---|---|---|---|---|---|---|---|
| SD1527-08 | 1090 | 5 | 0.35 | 11.5 | — | 50 | 8.0 | M105 |
| MSC81300M | 1090 | 300 | 70 | 6.3 | 40 | 50 | 0.2 | S042 |
| MSC81350M | 1090 | 350 | 70 | 6.9 | 40 | 50 | 0.17 | S042 |
| MSC81390M | 1090 | 390 | 80 | 6.8 | 35 | 50 | 0.15 | S042 |
| SD1541-09 | 1090 | 450 | 90 | 7.0 | — | 50 | 0.12 | M112 |
| MSC81450M | 1090 | 450 | 90 | 7.0 | 40 | 50 | 0.12 | S038 |
| SD1542-04 | 1090 | 600 | 150 | 6.0 | — | 50 | 0.06 | M112 |
| MSC81600M | 1090 | 600 | 150 | 6.0 | 35 | 50 | 0.09 | S038 |

Pulse Conditions 10μSec, 1% Duty Cycle unless otherwise specified

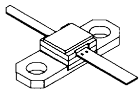
## 1030/1090 MHz CLASS C, COMMON BASE PULSED, SPECIAL APPLICATIONS (MODE-S, TCAS)

| PART NO. | FREQ. (MHz) | $P_{OUT}$ MIN (W) | $P_{IN}$ (W) | GAIN MIN (dB) | $\eta_C$ MIN (%) | $V_{CC}$ (V) | $R_{TH(j-c)}$ MAX (°C/W) | PULSE WIDTH (μSEC) | DUTY CYCLE (%) | PACKAGE STYLE |
|---|---|---|---|---|---|---|---|---|---|---|
| AM1011-055 | 1090 | 55 | 6.6 | 9.2 | 48 | 50 | 1.1 | 32 | 2 | S036 |
| AM1011-075 | 1090 | 75 | 9 | 9.2 | 48 | 50 | 0.86 | 32 | 2 | S036 |
| AM1011-175 | 1090 | 200 | 32 | 8.0 | 45 | 50 | 0.28 | 32 | 2 | S036 |
| AM1011-400 | 1090 | 400 | 63 | 8.0 | 45 | 50 | 0.17 | 32 | 2 | S038 |
| AM1011-500* | 1090 | 500 | 70 | 8.5 | 40 | 50 | 0.11 | 32 | 2 | M198 |
| AM1011-070 | 1090 | 70 | 15 | 6.7 | 45 | 28 | 0.68 | 100 | 2 | S042 |
| AM1011-060 | 1090 | 60 | 6 | 10.0 | 48 | 50 | 1.10 | 100 | 4 | S036 |
| AM1011-350* | 1090 | 350 | 60 | 7.7 | 48 | 50 | 0.23 | 100 | 4 | S038 |
| AM1011-050 | 1030 | 45 | 6 | 8.8 | 48 | 36 | 1.4 | 250 | 6 | S036 |
| AM1011-225 | 1030 | 225 | 40 | 7.5 | 48 | 36 | 0.29 | 250 | 6 | S038 |

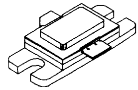
*In development



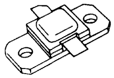
.250 SQ. 2LFL
(M124)



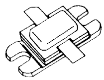
.250 x .250 2LFL
(M171)



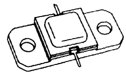
.400 x .600 2LFL
(M198)



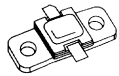
.400 x .400 2LFL
(S036)



.400 x .500 2LFL
(S038)



.400 x .400 2NLFL
(S042)



.310 x .310 2LFL
(S064)

## 960-1215 MHz CLASS C, COMMON BASE, PULSED, TACAN APPLICATIONS

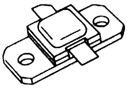
| PART NO. | FREQ. (MHz) | $P_{OUT}$ MIN (W) | $P_{IN}$ (W) | GAIN MIN (dB) | $\eta_C$ MIN (%) | $V_{CC}$ (V) | $R_{TH(j-c)}$ MAX (°C/W) | PULSE WIDTH (µSEC) | DUTY CYCLE (%) | PACKAGE STYLE |
|---|---|---|---|---|---|---|---|---|---|---|
| SD1550 | 960-1215 | 15 | 1.5 | 10.0 | 40 | 40 | 3.3 | 20 | 10 | M171 |
| AM0912-080 | 960-1215 | 90 | 13 | 8.4 | 38 | 50 | 0.80 | 10 | 10 | S042 |
| SD8250 | 960-1215 | 250 | 40 | 8.0 | 38 | 50 | 0.28 | 20 | 5 | S036 |
| AM0912-300 | 960-1215 | 300 | 60 | 7.0 | 38 | 50 | 0.16 | 10 | 10 | S038 |
| AM0912-350* | 960-1215 | 350 | 70 | 7.0 | 38 | 50 | 0.15 | 10 | 10 | M198 |

*In development

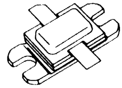
## 960-1215 MHz CLASS C, COMMON BASE, PULSED, JTIDS/MIDS/TACAN APPLICATIONS

| PART NO. | FREQ. (MHz) | $P_{OUT}$ MIN. (W) | $P_{IN}$ (W) | GAIN MIN (dB) | $\eta_C$ MIN (%) | $V_{CC}$ (V) | $R_{TH(j-c)}$ MAX (°C/W) | PACKAGE STYLE |
|---|---|---|---|---|---|---|---|---|
| SD1512* | 960-1215 | 5 | 1.0 | 7.0 | — | 30 | 3.3 | M124 |
| AM80912-005 | 960-1215 | 6 | 0.7 | 9.3 | 45 | 28 | 7.0 | S064 |
| AM80912-015 | 960-1215 | 15 | 2.3 | 8.1 | 45 | 28 | 3.0 | S064 |
| AM80912-030 | 960-1215 | 30 | 5.0 | 7.8 | 40 | 35 | 2.2 | S036 |
| AM0912-050 | 960-1215 | 50 | 8.9 | 7.5 | 40 | 35 | 1.5 | S042 |
| AM80912-085 | 960-1215 | 85 | 15 | 7.5 | 40 | 35 | 0.75 | S042 |
| AM0912-150 | 960-1215 | 150 | 26.7 | 7.5 | 45 | 35 | 0.57 | S038 |

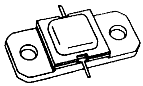
Note: Devices are characterized and tested under JTIDS pulse burst conditions.
* 400µSec, 20%



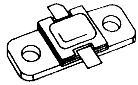
.400 x .400 2LFL
(S036)



.400 x .500 2LFL
(S038)



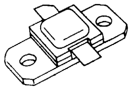
.400 x .400 2NLFL
(S042)



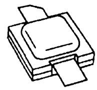
.310 x .310 2LFL
(S064)

## 850-1550 MHz CLASS C, PULSED, L-BAND RADAR APPLICATIONS

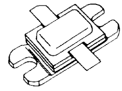
| PART NO. | FREQ. (MHz) | $P_{OUT}$ MIN (W) | $P_{IN}$ (W) | GAIN MIN (dB) | $\eta_C$ MIN (%) | $V_{CC}$ (V) | $R_{TH(j-c)}$ MAX (°C/W) | PULSE WIDTH (μSEC) | DUTY CYCLE (%) | PACKAGE STYLE |
|---|---|---|---|---|---|---|---|---|---|---|
| AM80814-005 | 850-1400 | 5.0 | 0.7 | 8.5 | 40 | 28 | 6.5 | 120 | 4 | S064 |
| AM80814-025 | 850-1400 | 25 | 5.0 | 7.0 | 38 | 35 | 2.3 | 120 | 4 | S036 |
| AM1214-300 | 1235-1365 | 270 | 63 | 6.3 | 40 | 50 | 0.24 | 50 | 4 | S038 |
| AM81214-006 | 1215-1400 | 5.5 | 0.7 | 9.0 | 47 | 28 | 9.0 | 1000 | 10 | S064 |
| AM81214-015 | 1215-1400 | 14.5 | 2.0 | 8.6 | 48 | 28 | 4.0 | 1000 | 10 | S064 |
| AM81214-030 | 1215-1400 | 26 | 5.0 | 7.2 | 45 | 28 | 2.4 | 1000 | 10 | S064 |
| AM81214-060 | 1215-1400 | 55 | 12 | 6.6 | 50 | 28 | 1.4 | 1000 | 10 | S042 |
| AM1214-100 | 1215-1400 | 100 | 25 | 6.0 | 50 | 28 | 0.55 | 100 | 10 | S038 |
| AM1214-175 | 1215-1400 | 160 | 30 | 7.3 | 45 | 40 | 0.45 | 150 | 5 | S038 |
| AM1214-200 | 1215-1400 | 200 | 40 | 7.0 | 45 | 40 | 0.23 | 150 | 5 | M205 |
| AM1214-325 | 1215-1400 | 325 | 75 | 6.4 | 38 | 50 | 0.10 | 13 | 2 | S038 |
| AM1416-100 | 1400-1550 | 90 | 15 | 7.8 | 40 | 45 | 0.25 | 10 | 10 | S042 |
| AM1416-200 | 1400-1550 | 180 | 40 | 6.5 | 40 | 50 | 0.11 | 10 | 10 | S042 |



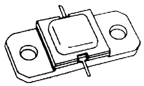
.400 x .400 2LFL
(S036)



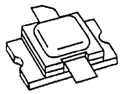
.400 x .400 2L
(S037)



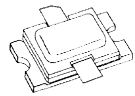
.400 x .500 2LFL
(S038)



.400 x .400 2NLFL
(S042)



.400 x .400 2L SFL
(S136)

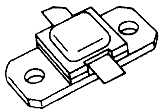


.400 x .500 2NL SFL
(S138)

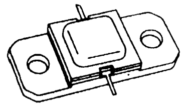
## 2300-3500 MHz CLASS C, COMMON BASE, PULSED, S-BAND RADAR

| PART NO. | FREQ. (MHz) | $P_{OUT}$ MIN (W) | $P_{IN}$ (W) | GAIN MIN (dB) | $\eta_C$ MIN (%) | $V_{CC}$ (V) | $R_{TH(j-c)}$ MAX (°C/W) | PULSE WIDTH (μSEC) | DUTY CYCLE (%) | PACKAGE STYLE |
|---|---|---|---|---|---|---|---|---|---|---|
| AM82325-040 | 2300-2500 | **40** | 10 | 6.0 | 40 | 35 | 0.90 | 10 | 20 | S036 |
| AM82729-030 | 2700-2900 | **28** | 6.3 | 6.5 | 30 | 40 | 1.4 | 50 | 10 | S036 |
| AM82729-060 | 2700-2900 | **60** | 13 | 6.6 | 35 | 40 | 0.50 | 50 | 10 | S036 |
| AM2729-110 | 2700-2900 | **105** | 23.5 | 6.5 | 33 | 40 | 0.4 | 50 | 10 | S138 |
| AM2729-125* | 2700-2900 | **125** | 25 | 7.0 | 35 | 40 | 0.35 | 50 | 10 | S038 |
| AM82731-001 | 2700-3100 | **1.0** | 0.30 | 5.2 | 27 | 30 | 13.0 | 100 | 10 | S042 |
| AM82731-003 | 2700-3100 | **3.0** | 0.80 | 5.7 | 27 | 30 | 6.5 | 100 | 10 | S042 |
| AM82731-006 | 2700-3100 | **5.5** | 1.5 | 5.6 | 27 | 30 | 3.75 | 100 | 10 | S042 |
| AM82731-012 | 2700-3100 | **12** | 3.0 | 6.0 | 30 | 40 | 4.0 | 100 | 10 | S036 |
| AM82731-025 | 2700-3100 | **25** | 6.0 | 6.2 | 30 | 40 | 2.0 | 100 | 10 | S036 |
| AM82731-050 | 2700-3100 | **50** | 12.5 | 6.0 | 30 | 40 | 0.75 | 100 | 10 | S036 |
| AM82731-075* | 2700-3100 | **75** | 15 | 7.0 | 35 | 40 | 0.6 | 100 | 10 | S038 |
| AM82931-055 | 2900-3100 | **55** | 13.5 | 6.1 | 32 | 42 | 0.50 | 50 | 10 | S036 |
| AM82931-55S | 2900-3100 | **55** | 13.5 | 6.1 | 32 | 42 | 0.50 | 50 | 10 | S136 |
| AM82931-55N | 2900-3100 | **55** | 13.5 | 6.1 | 32 | 42 | 0.50 | 50 | 10 | S037 |
| AM2931-110 | 2900-3100 | **105** | 25 | 6.2 | 32 | 42 | 0.40 | 50 | 10 | S138 |
| AM2931-125* | 2900-3100 | **125** | 25 | 7.0 | 35 | 42 | 0.35 | 50 | 10 | S038 |

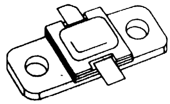
*In development



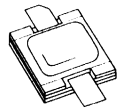
.400 x .400 2LFL
(S036)



.400 x .400 2NLFL
(S042)



.310 x .310 2LFL
(S064)

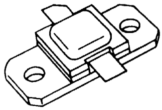


.310 x .310 2L
(S065)

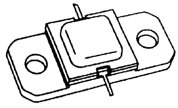
## 2300-3500 MHz CLASS C, COMMON BASE, PULSED, S-BAND RADAR

| PART NO. | FREQ. (MHz) | $P_{OUT}$ MIN (W) | $P_{IN}$ (W) | GAIN MIN (dB) | $\eta_C$ MIN (%) | $V_{CC}$ (V) | $R_{TH(j-c)}$ MAX (°C/W) | PULSE WIDTH (µSEC) | DUTY CYCLE (%) | PACKAGE STYLE |
|---|---|---|---|---|---|---|---|---|---|---|
| AM83135-001 | 3100-3500 | 1.0 | 0.30 | 5.2 | 27 | 30 | 13.0 | 100 | 10 | S042 |
| AM83135-003 | 3100-3500 | 3.0 | 0.80 | 5.7 | 27 | 30 | 6.5 | 100 | 10 | S042 |
| AM83135-005 | 3100-3500 | 5.0 | 1.5 | 5.2 | 27 | 30 | 3.75 | 100 | 10 | S042 |
| AM83135-010 | 3100-3500 | 10 | 3.2 | 5.0 | 30 | 40 | 4.0 | 100 | 10 | S064 |
| AM83135-015 | 3100-3500 | 15 | 4.5 | 5.2 | 30 | 40 | 2.8 | 100 | 10 | S064 |
| AM83135-030 | 3100-3500 | 30 | 8.5 | 5.5 | 30 | 40 | 1.5 | 100 | 10 | S064 |
| AM83135-040 | 3100-3500 | 40 | 12.5 | 5.1 | 30 | 40 | 1.2 | 100 | 10 | S064 |
| AM83135-050 | 3100-3500 | 50 | 15 | 5.2 | 30 | 42 | 0.40 | 10 | 10 | S064 |
| AM3135-007* | 3100-3500 | 6.5 | 1.63 | 6.0 | 30 | 30 | 5.8 | 500 | 10 | S064 |
| AM3135-014 | 3100-3500 | 13.5 | 3.4 | 6.0 | 32 | 30 | 3.5 | 500 | 10 | S064 |
| AM3135-025 | 3100-3500 | 25 | 6.25 | 6.0 | 35 | 30 | 2.0 | 500 | 10 | S064 |
| AM3135-25N | 3100-3500 | 25 | 6.25 | 6.0 | 35 | 30 | 2.0 | 500 | 10 | S065 |
| AM3135-035 | 3100-3500 | 35 | 8.8 | 6.0 | 35 | 30 | 1.5 | 500 | 10 | S064 |
| AM3135-045* | 3100-3500 | 45 | 11.3 | 6.0 | 35 | 30 | 1.2 | 500 | 10 | S036 |

*In development



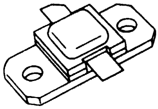
.400 x .400 2LFL
(S036)



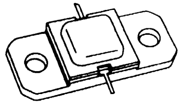
.400 x .400 2NLFL
(S042)

## 1400-2700 MHz CLASS C, COMMON BASE, BROADBAND

| PART NO. | FREQ. (MHz) | $P_{OUT}$ MIN. (W) | $P_{IN}$ (W) | GAIN MIN (dB) | $\eta_C$ MIN (%) | $V_{CC}$ (V) | $R_{TH(j-c)}$ MAX (°C/W) | PACKAGE STYLE |
|---|---|---|---|---|---|---|---|---|
| AM1416-001 | 1400-1600 | 1.5 | 0.20 | 8.8 | 45 | 24 | 22 | S042 |
| AM1416-003 | 1400-1600 | 3.2 | 0.50 | 8.1 | 45 | 24 | 15 | S042 |
| AM81416-006 | 1400-1600 | 5.0 | 1.0 | 7.0 | 45 | 20 | 9.0 | S042 |
| AM81416-012 | 1400-1600 | 11.2 | 2.0 | 7.5 | 47 | 20 | 5.5 | S036 |
| AM81416-020 | 1400-1600 | 17.6 | 4.0 | 6.4 | 45 | 20 | 3.0 | S036 |
| AM1418-001 | 1400-1800 | 1.5 | 0.20 | 8.8 | 45 | 24 | 22 | S042 |
| AM1418-003 | 1400-1800 | 3.0 | 0.50 | 7.8 | 45 | 24 | 15 | S042 |
| AM1618-001 | 1600-1800 | 1.5 | 0.20 | 8.8 | 45 | 24 | 22 | S042 |
| AM1618-003 | 1600-1800 | 3.2 | 0.50 | 8.1 | 45 | 24 | 15 | S042 |
| AM81618-005 | 1600-1800 | 4.6 | 1.0 | 6.6 | 47 | 20 | 9.0 | S042 |
| AM81618-009 | 1600-1800 | 9.0 | 1.0 | 9.5 | 45 | 24 | 9.0 | S042 |
| AM81618-010 | 1600-1800 | 9.5 | 2.0 | 6.8 | 47 | 20 | 5.5 | S036 |
| AM81618-016 | 1600-1800 | 16 | 3.0 | 7.3 | 45 | 24 | 3.5 | S036 |
| AM81618-020 | 1600-1800 | 16 | 4.0 | 6.0 | 45 | 20 | 3.0 | S036 |
| AM1720-001 | 1700-2000 | 1.25 | 0.25 | 7.0 | 45 | 24 | 22 | S042 |
| AM1720-003 | 1700-2000 | 3.0 | 0.50 | 7.8 | 45 | 24 | 15 | S042 |
| AM1720-006 | 1700-2000 | 6.0 | 1.0 | 7.8 | 45 | 24 | 9.5 | S042 |
| AM81720-012 | 1700-2000 | 12 | 2.2 | 7.4 | 40 | 24 | 5.5 | S036 |
| AM81720-020 | 1700-2000 | 20 | 4.5 | 6.5 | 42 | 24 | 3.0 | S036 |
| AM1821-001 | 1800-2100 | 1.25 | 0.25 | 7.0 | 45 | 24 | 22 | S042 |
| AM1821-003 | 1800-2100 | 3.0 | 0.50 | 7.8 | 45 | 24 | 15 | S042 |
| AM1821-006 | 1800-2100 | 6.0 | 1.0 | 7.8 | 45 | 24 | 9.5 | S042 |
| AM81821-010 | 1800-2100 | 10.0 | 2.2 | 6.6 | 40 | 24 | 5.5 | S036 |
| AM81821-018 | 1800-2100 | 18.0 | 4.5 | 6.0 | 40 | 24 | 3.0 | S036 |



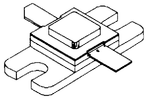
.400 x .400 2LFL
(S036)



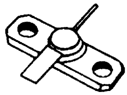
.400 x .400 2NLFL
(S042)

## 1400-2700 MHz CLASS C, COMMON BASE, BROADBAND (CONT'D)

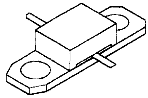
| PART NO. | FREQ. (MHz) | $P_{OUT}$ MIN. (W) | $P_{IN}$ (W) | GAIN MIN (dB) | $\eta_C$ MIN (%) | $V_{CC}$ (V) | $R_{TH(j-c)}$ MAX (°C/W) | PACKAGE STYLE |
|---|---|---|---|---|---|---|---|---|
| AM1922-001 | 1900-2200 | 1.25 | 0.25 | 7.0 | 40 | 24 | 22 | S042 |
| AM1922-003 | 1900-2200 | 3.0 | 0.50 | 7.8 | 40 | 24 | 15 | S042 |
| AM1922-006 | 1900-2200 | 6.0 | 1.0 | 7.8 | 40 | 24 | 9.5 | S042 |
| AM81922-010 | 1900-2200 | 10.0 | 2.2 | 6.6 | 40 | 24 | 5.5 | S036 |
| AM81922-018 | 1900-2200 | 18.0 | 4.5 | 6.0 | 40 | 24 | 3.0 | S036 |
| AM2023-001 | 2000-2300 | 1.25 | 0.25 | 7.0 | 45 | 24 | 22 | S042 |
| AM2023-003 | 2000-2300 | 3.0 | 0.50 | 7.8 | 50 | 24 | 15 | S042 |
| AM2023-006 | 2000-2300 | 6.0 | 1.0 | 7.8 | 45 | 24 | 9.5 | S042 |
| AM82023-010 | 2000-2300 | 10.0 | 2.2 | 6.6 | 40 | 24 | 5.5 | S036 |
| AM82023-016 | 2000-2300 | 16.0 | 4.0 | 6.0 | 40 | 24 | 3.0 | S036 |
| AM2327-001 | 2300-2700 | 1.0 | 0.25 | 6.0 | 35 | 24 | 24 | S042 |
| AM2327-003 | 2300-2700 | 2.6 | 0.50 | 7.2 | 40 | 24 | 15 | S042 |
| AM82327-004 | 2300-2700 | 4.0 | 1.0 | 6.0 | 30 | 24 | 11 | S042 |
| AM2327-005 | 2300-2700 | 5.0 | 1.0 | 7.0 | 35 | 24 | 9.0 | S042 |
| AM82327-006 | 2300-2700 | 6.0 | 1.75 | 5.4 | 30 | 24 | 9.0 | S042 |
| AM82327-010 | 2300-2700 | 9.0 | 2.75 | 5.2 | 30 | 24 | 5.5 | S036 |
| AM82327-015 | 2300-2700 | 15.0 | 6.0 | 4.0 | 30 | 24 | 3.0 | S036 |



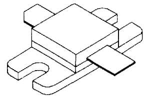
.397 x .397 2LFL
(M147)



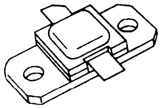
.230 2LFL
(M151)



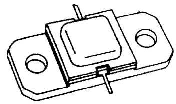
.250 SQ. 2LFL
(M170)



.400 SQ. 2LFL
(M186)



.400 x .400 2LFL
(S036)



.400 x .400 2NLFL
(S042)

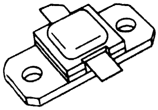
## 1500-1700 MHz CLASS C, COMMON BASE, SATCOM APPLICATIONS

| PART NO. | FREQ. (GHz) | $P_{OUT}$ MIN. (W) | $P_{IN}$ (W) | GAIN MIN (dB) | $\eta_C$ MIN (%) | $V_{CC}$ (V) | $R_{TH(j-c)}$ MAX (°C/W) | PACKAGE STYLE |
|---|---|---|---|---|---|---|---|---|
| SD1891-03 | 1.6-1.7* | 5 | 0.20 | 14.0 | 45 | 28 | 12 | M151 |
| SD1893-03 | 1.6-1.7* | 10 | 0.80 | 11.0 | 40 | 28 | 5.5 | M151 |
| SD1897 | 1.6-1.7* | 10 | 0.80 | 11.0 | 48 | 28 | 6.0 | M170 |
| SD1895-03 | 1.6-1.7* | 20 | 2.4 | 9.2 | 48 | 28 | 4.0 | M170 |
| SD1888-03 | 1.6-1.7* | 24 | 3.0 | 9.0 | 50 | 28 | 3.5 | M170 |
| SD1868 | 1.6-1.7* | 30 | 4.0 | 8.8 | 40 | 28 | 3.0 | M147 |
| AM1517-012 | 1.5-1.7(1) | 12 | 1.7 | 8.5 | 55 | 28 | 5.5 | S042 |
| AM1517-025 | 1.5-1.7(1) | 25 | 3.5 | 8.5 | 55 | 28 | 3.3 | S042 |
| SD1898 | 1.6-1.7* | 32 | 4.0 | 9.0 | 40 | 28 | 2.0 | M186 |
| AM1517-035 | 1.5-1.7(1) | 35 | 7.0 | 7.0 | 48 | 28 | 2.6 | S036 |
| AM1616-050 | 1.62 | 50 | 10.0 | 7.0 | 45 | 26 | 1.8 | S036 |
| *Test frequency-1.65GHz | | | | | | | | |

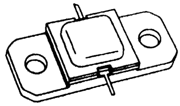
| AM1517 series band segment code(2) | |
|---|---|
| A | 1500-1550MHz |
| M | 1620-1660MHZ |
| S | 1625-1675MHz |

1) AM1517 series vary $P_{IN}$ to achieve $P_{OUT}$; performance guaranteed in 50MHz increments

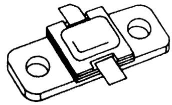
2) Alpha-Suffix added to AM1517 P/N designates band segment .



.400 x .400 2LFL
(S036)



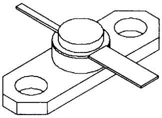
.400 x .400 2NLFL
(S042)



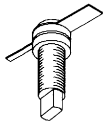
.310 x .310 2LFL
(S064)

## 1700-2400 MHz CLASS C, COMMON BASE, TELEMETRY/DATA LINK

| PART NO. | FREQ. (GHz) | $P_{OUT}$ MIN. (W) | $P_{IN}$ (W) | GAIN MIN (dB) | $\eta_C$ MIN (%) | $V_{CC}$ (V) | $R_{TH(j-c)}$ MAX (°C/W) | PACKAGE STYLE |
|---|---|---|---|---|---|---|---|---|
| AM81719-030 | 1.75-1.85 | 28 | 6.0 | 6.7 | 40 | 28 | 2.6 | S036 |
| AM81719-040 | 1.75-1.85 | 40 | 8.0 | 7.0 | 45 | 28 | 2.2 | S036 |
| AM82022-020 | 2.0-2.15 | 20 | 4.0 | 7.0 | 40 | 22 | 2.5 | S036 |
| AM82223-004 | 2.2-2.3 | 4.0 | 0.70 | 7.6 | 45 | 21 | 11 | S042 |
| AM82223-010 | 2.2-2.3 | 9.0 | 2.0 | 6.5 | 40 | 24 | 4.4 | S042 |
| AM82223-012 | 2.2-2.3 | 11 | 2.2 | 7.0 | 40 | 24 | 5.5 | S036 |
| AM82223-014 | 2.2-2.3 | 12 | 2.1 | 7.6 | 45 | 22 | 3.9 | S064 |
| AM82223-018 | 2.2-2.3 | 18 | 4.0 | 6.5 | 40 | 24 | 3.0 | S036 |
| AM82223-020 | 2.2-2.3 | 20 | 4.0 | 7.0 | 40 | 22 | 2.7 | S064 |
| AM82324-020 | 2.3-2.4 | 20 | 5.0 | 6.0 | 40 | 22 | 2.5 | S036 |



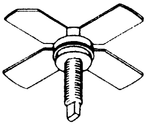
.250 2LFL
(S010)



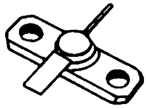
.230 2L STUD
(S016)

## 1000-4000 MHz CLASS C, COMMON BASE, GENERAL PURPOSE

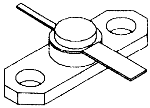
| PART NO. | FREQ. (GHz) | POUT MIN. (W) | PIN (W) | GAIN MIN (dB) | ηC MIN (%) | VCC (V) | COB MAX (pF) | RTH(j-c) MAX (°C/W) | PACKAGE STYLE |
|---|---|---|---|---|---|---|---|---|---|
| MSC81002 | 1.0 | 2.0 | 0.20 | 10.0 | 50 | 28 | 3.2 | 20 | S016 |
| MSC81118 | 1.0 | 2.0 | 0.20 | 10.0 | 50 | 28 | 3.2 | 20 | S010 |
| MSC81005 | 1.0 | 5.0 | 0.5 | 10.0 | 50 | 28 | 6.5 | 8.0 | S016 |
| MSC81111 | 1.0 | 5.0 | 0.5 | 10.0 | 50 | 28 | 6.5 | 8.0 | S010 |
| MSC81010 | 1.0 | 10 | 1.0 | 10.0 | 60 | 28 | 10 | 6.0 | S016 |
| MSC81058 | 1.0 | 10 | 1.0 | 10.0 | 60 | 28 | 10 | 6.0 | S010 |
| MSC81020 | 1.0 | 20 | 2.0 | 10.0 | 55 | 28 | 19 | 5.0 | S010 |
| MSC81402 | 1.4 | 2.0 | 0.2 | 10.0 | 50 | 28 | 3.2 | 25 | S010 |
| MSC81406 | 1.4 | 6.0 | 0.65 | 9.7 | 45 | 28 | 6.0 | 10 | S010 |
| MSC81410 | 1.4 | 10 | 1.4 | 8.5 | 45 | 28 | 9.5 | 6.0 | S010 |
| MSC82001 | 2.0 | 1.0 | 0.20 | 7.0 | 35 | 28 | 3.2 | 20 | S010 |
| MSC82003 | 2.0 | 3.0 | 0.50 | 7.8 | 35 | 28 | 9.5 | 8.0 | S010 |
| MSC82005 | 2.0 | 5.0 | 1.0 | 7.0 | 35 | 28 | 3.2 | 6.0 | S010 |
| MSC82010 | 2.0 | 10 | 3.16 | 5.0 | 35 | 28 | 6.5 | 5.0 | S010 |
| MSC82302 | 2.3 | 1.8 | 0.18 | 10.0 | 40 | 22 | 3.5 | 25 | S010 |
| MSC82304 | 2.3 | 3.8 | 0.38 | 10.0 | 40 | 22 | 5.0 | 13 | S010 |
| MSC82306 | 2.3 | 5.5 | 0.6 | 9.6 | 40 | 22 | 7.0 | 9.0 | S010 |
| MSC82307 | 2.3 | 7.0 | 0.76 | 9.6 | 40 | 22 | 8.5 | 7.0 | S010 |
| MSC3000 | 3.0 | 0.5 | 0.10 | 7.0 | 25 | 28 | 2.5 | 45 | S010 |
| MSC83301 | 3.0 | 1.0 | 0.20 | 7.0 | 33 | 28 | 3.5 | 25 | S010 |
| MSC83303 | 3.0 | 2.5 | 0.79 | 5.0 | 30 | 28 | 5.0 | 15 | S010 |
| MSC83305 | 3.0 | 4.5 | 1.59 | 4.5 | 30 | 28 | 7.5 | 8.5 | S010 |
| MSC4000 | 4.0 | 0.5 | 0.16 | 5.0 | 25 | 28 | 2.5 | 45 | S010 |
| MSC4001 | 4.0 | 1.0 | 0.32 | 5.0 | 25 | 28 | 3.6 | 25 | S010 |
| MSC4003 | 4.0 | 2.5 | 0.79 | 5.0 | 25 | 28 | 5.0 | 12.5 | S010 |



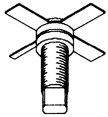
.280 4L STUD
(M122)



.230 2LFL
(M151)



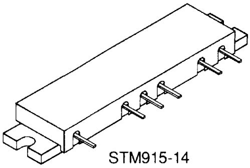
.250 2LFL
(S011)

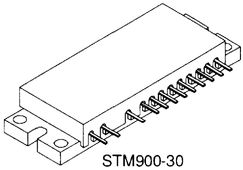


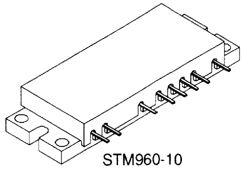
.230 4L STUD
(S027)

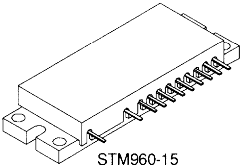
## 1000-4000 MHz CLASS A LINEAR, COMMON EMITTER

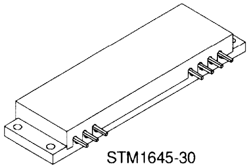
| PART NO. | FREQ. (GHz) | $P_{OUT}$ MIN. (dBm) | GAIN MIN (dB) | BIAS $V_{CE}$ (V) | BIAS $I_C$ (mA) | $R_{TH(j-c)}$ MAX (°C/W) | $C_{OB}$ MAX (pF) | PACKAGE STYLE |
|---|---|---|---|---|---|---|---|---|
| MSC82100 | 1.0 | 27 | 10.5 | 18 | 100 | 20 | 3.2 | S011 |
| MSC82040 | 1.0 | 27 | 10.5 | 18 | 100 | 20 | 3.2 | S027 |
| SD5000 | 1.0 | 31.8 | 9.5 | 20 | 220 | 25 | 4.0 | M122 |
| SD1851 | 2.0 | 29 | 8.0 | 20 | 120 | 30 | — | M151 |
| SD1853 | 2.0 | 31.8 | 7.0 | 20 | 220 | 15 | — | M151 |
| MSC80064 | 2.0 | 20.5 | 9.0 | 18 | 50 | 45 | 2.5 | S011 |
| MSC80195 | 2.0 | 28 | 7.5 | 18 | 140 | 35 | 3.0 | S011 |
| MSC80185 | 2.0 | 28 | 7.5 | 18 | 140 | 35 | 3.0 | S027 |
| MSC80196 | 2.0 | 30 | 7.0 | 18 | 220 | 17 | 5.0 | S011 |
| MSC80186 | 2.0 | 30 | 7.0 | 18 | 220 | 17 | 5.0 | S027 |
| MSC80197 | 2.0 | 31.7 | 6.0 | 18 | 360 | 8.5 | 7.0 | S011 |
| SD1855 | 2.0 | 34 | 6.0 | 20 | 440 | 8.5 | — | M151 |
| SD1850 | 2.3 | 23 | 11.0 | 15 | 80 | 45 | — | M151 |
| MSC80264 | 4.0 | 20 | 6.0 | 12 | 60 | 45 | 2.5 | S011 |


STM915-14


STM900-30


STM960-10


STM960-15


STM1645-30

# HYBRID POWER MODULES

## 800-960 MHz CLASS AB HYBRID POWER MODULES, DIGITAL CELLULAR & GENERAL PURPOSE UHF APPLICATIONS

| PART NO. | FREQ. (MHz) | $P_{OUT}$ MIN. (W) | GAIN MIN (dB) | $\eta_C$ MIN (%) | $V_{CC}$ (V) | PACKAGE DIMENSIONS (INCHES/MILLIMETERS) |
|---|---|---|---|---|---|---|
| STM915-14 | 890-915 | 14 | 41.5 | 35 | 12.5 | .550 x 2.39/14.0 x 60.5 (flange) |
| STM900-30 | 860-900 | 30 | 36 | 25 | 26 | .925 x 2.60/23.5 x 66.0 (flange) |
| STM960-10 | 915-960 | 10 | 26 | 30 | 26 | .925 x 2.60/23.5 x 66.0 (flange) |
| STM960-15 | 915-960 | 15 | 22 | 31 | 26 | .925 x 2.60/23.5 x 66.0 (flange) |

## 1.6 GHz CLASS C HYBRID POWER MODULES, SATCOM APPLICATIONS

| PART NO. | FREQ. (MHz) | $P_{OUT}$ MIN. (W) | GAIN MIN (dB) | $\eta_C$ MIN (%) | $V_{CC}$ (V) | PACKAGE DIMENSIONS (INCHES/MILLIMETERS) |
|---|---|---|---|---|---|---|
| STM1645-10 | 1625-1665 | 10 | 30 | 40 | 28 | — |
| STM1645-30 | 1625-1665 | 30 | 35 | 40 | 28 | 1.0 x 3.78/25.6 x 96.0 (flange) |

| INDUSTRY PART NUMBER | SGS-THOMSON NEAREST EQUIVALENT | SGS-THOMSON ALTERNATE REPLACEMENT | PAGE NUMBER |
|---|---|---|---|
| 2N3375 | SD1050 | | 729 |
| 2N3733 | SD1075 | | 741 |
| 2N4440 | SD1060 | | 733 |
| 2N5944 | SD1144 | | 771 |
| 2N5946 | SD1146 | | 775 |
| 2N6080 | SD1012 | | 683 |
| 2N6081 | SD1014-02 | | 707 |
| 2N6084 | SD1018 | | 715 |
| 2N6166 | SD1477 | | 993 |
| 2N6439 | SD1462 | | 961 |
| 10A015 | SD5000 | | 1367 |
| AM0405-30 | AM0405-030 | | 47 |
| AM0405-100 | AM0405-100 | | 51 |
| AM0608-20 | AM0608-020 | | 55 |
| AM0608-70 | AM0608-070 | | 59 |
| AM0608-200 | AM0608-200 | | 63 |
| AM0608-450 | AM0608-450 | | 65 |
| AM0710-300 | AM0710-300 | | 69 |
| AM0912-50 | AM0912-050 | | 26 |
| AM0912-75 | AM80912-085 | | 277 |
| AM0912-80 | AM0912-080 | | 73 |
| AM0912-120 | SD1538-08 | | 1123 |
| AM0912-200 | SD8250 | | 1371 |
| AM0912-300 | AM0912-300 | | 83 |
| AM0912-350 | AM0912-350 | | 89 |
| AM1011-50 | AM1011-050 | | 93 |
| AM1011-55 | AM1011-055 | | 95 |
| AM1011-60 | AM1011-060 | | 97 |
| AM1011-70 | AM1011-070 | | 101 |
| AM1011-75 | AM1011-075 | | 105 |
| AM1011-175 | AM1011-175 | | 109 |
| AM1011-225 | AM1011-225 | | 111 |
| AM1011-350 | AM1011-350 | | 115 |
| AM1011-400 | AM1011-400 | | 119 |
| AM1011-500 | AM1011-500 | | 125 |
| AM1214-100 | AM1214-100 | | 129 |
| AM1214-200 | AM1214-200 | | 137 |
| AM1214-300 | AM1214-300 | | 141 |
| AM1214-325 | AM1214-325 | | 147 |
| AM1416-3 | AM1416-001 | | 151 |
| AM1416-3 | AM1416-003 | | 155 |
| AM1416-100 | AM1416-100 | | 159 |
| AM1416-200 | AM1416-200 | | 163 |
| AM1418-1 | AM1418-001 | | 30 |
| AM1418-3 | AM1418-003 | | 30 |
| AM1517-12 | AM1517-012 | | 167 |
| AM1517-25 | AM1517-025 | | 173 |
| AM1517-35 | AM1517-035 | | 179 |
| AM1616-50 | AM1616-050 | | 185 |
| AM1618-1 | AM1618-001 | | 30 |
| AM1618-3 | AM1618-003 | | 30 |
| AM1720-1 | AM1720-001 | | 30 |
| AM1720-3 | AM1720-003 | | 30 |

| INDUSTRY PART NUMBER | SGS-THOMSON NEAREST EQUIVALENT | SGS-THOMSON ALTERNATE REPLACEMENT | PAGE NUMBER |
|---|---|---|---|
| AM1720-6 | AM1720-006 | | 30 |
| AM1821-1 | AM1821-001 | | 30 |
| AM1821-3 | AM1821-003 | | 30 |
| AM1821-6 | AM1821-006 | | 30 |
| AM1922-1 | AM1922-001 | | 31 |
| AM1922-3 | AM1922-003 | | 31 |
| AM1922-6 | AM1922-006 | | 31 |
| AM2023-1 | AM2023-001 | | 189 |
| AM2023-3 | AM2023-003 | | 193 |
| AM2023-6 | AM2023-006 | | 197 |
| AM2327-1 | AM2327-001 | | 201 |
| AM2327-3 | AM2327-003 | | 205 |
| AM2327-5 | AM2327-005 | | 209 |
| AM2729-110 | AM2729-110 | | 213 |
| AM2729-125 | AM2729-125 | | 217 |
| AM2931-110 | AM2931-110 | | 219 |
| AM2931-125 | AM2931-125 | | 223 |
| AM3135-7 | AM3135-007 | | 225 |
| AM3135-14 | AM3135-014 | | 227 |
| AM3135-25 | AM3135-025 | | 229 |
| AM3135-35 | AM3135-035 | | 233 |
| AM3135-45 | AM3135-045 | | 235 |
| AM80610-18 | AM80610-018 | | 241 |
| AM80610-30 | AM80610-030 | | 245 |
| AM0610-50 | AM80610-050 | | 249 |
| AM80814-5 | AM80814-005 | | 253 |
| AM80814-25 | AM80814-025 | | 259 |
| AM80912-5 | AM80912-005 | | 261 |
| AM80912-15 | AM80912-015 | | 265 |
| AM80912-30 | AM80912-030 | | 271 |
| AM80912-85 | AM80912-085 | | 277 |
| AM81214-6 | AM81214-006 | | 281 |
| AM81214-15 | AM81214-015 | | 285 |
| AM81214-30 | AM81214-030 | | 289 |
| AM81214-60 | AM81214-060 | | 295 |
| AM81416-6 | AM81416-006 | | 301 |
| AM81416-12 | AM81416-012 | | 305 |
| AM81416-20 | AM81416-020 | | 309 |
| AM81618-5 | AM81618-005 | | 30 |
| AM81618-9 | AM81618-009 | | 30 |
| AM81618-10 | AM81618-010 | | 30 |
| AM81618-16 | AM81618-016 | | 30 |
| AM81618-20 | AM81618-020 | | 30 |
| AM81719-30 | AM81719-030 | | 313 |
| AM81719-40 | AM81719-040 | | 317 |
| AM81720-12 | AM81720-012 | | 319 |
| AM81720-20 | AM81720-020 | | 323 |
| AM81821-10 | AM81821-010 | | 30 |
| AM81821-18 | AM81821-018 | | 30 |
| AM81922-10 | AM81922-010 | | 31 |
| AM81922-18 | AM81922-018 | | 327 |
| AM82022-20 | AM82022-020 | | 331 |
| AM82023-10 | AM82023-010 | | 333 |

| INDUSTRY PART NUMBER | SGS-THOMSON NEAREST EQUIVALENT | SGS-THOMSON ALTERNATE REPLACEMENT | PAGE NUMBER |
|---|---|---|---|
| AM82023-16 | AM82023-016 | | 337 |
| AM82223-4 | AM82223-004 | | 341 |
| AM82223-10 | AM82223-010 | | 345 |
| AM82223-12 | AM82223-012 | | 347 |
| AM82223-14 | AM82223-014 | | 351 |
| AM82223-18 | AM82223-018 | | 353 |
| AM82223-20 | AM82223-020 | | 357 |
| AM82324-20 | AM82324-020 | | 359 |
| AM82325-40 | AM82325-040 | | 361 |
| AM82327-4 | AM82327-004 | | 365 |
| AM82327-6 | AM82327-006 | | 369 |
| AM82327-10 | AM82327-010 | | 373 |
| AM82327-15 | AM82327-015 | | 377 |
| AM82729-30 | AM82729-030 | | 381 |
| AM82729-60 | AM82729-060 | | 385 |
| AM82731-1 | AM82731-001 | | 389 |
| AM82731-3 | AM82731-003 | | 393 |
| AM82731-6 | AM82731-006 | | 397 |
| AM82731-12 | AM82731-012 | | 401 |
| AM82731-25 | AM82731-025 | | 403 |
| AM82731-50 | AM82731-050 | | 407 |
| AM82731-75 | AM82731-075 | | 411 |
| AM82931-55 | AM82931-055 | | 413 |
| AM83135-1 | AM83135-001 | | 431 |
| AM83135-3 | AM83135-003 | | 435 |
| AM83135-5 | AM83135-005 | | 439 |
| AM83135-10 | AM83135-010 | | 443 |
| AM83135-15 | AM83135-015 | | 447 |
| AM83135-30 | AM83135-030 | | 449 |
| AM83135-40 | AM83135-040 | | 451 |
| AM83135-50 | AM83135-050 | | 453 |
| B12-12 | SD1014-02 | | 707 |
| B25-28 | SD1224 | | 779 |
| B2-8Z | SD1135-03 | | 757 |
| B3-12 | SD1012 | | 683 |
| B5-8Z | SD1146-03 | | 775 |
| B70-28 | SD1019 | | 723 |
| B8-12 | SD1014-02 | | 707 |
| BAM80 | SD1477 | | 993 |
| BLF177 | SD1920 | | 1313 |
| BLF278 | SD1920-02 | | 1317 |
| BLU10/12 | SD1433 | | 895 |
| BLU11SL | | SD1134-05 | 749 |
| BLU15/12 | SD1429-03 | | 891 |
| BLU20/12 | SD1422 | | 857 |
| BLU30/12 | SD1488 | | 1025 |
| BLU45/12 | SD1434 | | 901 |
| BLU60/28 | SD1462 | | 961 |
| BLU97 | SD1433 | | 895 |
| BLU99 | SD1135 | | 753 |
| BLV10 | SD1143 | | 761 |
| BLV11 | SD1143-01 | | 767 |
| BLV12 | SD1274-01 | | 799 |
| BLV20 | SD1013-03 | | 687 |
| BLV30 | SD1448 | | 921 |
| BLV33 | SD1459 | | 949 |
| BLV33F | SD1458 | | 945 |
| BLV36 | SD1456 | | 935 |
| BLV45/12 | SD1428 | | 881 |
| BLV57 | | SD1732 | 1253 |
| BLV58 | SD1490 | | 1035 |
| BLV59 | SD4017 | | 1351 |
| BLV62 | SD1492 | | 1041 |
| BLV75/12 | SD1477 | | 993 |
| BLV80/28 | SD1019-05 | SD1457 | 941 |
| BLV97 | SD1495-03 | | 1049 |
| BLV97CE | SD1425 | | 873 |
| BLV98 | SD1400-02 | SD1400-03 | 821 |
| BLV98CE | SD1423 | | 863 |
| BLV100 | SD1398 | | 815 |
| BLV102 | SD4590 | | 1357 |
| BLW29 | SD1143 | | 761 |
| BLW30 | SD1274 | | 795 |
| BLW31 | SD1274 | | 795 |
| BLW32 | SD1439 | | 911 |
| BLW33 | SD1449 | | 927 |
| BLW34 | SD1437 | | 907 |
| BLW40 | SD1273 | SD1275 | 803 |
| BLW60C | SD1018 | | 715 |
| BLW76 | SD1457 | | 941 |
| BLW77 | SD1729 | SD1407 | 835 |
| BLW78 | SD1729 | SD1407 | 835 |
| BLW79 | SD1134 | SD1144 | 771 |
| BLW80 | SD1135 | | 753 |
| BLW81 | SD1146 | SD1143 | 761 |
| BLW83 | SD1224-10 | | 787 |
| BLW85 | SD1018-06 | | 719 |
| BLW86 | SD1224-02 | | 783 |
| BLW89 | SD4012 | SD1420 | 849 |
| BLW90 | SD1437 | | 907 |
| BLW95 | SD1726 | | 1209 |
| BLW96 | SD1731 | | 1245 |
| BLW98 | SD1448 | SD4011 | 1333 |
| BLW99 | SD1487 | SD1449 | 927 |
| BLX15 | SD1727 | | 1217 |
| BLX39 | SD1224 | | 779 |
| BLX91A | | SD1462 | 961 |
| BLY88C | SD1143 | | 761 |
| BLY88C/01 | SD1143 | | 761 |
| BLY89C | SD1274 | | 795 |
| BLY91C | SD1013 | | 691 |
| BM100-28 | SD1480 | | 999 |
| BM45-12 | SD1428 | | 881 |
| BM70-12 | SD1477 | | 993 |
| C2M100-28 | SD1470 | | 977 |
| C2M100-28A | SD1470 | | 977 |

| INDUSTRY PART NUMBER | SGS-THOMSON NEAREST EQUIVALENT | SGS-THOMSON ALTERNATE REPLACEMENT | PAGE NUMBER |
|---|---|---|---|
| C2M60-28 | SD1462 | | 961 |
| C2M70-28 | SD1462 | | 961 |
| C3-28 | SD1449 | | 927 |
| C5-12 | SD1135 | | 753 |
| CD3401 | SD1458 | | 945 |
| CD4205 | SD1480 | | 999 |
| CEL500 | SD1650 | | 1183 |
| CM50-12A | SD1434 | | 901 |
| CM80-28R | SD1470 | | 977 |
| DME10 | SD1528-08 | | 1087 |
| DME150 | MSC81150M | | 575 |
| DME2 | MSC1002M | | 467 |
| DME25 | MSC81035M | | 555 |
| DME250 | MSC81250M | SD8250 | 583 |
| DME375 | SD1541-01 | MSC81450M | 613 |
| DME375A | SD1541-01 | MSC81450M | 613 |
| DME50 | SD1534-08 | | 1105 |
| DME75 | SD1536-08 | | 1113 |
| DMEG250 | SD8250 | | 1371 |
| LAE4001R | MSC80264 | | 533 |
| LCE2009S | MSC80185 | | 503 |
| LEE1015T | SD5000 | | 1367 |
| LTE21009R | MSC80196 | SD1851 | 1267 |
| LTE21015R | SD1853 | MSC80197 | 527 |
| LTE21025R | SD1855 | | 1275 |
| MRA0204-30V | SD4013 | | 1245 |
| MRA0204-60V | SD1468 | SD1462 | 961 |
| MRA0204-70 | SD1468 | SD1462 | 961 |
| MRA0510-15H | AM80610-018 | | 241 |
| MRA0510-50H | AM80610-050 | | 249 |
| MRA0610-18A | AM80610-018 | | 241 |
| MRA0610-18H | AM80610-018 | | 241 |
| MRA0610-40A | AM80610-050 | | 249 |
| MRA1214-55H | AM81214-060 | | 295 |
| MRA1417-2 | AM1418-003 | | 30 |
| MRA1417-2H | AM1418-003 | | 30 |
| MRA1600-2 | SD1891 | | 1289 |
| MRA1600-6 | SD1891-03 | | 1289 |
| MRA1600-13 | SD1895 | AM1517-012 | 167 |
| MRA1600-30 | SD1898 | | 1309 |
| MRA1600-50H | AM1616-050 | | 185 |
| MRA1618-35H | AM81719-040 | AM1517-035 | 179 |
| MRA1720-2 | AM1720-003 | | 30 |
| MRA1720-5 | AM1720-006 | | 30 |
| MRA1720-9 | AM81720-012 | | 319 |
| MRA1720-20 | AM81720-020 | | 323 |
| MRAL1417-2 | AM1418-003 | | 30 |
| MRAL1720-2 | AM1720-003 | | 30 |
| MRAL1720-5 | AM1720-006 | | 30 |
| MRAL1720-9 | AM81720-010 | | 319 |
| MRAL1720-20 | AM81720-020 | | 323 |
| MRAL2023-12H | AM82023-010 | | 333 |
| MRAL2023-18H | AM82023-016 | | 337 |

| INDUSTRY PART NUMBER | SGS-THOMSON NEAREST EQUIVALENT | SGS-THOMSON ALTERNATE REPLACEMENT | PAGE NUMBER |
|---|---|---|---|
| MRAL2023-3H | AM2023-003 | | 193 |
| MRAL2023-6H | AM2023-006 | | 197 |
| MRAL2023-1.5H | AM2023-001 | | 189 |
| MRAL2327-1.3 | AM2327-001 | | 201 |
| MRAL2327-12H | AM82327-015 | AM82327-010 | 373 |
| MRF10005 | SD1512 | AM80912-005 | 261 |
| MRF1000MB | MSC1000MP | | 463 |
| MRF1002MB | MSC1002MP | | 473 |
| MRF10030 | AM80912-030 | | 271 |
| MRF1004MB | SD1526-01 | | 1071 |
| MRF10070 | AM1011-075 | | 105 |
| MRF10120 | AM0912-150 | | 77 |
| MRF10150 | AM1011-175 | | 109 |
| MRF1015MB | SD1528-06 | | 1083 |
| MRF10350 | AM1011-350 | AM1011-400 | 119 |
| MRF1035MB | MSC81035MP | SD1530-01 | 1091 |
| MRF10500 | AM1011-500 | | 125 |
| MRF1090MB | SD1536-03 | | 1109 |
| MRF1150M | SD1538-02 | MSC81150M | 575 |
| MRF1250M | MSC81250M | | 583 |
| MRF1325M | MSC81325M | SD1540-08 | 1135 |
| MRF151 | SD1920 | | 1313 |
| MRF151G | SD1920-02 | | 1317 |
| MRF212 | SD1143 | | 761 |
| MRF216 | SD1428 | | 881 |
| MRF220 | SD1012-03 | | 687 |
| MRF221 | SD1014-06 | | 711 |
| MRF224 | SD1018-06 | | 719 |
| MRF232 | SD1143 | | 761 |
| MRF240 | SD1275 | SD1273 | 791 |
| MRF247 | SD1477 | | 993 |
| MRF315 | SD1224-02 | | 783 |
| MRF316 | SD1458 | SD1019 | 723 |
| MRF317 | SD1480 | | 999 |
| MRF325 | SD4013 | | 1345 |
| MRF327 | SD1470 | SD1468 | 973 |
| MRF329 | SD1470 | | 977 |
| MRF340 | SD1013-03 | | 699 |
| MRF392 | SD1463 | | 965 |
| MRF393 | SD1464 | | 969 |
| MRF401 | SD1224 | | 779 |
| MRF406 | SD1285 | | 811 |
| MRF410 | SD1224-10 | | 787 |
| MRF421 | SD1487 | | 1019 |
| MRF422 | SD1730 | SD1729 | 1235 |
| MRF426 | SD1224-10 | | 787 |
| MRF428 | SD1726 | | 1209 |
| MRF429 | SD1726 | | 1209 |
| MRF433 | SD1285 | | 811 |
| MRF448 | SD1731 | SD1728 | 1225 |
| MRF454 | SD1405 | | 831 |
| MRF455 | SD1446 | | 775 |
| MRF641 | SD1429-03 | | 891 |

| INDUSTRY PART NUMBER | SGS-THOMSON NEAREST EQUIVALENT | SGS-THOMSON ALTERNATE REPLACEMENT | PAGE NUMBER |
|---|---|---|---|
| MRF644 | SD1422 | | 857 |
| MRF646 | SD1434 | SD1488 | 1025 |
| MRF650 | SD1434 | | 901 |
| MRF652 | SD1433 | SD1135 | 753 |
| MRF652 | SD1135-03 | | 759 |
| MRF653 | SD1433 | | 895 |
| MRF750 | SD1134-05 | | 749 |
| MRF846 | SD1414 | | 843 |
| MRF847 | SD1414 | | 843 |
| MRF880 | SD1680 | | 1201 |
| MRF890S | SD1420-01 | | 853 |
| MRF892 | SD1400-02 | | 821 |
| | SD1400-03 | | 827 |
| MRF894 | SD1495-03 | | 1049 |
| MRF898 | SD1426 | | 877 |
| MRF899 | SD4590 | | 1357 |
| MRF1946 | SD1275 | | 803 |
| MRF1946A | SD1275-01 | | 807 |
| MRF2628 | SD1146 | | 775 |
| MRF5174 | SD1420 | SD1449 | 927 |
| MRF5175 | SD1437 | | 907 |
| MRW2001 | MSC82001 | | 627 |
| MRW2003 | MSC82003 | | 631 |
| MRW2005 | MSC82005 | | 635 |
| MRW2010 | MSC82010 | | 639 |
| MRW2301 | MSC82302 | | 655 |
| MRW2304 | MSC82304 | | 659 |
| MRW2307 | MSC82307 | | 667 |
| MRW3001 | MSC83301 | | 671 |
| MRW3003 | MSC83303 | | 675 |
| MRW3005 | MSC83305 | | 679 |
| MRW52501 | MSC80186 | | 509 |
| MRW52601 | MSC80196 | SD1853 | 1271 |
| MSC1000M | MSC1000M | | 457 |
| MSC1000MP | MSC1000MP | | 461 |
| MSC1002 | MSC81002 | | 539 |
| MSC1002M | MSC1002M | | 465 |
| MSC1002MP | MSC1002MP | | 471 |
| MSC1004M | SD1526-08 | | 1075 |
| MSC1004MP | SD1526-01 | | 1071 |
| MSC1004MS | SD1526 | | 1071 |
| MSC1005 | MSC81005 | | 543 |
| MSC1010 | MSC81010 | | 547 |
| MSC1015M | SD1528-08 | | 1087 |
| MSC1015MP | SD1528-06 | | 1083 |
| MSC1020 | MSC81020 | | 551 |
| MSC1035M | MSC81035M | | 555 |
| MSC1035MP | MSC81035MP | | 559 |
| MSC1075M | SD1534-08 | | 1105 |
| MSC1075MP | SD1534-01 | | 1101 |
| MSC1090M | SD1536-08 | | 1113 |
| MSC1090MP | SD1536-03 | | 1109 |
| MSC1150M | MSC81150M | SD1538-08 | 1123 |

| INDUSTRY PART NUMBER | SGS-THOMSON NEAREST EQUIVALENT | SGS-THOMSON ALTERNATE REPLACEMENT | PAGE NUMBER |
|---|---|---|---|
| MSC1175M | MSC81175M | | 579 |
| MSC1250M | MSC81250M | | 583 |
| MSC1300M | MSC81300M | SD1540-08 | 1135 |
| MSC1325M | MSC81325M | SD1540-08 | 1135 |
| MSC1350M | MSC81350M | | 595 |
| MSC1400M | MSC81400M | SD1541-01 | 1141 |
| MSC1450M | MSC81450M | SD1541-09 | 1147 |
| MSC1550M | MSC81550M | SD1542 | 1151 |
| MSC1600M | MSC81600M | SD1542-04 | 1155 |
| MSC2001 | MSC82001 | | 627 |
| MSC2003 | MSC82003 | | 631 |
| MSC2005 | MSC82005 | | 635 |
| MSC2010 | MSC82010 | | 639 |
| MSC2100 | MSC82100 | | 649 |
| MSC2302 | MSC82302 | | 655 |
| MSC2304 | MSC82304 | | 659 |
| MSC2307 | MSC82307 | | 667 |
| MSC3000 | MSC3000 | | 479 |
| MSC3001 | MSC83301 | | 671 |
| MSC3003 | MSC83303 | | 675 |
| MSC3005 | MSC83305 | | 679 |
| MSC4000 | MSC4000 | | 485 |
| MSC4001 | MSC4001 | | 489 |
| MSC4003 | MSC4003 | | 493 |
| MSC80040 | MSC82040 | | 643 |
| MSC80058 | MSC81058 | | 563 |
| MSC80064 | MSC80064 | | 497 |
| MSC80111 | MSC81111 | | 567 |
| MSC80118 | MSC81118 | | 571 |
| MSC80185 | MSC80185 | | 503 |
| MSC80186 | MSC80186 | | 509 |
| MSC80195 | MSC80195 | | 515 |
| MSC80196 | MSC80196 | | 521 |
| MSC80197 | MSC80197 | | 527 |
| MSC80264 | MSC80264 | | 533 |
| MSC81002 | MSC81002 | | 539 |
| MSC81005 | MSC81005 | | 543 |
| MSC81010 | MSC81010 | | 547 |
| MSC81020 | MSC81020 | | 551 |
| MSC81035M | MSC81035M | | 557 |
| MSC81035MP | MSC81035MP | | 559 |
| MSC81058 | MSC81058 | | 563 |
| MSC81111 | MSC81111 | | 567 |
| MSC81118 | MSC81118 | | 571 |
| MSC81150M | MSC81150M | | 575 |
| MSC81175M | MSC81175M | | 579 |
| MSC81250M | MSC81250M | | 583 |
| MSC81300M | MSC81300M | | 587 |
| MSC81325M | MSC81325M | | 591 |
| MSC81350M | MSC81350M | | 595 |
| MSC81390M | MSC81390M | | 599 |
| MSC81400M | MSC81400M | | 603 |
| MSC81402 | MSC81402 | | 607 |

| INDUSTRY PART NUMBER | SGS-THOMSON NEAREST EQUIVALENT | SGS-THOMSON ALTERNATE REPLACEMENT | PAGE NUMBER |
|---|---|---|---|
| MSC81406 | MSC81406 | | 609 |
| MSC81410 | MSC81410 | | 611 |
| MSC81450M | MSC81450M | | 613 |
| MSC81550M | MSC81550M | | 617 |
| MSC81600M | MSC81600M | | 621 |
| MSC82001 | MSC82001 | | 627 |
| MSC82003 | MSC82003 | | 631 |
| MSC82005 | MSC82005 | | 635 |
| MSC82010 | MSC82010 | | 639 |
| MSC82040 | MSC82040 | | 643 |
| MSC82100 | MSC82100 | | 649 |
| MSC82302 | MSC82302 | | 655 |
| MSC82304 | MSC82304 | | 659 |
| MSC82306 | MSC82306 | | 663 |
| MSC82307 | MSC82307 | | 667 |
| MSC83001 | MSC83301 | | 671 |
| MSC83003 | MSC83303 | | 675 |
| MSC83005 | MSC83305 | | 679 |
| MSC83301 | MSC83301 | | 671 |
| MSC83303 | MSC83303 | | 675 |
| MSC83305 | MSC83305 | | 679 |
| MX0912B250Y | AM0912-300 | SD8250 | 1371 |
| MX0912B350Y | AM0912-350 | | 89 |
| MX1011B400W | AM1011-400 | | 119 |
| MZ0912B50Y | AM0912-080 | | 71 |
| MZ0912B100Y | SD1538-08 | | 1123 |
| PH0404-30 | AM0405-030 | | 47 |
| HPPH0404-100 | AM0405-100 | | 51 |
| PH1090-175L | AM1011-225 | | 111 |
| PH1090-350L | AM1011-350 | | 115 |
| PH1090-550S | SD1542-04 | MSC81600M | 621 |
| PH1214-4M | AM81214-006 | | 27 |
| PH1214-25M | AM81214-030 | | 289 |
| PH1214-40M | AM81214-060 | | 295 |
| PH1214-220M | AM1214-200 | | 137 |
| PH1600-7.5 | SD1897 | | 1305 |
| PH1600-14 | SD1895 | | 1301 |
| PH1600-30 | SD1898 | | 1309 |
| PH2729-5M | AM82731-006 | | 397 |
| PH2729-25M | AM82729-030 | | 381 |
| PH2729-65M | AM82729-060 | | 385 |
| PH2729-110M | AM2729-110 | | 213 |
| PH2731-5M | AM82731-006 | | 397 |
| PH2731-20M | AM82731-025 | | 403 |
| PH2731-80M | AM82731-075 | | 411 |
| PH2931-135S | AM2931-125 | | 217 |
| PH3134-11S | AM83135-010 | | 443 |
| PH3134-30S | AM83135-030 | | 449 |
| PH3134-10M | AM83135-010 | | 443 |
| PH3134-25M | AM83135-030 | | 449 |
| PH3134-65M | AM83135-050 | | 453 |
| PH3134-9L | AM3135-007 | | 225 |
| PH3134-20L | AM3135-014 | | 227 |
| PH3134-55L | AM3135-045 | | 235 |
| PH3135-5S | AM83135-005 | | 439 |
| PH3135-25S | AM83135-030 | | 449 |
| PH3135-5M | AM83135-005 | | 439 |
| PH3135-20M | AM83135-015 | | 447 |
| PH3135-65M | AM83135-050 | | 453 |
| PLB16030U | SD1898 | | 1309 |
| PTB23001X | MSC82001 | | 627 |
| PTB23003X | MSC82003 | | 631 |
| PTB23005X | MSC82005 | | 635 |
| PTB32001X | MSC83301 | | 671 |
| PTB32003X | MSC83303 | | 675 |
| PTB32005X | MSC83305 | | 679 |
| PTB42001X | MSC4001 | | 489 |
| PTB42003X | MSC4003 | | 493 |
| PZB16035U | AM1517-035 | SD1898 | 1309 |
| PZB16050U | AM1616-050 | | 185 |
| PZ1721B12U | AM81720-012 | | 319 |
| PZ1721B25U | AM81720-020 | | 323 |
| PZ2024B10U | AM82023-010 | | 333 |
| PZ2024B20U | AM82023-016 | AM82022-020 | 331 |
| PZ2327B15U | AM82327-015 | | 377 |
| RV3135B5X | AM83135-005 | | 439 |
| RX1214B130Y | AM1214-100 | | 129 |
| RX1214B170Y | AM1214-175 | | 131 |
| RX1214B150W | AM1214-200 | AM1214-175 | 131 |
| RX1214B300Y | AM1214-300 | | 141 |
| RX1214B350Y | AM1214-325 | | 147 |
| RX2731B90W | AM82731-075 | | 411 |
| RX3034B70W | AM83135-050 | | 453 |
| RXB12350Y | AM1011-350 | | 115 |
| RZ1214B35Y | AM81214-030 | | 289 |
| RZ1214B65Y | AM81214-060 | | 295 |
| RZ2731B16W | AM82731-012 | | 401 |
| RZ2731B32W | AM82731-025 | | 403 |
| RZ2731B48W | AM82731-050 | | 407 |
| RZ2731B60W | AM82731-075 | | 411 |
| RZ3135B14W | AM83135-015 | | 447 |
| RZ3135B28W | AM83135-030 | | 449 |
| RZ3135B42W | AM83135-040 | | 451 |
| RZ3135B50W | AM83135-050 | | 453 |
| RZB12050Y | AM1011-050 | | 93 |
| RZB12100Y | AM1011-060 | | 97 |
| RZB12250Y | AM1011-225 | | 111 |
| S100-12 | SD1487 | | 1019 |
| S100-28 | SD1407 | | 835 |
| S100-50 | SD1726 | | 1209 |
| S15-12 | SD1285 | | 811 |
| S175-28 | SD1730 | | 1239 |
| S175-50 | SD1726 | | 1209 |
| S200-50 | SD1731 | | 1245 |
| S30-28 | SD1224-10 | | 787 |
| S70-12 | SD1405 | | 831 |

| INDUSTRY PART NUMBER | SGS-THOMSON NEAREST EQUIVALENT | SGS-THOMSON ALTERNATE REPLACEMENT | PAGE NUMBER |
|---|---|---|---|
| S80-12 | SD1405 | | 831 |
| SCELL500 | SD1650 | | 1183 |
| SD1012 | SD1012 | | 683 |
| SD1012-03 | SD1012-03 | | 687 |
| SD1013 | SD1013 | | 691 |
| SD1013-03 | SD1013-03 | | 699 |
| SD1014-02 | SD1014-02 | | 707 |
| SD1014-06 | SD1014-06 | | 711 |
| SD1018 | SD1018 | | 715 |
| SD1018-06 | SD1018-06 | | 719 |
| SD1019 | SD1019 | | 723 |
| SD1019-05 | SD1019-05 | | 723 |
| SD1050 | SD1050 | | 729 |
| SD1060 | SD1060 | | 733 |
| SD1070 | SD1070 | | 737 |
| SD1075 | SD1075 | | 741 |
| SD1134 | SD1134 | | 745 |
| SD1134-05 | SD1134-05 | | 749 |
| SD1135 | SD1135 | | 753 |
| SD1143 | SD1143 | | 761 |
| SD1143-01 | SD1143-01 | | 767 |
| SD1144 | SD1144 | | 771 |
| SD1146 | SD1146 | | 775 |
| SD1146-03 | SD1146-03 | | 775 |
| SD1224 | SD1224 | | 779 |
| SD1224-02 | SD1224-02 | | 783 |
| SD1224-10 | SD1224-10 | | 783 |
| SD1273 | SD1273 | | 791 |
| SD1274 | SD1274 | | 795 |
| SD1274-01 | SD1274-01 | | 799 |
| SD1275 | SD1275 | | 803 |
| SD1285 | SD1285 | | 811 |
| SD1398 | SD1398 | | 815 |
| SD1400-02 | SD1400-02 | | 821 |
| SD1400-03 | SD1400-03 | | 827 |
| SD1405 | SD1405 | | 831 |
| SD1407 | SD1407 | | 835 |
| SD1411 | SD1411 | | 839 |
| SD1414 | SD1414 | | 843 |
| SD1420 | SD1420 | | 849 |
| SD1420-01 | SD1420-01 | | 853 |
| SD1422 | SD1422 | | 857 |
| SD1423 | SD1423 | | 863 |
| SD1424 | SD1424 | | 867 |
| SD1425 | SD1425 | | 873 |
| SD1426 | SD1426 | | 877 |
| SD1428 | SD1428 | | 881 |
| SD1429 | SD1429 | | 887 |
| SD1429-03 | SD1429-03 | | 891 |
| SD1433 | SD1433 | | 895 |
| SD1434 | SD1434 | | 901 |
| SD1437 | SD1437 | | 907 |
| SD1439 | SD1439 | | 911 |

| INDUSTRY PART NUMBER | SGS-THOMSON NEAREST EQUIVALENT | SGS-THOMSON ALTERNATE REPLACEMENT | PAGE NUMBER |
|---|---|---|---|
| SD1446 | SD1446 | | 915 |
| SD1448 | SD1448 | | 921 |
| SD1449 | SD1449 | | 927 |
| SD1455 | SD1455 | | 931 |
| SD1456 | SD1456 | | 935 |
| SD1457 | SD1457 | | 941 |
| SD1458 | SD1458 | | 945 |
| SD1459 | SD1459 | | 949 |
| SD1460 | SD1460 | | 955 |
| SD1462 | SD1462 | | 961 |
| SD1463 | SD1463 | | 965 |
| SD1464 | SD1464 | | 969 |
| SD1468 | SD1468 | | 973 |
| SD1470 | SD1470 | | 977 |
| SD1474 | SD1474 | | 981 |
| SD1476 | SD1476 | | 985 |
| SD1477 | SD1477 | | 993 |
| SD1480 | SD1480 | | 999 |
| SD1483 | SD1483 | | 1005 |
| SD1485 | SD1485 | | 1011 |
| SD1487 | SD1487 | | 1019 |
| SD1488 | SD1488 | | 1025 |
| SD1489 | SD1489 | | 1029 |
| SD1490 | SD1490 | | 1035 |
| SD1492 | SD1492 | | 1041 |
| SD1495-03 | SD1495-03 | | 1049 |
| SD1496 | SD1496 | | 1053 |
| SD1496-03 | SD1496-03 | | 1057 |
| SD1511-08 | SD1511-08 | | 1061 |
| SD1512 | SD1512 | | 1065 |
| SD1526-01 | SD1526-01 | | 1071 |
| SD1526-08 | SD1526-08 | | 1075 |
| SD1527-08 | SD1527-08 | | 1079 |
| SD1528-06 | SD1528-06 | | 1083 |
| SD1528-08 | SD1528-08 | | 1087 |
| SD1530-01 | SD1530-01 | | 1091 |
| SD1530-08 | SD1530-08 | | 1095 |
| SD1534-01 | SD1534-01 | | 1101 |
| SD1534-08 | SD1534-08 | | 1105 |
| SD1536-03 | SD1536-03 | | 1109 |
| SD1536-08 | SD1536-08 | | 1113 |
| SD1538-02 | SD1538-02 | | 1117 |
| SD1538-08 | SD1538-08 | | 1123 |
| SD1540 | SD1540 | | 1129 |
| SD1540-08 | SD1540-08 | | 1135 |
| SD1541-01 | SD1541-01 | | 1141 |
| SD1541-09 | SD1541-09 | | 1147 |
| SD1542 | SD1542 | | 1151 |
| SD1542-04 | SD1542-04 | | 1155 |
| SD1550 | SD1550 | | 1161 |
| SD1563 | SD1563 | | 1165 |
| SD1564 | SD1564 | | 1173 |
| SD1565 | SD1565 | | 1177 |

| INDUSTRY PART NUMBER | SGS-THOMSON NEAREST EQUIVALENT | SGS-THOMSON ALTERNATE REPLACEMENT | PAGE NUMBER |
|---|---|---|---|
| SD1650 | SD1650 | | 1183 |
| SD1658 | SD1658 | | 1189 |
| SD1660 | SD1660 | | 1195 |
| SD1680 | SD1680 | | 1201 |
| SD1726 | SD1726 | | 1209 |
| SD1727 | SD1727 | | 1217 |
| SD1728 | SD1728 | | 1225 |
| SD1729 | SD1729 | | 1235 |
| SD1730 | SD1730 | | 1239 |
| SD1731 | SD1731 | | 1245 |
| SD1732 | SD1732 | | 1253 |
| SD1733 | SD1733 | | 1259 |
| SD1850 | SD1850 | | 1263 |
| SD1851 | SD1851 | | 1267 |
| SD1853 | SD1853 | | 1271 |
| SD1855 | SD1855 | | 1275 |
| SD1868 | SD1868 | | 1279 |
| SD1888-03 | SD1888-03 | | 1285 |
| SD1891 | SD1891-03 | | 1289 |
| SD1891-03 | SD1891-03 | | 1289 |
| SD1893 | SD1893-03 | | 1295 |
| SD1893-03 | SD1893-03 | | 1295 |
| SD1895 | SD1895-03 | | 1301 |
| SD1895-03 | SD1895-03 | | 1301 |
| SD1897 | SD1897 | | 1305 |
| SD1898 | SD1898 | | 1309 |
| SD1920 | SD1920 | | 1313 |
| SD1920-02 | SD1920-02 | | 1317 |
| SD1930 | SD1930 | | 1321 |
| SD4010 | SD4010 | | 1327 |
| SD4011 | SD4011 | | 1333 |
| SD4012 | SD4012 | | 1339 |
| SD4013 | SD4013 | | 1345 |
| SD4017 | SD4017 | | 1351 |
| SD4600 | SD4600 | | 1363 |
| SD5000 | SD5000 | | 1367 |
| SD8250 | SD8250 | | 1371 |
| SUMIL3 | SD4012 | | 1339 |
| SUMIL25 | SD4013 | | 1345 |
| SUTV040 | SD4011 | | 1333 |
| SUTV200 | SD4010 | | 1327 |
| TAN250A | SD8250 | | 1371 |
| TCC0105-100 | SD1464 | | 969 |
| TCC0204-125 | SD1463 | | 965 |
| TCC1720-3 | AM1720-003 | | 30 |
| TCC1720-006 | AM1720-006 | | 30 |
| TCC1720-10 | AM81720-012. | | 319 |
| TCC1720-20 | AM81720-020 | | 323 |
| TCC1922-18 | AM81922-018 | | 327 |
| TCC2001 | MSC82001 | | 627 |
| TCC2003 | MSC82003 | | 631 |
| TCC2005 | MSC82005 | | 635 |
| TCC2010 | MSC82010 | | 639 |

| INDUSTRY PART NUMBER | SGS-THOMSON NEAREST EQUIVALENT | SGS-THOMSON ALTERNATE REPLACEMENT | PAGE NUMBER |
|---|---|---|---|
| TCC2023-6 | AM2023-006 | | 197 |
| TCC2023-16 | AM82023-016 | | 337 |
| TCC20L08 | SD1851 | | 1267 |
| TCC20L15 | SD1853 | | 1271 |
| TCC20L25 | SD1855 | | 1275 |
| TCC593 | SD1437 | | 907 |
| TCC596 | SD1439 | | 911 |
| TCC597 | SD1449 | | 927 |
| TCC598 | SD1448 | | 921 |
| TCC2100 | MSC82100 | | 649 |
| TCC2223-3 | AM82223-004 | | 341 |
| TCC2223-10 | AM82223-010 | | 345 |
| TCC2223-18 | AM82223-018 | | 353 |
| TCC2301 | MSC82302 | | 655 |
| TCC2302 | MSC82302 | | 655 |
| TCC2304 | MSC82304 | | 659 |
| TCC2307 | MSC82307 | | 667 |
| TCC3000 | MSC3000 | | 479 |
| TCC3001 | MSC83301 | | 671 |
| TCC3003 | MSC83303 | | 675 |
| TCC3005 | MSC83305 | | 679 |
| TCC3100 | SD1456 | | 935 |
| TDS595 | SD1732 | | 1253 |
| TH416 | SD1729 | | 1235 |
| TH430 | SD1728 | | 1225 |
| TH513 | SD1733 | | 1259 |
| TH560 | SD1730 | | 1239 |
| TH562 | SD1731 | | 1245 |
| THA15 | SD1726 | | 1209 |
| THX15 | SD1727 | | 1217 |
| TP2033 | SD1274 | | 795 |
| TP2037 | SD1275 | | 803 |
| TP2317 | SD1274 | | 795 |
| TP2330 | SD1274 | | 795 |
| TP2330F | SD1274-01 | | 799 |
| TP2335 | SD1274 | | 795 |
| TP3004 | SD1398 | | 815 |
| TP3006 | SD1398 | | 815 |
| TP3008 | SD1398 | | 815 |
| TP3019 | SD1420 | | 849 |
| TP3020A | SD1420 | | 849 |
| TP3021 | SD1423 | | 863 |
| TP3022A/B | SD1423 | | 863 |
| TP3024A/B | SD1424 | | 967 |
| TP3030 | SD1425 | SD4017 | 1351 |
| TP3031 | SD1425 | SD4017 | 1351 |
| TP3033 | SD1425 | | 873 |
| TP3060 | SD1650 | | 1183 |
| TP3061 | SD4701 | | 21 |
| TP3062 | SD4600 | | 1363 |
| TP3064 | SD4701 | SD1650 | 1183 |
| TP3065 | SD1650 | | 1183 |
| TP3069 | SD4590 | | 1357 |

| INDUSTRY PART NUMBER | SGS-THOMSON NEAREST EQUIVALENT | SGS-THOMSON ALTERNATE REPLACEMENT | PAGE NUMBER |
|---|---|---|---|
| TP5050 | SD1462 | SD1468 | 973 |
| TP9380 | SD1457 | | 941 |
| TP9383 | SD1460 | | 955 |
| TP9386 | SD1480 | | 999 |
| TPM401 | SD1439 | SD1420 | 849 |
| TPM405 | SD1449 | SD1420 | 849 |
| TPM425 | SD1448 | SD4011 | 1333 |
| TPM4100 | SD1463 | | 965 |
| TPV375 | SD1455 | | 931 |
| TPV376 | SD1459 | | 949 |
| TPV385 | SD1458 | | 945 |
| TPV593 | SD1437 | | 907 |
| TPV595A | SD1732 | | 1253 |
| TPV596A | SD1439 | SD5000 | 1367 |
| TPV597 | SD1449 | | 927 |
| TPV598 | SD1448 | SD4011 | 1333 |
| TPV3100 | SD1456 | | 935 |
| TPV5055B | SD1489 | | 1029 |
| TPV7025 | SD1490 | | 1035 |
| TPV8200B | SD1492 | | 1041 |
| UMIL3 | SD4012 | | 1339 |
| UMIL25 | SD4013 | | 1345 |
| UMIL60 | SD1462 | | 961 |
| UMIL70 | SD1462 | | 961 |
| UMIL100 | SD1470 | | 977 |
| UMIL5FT | SD1930 | | 1321 |
| UMOB10 | SD1429 | | 887 |
| UMOB20 | SD1422 | | 857 |
| UMOB45 | SD1488 | SD1434 | 901 |
| UTV010 | SD1449 | | 927 |
| UTV020 | SD1437 | | 907 |
| UTV040 | SD4011 | | 1333 |
| UTV200 | SD4010 | | 1327 |
| VAM120 | SD1019-05 | | 723 |
| VMIL100 | SD1480 | | 999 |
| VMOB30 | SD1428 | | 881 |
| VTV150 | SD1458 | | 945 |
| VTV1250 | SD1456 | | 935 |

# DATASHEETS

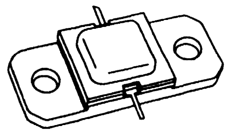
SGS-THOMSON MICROELECTRONICS

# AM0405-030

## RF & MICROWAVE TRANSISTORS UHF PULSE APPLICATIONS

PRELIMINARY DATA

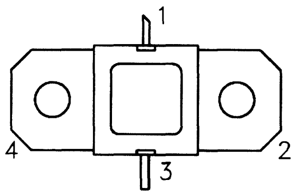
- REFRACTORY/GOLD METALLIZATION
- COMMON BASE CONFIGURATION
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 30 W MIN. WITH 9.3 dB GAIN



**.400 x .400 2NLFL (S042)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM0405-030 | 0405-30 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The AM0405-030 is a gold metallized silicon NPN pulse power transistor using overlay geometry.

The AM0405-030 is designed for pulsed applications in the frequency range of 420 - 450 MHz.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq$ 100°C) | 45 | W |
| $I_C$ | Device Current* | 2.3 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 32 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 4.0 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 15mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 5mA | $I_C$ = 0mA | 3.0 | — | — | V |
| $BV_{CER}$ | IC = 10mA | $R_{BE}$ = 10Ω | 65 | — | — | V |
| $I_{CES}$ | $V_{BE}$ = 0V | $V_{CE}$ = 32V | — | — | 5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 0.1A | 20 | — | 200 | — |

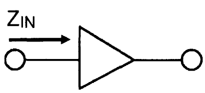
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 420 — 450MHz | $P_{IN}$ = 3.5W | $V_{CC}$ = 32V | 30 | — | — | W |
| $\eta_C$ | f = 420 — 450MHz | $P_{IN}$ = 3.5W | $V_{CC}$ = 32V | 60 | — | — | % |
| $G_P$ | f = 420 — 450MHz | $P_{IN}$ = 3.5W | $V_{CC}$ = 32V | 9.3 | — | — | dB |

Note: Pulse Width = 10,000μSec
Duty Cycle = 10%

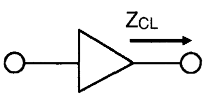
## IMPEDANCE DATA

**TYPICAL INPUT IMPEDANCE**



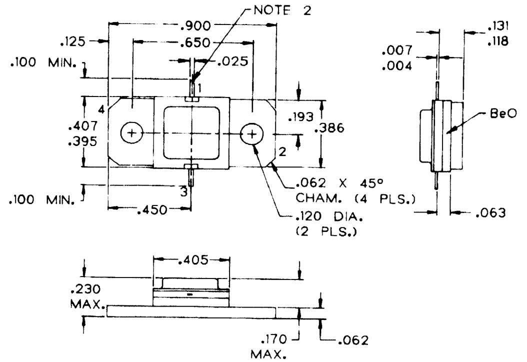

| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| L = 420 GHz | 4.7 + j 5.2 | 6.0 + j 6.1 |
| M = 435 GHz | 4.7 + j 5.2 | 5.6 + j 5.6 |
| H = 450 GHz | 4.7 + j 5.2 | 5.0 + j 5.2 |

**TYPICAL COLLECTOR LOAD IMPEDANCE**



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J113214F




NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD SLANT CUT.

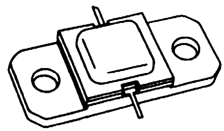
# SGS-THOMSON MICROELECTRONICS

# AM0405-100

## RF & MICROWAVE TRANSISTORS UHF PULSE APPLICATIONS

PRELIMINARY DATA

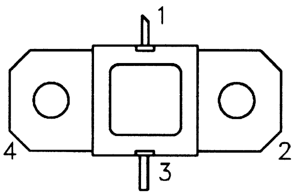
- REFRACTORY/GOLD METALLIZATION
- COMMON BASE CONFIGURATION
- INPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 100 W MIN. WITH 8 dB GAIN



**.400 x .400 2NLFL (S042)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM0405-100 | 0405-100 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

## DESCRIPTION

The AM0405-100 is a gold metallized silicon NPN pulse power transistor using overlay geometry.

The AM0405-100 is designed for pulsed applications in the frequency range of 420-450 MHz.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 100°C$) | 120 | W |
| $I_C$ | Device Current* | 6.9 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 32 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 1.5 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 40mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 3.0 | — | — | V |
| $BV_{CES}$ | IC = 80mA | $V_{BE}$ = 0V | 65 | — | — | V |
| $I_{CES}$ | $V_{BE}$ = 0V | $V_{CE}$ = 32V | — | — | 15 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 0.5A | 20 | — | 200 | — |

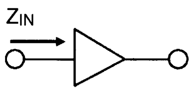
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 420 — 450MHz | $P_{IN}$ = 16W | $V_{CC}$ = 32V | 100 | — | — | W |
| $\eta_C$ | f = 420 — 450MHz | $P_{IN}$ = 16W | $V_{CC}$ = 32V | 60 | — | — | % |
| $G_P$ | f = 420 — 450MHz | $P_{IN}$ = 16W | $V_{CC}$ = 32V | 7.9 | — | — | dB |

Note: Pulse Width = 10,000µSec
Duty Cycle = 20%

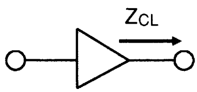
## IMPEDANCE DATA

TYPICAL INPUT IMPEDANCE




| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| L = 420 GHz | 3.8 + j 2.2 | 4.1 – j 1.3 |
| M = 435 GHz | 3.8 + j 1.3 | 3.8 – j 0.9 |
| H = 450 GHz | 3.8 + j 0.4 | 3.5 – j 0.4 |

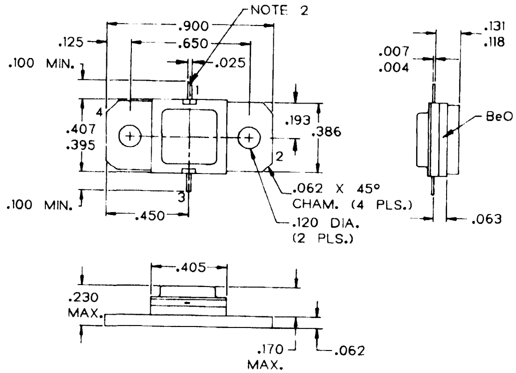
TYPICAL COLLECTOR LOAD IMPEDANCE




$P_{IN}$ = 16W
$V_{CC}$ = 32V
Normalized to 50 ohms

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J113214F




NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD SLANT CUT.

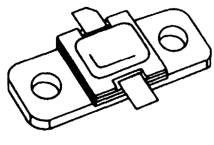
SGS-THOMSON
MICROELECTRONICS

# AM0608-020

## RF & MICROWAVE TRANSISTORS AVIONICS APPLICATIONS

PRELIMINARY DATA

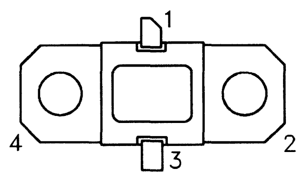
- REFRACTORY/GOLD METALLIZATION
- INTERNAL INPUT MATCHING
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 20 W MIN. WITH 9.0 dB GAIN



**.310 x .310 2LFL (S064)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM0608-020 | 0608-20 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The AM0608-020 is an internally-matched, common base silicon bipolar device optimized for pulsed applications in the 600 - 7500 MHz frequency range.

Housed in the popular IMPAC™ hermetic metal/ceramic package, this device uses a refractory/gold overlay die geometry for ruggedness and long-term reliability.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 100$°C) | 100 | W |
| $I_C$ | Device Current* | 2.4 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 40 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 1.5 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 15mA | $I_E$ = 0mA | 55 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 15mA | $R_{BE}$ = 10Ω | 55 | — | — | V |
| $I_{CES}$ | $V_{BE}$ = 0V | $V_{CE}$ = 35V | — | — | 5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 750mA | 20 | — | — | — |

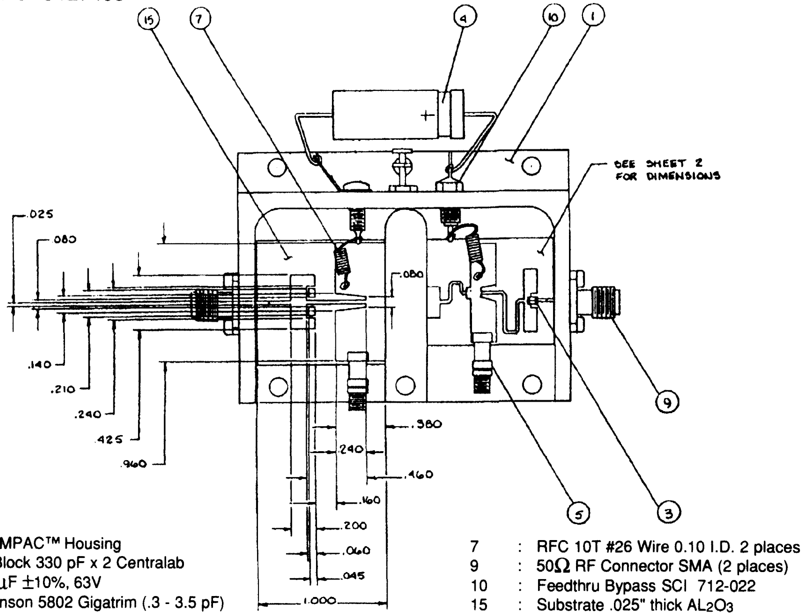
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 600 — 750 MHz | $P_{IN}$ = 2.5W | $V_{CC}$ = 35V | 20 | — | — | W |
| $\eta_C$ | f = 600 — 750 MHz | $P_{IN}$ = 2.5W | $V_{CC}$ = 35V | 40 | — | — | % |
| $G_P$ | f = 600 — 750 MHz | $P_{IN}$ = 2.5W | $V_{CC}$ = 35V | 9.0 | — | — | dB |

Note: Pulse Width = 10µSec
Duty Cycle = 10%

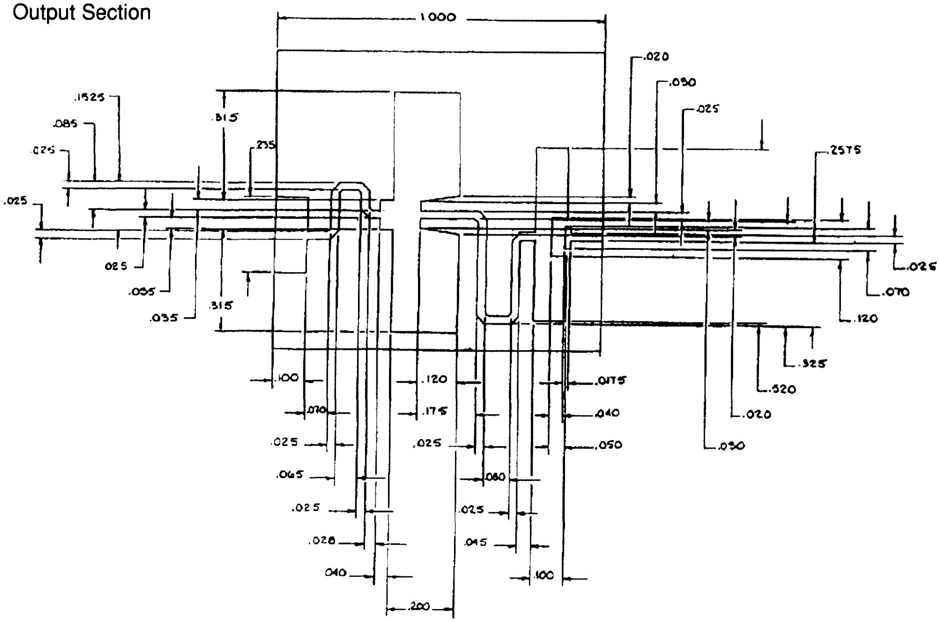
## TEST CIRCUIT

Ref.: Dwg. No. C127405



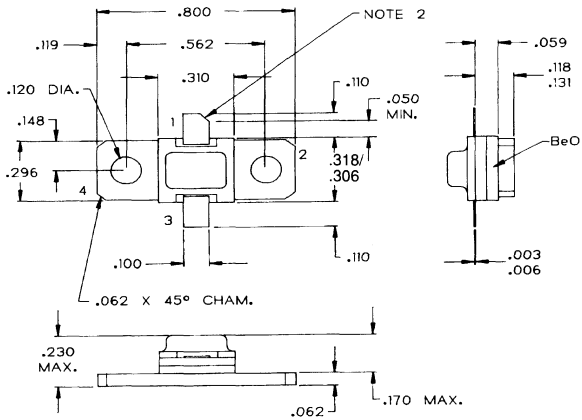

1 : Grd IMPAC™ Housing
3 : DC Block 330 pF x 2 Centralab
4 : 240 µF ±10%, 63V
5 : Johanson 5802 Gigatrim (.3 - 3.5 pF)
7 : RFC 10T #26 Wire 0.10 I.D. 2 places
9 : 50Ω RF Connector SMA (2 places)
10 : Feedthru Bypass SCI 712-022
15 : Substrate .025" thick $AL_2O_3$

Output Section



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J133100D




NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

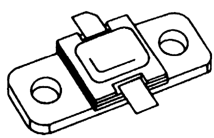
SGS-THOMSON
MICROELECTRONICS

# AM0608-070

## RF & MICROWAVE TRANSISTORS AVIONICS APPLICATIONS

PRELIMINARY DATA

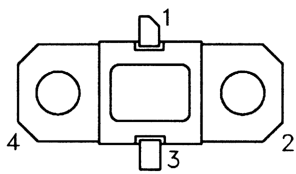
- REFRACTORY/GOLD METALLIZATION
- INTERNAL INPUT MATCHING
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 70 W MIN. WITH 7.3 dB GAIN



**.310 x .310 2LFL (S064)**
hermetically sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| AM0608-070 | 0608-70 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The AM0608-070 is an internally-matched, common base silicon bipolar device optimized for pulsed applications in the 600 - 750 MHz frequency range.

Housed in the popular IMPAC™hermetic metal/ceramic package, this device uses a refractory/gold overlay die geometry for ruggedness and long-term reliability.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 50°C$) | 250 | W |
| $I_C$ | Device Current* | 6.5 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 55 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 0.60 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

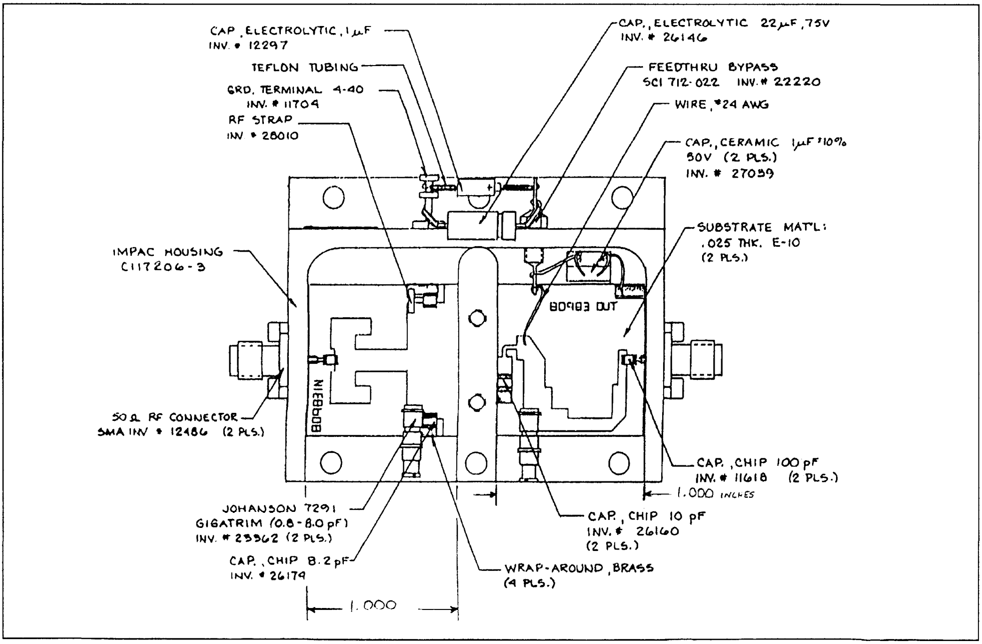
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 10mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 10mA | $R_{BE}$ = 10Ω | 65 | — | — | V |
| $I_{CES}$ | $V_{BE}$ = 0V | $V_{CE}$ = 50V | — | — | 6.25 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 500mA | 15 | — | 120 | — |

### DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 600 — 750 MHz | $P_{IN}$ = 13W | $V_{CC}$ = 50V | 70 | — | — | W |
| $\eta_c$ | f = 600 — 750 MHz | $P_{IN}$ = 13W | $V_{CC}$ = 50V | 35 | — | — | % |
| $G_P$ | f = 600 — 750 MHz | $P_{IN}$ = 13W | $V_{CC}$ = 50V | 7.3 | — | — | dB |

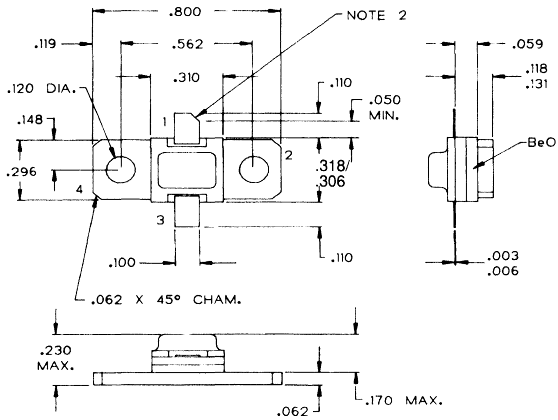
Note: Pulse Width = 10µSec
Duty Cycle = 1%

## TEST CIRCUIT



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J133100D




NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

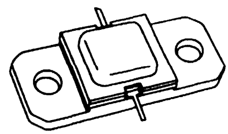
# SGS-THOMSON MICROELECTRONICS

# AM0608-200

## RF & MICROWAVE TRANSISTORS AVIONICS APPLICATIONS

PRELIMINARY DATA

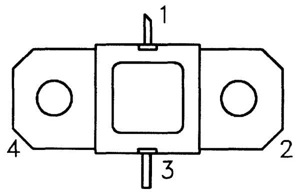
- REFRACTORY/GOLD METALLIZATION
- INTERNAL INPUT MATCHING
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 220 W MIN. WITH 8.7 dB GAIN



**.400 x .400 2NLFL (S042)**
hermetically sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| AM0608-200 | 0608-200 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The AM0608-200 is an internally-matched, common base silicon bipolar device optimized pulsed application in the 600 - 750 MHz frequency range. Housed in the industry-standard AMPAC™ metal/ceramic package, this device uses a refractory/gold overlay die geometry for ruggedness and long-term reliability.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 75°C$) | 875 | W |
| $I_C$ | Device Current* | 16.0 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 55 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 0.20 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 10mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 25mA | $R_{BE}$ = 10Ω | 65 | — | — | V |
| $I_{CES}$ | $V_{BE}$ = 0V | $V_{CE}$ = 50V | — | — | 25 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1mA | 15 | — | 120 | — |

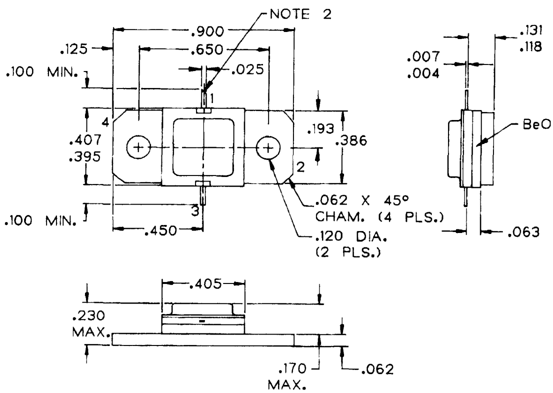
DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 600 — 750MHz | $P_{IN}$ = 30W | $V_{CC}$ = 50V | 220 | — | — | W |
| $\eta_C$ | f = 600 — 750MHz | $P_{IN}$ = 30W | $V_{CC}$ = 50V | 40 | — | — | % |
| $G_P$ | f = 600 — 750MHz | $P_{IN}$ = 30W | $V_{CC}$ = 50V | 8.7 | — | — | dB |

Note: Pulse Width = 10µSec
Duty Cycle = 1%

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J113214F



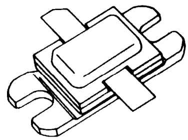

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD SLANT CUT.

# AM0608-450

## RF & MICROWAVE TRANSISTORS
## AVIONICS APPLICATIONS

PRELIMINARY DATA

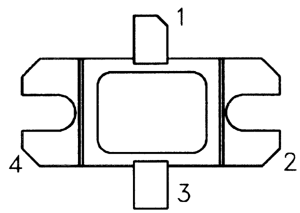
- REFRACTORY/GOLD METALLIZATION
- INPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 445 W MIN. WITH 6.9 dB GAIN



**.400 x .500 2LFL (S038)**
hermetically sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| AM0608-450 | 0608-450 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The AM0608-450 is an internally-matched, common base silicon bipolar device optimized pulsed application in the 600 - 750 MHz frequency range.

Housed in the industry-standard BIGPAC™ metal/ceramic package, this device uses a refractory/gold overlay die geometry for ruggedness and long-term reliability.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 50°C$) | 1500 | W |
| $I_C$ | Device Current* | 32 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 55 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 0.13 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

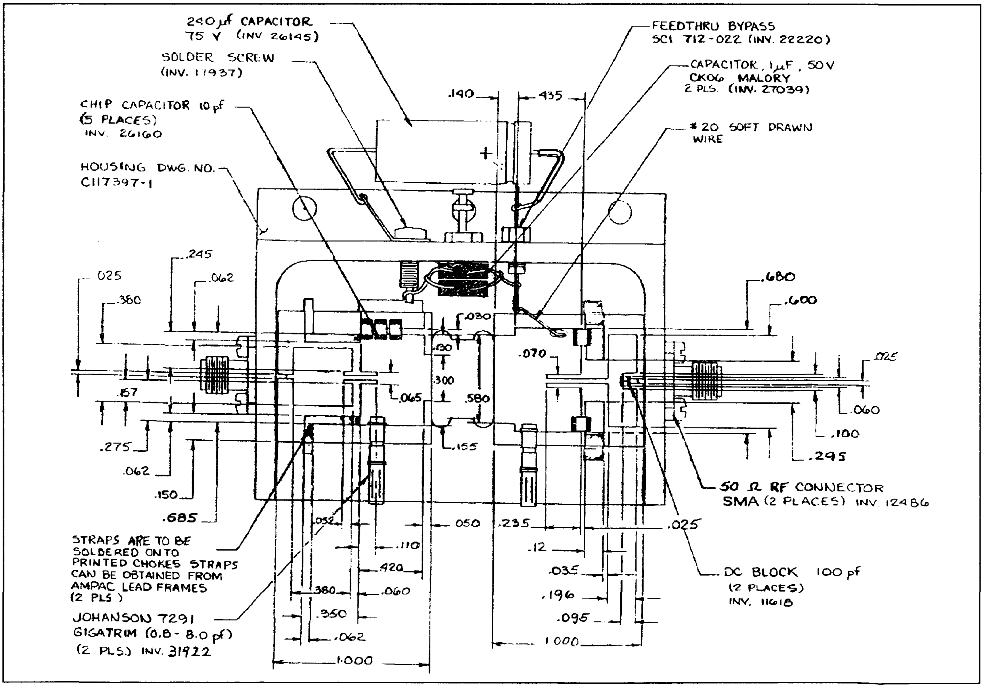
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 50mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 5mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 50mA | $R_{BE}$ = 10Ω | 65 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 50V | | — | — | 35 | mA |
| $I_{CBO}$ | $V_{CB}$ = 50V | | — | — | 25 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1A | 15 | — | 300 | — |

### DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 600 — 750MHz | $P_{IN}$ = 90W | $V_{CC}$ = 50V | 445 | — | — | W |
| $\eta_C$ | f = 600 — 750MHz | $P_{IN}$ = 90W | $V_{CC}$ = 50V | 35 | — | — | % |
| $G_P$ | f = 600 — 750MHz | $P_{IN}$ = 90W | $V_{CC}$ = 50V | 6.9 | — | — | dB |

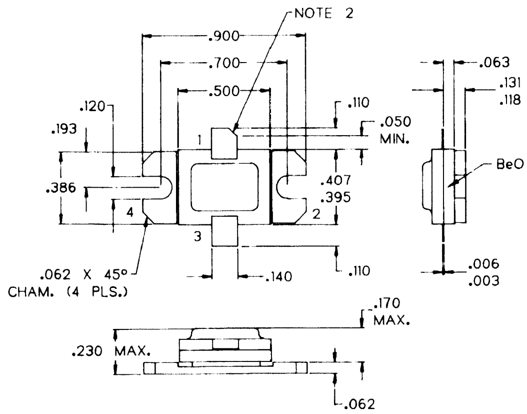
Note: Pulse Width = 10μS
Duty Cycle = 1%

## TEST CIRCUIT



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135066F




NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

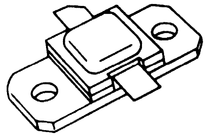
**SGS-THOMSON**
MICROELECTRONICS

# AM0710-300

## RF & MICROWAVE TRANSISTORS
## UHF PULSED APPLICATIONS

PRELIMINARY DATA

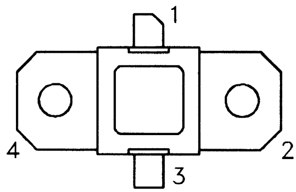
- REFRACTORY/GOLD METALLIZATION
- INTERNAL INPUT MATCHING
- LOW THERMAL RESISTANCE
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 300 W MIN. WITH 8.8 dB GAIN



**.400 x .400 2LFL (S036)**
hermetically sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| AM0710-300 | 0710-300 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The AM0710-300 is a high power, refractory/gold metallized silicon bipolar device suitable for UHF avionics, radar and EW applications.

With 8.8 dB minimum power gain, the hermetically pacakaged AM07010-300 is ideal for use in either single-ended or parallel-combined pulsed power amplifiers.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 100$°C) | 680 | W |
| $I_C$ | Device Current* | 20 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 50 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 0.22 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 40mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 3.0 | — | — | V |
| $BV_{CES}$ | IC = 40mA | $V_{BE}$ = 0V | 65 | — | — | V |
| $I_{CES}$ | $V_{BE}$ = 0V | $V_{CE}$ = 50V | — | — | 25 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 4mA | 10 | — | 999 | — |

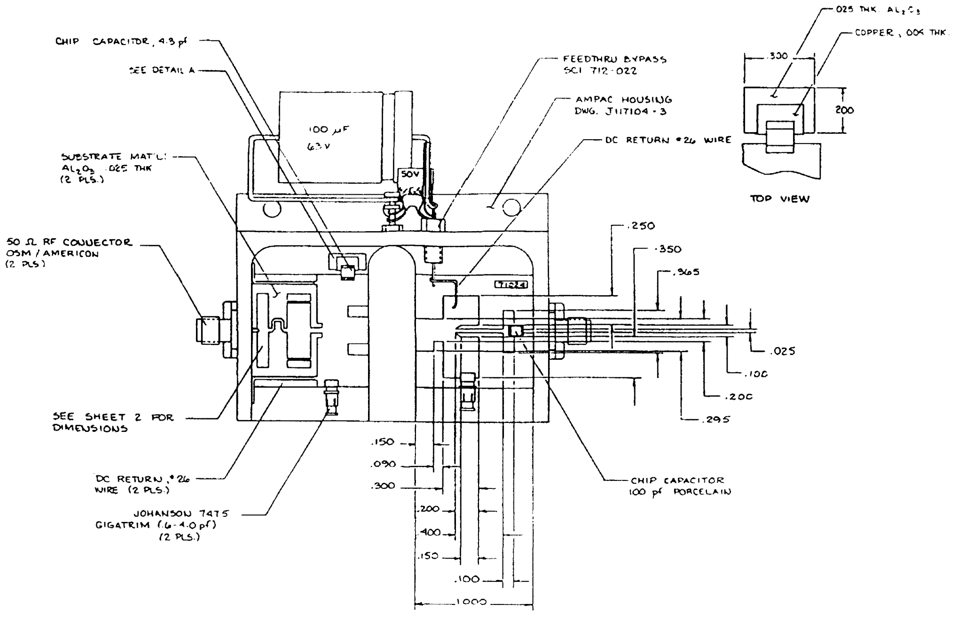
DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 750 — 950 MHz | $P_{IN}$ = 40W | $V_{CC}$ = 50V | 300 | — | — | W |
| $\eta_C$ | f = 750 — 950 MHz | $P_{IN}$ = 40W | $V_{CC}$ = 50V | 40 | — | — | % |
| $G_P$ | f = 750 — 950 MHz | $P_{IN}$ = 40W | $V_{CC}$ = 50V | 8.8 | — | — | dB |

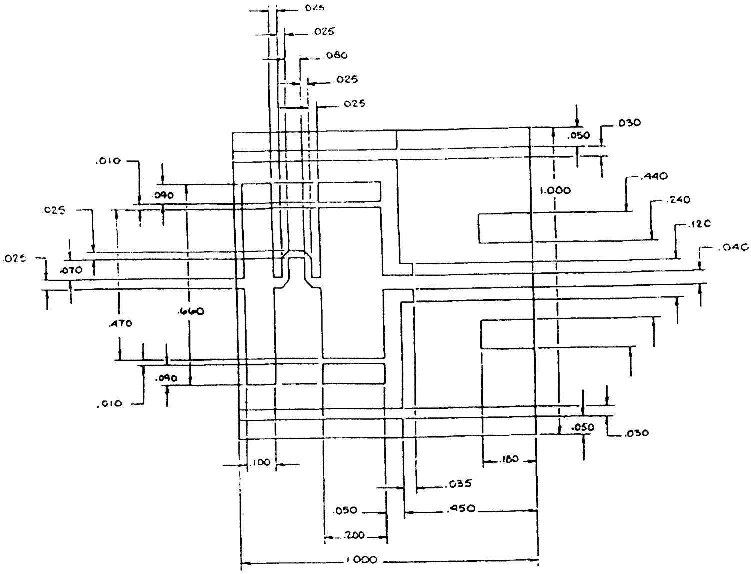
Note: Pulse Width = 10μSec
Duty Cycle = 10%

## TEST CIRCUIT

Ref.: Dwg. No. C127415

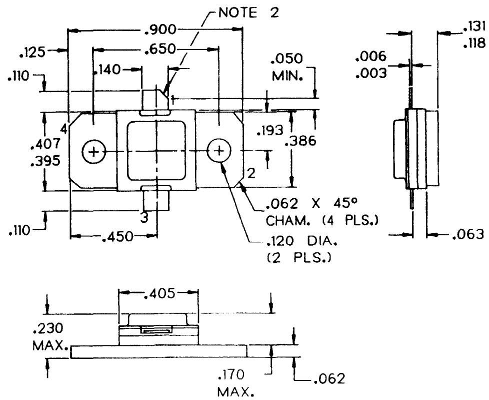


## TEST CIRCUIT (cont'd)




## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J133102E



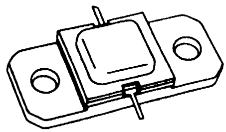

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

SGS-THOMSON MICROELECTRONICS

# AM0912-080

## RF & MICROWAVE TRANSISTORS AVIONICS APPLICATIONS

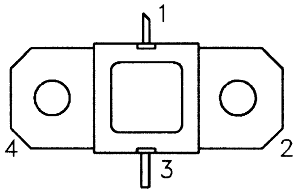
- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 90 W MIN. WITH 13 dB GAIN
- BANDWIDTH 225 MHz



**.400 x .400 2NLFL (S042)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM0912-080 | 0912-80 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The AM0912-080 Avionics power transistor is a broadband, high peak pulse power device specifically designed for avionics applications requiring broad bandwidth with moderate duty cycle and pulse width constraints such as ground/ship based DME/TACAN.

This device is also designed for specialized applications including JTIDS where reduced power provided under pulse formats utilizing short pulse widths and high burst or overall duty cycles.

The AM0912-080 is housed in the unique AMPAC™ Hermetic Metal/Ceramic package with internal Input/Output matching structures.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C$ ≤100°C) | 220 | W |
| $I_C$ | Device Current* | 7.0 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 50 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 0.80 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 40mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 3.0 | — | — | V |
| $BV_{CER}$ | IC = 40mA | $R_{BE}$ = 10Ω | 65 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 50V | | — | — | 12 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 2A | 20 | — | 120 | — |

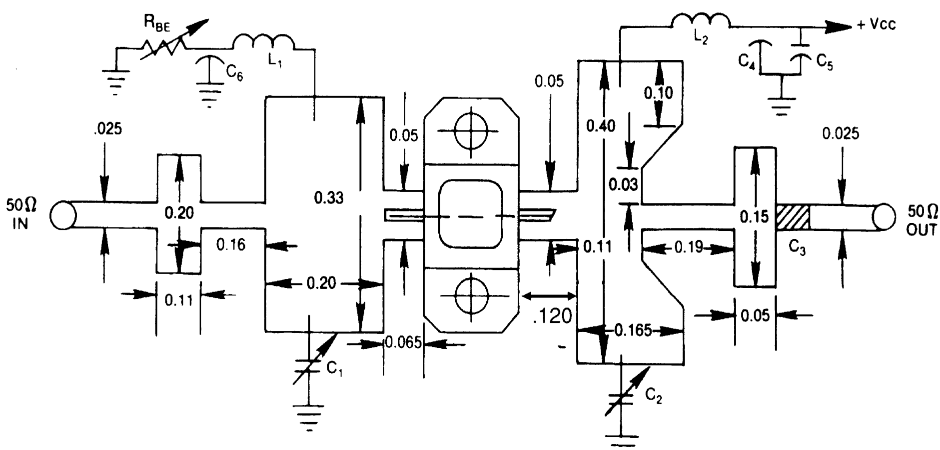
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 960 — 1215MHz | $P_{IN}$ = 13W | $V_{CC}$ = 50V | 90 | 100 | — | W |
| $\eta_C$ | f = 960 — 1215MHz | $P_{IN}$ = 13W | $V_{CC}$ = 50V | 38 | 44 | — | % |
| $G_P$ | f = 960 — 1215MHz | $P_{IN}$ = 13W | $V_{CC}$ = 50V | 8.4 | — | — | dB |

Note: Pulse Width = 10μSec
Duty Cycle = 10%

## TEST CIRCUIT

Ref. Dwg. No. J-313120

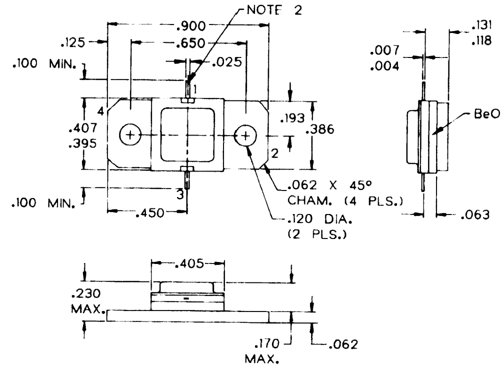



All dimensions are in inches.
Substrate material: .025 thick $Al_2O_3$

C1,C2 : 0.3 - 3.5 pF Johanson Capacitors, or Equiv.
C3 : 100 pF Chip Capacitor
C4.C6 : 1500 pF RF Feedthru
C5 : 100 MF, Electrolytic 50V
L1,L2 : No. 32 Wire, 4 Turn .062 I.D.
RBE : 0 - 1.0 Ohm

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J113214F



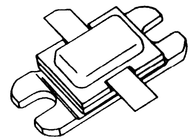

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD SLANT CUT.

SGS-THOMSON MICROELECTRONICS

# AM0912-150

## RF & MICROWAVE TRANSISTORS AVIONICS APPLICATIONS

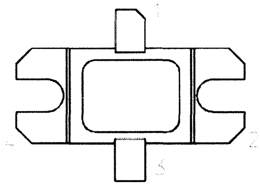
- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 150 W MIN. WITH 7.5 dB GAIN
- BANDWIDTH = 255MHz



**.400 x .500 2LFL (S038)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM0912-150 | 0912-150 |

**PIN CONNECTION**



1. Collector
2. Base
3. Emitter
4. Base

## DESCRIPTION

The AM0912-150 is designed for specialized avionics applications including Mode-S, TCAS and JTIDS, where power is provided under pulse formats utilizing short pulse widths and high burst or overall duty cycles.

The AM0912-150 is housed in the unique BIGPAC™ Hermetic Metal/Ceramic package with internal Input/Output matching structures.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq$ 100°C) | 300 | W |
| $I_C$ | Device Current* | 16.5 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 35 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 0.57 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 60mA | $I_E$ = 0mA | 55 | 65 | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CES}$ | IC = 100mA | | 55 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 35V | | — | — | 25 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 5A | 20 | — | — | — |

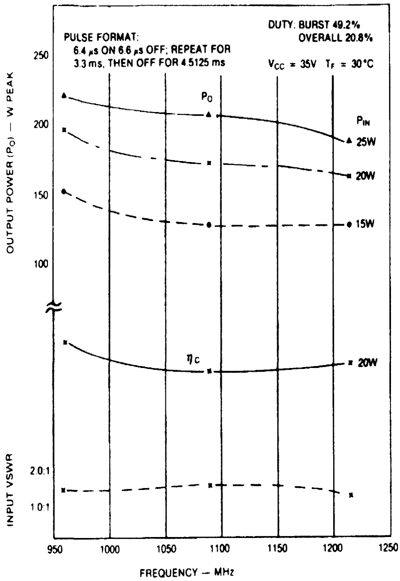
### DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 960 — 1215MHz | $P_{IN}$ = 26.7W | $V_{CC}$ = 35V | 150 | — | — | W |
| $\eta_C$ | f = 960 — 1215MHz | $P_{IN}$ = 26.7W | $V_{CC}$ = 35V | 45 | — | — | % |
| $G_P$ | f = 960 — 1215MHz | $P_{IN}$ = 26.7W | $V_{CC}$ = 35V | 7.5 | — | — | dB |

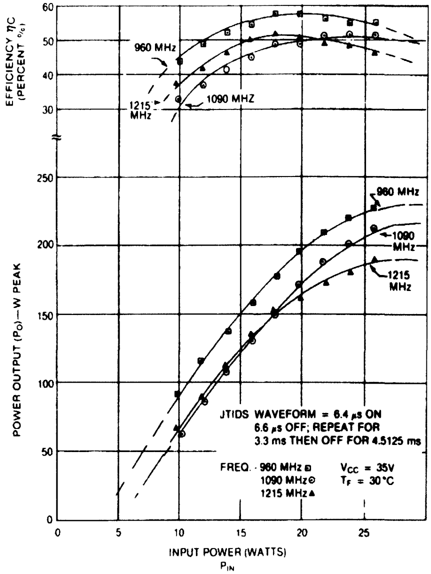
Note: Pulse Format: 6.4 µS on 6.6 µS off; repeat for 3.3 ms, then off for 4.5125 ms
Duty Cycle: Burst 49.2% overall 20.8%

## TYPICAL PERFORMANCE

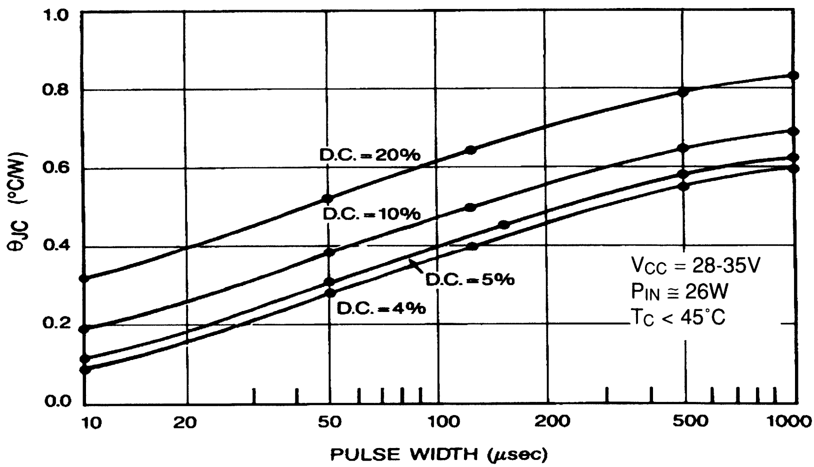
### TYPICAL POWER INPUT, POWER OUTPUT & COLLECTOR EFFICIENCY vs FREQUENCY




### POWER OUTPUT & COLLECTOR EFFICIENCY vs POWER INPUT

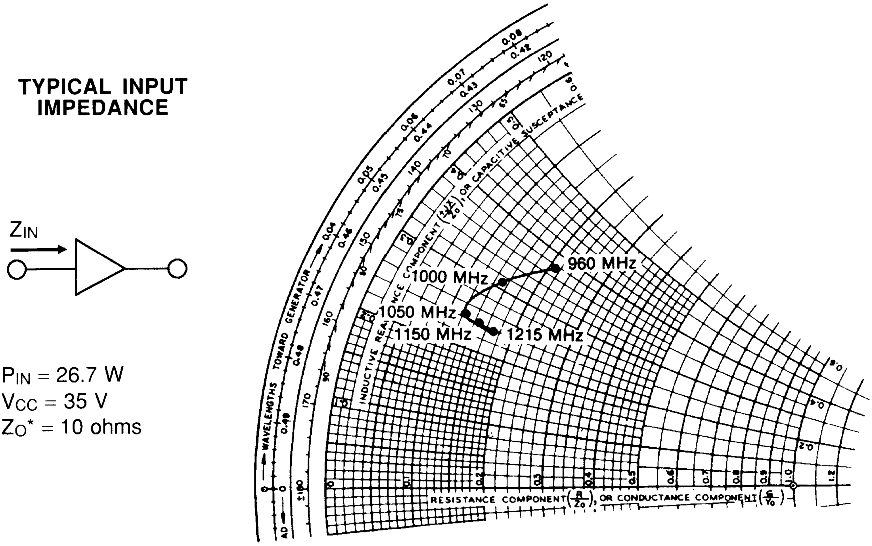



### MAXIMUM THERMAL RESISTANCE vs PULSE WIDTH & DUTY CYCLE



## IMPEDANCE DATA

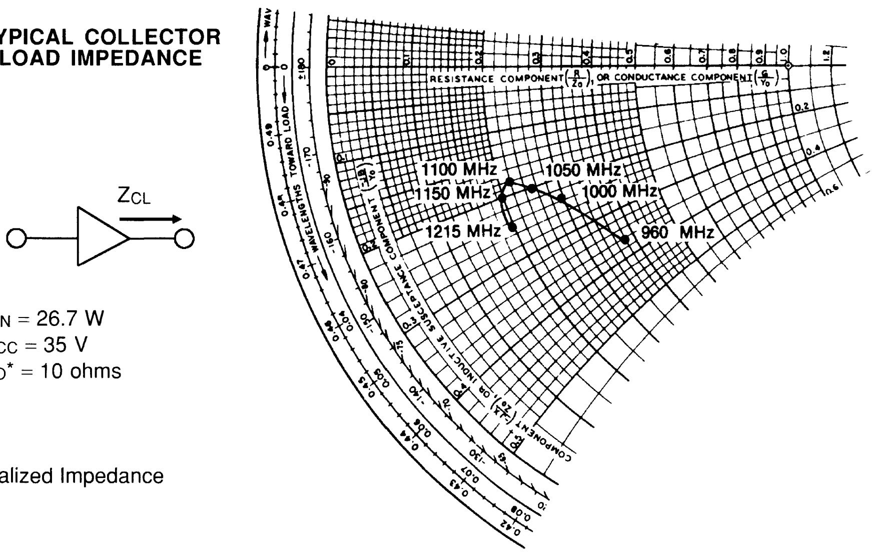
**TYPICAL INPUT IMPEDANCE**




$P_{IN}$ = 26.7 W
$V_{CC}$ = 35 V
$Z_O$* = 10 ohms

| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| L = 960 MHz | 2.1 + j 3.8 | 3.8 − j 3.6 |
| • = 1000 MHz | 1.5 + j 3.1 | 3.0 − j 2.4 |
| M = 1050 MHz | 1.2 + j 2.5 | 2.5 − j 2.0 |
| • = 1150 MHz | 1.5 + j 2.4 | 2.0 − j 2.0 |
| H = 1215 MHz | 1.7 + j 2.4 | 2.0 − j 2.5 |

**TYPICAL COLLECTOR LOAD IMPEDANCE**

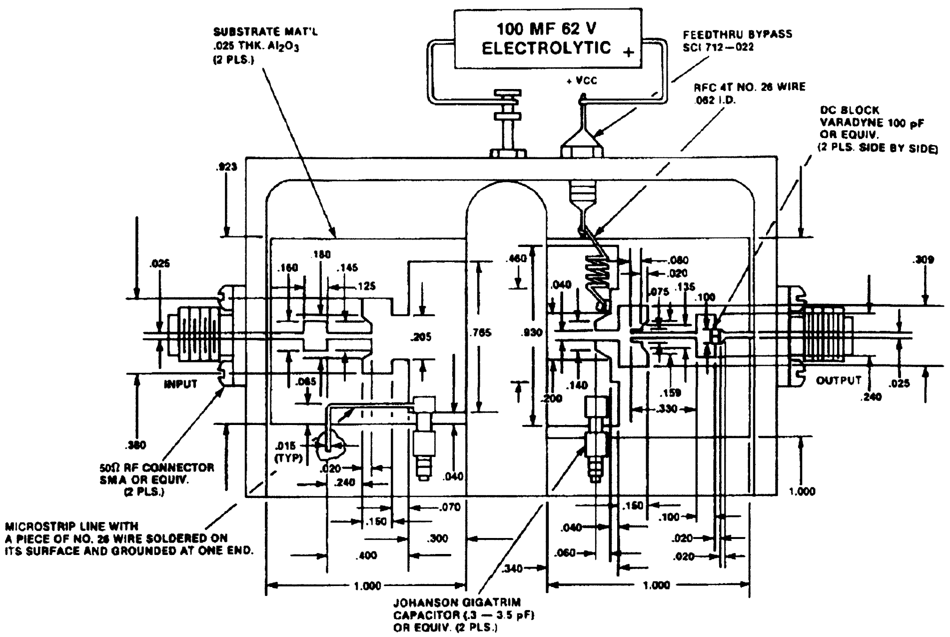



$P_{IN}$ = 26.7 W
$V_{CC}$ = 35 V
$Z_O$* = 10 ohms

*Normalized Impedance

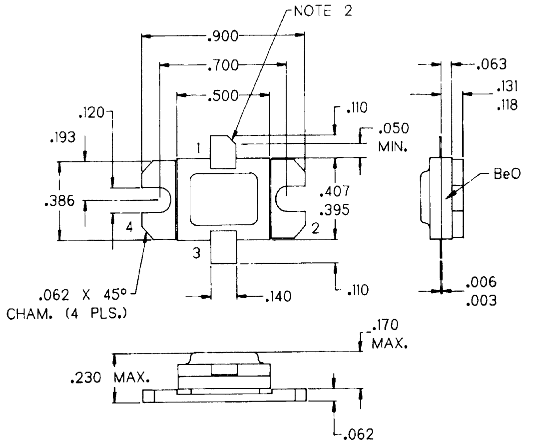
## TEST CIRCUIT

Ref: Dwg. No. C127513



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135066F



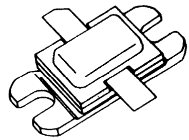

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

SGS-THOMSON
MICROELECTRONICS

# AM0912-300

## RF & MICROWAVE TRANSISTORS AVIONICS APPLICATIONS

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- 15:1 VSWR CAPABILITY
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 300 W MIN. WITH 7.0 dB GAIN
- BANDWIDTH 255 MHz



**.400 x .500 2LFL (S038)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM0912-300 | 0912-300 |

### DESCRIPTION

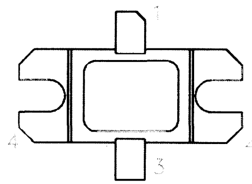
The AM0912-300 avionics power transistor is a broadband, high peak pulse power device specifically designed for avionics applications requiring broad bandwidth with moderate duty cycle and pulse width constraints such as ground/ship based DME/TACAN.

The AM0912-300 is also designed for specialized applications where reduced power is provided under pulse formats utilizing short pulse widths and high burst or overall duty cycles.

This device is capable of withstanding 15:1 VSWR mismatch load condition at any phase angle under full rated conditions.

The AM0912-300 is housed in the unique BIGPAC™ Hermetic Metal/Ceramic package with internal Input/Output matching structures.

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 100$°C) | 940 | W |
| $I_C$ | Device Current* | 24 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 50 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 0.16 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 50mA | $I_E$ = 0mA | 65 | 80 | — | V |
| $BV_{EBO}$ | $I_E$ = 15mA | $I_C$ = 0mA | 3.0 | — | — | V |
| $BV_{CER}$ | IC = 50mA | $R_{BE}$ = 10Ω | 65 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 50V | | — | — | 30 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 5A | 10 | — | — | — |

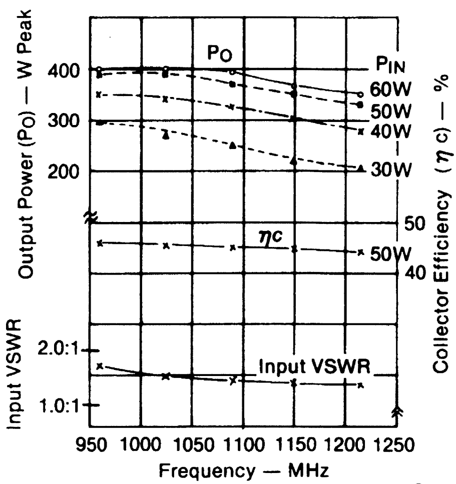
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 960 — 1215MHz | $P_{IN}$ = 60W | $V_{CC}$ = 50V | 300 | 330 | — | W |
| $\eta_C$ | f = 960 — 1215MHz | $P_{IN}$ = 60W | $V_{CC}$ = 50V | 38 | 45 | — | % |
| $G_P$ | f = 960 — 1215MHz | $P_{IN}$ = 60W | $V_{CC}$ = 50V | 7.0 | 7.4 | — | dB |

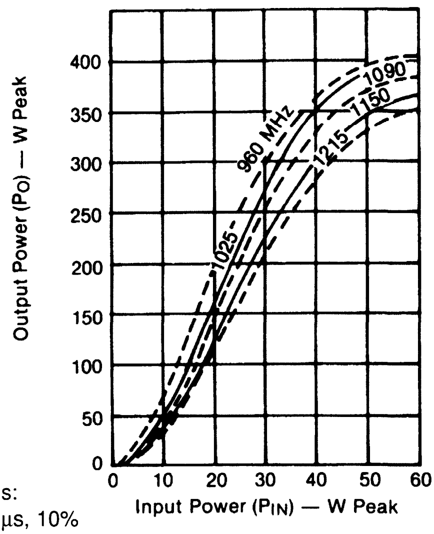
Note: Pulse Width = 10μSec
Duty Cycle = 10%

## TYPICAL PERFORMANCE

### TYPICAL BROADBAND RESPONSE

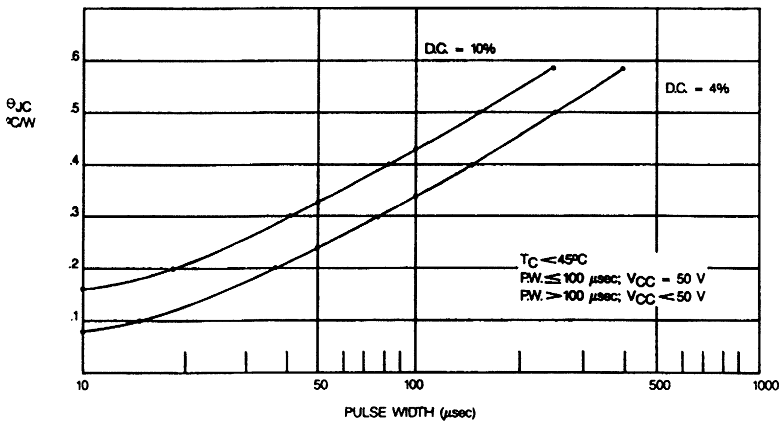



### TYPICAL POWER OUTPUT vs POWER INPUT



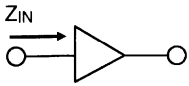

Conditions:
PW = 10 µs, 10%
$V_{CC}$ = 50 V

### MAXIMUM THERMAL RESISTANCE vs PULSE WIDTH & DUTY CYCLE

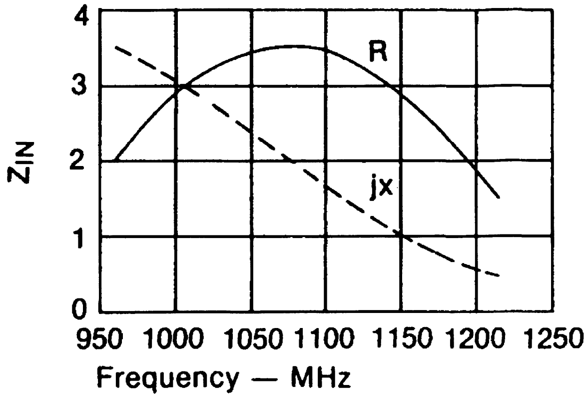


## IMPEDANCE DATA

**TYPICAL INPUT IMPEDANCE**

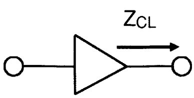



$P_{IN} = 60$ W
$V_{CC} = 50$ V
$Z_O = 50$ ohms

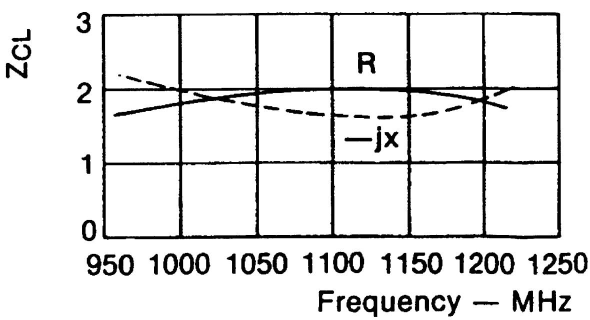



| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| L = 960 MHz | 2.0 + j 3.6 | 1.7 – j 2.2 |
| M = 1090 MHz | 3.5 + j 1.7 | 2.0 – j 1.7 |
| H = 1215 MHz | 1.6 + j 0.5 | 1.8 – j 2.0 |

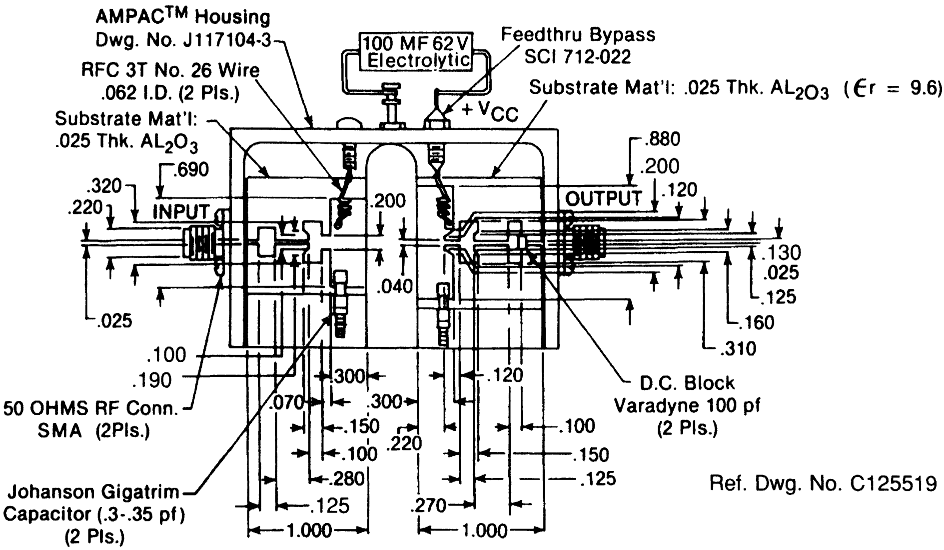
**TYPICAL COLLECTOR LOAD IMPEDANCE**




$P_{IN} = 60$ W
$V_{CC} = 50$ V
$Z_O = 50$ ohms

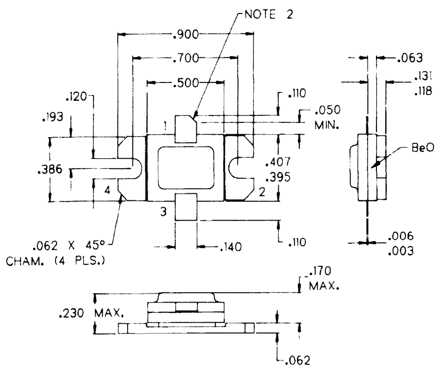


## TEST CIRCUIT




## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135066F




NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

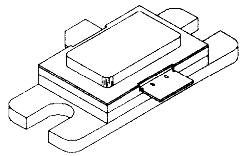
SGS-THOMSON MICROELECTRONICS

# AM0912-350

## RF & MICROWAVE TRANSISTORS AVIONICS APPLICATIONS

ADVANCE PRODUCT INFORMATION

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- SIXPAC™ METAL/CERAMIC PACKAGE
- $P_{OUT}$ = 350 W MIN. WITH 7.0 dB GAIN



**.400 x .600 2LFL (M198)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM0912-350 | 0912-350 |

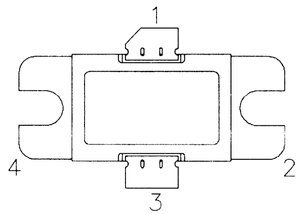
### DESCRIPTION

The AM0912-350 avionics power transistor is a broadband, high peak pulse power device specifically designed for avionics applications requiring broad bandwidth with moderate duty cycle and pulse width constraints such as ground/ship based DME/TACAN.

The AM0912-350 is also designed for specialized applications using high burst or overall duty cycles. The device is capable of withstanding 10:1 mismatch load condition at any phase angle under full rated conditions.

AM0912-350 is housed in the SIXPAC™ Hermetic Metal/Ceramic package with internal input/output matching structures.

### PIN CONNECTION




1. Collector
2. Base
3. Emitter
4. Base

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 75°C$) | 1140 | W |
| $I_C$ | Device Current* | 26 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 55 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 0.15 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case} = 25°C$)

### STATIC

| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C = 50mA$ | $I_E = 0mA$ | 70 | — | — | V |
| $BV_{EBO}$ | $I_E = 30mA$ | $I_C = 0mA$ | 3.0 | — | — | V |
| $BV_{CES}$ | IC = 50mA | $V_{BE} = 0V$ | 70 | — | — | V |
| $I_{CES}$ | $V_{BE} = 0V$ | $V_{CE} = 50V$ | — | — | 40 | mA |
| $h_{FE}$ | $V_{CE} = 5V$ | $I_C = 1.0A$ | 10 | — | — | — |

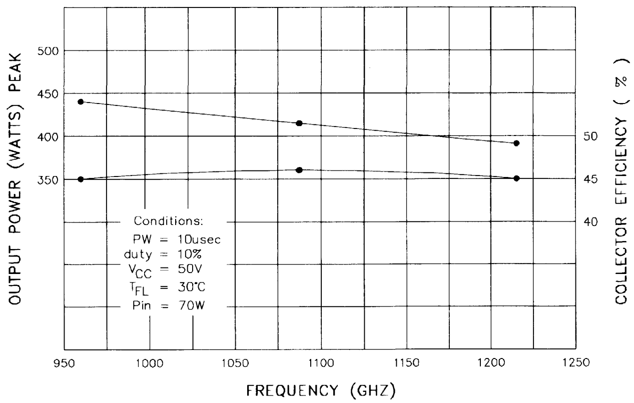
### DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 960 — 1215MHz | $P_{IN} = 70W$ | $V_{CC} = 50V$ | 350 | — | — | W |
| $\eta_C$ | f = 960 — 1215MHz | $P_{IN} = 70W$ | $V_{CC} = 50V$ | 38 | — | — | % |
| $G_P$ | f = 960 — 1215MHz | $P_{IN} = 70W$ | $V_{CC} = 50V$ | 7.0 | — | — | dB |

Note: Pulse Width = 10µSec
Duty Cycle = 10%

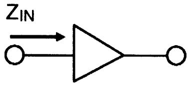
## TYPICAL PERFORMANCE

**POWER OUTPUT & COLLECTOR EFFICIENCY vs FREQUENCY**

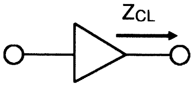


## IMPEDANCE DATA

**TYPICAL INPUT IMPEDANCE**




**TYPICAL COLLECTOR LOAD IMPEDANCE**

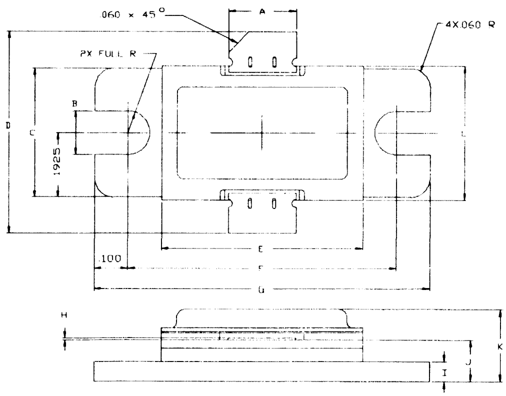



| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| L = 960 MHz | 0.73 + j 1.85 | 0.83 − j 0.74 |
| M = 1090 MHz | 1.24 + j 0.51 | 1.18 − j 0.73 |
| H = 1215 MHz | 1.49 − j 0.08 | 0.62 + j 1.10 |

$P_{IN}$ = 70W
$V_{CC}$ = 50V
Normalized to 50 ohms

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No. 12-0198




| SGS-THOMSON MICROELECTRONICS | MINIMUM Inches/mm | MAXIMUM Inches/mm |
|---|---|---|
| A | .195/4,95 | .205/5,21 |
| B | .130/3,30 | |
| C | .380/9,65 | .390/9,91 |
| D | .570/14,48 | |
| E | .590/14,99 | .610/15,49 |
| F | .795/20,19 | .805/20,45 |
| G | .995/25,27 | 1.005/25,53 |
| H | .002/0,05 | .006/0,15 |
| I | .055/1,40 | .065/1,65 |
| J | .110/2,79 | .130/3,30 |

| CONT'D | MINIMUM Inches/mm | MAXIMUM Inches/mm |
|---|---|---|
| K | | .230/5,84 |
| L | .393/9,98 | .410/10,41 |

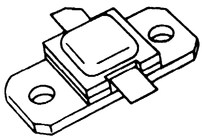
SGS-THOMSON MICROELECTRONICS

# AM1011-050

## RF & MICROWAVE TRANSISTORS L-BAND AVIONICS APPLICATIONS

PRELIMINARY DATA

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 45 W MIN. WITH 8.8 dB GAIN



**.400 x .400 2 LFL (S036)**
hermetically sealed

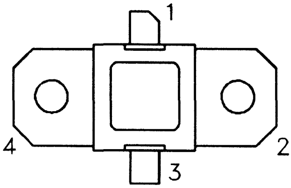
| ORDER CODE | BRANDING |
|---|---|
| AM1011-050 | 1011-50 |

### DESCRIPTION

The AM1011-050 device is a high power Class C transistor specifically designed for L-Band Avionics transponder/interrogator pulsed output and driver applications.

This device is capable of operation over a wide range of pulse widths, duty cycles and temperatures and is capable of withstanding severe output VSWR at rated RF conditions. Low RF thermal resistance and computerized automatic wire bonding techniques ensure high reliability and product consistency.
The AM1011-050 is supplied in the AMPAC™ Hermetic Metal/Ceramic package with internal Input/Output matching structures.

### PIN CONNECTION




1. Collector
2. Base
3. Emitter
4. Base

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 100°C$) | 105 | W |
| $I_C$ | Device Current* | 4 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 40 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 1.4 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 15mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 5mA | $I_C$ = 0mA | 3.0 | — | — | V |
| $BV_{CES}$ | IC = 15mA | | 65 | — | — | V |
| $I_{CES}$ | $V_{BE}$ = 0V | $V_{CE}$ = 36V | — | — | 5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 500mA | 10 | — | 200 | — |

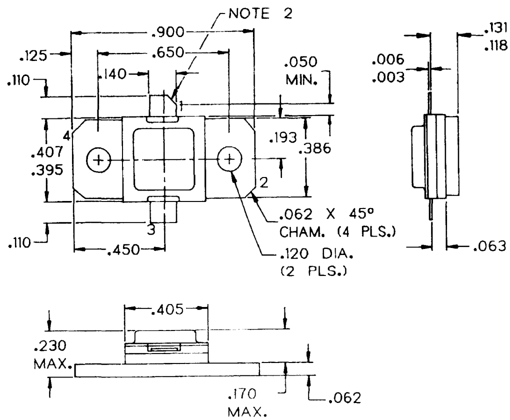
DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 1030MHz | $P_{IN}$ = 6W | $V_{CC}$ = 36V | 45 | — | — | W |
| $\eta_C$ | f = 1030MHz | $P_{IN}$ = 6W | $V_{CC}$ = 36V | 48 | — | — | % |
| $G_P$ | f = 1030MHz | $P_{IN}$ = 6W | $V_{CC}$ = 36V | 8.8 | — | — | dB |

Note: Pulse Width = 250µSec
Duty Cycle = 6%

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J133102E




NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED;
DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

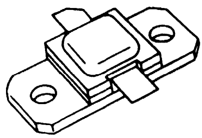
SGS-THOMSON
MICROELECTRONICS

# AM1011-055

## RF & MICROWAVE TRANSISTORS
## L-BAND AVIONICS APPLICATIONS

PRELIMINARY DATA

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- 10:1 VSWR CAPABILITY
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 55 W MIN. WITH 9.2 dB GAIN



**.400 x .400 2LFL (S036)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM1011-055 | 1011-55 |

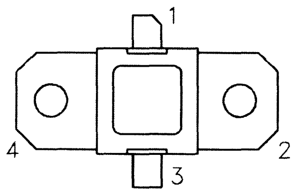
### DESCRIPTION

The AM1011-055 device is a high power Class C transistor specifically designed for L-Band Avionics transponder/interrogator output and driver applications.

This device is capable of operation over a wide range of pulse widths, duty cycles, and temperatures and is capable of withstanding 10:1 output VSWR at rated RF conditions. Low RF thermal resistance and computerized automatic wire bonding techniques ensure high reliability and product consistency.

The AM1011-055 is supplied in the AMPAC™ Hermetic Metal/Ceramic package with internal Input/Output matching structures.

### PIN CONNECTION




1. Collector
2. Base
3. Emitter
4. Base

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 100$°C) | 91 | W |
| $I_C$ | Device Current* | 3.79 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 50 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 1.1 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 7.5mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 3mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 7.5mA | $R_{BE}$ = 10Ω | 65 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 50V | | — | — | 4 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1A | 5 | — | 200 | — |

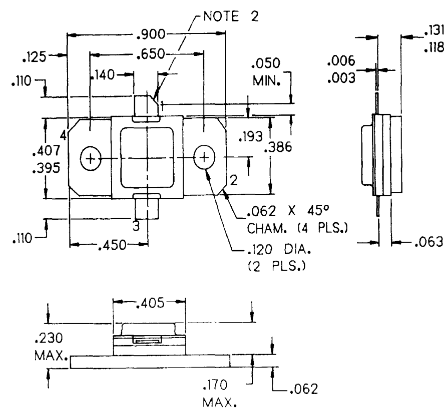
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1090MHz | $P_{IN}$ = 6.6W | $V_{CC}$ = 50V | 55 | — | — | W |
| $\eta_C$ | f = 1090MHz | $P_{IN}$ = 6.6W | $V_{CC}$ = 50V | 48 | — | — | % |
| $G_P$ | f = 1090MHz | $P_{IN}$ = 6.6W | $V_{CC}$ = 50V | 9.2 | — | — | dB |

Note: Pulse Width = 32 µS
Duty Cycle = 2%

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J133102E



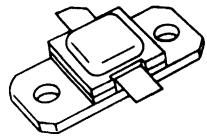

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED;
DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

# SGS-THOMSON MICROELECTRONICS

# AM1011-060

## RF & MICROWAVE TRANSISTORS L-BAND AVIONICS APPLICATIONS

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- 10:1 VSWR CAPABILITY
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 60 W MIN. WITH 10 dB GAIN



**.400 x .400 2LFL (S036)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM1011-060 | 1011-60 |

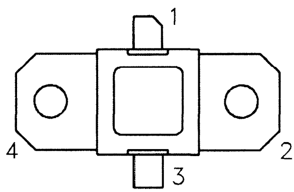
### DESCRIPTION

The AM1011-060 device is a high power Class C transistor specifically designed for L-Band Avionics transponder/interrogator pulsed output and driver applications.

This device is capable of operation over a wide range of pulse widths, duty cycles and temperatures and is capable of withstanding 10:1 output VSWR at rated RF conditions. Low RF thermal resistance and computerized automatic wire bonding techniques ensure high reliability and product consistency.

The AM1011-060 is supplied in the AMPAC™ Hermetic Metal/Ceramic package with internal Input/Output matching structures.

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq$ 100°C) | 130 | W |
| $I_C$ | Device Current* | 4 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 55 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 1.1 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 12mA | $I_E$ = 0mA | 70 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 4mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 12mA | $R_{BE}$ = 10Ω | 70 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 50V | | — | — | 4 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 500mA | 10 | — | 200 | — |

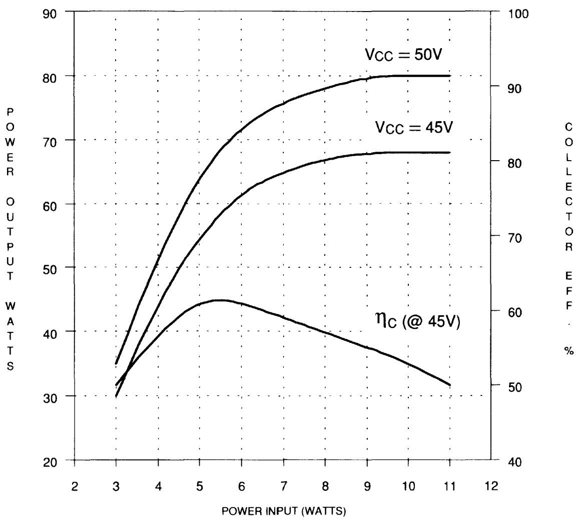
DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 1090MHz | $P_{IN}$ = 6W | $V_{CC}$ = 50V | 60 | 72 | — | W |
| $\eta_C$ | f = 1090MHz | $P_{IN}$ = 6W | $V_{CC}$ = 50V | 48 | 60 | — | % |
| $G_P$ | f = 1090MHz | $P_{IN}$ = 6W | $V_{CC}$ = 50V | 10 | 10.8 | — | dB |

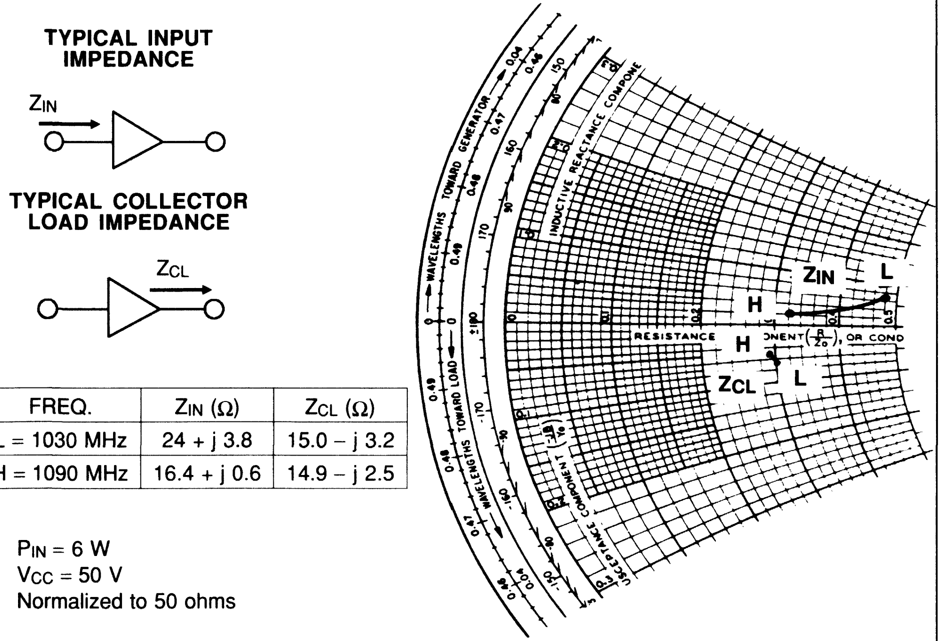
Note: Pulse Width = 100µSec
Duty Cycle = 4%

## TYPICAL PERFORMANCE

### TYPICAL POWER OUTPUT & COLLECTOR EFFICIENCY vs POWER INPUT



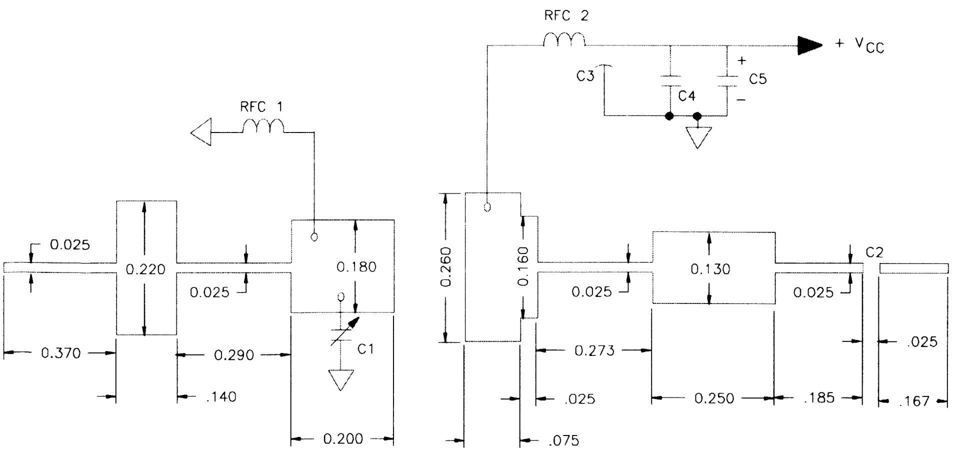
## IMPEDANCE DATA




| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| L = 1030 MHz | 24 + j 3.8 | 15.0 – j 3.2 |
| H = 1090 MHz | 16.4 + j 0.6 | 14.9 – j 2.5 |

$P_{IN}$ = 6 W
$V_{CC}$ = 50 V
Normalized to 50 ohms

## TEST CIRCUIT



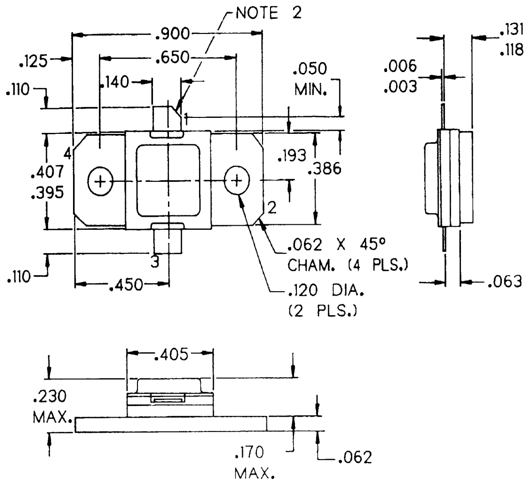

All dimensions are in inches.
Substrate material: .025 thick $Al_2O_3$

RFC 1: Gold Plated Ni Strap
0.400 Long, 0.035 Wide, 0.005 Thick
RFC 2: No. 26 Wire, 4 Turn .062 I.D.
C1 : 0.6—4.5 pF Johanson Gigatrim Capacitor

C2 : 100 pF Chip Capacitor
C3 : 1500 pF Filtercon Feedthrough
C4 : 1 µF, Ceramic Capacitor
C5 : 100 µF, Electrolytic Capacitor

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J133102E

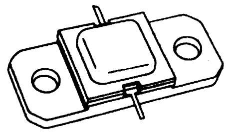



NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

# AM1011-070

## RF & MICROWAVE TRANSISTORS
## L-BAND AVIONICS APPLICATIONS

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 70 W MIN. WITH 6.7 dB GAIN



**.400 x .400 2NLFL (S042)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM1011-70 | 1011-70 |

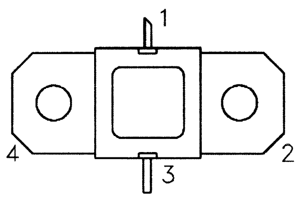
### DESCRIPTION

The AM1011-070 device is a high power Class C transistor specifically designed for L-Band Avionics transponder/interrogator pulsed output and driver applications.

This device is capable of operation over a wide range of pulse widths, duty cycles and temperatures and is capable of withstanding severe output VSWR at rated RF conditions. Low RF thermal resistance and computerized automatic wire bonding techniques ensure high reliability and product consistency.

The AM1011-070 is supplied in the AMPAC™ Hermetic Metal/Ceramic package with internal Input/Output matching structures.

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq$ 100°C) | 200 | W |
| $I_C$ | Device Current* | 8.0 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 32 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 0.68 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 25mA | $I_E$ = 0mA | 55 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 25mA | $R_{BE}$ = 10Ω | 55 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 35V | | — | — | 20 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 2mA | 20 | — | 200 | — |

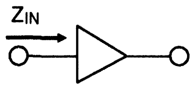
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1090 MHz | $P_{IN}$ = 15W | $V_{CC}$ = 28V | 70 | — | — | W |
| $\eta_C$ | f = 1090 MHz | $P_{IN}$ = 15W | $V_{CC}$ = 28V | 45 | — | — | % |
| $G_P$ | f = 1090 MHz | $P_{IN}$ = 15W | $V_{CC}$ = 28V | 6.7 | — | — | dB |

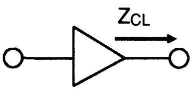
Note: Pulse Width = 100µSec
Duty Cycle = 2%

## IMPEDANCE DATA

**TYPICAL INPUT IMPEDANCE**




**TYPICAL COLLECTOR LOAD IMPEDANCE**

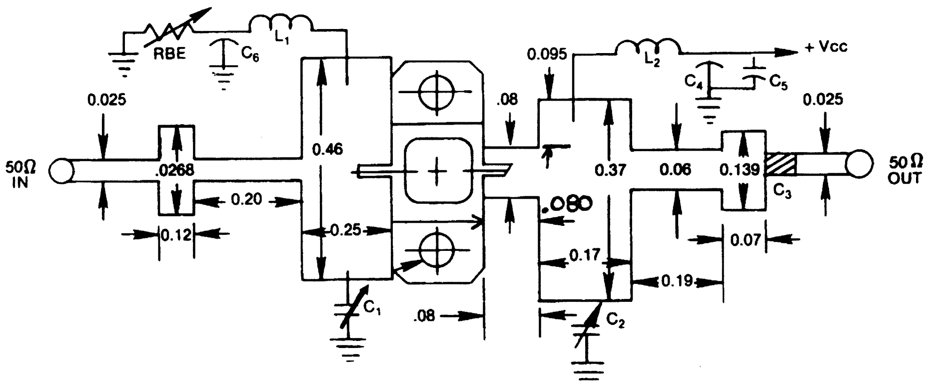



$P_{IN}$ = 15 W
$V_{CC}$ = 28 V
Normalized to 50 ohms

| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| L = 1025 MHz | 4.7 + j 4.7 | 3.6 + j 4.3 |
| H = 1090 MHz | 4.7 + j 3.9 | 3.3 + j 4.4 |

## TEST CIRCUIT

Ref. Dwg. No. J313119

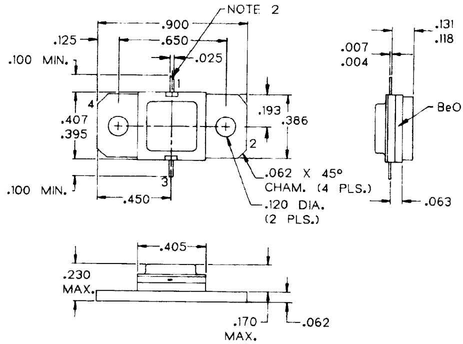



All dimensions are in inches.
Substrate material: .025 thick $Al_2O_3$

C1 : 0.3—3.5 pF Johanson Gigatrim Capacitor
C2 : 0.3—3.5 pF Johanson Gigatrim Capacitor
C3 : 100 pF Chip Capacitor
C4 : 1500 pF Erie Feedthru, or Equiv.
C5 : 100 MF Electrolytic Capacitor, 50V
C6 : 1500 pF Erie Feedthrough, or Equiv.
L1 : #32 Wire, 4 Turn .062 I.D.
L2 : #32 Wire, 4 Turn .062 I.D.
RBE : 0 — 1.0 Ohm

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J113214F

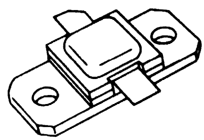



NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD SLANT CUT.

# AM1011-075

## RF & MICROWAVE TRANSISTORS L-BAND AVIONICS APPLICATIONS

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- 10:1 VSWR CAPABILITY
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 75 W MIN. WITH 9.2 dB GAIN



**.400 x .400 2LFL (S036)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM1011-075 | 1011-75 |

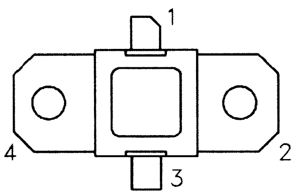
### DESCRIPTION

The AM1011-075 device is a high power Class C transistor specifically designed for L-Band Avionics transponder/interrogator pulsed output and driver applications.

This device is capable of operation over a wide range of pulse widths, duty cycles, and temperatures and is capable of withstanding 10:1 output VSWR at rated RF conditions. Low RF thermal resistance and computerized automatic wire bonding techniques ensure high reliability and product consistency.

The AM1011-075 is supplied in the AMPAC™ Hermetic Metal/Ceramic package with internal Input/Output matching structures.

### PIN CONNECTION




1. Collector
2. Base
3. Emitter
4. Base

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 100$°C) | 175 | W |
| $I_C$ | Device Current* | 5.4 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 55 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 0.86 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 10mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 4mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 20mA | $R_{BE}$ = 10Ω | 65 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 50V | | — | — | 6 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1mA | 10 | — | — | — |

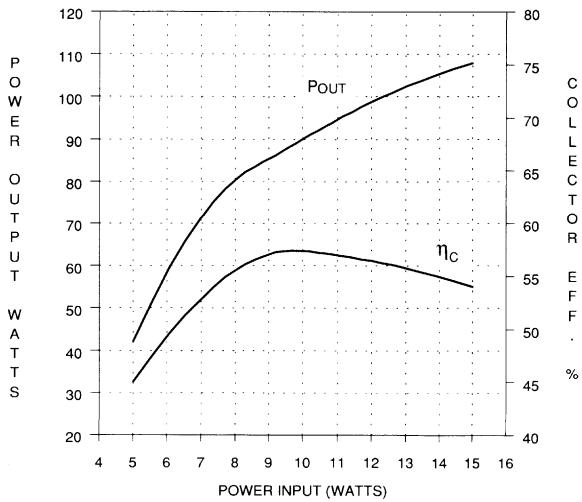
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1090MHz | $P_{IN}$ = 9W Peak | $V_{CC}$ = 50V | 75 | 84 | — | W |
| $\eta_C$ | f = 1090MHz | $P_{IN}$ = 9W Peak | $V_{CC}$ = 50V | 48 | 56 | — | % |
| $G_P$ | f = 1090MHz | $P_{IN}$ = 9W Peak | $V_{CC}$ = 50V | 9.2 | 9.7 | — | dB |

Note: Pulse Width = 32µSec
Duty Cycle = 2%

## TYPICAL PERFORMANCE

### TYPICAL POWER OUTPUT & COLLECTOR EFFICIENCY vs POWER INPUT

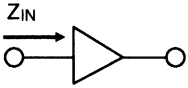




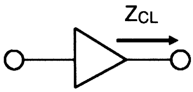

SGS-THOMSON MICROELECTRONICS

## IMPEDANCE DATA

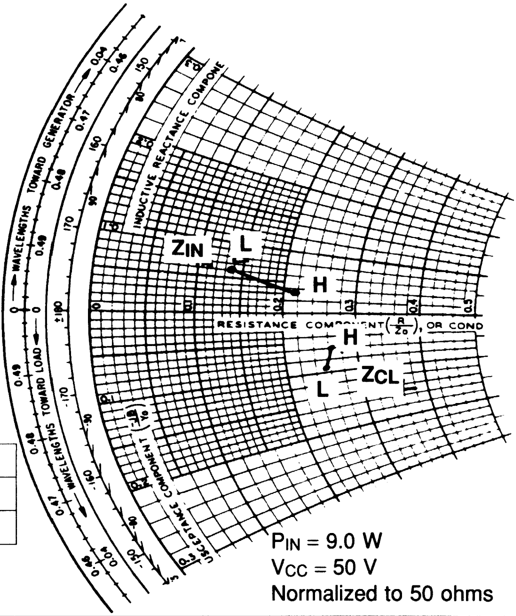
**TYPICAL INPUT IMPEDANCE**



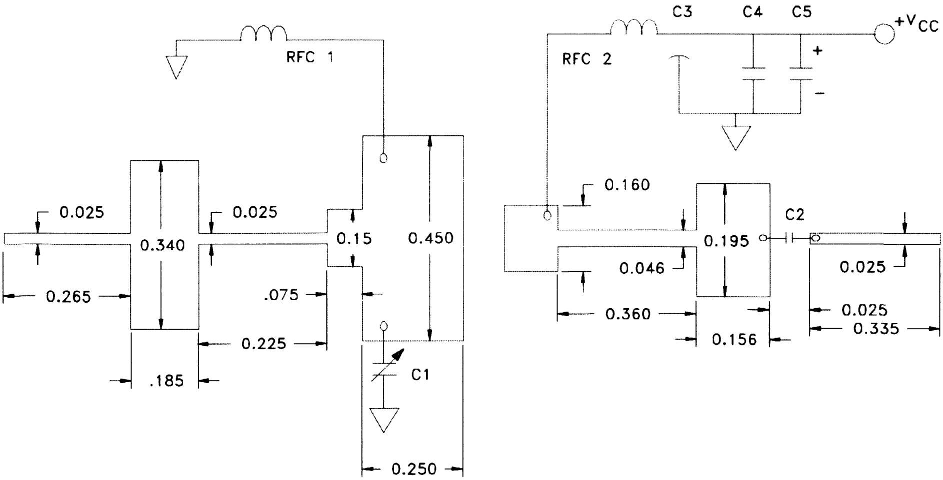

**TYPICAL COLLECTOR LOAD IMPEDANCE**




| FREQ. | $Z_{IN}$ ($\Omega$) | $Z_{CL}$ ($\Omega$) |
|---|---|---|
| L = 1030 MHz | 7.0 + j 3.0 | 12.5 – j 4.5 |
| H = 1090 MHz | 11.0 + j 1.5 | 13.0 – j 3.0 |




## TEST CIRCUIT

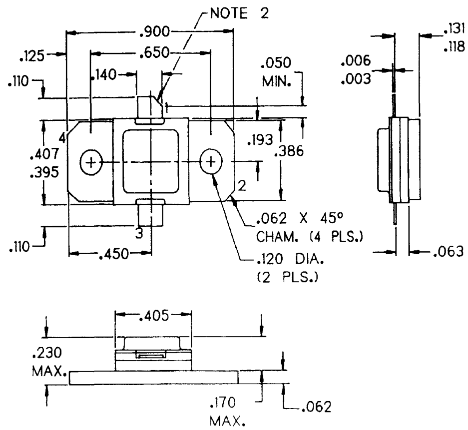



All dimensions are in inches.
Substrate material: .025 thick $Al_2O_3$

C1 : 0.8—8.0 pF Johanson Gigatrim Capacitor
C2 : 100 pF Chip Capacitor
C3 : 1500 pF Filtercon Feedthru
C4 : 1 μF, Ceramic Capacitor
C5 : 100 μF, Electrolytic Capacitor
RFC 1 : Au Plated Ni Strap
0.280 Long x 0.035 Wide x 0.005 Thick
RFC 2 : #26 Wire, 4 Turn 1/16 I.D.

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J133102E




NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

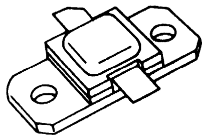
SGS-THOMSON MICROELECTRONICS

# AM1011-175

## RF & MICROWAVE TRANSISTORS L-BAND AVIONICS APPLICATIONS

PRELIMINARY DATA

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- 10:1 VSWR CAPABILITY
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 200 W MIN. WITH 8.0 dB GAIN



**.400 x .400 2LFL (S036)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM1011-175 | 1011-175 |

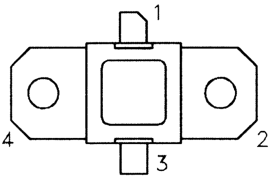
### DESCRIPTION

The AM1011-175 device is a high power Class C transistor specifically designed for L-Band Avionics transponder/interrogator output and driver applications.

This device is capable of operation over a wide range of pulse widths, duty cycles, and temperatures and is capable of withstanding 10:1 output VSWR at rated RF conditions. Low RF thermal resistance and computerized automatic wire bonding techniques ensure high reliability and product consistency.

The AM1011-175 is supplied in the AMPAC™ Hermetic Metal/Ceramic package with internal Input/Output matching structures.

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 100$°C) | 357 | W |
| $I_C$ | Device Current* | 15.9 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 50 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | - 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 0.28 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case} = 25°C$)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C = 30mA$ | $I_E = 0mA$ | 65 | — | — | V |
| $BV_{EBO}$ | $I_E = 12mA$ | $I_C = 0mA$ | 3.5 | — | — | V |
| $BV_{CES}$ | IC = 30mA | | 65 | — | — | V |
| $I_{CES}$ | $V_{CE} = 50V$ | | — | — | 18 | mA |
| $h_{FE}$ | $V_{CE} = 5V$ | $I_C = 3A$ | 5 | — | 200 | — |

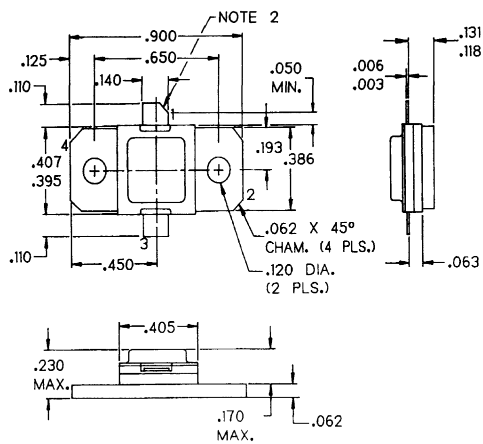
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1090MHz | $P_{IN} = 32W$ | $V_{CC} = 50V$ | 200 | — | — | W |
| $\eta_C$ | f = 1090MHz | $P_{IN} = 32W$ | $V_{CC} = 50V$ | 45 | — | — | % |
| $G_P$ | f = 1090MHz | $P_{IN} = 32W$ | $V_{CC} = 50V$ | 8.0 | — | — | dB |

Note: Pulse Width = 32µSec
Duty Cycle = 2%

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J133102E



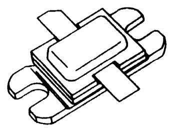

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

SGS-THOMSON
MICROELECTRONICS

# AM1011-225

## RF & MICROWAVE TRANSISTORS
## L-BAND AVIONICS APPLICATIONS

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTING
- 3:1 VSWR CAPABILITY
- LOW RF THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 225 W MIN. WITH 7.5 dB GAIN



**.400 x .500 2LFL (S038)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM1011-225 | 1011-225 |

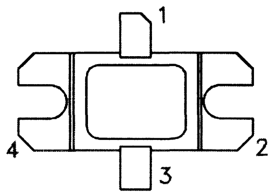
### DESCRIPTION

The AM1011-225 device is a high power Class C transistor specifically designed for L-Band Avionics transponder/interrogator pulsed output and driver applications.

This device is capable of operation over a wide range of pulse widths, duty cycles, and temperatures and is capable of withstanding 3:1 output VSWR at rated RF conditions. Low RF thermal resistance and computerized automatic wire bonding techniques ensure high reliability and product consistency.

The AM1011-225 is supplied in the BIGPAC™ Hermetic Metal/Ceramic package with Input/Output matching structures.

### PIN CONNECTION




1. Collector
2. Base
3. Emitter
4. Base

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* (Tc ≤ 100°C) | 517 | W |
| $I_C$ | Device Current* | 23 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 40 | V |
| $T_J$ | Temperature Junction (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 0.29 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 72mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{EBO}$ | $I_C$ = 0mA | $I_E$ = 25mA | 3.5 | — | — | V |
| $BV_{CES}$ | $I_C$ = 72mA | | 65 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 36V | $V_{BE}$ = 0V | — | — | 20 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 9A | 10 | — | 200 | — |

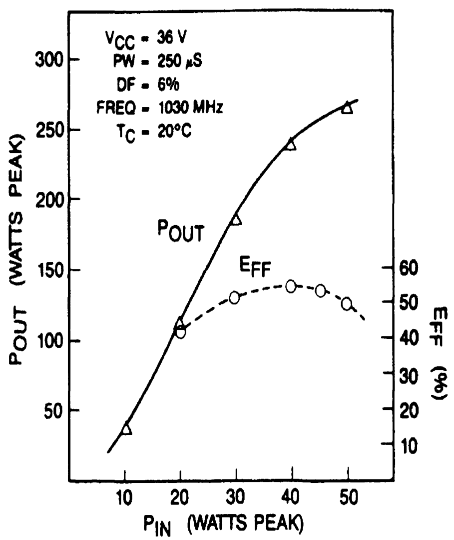
DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 1030MHz | $P_{IN}$ = 40W | $V_{CC}$ = 36V | 225 | 240 | — | W |
| $\eta_C$ | f = 1030MHz | $P_{IN}$ = 40W | $V_{CC}$ = 36V | 48 | 53 | — | % |
| $G_{PB}$ | f = 1030MHz | $P_{IN}$ = 40W | $V_{CC}$ = 36V | 7.5 | 7.8 | — | dB |

Note: Pulse Width = 250µSec
Duty Cycle = 6%

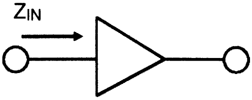
## TYPICAL PERFORMANCE

### TYPICAL POWER OUTPUT & COLLECTOR EFFICIENCY vs POWER INPUT

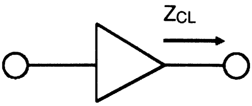


## IMPEDANCE DATA

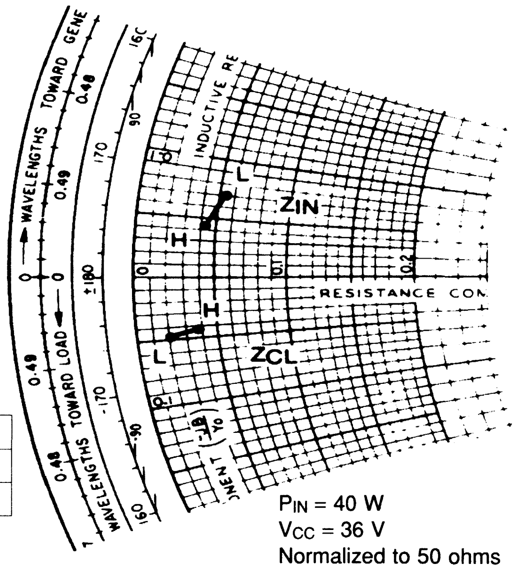
**TYPICAL INPUT IMPEDANCE**




**TYPICAL COLLECTOR LOAD IMPEDANCE**

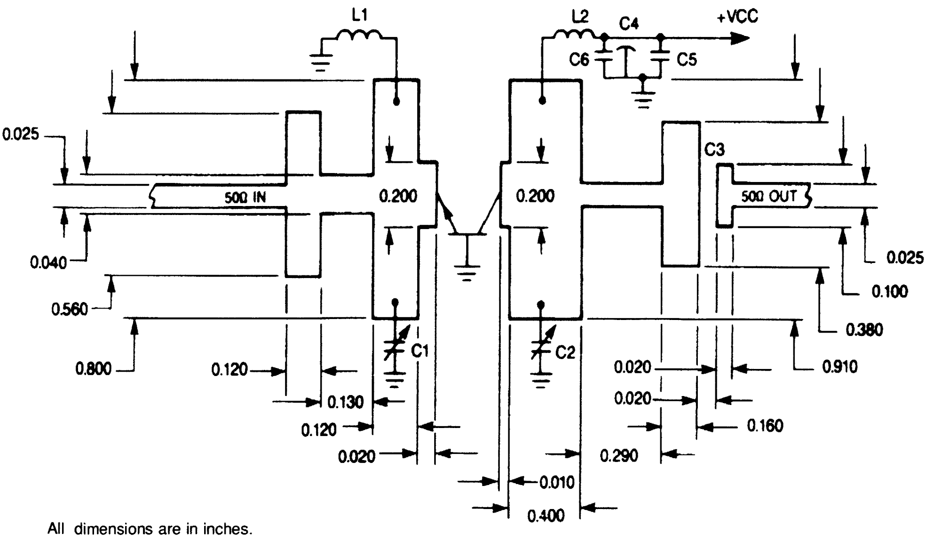



| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| L = 1030 MHz | 2.7 + j 4.0 | 1.0 – j 2.5 |
| H = 1090 MHz | 2.2 + j 2.1 | 2.0 – j 2.1 |




$P_{IN}$ = 40 W
$V_{CC}$ = 36 V
Normalized to 50 ohms

## TEST CIRCUIT

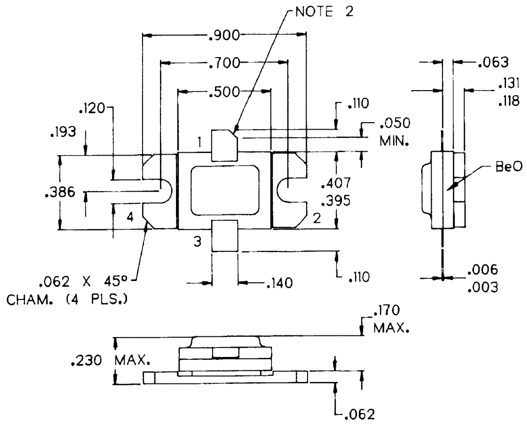



All dimensions are in inches.
Substrate material: .025 thick $Al_2O_3$ (Er = 9.6)

C1 : 0.6—4.5 pF Gigatrim Capacitor
C2 : 0.8—8.0 pF Gigatrim Capacitor
C3 : (2) 100 pF Chip Capacitors in Parallel
C4 : 1500 pF Filtercon Feedthru
C6 : 550 pF Chip Capacitor
L1 : Gold Plated Nickel Strap, 0.060 Inch Wide, 0.005 Inch Thick, 0.150 Inch Long
L2 : #28 Wire, 2 Turn 1/16 Inch I.D.

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135066F



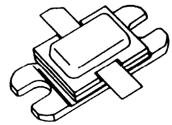

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

SGS-THOMSON MICROELECTRONICS

# AM1011-350

## RF & MICROWAVE TRANSISTORS L-BAND AVIONICS APPLICATIONS

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTING
- 3:1 VSWR CAPABILITY
- LOW RF THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 350 W MIN. WITH 7.7 dB GAIN



**.400 x .500 2LFL (S038)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM1011-350 | 1011-350 |

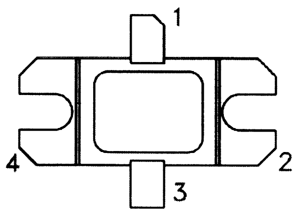
## DESCRIPTION

The AM1011-350 device is a high power Class C transistor specifically designed for L-Band Avionics Mode-S transponder/interrogator pulsed output and driver applications.

This device is capable of operation over a wide range of pulse widths, duty cycles, and temperatures and is capable of withstanding 3:1 output VSWR at rated RF conditions. Low RF thermal resistance and computerized automatic wire bonding techniques ensure high reliability and product consistency.

The AM1011-350 is supplied in the BIGPAC™ Hermetic Metal/Ceramic package with Input/Output matching structures.

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* (Tc ≤ 100°C) | 652 | W |
| $I_C$ | Device Current* | 28 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 55 | V |
| $T_J$ | Temperature Junction (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 0.23 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 72mA | $I_E$ = 0mA | 70 | — | — | V |
| $BV_{EBO}$ | $I_C$ = 0mA | $I_E$ = 25mA | 3.5 | — | — | V |
| $BV_{CES}$ | $I_C$ = 72mA | | 70 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 50V | $V_{BE}$ = 0V | — | — | 30 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 9A | 10 | — | 200 | — |

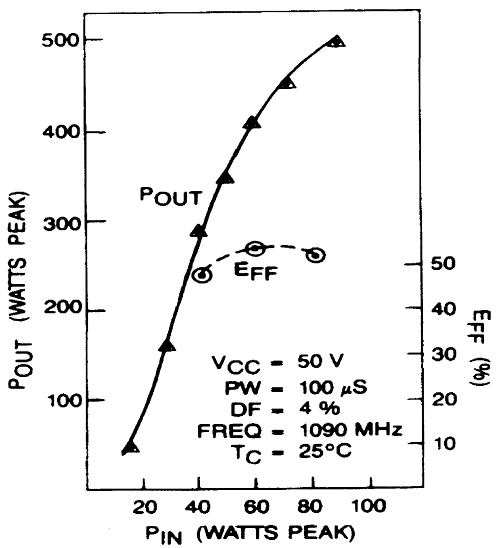
DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 1090MHz | $P_{IN}$ = 60W | $V_{CC}$ = 50V | 350 | 380 | — | W |
| $\eta_C$ | f = 1090MHz | $P_{IN}$ = 60W | $V_{CC}$ = 50V | 48 | 54 | — | % |
| $G_{PB}$ | f = 1090MHz | $P_{IN}$ = 60W | $V_{CC}$ = 50V | 7.7 | 8.0 | — | dB |

Note: Pulse Width = 100µSec
Duty Cycle = 4%

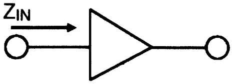
## TYPICAL PERFORMANCE

**TYPICAL POWER OUTPUT & COLLECTOR EFFICIENCY vs POWER INPUT**

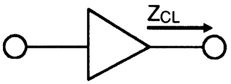


## IMPEDANCE DATA

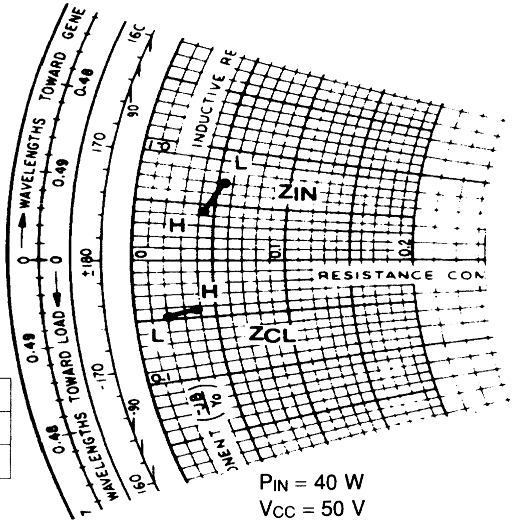
**TYPICAL INPUT IMPEDANCE**




**TYPICAL COLLECTOR LOAD IMPEDANCE**

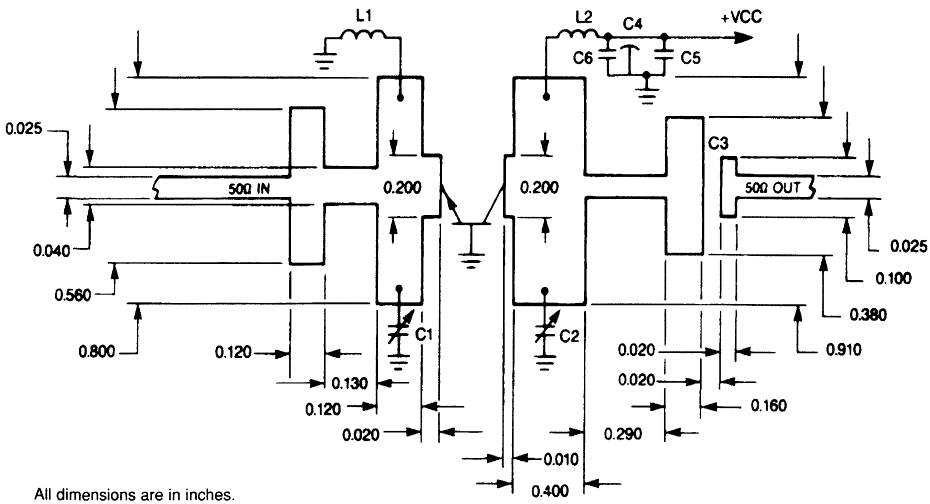



| FREQ. | ZIN (Ω) | ZCL (Ω) |
|---|---|---|
| L = 1030 MHz | 2.6 + j 3.5 | 1.0 – j 2.4 |
| H = 1090 MHz | 2.2 + j 2.1 | 1.9 – j 2.1 |




$P_{IN}$ = 40 W
$V_{CC}$ = 50 V
Normalized to 50 ohms

## TEST CIRCUIT

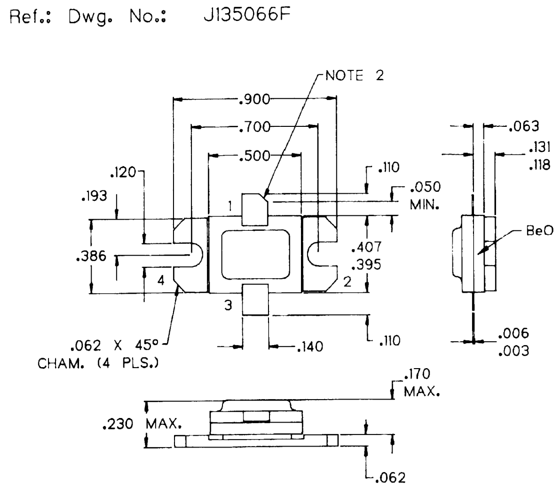



All dimensions are in inches.
Substrate material: .025 thick $Al_2O_3$ (Er = 9.6)

C1 : 0.6—4.5 pF Gigatrim Capacitor
C2 : 0.8—8.0 pF Gigatrim Capacitor
C3 : (2) 100 pF Chip Capacitors in Parallel
C4 : 1500 pF Filtercon Feedthru

C5 : 200 µF Electrolytic Capacitor
C6 : 550 pF Chip Capacitor
L1 : Gold Plated Nickel Strap, 0.060 Inch Wide, 0.005 Inch Thick, 0.150 Inch Long
L2 : #28 Wire, 2 Turn 1/16 Inch I.D.

## PACKAGE MECHANICAL DATA



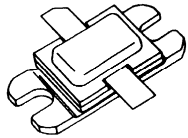

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

SGS-THOMSON MICROELECTRONICS

# AM1011-400

## RF & MICROWAVE TRANSISTORS L-BAND AVIONICS APPLICATIONS

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- 15:1 VSWR CAPABILITY
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 400 W MIN. WITH 8.0 dB GAIN



**.400 x .500 2LFL (S038)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM1011-400 | 1011-400 |

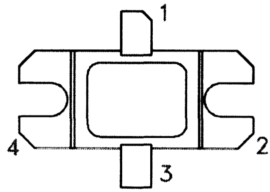
### DESCRIPTION

The AM1011-400 device is a high power Class C transistor specifically designed for TCAS and Mode-S pulsed output and driver applications.

This device is designed for operation under moderate pulse width and duty cycle pulse conditions and is capable of withstanding 15:1 output VSWR at rated RF conditions. Low RF thermal resistance and computerized automatic wire bonding techniques ensure high reliability and product consistency.

The AM1011-400 is supplied in the BIGPAC™ Hermetic Metal/Ceramic package Input/Output matching structures.

### PIN CONNECTION




1. Collector
2. Base
3. Emitter
4. Base

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 100°C$) | 880 | W |
| $I_C$ | Device Current* | 24 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 55 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 0.17 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 50mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 15mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 50mA | $R_{BE}$ = 10Ω | 65 | — | — | V |
| $I_{CES}$ | $V_{BE}$ = 50V | $V_{CE}$ = 0V | — | — | 30 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 5A | 10 | — | — | — |

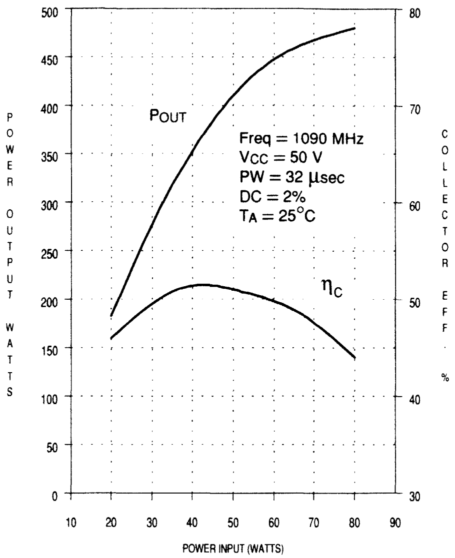
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1090MHz | $P_{IN}$ = 63W | $V_{CC}$ = 50V | 400 | 450 | — | W |
| $\eta_C$ | f = 1090MHz | $P_{IN}$ = 63W | $V_{CC}$ = 50V | 45 | 50 | — | % |
| $G_P$ | f = 1090MHz | $P_{IN}$ = 63W | $V_{CC}$ = 50V | 8.0 | 8.5 | — | dB |

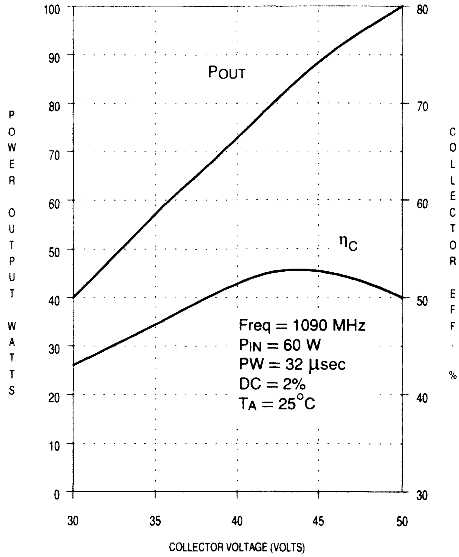
Note: Pulse Width = 32µSec
Duty Cycle = 2%

## TYPICAL PERFORMANCE

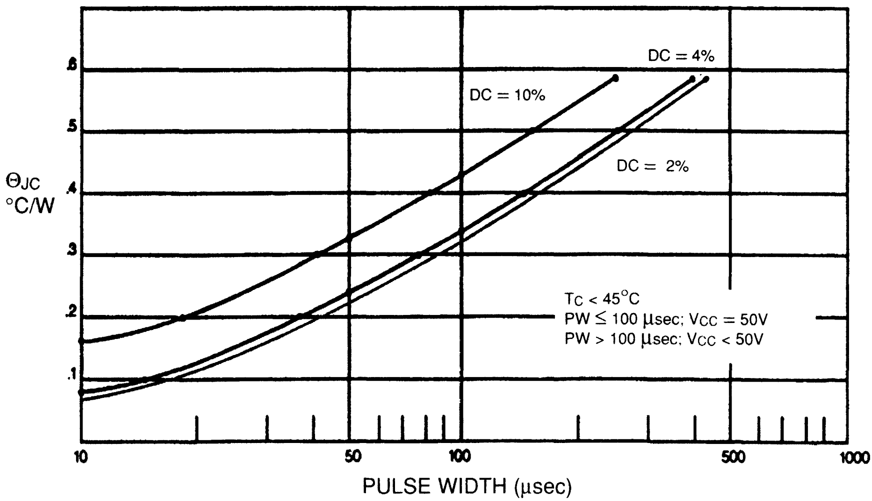
### TYPICAL NARROWBAND POWER AMPLIFIER




### TYPICAL RELATIVE OUTPUT POWER & COLLECTOR EFFICIENCY vs COLLECTOR VOLTAGE

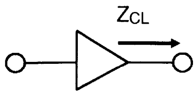



### MAXIMUM THERMAL RESISTANCE vs PULSE WIDTH & DUTY CYCLE

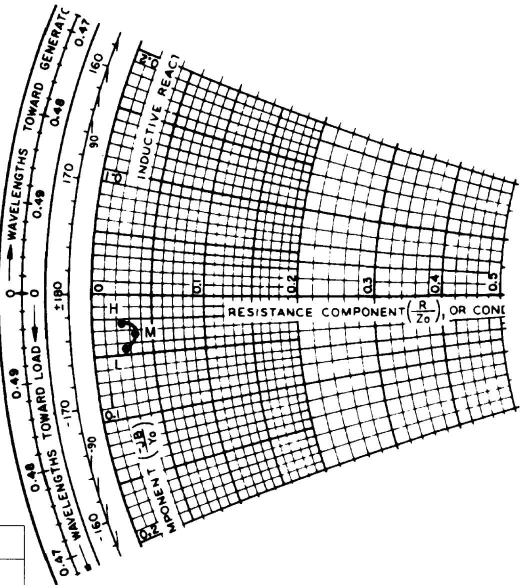


## IMPEDANCE DATA

### TYPICAL COLLECTOR LOAD IMPEDANCE

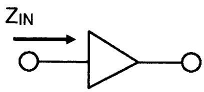



$P_{IN}$ = 63 W
$V_{CC}$ = +50 V
$Z_O$* = 50 Ω

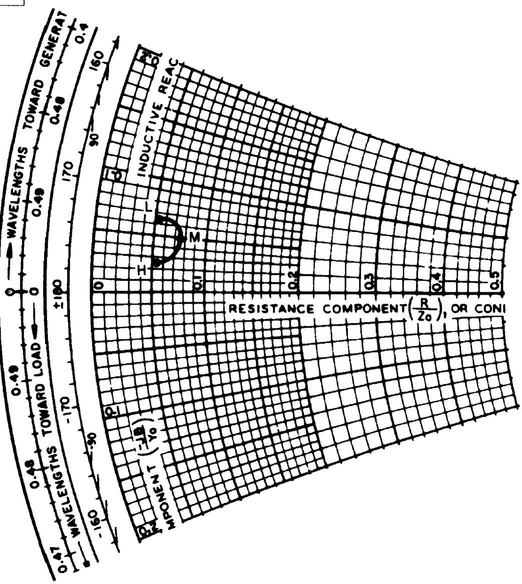



| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| L = 1025 MHz | 2.4 + j 3.2 | 1.4 − j 2.2 |
| M = 1090 MHz | 3.8 + j 2.5 | 1.6 − j 1.6 |
| H = 1150 MHz | 2.3 + j 1.3 | 1.2 − j 1.1 |

### TYPICAL INPUT IMPEDANCE

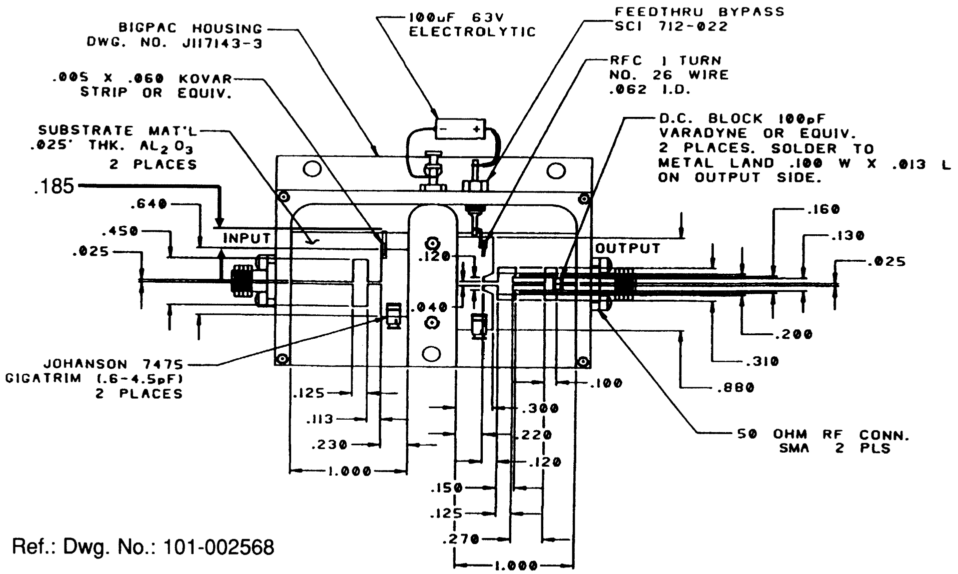



$P_{IN}$ = 63 W
$V_{CC}$ = +50 V
$Z_O$* = 50 Ω




*Normalized Impedance

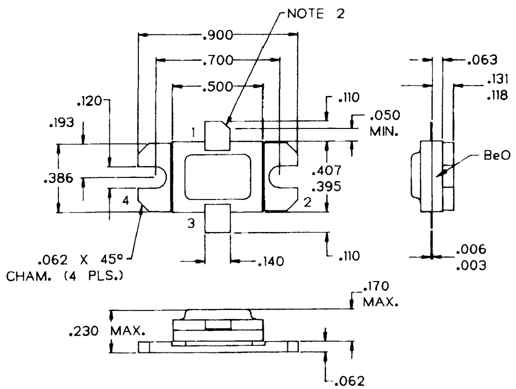
## TEST CIRCUIT




Ref.: Dwg. No.: 101-002568

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135066F



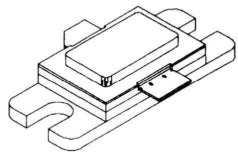

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

# AM1011-500

## RF & MICROWAVE TRANSISTORS AVIONICS APPLICATIONS

ADVANCED PRODUCT INFORMATION

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- 3:1 VSWR CAPABILITY
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- SIXPAC™ METAL/CERAMIC PACKAGE
- $P_{OUT}$ = 500 W MIN. WITH 8.5 dB GAIN



**.400 x .600 2LFL (M198)**
hermetically sealed

| ORDER CODE | BRANDING |
| --- | --- |
| AM1011-500 | 1011-500 |

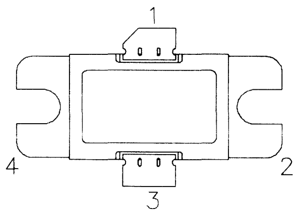
### DESCRIPTION

The AM1011-500 device is a high power Class C transistor specifically designed for L-Band Avionic Mode-S transponder/interrogator pulsed output and driver applications.

This device is capable of operation over a wide range of pulse widths, duty cycles, and temperatures and is capable of withstanding 3:1 output VSWR at rated RF conditions. Low RF thermal resistance and computerized automatic wire bonding techniques ensure high reliability and product consistency.

The AM1011-500 is supplied in the SIXPAC™ Hermetic metal/ceramic package with input/output matching structures.

### PIN CONNECTION




1. Collector
2. Base
3. Emitter
4. Base

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
| --- | --- | --- | --- |
| $P_{DISS}$ | Power Dissipation* ($T_C \leq$ 100°C) | 1,360 | W |
| $I_C$ | Device Current* | 27 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 55 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
| --- | --- | --- | --- |
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 0.11 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 50mA | $I_E$ = 0mA | 70 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 30mA | $I_C$ = 0mA | 3.0 | — | — | V |
| $BV_{CES}$ | IC = 50mA | $V_{BE}$ = 0V | 70 | — | — | V |
| $I_{CES}$ | $V_{BE}$ = 0V | $V_{CE}$ = 50V | — | — | 40 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1.0A | 10 | — | — | — |

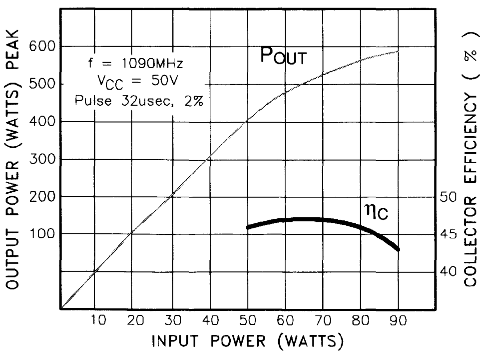
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1090MHz | $P_{IN}$ = 70W | $V_{CC}$ = 50V | 500 | — | — | W |
| $\eta_C$ | f = 1090MHz | $P_{IN}$ = 70W | $V_{CC}$ = 50V | 40 | — | — | % |
| $G_P$ | f = 1090MHz | $P_{IN}$ = 70W | $V_{CC}$ = 50V | 8.5 | — | — | dB |

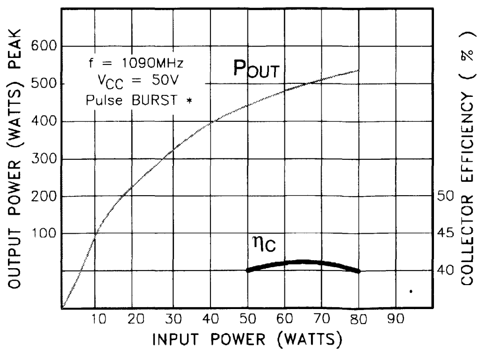
Note: Pulse Width = 32µSec
Duty Cycle = 2%

## TYPICAL PERFORMANCE

**POWER OUTPUT & COLLECTOR EFFICIENCY vs POWER INPUT**



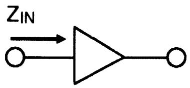

**POWER OUTPUT & COLLECTOR EFFICIENCY vs POWER INPUT**



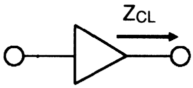

* Pulse Burst conditions:
128 µSec train of 0.5 µSec off with a period of 6.4 ms.

## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE



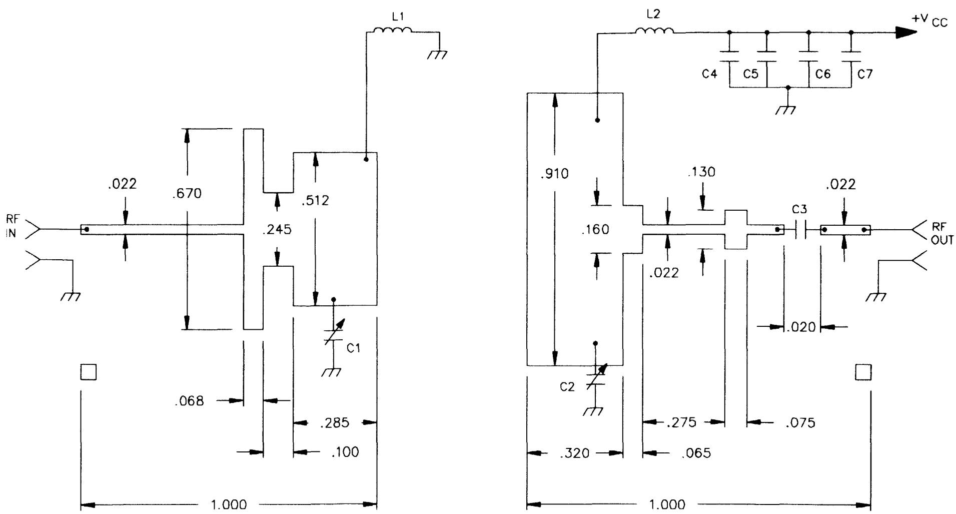

### TYPICAL COLLECTOR LOAD IMPEDANCE




| FREQ. | $Z_{IN}$ ($\Omega$) | $Z_{CL}$ ($\Omega$) |
|---|---|---|
| 1090 MHz | 1.24 + j 0.51 | 1.18 − j 0.73 |

$P_{IN}$ = 70W
$V_{CC}$ = 50V
Normalized to 50 ohms

## TEST CIRCUIT (Preliminary)



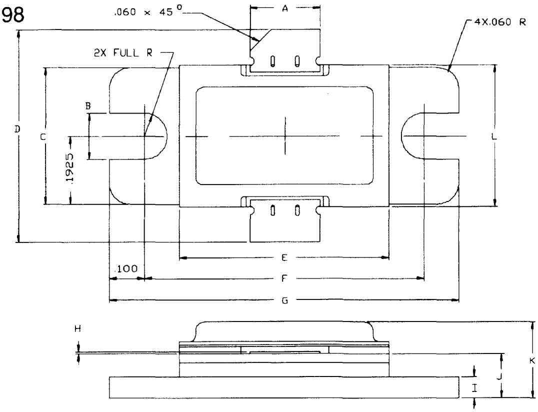

C1,C2 : 0.6 - 4.5 pF Variable Capacitor
C3,C4 : 91 pF (Case A, Case B)
C5 : 39 pF Capacitor
C6 : 0.1 µF Capacitor
C7 : 100 µF Capacitor, 63V

L1 : Strap 0.28 Long, 0.35 Wide and .005 Thick
L2 : 4 Turn, #28 Wire, 1/16" I.D.

Er = 10.2, H = 25 mil.

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No. 12-0198




| SGS-THOMSON MICROELECTRONICS | MINIMUM Inches/mm | MAXIMUM Inches/mm |
|---|---|---|
| A | .195/4,95 | .205/5,21 |
| B | .130/3,30 | |
| C | .380/9,65 | .390/9,91 |
| D | .570/14,48 | |
| E | .590/14,99 | .610/15,49 |
| F | .795/20,19 | .805/20,45 |
| G | .995/25,27 | 1.005/25,53 |
| H | .002/0,05 | .006/0,15 |
| I | .055/1,40 | .065/1,65 |
| J | .110/2,79 | .130/3,30 |

| CONT'D | MINIMUM Inches/mm | MAXIMUM Inches/mm |
|---|---|---|
| K | | .230/5,84 |
| L | .393/9,98 | .410/10,41 |

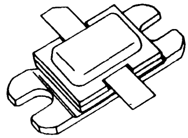
SGS-THOMSON
MICROELECTRONICS

# AM1214-100

## RF & MICROWAVE TRANSISTORS L-BAND RADAR APPLICATIONS

PRELIMINARY DATA

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 100 W MIN. WITH 6.0 dB GAIN



**.400 x .500 2LFL (S038)**
hermetically sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| AM1214-100 | 1214-100 |

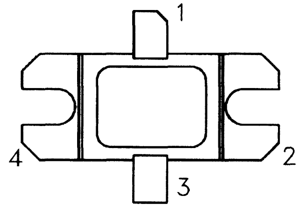
### DESCRIPTION

The AM1214-100 device is a high power Class C transistor specifically designed for L-Band Radar pulsed driver applications.

This device is capable of operation over a wide range of pulse widths, duty cycles, and temperatures and is capable of withstanding 3:1 output VSWR at rated RF conditions. Low RF thermal resistance and computerized automatic wire bonding techniques ensure high reliability and product consistency.

AM1214-100 is supplied in the grounded IMPAC™ hermetic metal/ceramic package with internal input/output matching structures.

### PIN CONNECTION




1. Collector
2. Base
3. Emitter
4. Base

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq$ 100°C) | 270 | W |
| $I_C$ | Device Current* | 13.5 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 32 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 0.55 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 50mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CES}$ | IC = 100mA | | 65 | — | — | V |
| $I_{CES}$ | $V_{BE}$ = 0V | $V_{CE}$ = 32V | — | — | 20 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 5A | 15 | — | — | — |

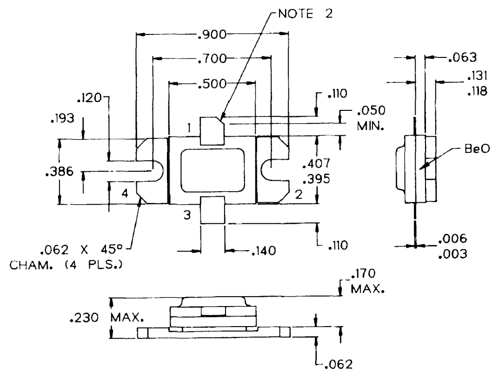
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1215 — 1400MHz | $P_{IN}$ = 25W | $V_{CC}$ = 28V | 100 | — | — | W |
| $\eta_c$ | f = 1215 — 1400MHz | $P_{IN}$ = 25W | $V_{CC}$ = 28V | 50 | — | — | % |
| $G_P$ | f = 1215 — 1400MHz | $P_{IN}$ = 25W | $V_{CC}$ = 28V | 6.0 | — | — | dB |

Note: Pulse Width = 100µSec
Duty Cycle = 10%

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135066F



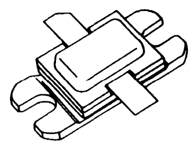

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

SGS-THOMSON
MICROELECTRONICS

# AM1214-175

## RF & MICROWAVE TRANSISTORS
## L-BAND RADAR APPLICATIONS

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- 3:1 VSWR CAPABILITY
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 160 W MIN. WITH 7.3 dB GAIN



**.400 x .500 2LFL (S038)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM1214-175 | 1214-175 |

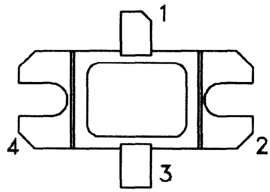
### DESCRIPTION

The AM1214-175 device is a high power Class C transistor specifically designed for L-Band radar pulsed output and driver applications.

This device is capable of operation over a wide range of pulse widths, duty cycles and temperatures and is capable of withstanding 3:1 output VSWR at rated RF conditions. Low RF thermal resistance and computerized automatic wire bonding techniques ensure high reliability and product consistency.

The AM1214-175 is supplied in the BIGPAC™ Hermetic Metal/Ceramic package with internal Input/Output matching structures.

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq$ 100°C) | 330 | W |
| $I_C$ | Device Current* | 14 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 45 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 0.45 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

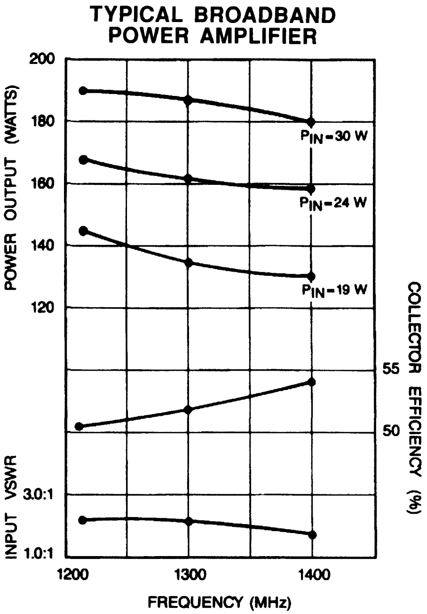
| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 60mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CES}$ | IC = 100mA | | 65 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 40V | | — | — | 25 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 5A | 15 | — | 150 | — |

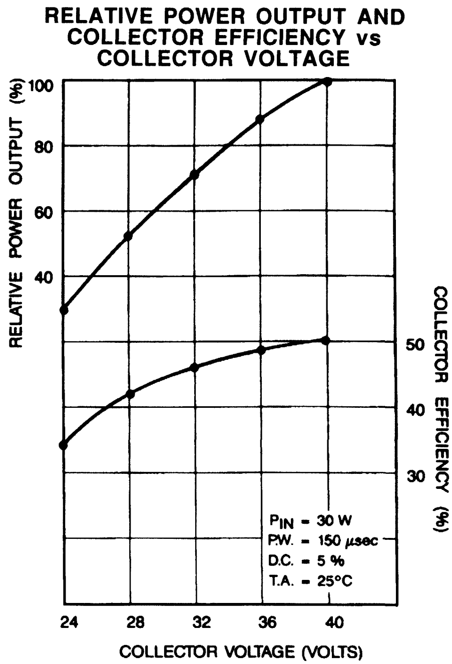
DYNAMIC

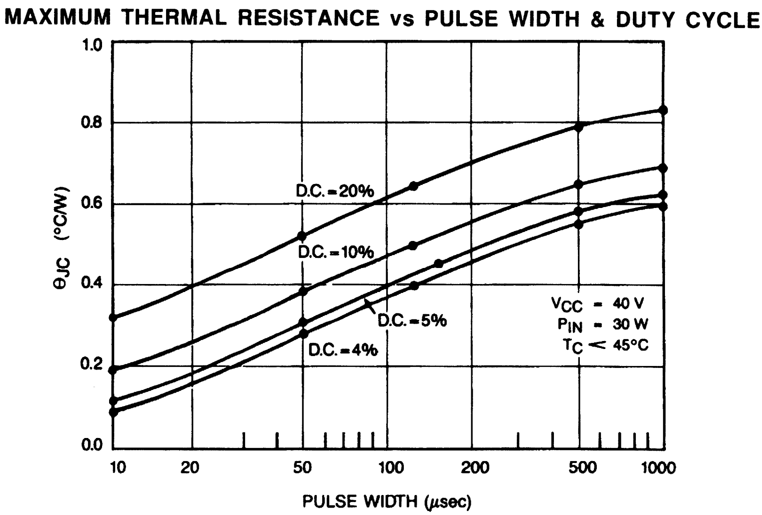
| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 1215 — 1400MHz | $P_{IN}$ = 30W | $V_{CC}$ = 40V | 160 | 180 | — | W |
| $\eta_c$ | f = 1215 — 1400MHz | $P_{IN}$ = 30W | $V_{CC}$ = 40V | 45 | 50 | — | % |
| $G_P$ | f = 1215 — 1400MHz | $P_{IN}$ = 30W | $V_{CC}$ = 40V | 7.3 | 7.8 | — | dB |

Note: Pulse Width = 150µS
Duty Cycle = 5%

## TYPICAL PERFORMANCE

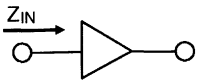


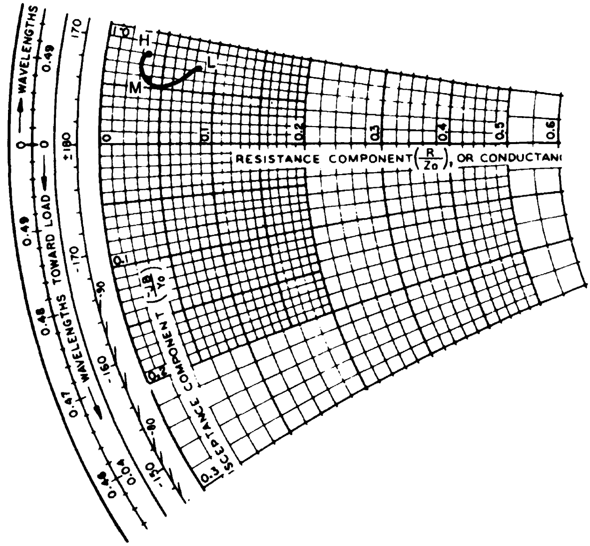



## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE

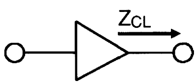



$P_{IN}$ = 30 W
$V_{CC}$ = 40 V
$Z_0$* = 50 ohms

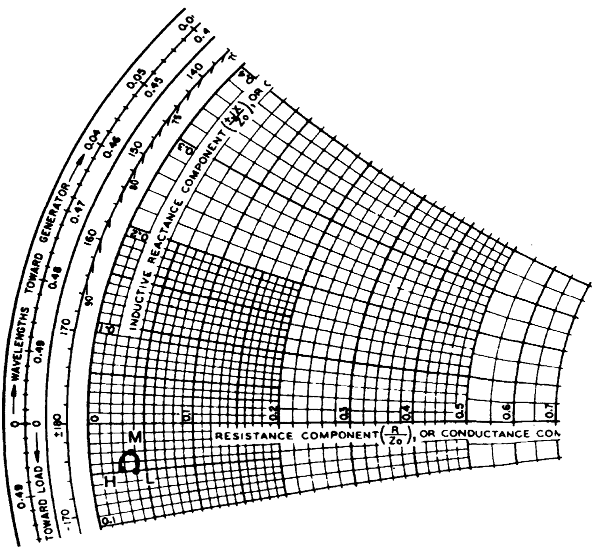



| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| L = 1215 MHz | 4.0 + j 3.5 | 2.0 – j 2.5 |
| M = 1300 MHz | 2.0 + j 3.0 | 2.0 – j 1.5 |
| H = 1400 MHz | 1.5 + j 4.0 | 1.5 – j 2.5 |

### TYPICAL COLLECTOR LOAD IMPEDANCE

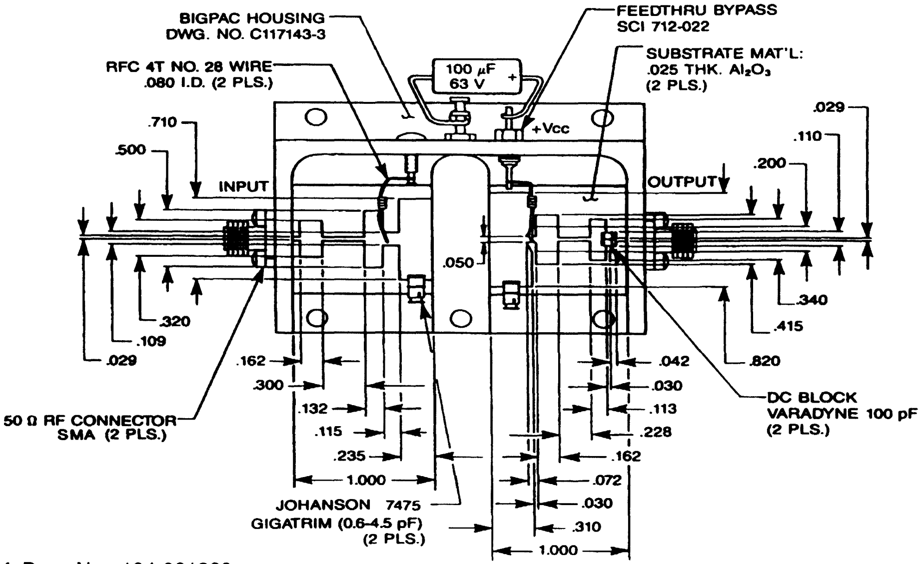



$P_{IN}$ = 30 W
$V_{CC}$ = 40 V
$Z_0$* = 50 ohms




*Normalized Impedance

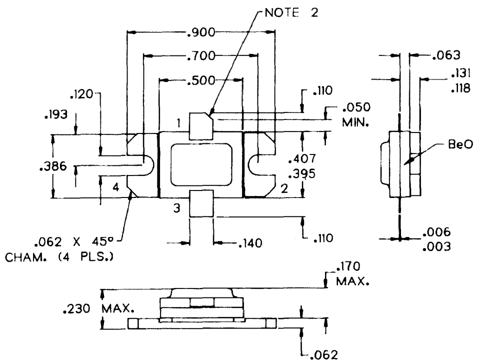
## TEST CIRCUIT



Ref. Dwg. No.: 104-001280

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135066F



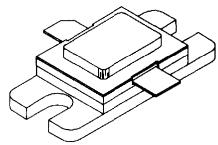

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED;
DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

# AM1214-200

## RF & MICROWAVE TRANSISTORS
## L-BAND RADAR APPLICATIONS

PRELIMINARY DATA

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 200 W MIN. WITH 7.0 dB GAIN



**.400 x .500 2LFL (M205)**
hermetically sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| AM1214-200 | 1214-200 |

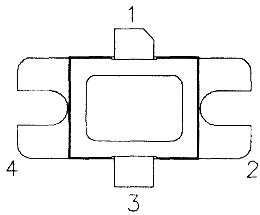
### DESCRIPTION

The AM1214-200 device is a high power Class C transistor specifically designed for L-Band Radar pulsed output and driver applications.

This device is capable of operation over a wide range of pulse widths, duty cycles and temperatures, and wiil tolerate severe mismatch and overdrive conditions. Low RF thermal resistance and computerized automatic wire bonding techniques ensure high reliability and product consistency.

AM1214-200 is supplied in the BIGPAC™ hermetic metal/ceramic package with internal input/output matching structures.

### PIN CONNECTION




1. Collector
2. Base
3. Emitter
4. Base

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq$ 100°C) | 575 | W |
| $I_C$ | Device Current* | 16 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 40 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 0.26 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 50mA | $I_E$ = 0mA | 70 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 30mA | $I_C$ = 0mA | 3.0 | — | — | V |
| $BV_{CES}$ | IC = 50mA | $V_{BE}$ = 0V | 70 | — | — | V |
| $I_{CES}$ | $V_{BE}$ = 0V | $V_{CE}$ = 40V | — | — | 30 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 500mA | 10 | — | — | — |

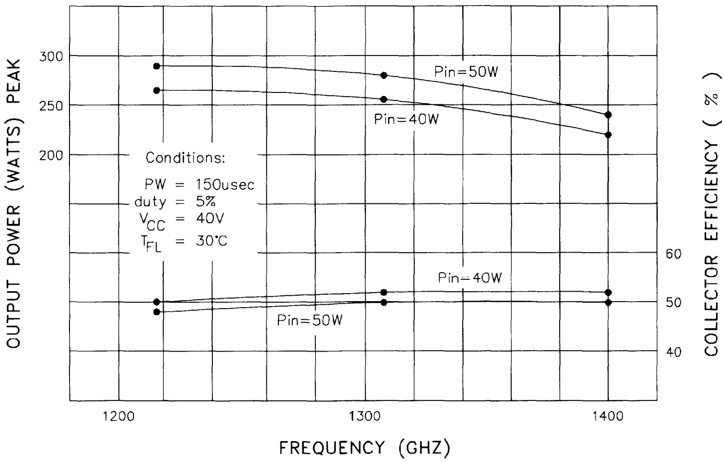
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1215 — 1400MHz | $P_{IN}$ = 40W | $V_{CC}$ = 40V | 200 | — | — | W |
| $\eta_C$ | f = 1215 — 1400MHz | $P_{IN}$ = 40W | $V_{CC}$ = 40V | 45 | — | — | % |
| $G_P$ | f = 1215 — 1400MHz | $P_{IN}$ = 40W | $V_{CC}$ = 40V | 7.0 | — | — | dB |

Note: Pulse Width = 150µSec
Duty Cycle = 5%

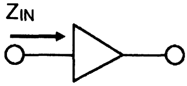
## TYPICAL PERFORMANCE

### POWER OUTPUT & COLLECTOR EFFICIENCY vs FREQUENCY

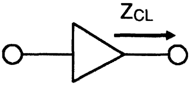


## IMPEDANCE DATA

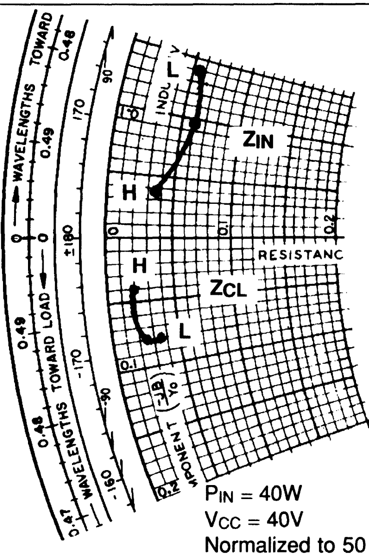
### TYPICAL INPUT IMPEDANCE




### TYPICAL COLLECTOR LOAD IMPEDANCE

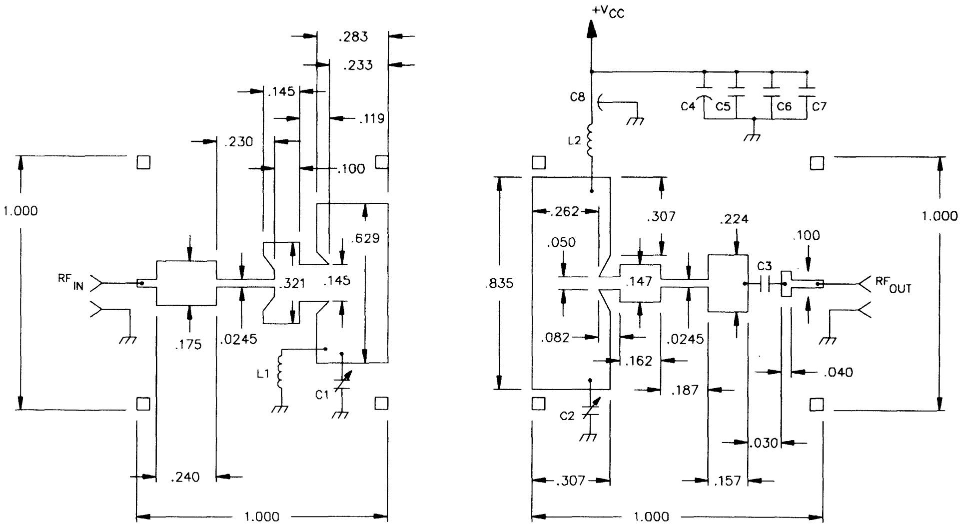



| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| L = 1215 MHz | 2.7 + j 7.0 | 1.7 − j 4.0 |
| M = 1300 MHz | 3.0 + j 4.8 | 1.4 − j 4.0 |
| H = 1400 MHz | 1.8 + j 1.7 | 1.0 − j 2.0 |




$P_{IN}$ = 40W
$V_{CC}$ = 40V
Normalized to 50 ohms

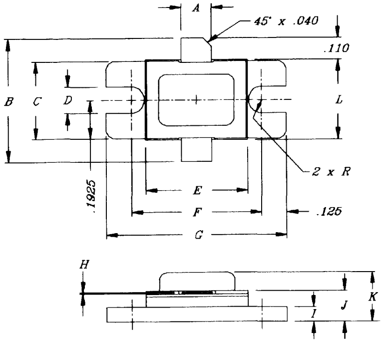
## TEST CIRCUIT




All dimensions are in millimeters.
Substrate 0.025" Thick $Al_2O_3$ (Er = 9.8)

C1,C2 : 0.6 - 4.5 pF Johanson 7475 Variable Capacitor
C3 : 100 pF Case B Chip Capacitor
C4 : 100 µF, 63V Electrolytic Capacitor
C5 : 68 pF Case B Chip Capacitor
C6 : 620 pF Case B Chip Capacitor
C7 : 0.1 µF Ceramic Capacitor
C8 : Feedthru bypass 1200 pF
L1 : .018" OD Wire - Placement is Critical
L2 : 4 Turn .018" OD Inductor

## PACKAGE MECHANICAL DATA



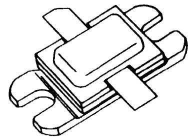

| SGS–THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches / mm | MAXIMUM Inches / mm |
| A | .145 / 3.68 | .155 / 3.93 |
| B | .600 / 15.24 | |
| C | .380 / 9.65 | .390 / 9.91 |
| D | .130 / 3.30 | |
| E | .495 / 12.57 | .507 / 12.88 |
| F | .640 / 16.26 | .655 / 16.64 |
| G | .890 / 22.61 | .910 / 23.11 |
| H | .002 / 0.05 | .006 / 0.15 |
| I | .055 / 1.40 | .065 / 1.65 |
| J | .115 / 2.92 | .135 / 3.43 |
| K | | .230 / 5.84 |
| L | .395 / 10.03 | .407 / 10.34 |

SGS-THOMSON MICROELECTRONICS

# AM1214-300

## RF & MICROWAVE TRANSISTORS L-BAND RADAR APPLICATIONS

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- 5:1 VSWR CAPABILITY
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 270 W MIN. WITH 6.3 dB GAIN



**.400 x .500 2LFL (S038)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM1214-300 | 1214-300 |

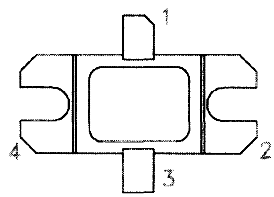
### DESCRIPTION

The AM1214-300 device is a high power transistor specifically designed for L-Band radar pulsed output and driver applications.

This device is designed for operation under moderate pulse width and duty cycle pulse conditions and is capable of withstanding 5:1 output VSWR at rated RF conditions. Low RF thermal resistance and computerized automatic wire bonding techniques ensure high reliability and product consistency.

The AM1214-300 is supplied in the BIGPAC™ Hermetic Metal/Ceramic package with internal Input/Output matching structures.

### PIN CONNECTION




1. Collector
2. Base
3. Emitter
4. Base

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 100°C$) | 730 | W |
| $I_C$ | Device Current* | 18.75 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 55 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | − 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 0.24 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 50mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 15mA | $I_C$ = 0mA | 3.0 | — | — | V |
| $BV_{CES}$ | IC = 50mA | | 65 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 50V | | — | — | 30 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 5A | 10 | — | — | — |

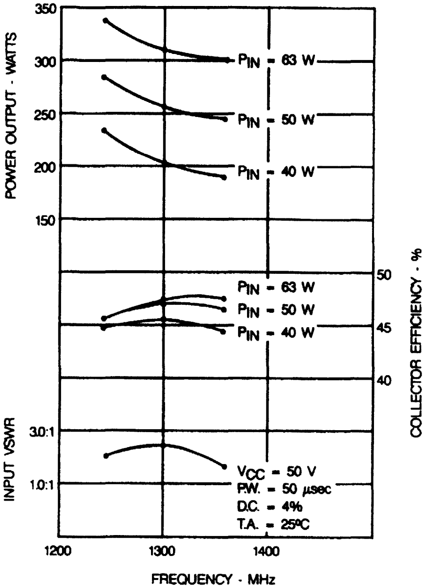
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1235 — 1365MHz | $P_{IN}$ = 63W | $V_{CC}$ = 50V | 270 | 300 | — | W |
| $\eta_C$ | f = 1235 — 1365MHz | $P_{IN}$ = 63W | $V_{CC}$ = 50V | 40 | 45 | — | % |
| $G_P$ | f = 1235 — 1365MHz | $P_{IN}$ = 63W | $V_{CC}$ = 50V | 6.3 | 6.8 | — | dB |

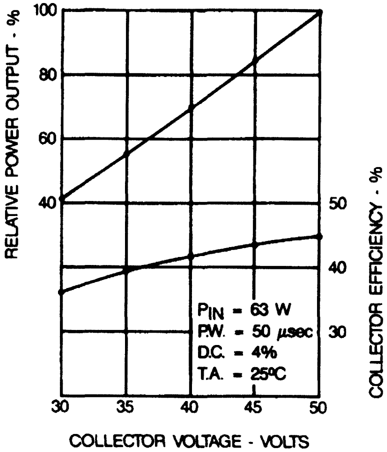
Note: Pulse Width = 50µSec
Duty Cycle = 4%

## TYPICAL PERFORMANCE

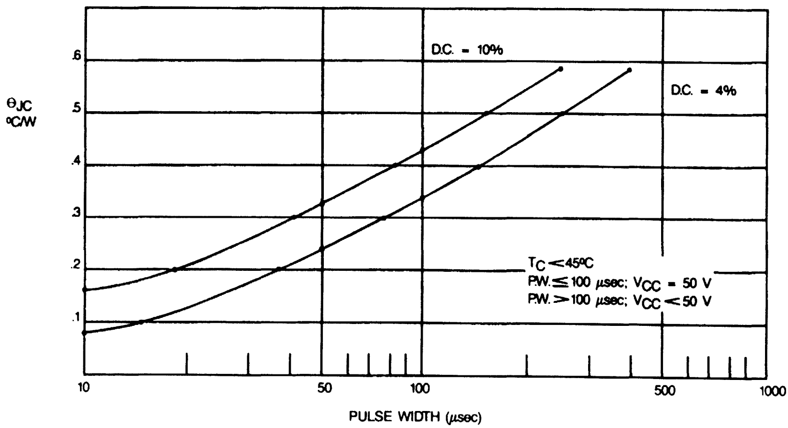
### TYPICAL BROADBAND POWER AMPLIFIER




### RELATIVE POWER OUTPUT & COLLECTOR EFFICIENCY vs COLLECTOR VOLTAGE

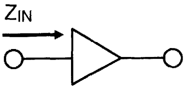


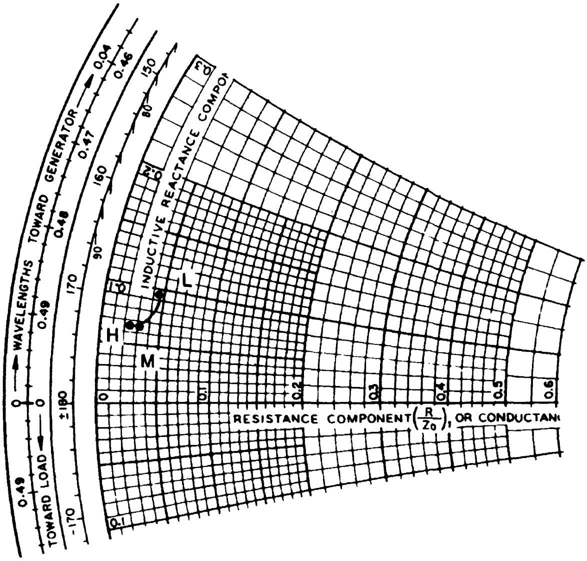

### MAXIMUM THERMAL RESISTANCE vs PULSE WIDTH & PULSE CYCLE



## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE

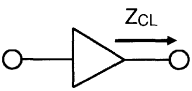


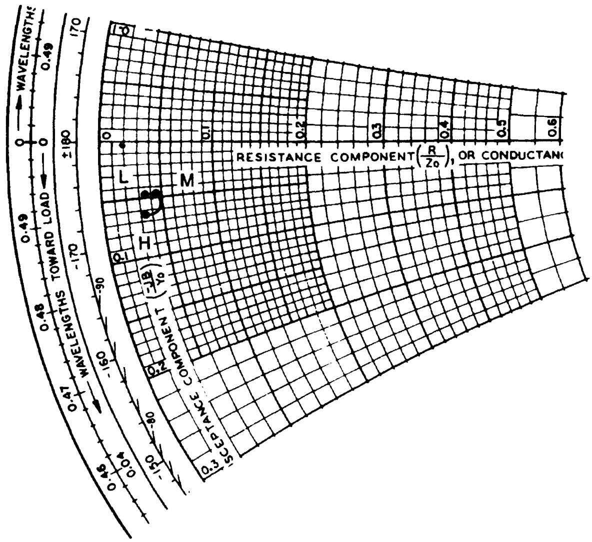




$P_{IN}$ = 63 W
$V_{CC}$ = 50 V
$Z_0$* = 50 ohms

| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| L = 1235 MHz | 2.5 + j 5.0 | 2.0 – j 2.5 |
| M = 1300 MHz | 1.5 + j 3.5 | 2.5 – j 2.5 |
| H = 1365 MHz | 1.0 + j 3.5 | 2.0 – j 3.0 |

### TYPICAL COLLECTOR LOAD IMPEDANCE

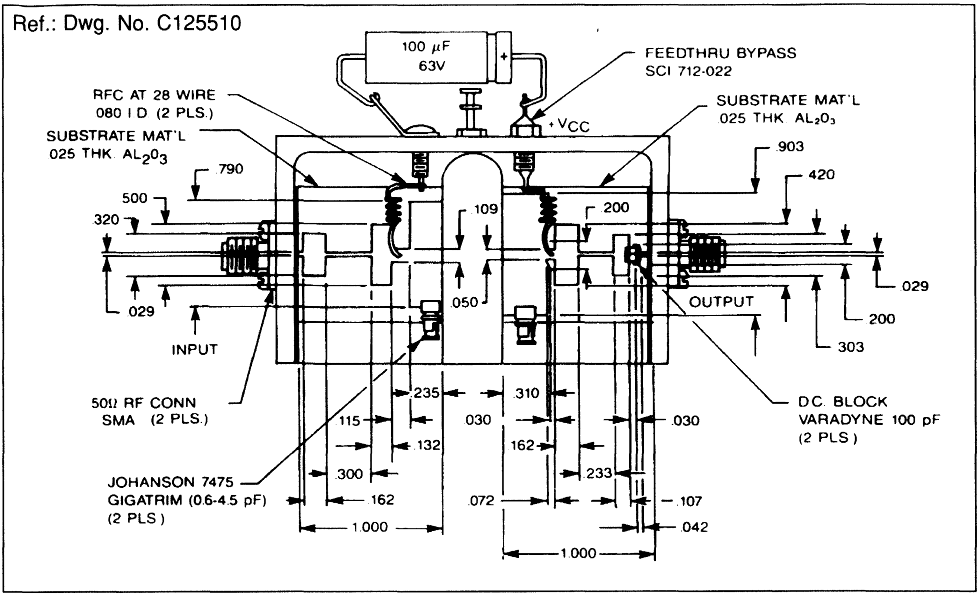


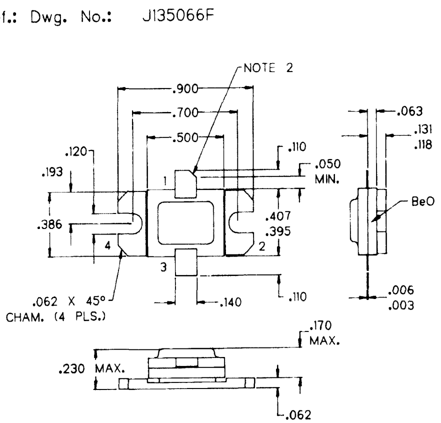

$P_{IN}$ = 63 W
$V_{CC}$ = 50 V
$Z_0$* = 50 ohms

*Normalized Impedance

## TEST CIRCUIT




## PACKAGE MECHANICAL DATA

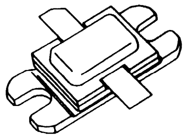



NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

# AM1214-325

## RF & MICROWAVE TRANSISTORS L-BAND RADAR APPLICATIONS

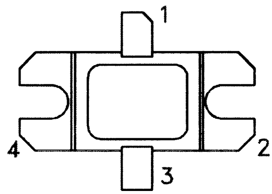
- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- 5:1 VSWR CAPABILITY
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 325 W MIN. WITH 6.4 dB GAIN



**.400 x .500 2LFL (S038)**
hermetically sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| AM1214-325 | 1214-325 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The AM1214-325 device is a high power transistor specifically designed for L-Band radar pulsed output and driver applications.

This device is designed for operation under moderate pulse width and duty cycle pulse conditions and is capable of withstanding 5:1 VSWR at rated RF conditions. Low RF thermal resistance and computerized automatic wire bonding techniques ensure high reliability and product consistency.

The AM1214-325 is supplied in the BIGPAC™ Hermetic Metal/Ceramic package with internal Input/Output matching structures.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq$ 100°C) | 1250 | W |
| $I_C$ | Device Current* | 25 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 45 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 0.10 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS (Tcase = 25°C)

### STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 50mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 15mA | $I_C$ = 0mA | 3.0 | — | — | V |
| $BV_{CES}$ | IC = 50mA | | 65 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 50V | | — | — | 30 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 5A | 10 | — | — | — |

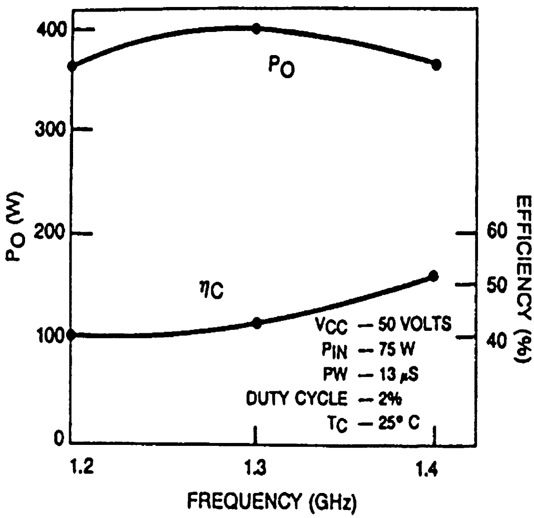
### DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1200 — 1400MHz | $P_{IN}$ = 75W | $V_{CC}$ = 45V | 325 | 360 | — | W |
| $\eta_c$ | f = 1200 — 1400MHz | $P_{IN}$ = 75W | $V_{CC}$ = 45V | 38 | 45 | — | % |
| $G_P$ | f = 1200 — 1400MHz | $P_{IN}$ = 75W | $V_{CC}$ = 45V | 6.4 | 6.8 | — | dB |

Note: Pulse Width = 13μSec
Duty Cycle = 2%

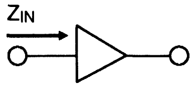
## TYPICAL PERFORMANCE

**POWER OUTPUT & EFFICIENCY vs FREQUENCY**

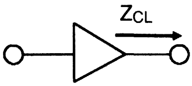


## IMPEDANCE DATA

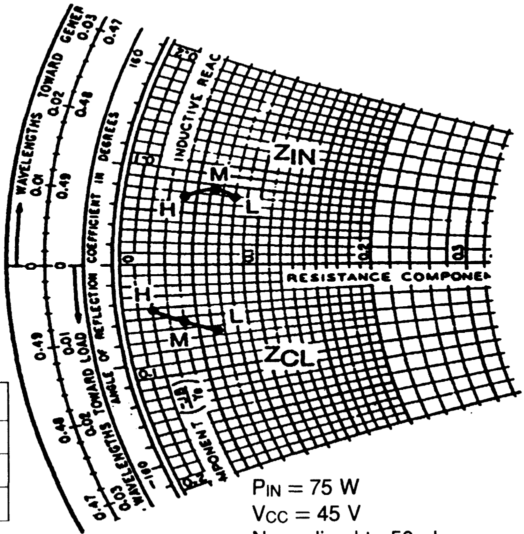
**TYPICAL INPUT IMPEDANCE**




**TYPICAL COLLECTOR LOAD IMPEDANCE**

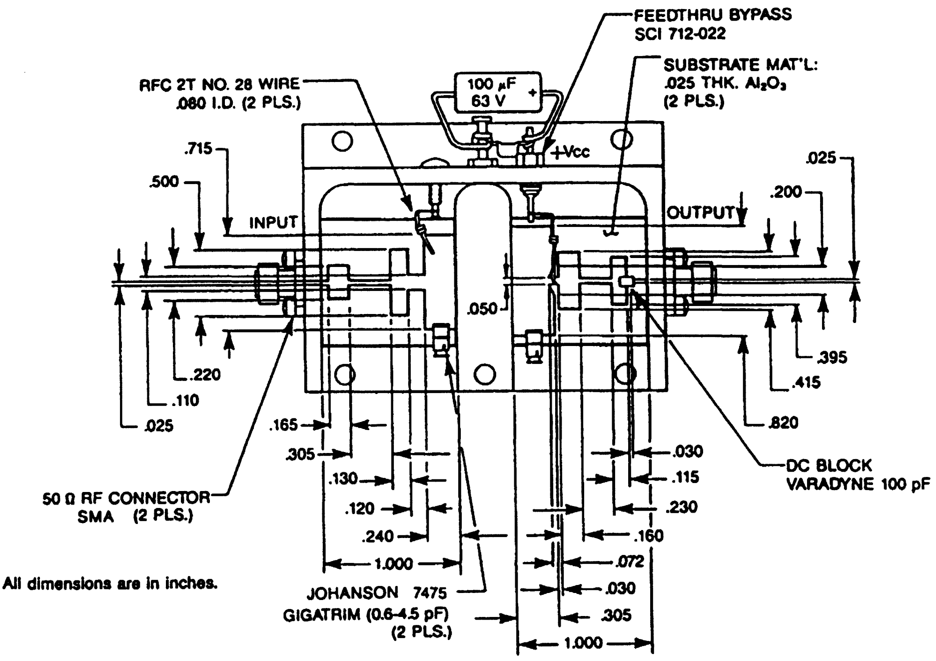



| FREQ. | ZIN (Ω) | ZCL (Ω) |
|---|---|---|
| L = 1.2 GHz | 4.0 + j 3.5 | 3.0 − j 3.0 |
| M = 1.3 GHz | 3.0 + j 4.0 | 2.0 − j 2.5 |
| H = 1.4 GHz | 2.0 + j 3.5 | 1.0 − j 2.0 |




$P_{IN}$ = 75 W
$V_{CC}$ = 45 V
Normalized to 50 ohms

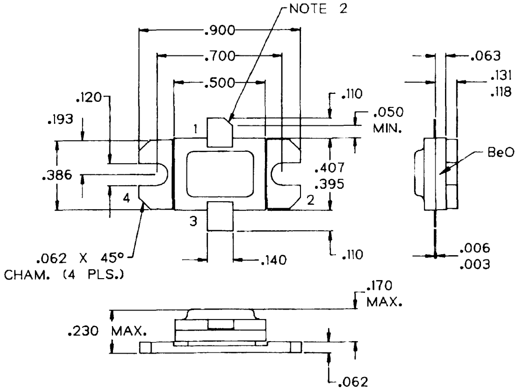
## TEST CIRCUIT




All dimensions are in inches.

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135066F

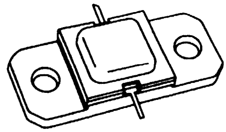



NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

# RF & MICROWAVE TRANSISTORS APPLICATIONS

PRELIMINARY DATA

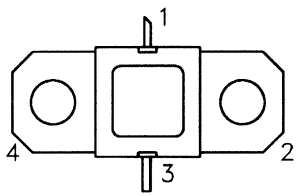
- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 1.5 W MIN. WITH 8.8 dB GAIN



**.400 x .400 2NLFL (S042)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM1416-001 | 1416-1 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

## DESCRIPTION

The AM1416-001 is a common base, silicon NPN bipolar device optimized for Class C, CW operation in the 1400 - 1600 MHz frequency range.

AM1416-001 utilizes a rugged, emitter ballasted die geometry to achieve high gain and efficiency and is suitable for driver or output stages in Class C power amplifiers.

The AM1416-001 is provided in the industry-standard AMPAC™ metal/ceramic, hermetic package.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 75$°C) | 4.6 | W |
| $I_C$ | Device Current* | .213 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 24 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 22 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

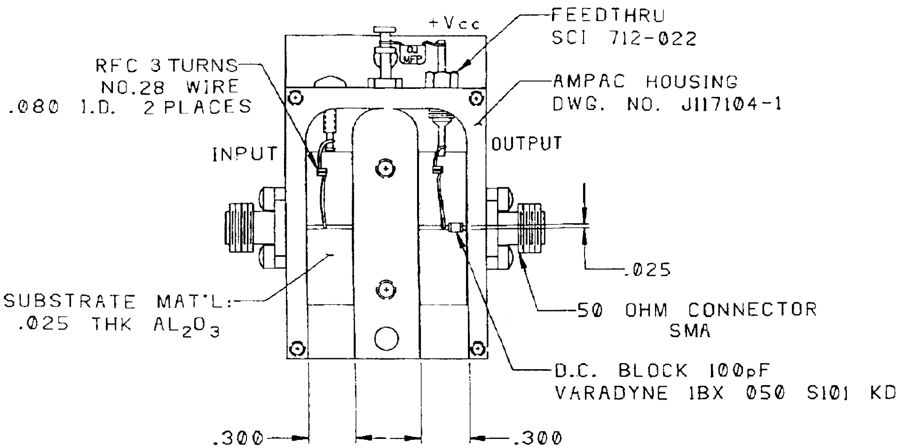
| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 1mA | $I_E$ = 0mA | 40 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.0 | — | — | V |
| $BV_{CER}$ | IC = 5mA | $R_{BE}$ = 10Ω | 40 | — | — | V |
| $I_{CES}$ | $V_{BE}$ = 0V | $V_{CE}$ = 24V | — | — | 5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 100mA | 15 | — | 120 | — |

DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 1400 — 1600MHz | $P_{IN}$ = 0.20W | $V_{CC}$ = 24V | 1.5 | — | — | W |
| $\eta_c$ | f = 1400 — 1600MHz | $P_{IN}$ = 0.20W | $V_{CC}$ = 24V | 45 | — | — | % |
| $G_P$ | f = 1400 — 1600MHz | $P_{IN}$ = 0.20W | $V_{CC}$ = 24V | 8.8 | — | — | dB |

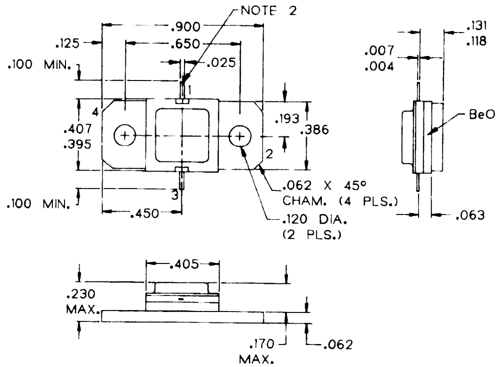
## TEST CIRCUIT

Ref.: Dwg. No. J125178



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J113214F




NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD SLANT CUT.

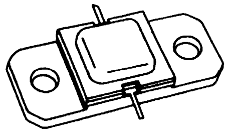
SGS-THOMSON
MICROELECTRONICS

# AM1416-003

## RF & MICROWAVE TRANSISTORS APPLICATIONS

PRELIMINARY DATA

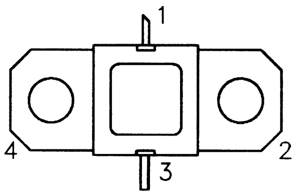
- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 3.2 W MIN. WITH 8.1 dB GAIN



**.400 x .400 2NLFL (S042)**
hermetically sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| AM1416-003 | 1416-3 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The AM1416-003 is a common base, silicon NPN bipolar device optimized for Class C, CW operation in the 1400 - 1600 MHz frequency range.

AM1416-003 utilizes a rugged, emitter ballasted die geometry to achieve high gain and efficiency and is suitable for driver or output stages in Class C power amplifiers.

The AM1416-003 is provided in the industry-standard AMPAC™ metal/ceramic, hermetic package

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq$ 40°C) | 10.6 | W |
| $I_C$ | Device Current* | .49 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 24 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 15 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

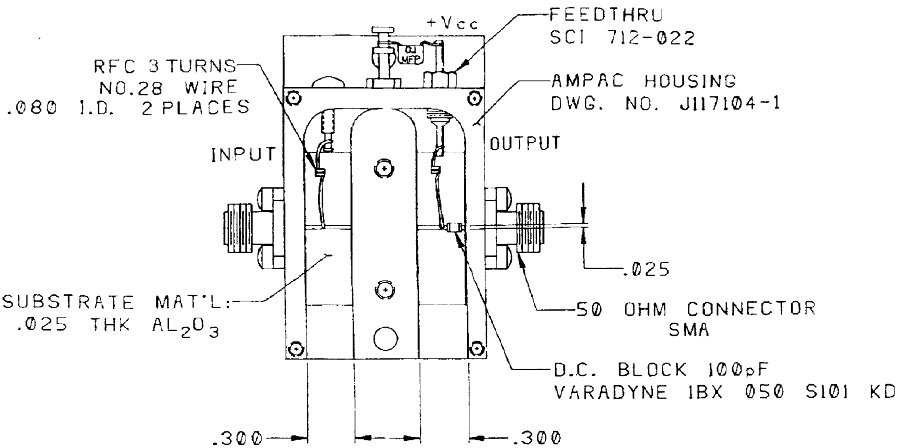
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 1mA | $I_E$ = 0mA | 40 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.0 | — | — | V |
| $BV_{CER}$ | IC = 5mA | $R_{BE}$ = 10Ω | 40 | — | — | V |
| $I_{CES}$ | $V_{BE}$ = 0V | $V_{CE}$ = 24V | — | — | 5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 250mA | 15 | — | 120 | — |

DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1400 - 1600MHz | $P_{IN}$ = 0.50W | $V_{CC}$ = 24V | 3.2 | — | — | W |
| $\eta_C$ | f = 1400 - 1600MHz | $P_{IN}$ = 0.50W | $V_{CC}$ = 24V | 45 | — | — | % |
| $G_P$ | f = 1400 - 1600MHz | $P_{IN}$ = 0.50W | $V_{CC}$ = 24V | 8.1 | — | — | dB |

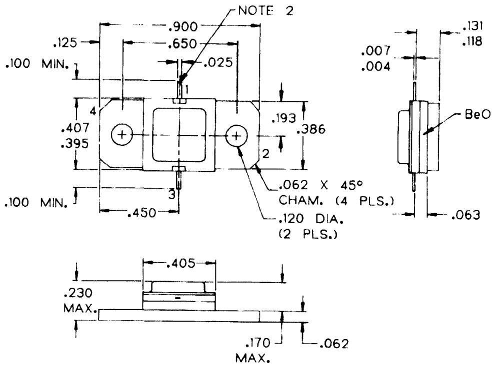
## TEST CIRCUIT

Ref.: Dwg. No. J125178



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J113214F



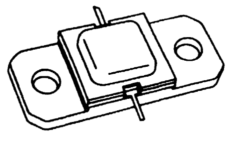

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD SLANT CUT.

SGS-THOMSON
MICROELECTRONICS

# AM1416-100

## RF & MICROWAVE TRANSISTORS APPLICATIONS

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 90 W MIN. WITH 7.8 dB GAIN



**.400 x .400 2NLFL (S042)**
hermetically sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| AM1416-100 | 1416-100 |

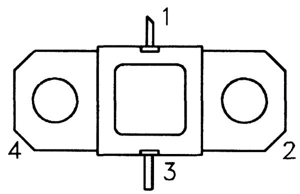
### DESCRIPTION

The AM1416-100 device is a high power silicon bipolar NPN transistor specifically designed for L-Band radar pulsed output and driver applications.

The device is capable of capable of operation over a wide range of pulse widths, duty cycles, and temperatures, and can withstand a 3:1 output VSWR with a + 1 dB input overdrive. Low RF thermal resistance, refractory/gold metallization, and automatic wire bonding techniques ensure high reliability and product consistency (including phase characteristics).

The AM1416-100 is supplied in the hermetic metal/ceramic package with internal input/output impedance matching circuitry, and is intended for military and other high reliability applications.

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq$ 125°C) | 390 | W |
| $I_C$ | Device Current* | 8.5 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 50 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 0.32 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

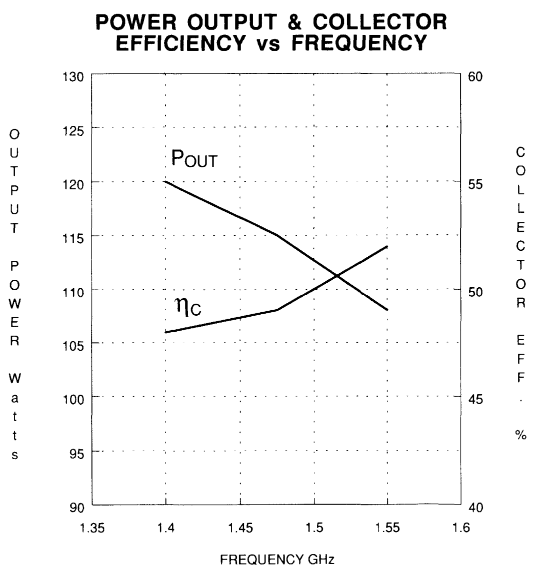
| Symbol | Test Conditions | | Value Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 60mA | $I_E$ = 0mA | 60 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 3mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CES}$ | IC = 60mA | $V_{BE}$ = 0V | 60 | — | — | V |
| $I_{CES}$ | $V_{BE}$ = 0V | $V_{CE}$ = 45V | — | — | 10 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1A | 15 | — | — | — |

### DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 1400 — 1550MHz | $P_{IN}$ = 15W | $V_{CC}$ = 45V | 90 | — | — | W |
| $\eta_C$ | f = 1400 — 1550MHz | $P_{IN}$ = 15W | $V_{CC}$ = 45V | 40 | — | — | % |
| $G_P$ | f = 1400 — 1550MHz | $P_{IN}$ = 15W | $V_{CC}$ = 45V | 7.8 | — | — | dB |

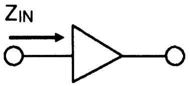
Note: Pulse Width = 10μSec
Duty Cycle = 10%

## TYPICAL PERFORMANCE

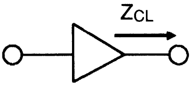


## IMPEDANCE DATA

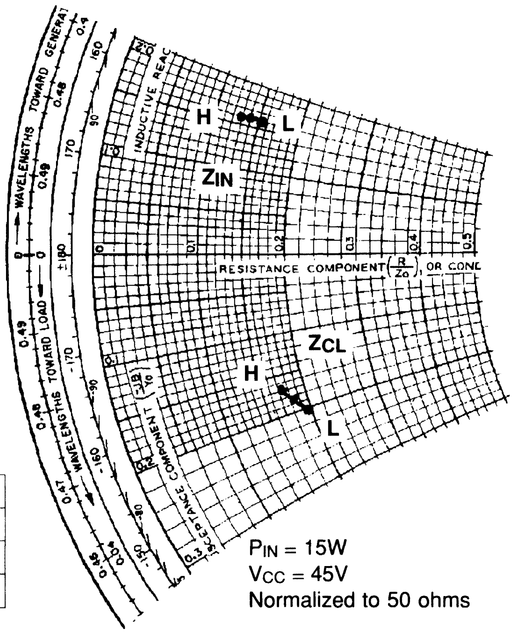
**TYPICAL INPUT IMPEDANCE**



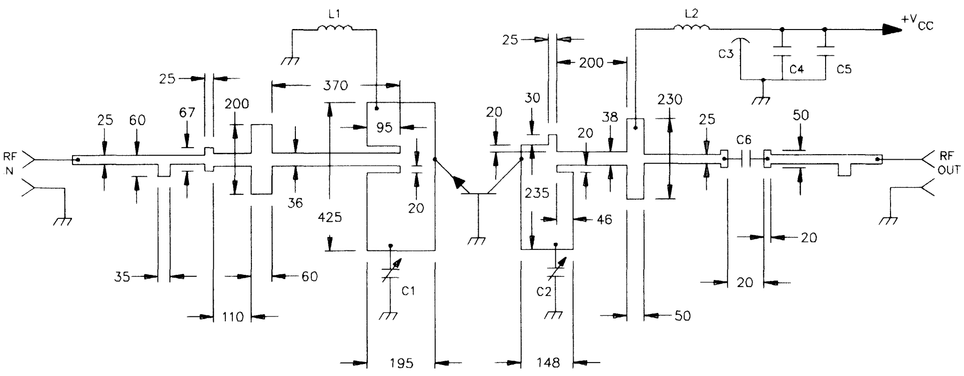

**TYPICAL COLLECTOR LOAD IMPEDANCE**




| FREQ. | ZIN (Ω) | ZCL (Ω) |
|---|---|---|
| L = 1.4 GHz | 7.5 + j 8.0 | 9.6 – j 10.0 |
| M = 1.475 GHz | 7.0 + j 8.0 | 9.2 – j 9.2 |
| H = 1.55 GHz | 6.4 + j 8.0 | 8.8 – j 8.5 |




## TEST CIRCUIT

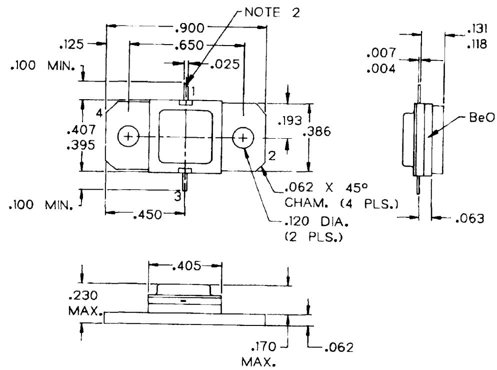



All dimensions are in mils. except as noted
Substrates: .025" $AL_2O_3$ (Er = 9.6)

C1,C2 : 0.6 - 4.5 pF Trim Capacitor
C3 : Feedthru 1000 pF
C4 : 0.1 μF Capacitor
C5 : 100 μF Capacitor
C6 : 100 pF Chip Capacitor
L1,L2 : #26 Wire .50" long

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J113214F




NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD SLANT CUT.

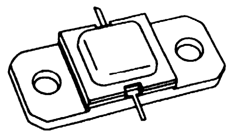
SGS-THOMSON MICROELECTRONICS

# AM1416-200

## RF & MICROWAVE TRANSISTORS L-BAND RADAR APPLICATIONS

PRELIMINARY DATA

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 180 W MIN. WITH 6.5 dB GAIN



**.400 X .400 2NLFL (S042)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM1416-200 | 1416-200 |

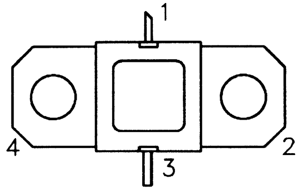
### DESCRIPTION

The AM1416-200 device is a high power silicon bipolar NPN transistor specifically designed for L-Band radar pulsed output and driver applications.

This device is capable of operation over a wide range of pulse widths, duty cycles, and temperatures and can withstand a 3:1 output VSWR with a + 1 dB input overdrive. Low RF thermal resistance, refractory/gold metallization, and automatic wire bonding techniques ensure high reliability and product consistency (including phase characteristics).

The AM1416-200 is supplied in the hermetic metal/ceramic package with internal input/output impedance matching circuitry, and is intended for military and other high reliability applications.

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 125°C$) | 625 | W |
| $I_C$ | Device Current* | 12 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 55 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 0.2 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

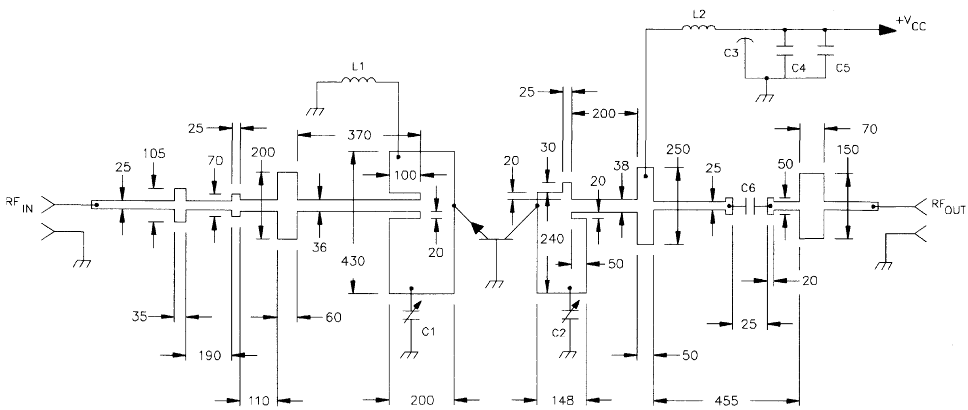
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 25mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 25mA | $R_{BE}$ = 10Ω | 65 | — | — | V |
| $I_{CES}$ | $V_{BE}$ = 0V | $V_{CE}$ = 50V | — | — | 15 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 2.5A | 10 | — | — | — |

### DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1400 — 1550MHz | $P_{IN}$ = 40W | $V_{CC}$ = 50V | 180 | — | — | W |
| $\eta_C$ | f = 1400 — 1550MHz | $P_{IN}$ = 40W | $V_{CC}$ = 50V | 40 | — | — | % |
| $G_P$ | f = 1400 — 1550MHz | $P_{IN}$ = 40W | $V_{CC}$ = 50V | 6.5 | — | — | dB |

Note: Pulse Width = 10µSec
Duty Cycle = 10%

## TEST CIRCUIT

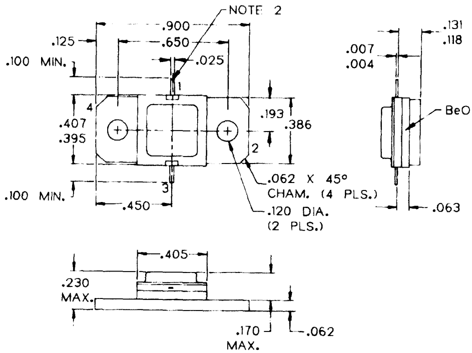



All Dimensions are in Millimeters except as noted.
Substrates: .025" $AL_2O_3$ (Er = 9.6)

C1 : .4 - 2.5 pF Johanson 7487
C2 : .6 - 4.5 pF Johanson 7475
C3 : Feedthru 1000 pF
C4 : 0.1 µF Capacitor
C5 : 100 µF Capacitor
C6 : 100 pF Chip Capacitor
L1,L2 : #26 Wire , .05" Long

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J113214F



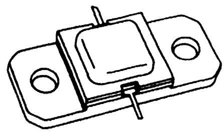

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD SLANT CUT.

SGS-THOMSON MICROELECTRONICS

# AM1517-012

## RF & MICROWAVE TRANSISTORS SATELLITE COMMUNICATIONS APPLICATIONS

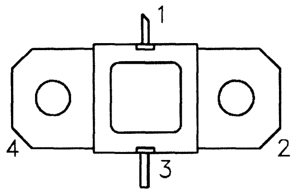
- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- ∞:1 VSWR CAPABILITY
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 12 W MIN. WITH 8.5 dB GAIN



**.400 x .400 2NLFL (S042)**
hermeticallysealed

| ORDER CODE | BRANDING |
|---|---|
| AM1517-012 | 1517-12 |

### PIN CONNECTION




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The AM1517-012 power transistor is designed specifically for Satellite communications applications in the 1.5 – 1.7 GHz frequency range.

The device is capable of withstanding any mismatch load condition at any phase angle (VSWR ∞:1) under full rated conditions. The unit is an overlay, emitter site ballasted, geometry utilizing a Refractory/Gold metallization system.

The AM1517-012 is supplied in the AMPAC™ Hermetic/Ceramic package with internal Input/Output matching structures.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 100$°C) | 27 | W |
| $I_C$ | Device Current* | 1.25 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 30 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 5.5 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS (Tcase = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C = 4mA$ | $I_E = 0mA$ | 45 | — | — | V |
| $BV_{EBO}$ | $I_E = 4mA$ | $I_C = 0mA$ | 3.0 | — | — | V |
| $I_{CBO}$ | $V_{CB} = 28V$ | | — | — | 1 | mA |
| $h_{FE}$ | $V_{CE} = 5V$ | $I_C = .8A$ | 15 | — | 150 | — |

DYNAMIC

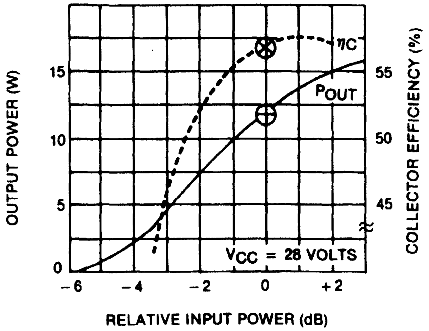
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1.5 — 1.7GHz | $P_{IN} = 1.7W$ | $V_{CC} = 28V$ | 12 | 13 | — | W |
| $\eta_C$ | f = 1.5 — 1.7GHz | $P_{IN} = 1.7W$ | $V_{CC} = 28V$ | 55 | 58 | — | % |
| $G_P$ | f = 1.5 — 1.7GHz | $P_{IN} = 1.7W$ | $V_{CC} = 28V$ | 8.5 | — | — | dB |

Note: AM1517 series vary $P_{IN}$ to achieve $P_{OUT}$; performance guaranteed in 50 MHz increments.
Alpha-Suffix added to AM1517 P/N designates band segment.

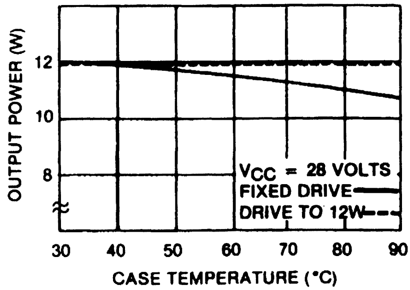
A -1500 = 1550 MHz
M -1620 = 1660 MHz
S -1625 = 1675 MHz

## TYPICAL PERFORMANCE

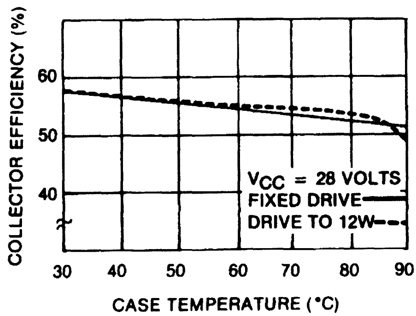
### TYPICAL PERFORMANCE vs DRIVE POWER



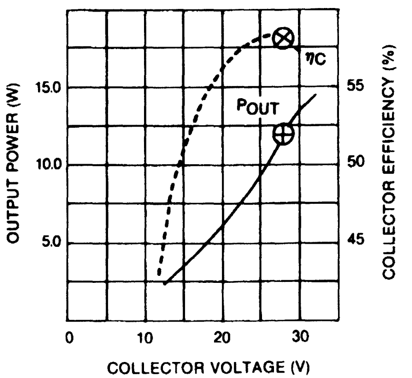

### POWER OUTPUT vs TEMPERATURE



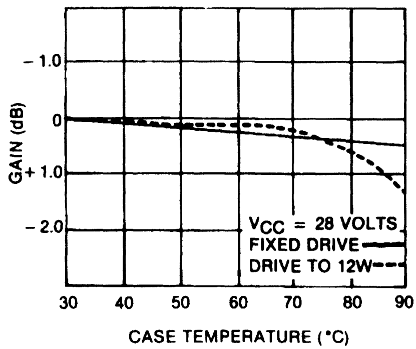

### COLLECTOR EFFICIENCY vs TEMPERATURE




### TYPICAL PERFORMANCE vs VOLTAGE @ FIXED DRIVE

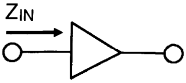



### GAIN vs TEMPERATURE

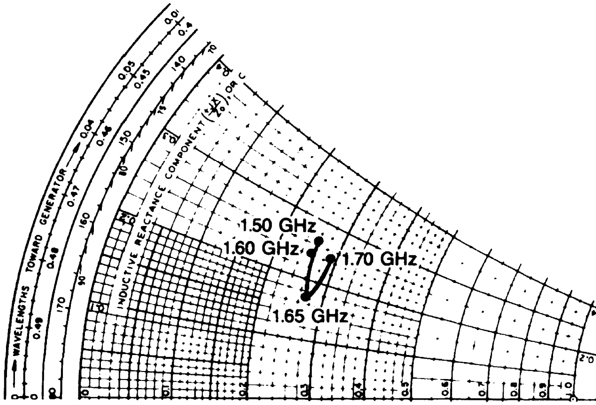


## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE

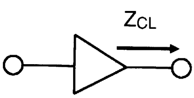



POUT = 12 W
VCC = 28 V
ZO = 50 ohms

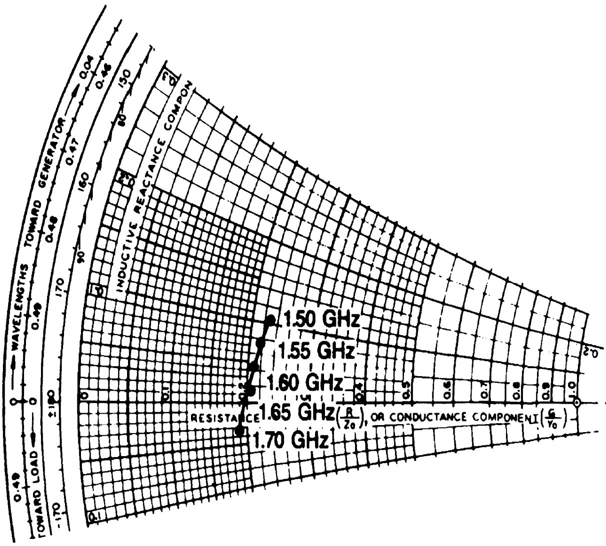



| FREQ. | ZIN (Ω) | ZCL (Ω) |
|---|---|---|
| L = 1.50 GHz | 13.0 + j 13.5 | 11.5 + j 5.0 |
| M = 1.60 GHz | 13.0 + j 12.0 | 10.5 + j 2.2 |
| H = 1.70 GHz | 14.5 + j 12.5 | 9.5 – j 1.5 |

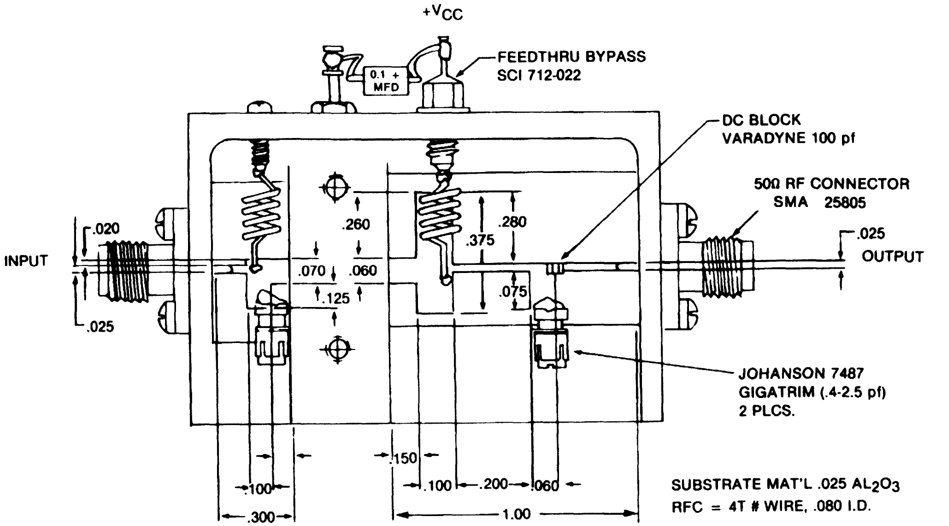
### TYPICAL COLLECTOR LOAD IMPEDANCE




POUT = 12 W
VCC = 28 V
ZO = 50 ohms



## TEST CIRCUIT

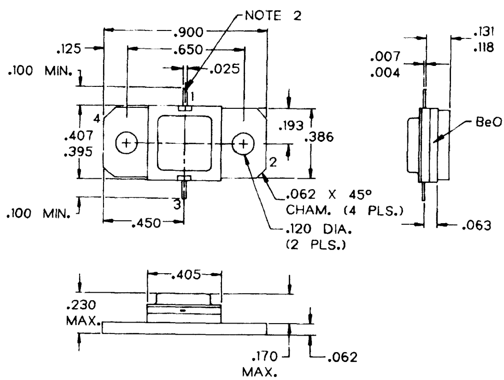



All dimensions are in inches.

Ref.: Dwg. No. C125369

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J113214F

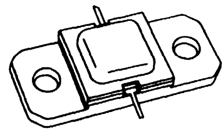



NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD SLANT CUT.

# AM1517-025

## RF & MICROWAVE TRANSISTORS SATELLITE COMMUNICATIONS APPLICATIONS

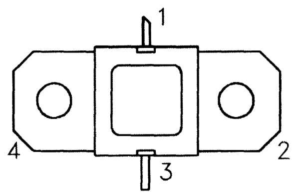
- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- ∞:1 VSWR CAPABILITY
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 25 W MIN. WITH 8.5 dB GAIN



**.400 x .400 2NLFL (S042)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM1517-025 | 1517-25 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The AM1517-025 power transistor is designed specifically for Satellite communications applications in the 1.5 – 1.7 GHz frequency range.

The device is capable of withstanding any mismatch load condition at any phase angle (VSWR ∞:1) under full rated conditions. The unit is an overlay, emitter site ballasted, geometry utilizing a Refactory/Gold metallization system.

The AM1517-025 is supplied in the AMPAC™ Hermetic/Ceramic package with internal Input/Output matching structures.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq$ 100°C) | 45 | W |
| $I_C$ | Device Current* | 2.5 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 30 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 3.3 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 8mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 8mA | $I_C$ = 0mA | 3.0 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 28V | | — | — | 2 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1.6A | 15 | — | 150 | — |

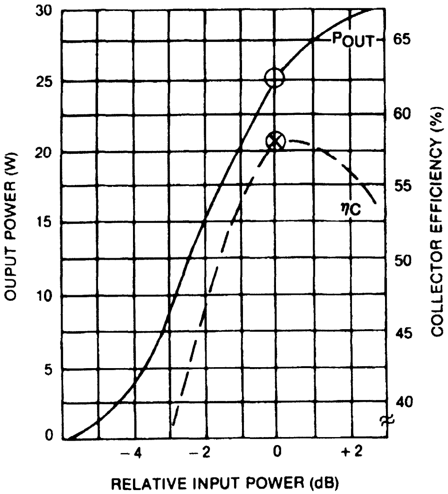
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1.5 — 1.7GHz | $P_{IN}$ = 3.5W | $V_{CC}$ = 28V | 25 | — | — | W |
| $\eta_C$ | f = 1.5 — 1.7GHz | $P_{IN}$ = 3.5W | $V_{CC}$ = 28V | 55 | 58 | — | % |
| $G_P$ | f = 1.5 — 1.7GHz | $P_{IN}$ = 3.5W | $V_{CC}$ = 28V | 8.5 | — | — | dB |

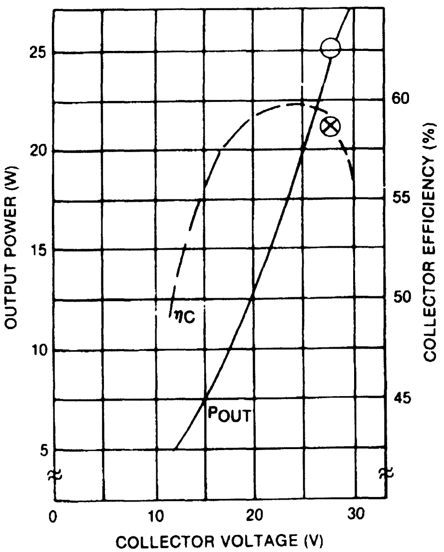
Note: AM1517 series vary $P_{IN}$ to achieve $P_{OUT}$; performance guaranteed in 50 MHz increments.
Alpha-Suffix added to AM1517 P/N designates band segment.
A -1500 - 1550 MHz
M -1620 - 1660 MHz
S -1625 - 1675 MHz

## TYPICAL PERFORMANCE

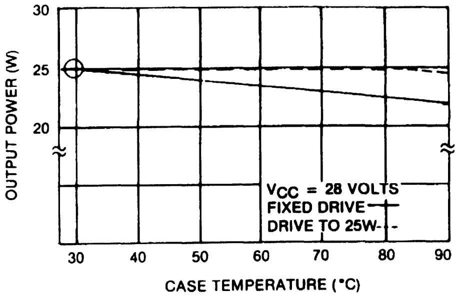
### POWER OUTPUT & COLLECTOR EFFICIENCY vs POWER INPUT



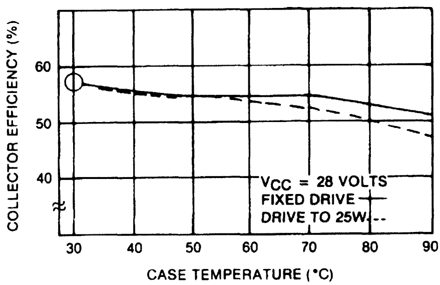

### POWER OUTPUT & COLLECTOR EFFICIENCY vs COLLECTOR VOLTAGE



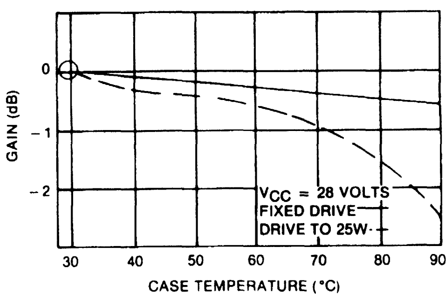

### POWER OUTPUT vs TEMPERATURE




### COLLECTOR EFFICIENCY vs TEMPERATURE

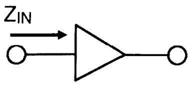



### GAIN vs TEMPERATURE

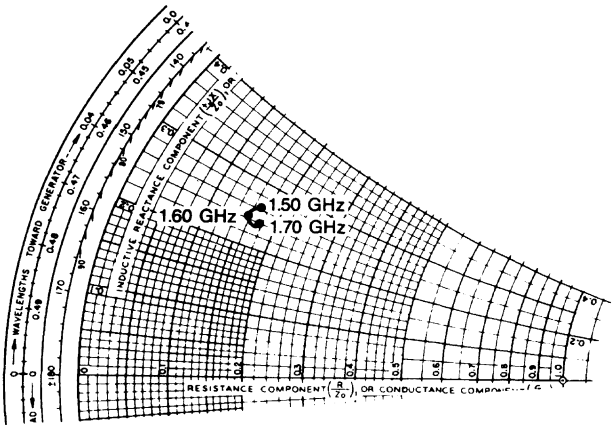


## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE

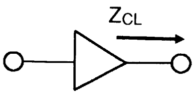



$P_{OUT}$ = 25 W
$V_{CC}$ = 28 V
$Z_O$ = 50 ohms

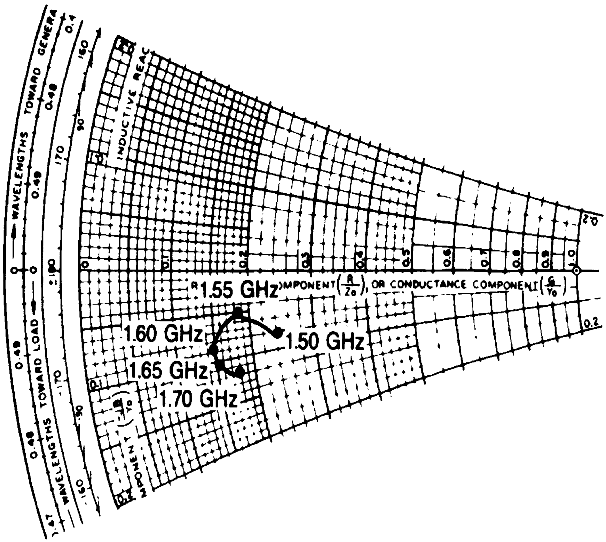



| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| L = 1.5 GHz | 8.5 + j 13.0 | 12.0 – j 4.0 |
| M = 1.6 GHz | 8.0 + j 12.5 | 7.5 – j 4.5 |
| H = 1.7 GHz | 9.0 + j 12.0 | 9.0 – j 6.0 |

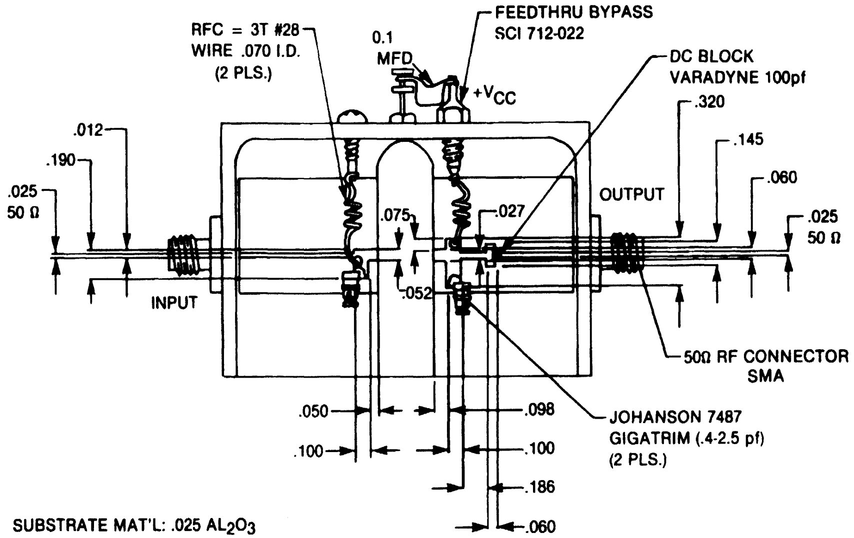
### TYPICAL COLLECTOR LOAD IMPEDANCE




$P_{OUT}$ = 25 W
$V_{CC}$ = 28 V
$Z_O$ = 50 ohms



## TEST CIRCUIT



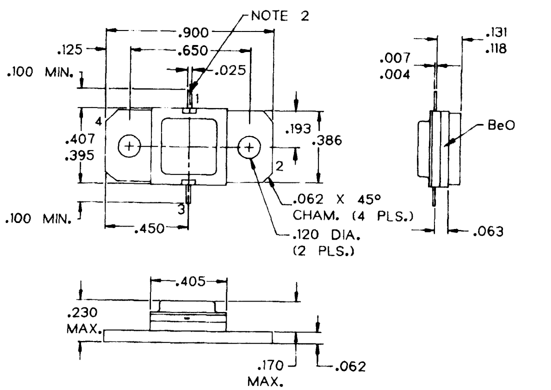

SUBSTRATE MAT'L: .025 $AL_2O_3$

All dimensions are in inches.

Ref. Dwg. No.: C125383

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J113214F



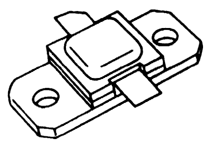

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD SLANT CUT.

# SGS-THOMSON MICROELECTRONICS

# AM1517-035

## RF & MICROWAVE TRANSISTORS SATELLITE COMMUNICATIONS APPLICATIONS

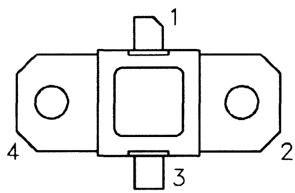
- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- ∞:1 VSWR CAPABILITY
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 35 W MIN. WITH 7.0 dB GAIN



**.400 x .400 2LFL (S036)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM1517-035 | 1517-35 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The AM1517-035 is a high power, CW transistor specifically designed to operate within a 50 MHz increment of the 1.5 – 1.7 GHz band. Applications for the device include GPS and Inmarsat satellite communications systems.

This refractory/gold metallized, ballasted overlay device is housed in the industry standard AMPAC™ Hermetic Metal/Ceramic package.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 100$°C) | 58 | W |
| $I_C$ | Device Current* | 3.4 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 30 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 2.6 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 20mA | $I_E$ = 0mA | 55 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 4 | — | — | V |
| $BV_{CES}$ | IC = 20mA | | 55 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 28V | | — | — | 5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 2A | 20 | — | 300 | — |

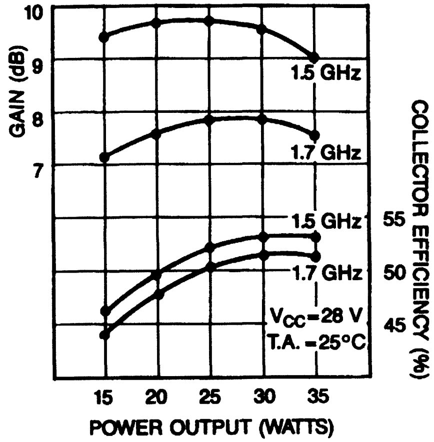
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{IN}$ | f = 1.5 — 1.7GHz | $P_{IN}$ = 7.0W | $V_{CC}$ = 28V | — | — | 7.0 | W |
| $\eta_C$ | f = 1.5 — 1.7GHz | $P_{IN}$ = 7.0W | $V_{CC}$ = 28V | 48 | 52 | — | % |
| $G_P$ | f = 1.5 — 1.7GHz | $P_{IN}$ = 7.0W | $V_{CC}$ = 28V | 7.0 | 7.7 | — | dB |

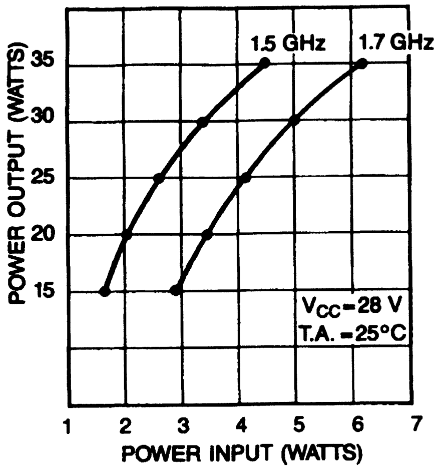
Note: AM1517 series vary $P_{IN}$ to achieve $P_{OUT}$; performance guaranteed in 50 MHz increments.
Alpha-Suffix added to AM1517 P/N designates band segment.
A -1500 - 1550 MHz
M -1620 - 1660 MHz
S -1625 - 1675 MHz

## TYPICAL PERFORMANCE

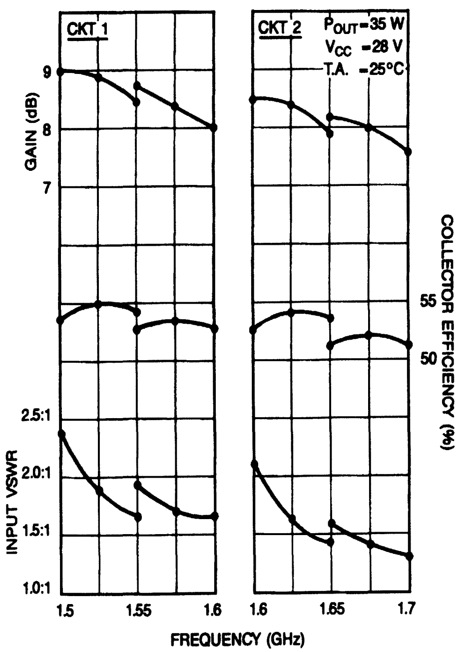
### TYPICAL BAND EDGE GAIN & COLLECTOR EFFICIENCY vs POWER OUTPUT



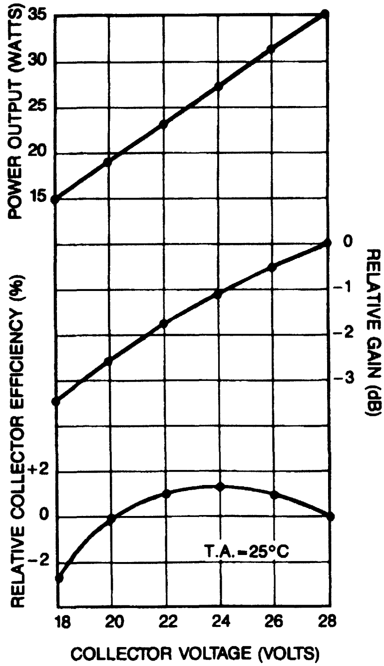

### TYPICAL BAND EDGE POWER OUTPUT vs POWER INPUT




### TYPICAL BROADBAND GAIN & COLLECTOR EFFICIENCY vs FREQUENCY IN 50 MHz INCREMENTS

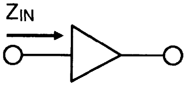



### TYPICAL POWER OUTPUT, RELATIVE GAIN & COLLECTOR EFFICIENCY vs COLLECTOR VOLTAGE

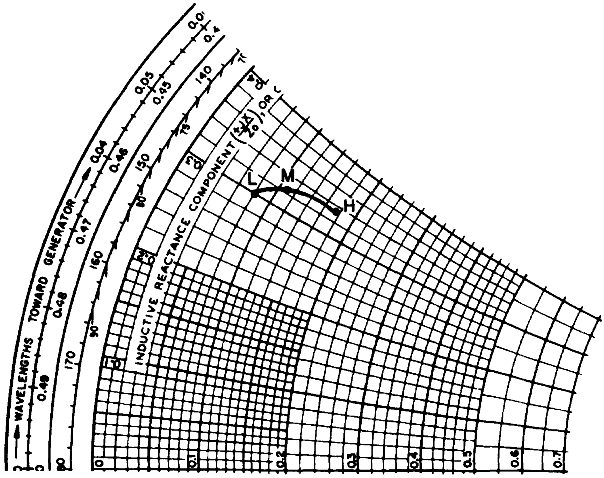


## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE

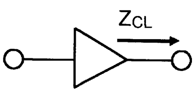


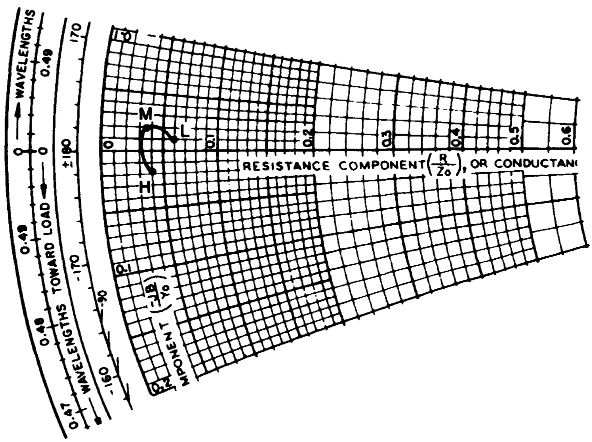

POUT = 35 W
VCC = 28 V
ZO = 50 ohms




| FREQ. | ZIN (Ω) | ZCL (Ω) |
|---|---|---|
| L = 1.5 GHz | 4.0 + j 15.0 | 3.0 + j 0.5 |
| M = 1.6 GHz | 5.5 + j 16.2 | 1.8 + j 1.0 |
| H = 1.7 GHz | 8.8 + j 16.8 | 2.0 – j 1.0 |

### TYPICAL COLLECTOR LOAD IMPEDANCE

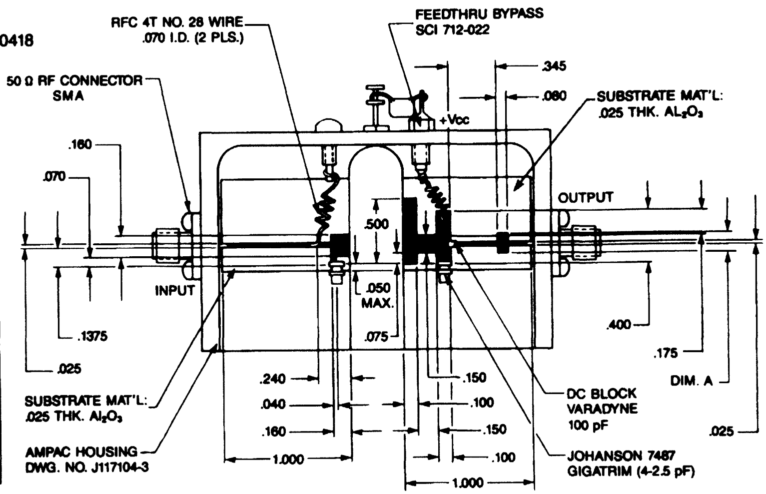



POUT = 35 W
VCC = 28 V
ZO = 50 ohms

## TEST CIRCUIT

Ref. Dwg. No. 101-000418

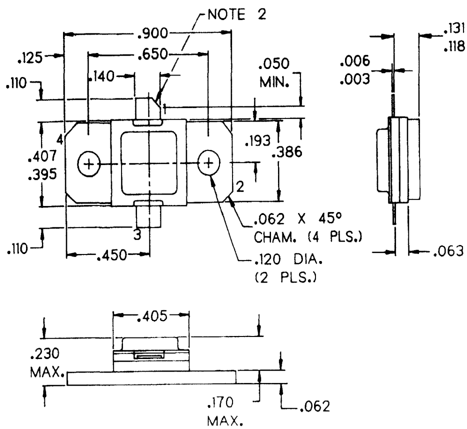



| CIRCUIT 1 | CIRCUIT 2 |
|---|---|
| DIM. A | DIM. A |
| .140 AS SHOWN | .025 STR. THRU LINE |
| 1517-35 A | |
| | |
| | 1517-35 S |
| | |
| | 1517-35 M |

All dimensions are in inches.

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J133102E




NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED;
   DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

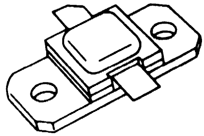
SGS-THOMSON MICROELECTRONICS

# AM1616-050

## RF & MICROWAVE TRANSISTORS SATELLITE COMMUNICATIONS APPLICATIONS

PRELIMINARY DATA

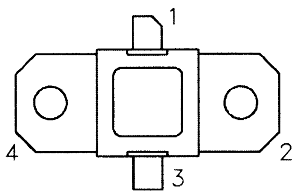
- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- 10:1 VSWR CAPABILITY
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 50 W MIN. WITH 7.0 dB GAIN



**.400 x .400 2LFL (S036)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM1616-050 | 1616-50 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The AM1616-050 is a high power Class C, CW transistor specifically designed for 1.6 GHz satellite communications applications including GPS and INMARSAT.

Refractory/Gold metallization and an Emitter-site ballasted overlay geometry ensure long term reliability for both satellite-based and earth terminal usages.

The AM1616-050 is housed in the proven AMPAC™ Hermetic Metal/Ceramic package.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 50$°C) | 83 | W |
| $I_C$ | Device Current* | 6.0 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 26 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 1.8 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

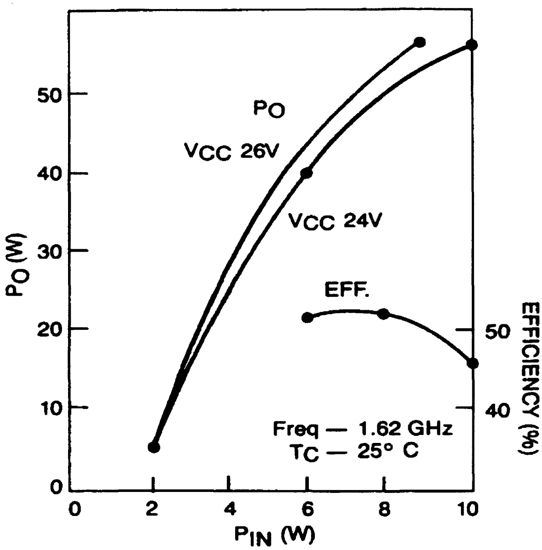
| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 40mA | $I_E$ = 0mA | 48 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 4mA | $I_C$ = 0mA | 4 | — | — | V |
| $BV_{CES}$ | IC = 40mA | | 48 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 26V | | — | — | 4 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 3A | 20 | — | — | — |

DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{IN}$ | f = 1.62 GHz | $P_{OUT}$ = 50W | $V_{CC}$ = 26V | — | — | 10 | W |
| $\eta_C$ | f = 1.62 GHz | $P_{OUT}$ = 50W | $V_{CC}$ = 26V | 45 | 52 | — | % |
| $G_P$ | f = 1.62 GHz | $P_{OUT}$ = 50W | $V_{CC}$ = 26V | 7.0 | 8.5 | — | dB |

## TYPICAL PERFORMANCE

POWER OUTPUT & COLLECTOR EFFECIENCY vs POWER INPUT

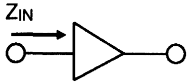




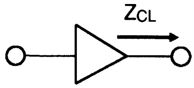

SGS-THOMSON MICROELECTRONICS

## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE

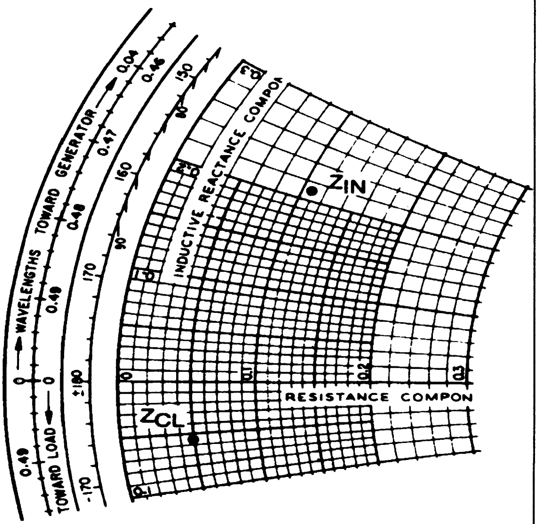



### TYPICAL COLLECTOR LOAD IMPEDANCE

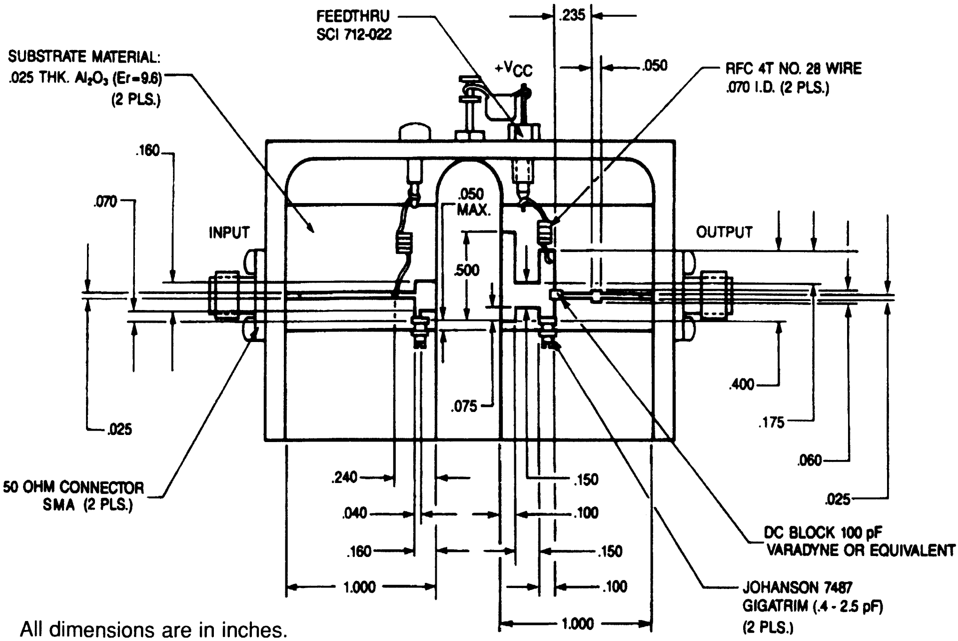



| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 1.62 GHz | 5.5 + j 10.5 | 2.5 – j 2.8 |

$P_{IN}$ = 8 W
$V_{CC}$ = 26 V
Normalized to 50 ohms



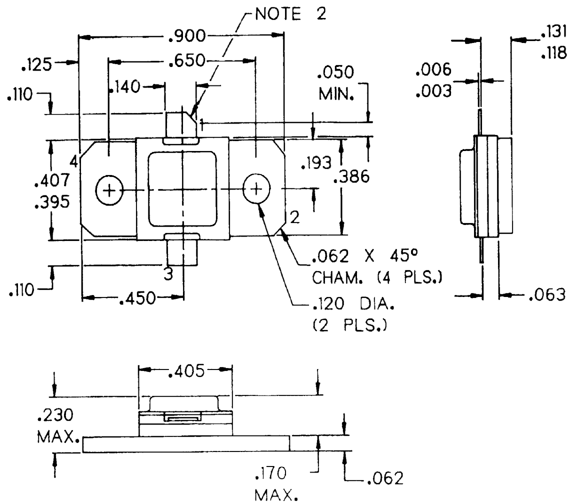

## TEST CIRCUIT




All dimensions are in inches.

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J133102E




NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

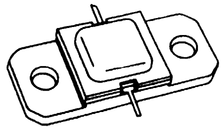
SGS-THOMSON
MICROELECTRONICS

# AM2023-001

## RF & MICROWAVE TRANSISTORS COMMUNICATIONS APPLICATIONS

PRELIMINARY DATA

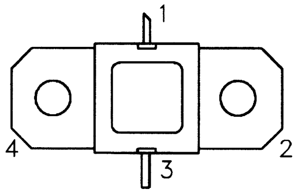
- REFRACTORY/GOLD METALLIZATION
- INPUT/OUTPUT MATCHING
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 1.25W MIN. WITH 7.0 dB GAIN



**.400 x .400 2NLFL (S042)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM2023-001 | 2023-1 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The AM2023-001 is an internally-matched device specifically designed for 2 GHz telecommunications and telemetry applications.

Housed in the industry-standard AMPAC™ hermetic package, the AM2023-001 incorporates refractory-gold metallization for superior reliability in Class C power amplifier service.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 80°C$) | 5.3 | W |
| $I_C$ | Device Current* | .245 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 24 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 22 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

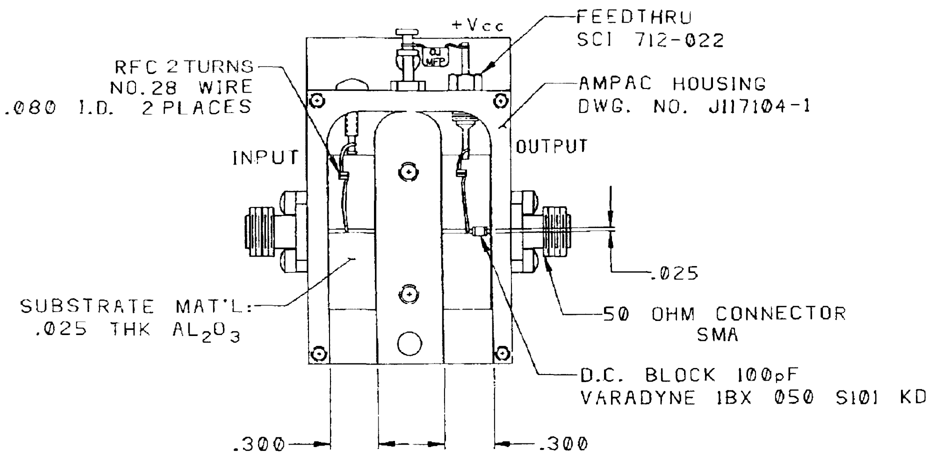
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 1mA | $I_E$ =0mA | 40 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.0 | — | — | V |
| $BV_{CER}$ | IC = 5mA | $R_{BE}$ = 10Ω | 40 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 24V | | — | — | 5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 100mA | 15 | — | 120 | — |

DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 2000 — 2300MHz | $P_{IN}$ = 0.25W | $V_{CC}$ = 24V | 1.25 | — | — | W |
| $\eta_c$ | f = 2000 — 2300MHz | $P_{IN}$ = 0.25W | $V_{CC}$ = 24V | 45 | — | — | % |
| $G_P$ | f = 2000 — 2300MHz | $P_{IN}$ = 0.25W | $V_{CC}$ = 24V | 7.0 | — | — | dB |

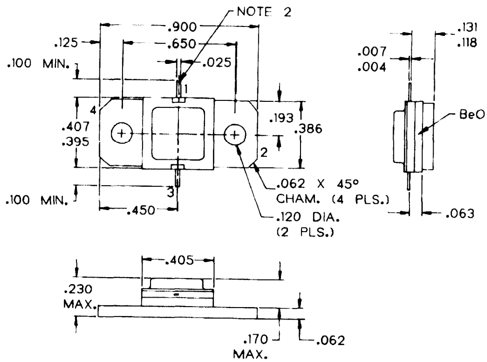
## TEST CIRCUIT

Dwg. No. J125178



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J113214F




NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD SLANT CUT.

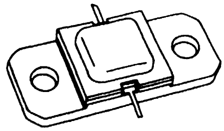
**SGS-THOMSON MICROELECTRONICS**

# AM2023-003

## RF & MICROWAVE TRANSISTORS COMMUNICATIONS APPLICATIONS

PRELIMINARY DATA

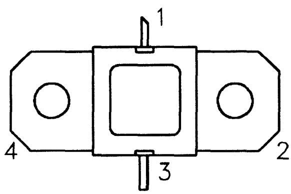
- REFRACTORY/GOLD METALLIZATION
- INPUT/OUTPUT MATCHING
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 3.0 W MIN. WITH 7.8 dB GAIN



**.400 x .400 2NLFL (S042)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM2023-003 | 2023-3 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The AM2023-003 is an internally matched device specifically designed for 2 GHz telecommunications and telemetry applications.

Housed in the industry-standard AMPAC™ hermetic package, the AM2023-003 incorporate refractory-gold metallization for superior reliability in Class C power amplifier service.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 75$°C) | 8.33 | W |
| $I_C$ | Device Current* | 450 | mA |
| $V_{CC}$ | Collector-Supply Voltage* | 26 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 15 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

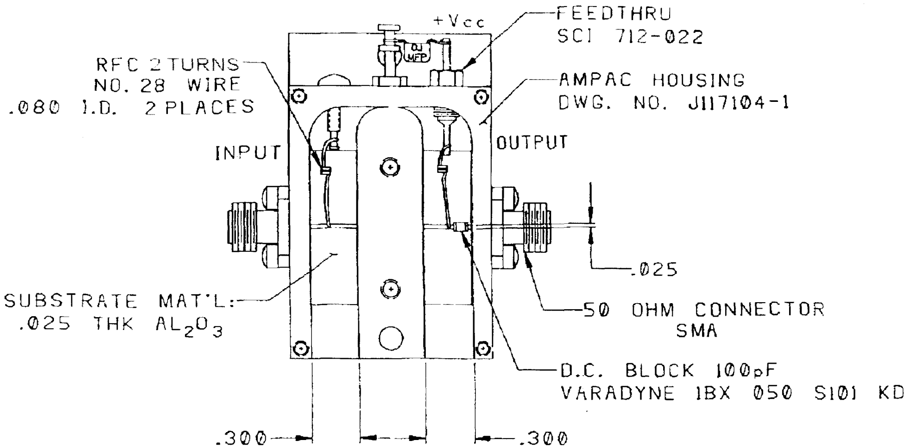
| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 1mA | $I_E$ = 0mA | 40 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.0 | — | — | V |
| $BV_{CER}$ | IC = 5mA | $R_{BE}$ = 10Ω | 40 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 24V | | — | — | 500 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 250mA | 15 | — | 120 | — |

DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 2000 — 2300MHz | $P_{IN}$ = 0.50W | $V_{CC}$ = 24V | 3.0 | — | — | W |
| $\eta_C$ | f = 2000 — 2300MHz | $P_{IN}$ = 0.50W | $V_{CC}$ = 24V | 50 | — | — | % |
| $G_P$ | f = 2000 — 2300MHz | $P_{IN}$ = 0.50W | $V_{CC}$ = 24V | 7.8 | — | — | dB |

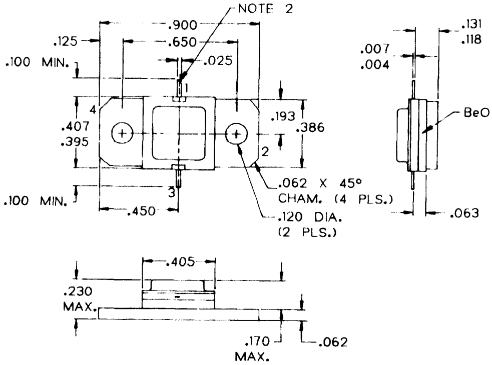
## TEST CIRCUIT

Dwg. No. J125178



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J113214F



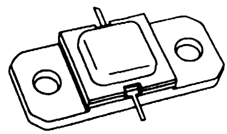

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD SLANT CUT.

# AM2023-006

## RF & MICROWAVE TRANSISTORS COMMUNICATIONS APPLICATIONS

PRELIMINARY DATA

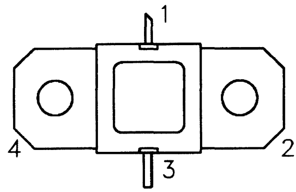
- REFRACTORY/GOLD METALLIZATION
- INPUT/OUTPUT MATCHING
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 6.0 W MIN. WITH 7.8 dB GAIN



**.400 x .400 2NLFL (S042)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM2023-006 | 2023-6 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The AM2023-006 is an internally matched device specifically designed for 2 GHz, telecommunications and telemetry applications.

Housed in the industry-standard AMPAC™ hermetic package, the AM2023-006 incorporates refractory-gold metallization for superior reliability in Class C power amplifier service.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* | 18.4 | W |
| $I_C$ | Device Current* | .850 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 24 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 9.5 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

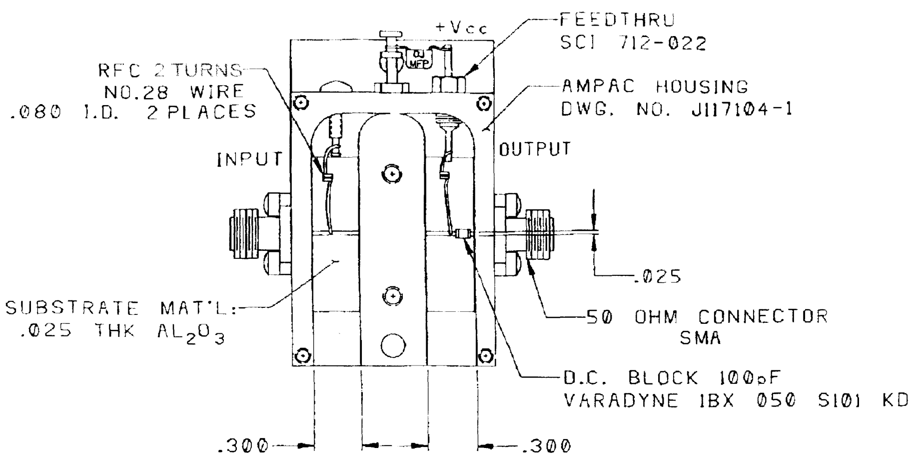
| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 1mA | $I_E$ = 0mA | 40 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.0 | — | — | V |
| $BV_{CER}$ | IC = 5mA | $R_{BE}$ = 10Ω | 40 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 24V | | — | — | 500 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 500mA | 15 | — | 120 | — |

DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 2000 — 2300MHz | $P_{IN}$ = 1.0W | $V_{CC}$ = 24V | 6.0 | — | — | W |
| $\eta_C$ | f = 2000 — 2300MHz | $P_{IN}$ = 1.0W | $V_{CC}$ = 24V | 40 | — | — | % |
| $G_P$ | f = 2000 — 2300MHz | $P_{IN}$ = 1.0W | $V_{CC}$ = 24V | 7.8 | — | — | dB |

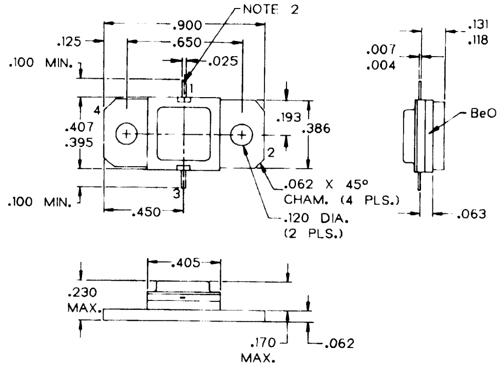
## TEST CIRCUIT

Dwg. No. J125178



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J113214F



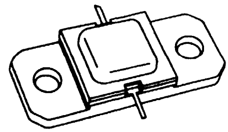

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD SLANT CUT.

SGS-THOMSON MICROELECTRONICS

# AM2327-001

## RF & MICROWAVE TRANSISTORS COMMUNICATIONS APPLICATIONS

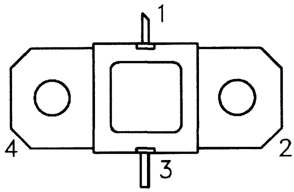
- REFRACTORY/GOLD METALLIZATION
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING TO 50 OHMS
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 1.0 W MIN. WITH 6.0 dB GAIN



**.400 x .400 2NLFL (S042)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM2327-001 | 2327-1 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The AM2327-001 is an internally matched device specifically designed for 2 GHz telecommunications and telemetry applications.

Housed in the industry-standard AMPAC™ hermetic package. The AM2327-001 incorporates refractory-gold metallization for superior reliability in Class C power amplifier service.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 100$°C) | 1.75 | W |
| $I_C$ | Device Current* | 0.12 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 24 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 22 | °C/W |

*Applies only to rated RF amplifier operation

NOTE: Thermal Resistance determined by Infra-Red Scanning of Hot-Spot Junction Temperature at rated RF operating conditions.

## ELECTRICAL SPECIFICATIONS ($T_{case} = 25°C$)

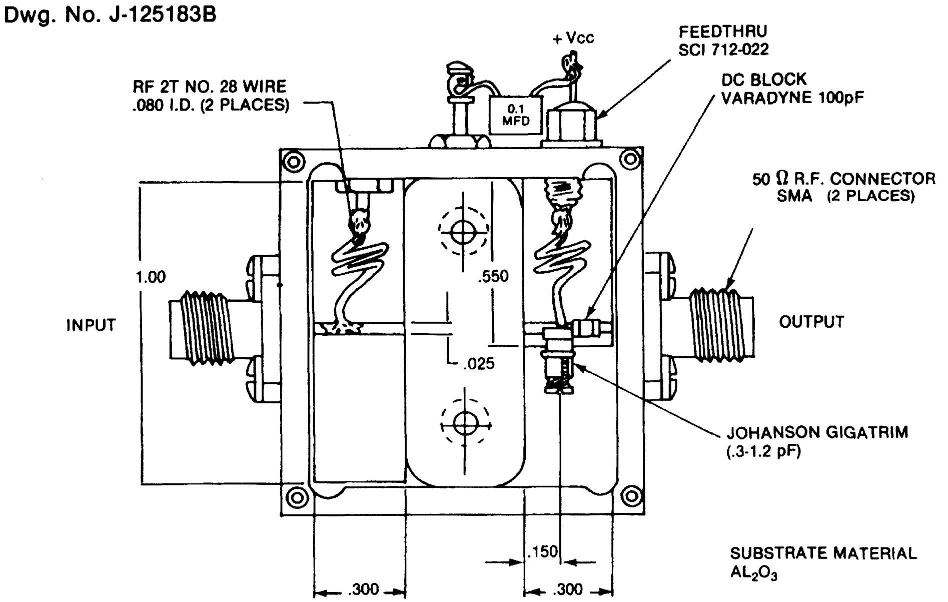
STATIC

| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C = 1mA$ | $I_E = 0mA$ | 40 | — | — | V |
| $BV_{EBO}$ | $I_E = 1mA$ | $I_C = 0mA$ | 3.0 | — | — | V |
| $BV_{CER}$ | IC = 5mA | $R_{BE} = 10\Omega$ | 40 | — | — | V |
| $I_{CBO}$ | $V_{BE} = 0V$ | $V_{CB} = 24V$ | — | — | 500 | mA |
| $h_{FE}$ | $V_{CE} = 5V$ | $I_C = 100mA$ | 15 | — | 120 | — |

DYNAMIC

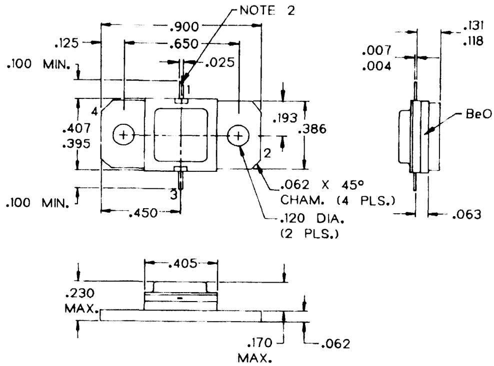
| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 2300 — 2700 MHz | $P_{IN} = 0.25W$ | $V_{CC} = 24V$ | 1.0 | — | — | W |
| $\eta_C$ | f = 2300 — 2700 MHz | $P_{IN} = 0.25W$ | $V_{CC} = 24V$ | 35 | — | — | % |
| $G_P$ | f = 2300 — 2700 MHz | $P_{IN} = 0.25W$ | $V_{CC} = 24V$ | 6.0 | — | — | dB |

## TEST CIRCUIT



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J113214F



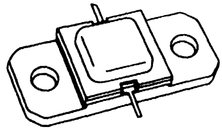

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD SLANT CUT.

SGS-THOMSON MICROELECTRONICS

# AM2327-003

## RF & MICROWAVE TRANSISTORS COMMUNICATIONS APPLICATIONS

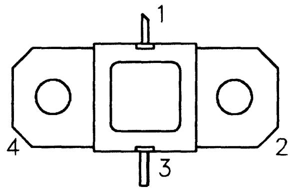
- REFRACTORY/GOLD METALLIZATION
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING TO 50 OHMS
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 2.6 W MIN. WITH 7.2 dB GAIN



**.400 x .400 2NLFL (S042)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM2327-003 | 2327-3 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

## DESCRIPTION

The AM2327-003 is an internally matched device specifically designed for 2 GHz telecommunications and telemetry applications.

Housed in the industry-standard AMPAC™ hermetic package. The AM2327-003 incorporates refractory-gold metallization for superior reliability in Class C power amplifier service.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 100$°C) | 6.0 | W |
| $I_C$ | Device Current* | 0.40 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 24 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 15 | °C/W |

*Applies only to rated RF amplifier operation

NOTE: Thermal Resistance determined by Infra-Red Scanning of Hot-Spot Junction Temperature at rated RF operating conditions.

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

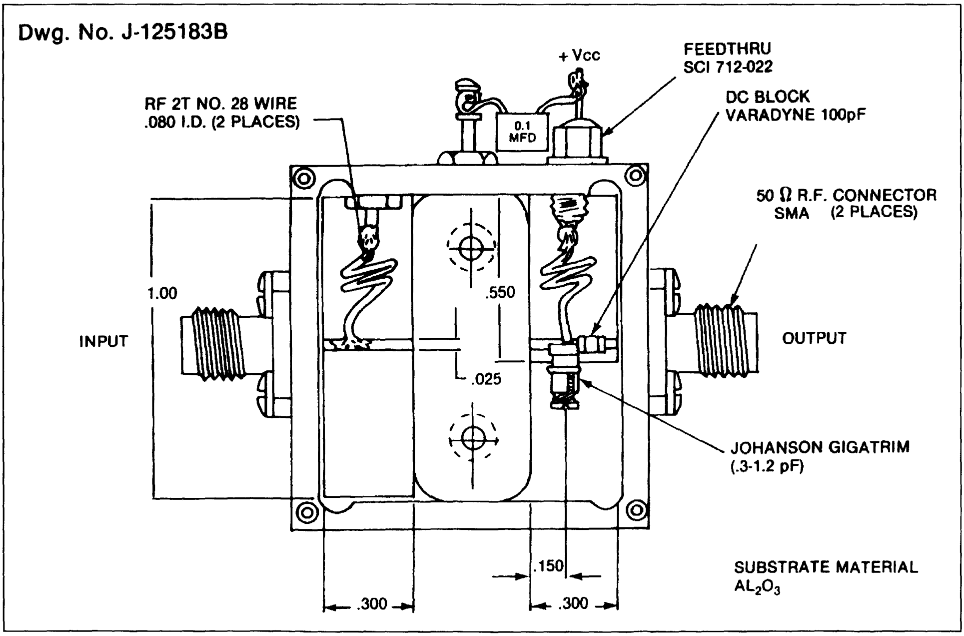
STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 1mA | $I_E$ = 0mA | 40 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.0 | — | — | V |
| $BV_{CER}$ | IC = 5mA | $R_{BE}$ = 10Ω | 40 | — | — | V |
| $I_{CBO}$ | $V_{BE}$ = 0V | $V_{CB}$ = 24V | — | — | 500 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 250mA | 15 | — | 120 | — |

DYNAMIC

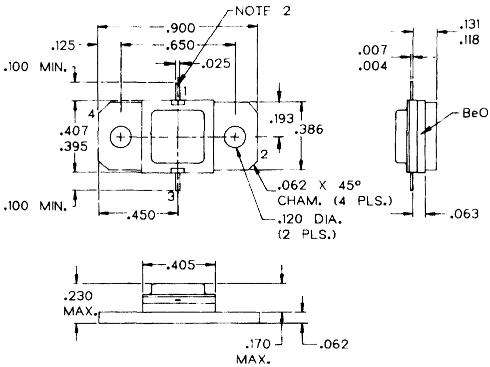
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 2300 — 2700 MHz | $P_{IN}$ = 0.50W | $V_{CC}$ = 24V | 2.6 | — | — | W |
| $\eta_C$ | f = 2300 — 2700 MHz | $P_{IN}$ = 0.50W | $V_{CC}$ = 24V | 40 | — | — | % |
| $G_P$ | f = 2300 — 2700 MHz | $P_{IN}$ = 0.50W | $V_{CC}$ = 24V | 7.2 | — | — | dB |

## TEST CIRCUIT



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J113214F



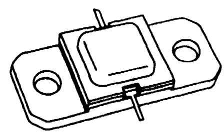

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD SLANT CUT.

**SGS-THOMSON**
MICROELECTRONICS

# AM2327-005

## RF & MICROWAVE TRANSISTORS COMMUNICATIONS APPLICATIONS

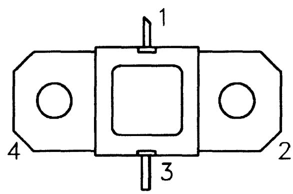
- REFRACTORY/GOLD METALLIZATION
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING TO 50 OHMS
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 5.0 W MIN. WITH 7.0 dB GAIN



**.400 x .400 2NLFL (S042)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM2327-005 | 2327-5 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The AM2327-005 is an internally matched device specifically designed for 2 GHz telecommunications and telemetry applications.

Housed in the industry-standard AMPAC™ hermetic package. The AM2327-005 incorporates refractory-gold metallization for superior reliability in Class C power amplifier service.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 100$°C) | 12.0 | W |
| $I_C$ | Device Current* | 0.75 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 24 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 9.0 | °C/W |

*Applies only to rated RF amplifier operation

NOTE: Thermal Resistance determined by Infra-Red Scanning of Hot-Spot Junction Temperature at rated RF operating conditions.

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

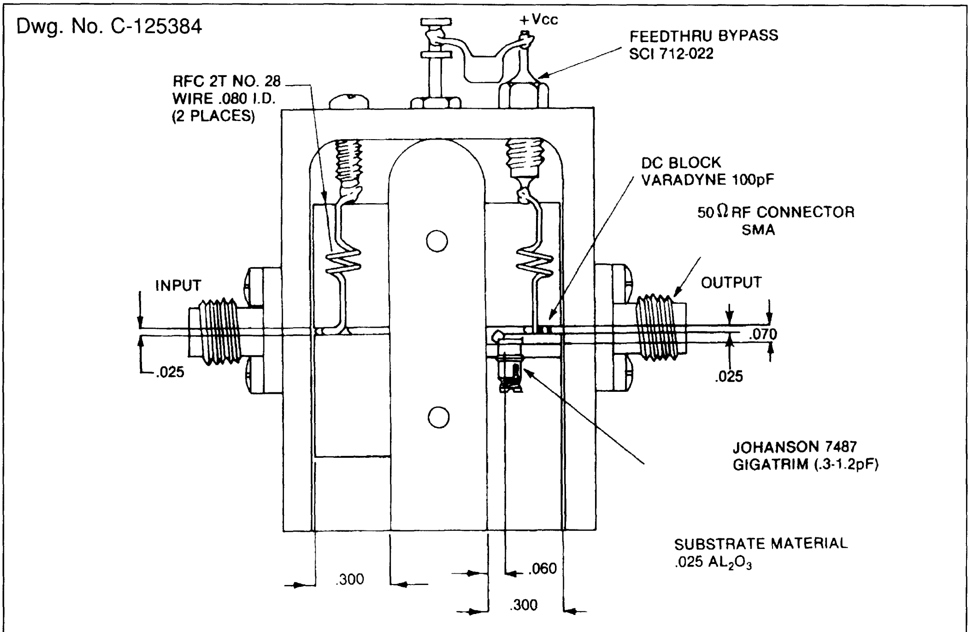
STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 1mA | $I_E$ = 0mA | 40 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.0 | — | — | V |
| $BV_{CER}$ | IC = 5mA | $R_{BE}$ = Ω | 40 | — | — | V |
| $I_{CBO}$ | $V_{BE}$ = 0V | $V_{CB}$ = 24V | — | — | 500 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 500mA | 15 | — | 120 | — |

DYNAMIC

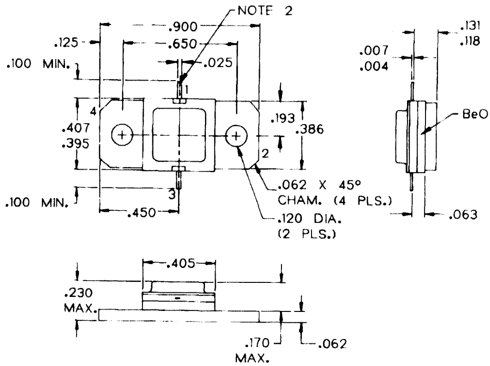
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 2300 — 2700MHz | $P_{IN}$ = 1.0W | $V_{CC}$ = 24V | 5.0 | — | — | W |
| $\eta_c$ | f = 2300 — 2700MHz | $P_{IN}$ = 1.0W | $V_{CC}$ = 24V | 35 | — | — | % |
| $G_P$ | f = 2300 — 2700MHz | $P_{IN}$ = 1.0W | $V_{CC}$ = 24V | 7.0 | — | — | dB |

## TEST CIRCUIT



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J113214F



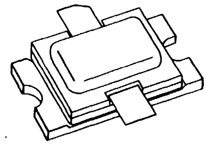

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD SLANT CUT.

SGS-THOMSON MICROELECTRONICS

# AM2729-110

## RF & MICROWAVE TRANSISTORS S-BAND RADAR APPLICATIONS

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- 3:1 VSWR CAPABILITY
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 105 W MIN. WITH 6.5 dB GAIN



**.400 x .500 2L SFL (S138)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM2729-110 | 2729-110 |

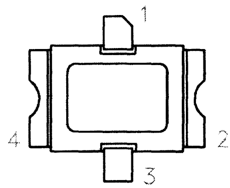
### DESCRIPTION

The AM2729-110 device is a high power silicon bipolar NPN transistor specifically designed for S-Band radar pulsed output and driver applications.

This device is capable of operation over a wide range of pulse widths, duty cycles and temperatures and can withstand a 3:1 output VSWR. Low RF thermal resistance, refractory/gold metallization, and computerized automatic wire bonding techniques ensure high reliability and product consistency (including phase characteristics).

The AM2729-110 is supplied in the BIGPAC™ Hermetic Metal/Ceramic package with internal Input/Output matching circuitry, and is intended for military and other high reliability applications.

### PIN CONNECTION




1. Collector
2. Base
3. Emitter
4. Base

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq$ 100°C) | 438 | W |
| $I_C$ | Device Current* | 12 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 48 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 0.4 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS (Tcase = 25°C)

STATIC

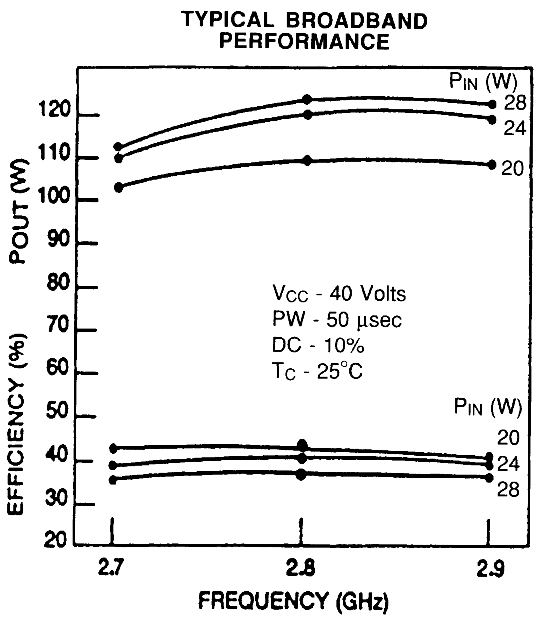
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 40mA | $I_E$ = 0mA | 55 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 8mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 40mA | $R_{BE}$ = 10Ω | 55 | — | — | V |
| $I_{CES}$ | $V_{BE}$ = 0V | $V_{CE}$ = 40V | — | — | 30 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 4A | 30 | — | — | — |

DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 2700 — 2900MHz | $P_{IN}$ = 23.5W | $V_{CC}$ = 40V | 105 | 115 | — | W |
| $\eta_C$ | f = 2700 — 2900MHz | $P_{IN}$ = 23.5W | $V_{CC}$ = 40V | 33 | 40 | — | % |
| $G_P$ | f = 2700 — 2900MHz | $P_{IN}$ = 23.5W | $V_{CC}$ = 40V | 6.5 | 6.9 | — | dB |

Note: Pulse Width = 50 µSec
Duty Cycle = 10%

## TYPICAL PERFORMANCE

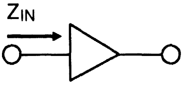




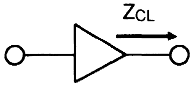

SGS-THOMSON MICROELECTRONICS

## IMPEDANCE DATA

**TYPICAL INPUT IMPEDANCE**

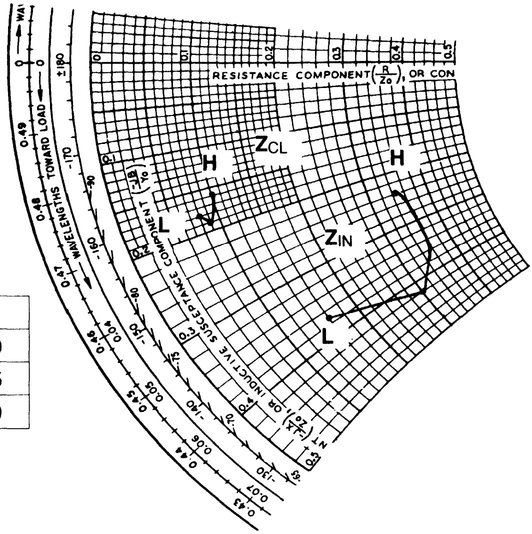



**TYPICAL COLLECTOR LOAD IMPEDANCE**

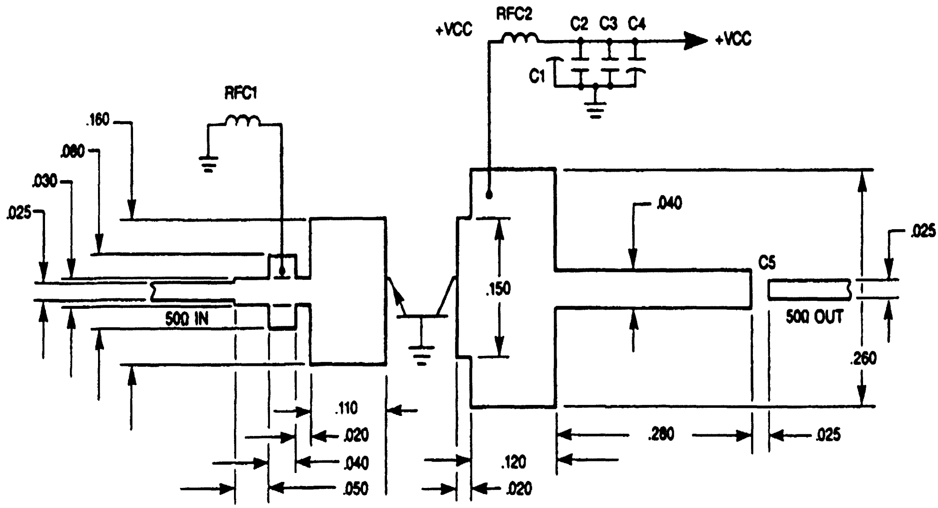



| FREQ. | ZIN (Ω) | ZCL (Ω) |
|---|---|---|
| L = 2.7 GHz | 8.0 – j 18.5 | 4.0 – j 9.0 |
| M = 2.8 GHz | 15.0 – j 21.0 | 4.5 – j 9.5 |
| H = 2.9 GHz | 17.3 – j 12.0 | 5.0 – j 8.0 |

$P_{IN}$ = 23.5 W
$V_{CC}$ = 40 V
Normalized to 50 ohms




## TEST CIRCUIT



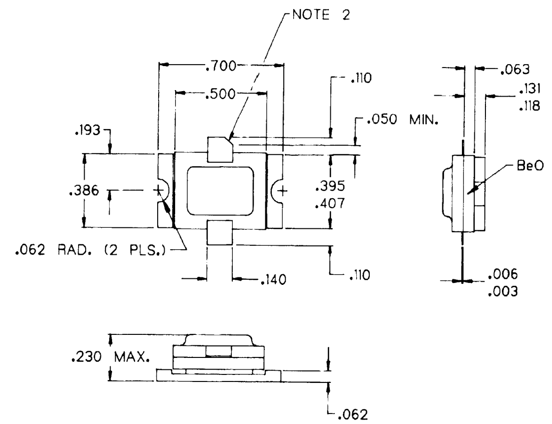

All dimensions are in inches.
Substrate material: .025 thick $Al_2O_3$

C1 : 1500 pF RF Feedthrough
C2 : 1 μF CK06 Capacitor
C3 : 1 μF Tantalum Capacitor
C4 : 100 μF Electrolytic Capacitor, 63V

C5 : 22 pF Chip Capacitor
RFC1 : No. 26 Wire, 2 Turn .08 I.D.
RFC2 : No. 26 Wire, 2 Turn .08 I.D.

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: 103-000737A




NOTES:
1. ALL TOLERANCES ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

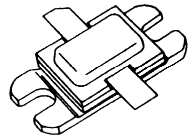
SGS-THOMSON
MICROELECTRONICS

# AM2729-125

## RF & MICROWAVE TRANSISTORS S-BAND RADAR APPLICATIONS

PRELIMINARY DATA

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 125 W MIN. WITH 7.0 dB GAIN



**.400 x .500 2LFL (S038)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM2729-125 | 2729-125 |

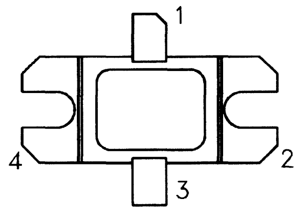
### DESCRIPTION

The AM2729-125 device is a high power silicon bipolar NPN transistor specifically designed for medium pulse S-Band radar output and driver applications.

This device is characterized at 50 µsec pulse width and 10% duty cycle, but is capable of operation over a range of pulse widths, duty cycles and temperatures, and can withstand a 3:1 output VSWR with a +1 dB input overdrive. Low RF thermal resistance, refractory/gold metallization and computerized automatic wire bonding techniques ensure high reliability and product consistency (including phase characteristics).

The AM2729-125 is supplied in the BIGPAC™ Hermetic Metal/Ceramic package with internal Input/Output impedance matching circuitry, and is intended for military and other high reliability applications.

### PIN CONNECTION




1. Collector
2. Base
3. Emitter
4. Base

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 75$°C) | 500 | W |
| $I_C$ | Device Current* | 16 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 45 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 0.35 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 50mA | $I_E$ = 0mA | 55 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CES}$ | IC = 50mA | $V_{BE}$ = 0V | 55 | — | — | V |
| $I_{CES}$ | $V_{BE}$ = 0V | $V_{CE}$ = 40V | — | — | 40 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 5A | 30 | — | 300 | — |

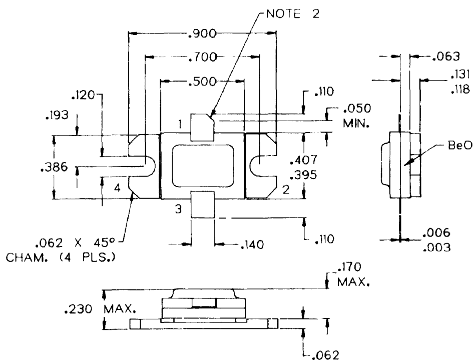
### DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 2700 — 2900MHz | $P_{IN}$ = 25W | $V_{CC}$ = 40V | 125 | — | — | W |
| $\eta_C$ | f = 2700 — 2900MHz | $P_{IN}$ = 25W | $V_{CC}$ = 40V | 35 | — | — | % |
| $G_P$ | f = 2700 — 2900MHz | $P_{IN}$ = 25W | $V_{CC}$ = 40V | 7.0 | — | — | dB |

Note: Pulse Width = 50µSec
Duty Cycle = 10%

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135066F



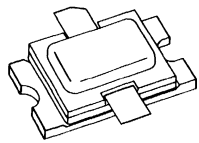

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

SGS-THOMSON
MICROELECTRONICS

# AM2931-110

## RF & MICROWAVE TRANSISTORS
## S-BAND RADAR APPLICATIONS

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- 3:1 VSWR CAPABILITY
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ =105 W MIN. WITH 6.2 dB GAIN



**.400 x .500 2L SFL (S138)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM2931-110 | 2931-110 |

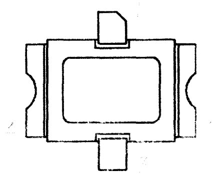
### DESCRIPTION

The AM2931-110 is a high power silicon bipolar NPN transistor specifically designed for S-Band radar pulsed output and driver applications.

This device is capable of operation over a wide range of pulse widths, duty cycles and temperatures and can withstand a 3:1 output VSWR. Low RF thermal resistance, refractory/gold metallization, and computerized automatic wire bonding techniques ensure high reliability and product consistency (including phase characteristics).

The AM2931-110 is supplied in the BIGPAC™ Hermetic Metal/Ceramic package with internal Input/Output matching circuitry, and is intended for military and other high reliability applications.

### PIN CONNECTION



1. Collector
2. Base
3. Emitter
4. Base

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq$ 100°C) | 375 | W |
| $I_C$ | Device Current* | 12 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 48 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | − 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 0.40 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS (Tcase = 25°C)

STATIC

| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 40mA | $I_E$ = 0mA | 55 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 8mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 40mA | $R_{BE}$ = 10Ω | 55 | — | — | V |
| $I_{CES}$ | $V_{BE}$ = 0V | $V_{CE}$ = 42V | — | — | 30 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 4A | 30 | — | — | — |

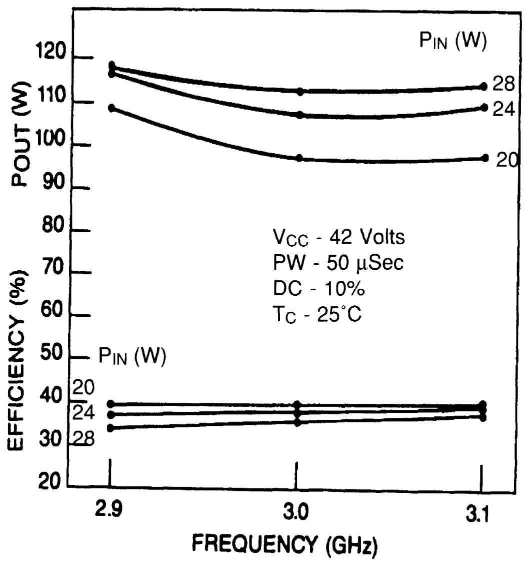
DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 2900 — 3100MHz | $P_{IN}$ = 25W | $V_{CC}$ = 42V | 105 | 115 | — | W |
| $\eta_C$ | f = 2900 — 3100MHz | $P_{IN}$ = 25W | $V_{CC}$ = 42V | 32 | 40 | — | % |
| $G_P$ | f = 2900 — 3100MHz | $P_{IN}$ = 25W | $V_{CC}$ = 42V | 6.2 | 6.6 | — | dB |

Note: Pulse Width = 50 µSec
Duty Cycle = 10%

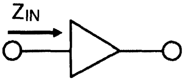
## TYPICAL PERFORMANCE

TYPICAL BROADBAND PERFORMANCE

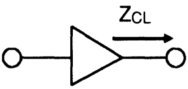


## IMPEDANCE DATA

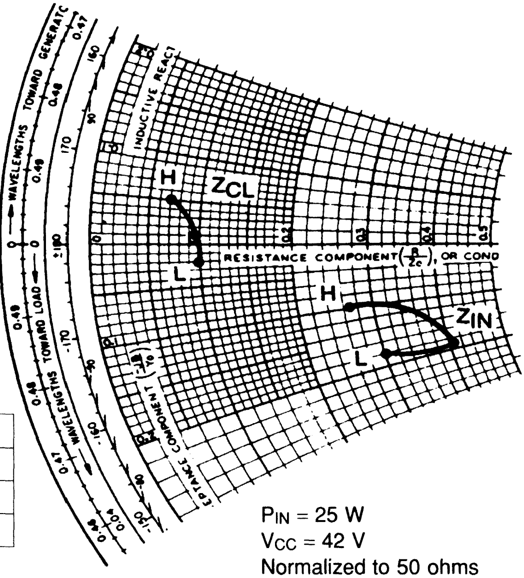
**TYPICAL INPUT IMPEDANCE**




**TYPICAL COLLECTOR LOAD IMPEDANCE**

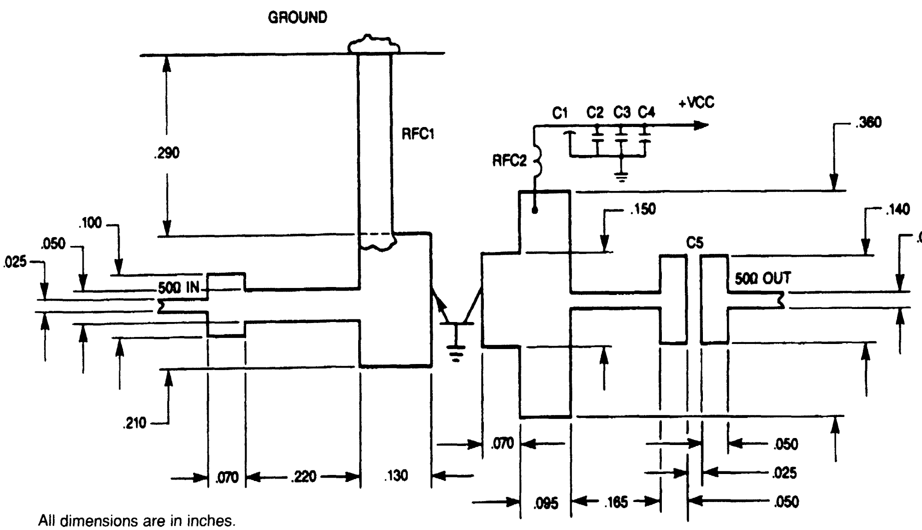



| FREQ. | ZIN (Ω) | ZCL (Ω) |
|---|---|---|
| L = 2.9 GHz | 15.0 – j 9.0 | 5.0 – j 1.0 |
| M = 3.0 GHz | 20.0 – j 9.5 | 4.8 + j 0.5 |
| H = 3.1 GHz | 13.5 – j 5.0 | 3.5 + j 2.5 |




$P_{IN}$ = 25 W
$V_{CC}$ = 42 V
Normalized to 50 ohms

## TEST CIRCUIT



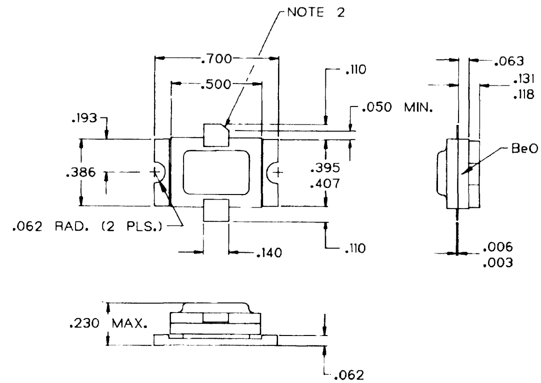

All dimensions are in inches.
Substrate material: .025 thick $Al_2O_3$ (Er = 9.6)

C1 : 1500 pF RF Feedthrough
C2 : 1 µF, CK06 CapacitorC
C3 : 1 µF, Tantalum Capacitor
C4 : 100 µF Electrolytic Capacitor, 63V

C5 : 22 pF Chip Capacitor (bridge at location indicated)
RFC1 : Gold Plated Nickel Strap, 0.060 Inch Wide, 0.005 Inch Thick, 0.290 Inch Long
RFC2 : No. 26 Wire, 2 Turn .0.80 Inch I.D.

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: 103-000737A




NOTES:
1. ALL TOLERANCES ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

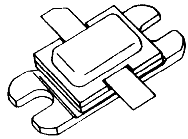
SGS-THOMSON
MICROELECTRONICS

# AM2931-125

## RF & MICROWAVE TRANSISTORS
## S-BAND RADAR APPLICATIONS

PRELIMINARY DATA

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 125 W MIN. WITH 7.0 dB GAIN



**.400 x .500 2LFL (S038)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM2931-125 | 2931-125 |

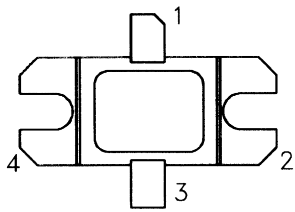
## DESCRIPTION

The AM2931-125 device is a high power silicon bipolar NPN transistor specifically designed for medium pulse S-Band radar output and driver applications.

This device is characterized at 50 µsec pulse width and 10% duty cycle, but is capable of operation over a range of pulse widths, duty cycles and temperatures, and can withstand a 3:1 output VSWR with a +1 dB input overdrive. Low RF thermal resistance, refractory/gold metallization and computerized automatic wire bonding techniques ensure high reliability and product consistency (including phase characteristics).

The AM2931-125 is supplied in the BIGPAC™ Hermetic Metal/Ceramic package with internal Input/Output impedance matching circuitry, and is intended for military and other high reliability applications.

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 75°C$) | 500 | W |
| $I_C$ | Device Current* | 16 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 45 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 0.35 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 50mA | $I_E$ = 0mA | 55 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CES}$ | IC = 50mA | $V_{BE}$ = 0V | 55 | — | — | V |
| $I_{CES}$ | $V_{BE}$ = 0V | $V_{CE}$ = 42V | — | — | 40 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 5A | 30 | — | 300 | — |

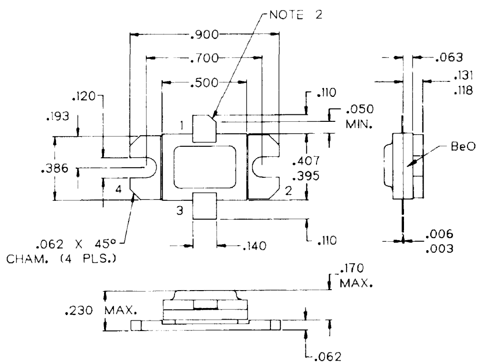
DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 2900 — 3100MHz | $P_{IN}$ = 25W | $V_{CC}$ = 42V | 125 | — | — | W |
| $\eta_c$ | f = 2900 — 3100MHz | $P_{IN}$ = 25W | $V_{CC}$ = 42V | 35 | — | — | % |
| $G_P$ | f = 2900 — 3100MHz | $P_{IN}$ = 25W | $V_{CC}$ = 42V | 7.0 | — | — | dB |

Note: Pulse Width = 50µSec
Duty Cycle = 10%

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135066F




NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

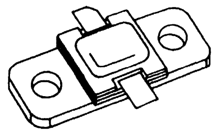
SGS-THOMSON MICROELECTRONICS

# AM3135-007

## RF & MICROWAVE TRANSISTORS S-BAND RADAR APPLICATIONS

PRELIMINARY DATA

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- LOW THERMAL RESISTANCE
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 6.5 W MIN. WITH 6.0 dB GAIN



**.310 x .310 2LFL (S064)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM3135-007 | 3135-7 |

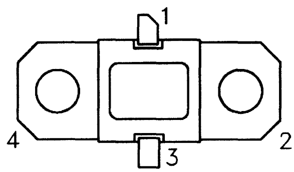
### DESCRIPTION

The AM3135-007 device is a high power silicon bipolar NPN transistor specifically designed for long pulse S-Band radar output and driver applications.

This device is characterized at 500 µsec pulse width and 10% duty cycle, but is capable of operation over a range of pulse widths, duty cycles and temperatures, and can withstand a 3:1 output VSWR with a +1 dB input overdrive. Low RF thermal resistance, refractory/gold metallization and computerized automatic wire bonding techniques ensure high reliability and product consistency (including phase characteristics).

The AM3135-007 is supplied in the AMPAC™ Hermetic Metal/Ceramic package with internal Input/Output impedance matching circuitry, and is intended for military and other high reliability applications.

### PIN CONNECTION




1. Collector
2. Base
3. Emitter
4. Base

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 50°C$) | 34 | W |
| $I_C$ | Device Current* | 1.2 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 34 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 5.8 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 7mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CES}$ | IC = 7mA | $V_{BE}$ = 0V | 45 | — | — | V |
| $I_{CES}$ | $V_{BE}$ = 0V | $V_{CE}$ = 30V | — | — | 5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 600mA | 30 | — | 300 | — |

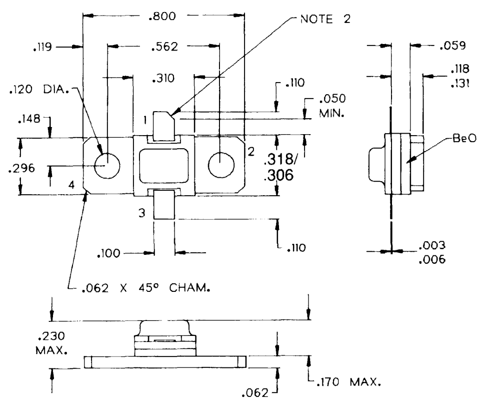
### DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 3100 — 3500MHz | $P_{IN}$ = 1.63W | $V_{CC}$ = 30V | 6.5 | — | — | W |
| $\eta_C$ | f = 3100 — 3500MHz | $P_{IN}$ = 1.63W | $V_{CC}$ = 30V | 30 | — | — | % |
| $G_P$ | f = 3100 — 3500MHz | $P_{IN}$ = 1.63W | $V_{CC}$ = 30V | 6.0 | — | — | dB |

Note: Pulse Width = 500µSec
Duty Cycle = 10%

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J133100D




NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

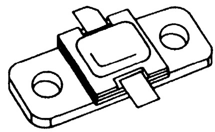
SGS-THOMSON MICROELECTRONICS

# AM3135-014

## RF & MICROWAVE TRANSISTORS S-BAND RADAR APPLICATIONS

PRELIMINARY DATA

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 13.5 W MIN. WITH 6.0 dB GAIN



**.310 x .310 2LFL (S064)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM3135-014 | 3135-14 |

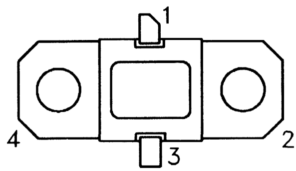
### DESCRIPTION

The AM3135-014 device is a high power silicon bipolar NPN transistor specifically designed for long pulse S-Band radar output and driver applications.

This device is characterized at 500 μsec pulse width and 10% duty cycle, but is capable of operation over a range of pulse widths, duty cycles and temperatures, and can withstand a 3:1 output VSWR with a +1 dB input overdrive. Low RF thermal resistance, refractory/gold metallization and computerized automatic wire bonding techniques ensure high reliability and product consistency (including phase characteristics).

The AM3135-014 is supplied in the IMPAC™ Hermetic Metal/Ceramic package with internal Input/Output impedance matching circuitry, and is intended for military and other high reliability applications.

### PIN CONNECTION




1. Collector
2. Base
3. Emitter
4. Base

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 50°C$) | 57 | W |
| $I_C$ | Device Current* | 1.8 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 34 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 3.5 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 10mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 2mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CES}$ | IC = 10mA | $V_{BE}$ = 0V | 45 | — | — | V |
| $I_{CES}$ | $V_{BE}$ = 0V | $V_{CE}$ = 30V | — | — | 8 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1A | 30 | — | 300 | — |

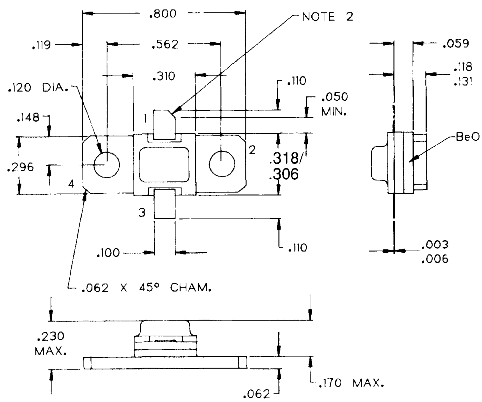
DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 3100 — 3500MHz | $P_{IN}$ = 3.4W | $V_{CC}$ = 30V | 13.5 | — | — | W |
| $\eta_C$ | f = 3100 — 3500MHz | $P_{IN}$ = 3.4W | $V_{CC}$ = 30V | 32 | — | — | % |
| $G_P$ | f = 3100 — 3500MHz | $P_{IN}$ = 3.4W | $V_{CC}$ = 30V | 6.0 | — | — | dB |

Note: Pulse Width = 500μSec
Duty Cycle = 10%

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J133100D



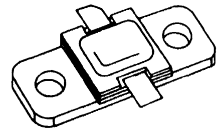

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

SGS-THOMSON MICROELECTRONICS

# AM3135-025

## RF & MICROWAVE TRANSISTORS S-BAND RADAR APPLICATIONS

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- 3:1 VSWR CAPABILITY @ 1 dB OVERDRIVE
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 30 W MIN. WITH 6.8 dB GAIN



**.310 x .310 2LFL (S064)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM3135-025 | 3135-25 |

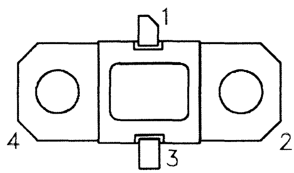
### DESCRIPTION

The AM3135-025 device is a high power silicon bipolar NPN transistor specifically designed for long pulse S-Band radar output and driver applications.

This device is characterized at 500 µsec pulse width and 10% duty cycle, but is capable of operation over a range of pulse widths, duty cycles and temperatures, and can withstand a 3:1 output VSWR with a +1 dB input overdrive. Low RF thermal resistance, refractory/gold metallization and computerized automatic wire bonding techniques ensure high reliability and product consistency (including phase characteristics).

The AM3135-025 is supplied in the IMPAC™ Hermetic Metal/Ceramic package with internal Input/Output impedance matching circuitry, and is intended for military and other high reliability applications.

### PIN CONNECTION




1. Collector
2. Base
3. Emitter
4. Base

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 50°C$) | 100 | W |
| $I_C$ | Device Current* | 3.3 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 34 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 2.0 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 20mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 4mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CES}$ | IC = 20mA | $V_{BE}$ = 0V | 45 | — | — | V |
| $I_{CES}$ | $V_{BE}$ = 0V | $V_{CE}$ = 30V | — | — | 15 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 2A | 30 | — | — | — |

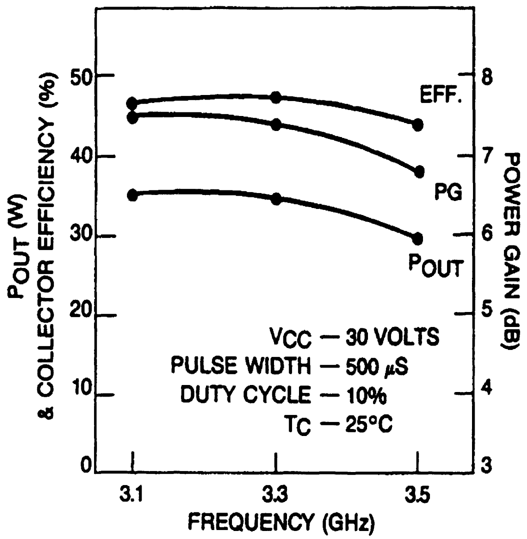
DYNAMIC

| Symbol | Test Condtions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 3.1 — 3.5GHz | $P_{IN}$ = 6.25W | $V_{CC}$ = 30V | 25 | 30 | — | W |
| $\eta_C$ | f = 3.1 — 3.5GHz | $P_{IN}$ = 6.25W | $V_{CC}$ = 30V | 35 | 44 | — | % |
| $G_P$ | f = 3.1 — 3.5GHz | $P_{IN}$ = 6.25W | $V_{CC}$ = 30V | 6.0 | 6.8 | — | dB |

Note: Pulse Width = 500 µSec
Duty Cycle = 10%

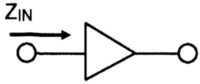
## TYPICAL PERFORMANCE

TYPICAL BROADBAND PERFORMANCE

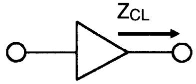


## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE

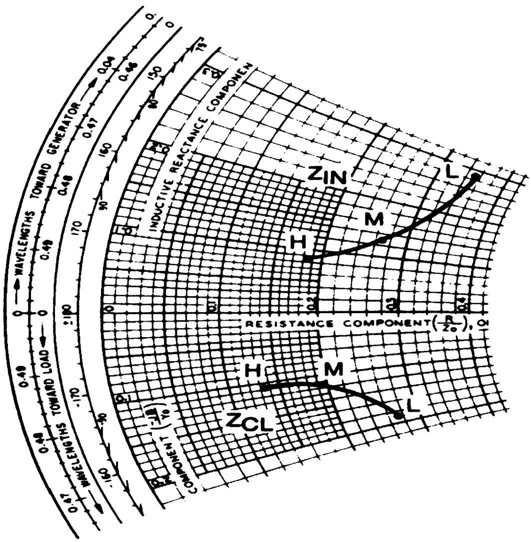



### TYPICAL COLLECTOR LOAD IMPEDANCE

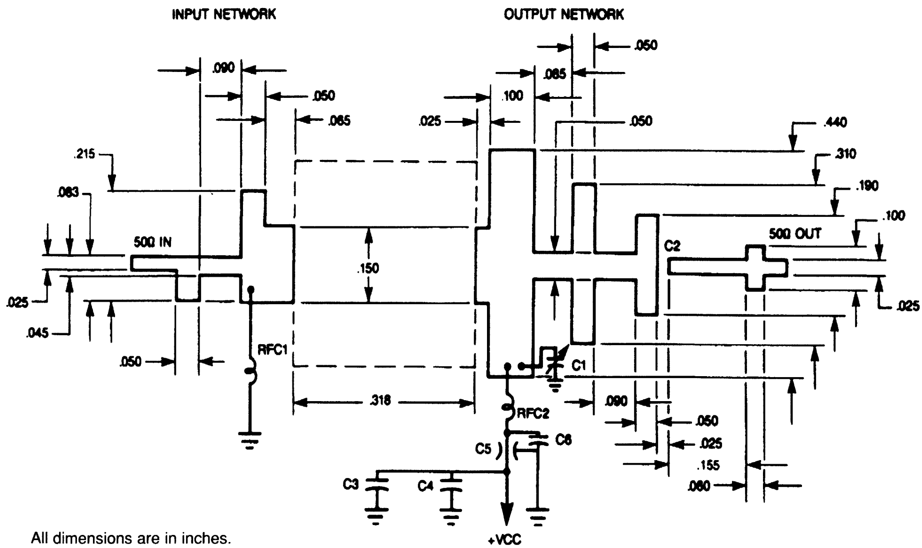



| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| L = 3.1 GHz | 17.5 + j 14.5 | 13.5 – j 4.5 |
| M = 3.3 GHz | 13.5 + j 6.5 | 10.0 – j 6.0 |
| H = 3.5 GHz | 9.0 + j 4.5 | 6.5 – j 5.5 |

$P_{IN}$ = 6.25 W
$V_{CC}$ = 30 V
Normalized to 50 ohms




## TEST CIRCUIT

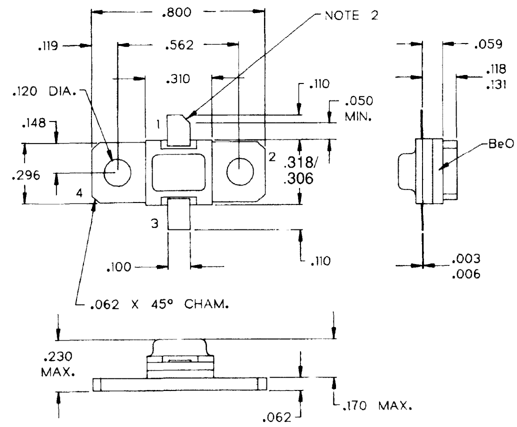



All dimensions are in inches.
Substrate material: .025 thick $Al_2O_3$ (Er = 9.6)

C1 : 0.3—1.2 pF Johanson Gigatrim Capacitor
C2 : 33 pF, 50V Chip Capacitor
C3 : 100 pF Electrolytic Capacitor
C4 : 0.1 µF, Disc Ceramic Capacitor
C5 : 1000 pF, 200V Feedthrough
C6 : 1 µF Electrolytic Capacitor
RFC1 : No. 26 Wire, 1 Turn .080 I.D.
RFC2 : No. 26 Wire, 1 Turn .080 I.D.

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J133100D




NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED;
   DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

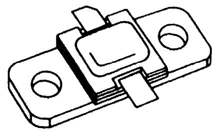
SGS-THOMSON MICROELECTRONICS

# AM3135-035

## RF & MICROWAVE TRANSISTORS
## S-BAND RADAR APPLICATIONS

PRELIMINARY DATA

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 35 W MIN. WITH 6.0 dB GAIN



**.310 x .310 2LFL (S064)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM3135-035 | 3135-35 |

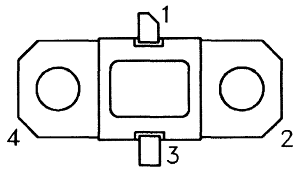
## DESCRIPTION

The AM3135-035 device is a high power silicon bipolar NPN transistor specifically designed for long pulse S-Band radar output and driver applications.

This device is characterized at 500 µsec pulse width and 10% duty cycle, but is capable of operation over a range of pulse widths, duty cycles and temperatures, and can withstand a 3:1 output VSWR with a +1 dB input overdrive. Low RF thermal resistance, refractory/gold metallization and computerized automatic wire bonding techniques ensure high reliability and product consistency (including phase characteristics).

The AM3135-035 is supplied in the IMPAC™ Hermetic Metal/Ceramic package with internal Input/Output impedance matching circuitry, and is intended for military and other high reliability applications.

## PIN CONNECTION




1. Collector
2. Base
3. Emitter
4. Base

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 50°C$) | 125 | W |
| $I_C$ | Device Current* | 4.4 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 34 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 1.6 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 25mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 5mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CES}$ | IC = 25mA | $V_{BE}$ = 0V | 45 | — | — | V |
| $I_{CES}$ | $V_{BE}$ = 0V | $V_{CE}$ = 30V | — | — | 20 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 3A | 30 | — | 300 | — |

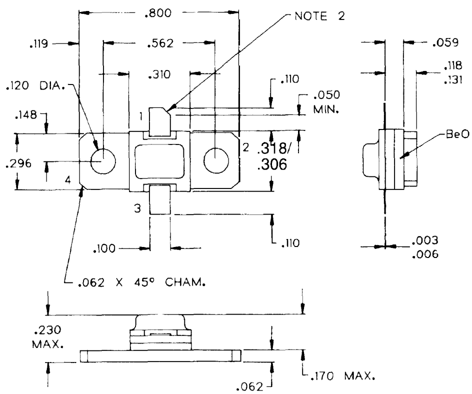
### DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 3100 — 3500MHz | $P_{IN}$ = 8.8W | $V_{CC}$ = 30V | 35 | — | — | W |
| $\eta_c$ | f = 3100 — 3500MHz | $P_{IN}$ = 8.8W | $V_{CC}$ = 30V | 35 | — | — | % |
| $G_P$ | f = 3100 — 3500MHz | $P_{IN}$ = 8.8W | $V_{CC}$ = 30V | 6.0 | — | — | dB |

Note: Pulse Width = 500µSec
Duty Cycle = 10%

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J133100D




NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

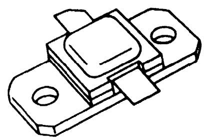
SGS-THOMSON MICROELECTRONICS

# AM3135-045

## RF & MICROWAVE TRANSISTORS S-BAND RADAR APPLICATIONS

PRELIMINARY DATA

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 45 W MIN. WITH 6.0 dB GAIN



**.400 x .400 2LFL (S036)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM3135-045 | 3135-45 |

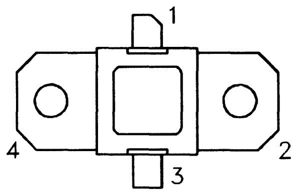
### DESCRIPTION

The AM3135-045 device is a high power silicon bipolar NPN transistor specifically designed for long pulse S-Band radar output and driver applications.

This device is characterized at 500 µsec pulse width and 10% duty cycle, but is capable of operation over a range of pulse widths, duty cycles and temperatures, and can withstand a 3:1 output VSWR with a +1 dB input overdrive. Low RF thermal resistance, refractory/gold metallization and computerized automatic wire bonding techniques ensure high reliability and product consistency (including phase characteristics).

The AM3135-045 is supplied in the IMPAC™ Hermetic Metal/Ceramic package with internal Input/Output impedance matching circuitry, and is intended for military and other high reliability applications.

### PIN CONNECTION




1. Collector
2. Base
3. Emitter
4. Base

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 50°C$) | 150 | W |
| $I_C$ | Device Current* | 5.0 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 34 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 1.33 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 35mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 6mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CES}$ | IC = 35mA | $V_{BE}$ = 0V | 45 | — | — | V |
| $I_{CES}$ | $V_{BE}$ = 0V | $V_{CE}$ = 30V | — | — | 25 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 3.5A | 30 | — | 300 | — |

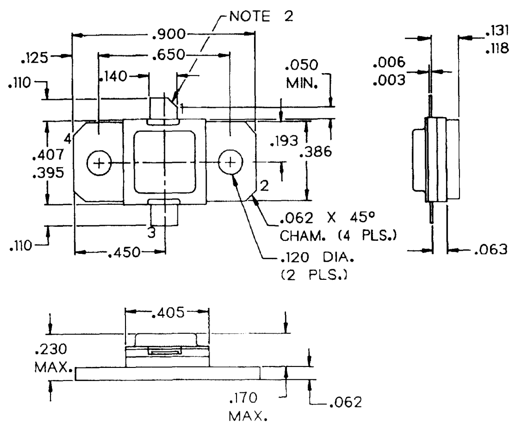
### DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 3100 — 3500MHz | $P_{IN}$ = 11.3W | $V_{CC}$ = 30V | 45 | — | — | W |
| $\eta_C$ | f = 3100 — 3500MHz | $P_{IN}$ = 11.3W | $V_{CC}$ = 30V | 35 | — | — | % |
| $G_P$ | f = 3100 — 3500MHz | $P_{IN}$ = 11.3W | $V_{CC}$ = 30V | 6.0 | — | — | dB |

Note: Pulse Width = 500µSec
Duty Cycle = 10%

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J133102E



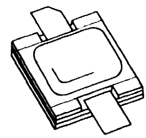

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

SGS-THOMSON
MICROELECTRONICS

# AM3135-25N

## RF & MICROWAVE TRANSISTORS
## S-BAND RADAR APPLICATIONS

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- 3:1 VSWR CAPABILITY @ 1 dB OVERDRIVE
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 30 W MIN. WITH 6.8 dB GAIN



**.310 x .310 2L (S065)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM3135-25N | 3135-25N |

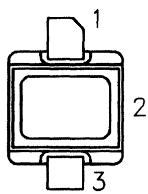
### DESCRIPTION

The AM3135-25N device is a high power silicon bipolar NPN transistor specifically designed for long pulse S-Band radar output and driver applications.

This device is characterized at 500 µsec pulse width and 10% duty cycle, but is capable of operation over a range of pulse widths, duty cycles and temperatures, and can withstand a 3:1 output VSWR with a +1 dB input overdrive. Low RF thermal resistance, refractory/gold metallization and computerized automatic wire bonding techniques ensure high reliability and product consistency (including phase characteristics).

The AM3135-25N is supplied in the IMPAC™ Hermetic Metal/Ceramic package with internal Input/Output impedance matching circuitry, and is intended for military and other high reliability applications.

**PIN CONNECTION**




1. Collector
2. Base (bottom surface)
3. Emitter

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 50$°C) | 100 | W |
| $I_C$ | Device Current* | 3.3 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 34 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 2.0 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

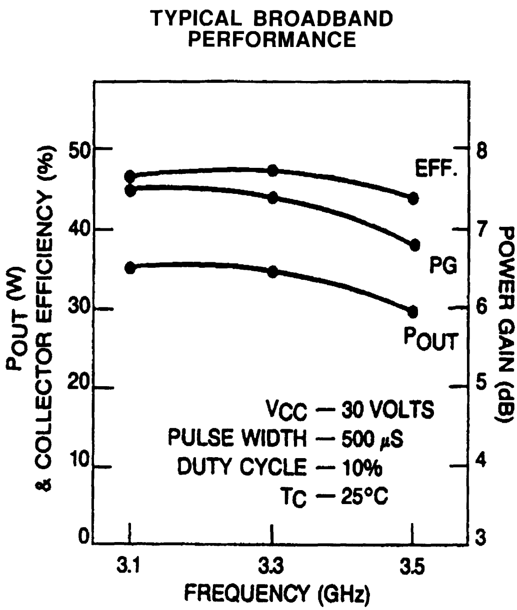
| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 20mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 4mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CES}$ | IC = 20mA | $V_{BE}$ = 0V | 45 | — | — | V |
| $I_{CES}$ | $V_{BE}$ = 0V | $V_{CE}$ = 30V | — | — | 15 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 2A | 30 | — | — | — |

DYNAMIC

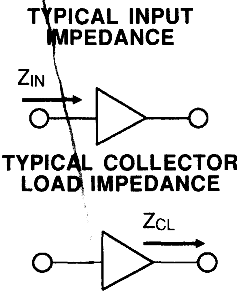
| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 3.1 — 3.5GHz | $P_{IN}$ = 6.25W | $V_{CC}$ = 30V | 25 | 30 | — | W |
| $\eta_C$ | f = 3.1 — 3.5GHz | $P_{IN}$ = 6.25W | $V_{CC}$ = 30V | 35 | 44 | — | % |
| $G_P$ | f = 3.1 — 3.5GHz | $P_{IN}$ = 6.25W | $V_{CC}$ = 30V | 6.0 | 6.8 | — | dB |

Note: Pulse Width = 500 µSec
Duty Cycle = 10%

## TYPICAL PERFORMANCE

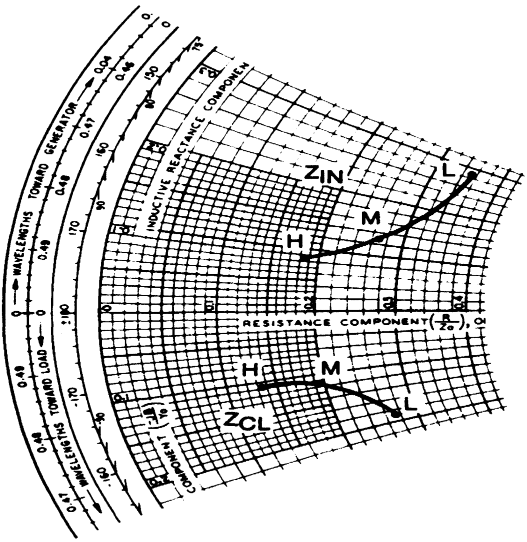


## IMPEDANCE DATA

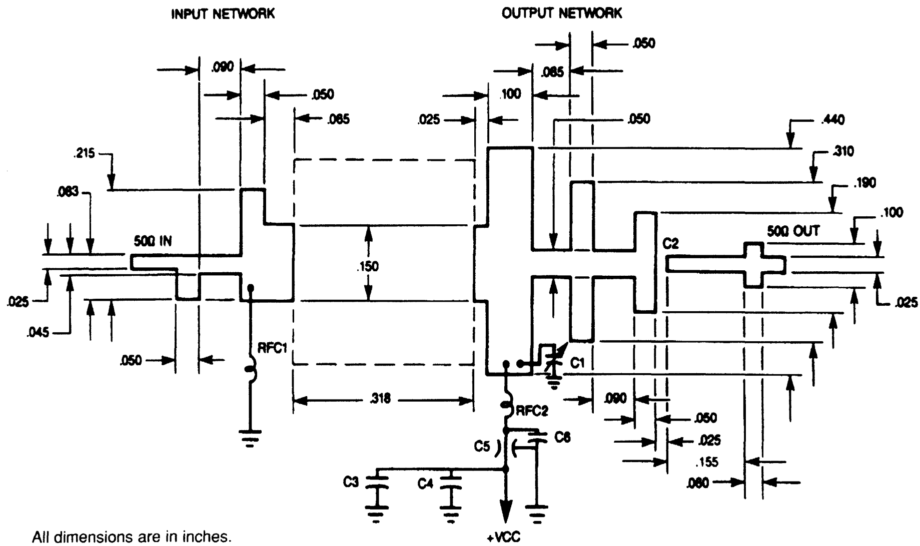



| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| L = 3.1 GHz | 17.5 + j 14.5 | 13.5 – j 4.5 |
| M = 3.3 GHz | 13.5 + j 6.5 | 10.0 – j 6.0 |
| H = 3.5 GHz | 9.0 + j 4.5 | 6.5 – j 5.5 |

$P_{IN}$ = 6.25 W
$V_{CC}$ = 30 V
Normalized to 50 ohms




## TEST CIRCUIT

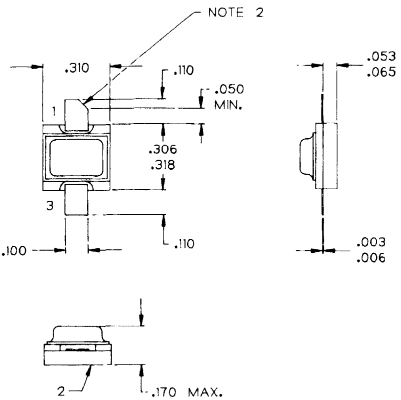



All dimensions are in inches.
Substrate material: .025 thick $Al_2O_3$ (Er = 9.6)

C1 : 0.3—1.2 pF Johanson Gigatrim Capacitor
C2 : 33 pF, 50V Chip Capacitor
C3 : 100 pF Electrolytic Capacitor
C4 : 0.1 µF, Disc Ceramic Capacitor
C5 : 1000 pF, 200V Feedthrough
C6 : 1 µF Electrolytic Capacitor
RFC1 : No. 26 Wire, 1 Turn .080 I.D.
RFC2 : No. 26 Wire, 1 Turn .080 I.D.

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135062 A



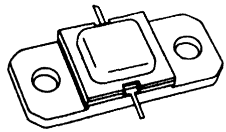

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

SGS-THOMSON MICROELECTRONICS

# AM80610-018

## RF & MICROWAVE TRANSISTORS UHF COMMUNICATIONS APPLICATIONS

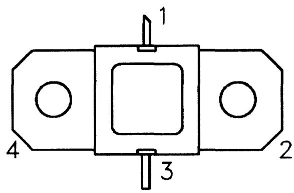
- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 18 W MIN. WITH 8.6 dB GAIN



**.400 x .400 2NLFL (S042)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM80610-18 | 80610-18 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The AM80610-018 is a high power, common base NPN silicon bipolar device optimized for CW operation in the 620 - 960 MHz frequency range.

AM80610-018 utilizes a rugged, overlay, emitter-ballasted L-Band die geometry to achieve high gain and collector efficiency and is suitable for driver or output stage use in Class C power amplifiers. Typical applications include military communications, ECM, and test equipment.

The AM80610-018 is provided in the industry-standard, metal/ceramic AMPAC™ hermetic package.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 50°C$) | 40 | W |
| $I_C$ | Device Current* | 2.0 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 32 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 4.0 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

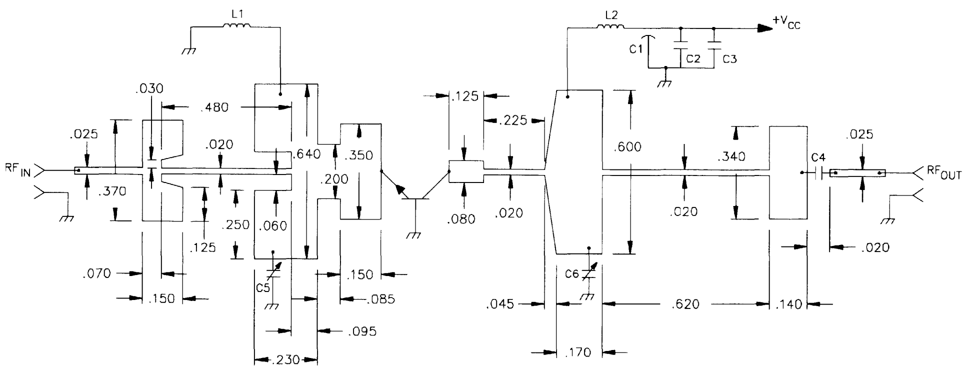
STATIC

| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 10mA | $I_E$ = 0mA | 55 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 20mA | $R_{BE}$ = 10Ω | 55 | — | — | V |
| $I_{CES}$ | $V_{BE}$ = 0V | $V_{CE}$ = 28V | — | — | 5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1A | 15 | — | 150 | — |

DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 620 — 960MHz | $P_{IN}$ = 2.5W | $V_{CC}$ = 28V | 18 | — | — | W |
| $\eta_C$ | f = 620 — 960MHz | $P_{IN}$ = 2.5W | $V_{CC}$ = 28V | 48 | — | — | % |
| $G_P$ | f = 620 — 960MHz | $P_{IN}$ = 2.5W | $V_{CC}$ = 28V | 8.6 | — | — | dB |

## TEST CIRCUIT

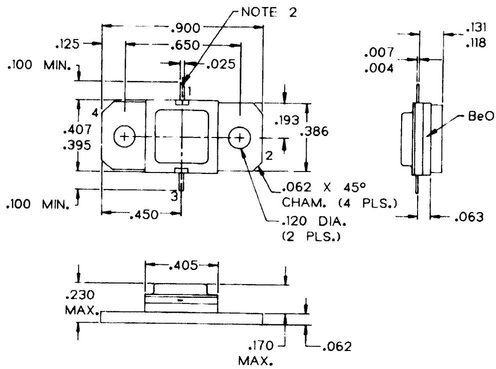



All dimensions are in inches.
Substrate material: $AL_2O_3$ .025" thick (Er = 9.6)

C1 : 1500 pF Feedthrough
C2 : 100 mF Electrolytic
C3 : .1μF Disc
C4 : 100 pF Chip
C5,C6 : .3 - 3.5 pF Gigatrim Capacitor
L1 : 5 Turns #26 Wire 1/16" I.D.
L2 : 3 Turns #26 Wire 1/16" I.D.

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J113214F



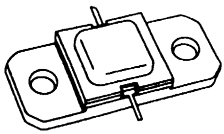

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD SLANT CUT.

# SGS-THOMSON MICROELECTRONICS

# AM80610-030

## RF & MICROWAVE TRANSISTORS UHF COMMUNICATIONS APPLICATIONS

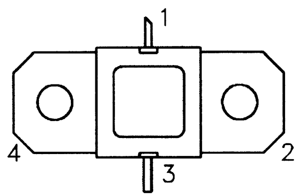
- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- INPUT/OUTPUT MATCHING
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 30 W MIN. WITH 8.5 dB GAIN



**.400 x .400 2NLFL (S042)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM80610-030 | 80610-30 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The AM80610-030 is a high power, common base NPN silicon bipolar device optimized for CW operation in the 620 - 960 MHz frequency range.

AM80610-030 utilizes a rugged, overlay, emitter-ballasted L-Band die geometry to achieve high gain and collector efficiency and is suitable for driver or output stage use in Class C power amplifiers. Typical applications include military communications, ECM, and test equipment.

The Am80610-030 is provided in the industry-standard, metal/ceramic AMPAC™ hermetic package.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 50°C$) | 57 | W |
| $I_C$ | Device Current* | 3.0 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 32 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 2.6 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

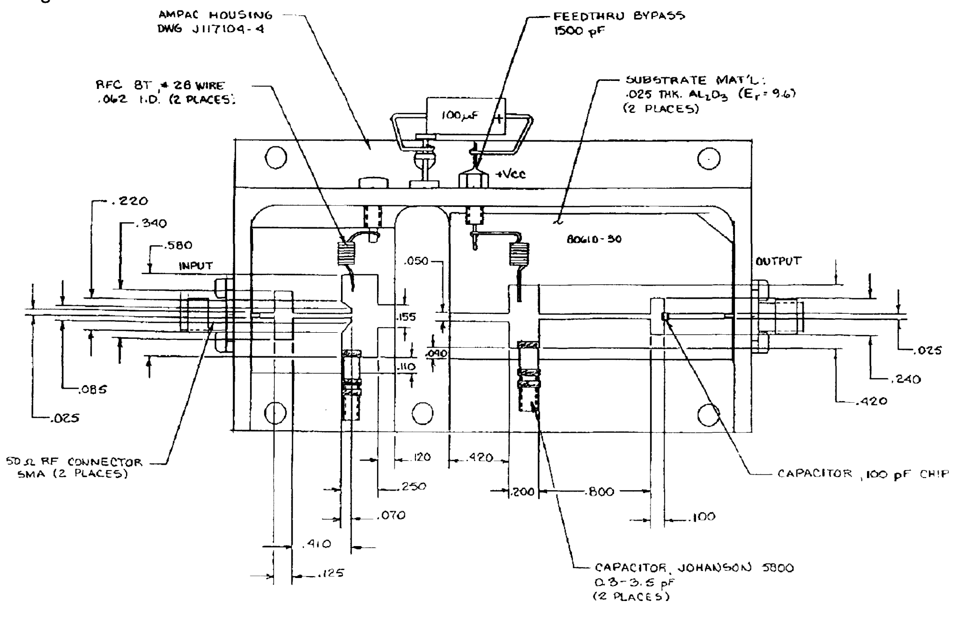
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 20mA | $I_E$ = 0mA | 55 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 2mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 40mA | $R_{BE}$ = 10Ω | 55 | — | — | V |
| $I_{CES}$ | $V_{BE}$ = 0V | $V_{CE}$ = 28V | — | — | 10 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 2A | 15 | — | 150 | — |

### DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 620 — 960MHz | $P_{IN}$ = 4.2W | $V_{CC}$ = 28V | 30 | — | — | W |
| $\eta_C$ | f = 620 — 960MHz | $P_{IN}$ = 4.2W | $V_{CC}$ = 28V | 50 | — | — | % |
| $G_P$ | f = 620 — 960MHz | $P_{IN}$ = 4.2W | $V_{CC}$ = 28V | 8.5 | — | — | dB |

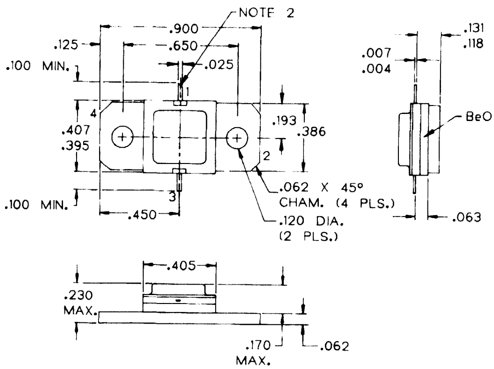
## TEST CIRCUIT

Dwg.No. C127464



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J113214F



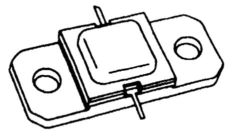

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD SLANT CUT.

SGS-THOMSON MICROELECTRONICS

# AM80610-050

## RF & MICROWAVE TRANSISTORS UHF COMMUNICATIONS APPLICATIONS

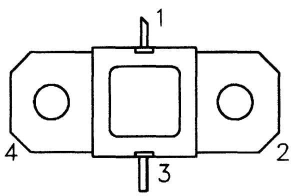
- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 50 W MIN. WITH 8.5 dB GAIN



**.400 x .400 2NLFL (S042)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM80610-050 | 80610-50 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The AM80610-050 is a high power, common base NPN silicon bipolar device optimized for CW operation in the 750 - 960 MHz frequency range.

AM80610-050 utilizes a rugged, overlay, emitter-ballasted L-Band die geometry to achieve high gain and collector efficiency and is suitable for driver or output stage use in Class C power amplifiers. Typical applications include military communications, ECM, and test equipment.

The AM80610-050 is provided in the industry-standard, Metal/Ceramic AMPAC™ Hermetic package.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq$ 50°C) | 83 | W |
| $I_C$ | Device Current* | 5.0 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 30 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 1.8 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

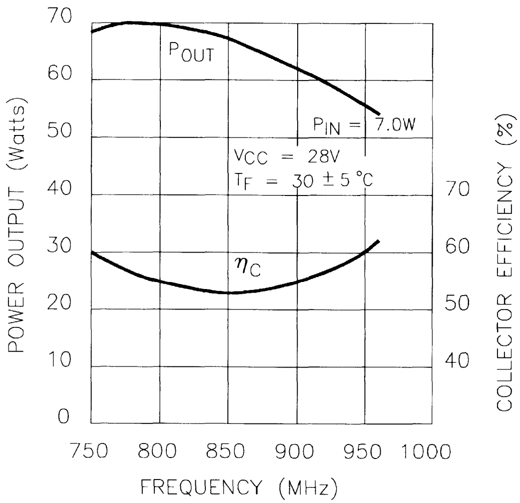
| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 30mA | $I_E$ = 0mA | 55 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 3mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CES}$ | IC = 60mA | $V_{BE}$ = 0V | 55 | — | — | V |
| $I_{CES}$ | $V_{BE}$ = 0V | $V_{CE}$ = 28V | — | — | 10 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 3A | 15 | — | — | — |

DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 750 — 960MHz | $P_{IN}$ = 7.0W | $V_{CC}$ = 28V | 50 | — | — | W |
| $\eta_C$ | f = 750 — 960MHz | $P_{IN}$ = 7.0W | $V_{CC}$ = 28V | 50 | — | — | % |
| $G_P$ | f = 750 — 960MHz | $P_{IN}$ = 7.0W | $V_{CC}$ = 28V | 8.5 | — | — | dB |

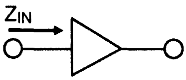
## TYPICAL PERFORMANCE

TYPICAL BROADBAND PERFORMANCE

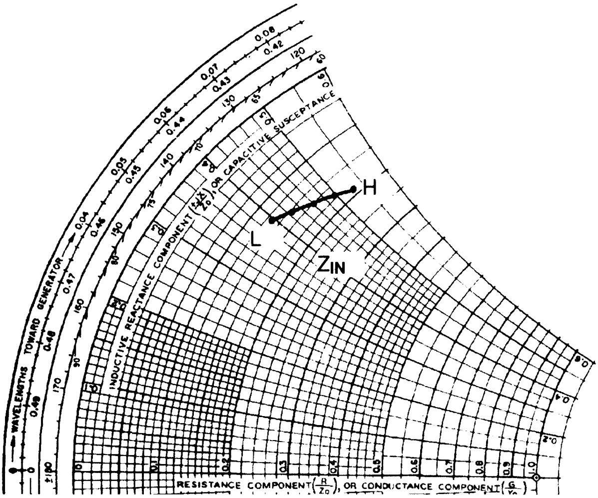


## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE

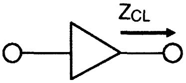


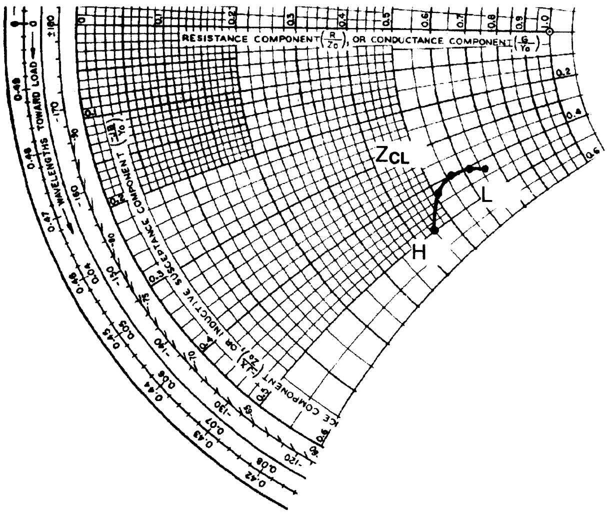

$P_{IN}$ = 7.0W
$V_{CC}$ = 28V
Normalized to 50 Ohms




| FREQ. | $Z_{IN}(\Omega)$ | $Z_{CL}(\Omega)$ |
|---|---|---|
| L = 600 MHz | 6.5 + j 19.8 | 33.0 − j 21.5 |
| • = 700 MHz | 7.0 + j 21.3 | 31.0 − j 20.5 |
| M = 800 MHz | 8.0 + j 23.0 | 28.0 − j 20.0 |
| • = 900 MHz | 8.9 + j 24.5 | 25.2 − j 21.0 |
| H = 1000 MHz | 9.5 + j 26.5 | 22.5 − j 25.0 |

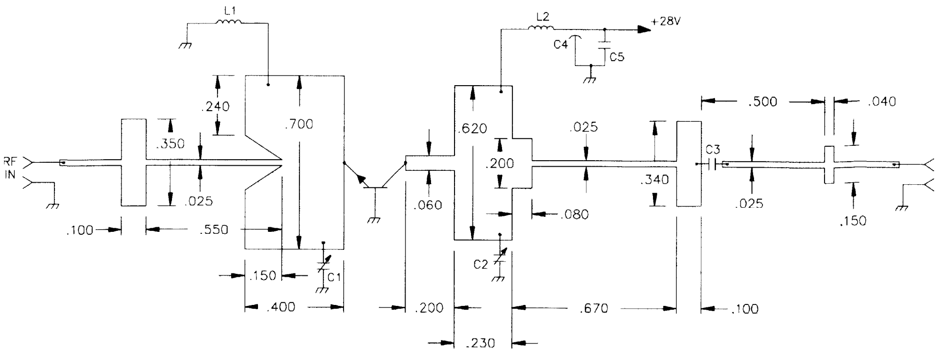
### TYPICAL COLLECTOR LOAD IMPEDANCE




$P_{IN}$ = 7.0W
$V_{CC}$ = 28V
Normalized to 50 Ohms

## TEST CIRCUIT

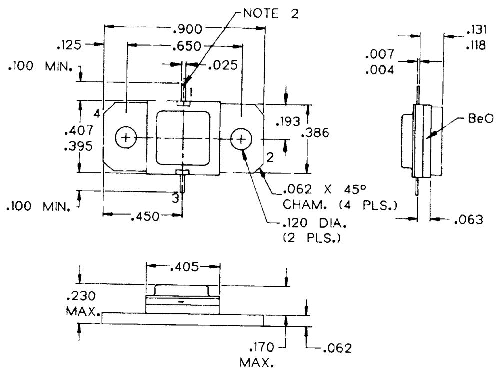



All dimensions are in inches
All microstrip lines are on 0.025" thick $AL_2O_3$ (Er = 9.6)

C1,C2 : .3 - 3.5 pF Johanson Capacitors
C3 : 2 x 100 pF Chip Capacitors
C4 : 1500 pF RF Feedthrough
C5 : 100 mF Electrolytic Capacitor
L1,L2 : 6 Turns #22 Wire 1/8" I.D.

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J113214F

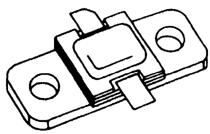



NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD SLANT CUT.

# AM80814-005

## RF & MICROWAVE TRANSISTORS
## L-BAND RADAR APPLICATIONS

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- 5:1 VSWR CAPABILITY
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 5.0 W MIN. WITH 8.5 dB GAIN



**.310 x .310 2LFL (S064)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM80814-005 | 80814-5 |

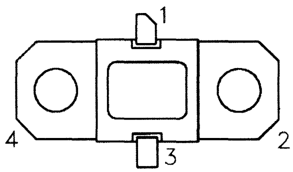
### DESCRIPTION

The AM80814-005 device is a high power Class C transistor specifically designed for L-Band radar pulsed driver applications.

This device is capable of operation over a wide range of pulse widths, duty cycles and temperatures and is capable of withstanding 5:1 output VSWR at rated RF conditions. Low thermal resistance and computerized automatic wire bonding techniques ensure high reliability and product consistency.

The AM80814-005 is supplied in the IMPAC™ Hermetic Metal/Ceramic package with internal Input/Output matching structures.

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 100$°C) | 23 | W |
| $I_C$ | Device Current* | 1.0 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 28 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | - 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 6.5 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 1mA | $I_E$ = 0mA | 48 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 5mA | $R_{BE}$ = 10Ω | 48 | — | — | V |
| $I_{CES}$ | $V_{BE}$ = 0V | $V_{CE}$ = 28V | — | — | 500 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 250mA | 30 | — | 300 | — |

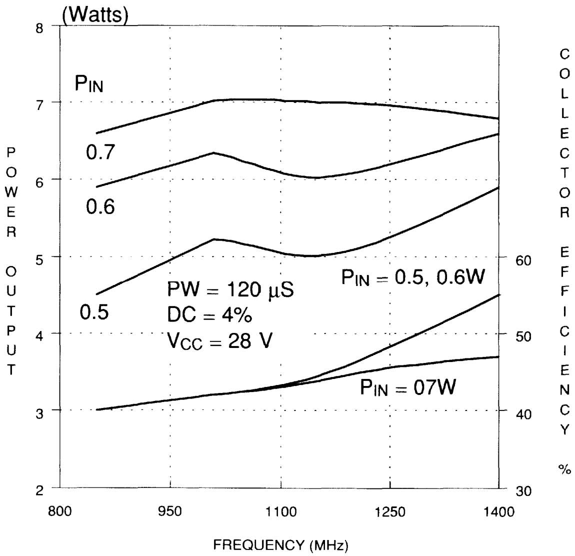
DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 850 — 1400MHz | $P_{IN}$ = 0.7W | $V_{CC}$ = 28V | 5.0 | 5.7 | — | W |
| $\eta_C$ | f = 850 — 1400MHz | $P_{IN}$ = 0.7W | $V_{CC}$ = 28V | 35 | 40 | — | % |
| $G_P$ | f = 850 — 1400MHz | $P_{IN}$ = 0.7W | $V_{CC}$ = 28V | 8.5 | 9.0 | — | dB |

Note: Pulse Width = 120µS
Duty Cycle = 4%

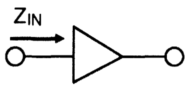
## TYPICAL PERFORMANCE

### POWER OUTPUT & COLLECTOR EFFICIENCY vs FREQUENCY

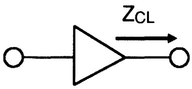


## IMPEDANCE DATA

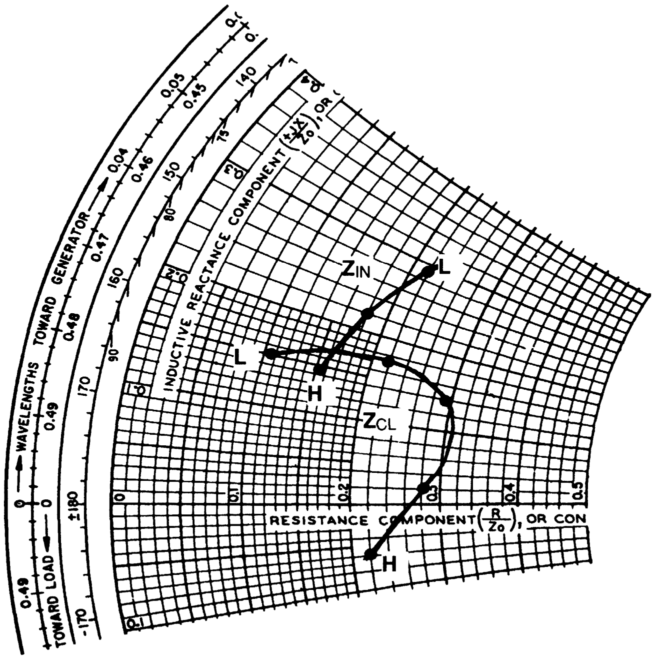
**TYPICAL INPUT IMPEDANCE**




**TYPICAL COLLECTOR LOAD IMPEDANCE**

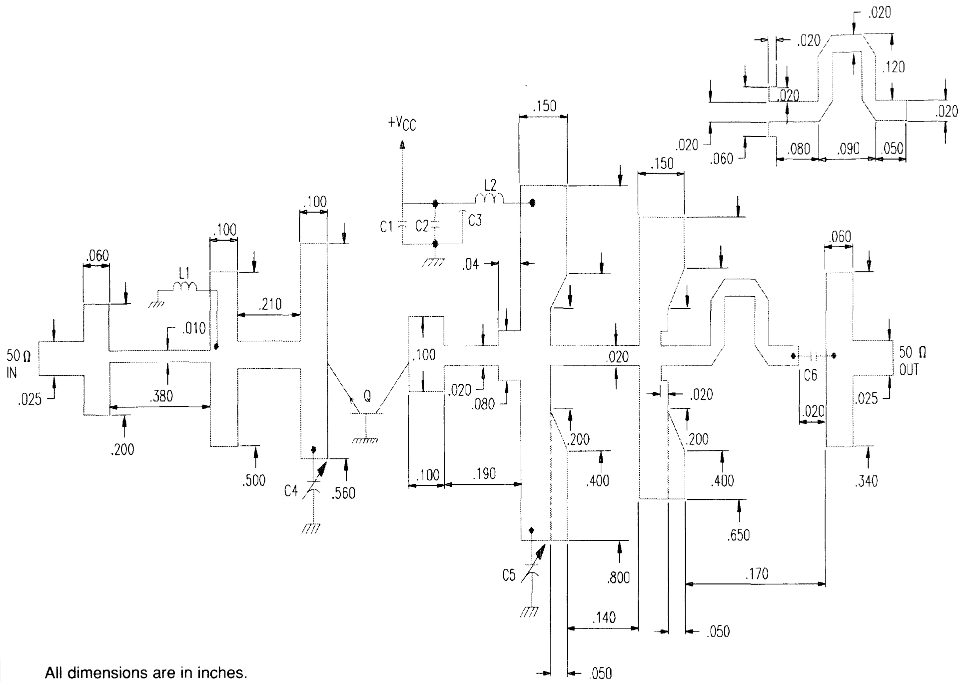



$P_{IN}$ = 0.7 W
$V_{CC}$ = 28 V
Normalized to 50 ohms




| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| L = 0.85 GHz | 0.22 + j 0.29 | 0.13 + j 0.15 |
| • = 1.0 GHz | 0.21 + j 0.25 | 0.18 + j 0.18 |
| • = 1.1 GHz | 0.19 + j 0.22 | 0.23 + j 0.17 |
| • = 1.2 GHz | 0.18 + j 0.17 | 0.32 + j 0.16 |
| • = 1.3 GHz | 0.17 + j 0.15 | 0.29 + j 0.02 |
| H = 1.4 GHz | 0.16 + j 0.14 | 0.22 − j 0.06 |

## TEST CIRCUIT

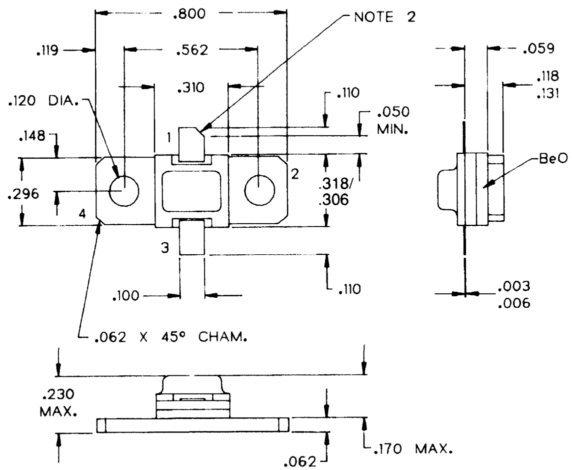


All dimensions are in inches.
Substrate material: .025 thick $Al_2O_3$

C1 : 100 µF Electrolytic Capacitor, 63V
C2 : .1 µF Ceramic Capacitor
C3 : Feedthrough Bypass SC! 712-022
C4 : .6 — 4.5 pF, 2 pls, Johanson Gigatrim Capacitor
C5 : .6 — 4.5 pF, 2 pls, Johanson Gigatrim Capacitor
C6 : 100 pF Chip Capacitor
L1 : No. 26 Wire, 4 Turn
L2 : No. 26 Wire, 4 Turn

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J133100D




NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

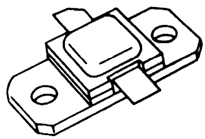
# SGS-THOMSON MICROELECTRONICS

# AM80814-025

## RF & MICROWAVE TRANSISTORS L-BAND RADAR APPLICATIONS

PRELIMINARY DATA

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 25 W MIN. WITH 7.0 dB GAIN



**.400 x .400 2LFL (S036)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM80814-025 | 80814-25 |

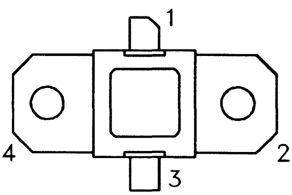
### DESCRIPTION

AM80814-025 is a high power silicon Class C transistor designed for ultra-broadband L-Band radar applications.

This device is capable of operation over a broad range of pulse widths and duty cycles. Low RF thermal resistance and computerized automatic wire bonding techniques ensure high reliability and product consistency.

AM80814-025 is supplied in the industry-standard AMPAC™ hermetic Metal/Ceramic package incorporating Input/Output impedance matching.

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation*($T_C \leq 75$°C) | 75 | W |
| $I_C$ | Device Current* | 3.5 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 38 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | − 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 2.3 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 10mA | $I_E$ = 0mA | 55 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 20mA | $R_{BE}$ = 10Ω | 55 | — | — | V |
| $I_{CES}$ | $V_{BE}$ = 0V | $V_{CE}$ = 28V | — | — | 5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1A | 15 | — | 150 | — |

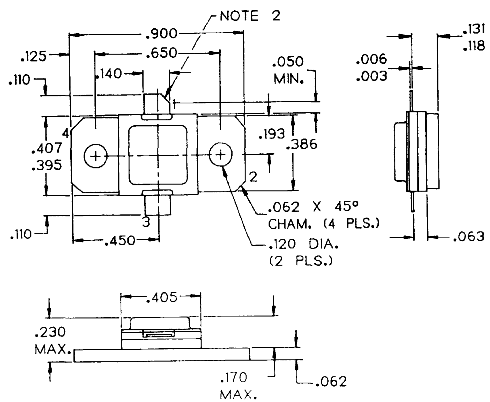
DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 850 — 1400MHz | $P_{IN}$ = 5.0W | $V_{CC}$ = 35V | 25 | — | — | W |
| $\eta_C$ | f = 850 — 1400MHz | $P_{IN}$ = 5.0W | $V_{CC}$ = 35V | 38 | — | — | % |
| $G_P$ | f = 850 — 1400MHz | $P_{IN}$ = 5.0W | $V_{CC}$ = 35V | 7.0 | — | — | dB |

Note: Pulse Width = 120µS
Duty Cycle = 4%

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J133102E



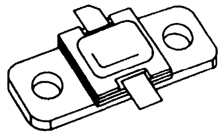

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

SGS-THOMSON MICROELECTRONICS

# AM80912-005

## RF & MICROWAVE TRANSISTORS AVIONICS APPLICATIONS

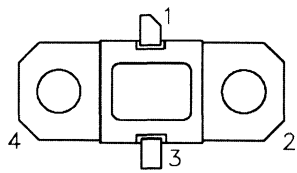
- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- 5:1 VSWR CAPABILITY
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 6.0 W MIN. WITH 9.3 dB GAIN



**.310 x .310 2LFL (S064)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM80912-005 | 80912-5 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The AM80912-005 is designed for specialized avionics applications, including JTIDS, where power is provided under pulse formats utilizing short pulse widths and high burst or overall duty cycles.

The AM80912-005 is housed in the unique IMPAC™ Hermetic Metal/Ceramic package with internal input impedance matching.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 75$°C) | 25 | W |
| $I_C$ | Device Current* | 0.9 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 32 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 7.0 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 1mA | $I_E$ = 0mA | 48 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 5mA | $R_{BE}$ = 10Ω | 48 | — | — | V |
| $I_{CES}$ | $V_{BE}$ = 0V | $V_{CE}$ = 28V | — | — | 0.5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 250mA | 30 | — | 300 | — |

DYNAMIC

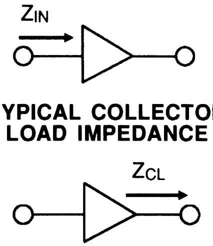
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 960 — 1215MHz | $P_{IN}$ = 0.7W | $V_{CC}$ = 28V | 6.0 | — | — | W |
| $\eta_C$ | f = 960 — 1215MHz | $P_{IN}$ = 0.7W | $V_{CC}$ = 28V | 45 | — | — | % |
| $G_P$ | f = 960 — 1215MHz | $P_{IN}$ = 0.7W | $V_{CC}$ = 28V | 9.3 | — | — | dB |

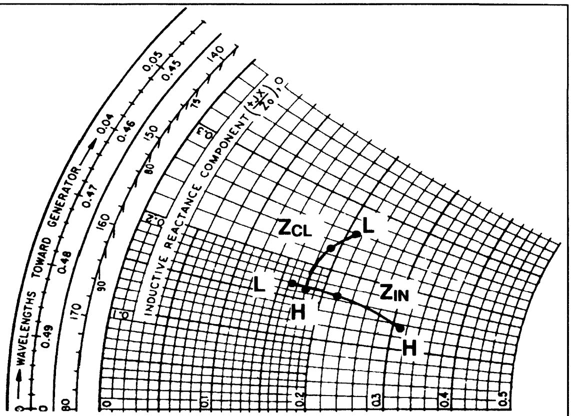
Note: Pulse format: 6.4 µS on 6.6 µS off, repeat for 3.3 ms, then off for 4.5125 ms.
Duty Cycle: Burst 49.2%, overall 20.8%

## IMPEDANCE DATA

**TYPICAL INPUT IMPEDANCE**

**TYPICAL COLLECTOR LOAD IMPEDANCE**

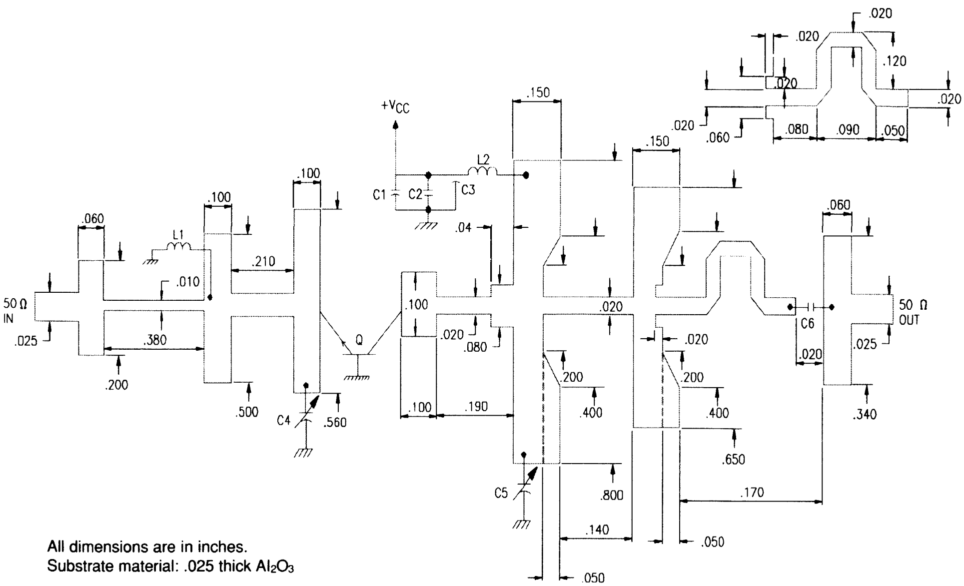



| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| L = 960 MHz | 8.2 + j 8.52 | 10.5 + j 12.9 |
| M = 1090 MHz | 11.1 + j 8.34 | 9.4 + j 11.3 |
| H = 1215 MHz | 15.6 + j 6.8 | 9.0 + j 8.3 |

$P_{IN}$ = 0.7 W
$V_{CC}$ = 28 V
Normalized to 50 ohms

## TEST CIRCUIT

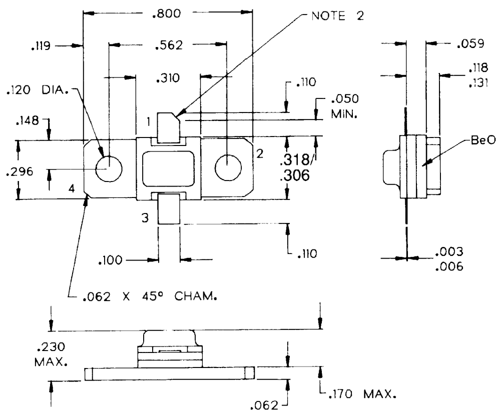



All dimensions are in inches.
Substrate material: .025 thick $Al_2O_3$

C1 : 100 µF Electrolytic Capacitor, 63V
C2 : .1 µF Ceramic Capacitor
C3 : Feedthrough Bypass SCI 712-022
C4 : .6 — 4.5 pF, 2 pls, Johanson Gigatrim Capacitor
C5 : .6 — 4.5 pF, 2 pls, Johanson Gigatrim Capacitor
C6 : 100 pF Chip Capacitor
L1 : No. 26 Wire, 4 Turn
L2 : No. 26 Wire, 4 Turn

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J133100D



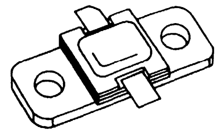

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

SGS-THOMSON MICROELECTRONICS

# AM80912-015

## RF & MICROWAVE TRANSISTORS AVIONICS APPLICATIONS

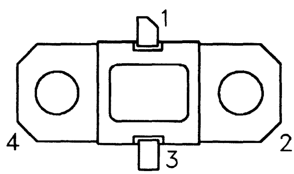
- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- ∞:1 VSWR CAPABILITY
- LOW THERMAL RESISTANCE
- INPUT MATCHING
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 15 W MIN. WITH 8.1 dB GAIN
- BANDWIDTH 255 MHz



**.310 x .310 2LFL (S064)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM80912-015 | 80912-15 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The AM80912-015 is designed for specialized avionics applications, including JTIDS, where power is provided under pulse formats utilizing short pulse widths and high burst or overall duty cycles.

The AM80912-015 is housed in the unique IMPAC™ Hermetic Metal/Ceramic package with internal input impedance matching.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation*($T_C \leq$ 100°C) | 50 | W |
| $I_C$ | Device Current* | 1.8 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 32 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 3.0 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

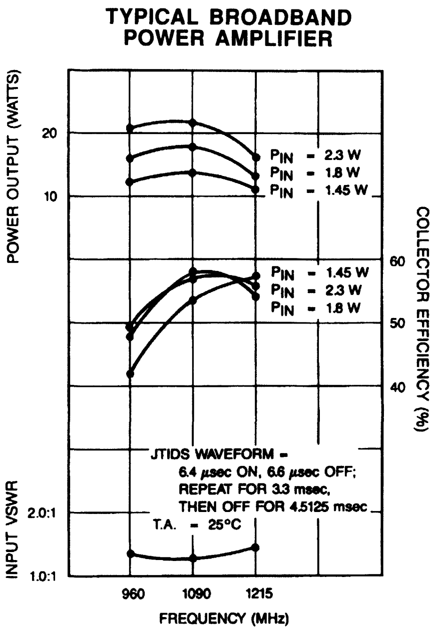
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 10mA | $I_E$ = 0mA | 55 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 10mA | $R_{BE}$ = 10Ω | 55 | — | — | V |
| $I_{CES}$ | $V_{BE}$ = 0V | $V_{CE}$ = 28V | — | — | 2.0 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 500mA | 15 | — | 150 | — |

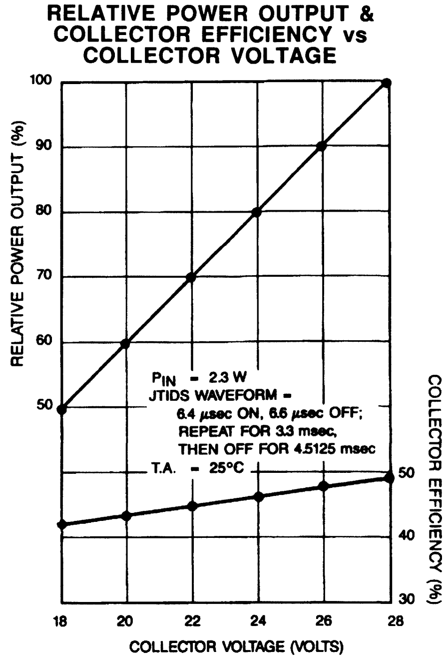
DYNAMIC

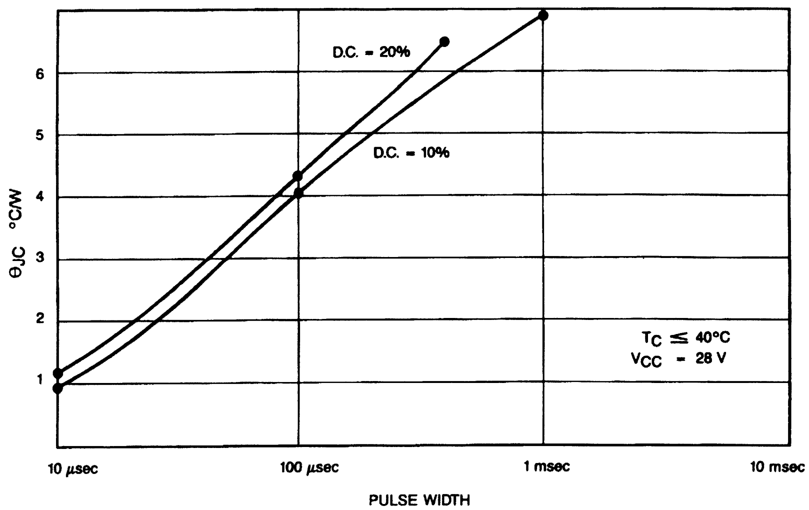
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 960 — 1215MHz | $P_{IN}$ = 2.3W | $V_{CC}$ = 28V | 15 | 17 | — | W |
| $\eta_C$ | f = 960 — 1215MHz | $P_{IN}$ = 2.3W | $V_{CC}$ = 28V | 45 | 49 | — | % |
| $G_P$ | f = 960 — 1215MHz | $P_{IN}$ = 2.3W | $V_{CC}$ = 28V | 8.1 | 8.9 | — | dB |

Note: Pulse format: 6.4 µS on 6.6 µS off, repeat for 3.3 ms, then off for 4.5125 ms.
Duty Cycle: Burst 49.2%, overall 20.8%

## TYPICAL PERFORMANCE

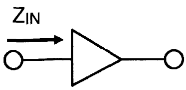


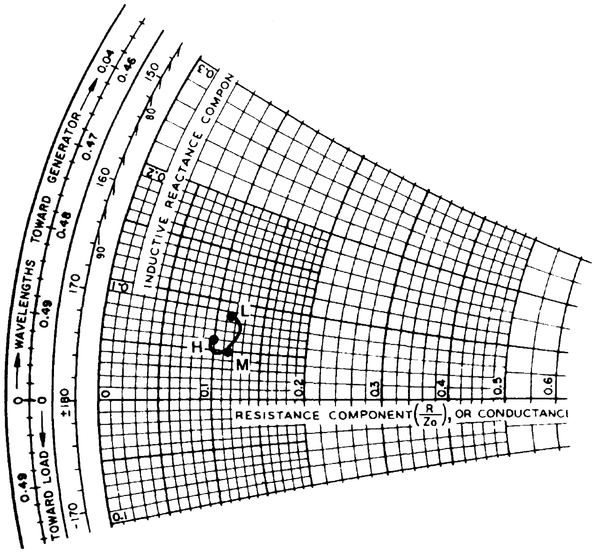



## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE

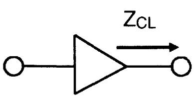



PIN = 2.3 W
VCC = 28 V
ZO* = 50 ohms



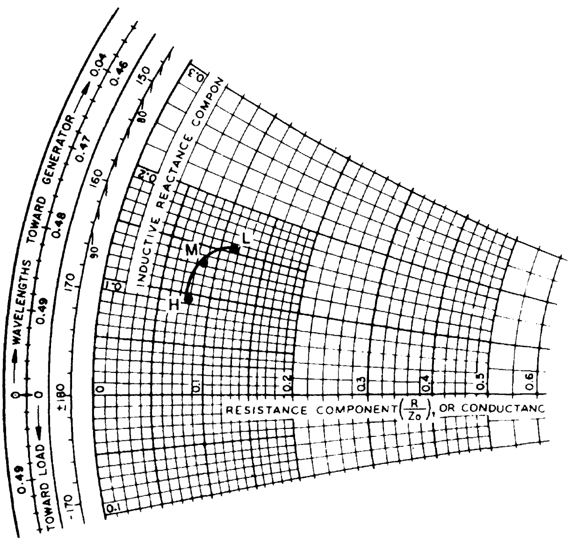

| FREQ. | ZIN (Ω) | ZCL (Ω) |
|---|---|---|
| L = 960 MHz | 5.7 + j 4.3 | 5.7 + j 7.7 |
| M = 1090 MHz | 5.8 + j 2.5 | 4.3 + j 6.5 |
| H = 1215 MHz | 5.0 + j 3.0 | 4.0 + j 4.8 |

### TYPICAL COLLECTOR LOAD IMPEDANCE



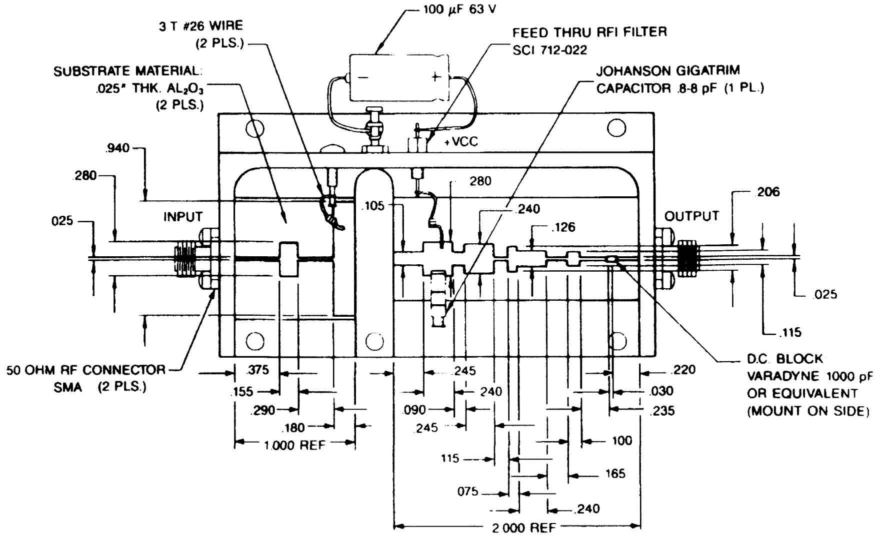

PIN = 2.3 W
VCC = 28 V
ZO* = 50 ohms

*Normalized Impedance



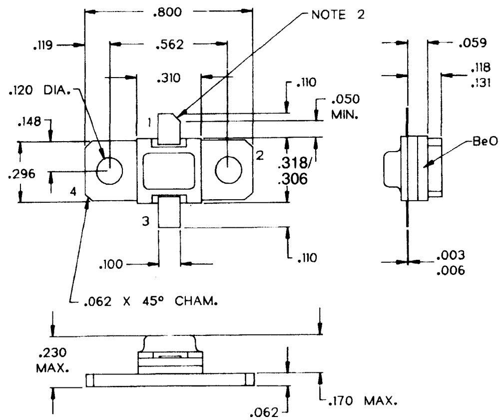
## TEST CIRCUIT

Ref.: Dwg. No. 104-000284




## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J133100D



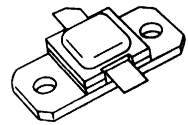

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

SGS-THOMSON MICROELECTRONICS

# AM80912-030

## RF & MICROWAVE TRANSISTORS SPECIALITY AVIONICS/JTIDS APPLICATIONS

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- 15:1 VSWR CAPABILITY
- LOW RF THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 30 W MIN. WITH 7.8 dB GAIN



**.400 x .400 2LFL (S036)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM80912-030 | 80912-30 |

### DESCRIPTION

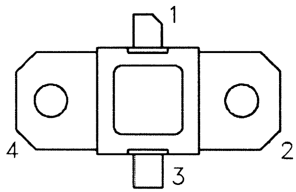
The AM80912-030 device is a high power Class C transistor specifically designed for JTIDS pulsed output and driver applications.

This device is capable of operation over a wide range of pulse widths, duty cycles and temperatures and is capable of withstanding 15:1 output VSWR at rated RF conditions.

Low RF thermal resistance and computerized automatic wire bonding techniques ensure high reliability and product consistency.

The AM80912-030 is supplied in the hermetic metal/ceramic package with internal input matching structures.

### PIN CONNECTION




1. Collector
2. Base
3. Emitter
4. Base

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 85°C$) | 75 | W |
| $I_C$ | Collector Current* | 3.5 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 40 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 2.2 | °C/W |

*Applies only to rated RF amplifier operation.

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 10mA | | 55 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | | 3.5 | — | — | V |
| $BV_{CER}$ | $I_C$ = 20mA | $R_{BE}$ = 10Ω | 55 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 35V | | — | — | 5.0 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1.0A | 15 | — | 150 | — |

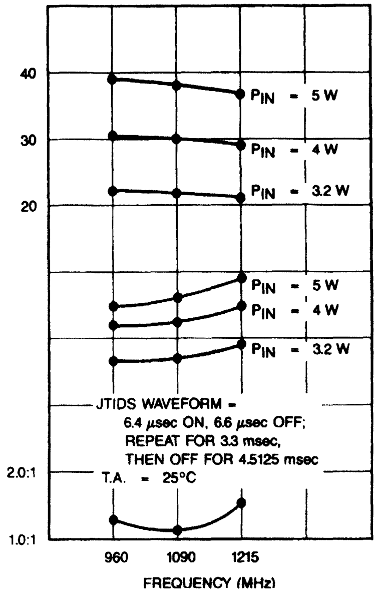
DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 960 — 1215MHz | $P_{IN}$ = 5.0W | $V_{CC}$ = +35V | 30 | 36 | — | W |
| $\eta_C$ | f = 960 — 1215MHz | $P_{IN}$ = 5.0W | $V_{CC}$ = +35V | 40 | 45 | — | % |
| $G_P$ | f = 960 — 1215MHz | $P_{IN}$ = 5.0W | $V_{CC}$ = +35V | 7.8 | 8.6 | — | dB |

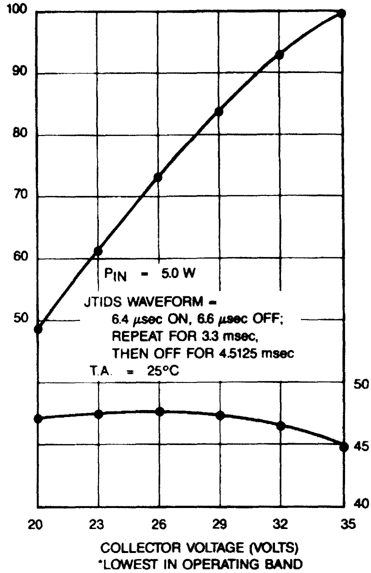
Note: Pulse format: 6.4 µs on 6.6 µs off, repeat for 3.3 ms, then off for 4.5125 ms.
Duty Cycle: Burst 49.2%, overall 20.8%

## TYPICAL PERFORMANCE

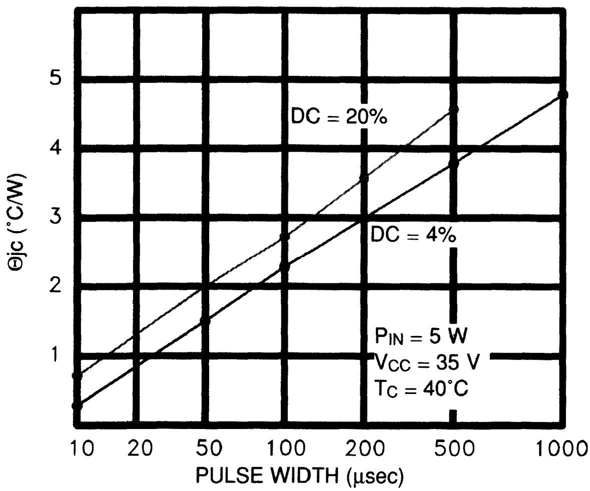
### TYPICAL BROADBAND POWER AMPLIFIER




### TYPICAL RELATIVE POWER OUTPUT & COLLECTOR EFFICIENCY* vs COLLECTOR VOLTAGE

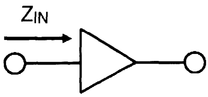



### MAXIMUM THERMAL RESISTANCE vs PULSE WIDTH & DUTY CYCLE

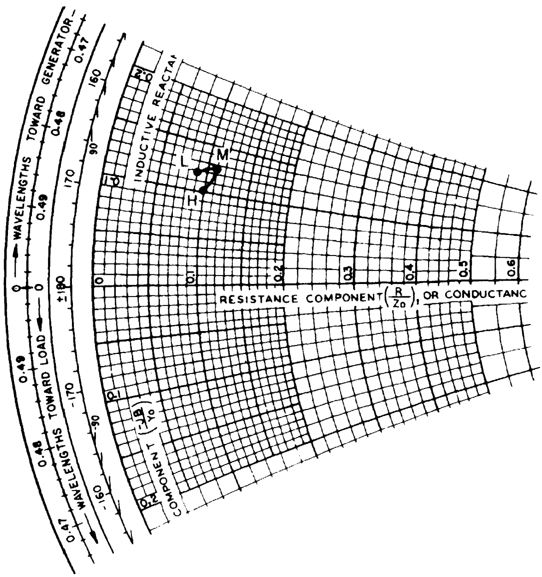


## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE

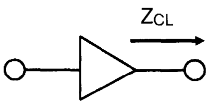



PIN = 5W
VCC = +35V
ZO* = 50Ω

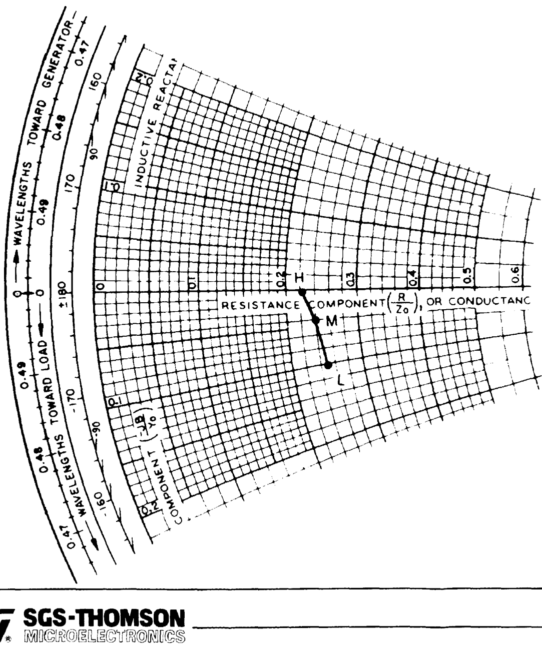



| FREQ. | ZIN (Ω) | ZCL (Ω) |
|---|---|---|
| L = 960 MHz | 4.5 + j 6.0 | 11.0 – j 0.5 |
| M = 1090 MHz | 5.5 + j 6.3 | 12.0 – j 2.0 |
| H = 1215 MHz | 5.0 + j 5.0 | 12.5 – j 5.0 |

### TYPICAL COLLECTOR LOAD IMPEDANCE

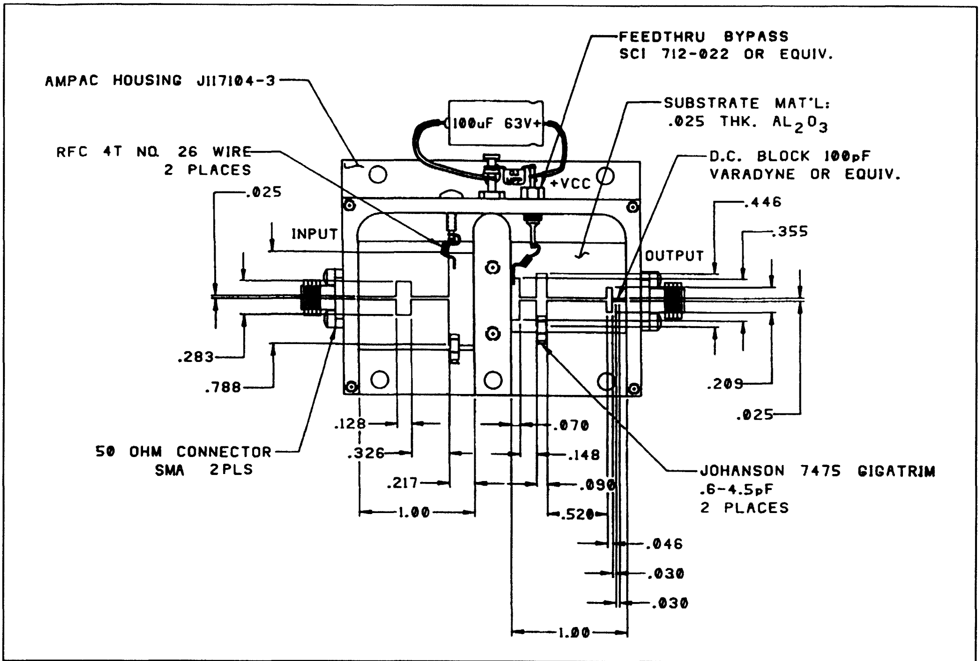



PIN = 5W
VCC = +35V
ZO* = 50Ω

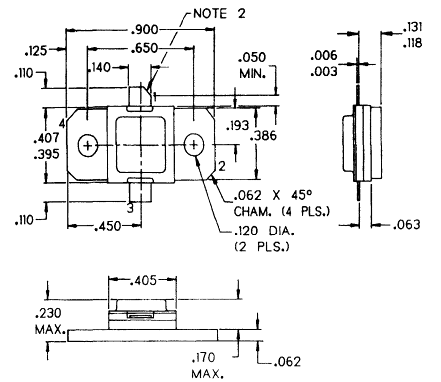



*Normalized Impedance

## TEST CIRCUIT




## PACKAGE MECHANICAL DATA



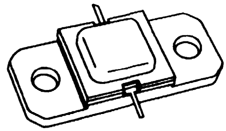

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

SGS-THOMSON MICROELECTRONICS

# AM80912-085

## RF & MICROWAVE TRANSISTORS AVIONICS APPLICATIONS

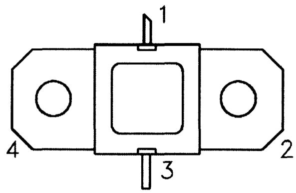
- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- 5:1 VSWR CAPABILITY
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 85 W MIN. WITH 7.5 dB GAIN



**.400 x .400 2NLFL (S042)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM80912-085 | 80912-85 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The AM80912-085 is designed for specialized avionics applications including JTIDS, where power is provided under pulse formats utilizing short pulse widths and high burst or overall duty cycles.

The AM80912-085 is housed in a unique BIGPAC™ Hermetic Metal/Ceramic package with internal Input/Output impedance matching.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 100°C$) | 300 | W |
| $I_C$ | Device Current* | 8.0 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 40 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 0.75 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case} = 25°C$)

### STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C = 25mA$ | $I_E = 0mA$ | 55 | — | — | V |
| $BV_{EBO}$ | $I_E = 10mA$ | $I_C = 0mA$ | 3.5 | — | — | V |
| $BV_{CER}$ | $IC = 25mA$ | $R_{BE} = 10\Omega$ | 55 | — | — | V |
| $I_{CES}$ | $V_{BE} = 0V$ | $V_{CE} = 35V$ | — | — | 20 | mA |
| $h_{FE}$ | $V_{CE} = 5V$ | $I_C = 2A$ | 20 | — | 200 | — |

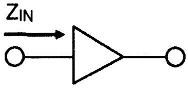
### DYNAMIC

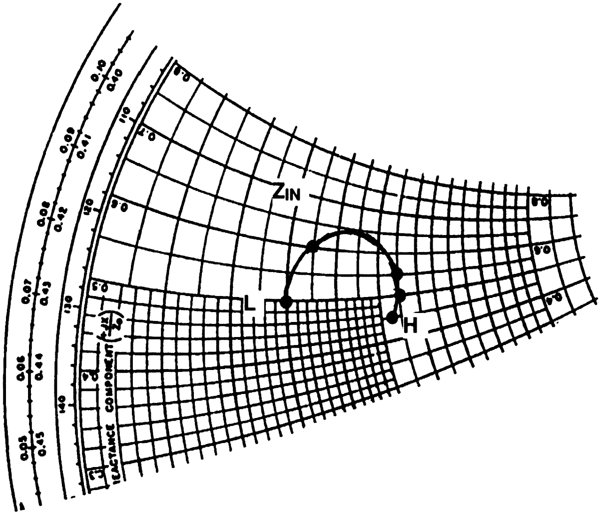
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 960 — 1215MHz | $P_{IN} = 15W$ | $V_{CC} = 35V$ | 85 | — | — | W |
| $\eta_C$ | f = 960 — 1215MHz | $P_{IN} = 15W$ | $V_{CC} = 35V$ | 40 | — | — | % |
| $G_P$ | f = 960 — 1215MHz | $P_{IN} = 15W$ | $V_{CC} = 35V$ | 7.5 | — | — | dB |

Note: Pulse format: 6.4 µS on 6.6 µS off, repeat for 3.3 ms, then off for 4.5125 ms
Duty Cycle: Burst 49.2%, overall 20.8%

## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE

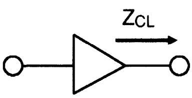


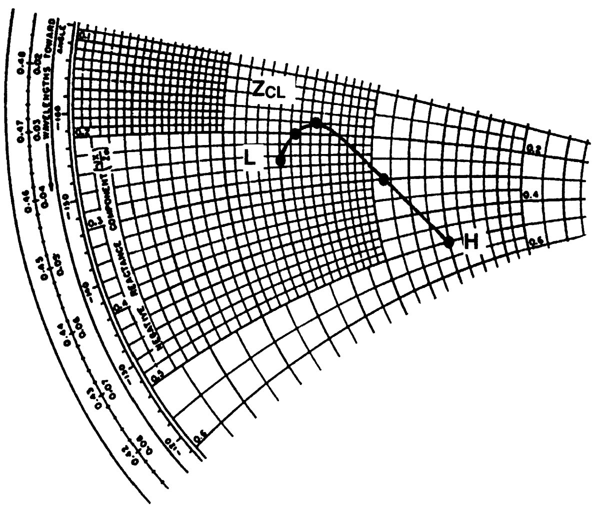




$P_{IN}$ = 15 W
$V_{CC}$ = 35 V
Normalized to 10 ohms

| FREQ. | $Z_{IN}$(Ω) | $Z_{CL}$(Ω) |
|---|---|---|
| L = 960 MHz | 3.0 + j 5.0 | 7.0 – j 5.0 |
| • = 1025 MHz | 3.5 + j 6.0 | 5.3 – j 3.0 |
| M = 1090 MHz | 5.5 + j 5.5 | 3.7 – j 1.8 |
| • = 1150 MHz | 5.5 + j 5.0 | 3.3 – j 2.0 |
| H = 1215 MHz | 5.3 + j 4.5 | 3.0 – j 2.5 |

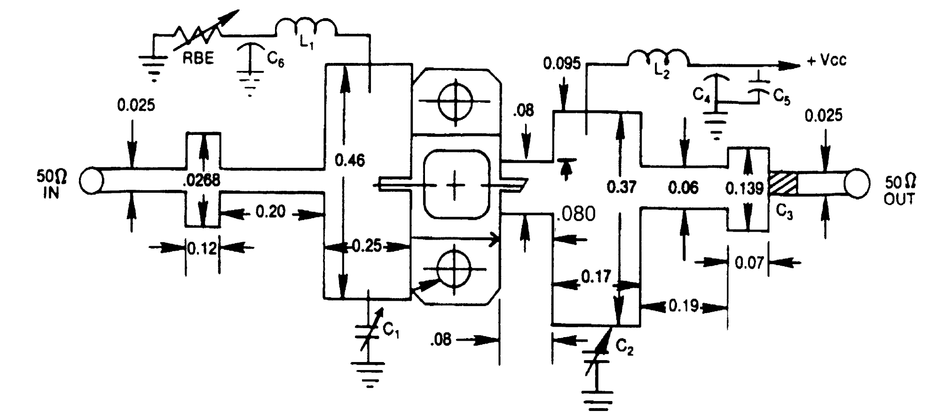
### TYPICAL COLLECTOR LOAD IMPEDANCE




$P_{IN}$ = 15 W
$V_{CC}$ = 35 V
Normalized to 10 ohms

## TEST CIRCUIT

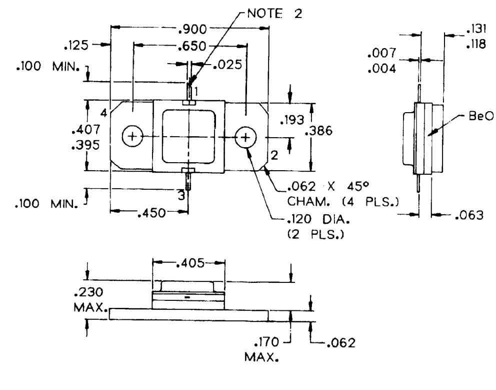



All dimensions are in inches.
Substrate material: .025 thick $Al_2O_3$ (Er = 9.6)

| | | |
|---|---|---|
| C1 | : | 0.3—3.5 pF Variable Johanson Capacitor or Equiv. |
| C2 | : | 0.3—3.5 pF Variable Johanson Capacitor or Equiv. |
| C3 | : | 100 pF Chip Capacitor |
| C4 | : | 1500 pF Erie RF Feedthrough, or Equiv. |
| C5 | : | 100 MF, Electrolytic Capacitor, 50V |
| C6 | : | 1500 pF Erie RF Feedthrough, or Equiv. |
| L1 | : | No. 32 Wire, 4 Turns 1/16" I.D. |
| L2 | : | No. 32 Wire, 4 Turns 1/16" I.D. |

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J113214F



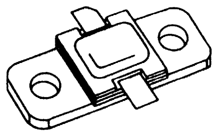

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD SLANT CUT.

# SGS-THOMSON MICROELECTRONICS

# AM81214-006

## RF & MICROWAVE TRANSISTORS
## L-BAND RADAR APPLICATIONS

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- 5:1 VSWR CAPABILITY
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 5.5 W MIN. WITH 10 dB GAIN



**.310 x .310 2LFL (S064)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM81214-6 | 81214-6 |

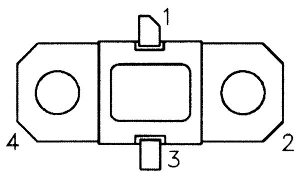
### DESCRIPTION

The AM81214-006 device is a high power Class C transistor specifically designed for L-Band Radar pulsed driver applications.

This device is capable of operation over a wide range of pulse widths, duty cycles, and temperatures and is capable of withstanding 5:1 output VSWR at rated RF conditions. Low RF thermal resistance and computerized automatic wire bonding techniques ensure high reliability and product consistency.

AM81214-006 is supplied in the grounded IMPAC™ Hermetic Metal/Ceramic package with internal input/output matching structures.

### PIN CONNECTION




1. Collector
2. Base
3. Emitter
4. Base

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 100°C$) | 16.7 | W |
| $I_C$ | Device Current* | 0.82 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 32 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 9.0 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 5mA | $I_E$ = 0mA | 48 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 5mA | $R_{BE}$ = 10Ω | 48 | — | — | V |
| $I_{CES}$ | $V_{BE}$ = 0V | $V_{CE}$ = 28V | — | — | 1.0 | mA |
| $h_{FE}$ | $V_{CE}$ = 5 V | $I_C$ = 500mA | 30 | — | 300 | — |

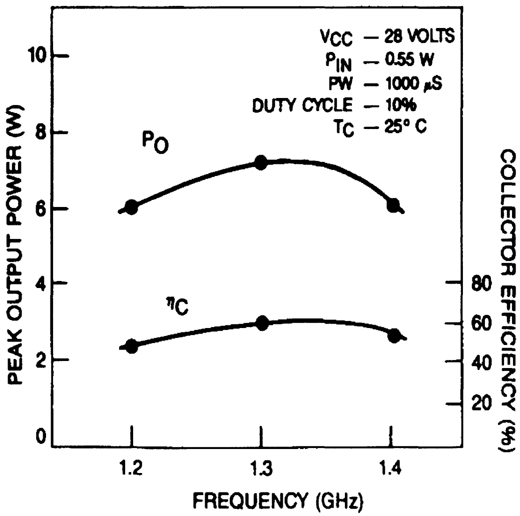
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{IN}$ | f = 1.2 — 1.4GHz | $P_{IN}$ = 0.55W | $V_{CC}$ = 28V | — | 5.5 | 6.2 | W |
| $\eta_C$ | f = 1.2 — 1.4GHz | $P_{IN}$ = 0.55W | $V_{CC}$ = 28V | 47 | 52 | — | % |
| $G_P$ | f = 1.2 — 1.4GHz | $P_{IN}$ = 0.55W | $V_{CC}$ = 28V | 10 | 10.5 | — | dB |

Note: Pulse Width = 1000µS
Duty Cycle = 10%

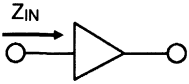
## TYPICAL PERFORMANCE

TYPICAL BROADBAND PERFORMANCE

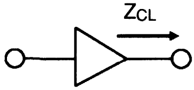


## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE

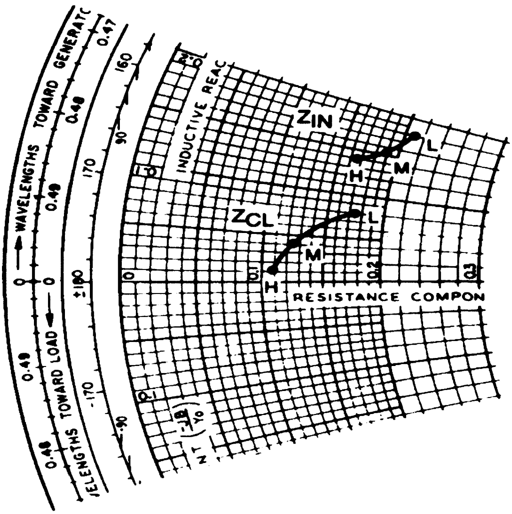



### TYPICAL COLLECTOR LOAD IMPEDANCE

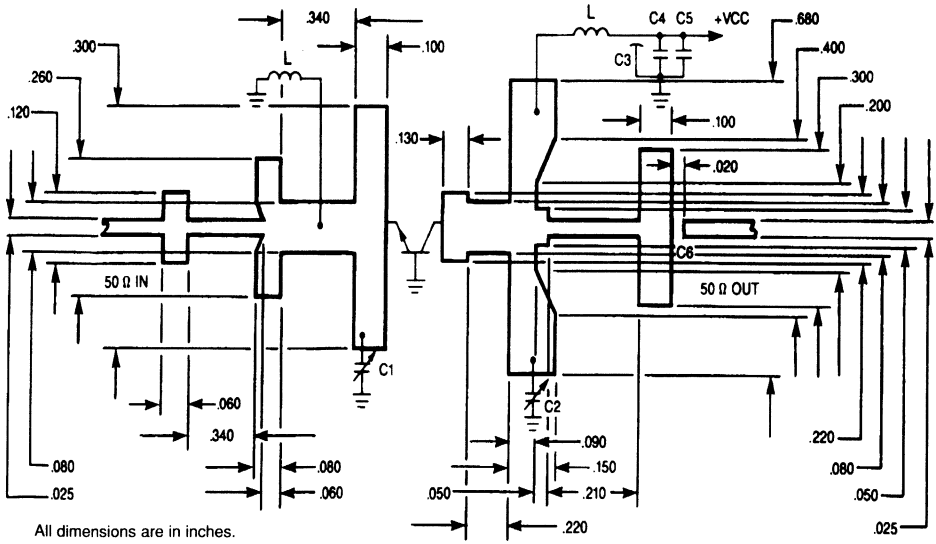



| FREQ. | $Z_{IN}(\Omega)$ | $Z_{CL}(\Omega)$ |
|---|---|---|
| L = 1.2 GHz | 10.5 + j 9.0 | 9.0 + j 3.0 |
| M = 1.3 GHz | 9.5 + j 8.0 | 6.5 + j 2.0 |
| H = 1.4 GHz | 8.5 + j 7.0 | 6.0 + j 1.0 |

$P_{IN}$ = 0.55 W
$V_{CC}$ = 28 V
Normalized to 50 ohms




## TEST CIRCUIT

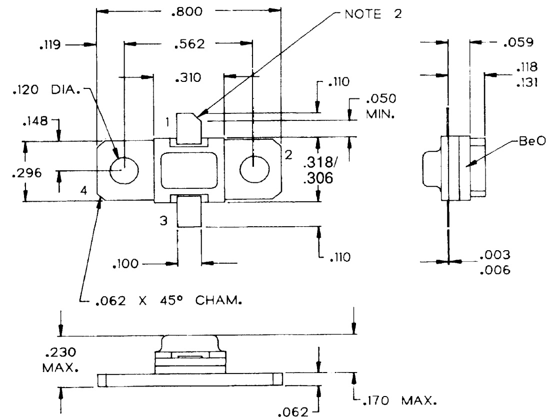



All dimensions are in inches.
Substrate material: .025 thick $Al_2O_3$

C1 : 0.2—2.5 pF Johanson Gigatrim Capacitor
C2 : 0.2—2.5 pF Johanson Gigatrim Capacitor
C3 : 1500 pF Filtercon Feedthrough
C4 : 0.1 µF, Ceramic Capacitor
C5 : 100 µF, Electrolytic Capacitor
C6 : 100 pF Chip Capacitor
L : No. 26 Wire, 4 Turn .062 I.D.

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J133100D



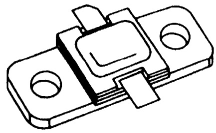

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

SGS-THOMSON MICROELECTRONICS

# AM81214-015

## RF & MICROWAVE TRANSISTORS L-BAND RADAR APPLICATIONS

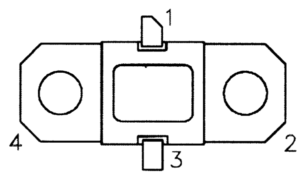
- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- 5:1 VSWR CAPABILITY
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 14.5 W MIN. WITH 8.6 dB GAIN



**.310 x .310 2LFL (S064)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM 81214-015 | 81214-15 |

**PIN CONNECTION**




| | |
|---|---|
| 1. Collector | 3. Emitter |
| 2. Base | 4. Base |

### DESCRIPTION

The AM81214-015 device is a high power Class C transistor specifically designed for L-Band Radar pulsed output and driver applications.

This device is capable of operation over a wide range of pulse widths, duty cycles, and temperatures and is capable of withstanding 5:1 output VSWR at rated RF conditions. Low RF thermal resistance and computerized automatic wire bonding techniques ensure high reliability and product consistency.

AM81214-015 is supplied in the grounded IMPAC™ Hermetic Metal/Ceramic package with internal input/output matching structures.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 100°C$) | 37.5 | W |
| $I_C$ | Device Current* | 1.8 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 32 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 4.0 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

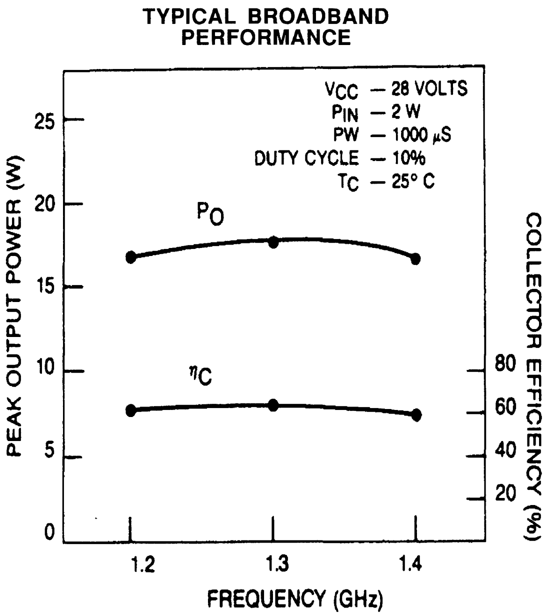
| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 15mA | $I_E$ = 0mA | 48 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1.5mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 15mA | $R_{BE}$ = 10Ω | 48 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 28V | $V_{BE}$ = 28V | — | — | 1.5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1A | 30 | — | 300 | — |

DYNAMIC

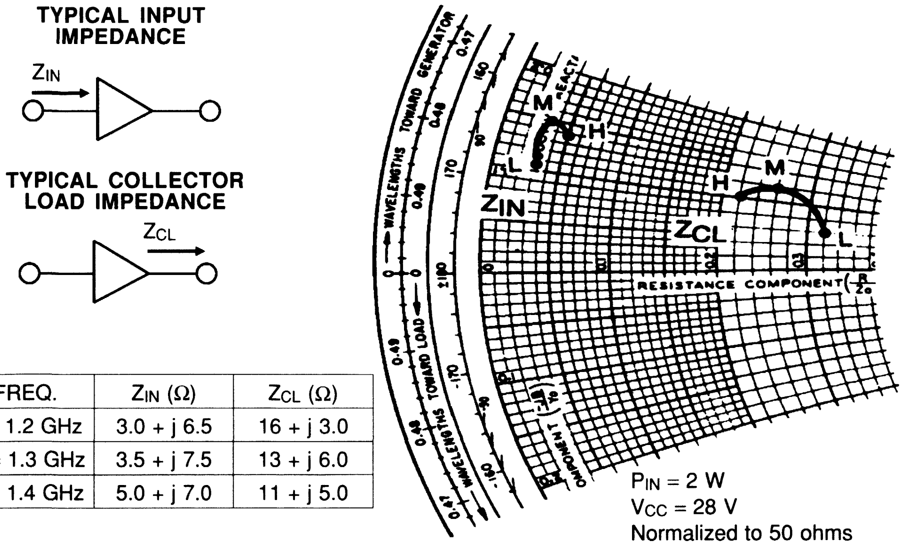
| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{IN}$ | f = 1.2 — 1.4GHz | $P_{IN}$ = 2W Peak | $V_{CC}$ = 28V | 14.5 | 17.0 | — | W |
| $\eta_C$ | f = 1.2 — 1.4GHz | $P_{IN}$ = 2W Peak | $V_{CC}$ = 28V | 48 | 58 | — | % |
| $G_P$ | f = 1.2 — 1.4GHz | $P_{IN}$ = 2W Peak | $V_{CC}$ = 28V | 8.6 | 9.3 | — | dB |

Note: Pulse Width = 1000 µS
Duty Cycle = 10%

## TYPICAL PERFORMANCE



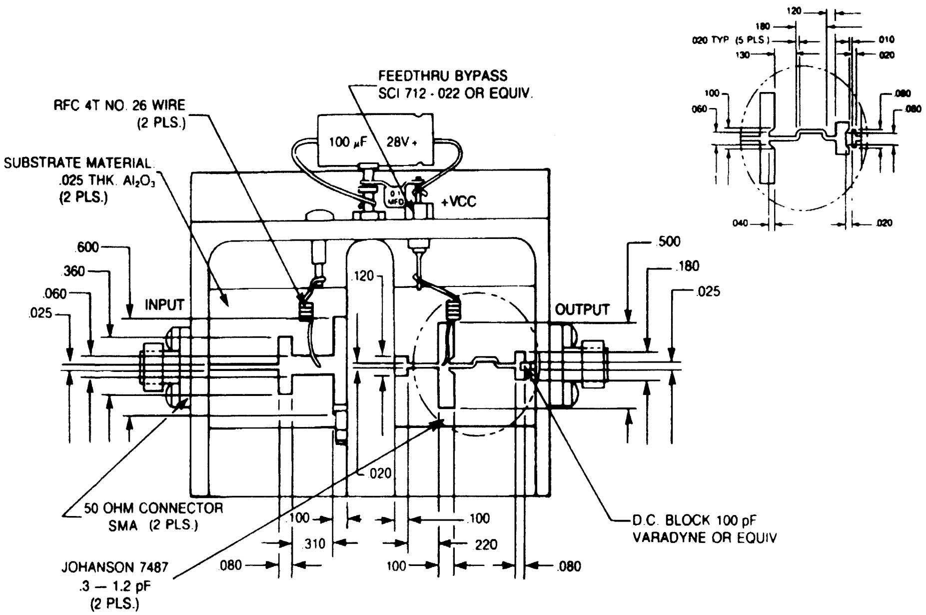
## IMPEDANCE DATA




| FREQ. | ZIN (Ω) | ZCL (Ω) |
|---|---|---|
| L = 1.2 GHz | 3.0 + j 6.5 | 16 + j 3.0 |
| M = 1.3 GHz | 3.5 + j 7.5 | 13 + j 6.0 |
| H = 1.4 GHz | 5.0 + j 7.0 | 11 + j 5.0 |

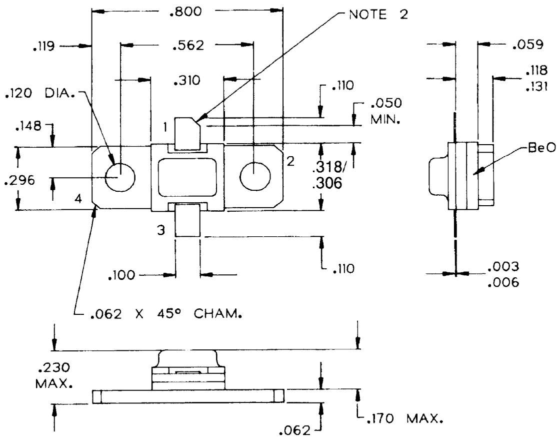
$P_{IN}$ = 2 W
$V_{CC}$ = 28 V
Normalized to 50 ohms

## TEST CIRCUIT



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J133100D



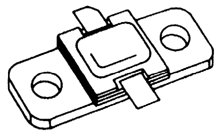

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

SGS-THOMSON MICROELECTRONICS

# AM81214-030

## RF & MICROWAVE TRANSISTORS L-BAND RADAR APPLICATIONS

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- RUGGEDIZED VSWR ∞:1
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 26 W MIN. WITH 7.2 dB GAIN



**.310 x .310 2LFL (S064)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM81214-030 | 81214-30 |

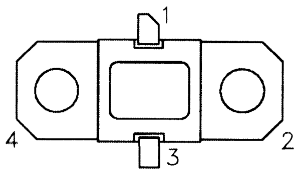
### DESCRIPTION

The AM81214-030 device is a high power transistor specifically designed for L-Band Radar pulsed driver applications.

The device is capable of operation over a wide range of pulse widths, duty cycles and temperatures and is capable of withstanding ∞:1 output VSWR at rated RF conditions. Low RF thermal resistance and computerized automatic wire bonding techniques ensure high reliability and product consistency.

The AM81214-030 is supplied in the IMPAC™ Hermetic Metal/Ceramic package with internal Input/Output matching structures.

### PIN CONNECTION




1. Collector
2. Base
3. Emitter
4. Base

### ABSOLUTE MAXIMUM RATINGS (Tcase = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \le 100$°C) | 63 | W |
| $I_C$ | Device Current* | 2.75 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 32 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 2.4 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 10mA | $I_E$ = 0mA | 55 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 20mA | $R_{BE}$ = 10Ω | 55 | — | — | V |
| $I_{CES}$ | $V_{BE}$ = 0V | $V_{CE}$ = 28V | — | — | 5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1A | 15 | — | 150 | — |

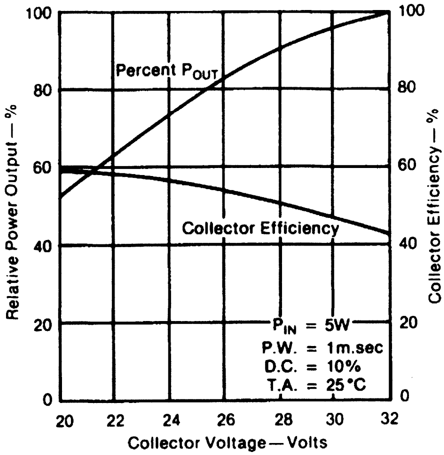
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{IN}$ | f = 1215 — 1400MHz | $P_{IN}$ = 5W Peak | $V_{CC}$ = 28V | 26 | 36 | — | W |
| $\eta_C$ | f = 1215 — 1400MHz | $P_{IN}$ = 5W Peak | $V_{CC}$ = 28V | 45 | 49 | — | % |
| $G_P$ | f = 1215 — 1400MHz | $P_{IN}$ = 5W Peak | $V_{CC}$ = 28V | 7.2 | 8.5 | — | dB |

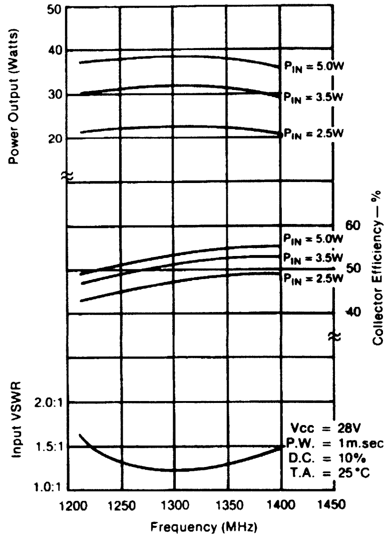
Note: Pulse Width = 1000µS
Duty Cycle = 10%

## TYPICAL PERFORMANCE

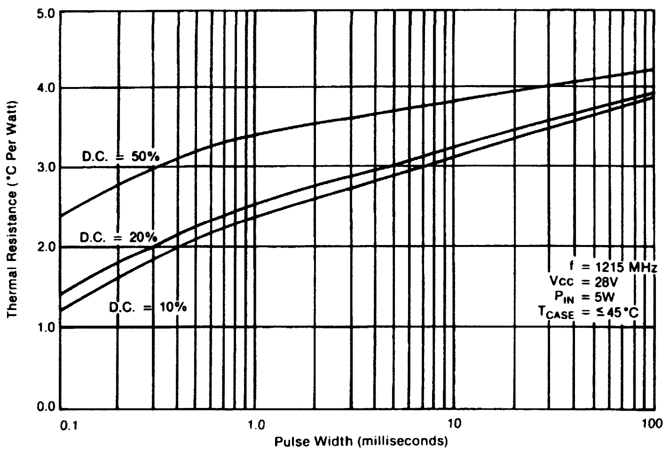
RELATIVE POWER OUTPUT & COLLECTOR EFFICIENCY vs COLLECTOR VOLTAGE




TYPICAL BROADBAND POWER AMPLIFIER

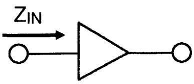



MAXIMUM THERMAL RESISTANCE vs PULSE WIDTH

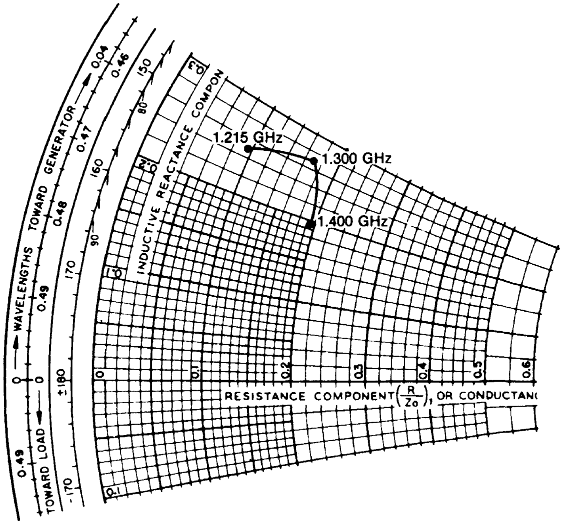


## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE

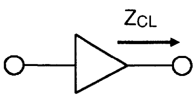



PIN = 5.0 W
VCC = 28 V
ZO = 50 Ohms

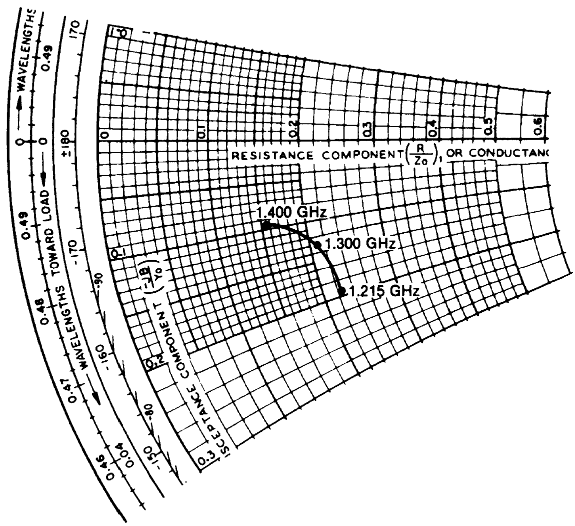



| FREQ. | ZIN (Ω) | ZCL (Ω) |
|---|---|---|
| L = 1.215 GHz | 4.5 + j 12.5 | 11.0 – j 10.0 |
| M = 1.300 GHz | 8.5 + j 13.5 | 10.5 – j 6.5 |
| H = 1.400 GHz | 9.5 + j 10.0 | 8.0 – j 5.0 |

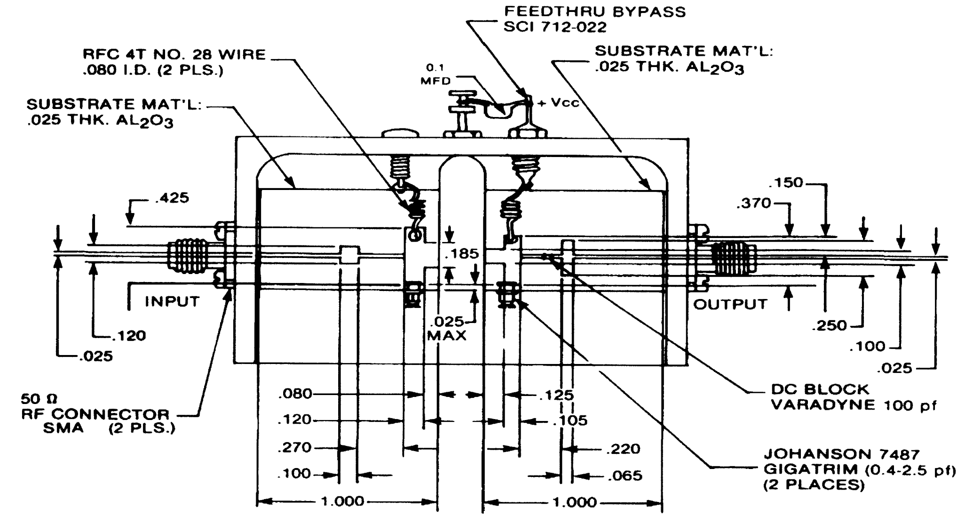
### TYPICAL COLLECTOR LOAD IMPEDANCE




PIN = 5.0 W
VCC = 28 V
ZO = 50 Ohms

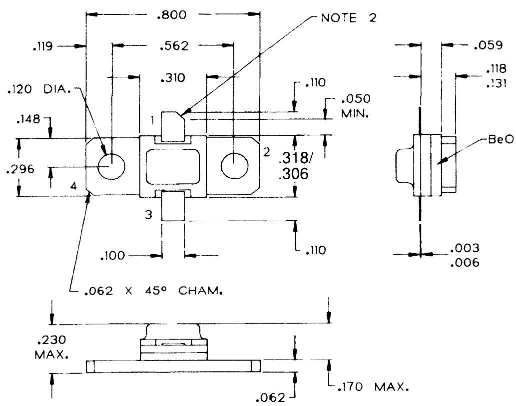


## TEST CIRCUIT




## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J133100D



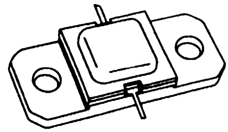

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED;
DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

SGS-THOMSON MICROELECTRONICS

# AM81214-060

## RF & MICROWAVE TRANSISTORS L-BAND RADAR APPLICATIONS

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- RUGGEDIZED VSWR ∞:1
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 55 W MIN. WITH 6.6 dB GAIN



**.400 x .400 2NLFL (S042)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM81214-060 | 81214-60 |

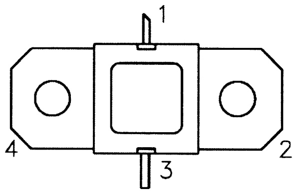
### DESCRIPTION

The AM81214-060 device is a high power transistor specifically designed for L-Band radar pulsed output and driver applications.

The device is capable of operation over a wide range of pulse widths, duty cycles, and temperatures and is capable of withstanding ∞:1 output VSWR at rated RF conditions. Low RF thermal resistance and computerized automatic wire bonding techniques ensure high reliability and product consistency.

The AM81214-060 is supplied in the AMPAC™ Hermetic Metal/Ceramic package with internal Input/Output matching structures.

### PIN CONNECTION




1. Collector
2. Base
3. Emitter
4. Base

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \le 100°C$) | 107 | W |
| $I_C$ | Device Current* | 5.0 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 32 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 1.4 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case} = 25°C$)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C = 20mA$ | $I_E = 0mA$ | 55 | — | — | V |
| $BV_{EBO}$ | $I_E = 2mA$ | $I_C = 0mA$ | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 40mA | $R_{BE} = 10\Omega$ | 55 | — | — | V |
| $I_{CES}$ | $V_{BE} = 0V$ | $V_{CE} = 28V$ | — | — | 10 | mA |
| $h_{FE}$ | $V_{CE} = 5V$ | $I_C = 2A$ | 15 | — | 150 | — |

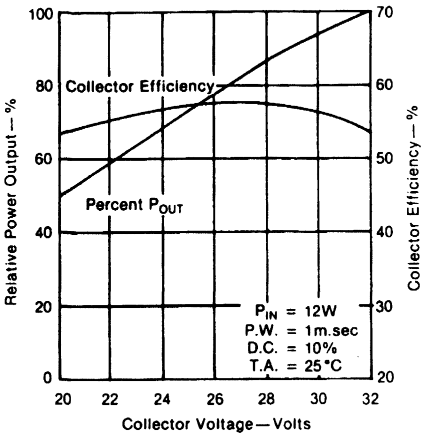
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1215 — 1400MHz | $P_{IN} = 12W$ | $V_{CC} = 28V$ | 55 | 63 | — | W |
| $\eta_C$ | f = 1215 — 1400MHz | $P_{IN} = 12W$ | $V_{CC} = 28V$ | 50 | 57 | — | % |
| $G_P$ | f = 1215 — 1400MHz | $P_{IN} = 12W$ | $V_{CC} = 28V$ | 6.6 | 7.2 | — | dB |

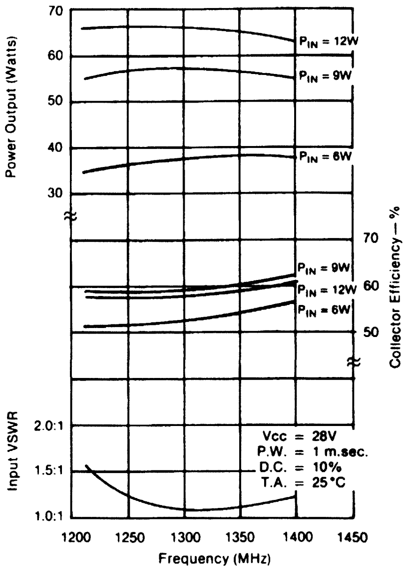
Note: Pulse Width = 1000µS
Duty Cycle = 10%

## TYPICAL PERFORMANCE

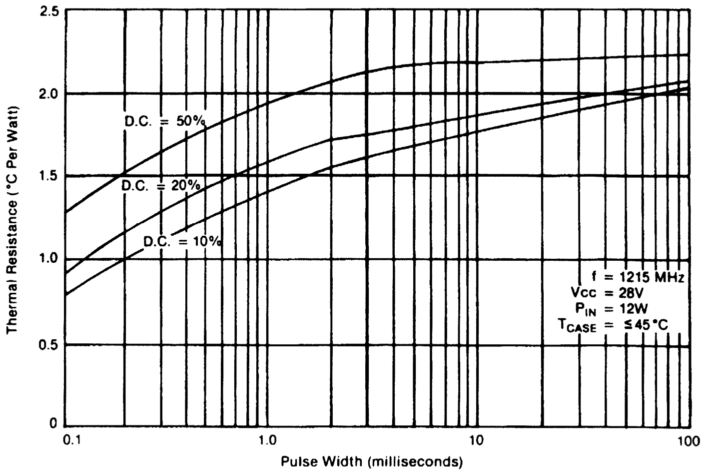
### RELATIVE POWER OUTPUT & COLLECTOR EFFICIENCY vs COLLECTOR VOLTAGE




### TYPICAL BROADBAND POWER AMPLIFIER

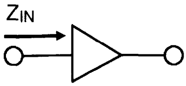



### MAXIMUM THERMAL RESISTANCE vs PULSE WIDTH

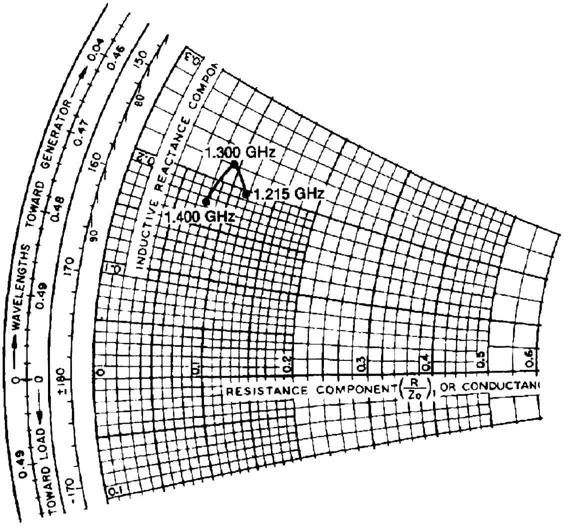


## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE

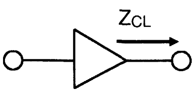



$P_{IN}$ = 12.0 W
$V_{CC}$ = 28 V
$Z_0$ = 50 ohms

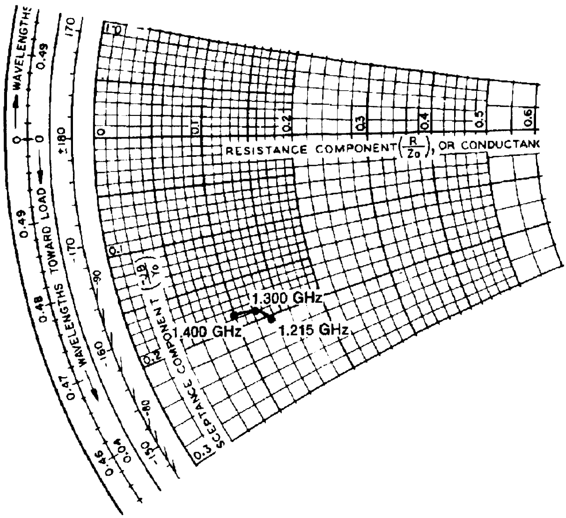



| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| L = 1.2 GHz | 6.0 + j 10.0 | 7.0 – j 10.0 |
| M = 1.3 GHz | 4.5 + j 11.0 | 6.0 – j 9.5 |
| H = 1.4 GHz | 4.0 + j 9.0 | 5.0 – j 9.0 |

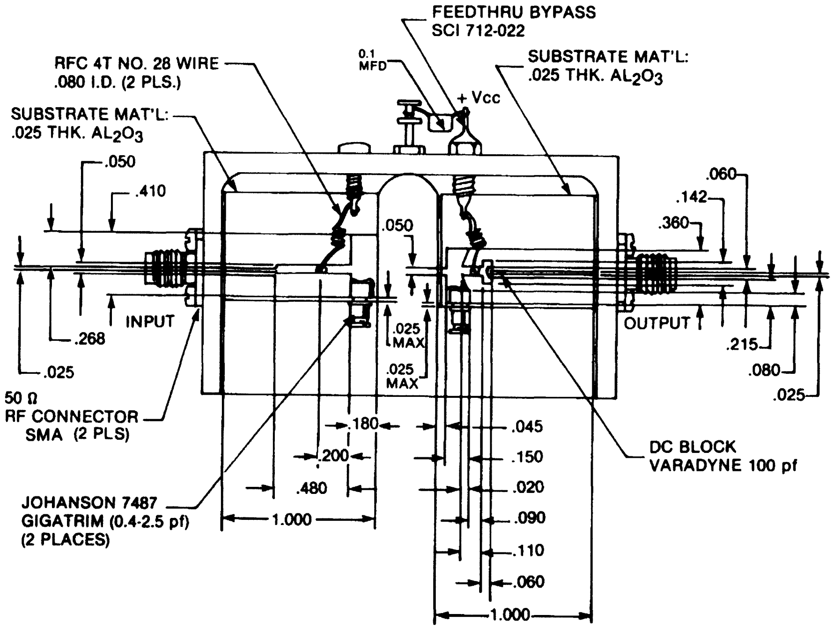
### TYPICAL COLLECTOR LOAD IMPEDANCE




$P_{IN}$ = 12.0 W
$V_{CC}$ = 28 V
$Z_0$ = 50 ohms

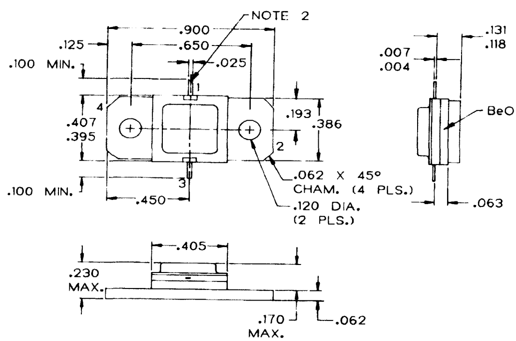


## TEST CIRCUIT




## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J113214F



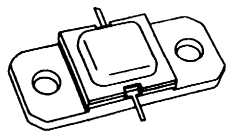

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD SLANT CUT.

SGS-THOMSON
MICROELECTRONICS

# AM81416-006

## RF & MICROWAVE TRANSISTORS TELECOMMUNICATIONS APPLICATIONS

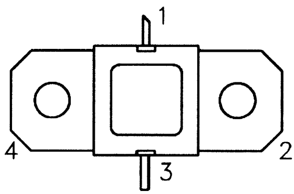
- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 5 W MIN. WITH 7.0 dB GAIN



**.400 x .400 2NLFL (S042)**
hermetically sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| AM81416-006 | 81416-6 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The AM81416-006 is a common base, silicon NPN bipolar device optimized for Class C, CW operation in the 1400 - 1600 MHz frequency range.

AM81416-006 utilizes a rugged, emitter-ballasted die geometry to achieve high gain and efficiency and is suitable for driver or output stages in Class C power amplifiers.

The AM81416-006 is provided in the industry-standard AMPAC™ metal/ceramic, hermetic package.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 50°C$) | 16.5 | W |
| $I_C$ | Device Current* | 0.8 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 22 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j\text{-}c)}$ | Junction-Case Thermal Resistance* | 9.0 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

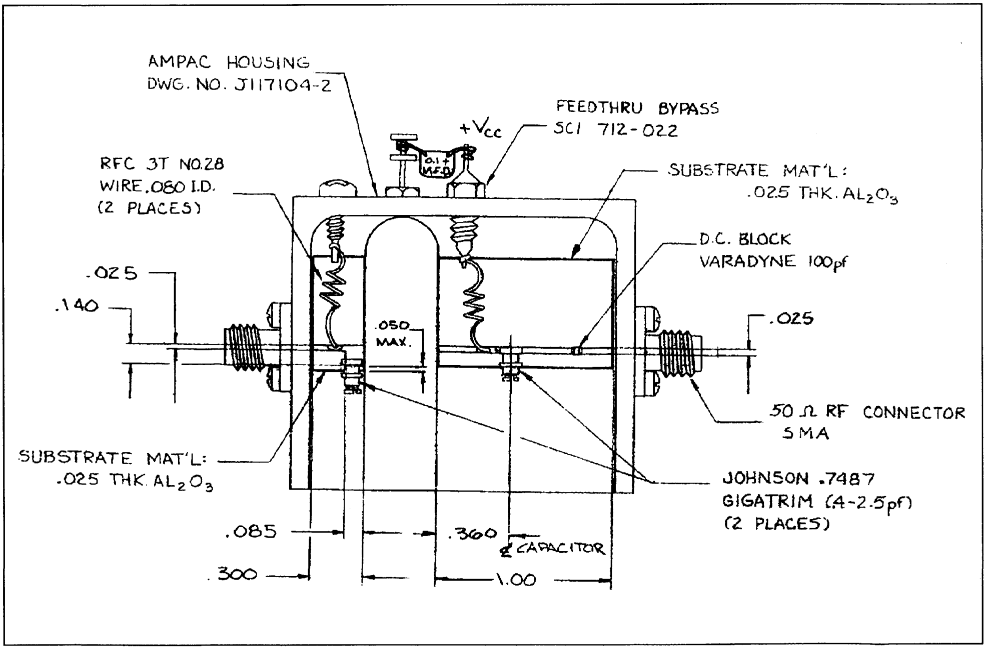
### STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 5mA | $I_E$ = 0mA | 40 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $I_{CBO}$ | $V_{BE}$ = 0V | $V_{CB}$ = 20V | — | — | 1 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 500mA | 20 | — | 300 | — |

### DYNAMIC

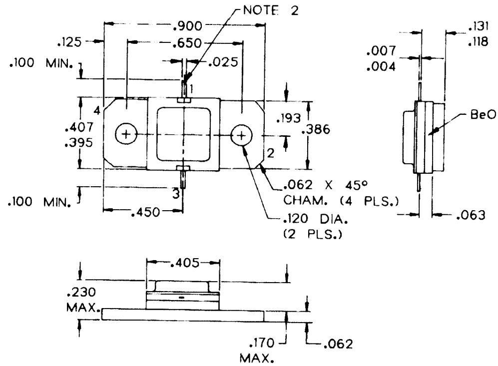
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1400 — 1600MHz | $P_{IN}$ = 1.0W | $V_{CC}$ = 20V | 5.0 | — | — | W |
| $\eta_C$ | f = 1400 — 1600MHz | $P_{IN}$ = 1.0W | $V_{CC}$ = 20V | 50 | — | — | % |
| $G_P$ | f = 1400 — 1600MHz | $P_{IN}$ = 1.0W | $V_{CC}$ = 20V | 7.0 | | — | dB |

## TEST CIRCUIT



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J113214F



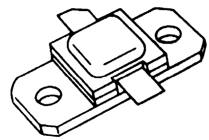

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD SLANT CUT.

SGS-THOMSON MICROELECTRONICS

# AM81416-012

## RF & MICROWAVE TRANSISTORS TELECOMMUNICATIONS APPLICATIONS

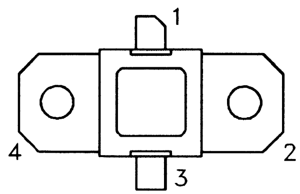
- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 11.2 W MIN. WITH 7.5 dB GAIN



**.400 x .400 2LFL (S036)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM81416-012 | 81416-12 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The AM81416-012 is a common base, silicon NPN bipolar device optimized for Class C, CW operation in the 1400 - 1600 MHz frequency range.

AM81416-006 utilizes a rugged, emitter-ballasted die geometry to achieve high gain and efficiency and is suitable for driver or output stages in Class C power amplifiers.

The AM81416-006 is provided in the industry-standard AMPAC™ metal/ceramic, hermetic package.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 50°C$) | 27 | W |
| $I_C$ | Device Current* | 1.5 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 22 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 5.5 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

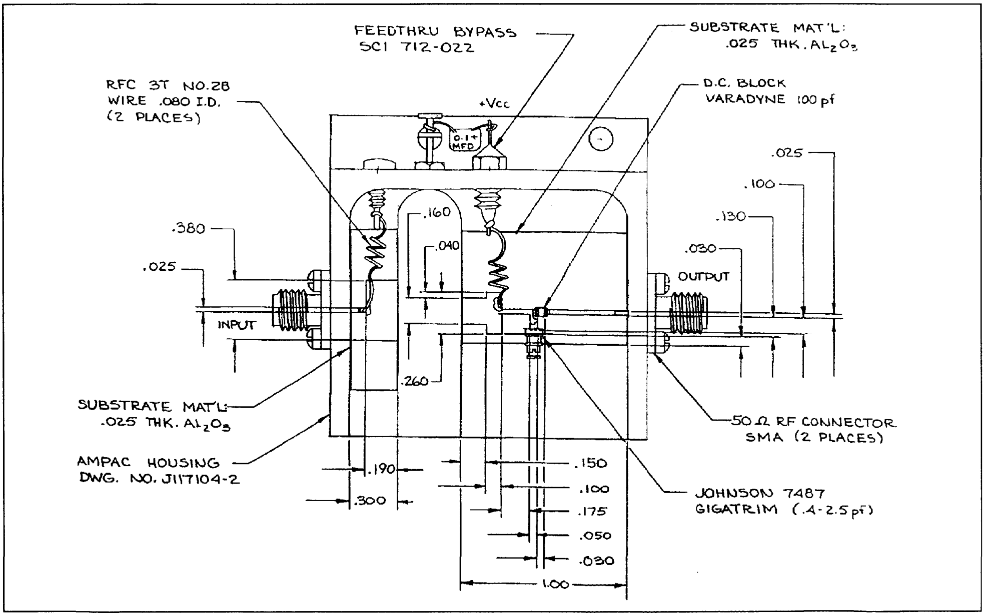
STATIC

| Symbol | Test Conditions | | Value Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 5mA | $I_E$ = 0mA | 40 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $I_{CBO}$ | $V_{BE}$ = 0V | $V_{CB}$ = 20V | — | — | 1 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1A | 20 | — | 300 | — |

DYNAMIC

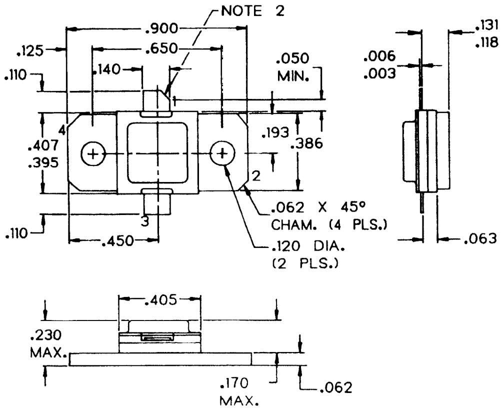
| Symbol | Test Conditions | | | Value Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 1400 — 1600MHz | $P_{IN}$ = 2.0W | $V_{CC}$ = 20V | 11.2 | — | — | W |
| $\eta_C$ | f = 1400 — 1600MHz | $P_{IN}$ = 2.0W | $V_{CC}$ = 20V | 47 | — | — | % |
| $G_P$ | f = 1400 — 1600MHz | $P_{IN}$ = 2.0W | $V_{CC}$ = 20V | 7.5 | — | — | dB |

## TEST CIRCUIT



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J133102E



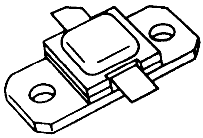

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

**SGS-THOMSON**
MICROELECTRONICS

# AM81416-020

## RF & MICROWAVE TRANSISTORS COMMUNICATIONS APPLICATIONS

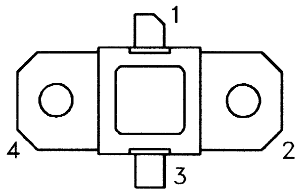
- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 17.6 W MIN. WITH 6.4 dB GAIN



**.400 x .400 2LFL (S036)**
hermetically sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| AM81416-020 | 81416-20 |

**PIN CONNECTION**




| | |
|---|---|
| 1. Collector | 3. Emitter |
| 2. Base | 4. Base |

### DESCRIPTION

The AM81416-020 is a common base, silicon NPN bipolar device optimized for Class C, CW operation in the 1400 - 1600 MHz frequency range.

AM81416-020 utilizes a rugged, emitter-ballasted die geometry to achieve high gain and efficiency and is suitable for driver or output stages in Class C power amplifiers.

The AM81416-020 is provided in the industry-standard AMPAC™ metal/ceramic, hermetic pack-

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 50$°C) | 50 | W |
| $I_C$ | Device Current* | 2.8 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 22 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 3.0 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

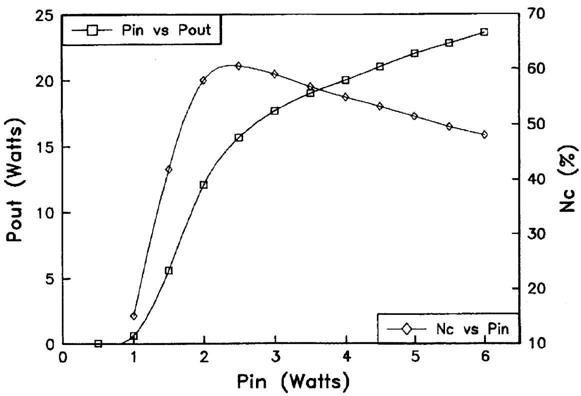
| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 5mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.0 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 20V | | — | — | 2.0 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 2A | 15 | — | 150 | — |

### DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 1400 — 1600MHz | $P_{IN}$ = 4.0W | $V_{CC}$ = 20V | 17.6 | — | — | W |
| $\eta_C$ | f = 1400 — 1600MHz | $P_{IN}$ = 4.0W | $V_{CC}$ = 20V | 45 | — | — | % |
| $G_P$ | f = 1400 — 1600MHz | $P_{IN}$ = 4.0W | $V_{CC}$ = 20V | 6.4 | — | — | dB |

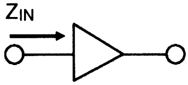
## TYPICAL PERFORMANCE

**POWER OUTPUT & COLLECTOR EFFICIENCY vs POWER INPUT**

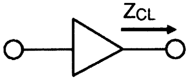


## IMPEDANCE DATA

**TYPICAL INPUT IMPEDANCE**

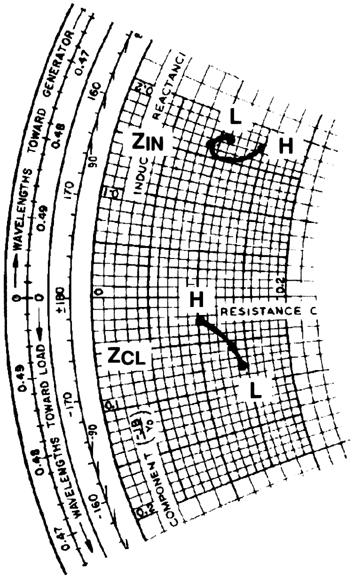



**TYPICAL COLLECTOR LOAD IMPEDANCE**

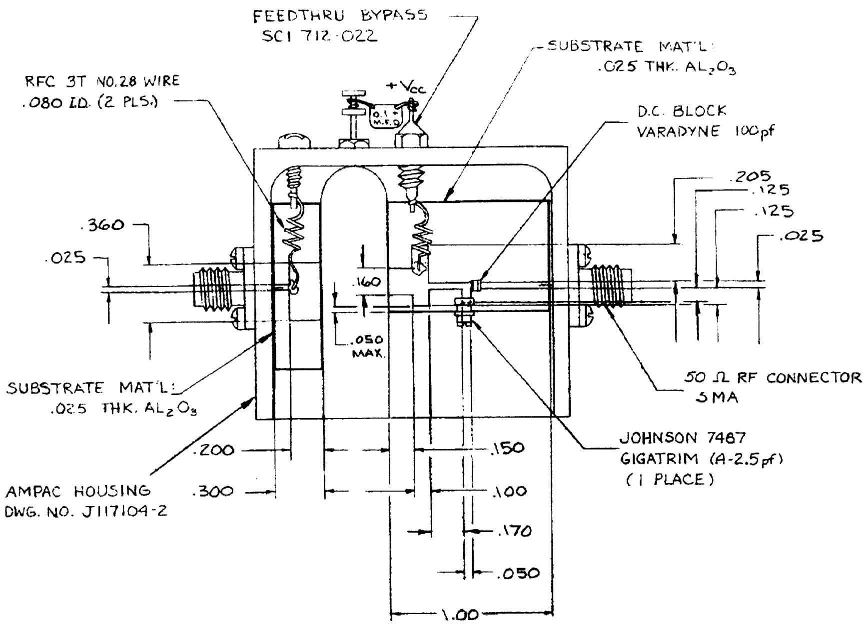



| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| L = 1.4 GHz | 5.5 + j 8.8 | 7.0 − j 4.0 |
| M = 1.5 GHz | 4.6 + j 8.3 | 6.8 − j 2.8 |
| H = 1.6 GHz | 7.4 + j 8.9 | 5.1 − j 1.3 |

$P_{IN}$ = 4.0W
$V_{CC}$ = 20V
Normalized to 50 ohms

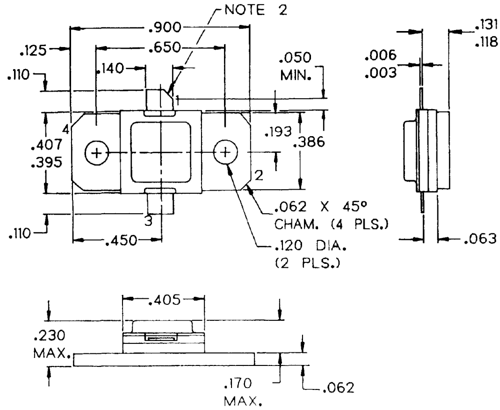



## TEST CIRCUIT



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J133102E




NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

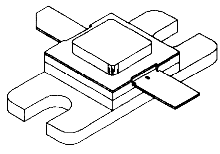
**SGS-THOMSON**
MICROELECTRONICS

# AM81719-030

## RF & MICROWAVE TRANSISTORS TELEMETRY APPLICATIONS

PRELIMINARY DATA

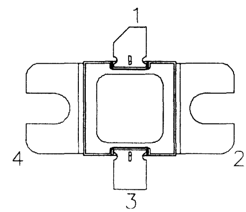
- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 28 W MIN. WITH 6.7 dB GAIN



**.400 SQ 2LFL (M147)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM81719-030 | 81719-030 |

### PIN CONNECTION




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The AM81719-030 is a high power silicon NPN bipolar transistor designed for Class C, CW communications and telemetry applications in the 1.75 - 1.85 GHz frequency range.

An emitter site ballasted refractory/gold overlay die geometry computerized automatic wire bonding is employed to ensure long term reliability and product consistency.

AM81719-030 is supplied in the industry-standard AMPAC™ hermetic metal/ceramic package.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* | 67.3 | W |
| $I_C$ | Device Current* | 2.67 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 28 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 2.6 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS (Tcase = 25°C)

STATIC

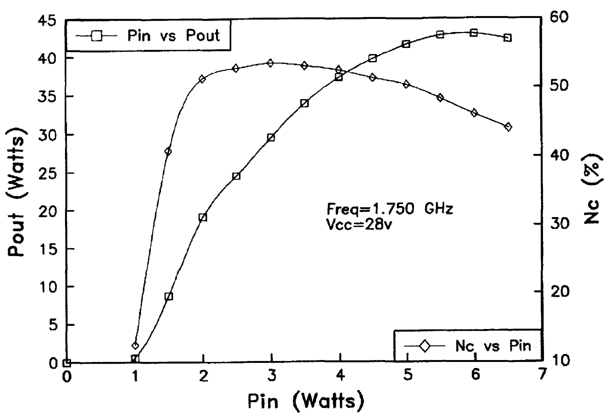
| Symbol | Test Conditions | | Value Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 10mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 3.0 | — | — | V |
| $BV_{CES}$ | IC = 10mA | | 45 | — | — | V |
| $I_{CES}$ | $V_{BE}$ = 0V | $V_{CE}$ = 28V | — | — | 5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 2mA | 15 | — | 150 | — |

DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 1.75 — 1.85GHz | $P_{IN}$ = 6.0W | $V_{CC}$ = 28V | 28 | — | — | W |
| $\eta_C$ | f = 1.75 — 1.85GHz | $P_{IN}$ = 6.0W | $V_{CC}$ = 28V | 40 | — | — | % |
| $G_P$ | f = 1.75 — 1.85GHz | $P_{IN}$ = 6.0W | $V_{CC}$ = 28V | 6.7 | — | — | dB |

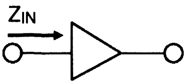
## TYPICAL PERFORMANCE

**POWER OUTPUT & COLLECTOR EFFICENCY vs POWER INPUT**

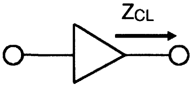


## IMPEDANCE DATA

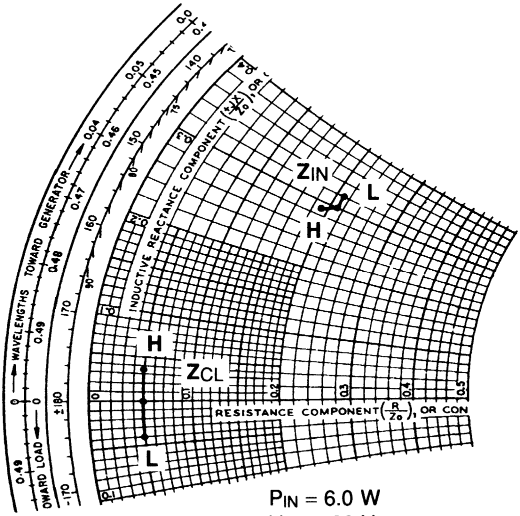
TYPICAL INPUT IMPEDANCE




TYPICAL COLLECTOR LOAD IMPEDANCE



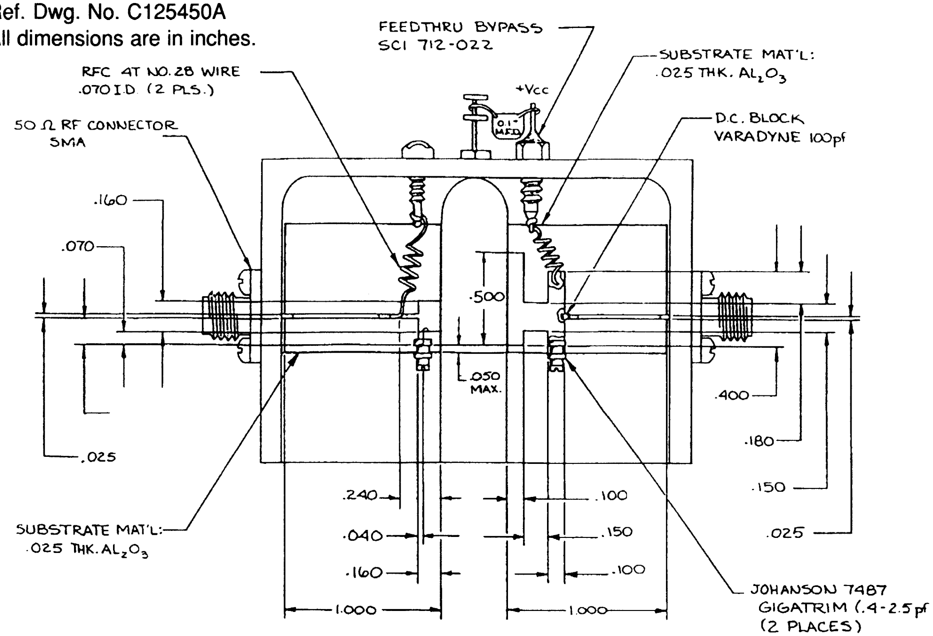

| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| L = 1.7 GHz | 10.5 + j 16.0 | 2.5 – j 2.0 |
| M = 1.8 GHz | 10.25 + j 15.0 | 2.5 + j 0.0 |
| H = 1.9 GHz | 9.5 + j 14.5 | 2.5 + j 2.0 |




$P_{IN}$ = 6.0 W
$V_{CC}$ = 28 V
Normalized to 50 ohms

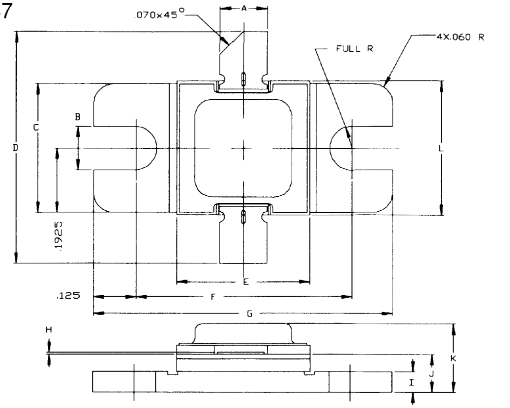
## TEST CIRCUIT

Ref. Dwg. No. C125450A
All dimensions are in inches.



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No. 12-0147




| SGS-THOMSON MICROELECTRONICS | | | CONT'D | | |
|---|---|---|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm | | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | 135/3,43 | .145/3,68 | K | | .230/5,84 |
| B | .125/3,18 | | L | .392/9,96 | .402/10,29 |
| C | .380/9,65 | .390/9,91 | | | |
| D | .885/22,48 | | | | |
| E | .392/9,96 | .402/10,29 | | | |
| F | .645/16,38 | .655/16,64 | | | |
| G | .895/22,73 | .905/22,99 | | | |
| H | .002/0,05 | .006/0,15 | | | |
| I | .055/1,40 | .065/1,65 | | | |
| J | .105/2,67 | .125/3,18 | | | |

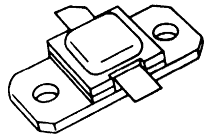
SGS-THOMSON MICROELECTRONICS

# AM81719-040

## RF & MICROWAVE TRANSISTORS TELEMETRY APPLICATIONS

PRELIMINARY DATA

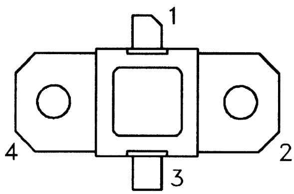
- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 40 W MIN. WITH 7 dB GAIN



**.400 X .400 2 LFL (S036)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM81719-040 | 81719-40 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The AM81719-040 is a high power silicon NPN bipolar transistor designed for Class C, CW communications and telemetry applications in the 1.75 - 1.85 GHz frequency range.

An emitter-ballasted refractory-gold overlay die geometry with computerized automatic wire-bonding is employed to ensure long-term reliability and product consistency.

AM1719-040 is supplied in the industry-standard AMPAC™ hermetic metal/ceramic package.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* | 79.5 | W |
| $I_C$ | Device Current* | 4.8 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 30 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 2.2 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

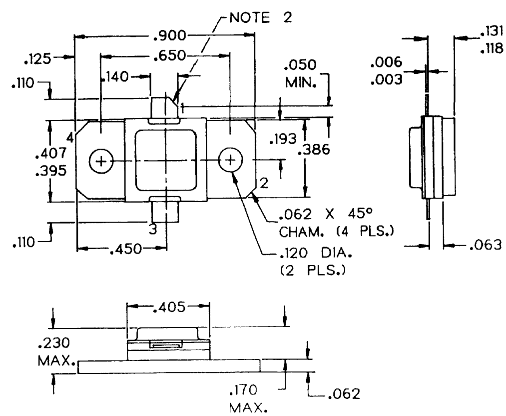
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 50mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 4mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CES}$ | IC = 80mA | | 45 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 28V | | — | — | 8 | mA |
| $h_{FE}$ | $V_{CE}$ = 30V | $I_C$ = 2.5A | 30 | — | 300 | — |

### DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1750 — 1850MHz | $P_{IN}$ = 8.0W | $V_{CC}$ = 28V | 40 | — | — | W |
| $\eta_C$ | f = 1750 — 1850MHz | $P_{IN}$ = 8.0W | $V_{CC}$ = 28V | 45 | — | — | % |
| $G_P$ | f = 1750 — 1850MHz | $P_{IN}$ = 8.0W | $V_{CC}$ = 28V | 6.7 | — | — | dB |

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J133102E



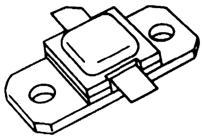

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

SGS-THOMSON MICROELECTRONICS

# AM81720-012

## RF & MICROWAVE TRANSISTORS COMMUNICATIONS APPLICATIONS

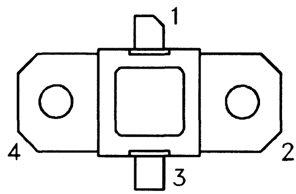
- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- RUGGIZED VSWR ∞:1
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 12 W MIN. WITH 7.4 dB GAIN



**.400 x .400 2LFL (S036)**
hermetically sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| AM81720-012 | 81720-12 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The AM81720-012 is designed specifically for Telecommunications applications.

The device is capable of withstanding any mismatch load condition at any phase angle (VSWR ∞:1) under full rated conditions. The unit is an overlay, emitter site ballasted, geometry utilizing a refractory/gold metallization system.

The unique AMPAC™ devices are housed in Hermetic Metal/Ceramic packages with internal Input/Output matching structures.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* | 31.8 | W |
| $I_C$ | Device Current* | 1.47 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 24 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 5.5 | °C/W |

*Applies only to rated RF amplifier operation

NOTE: Thermal Resistance determined by Infra-Red Scanning of Hot-Spot Junction Temperature at rated RF operating conditions.

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

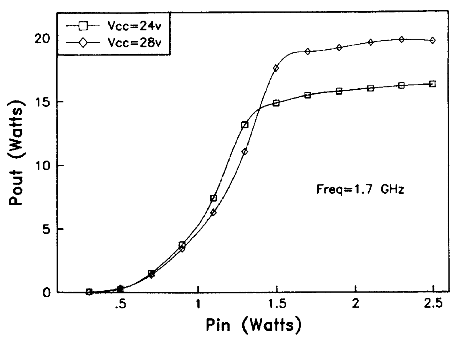
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 5mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 5mA | $I_C$ = 0mA | 3.0 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 24V | | — | — | 1.25 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1A | 15 | — | 150 | — |

### DYNAMIC

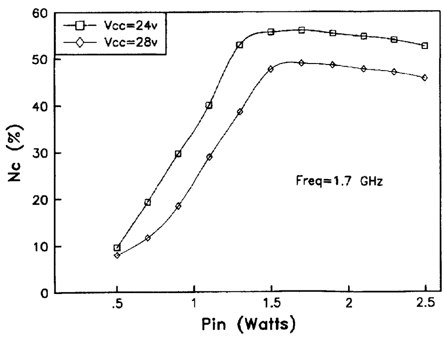
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1.7 — 2.0GHz | $P_{IN}$ = 2.2W | $V_{CC}$ = 24V | 12 | — | — | W |
| $\eta_C$ | f = 1.7 — 2.0GHz | $P_{IN}$ = 2.2W | $V_{CC}$ = 24V | 40 | — | — | % |
| $G_P$ | f = 1.7 — 2.0GHz | $P_{IN}$ = 2.2W | $V_{CC}$ = 24V | 7.4 | — | — | dB |

## TYPICAL PERFORMANCE

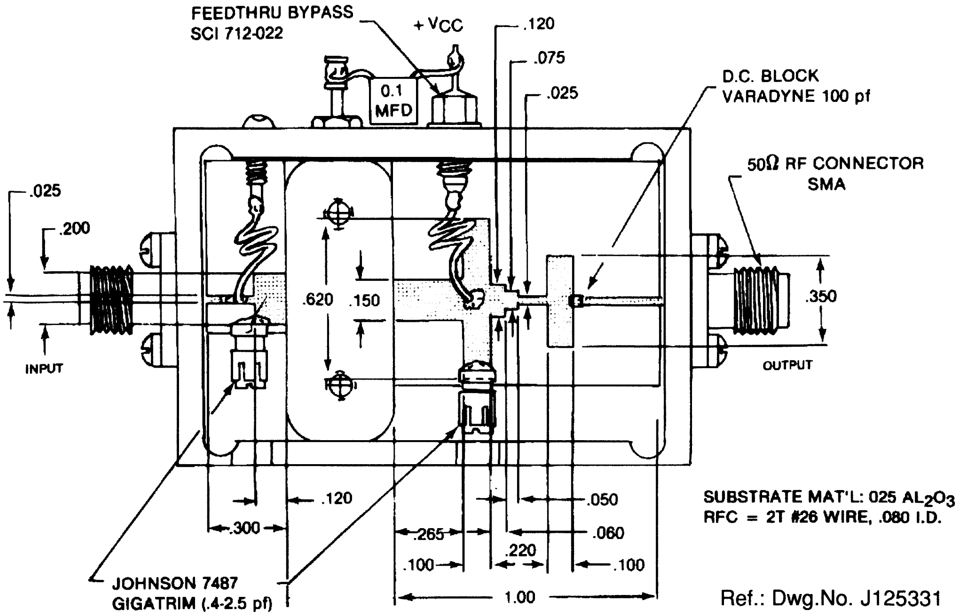
### POWER OUTPUT vs POWER INPUT




### COLLECTOR EFFICIENCY vs POWER INPUT

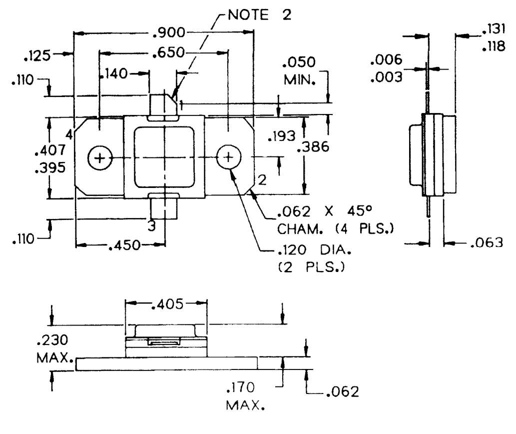


## TEST CIRCUIT




## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J133102E



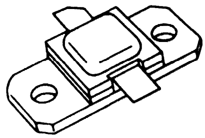

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

SGS-THOMSON MICROELECTRONICS

# AM81720-020

## RF & MICROWAVE TRANSISTORS COMMUNICATIONS APPLICATIONS

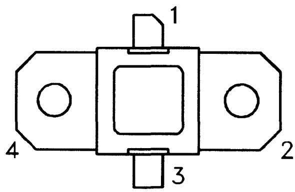
- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- RUGGEDIZED VSWR ∞:1
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 20 W MIN. WITH 6.5 dB GAIN



**.400 x .400 2LFL (S036)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM81720-020 | 81720-20 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

## DESCRIPTION

The AM81720-020 device is designed specifically for Telecommunications applications.

The device is capable of withstanding any mismatch load condition at any phase angle (VSWR ∞:1) under full rated conditions. The unit is an overlay, emitter site ballasted, geometry utilizing a refractory/gold metallization system.

The unique AMPAC™ devices are housed in Hermetic Metal/Ceramic packages with internal Input/Output matching structures.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* | 58.3 | W |
| $I_C$ | Device Current* | 3.0 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 28 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 3.0 | °C/W |

*Applies only to rated RF amplifier operation

NOTE: Thermal Resistance determined by Infra-Red Scanning of Hot-Spot Junction Temperature at rated RF operating conditions.

## ELECTRICAL SPECIFICATIONS ($T_{case} = 25°C$)

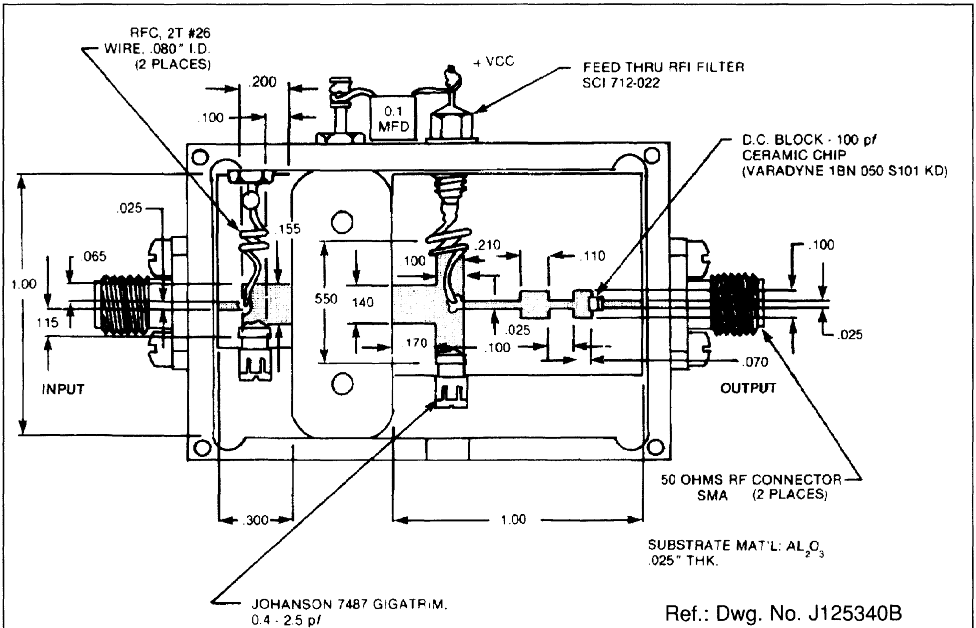
STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C = 5mA$ | $I_E = 0mA$ | 45 | — | — | V |
| $BV_{EBO}$ | $I_E = 1mA$ | $I_C = 0mA$ | 3.5 | — | — | V |
| $I_{CBO}$ | $V_{CB} = 24V$ | | — | — | 2 | mA |
| $h_{FE}$ | $V_{CE} = 5V$ | $I_C = 2A$ | 30 | — | 300 | — |

DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1700 — 2000MHz | $P_{IN} = 4.5W$ | $V_{CC} = 24V$ | 20 | — | — | W |
| $\eta_C$ | f = 1700 — 2000MHz | $P_{IN} = 4.5W$ | $V_{CC} = 24V$ | 42 | — | — | % |
| $G_P$ | f = 1700 — 2000MHz | $P_{IN} = 4.5W$ | $V_{CC} = 24V$ | 6.5 | — | — | dB |

## TEST CIRCUIT

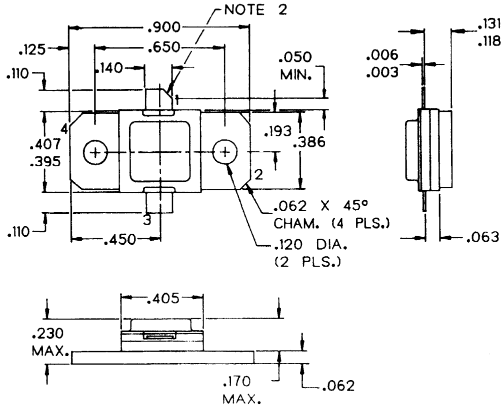



Ref.: Dwg. No. J125340B

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J133102E

Case Style: S036




NOTES:

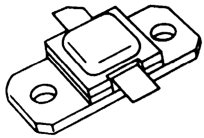
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

SGS-THOMSON
MICROELECTRONICS

# AM81922-018

## RF & MICROWAVE TRANSISTORS
## COMMUNICATIONS APPLICATIONS

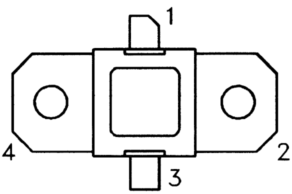
- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- RUGGIZED VSWR ∞:1
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 18 W MIN. WITH 6.0 dB GAIN



**.400 x .400 2LFL (S036)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM81922-018 | 81922-18 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The AM81922-018 device is designed specifically for Telecommunications applications.

The device is capable of withstanding any mismatch load condition at any phase angle (VSWR ∞:1) under full rated conditions. The unit is an overlay, emitter site ballasted, geometry utilizing a Refractory/gold metallization system.

The unique AMPAC™ devices are housed in Hermetic Metal/Ceramic packages with internal Input/Output matching structures.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* | 58.3 | W |
| $I_C$ | Device Current* | 2.7 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 24 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 3.0 | °C/W |

*Applies only to rated RF amplifier operation

Note: Thermal Resistance determined by Infra-Red Scanning of Hot-Spot Junction Temperature at rated RF operating conditions.

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

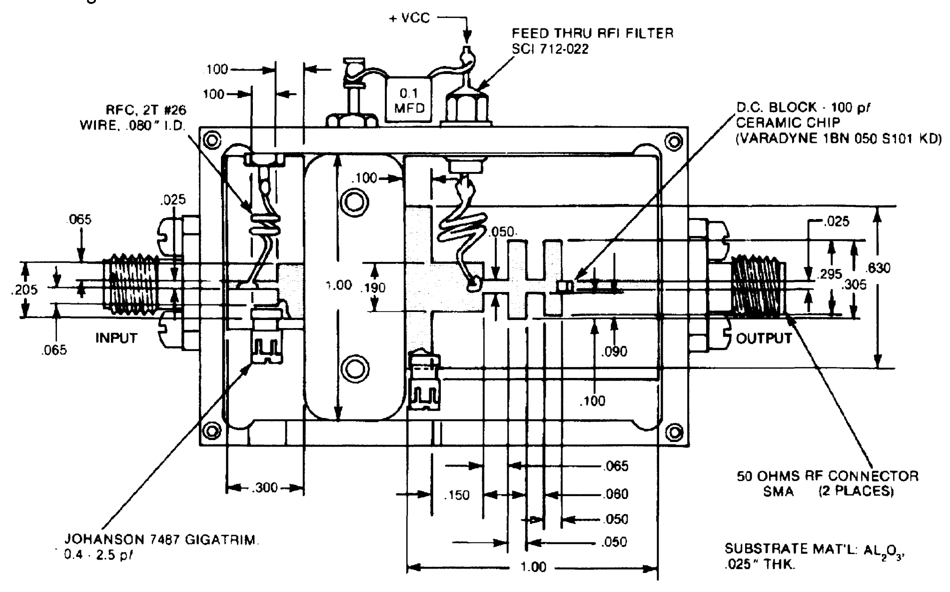
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 8mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 8mA | $I_C$ = 0mA | 3.0 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 28V | | — | — | 2 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1.6A | 15 | — | 150 | — |

DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1900 — 2200MHz | $P_{IN}$ = 4.5W | $V_{CC}$ = 24V | 18 | — | — | W |
| $\eta_C$ | f = 1900 — 2200MHz | $P_{IN}$ = 4.5W | $V_{CC}$ = 24V | 40 | — | — | % |
| $G_P$ | f = 1900 — 2200MHz | $P_{IN}$ = 4.5W | $V_{CC}$ = 24V | 6.0 | — | — | dB |

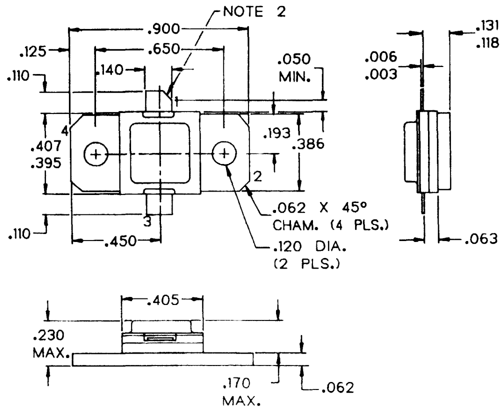
## TEST CIRCUIT

Ref.: Dwg. No. J125343A



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J133102E




NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

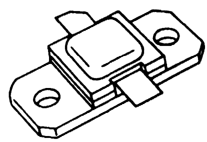
SGS-THOMSON MICROELECTRONICS

# AM82022-020

## RF & MICROWAVE TRANSISTORS TELEMETRY APPLICATIONS

PRELIMINARY DATA

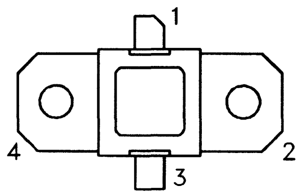
- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 20 W MIN. WITH 7.0 dB GAIN



**.400 x .400 2LFL (S036)**
hermetically sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| AM82022-020 | 82022-20 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The AM82022-020 is a common base NPN silicon power transistor optimized for high gain and efficiency in the 2.0 - 2.2 GHz frequency range.

Ideal for Class C, CW power amplifier applications, the AM82022-020 utilizes an emitter-ballasted, gold metallized die geometry and is provided in the industry-standard AMPAC™ metal/ceramic, hermetic package.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 50°C$) | 60 | W |
| $I_C$ | Device Current* | 3 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 25 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 2.5 | °C/W |

*Applies only to rated RF amplifier operation

NOTE: Thermal Resistance determined by Infra-Red Scanning of Hot-Spot Junction Temeperature at rated RF operating conditions.

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

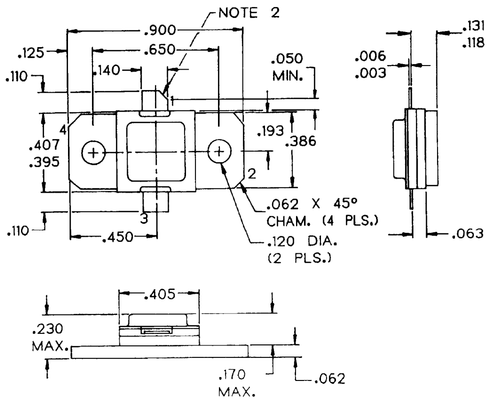
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 12mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 2.5mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 25mA | $R_{BE}$ = 10Ω | 45 | — | — | V |
| $I_{CBO}$ | $V_{BE}$ = 0V | $V_{CB}$ = 22V | — | — | 2.5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 2A | 30 | — | 300 | — |

DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 2.0 — 2.2GHz | $P_{IN}$ = 4.0W | $V_{CC}$ = 22V | 20 | — | — | W |
| $\eta_C$ | f = 2.0 — 2.2GHz | $P_{IN}$ = 4.0W | $V_{CC}$ = 22V | 40 | — | — | % |
| $G_P$ | f = 2.0 — 2.2GHz | $P_{IN}$ = 4.0W | $V_{CC}$ = 22V | 7.0 | — | — | dB |

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J133102E



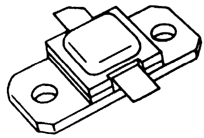

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

SGS-THOMSON MICROELECTRONICS

# AM82023-010

## RF & MICROWAVE TRANSISTORS COMMUNICATIONS APPLICATIONS

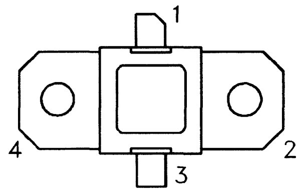
- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- ∞:1 VSWR CAPABILITY AT RATED CONDITIONS
- INPUT/OUTPUT MATCHING
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 10 W MIN. WITH 6.6 dB GAIN



**.400 x .400 2LFL (S036)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM82023-010 | 82023-10 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The AM82023-010 device is designed specifically for Telemetry and Communications applications.

The device is capable of withstanding any mismatch load condition at any phase angle (VSWR ∞:1) under full rated conditions. The unit is an overlay, emitter site ballasted, geometry utilizing a Refractory/Gold metallization system.

The unique AMPAC™ devices are housed in Hermetic Metal/Ceramic packages with internal Input/Output matching structures.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* | 31.8 | W |
| $I_C$ | Device Current* | 1.75 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 28 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 5.5 | °C/W |

*Applies only to rated RF amplifier operation

Note: Thermal Resistance determined by Infra-Red Scanning of Hot-Spot Junction Temperature at rated RF operating conditions.

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

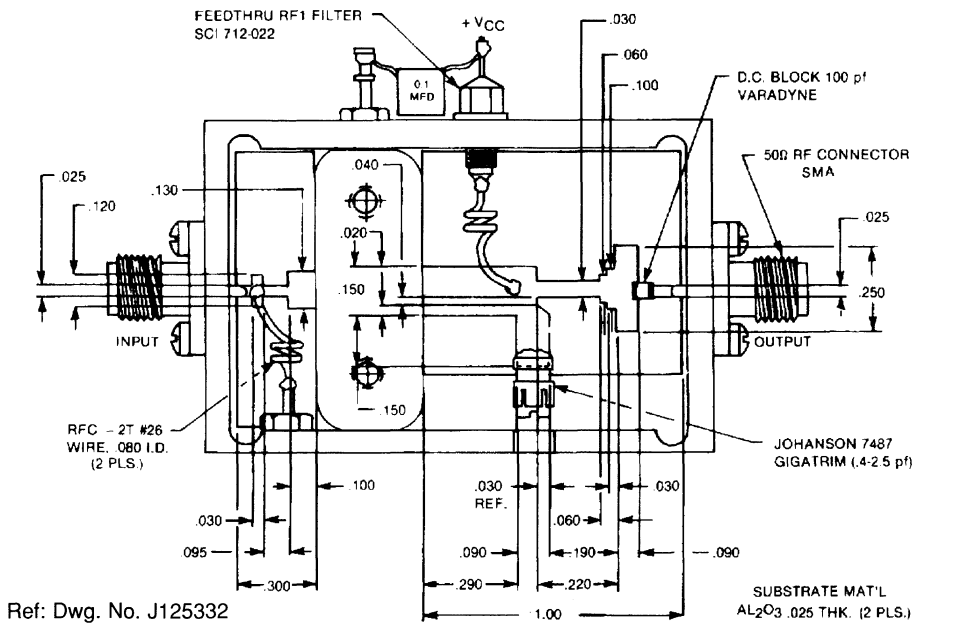
STATIC

| Symbol | Test Conditions | | Value Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 5mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 24V | | — | — | 1 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1A | 30 | — | 300 | — |

DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 2000 — 2300MHz | $P_{IN}$ = 2.2W | $V_{CC}$ = 24V | 10 | — | — | W |
| $\eta_C$ | f = 2000 — 2300MHz | $P_{IN}$ = 2.2W | $V_{CC}$ = 24V | 40 | — | — | % |
| $G_P$ | f = 2000 — 2300MHz | $P_{IN}$ = 2.2W | $V_{CC}$ = 24V | 6.6 | — | — | dB |

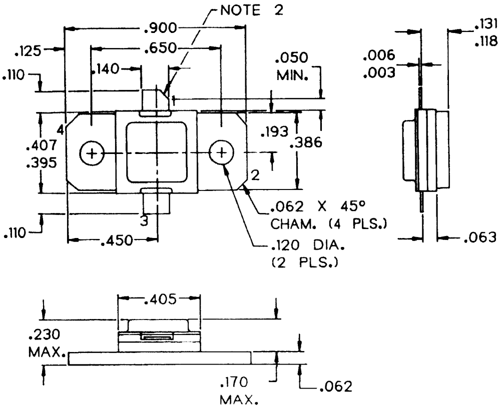
## TEST CIRCUIT




Ref: Dwg. No. J125332

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J133102E



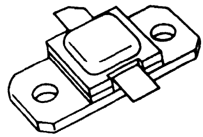

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

![SGS-THOMSON MICROELECTRONICS]

# AM82023-016

## RF & MICROWAVE TRANSISTORS
## COMMUNICATIONS APPLICATIONS

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- ∞:1 VSWR CAPABILITY AT RATED CONDITIONS
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 16 W MIN. WITH 6.0 dB GAIN



**.400 x .400 2LFL (S036)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM82023-016 | 82023-16 |

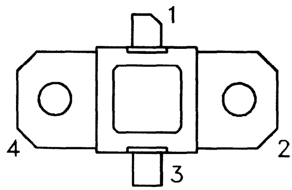
### DESCRIPTION

The AM82023-016 device is designed specifically for Telemetry and Communications applications.

The device is capable of withstanding any mismatch load condition at any phase angle (VSWR ∞:1) under full rated conditions. The unit is an overlay, emitter site ballasted, geometry utilizing a refractory/gold metallization system.

The unique AMPAC™ devices are housed in Hermetic Metal/Ceramic packages with internal Input/Output matching structures.

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* | 58.3 | W |
| $I_C$ | Device Current* | 3.0 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 28 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 3.0 | °C/W |

*Applies only to rated RF amplifier operation

Note: Thermal Resistance determined by Infra-Red Scanning of Hot-Spot Junction Temperature at rated RF operating conditions.

## ELECTRICAL SPECIFICATIONS (Tcase = 25°C)

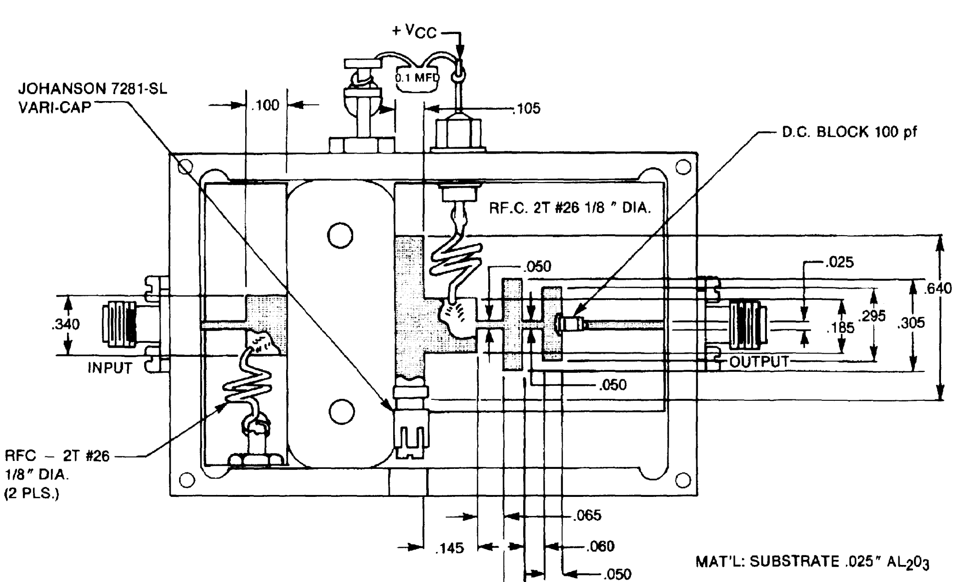
STATIC

| Symbol | Test Conditions | | Value Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 5mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 24V | | — | — | 2 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 2A | 30 | — | 300 | — |

DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 2000 — 2300MHz | $P_{IN}$ = 4.0W | $V_{CC}$ = 24V | 16 | — | — | W |
| $\eta_C$ | f = 2000 — 2300MHz | $P_{IN}$ = 4.0W | $V_{CC}$ = 24V | 40 | — | — | % |
| $G_P$ | f = 2000 — 2300MHz | $P_{IN}$ = 4.0W | $V_{CC}$ = 24V | 6.0 | — | — | dB |

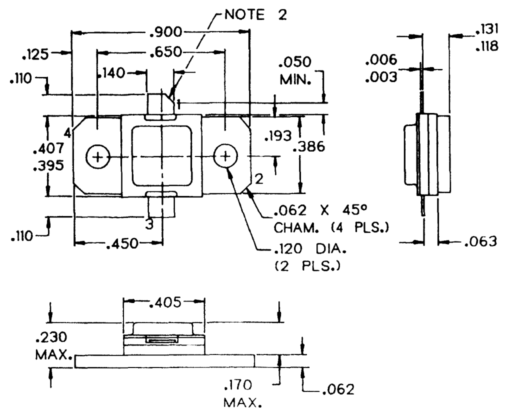
## TEST CIRCUIT




Ref.: Dwg. No. J125152

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J133102E



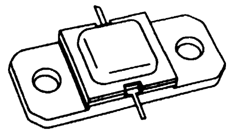

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

SGS-THOMSON
MICROELECTRONICS

# AM82223-004

## RF & MICROWAVE TRANSISTORS TELEMETRY APPLICATIONS

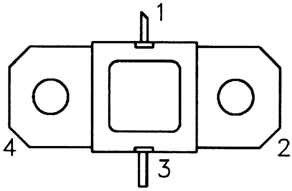
- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- ∞:1 VSWR CAPABILITY AT RATED CONDITIONS
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 4 W MIN. WITH 7.6 dB GAIN



**.400 x .400 2NLFL (S042)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM82223-004 | 82223-4 |

### PIN CONNECTION




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The AM82223-004 is a common base, silicon NPN bipolar transistor designed for high gain and efficiency in the 2.2 - 2.3 GHz frequency range.

Suitable for hi-rel aerospace telemetry applications, the AM82223-004 is provided in the industry-standard AMPAC™ metal/ceramic hermetic package and incorporates internal input and output impedance matchng structures along with a rugged, emitter-site ballasted overlay die geometry.

AM82223-004 is capable of withstanding ∞:1 load mismatch at any phase angle under full rated operating conditions.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* | 15.9 | W |
| $I_C$ | Device Current* | 0.75 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 26 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 11 | °C/W |

*Applies only to rated RF amplifier operation

NOTE: Thermal Resistance determined by Infra-Red SScanning of Hot-Spot Junction Temperature at rated RF operating conditions.

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

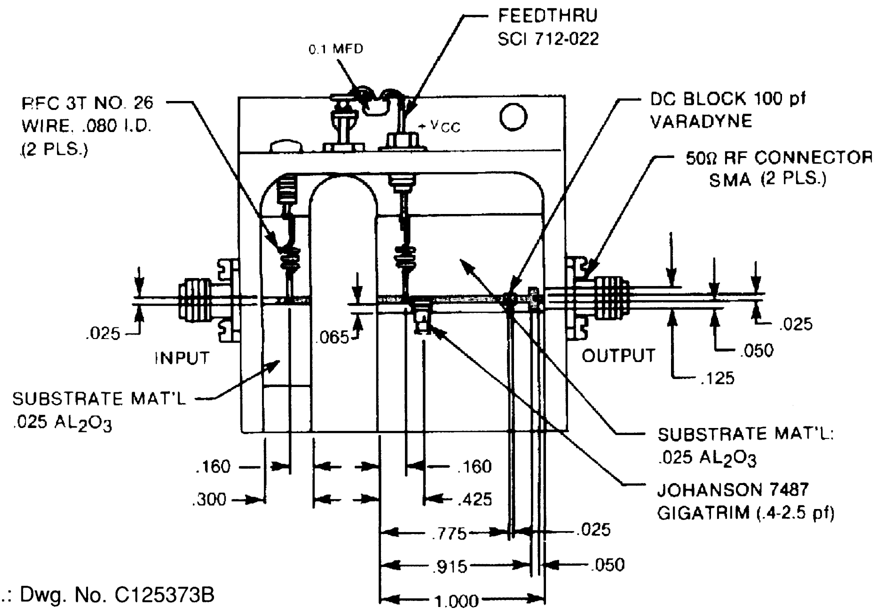
STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 5mA | $I_E$ = 0mA | 40 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 10mA | $R_{BE}$ = 10Ω | 40 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 24V | | — | — | 1 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 500mA | 20 | — | — | — |

DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 2.2 — 2.3GHz | $P_{IN}$ = 0.70W | $V_{CC}$ = 21V | 4.0 | — | — | W |
| $\eta_C$ | f = 2.2 — 2.3GHz | $P_{IN}$ = 0.70W | $V_{CC}$ = 21V | 45 | — | — | % |
| $G_P$ | f = 2.2 — 2.3GHz | $P_{IN}$ = 0.70W | $V_{CC}$ = 21V | 7.6 | — | — | dB |

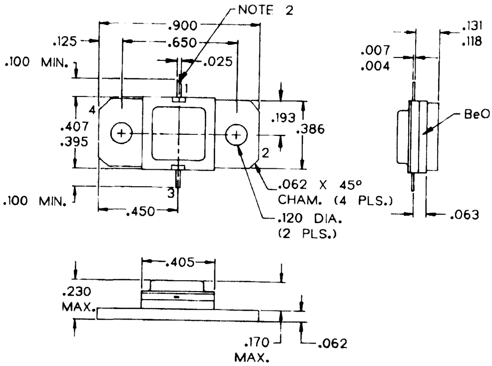
## TEST CIRCUIT




Ref.: Dwg. No. C125373B

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J113214F



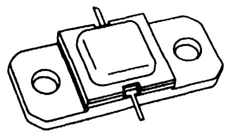

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD SLANT CUT.

SGS-THOMSON MICROELECTRONICS

# AM82223-010

## RF & MICROWAVE TRANSISTORS TELEMETRY APPLICATIONS

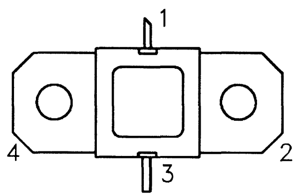
- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- ∞:1 VSWR CAPABILITY AT RATED CONDITIONS
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 9 W MIN. WITH 6.5 dB GAIN



**.400 x .400 2NLFL (S042)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM82223-010 | 82223-10 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The AM82223-010 is a common base, silicon NPN bipolar transistor designed for high gain and efficiency in the 2.2 - 2.3 GHz frequency range.

Suitable for hi-rel aerospace telemetry applications, the AM82223-010 is provided in the industry-standard AMPAC™ metal/ceramic hermetic package and incorporates internal input and output impedance matching structures along with a rugged, emitter-site ballasted overlay die geometry.

AM82223-010 is capable of withstanding ∞:1 load mismatch at any phase angle under full rated operating conditions.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 75$°C) | 28 | W |
| $I_C$ | Device Current* | 1.2 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 26 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 4.4 | °C/W |

*Applies only to rated RF amplifier operation

NOTE: Thermal Resistance determined by Infra-Red Scanning of Hot-Spot Junction Temperature at rated RF operating conditions.

## ELECTRICAL SPECIFICATIONS ($T_{case} = 25°C$)

STATIC

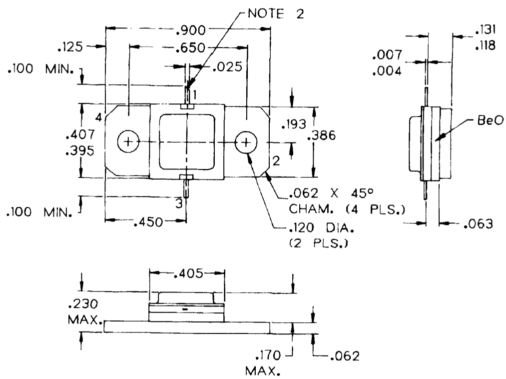
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C = 5mA$ | $I_E = 0mA$ | 45 | — | — | V |
| $BV_{EBO}$ | $I_E = 1mA$ | $I_C = 0mA$ | 3.5 | — | — | V |
| $BV_{CER}$ | $IC = 10mA$ | $R_{BE} = 10\Omega$ | 45 | — | — | V |
| $I_{CBO}$ | $V_{CB} = 24V$ | | — | — | 1 | mA |
| $h_{FE}$ | $V_{CE} = 5V$ | $I_C = 750mA$ | 30 | — | 300 | — |

DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 2.2 — 2.3GHz | $P_{IN} = 2.0W$ | $V_{CC} = 24V$ | 9.0 | — | — | W |
| $\eta_C$ | f = 2.2 — 2.3GHz | $P_{IN} = 2.0W$ | $V_{CC} = 24V$ | 45 | — | — | % |
| $G_P$ | f = 2.2 — 2.3GHz | $P_{IN} = 2.0W$ | $V_{CC} = 24V$ | 6.5 | — | — | dB |

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J113214F



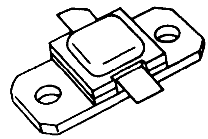

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD SLANT CUT.

SGS-THOMSON
MICROELECTRONICS

# AM82223-012

## RF & MICROWAVE TRANSISTORS
## TELEMETRY APPLICATIONS

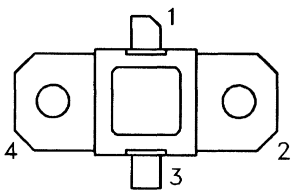
- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- ∞:1 VSWR CAPABILITY
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 11 W MIN. WITH 7.0 dB GAIN



**.400 x .400 2LFL (S036)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM82223-012 | 82223-12 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

## DESCRIPTION

The AM82223-012 is a common base, silicon NPN bipolar transistor designed for high gain and efficiency in the 2.2 - 2.3 GHz frequency range.

Suitable for hi-rel aerospace telemetry applications, the AM82223-012 is provided in the industry-standard AMPAC™ metal/ceramic hermetic package and incorporates internal input and output impedance matchng structures along with a rugged, emitter-site ballasted overlay die geometry.

AM82223-012 is capable of withstanding ∞:1 load mismatch at any phase angle under full rated operating conditions.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* | 31.8 | W |
| $I_C$ | Device Current* | 1.75 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 28 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 5.5 | °C/W |

*Applies only to rated RF amplifier operation

NOTE: Thermal Resistance determined by Infra-Red Scanning of Hot-Spot Junction Temperature at rated RF operating conditions.

## ELECTRICAL SPECIFICATIONS ($T_{case} = 25°C$)

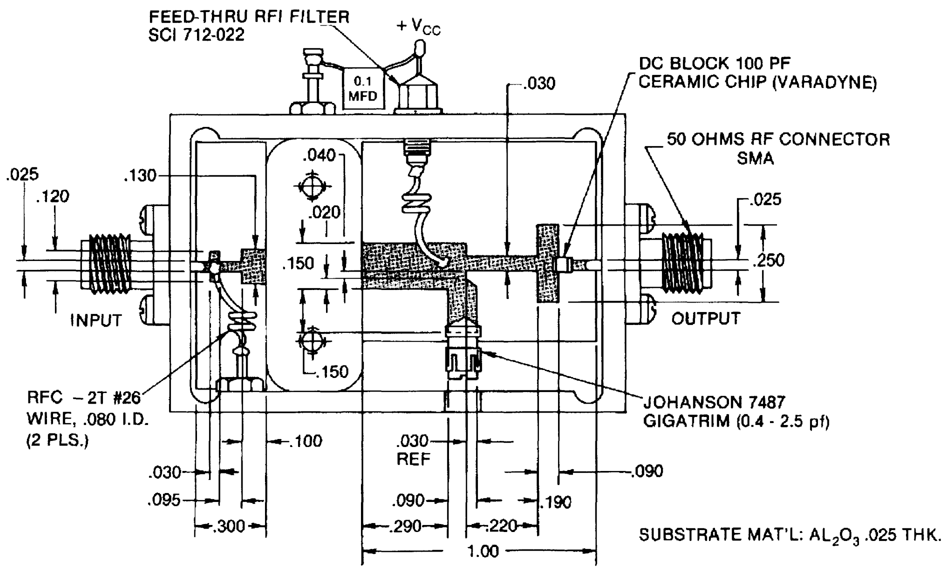
STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C = 5mA$ | $I_E = 0mA$ | 45 | — | — | V |
| $BV_{EBO}$ | $I_E = 1mA$ | $I_C = 0mA$ | 3.5 | — | — | V |
| $I_{CBO}$ | $V_{CB} = 24V$ | | — | — | 1 | mA |
| $h_{FE}$ | $V_{CE} = V$ | $I_C = mA$ | 30 | — | 300 | — |

DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 2.2 — 2.3 GHz | $P_{IN} = 2.2W$ | $V_{CC} = 24V$ | 11 | — | — | W |
| $\eta_C$ | f = 2.2 — 2.3 GHz | $P_{IN} = 2.2W$ | $V_{CC} = 24V$ | 40 | — | — | % |
| $G_P$ | f = 2.2 — 2.3 GHz | $P_{IN} = 2.2W$ | $V_{CC} = 24V$ | 7.0 | — | — | dB |

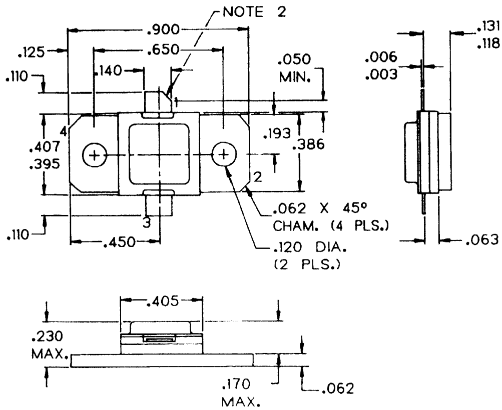
## TEST CIRCUIT




Ref.: Dwg. No.J133102C

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J133102E



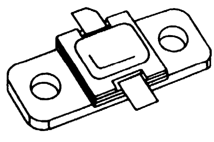

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

SGS-THOMSON
MICROELECTRONICS

# AM82223-014

## RF & MICROWAVE TRANSISTORS
## TELEMETRY APPLICATIONS

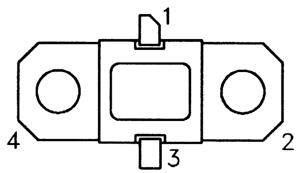
- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- ∞:1 VSWR CAPABILITY
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 12 W MIN. WITH 7.6 dB GAIN



**.310 x .310 2LFL (S064)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM82223-014 | 2223-14 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The AM82223-014 is a common base, silicon NPN bipolar transistor designed for high gain and efficiency in the 2.2 - 2.3 GHz frequency range.

Suitable for hi-rel aerospace telemetry applications, the AM82223-014 is provided in the industry-standard AMPAC™ metal/ceramic hermetic package and incorporates internal input and output impedance matching structures along with a rugged, emitter-site ballasted overlay die geometry.

AM82223-014 is capable of withstanding an ∞:1 load mismatch at any phase angle under full rated operating conditions.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 70$°C) | 33 | W |
| $I_C$ | Device Current* | 1.5 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 25 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 3.9 | °C/W |

*Applies only to rated RF amplifier operation

NOTE: Thermal Resistance determined by Infra-Red Scanning of Hot-Spot Junction Temperature at rated RF operating conditions.

## ELECTRICAL SPECIFICATIONS ($T_{case} = 25°C$)

STATIC

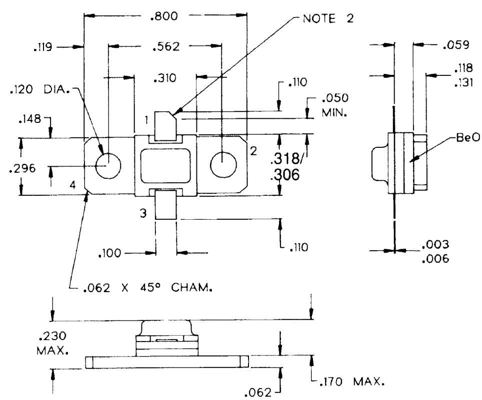
| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C = 15mA$ | $I_E = 0mA$ | 45 | — | — | V |
| $BV_{EBO}$ | $I_E = 1.5mA$ | $I_C = 0mA$ | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 15mA | $V_{BE} = 0V$ | 45 | — | — | V |
| $I_{CES}$ | $V_{CE} = 22V$ | | — | — | 1.5 | mA |
| $h_{FE}$ | $V_{CE} = 5V$ | $I_C = 1A$ | 30 | — | 300 | — |

DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 2.2 — 2.3GHz | $P_{IN} = 2.1W$ | $V_{CC} = 22V$ | 12 | — | — | W |
| $\eta_C$ | f = 2.2 — 2.3GHz | $P_{IN} = 2.1W$ | $V_{CC} = 22V$ | 45 | — | — | % |
| $G_P$ | f = 2.2 — 2.3GHz | $P_{IN} = 2.1W$ | $V_{CC} = 22V$ | 7.6 | — | — | dB |

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J133100D

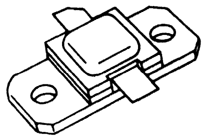



NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

# AM82223-018

## RF & MICROWAVE TRANSISTORS TELEMETRY APPLICATIONS

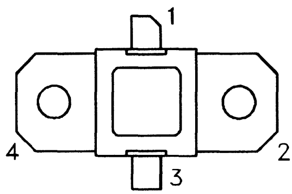
- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- ∞:1 VSWR CAPABILITY AT RATED CONDITIONS
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 18 W MIN. WITH 6.5 dB GAIN



**.400 x .400 2LFL (S036)**
hermetically sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| AM82223-018 | 82223-18 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

**DESCRIPTION**

The AM82223-018 is a common base, silicon NPN bipolar transistor designed for high gain and efficiency in the 2.2 - 2.3 GHz frequency range.

Suitable for hi-rel aerospace telemetry applications, the AM82223-018 is provided in the industry-standard AMPAC™ metal/ceramic hermetic package and incorporates internal input and output impedance matchng structures along with a rugged, emitter-site ballasted overlay die geometry.

AM82223-018 is capable of withstanding ∞:1 load mismatch at any phase angle under full rated operating conditions.

**ABSOLUTE MAXIMUM RATINGS** ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* | 58.3 | W |
| $I_C$ | Device Current* | 3.0 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 28 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

**THERMAL DATA**

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 3.0 | °C/W |

*Applies only to rated RF amplifier operation

NOTE: Thermal resistance determined by Infra-Red Scanning of Hot Spot Junction Temperature at rated RF operating conditions.

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

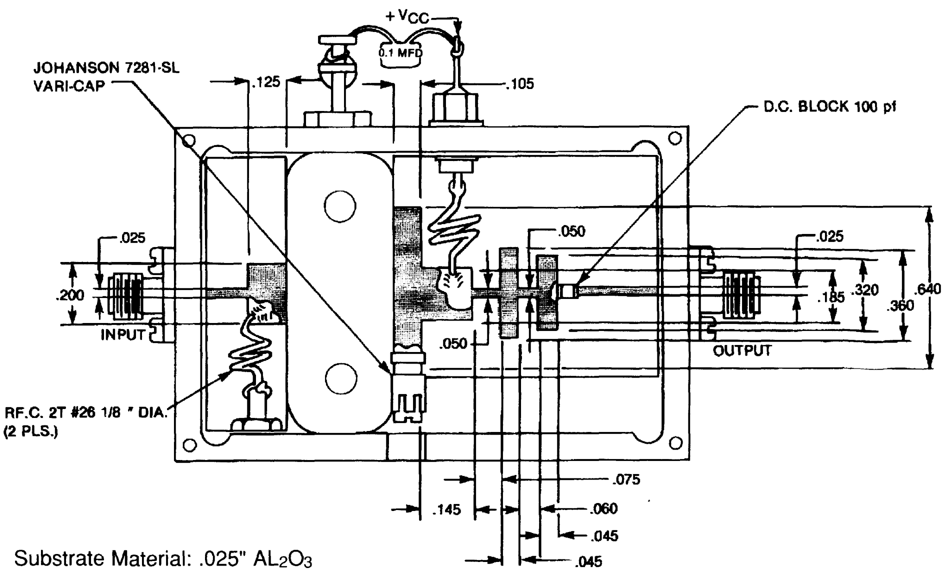
STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 5mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 24V | | — | — | 2.0 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 2A | 30 | — | 300 | — |

DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 2.2 — 2.3GHz | $P_{IN}$ = 4.0W | $V_{CC}$ = 24V | 18 | — | — | W |
| $\eta_C$ | f = 2.2 — 2.3GHz | $P_{IN}$ = 4.0W | $V_{CC}$ = 24V | 40 | — | — | % |
| $G_P$ | f = 2.2 — 2.3GHz | $P_{IN}$ = 4.0W | $V_{CC}$ = 24V | 6.5 | — | — | dB |

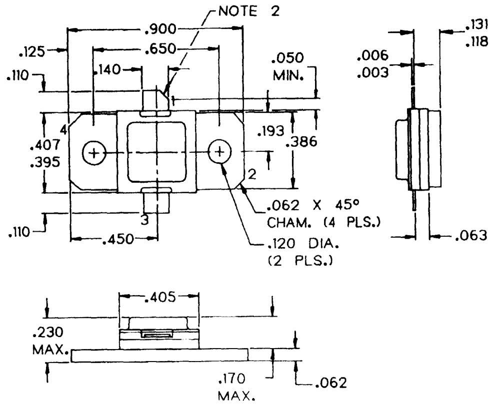
## TEST CIRCUIT




Substrate Material: .025" $AL_2O_3$
Ref.: Dwg. No. J125199B

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J133102E



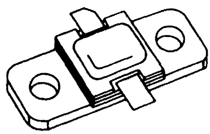

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

SGS-THOMSON MICROELECTRONICS

# AM82223-020

## RF & MICROWAVE TRANSISTORS TELEMETRY APPLICATIONS

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- ∞:1 VSWR CAPABILITY AT RATED CONDITIONS
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 20 W MIN. WITH 7.0 dB GAIN



**.310 x .310 2LFL (S064)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM82223-020 | 82223-20 |

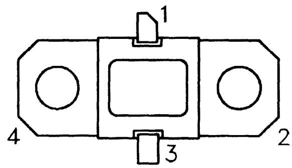
### DESCRIPTION

The AM82223-020 is a common base, silicon NPN bipolar transistor designed for high gain and efficiency in the 2.2 - 2.3 GHz frequency range.

Suitable for hi-rel aerospace telemetry applications, the AM82223-020 is provided in the industry-standard AMPAC™ metal/ceramic hermetic package and incorporates internal input and output impedance matching structures along with a rugged, emitter-site ballasted overlay die geometry.

AM82223-020 is capable of withstanding an ∞:1 load mismatch at any phase angle under full rated operating conditions.

### PIN CONNECTION




1. Collector
2. Base
3. Emitter
4. Base

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 50$°C) | 55 | W |
| $I_C$ | Device Current* | 3 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 25 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 2.7 | °C/W |

*Applies only to rated RF amplifier operation

NOTE: Thermal Resistance determined by Infra-Red Scanning of Hot-Spot Junction Temperature at rated RF operating conditions.

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

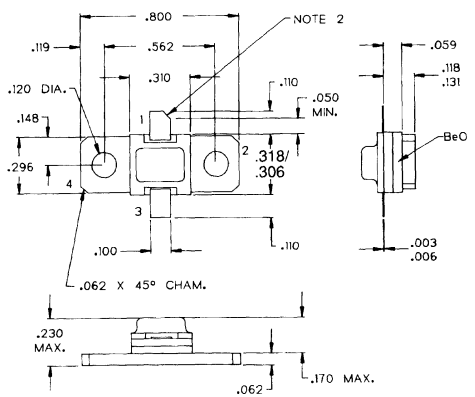
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 12mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 2.5mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 25mA | $R_{BE}$ = 10Ω | 45 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 22V | | — | — | 2.5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 2A | 30 | — | 300 | — |

### DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 2.2 — 2.3GHz | $P_{IN}$ = 4.0W | $V_{CC}$ = 22V | 20 | — | — | W |
| $\eta_C$ | f = 2.2 — 2.3GHz | $P_{IN}$ = 4.0W | $V_{CC}$ = 22V | 40 | — | — | % |
| $G_P$ | f = 2.2 — 2.3GHz | $P_{IN}$ = 4.0W | $V_{CC}$ = 22V | 7.0 | — | — | dB |

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J133100D




NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

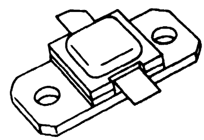
SGS-THOMSON MICROELECTRONICS

# AM82324-020

## RF & MICROWAVE TRANSISTORS TELEMETRY APPLICATIONS

PRELIMINARY DATA

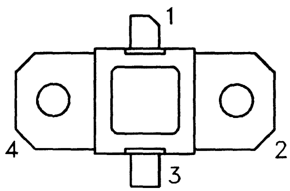
- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 20 W MIN. WITH 6.0 dB GAIN



**.400 x .400 2LFL (S036)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM82324-020 | 82324-20 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The AM82324-020 is a common base NPN silicon bipolar transistor optimized for high gain and efficiency in the 2.3 - 2.4 GHz frequency range.

Designed for Class C, CW power amplifier application, the AM82324-020 utilizes a rugged, emitter-ballasted, gold metallized die geometry for low thermal resistance and excellent long term reliability.

AM82324-020 is provided in the industry-standard AMPAC™ metal/ceramic, hermetic package.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \le 100$°C) | 60 | W |
| $I_C$ | Device Current* | 3 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 25 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 2.5 | °C/W |

*Applies only to rated RF amplifier operation

NOTE: Thermal Resistance determined by Infra-Red Scanning of Hot-Spot Junction Temperature at rated RF operating conditions.

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

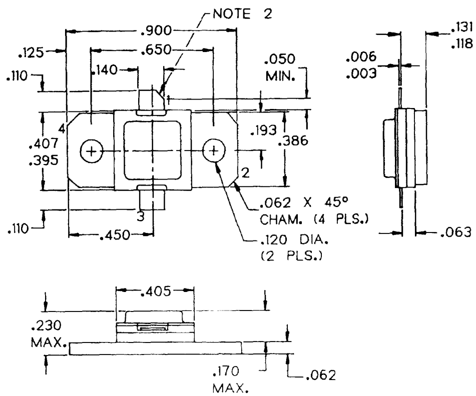
| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 50mA | $I_E$ = 0mA | | 45 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 2.5mA | $I_C$ = 0mA | | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 25mA | $R_{BE}$ = 10Ω | | 45 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 22V | | | — | — | 2.5 | mA |
| $h_{FE}$ | DC Current Gain | $V_{CE}$ = 5V | $I_C$ = 2A | 30 | — | 300 | — |

DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 2.3 — 2.4GHz | $P_{IN}$ = 5.0W | $V_{CC}$ = 22V | 20 | — | — | W |
| $\eta_C$ | f = 2.3 — 2.4GHz | $P_{IN}$ = 5.0W | $V_{CC}$ = 22V | 2.5 | — | — | % |
| $G_P$ | f = 2.3 — 2.4GHz | $P_{IN}$ = 5.0W | $V_{CC}$ = 22V | 6.0 | — | — | dB |

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J133102E




NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

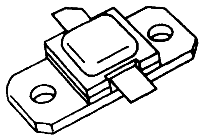
SGS-THOMSON MICROELECTRONICS

# AM82325-040

## RF & MICROWAVE TRANSISTORS S-BAND RADAR APPLICATIONS

PRELIMINARY DATA

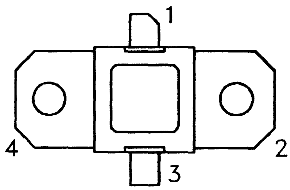
- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 40 W MIN. WITH 6.0 dB GAIN



**.400 x .400 2LFL (S036)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM82325-040 | 82325-40 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The AM82325-040 is a high power silicon NPN bipolar device optimized for specialized pulsed applications in the 2.3 - 2.5 GHz frequency range.

AM82325-040 incorporates computerized automatic wire bonding for high reliability and product consistency and is supplied in the industry-standard AMPAC™ input/output matched package.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 50$°C) | 220 | W |
| $I_C$ | Device Current* | 8.0 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 40 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 0.90 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case} = 25°C$)

STATIC

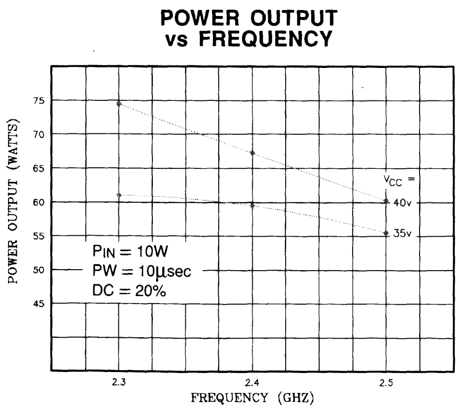
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C = 25mA$ | $I_E = 0mA$ | 55 | — | — | V |
| $BV_{EBO}$ | $I_E = 5mA$ | $I_C = 0mA$ | 3.5 | — | — | V |
| $BV_{CER}$ | $IC = 25mA$ | $R_{BE} = 10\Omega$ | 55 | — | — | V |
| $I_{CES}$ | $V_{CE} = 35V$ | | — | — | 20 | mA |
| $h_{FE}$ | $V_{CE} = 5V$ | $I_C = 3A$ | 30 | — | — | — |

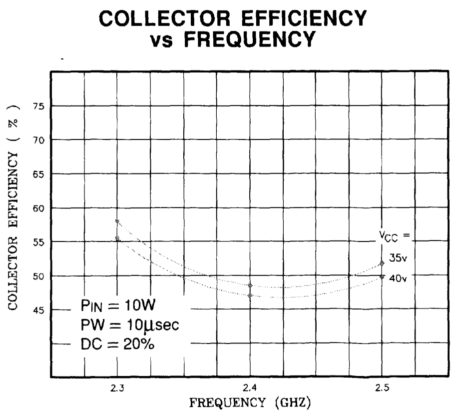
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 2.3 — 2.5GHz | $P_{IN} = 10W$ | $V_{CC} = 35V$ | 40 | — | — | W |
| $\eta_C$ | f = 2.3 — 2.5GHz | $P_{IN} = 10W$ | $V_{CC} = 35V$ | 40 | — | — | % |
| $G_P$ | f = 2.3 — 2.5GHz | $P_{IN} = 10W$ | $V_{CC} = 35V$ | 6.0 | — | — | dB |

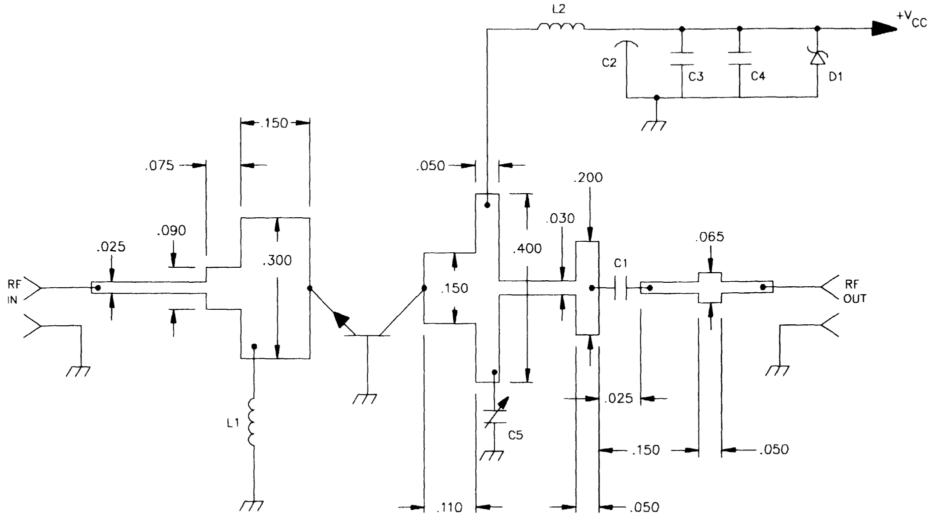
Note: Pulse Width = 10μSec
Duty Cycle = 20%

## TYPICAL PERFORMANCE



## TEST CIRCUIT

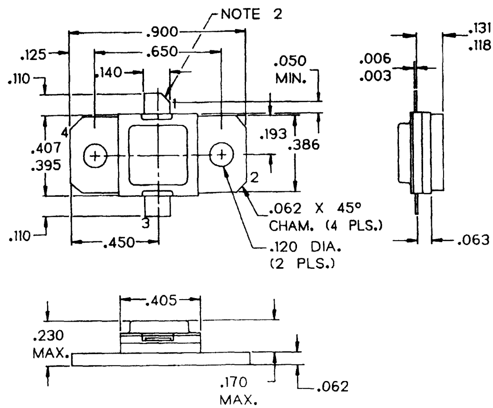



Alll dimensions are in inches.
All microstrip lines are on 0.025" Thick $AL_2O_3$ (Er = 9.6)

| | | |
|---|---|---|
| C1 | : | 100 pF Chip Capacitor |
| C2 | : | 1500 pF RF Feedthru |
| C3 | : | 0.1 µF Ceramic |
| C4 | : | 2 x 100 µF Electrolytic Capacitor |
| C5 | : | 0.3 - 1.5 pF Gigatrim |
| D1 | : | 36V 5W Zener |
| L1 | : | Gold Plated Nickel Strap, 5mil Thick, 60Mil Wide and 275mil Long |
| L2 | : | 2 Turns, #28 Wire 1/16" I.D. |

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J133102E



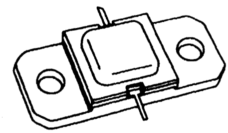

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

SGS-THOMSON
MICROELECTRONICS

# AM82327-004

## RF & MICROWAVE TRANSISTORS
## COMMUNICATIONS APPLICATIONS

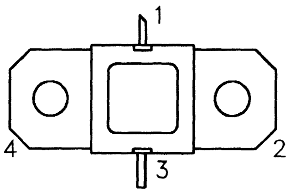
- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 4 W MIN. WITH 6.0 dB GAIN



**.400 x .400 2NLFL (S042)**
hermetically sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| AM82327-004 | 82327-4 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

## DESCRIPTION

The AM82327-004 is a common base NPN silicon bipolar transistor optimized for high gain and efficiency in the 2.3 - 2.7 GHz frequency range.

Ideal for Class C telecommunications applications, the AM82327-004 utilizes an emitter-ballasted, gold-metallized die geometry for low thermal resistance and outstanding long term reliability.

AM82327-004 is provided in the industry-standard AMPAC™ metal/ceramic, hermetic package.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* | 15.9 | W |
| $I_C$ | Device Current* | 0.75 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 28 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 11 | °C/W |

*Applies only to rated RF amplifier operation

NOTE: Thermal Resistance determined by Infra-Red Scanning of Hot-Spot Junction Temperature at rated RF operating conditions.

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

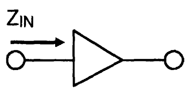
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 5mA | $I_E$ = 0mA | 40 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 24V | | — | — | 1 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 500mA | 20 | — | — | — |

DYNAMIC

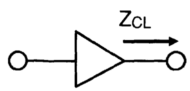
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 2300 — 2700MHz | $P_{IN}$ = 1.0W | $V_{CC}$ = 24V | 4.0 | — | — | W |
| $\eta_C$ | f = 2300 — 2700MHz | $P_{IN}$ = 1.0W | $V_{CC}$ = 24V | 30 | — | — | % |
| $G_P$ | f = 2300 — 2700MHz | $P_{IN}$ = 1.0W | $V_{CC}$ = 24V | 6.0 | — | — | dB |

## IMPEDANCE DATA

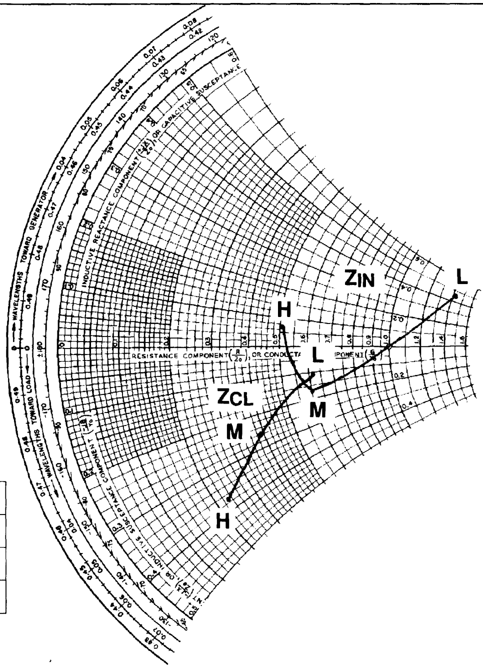
**TYPICAL INPUT IMPEDANCES**




**TYPICAL COLLECTOR LOAD IMPEDANCES**



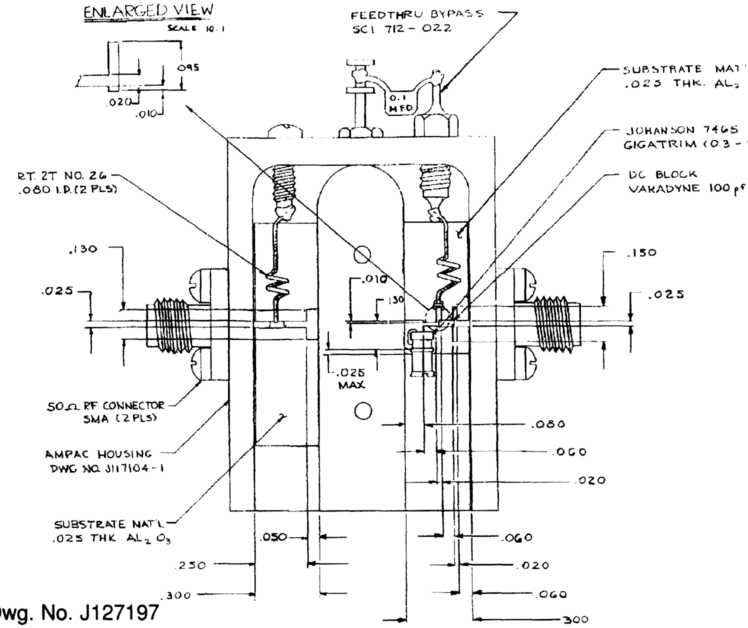

| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| L = 2.3 GHz | 70.5 + j 23.0 | 31.0 – j 6.0 |
| M = 2.5 GHz | 30.0 – j 8.5 | 19.5 – j 13.0 |
| H = 2.7 GHz | 26.0 + j 4.0 | 11.5 – j 18.5 |






SGS-THOMSON MICROELECTRONICS

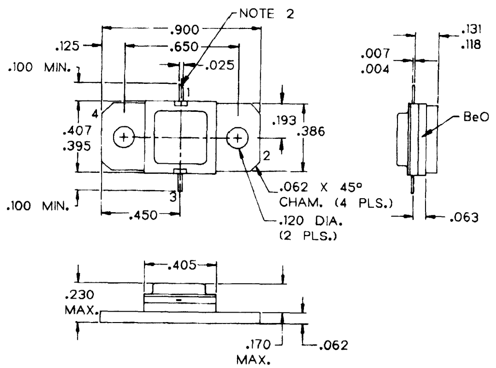
## TEST CIRCUIT




Ref.: Dwg. No. J127197

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J113214F



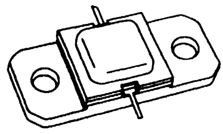

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD SLANT CUT.

SGS-THOMSON MICROELECTRONICS

# AM82327-006

## RF & MICROWAVE TRANSISTORS COMMUNICATIONS APPLICATIONS

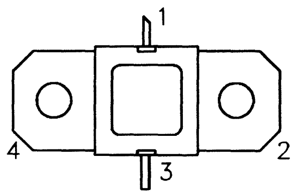
- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 6 W MIN. WITH 5.4 dB GAIN



**.400 x .400 2NLFL (S042)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM82327-006 | 82327-6 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

## DESCRIPTION

The AM82327-006 is a common base NPN silicon bipolar transistor optimized for high gain and efficiency in the 2.3 - 2.7 GHz frequency range.

Ideal for Class C telecommunications applications, the AM82327-006 utilizes an emitter-ballasted, gold-metallized die geometry for low thermal resistance and outstanding long term reliability.

AM82327-006 is provided in the industry-standard AMPAC™ metal/ceramic, hermetic package.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* | 19.4 | W |
| $I_C$ | Device Current* | 1.1 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 28 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 9.0 | °C/W |

*Applies only to rated RF amplifier operation

Note: Thermal Resistance determined by Infra-Red Scanning of Hot-Spot Junction Temperatureat at rated RF operating conditions.

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

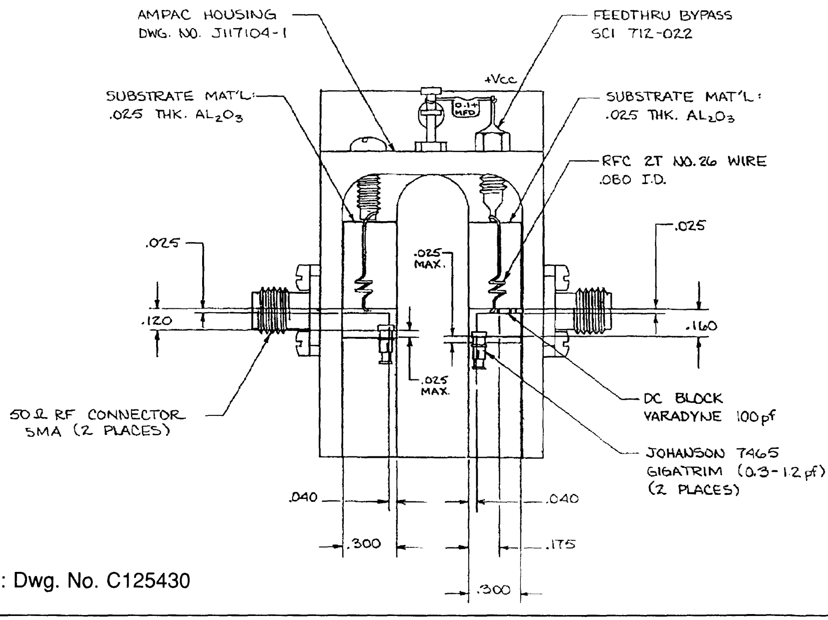
STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 5mA | $I_E$ = 0mA | 40 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $I_{CBO}$ | $V_{BE}$ = 0V | $V_{CE}$ = 24V | — | — | 1 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 500mA | 20 | — | — | — |

DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 2.3 — 2.7GHz | $P_{IN}$ = 1.75W | $V_{CC}$ = 24V | 6.0 | — | — | W |
| $\eta_C$ | f = 2.3 — 2.7GHz | $P_{IN}$ = 1.75W | $V_{CC}$ = 24V | 30 | — | — | % |
| $G_P$ | f = 2.3 — 2.7GHz | $P_{IN}$ = 1.75W | $V_{CC}$ = 24V | 5.4 | — | — | dB |

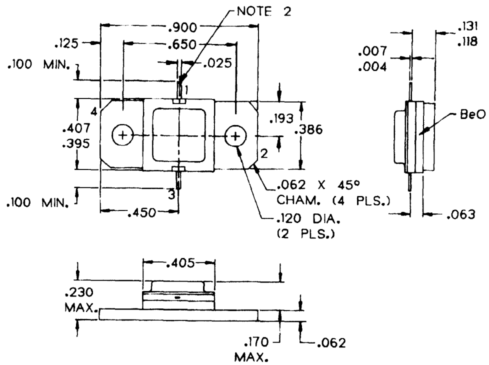
## TEST CIRCUIT




Ref.: Dwg. No. C125430

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J113214F



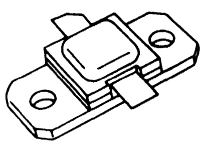

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD SLANT CUT.

SGS-THOMSON MICROELECTRONICS

# AM82327-010

## RF & MICROWAVE TRANSISTORS COMMUNICATIONS APPLICATIONS

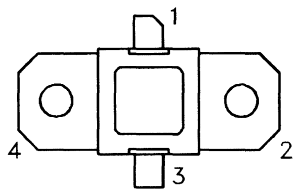
- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 9 W MIN. WITH 5.2 dB GAIN



**.400 x .400 2LFL (S036)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM82327-010 | 82327-10 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The AM82327-010 is a common base NPN silicon bipolar transistor optimized for high gain and efficiency in the 2.3 - 2.7 GHz frequency range.

Ideal for Class C telecommunications applications, the AM82327-010 utilizes an emitter-ballasted, gold metallized die geometry for low thermal resistance and outstanding long term reliability.

AM82327-010 is provided in the industry-standard AMPAC™ metal/ceramic, hermetic package.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* | 31.8 | W |
| $I_C$ | Device Current* | 1.75 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 28 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 5.5 | °C/W |

*Applies only to rated RF amplifier operation

NOTE: Thermal Resistance determined by Infra-Red Scanning of Hot-Spot Junction Temperature at rated RF operating conditions

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

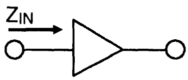
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 5mA | $I_E$ = 0mA | 40 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 24V | | — | — | 1 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1A | 20 | — | 300 | — |

DYNAMIC

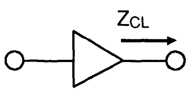
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 2300 — 2700MHz | $P_{IN}$ = 2.75W | $V_{CC}$ = 24V | 9.0 | — | — | W |
| $\eta_C$ | f = 2300 — 2700MHz | $P_{IN}$ = 2.75W | $V_{CC}$ = 24V | 30 | — | — | % |
| $G_P$ | f = 2300 — 2700MHz | $P_{IN}$ = 2.75W | $V_{CC}$ = 24V | 5.2 | — | — | dB |

## IMPEDANCE DATA

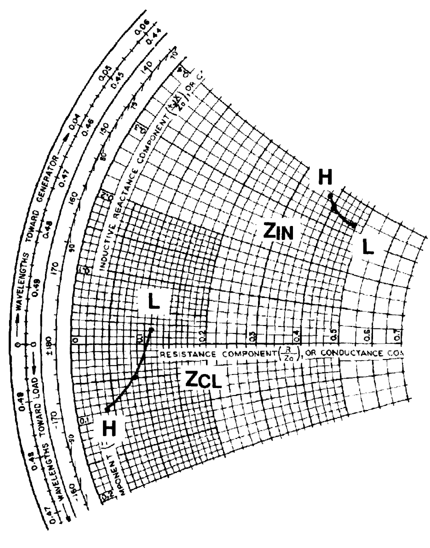
TYPICAL INPUT IMPEDANCES



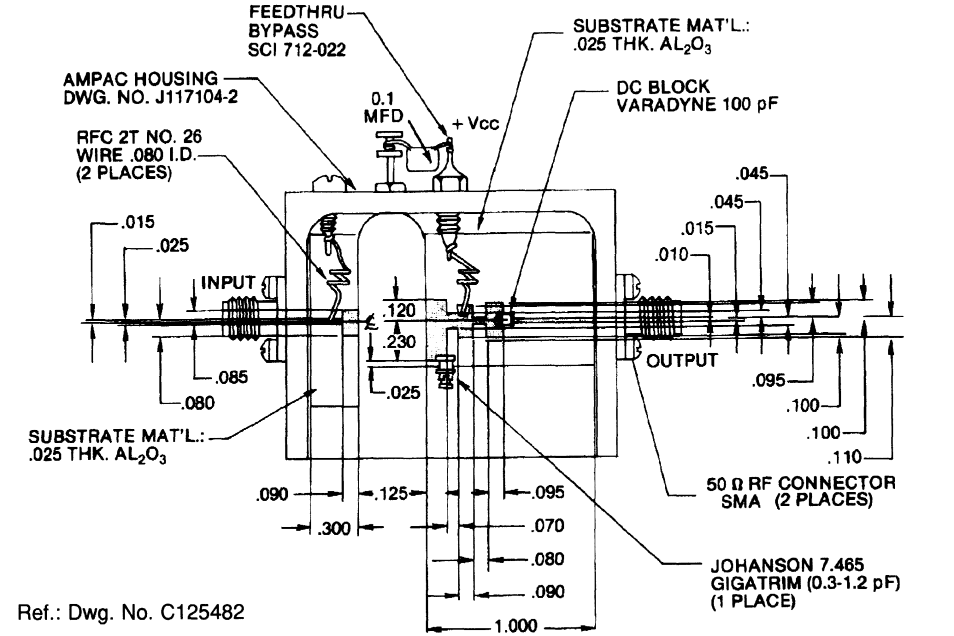

TYPICAL COLLECTOR LOAD IMPEDANCES




| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| L = 2.3 GHz | 23.8 + j 16.4 | 5.5 + j 1.1 |
| M = 2.5 GHz | 20.0 + j 17.3 | 4.3 – j 2.5 |
| H = 2.7 GHz | 21.5 + j 18.5 | 2.0 – j 4.5 |



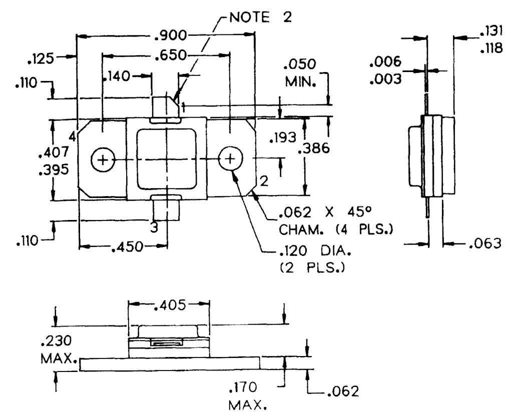
## TEST CIRCUIT




Ref.: Dwg. No. C125482

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J133102E



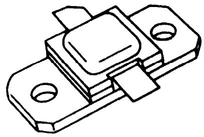

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

SGS-THOMSON MICROELECTRONICS

# AM82327-015

## RF & MICROWAVE TRANSISTORS COMMUNICATIONS APPLICATIONS

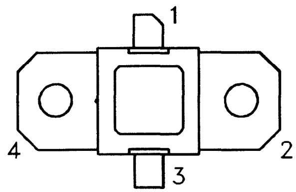
- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 15 W MIN. WITH 4.0 dB GAIN



**.400 x .400 2LFL (S036)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM82327-015 | 82327-15 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The AM82327-015 is a common base NPN silicon bipolar transistor optimized for high gain and efficiency in the 2.3 - 2.7 GHz frequency range.

Ideal for Class C telecommunications applications, the AM82327-015 utilizes an emitter-ballasted, gold metallized die geometry for low thermal resistance and outstanding long term reliability.

AM82327-015 is provided in the industry-standard AMPAC™ metal/ceramic, hermetic package.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* | 58.3 | W |
| $I_C$ | Device Current* | 3.0 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 28 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 3.0 | °C/W |

*Applies only to rated RF amplifier operation

NOTE: Thermal Resistance determined by Infra-Red Scanning of Hot-Spot Junction Temperature at rated RF operating conditions.

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

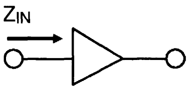
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 5mA | $I_E$ = 0mA | 40 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 24V | | — | — | 2 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 2A | 20 | — | 900 | — |

DYNAMIC

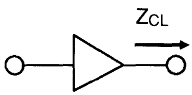
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 2300 — 2700MHz | $P_{IN}$ = 6.0W | $V_{CC}$ = 24V | 15.0 | — | — | W |
| $\eta_C$ | f = 2300 — 2700MHz | $P_{IN}$ = 6.0W | $V_{CC}$ = 24V | 30 | — | — | % |
| $G_P$ | f = 2300 — 2700MHz | $P_{IN}$ = 6.0W | $V_{CC}$ = 24V | 4.0 | — | — | dB |

## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCES

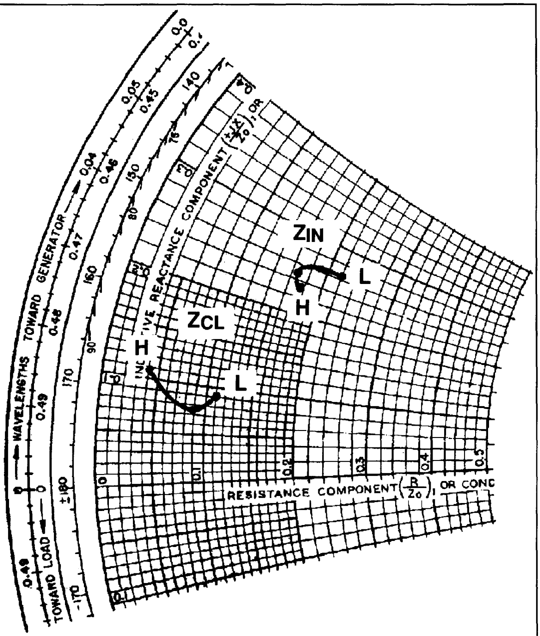



### TYPICAL COLLECTOR LOAD IMPEDANCES

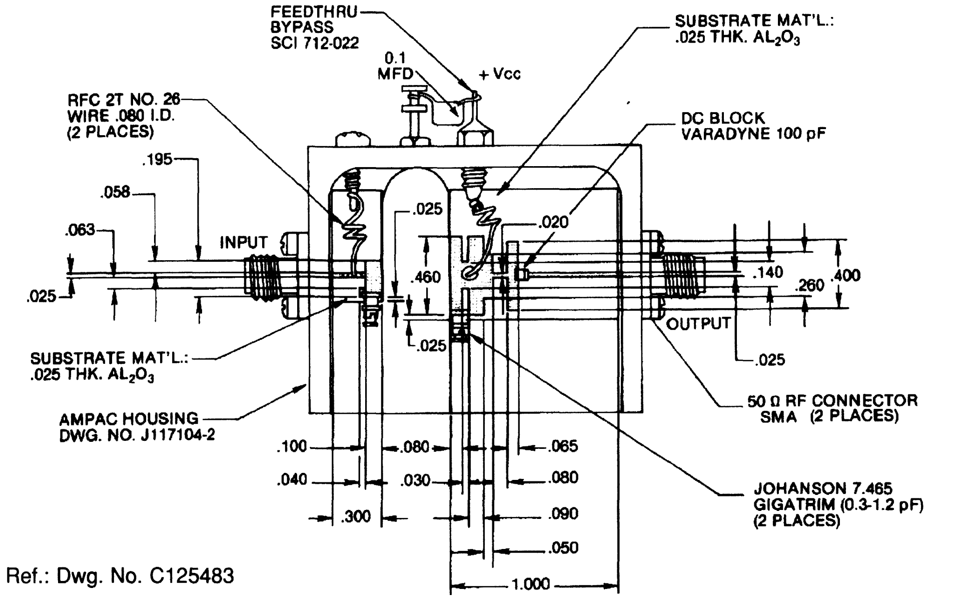



| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| L = 2.3 GHz | 11.0 + j 13.2 | 5.5 + j 4.5 |
| M = 2.5 GHz | 8.5 + j 12.5 | 4.4 + j 3.8 |
| H = 2.7 GHz | 8.8 + j 12.0 | 2.0 + j 5.5 |

$P_{IN}$ = 6.0W
$V_{CC}$ = 24V
Normalized to 50 ohms



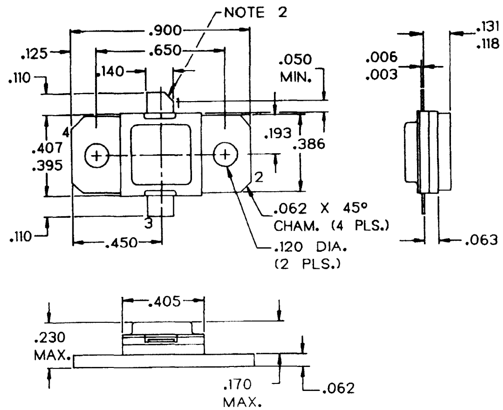
## TEST CIRCUIT




Ref.: Dwg. No. C125483

## PACKAGE MECHANICAL DATA

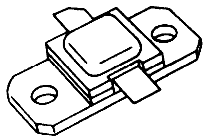
Ref.: Dwg. No.: J133102E




NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

# RF & MICROWAVE TRANSISTORS S-BAND RADAR APPLICATIONS

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- 3:1 VSWR CAPABILITY
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 28 W MIN. WITH 6.5 dB GAIN



**.400 x .400 2LFL (S036)**
hermetically sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| AM82729-030 | 82729-30 |

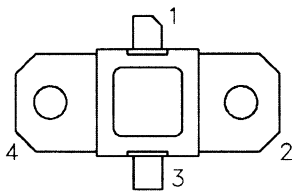
## DESCRIPTION

The AM82729-030 device is a high power silicon bipolar NPN transistor specifically designed for S-Band radar pulsed output and driver applications.

This device is capable of operation over a wide range of pulse widths, duty cycles, and temperatures and can withstand a 3:1 output VSWR with a +1 dB input over drive. Low RF thermal resistance, refractory/gold metallization, and automatic wire bonding techniques ensure high reliability and product consistency (including phase characteristics).

The AM82729-030 is supplied in the Hermetic Metal/Ceramic package with internal Input/Output impedance matching circuitry, and is intended for military and other high reliability applications.

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 100°C$) | 107 | W |
| $I_C$ | Device Current* | 4 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 48 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 1.4 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS (Tcase = 25°C)

### STATIC

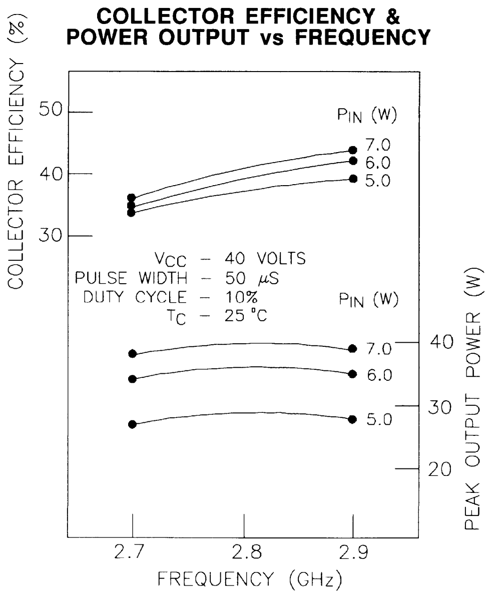
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 15mA | $I_E$ = 0mA | 55 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 2mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 15mA | $R_{BE}$ = 10Ω | 55 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 40V | | — | — | 10 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1.5A | 30 | — | — | — |

### DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 2700 — 2900MHz | $P_{IN}$ = 6.3W | $V_{CC}$ = 40V | 28 | — | — | W |
| $\eta_C$ | f = 2700 — 2900MHz | $P_{IN}$ = 6.3W | $V_{CC}$ = 40V | 30 | — | — | % |
| $G_P$ | f = 2700 — 2900MHz | $P_{IN}$ = 6.3W | $V_{CC}$ = 40V | 6.5 | — | — | dB |

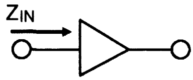
Note: Pulse Width = 50µSec
Duty Cycle = 10%

## TYPICAL PERFORMANCE

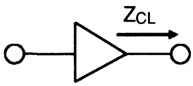


## IMPEDANCE DATA

**TYPICAL INPUT IMPEDANCE**



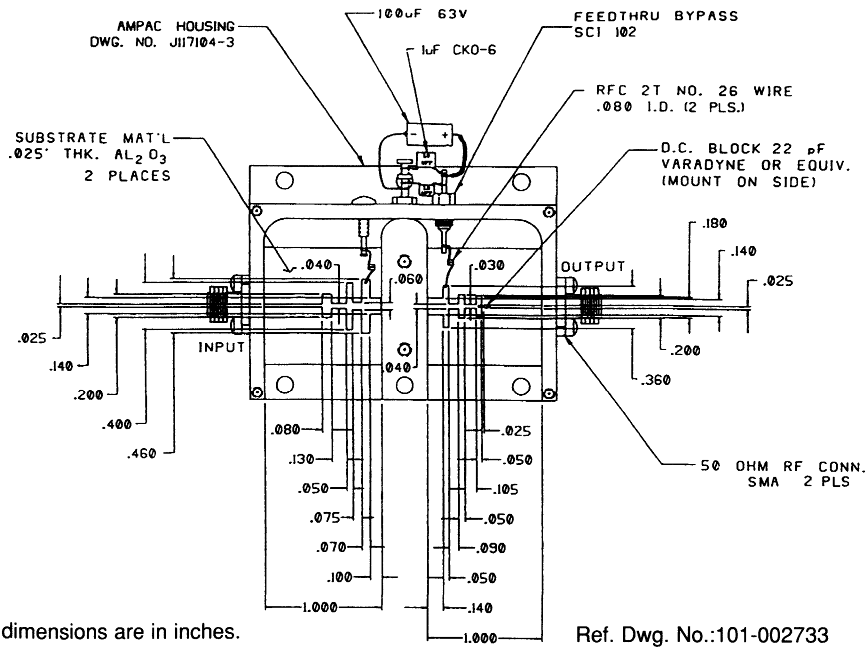

**TYPICAL COLLECTOR LOAD IMPEDANCE**




| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| L = 2.7 GHz | 12 + j 3.0 | 15.0 – j 4.0 |
| M = 2.8 GHz | 4.5 + j 2.5 | 17.0 – j 3.0 |
| H = 2.9 GHz | 6.5 + j 0.0 | 15.5 – j 3.0 |

$P_{IN}$ = 6.3 W
$V_{CC}$ = 40 V
Normalized to 50 ohms

## TEST CIRCUIT

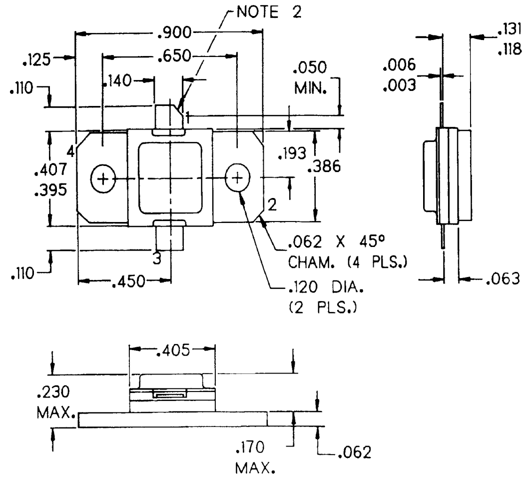



All dimensions are in inches.

Ref. Dwg. No.:101-002733

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J133102E



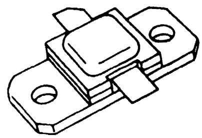

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

SGS-THOMSON
MICROELECTRONICS

# AM82729-060

## RF & MICROWAVE TRANSISTORS
## S-BAND RADAR APPLICATIONS

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- VSWR 3:1 @ +1dB OVERDRIVE
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 60 W MIN. WITH 6.6 dB GAIN



**.400 x .400 2LFL (S036)**
hermetically sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| AM82729-060 | 82729-60 |

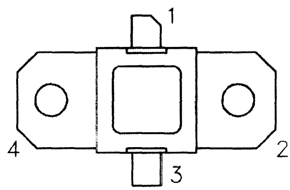
### DESCRIPTION

The AM82729-060 device is a high power silicon bipolar NPN transistor specificially designed for S-Band radar pulsed output and driver applications.

This device is capable of operation over a wide range of pulse widths, duty cycles, and temperatures and can withstand a 3:1 VSWR with a +1dB input overdrive. Low RF thermal resistance, refractory/gold metallization, and automatic wire bonding techniques ensure high reliability and product consistency (including phase characteristics).

The AM82729-060 is supplied in the Hermetic Metal/Ceramic package with internal Input/Output impedance matching circuitry, and is intended for military and other high reliability applications.

### PIN CONNECTION




1. Collector
2. Base
3. Emitter
4. Base

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 100°C$) | 300 | W |
| $I_C$ | Device Current* | 8 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 48 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 0.50 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 25mA | $I_E$ = 0mA | 55 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 5mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 25mA | $R_{BE}$ = 10Ω | 55 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 40V | | — | — | 20 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 3A | 30 | — | — | — |

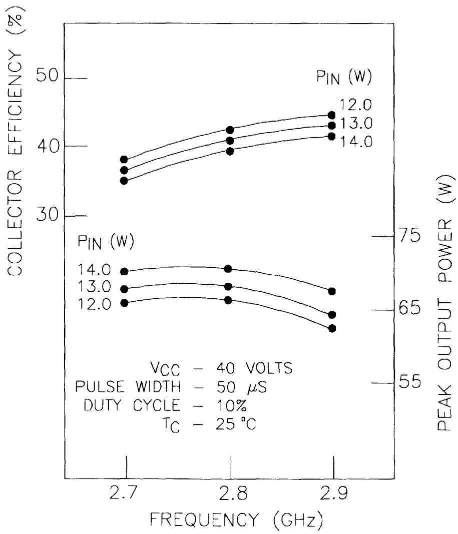
DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 2700 — 2900MHz | $P_{IN}$ = 13W | $V_{CC}$ = 40V | 60 | — | — | W |
| $\eta_C$ | f = 2700 — 2900MHz | $P_{IN}$ = 13W | $V_{CC}$ = 40V | 35 | — | — | % |
| $G_P$ | f = 2700 — 2900MHz | $P_{IN}$ = 13W | $V_{CC}$ = 40V | 6.6 | — | — | dB |

Note: Pulse Width = 50µSec
Duty Cycle = 10%

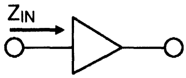
## TYPICAL PERFORMANCE

**POWER OUTPUT & COLLECTOR EFFICIENCY vs FREQUNCY**

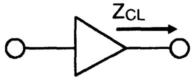


## IMPEDANCE DATA

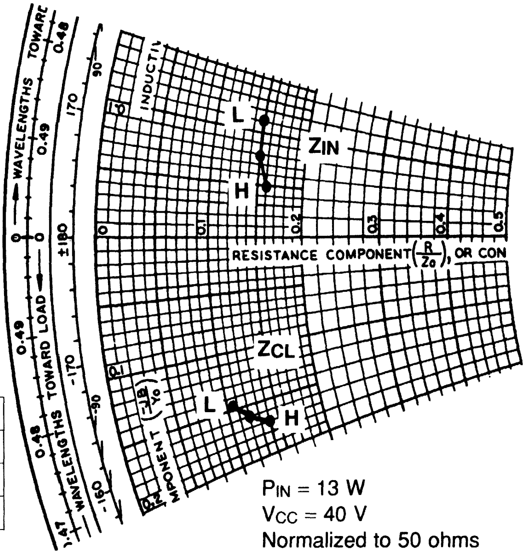
**TYPICAL INPUT IMPEDANCE**




**TYPICAL COLLECTOR LOAD IMPEDANCE**

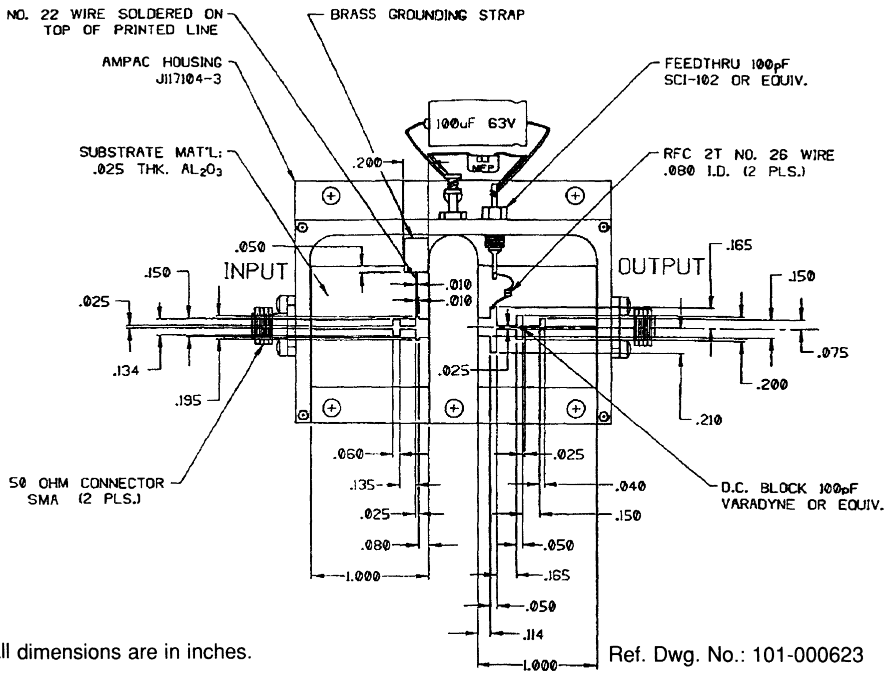



| FREQ. | ZIN (Ω) | ZCL (Ω) |
|---|---|---|
| L = 2.7 GHz | 7.4 + j 5.4 | 7.1 – j 8.6 |
| M = 2.8 GHz | 7.6 + j 4.1 | 6.0 – j 8.0 |
| H = 2.9 GHz | 7.8 + j 3.0 | 5.4 – j 7.4 |




$P_{IN}$ = 13 W
$V_{CC}$ = 40 V
Normalized to 50 ohms

## TEST CIRCUIT

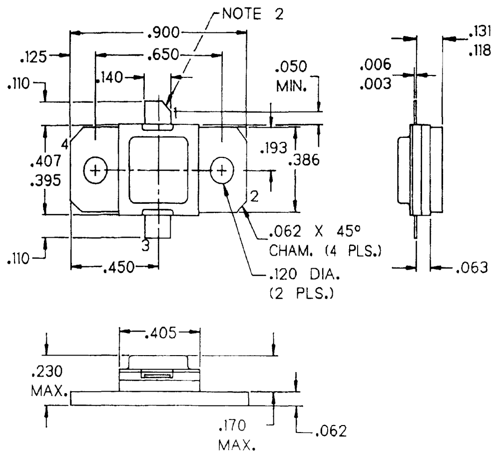



All dimensions are in inches.

Ref. Dwg. No.: 101-000623

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J133102E



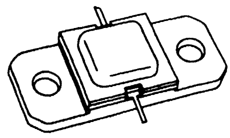

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

SGS-THOMSON MICROELECTRONICS

# AM82731-001

## RF & MICROWAVE TRANSISTORS S-BAND RADAR APPLICATIONS

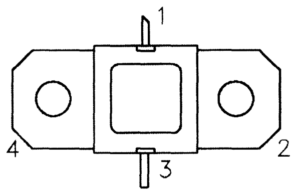
- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- 10:1 VSWR CAPABILITY
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT IMPEDANCE MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 1.0 W. MIN. WITH 5.2 dB GAIN
- BANDWIDTH = 400 MHz



**.400 x .400 2NLFL (S042)**
hermetically sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| AM 82731-001 | 82731-1 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The AM82731-001 device is a medium power silicon bipolar NPN transistor specifically designed for S-Band radar pulsed driver applications.

This device is capable of operation over a wide range of pulse widths, duty cycles, and temperatures and can withstand a 10:1 output VSWR. Low RF thermal resistance, refractory/gold metallization, and automatic wire bonding techniques ensure high reliability and product consistency.

The AM82731-001 is supplied in the hermetic metal/ceramic package with internal input/output impedance matching circuitry, and is intended for military and other high reliability applications.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 100$°C) | 11.5 | W |
| $I_C$ | Device Current* | 0.45 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 34 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH}$(j-c) | Junction-Case Thermal Resistance | 13.0 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 1mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | $I_C$ = 1mA | $R_{BE}$ = 10Ω | 45 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 30V | | — | — | 0.5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 100mA | 10 | — | — | — |

Specifications subject to change without notice

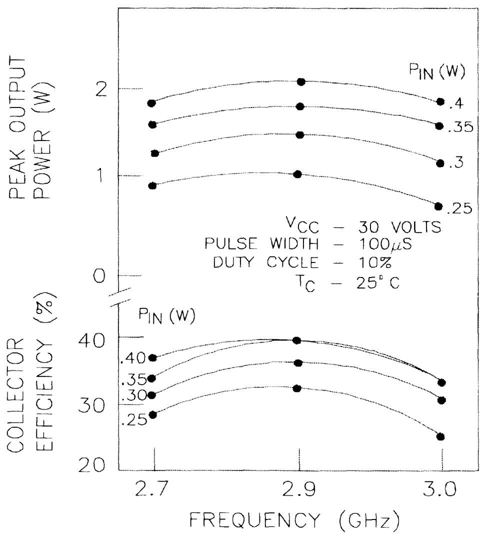
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 2.7 — 3.1 GHz | $P_{IN}$ = 0.3W | $V_{CC}$ = 30V | 1.0 | 1.1 | — | W |
| $\eta_C$ | f = 2.7 — 3.1 GHz | $P_{IN}$ = 0.3W | $V_{CC}$ = 30V | 27 | 30 | — | % |
| $G_{PB}$ | f = 2.7 — 3.1 GHz | $P_{IN}$ = 0.3W | $V_{CC}$ = 30V | 5.2 | 5.6 | — | dB |

Note: Pulse Width = 100 µS
Duty Cycle = 10%

## TYPICAL PERFORMANCE

### TYPICAL BROADBAND PERFORMANCE

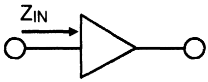




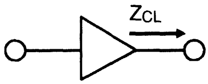

SGS-THOMSON MICROELECTRONICS

## IMPEDANCE DATA

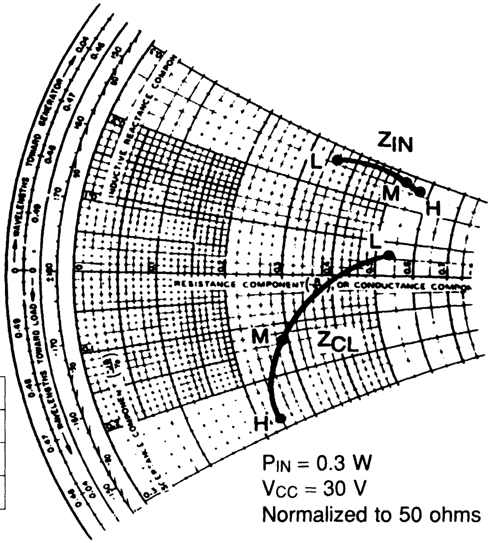
**TYPICAL INPUT IMPEDANCES**



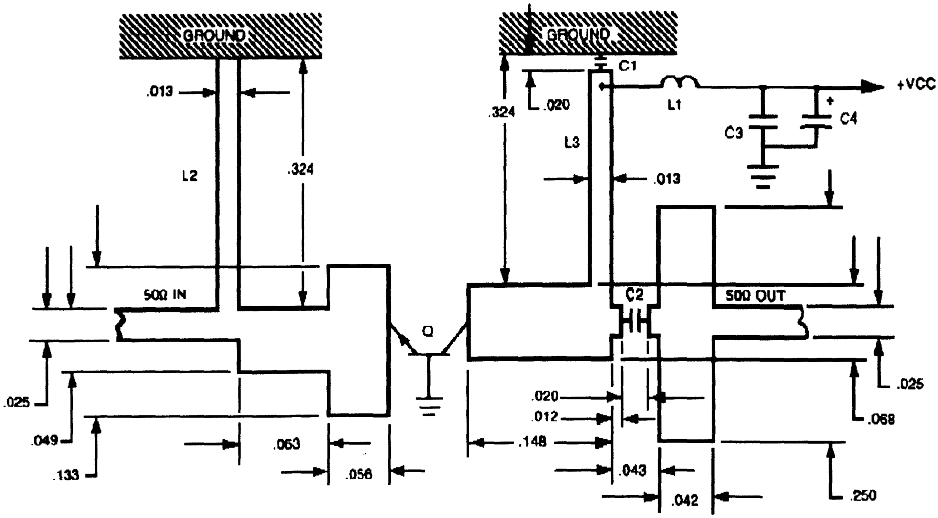

**TYPICAL COLLECTOR LOAD IMPEDANCES**




| FREQ. | $Z_{IN}(\Omega)$ | $Z_{CL}(\Omega)$ |
|---|---|---|
| L = 2.7 GHz | 18.0 + j 23.5 | 27.0 + j 3.0 |
| M = 2.9 GHz | 24.0 + j 23.5 | 14.0 – j 6.5 |
| H = 3.1 GHz | 28.0 + j 23.0 | 12.0 – j 14.0 |




## TEST CIRCUIT

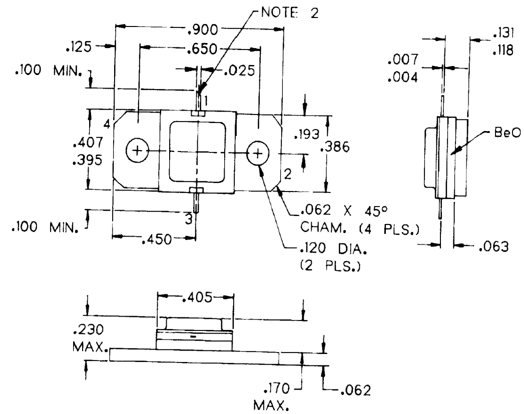



All dimensions are in inches.
Substrate material: .025 thick $Al_2O_3$ (Er = 9.6)

| | | |
|---|---|---|
| C1 | : | 100 pF Chip Capacitor |
| C2 | : | 100 pF Chip Capacitor (Note: Capacitor is mounted on its thin side) |
| C3 | : | 1500 pF, RF Feedthru |
| C4 | : | 100 µF, Electrolytic Capacitor |
| L1 | : | No. 32 Wire, 0.500 Inch Long |
| L2 | : | Printed RF Choke |
| L3 | : | Printed RF Choke |

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J113214F



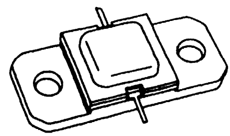

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD SLANT CUT.

SGS-THOMSON
MICROELECTRONICS

# AM82731-003

## RF & MICROWAVE TRANSISTORS
## S-BAND RADAR APPLICATIONS

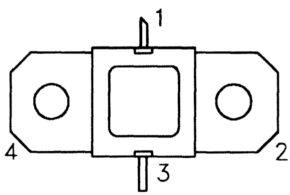
- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- 10:1 VSWR CAPABILITY
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT IMPEDANCE MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 3.0 W. MIN. WITH 5.7 dB GAIN
- BANDWIDTH = 400 MHz



**.400 x .400 2NLFL (S042)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM 82731-003 | 82731-3 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The AM82731-003 device is a medium power silicon bipolar NPN transistor specifically designed for S-Band radar pulsed driver applications.

This device is capable of operation over a wide range of pulse widths, duty cycles, and temperatures and can withstand a 10:1 output VSWR. Low RF thermal resistance, refractory/gold metallization, and automatic wire bonding techniques ensure high reliability and product consistency.

The AM82731-003 is supplied in the hermetic metal/ceramic package with internal input/output impedance matching circuitry, and is intended for military and other high reliability applications.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq$ 100°C) | 23 | W |
| $I_C$ | Device Current* | 0.9 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 34 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH}$(j-c) | Junction-Case Thermal Resistance | 6.5 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 2mA | $I_E$ = 0mA | 50 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | $I_C$ = 2mA | $R_{BE}$ = 10Ω | 50 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 30V | | — | — | 2.0 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 200mA | 10 | — | — | — |

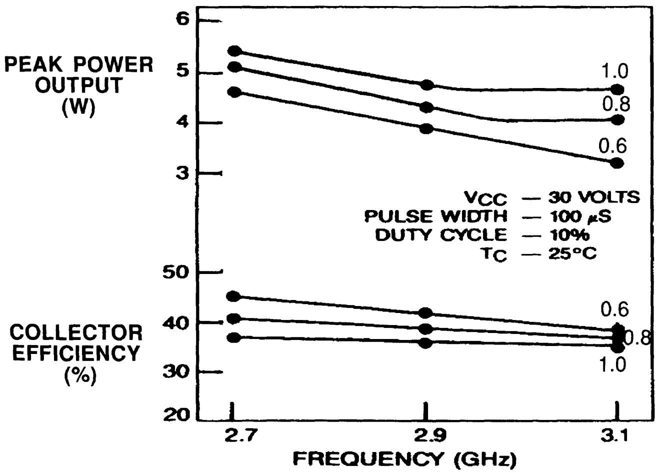
DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 2.7 — 3.1GHz | $P_{IN}$ = 0.8W | $V_{CC}$ = 30V | 3.0 | 4.0 | — | W |
| $\eta_C$ | f = 2.7 — 3.1GHz | $P_{IN}$ = 0.8W | $V_{CC}$ = 30V | 27 | 37 | — | % |
| $G_{PB}$ | f = 2.7 — 3.1GHz | $P_{IN}$ = 0.8W | $V_{CC}$ = 30V | 5.7 | 7.0 | — | dB |

Note: Pulse Width = 100µS
Duty Cycle = 10%

## TYPICAL PERFORMANCE

TYPICAL BROADBAND PERFORMANCE

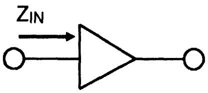




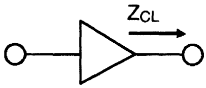

SGS-THOMSON MICROELECTRONICS

## IMPEDANCE DATA

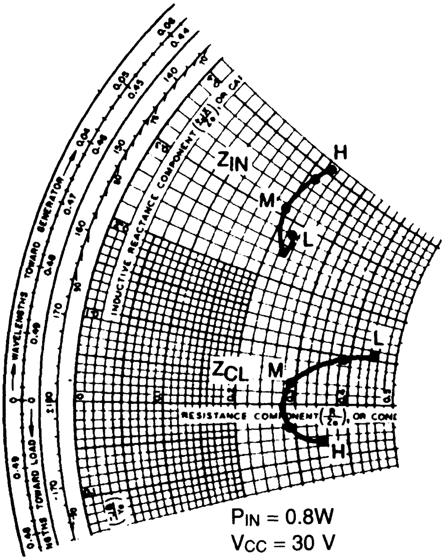
**TYPICAL INPUT IMPEDANCES**




**TYPICAL COLLECTOR LOAD IMPEDANCES**

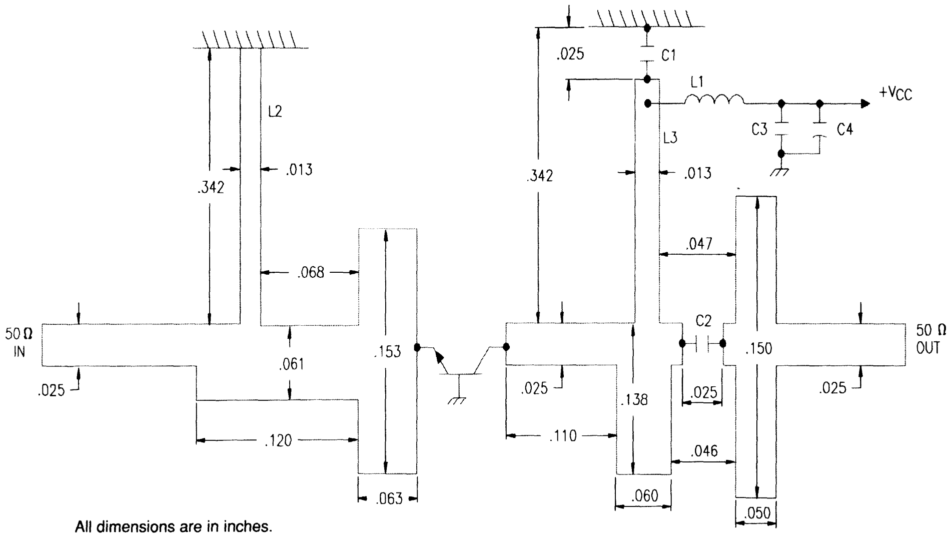



| FREQ. | $Z_{IN}(\Omega)$ | $Z_{CL}(\Omega)$ |
|---|---|---|
| L = 2.7 GHz | 11.5 + j 14.0 | 22.5 + j 5.5 |
| • = 2.9 GHz | 11.5 + j 12.5 | 19.5 + j 5.0 |
| M = 3.1 GHz | 10.0 + j 15.5 | 14.5 + j 2.0 |
| • = 3.3 GHz | 11.0 + j 19.0 | 14.5 − j 2.0 |
| H = 3.5 GHz | 11.0 + j 20.5 | 17.5 − j 3.5 |




$P_{IN}$ = 0.8W
$V_{CC}$ = 30 V
Normalized at 50 ohms

## TEST CIRCUIT

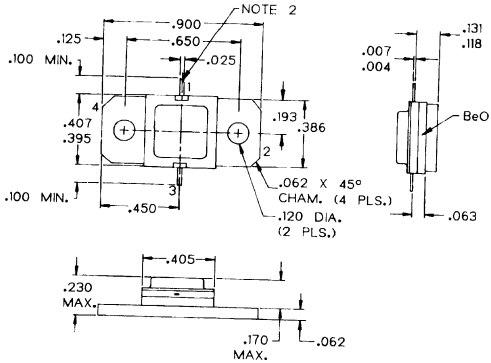



All dimensions are in inches.
Substrate material: .025 thick $Al_2O_3$ (Er = 9.6)

C1 : 100 pF Microwave Chip Capacitor
C2 : 100 pF Microwave Chip Capacitor (Note: Capacitor is mounted on its thin side)
C3 : 1500 pF, RF Feedthru
C4 : 100 µF, Electrolytic Capacitor
L1 : No. 32 Wire, 0.500 Inch Long
L2 : Printed RF Choke
L3 : Printed RF Choke

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J113214F



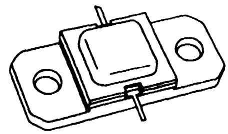

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD SLANT CUT.

SGS-THOMSON
MICROELECTRONICS

# AM82731-006

## RF & MICROWAVE TRANSISTORS
## S-BAND RADAR APPLICATIONS

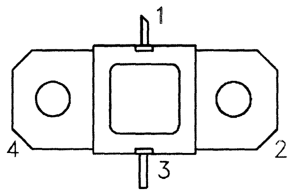
- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- 5:1 VSWR CAPABILITY
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT IMPEDANCE MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 5.5 W. MIN. WITH 5.6 dB GAIN
- BANDWIDTH = 400 MHz



**.400 x .400 2NLFL (S042)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM 82731-006 | 82731-6 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The AM82731-006 device is a medium power silicon bipolar NPN transistor specifically designed for S-Band radar pulsed driver applications.

This device is capable of operation over a wide range of pulse widths, duty cycles, and temperatures and can withstand a 5:1 output VSWR. Low RF thermal resistance, refractory/gold metallization, and automatic wire bonding techniques ensure high reliability and product consistency.

The AM82731-006 is supplied in the hermetic metal/ceramic package with internal input/output impedance matching circuitry, and is intended for military and other high reliability applications.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 100$°C) | 40 | W |
| $I_C$ | Device Current* | 1.8 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 34 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | − 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH}$(j-c) | Junction-Case Thermal Resistance | 3.75 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 5mA | $I_E$ = 0mA | 50 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | $I_C$ = 5mA | $R_{BE}$ = 10Ω | 50 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 30V | | — | — | 4 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 500mA | 10 | — | — | — |

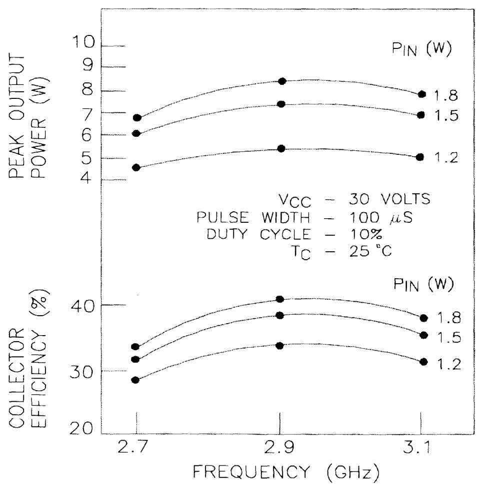
### DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 2.7 — 3.1GHz | $P_{IN}$ = 1.5W | $V_{CC}$ = 30V | 5.5 | 6.0 | — | W |
| $\eta_C$ | f = 2.7 — 3.1GHz | $P_{IN}$ = 1.5W | $V_{CC}$ = 30V | 27 | 32 | — | % |
| $G_{PB}$ | f = 2.7 — 3.1GHz | $P_{IN}$ = 1.5W | $V_{CC}$ = 30V | 5.6 | 6.0 | — | dB |

Note: Pulse Width = 100µS
Duty Cycle = 10%

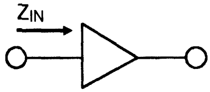
## TYPICAL PERFORMANCE

### TYPICAL BROADBAND PERFORMANCE

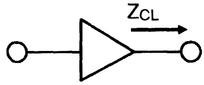


## IMPEDANCE DATA

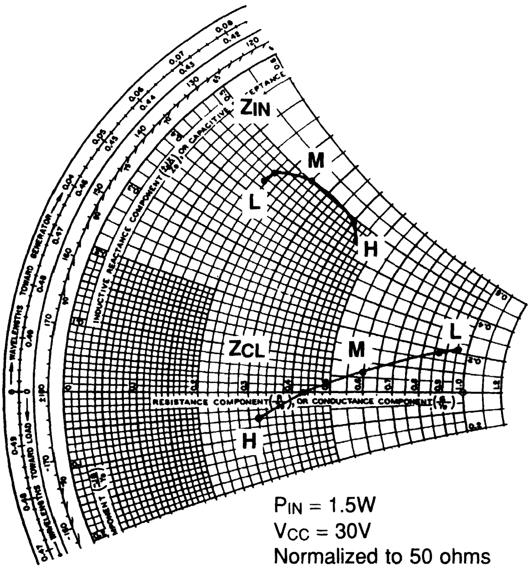
**TYPICAL INPUT IMPEDANCES**



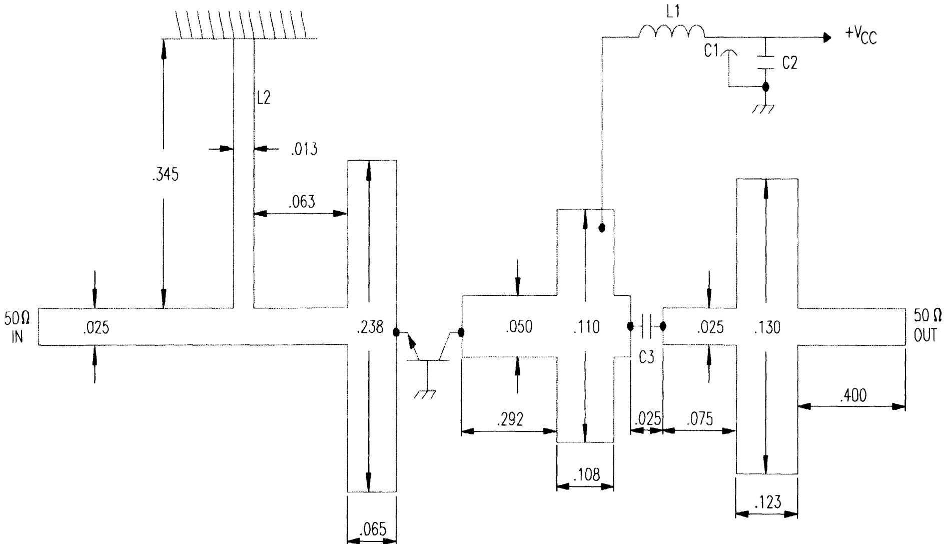

**TYPICAL COLLECTOR LOAD IMPEDANCES**




| FREQ. | $Z_{IN}(\Omega)$ | $Z_{CL}(\Omega)$ |
|---|---|---|
| L = 2.7 GHz | 9.0 + j 22.0 | 48.0 + j 11.5 |
| • = 2.9 GHz | 9.0 + j 23.0 | 43.0 + j 9.0 |
| M = 3.1 GHz | 12.5 + j 25.0 | 30.0 + j 3.0 |
| • = 3.3 GHz | 20.0 + j 25.0 | 21.5 + j 0.0 |
| H = 3.5 GHz | 22.0 + j 22.5 | 16.0 – j 3.0 |




## TEST CIRCUIT

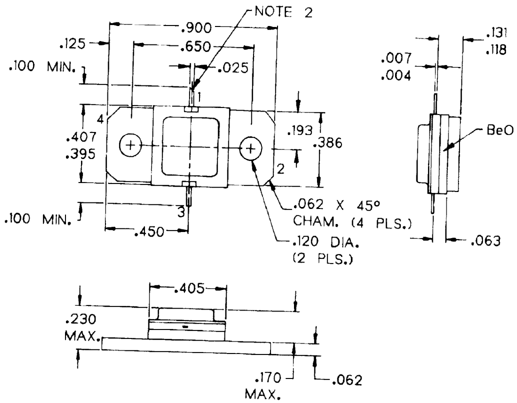



All dimensions are in inches.
Substrate material: .025 thick $Al_2O_3$ (Er = 9.6)

C1 : 1500 pF RF Feedthru
C2 : 100 µF Electrolytic
C3 : 100 pF Chip Capacitor
L1 : No. 32 Wire, 0.062 Inch Long
L2 : Printed RF Choke

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J113214F




NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD SLANT CUT.

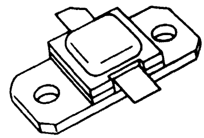
SGS-THOMSON
MICROELECTRONICS

# AM82731-012

## RF & MICROWAVE TRANSISTORS
## S-BAND RADAR APPLICATIONS

PRELIMINARY DATA

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 12 W MIN. WITH 6.0 dB GAIN



**.400 x .400 2LFL (S036)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM82731-012 | 82731-12 |

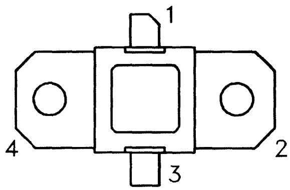
## DESCRIPTION

The AM82731-012 device is a high power silicon bipolar NPN transistor specifically designed for S-Band radar pulsed output and driver applications.

This device is capable of operaion over a wide range of pulse widths, duty cycles, and temperatures and can withstand a 3:1 output VSWR with a + 1 dB input overdrive. Low RF thermal resistance, refractory/gold metallization, and automatic wire bonding techniques ensure high reliability and product consistency (including phase characteristics).

The AM82731-012 is supplied in the Hermetic Metal/Ceramic package with internal Input/Output impedance matching sircuitry, and is intended for military and other high reliability applications.

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 50°C$) | 50 | W |
| $I_C$ | Device Current* | 2.0 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 46 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 4.0 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 7mA | $I_E$ = 0mA | 55 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 7mA | $R_{BE}$ = 10Ω | 55 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 40V | | — | — | 5 | mA |
| $h_{FE}$ | $V_{CE}$ = V | $I_C$ = 600mA | 30 | — | 300 | — |

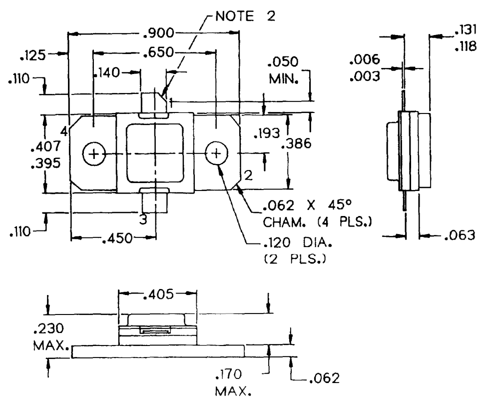
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 2700 —3100 MHz | $P_{IN}$ = 3.0W | $V_{CC}$ = 40V | 12 | — | — | W |
| $\eta_C$ | f = 2700 —3100 MHz | $P_{IN}$ = 3.0W | $V_{CC}$ = 40V | 30 | — | — | % |
| $G_P$ | f = 2700 —3100 MHz | $P_{IN}$ = 3.0W | $V_{CC}$ = 40V | 6.0 | — | — | dB |

Note: Pulse Width = 100µS
Duty Cycle = 10%

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J133102E



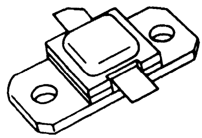

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

**SGS-THOMSON**
MICROELECTRONICS

# AM82731-025

## RF & MICROWAVE TRANSISTORS
## S-BAND RADAR APPLICATIONS

- LOW PARASITIC, DOUBLE LEVEL METAL DESIGN
- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- 3:1 VSWR @ 1 dB OVERDRIVE
- LOW RF THERMAL RESISTANCE
- INPUT/OUTPUT IMPEDANCE MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 25 W MIN. WITH 6.2 dB GAIN



**.400 x .400 2LFL (S036)**
hermetically sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| AM82731-025 | 82731-25 |

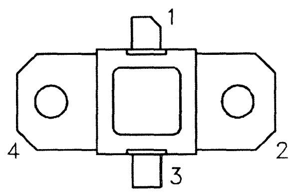
## DESCRIPTION

The AM82731-025 device is a high power silicon bipolar NPN transistor specifically designed for S-Band radar pulsed output and driver applications.

This device is capable of operation over a wide range of pulse widths, duty cycles, and temperatures and can withstand a 3:1 output VSWR with a +1dB input over drive. Low RF thermal resistance, refractory/gold metallization, and automatic wire bonding techniques ensure high reliability and product consistency (including phase characteristics).

The AM82731-025 is supplied in the Hermetic Metal/Ceramic package with internal Input/Output impedance matching circuitry, and is intended for military and other high reliability applications.

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 50°C$) | 100 | W |
| $I_C$ | Device Current* | 4 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 46 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 2.0 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 15mA | $I_E$ = 0mA | 55 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 2mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 15mA | $R_{BE}$ = 10Ω | 55 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 0V | $V_{BE}$ = 40V | — | — | 10 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1.5A | 30 | — | — | — |

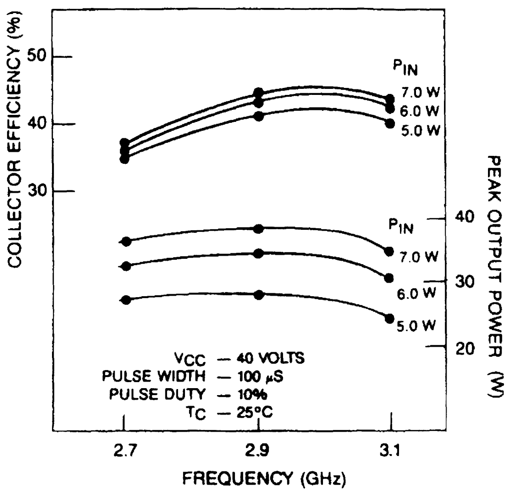
DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 2.7 — 3.1GHz | $P_{IN}$ = 6.0W | $V_{CC}$ = 40V | 25 | 30 | — | W |
| $\eta_C$ | f = 2.7 — 3.1GHz | $P_{IN}$ = 6.0W | $V_{CC}$ = 40V | 30 | 36 | — | % |
| $G_{PB}$ | f = 2.7 — 3.1GHz | $P_{IN}$ = 6.0W | $V_{CC}$ = 40V | 6.2 | 7.0 | — | dB |

Note: Pulse Width = 100 µSec
Duty Cycle = 10%

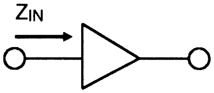
## TYPICAL PERFORMANCE

TYPICAL BROADBAND PERFORMANCE

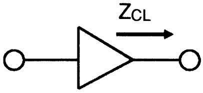


## IMPEDANCE DATA

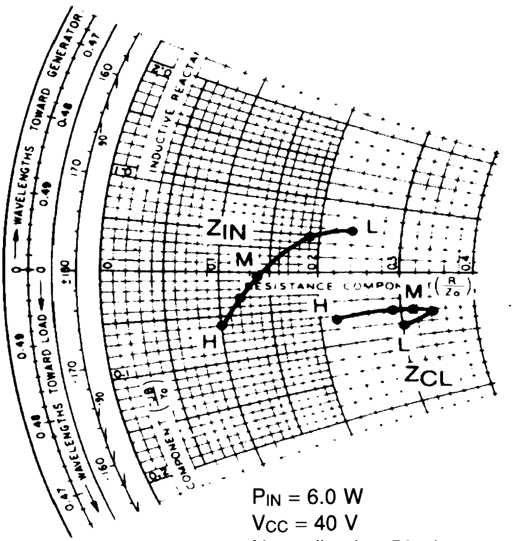
### TYPICAL INPUT IMPEDANCES




### TYPICAL COLLECTOR LOAD IMPEDANCES

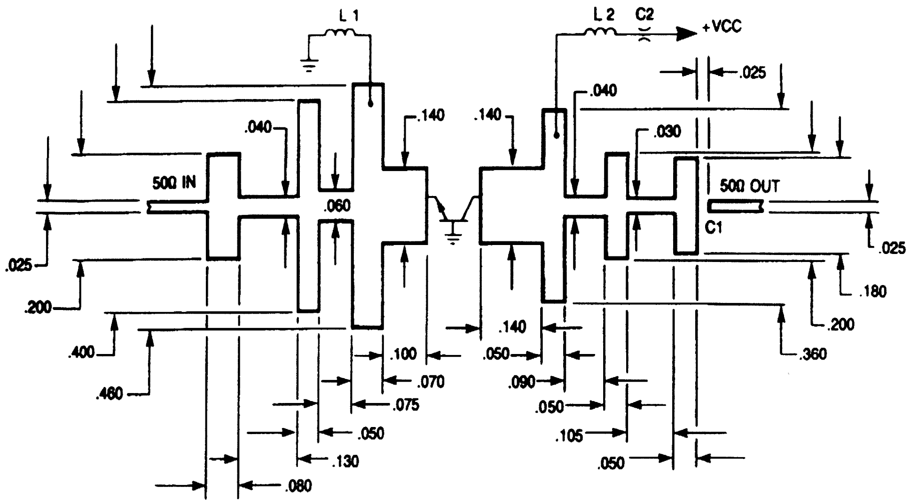



| FREQ. | $Z_{IN}(\Omega)$ | $Z_{CL}(\Omega)$ |
|---|---|---|
| L = 2.7 GHz | 12.0 + j 3.0 | 15.0 – j 4.0 |
| • = 2.8 GHz | 9.5 + j 2.5 | 17.0 – j 3.0 |
| M = 2.9 GHz | 6.5 + j 0.0 | 15.5 – j 3.0 |
| • = 3.0 GHz | 6.0 –j 1.5 | 14.5 – j 3.0 |
| H = 3.1 GHz | 5.0 –j 3.0 | 11.0 – j 3.0 |




$P_{IN}$ = 6.0 W
$V_{CC}$ = 40 V
Normalized to 50 ohms

## TEST CIRCUIT

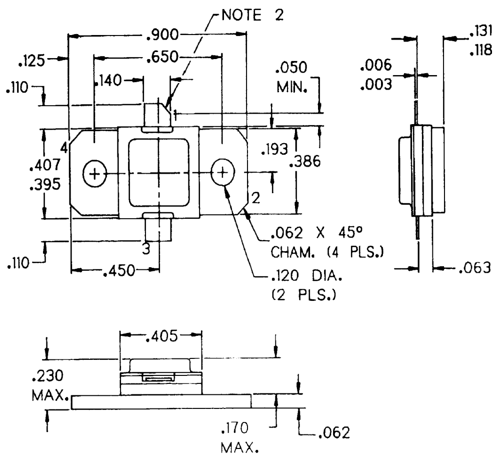



All dimensions are in inches.
Sustrate material: .025 thick $Al_2O_3$ (Er = 9.6)

C1 : 22 pF Chip Capacitor
C2 : 1500 pF RF Feedthrough
L1 : No. 26 Wire, 2 Turn, 0.08 Inch I.D.
L2 : No. 26 Wire, 2 Turn, 0.08 Inch I.D.

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J133102E



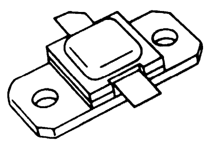

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

SGS-THOMSON
MICROELECTRONICS

# AM82731-050

## RF & MICROWAVE TRANSISTORS
## S-BAND RADAR APPLICATIONS

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- RUGGEDIZED VSWR 3:1 @ 1 dB OVERDRIVE
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 50 W MIN. WITH 6 dB GAIN



**.400 x .400 2LFL (S036)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM82731-050 | 82731-50 |

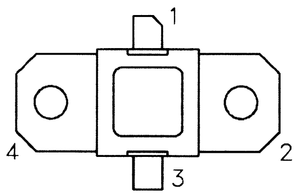
### DESCRIPTION

The AM82731-050 device is a high power silicon bipolar NPN transistor specifically designed for S-Band radar pulsed output and driver applications.

The device is capable of operation over a wde range of pulse widths, duty cycles and temperatures and can withstand a 3:1 output VSWR with a +1 dB input overdrive. Low RF thermal resistance, refractory/gold metallization, and computerized automatic wire bonding techniques ensure high reliability and product consistency.

The AM82731-050 is supplied in the AMPAC™ Hermetic Metal/Ceramic package with internal Input/Output impedance matching circuitry, and is intended for military and other high reliability applications.

### PIN CONNECTION




1. Collector
2. Base
3. Emitter
4. Base

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \le 50$°C) | 167 | W |
| $I_C$ | Device Current* | 8 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 46 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 1.2 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 25mA | $I_E$ = 0mA | 55 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 5mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 25mA | $R_{BE}$ = 10Ω | 55 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 40V | | — | — | 20 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 3A | 30 | — | — | — |

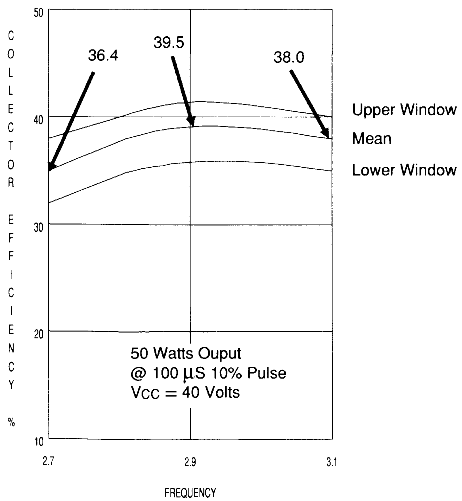
### DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 2700 — 3100MHz | $P_{IN}$ = 12.5W | $V_{CC}$ = 40V | 50 | 56 | — | W |
| $\eta_C$ | f = 2700 — 3100MHz | $P_{IN}$ = 12.5W | $V_{CC}$ = 40V | 30 | 35 | — | % |
| $G_P$ | f = 2700 — 3100MHz | $P_{IN}$ = 12.5W | $V_{CC}$ = 40V | 6.0 | 6.5 | — | dB |

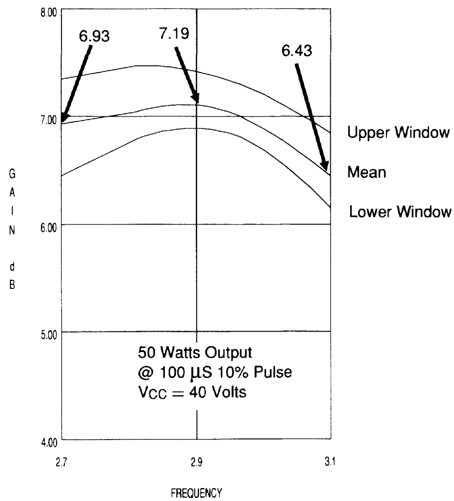
Note: Pulse Width = 100μS
Duty Cycle = 10%

## TYPICAL PERFORMANCE

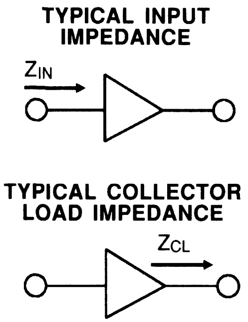
### COLLECTOR EFFICIENCY vs FREQUENCY

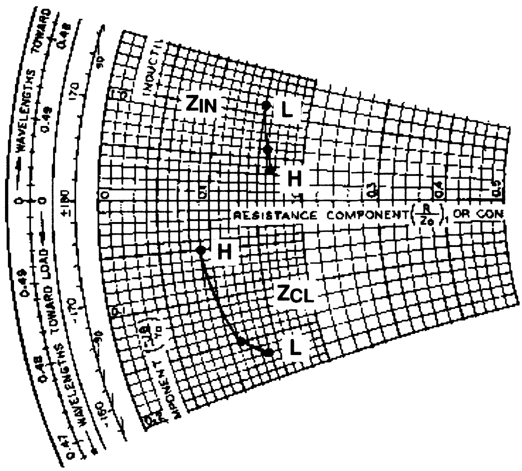



### GAIN vs FREQUENCY



## IMPEDANCE DATA

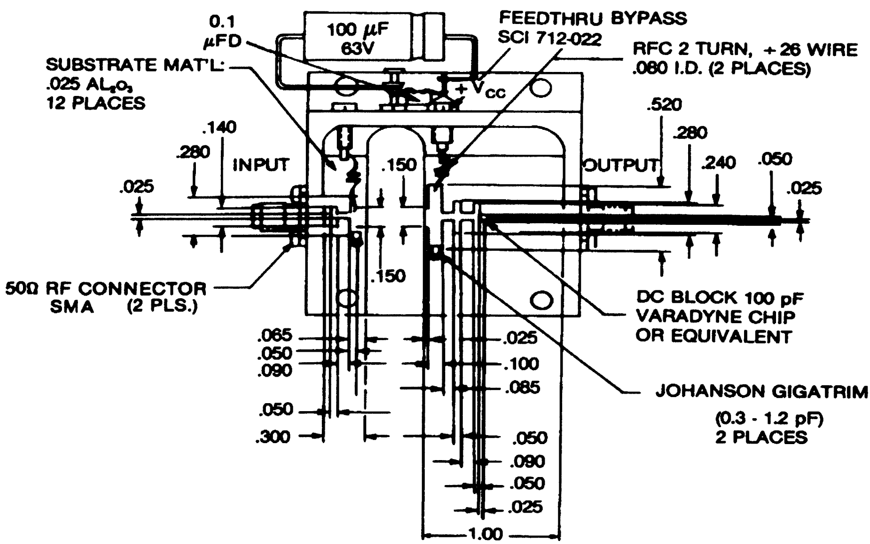



| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| L = 2.7 GHz | 7.4 + j 5.4 | 7.1 – j 8.6 |
| M = 2.9 GHz | 7.8 + j 3.0 | 5.4 – j 7.4 |
| H = 3.1 GHz | 8.0 + j 2.0 | 4.6 – j 2.6 |

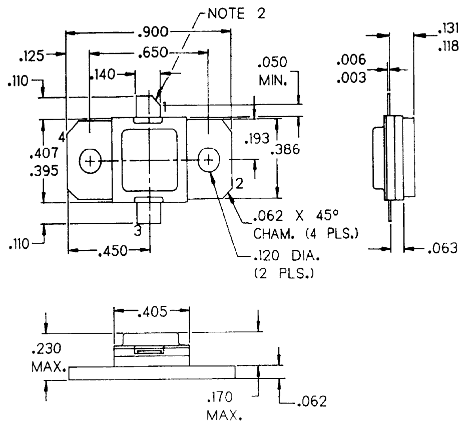
$P_{IN}$ = 12.5 W
$V_{CC}$ = 40 V
$Z_0$ = 50 ohms

## TEST CIRCUIT



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J133102E




NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

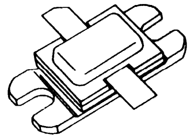
**SGS-THOMSON**
MICROELECTRONICS

# AM82731-075

## RF & MICROWAVE TRANSISTORS
## S-BAND RADAR APPLICATIONS

PRELIMINARY DATA

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 75 W MIN. WITH 7.0 dB GAIN



**.400 x .500 2LFL (S038)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM82731-075 | 82731-75 |

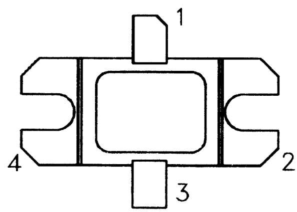
### DESCRIPTION

The AM82731-075 device is a high power silicon bipolar NPN transistor specifically desined for medium pulse S-Band radar output and driver applications.

This device is characterized at 100 µsec pulse width and 10% duty cycle, but is capable of operation over a range of pulse widths, duty cycles and temperatures, and can withstand 3:1 output VSWR with a + 1 dB input overdrive. Low RF thermal resistance, refractory/gold metallization and computerized automatic wire bonding techniques ensure high reliability and product consistency (including phase characteristics).

The AM82731-075 is supplied in the BIGPAC™ hermetic metal/ceramic package with internal input/output impedance matching circuitry, and is intended for military and other high reliability applications.

### PIN CONNECTION




1. Collector
2. Base
3. Emitter
4. Base

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 75°C$) | 290 | W |
| $I_C$ | Device Current* | 10 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 45 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 0.6 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 50mA | $I_E$ = 0mA | 55 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CES}$ | IC = 50mA | $V_{BE}$ = 0V | 55 | — | — | V |
| $I_{CES}$ | $V_{BE}$ = 0V | $V_{CE}$ = 40V | — | — | 40 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 5A | 30 | — | 300 | — |

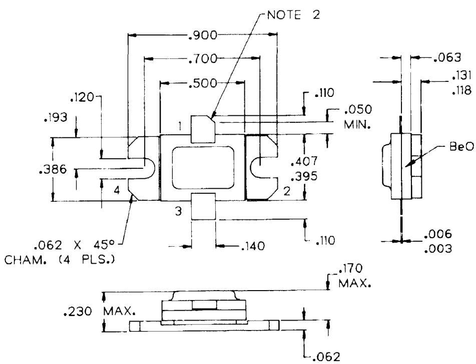
### DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 2700 — 3100MHz | $P_{IN}$ = 15W | $V_{CC}$ = 40V | 75 | — | — | W |
| $\eta_C$ | f = 2700 — 3100MHz | $P_{IN}$ = 15W | $V_{CC}$ = 40V | 35 | — | — | % |
| $G_P$ | f = 2700 — 3100MHz | $P_{IN}$ = 15W | $V_{CC}$ = 40V | 7.0 | — | — | dB |

Note: Pulse Width = 100µSec
Duty Cycle = 10%

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135066F



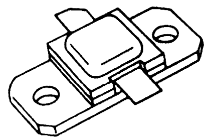

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

SGS-THOMSON MICROELECTRONICS

# AM82931-055

## RF & MICROWAVE TRANSISTORS S-BAND RADAR APPLICATIONS

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- 3:1 VSWR CAPABILITY @ 1dB OVERDRIVE
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 55 W MIN. WITH 6.1 dB GAIN
- BANDWIDTH = 200 MHz



**.400 x .400 2LFL (S036)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM82931-055 | 82931-55 |

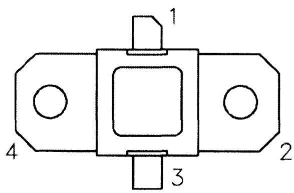
### DESCRIPTION

The AM82931-055 device is a high power silicon bipolar NPN transistor specifically designed for S-Band radar pulsed output and driver applications.

This device is capable of operation over a wide range of pulse widths, duty cycles and temperatures and can withstand a 3:1 output VSWR with a +1dB input overdrive. Low RF thermal resistance, refractory/gold metallization, and computerized automatic wire bonding techniques ensure high reliability and product consistency (including phase characteristics).

The AM82931-055 is supplied in the AMPAC™ Hermetic Metal/Ceramic package with internal Input/Output impedance matching circuitry, and is intended for military and other high reliability applications.

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 100°C$) | 300 | W |
| $I_C$ | Device Current* | 8 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 48 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 0.50 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

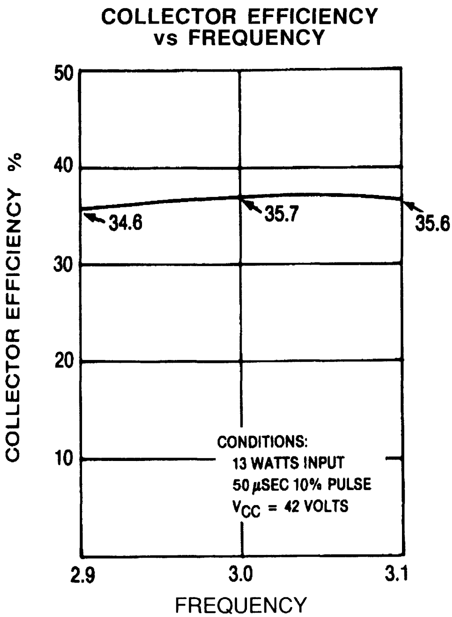
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 25mA | $I_E$ = 0mA | 55 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 5mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 25mA | $R_{BE}$ = 10Ω | 55 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 42V | | — | — | 20 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 3A | 30 | — | — | — |

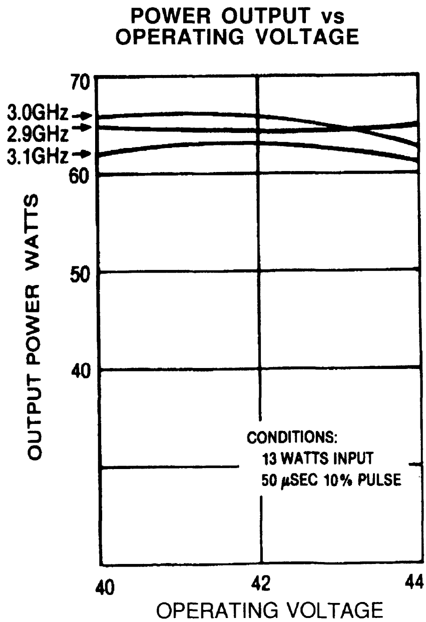
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 2.9 — 3.1GHz | $P_{IN}$ = 3.5W | $V_{CC}$ = 42V | 55 | 63 | — | W |
| $\eta_C$ | f = 2.9 — 3.1GHz | $P_{IN}$ = 3.5W | $V_{CC}$ = 42V | 32 | 35 | — | % |
| $G_P$ | f = 2.9 — 3.1GHz | $P_{IN}$ = 3.5W | $V_{CC}$ = 42V | 6.1 | 6.5 | — | dB |

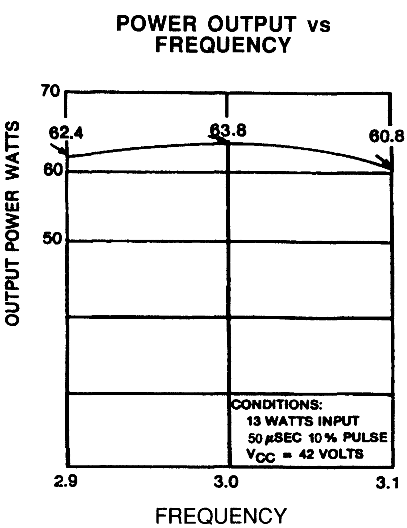
Note: Pulse Width = 50µSec
Duty Cycle = 10%

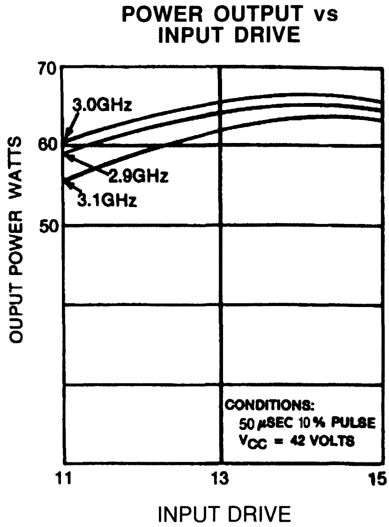
## TYPICAL PERFORMANCE

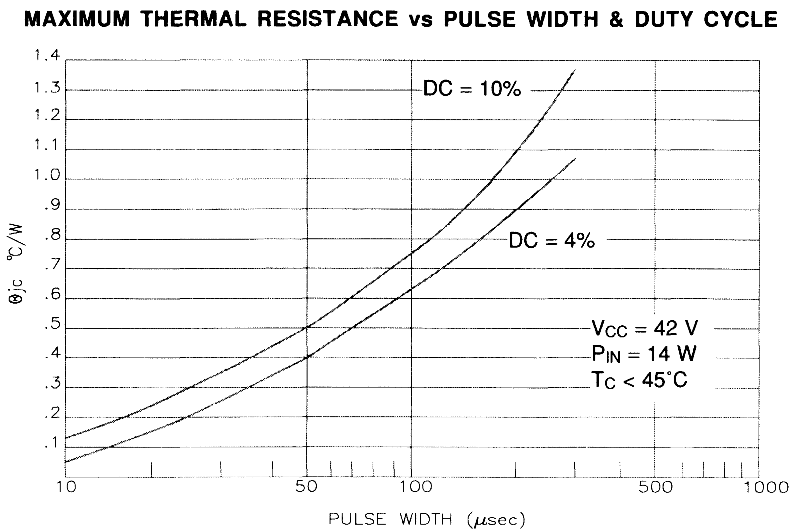


## TYPICAL PERFORMANCE

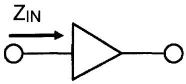


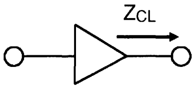



## IMPEDANCE DATA

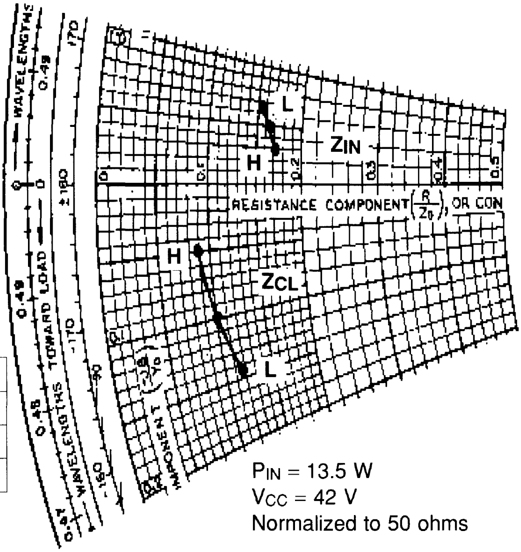
**TYPICAL INPUT IMPEDANCE**




**TYPICAL COLLECTOR LOAD IMPEDANCE**

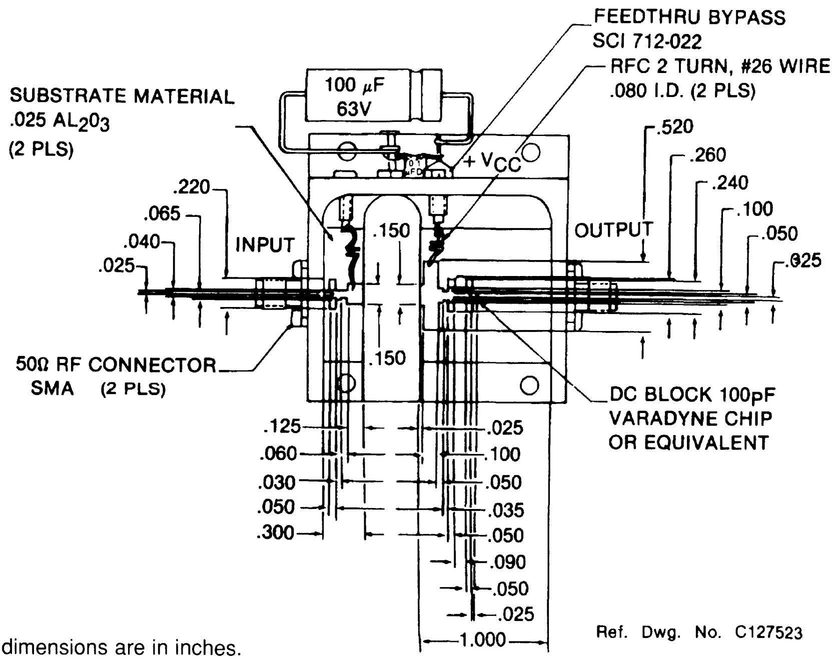



| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| L = 2.9 GHz | 8.30 + j 3.0 | 5.7 − j 7.2 |
| M = 3.0 GHz | 8.3 + j 2.3 | 5.2 − j 5.0 |
| H = 3.1 GHz | 8.6 + j 1.6 | 4.6 − j 2.6 |




$P_{IN}$ = 13.5 W
$V_{CC}$ = 42 V
Normalized to 50 ohms

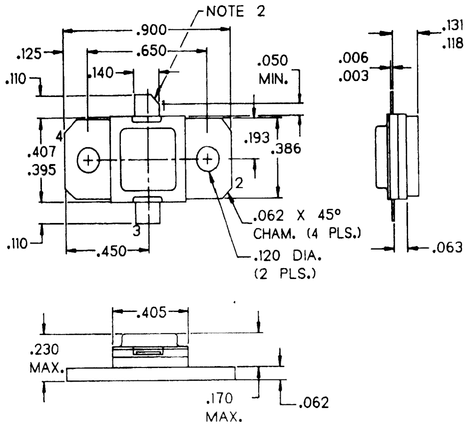
## TEST CIRCUIT




All dimensions are in inches.

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J133102E



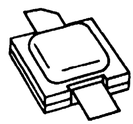

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED;
   DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

SGS-THOMSON MICROELECTRONICS

# AM82931-055N

## RF & MICROWAVE TRANSISTORS S-BAND RADAR APPLICATIONS

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- 3:1 VSWR CAPABILITY @ 1dB OVERDRIVE
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 55 W MIN. WITH 6.1 dB GAIN
- BANDWIDTH = 200 MHz



**.400 x .400 2L (S037)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM82931-055N | 82931-55N |

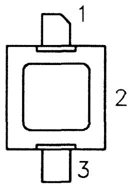
### DESCRIPTION

The AM82931-055N device is a high power silicon bipolar NPN transistor specifically designed for S-Band radar pulsed output and driver applications.

This device is capable of operation over a wide range of pulse widths, duty cycles and temperatures and can withstand a 3:1 output VSWR with a +1dB input overdrive. Low RF thermal resistance, refractory/gold metallization, and computerized automatic wire bonding techniques ensure high reliability and product consistency (including phase characteristics).

The AM82931-055N is supplied in the AMPAC™ Hermetic Metal/Ceramic package with internal Input/Output impedance matching circuitry, and is intended for military and other high reliability applications.

**PIN CONNECTION**




1. Collector
2. Base (bottom surface)
3. Emitter

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq$ 100°C) | 300 | W |
| $I_C$ | Device Current* | 8 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 48 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | − 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 0.50 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

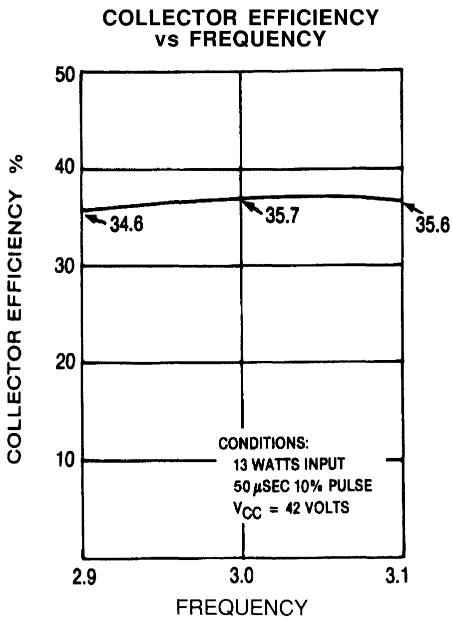
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 25mA | $I_E$ = 0mA | 55 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 5mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 25mA | $R_{BE}$ = 10Ω | 55 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 42V | | — | — | 20 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 3A | 30 | — | — | — |

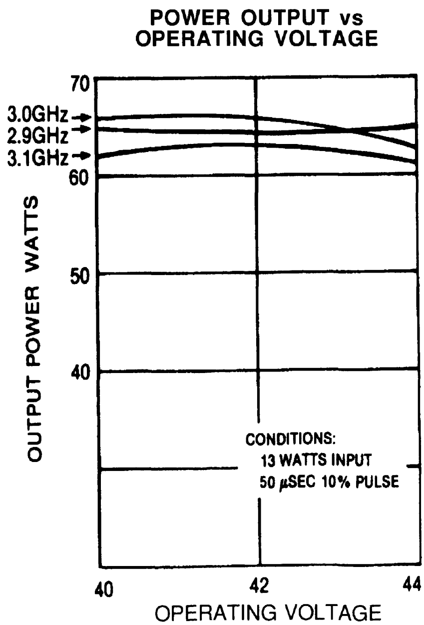
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 2.9 — 3.1GHz | $P_{IN}$ = 13.5W | $V_{CC}$ = 42V | 55 | 63 | — | W |
| $\eta_C$ | f = 2.9 — 3.1GHz | $P_{IN}$ = 13.5W | $V_{CC}$ = 42V | 32 | 35 | — | % |
| $G_P$ | f = 2.9 — 3.1GHz | $P_{IN}$ = 13.5W | $V_{CC}$ = 42V | 6.1 | 6.5 | — | dB |

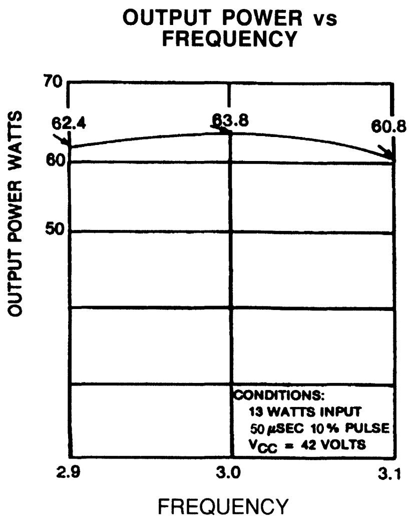
Note: Pulse Width = 50µSec
Duty Cycle = 10%

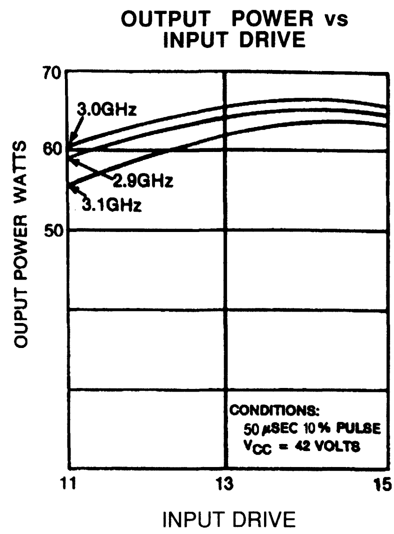
## TYPICAL PERFORMANCE

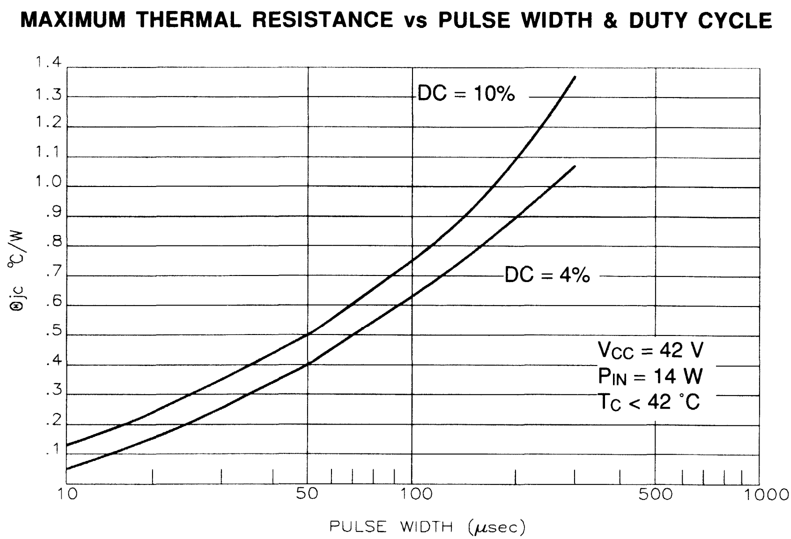


## TYPICAL PERFORMANCE

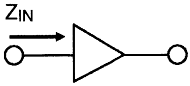


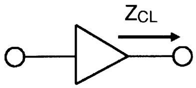



## IMPEDANCE DATA

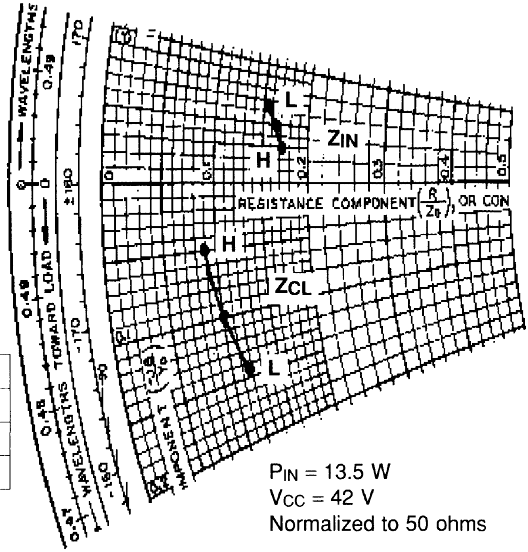
**TYPICAL INPUT IMPEDANCE**




**TYPICAL COLLECTOR LOAD IMPEDANCE**

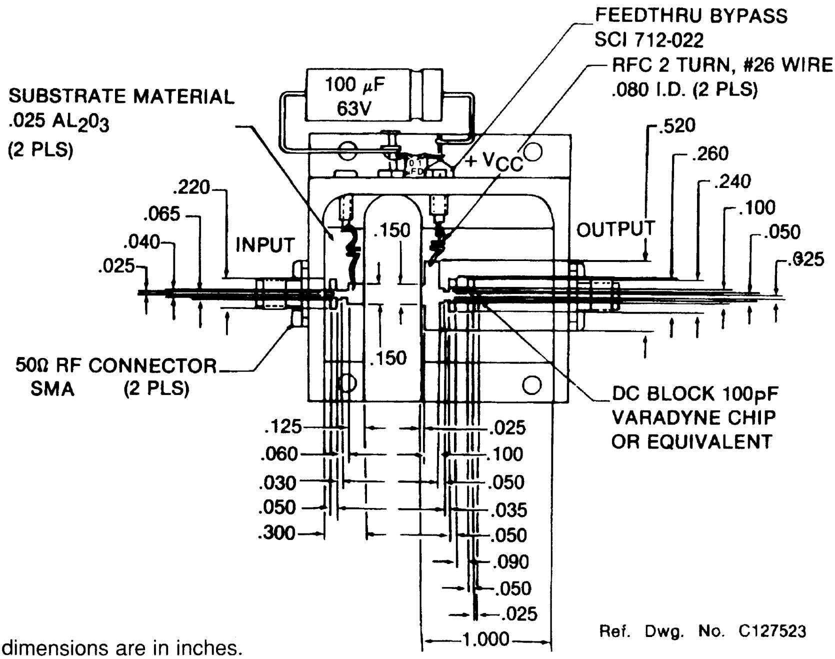



| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| L = 2.9 GHz | 8.0 + j 3.0 | 5.7 – j 7.2 |
| M = 3.0 GHz | 8.3 + j 2.3 | 5.2 – j 5.0 |
| H = 3.1 GHz | 8.6 + j 1.6 | 4.6 – j 2.6 |




$P_{IN}$ = 13.5 W
$V_{CC}$ = 42 V
Normalized to 50 ohms

## TEST CIRCUIT

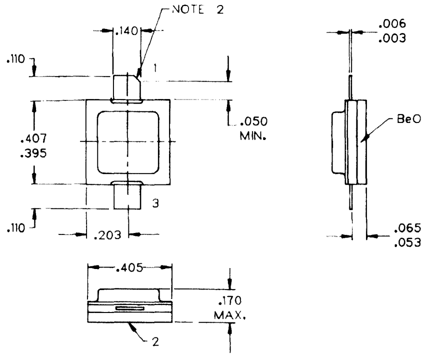



Ref. Dwg. No. C127523

All dimensions are in inches.

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135085B



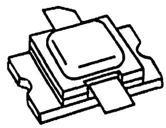

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 MIN.

SGS-THOMSON MICROELECTRONICS

# AM82931-055S

## RF & MICROWAVE TRANSISTORS S-BAND RADAR APPLICATIONS

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- 3:1 VSWR CAPABILITY @ 1dB OVERDRIVE
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 55 W MIN. WITH 6.1 dB GAIN
- BANDWIDTH = 200 MHz



**.400 x .400 2L SFL (S136)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM82931-055S | 82931-55S |

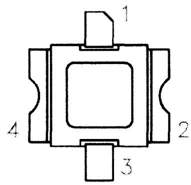
### DESCRIPTION

The AM82931-055S device is a high power silicon bipolar NPN transistor specifically designed for S-Band radar pulsed output and driver applications.

This device is capable of operation over a wide range of pulse widths, duty cycles and temperatures and can withstand a 3:1 output VSWR with a +1dB input overdrive. Low RF thermal resistance, refractory/gold metallization, and computerized automatic wire bonding techniques ensure high reliability and product consistency (including phase characteristics).

The AM82931-055S is supplied in the AMPAC™ Hermetic Metal/Ceramic package with internal Input/Output impedance matching circuitry, and is intended for military and other high reliability applications.

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 100$°C) | 300 | W |
| $I_C$ | Device Current* | 8 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 48 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 0.50 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

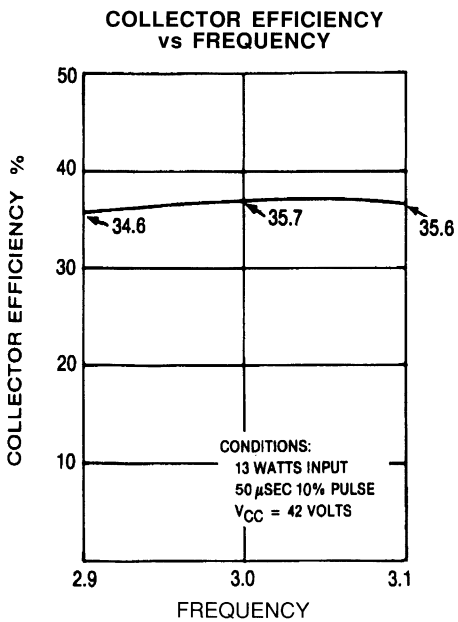
| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 25mA | $I_E$ = 0mA | 55 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 5mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 25mA | $R_{BE}$ = 10Ω | 55 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 42V | | — | — | 20 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 3A | 30 | — | — | — |

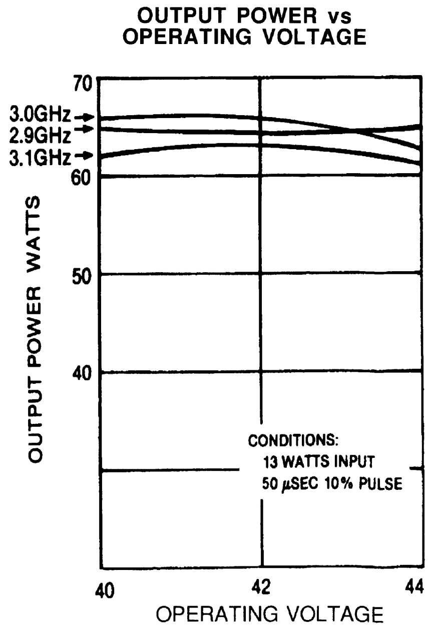
DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 2.9 — 3.1GHz | $P_{IN}$ = 13.5W | $V_{CC}$ = 42V | 55 | 63 | — | W |
| $\eta_c$ | f = 2.9 — 3.1GHz | $P_{IN}$ = 13.5W | $V_{CC}$ = 42V | 32 | 35 | — | % |
| $G_P$ | f = 2.9 — 3.1GHz | $P_{IN}$ = 13.5W | $V_{CC}$ = 42V | 6.1 | 6.5 | — | dB |

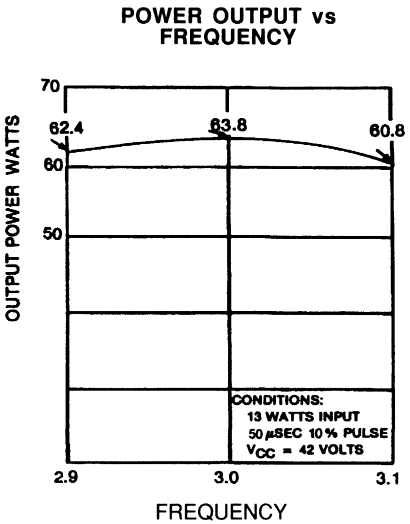
Note: Pulse Width = 50μSec
Duty Cycle = 10%

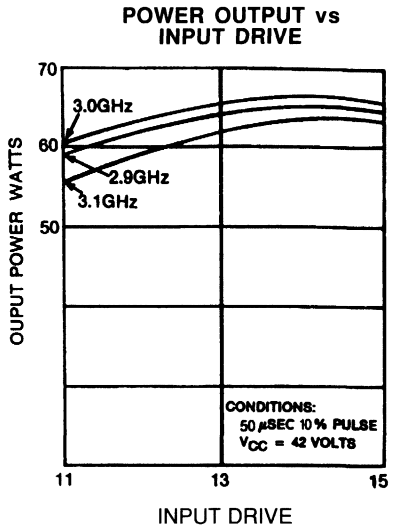
## TYPICAL PERFORMANCE

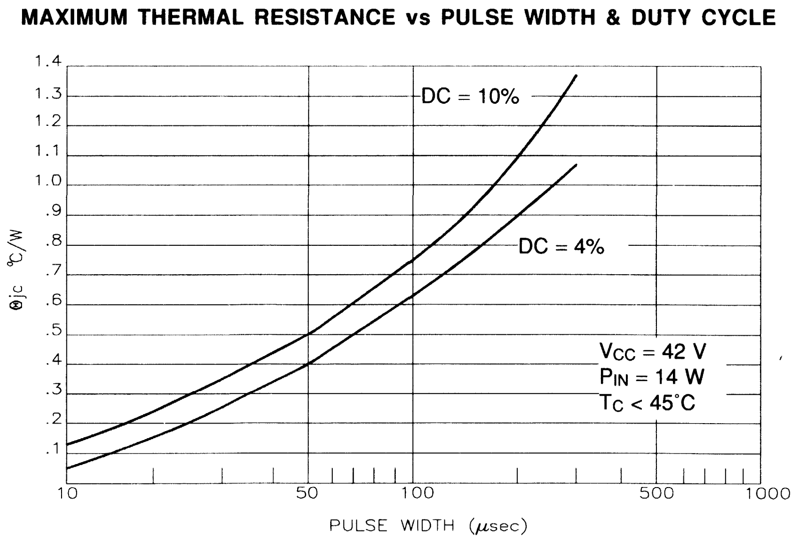


## TYPICAL PERFORMANCE

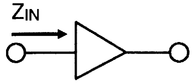


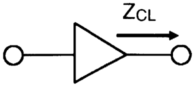



## IMPEDANCE DATA

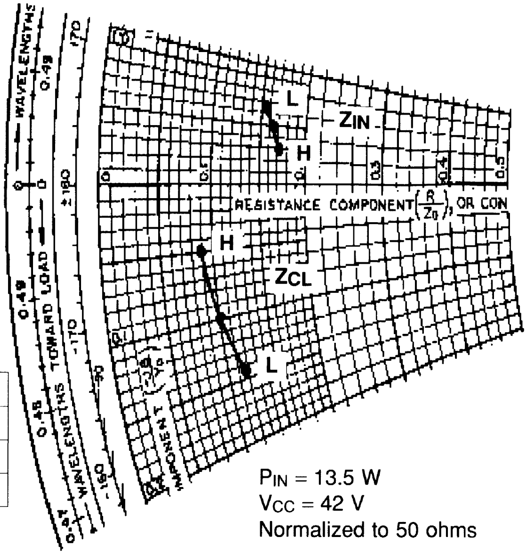
### TYPICAL INPUT IMPEDANCE



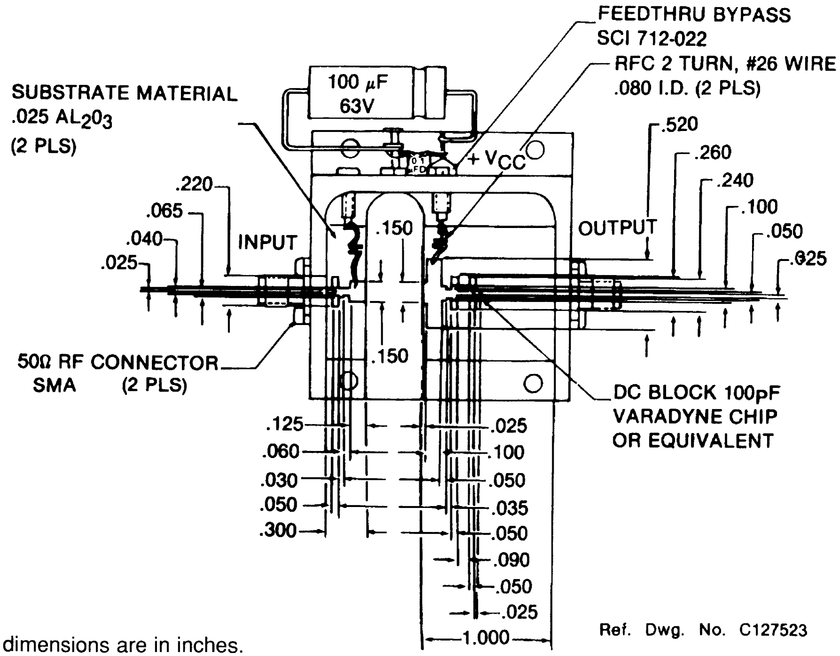

### TYPICAL COLLECTOR LOAD IMPEDANCE




| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| L = 2.9 GHz | 8.0 + j 3.0 | 5.7 − j 7.2 |
| M = 3.0 GHz | 8.3 + j 2.3 | 5.2 − j 5.0 |
| H = 3.1 GHz | 8.6 + j 1.6 | 4.6 − j 2.6 |




## TEST CIRCUIT

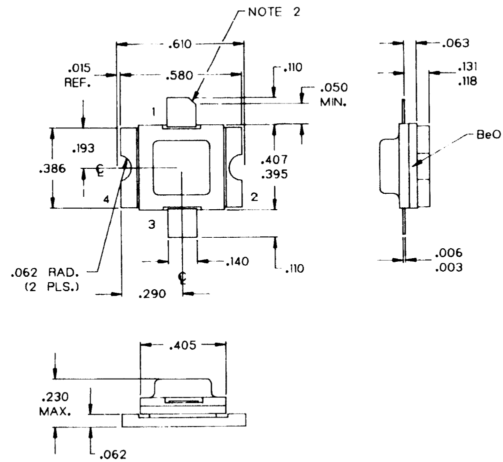



All dimensions are in inches.

Ref. Dwg. No. C127523

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135075B



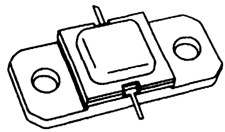

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

**SGS-THOMSON MICROELECTRONICS**

# AM83135-001

## RF & MICROWAVE TRANSISTORS S-BAND RADAR APPLICATIONS

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- 10:1 VSWR CAPABILITY
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 1.0 W MIN. WITH 5.2 dB GAIN



**.400 x .400 2NLFL (S042)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM83135-001 | 83135-1 |

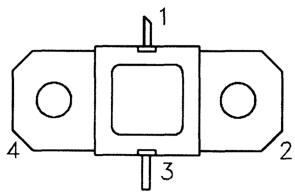
### DESCRIPTION

The AM83135-001 device is a medium power silicon bipolar NPN transistor specifically designed for S-Band radar pulsed driver applications.

This device is capable of operation over a wide range of pulse widths, duty cycles and temperatures and can withstand a 10:1 output VSWR. Low RF thermal resistance, refractory/gold metallization, and automatic wire bonding techniques ensure high reliability and product consistency.

The AM83135-001 is supplied int the AMPAC™ Hermetic/Ceramic package with internal Input/Output impedance matching circuitry, and is intended for military and other high reliability applications.

### PIN CONNECTION




1. Collector
2. Base
3. Emitter
4. Base

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 100°C$) | 11.5 | W |
| $I_C$ | Device Current* | 0.45 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 34 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 13.0 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 1mA | $I_E$ = 0mA | 50 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 0.5mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 1mA | $R_{BE}$ = 10Ω | 50 | — | — | V |
| $I_{CES}$ | $V_{BE}$ = 0V | $V_{CE}$ = 30V | — | — | 0.5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 100mA | 10 | — | — | — |

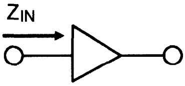
DYNAMIC

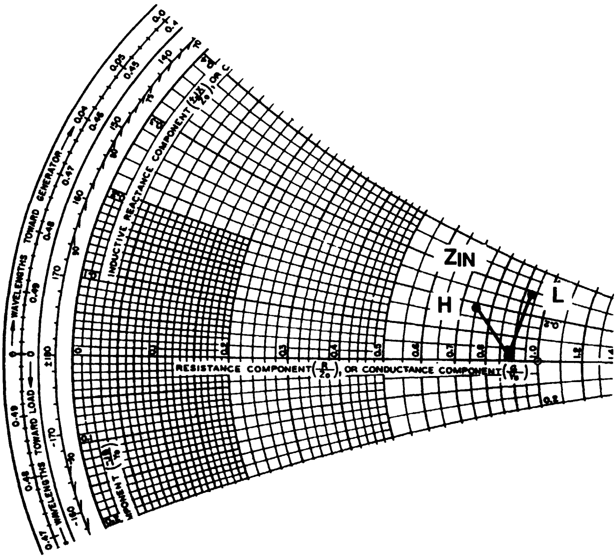
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 3.1 — 3.5GHz | $P_{IN}$ = 0.3W | $V_{CC}$ = 30V | 1.0 | 1.4 | — | W |
| $\eta_C$ | f = 3.1 — 3.5GHz | $P_{IN}$ = 0.3W | $V_{CC}$ = 30V | 27 | 35 | — | % |
| $G_P$ | f = 3.1 — 3.5GHz | $P_{IN}$ = 0.3W | $V_{CC}$ = 30V | 5.2 | 6.7 | — | dB |

Note: Pulse Width = 100 µS
Duty Cycle = 10%

## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE

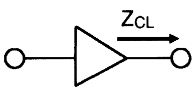


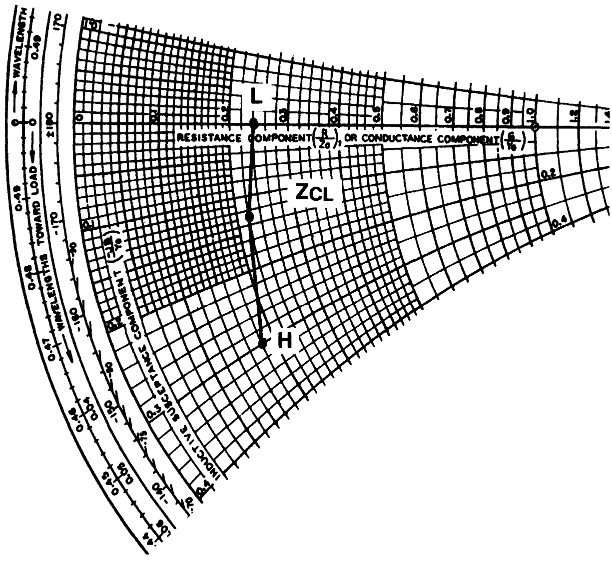




$P_{IN}$ = 0.3 W
$V_{CC}$ = 30 V
$Z_O$ = 50 ohms

| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| L = 3.1 GHz | 46.0 + j 14.5 | 12.0 − j 0.0 |
| M = 3.3 GHz | 43.0 + j 10.0 | 11.0 − j 6.5 |
| H = 3.5 GHz | 38.0 + j 10.0 | 9.0 − j 15.0 |

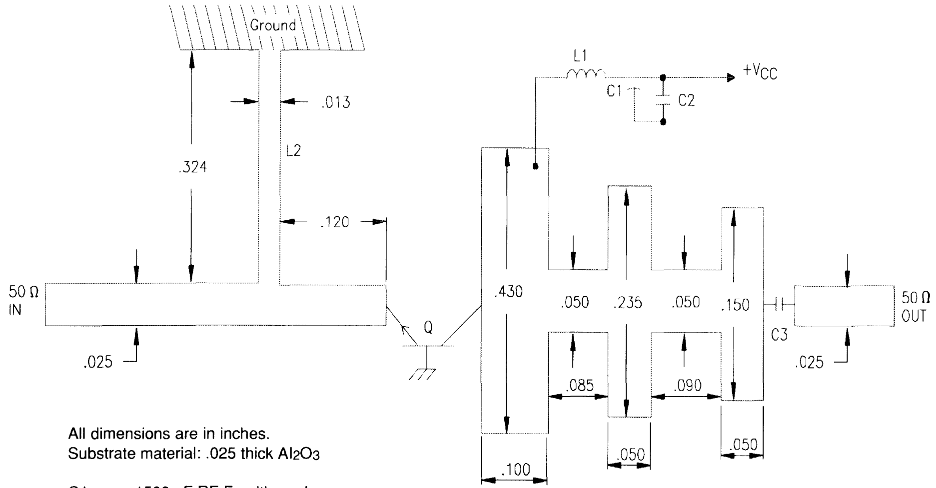
### TYPICAL COLLECTOR LOAD IMPEDANCE




$P_{IN}$ = 0.3 W
$V_{CC}$ = 30 V
$Z_O$ = 50 ohms

## TEST CIRCUIT

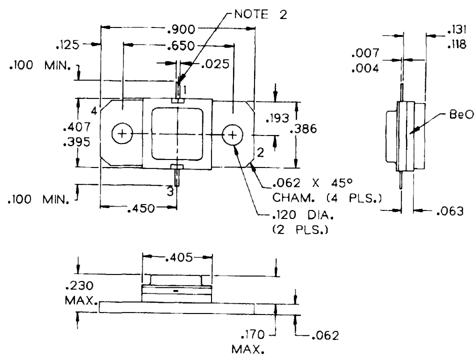



All dimensions are in inches.
Substrate material: .025 thick $Al_2O_3$

| | | |
|---|---|---|
| C1 | : | 1500 pF RF Feedthrough |
| C2 | : | 100 MF Electrolytic |
| C3 | : | 100 pF Chip |
| L1 | : | No. 26 Wire, 4 Turn .062 I.D. |
| L2 | : | Printed RF Choke |

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J113214F



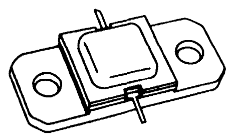

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD SLANT CUT.

SGS-THOMSON MICROELECTRONICS

# AM83135-003

## RF & MICROWAVE TRANSISTORS S-BAND RADAR APPLICATIONS

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- 10:1 VSWR CAPABILITY
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 3.0 W MIN. WITH 5.7 dB GAIN



**.400 x .400 2NLFL (S042)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM83135-003 | 83135-3 |

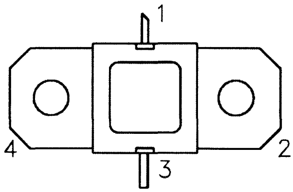
### DESCRIPTION

The AM83135-003 device is a medium power silicon bipolar NPN transistor specifically designed for S-Band radar pulsed driver applications.

This device is capable of operation over a wide range of pulse widths, duty cycles and temperatures and can withstand a 10:1 output VSWR. Low RF thermal resistance, refractory/gold metallization, and automatic wire bonding techniques ensure high reliability and product consistency.

The AM83135-003 is supplied in the AMPAC™ Hermetic Metal/Ceramic package with internal Input/Output impedance matching circuitry, and is intended for military and other high reliability applications.

### PIN CONNECTION




1. Collector
2. Base
3. Emitter
4. Base

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 100°C$) | 23 | W |
| $I_C$ | Device Current* | 0.9 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 34 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j\text{-}c)}$ | Junction-Case Thermal Resistance* | 6.5 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 2mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 2mA | $R_{BE}$ = 10Ω | 45 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 30V | | — | — | 2.0 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 200mA | 10 | — | — | — |

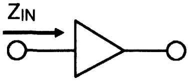
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 3.1 — 3.5GHz | $P_{IN}$ = 0.8W | $V_{CC}$ = 30V | 3.0 | 4.0 | — | W |
| $\eta_C$ | f = 3.1 — 3.5GHz | $P_{IN}$ = 0.8W | $V_{CC}$ = 30V | 27 | 37 | — | % |
| $G_P$ | f = 3.1 — 3.5GHz | $P_{IN}$ = 0.8W | $V_{CC}$ = 30V | 5.7 | 7.0 | — | dB |

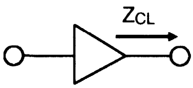
Note: Pulse Width = 100 µS
Duty Cycle = 10%

## IMPEDANCE DATA

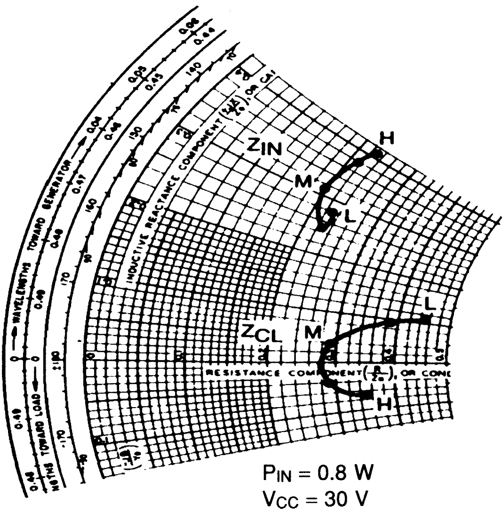
**TYPICAL INPUT IMPEDANCE**




**TYPICAL COLLECTOR LOAD IMPEDANCE**

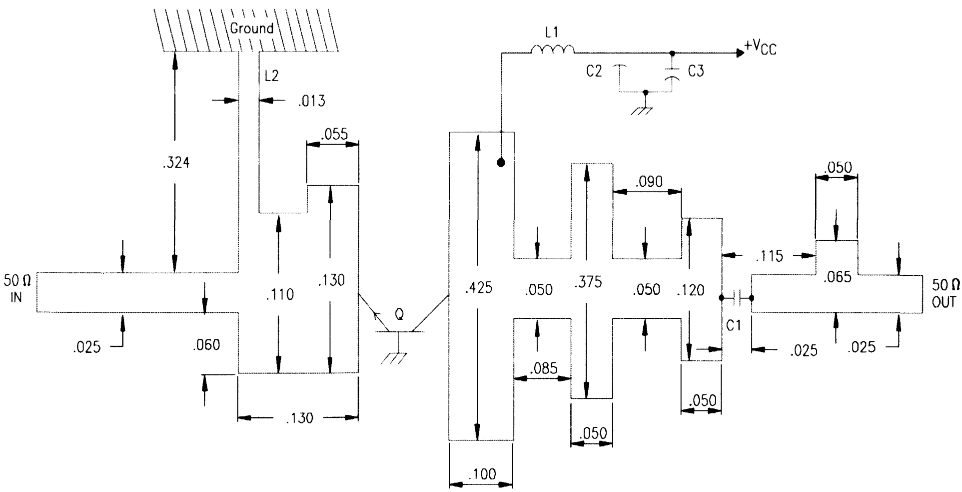



| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| L = 2.7 GHz | 11.5 + j 14.0 | 22.5 + j 5.5 |
| • = 2.9 GHz | 11.5 + j 12.5 | 19.5 + j 5.0 |
| M = 3.1 GHz | 10.0 + j 15.5 | 14.5 + j 2.0 |
| • = 3.3 GHz | 11.0 + j 19.0 | 14.5 – j 2.0 |
| H = 3.5 GHz | 11.0 + j 20.5 | 17.5 – j 3.5 |




$P_{IN}$ = 0.8 W
$V_{CC}$ = 30 V
Normalized to 50 ohms

## TEST CIRCUIT

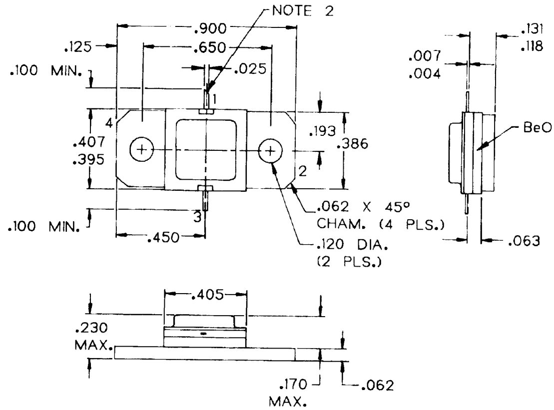



All dimensions are in inches.
Substrate material: .025 thick $Al_2O_3$

C1 : 100 pF Chip Capacitor (Note: Mount this Capacitor on its thin side.)
C2 : 1500 pF RF Feedthru
C3 : 100 MF, Electrolytic Capacitor
L1 : No. 32 Wire, 2 Turns 1/16" I.D.
L2 : Printed Choke

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J113214F
Case Style: S042



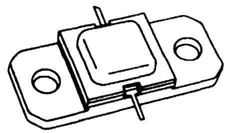

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD SLANT CUT.

**SGS-THOMSON MICROELECTRONICS**

# AM83135-005

## RF & MICROWAVE TRANSISTORS S-BAND RADAR APPLICATIONS

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- 5:1 VSWR CAPABILITY
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 5.0 W MIN. WITH 5.2 dB GAIN



**.400 x .400 2NLFL (S042)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| 83135-005 | 83135-5 |

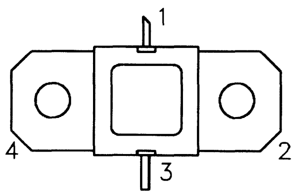
### DESCRIPTION

The AM83135-005 device is a medium power silicon bipolar NPN transistor specifically designed for S-Band radar pulsed driver applications.

This device is capable of operation over a wide range of pulse widths. duty cycles and temperatures, and can withstand a 5:1 output VSWR. Low RF thermal resistance, refractory/gold metallization, and computerized automatic wire bonding techniques ensure high reliability and product consistency.

The AM83135-005 is supplied in the AMPAC™ Hermetic Metal/Ceramic package with internal Input/Output matching circuitry, and is intended for military and other high reliability applications.

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 100$°C) | 40 | W |
| $I_C$ | Device Current* | 1.8 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 34 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 3.75 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 4mA | $I_E$ = 0mA | 50 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 2mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 4mA | $R_{BE}$ = 10Ω | 50 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 30V | | — | — | 2.0 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 500mA | 10 | — | — | — |

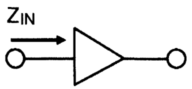
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 3.1 — 3.5GHz | $P_{IN}$ = 1.5W | $V_{CC}$ = 30V | 5.0 | 6.0 | — | W |
| $\eta_C$ | f = 3.1 — 3.5GHz | $P_{IN}$ = 1.5W | $V_{CC}$ = 30V | 27 | — | — | % |
| $G_P$ | f = 3.1 — 3.5GHz | $P_{IN}$ = 1.5W | $V_{CC}$ = 30V | 5.2 | 6.4 | — | dB |

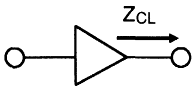
Note: Pulse Width = 100µS
Duty Cycle = 10%

## IMPEDANCE DATA

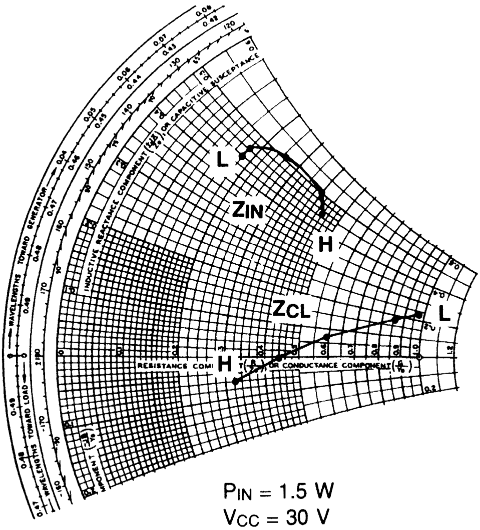
**TYPICAL INPUT IMPEDANCE**




**TYPICAL COLLECTOR LOAD IMPEDANCE**

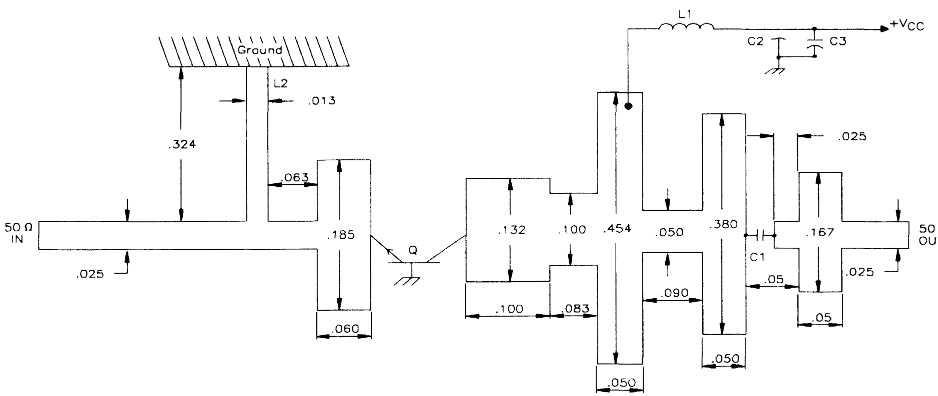



| FREQ. | ZIN (Ω) | ZCL (Ω) |
|---|---|---|
| L = 2.7 GHz | 9.0 j 22.0 | 48.0 + j 11.5 |
| • = 2.9 GHz | 9.0 j 23.0 | 43.0 + j 9.0 |
| M = 3.1 GHz | 12.5 + j 25.0 | 30.0 + j 3.0 |
| • = 3.3 GHz | 20.0 + j 25.0 | 21.5 + 0.0 |
| H = 3.5 GHz | 22.0 + j 22.5 | 16.0 – j 3.0 |




$P_{IN}$ = 1.5 W
$V_{CC}$ = 30 V
Normalized to 50 ohms

## TEST CIRCUIT



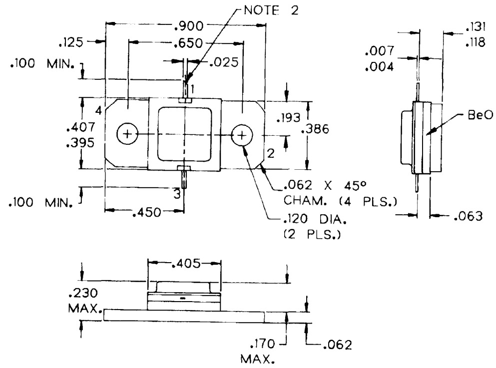

All dimensions are in inches.
Substrate Material: .025 tick $Al_2O_3$ (Er = 9.6)

C1 : 100 pF Chip Capacitor
(Note: Mounted on its thin side)
C2 : 1500 pF RF Feedthru
C3 : 100 mF Electrolytic

L1 : No. 32 Wire, 2 Turns 1/16" I.D.
L2 : Printed Choke

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J113214F



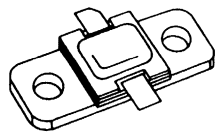

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD SLANT CUT.

SGS-THOMSON MICROELECTRONICS

# AM83135-010

## RF & MICROWAVE TRANSISTORS S-BAND RADAR APPLICATIONS

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 10 W MIN. WITH 5.0 dB GAIN



**.310 x .310 2LFL (S064)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM83135-010 | 83135-10 |

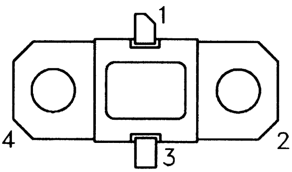
### DESCRIPTION

The AM83135-010 device is a high power silicon bipolar NPN transistor specifically designed for S-Band radar pulsed output and driver applications.

This device is characterized at 100µsec pulse width and 10% duty cycle, but is capable of operation over a range of pulse widths, duty cycles, and temperatures, and can withstand a 3:1 output VSWR with a + 1 dB input overdrive. Low RF thermal resistance, refractory/gold metallization, and computerized automatic wire bonding techniques ensure high reliability and product consistency (including phase characteristics).

The AM83135-010 is supplied in the IMPAC™ hermetic metal/ceramic package with internal input/output impedance matching circuitry, and is intended for military and other high reliability applications.

### PIN CONNECTION




1. Collector
2. Base
3. Emitter
4. Base

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 50$°C) | 50 | W |
| $I_C$ | Device Current* | 2 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 46 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 4.0 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 7mA | $I_E$ = 0mA | 55 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 7mA | $R_{BE}$ = 10Ω | 55 | — | — | V |
| $I_{CES}$ | $V_{BE}$ = 0V | $V_{CE}$ = 40V | — | — | 5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 600mA | 30 | — | — | — |

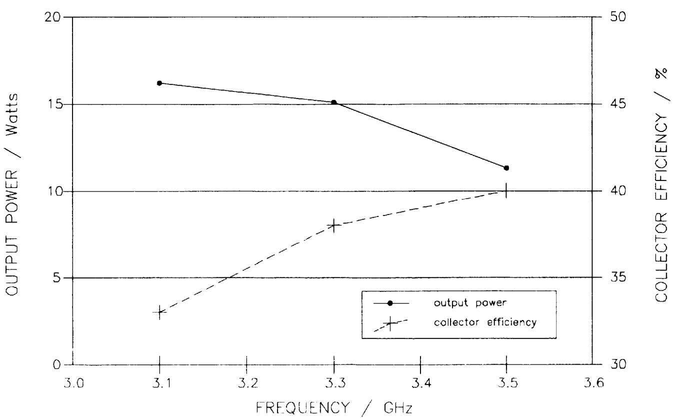
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 3.1 — 3.5GHz | $P_{IN}$ = 3.2W | $V_{CC}$ = 40V | 10 | — | — | W |
| $\eta_C$ | f = 3.1 — 3.5GHz | $P_{IN}$ = 3.2W | $V_{CC}$ = 40V | 30 | — | — | % |
| $G_P$ | f = 3.1 — 3.5GHz | $P_{IN}$ = 3.2W | $V_{CC}$ = 40V | 5.0 | — | — | dB |

Note: Pulse Width = 100µSec
Duty Cycle = 10%

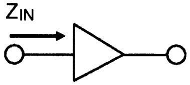
## TYPICAL PERFORMANCE

### POWER OUTPUT & COLLECTOR EFFICIENCY vs FREQUENCY

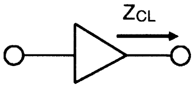


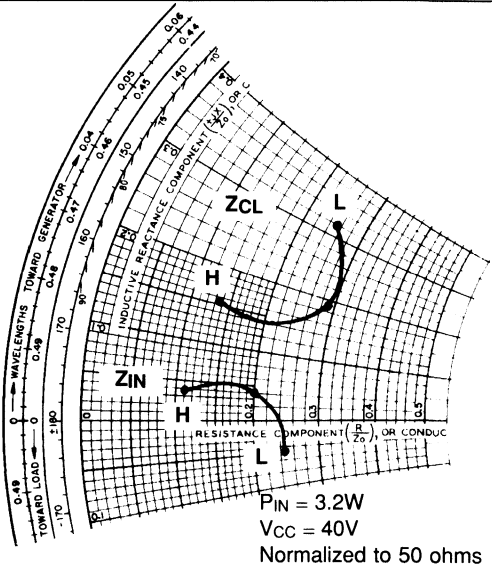
## IMPEDANCE DATA

**TYPICAL INPUT IMPEDANCE**



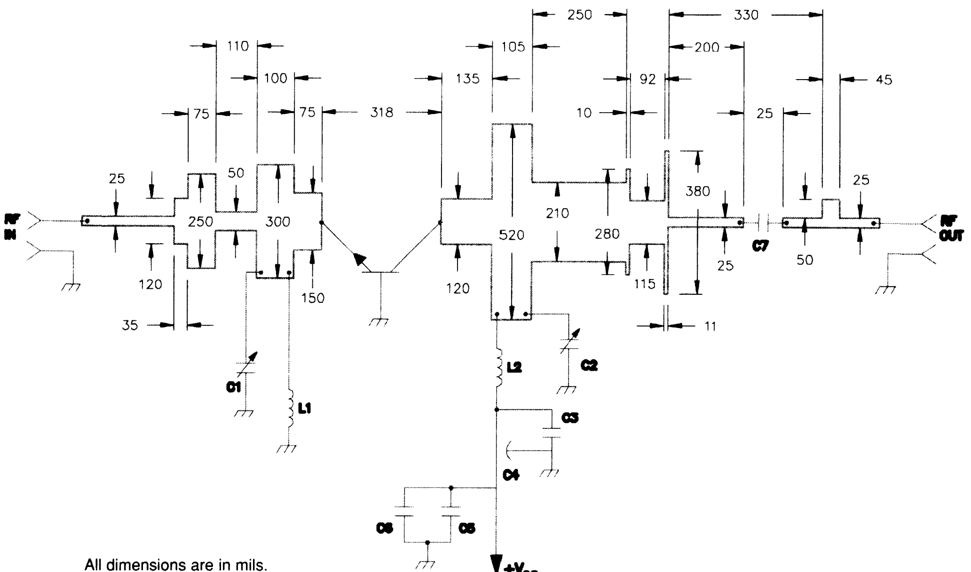

**TYPICAL COLLECTOR LOAD IMPEDANCE**




| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| L = 3.1 GHz | 12.1 – j 1.6 | 12.7 + 16.0 |
| M = 3.3 GHz | 10.0 + j 1.9 | 14.3 + j 9.5 |
| H = 3.5 GHz | 5.5 + j 1.7 | 6.8 + j 7.7 |

## TEST CIRCUIT

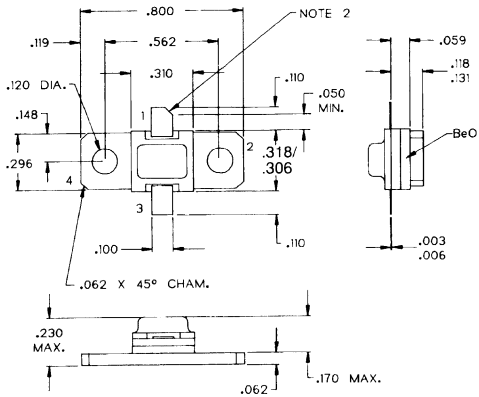



All dimensions are in mils.
Substrate material: .025" thick $Al_2O_3$

C1,C2 : 33 pF 50V Chip Capacitor
C3 : 1 µf 50V Electrolytic Capacitor
C4 : 1000 pF 200V Feedthru Capacitor
C5 : 0.1 µF 50V Disc Ceramic Capacitor
C6 : 100 µf 63V Electrolytic Capacitor
C7 : 33 pF 50V Chip Capacitor
L1,L2 : RF Choke, 2 Turns #26 Tinned Wire, .080" I.D.

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J133100D




NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED;
   DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

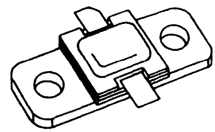
SGS-THOMSON
MICROELECTRONICS

# AM83135-015

## RF & MICROWAVE TRANSISTORS
## S-BAND RADAR APPLICATIONS

PRELIMINARY DATA

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 15 W MIN. WITH 5.2 dB GAIN



**.310 x .310 2LFL (S064)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM83131-015 | 83135-15 |

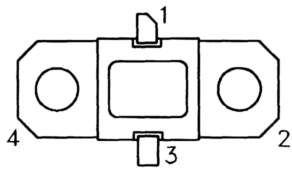
### DESCRIPTION

The AM83135-015 device is a high power silicon bipolar NPN transistor specifically designed for S-Band radar pulsed output and driver applications.

This device is characterized at 100µsec pulse width and 10% duty cycle, but is capable of operation over a range of pulse widths, duty cycles, and temperatures, and can withstand a 3:1 output VSWR with a + 1 dB input overdrive. Low RF thermal resistance, refractory/gold metallization, and computerized automatic wire bonding techniques ensure high reliability and product consistency (including phase characteristics).

The AM83135-015 is supplied in the IMPAC™ Hermetic Metal/Ceramic package with internal Input/Output impedance matching circuitry, and is intended for military and other high reliability applications.

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 50$°C) | 71 | W |
| $I_C$ | Device Current* | 3.0 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 46 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 2.8 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

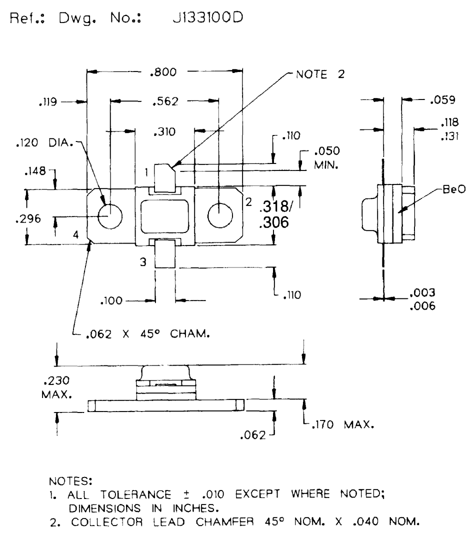
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 10mA | $I_E$ = 0mA | 55 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 2mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 10mA | $R_{BE}$ = 10Ω | 55 | — | — | V |
| $I_{CES}$ | $V_{BE}$ = 0V | $V_{CE}$ = 40V | — | — | 8 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1A | 30 | — | 300 | — |

DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 3.1 — 3.5GHz | $P_{IN}$ = 4.5W | $V_{CC}$ = 40V | 15 | — | — | W |
| $\eta_C$ | f = 3.1 — 3.5GHz | $P_{IN}$ = 4.5W | $V_{CC}$ = 40V | 30 | — | — | % |
| $G_P$ | f = 3.1 — 3.5GHz | $P_{IN}$ = 4.5W | $V_{CC}$ = 40V | 5.2 | — | — | dB |

Note: Pulse Width = 100µS
Duty Cycle = 10%

## PACKAGE MECHANICAL DATA



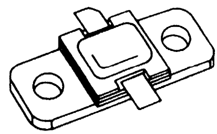
SGS-THOMSON MICROELECTRONICS

# AM83135-030

## RF & MICROWAVE TRANSISTORS S-BAND RADAR APPLICATIONS

PRELIMINARY DATA

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 30 W MIN. WITH 5.5 dB GAIN



**.310 x .310 2LFL (S064)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM83135-030 | AM83135-30 |

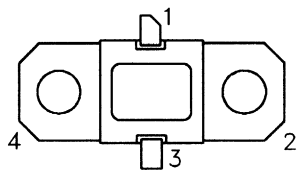
### DESCRIPTION

The AM83135-030 device is a high power silicon bipolar NPN transistor specifically designed for S-Band radar pulsed output and driver applications.

This device is characterized at 100μsec pulse width and 10% duty cycle, but is capable of operation over a range of pulse widths, duty cycles, and temperatures, and withstand a 3:1 output VSWR with a + 1 dB input overdrive. Low RF thermal resistance, refractory/gold metallization, and computerized automatic wire bonding techniques ensure high reliability and product consistency (including phase characteristics).

The AM83135-030 is supplied in the IMPAC™ Hermetic Metal/Ceramic package with internal Input/Output impedance matching circuitry, and is intended for military and other high reliability applications.

### PIN CONNECTION




1. Collector
2. Base
3. Emitter
4. Base

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 50$°C) | 133 | W |
| $I_C$ | Device Current* | 6.0 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 46 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 1.5 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 20mA | $I_E$ = 0mA | 55 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 4mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 20mA | $R_{BE}$ = 10Ω | 55 | — | — | V |
| $I_{CES}$ | $V_{BE}$ = 0V | $V_{CE}$ = 40V | — | — | 15 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 2A | 30 | — | 300 | — |

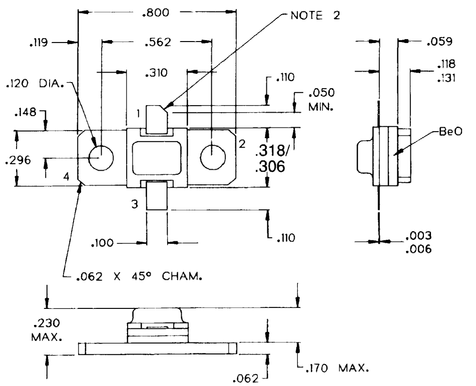
### DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 3.1 — 3.5GHz | $P_{IN}$ = 8.5W | $V_{CC}$ = 40V | 30 | — | — | W |
| $\eta_c$ | f = 3.1 — 3.5GHz | $P_{IN}$ = 8.5W | $V_{CC}$ = 40V | 30 | — | — | % |
| $G_P$ | f = 3.1 — 3.5GHz | $P_{IN}$ = 8.5W | $V_{CC}$ = 40V | 5.5 | — | — | dB |

Note: Pulse Width = 100μSec
Duty Cycle = 10%

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J133100D




NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

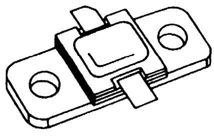
SGS-THOMSON MICROELECTRONICS

# AM83135-040

## RF & MICROWAVE TRANSISTORS S-BAND RADAR APPLICATIONS

PRELIMINARY DATA

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 40 W MIN. WITH 5.1 dB GAIN



**.310 x .310 2LFL (S064)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM83135-040 | AM83135-40 |

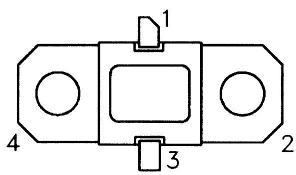
### DESCRIPTION

The AM83135-040 device is a high power silicon bipolar NPN transistor specifically designed for S-Band radar pulsed output and driver applications.

This device is characterized at 10µsec pulse width and 10% duty cycle, but is capable of operation over a range of pulse widths, duty cycles, and temperatures, and can withstand a 3:1 output VSWR with a + 1 dB input overdrive. Low RF thermal resistance, refractory/gold metallization, and computerized automatic wire bonding techniques ensure high reliability and product consistency (including phase characteristics).

The AM83135-040 is supplied in the IMPAC™ Hermetic Metal/Ceramic package with internal Input/Output impedance matching circuitry, and is intended for military and other high reliability applications.

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 50°C$) | 167 | W |
| $I_C$ | Device Current* | 8.0 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 46 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 1.2 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 25mA | $I_E$ = 0mA | 55 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 5mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 25mA | $R_{BE}$ = 10Ω | 55 | — | — | V |
| $I_{CES}$ | $V_{BE}$ = 0V | $V_{CE}$ = 40V | — | — | 20 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 3A | 30 | — | 300 | — |

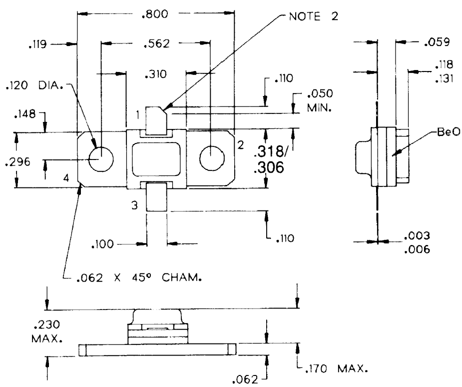
DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 3.1 — 3.5GHz | $P_{IN}$ = 12.5W | $V_{CC}$ = 40V | 40 | — | — | W |
| $\eta_C$ | f = 3.1 — 3.5GHz | $P_{IN}$ = 12.5W | $V_{CC}$ = 40V | 30 | — | — | % |
| $G_P$ | f = 3.1 — 3.5GHz | $P_{IN}$ = 12.5W | $V_{CC}$ = 40V | 5.1 | — | — | dB |

Note: Pulse Width = 100μS
Duty Cycle = 10%

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J133100D



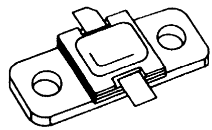

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

# SGS-THOMSON MICROELECTRONICS

# AM83135-050

## RF & MICROWAVE TRANSISTORS S-BAND RADAR APPLICATIONS

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- RUGGEDIZED VSWR 3:1 @ 1dB OVERDRIVE
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 50 W MIN. WITH 5.2 dB GAIN



**.310 x .310 2LFL (S064)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| AM83135-050 | 83135-50 |

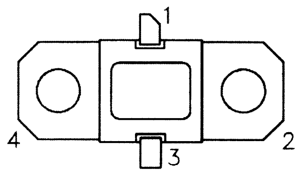
### DESCRIPTION

The AM83135-050 device is a high power silicon bipolar NPN transistor specifically designed for S-Band radar pulsed output and driver applications.

This device is characterized at 10 µsec pulsewidth and 10% duty cycle, but is capable of operation over a range of pulse widths, duty cycles and temperatures and can withstand a 3:1 output VSWR with a +1 dB input overdrive. Low RF thermal resistance, refractory/gold metallization, and computerized automatic wire bonding techniques ensure high reliability and product consistency (including phase characteristics).

The AM83135-050 is supplied in the IMPAC™ Hermetic Metal/Ceramic package with internal Input/Output impedance matching circuitry, and is intended for military and other high reliability applications.

### PIN CONNECTION




1. Collector
2. Base
3. Emitter
4. Base

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq$ 125°C) | 312 | W |
| $I_C$ | Device Current* | 8.0 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 48 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 0.40 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 25mA | $I_E$ = 0mA | 55 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 5mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 25mA | $R_{BE}$ = 10Ω | 55 | — | — | V |
| $I_{CES}$ | $V_{BE}$ = 0V | $V_{CE}$ = 42V | — | — | 20 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 3A | 30 | — | 300 | — |

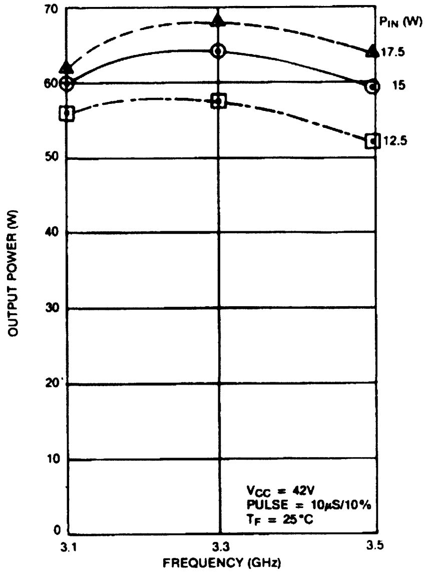
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 3.1 — 3.5GHz | $P_{IN}$ = 15W | $V_{CC}$ = 42V | 50 | — | | W |
| $\eta_C$ | f = 3.1 — 3.5GHz | $P_{IN}$ = 15W | $V_{CC}$ = 42V | 30 | — | — | % |
| $G_P$ | f = 3.1 — 3.5GHz | $P_{IN}$ = 15W | $V_{CC}$ = 42V | 5.2 | — | — | dB |

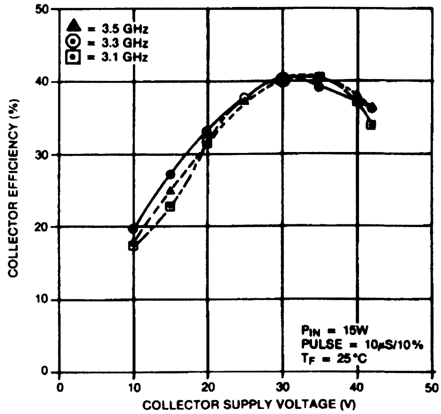
Note: Pulse Width = 10µSec
Duty Cycle = 10%

## TYPICAL PERFORMANCE

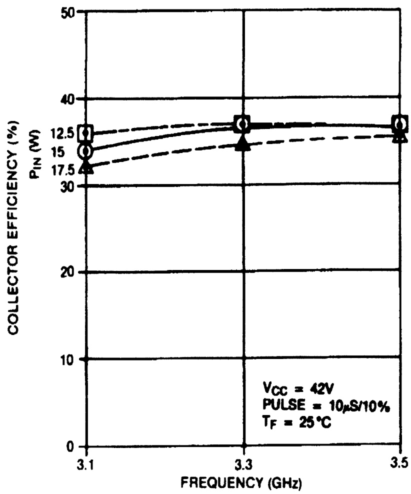
### OUTPUT POWER vs FREQUENCY



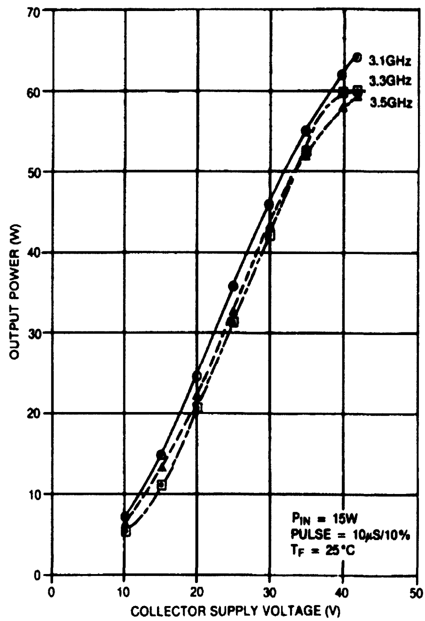

### COLLECTOR EFFICIENCY vs COLLECTOR SUPPLY VOLTAGE




### COLLECTOR EFFICIENCY vs FREQUENCY

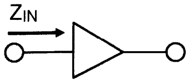



### OUTPUT POWER vs COLLECTOR SUPPLY VOLTAGE

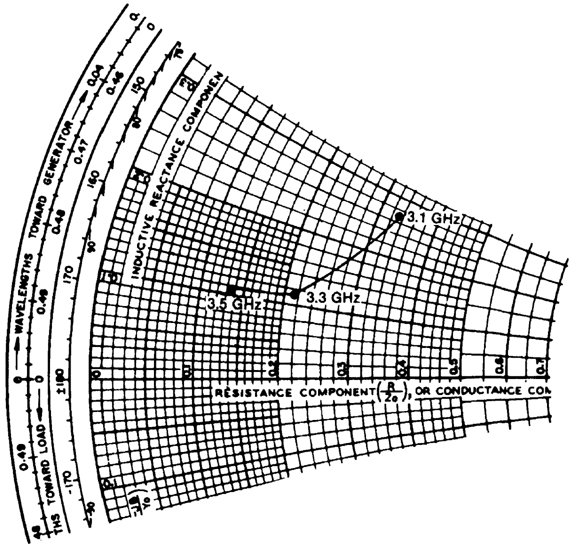


## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE

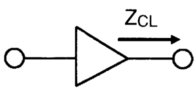



$P_{IN}$ = 15 W
$V_{CC}$ = 42 V
$Z_O$* = 50 ohms

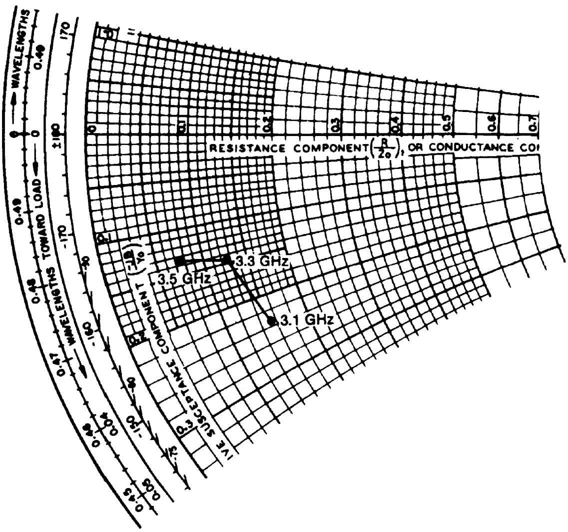



| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| L = 3.1 GHz | 16.5 + j 13.5 | 7.7 − j 11.8 |
| M = 3.3 GHz | 10.8 + j 5.5 | 6.5 − j 7.2 |
| H = 3.5 GHz | 6.7 + j 5.2 | 3.8 − j 6.7 |

### TYPICAL COLLECTOR LOAD IMPEDANCE

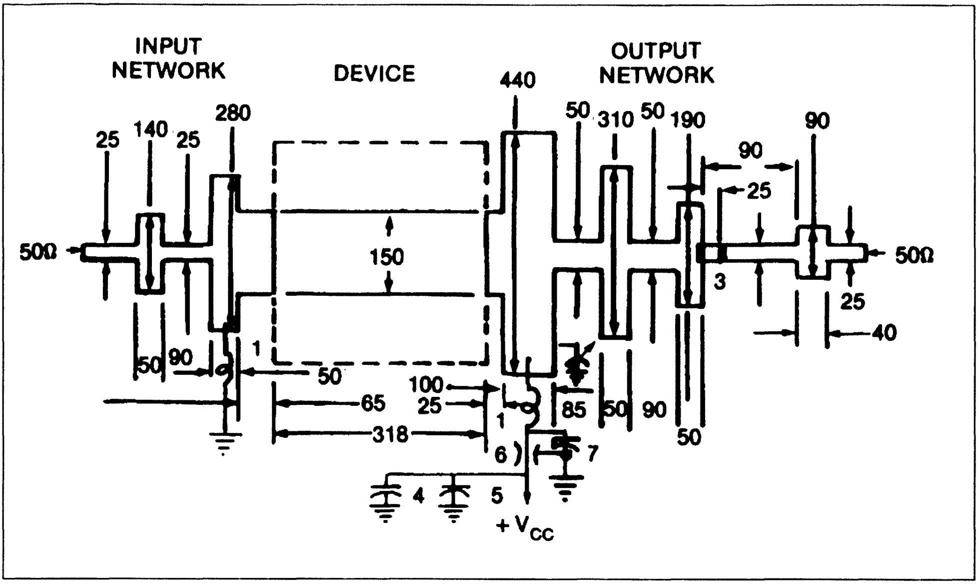



$P_{IN}$ = 15 W
$V_{CC}$ = 42 V
$Z_O$* = 50 ohms

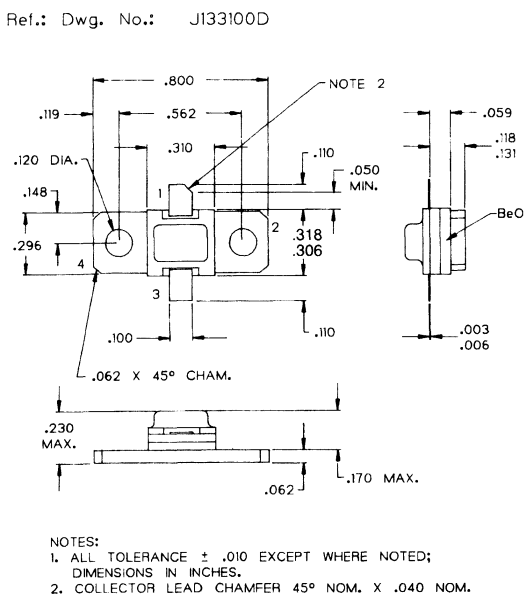



*Normalized

## TEST CIRCUIT

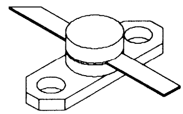



## PACKAGE MECHANICAL DATA



# RF & MICROWAVE TRANSISTORS AVIONICS APPLICATIONS

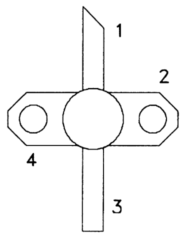
- RUGGEDIZED VSWR ∞:1
- INPUT MATCHING
- LOW THERMAL RESISTANCE
- CLASS A OPERATION
- $P_{OUT}$ = 0.6 W MIN. WITH 10.8 dB GAIN



**.280 2LFL (S058)**
epoxy sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| MSC1000M | 1000M |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

## DESCRIPTION

The MSC1000M is a Class A, common emitter transistor with an emitter ballasted Matrix geometry specifically designed for DME/IFF driver applications.

This device is capable of withstanding a ∞:1 load VSWR at any phase angle under full rated conditions. Low RF thermal resistance and semi-automatic wire bonding techniques ensure high reliability and product consistency.

The MSC1000M is housed in the IMPAC™ package with internal input matching.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* (See Safe Area) | — | W |
| $I_C$ | Device Current* | 300 | mA |
| $V_{CE}$ | Collector-Emitter Bias Voltage* | 20 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 35 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case} = 25°C$)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C = 1mA$ | $I_E = 0mA$ | 50 | — | — | V |
| $BV_{EBO}$ | $I_E = 1mA$ | $I_C = 0mA$ | 3.5 | — | — | V |
| $BV_{CEO}$ | $IC = 5mA$ | $I_B = 0mA$ | 20 | — | — | V |
| $I_{CES}$ | $V_{CE} = 28V$ | | — | — | 1.0 | mA |
| $h_{FE}$ | $V_{CE} = 5V$ | $I_C = 100mA$ | 15 | — | 120 | — |

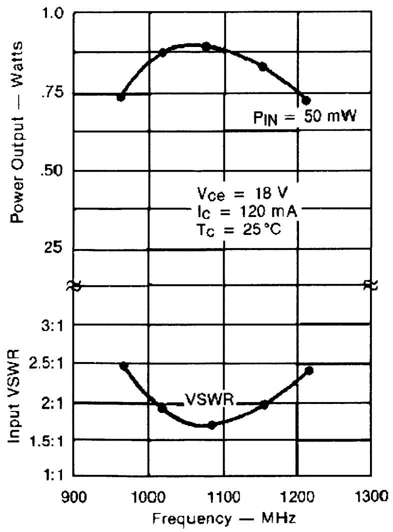
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1025 — 1150 MHz | $P_{IN} = 50$ mW | $V_{CE} = 18$ V | 0.6 | 0.85 | — | W |
| $G_P$ | f = 1025 — 1150 MHz | $P_{IN} = 50$ mW | $V_{CE} = 18$ V | 10.8 | 12.3 | — | dB |

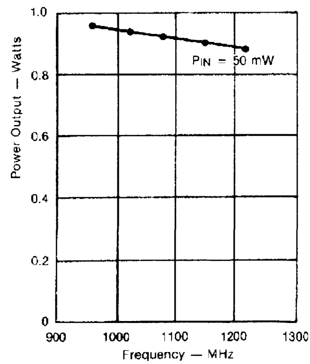
Note: Pulse Width = 10μSec $I_C = 120mA$
Duty Cycle = 1%

## TYPICAL PERFORMANCE

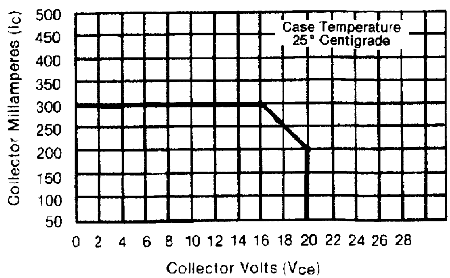
### BROADBAND POWER AMPLIFIER




### NARROWBAND POWER OUTPUT vs FREQUENCY




### MAXIMUM OPERATING AREA for FORWARD BIAS OPERATION

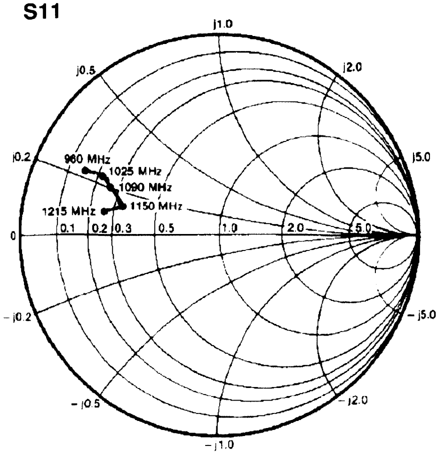




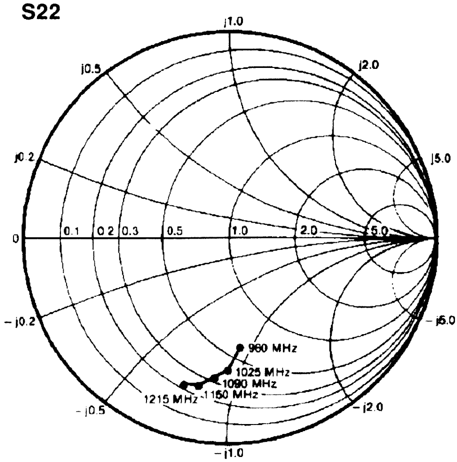

SGS-THOMSON MICROELECTRONICS

## TYPICAL S-PARAMETERS

**S11**

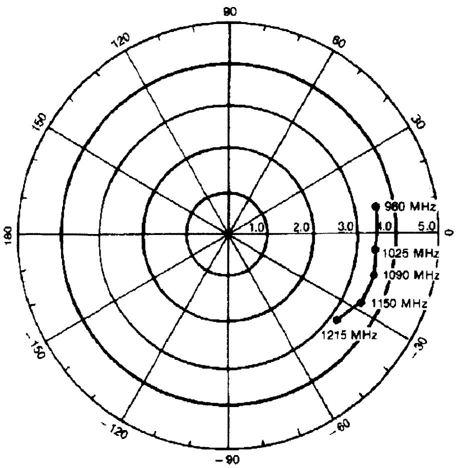



**S22**

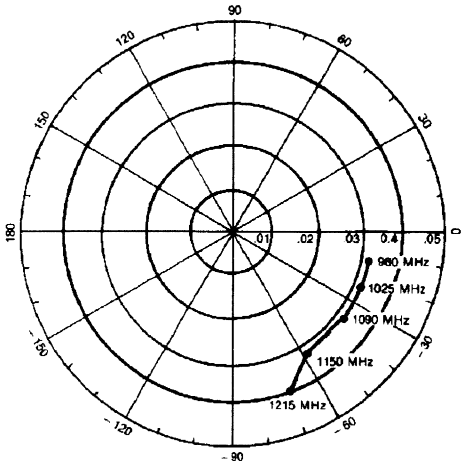



$V_{CE} = 18$ V
$I_C = 120$ mA
Zg = 50 ohms

**S21**

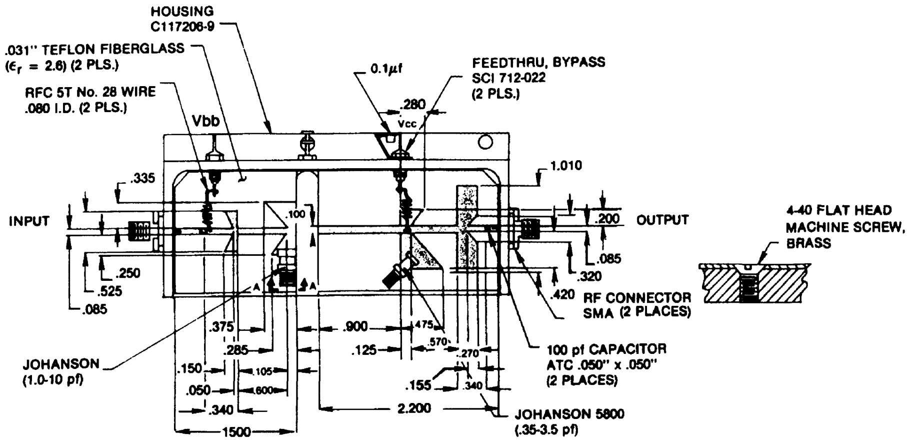



**S12**



## TEST CIRCUIT

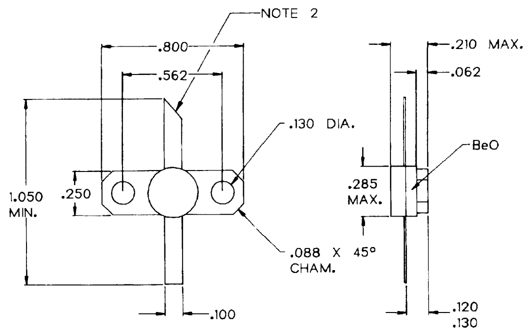
Ref.: Dwg No. C127297




All dimensions are in inches.

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135039B



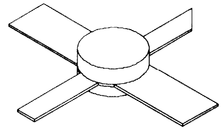

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD SLANT CUT.

**SGS-THOMSON MICROELECTRONICS**

# MSC1000MP

## RF & MICROWAVE TRANSISTORS AVIONICS APPLICATIONS

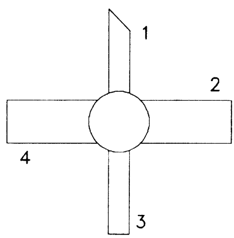
- RUGGEDIZED VSWR ∞:1
- INPUT MATCHING
- LOW THERMAL RESISTANCE
- CLASS A OPERATION
- $P_{OUT}$ = 0.6 W MIN. WITH 10.8 dB GAIN



**.280 4LSL (S053)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| MSC1000MP | 1000MP |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

### DESCRIPTION

The MSC1000MP is a Class A, common emitter transistor with an emitter ballasted Matrix geometry specifically designed for DME/IFF driver applications.

This device is capable of withstanding a ∞:1 load VSWR at any phase angle under full rated conditions. Low RF thermal resistance and semi-automatic wire bonding techniques ensure high reliability and product consistency.

The MSC1000MP is housed in the IMPAC™ package with internal input matching.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* (See Safe Area) | — | W |
| $I_C$ | Device Current* | 300 | mA |
| $V_{CE}$ | Collector-Emitter Bias Voltage* | 20 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 35 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 1mA | $I_E$ = 0mA | 50 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CEO}$ | IC = 5mA | $I_B$ = 0mA | 20 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 28V | | — | — | 1.0 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 100mA | 15 | — | 120 | — |

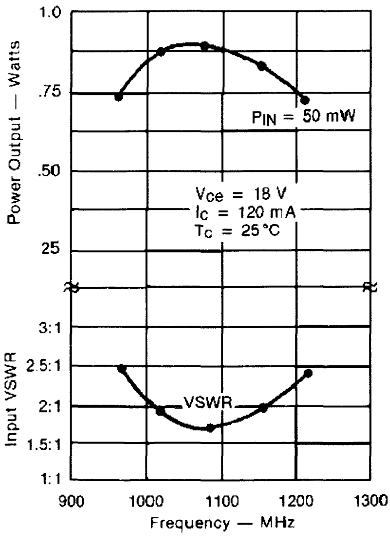
DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 1025 — 1150 MHz | $P_{IN}$ = 50 mW | $V_{CE}$ = 18 V | 0.6 | 0.85 | — | W |
| $G_P$ | f = 1025 — 1150 MHz | $P_{IN}$ = 50 mW | $V_{CE}$ = 18 V | 10.8 | 12.3 | — | dB |

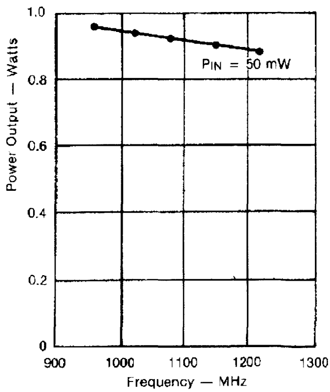
Note: Pulse Width = 10µSec $I_C$ = 120mA
Duty Cycle = 1%

## TYPICAL PERFORMANCE

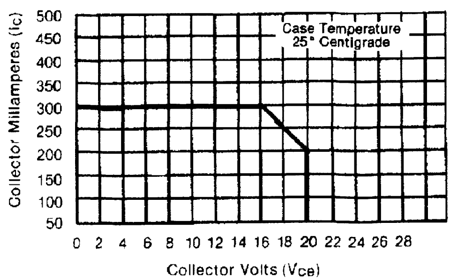
### BROADBAND POWER AMPLIFIER




### NARROWBAND POWER OUTPUT vs FREQUENCY




### MAXIMUM OPERATING AREA for FORWARD BIAS OPERATION

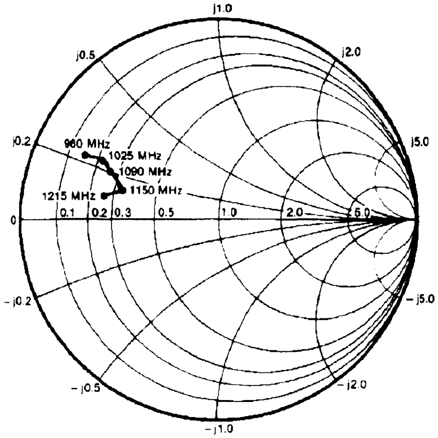




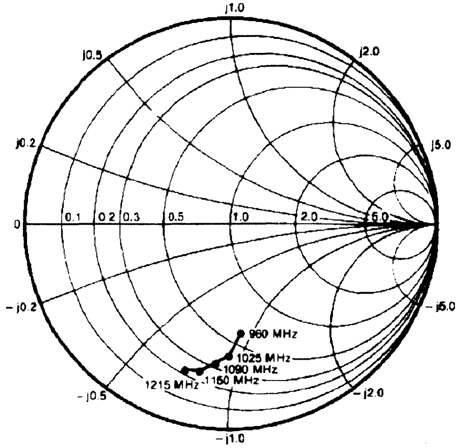

SGS-THOMSON MICROELECTRONICS

## TYPICAL S–PARAMETERS

S11

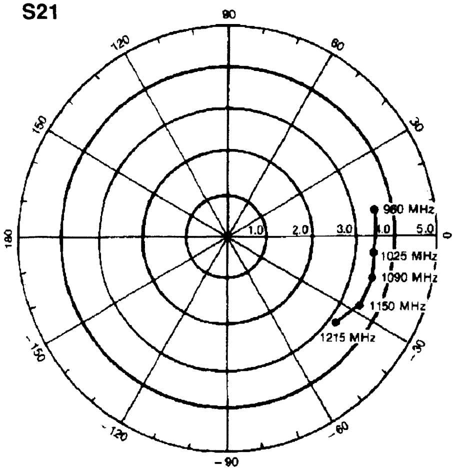



S22

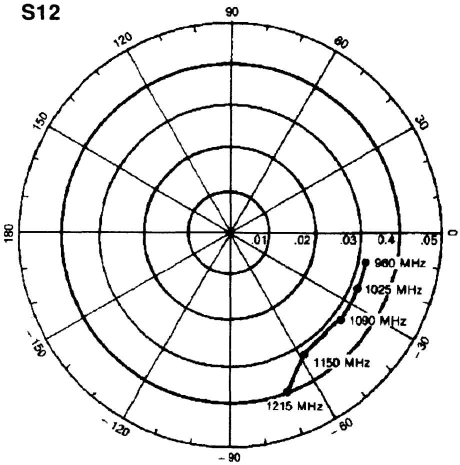



$V_{CE}$ = 18 V
$I_C$ = 120 mA
Zg = 50 ohms

S21

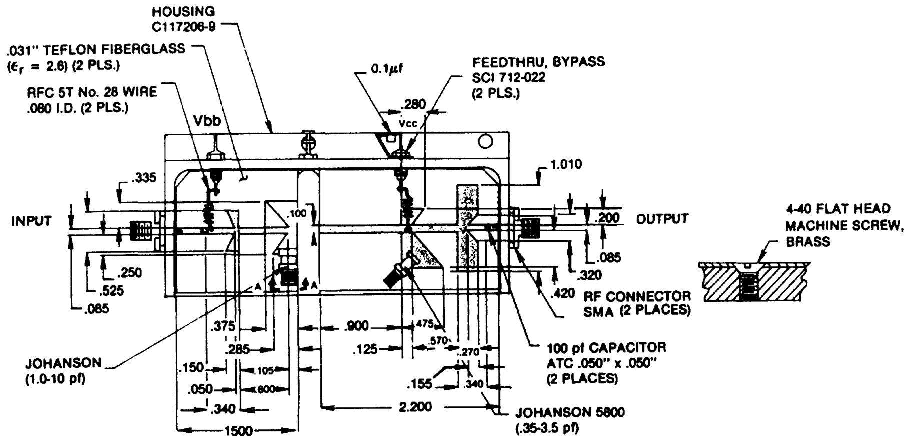



S12



## TEST CIRCUIT

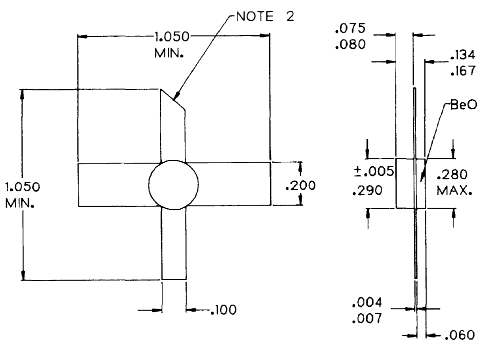
Ref.: Dwg. No. C127297




All dimensions are in inches.

## PACKAGE MECHANICAL DATA

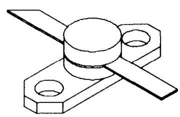
Ref.: Dwg. No.: J135032E




NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD SLANT CUT.

# RF & MICROWAVE TRANSISTORS AVIONICS APPLICATIONS

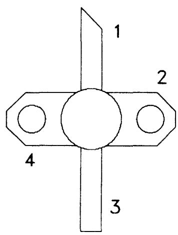
- RUGGEDIZED VSWR ∞:1
- INPUT MATCHING
- LOW THERMAL RESISTANCE
- $P_{OUT}$ = 2.0 W MIN. WITH 9.0 dB GAIN



**.280 2LFL (S068)**
epoxy sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| MSC1002M | 1002M |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

## DESCRIPTION

The MSC1002M is a low level Class C transistor with an overlay, emitter site ballasted geometry specifically designed for avionics driver applications. This device is capable of withstanding an ∞:1 load VSWR at any phase angle under full rated conditions. Low RF thermal resistance and semi-automatic bonding techniques ensure high reliability and product consistency.

The MSC1002M is housed in the IMPAC™ package with internal input matching.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 100°C$) | 10 | W |
| $I_C$ | Device Current* | 250 | mA |
| $V_{CC}$ | Collector-Supply Voltage* | 37 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 10.0 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 1mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 5mA | $R_{BE}$ = 10Ω | 45 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 35V | | — | — | 1.0 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 100mA | 30 | — | 300 | — |

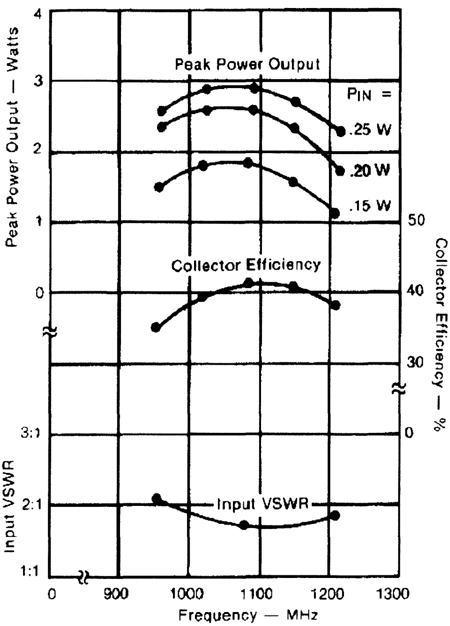
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1025 — 1150 MHz | $P_{IN}$ = 0.25 W | $V_{CC}$ = 35 V | 2.0 | 2.7 | — | W |
| $\eta_C$ | f = 1025 — 1150 MHz | $P_{IN}$ = 0.25 W | $V_{CC}$ = 35 V | 35 | 39 | — | % |
| $G_P$ | f = 1025 — 1150 MHz | $P_{IN}$ = 0.25 W | $V_{CC}$ = 35 V | 9.0 | 10.3 | — | dB |

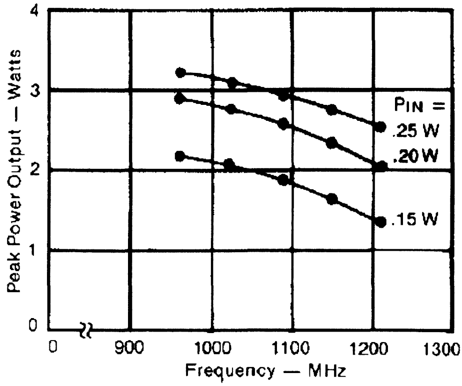
Note: Pulse Width = 10μSec
Duty Cycle = 1%

## TYPICAL PERFORMANCE

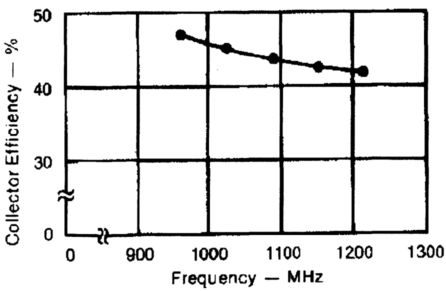
### BROADBAND POWER AMPLIFIER



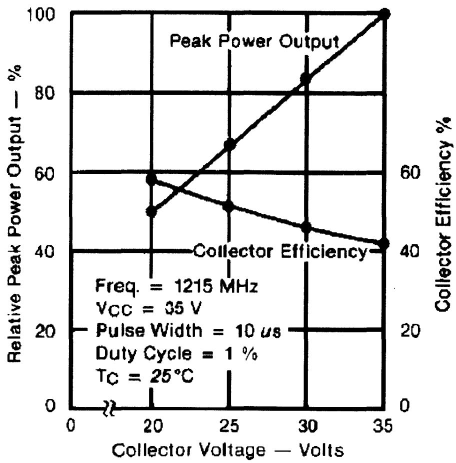

### NARROWBAND PEAK POWER OUTPUT vs FREQUENCY




### NARROWBAND COLLECTOR EFFICIENCY vs FREQUENCY



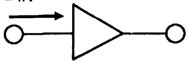

### RELATIVE PEAK POWER OUTPUT & COLLECTOR EFFICIENCY vs COLLECTOR VOLTAGE

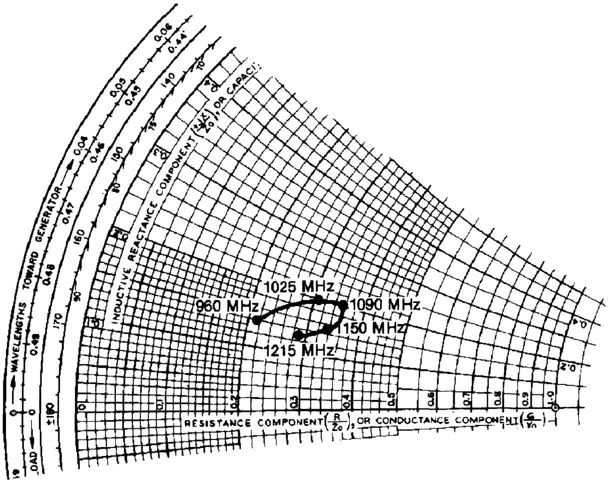


## IMPEDANCE DATA

**TYPICAL INPUT IMPEDANCE**

$Z_{IN}$



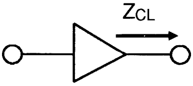


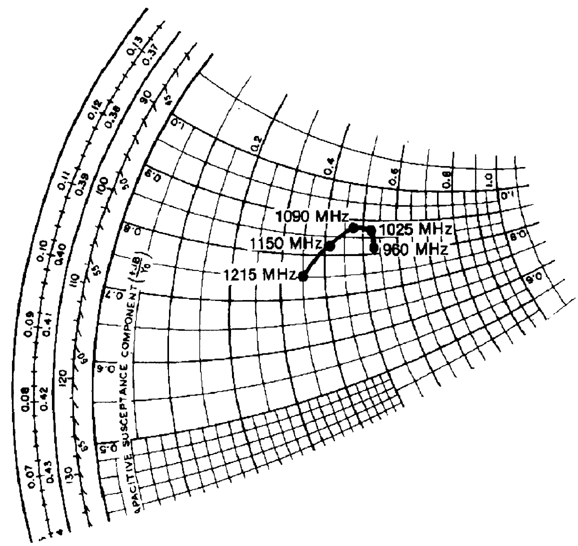

$P_{IN}$ = 250 MW
$V_{CC}$ = 35 V
Normalized to 50 ohms

| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 960 MHz | 10.7 + j 7.0 | 26.5 + j 41.0 |
| 1025 MHz | 15.3 + j 10.0 | 26.0 + j 43.5 |
| 1090 MHz | 17.8 + 10.2 | 23.5 + j 44.0 |
| 1150 MHz | 16.8 + j 15.0 | 20.5 + j 41.5 |
| 1215 MHz | 14.4 + j 13.0 | 17.5 + j 37.5 |

**TYPICAL COLLECTOR LOAD IMPEDANCE**

$Z_{CL}$

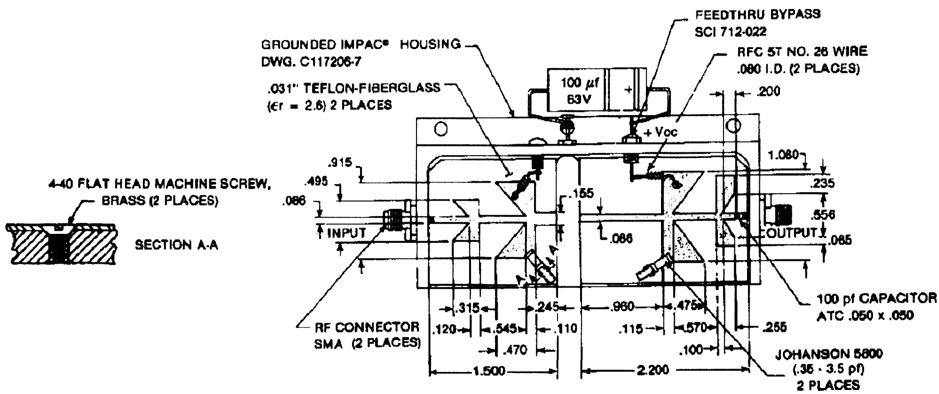





$P_{IN}$ = 250 MW
$V_{CC}$ = 35 V
Normalized to 50 ohms

## TEST CIRCUIT

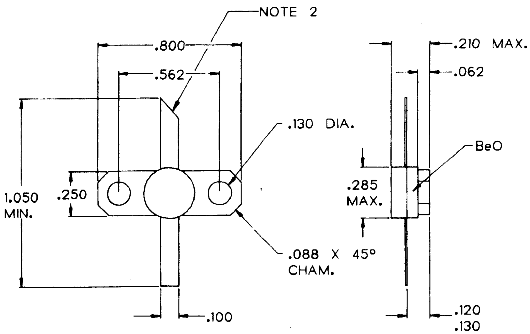
Ref.: Dwg. No. C127298




All dimensions are in inches.

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135039B



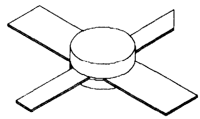

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD SLANT CUT.

SGS-THOMSON MICROELECTRONICS

# MSC1002MP

## RF & MICROWAVE TRANSISTORS AVIONICS APPLICATIONS

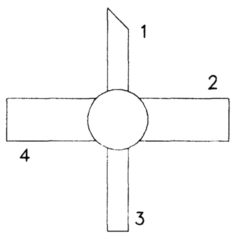
- RUGGEDIZED VSWR ∞:1
- INPUT MATCHING
- LOW THERMAL RESISTANCE
- $P_{OUT}$ = 2.0 W MIN. WITH 9.0 dB GAIN



**.280 4LSL (S051)**
epoxy sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| MSC1002MP | 1002MP |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The MSC1002MP is a low level Class C transistor with an overlay, emitter site ballasted geometry specifically designed for avionics driver applications. This device is capable of withstanding an ∞:1 load VSWR at any phase angle under full rated conditions. Low RF thermal resistance and semi-automatic bonding techniques ensure high reliability and product consistency.

The MSC1002MP is housed in the IMPAC™ package with internal input matching.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq$ 100°C) | 10 | W |
| $I_C$ | Device Current* | 250 | mA |
| $V_{CC}$ | Collector-Supply Voltage* | 37 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 10.0 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 1mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 5mA | $R_{BE}$ = 10Ω | 45 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 35V | | — | — | 1.0 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 100mA | 30 | — | 300 | — |

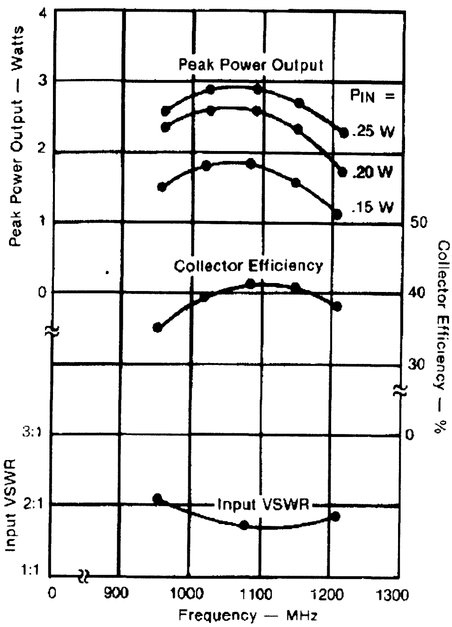
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1025 — 1150 MHz | $P_{IN}$ = 0.25 W | $V_{CC}$ = 35 V | 2.0 | 2.7 | — | W |
| $\eta_C$ | f = 1025 — 1150 MHz | $P_{IN}$ = 0.25 W | $V_{CC}$ = 35 V | 35 | 39 | — | % |
| $G_P$ | f = 1025 — 1150 MHz | $P_{IN}$ = 0.25 W | $V_{CC}$ = 35 V | 9.0 | 10.3 | — | dB |

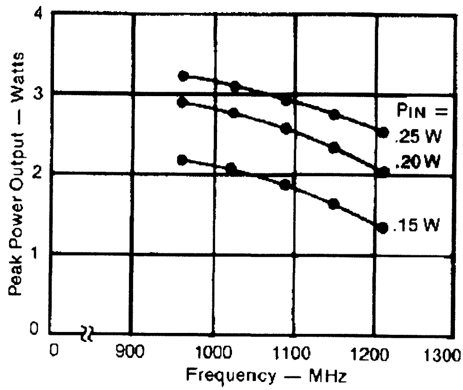
Note: Pulse Width = 10μSec
Duty Cycle = 1%

## TYPICAL PERFORMANCE

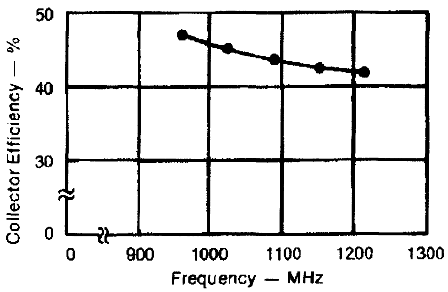
### BROADBAND POWER AMPLIFIER



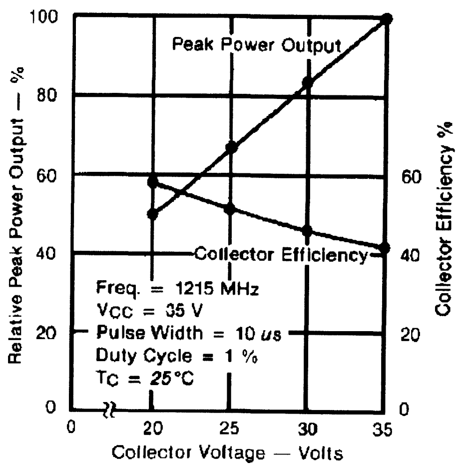

### NARROWBAND PEAK POWER OUTPUT vs FREQUENCY




### NARROWBAND COLLECTOR EFFICIENCY vs FREQUENCY

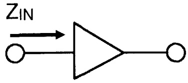



### RELATIVE PEAK POWER OUTPUT & COLLECTOR EFFICIENCY vs COLLECTOR VOLTAGE

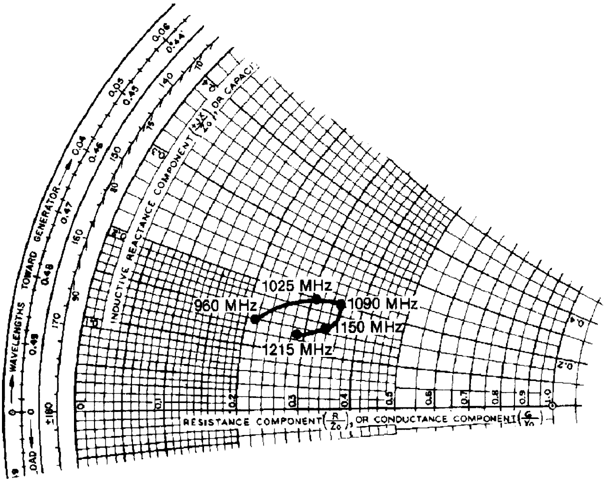


## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE

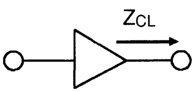



PIN = 250 MW
VCC = 35 V
Normalized to 50 ohms

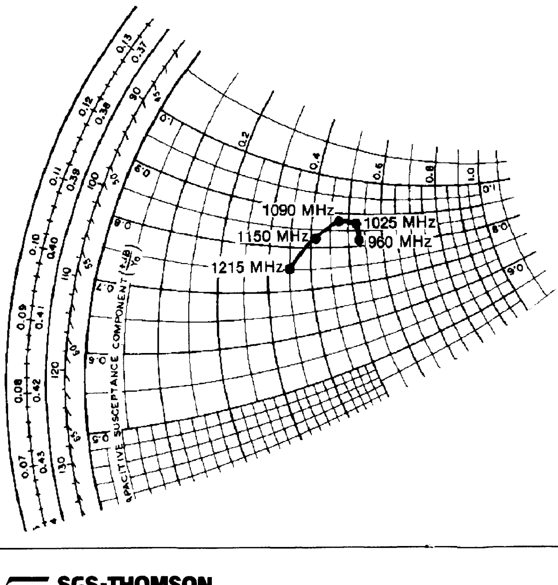



| FREQ. | ZIN (Ω) | ZCL (Ω) |
|---|---|---|
| 960 MHz | 10.7 + j 7.0 | 26.5 + j 41.0 |
| 1025 MHz | 15.3 + j 10.0 | 26.0 + j 43.5 |
| 1090 MHz | 17.8 + 10.2 | 23.5 + j 44.0 |
| 1150 MHz | 16.8 + j 15.0 | 20.5 + j 41.5 |
| 1215 MHz | 14.4 + j 13.0 | 17.5 + j 37.5 |

### TYPICAL COLLECTOR LOAD IMPEDANCE

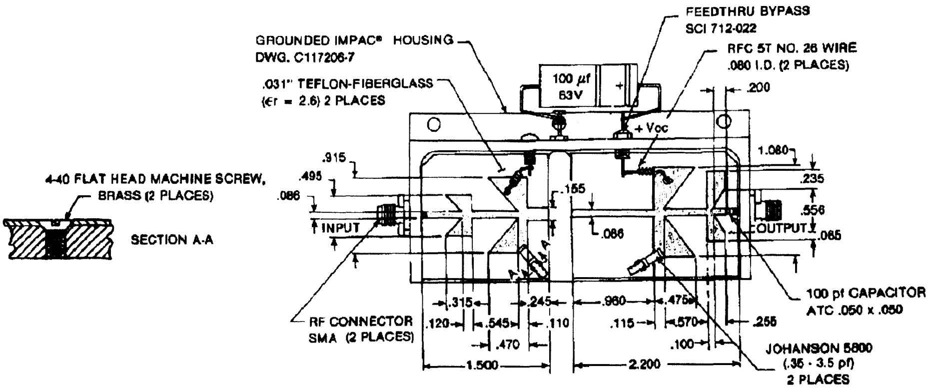



PIN = 250 MW
VCC = 35 V
Normalized to 50 ohms



## TEST CIRCUIT

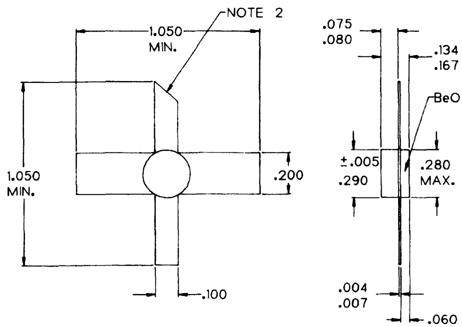
Ref.: Dwg. No. C127298




All dimensions are in inches.

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135032E



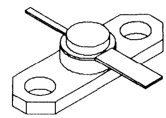

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD SLANT CUT.

SGS-THOMSON MICROELECTRONICS

# MSC3000

## RF & MICROWAVE TRANSISTORS GENERAL PURPOSE AMPLIFIER APPLICATIONS

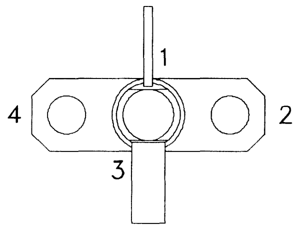
- COMMON BASE
- HIGH GAIN & EFFICIENCY TO 3.5 GHz
- HERMETIC STRIPAC® PACKAGE
- $P_{OUT}$ = 0.5 W MIN. WITH 7.0 dB GAIN @ 3 GHz



**.250 2LFL (S010)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| MSC3000 | 3000 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The MSC3000 is a hermetically sealed silicon NPN common base transistor featuring a unique matrix geometry to provide high gain, efficiency and output power at frequencies up to 3500 MHz.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 85$°C) | 2.5 | W |
| $I_C$ | Device Current* | 0.1 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 30 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 45 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

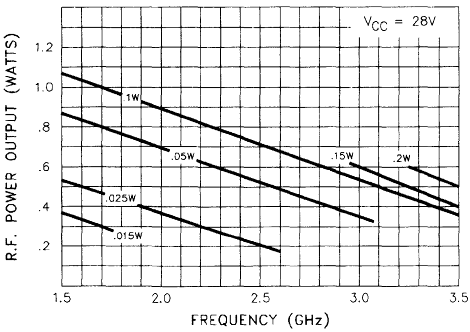
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 1mA | $I_E$ = 0mA | 50 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 5mA | $R_{BE}$ = 10Ω | 50 | — | — | V |
| $I_{CBO}$ | $V_{CE}$ = 28V | | — | — | 250 | µA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 50mA | 15 | — | 120 | — |

DYNAMIC

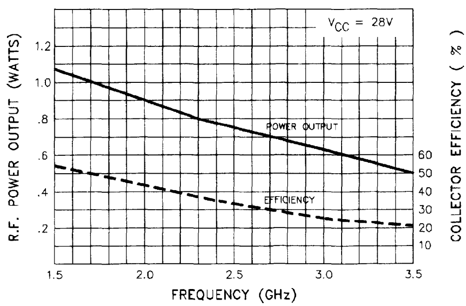
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 3.0 GHz | $P_{IN}$ = 0.10 W | $V_{CC}$ = 28 V | 0.5 | — | — | W |
| $\eta_C$ | f = 3.0 GHz | $P_{IN}$ = 0.10 W | $V_{CC}$ = 28 V | 25 | — | — | % |
| $G_P$ | f = 3.0 GHz | $P_{IN}$ = 0.10 W | $V_{CC}$ = 28 V | 7.0 | — | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 28 V | | — | — | 2.5 | pF |

## TYPICAL PERFORMANCE

### POWER OUTPUT vs FREQUENCY

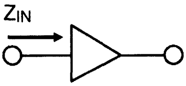


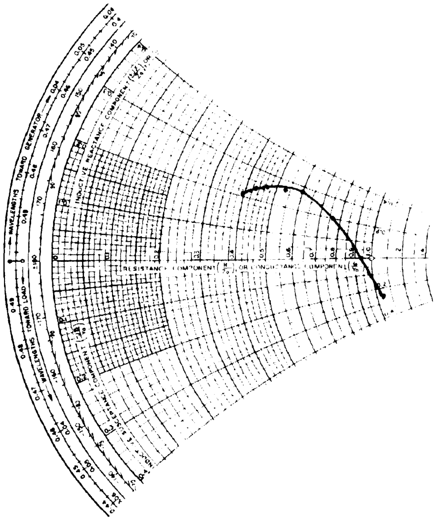

### SATURATED POWER OUTPUT & COLLECTOR EFFICIENCY vs FREQUENCY



## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE

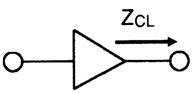


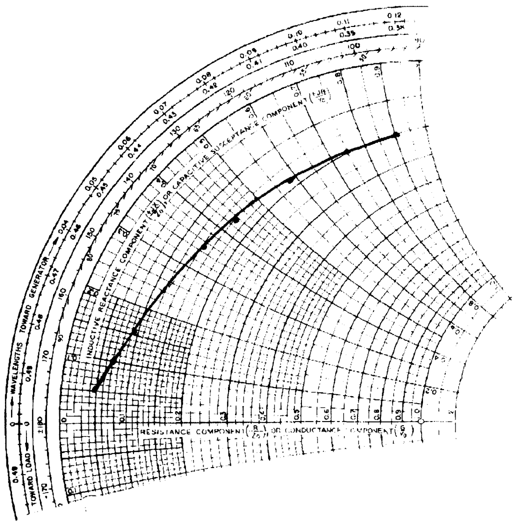



| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 1.5 GHz | 19.5 + j 10.5 | 10.0 + j 45.0 |
| 1.7 GHz | 21.5 + j 12.0 | 10.0 + j 37.5 |
| 2.0 GHz | 23.5 + j 13.0 | 9.1 + j 29.0 |
| 2.3 GHz | 26.5 + j 13.0 | 8.0 + j 21.5 |
| 2.5 GHz | 30 .0 + j 14.0 | 7.1 + j 17.5 |
| 3.0 GHz | 38.0 + j 10.0 | 4.5 + j 7.8 |
| 3.3 GHz | 47.0 + j 0.0 | 3.5 + j 5.0 |
| 3.5 GHz | 53.0 – j 12.5 | 2.5 + j 2.5 |

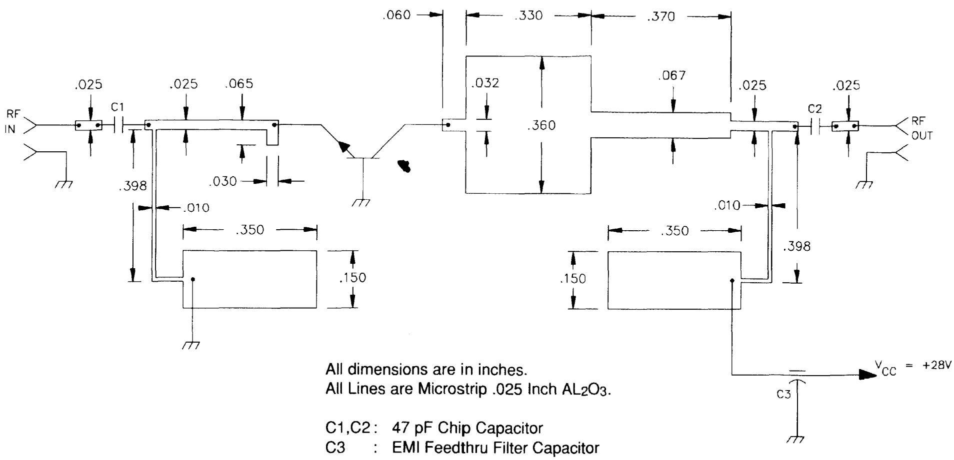
$P_{IN}$ = 0.1 W
$V_{CC}$ = 28 V
Normalized to 50 ohms

### TYPICAL COLLECTOR LOAD IMPEDANCE



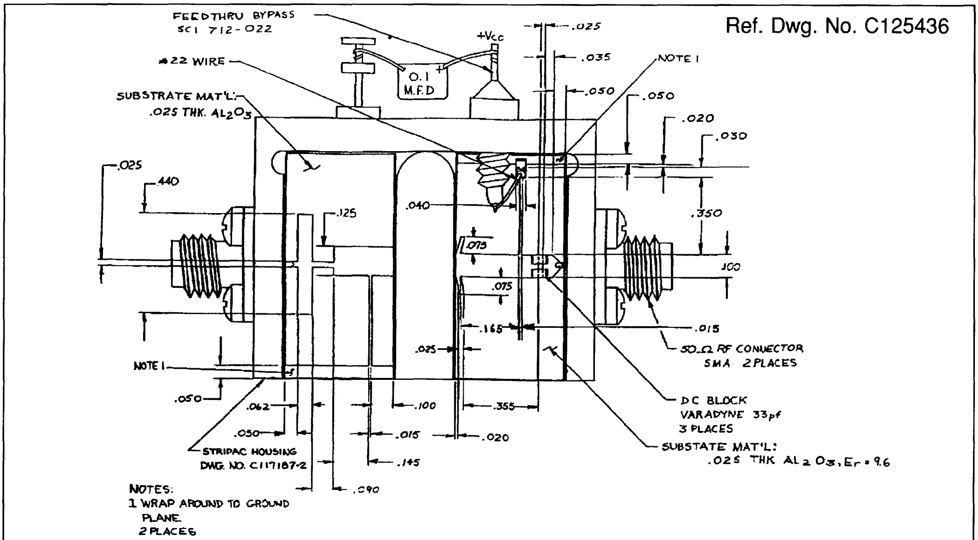
## TYPICAL 2.8 - 3.1 GHz AMPLIFIER CIRCUIT



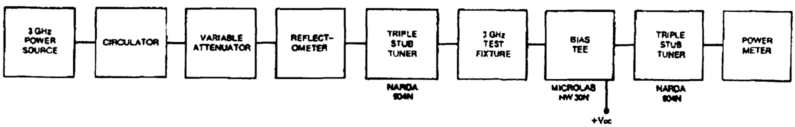

All dimensions are in inches.
All Lines are Microstrip .025 Inch $AL_2O_3$.

C1,C2 : 47 pF Chip Capacitor
C3 : EMI Feedthru Filter Capacitor

## TEST CIRCUIT

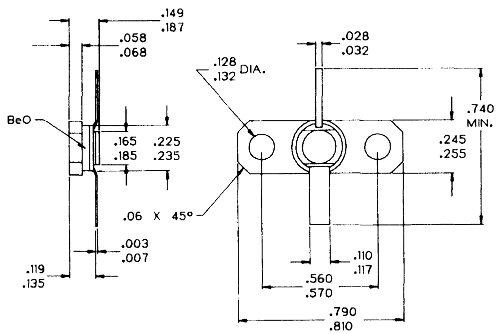



RF Amplifier Power Output Test



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135021C



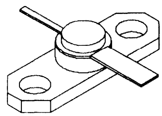

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED;
DIMENSIONS IN INCHES.

SGS-THOMSON
MICROELECTRONICS

# MSC4000

## RF & MICROWAVE TRANSISTORS GENERAL PURPOSE AMPLIFIER APPLICATIONS

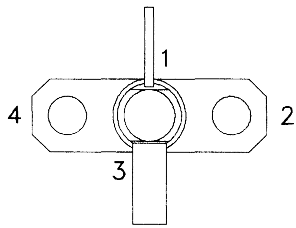
- VSWR CAPABILITY 3:1 @ RATED CONDITIONS
- HERMETIC STRIPAC® PACKAGE
- $P_{OUT}$ = 0.5 W MIN. WITH 5.0 dB GAIN @ 4.0 GHz



**.250 2LFL (S010)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| MSC4000 | 4000 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The MSC4000 is a common base hermetically sealed silicon NPN microwave power transistor featuring a unique Microgrid™ structure. This device is capable of withstanding a 3:1 load VSWR at any phase angle under rated conditions.

The MSC4000 was designed for Class C amplifier applications in the 2.0 - 4.4 GHz frequency range.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* | 3.89 | W |
| $I_C$ | Device Current* | 0.15 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 30 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 45 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

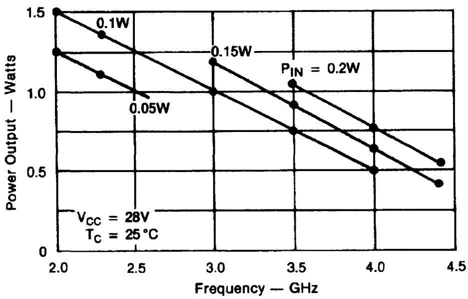
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 1mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 5mA | $R_{BE}$ = 10Ω | 45 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 28V | | — | — | 0.5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 100mA | 15 | — | 120 | — |

DYNAMIC

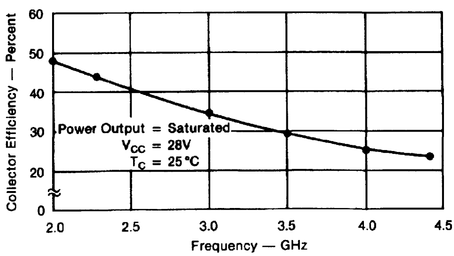
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 4.0 GHz | $P_{IN}$ = 0.16 W | $V_{CC}$ = 28 V | 0.5 | 0.60 | — | W |
| $\eta_C$ | f = 4.0 GHz | $P_{IN}$ = 0.16 W | $V_{CC}$ = 28 V | 25 | 27 | — | % |
| $G_P$ | f = 4.0 GHz | $P_{IN}$ = 0.16 W | $V_{CC}$ = 28 V | 5.0 | 5.8 | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 28 V | | — | — | 2.5 | pF |

## TYPICAL PERFORMANCE

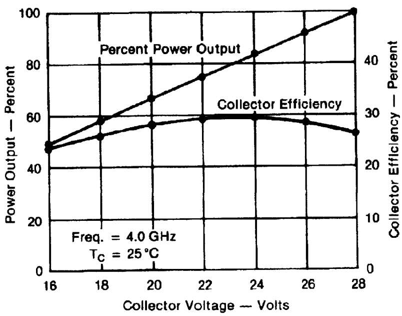
### TYPICAL POWER OUTPUT vs FREQUENCY




### TYPICAL COLLECTOR EFFICIENCY vs FREQUENCY

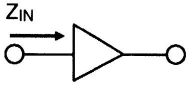


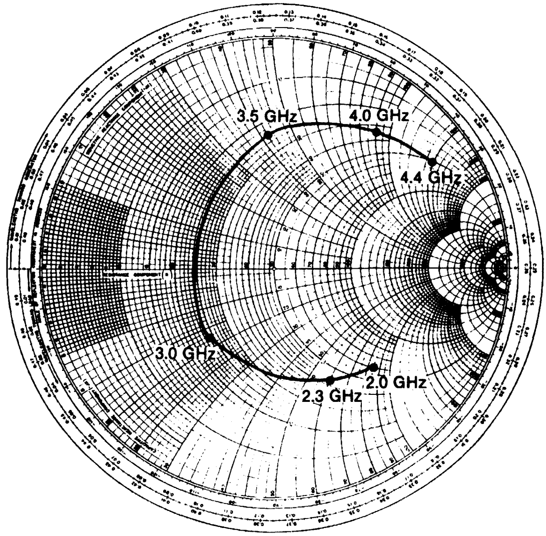

### RELATIVE POWER OUTPUT & COLLECTOR EFFICIENCY vs COLLECTOR VOLTAGE



## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE

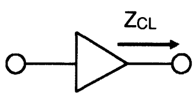


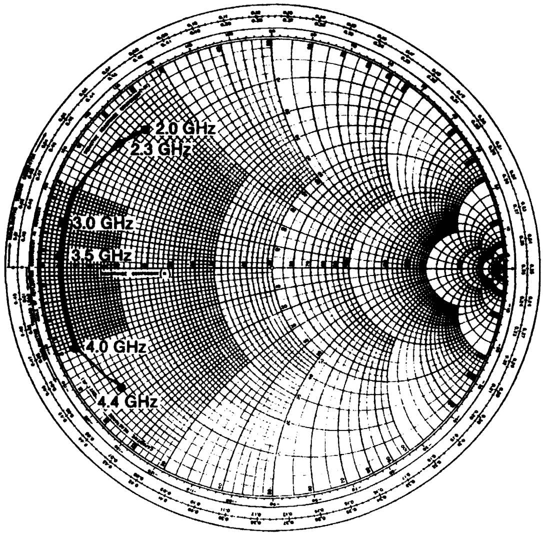




| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 2.0 GHz | 60.0 – j 85.0 | 6.0 + j 22.0 |
| 2.3 GHz | 42.0 – j 60.0 | 4.5 + j 18.0 |
| 3.0 GHz | 24.0 – j 17.5 | 2.0 + j 5.5 |
| 3.5 GHz | 24.0 + j 42.0 | 2.0 + j 1.3 |
| 4.0 GHz | 33.0 + j 90.0 | 2.0 – j 10.0 |
| 4.4 GHz | 50.0 + j 150.0 | 5.0 – j 17.5 |

$P_{OUT}$ = Saturated
$V_{CC}$ = 28 V
Normalized to 50 ohms

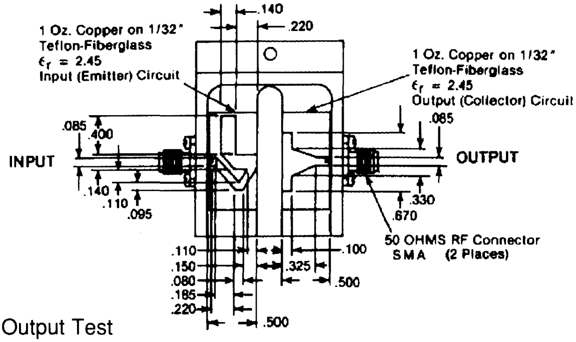
### TYPICAL COLLECTOR LOAD IMPEDANCE



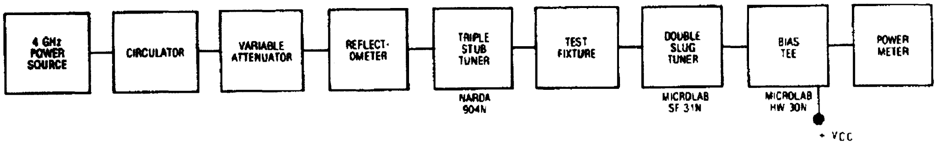



## TEST CIRCUIT

Ref.: Dwg. No. C125504B



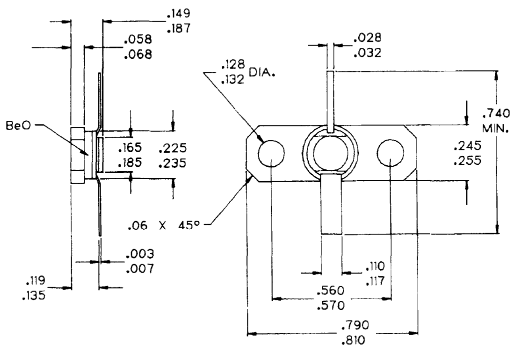

RF Amplifier Power Output Test




All dimensions are in inches.

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135021C



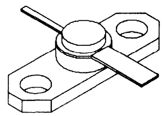

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED;
DIMENSIONS IN INCHES.

SGS-THOMSON
MICROELECTRONICS

# MSC4001

## RF & MICROWAVE TRANSISTORS GENERAL PURPOSE AMPLIFIER APPLICATIONS

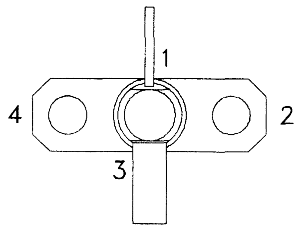
- VSWR CAPABILITY 3:1 @ RATED CONDITIONS
- HERMETIC STRIPAC® PACKAGE
- $P_{OUT}$ = 1.0 W MIN. WITH 5.0 dB GAIN @ 4.0 GHz



**.250 2LFL (S010)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| MSC4001 | 4001 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The MSC4001 is a common base hermetically sealed silicon NPN microwave power transistor featuring a unique Microgrid™ structure. This device is capable of withstanding a 3:1 load VSWR at any phase angle under rated conditions.

The MSC4001 was designed for Class C amplifier applications in the 2.0 - 4.4 GHz frequency range.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* | 7.0 | W |
| $I_C$ | Device Current* | 0.25 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 30 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 25 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

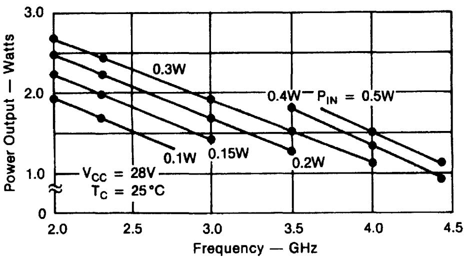
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 1mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 5mA | $R_{BE}$ = 10Ω | 45 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 28V | | — | — | 0.5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 100mA | 15 | — | 120 | — |

DYNAMIC

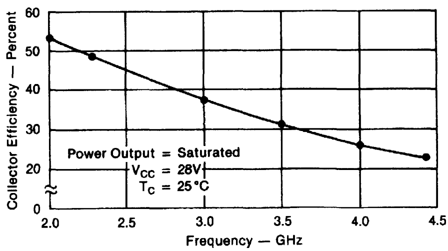
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 4.0 GHz | $P_{IN}$ = 0.32 W | $V_{CC}$ = 28 V | 1.0 | 1.2 | — | W |
| $\eta_C$ | f = 4.0 GHz | $P_{IN}$ = 0.32 W | $V_{CC}$ = 28 V | 25 | 27 | — | % |
| $G_P$ | f = 4.0 GHz | $P_{IN}$ = 0.32 W | $V_{CC}$ = 28 V | 5.0 | 5.8 | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 28 V | | — | — | 3.6 | pF |

## TYPICAL PERFORMANCE

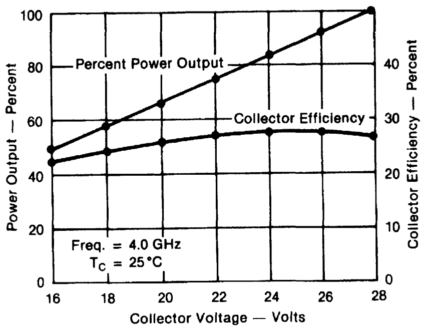
### TYPICAL POWER OUTPUT vs FREQUENCY




### TYPICAL COLLECTOR EFFICIENCY vs FREQUENCY

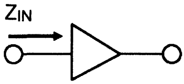


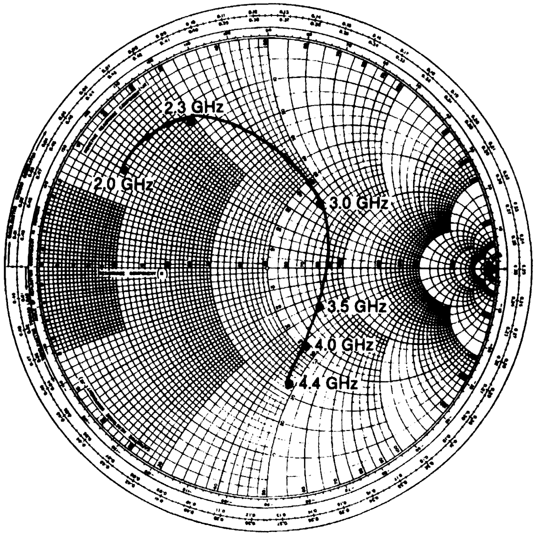

### RELATIVE POWER OUTPUT & COLLECTOR EFFICIENCY vs COLLECTOR VOLTAGE



## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE

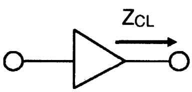


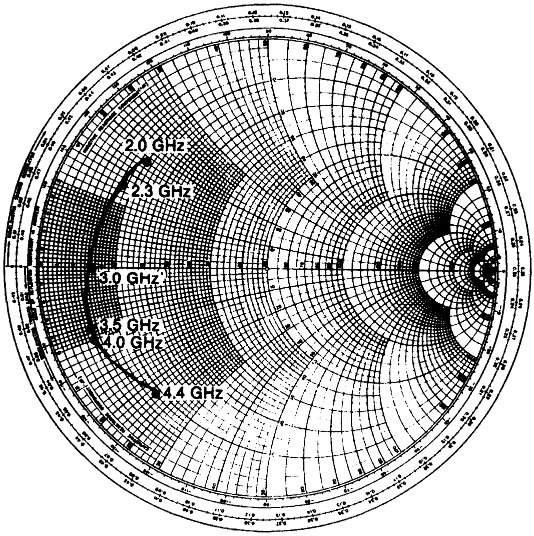




| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 2.0 GHz | 7.5 + j 15.0 | 10.0 + j 18.0 |
| 2.3 GHz | 11.0 + j 29.0 | 8.5 + j 13.0 |
| 3.0 GHz | 65.0 + j 42.5 | 6.0 + j 0.0 |
| 3.5 GHz | 65.0 − j 27.5 | 5.0 − j 8.5 |
| 4.0 GHz | 53.0 − j 42.5 | 5.0 − j 10.0 |
| 4.4 GHz | 33.0 − j 48.0 | 9.0 − j 22.0 |

$P_{OUT}$ = Saturated
$V_{CC}$ = 28 V
Normalized to 50 ohms

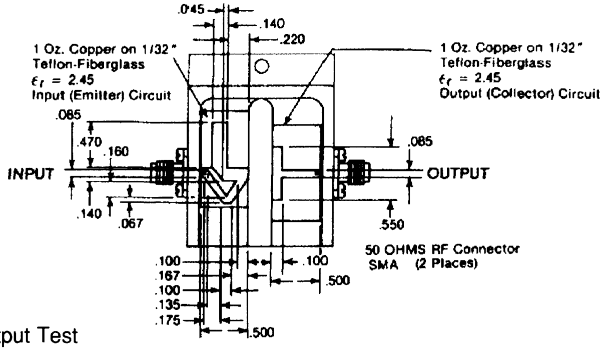
### TYPICAL COLLECTOR LOAD IMPEDANCE



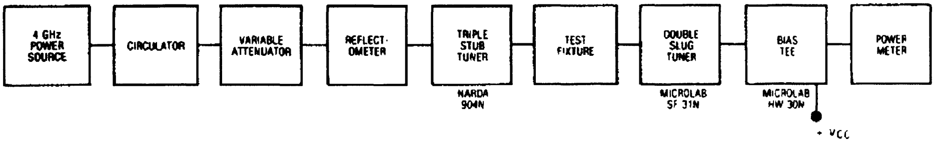



## TEST CIRCUIT

Ref.: Dwg. No. C125505B



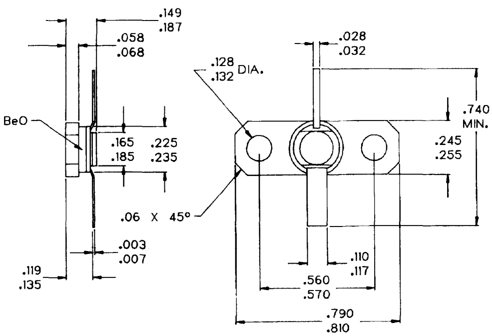

RF Amplifier Power Output Test




All dimensions are in inches.

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135021C



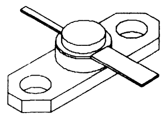

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.

SGS-THOMSON MICROELECTRONICS

# MSC4003

## RF & MICROWAVE TRANSISTORS GENERAL PURPOSE AMPLIFIER APPLICATIONS

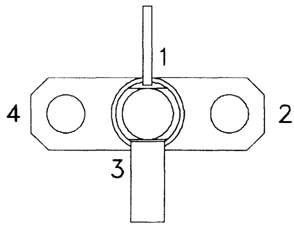
- VSWR CAPABILITY 3:1 @ RATED CONDITIONS
- HERMETIC STRIPAC® PACKAGE
- $P_{OUT}$ = 2.5 W MIN. WITH 5.0 dB GAIN @ 4.0 GHz



**.250 2LFL (S010)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| MSC4003 | 4003 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The MSC4003 is a common base hermetically sealed silicon NPN microwave power transistor featuring a unique Microgrid™ structure. This device is capable of withstanding a 3:1 load VSWR at any phase angle under rated conditions.

The MSC4003 was designed for Class C amplifier applications in the 2.0 - 4.4 GHz frequency range.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* | 14.0 | W |
| $I_C$ | Device Current* | 0.5 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 30 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 12.5 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

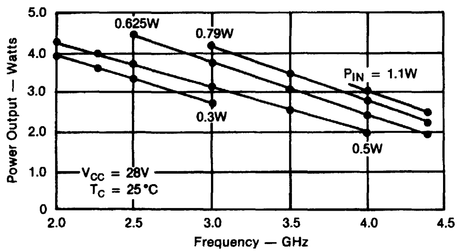
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 2.5mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 5mA | $R_{BE}$ = 10Ω | 45 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 28V | | — | — | 0.5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 250mA | 15 | — | 120 | — |

DYNAMIC

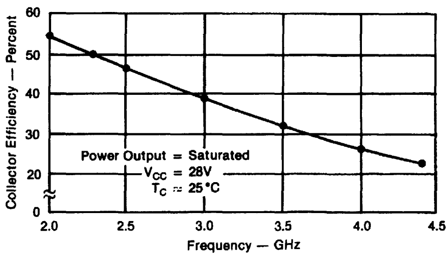
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 4.0 GHz | $P_{IN}$ = 0.79 W | $V_{CC}$ = 28 V | 2.5 | 2.7 | — | W |
| $\eta_C$ | f = 4.0 GHz | $P_{IN}$ = 0.79 W | $V_{CC}$ = 28 V | 25 | 27 | — | % |
| $G_P$ | f = 4.0 GHz | $P_{IN}$ = 0.79 W | $V_{CC}$ = 28 V | 5.0 | 5.3 | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 28 V | | — | — | 5.0 | pF |

## TYPICAL PERFORMANCE

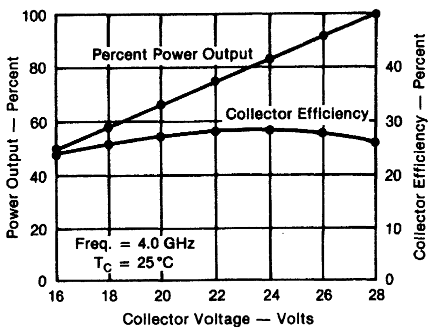
### TYPICAL POWER OUTPUT vs FREQUENCY




### TYPICAL COLLECTOR EFFICIENCY vs FREQUENCY

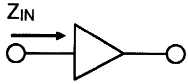


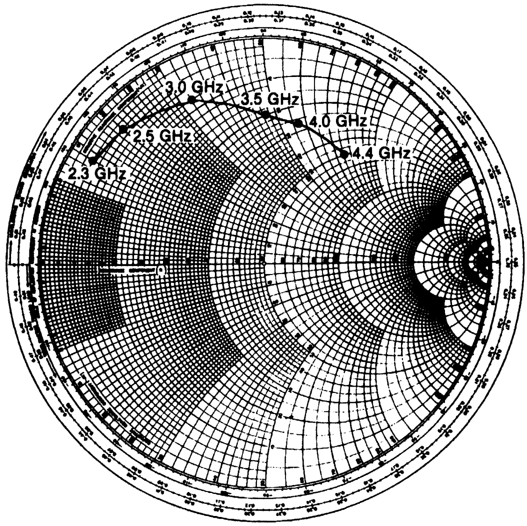

### RELATIVE POWER OUTPUT & COLLECTOR EFFICIENCY vs COLLECTOR VOLTAGE



## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE

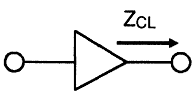


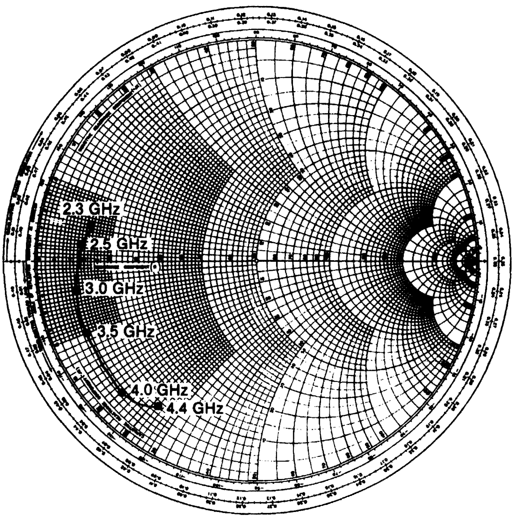




| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 2.3 GHz | 3.0 + j 14.0 | 6.5 + j 5.5 |
| 2.5 GHz | 4.0 + j 20.0 | 5.3 + j 2.5 |
| 3.0 GHz | 8.0 + j 32.0 | 4.5 – j 4.0 |
| 3.5 GHz | 20.0 + j 47.0 | 4.5 – j 10.0 |
| 4.0 GHz | 27.0 + j 57.0 | 4.5 – j 20.0 |
| 4.4 GHz | 50.0 + j 75.0 | 7.0 – j 26.0 |

$P_{OUT}$ = Saturated
$V_{CC}$ = 28 V
Normalized to 50 ohms

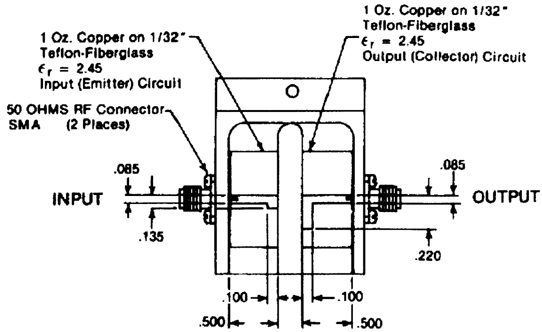
### TYPICAL COLLECTOR LOAD IMPEDANCE



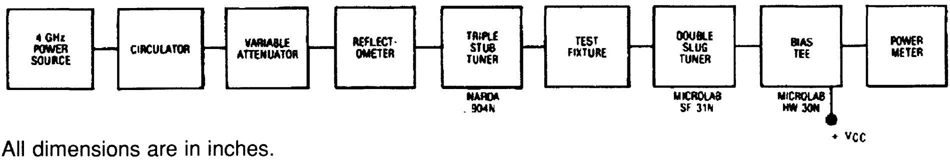



## TEST CIRCUIT

Ref.: Dwg. No. C125506B



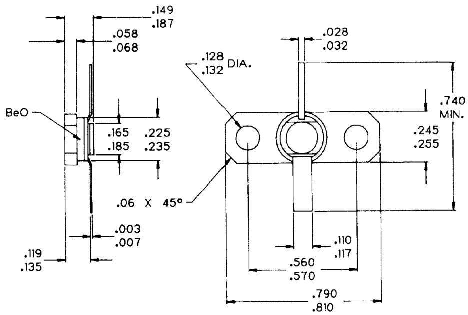

RF Amplifier PowerOutput Test




All dimensions are in inches.

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135021C



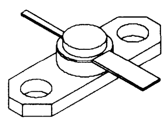

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.

SGS-THOMSON MICROELECTRONICS

# MSC80064

## RF & MICROWAVE TRANSISTORS GENERAL PURPOSE LINEAR APPLICATIONS

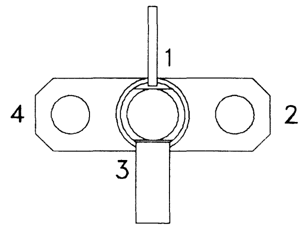
- EMITTER BALLASTED
- CLASS A LINEAR OPERATION
- COMMON EMITTER
- VSWR CAPABILITY 20:1 @ RATED CONDITIONS
- ft 3.2 GHz TYPICAL
- NOISE FIGURE 11 dB @ 3 GHz
- $P_{OUT}$ = 20.5 dBm MIN. @ 2 GHz



**.250 2LFL (S011)**
hermetically sealed

| ORDER CODE | BRANDING |
| --- | --- |
| MSC80064 | 80064 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

### DESCRIPTION

The MSC80064 is a hermetically sealed NPN power transistor featuring a unique matrix structure. This device is specifically designed for Class A linear applications to provide high gain and high output power at the 1.0 dB compression point.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
| --- | --- | --- | --- |
| $P_{DISS}$ | Power Dissipation (see Safe Area) | — | W |
| $I_C$ | Device Bias Current | 100 | mA |
| $V_{CE}$ | Collector-Emitter Bias Voltage* | 20 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
| --- | --- | --- | --- |
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 45 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 1mA | $I_E$ = 0mA | 50 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CEO}$ | IC = 5mA | $I_B$ = 0mA | 20 | — | — | V |
| $I_{CEO}$ | $V_{CE}$ = 18V | | — | — | 0.5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 50mA | 15 | — | 120 | — |

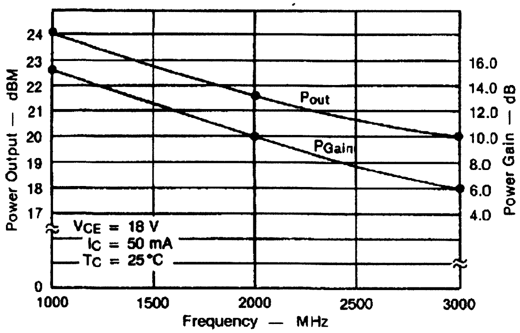
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $G_P$* | f = 2.0 GHz | $P_{OUT}$ = 20.5 dBm | | 9.0 | 10.0 | — | dB |
| $\Delta G_P$* | f = 2.0 GHz | $P_{OUT}$ = 20.5 dBm | $\Delta P_{OUT}$ = 10 dB | — | — | 1 | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 28 V | | — | — | 2.5 | pF |

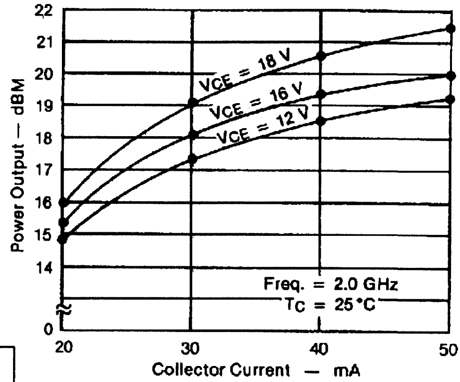
*Note: $V_{CE}$ = 18 V
$I_E$ = 50 mA

## TYPICAL PERFORMANCE

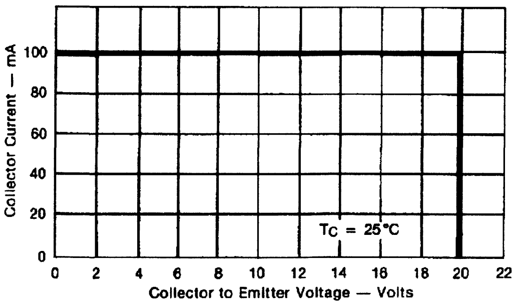
### TYPICAL POWER OUTPUT & GAIN @ 1dB COMPRESSION POINT vs FREQUENCY



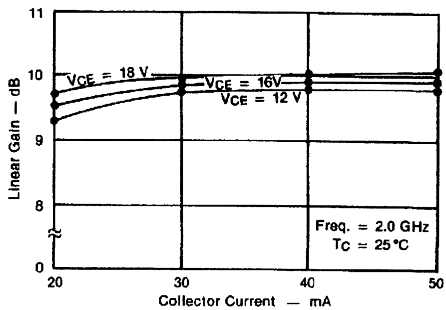

### TYPICAL POWER OUTPUT & GAIN @ 1dB COMPRESSION POINT vs COLLECTOR EFFICIENCY




### MAXIMUM OPERATING AREA FOR FORWARD BIAS OPERATION

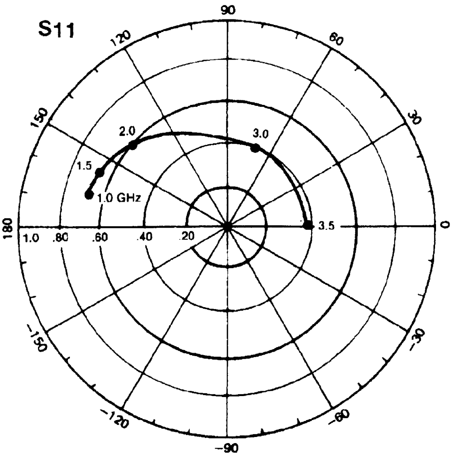



### TYPICAL LINEAR GAIN vs COLLECTOR CURRENT

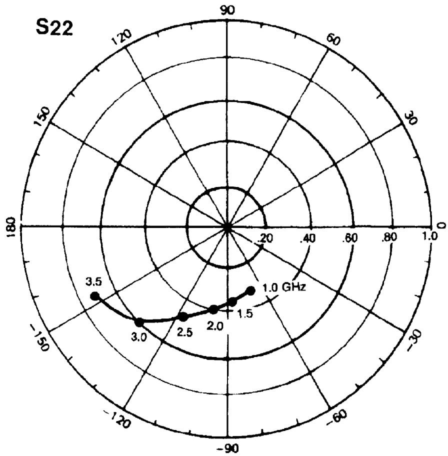


## TYPICAL S–PARAMETERS

S11

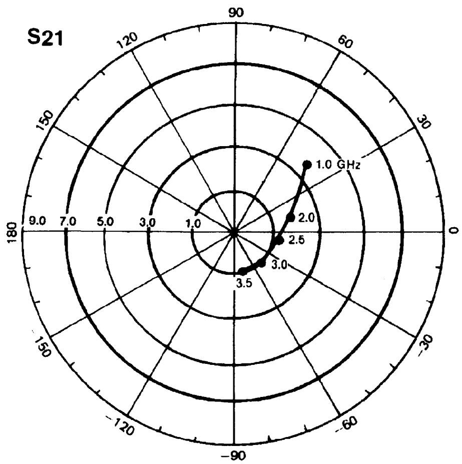



S22

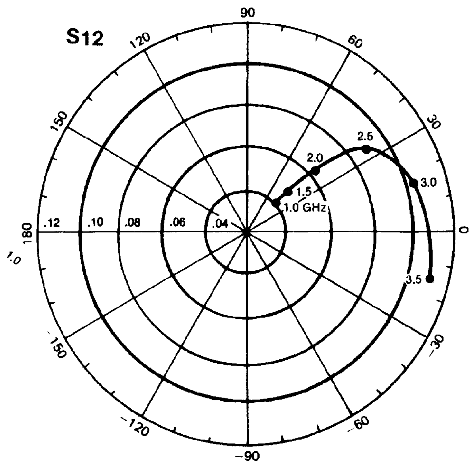



$V_{CE}$ = 18 V
$I_C$ = mA
Zg = 50 ohms

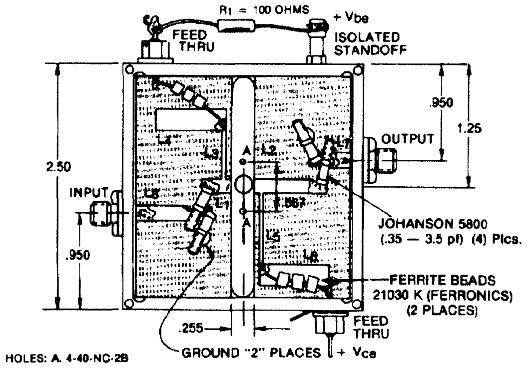
S21

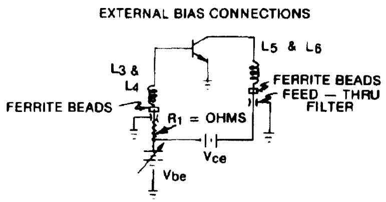



S12



## TEST CIRCUIT




Ref: Dwg. No. J127066

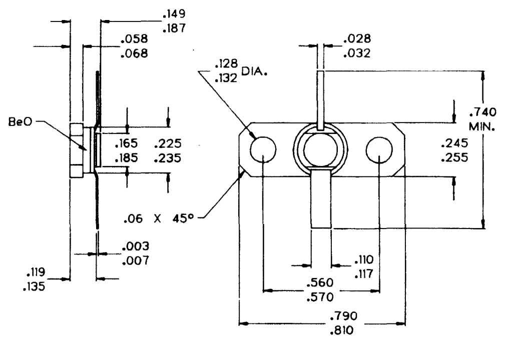
Notes: 1: Dielectric: Teflon-Fiberglass, 1/16 in. th'k ( $\epsilon_r$ = 2.6)
2. Input-Output Connectors — OSM 204CC or Equiv.

| Line | L1 | L2 | L3 | L4 | L5 | L6 | L7 | L8 |
|---|---|---|---|---|---|---|---|---|
| Lengths | 0.63 | 0.89 | 0.925 | 0.925 | 0.925 | 0.925 | 0.61 | 0.87 |
| Width | 0.16 | 0.16 | 0.03 | 0.25 | 0.03 | 0.25 | 0.16 | 0.16 |

All dimensions are in inches.

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135021C



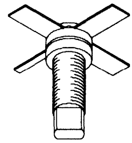

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED;
DIMENSIONS IN INCHES.

SGS-THOMSON MICROELECTRONICS

# MSC80185

## RF & MICROWAVE TRANSISTORS GENERAL PURPOSE LINEAR APPLICATIONS

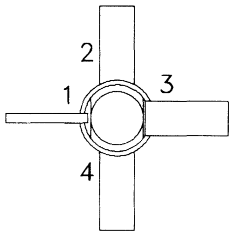
- EMITTER BALLASTED
- CLASS A LINEAR OPERATION
- COMMON EMITTER
- VSWR CAPABILITY 20:1 @ RATED CONDITIONS
- ft 3.2 GHz TYPICAL
- NOISE FIGURE 12.0 dB @ 2 GHz
- $P_{OUT}$ = 28 dBm MIN. @ 2.0 GHz



**.230 4L STUD (S027)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| MSC80185 | 80185 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

### DESCRIPTION

The MSC80185 is a hermetically sealed NPN power transistor featuring a unique matrix structure. This device is specifically designed for Class A linear applications to provide high gain and high output power at the 1.0 dB compression point.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation (see Safe Area) | — | W |
| $I_C$ | Device Bias Current | 300 | mA |
| $V_{CE}$ | Collector-Emitter Bias Voltage* | 20 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 35 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 1mA | $I_E$ = 0mA | 50 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CEO}$ | IC = 5mA | $I_B$ = 0mA | 20 | — | — | V |
| $I_{CEO}$ | $V_{CE}$ = 18V | | — | — | 0.5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 100mA | 15 | — | 120 | — |

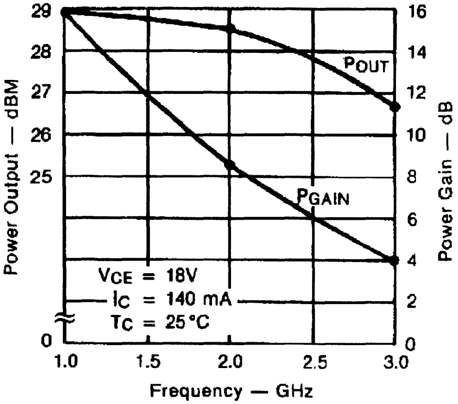
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $G_P$* | f = 2.0 GHz | $P_{OUT}$ = 28 dBm | | 7.5 | 8.5 | — | dB |
| $\Delta G_P$* | f = 2.0 GHz | $P_{OUT}$ = 28 dBm | $\Delta P_{OUT}$ = 10 dB | — | — | 1 | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 28 V | | — | — | 3.0 | pF |

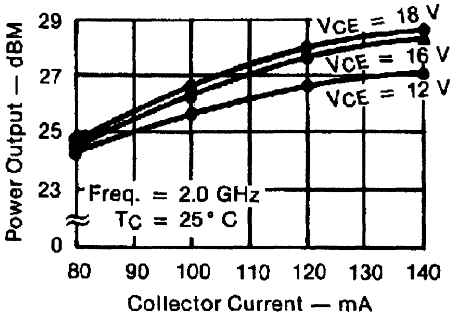
* Note: $V_{CE}$ = 18V
$I_C$ = 140mA

## TYPICAL PERFORMANCE

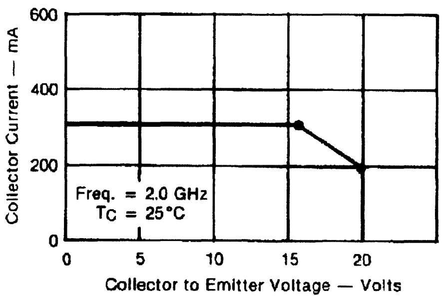
### TYPICAL POWER OUTPUT & GAIN @ 1dB COMPRESSION POINT vs FREQUENCY



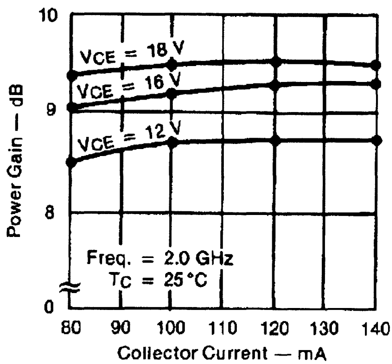

### TYPICAL POWER OUTPUT & GAIN @ 1dB COMPRESSION POINT vs COLLECTOR CURRENT



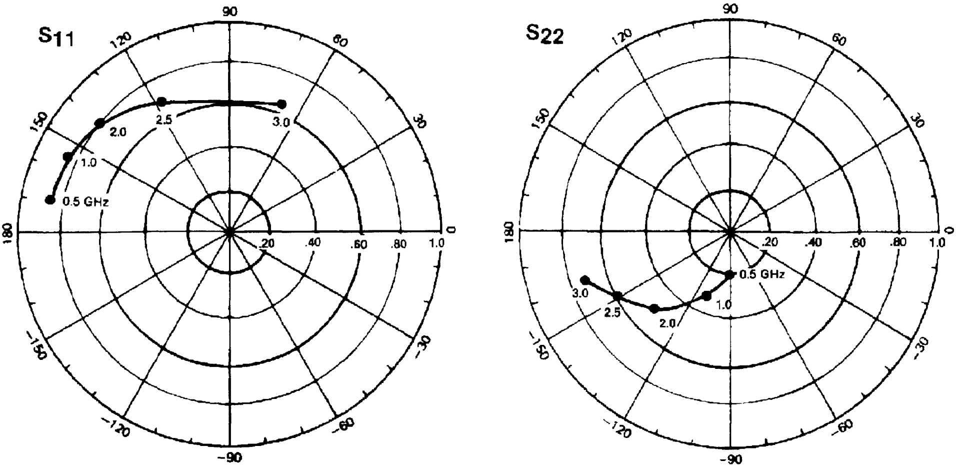

### MAXIMUM OPERATING AREA FOR FORWARD BIAS OPERATION



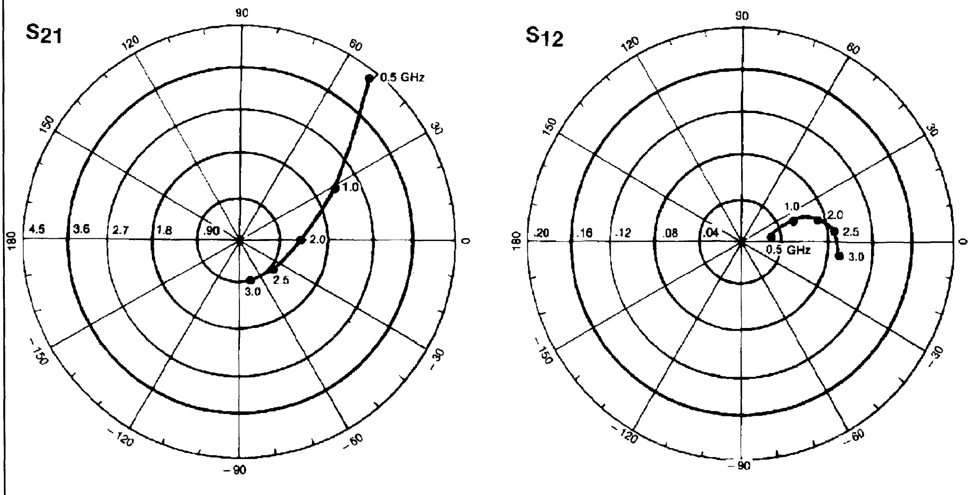

### TYPICAL LINEAR GAIN vs COLLECTOR CURRENT



## TYPICAL S–PARAMETERS

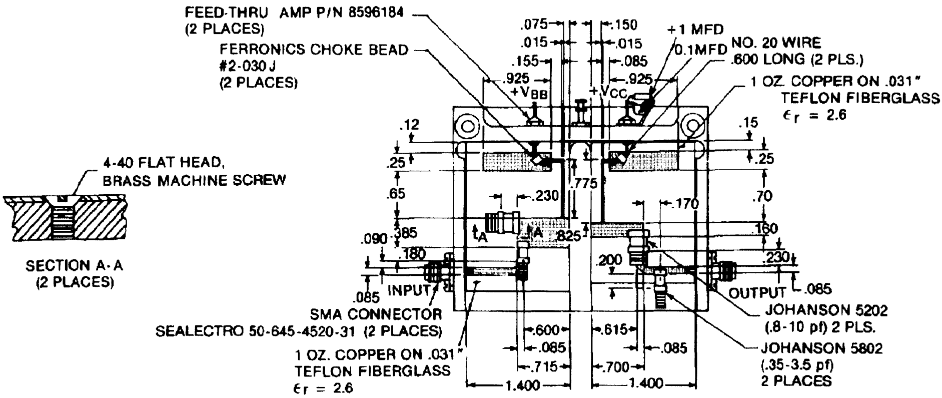



$V_{CE} = 18$ V
$I_C = 140$ mA
$Zg = 50$ ohms



## TEST CIRCUIT

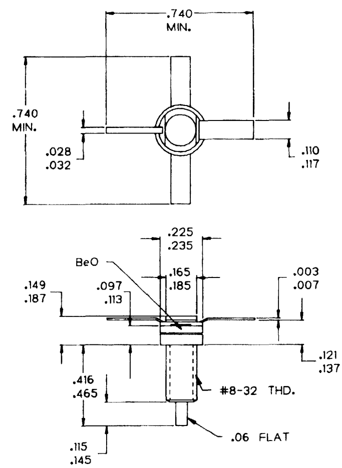
Ref.: Dwg. No. C127304A




All dimensions are in inches.

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135023F



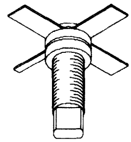

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.

SGS-THOMSON MICROELECTRONICS

# MSC80186

## RF & MICROWAVE TRANSISTORS GENERAL PURPOSE LINEAR APPLICATIONS

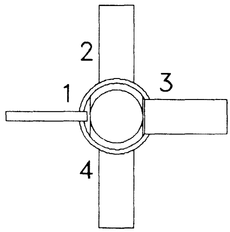
- EMITTER BALLASTED
- CLASS A LINEAR OPERATION
- COMMON EMITTER
- VSWR CAPABILITY 15:1 @ RATED CONDITIONS
- ft 3.2 GHz TYPICAL
- NOISE FIGURE 12.5 dB @ 2 GHz
- $P_{OUT}$ = 30.0 dBm MIN.



**.230 4L STUD (S027)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| MSC80186 | 80186 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

## DESCRIPTION

The MSC80185 is a hermetically sealed NPN power transistor featuring a unique matrix structure. This device is specifically designed for Class A linear applications to provide high gain and high output power at the 1.0 dB compression point.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation (see Safe Area) | — | W |
| $I_C$ | Device Bias Current | 500 | mA |
| $V_{CE}$ | Collector-Emitter Bias Voltage* | 20 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 17 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 1mA | $I_E$ = 0mA | 50 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CEO}$ | IC = 5mA | $I_B$ = 0mA | 20 | — | — | V |
| $I_{CEO}$ | $V_{CE}$ = 18V | | — | — | 1.0 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = mA | 15 | — | 120 | — |

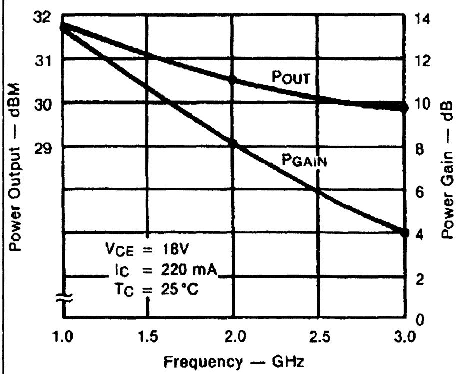
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $G_P$* | f = 2.0 GHz | $P_{OUT}$ = 30.0 dBm | | 7.0 | 9.0 | — | dB |
| $\Delta G_P$* | f = 2.0 GHz | $P_{OUT}$ = 30.0 dBm | $\Delta P_{OUT}$ = 10 dB | — | — | 1 | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 28 V | | — | — | 5.0 | pF |

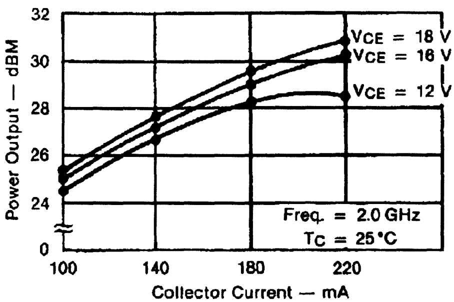
* Note: $V_{CE}$ = 18V
$I_C$ = 220mA

## TYPICAL PERFORMANCE

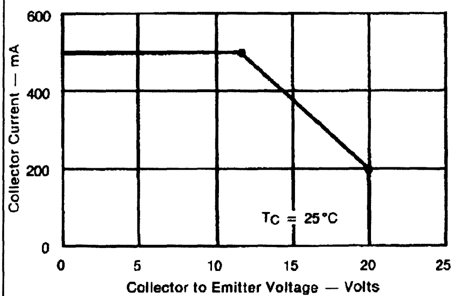
### TYPICAL POWER OUTPUT & GAIN @ 1dB COMPRESSION POINT vs FREQUENCY



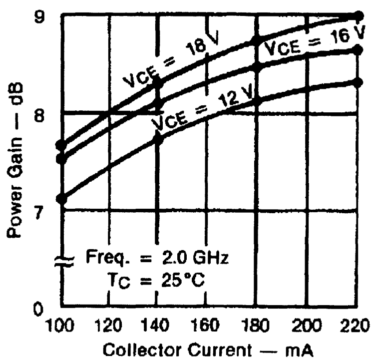

### TYPICAL POWER OUTPUT & GAIN @ 1dB COMPRESSION POINT vs COLLECTOR CURRENT



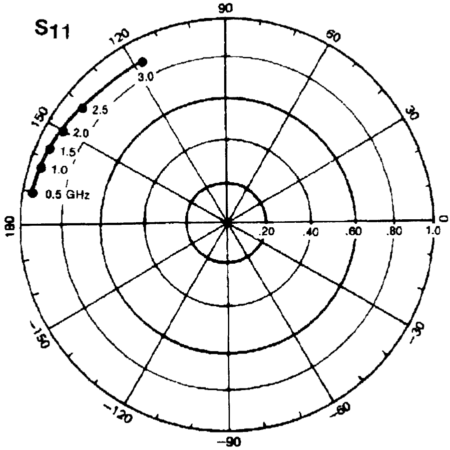

### MAXIMUM OPERATING AREA FOR FORWARD BIAS OPERATION

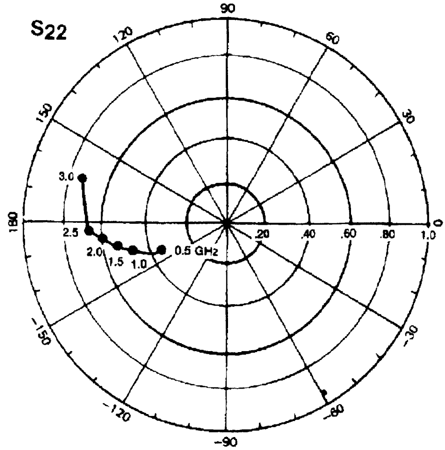



### TYPICAL LINEAR GAIN vs COLLECTOR CURRENT

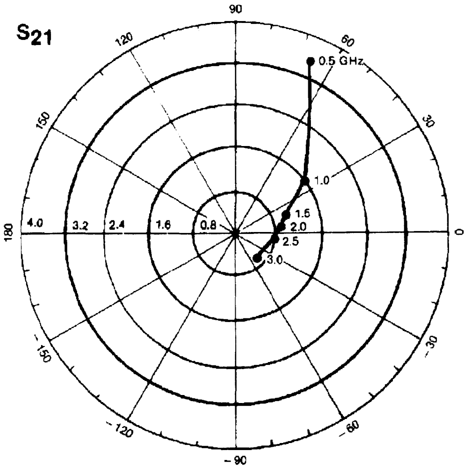


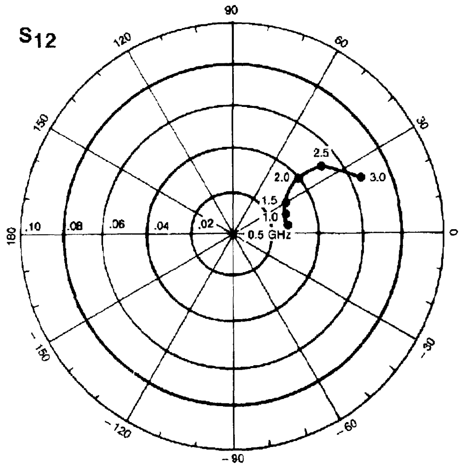
## TYPICAL S-PARAMETERS



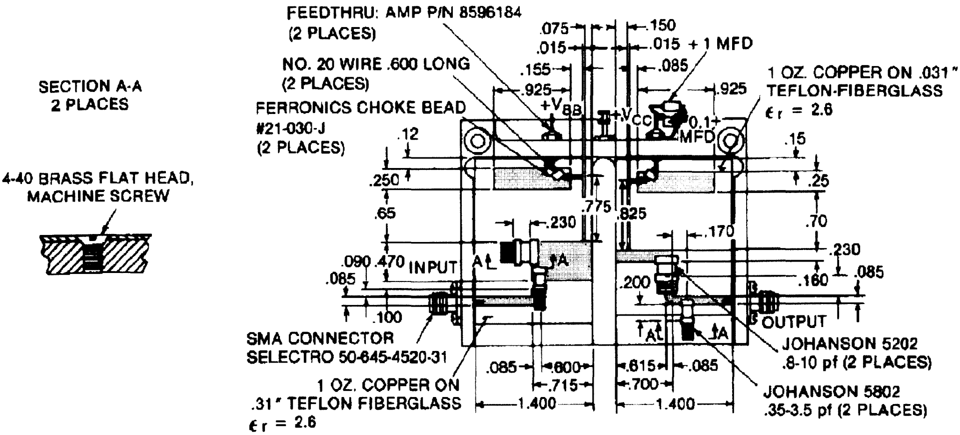

$V_{CE} = 18$ V
$I_C = 220$ mA
Zg = 50 ohms



## TEST CIRCUIT

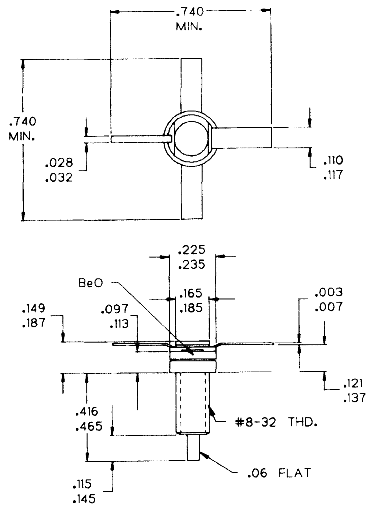
Ref.: Dwg. No. C127305




All dimensions are in inches.

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135023F



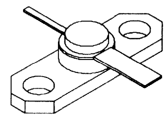

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.

SGS-THOMSON MICROELECTRONICS

# MSC80195

## RF & MICROWAVE TRANSISTORS GENERAL PURPOSE LINEAR APPLICATIONS

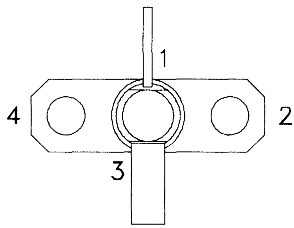
- EMITTER BALLASTED
- CLASS A LINEAR OPERATION
- COMMON EMITTER
- VSWR CAPABILITY 20:1 @ RATED CONDITIONS
- ft 3.2 GHz TYPICAL
- NOISE FIGURE 12.0 dB @ 2 GHz
- $P_{OUT}$ = 28 dBm MIN. @ 2.0 GHz



**.250 2LFL (S011)**
hermetically sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| MSC80195 | 80195 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Baser
4. Emitter

### DESCRIPTION

The MSC80195 is a hermetically sealed NPN power transistor featuring a unique matrix structure. This device is specifically designed for Class A linear applications to provide high gain and high output power at the 1.0 dB compression point.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation (see Safe Area) | — | W |
| $I_C$ | Device Bias Current | 300 | mA |
| $V_{CE}$ | Collector-Emitter Bias Voltage* | 20 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 35 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

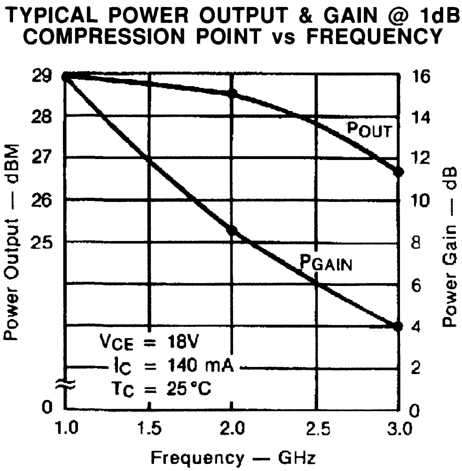
| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 1mA | $I_E$ = 0mA | 50 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CEO}$ | IC = 5mA | $I_B$ = 0mA | 20 | — | — | V |
| $I_{CEO}$ | $V_{CE}$ = 18V | | — | — | 0.5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 100mA | 15 | — | 120 | — |

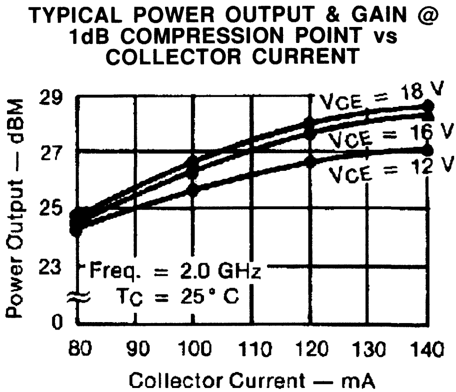
DYNAMIC

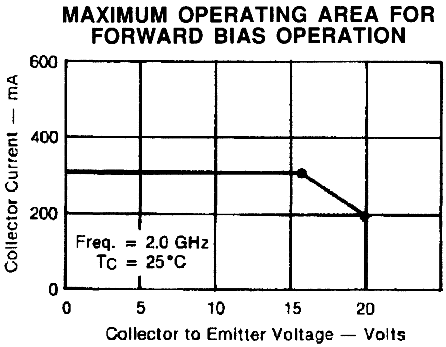
| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $G_P$* | f = 2.0 GHz | $P_{OUT}$ = 28 dBm | | — | — | 1 | dB |
| $\Delta G_P$* | f = 2.0 GHz | $P_{OUT}$ = 28 dBm | $\Delta P_{OUT}$ = 10 dB | 7.5 | 8.5 | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 28 V | | — | — | 3.0 | pF |

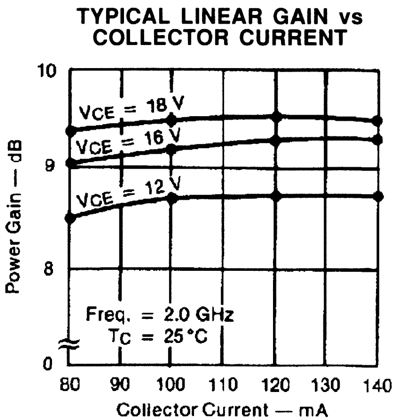
* Note: $V_{CE}$ = 18 V
$I_C$ = 140mA

## TYPICAL PERFORMANCE

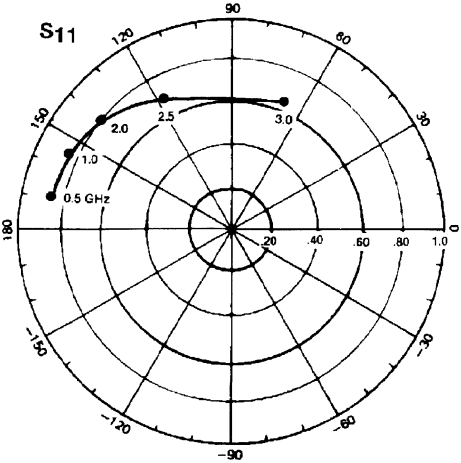


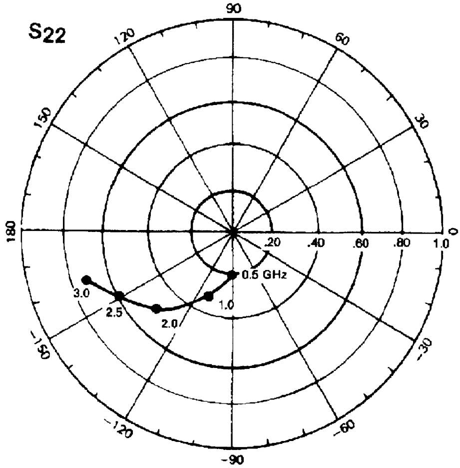



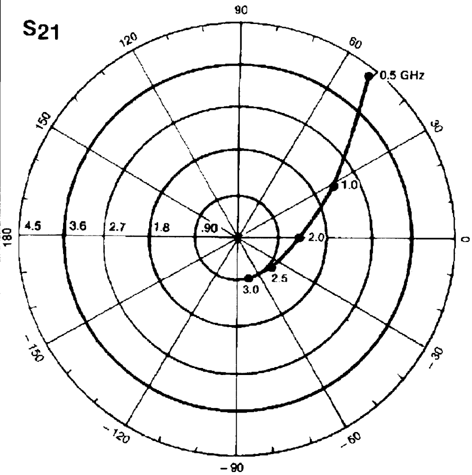



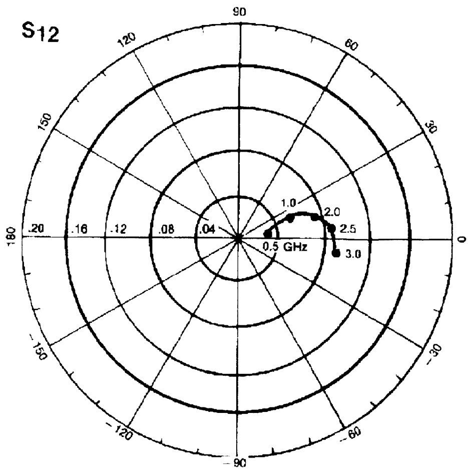
## TYPICAL S–PARAMETERS



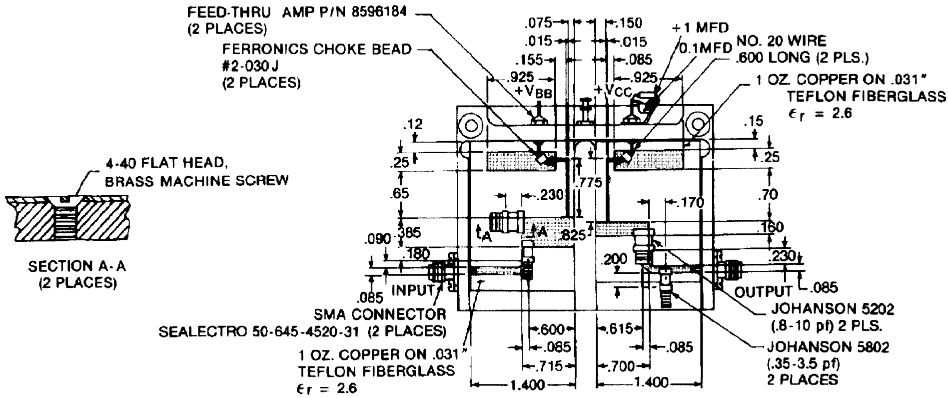

$V_{CE}$ = 18 V
$I_C$ = 140mA
Zg = 50 ohms



## TEST CIRCUIT

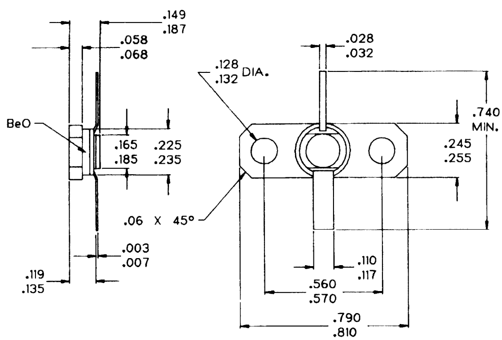
Ref.: Dwg. No. C127304A




All dimensions are in inches.

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135021C



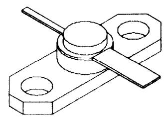

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED;
DIMENSIONS IN INCHES.

**SGS-THOMSON MICROELECTRONICS**

# MSC80196

## RF & MICROWAVE TRANSISTORS GENERAL PURPOSE LINEAR APPLICATIONS

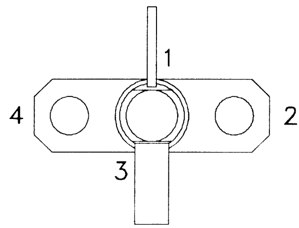
- EMITTER BALLASTED
- CLASS A LINEAR OPERATION
- COMMON EMITTER
- VSWR CAPABILITY 15:1 @ RATED CONDITIONS
- ft 3.2 GHz TYPICAL
- NOISE FIGURE 12.5 dB @ 2 GHz
- $P_{OUT}$ = 30.0 dBm MIN.



**.250 2LFL (S011)**
hermetically sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| MSC80196 | 80196 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

### DESCRIPTION

The MSC80196 is a hermetically sealed NPN power transistor featuring a unique matrix structure. This device is specifically designed for Class A linear applications to provide high gain and high output power at the 1.0 dB compression point.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation (see Safe Area) | — | W |
| $I_C$ | Device Bias Current | 500 | mA |
| $V_{CE}$ | Collector-Emitter Bias Voltage* | 20 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 17 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 1mA | $I_E$ = 0mA | 50 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CEO}$ | IC = 5mA | $I_B$ = 0mA | 20 | — | — | V |
| $I_{CEO}$ | $V_{CE}$ = 18V | | — | — | 1.0 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = mA | 15 | — | 120 | — |

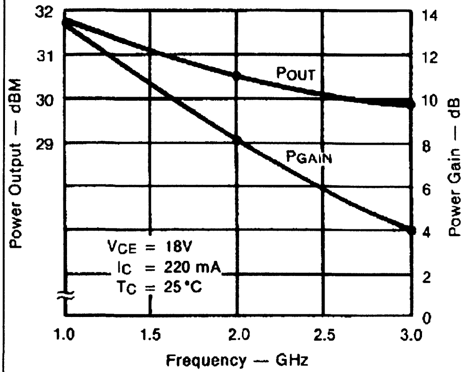
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $G_P$* | f = 2.0 GHz | $P_{OUT}$ = 30.0 dBm | | 7.0 | 9.0 | — | dB |
| $\Delta G_P$* | f = 2.0 GHz | $P_{OUT}$ = 30.0 dBm | $\Delta P_{OUT}$ = 10 dB | — | — | 1 | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 28 V | | — | — | 5.0 | pF |

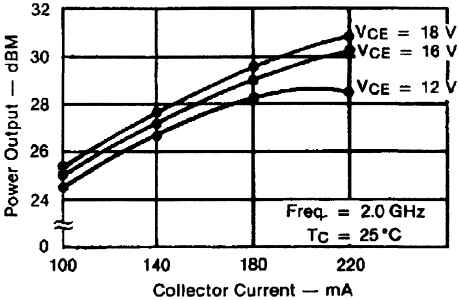
* Note: $V_{CE}$ = 18V
$I_C$ = 220mA

## TYPICAL PERFORMANCE

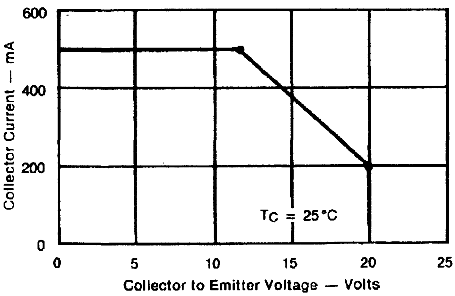
### TYPICAL POWER OUTPUT & GAIN @ 1dB COMPRESSION POINT vs FREQUENCY



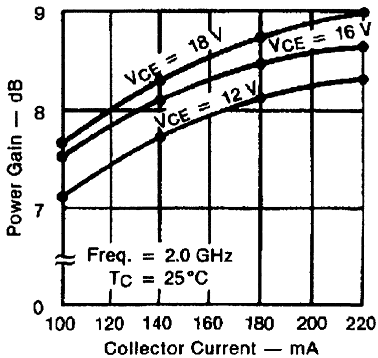

### TYPICAL POWER OUTPUT & GAIN @ 1dB COMPRESSION POINT vs COLLECTOR CURRENT




### MAXIMUM OPERATING AREA FOR FORWARD BIAS OPERATION

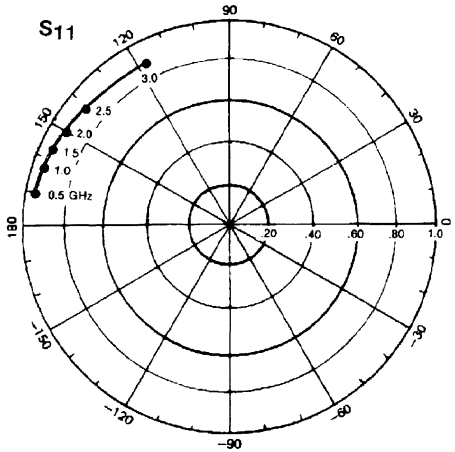



### TYPICAL LINEAR GAIN vs COLLECTOR CURRENT

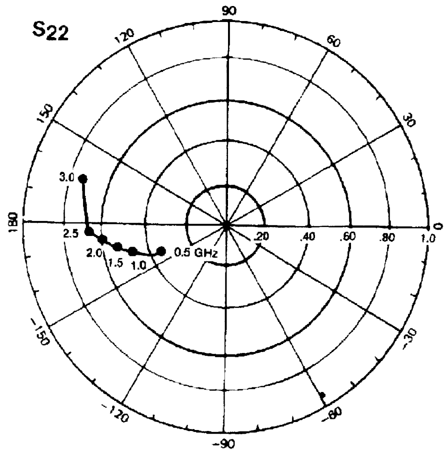


## TYPICAL S–PARAMETERS

$S_{11}$

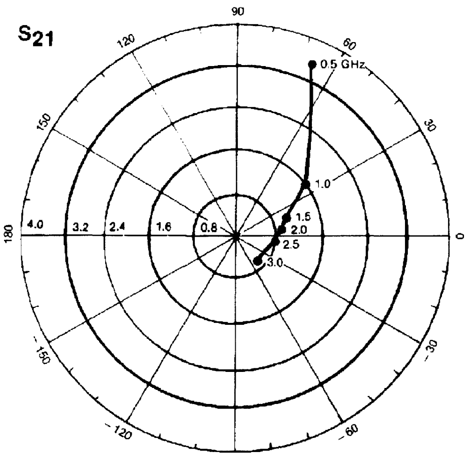



$S_{22}$

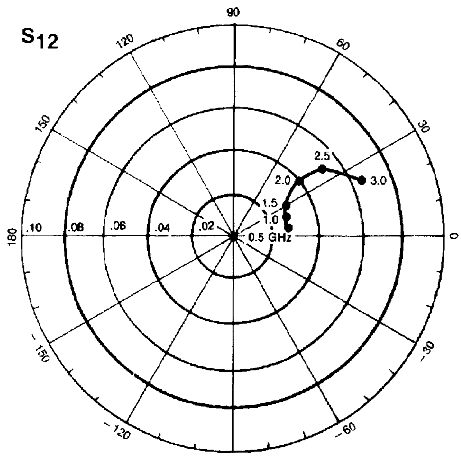



$V_{CE}$ = 18 V
$I_C$ = 220 mA
Zg = 50 ohms

$S_{21}$

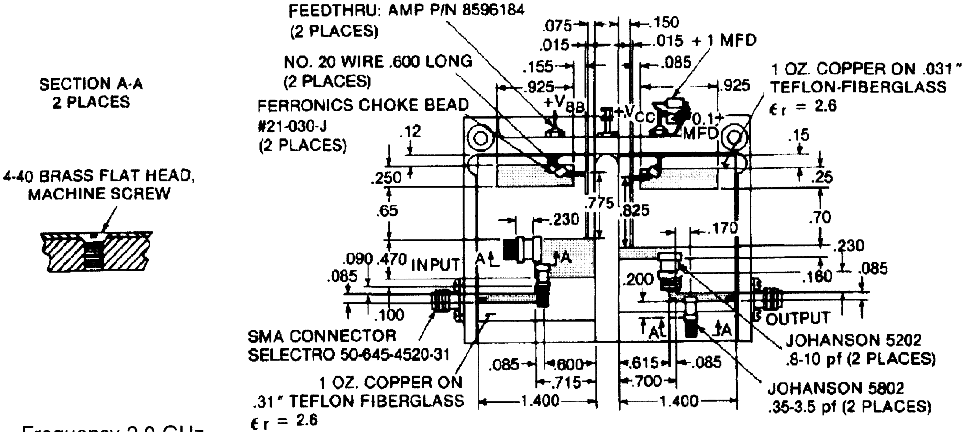



$S_{12}$



## TEST CIRCUIT

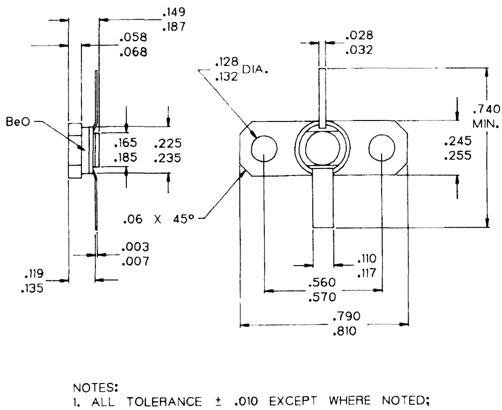
Ref.: Dwg. No. C127305




Frequency 2.0 GHz
All dimensions are in inches.

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135021C



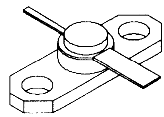

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.

**SGS-THOMSON**
MICROELECTRONICS

# MSC80197

## RF & MICROWAVE TRANSISTORS GENERAL PURPOSE LINEAR APPLICATIONS

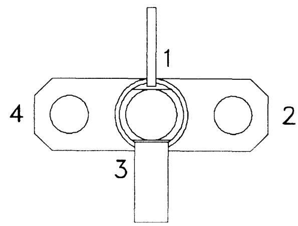
- EMITTER BALLASTED
- CLASS A LINEAR OPERATION
- COMMON EMITTER
- VSWR CAPABILITY 15:1 @ RATED CONDITIONS
- ft 3.2 GHz TYPICAL
- NOISE FIGURE 12.5 dB @ 2 GHz
- $P_{OUT}$ = 31.7 dBm MIN. @ 2.0 GHz



**.250 2LFL (S011)**
hermetically sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| MSC80197 | 80197 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

### DESCRIPTION

The MSC80197 is a hermetically sealed NPN power transistor featuring a unique matrix structure. This device is specifically designed for Class A linear applications to provide high gain and high output power at the 1.0 dB compression point.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation (see Safe Area) | — | W |
| $I_C$ | Device Bias Current | 700 | mA |
| $V_{CE}$ | Collector-Emitter Bias Voltage* | 20 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 8.5 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

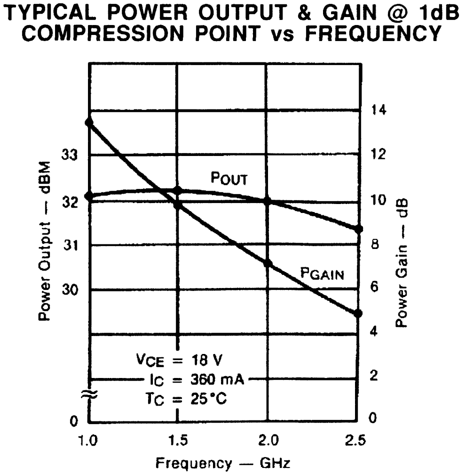
| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 1mA | $I_E$ = 0mA | 50 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CEO}$ | IC = 5mA | $I_B$ = 0mA | 20 | — | — | V |
| $I_{CEO}$ | $V_{CE}$ = 18V | | — | — | 1.0 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 500mA | 15 | — | 120 | — |

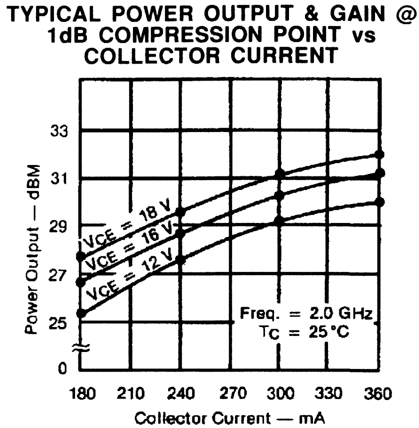
DYNAMIC

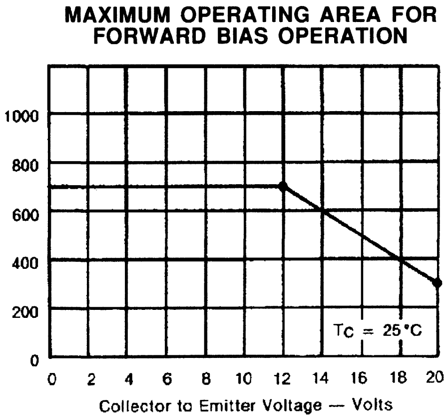
| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $G_P$* | f = 2.0 GHz | $P_{OUT}$ = 31.7 dBm | | 6.0 | 7.0 | — | dB |
| $\Delta G_P$* | f = 2.0 GHz | $P_{OUT}$ = 31.7 dBm | $\Delta P_{OUT}$ = 10 dB | — | — | 1 | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 28 V | | — | — | 7.0 | pF |

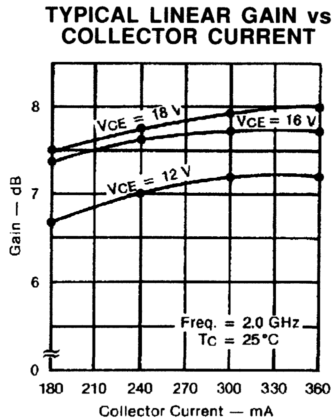
* Note: $V_{CE}$ = 18 V
$I_C$ = 360 mA

## TYPICAL PERFORMANCE



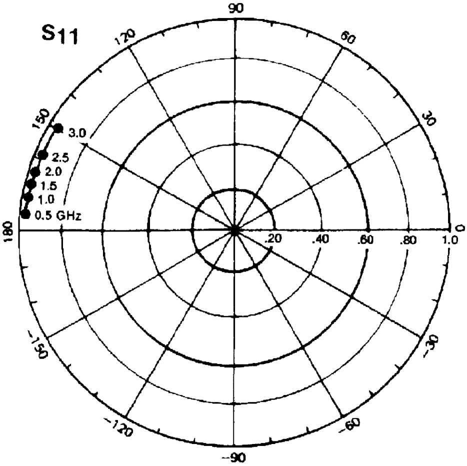



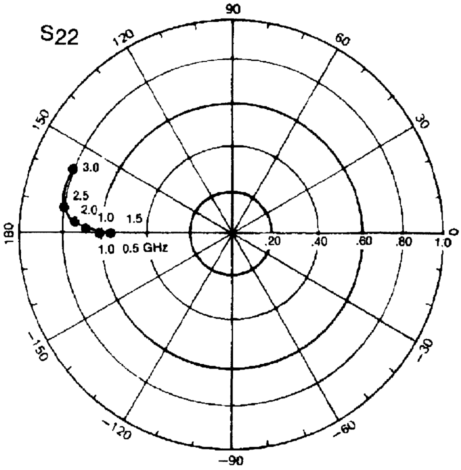



## TYPICAL S–PARAMETERS

$S_{11}$

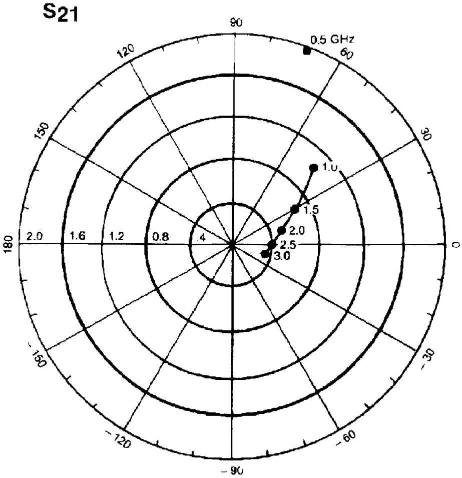



$S_{22}$

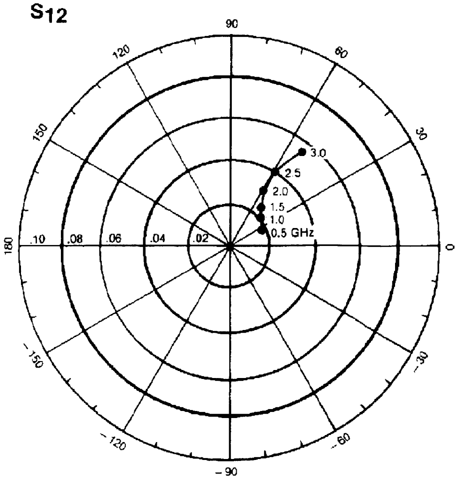



$V_{CE}$ = 18 V
$I_C$ = mA
Zg = 50 ohms

$S_{21}$




$S_{12}$



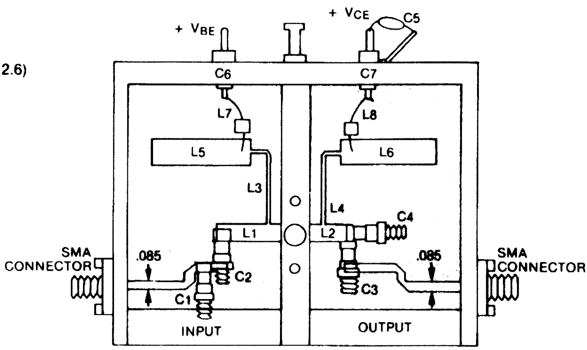



SGS-THOMSON
MICROELECTRONICS

## TEST CIRCUIT

Ref.: Dwg. No. C127271

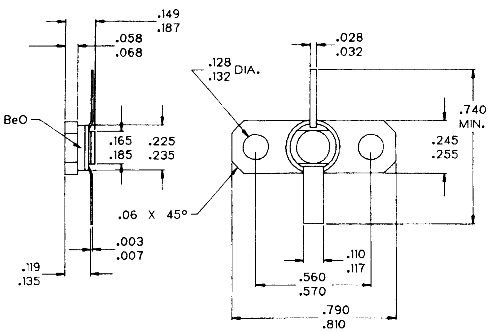
Board Material 1/32" Teflon — Fiberglass ($\epsilon_r$ = 2.6)
$C_1$, $C_2$, $C_3$, $C_4$, 0.35 to 3.5 pf Johanson #5800
$C_5$, 0.1 uf Disk Capacitor
$C_6$, $C_7$, Feedthru Filter SCI 712 — 022 (1500 pf)
or AMP P/N 8596184
$L_1$, .160 Wide, 590 Long
$L_2$, .160 Wide, 425 Long
$L_3$, $L_4$, .020 Wide, .825 Long
$L_5$, $L_6$, .250 Wide, .900 Long
$L_7$, $L_8$, #20 A.W.G. Tinned Copper, .600 Long,
Ferronics Chokebead #21 - 030 - J




Frequency 2.0 GHz
All dimensions are in inches.

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135021C



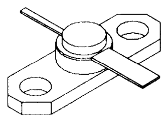

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED;
DIMENSIONS IN INCHES.

SGS-THOMSON MICROELECTRONICS

# MSC80264

## RF & MICROWAVE TRANSISTORS GENERAL PURPOSE LINEAR APPLICATIONS

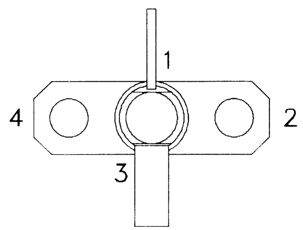
- EMITTER BALLASTED
- CLASS A LINEAR OPERATION
- COMMON EMITTER
- VSWR CAPABILITY 20:1 @ RATED CONDITIONS
- ft 3.2 GHz TYPICAL
- NOISE FIGURE 11.0 dB @ 2 GHz
- $P_{OUT}$ = 28 dBm MIN. @ 2.0 GHz



**.250 2LFL (S011)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| MSC80264 | 80264 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

### DESCRIPTION

The MSC80264 is a hermetically sealed NPN power transistor featuring a unique matrix structure. This device is specifically designed for Class A linear applications to provide high gain and high output power at the 1.0 dB compression point at frequencies from 1.0 - 4.0 GHz.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation (see Safe Area) | — | W |
| $I_C$ | Device Bias Current | 67 | mA |
| $V_{CE}$ | Collector-Emitter Bias Voltage* | 20 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 45 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 1mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CEO}$ | IC = 5mA | $I_B$ = 0mA | 15 | — | — | V |
| $I_{CEO}$ | $V_{CE}$ = 12V | | — | — | 1.0 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 100mA | 15 | — | 120 | — |

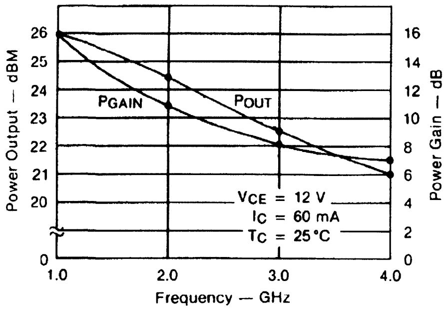
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $G_P$* | f = 4.0 GHz | $P_{OUT}$ = 20 dBm | | 6.0 | 7.0 | — | dB |
| $\Delta G_P$* | f = 4.0 GHz | $P_{OUT}$ = 20 dBm | $\Delta P_{OUT}$ = 10 dB | — | — | 1 | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 28 V | | — | — | 2.5 | pF |

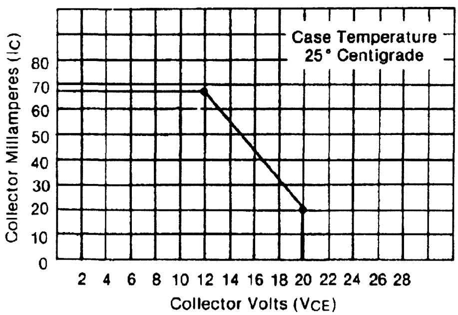
* Note: $V_{CE}$ = 12V
$I_C$ = 60mA

## TYPICAL PERFORMANCE

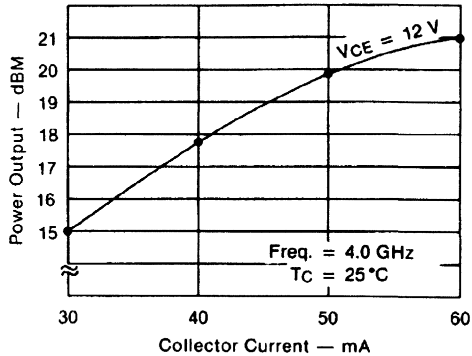
### TYPICAL POWER OUTPUT & GAIN @ 1dB COMPRESSION POINT vs FREQUENCY



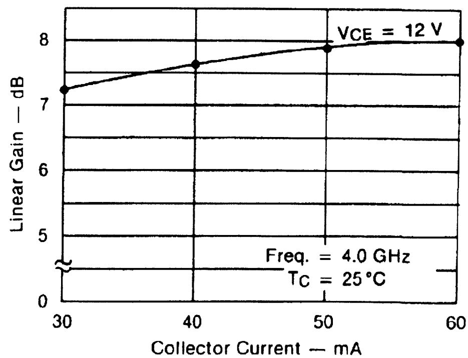

### MAXIMUM OPERATING AREA FOR FORWARD BIAS OPERATION




### TYPICAL POWER OUTPUT & GAIN @ 1dB COMPRESSION POINT vs COLLECTOR CURRENT

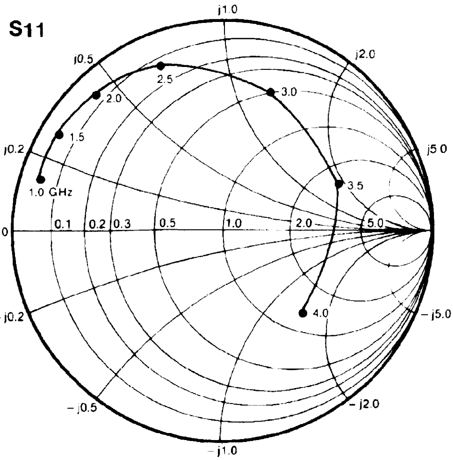



### TYPICAL LINEAR GAIN vs COLLECTOR CURRENT

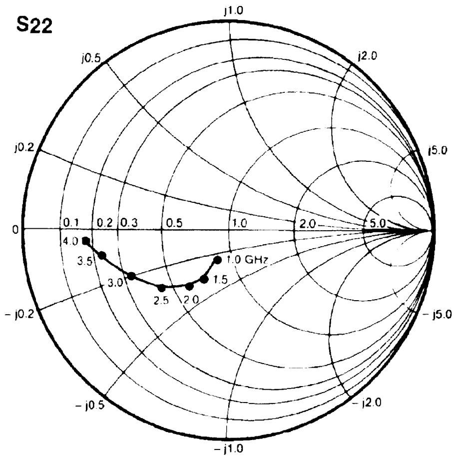


## TYPICAL S–PARAMETERS

S11

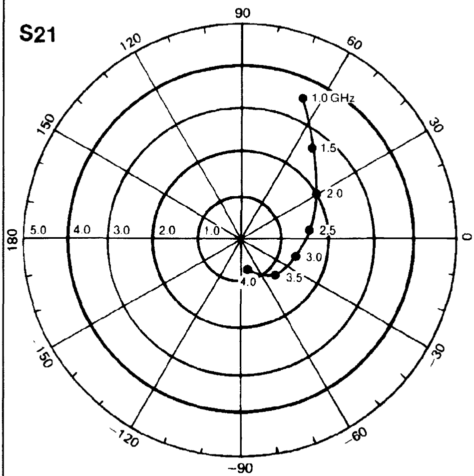



S22

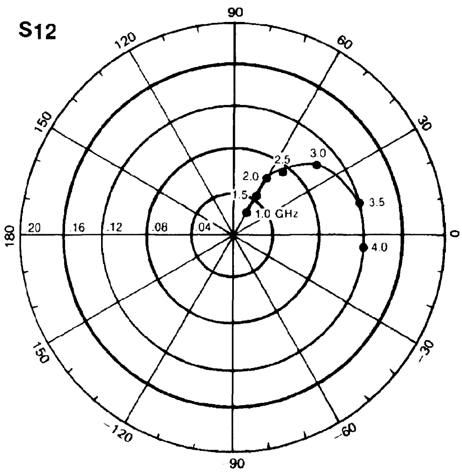



$V_{CE}$ = 12 V
$I_C$ = 60 mA
Zg = 50 ohms

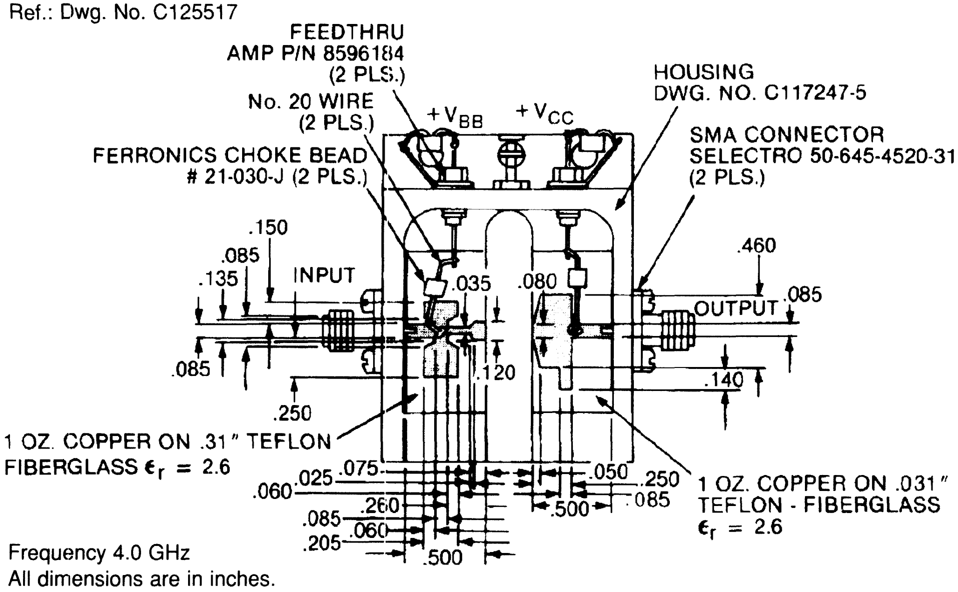
S21



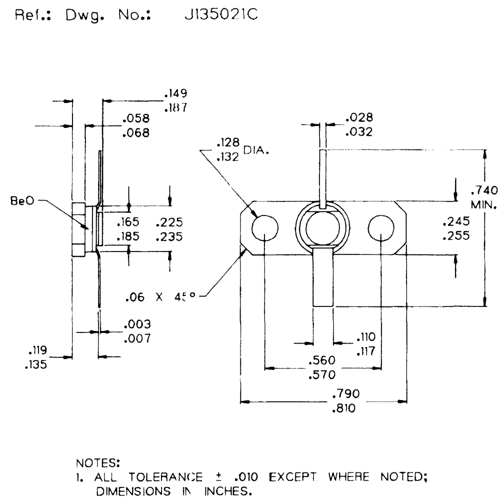

S12



## TEST CIRCUIT




## PACKAGE MECHANICAL DATA

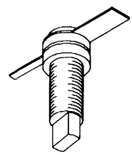


SGS-THOMSON MICROELECTRONICS

# MSC81002

## RF & MICROWAVE TRANSISTORS GENERAL PURPOSE AMPLIFIER APPLICATIONS

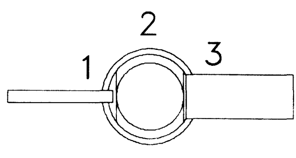
- EMITTER BALLASTED
- VSWR CAPABILITY ∞:1 @ RATED CONDITIONS
- HERMETIC STRIPAC® PACKAGE
- $P_{OUT}$ = 2.0 W MIN. WITH 10 dB GAIN @ 1 GHz



**.230 2L STUD (S016)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| MSC81002 | 81002 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter

### DESCRIPTION

The MSC81002 is a common base hermetically sealed silicon NPN microwave transistor utilizing a fishbone, emitter ballasted geometry with a refractory/gold metallization system. This device is capable of withstanding an infinite load VSWR at any phase angle under rated conditions.

The MSC81002 was designed for Class C amplifier applications in the 0.4 - 1.2 GHz frequency range.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 75°C$) | 6.25 | W |
| $I_C$ | Device Current* | 200 | mA |
| $V_{CC}$ | Collector-Supply Voltage* | 35 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 20 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

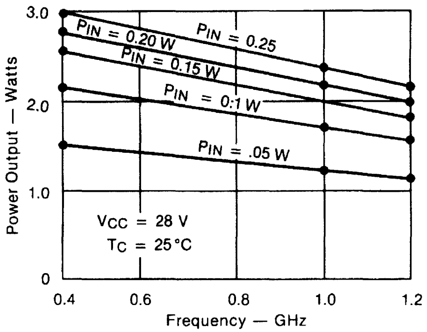
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 1mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 5mA | $R_{BE}$ = 10Ω | 45 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 28V | | — | — | 0.5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 100mA | 15 | — | 120 | — |

### DYNAMIC

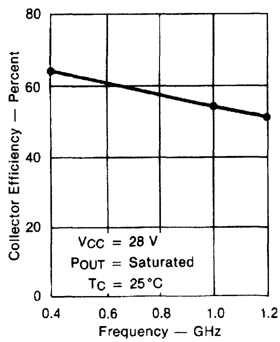
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1.0 GHz | $P_{IN}$ = 0.2 W | $V_{CC}$ = 28 V | 2.0 | 2.2 | — | W |
| $\eta_C$ | f = 1.0 GHz | $P_{IN}$ = 0.2 W | $V_{CC}$ = 28 V | 50 | 55 | — | % |
| $G_P$ | f = 1.0 GHz | $P_{IN}$ = 0.2 W | $V_{CC}$ = 28 V | 10 | 10.4 | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 28 V | | — | — | 3.2 | pF |

## TYPICAL PERFORMANCE

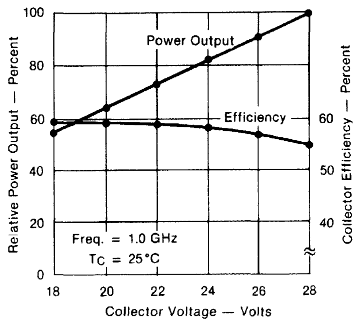
### POWER OUTPUT vs FREQUENCY




### COLLECTOR EFFICIENCY vs FREQUENCY

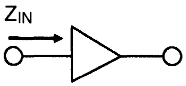


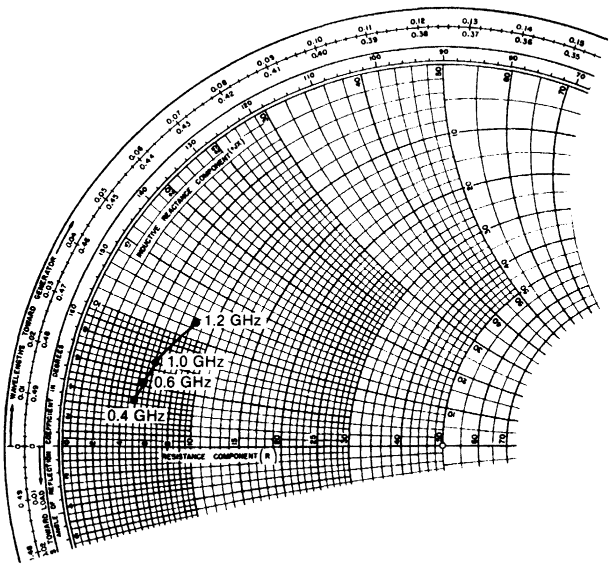

### RELATIVE POWER OUTPUT vs COLLECTOR VOLTAGE



## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE

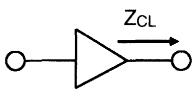


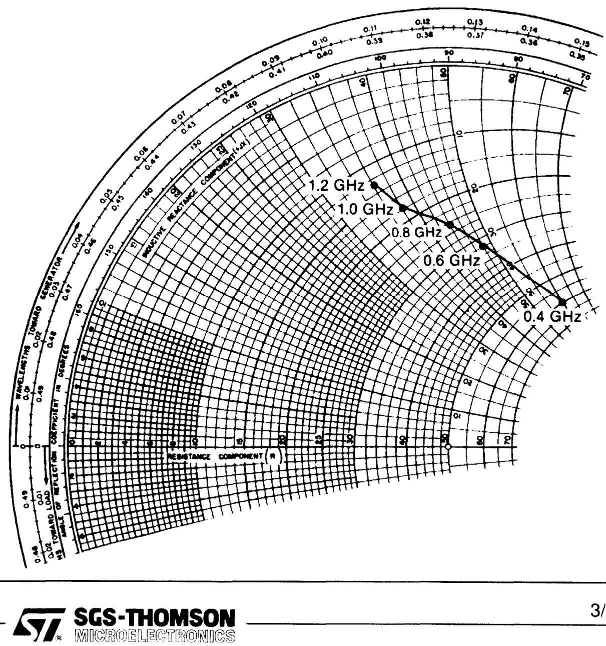




$P_{IN}$ = 0.2 W
$V_{CC}$ = 28 V
Normalized to 50 ohms

| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 0.4 GHz | 4.8 + j 3.7 | 60.0 + j 60.0 |
| 0.6 GHz | 5.4 + j 5.3 | 32.0 + j 48.0 |
| 1.0 GHz | 6.0 + j 7.0 | 18.0 + j 38.0 |
| 1.2 GHz | 8.2 + j 11.6 | 12.8 + j 36.0 |

### TYPICAL COLLECTOR LOAD IMPEDANCE

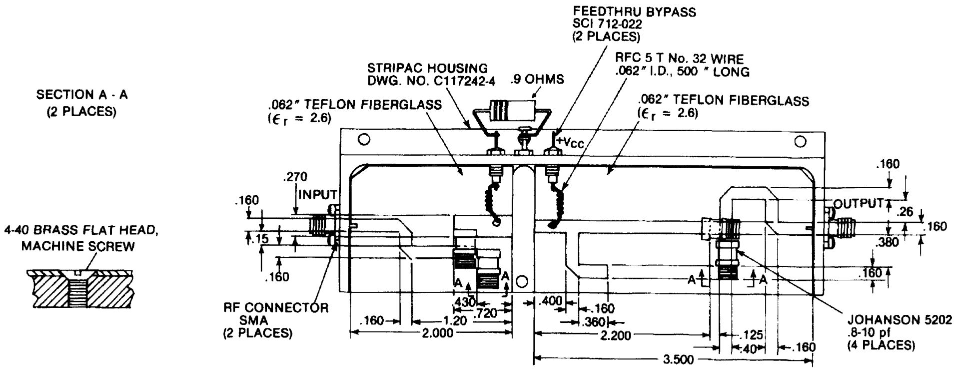



$P_{OUT}$ = Saturated
$V_{CC}$ = 28 V
Normalized to 50 ohms

## TEST CIRCUIT

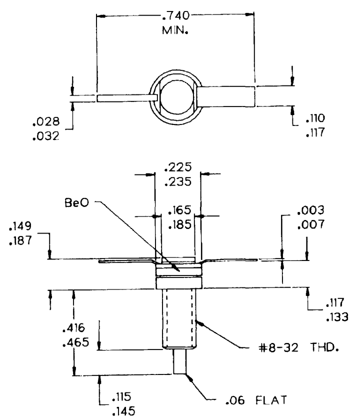
Ref.: Dwg. No. C127317




All dimensions are in inches.
Frequency 1.0 GHz

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135022C

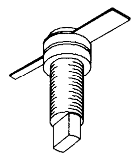



NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED;
DIMENSIONS IN INCHES.

# MSC81005

## RF & MICROWAVE TRANSISTORS GENERAL PURPOSE AMPLIFIER APPLICATIONS

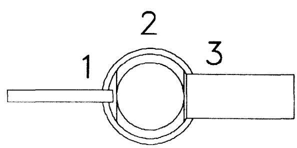
- EMITTER BALLASTED
- REFRACTORY/GOLD METALLIZATION
- VSWR CAPABILITY ∞:1 @ RATED CONDITIONS
- HERMETIC STRIPAC® PACKAGE
- $P_{OUT}$ = 5.0 W MIN. WITH 10 dB GAIN @ 1 GHz



**.230 2L STUD (S016)**
hermetically sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| MSC81005 | 81005 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter

### DESCRIPTION

The MSC81005 is a common base hermetically sealed silicon NPN microwave transistor utilizing a fishbone emitter ballasted geometry with a refractory/gold metallization system. This device is capable of withstanding an infinite load VSWR at any phase angle under rated rated conditions. The MSC81005 is designed for Class C amplifier applications in the 0.4 - 1.2 GHz frequency range.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \le 50$°C) | 18.75 | W |
| $I_C$ | Device Current* | 600 | mA |
| $V_{CC}$ | Collector-Supply Voltage* | 35 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 8.0 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

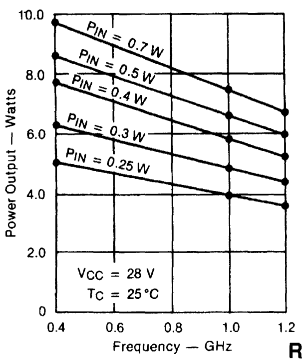
| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 1mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 5mA | $R_{BE}$ = 10Ω | 45 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 28V | | — | — | 1.0 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 200mA | 15 | — | 120 | — |

DYNAMIC

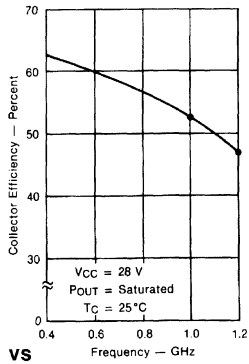
| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 1.0 GHz | $P_{IN}$ = 0.5 W | $V_{CC}$ = 28 V | 5.0 | 6.6 | — | W |
| $\eta_c$ | f = 1.0 GHz | $P_{IN}$ = 0.5 W | $V_{CC}$ = 28 V | 50 | 52 | — | % |
| $G_P$ | f = 1.0 GHz | $P_{IN}$ = 0.5 W | $V_{CC}$ = 28 V | 10 | 11.2 | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 28 V | | — | — | 6.5 | pF |

## TYPICAL PERFORMANCE

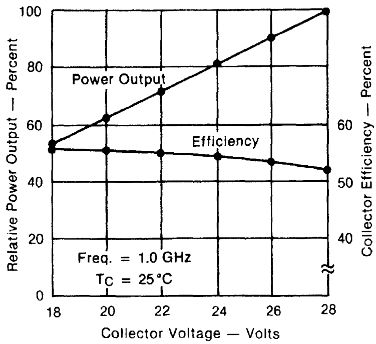
### POWER OUTPUT vs FREQUENCY




### COLLECTOR EFFICIENCY vs FREQUENCY

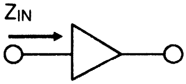



### RELATIVE POWER OUTPUT vs COLLECTOR VOLTAGE

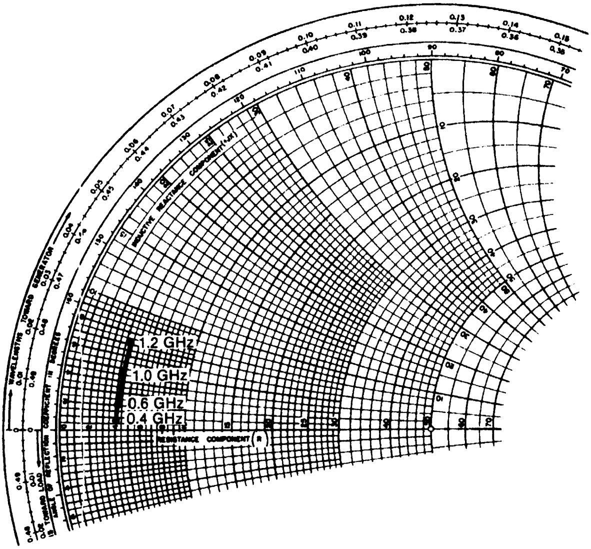


## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE

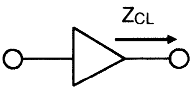



$P_{IN} = 0.5$ W
$V_{CC} = 35$ V
Normalized to 50 ohms

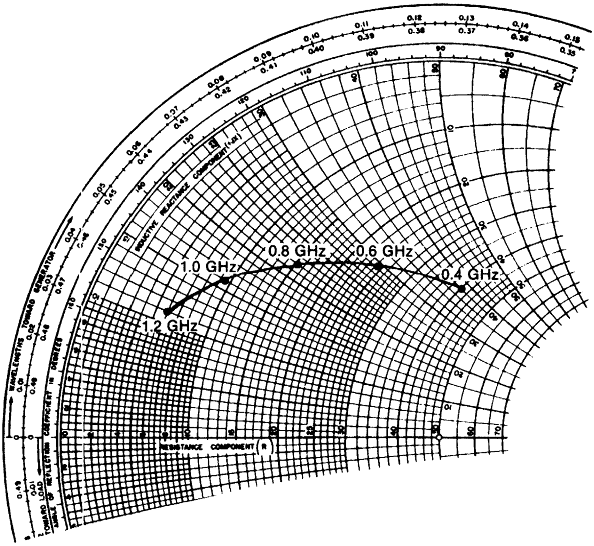



| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 0.4 GHz | 4.0 + j 0.8 | 40.0 + j 38.0 |
| 0.6 GHz | 4.1 + j 2.0 | 24.0 + j 29.5 |
| 0.8 GHz | 4.2 + j 3.2 | 15.0 + j 22.0 |
| 1.0 GHz | 4.3 + j 4.5 | 9.4 + j 16.0 |
| 1.2 GHz | 4.4 + j 7.1 | 6.0 + j 11.0 |

### TYPICAL COLLECTOR LOAD IMPEDANCE

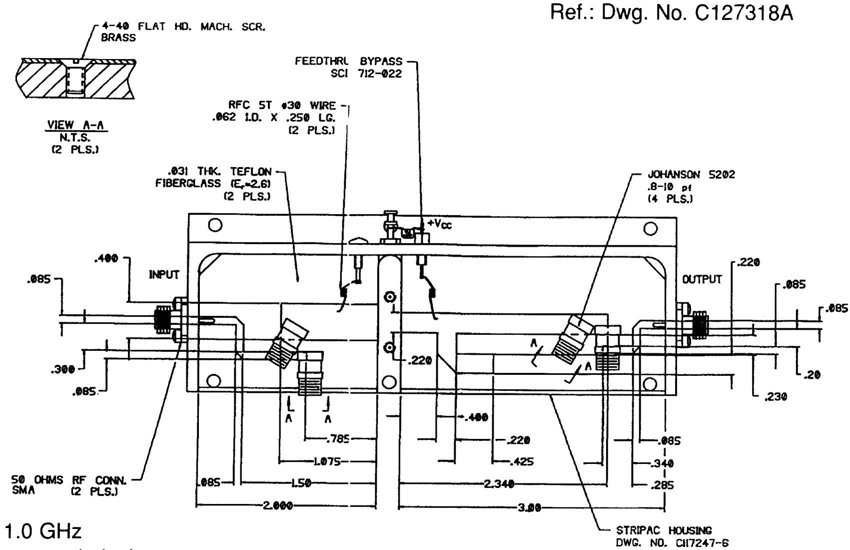



$P_{OUT}$ = Saturated
$V_{CC} = 35$ V
Normalized to 50 ohms



## TEST CIRCUIT

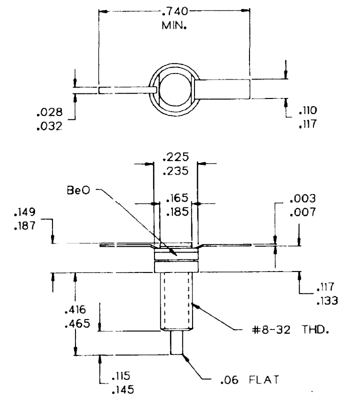
Ref.: Dwg. No. C127318A




Frequency 1.0 GHz
All dimensions are in inches.

## PACKAGE MECHANICAL DATA

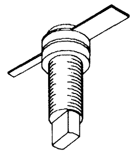
Ref.: Dwg. No.: J135022C




NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED;
DIMENSIONS IN INCHES.

# RF & MICROWAVE TRANSISTORS GENERAL PURPOSE AMPLIFIER APPLICATIONS

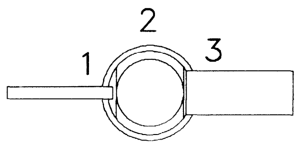
- EMITTER BALLASTED
- VSWR CAPABILITY ∞:1 @ RATED CONDITIONS
- HERMETIC STRIPAC® PACKAGE
- $P_{OUT}$ = 10 W MIN. WITH 10 dB GAIN @ 1 GHz



**.230 2L STUD (S016)**
hermetically sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| MSC81010 | 81010 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter

## DESCRIPTION

The MSC81010 is a common base hermetically sealed silicon NPN microwave transistor utilizing a fishbone, emitter ballasted geometry with a refractory/gold metallization system. This device is capable of withstanding infinite load VSWR at any phase angle under rated conditions.

The MSC81010 is designed for Class C amplifier applications in the 0.4 - 1.2 GHz frequency range.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* | 29 | W |
| $I_C$ | Device Current* | 1.0 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 35 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 6.0 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case} = 25°C$)

### STATIC

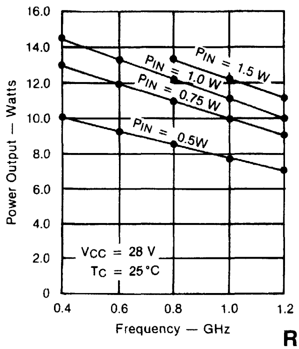
| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C = 1mA$ | $I_E = 0mA$ | 45 | — | — | V |
| $BV_{EBO}$ | $I_E = 1mA$ | $I_C = 0mA$ | 3.5 | — | — | V |
| $BV_{CER}$ | $IC = 10mA$ | $R_{BE} = 10\Omega$ | 45 | — | — | V |
| $I_{CBO}$ | $V_{CB} = 28V$ | | — | — | 2.5 | mA |
| $h_{FE}$ | $V_{CE} = 5V$ | $I_C = 500mA$ | 15 | — | 120 | — |

### DYNAMIC

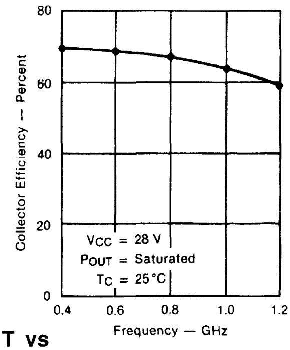
| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 1.0 GHz | $P_{IN} = 1.0$ W | $V_{CC} = 28$ V | 10 | 11 | — | W |
| $\eta_c$ | f = 1.0 GHz | $P_{IN} = 1.0$ W | $V_{CC} = 28$ V | 60 | 64 | — | % |
| $G_P$ | f = 1.0 GHz | $P_{IN} = 1.0$ W | $V_{CC} = 28$ V | 10 | 10.4 | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB} = 28$ V | | — | — | 10 | pF |

## TYPICAL PERFORMANCE

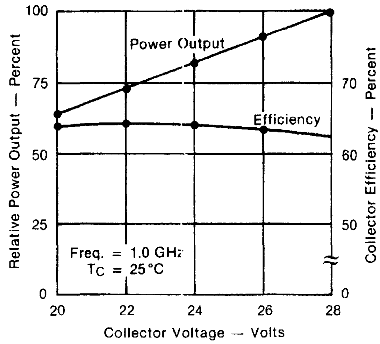
### POWER OUTPUT vs FREQUENCY




### FREQUENCY vs COLLECTOR EFFICIENCY

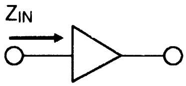


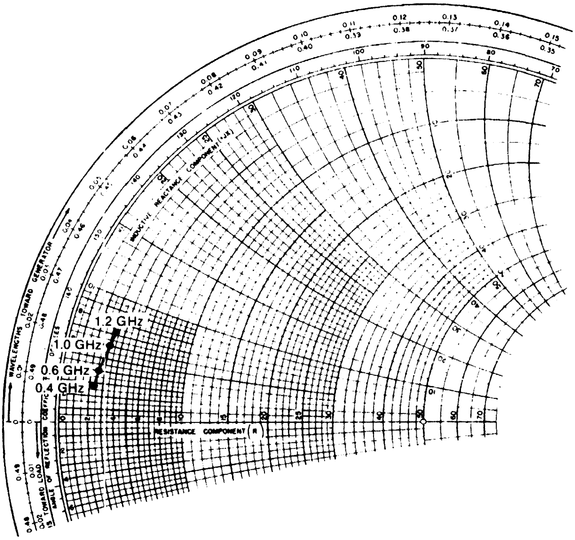

### RELATIVE POWER OUTPUT vs COLLECTOR VOLTAGE



## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE

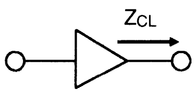


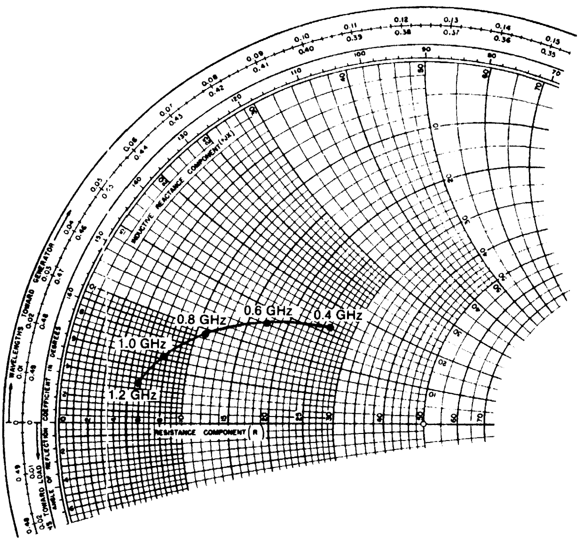




$P_{IN}$ = 1.0 W
$V_{CC}$ = 28 V
Normalized to 50 ohms

| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 0.4 GHz | 2.3 + j 2.7 | 26.0 + j 16.0 |
| 0.6 GHz | 2.5 + j 4.0 | 17.2 + j 13.0 |
| 0.8 GHz | 2.8 + j 5.0 | 11.0 + j 9.5 |
| 1.0 GHz | 3.0 + j 6.0 | 7.7 + j 6.3 |
| 1.2 GHz | 3.3 + j 7.2 | 5.8 + j 3.5 |

### TYPICAL COLLECTOR LOAD IMPEDANCE

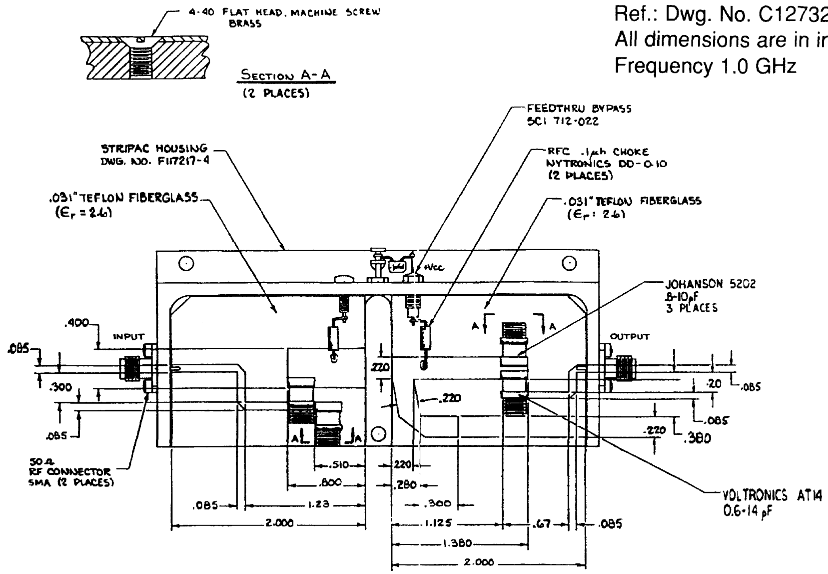



$P_{OUT}$ = Saturated
$V_{CC}$ = 28 V
Normalized to 50 ohms

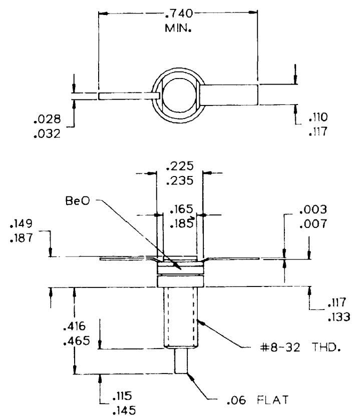
## TEST CIRCUIT

Ref.: Dwg. No. C127320
All dimensions are in inches.
Frequency 1.0 GHz




## PACKAGE MECHANICAL DATA

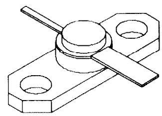
Ref.: Dwg. No.: J135022C




NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.

# RF & MICROWAVE TRANSISTORS GENERAL PURPOSE AMPLIFIER APPLICATIONS

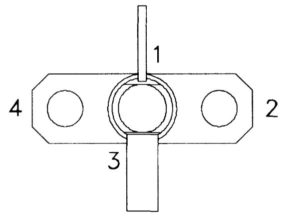
- EMITTER BALLASTED
- REFRACTORY/GOLD METALLIZATION
- LOW THERMAL RESISTANCE
- HERMETIC STRIPAC® PACKAGE
- $P_{OUT}$ = 20 W MIN. WITH 10 dB GAIN @ 1 GHz



**.250 2LFL (S010)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| MSC81020 | 81020 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

## DESCRIPTION

The MSC81020 is a common base hermetically sealed silicon NPN microwave tranisitor utilizing a fishbone emitter ballasted geometry with a refractory/gold metallization system. This device is designed for Class C amplifier applications in the 0.4 - 1.2 GHz frequency range.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* | 35 | W |
| $I_C$ | Device Current* | 1.50 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 35 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 5.0 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

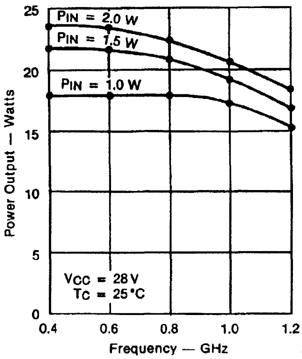
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 5mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | $I_C$ = 15mA | $R_{BE}$ = 10Ω | 45 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 28V | | — | — | 5.0 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1000mA | 15 | — | 120 | — |

DYNAMIC

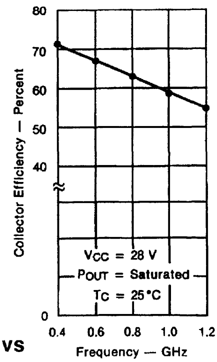
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1.0 GHz | $P_{IN}$ = 2.0 W | $V_{CC}$ = 28 V | 20 | 21 | — | W |
| $\eta_C$ | f = 1.0 GHz | $P_{IN}$ = 2.0 W | $V_{CC}$ = 28 V | 55 | 58 | — | % |
| $G_P$ | f = 1.0 GHz | $P_{IN}$ = 2.0 W | $V_{CC}$ = 28 V | 10 | 10.2 | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 28 V | | — | — | 19 | pF |

## TYPICAL PERFORMANCE

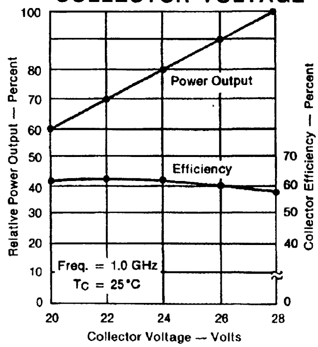
### POWER OUTPUT vs FREQUENCY




### COLLECTOR EFFICIENCY vs FREQUENCY

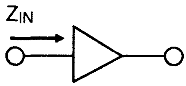



### RELATIVE POWER OUTPUT vs COLLECTOR VOLTAGE

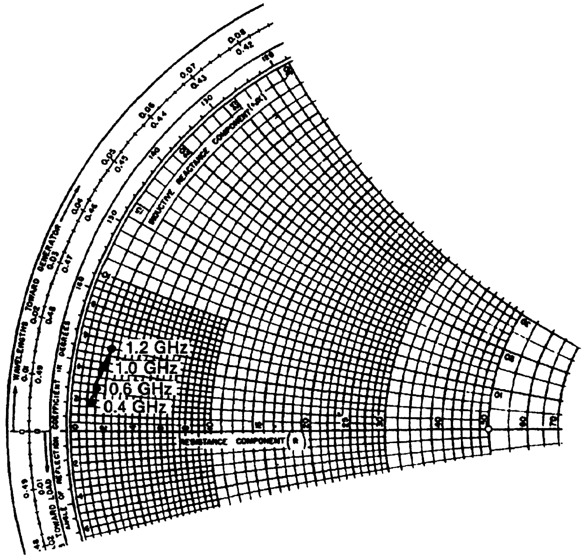


## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE

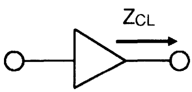



$P_{IN}$ = 3.0 W
$V_{CC}$ = 28 V
Normalized to 50 ohms

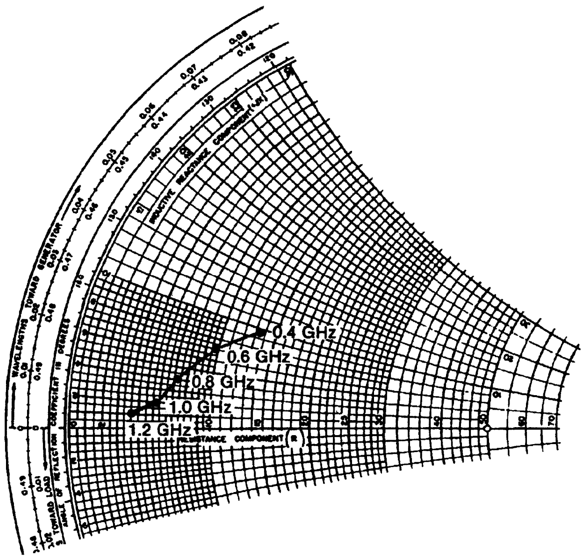



| FREQ. | $Z_{IN}$ ($\Omega$) | $Z_{CL}$ ($\Omega$) |
|---|---|---|
| 0.4 GHz | 1.3 + j 1.7 | 13.3 + j 9.8 |
| 0.6 GHz | 1.5 + j 2.8 | 9.7 + j 7.0 |
| 0.8 GHz | 1.6 + j 3.4 | 7.2 + j 4.0 |
| 1.0 GHz | 1.8 + j 4.2 | 5.8 + j 2.0 |
| 1.2 GHz | 2.0 + j 5.5 | 4.0 + j 1.0 |

### TYPICAL COLLECTOR LOAD IMPEDANCE

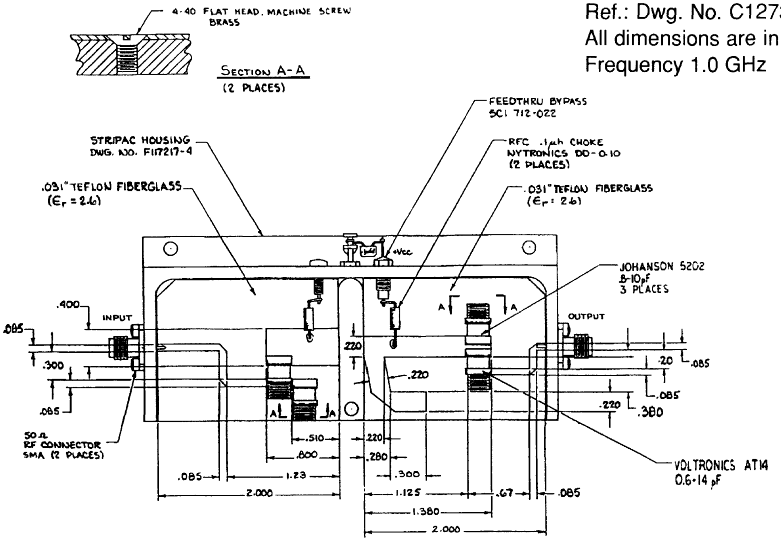



$P_{OUT}$ = Saturated
$V_{CC}$ = 28 V
Normalized to 50 ohms



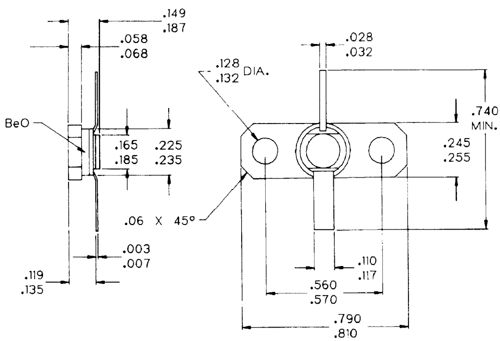
## TEST CIRCUIT

Ref.: Dwg. No. C127320
All dimensions are in inches.
Frequency 1.0 GHz




## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135021C

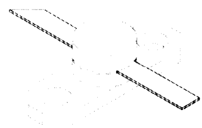



NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.

# MSC81035M

## RF & MICROWAVE TRANSISTORS
## AVIONICS APPLICATIONS

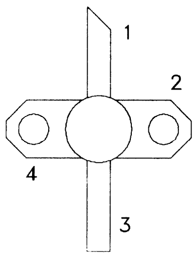
- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- ∞:1 VSWR CAPABILITY
- LOW THERMAL RESISTANCE
- INPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 35 W MIN. WITH 10.7 dB GAIN



**.280 2LFL (S068)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| MSC81035M | 81035M |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The MSC81035M is a medium power Class C transistor designed specifically for pulsed L-Band avionics applications. This device is a direct replacement for the MSC1035M. MSC81035M offers improved saturated ouput power and collector efficiency based on the test circuit described herein.

Low RF thermal resistance and computerized automatic wire bonding techniques ensure high reliability and product consistency.

The MSC81035M is housed in the IMPAC™ package with internal input matching.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq$ 100°C) | 150 | W |
| $I_C$ | Device Current* | 3.0 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 55 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 1.0 | °C/W |

*Applies only to rated RF amplifier operation

Note: Thermal Resistance determined by Infra-Red Scanning of Hot-Spot Junction Temperature at rated RF operating conditions.

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 10mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 10mA | $R_{BE}$ = 10Ω | 65 | — | — | V |
| $I_{CES}$ | $V_{BE}$ = 0V | $V_{CE}$ = 50V | — | — | 5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 500mA | 15 | — | 120 | — |

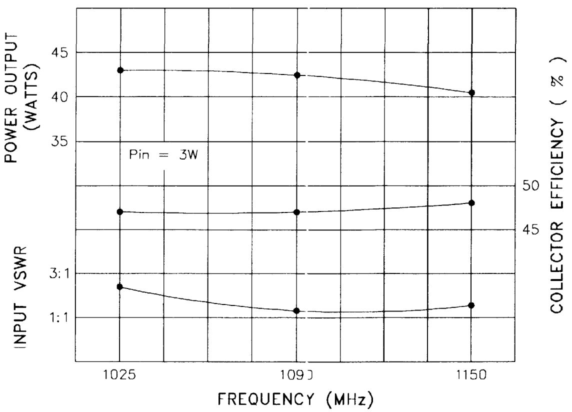
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1025 — 1150MHz | $P_{IN}$ = 3.0W | $V_{CC}$ = 50V | 35 | 40 | — | W |
| $\eta_c$ | f = 1025 — 1150MHz | $P_{IN}$ = 3.0W | $V_{CC}$ = 50V | 43 | 48 | — | % |
| $G_P$ | f = 1025 — 1150MHz | $P_{IN}$ = 3.0W | $V_{CC}$ = 50V | 10.7 | 11.2 | — | dB |

Note: Pulse Width = 10µSec
Duty Cycle = 1%

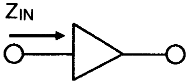
## TYPICAL PERFORMANCE

### TYPICAL BROADBAND POWER AMPLIFIER

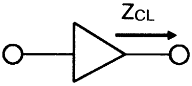


## IMPEDANCE DATA

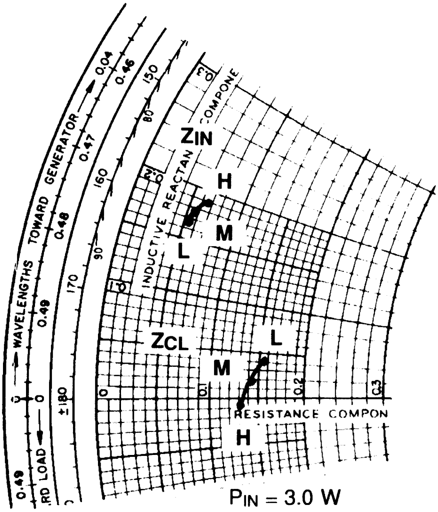
**TYPICAL INPUT IMPEDANCE**




**TYPICAL COLLECTOR LOAD IMPEDANCE**



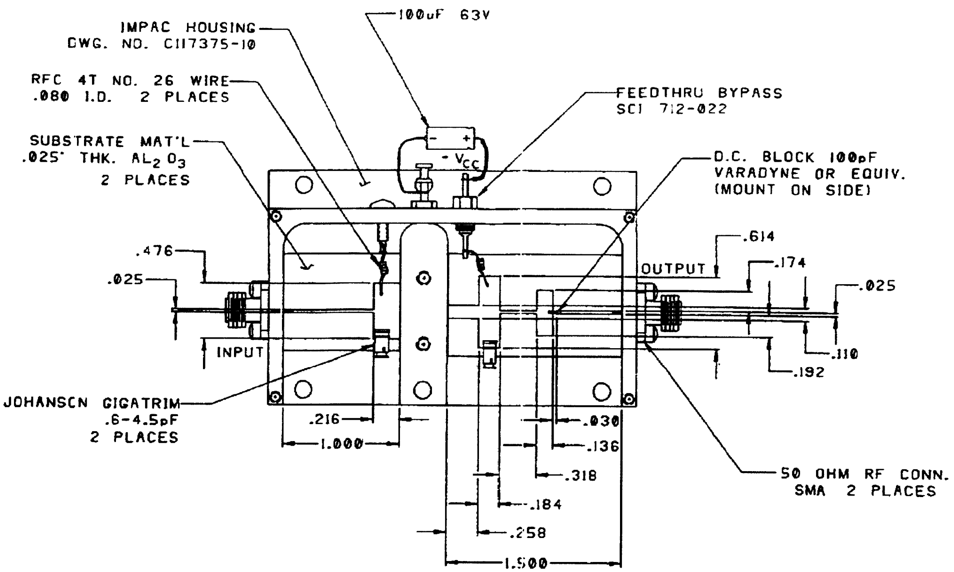

| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| L = 1025 MHz | 2.6 + j 8.3 | 7.7 + j 2.0 |
| M = 1090 MHz | 2.8 + j 8.7 | 7.1 + j 1.0 |
| H = 1150 MHz | 3.2 + j 4.4 | 6.5 – j 0.5 |




$P_{IN}$ = 3.0 W
$V_{CC}$ = 50 V
Normalized to 50 ohms

## TEST CIRCUIT

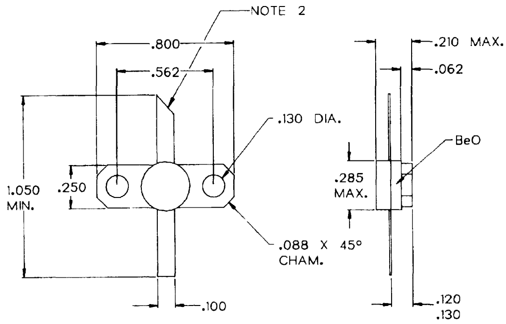
Ref.: Dwg. No. 101 002888




All dimensions are in inches.

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135039B



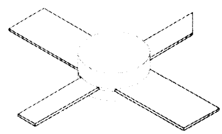

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD SLANT CUT.

SGS-THOMSON MICROELECTRONICS

# MSC81035MP

## RF & MICROWAVE TRANSISTORS AVIONICS APPLICATIONS

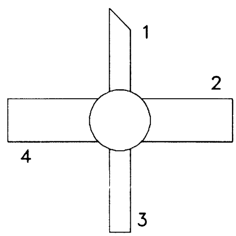
- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- ∞:1 VSWR CAPABILITY
- LOW THERMAL RESISTANCE
- INPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 35 W MIN. WITH 10.7 dB GAIN



**.280 4LSL (S051)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| MSC81035MP | 81035MP |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The MSC81035MP is a medium power Class C transistor designed specifically for pulsed L-Band avionics applications. This device is a direct replacement for the MSC1035MP. MSC81035MP offers improved saturated ouput power and collector efficiency based on the test circuit described herein.

Low RF thermal resistance and computerized automatic wire bonding techniques ensure high reliability and product consistency.

The MSC81035MP is housed in the IMPAC™package with internal input matching.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 100°C$) | 150 | W |
| $I_C$ | Device Current* | 3.0 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 55 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 1.0 | °C/W |

*Applies only to rated RF amplifier operation

Note: Thermal Resistance determined by Infra-Red Scanning of Hot-Spot Junction Temperature at rated RF operating conditions.

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

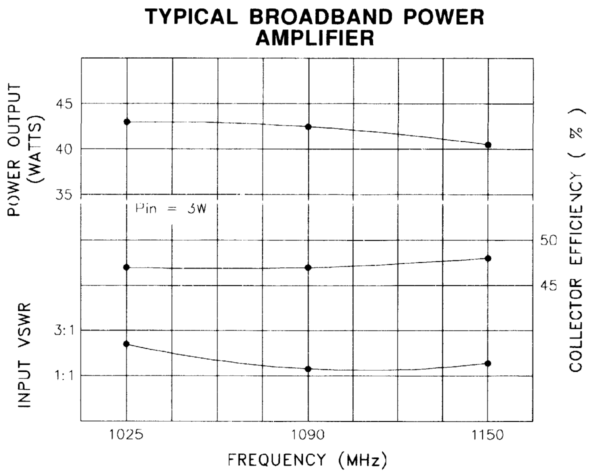
| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 10mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 10mA | $R_{BE}$ = 10Ω | 65 | — | — | V |
| $I_{CES}$ | $V_{BE}$ = 0V | $V_{CE}$ = 50V | — | — | 5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 500mA | 15 | — | 120 | — |

DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 1025 — 1150 MHz | $P_{IN}$ = 3.0W | $V_{CC}$ = 50V | 35 | 40 | — | W |
| $\eta_C$ | f = 1025 — 1150 MHz | $P_{IN}$ = 3.0W | $V_{CC}$ = 50V | 10.7 | 11.2 | — | % |
| $G_P$ | f = 1025 — 1150 MHz | $P_{IN}$ = 3.0W | $V_{CC}$ = 50V | 43 | 48 | — | dB |

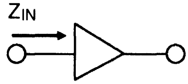
Note: Pulse Width = 10μSec
Duty Cycle = 1%

## TYPICAL PERFORMANCE

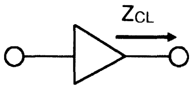


## IMPEDANCE DATA

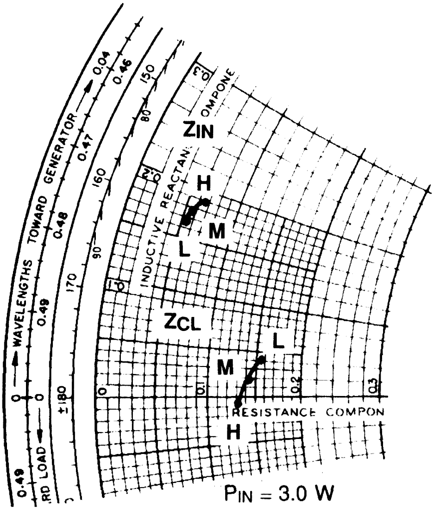
### TYPICAL INPUT IMPEDANCE




### TYPICAL COLLECTOR LOAD IMPEDANCE



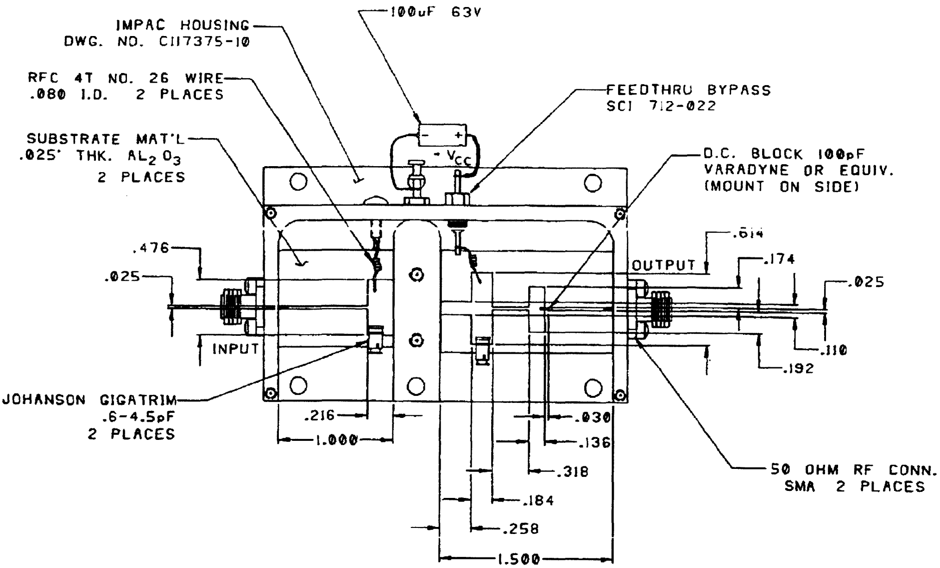

| FREQ. | ZIN (Ω) | ZCL (Ω) |
|---|---|---|
| L = 1025 MHz | 2.6 + j 8.3 | 7.7 + j 2.0 |
| M = 1090 MHz | 2.8 + j 8.7 | 7.1 + j 1.0 |
| H = 1150 MHz | 3.2 + j 4.4 | 6.5 − j 0.5 |




$P_{IN}$ = 3.0 W
$V_{CC}$ = 50 V
Normalized to 50 ohms

## TEST CIRCUIT

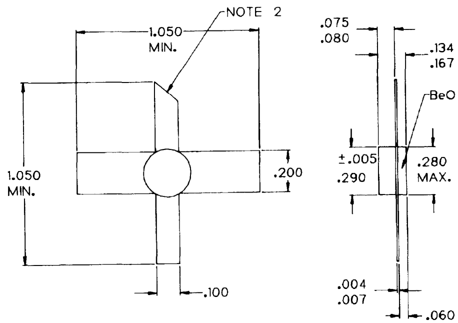
Ref.: Dwg. No. 101 002888




All dimensions are in inches.

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135032E



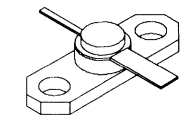

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD SLANT CUT.

SGS-THOMSON MICROELECTRONICS

# MSC81058

## RF & MICROWAVE TRANSISTORS GENERAL PURPOSE AMPLIFIER APPLICATIONS

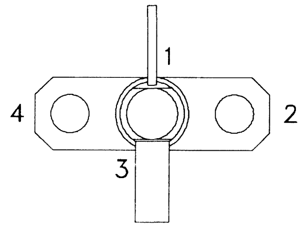
- EMITTER BALLASTED
- REFRACTORY/GOLD METALLIZATION
- VSWR CAPABILITY ∞:1 @ RATED CONDITIONS
- HERMETIC STRIPAC® PACKAGE
- $P_{OUT}$ = 10 W MIN. WITH 10 dB GAIN @ 1 GHz



**.250 2LFL (S010)**
hermetically sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| MSC81058 | 81058 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The MSC81058 is a common base hermetically sealed silicon NPN microwave transistor utilizing a fishbone, emitter ballasted geometry with a refractory/gold metallization system. This device is capable of withstanding infinite load VSWR at any phase angle under rated conditions.

The MSC81058 is designed for Class C amplifier applications in the 0.4 - 1.2 GHz frequency range.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* | 29 | W |
| $I_C$ | Device Current* | 1.0 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 35 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 6.0 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

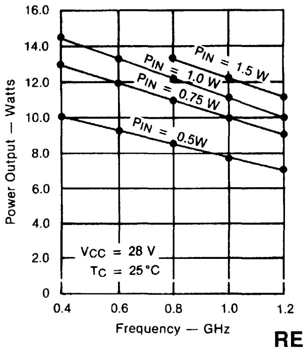
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 1mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 10mA | $R_{BE}$ = 10Ω | 45 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 28V | | — | — | 2.5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 500mA | 15 | — | 120 | — |

### DYNAMIC

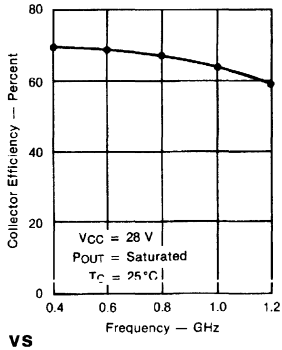
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1.0 GHz | $P_{IN}$ = 1.0 W | $V_{CC}$ = 28 V | 10 | 11 | — | W |
| $\eta_C$ | f = 1.0 GHz | $P_{IN}$ = 1.0 W | $V_{CC}$ = 28 V | 60 | 64 | — | % |
| $G_P$ | f = 1.0 GHz | $P_{IN}$ = 1.0 W | $V_{CC}$ = 28 V | 10 | 10.4 | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 28 V | | — | — | 10 | pF |

## TYPICAL PERFORMANCE

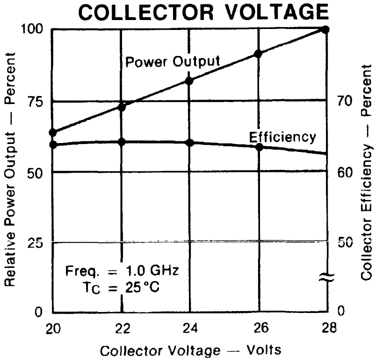
### POWER OUTPUT vs FREQUENCY




### FREQUENCY vs COLLECTOR EFFICIENCY

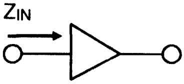


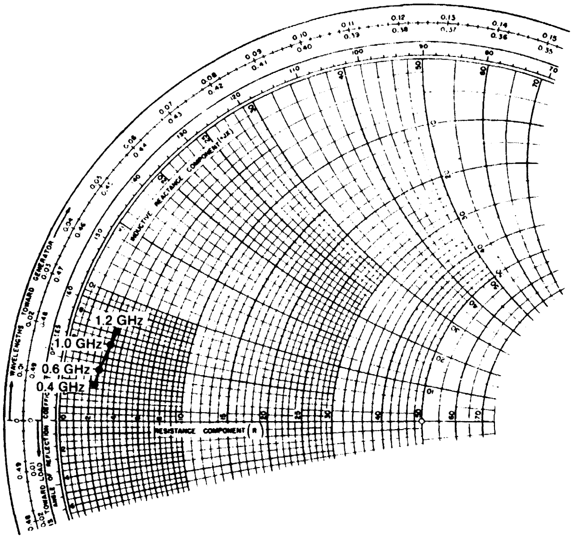

### RELATIVE POWER OUTPUT vs COLLECTOR VOLTAGE



## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE

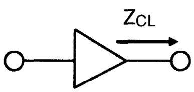


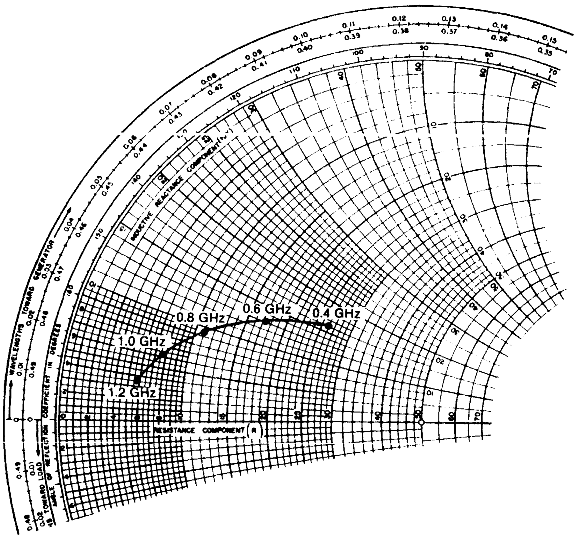




$P_{IN}$ = 1.0 W
$V_{CC}$ = 28 V
Normalized to 50 ohms

| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 0.4 GHz | 2.3 + j 2.7 | 26.0 + j 16.0 |
| 0.6 GHz | 2.5 + j 4.0 | 17.2 + j 13.0 |
| 0.8 GHz | 2.8 + j 5.0 | 11.0 + j 9.5 |
| 1.0 GHz | 3.0 + j 6.0 | 7.7 + j 6.3 |
| 1.2 GHz | 3.3 + j 7.2 | 5.8 + j 3.5 |

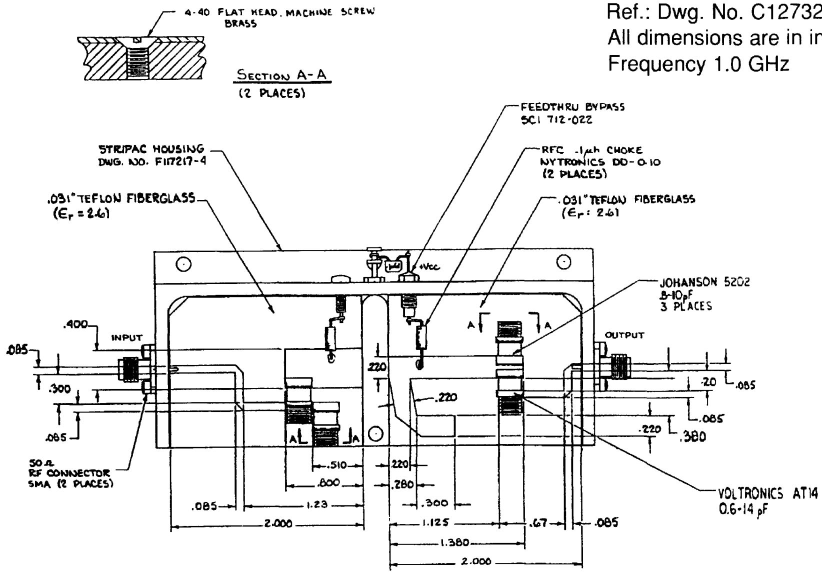
### TYPICAL COLLECTOR LOAD IMPEDANCE




$P_{OUT}$ = Saturated
$V_{CC}$ = 28 V
Normalized to 50 ohms

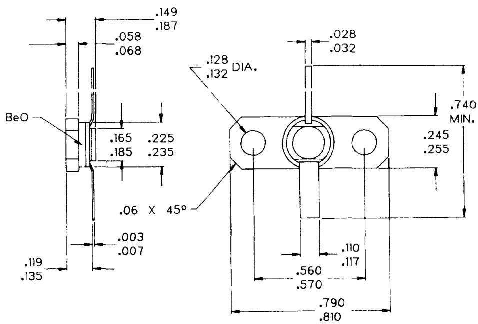
## TEST CIRCUIT




Ref.: Dwg. No. C127320
All dimensions are in inches.
Frequency 1.0 GHz

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135021C



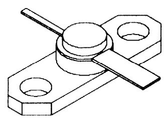

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED;
DIMENSIONS IN INCHES.

SGS-THOMSON
MICROELECTRONICS

# MSC81111

## RF & MICROWAVE TRANSISTORS
## GENERAL PURPOSE AMPLIFIER APPLICATIONS

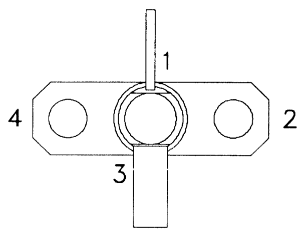
- EMITTER BALLASTED
- REFRACTORY/GOLD METALLIZATION
- VSWR CAPABILITY ∞:1 @ RATED CONDITIONS
- HERMETIC STRIPAC® PACKAGE
- $P_{OUT}$ = 5.0 W MIN. WITH 10 dB GAIN @ 1 GHz



**.250 2LFL (S010)**
hermetically sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| MSC81111 | 81111 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The MSC81111 is a common base hermetically sealed silicon NPN microwave transistor utilizing a fishbone emitter ballasted geometry with a refractory/gold metallization system. This device is capable of withstanding an infinite load VSWR at any phase angle under rated rated conditions. The MSC81111 is designed for Class C amplifier applications in the 0.4 - 1.2 GHz frequency range.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 50$°C) | 18.75 | W |
| $I_C$ | Device Current* | 600 | mA |
| $V_{CC}$ | Collector-Supply Voltage* | 35 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 8.0 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

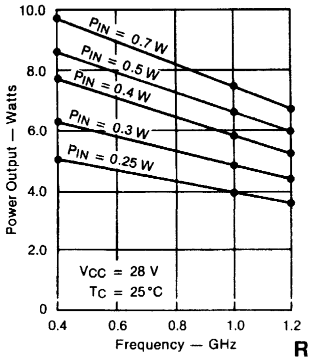
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 1mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 5mA | $R_{BE}$ = 10Ω | 45 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 28V | | — | — | 1.0 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 200mA | 15 | — | 120 | — |

### DYNAMIC

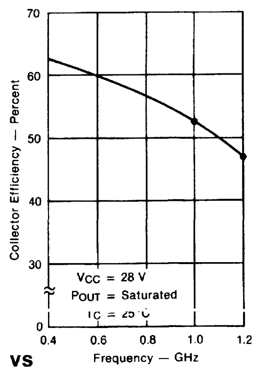
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1.0 GHz | $P_{IN}$ = 0.5 W | $V_{CC}$ = 28 V | 5.0 | 6.6 | — | W |
| $\eta_C$ | f = 1.0 GHz | $P_{IN}$ = 0.5 W | $V_{CC}$ = 28 V | 50 | 52 | — | % |
| $G_P$ | f = 1.0 GHz | $P_{IN}$ = 0.5 W | $V_{CC}$ = 28 V | 10 | 11.2 | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 28 V | | — | — | 6.5 | pF |

## TYPICAL PERFORMANCE

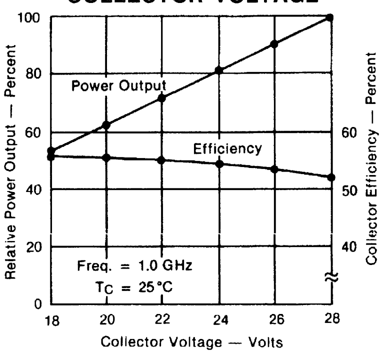
### POWER OUTPUT vs FREQUENCY




### COLLECTOR EFFICIENCY vs FREQUENCY

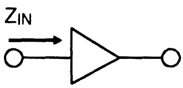


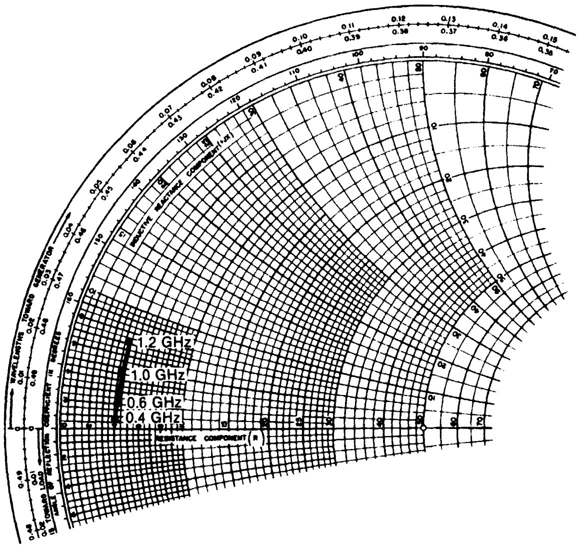

### RELATIVE POWER OUTPUT vs COLLECTOR VOLTAGE



## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE

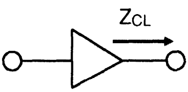


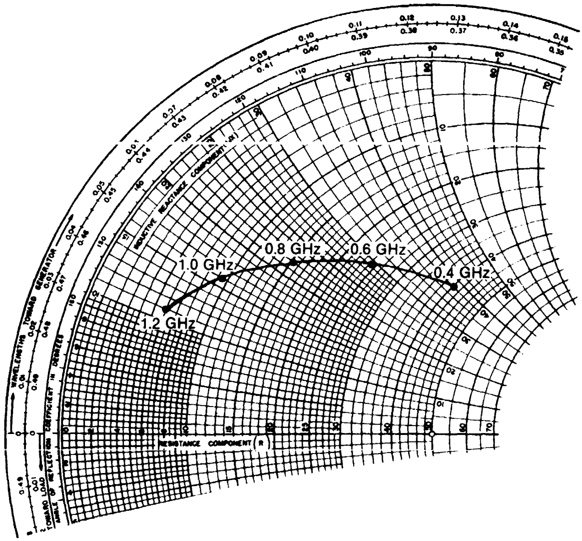




$P_{IN}$ = 0.5 W
$V_{CC}$ = 35 V
Normalized to 50 ohms

| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 0.4 GHz | 4.0 + j 0.8 | 40.0 + j 38.0 |
| 0.6 GHz | 4.1 + j 2.0 | 24.0 + j 29.5 |
| 0.8 GHz | 4.2 + j 3.2 | 15.0 + j 22.0 |
| 1.0 GHz | 4.3 + j 4.5 | 9.4 + j 16.0 |
| 1.2 GHz | 4.4 + j 7.1 | 6.0 + j 11.0 |

### TYPICAL COLLECTOR LOAD IMPEDANCE

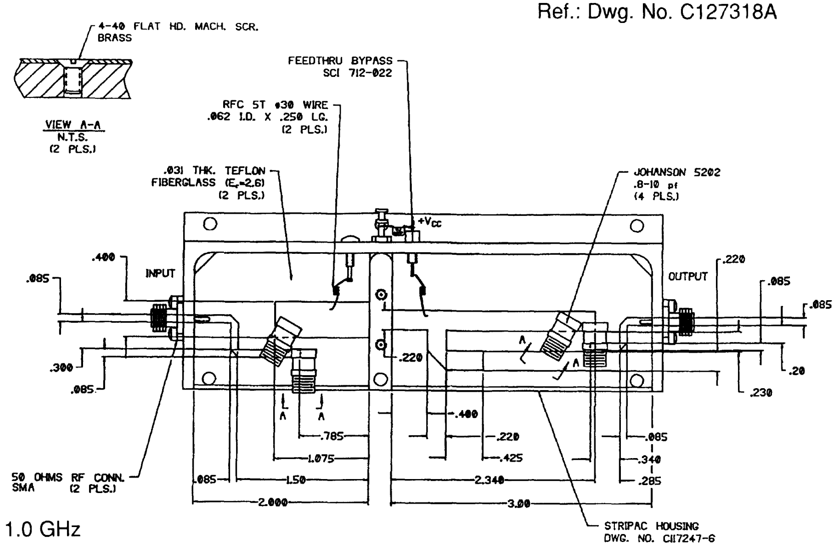



$P_{OUT}$ = Saturated
$V_{CC}$ = 35 V
Normalized to 50 ohms

## TEST CIRCUIT

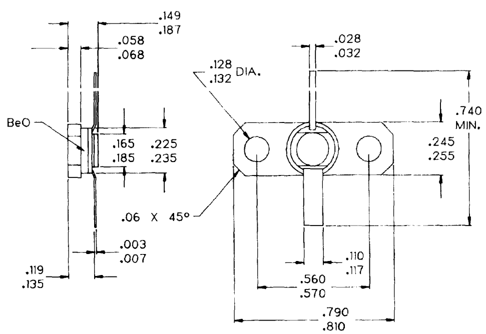
Ref.: Dwg. No. C127318A




Frequency 1.0 GHz
All dimensions are in inches.

## PACKAGE MECHANICAL DATA

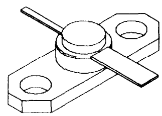
Ref.: Dwg. No.: J135021C




NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED;
DIMENSIONS IN INCHES.

# RF & MICROWAVE TRANSISTORS GENERAL PURPOSE AMPLIFIER APPLICATIONS

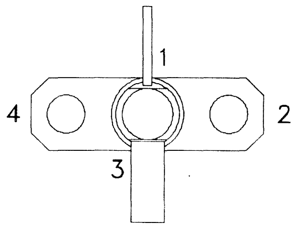
- EMITTER BALLASTED
- VSWR CAPABILITY ∞:1 @ RATED CONDITIONS
- HERMETIC STRIPAC® PACKAGE
- $P_{OUT}$ = 2.0 W MIN. WITH 10 dB GAIN @ 1.0 GHz



**.250 2LFL (S010)**
hermetically sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| MSC81118 | 81118 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

## DESCRIPTION

The MSC81118 is a common base hermetically sealed silicon NPN microwave transistor utilizing a fishbone, emitter ballasted geometry with a refractory/gold metallization system. This device is capable of withstanding an infinite load VSWR at any phase angle under rated conditions.

The MSC81118 was designed for Class C amplifier applications in the 0.4 - 1.2 GHz frequency range.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 75°C$) | 6.25 | W |
| $I_C$ | Device Current* | 200 | mA |
| $V_{CC}$ | Collector-Supply Voltage* | 35 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 20 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

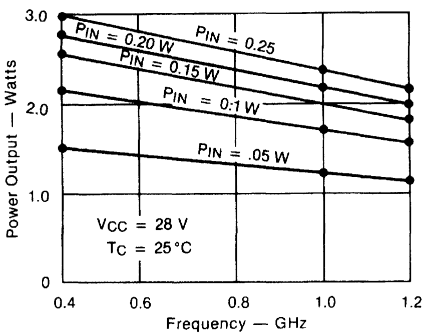
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 1mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 5mA | $R_{BE}$ = 10Ω | 45 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 28V | | — | — | 0.5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 100mA | 15 | — | 120 | — |

DYNAMIC

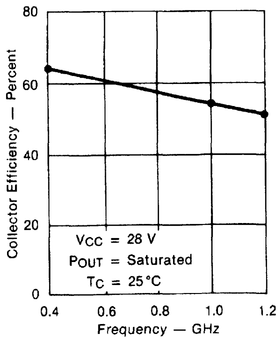
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1.0 GHz | $P_{IN}$ = 0.2 W | $V_{CC}$ = 28 V | 2.0 | 2.2 | — | W |
| $\eta_C$ | f = 1.0 GHz | $P_{IN}$ = 0.2 W | $V_{CC}$ = 28 V | 50 | 55 | — | % |
| $G_P$ | f = 1.0 GHz | $P_{IN}$ = 0.2 W | $V_{CC}$ = 28 V | 10 | 10.4 | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 28 V | | — | — | 3.2 | pF |

## TYPICAL PERFORMANCE

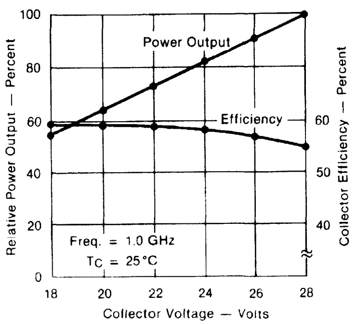
### POWER OUTPUT vs FREQUENCY




### COLLECTOR EFFICIENCY vs FREQUENCY

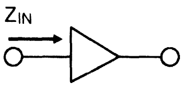


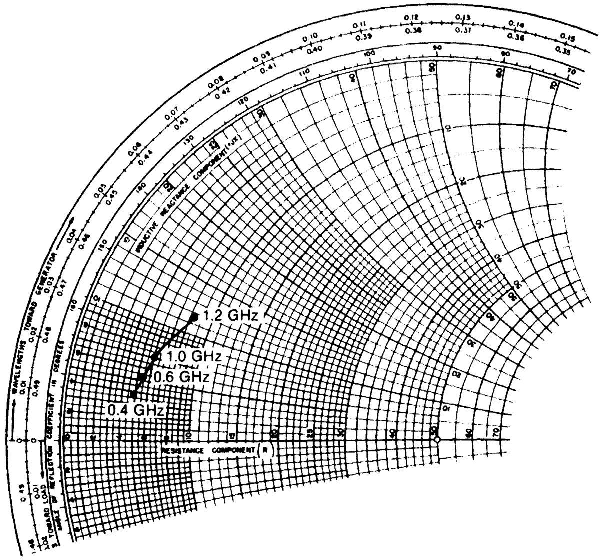

### RELATIVE POWER OUTPUT vs COLLECTOR VOLTAGE



## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE

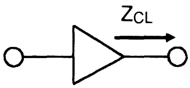


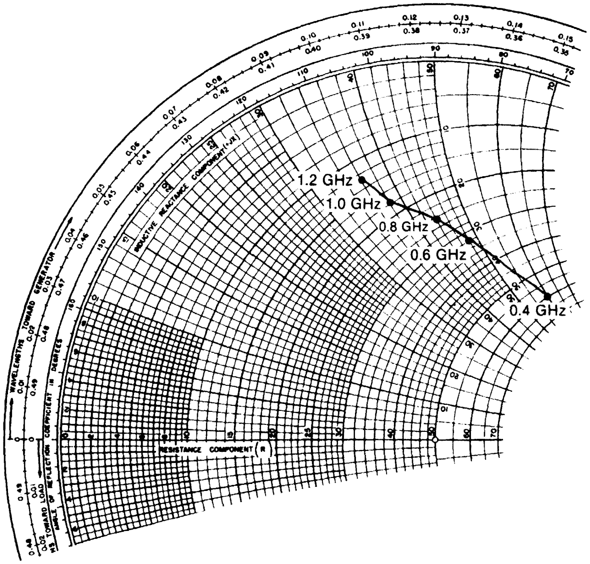




$P_{IN}$ = 0.2 W
$V_{CC}$ = 28 V
Normalized to 50 ohms

| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 0.4 GHz | 4.8 + j 3.7 | 60.0 + j 60.0 |
| 0.6 GHz | 5.4 + j 5.3 | 32.0 + j 48.0 |
| 1.0 GHz | 6.0 + j 7.0 | 18.0 + j 38.0 |
| 1.2 GHz | 8.2 + j 11.6 | 12.8 + j 36.0 |

### TYPICAL COLLECTOR LOAD IMPEDANCE

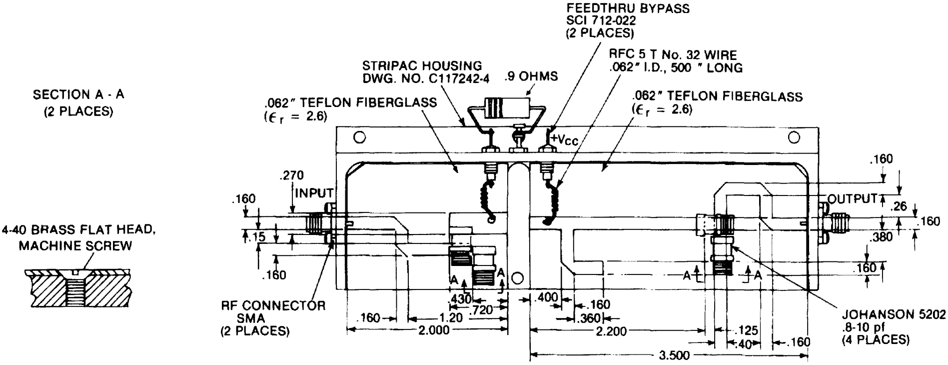



$P_{OUT}$ = Saturated
$V_{CC}$ = 28 V
Normalized to 50 ohms

## TEST CIRCUIT

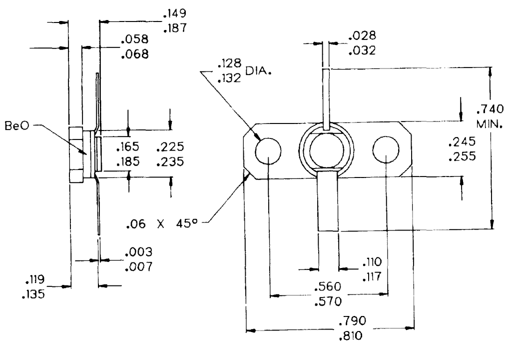
Ref.:Dwg. No. C127317




All dimensions are in inches.
Frequency 1.0 GHz

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135021C

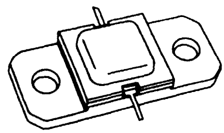



NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.

# MSC81150M

## RF & MICROWAVE TRANSISTORS AVIONICS APPLICATIONS

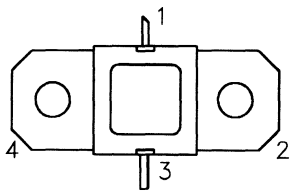
- REFRACTORY/GOLD METALLIZATION
- RUGGIZED VSWR 20:1
- LOW THERMAL RESISTANCE
- INTERNAL INPUT/OUTPUT MATCHING
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 150 W MIN. WITH 7.8 dB GAIN



**.400 x .400 2NLFL (S042)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| MSC81150M | 81150M |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The MSC81150M device is a high power pulsed transistor specifically designed for DME/TACAN avionics applications.

This device is capable of withstanding a minimum 20:1 load VSWR at any phase angle under full rated conditions. Low RF thermal resistance and semi-automatic wire bonding techniques ensure high reliability and product consistency.

The MSC81150M is housed in the unique AMPAC™ package with internal input/output matching structures.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* | 400 | W |
| $I_C$ | Device Current* | 11 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 55 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 0.3 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 10mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 15mA | $R_{BE}$ = 10Ω | 65 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 50V | | — | — | 12.5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1A | 15 | — | 120 | — |

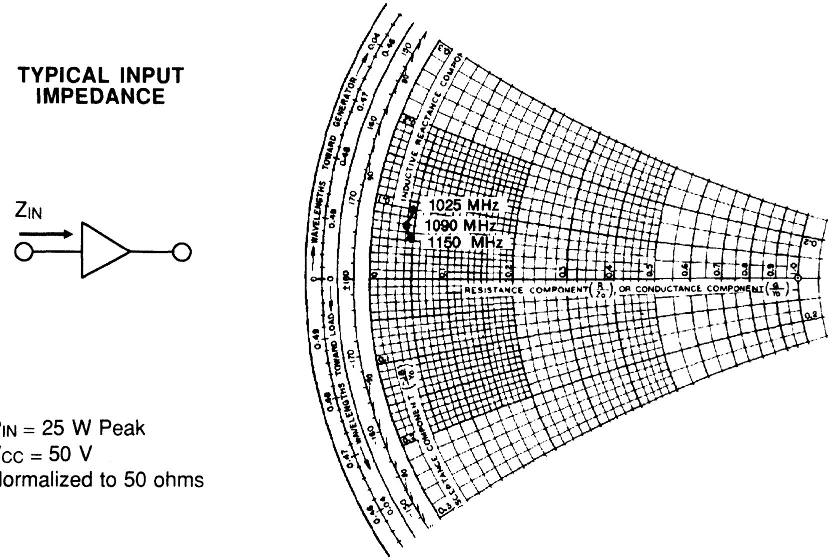
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1025 — 1150 MHz | $P_{IN}$ = 25 W | $V_{CC}$ = 50 V | 150 | 170 | — | W |
| $\eta_C$ | f = 1025 — 1150 MHz | $P_{IN}$ = 25 W | $V_{CC}$ = 50 V | 40 | 42 | — | % |
| $G_P$ | f = 1025 — 1150 MHz | $P_{IN}$ = 25 W | $V_{CC}$ = 50 V | 7.8 | 8.3 | — | dB |

Note: Pulse Width = 10μSec
Duty Cycle = 1%

## IMPEDANCE DATA

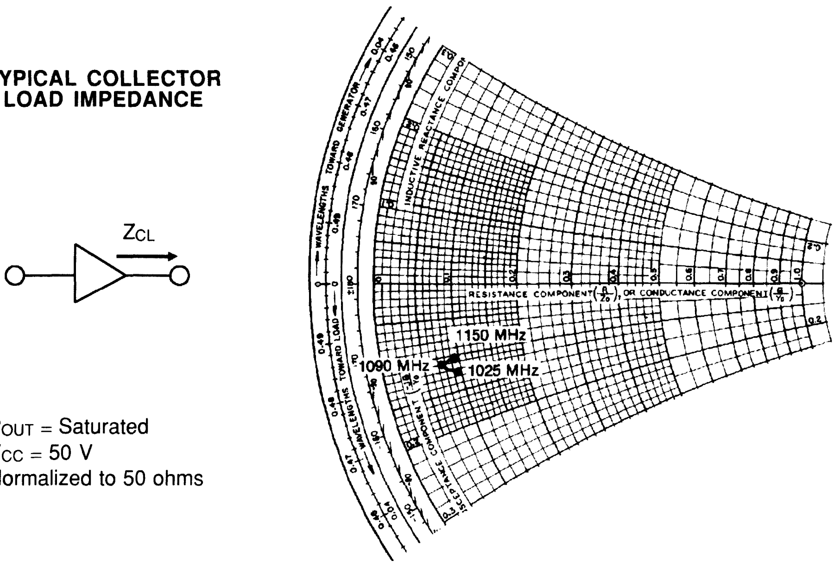
### TYPICAL INPUT IMPEDANCE




$P_{IN}$ = 25 W Peak
$V_{CC}$ = 50 V
Normalized to 50 ohms

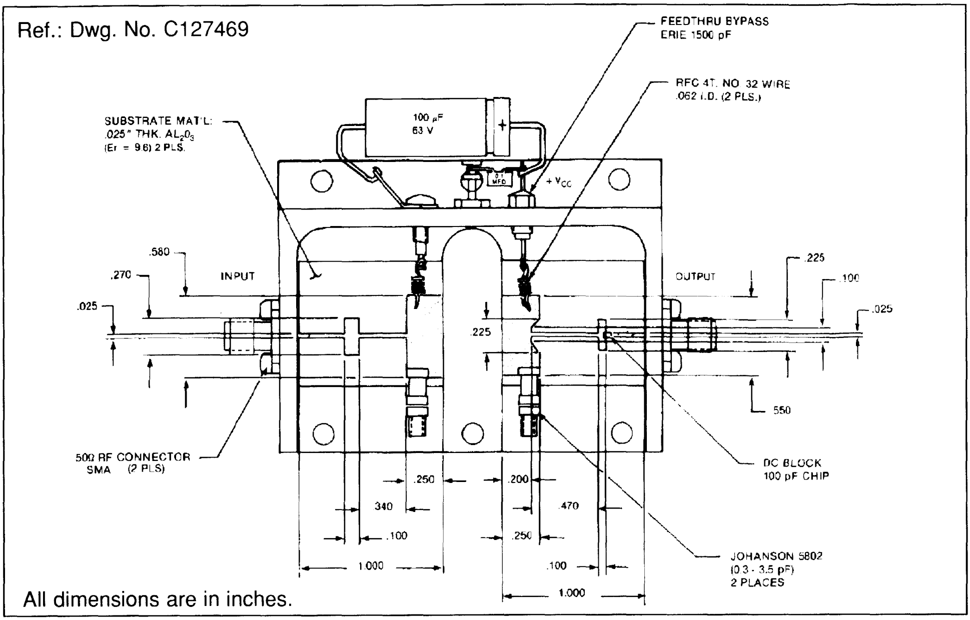
| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| L = 1025 MHz | 2.2 + j 5.0 | 4.7 – j 6.2 |
| M = 1090 MHz | 2.0 + j 3.5 | 3.6 – j 5.5 |
| H = 1150 MHz | 2.3 + j 2.7 | 4.8 – j 5.2 |

### TYPICAL COLLECTOR LOAD IMPEDANCE

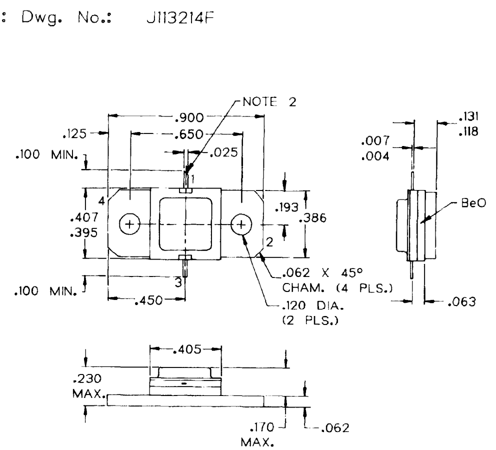



$P_{OUT}$ = Saturated
$V_{CC}$ = 50 V
Normalized to 50 ohms

## TEST CIRCUIT




## PACKAGE MECHANICAL DATA

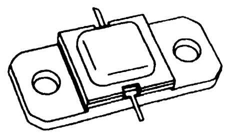



NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD SLANT CUT.

# MSC81175M

## RF & MICROWAVE TRANSISTORS
## AVIONICS APPLICATIONS

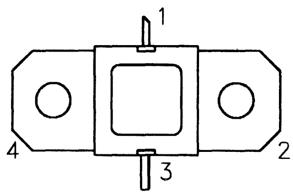
- REFRACTORY\GOLD METALLIZATION
- RUGGEDIZED VSWR 20:1
- INTERNAL INPUT/OUTPUT MATCHING
- LOW THERMAL RESISTANCE
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 175 W MIN. WITH 7.7 dB GAIN



**.400 x .400 NLFL (S042)**
hermetically sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| MSC81175M | 81175M |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The MSC81175M device is a high power pulsed transistor specifically designed for DME/TACAN avionics applications.

This device is capable of withstanding a minimum 20:1 load VSWR at any phase angle under full rated conditions. Low RF thermal resistance and semi automatic wire bonding techniques ensure high reliability and product consistency.

The MSC81175M is housed in the unique AMPAC™ package with internal input/output matching structures.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* | 400 | W |
| $I_C$ | Device Current* | 12 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 55 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | − 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 0.3 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 10mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 15mA | $R_{BE}$ = 10Ω | 65 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 50V | | — | — | 12.5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1A | 15 | — | 120 | — |

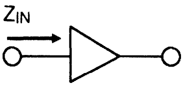
DYNAMIC

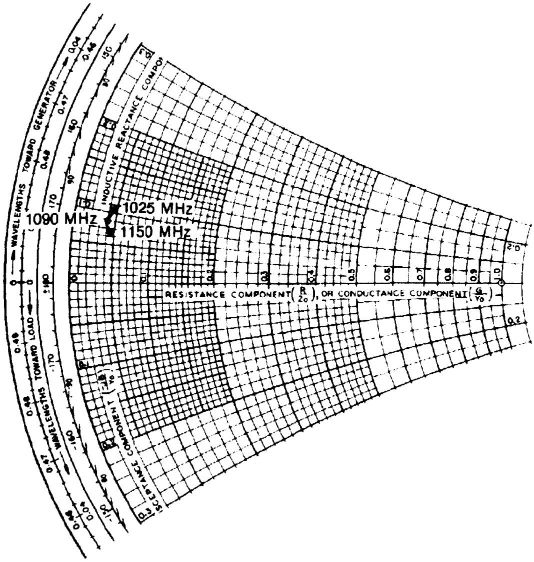
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1025 — 1150 MHz | $P_{IN}$ = 30 W | $V_{CC}$ = 50 V | 175 | 190 | — | W |
| $\eta_C$ | f = 1025 — 1150 MHz | $P_{IN}$ = 30 W | $V_{CC}$ = 50 V | 40 | 42 | — | % |
| $G_P$ | f = 1025 — 1150 MHz | $P_{IN}$ = 30 W | $V_{CC}$ = 50 V | 7.7 | 8.0 | — | dB |

Note: Pulse Width = 10μSec
Duty Cycle = 1%

## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE

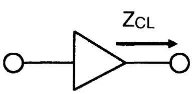


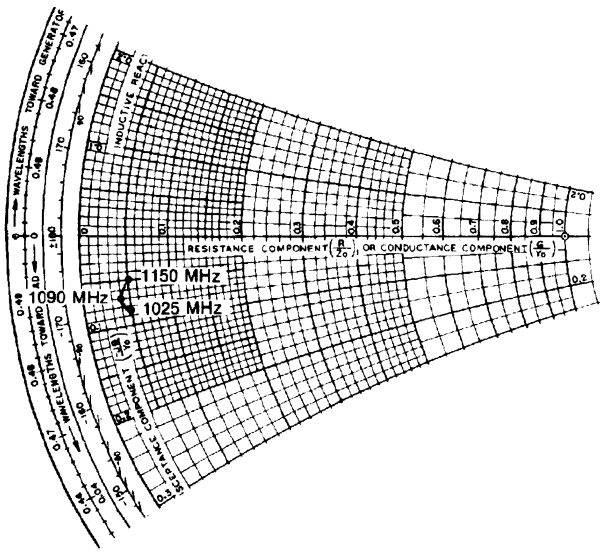




$P_{IN}$ = 30 W
$V_{CC}$ = 50 V
Normalized to 50 ohms

| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| L = 1025 MHz | 2.3 + j 5.1 | 2.4 − j 4.2 |
| M = 1090 MHz | 2.0 + j 4.5 | 2.0 − j 3.5 |
| H = 1150 MHz | 2.2 + j 3.3 | 2.5 − j 2.5 |

### TYPICAL COLLECTOR LOAD IMPEDANCE

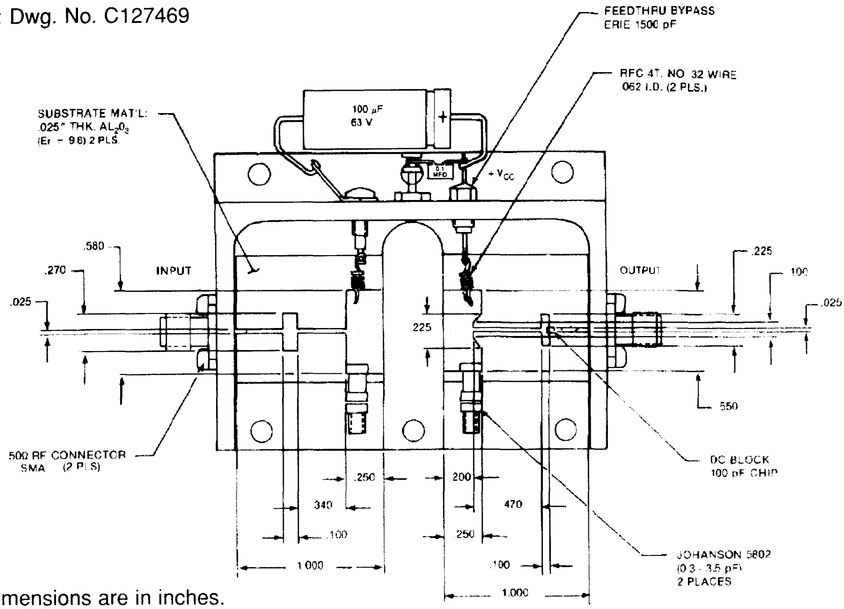



$P_{OUT}$ = Saturated
$V_{CC}$ = 50 V
Normalized to 50 ohms

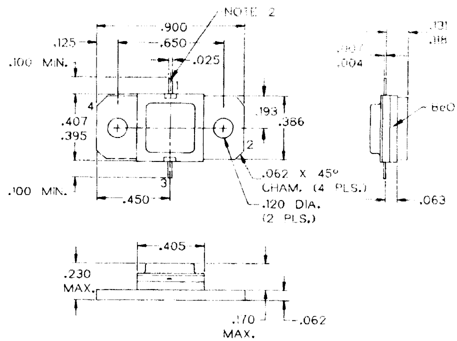
## TEST CIRCUIT

Ref.: Dwg. No. C127469




All dimensions are in inches.

## PACKAGE MECHANICAL DATA



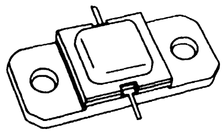

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED;
DIMENSIONS IN INCHES.
2. COLLECTOR LEAD SLANT CUT.

SGS-THOMSON MICROELECTRONICS

# MSC81250M

## RF & MICROWAVE TRANSISTORS AVIONICS APPLICATIONS

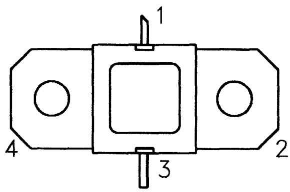
- REFRACTORY\GOLD METALLIZATION
- RUGGEDIZED VSWR 20:1
- INTERNAL INPUT/OUTPUT MATCHING
- LOW THERMAL RESISTANCE
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 250 W MIN. WITH 6.2 dB GAIN



**.400 x .400 2NLFL (S042)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| MSC81250M | 81250M |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The MSC81250M device is a high power pulsed transistor specifically designed for DME/TACAN avionics applications.

This device is capable of withstanding a minimum 20:1 load VSWR at any phase angle under full rated conditions. Low RF thermal resistance and semi automatic wire bonding techniques ensure high reliability and product consistency.

The MSC81250M is housed in the unique AMPAC™ package with internal input/output matching structures.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 80$°C) | 600 | W |
| $I_C$ | Device Current* | 17.8 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 55 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | − 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 0.20 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 10mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 25mA | $R_{BE}$ = 10Ω | 65 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 50V | | — | — | 25 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1A | 15 | — | 120 | — |

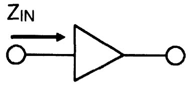
DYNAMIC

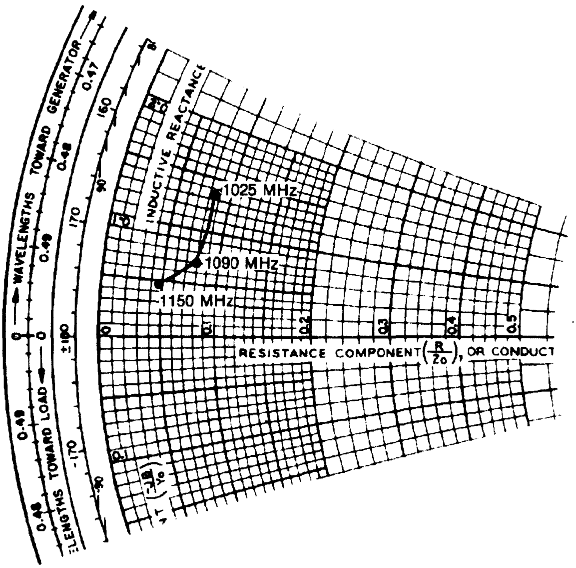
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1025 — 1150 MHz | $P_{IN}$ = 60 W | $V_{CC}$ = 50 V | 250 | 270 | — | W |
| $\eta_C$ | f = 1025 — 1150 MHz | $P_{IN}$ = 60 W | $V_{CC}$ = 50 V | 40 | 38 | — | % |
| $G_P$ | f = 1025 — 1150 MHz | $P_{IN}$ = 60 W | $V_{CC}$ = 50 V | 6.2 | 6.5 | — | dB |

Note: Pulse Width = 10µSec
Duty Cycle = 1%

## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE

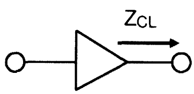


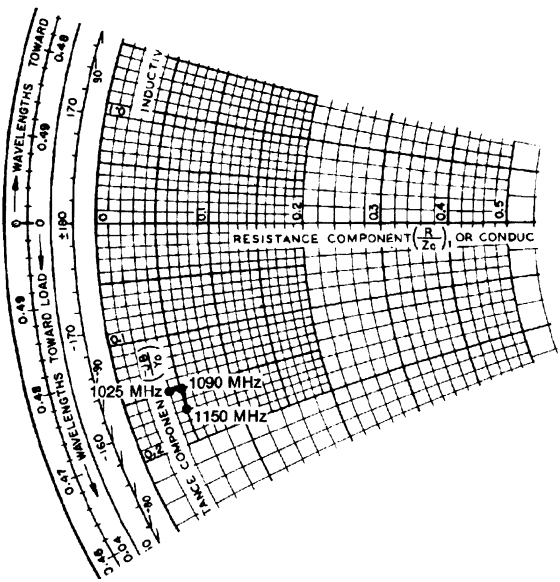




$P_{IN}$ = 60 W
$V_{CC}$ = 50 V
Normalized to 50 ohms

| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| L = 1025 MHz | 4.2 + j 6.7 | 2.0 − j 7.5 |
| M = 1090 MHz | 4.0 + j 3.5 | 2.5 − j 7.5 |
| H = 1150 MHz | 2.3 + j 2.3 | 2.5 − j 8.5 |

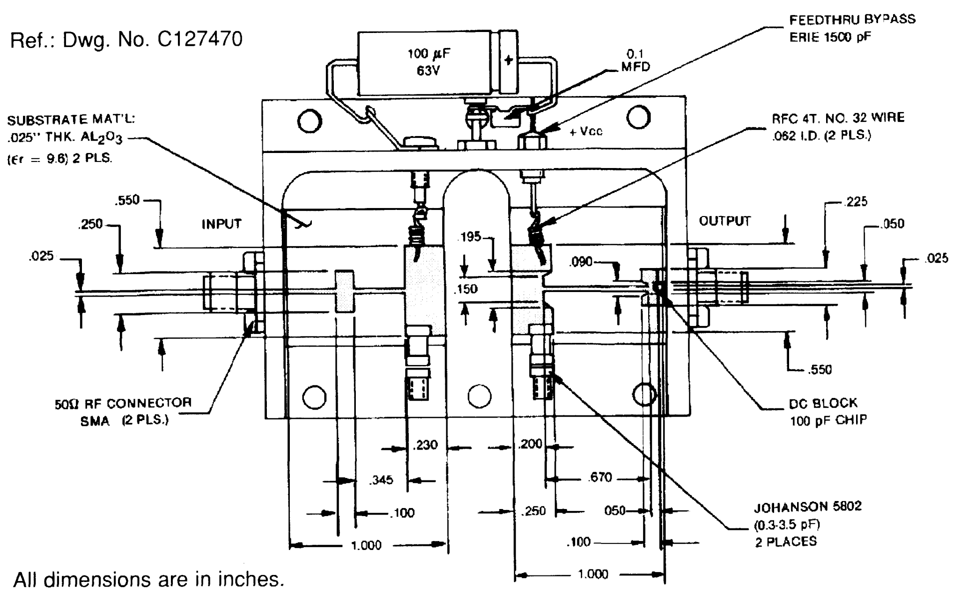
### TYPICAL COLLECTOR LOAD IMPEDANCE



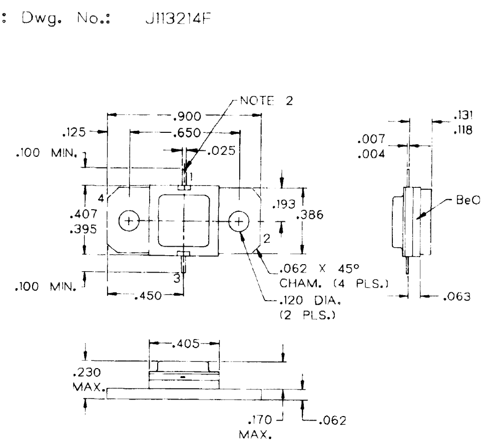




$P_{IN}$ = 60 W
$V_{CC}$ = 50 V
Normalized to 50 ohms

## TEST CIRCUIT



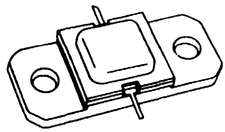

## PACKAGE MECHANICAL DATA




NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD SLANT CUT.

# RF & MICROWAVE TRANSISTORS AVIONICS APPLICATIONS

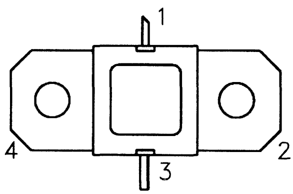
- REFRACTORY\GOLD METALLIZATION
- RUGGEDIZED VSWR 20:1
- INTERNAL INPUT/OUTPUT MATCHING
- LOW THERMAL RESISTANCE
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 300 W MIN. WITH 6.3 dB GAIN



**.400 x .400 2NLFL (S042)**
hermetically sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| MSC81300M | 81300M |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

## DESCRIPTION

The MSC81300M device is a high power pulsed transistor specifically designed for IFF avionics applications.

This device is capable of withstanding a minimum 20:1 load VSWR at any phase angle under full rated conditions. Low RF thermal resistance and semi automatic wire bonding techniques ensure high reliability and product consistency.

The MSC81300M is housed in the unique AMPAC™ package with internal input/output matching structures.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* | 625 | W |
| $I_C$ | Device Current* | 18.8 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 55 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 0.20 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 10mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 25mA | $R_{BE}$ = 10Ω | 65 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 50V | | — | — | 25 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1A | 15 | — | 120 | — |

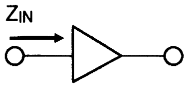
DYNAMIC

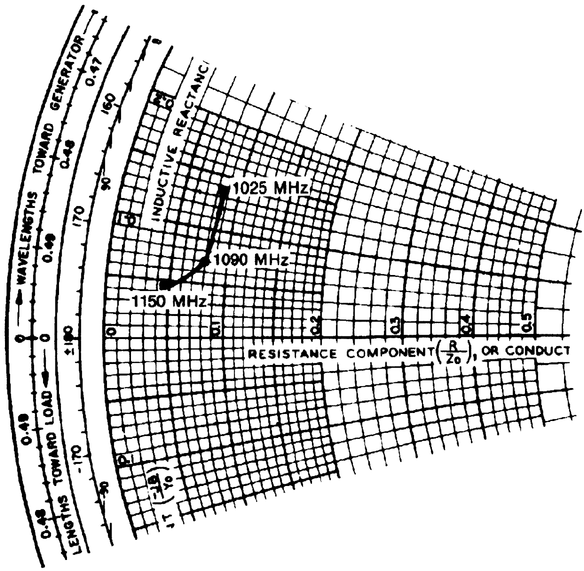
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1090 MHz | $P_{IN}$ = 70 W | $V_{CC}$ = 50 V | 300 | 330 | — | W |
| $\eta_C$ | f = 1090 MHz | $P_{IN}$ = 70 W | $V_{CC}$ = 50 V | 35 | 42 | — | % |
| $G_P$ | f = 1090 MHz | $P_{IN}$ = 70 W | $V_{CC}$ = 50 V | 6.3 | 6.7 | — | dB |

Note: Pulse Width = 10µSec
Duty Cycle = 1%

## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE

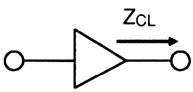


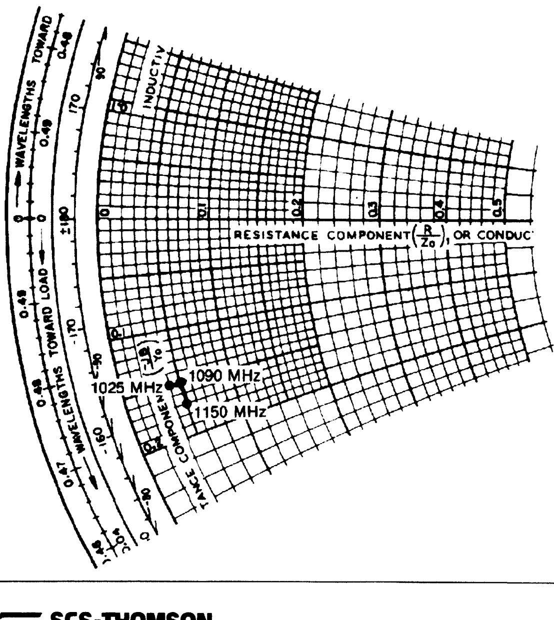




PIN = 70 W
VCC = 50 V
Normalized to 50 ohms

| FREQ. | ZIN (Ω) | ZCL (Ω) |
|---|---|---|
| 1025 MHz | 4.2 + j 6.7 | 2.0 – j 7.5 |
| 1090 MHz | 4.0 + j 3.5 | 2.5 – j 7.5 |
| 1150 MHz | 2.3 + j 2.3 | 2.5 – j 8.5 |

### TYPICAL COLLECTOR LOAD IMPEDANCE

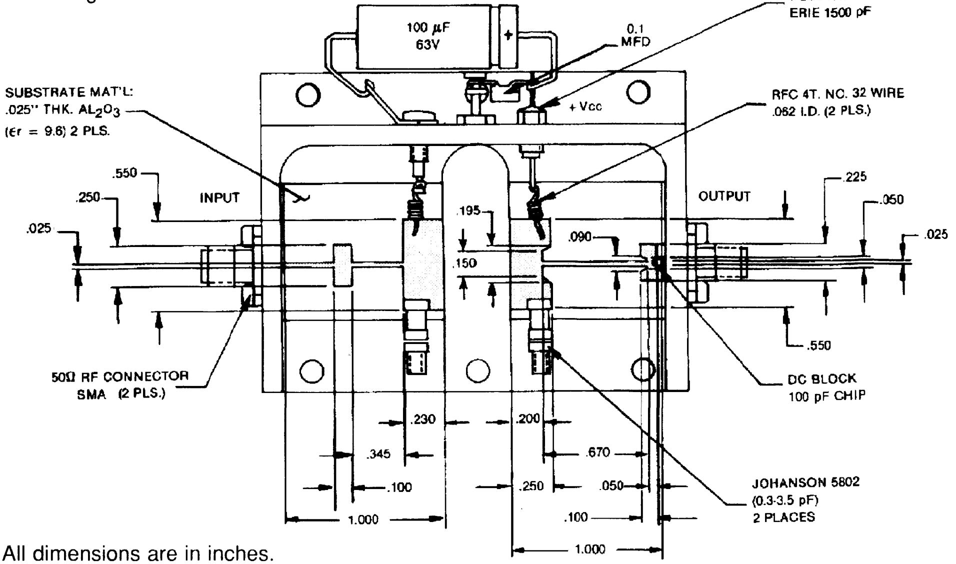



PIN = 70 W
VCC = 50 V
Normalized to 50 ohms

## TEST CIRCUIT

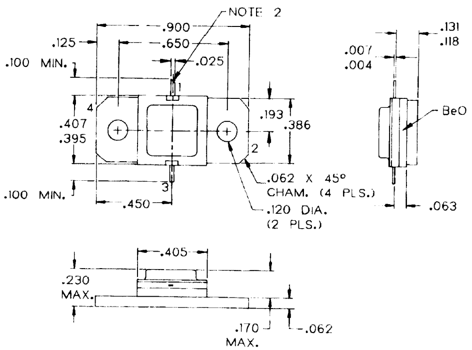
Ref.: Dwg. No. C127470




All dimensions are in inches.

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J113214F




NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD SLANT CUT.

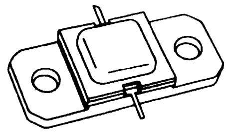
SGS-THOMSON MICROELECTRONICS

# MSC81325M

## RF & MICROWAVE TRANSISTORS AVIONICS APPLICATIONS

PRELIMINARY DATA

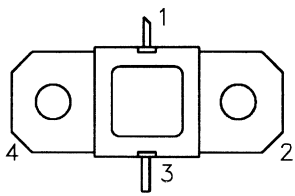
- REFRACTORY/GOLD METALLIZATION
- EMITTER BALLASTED
- RUGGEDIZED VSWR ∞:1
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 325 W MIN. WITH 6.7 dB GAIN



**.400 x .400 2NLFL (S042)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| MSC81325M | 81325M |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The MSC81325M device is a high power pulsed transistor specifically designed for DME/TACAN avionics applications.

This device is capable of withstanding an infinite load VSWR at any phase angle under full rated conditions. Low RF thermal resistance and semi-automatic bonding techniques ensure high reliability and product consistency.

The MSC81325M is housed in the industry-standard AMPAC™ metal/ceramic hermetic package with internal input/output matching structures.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 100°C$) | 880 | W |
| $I_C$ | Device Current* | 24 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 55 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 0.17 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

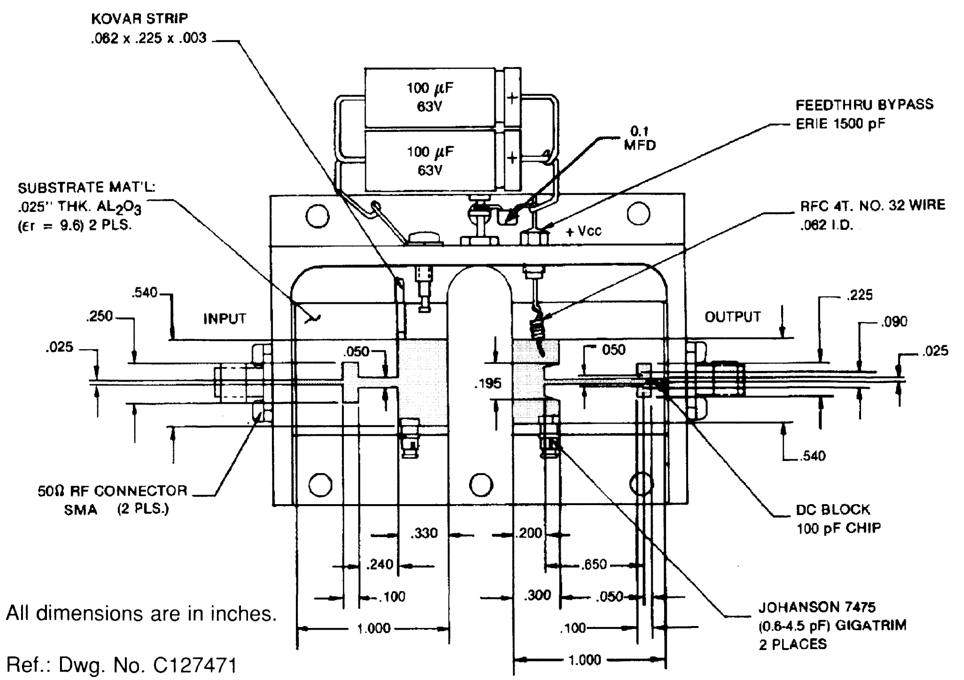
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 10mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 25mA | $R_{BE}$ = 10Ω | 65 | — | — | V |
| $I_{CES}$ | $V_{BE}$ = 0V | $V_{CE}$ = 50V | — | — | 25 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1A | 15 | — | 120 | — |

DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1025 — 1150 MHz | $P_{IN}$ = 70 W | $V_{CC}$ = 50 V | 325 | 360 | — | W |
| $\eta_c$ | f = 1025 — 1150 MHz | $P_{IN}$ = 70 W | $V_{CC}$ = 50 V | 40 | 41 | — | % |
| $G_P$ | f = 1025 — 1150 MHz | $P_{IN}$ = 70 W | $V_{CC}$ = 50 V | 6.7 | 7.1 | — | dB |

Note: Pulse Width = 10µSec
Duty Cycle = 1%

## TEST CIRCUIT

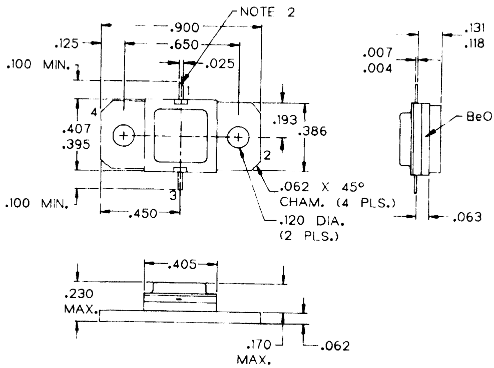



All dimensions are in inches.

Ref.: Dwg. No. C127471

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J113214F



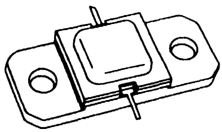

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD SLANT CUT.

SGS-THOMSON MICROELECTRONICS

# MSC81350M

## RF & MICROWAVE TRANSISTORS AVIONICS APPLICATIONS

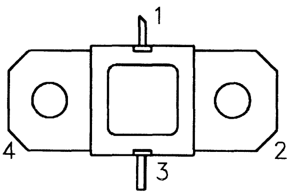
- REFRACTORY/GOLD METALLIZATION
- RUGGEDIZED VSWR 20:1
- INTERNAL INPUT/OUTPUT MATCHING
- LOW THERMAL RESISTANCE
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 350 W MIN. WITH 7.0 dB GAIN



**.400 x .400 2NLFL (S042)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| MSC81350M | 81350M |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The MSC81350M device is a high power pulsed transistor specifically designed for IFF avionics applications.

This device is capable of withstanding a minimum 20:1 load VSWR at any phase angle under full rated conditions. Low RF thermal resistance and semi automatic wire bonding techniques ensure high reliability and product consistency.

The MSC81350M is housed in the unique AMPAC™ package with internal input/output matching structures.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 55$°C) | 720 | W |
| $I_C$ | Device Current* | 19.8 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 55 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 0.20 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 10mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 25mA | $R_{BE}$ = 10Ω | 65 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 50V | | — | — | 25 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1A | 15 | — | 120 | — |

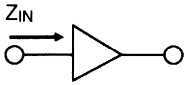
DYNAMIC

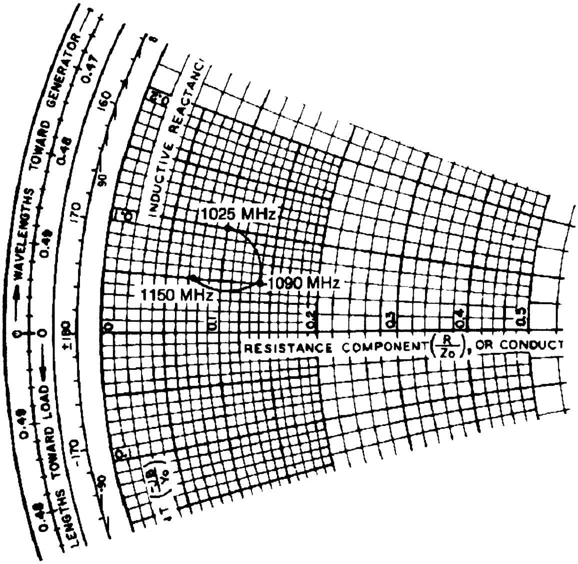
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1090 MHz | $P_{IN}$ = 70 W | $V_{CC}$ = 50 V | 350 | 360 | — | W |
| $\eta_C$ | f = 1090 MHz | $P_{IN}$ = 70 W | $V_{CC}$ = 50 V | 40 | 44 | — | % |
| $G_P$ | f = 1090 MHz | $P_{IN}$ = 70 W | $V_{CC}$ = 50 V | 7.0 | 7.1 | — | dB |

Note: Pulse Width = 10μSec
Duty Cycle = 1%

## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE

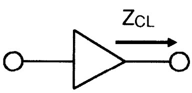


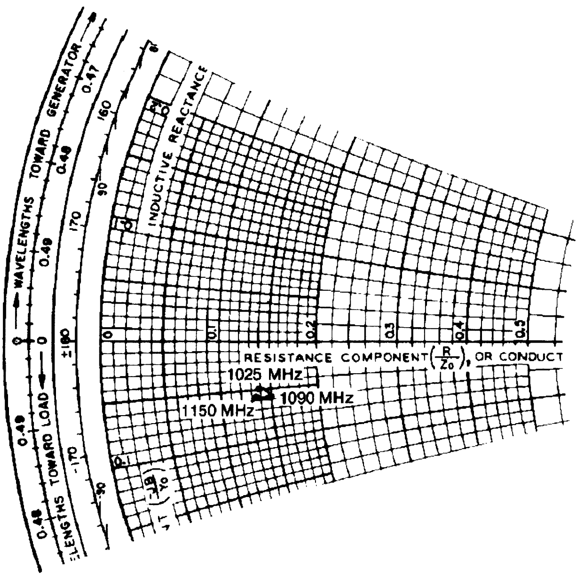




$P_{IN}$ = 70 W
$V_{CC}$ = 50 V
Normalized to 50 ohms

| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| L = 1025 MHz | 5.0 + j 5.0 | 7.0 − j 2.5 |
| M = 1090 MHz | 7.0 + j 2.5 | 7.5 − j 2.8 |
| H = 1150 MHz | 3.6 + j 2.5 | 6.8 − j 2.7 |

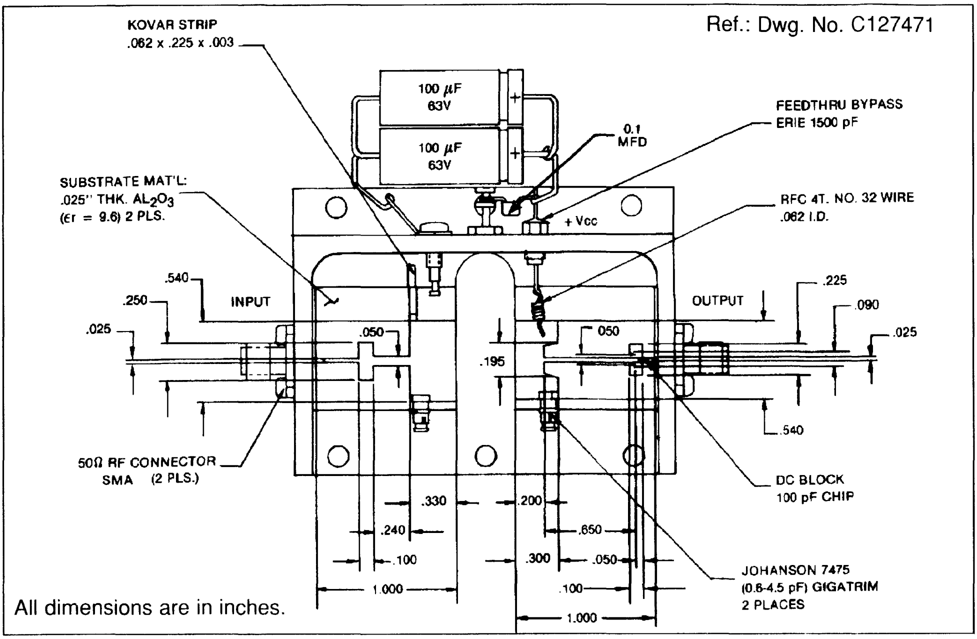
### TYPICAL COLLECTOR LOAD IMPEDANCE



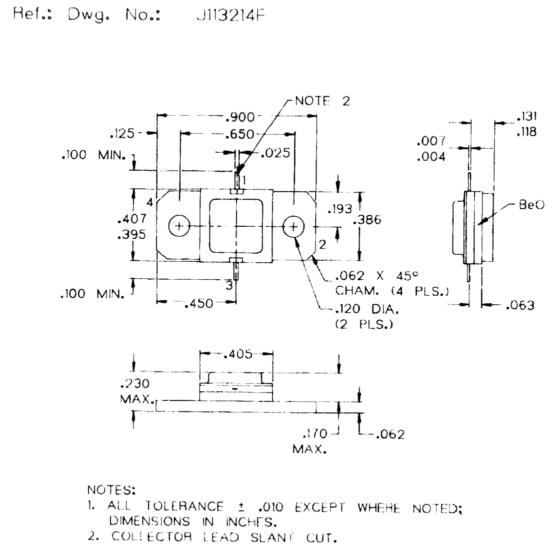




$P_{IN}$ = 70 W
$V_{CC}$ = 50 V
Normalized to 50 ohms

## TEST CIRCUIT




## PACKAGE MECHANICAL DATA

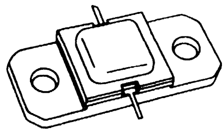


SGS-THOMSON MICROELECTRONICS

# MSC81390M

## RF & MICROWAVE TRANSISTORS AVIONICS APPLICATIONS

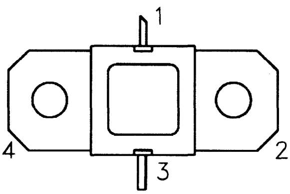
- RUGGEDIZED VSWR 20:1
- INTERNAL INPUT/OUTPUT MATCHING
- LOW THERMAL RESISTANCE
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 390 W MIN. WITH 6.8 dB GAIN



**.400 x .400 2NLFL (S042)**
hermetically sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| MSC81390M | 81390M |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The MSC81390M transistor is a high peak pulse power device specifically designed for IFF avionics applications.

This device is capable of withstanding any mismatch load condition at any phase angle under full rated conditions.

The MSC81390M is housed in the unique AMPAC™ hermetic metal/ceramic package with internal input/output matching structures.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 100°C$) | 1000 | W |
| $I_C$ | Device Current* | 28 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 50 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 0.15 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

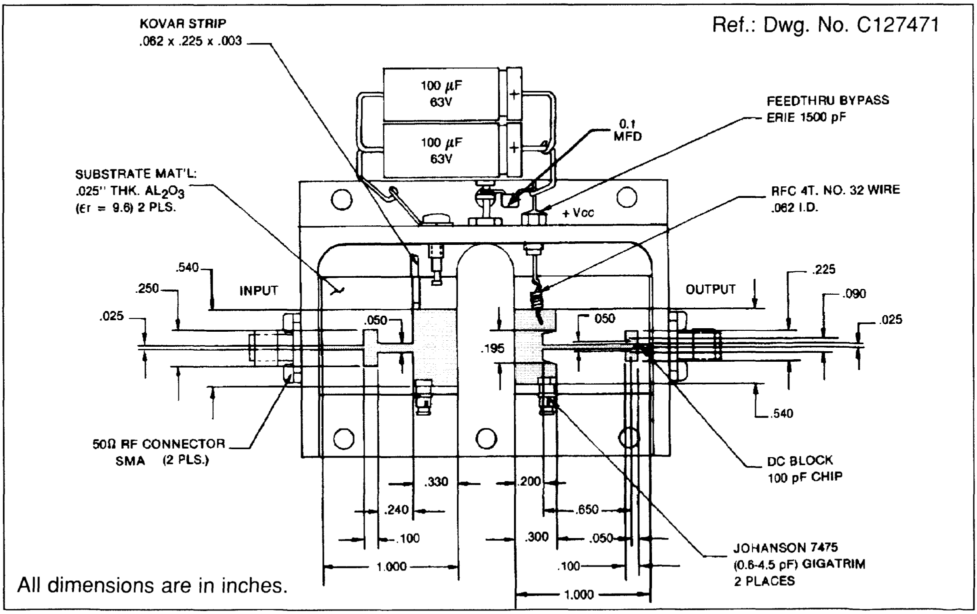
| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 15mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 50mA | $R_{BE}$ = 10Ω | 65 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 65V | | — | — | 35 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1A | 15 | — | 120 | — |

### DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 1090 MHz | $P_{IN}$ = 80 W | $V_{CC}$ = 50 V | 390 | — | — | W |
| $\eta_C$ | f = 1090 MHz | $P_{IN}$ = 80 W | $V_{CC}$ = 50 V | 35 | — | — | % |
| $G_P$ | f = 1090 MHz | $P_{IN}$ = 80 W | $V_{CC}$ = 50 V | 6.8 | — | — | dB |

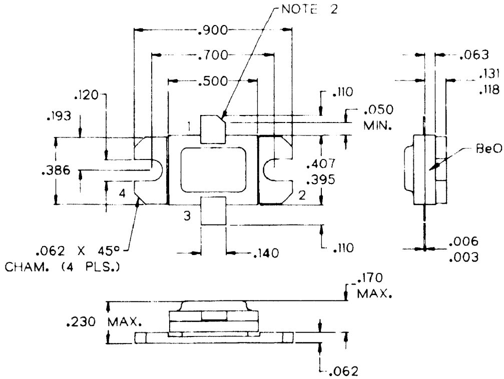
Note: Pulse Width = 10µSec
Duty Cycle = 1%

## TEST CIRCUIT



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135066F



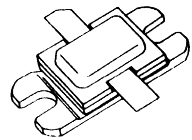

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

SGS-THOMSON MICROELECTRONICS

# MSC81400M

## RF & MICROWAVE TRANSISTORS AVIONICS APPLICATIONS

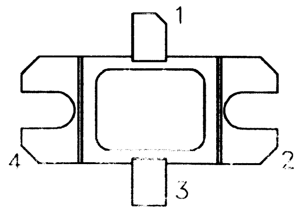
- REFRACTORY\GOLD METALLIZATION
- RUGGEDIZED VSWR 25:1
- INTERNAL INPUT/OUTPUT MATCHING
- LOW THERMAL RESISTANCE
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 400 W MIN. WITH 6.5 dB GAIN



**.400 x .500 2LFL (S038)**
hermetically sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| MSC81400M | 81400M |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The MSC81400M "Super Power" transistor is a high peak pulse power device specifically designed for DME/TACAN avionics applications.

This device is capable of withstanding a minimum 25:1 load mismatch condition at any phase angle under full rated conditions.

The MSC81400M is housed in the unique BIGPAC™ hermetic metal/ceramic package with internal input/output matching structures.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 80$°C) | 1000 | W |
| $I_C$ | Device Current* | 28 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 55 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | − 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 0.12 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 15mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 50mA | $R_{BE}$ = 10Ω | 65 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 50V | | — | — | 35 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1A | 15 | — | 120 | — |

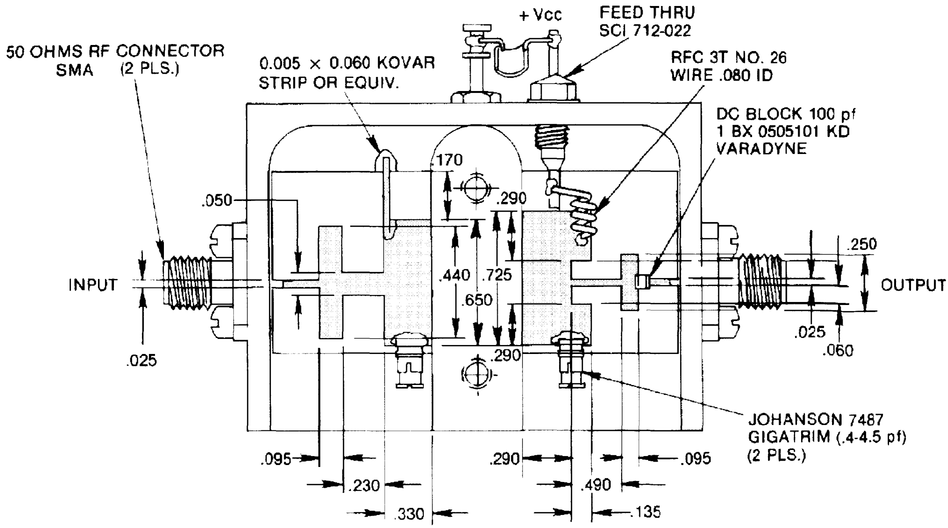
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1025 — 1150 MHz | $P_{IN}$ = 90 W | $V_{CC}$ = 50 V | 400 | 450 | — | W |
| $\eta_C$ | f = 1025 — 1150 MHz | $P_{IN}$ = 90 W | $V_{CC}$ = 50 V | 40 | — | — | % |
| $G_P$ | f = 1025 — 1150 MHz | $P_{IN}$ = 90 W | $V_{CC}$ = 50 V | 6.5 | — | — | dB |

Note: Pulse Width = 10μSec
Duty Cycle = 1%

## TEST CIRCUIT

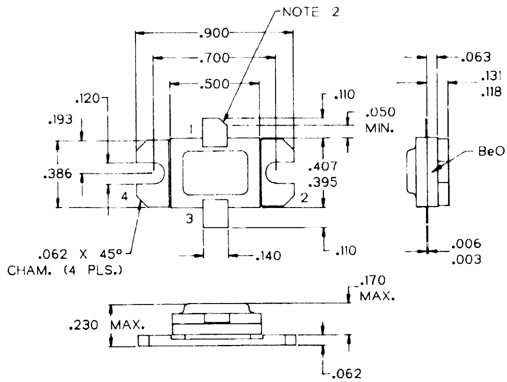
Ref.: Dwg. No. C125363




All dimensions are in inches.

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135066F



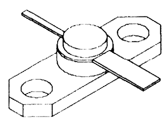

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

# MSC81402

## RF & MICROWAVE TRANSISTORS GENERAL PURPOSE AMPLIFIERS APPLICATIONS

PRELIMINARY DATA

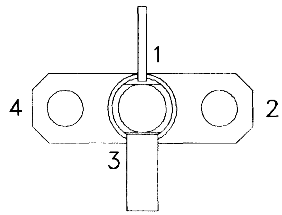
- REFRACTORY/GOLD METALLIZATION
- HIGH GAIN & COLLECTOR EFFICIENCY
- RUGGED OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 2.0 W MIN. WITH 10.0 dB GAIN



**.250 2LFL (S010)**
hermetically sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| MSC81402 | 81402 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The MSC81402 is a 28 Volt, Class C, common base NPN biploar device designed for general purpose amplifier applications in the UHF and L-Band frequency range.

High gain and collector efficiency along with extreme ruggedness are obtained using a gold metallized emitter-ballasted overlay die geometry.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 50$°C) | 6 | W |
| $I_C$ | Device Current* | 0.23 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 30 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 25 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

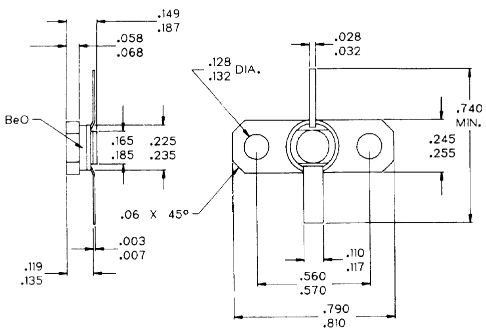
| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 1mA | $I_E$ = 0mA | 50 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 5mA | $R_{BE}$ = 10Ω | 50 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 28V | | — | — | 0.5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 100mA | 30 | — | 300 | — |

DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 1.4 GHz | $P_{IN}$ = 0.2W | $V_{CC}$ = 28V | 2.0 | — | — | W |
| $\eta_C$ | f = 1.4 GHz | $P_{IN}$ = 0.2W | $V_{CC}$ = 28V | 50 | — | — | % |
| $G_P$ | f = 1.4 GHz | $P_{IN}$ = 0.2W | $V_{CC}$ = 28V | 10.0 | — | — | dB |
| $C_{OB}$ | f = 1MHz | $V_{CB}$ = 28V | | — | 3.2 | — | pF |

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135021C




NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.

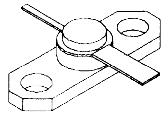
**SGS-THOMSON MICROELECTRONICS**

# MSC81406

## RF & MICROWAVE TRANSISTORS GENERAL PURPOSE AMPLIFIERS APPLICATIONS

PRELIMINARY DATA

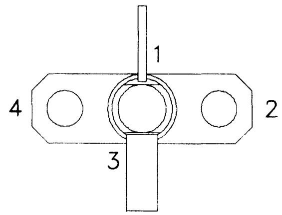
- REFRACTORY\GOLD METALLIZATION
- HIGH GAIN & COLLECTOR EFFICIENCY
- RUGGED OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 6.0 W MIN. WITH 9.7 dB GAIN



**.250 2LFL (S010)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| MSC81406 | 81406 |

### PIN CONNECTION




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The MSC81406 is a 28 Volt, Class C, common base NPN biploar device designed for general purpose amplifier applications in the UHF and L-Band frequency range.

High gain and collector efficiency along with extreme ruggedness are obtained using a gold metallized emitter-ballasted overlay die geometry.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 50°C$) | 15 | W |
| $I_C$ | Device Current* | 0.6 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 28 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 10 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

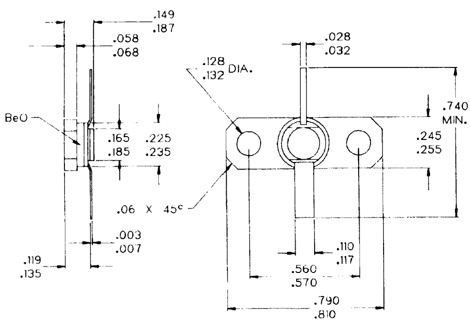
| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 5mA | $I_E$ = 0mA | 55 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 5mA | $R_{BE}$ = 10Ω | 55 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 28V | | — | — | 1.0 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 250mA | 20 | — | 300 | — |

DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 1.4 GHz | $P_{IN}$ = 0.65W | $V_{CC}$ = 28V | 6.0 | — | — | W |
| $\eta_C$ | f = 1.4 GHz | $P_{IN}$ = 0.65W | $V_{CC}$ = 28V | 45 | — | — | % |
| $G_P$ | f = 1.4 GHz | $P_{IN}$ = 0.65W | $V_{CC}$ = 28V | 9.7 | — | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 28V | | — | — | 6.0 | pF |

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135021C




NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED;
DIMENSIONS IN INCHES.

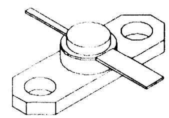
SGS-THOMSON MICROELECTRONICS

# MSC81410

## RF & MICROWAVE TRANSISTORS GENERAL PURPOSE AMPLIFIERS APPLICATIONS

PRELIMINARY DATA

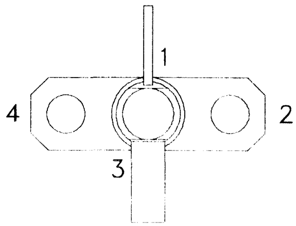
- REFRACTORY\GOLD METALLIZATION
- HIGH GAIN & COLLECTOR EFFICIENCY
- RUGGED OVERALY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 10 W MIN. WITH 8.5 dB GAIN



**.250 2LFL (S010)**
hermetically sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| MSC81410 | 81410 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

## DESCRIPTION

The MSC81410 is a 28 Volt, Class C, common base NPN biploar device designed for general purpose amplifier applications in the UHF and L-Band frequency range.

High gain and collector efficiency along with extreme ruggedness are obtained using a gold metallized emitter-ballasted overlay die geometry.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 50$°C) | 25 | W |
| $I_C$ | Device Current* | 1.0 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 28 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 6.0 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

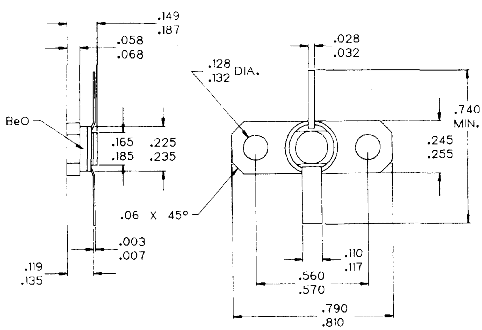
| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 10mA | $I_E$ = 0mA | 55 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 2mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 10mA | $R_{BE}$ = 10Ω | 55 | — | — | V |
| $I_{CES}$ | $V_{BE}$ = 0V | $V_{CE}$ = 28V | — | — | 2.0 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 500mA | 20 | — | 300 | — |

DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 1.4 GHz | $P_{IN}$ = 1.4 W | $V_{CC}$ = 28 V | 10 | — | — | W |
| $\eta_C$ | f = 1.4 GHz | $P_{IN}$ = 1.4 W | $V_{CC}$ = 28 V | 45 | — | — | % |
| $G_P$ | f = 1.4 GHz | $P_{IN}$ = 1.4 W | $V_{CC}$ = 28 V | 8.5 | — | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 28 V | | — | — | 9.5 | pF |

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135021C



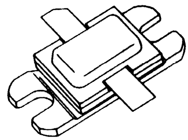

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED;
DIMENSIONS IN INCHES.

SGS-THOMSON MICROELECTRONICS

# MSC81450M

## RF & MICROWAVE TRANSISTORS AVIONICS APPLICATIONS

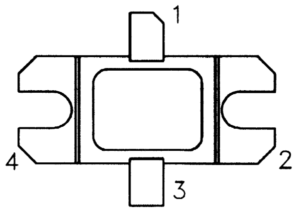
- REFRACTORY\GOLD METALLIZATION
- RUGGEDIZED VSWR 25:1
- INTERNAL INPUT/OUTPUT MATCHING
- LOW THERMAL RESISTANCE
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 450 W MIN. WITH 7.0 dB GAIN



**.400 x .500 2LFL (S038)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| MSC81450M | 81450M |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

## DESCRIPTION

The MSC81450M device is a high power pulsed transistor specifically designed for IFF avionics applications.

This device is capable of withstanding a minimum 25:1 load mismatch at any phase angle under full rated conditions.

The MSC81450M is housed in the unique BIGPAC™ package with internal input/output matching structures.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* | 910 | W |
| $I_C$ | Device Current* | 28 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 55 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 0.15 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 15mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 50mA | $R_{BE}$ = 10Ω | 65 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 50V | | — | — | 35 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1A | 15 | — | 120 | — |

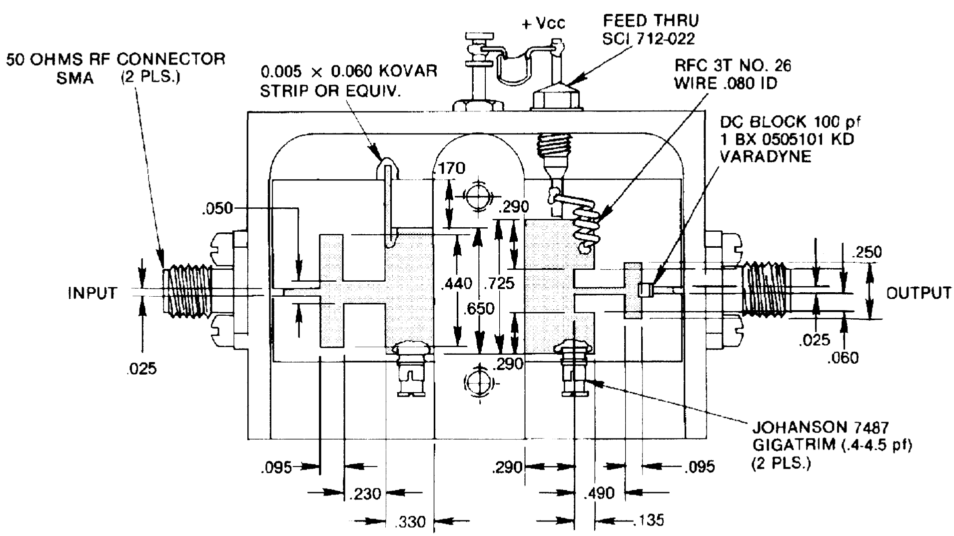
### DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1090 MHz | $P_{IN}$ = 90 W | $V_{CC}$ = 50 V | 450 | 500 | — | W |
| $\eta_c$ | f = 1090 MHz | $P_{IN}$ = 90 W | $V_{CC}$ = 50 V | 40 | — | — | % |
| $G_P$ | f = 1090 MHz | $P_{IN}$ = 90 W | $V_{CC}$ = 50 V | 7.0 | — | — | dB |

Note: Pulse Width = 10µSec
Duty Cycle = 1%

## TEST CIRCUIT

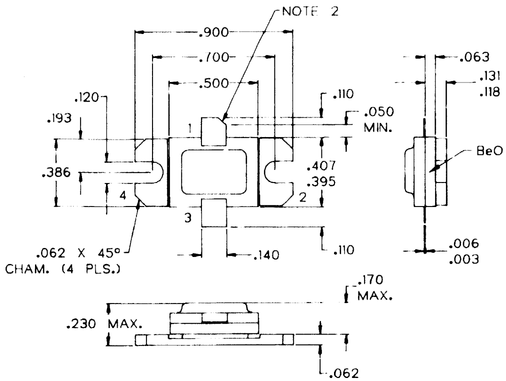
Ref.: Dwg. No. C125363




All dimensions are in inches.

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135066F



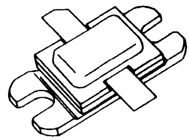

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

SGS-THOMSON MICROELECTRONICS

# MSC81550M

## RF & MICROWAVE TRANSISTORS AVIONICS APPLICATIONS

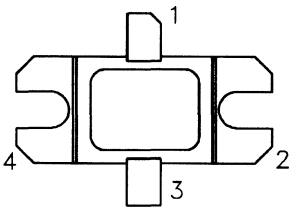
- REFRACTORY\GOLD METALLIZATION
- VSWR CAPABILITY 25:1
- INTERNAL INPUT/OUTPUT MATCHING
- LOW THERMAL RESISTANCE
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 550 W MIN. WITH 5.6 dB GAIN



**.400 x .500 2LFL (S038)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| MSC81550M | 81550M |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

## DESCRIPTION

The MSC81550M device is a high power pulsed transistor specifically designed for DME/TACAN avionics applications.

This device is capable of withstanding a minimum 25:1 load mismatch condition at any phase angle under full rated conditions.

The MSC81550M is housed in the unique BIGPAC™ package with internal input/output matching structures.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 80°C$) | 1350 | W |
| $I_C$ | Device Current* | 40 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 55 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 0.09 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 25mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 5mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 50mA | $R_{BE}$ = 10Ω | 65 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 50V | | — | — | 60 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 2A | 10 | — | 250 | — |

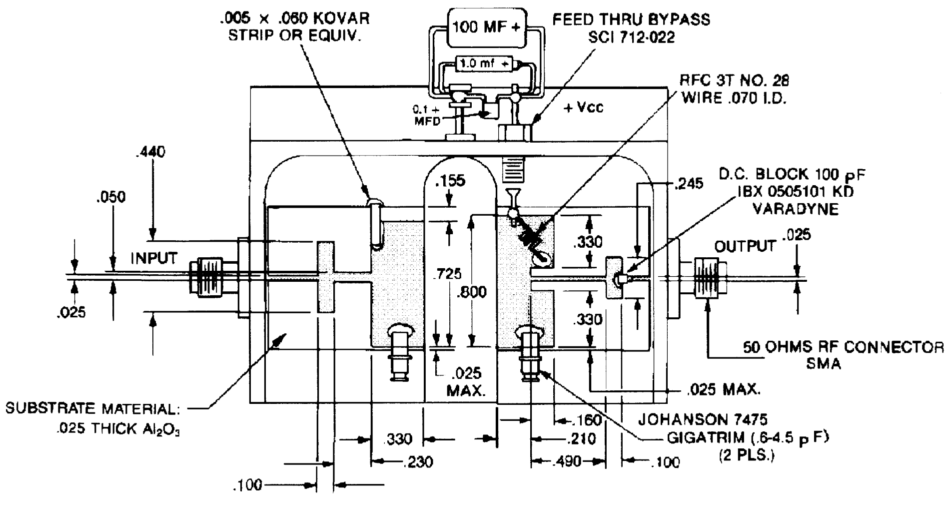
### DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1025 — 1150 MHz | $P_{IN}$ = 150 W | $V_{CC}$ = 50 V | 550 | 600 | — | W |
| $\eta_C$ | f = 1025 — 1150 MHz | $P_{IN}$ = 150 W | $V_{CC}$ = 50 V | 35 | 38 | — | % |
| $G_P$ | f = 1025 — 1150 MHz | $P_{IN}$ = 150 W | $V_{CC}$ = 50 V | 5.6 | — | — | dB |

Note: Pulse Width = 10μSec
Duty Cycle = 1%

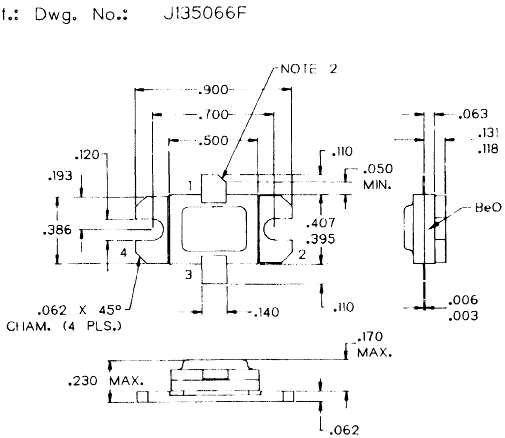
## TEST CIRCUIT

Ref.: Dwg. No. C125410A




All dimensions are in inches.

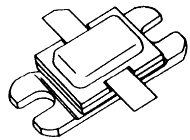
## PACKAGE MECHANICAL DATA




NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED;
DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

# RF & MICROWAVE TRANSISTORS AVIONICS APPLICATIONS

- REFRACTORY/GOLD METALLIZATION
- 25:1 VSWR CAPABILITY @ RATED CONDITIONS
- INPUT MATCHING
- OVERLAY GEOMETRY
- LOW THERMAL RESISTANCE
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 600 W MIN. WITH 6.0 dB GAIN



**.400 x .500 2LFL (S038)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| MSC81600M | 81600M |

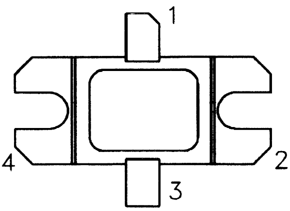
## DESCRIPTION

The MSC81600M device is a high power pulsed transistor specifically designed for IFF avionics applications.

This device is designed for operation under short pulse width and low duty cycle pulse conditions and is capable of withstanding a minimum 25:1 load mismatch at rated RF conditions. Low RF thermal resistance and computerized automatic wire bonding techniques ensure high reliability and product consistency.

The MSC81600M is supplied in the BIGPAC™ hermetic metal/ceramic package with internal input matching.

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq$ 100°C) | 1670 | W |
| $I_C$ | Device Current* | 43 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 55 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 0.09 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 25mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 5mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 50mA | $R_{BE}$ = 10Ω | 65 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 50V | | — | — | 60 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 2A | 10 | — | 250 | — |

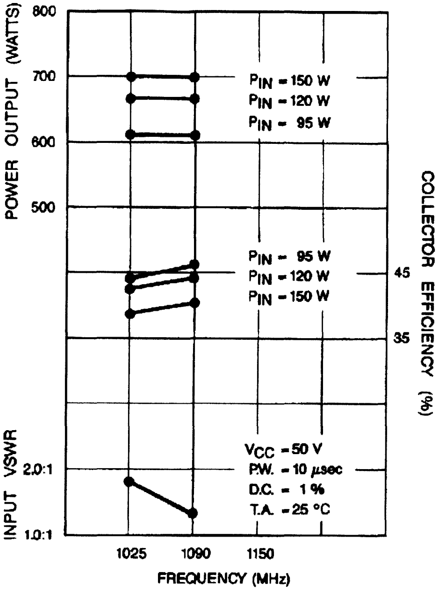
### DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1090 MHz | $P_{IN}$ = 150 W | $V_{CC}$ = 50 V | 600 | 700 | — | W |
| $\eta_C$ | f = 1090 MHz | $P_{IN}$ = 150 W | $V_{CC}$ = 50 V | 35 | 40 | — | % |
| $G_P$ | f = 1090 MHz | $P_{IN}$ = 150 W | $V_{CC}$ = 50 V | 6.0 | 6.7 | — | dB |

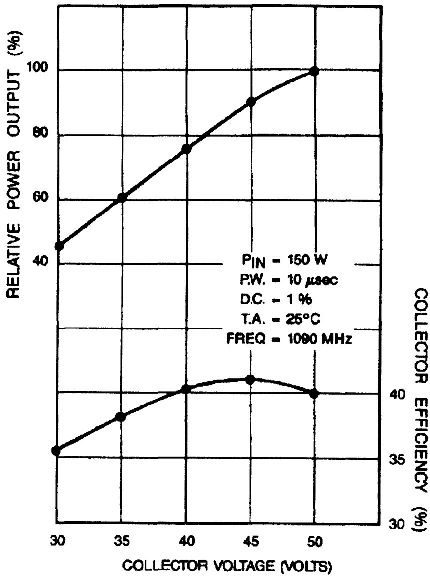
Note: Pulse Width = 10µSec
Duty Cycle = 1%

## TYPICAL PERFORMANCE

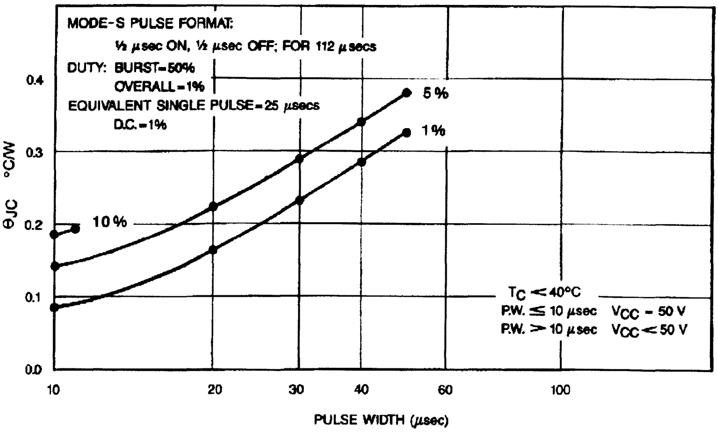
### NARROWBAND POWER AMPLIFIER




### RELATIVE POWER OUTPUT & COLLECTOR EFFICIENCY vs COLLECTOR vOLTAGE

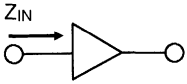



### MAXIMUM THERMAL RESISTANCE vs PULSE WIDTH & DUTY CYCLE

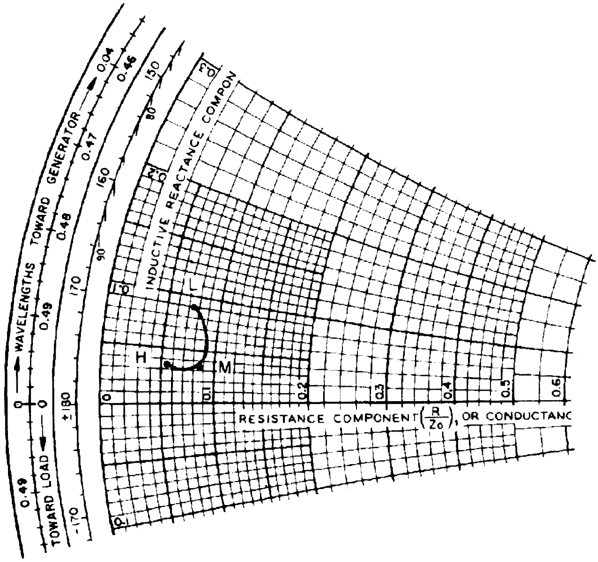


## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE

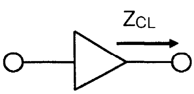



$P_{IN}$ = 150 W
$V_{CC}$ = 50 V
Normalized to 50 ohms

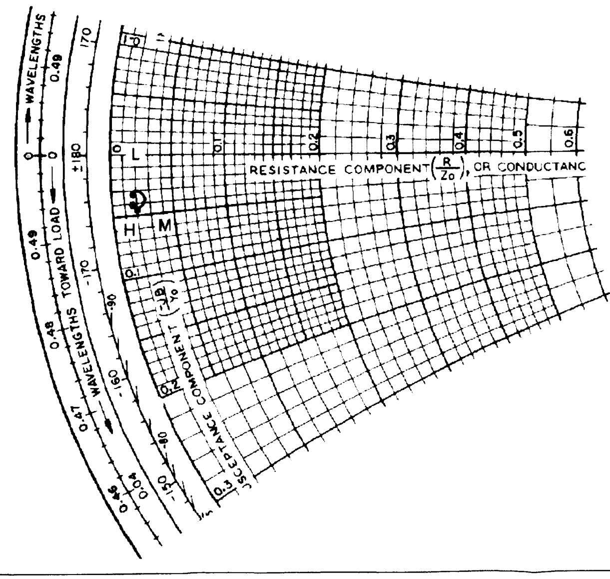



| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| L = 1025 MHz | 3.7 + j 4.5 | 0.9 – j 1.6 |
| M = 1090 MHz | 4.3 + j 1.6 | 1.0 – j 2.3 |
| H = 1150 MHz | 2.8 + j 1.6 | 0.8 – j 2.0 |

### TYPICAL COLLECTOR LOAD IMPEDANCE

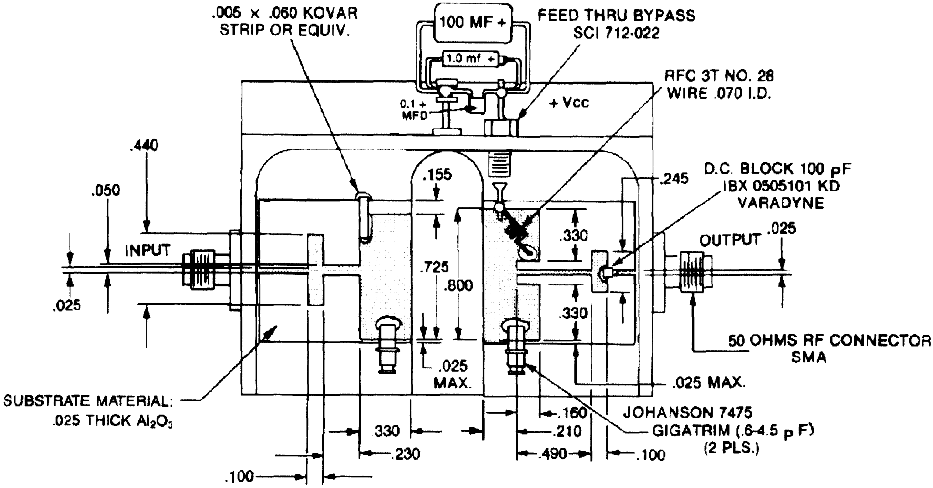



$P_{IN}$ = 150 W
$V_{CC}$ = 50 V
Normalized to 50 ohms



## TEST CIRCUIT

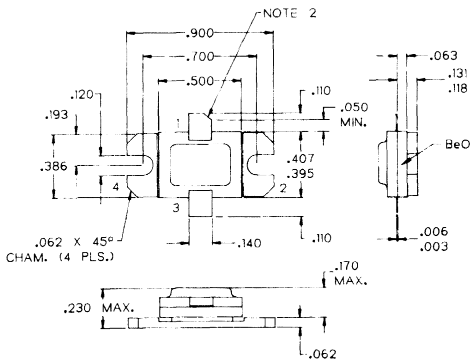
Ref.: Dwg. No. C125410




All dimensions are in inches.

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135066F



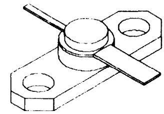

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.

**SGS-THOMSON MICROELECTRONICS**

# MSC82001

## RF & MICROWAVE TRANSISTORS GENERAL PURPOSE AMPLIFIER APPLICATIONS

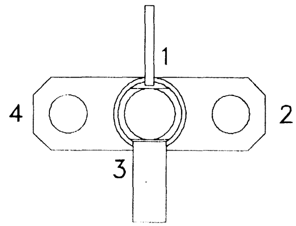
- EMITTER BALLASTED
- REFRACTORY/GOLD METALLIZATION
- VSWR CAPABILITY ∞:1 @ RATED CONDITIONS
- HERMETIC STRIPAC® PACKAGE
- $P_{OUT}$ = 1.0 W MIN. WITH 7.0 dB GAIN @ 2.0 GHz



**.250 2LFL (S010)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| MSC82001 | 82001 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The MSC82001 is a common base hermetically sealed silicon NPN microwave transistor utilizing a fishbone emitter ballasted geometry with a refractory/gold metallization system. This device is capable of withstanding an infinite load VSWR at any phase angle under rated rated conditions. The MSC82001 was designed for Class C amplifier applications in the 1.0 - 2.0 GHz frequency range.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* | 7.0 | W |
| $I_C$ | Device Current* | 200 | mA |
| $V_{CC}$ | Collector-Supply Voltage* | 35 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 20 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

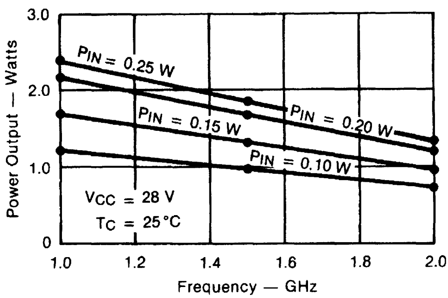
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 1mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 5mA | $R_{BE}$ = 10Ω | 45 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 28V | | — | — | 0.5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 100mA | 15 | — | 120 | — |

DYNAMIC

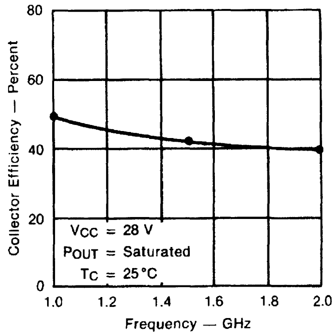
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 2.0 GHz | $P_{IN}$ = 0.2 W | $V_{CC}$ = 28 V | 1.0 | 1.2 | — | W |
| $\eta_C$ | f = 2.0 GHz | $P_{IN}$ = 0.2 W | $V_{CC}$ = 28 V | 35 | 40 | — | % |
| $G_P$ | f = 2.0 GHz | $P_{IN}$ = 0.2 W | $V_{CC}$ = 28 V | 7.0 | 7.8 | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 28 V | | — | — | 3.2 | pF |

## TYPICAL PERFORMANCE

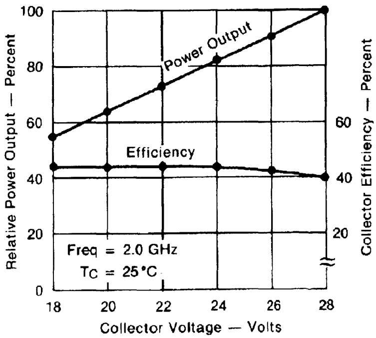
### POWER OUTPUT vs FREQUENCY




### COLLECTOR EFFICIENCY vs FREQUENCY

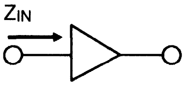


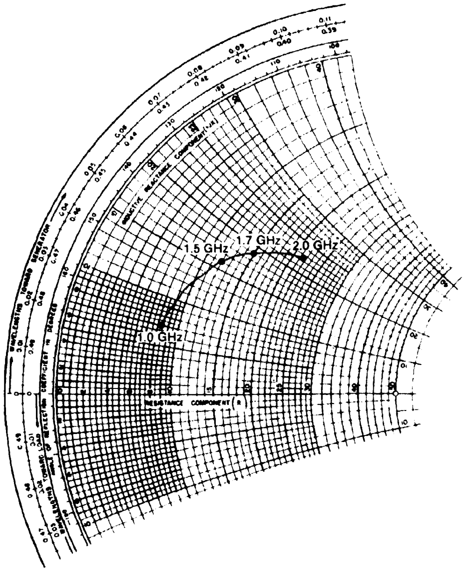

### RELATIVE POWER OUTPUT vs COLLECTOR VOLTAGE



## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE

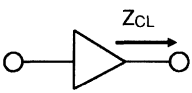


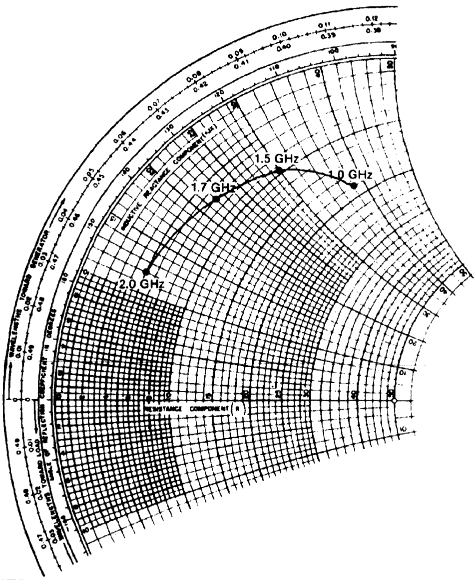




$P_{IN} = 0.2$ W
$V_{CC} = 28$ V
Normalized to 50 ohms

| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 1.0 GHz | 8.3 + j 7.0 | 18.0 + j 38.0 |
| 1.5 GHz | 12.0 + j 16.0 | 9.6 + j 30.0 |
| 1.7 GHz | 15.0 + j 14.0 | 7.0 + j 22.0 |
| 2.0 GHz | 21.5 + j 22.5 | 5.0 + j 12.0 |

### TYPICAL COLLECTOR LOAD IMPEDANCE



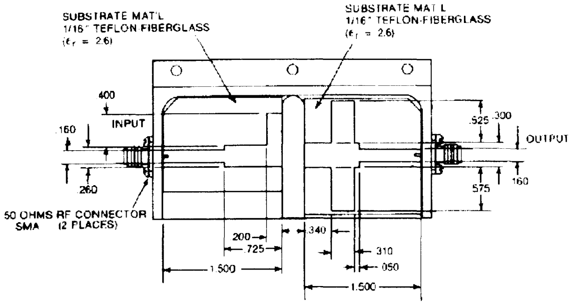




$P_{OUT}$ = Saturated
$V_{CC} = 28$ V
Normalized to 50 ohms

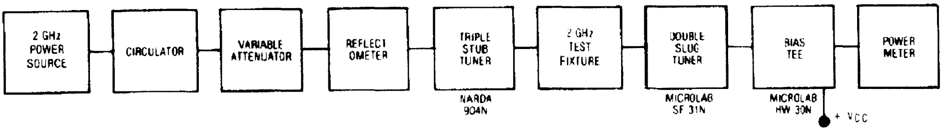
## TEST CIRCUIT

Ref.: Dwg. No. C127

All dimensions are in inches.
Frequency 2.0 GHz

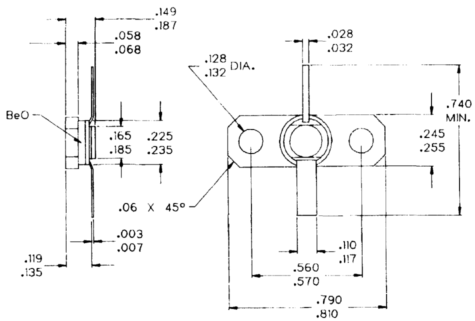



RF Amplifier Power Output Test




## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135021C



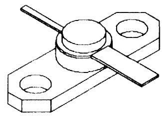

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED;
DIMENSIONS IN INCHES.

# MSC82003

SGS-THOMSON MICROELECTRONICS

## RF & MICROWAVE TRANSISTORS GENERAL PURPOSE AMPLIFIER APPLICATIONS

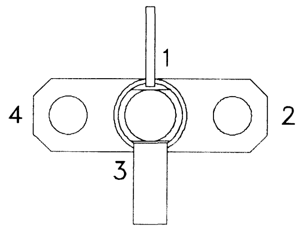
- EMITTER BALLASTED
- VSWR CAPABILITY ∞:1 @ RATED CONDITIONS
- REFRACTORY/GOLD METALLIZATION
- HERMETIC STRIPAC® PACKAGE
- $P_{OUT}$ = 3.0 W MIN. WITH 7.8 dB GAIN @ 2.0 GHz



**.250 2LFL (S010)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| MSC82003 | 82003 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The MSC82003 is a common base hermetically sealed silicon NPN microwave transistor utilizing a fishbone emitter ballasted geometry with a refractory/gold metallization system. This device is capable of withstanding an infinite load VSWR at any phase angle under rated rated conditions. The MSC82003 was designed for Class C amplifier applications in the 1.0 - 2.0 GHz frequency range.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* | 21.8 | W |
| $I_C$ | Device Current* | 600 | mA |
| $V_{CC}$ | Collector-Supply Voltage* | 35 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 8.0 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case} = 25°C$)

STATIC

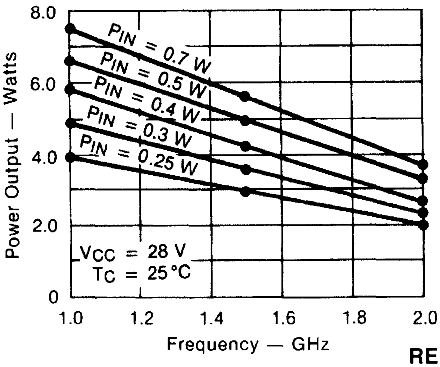
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C = 1mA$ | $I_E = 0mA$ | 45 | — | — | V |
| $BV_{EBO}$ | $I_E = 1mA$ | $I_C = 0mA$ | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 5mA | $R_{BE} = 10\Omega$ | 45 | — | — | V |
| $I_{CBO}$ | $V_{CB} = 28V$ | | — | — | 1.0 | mA |
| $h_{FE}$ | $V_{CE} = 5V$ | $I_C = 200mA$ | 15 | — | 120 | — |

DYNAMIC

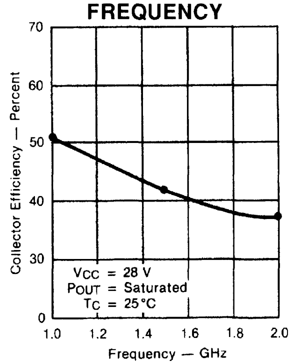
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 2.0 GHz | $P_{IN} = 0.5$ W | $V_{CC} = 28$ V | 3.0 | 3.3 | — | W |
| $\eta_C$ | f = 2.0 GHz | $P_{IN} = 0.5$ W | $V_{CC} = 28$ V | 35 | 37 | — | % |
| $G_P$ | f = 2.0 GHz | $P_{IN} = 0.5$ W | $V_{CC} = 28$ V | 7.8 | 8.2 | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB} = 28$ V | | — | — | 6.5 | pF |

## TYPICAL PERFORMANCE

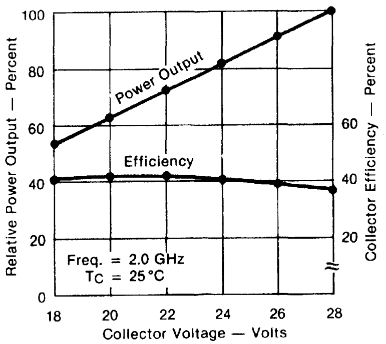
### POWER OUTPUT vs FREQUENCY




### COLLECTOR EFFICIENCY vs FREQUENCY

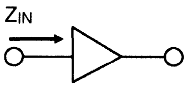



### RELATIVE POWER OUTPUT vs COLLECTOR VOLTAGE

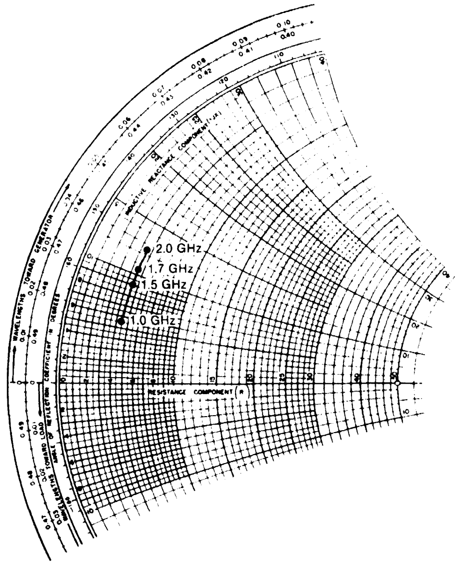


## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE

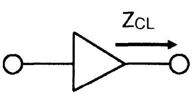



$P_{IN}$ = 0.5 W
$V_{CC}$ = 28 V
Normalized to 50 ohms

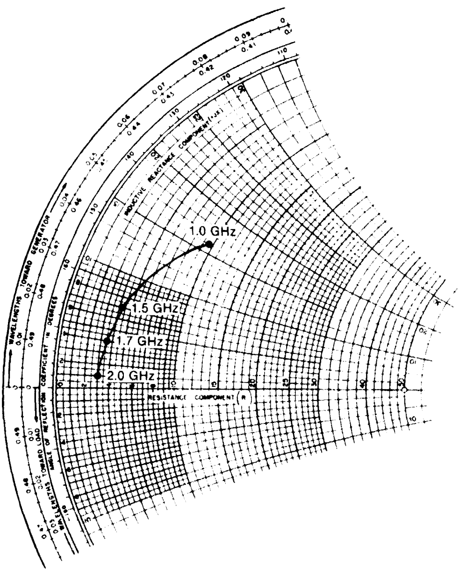



| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 1.0 GHz | 4.4 + j 5.5 | 9.6 + j 16.0 |
| 1.5 GHz | 4.5 + j 9.0 | 4.3 + j 7.0 |
| 1.7 GHz | 4.5 + j 10.5 | 3.5 + j 4.0 |
| 2.0 GHz | 4.6 + j 12.5 | 3.0 + j 1.0 |

### TYPICAL COLLECTOR LOAD IMPEDANCE



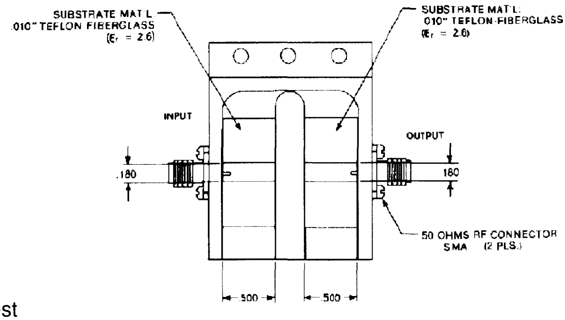

$P_{OUT}$ = Saturated
$V_{CC}$ = 28 V
Normalized to 50 ohms



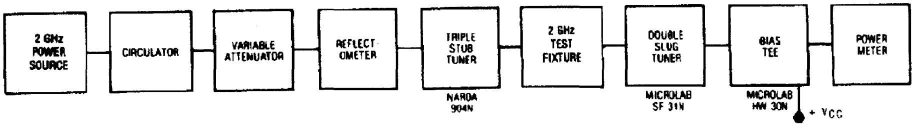
## TEST CIRCUIT

Ref.: Dwg. No. C125518

All dimensions are in inches.
Frequency 2.0 GHz

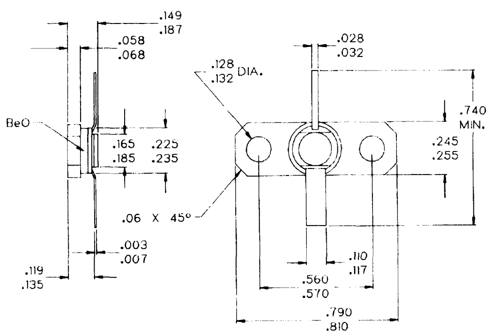



RF Amplifier Power Output Test




## PACKAGE MECHANICAL DATA

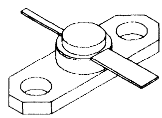
Ref.: Dwg. No.: J135021C




NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED;
DIMENSIONS IN INCHES.

# RF & MICROWAVE TRANSISTORS GENERAL PURPOSE AMPLIFIER APPLICATIONS

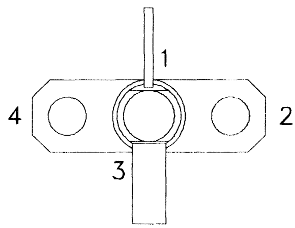
- EMITTER BALLASTED
- VSWR CAPABILITY ∞:1 @ RATED CONDITIONS
- REFRACTORY/GOLD METALLIZATION
- HERMETIC STRIPAC® PACKAGE
- $P_{OUT}$ = 5.0 W MIN. WITH 7.0 dB GAIN @ 2.0 GHz



**.250 2LFL (S010)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| MSC82005 | 82005 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

## DESCRIPTION

The MSC82005 is a common base hermetically sealed silicon NPN microwave transistor utilizing a fishbone emitter ballasted geometry with a refractory/gold metallization system. This device is capable of withstanding an infinite load VSWR at any phase angle under rated rated conditions. The MSC82005 was designed for Class C amplifier applications in the 1.0 - 2.0 GHz frequency range.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* | 29 | W |
| $I_C$ | Device Current* | 1.0 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 35 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 6.0 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

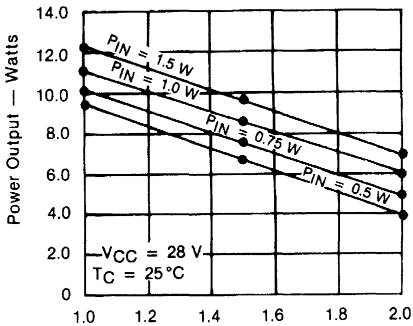
| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 1mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 5mA | $R_{BE}$ = 10Ω | 45 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 28V | | — | — | 2.5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 500mA | 15 | — | 120 | — |

### DYNAMIC

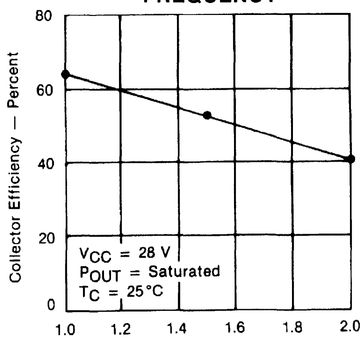
| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 2.0 GHz | $P_{IN}$ = 1.0 W | $V_{CC}$ = 28 V | 5.0 | 6.0 | — | W |
| $\eta_C$ | f = 2.0 GHz | $P_{IN}$ = 1.0 W | $V_{CC}$ = 28 V | 35 | 40 | — | % |
| $G_P$ | f = 2.0 GHz | $P_{IN}$ = 1.0 W | $V_{CC}$ = 28 V | 7.0 | 7.8 | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 28 V | | — | — | 10 | pF |

## TYPICAL PERFORMANCE

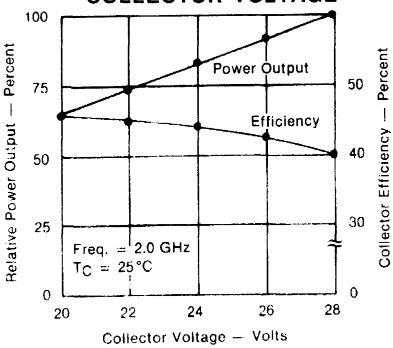
### POWER OUTPUT vs FREQUENCY




### COLLECTOR EFFICIENCY vs FREQUENCY

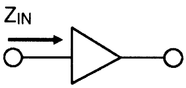


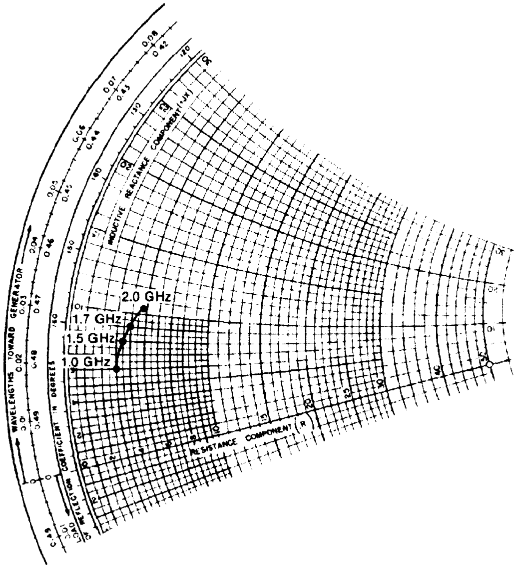

### RELATIVE POWER OUTPUT vs COLLECTOR VOLTAGE



## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE

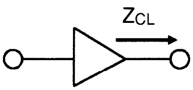


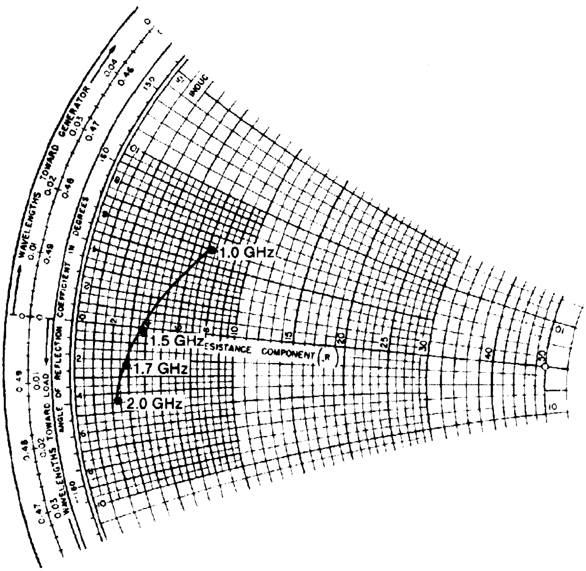




$P_{IN}$ = 1.0 W
$V_{CC}$ = 28 V
Normalized to 50 ohms

| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 1.0 GHz | 3.0 + j 6.0 | 7.2 + j 6.0 |
| 1.5 GHz | 3.5 + j 8.0 | 3.7 – j 0.2 |
| 1.7 GHz | 4.0 + j 9.0 | 2.8 – j 2.3 |
| 2.0 GHz | 4.8 + j 10.5 | 2.3 – j 4.5 |

### TYPICAL COLLECTOR LOAD IMPEDANCE



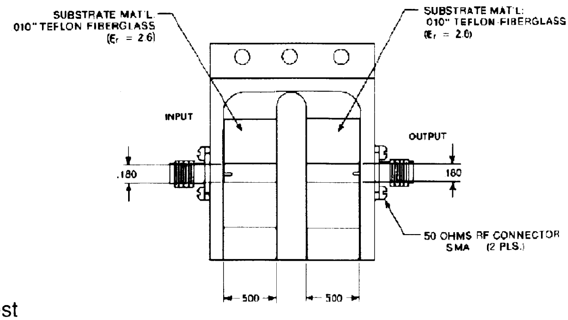




$P_{OUT}$ = Saturated
$V_{CC}$ = 28 V
Normalized to 50 ohms

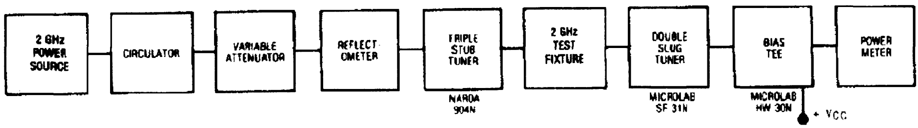
## TEST CIRCUIT

Ref.: Dwg. No. C125518

All dimensions are in inches.
Frequency 2.0 GHz

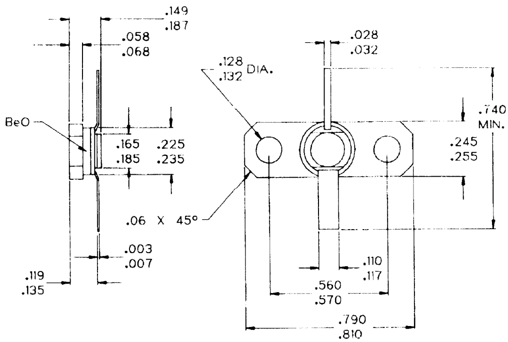



RF Amplifier Power Output Test




## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135021C



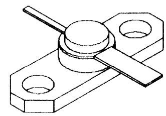

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.

SGS-THOMSON MICROELECTRONICS

# MSC82010

## RF & MICROWAVE TRANSISTORS GENERAL PURPOSE AMPLIFIER APPLICATIONS

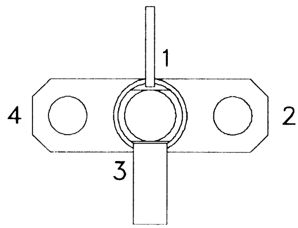
- EMITTER BALLASTED
- VSWR CAPABILITY ∞:1 @ RATED CONDITIONS
- HERMETIC STRIPAC® PACKAGE
- $P_{OUT}$ = 10 W MIN. WITH 5.2 dB GAIN @ 2.0 GHz



**.250 2LFL (S010)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| MSC82010 | 82010 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The MSC82010 is a common base hermetically sealed silicon NPN microwave transistor utilizing a fishbone emitter ballasted geometry with a refractory/gold metallization system. This device is capable of withstanding an infinite load VSWR at any phase angle under rated rated conditions. The MSC82010 was designed for Class C amplifier applications in the 1.0 - 2.0 GHz frequency range.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* | 35 | W |
| $I_C$ | Device Current* | 1.5 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 35 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 5.0 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

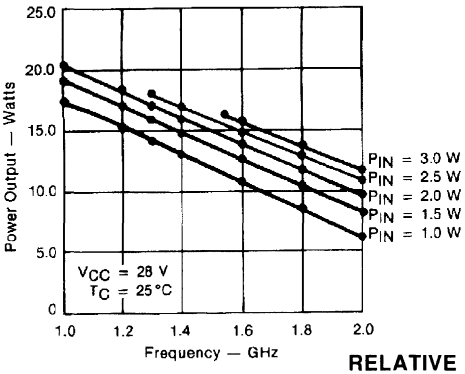
| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 5mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 15mA | $R_{BE}$ = 10Ω | 45 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 28V | | — | — | 5.0 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1000mA | 15 | — | 120 | — |

DYNAMIC

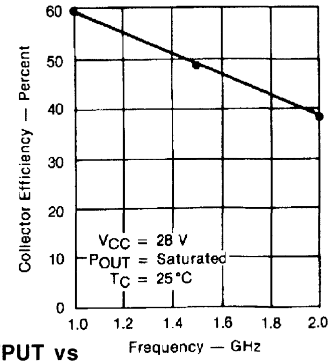
| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 2.0 GHz | $P_{IN}$ = 3.0 W | $V_{CC}$ = 28 V | 10 | 11.5 | — | W |
| $\eta_c$ | f = 2.0 GHz | $P_{IN}$ = 3.0 W | $V_{CC}$ = 28 V | 35 | 38 | — | % |
| $G_P$ | f = 2.0 GHz | $P_{IN}$ = 3.0 W | $V_{CC}$ = 28 V | 5.2 | 5.8 | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 28 V | | — | — | 19 | pF |

## TYPICAL PERFORMANCE

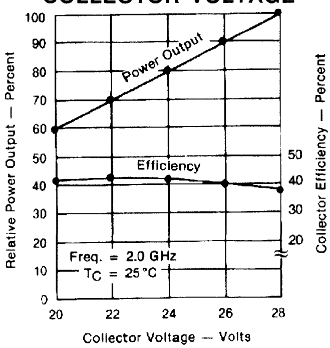
### POWER OUTPUT vs FREQUENCY




### COLLECTOR EFFICIENCY vs FREQUENCY

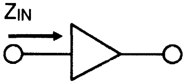



### RELATIVE POWER OUTPUT vs COLLECTOR VOLTAGE

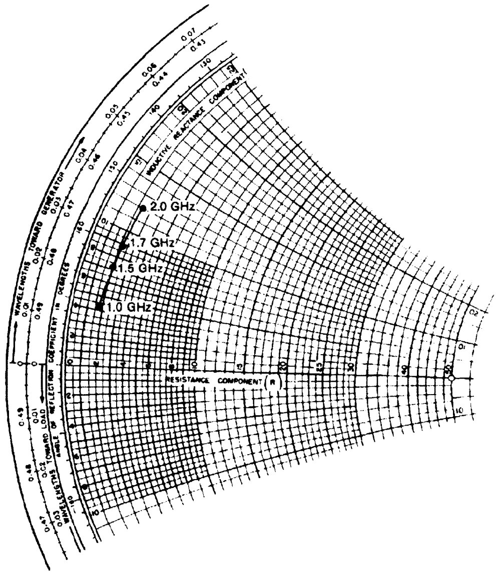


## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE

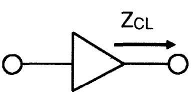



$P_{IN}$ = 3.0 W
$V_{CC}$ = 28 V
Normalized to 50 ohms

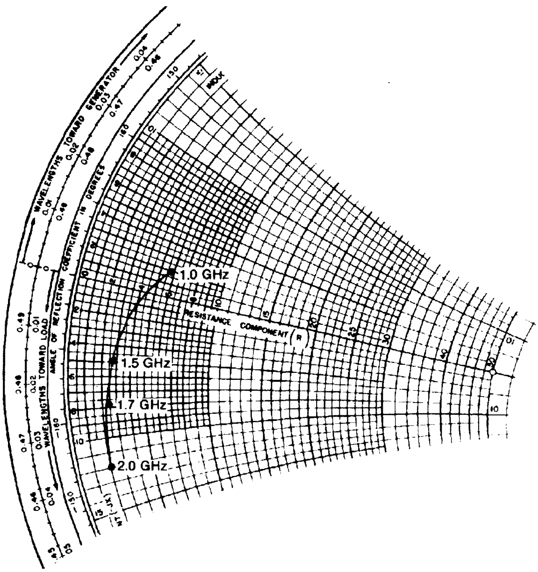



| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 1.0 GHz | 1.7 + j 4.2 | 5.7 + j 1.9 |
| 1.5 GHz | 2.0 + j 7.2 | 2.8 – j 5.0 |
| 1.7 GHz | 2.2 + j 8.8 | 2.5 – j 7.8 |
| 2.0 GHz | 2.4 + j 12.0 | 2.0 – j 12.0 |

### TYPICAL COLLECTOR LOAD IMPEDANCE



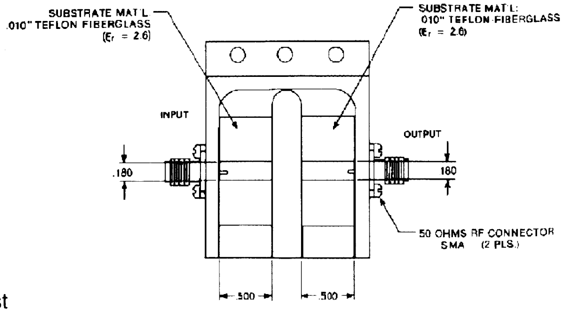

$P_{OUT}$ = Saturated
$V_{CC}$ = 28 V
Normalized to 50 ohms



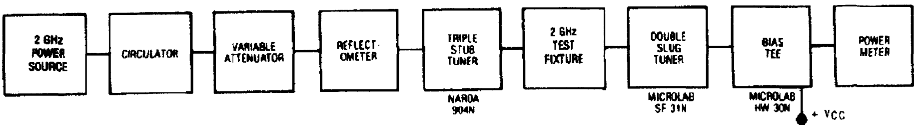
## TEST CIRCUIT

Ref.: Dwg. No. C125518

All dimensions are in inches.
Frequency 2.0 GHz

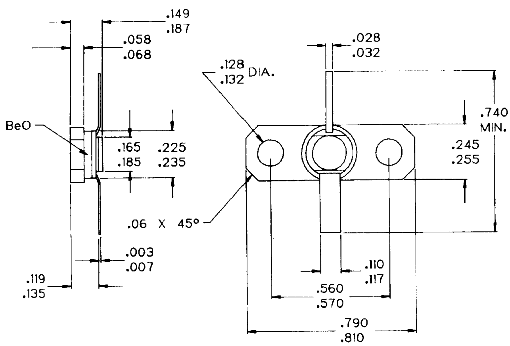



RF Amplifier Power Output Test




## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135021C



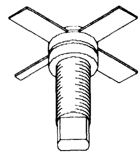

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED;
DIMENSIONS IN INCHES.

SGS-THOMSON MICROELECTRONICS

# MSC82040

## RF & MICROWAVE TRANSISTORS GENERAL PURPOSE LINEAR APPLICATIONS

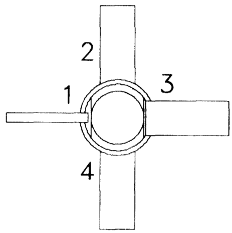
- EMITTER BALLASTED
- CLASS A LINEAR OPERATION
- COMMON EMITTER
- VSWR CAPABILITY ∞:1 @ RATED CONDITIONS
- ft 1.6 GHz TYPICAL
- NOISE FIGURE 15.5 dB @ 2 GHz
- $P_{OUT}$ = 27 dBm MIN. @ 1.0 GHz



**.230 4L STUD (S027)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| MSC82040 | 82040 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

### DESCRIPTION

The MSC82040 is a hermetically sealed NPN power transistor with a fishbone, emitter finger ballasted geometry utilizing a refractory/gold metallization system. The device is designed specifically for Class A linear applications to provide high gain and high output power at the 1.0 dB compression point.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation (see Safe Area) | — | W |
| $I_C$ | Device Bias Current | 200 | mA |
| $V_{CE}$ | Collector-Emitter Bias Voltage* | 20 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 20 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 1mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CEO}$ | IC = 5mA | $I_B$ = 0mA | 20 | — | — | V |
| $I_{CEO}$ | $V_{CE}$ = 18V | | — | — | 0.5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 100mA | 15 | — | 120 | — |

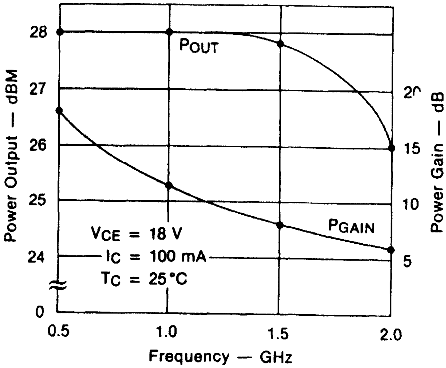
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $G_P$* | f = 1.0 GHz | $P_{OUT}$ = 27 dBm | | 10.5 | 11.5 | — | dB |
| $\Delta G_P$* | f = 1.0 GHz | $P_{OUT}$ = 27 dBm | $\Delta P_{OUT}$ = 10 dB | — | — | 1 | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 28 V | | — | — | 3.2 | pF |

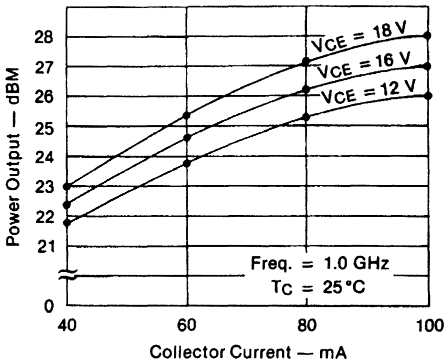
* Note: $V_{CE}$ = 18V
$I_C$ = 100mA

## TYPICAL PERFORMANCE

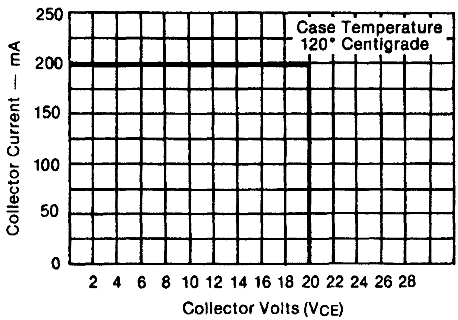
### TYPICAL POWER OUTPUT & GAIN @ 1dB COMPRESSION POINT vs FREQUENCY



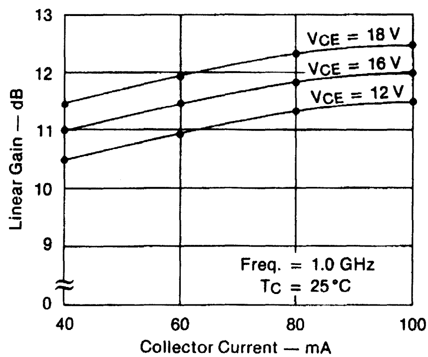

### TYPICAL POWER OUTPUT & GAIN @ 1dB COMPRESSION POINT vs COLLECTOR CURRENT




### MAXIMUM OPERATING AREA FOR FORWARD BIAS OPERATION

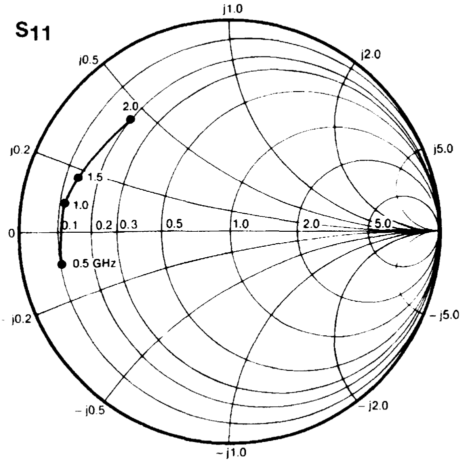



### TYPICAL LINEAR GAIN vs COLLECTOR CURRENT

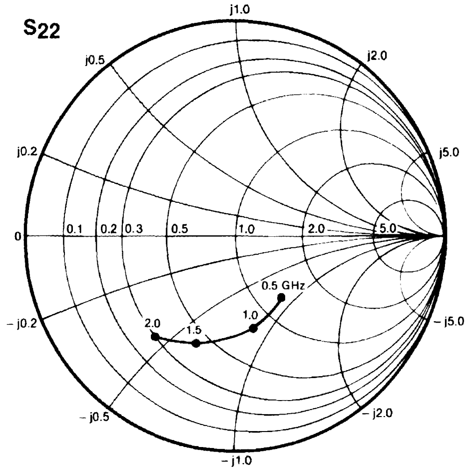


## TYPICAL S–PARAMETERS

S11

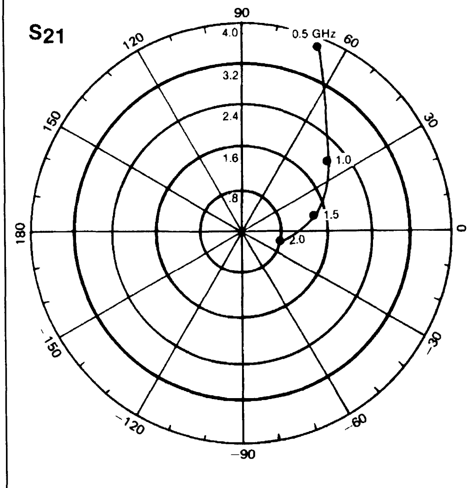



S22

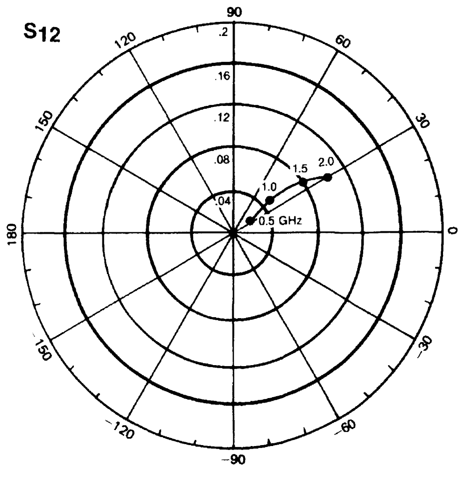



$V_{CE}$ = 18 V
$I_C$ = 100 mA
Zg = 50 ohms

S21




S12

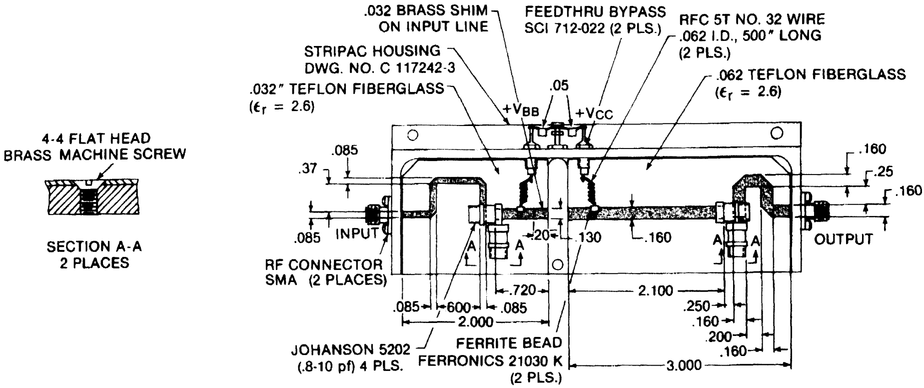





SGS-THOMSON MICROELECTRONICS

## TEST CIRCUIT

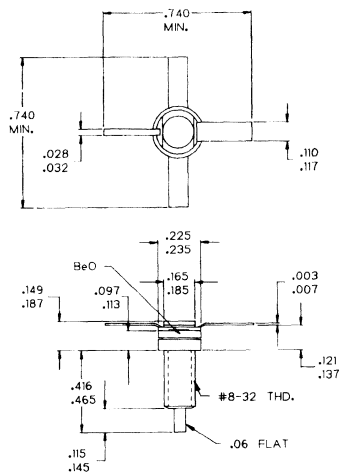
Ref.: Dwg. No. C127323




All dimensions are in inches.
Frequency 1.0 GHz

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135023F



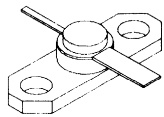

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.

SGS-THOMSON MICROELECTRONICS

# MSC82100

## RF & MICROWAVE TRANSISTORS GENERAL PURPOSE LINEAR APPLICATIONS

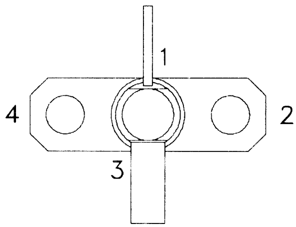
- EMITTER BALLASTED
- CLASS A LINEAR OPERATION
- COMMON EMITTER
- VSWR CAPABILITY ∞:1 @ RATED CONDITIONS
- ft 1.6 GHz TYPICAL
- NOISE FIGURE 15.5 dB @ 2 GHz
- $P_{OUT}$ = 27 dBm MIN. @ 1.0 GHz



**.250 2LFL (S011)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| MSC82100 | 82100 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

### DESCRIPTION

The MSC82100 is a hermetically sealed NPN power transistor with a fishbone, emitter finger ballasted geometry utilizing a refractory/gold metallization system. The device is designed specifically for Class A linear applications to provide high gain and high output power at the 1.0 dB compression point.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation (see Safe Area) | — | W |
| $I_C$ | Device Bias Current | 200 | mA |
| $V_{CE}$ | Collector-Emitter Bias Voltage* | 20 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 20 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 1mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CEO}$ | IC = 5mA | $I_B$ = 0mA | 20 | — | — | V |
| $I_{CEO}$ | $V_{CE}$ = 18V | | — | — | 0.5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 100mA | 15 | — | 120 | — |

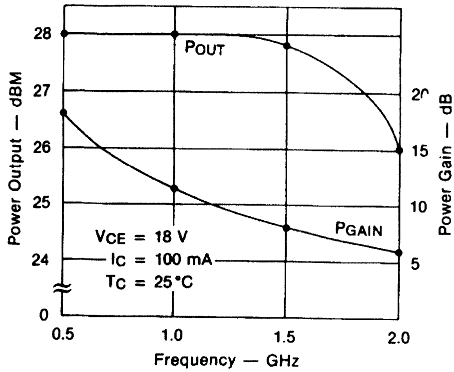
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $G_P$* | f = 1.0 GHz | $P_{OUT}$ = 27 dBm | | 10.5 | 11.5 | — | dB |
| $\Delta G_P$* | f = 1.0 GHz | $P_{OUT}$ = 27 dBm | $\Delta P_{OUT}$ = 10 dB | — | — | 1 | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 28 V | | — | — | 3.2 | pF |

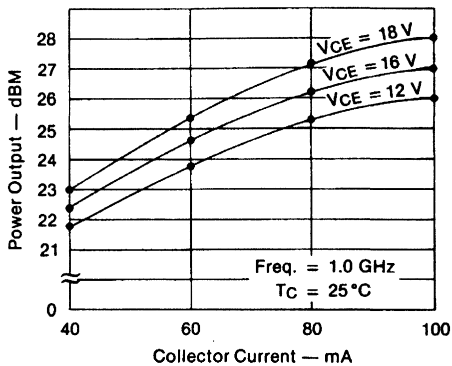
* Note: $V_{CE}$ = 18V
$I_C$ = 100mA

## TYPICAL PERFORMANCE

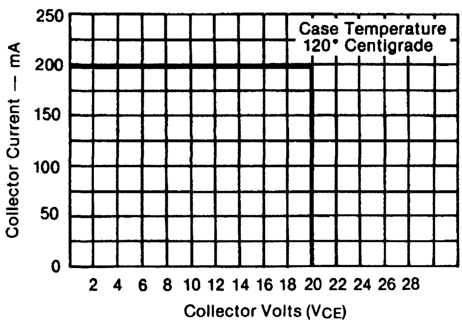
### TYPICAL POWER OUTPUT & GAIN @ 1dB COMPRESSION POINT vs FREQUENCY



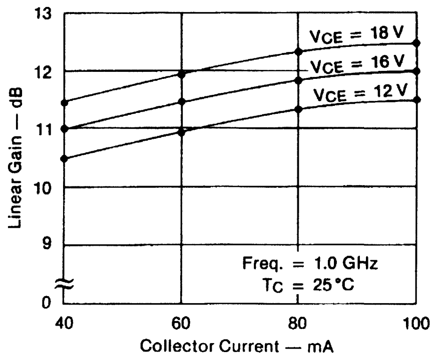

### TYPICAL POWER OUTPUT & GAIN @ 1dB COMPRESSION POINT vs COLLECTOR CURRENT




### MAXIMUM OPERATING AREA FOR FORWARD BIAS OPERATION

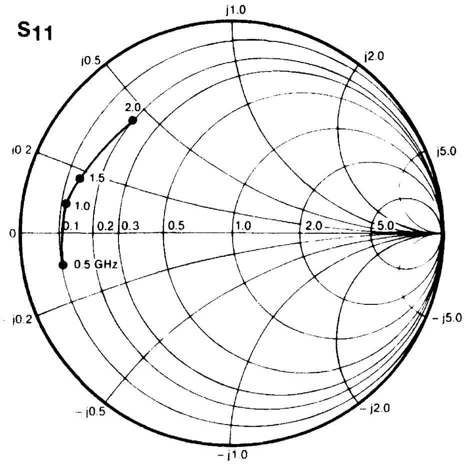



### TYPICAL LINEAR GAIN vs COLLECTOR CURRENT

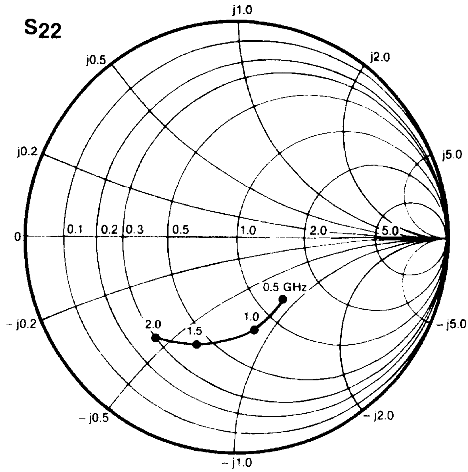


## TYPICAL S–PARAMETERS

$S_{11}$

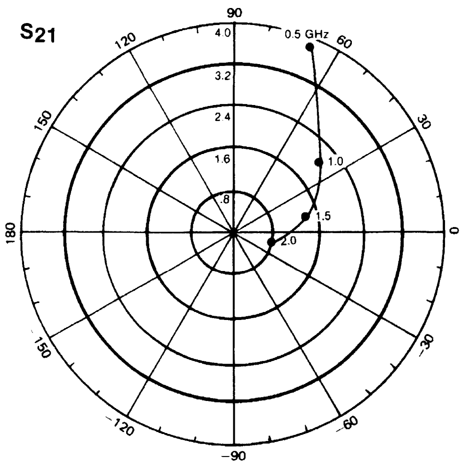



$S_{22}$

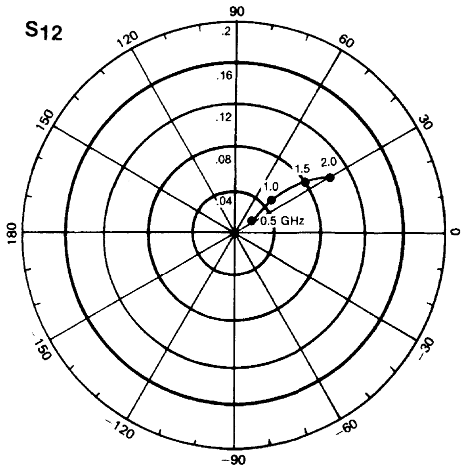



$V_{CE}$ = 18 V
$I_C$ = 100 mA
Zg = 50 ohms

$S_{21}$

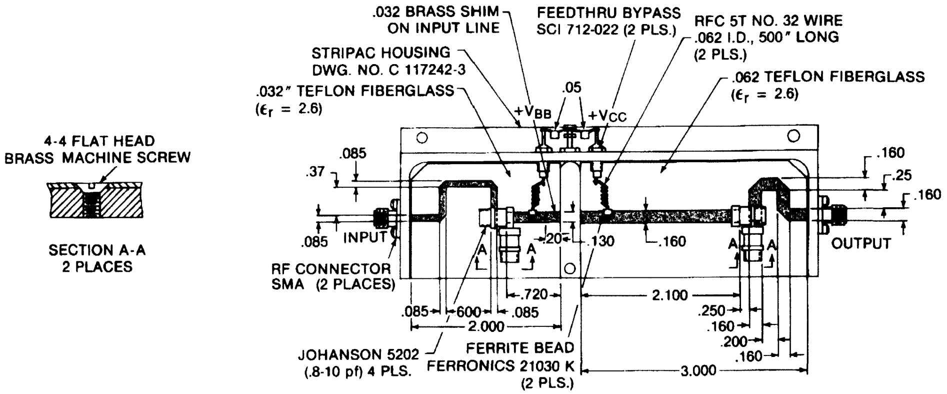



$S_{12}$



## TEST CIRCUIT

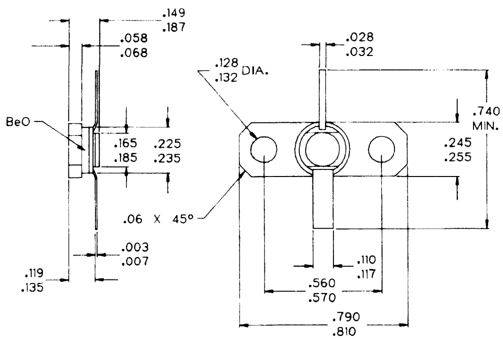
Ref.: Dwg. No. C127323




All dimensions are in inches.
Frequency 1.0 GHz

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135021C




NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.

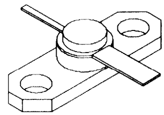
SGS-THOMSON
MICROELECTRONICS

# MSC82302

## RF & MICROWAVE TRANSISTORS
## GENERAL PURPOSE AMPLIFIER APPLICATIONS

PRELIMINARY DATA

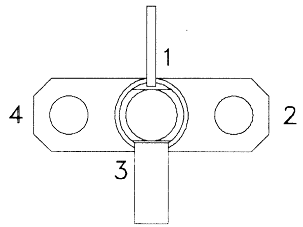
- REFRACTORY/GOLD METALLIZATION
- VSWR CAPABILITY 20:1 @ RATED CONDITIONS
- HERMETIC STRIPAC® PACKAGE
- $P_{OUT}$ = 1.8 W MIN. WITH 10.0 dB GAIN



**.250 2LFL (S010)**
hermetically sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| MSC82302 | 82302 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The MSC82302 is a common base hermetically sealed silicon NPN microwave power transistor utilizing a rugged overlay die geometry. This device is capable of withstanding 20:1 load VSWR at any phase angle under rated conditions.

The MSC82302 was designed for Class C Amplifier/Oscillator applications in the 1.5 - 2.3 GHz frequency range.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 50$°C) | 6.0 | W |
| $I_C$ | Device Current* | 300 | mA |
| $V_{CC}$ | Collector-Supply Voltage* | 26 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 25 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case} = 25°C$)

STATIC

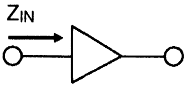
| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C = 1mA$ | $I_E = 0mA$ | 44 | — | — | V |
| $BV_{EBO}$ | $I_E = 1mA$ | $I_C = 0mA$ | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 5mA | $R_{BE} = 10\Omega$ | 44 | — | — | V |
| $I_{CBO}$ | $V_{CB} = 22V$ | | — | — | 0.5 | mA |
| $h_{FE}$ | $V_{CE} = 5V$ | $I_C = 100mA$ | 30 | — | 300 | — |

DYNAMIC

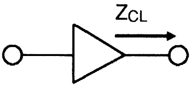
| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 2.3 GHz | $P_{IN} = 0.18$ W | $V_{CC} = 22$ V | 1.8 | — | — | W |
| $\eta_C$ | f = 2.3 GHz | $P_{IN} = 0.18$ W | $V_{CC} = 22$ V | 40 | — | — | % |
| $G_P$ | f = 2.3 GHz | $P_{IN} = 0.18$ W | $V_{CC} = 22$ V | 10.0 | — | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB} = 22$ V | | — | — | 3.5 | pF |

## IMPEDANCE DATA

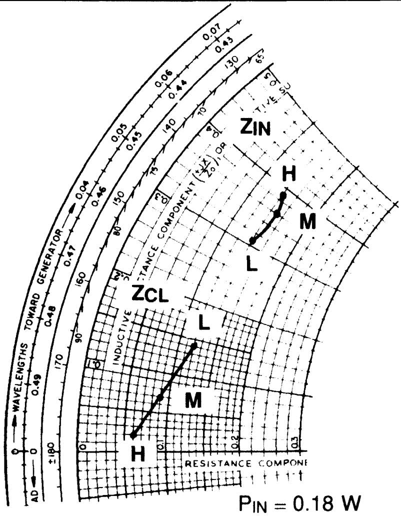
**TYPICAL INPUT IMPEDANCE**




**TYPICAL COLLECTOR LOAD IMPEDANCE**




| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| L = 2.0 GHz | 7.0 + j 15.5 | 6.0 + j 7.0 |
| M = 2.15 GHz | 7.5 + j 18.0 | 4.5 + j 3.5 |
| H = 2.3 GHz | 7.0 + j 19.5 | 3.0 + j 1.0 |

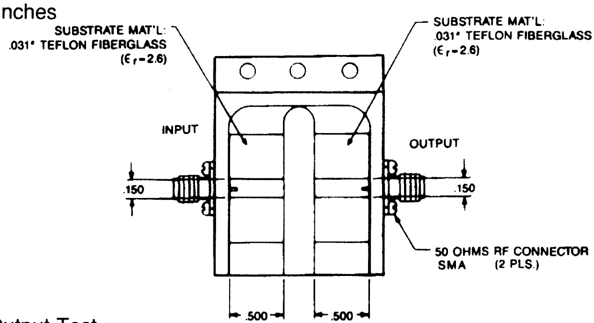



$P_{IN}$ = 0.18 W
$V_{CC}$ = 22 V
Normalized to 50 ohms

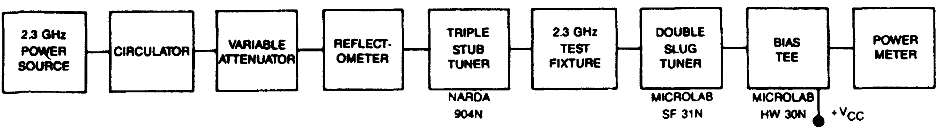
## TEST CIRCUIT

Ref: Dwg. No. C125561

All dimensions are in inches
Frequency 2.3 GHz

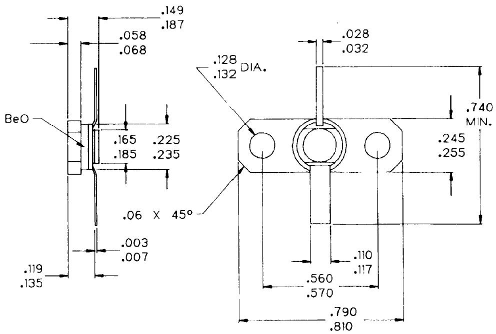



RF Amplifier Power Output Test



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135021C




NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED;
DIMENSIONS IN INCHES.

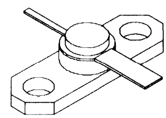
SGS-THOMSON MICROELECTRONICS

# MSC82304

## RF & MICROWAVE TRANSISTORS GENERAL PURPOSE AMPLIFIER APPLICATIONS

PRELIMINARY DATA

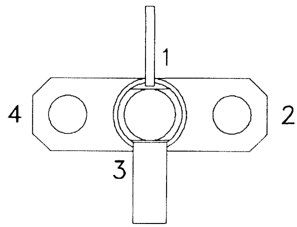
- REFRACTORY/GOLD METALLIZATION
- VSWR CAPABILITY 20:1 @ RATED CONDITIONS
- HERMETIC STRIPAC® PACKAGE
- $P_{OUT}$ = 3.8 W MIN. WITH 10.0 dB GAIN



**.250 2LFL (S010)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| MSC82304 | 82304 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The MSC82304 is a common base hermetically sealed silicon NPN microwave power transistor utilizing a rugged overlay die geometry. This device is capable of withstanding 20:1 load VSWR at any phase angle under rated conditions.

The MSC82304 was designed for Class C Amplifier/Oscillator applications in the 1.5 - 2.3 GHz frequency range.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 50°C$) | 11.5 | W |
| $I_C$ | Device Current* | 600 | mA |
| $V_{CC}$ | Collector-Supply Voltage* | 26 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 13 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

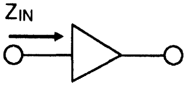
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 1mA | $I_E$ = 0mA | 44 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 5mA | $R_{BE}$ = 10Ω | 44 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 22V | | — | — | 0.5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 250mA | 30 | — | 300 | — |

DYNAMIC

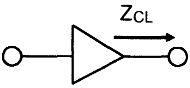
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 2.3 GHz | $P_{IN}$ = 0.38 W | $V_{CC}$ = 22 V | 3.8 | — | — | W |
| $\eta_C$ | f = 2.3 GHz | $P_{IN}$ = 0.38 W | $V_{CC}$ = 22 V | 40 | — | — | % |
| $G_P$ | f = 2.3 GHz | $P_{IN}$ = 0.38 W | $V_{CC}$ = 22 V | 10.0 | — | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 22 V | | — | — | 5.0 | pF |

## IMPEDANCE DATA

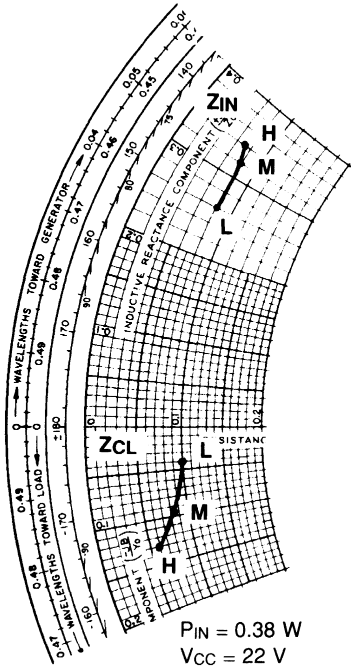
### TYPICAL INPUT IMPEDANCE




### TYPICAL COLLECTOR LOAD IMPEDANCE




| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| L = 2.0 GHz | 3.95 + j 13.0 | 4.9 – j 1.95 |
| M = 2.15 GHz | 3.90 + j 16.0 | 4.2 – j 4.7 |
| H = 2.3 GHz | 3.45 + j 17.0 | 3.0 – j 6.5 |

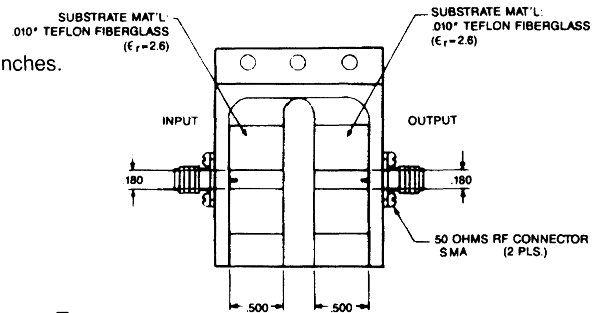



$P_{IN}$ = 0.38 W
$V_{CC}$ = 22 V
Normalized to 50 ohms

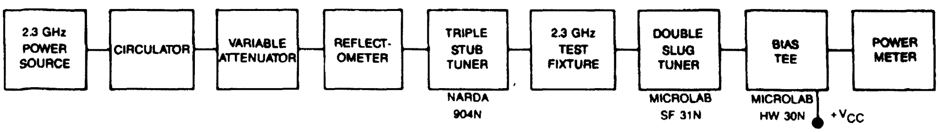
## TEST CIRCUIT

Ref.: Dwg. No. C125518

All dimensions are in inches.
Frequency 2.3 GHz

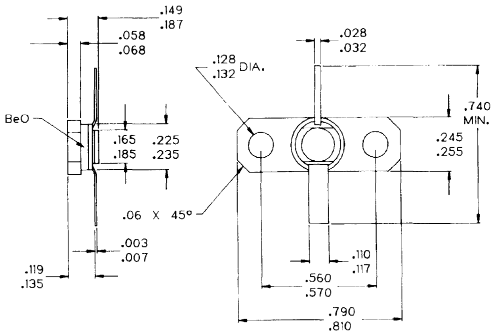



RF Amplifier Power Output Test



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135021C



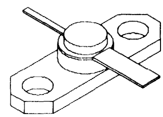

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED;
DIMENSIONS IN INCHES.

# MSC82306

## RF & MICROWAVE TRANSISTORS GENERAL PURPOSE AMPLIFIER APPLICATIONS

PRELIMINARY DATA

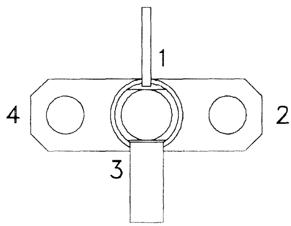
- REFRACTORY\GOLD METALLIZATION
- VSWR CAPABILITY 20:1 @ RATED CONDITIONS
- HERMETIC STRIPAC® PACKAGE
- $P_{OUT}$ = 5.5 W MIN. WITH 9.6 dB GAIN



**.250 2LFL (S010)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| MSC82306 | 82306 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The MSC82306 is a common base hermetically sealed silicon NPN microwave power transistor utilizing a rugged overaly die geometry. This device is capable of withstanding 20:1 load VSWR at any phase angle under rated conditions.

The MSC82306 was designed for Class C Amplifier/Oscillator applications in the 1.5 - 2.3 GHz frequency range.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 50$°C) | 16.7 | W |
| $I_C$ | Device Current* | 900 | mA |
| $V_{CC}$ | Collector-Supply Voltage* | 26 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 9.0 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

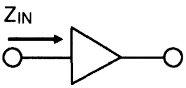
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 1mA | $I_E$ = 0mA | 44 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 5mA | $R_{BE}$ = 10Ω | 44 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 22V | | — | — | 0.5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 400mA | 30 | — | 300 | — |

DYNAMIC

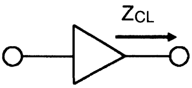
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 2.3 GHz | $P_{IN}$ = 0.6 W | $V_{CC}$ = 22 V | 5.5 | 6.3 | — | W |
| $\eta_C$ | f = 2.3 GHz | $P_{IN}$ = 0.6 W | $V_{CC}$ = 22 V | 40 | 45 | — | % |
| $G_P$ | f = 2.3 GHz | $P_{IN}$ = 0.6 W | $V_{CC}$ = 22 V | 9.6 | 10.2 | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 22 V | | — | — | 7.0 | pF |

## IMPEDANCE DATA

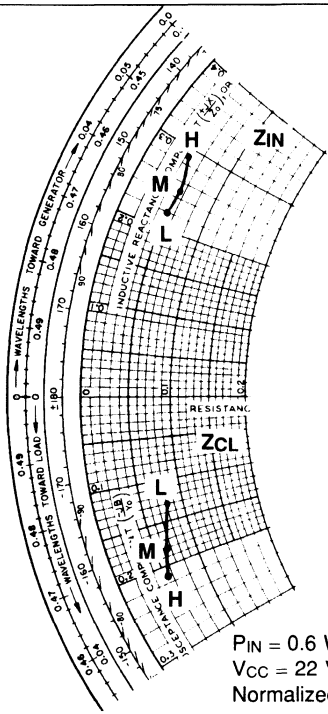
### TYPICAL INPUT IMPEDANCE




### TYPICAL COLLECTOR LOAD IMPEDANCE




| FREQ. | ZIN (Ω) | ZCL (Ω) |
|---|---|---|
| L = 2.0 GHz | 2.60 + j 11.0 | 4.1 – j 6.5 |
| M = 2.15 GHz | 2.75 + j 12.5 | 3.3 – j 9.0 |
| H = 2.3 GHz | 2.30 + j 14.5 | 2.8 – j 10.5 |

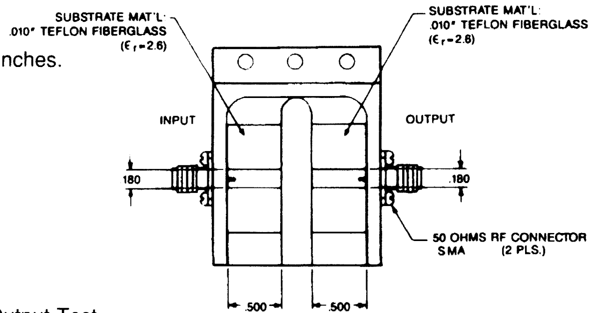



$P_{IN}$ = 0.6 W
$V_{CC}$ = 22 V
Normalized to 50 ohms

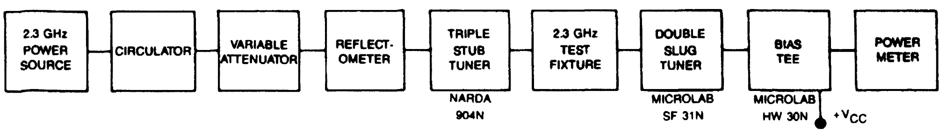
## TEST CIRCUIT

Ref.: Dwg. No. C125518

All dimensions are in inches.
Frequency 2.3 GHz

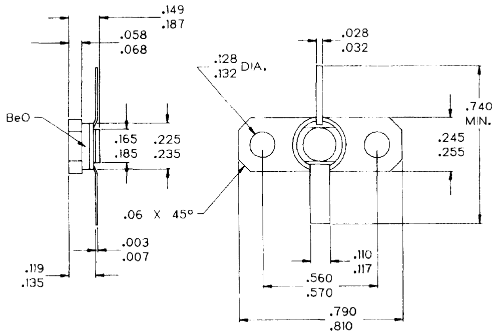



RF Amplifier Power Output Test



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135021C




NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.

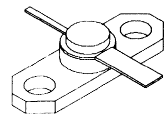
SGS-THOMSON MICROELECTRONICS

# MSC82307

## RF & MICROWAVE TRANSISTORS GENERAL PURPOSE AMPLIFIER APPLICATIONS

PRELIMINARY DATA

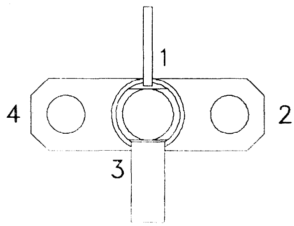
- REFRACTORY/GOLD METALLIZATION
- VSWR CAPABILITY 20:1 @ RATED CONDITIONS
- HERMETIC STRIPAC® PACKAGE
- $P_{OUT}$ = 7.0 W MIN. WITH 9.6 dB GAIN



**.250 2LFL (S010)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| MSC82307 | 82307 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The MSC82307 is a common base hermetically sealed silicon NPN microwave power transistor utilizing a rugged overlay die geometry. This device is capable of withstanding 20:1 load VSWR at any phase angle under rated conditions.

The MSC82307 was designed for Class C amplifier/oscillator applications in the 1.5 - 2.3 GHz frequency range.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 50°C$) | 21.4 | W |
| $I_C$ | Device Current* | 1.2 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 26 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 7.0 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case} = 25°C$)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C = 1mA$ | $I_E = 0mA$ | 44 | — | — | V |
| $BV_{EBO}$ | $I_E = 1mA$ | $I_C = 0mA$ | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 5mA | $R_{BE} = 10\Omega$ | 44 | — | — | V |
| $I_{CBO}$ | $V_{CB} = 22V$ | | — | — | 0.5 | mA |
| $h_{FE}$ | $V_{CE} = 5V$ | $I_C = 500mA$ | 30 | — | 300 | — |

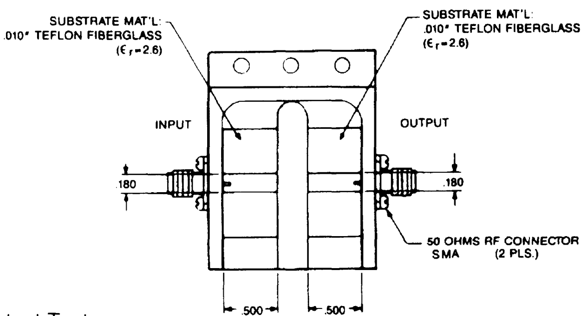
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 2.3 GHz | $P_{IN} = 0.76$ W | $V_{CC} = 22$ V | 7.0 | 8.0 | — | W |
| $\eta_C$ | f = 2.3 GHz | $P_{IN} = 0.76$ W | $V_{CC} = 22$ V | 40 | 45 | — | % |
| $G_P$ | f = 2.3 GHz | $P_{IN} = 0.76$ W | $V_{CC} = 22$ V | 9.6 | 10.2 | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB} = 22$ V | | — | — | 8.5 | pF |

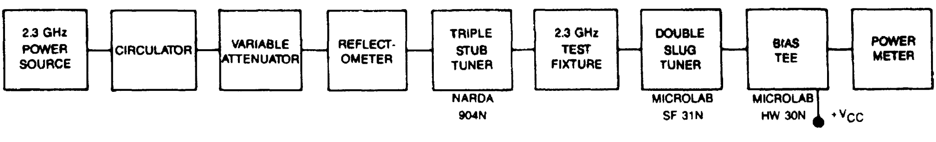
## TEST CIRCUIT

Ref.: Dwg. No. C125518

All dimensions are in inches.
Frequency 2.3 GHz




RF Amplifier Power Output Test

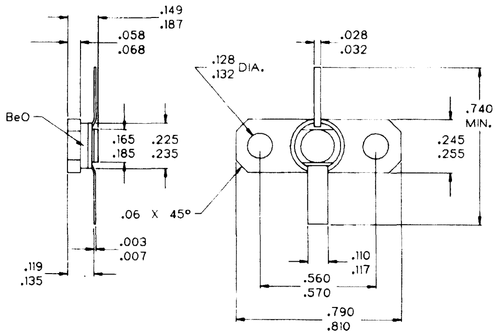





SGS-THOMSON MICROELECTRONICS

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135021C



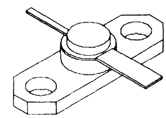

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED;
DIMENSIONS IN INCHES.

SGS-THOMSON MICROELECTRONICS

# MSC83301

## RF & MICROWAVE TRANSISTORS GENERAL PURPOSE AMPLIFIER APPLICATIONS

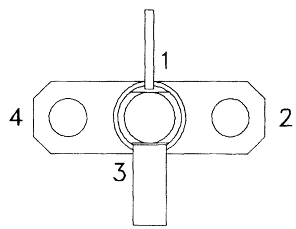
- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- VSWR CAPABILITY ∞:1 @ RATED CONDITIONS
- HERMETIC STRIPAC® PACKAGE
- $P_{OUT}$ = 1.0 W MIN. WITH 7.0 dB GAIN @ 3.0 GHz



**.250 2LFL (S010)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| MSC83301 | 83301 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

## DESCRIPTION

The MSC83301 is a common base hermetically sealed silicon NPN microwave power transistor utilizing an overlay, emitter site ballasted geometry with a refractory gold metallization system. This device is capable of withstanding an infinite load VSWR at any phase angle under rated conditions. The MSC83301 is designed for Class C amplifier/oscillator applications in the 1.0 - 3.0 GHz frequency range.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 50$°C) | 6.0 | W |
| $I_C$ | Device Current* | 200 | mA |
| $V_{CC}$ | Collector-Supply Voltage* | 30 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 25 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

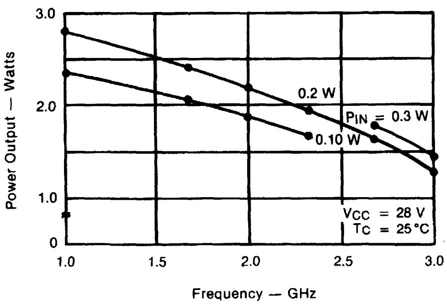
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 1mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 5mA | $R_{BE}$ = 10Ω | 45 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 28V | | — | — | 0.5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 100mA | 30 | — | 300 | — |

DYNAMIC

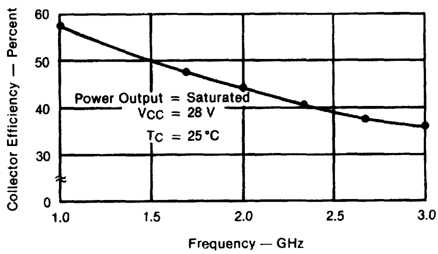
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 3.0 GHz | $P_{IN}$ = 0.20 W | $V_{CC}$ = 28 V | 1.0 | 1.3 | — | W |
| $\eta_C$ | f = 3.0 GHz | $P_{IN}$ = 0.20 W | $V_{CC}$ = 28 V | 33 | 36 | — | % |
| $G_P$ | f = 3.0 GHz | $P_{IN}$ = 0.20 W | $V_{CC}$ = 28 V | 7.0 | 8.1 | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 28 V | | — | — | 3.5 | pF |

## TYPICAL PERFORMANCE

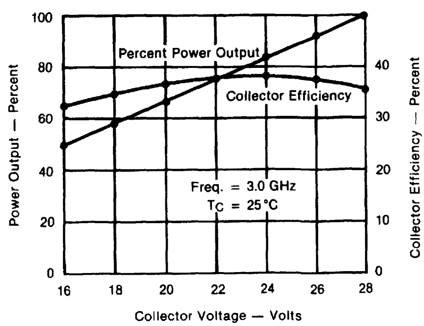
### TYPICAL POWER OUTPUT vs FREQUENCY




### TYPICAL COLLECTOR EFFICIENCY vs FREQUENCY

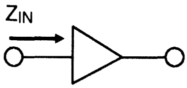


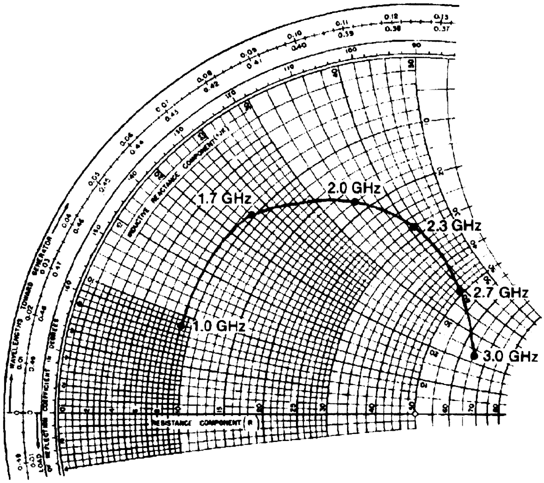

### PERCENT POWER OUTPUT & COLLECTOR EFFICIENCY vs COLLECTOR VOLTAGE



## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE

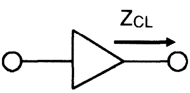


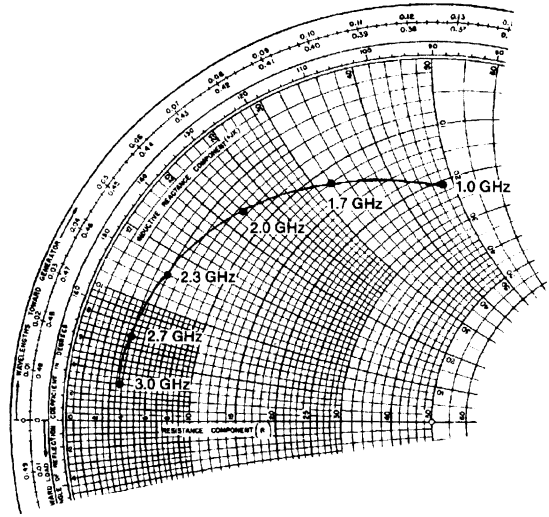




| FREQ. | ZIN (Ω) | ZCL (Ω) |
|---|---|---|
| 1.0 GHz | 9.0 + j 9.0 | 21.0 + j 48.0 |
| 1.7 GHz | 9.5 + j 23.0 | 12.0 + j 32.0 |
| 2.0 GHz | 18.0 + j 34.5 | 7.5 + j 22.0 |
| 2.3 GHz | 28.0 + j 41.0 | 5.0 + j 13.0 |
| 2.7 GHz | 49.0 + j 39.0 | 4.0 + j 7.0 |
| 3.0 GHz | 65.0 + j 22.0 | 3.8 + j 3.0 |

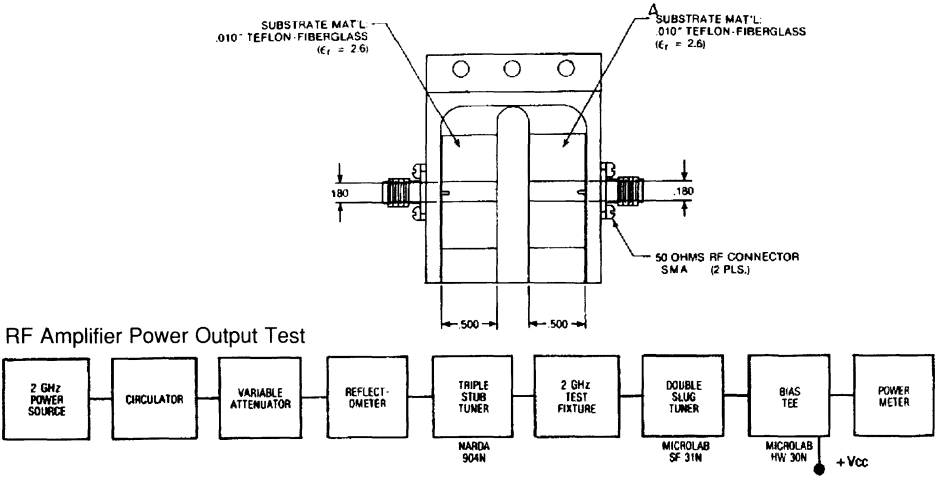
$P_{OUT}$ = Saturated
$V_{CC}$ = 28 V
Normalized to 50 ohms

### TYPICAL COLLECTOR LOAD IMPEDANCE



## TEST CIRCUIT

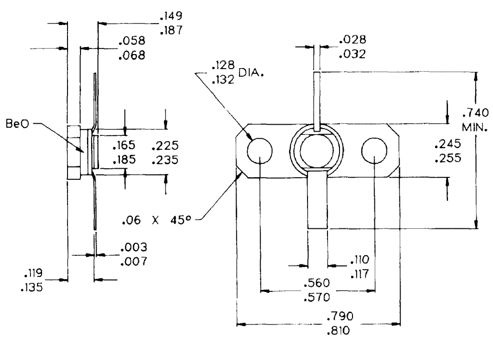



All dimensions are in inches.

Ref.: Dwg. No. C125518

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135021C



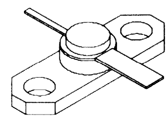

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED;
DIMENSIONS IN INCHES.

SGS-THOMSON MICROELECTRONICS

# MSC83303

## RF & MICROWAVE TRANSISTORS GENERAL PURPOSE AMPLIFIER APPLICATIONS

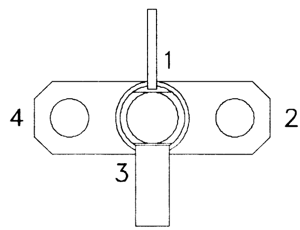
- REFRACTORY/GOLD METALLIZATION
- EMITTER BALLASTED
- VSWR CAPABILITY ∞:1 @ RATED CONDITIONS
- HERMETIC STRIPAC® PACKAGE
- $P_{OUT}$ = 1.0 W MIN. WITH 7.0 dB GAIN @ 3.0 GHz



**.250 2LFL (S010)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| MSC83303 | 83303 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The MSC83303 is a common base hermetically sealed silicon NPN microwave power transistor utilizing an overlay, emitter site ballasted geometry with a refractory/gold metallization system. This device is capable of withstanding an infinite load VSWR at any phase angle under rated conditions. The MSC83303 is designed for Class C amplifier/oscillator applications in the 1.0 - 3.0 GHz frequency range.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 50°C$) | 6.0 | W |
| $I_C$ | Device Current* | 200 | mA |
| $V_{CC}$ | Collector-Supply Voltage* | 30 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 25 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

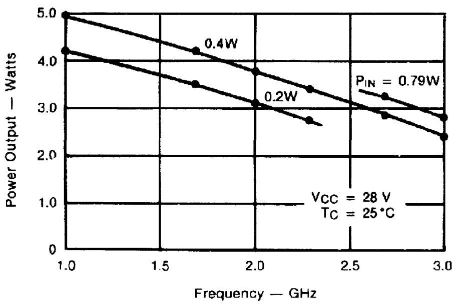
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 1mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 5mA | $R_{BE}$ = 10Ω | 45 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 28V | | — | — | 0.5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 200mA | 30 | — | 300 | — |

DYNAMIC

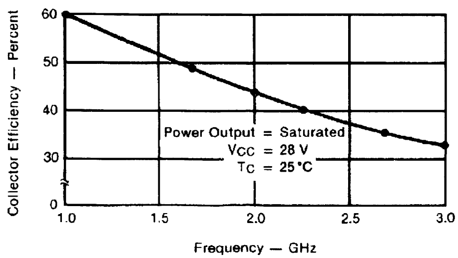
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 3.0 GHz | $P_{IN}$ = 0.79 W | $V_{CC}$ = 28 V | 2.5 | 2.8 | — | W |
| $\eta_c$ | f = 3.0 GHz | $P_{IN}$ = 0.79 W | $V_{CC}$ = 28 V | 30 | 33 | — | % |
| $G_P$ | f = 3.0 GHz | $P_{IN}$ = 0.79 W | $V_{CC}$ = 28 V | 5.0 | 5.5 | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 28 V | | — | — | 5 | pF |

## TYPICAL PERFORMANCE

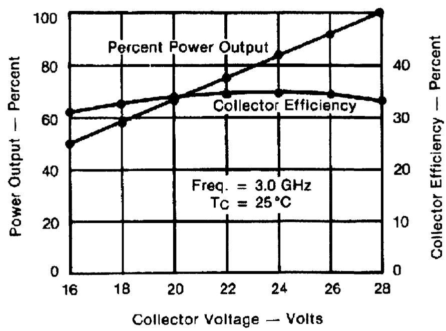
### TYPICAL POWER OUTPUT vs FREQUENCY




### TYPICAL COLLECTOR EFFICIENCY vs FREQUENCY

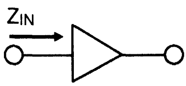


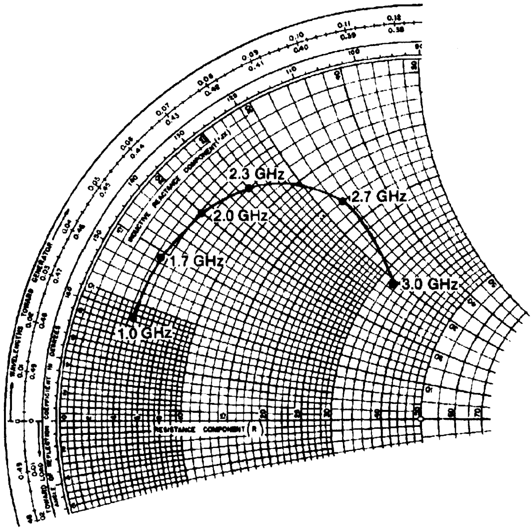

### PERCENT POWER OUTPUT & COLLECTOR EFFICIENCY vs COLLECTOR VOLTAGE



## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE

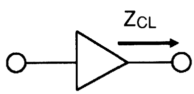


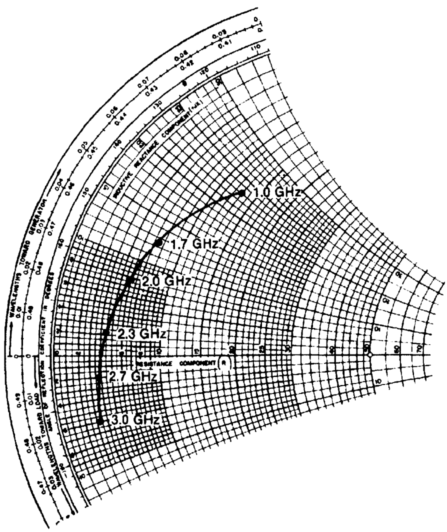




| FREQ. | $Z_{IN}$ ($\Omega$) | $Z_{CL}$ ($\Omega$) |
|---|---|---|
| 1.0 GHz | 4.4 + j 8.7 | 13.0 + j 23.0 |
| 1.7 GHz | 4.5 + j 14.5 | 7.5 + j 12.5 |
| 2.0 GHz | 5.1 + j 20.0 | 6.0 + j 7.8 |
| 2.3 GHz | 7.0 + j 25.0 | 4.5 + j 2.2 |
| 2.7 GHz | 16.0 + j 33.0 | 3.8 – j 2.0 |
| 3.0 GHz | 33.0 + j 29.0 | 3.3 – j 6.0 |

$P_{OUT}$ = Saturated
$V_{CC}$ = 28 V
Normalized to 50 ohms

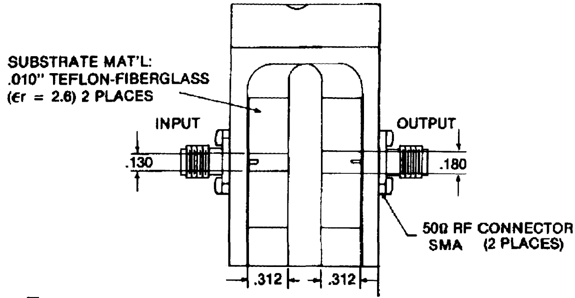
### TYPICAL COLLECTOR LOAD IMPEDANCE



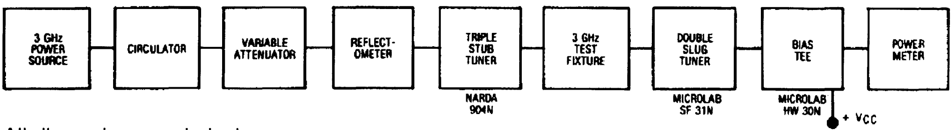



## TEST CIRCUIT

Ref.: Dwg. No. C125562



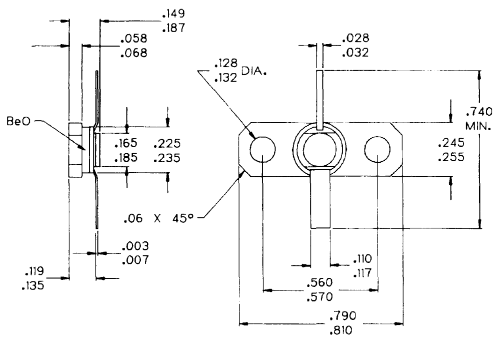

RF Amplifier Power Output Test




All dimensions are in inches.
Frequency 3.0 GHz

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135021C



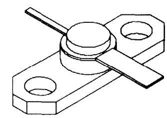

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED;
DIMENSIONS IN INCHES.

SGS-THOMSON MICROELECTRONICS

# MSC83305

## RF & MICROWAVE TRANSISTORS GENERAL PURPOSE AMPLIFIER APPLICATIONS

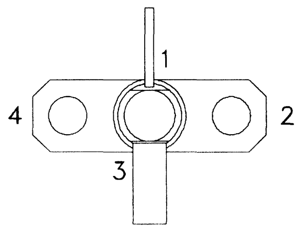
- REFRACTORY/GOLD METALLIZATION
- EMITTER BALLASTED
- VSWR CAPABILITY ∞:1 @ RATED CONDITIONS
- HERMETIC STRIPAC® PACKAGE
- $P_{OUT}$ = 4.5 W MIN. WITH 4.5 dB GAIN @ 3.0 GHz



**.250 2LFL (S010)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| MSC83305 | 83305 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The MSC83305 is a common base hermetically sealed silicon NPN microwave power transistor utilizing an emitter site ballasted geometry with a refractory gold metallization system. This device is capable of withstanding an infinite load VSWR at any phase angle under rated conditions. The MSC83305 was designed for Class C amplifier/oscillator applications in the 1.0 - 3.0 GHz frequency range.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 50°C$) | 17.6 | W |
| $I_C$ | Device Current* | 700 | mA |
| $V_{CC}$ | Collector-Supply Voltage* | 30 | V |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance* | 8.5 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

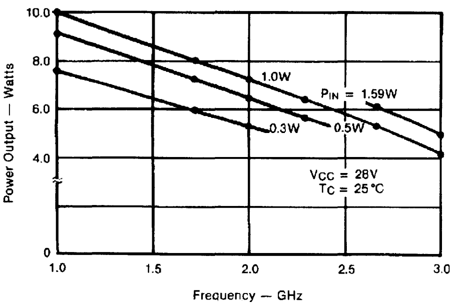
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 1mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CER}$ | IC = 5mA | $R_{BE}$ = 10Ω | 45 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 28V | | — | — | 0.5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 500mA | 30 | — | 300 | — |

### DYNAMIC

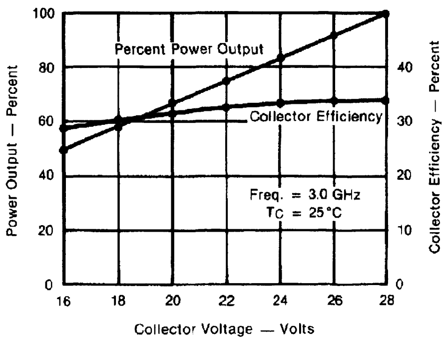
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 3.0 GHz | $P_{IN}$ = 1.59 W | $V_{CC}$ = 28 V | 4.5 | 5.0 | — | W |
| $\eta_c$ | f = 3.0 GHz | $P_{IN}$ = 1.59 W | $V_{CC}$ = 28 V | 30 | 33 | — | % |
| $G_P$ | f = 3.0 GHz | $P_{IN}$ = 1.59 W | $V_{CC}$ = 28 V | 4.5 | 5.0 | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 28 V | | — | — | 7.5 | pF |

## TYPICAL PERFORMANCE

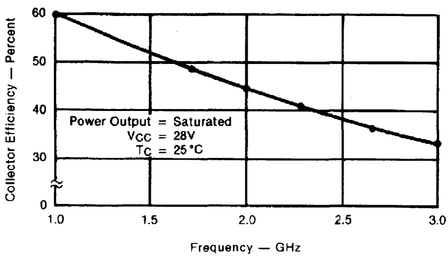
### POWER OUTPUT vs FREQUENCY




### PERCENT POWER OUTPUT & COLLECTOR EFFICIENCY vs COLLECTOR VOLTAGE

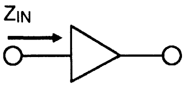


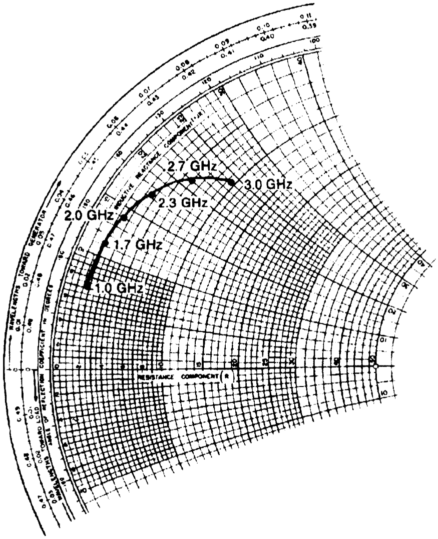

### COLLECTOR EFFICIENCY vs FREQUENCY



## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE

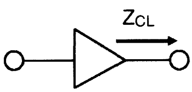


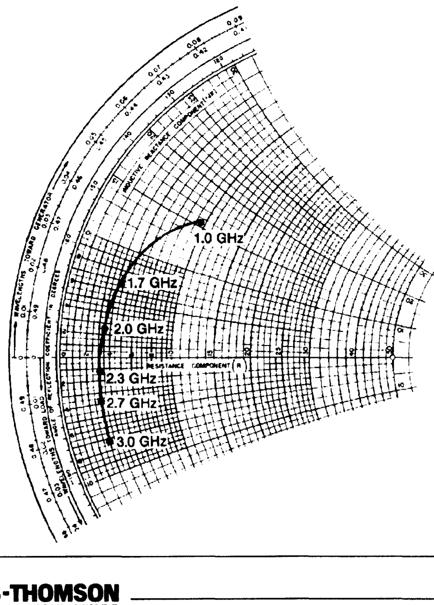




| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 1.0 GHz | 1.7 + j 7.2 | 9.5 + j 15.5 |
| 1.7 GHz | 2.0 + j 11.2 | 4.2 + j 6.7 |
| 2.0 GHz | 2.4 + j 14.0 | 3.5 + j 2.5 |
| 2.3 GHz | 3.6 + j 17.4 | 3.1 − j 1.2 |
| 2.7 GHz | 6.0 + j 21.0 | 3.0 − j 3.8 |
| 3.0 GHz | 9.5 + j 24.0 | 3.0 − j 7.2 |

$P_{OUT}$ = Saturated
$V_{CC}$ = 28V
Normalized to 50 ohms

### TYPICAL COLLECTOR LOAD IMPEDANCE

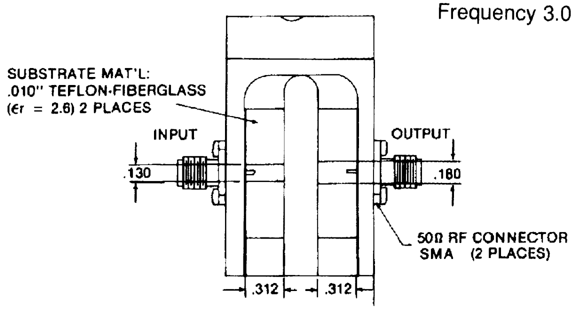


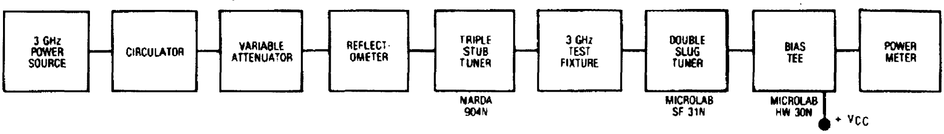
## TEST CIRCUIT

Ref.: Dwg. No. C125562

All dimensions are in inches.
Frequency 3.0 GHz

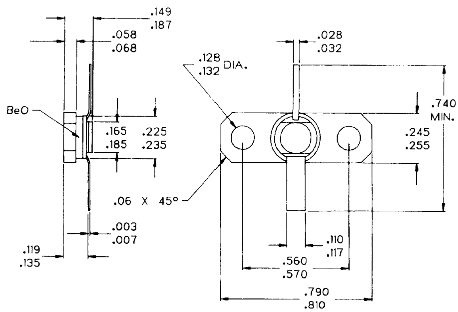



RF Amplifier Power Output Test




## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J135021C



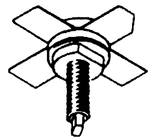

NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED;
DIMENSIONS IN INCHES.

SGS-THOMSON MICROELECTRONICS

# SD1012 (2N6080)

## RF & MICROWAVE TRANSISTORS VHF FM MOBILE APPLICATIONS

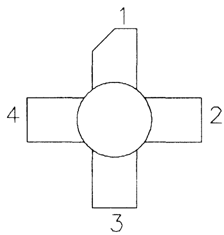
- 175 MHz
- 12.5 VOLTS
- HIGH EFFICIENCY
- COMMON EMITTER
- FM CLASS C TRANSISTOR
- $P_{OUT}$ = 4 W MIN. WITH 12 dB GAIN



**.380 4L STUD (M135)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1012 | 2N6080 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

### DESCRIPTION

The SD1012 is an epitaxial silicon NPN planar transistor designed primarily for VHF mobile and marine transmitters. The device utilizes emitter ballasting resistors and improved metallization systems to achieve extreme ruggedness under severe operating conditions.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 36 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 18 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 1.0 | A |
| $P_{DISS}$ | Power Dissipation | 12 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 15 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

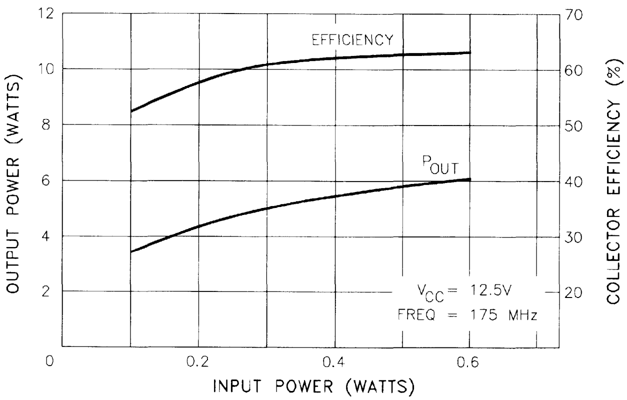
| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CES}$ | $I_C$ = 5mA | $V_{BE}$ = 0V | 36 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 10mA | $I_B$ = 0mA | 18 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 15V | $I_E$ = 0mA | — | — | .25 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 0.25A | 5 | — | 200 | — |

### DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 175 MHz | $P_{IN}$ = 0.25 W | $V_{CE}$ = 12.5 V | 4 | — | — | W |
| $G_P$ | f = 175 MHz | $P_{IN}$ = 0.25 W | $V_{CE}$ = 12.5 V | 12 | — | — | dB |
| $\eta_c$ | f = 175 MHz | $P_{IN}$ = 0.25 W | $V_{CE}$ = 12.5 V | 50 | — | — | % |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 15 V | | — | — | 20 | pF |

## TYPICAL PERFORMANCE

### POWER OUTPUT & COLLECTOR EFFICIENCY vs POWER INPUT



## IMPEDANCE DATA

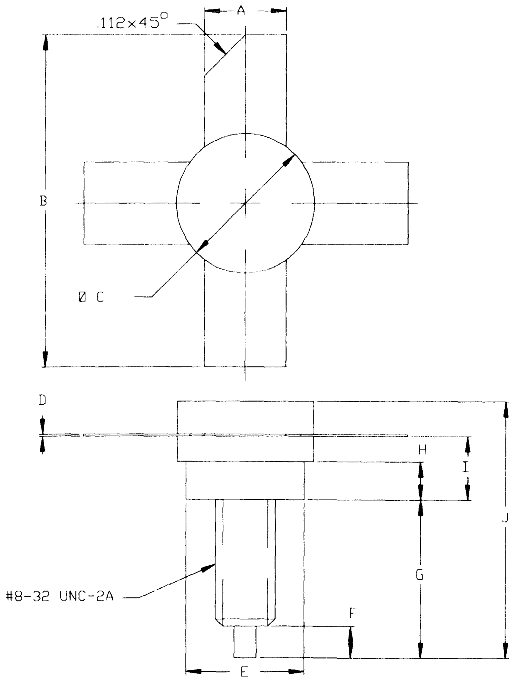
| $P_{IN}$ (W) | $P_{OUT}$ (W) | $Z_{IN}$ ($\Omega$) | $Z_{OUT}$ ($\Omega$) |
|---|---|---|---|
| 0.1 | 3.3 | 1.5 + j 1.7 | 5.8 + j 1.4 |
| 0.3 | 4.9 | 2.2 + j 1.3 | 7.6 + j 9.8 |
| 0.5 | 5.8 | 2.9 + j 0.4 | 8.4 + j 6.9 |

Freq. = 175 MHz
$V_{CC}$ = 12.5 V

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0135

| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .220/5,59 | .230/5,84 |
| B | .980/24,89 | |
| C | .370/9,40 | .385/9,78 |
| D | .004/0,10 | .007/0,18 |
| E | .320/8,13 | .330/8,38 |
| F | .100/2,54 | .130/3,30 |
| G | .450/11,43 | .490/12,45 |
| H | .090/2,29 | .100/2.54 |
| I | .155/3,94 | .175/4,45 |
| J | | .750/19,05 |

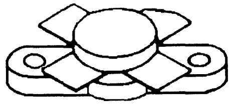


SGS-THOMSON
MICROELECTRONICS

# SD1012-03

## RF & MICROWAVE TRANSISTORS
## VHF MOBILE APPLICATIONS

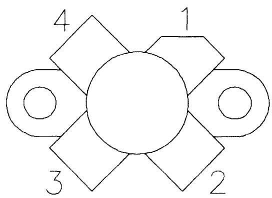
- 175 MHz
- 12.5 VOLTS
- EFFICIENCY 50%
- COMMON EMITTER
- $P_{OUT}$ = 6 W MIN. WITH 9 dB GAIN



**.380 4LFL (M113)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1012-03 | SD1012-03 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

### DESCRIPTION

The SD1012-03 is a 12.5 V Class C epitaxial silicon NPN planar transistor designed primarily for VHF communications in the 136 - 175 MHz frequency range. Emitter ballasting is employed to adchieve excellent ruggedness under severe load mismatch conditions.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 36.0 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 18.0 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 36.0 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 1.8 | A |
| $P_{DISS}$ | Power Dissipation (+25°C) | 20.0 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 8.75 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

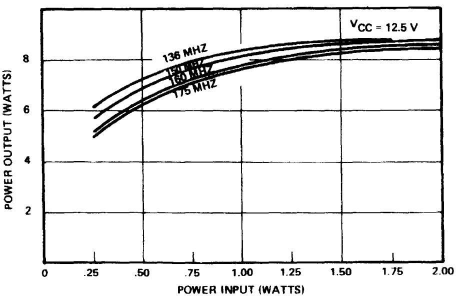
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CES}$ | $I_C$ = 5mA | | 36.0 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 10mA | | 18.0 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | | 4.0 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 15V | | — | — | 1.0 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = .25A | 5 | — | — | — |

DYNAMIC

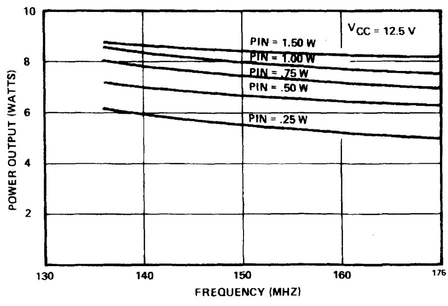
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 175 MHz | $P_{IN}$ = .75 W | $V_{CC}$ = 12.5 V | 6.0 | — | — | W |
| $\eta_C$ | f = 175 MHz | $P_{IN}$ = .75 W | $V_{CC}$ = 12.5 V | 50 | — | — | % |
| $G_P$ | f = 175 MHz | $P_{IN}$ = .75 W | $V_{CC}$ = 12.5 V | 9.0 | — | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 15 V | | — | — | 20 | pF |

## TYPICAL PERFORMANCE

### POWER OUTPUT vs POWER INPUT

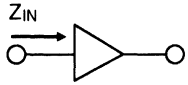



### POWER OUTPUT vs FREQUENCY

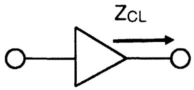


## IMPEDANCE DATA

**TYPICAL INPUT IMPEDANCE**



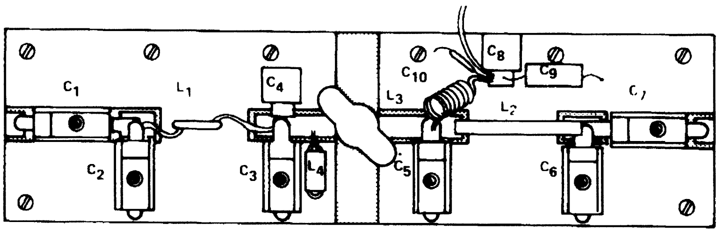

**TYPICAL COLLECTOR LOAD IMPEDANCE**

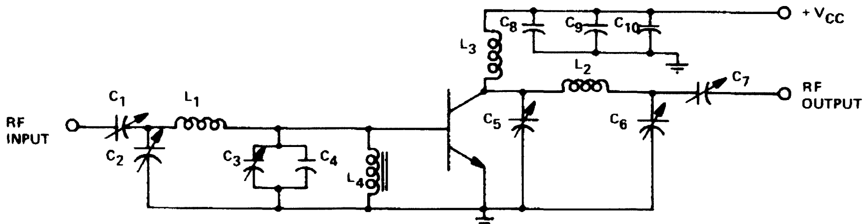



| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 150 MHz | 4.90 + j 3.46 | 11.4 + j 4.56 |
| 175 MHz | 4.32 + j 3.04 | 13.0 + j 7.81 |

$V_{CC}$ = 12.5 V
$P_{IN}$ = 1 W
$P_{OUT}$ = 8.1 @ 150 MHz
$P_{OUT}$ = 7.7 @ 175 MHz

## TEST CIRCUIT



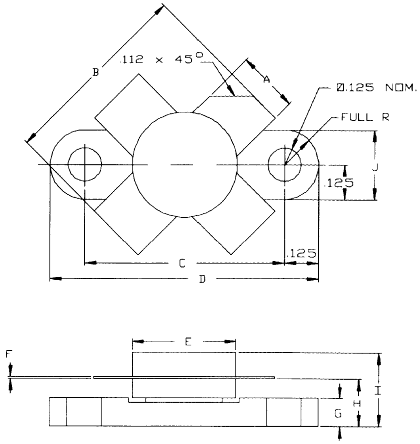




| | | |
|---|---|---|
| C1,C2,C6 | : | 4-40pF, ARCO 422 |
| C3,C5 | : | 7-100pF, ARCO 423 |
| C4 | : | 25pF, UNELO |
| C7 | : | 24-200pF, ARCO 425 |
| C8 | : | 1000pF Unelco |
| C9 | : | 10µf Electrolytic 35 Vdc |
| C10 | : | .01µf Disc |

| | | |
|---|---|---|
| L1 | : | 1 Turn, #18 AWG, 5/16" I.D. |
| L2 | : | Cu. .003", 1 3/4" Long, 3/16"Wide, 5/16" Height |
| L3 | : | 10 Turns #22 Enameled Tightly Wound on 300Ω 1/2 Watt Carbon Resistor |
| L4 | : | RFC, 2 1/2 Turns on VK2K/07-3B Ferroxcube |

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0113



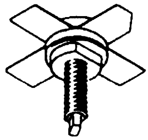

| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .220/5,59 | .230/5,84 |
| B | .785/19,94 | |
| C | .720/18,29 | .730/18,54 |
| D | .970/24,64 | .980/24,89 |
| E | | .385/9,78 |
| F | .004/0,10 | .006/0,15 |
| G | .085/2,16 | .105/2,67 |
| H | .160/4,06 | .180/4,57 |
| I | | .280/7,11 |
| J | .240/6,10 | .255/6,48 |

SGS-THOMSON
MICROELECTRONICS

# SD1013

## RF & MICROWAVE TRANSISTORS
## VHF APPLICATIONS

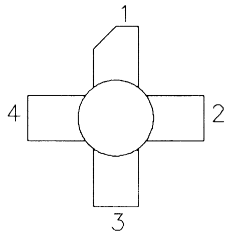
- 150 MHz
- 28 VOLTS
- COMMON EMITTER
- TYPICAL EFFICIENCY 55%
- $P_{OUT}$ = 10 W MIN. WITH 10 dB GAIN



**.380 4L STUD (M135)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1013 | SD1013 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

## DESCRIPTION

The SD1013 is a 28 V Class C epitaxial silicon NPN planar transistor designed for 108 - 152 MHz FM applications.

This device utilizes emitter resistors to achieve infinite VSWR at rated operating conditions.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 65.0 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 35.0 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 65.0 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 1.0 | A |
| $P_{DISS}$ | Power Dissipation | 13.0 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 13.5 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 200mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{CES}$ | $I_C$ = 200mA | $V_{BE}$ = 0V | 65 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 200mA | $I_B$ = 0mA | 35 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 30V | $I_E$ = 0mA | — | — | 1.0 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 200mA | 5.0 | — | — | — |

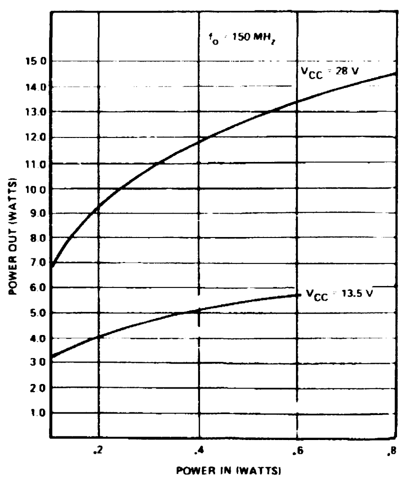
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 150 MHz | $P_{IN}$ = 1.0 W | $V_{CC}$ = 28 V | 10 | — | — | W |
| $G_P$ | f = 150 MHz | $P_{IN}$ = 1.0 W | $V_{CC}$ = 28 V | 10 | — | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 30V | | — | — | 15 | pF |

Note: When used at 13.5 Volts performances are:
$P_{OUT}$ = 3.5 Watt Typical
$G_P$ = 10.5 dB Typical

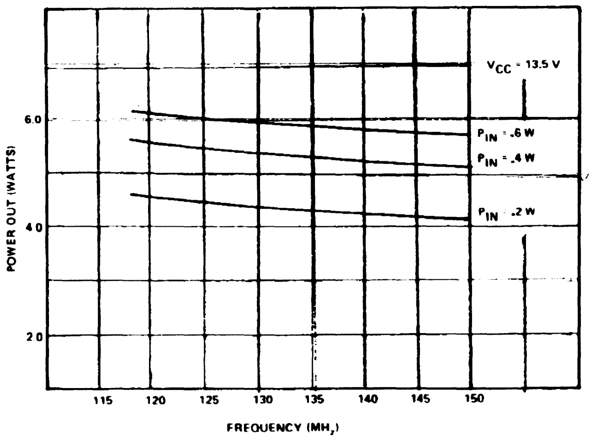
## TYPICAL PERFORMANCE

### POWER OUTPUT vs POWER INPUT

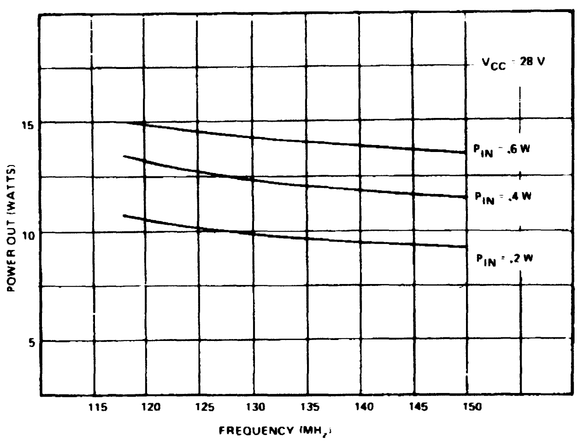


## TYPICAL PERFORMANCE (cont'd)

### POWER OUTPUT vs FREQUENCY (13.5 V)

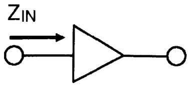


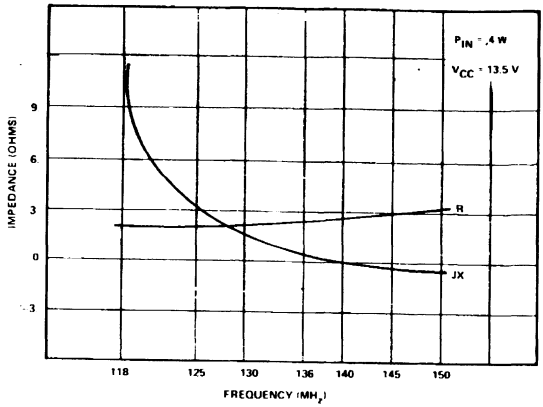

### POWER OUTPUT vs FREQUENCY (28 V)



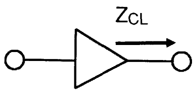
## IMPEDANCE DATA (13.5 V)

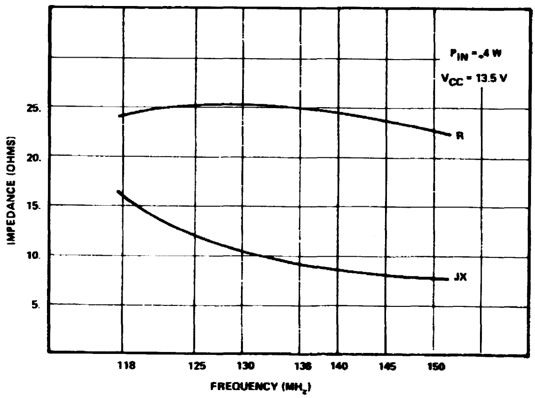
### TYPICAL INPUT IMPEDANCE



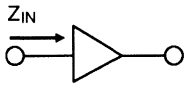

### TYPICAL COLLECTOR LOAD IMPEDANCE

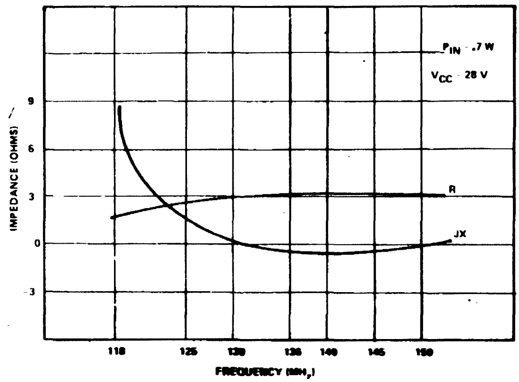


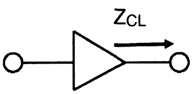
## IMPEDANCE DATA (28 V)

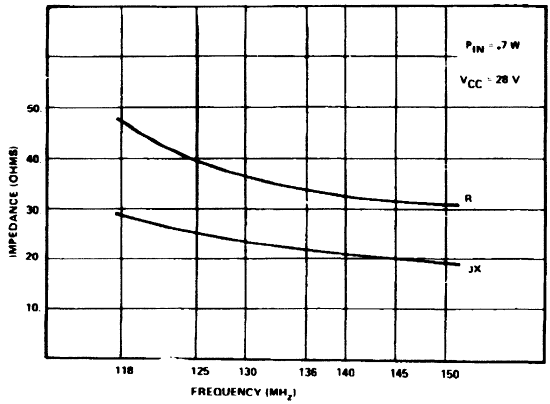
### TYPICAL INPUT IMPEDANCE



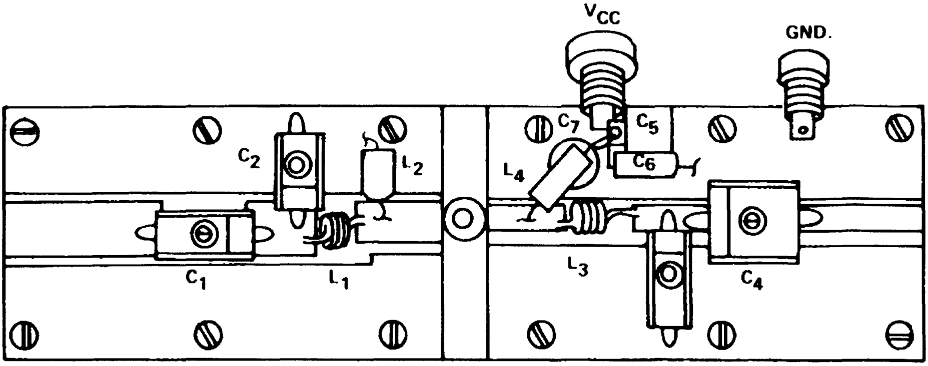



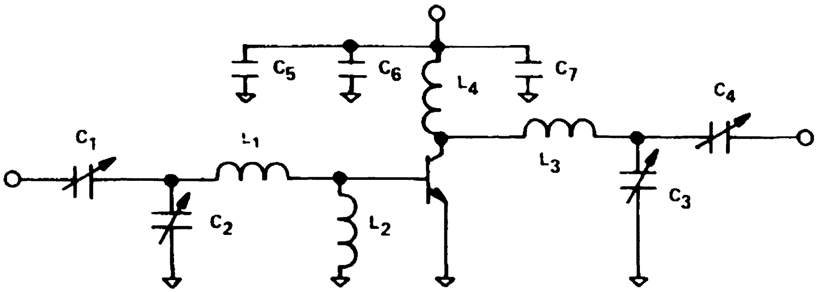

### TYPICAL COLLECTOR LOAD IMPEDANCE



## TEST CIRCUIT

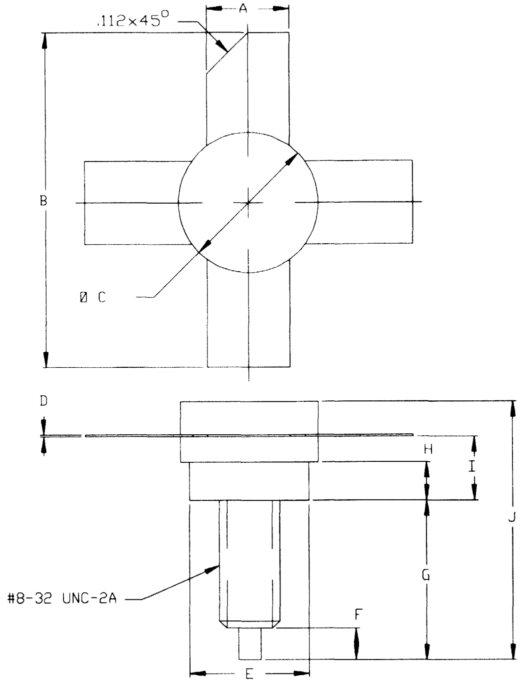



| | | | | | |
|---|---|---|---|---|---|
| C1,C2 | : | ARCO 422 | C7 | : | .01pF Ceramic Disc |
| C3 | : | ARCO 421 | L1 | : | 3Turns #22, 1/8" I.D. |
| C4 | : | ARCO 464 | L2 | : | RFC Ferroxcube |
| C5 | : | 1000pF UNELCO | L3 | : | 3 Turns #18, 1/4" I.D. |
| C6 | : | 10µF Electrolytic 35V | L4 | : | .47µh Molded Choke |

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0135



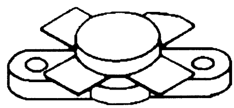

| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | 220/5,59 | .230/5,84 |
| B | .980/24,89 | |
| C | .370/9,40 | .385/9,78 |
| D | .004/0,10 | .007/0,18 |
| E | .320/8,13 | .330/8,38 |
| F | .100/2,54 | .130/3,30 |
| G | .450/11,43 | .490/12,45 |
| H | .090/2,29 | .100/2.54 |
| I | .155/3,94 | .175/4,45 |
| J | | .750/19,05 |

SGS-THOMSON
MICROELECTRONICS

# SD1013-03

## RF & MICROWAVE TRANSISTORS
## VHF APPLICATIONS

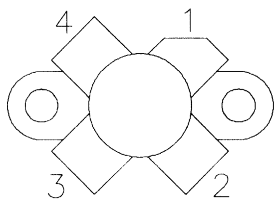
- 150 MHz
- 28 VOLTS
- COMMON EMITTER
- EFFICIENCY 50% TYPICAL
- $P_{OUT}$ = 10 W MIN. WITH 10 dB GAIN



**.380 4LFL (M113)**
epoxy sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| SD1013-03 | SD1013-3 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

## DESCRIPTION

The SD1013-03 is a 28 V Class C epitaxial silicon NPN planar transistor designed for 108 - 152 MHz FM applications.

This device utilizes diffused emitter resistors to achieve infinite VSWR at rated operating conditions.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 65 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 35 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 65 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4 | V |
| $I_C$ | Device Current | 1 | A |
| $P_{DISS}$ | Power Dissipation (+25°C) | 13 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 13.5 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 200mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{CES}$ | $I_C$ = 200mA | $V_{BE}$ = 0V | 65 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 200mA | $I_B$ = 0mA | 35 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 30V | $I_E$ = 0mA | — | — | 1 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 200mA | 5 | — | 200 | — |

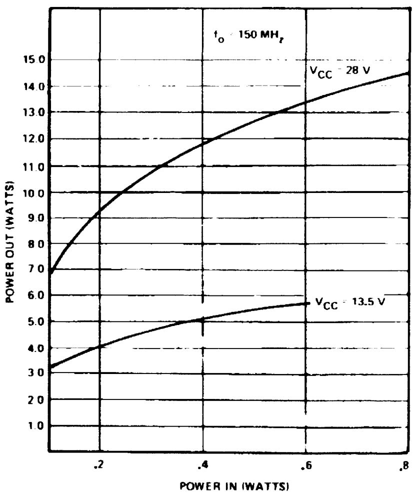
DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 150 MHz | $P_{IN}$ = 1.0 W | $V_{CC}$ = 28 V | 10 | — | — | W |
| $G_P$ | f = 150 MHz | $P_{IN}$ = 1.0 W | $V_{CC}$ = 28 V | 10 | — | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 30 V | | — | — | 1 | pF |

Note: When used at 13.5 Volts performances are:
$P_{OUT}$ = 3.5 Watts Typical
$G_P$ = 10.5 dB Typical

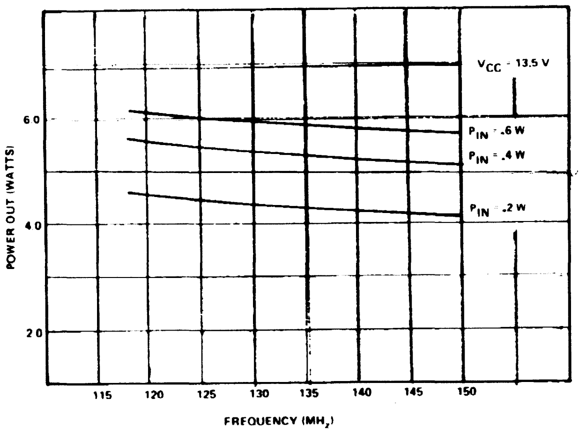
## TYPICAL PERFORMANCE

### POWER OUTPUT vs POWER INPUT

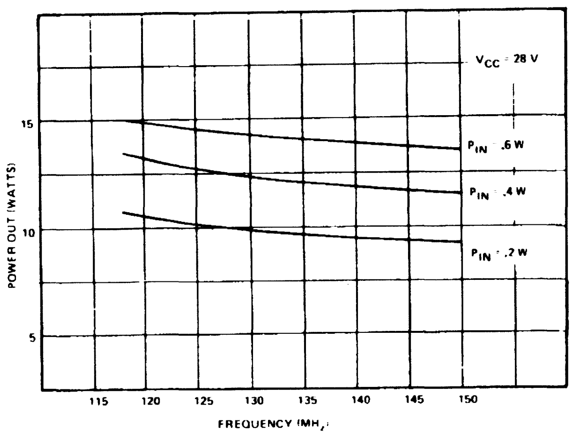


## TYPICAL PERFORMANCE (cont'd)

### POWER OUTPUT vs FREQUENCY (13.5 V)

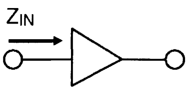


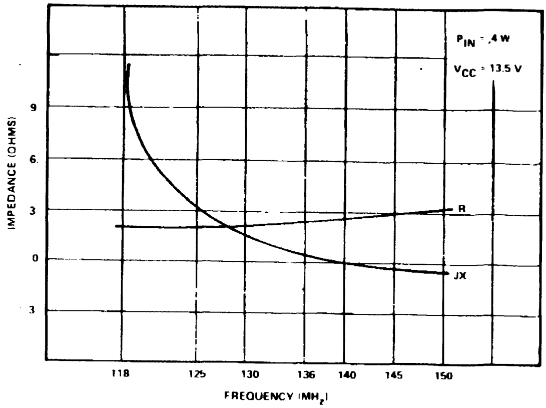

### POWER OUTPUT vs FREQUENCY (28 V)



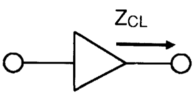
## IMPEDANCE DATA (13.5 V)

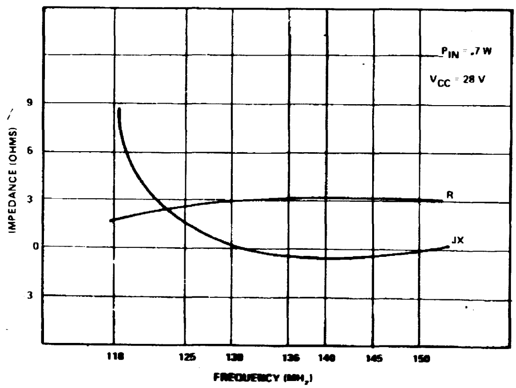
### TYPICAL INPUT IMPEDANCE



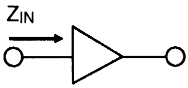

### TYPICAL COLLECTOR LOAD IMPEDANCE

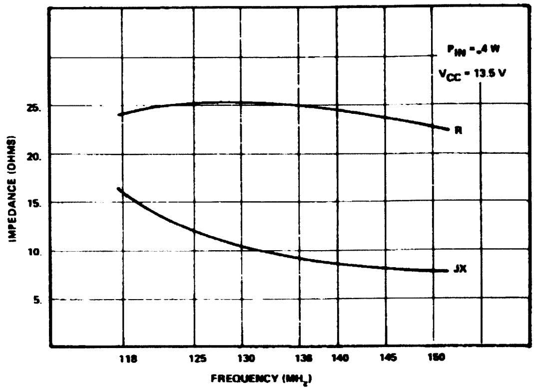


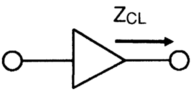
## IMPEDANCE DATA (28 V)

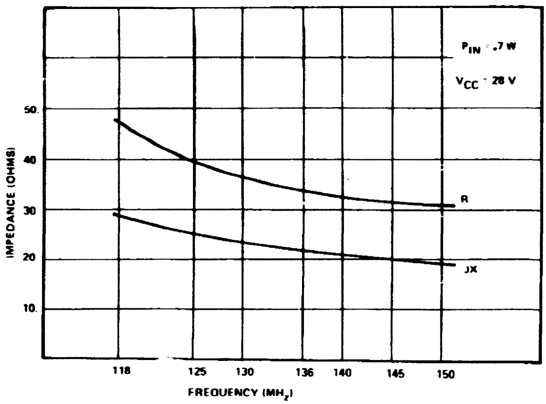
### TYPICAL INPUT IMPEDANCE



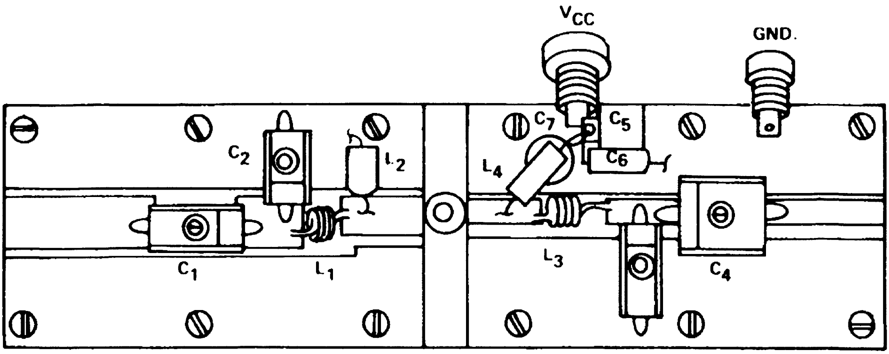



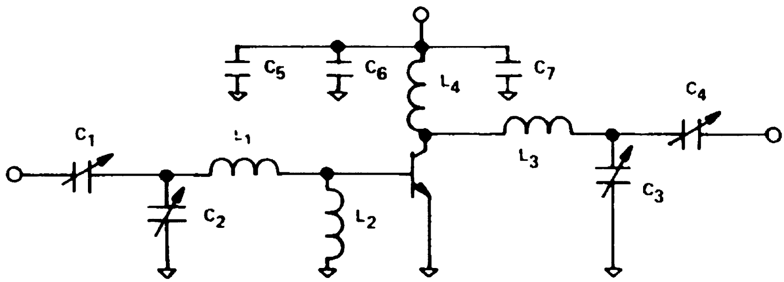

### TYPICAL COLLECTOR LOAD IMPEDANCE



## TEST CIRCUIT

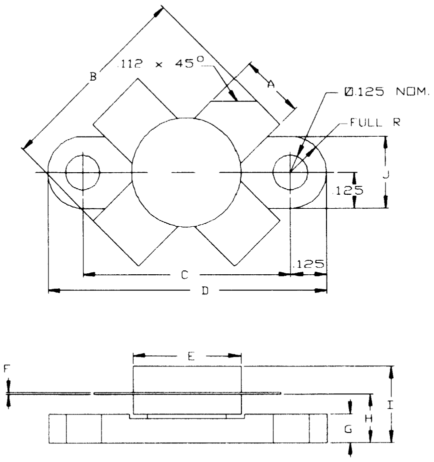



| | | | | | |
|---|---|---|---|---|---|
| C1,C2 | : | ARCO 422 | C7 | : | .01pF Ceramic Disc |
| C3 | : | ARCO 421 | L1 | : | 3Turns #22, 1/8" I.D. |
| C4 | : | ARCO 464 | L2 | : | RFC Ferroxcube |
| C5 | : | 1000pF Unelco | L3 | : | 3 Turns #18, 1/4" I.D. |
| C6 | : | 10µF Electrolytic 35V | L4 | : | .47µh Molded Choke |

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0113

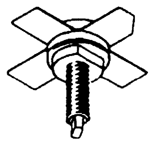



| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .220/5,59 | .230/5,84 |
| B | .785/19,94 | |
| C | .720/18,29 | .730/18,54 |
| D | .970/24,64 | .980/24,89 |
| E | | .385/9,78 |
| F | .004/0,10 | 006/0,15 |
| G | .085/2,16 | .105/2,67 |
| H | .160/4,06 | .180/4,57 |
| I | | .280/7,11 |
| J | .240/6,10 | .255/6,48 |

# SD1014-02 (2N6081)

## RF & MICROWAVE TRANSISTORS
## VHF FM MOBILE APPLICATIONS

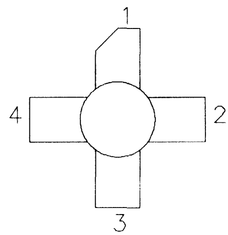
- 175 MHz
- 12.5 VOLTS
- HIGH EFFICIENCY
- COMMON EMITTER
- FM CLASS C TRANSISTOR
- $P_{OUT}$ = 15 W MIN. WITH 6.3 dB GAIN



**.380 4L STUD (M135)**
epoxy sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| SD1014-02 | 2N6081 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

### DESCRIPTION

The SD1014-02 is an epitaxial silicon NPN planar transistor designed primarily for VHF mobile and marine transmitters. The device utilizes emitter ballasting resistors and improved metallization systems to achieve extreme ruggedness under severe operating conditions.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 36 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 18 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 2.5 | A |
| $P_{DISS}$ | Power Dissipation | 31 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 5.6 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

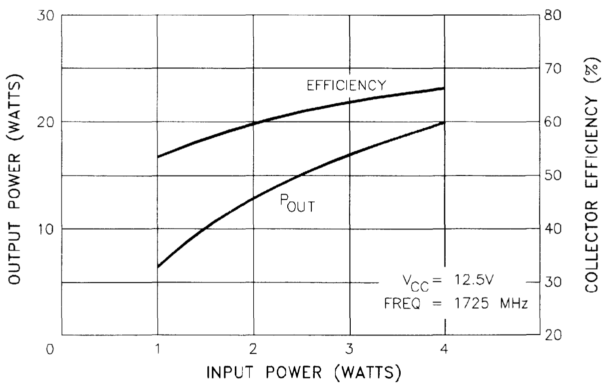
| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CES}$ | $I_C$ = 10mA | $V_{BE}$ = 0V | 36 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 20mA | $I_B$ = 0mA | 18 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 2mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 15V | $I_E$ = 0mA | — | — | 0.5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 500mA | 5 | — | 200 | — |

DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 175 MHz | $P_{IN}$ = 3.5 W | $V_{CE}$ = 12.5 V | 15 | — | — | W |
| $G_P$ | f = 175 MHz | $P_{IN}$ = 3.5 W | $V_{CE}$ = 12.5 V | 6.3 | — | — | dB |
| $\eta_C$ | f = 175 MHz | $P_{OUT}$ = 15 W | $V_{CE}$ = 12.5 V | 60 | — | — | % |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 15 V | | — | — | 85 | pF |

## TYPICAL PERFORMANCE

### POWER OUTPUT & COLLECTOR EFFICIENCY vs POWER INPUT



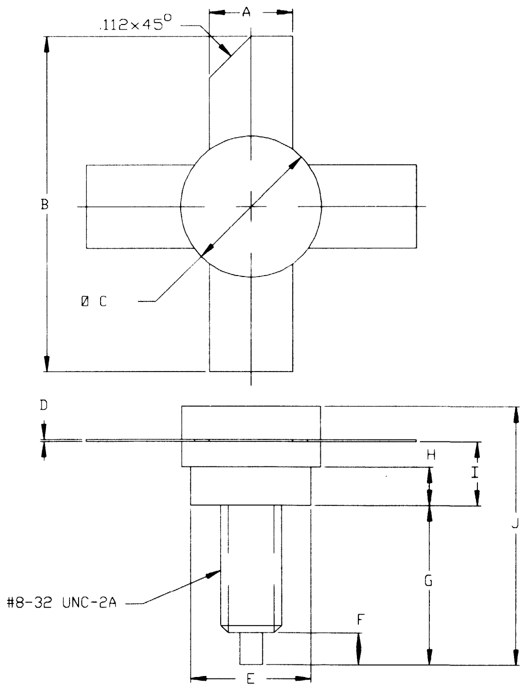
## IMPEDANCE DATA

| $P_{IN}$ (W) | $P_{OUT}$ (W) | $Z_{IN}$ ($\Omega$) | $Z_{OUT}$ ($\Omega$) |
|---|---|---|---|
| 1 | 9.3 | 0.8 – j 1.0 | 4.0 + j 3.0 |
| 3 | 19.6 | 1.0 – j 1.4 | 3.3 + j 1.2 |
| 5 | 27.6 | 1.0 – j 1.0 | 2.9 + j 0.6 |

Freq. = 175 MHz
$V_{CC}$ = 12.5 V

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0135



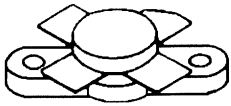

| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .220/5,59 | .230/5,84 |
| B | .980/24,89 | |
| C | .370/9,40 | .385/9,78 |
| D | .004/0,10 | .007/0,18 |
| E | .320/8,13 | .330/8,38 |
| F | .100/2,54 | .130/3,30 |
| G | .450/11,43 | .490/12,45 |
| H | .090/2,29 | .100/2.54 |
| I | .155/3,94 | .175/4,45 |
| J | | .750/19,05 |

SGS-THOMSON MICROELECTRONICS

# SD1014-06

## RF & MICROWAVE TRANSISTORS VHF APPLICATIONS

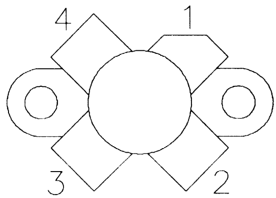
- 175 MHz
- 12.5 VOLTS
- EFFICIENCY 60%
- COMMON EMITTER
- $P_{OUT}$ = 15 W MIN. WITH 6.3 dB GAIN



**.380 4LFL (M113)**
epoxy sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| SD1014-06 | SD1014-6 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

### DESCRIPTION

This epitaxial silicon Class C NPN planar transistor is designed primarily for VHF mobile and marine transmitters. The device utilizes emitter ballasting resistors and improved metallization systems to achieve extreme ruggedness under severe operating conditions.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 36 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 18 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 36 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 2.5 | A |
| $P_{DISS}$ | Power Dissipation | 31 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 5.6 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case} = 25°C$)

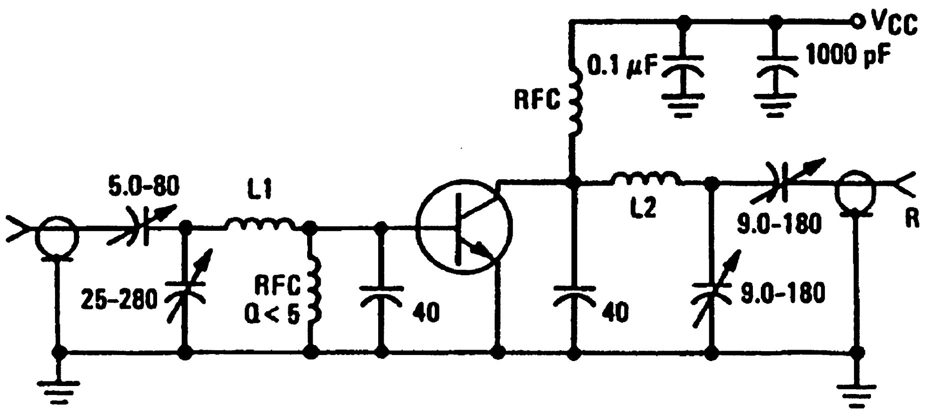
### STATIC

| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CES}$ | $I_C$ = 10mA | $V_{BE}$ = 0V | 36 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 20mA | $I_B$ = 0mA | 18 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 2mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 15V | $I_E$ = 0mA | — | — | 0.5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 500mA | 5 | — | 200 | — |

### DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 175 MHz | $P_{IN}$ = 3.5 W | $V_{CC}$ = 12.5 V | 15 | — | — | W |
| $\eta_C$ | f = 175 MHz | $P_{IN}$ = 3.5 W | $V_{CC}$ = 12.5 V | 60 | — | — | % |
| $G_P$ | f = 175 MHz | $P_{IN}$ = 3.5 W | $V_{CC}$ = 12.5 V | 6.3 | — | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 15 V | | — | — | 85 | pF |

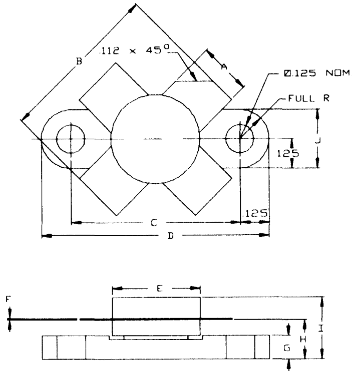
## TEST CIRCUIT




L1 : #14 AWG Wire, 1 3/8" Long
L2 : 1 Turn, #14 AWG Wire, 3/8" Diameter 1 1/2" Long

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0113



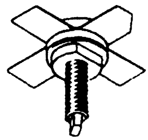

| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .220/5,59 | .230/5,84 |
| B | .785/19,94 | |
| C | .720/18,29 | .730/18,54 |
| D | .970/24,64 | .980/24,89 |
| E | | .385/9,78 |
| F | .004/0,10 | .006/0,15 |
| G | .085/2,16 | .105/2,67 |
| H | .160/4,06 | .180/4,57 |
| I | | .280/7,11 |
| J | .240/6,10 | .255/6,48 |

SGS-THOMSON
MICROELECTRONICS

# SD1018 (2N6084)

## RF & MICROWAVE TRANSISTORS
## VHF FM MOBILE APPLICATIONS

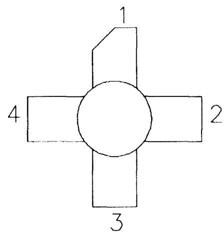
- 175 MHz
- 12.5 VOLTS
- HIGH EFFICIENCY
- COMMON EMITTER
- FM CLASS C TRANSISTOR
- $P_{OUT}$ = 40 W MIN. WITH 4.5 dB GAIN



**.380 4L STUD (M135)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1018 | 2N6081 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

## DESCRIPTION

The SD1018 is an epitaxial silicon NPN planar transistor designed primarily for VHF mobile and marine transmitters. The device utilizes emitter ballasting resistors and improved metallization systems to achieve extreme ruggedness under severe operating conditions.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 36 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 18 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 6.0 | A |
| $P_{DISS}$ | Power Dissipation | 80 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 2.2 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

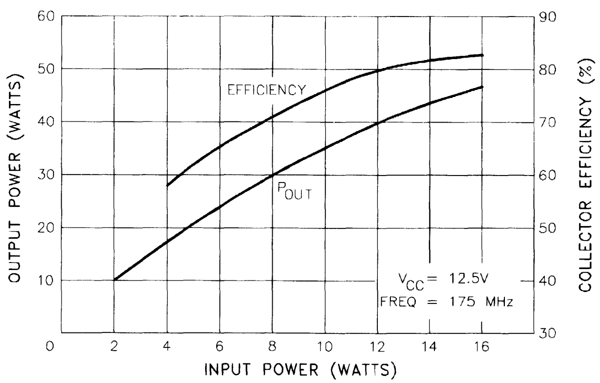
| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CES}$ | $I_C$ = 20mA | $V_{BE}$ = 0V | 36 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 100mA | $I_B$ = 0mA | 18 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 15V | $I_E$ = 0mA | — | — | 2.5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1A | 5 | — | — | — |

DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 175 MHz | $P_{IN}$ = 14 W | $V_{CE}$ = 12.5 V | 40 | — | — | W |
| $G_P$ | f = 175 MHz | $P_{IN}$ = 14 W | $V_{CE}$ = 12.5 V | 4.5 | — | — | dB |
| $\eta_c$ | f = 175 MHz | $P_{OUT}$ = 40 W | $V_{CE}$ = 12.5 V | 70 | — | — | % |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 15 V | | — | — | 200 | pF |

## TYPICAL PERFORMANCE

**POWER OUTPUT & COLLECTOR EFFICIENCY vs POWER INPUT**



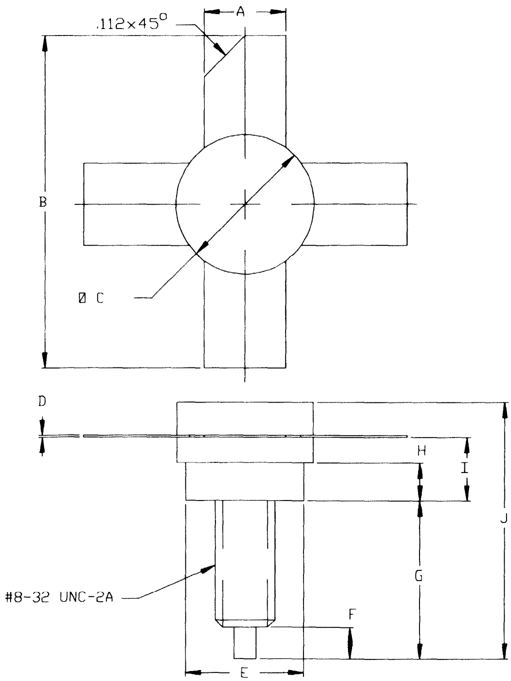
## IMPEDANCE DATA

| $P_{IN}$ (W) | $P_{OUT}$ (W) | $Z_{IN}$ ($\Omega$) | $Z_{OUT}$ ($\Omega$) |
|---|---|---|---|
| 4 | 21.7 | 0.8 – j 1.1 | 2.2 – j 0.3 |
| 8 | 37.1 | 0.8 – j 1.3 | 1.7 – j 0.5 |
| 12 | 46.5 | 0.8 – j 1.6 | 1.6 – j 0.3 |

Freq. = 175 MHz
$V_{CC}$ = 12.5 V

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0135



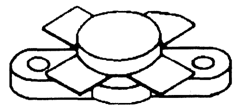

| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .220/5,59 | .230/5,84 |
| B | .980/24,89 | |
| C | .370/9,40 | .385/9,78 |
| D | .004/0,10 | .007/0,18 |
| E | .320/8,13 | .330/8,38 |
| F | .100/2,54 | .130/3,30 |
| G | .450/11,43 | .490/12,45 |
| H | .090/2,29 | .100/2.54 |
| I | .155/3,94 | .175/4,45 |
| J | | .750/19,05 |

SGS-THOMSON MICROELECTRONICS

# SD1018-06

## RF & MICROWAVE TRANSISTORS VHF MOBILE APPLICATIONS

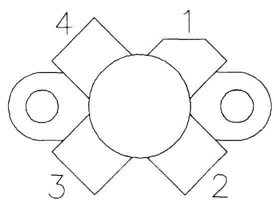
- 175 MHz
- 12.5 VOLTS
- EFFICIENCY 70%
- COMMON EMITTER
- $P_{OUT}$ = 40 W MIN. WITH 4.5 dB GAIN



**.380 4LFL (M113)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1018-06 | SD1018-06 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

### DESCRIPTION

The SD1018-06 is an epitaxial silicon NPN planar transistor designed primarily for VHF mobile and marine transmitters. This device utilizes ballasted emitter resistors and improved metallization systems to achieve extreme ruggedness under severe operating conditions.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 36 | V |
| $V_{CER}$ | Collector-Emitter Voltage | 18 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 36 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 6.0 | A |
| $P_{DISS}$ | Power Dissipation | 80 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 2.2 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case} = 25°C$)

STATIC

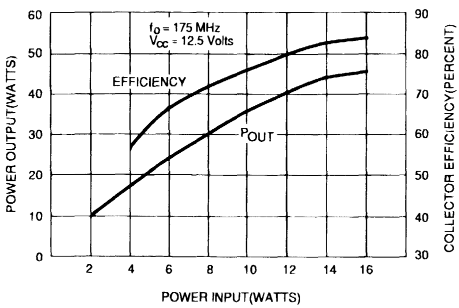
| Symbol | Test Conditions | | Value Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CES}$ | $I_C = 20mA$ | $V_{BE} = 0mA$ | 36 | — | — | V |
| $BV_{CEO}$ | $I_C = 100mA$ | | 18 | — | — | V |
| $BV_{EBO}$ | $I_E = 10mA$ | $I_C = 0mA$ | 4.0 | — | — | V |
| $I_{CBO}$ | $V_{CB} = 15V$ | $I_E = 0mA$ | — | — | 2.5 | mA |
| $h_{FE}$ | $V_{CE} = 5V$ | $I_C = 1A$ | 5 | — | — | — |

DYNAMIC

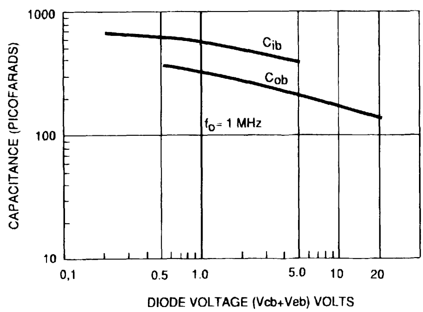
| Symbol | Test Conditions | | | Value Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 175 MHz | $P_{IN} = 14$ W | $V_{CC} = 12.5$ V | 40 | — | — | W |
| $\eta_C$ | f = 175 MHz | $P_{IN} = 14$ W | $V_{CC} = 12.5$ V | 70 | — | — | % |
| $G_P$ | f = 175 MHz | $P_{IN} = 14$ W | $V_{CC} = 12.5$ V | 4.5 | — | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB} = 15$ V | | — | — | 200 | pF |

## TYPICAL PERFORMANCE

### POWER OUTPUT vs POWER INPUT

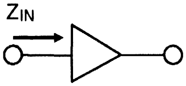



### CAPACITANCE vs VOLTAGE

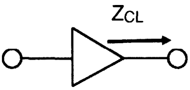


## IMPEDANCE DATA

**TYPICAL INPUT IMPEDANCE**

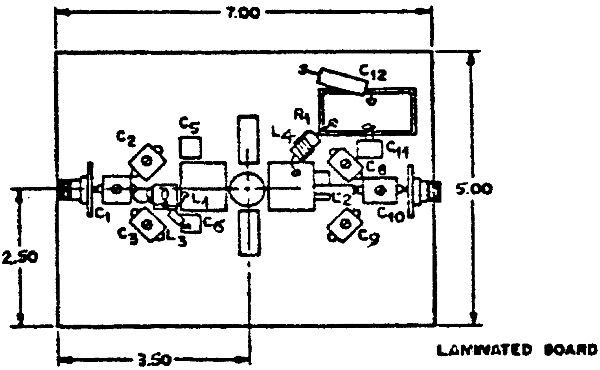



**TYPICAL COLLECTOR LOAD IMPEDANCE**

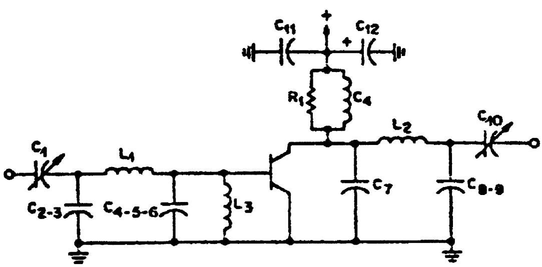



| PIN | POUT | ZIN (Ω) | ZCL (Ω) |
|---|---|---|---|
| 4 W | 21.7 W | 0.8 – j 1.1 | 2.2 – j 0.3 |
| 8 W | 37.1 W | 0.8 – j 1.3 | 1.7 – j 0.5 |
| 12 W | 46.5 W | 0.8 – j 1.6 | 1.6 – j 0.3 |

## TEST CIRCUIT

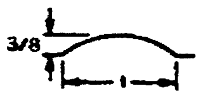



1. Material: Epoxy Glass Board with Copper Lands for Base and Collector Contacts
2. Clamp: DE-STA-CO No. 205S



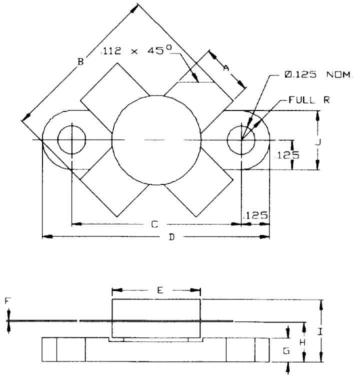

| | | | |
|---|---|---|---|
| C1 | : ARCO 462 | L1 | : 1 1/2 Turns #14 AWG, 1/4" I.D. x 1/2" Long |
| C2,C3,C4 | : ARCO 403 | L2* | : 1/8" Wide Brass Strap x 1 1/2" Long |
| C4,C5,C6 | : Unelco 100pF | L3 | : Ferrite Bead 48 |
| C7 | : Unelco 200pF | L4 | : 4 Turns, #16 AWG, 3/4" Long Wound on R1 |
| C8,C9,C10 | : ARCO 404 | R1 | : 510Ω |
| C11 | : Unelco 500pF | | |
| C12 | : 33µF 15V | | |

L2*



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0113

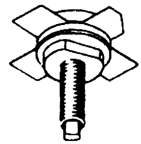



| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .220/5,59 | .230/5,84 |
| B | .785/19,94 | |
| C | .720/18,29 | .730/18,54 |
| D | .970/24,64 | .980/24,89 |
| E | | 385/9,78 |
| F | .004/0,10 | .006/0,15 |
| G | .085/2,16 | .105/2,67 |
| H | .160/4,06 | 180/4,57 |
| I | | .280/7,11 |
| J | .240/6,10 | 255/6,48 |

# SD1019

## RF & MICROWAVE TRANSISTORS
## VHF APPLICATIONS

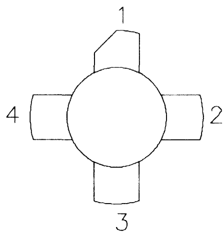
- 136 MHz
- 13.5 VOLTS
- COMMON EMITTER
- $P_{OUT}$ = 30 W MIN. WITH 4.5 dB GAIN



**.500 4L STUD (M130)**
epoxy sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| SD1019 | SD1019 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

### DESCRIPTION

The SD1019 is a 28 V Class C epitaxial silicon NPN planar transistor designed primarily for VHF communications. This device utilizes nichrome aluminum metallization to achieve infinite VSWR at rated operating conditions.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 65 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 35 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 9.0 | A |
| $P_{DISS}$ | Power Dissipation | 117 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 1.7 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case} = 25°C$)

STATIC

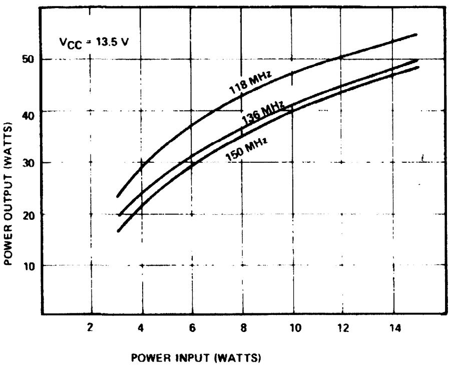
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C = 20mA$ | $I_E = 0mA$ | 65 | — | — | V |
| $BV_{CEO}$ | $I_C = 200mA$ | $I_B = 0mA$ | 35 | — | — | V |
| $BV_{EBO}$ | $I_E = 10mA$ | $I_C = 0mA$ | 4.0 | — | — | V |
| $I_{CBO}$ | $V_{CB} = 30V$ | $I_E = 0mA$ | — | 1.5 | — | mA |
| $h_{FE}$ | $V_{CE} = 5V$ | $I_C = 500mA$ | 5 | — | — | — |

DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 150 MHz | $P_{IN} = 10.6$ W | $V_{CC} = 13.5$ V | 30 | — | — | W |
| $G_P$ | f = 150 MHz | $P_{IN} = 10.6$ W | $V_{CC} = 13.5$ V | 4.5 | — | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB} = 30$ V | | — | — | 150 | pF |

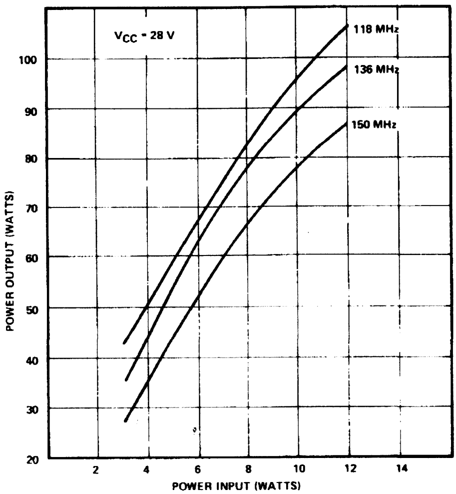
## TYPICAL PERFORMANCE

### POWER OUTPUT vs POWER INPUT (13.5V)



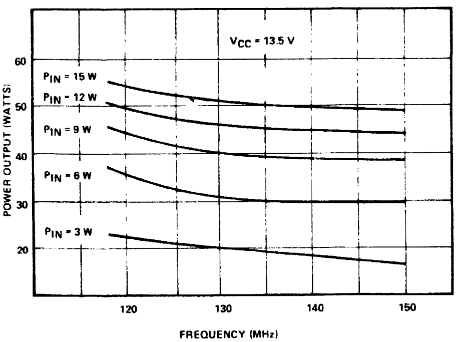

POWER OUTPUT VS. POWER INPUT

### POWER OUTPUT vs POWER INPUT (28V)



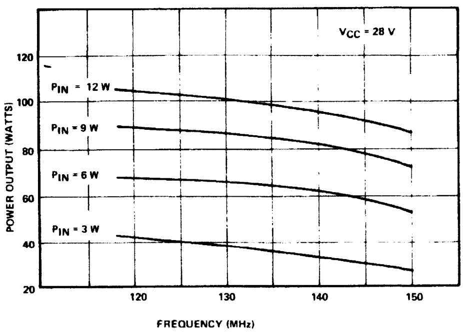

POWER OUTPUT VS. POWER INPUT

### POWER OUTPUT vs FREQUENCY (13.5V)




POWER OUTPUT VS. FREQUENCY

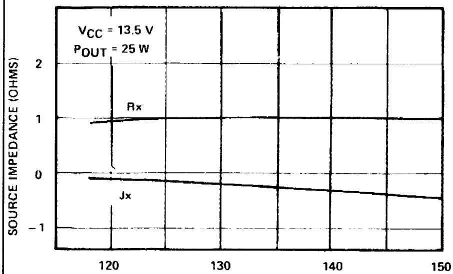
### POWER OUTPUT vs FREQUENCY (28V)




POWER OUTPUT VS. FREQUENCY

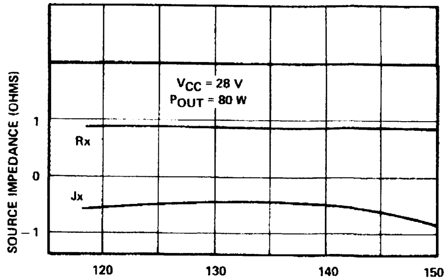
## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE (13.5 V)



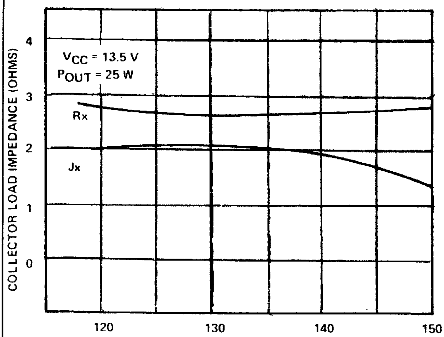

SERIES SOURCE IMPEDANCE VS. FREQUENCY

### TYPICAL INPUT IMPEDANCE (28 V)



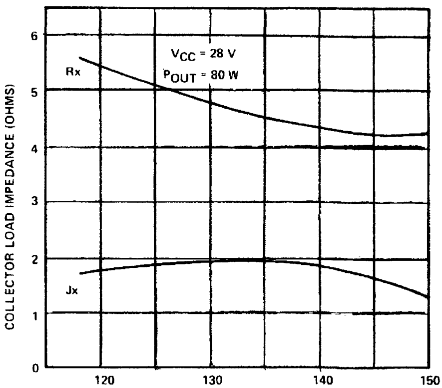

SERIES SOURCE IMPEDANCE VS. FREQUENCY

### TYPICAL COLLECTOR LOAD IMPEDANCE (13.5 V)



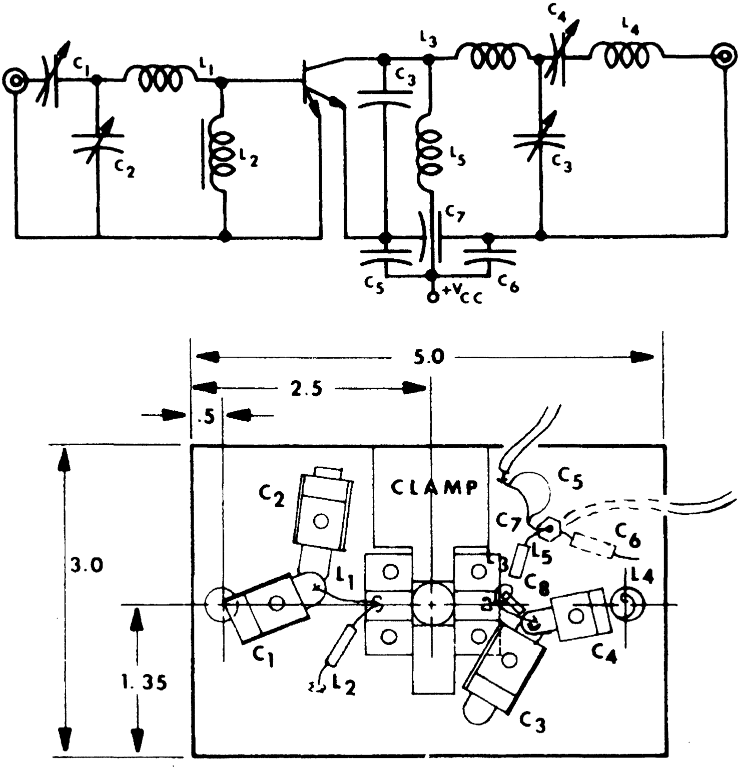

SERIES COLLECTOR LOAD IMPEDANCE VS. FREQUENCY

### TYPICAL COLLECTOR LOAD IMPEDANCE (28 V)




SERIES COLLECTOR LOAD IMPEDANCE VS. FREQUENCY

## TEST CIRCUIT

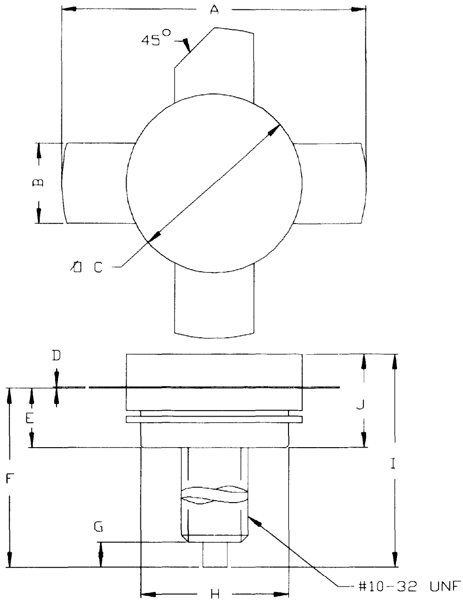



| | | | |
|---|---|---|---|
| C1 | : ARCO 462 | L1 | : #14 AWG. Wire, .3" Long |
| C2,C3,C4 | : ARCO 463 | L2 | : 12mH Choke |
| C5 | : .02μF Erie | L3 | : 1 Turn, #20 AWG. Wire, .3" I.D., .25" Long |
| C6 | : 15μF Semcor | L4 | : 1 Turn, #16 AWG. Wire, .23" I.D., .1" Long |
| C7 | : AB 220pF Feedthru | L5 | : .22mH Deci-Ductor |
| C8 | : 150pF Unelco | | |

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0130

| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | 1.010/25,65 | 1.050/26,67 |
| B | .220/5,59 | .230/5,84 |
| C | .495/12,57 | .505/12,83 |
| D | .003/0,08 | .007/0,18 |
| E | .160/4,06 | .180/4,57 |
| F | .622/15,80 | |
| G | .100/2,54 | .130/3,31 |
| H | .415/10,54 | .425/10,80 |
| I | .720/18,29 | |
| J | .250/6,35 | .290/7,37 |

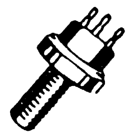


SGS-THOMSON
MICROELECTRONICS

# SD1050 (2N3375)

## RF & MICROWAVE TRANSISTORS
## VHF-UHF APPLICATIONS

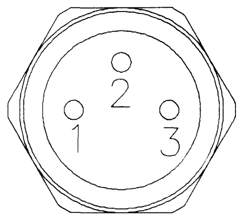
- 130 - 400 MHz
- 28 VOLTS
- HIGH POWER GAIN
- HIGH EFFICIENCY
- COMMON EMITTER
- $P_{OUT}$ = 3 W MIN. @ 400 MHz



**TO 60 (M137)**

| ORDER CODE | BRANDING |
|---|---|
| SD1050 | 2N3375 |

**PIN CONNECTION**




1. Emitter
2. Base
3. Collector

### DESCRIPTION

This line of silicon epitaxial NPN planar high frequency transistor employs a multi emitter electrode design. This feature together with a heavily diffused base matrix located between the individual emitters results in high RF current handling capability, high power gain, low base resistance and low output capacitance. These transistors are intended for Class A, B, or C amplifier, oscillator or frequency multiplier circuits and are specifically designed for operation in the VHF-UHF region

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 65 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 40 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 1.5 | A |
| $P_{DISS}$ | Power Dissipation (+25°C) | 11.6 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 15.0 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

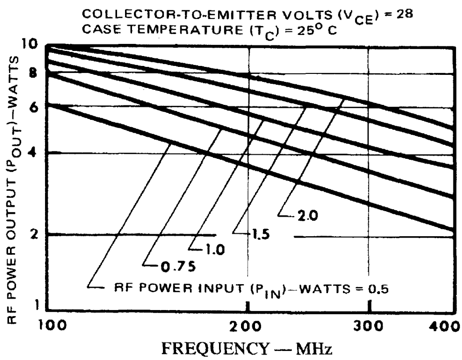
| Symbol | Test Conditions | Value | | | Unit |
|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 0.5mA | 65 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 0.1mA | 4 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 200mA | 40 | — | — | V |
| $I_{CEO}$ | $V_{CE}$ = 30V | — | — | 0.1 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V  $I_C$ = 250mA | 10 | — | — | — |

DYNAMIC

| Symbol | Test Conditions | Value | | | Unit |
|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 400 MHz  $P_{IN}$ = 1 W  $V_{CC}$ = 28 V | 3 | — | — | W |
| $\eta_C$ | f = 400 MHz  $P_{IN}$ = 1 W  $V_{CC}$ = 28 V | 40 | — | — | % |
| $G_P$ | f = 400 MHz  $P_{IN}$ = 1 W  $V_{CC}$ = 28 V | 4.8 | — | — | dB |
| $C_{OB}$ | f = 1 MHz  $V_{CB}$ = 30 V | — | — | 10 | pF |

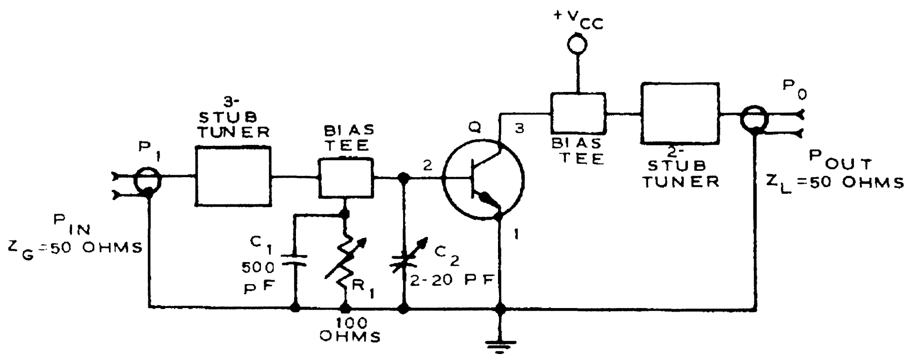
## TYPICAL PERFORMANCE

2N3375 POWER OUTPUT VS FREQUENCY



## TEST CIRCUIT

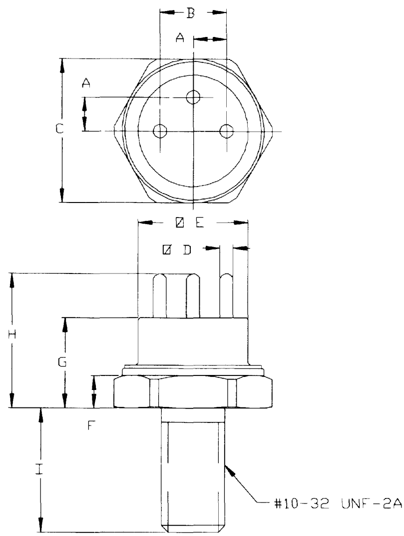
Frequency 400 MHz



## PACKAGE MECHANICAL DATA

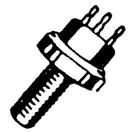
Ref.: Dwg. No.12-0137

| SGS-THOMSON MICROELECTRONICS | | | |
|---|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm | |
| A | .090/2,29 | .110/2,79 | |
| B | .185/4,70 | .215/5,46 | |
| C | .420/10,67 | .440/11,18 | |
| D | .030/0,76 | .046/1,17 | |
| E | .320/8,13 | .360/9,14 | |
| F | .090/2,29 | .135/3,43 | |
| G | .215/5,46 | .320/8,13 | |
| H | | .480/12,19 | |
| I | .420/10,67 | .455/11,56 | ← STANDARD STUD |
| I | .140/3,56 | .160/4,06 | ← SHORT STUD |



# RF & MICROWAVE TRANSISTORS
# VHF-UHF APPLICATIONS

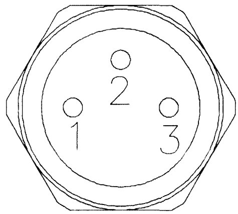
- 400 MHz
- 28 VOLTS
- EFFICIENCY 45% MIN.
- $P_{OUT}$ = 5.0 W MIN. WITH 4.7 dB GAIN



TO 60 (M137)

| ORDER CODE | BRANDING |
|---|---|
| SD1060 | 2N4440 |

**PIN CONNECTION**




1. Emitter
2. Base
3. Collector

## DESCRIPTION

This silicon epitaxial NPN planar high frequency transistor employs a multi emitter electrode design. This feature together with a heavily diffused base matrix located between the individual emitters results in high RF current handling capability, high power gain, low base resistance and low output capacitance. These transistors are intended for Class A, B, or C amplifier, oscillator or frequency multiplier circuits and are specifically designed for operation in the VHF-UHF region

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 65 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 40 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 1.5 | A |
| $P_{DISS}$ | Power Dissipation | 11.6 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 15.1 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

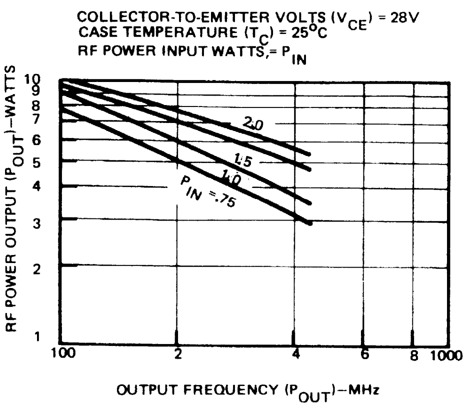
| Symbol | Test Conditions | Value | | | Unit |
|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 100µA | 65 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | 4.0 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 200mA | 40 | — | — | V |
| $I_{CEO}$ | $V_{CE}$ = 30V | — | — | 0.1 | mA |

DYNAMIC

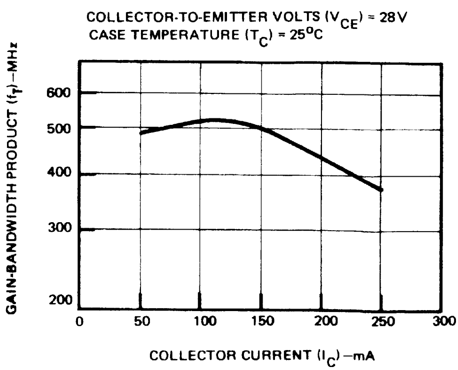
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 400 MHz | $P_{IN}$ = 1.7 W | $V_{CC}$ = 28 V | 5.0 | — | — | W |
| $\eta_C$ | f = 400 MHz | $P_{IN}$ = 1.7 W | $V_{CC}$ = 28 V | 45 | — | — | % |
| $G_P$ | f = 400 MHz | $P_{IN}$ = 1.7 W | $V_{CC}$ = 28 V | 4.7 | — | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 30 V | | — | — | 10.0 | pF |

## TYPICAL PERFORMANCE

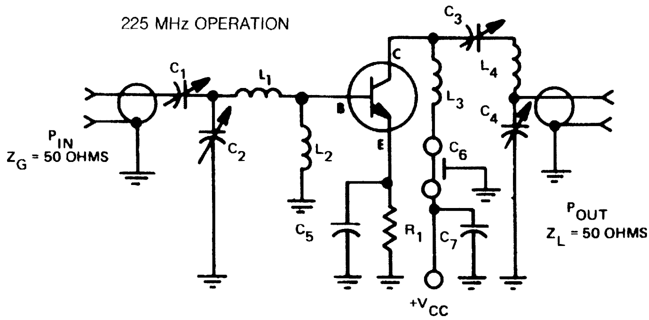
### POWER OUTPUT vs FREQUENCY

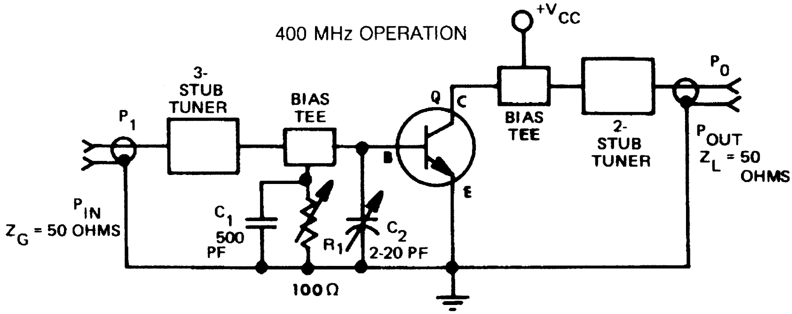



### POWER GAIN vs COLLECTOR CURRENT



## TEST CIRCUIT

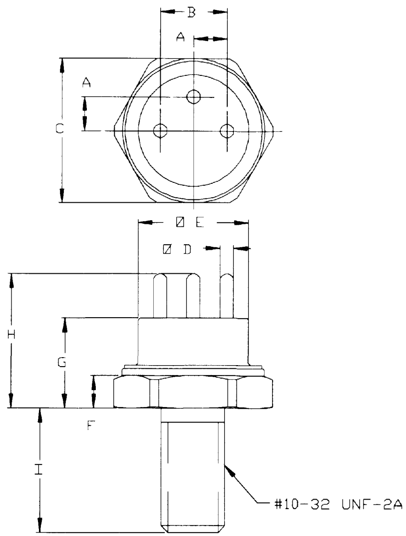


## PACKAGE MECHANICAL DATA

Ref.: Dwg. No. 12-0137

| SGS-THOMSON MICROELECTRONICS | | | |
|---|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm | |
| A | .090/2,29 | .110/2,79 | |
| B | .185/4,70 | .215/5,46 | |
| C | .420/10,67 | .440/11,18 | |
| D | .030/0,76 | .046/1,17 | |
| E | .320/8,13 | .360/9,14 | |
| F | .090/2,29 | .135/3,43 | |
| G | .215/5,46 | .320/8,13 | |
| H | | .480/12,19 | |
| I | .420/10,67 | .455/11,56 | ←STANDARD STUD |
| I | .140/3,56 | .160/4,06 | ←SHORT STUD |

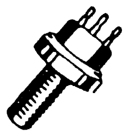


SGS-THOMSON MICROELECTRONICS

# SD1070 (2N3632)

## RF & MICROWAVE TRANSISTORS VHF-UHF APPLICATIONS

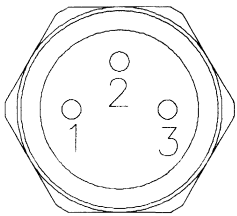
- 130 - 400 MHz
- 28 VOLTS
- HIGH POWER GAIN
- HIGH EFFICIENCY
- COMMON EMITTER
- $P_{OUT}$ = 13.5 W MIN. @ 175 MHz



**TO 60 (M137)**

| **ORDER CODE** | **BRANDING** |
|---|---|
| SD1070 | 2N3632 |

**PIN CONNECTION**




1. Emitter
2. Base
3. Collector

### DESCRIPTION

This silicon epitaxial NPN planar high frequency transistor employs a multi emitter electrode design. This feature together with a heavily diffused base matrix located between the individual emitters results in high RF current handling capability, high power gain, low base resistance and low output capacitance. These transistors are intended for Class A, B, or C amplifier, oscillator or frequency multiplier circuits and are specifically designed for operation in the VHF-UHF region

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 65 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 40 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 3.0 | A |
| $P_{DISS}$ | Power Dissipation | 23.0 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 7.6 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

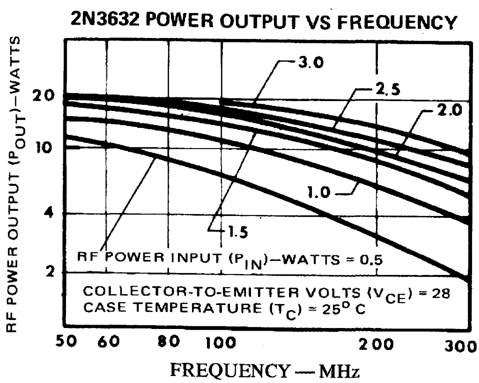
| Symbol | Test Conditions | | Value | | Unit |
|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 0.5mA | 65 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 0.25mA | 4 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 200mA | 40 | — | — | V |
| $I_{CEO}$ | $V_{CE}$ = 30V | — | — | 0.25 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V    $I_C$ = 1A | 5 | — | — | — |

DYNAMIC

| Symbol | Test Conditions | | Value | | Unit |
|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 175 MHz   $P_{IN}$ = 3.5 V   $V_{CC}$ = 28 V | 13.5 | — | — | W |
| $\eta_C$ | f = 175 MHz   $P_{IN}$ = 3.5 V   $V_{CC}$ = 28 V | 70 | — | — | % |
| $G_P$ | f = 175 MHz   $P_{IN}$ = 3.5 V   $V_{CC}$ = 28 V | 5.8 | — | — | dB |
| $C_{OB}$ | f = 1 MHz   $V_{CB}$ = 30 V | — | — | 20 | pF |

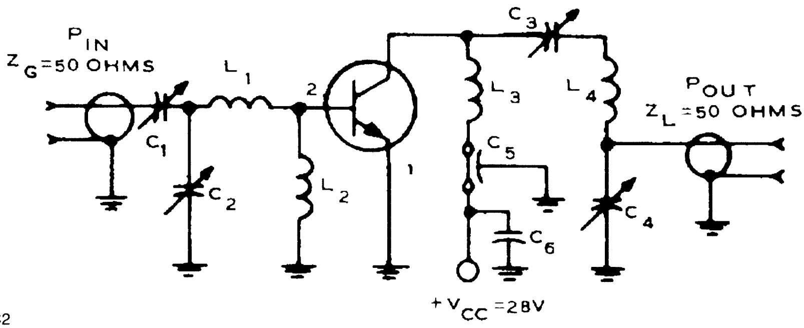
## TYPICAL PERFORMANCE

### POWER OUTPUT vs FREQUENCY



## TEST CIRCUIT

Frequency 175MHz

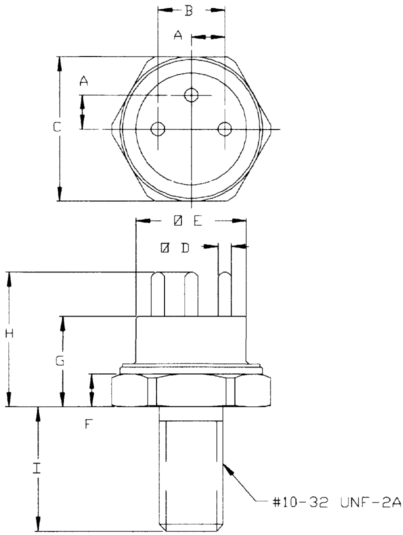



| | | |
|---|---|---|
| C1, C2<br>C3, C4 | : | 7 - 100pF |
| C5 | : | 100pF |
| C6 | : | 0.01µF, Disc Ceramic |
| L1 | : | 1.5 Turns #16 Wire, 3/16" I.D., 5/16" Long |
| L2 | : | Ferrite Choke, Z = 450 |
| L3 | : | 1 Turn #16 Wire, 1/4" I.D., 3/8" Long |
| L4 | : | 2 Turns #16 Wire, 1/4" I.D., 1/4" Long |

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0137

| SGS-THOMSON MICROELECTRONICS | | | |
|---|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm | |
| A | .090/2,29 | .110/2,79 | |
| B | .185/4,70 | .215/5,46 | |
| C | .420/10,67 | .440/11,18 | |
| D | .030/0,76 | .046/1,17 | |
| E | .320/8,13 | .360/9,14 | |
| F | .090/2,29 | .135/3,43 | |
| G | .215/5,46 | .320/8,13 | |
| H | | .480/12,19 | |
| I | .420/10,67 | .455/11,56 | ←STANDARD STUD |
| I | .140/3,56 | .160/4,06 | ←SHORT STUD |

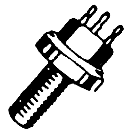


SGS-THOMSON
MICROELECTRONICS

# SD1075 (2N3733)

## RF & MICROWAVE TRANSISTORS
## VHF-UHF APPLICATIONS

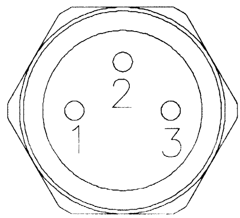
- 130 - 400 MHz
- 28 VOLTS
- HIGH POWER GAIN
- HIGH EFFICIENCY
- COMMON EMITTER
- $P_{OUT}$ = 10 W MIN. @ 400 MHz



**TO 60 (M137)**

| **ORDER CODE** | **BRANDING** |
|---|---|
| SD1075 | 2N3733 |

**PIN CONNECTION**




1. Emitter
2. Base
3. Collector

### DESCRIPTION

This line of silicon epitaxial NPN planar high frequency transistor employs a multi emitter electrode design. This feature together with a heavily diffused base matrix located between the individual emitters results in high RF current handling capability, high power gain, low base resistance and low output capacitance. These transistors are intended for Class A, B, or C amplifier, oscillator or frequency multiplier circuits and are specifically designed for operation in the VHF-UHF region

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 65 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 40 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 3.0 | A |
| $P_{DISS}$ | Power Dissipation | 23.0 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 7.6 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

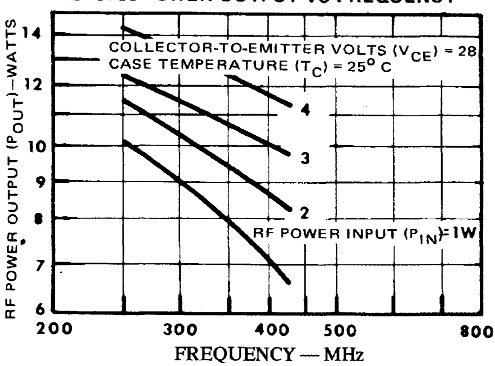
| Symbol | Test Conditions | Value | | | Unit |
|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 0.5mA | 65 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 0.25mA | 4 | — | — | V |
| $BV_{CEO}$ | IC = 200mA | 40 | — | — | V |
| $I_{CEO}$ | $V_{CE}$ = 30V | — | — | 0.25 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V   $I_C$ = 250mA | 10 | — | 150 | — |

DYNAMIC

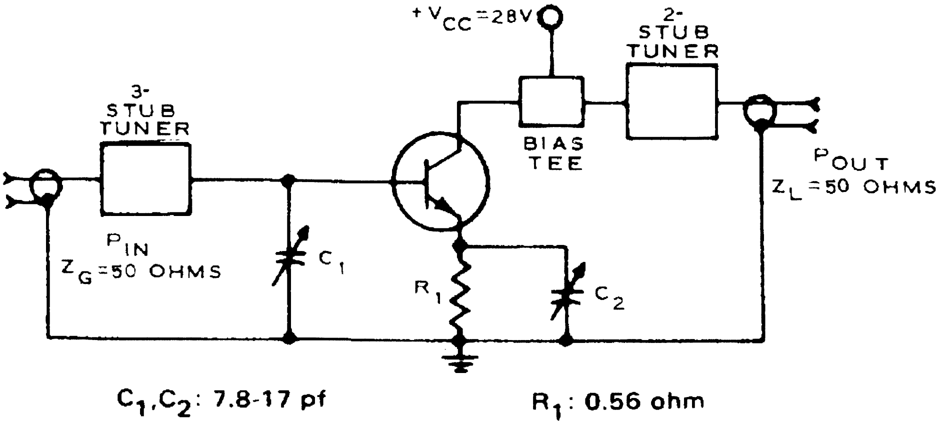
| Symbol | Test Conditions | Value | | | Unit |
|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 400 MHz   $P_{IN}$ = 4 V   $V_{CC}$ = 28 V | 10 | — | — | W |
| $\eta_C$ | f = 400 MHz   $P_{IN}$ = 4 V   $V_{CC}$ = 28 V | 45 | — | — | % |
| $G_P$ | f = 400 MHz   $P_{IN}$ = 4 V   $V_{CC}$ = 28 V | 4.0 | — | — | dB |
| $C_{OB}$ | f = 1 MHz   $V_{CB}$ = 30 V | — | — | 20 | pF |

## TYPICAL PERFORMANCE

2N3733 POWER OUTPUT VS FREQUENCY



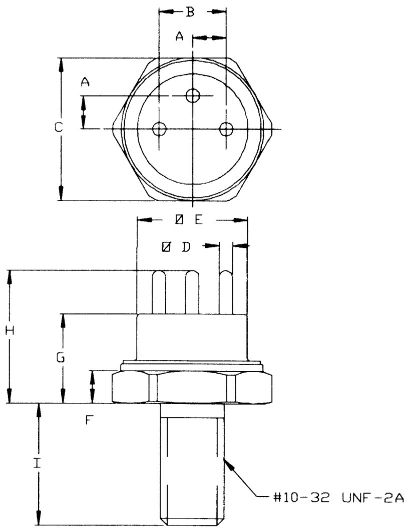
## TEST CIRCUIT




## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0137

| SGS-THOMSON MICROELECTRONICS | | | |
|---|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm | |
| A | .090/2,29 | .110/2,79 | |
| B | .185/4,70 | .215/5,46 | |
| C | .420/10,67 | .440/11,18 | |
| D | .030/0,76 | .046/1,17 | |
| E | .320/8,13 | .360/9,14 | |
| F | .090/2,29 | .135/3,43 | |
| G | .215/5,46 | .320/8,13 | |
| H | | .480/12,19 | |
| I | .420/10,67 | .455/11,56 | ← STANDARD STUD |
| I | .140/3,56 | .160/4,06 | ← SHORT STUD |

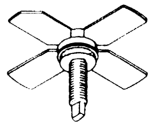


SGS-THOMSON
MICROELECTRONICS

# SD1134

## RF & MICROWAVE TRANSISTORS
## UHF MOBILE APPLICATIONS

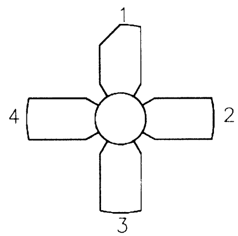
- 450 - 512 MHz
- 12.5 VOLTS
- EFFICIENCY 55%
- COMMON EMITTER
- $P_{OUT}$ = 2.0 W MIN. WITH 10.0 dB GAIN



**.280 4L STUD (M122)**
epoxy sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| SD1134 | SD1134 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

## DESCRIPTION

The SD1134 is a 12.5 V Class C epitaxial silicon NPN planar transistor designed primarily for UHF communications. This device utilizes improved metallization to achieve infinite VSWR at rated operating conditions.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 36 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 16 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 36 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 0.75 | A |
| $P_{DISS}$ | Power Dissipation | 5 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 35 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

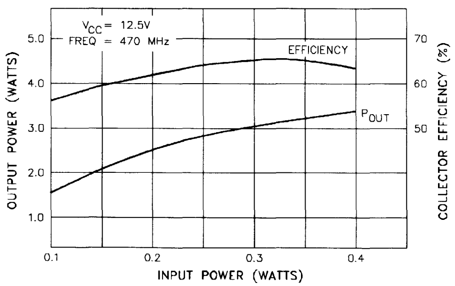
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CES}$ | $I_C$ = 5mA | $V_{BE}$ = 0V | 36 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 25mA | $I_B$ = 0mA | 16 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 15V | $I_E$ = 0mA | — | — | 1 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 100mA | 20 | — | — | — |

### DYNAMIC

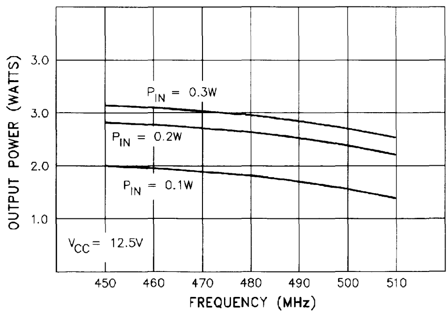
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 470 MHz | $P_{IN}$ = 0.20 W | $V_{CC}$ = 12.5 V | 2.0 | — | — | W |
| $G_P$ | f = 470 MHz | $P_{IN}$ = 0.20 W | $V_{CC}$ = 12.5 V | 10.0 | — | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 12 V | | — | 6 | — | pF |

## TYPICAL PERFORMANCE

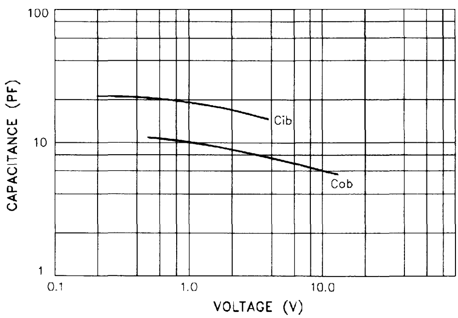
### POWER OUTPUT & COLLECTOR EFFICIENCY vs POWER INPUT




### POWER OUTPUT vs FREQUENCY

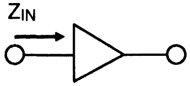



### CAPACITANCE vs VOLTAGE

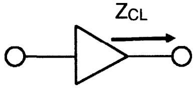


## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE

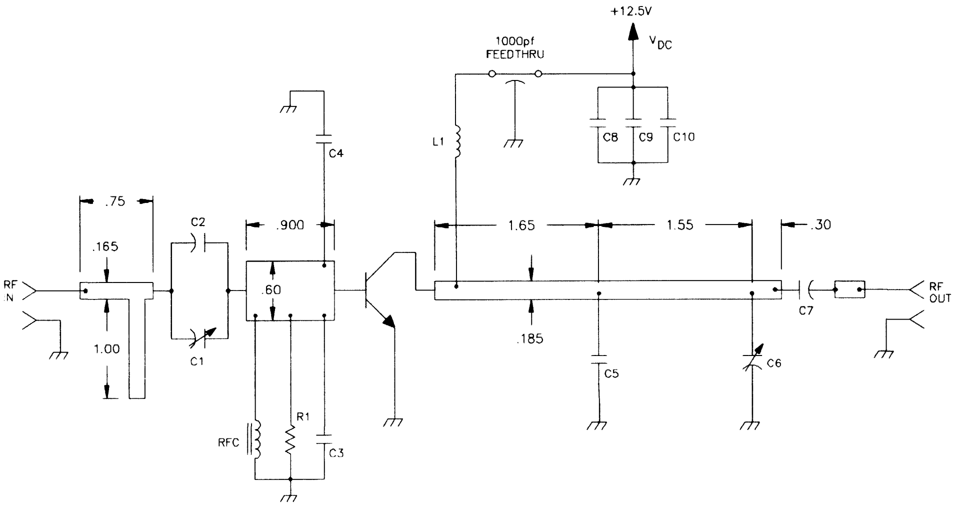



### TYPICAL COLLECTOR LOAD IMPEDANCE




| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 450 MHz | 2.7 + j 0.9 | 11.5 – j 15.0 |
| 470 MHz | 2.6 + j 1.3 | 12.2 – j 13.5 |
| 512 MHz | 2.2 + j 1.7 | 12.7 – j 13.0 |

## TEST CIRCUIT



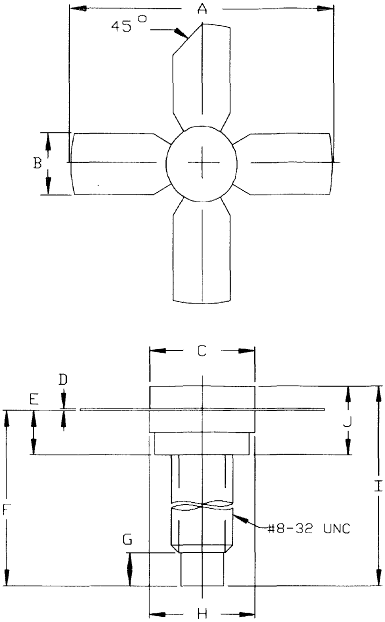

C1 : 0.8-10pF, Voltronics AJ10
C2, : ATC 100-B, 7.5pF, Chip Capacitor
C3, C4 : ATC 100-B, 24pF, Chip Capacitor
C5 : ATC 100-B, 5.6pF, Chip Capacitor
C6 : 0.6-6pF, Johanson
C7 : ATC 100-B, 200pF, Chip Capacitor
C8 : 5.6μF Electrolytic
C9 : 0.1μF, Disc-Ceramic
C10 : 0.01μF, Disc-Ceramic
L1 : 2 Turns #22 Enameled 0.1" I.D.
R1 : 360Ω, 1/4" Wide
RFC : 2 Turns in Ferroxcube VK 200/19-4B

Board Material: 3M-K-6098 1/16" Thick

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0122

| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | 1.010/25,65 | 1.055/26,80 |
| B | .220/5,59 | .230/5,84 |
| C | .270/6,86 | .285/7,24 |
| D | .003/0,08 | .007/0,18 |
| E | .117/2,97 | .137/3,48 |
| F | .572/14,53 | |
| G | .130/3,30 | |
| H | .275/6,99 | .285/7,24 |
| I | .640/16,26 | |
| J | .175/4,45 | .217/5,51 |

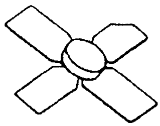


SGS-THOMSON
MICROELECTRONICS

# SD1134-05

## RF & MICROWAVE TRANSISTORS
## VHF PORTABLE/MOBILE APPLICATIONS

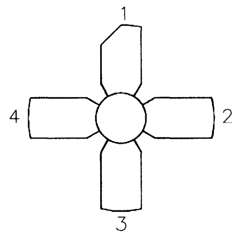
- 175 MHz
- 7.5 VOLTS
- COMMON EMITTER
- $P_{OUT}$ = 0.5 W MIN. WITH 7.0 dB GAIN



**.280 4LSL (M123)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1134-05 | 1134-5 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

## DESCRIPTION

The SD1134-05 is a 7.5 V epitaxial silicon NPN planar transistor designed primarily for VHF communications. It with stands very high VSWR under rated operating conditions.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 36 | V |
| $V_{CER}$ | Collector-Emitter Voltage | 16 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 36 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 0.75 | A |
| $P_{DISS}$ | Power Dissipation | 5.0 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 35 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

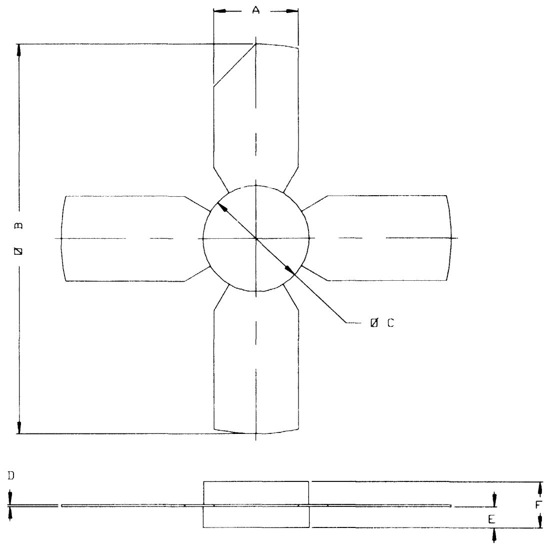
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CES}$ | $I_C$ = 5mA | $V_{BE}$ = 0V | 36 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 25mA | $I_B$ = 0mA | 16 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $I_{CER}$ | $V_{CE}$ = 10V | $R_{BE}$ = 80Ω | — | — | 0.5 | mA |
| $I_{CBO}$ | $V_{CB}$ = 15V | $I_E$ = 0mA | — | — | 1.0 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 100mA | 40 | — | 200 | — |

DYNAMIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 150 MHz | $V_{CC}$ = 7.5 V | 1.4 | — | — | W |
| $G_P$ | f = 150 MHz | $V_{CC}$ = 7.5 V | 11.5 | — | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 7.5 V | — | 6.0 | — | pF |

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0123



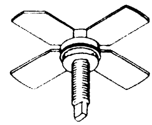

| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | 220/5,59 | 230/5,84 |
| B | ------ | 1.055/26,8 |
| C | 275/6,99 | 285/7,24 |
| D | .004/0,10 | .006/0,15 |
| E | 050/1,27 | .060/1,52 |
| F | .118/3,00 | .130/3,30 |
| | | |

SGS-THOMSON MICROELECTRONICS

# SD1135

## RF & MICROWAVE TRANSISTORS UHF MOBILE APPLICATIONS

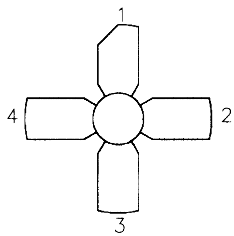
- 470 MHz
- 12.5 VOLTS
- EFFICIENCY 60%
- COMMON EMITTER
- $P_{OUT}$ = 5.0 W MIN. WITH 8.5 dB GAIN



**.280 2L STUD (M122)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1135 | SD1135 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

## DESCRIPTION

The SD1135 is a 12.5 V Class C epitaxial silicon NPN planar transistor designed primarily for UHF communications. This device utilizes improved metallization to achieve infinite VSWR at rated operating conditions.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 36 | V |
| $V_{CER}$ | Collector-Emitter Voltage | 18 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 36 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 2.0 | A |
| $P_{DISS}$ | Power Dissipation | 37 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 11.6 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

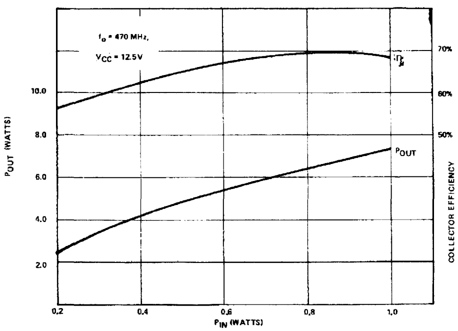
| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CES}$ | $I_C$ = 10mA | $V_{BE}$ = 0mA | 36 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 50mA | $I_B$ = 0mA | 16 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 2mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 15V | $I_E$ = 0mA | — | — | 1 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 200mA | 20 | — | — | — |

### DYNAMIC

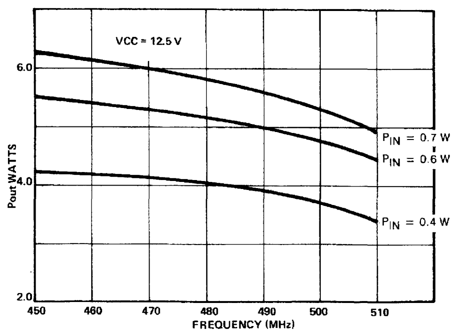
| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 470 MHz | $P_{IN}$ = 0.70 W | $V_{CC}$ = 12.5 V | 5.0 | — | — | W |
| $G_P$ | f = 470 MHz | $P_{IN}$ = 0.70 W | $V_{CC}$ = 12.5 V | 8.5 | — | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 12 V | | — | 19 | — | pF |

## TYPICAL PERFORMANCE

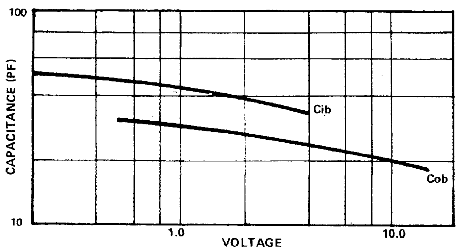
### POWER OUTPUT vs POWER INPUT




### POWER OUTPUT vs FREQUENCY

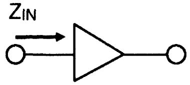



### CAPACITANCE vs VOLTAGE

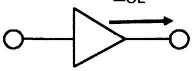


## IMPEDANCE DATA

**TYPICAL INPUT IMPEDANCE**

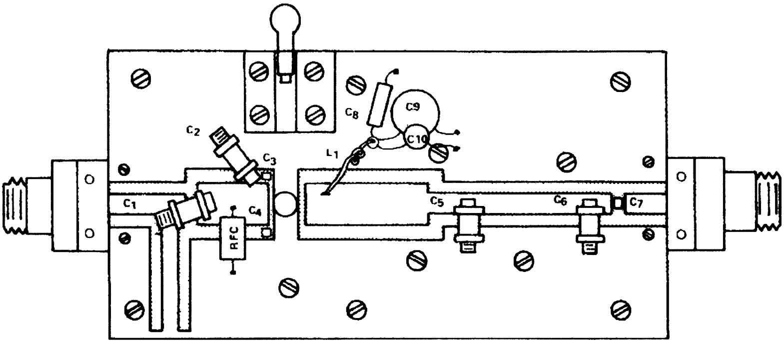


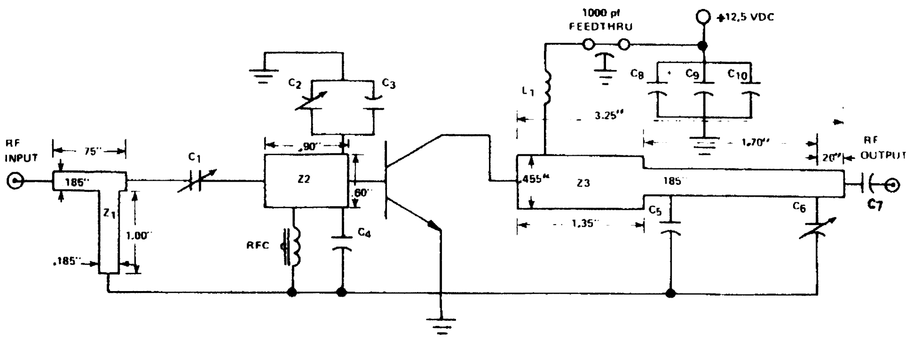

**TYPICAL COLLECTOR LOAD IMPEDANCE**




| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 450 MHz | 1.4 + j 2.0 | 10.7 − j 6.9 |
| 470 MHz | 1.4 + j 2.9 | 11.4 − j 5.8 |
| 512 MHz | 1.5 + j 3.4 | 11.9 − j 3.2 |

## TEST CIRCUIT



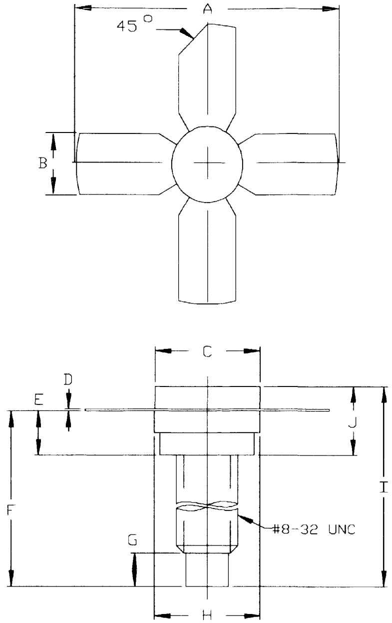




| | | |
|---|---|---|
| C1,C2, C5,C6 | : | 0.8-10pF, Voltronics AJ10 |
| C3,C4 | : | ATC 100-B, 16pF, Chip Capacitor |
| C7 | : | ATC 100-B, 620pF, Chip Capacitor |
| C8 | : | 5.6μF, 35V, Electrolytic |
| C9 | : | 0.1μF, Disc-Ceramic |
| C10 | : | 0.01μF, Disc-Ceramic |
| L1 | : | 2 Turns, #22 Enameled, 0.1" I.D. |
| RFC | : | 2 Turns in Ferroxcube VK 200/19-4B |

Board Material 3M-K-6098, 1/16" Thick

## PACKAGE MECHANICAL DATA

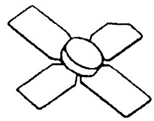
Ref.: Dwg. No.12-0122




| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | 1.010/25,65 | 1.055/26,80 |
| B | .220/5,59 | .230/5,84 |
| C | .270/6,86 | .285/7,24 |
| D | .003/0,08 | .007/0,18 |
| E | .117/2,97 | .137/3,48 |
| F | .572/14,53 | |
| G | .130/3,30 | |
| H | .275/6,99 | .285/7,24 |
| I | .640/16,26 | |
| J | .175/4,45 | .217/5,51 |

# RF & MICROWAVE TRANSISTORS
# VHF PORTABLE/MOBILE APPLICATIONS

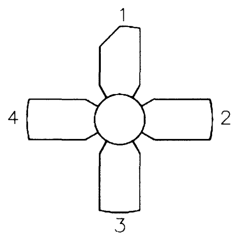
- 150 MHz
- 7.5 VOLTS
- COMMON EMITTER
- $P_{OUT}$ = 2.5 W MIN. WITH 11.0 dB GAIN



**.280 4LSL (M123)**
epoxy sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| SD1135-03 | 1135-3 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

## DESCRIPTION

The SD1135-03 is a 7.5 V Class C epitaxial silicon NPN planar transistor designed primarily for VHF communications. It withstands severe mismatch under operating conditions.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 36 | V |
| $V_{CER}$ | Collector-Emitter Voltage | 16 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 36 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 1.7 | A |
| $P_{DISS}$ | Power Dissipation | 15 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 11.6 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

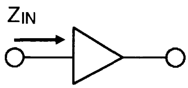
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CES}$ | $I_C$ = 10mA | $V_{BE}$ = 0V | 36 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 50mA | $I_B$ = 0mA | 16 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 2mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $I_{CER}$ | $V_{CE}$ = 10V | $R_{BE}$ = 50Ω | — | — | 0.5 | mA |
| $I_{CBO}$ | $V_{CB}$ = 15V | $I_E$ = 0mA | — | — | 1.0 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 200mA | 20 | — | — | — |

### DYNAMIC

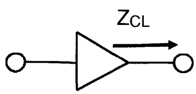
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 150 MHz | $V_{CC}$ = 7.5 V | 2.5 | — | — | W |
| $G_P$ | f = 150 MHz | $V_{CC}$ = 7.5 V | 11.0 | — | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 7.5 V | — | 19 | — | pF |

## IMPEDANCE DATA

**TYPICAL INPUT IMPEDANCE**




**TYPICAL COLLECTOR LOAD IMPEDANCE**



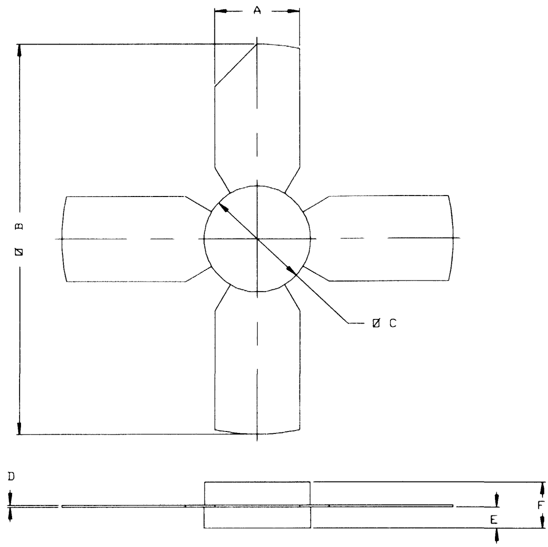

| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 150 MHz | 2.2 – j 0.4 | 7.9 + j 8.4 |
| 160 MHz | 1.9 – j 0.8 | 7.6 + j 8.2 |
| 170 MHz | 1.0 – j 1.0 | 6.0 + j 8.3 |

$P_{OUT}$ = 2.5W
$V_{CE}$ = 7.5V

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0123

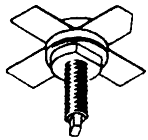
| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | 220/5,59 | 230/5,84 |
| B | ------ | 1.055/26,8 |
| C | 275/6,99 | 285/7,24 |
| D | .004/0,10 | .006/0,15 |
| E | .050/1,27 | .060/1,52 |
| F | .118/3,00 | .130/3,30 |
| | | |



# SD1143

## RF & MICROWAVE TRANSISTORS VHF MOBILE APPLICATIONS

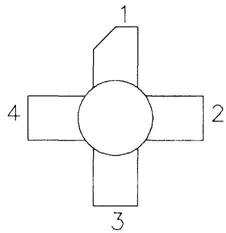
- 175 MHz
- 12.5 VOLTS
- COMMON EMITTER
- $P_{OUT}$ = 10 W MIN. WITH 10 dB GAIN



**.380 4L STUD (M135)**
epoxy sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| SD1143 | SD1143 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

## DESCRIPTION

The SD1143 is a 12.5 V Class C epitaxial silicon NPN planar transistor designed primarily for VHF communications. It withstands very high VSWR under operating conditions.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 36 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 18 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 36 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 2.0 | A |
| $P_{DISS}$ | Power Dissipation | 20 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 8.75 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case} = 25°C$)

STATIC

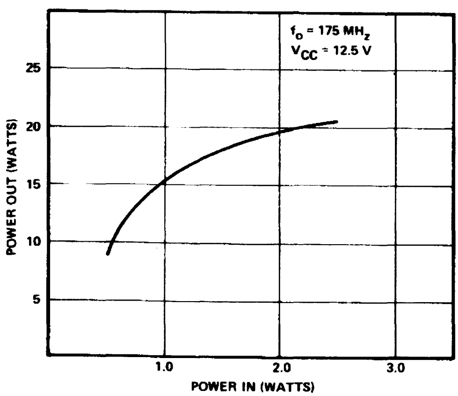
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CES}$ | $I_C = 50mA$ | $V_{BE} = 0V$ | 36 | — | — | V |
| $BV_{CEO}$ | $I_C = 15mA$ | $I_B = 0mA$ | 18 | — | — | V |
| $BV_{EBO}$ | $I_E = 2.5mA$ | $I_C = 0mA$ | 4.0 | — | — | V |
| $I_{CBO}$ | $V_{CB} = 15V$ | $I_E = 0mA$ | — | — | 1 | mA |
| $h_{FE}$ | $V_{CE} = 5V$ | $I_C = 250mA$ | 5 | — | 200 | — |

DYNAMIC

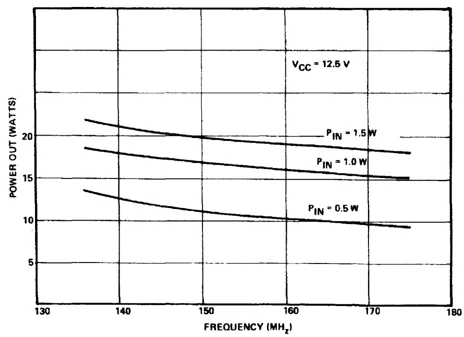
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 175 MHz | $P_{IN} = 1$ W | $V_{CC} = 12.5$ V | 10 | — | — | W |
| $G_P$ | f = 175 MHz | $P_{IN} = 1$ W | $V_{CC} = 12.5$ V | 10 | — | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB} = 15$ V | | — | — | 45 | pF |

## TYPICAL PERFORMANCE

### POWER OUTPUT vs POWER INPUT

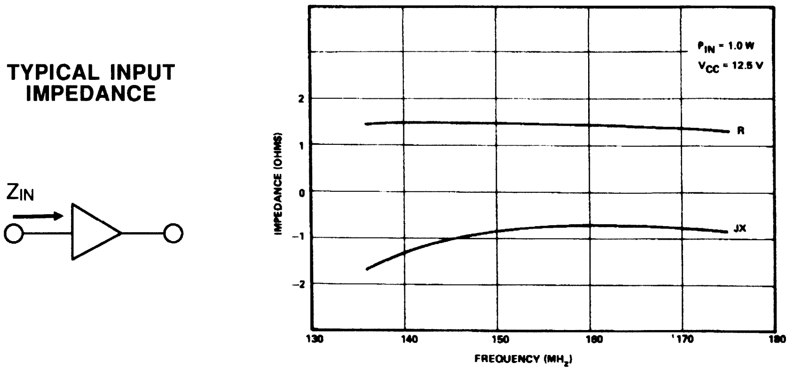



### POWER OUTPUT vs FREQUENCY

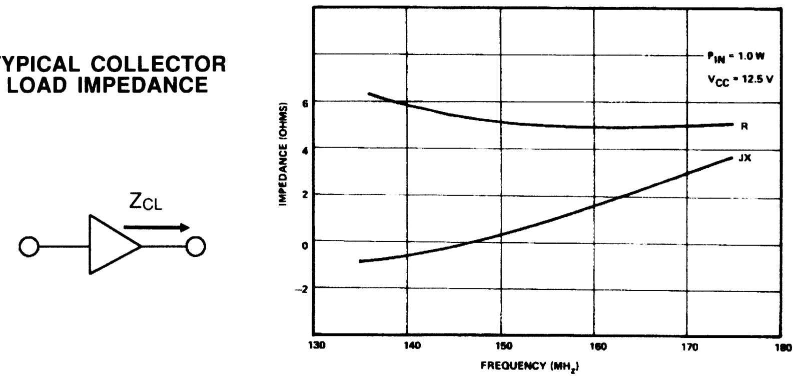


## IMPEDANCE DATA

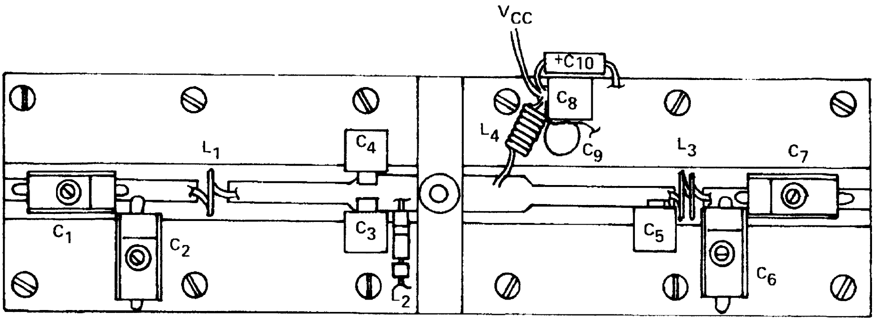
### TYPICAL INPUT IMPEDANCE

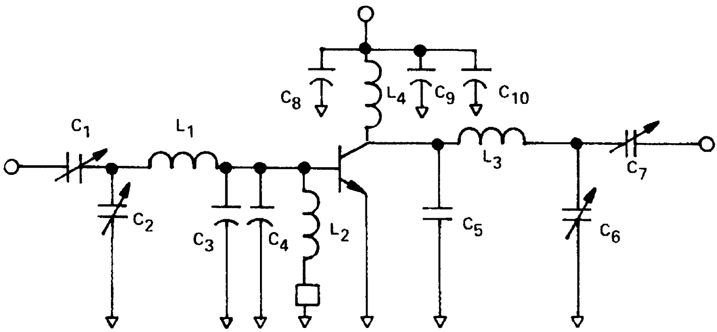



### TYPICAL COLLECTOR LOAD IMPEDANCE



## TEST CIRCUIT

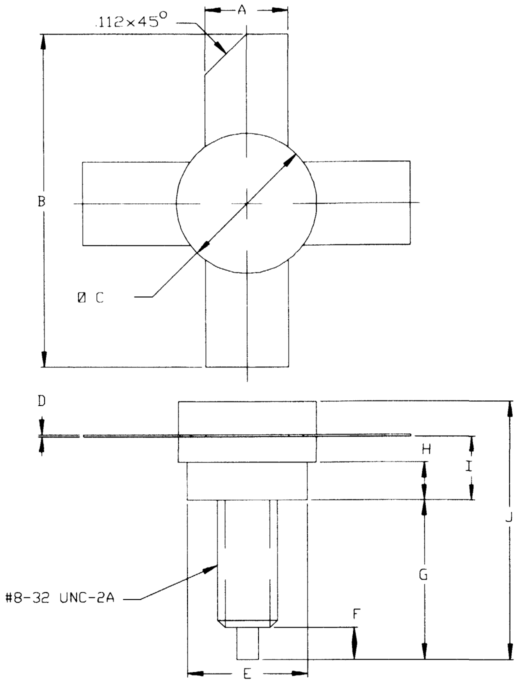



| | | |
|---|---|---|
| C1 | : | ARCO 423 |
| C2,C6 | : | ARCO 422 |
| C3 | : | 82pF, Unelco |
| C4 | : | 120 pF, Unelco |
| C5 | : | 56pF, Unelco |
| C7 | : | ARCO 425 |
| C8 | : | 1000pF, Unelco |
| C9 | : | 0.001µF Disc |
| C10 | : | 5.6µF Tantalum |
| L1 | : | 1 Turn, #16 AWG. 3/8" Diameter |
| L2 | : | 33µh Molded Choke |
| L3 | : | 2 Turns, #16 AWG 1/4" Diameter |
| L4 | : | 10 Turns, #22 AWG 1/8" Diameter Close Wound |

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0135

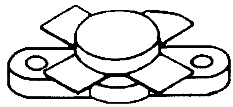



| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .220/5,59 | .230/5,84 |
| B | .980/24,89 | |
| C | .370/9,40 | .385/9,78 |
| D | .004/0,10 | .007/0,18 |
| E | .320/8,13 | .330/8,38 |
| F | .100/2,54 | .130/3,30 |
| G | .450/11,43 | .490/12,45 |
| H | .090/2,29 | .100/2.54 |
| I | .155/3,94 | .175/4,45 |
| J | | .750/19,05 |

# SD1143-01

## RF & MICROWAVE TRANSISTORS
## VHF MOBILE APPLICATIONS

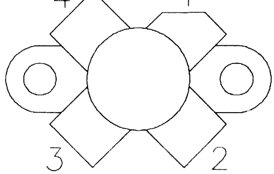
- 175 MHz
- 12.5 VOLTS
- COMMON EMITTER
- $P_{OUT}$ = 10 W MIN. WITH 10 dB GAIN



**.380 4LFL (M113)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1143-01 | SD1143-1 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

### DESCRIPTION

The SD1143-01 is a 12.5 V Class C epitaxial silicon NPN planar transistor designed primarily for VHF communications. It withstands very high VSWR under operating conditions.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 36 | V |
| $V_{CER}$ | Collector-Emitter Voltage | 18 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 36 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 2.0 | A |
| $P_{DISS}$ | Power Dissipation | 20 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | − 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 8.75 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

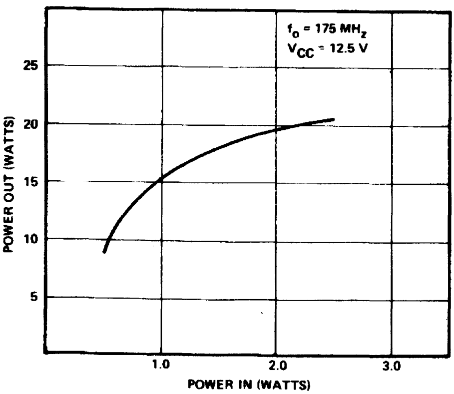
| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CES}$ | $I_C$ = 50mA | $V_{BE}$ = 0V | 36 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 15mA | $I_B$ = 0mA | 18 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 2.5mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 15V | $I_E$ = 0mA | — | — | 2 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 250mA | 5 | — | 200 | — |

### DYNAMIC

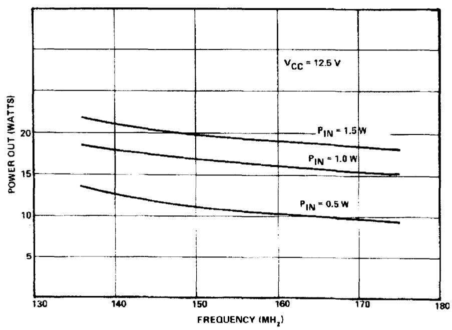
| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 175 MHz | $P_{IN}$ = 1 W | $V_{CC}$ = 12.5 V | 10 | — | — | W |
| $G_P$ | f = 175 MHz | $P_{IN}$ = 1 W | $V_{CC}$ = 12.5 V | 10 | — | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 15 V | | — | — | 45 | pF |

## TYPICAL PERFORMANCE

**POWER OUTPUT vs POWER INPUT**

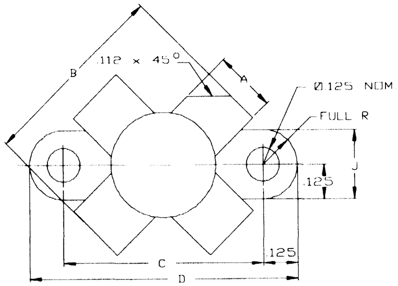


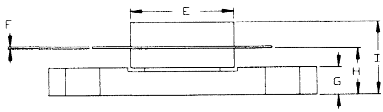

**POWER OUTPUT vs FREQUENCY**



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0113



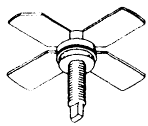




| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .220/5,59 | .230/5,84 |
| B | .785/19,94 | |
| C | .720/18,29 | .730/18,54 |
| D | .970/24,64 | .980/24,89 |
| E | | .385/9,78 |
| F | .004/0,10 | .006/0,15 |
| G | .085/2,16 | .105/2,67 |
| H | .160/4,06 | .180/4,57 |
| I | | .280/7,11 |
| J | .240/6,10 | .255/6,48 |

# SD1144 (2N5944)

## RF & MICROWAVE TRANSISTORS UHF MOBILE APPLICATIONS

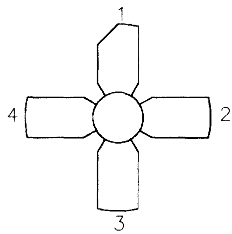
- 470 MHz
- 12.5 VOLTS
- COMMON EMITTER
- COLLECTOR EFFICIENCY 60%
- $P_{OUT}$ = 2 W MIN. WITH 9 dB GAIN



**.280 4L STUD (M122)**
epoxy sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| SD1144 | 2N5944 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

### DESCRIPTION

The SD1144 is a 12.5 V Class C epitaxial silicon NPN planar transistor designed primarily for UHF communications. This device utilizes imporoved metallization to achieve infinite VSWR at rated operating conditions.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 36 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 16 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 36 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 0.4 | A |
| $P_{DISS}$ | Power Dissipation | 5.0 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 35 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

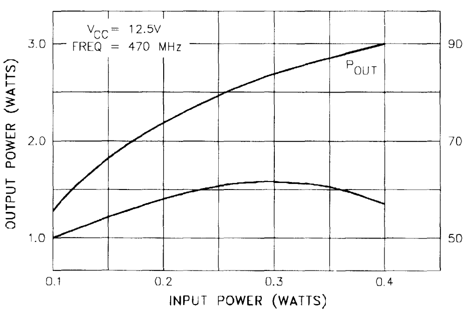
| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CES}$ | $I_C$ = 50mA | $V_{BE}$ = 0V | 36 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 50mA | $I_B$ = 0mA | 16 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 15V | $I_E$ = 0mA | — | — | 1 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 100mA | 20 | — | — | — |

DYNAMIC

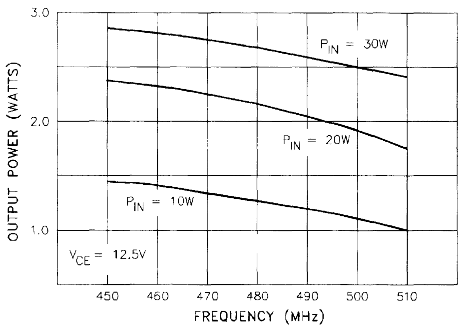
| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 470 MHz | $P_{IN}$ = 0.25 W | $V_{CE}$ = 12.5 V | 2 | — | — | W |
| $G_P$ | f = 470 MHz | $P_{IN}$ = 0.25 W | $V_{CE}$ = 12.5 V | 9 | — | — | dB |
| $\eta_C$ | f = 470 MHz | $P_{IN}$ = 0.25 W | $V_{CE}$ = 12.5 V | 60 | — | — | % |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 12.5 V | | — | — | 15 | pF |

## TYPICAL PERFORMANCE

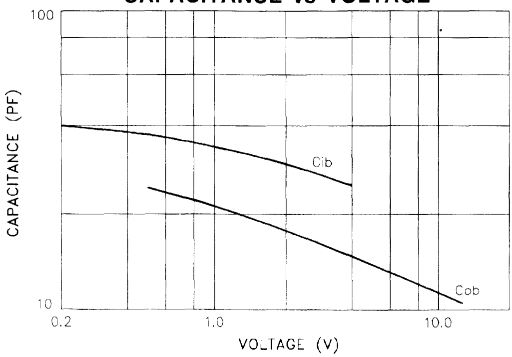
### POWER OUTPUT vs POWER INPUT




### POWER OUTPUT vs FREQUENCY

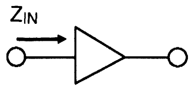



### CAPACITANCE vs VOLTAGE

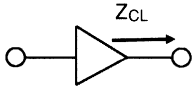


## IMPEDANCE DATA

**TYPICAL INPUT IMPEDANCE**

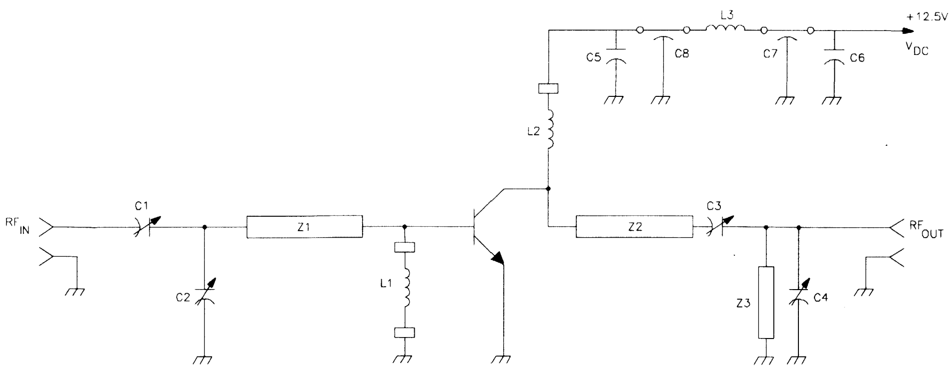



**TYPICAL COLLECTOR LOAD IMPEDANCE**




| FREQ. | $Z_{IN}$ ($\Omega$) | $Z_{OUT}$ ($\Omega$) |
|---|---|---|
| 470 MHz | 2.24 + j 6.5 | 13.0 − j 8.65 |

## TEST CIRCUIT




C1, C2
C3, C4 : 1.0 - 25pF, Arco 421
C5 : 1.0μF, 35V, Electrolytic
C6 : 4.7μF, 35V, Electrolytic
C7, C8 : 1000pF Feedthru

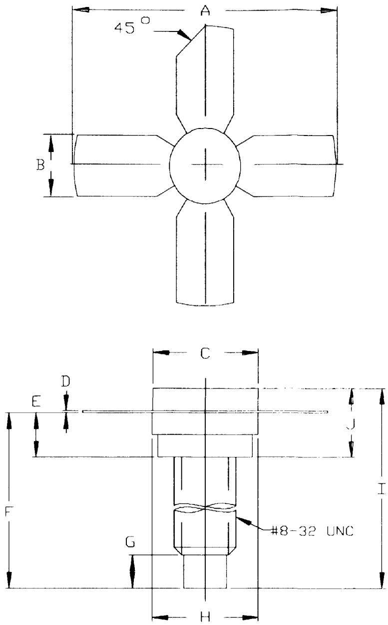
L1, L2 : 7 Turns #22 Enameled 0.175" I.D. with Ferroxcube Ferrite Beads #56-590-65/3B
L3 : 2 Turns in Ferroxcube VK200/10-3B (RFC)

Board Material: Glass Teflon, 1/16" Duriod

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0122

| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | 1.010/25,65 | 1.055/26,80 |
| B | .220/5,59 | .230/5,84 |
| C | .270/6,86 | .285/7,24 |
| D | .003/0,08 | .007/0,18 |
| E | .117/2,97 | .137/3,48 |
| F | .572/14,53 | |
| G | .130/3,30 | |
| H | .275/6,99 | .285/7,24 |
| I | .640/16,26 | |
| J | .175/4,45 | .217/5,51 |

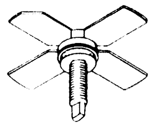


SGS-THOMSON MICROELECTRONICS

# SD1146 (2N5946)

## RF & MICROWAVE TRANSISTORS UHF MOBILE APPLICATIONS

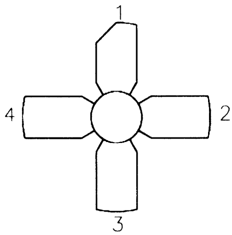
- 470 MHz
- 12.5 VOLTS
- EFFICIENCY 60%
- COMMON EMITTER
- $P_{OUT}$ = 10.0 W MIN. WITH 6.0 dB GAIN



**.280 4L STUD (M122)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1146 | 2N5946 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

### DESCRIPTION

The SD1146 is a Class C 12.5 V epitaxial silicon NPN planar transistor designed primarily for UHF communications. This devices utilizes improved metallization to achieve infinite VSWR at rated operating conditions.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 36.0 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 16.0 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 36.0 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 2.0 | A |
| $P_{DISS}$ | Power Dissipation (+25°C) | 37.5 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 4.7 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case} = 25°C$)

STATIC

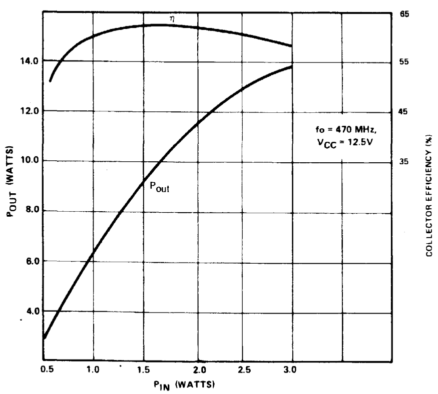
| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CES}$ | $I_C = 200mA$ | $V_{BE} = 0V$ | 36 | — | — | V |
| $BV_{CEO}$ | $I_C = 200mA$ | | 16 | — | — | V |
| $BV_{EBO}$ | $I_E = 4mA$ | $I_C = 0mA$ | 4.0 | — | — | V |
| $I_{CBO}$ | $V_{CE} = 15V$ | $I_E = 0mA$ | — | — | 2 | mA |
| $I_{CES}$ | $V_{CE} = 15V$ | $I_C = 0mA$ | — | — | 5 | mA |
| $h_{FE}$ | $V_{CE} = 5V$ | $I_C = .5A$ | 20 | — | — | — |

DYNAMIC

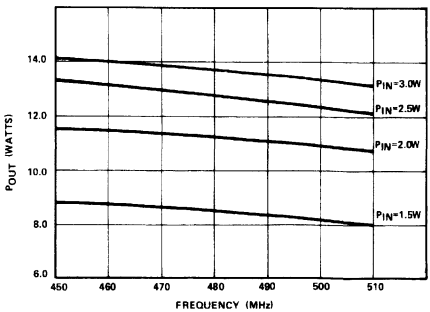
| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 470 MHz | $P_{IN} = 2.5$ W | $V_{CC} = 12.5$ V | 10 | — | — | W |
| $\eta_c$ | f = 470 MHz | $P_{IN} = 2.5$ W | $V_{CC} = 12.5$ V | 60 | — | — | % |
| $G_P$ | f = 470 MHz | $P_{IN} = 2.5$ W | $V_{CC} = 12.5$ V | 6 | — | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB} = 12.5$ V | | — | — | 45 | pF |

## TYPICAL PERFORMANCE

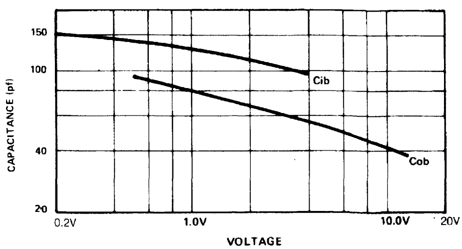
### POWER OUTPUT vs POWER INPUT




### POWER OUTPUT vs FREQUENCY

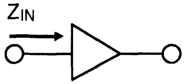



### CAPACITANCE vs VOLTAGE

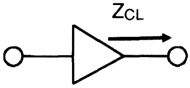


## IMPEDANCE DATA

**TYPICAL INPUT IMPEDANCE**



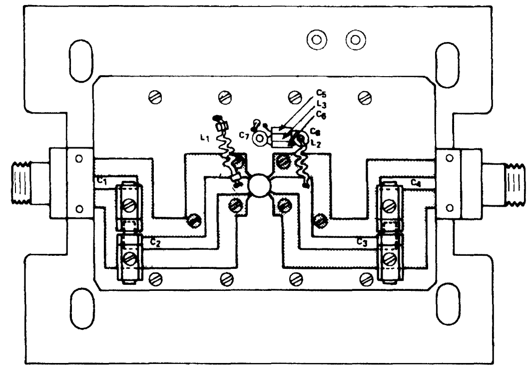

**TYPICAL COLLECTOR LOAD IMPEDANCE**

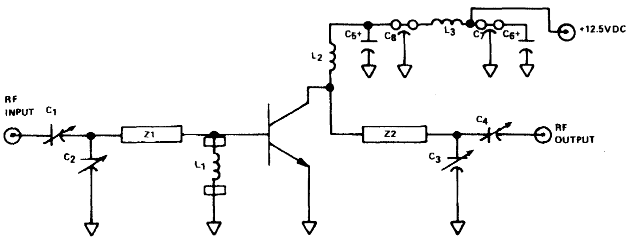



| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 470 MHz | 1.6 + j 2.2 | 6.0 − j 0.34 |

$P_{OUT}$ = 10.0 W
$V_{CC}$ = 12.5 V

## TEST CIRCUIT



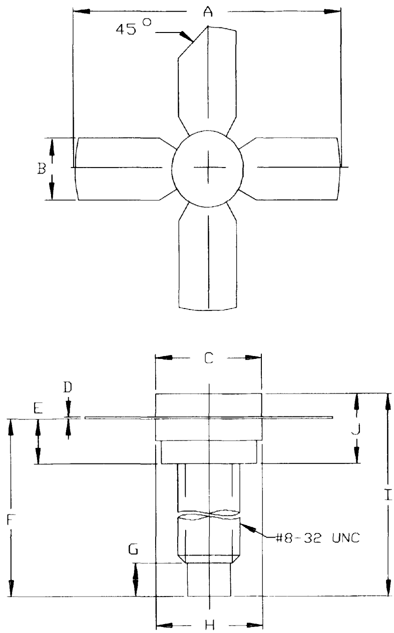




C1 : 1.0-20pF, ARCO #420
C2,C3,C4 : 1.0-25pF, ARCO #421
C5,C6 : Electrolytic, 1.0µF, 35V
C7,C8 : Feedthru, 1000pF
L1 : 7 Turns #22 Enameled 0.175" I.D. Ferroxcube Ferrite Beads #56-590-65/3B
L2 : 5 Turns #22 Enameled 0.175" I.D.
L3 : 2 Turns in Ferroxcube VK 200/19-4B (RFC)

Board Material - Glass Teflon 1/16" Duroid

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0122



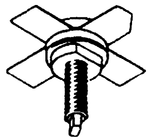

| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | 1.010/25,65 | 1.055/26,80 |
| B | .220/5,59 | .230/5,84 |
| C | .270/6,86 | .285/7,24 |
| D | .003/0,08 | .007/0,18 |
| E | .117/2,97 | .137/3,48 |
| F | .572/14,53 | |
| G | .130/3,30 | |
| H | .275/6,99 | .285/7,24 |
| I | .640/16,26 | |
| J | .175/4,45 | .217/5,51 |

SGS-THOMSON MICROELECTRONICS

# SD1224 (2N5643)

## RF & MICROWAVE TRANSISTORS VHF FM APPLICATIONS

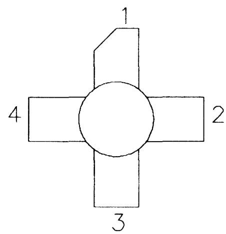
- 175 MHz
- 28 VOLTS
- CLASS C
- COMMON EMITTER
- EFFICIENCY 60% MIN
- $P_{OUT}$ = 40 W MIN. WITH 7.6 dB GAIN



**.380 4L STUD (M135)**
epoxy sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| SD1224 | 2N5643 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

### DESCRIPTION

The SD1224 is an epitaxial silicon NPN planar transistor designed primarily for 28 V FM Class C RF amplifiers utilized in ground station transmitters. This device utilizes ballasted emitter resistors and improved metallization systems to achieve optimum load mismatch capability.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 65 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 35 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 5.0 | A |
| $P_{DISS}$ | Power Dissipation | 60 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 2.9 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case} = 25°C$)

STATIC

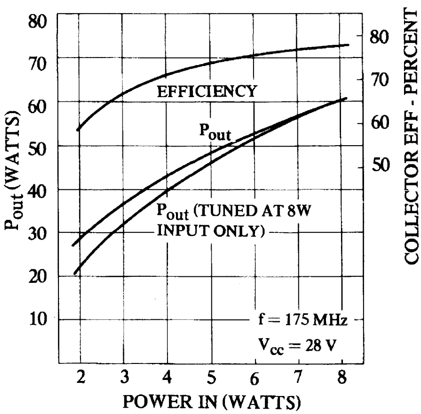
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C = 10mA$ | $I_B = 0mA$ | 65 | — | — | V |
| $BV_{CES}$ | $I_C = 200mA$ | $V_{BE} = 0V$ | 65 | — | — | V |
| $BV_{CEO}$ | $I_C = 200mA$ | $I_B = 0mA$ | 35 | — | — | V |
| $BV_{EBO}$ | $I_E = 10mA$ | $I_C = 0mA$ | 4.0 | — | — | V |
| $I_{CES}$ | $V_{CE} = 30V$ | $I_E = 0mA$ | — | — | 10 | mA |
| $I_{CBO}$ | $V_{CB} = 30V$ | $I_E = 0mA$ | — | — | 1 | mA |
| $h_{FE}$ | $V_{CE} = 5V$ | $I_C = 500mA$ | 5 | — | 200 | — |

DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 175 MHz | $P_{IN} = 7.0$ W | $V_{CE} = 28$ V | 40 | — | — | W |
| $G_P$ | f = 175 MHz | $P_{IN} = 7.0$ W | $V_{CE} = 28$ V | 7.6 | — | — | dB |
| $\eta_c$ | f = 175 MHz | $P_{IN} = 7.0$ W | $V_{CE} = 28$ V | 60 | — | — | % |
| $C_{OB}$ | f = 1 MHz | $V_{CB} = 30$ V | | — | — | 65 | pF |

## TYPICAL PERFORMANCE

**POWER OUTPUT & COLLECTOR EFFICIENCY vs POWER INPUT**




Power Output vs Power Input

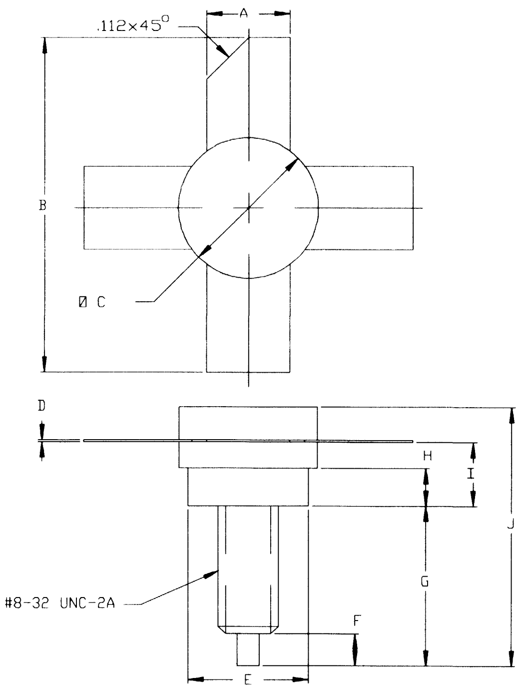
## IMPEDANCE DATA

| $P_{IN}$ (W) | $P_{OUT}$ (W) | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|---|
| 2.0 | 28.5 | 0.85 + j 1.20 | 3.25 + j 7.05 |
| 4.0 | 43.0 | 1.02 + j 1.32 | 4.45 + j 5.40 |
| 6.0 | 53.0 | 1.01 + j 1.42 | 5.25 + j 4.42 |
| 8.0 | 60.5 | 1.05 + j 1.35 | 5.45 + j 4.12 |

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0135

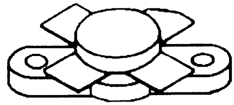
| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .220/5,59 | .230/5,84 |
| B | .980/24,89 | |
| C | .370/9,40 | .385/9,78 |
| D | .004/0,10 | .007/0,18 |
| E | .320/8,13 | .330/8,38 |
| F | .100/2,54 | .130/3,30 |
| G | .450/11,43 | .490/12,45 |
| H | .090/2,29 | .100/2.54 |
| I | .155/3,94 | .175/4,45 |
| J | | .750/19,05 |



# SD1224-02

## RF & MICROWAVE TRANSISTORS VHF APPLICATIONS

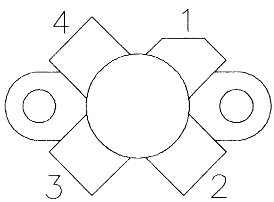
- 175 MHz
- 28 VOLTS
- EFFICIENCY 60%
- COMMON EMITTER
- GOLD METALLIZATION
- $P_{OUT}$ = 40 W MIN. WITH 7.6 dB GAIN



**.380 4LFL (M113)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1224-02 | SD1224-2 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

## DESCRIPTION

The SD1224-02 is an epitaxial silicon NPN planar transistor designed primarily for 12.5 V AM Class C RF amplifiers functional in the aviation band 118 - 136 MHz and for 28 V FM Class C RF amplifiers utilized in ground station transmitters. It withstands extremely high VSWR under operating conditions.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 65 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 35 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 65 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 5.0 | A |
| $P_{DISS}$ | Power Dissipation | 60 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 2.9 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

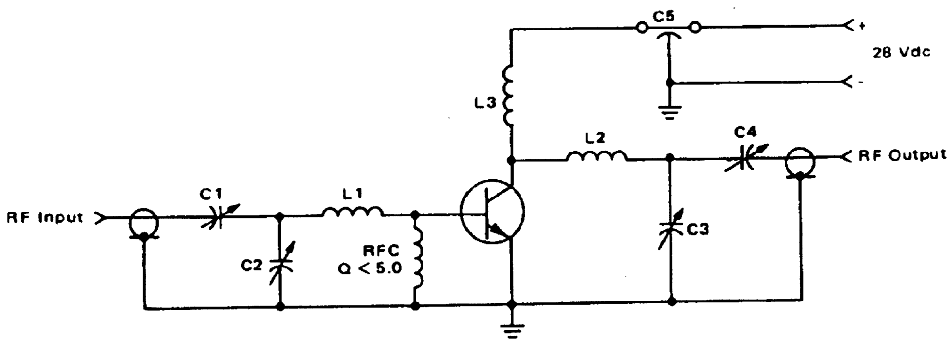
STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 200mA | $V_{BE}$ = 0V | 65 | — | — | V |
| $BV_{CES}$ | $I_C$ = 200mA | $V_{BE}$ = 0V | 65 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 200mA | $I_B$ = 0mA | 35 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 30V | $I_E$ = 0mA | — | — | 1 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 500mA | 5 | — | — | — |

DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 175 MHz | $P_{IN}$ = 7 W | $V_{CC}$ = 28 V | 40 | — | — | W |
| $\eta_C$ | f = 175 MHz | $P_{IN}$ = 7 W | $V_{CC}$ = 28 V | 60 | — | — | % |
| $G_P$ | f = 175 MHz | $P_{IN}$ = 7 W | $V_{CC}$ = 28 V | 7.6 | — | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 30 V | | — | — | 65 | pF |

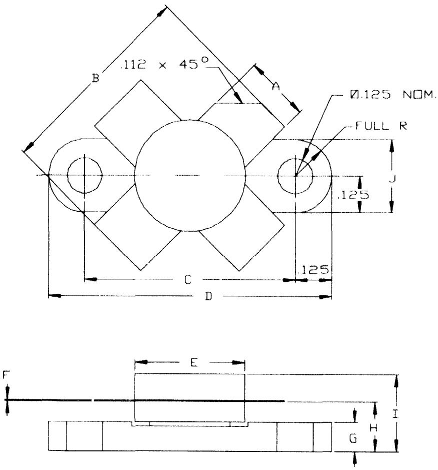
## TEST CIRCUIT




C1,C2,
C3,C4 : ARCO 464, 25-280pF
C5 : 0.1μF
L1 : 1" Straight #16 AWG
L2 : 1 Turn, #16 AWG, 1/4" I.D.
L3 : 0.22μH

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0113



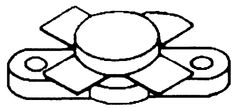

| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .220/5,59 | .230/5,84 |
| B | .785/19,94 | |
| C | .720/18,29 | .730/18,54 |
| D | .970/24,64 | .980/24,89 |
| E | | .385/9,78 |
| F | .004/0,10 | .006/0,15 |
| G | .085/2,16 | .105/2,67 |
| H | .160/4,06 | .180/4,57 |
| I | | .280/7,11 |
| J | .240/6,10 | .255/6,48 |

SGS-THOMSON
MICROELECTRONICS

# SD1224-10

## RF & MICROWAVE TRANSISTORS
## HF SSB APPLICATIONS

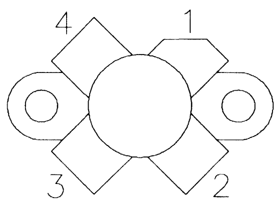
- 30 MHz
- 28 VOLTS
- IMD –28 dB
- COMMON EMITTER
- GOLD METALLIZATION
- $P_{OUT}$ = 30 W MIN. WITH 18 dB GAIN



**.380 4LFL (M113)**
epoxy sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| SD1224-10 | 1224-10 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

### DESCRIPTION

The SD1224-10 is a 28 V epitaxial silicon NPN planar transistor designed primarily for SSB communications. This device utilizes emitter ballasting for improved ruggedness and reliability.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 65 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 36 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 4.5 | A |
| $P_{DISS}$ | Power Dissipation | 80 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 2.2 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 200mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{CES}$ | $I_C$ = 200mA | $V_{BE}$ = 0V | 65 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 200mA | $I_B$ = 0mA | 35 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 30V | $I_E$ = 0mA | — | — | 1 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = .5A | 5 | — | 200 | — |

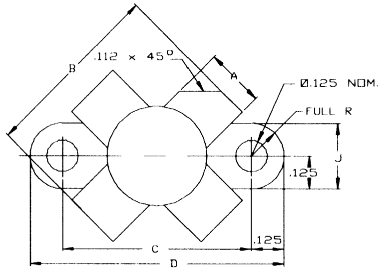
DYNAMIC

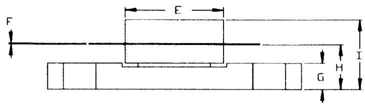
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 30 MHz | $V_{CE}$ = 28 V | $I_{CQ}$ = 25 mA | 30 | — | — | W |
| $G_P$ | f = 30 MHz | $V_{CE}$ = 28 V | $I_{CQ}$ = 25 mA | 18 | 20 | — | dB |
| IMD | f = 30 MHz | $V_{CE}$ = 28 V | $I_{CQ}$ = 25 mA | — | − 32 | − 28 | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 30 V | | — | — | 65 | pF |

Note: $P_{IN}$ = 0.48W

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0



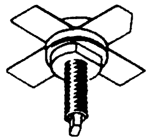

| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .220/5,59 | .230/5,84 |
| B | .785/19,94 | |
| C | .720/18,29 | .730/18,54 |
| D | .970/24,64 | .980/24,89 |
| E | | .385/9,78 |
| F | .004/0,10 | .006/0,15 |
| G | .085/2,16 | .105/2,67 |
| H | .160/4,06 | .180/4,57 |
| I | | .280/7,11 |
| J | .240/6,10 | .255/6,48 |

SGS-THOMSON MICROELECTRONICS

# SD1273

## RF & MICROWAVE TRANSISTORS VHF MOBILE APPLICATIONS

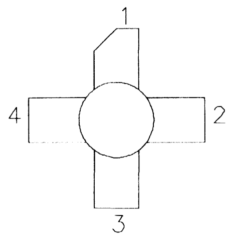
- 160 MHz
- 13.6 VOLTS
- COMMON EMITTER
- $P_{OUT}$ = 40 W MIN. WITH 9.0 dB GAIN



**.380 4L STUD (M135)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1273 | SD1273 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

### DESCRIPTION

The SD1273 is especially designed for VHF large signal amplifier applications in industrial and commercial FM equipment operating up to 175 MHz. Ideally suited for marine radio applications.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 36 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 18 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 5.0 | A |
| $P_{DISS}$ | Power Dissipation | 70 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 2.5 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 50mA | $I_E$ = 0mA | 36 | — | — | V |
| $BV_{CES}$ | $I_C$ = 50mA | $V_{BE}$ = 0mA | 36 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 50mA | $I_B$ = 0mA | 18 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 15V | $I_E$ = 0mA | — | — | 5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 5A | 20 | — | 200 | — |

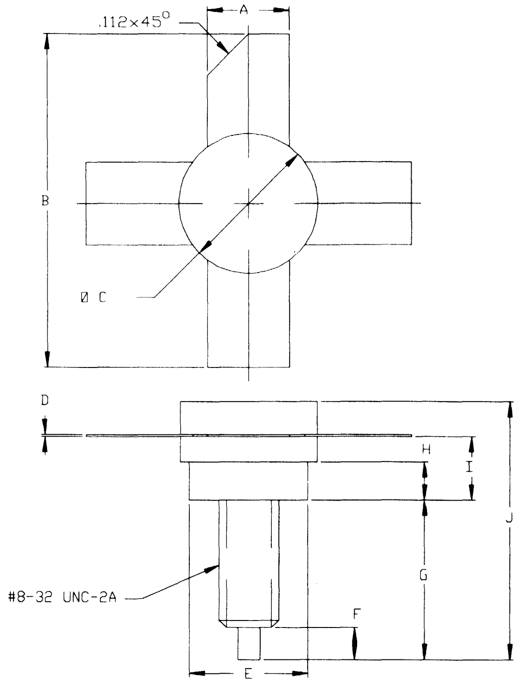
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 160 MHz | $P_{IN}$ = 5 W | $V_{CC}$ = 13.6 V | 40 | — | — | W |
| $G_P$ | f = 160 MHz | $P_{IN}$ = 5 W | $V_{CC}$ = 13.6 V | 9 | — | — | dB |
| $\eta_C$ | f = 160 MHz | $P_{IN}$ = 5 W | $V_{CC}$ = 13.6 V | 55 | — | — | % |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 13.6 V | | — | — | 135 | pF |

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0135

| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .220/5,59 | .230/5,84 |
| B | .980/24,89 | |
| C | .370/9,40 | .385/9,78 |
| D | .004/0,10 | .007/0,18 |
| E | .320/8,13 | .330/8,38 |
| F | .100/2,54 | .130/3,30 |
| G | .450/11,43 | .490/12,45 |
| H | .090/2,29 | .100/2.54 |
| I | .155/3,94 | .175/4,45 |
| J | | .750/19,05 |

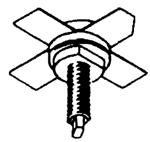


SGS-THOMSON
MICROELECTRONICS

# SD1274

## RF & MICROWAVE TRANSISTORS
## VHF MOBILE APPLICATIONS

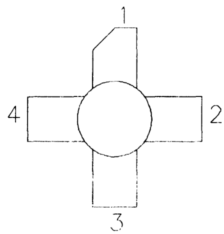
- 160 MHz
- 13.6 VOLTS
- COMMON EMITTER
- $P_{OUT}$ = 30 W MIN. WITH 10 dB GAIN



**.380 4L STUD (M135)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1274 | SD1274 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The SD1274 is a 13.6 V Class C epitaxial silicon NPN planar transistor designed primarily for VHF communications. The SD1274 utilizes an emitter ballasted die geometry to withstand severe load mismatch conditions.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 36 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 18 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 36 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 8.0 | A |
| $P_{DISS}$ | Power Dissipation | 70 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 1.2 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

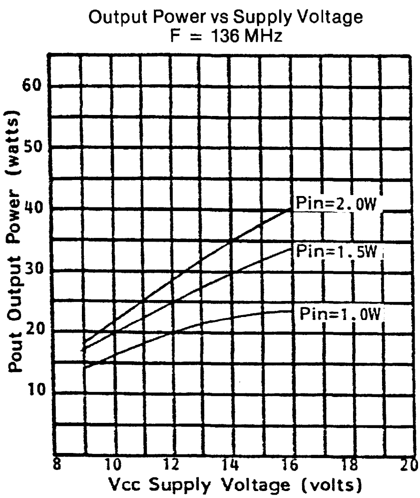
| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CES}$ | $I_C$ = 15mA | $V_{BE}$ = 0mA | 36 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 50mA | $I_B$ = 0mA | 18 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 5mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 15V | $I_E$ = 0mA | — | — | 5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 250mA | 20 | — | — | — |

DYNAMIC

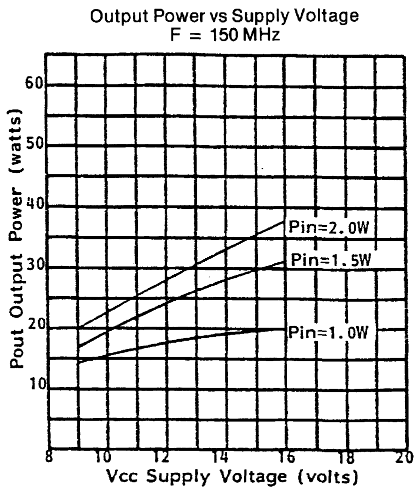
| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 160 MHz | $P_{IN}$ = 3.0 W | $V_{CE}$ = 13.6 V | 30 | — | — | W |
| $G_P$ | f = 160 MHz | $P_{IN}$ = 3.0 W | $V_{CE}$ = 13.6 V | 10 | — | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 15 V | | — | 95 | — | pF |

## TYPICAL PERFORMANCE

### POWER OUTPUT vs SUPPLY VOLTAGE (136 MHz)

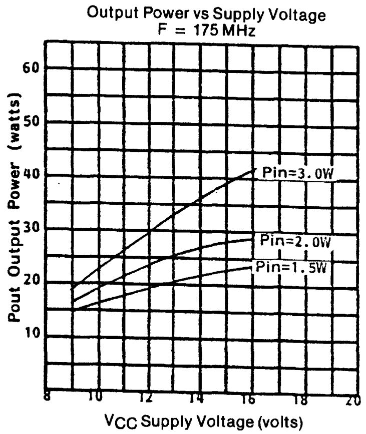



### POWER OUTPUT vs SUPPLY VOLTAGE (150 MHz)

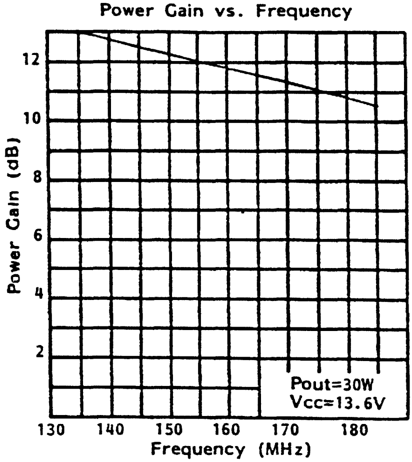


## TYPICAL PERFORMANCE (cont'd)

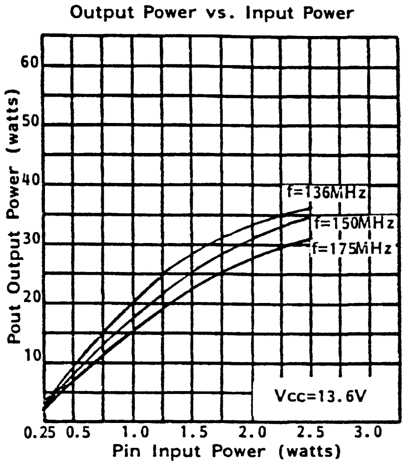
### POWER OUTPUT vs SUPPLY VOLTAGE (175 MHz)




### POWER GAIN vs FREQUENCY




### POWER OUTPUT vs POWER INPUT




## IMPEDANCE DATA

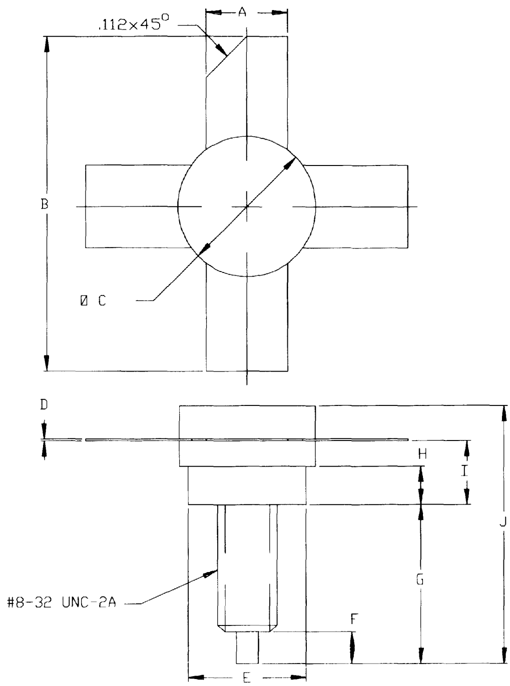
| FREQ. | $Z_{IN}$ ($\Omega$) | $Z_{CL}$ ($\Omega$) |
|---|---|---|
| 175 MHz | 1.0 + j 0.4 | 2.3 + j 0.1 |

$P_{IN}$ = 3.0 W
$V_{CE}$ = 12.5 V

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0135

| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .220/5,59 | .230/5,84 |
| B | .980/24,89 | |
| C | .370/9,40 | .385/9,78 |
| D | .004/0,10 | .007/0,18 |
| E | .320/8,13 | .330/8,38 |
| F | .100/2,54 | .130/3,30 |
| G | .450/11,43 | .490/12,45 |
| H | .090/2,29 | .100/2.54 |
| I | .155/3,94 | .175/4,45 |
| J | | .750/19,05 |

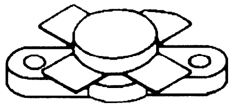


SGS-THOMSON MICROELECTRONICS

# SD1274-01

## RF & MICROWAVE TRANSISTORS VHF MOBILE APPLICATIONS

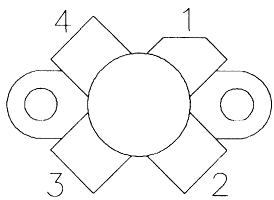
- 160 MHz
- 13.6 VOLTS
- COMMON EMITTER
- $P_{OUT}$ = 30 W MIN. WITH 10 dB GAIN



**.380 4LFL (M113)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1274-01 | SD1274-1 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

### DESCRIPTION

The SD1274-01 is a 13.6 V Class C epitaxial silicon NPN planar transistor designed primarily for VHF communications. The SD1274-01 utilizes an emitter ballasted die geometry to withstand severe load mismatch conditions.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 36 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 18 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 36 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 8.0 | A |
| $P_{DISS}$ | Power Dissipation | 70 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 1.2 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

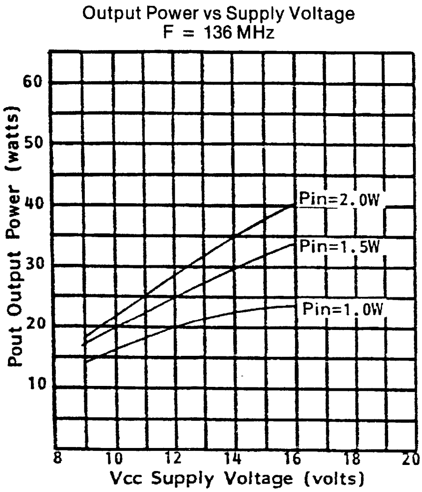
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CES}$ | $I_C$ = 15mA | $V_{BE}$ = 0mA | 36 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 50mA | $I_B$ = 0mA | 18 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 5mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 15V | $I_E$ = 0mA | — | — | 5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 250mA | 20 | — | — | — |

DYNAMIC

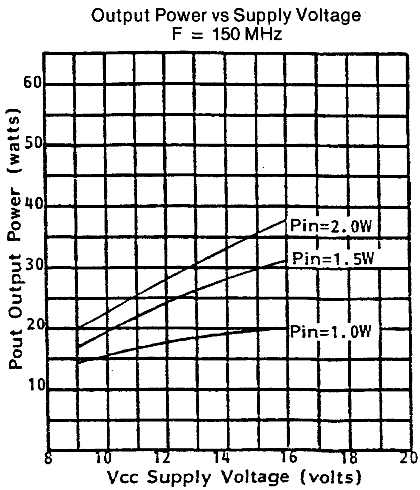
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 160 MHz | $P_{IN}$ = 3.0 W | $V_{CE}$ = 13.6 V | 30 | — | — | W |
| $G_P$ | f = 160 MHz | $P_{IN}$ = 3.0 W | $V_{CE}$ = 13.6 V | 10 | — | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 15 V | | — | 95 | — | pF |

## TYPICAL PERFORMANCE

### POWER OUTPUT vs SUPPLY VOLTAGE (136 MHz)

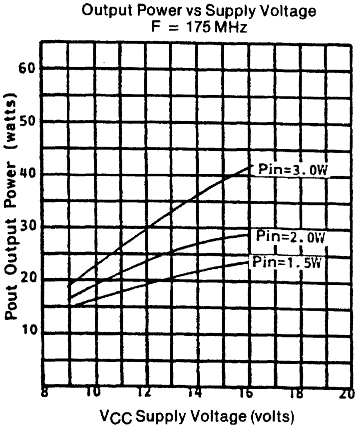



### POWER OUTPUT vs SUPPLY VOLTAGE (150 MHz)

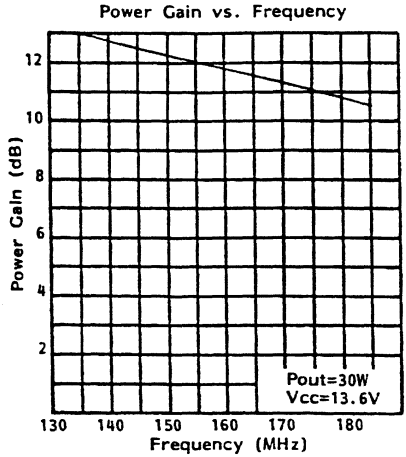


## TYPICAL PERFORMANCE (cont'd)

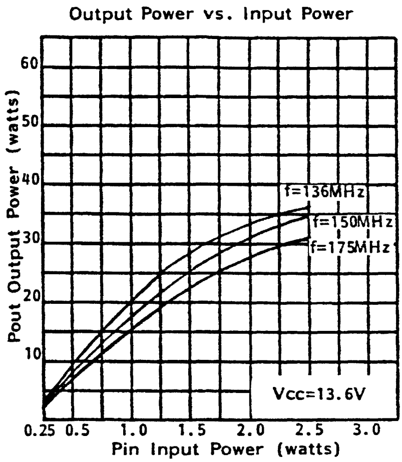
### POWER OUTPUT vs SUPPLY VOLTAGE (175 MHz)




### POWER GAIN vs FREQUENCY




### POWER OUTPUT vs POWER INPUT



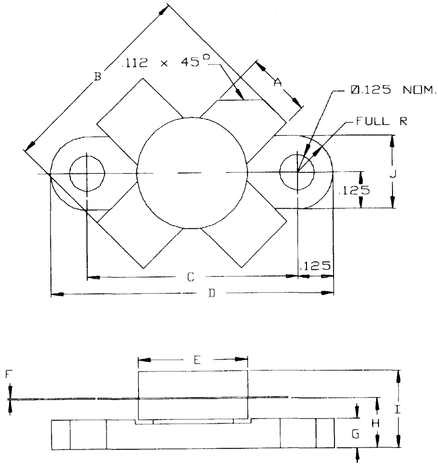

## IMPEDANCE DATA

| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 175 MHz | 1.0 + j 0.4 | 2.3 + j 0.1 |

$P_{IN}$ = 3.0 W
$V_{CE}$ = 12.5 V

## PACKAGE MECHANICAL DATA

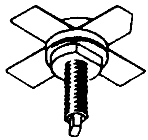
Ref.: Dwg. No.12-0113




| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .220/5,59 | .230/5,84 |
| B | .785/19,94 | |
| C | .720/18,29 | .730/18,54 |
| D | .970/24,64 | .980/24,89 |
| E | | .385/9,78 |
| F | .004/0,10 | .006/0,15 |
| G | .085/2,16 | .105/2,67 |
| H | .160/4,06 | .180/4,57 |
| I | | .280/7,11 |
| J | .240/6,10 | .255/6,48 |

## RF & MICROWAVE TRANSISTORS VHF MOBILE APPLICATIONS

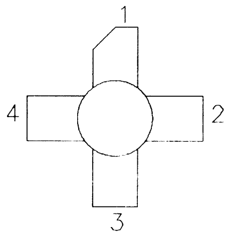
- 160 MHz
- 13.6 VOLTS
- COMMON EMITTER
- $P_{OUT}$ = 40 W MIN. WITH 9.0 dB GAIN



**.380 4L STUD (M135)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1275 | SD1275 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The SD1275 is a 13.6 V Class C epitaxial silicon NPN planar transistor designed primarily for VHF communications. The SD1275 utilizes an emitter ballasted die geometry to withstand severe load mismatch conditions.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 36 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 18 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 36 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 8.0 | A |
| $P_{DISS}$ | Power Dissipation | 70 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 1.2 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

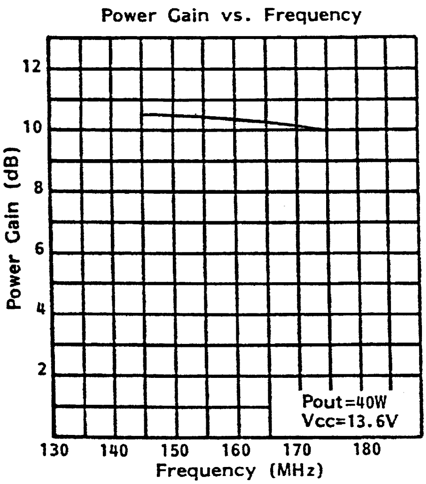
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CES}$ | $I_C$ = 15mA | $V_{BE}$ = 0mA | 36 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 50mA | $I_B$ = 0mA | 18 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 5mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 15V | $I_E$ = 0mA | — | — | 5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 250mA | 20 | — | — | — |

DYNAMIC

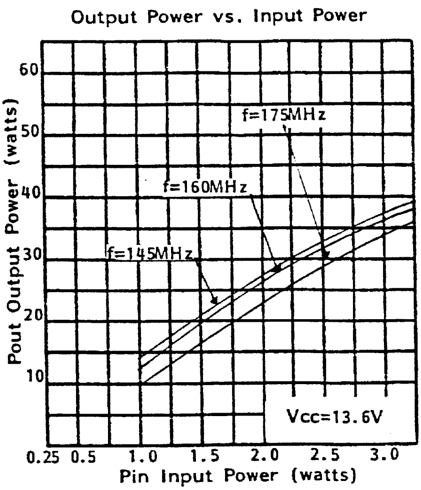
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 160 MHz | $P_{IN}$ = 5.0 W | $V_{CE}$ = 13.6 V | 40 | — | — | W |
| $G_P$ | f = 160 MHz | $P_{IN}$ = 5.0 W | $V_{CE}$ = 13.6 V | 9 | — | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 15 V | | — | 95 | — | pF |

## TYPICAL PERFORMANCE

### POWER GAIN vs FREQUENCY



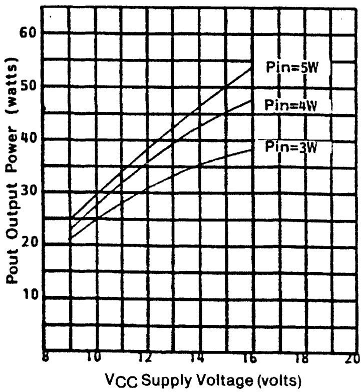

### POWER OUTPUT vs POWER INPUT



## TYPICAL PERFORMANCE (cont'd)

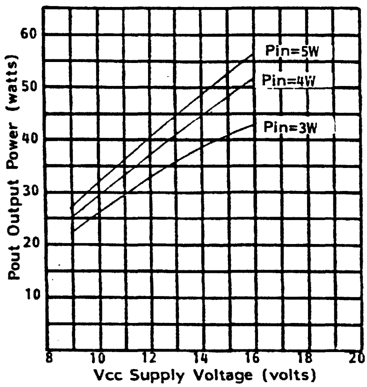
### POWER OUTPUT vs SUPPLY VOLTAGE (175 MHz)

Output Power vs Supply Voltage
F = 175 MHz



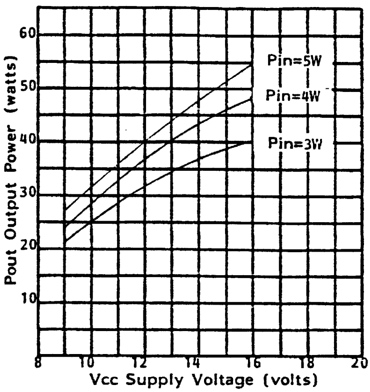

### POWER OUTPUT vs SUPPLY VOLTAGE (145 MHz)

Output Power vs Supply Voltage
F = 145 MHz




### POWER OUTPUT vs SUPPLY VOLTAGE (160 MHz)

Output Power vs Supply Voltage
F = 160 MHz




## IMPEDANCE DATA

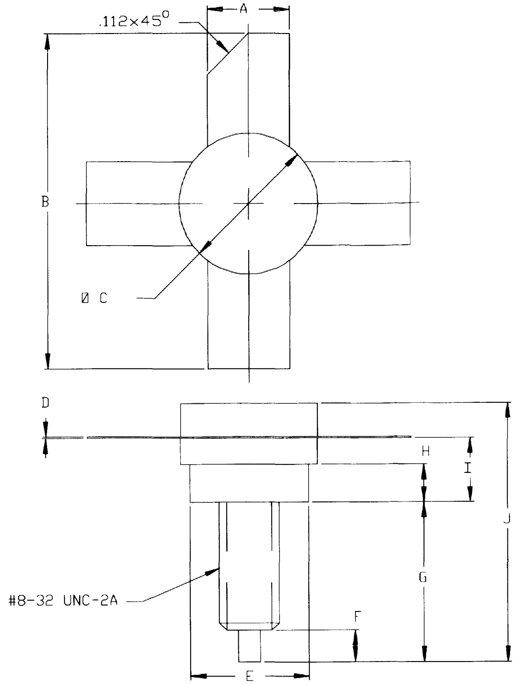
| FREQ. | $Z_{IN}$ ($\Omega$) | $Z_{CL}$ ($\Omega$) |
|---|---|---|
| 160 MHz | 1.0 + j 0.4 | 2.3 + j 0.1 |

$P_{IN}$ = 3.0 W
$V_{CE}$ = 12.5 V

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0135

| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .220/5,59 | .230/5,84 |
| B | .980/24,89 | |
| C | .370/9,40 | .385/9,78 |
| D | .004/0,10 | .007/0,18 |
| E | .320/8,13 | .330/8,38 |
| F | .100/2,54 | .130/3,30 |
| G | .450/11,43 | .490/12,45 |
| H | .090/2,29 | .100/2.54 |
| I | .155/3,94 | .175/4,45 |
| J | | .750/19,05 |

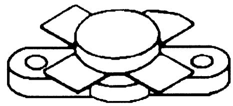


SGS-THOMSON MICROELECTRONICS

# SD1275-01

## RF & MICROWAVE TRANSISTORS VHF MOBILE APPLICATIONS

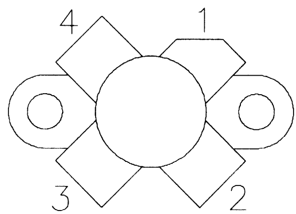
- 160 MHz
- 13.6 VOLTS
- COMMON EMITTER
- $P_{OUT}$ = 40 W MIN. WITH 9.0 dB GAIN



**.380 4LFL (M113)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1275-01 | SD1275-1 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

## DESCRIPTION

The SD1275-01 is a 13.6 V Class C epitaxial silicon NPN planar transistor designed primarily for VHF communications. The SD1275-01 utilizes an emitter ballasted die geometry to withstand severe load mismatch conditions.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 36 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 18 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 36 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 8.0 | A |
| $P_{DISS}$ | Power Dissipation | 70 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 1.2 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

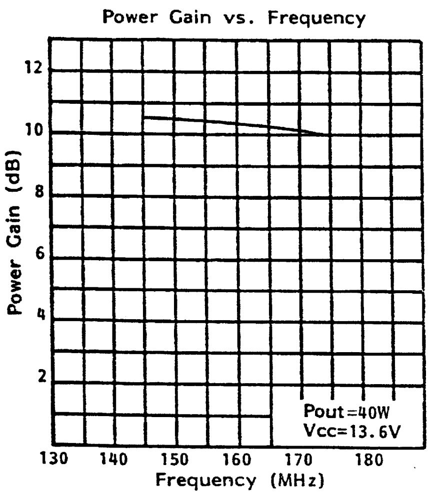
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CES}$ | $I_C$ = 15mA | $V_{BE}$ = 0mA | 36 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 50mA | $I_B$ = 0mA | 18 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 5mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 15V | $I_E$ = 0mA | — | — | 5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 250mA | 20 | — | — | — |

DYNAMIC

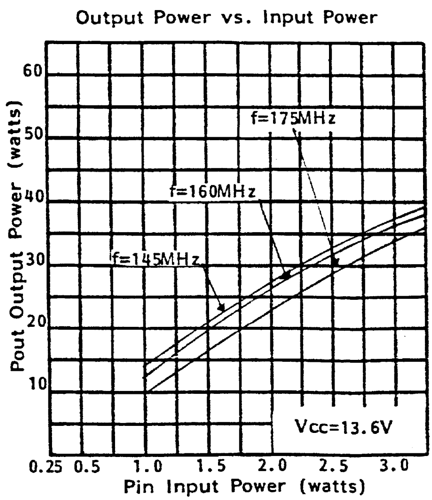
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 160 MHz | $P_{IN}$ = 5.0 W | $V_{CE}$ = 13.6 V | 40 | — | — | W |
| $G_P$ | f = 160 MHz | $P_{IN}$ = 5.0 W | $V_{CE}$ = 13.6 V | 9 | — | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 15 V | | — | 95 | — | pF |

## TYPICAL PERFORMANCE

### POWER GAIN vs FREQUENCY



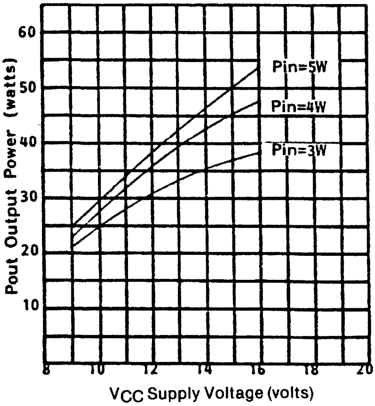

### POWER OUTPUT vs POWER INPUT



## TYPICAL PERFORMANCE (cont'd)

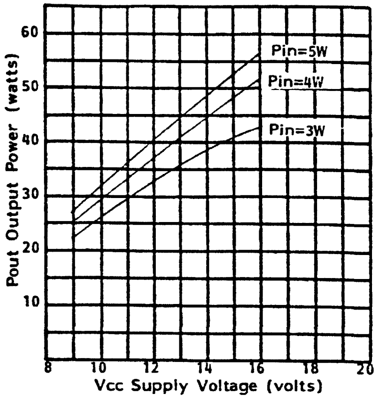
### POWER OUTPUT vs SUPPLY VOLTAGE (175 MHz)

Output Power vs Supply Voltage
F = 175 MHz



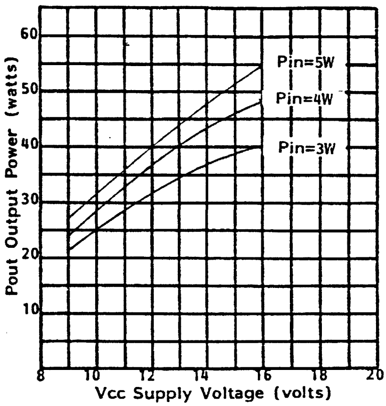

### POWER OUTPUT vs SUPPLY VOLTAGE (145 MHz)

Output Power vs Supply Voltage
F = 145 MHz




### POWER OUTPUT vs SUPPLY VOLTAGE (160 MHz)

Output Power vs Supply Voltage
F = 160 MHz



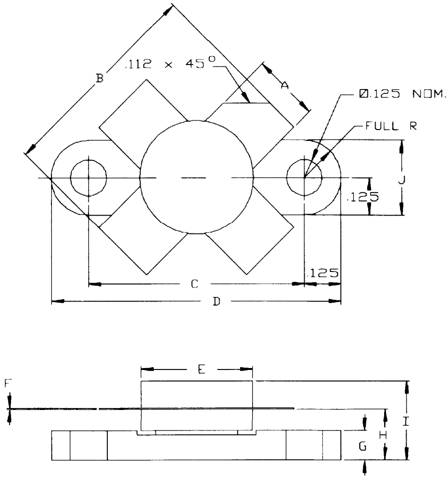

## IMPEDANCE DATA

| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 160 MHz | 1.0 + j 0.4 | 2.3 + j 0.1 |

$P_{IN}$ = 3.0 W
$V_{CE}$ = 12.5 V

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0113



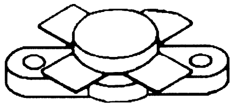

| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .220/5,59 | .230/5,84 |
| B | .785/19,94 | |
| C | .720/18,29 | .730/18,54 |
| D | .970/24,64 | .980/24,89 |
| E | | .385/9,78 |
| F | .004/0,10 | .006/0,15 |
| G | .085/2,16 | .105/2,67 |
| H | .160/4,06 | .180/4,57 |
| I | | .280/7,11 |
| J | .240/6,10 | .255/6,48 |

# SGS-THOMSON MICROELECTRONICS

# SD1285

## RF & MICROWAVE TRANSISTORS HF SSB APPLICATIONS

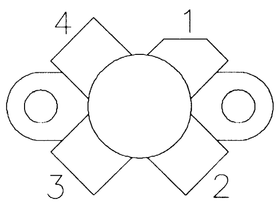
- 30 MHz
- 12.5 VOLTS
- COMMON EMITTER
- GOLD METALLIZATION
- IMD – 30 dB
- $P_{OUT}$ = 20 W MIN. WITH 15 dB GAIN



**.380 4LFL (M113)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1285 | SD1285 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

## DESCRIPTION

The SD1285 is a 12.5 V epitaxial NPN planar transistor designed primarily for SSB communications. This device utilizes emitter ballasting to achieve extreme ruggedness under severe operating conditions.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 36 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 18 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 4.5 | A |
| $P_{DISS}$ | Power Dissipation | 80 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 2.2 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 50mA | $I_E$ = 0mA | 36 | — | — | V |
| $BV_{CES}$ | $I_C$ = 50mA | $V_{BE}$ = 0V | 36 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 50mA | $I_B$ = 0mA | 18 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 5mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 15V | $I_E$ = 0mA | — | — | 5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1A | 10 | — | 200 | — |

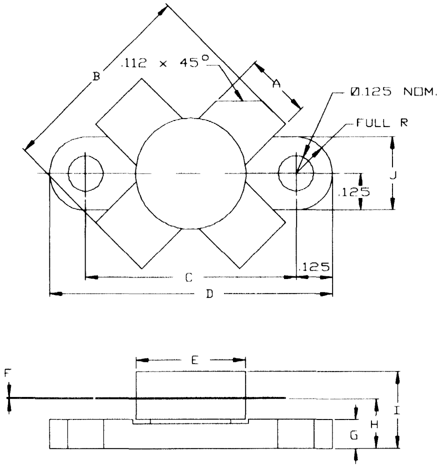
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 30 MHz | $V_{CC}$ = 12.5 V | $I_{CQ}$ = 25 mA | 20 | — | — | W |
| $G_P$ | f = 30 MHz | $V_{CC}$ = 12.5 V | $I_{CQ}$ = 25 mA | 15 | 18 | — | dB |
| IMD | f = 30 MHz | $V_{CC}$ = 12.5 V | $I_{CQ}$ = 25 mA | — | — | – 30 | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 12.5 V | | — | 100 | — | pF |

Note: $P_{IN}$ = 0.65 W

## PACKAGE MECHANICAL DATA

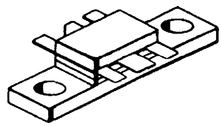
Ref.: Dwg. No.12-0113




| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .220/5,59 | .230/5,84 |
| B | .785/19,94 | |
| C | .720/18,29 | .730/18,54 |
| D | .970/24,64 | .980/24,89 |
| E | | .385/9,78 |
| F | .004/0,10 | .006/0,15 |
| G | .085/2,16 | .105/2,67 |
| H | .160/4,06 | .180/4,57 |
| I | | .280/7,11 |
| J | .240/6,10 | .255/6,48 |

# RF & MICROWAVE TRANSISTORS
# 850-960 MHz APPLICATIONS

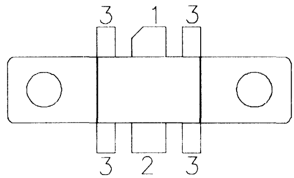
- 850 - 960 MHZ
- 24 VOLTS
- COMMON EMITTER
- OVERLAY GEOMETRY
- GOLD METALLIZATION
- $P_{OUT}$ = 6.0 W MIN. WITH 10.0 dB GAIN



**.230 6LFL (M142)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1398 | SD1398 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter

## DESCRIPTION

The SD1398 is a gold metallized epitaxial silicon NPN transistor designed for high linearity Class AB operation cellular base station applications. The SD1398 can also be operated Class C.

The SD1398 is internally input matched and can be used as a driver for the SD1423 or SD1424.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 50 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 35 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.5 | V |
| $I_C$ | Device Current | 2.4 | A |
| $P_{DISS}$ | Power Dissipation | 53 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 3.3 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 5mA | $I_E$ = 0mA | 50 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 5mA | $I_B$ = 0mA | 24 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 5mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $I_{CEO}$ | $V_{CE}$ = 24V | $I_E$ = 0mA | — | — | 1.0 | mA |
| $I_{CBO}$ | $V_{CB}$ = 24V | $I_E$ = 0mA | — | — | 1.0 | mA |
| $h_{FE}$ | $V_{CE}$ = 10V | $I_C$ = 0.1A | 20 | — | 100 | — |

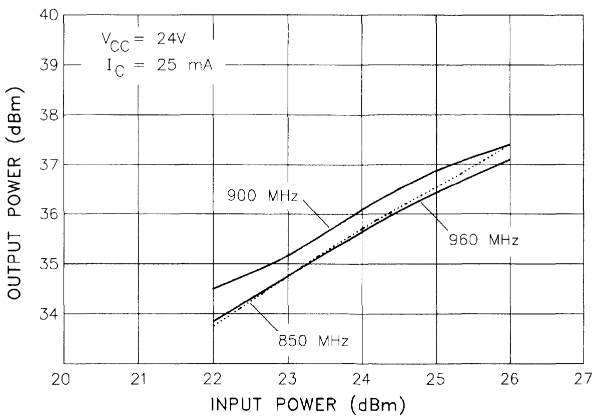
DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 850 — 960 MHz | $V_{CE}$ = 24 V | $I_{CQ}$ = 25 mA | 6 | — | — | W |
| $\eta_C$ | f = 850 — 960 MHz | $V_{CE}$ = 24 V | $I_{CQ}$ = 25 mA | — | 50 | — | % |
| $G_P$ | f = 850 — 960 MHz | $V_{CE}$ = 24 V | $I_{CQ}$ = 25 mA | 10 | 12 | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 24 V | | — | 7.5 | 8.5 | pF |

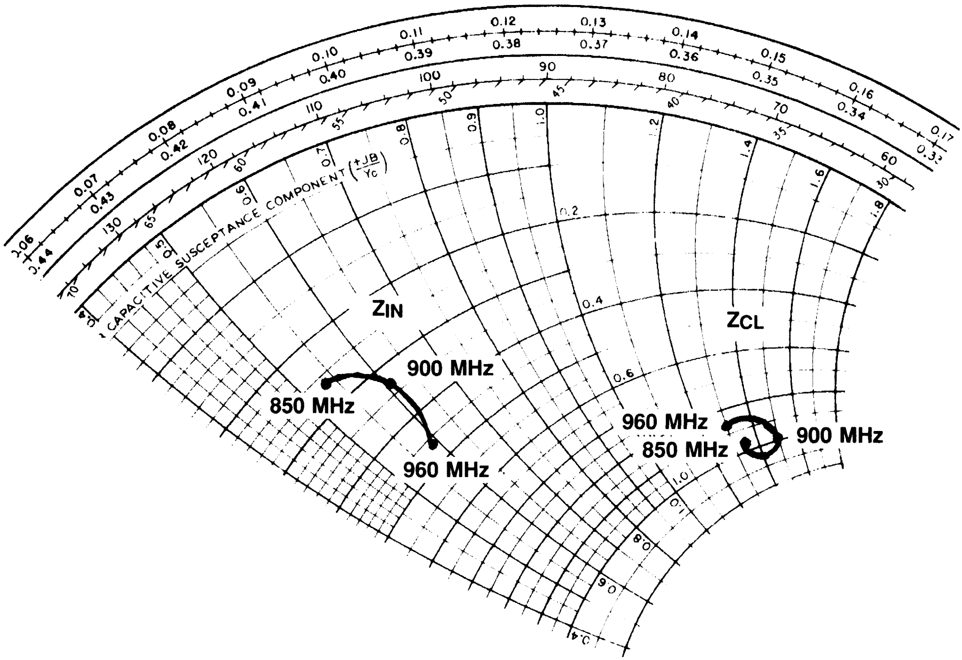
Note: $P_{IN}$ = 0.60w

## TYPICAL PERFORMANCE

### CLASS AB BROADBAND POWER OUTPUT vs POWER INPUT

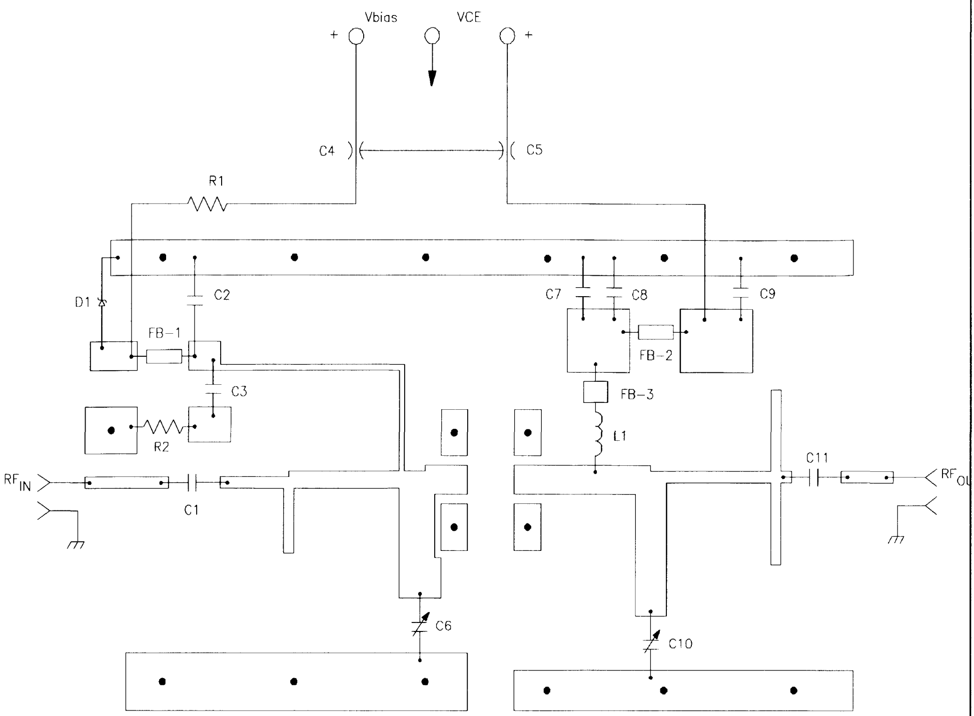


## IMPEDANCE DATA




| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 850 MHz | 2.6 + j 5.4 | 9.5 + j 13.5 |
| 900 MHz | 3.3 + j 6.1 | 9.9 + j 15.0 |
| 950 MHz | 4.6 + j 5.9 | 8.6 + j 13.0 |

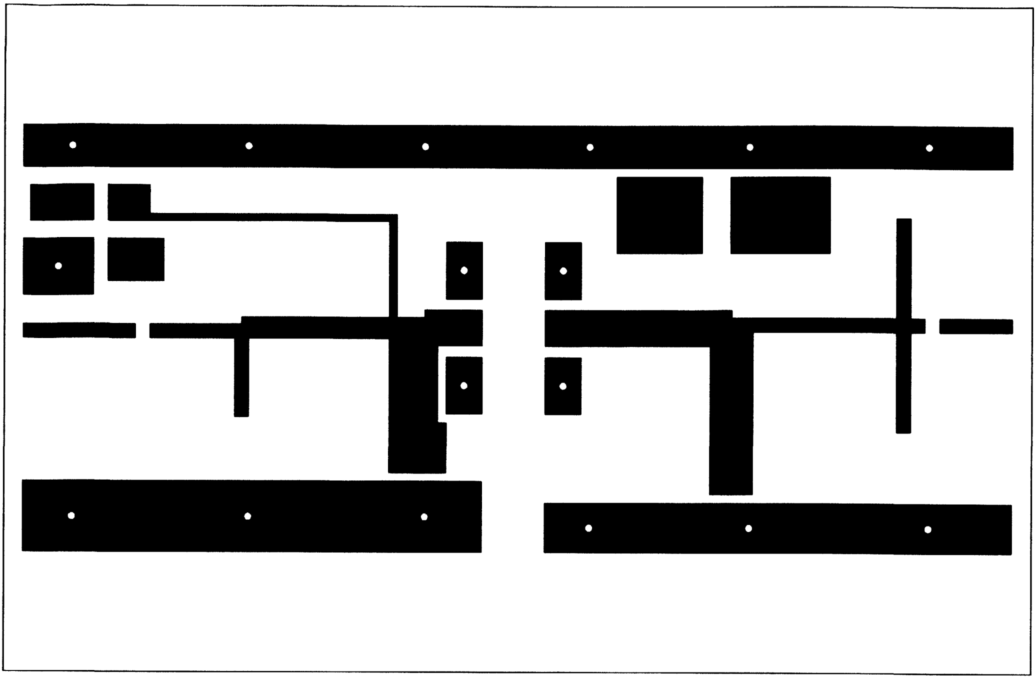
## TEST CIRCUIT




| | | |
|---|---|---|
| C1, C2<br>C7, C11 | : | 240pF ATC Size A |
| C3 | : | 0.1MFD 50Vdc, CK05 Type |
| C4, C5 | : | 1500pF Feedthru #9900-381-6004 Murata/Erie |
| C6, C10 | : | 0.8 - 8.0pF Johanson Gigatrim |
| C8 | : | 0.01 MFD 100Vdc CK05 Type |
| C9 | : | 10MFD Electrolytic, 63Vdc |
| D1 | : | IN5661 |

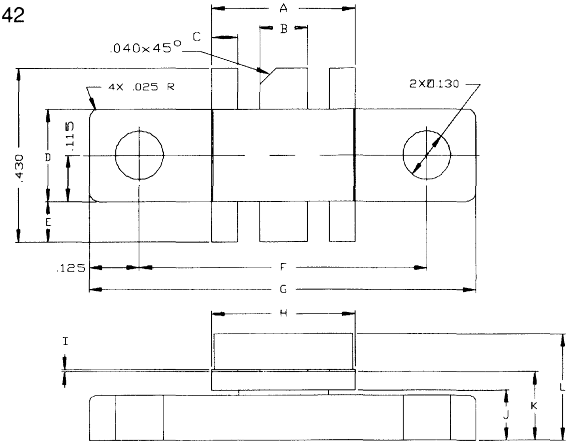
| | | |
|---|---|---|
| FB-1,<br>FB-2 | : | 2.5 Turns, #22 AWG, Ferrite Bead |
| FB-3 | : | Ferrite Bead L1 Cold End |
| L1 | : | 3 Turns, #22 AWG, 0.125" I.D. |
| R1 | : | 150Ω in 5% Carbon Comp |
| R2 | : | 51Ω, Chip Resistor |
| Board<br>Material: | | Er = 10.2, Height 0.05", Teflon Glass |

## TEST CIRCUIT LAYOUT



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0142




| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .355/9,02 | .365/9,27 |
| B | .115/2,92 | .125/3,18 |
| C | .075/1,91 | .085/2,16 |
| D | .225/5,72 | .235/5,97 |
| E | .090/2,29 | .110/2,79 |
| F | .720/18,29 | .730/18,54 |
| G | .970/24,64 | .980/24,89 |
| H | .355/9,02 | .365/9,27 |
| I | .004/0,10 | .006/0,15 |
| J | .120/3,05 | .130/3,30 |

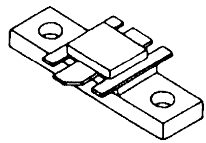
| CONT'D | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| K | .160/4,06 | .180/4,57 |
| L | .230/5,84 | .260/6,60 |

SGS-THOMSON MICROELECTRONICS

# SD1400-02

## RF & MICROWAVE TRANSISTORS 800/900 MHz APPLICATIONS

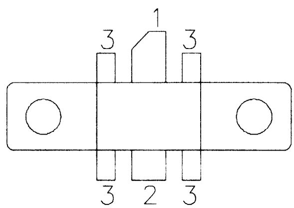
- 900 MHz
- 24 VOLTS
- COMMON BASE
- EFFICIENCY 55%
- GOLD METALLIZATION
- $P_{OUT}$ = 14 W MIN. WITH 9.7 dB GAIN



**.230 6LFL (M118)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1400-02 | SD1400-2 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base

### DESCRIPTION

The SD1400-02 is a 24 V Class C epitaxial silicon NPN planar transistor designed for base station applications in cellular telephone systems. The SD1400-02 uses matched input technology (tuned Q) to increase bandwidth and power gain over the 806 - 900 MHz range. It withstands 20:1 VSWR at rated conditions.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 55 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 28 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 55 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 2.0 | A |
| $P_{DISS}$ | Power Dissipation | 57.5 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 3.0 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CES}$* | $I_C$ = 50mA | $V_{BE}$ = 0V | 55 | — | — | V |
| $BV_{CEO}$* | $I_C$ = 50mA | $I_B$ = 0mA | 28 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 15V | $I_E$ = 0mA | — | — | 2.5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1A | 20 | — | — | — |

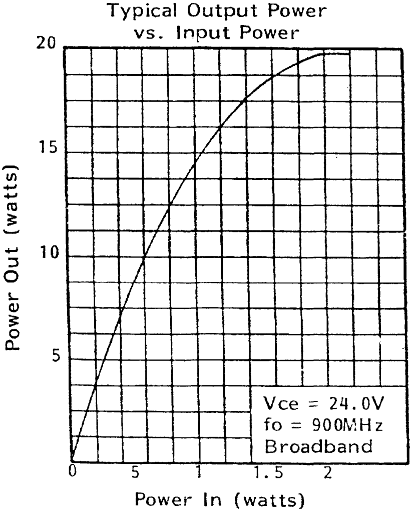
DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 900 MHz | $P_{IN}$ = 1.5W | $V_{CE}$ = 24 V | 14 | — | — | W |
| $\eta_C$ | f = 900 MHz | $P_{IN}$ = 1.5W | $V_{CE}$ = 24 V | — | 55 | — | % |
| $G_P$ | f = 900 MHz | $P_{IN}$ = 1.5W | $V_{CE}$ = 24 V | 9.7 | — | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 24 V | | — | 12 | — | pF |

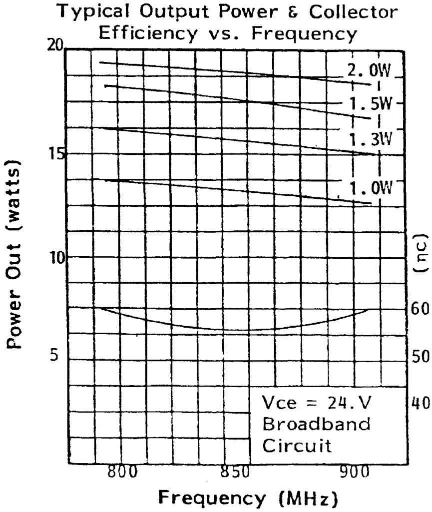
Note: * Pulsed through 25mH Inductor

## TYPICAL PERFORMANCE

### POWER OUTPUT vs POWER INPUT




### POWER OUTPUT & COLLECTOR EFFICIENCY vs FRQUENCY

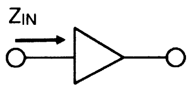


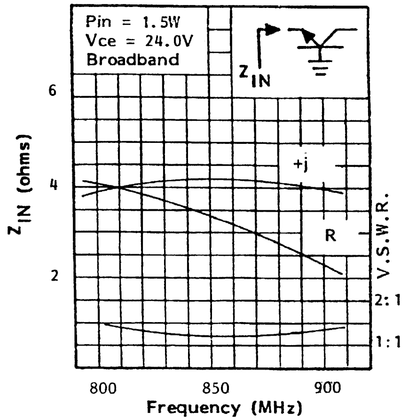



SGS-THOMSON
MICROELECTRONICS

## IMPEDANCE DATA

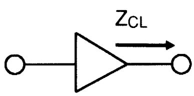
### TYPICAL INPUT IMPEDANCE

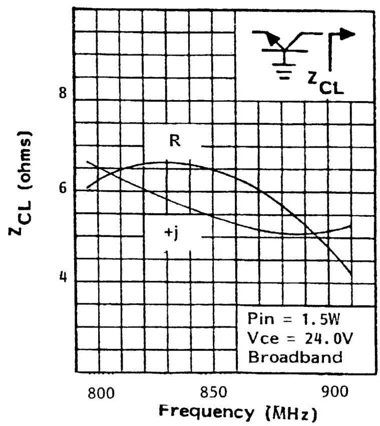



| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 900 MHz | 2.3 + j 4.0 | 4.8 + j 5.2 |

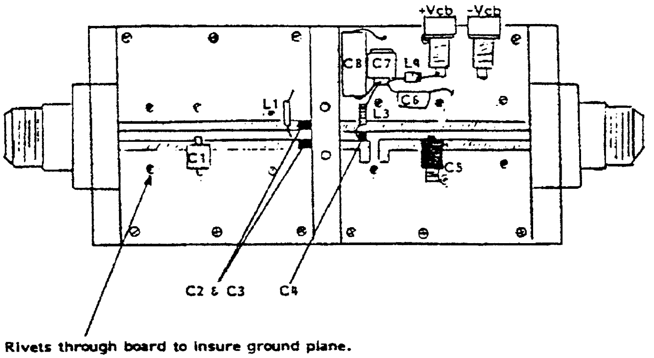
### TYPICAL COLLECTOR LOAD IMPEDANCE



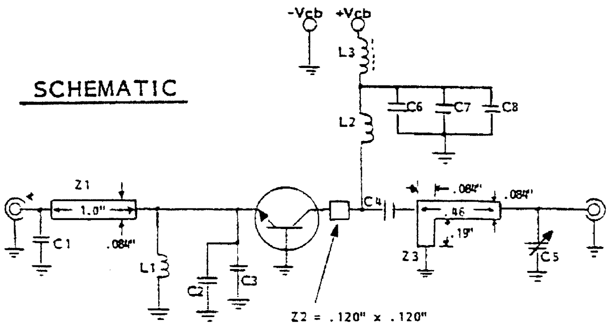



## TEST CIRCUIT

LAY-OUT (800-900MHz Vcb = +25V)




SCHEMATIC

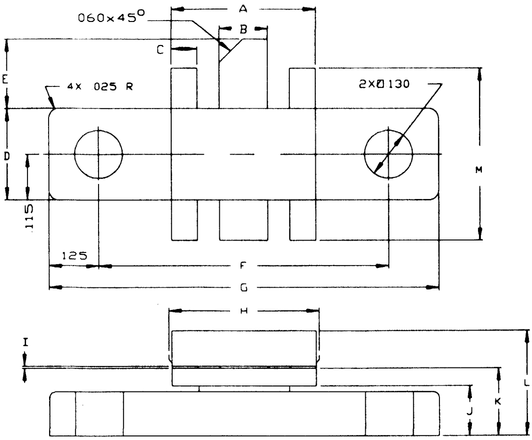



| | | |
|---|---|---|
| C1 | : | 5pF Unelco |
| C2 | : | 12pF ATC 100 mils Chip Capacitor |
| C3 | : | 12pF ATC 100 mils Chip Capacitor |
| C4 | : | 18pF ATC 100 mils Chip Capacitor |
| C5 | : | 0.6pF ATC 100 mils Chip Capacitor |
| C6 | : | 0.1µF Disc |
| C7 | : | 1000pF Unelco |
| C8 | : | 47µF 63V Electrolytic |
| L1 | : | .15mH Molded Choke |
| L2 | : | #24 AWG Insulated 12 Turns with .090" Diameter |
| L3 | : | #22 Enamel with 2 Turns in a Ferroxcube Bead (ferrite) #56-590-65/38 |

Board Material : Glass Teflon 1/32" Thick #3M-K-6098

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0118



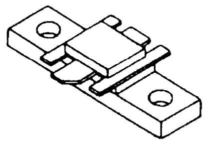

| SGS-THOMSON MICROELECTRONICS | | | CONT'D | | |
|---|---|---|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm | | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .355/9.02 | .365/9.27 | K | .160/4.06 | .180/4.57 |
| B | .115/2.92 | .125/3.18 | L | .250/6.35 | .275/6.99 |
| C | .060/1.52 | .070/1.78 | M | .420/10.67 | .450/11.43 |
| D | .225/5.72 | .235/5.97 | | | |
| E | .150/3.81 | .170/4.32 | | | |
| F | .720/18.29 | .730/18.54 | | | |
| G | .970/24.64 | .980/24.89 | | | |
| H | .355/9.02 | .365/9.27 | | | |
| I | .004/0.10 | .006/0.15 | | | |
| J | .120/3.05 | .130/3.30 | | | |

SGS-THOMSON MICROELECTRONICS

# SD1400-03

## RF & MICROWAVE TRANSISTORS 800/900 MHz APPLICATIONS

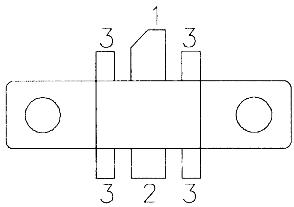
- 960 MHz
- 24 VOLTS
- COMMON BASE
- EFFICIENCY 50%
- GOLD METALLIZATION
- $P_{OUT}$ = 14 W MIN. WITH 9.5 dB GAIN



**.230 6LFL (M118)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1400-03 | SD1400-3 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base

## DESCRIPTION

The SD1400-03 is a 24 V Class C epitaxial silicon NPN planar transistor designed for amplifier applications in the 900 - 960 MHz frequency range. Internal input matching and common base configuration assure optimum gain and efficiency across the entire frequeny band.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 55 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 28 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 55 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 2.0 | A |
| $P_{DISS}$ | Power Dissipation | 50 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 3.5 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

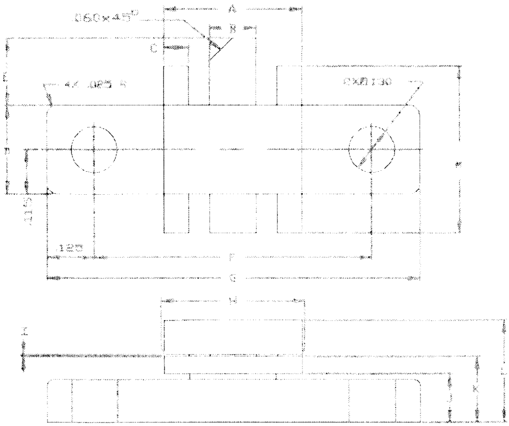
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CES}$ | $I_C$ = 50mA | $V_{BE}$ = 0V | 55 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 50mA | $I_B$ = 0mA | 28 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 15V | $I_E$ = 0mA | — | — | 2.5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1A | 30 | — | 200 | — |

DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 960 MHz | $P_{IN}$ = 1.6 W | $V_{CE}$ = 24 V | 14 | — | — | W |
| $\eta_C$ | f = 960 MHz | $P_{IN}$ = 1.6 W | $V_{CE}$ = 24 V | 50 | — | — | % |
| $G_P$ | f = 960 MHz | $P_{IN}$ = 1.6 W | $V_{CE}$ = 24 V | 9.5 | — | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 24 V | | — | — | 18 | pF |

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0118



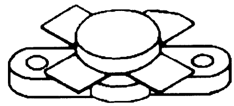

| SGS-THOMSON MICROELECTRONICS | | | CONT'D | | |
|---|---|---|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm | | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .355/9,02 | .365/9,27 | K | .160/4,06 | .180/4,57 |
| B | .115/2,92 | .125/3,18 | L | .250/6,35 | .275/6,99 |
| C | .060/1,52 | .070/1,78 | M | .420/10,67 | .450/11,43 |
| D | .225/5,72 | .235/5,97 | | | |
| E | .150/3,81 | .170/4,32 | | | |
| F | .720/18,29 | .730/18,54 | | | |
| G | .970/24,64 | .980/24,89 | | | |
| H | .355/9,02 | .365/9,27 | | | |
| I | .004/0,10 | .006/0,15 | | | |
| J | .120/3,05 | .130/3,30 | | | |

SGS-THOMSON MICROELECTRONICS

# SD1405

## RF & MICROWAVE TRANSISTORS HF SSB APPLICATIONS

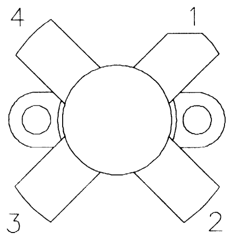
- 30 MHz
- 12.5 VOLTS
- COMMON EMITTER
- IMD –32 dB
- GOLD METALLIZATION
- $P_{OUT}$ = 75 W MIN. WITH 13 dB GAIN



**.500 4LFL (M174)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1405 | SD1405 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

### DESCRIPTION

The SD1405 is a 12.5 V Class C epitaxial silicon NPN planar transistor designed primarily for HF communications. This device utilizes diffused emitter resistors to achieve infinte VSWR under rated operating conditions.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 36 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 18 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 20 | A |
| $P_{DISS}$ | Power Dissipation | 270 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 0.65 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 50mA | $I_E$ = 0mA | 36 | — | — | V |
| $BV_{CES}$ | $I_C$ = 100mA | $V_{BE}$ = 0V | 36 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 100mA | $I_B$ = 0mA | 18 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 15V | $I_E$ = 0mA | — | — | 15 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 5A | 20 | — | — | — |

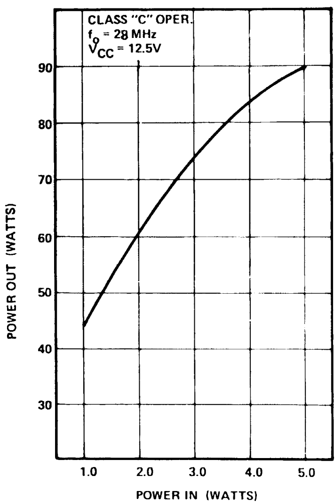
### DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 30 MHz | $P_{IN}$ = 3.8 W | $V_{CE}$ = 12.5 V | 75 | — | — | W |
| $G_P$ | f = 30 MHz | $P_{IN}$ = 3.8 W | $V_{CE}$ = 12.5 V | 13 | — | — | dB |
| IMD* | f = 30 MHz | $V_{CE}$ = 12.5 V | $I_{CQ}$ = 100 mA | –32 | — | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 12 V | | — | 350 | — | pF |

Note: *$P_{OUT}$ = 60WPEP, $f_O$ = 30 + 30.001 MHz

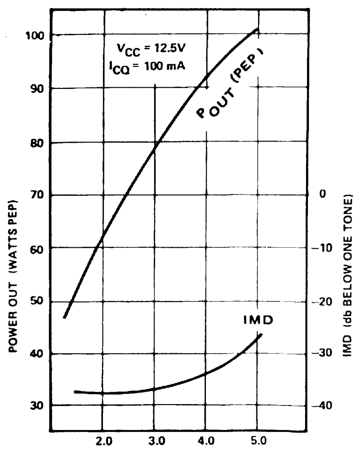
## TYPICAL PERFORMANCE

### POWER OUTPUT vs POWER INPUT




POWER OUT VS. POWER IN

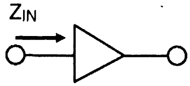
### POWER OUTPUT vs POWER INPUT TWO TONE TEST



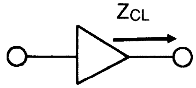

TWO TONE TEST
28.000 & 28.001 MHz

## IMPEDANCE DATA

**TYPICAL INPUT IMPEDANCE**

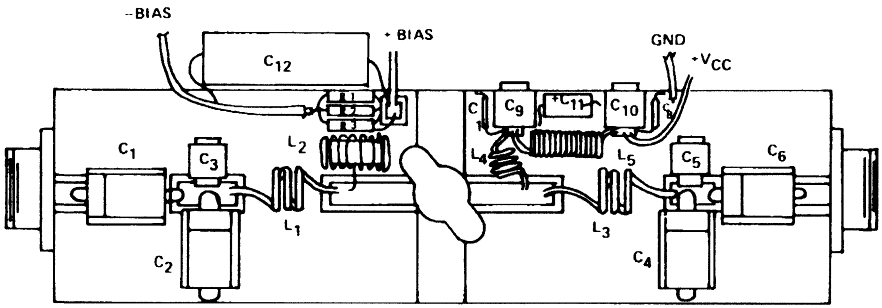


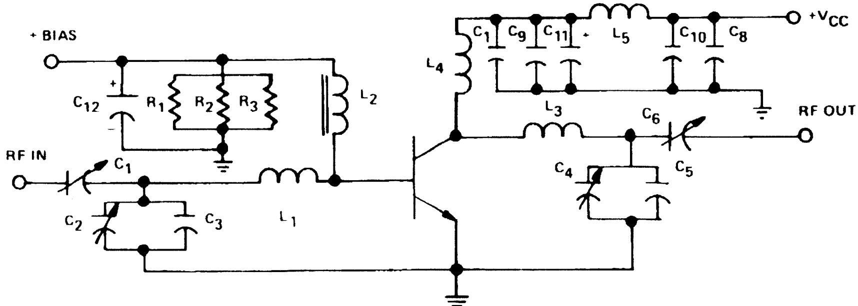

**TYPICAL COLLECTOR LOAD IMPEDANCE**




| FREQ. | ZIN (Ω) | ZCL (Ω) |
|---|---|---|
| 30 MHz | 0.7 + j 0.75 | 1.2 + j 1.0 |

## TEST CIRCUIT

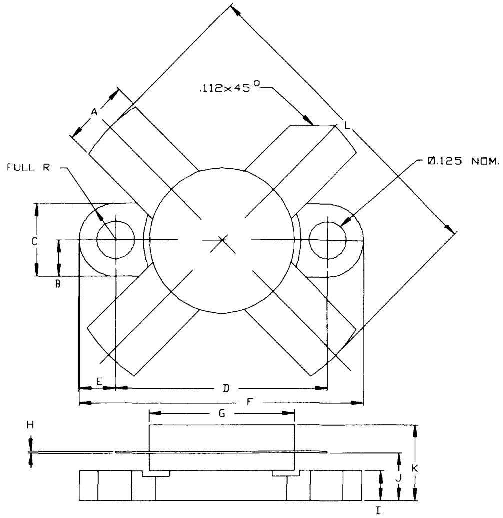



| | | |
|---|---|---|
| C1 | : | 9 - 180 pF, Arco 463 |
| C2,C4 | : | 5 - 380pF, Arco 465 |
| C3,C5 | : | 200pF, Unelco |
| C6 | : | 110 - 580pF, Arco 467 |
| C7,C8 | : | 0.1µF Ceramic Disk |
| C9,C10 | : | 1000pF, Unelco |
| C11 | : | 10µF, Electrolytic, 35Vdc |
| C12 | : | 1000µF, Electrolytic, 50Vdc |
| L1,L3 | : | 2 1/2 Turns, #14 AWG, 1/4" I.D. Loose Wound |
| L2 | : | 16 Turns, #16 AWG, Enameled Wire On Micrometals Torroid #T-94 |
| L4 | : | 3 1/2 Turns, #16 AWG, Enameled Wire, 1/4" I.D. |
| L5 | : | 14 Turns, #16 AWG, Enameled Wire, 1/4" I.D. |
| R1,R2,R3 | : | 1.5 Ohm, 1 Watt Carbon |

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0174

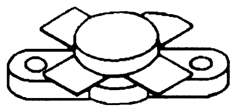



| SGS-THOMSON MICROELECTRONICS | MINIMUM Inches/mm | MAXIMUM Inches/mm |
|---|---|---|
| A | .220/5,59 | .230/5,84 |
| B | .125/3,18 | |
| C | .245/6,22 | .255/6,48 |
| D | .720/18,28 | .730/18,54 |
| E | .125/3,18 | |
| F | .970/24,64 | .980/24,89 |
| G | .495/12,57 | .505/12,83 |
| H | .003/0,08 | .007/0,18 |
| I | .090/2,29 | .110/2,79 |
| J | .160/4,06 | .175/4,45 |

| CONT'D | MINIMUM Inches/mm | MAXIMUM Inches/mm |
|---|---|---|
| K | | .280/7,11 |
| L | | 1.050/26,67 |

# RF & MICROWAVE TRANSISTORS
# HF SSB APPLICATIONS

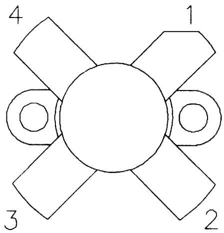
- 30 MHz
- 28 VOLTS
- IMD –30 dB
- COMMON EMITTER
- GOLD METALLIZATION
- $P_{OUT}$ = 125 W MIN. WITH 15 dB GAIN



**.500 4LFL (M174)**
epoxy sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| SD1407 | 1407 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

## DESCRIPTION

The SD1407 is a 28 V epitaxial silicon NPN planar transistor designed primarily for SSB communications. This device utilizes state-of-the-art diffused emitter ballasting for improved ruggedness and reliability.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 65 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 36 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 20 | A |
| $P_{DISS}$ | Power Dissipation | 270 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j\text{-}c)}$ | Junction-Case Thermal Resistance | 0.65 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 100mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{CES}$ | $I_C$ = 100mA | $V_{BE}$ = 0V | 65 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 100mA | $I_B$ = 0mA | 35 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 30V | $I_E$ = 0mA | — | — | 15 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 5A | 10 | — | 200 | — |

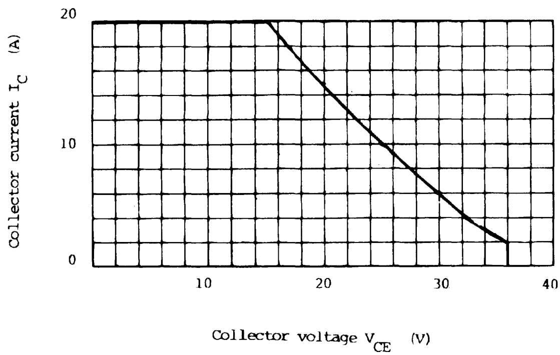
DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 30 MHz | $P_{IN}$ = 3.95 W | $V_{CE}$ = 28 V | 125 | — | — | W |
| $G_P$ | f = 30 MHz | $P_{IN}$ = 3.95 W | $V_{CE}$ = 28 V | 15 | 16 | — | dB |
| IMD* | f = 30 MHz | $V_{CE}$ = 28 V | $I_{CQ}$ = 100 mA | — | –34 | –30 | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 30 V | | — | 250 | — | pF |

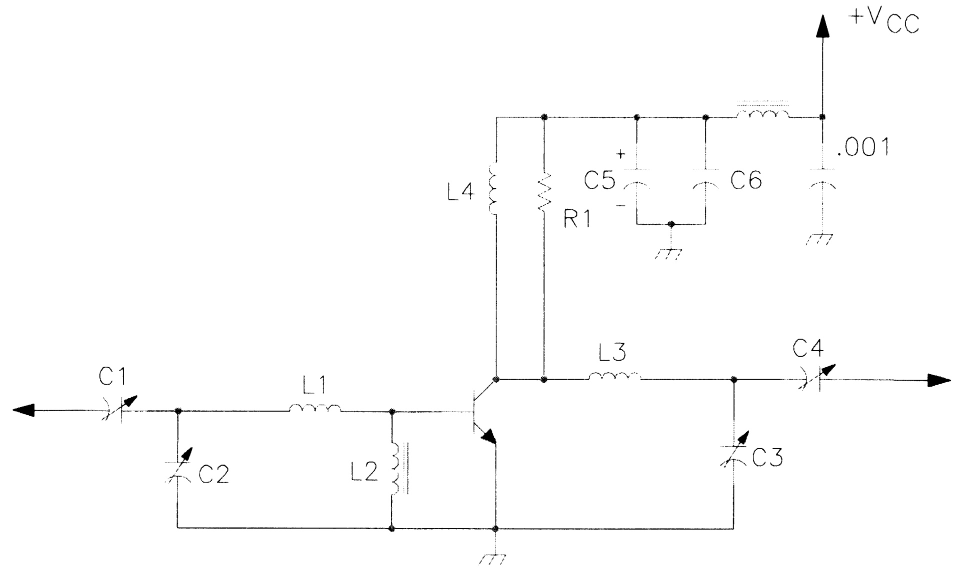
Note: *$P_{OUT}$ = 100W PEP, $f_O$ = 30 + 30.001 MHz

## TYPICAL PERFORMANCE

### SAFE OPERATING AREA



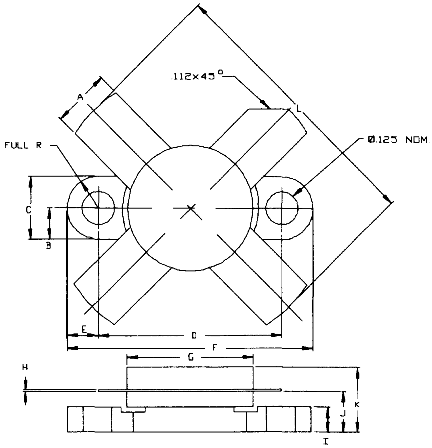
## TEST CIRCUIT




| | | | | | |
|---|---|---|---|---|---|
| C1 | : | 24 - 200pF Arco 425 | L1 | : | 4 Turns, #16 AWG, Tinned, 0.40" I.D. |
| C2,C4 | : | 50 - 380pF Arco 465 | L2,L5 | : | 1 Turn, #22 AWG, Tinned, formed with VK-200 #4B Ferroxcube |
| C3 | : | 9 - 180pF Arco 463 | | | |
| C5 | : | 10µF, Electrolytic, 35Vdc | L4 | : | 17 Turns, #18 Enameled Wire Wrapped Around R1 |
| C6 | : | 0.01µF, 100V, Ceramic | R1 | : | 390Ω Resistor (2 Watt) |

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0174




| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .220/5,59 | .230/5,84 |
| B | .125/3,18 | |
| C | .245/6,22 | .255/6,48 |
| D | .720/18,28 | .730/18,54 |
| E | .125/3,18 | |
| F | .970/24,64 | .980/24,89 |
| G | .495/12,57 | .505/12,83 |
| H | .003/0,08 | .007/0,18 |
| I | .090/2,29 | .110/2,79 |
| J | .160/4,06 | .175/4,45 |

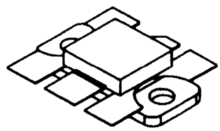
| CONT'D | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| K | | .280/7,11 |
| L | | 1.050/26,67 |

SGS-THOMSON MICROELECTRONICS

# SD1411

## RF & MICROWAVE TRANSISTORS HF SSB APPLICATIONS

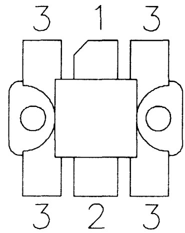
- 30 MHz
- 40 VOLTS
- IMD −30 dB
- COMMON EMITTER
- GOLD METALLIZATION
- $P_{OUT}$ = 200 W MIN. WITH 16 dB GAIN



**.400 x .425 6LFL (M153)**
epoxy sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| SD1411 | SD1411 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter

### DESCRIPTION

The SD1411 is a silicon NPN transistor designed for telecommunications in HF and VHF frequency bands. This device utilizes gold metallized die with diffused emitter resistors to achieve high reliability and ruggedness.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 110 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 55 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 40 | A |
| $P_{DISS}$ | Power Dissipation | 330 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | − 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 0.36 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

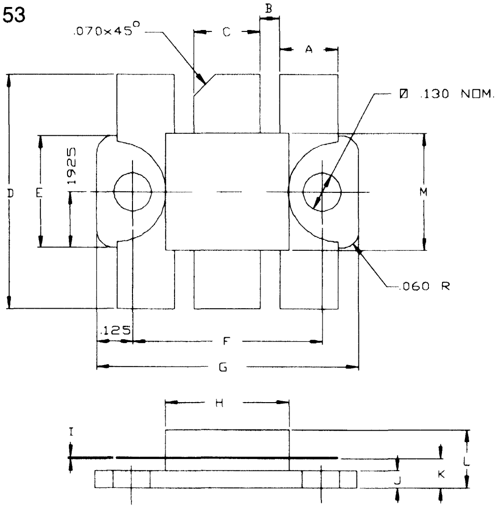
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 200mA | $I_E$ = 0mA | 110 | — | — | V |
| $BV_{CES}$ | $I_C$ = 200mA | $V_{BE}$ = 0V | 110 | — | — | V |
| $BV_{CER}$ | $I_C$ = 200mA | $R_{BE}$ = 10Ω | 100 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 200mA | $I_B$ = 0mA | 55 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 20mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 45V | $I_E$ = 0mA | — | — | 20 | mA |
| $h_{FE}$ | $V_{CE}$ = 6V | $I_C$ = 10A | 15 | — | 80 | — |

DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 30 MHz | $V_{CE}$ = 40 V | $I_{CQ}$ = 150 mA | 200 | — | — | W |
| $G_P$ | f = 30 MHz | $V_{CE}$ = 40 V | $I_{CQ}$ = 150 mA | 16 | — | — | dB |
| IMD | f = 30 MHz | $V_{CE}$ = 40 V | $I_{CQ}$ = 150 mA | — | — | –30 | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 50 V | | — | — | 360 | pF |

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0153



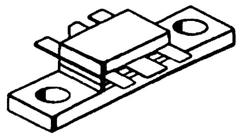

| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .195/4,95 | .205/5,21 |
| B | .067/1,70 | |
| C | .220/5,59 | .230/5,84 |
| D | .790/20,07 | .810/20,57 |
| E | .380/9,65 | .390/9,91 |
| F | .645/16,38 | .655/16,64 |
| G | .885/22,48 | .905/22,98 |
| H | .420/10,67 | .430/10,92 |
| I | .003/0,08 | .007/0,18 |
| J | .055/1,40 | .065/1,65 |

| CONT'D | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| K | .095/2,41 | .110/2,79 |
| L | | .220/5,59 |
| M | .395/10,03 | .405/10,29 |
| | | |

# SD1414

## RF & MICROWAVE TRANSISTORS
## 800-900 MHz APPLICATIONS

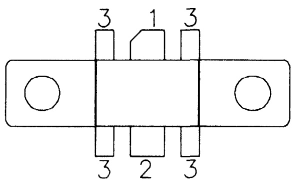
- 836 MHz
- 12.5 VOLTS
- COMMON BASE
- $P_{OUT}$ = 45 W MIN. WITH 4.7 dB GAIN



**.230 6LFL (M142)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1414 | SD1414 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base

### DESCRIPTION

The SD1414 is a 12.5 V Class C epitaxial silicon NPN planar transistor designed for amplifier applications in the 806 - 866 MHz frequency range. Internal input matching and common base configuration assure optimum gain and efficiency across the entire frequency band. The SD1414 withstands infinite VSWR at rated power output.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 36 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 18 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 36 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 9.0 | A |
| $P_{DISS}$ | Power Dissipation | 150 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 1.2 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

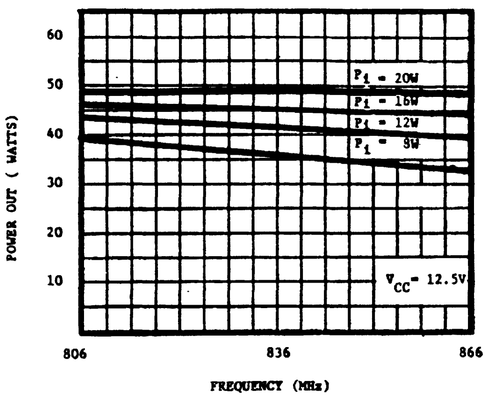
| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CES}$ | $I_C$ = 50mA | $V_{BE}$ = 0V | 36 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 50mA | $I_B$ = 0mA | 18 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 15V | $I_E$ = 0mA | — | — | 5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1A | 5 | — | 200 | — |

DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 836 MHz | $P_{IN}$ = 15 W | $V_{CE}$ = 12.5 V | 45 | — | — | W |
| $G_P$ | f = 836 MHz | $P_{IN}$ = 15 W | $V_{CE}$ = 12.5 V | 4.7 | — | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 12.5 V | | — | 80 | — | pF |

## TYPICAL PERFORMANCE

### POWER OUTPUT vs FREQUENCY

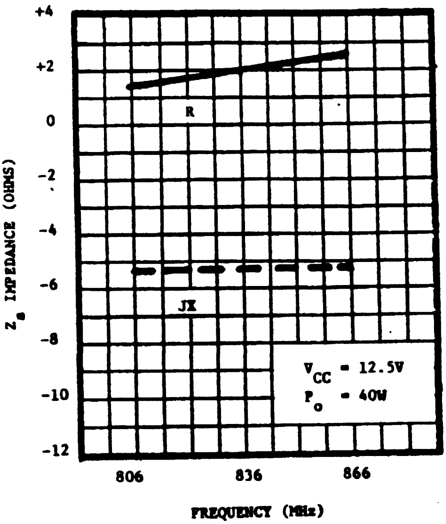




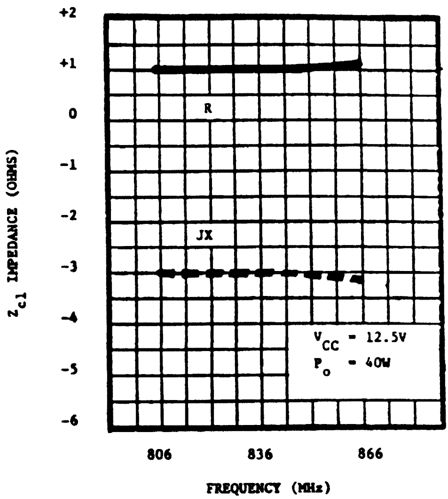

SGS-THOMSON MICROELECTRONICS

## IMPEDANCE DATA

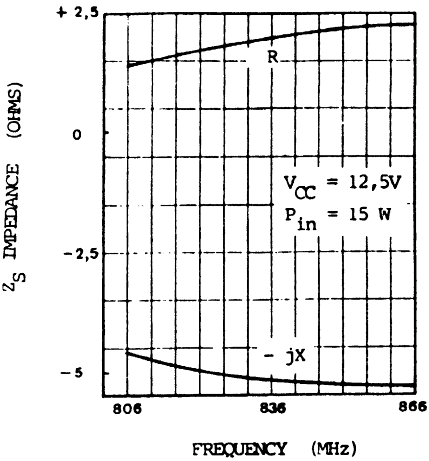
### TYPICAL INPUT IMPEDANCE



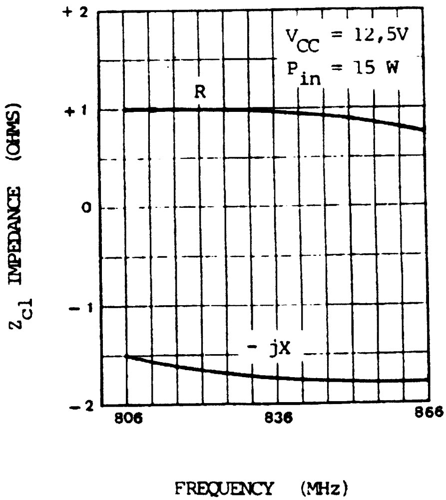

### TYPICAL COLLECTOR LOAD IMPEDANCE



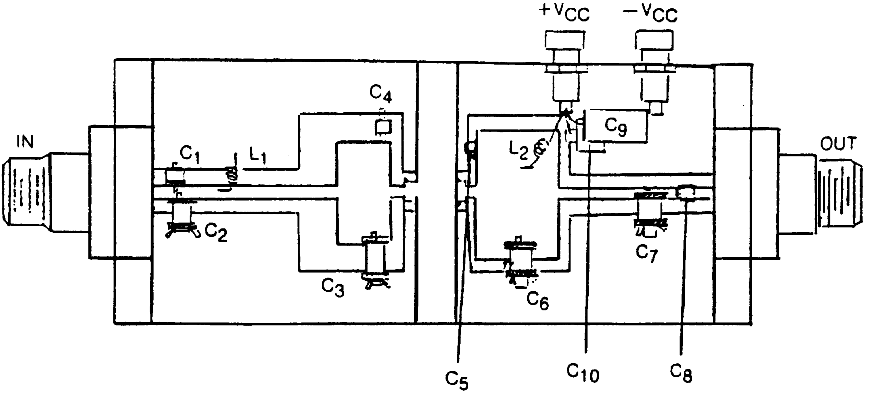

### TYPICAL INPUT IMPEDANCE

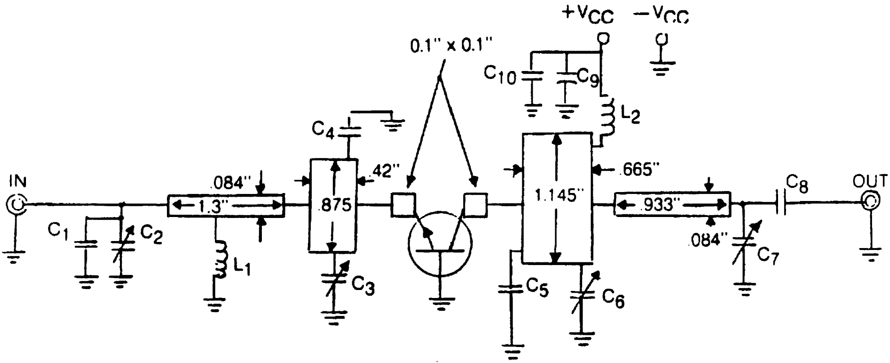



### TYPICAL COLLECTOR LOAD IMPEDANCE



## TEST CIRCUIT



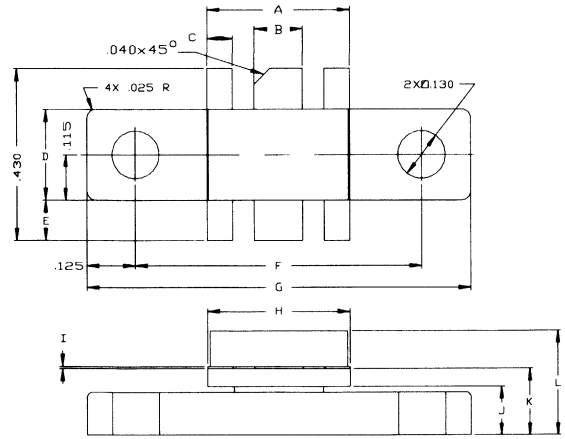

C1, C4 : 5pF ATC 100 mils Chip Capacitor
C2 : 1 - 12pF Variable Capacitor
C3 : .6 - 6pF Variable Capacitor
C5 : 2pF "A" Size Chip Capacitor
C6, C7 : .6 - 12pF Voltronic Variable Capacitor

C8 : 480pF ATC 100 mils Chip Capacitor
C9 : 47µF, 63V, Electrolytic Capacitor
C10 : 1000pF Unelco Capacitor
L1, L2 : 5 Turns #24 AWG Enamel

Board Material: 3M-K-6098-11 12.9 mils Thick

## PACKAGE MECHANICAL DATA

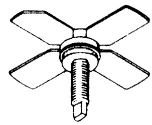
Ref.: Dwg. No.12-0




| SGS-THOMSON MICROELECTRONICS | | | CONT'D | | |
|---|---|---|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm | | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .355/9,02 | .365/9,27 | K | .160/4,06 | .180/4,57 |
| B | .115/2,92 | .125/3,18 | L | .230/5,84 | .260/6,60 |
| C | .075/1,91 | .085/2,16 | | | |
| D | .225/5,72 | .235/5,97 | | | |
| E | .090/2,29 | .110/2,79 | | | |
| F | .720/18,29 | .730/18,54 | | | |
| G | .970/24,64 | .980/24,89 | | | |
| H | .355/9,02 | .365/9,27 | | | |
| I | .004/0,10 | .006/0,15 | | | |
| J | .120/3,05 | .130/3,30 | | | |

# RF & MICROWAVE TRANSISTORS
# 800-900 MHz BASE STATION APPLICATIONS

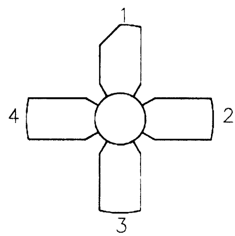
- 860 - 960 MHz
- 24 VOLTS
- COMMON EMITTER
- GOLD METALLIZATION
- CLASS A LINEAR OPERATION
- $P_{OUT}$ = 2.1 W MIN. WITH 9.0 dB GAIN



**.280 4L STUD (M122)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1420 | SD1420 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

## DESCRIPTION

The SD1420 is a gold metallized epitaxial silicon NPN planar transistor designed for high linearity Class A operation Cellular Base Station applications. The SD1420 is also available in a studless package as the SD1420-01.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 40 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 28 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.5 | V |
| $I_C$ | Device Current | .250 | A |
| $P_{DISS}$ | Power Dissipation | 7 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 55 to +150 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 20 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case} = 25°C$)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C = 1mA$ | $I_E = 0mA$ | 40 | — | — | V |
| $BV_{CEO}$ | $I_C = 1mA$ | $I_B = 0mA$ | 28 | — | — | V |
| $BV_{EBO}$ | $I_E = 1mA$ | $I_C = 0mA$ | 3.5 | — | — | V |
| $I_{CBO}$ | $V_{CB} = 24V$ | $I_E = 0mA$ | — | — | .5 | mA |
| $h_{FE}$ | $V_{CE} = 5V$ | $I_C = 100mA$ | 20 | — | 120 | — |

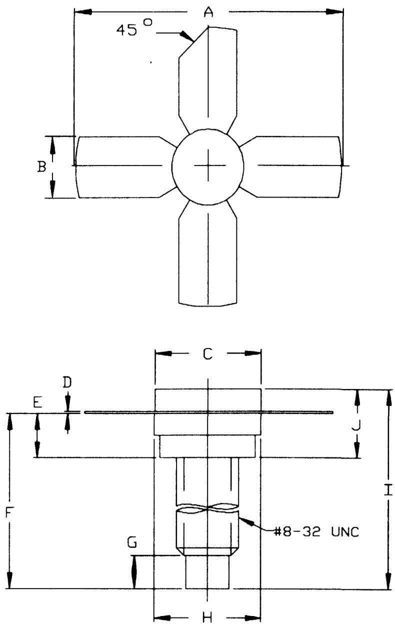
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 960 MHz | $V_{CE} = 24$ V | $I_{CQ} = 200mA$ | 2.1 | — | — | W |
| $G_P$ | f = 960 MHz | $V_{CE} = 24$ V | $I_{CQ} = 200mA$ | 8.9 | 9.0 | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB} = 28$ V | | — | — | 5 | pF |

Note: $^*P_{IN} = 0.27$ W

## PACKAGE MECHANICAL DATA

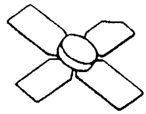
Ref.: Dwg. No.12-0122




| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | 1.010/25,65 | 1.055/26,80 |
| B | .220/5,59 | .230/5,84 |
| C | .270/6,86 | .285/7,24 |
| D | .003/0,08 | .007/0,18 |
| E | .117/2,97 | .137/3,48 |
| F | .572/14,53 | |
| G | .130/3,30 | |
| H | .275/6,99 | .285/7,24 |
| I | .640/16,26 | |
| J | .175/4,45 | .217/5,51 |

# RF & MICROWAVE TRANSISTORS
# 800-900 MHz BASE STATION APPLICATIONS

- 860 - 960 MHz
- 24 VOLTS
- COMMON EMITTER
- GOLD METALLIZATION
- CLASS A LINEAR OPERATION
- $P_{OUT}$ = 0.9 W MIN. WITH 9.5 dB GAIN

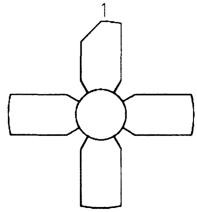


**.280 4LSL (M123)**
epoxy sealed

**ORDER CODE** SD1420-01

**BRANDING** 1420-1

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

## DESCRIPTION

The SD1420 is a gold metallized epitaxial silicon NPN planar transistor designed for high linearity Class A operation Cellular Base Station applications. The SD1420-01 is also available in a stud package as the SD1420.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 40 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 28 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.5 | V |
| $I_C$ | Device Current | .250 | A |
| $P_{DISS}$ | Power Dissipation | 7 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 55 to +150 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 20 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 1mA | $I_E$ = 0mA | 40 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 1mA | $I_B$ = 0mA | 28 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 24V | $I_E$ = 0mA | — | — | .5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 100mA | 20 | — | 120 | — |

DYNAMIC

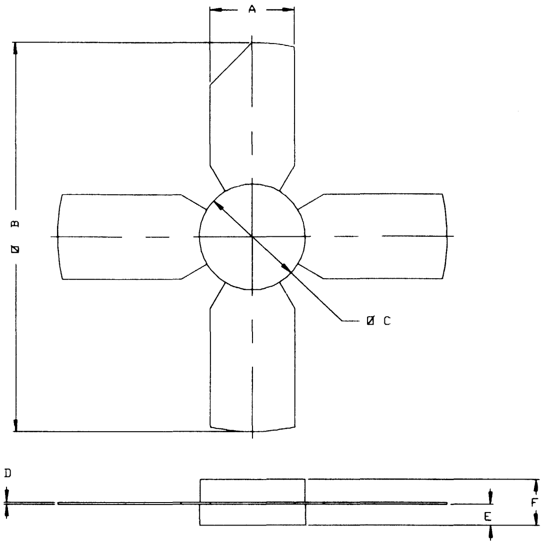
| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 960 MHz | $V_{CE}$ = 24 V | $I_{CQ}$ = 125 mA | 0.9 | — | — | W |
| $G_P$ | f = 960 MHz | $V_{CE}$ = 24 V | $I_{CQ}$ = 125 mA | 9.5 | — | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 28 V | | — | — | 5 | pF |

Note: $P_{IN}$ = 0.1 W

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0123

| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .220/5,59 | .230/5,84 |
| B | ------ | 1.055/26,8 |
| C | 275/6,99 | .285/7,24 |
| D | .004/0,10 | .006/0,15 |
| E | .050/1,27 | .060/1,52 |
| F | .118/3,00 | .130/3,30 |
| | | |

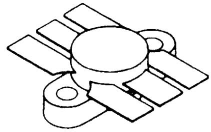


SGS-THOMSON MICROELECTRONICS

# SD1422

## RF & MICROWAVE TRANSISTORS UHF MOBILE APPLICATIONS

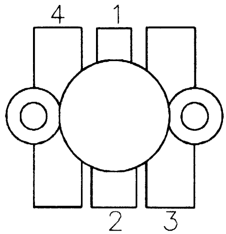
- 470 MHz
- 12.5 VOLTS
- COMMON EMITTER
- GOLD METALLIZATION
- $P_{OUT}$ = 25 W MIN. WITH 6.2 dB GAIN



**.500 6LFL (M111)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1422 | SD1422 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The SD1422 is a 12.5 V Class C epitaxial silicon NPN planar transistor designed for broadband applications in the 450 - 512 MHz land mobile radio band. This device utilizes diffused emitter resistors to withstand 20:1 VSWR at rated operating conditions.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 36 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 16 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 36 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 4.8 | A |
| $P_{DISS}$ | Power Dissipation | 70 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 2.5 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

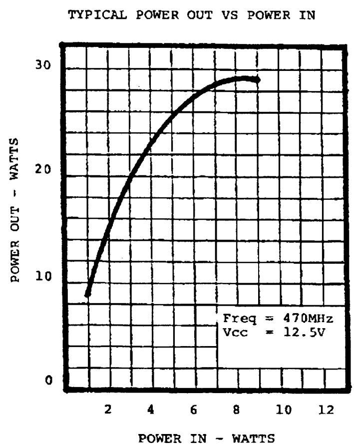
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CES}$ | $I_C$ = 10mA | $V_{BE}$ = 0V | 36 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 50mA | $I_B$ = 0mA | 16 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 5mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 12.5V | $I_E$ = 0mA | — | — | 5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1A | 10 | — | — | — |

DYNAMIC

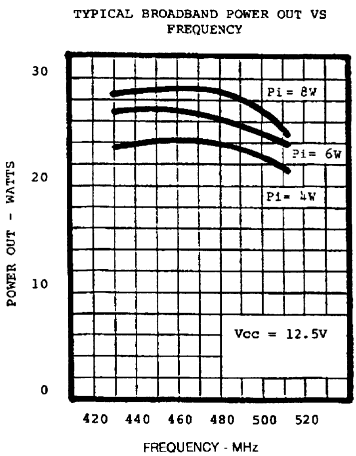
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 470 MHz | $P_{IN}$ = 6.0 W | $V_{CC}$ = 12.5 V | 25 | — | — | W |
| $G_P$ | f = 470 MHz | $P_{IN}$ = 6.0 W | $V_{CC}$ = 12.5 V | 6.2 | — | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 12.5 V | | — | 70 | — | pF |

## TYPICAL PERFORMANCE

### POWER OUTPUT vs POWER INPUT

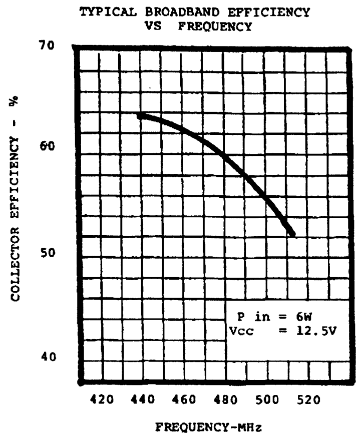



### BROADBAND POWER OUTPUT vs FREQUENCY

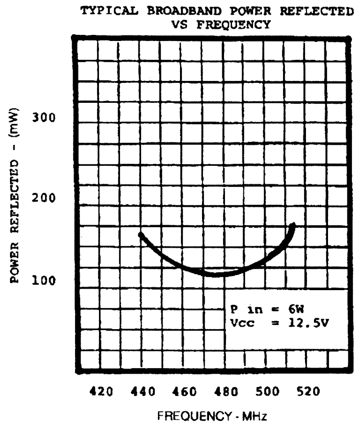


## TYPICAL PERFORMANCE (cont'd)

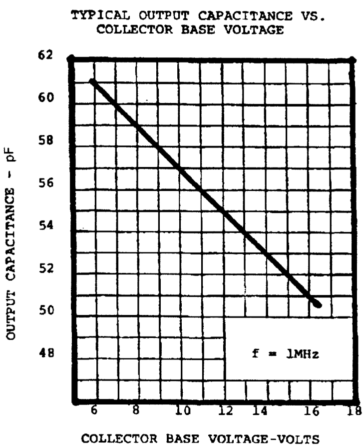
### COLLECTOR EFFICIENCY vs FREQUENCY




### BROADBAND POWER REFLECTED vs FREQUENCY

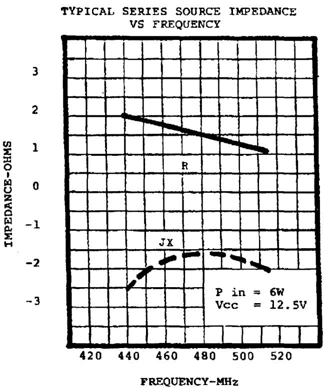



### OUTPUT CAPACITANCE vs COLECTOR BASE VOLTAGE

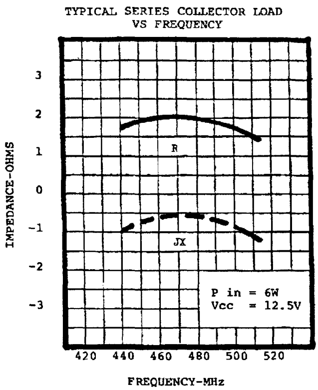


## IMPEDANCE DATA

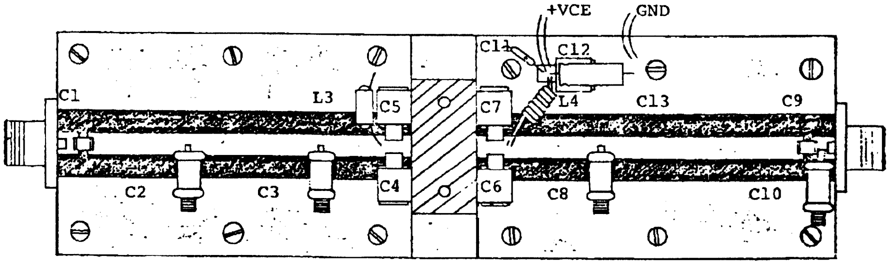
### TYPICAL INPUT IMPEDANCE

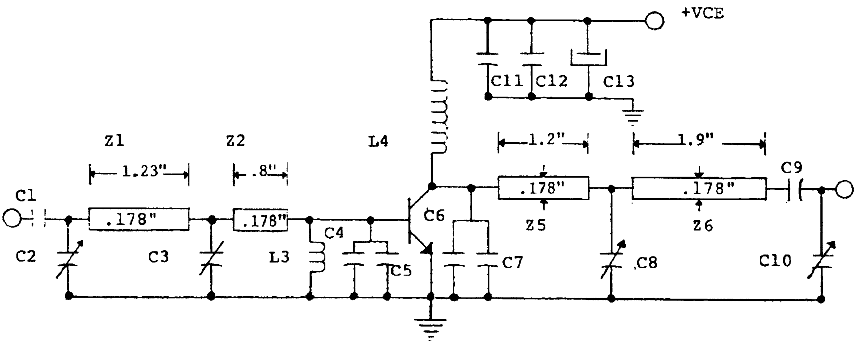



### TYPICAL COLLECTOR LOAD IMPEDANCE



## TEST CIRCUIT



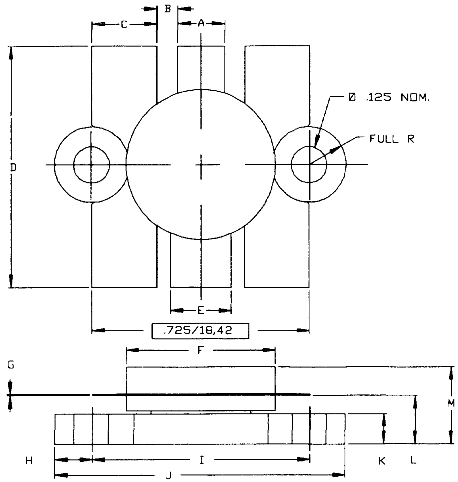

| | | |
|---|---|---|
| C1 | : | ATC 100mils Chip Capacitor 75pF |
| C2, C3<br>C8, C10 | : | Voltronics Air Variable 1-14pF |
| C4, C5 | : | 27pF Unelco |
| C6, C7 | : | 36pF Unelco |
| C9 | : | ATC 100mils Chip Capacitor 750pF |
| C11 | : | 0.10µF, 25V, Erie Disc Capacitor |
| C12 | : | 1000pF Unelco |
| C13 | : | 8.2µF, 25V, Emectronic Capacitor |

| | | |
|---|---|---|
| L3 | : | VK200 21/4B Ferroxcube 1 1/2 Turn |
| L4 | : | 7 Turns #18 AWG .2" I.D. with Wire Spacing |
| Z1 | : | 50Ω Microstrip .178" x 1.23" |
| Z2 | : | 50Ω Microstrip .178" x .8" |
| Z5 | : | 50Ω Microstrip .178" x 1.2" |
| Z6 | : | 50Ω Microstrip .178" x 1.9" |

Board Material: 3M-k6098 1/16" Thick

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0111




| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .150/3,43 | .160/4,06 |
| B | .045/1,14 | |
| C | .210/5,33 | .220/5,59 |
| D | .835/21,21 | .865/21,97 |
| E | .200/5,08 | .210/5,33 |
| F | .490/12,45 | .510/12,95 |
| G | .003/0,08 | .007/0,18 |
| H | .125/3,18 | |
| I | .720/18,29 | .730/18,54 |
| J | .970/24,64 | .980/24,89 |

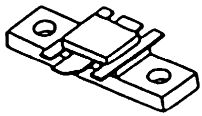
| CONT'D | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| K | .095/2,41 | .105/2,67 |
| L | .150/3,81 | .170/4,32 |
| M | | .280/7,11 |

SGS-THOMSON MICROELECTRONICS

# SD1423

## RF & MICROWAVE TRANSISTORS 800-960MHz BASE STATION APPLICATIONS

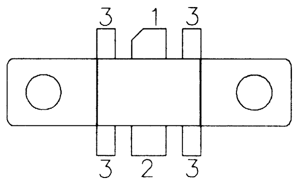
- 800 - 960 MHz
- 24 VOLTS
- EFFICIENCY 50%
- COMMON EMITTER
- GOLD METALLIZATION
- CLASS AB LINEAR OPERATION
- $P_{OUT}$ = 15 W MIN. WITH 8.0 dB GAIN



**.230 6LFL (M142)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1423 | SD1423 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter

### DESCRIPTION

The SD1423 is a gold metallization epitaxial silicon NPN planar transistor using diffused emitter ballast resistors for high linearity Class AB operation for cellular base station applications. The SD1423 is designed as a medium power output device or as the driver for the SD1424.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 48 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 30 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 45 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 2.5 | A |
| $P_{DISS}$ | Power Dissipation | 29 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 6 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 50mA | $I_E$ = 0mA | 48 | 50 | — | V |
| $BV_{CEO}$ | $I_C$ = 20mA | $I_B$ = 0mA | 25 | 30 | — | V |
| $BV_{EBO}$ | $I_E$ = 5mA | $I_C$ = 0mA | 3.5 | 4.0 | — | V |
| $I_{CBO}$ | $V_{CB}$ = 24V | $I_E$ = 0mA | — | — | 1.0 | mA |
| $h_{FE}$ | $V_{CE}$ = 10V | $I_C$ = 100mA | 20 | — | 100 | — |

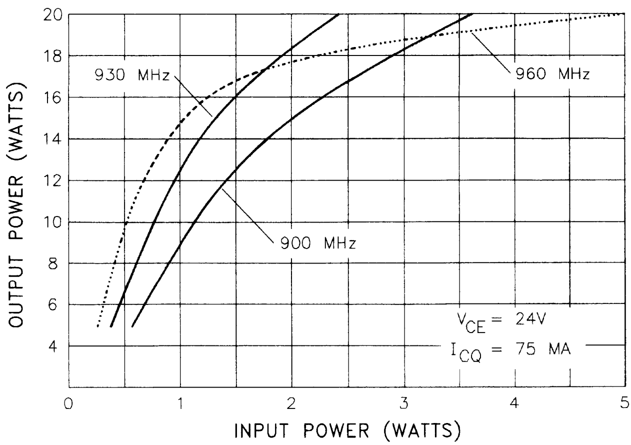
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 960 MHz | $V_{CC}$ = 24 V | $I_{CQ}$ = 75 mA | 15 | — | — | W |
| $G_P$ | f = 960 MHz | $V_{CC}$ = 24 V | $I_{CQ}$ = 75 mA | 8 | — | — | dB |
| $\eta_c$ | f = 960 MHz | $V_{CC}$ = 24 V | $I_{CQ}$ = 75 mA | 45 | 50 | — | % |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 24V | | — | 20 | 24 | pF |

Note: $P_{IN}$ = 2.4 W

## TYPICAL PERFORMANCE

### POWER OUTPUT vs POWER INPUT





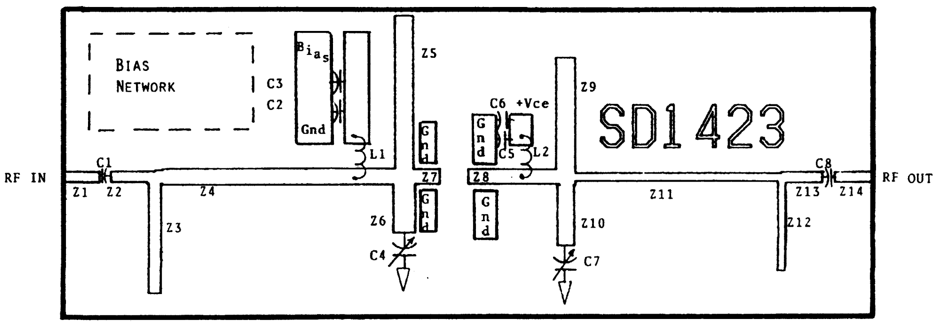

SGS-THOMSON MICROELECTRONICS

## IMPEDANCE DATA

| FREQ. | $Z_{IN}$ ($\Omega$) | $Z_{CL}$ ($\Omega$) |
|---|---|---|
| 900 MHz | 1.30 + j 1.98 | 3.99 + j 5.55 |
| 930 MHz | 1.42 + j 2.31 | 3.18 + j 4.97 |
| 960 MHz | 1.45 + j 2.62 | 2.96 + j 4.07 |

$P_{OUT}$ = 15 W
$V_{CE}$ = 75 mA
$I_{CQ}$ = 24 V

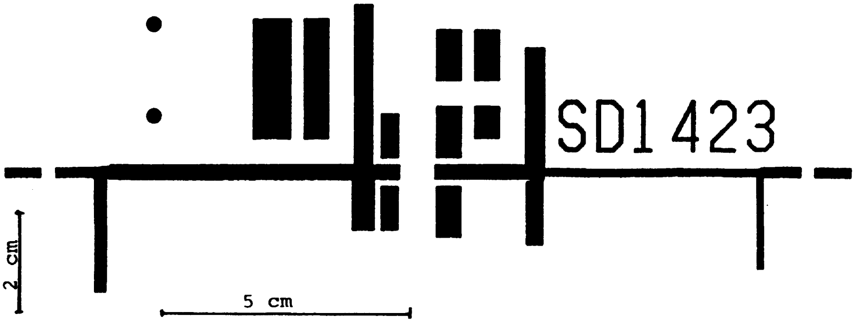
## TEST CIRCUIT




| | | |
|---|---|---|
| C1, C2, C5, C10 | : | 220pF ATC 100B |
| C3, C6 | : | 4.7MFD |
| C4, C7 | : | 0.8 - 8.0pF Johanson Gigatrim |
| L1, L2 | : | 4 Turns, #22 0.15" I.D. |
| Z1, Z2, Z13, Z14 | : | Width 83.25, Length 300 |
| Z3 | : | Width 101, Length 892.5 |
| Z4 | : | Width 124.5, Length 300 |
| Z5 | : | Width 149, Length 1242 |
| Z6 | : | Width 178, Length 393.5 |
| Z7 | : | Width 120, Length 200 |
| Z8 | : | Width 120, Length 720 |
| Z9 | : | Width 155, Length 899 |
| Z10 | : | Width 135.5, Length 490 |
| Z11 | : | Width 63.7, Length 1660 |
| Z12 | : | Width 59.2, Length 718.5 |

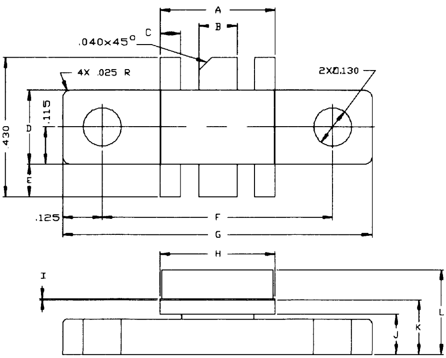
All Measurements in mm unless otherwise specified

## TEST CIRCUIT LAYOUT




## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0142



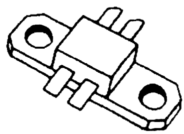

| SGS-THOMSON MICROELECTRONICS | | | CONT'D | | |
|---|---|---|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm | | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .355/9,02 | .365/9,27 | K | .160/4,06 | .180/4,57 |
| B | .115/2,92 | .125/3,18 | L | .230/5,84 | .260/6,60 |
| C | .075/1,91 | .085/2,16 | | | |
| D | .225/5,72 | .235/5,97 | | | |
| E | .090/2,29 | .110/2,79 | | | |
| F | .720/18,29 | .730/18,54 | | | |
| G | .970/24,64 | .980/24,89 | | | |
| H | .355/9,02 | .365/9,27 | | | |
| I | .004/0,10 | .006/0,15 | | | |
| J | .120/3,05 | .130/3,30 | | | |

SGS-THOMSON
MICROELECTRONICS

# SD1424

## RF & MICROWAVE TRANSISTORS
## 800-900 MHz BASE STATION APPLICATIONS

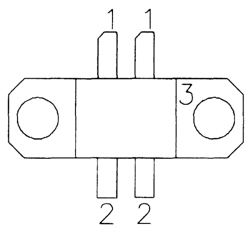
- 800 - 900 MHz
- 24 VOLTS
- COMMON EMITTER
- GOLD METALLIZATION
- INTERNAL INPUT MATCHING
- CLASS AB LINEAR OPERATION
- $P_{OUT}$ = 30 W MIN. WITH 7.5 dB GAIN



**.250 x .320 4LFL (M156)**
epoxy sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| SD1424 | SD1424 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter

### DESCRIPTION

The SD1424 is a gold metallized epitaxial silicon NPN planar transistor using diffused emitter ballast resistors for high linearity Class AB operation in cellular base station application.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 48 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 45 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 5 | A |
| $P_{DISS}$ | Power Dissipation | 43 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 3.0 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case} = 25°C$)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C = 50mA$ | $I_E = 0mA$ | 48 | 50 | — | V |
| $BV_{CEO}$ | $I_C = 20mA$ | $I_B = 0mA$ | 25 | 30 | — | V |
| $BV_{EBO}$ | $I_E = 5mA$ | $I_C = 0mA$ | 3.5 | 4.0 | — | V |
| $I_{CBO}$ | $V_{CB} = 24V$ | $I_E = 0mA$ | — | — | 1.0 | mA |
| $h_{FE}$ | $V_{CE} = 5V$ | $I_C = 100mA$ | 20 | — | 100 | — |

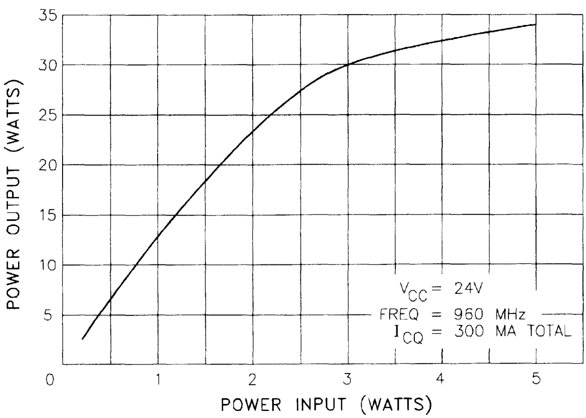
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 960 MHz | $P_{IN} = 5.3$ W | $V_{CC} = 24$ V | 30 | — | — | W |
| $G_P$ | f = 960 MHz | $P_{IN} = 5.3$ W | $V_{CC} = 24$ V | 7.5 | — | — | dB |
| $\eta_c$ | f = 960 MHz | $P_{IN} = 5.3$ W | $V_{CC} = 24$ V | 45 | 50 | — | % |
| $C_{OB}$ | f = 1 MHz | $V_{CB} = 24$ V | | — | 20 | 24 | pF |

Note: $I_{CQ} = 150mA$

## TYPICAL PERFORMANCE

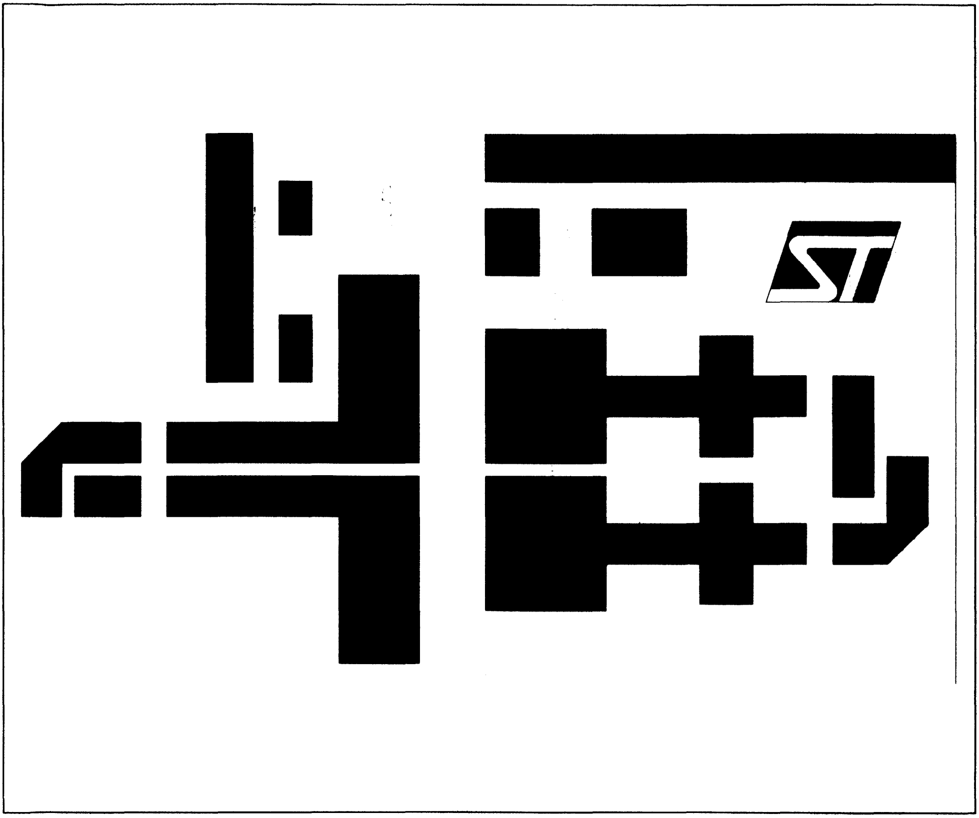
### POWER OUTPUT vs POWER INPUT



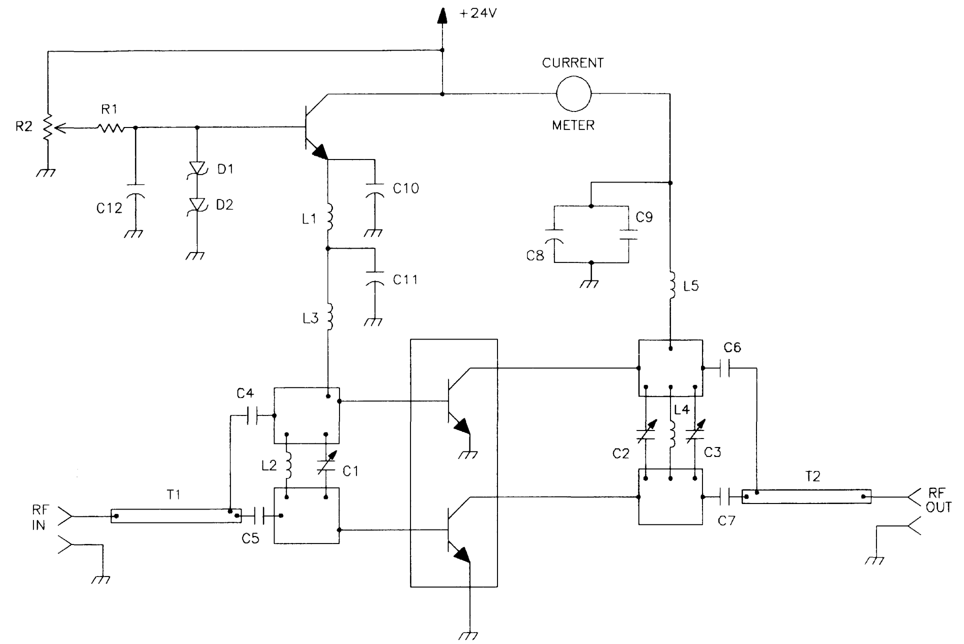



SGS-THOMSON MICROELECTRONICS

## TEST CIRCUIT LAYOUT



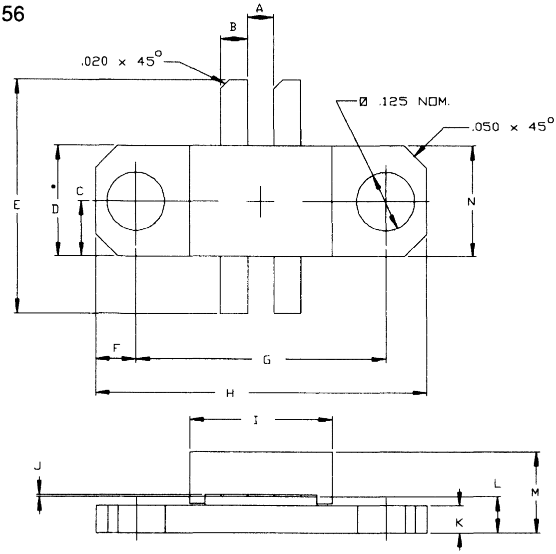
## TEST CIRCUIT




| | | | | | |
|---|---|---|---|---|---|
| C1, C2, C3 | : | 0.8 - 8pF Variable Capacitors | D1, D2 | : | SD1423 Devices |
| C4, C5, C6, C7 | : | 62pF | L1, L2 | : | #22 AWG with Ferrite Core |
| C8 | : | 22μF | L3 | : | 4 Turns, #22 AWG |
| C9 | : | 180pF | L4 | : | 2 Turns, #22 AWG |
| C10 | : | 47μF, 63V | L5 | : | 5 Turns, #22 AWG |
| C11 | : | 180pF | T1, T2 | : | λ/4 Transformers |
| C12 | : | 10μF, 63V | Material: | | Epsilam 10, Er = 10.5, Height = .050" |

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0156



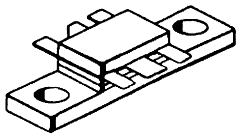

| SGS-THOMSON MICROELECTRONICS | | | CONT'D | | |
|---|---|---|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm | | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .060/1,52 | | K | .055/1,40 | .065/1,65 |
| B | .055/1,40 | .065/1,65 | L | .075/1,91 | .095/2,41 |
| C | .124/3,15 | | M | | .190/4,83 |
| D | .243/6,17 | .253/6,43 | N | .245/6,22 | .257/6,53 |
| E | .635/16,13 | .665/16,89 | | | |
| F | .092/2,34 | | | | |
| G | .555/14,10 | .565/14,35 | | | |
| H | .739/18,77 | .749/19,02 | | | |
| I | .315/8,00 | .327/8,31 | | | |
| J | .002/0,05 | .006/0,15 | | | |

SGS-THOMSON
MICROELECTRONICS

# SD1425

## RF & MICROWAVE TRANSISTORS
## 800-900 MHz BASE STATION APPLICATIONS

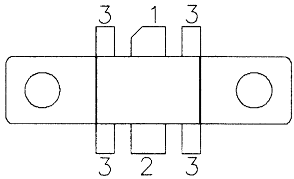
- 800 - 900 MHz
- 24 VOLTS
- COMMON EMITTER
- GOLD METALLIZATION
- INTERNAL INPUT MATCHING
- CLASS AB LINEAR OPERATION
- $P_{OUT}$ = 30 W MIN. WITH 7.5 dB GAIN



**.230 6LFL (M142)**
epoxy sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| SD1425 | SD1425 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter

### DESCRIPTION

The SD1425 is a gold metallized epitaxial silicon NPN planar transistor using diffused emitter ballast resistors for high linearity Class AB operation in cellular base station applications.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 50 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 45 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 5.0 | V |
| $I_C$ | Device Current | 5.0 | A |
| $P_{DISS}$ | Power Dissipation | 43 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 3.0 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

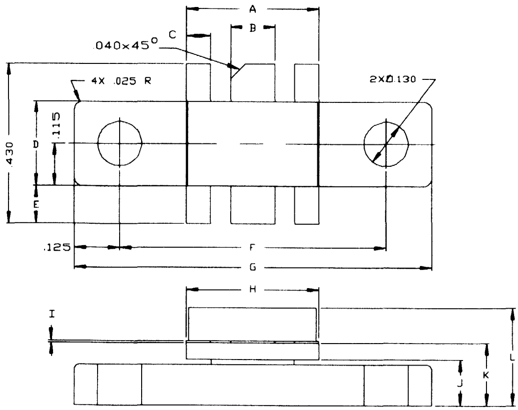
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 100mA | $I_E$ = 0mA | 48 | 50 | — | V |
| $BV_{CEO}$ | $I_C$ = 40mA | $I_B$ = 0mA | 25 | 30 | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 3.5 | 5.0 | — | V |
| $I_{CBO}$ | $V_{CB}$ = 24V | $I_E$ = 0mA | — | — | 2.0 | mA |
| $h_{FE}$ | $V_{CE}$ = 10V | $I_C$ = 200mA | 20 | — | 100 | — |

DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 960 MHz | $P_{IN}$ = 5.3 W | $V_{CC}$ = 24 V | 30 | — | — | W |
| $G_P$ | f = 960 MHz | $P_{IN}$ = 5.3 W | $V_{CC}$ = 24 V | 7.5 | — | — | dB |
| $\eta_C$ | f = 960 MHz | $P_{IN}$ = 5.3 W | $V_{CC}$ = 24 V | 45 | 50 | — | % |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 24 V | | — | 40 | 48 | pF |

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0142

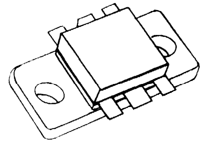



| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .355/9,02 | .365/9,27 |
| B | .115/2,92 | .125/3,18 |
| C | .075/1,91 | .085/2,16 |
| D | .225/5,72 | .235/5,97 |
| E | .090/2,29 | .110/2,79 |
| F | .720/18,29 | .730/18,54 |
| G | .970/24,64 | .980/24,89 |
| H | .355/9,02 | .365/9,27 |
| I | .004/0,10 | .006/0,15 |
| J | .120/3,05 | .130/3,30 |

| CONT'D | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| K | .160/4,06 | .180/4,57 |
| L | .230/5,84 | 260/6,60 |

# RF & MICROWAVE TRANSISTORS 800/900 MHz APPLICATIONS

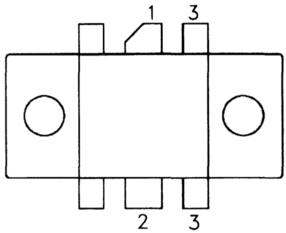
- 900 MHz
- 24 VOLTS
- GOLD METALLIZATION
- EMITTER BALLASTED
- INTERNAL INPUT AND OUTPUT MATCHING
- COMMON BASE CONFIGURATION
- $P_{OUT}$ = 60 W MIN. WITH 7.0 dB GAIN



**.400 6LFL (M169)**
epoxy sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| SD1426 | SD1426 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter

## DESCRIPTION

The SD1426 is a 24 V epitaxial silicon NPN planar transistor designed primarily for common base amplifier applications in the 800 - 960 MHz frequency range.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 55 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 55 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 10 | A |
| $P_{DISS}$ | Power Dissipation | 175 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 1.0 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

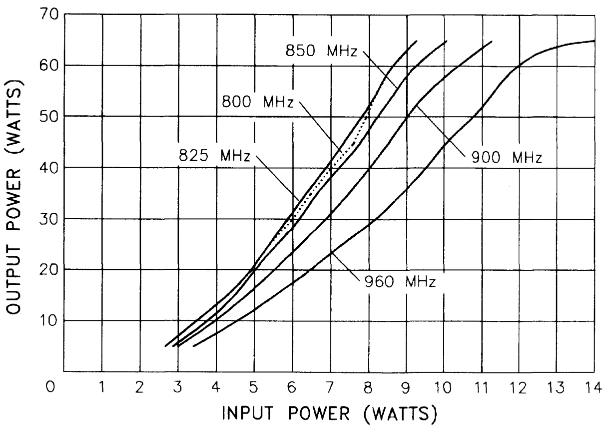
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 50mA | $I_E$ = 0mA | 55 | — | — | V |
| $BV_{CES}$ | $I_C$ = 50mA | $V_{BE}$ = 0V | 55 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 50mA | $I_B$ = 0mA | 28 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 3.0 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 25V | $I_E$ = 0mA | — | — | 10 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 2A | 20 | — | 150 | — |

### DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 900 MHz | $P_{IN}$ = 12 W | $V_{CE}$ = 24 V | 60 | — | — | W |
| $G_P$ | f = 900 MHz | $P_{IN}$ = 12 W | $V_{CE}$ = 24 V | 7.0 | — | — | dB |
| $\eta_c$ | f = 900 MHz | $P_{IN}$ = 12 W | $V_{CE}$ = 24 V | 55 | — | — | % |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 24 V | | — | 60 | — | pF |

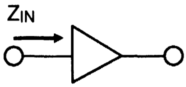
## TYPICAL PERFORMANCE

### BROADBAND POWER OUTPUT vs POWER INPUT

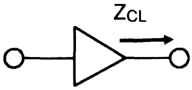


## IMPEDANCE DATA

**TYPICAL INPUT IMPEDANCE**

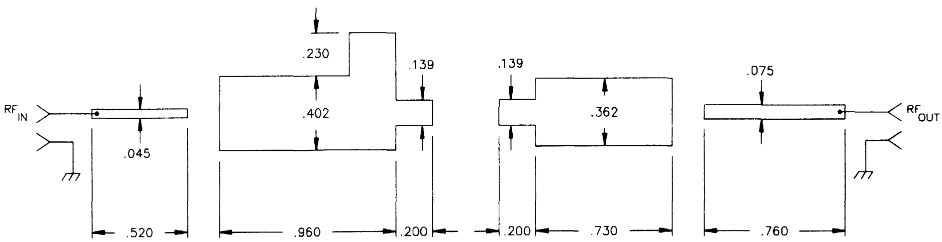



**TYPICAL COLLECTOR LOAD IMPEDANCE**



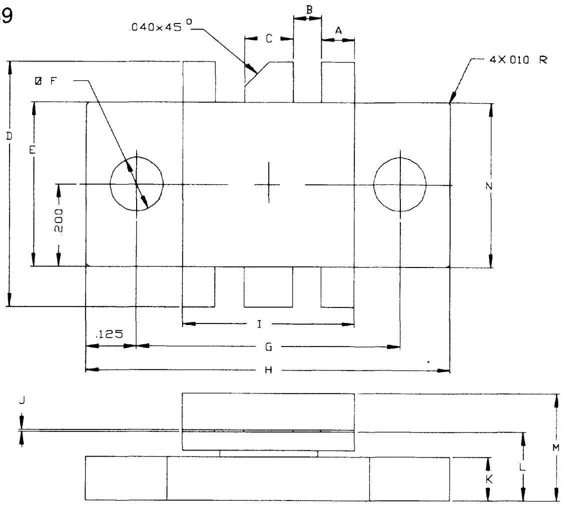

| FREQ. | $Z_{IN}$ ($\Omega$) | $Z_{CL}$ ($\Omega$) |
|---|---|---|
| 960 MHz | 3.8 − j 3.8 | 4.9 + j 2.0 |
| 930 MHz | 5.4 − j 4.8 | 4.6 + j 1.0 |
| 900 MHz | 7.6 − j 3.4 | 5.0 + j 0.4 |
| 870 MHz | 9.4 − j 2.6 | 4.3 + j 0.6 |
| 850 MHz | 10.8 − j 2.4 | 4.4 + j 0.4 |
| 800 MHz | 10.8 + j 1.0 | 4.3 + j 0.5 |

## TEST CIRCUIT



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0169




| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .078/1,98 | .088/2,24 |
| B | .120/3,05 | |
| C | .115/2,92 | .125/3,18 |
| D | .580/14,73 | .620/15,75 |
| E | .395/10,03 | .405/10,29 |
| F | .125/3,18 | |
| G | .720/18,29 | .730/18,54 |
| H | .970/24,64 | .980/24,89 |
| I | .420/10,67 | .430/10,92 |
| J | .002/0,05 | .007/0,18 |

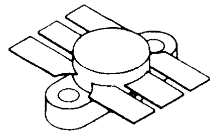
| CONT'D | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| K | .105/2,67 | .115/2,92 |
| L | .159/4,04 | .175/4,45 |
| M | | .280/7,11 |
| N | .395/10,03 | .408/10,36 |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

SGS-THOMSON
MICROELECTRONICS

# SD1428

## RF & MICROWAVE TRANSISTORS
## VHF MOBILE APPLICATIONS

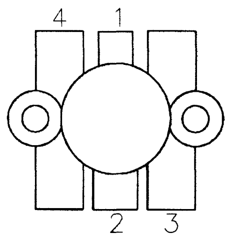
- 175 MHz
- 12.5 VOLTS
- EFFICIENCY 50%
- COMMON EMITTER
- GOLD METALLIZATION
- $P_{OUT}$ = 45 W MIN. WITH 6.5 dB GAIN



**.500 6LFL (M111)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1428 | SD1428 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Emitter

### DESCRIPTION

The SD1428 is an internally matched 12.5 V Class C epitaxial silicon NPN planar transistor designed primarily for VHF communications. This device utilizes diffused emitter resistors to achieve infinite VSWR through all phase angles at rated operating conditions.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 36 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 18 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 36 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 6.0 | A |
| $P_{DISS}$ | Power Dissipation | 145 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 1.2 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

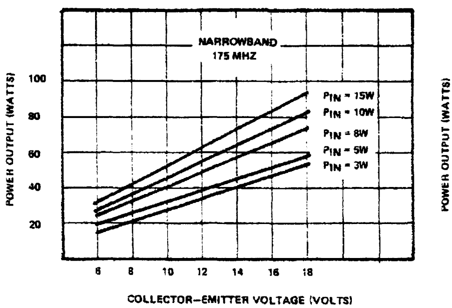
| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 50mA | $I_E$ = 0mA | 36 | — | — | V |
| $BV_{CES}$ | $I_C$ = 50mA | $V_{BE}$ = 0V | 36 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 50mA | $I_B$ = 0mA | 18 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 15V | $I_E$ = 0mA | — | — | 5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 5A | 20 | — | 200 | — |

DYNAMIC

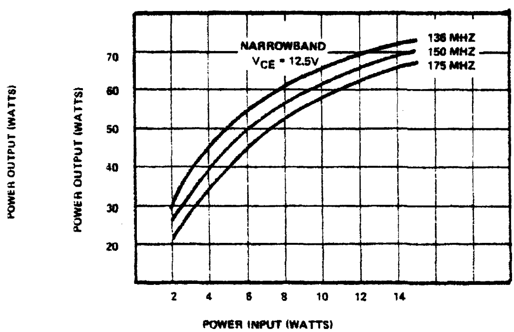
| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 138 — 175 MHz | $P_{IN}$ = 10 W | $V_{CE}$ = 12.5 V | 45 | — | — | W |
| $G_P$ | f = 138 — 175 MHz | $P_{IN}$ = 10 W | $V_{CE}$ = 12.5 V | 6.5 | — | — | dB |
| $\eta_C$ | f = 138 — 175 MHz | $P_{IN}$ = 10 W | $V_{CE}$ = 12.5 V | 50 | — | — | % |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 12.5 V | | — | — | 135 | pF |

## TYPICAL PERFORMANCE

### POWER OUTPUT vs COLLECTOR EMITTER VOLTAGE

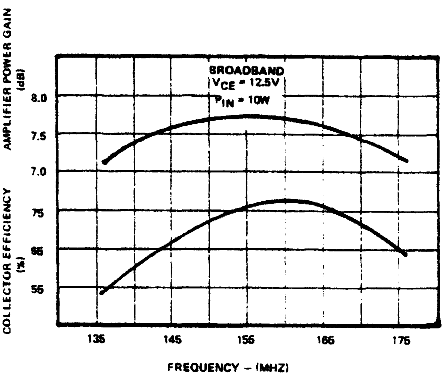



### POWER OUTPUT vs POWER INPUT

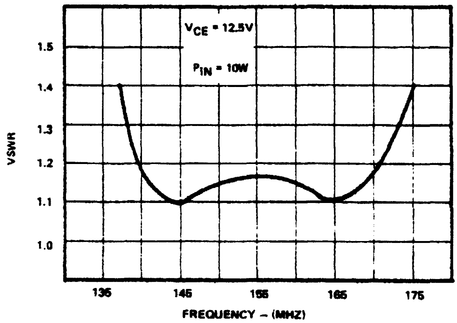


## TYPICAL PERFORMANCE (cont'd)

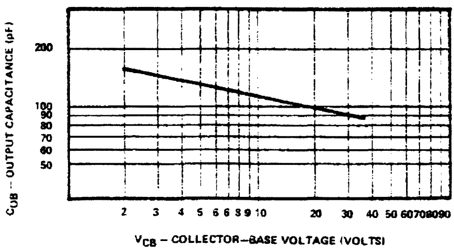
### POWER GAIN & COLLECTOR EFFICIENCY vs FREQUENCY




### INPUT VSWR vs FREQUENCY

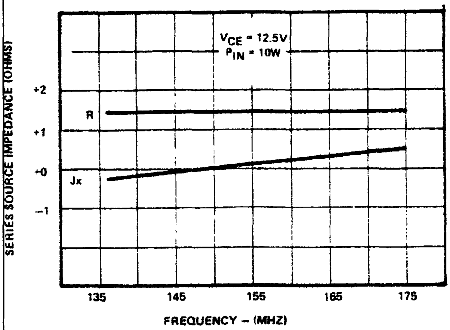



### COLLECTOR CAPACITANCE vs VOLTAGE

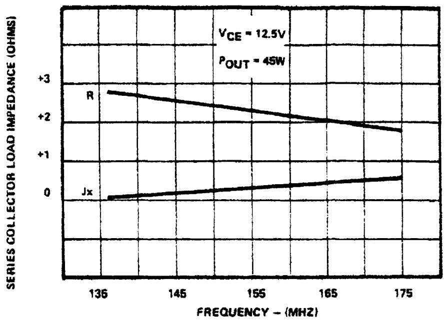


## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE



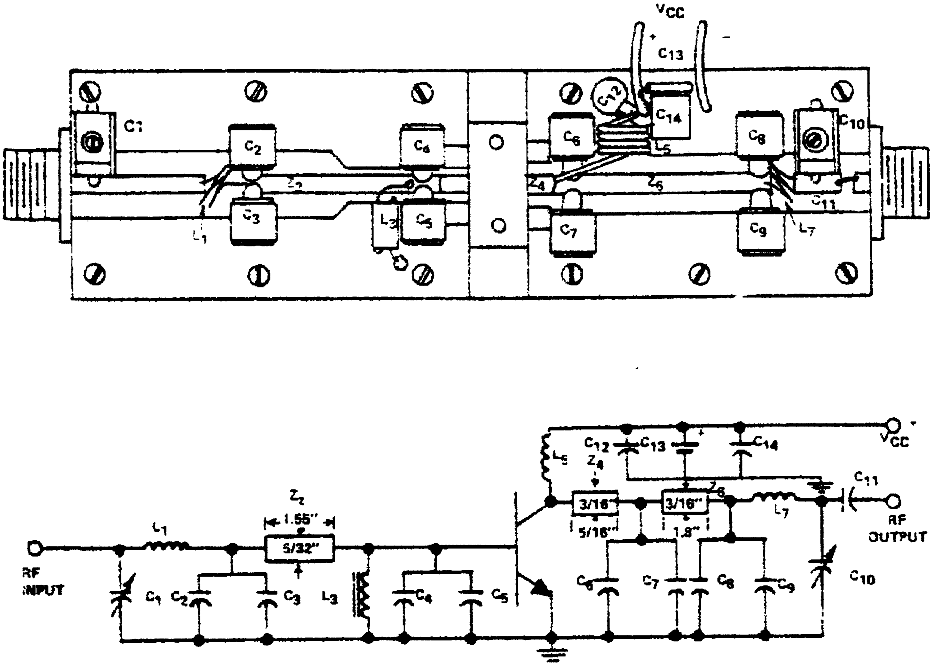

### TYPICAL COLLECTOR LOAD IMPEDANCE




| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 175 MHz | 1.38 + j 0.44 | 1.70 + j 0.48 |

$P_{OUT}$ = 45W
$P_{IN}$ = 10W
$V_{CE}$ = 12.5V

## TEST CIRCUIT

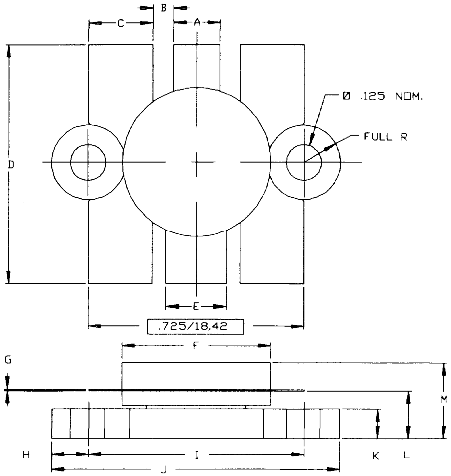



C1, C10 : 4 - 40pF ARCO 403
C2 : 39pF Unelco
C3 : 56pF Unelco
C4 : 82pF Unelco
C5 : 100pF Unelco
C6, C7 : 200pF Unelco
C8, C9 : 62pF Unelco
C11 : .015f Erie Red Cap
C12 : .01f Erie Disk
C13 : 4.7f Electrolytic

C14 : 1000pF Unelco
L1 : 2 Turns, #18 AWG, 1/4" I.D., Wire Spacing, Enameled
L3 : vk200 Ferroxcube
L5 : 4 Turns, #16 AWG, 1/4" I.D., Close Wound, Enameled
L7 : 2 Turns, #16 AWG, 17/64" I.D., Wire Spacing, Enameled
Z2 : Approx. 8.1mH
Z4 : Approx. 2.3mH
Z6 : Approx. 10.1mH

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0111



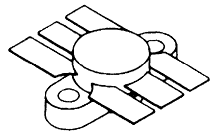

| SGS-THOMSON MICROELECTRONICS | | | CONT'D | | |
|---|---|---|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm | | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .150/3,43 | .160/4,06 | K | .095/2,41 | .105/2,67 |
| B | .045/1,14 | | L | .150/3,81 | .170/4,32 |
| C | .210/5,33 | .220/5,59 | M | | .280/7,11 |
| D | .835/21,21 | .865/21,97 | | | |
| E | .200/5,08 | .210/5,33 | | | |
| F | .490/12,45 | .510/12,95 | | | |
| G | .003/0,08 | .007/0,18 | | | |
| H | .125/3,18 | | | | |
| I | .720/18,29 | .730/18,54 | | | |
| J | .970/24,64 | .980/24,89 | | | |

SGS-THOMSON MICROELECTRONICS

# SD1429

## RF & MICROWAVE TRANSISTORS UHF MOBILE APPLICATIONS

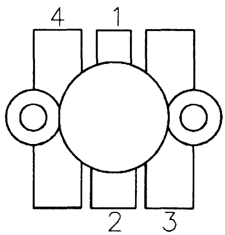
- 470 MHz
- 12.5 VOLTS
- COMMON EMITTER
- $P_{OUT}$ = 12 W MIN. WITH 7.8 dB GAIN



**.500 6LFL (M111)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1429 | SD1429 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Emitter

## DESCRIPTION

The SD1429 is a 12.5 V Class C epitaxial silicon NPN planar transistor designed primarily for UHF communications. This device utilizes "Tuned Q" technology which consists of an input matching network on the base to achieve optimum gain and broadband characteristics.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 36 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 16 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 36 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 3.4 | A |
| $P_{DISS}$ | Power Dissipation | 37.5 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 4.6 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

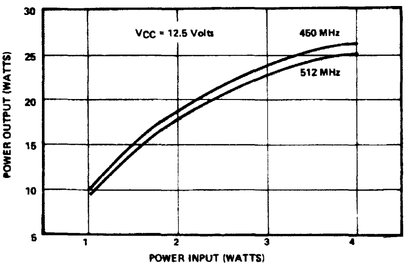
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CES}$ | $I_C$ = 200mA | $V_{BE}$ = 0V | 36 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 200mA | $I_B$ = 0mA | 16 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 4mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 15V | $I_E$ = 0mA | — | — | 2.0 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 500mA | 20 | — | 200 | — |

DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 470 MHz | $P_{IN}$ = 2 W | $V_{CE}$ = 12.5 V | 12 | — | — | W |
| $G_P$ | f = 470 MHz | $P_{IN}$ = 2 W | $V_{CE}$ = 12.5 V | 7.8 | — | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 12 V | | — | — | 50 | pF |

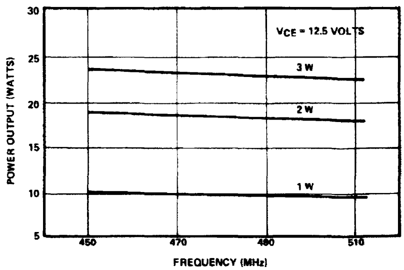
## TYPICAL PERFORMANCE

### POWER OUTPUT vs POWER INPUT




POWER OUTPUT VS POWER INPUT

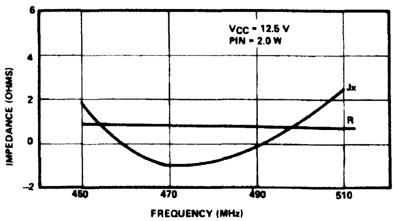
### POWER OUTPUT vs FREQUENCY




POWER OUTPUT VS FREQUENCY

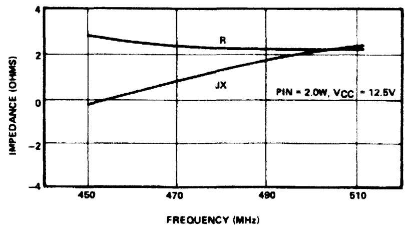
## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE



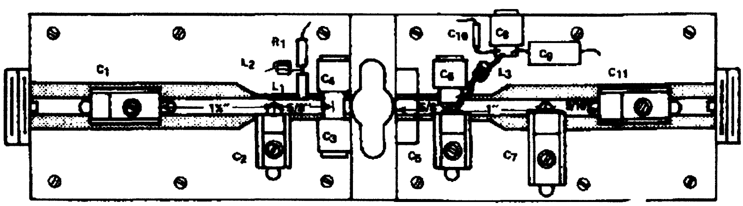

SOURCE IMPEDANCE VS FREQUENCY

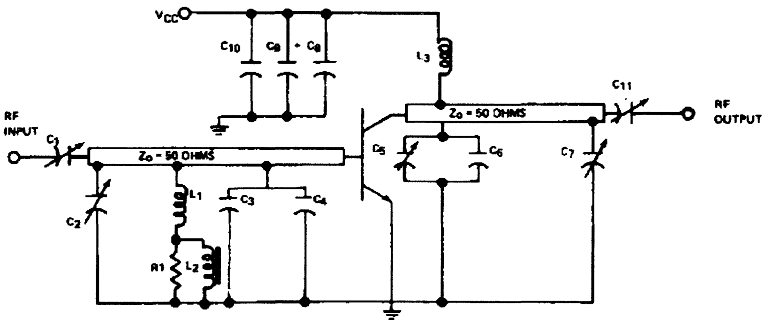
### TYPICAL COLLECTOR LOAD IMPEDANCE




COLLECTOR LOAD IMPEDANCE VS FREQUENCY

## TEST CIRCUIT



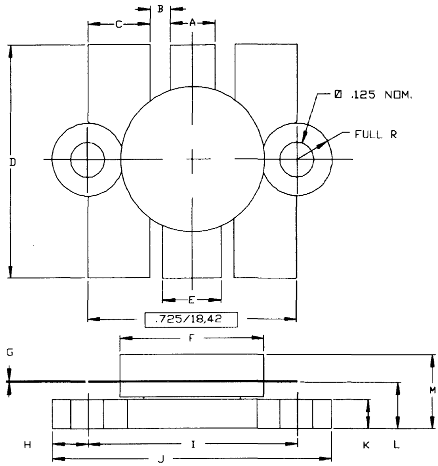

C1, C11 : 4 - 40pF, Arco 422
C2 : 0.9 - 7pF, Arco 400
C3, C4 : 20pF, Unelco
C5 : 1.5 - 20pF, Unelco
C6 : 15pF, Unelco
C7 : 2 - 25pF, Unelco
C8 : 1000pF, Unelco
C9 : 10μF, Electrolytic
C10 : 0.47μF, Erie Red Cap

L1 : 0.10μH, Molded Choke
L2 : 6 Turns, #28 AWG Thru Ferroxcube Sleeve #3B1
L3 : 6 Turns, #28 AWG, 0.20" I.D.
R1 : 56Ω, 1/4 Watt
ZO : 50Ω Line

Board Material: Double Sided Copper 1/16" Thick, 2M-K-6098

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0111



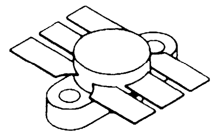

| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .150/3,43 | .160/4,06 |
| B | .045/1,14 | |
| C | .210/5,33 | .220/5,59 |
| D | .835/21,21 | .865/21,97 |
| E | .200/5,08 | .210/5,33 |
| F | .490/12,45 | .510/12,95 |
| G | .003/0,08 | .007/0,18 |
| H | .125/3,18 | |
| I | .720/18,29 | .730/18,54 |
| J | .970/24,64 | .980/24,89 |

| CONT'D | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| K | .095/2,41 | .105/2,67 |
| L | .150/3,81 | .170/4,32 |
| M | | .280/7,11 |

# SD1429-03

## RF & MICROWAVE TRANSISTORS
## UHF MOBILE APPLICATIONS

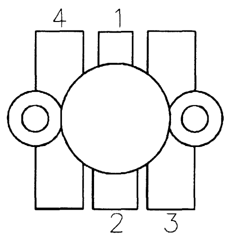
- 470 MHz
- 12.5 VOLTS
- COMMON EMITTER
- $P_{OUT}$ = 15 W MIN. WITH 7.5 dB GAIN



**.500 6LFL (M111)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1429-03 | SD1429-3 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Emitter

### DESCRIPTION

The SD1429-03 is a 12.5 V Class C epitaxial silicon NPN planar transistor designed primarily for UHF communications. It withstands infinite VSWR at rated operating conditions.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 36 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 16 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 36 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 3.4 | A |
| $P_{DISS}$ | Power Dissipation | 37.5 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 4.6 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

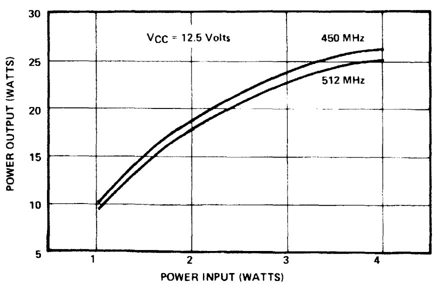
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CES}$ | $I_C$ = 50mA | $V_{BE}$ = 0V | 36 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 50mA | $I_B$ = 0mA | 16 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $I_{CEO}$ | $V_{CE}$ = 15V | $I_E$ = 0mA | — | — | 5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 500mA | 20 | — | 200 | — |

DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 470 MHz | $P_{IN}$ = 2.5 W | $V_{CC}$ = 12.5 V | 15 | — | — | W |
| $G_P$ | f = 470 MHz | $P_{IN}$ = 2.5 W | $V_{CC}$ = 12.5 V | 7.5 | — | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 12 V | | — | — | 50 | pF |

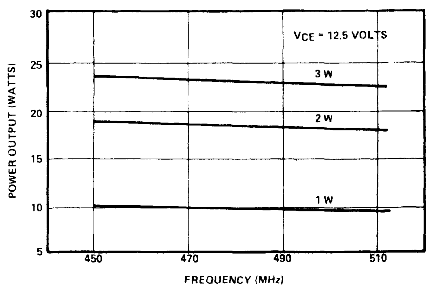
## TYPICAL PERFORMANCE

### POWER OUTPUT vs POWER INPUT




POWER OUTPUT VS POWER INPUT

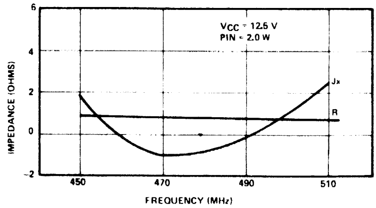
### POWER OUTPUT vs FREQUENCY




POWER OUTPUT VS FREQUENCY

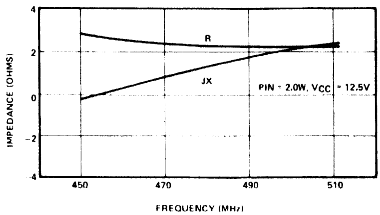
## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE



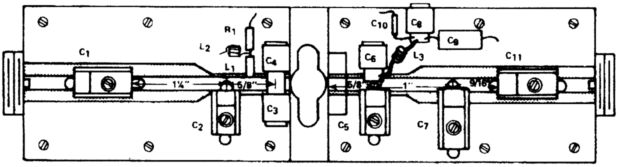

SOURCE IMPEDANCE VS FREQUENCY

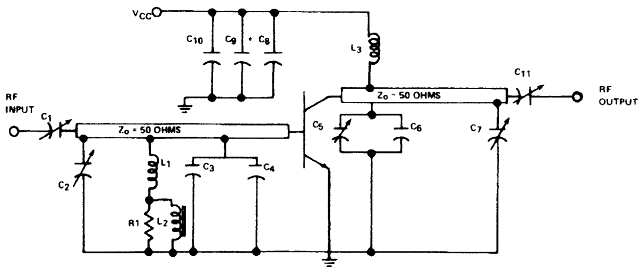
### TYPICAL COLLECTOR LOAD IMPEDANCE




COLLECTOR LOAD IMPEDANCE VS FREQUENCY

## TEST CIRCUIT



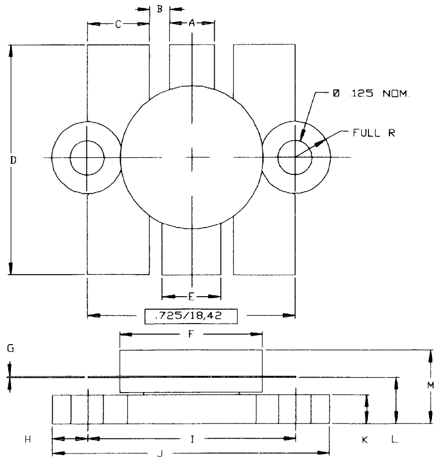

| | | |
|---|---|---|
| C1, C11 | : | 4 - 4pF, Arco 422 |
| C2 | : | 0.9 - 7pF, Arco 400 |
| C3, C4 | : | 20pF, Unelco |
| C5 | : | 1.5 - 20pF, Arco |
| C6 | : | 15pF, Unelco |
| C7 | : | 2 - 25pF, Arco 421 |
| C8 | : | 1000pF, Unelco |
| C9 | : | 10µF, Electrolytic, 30Vdc |
| C10 | : | 0.47µF, Erie Red Cap |

| | | |
|---|---|---|
| L1 | : | 0.10µh, Molded Choke |
| L2 | : | 6 Turns, #28 AWG Thru Ferroxcube Sleeve #3B1 |
| L3 | : | 6 Turns, #20 AWG, 0.20" I.D. |
| R1 | : | 56Ω, 1/4 Watt |
| Zo | : | 50Ω Line |

Board Material: Double Sided Copper 1/16" Thick, 3M-K-6098
Mounted on 3/8" Brass Plates

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0111




| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .150/3,43 | .160/4,06 |
| B | .045/1,14 | |
| C | .210/5,33 | .220/5,59 |
| D | .835/21,21 | .865/21,97 |
| E | .200/5,08 | .210/5,33 |
| F | .490/12,45 | .510/12,95 |
| G | .003/0,08 | .007/0,18 |
| H | .125/3,18 | |
| I | .720/18,29 | .730/18,54 |
| J | .970/24,64 | .980/24,89 |

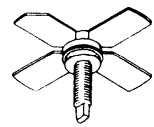
| CONT'D | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| K | .095/2,41 | .105/2,67 |
| L | .150/3,81 | .170/4,32 |
| M | | .280/7,11 |

# SGS-THOMSON MICROELECTRONICS

# SD1433

## RF & MICROWAVE TRANSISTORS UHF MOBILE APPLICATIONS

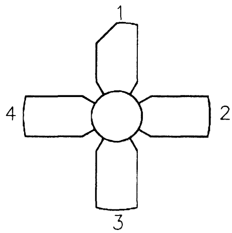
- 470 MHz
- 12.5 VOLTS
- CLASS C
- EFFICIENCY 60%
- COMMON EMITTER
- $P_{OUT}$ = 10 W MIN. WITH 8.0 dB GAIN



**.280 4L STUD (M122)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1433 | SD1433 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

### DESCRIPTION

The SD1433 is a Class C epitaxial silicon NPN planar transistor designed for driver applications in the 450 - 512 MHz frequency range. This device uses an emitter ballasted geometry specifically designed for optimum stable power gain, maximum efficiency and infinite VSWR.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 36 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 16 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 36 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 2.5 | A |
| $P_{DISS}$ | Power Dissipation | 58 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 3.0 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case} = 25°C$)

### STATIC

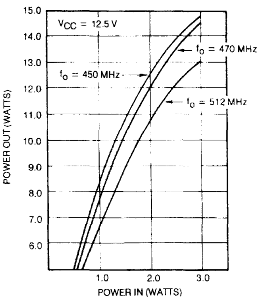
| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CES}$ | $I_C = 25mA$ | $V_{BE} = 0V$ | 36 | — | — | V |
| $BV_{CEO}$ | $I_C = 20mA$ | $I_B = 0mA$ | 16 | — | — | V |
| $BV_{EBO}$ | $I_E = 10mA$ | $I_C = 0mA$ | 4.0 | — | — | V |
| $I_{CES}$ | $V_{CE} = 10V$ | $I_E = 0mA$ | — | — | 3 | mA |
| $I_{CBO}$ | $V_{CB} = 15V$ | $I_E = 0mA$ | — | — | 2 | mA |
| $h_{FE}$ | $V_{CE} = 5V$ | $I_C = 1A$ | 10 | — | — | — |

### DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 470 MHz | $P_{IN} = 2.0$ W | $V_{CE} = 12.5$ V | 10 | — | — | W |
| $G_P$ | f = 470 MHz | $P_{OUT} = 10$ W | $V_{CE} = 12.5$ V | 7 | — | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB} = 12.5$ V | | — | 19 | — | pF |

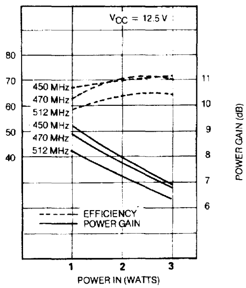
## TYPICAL PERFORMANCE

### POWER OUTPUT vs POWER INPUT



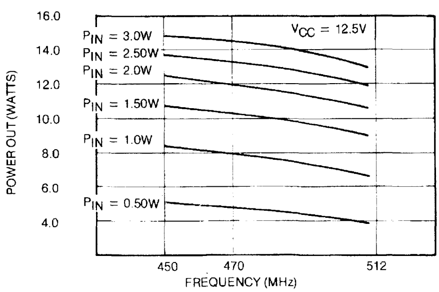

POWER OUT VS POWER IN

### POWER GAIN & EFFICIENCY vs POWER INPUT




POWER GAIN/EFFICIENCY VS POWER IN

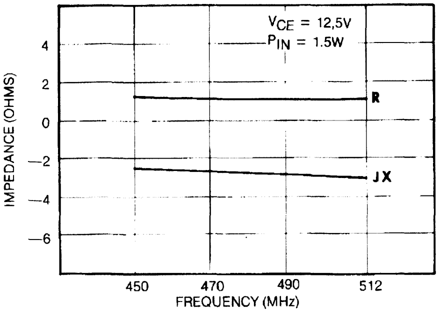
### POWER OUTPUT vs FREQUENCY




POWER OUT VS FREQUENCY

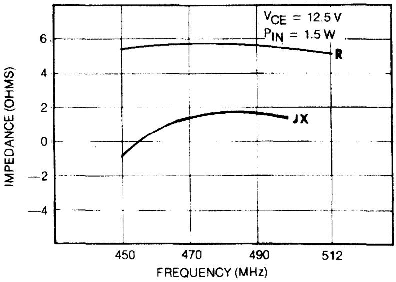
## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE




**SERIES SOURCE IMPEDANCE VS FREQUENCY**

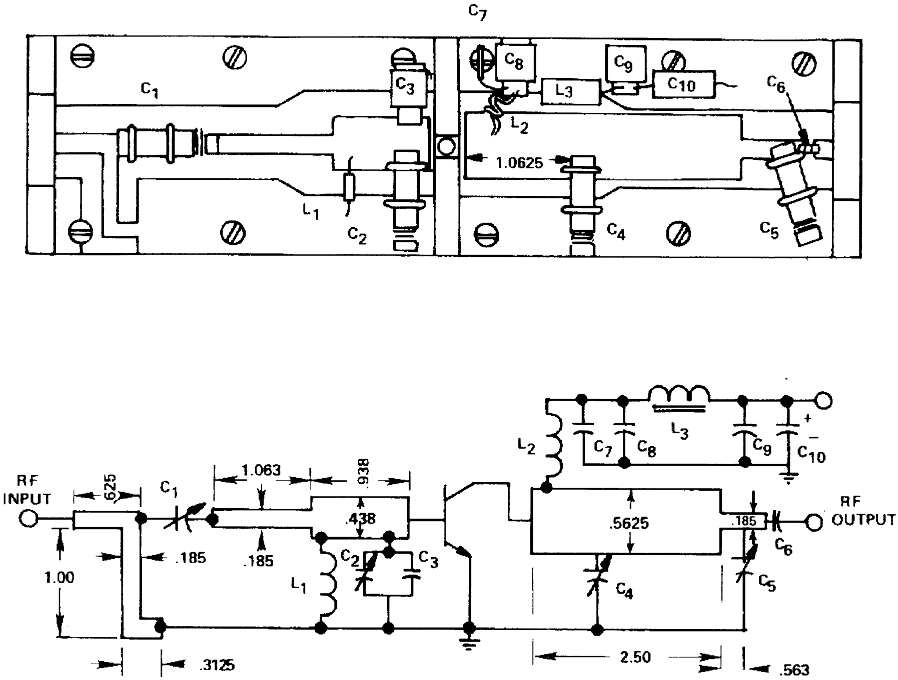
### TYPICAL COLLECTOR LOAD IMPEDANCE




**SERIES COLLECTOR LOAD IMPEDANCE VS FREQUENCY**

| FREQ. | $Z_{IN}$ ($\Omega$) | $Z_{CL}$ ($\Omega$) |
|---|---|---|
| 470 MHz | 1.5 – j 2.7 | 5.7 + j 1.5 |

## TEST CIRCUIT



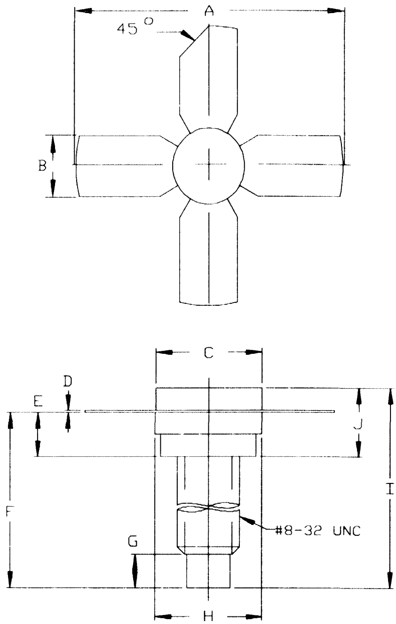

C1, C2 : 0.8pF Voltronics
C3 : 18pF Chip Capacitor
C4, C5 : AJ810
C6 : 1000pF Chip Capacitor
C7 : 0.01µF Disc Ceramic
C8, C9 : 1000pF Unelco
C10 : 10µF, 35V Electrolytic

L1 : 0.47µH Molded Choke
L2 : 2 Turns, #20 AWG, 1/8" I.D.
L3 : 2 Turns in Ferroxcube VK200/19-4B

Board Material: 3M-K6098, 1/16" Thick

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0122



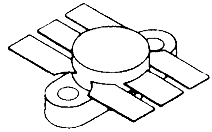

| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | 1.010/25,65 | 1.055/26,80 |
| B | .220/5,59 | .230/5,84 |
| C | .270/6,86 | .285/7,24 |
| D | .003/0,08 | .007/0,18 |
| E | .117/2,97 | .137/3,48 |
| F | .572/14,53 | |
| G | .130/3,30 | |
| H | .275/6,99 | .285/7,24 |
| I | .640/16,26 | |
| J | .175/4,45 | .217/5,51 |

SGS-THOMSON MICROELECTRONICS

# SD1434

## RF & MICROWAVE TRANSISTORS UHF MOBILE APPLICATIONS

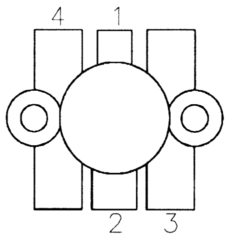
- 470 MHz
- 12.5 VOLTS
- COMMON EMITTER
- $P_{OUT}$ = 45 W MIN. WITH 5.0 dB GAIN



**.500 6LFL (M111)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1434 | SD1434 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Emitter

## DESCRIPTION

The SD1434 is a 12.5 V Class C epitaxial silicon NPN planar transistor designed primarily for UHF communications. This device utilizes diffused emitter resistors to achieve infinite VSWR under operating conditions.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 36 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 16 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 36 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 10.0 | A |
| $P_{DISS}$ | Power Dissipation | 175 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 1.0 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

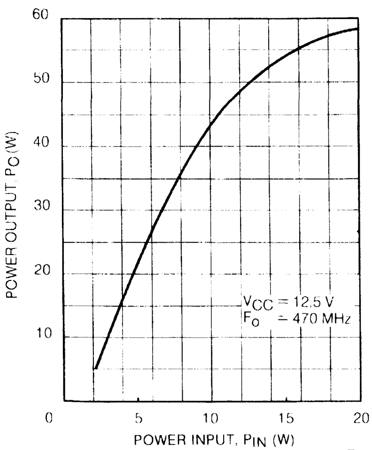
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 5mA | $I_E$ = 0mA | 36 | — | — | V |
| $BV_{CES}$ | $I_C$ = 20mA | $V_{BE}$ = 0V | 36 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 50mA | $I_B$ = 0mA | 16 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 5mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 22V | $I_E$ = 0mA | — | — | 5 | mA |
| $I_{CBO}$ | $V_{CB}$ = 15V | $I_E$ = 0mA | — | — | 5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1A | 20 | — | 200 | — |

DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 470 MHz | $P_{IN}$ = 14 W | $V_{CE}$ = 12.5 V | 45 | — | — | W |
| $G_P$ | f = 470 MHz | $P_{IN}$ = 14 W | $V_{CE}$ = 12.5 V | 5 | — | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 12.5 V | | — | 130 | — | pF |

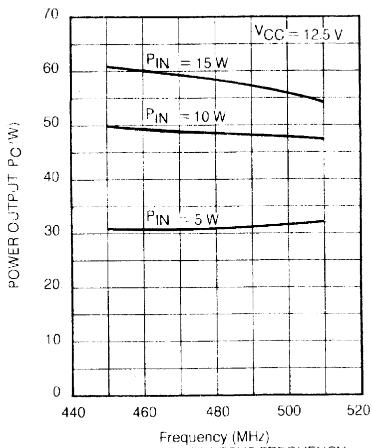
## TYPICAL PERFORMANCE

### POWER OUTPUT vs POWER INPUT



POWER OUTPUT VERSUS POWER INPUT

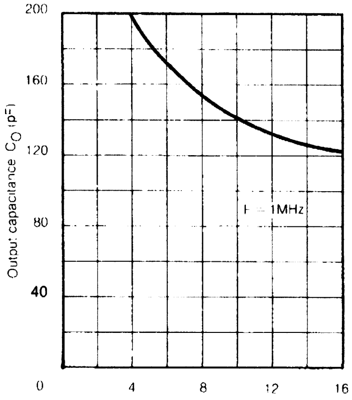
### POWER OUTPUT vs FREQUENCY



POWER OUTPUT VERSUS FREQUENCY

## TYPICAL PERFORMANCE (cont'd)

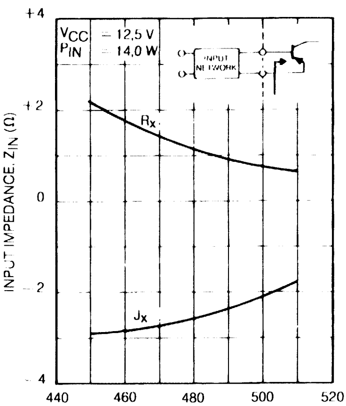
### OUTPUT CAPACITANCE vs COLLECTOR BASE VOLTAGE




OUTPUT CAPACITANCE VERSUS COLLECTOR - BASE VOLTAGE

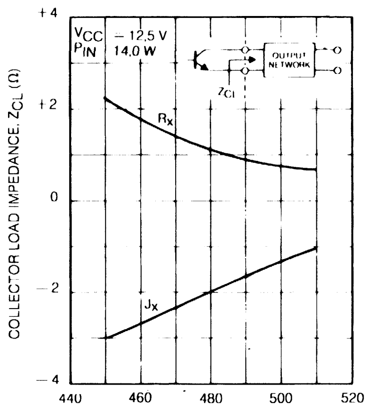
## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE



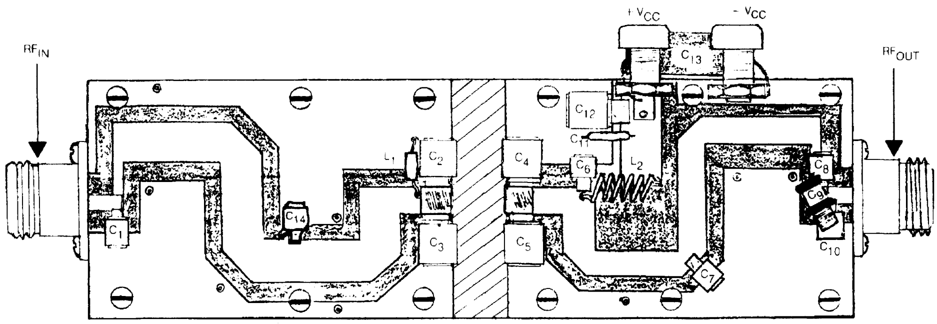

TYPICAL INPUT IMPEDANCE VERSUS FREQUENCY

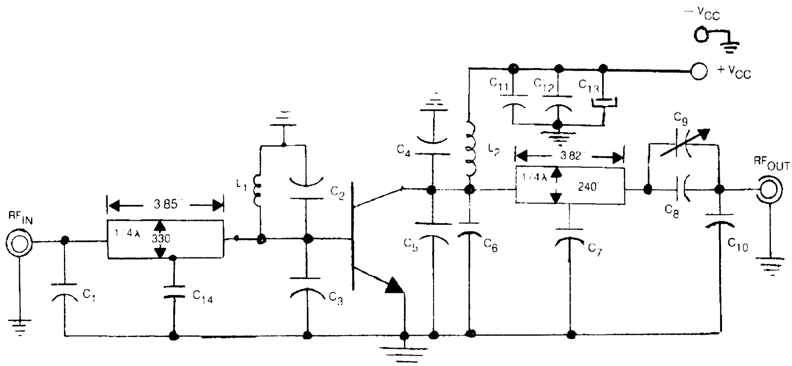
### TYPICAL COLLECTOR LOAD IMPEDANCE




TYPICAL COLLECTOR LOAD IMPEDANCE VERSUS FREQUENCY

## TEST CIRCUIT



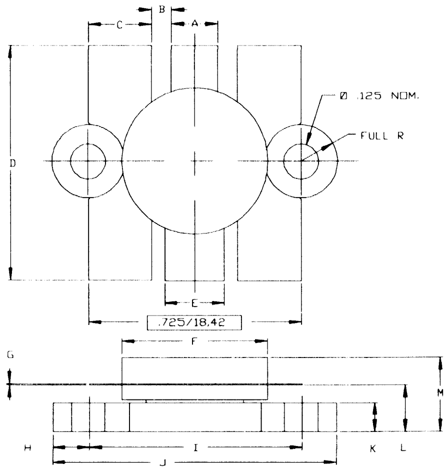




| | | |
|---|---|---|
| C1 | : | 10pF Unelco, 200 mil Sq. |
| C2 | : | 36pF Unelco, 400 mil Sq. |
| C3 | : | 34pF Unelco, 400 mil Sq. |
| C4 | : | 36pF Unelco, 400 mil Sq. |
| C5 | : | 38pF Unelco, 400 mil Sq. |
| C6 | : | 16pF Unelco, 200 mil Sq. |
| C7 | : | 10pF Unelco, 200 mil Sq. |
| C8 | : | 25pF Unelco, 200 mil Sq. |
| C9 | : | 1 - 12pF, ATC Variable |
| C10 | : | 6pF Unelco, 200 mil Sq. |

| | | |
|---|---|---|
| C11 | : | .01µF 50V, Erie Disc |
| C12 | : | 1000pF Unelco, 400 mil Sq. |
| C13 | : | 47µF 63V, Sprague Electrolytic |
| C14 | : | 10pF Unelco, 200 mil Sq. |
| L1 | : | 27µH Molded |
| L2 | : | 6 Turns, #18 AWG, .175" I.D. |
| Material | : | Pc Board, Double Sided Copper 1/32" Thick Teflon-Glass, 3M-K-6098 |

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0111

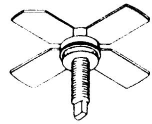



| SGS-THOMSON MICROELECTRONICS | | | CONT'D | | |
|---|---|---|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm | | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .150/3,43 | .160/4,06 | K | .095/2,41 | .105/2,67 |
| B | .045/1,14 | | L | .150/3,81 | .170/4,32 |
| C | .210/5,33 | .220/5,59 | M | | .280/7,11 |
| D | .835/21,21 | .865/21,97 | | | |
| E | 200/5,08 | 210/5,33 | | | |
| F | .490/12,45 | .510/12,95 | | | |
| G | .003/0,08 | .007/0,18 | | | |
| H | .125/3,18 | | | | |
| I | .720/18,29 | .730/18,54 | | | |
| J | .970/24,64 | .980/24,89 | | | |

# SD1437

## RF & MICROWAVE TRANSISTORS
## UHF TV/LINEAR APPLICATIONS

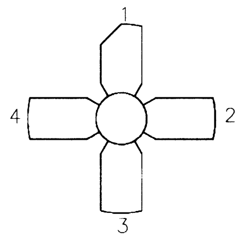
- 860 MHz
- COMMON EMITTER
- GOLD METALLIZATION
- CLASS A LINEAR OPERATION
- $P_{OUT}$ = 2 W MIN. WITH 8.5 dB GAIN



**.280 4L STUD (M122)**
epoxy sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| SD1437 | TCC593 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

### DESCRIPTION

The SD1437 is a silicon NPN bipolar device specifically designed for high linearity applications in the UHF frequency range including TV Bands IV and V.

Gold metallization and emitter ballasting assure high reliability under Class A linear amplifier operation.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 45 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 25 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4 | V |
| $I_C$ | Device Current | 800 | mA |
| $P_{DISS}$ | Power Dissipation | 15.9 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 11.0 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case} = 25°C$)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C = 10mA$ | $I_E = 0mA$ | 45 | — | — | V |
| $BV_{CEO}$ | $I_C = 80mA$ | $I_B = 0mA$ | 25 | — | — | V |
| $BV_{EBO}$ | $I_E = 1mA$ | $I_C = 0mA$ | 4.0 | — | — | V |
| $I_{CBO}$ | $V_{CB} = 28V$ | $I_E = 0mA$ | — | — | 0.45 | mA |
| $h_{FE}$ | $V_{CE} = 20V$ | $I_C = 250mA$ | 10 | — | 100 | — |

DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$[1] | f = 860 MHz | $V_{CE} = 25$ V | $I_C = 450$ mA | 2 | — | — | W |
| $G_P$[2] | f = 860 MHz | $V_{CE} = 25$ V | $I_C = 450$ mA | 8.5 | — | — | dB |
| $IMD_3$[3] | $P_{SYNC} = 2$ W | $V_{CE} = 25$ V | $I_C = 450$ mA | — | −60 | — | dBc |
| $C_{OB}$ | f = 1 MHz | $V_{CB} = 25$ V | | — | — | 10 | pF |

Note 1: $P_{IN} = 0.3$ W

Note 2: $P_{OUT} = 2$ W

Note 3: Levels relative to $P_{SYNC}$

$f_1 = 860.0$ MHz −8dBc

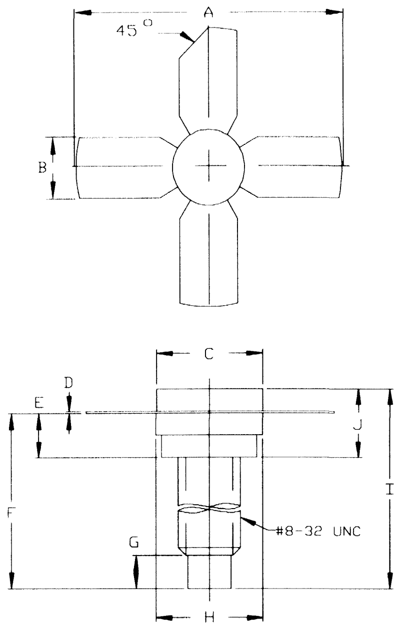
$f_1 = 863.5$ MHz −16dBc

$f_1 = 864.5$ MHz −7dBc

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0122

| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | 1.010/25,65 | 1.055/26,80 |
| B | .220/5,59 | .230/5,84 |
| C | .270/6,86 | .285/7,24 |
| D | .003/0,08 | .007/0,18 |
| E | .117/2,97 | .137/3,48 |
| F | .572/14,53 | |
| G | .130/3,30 | |
| H | .275/6,99 | .285/7,24 |
| I | .640/16,26 | |
| J | .175/4,45 | .217/5,51 |

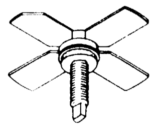


SGS-THOMSON
MICROELECTRONICS

# SD1439

## RF & MICROWAVE TRANSISTORS
## UHF TV\LINEAR APPLICATIONS

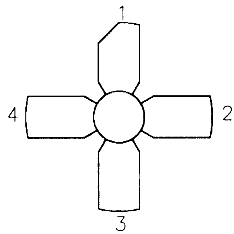
- 860 MHz
- COMMON EMITTER
- GOLD METALLIZATION
- CLASS A LINEAR OPERATION
- $P_{OUT}$ = 0.5 W MIN. WITH 9.5 dB GAIN



**.280 4L STUD (M122)**
epoxy sealed

| **ORDER CODE** | **BRANDING** |
| --- | --- |
| SD1439 | TCC596 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

### DESCRIPTION

The SD1439 is a silicon NPN bipolar device specifically designed for high linearity applications in the UHF frequency range including TV Bands IV and V.

Gold metallization and emitter ballasting assure high reliability under Class A linear amplifier operation.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
| --- | --- | --- | --- |
| $V_{CBO}$ | Collector-Base Voltage | 45 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 25 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.5 | V |
| $I_C$ | Device Current | 2.0 | A |
| $P_{DISS}$ | Power Dissipation | 31.8 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
| --- | --- | --- | --- |
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 5.5 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 1mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 20mA | $I_B$ = 0mA | 24 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 0.25mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 28V | $I_E$ = 0mA | — | — | 0.45 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 100mA | 15 | — | 120 | — |

### DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$[1] | f = 860 MHz | $V_{CE}$ = 20 V | $I_C$ = 220 mA | 0.5 | — | — | W |
| $G_P$[2] | f = 860 MHz | $V_{CE}$ = 20 V | $I_C$ = 220 mA | 9.5 | — | — | dB |
| $IMD_3$[3] | $P_{SYNC}$ = 0.5 W | $V_{CE}$ = 20 V | $I_C$ = 220 mA | — | — | –58 | dBc |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 28 V | | — | — | 5 | pF |

Note: $P_{IN}$ = 56 mW

Note 2: $P_{OUT}$ = 0.5 W

Note 3: Levels relative to $P_{SYNC}$ = 0.5 W

$f_1$ = 860.0 MHz –8dBc

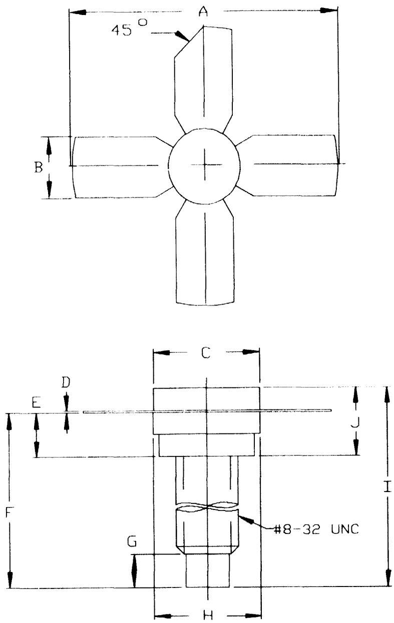
$f_2$ = 863.5 MHz –16dBc

$f_3$ = 864.5 MHz –7dBc

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0122

| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | 1.010/25,65 | 1.055/26,80 |
| B | .220/5,59 | .230/5,84 |
| C | .270/6,86 | .285/7,24 |
| D | .003/0,08 | .007/0,18 |
| E | .117/2,97 | .137/3,48 |
| F | .572/14,53 | |
| G | .130/3,30 | |
| H | .275/6,99 | .285/7,24 |
| I | .640/16,26 | |
| J | .175/4,45 | .217/5,51 |

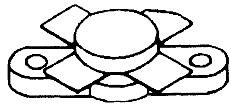


SGS-THOMSON MICROELECTRONICS

# SD1446

## RF & MICROWAVE TRANSISTORS HF/VHF APPLICATIONS

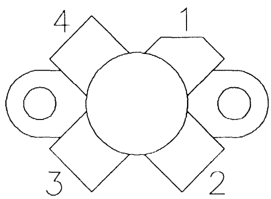
- 50 MHz
- 12.5 VOLTS
- EFFICIENCY 55%
- COMMON EMITTER
- GOLD METALLIZATION
- $P_{OUT}$ = 70 W MIN. WITH 10 dB GAIN



**.380 4LFL (M113)**
epoxy sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| SD1446 | SD1446 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

### DESCRIPTION

The SD1446 is a 12.5 V Class C epitaxial silicon NPN planar transistor designed primarily for land mobile transmitter applications. This device utilizes emitter ballasting and is extremely stable and capable of withstanding high VSWR under operating conditions.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 36 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 18 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.5 | V |
| $I_C$ | Device Current | 12.0 | A |
| $P_{DISS}$ | Power Dissipation | 183 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 1.05 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

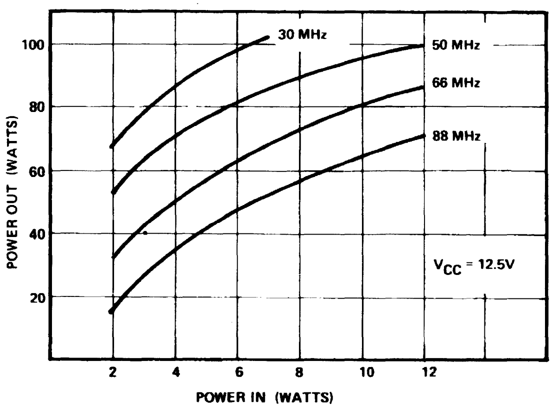
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 50mA | $I_E$ = 0mA | 36 | — | — | V |
| $BV_{CES}$ | $I_C$ = 100mA | $V_{BE}$ = 0V | 36 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 50mA | $I_B$ = 0mA | 18 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 15V | $I_E$ = 0mA | — | — | 10 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 5A | 10 | — | — | — |

DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 50 MHz | $P_{IN}$ = 7 W | $V_{CE}$ = 12.5 V | 70 | — | — | W |
| $G_P$ | f = 50 MHz | $P_{IN}$ = 7 W | $V_{CE}$ = 12.5 V | 10 | — | — | dB |
| $\eta_C$ | f = 50 MHz | $P_{IN}$ = 7 W | $V_{CE}$ = 12.5 V | — | 55 | — | % |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 12.5V | | — | — | 300 | pF |

## TYPICAL PERFORMANCE

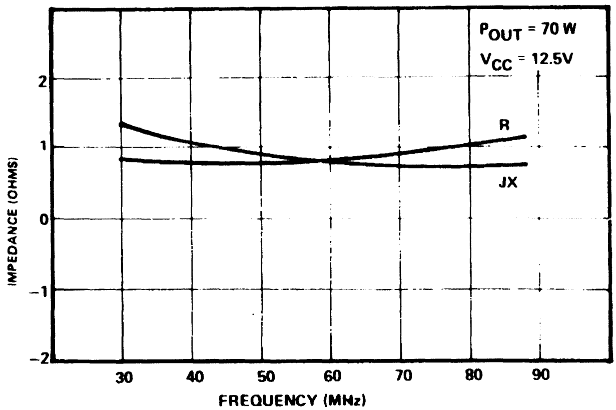
### POWER OUTPUT vs POWER INPUT




POWER OUT VS. POWER IN

## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE

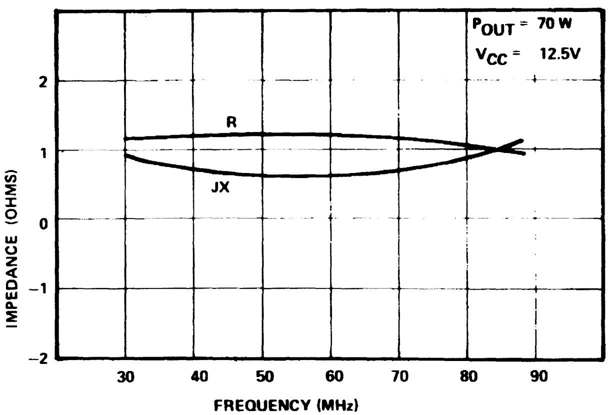



SERIES SOURCE IMPEDANCE

| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 50 MHz | 0.8 + j 0.9 | 1.2 + j 0.6 |

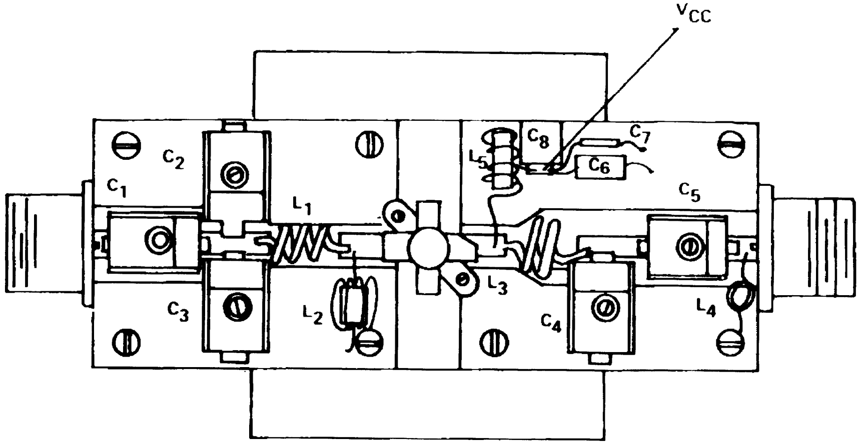
$P_{OUT}$ = 70W
$V_{CE}$ = 12.5V

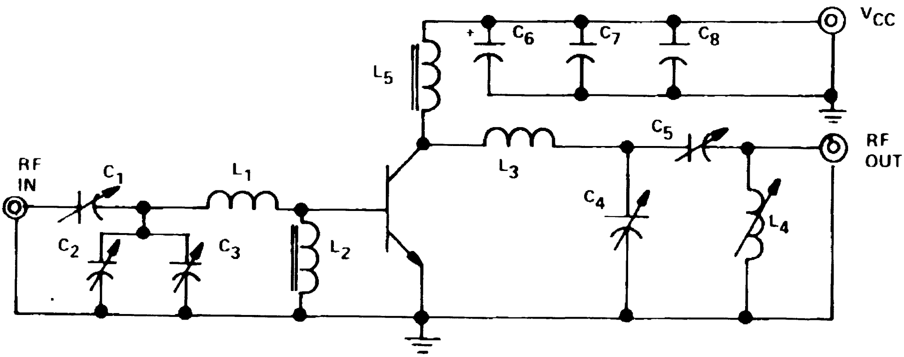
### TYPICAL COLLECTOR LOAD IMPEDANCE




SERIES COLLECTOR LOAD IMPEDANCE

## TEST CIRCUIT



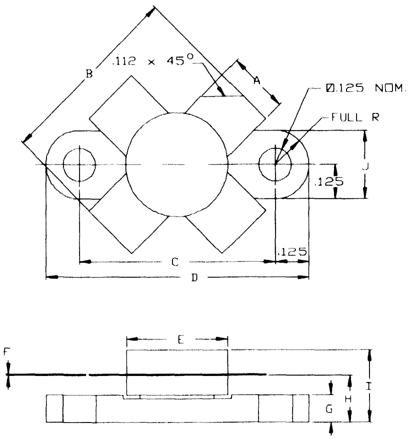




| | | |
|---|---|---|
| C1, C4 | : | 50 - 380pF Arco 465 |
| C2 | : | 110 - 580pF Arco 467 |
| C3 | : | 140 - 680pF Arco 468 |
| C5 | : | 9 - 180pF Arco 463 |
| C6 | : | 10μF, 35Vdc, Electrolytic |
| C7 | : | .01μF Erie |
| C8 | : | 1000pF Unelco |
| L1 | : | 2 1/2 Turns, #14 Awg, Tinned, 1/4" I.D. Loose Wound |
| L2 | : | 10 Turns, #28 AWG, Enameled on Ferroxcube Sleeve #3B |
| L3 | : | 1 1/2 Turns, #12 AWG, Tinned, 3/8" I.D. Loose Wound |
| L4 | : | 8 Turns, #18 AWG on 1/4" I.D. Coil form 1/2" Length with Ferrite Slug |
| L5 | : | 11 Turns, #16 AWG, Enameled on Torroid, Micrometals, T50-2 |

Board Material: Double Sided Copper 1/16" Thick

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0113



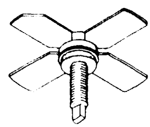

| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .220/5,59 | .230/5,84 |
| B | .785/19,94 | |
| C | .720/18,29 | .730/18,54 |
| D | .970/24,64 | .980/24,89 |
| E | | .385/9,78 |
| F | .004/0,10 | .006/0,15 |
| G | .085/2,16 | .105/2,67 |
| H | .160/4,06 | .180/4,57 |
| I | | 280/7,11 |
| J | .240/6,10 | 255/6,48 |

SGS-THOMSON MICROELECTRONICS

# SD1448 (TCC598)

## RF & MICROWAVE TRANSISTORS UHF TV/LINEAR APPLICATIONS

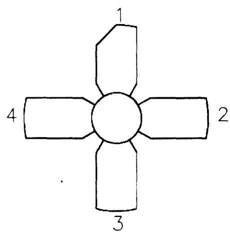
- 860 MHz
- 25 VOLTS
- COMMON EMITTER
- GOLD METALLIZATION
- CLASS A LINEAR OPERATION
- $P_{OUT}$ = 4.0 W MIN. WITH 7.0 dB GAIN



**.280 4L STUD (M122)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1448 | TCC598 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

## DESCRIPTION

The SD1448 is a silicon NPN bipolar device specifically designed for high linearity applications in the UHF frequency range including TV Bands IV and V.

Gold metallization and emitter ballasting assure high reliability under Class A linear amplifier operation.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 45 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 25 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4 | V |
| $I_C$ | Device Current | 1.6 | A |
| $P_{DISS}$ | Power Dissipation | 31.8 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 5.5 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 10mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 20mA | $I_B$ = 0mA | 25 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 2.5mA | $I_C$ = 0mA | 3.0 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 28V | $I_E$ = 0mA | — | — | 0.9 | mA |
| $h_{FE}$ | $V_{CE}$ = 20V | $I_C$ = 500mA | 10 | — | — | — |

### DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$[1] | f = 860 MHz | $V_{CE}$ = 25 V | $I_C$ = 850 mA | 4.0 | — | — | W |
| $G_P$[2] | f = 860 MHz | $V_{CE}$ = 25 V | $I_C$ = 850 mA | 7.0 | — | — | dB |
| $IMD_3$[3] | $P_{SYNC}$ = 4 W | $V_{CE}$ = 25 V | $I_C$ = 850 mA | — | — | −60 | dBc |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 25 V | | — | — | 20 | pF |

Note 1: $P_{IN}$ = 0.8W

Note 2: $P_{OUT}$ = 4 W

Note 3: Levels relative to $P_{SYNC}$ = 4 W

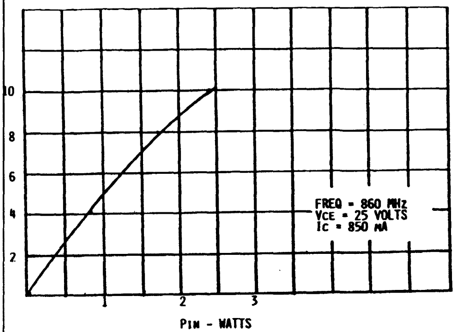
$f_1$ = 860.0 MHz −8dBc

$f_2$ = 863.5 MHz −16dBc

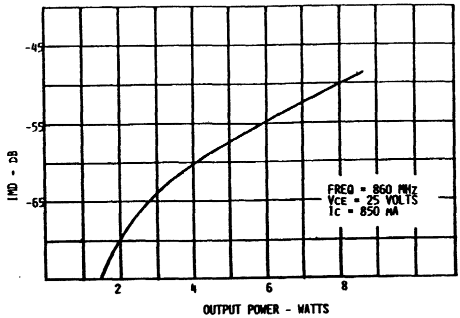
$f_3$ = 864.5 MHz −7dBc

## TYPICAL PERFORMANCE

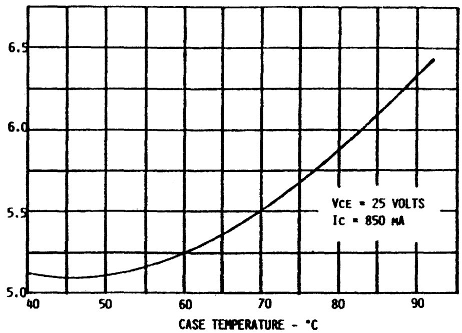
### POWER OUTPUT vs POWER INPUT



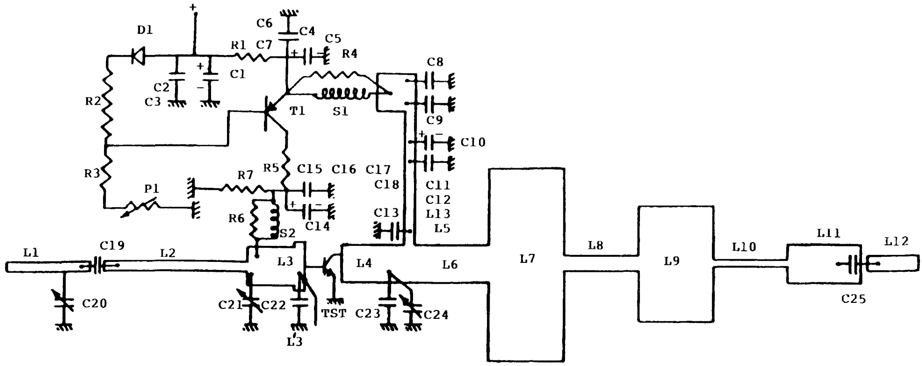

### INTERMODULATION DISTORTION vs POWER OUTPUT




### THERMAL RESISTANCE vs CASE TEMPERATURE

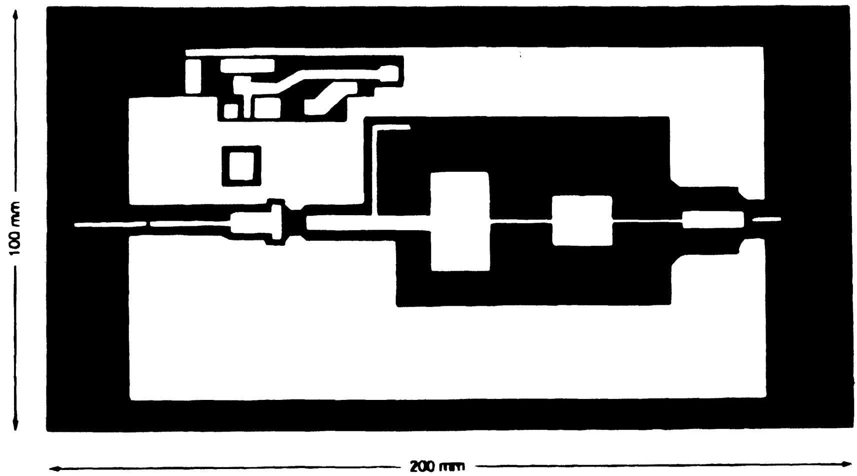


## TEST CIRCUIT




| | | | |
|---|---|---|---|
| C1 | : 22mF, 63V Sprague | L7 | : 4Ω Transmission Line, Length 8% λ at 860 MHz |
| C2, C6, C8, C15 | : 4.7nF Chip LCC | L8 | : 55Ω Transmission Line, Length 7.5% λ at 860 MHz |
| C3, C7, C9, C11, C16 | : 100nF Chip LCC | L9 | : 7.5Ω Transmission Line, Length 8% λ at 860 MHz |
| C4, C10 | : 4.7μF, 40V Sprague | L10 | : 100Ω Transmission Line, Length 8% λ at 860 MHz |
| C5, C15 | : 4.7μF, 63V Sprague | L11 | : 20Ω Transmission Line, Length 8% λ at 860 MHz |
| C12, C17, C18 | : 470pF Chip LCC | L12 | : 50Ω Transmission Line, Length 5mm |
| C13, C25 | : 47pF ATC 100B | L13 | : 50Ω Transmission Line, Length 12mm |
| C19 | : 47pF ATC 100A | P1 | : 3.3kΩ Adjustable |
| C20 | : 0.5 - 4.5pF Adjustable Airtronic | R1 | : 2.2Ω, 3W SFERNICE |
| C21, C24 | : 0.8 - 5pF Adjustable Johanson | R2 | : 100Ω, 1/2W |
| C22 | : 10pF ATC 100A | R3 | : 51Ω, 1/2W |
| C23 | : 15pF ATC 100B | R4, R6 | : 100Ω, 1/2W |
| | | R5, R7 | : 56Ω, 1W |
| D1 | : 1N 4001 or 1N 914 | T1 | : BDX 54 B |
| L1 | : 50Ω Transmission Line, Length 18mm | S1 | : 6 Turns, Wire Diameter 0.5mm on 2.5mm Internal Diameter |
| L2 | : 50Ω Transmission Line, Length 22mm | S2 | : 10 to 12 Turns on R6, Wire Diameter 0.5mm |
| L3 | : 16.4Ω Transmission Line, Length 12mm | | |
| L'3 | : 10.5Ω Transmission Line, Length 3.5mm | | |
| L4 | : 20Ω Transmission Line, Length 13mm | PC Board Material | : Er = 2.5, .020" Thick |
| L5 | : 50Ω Transmission Line, Length 2.5mm | | |
| L6 | : 20Ω Transmission Line, Length 23mm | | |

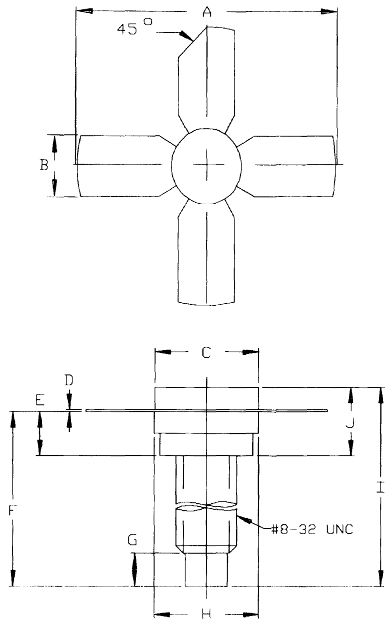
## TEST CIRCUIT LAYOUT



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0122

| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | 1.010/25,65 | 1.055/26,80 |
| B | .220/5,59 | .230/5,84 |
| C | .270/6,86 | .285/7,24 |
| D | .003/0,08 | .007/0,18 |
| E | .117/2,97 | .137/3,48 |
| F | .572/14,53 | |
| G | .130/3,30 | |
| H | .275/6,99 | .285/7,24 |
| I | .640/16,26 | |
| J | .175/4,45 | .217/5,51 |

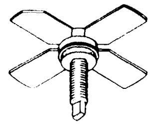


SGS-THOMSON
MICROELECTRONICS

# SD1449 (TCC597)

## RF & MICROWAVE TRANSISTORS UHF TV\LINEAR APPLICATIONS

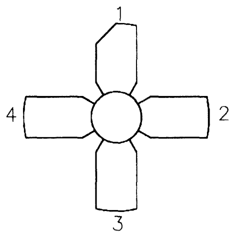
- 860 MHz
- 20 VOLTS
- COMMON EMITTER
- GOLD METALLIZATION
- CLASS A LINEAR OPERATION
- $P_{OUT}$ = 1.0 W MIN. WITH 10.0 dB GAIN



**.280 4L STUD (M122)**
epoxy sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| SD1449 | TCC597 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

### DESCRIPTION

The SD1449 is a silicon NPN bipolar device specifically designed for high linearity applications in the UHF frequency range including TV Bands IV and V.

Gold metallization and emitter ballasting assure high reliability under Class A linear amplifier operation.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 45 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 25 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.5 | V |
| $I_C$ | Device Current | 1.2 | A |
| $P_{DISS}$ | Power Dissipation | 19.4 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 9.0 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 2mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{CER}$ | $I_C$ = 40mA | $R_{BE}$ = 10Ω | 50 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 40mA | $I_B$ = 0mA | 24 | — | — | V |
| $BV_{EBO}$ | $I_E$ = .5mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 28V | $I_E$ = 0mA | — | — | 0.45 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 200mA | 20 | — | 120 | — |

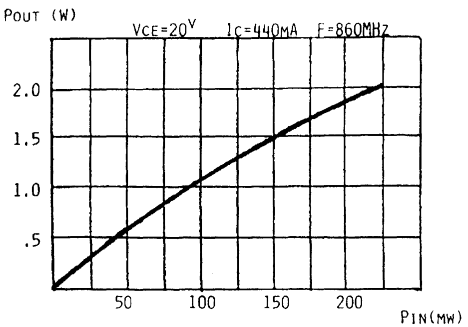
### DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$[1] | f = 860 MHz | $V_{CE}$ = 20 V | $I_C$ = 440 mA | 1 | — | — | W |
| $G_P$[2] | f = 860 MHz | $V_{CE}$ = 20 V | $I_C$ = 440 mA | 10 | — | — | dB |
| $IMD_3$[3] | $P_{SYNC}$ = 1 W | $V_{CE}$ = 20 V | $I_C$ = 440 mA | — | — | –58 | dBc |
| $IMD_3$[3] | $P_{SYNC}$ = 2 W | $V_{CE}$ = 20 V | $I_C$ = 440 mA | — | — | –51 | dBc |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 20V | | — | — | 7 | pF |

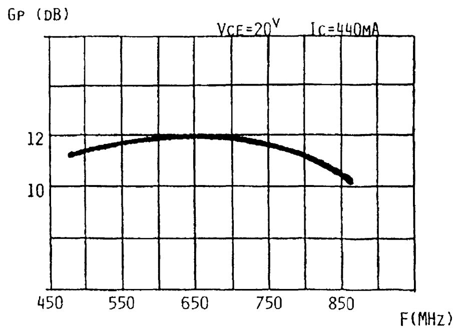
Note 1: $P_{IN}$ = 0.1W
Note 2: $P_{OUT}$ = 1 W
Note 3: Levels relative to $P_{SYNC}$
$f_1$ = 860.0 MHz –8dBc
$f_2$ = 863.5 MHz –16dBc
$f_3$ = 864.5 MHz –7dBc

## TYPICAL PERFORMANCE

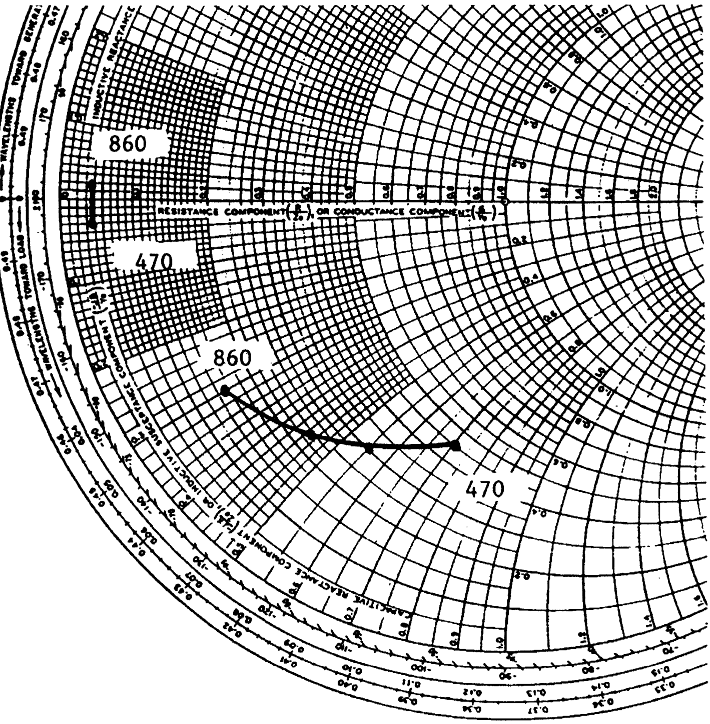
### POWER OUTPUT vs INPUT POWER




### BROADBAND POWER GAIN vs FREQUENCY



## IMPEDANCE DATA

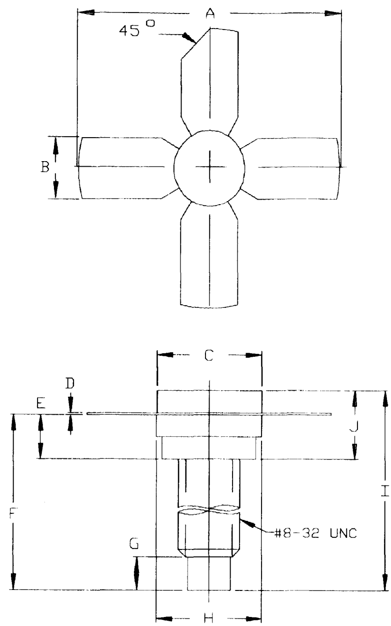



| FREQ. | $Z_{IN}$ (Ω) | $Z_{OUT}$ (Ω) |
|---|---|---|
| 860 MHz | 1.8 + j 0.8 | 8.0 – j 15.0 |
| 650 MHz | 1.9 – j 0.5 | 15.0 – j 27.0 |
| 470 MHz | 2.0 – j 1.5 | 23.0 – j 35.0 |

$V_{CC}$ = 20 V
$I_C$ = 440 mA

## PACKAGE MECHANICAL DATA

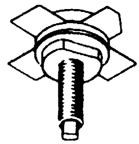
Ref.: Dwg. No.12-0122




| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | 1.010/25,65 | 1.055/26,80 |
| B | .220/5,59 | .230/5,84 |
| C | .270/6,86 | .285/7,24 |
| D | .003/0,08 | .007/0,18 |
| E | .117/2,97 | .137/3,48 |
| F | .572/14,53 | |
| G | .130/3,30 | |
| H | .275/6,99 | .285/7,24 |
| I | .640/16,26 | |
| J | .175/4,45 | .217/5,51 |

# RF & MICROWAVE TRANSISTORS TV/LINEAR APPLICATIONS

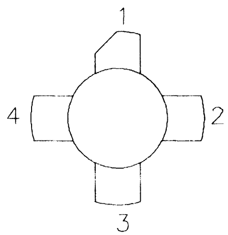
- 170 - 230 MHz
- 25 VOLTS
- IMD - 55dB
- COMMON EMITTER
- GOLD METALLIZATION
- HIGH SATURATED POWER CAPABILITY
- DIFFUSED EMITTER BALLAST RESISTORS
- DESIGNED FOR HIGH POWER LINEAR OPERATION
- $P_{OUT}$ = 20 W MIN. WITH 8.0 dB GAIN



**.500 4L STUD (M130)**
epoxy sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| SD1455 | SD1455 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

## DESCRIPTION

The SD1143 is a gold metallized epitaxial silicon NPN planar transistor using diffused emitter ballast resistors for high linearity Class A operation in VHF and Band III television transmitters and transposers.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CEO}$ | Collector-Emitter Voltage | 35 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 60 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 8.0 | A |
| $P_{DISS}$ | Power Dissipation | 140 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 1.5 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 50mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{CER}$ | $I_C$ = 50mA | $R_{BE}$ = 10Ω | 60 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 50mA | $I_B$ = 0mA | 35 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $I_{CES}$ | $V_{CB}$ = 50V | $I_E$ = 0mA | — | — | 5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1A | 20 | — | 120 | — |

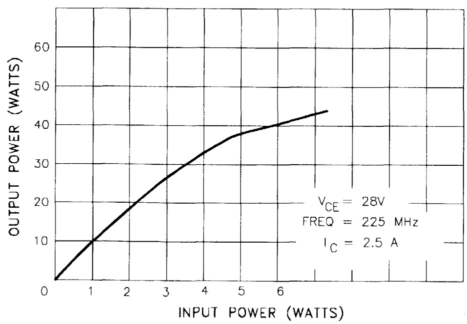
DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 225 MHz | $V_{CE}$ = 25 V | $I_C$ = 2.5 A | 20 | — | — | W |
| $G_P$ | f = 225 MHz | $V_{CE}$ = 25 V | $I_C$ = 2.5 A | 8.0 | 9.0 | — | dB |
| $IMD_3$* | $P_{OUT}$ = 14 W | $V_{CE}$ = 25 V | $I_C$ = 2.5 A | — | -55 | — | dBc |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 30 V | | — | — | 85 | pF |

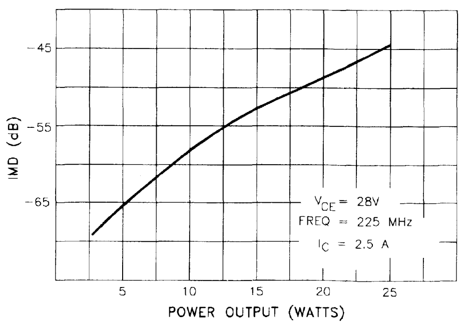
Note: * f = 225 MHz
3 Tone Testing
Vision Carrier −8dB/ref
Sound Carrier −7dB/ref
Sideband Carrier −16dB/ref

## TYPICAL PERFORMANCE

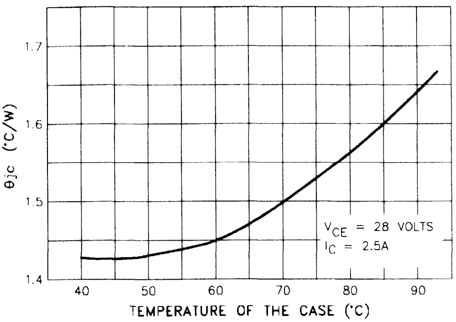
### POWER OUTPUT vs POWER INPUT

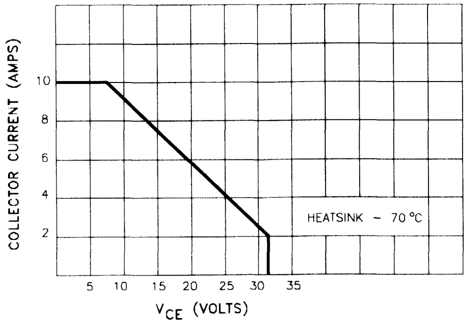



### INTERMODULATION DISTORTION vs POWER OUTPUT

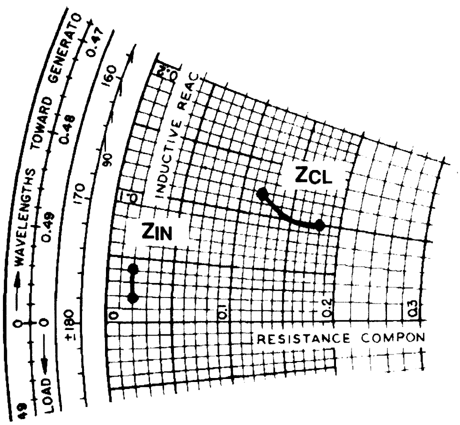


## TYPICAL PERFORMANCE (CONT'D)




## IMPEDANCE DATA



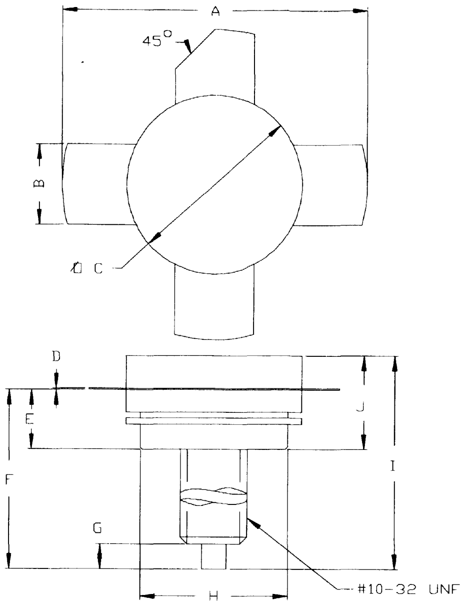

| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 150 MHz | 1.0 + j 1.0 | 9.0 + j 5.0 |
| 250 MHz | 1.0 + j 2.0 | 6.0 + j 6.0 |

$V_{CE}$ = 28 V
$I_C$ = 2.5 A
Normalized to 50 Ohms

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0130

| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | 1.010/25,65 | 1.050/26,67 |
| B | .220/5,59 | .230/5,84 |
| C | .495/12,57 | .505/12,83 |
| D | .003/0,08 | .007/0,18 |
| E | .160/4,06 | .180/4,57 |
| F | .622/15,80 | |
| G | .100/2,54 | .130/3,31 |
| H | .415/10,54 | .425/10,80 |
| I | .720/18,29 | |
| J | .250/6,35 | .290/7,37 |

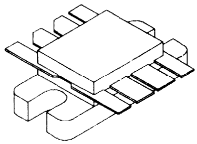


SGS-THOMSON MICROELECTRONICS

# SD1456 (TCC3100)

## RF & MICROWAVE TRANSISTORS TV/LINEAR APPLICATIONS

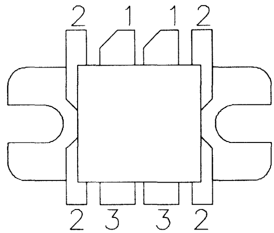
- 170 - 230 MHz
- 28 VOLTS
- CLASS AB PUSH PULL
- DESIGNED FOR HIGH POWER LINEAR OPERATION
- HIGH SATURATED POWER CAPABILITY
- GOLD METALLIZATION
- DIFFUSED EMITTER BALLAST RESISTORS
- COMMON EMITTER CONFIGURATION
- $P_{OUT}$ = 100 W MIN. WITH 11.0 dB GAIN



**.400 x .425 8LFL (M168)**
epoxy sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| SD1456 | TCC3100 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base

### DESCRIPTION

The SD1456 is a gold metallized epitaxial silicon NPN planar transistor using diffused emitter ballast resistors for high linearity Class AB operation in VHF and Band III television transmitters and transposers.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 65 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 33 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.5 | V |
| $I_C$ | Device Current | 16 | A |
| $P_{DISS}$ | Power Dissipation | 150 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 1.2 | °C/W |

November 1992

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 50mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{CER}$ | $I_C$ = 50mA | $R_{BE}$ = 15Ω | 60 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 50mA | $I_B$ = 0mA | 33 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 5mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 500mA | 20 | — | 150 | — |

### DYNAMIC (Class AB)

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 225 MHz | $V_{CE}$ = 28 V | $I_C$ = 2 x 100 mA | 100 | — | — | W |
| $G_P$ | $P_{OUT}$ = 100 W | $V_{CE}$ = 28 V | $I_C$ = 2 x 100 mA | 11 | — | — | dB |
| $\eta_C$ | $P_{OUT}$ = 100 W | $V_{CE}$ = 28 V | $I_C$ = 2 x 100 mA | 70 | — | — | % |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 28 V | | — | 60 | — | pF |

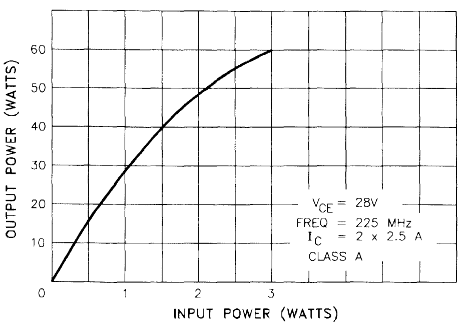
### DYNAMIC (Class A)

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$* | f = 225 MHz | $V_{CE}$ = 28 V | $I_C$ = 2 x 2.5 A | 28 | 32 | — | W |
| $G_P$* | $P_{IN}$ = 1.1 W | $V_{CE}$ = 28 V | $I_C$ = 2 x 2.5 A | 14 | 15 | — | dB |
| $IMD_3$* | $P_{IN}$ = 1.1 W | $V_{CE}$ = 28 V | $P_{REF}$ = 28 W | — | -51 | — | dB |

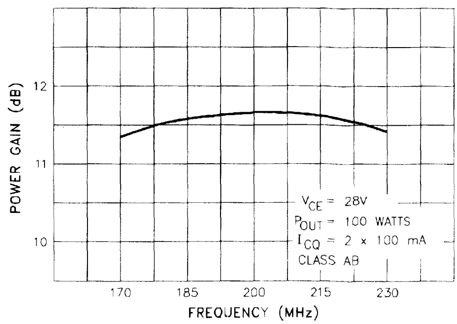
Note: * Class A Performance Characteristics Indicate Capability but are not Tested.
IMD3 - 3 Tone Meaurement; −8, −7, −16dB relative to $P_{REF}$

## TYPICAL PERFORMANCE

### POWER OUTPUT vs POWER INPUT

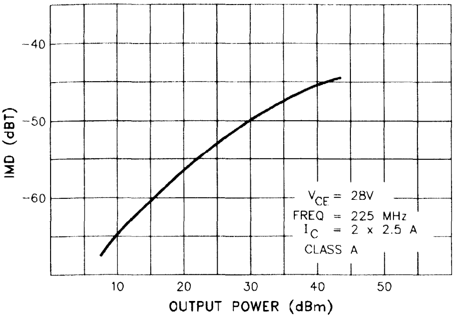



### BROADBAND POWER GAIN vs FREQUENCY

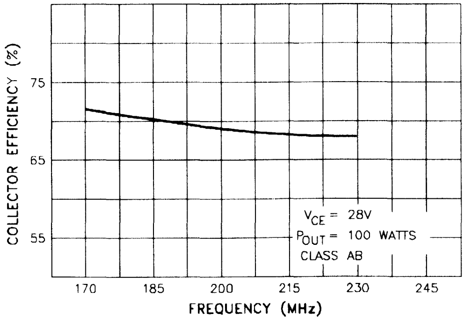


## TYPICAL PERFORMANCE (cont'd)

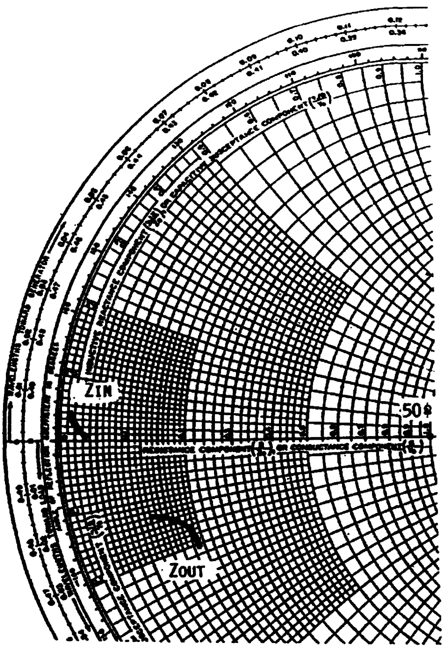
### INTERMODULATION DISTORTION vs POWER OUTPUT




### COLLECTOR EFFICIENCY vs FREQUENCY



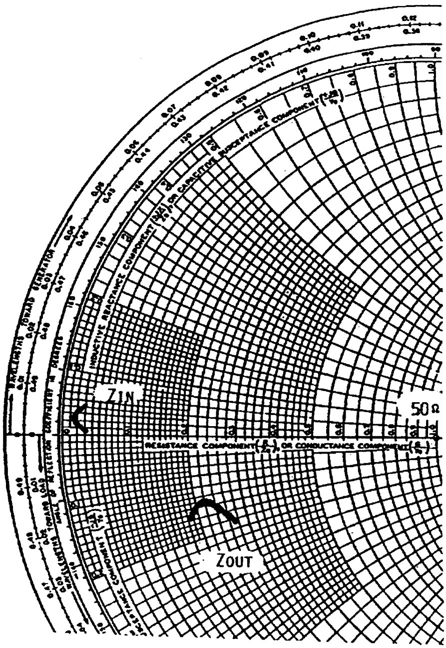

## IMPEDANCE DATA




| FREQ. | $Z_{IN}$ (Ω) | $Z_{OUT}$ (Ω) |
|---|---|---|
| 170 MHz | 1.3 + j 0.6 | 9.5 − j 10.0 |
| 200 MHz | 1.0 + j 1.0 | 9.0 − j 8.0 |
| 230 MHz | 0.9 + j 1.8 | 6.3 − j 6.5 |

$P_{OUT}$ = 100 W
$V_{CE}$ = 28 V
$I_{CQ}$ = 2 x 100 mA
Class AB

## IMPEDANCE DATA

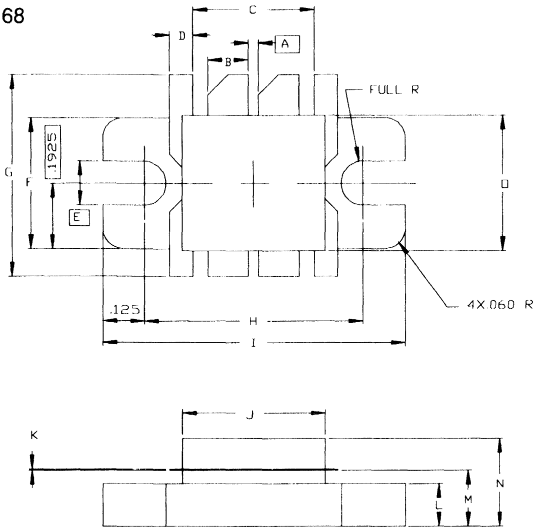



| FREQ. | $Z_{IN}$ (Ω) | $Z_{OUT}$ (Ω) |
|---|---|---|
| 170 MHz | 1.05 + j 0.65 | 13.5 − j 9.0 |
| 200 MHz | 0.9 + j 1.1 | 11.0 − j 6.5 |
| 230 MHz | 1.25 + j 1.8 | 9.5 − j 7.7 |

$V_{CE}$ = 28 V
$I_{CQ}$ = 2 x 2.5 A
Class A

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0168




| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .030/0,76 | |
| B | .115/2,92 | .125/3,18 |
| C | .360/9,14 | |
| D | .065/1,65 | .075/1,91 |
| E | .130/3,30 | |
| F | .380/9,65 | .390/9,91 |
| G | .735/18,67 | .765/19,43 |
| H | .645/16,38 | .655/16,64 |
| I | .895/22,73 | .905/22,99 |
| J | .420/10,67 | .430/10,92 |

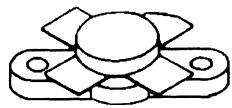
| CONT'D | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| K | .003/0,08 | .007/0,18 |
| L | .120/3,05 | .130/3,30 |
| M | .159/4,04 | .175/4,45 |
| N | | .280/7,11 |
| O | .395/10,03 | .405/10,29 |
| | | |

**SGS-THOMSON**
MICROELECTRONICS

# SD1457

## RF & MICROWAVE TRANSISTORS
## FM BROADCAST APPLICATIONS

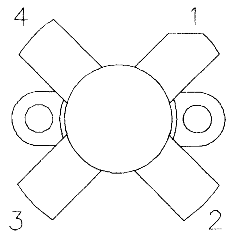
- 108 MHz
- 28 VOLTS
- EFFICIENCY 75%
- COMMON EMITTER
- GOLD METALLIZATION
- $P_{OUT}$ = 75 W MIN. WITH 10.0 dB GAIN



**.500 4LFL (M174)**
epoxy sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| SD1457 | SD1457 |

**PIN CONNECTION**




| | |
|---|---|
| 1. Collector | 3. Base |
| 2. Emitter | 4. Emitter |

### DESCRIPTION

The SD1457 is a 28 V gold metallized epitaxial silicon NPN planar transistor designed for FM VHF broadcast transmitters.

This device utlizes diffused emitter resistors to achieve infinite VSWR at rated operating conditions.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 65 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 30 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 60 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 10 | A |
| $P_{DISS}$ | Power Dissipation | 100 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 1.5 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

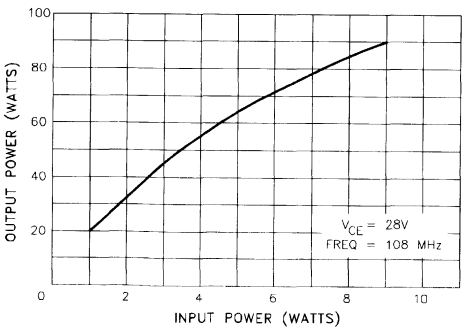
| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 50mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{CER}$ | $I_C$ = 50mA | $R_{BE}$ = 10Ω | 60 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 50mA | $I_B$ = 0mA | 30 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1A | 20 | — | 150 | — |

DYNAMIC

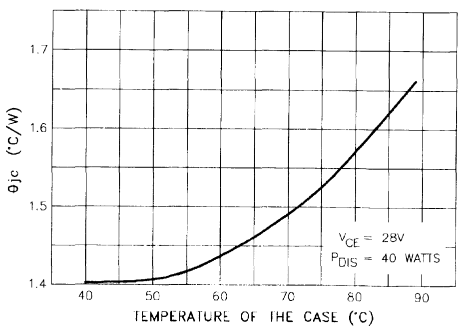
| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 108 MHz | $P_{IN}$ = 7.5 W | $V_{CE}$ = 28 V | 75 | — | — | W |
| $G_P$ | f = 108 MHz | $P_{IN}$ = 7.5 W | $V_{CE}$ = 28 V | 10 | — | — | dB |
| $\eta_C$ | f = 108 MHz | $P_{IN}$ = 7.5 W | $V_{CE}$ = 28 V | 70 | — | — | % |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 30 V | | — | — | 85 | pF |

## TYPICAL PERFORMANCE

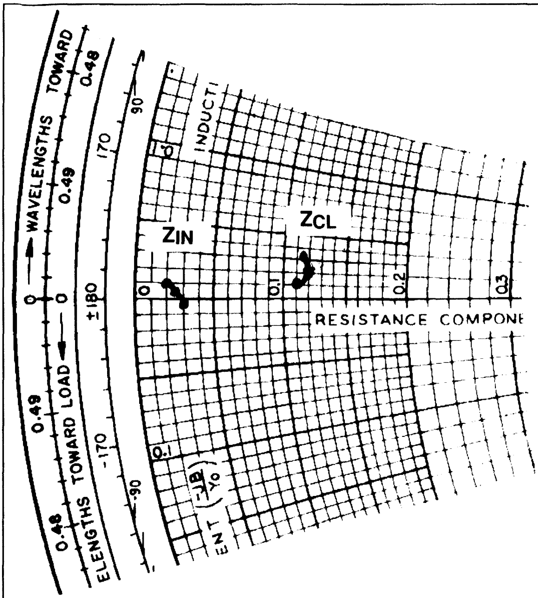
### POWER OUTPUT vs POWER INPUT




### THERMAL RESISTANCE vs CASE TEMPERATURE

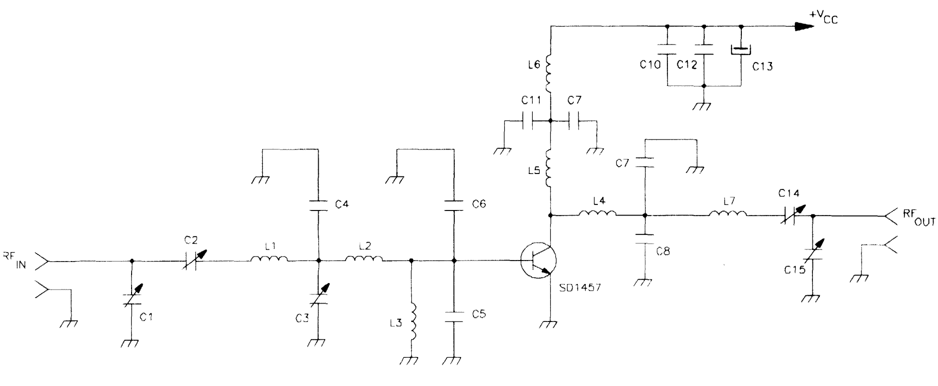


## IMPEDANCE DATA




| FREQ. | ZIN (Ω) | ZCL (Ω) |
|---|---|---|
| 88 MHz | 1.4 + j 0.1 | 5.5 + j 0.7 |
| 98 MHz | 1.2 + j 0.3 | 6.1 + j 1.1 |
| 100 MHz | 1.0 + j 0.5 | 5.7 + j 1.6 |

## TEST CIRCUIT



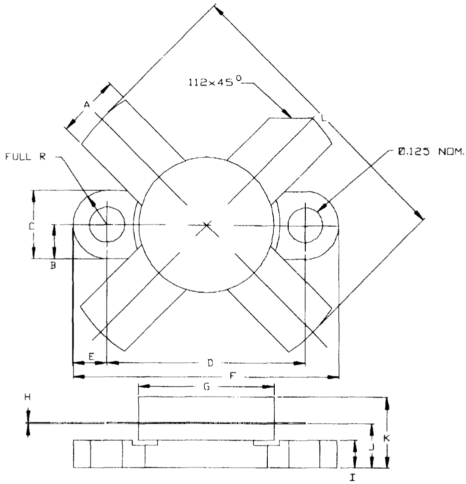

| | | |
|---|---|---|
| C1, C2, C14 | : | 24 - 200pF, Arco 425 |
| C3 | : | 16 - 100pF, Arco 423 |
| C4 | : | 62pF, Unelco Capacitor |
| C5, C6 | : | 330pF, Unelco Capacitor |
| C7, C10 | : | 1000pF, Unelco Capacitor |
| C8, C9 | : | 36pF, Unelco Capacitor |
| C11, C12 | : | 0.1μF, Disc Capacitor |
| C13 | : | 100μF, 63V, Electrolytic Capacitor |
| C15 | : | 25 - 150pF, Arco 424 |

| | | |
|---|---|---|
| L1 | : | 3 Turns, 1mm Wire, 6mm I.D. |
| L2 | : | 1/2 Turn, 1.4mm Wire, 15mm Length |
| L3 | : | 0.7μH, Molded Choke |
| L4 | : | 1/2 Turn, 2mm Wire, 20mm Length |
| L5 | : | 4 Turns, 1mm Wire, 6mm I.D. |
| L6 | : | 4 Turns, 1.2mm Wire on Ferrite Core |
| L7 | : | 3 Turns, 1.4mm Wire. 8mm I.D. |

Board Material: Epoxy Glass

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0174




| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .220/5,59 | .230/5,84 |
| B | .125/3,18 | |
| C | .245/6,22 | .255/6,48 |
| D | .720/18,28 | .730/18,54 |
| E | .125/3,18 | |
| F | .970/24,64 | .980/24,89 |
| G | .495/12,57 | .505/12,83 |
| H | .003/0,08 | .007/0.18 |
| I | .090/2,29 | .110/2,79 |
| J | .160/4,06 | .175/4,45 |

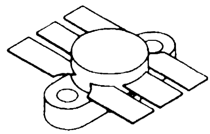
| CONT'D | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| K | | .280/7,11 |
| L | | 1.050/26,67 |

SGS-THOMSON MICROELECTRONICS

# SD1458

## RF & MICROWAVE TRANSISTORS TV\LINEAR APPLICATIONS

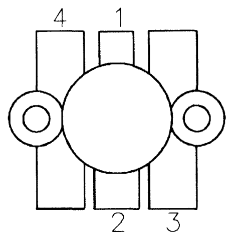
- 170 - 230 MHz
- 28 VOLTS
- IMD –55 dB
- COMMON EMITTER
- GOLD METALLIZATION
- INTERNAL INPUT MATCHING
- HIGH SATURATED POWER CAPABILITY
- DESIGNED FOR HIGH POWER LINEAR OPERATION
- $P_{OUT}$ = 14 W MIN. WITH 14.0 dB GAIN



**.500 6LFL (M111)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1458 | SD1458 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Emitter

### DESCRIPTION

The SD1458 is a gold metallized epitaxial silicon NPN planar transistor using diffused emitter ballast resistors for high linearity Class A operation in VHF and band III television transmitters and transposers.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 60 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 35 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 10 | A |
| $P_{DISS}$ | Power Dissipation | 140 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 1.5 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CER}$ | $I_C$ = 50mA | $R_{BE}$ = 10Ω | 60 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 50mA | $I_B$ = 0mA | 35 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 50V | $I_E$ = 0mA | — | — | 5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1A | 10 | — | 100 | — |

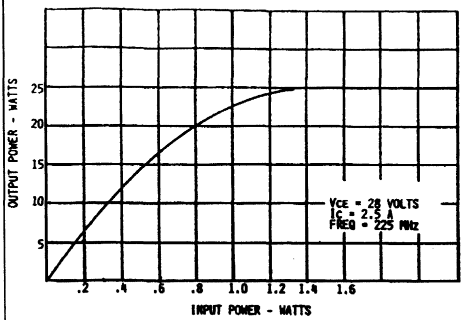
### DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 225 MHz | $V_{CE}$ = 28 V | $I_C$ = 2.5 A | 14 | — | — | W |
| $G_P$ | f = 225 MHz | $V_{CE}$ = 28 V | $I_C$ = 2.5 A | 14 | — | — | dB |
| $IMD_3$ | f = 225 MHz | $V_{CE}$ = 28 V | $I_C$ = 2.5 A | — | — | –55 | dBc |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 28 V | | — | — | 80 | pF |

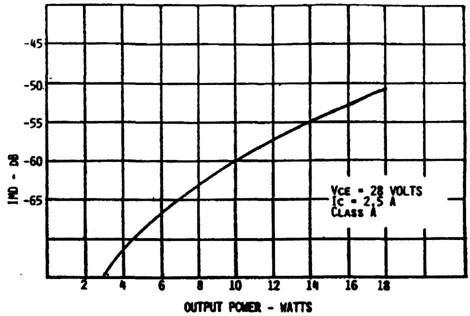
Note: $IMD_3$
- Vision Carrier - 8dB
- Sound Carrier - 7dB
- Sideband Carrier - 16dB

## TYPICAL PERFORMANCE

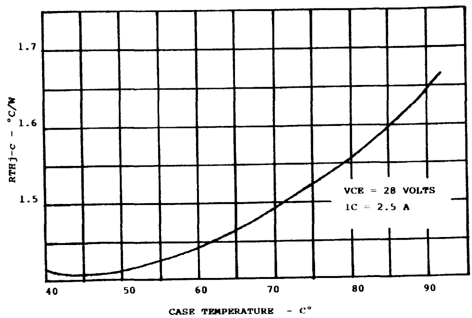
### POWER OUTPUT vs POWER INPUT




### IMD vs POWER OUTPUT

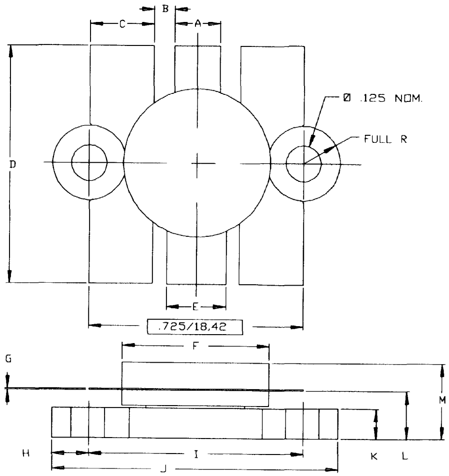



### THERMAL RESISTANCE vs CASE TEMPERATURE



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0111




| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .150/3,43 | .160/4,06 |
| B | .045/1,14 | |
| C | .210/5,33 | .220/5,59 |
| D | .835/21,21 | .865/21,97 |
| E | .200/5,08 | .210/5,33 |
| F | .490/12,45 | .510/12,95 |
| G | .003/0,08 | .007/0,18 |
| H | .125/3,18 | |
| I | .720/18,29 | .730/18,54 |
| J | .970/24,64 | .980/24,89 |

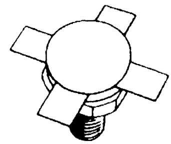
| CONT'D | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| K | .095/2,41 | .105/2,67 |
| L | .150/3,81 | .170/4,32 |
| M | | .280/7,11 |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

SGS-THOMSON MICROELECTRONICS

# SD1459

## RF & MICROWAVE TRANSISTORS TV/LINEAR APPLICATIONS

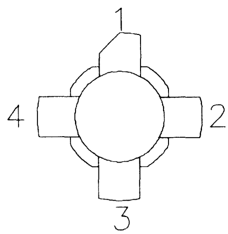
- 170 - 230 MHz
- 28 VOLTS
- IMD –53 dB
- COMMON EMITTER
- GOLD METALLIZATION
- HIGH SATURATED POWER CAPABILITY
- DIFFUSED EMITTER BALLAST RESISTORS
- $P_{OUT}$ = 20 W MIN. WITH 7.5 dB GAIN



**.550 4L STUD (M164)**
epoxy sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| SD1459 | SD1459 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

### DESCRIPTION

The SD1459 is a gold metallized epitaxial silicon NPN planar transistor using diffused emitter ballast resistors for high linearity Class A operation in VHF and Band III television transmitters and transposers.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 60 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 30 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 16 | A |
| $P_{DISS}$ | Power Dissipation | 150 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 1.2 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

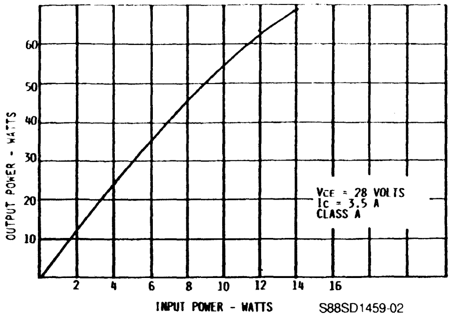
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 100mA | $I_E$ = 0mA | 60 | — | — | V |
| $BV_{CER}$ | $I_C$ = 100mA | $R_{BE}$ = 10Ω | 60 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 100mA | $I_B$ = 0mA | 30 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 20mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1A | 10 | — | 120 | — |

DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 225 MHz | $V_{CE}$ = 28 V | $I_C$ = 3.5 A | 20 | — | — | W |
| $G_P$ | f = 225 MHz | $V_{CE}$ = 28 V | $I_C$ = 3.5 A | 7.5 | — | 8.0 | dB |
| IMD | f = 225 MHz | $V_{CE}$ = 28 V | $I_C$ = 3.5 A | — | −53 | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 30 V | | — | — | 150 | pF |

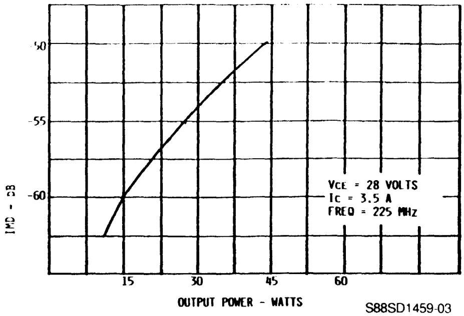
## TYPICAL PERFORMANCE

### POWER OUTPUT vs POWER INPUT



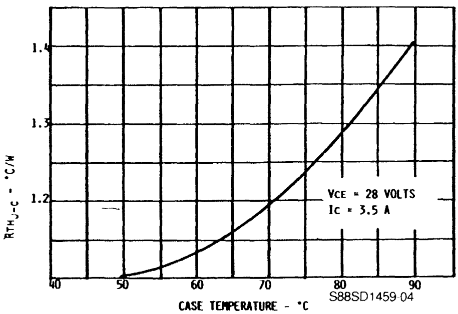
S88SD1459-02

### IMD vs POWER OUTPUT



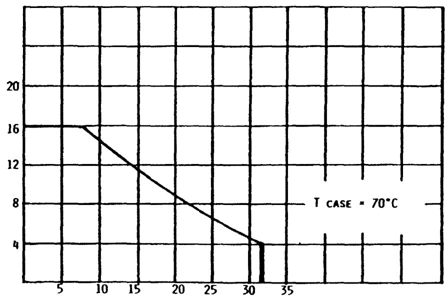
S88SD1459-03

### THERMAL RESISTANCE vs CASE TEMPERATURE



S88SD1459-04

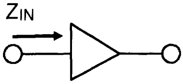
### SAFE OPERATING AREA



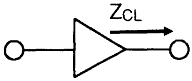
S88SD1459-05

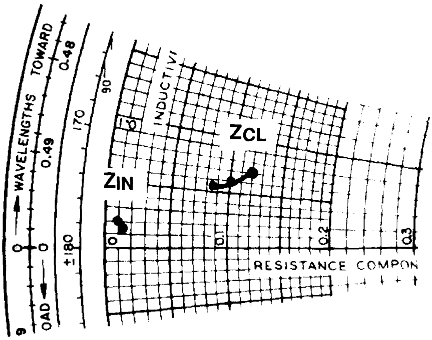
## IMPEDANCE DATA

**TYPICAL INPUT IMPEDANCE**



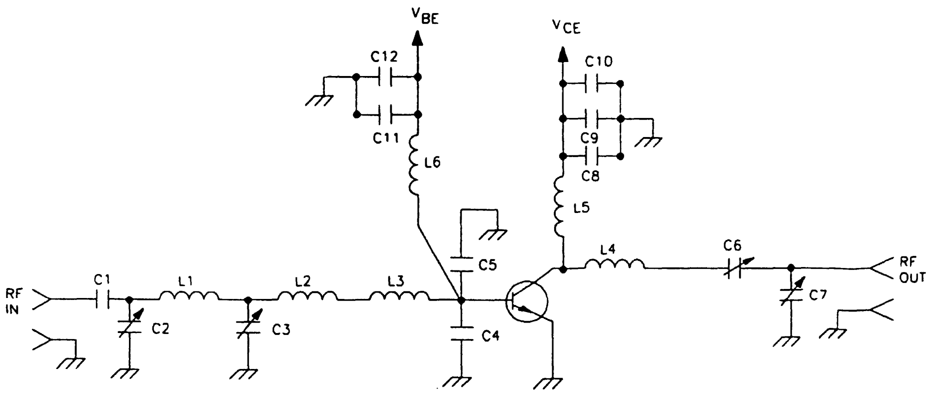

**TYPICAL COLLECTOR LOAD IMPEDANCE**



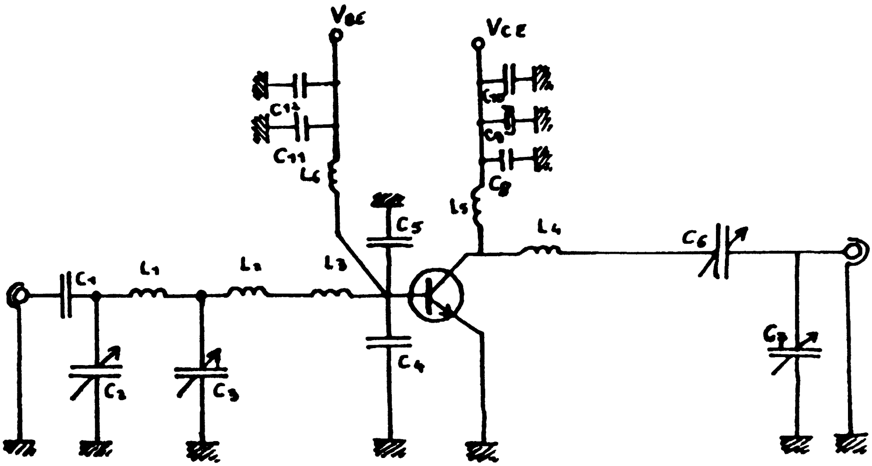

| FREQ. | ZIN (Ω) | ZCL (Ω) |
|---|---|---|
| 170 MHz | 0.6 + j 0.7 | 5.9 + j 3.5 |
| 200 MHz | 0.55 + j 0.8 | 5.0 + j 3.0 |
| 230 MHz | 0.5 + j 0.9 | 4.2 + j 2.8 |

## TEST CIRCUIT FOR 225 MHz




Components List is on next page.

## TEST CIRCUIT




S88SD1459-07

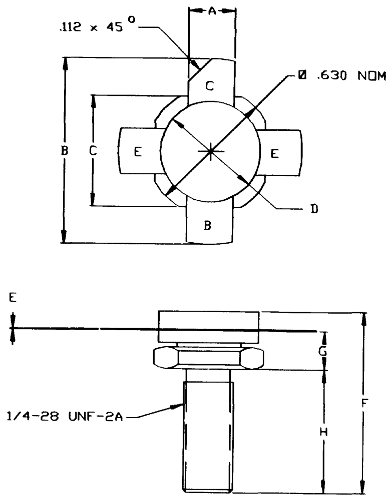
| | | |
|---|---|---|
| C1, C10 | : | 470 pF ATC 100 B Chip Capacitor |
| C2 | : | 4 - 40pF Arco 403 Trimmer Capacitor |
| C3 | : | 4 - 60pF Arco 404 Trimmer Capacitor |
| C4, C5 | : | 82pF ATC 100B Chip Capacitor |
| C6 | : | 24 - 200pF Arco 425 Trimmer Capacitor |
| C7 | : | 10 - 80pF Arco 405 Trimmer Capacitor |
| C8, C11 | : | 1μF LCC Chip Capacitor |
| C9 | : | 100μF 63V Electrolytic |
| C12 | : | 10mF LCC CPM13B |

| | | |
|---|---|---|
| L1 | : | 1 1/2 Turns, 0.7mm Enameled Wire 4.5mm I.D. |
| L2 | : | 21mm 50Ω Line |
| L3 | : | Length of the Base Lead |
| L4 | : | Enameled Wire 1.6mm Diameter |
| L5 | : | Enameled Wire 1.6mm Diameter |
| L6 | : | 9 Turns 0.7mm Enameled Wire 4.5mm 1.D. |

Material: Epoxy 63 Mils Er = 2.55

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0164



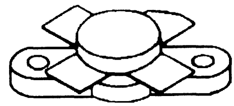

| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .220/5,59 | .230/5,84 |
| B | | 1.050/26,67 |
| C | .545/13,84 | .555/14,10 |
| D | .495/12,57 | .505/12,83 |
| E | .003/0,08 | .007/0,18 |
| F | | .830/21,08 |
| G | .185/4,70 | .198/5,03 |
| H | .497/12,62 | .530/13,46 |
| | | |
| | | |

SGS-THOMSON
MICROELECTRONICS

# SD1460

## RF & MICROWAVE TRANSISTORS
## FM BROADCAST APPLICATIONS

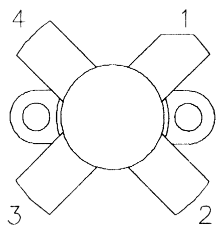
- 108 MHz
- 28 VOLTS
- EFFICIENCY 75%
- COMMON EMITTER
- GOLD METALLIZATION
- $P_{OUT}$ = 150 W MIN. WITH 9.2 dB GAIN



**.500 4LFL (M174)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1460 | SD1460 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

### DESCRIPTION

The SD1143 is a 28 V gold metallized epitaxial silicon NPN planar transistor designed for VHF FM broadcast transmitters. This device utilizes diffused emitter resistors to achieve infinite VSWR at rated operating conditions.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 60 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 25 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 60 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 16 | A |
| $P_{DISS}$ | Power Dissipation | 230 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 0.75 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

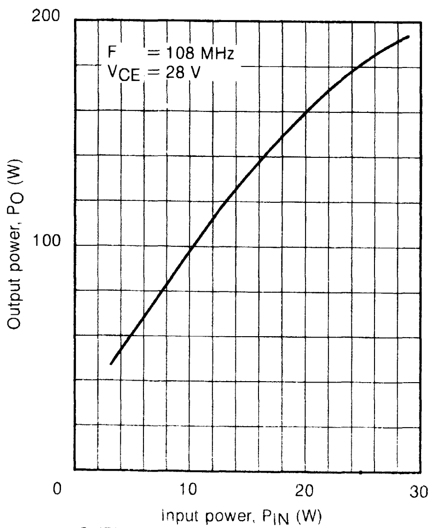
| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 100mA | $I_E$ = 0mA | 60 | — | — | V |
| $BV_{CER}$ | $I_C$ = 100mA | $R_{BE}$ = 10Ω | 55 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 100mA | $I_B$ = 0mA | 25 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 20mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1A | 20 | — | 150 | — |

DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 108 MHz | $P_{IN}$ = 18 W | $V_{CE}$ = 28 V | 150 | — | — | W |
| $G_P$ | f = 108 MHz | $P_{IN}$ = 18 W | $V_{CE}$ = 28 V | 9.2 | — | — | dB |
| $\eta_c$ | f = 108 MHz | $P_{IN}$ = 18 W | $V_{CE}$ = 28 V | 70 | — | — | % |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 28 V | | — | — | 150 | pF |

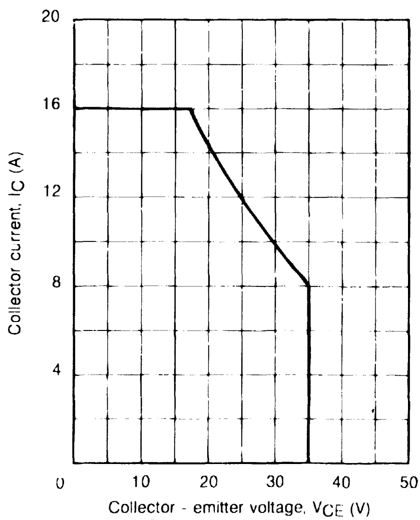
## TYPICAL PERFORMANCE

### POWER OUTPUT vs POWER INPUT




OUTPUT POWER VERSUS INPUT POWER

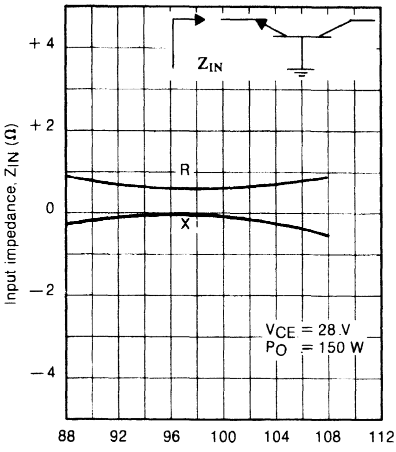
### SAFE OPERATING AREA




SAFE OPERATING AREA

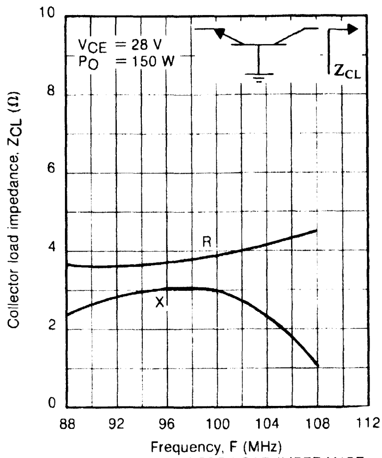
## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE



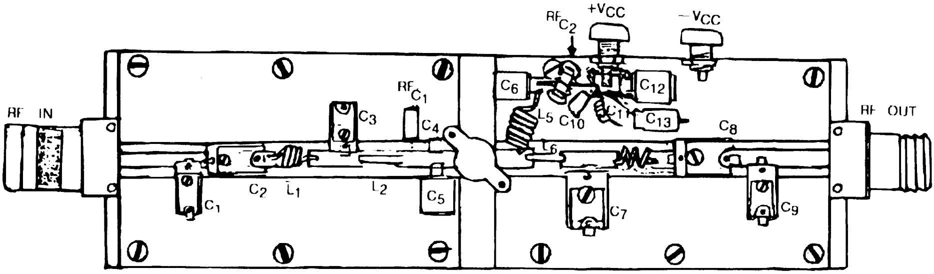

TYPICAL INPUT IMPEDANCE VERSUS FREQUENCY

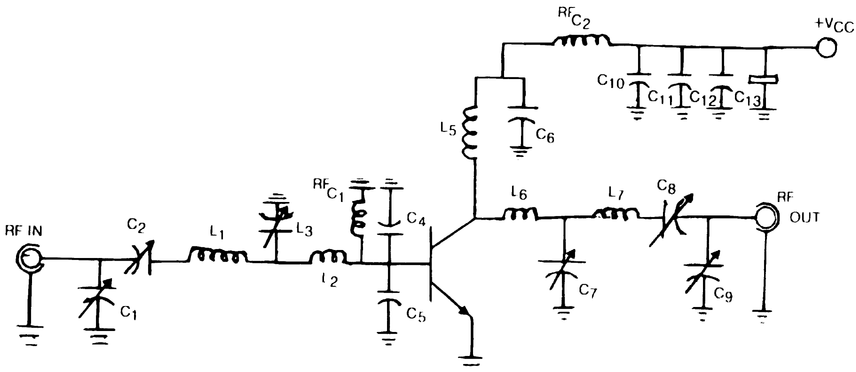
### TYPICAL COLLECTOR LOAD IMPEDANCE




TYPICAL COLLECTOR LOAD IMPEDANCE VERSUS FREQUENCY

## TEST CIRCUIT




C1, C2,
C3, C9 : 24 - 200pF Variable, Arco 425
C4 : 470pF ATC 125 mil. Sq. Chip
C5 : 470pF Unelco, 400 mil. Sq.
C6 : 1000pF Unelco, 400 mil Sq.
C7 : 50 - 380pF Variable, Arco 465
C8 : 25 - 280pF Variable, Arco 464
C10 : .1μF 50V, Erie Disc
C11 : .01μF 50V, Erie Disc
C12 : 1000pF Unelco, 400 mil Sq.
C13 : 100μF 35V, Sprague Electrolytic

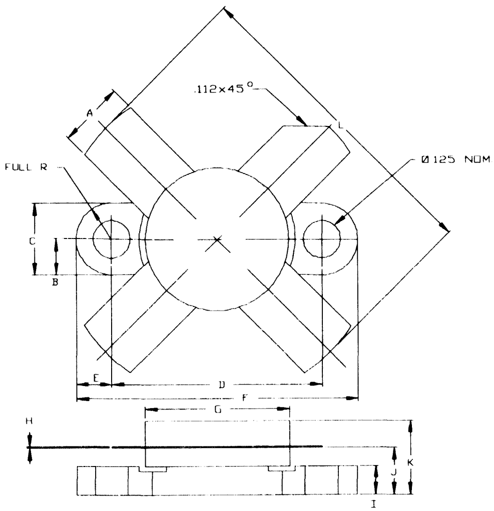
L1 : 3 Turns, #16 AWG, .225" I.D.
L2 : #14 AWG, Length .335", Height .400"
L5 : 5 1/2 Turns, #16 AWG Enameled .270" I.D.
L6 : #14 AWG, Length .300", Height .335"
L7 : 3 Turns, #16 AWG, Length .300", Height .335"

RFC 1 : VK200 19/4B (1 winding) Ferroxcube Choke
RFC 2 : 6 Turns, #16 AWG Enamel on T50-2 Torroid

Board Material: 3-M-K-6098 1/16" Thick

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0174




| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .220/5,59 | .230/5,84 |
| B | .125/3,18 | |
| C | .245/6,22 | .255/6,48 |
| D | .720/18,28 | .730/18,54 |
| E | .125/3,18 | |
| F | .970/24,64 | .980/24,89 |
| G | .495/12,57 | .505/12,83 |
| H | .003/0,08 | .007/0,18 |
| I | .090/2,29 | .110/2,79 |
| J | .160/4,06 | .175/4,45 |

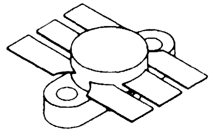
| CONT'D | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| K | | .280/7,11 |
| L | | 1.050/26,67 |

SGS-THOMSON
MICROELECTRONICS

# SD1462

## RF & MICROWAVE TRANSISTORS
## WIDEBAND VHF/UHF APPLICATIONS

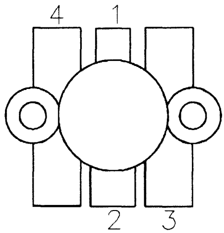
- 400 MHz
- 28 VOLTS
- EFFICIENCY 60%
- COMMON EMITTER
- GOLD METALLIZATION
- $P_{OUT}$ = 70 W MIN. WITH 9.0 dB GAIN



**.500 6LFL (M111)**
epoxy sealed

| ORDER CODE | BRANDING |
| --- | --- |
| SD1462 | SD1462 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Emitter

### DESCRIPTION

The SD1462 is a 28 V Class C epitaxial silicon NPN planar transistor designed primarily for UHF communications. This device utilizes diffused emitter resistors to achieve VSWR of 10:1 under operating conditions, and is internally input matched to optimize power gain and efficiency over the 225 - 400 MHz band.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
| --- | --- | --- | --- |
| $V_{CBO}$ | Collector-Base Voltage | 60 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 33 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 8.0 | A |
| $P_{DISS}$ | Power Dissipation | 220 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
| --- | --- | --- | --- |
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 0.8 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case} = 25°C$)

STATIC

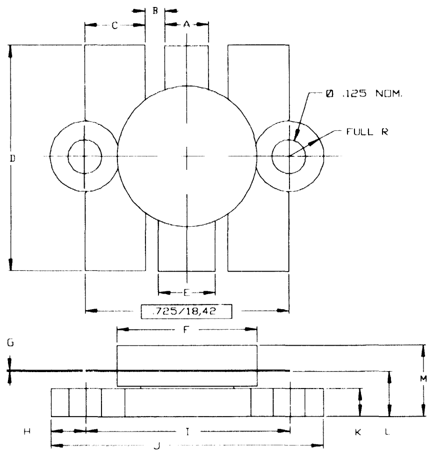
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C = 50mA$ | $I_E = 0mA$ | 60 | — | — | V |
| $BV_{CEO}$ | $I_C = 50mA$ | $I_B = 0mA$ | 33 | — | — | V |
| $BV_{EBO}$ | $I_E = 10mA$ | $I_C = 0mA$ | 4.0 | — | — | V |
| $I_{CBO}$ | $V_{CB} = 30V$ | $I_E = 0mA$ | — | — | 5 | mA |
| $h_{FE}$ | $V_{CE} = 5V$ | $I_C = 1A$ | 20 | — | 120 | — |

DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 400 MHz | $P_{IN} = 8.8$ W | $V_{CE} = 28$ V | 70 | — | — | W |
| $G_P$ | f = 400 MHz | $P_{IN} = 8.8$ W | $V_{CE} = 28$ V | 9.0 | — | — | dB |
| $\eta_c$ | f = 400 MHz | $P_{IN} = 8.8$ W | $V_{CE} = 28$ V | — | 60 | — | % |
| $C_{OB}$ | f = 1 MHz | $V_{CB} = 28$ V | | — | 65 | — | pF |

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0111




| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .150/3,43 | .160/4,06 |
| B | .045/1,14 | |
| C | .210/5,33 | .220/5,59 |
| D | .835/21,21 | .865/21,97 |
| E | .200/5,08 | .210/5,33 |
| F | .490/12,45 | .510/12,95 |
| G | .003/0,08 | .007/0,18 |
| H | .125/3,18 | |
| I | .720/18,29 | .730/18,54 |
| J | .970/24,64 | .980/24,89 |

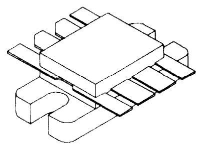
| CONT'D | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| K | .095/2,41 | .105/2,67 |
| L | .150/3,81 | .170/4,32 |
| M | | .280/7,11 |

SGS-THOMSON MICROELECTRONICS

# SD1463 (TCC0204-125)

## RF & MICROWAVE TRANSISTORS VHF/UHF APPLICATIONS

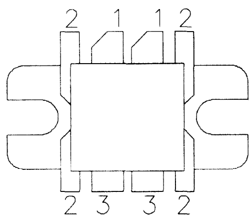
- 400 MHz
- 28 VOLTS
- EFFICIENCY 60%
- COMMON EMITTER
- GOLD METALLIZATION
- $P_{OUT}$ = 125 W MIN. WITH 7.0 dB GAIN



**.400 x .425 8LFL (M168)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1463 | 0204-125 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base

### DESCRIPTION

The SD1463 is a 28 V Class C gold metallized epitaxial silicon NPN planar transistor designed for UHF military and commercial equipment. The SD1463 is an internally matched, broadband device optimized for operation within the 225 - 400 MHz frequency range. This device utlizies diffused emitter resistors to achieve 10:1 VSWR load mismatch capability at rated operating conditions.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 60 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 33 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 15 | A |
| $P_{DISS}$ | Power Dissipation | 270 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 0.65 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 100mA | $I_E$ = 0mA | 60 | — | — | V |
| $BV_{CES}$ | $I_C$ = 80mA | $V_{BE}$ = 0V | 60 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 50mA | $I_B$ = 0mA | 33 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 20mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 30V | $I_E$ = 0mA | — | — | 10 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1A | 20 | — | 200 | — |

DYNAMIC

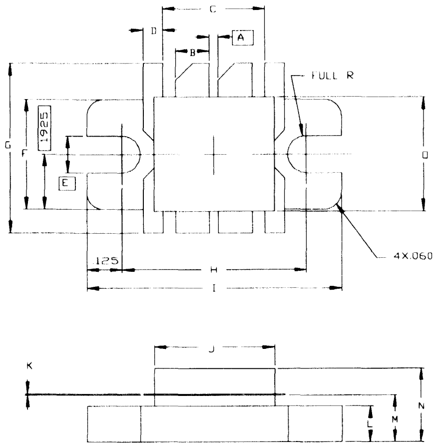
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 400 MHz | $P_{IN}$ = 25 W | $V_{CC}$ = 28 V | 125 | — | — | W |
| $G_P$ | f = 400 MHz | $P_{IN}$ = 25 W | $V_{CC}$ = 28 V | 7.0 | — | — | dB |
| $\eta_C$ | f = 400 MHz | $P_{IN}$ = 25 W | $V_{CC}$ = 28 V | 60 | — | — | % |

## IMPEDANCE DATA

| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 225 MHz | 0.5 + j 2.5 | 8.8 + j 3.5 |
| 400 MHz | 1.5 + j 1.7 | 5.0 + j 0.0 |

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0168




| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .030/0,76 | |
| B | .115/2,92 | .125/3,18 |
| C | .360/9,14 | |
| D | .065/1,65 | .075/1,91 |
| E | 130/3,30 | |
| F | .380/9,65 | .390/9,91 |
| G | .735/18,67 | .765/19,43 |
| H | .645/16,38 | .655/16,64 |
| I | .895/22,73 | .905/22,99 |
| J | 420/10,67 | .430/10,92 |

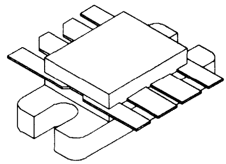
| CONT'D | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| K | .003/0,08 | .007/0,18 |
| L | .120/3,05 | 130/3,30 |
| M | .159/4,04 | .175/4,45 |
| N | | .280/7,11 |
| O | .395/10,03 | 405/10,29 |
| | | |

SGS-THOMSON MICROELECTRONICS

# SD1464 (TCC0105-100)

## RF & MICROWAVE TRANSISTORS VHF/UHF APPLICATIONS

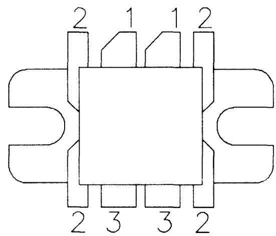
- 500 MHz
- 28 VOLTS
- EFFICIENCY 55%
- COMMON EMITTER
- GOLD METALLIZATION
- $P_{OUT}$ = 100 W MIN. WITH 5.5 dB GAIN



**.400 x .425 8LFL (M168)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1464 | 0105-100 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base

### DESCRIPTION

The SD1464 is a 28 V gold metallized, Class C epitaxial silicon NPN planar transistor designed for UHF military and commercial equipment. The SD1464 is an internally matched, broadband device optimized for operation within the 100 - 500 MHz frequency range. This device utilizes diffused emitter resistors to adchieve 5:1 VSWR load mismatch capability at rated operating conditions.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 60 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 33 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 60 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 15 | A |
| $P_{DISS}$ | Power Dissipation | 260 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 0.67 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

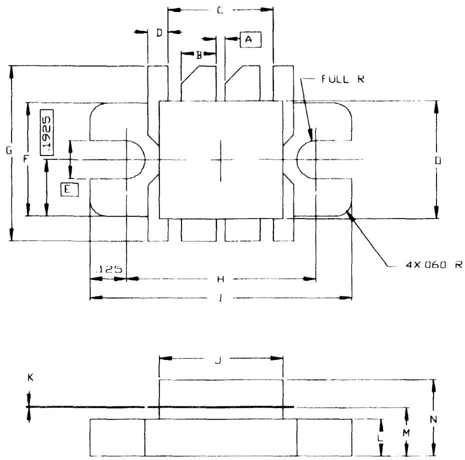
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 100mA | $I_E$ = 0mA | 60 | — | — | V |
| $BV_{CES}$ | $I_C$ = 80mA | $V_{BE}$ = 0V | 60 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 50mA | $I_B$ = 0mA | 33 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 20mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 30V | $I_E$ = 0mA | — | — | 10 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1A | 20 | — | — | — |

DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 500 MHz | $P_{IN}$ = 28.2 W | $V_{CE}$ = 28 V | 100 | — | — | W |
| $G_P$ | f = 500 MHz | $P_{IN}$ = 28.2 W | $V_{CE}$ = 28 V | 5.5 | — | — | dB |
| $\eta_C$ | f = 500 MHz | $P_{IN}$ = 28.2 W | $V_{CE}$ = 28 V | 55 | — | — | % |

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0168




| | SGS-THOMSON MICROELECTRONICS | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .030/0,76 | |
| B | .115/2,92 | .125/3,18 |
| C | .360/9,14 | |
| D | .065/1,65 | .075/1,91 |
| E | .130/3,30 | |
| F | .380/9,65 | .390/9,91 |
| G | .735/18,67 | .765/19,43 |
| H | .645/16,38 | .655/16,64 |
| I | .895/22,73 | .905/22,99 |
| J | .420/10,67 | .430/10,92 |

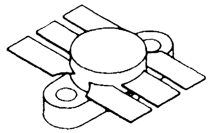
| | CONT'D | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| K | .003/0,08 | .007/0,18 |
| L | .120/3,05 | .130/3,30 |
| M | .159/4,04 | .175/4,45 |
| N | | .280/7,11 |
| O | .395/10,03 | .405/10,29 |
| | | |

SGS-THOMSON
MICROELECTRONICS

# SD1468

## RF & MICROWAVE TRANSISTORS
## VHF/UHF APPLICATIONS

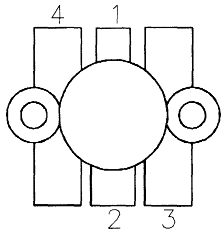
- 400 MHz
- 28 VOLTS
- INPUT MATCHED
- COMMON EMITTER
- GOLD METALLIZATION
- $P_{OUT}$ = 70 W MIN. WITH 8.4 dB GAIN



**.500 6LFL (M111)**
epoxy sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| SD1468 | SD1468 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

### DESCRIPTION

The SD1468 is a 28 V Class C gold metallized, epitaxial silicon NPN planar transistor designed for UHF military and commercial equipment. The SD1468 is an internally matched, broadband device optimized for operation within the 200 - 500 MHz frequency range. This device utilizes diffused emitter resistors to achieve a VSWR of 20:1 at rated operating conditions.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 60 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 30 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 60 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 8.0 | A |
| $P_{DISS}$ | Power Dissipation | 140 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 1.25 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

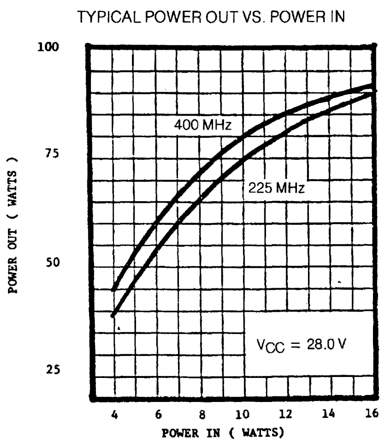
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CES}$ | $I_C$ = 50mA | $V_{BE}$ = 0V | 60 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 50mA | $I_B$ = 0mA | 30 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 5mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $I_{CEO}$ | $V_{CE}$ = 30V | $I_E$ = 0mA | — | — | 5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 2A | 10 | — | 80 | — |

DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 400 MHz | $P_{IN}$ = 10 W | $V_{CC}$ = 28 V | 70 | — | — | W |
| $G_P$ | f = 400 MHz | $P_{IN}$ = 10 W | $V_{CC}$ = 28 V | 8.4 | — | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 28 V | | — | — | 80 | pF |

## TYPICAL PERFORMANCE

### POWER OUTPUT vs POWER INPUT

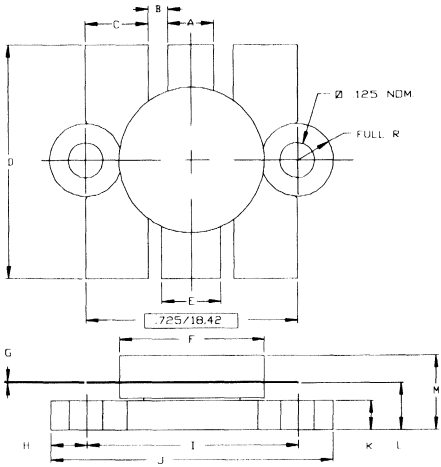



## IMPEDANCE DATA

| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 225 MHz | 1.44 − j 0.87 | 1.70 − j 2.6 |
| 400 MHz | 1.29 + j 0.87 | 3.0 + j 0.87 |

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0111



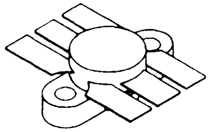

| SGS-THOMSON MICROELECTRONICS | MINIMUM Inches/mm | MAXIMUM Inches/mm | CONT'D | MINIMUM Inches/mm | MAXIMUM Inches/mm |
|---|---|---|---|---|---|
| A | .150/3,43 | .160/4,06 | K | .095/2,41 | .105/2,67 |
| B | .045/1,14 | | L | .150/3,81 | .170/4,32 |
| C | .210/5,33 | .220/5,59 | M | | .280/7,11 |
| D | .835/21,21 | .865/21,97 | | | |
| E | .200/5,08 | .210/5,33 | | | |
| F | .490/12,45 | .510/12,95 | | | |
| G | .003/0,08 | .007/0,18 | | | |
| H | .125/3,18 | | | | |
| I | .720/18,29 | .730/18,54 | | | |
| J | .970/24,64 | 980/24,89 | | | |

SGS-THOMSON MICROELECTRONICS

# SD1470

## RF & MICROWAVE TRANSISTORS WIDEBAND VHF/UHF APPLICATIONS

- 400 MHz
- 28 VOLTS
- EFFICIENCY 60%
- INPUT MATCHED
- COMMON EMITTER
- GOLD METALLIZATION
- $P_{OUT}$ = 100 W MIN. WITH 7.0 dB GAIN

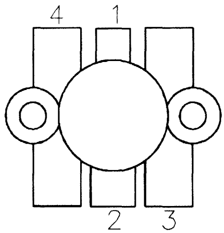


**.500 6LFL (M111)**
epoxy sealed

**ORDER CODE** SD1470

**BRANDING** SD1470

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Emitter

### DESCRIPTION

The SD1470 is a 28 V Class C epitaxial silicon NPN planar transistor designed primarily for UHF communications. The device utilizes diffused emitter resistors to achieve infinite VSWR under operating conditions, and is internally input matched to optimize power gain and efficiency over the band.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 60 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 33 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 4.0 | A |
| $P_{DISS}$ | Power Dissipation | 250 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 0.7 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

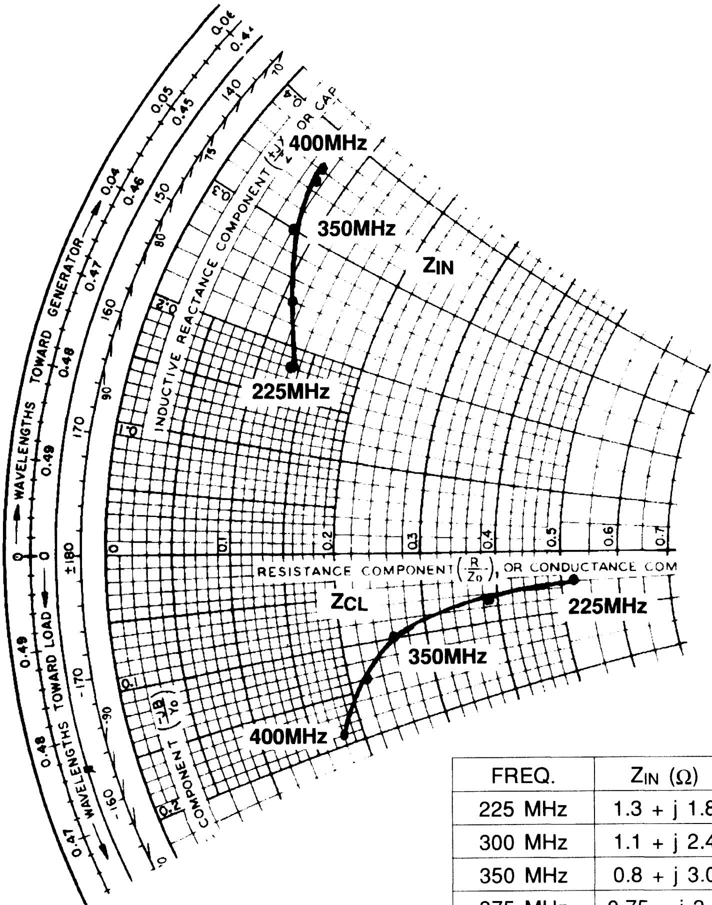
STATIC

| Symbol | Test Conditions | | Value Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 100mA | $I_E$ = 0mA | 60 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 50mA | $I_B$ = 0mA | 33 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 20mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 28V | $I_E$ = 0mA | — | — | 25 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1A | 20 | — | 200 | — |

DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 400 MHz | $P_{IN}$ = 20 W | $V_{CE}$ = 28 V | 100 | — | — | W |
| $G_P$ | f = 400 MHz | $P_{IN}$ = 20 W | $V_{CE}$ = 28 V | 7.0 | — | — | dB |
| $\eta_C$ | f = 400 MHz | $P_{IN}$ = 20 W | $V_{CE}$ = 28 V | — | 60 | — | % |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 28 V | | — | 100 | — | pF |

## IMPEDANCE DATA

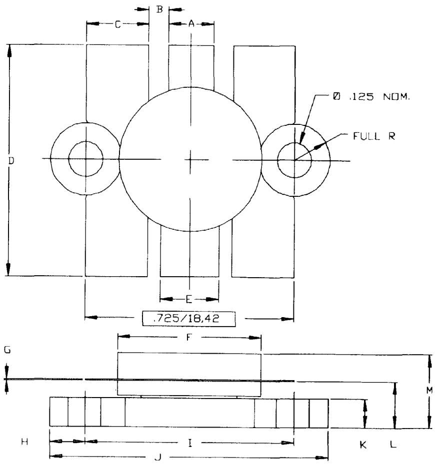



| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 225 MHz | 1.3 + j 1.8 | 5.4 − j 0.5 |
| 300 MHz | 1.1 + j 2.4 | 3.9 − j 0.7 |
| 350 MHz | 0.8 + j 3.0 | 2.6 − j 1.0 |
| 375 MHz | 0.75 + j 3.5 | 2.2 − j 1.4 |
| 400 MHz | 0.70 + j 3.6 | 1.8 − j 1.9 |

Normalized to 10 Ohms

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0111



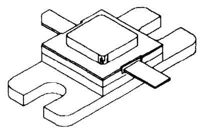

| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .150/3,43 | .160/4,06 |
| B | .045/1,14 | |
| C | .210/5,33 | .220/5,59 |
| D | .835/21,21 | .865/21,97 |
| E | .200/5,08 | .210/5,33 |
| F | .490/12,45 | .510/12,95 |
| G | .003/0,08 | .007/0,18 |
| H | .125/3,18 | |
| I | .720/18,29 | .730/18,54 |
| J | .970/24,64 | .980/24,89 |

| CONT'D | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| K | .095/2,41 | .105/2,67 |
| L | .150/3,81 | .170/4,32 |
| M | | .280/7,11 |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

# SD1474

## RF & MICROWAVE TRANSISTORS
## UHF PULSED APPLICATIONS

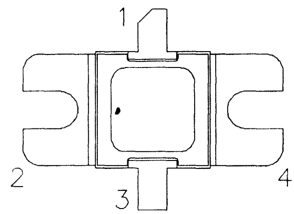
- 425 MHz
- 28 VOLTS
- COMMON EMITTER
- GOLD METALLIZATION
- EMITTER BALLASTED
- $P_{OUT}$ = 48 W MIN. WITH 6.8 dB GAIN



**.400 SQ. 2LFL (M138)**
hermetically sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| SD1474 | 1474 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

### DESCRIPTION

The SD1474 is a Class C, 28 V common emitter device optimized for pulsed applications in the 400 - 500 MHz frequency range. Refractory gold metallization and emitter ballasting ensure long-term reliability as well as device ruggedness under severe load mismatch conditions.

SD1474 is characterized for both CW and pulsed operation and is provided in an industry -standard .400" Sq. hermetic package.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 60 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 60 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 5 | A |
| $P_{DISS}$ | Power Dissipation | 87.5 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 2.0 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

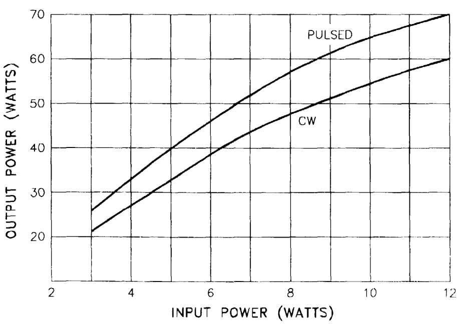
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 50mA | $I_E$ = 0mA | 60 | — | — | V |
| $BV_{CES}$ | $I_C$ = 50mA | $V_{BE}$ = 0V | 60 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 50mA | $I_B$ = 0mA | 32 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 5mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 30V | $I_E$ = 0mA | — | — | 5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1A | 20 | — | 100 | — |

### DYNAMIC

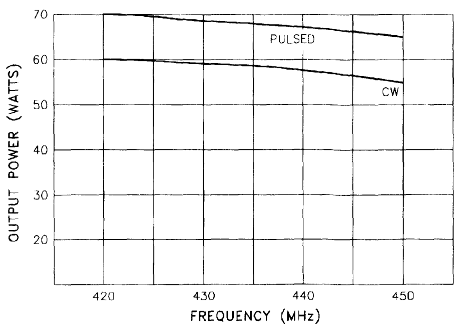
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 425 MHz | $P_{IN}$ = 10 W | $V_{CE}$ = 28 V | 48 | — | — | W |
| $G_P$ | f = 425 MHz | $P_{IN}$ = 10 W | $V_{CE}$ = 28 V | 6.8 | — | — | dB |
| $\eta_C$ | f = 425 MHz | $P_{IN}$ = 10 W | $V_{CE}$ = 28 V | 50 | — | — | % |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 28 V | | — | 42 | — | pF |

## TYPICAL PERFORMANCE

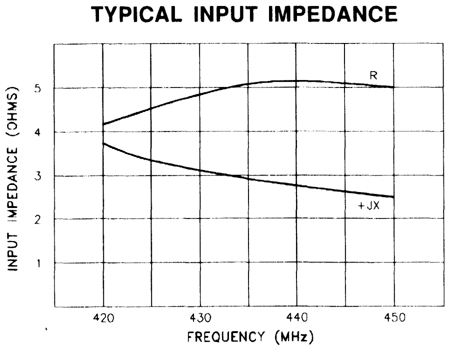
### POWER OUTPUT vs POWER INPUT

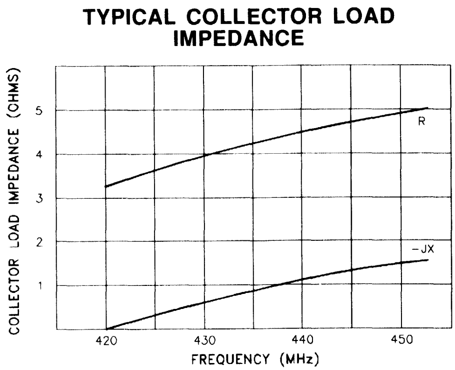



### POWER OUTPUT vs FREQUENCY

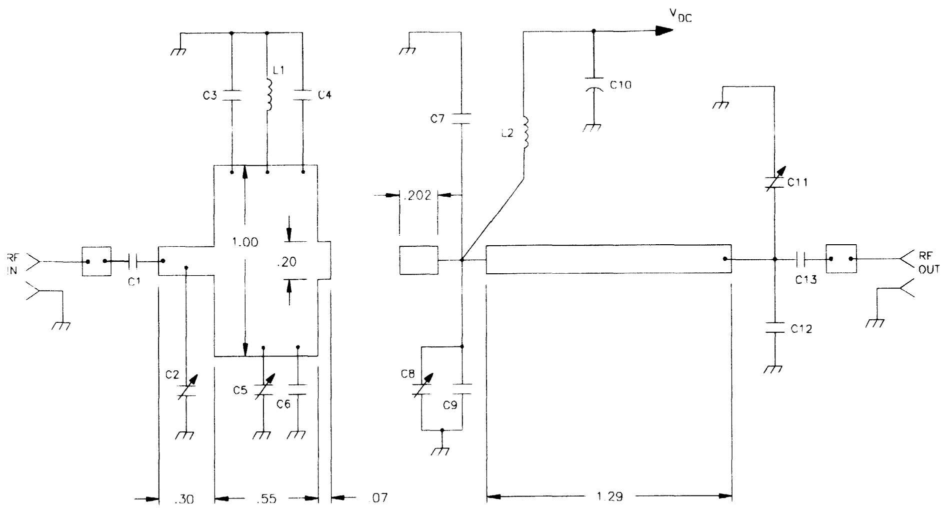


## IMPEDANCE DATA




## TEST CIRCUIT

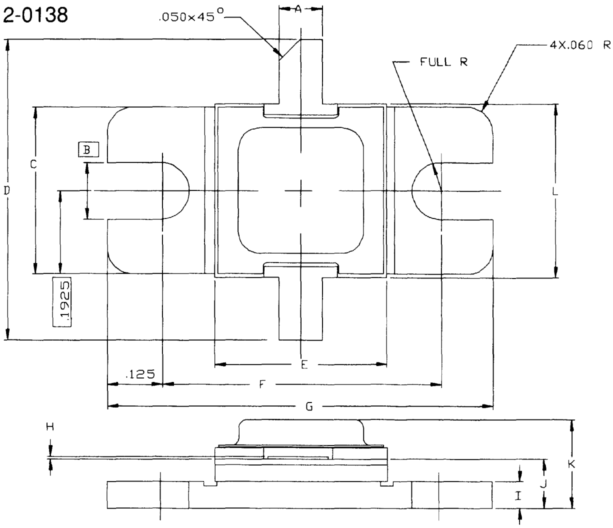



| | | |
|---|---|---|
| C1, C13 | : | 100pF |
| C2, C5, C9, C11 | : | 0.6 - 12.0pF |
| C3 | : | 9.1pF |
| C4 | : | 16pF |
| C6 | : | 6.2pF |
| C7 | : | 31pF |
| C8 | : | 37pF |
| C10 | : | 1000pF |
| C12 | : | 6pF |
| L1 | : | 2 Turns #20 Wire .23" Diameter |
| L2 | : | 3 Turns #18 Wire .33" Diameter |

Board: 3M Epsilam 6, 0.030" Thick

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0138



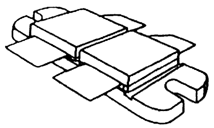

| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .095/2,41 | .105/2,67 |
| B | .125/3,18 | |
| C | .380/9,65 | .390/9,91 |
| D | .780/19,81 | |
| E | .392/9,96 | .408/10,36 |
| F | .645/16,38 | .655/16,64 |
| G | .895/22,73 | .905/22,99 |
| H | .002/0,05 | .006/0,15 |
| I | .055/1,40 | .065/1,65 |
| J | .105/2,67 | .130/3,30 |

| CONT'D | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| K | | .230/5,84 |
| L | .392/9,96 | .408/10,36 |

# SD1476

## RF & MICROWAVE TRANSISTORS TV/LINEAR APPLICATIONS

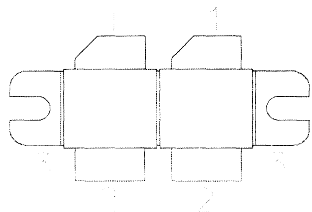
- 55 - 88 MHz
- 32 VOLTS
- COMMON EMITTER
- GOLD METALLIZATION
- INTERNAL INPUT MATCHING
- CLASS AB PUSH PULL
- HIGH SATURATED POWER CAPABILITY
- DIFFUSED EMITTER BALLAST RESISTORS
- DESIGNED FOR HIGH POWER LINEAR OPERATION
- $P_{OUT}$ = 240 W MIN. WITH 12.0 dB GAIN



**2 x .437 x .450 2LFL (M165)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1476 | SD1476 |

**PIN CONNECTION**



1. Collector 3. Emitter
2. Base

### DESCRIPTION

The SD1476 is a gold metallized epitaxial silicon NPN planar transistor using diffused emitter ballast resistors for high linearity Class AB operation in VHF and Band I television transmitters and transposers.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 70 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 40 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 25 | A |
| $P_{DISS}$ | Power Dissipation | 430 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 50 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 0.4 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 50mA | $I_E$ = 0mA | 70 | — | — | V |
| $BV_{CER}$ | $I_C$ = 50mA | $R_{BE}$ = 51Ω | 68 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 100mA | $I_B$ = 0mA | 40 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 20mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $I_{CEO}$ | $V_{CE}$ = 30V | $I_E$ = 0mA | — | — | 10 | mA |
| $I_{CBO}$ | $V_{CB}$ = 30V | $I_E$ = 0mA | — | — | 10 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 7A | 10 | — | 50 | — |

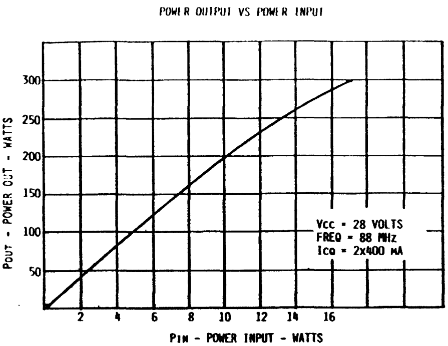
### DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$* | f = 88 MHz | $V_{CE}$ = 32 V | $I_{CQ}$ = 2 x 400mA | 240 | — | — | W |
| $G_P$ | f = 88 MHz | $V_{CE}$ = 32 V | $I_{CQ}$ = 2 x 400mA | 12 | — | — | dB |
| $\eta_c$ | f = 88 MHz | $V_{CE}$ = 32 V | $I_{CQ}$ = 2 x 400mA | 50 | — | — | % |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 28 V | | — | — | 220 | pF |

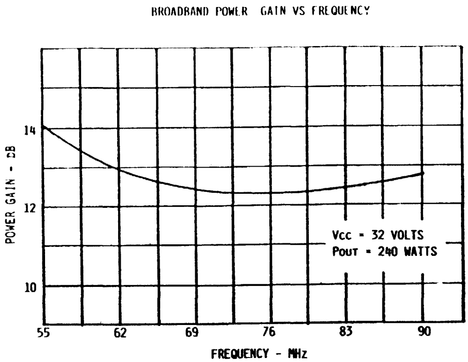
Note: *1 dB Compression

## TYPICAL PERFORMANCE

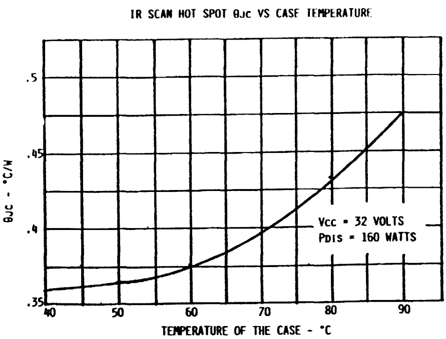
### POWER OUTPUT vs POWER INPUT



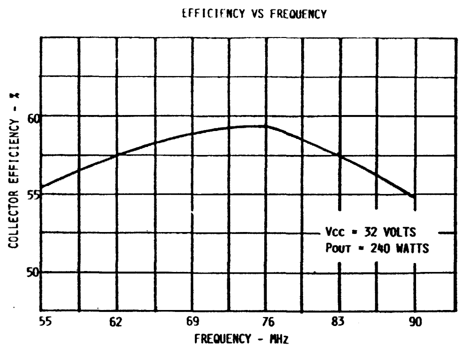

### POWER GAIN vs FREQUENCY




### THERMAL RESISTANCE vs CASE TEMPERATURE

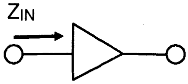



### COLLECTOR EFFICIENCY vs FREQUENCY

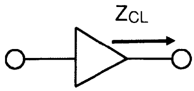


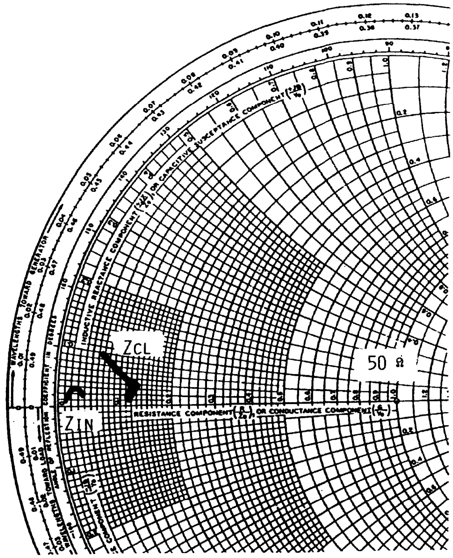
## IMPEDANCE DATA

**TYPICAL INPUT IMPEDANCE**




**TYPICAL COLLECTOR LOAD IMPEDANCE**

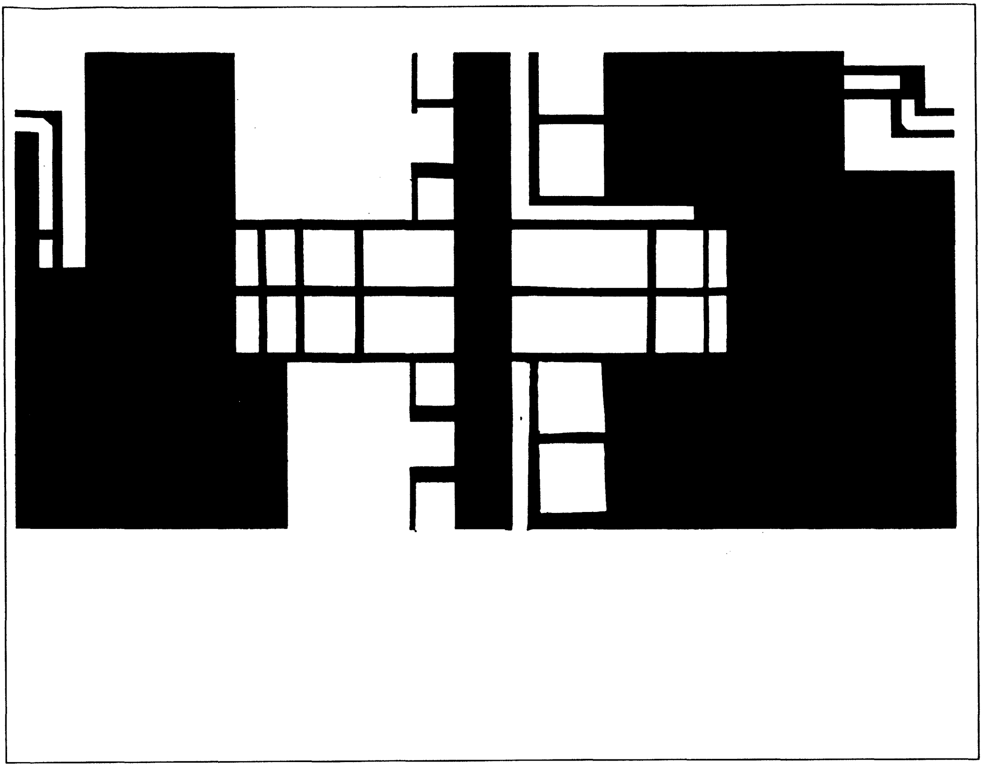


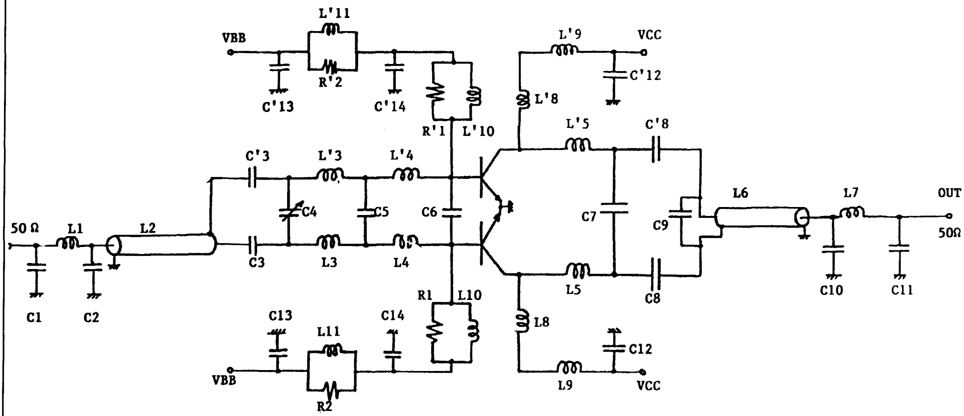

| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 55 MHz | 1.7 j 1.0 | 6.1 + j 1.0 |
| 65 MHz | 1.5 + j 1.3 | 7.0 + j 2.1 |
| 75 MHz | 1.0 + j 1.1 | 6.2 + j 2.0 |
| 90 MHz | 0.8 + j 0.4 | 3.4 + j 4.4 |

$P_{OUT}$ = 240 W
$V_{CC}$ = 32 V

## PRINTED CIRCUIT BOARD LAYOUT



## TEST CIRCUIT



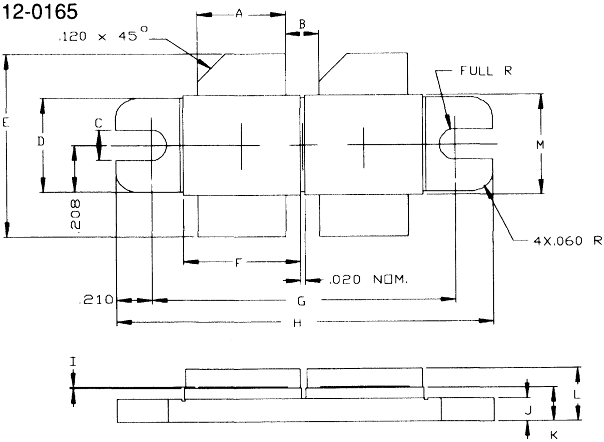

| | | |
|---|---|---|
| C1 | : | 10pF + 33pF, ATC 100B |
| C2 | : | 47pF, ATC 100B |
| C3, C'3 | : | 1.5nF + 2.2nF, ATC 100B |
| C4 | : | 4 - 60pF, Arco 404 |
| C5 | : | 2 x 100pF + 47pF, ATC 100B |
| C6 | : | 2 x 330pF + 3 x 180pF +270pF, ATC 100B |
| C7 | : | 150pF + 10pF, ATC 100B |
| C8, C'8 | : | 4.7nF, ATC 100B |
| C9 | : | 4 - 40pF, Arco 403 |
| C10 | : | 10pF, ATC 100B |
| C11 | : | 43pF, ATC 100B |
| C12, C'12 | : | 1µF 63V, LCC CPM13B |
| C13, C'13 | : | 82nF 100V, LCC 745 |
| C14, C'14 | : | 270nF 63V, LCC7950 |

| | | |
|---|---|---|
| L1, L7 | : | 4 Turns Diameter 7mm, Wire Diameter 1.5mm |
| L2 | : | 7 Turns Diameter 25mm, Coaxial Cable Zc = 25Ω |
| L3, L'3 | : | 2 Turns Diameter 2.5mm, Wire Diameter 0.8mm |
| L4, L'4 | : | Length 15mm, Wire Diameter 1.5mm |
| L5, L'5 | : | Length 30mm, Wire Diameter 1.5mm |
| L6 | : | 6 Turns Diameter 25mm, Coaxial Cable Zc = 25Ω |
| L8, L'8 | : | 16 Turns Diameter, Wire Diameter 1.5mm |
| L9, L'9 | : | 1 Turn, Wire Diameter 1.5mm in Ferrite (stackpole 57 33 12) |
| L10, L'10<br>L11, L'11 | : | 14 Turns, Wire Diameter 0.6mm Around Resistor 1W |
| R1, R'1<br>R2, R'2 | : | 180Ω, 1W |

Material : Epoxy 63 mil, Er = 2.55

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0165

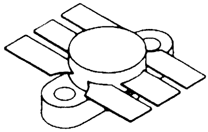



| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .373/9,47 | .385/9,78 |
| B | .122/3,10 | |
| C | .125/3,18 | |
| D | .411/10,44 | .421/10,69 |
| E | .825/20,96 | .865/21,97 |
| F | .495/12,57 | .505/12,83 |
| G | 1.255/31,88 | 1.265/32,13 |
| H | 1.675/42,55 | 1.685/42,80 |
| I | .002/0,05 | .006/0,15 |
| J | .095/2,41 | .105/2,67 |

| CONT'D | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| K | .135/3,43 | .155/3,94 |
| L | | .250/6,35 |
| M | .425/10,80 | .435/11,05 |

# RF & MICROWAVE TRANSISTORS VHF MOBILE APPLICATIONS

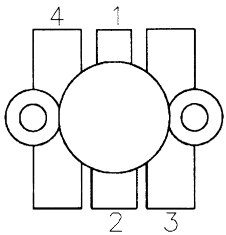
- 175 MHz
- 12.5 VOLTS
- COMMON EMITTER
- $P_{OUT}$ = 100 W MIN. WITH 6.0 dB GAIN



**.500 6LFL (M111)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1477 | SD1477 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Emitter

## DESCRIPTION

The SD1477 is a 12.5 V Class C epitaxial silicon NPN planar transistor designed primarily for VHF FM communications. This device utilizes diffused emitter resistors to withstand extremely high VSWR under rated operating conditions, and is internally input matched to optimize power gain and efficiency over the 136 - 175 MHz band.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 36 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 18 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 36 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 20 | A |
| $P_{DISS}$ | Power Dissipation | 270 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 0.65 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

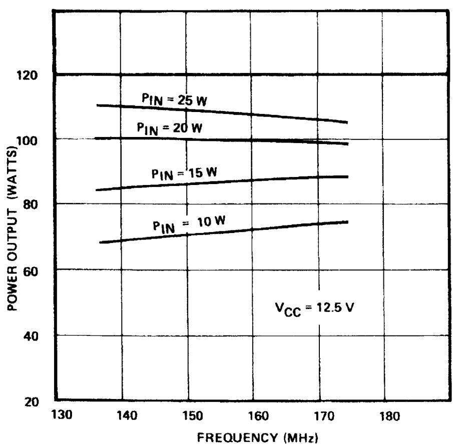
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 50mA | $I_E$ = 0mA | 36 | — | — | V |
| $BV_{CES}$ | $I_C$ = 100mA | $V_{BE}$ = 0V | 36 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 100mA | $I_B$ = 0mA | 18 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 15V | $I_E$ = 0mA | — | — | 15 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 5A | 10 | — | — | — |

### DYNAMIC

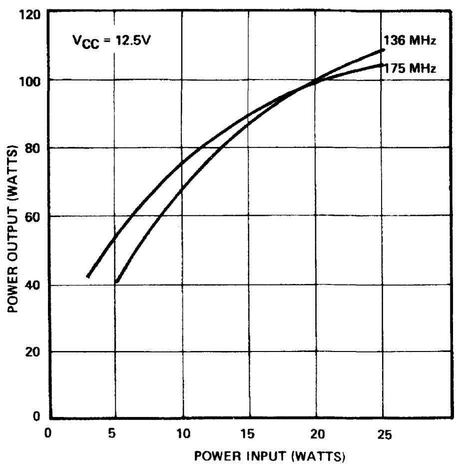
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 175 MHz | $P_{IN}$ = 25 W | $V_{CC}$ = 12.5 V | 100 | — | — | W |
| $G_P$ | f = 175 MHz | $P_{IN}$ = 25 W | $V_{CC}$ = 12.5 V | 6.0 | — | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 12.5 V | | — | 350 | — | pF |

## TYPICAL PERFORMANCE

### POWER OUTPUT vs FREQUENCY

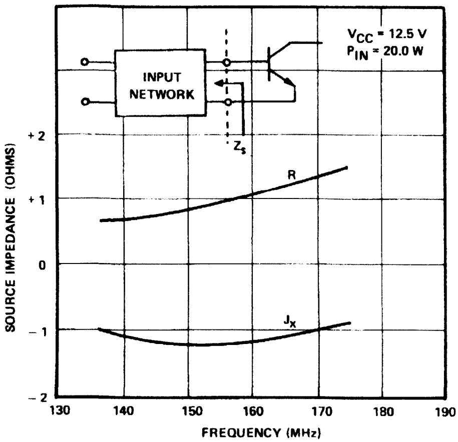



### POWER OUTPUT vs POWER INPUT

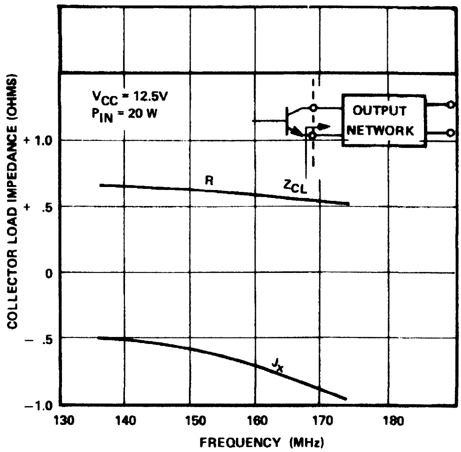


## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE

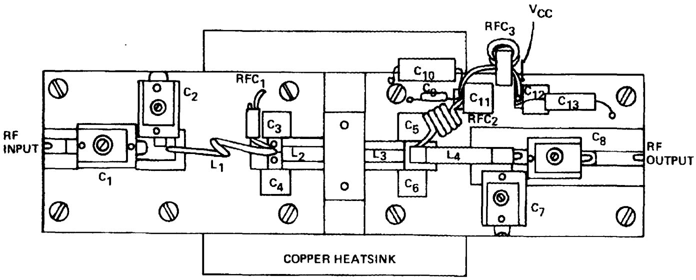


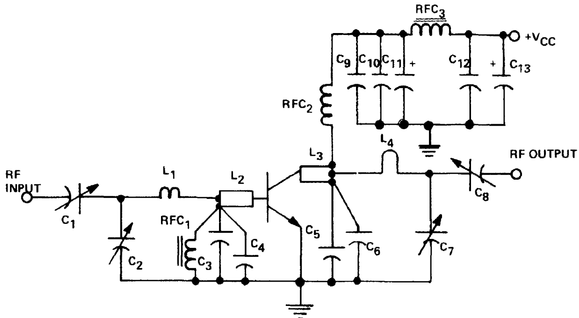

### TYPICAL COLLECTOR LOAD IMPEDANCE




| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 175 MHz | 1.5 − j 0.9 | 0.5 − j 1.0 |

## TEST CIRCUIT



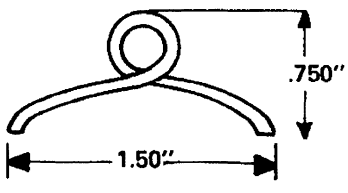




| | | |
|---|---|---|
| C1, C2 | : | Arco 462 5 - 80pF |
| C3, C4 | : | Unelco 100pF, 350V |
| C5, C6 | : | Unelco 120pF, 350V |
| C7, C8 | : | Arco 463 9 - 180pF |
| C9, C12 | : | Unelco 1000pF, 350V |
| C10 | : | Erie .15µF, 200V Red Cap |
| C11 | : | 25µF, 25V Electrolytic |
| C13 | : | 10µF, 25V Electrolytic |

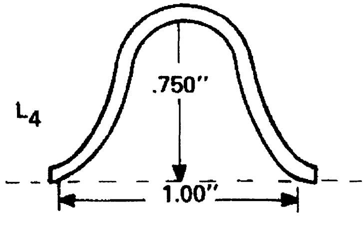
| | | |
|---|---|---|
| L1 | : | 1 Turn, #12, 1/4" I.D. |
| L2, L3 | : | 1/2" 50Ω Stripline (.180" Wide) |
| L4 | : | 1/8" Thick Copper Strap 1/4" Wide |
| RFC1 | : | 1 1/2 Turns on Ferroxcube VK200/19-B |
| RFC2 | : | 4 Turn #16 Enamel, 3/8" I.D., 3/8" Long |
| RFC3 | : | 4 Turns #16 Enamel on T50-2 Torroid |

Board
Material: 3M-K6098, 1/16" Thick

L1

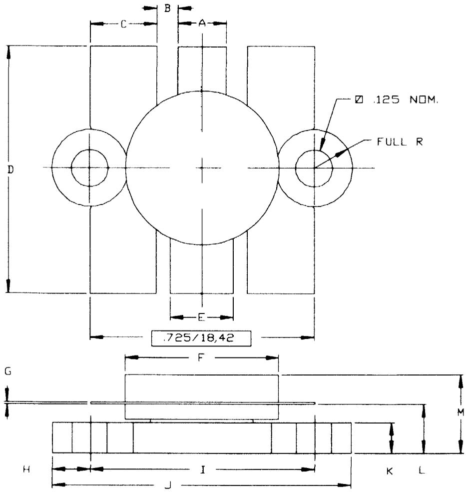



L4



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0111

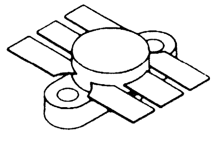



| SGS-THOMSON MICROELECTRONICS | | | CONT'D | | |
|---|---|---|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm | | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .150/3,43 | .160/4,06 | K | .095/2,41 | .105/2,67 |
| B | .045/1,14 | | L | .150/3,81 | .170/4,32 |
| C | .210/5,33 | .220/5,59 | M | | .280/7,11 |
| D | .835/21,21 | .865/21,97 | | | |
| E | .200/5,08 | .210/5,33 | | | |
| F | .490/12,45 | .510/12,95 | | | |
| G | .003/0,08 | .007/0,18 | | | |
| H | .125/3,18 | | | | |
| I | .720/18,29 | .730/18,54 | | | |
| J | .970/24,64 | .980/24,89 | | | |

# SD1480

## RF & MICROWAVE TRANSISTORS
## VHF APPLICATIONS

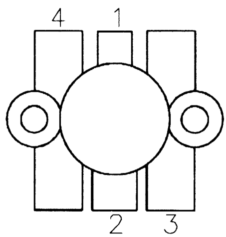
- 136 - 175 MHz
- 28 VOLTS
- EFFICIENCY 55%
- COMMON EMITTER
- GOLD METALLIZATION
- INTERNAL INPUT MATCHING
- $P_{OUT}$ = 125 W MIN. WITH 9.2 dB GAIN



**.500 6LFL (M111)**
epoxy sealed

| **ORDER CODE** | **BRANDING** |
| --- | --- |
| SD1480 | SD1480 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Emitter

### DESCRIPTION

The SD1480 is a common emitter 28 V Class C epitaxial silicon NPN planar transistor designed primarily for VHF communications applications. This internally matched device incorporates diffused emitter ballasting resistors nad provides high gain and stable operation across the entire 136 - 175 MHz VHF communications band.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
| --- | --- | --- | --- |
| $V_{CBO}$ | Collector-Base Voltage | 65 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 36 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 65 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 20 | A |
| $P_{DISS}$ | Power Dissipation | 270 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
| --- | --- | --- | --- |
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 0.65 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

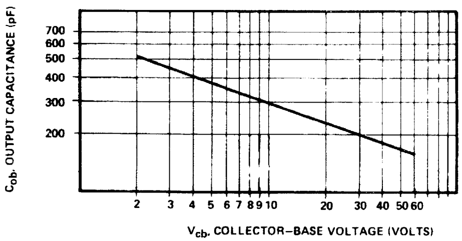
| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 100mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{CES}$ | $I_C$ = 100mA | $V_{BE}$ = 0V | 65 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 100mA | $I_B$ = 0mA | 35 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 30V | $I_E$ = 0mA | — | — | 15 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 5A | 20 | — | 200 | — |

DYNAMIC

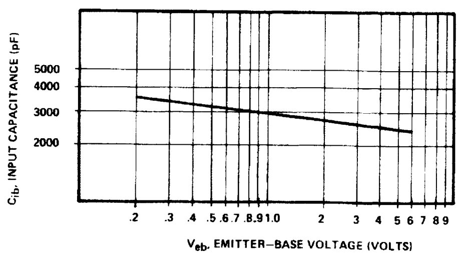
| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 138 — 175 MHz | $P_{IN}$ = 15 W | $V_{CE}$ = 28 V | 125 | — | — | W |
| $G_P$ | f = 138 — 175 MHz | $P_{IN}$ = 15 W | $V_{CE}$ = 28 V | 9.2 | — | — | dB |
| $\eta_c$ | f = 138 — 175 MHz | $P_{IN}$ = 15 W | $V_{CE}$ = 28 V | 55 | — | — | % |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 28 V | | — | — | 250 | pF |

## TYPICAL PERFORMANCE

### OUTPUT CAPACITANCE vs COLLECTOR BASE VOLTAGE

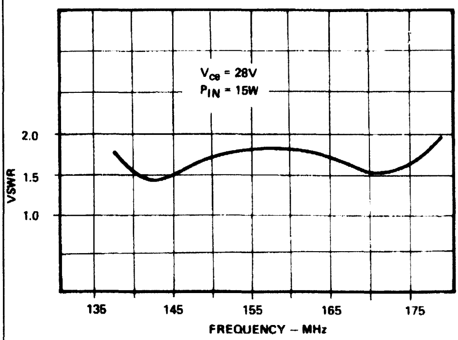



### INPUT CAPACITANCE vs EMITTER BASE VOLTAGE

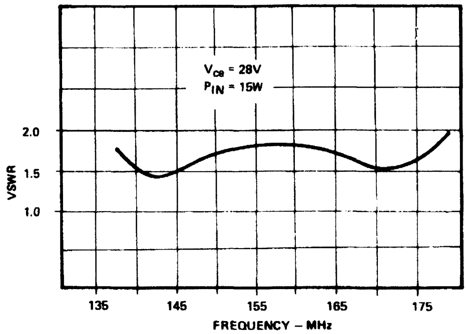


## TYPICAL PERFORMANCE (cont'd)

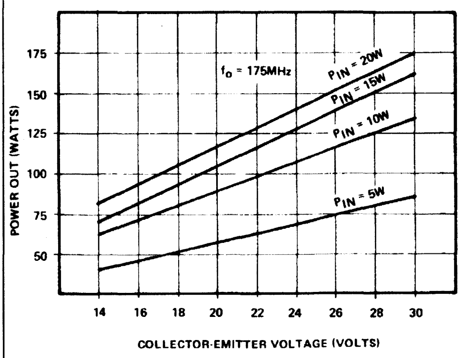
### POWER OUTPUT vs POWER INPUT



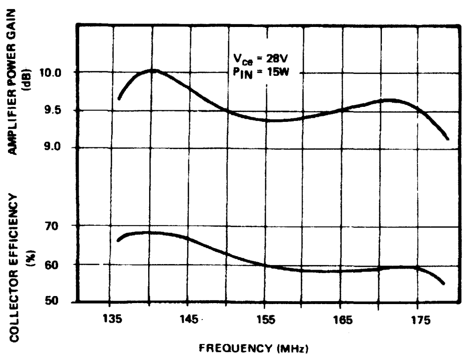

### INPUT VSWR vs FREQUENCY




### POWER OUTPUT vs COLLECTOR EMITTER VOLTAGE

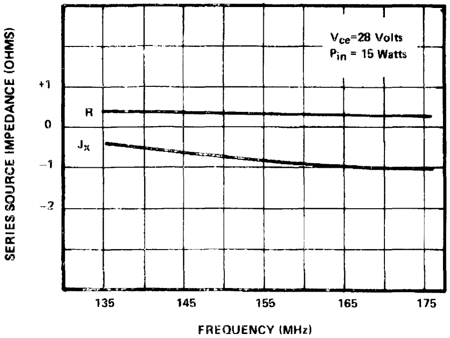



### POWER GAIN & COLLECTOR EFFICIENCY vs FREQUENCY

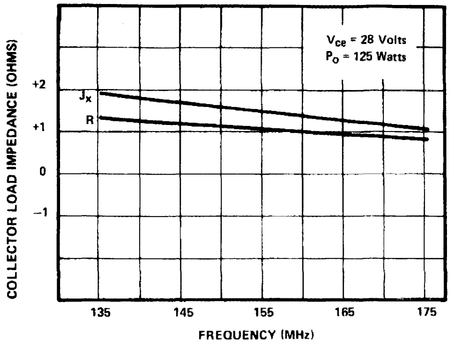


## IMPEDANCE DATA

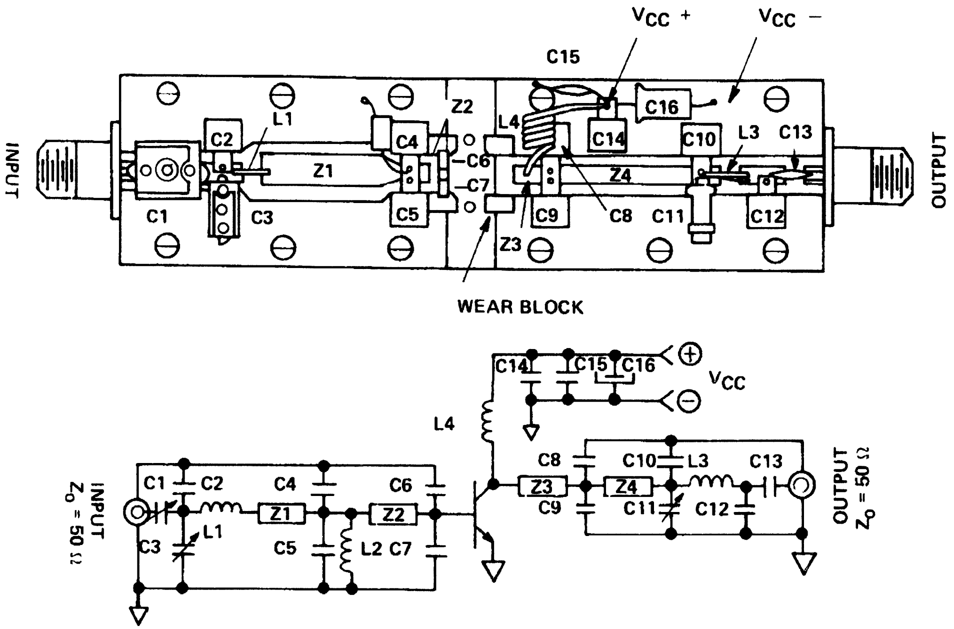
### TYPICAL INPUT IMPEDANCE




### TYPICAL COLLECTOR LOAD IMPEDANCE



## TEST CIRCUIT



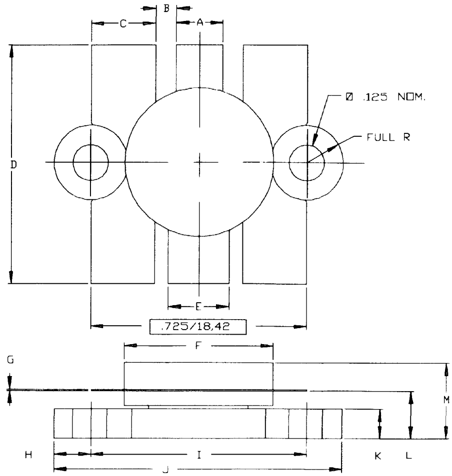

| | | |
|---|---|---|
| C1 | : | .080pF Arco 462 |
| C2 | : | 25mF Underwood |
| C3 | : | 2.020pF Arco 402 |
| C4, C5 | : | 15pF Underwood |
| C6 | : | 240pF ATC Chip Capacitor |
| C7 | : | 270pF ATC Chip Capacitor |
| C8 | : | 150pF Underwood |
| C9 | : | 180pF Underwood |
| C10 | : | 100pF Underwood |
| C11 | : | 8.20pF Johanson JMC5501 |
| C12 | : | 33pF Underwood |
| C13, C15 | : | .15µF Disc Capacitor |
| C14 | : | 100pF Underwood |
| C16 | : | 10µF Electrolytic |

| | | |
|---|---|---|
| L1 | : | See Detail A |
| L2 | : | Ferroxcube VK200 19/4B |
| L3 | : | 1 Turn #16 AWG 250 I.D. Close Wound |
| L4 | : | 5 Turns #16 AWG 250 I.D. Close Wound |
| Z1 | : | Microstrip, .330" W x 1.600" L |
| Z2 | : | Microstrip, .200" W x .400" L |
| Z3 | : | Microstrip, .200" W x .600" L |
| Z4 | : | Microstrip, .200" W x 1.600" L |

PCB: 3M 1oz. Doulbe Sided 1/16" Teflon-Glass, Er = 2.5

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0111



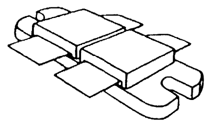

| SGS-THOMSON MICROELECTRONICS | | | CONT'D | | |
|---|---|---|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm | | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .150/3,43 | .160/4,06 | K | .095/2,41 | .105/2,67 |
| B | .045/1,14 | | L | .150/3,81 | .170/4,32 |
| C | .210/5,33 | .220/5,59 | M | | .280/7,11 |
| D | .835/21,21 | .865/21,97 | | | |
| E | .200/5,08 | .210/5,33 | | | |
| F | .490/12,45 | .510/12,95 | | | |
| G | .003/0,08 | .007/0,18 | | | |
| H | .125/3,18 | | | | |
| I | .720/18,29 | .730/18,54 | | | |
| J | .970/24,64 | .980/24,89 | | | |

SGS-THOMSON MICROELECTRONICS

# SD1483

## RF & MICROWAVE TRANSISTORS FM BROADCAST APPLICATIONS

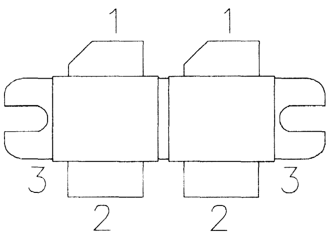
- 88 - 108 MHz
- 28 VOLTS
- EFFICIENCY 60%
- COMMON EMITTER
- GOLD METALLIZATION
- $P_{OUT}$ = 300 W MIN. WITH 10 dB GAIN



**2 x .437 x .450 2LFL (M175)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1483 | SD1483 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter

## DESCRIPTION

The SD1483 is a 28 V gold metallized epitaxial silicon NPN planar transistor designed for VHF FM broadcast transmitters.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 60 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 30 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 60 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.0 | V |
| $I_C$ | Device Current | 25 | A |
| $P_{DISS}$ | Power Dissipation | 380 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 50 to +150 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 0.45 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

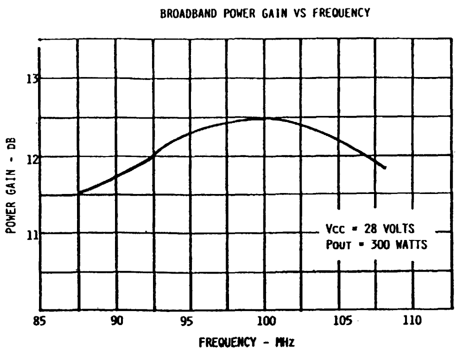
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 100mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{CES}$ | $I_C$ = 100mA | $V_{BE}$ = 0V | 60 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 100mA | $I_B$ = 0mA | 30 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 20mA | $I_C$ = 0mA | 3.0 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 30V | $I_E$ = 0mA | — | — | 10 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1A | 15 | — | 120 | — |

DYNAMIC

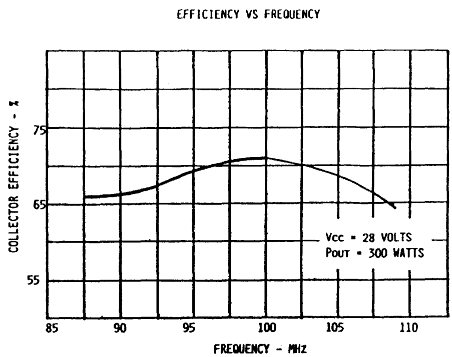
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 108 MHz | $P_{IN}$ = 30 W | $V_{CE}$ = 28 V | 300 | — | — | W |
| $G_P$ | f = 108 MHz | $P_{IN}$ = 30 W | $V_{CE}$ = 28 V | 10 | — | — | dB |
| $\eta_C$ | f = 108 MHz | $P_{IN}$ = 30 W | $V_{CE}$ = 28 V | 60 | — | — | % |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 28 V | | — | 130 | — | pF |

## TYPICAL PERFORMANCE

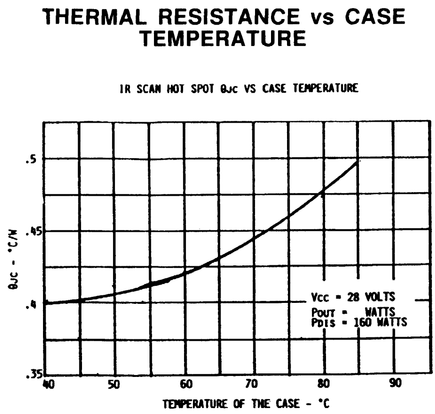
### POWER GAIN vs FREQUENCY



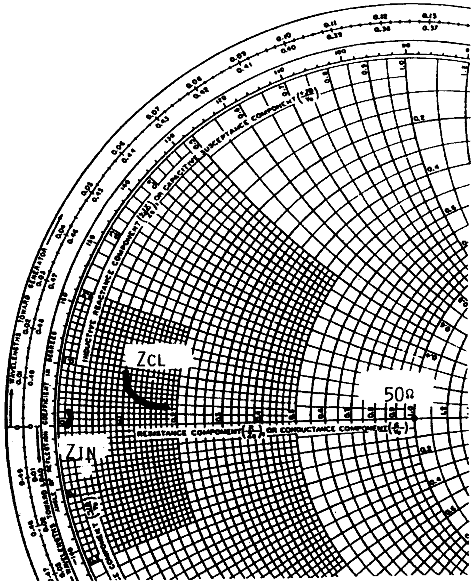

### COLLECTOR EFFICIENCY vs FREQUENCY



## TYPICAL PERFORMANCE (cont'd)



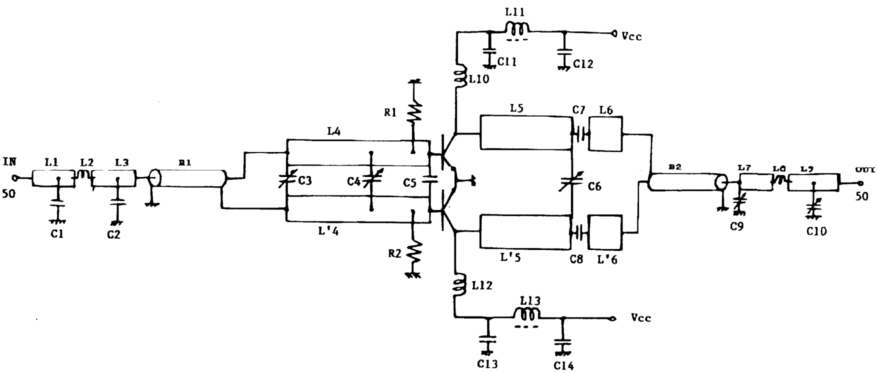

## IMPEDANCE DATA




| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 85 MHz | 0.82 – j 0.0 | 8.6 + j 1.37 |
| 90 MHz | 0.93 – j 0.16 | 7.1 + j 1.5 |
| 100 MHz | 0.98 – j 0.33 | 5.8 + j 2.7 |
| 110 MHz | 0.93 – j 0.79 | 5.7 + j 3.6 |

$P_{OUT}$ = 300 W
$V_{CC}$ = 28 V

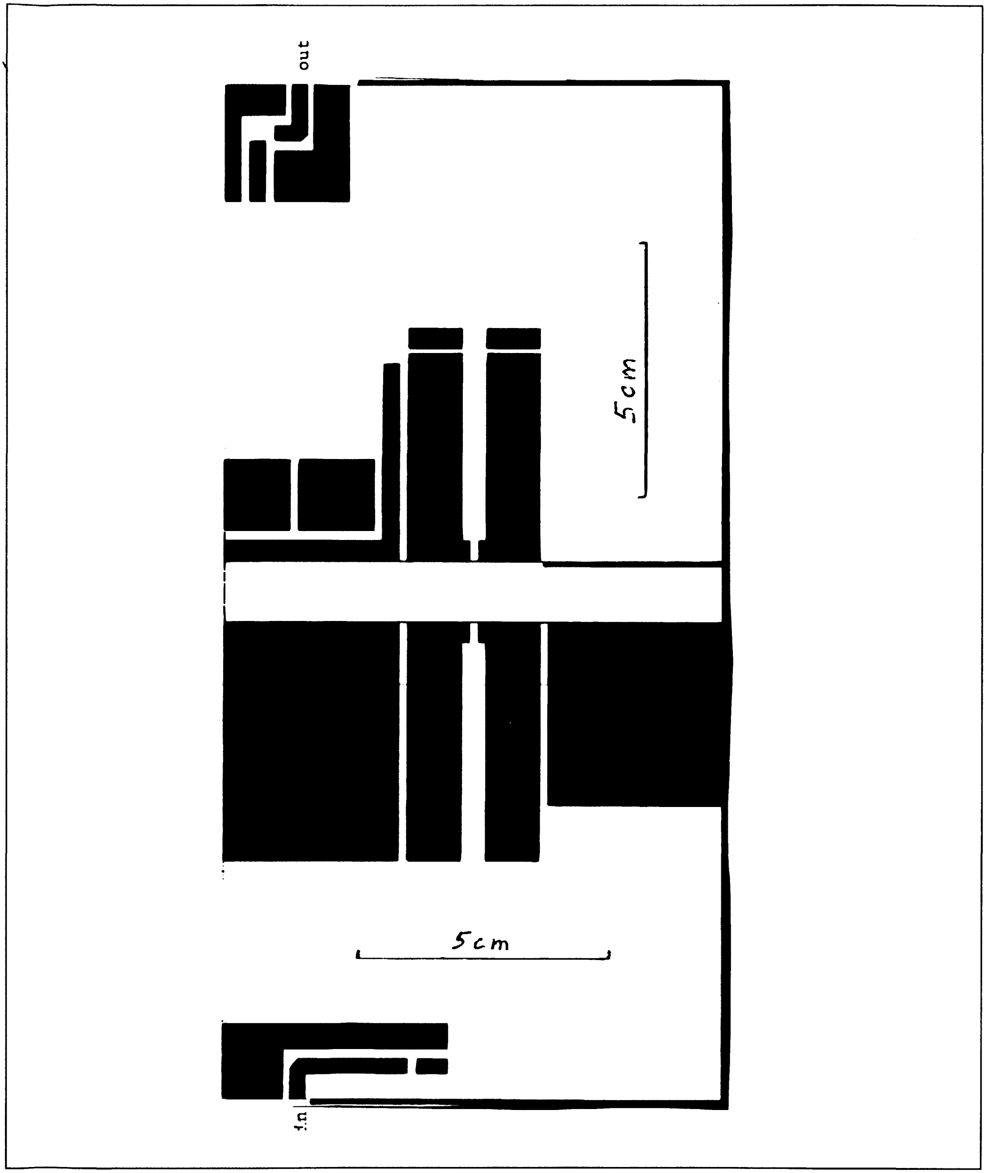
## TEST CIRCUIT




| | | |
|---|---|---|
| B1, B2 | : | $Z_c = 25\Omega$ Coaxial Cable $= \lambda_g/4$ |
| C1 | : | 4 - 60pF Trimmer |
| C2 | : | 33pF ATC 100B |
| C3 | : | 24 - 200pF Trimmer |
| C4 | : | 270pF + 380pF + 24 - 200pF Trimmer |
| C5 | : | 560pF ATC 100B |
| C6 | : | 24 - 200pF Trimmer |
| C7, C8 | : | 4.7nF ATC 100B |
| C9 | : | 2 x 22pF, ATC 100B + 1 - 10pF Trimmer |
| C10 | : | 27pF ATC 100B + 1 - 14pF Trimmer |
| C11, C12<br>C13, C14 | : | 1nF + 100nF + 47$\mu$F, 63V |

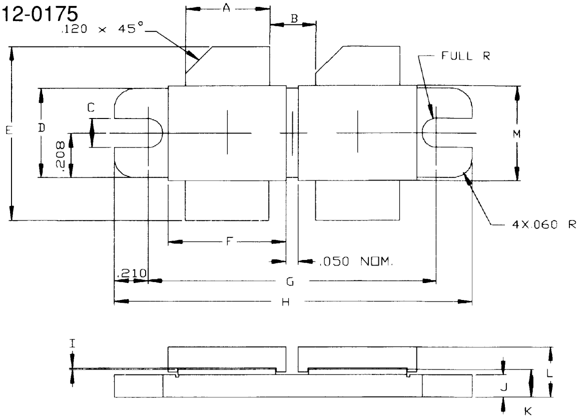
| | | |
|---|---|---|
| L1, L3<br>L7, L9 | : | Printed Line $Z_c = 50\Omega$ |
| L2 | : | Inductor Length 32nH |
| L4, L'4 | : | Printed Line Width 11mm, Length 47mm |
| L5, L'5 | : | Printed Line Width 11mm, Length 40mm |
| L6, L'6 | : | Printed Line Width 11mm, Length 4mm |
| L8 | : | Inductor Length 50nH |
| L10, L12 | : | Wire Diameter 1.5mm, Length 75nH |
| L11, L13 | : | Choke |
| R1, R2 | : | 6.2$\Omega$ Sfernice |
| Material: | | Epoxy 63 mils Er = 2.55 |

## PRINTED CIRCUIT BOARD LAYOUT



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0175

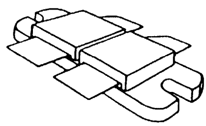



| SGS-THOMSON MICROELECTRONICS | | | CONT'D | | |
|---|---|---|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm | | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .373/9,47 | .385/9,78 | K | .115/2,92 | .135/3,43 |
| B | .190/4,83 | | L | | .250/6,35 |
| C | .125/3,18 | | M | .445/11,30 | .455/11,56 |
| D | .411/10,44 | .421/10,69 | | | |
| E | .825/20,96 | .865/21,97 | | | |
| F | .525/13,34 | .535/13,59 | | | |
| G | 1.255/31,88 | 1.265/32,13 | | | |
| H | 1.675/42,55 | 1.685/42,80 | | | |
| I | .002/0,05 | .006/0,15 | | | |
| J | .095/2,41 | .105/2,67 | | | |

# SD1485

## RF & MICROWAVE TRANSISTORS
## TV/LINEAR APPLICATIONS

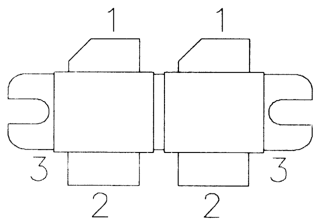
- 170 - 230 MHz
- 32 VOLTS
- COMMON EMITTER
- GOLD METALLIZATION
- CLASS AB PUSH PULL
- INTERNAL INPUT MATCHING
- HIGH SATURATED POWER CAPABILITY
- DESIGNED FOR HIGH POWER LINEAR OPERATION
- $P_{OUT}$ = 200 W MIN. WITH 11.0 dB GAIN



**2 x .437 x .450 2LFL (M175)**
epoxy sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| SD1485 | SD1485 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter

### DESCRIPTION

The SD1485 is a gold metallized epitaxial silicon NPN planar transistor using diffused emitter ballast resistors for high linearity Class AB operation in VHF and Band III television transmitters and transposers.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 65 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 35 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.0 | V |
| $I_C$ | Device Current | 25 | A |
| $P_{DISS}$ | Power Dissipation | 385 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 50 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 0.45 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 100mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{CER}$ | $I_C$ = 100mA | $R_{BE}$ = 15Ω | 60 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 100mA | $I_B$ = 0mA | 35 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 20mA | $I_C$ = 0mA | 3.0 | — | — | V |
| $I_{CES}$ | $V_{CB}$ = 32V | $I_E$ = 0mA | — | — | 10 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 4A | 20 | — | 70 | — |

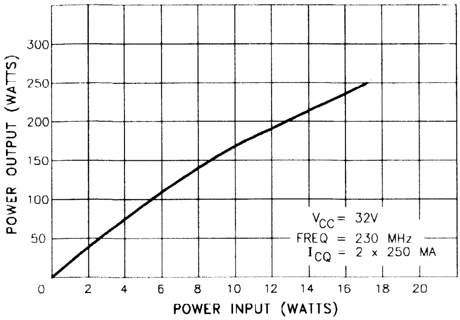
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$* | f = 230 MHz | $V_{CE}$ = 32 V | $I_{CQ}$ = 2 x 500mA | 200 | — | — | W |
| $G_P$ | f = 230 MHz | $V_{CE}$ = 32 V | $I_{CQ}$ = 2 x 500mA | 11 | — | — | dB |
| $\eta_C$ | f = 230 MHz | $V_{CE}$ = 32 V | $I_{CQ}$ = 2 x 500mA | 50 | — | — | % |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 28 V | | — | 130 | — | pF |

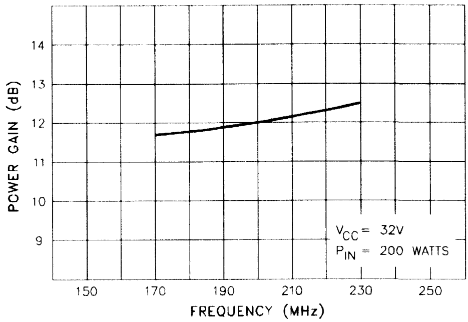
Note: *1 dB Compression

## TYPICAL PERFORMANCE

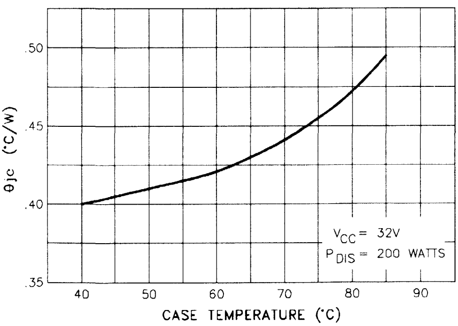
### POWER OUTPUT vs POWER INPUT



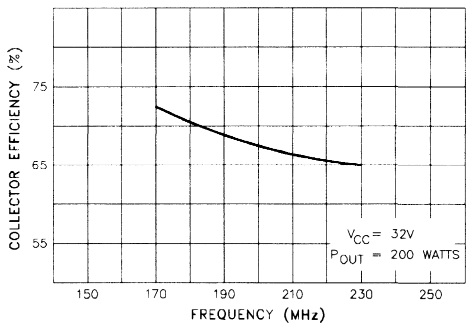

### BRAODBAND POWER GAIN vs FREQUENCY




### THERMAL RESISTANCE vs CASE TEMPERATURE

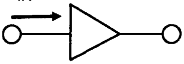



### COLLECTOR EFFICIENCY vs FREQUENCY

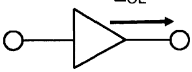


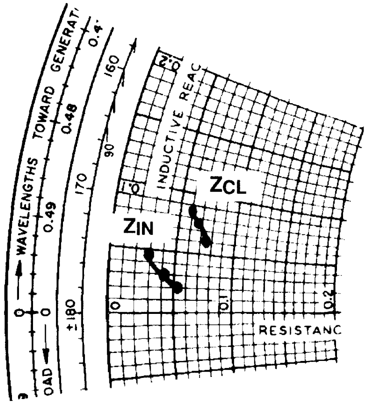
## IMPEDANCE DATA

**TYPICAL INPUT IMPEDANCE**




**TYPICAL COLLECTOR LOAD IMPEDANCE**

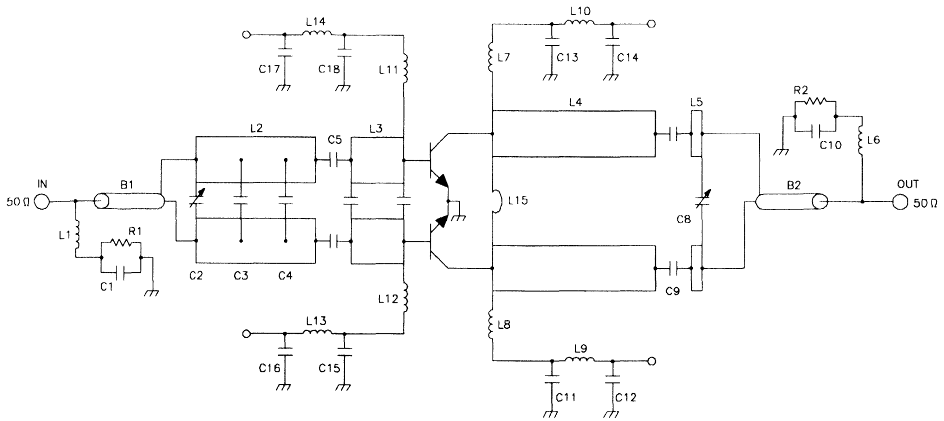



| FREQ. | $Z_{IN}$ (Ω)* | $Z_{CL}$ (Ω)** |
|---|---|---|
| 170 MHz | 2.7 + j 1.0 | 3.75 + j 3.0 |
| 200 MHz | 2.1 + j 1.5 | 3.4 + j 3.7 |
| 230 MHz | 1.4 + j 2.2 | 3.0 + j 4.1 |

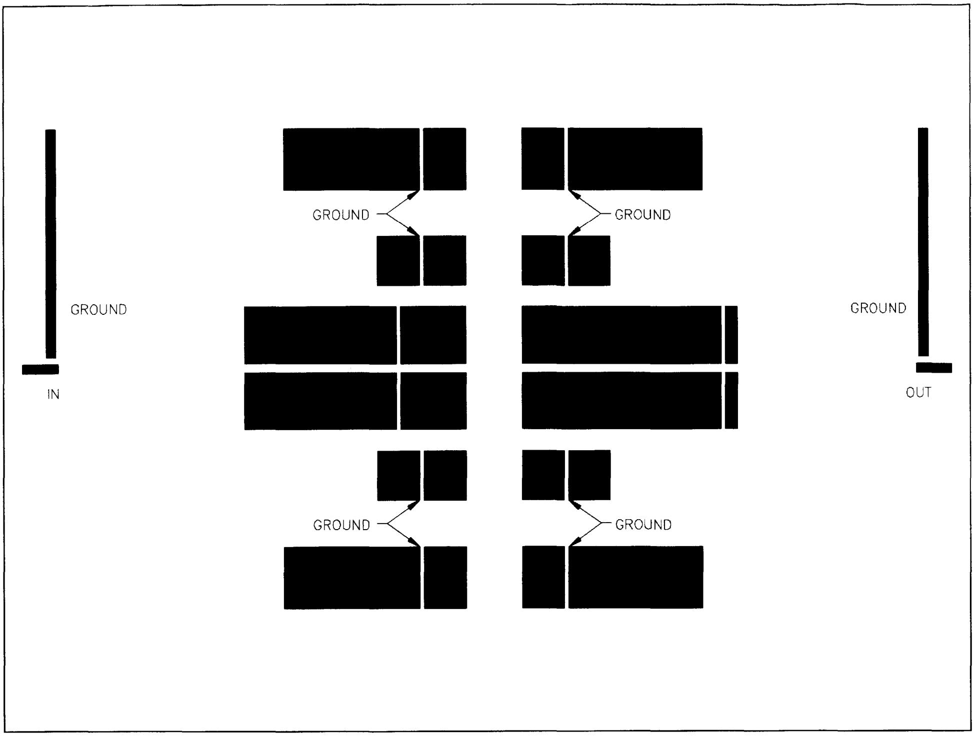
* Base to Base
** Collector to Collector
$P_{OUT}$ = 200 W
$V_{CC}$ = 32 V

## TEST CIRCUIT



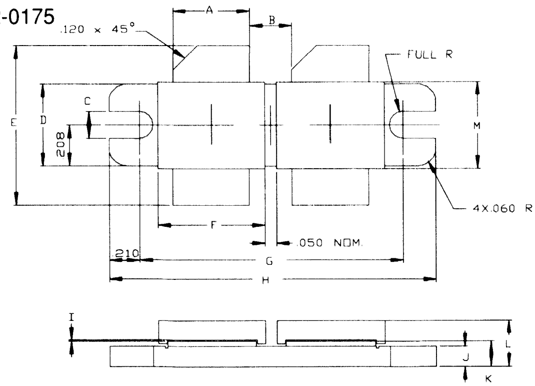

| | | | | | |
|---|---|---|---|---|---|
| B1, B2 | : | Coaxial Cable Zc = 25Ω; $\lambda_g/4$ @ 200MHz | L1, L6 | : | 470nH |
| | | | L2 | : | Printed Line Zc = 12.5mm, Length 32mm |
| C1, C10 | : | 1nF ATC 100B | L3 | : | Printed Line Zc = 12.5mm, Length 14mm |
| C2 | : | 18pF ATC 100B + 0 - 20pf Trimmer | L4 | : | Printed Line Zc = 12.5mm, Length 43mm |
| C3 | : | 15pF ATC 100B | L5 | : | Printed Line Zc = 12.5mm, Length 32mm |
| C4 | : | 33pF ATC 100B | L7, L8 | : | 3 Turns, Wire Diameter 1mm |
| C5 | : | 470pF ATC 100B | L9, L10 | : | 5 Turns, WIre Diameter 1mm |
| C6 | : | 47pF ATC 100B | L11, L12 | | |
| C7 | : | 150pF ATC 100B | L13, L14 | : | 10 Turns, Wire Diameter 5mm |
| C8 | : | 18pF + 0 - 20pF Trimmer | L15 | : | Wire Diameter 1mm, Length 13mm |
| C9 | : | 2 x 220pF ATC 100B | | | |
| C11, C12 | | | Material: | | Telfon-Glass 30 mils Thick, Er = 2.55 |
| C13, C14 | : | 1.5nF ATC 100B + 100nF + 100μF, 63V | | | |
| C15, C16 | | | | | |
| C17, C18 | : | 1.5nF ATC 100B + 100nF + 47μF, 63V | | | |

## PRINTED CIRCUIT BOARD LAYOUT



## PACKAGE MECHANICAL DATA

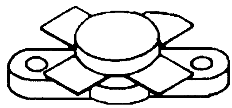
Ref.: Dwg. No.12-0175




| SGS-THOMSON MICROELECTRONICS | | | CONT'D | | |
|---|---|---|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm | | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .373/9,47 | .385/9,78 | K | .115/2,92 | .135/3,43 |
| B | .190/4,83 | | L | | .250/6,35 |
| C | .125/3,18 | | M | .445/11,30 | .455/11,56 |
| D | .411/10,44 | .421/10,69 | | | |
| E | .825/20,96 | .865/21,97 | | | |
| F | .525/13,34 | .535/13,59 | | | |
| G | 1.255/31,88 | 1.265/32,13 | | | |
| H | 1.675/42,55 | 1.685/42,80 | | | |
| I | .002/0,05 | .006/0,15 | | | |
| J | .095/2,41 | .105/2,67 | | | |

# RF & MICROWAVE TRANSISTORS HF SSB APPLICATIONS

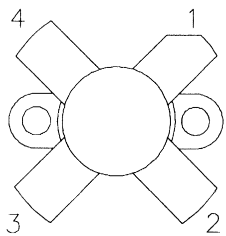
- 30 MHz
- 12.5 VOLTS
- IMD –30 dB
- COMMON EMITTER
- GOLD METALLIZATION
- $P_{OUT}$ = 100 W MIN. WITH 12.0 dB GAIN



**.500 4LFL (M174)**
epoxy sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| SD1487 | SD1487 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

## DESCRIPTION

The SD1487 is a 12.5 V Class C epitaxial silicon NPN planar transistor designed primarily for HF communications. This device utilizes state-of-the-art diffused emitter ballasting to achieve extreme ruggedness under severe operating conditions.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 36 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 18 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 20 | A |
| $P_{DISS}$ | Power Dissipation | 290 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j\text{-}c)}$ | Junction-Case Thermal Resistance | 0.6 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 100mA | $I_E$ = 0mA | 36 | — | — | V |
| $BV_{CES}$ | $I_C$ = 100mA | $V_{BE}$ = 0V | 36 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 100mA | $I_B$ = 0mA | 18 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 20mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 15V | $I_E$ = 0mA | — | — | 20 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 5A | 10 | — | 200 | — |

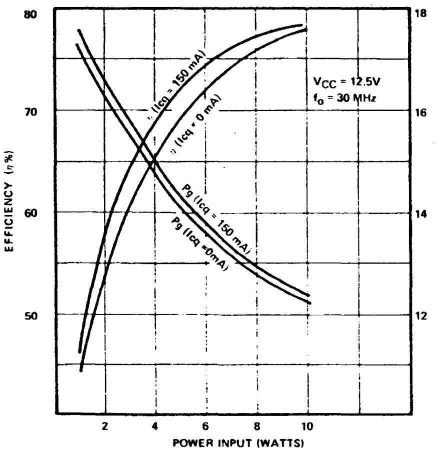
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 30 MHz | $V_{CE}$ = 12.5 V | $I_{CQ}$ = 150mA | 100 | — | — | W |
| $G_P$ | f = 30 MHz | $V_{CE}$ = 12.5 V | $I_{CQ}$ = 150mA | 11 | 13 | — | dB |
| $IMD_3$* | $P_{OUT}$ = 100 W PEP | $V_{CE}$ = 12.5 V | $I_{CQ}$ = 150mA | — | — | -30 | dBc |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 12.5 V | | — | 400 | — | pF |

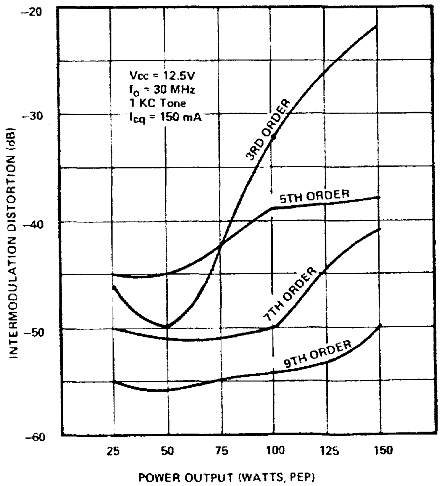
Note: *f = 30 + 30.001MHz

## TYPICAL PERFORMANCE

### POWER GAIN & COLLECTOR EFFICIENCY vs POWER INPUT

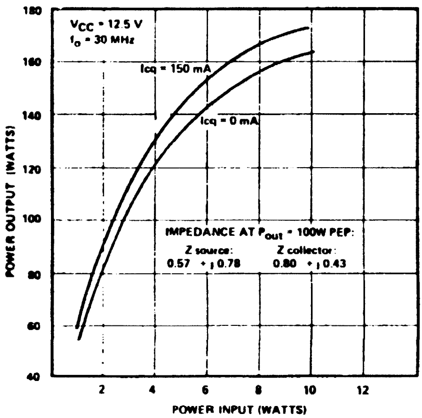



### IMD vs POWER OUTPUT, PEP



## TYPICAL PERFORMANCE (cont'd)

### POWER OUTPUT vs POWER INPUT

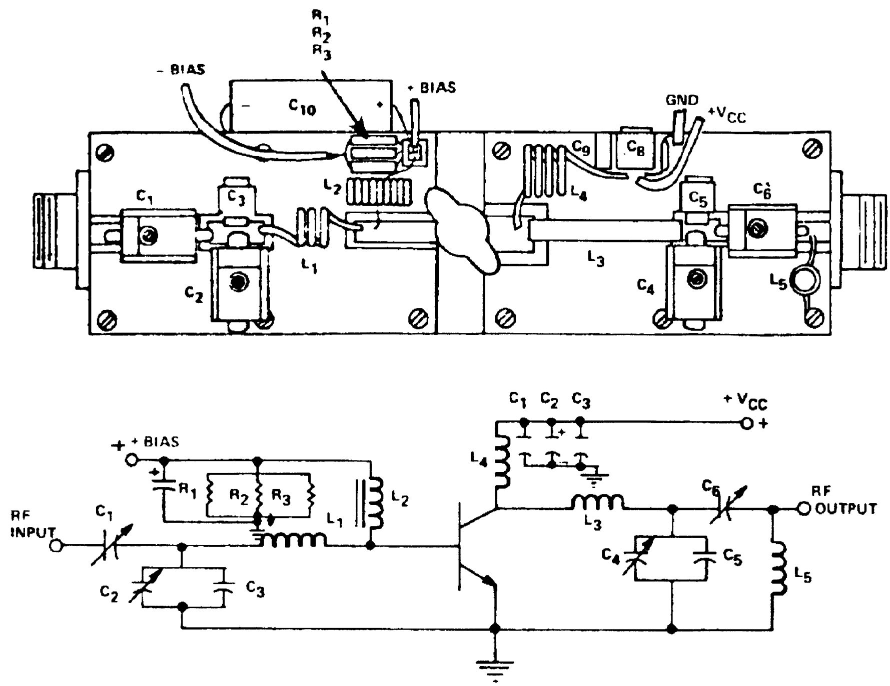



## IMPEDANCE DATA

| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 30 MHz | 0.57 + j 0.78 | 0.80 + j 0.43 |

$P_{OUT}$ = 100 W PEP
$V_{CE}$ = 12.5 V

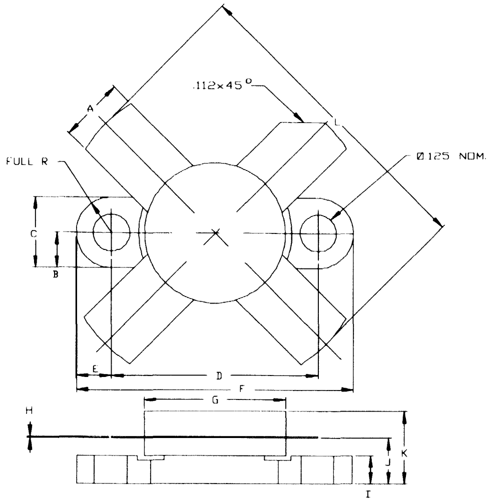
## TEST CIRCUIT




| | | |
|---|---|---|
| C1 | : | 9 - 180pF Arco 463 |
| C2 | : | 5 - 380pF Arco 465 |
| C3 | : | 200pF Arco 465 |
| C4, C6 | : | 170pF Arco 469 |
| C7 | : | 0.1µF Ceramic Disc |
| C5, C8 | : | 1000pF Unelco |
| C9 | : | 10µF Electrolytic, 35Vdc |
| C10 | : | 1000µF Electrolytic, 35Vdc |
| L1 | : | 2 1/2 Turns, #14 AWG, I.D. Loose Wound |
| L2 | : | 16 Turns, #16 AWG, Enameled Wire on Micrometals Torroid #T-94 |
| L3 | : | Copper Strap 1/4" Widht, Length 1 1/2, Height 1/2" |
| L4 | : | 4 Turns, #16 AWG, Enameled Wire 3/8" I.D. |
| L5 | : | 5 Turns, #18 AWG on 1/4" I.D. Coil Form Length 1/2", Ferrite Slug |
| R1, R2, R3 | : | 1.5 Ohm, 1 Watt Carbon |

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0174




| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .220/5,59 | .230/5,84 |
| B | .125/3,18 | |
| C | .245/6,22 | .255/6,48 |
| D | .720/18,28 | .730/18,54 |
| E | .125/3,18 | |
| F | .970/24,64 | .980/24,89 |
| G | .495/12,57 | .505/12,83 |
| H | .003/0,08 | .007/0,18 |
| I | .090/2,29 | .110/2,79 |
| J | .160/4,06 | .175/4,45 |

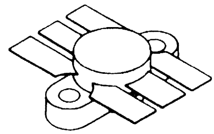
| CONT'D | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| K | | .280/7,11 |
| L | | 1.050/26,67 |

SGS-THOMSON MICROELECTRONICS

# SD1488

## RF & MICROWAVE TRANSISTORS UHF MOBILE APPLICATIONS

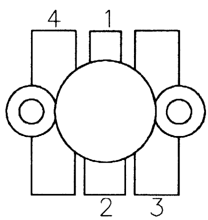
- 470 MHz
- 12.5 VOLTS
- EFFICIENCY 55%
- COMMON EMITTER
- $P_{OUT}$ = 38 W MIN. WITH 5.8 dB GAIN



**.500 6LFL (M111)**
EPOXY SEALED

| ORDER CODE | BRANDING |
|---|---|
| SD1488 | SD1488 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

### DESCRIPTION

The SD1488 is a 12.5 V Class C epitaxial silicon NPN planar transistor designed primarily for broadband applications in the 450 - 512 MHz land mobile radio band. This device utilizes diffused emitter resistors to withstand infinite VSWR at rated operating conditions.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 36 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 16 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 8.0 | A |
| $P_{DISS}$ | Power Dissipation | 117 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 1.5 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case} = 25°C$)

STATIC

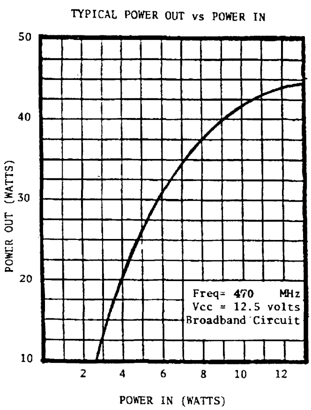
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CES}$ | $I_C = 15mA$ | $V_{BE} = 0V$ | 36 | — | — | V |
| $BV_{CEO}$ | $I_C = 50mA$ | $I_B = 0mA$ | 16 | — | — | V |
| $BV_{EBO}$ | $I_E = 5mA$ | $I_C = 0mA$ | 4.0 | — | — | V |
| $I_{CES}$ | $V_{CE} = 12.5V$ | $I_E = 0mA$ | — | — | 5 | mA |
| $h_{FE}$ | $V_{CE} = 5V$ | $I_C = 1A$ | 20 | — | — | — |

DYNAMIC

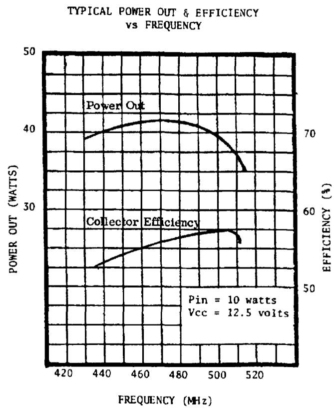
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 470 MHz | $P_{IN} = 10.0$ W | $V_{CC} = 12.5$ V | 38 | — | — | W |
| $G_P$ | f = 470 MHz | $P_{IN} = 10.0$ W | $V_{CC} = 12.5$ V | 5.8 | — | — | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB} = 12.5$ V | | — | 95 | — | pF |

## TYPICAL PERFORMANCE

### POWER OUTPUT vs POWER INPUT

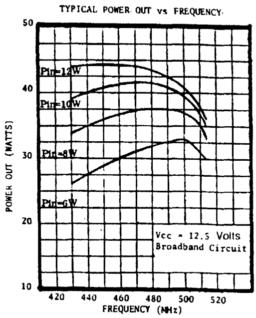



### POWER OUTPUT & COLLECTOR EFFICIENCY vs FREQUENCY

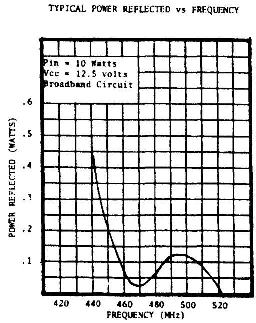


## TYPICAL PERFORMANCE (cont'd)

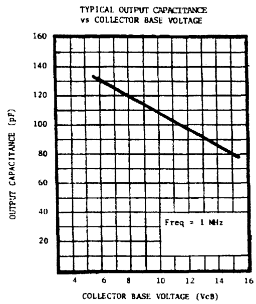
### POWER OUTPUT vs FREQUENCY




### POWER REFLECTED vs FREQUENCY

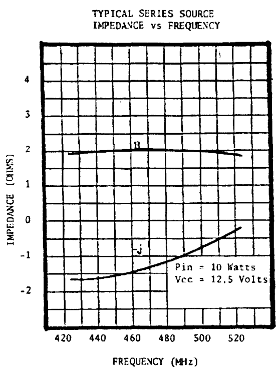



### OUTPUT CAPACITANCE vs COLLECTOR BASE VOLTAGE

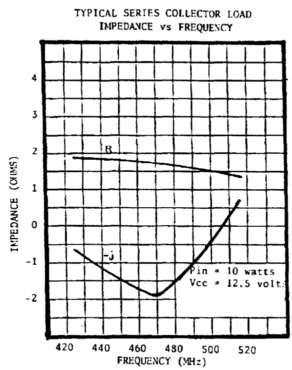



## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE

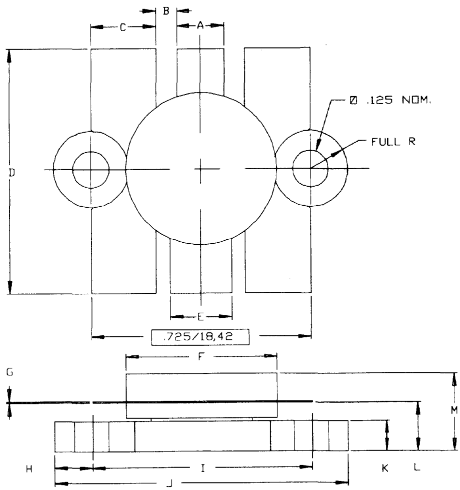



### TYPICAL COLLECTOR LOAD IMPEDANCE



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0111

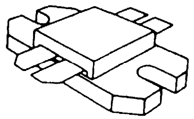



| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .150/3,43 | .160/4,06 |
| B | .045/1,14 | |
| C | .210/5,33 | .220/5,59 |
| D | .835/21,21 | .865/21,97 |
| E | .200/5,08 | .210/5,33 |
| F | .490/12,45 | .510/12,95 |
| G | .003/0,08 | .007/0,18 |
| H | .125/3,18 | |
| I | .720/18,29 | .730/18,54 |
| J | .970/24,64 | .980/24,89 |

| CONT'D | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| K | .095/2,41 | .105/2,67 |
| L | .150/3,81 | .170/4,32 |
| M | | .280/7,11 |

# RF & MICROWAVE TRANSISTORS
# TV/LINEAR APPLICATIONS

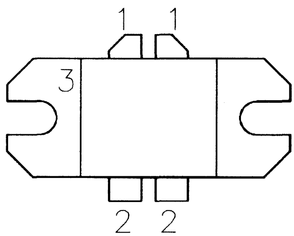
- 470 - 860 MHz
- 28 VOLTS
- CLASS AB PUSH PULL
- DESIGNED FOR HIGH POWER LINEAR OPERATION
- HIGH SATURATED POWER CAPABILITY
- GOLD METALLIZATION
- DIFFUSED EMITTER BALLAST RESISTORS
- COMMON EMITTER CONFIGURATION
- INTERNAL INPUT MATCHING
- $P_{OUT}$ = 50 W MIN. WITH 6.5 dB GAIN



**.438 x .450 4LFL (M173)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1489 | SD1489 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter

## DESCRIPTION

The SD1489 is a gold metallized epitaxial silicon NPN planar transistor using diffused emitter ballast resistors for high linearity Class AB operation in UHF and Band IV, V television transmitters and transposers.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 45 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 30 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.0 | V |
| $I_C$ | Device Current | 8 | A |
| $P_{DISS}$ | Power Dissipation | 175 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 1.0 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 50mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{CER}$ | $I_C$ = 20mA | $R_{BE}$ = 10Ω | 40 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 200mA | $I_B$ = 0mA | 30 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 3.0 | — | — | V |
| $I_{CEO}$ | $V_{CE}$ = 28V | $I_E$ = 0mA | — | — | 5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 3A | 10 | — | 80 | — |

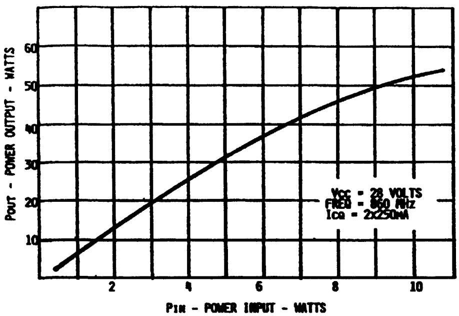
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 860 MHz | $V_{CE}$ = 28 V | $I_{CQ}$ = 2 x 250 mA | 50 | — | — | W |
| $G_P$ | f = 860 MHz | $V_{CE}$ = 28 V | $I_{CQ}$ = 2 x 250 mA | 6.8 | — | — | dB |
| $\eta_C$ | f = 860 MHz | $V_{CE}$ = 28 V | $I_{CQ}$ = 2 x 250 mA | — | 45 | — | % |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 28 V | | — | 70 | — | pF |

Note: Pulse Width = 10μSec, Duty Cycle = 1%

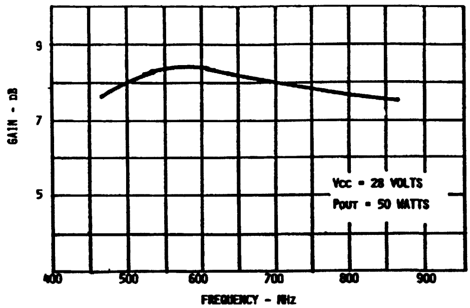
## TYPICAL PERFORMANCE

### POWER OUTPUT vs POWER INPUT



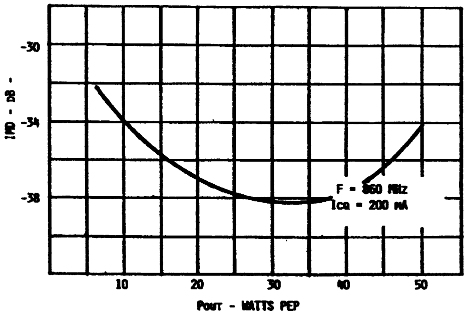

S88-SD1489-02

### BROADBAND POWER GAIN vs FREQUENCY



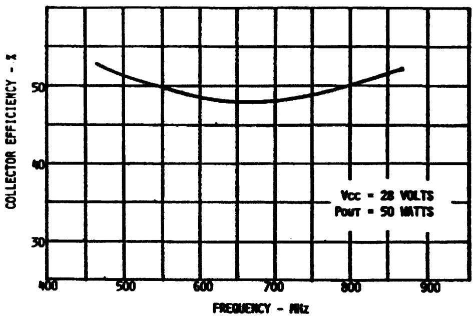

S88-SD1489-03

### INTERMODULATION DISTORTION vs POWER OUTPUT



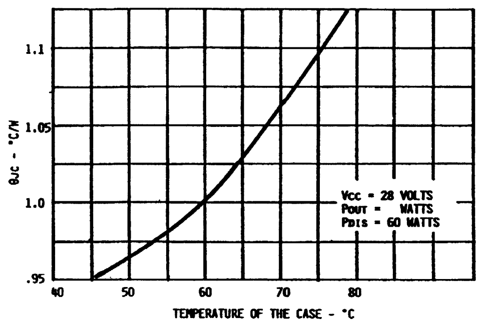

S88-SD1489-04

### COLLECTOR EFFICIENCY vs FREQUENCY



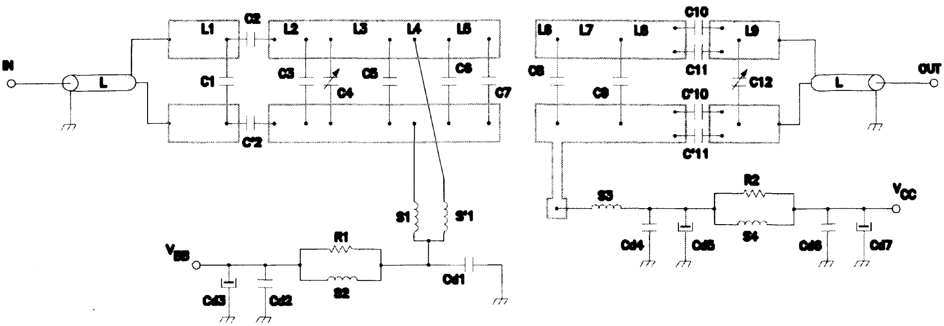

S88-SD1489-05

### THERMAL RESISTANCE vs CASE TEMPERATURE




S88-SD1489-06

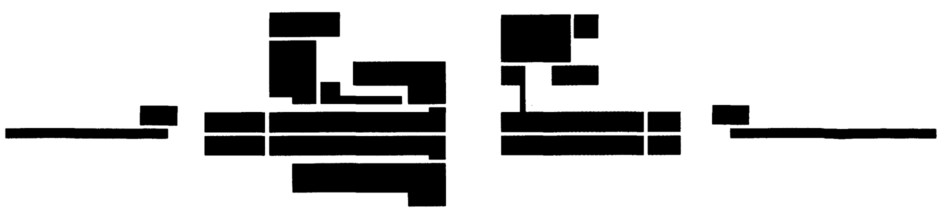
## TEST CIRCUIT




| | | |
|---|---|---|
| C1 | : | 1.5pF ATC 100A |
| C2, C'2 | : | 100pF ATC 100A |
| C3, C12 | : | .5 - 4.5pF Airtronic Adjustable |
| C4, C5 | : | 2.7pF ATC 100A |
| C6 | : | 10pF ATC 100A |
| C7 | : | 18pF ATC 100A |
| C8 | : | 6.8pF ATC 100A |
| C9 | : | 1.5pF ATC 100A + 1.8pF ATC 100A |
| C10, C'10 | : | 100pF ATC 100A |
| C11, C'11 | : | 120pF ATC 100A |
| Cd1 | : | 100pF ATC 100A |
| Cd2 | : | 47pF AATC 100B + 1000pF ATC 100B |
| Cd3 | : | 500µF 25V |
| Cd4 | : | 100pF ATC 100A |
| Cd5 | : | 22µF 35V |
| Cd6 | : | 1000pF ATC 100B |
| Cd7 | : | 47µF 63V |

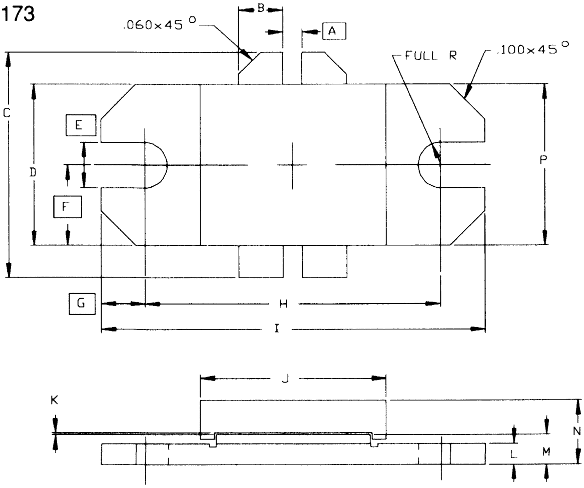
| | | |
|---|---|---|
| L | : | Coaxial Cable Zo = 50Ω Length λ/4 at 680 MHz |
| L1 | : | Printed Transmissiion Line Zo = 25Ω Length 12mm |
| L2 | : | Printed Transmission Line Zo = 25Ω Length 12mm |
| L3 | : | Printed Transmission Line Zo = 25Ω Length 10mm |
| L4 | : | Printed Transmission Line Zo = 25Ω Length 9mm |
| L5 | : | Printed Transmission Line Zo = 25Ω Length 5.5mm |
| L6 | : | Printed Transmission Line Zo = 25Ω Length 6mm |
| L7 | : | Printed Transmission Line Zo = 25Ω Length 14.5mm |
| L8 | : | Printed Transmission Line Zo = 25Ω Length 12mm |
| L9 | : | Printed Transmission Line Zo = 25Ω Length 7mm |
| R1 | : | 150 W 1/4 W |
| R2 | : | 51 W 1/4W |
| S1, S'1 | : | 10 Turns of .35mm Wire on 2mm Diameter |
| S2 | : | 9 Turns of .35mm Wire on R1 |
| S3 | : | 2 Turns of .8mm Wire on 4mm Diameter |
| S4 | : | 5 Turns of .8mm Wire on R2 |
| Board: | | Er = 2.55, .020" Thick |

## TEST CIRCUIT LAYOUT



## PACKAGE MECHANICAL DATA

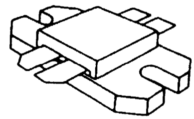
Ref.: Dwg. No.12-0173




| SGS-THOMSON MICROELECTRONICS | MINIMUM Inches/mm | MAXIMUM Inches/mm | CONT'D | MINIMUM Inches/mm | MAXIMUM Inches/mm |
|---|---|---|---|---|---|
| A | .055/1,40 | | K | .002/0,05 | .006/0,15 |
| B | .120/3,05 | .130/3,30 | L | .055/1,40 | .065/1,65 |
| C | | .785/19,94 | M | .080/2,03 | .095/2,41 |
| D | .455/11,56 | .465/11,81 | N | | .195/4,95 |
| E | .125/3,18 | | P | .455/11,56 | .465/11,81 |
| F | .230/5,84 | | | | |
| G | .128/3,25 | | | | |
| H | .838/21,28 | .850/21,59 | | | |
| I | 1.095/27,81 | 1.105/28,07 | | | |
| J | .525/13,34 | .535/13,59 | | | |

# RF & MICROWAVE TRANSISTORS TV/LINEAR APPLICATIONS

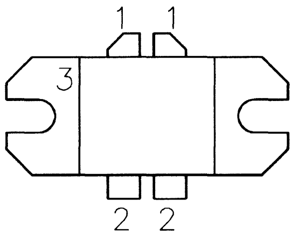
- 470 - 860 MHz
- 28 VOLTS
- CLASS AB PUSH PULL
- DESIGNED FOR HIGH POWER LINEAR OPERATION
- HIGH SATURATED POWER CAPABILITY
- GOLD METALLIZATION
- DIFFUSED EMITTER BALLAST RESISTORS
- COMMON EMITTER CONFIGURATION
- INTERNAL INPUT MATCHING
- $P_{OUT}$ = 25 W MIN. WITH 9.0 dB GAIN



**.438 x .450 4LFL (M173)**
epoxy sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| SD1490 | SD1490 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter

## DESCRIPTION

The SD1490 is a gold metallized epitaxial silicon NPN planar transistor using diffused emitter ballast resistors for high linearity Class AB operation in UHF and Band IV, V television transmitters and transposers.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 45 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 30 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.0 | V |
| $I_C$ | Device Current | 8 | A |
| $P_{DISS}$ | Power Dissipation | 135 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 50 to +150 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 1.3 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 50mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 200mA | $I_B$ = 0mA | 30 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 3.0 | — | — | V |
| $I_{CEO}$ | $V_{CE}$ = 25V | $I_E$ = 0mA | — | — | 5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 3A | 10 | — | 80 | — |

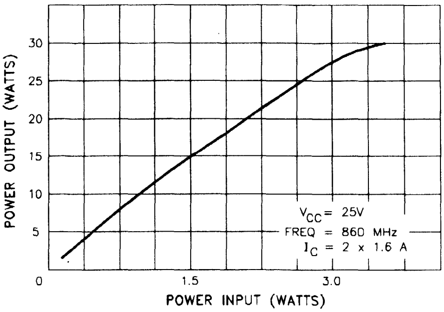
### DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 860 MHz | $V_{CE}$ = 25 V | $I_C$ = 3.2 A | 25 | — | — | W |
| $G_P$ | f = 860 MHz | $V_{CE}$ = 25 V | $I_C$ = 3.2 A | 8.0 | — | — | dB |
| CMOD | f = 860 MHz | $V_{CE}$ = 25 V | $P_{REF}$ = 25 W | — | — | 20 | % |
| $IMD_3$* | f = 860 MHz | $V_{CE}$ = 25 V | $P_{REF}$ = 25 W | — | — | –45 | dB |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 28 V | | — | 70 | — | pF |

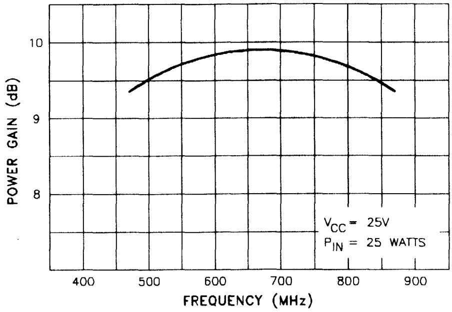
Note: * 3 Tone Testing ( – 8, – 10, – 16 dB Relative to $P_{REF}$)

## TYPICAL PERFORMANCE

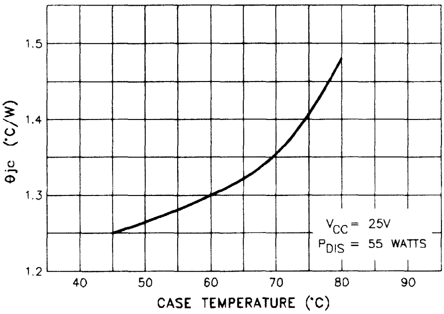
### POWER OUTPUT vs POWER INPUT



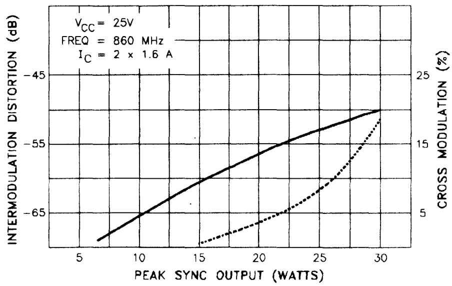

### BROADBAND POWER GAIN vs FREQUENCY



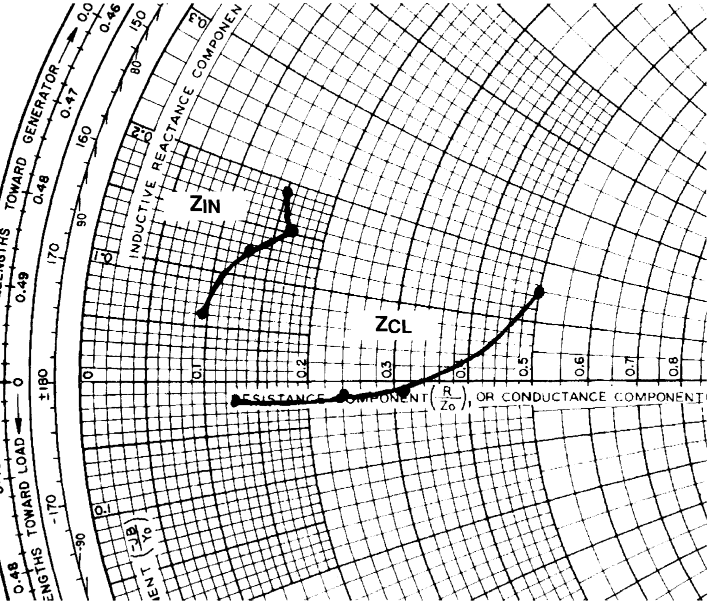

### THERMAL RESISTANCE vs CASE TEMPERATURE




### CROSS MODULATION & INTERMODULATION vs PEAK SYNC OUTPUT



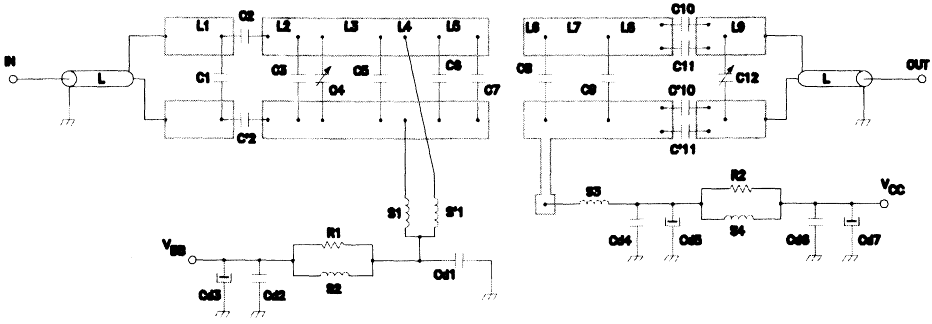
## IMPEDANCE DATA




| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 470 MHz | 7.5 + j 9.5 | 25 + j 7.5 |
| 590 MHz | 8.2 + j 7.5 | 15.6 – j 0.13 |
| 710 MHz | 6.6 + j 6.2 | 11.9 – j 0.28 |
| 860 MHz | 4.7 + j 3.0 | 6.7 – j 0.38 |

$P_{OUT}$ = 25 W
$V_{CC}$ = 25 V
$I_C$ = 3.2 A
Normalized to 50 Ohms

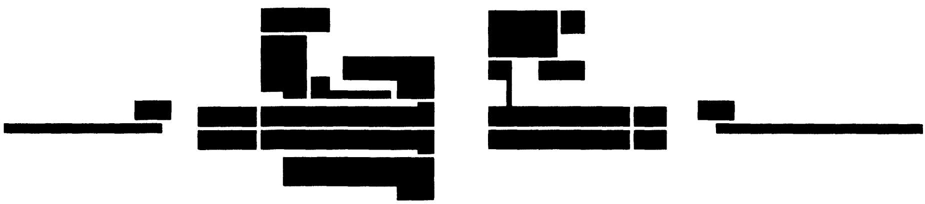
## TEST CIRCUIT




| | | |
|---|---|---|
| C1 | : | 1.5pF ATC 100A |
| C2, C'2 | : | 100pF ATC 100A |
| C3, C12 | : | .5 - 4.5pF Airtronic Adjustable |
| C4, C5 | : | 2.7pF ATC 100A |
| C6 | : | 10pF ATC 100A |
| C7 | : | 18pF ATC 100A |
| C8 | : | 6.8pF ATC 100A |
| C9 | : | 1.5pF ATC 100A + 1.8pF ATC 100A |
| C10, C'10 | : | 100pF ATC 100A |
| C11, C'11 | : | 120pF ATC 100A |
| Cd1 | : | 100pF ATC 100A |
| Cd2 | : | 47pF AATC 100B + 1000pF ATC 100B |
| Cd3 | : | 500µF 25V |
| Cd4 | : | 100pF ATC 100A |
| Cd5 | : | 22µF 35V |
| Cd6 | : | 1000pF ATC 100B |
| Cd7 | : | 47µF 63V |

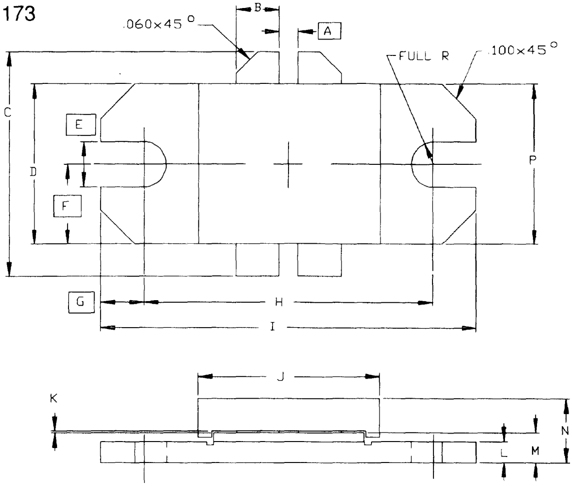
| | | |
|---|---|---|
| L | : | Coaxial Cable Zo = 50Ω Length λ/4 at 680 MHz |
| L1 | : | Printed Transmission Line Zo = 25Ω Length 12mm |
| L2 | : | Printed Transmission Line Zo = 25Ω Length 12mm |
| L3 | : | Printed Transmission Line Zo = 25Ω Length 10mm |
| L4 | : | Printed Transmission Line Zo = 25Ω Length 9mm |
| L5 | : | Printed Transmission Line Zo = 25Ω Length 5.5mm |
| L6 | : | Printed Transmission Line Zo = 25Ω Length 6mm |
| L7 | : | Printed Transmission Line Zo = 25Ω Length 14.5mm |
| L8 | : | Printed Transmission Line Zo = 25Ω Length 10mm |
| L9 | : | Printed Transmission Line Zo = 25Ω Length 7mm |
| R1 | : | 150 W 1/4 W |
| R2 | : | 51 W 1/4W |
| S1, S'1 | : | 10 Turns of .35mm Wire on 2mm Diameter |
| S2 | : | 9 Turns of .35mm Wire on R1 |
| S3 | : | 2 Turns of .8mm Wire on 4mm Diater |
| S4 | : | 5 Turns of .8mm Wire on R2 |
| Board: | | Er = 2.55, .020" Thick |

## TEST CIRCUIT LAYOUT



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0173



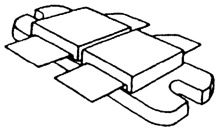

| SGS-THOMSON MICROELECTRONICS | | | CONT'D | | |
|---|---|---|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm | | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .055/1,40 | | K | .002/0,05 | .006/0,15 |
| B | .120/3,05 | .130/3,30 | L | .055/1,40 | .065/1,65 |
| C | | .785/19,94 | M | .080/2,03 | .095/2,41 |
| D | .455/11,56 | .465/11,81 | N | | .195/4,95 |
| E | .125/3,18 | | P | .455/11,56 | .465/11,81 |
| F | .230/5,84 | | | | |
| G | .128/3,25 | | | | |
| H | .838/21,28 | .850/21,59 | | | |
| I | 1.095/27,81 | 1.105/28,07 | | | |
| J | .525/13,34 | .535/13,59 | | | |

SGS-THOMSON
MICROELECTRONICS

# SD1492

## RF & MICROWAVE TRANSISTORS
## TV/LINEAR APPLICATIONS

- 470 - 860 MHz
- 28 VOLTS
- CLASS AB PUSH PULL
- DESIGNED FOR HIGH POWER CAPABILITY
- GOLD METALLIZATION
- DIFFUSED EMITTER BALLAST RESISTORS
- COMMON EMITTER CONFIGURATION
- INTERNAL INPUT MATCHING
- $P_{OUT}$ = 150 W MIN. WITH 6.5 dB GAIN

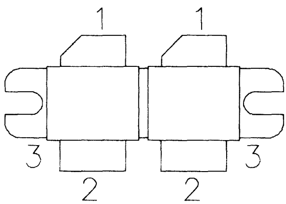


**2 x .437 x .450 2LFL (M175)**
epoxy sealed

**ORDER CODE** SD1492

**BRANDING** SD1492

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter

## DESCRIPTION

The SD1492 is a gold metallized epitaxial silicon NPN planar transistor using diffused emitter ballast resistors for high linearity Class AB operation in UHF and Band IV, V television transmitters and transposers.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 60 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 30 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.0 | V |
| $I_C$ | Device Current | 25 | A |
| $P_{DISS}$ | Power Dissipation | 310 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 0.55 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 100mA | $I_E$ = 0mA | 60 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 100mA | $I_B$ = 0mA | 30 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 50mA | $I_C$ = 0mA | 3.0 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 28V | $I_E$ = 0mA | — | — | 10 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 3A | 15 | — | 70 | — |

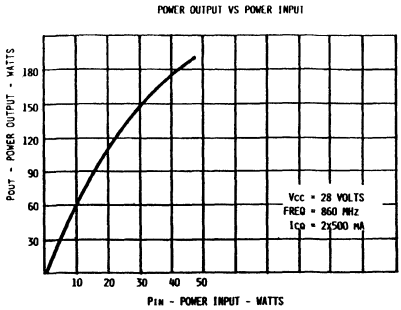
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$* | f = 860 MHz | $V_{CE}$ = 28 V | $I_{CQ}$ = 2 x 500 mA | 150 | — | — | W |
| $G_P$* | $P_{OUT}$ = 150 W | $V_{CE}$ = 28 V | $I_{CQ}$ = 2 x 500 mA | 6.5 | — | — | dB |
| $\eta_C$* | $P_{OUT}$ = 150 W | $V_{CE}$ = 28 V | $I_{CQ}$ = 2 x 500 mA | 45 | — | — | % |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 28 V | | — | — | 100 | pF |

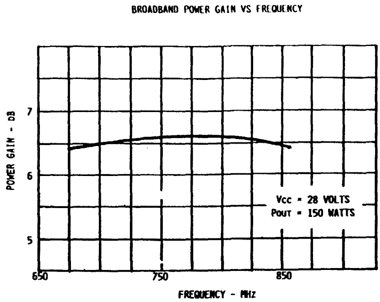
Note: * 1 dB Compression Point

## TYPICAL PERFORMANCE

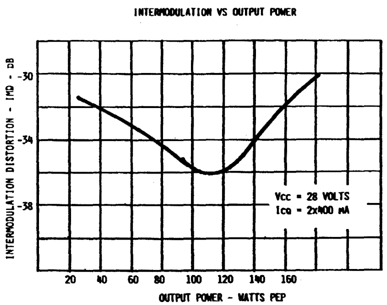
### POWER OUTPUT vs POWER INPUT



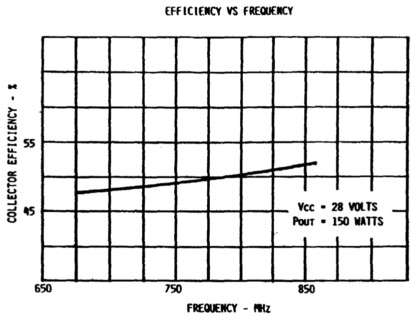

### BROADBAND POWER GAIN vs FREQUENCY



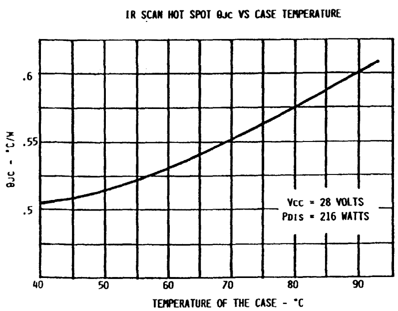

### INTERMODULATION DISTORTION vs POWER OUTPUT



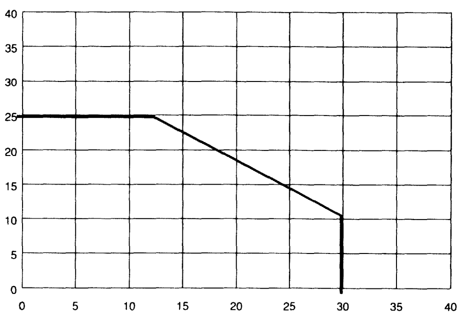

### COLLECTOR EFFICIENCY vs FREQUENCY




### THERMAL RESISTANCE vs CASE TEMPERATURE

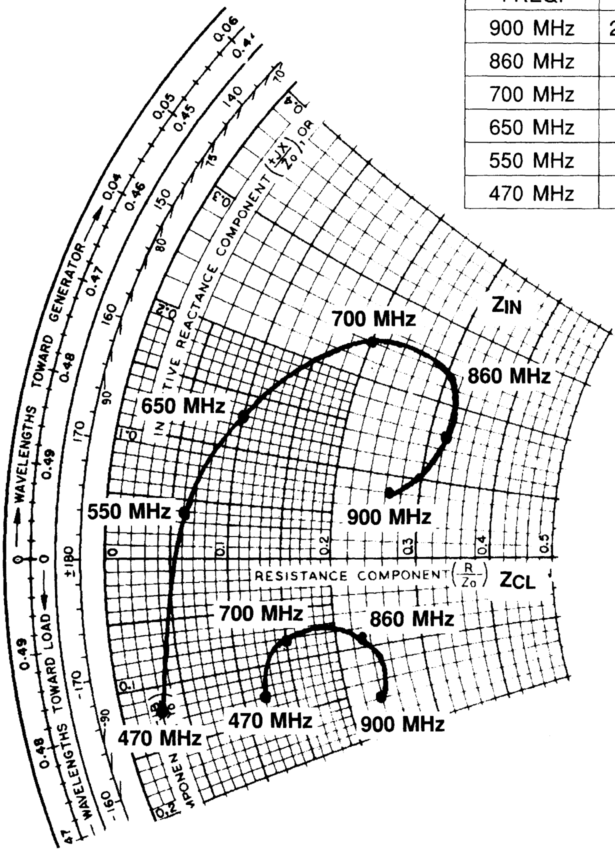



### SAFE OPERATING AREA

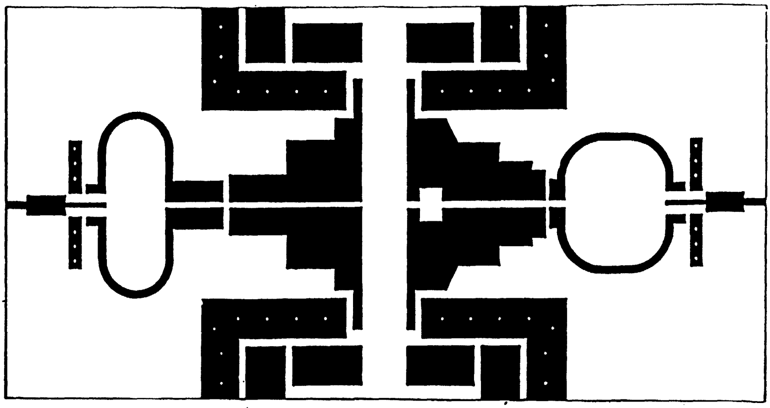


## IMPEDANCE DATA

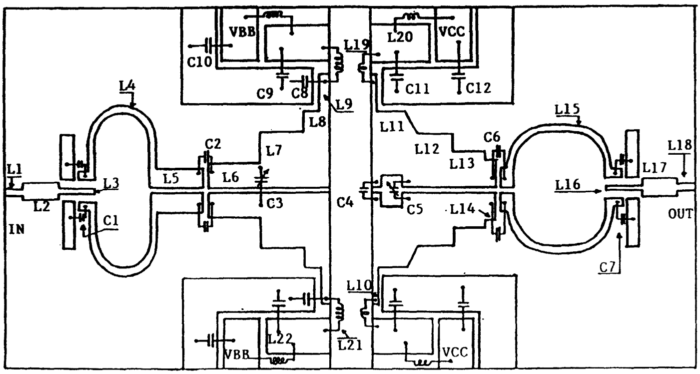
| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 900 MHz | 2.65 + j 0.8 | 2.4 − j 1.6 |
| 860 MHz | 3.2 + j 1.6 | 2.3 − j 0.9 |
| 700 MHz | 2.0 + j 2.4 | 1.5 − j 0.8 |
| 650 MHz | 1.0 + j 1.3 | — |
| 550 MHz | 0.6 + j 0.4 | — |
| 470 MHz | 0.3 − j 1.2 | 1.2 − j 1.3 |



## PHOTOMASTER OF TEST CIRCUIT



## TEST CIRCUIT



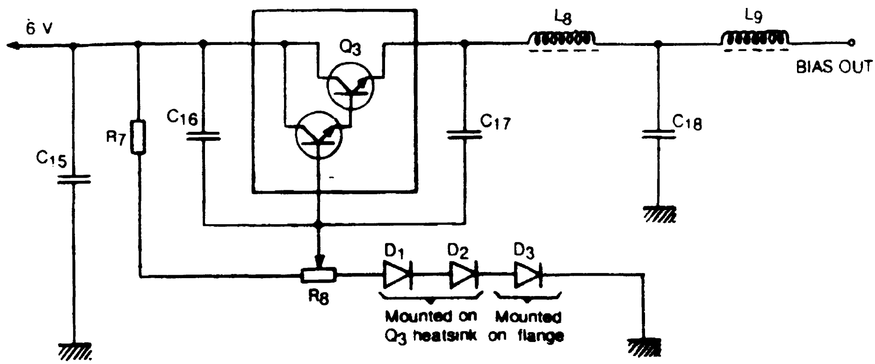

B1, B2 : Coaxial Cable 25, 43mm

C1, C2
C6, C7 : 330pF, ATC 100B
C3 : .8 - 8pF Johanson Gigatrim
C4 : 4.7pF + 3.9pF, ATC 100B
C5 : 3.9pF + 1.7pF, ATC 100B + .8 - 8pF Johanson Gigatrim
C8 : 120pF, ATC 100B
C9 : 1.5nF, ATC 100B
C10 : 10nF + 47μF, 63V
C11 : 1.5nF, ATC 100B + 10nF
C12 : 470pF + 1.5nF, ATC 100B + 100μF, 63V

Substrate: Teflon Glass Er = 2.55, 30Mils

L1, L18 : Printed Line 50Ω
L2, L17 : Printed Line 26.7Ω, 10mm
L3, L16 : Printed Line 60Ω, 10.5mm
L4, L15 : Printed Line 50Ω, 43mm
L5 : Printed Line 25Ω, 13.5mm
L6 : Printed Line 21Ω, 15mm
L7 : Printed Line 10.5Ω, 12.5mm
L8 : Printed Line 8Ω, 7.5mm
L9, l10 : Printed Line 50Ω, 10mm
L11 : Printed Line 9.5Ω, 10.5mm
L12 : Printed Line 11Ω, 14.5mm
L13 : Printed Line 15.5Ω, 8.5mm
L14 : Printed Line 19Ω, 3.5mm
L19 : 2 Turns, #16 AWG
L20 : 8 Turns, #16 AWG
L21, L22 : 12 Turns, #22 AWG

## BIAS VOLTAGE SOURCE



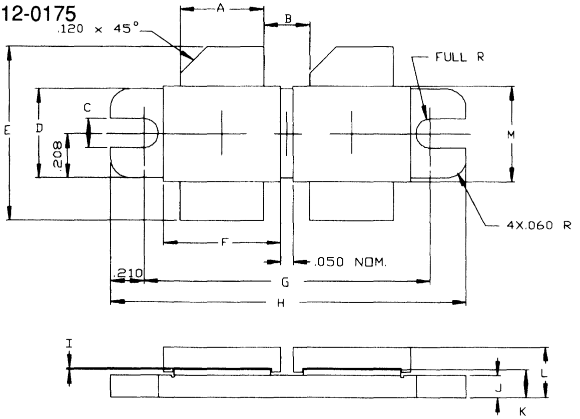

| | | |
|---|---|---|
| C15 | : | 10nF + 100nF + 10μF |
| C16 | : | 10nF |
| C17 | : | 1μF |
| C18 | : | 1.2nF + 27nF + 10μF |

| | | |
|---|---|---|
| D1 | : | AAY 49 Ge Diode Thermally Connected with Q3 heatsink |
| D2 | : | 1N 400S - Si Diode Thermally Connected with Q3 heatsink |
| D3 | : | 1n 400S - Si Diode Thenmally Connected with SD1492 (RF Transistors) Flange |

| | | |
|---|---|---|
| L6, L9 | : | Ferrite Choice |
| Q | : | Box 63B |
| R6 | : | 100Ω Trimpot |
| R7 | : | 470Ω, 1/2W |

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0175

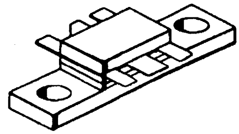



| SGS-THOMSON MICROELECTRONICS | | | CONT'D | | |
|---|---|---|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm | | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .373/9,47 | .385/9,78 | K | .115/2,92 | .135/3,43 |
| B | .190/4,83 | | L | | .250/6,35 |
| C | .125/3,18 | | M | .445/11,30 | .455/11,56 |
| D | .411/10,44 | .421/10,69 | | | |
| E | .825/20,96 | .865/21,97 | | | |
| F | .525/13,34 | .535/13,59 | | | |
| G | 1.255/31,88 | 1.265/32,13 | | | |
| H | 1.675/42,55 | 1.685/42,80 | | | |
| I | .002/0,05 | .006/0,15 | | | |
| J | .095/2,41 | .105/2,67 | | | |

# SD1495-03

## RF & MICROWAVE TRANSISTORS 800/900 MHz APPLICATIONS

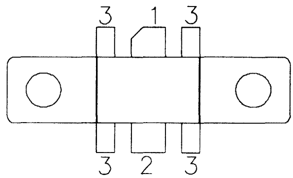
- 960 MHz
- 24 VOLTS
- EFFICIENCY 50%
- COMMON BASE
- $P_{OUT}$ = 30 W MIN. WITH 7.0 dB GAIN



**.230 6LFL (M142)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1495-03 | SD1495-3 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base

## DESCRIPTION

The SD1495-03 is a 24 V Class C epitaxial silicon NPN planar transistor designed primarily for amplifier applications in the 900 - 960 MHz frequency range. Internal input matching and common base configuration assure optimum gain and efficiency across the entire frequency band.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 50 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 30 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 50 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 9.0 | A |
| $P_{DISS}$ | Power Dissipation | 100 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 1.5 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case} = 25°C$)

STATIC

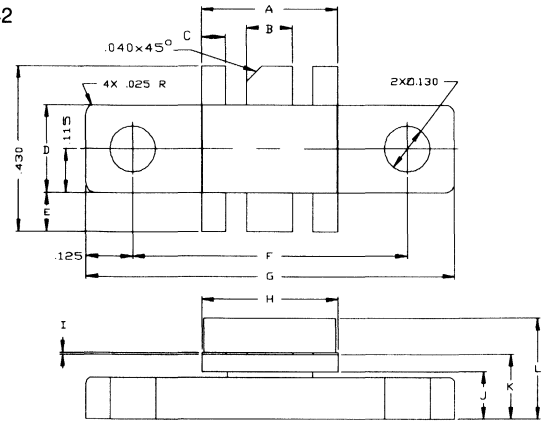
| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CES}$ | $I_C = 50mA$ | $V_{BE} = 0V$ | 50 | — | — | V |
| $BV_{CEO}$ | $I_C = 50mA$ | $I_B = 0mA$ | 30 | — | — | V |
| $BV_{EBO}$ | $I_E = 10mA$ | $I_C = 0mA$ | 4.0 | — | — | V |
| $I_{CBO}$ | $V_{CB} = 15V$ | $I_E = 0mA$ | — | — | 5 | mA |
| $h_{FE}$ | $V_{CE} = 5V$ | $I_C = 1A$ | 10 | — | 120 | — |

DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 960 MHz | $P_{IN} = 6.0$ W | $V_{CE} = 24$ V | 30 | — | — | W |
| $G_P$ | f = 960 MHz | $P_{IN} = 6.0$ W | $V_{CE} = 24$ V | 7.0 | — | — | dB |
| $\eta_C$ | f = 960 MHz | $P_{IN} = 6.0$ W | $V_{CE} = 24$ V | 50 | — | — | % |
| $C_{OB}$ | f = 1 MHz | $V_{CB} = 24$ V | | — | — | 55 | pF |

## PACKAGE MECHANICAL DATA

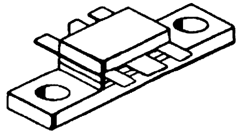
Ref.: Dwg. No.12-0142




| SGS-THOMSON MICROELECTRONICS | | | CONT'D | | |
|---|---|---|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm | | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .355/9,02 | .365/9,27 | K | .160/4,06 | .180/4,57 |
| B | .115/2,92 | .125/3,18 | L | .230/5,84 | .260/6,60 |
| C | .075/1,91 | .085/2,16 | | | |
| D | .225/5,72 | .235/5,97 | | | |
| E | .090/2,29 | .110/2,79 | | | |
| F | .720/18,29 | .730/18,54 | | | |
| G | .970/24,64 | .980/24,89 | | | |
| H | .355/9,02 | .365/9,27 | | | |
| I | .004/0,10 | .006/0,15 | | | |
| J | .120/3,05 | .130/3,30 | | | |

# RF & MICROWAVE TRANSISTORS 800/900 MHz APPLICATIONS

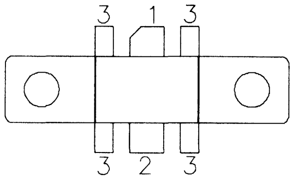
- 900 MHz
- 24 VOLTS
- EFFICIENCY 50%
- COMMON BASE
- $P_{OUT}$ = 60 W MIN. WITH 7.5 dB GAIN



**.230 6LFL (M142)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1496 | SD1496 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base

## DESCRIPTION

The SD1496 is a 24 V Class C epitaxial silicon NPN transistor designed for base station applications in the 860 - 900 MHz frequency range.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 50 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 26 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 50 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 9 | A |
| $P_{DISS}$ | Power Dissipation | 190 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 0.9 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 50mA | $I_E$ = 0mA | 50 | — | — | V |
| $BV_{CES}$ | $I_C$ = 50mA | $V_{BE}$ = 0V | 50 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 50mA | $I_B$ = 0mA | 26 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 3.0 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 20V | $I_E$ = 0mA | — | — | 10 | mA |
| $I_{CBO}$ | $V_{CB}$ = 30V | $I_E$ = 0mA | — | — | 5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1A | 20 | — | 100 | — |

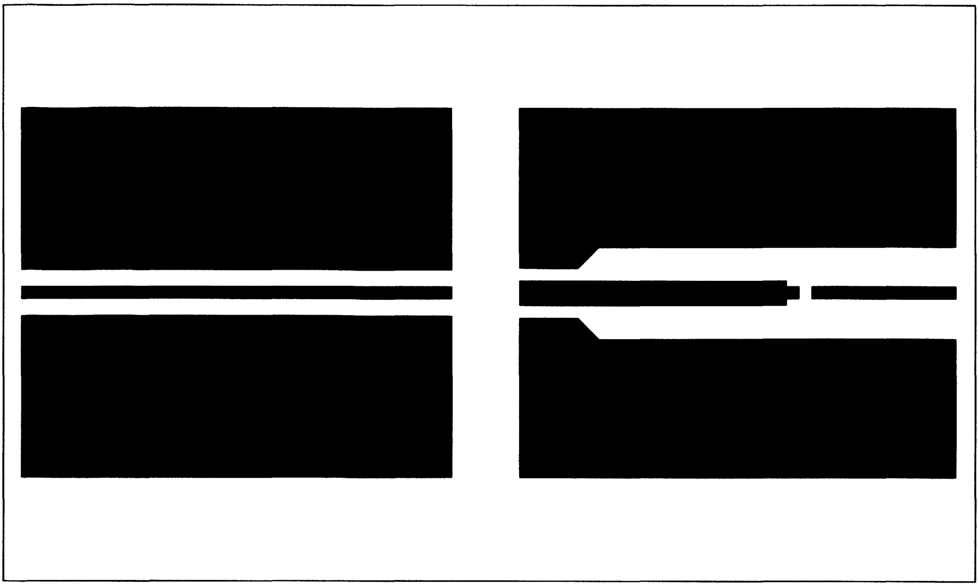
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 860 — 900 MHz | $P_{IN}$ = 10.6 W | $V_{CE}$ = 24 V | 60 | — | — | W |
| $G_P$ | f = 860 — 900 MHz | $P_{IN}$ = 10.6 W | $V_{CE}$ = 24 V | 7.5 | — | — | dB |
| $\eta_C$ | f = 860 — 900 MHz | $P_{IN}$ = 10.6 W | $V_{CE}$ = 24 V | — | 50 | — | % |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 24 V | | — | 55 | — | pF |

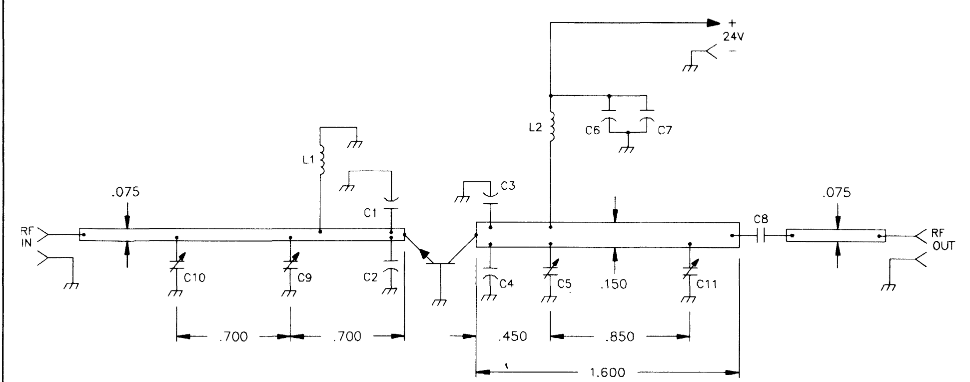
## IMPEDANCE DATA

| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 900 MHz | 1.0 + j 4.9 | 1.40 + j 1.3 |
| 890 MHz | 1.2 + j 5.1 | 1.35 + j 1.2 |
| 880 MHz | 1.45 + j 5.2 | 1.25 + j 1.1 |
| 860 MHz | 2.0 + j 5.4 | 1.15 + j 0.85 |

## TEST CIRCUIT LAYOUT



## TEST CIRCUIT




C1, C2 : 16pF Unelco
C3, C4 : 17pF Unelco
C5, C9
C10, C11 : .8 - 8pF Johanson Trimmer
C6 : 1000pF Unelco
C7 : 33μF Electrolytic
C8 : 47pF ATC Chip Capacitor

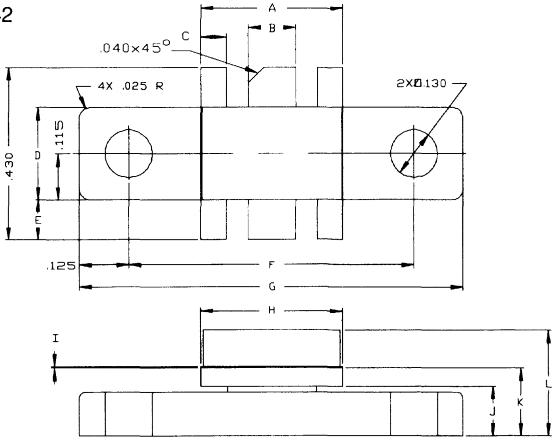
L1 : 4 1/2 Turns #22 Wire
L2 : 1 1/2 Turns #18 Wire

Z1 : 50Ω Transmission Line
Z2 : 35Ω Transmission Line

Board Dielectric Constant 2.5

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0142



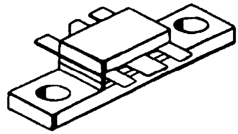

| SGS-THOMSON MICROELECTRONICS | | | CONT'D | | |
|---|---|---|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm | | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .355/9,02 | .365/9,27 | K | .160/4,06 | .180/4,57 |
| B | .115/2,92 | .125/3,18 | L | .230/5,84 | .260/6,60 |
| C | .075/1,91 | .085/2,16 | | | |
| D | .225/5,72 | .235/5,97 | | | |
| E | .090/2,29 | .110/2,79 | | | |
| F | .720/18,29 | .730/18,54 | | | |
| G | .970/24,64 | .980/24,89 | | | |
| H | .355/9,02 | .365/9,27 | | | |
| I | .004/0,10 | .006/0,15 | | | |
| J | .120/3,05 | .130/3,30 | | | |

SGS-THOMSON MICROELECTRONICS

# SD1496-03

## RF & MICROWAVE TRANSISTORS 800/900 MHz APPLICATIONS

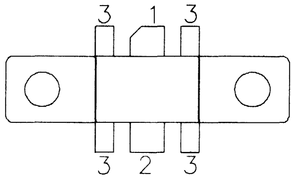
- 960 MHz
- 24 VOLTS
- EFFICIENCY 50%
- COMMON BASE CONFIGURATION
- INTERNAL INPUT MATCHING
- $P_{OUT}$ = 55 W MIN. WITH 7.4 dB GAIN



**.230 6LFL (M142)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1496-03 | 1496-3 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base

### DESCRIPTION

The SD1496-03 is a 24 V Class C epitaxial silicon NPN planar transistor designed primarily for amplifier applications in the 900 - 960 MHz frequency range. Internal input matching and common base configuration assure optimum gain and efficiency across the entire frequency band.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 50 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 26 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 50 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 9 | A |
| $P_{DISS}$ | Power Dissipation | 190 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 0.9 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

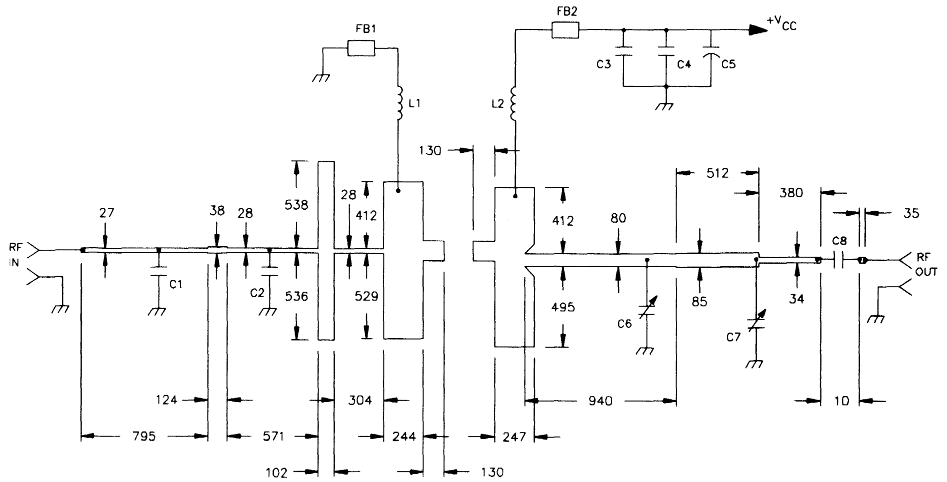
### STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 50mA | $I_E$ = 0mA | 50 | — | — | V |
| $BV_{CES}$ | $I_C$ = 50mA | $V_{BE}$ = 0V | 50 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 50mA | $I_B$ = 0mA | 26 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 3.0 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 20V | $I_E$ = 0mA | — | — | 10 | mA |
| $I_{CBO}$ | $V_{CB}$ = 30V | $I_E$ = 0mA | — | — | 5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1A | 20 | — | 100 | — |

### DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 960 MHz | $P_{IN}$ = 10.0 W | $V_{CE}$ = 24 V | 55 | — | — | W |
| $G_P$ | f = 960 MHz | $P_{IN}$ = 10.0 W | $V_{CE}$ = 24 V | 7.4 | — | — | dB |
| $\eta_C$ | f = 960 MHz | $P_{IN}$ = 10.0 W | $V_{CE}$ = 24 V | — | 50 | — | % |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 24 V | | — | 55 | — | pF |

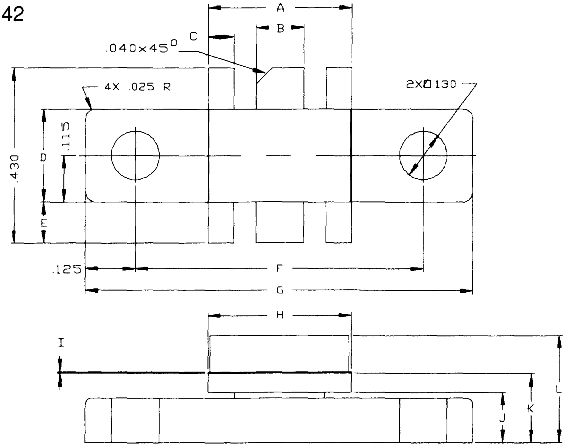
## TEST CIRCUIT




| | | | | | |
|---|---|---|---|---|---|
| C1 | : | 3.6pF ATC Chip Capacitor | FB1 | | |
| C2 | : | 1.5pf ATC Chip CApacitor | FB2 | : | Ferrite Bead Cool Side of Inductor |
| C3 | : | 100pF 35V Unelco | | | |
| C4 | : | 33µF 35V Electrolytic Capacitor | L1 | : | 4 1/2 Turns #23 Closely Wound |
| C5 | : | .1µF 50V Ceramic Capacitor | L2 | : | 1 1/2 Turns #17, .281" I.D. |
| C6 | : | .4 - 4.5pF Johanson Variable Capacitor | | | |
| C7 | : | .3 - 3.0pF Johanson Variable Capacitor | Material: | | Er = 10.2, Thickness 25Mils |
| C8 | : | 220pF ATC Chip Capacitor | All Dimensions in Mils | | |

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0142




| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .355/9,02 | .365/9,27 |
| B | .115/2,92 | .125/3,18 |
| C | .075/1,91 | .085/2,16 |
| D | .225/5,72 | .235/5,97 |
| E | .090/2,29 | .110/2,79 |
| F | .720/18,29 | .730/18,54 |
| G | .970/24,64 | .980/24,89 |
| H | .355/9,02 | .365/9,27 |
| I | .004/0,10 | .006/0,15 |
| J | .120/3,05 | .130/3,30 |

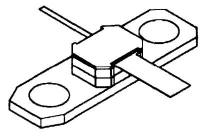
| CONT'D | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| K | .160/4,06 | .180/4,57 |
| L | .230/5,84 | .260/6,60 |

# SGS-THOMSON MICROELECTRONICS

# SD1511-08

## RF & MICROWAVE TRANSISTORS UHF RADAR APPLICATIONS

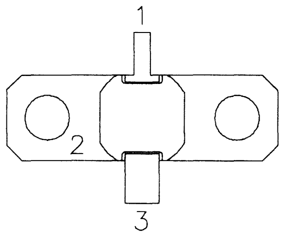
- 425 MHz
- 28 VOLTS
- COMMON EMITTER
- EMITTER BALLASTED
- GOLD METALLIZATION
- $P_{OUT}$ = 10 W MIN. WITH 9.2 dB GAIN



**.250 SQ. 2LFL (M105)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1511-08 | 1511-8 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base

### DESCRIPTION

The SD1511-08 is a gold metallized silicon NPN power transistor designed for CW and pulsed radar applications in the 400 - 450 MHz frequency range.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 65 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 65 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 2.0 | A |
| $P_{DISS}$ | Power Dissipation | 58.3 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 3.0 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case} = 25°C$)

### STATIC

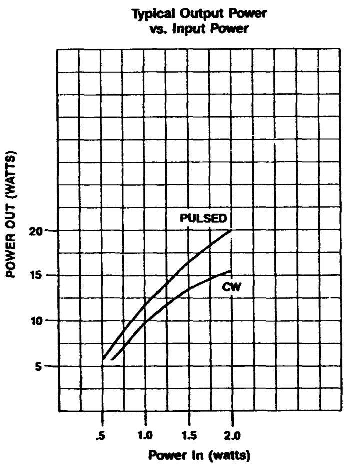
| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C = 10mA$ | $I_E = 0mA$ | 65 | — | — | V |
| $BV_{EBO}$ | $I_E = 1mA$ | $I_C = 0mA$ | 4.0 | — | — | V |
| $I_{CBO}$ | $V_{CB} = 30V$ | $I_E = 0mA$ | — | — | 1 | mA |
| $h_{FE}$ | $V_{CE} = 5V$ | $I_C = 1A$ | 10 | — | 100 | — |

### DYNAMIC

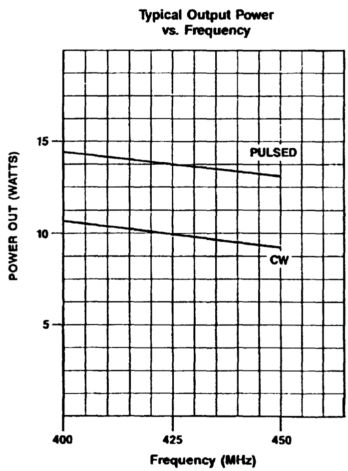
| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 425 MHz | $P_{IN} = 1.2$ W | $V_{CE} = 28$ V | 10 | — | — | W |
| $G_P$ | f = 425 MHz | $P_{IN} = 1.2$ W | $V_{CE} = 28$ V | 9.2 | — | — | dB |
| $\eta_C$ | f = 425 MHz | $P_{IN} = 1.2$ W | $V_{CE} = 28$ V | 50 | — | — | % |

## TYPICAL PERFORMANCE

### POWER OUTPUT vs POWER INPUT

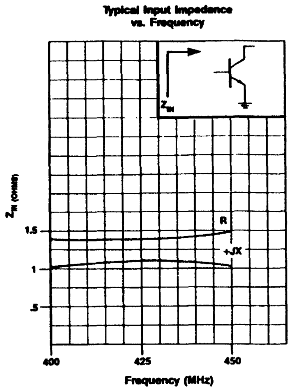



### POWER OUTPUT vs FREQUENCY

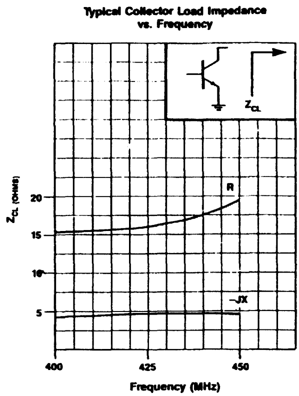


## IMPEDANCE DATA

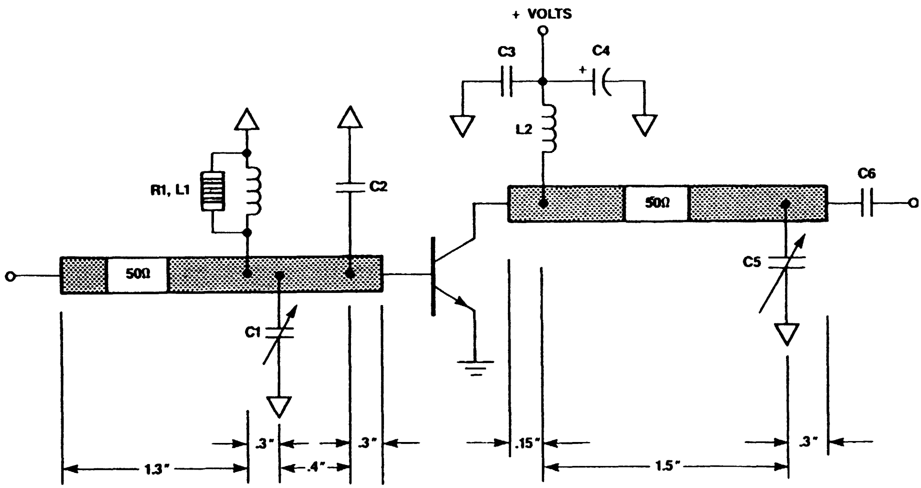
### TYPICAL INPUT IMPEDANCE




### TYPICAL COLLECTOR LOAD IMPEDANCE




## TEST CIRCUIT



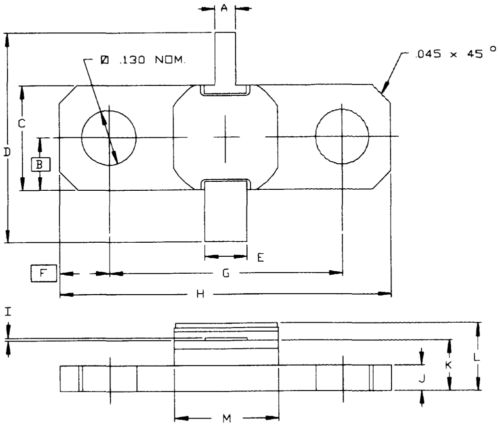

C1, C5 : 6 - 12pF Capacitor
C2 : 33pF Capacitor
C3, C6 : 470pF Capaciotr
C4 : 1000μF

L1 : 12 1/2 Turns #24 AWG
L2 : #18 AWG Hairpin, Length 1"

R1 : 1000Ω

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0105




| SGS-THOMSON MICROELECTRONIC | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .045/1,14 | .055/1,40 |
| B | .125/3,18 | |
| C | .245/6,22 | .255/6,48 |
| D | 1.235/31,37 | |
| E | .095/2,41 | .105/2,67 |
| F | .120/3,05 | |
| G | .557/14,15 | .567/14,40 |
| H | .795/20,19 | .805/20,45 |
| I | .002/0,05 | .006/0,15 |
| J | .057/1,45 | .067/1,70 |

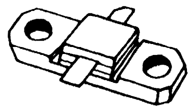
| CONT'D | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| K | .112/2,84 | .132/3,35 |
| L | | .175/4,45 |
| M | .245/6,22 | .257/6,53 |

SGS-THOMSON
MICROELECTRONICS

# SD1512

## RF & MICROWAVE TRANSISTORS
## SPECIAL AVIONICS APPLICATIONS

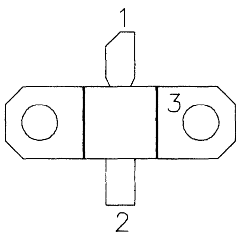
- 960 - 1220 MHz
- 30 VOLTS
- EXTREMELY RUGGED
- THERMALLY STABLE
- GOLD METALLIZATION
- DESIGNED FOR LONG PULSE L-BAND APPLICATIONS
- $P_{OUT}$ = 5.0 W MIN. WITH 7.0 dB GAIN



**.250 SQ. 2LFL (M124)**
epoxy sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| SD1512 | SD1512 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base

### DESCRIPTION

The SD1512 is a gold metallized epitaxial silicon NPN planar pulsed transistor that has been designed for use in extended pulse width and duty cycle applications from 960 - 1220 MHz.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 65 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 30 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 2.0 | A |
| $P_{DISS}$ | Power Dissipation | 53 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 3.3 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CES}$ | $I_C$ = 25mA | $V_{BE}$ = 0V | 65 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 10mA | $I_B$ = 0mA | 30 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 28V | $I_E$ = 0mA | — | — | 5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 100mA | 20 | — | — | — |

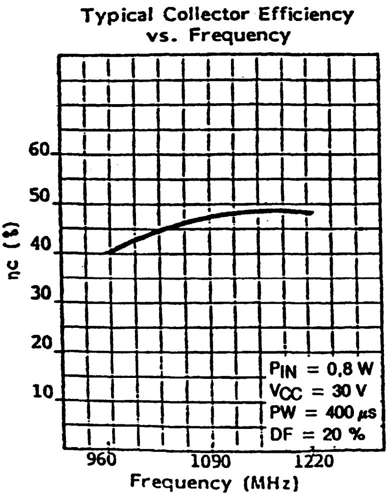
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 960 — 1220 MHz | $P_{IN}$ = 1.0 W | $V_{CE}$ = 30 V | 5 | — | — | W |
| $G_P$ | f = 960 — 1220 MHz | $P_{IN}$ = 1.0 W | $V_{CE}$ = 30 V | 7 | — | — | dB |

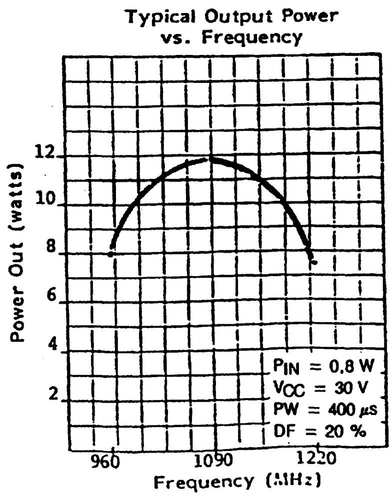
Note: Pulse Width = 400µSec
Duty Cycle = 20%

## TYPICAL PERFORMANCE

### COLLECTOR EFFICIENCY vs FREQUENCY

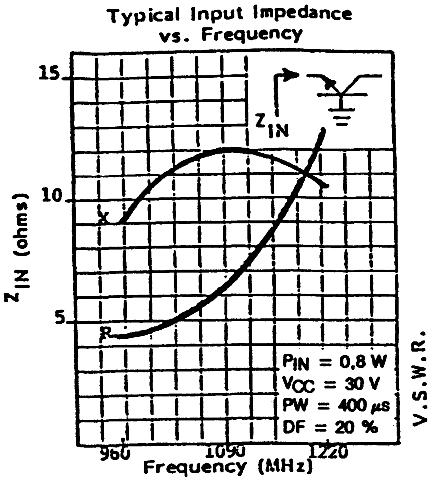



### POWER OUTPUT vs FREQUENCY

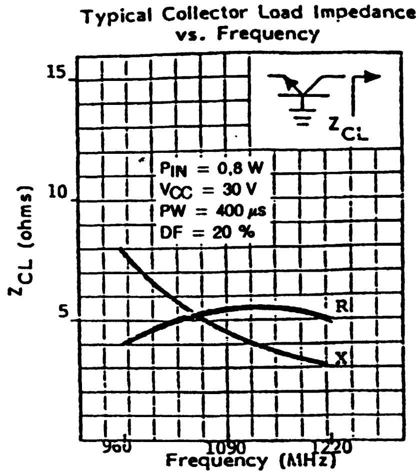


## IMPEDANCE DATA

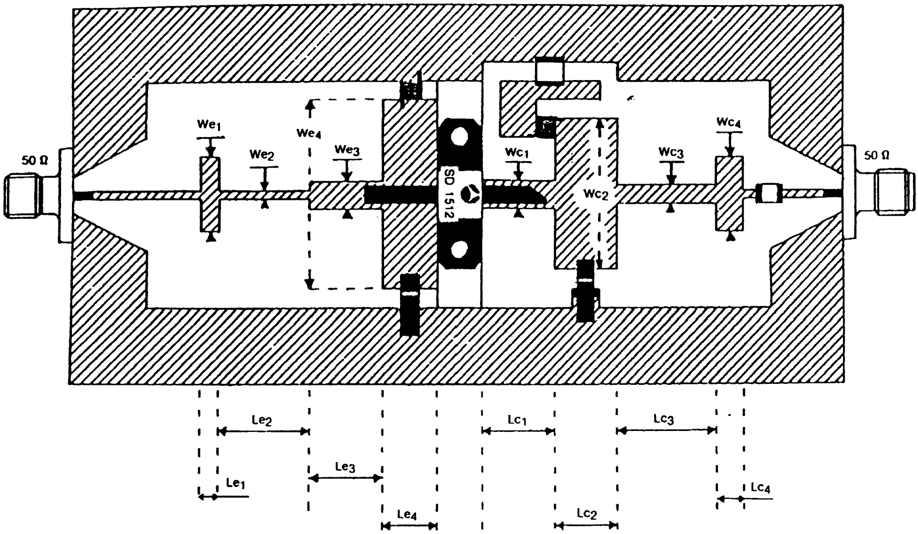
### TYPICAL INPUT IMPEDANCE




### TYPICAL COLLECTOR LOAD IMPEDANCE

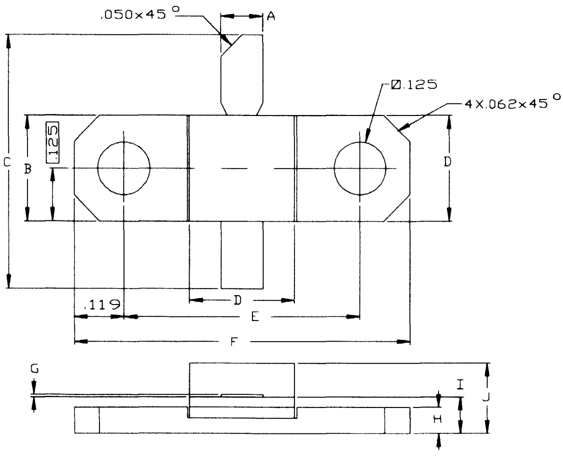


## TEST CIRCUIT



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0124

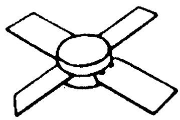



| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .095/2,41 | .105/2,67 |
| B | .245/6,22 | .255/6,48 |
| C | .750/19,05 | |
| D | .245/6,22 | .258/6,55 |
| E | .555/14,10 | .570/14,48 |
| F | .795/20,19 | .805/20,45 |
| G | .003/0,08 | .007/0,18 |
| H | .055/1,40 | .065/1,65 |
| I | .075/1,91 | .100/2,54 |
| J | .150/3,81 | .180/4,57 |

# SD1526-01

## RF & MICROWAVE TRANSISTORS AVIONICS APPLICATIONS

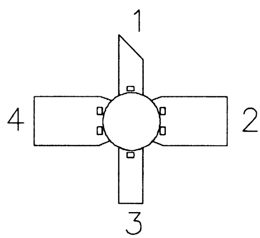
- DESIGNED FOR HIGH POWER PULSED IFF, DME, TACAN APPLICATIONS
- 6.0 WATTS (typ.) IFF 1030 - 1090 MHz
- 5.0 WATTS (min.) DME 1025 - 1150 MHz
- 4.0 WATTS (typ.) TACAN 960 - 1215 MHz
- 9.5 dB MIN. GAIN
- LOW THERMAL RESISTANCE
- EMITTER BALLASTED
- INFINITE LOAD VSWR CAPABILITY AT SPECIFIED OPERATING CONDITIONS
- INPUT MATCHED, COMMON BASE CONFIGURATION



**.280 4LSL (M115)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1526-01 | 1526-1 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The SD1526-01 is a gold metallized, silicon NPN power transistor. The SD1526-01 is designed for pulsed applications with low duty cycles such as IFF, DME, TACAN. The SD1526-01 is packaged in the .280" input matched stripline package resulting in improved broadband performance and a low thermal resistance.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 45 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 45 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.5 | V |
| $I_C$ | Device Current | 1.0 | A |
| $P_{DISS}$ | Power Dissipation | 21.9 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 8.0 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 1mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{CES}$ | $I_C$ = 1mA | $V_{BE}$ = 0V | 45 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 28V | $I_E$ = 0mA | — | — | 1 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 100mA | 15 | — | 200 | — |

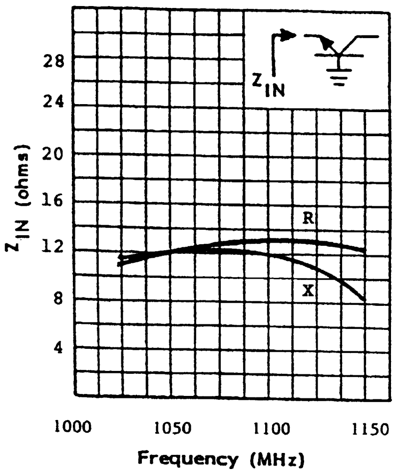
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1025 — 1150MHz | $P_{IN}$ = .55 W | $V_{CE}$ = 28 V | 5 | — | — | W |
| $G_P$ | f = 1025 — 1150MHz | $P_{IN}$ = .55 W | $V_{CE}$ = 28 V | 9.5 | — | — | dB |

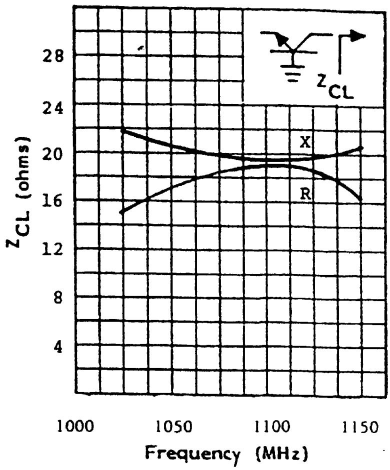
Note: Pulse Width = 10µSec, Duty Cycle = 1%
This device is suitable for use under other pulse widths/duty cycle conditions.
Please contact the factory for specific applications assistance.

## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE

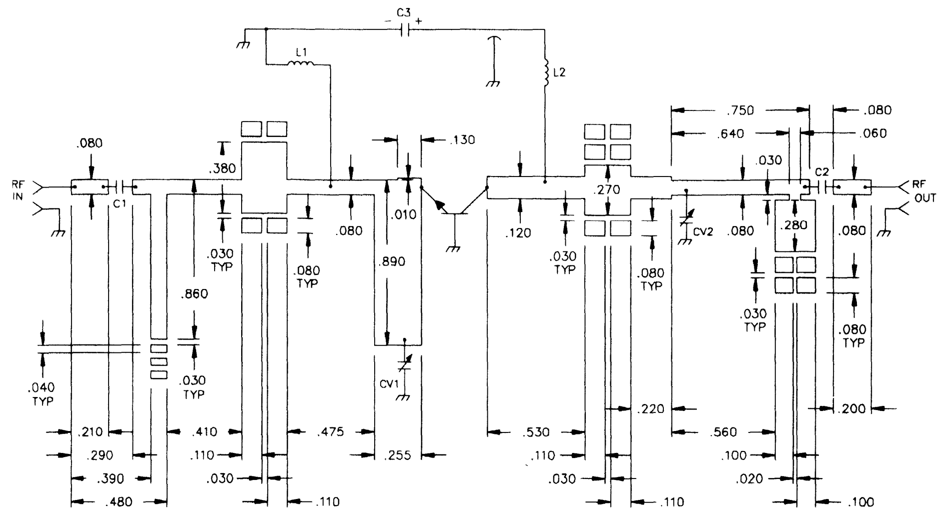



### TYPICAL COLLECTOR LOAD IMPEDANCE




$P_{IN}$ = 0.5 w
$V_{CE}$ = 28 V
Pulse Width 10µsec
Duty Cycle 1%

## TEST CIRCUIT




C1, C2 : 330pF ATC Chip Capacitor
C3 : 2200pF 63V Electrolytic

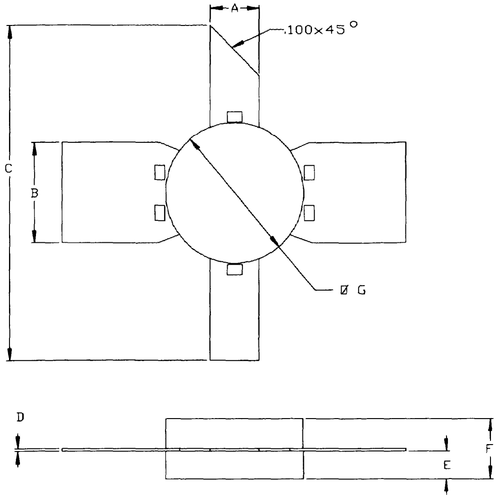
CV1, CV2 : 0.4 - 2.5pF Johanson Gigatrim

L1, L2 : 5 Turns, 0.080" I.D. #20 AWG

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0115

| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .095/2,41 | .105/2,67 |
| B | .195/4,95 | .205/5,21 |
| C | 1.000/25,40 | |
| D | .004/0,10 | .007/0,18 |
| E | .050/1,27 | .065/1,65 |
| F | .120/3,05 | .135/3,43 |
| G | .275/6,99 | .285/7,21 |
| | | |
| | | |
| | | |

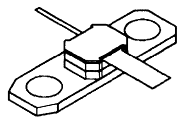


SGS-THOMSON MICROELECTRONICS

# SD1526-08

## RF & MICROWAVE TRANSISTORS AVIONICS APPLICATIONS

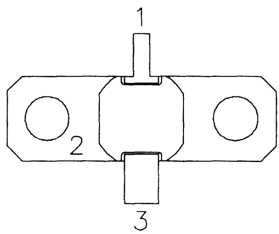
- DESIGNED FOR HIGH POWER PULSED IFF, DME, TACAN APPLICATIONS
- 6.0 WATTS (typ.) IFF 1030 - 1090 MHz
- 5.0 WATTS (min.) DME 1025 - 1150 MHz
- 4.0 WATTS (typ.) TACAN 960 - 1215 MHz
- 9.5 dB MIN. GAIN
- LOW THERMAL RESISTANCE
- EMITTER BALLASTED
- INFINITE LOAD VSWR CAPABILITY AT SPECIFIED OPERATING CONDITIONS
- INPUT MATCHED, COMMON BASE CONFIGURATION



**.250 SQ. 2LFL (M105)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1526-08 | 1526-8 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter

### DESCRIPTION

The SD1526-08 is a gold metallized, silicon NPN power transistor. The SD1526-08 is designed for pulsed applications with low duty cycles such as IFF, DME, TACAN. The SD1526-08 is packaged in the .250" input matched stripline package resulting in improved broadband performance and a low thermal resistance.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 45 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 45 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.5 | V |
| $I_C$ | Device Current | 1.0 | A |
| $P_{DISS}$ | Power Dissipation | 21.9 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 8.0 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 1mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 5mA | $I_B$ = 0V | 45 | — | — | V |
| $BV_{CES}$ | $I_C$ = 5mA | $V_{BE}$ = 0V | 45 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 28V | $I_E$ = 0mA | — | — | 1 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 100mA | 10 | — | 200 | — |

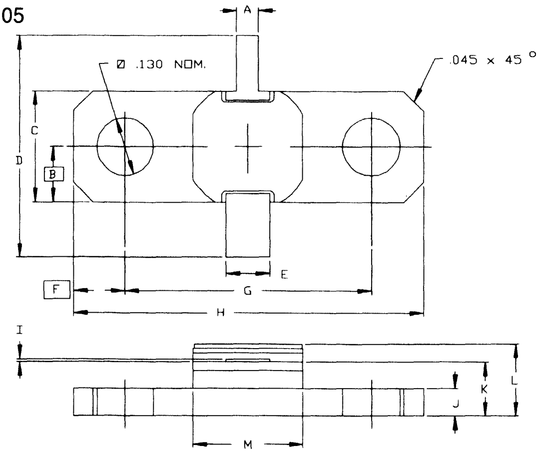
DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 1025 — 1150MHz | $P_{IN}$ = .55 W | $V_{CE}$ = 28 V | 5 | — | — | W |
| $G_P$ | f = 1025 — 1150MHz | $P_{IN}$ = .55 W | $V_{CE}$ = 28 V | 9.5 | — | — | dB |

Note: Pulse Width = 10µSec, Duty Cycle = 1%
This device is suitable for use under other pulse widths/duty cycle conditions.
Please contact the factory for specific applications assistance.

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0105




| SGS-THOMSON MICROELECTRONIC | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .045/1,14 | .055/1,40 |
| B | .125/3,18 | |
| C | .245/6,22 | .255/6,48 |
| D | 1.235/31,37 | |
| E | .095/2,41 | .105/2,67 |
| F | .120/3,05 | |
| G | .557/14,15 | .567/14,40 |
| H | .795/20,19 | .805/20,45 |
| I | .002/0,05 | .006/0,15 |
| J | .057/1,45 | .067/1,70 |

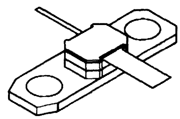
| CONT'D | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| K | .112/2,84 | .132/3,35 |
| L | | .175/4,45 |
| M | .245/6,22 | .257/6,53 |

SGS-THOMSON
MICROELECTRONICS

# SD1527-08

## RF & MICROWAVE TRANSISTORS
## AVIONICS APPLICATIONS

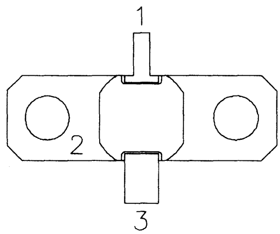
- 5.0 WATTS (min.) IFF 1030 - 1090 MHz
- 4.0 WATTS (typ.) TACAN 960 - 1215 MHz
- DESIGNED FOR HIGH POWER PULSED IFF AND TACAN APPLICATIONS
- LOW THERMAL RESISTANCE
- INPUT MATCHED,COMMON BASE CONFIGURATION
- INFINITE LOAD VSWR CAPABILITY @ SPECIFIED OPERATING CONDITIONS



**.250 SQ 2LFL (M105)**
hermetically sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| SD1527-08 | 1527-8 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter

### DESCRIPTION

The SD1527-08 is a gold metallized, epitaxial silicon NPN power transistor. The SD1527-08 is designed for pulsed applications with low duty cycles such as IFF, DME, TACAN. The SD1527-08 is packaged in the .250" input matched hermetic stripline flange package resulting in improved broadband performance and a low thermal resistance.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 80 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 80 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.5 | V |
| $I_C$ | Device Current | 1.0 | A |
| $P_{DISS}$ | Power Dissipation | 21.9 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 8.0 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 10mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{CES}$ | $I_C$ = 10mA | $V_{BE}$ = 0V | 65 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 50V | $I_E$ = 0mA | — | — | 1 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 100mA | 15 | — | 200 | — |

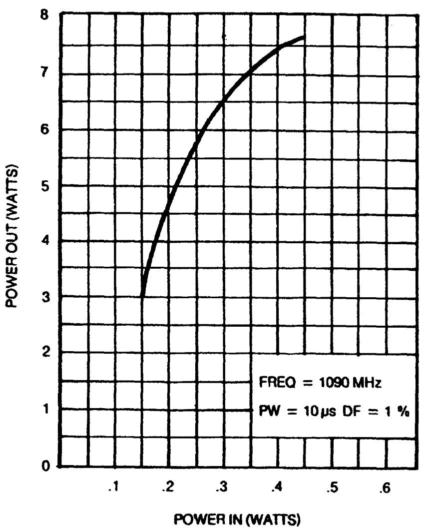
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1090 MHz | $P_{IN}$ = 0.35 W | $V_{CE}$ = 50 V | 5.0 | — | — | W |
| $G_P$ | f = 1090 MHz | $P_{IN}$ = 0.35 W | $V_{CE}$ = 50 V | 11.5 | — | — | dB |

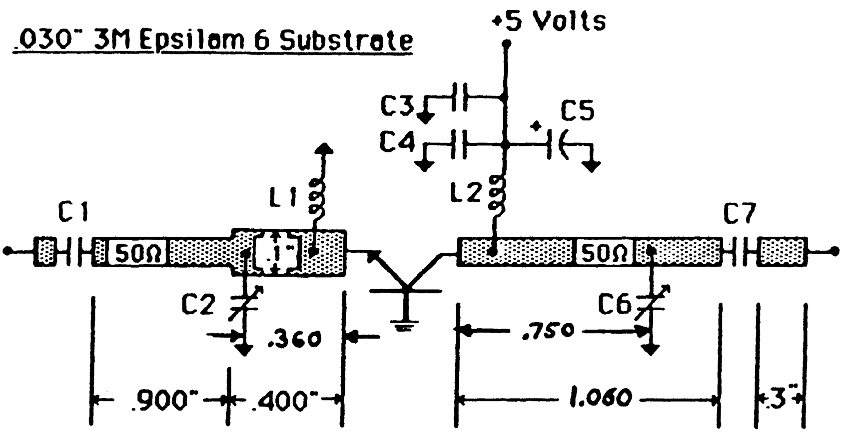
Note: Pulse Width = 10µSec
Duty Cycle = 1%

## TYPICAL PERFORMANCE

POWER OUTPUT vs POWER INPUT



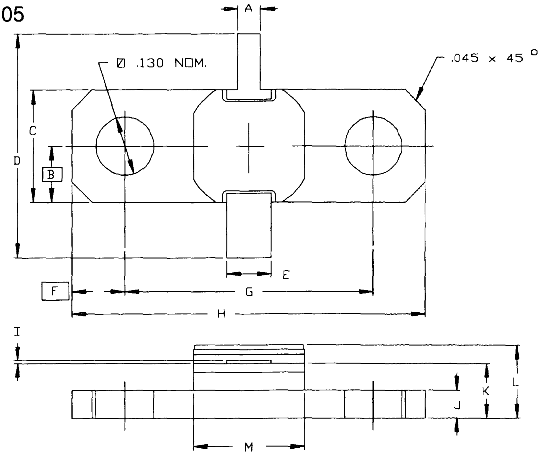
## TEST CIRCUIT




C1, C3,
C4, C7 : 470pF Capacitor
C2, C6 : .6 - 4.5pF Capacitor
C5 : 2200µF
L1 : 4.5 Turns, #22 AWG
LL2 : 8.5 Turns, #24 AWG

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0105

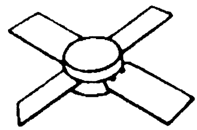



| SGS-THOMSON MICROELECTRONIC | | | CONT'D | | |
|---|---|---|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm | | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .045/1,14 | .055/1,40 | K | .112/2,84 | .132/3,35 |
| B | .125/3,18 | | L | | .175/4,45 |
| C | .245/6,22 | .255/6,48 | M | .245/6,22 | .257/6,53 |
| D | 1.235/31,37 | | | | |
| E | .095/2,41 | .105/2,67 | | | |
| F | .120/3,05 | | | | |
| G | .557/14,15 | .567/14,40 | | | |
| H | .795/20,19 | .805/20,45 | | | |
| I | .002/0,05 | .006/0,15 | | | |
| J | .057/1,45 | .067/1,70 | | | |

# SD1528-06

## RF & MICROWAVE TRANSISTORS AVIONICS APPLICATIONS

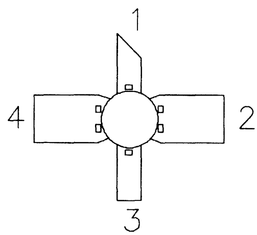
- DESIGNED FOR HIGH POWER PULSED IFF, DME, TACAN APPLICATIONS
- 20 W (typ.) IFF 1030 - 1090 MHz
- 15 W (min.) DME 1025 - 1150 MHz
- 15 W (typ.) TACAN 960 - 1215 MHz
- REFRACTORY GOLD METALLIZATION
- EMITTER BALLASTED AND LOW THERMAL RESISTANCE FOR RELIABILITY AND RUGGEDNESS
- 20:1 LOAD VSWR CAPABILITY @ SPECIFIED OPERATING CONDITIONS
- INPUT MATCHED, COMMON BASE CONFIGURATION



**.280 4 LFL (M115)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1528-06 | 1528-6 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The SD1528-06 is a gold metallized epitaxial silicon NPN power transistor. The SD1528-06 is designed for applications requiring high peak power and low duty cycles such as IFF, DME and TACAN. The SD1528-06 is packaged in the .280" input matched stripline package, resulting in improved broadband performance and low thermal resistance.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 65 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 65 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.5 | V |
| $I_C$ | Device Current | 1.5 | A |
| $P_{DISS}$ | Power Dissipation | 87.5 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 2.0 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 10mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{CES}$ | $I_C$ = 25mA | $V_{BE}$ = 0V | 65 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 50V | $I_E$ = 0mA | — | — | 2 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = .1A | 10 | — | 200 | — |

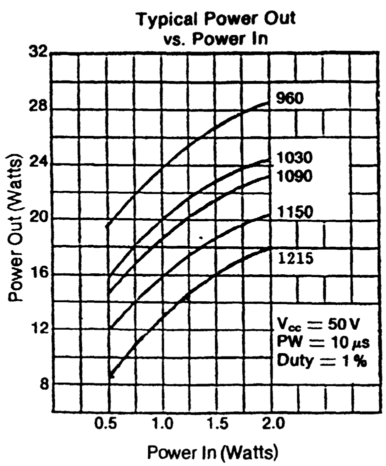
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1025 — 1150MHz | $P_{IN}$ = 1.5 W | $V_{CE}$ = 50 V | 15 | — | — | W |
| $G_P$ | f = 1025 — 1150MHz | $P_{IN}$ = 1.5 W | $V_{CE}$ = 50 V | 10 | — | — | dB |
| $\eta_C$ | f = 1025 — 1150MHz | $P_{IN}$ = 1.5 W | $V_{CE}$ = 50 V | 30 | — | — | % |

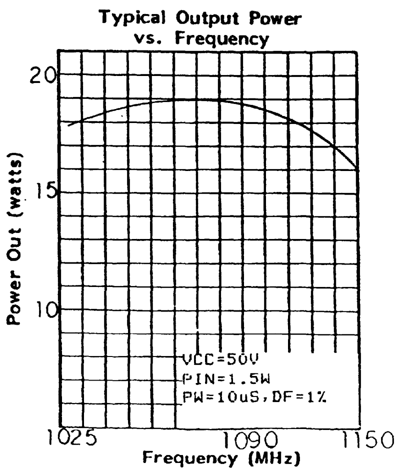
Note: Pulse Width = 10µsec, Duty Cycle = 1%

## TYPICAL PERFORMANCE

### POWER OUTPUT vs POWER INPUT

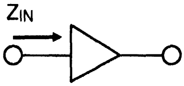



### POWER OUTPUT vs FREQUENCY

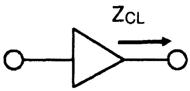


## IMPEDANCE DATA

**TYPICAL INPUT IMPEDANCE**




**TYPICAL COLLECTOR LOAD IMPEDANCE**

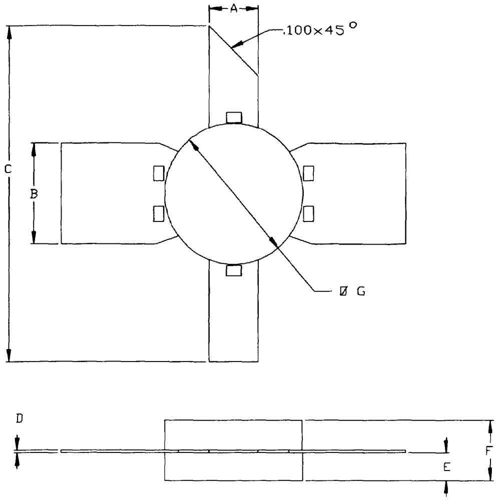



| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 960 MHz | 2.5 + j 12.5 | 17.0 + j 15.5 |
| 1030 MHz | 3.5 + j 12.5 | 17.0 + j 14.5 |
| 1090 MHz | 3.0 + j 13.5 | 19.5 + j 12.5 |
| 1150 MHz | 3.5 + j 14.0 | 18.0 + j 12.0 |
| 1215 MHz | 5.0 + j 17.0 | 16.0 + j 12.0 |

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0115

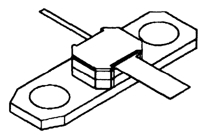
| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .095/2,41 | .105/2,67 |
| B | .195/4,95 | .205/5,21 |
| C | 1.000/25,40 | |
| D | .004/0,10 | .007/0,18 |
| E | .050/1,27 | .065/1,65 |
| F | .120/3,05 | .135/3,43 |
| G | .275/6,99 | .285/7,21 |
| | | |
| | | |
| | | |



# SD1528-08

## RF & MICROWAVE TRANSISTORS AVIONICS APPLICATIONS

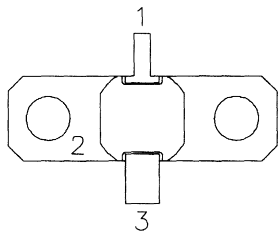
- DESIGNED FOR HIGH POWER PULSED IFF, DME, TACAN APPLICATIONS
- 20 WATTS (typ.) IFF 1030 - 1090 MHz
- 15 WATTS (min.) DME 1025 - 1150 MHz
- 15 WATTS (typ.) TACAN 960 - 1215 MHz
- 10 dB MIN. GAIN
- REFRACTORY GOLD METALLIZATION
- EMITTER BALLASTING AND LOW THERMAL RESISTANCE
- 20:1 LOAD VSWR CAPABILITY AT SPECIFIED OPERATING CONDITIONS
- INPUT MATCHED, COMMON BASE CONFIGURATION



**.250 SQ. 2LFL (M105)**
hermetically sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| SD1528-08 | 1528-8 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter

### DESCRIPTION

The SD1528-08 is a gold metallized, silicon NPN power transistor. The SD1528-08 is designed for applications requiring high peak power and low duty cycles such as IFF, DME and TACAN. The SD1528-08 is packaged in the .250" input matched hermetic stripline flange package resulting in improved broadband performance and a low thermal resistance.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 65 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 65 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.5 | V |
| $I_C$ | Device Current | 1.5 | A |
| $P_{DISS}$ | Power Dissipation | 87.5 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 2.0 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 10mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{CES}$ | $I_C$ = 25mA | $V_{BE}$ = 0V | 65 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 50V | $I_E$ = 0mA | — | — | 2 | mA |

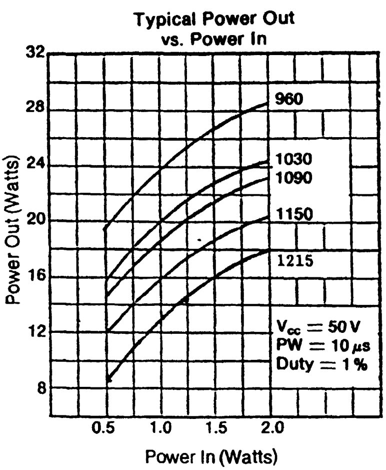
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1025 — 1150MHz | $P_{IN}$ = 1.5 W | $V_{CE}$ = 50 V | 15 | — | — | W |
| $G_P$ | f = 1025 — 1150MHz | $P_{IN}$ = 1.5 W | $V_{CE}$ = 50 V | 10 | — | — | dB |
| $\eta_C$ | f = 1025 — 1150MHz | $P_{IN}$ = 1.5 W | $V_{CE}$ = 50 V | 30 | — | — | % |

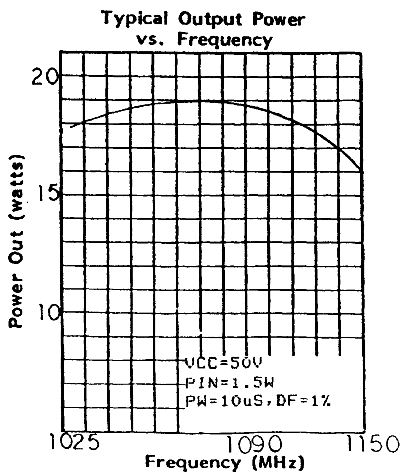
Note: Pulse Width = 10µSec, Duty Cycle = 1%

## TYPICAL PERFORMANCE

### POWER OUTPUT vs POWER INPUT

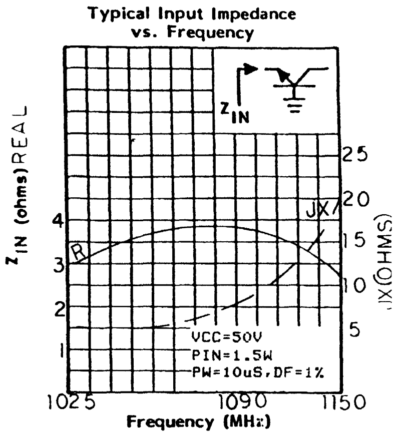



### POWER OUTPUT vs FREQUENCY

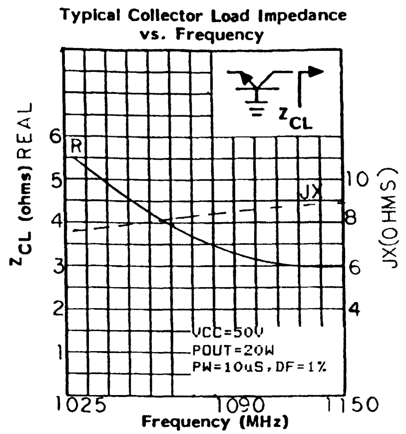


## IMPEDANCE DATA

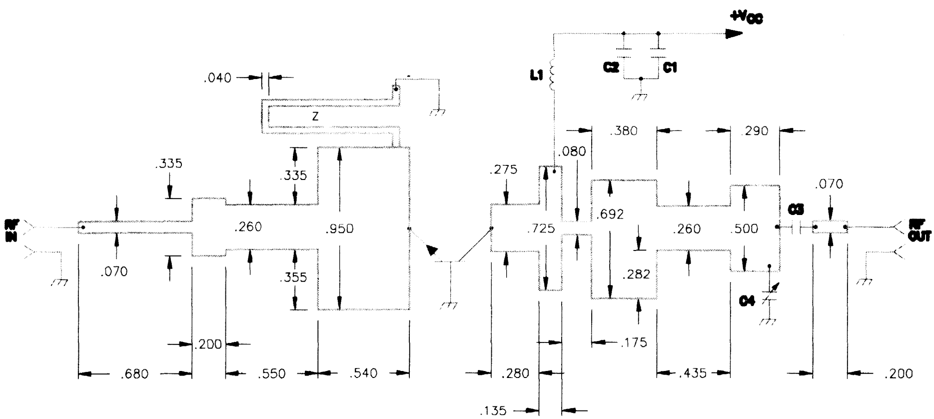
### TYPICAL INPUT IMPEDANCE




### TYPICAL COLLECTOR LOAD IMPEDANCE




## TEST CIRCUIT



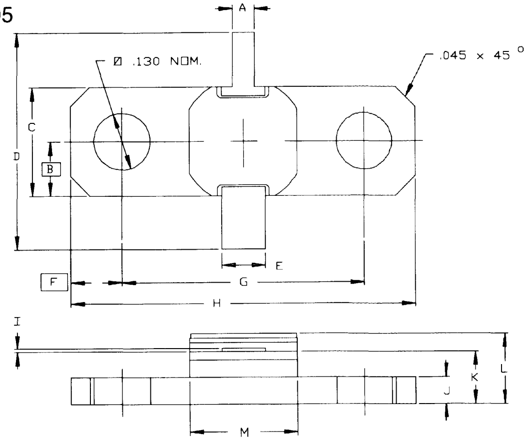

C1 : 1000µF Electrolytic
C2 : 680pF Chip Capacitor
C3 : 120pF Chip Capacitor
C4 : 0.6 - 4.5pF Johanson Gigatrim

L1 : 6 1/2 Turns, #22 AWG on a #30 Drill Bit
Z : Printed Transmission Line, Length = 1.91"

Board : Er = 2.5, .034" Thick
All Dimensions are in Inches.

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0105




| SGS-THOMSON MICROELECTRONIC | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .045/1,14 | .055/1,40 |
| B | .125/3,18 | |
| C | .245/6,22 | .255/6,48 |
| D | 1.235/31,37 | |
| E | .095/2,41 | .105/2,67 |
| F | .120/3,05 | |
| G | .557/14,15 | .567/14,40 |
| H | .795/20,19 | .805/20,45 |
| I | .002/0,05 | .006/0,15 |
| J | .057/1,45 | .067/1,70 |

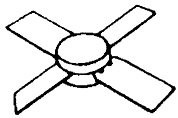
| CONT'D | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| K | .112/2,84 | .132/3,35 |
| L | | .175/4,45 |
| M | .245/6,22 | .257/6,53 |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

**SGS-THOMSON**
MICROELECTRONICS

# SD1530-01

## RF & MICROWAVE TRANSISTORS
## AVIONICS APPLICATIONS

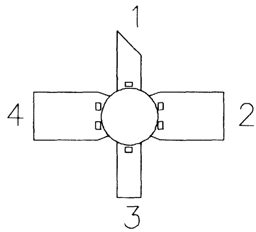
- DESIGNED FOR HIGH POWER PULSED IFF, DME, TACAN APPLICATIONS
- 40 WATTS (typ.) IFF 1030 - 1090 MHz
- 35 WATTS (min.) DME 1025 - 1150 MHz
- 25 WATTS (typ.) TACAN 960 - 1215 MHz
- 9.0 dB MIN. GAIN
- REFRACTORY GOLD METALLIZATION
- EMITTER BALLASTING AND LOW THERMAL RESISTANCE FOR RELIABILITY AND RUGGEDNESS
- INFINITE LOAD VSWR CAPABILITY AT SPECIFIED OPERATING CONDITIONS
- INPUT MATCHED, COMMON BASE CONFIGURATION



**.280 4LSL (M115)**
epoxy sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| SD1530-01 | 1530-1 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The SD1530-01 is a gold metallized silicon, NPN power transistor designed for applications requiring high peak power and low duty cycles such as IFF, DME and TACAN. The SD1530-01 is packaged in the .280" input matched stripline package resulting in improved broadband performance and a low thermal resistance.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 65 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 65 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.5 | V |
| $I_C$ | Device Current | 2.6 | A |
| $P_{DISS}$ | Power Dissipation | 87.5 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 2.0 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 20mA | $I_E$ = 0mA | 60 | — | — | V |
| $BV_{CES}$ | $I_C$ = 20mA | $V_{BE}$ = 0V | 60 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 2mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 50V | $I_E$ = 0mA | — | — | 2 | mA |

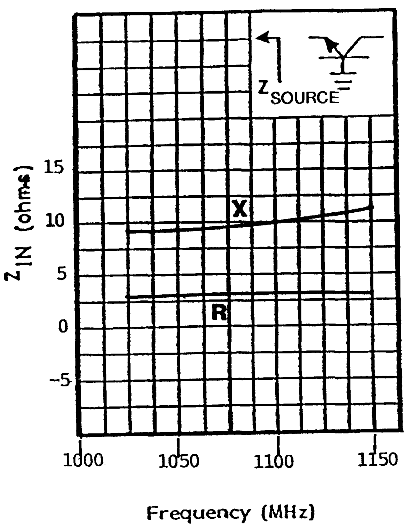
DYNAMIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1025 — 1150MHz | $P_{IN}$ = 5.6 W$V_{CE}$ = 50 V | 35 | — | — | W |
| $G_P$ | f = 1025 — 1150MHz | $P_{IN}$ = 5.6 W$V_{CE}$ = 50 V | 9.0 | — | — | dB |

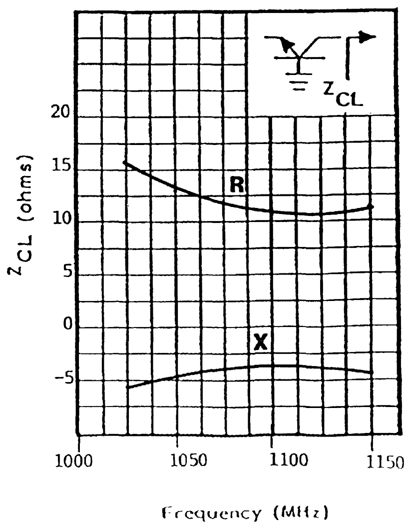
Note: Pulse Width = 10µSec, Duty Cycle = 1%
This device is suitable for use under other pulse width/duty cycle conditions.
Please contact the factory for specific applications assistance.

## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE



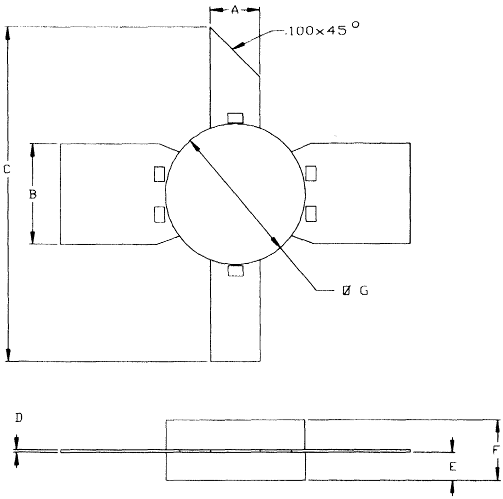

### TYPICAL COLLECTOR LOAD IMPEDANCE



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0115

| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .095/2,41 | .105/2,67 |
| B | .195/4,95 | .205/5,21 |
| C | 1.000/25,40 | |
| D | .004/0,10 | .007/0,18 |
| E | .050/1,27 | .065/1,65 |
| F | .120/3,05 | .135/3,43 |
| G | .275/6,99 | .285/7,21 |
| | | |
| | | |
| | | |

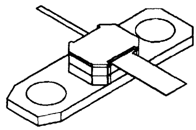


# SGS-THOMSON MICROELECTRONICS

# SD1530-08

## RF & MICROWAVE TRANSISTORS AVIONICS APPLICATIONS

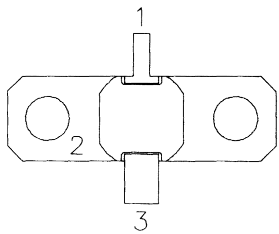
- DESIGNED FOR HIGH POWER PULSED IFF, DME, TACAN APPLICATIONS
- 40 WATTS (typ.) IFF 1030 - 1090 MHz
- 35 WATTS (min.) DME 1025 - 1150 MHz
- 25 WATTS (typ.) TACAN 960 - 1215 MHz
- 9.0 dB MIN. GAIN
- REFRACTORY GOLD METALLIZATION
- EMITTER BALLASTING AND LOW THERMAL RESISTANCE FOR RELIABILITY AND RUGGEDNESS
- INFINITE LOAD VSWR CAPABILITY AT SPECIFIED OPERATING CONDITIONS
- INPUT MATCHED, COMMON BASE CONFIGURATION



**.250 SQ. 2LFL (M105)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1530-08 | 1530-8 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter

### DESCRIPTION

The SD1530-08 is a gold metallized silicon, NPN power transistor designed for applications requiring high peak power and low duty cycles such as IFF, DME and TACAN. The SD1530-08 is packaged in the .250" input matched hermetic stripline flange package resulting in improved broadband performance and a low thermal resistance.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 65 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 65 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.5 | V |
| $I_C$ | Device Current | 2.6 | A |
| $P_{DISS}$ | Power Dissipation | 87.5 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | − 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 2.0 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 10mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{CES}$ | $I_C$ = 25mA | $V_{BE}$ = 0V | 65 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 50V | $I_E$ = 0mA | — | — | 5 | mA |

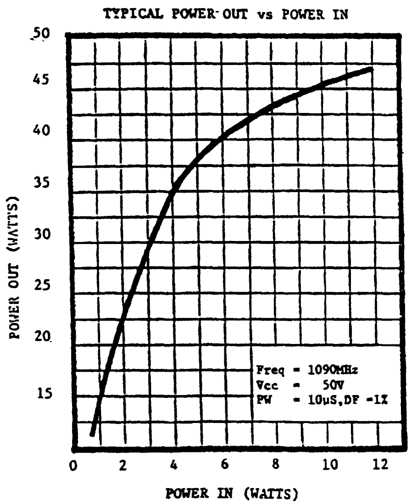
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1025 — 1150MHz | $P_{IN}$ = 5.0 W | $V_{CE}$ = 50 V | 35 | — | — | W |
| $G_P$ | f = 1025 — 1150MHz | $P_{IN}$ = 5.0 W | $V_{CE}$ = 50 V | 9.0 | — | — | dB |
| $\eta_C$ | f = 1025 — 1150MHz | $P_{IN}$ = 5.0 W | $V_{CE}$ = 50 V | 30 | — | — | % |

Note: Pulse Width = 10µSec, Duty Cycle = 1%
This device is suitable for use under other pulse width/duty cycle conditions.
Please contact the factory for specific applications assistance.

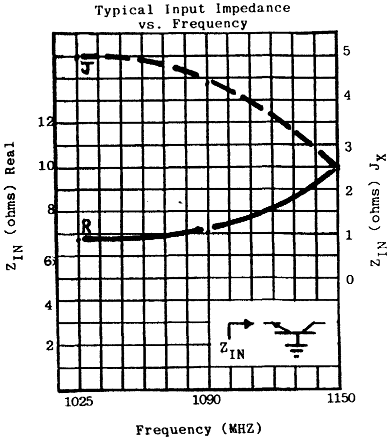
## TYPICAL PERFORMANCE

### POWER OUTPUT vs POWER INPUT

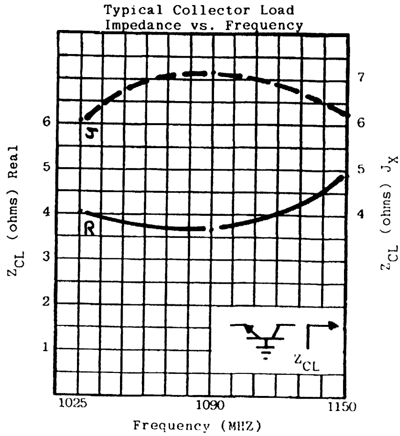


## IMPEDANCE DATA

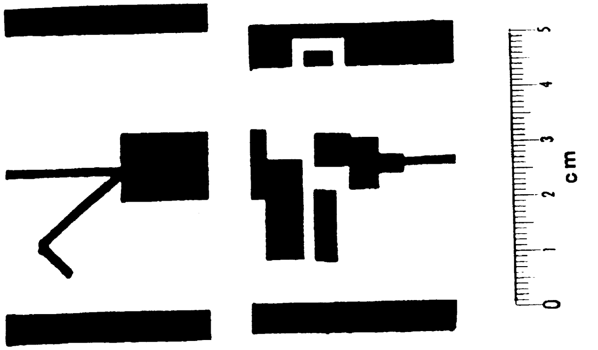
### TYPICAL INPUT IMPEDANCE

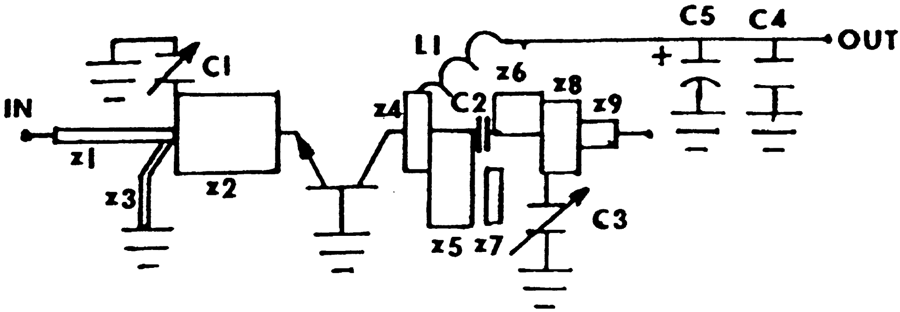



### TYPICAL COLLECTOR LOAD IMPEDANCE



## TEST CIRCUIT AND PC BOARD LAYOUT




C1, C3 : 0.6 - 4.5pF, Johanson Gigatrim
C2 : 470pF ATC Chip Capacitor
C4 : 1000pF ATC Chip Capacitor
C5 : 1000μF, 63V, Electrolytic Capacitor

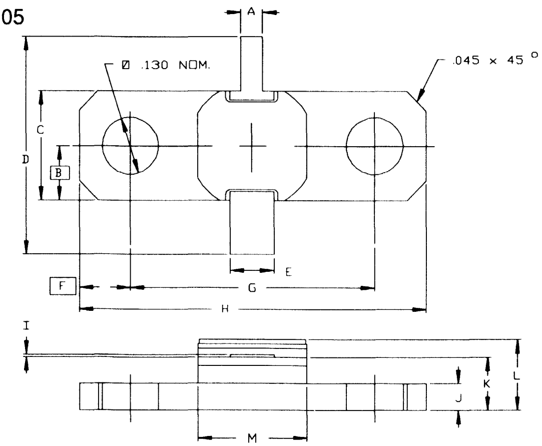
L1 : 4.5 Turns #22 AWG Wire

Z1 : 500mm Line
Z2 : .450" Wire Line Length .600"
Z3 : 50Ω Shunt Line

Z4 : .110" x .490"
Z5 : .250" x .700"
Z6 : .250" x .225"
Z7 : Ground
Z8 : .185" x .360"
Z9 : .180" x .120"

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0105

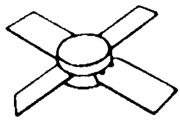



| SGS-THOMSON MICROELECTRONIC | | | CONT'D | | |
|---|---|---|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm | | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .045/1,14 | .055/1,40 | K | .112/2,84 | .132/3,35 |
| B | .125/3,18 | | L | | .175/4,45 |
| C | .245/6,22 | .255/6,48 | M | .245/6,22 | .257/6,53 |
| D | 1.235/31,37 | | | | |
| E | .095/2,41 | .105/2,67 | | | |
| F | .120/3,05 | | | | |
| G | .557/14,15 | .567/14,40 | | | |
| H | .795/20,19 | .805/20,45 | | | |
| I | .002/0,05 | .006/0,15 | | | |
| J | .057/1,45 | .067/1,70 | | | |

# SD1534-01

## RF & MICROWAVE TRANSISTORS AVIONICS APPLICATIONS

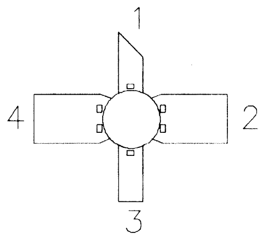
- DESIGNED FOR HIGH POWER PULSED IFF, DME, TACAN APPLICATIONS
- 80 WATTS (typ.) IFF 1030 - 1090 MHz
- 75 WATTS (min.) DME 1025 - 1150 MHz
- 50 WATTS (typ.) TACAN 960 - 1215 MHz
- 8.0 dB MIN. GAIN
- REFRACTORY GOLD METALLIZATION
- EMITTER BALLASTING AND LOW THERMAL RESISTANCE FOR RELIABILITY AND RUGGEDNESS
- INFINITE LOAD VSWR CAPABILITY AT SPECIFIED OPERATING CONDITIONS
- INPUT MATCHED, COMMON BASE CONFIGURATION



**.280 4LSL (M115)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1534-01 | 1534-1 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The SD1534-01 is a gold metallized silicon, NPN power transistor designed for applications requiring high peak power and low duty cycles such as IFF, DME and TACAN. The SD1534-01 is packaged in the .280" input matched stripline package resulting in improved broadband performance and a low thermal resistance.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 65 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 65 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.5 | V |
| $I_C$ | Device Current | 5.5 | A |
| $P_{DISS}$ | Power Dissipation | 218.7 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 0.8 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 10mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{CES}$ | $I_C$ = 25mA | $V_{BE}$ = 0V | 65 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 50V | $I_E$ = 0mA | — | — | 5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 100mA | 10 | — | — | — |

DYNAMIC

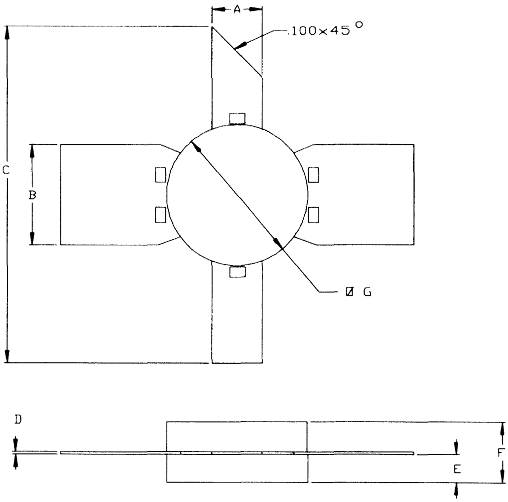
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1025 — 1150MHz | $P_{IN}$ = 13.0W | $V_{CE}$ = 50 V | 75 | — | — | W |
| $G_P$ | f = 1025 — 1150MHz | $P_{IN}$ = 13.0W | $V_{CE}$ = 50 V | 7.6 | — | — | dB |

Note: Pulse Width = 10µSec, Duty Cycle = 1%
This device is suitable for use under other pulse width/duty cycle conditions.
Please contact the factory for specific applications assistance.

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0115

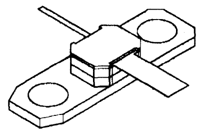
| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .095/2,41 | .105/2,67 |
| B | .195/4,95 | .205/5,21 |
| C | 1.000/25,40 | |
| D | .004/0,10 | .007/0,18 |
| E | .050/1,27 | .065/1,65 |
| F | .120/3,05 | .135/3,43 |
| G | .275/6,99 | .285/7,21 |
| | | |
| | | |
| | | |



# SD1534-08

## RF & MICROWAVE TRANSISTORS AVIONICS APPLICATIONS

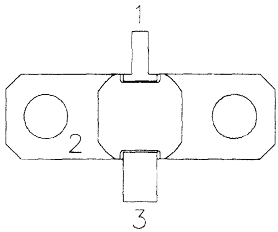
- DESIGNED FOR HIGH POWER PULSED IFF, DME, TACAN APPLICATIONS
- 80 WATTS (typ.) IFF 1030 - 1090 MHz
- 75 WATTS (min.) DME 1025 - 1150 MHz
- 50 WATTS (typ.) TACAN 960 - 1215 MHz
- 8.0 dB MIN. GAIN
- REFRACTORY GOLD METALLIZATION
- EMITTER BALLASTING AND LOW THERMAL RESISTANCE FOR RELIABILITY AND RUGGEDNESS
- INFINITE LOAD VSWR CAPABILITY AT SPECIFIED OPERATING CONDITIONS
- INPUT MATCHED, COMMON BASE CONFIGURATION



**.250 SQ. 2LFL (M105)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1534-08 | 1534-8 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter

### DESCRIPTION

The SD1534-08 is a gold metallized silicon, NPN power transistor designed for applications requiring high peak power and low duty cycles such as IFF, DME and TACAN. The SD1534-08 is packaged in the .280" input matched hermetic stripline flange package resulting in improved broadband performance and a low thermal resistance.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 65 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 65 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.5 | V |
| $I_C$ | Device Current | 5.5 | A |
| $P_{DISS}$ | Power Dissipation | 218.7 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 0.8 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case} = 25°C$)

### STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C = 10mA$ | $I_E = 0mA$ | 65 | — | — | V |
| $BV_{CES}$ | $I_C = 25mA$ | $V_{BE} = 0V$ | 65 | — | — | V |
| $BV_{EBO}$ | $I_E = 10mA$ | $I_C = 0mA$ | 3.5 | — | — | V |
| $I_{CES}$ | $V_{CE} = 50V$ | $I_E = 0mA$ | — | — | 5 | mA |
| $h_{FE}$ | $V_{CE} = 5V$ | $I_C = 100mA$ | 10 | — | 200 | — |

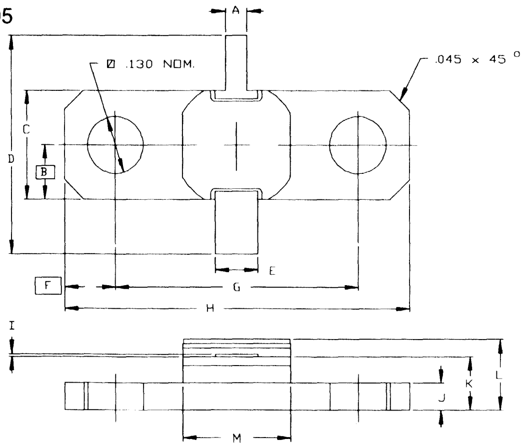
### DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1025 — 1150MHz | $P_{IN} = 13.5$ W | $V_{CE} = 50$ V | 75 | — | — | W |
| $G_P$ | f = 1025 — 1150MHz | $P_{IN} = 13.5$ W | $V_{CE} = 50$ V | 7.5 | — | — | dB |

Note: Pulse Width = 10µSec, Duty Cycle = 1%
This device is suitable for use under other pulse width/duty cycle conditions.
Please contact the factory for specific applications assistance.

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0105




| SGS-THOMSON MICROELECTRONIC | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .045/1,14 | .055/1,40 |
| B | .125/3,18 | |
| C | .245/6,22 | .255/6,48 |
| D | 1.235/31,37 | |
| E | .095/2,41 | .105/2,67 |
| F | .120/3,05 | |
| G | .557/14,15 | .567/14,40 |
| H | .795/20,19 | .805/20,45 |
| I | .002/0,05 | .006/0,15 |
| J | .057/1,45 | .067/1,70 |

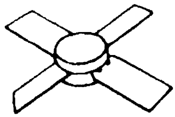
| CONT'D | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| K | .112/2,84 | .132/3,35 |
| L | | .175/4,45 |
| M | .245/6,22 | .257/6,53 |

SGS-THOMSON MICROELECTRONICS

# SD1536-03

## RF & MICROWAVE TRANSISTORS AVIONICS APPLICATIONS

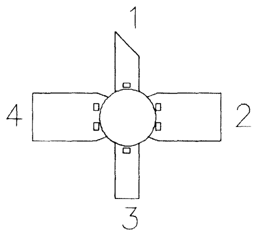
- DESIGNED FOR HIGH POWER PULSED IFF, DME, TACAN APPLICATIONS
- 100 WATTS (typ.) IFF 1030 - 1090 MHz
- 90 WATTS (min.) DME 1025 - 1150 MHz
- 90 WATTS (typ.) TACAN 960 - 1215 MHz
- 8.4 dB MIN. GAIN
- REFRACTORY GOLD METALLIZATION
- EMITTER BALLASTING AND LOW THERMAL RESISTANCE FOR RELIABILITY AND RUGGEDNESS
- INFINITE LOAD VSWR CAPABILITY AT SPECIFIED OPERATING CONDITIONS
- INPUT MATCHED, COMMON BASE CONFIGURATION



**.280 4LSL (M115)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1536-03 | 1536-3 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

## DESCRIPTION

The SD1536-03 is a gold metallized silicon, NPN power transistor designed for applications requiring high peak power and low duty cycles such as IFF, DME and TACAN. The SD1536-03 is packaged in the .280" input matched stripline package resulting in improved broadband performance and a low thermal resistance.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 65 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 65 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.5 | V |
| $I_C$ | Device Current | 10 | A |
| $P_{DISS}$ | Power Dissipation | 292 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 0.60 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case} = 25°C$)

### STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C = 10mA$ | $I_E = 0mA$ | 65 | — | — | V |
| $BV_{CER}$ | $I_C = 25mA$ | $R_{BE} = 10\Omega$ | 65 | — | — | V |
| $BV_{EBO}$ | $I_E = 1mA$ | $I_C = 0mA$ | 3.5 | — | — | V |
| $I_{CES}$ | $V_{CE} = 50V$ | $I_E = 0mA$ | — | — | 10 | mA |
| $h_{FE}$ | $V_{CE} = 5V$ | $I_C = 100mA$ | 5 | — | — | — |

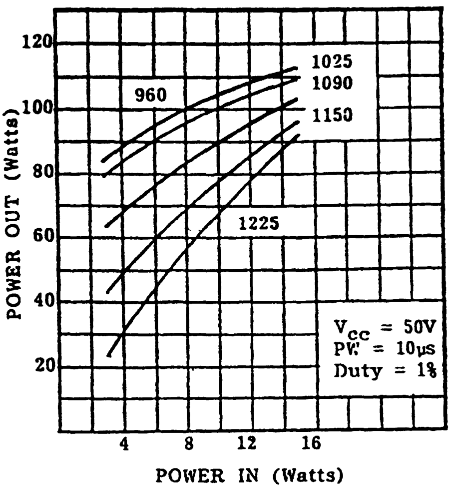
### DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1025 — 1150MHz | $P_{IN} = 13.0$ W | $V_{CE} = 50$ V | 90 | — | — | W |
| $G_P$ | f = 1025 — 1150MHz | $P_{IN} = 13.0$ W | $V_{CE} = 50$ V | 8.4 | — | — | dB |

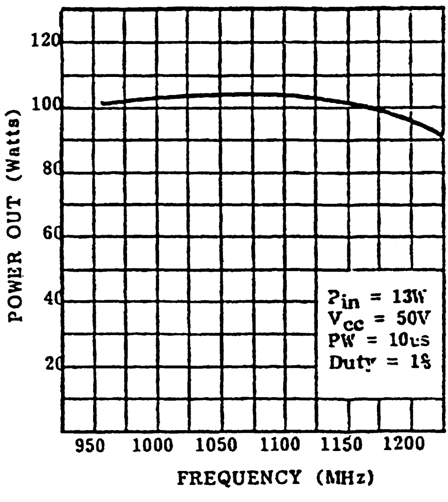
Note: Pulse Width = 10µSec, Duty Cycle = 1%
This device is suitable for use under other pulse width/duty cycle conditions
Please contact the factory for specific applications assistance.

## TYPICAL PERFORMANCE

### POWER OUTPUT vs POWER INPUT




### POWER OUTPUT vs FREQUENCY



## IMPEDANCE DATA

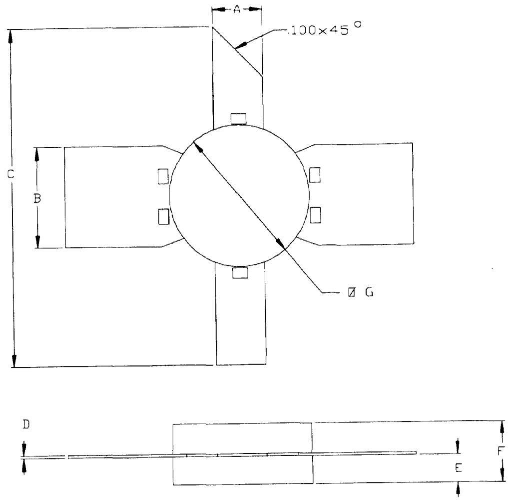
| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 960 MHz | 2.5 + j 13.0 | 4.6 − j 5.5 |
| 1030 MHz | 5.2 + j 15.0 | 5.0 − j 5.5 |
| 1090 MHz | 16.3 + j 15.0 | 4.8 − j 5.5 |
| 1150 MHz | 14.7 + j 2.5 | 4.7 − j 7.0 |
| 1215 MHz | 7.6 + j 0.5 | 4.7 − j 5.0 |

$P_{IN}$ = 13 W
$V_{CE}$ = 50 V
Pulse Width = 10μSec
Duty Cycle = 1%

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0115

| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .095/2,41 | .105/2,67 |
| B | .195/4,95 | .205/5,21 |
| C | 1.000/25,40 | |
| D | .004/0,10 | .007/0,18 |
| E | .050/1,27 | .065/1,65 |
| F | .120/3,05 | .135/3,43 |
| G | .275/6,99 | .285/7,21 |
| | | |
| | | |
| | | |

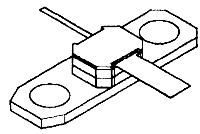


SGS-THOMSON MICROELECTRONICS

# SD1536-08

## RF & MICROWAVE TRANSISTORS AVIONICS APPLICATIONS

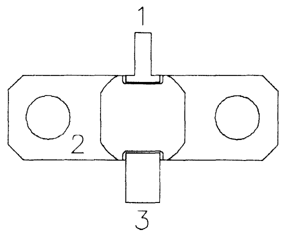
- DESIGNED FOR HIGH POWER PULSED IFF, DME, TACAN APPLICATIONS
- 100 WATTS (typ.) IFF 1030 - 1090 MHz
- 90 WATTS (min.) DME 1025 - 1150 MHz
- 90 WATTS (typ.) TACAN 960 - 1215 MHz
- 8.4 dB MIN. GAIN
- REFRACTORY GOLD METALLIZATION
- EMITTER BALLASTING AND LOW THERMAL RESISTANCE FOR RELIABILITY AND RUGGEDNESS
- INFINITE LOAD VSWR CAPABILITY AT SPECIFIED OPERATING CONDITIONS
- INPUT MATCHED, COMMON BASE CONFIGURATION



**.250 SQ. 2LFL (M105)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1536-08 | 1536-8 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter

### DESCRIPTION

The SD1536-08 is a gold metallized silicon, NPN power transistor designed for applications requiring high peak power and low duty cycles such as IFF, DME and TACAN. The SD1536-08 is packaged in the .250" input matched hermetic stripline flange package resulting in improved broadband performance and a low thermal resistance.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 65 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 65 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.5 | V |
| $I_C$ | Device Current | 10 | A |
| $P_{DISS}$ | Power Dissipation | 292 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 0.60 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 10mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{CER}$ | $I_C$ = 25mA | $R_{BE}$ = 10Ω | 65 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 50V | $I_E$ = 0mA | — | — | 10 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 100mA | 5 | — | — | — |

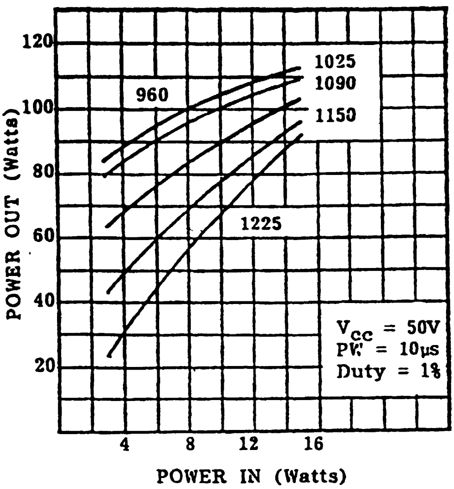
### DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 1025 — 1150MHz | $P_{IN}$ = 13.0 W | $V_{CE}$ = 50 V | 90 | — | — | W |
| $G_P$ | f = 1025 — 1150MHz | $P_{IN}$ = 13.0 W | $V_{CE}$ = 50 V | 8.4 | — | — | dB |

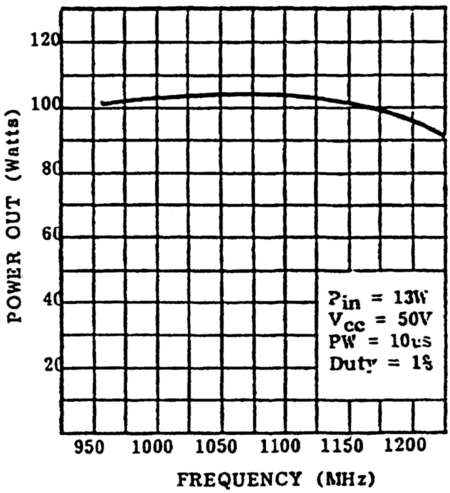
Note: Pulse Width = 10μSec, Duty Cycle = 1%
This device is suitable for use under other pulse width/duty cycle conditions
Please contact the factory for specific applications assistance.

## TYPICAL PERFORMANCE

### POWER OUTPUT vs POWER INPUT

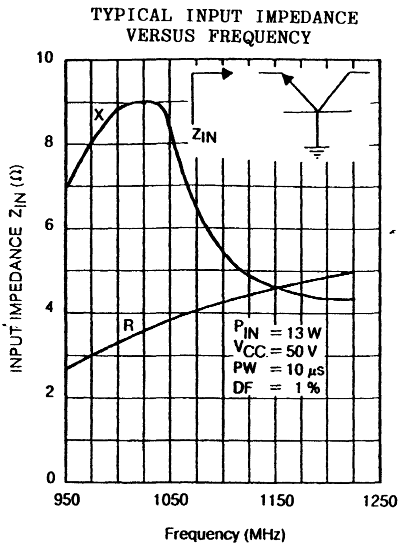



### POWER OUTPUT vs FREQUENCY

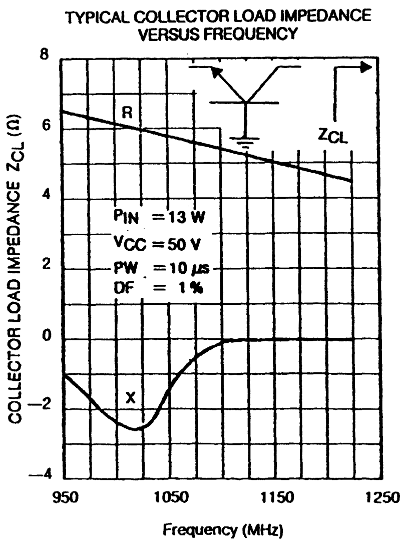


## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE

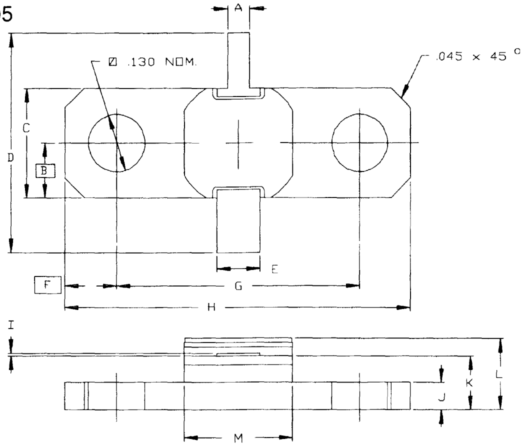



### TYPICAL COLLECTOR LOAD IMPEDANCE



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0105




| SGS-THOMSON MICROELECTRONIC | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .045/1,14 | .055/1,40 |
| B | .125/3,18 | |
| C | .245/6,22 | .255/6,48 |
| D | 1.235/31,37 | |
| E | .095/2,41 | .105/2,67 |
| F | .120/3,05 | |
| G | .557/14,15 | .567/14,40 |
| H | .795/20,19 | .805/20,45 |
| I | .002/0,05 | .006/0,15 |
| J | .057/1,45 | .067/1,70 |

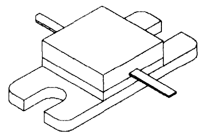
| CONT'D | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| K | .112/2,84 | .132/3,35 |
| L | | .175/4,45 |
| M | .245/6,22 | .257/6,53 |

SGS-THOMSON
MICROELECTRONICS

# SD1538-02

## RF & MICROWAVE TRANSISTORS AVIONICS APPLICATIONS

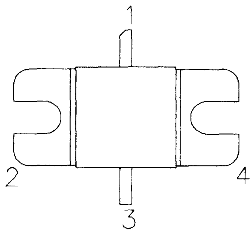
- DESIGNED FOR HIGH POWER PULSED IFF, DME, TACAN APPLICATIONS
- 200 WATTS (typ.) IFF 1030 - 1090 MHz
- 150 WATTS (min.) DME 1025 - 1150 MHz
- 140 WATTS (typ.) TACAN 960 - 1215 MHz
- 7.8 dB MIN. GAIN
- REFRACTORY GOLD METALLIZATION
- EMITTER BALLASTING AND LOW THERMAL RESISTANCE FOR RELIABILITY AND RUGGEDNESS
- 30:1 LOAD VSWR CAPABILITY AT SPECIFIED OPERATING CONDITIONS
- INPUT/OUTPUT MATCHED, COMMON BASE CONFIGURATION



**.400 SQ. 2LFL (M103)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1538-02 | SD1538-2 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The SD1538-02 is a gold metallized silicon, NPN power transistor designed for applications requiring high peak power and low duty cycles such as IFF, DME and TACAN. The SD1538-02 is packaged in a metal/ceramic package with internal input/output matching resulting in improved broadband performance and a low thermal resistance.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 65 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 65 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.5 | V |
| $I_C$ | Device Current | 11.0 | A |
| $P_{DISS}$ | Power Dissipation | 583 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 0.30 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 10mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{CES}$ | $I_C$ = 25mA | $V_{BE}$ = 0V | 65 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 5mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 50V | $I_E$ = 0mA | — | — | 10 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 300mA | 5 | — | — | — |

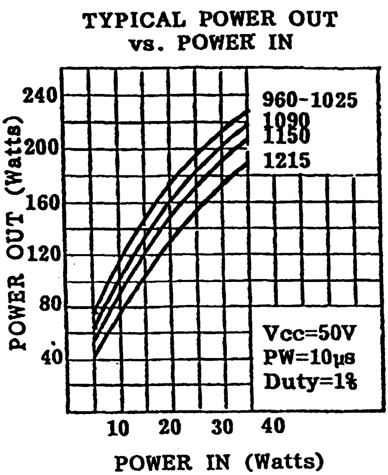
### DYNAMIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1025 — 1150MHz | $P_{IN}$ = 25.0 W$V_{CE}$ = | 5050 | — | — | W |
| $G_P$ | f = 1025 — 1150MHz | $P_{IN}$ = 25.0 W$V_{CE}$ = | 50.8 | — | — | dB |

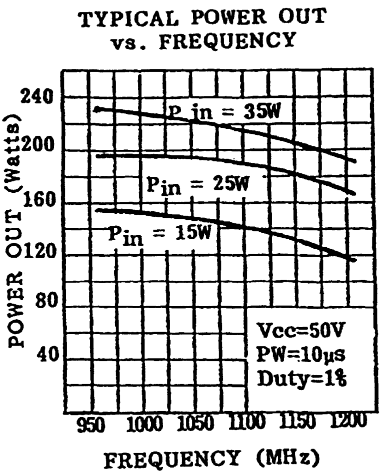
Note: Pulse Width = 10µSec, Duty Cycle = 1%
This device is suitable for use under other pulse width/duty cycle conditions.
Please contact the factory for specific applications assistance.

## TYPICAL PERFORMANCE

### POWER OUTPUT vs POWER INPUT

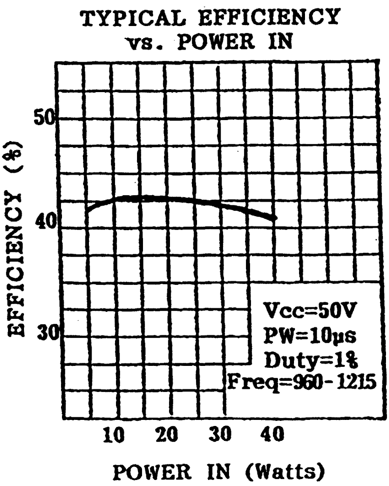



### POWER OUTPUT vs FREQUENCY

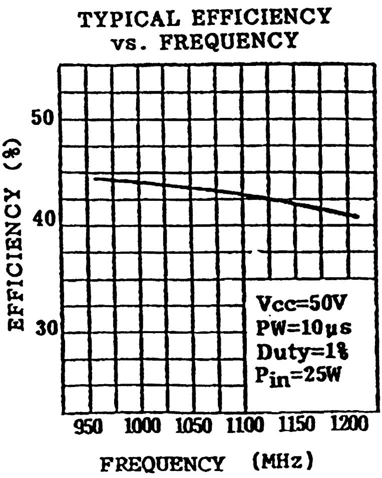


## TYPICAL PERFORMANCE (cont'd)

### EFFICIENCY vs POWER INPUT

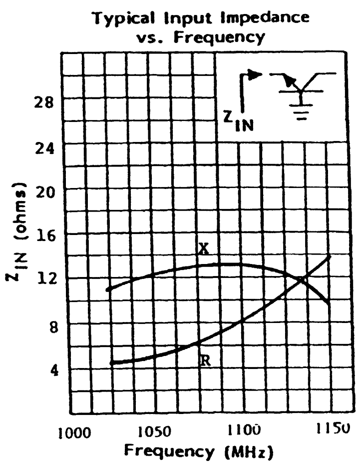



### EFFICIENCY vs FREQUENCY

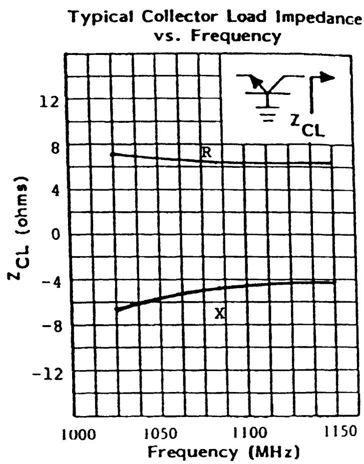



## IMPEDANCE DATA

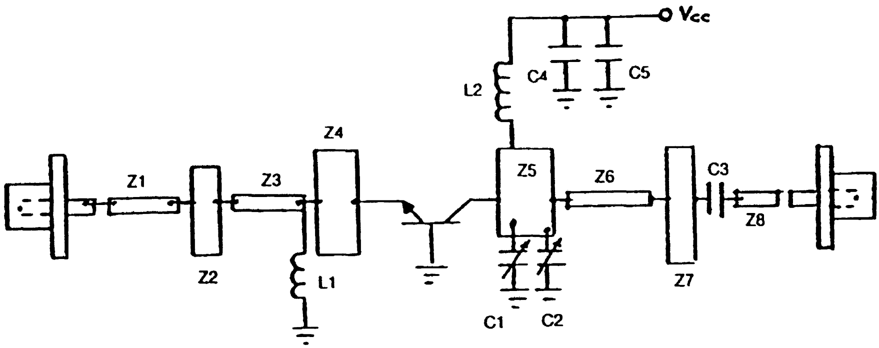
### TYPICAL INPUT IMPEDANCE




### TYPICAL COLLECTOR LOAD IMPEDANCE

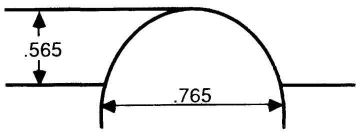


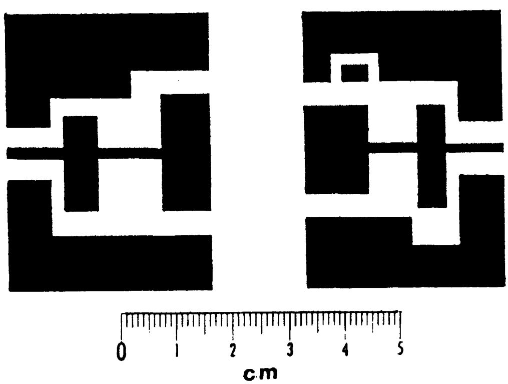
## TEST CIRCUIT AND PC BOARD LAYOUT




| | | |
|---|---|---|
| C1, C2 | : | .6 - 4.5pF Gigatrim |
| C3 | : | .100 x .100 120pF Chip Capacitor |
| C4 | : | .100 x .100 470pF Chip Capacitor |
| C5 | : | 100mF Electrolytic |
| L1 | : | #20 AWG |
| L2 | : | 3 Turns, #20 AWG Wound on #32 Drill Bit |

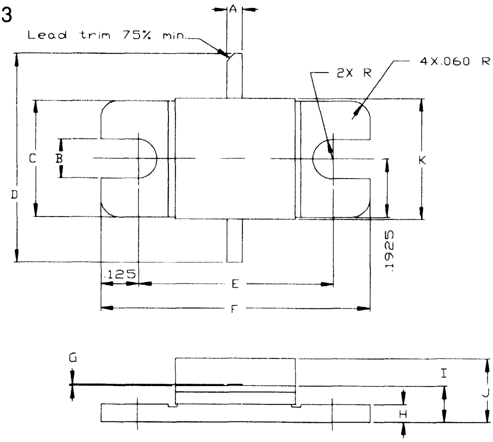
| | | |
|---|---|---|
| Z1 | : | .195 x .415 |
| Z2 | : | .685 x .230 |
| Z3 | : | .080 x .105 |
| Z4 | : | .845 x .345 |
| Z5 | : | .640 x .470 |
| Z6 | : | .070 x .405 |
| Z7 | : | .740 x .180 |
| Z8 | : | .50 x .325 |



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0103



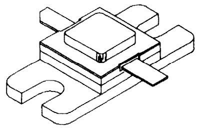

| SGS-THOMSON MICROELECTRONICS | MINIMUM Inches/mm | MAXIMUM Inches/mm |
|---|---|---|
| A | .045/1,14 | .055/1,40 |
| B | .130/3,30 | |
| C | .380/ 9,65 | .390/ 9,91 |
| D | .880/22,35 | .920/23,37 |
| E | .645/16,38 | .655/16,64 |
| F | .890/22,61 | .910/23,11 |
| G | .002/0,05 | .006/0,15 |
| H | .055/1,40 | .065/1,65 |
| I | .110/2,79 | .130/3,30 |
| J | .190/4,83 | .215/5,46 |

| CONT'D | MINIMUM Inches/mm | MAXIMUM Inches/mm |
|---|---|---|
| K | .390/9,91 | .410/10,41 |

# SD1538-08

## RF & MICROWAVE TRANSISTORS AVIONICS APPLICATIONS

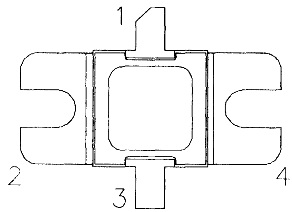
- DESIGNED FOR HIGH POWER PULSE IFF, DME, AND TACAN APPLICATIONS
- 200 W (typ.) IFF 1030 - 1090 MHz
- 150 W (min.) DME 1025 - 1150 MHz
- 140 W (typ.) TACAN 960 - 1215 MHz
- 8.2 dB MIN. GAIN
- REFRACTORY GOLD METALLIZATION
- BALLASTING AND LOW THERMAL RESISTANCE FOR RELIABILITY AND RUGGEDNESS
- 30:1 LOAD VSWR CAPABILITY AT SPECIFIED OPERATING CONDITIONS
- INPUT AND OUTPUT MATCHED, COMMON BASE CONFIGURATION



**.400 x .400 2LFL (M138)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1538-08 | 1538-8 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The SD1538-08 is a gold metallized, silicon NPN power transistor. The SD1538-08 is designed for applications requiring high peak power and low duty cycles such as IFF, DME and TACAN. The SD1538-08 is packaged in a metal/ceramic package with internal input/output matching, resulting in improved broadband performance and low thermal resistance.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 65 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 65 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.5 | V |
| $I_C$ | Device Current | 11 | A |
| $P_{DISS}$ | Power Dissipation | 583 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 0.30 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 10mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{CES}$ | $I_C$ = 25mA | $V_{BE}$ = 0V | 65 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 5mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 50V | $I_E$ = 0mA | — | — | 10 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 300mA | 5 | — | — | — |

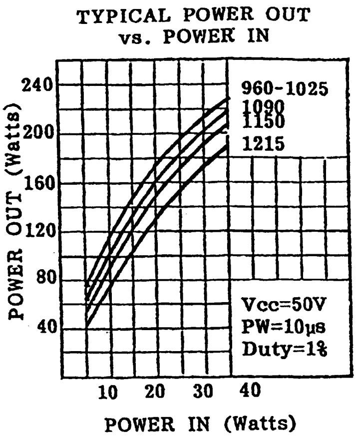
### DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 1025 — 1150MHz | $P_{IN}$ = 25 W | $V_{CE}$ = 50 V | 150 | — | — | W |
| $G_P$ | f = 1025 — 1150MHz | $P_{IN}$ = 25 W | $V_{CE}$ = 50 V | 8.2 | — | — | dB |

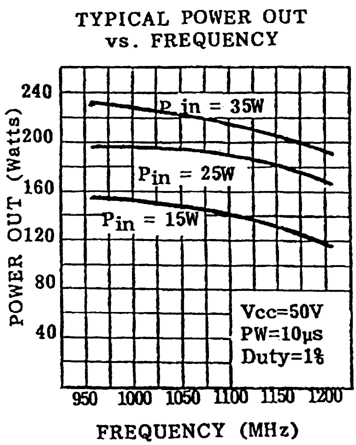
Note: Pulse Width = 10µSec, Duty Cyle = 1%

## TYPICAL PERFORMANCE

### POWER OUTPUT vs POWER INPUT

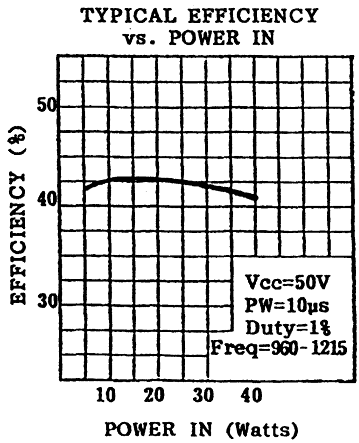



### POWER OUTPUT vs FREQUENCY

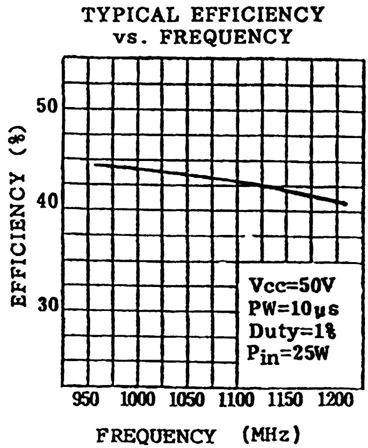


## TYPICAL PERFORMANCE (cont'd)

### EFFICIENCY vs POWER INPUT

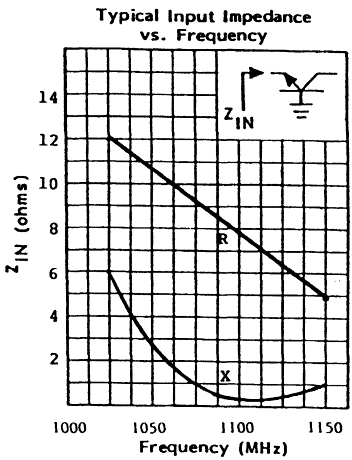



### EFFICIENCY vs FREQUENCY

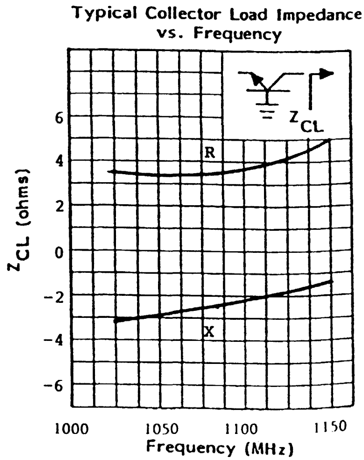



## IMPEDANCE DATA

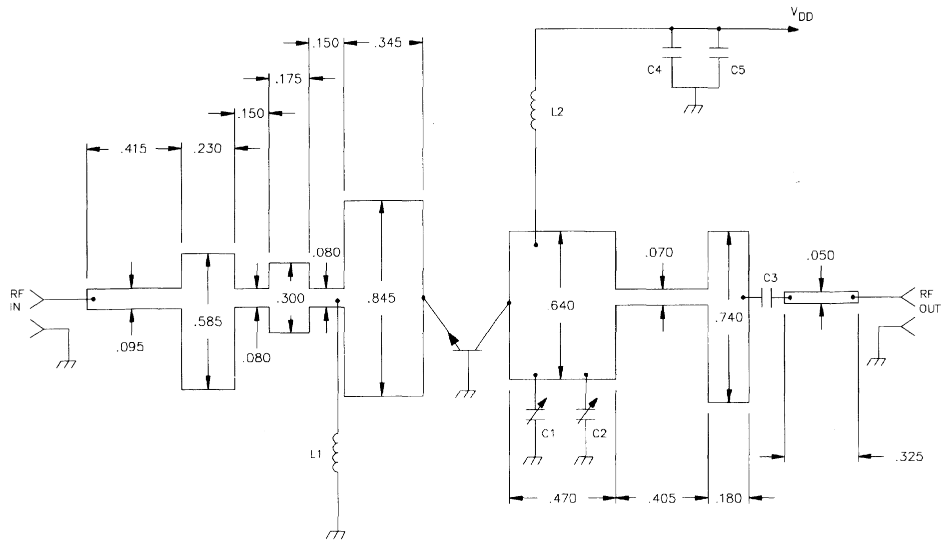
### TYPICAL INPUT IMPEDANCE




### TYPICAL COLLECTOR LOAD IMPEDANCE



## TEST CIRCUIT

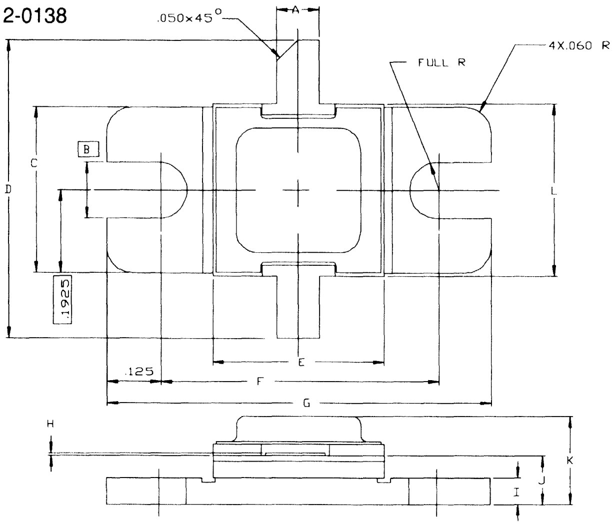



C1, C2 : .6 - 4.5pF Gigatrim
C3 : .100 x .100 120pF Chip Capacitor
C4 : .100 x .100 470pF Chip Capacitor
C5 : 100μF Electrolytic

L1 : #20 AWG
L2 : 3 Turns, #20 AWG Wound on #32 Drill Bit

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0138




| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .095/2,41 | .105/2,67 |
| B | .125/3,18 | |
| C | .380/9,65 | .390/9,91 |
| D | .780/19,81 | |
| E | .392/9,96 | .408/10,36 |
| F | .645/16,38 | .655/16,64 |
| G | .895/22,73 | .905/22,99 |
| H | .002/0,05 | .006/0,15 |
| I | .055/1,40 | .065/1,65 |
| J | .105/2,67 | .130/3,30 |

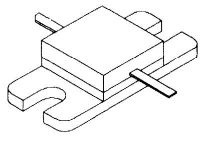
| CONT'D | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| K | | .230/5,84 |
| L | .392/9,96 | .408/10,36 |

SGS-THOMSON
MICROELECTRONICS

# SD1540

## RF & MICROWAVE TRANSISTORS AVIONICS APPLICATIONS

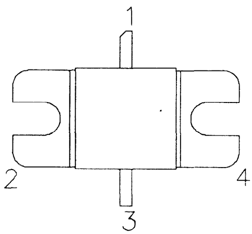
- DESIGNED FOR HIGH POWER PULSED IFF, DME, TACAN APPLICATIONS
- 350 WATTS (typ.) IFF 1030 - 1090 MHz
- 300 WATTS (min.) DME 1025 - 1150 MHz
- 2900 WATTS (typ.) TACAN 960 - 1215 MHz
- 6.3 dB MIN. GAIN
- REFRACTORY GOLD METALLIZATION
- EMITTER BALLASTING AND LOW THERMAL RESISTANCE FOR RELIABILITY AND RUGGEDNESS
- 30:1 LOAD VSWR CAPABILITY AT SPECIFIED OPERATING CONDITIONS
- INPUT/OUTPUT MATCHED, COMMON BASE CONFIGURATION



**.400 SQ. 2LFL (M103)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1540 | SD1540 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

## DESCRIPTION

The SD1540 is a gold metallized silicon, NPN power transistor designed for applications requiring high peak power and low duty cycles such as IFF, DME and TACAN. The SD1540 is packaged in a metal/ceramic package with internal input/output matching resulting in improved broadband performance and a low thermal resistance.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 65 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 65 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.5 | V |
| $I_C$ | Device Current | 22 | A |
| $P_{DISS}$ | Power Dissipation | 875 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | − 65 to +150 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 0.20 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 10mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 5mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 50V | $I_E$ = 0mA | — | — | 25 | mA |

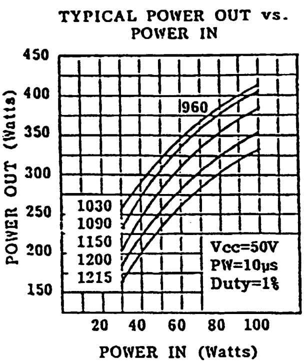
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1025 — 1150MHz | $P_{IN}$ = 70 W | $V_{CE}$ = 50 V | 300 | — | — | W |
| $G_P$ | f = 1025 — 1150MHz | $P_{IN}$ = 70 W | $V_{CE}$ = 50 V | 6.3 | — | — | dB |

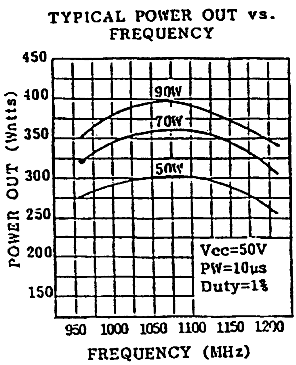
Note: Pulse Width = 10µSec, Duty Cycle = 1%
This device is suitable for use under other pulse width/duty cycle conditions.
Please contact the factory for specific applications asistance.

## TYPICAL PERFORMANCE

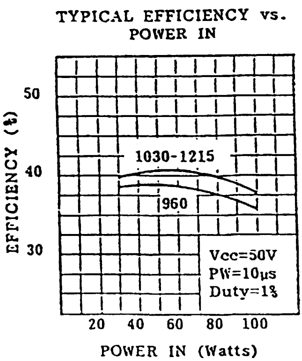
### POWER OUTPUT vs POWER INPUT



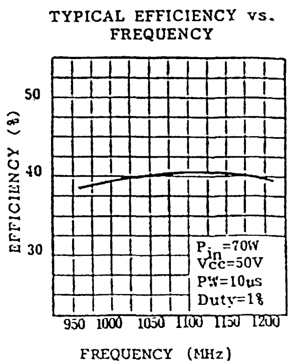

### POWER OUTPUT vs FREQUENCY




### EFFICIENCY vs POWER INPUT

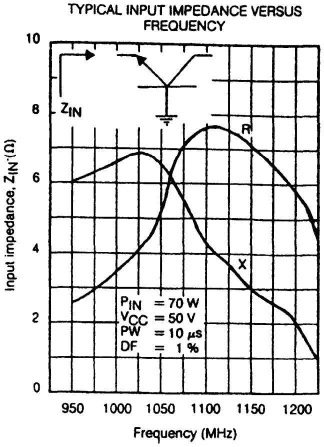



### EFFICIENCY vs FREQUENCY

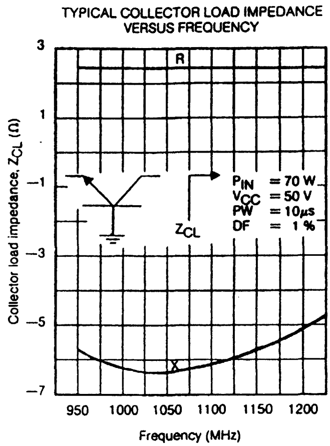


## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE

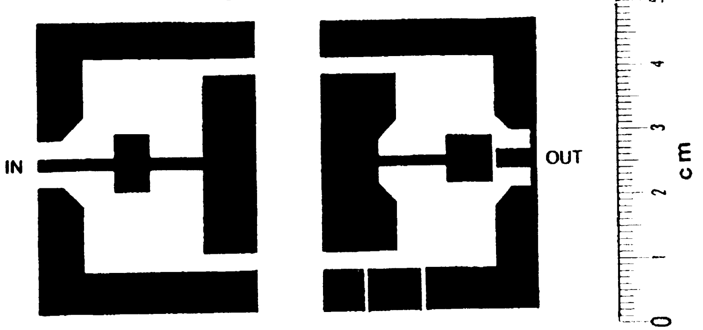


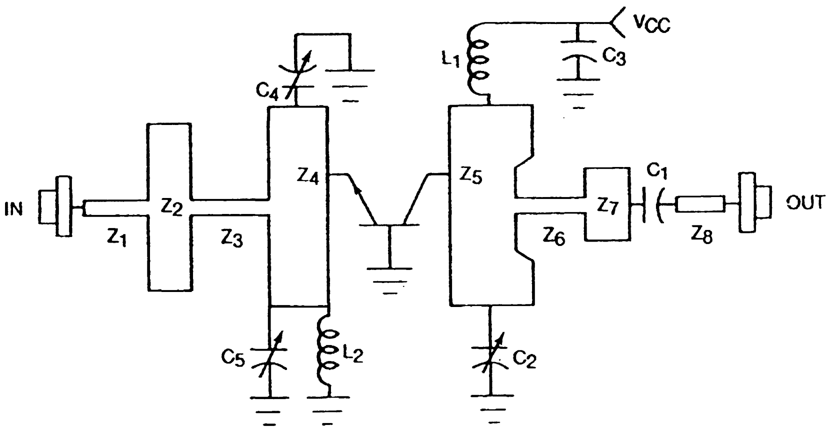

### TYPICAL COLLECTOR LOAD IMPEDANCE



## TEST CIRCUIT

Teflon Fiberglass $\varepsilon_r$ = 2.5 THK .031



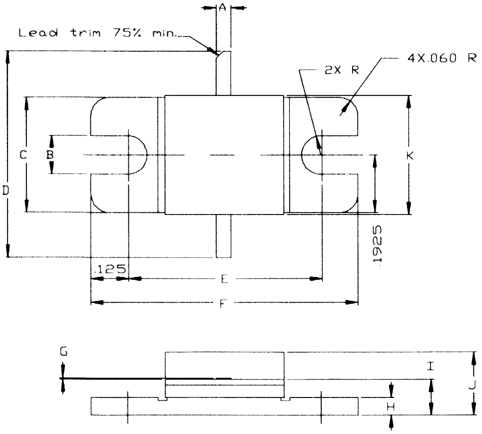

All Dimension are in Inches

| | | |
|---|---|---|
| C1 | : | 100pF Chip Capacitor Across .120 Sq. Gap |
| C2 | : | .6 - 4.5pF JOHANSON |
| C3 | : | 470pF Chip Capacitor Across .120 Sq. Gap |
| C4, C5 | : | .35 - 3.5pF |
| L1 | : | 2 3/4 Turns Diameter 16 Tinned .125 I.D. .215 Long |
| L2 | : | 2 3/4 Turns Diameter 20 Tinned .090 I.D. .220 Long |

| | | |
|---|---|---|
| Z1 | : | .395 x .083 |
| Z2 | : | .250 x .340 |
| Z3 | : | .495 x .083 |
| Z4 | : | .360 x 1.193 |
| Z5 | : | .485 x 1.2 |
| Z6 | : | .520 x .035 |
| Z7 | : | .270 x .330 |
| Z8 | : | .270 x .110 |

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0103



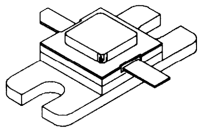

| SGS-THOMSON MICROELECTRONICS | | | CONT'D | | |
|---|---|---|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm | | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .045/1,14 | .055/1,40 | K | .390/9,91 | .410/10,41 |
| B | .130/3,30 | | | | |
| C | .380/ 9,65 | .390/ 9,91 | | | |
| D | .880/22,35 | .920/23,37 | | | |
| E | .645/16,38 | .655/16,64 | | | |
| F | .890/22,61 | .910/23,11 | | | |
| G | .002/0,05 | .006/0,15 | | | |
| H | .055/1,40 | .065/1,65 | | | |
| I | .110/2,79 | .130/3,30 | | | |
| J | .190/4,83 | .215/5,46 | | | |

SGS-THOMSON MICROELECTRONICS

# SD1540-08

## RF & MICROWAVE TRANSISTORS AVIONICS APPLICATIONS

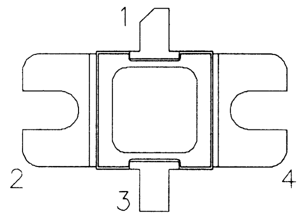
- DESIGNED FOR HIGH POWER PULSED IFF, DME, TACAN APPLICATIONS
- 350 WATTS (typ.) IFF 1030 - 1090 MHz
- 300 WATTS (min.) DME 1025 - 1150 MHz
- 290 WATTS (typ.) TACAN 960 - 1215 MHz
- 6.3 dB MIN. GAIN
- REFRACTORY GOLD METALLIZATION
- EMITTER BALLASTING AND LOW THERMAL RESISTANCE FOR RELIABILITY AND RUGGEDNESS
- 20:1 LOAD VSWR CAPABILITY AT SPECIFIED OPERATING CONDITIONS
- INPUT/OUTPUT MATCHED, COMMON BASE CONFIGURATION



**.400 x .400. 2LFL (M138)**
hermetically sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| SD1540-08 | SD1540-8 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The SD1540-08 is a gold metallized silicon, NPN power transistor designed for applications requiring high peak power and low duty cycles such as IFF, DME and TACAN. The SD1540 is packaged in a metal/ceramic package with internal input/output matching resulting in improved broadband performance and a low thermal resistance.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 65 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 65 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.5 | V |
| $I_C$ | Device Current | 22 | A |
| $P_{DISS}$ | Power Dissipation | 875 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 0.20 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 10mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{CES}$ | $I_C$ = 25mA | $V_{BE}$ = 0V | 65 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 5mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 50V | $I_E$ = 0mA | — | — | 25 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1A | 10 | — | — | — |

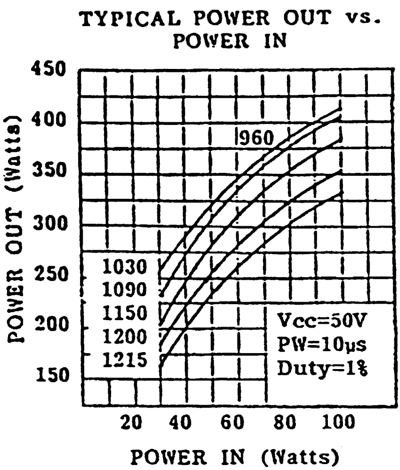
DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 1025 — 1150MHz | $P_{IN}$ = 70 W | $V_{CE}$ = 50 V | 300 | — | — | W |
| $G_P$ | f = 1025 — 1150MHz | $P_{IN}$ = 70 W | $V_{CE}$ = 50 V | 6.3 | — | — | dB |
| $\eta_C$ | f = 1025 — 1150MHz | $P_{IN}$ = 70 W | $V_{CE}$ = 50 V | 35 | — | — | % |

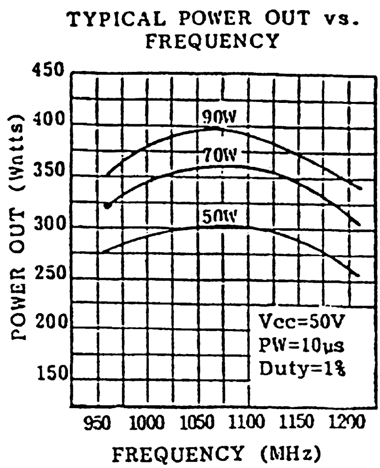
Note: Pulse Width = 10µSec, Duty Cycle = 1%
This device is suitable for use under other pulse width/duty cycle conditions.
Please contact the factory for specific applications assistance.

## TYPICAL PERFORMANCE

### POWER OUTPUT vs POWER INPUT

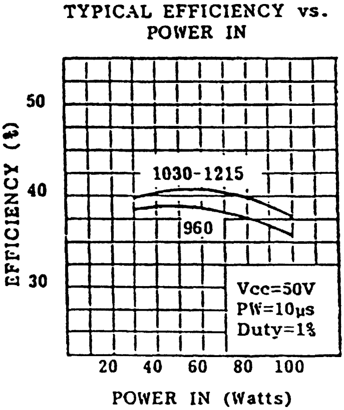



### POWER OUTPUT vs FREQUENCY

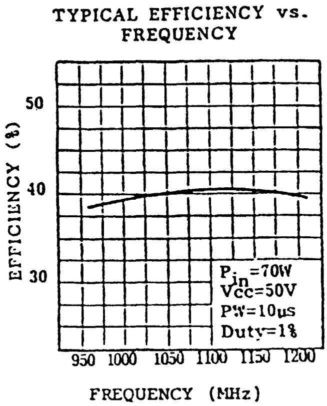


## TYPICAL PERFORMANCE (cont'd)

### EFFICIENCY vs POWER INPUT

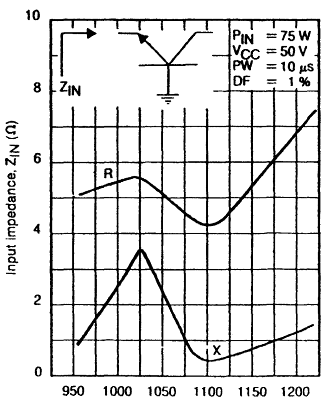



### EFFICIENCY vs FREQUENCY



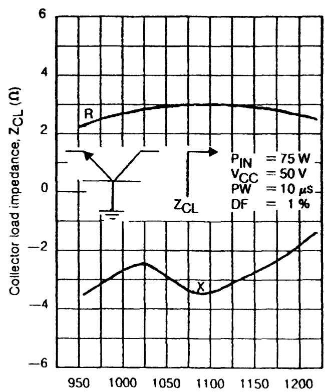

## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE




TYPICAL INPUT IMPEDANCE VERSUS FREQUENCY

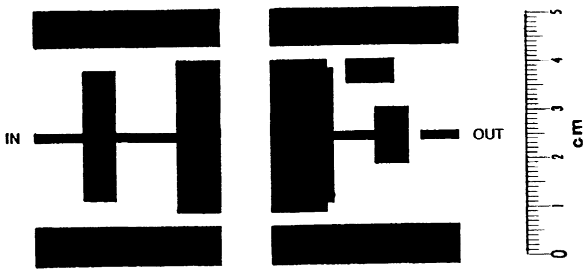
### TYPICAL COLLECTOR LOAD IMPEDANCE

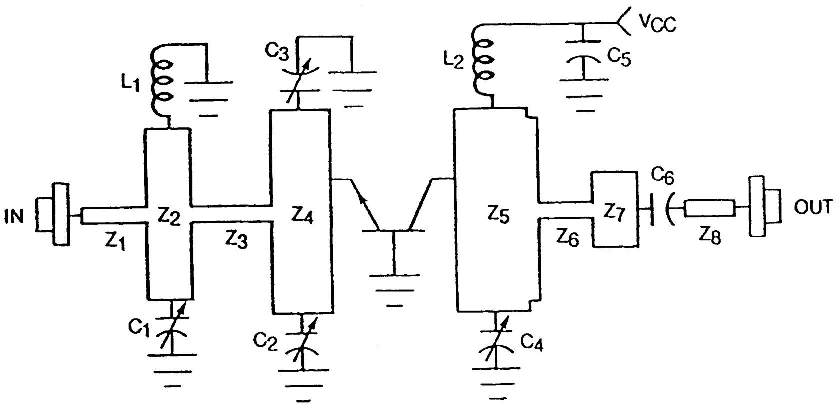



TYPICAL COLLECTOR LOAD IMPEDANCE VERSUS FREQUENCY

## TEST CIRCUIT

Teflon Fiberglass $\varepsilon_r$ = 2.5 THK .031



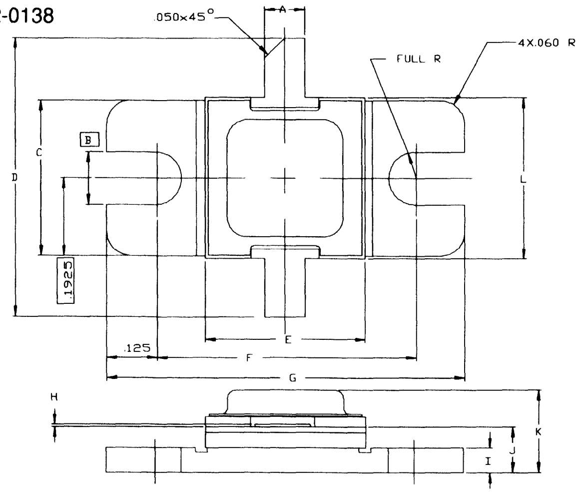

All Dimension are in Inches

| | | |
|---|---|---|
| C1,C2. C3, C4 | : | .6 - 4.5pF JOHANSON Gigatrim |
| C5 | : | 1000µF, 63V, Electrolytic |
| C6 | : | 100pF Chip Capacitor Across .090 Gap |
| L1 | : | 2 Turns #24 .12 I.D., Spaced Wire Diameter |
| L2 | : | 4 Turns #24, .07 I.D., Spaced Wire Diameter |

| | | |
|---|---|---|
| Z1 | : | .404 x .075 |
| Z2 | : | .263 x .995 |
| Z3 | : | .483 x .077 |
| Z4 | : | .350 x 1.203 |
| Z5 | : | .505 x 1.200 with Two Notches .05 Long By .068 Wide |
| Z6 | : | .335 x .076 |
| Z7 | : | .260 x .442 |
| Z8 | : | .310 x .082 |

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0138




| SGS-THOMSON MICROELECTRONICS | MINIMUM Inches/mm | MAXIMUM Inches/mm |
|---|---|---|
| A | .095/2,41 | .105/2,67 |
| B | .125/3,18 | |
| C | .380/9,65 | .390/9,91 |
| D | .780/19,81 | |
| E | .392/9,96 | .408/10,36 |
| F | .645/16,38 | .655/16,64 |
| G | .895/22,73 | .905/22,99 |
| H | .002/0,05 | .006/0,15 |
| I | .055/1,40 | .065/1,65 |
| J | .105/2,67 | .130/3,30 |

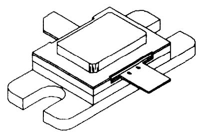
| CONT'D | MINIMUM Inches/mm | MAXIMUM Inches/mm |
|---|---|---|
| K | | .230/5,84 |
| L | .392/9,96 | .408/10,36 |

SGS-THOMSON MICROELECTRONICS

# SD1541-01

## RF & MICROWAVE TRANSISTORS AVIONICS APPLICATIONS

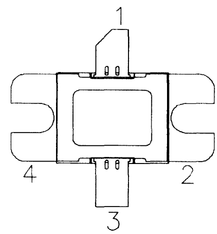
- DESIGNED FOR HIGH POWER PULSED IFF AND DME APPLICATIONS
- 400 (min.) DME 1025 - 1150 MHz
- 6.5 dB MIN. GAIN
- REFRACTORY GOLD METALLIZATION
- EMITTER BALLASTING AND LOW THERMAL RESISTANCE FOR RELIABILITY AND RUGGEDNESS
- 30:1 LOAD VSWR CAPABILITY AT SPECIFICIED OPERATING CONDITIONS
- INPUT/OUTPUT MATCHED, COMMON BASE CONFIGURATION



**.400 x .500 2LFL (M112)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1541-01 | SD1541-1 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

## DESCRIPTION

The SD1541-01 is a hermetically sealed, gold metallized, silicon NPN power transistor. The SD1541-01 is designed for applications requiring high peak power and low duty cycles such as DME. The SD1541-01 is packaged in a hermetic metal/ceramic package with internal input/output matching, resulting in improved broadband performance and a low thermal resistance.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 65 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 65 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.5 | V |
| $I_C$ | Device Current | 22 | A |
| $P_{DISS}$ | Power Dissipation | 1458 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 0.12 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 25mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{CES}$ | $I_C$ = 50mA | $V_{BE}$ = 0V | 65 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 50V | $I_E$ = 0mA | — | — | 25 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = .25A | 5 | — | 200 | — |

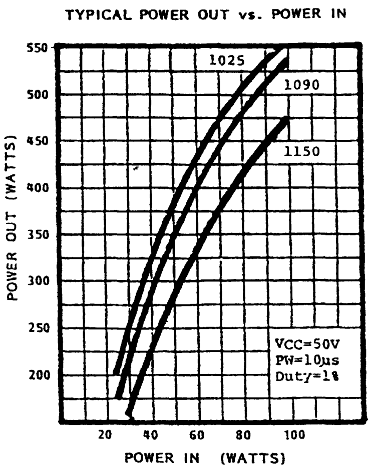
DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 1025 — 1150MHz | $P_{IN}$ = 90 W | $V_{CE}$ = 50 V | 400 | — | — | W |
| $G_P$ | f = 1025 — 1150MHz | $P_{IN}$ = 90 W | $V_{CE}$ = 50 V | 6.5 | — | — | dB |

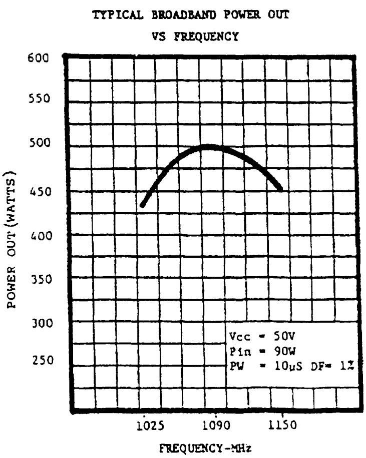
Note: Pulse Width = 10µSec, Duty Cycle = 1%
This device is suitable for use under other pulse width/duty cycle conditions.
Please contact the factory for specific applications assistance.

## TYPICAL PERFORMANCE

### POWER OUTPUT vs POWER INPUT



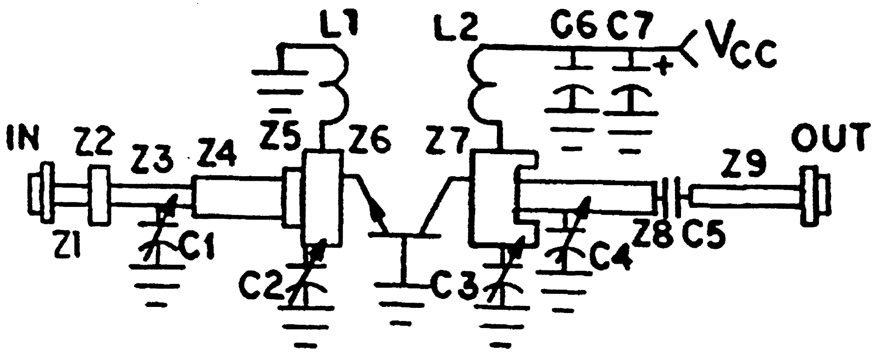

### POWER OUTPUT vs FREQUENCY



## IMPEDANCE DATA

| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 1020 MHz | 2.898 + j 4.1 | 1.382 − j 3.2 |
| 1090 MHz | 2.325 + j 3.4 | 1.338 − j 2.8 |
| 1150 MHz | 1.994 + j 2.8 | 1.269 − j 2.5 |

## TEST CIRCUIT




All Dimensions in Inches Unless Otherwise specified

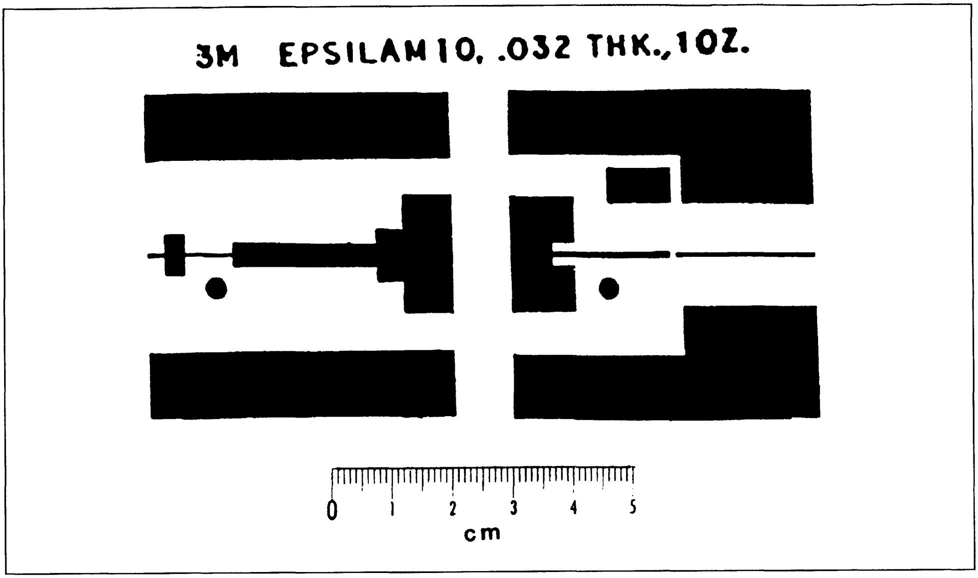
C1 : 0.4 - 2.5pF Johanson Gigatrim
C2, C3,
C4 : 0.6 - 4.5pF Johanson Gigatrim
C5 : 82pF Chip Capacitor, .055 Sq.

L1 : Loop, #18 Tinned, .36 Wide x .27 above Circuit
L2 : 4 3/4 Turns, #24 En., C.W., .075 I.D.

Z1 : 50Ω(.02 Wide)
Z2 : .250 x .120
Z3 : 50Ω .020 x .330; C1 tapped .15 from Load
Z4 : .145 x .920
Z5 : .325 x .180
Z6 : .730 x .315
Z7 : .710 x .425 with .140 x .150 cutout
Z8 : .35 x .780; C4 Tapped .36 from Cen
Z9 : 50Ω

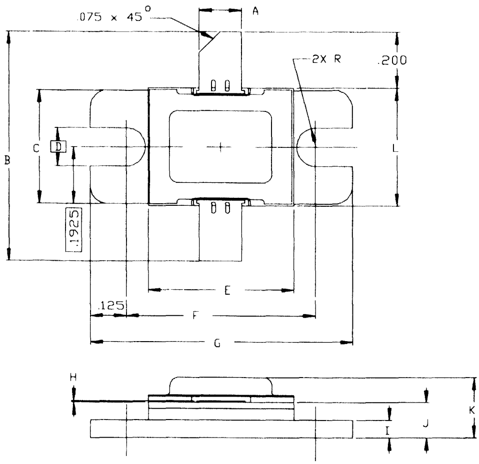
C1, C4 : Cold End Terminated Through Eyelet.

## PC BOARD LAYOUT



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0112



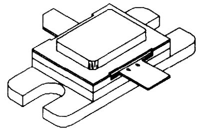

| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .145/3,68 | .155/3,93 |
| B | .750/19,05 | |
| C | .380/9,65 | .390/9,91 |
| D | .130/3,30 | |
| E | .495/12,57 | .507/12,88 |
| F | .640/16,26 | .655/16,64 |
| G | .890/22,61 | .910/23.11 |
| H | .002/0,05 | .006/0,15 |
| I | .055/1,40 | .065/1,65 |
| J | .115/2,92 | .135/3,43 |
| K | | .230/5,84 |
| L | .395/10,03 | .407/10,34 |

SGS-THOMSON MICROELECTRONICS

# SD1541-09

## RF & MICROWAVE TRANSISTORS AVIONICS APPLICATIONS

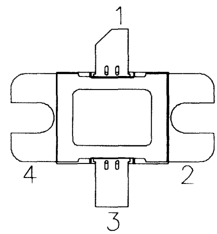
- DESIGNED FOR HIGH POWER PULSED IFF APPLICATIONS
- 450 WATTS (min.) IFF 1030/1090 MHz
- 7.0 dB MIN. GAIN
- REFRACTORY GOLD METALLIZATION
- BALLASTING AND LOW THERMAL RESISTANCE FOR RELIABILITY AND RUGGEDNESS
- 30:1 LOAD VSWR CAPABILITY AT SPECIFIED OPERATING CONDITIONS
- INPUT MATCHED, COMMON BASE CONFIGURATION



**.400 x .500 2LFL (M112)**
hermetically sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| SD1541-09 | 1541-9 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The SD1541-09 is a gold metallized silicon NPN planar transistor. The SD1541-09 is designedfor applications requiring high peak and low duty cycles such as IFF. The SD1541-09 is packaged in a metal/ceramic package with internal input matching, resulting in improved broadband performance and a low thermal resistance.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 65 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 65 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.5 | V |
| $I_C$ | Device Current | 22 | A |
| $P_{DISS}$ | Power Dissipation | 1458 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | − 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 0.12 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 25mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{CES}$ | $I_C$ = 50mA | $I_B$ = 0mA | 65 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 50V | $I_E$ = 0mA | — | — | 25 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = .25A | 5 | — | 200 | — |

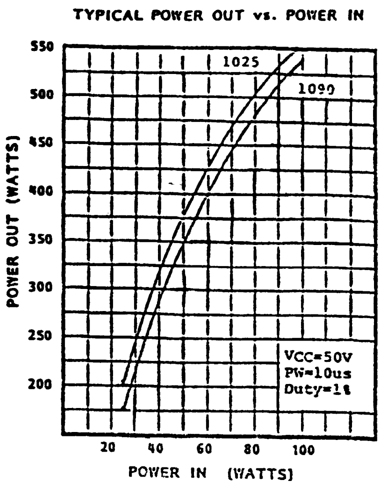
### DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 1090 MHz | $P_{IN}$ = 90 W | $V_{CE}$ = 50 V | 450 | — | — | W |
| $G_P$ | f = 1090 MHz | $P_{IN}$ = 90 W | $V_{CE}$ = 50 V | 7.0 | — | — | dB |

Note: Pulse Width = 10μSec, Duty Cycle = 1%

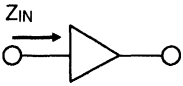
## TYPICAL PERFORMANCE

### POWER OUTPUT vs POWER INPUT

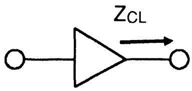


## IMPEDANCE DATA

**TYPICAL INPUT IMPEDANCE**

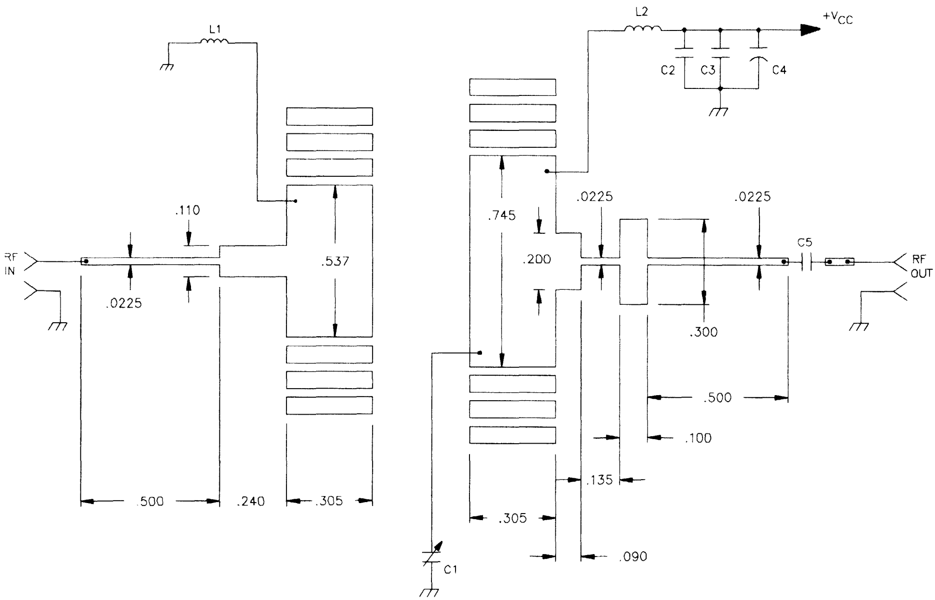



**TYPICAL COLLECTOR LOAD IMPEDANCE**




| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 1030 MHz | 1.6 + j 5.1 | 1.1 − j 2.0 |
| 1090 MHz | 2.5 + j 4.7 | 1.2 − j 1.2 |

## TEST CIRCUIT LAYOUT



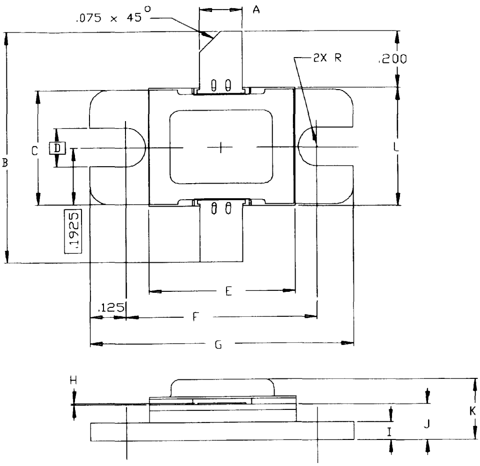

C1 : .4 - 2.5pF Johanson Gigatrim
C2 : 100pF Chip Capacitor
C3 : .01μfD CK05BX103K
C4 : 1000μfD Electrolytic 63V
C5 : 100pF Chip Capacitor

L1 : 1/2 Turn .026" Diameter Wire
Loop = .170" Width x .320" Height
L2 : 1 Turn .026" Diameter Wire I.D. .130"

All Dimensions are in Inches
Board Er = 10.2, Height .025"

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0112



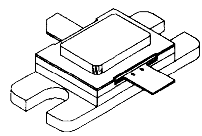

| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .145/3,68 | .155/3,93 |
| B | .750/19,05 | |
| C | .380/9,65 | .390/9,91 |
| D | .130/3,30 | |
| E | .495/12,57 | .507/12,88 |
| F | .640/16,26 | .655/16,64 |
| G | .890/22,61 | .910/23.11 |
| H | .002/0,05 | .006/0,15 |
| I | .055/1,40 | .065/1,65 |
| J | .115/2,92 | .135/3,43 |
| K | | .230/5,84 |
| L | .395/10,03 | .407/10,34 |

SGS-THOMSON MICROELECTRONICS

# SD1542

## RF & MICROWAVE TRANSISTORS AVIONICS APPLICATIONS

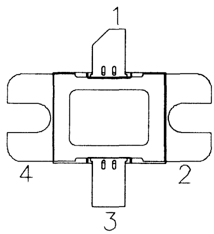
- DESIGNED FOR HIGH POWER PULSED IFF AND DME APPLICATIONS
- 600 WATTS (typ.) IFF 1030/1090 MHz
- 550 WATTS (min.) DME 1025 - 1150 MHz
- 5.6 dB MIN. GAIN
- REFRACTORY GOLD METALLIZATION
- BALLASTING AND LOW THERMAL RESISTANCE FOR RELIABILITY AND RUGGEDNESS
- 30:1 LOAD VSWR CAPABILITY AT SPECIFIED OPERATING CONDITIONS
- INTERNAL INPUT/OUTPUT MATCHED, COMMON BASE CONFIGURATION



**.400 x .500 2LFL (M112)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1542 | SD1542 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The SD1542 is a hermetically sealed, gold metallized, silicon NPN power transistor. The SD1542 is designed for applications requiring high peak power and low duty cycles such as IFF and DME. The SD1542 is packaged in a hermetic metal/ceramic package with internal input/output matching, resulting in improved broadband performance and a low thermal resistance.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 65 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 65 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.5 | V |
| $I_C$ | Device Current | 40 | A |
| $P_{DISS}$ | Power Dissipation | 1350 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 0.06 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 25mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{CES}$ | $I_C$ = 50mA | $V_{BE}$ = 0V | 65 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 50V | $I_E$ = 0mA | — | — | 35 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = .25A | 5 | — | 200 | — |

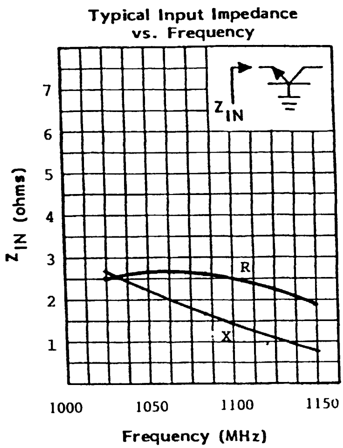
### DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1025 — 1150MHz | $P_{IN}$ = 150 W | $V_{CE}$ = 50 V | 550 | — | — | W |
| $G_P$ | f = 1025 — 1150MHz | $P_{IN}$ = 150 W | $V_{CE}$ = 50 V | 5.6 | — | — | dB |

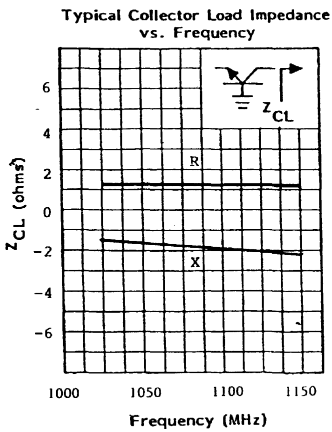
Note: Pulse Width = 10μSec, Duty Cycle = 1%

## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE



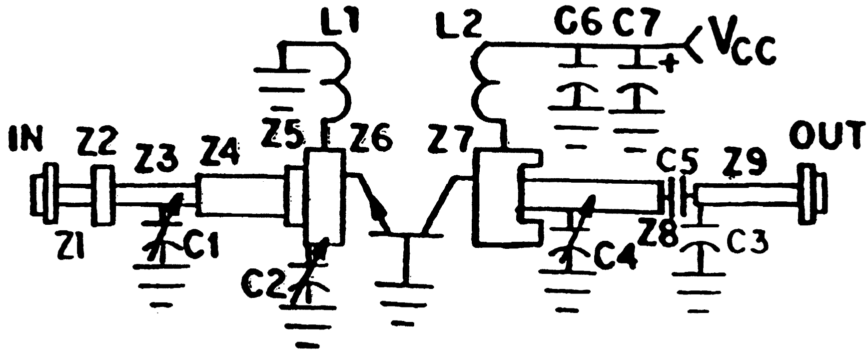

### TYPICAL COLLECTOR LOAD IMPEDANCE




| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 1020 MHz | 1.78 + j 3.0 | 1.33 − j 2.7 |
| 1090 MHz | 1.57 + j 2.1 | 1.64 − j 3.4 |
| 1150 MHz | 1.55 + j 1.4 | 1.93 − j 4.0 |

$P_{IN}$ = 150 W
$V_{CE}$ = 50 V

## TEST CIRCUIT

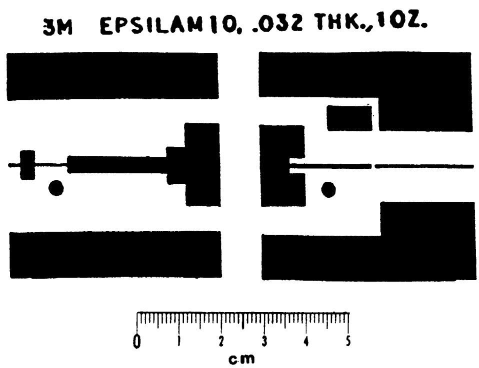



All Dimensions are in inches Unless Otherwise Specified

| | | |
|---|---|---|
| C1 | : | 0.4 - 2.5pF Johanson Gigatrim |
| C2, C3, C4 | : | 0.6 - 4.5pF Johanson Gigatrim |
| C5 | : | 82pF Chip Capacitor, .055 Sq. |
| C6 | : | Pair of 820pF Chip Capacitors, .11 Sq. |
| C7 | : | 1000µF Electrolytic |
| L1 | : | Loop, #18 Tinned, .36 Wide x .27 Above Circuit |
| L2 | : | 4 3/4 Turns, #24 Enameled, Close Wound, .075 I.D. |

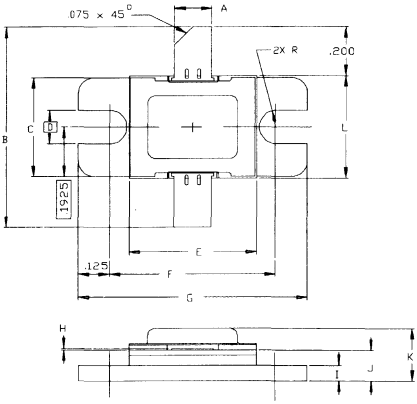
| | | |
|---|---|---|
| Z1 | : | 50Ω (.02 Wide) |
| Z2 | : | .250 x .120 |
| Z3 | : | 50Ω, .020 x .330; C1 Tapped .15 From Load |
| Z4 | : | .145 x .920 |
| Z5 | : | .325 x .180 |
| Z6 | : | .730 x .315 |
| Z7 | : | .710 x .425 with .140 x .150 Cutout |
| Z8 | : | .035 x .780; C4 Tapped .36 from Center |
| Z9 | : | 50Ω (.02 Wide) |
| C1, C4 | : | Cold End Terminated Through Eyelet |

## PC BOARD LAYOUT



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0112



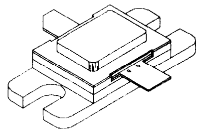

| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .145/3,68 | .155/3,93 |
| B | .750/19,05 | |
| C | .380/9,65 | .390/9,91 |
| D | .130/3,30 | |
| E | .495/12,57 | .507/12,88 |
| F | .640/16,26 | .655/16,64 |
| G | .890/22,61 | .910/23.11 |
| H | .002/0,05 | .006/0,15 |
| I | .055/1,40 | .065/1,65 |
| J | .115/2,92 | .135/3,43 |
| K | | .230/5,84 |
| L | .395/10,03 | .407/10,34 |

SGS-THOMSON MICROELECTRONICS

# SD1542-04

## RF & MICROWAVE TRANSISTORS AVIONICS APPLICATIONS

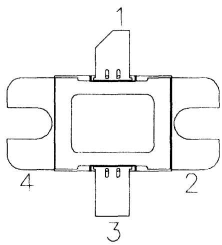
- DESIGNED FOR HIGH POWER PULSED IFF
- 600 WATTS (min.) IFF 1030/1090 MHz
- REFRACTORY GOLD METALLIZATION
- 6.0 dB MIN. GAIN
- BALLASTING AND LOW THERMAL REISTANCE FOR RELIABILITY AND RUGGEDNESS
- 30:1 LOAD VSWR CAPABILITY AT SPECIFIED OPERATING CONDITIONS
- INPUT MATCHED, COMMON BASE CONFIGURATION



**.400 x .500 2LFL (M112)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1542-04 | SD1542-4 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The SD1542-04 is a hermetically sealed, gold metallized, silicon NPN power transistor. The SD1542-04 is designed for applications requiring high peak power and low duty cycles such as IFF. The SD1542-04 is packaged in a hermetic metal/ceramic package with internal input matching, resulting in improved broadband performance and low thermal reistance.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 65 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 65 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.5 | V |
| $I_C$ | Device Current | 40 | A |
| $P_{DISS}$ | Power Dissipation | 1350 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 0.06 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 25mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 50V | $I_E$ = 0mA | — | — | 35 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1A | 5 | — | 200 | — |

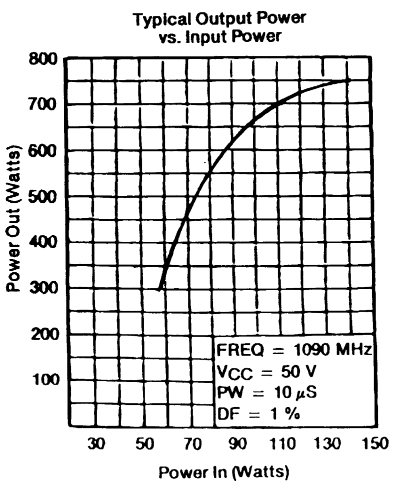
DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 1090 MHz | $P_{IN}$ = 150 W | $V_{CE}$ = 50 V | 600 | — | — | W |
| $G_P$ | f = 1090 MHz | $P_{IN}$ = 150 W | $V_{CE}$ = 50 V | 6.0 | — | — | dB |

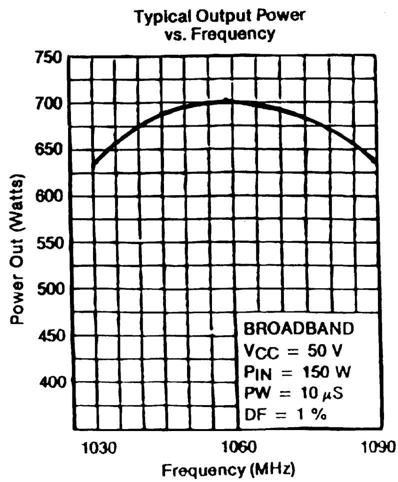
Note: Pulse Width = 10μSec, Duty Cyle = 1%

## TYPICAL PERFORMANCE

### POWER OUTPUT vs POWER INPUT

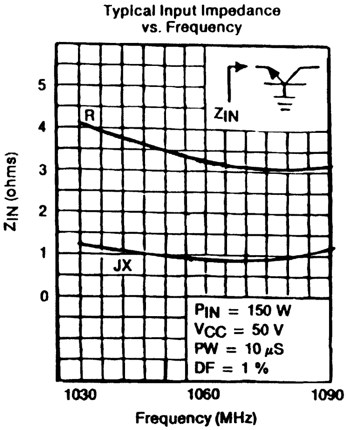



### POWER OUTPUT vs FREQUENCY

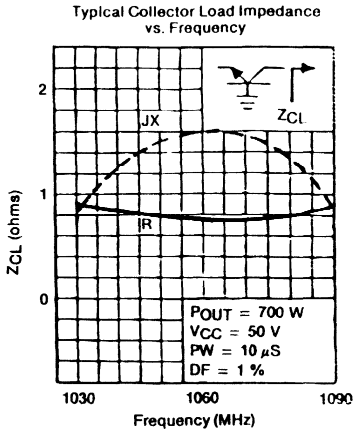


## IMPEDANCE DATA

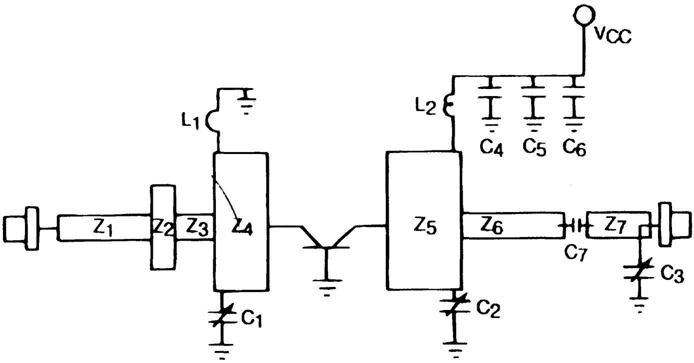
### TYPICAL INPUT IMPEDANCE




### TYPICAL COLLECTOR LOAD IMPEDANCE



## TEST CIRCUIT

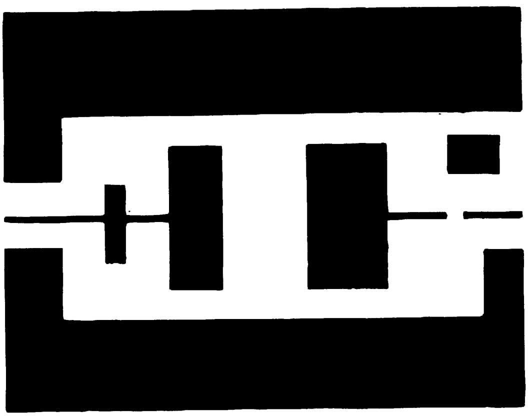



C1, C2,
C3 : .8 - 4.8pF Gigatrim
C4 : 120pF Chip Capacitor
C5 : 680pF Chip Capacitor
C6 : 1000µF 63Vdc Electrolytic
C7 : 56pF Chip Capacitor

L1 : 100mils Wide Brass Strip
L2 : #18 AWG Wire

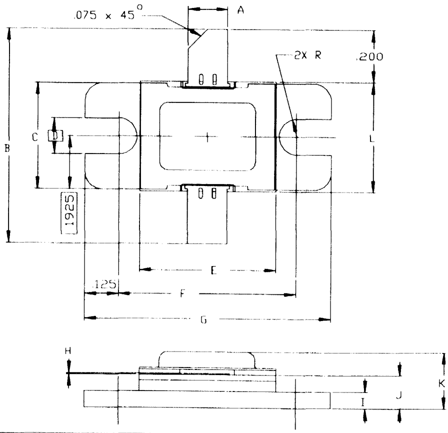
Z1 : 510 mils x 20mils
Z2 : 120mils x 380mils
Z3 : 210mils x 20mils
Z4 : 270mils x 725mils
Z5 : 400mils x 720mils
Z6 : 340mils x 20 mils
Z7 : 245mils x 20 mils

## CIRCUIT BOARD LAYOUT



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0112



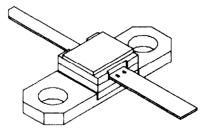

| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .145/3,68 | .155/3,93 |
| B | .750/19,05 | |
| C | .380/9,65 | .390/9,91 |
| D | .130/3,30 | |
| E | .495/12,57 | .507/12,88 |
| F | .640/16,26 | .655/16,64 |
| G | .890/22,61 | .910/23.11 |
| H | .002/0,05 | .006/0,15 |
| I | .055/1,40 | .065/1,65 |
| J | .115/2,92 | .135/3,43 |
| K | | .230/5,84 |
| L | .395/10,03 | .407/10,34 |

SGS-THOMSON
MICROELECTRONICS

# SD1550

## RF & MICROWAVE TRANSISTORS
## AVIONICS APPLICATIONS

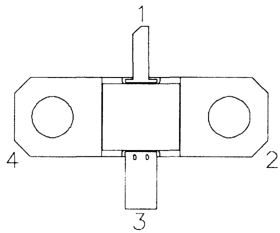
- DESIGNED FOR USE IN TACAN SYSTEMS
- EXTREMELY RUGGED
- THERMALLY STABLE
- GOLD METALLIZATION
- $P_{OUT}$ = 15 W MIN. WITH 10.0 dB GAIN



**.250 x .250 2LFL (M171)**
hermetically sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| SD1550 | 1550 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The SD1550 is a gold metallized silicon NPN planar pulsed transistor that has been designed for use in extended pulse width and duty cycle applications from 960 - 1215 MHz. This device is extremely rugged, thermally stable, and is capable of operation at pulse widths in excess of 20µsec and duty cycles greater than 10%.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 65 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 30 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 2.0 | A |
| $P_{DISS}$ | Power Dissipation | 53 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 3.3 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CES}$ | $I_C$ = 25mA | $V_{BE}$ = 0V | 65 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 10mA | $I_B$ = 0mA | 30 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 28V | $I_E$ = 0mA | — | — | 5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 100mA | 20 | — | 200 | — |

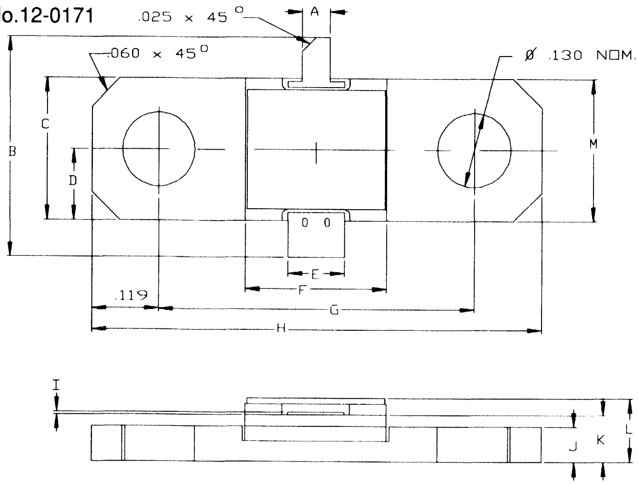
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 960 — 1215 MHz | $P_{IN}$ = 1.5 W | $V_{CE}$ = 40 V | 15 | — | — | W |
| $G_P$ | f = 960 — 1215 MHz | $P_{IN}$ = 1.5 W | $V_{CE}$ = 40 V | 10 | — | — | dB |
| $\eta_C$ | f = 960 — 1215 MHz | $P_{IN}$ = 1.5 W | $V_{CE}$ = 40 V | 40 | — | — | % |

Note: Pulse Width = 20µSec, Duty Cyle = 10%

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0171




| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .045/1,14 | .055/1,40 |
| B | .980/24,89 | |
| C | .245/6,22 | .255/6,48 |
| D | .125/3,18 | |
| E | .095/2,41 | .105/2,67 |
| F | .245/6,22 | .255/6,48 |
| G | .557/14,15 | .567/14,40 |
| H | .795/20,19 | .805/20,45 |
| I | .002/0,05 | .006/0,15 |
| J | .057/1,45 | .067/1,70 |

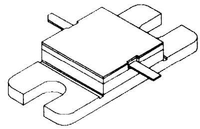
| CONT'D | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| K | .076/1,93 | .088/2,24 |
| L | | .130/3,30 |
| M | .245/6,22 | .258/6,55 |

SGS-THOMSON MICROELECTRONICS

# SD1563

## RF & MICROWAVE TRANSISTORS UHF PULSED APPLICATIONS

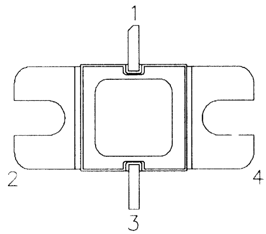
- 350 WATTS @ 10μSEC PULSE WIDTH, 10% DUTY CYCLE
- 300 WATTS @ 250μSEC PULSE WIDTH, 10% DUTY CYCLE
- 9.5 dB MIN. GAIN
- REFRACTORY GOLD METALLIZATION
- EMITTER BALLASTING AND LOW THERMAL RESISTANCE FOR RELIABILITY AND RUGGEDNESS
- INFINITE VSWR CAPABILITY AT SPECIFIED OPERATING CONDITIONS



**.400 x .400 2LFL (M106)**
hermetically sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| SD1563 | SD1563 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The SD1563 is a gold metallized silicon NPN pulse power transistor. The SD1563 is designed for applications requiring high peak power and low duty cycles within the frequency range of 400 - 500 MHz.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 65 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 65 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.5 | V |
| $I_C$ | Device Current | 21.6 | A |
| $P_{DISS}$ | Power Dissipation | 875 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 0.2 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 50mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{CES}$ | $I_C$ = 50mA | $V_{BE}$ = 0V | 65 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 50mA | $I_B$ = 0mA | 28 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 30V | $I_E$ = 0mA | — | — | 7.5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 5A | 10 | — | 100 | — |

DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 425 MHz | $P_{IN}$ = 33.5 W | $V_{CE}$ = 40 V | 300 | — | — | W |
| $G_P$ | f = 425 MHz | $P_{OUT}$ = 300 W | $V_{CE}$ = 40 V | 9.5 | — | — | dB |
| $\eta_C$ | f = 425 MHz | $P_{IN}$ = 25 W | $V_{CE}$ = 40 V | 55 | — | — | % |

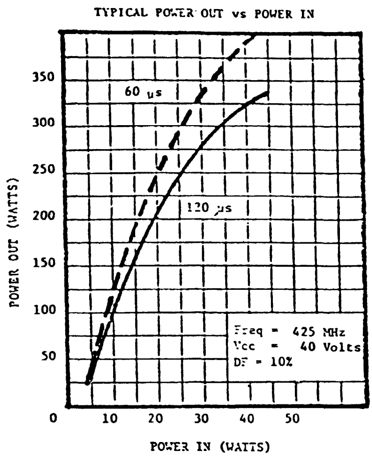
Note: Pulse Width = 250µSec, Duty Cyle = 10%

## TYPICAL PERFORMANCE

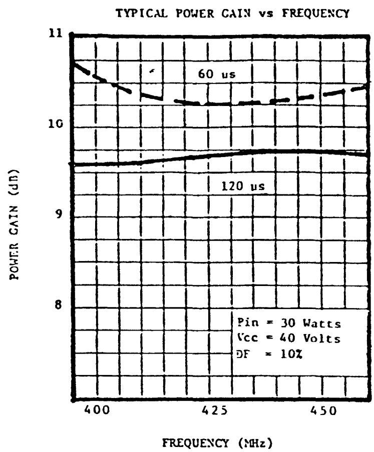
| $P_{OUT}$ (W) | P.W. (µSec) | D.C. (%) | $T_J$ (°C max.) | $V_{CC}$ |
|---|---|---|---|---|
| 360 | 10 | 10 | 150 | 40 |
| 350 | 20 | 10 | 150 | 40 |
| 325 | 100 | 10 | 150 | 40 |
| 310 | 500 | 10 | 150 | 40 |
| 300 | 1000 | 10 | 150 | 40 |

## TYPICAL PERFORMANCE (P.W. = 120µSec)

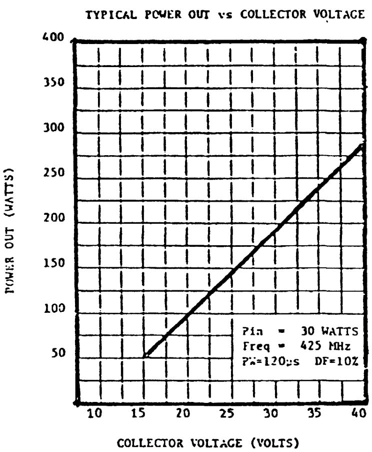
### POWER OUTPUT vs POWER INPUT



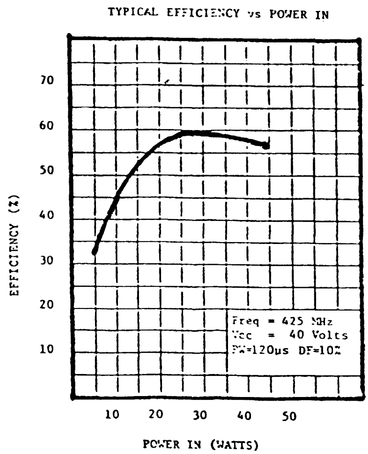

### POWER GAIN vs FREQUENCY




### POWER OUTPUT vs COLLECTOR VOLTAGE

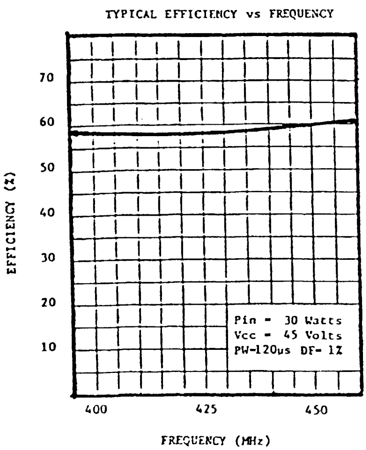



### EFFICIENCY vs POWER INPUT

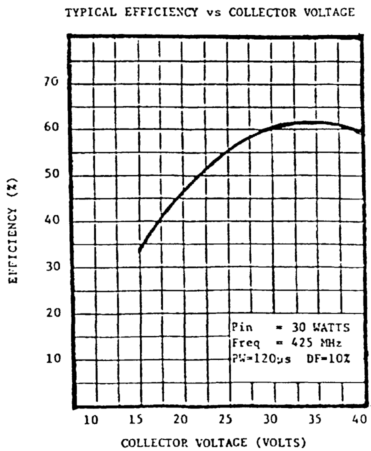


## TYPICAL PERFORMANCE (P.W. = 120μSec)

### EFFICIENCY vs FREQUENCY

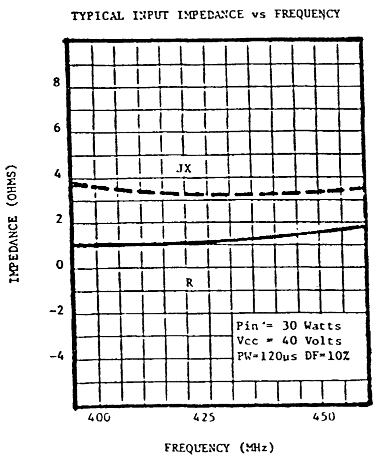



### EFFICIENCY vs COLLECTOR VOLTAGE

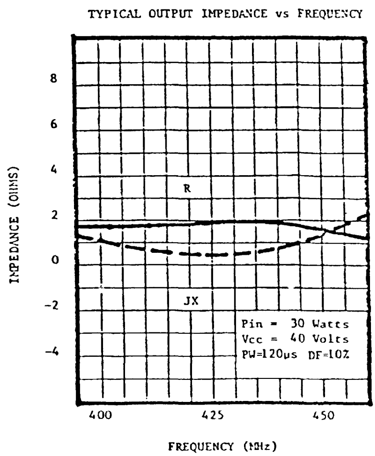



## IMPEDANCE DATA (P.W. = 120μSec)

### TYPICAL INPUT IMPEDANCE

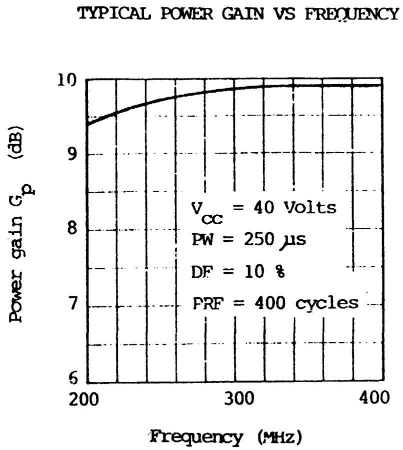



### TYPICAL COLLECTOR LOAD IMPEDANCE

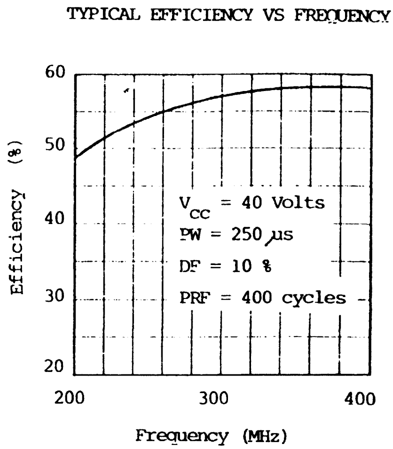


## TYPICAL PERFORMANCE (P.W. = 250µSec)

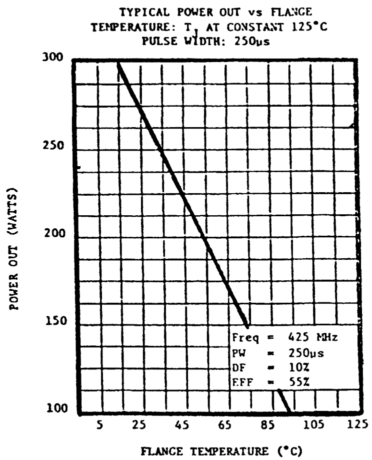
### POWER GAIN vs FREQUENCY



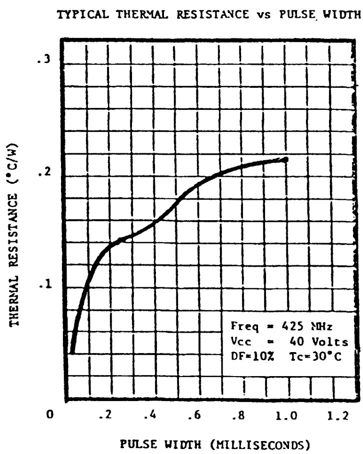

### EFFICIENCY vs FREQUENCY




### POWER OUTPUT vs FLANGE $T_J$ @ CONSTANT 125°C

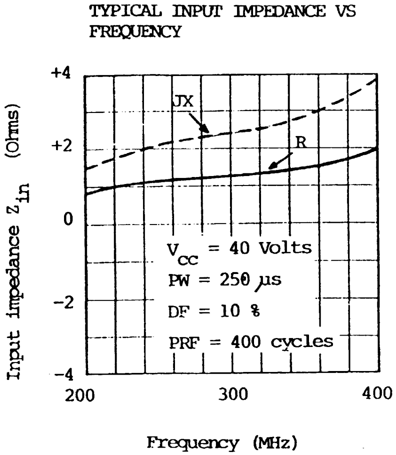



### THERMAL RESISTANCE vs PULSE WIDTH

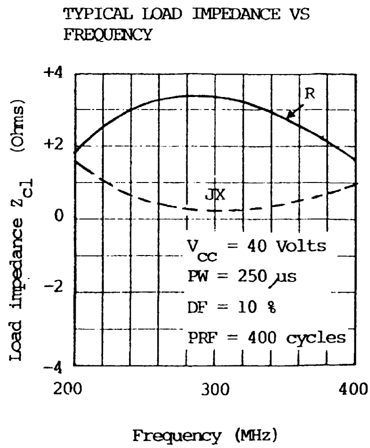


## IMPEDANCE DATA (P.W. = 250µSec)

### TYPICAL INPUT IMPEDANCE

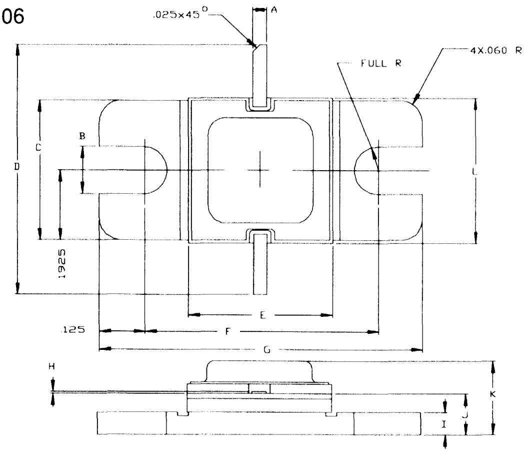



### TYPICAL COLLECTOR LOAD IMPEDANCE



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0106



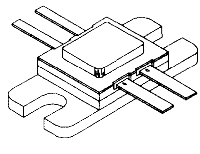

| SGS-THOMSON MICROELECTRONICS | | | CONT'D | | |
|---|---|---|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm | | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | 045/1,14 | .055/1,40 | K | | .230/5,84 |
| B | .125/3,18 | | L | .392/9,96 | .402/10,29 |
| C | .380/9,65 | .390/9,91 | | | |
| D | .710/18,03 | | | | |
| E | .392/9,96 | .402/10,29 | | | |
| F | .645/16,38 | .655/16,64 | | | |
| G | .895/22,73 | .905/22,99 | | | |
| H | 002/0,05 | .006/0,15 | | | |
| I | .055/1,40 | .065/1,65 | | | |
| J | .105/2,67 | .125/3,18 | | | |

SGS-THOMSON
MICROELECTRONICS

# SD1564

## RF & MICROWAVE TRANSISTORS
## UHF PULSED APPLICATIONS

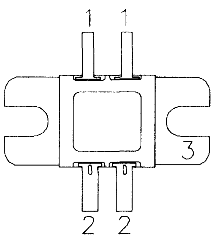
- 400 WATTS @ 60μSEC PULSE WIDTH, 2% DUTY CYCLE
- 7.0 dB MIN. GAIN
- REFRACTORY GOLD METALLIZATION
- EMITTER BALLASTING AND LOW THERMAL RESISTANCE FOR RELIABILITY AND RUGGEDNESS
- INFINITE VSWR CAPABILITY AT SPECIFIED OPERATING CONDITIONS
- INPUT MATCHED, COMMON EMITTER, BALANCED CONFIGURATION
- HERMETIC PACKAGE



**.400 x .425 4LFL (M119)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1564 | SD1564 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter

### DESCRIPTION

The SD1564 is a hermetically sealed, gold metallized silicon NPN pulse power transistor. The SD1564 is designed for applications requiring high peak power and low duty cycles within the frequency range of 400 - 450 MHz.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 65 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 65 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.5 | V |
| $I_C$ | Device Current | 28.8 | A |
| $P_{DISS}$ | Power Dissipation | 1167 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 0.15 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case} = 25°C$)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C = 50mA$ | $I_E = 0mA$ | 65 | — | — | V |
| $BV_{CES}$ | $I_C = 50mA$ | $V_{BE} = 0V$ | 65 | — | — | V |
| $BV_{EBO}$ | $I_E = 5mA$ | $I_C = 0mA$ | 3.5 | — | — | V |
| $I_{CES}$ | $V_{CE} = 40V$ | $I_E = 0mA$ | — | — | 20 | mA |
| $h_{FE}$ | $V_{CE} = 5V$ | $I_C = 500mA$ | 20 | — | — | — |

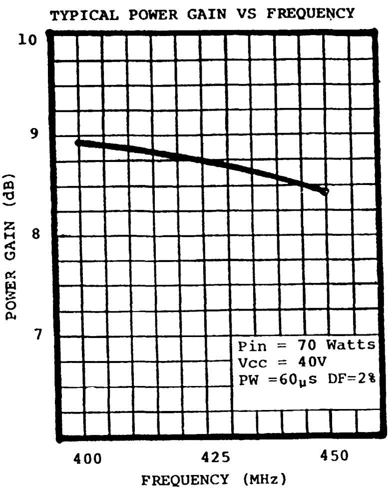
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 425 MHz | $P_{IN} = 80$ W | $V_{CE} = 40$ V | 400 | — | — | W |
| $G_P$ | f = 425 MHz | $P_{IN} = 80$ W | $V_{CE} = 40$ V | 7.0 | — | — | dB |
| $\eta_C$ | f = 425 MHz | $P_{IN} = 80$ W | $V_{CE} = 40$ V | 50 | — | — | % |

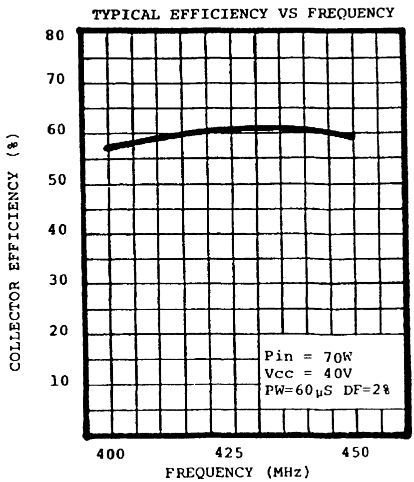
Note: Pulse Width = 60µSec, Duty Cyle = 2%

## TYPICAL PERFORMANCE

### POWER GAIN vs FREQUENCY

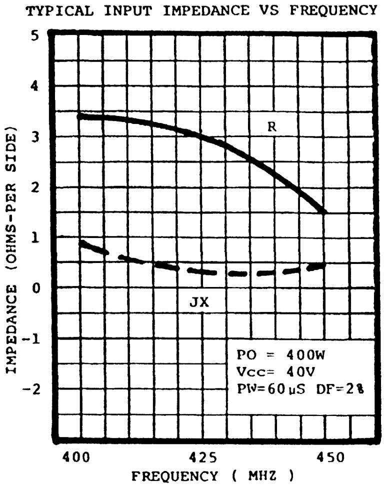



### COLLECTOR EFFICIENCY vs FREQUENCY

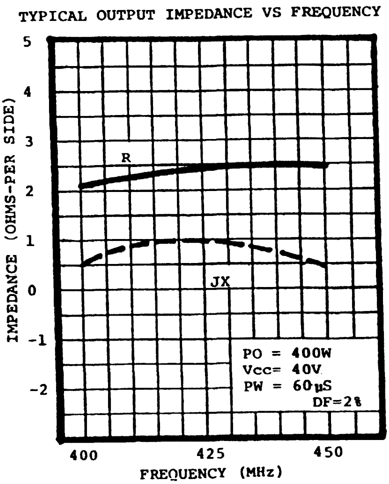


## IMPEDANCE DATA

### TYPICAL INPUT IMPEDANCE

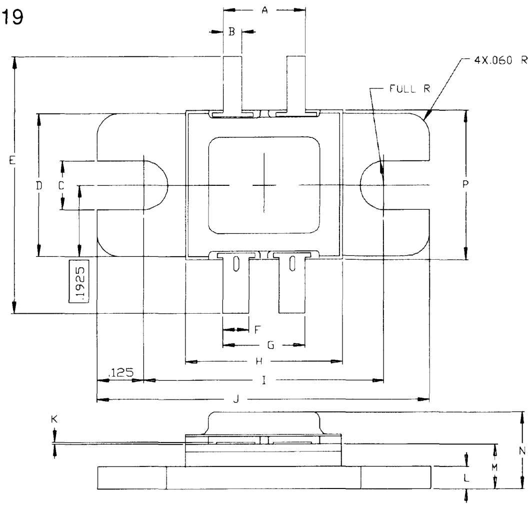



### TYPICAL COLLECTOR LOAD IMPEDANCE



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0119




| SGS-THOMSON MICROELECTRONICS | MINIMUM Inches/mm | MAXIMUM Inches/mm |
|---|---|---|
| A | .210/5,33 | .230/5,84 |
| B | .045/1,14 | .055/1,40 |
| C | .130/3,30 | |
| D | .380/9,65 | .390/9,91 |
| E | .770/19,56 | .830/21,08 |
| F | .070/1,78 | .080/2,03 |
| G | .215/5,46 | .235/5,97 |
| H | .420/10,67 | .433/11,00 |
| I | .645/16,38 | .655/16,64 |
| J | .895/22,73 | .905/22,99 |

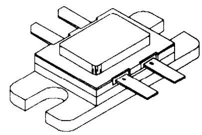
| CONT'D | MINIMUM Inches/mm | MAXIMUM Inches/mm |
|---|---|---|
| K | .002/0,05 | .006/0,15 |
| L | .058/1,47 | .065/1,65 |
| M | .115/2,92 | .130/3,30 |
| N | ---- | .230/5,84 |
| P | .395/10,03 | .408/10,36 |

SGS-THOMSON
MICROELECTRONICS

# SD1565

## RF & MICROWAVE TRANSISTORS
## UHF PULSED APPLICATIONS

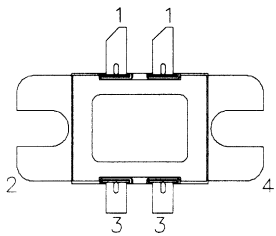
- 500 WATTS @ 250µSec PULSE WIDTH, 10% DUTY CYCLE
- REFRACTORY GOLD METALLIZATION
- EMITTER BALLASTING AND LOW RESISTANCE FOR RELIABILITY AND RUGGEDNESS
- INFINITE VSWR CAPABILITY AT SPECIFIED OPERATING CONDITIONS
- INPUT MATCHED, COMMON BASE CONFIGURATION
- BALANCED CONFIGURATION



**.400 x .500 4LFL (M102)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1565 | SD1565 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The SD1565 is a hermetically sealed, gold metallized silicon NPN pulse power transistor mounted in a common base balanced configuration. The SD1565 is designed for applications requiring high peak power and low duty cycles within the frequency range of 400 - 500 MHz.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 65 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 65 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.5 | V |
| $I_C$ | Device Current | 43.2 | A |
| $P_{DISS}$ | Power Dissipation | 1167 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 0.15 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 50mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{CES}$ | $I_C$ = 50mA | $V_{BE}$ = 0V | 65 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 30V | $I_E$ = 0mA | — | — | 15 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 5A | 20 | — | 200 | — |

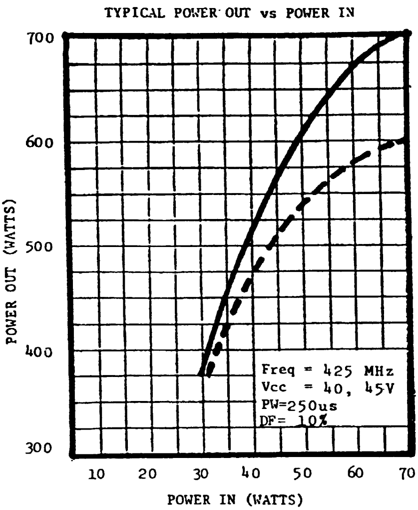
DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 425 MHz | $P_{IN}$ = 54 W | $V_{CE}$ = 40 V | 500 | — | — | W |
| $G_P$ | f = 425 MHz | $P_{IN}$ = 54 W | $V_{CE}$ = 40 V | 9.7 | — | — | dB |
| $\eta_C$ | f = 425 MHz | $P_{IN}$ = 54 W | $V_{CE}$ = 40 V | 50 | — | — | % |

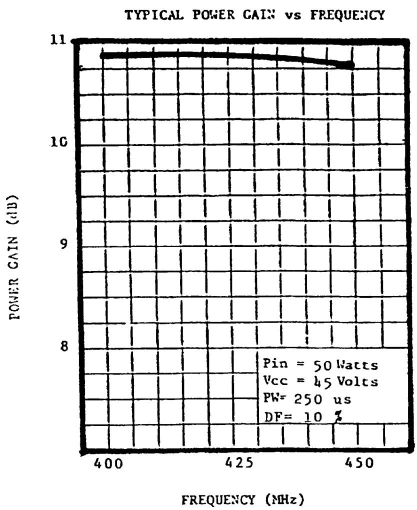
Note: Pulse Width = 250μSec, Duty Cycle = 10%
This device is suitable for use under other pulse width/duty cycle conditions.
Please contact the factory for specific applications assistance.

## TYPICAL PERFORMANCE (P.W. = 250μS, D.C. = 10%)

### POWER OUTPUT vs POWER INPUT

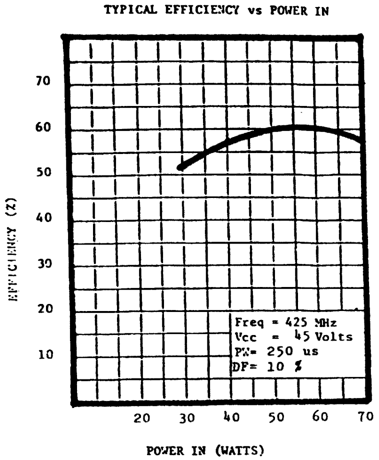



### POWER GAIN vs FREQUENCY

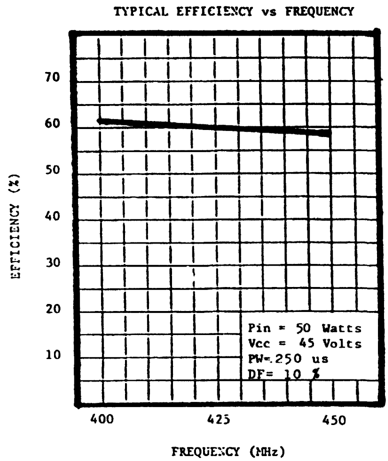


## TYPICAL PERFORMANCE (P.W. = 250µS, D.C. = 10%)

### EFFICIENCY vs POWER INPUT

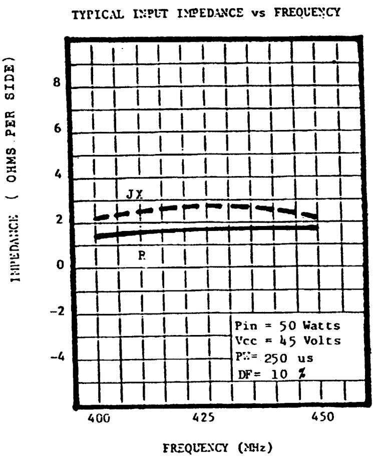



### EFFICIENCY vs FREQUENCY

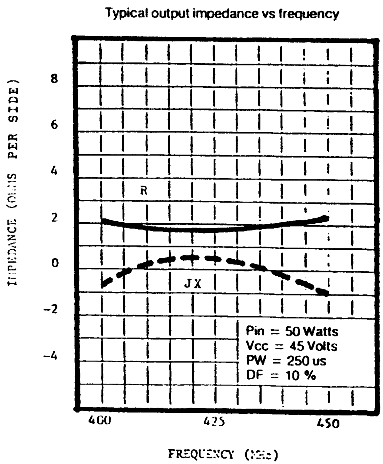



## IMPEDANCE DATA (P.W. = 250µS, D.C. = 10%)

### TYPICAL INPUT IMPEDANCE

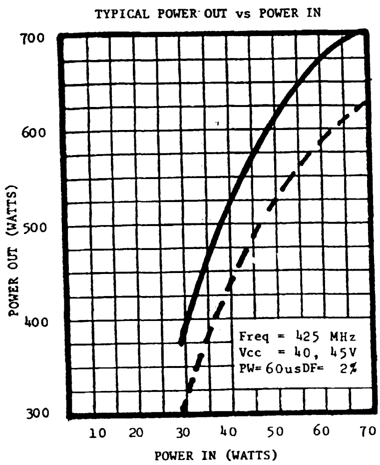



### TYPICAL COLLECTOR LOAD IMPEDANCE

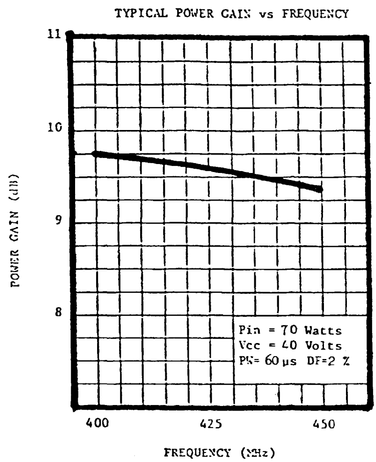


## TYPICAL PERFORMANCE (P.W. = 60μS, D.C. = 2%)

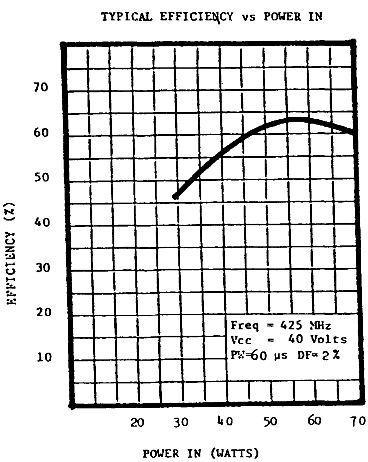
### POWER OUTPUT vs POWER INPUT



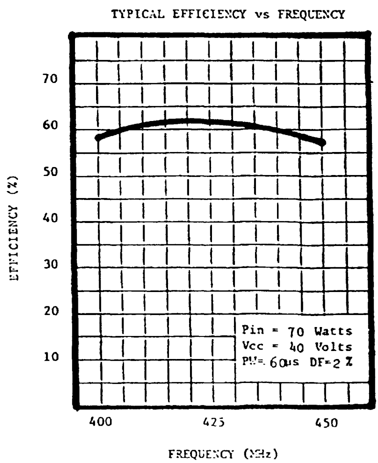

### POWER GAIN vs FREQUENCY




### EFFICIENCY vs POWER INPUT

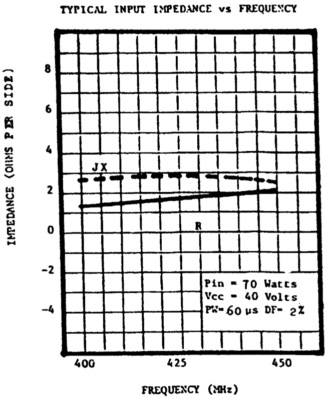



### EFFICIENCY vs FREQUENCY

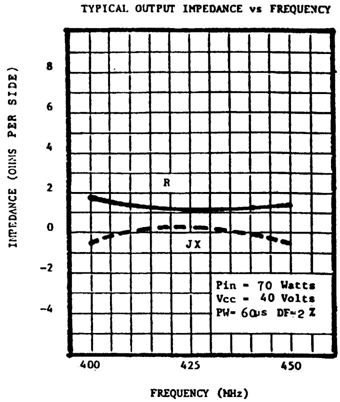


## IMPEDANCE DATA (P.W. = 60µS, D.C. = 2%)

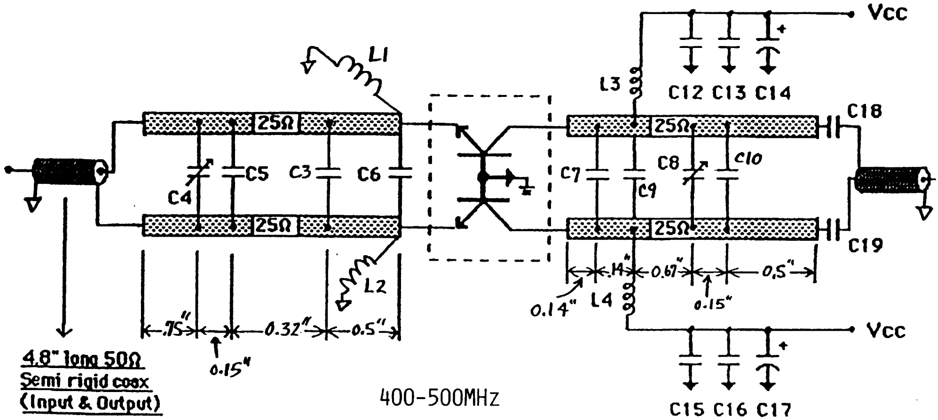
### TYPICAL INPUT IMPEDANCE




### TYPICAL COLLECTOR LOAD IMPEDANCE

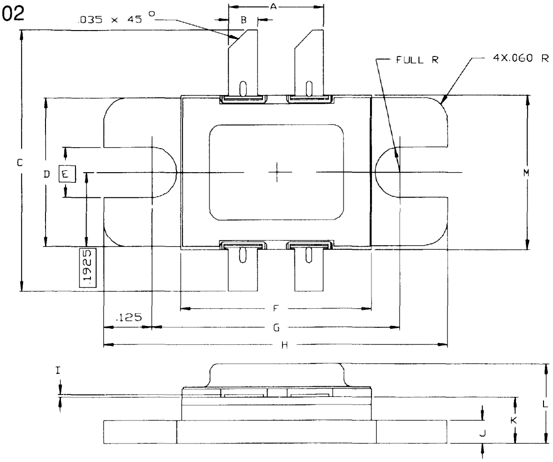



## TEST CIRCUIT



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0102




| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .240/6,10 | 254/6,45 |
| B | .070/1,78 | .080/2,03 |
| C | .780/19,81 | .820/20,83 |
| D | .380/9,65 | .390/9,91 |
| E | .130/3,30 | |
| F | .495/12,57 | .507/12,88 |
| G | .640/16,26 | .655/16,64 |
| H | .890/22,61 | 910/23,11 |
| I | .002/0,05 | .006/0,15 |
| J | .058/1,47 | .065/1,65 |

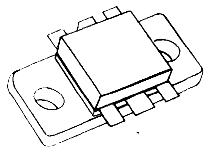
| CONT'D | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| K | .115/2,92 | .130/3,30 |
| L | --- | .230/5,84 |
| M | .395/10,03 | .407/10,34 |

# SGS-THOMSON MICROELECTRONICS

# SD1650

## RF & MICROWAVE TRANSISTORS CELLULAR BASE STATION APPLICATIONS

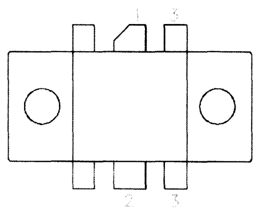
- REFRACTORY/GOLD METALLIZATION
- DOUBLE STEP INPUT/OUTPUT MATCH
- 850-960 MHz CLASS AB LINEAR
- COMMON EMITTER
- $P_{OUT}$ = 60 W MIN. WITH 7 dB MIN GAIN



**.400 6LFL (M169)**
epoxy sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| SD1650 | SCELL500 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter

### DESCRIPTION

Designed for 900 MHz cellular radio base station applications, the SD1650 exhibits high collector efficiency with excellent thermal characteristics. Double-section internal input/output matching result in terminal impedance levels easily handled by the circuit designer.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 60 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 28 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 10 | A |
| $P_{DISS}$ | Power Dissipation (+25°C) | 175 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 1.5 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

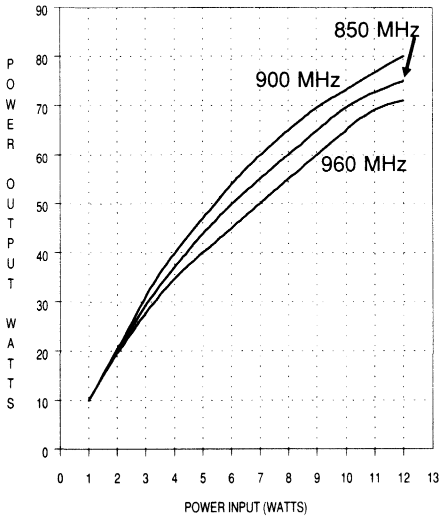
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 50mA | | 60 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 20mA | | 3.0 | — | — | V |
| $BV_{CES}$ | $I_C$ = 100mA | | 60 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 100mA | | 28 | — | — | V |
| $I_{CEO}$ | $V_{CE}$ = 24V | | — | — | 10 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 6A | 20 | — | 200 | — |

DYNAMIC

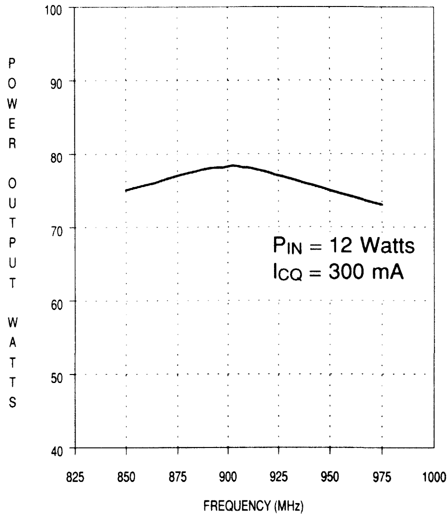
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 900 MHz | $P_{IN}$ = 12 W | $I_{CQ}$ = 300 mA | 60 | — | — | W |
| $\eta_C$ | f = 900 MHz | $P_{IN}$ = 12 W | $I_{CQ}$ = 300 mA | 45 | — | — | % |
| $G_P$ | f = 900 MHz | $P_{IN}$ = 12 W | $I_{CQ}$ = 300 mA | 7 | — | — | dB |
| VSWR | f = 900 MHz | $P_{IN}$ = 12 W | | 3:1 | — | — | — |

## TYPICAL PERFORMANCE

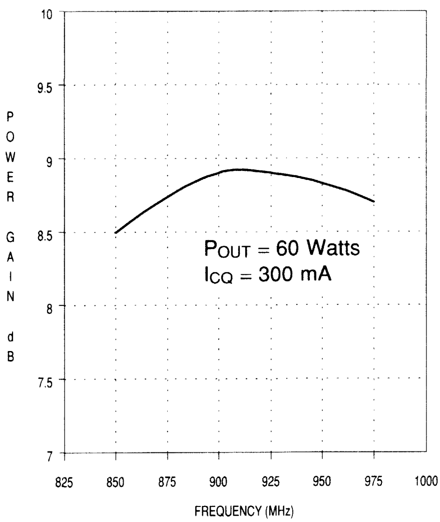
### BROADBAND POWER OUTPUT vs POWER INPUT



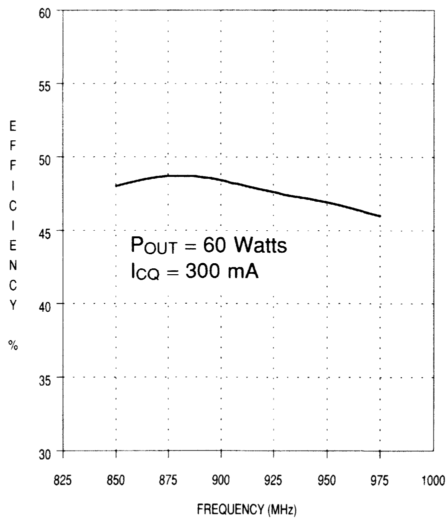

### BROADBAND POWER OUTPUT vs FREQUENCY




### BROADBAND POWER GAIN vs FREQUENCY

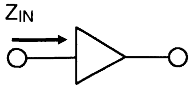



### BROADBAND EFFICIENCY vs FREQUENCY

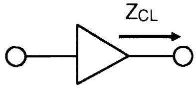


## IMPEDANCE DATA

**TYPICAL INPUT IMPEDANCE**

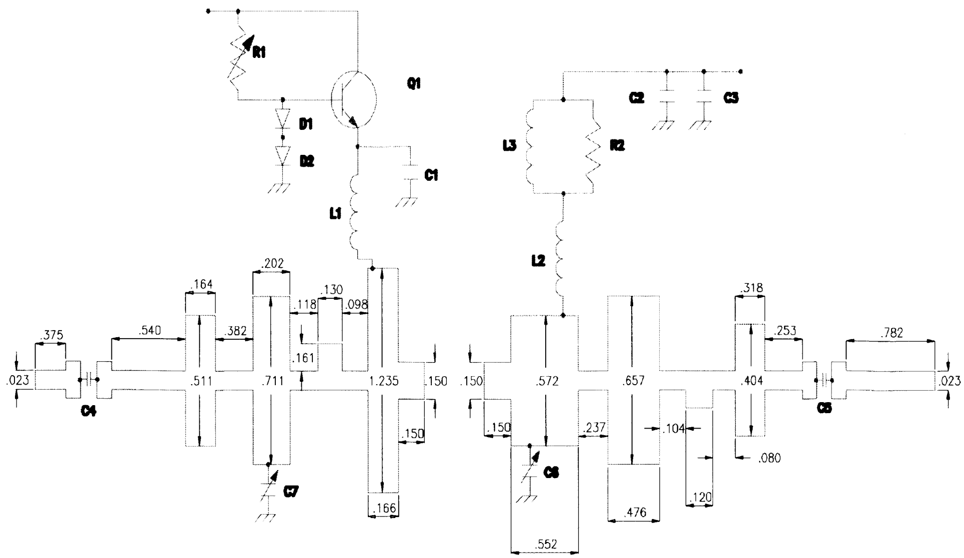



**TYPICAL COLLECTOR LOAD IMPEDANCE**




| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 850 MHz | 2.4 + j 5.2 | 4.0 − j 1.3 |
| 870 MHz | 2.6 + j 5.4 | 3.9 − j 2.3 |
| 900 MHz | 3.2 + j 6.3 | 3.6 − j 2.6 |
| 930 MHz | 4.1 + j 6.0 | 3.4 − j 2.4 |
| 960 MHz | 4.7 + j 5.6 | 3.0 − j 3.0 |

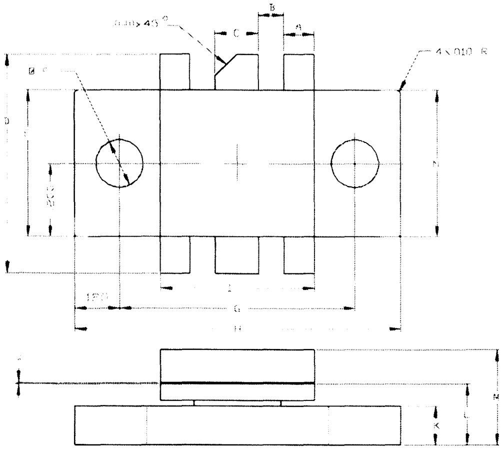
## TEST CIRCUIT




| | | | | | |
|---|---|---|---|---|---|
| C1,C2 | : | 220 pF Chip Capacitor ATC Size B | L1,L2 | : | 5 Turn 1/4" Dia. 16 AWG Coil |
| C3 | : | 10 Microfarad Electrolytic Capacitor | Q1 | : | SD1438-02 or Equiv. |
| C4,C5 | : | 220 pF Chip Capacitor ATC Size B | R1 | : | 5KΩ Potentiometer |
| C6,C7 | : | 1 - 4 pF Johanson Variable Capacitor | R2 | : | 100Ω 1/4 Watt Resistor |
| D1,D2 | : | 1N3064 Diode or Equiv | Er =10.2 H =.025in. | | |

## PACKAGE MECHANICAL DATA

Ref. Dwg. No.: 12-0169




| | SGS-THOMSON MICROELECTRONICS | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .078/1.98 | .088/2.24 |
| B | .120/3.05 | |
| C | .115/2.92 | .125/3.18 |
| D | .580/14.73 | .620/15.75 |
| E | .390/10.03 | .405/10.29 |
| F | .125/3.18 | |
| G | .720/18.29 | .730/18.54 |
| H | .970/24.64 | .980/24.89 |
| I | .420/10.67 | .430/10.92 |
| J | [illegible]/0.15 | .007/0.18 |

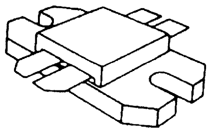
| | CONT'D | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| K | .105/2.67 | .115/2.92 |
| L | .159/4.04 | .175/4.45 |
| M | | .280/7.11 |
| N | .395/10.03 | .408/10.36 |

SGS-THOMSON MICROELECTRONICS

# SD1658

## RF & MICROWAVE TRANSISTORS 800/900 MHz APPLICATIONS

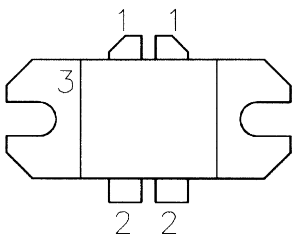
- 860 - 900 MHz
- 24 VOLTS
- CLASS AB PUSH PULL
- INTERNAL INPUT MATCHED
- DESIGNED FOR HIGH POWER LINEAR OPERATION
- HIGH SATURATED POWER CAPABILITY
- GOLD METALLIZATION
- DIFFUSED EMITTER BALLAST RESISTORS
- COMMON EMITTER CONFIGURATION
- $P_{OUT}$ = 40 W MIN. WITH 6.0 dB GAIN



**.438 x .450 4LFL (M173)**
epoxy sealed

**ORDER CODE** SD1658 — **BRANDING** SD1658

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter

## DESCRIPTION

The SD1658 is a gold metallized epitaxial silicon NPN planar transistor using diffused emitter ballast resistors for high linearity Class AB operation in cellular base station applications.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 45 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 30 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.0 | V |
| $I_C$ | Device Current | 8.0 | A |
| $P_{DISS}$ | Power Dissipation | 175 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 1.0 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 50mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{CER}$ | $I_C$ = 20mA | $R_{BE}$ = 10Ω | 40 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 200mA | $I_B$ = 0mA | 30 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 3.0 | — | — | V |
| $I_{CEO}$ | $V_{CE}$ = 28V | $I_E$ = 0mA | — | — | 5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 3A | 10 | — | 80 | — |

DYNAMIC

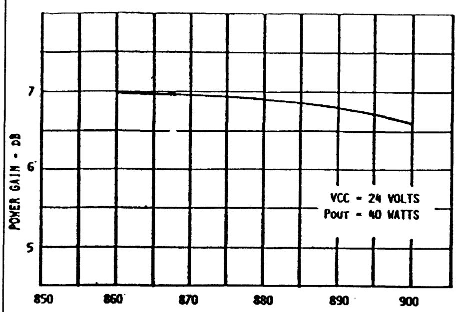
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$* | f = 900 MHz | $V_{CE}$ = 24 V | $I_{CQ}$ = 2 x 250 mA | 40 | — | — | W |
| $G_P$* | f = 900 MHz | $V_{CE}$ = 24 V | $I_{CQ}$ = 2 x 250 mA | 6.0 | — | — | dB |
| $\eta_C$* | f = 900 MHz | $V_{CE}$ = 24 V | $I_{CQ}$ = 2 x 250 mA | 40 | — | — | % |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 28 V | | 60 | — | 80 | pF |

Note: * @ 1 dB Compression

## TYPICAL PERFORMANCE

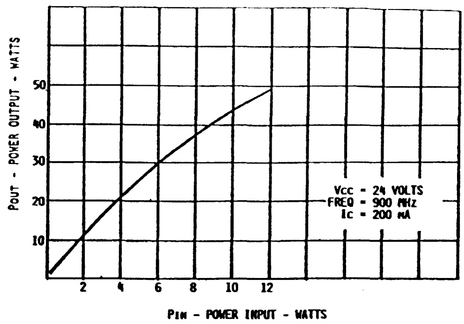
### BROADBAND POWER GAIN vs FREQUENCY

BROADBAND POWER GAIN VS FREQUENCY



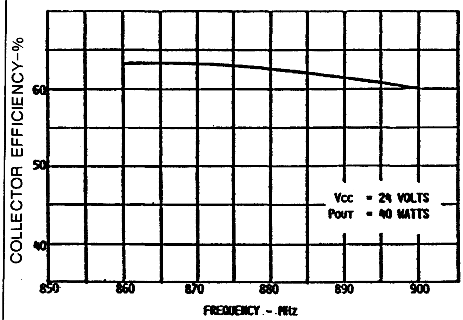

### POWER OUTPUT vs POWER INPUT

POWER OUTPUT VS POWER INPUT



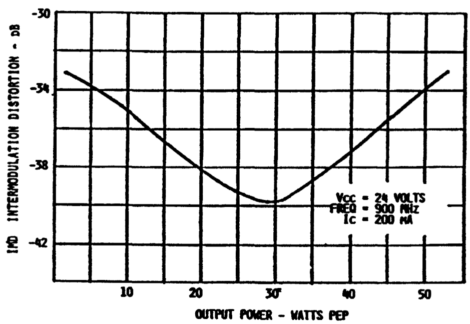

### COLLECTOR EFFICIENCY vs FREQUENCY

EFFICIENCY VS FREQUENCY



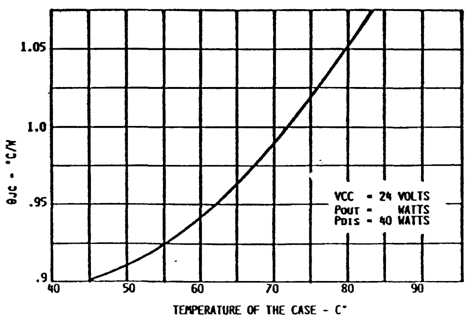

### INTERMODULATION DISTORTION vs POWER OUTPUT

IMD VS OUTPUT POWER

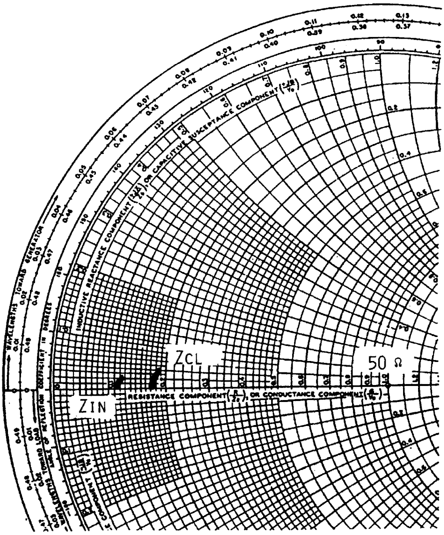



### THERMAL RESISTANCE vs CASE TEMPERATURE

IR SCAN HOT SPOT θJC VS CASE TEMPERATURE



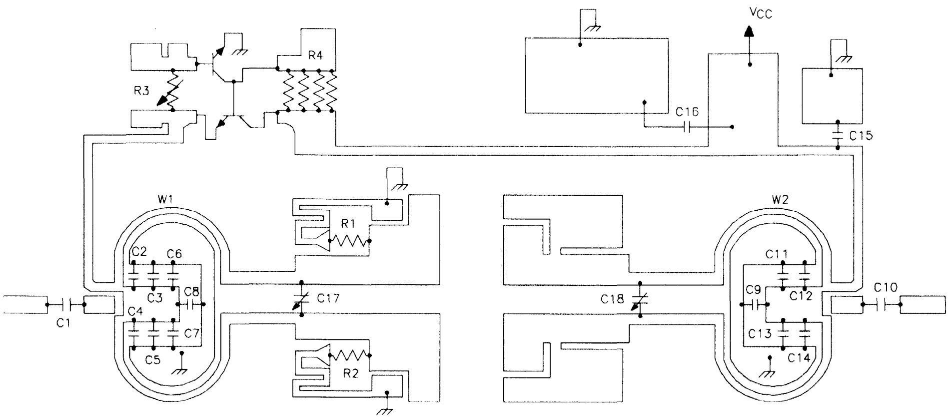
## IMPEDANCE DATA




| FREQ. | $Z_{IN}$ (Ω)* | $Z_{CL}$ (Ω)** |
|---|---|---|
| 830 MHz | 5.6 + j 0.55 | 9.4 + j 2.1 |
| 870 MHz | 5.8 + j 0.6 | 9.2 + j 1.1 |
| 910 MHz | 5.9 + j 0.95 | 9.1 + j 0.0 |

* Base to Base
** Collector to Collector
$P_{OUT}$ = 40W
$V_{CC}$ = 24V

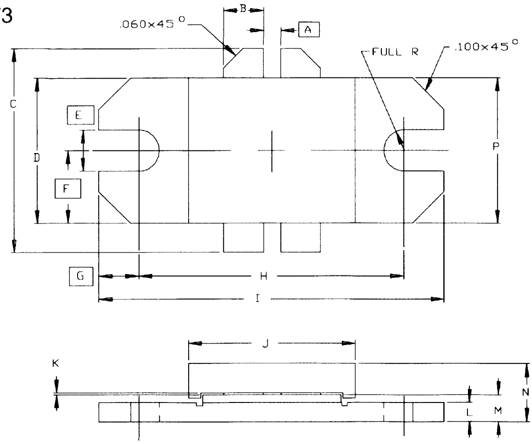
## TEST CIRCUIT




| | | | |
|---|---|---|---|
| C1, C10 | : 120pF Chip Capacitor B Size | C17 | : .6 - 4.5pF Johansson Variable Capacitor |
| C2, C5<br>C11, C14 | : 470pF Chip Capacitor B Size | C18 | : .8 - 8.0pF Johanson Variable Capacitor |
| C6, C7 | : 100µF Electrolytic Capacitor | R1, R2 | : 20Ω (.5W) Chip Resistor |
| C8 | : 4.7µF Electrolytic Capacitor | R3 | : 10K Potentiometer |
| C9 | : 10µF Electrolytic Capacitor | R4 | : 4 3.17KΩ (.25W) Chip Resistor |
| C15 | : 39,000pF Chip Capacitor | | |
| C16 | : 63µF Capacitor | Material: | Teflon Glass, Er = 2.33, Height .020 |

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0173



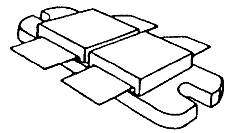

| SGS-THOMSON MICROELECTRONICS | MINIMUM Inches/mm | MAXIMUM Inches/mm | CONT'D | MINIMUM Inches/mm | MAXIMUM Inches/mm |
|---|---|---|---|---|---|
| A | .055/1,40 | | K | .002/0,05 | .006/0,15 |
| B | .120/3,05 | .130/3,30 | L | .055/1,40 | .065/1,65 |
| C | | .785/19,94 | M | .080/2,03 | .095/2,41 |
| D | .455/11,56 | .465/11,81 | N | | .195/4,95 |
| E | .125/3,18 | | P | .455/11,56 | .465/11,81 |
| F | .230/5,84 | | | | |
| G | .128/3,25 | | | | |
| H | .838/21,28 | .850/21,59 | | | |
| I | 1.095/27,81 | 1.105/28,07 | | | |
| J | .525/13,34 | .535/13,59 | | | |

SGS-THOMSON
MICROELECTRONICS

# SD1660

## RF & MICROWAVE TRANSISTORS
## 800/900 MHz APPLICATIONS

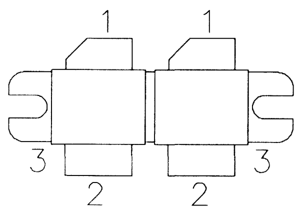
- 860 - 900 MHz
- 24 VOLTS
- CLASS AB PUSH PULL
- INTERNAL INPUT MATCHING
- DESIGNED FOR HIGH POWER LINEAR OPERATION
- HIGH SATURATED POWER CAPABILITY
- GOLD METALLIZATION FOR HIGH RELIABILITY
- DIFFUSED EMITTER BALLAST RESISTORS
- COMMON EMITTER CONFIGURATION
- $P_{OUT}$ = 120 W MIN. WITH 6.0 dB GAIN



**2 x .437 x .450 2LFL (M175)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1660 | SD1660 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter

### DESCRIPTION

The SD1660 is a gold metallized epitaxial silicon NPN planar transistor using diffused emitter ballast resistors for high linearity Class AB operation in cellular base station applications.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 60 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 30 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.0 | V |
| $I_C$ | Device Current | 25 | A |
| $P_{DISS}$ | Power Dissipation | 310 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 55 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 0.55 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 100mA | $I_E$ = 0mA | 60 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 100mA | $I_B$ = 0mA | 30 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 50mA | $I_C$ = 0mA | 3.0 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 28V | $I_E$ = 0mA | — | — | 10 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 3A | 15 | — | 70 | — |

Tested Per Side

DYNAMIC

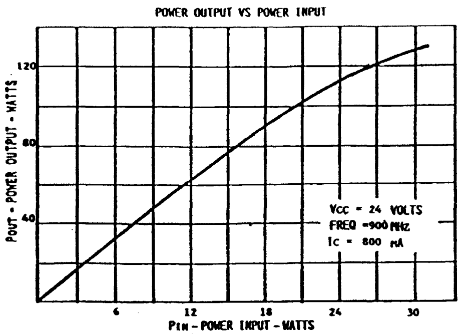
| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$* | f = 900 MHz | $V_{CE}$ = 24 V | $I_{CQ}$ = 2 x 400mA | 120 | — | — | W |
| $G_P$* | f = 900 MHz | $V_{CE}$ = 24 V | $I_{CQ}$ = 2 x 400mA | 6.0 | — | — | dB |
| IMD** | f = 900 MHz | $V_{CE}$ = 24 V | $I_{CQ}$ = 2 x 400mA | — | -32 | — | dBc |
| $\eta_C$ | f = 900 MHz | $V_{CE}$ = 24 V | $I_{CQ}$ = 2 x 400mA | 50 | — | — | % |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 28 V | | — | — | 100 | pF |

Note: * @ 1 dB Compression

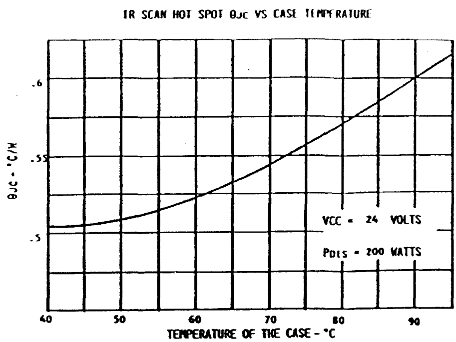
** $P_{OUT}$ = 120W PEP, $\Delta$ F = 600KHz (2 tones)

## TYPICAL PERFORMANCE

### POWER OUTPUT vs POWER INPUT

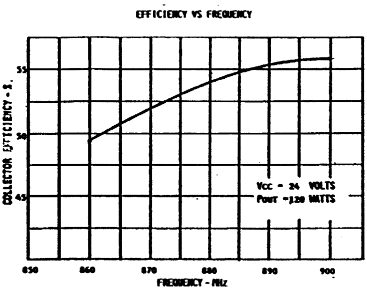



### THERMAL RESISTANCE vs CASE TEMPERATURE

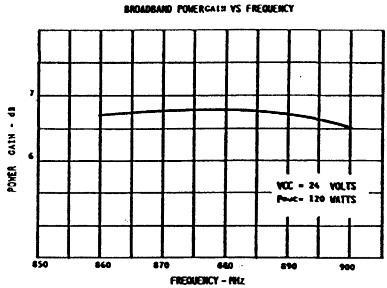


## TYPICAL PERFORMANCE (cont'd)

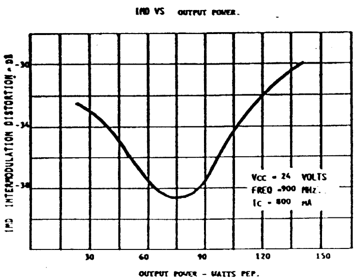
### COLLECTOR EFFICIENCY vs FREQUENCY



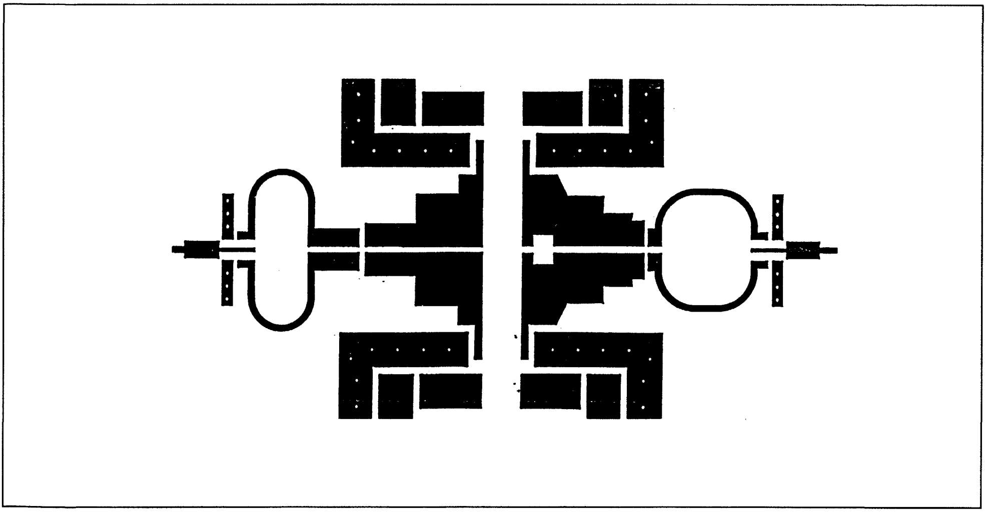

### BROADBAND POWER GAIN vs FREQUENCY



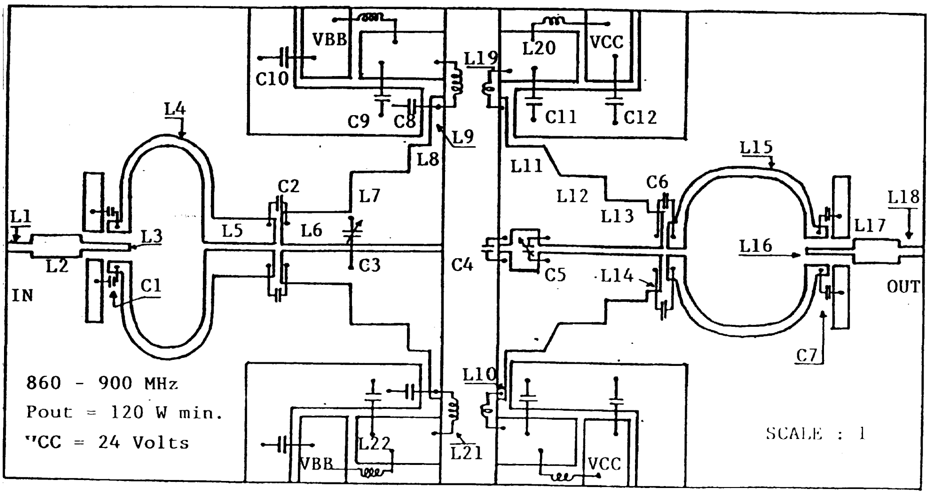

### INTERMODULATION DISTORTION vs POWER OUTPUT




## PHOTOMASTER OF TEST CIRCUIT



## TEST CIRCUIT



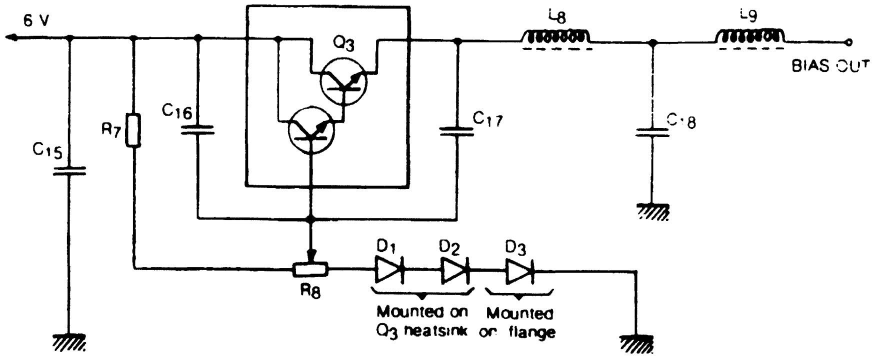

B1, B2 : Coaxial Cable 25.43mm

C1, C2 : 330pF, ATC 100B
C3 : .8 - 8.0pF Johanson Gigatrim
C4 : 4.7 + 3.9pF, ATC 100B
C5 : 3.9 + 1.7pF, ATC 100B + .8 - 8.0pF Johanson Gigatrim
C6, C7 : 330pF, ATC 100B
C8 : 120pF ATC 100B
C9 : 1.5nF, ATC 100B
C10 : 10nF + 47µF, 63V
C11 : 1.5nF, ATC 100B + 10nF
C12 : 470pF + 1.5nF, ATC 100B + 100mF, 63V

Substrate: Teflon Glass, Er = 2.55, 30Mils Thick

L1, L18 : Printed Line 50Ω
L2, L17 : Printed Line 26.7Ω 10mm
L3, L16 : Printed Line 60Ω 10.5mm
L4, L15 : Printed Line 50Ω 43mm
L5 : Printed Line 25Ω 13.5mm
L6 : Printed Line 21Ω 15mm
L7 : Printed Line 10.5Ω 12.5mm
L8 : Printed Line 8Ω 7.5mm
L9, L10 : Printed Line 50Ω 10mm
L11 : Printed Line 9.5Ω 10.5mm
L12 : Printed Line 11Ω 14.5mm
L13 : Printed Line 15.5Ω 8.5mm
L14 : Printed Line 19Ω 3.5mm
L19 : 2 Turns, #16 AWG
L20 : 2 Turns, #16 AWG
L21, L22 : 12 Turns, #22 AWG

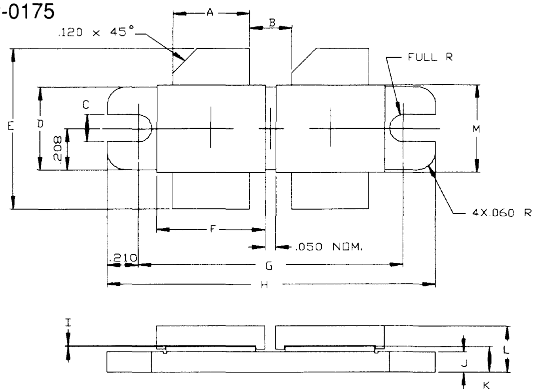
## BIAS VOLTAGE SOURCE




| | | |
|---|---|---|
| C15 | : | 10nF + 100nF + 10μF |
| C16 | : | 10nF |
| C17 | : | 1μF |
| C18 | : | 1.2nF + 27nF + 10μF |
| D1 | : | AAY 49, Ge Diode Thermally Connected with Q3 Heatsink |
| D2 | : | 1N 4005, SI Diode Thermally Connected with Q3 Heatsink |
| D3 | : | 1N 4005, SI Diode Thermally Connected with RF Transistors Flange |
| L8, L9 | : | Ferrite Choke |
| Q3 | : | BDX 63B |
| R7 | : | 470Ω, 1/2W |
| R8 | : | 100Ω, Trimpot |

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0175



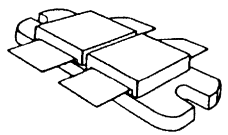

| SGS-THOMSON MICROELECTRONICS | | | CONT'D | | |
|---|---|---|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm | | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .373/9,47 | .385/9,78 | K | .115/2,92 | .135/3,43 |
| B | .190/4,83 | | L | | .250/6,35 |
| C | .125/3,18 | | M | .445/11,30 | .455/11,56 |
| D | .411/10,44 | .421/10,69 | | | |
| E | .825/20,96 | .865/21,97 | | | |
| F | .525/13,34 | .535/13,59 | | | |
| G | 1.255/31,88 | 1.265/32,13 | | | |
| H | 1.675/42,55 | 1.685/42,80 | | | |
| I | .002/0,05 | .006/0,15 | | | |
| J | .095/2,41 | .105/2,67 | | | |

SGS-THOMSON MICROELECTRONICS

# SD1680

## RF & MICROWAVE TRANSISTORS 800/900 MHz APPLICATIONS

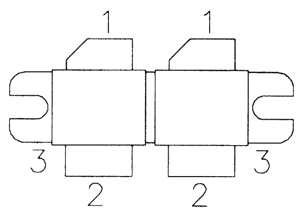
- 915 - 960 MHz
- 24 VOLTS
- CLASS AB PUSH PULL
- INTERNAL INPUT MATCHING
- DESIGNED FOR HIGH POWER LINEAR OPERATION
- HIGH SATURATED POWER CAPABILITY
- GOLD METALLIZATION FOR HIGH RELIABILITY
- DIFFUSED EMITTER BALLAST RESISTORS
- COMMON EMITTER CONFIGURATION
- $P_{OUT}$ = 100 W MIN. WITH 7.0 dB GAIN



**2 x .437 x .450 2LFL (M175)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1680 | SD1680 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter

## DESCRIPTION

The SD1680 is a gold metallized epitaxial silicon NPN planar transistor using diffused emitter ballast resistors for high linearity Class AB operation in cellular base station applications.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 60 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 30 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.0 | V |
| $I_C$ | Device Current | 25 | A |
| $P_{DISS}$ | Power Dissipation | 310 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 55 to +150 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 0.55 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 100mA | $I_E$ = 0mA | 60 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 100mA | $I_B$ = 0mA | 30 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 50mA | $I_C$ = 0mA | 3.0 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 28V | $I_E$ = 0mA | — | — | 10 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 3A | 15 | — | 70 | — |

Tested Per Side

### DYNAMIC

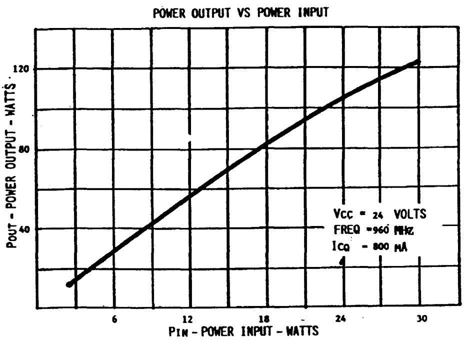
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$* | f = 900 MHz | $V_{CE}$ = 24 V | $I_{CQ}$ = 2 x 300 mA | 120 | — | — | W |
| $G_P$* | f = 900 MHz | $V_{CE}$ = 24 V | $I_{CQ}$ = 2 x 300 mA | 7.0 | — | — | dB |
| IMD** | f = 900 MHz | $V_{CE}$ = 24 V | $I_{CQ}$ = 2 x 300 mA | — | –32 | — | dBc |
| $\eta_C$ | f = 900 MHz | $V_{CE}$ = 24 V | $I_{CQ}$ = 2 x 300 mA | 45 | — | — | % |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 28 V | | — | — | 100 | pF |

Note: * @ 1 dB Compression

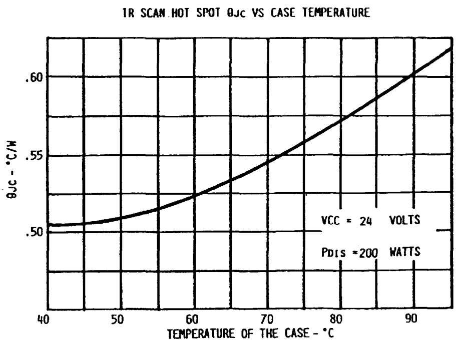
** $P_{OUT}$ = 100W PEP, $\Delta$ F = 400KHz (2 tones)

## TYPICAL PERFORMANCE

### POWER OUTPUT vs POWER INPUT

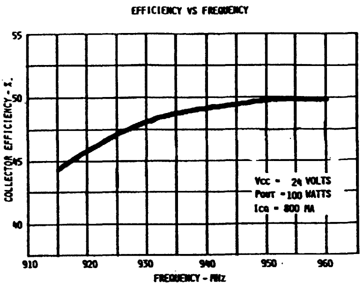



### THERMAL RESISTANCE vs CASE TEMPERATURE

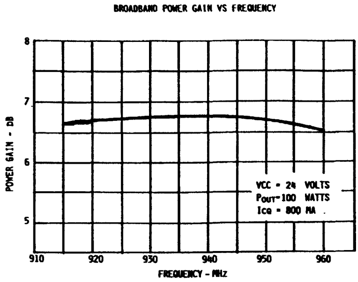


## TYPICAL PERFORMANCE (cont'd)

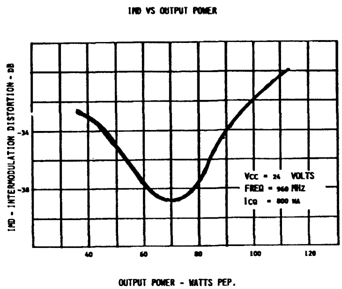
### COLLECTOR EFFICIENCY vs FREQUENCY



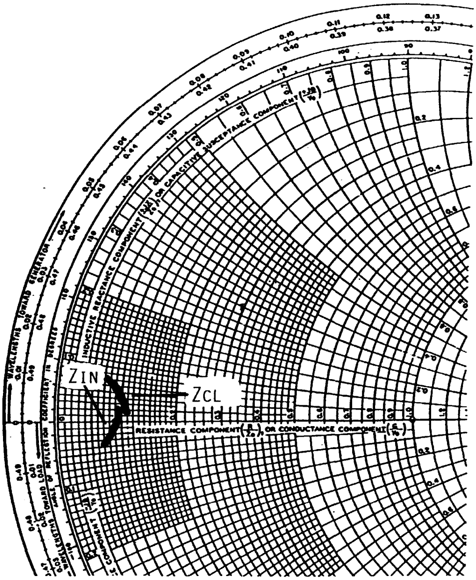

### BROADBAND POWER GAIN vs FREQUENCY




### INTERMODULATION DISTORTION vs POWER OUTPUT



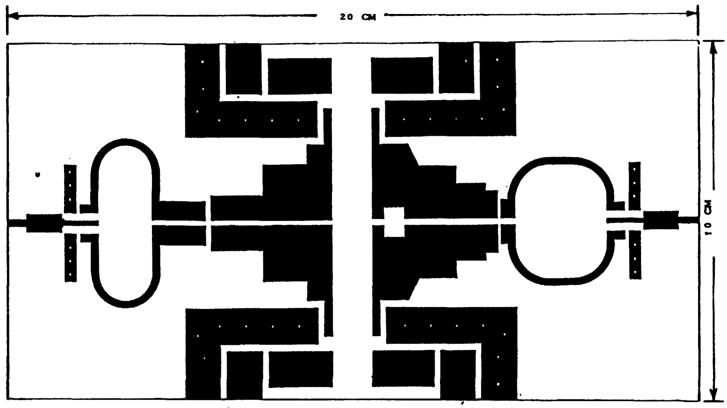
## IMPEDANCE DATA

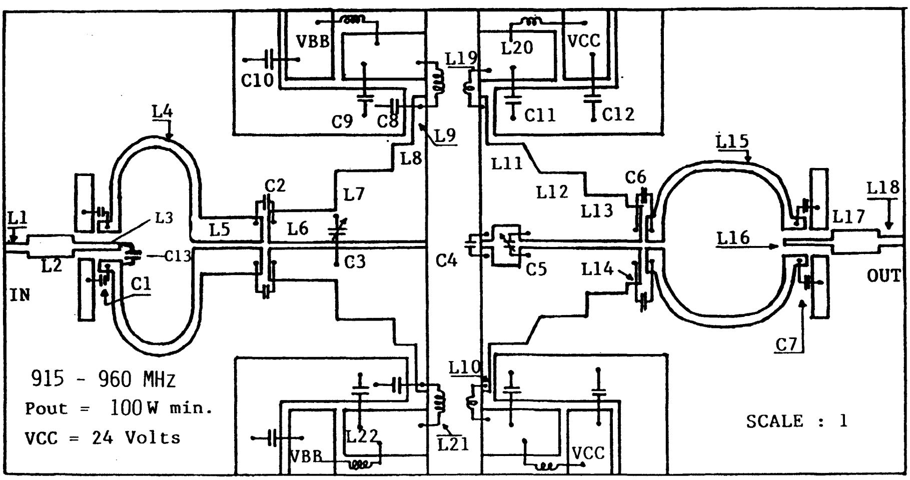



| FREQ. | $Z_{IN}$ (Ω)* | $Z_{CL}$ (Ω)** |
|---|---|---|
| 910 MHz | 4.8 + j 0.95 | 5.0 + j 0.9 |
| 930 MHz | 4.5 + j 0.0 | 4.6 + j 1.7 |
| 950 MHz | 4.3 − j 1.0 | 4.2 + j 2.6 |
| 970 MHz | 4.1 − j 1.9 | 3.8 + j 3.4 |

* Base to Base
** Collector to Collector
$P_{OUT}$ = 100W
$V_{CC}$ = 24V
Normalized to 50 Ohms

## TEST CIRCUIT



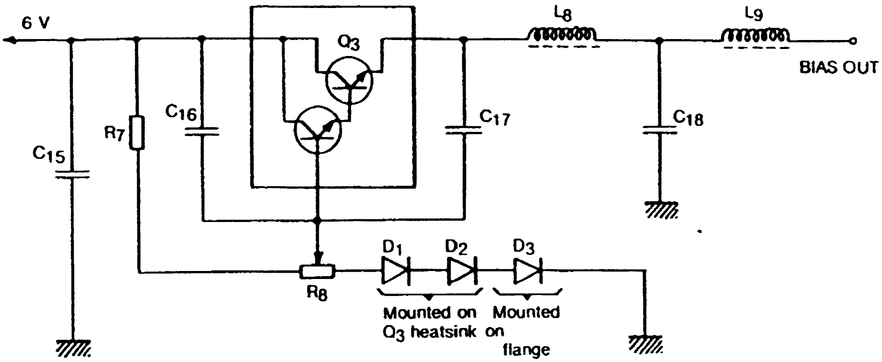

B1, B2 : Coaxial Cable 25, 43mm

C1, C2 : 330pF, ATC 100B
C3 : .8 - 8.0pF Johanson Gigatrim
C4 : 2 x 3.6pF + 1.6pF ATC 100B
C5 : 3.3pF ATC 100B + .8 - 8.0pF Johanson Gigatrim
C6, C7 : 330pF, ATC 100B
C8 : 120pF ATC 100B
C9 : 1.5nF, ATC 100B
C10 : 10nF + 47µF, 63V
C11 : 1.5nF, ATC 100B + 10nF
C12 : 470pF + 1.5nF, ATC 100B + 100mF, 63V
C13 : .4 - 4pF Johanson Gigatrim

Substrate: Teflon Glass, Er = 2.55, 30Mils Thick

L1, L18 : Printed Line 50Ω
L2, L17 : Printed Line 26.7Ω 10mm
L3, L16 : Printed Line 60Ω 10.5mm
L4, L15 : Printed Line 50Ω 43mm
L5 : Printed Line 25Ω 13.5mm
L6 : Printed Line 21Ω 15mm
L7 : Printed Line 10.5Ω 12.5mm
L8 : Printed Line 8Ω 7.5mm
L9, L10 : Printed Line 50Ω 10mm
L11 : Printed Line 9.5Ω 10.5mm
L12 : Printed Line 11Ω 14.5mm
L13 : Printed Line 15.5Ω 8.5mm
L14 : Printed Line 19Ω 3.5mm
L19 : 2 Turns, #16 AWG
L20 : 2 Turns, #16 AWG
L21, L22 : 12 Turns, #22 AWG

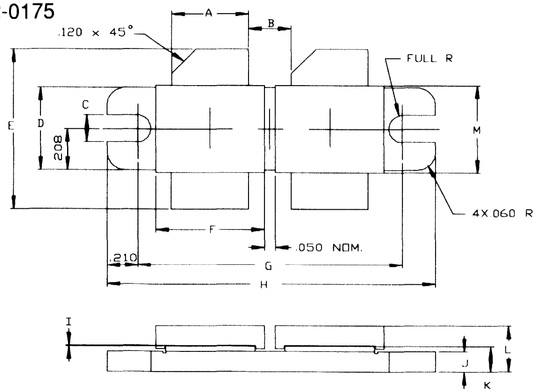
## BIAS VOLTAGE SOURCE




| | | |
|---|---|---|
| C15 | : | 10nF + 100nF + 10µF |
| C16 | : | 10nF |
| C17 | : | 1µF |
| C18 | : | 1.2nF + 27nF + 10µF |
| D1 | : | AAY 49, Ge Diode Thermally Connected with Q3 Heatsink |
| D2 | : | 1N 4005, SI Diode Thermally Connected with Q3 Heatsink |
| D3 | : | 1N 4005, SI Diode Thermally Connected with RF Transistors Flange |
| L8, L9 | : | Ferrite Choke |
| Q3 | : | BDX 63B |
| R7 | : | 470Ω, 1/2W |
| R8 | : | 100Ω, Trimpot |

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0175



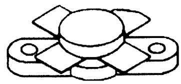

| SGS-THOMSON MICROELECTRONICS | | | CONT'D | | |
|---|---|---|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm | | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .373/9,47 | .385/9,78 | K | .115/2,92 | .135/3,43 |
| B | .190/4,83 | | L | | .250/6,35 |
| C | .125/3,18 | | M | .445/11,30 | .455/11,56 |
| D | .411/10,44 | .421/10,69 | | | |
| E | .825/20,96 | .865/21,97 | | | |
| F | .525/13,34 | .535/13,59 | | | |
| G | 1.255/31,88 | 1.265/32,13 | | | |
| H | 1.675/42,55 | 1.685/42,80 | | | |
| I | .002/0,05 | .006/0,15 | | | |
| J | .095/2,41 | .105/2,67 | | | |

SGS-THOMSON
MICROELECTRONICS

# SD1726 (THA15)

## RF & MICROWAVE TRANSISTORS
## HF SSB APPLICATIONS

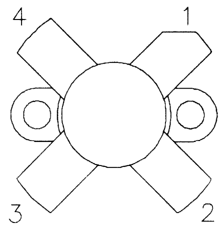
- OPTIMIZED FOR SSB
- 30 MHz
- 50 VOLTS
- IMD –30 dB
- COMMON EMITTER
- GOLD METALLIZATION
- $P_{OUT}$ = 150 W PEP MIN. WITH 14 dB GAIN



**.500 4LFL (M174)**
epoxy sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| SD1726 | THA15 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

### DESCRIPTION

The SD1726 is a 50 V epitaxial silicon NPN planar transistor designed primarily for SSB communications. This device utilizes emitter ballasting to achieve extreme ruggedness under severe operating conditions.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 110 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 55 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 10 | A |
| $P_{DISS}$ | Power Dissipation | 233 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j\text{-}c)}$ | Junction-Case Thermal Resistance | 0.75 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case} = 25°C$)

### STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C = 100mA$ | $I_E = 0mA$ | 110 | — | — | V |
| $BV_{CES}$ | $I_C = 100mA$ | $V_{BE} = 0V$ | 110 | — | — | V |
| $BV_{CEO}$ | $I_C = 100mA$ | $I_B = 0mA$ | 55 | — | — | V |
| $BV_{EBO}$ | $I_E = 10mA$ | $I_C = 0mA$ | 4.0 | — | — | V |
| $I_{CEO}$ | $V_{CE} = 30V$ | $I_E = 0mA$ | — | — | 5 | mA |
| $I_{CES}$ | $V_{CE} = 60V$ | $I_E = 0mA$ | — | — | 5 | mA |
| $h_{FE}$ | $V_{CE} = 6V$ | $I_C = 1.4A$ | 18 | — | 43.5 | — |

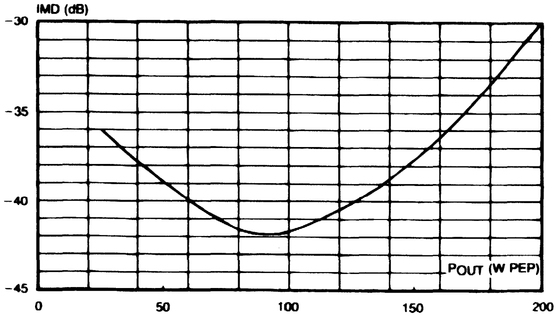
### DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 30 MHz | $V_{CE} = 50$ V | $I_{CQ} = 100mA$ | 150 | — | — | W |
| $G_P$* | $P_{OUT} = 150$ WPEP | $V_{CE} = 50$ V | $I_{CQ} = 100mA$ | 14 | — | — | dB |
| IMD* | $P_{OUT} = 150$ WPEP | $V_{CE} = 50$ V | $I_{CQ} = 100mA$ | — | — | –30 | dBc |
| $\eta_C$* | $P_{OUT} = 150$ WPEP | $V_{CE} = 50$ V | $I_{CQ} = 100mA$ | 37 | — | — | % |
| $C_{OB}$ | f = 1 MHz | $V_{CB} = 50$ V | | — | — | 220 | pF |

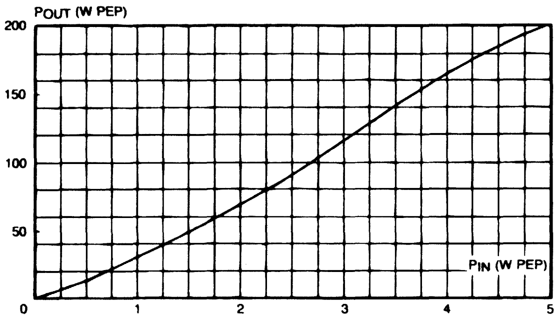
Note: The SD1726 is also usable in Class A at 40 V. Typical performance is:
$P_{OUT} = 30$ W PEP, $G_P = 14$ dB, IMD = – 40dBc
* $f_1 = 30.00$ MHz; $f_2 = 30.001$ MHz

## TYPICAL PERFORMANCE

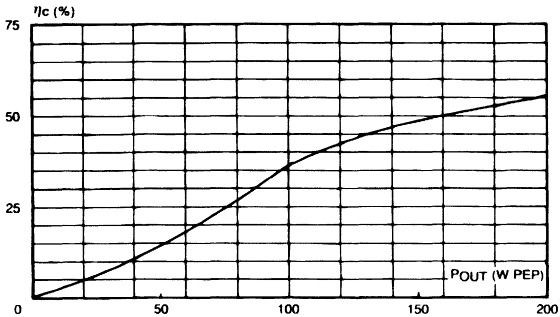
### INTERMODULATION DISTORTION vs POWER OUTPUT PEP




### POWER OUTPUT PEP vs POWER INPUT

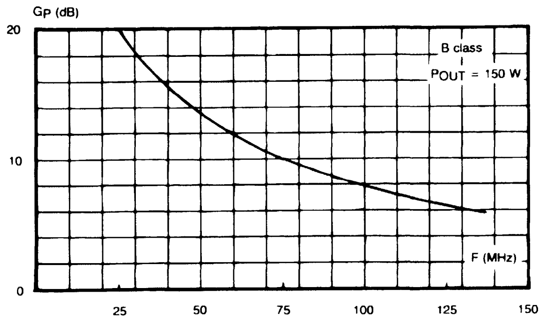



### COLLECTOR EFFICIENCY vs POWER OUTPUT PEP

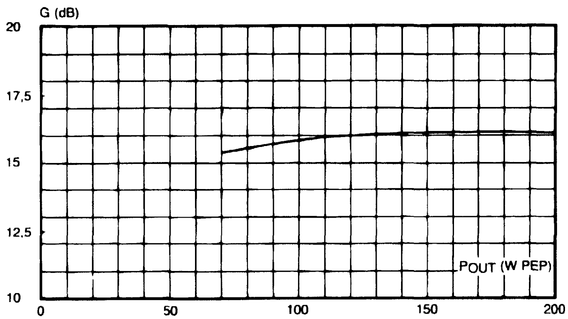


## TYPICAL PERFORMANCE (cont'd)

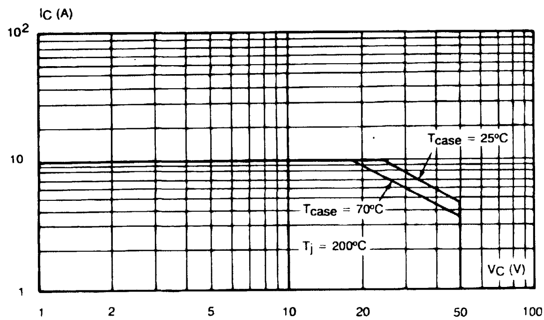
### POWER GAIN vs FREQUENCY




### POWER GAIN vs POWER OUTPUT PEP

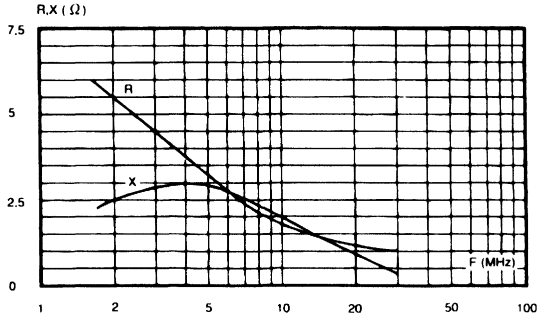



### SAFE OPERATING AREA

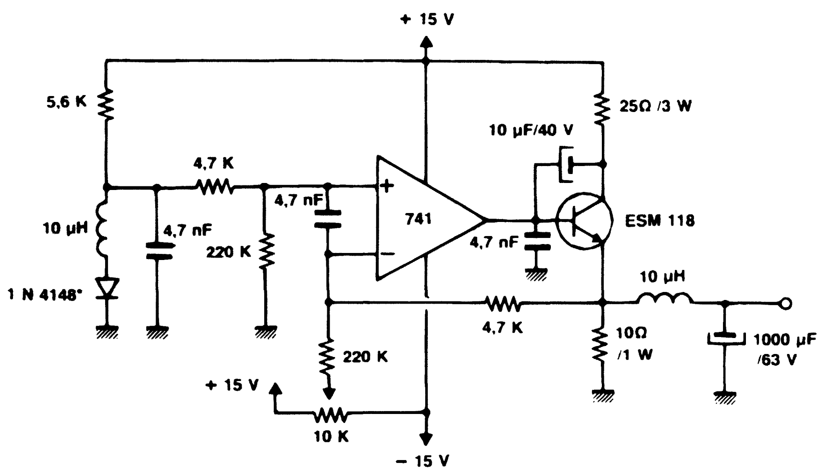


## IMPEDANCE DATA

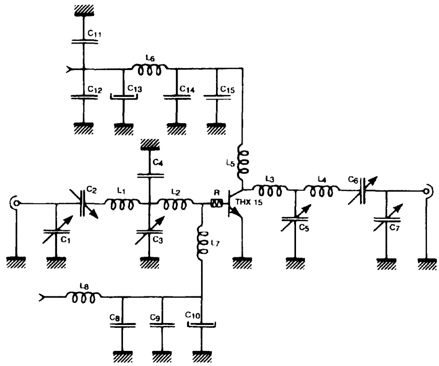
### TYPICAL INPUT IMPEDANCE




## BIAS CRCUIT



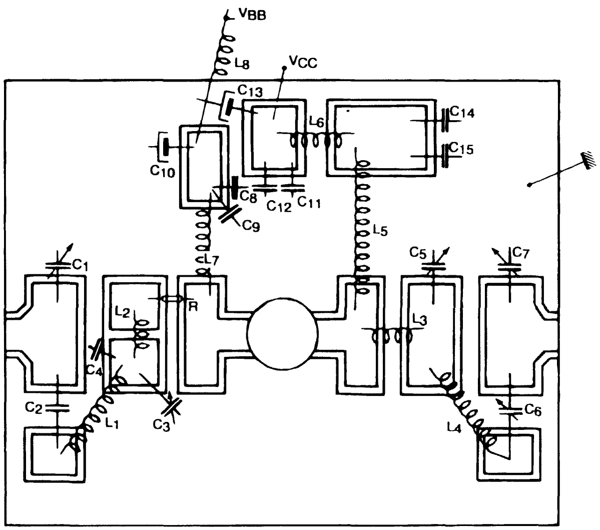
## TEST CIRCUIT - CLASS AB - 30 MHz




| | | |
|---|---|---|
| C1 | : | Arco 427 |
| C2 | : | Arco 4611 |
| C3 | : | Arco 4615 |
| C4 | : | 220pF |
| C5, C6 | : | Arco 4215 |
| C7 | : | Arco 426 |
| C8, C12 | : | 100nF 63V |
| C9, C11 C15 | : | 1nF |
| C10 | : | 470μF 40V |
| C13 | : | 220μF 63V |
| C14 | : | 10nF |

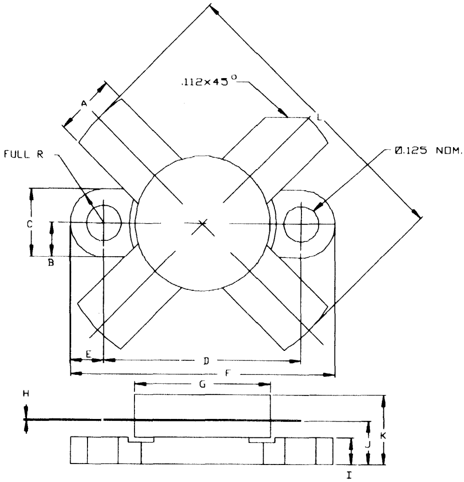
| | | |
|---|---|---|
| L1 | : | 5 Turns Diameter 8mm, 1.3mm Wire, Length 15mm |
| L2 | : | Hair Pin Copper Foil 20 x 5mm, 0.2mm Thick |
| L3 | : | 1 Turn Diameter 10mm, 1.3mm Wire, Length 8mm |
| L4 | : | 6 Turns Diameter 8mm, 1.3mm Wire, Length 25mm |
| L5 | : | 4 Turns Diameter 12mm, 2mm Wire, Length 25mm |
| L6, L7 L8 | : | Choke |
| R | : | 0.6Ω |

## MOUNTING CIRCUIT - CLASS AB - 30MHz



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0174




| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .220/5,59 | .230/5,84 |
| B | .125/3,18 | |
| C | .245/6,22 | .255/6,48 |
| D | .720/18,28 | .730/18,54 |
| E | 125/3,18 | |
| F | .970/24,64 | .980/24,89 |
| G | .495/12,57 | .505/12,83 |
| H | .003/0,08 | .007/0,18 |
| I | .090/2,29 | .110/2,79 |
| J | .160/4,06 | .175/4,45 |

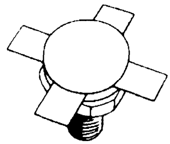
| CONT'D | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| K | | .280/7,11 |
| L | | 1.050/26,67 |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

**SGS-THOMSON MICROELECTRONICS**

# SD1727 (THX15)

## RF & MICROWAVE TRANSISTORS HF SSB APPLICATIONS

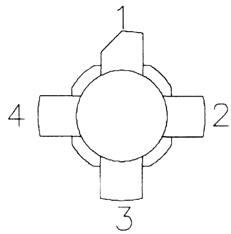
- OPTIMIZED FOR SSB
- 30 MHz
- 50 VOLTS
- IMD –30 dB
- COMMON EMITTER
- GOLD METALLIZATION
- $P_{OUT}$ = 150 W PEP MIN. WITH 14 dB GAIN



**.500 4LFL (M164)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1727 | THX15 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

### DESCRIPTION

The SD1727 is a 50 V epitaxial silicon NPN planar transistor designed primarily for SSB communications. This device utilizes emitter ballasting to achieve extreme ruggedness under severe operating conditions.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 110 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 55 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 10 | A |
| $P_{DISS}$ | Power Dissipation | 233 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 0.75 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case} = 25°C$)

### STATIC

| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C = 100mA$ | $I_E = 0mA$ | 110 | — | — | V |
| $BV_{CES}$ | $I_C = 100mA$ | $V_{BE} = 0V$ | 110 | — | — | V |
| $BV_{CEO}$ | $I_C = 100mA$ | $I_B = 0mA$ | 55 | — | — | V |
| $BV_{EBO}$ | $I_E = 10mA$ | $I_C = 0mA$ | 4.0 | — | — | V |
| $I_{CEO}$ | $V_{CE} = 30V$ | $I_E = 0mA$ | — | — | 5 | mA |
| $I_{CES}$ | $V_{CE} = 60V$ | $I_E = 0mA$ | — | — | 5 | mA |
| $h_{FE}$ | $V_{CE} = 6V$ | $I_C = 1.4A$ | 18 | — | 43.5 | — |

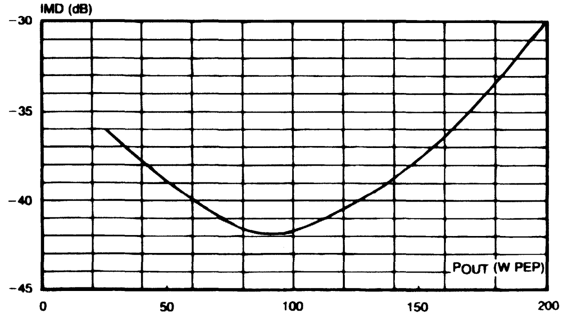
### DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 30 MHz | $V_{CE} = 50$ V | $I_{CQ} = 100mA$ | 150 | — | — | W |
| $G_P$* | $P_{OUT} = 150$ WPEP | $V_{CE} = 50$ V | $I_{CQ} = 100mA$ | 14 | — | — | dB |
| IMD* | $P_{OUT} = 150$ WPEP | $V_{CE} = 50$ V | $I_{CQ} = 100mA$ | — | — | -30 | dBc |
| $\eta_c$* | $P_{OUT} = 150$ WPEP | $V_{CE} = 50$ V | $I_{CQ} = 100mA$ | 37 | — | — | % |
| $C_{OB}$ | f = 1 MHz | $V_{CB} = 50$ V | | — | — | 220 | pF |

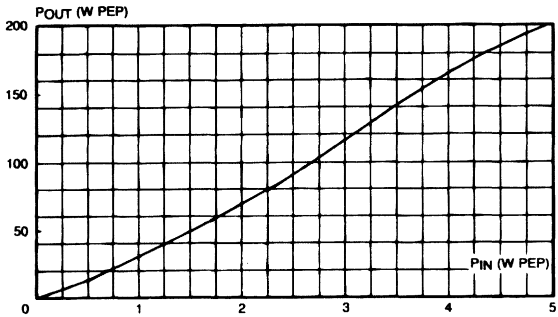
Note: The SD1727 is also usable in Class A at 40 V. Typical performance is:
$P_{OUT} = 30$ W PEP, $G_P = 14$ dB, IMD = – 40dBc
* $f_1 = 30.00$ MHz; $f_2 = 30.001$ MHz

## TYPICAL PERFORMANCE

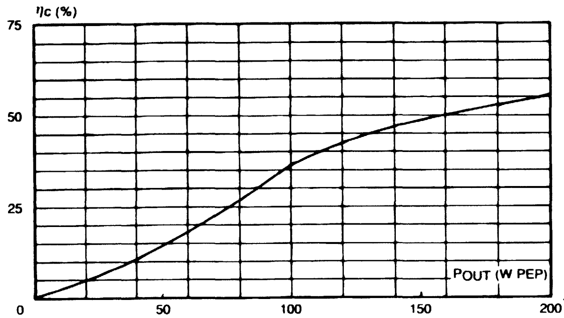
### INTERMODULATION DISTORTION vs POWER OUTPUT PEP




### POWER OUTPUT PEP vs POWER INPUT

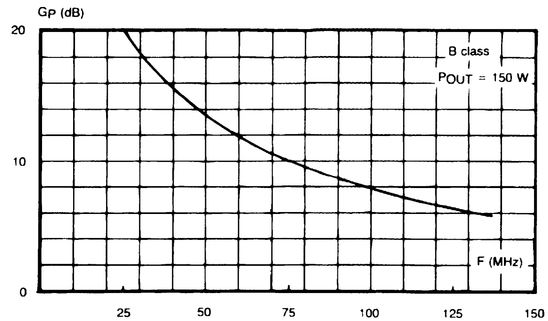



### COLLECTOR EFFICIENCY vs POWER OUTPUT PEP

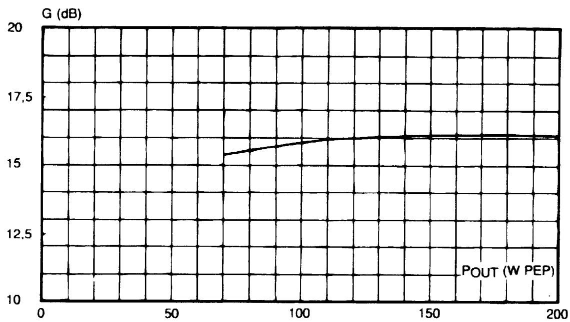


## TYPICAL PERFORMANCE (cont'd)

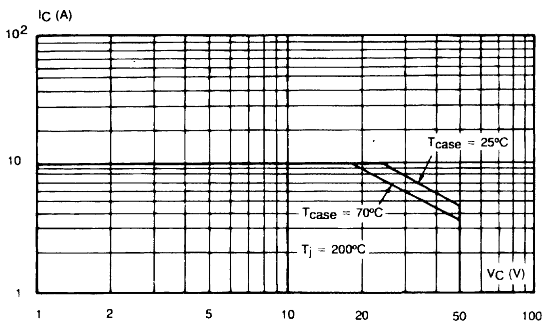
### POWER GAIN vs FREQUENCY




### POWER GAIN vs POWER OUTPUT PEP

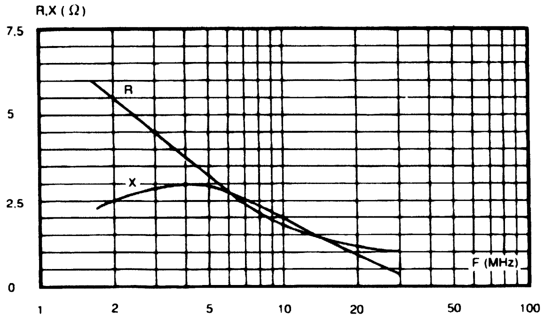



### SAFE OPERATING AREA

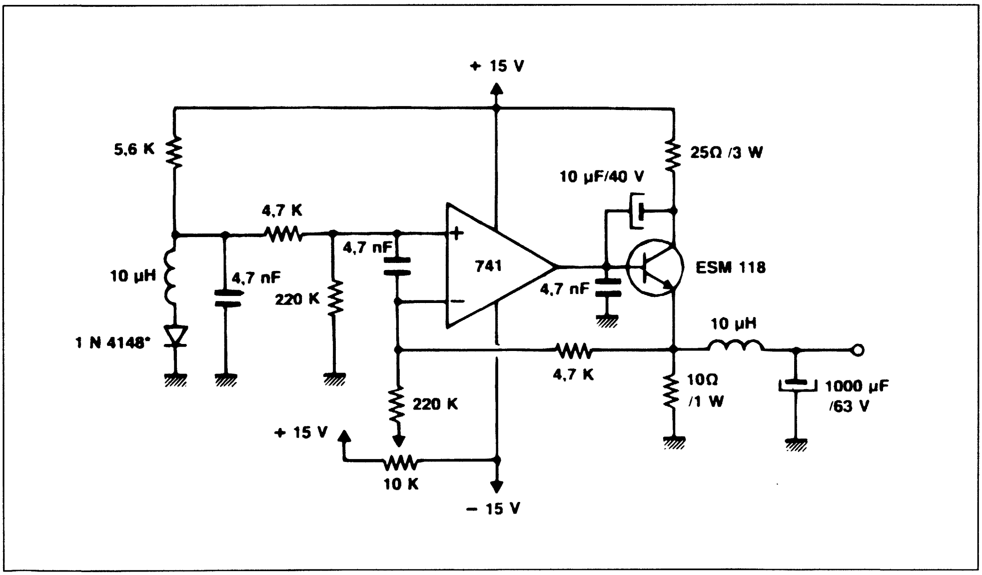


## IMPEDANCE DATA

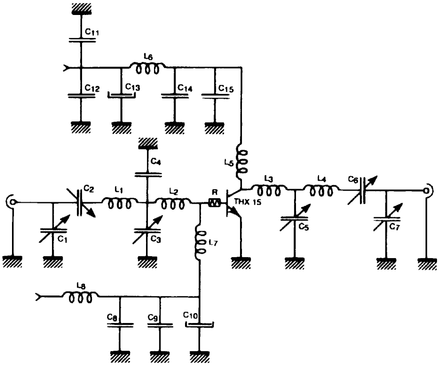
### TYPICAL INPUT IMPEDANCE




## BIAS CRCUIT



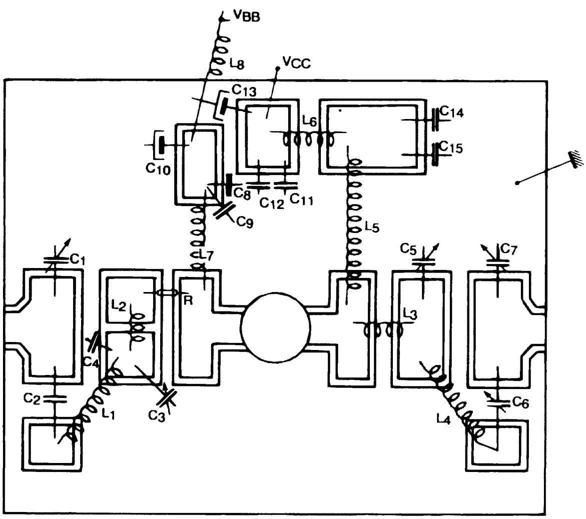
## TEST CIRCUIT - CLASS AB - 30 MHz




| | | |
|---|---|---|
| C1 | : | Arco 427 |
| C2 | : | Arco 4611 |
| C3 | : | Arco 4615 |
| C4 | : | 220pF |
| C5, C6 | : | Arco 4215 |
| C7 | : | Arco 426 |
| C8, C12 | : | 100nF 63V |
| C9, C11<br>C15 | : | 1nF |
| C10 | : | 470µF 40V |
| C13 | : | 220µF 63V |
| C14 | : | 10nF |

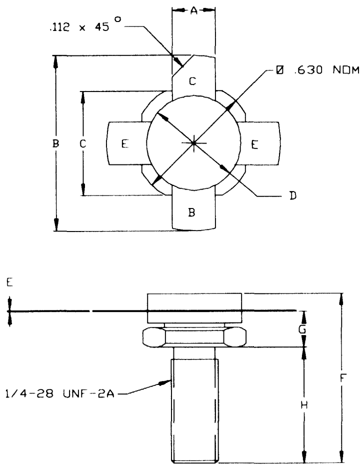
| | | |
|---|---|---|
| L1 | : | 5 Turns Diameter 8mm, 1.3mm Wire, Length 15mm |
| L2 | : | Hair Pin Copper Foil 20 x 5mm, 0.2mm Thick |
| L3 | : | 1 Turn Diameter 10mm, 1.3mm Wire, Length 8mm |
| L4 | : | 6 Turns Diameter 8mm, 1.3mm Wire, Length 25mm |
| L5 | : | 4 Turns Diameter 12mm, 2mm Wire, Length 25mm |
| L6, L7<br>L8 | : | Choke |
| R | : | 0.6Ω |

## MOUNTING CIRCUIT - CLASS AB - 30MHz



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0164



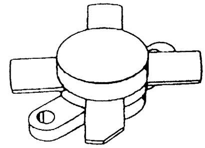

| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .220/5,59 | .230/5,84 |
| B | | 1.050/26,67 |
| C | .545/13,84 | .555/14,10 |
| D | .495/12,57 | .505/12,83 |
| E | .003/0,08 | .007/0,18 |
| F | | .830/21,08 |
| G | .185/4,70 | .198/5,03 |
| H | .497/12,62 | .530/13,46 |
| | | |
| | | |

SGS-THOMSON MICROELECTRONICS

# SD1728 (TH430)

## RF & MICROWAVE TRANSISTORS HF SSB APPLICATIONS

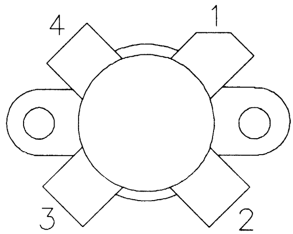
- OPTIMIZED FOR SSB
- 30 MHz
- 50 VOLTS
- IMD − 30 dB
- GOLD METALLIZATION
- COMMON EMITTER
- $P_{OUT}$ = 250 W PEP WITH 14.5 dB GAIN



**.550 4LFL (M177)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1728 | TH430 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

## DESCRIPTION

The SD1728 is a 50 V epitaxial silicon NPN planar transistor designed primarily for SSB and VHF communications. This device utilizes emitter ballasting for improved ruggedness and reliability.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 110 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 55 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 40 | A |
| $P_{DISS}$ | Power Dissipation | 330 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | − 65 to +150 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 0.4 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CES}$ | $I_C$ = 200mA | $V_{BE}$ = 0V | 110 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 200mA | $I_B$ = 0mA | 55 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 20mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $I_{CEO}$ | $V_{CE}$ = 30V | $I_E$ = 0mA | — | — | 10 | mA |
| $I_{CES}$ | $V_{CE}$ = 60V | $I_E$ = 0mA | — | — | 10 | mA |
| $h_{FE}$ | $V_{CE}$ = 6V | $I_C$ = 10A | 15 | — | 45 | — |

### DYNAMIC

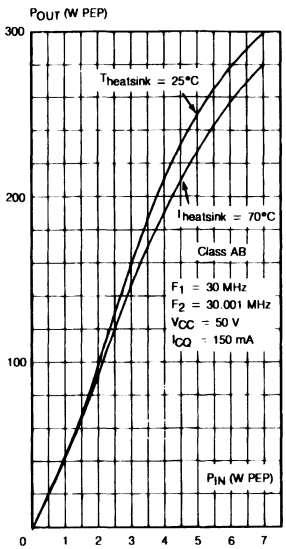
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 30 MHz | $V_{CC}$ = 50 V | $I_{CQ}$ = 150 mA | 250 | — | — | W |
| $G_P$* | $P_{OUT}$ = 250 W PEP | $V_{CC}$ = 50 V | $I_{CQ}$ = 150 mA | 14.5 | — | — | dB |
| IMD* | $P_{OUT}$ = 250 W PEP | $V_{CC}$ = 50 V | $I_{CQ}$ = 150 mA | — | — | –30 | dBc |
| $\eta_c$* | $P_{OUT}$ = 250 W PEP | $V_{CC}$ = 50 V | $I_{CQ}$ = 150 mA | 37 | — | — | % |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 50 V | | — | — | 360 | pF |

Note: * Two Tone Method; $f_1$ = 30.00 MHz; $f_2$ = 30.001 MHz
In Class C: $G_P$ Min. 13.5 dB, Efficiency 65%@ 30MHz
$G_P$ Min. 10 dB, Efficiency 57%@ 70MHz

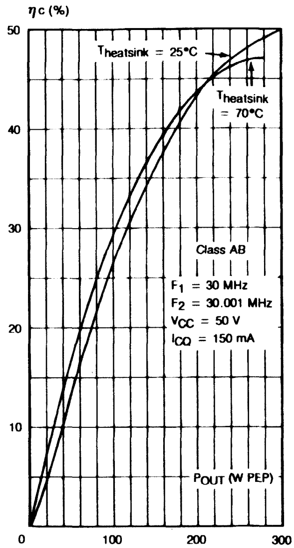
## TYPICAL PERFORMANCE

### CLASS AB

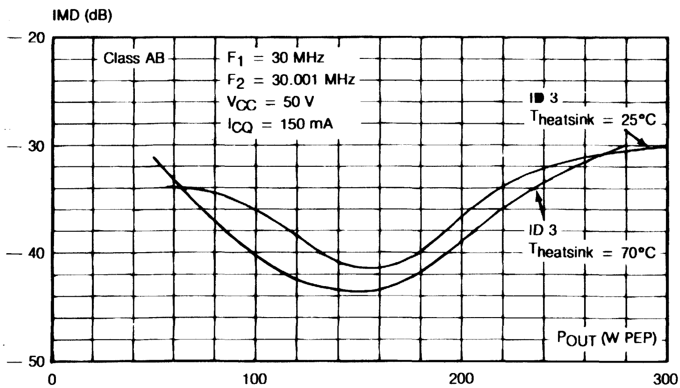
### POWER OUTPUT PEP vs POWER INPUT




### COLLECTOR EFFICIENCY vs POWER OUTPUT PEP

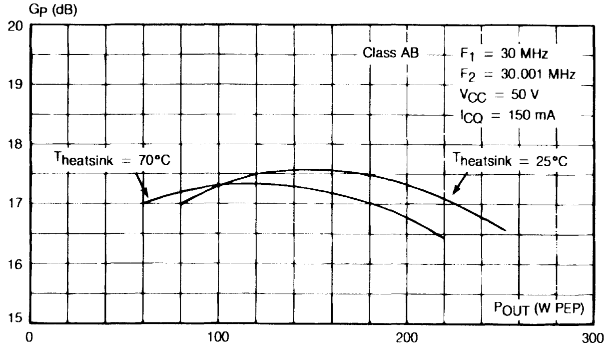



### INTERMODULATION DISTORTION vs POWER OUTPUT PEP

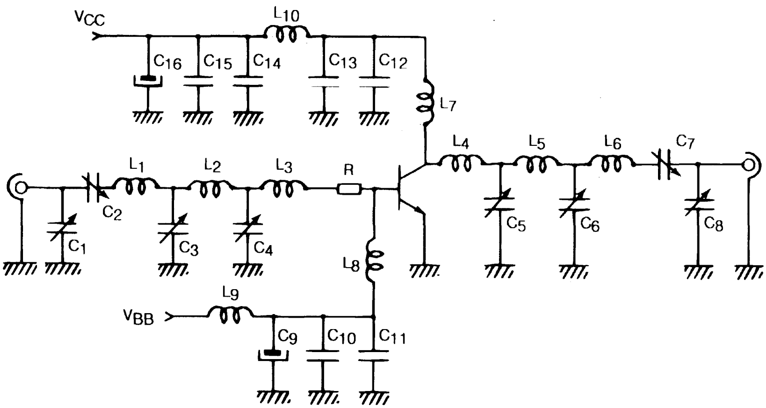


## TYPICAL PERFORMANCE (cont'd)

### POWER GAIN vs POWER OUTPUT PEP




## TEST CIRCUIT SSB - CLASS AB - 30 MHz




| | | |
|---|---|---|
| C1 | : | Arco 429 |
| C2 | : | Arco 4615 |
| C3, C6 | : | Arco 4213 |
| C4, C5, C7 | : | Arco 4611 |
| C8 | : | Arco 427 |
| C9 | : | 470µF, 40V |
| C10, C14 | : | 100nF, 63V |
| C11, C13, C15 | : | 1nF |
| C12 | : | 10nF |
| C16 | : | 220µF, 63V |

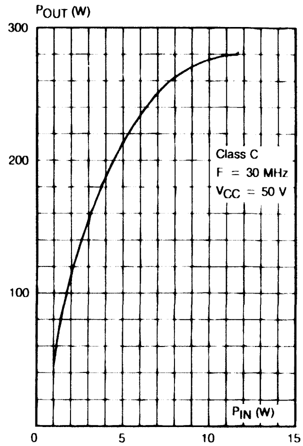
| | | |
|---|---|---|
| L1 | : | 5 Turns, Diameter 10mm, 1.3mm Wire, Length 15mm |
| L2 | : | 2 Turns, Diameter 12mm, 2mm Wire, Length 8mm |
| L3 | : | 1 Turn, Diameter 12mm, 2mm Wire, Length 5mm |
| L4 | : | Hair Pin Copper Foil 20 x 5mm |
| L5 | : | 1 Turn, Diameter 12mm, 2mm Wire, Length 8mm |
| L6 | : | 5 Turns, Diameter 8mm, 1.3mm Wire, Length 18mm |
| L7 | : | 3 Turns, Diameter 8mm, 1.3mm Wire, Length 15mm |
| R | : | 0.25Ω* |

* 4 Resistors 1Ω 0.5W in parallel

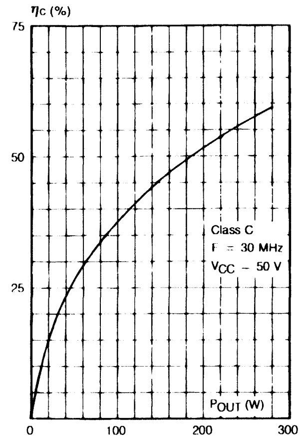
## TYPICAL PERFORMANCE

**CLASS C F = 30 MHz**

### POWER OUTPUT vs POWER INPUT

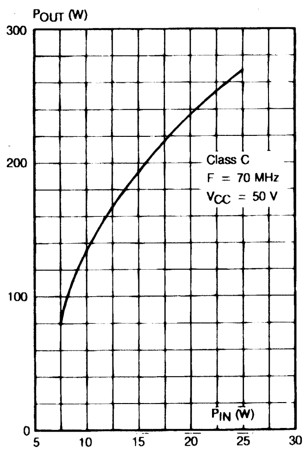



### COLLECTOR EFFICIENCY vs POWER OUTPUT

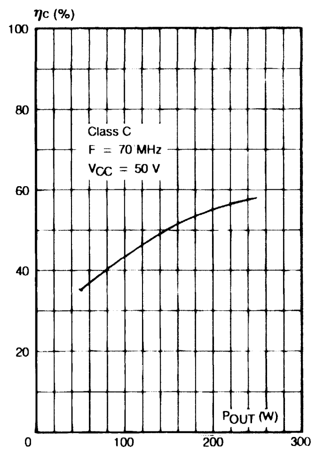



**CLASS C F = 70 MHz**

### POWER OUTPUT vs POWER INPUT

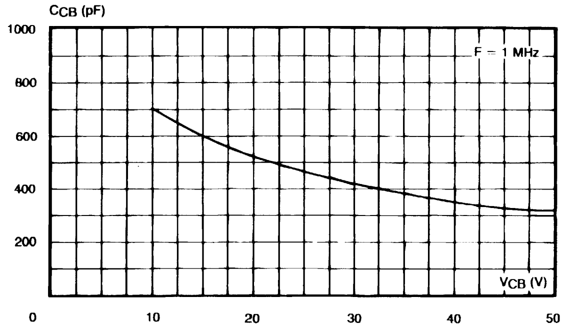



### COLLECTOR EFFICIENCY vs POWER OUTPUT

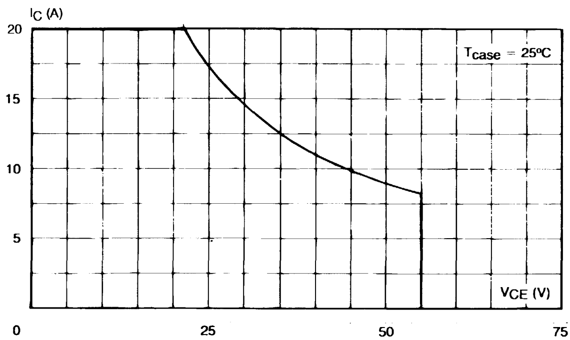


## TYPICAL PERFORMANCE (cont'd)

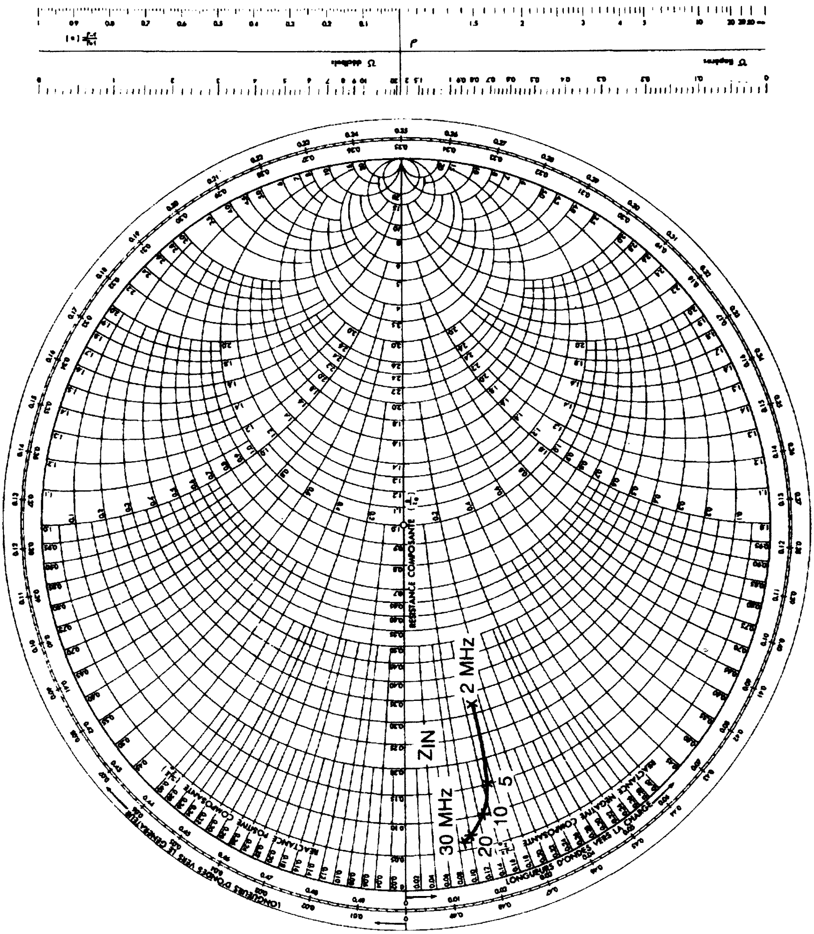
### COLLECTOR BASE CAPACITANCE vs COLLECTOR BASE VOLTAGE




### DC SAFE OPERATING AREA

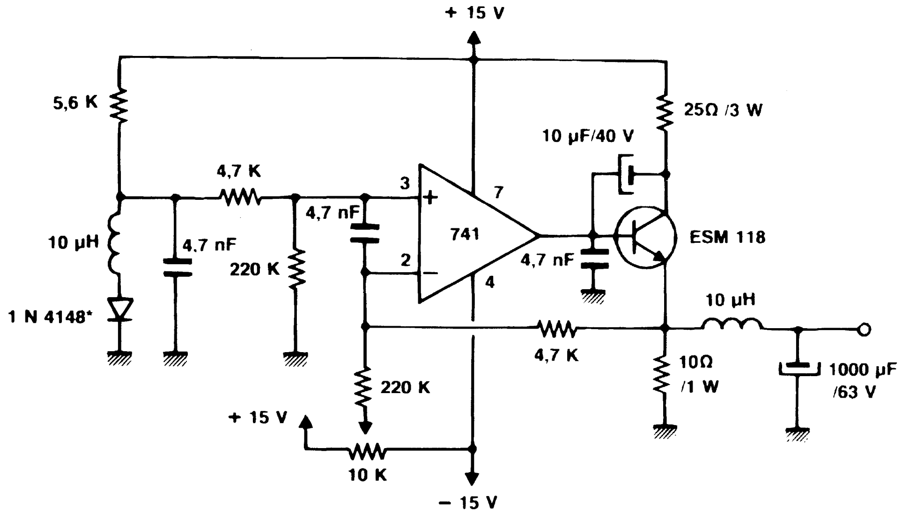


## IMPEDANCE DATA (TYPICAL)

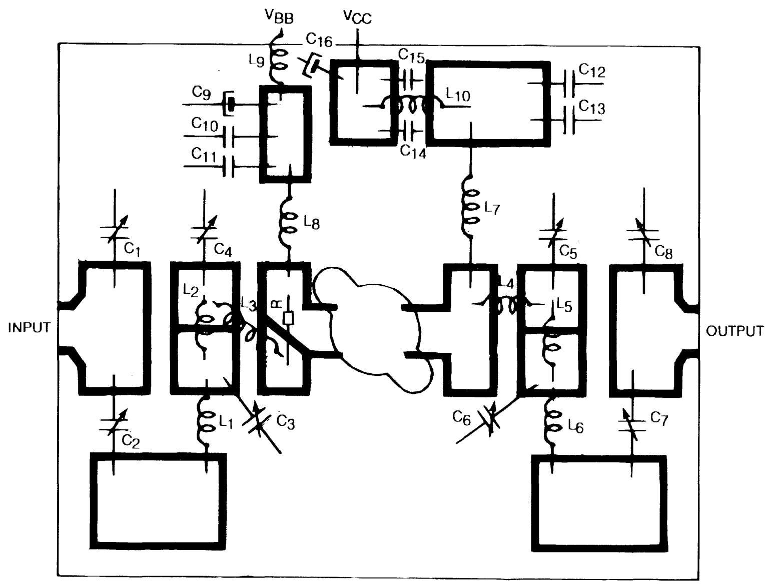



$P_{OUT}$ = 250 W PEP
$V_{CC}$ = 50 V

## BIAS CIRCUIT

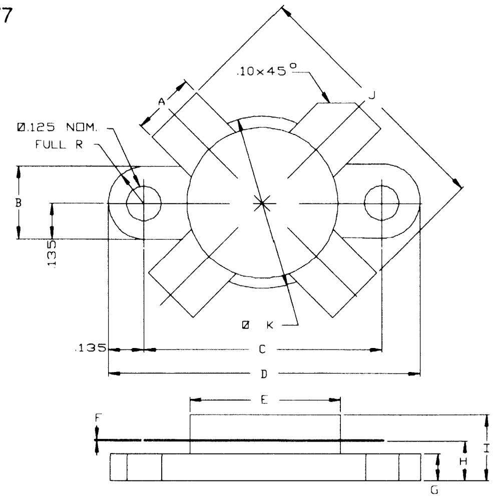



## MOUNTING CIRCUIT



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0177




| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .225/5,72 | .235/5,97 |
| B | .265/6,73 | .275/6,96 |
| C | .860/21,84 | .870/22,10 |
| D | 1.130/28,70 | 1.140/28,96 |
| E | .545/13,84 | .555/14,10 |
| F | .003/0,08 | .007/0,18 |
| G | .100/2,54 | .118/3,00 |
| H | .150/3,81 | .170/4,32 |
| I | | .280/7,11 |
| J | 1.080/27,43 | 1.120/28,45 |

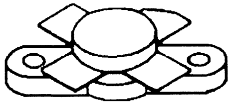
| CONT'D | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| K | .625/15,88 | .635/16,13 |
| | | |
| | | |
| | | |

SGS-THOMSON
MICROELECTRONICS

# SD1729 (TH416)

## RF & MICROWAVE TRANSISTORS
## HF SSB APPLICATIONS

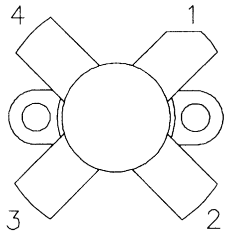
- OPTIMIZED FOR SSB
- 30 MHz
- 28 VOLTS
- IMD −30 dB
- COMMON EMITTER
- GOLD METALLIZATION
- $P_{OUT}$ = 130 W PEP WITH 12 dB GAIN



**.500 4LFL (M174)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1729 | TH416 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

### DESCRIPTION

The SD1729 is a Class AB 28 V epitaxial silicon NPN planar transistor designed primarily for SSB communications. This device utilizes emitter ballasting to achieve extreme ruggedness under severe operating conditions.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 70 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 35 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 12 | A |
| $P_{DISS}$ | Power Dissipation | 175 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | − 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 1.0 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CES}$ | $I_C$ = 50mA | $V_{BE}$ = 0V | 70 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 100mA | $I_B$ = 0mA | 35 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 20mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $I_{CES}$ | $V_{CE}$ = 35V | $I_E$ = 0mA | — | — | 20 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 7A | 18 | — | 50 | — |

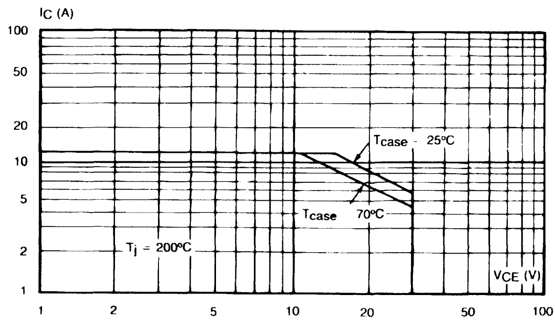
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 30 MHz | $V_{CE}$ = 28 V | $I_{CQ}$ = 150 mA | 130 | — | — | W |
| $G_P$ | $P_{OUT}$ = 130 W PEP | $V_{CE}$ = 28 V | $I_{CQ}$ = 150 mA | 12 | — | — | dB |
| IMD* | $P_{OUT}$ = 130 W PEP | $V_{CE}$ = 28 V | $I_{CQ}$ = 150 mA | — | — | –30 | dBc |
| $\eta_C$ | $P_{OUT}$ = 130 W PEP | $V_{CE}$ = 28 V | $I_{CQ}$ = 150 mA | 37 | — | — | % |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 28 V | | — | 220 | — | pF |

Note: * $f_1$ = 30.00 MHz, $f_2$ = 30.001 MHz

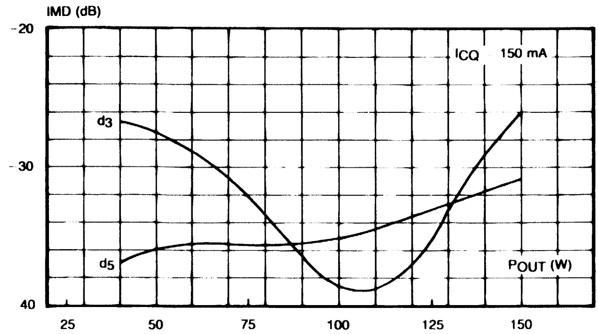
## TYPICAL PERFORMANCE

### SAFE OPERATING AREA

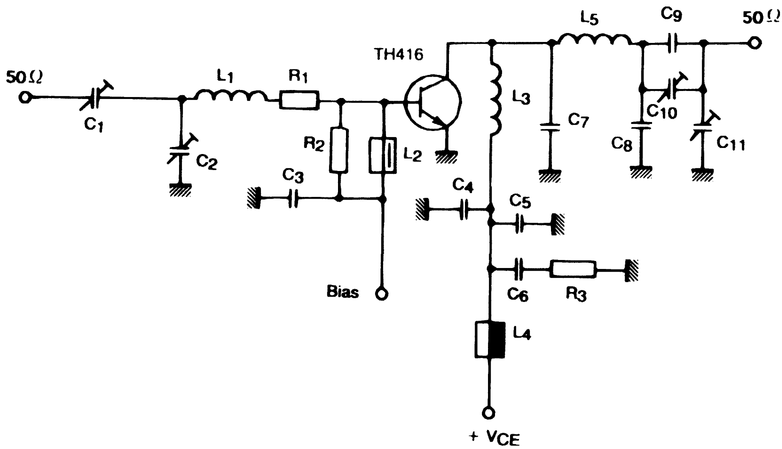


## TYPICAL PERFORMANCE (cont'd)

### INTERMODULATION DISTORTION vs POWER OUTPUT



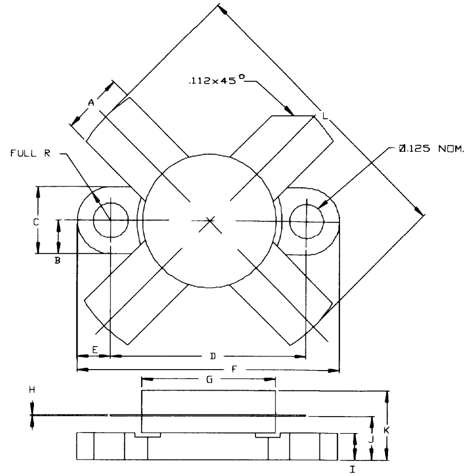

## TEST CIRCUIT




| | | | | | |
|---|---|---|---|---|---|
| C1 | : | 20 - 120pF | L1 | : | 88nF |
| C2 | : | 50 - 300pF | L2 | : | 22μH Choke Coil |
| C3, C4 | : | 3.9nF | L3, L5 | : | 80nF |
| C5 | : | 100nF | L4 | : | Ferroxcube Choke Coil |
| C6 | : | 2.2μF | | | |
| C7 | : | 2 x 180pF in Parallel | R1 | : | 0.55Ω |
| C8 | : | 3 x 56pF and 33pF in Parallel | R2 | : | 27Ω |
| C9 | : | 4 x 56pF and 68pF in Parallel | R3 | : | 4.7Ω |
| C10, C11 | : | 360pF | | | |

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0174




| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .220/5,59 | .230/5,84 |
| B | .125/3,18 | |
| C | .245/6,22 | .255/6,48 |
| D | .720/18,28 | .730/18,54 |
| E | .125/3,18 | |
| F | .970/24,64 | .980/24,89 |
| G | .495/12,57 | .505/12,83 |
| H | .003/0,08 | .007/0,18 |
| I | .090/2,29 | .110/2,79 |
| J | .160/4,06 | .175/4,45 |

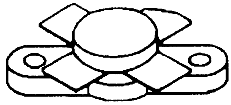
| CONT'D | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| K | | .280/7,11 |
| L | | 1.050/26,67 |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

SGS-THOMSON MICROELECTRONICS

# SD1730 (TH560)

## RF & MICROWAVE TRANSISTORS HF SSB APPLICATIONS

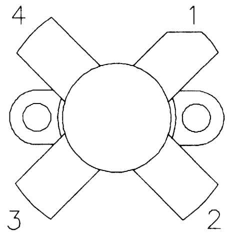
- OPTIMIZED FOR SSB
- 30 MHz
- 28 VOLTS
- IMD −30dB
- EFFICIENCY 40%
- COMMON EMITTER
- GOLD METALLIZATION
- $P_{OUT}$ = 220 W PEP WITH 12 dB GAIN



**.500 4 LFL (M174)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1730 | TH560 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

### DESCRIPTION

The SD1730 is a 28 V epitaxial silicon NPN planar transistor designed primarily for SSB and VHF communications. The devices utlizes emitter ballasting for improved ruggedness and reliability.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 70 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 35 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 16 | A |
| $P_{DISS}$ | Power Dissipation | 320 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | − 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 0.7 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CES}$ | $I_C$ = 100mA | $V_{BE}$ = 0V | 70 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 200mA | $I_B$ = 0mA | 35 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 20mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $I_{CEO}$ | $V_{CE}$ = 30V | $I_E$ = 0mA | — | — | 5 | mA |
| $I_{CES}$ | $V_{CE}$ = 35V | $I_E$ = 0mA | — | — | 5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 7A | 15 | — | 50 | — |

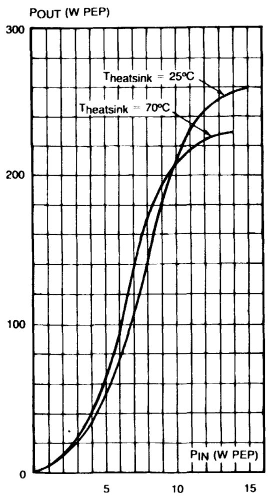
DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 30 MHz | $V_{CE}$ = 28 V | $I_{CQ}$ = 750 mA | 220 | — | — | W |
| $G_P$* | $P_{OUT}$ = 220 W PEP | $V_{CE}$ = 28 V | $I_{CQ}$ = 750 mA | 12 | — | — | dB |
| IMD* | $P_{OUT}$ = 220 W PEP | $V_{CE}$ = 28 V | $I_{CQ}$ = 750 mA | — | — | –30 | dBc |
| $\eta_c$* | $P_{OUT}$ = 220 W PEP | $V_{CE}$ = 28 V | $I_{CQ}$ = 750 mA | 40 | — | — | % |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 28 V | | — | 450 | — | pF |
| Load Mismatch | $P_{OUT}$ = 220 W PEP | $V_{CE}$ = 28 V | $I_{CQ}$ = 750 mA | — | ∞:1 | — | VSWR |

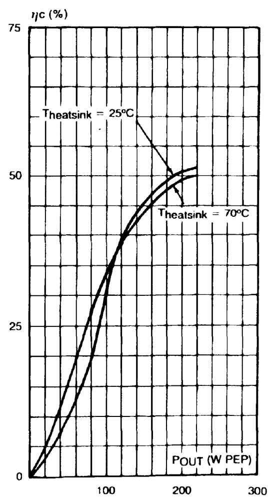
Note: * $f_1$ = 30.00 MHz, $f_2$ = 30.001 MHz

## TYPICAL PERFORMANCE

### POWER OUTPUT PEP vs POWER INPUT

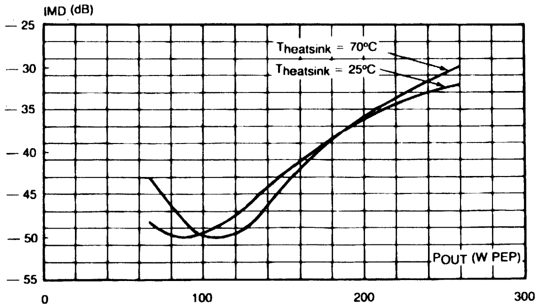



### COLLECTOR EFFICIENCY vs POWER OUTPUT PEP

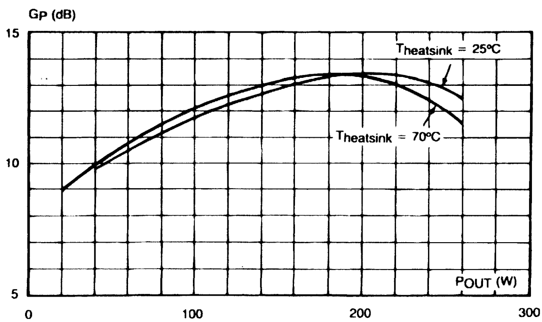


## TYPICAL PERFORMANCE (cont'd)

### INTERMODULATION DISTORTION vs POWER OUTPUT PEP



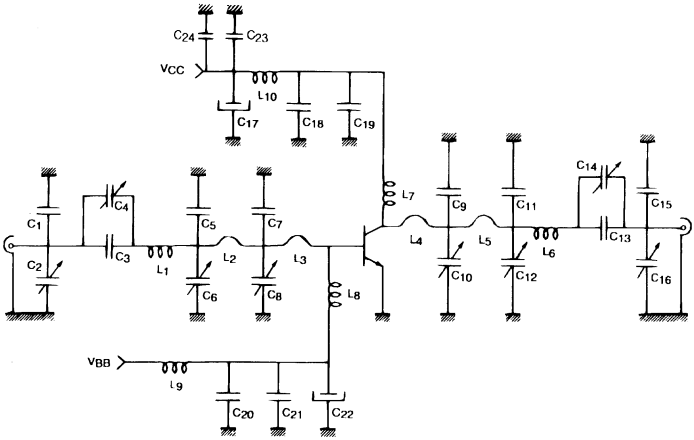

### POWER GAIN vs POWER OUTPUT




## IMPEDANCE DATA

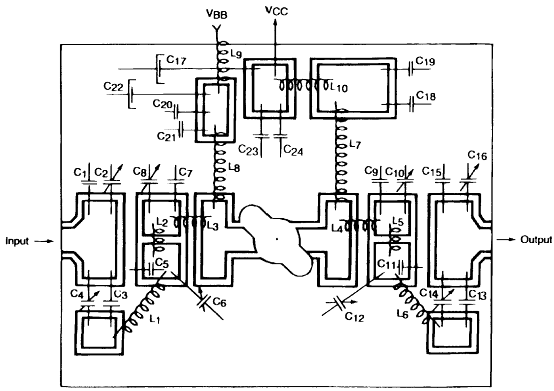
| FREQ. | $Z_{IN}$ ($\Omega$) | $Z_{CL}$ ($\Omega$) |
|---|---|---|
| 30 MHz | 1.15 + j 0.41 | 1.25 + j 1.92 |

## TEST CIRCUIT

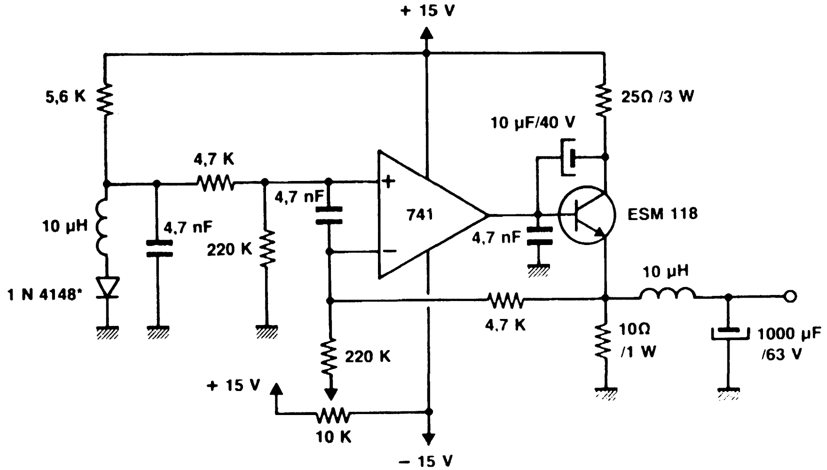



| | | |
|---|---|---|
| C1 | : | 180pF |
| C2, C4, C6,<br>C8, C10, C12<br>C14, C16 | : | Arco 428 |
| C3 | : | 820pF |
| C5, C13 | : | 680pF |
| C7, C11 | : | 1.2nF |
| C9 | : | 1.5nF |
| C17, C22 | : | 470µF, 40V |
| C18 | : | 10nF |
| C19, C21<br>C23 | : | 1nF |
| C20, C24 | : | 100nF, 63V |

| | | |
|---|---|---|
| L1 | : | 3 Turns, Diameter 10mm, 1.3mm Wire, Length 10mm |
| L2, L5 | : | Hair Pin Copper foil 40 x 5mm, 0.2mm Thick |
| L3, L4 | : | Hair Pin Copper Foil 10 x 5mm, 0.2mm Thick |
| L6 | : | 5 Turns, Diameter 10mm, 1.3mm Wire, Length 15mm |
| L7 | : | 3 Turns, Diameter 10mm, 1.3mm Wire, Length 25mm |
| L8 | : | Choke |
| L9 | : | Choke |
| L10 | : | Choke |

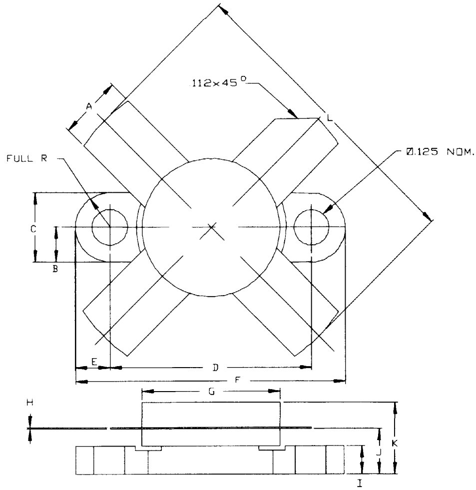


## BIAS CIRCUIT



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0174




| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .220/5,59 | .230/5,84 |
| B | .125/3,18 | |
| C | .245/6,22 | .255/6,48 |
| D | .720/18,28 | .730/18,54 |
| E | .125/3,18 | |
| F | .970/24,64 | .980/24,89 |
| G | .495/12,57 | .505/12,83 |
| H | .003/0,08 | .007/0,18 |
| I | .090/2,29 | .110/2,79 |
| J | .160/4,06 | .175/4,45 |

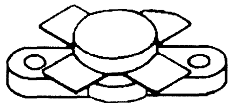
| CONT'D | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| K | | .280/7,11 |
| L | | 1.050/26,67 |

SGS-THOMSON MICROELECTRONICS

# SD1731 (TH562)

## RF & MICROWAVE TRANSISTORS HF SSB APPLICATIONS

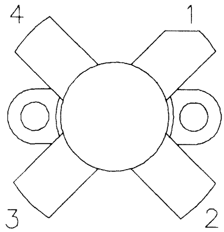
- OPTIMIZED FOR SSB
- 30 MHz
- 50 VOLTS
- EFFICIENCY 40%
- COMMON EMITTER
- GOLD METALLIZATION
- $P_{OUT}$ = 220 W PEP WITH 13 dB GAIN



**.500 4LFL (M174)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1731 | TH562 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

### DESCRIPTION

The SD1731 is a 50 V epitaxial silicon NPN planar transistor designed primarily for SSB communications. This device utilizes emitter ballasting for improved ruggedness and reliability.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 110 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 55 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 12 | A |
| $P_{DISS}$ | Power Dissipation | 320 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j\text{-}c)}$ | Junction-Case Thermal Resistance | 0.7 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 200mA | $I_E$ = 0mA | 110 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 200mA | $I_B$ = 0mA | 55 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 20mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $I_{CEO}$ | $V_{CE}$ = 30V | $I_E$ = 0mA | — | — | 5 | mA |
| $I_{CES}$ | $V_{CE}$ = 55V | $I_E$ = 0mA | — | — | 10 | mA |
| $h_{FE}$ | $V_{CE}$ = 6V | $I_C$ = 10A | 15 | — | 80 | — |

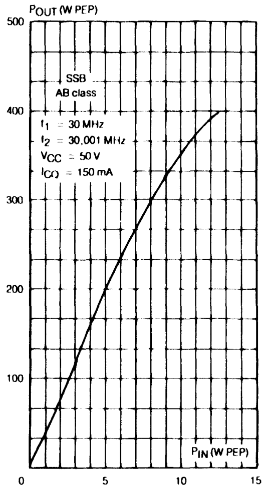
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 30 MHz | $V_{CE}$ = 50 V | $I_{CQ}$ = 150 mA | 220 | — | — | W |
| $G_P$* | $P_{OUT}$ = 220 W PEP | $V_{CE}$ = 50 V | $I_{CQ}$ = 150 mA | 13 | — | — | dB |
| IMD* | $P_{OUT}$ = 220 W PEP | $V_{CE}$ = 50 V | $I_{CQ}$ = 150 mA | — | — | −30 | dBc |
| $\eta_c$* | $P_{OUT}$ = 220 W PEP | $V_{CE}$ = 50 V | $I_{CQ}$ = 150 mA | 40 | — | — | % |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 50 V | | — | 330 | — | pF |

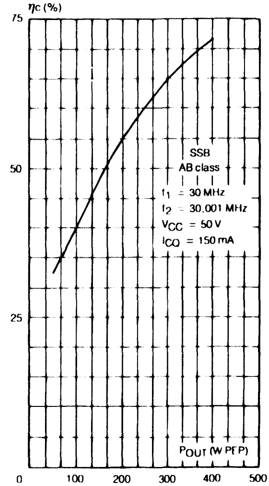
Note: *$f_1$ = 30.00 MHz, $f_2$ = 30.001 MHz

## TYPICAL PERFORMANCE

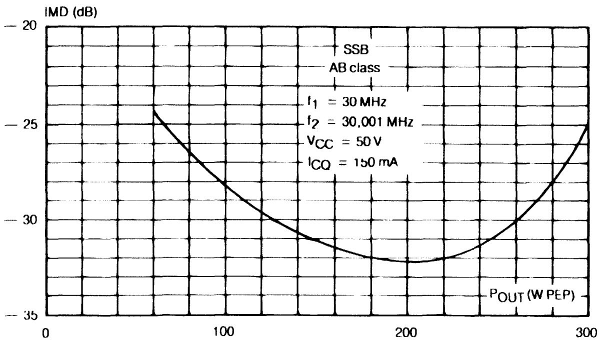
### POWER OUTPUT PEP vs POWER INPUT




### COLLECTOR EFFICIENCY vs POWER OUTPUT PEP

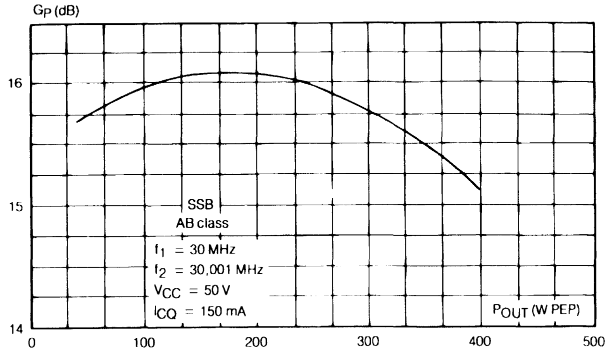



### INTERMODULATION DISTORTION vs POWER OUTPUT PEP

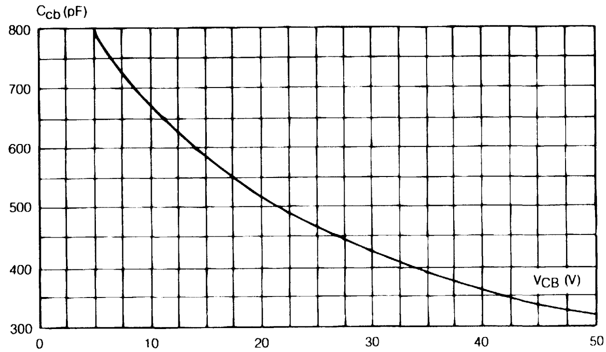


## TYPICAL PERFORMANCE

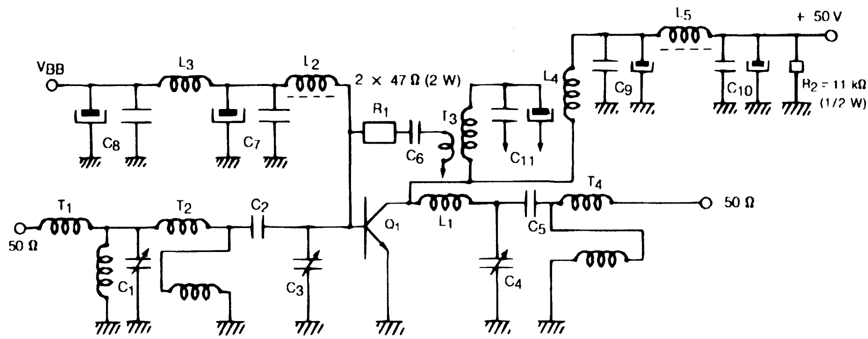
### POWER GAIN vs POWER OUTPUT PEP




### COLLECTOR BASE CAPACITANCE vs COLLECTOR EMITTER VOLTAGE

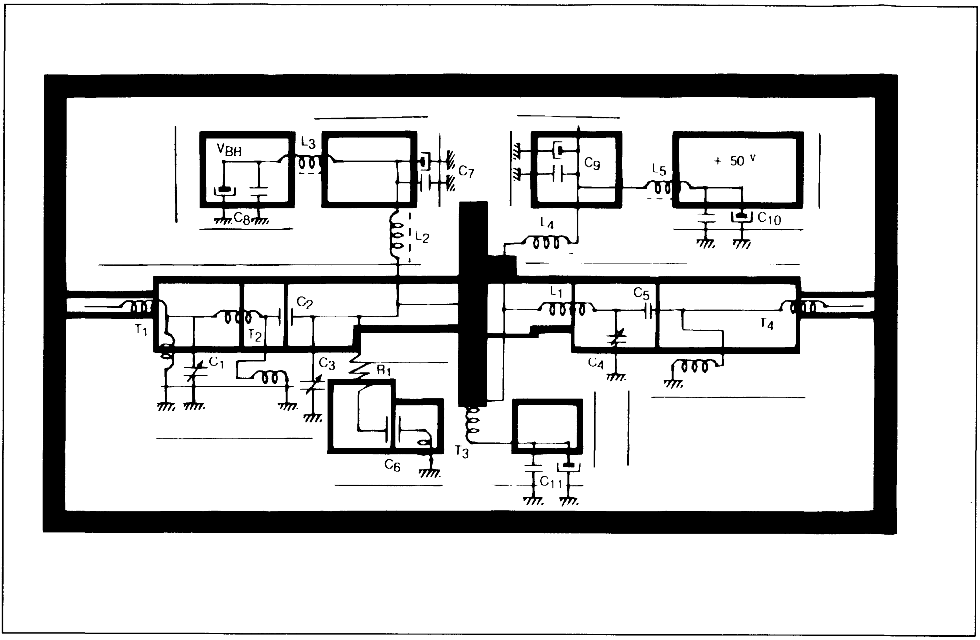


## TEST CIRCUIT

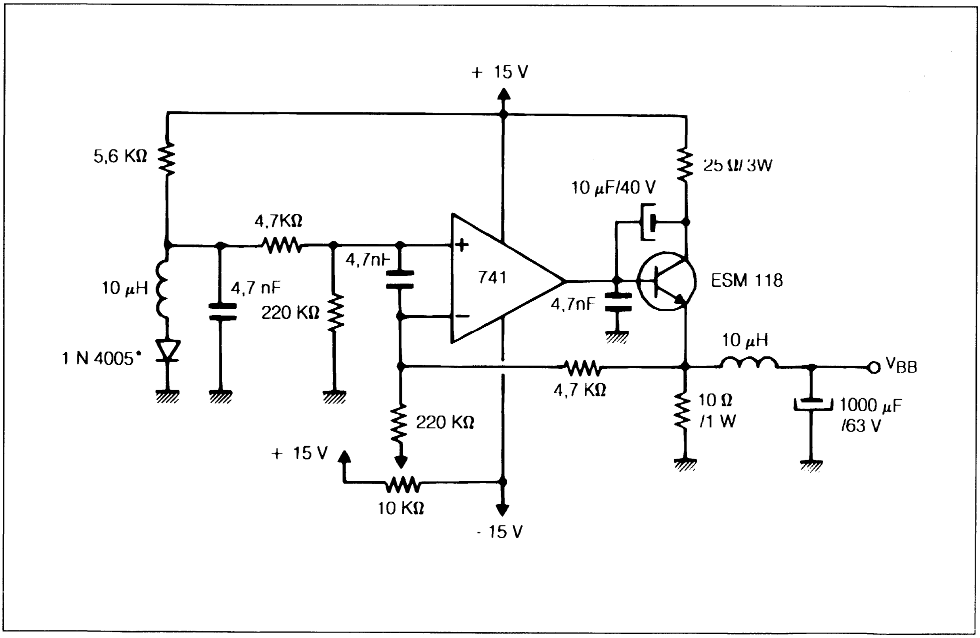



| | | |
|---|---|---|
| C1 | : | Arco 426 + 220pF + 330pF Chips |
| C2 | : | 2 x 10nF Chips |
| C3 | : | Arco 4615 + 2.2nF + 2 x 1nF LCC + 4.7nF + 560pf Chps |
| C4 | : | Arco 4213 + 330pF Chip |
| C5 | : | 10nF Chip |
| C6 | : | 3 x 10nF Chips |
| C7, C8, C9, C10, C11 | : | 1nF + 10nF + 100nF + 4.7μF, 63V + 100μF, 63V |
| L1 | : | 3 Turns of 1.2mm Unenameled Wire Diameter, 7.1mm, Length 13mm |
| L2, L3 | : | 8 Turns of 0.55mm Enameled Wire on Ferrite Core Phillips 4C6 97170 (9 x 6 x 3) |
| L4 | : | 10 Turns of 1.2mm Enameled Wire, Diameter 8.1mm, Length 20mm |
| L5 | : | 7 Turns of 1.2mm Enameled Wire on Ferrite Core Phillips 4C6 97180 |
| T1 | : | 6:3.5 Impedance Transformer on toriod Phillips 4C6 97180 |
| T2 | : | Twisted Pair 4:1 Transformer, 4 Turns Made with 1.0mm Enameled on toriod Phillips 4C6 97180 |
| T3 | : | Feedback Transformer<br>Primary: 2 Turns of 1mm Enameled Wire<br>Secondary: 8 Turns of 1mm Enameled Wire |
| T4 | : | Twisted Pair 4:1 Transformer, 4 Turns of bifilar Twisted 1.2mm Wires on Ferrite Core Phillips 4C6 97200 |

## MOUNTING CIRCUIT

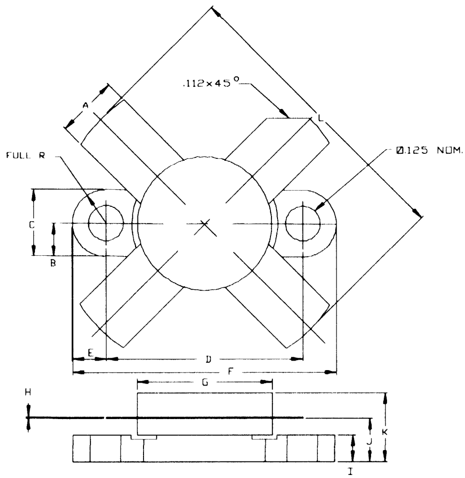



## BIAS CIRCUIT



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0174




| | SGS-THOMSON MICROELECTRONICS | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .220/5,59 | .230/5,84 |
| B | .125/3,18 | |
| C | .245/6,22 | .255/6,48 |
| D | .720/18,28 | .730/18,54 |
| E | .125/3,18 | |
| F | .970/24,64 | .980/24,89 |
| G | .495/12,57 | .505/12,83 |
| H | .003/0,08 | .007/0,18 |
| I | .090/2,29 | .110/2,79 |
| J | .160/4,06 | .175/4,45 |

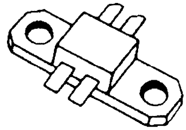
| | CONT'D | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| K | | .280/7,11 |
| L | | 1.050/26,67 |

SGS-THOMSON MICROELECTRONICS

# SD1732 (TDS595)

## RF & MICROWAVE TRANSISTORS TV LINEAR APPLICATIONS

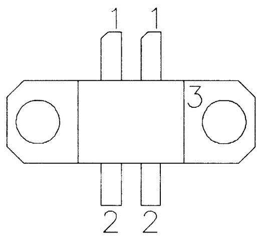
- 470 - 860 MHz
- 25 VOLTS
- CLASS A PUSH PULL
- DESIGNED FOR HIGH POWER LINEAR OPERATION
- HIGH SATURATED POWER CAPABILITY
- GOLD METALLIZATION
- DIFFUSED EMITTER BALLAST RESISTORS
- COMMON EMITTER CONFIGURATION
- INTERNAL INPUT MATCHING
- $P_{OUT}$ = 14.0 W MIN. WITH 8.5 dB GAIN



**.250 x .320 4LFL (M156)**
epoxy sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| SD1732 | TDS595 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter

### DESCRIPTION

The SD1732 is a gold metallized epitaxial silicon NPN planar transistor using diffused emitter ballast resistors for high linearity Class A operation in UHF and Band IV, V television transmitters and transposers.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 45 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 25 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 2 x 2.6 | A |
| $P_{DISS}$ | Power Dissipation | 65 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 2.5 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 20mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 40mA | $I_B$ = 0mA | 25 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 5mA | $I_C$ = 0mA | 3.0 | — | — | V |
| $h_{FE}$ | $V_{CE}$ = 20V | $I_C$ = 0.5A | 10 | — | — | — |

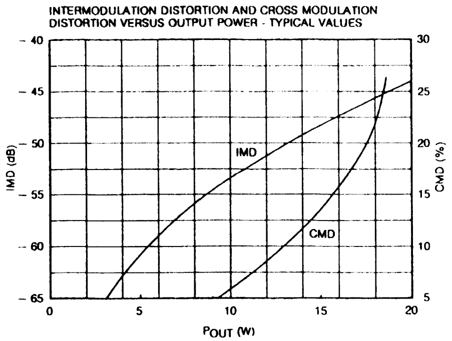
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 845 MHz | $V_{CE}$ = 25 V | $I_{CQ}$ = 2 x 850 mA | 14 | — | — | W |
| $G_P$ | $P_{OUT}$ = 14 W | $V_{CE}$ = 25 V | $I_{CQ}$ = 2 x 850 mA | 8.5 | — | — | dB |
| $IMD_3$* | $P_{OUT}$ = 14 W | $V_{CE}$ = 25 V | $I_{CQ}$ = 2 x 850 mA | — | -47 | — | dBc |
| CMD** | $P_{OUT}$ = 14 W | $V_{CE}$ = 25 V | $I_{CQ}$ = 2 x 850 mA | — | 20 | — | % |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 25 V | | — | — | 20 | pF |

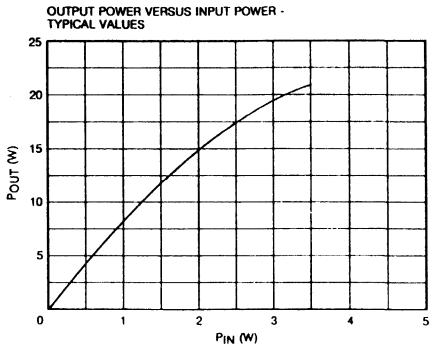
Note: *IMD 3 Tone Testing
Vision Carrier −8 dB ref
Sound Carrier −7 dB ref
Sideband Carrier −16 dB ref
** CMD: Cross Modulation Distortion of the Voltage Variation (%) of Sound Carrier When Vision Carrier is Switched from 0 to −20 dB

## TYPICAL PERFORMANCE

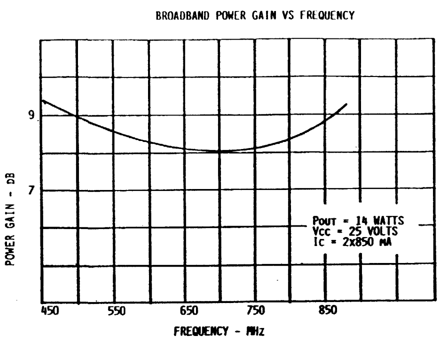
### INTERMODULATION DISTORTION & CROSS MODULATION DISTORTION vs POWER OUTPUT



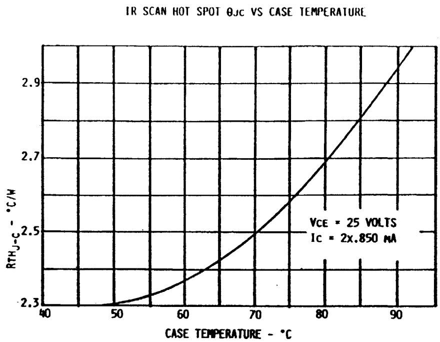

### POWER OUTPUT vs POWER INPUT



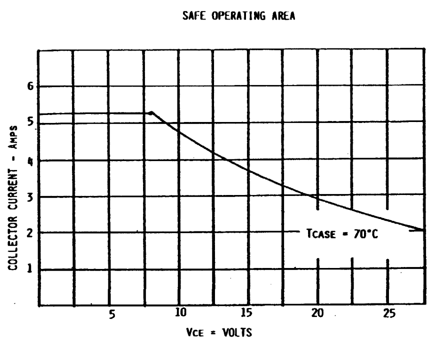

### BROADBAND POWER GAIN vs FREQUENCY



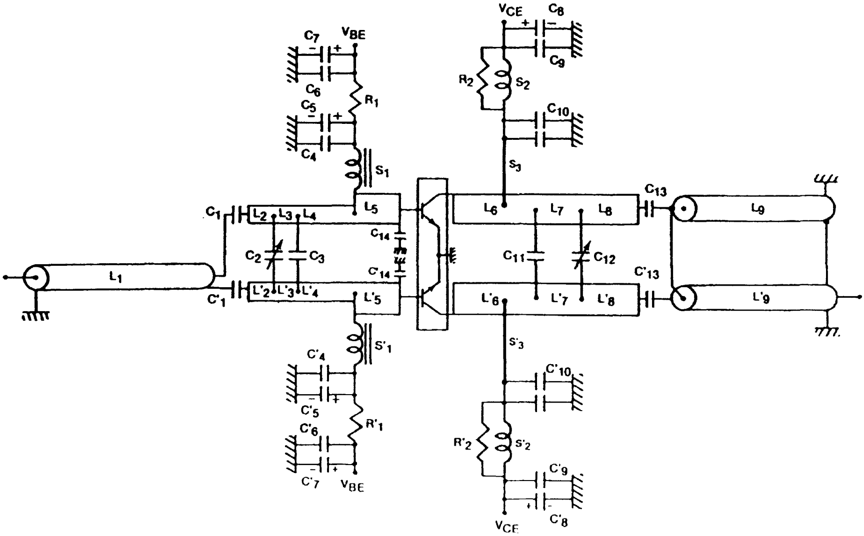

### THERMAL RESISTANCE vs CASE TEMPERATURE




### SAFE OPERATING AREA



## TEST CIRCUIT




C1, C'1,
C13, C'13 : 68pF, ATC 100A
C2 : 4.5pF Adjustable Johanson
C3 : 4.7pF, ATC 100A
C4, C'4, C6, C'6, C9, C'9,
C10, C'10 : 100pF, ATC 100A + 1nF LCC Chip + 10nF LCC Chip
C5, C'5 : 4.7µF, 25V, Tantalum Capacitor
C7, C'7 : 10µF, 25V, Tantalum Capacitor
C8, C'8 : 22µF, 35V, Tantalum Capacitor
C11 : 4.7pf, ATC 100A
C12 : 8pF Adjustable Johanson
C14, C'14 : 22pF, ATC 100A

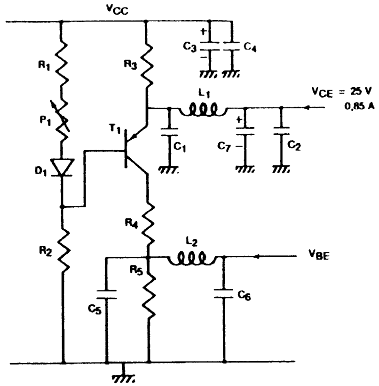
L1, L9, L'9: 50Ω Coaxial Wire Diameter 2.2mm, Length 29mm on 70Ω Transmission Line
L2, L'2 : 50Ω Printed Transmission Line Length 4mm
L3, L'3 : 50Ω Printed Transmission Line Length 3mm
L4, L'4 : 50Ω Printed Transmission Line Length 9.5mm
L5, L'5 : 39Ω Printed Transmission Line Length 7mm
L6, L'6 : 39Ω Printed Transmission Line Length 15mm
L7, L'7 : 39Ω Printed Transmission Line Length 8mm
L8, L'8 : 39Ω Printed Transmission Line Length 10mm

R1, R'1 : 4.7Ω, 1/2W
R2, R'2 : 1207Ω, 1/2W

S1, S'1 : 470nH Molded
S2, S'2 : 5 Turns, Diameter Wire 0.5mm on 3mm I.D.
S3, S'3 : Diameter Wire 1.2mm, Length 12mm

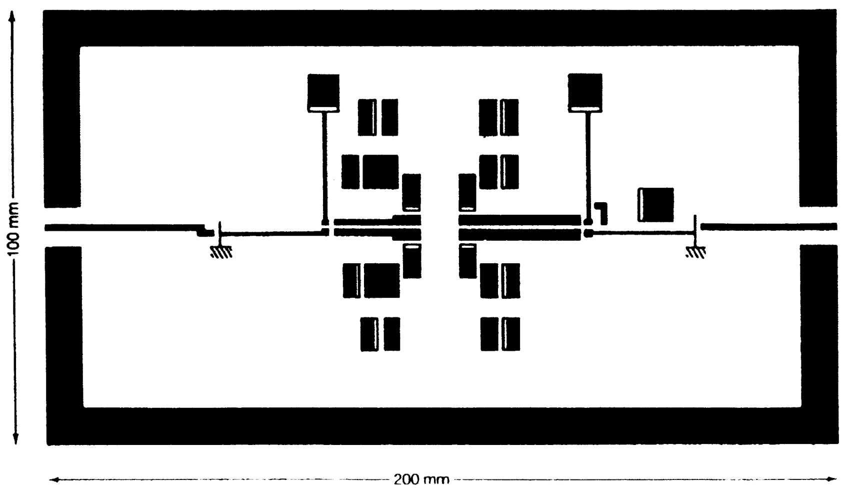
Substrate: Teflon Glass 30Mils, Er = 2.55

## SUPPLY CIRCUIT - CLASS A ADJUSTABLE (per side)



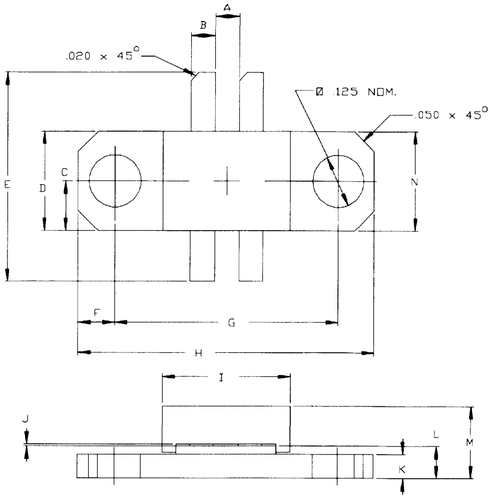

| | | | | | |
|---|---|---|---|---|---|
| C1, C2, C4, C5, C6 | : | 1nF LCC Chip + 10nF LCC Chip | P1 | : | 1kΩ |
| C3 | : | 100µF Sprague | R1 | : | 56Ω, 1/2W |
| C7 | : | 10µF Sprague | R2 | : | 5600Ω, 1/2W |
| | | | R3 | : | 2.2Ω, 3W |
| D1 | : | 1N 4001 | R4, R5 | : | 56Ω, 1W |
| L1, L2 | : | 5 Turns, 0.5mmWire on 3mm Internal Diameter | T1 | : | BDX 54 B |

## PHOTOMASTER OF TEST CIRCUIT



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0156



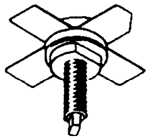

| SGS-THOMSON MICROELECTRONICS | | | CONT'D | | |
|---|---|---|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm | | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .060/1,52 | | K | .055/1,40 | .065/1,65 |
| B | .055/1,40 | .065/1,65 | L | .075/1,91 | .095/2,41 |
| C | .124/3,15 | | M | | .190/4,83 |
| D | .243/6,17 | .253/6,43 | N | .245/6,22 | .257/6,53 |
| E | .635/16,13 | .665/16,89 | | | |
| F | .092/2,34 | | | | |
| G | .555/14,10 | .565/14,35 | | | |
| H | .739/18,77 | .749/19,02 | | | |
| I | .315/8,00 | .327/8,31 | | | |
| J | .002/0,05 | .006/0,15 | | | |

SGS-THOMSON MICROELECTRONICS

# SD1733 (TH513)

## RF & MICROWAVE TRANSISTORS HF SSB APPLICATIONS

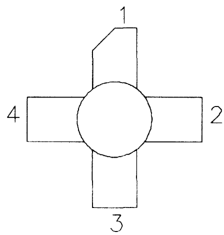
- OPTIMIZED FOR SSB
- 30 MHz
- 50 VOLTS
- COMMON EMITTER
- GOLD METALLIZATION
- $P_{OUT}$ = 75 W MIN. WITH 14.0 dB GAIN



**.380 4L STUD (M135)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1733 | TH513 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

### DESCRIPTION

The SD1733 is a 50 V Class AB epitaxial silicon NPN planar transistor designed primarily for SSB and VHF communications. This device utilizes emitter ballasting for improved ruggedness and reliability.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 110 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 55 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current | 3.25 | A |
| $P_{DISS}$ | Power Dissipation | 127 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 2.0 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

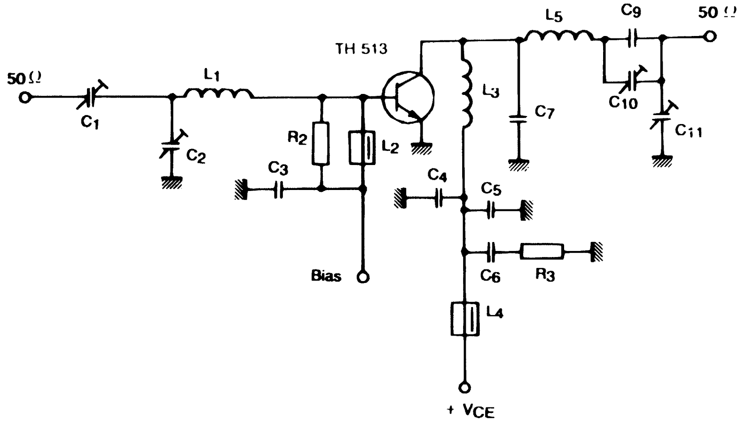
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CES}$ | $I_C$ = 100mA | $V_{BE}$ = 0V | 110 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 200mA | $I_B$ = 0mA | 55 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $h_{FE}$ | $V_{CE}$ = 6V | $I_C$ = 1.4A | 19 | — | 50 | — |

DYNAMIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 30 MHz | $V_{CE}$ = 50 V | 75 | — | — | W |
| $G_P$* | $P_{OUT}$ = 75 W PEP | $V_{CE}$ = 50 V | 14 | — | — | dB |
| IMD* | $P_{OUT}$ = 75 W PEP | $V_{CE}$ = 50 V | — | — | –30 | dBc |
| $\eta_c$* | $P_{OUT}$ = 75 W PEP | $V_{CE}$ = 50 V | 37 | — | — | % |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 50 V | — | — | 100 | pF |

Note: * $f_1$ = 30.00 MHz, $f_2$ = 30.001 MHz

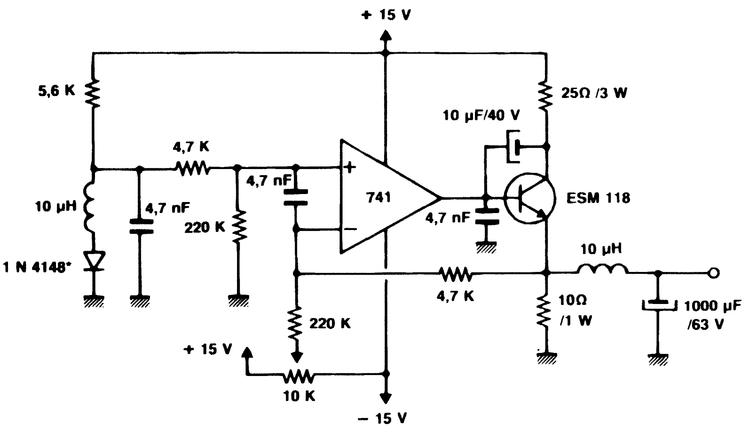
## TEST CIRCUIT




| | | |
|---|---|---|
| C1 | : | 20 - 500pF |
| C2 | : | 50 - 500pF |
| C3, C4 | : | 3.9nF |
| C5 | : | 100nF |
| C6 | : | 2.2µF |
| C7 | : | 56pF |
| C9 | : | 100pF |
| C10 | : | 20 - 150pF |
| C11 | : | 20 - 500pF |

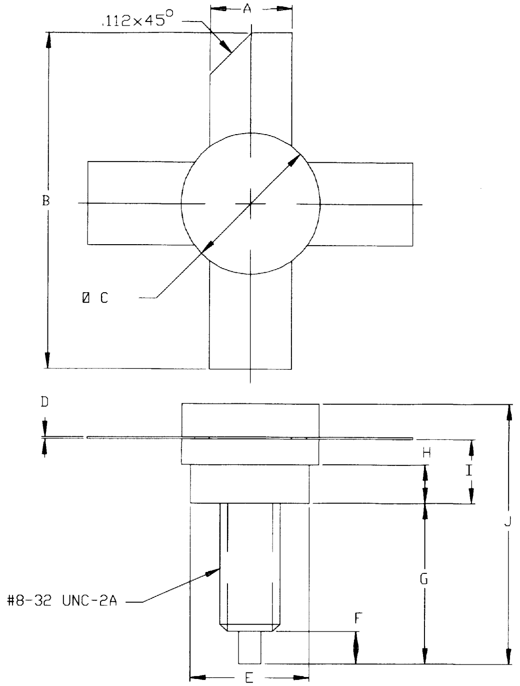
| | | |
|---|---|---|
| L1 | : | 3 Turns, Diameter Wire 1.5mm, Int. Diameter 7mm, Pitch 2.5mm |
| L2 | : | 22µH Choke Coil |
| L3 | : | 4 Turns, Diameter Wire 1.5mm, Int. Diameter 10mm, Pitch 2.5mm |
| L4 | : | Ferroxcube Choke Coil |
| L5 | : | 7 Turns, Diameter Wire 1.5mm, Int. Diameter 12mm, Pitch 2.5mm |
| R2 | : | 33Ω |
| R3 | : | 4.7Ω |

## BIAS CIRCUIT



## PACKAGE MECHANICAL DATA

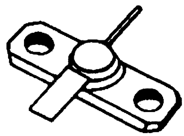
Ref.: Dwg. No.12-0135




| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .220/5,59 | .230/5,84 |
| B | .980/24,89 | |
| C | .370/9,40 | .385/9,78 |
| D | .004/0,10 | .007/0,18 |
| E | .320/8,13 | .330/8,38 |
| F | .100/2,54 | .130/3,30 |
| G | .450/11,43 | .490/12,45 |
| H | .090/2,29 | .100/2.54 |
| I | .155/3,94 | .175/4,45 |
| J | | .750/19,05 |

# RF & MICROWAVE TRANSISTORS
# GENERAL PURPOSE LINEAR APPLICATIONS

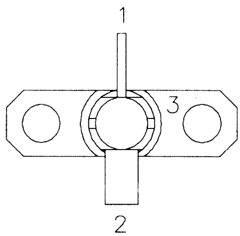
- 2.3 GHz
- 15 VOLTS
- CLASS A
- OVERLAY GEOMETRY
- GOLD METALLIZATION
- COMMON EMITTER CONFIGURATION
- $P_{OUT}$ = .2W MIN. WITH 11.0 dB GAIN



**.230 2LFL (M151)**
hermetically sealed

| ORDER CODE | BRANDING |
| --- | --- |
| SD1850 | SD1850 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter

## DESCRIPTION

The SD1850 is a silicon NPN planar transistor designed for high gain linear performance at 2.0 GHz. This part uses gold metallized die and poly-silicon site ballasting to achieve high reliability and ruggedness. The part can be used for applications such as Telecommunications, radar ECM, space and other commercial and military systems.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
| --- | --- | --- | --- |
| $V_{CBO}$ | Collector-Base Voltage | 30 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 15 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 2.0 | V |
| $I_C$ | Device Current | 0.1 | A |
| $P_{DISS}$ | Power Dissipation | 3.9 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

## THERMAL DATA

| | | | |
| --- | --- | --- | --- |
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 45 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case} = 25°C$)

STATIC

| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C = 5mA$ | $I_E = 0mA$ | 30 | — | — | V |
| $BV_{CEO}$ | $I_C = 5mA$ | $I_B = 0mA$ | 15 | — | — | V |
| $BV_{EBO}$ | $I_E = 1mA$ | $I_C = 0mA$ | 2.0 | — | — | V |
| $h_{FE}$ | $V_{CE} = 3V$ | $I_C = 50mA$ | 20 | — | 150 | — |

DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 2.3 GHz | $V_{CE} = 15$ V | $I_{CQ} = 80$ mA | .2 | — | — | W |
| $G_P$ | f = 2.3 GHz | $V_{CE} = 15$ V | $I_{CQ} = 80$ mA | 11 | — | — | dB |

Note: 1 dB Compression point

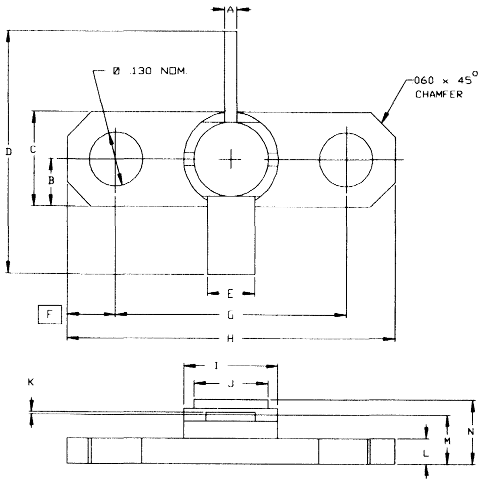
## S-PARAMETER DATA

**BIAS**: Current = 60mA, Voltage = 15 Volts

| Frequency | Return Loss-in | | Gain Forward | | | | Loss-reverse | | Return Loss-out | |
|---|---|---|---|---|---|---|---|---|---|---|
| | S11 | | S21 | | | Hfe | S12 | | S22 | |
| MHz | DB | ANG | DB | MAG | ANG | | DB | ANG | DB | ANG |
| 500 | 2.35 | – 173.8 | + 18.80 | 6.76 | 78.1 | – 10.9389 | 29.59 | 31.4 | 9.70 | – 141.8 |
| 1000 | 2.32 | 172.5 | + 11.10 | 3.59 | 53.6 | – 6.8204 | 25.67 | 40.1 | 7.88 | – 184.5 |
| 1500 | 2.54 | 160.2 | + 7.54 | 2.38 | 31.2 | – 5.2930 | 23.35 | 41.5 | 6.02 | 179.7 |
| 2000 | 2.93 | 147.7 | + 5.82 | 1.98 | 11.0 | – 4.5951 | 20.70 | 37.4 | 4.34 | 166.2 |
| 2500 | 3.9 | 129.0 | + 4.3 | 1.64 | – 10.0 | – 3.2462 | 18.6 | 32.0 | 3.3 | 148.0 |
| 3000 | 5.3 | 98.0 | + 2.9 | 1.40 | – 35.0 | – 2.6655 | 17.1 | 17.0 | 1.9 | 133.0 |
| 3500 | 7.4 | 51.0 | + 1.8 | 1.20 | – 58.0 | – 3.0508 | 15.9 | – 2.0 | 1.0 | 120.0 |
| 4000 | 8.3 | – 22.0 | + 0.1 | 1.01 | – 83.0 | – 3.1661 | 15.7 | – 22.0 | 0.6 | 108.0 |

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0192



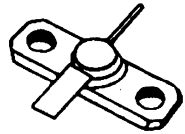

| | SGS-THOMSON MICROELECTRONICS | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .025/0,64 | .035/0,89 |
| B | .115/2,92 NOM. | |
| C | .225/5,72 | .235/5,97 |
| D | .710/18,03 | .750/19,05 |
| E | .110/2,79 | .120/3,05 |
| F | .120/3,05 NOM. | |
| G | .555/14,10 | .565/14,35 |
| H | .795/20,19 | .805/20,45 |
| I | .222/5,64 | .236/5,99 |
| J | .165/4,19 | .185/4,70 |

| | CONT'D | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| K | .003/0,08 | .007/0,18 |
| L | .055/1,40 | .067/1,70 |
| M | .120/3,18 | .140/3,56 |
| N | | .170/4,32 |

# SD1851 (TCC20L08)

## RF & MICROWAVE TRANSISTORS GENERAL PURPOSE LINEAR APPLICATIONS

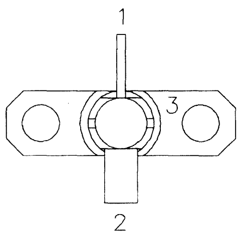
- 2.0 GHz
- 20 VOLTS
- CLASS A
- OVERLAY GEOMETRY
- GOLD METALLIZATION
- COMMON EMITTER CONFIGURATION
- $P_{OUT}$ = .8 W MIN. WITH 8.0 dB GAIN



**.230 2LFL (M151)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1851 | 20L08 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter

### DESCRIPTION

The SD1851 is a silicon NPN planar transistor designed for high gain linear performance at 2.0 GHz. This part uses gold metallized die and poly-silicon site ballasting to achieve high reliability and ruggedness. The part can be used for applications such as telecommunications, radar, ECM, space and other commercial and military systems.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 40 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 21 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.5 | V |
| $I_C$ | Device Current | 0.15 | A |
| $P_{DISS}$ | Power Dissipation | 5.8 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 30 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 1mA | $I_E$ = 0mA | 40 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 5mA | $I_B$ = 0mA | 22 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 100mA | 15 | — | 150 | — |

DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$* | f = 2.0 GHz | $V_{CE}$ = 20 V | $I_{CQ}$ = 120 mA | 0.8 | — | — | W |
| $G_P$* | f = 2.0 GHz | $V_{CE}$ = 20 V | $I_{CQ}$ = 120 mA | 8.0 | — | — | dB |

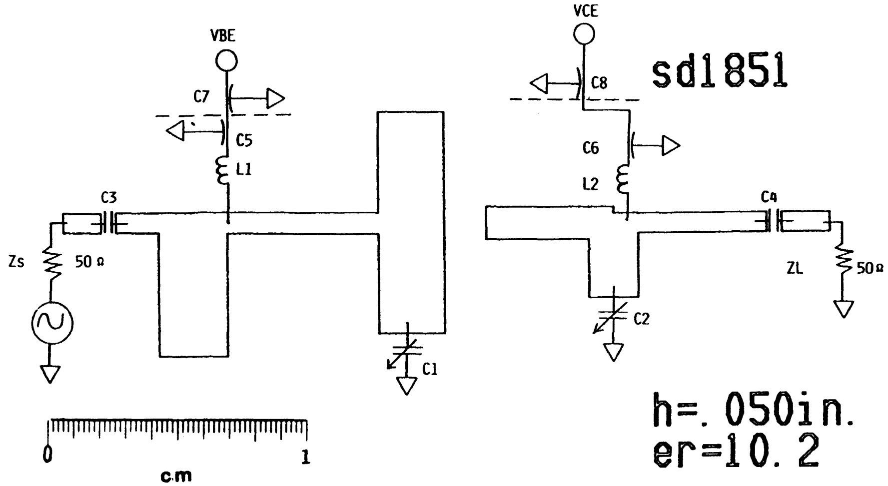
Note: * 1 dB Compression

## S-PARAMETER DATA

**BIAS:** Voltage = 20 Volts

| Frequency | S11 | | S21 | | S12 | | S22 | |
|---|---|---|---|---|---|---|---|---|
| MHz | Mag | Ang | Mag | Ang | Mag | Ang | Mag | Ang |
| 500 | .914 | 178.6 | 4.446 | 77.3 | .022 | 28.6 | .227 | –108. |
| 1000 | .906 | 168.9 | 2.317 | 58.8 | .026 | 43.6 | .323 | – 123. |
| 1500 | .876 | 159.0 | 1.590 | 40.7 | .035 | 55.3 | .426 | – 138. |
| 2000 | .845 | 146.4 | 1.270 | 22.4 | .050 | 62.3 | .498 | – 152. |
| 2500 | .811 | 130.7 | 1.088 | 8.4 | .073 | 59.7 | .569 | – 168. |
| 3000 | .744 | 105.3 | .931 | 10.9 | .107 | 54.5 | .618 | 175 |

## TEST CIRCUIT



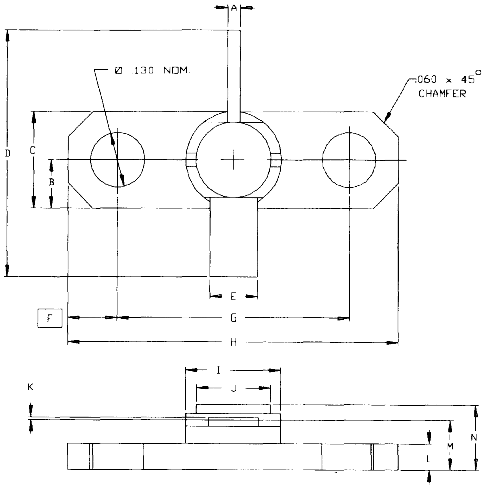

C1, C2 : .4 - 2.5pF Johanson Capacitor
C3, C4 : 100pF Chip Capacitor ATC
C5, C6 : 15,000pF Chip Capacitor ATC
C7, C8 : 15,000pF EMI Filter 4 - 40

L1, L2 : 3 Turns, Choke #28 Wire, .080" Diameter

S1 : Epsilam 10, Er = 10.2, Height = .050", 1oz Cu.
SMA Launcher CDI (2 pieces), .397 Sq. Fixture
Housing, Heatsink

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0192



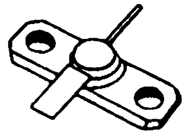

| SGS-THOMSON MICROELECTRONICS | | | CONT'D | | |
|---|---|---|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm | | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .025/0,64 | .035/0,89 | K | .003/0,08 | .007/0,18 |
| B | .115/2,92 NOM. | | L | .055/1,40 | .067/1,70 |
| C | .225/5,72 | .235/5,97 | M | .120/3,18 | .140/3,56 |
| D | .710/18,03 | .750/19,05 | N | | .170/4,32 |
| E | .110/2,79 | .120/3,05 | | | |
| F | .120/3,05 NOM. | | | | |
| G | .555/14,10 | .565/14,35 | | | |
| H | .795/20,19 | .805/20,45 | | | |
| I | .222/5,64 | .236/5,99 | | | |
| J | .165/4,19 | .185/4,70 | | | |

SGS-THOMSON
MICROELECTRONICS

# SD1853 (TCC20L15)

## RF & MICROWAVE TRANSISTORS
## GENERAL PURPOSE LINEAR APPLICATIONS

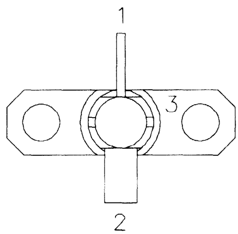
- 2.0 GHz
- 20 VOLTS
- CLASS A
- OVERLAY GEOMETRY
- GOLD METALLIZATION
- COMMON EMITTER CONFIGURATION
- $P_{OUT}$ = 1.5 W MIN. WITH 7.0 dB GAIN



**.230 2LFL (M151)**
hermetically sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| SD1853 | 20L15 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter

### DESCRIPTION

The SD1853 is a silicon NPN planar transistor designed for high gain linear performance at 2.0 GHz. This part uses gold metallized die and poly-silicon site ballasting to achieve high reliability and ruggedness. The SD1853 can be used for applications such as telecommunications, radar, ECM, space and other commercial and military systems.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 40 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 25 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.5 | V |
| $I_C$ | Device Current | 0.25 | A |
| $P_{DISS}$ | Power Dissipation | 11.7 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | - 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 15.0 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case} = 25°C$)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C = 1mA$ | $I_E = 0mA$ | 40 | — | — | V |
| $BV_{CEO}$ | $I_C = 5mA$ | $I_B = 0mA$ | 25 | — | — | V |
| $BV_{EBO}$ | $I_E = 1mA$ | $I_C = 0mA$ | 3.5 | — | — | V |
| $h_{FE}$ | $V_{CE} = 5V$ | $I_C = 200mA$ | 15 | — | 150 | — |

DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$* | f = 2.0 GHz | $V_{CE} = 20$ V | $I_{CQ} = 220$ mA | 1.5 | — | — | W |
| $G_P$* | f = 2.0 GHz | $V_{CE} = 20$ V | $I_{CQ} = 220$ mA | 7.0 | — | — | dB |

Note: * 1 dB Compression

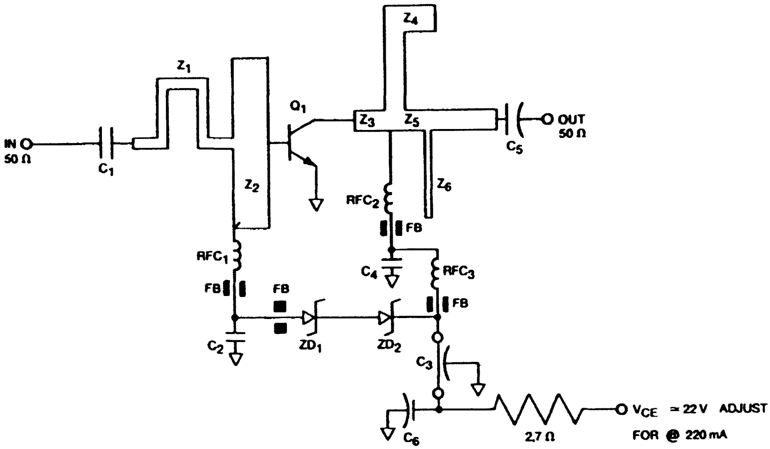
## S-PARAMETERS DATA

**BIAS:** Current = 208mA, Voltage = 20 Volts

### FREQUENCY

| MHz | S11 | | S21 | | S12 | | S22 | |
|---|---|---|---|---|---|---|---|---|
| | Mag | Ang | Mag | Ang | Mag | Ang | Mag | Ang |
| 500 | .92 | 176.0 | 3.53 | 81.9 | .03 | 28.2 | .30 | – 155.9 |
| 1000 | .94 | 166.0 | 1.66 | 69.7 | .03 | 45.1 | .36 | – 161.3 |
| 1500 | .93 | 156.1 | 1.27 | 57.1 | .04 | 64.3 | .43 | – 169.1 |
| 2000 | .89 | 142.2 | 1.00 | 47.9 | .05 | 70.4 | .54 | – 172.1 |
| 2500 | .82 | 124.4 | .88 | 38.9 | .06 | 74.8 | .59 | – 178.2 |
| 3000 | .76 | 97.5 | .89 | 22.5 | .08 | 71.5 | .61 | 171.1 |
| 3500 | .75 | 63.6 | .93 | 2.1 | .11 | 61.7 | .66 | 156.0 |

## TEST CIRCUIT




C1, C2,
C4, C5 : 22pF Chip Capacitor
C3 : 0.001 Feedthru Capacitor
C6 : 10µF, 25V

FB : Ferrite Bead

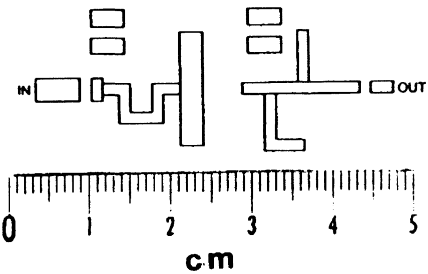
Q1 : SD1853

$P_{OUT}$ = 1 W, $V_{CE}$ = 22 V, FREQ = 2.3 GHz,
$I_{CQ}$ = 220 mA

RFC1,
RFC2 : 3 Turns, AWG #28, .1" I.D.
RFC3 : 8 Turns, AWG #26, .15" I.D.

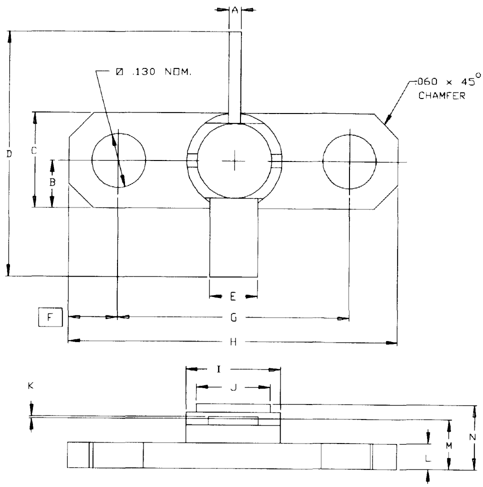
Z1, Z2, Z3, Z4,
Z5, Z6 : Microstrip on 1/32" Teflon Glass, Er = 2.55
ZD1 : 9V, 1W, Zener
ZD2 : 12V, 1W, Zener

**P.C. ARTWORK TO SCALE**



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0192



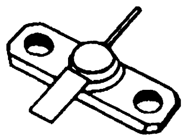

| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .025/0,64 | .035/0,89 |
| B | .115/2,92 NOM. | |
| C | .225/5,72 | .235/5,97 |
| D | .710/18,03 | .750/19,05 |
| E | .110/2,79 | .120/3,05 |
| F | .120/3,05 NOM. | |
| G | .555/14,10 | .565/14,35 |
| H | .795/20,19 | .805/20,45 |
| I | .222/5,64 | .236/5,99 |
| J | .165/4,19 | .185/4,70 |

| CONT'D | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| K | .003/0,08 | .007/0,18 |
| L | .055/1,40 | .067/1,70 |
| M | .120/3,18 | .140/3,56 |
| N | | .170/4,32 |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

# SD1855 (TCC20L25)

## RF & MICROWAVE TRANSISTORS GENERAL PURPOSE LINEAR APPLICATIONS

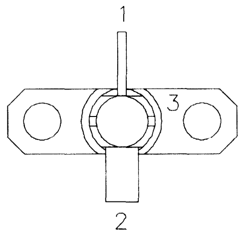
- 2.0 GHz
- 20 VOLTS
- CLASS A
- OVERLAY GEOMETRY
- GOLD METALLIZED DIE
- COMMON EMITTER CONFIGURATION
- $P_{OUT}$ = 2.5W MIN. WITH 6.0 dB GAIN



**.230 2LFL (M151)**
hermetically sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| SD1855 | TCC20L25 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter

### DESCRIPTION

The SD1855 is a silicon NPN planar transistor designed for high gain linear performance at 2.0 GHz. This part uses gold metallized die and poly-silicon site ballasting to achieve high reliability and ruggedness. The SD1855 can be used for applications sucha as telecommunications, radar, ECM, space and other commercial and military systems.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 40 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 25 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.5 | V |
| $I_C$ | Device Current | 0.5 | A |
| $P_{DISS}$ | Power Dissipation | 20.6 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 8.5 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 2mA | $I_E$ = 0mA | 40 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 5mA | $I_B$ = 0mA | 25 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 2mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 400mA | 15 | — | 150 | — |

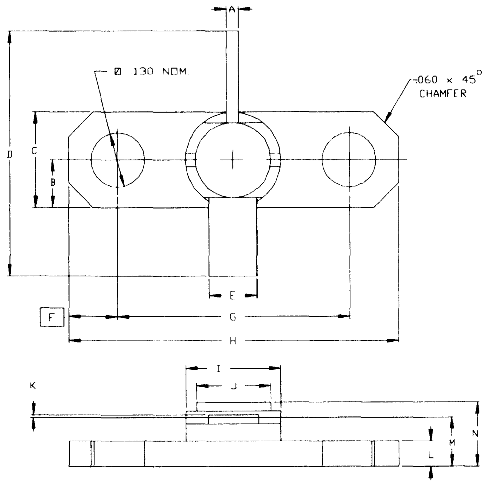
### DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$* | f = 2.0 GHz | $V_{CE}$ = 20 V | $I_{CQ}$ = 440 mA | 2.5 | — | — | W |
| $G_P$* | f = 2.0 GHz | $V_{CE}$ = 20 V | $I_{CQ}$ = 440 mA | 6.0 | — | — | dB |

Note: * 1dB Compression

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0192




| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .025/0,64 | .035/0,89 |
| B | .115/2,92 NOM. | |
| C | .225/5,72 | .235/5,97 |
| D | .710/18,03 | .750/19,05 |
| E | .110/2,79 | .120/3,05 |
| F | .120/3,05 NOM. | |
| G | .555/14,10 | .565/14,35 |
| H | .795/20,19 | .805/20,45 |
| I | .222/5,64 | .236/5,99 |
| J | .165/4,19 | .185/4,70 |

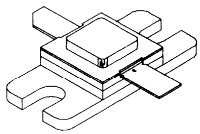
| CONT'D | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| K | .003/0,08 | .007/0,18 |
| L | .055/1,40 | .067/1,70 |
| M | .120/3,18 | .140/3,56 |
| N | | .170/4,32 |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

SGS-THOMSON
MICROELECTRONICS

# SD1868

## RF & MICROWAVE TRANSISTORS
## 1.6 GHz SATCOM APPLICATIONS

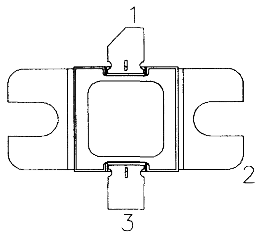
- 1.6 - 1.65 GHz
- 28 VOLTS
- COMMON BASE
- OVERLAY DIE GEOMETRY
- REFRACTORY/GOLD METALLIZATION
- HIGH RELIABILITY AND RUGGEDNESS
- LOW THERMAL RESISTANCE
- $P_{OUT}$ = 30 W MIN. WITH 8.7 dB GAIN



**.397 x .397 2LFL (M147)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1868 | SD1868 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter

### DESCRIPTION

The SD1868 is a 28 V internally input and output matched silicon NPN planar transistor designed for 1.6 GHz SATCOM applications. The device utilizes polysilicon site ballasting with gold metallized to achieve high reliability and ruggedness.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 45 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 15 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.5 | V |
| $I_C$ | Device Current | 5.2 | A |
| $P_{DISS}$ | Power Dissipation | 58.3 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 3.0 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 10mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 10mA | $I_B$ = 0mA | 10 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 0.5A | 15 | — | 150 | — |

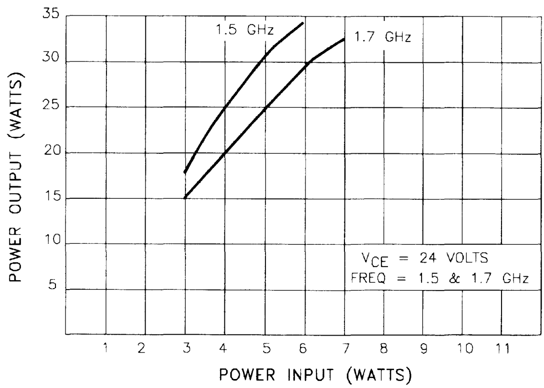
* Pulsed through 25MHz Inductor

### DYNAMIC

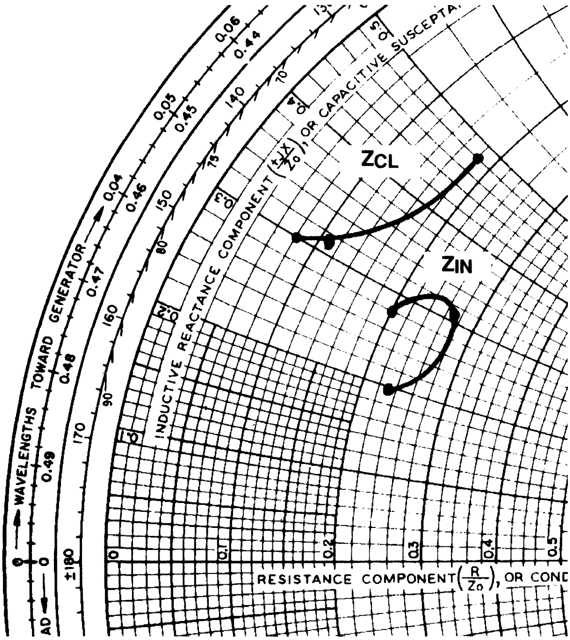
| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 1.6 — 1.65 GHz | $P_{IN}$ = 4.0 W | $V_{CE}$ = 28 V | 30 | — | — | W |
| $G_P$ | f = 1.6 — 1.65 GHz | $P_{OUT}$ = 30 W | $V_{CE}$ = 28 V | 8.75 | — | — | dB |
| $\eta_C$ | f = 1.6 — 1.65 GHz | $P_{IN}$ = 4.0 W | $V_{CE}$ = 28 V | 40 | — | — | % |

## TYPICAL PERFORMANCE

### POWER OUTPUT vs POWER INPUT

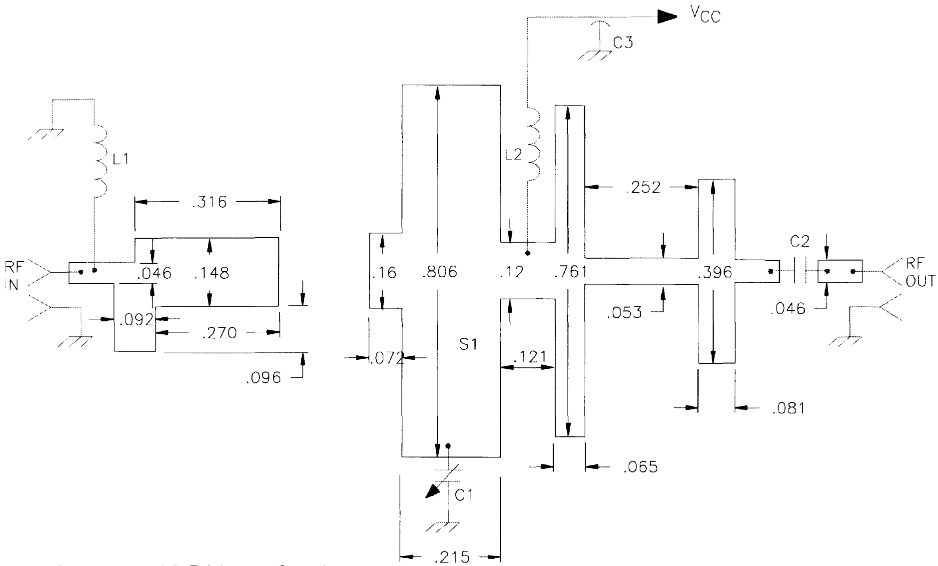


## IMPEDANCE DATA




| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 1.6 GHz | 11.6 + j 10.2 | 9.0 + j 24.2 |
| 1.8 GHz | 13.7 + j 15.5 | 5.4 + j 15.7 |
| 2.0 GHz | 10.2 + j 13.9 | 4.1 + j 14.8 |

## TEST CIRCUIT



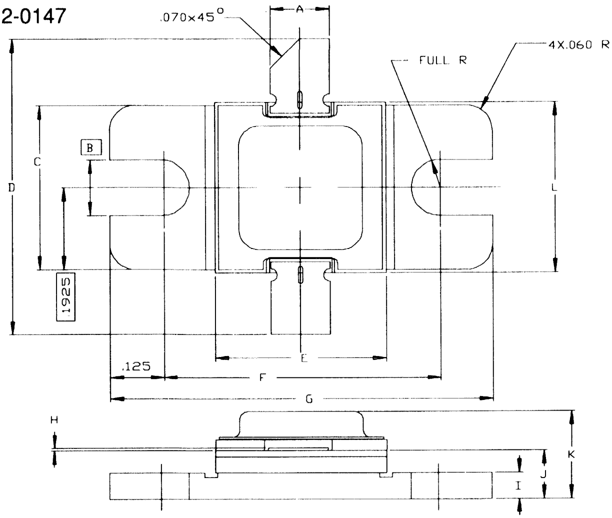

C1 : .4 - 2.5pF Johanson Capaciotr
C2 : 100pF Chip Capacitor ATC
C3 : 15,000pF EMI Filter Murata/Erie

L1, L2 : 4 Turns, #28 Wire, .080" Diameter

S1 : Epsilam 10, Er = 10.2, Thickness .050"
1 Oz. Copper SMA Launcher CDI (2 pieces)
.397 Sq. Fixture Housing, Heatsink

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0147




| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .135/3,43 | .145/3,68 |
| B | .125/3,18 | |
| C | .380/9,65 | .390/9,91 |
| D | .880/22,35 | |
| E | .392/9,96 | .405/10,29 |
| F | .645/16,38 | .655/16,64 |
| G | .895/22,73 | .905/22,99 |
| H | .002/0,05 | .006/0,15 |
| I | .055/1,40 | .065/1,65 |
| J | .105/2,67 | .125/3,18 |

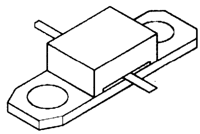
| CONT'D | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| K | | .230/5,84 |
| L | .392/9,96 | .405/10,29 |

SGS-THOMSON
MICROELECTRONICS

# SD1888-03

## RF & MICROWAVE TRANSISTORS
## 1.6 GHz SATCOM APPLICATIONS

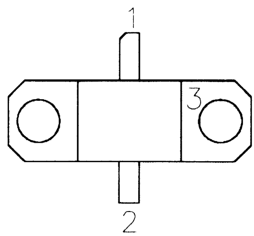
- 1.65 GHz
- 28 VOLTS
- EFFICIENCY 50% MIN.
- CLASS C OPERATION
- COMMON BASE
- INPUT/OUTPUT MATCHING
- $P_{OUT}$ = 24 W MIN. WITH 9.0 dB GAIN



**.250 SQ. 2LFL (M170)**
epoxy sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| SD1888-03 | 1888-3 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base

### DESCRIPTION

The SD1888-03 is a 28 V Class C silicon NPN transistor designed for INMARSAT and other 1.65 GHz SATCOM applications. A gold metallized emitter-ballasted die geometry is employed providing high gain and efficiency while ensuring long term reliability and ruggedness under severe operating conditions. SD1888-03 is packaged in a cost-effective epoxy sealed housing

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 45 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 12 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.0 | V |
| $I_C$ | Device Current | 2.6 | A |
| $P_{DISS}$ | Power Dissipation | 50 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 3.5 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

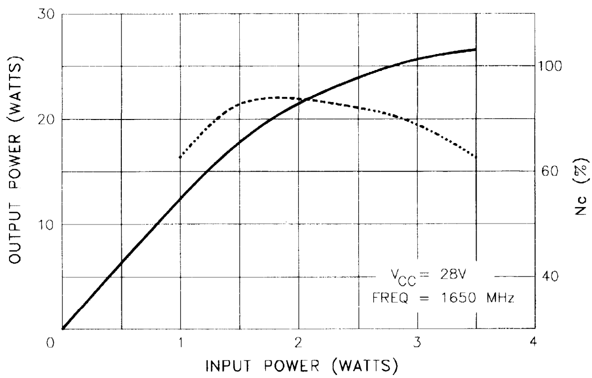
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 6mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 6mA | $I_B$ = 0mA | 12 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 6mA | $I_C$ = 0mA | 3.0 | — | — | V |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1.2A | 15 | — | 150 | — |

DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1.65 GHz | $P_{IN}$ = 3.0 W | $V_{CE}$ = 28 V | 24 | — | — | W |
| $G_P$ | f = 1.65 GHz | $P_{IN}$ = 3.0 W | $V_{CE}$ = 28 V | 9.0 | — | — | dB |
| $\eta_C$ | f = 1.65 GHz | $P_{IN}$ = 3.0 W | $V_{CE}$ = 28 V | 50 | — | — | % |

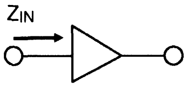
## TYPICAL PERFORMANCE

### POWER OUTPUT & EFFICIENCY vs POWER INPUT

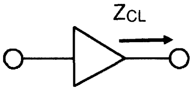


## IMPEDANCE DATA

TYPICAL INPUT IMPEDANCE

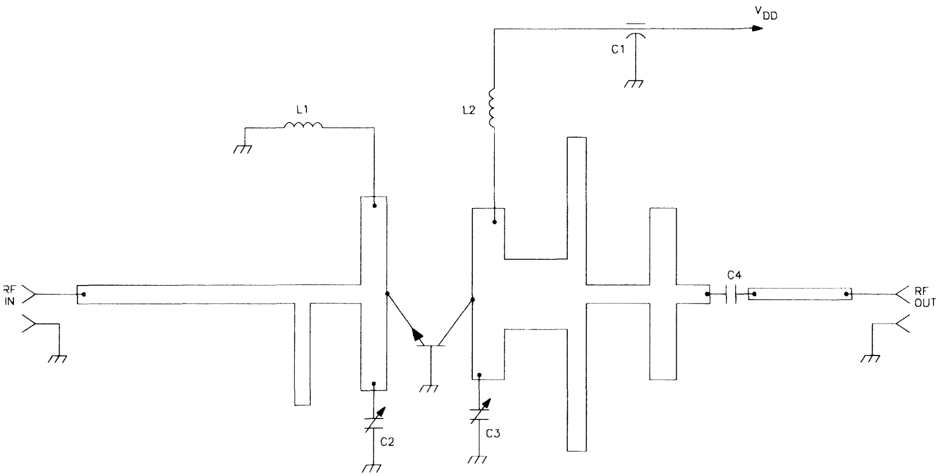



TYPICAL COLLECTOR LOAD IMPEDANCE




| FREQ. | $Z_{IN}$ ($\Omega$) | $Z_{CL}$ ($\Omega$) |
|---|---|---|
| 1600 MHz | 9.0 + j 14.0 | 11.0 + j 2.0 |
| 1650 MHz | 11.5 + j 12.0 | 9.0 + j 4.0 |
| 1700 MHz | 23.0 + j 8.0 | 8.0 + j 5.5 |

## TEST CIRCUIT

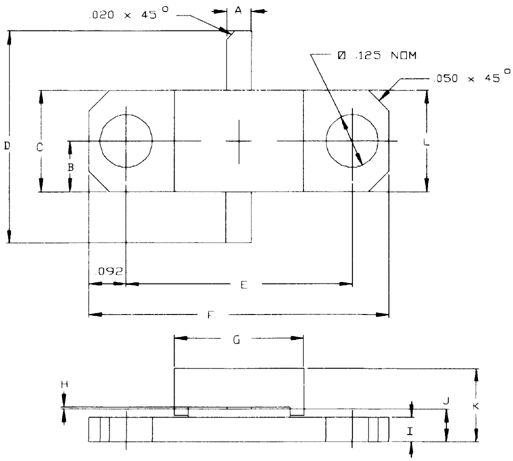



C1 : 1500pF Feedtrhu Capacitor Erie
C2, C3 : 0.4 - 2.5pF Trim Capacitor Johanson Gigatrim
C4 : 100pF ATC Chip Capacitor

L1, L2 : RF Chokes; 3 Turns #22 Wire .100" Diameter

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0170




| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .055/1,40 | .065/1,65 |
| B | .124/3,15 | |
| C | .243/6,17 | .253/6,43 |
| D | .635/16,13 | .665/16,89 |
| E | .555/14,10 | .565/14,35 |
| F | .739/18,77 | .749/19,02 |
| G | .315/8,00 | .325/8,26 |
| H | .002/0,05 | .006/0,15 |
| I | .055/1,40 | .065/1,65 |
| J | .075/1,91 | .095/2,41 |

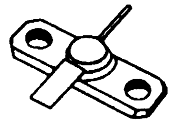
| CONT'D | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| K | | .190/4,83 |
| L | .245/6,22 | .255/6,48 |

SGS-THOMSON MICROELECTRONICS

# SD1891-03

## RF & MICROWAVE TRANSISTORS 1.6 GHz SATCOM APPLICATIONS

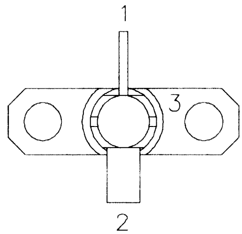
- 1.65 GHz
- 28 VOLTS
- GOLD METALLIZED SYSTEM
- POLYSILICON SITE BALLASTING
- OVERLAY DIE GEOMETRY
- HIGH RELIABILITY AND RUGGEDNESS
- $P_{OUT}$ = 5.0 W MIN. WITH 14.0 dB GAIN



**.230 2LFL (M151)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1891-03 | 1891-03 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base

### DESCRIPTION

The SD1891-03 is a 28 V silicon NPN transistor designed for INMARSAT and other 1.6 GHz SATCOM applications. This device utilizes poly-silicon site ballasting with a gold metallized die to achieve high reliability and ruggedness.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 45 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 15 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.5 | V |
| $I_C$ | Device Current | 1.1 | A |
| $P_{DISS}$ | Power Dissipation | 8.8 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 20.0 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

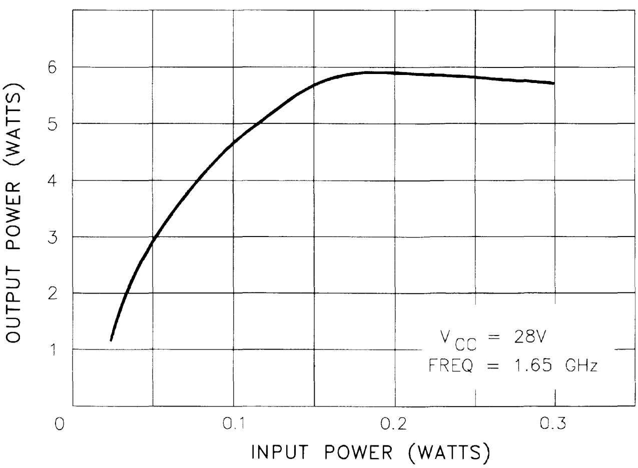
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 1mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 1mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 24V | $I_E$ = 0mA | — | — | 0.5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 100mA | 15 | — | 150 | — |

DYNAMIC

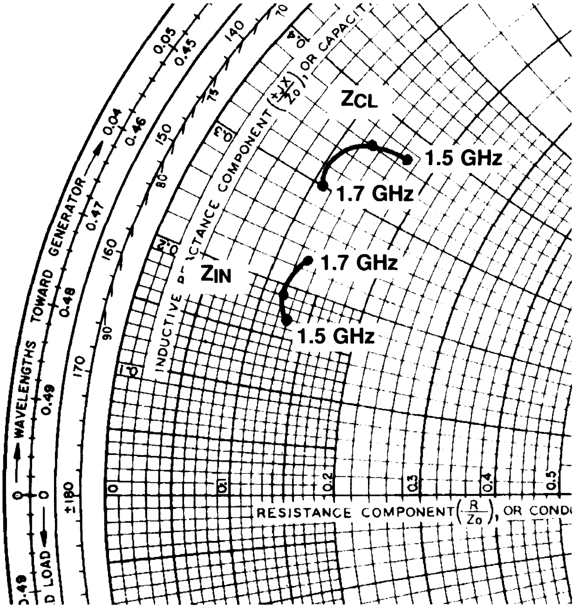
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1.65 MHz | $P_{IN}$ = 200 mW | $V_{CE}$ = 28 V | 5.0 | — | — | W |
| $G_P$ | f = 1.65 MHz | $P_{IN}$ = 200 mW | $V_{CE}$ = 28 V | 14 | — | — | dB |
| $\eta_C$ | f = 1.65 MHz | $P_{IN}$ = 200 mW | $V_{CE}$ = 28 V | 45 | — | — | % |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 28 V | | — | 2.5 | — | pF |

## TYPICAL PERFORMANCE

### POWER OUTPUT vs POWER INPUT

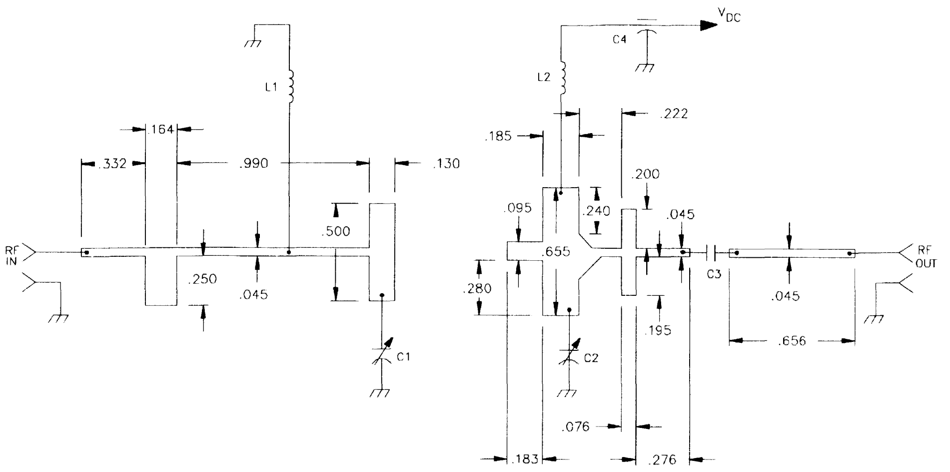


## IMPEDANCE DATA




| FREQ. | ZIN (Ω) | ZCL (Ω) |
|---|---|---|
| 1.5 GHz | 6.5 + j 8.5 | 8.5 + j 18.5 |
| 1.6 GHz | 6.0 + j 9.5 | 6.5 + j 18.0 |
| 1.7 GHz | 6.5 + j 11.5 | 5.5 + j 15.0 |

## TEST CIRCUIT



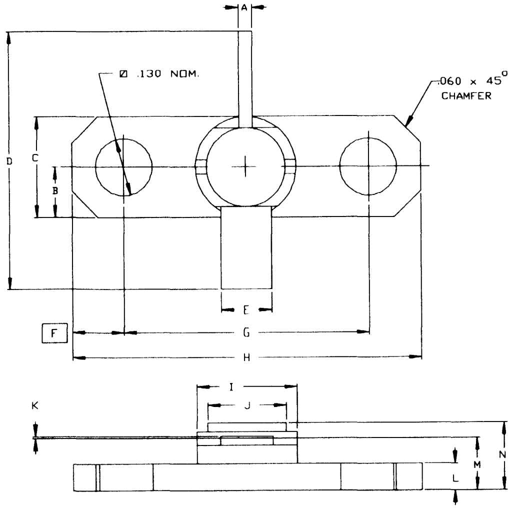

C1, C2 : .4 - 2.5pF Johandson Capacitor #27283
C3 : 100pF ATC Chip Capacitor ATC100 A101KCA 150
C4 : 15,000pF EMI Filter Murata/Erie 9900-381-6004

L1, L2 : 4 Turns, Choke #28 AWG .080" I.D.

S1 : Epsilam 10 Er = 10.2, Height .050" 1 Oz. Cu. SMA Launcher CD1
(2 pieces) .230" Fixture Housing Heatsink

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0192




| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .025/0,64 | .035/0,89 |
| B | .115/2,92 NOM. | |
| C | .225/5,72 | .235/5,97 |
| D | .710/18,03 | .750/19,05 |
| E | .110/2,79 | .120/3,05 |
| F | .120/3,05 NOM. | |
| G | .555/14,10 | .565/14,35 |
| H | .795/20,19 | .805/20,45 |
| I | .222/5,64 | .236/5,99 |
| J | .165/4,19 | .185/4,70 |

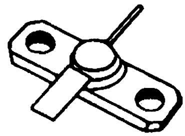
| CONT'D | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| K | .003/0,08 | .007/0,18 |
| L | .055/1,40 | .067/1,70 |
| M | .120/3,18 | .140/3,56 |
| N | | .170/4,32 |

SGS-THOMSON
MICROELECTRONICS

# SD1893-03

## RF & MICROWAVE TRANSISTORS
## 1.6 GHZ SATCOM APPLICATIONS

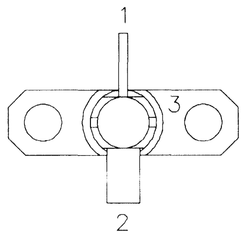
- 1.65 GHz
- 28 VOLTS
- OVERLAY DIE GEOMETRY
- GOLD METALLIZATION
- HIGH RELIABILITY AND RUGGEDNESS
- $P_{OUT}$ = 10 W MIN. WITH 11.0 dB GAIN
- COMMON BASE



**.230 2LFL (M151)**
hermetically sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| SD1893-03 | 1893-3 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base

### DESCRIPTION

The SD1893-03 is a 28 V silicon NPN planar transistor designed for INMARSAT and other 1.6 GHz SATCOM applications. The device utilizes polysilicon site ballasting with a gold metallized die to achieve high reliability and ruggedness.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 45 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 15 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.5 | V |
| $I_C$ | Device Current | 4.4 | A |
| $P_{DISS}$ | Power Dissipation | 43 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j\text{-}c)}$ | Junction-Case Thermal Resistance | 5.5 | °C/W |

**ELECTRICAL SPECIFICATIONS** ($T_{case}$ = 25°C)

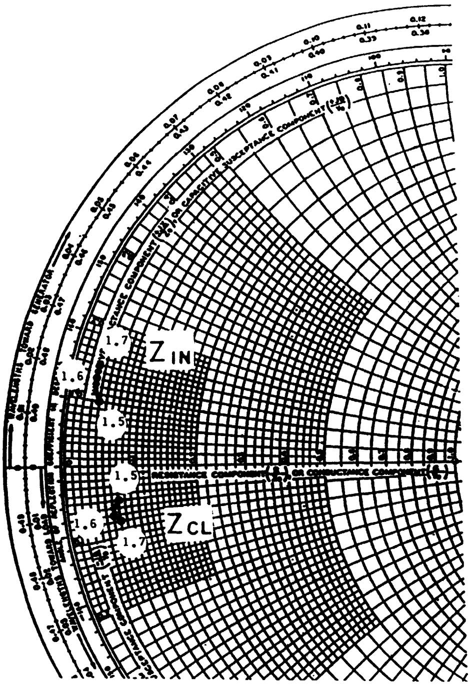
STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 3mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 3mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 28V | $I_E$ = 0mA | — | — | 5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 300mA | 15 | — | 150 | — |

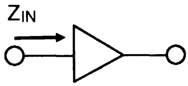
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1.65 GHz | $P_{IN}$ = 0.6 W | $V_{CE}$ = 28 V | 10 | — | — | W |
| $G_P$ | f = 1.65 GHz | $P_{IN}$ = 0.6 W | $V_{CE}$ = 28 V | 11 | — | — | dB |
| $\eta_c$ | f = 1.65 GHz | $P_{IN}$ = 0.6 W | $V_{CE}$ = 28 V | 45 | — | — | % |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 28 V | | — | 19 | — | pF |

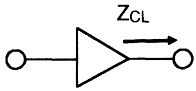
## IMPEDANCE DATA




**TYPICAL INPUT IMPEDANCE**

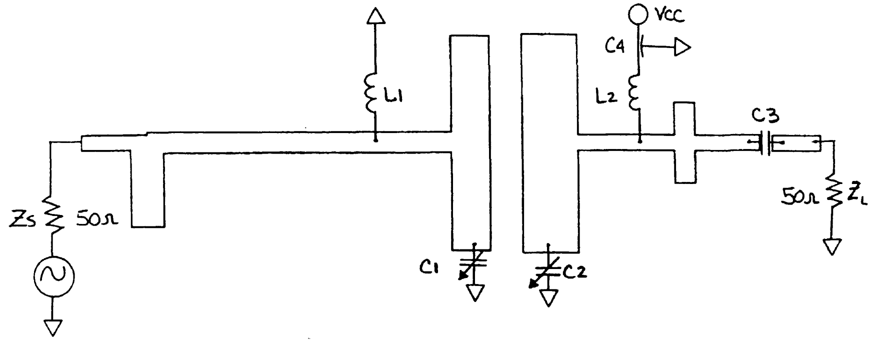



**TYPICAL COLLECTOR LOAD IMPEDANCE**




| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 1.5 GHz | 2.5 + j 4.5 | 3.5 − j 2.6 |
| 1.6 GHz | 2.0 + j 6.0 | 3.0 − j 3.3 |
| 1.7 GHz | 2.0 + j 7.0 | 3.5 − j 4.0 |

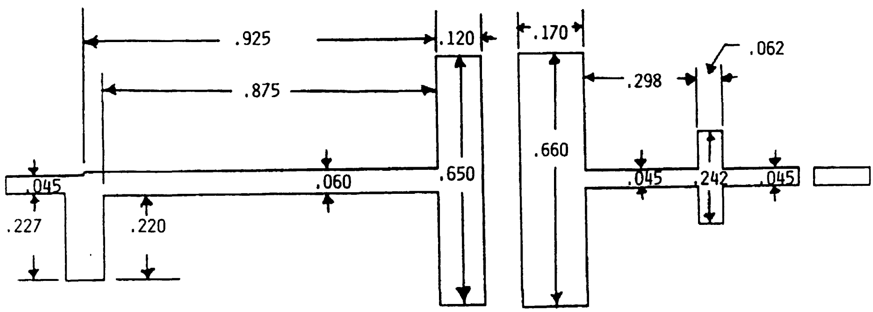
## TEST CIRCUIT

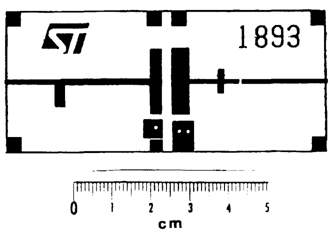



C1, C2 : .4 - 2.5pF Johanson Capacitor #27283
C3 : 100pF Chip Capacitor ATC 100 A101KCA 150
C4 : 15,000pF EMI Filter Murata/Erie 9900-381-6004

L1, L2 : 4 Turn, Choke #28 AWG .080" I.D.

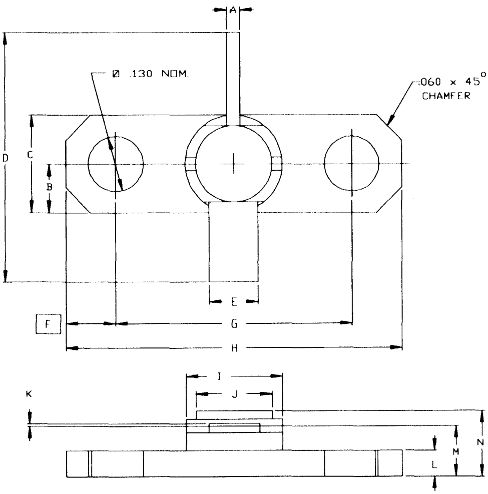
Board Material: Epsilam 10, Er = 10.2, H = .050"
1 Oz. Cu. SMA Launcher CDI (2 poeces)
.230" Fixture Housing Heatsink, Advanced Corp. 5308-2CC



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0192




| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .025/0,64 | .035/0,89 |
| B | .115/2,92 NOM. | |
| C | .225/5,72 | .235/5,97 |
| D | .710/18,03 | .750/19,05 |
| E | .110/2,79 | .120/3,05 |
| F | .120/3,05 NOM. | |
| G | .555/14,10 | .565/14,35 |
| H | .795/20,19 | .805/20,45 |
| I | .222/5,64 | .236/5,99 |
| J | .165/4,19 | .185/4,70 |

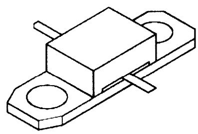
| CONT'D | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| K | .003/0,08 | .007/0,18 |
| L | .055/1,40 | .067/1,70 |
| M | .120/3,18 | .140/3,56 |
| N | | .170/4,32 |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

SGS-THOMSON MICROELECTRONICS

# SD1895-03

## RF & MICROWAVE TRANSISTORS 1.6 GHz SATCOM APPLICATIONS

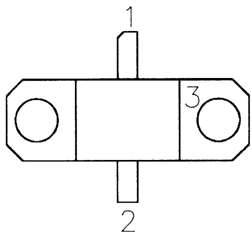
- 1.65 GHz
- 28 VOLTS
- OVERLAY DIE GEOMETRY
- ALL GOLD METALLIZED SYSTEM
- HIGH RELIABILITY AND RUGGEDNESS
- COOMON BASE
- $P_{OUT}$ = 15 W MIN. WITH 9.2 dB GAIN



**.250 x .250 2LFL (M170)**
hermetically sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| SD1895-03 | SD1895-3 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base

## DESCRIPTION

The SD1895-03 is a 28 V silicon NPN planar transistor designed for INMARSAT and other 1.6 GHz SATCOM applications. This device utilizes poly-silicon site ballasting with a gold metallized die to achieve high reliability and ruggedness.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 45 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 15 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.0 | V |
| $I_C$ | Device Current | 3.0 | A |
| $P_{DISS}$ | Power Dissipation | 37.2 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 4.7 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

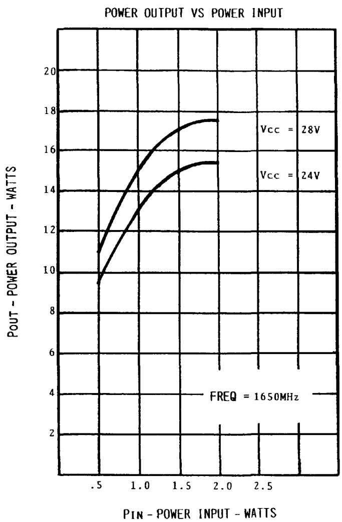
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 5mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 5mA | $I_B$ = 0mA | 12 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 5mA | $I_C$ = 0mA | 3.0 | — | — | V |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1A | 15 | — | 150 | — |

DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1.65 GHz | $P_{IN}$ = 2.4 W | $V_{CE}$ = 28 V | 20 | — | — | W |
| $G_P$ | f = 1.65 GHz | $P_{IN}$ = 2.4 W | $V_{CE}$ = 28 V | 9.2 | — | — | dB |
| $\eta_C$ | f = 1.65 GHz | $P_{IN}$ = 2.4 W | $V_{CE}$ = 28 V | 48 | — | — | % |

## TYPICAL PERFORMANCE

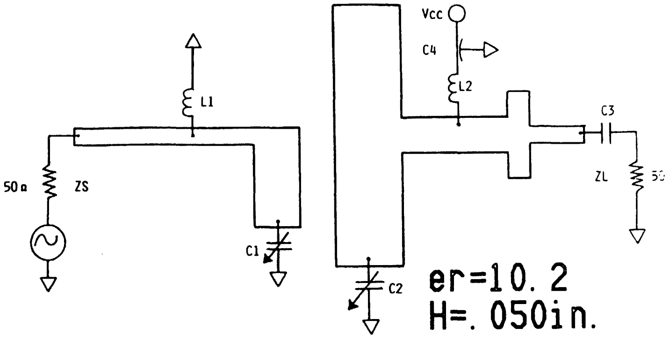
### POWER OUTPUT vs POWER INPUT




## IMPEDANCE DATA

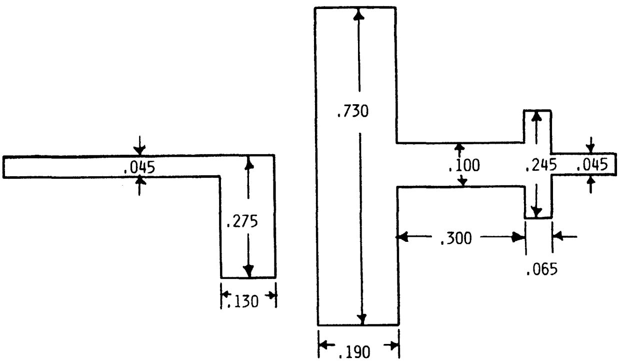
| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 1.65 GHz | 17.0 + j 18.0 | 3.5 − j 2.0 |

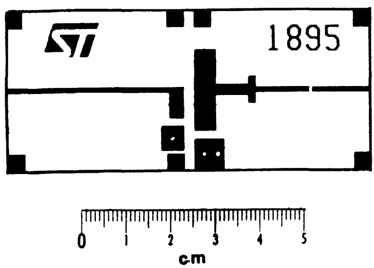
## TEST CIRCUIT



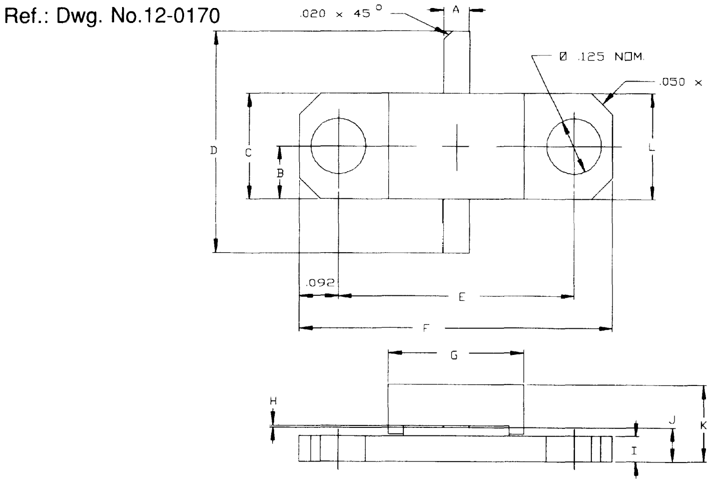

C1, C2 : 0.4 - 2.5pF #27283 Johanson Trimmer
C3 : 100pF ATC 100A101KCA150 Chip Capacitor
C4 : 15,000pF EMI Filter Murata/Erie #9900-381-6004

L1, L2 : 4 Turns, #28 AWG. .080" I.D.



## PACKAGE MECHANICAL DATA




| SGS-THOMSON MICROELECTRONICS | MINIMUM Inches/mm | MAXIMUM Inches/mm |
|---|---|---|
| A | .055/1,40 | .065/1,65 |
| B | .124/3,15 | |
| C | .243/6,17 | .253/6,43 |
| D | .635/16,13 | .665/16,89 |
| E | .555/14,10 | .565/14,35 |
| F | .739/18,77 | 749/19,02 |
| G | .315/8,00 | .325/8,26 |
| H | .002/0,05 | .006/0,15 |
| I | .055/1,40 | .065/1,65 |
| J | .075/1,91 | .095/2,41 |

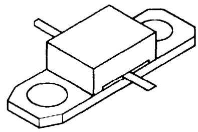
| CONT'D | MINIMUM Inches/mm | MAXIMUM Inches/mm |
|---|---|---|
| K | | .190/4,83 |
| L | .245/6,22 | .255/6,48 |

**SGS-THOMSON**
MICROELECTRONICS

# SD1897

## RF & MICROWAVE TRANSISTORS
## 1.65 GHz SATCOM APPLICATIONS

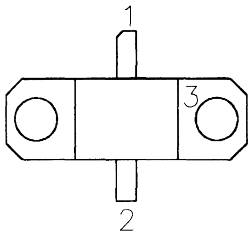
- 1.65 GHz
- 28 VOLTS
- CLASS C OPERATION
- COMMON BASE
- $P_{OUT}$ = 10 W MIN. WITH 11.0 dB GAIN



**.250 SQ. 2LFL (M170)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1897 | 1897 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base

### DESCRIPTION

The SD1897 is a 28 V Class C silicon NPN transistor designed for INMARSAT and other 1.65 GHz SATCOM applications. A gold metallized emitter-ballasted die geometry is employed providing high gain and efficiency while ensuring long term reliability and ruggedness under severe operating conditions. SD1897 is packaged in a cost-effective epoxy sealed housing.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 45 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 15 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.5 | V |
| $I_C$ | Device Current | 2.3 | A |
| $P_{DISS}$ | Power Dissipation | 29 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | − 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 6.0 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

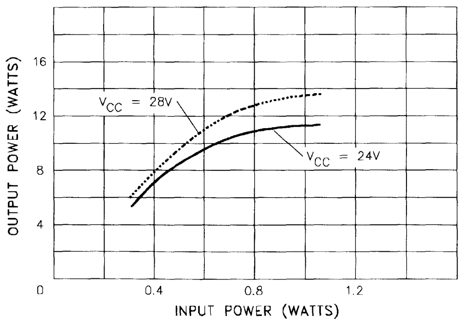
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 3mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 3mA | $I_B$ = 0mA | 12 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 3mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 600mA | 15 | — | 150 | — |

DYNAMIC

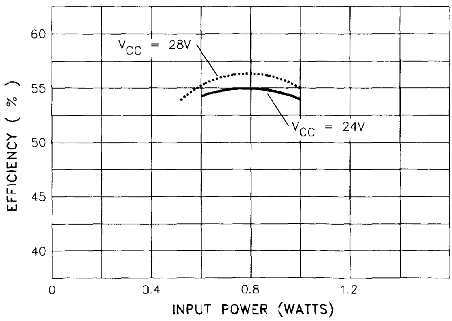
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1.65 GHz | $P_{IN}$ = 0.8 W | $V_{CE}$ = 28 V | 10 | — | — | W |
| $G_P$ | f = 1.65 GHz | $P_{IN}$ = 0.8 W | $V_{CE}$ = 28 V | 11 | — | — | dB |
| $\eta_C$ | f = 1.65 GHz | $P_{IN}$ = 0.8 W | $V_{CE}$ = 28 V | 48 | — | — | % |

## TYPICAL PERFORMANCE

**POWER OUTPUT vs POWER INPUT**

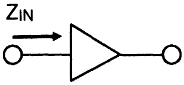



**EFFICIENCY vs POWER INPUT**

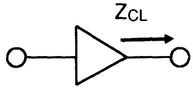


## IMPEDANCE DATA

**TYPICAL INPUT IMPEDANCE**



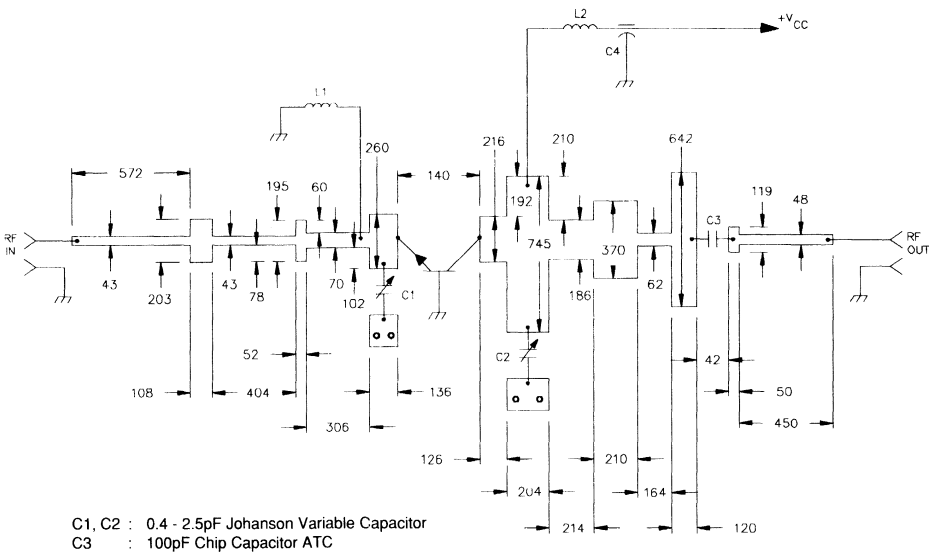

**TYPICAL COLLECTOR LOAD IMPEDANCE**




| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 1600 MHz | 22.0 + j 23.0 | 3.1 + j 4.0 |
| 1650 MHz | 28.0 + j 18.0 | 3.0 + j 2.0 |

$P_{OUT}$ = 10 W
$V_{CE}$ = 28 V
$P_{IN}$ = 0.8 W

## TEST CIRCUIT



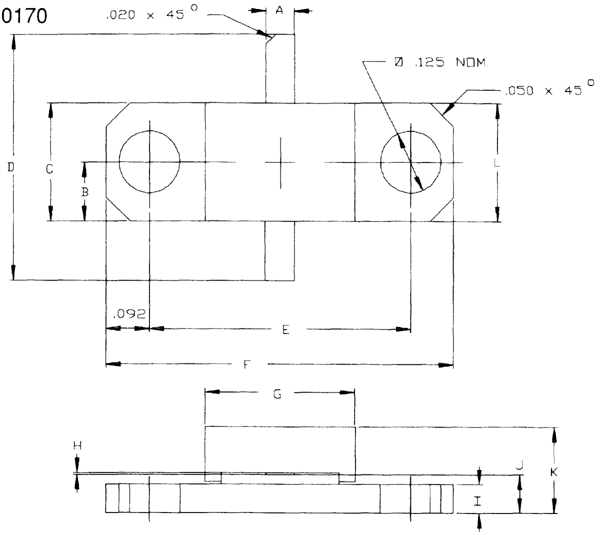

C1, C2 : 0.4 - 2.5pF Johanson Variable Capacitor
C3 : 100pF Chip Capacitor ATC
C4 : Suppression Filters CDI 9900381-6004

L1, L2 : 4 Turns, Choke #28 AWG .080" I.D.

Substrate: Er = 10.2, Height .050", 1 Oz. Cu.
All Dimensions in mm unless otherwise specified

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0170




| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .055/1,40 | .065/1,65 |
| B | .124/3,15 | |
| C | .243/6,17 | .253/6,43 |
| D | .635/16,13 | .665/16,89 |
| E | .555/14,10 | .565/14,35 |
| F | .739/18,77 | .749/19,02 |
| G | .315/8,00 | .325/8,26 |
| H | .002/0,05 | .006/0,15 |
| I | .055/1,40 | .065/1,65 |
| J | .075/1,91 | .095/2,41 |

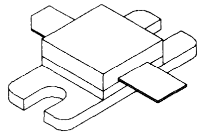
| CONT'D | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| K | | .190/4,83 |
| L | .245/6,22 | .255/6,48 |

SGS-THOMSON
MICROELECTRONICS

# SD1898

## RF & MICROWAVE TRANSISTORS 1.6 GHz SATCOM APPLICATIONS

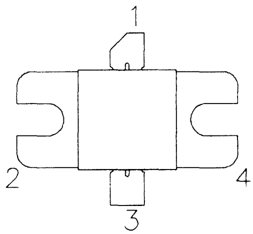
- 1.65 GHz
- 28 VOLTS
- EFFICIENCY 40% MIN.
- CLASS C OPERATION
- COMMON BASE
- $P_{OUT}$ = 32 W MIN. WITH 9 dB GAIN



**.400 SQ. 2LFL (M186)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1898 | 1898 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Base

### DESCRIPTION

The SD1898 is a 28 V Class C silicon NPN transistor designed for INMARSAT and other 1.65 GHz SATCOM applications. A gold metallized emitter-ballasted die geometry is employed providing high gain and efficiency while ensuring long term reliability and ruggedness under severe operating conditions. SD1898 is packaged in a cost-effective epoxy sealed housing.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 45 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 15 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.5 | V |
| $I_C$ | Device Current | 7.8 | A |
| $P_{DISS}$ | Power Dissipation | 87.5 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 2.0 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

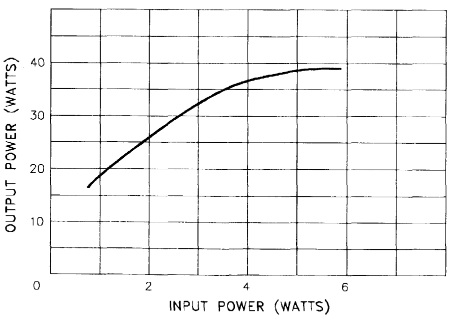
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 10mA | $I_E$ = 0mA | 45 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 10mA | $I_B$ = 0mA | 12 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 2A | 15 | — | 150 | — |

DYNAMIC

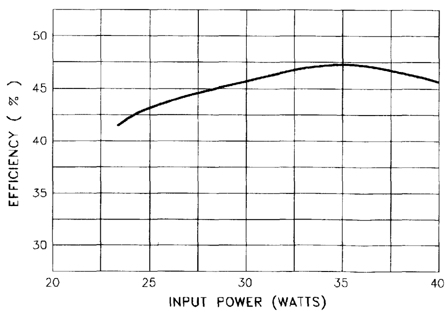
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 1.65 GHz | $P_{IN}$ = 4.0 W | $V_{CE}$ = 28 V | 32 | — | — | W |
| $G_P$ | f = 1.65 GHz | $P_{IN}$ = 4.0 W | $V_{CE}$ = 28 V | 9.0 | — | — | dB |
| $\eta_C$ | f = 1.65 GHz | $P_{IN}$ = 4.0 W | $V_{CE}$ = 28 V | 40 | — | — | % |

## TYPICAL PERFORMANCE

### POWER OUTPUT vs POWER INPUT

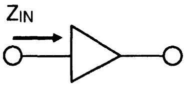



### EFFICIENCY vs POWER INPUT

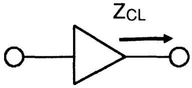


## IMPEDANCE DATA

**TYPICAL INPUT IMPEDANCE**

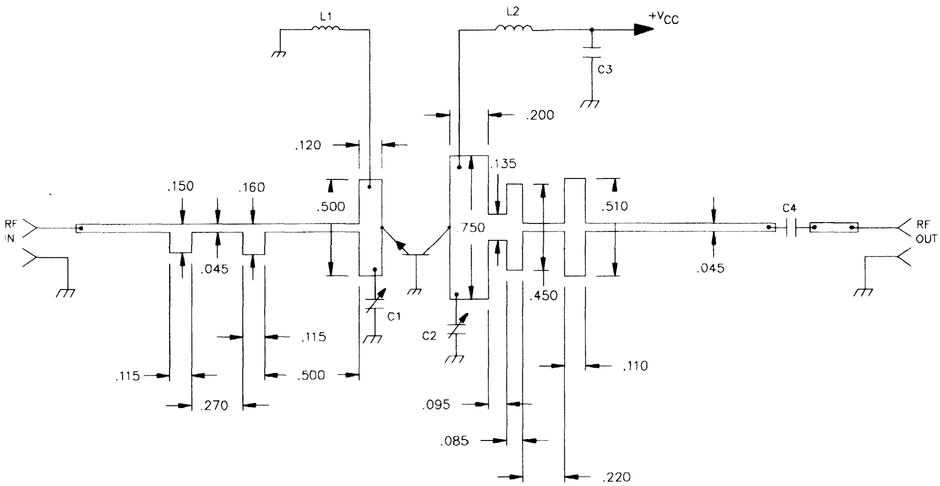



**TYPICAL COLLECTOR LOAD IMPEDANCE**




| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 1550 MHz | 6.6 + j 15.0 | 5.6 – j 2.5 |
| 1600 MHz | 8.3 + j 14.5 | 4.7 – j 1.9 |
| 1650 MHz | 12.0 + j 12.0 | 4.1 – j 1.4 |

## TEST CIRCUIT



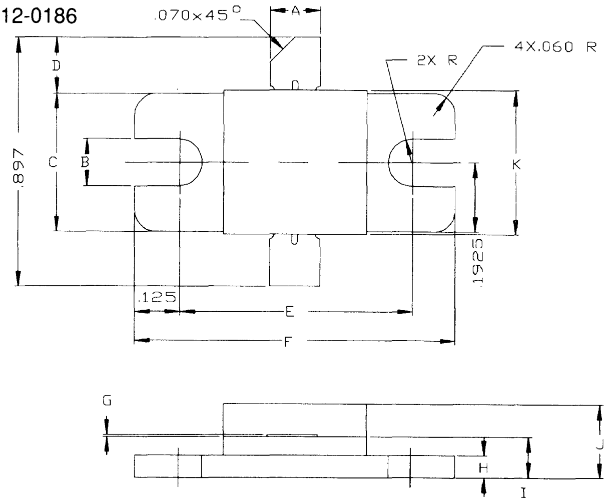

C1, C2 : .4 - 2.5pF Johanson Capacitor
C3 : 15,000pF EMI Filter
C4 : 1000pF Chip Capacitor

L1, L2 : 5 Turns Choke Diameter Wire .025" I.D. .125"

Substrate: Er = 10.2, Height .050", 1 Oz. Copper
All Dimensions in Inches.

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0186




| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .135/3,43 | .145/3,69 |
| B | .130/3,30 NOM. | |
| C | .380/ 9,65 | .390/ 9,91 |
| D | .240/6,10 | .260/6,61 |
| E | .645/16,38 | .655/16,64 |
| F | .890/22,61 | .910/23,11 |
| G | .002/0,05 | .006/0,15 |
| H | .055/1,40 | .065/1,65 |
| I | .090/2,29 | .110/2,79 |
| J | .180/4,57 | .200/5,08 |

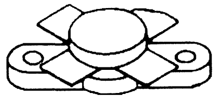
| CONT'D | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| K | .390/9,91 | .410/10,41 |

SGS-THOMSON MICROELECTRONICS

# SD1920

## RF MOS FIELD EFFECT TRANSISTORS HF/VHF APPLICATIONS

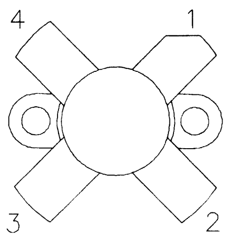
- 2 - 200 MHz
- 50 VOLTS
- IMD –30 dB
- CLASS AB
- WIDEBAND TUNING
- SIMPLE BIAS CIRCUITRY
- GOLD METALLIZATION FOR HIGH RELIABILITY
- COMMON SOURCE CONFIGURATION
- $P_{OUT}$ = 150 W MIN. WITH 8.0 dB GAIN



**.500 4LFL (M174)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1920 | SD1920 |

**PIN CONNECTION**




1. Drain
2. Source
3. Gate
4. Source

### DESCRIPTION

The SD1920 is a gold metallized N-Channel MOS field-effect RF power transistor. The SD1920 is intended for use in 50 V dc large signal applications up to 200 MHz.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{(BR)DSS}$ | Drain-Source Voltage | 125 | V |
| $V_{DGR}$ | Drain-Gate Voltage | 125 | V |
| $V_{GS}$ | Gate-Source Voltage | ± 30 | V |
| $I_D$ | Drain Current | 13.9 | A |
| $P_{DISS}$ | Power Dissipation | 215 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 0.70 (Typ.) | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Parameter | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $V_{(BR)DSS}$ | $V_{GS}$ = 0V | $I_D$ = 100mA | | 125 | — | — | V |
| $I_{DSS}$ | $V_{DS}$ = 50V | $V_{GS}$ = 0V | | — | — | 5 | mA |
| $I_{GSS}$ | $V_{GS}$ = 20V | $V_{DS}$ = 0V | | — | — | 1 | µA |
| $V_{DS}(on)$ | $V_{GS}$ = 10V | $I_D$ = 10A | | — | — | 5 | V |
| $G_{FS}$ | $V_{DS}$ = 10V | $I_D$ = 5A | | 4 | — | — | mhos |
| $C_{ISS}$ | $V_{DS}$ = 50V | $V_{GS}$ = 0V | F = 1MHz | — | — | 500 | pF |
| $C_{OSS}$ | $V_{DS}$ = 50V | $V_{GS}$ = 0V | F = 1MHz | — | — | 250 | pF |
| $C_{RSS}$ | $V_{DS}$ = 50V | $V_{GS}$ = 0V | F = 1MHz | — | — | 50 | pF |
| $V_{GS(TH)}$ | $V_{GS}$ = 10V | $I_D$ = 100mA | | 1 | — | 5 | V |

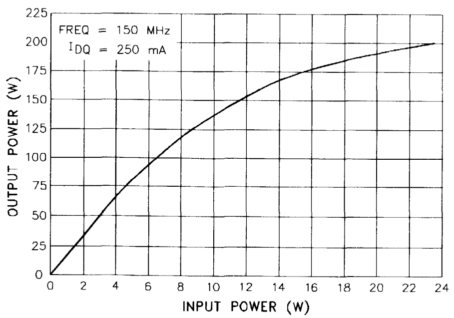
DYNAMIC

| Symbol | Parameter | | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|---|
| | | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | $V_{DS}$ = 50V | | $I_{DQ}$ = 250mA | f = 150 MHz | 150 | — | — | W |
| $\eta_D$ | $V_{DS}$ = 50V | $P_{OUT}$ = 150W | $I_{DQ}$ = 250mA | f = 150 MHz | 45 | — | — | % |
| $G_{PS}$ | $V_{DS}$ = 50V | $P_{OUT}$ = 150W | $I_{DQ}$ = 250mA | f = 150 MHz | 8.0 | — | — | dB |
| $IMD_3$* | $V_{DS}$ = 50V | $P_{OUT}$ = 150W | $I_{DQ}$ = 250mA | f = 30 MHz | — | –30 | — | dB |

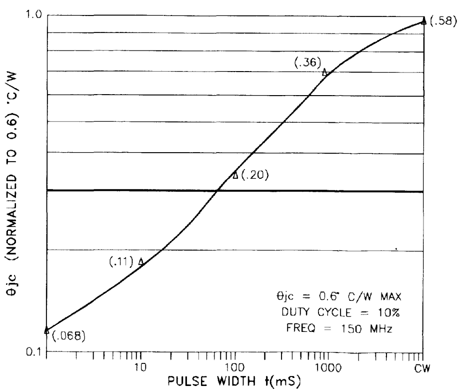
* 2 Tones, $\Delta f$ = 1 kHz

## TYPICAL PERFORMANCE

### POWER OUTPUT vs POWER INPUT

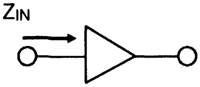



### THERMAL RESPONSE

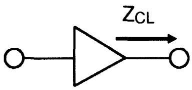


## IMPEDANCE DATA

**TYPICAL INPUT IMPEDANCE**



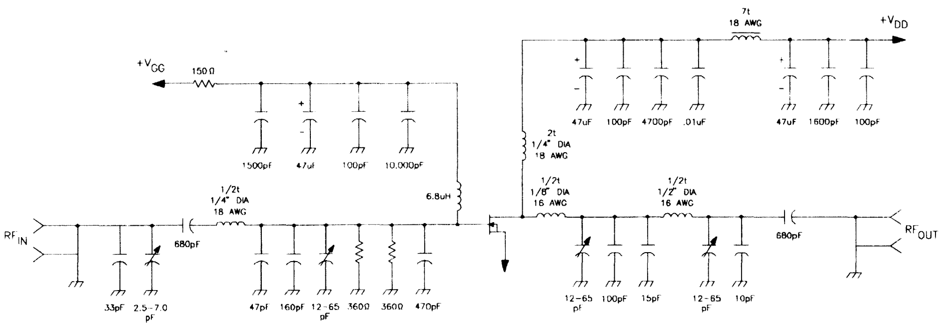

**TYPICAL COLLECTOR LOAD IMPEDANCE**




| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 150 MHz | 1.2 – j 1.4 | 2.2 + j 2.3 |

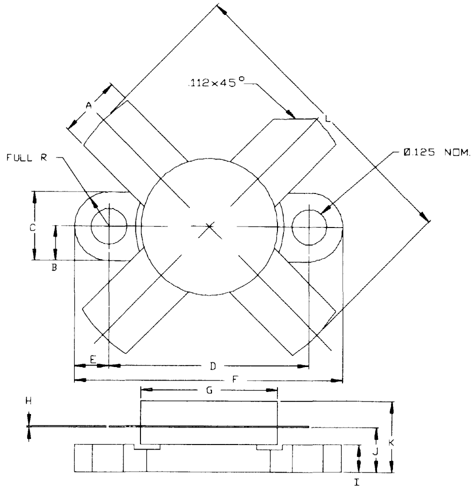
## TEST CIRCUIT

f = 150 MHz



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No. 12-0174




| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .220/5,59 | .230/5,84 |
| B | .125/3,18 | |
| C | .245/6,22 | .255/6,48 |
| D | .720/18,28 | .730/18,54 |
| E | .125/3,18 | |
| F | .970/24,64 | .980/24,89 |
| G | .495/12,57 | .505/12,83 |
| H | .003/0,08 | .007/0,18 |
| I | .090/2,29 | .110/2,79 |
| J | .160/4,06 | .175/4,45 |

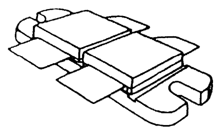
| CONT'D | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| K | | .280/7,11 |
| L | | 1.050/26,67 |

SGS-THOMSON
MICROELECTRONICS

# SD1920-02

## RF MOS FIELD EFFECT TRANSISTORS
## HF/VHF APPLICATIONS

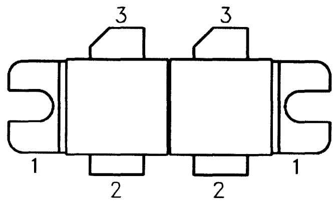
- 2 - 200 MHz
- 50 VOLTS
- IMD – 30dB
- CLASS AB
- GOLD METALLIZATION FOR HIGH RELIABILITY
- DESIGNED FOR LINEAR OPERATION
- WIDEBAND TUNING
- SIMPLE BIAS CIRCUITRY
- COMMON SOURCE CONFIGURATION
- $P_{OUT}$ = 300 W MIN. WITH 8.0 dB GAIN



**2 x .437 x .450 2LFL (M176)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1920-02 | 1920-2 |

**PIN CONNECTION**




1. Drain
2. Gate
3. Source

## DESCRIPTION

The SD1920-02 is a gold metallized N-Channel MOS field-effect RF power transistor. The SD1920-02 is intended for used in 50 V dc large signal applications up to 200 MHz.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value (per side) | Unit |
|---|---|---|---|
| $V_{(BR)DSS}$ | Drain-Source Voltage | 125 | V |
| $V_{DGR}$ | Drain-Gate Voltage | 125 | V |
| $V_{GS}$ | Gate-Source Voltage | ± 30 | V |
| $I_D$ | Drain Current | 13.9 | A |
| $P_{DISS}$ | Power Dissipation | 215 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 0.70 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

| Symbol | Parameter | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $V_{(BR)DSS}$ | $V_{GS}$ = 0V | $I_D$ = 100mA | | 125 | — | — | V |
| $I_{DSS}$ | $V_{DS}$ = 50V | $V_{GS}$ = 0V | | — | — | 5 | mA |
| $I_{GSS}$ | $V_{GS}$ = 20V | $V_{DS}$ = 0V | | — | — | 1 | µA |
| $V_{DS(on)}$ | $V_{GS}$ = 10V | $I_D$ = 10A | | — | — | 5 | V |
| $G_{FS}$ | $V_{DS}$ = 10V | $I_D$ = 5A | | 4 | — | — | mhos |
| $C_{ISS}$ | $V_{DS}$ = 50V | $V_{GS}$ = 0V | F = 1MHz | — | — | 500 | pF |
| $C_{OSS}$ | $V_{DS}$ = 50V | $V_{GS}$ = 0V | F = 1MHz | — | — | 250 | pF |
| $C_{RSS}$ | $V_{DS}$ = 50V | $V_{GS}$ = 0V | F = 1MHz | — | — | 50 | pF |
| $V_{GS(TH)}$ | $V_{GS}$ = 10V | $I_D$ = 100mA | | 1 | — | 5 | V |

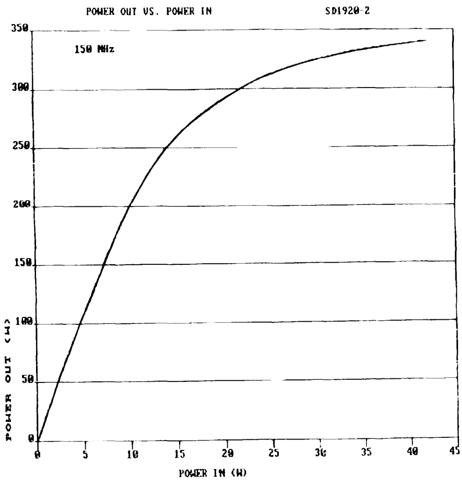
All DC Static Parameters Tested Per Side.

### DYNAMIC

| Symbol | Parameter | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | $V_{DS}$ = 50 V | $I_{DQ}$ = 2 x 250 mA | f = 150 MHz | 300 | — | — | W |
| $\eta_D$ | $V_{DS}$ = 50 V | $I_{DQ}$ = 2 x 250 mA | f = 150 MHz | 45 | — | — | % |
| $G_{PS}$ | $V_{DS}$ = 50 V | $I_{DQ}$ = 2 x 250 mA | f = 150 MHz | 8.0 | — | — | dB |

## TYPICAL PERFORMANCE

### POWER OUTPUT vs POWER INPUT

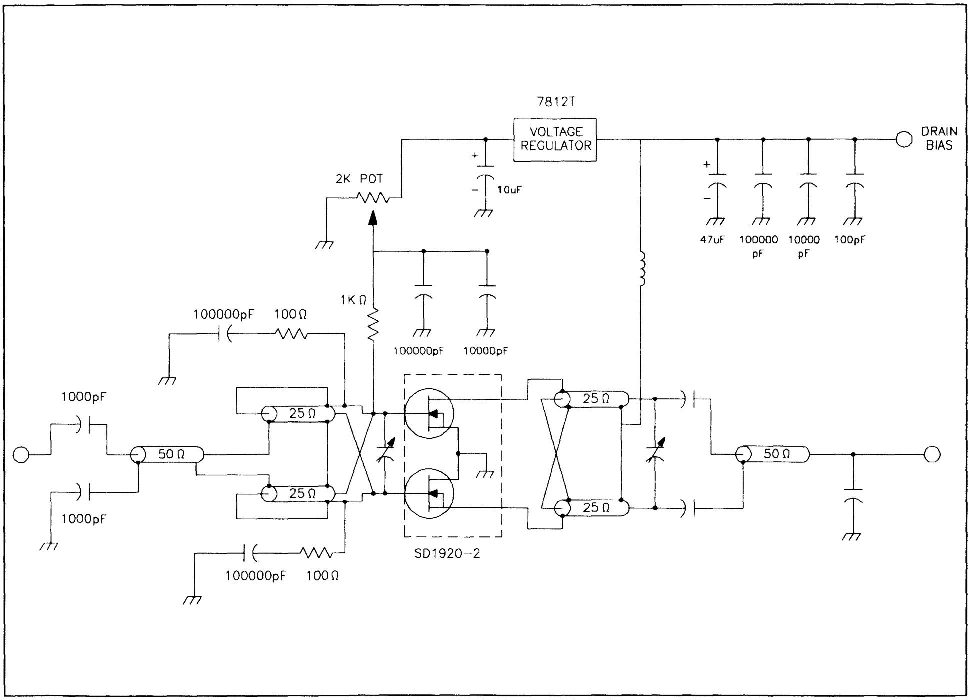


## IMPEDANCE DATA

| FREQ. | $Z_{IN}$ (Ω)* | $Z_{CL}$ (Ω)** |
|---|---|---|
| 150 MHz | 1.2 − j 0.1 | 3.3 + j 4.7 |

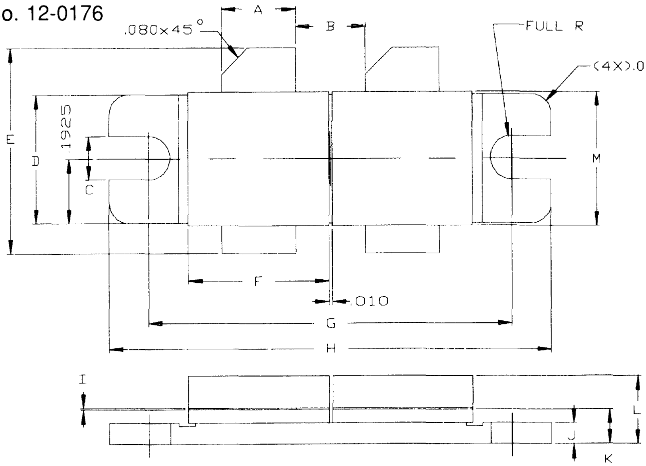
* Gate to Gate
** Drain to Drain

## TEST CIRCUIT



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No. 12-0176




| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .220/5,59 | .230/5,84 |
| B | .210/5,33 | |
| C | .125/3,18 | |
| D | .380/9,65 | .390/9,91 |
| E | .580/14,73 | .620/15,75 |
| F | .420/10,67 | .430/10,93 |
| G | 1.090/27,69 | 1.105/28,07 |
| H | 1.335/33,91 | 1.345/34,16 |
| I | .003/0,08 | .007/0,18 |
| J | .060/1,52 | .070/1,78 |

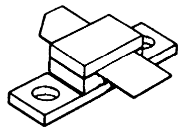
| CONT'D | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| K | .100/2,54 | .115/2,92 |
| L | | .230/5,84 |
| M | .395/10,03 | .405/10,29 |

SGS-THOMSON
MICROELECTRONICS

# SD1930

## RF MOS FEILD EFFECT TRANSISTORS
## HF\VHF BROADBAND APPLICATIONS

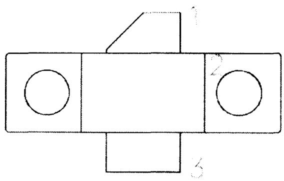
- GOLD METALLIZATION
- NO THERMAL RUNAWAY
- 28 VOLTAGE OUTPUT
- COMMON SOURCE CONFIGURATION
- $P_{OUT}$ = 5 W MIN. WITH 12.0 dB GAIN
- WIDEBAND TUNING
- SIMPLE BIAS CIRCUITRY



**.230 x .360 2LFL (M159)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD1930 | SUMIL5FT |

**PIN CONNECTION**




1. Drain
2. Source
3. Gate

## DESCRIPTION

The SD1930 is a gold metallized N-channel MOS field-effect RF transistor.

The SD1930 is intended for use in 28V DC large signal applications up to 400MHz.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{(BR)DSS}$ | Drain-Source Voltage | 60 | V |
| $V_{DGR}$ | Drain-Gate Voltage | 60 | V |
| $V_{GS}$ | Gate-Source Voltage | ±20 | V |
| $I_D$ | Drain Current | .9 | A |
| $P_{DISS}$ | Power Dissipation | 35 | W |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |
| $T_{CH}$ | Channel Temperature | +200 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 5.0 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

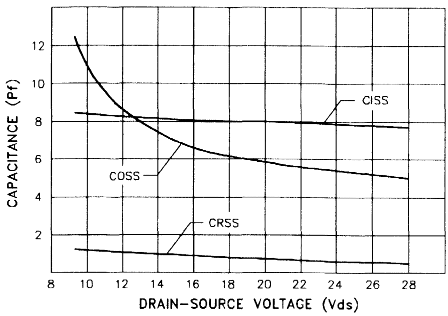
| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $V_{(BR)DSS}$ | $V_{GS}$ = 0V | $I_{DS}$ = 10mA | | 60 | — | — | V |
| $I_{DSS}$ | $V_{GS}$ = 0V | $V_{DS}$ = 28V | | — | — | 1.0 | mA |
| $G_{FS}$ | $V_{DS}$ = 10V | $I_D$ = .5A | | 0.2 | 0.6 | — | mho |
| $C_{ISS}$ | $V_{GS}$ = 0V | $V_{DS}$ = 28V | F = 1MHz | — | 8 | 12 | pF |
| $C_{OSS}$ | $V_{GS}$ = 0V | $V_{DS}$ = 28V | F = 1MHz | — | 5 | 7 | pF |
| $C_{RSS}$ | $V_{GS}$ = 0V | $V_{DS}$ = 28V | F = 1MHz | — | 0.6 | 1.5 | pF |
| $V_{GS(TH)}$ | $V_{DS}$ = 10V | $I_D$ = 50mA | | 0.8 | — | 6.0 | V |

DYNAMIC

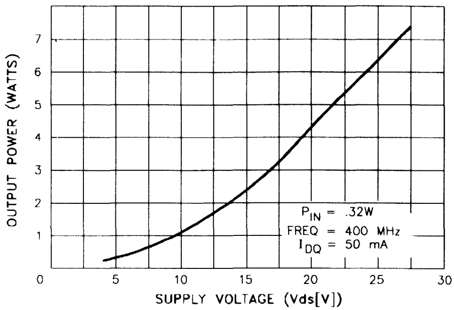
| Symbol | Test Conditions | | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|---|
| | | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | $V_{DD}$ = 28 V | $P_{IN}$ = .32 W | $I_{DQ}$ = 50 mA | f = 400 MHz | 5.0 | 7.0 | — | W |
| $\eta_D$ | $V_{DD}$ = 28 V | $P_{OUT}$ = 5 W | $I_{DQ}$ = 50 mA | f = 400 MHz | 45 | 55 | — | % |
| $G_{PS}$ | $V_{DD}$ = 28 V | $P_{OUT}$ = 5 W | $I_{DQ}$ = 50 mA | f = 400 MHz | 12.0 | 13.0 | — | dB |

## TYPICAL PERFORMANCE

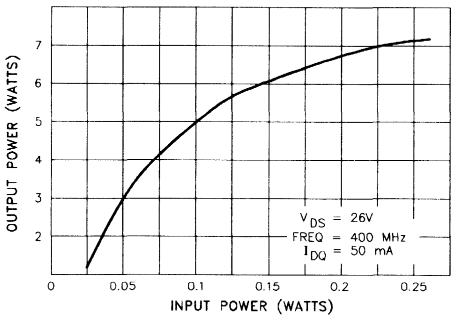
### CAPACITANCE vs DRAIN-SOURCE VOLTAGE




### POWER OUTPUT vs SUPPLY VOLTAGE

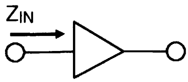



### POWER OUTPUT vs POWER INPUT

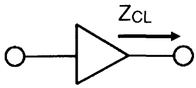


## IMPEDANCE DATA

**TYPICAL INPUT IMPEDANCE**

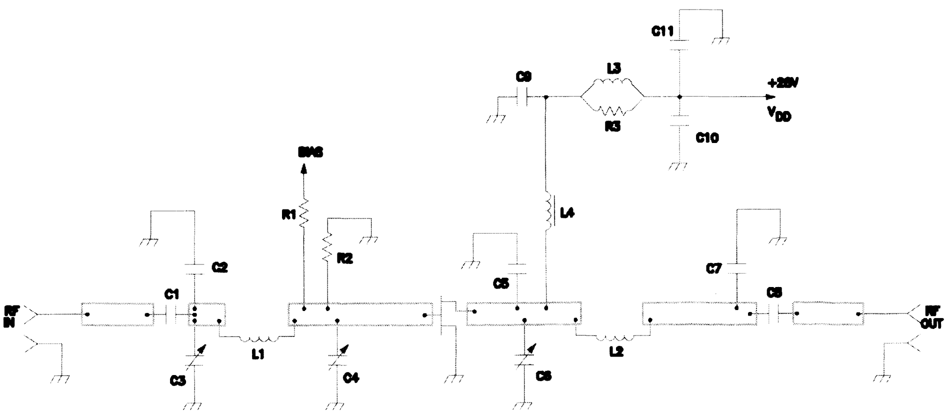



**TYPICAL COLLECTOR LOAD IMPEDANCE**




| FREQ. | $Z_{IN}$ ($\Omega$) | $Z_{CL}$ ($\Omega$) |
|---|---|---|
| 225 MHz | 22.6 – j 12.2 | 33.25 – j 3.52 |
| 400 MHz | 8.5 – j 19.2 | 21.8 + j 21.72 |

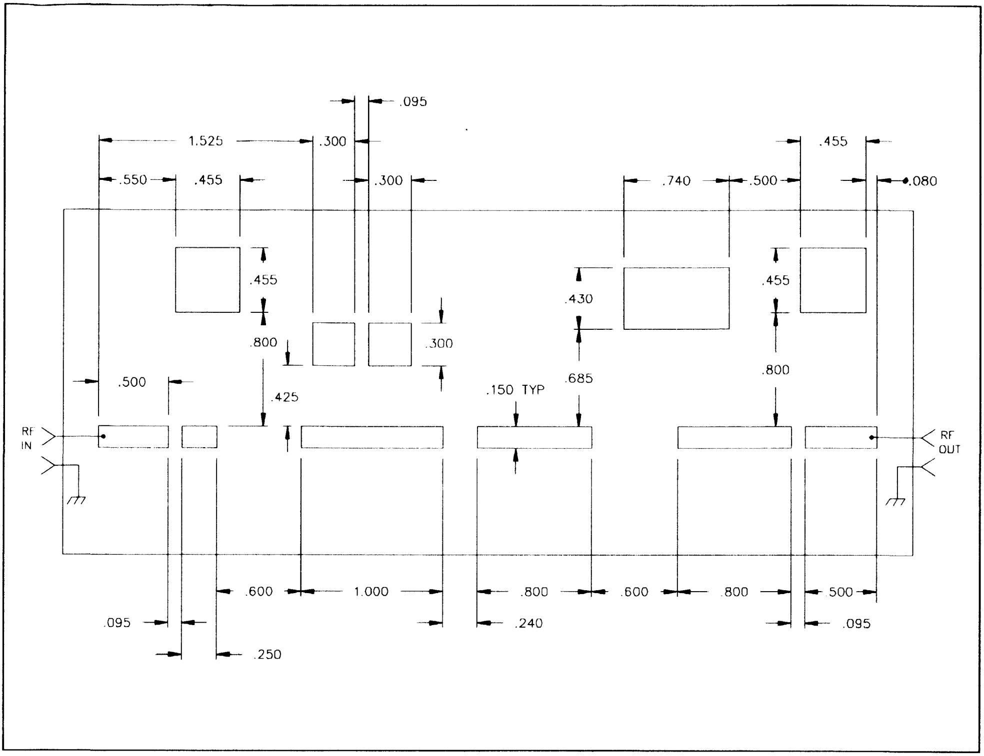
## TEST CIRCUIT




C1, C8 : 470 pF ATC
C2, C7 : 17 pF ATC
C3, C6 : .8 - 8 pF Johanson
C4 : .4 - 2.4 pF Johanson
C5 : 9.1 pF ATC
C9, C10 : 10 μF Electrolytic
C11 : .01 μF 103K Ceramic

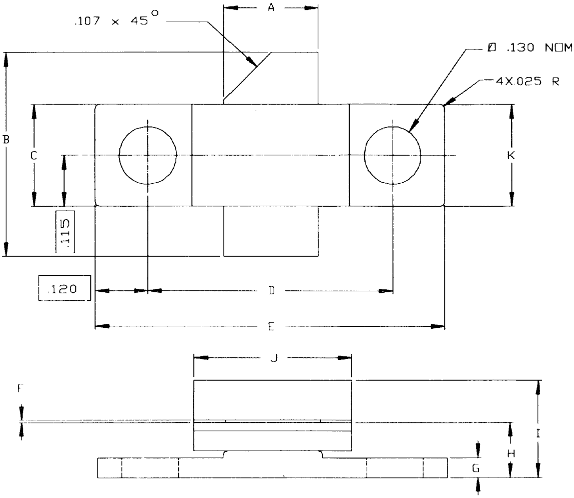
L1, L2 : 0.78 inch long 20 AWG Straight Wire
L3 : 7 Turns 20 AWG Wire (0.1 inch diameter)
L4 : VK 200 Ferrox Cube
R1, R2 : 560 Ohm 1/4 Watt
R3 : 15 Ohm 1/2 Watt

## TEST CIRCUIT



## PACKAGE MECHANICAL DATA

Ref.: Dwg. No. 12-0159

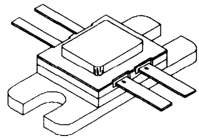



| SGS-THOMSON MICROELECTRONICS | MINIMUM Inches/mm | MAXIMUM Inches/mm |
|---|---|---|
| A | .210/5,33 | .220/5,51 |
| B | .670/17,02 | .730/18,54 |
| C | .225/5,72 | .235/5,97 |
| D | .555/14,10 | .565/14,35 |
| E | .795/20,19 | .805/20,45 |
| F | .003/0,08 | .007/0,18 |
| G | .039/1,00 | .050/1,27 |
| H | .120/3,05 | .135/3,43 |
| I | | .240/6,10 |
| J | .355/9,02 | .365/9,27 |

| CONT'D | MINIMUM Inches/mm | MAXIMUM Inches/mm |
|---|---|---|
| K | .225/5,72 | .235/5,97 |

# RF & MICROWAVE TRANSISTORS UHF TV LINEAR APPLICATIONS

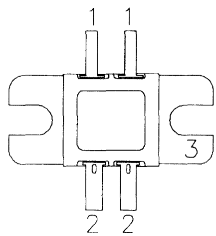
- 470-860 MHz
- 26.5 VOLTS
- GOLD METALLIZATION
- $P_{OUT}$ = 20.0W MIN. WITH 9.5 dB GAIN
- INTERNAL INPUT MATCHING
- DIFFUSED EMITTER BALLAST RESISTORS



**.400 x .425 4LFL (M119)**
hermetically sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| SD4010 | SUTV200 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter

## DESCRIPTION

The SD4010 is a gold metallized epitaxial silicon NPN planar transistor using diffused emitter ballast resistors. The SD4010 is intended for use in linear applications up to 1GHz, including UHF television transmitters, transposers and cellular base stations.

## ABSOLUTE MAXIMUM RATINGS (Tcase = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 60.0 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 60.0 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 4.0 | V |
| $I_C$ | Device Current (Maximum) | 11.0 | A |
| $P_{DISS}$ | Power Dissipation | 88.8 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 1.9 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 3.0 | 4.0 | — | V |
| $BV_{CES}$ | $I_C$ = 50mA | $V_{BE}$ = 0V | 60.0 | 85.0 | — | V |
| $BV_{CEO}$ | $I_C$ = 50mA | $I_B$ = 0mA | 28.0 | 30.0 | — | V |
| $I_{CEO}$ | $V_{CE}$ = 26.5V | $I_E$ = 0mA | — | — | 5 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 3A | 25 | 50 | 80 | — |

Tested Per Side

### DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 860MHz | $V_{CE}$ = 26.5V | $P_{IN}$ = 2.2W | 20.0 | 28.0 | — | W |
| $G_P$ | f = 860MHz | $V_{CE}$ = 26.5V | $P_{OUT}$ = 20W | 9.5 | 10.5 | — | dB |
| $IMD_3$ | $P_{SYNC}$ = 20W | $V_{CE}$ = 26.5V | (note 1) | — | –48 | –46 | dBc |
| $IP_3$ | $V_{CB}$ = 26.5V | $P_{OUT}$ = 20W PEP | (note 2) | — | 55 | — | dBm |
| $C_{OB}$ | f = 860MHz | $V_{CB}$ = 26.5V | (note 3) | — | 25 | 36 | pF |
| Load* Mismatch | f = 860MHz | $V_{CE}$ = 26.5V | $P_{OUT}$ = 20W | 3:1 | 10:1 | — | VSWR |

$I_{CQ} = I_C =$ 2.7A (1.35A per Side)
*VSWR tested for a minimum of 3:1 SWR at all phase angles.

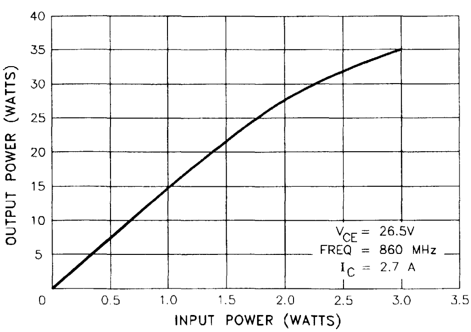
Note 1: Three Tone IMD Testing (CCIR)
$f_1$ = 860.0MHz/ –8dB ref. to $P_{SYNC}$ - Visual
$f_2$ = 863.5MHz/ –16dB ref. to $P_{SYNC}$ - Color Subcarrier
$f_3$ = 864.5MHz/ –7dB ref. to $P_{SYNC}$ - Aural

Note 2: $IP_3$ Calculated Based on Two-Tone IMD Testing:
$f_1$ = 900.0 MHz/ –6dB ref. to $P_{OUT}$
$f_2$ = 900.1 MHz/ –6dB ref. to $P_{OUT}$
$IMD_3$ (Typ) < –36dBc

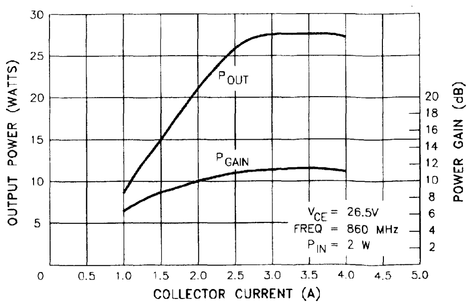
Note 3: Tested Per Side

## TYPICAL PERFORMANCE

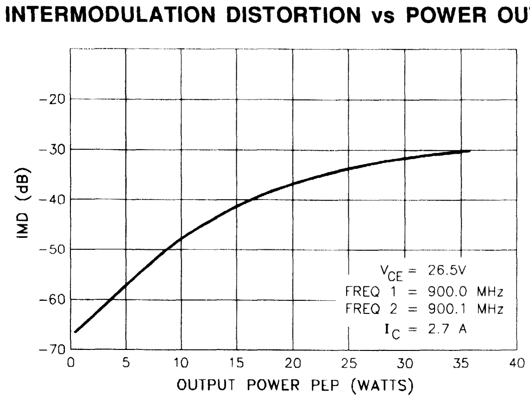
### POWER OUTPUT vs POWER INPUT



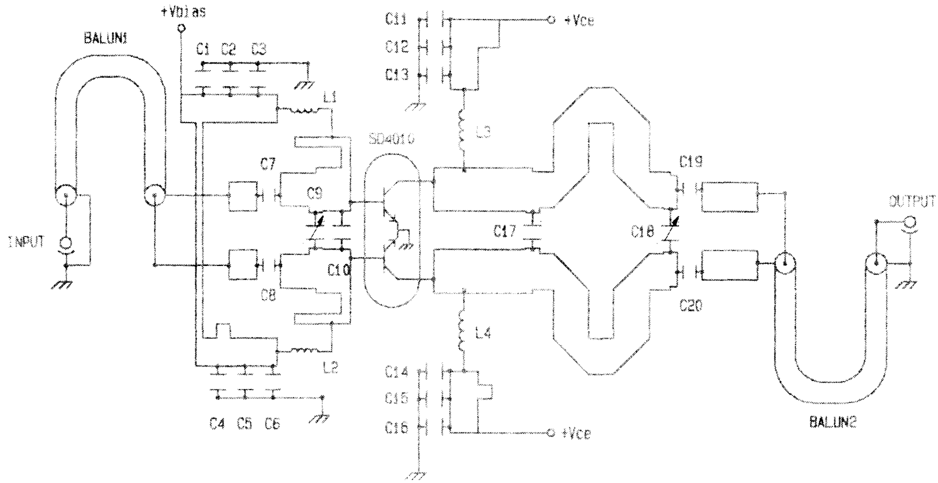

### POWER OUTPUT & POWER GAIN vs TOTAL COLLECTOR CURRENT



## TYPICAL PERFORMANCE (cont'd)




## TEST CIRCUIT SCHEMATIC




Balun 1, 2 : 50Ω Coaxial Cable, λ/4 @ 860 MHz

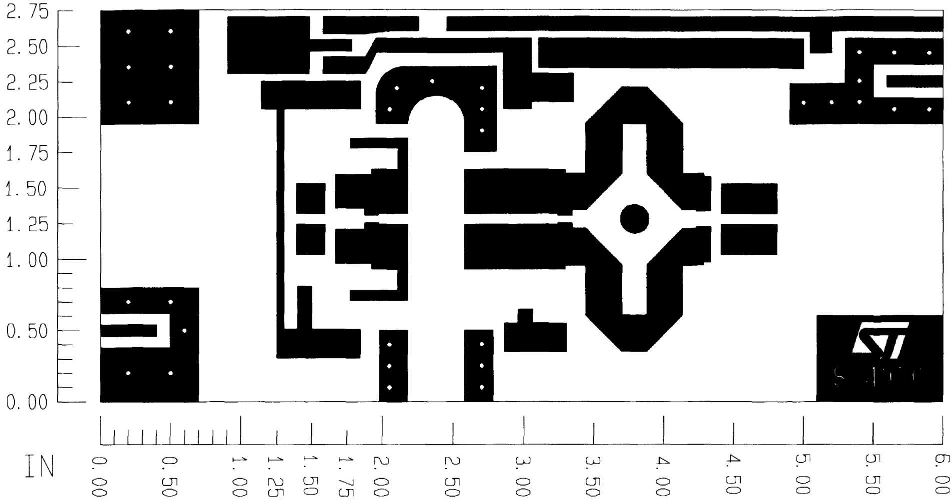
C1, C4,
C11, C16 : 100μF, 50V Electrolytic
C2, C5,
C12, C15 : 10μF, 35V Tantalum
C3, C6, C7 C8,
C19, C20 : 75 pF Ceramic Chip, ATC B
C9, C18 : 0.4 - 2.5 pF Variable, JOHANSON Giga-trim
C10 : 2pF Ceramic Chip, ATC B
C17 : 5pF Ceramic Chip, ATC B

L1, L2 : 7 Turns, 0.12" I.D., #22 AWG (1:1)
L3, L4 : 5 Turns, 0.12" I.D., #22 AWG (1:1)

See Photomaster for Microstrip Lines

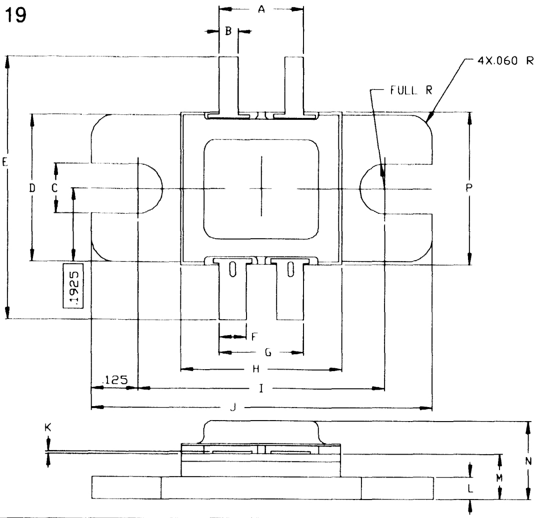
Board
Material: ROGERS Ultra-Lam Er = 2.55, Height = 0.030", 2 oz. Cu.

## PHOTOMASTER OF TEST CIRCUIT



## PACKAGE MECHANICAL DATA

Ref. Dwg. No.: 12-0119



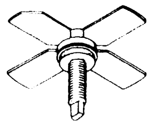

| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .210/5,33 | .230/5,84 |
| B | .045/1,14 | .055/1,40 |
| C | .130/3,30 | |
| D | .380/9,65 | .390/9,91 |
| E | .770/19,56 | .830/21,08 |
| F | .070/1,78 | .080/2,03 |
| G | .215/5,46 | .235/5,97 |
| H | .420/10,67 | .433/11,00 |
| I | .645/16,38 | .655/16,64 |
| J | .895/22,73 | .905/22,99 |

| CONT'D | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| K | .002/0,05 | .006/0,15 |
| L | .058/1,47 | .065/1,65 |
| M | .115/2,92 | .130/3,30 |
| N | ---- | .230/5,84 |
| P | .395/10,03 | .408/10,36 |

# SD4011

## RF & MICROWAVE TRANSISTORS
## UHF TV/LINEAR APPLICATIONS

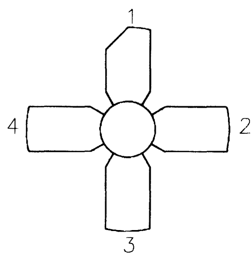
- GOLD METALLIZATION
- INTERNAL INPUT MATCHING
- COMMON EMITTER
- OVERLAY GEOMETRY
- CLASS A OPERATION
- METAL/CERAMIC PACKAGE
- $P_{OUT}$ = 4 W MIN. WITH 8 dB GAIN



**.280 4L STUD (M122)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD4011 | SUTV040 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

### DESCRIPTION

The SD4011 is a gold metallized NPN silicon bipolar device optimized for Class A operation in TV Band IV/V.

Suitable for a variety of other UHF linear applications, SD4011 is supplied in an industry-standard .280 stud package.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 65 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 65 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.5 | V |
| $I_C$ | Device Current | 1.59 | A |
| $P_{DISS}$ | Power Dissipation | 31.8 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 5.5 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

### STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 5mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 5mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CES}$ | $I_C$ = 10mA | $V_{BE}$ = 0V | 65 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 5mA | $I_B$ = 0mA | 20 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 40V | $I_E$ = 0mA | — | — | 1.0 | mA |
| $h_{FE}$ | $V_C$ = 5V | $I_C$ = 800mA | 20 | — | 200 | — |

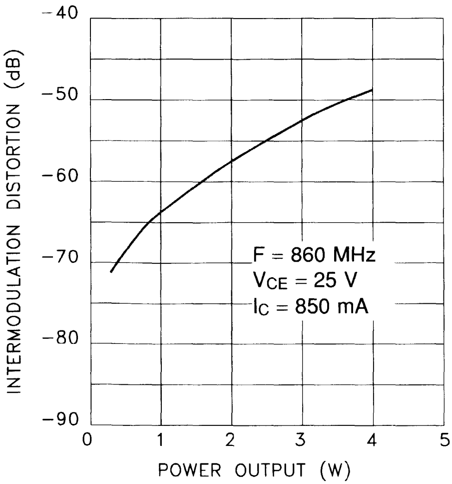
### DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 860 MHz | $V_{CE}$ = 25 V | $I_C$ = 850 mA | 4 | — | — | W |
| $G_P$ | f = 860 MHz | $V_{CE}$ = 25 V | $I_C$ = 850 mA | 8.0 | — | — | dB |
| $IMD_3$ | f = 860 MHz | $V_{CE}$ = 25 V | $I_C$ = 850 mA | –60 | — | — | dBc |
| $C_{OB}$ | f = 1 MHz | $V_{CE}$ = 25 V | | — | 13 | 20 | pF |

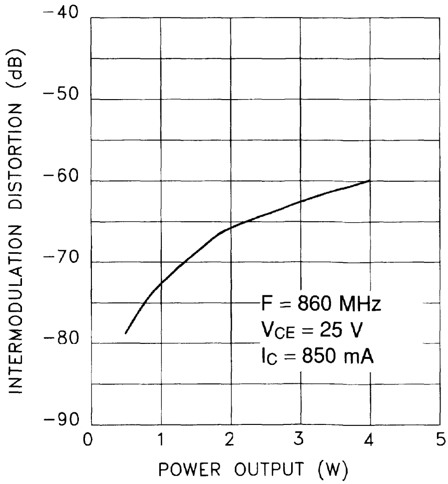
Note: $P_{IN}$ = 0.63

## TYPICAL PERFORMANCE

**INTERMODULATION DISTORTION vs POWER OUTPUT**

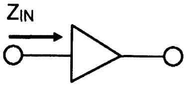



**INTERMODULATION DISTORTION (3 TONES) vs POWER OUTPUT**

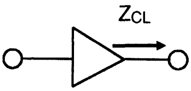


## IMPEDANCE DATA

**TYPICAL INPUT IMPEDANCE**



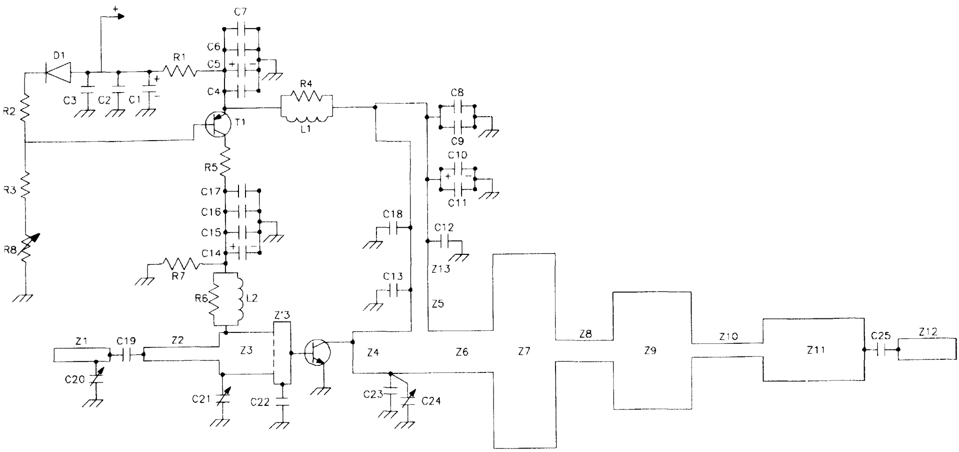

**TYPICAL COLLECTOR LOAD IMPEDANCE**




| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 470 MHz | 2.26 + j 1.67 | 11.30 + j 5.23 |
| 600 MHz | 1.93 + j 1.96 | 10.65 + j 2.91 |
| 700 MHz | 1.40 + j 2.38 | 8.41 + j 6.07 |
| 860 MHz | 1.19 + j 3.45 | 5.63 + j 4.17 |

Normalized to 50 ohms

## TEST CIRCUIT



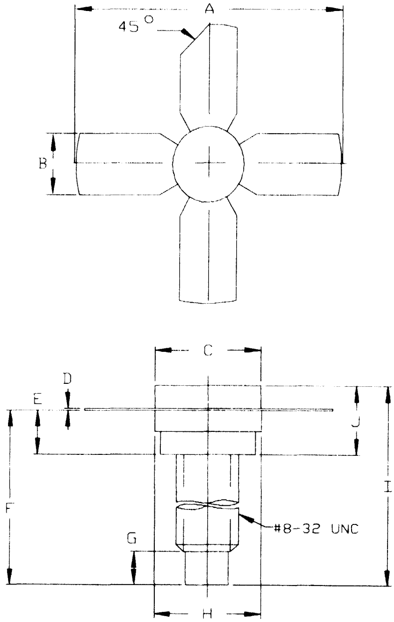

| | | |
|---|---|---|
| C1 | : | 22µF - 63V - Sprague |
| C2, C6, C8, C15 | : | 4.7nF Chip LCC |
| C3, C7 ,C9 C11, C16 | : | 100nF Chip LCC |
| C4, C10 | : | 4.7µF - 40V - Sprague |
| C5, C14 | : | 4.7µF - 63V - Sprague |
| C12, C17, C18 | : | 470pF Chip LCC |
| C13, C25 | : | 47pF ATC 100B |
| C19 | : | 47pF ATC 100A |
| C20 | : | 0.5 - 4.5pF Adjustable Airtronic |
| C21, C24 | : | 0.8 - 5pF Adjustable Johanson |
| C22 | : | 10pF ATC 100A |
| C23 | : | 15pF ATC 100B |
| D1 | : | 1N 4001 or 1N 914 |
| L1 | : | 6 Turns - Wire Dia. 5/10 on 2.5mm Internal Dia. |
| L2 | : | 10 to 12 Turns on R6 - Wire Dia. 5/10 |
| R1 | : | 2.2Ω - 3W - Sfernice |
| R2 | : | 100Ω - 1/2W |
| R3 | : | 510Ω - 1/2W |
| R4,R6 | : | 100Ω - 1/2W |
| R5,R7 | : | 56Ω - 1W |
| R8 | : | 3.3kΩ Adjustable |
| T1 | : | BDX 54 B |

| | | |
|---|---|---|
| Z1 | : | 50Ω transmission line - length 18mm |
| Z2 | : | 50Ω transmission line - length 22mm |
| Z3 | : | 16,4Ω transmission line - length 12mm |
| Z'3 | : | 10,5Ω transmission line - length 3.5mm |
| Z4 | : | 20Ω transmission line - length 13mm |
| Z5 | : | 50Ω transmission line - length 2.5mm |
| Z6 | : | 20Ω transmission line - length 23mm |
| Z7 | : | 4Ω transmission line - length 8% $\lambda$ g at 860MHz |
| Z8 | : | 55Ω transmission line - length 7.5% $\lambda$ g at 860MHz |
| Z9 | : | 7.5Ω transmission line - length 8% $\lambda$ g at 860MHz |
| Z10 | : | 100Ω transmission line - length 8% $\lambda$ g at 860MHz |
| Z11 | : | 20Ω transmission line - length 8% $\lambda$ g at 860MHz |
| Z12 | : | 50Ω transmission line - length 5mm |
| Z13 | : | 50Ω transmission line - length 12mm |

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No. 12-0122

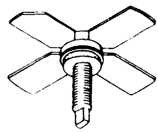
| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | 1.010/25,65 | 1.055/26,80 |
| B | .220/5,59 | .230/5,84 |
| C | .270/6,86 | .285/7,24 |
| D | .003/0,08 | .007/0,18 |
| E | .117/2,97 | .137/3,48 |
| F | 572/14,53 | |
| G | .130/3,30 | |
| H | .275/6,99 | .285/7,24 |
| I | .640/16,26 | |
| J | .175/4,45 | .217/5,51 |



# SD4012

## RF & MICROWAVE TRANSISTORS UHF COMMUNICATIONS APPLICATIONS

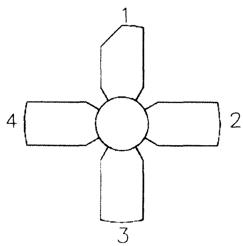
- REFRACTORY/GOLD METALLIZATION
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC PACKAGE
- $P_{OUT}$ = 3 W MIN. WITH 11.7 dB GAIN



**.280 4L STUD (M122)**
epoxy sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| SD4012 | SUMIL3 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

## DESCRIPTION

The SD4012 is a gold metallized epitaxial silicon NPN planar transistor using diffused emitter ballast resistors for superior ruggedness. The SD4012 can withstand a 30:1 VSWR.

Ideal for military communications applications in the 225 - 400 MHz frequency range, the SD4012 provides typically 13 dB gain with 60% collector efficiency.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 55.0 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 30.0 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.5 | V |
| $I_C$ | Device Current | 0.7 | A |
| $P_{DISS}$ | Power Dissipation | 11.0 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 16.0 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

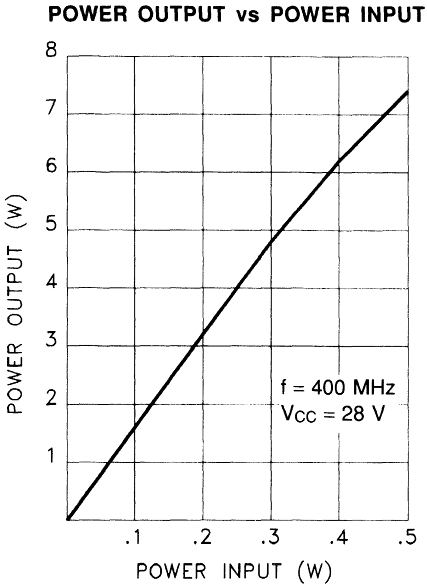
### STATIC

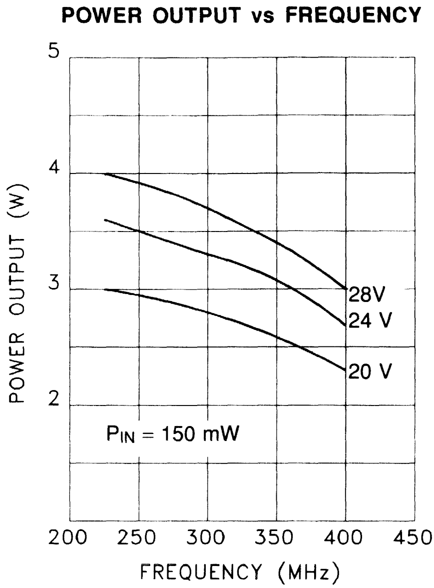
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 20mA | $I_E$ = 0mA | 55 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 5mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CES}$ | $I_C$ = 20mA | $V_{BE}$ = 0V | 55 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 50mA | $I_B$ = 0mA | 30 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 30V | $I_E$ = 0mA | — | — | 1 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 100mA | 10 | 40 | 150 | — |

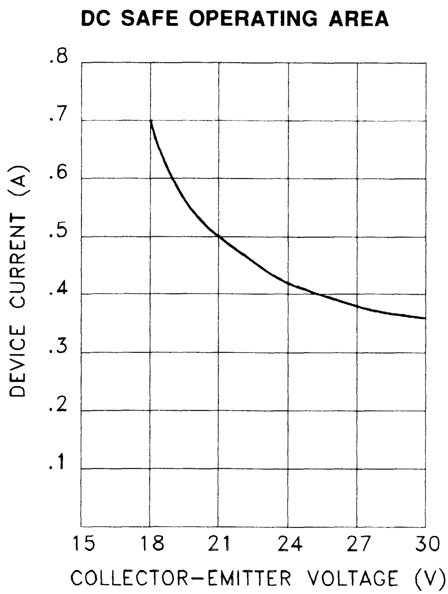
### DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 400 MHz | $P_{IN}$ = 0.2 W | $V_{CC}$ = 28 V | 3.0 | — | — | W |
| $P_{IN}$ | f = 400 MHz | $P_{IN}$ = 0.2 W | $V_{CC}$ = 28 V | — | — | 0.2 | W |
| $\eta_C$ | f = 400 MHz | $P_{IN}$ = 0.2 W | $V_{CC}$ = 28 V | — | 60 | — | % |
| $G_P$ | f = 400 MHz | $P_{IN}$ = 0.2 W | $V_{CC}$ = 28 V | 11.7 | 13.0 | — | dB |
| VSWR | f = 400 MHz | $P_{IN}$ = 0.2 W | $V_{CC}$ = 28 V | — | — | 30:1 | W |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 28V | | — | 4.5 | 6 | W |

## TYPICAL PERFORMANCE

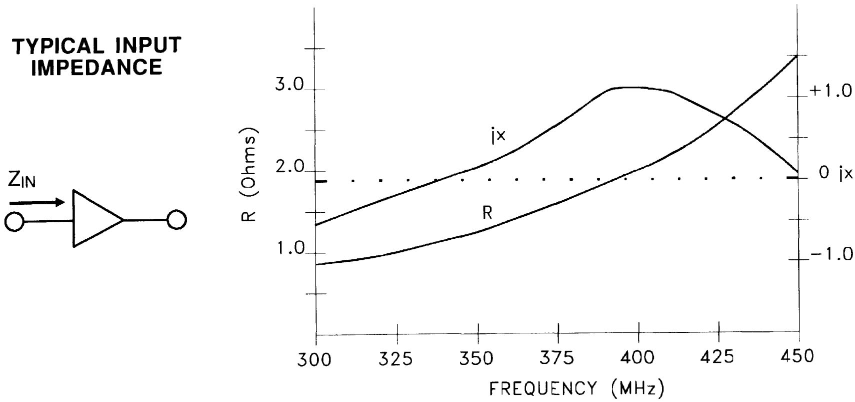


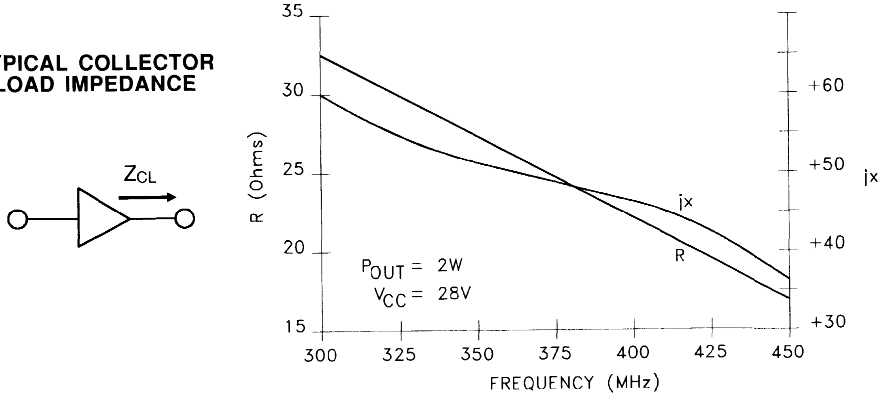



## IMPEDANCE DATA

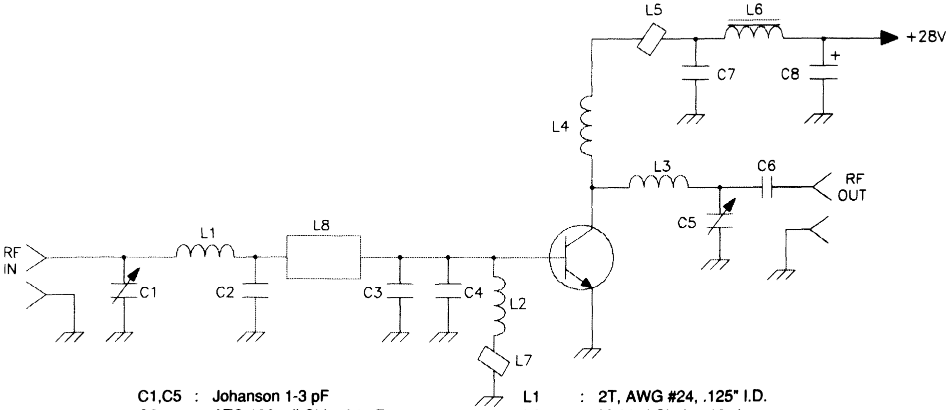
### TYPICAL INPUT IMPEDANCE




### TYPICAL COLLECTOR LOAD IMPEDANCE



## TEST CIRCUIT

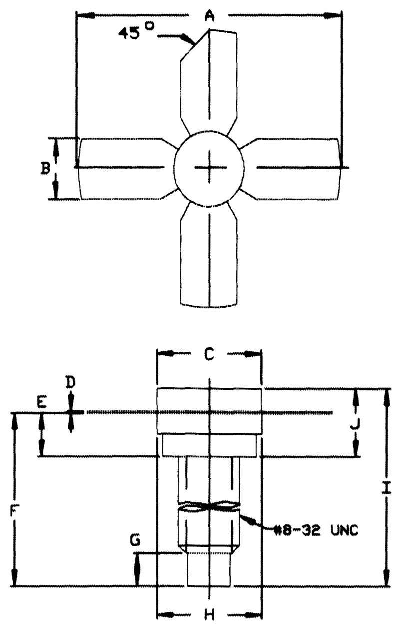



| | | | | | |
|---|---|---|---|---|---|
| C1,C5 | : | Johanson 1-3 pF | L1 | : | 2T, AWG #24, .125" I.D. |
| C2 | : | ATC 100 mil Chip, 24 pF | L2 | : | Molded Choke .10µh |
| C3 | : | ATC 100 mil Chip, 47 pF | L3 | : | 2 1/2T, AWG #24, .125" I.D. |
| C4 | : | ATC 100 mil Chip, 3 pF | L4 | : | Molded Choke .15µh |
| C6 | : | ATC 100 mil Chip, 820 pF | L5,L7 | : | Ferrite Bead Ferroxcube 56-590-65-38 |
| C7 | : | Ceramic 1.0µF | L6 | : | Ferrite Choke VK200-0-4B |
| C8 | : | Electrolytic 10µF | L8 | : | Microstripe, .085" x 2.0" |

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No. 12-0122

| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | 1.010/25,65 | 1.055/26,80 |
| B | .220/5,59 | .230/5,84 |
| C | .270/6,86 | .285/7,24 |
| D | .003/0,08 | .007/0,18 |
| E | .117/2,97 | .137/3,48 |
| F | .572/14,53 | |
| G | .130/3,30 | |
| H | .275/6,99 | .285/7,24 |
| I | .640/16,26 | |
| J | .175/4,45 | .217/5,51 |



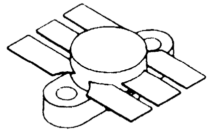
SGS-THOMSON
MICROELECTRONICS

# SD4013

## RF & MICROWAVE TRANSISTORS
## UHF COMMUNICATIONS APPLICATIONS

PRELIMINARY DATA

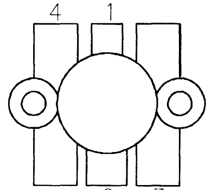
- REFRACTORY/GOLD METALLIZATION
- INTERNAL INPUT MATCHING
- METAL/CERAMIC PACKAGE
- EMITTER BALLASTED
- 20:1 VSWR CAPABILITY
- $P_{OUT}$ = 25 W MIN. WITH 9 dB GAIN



**.500 6LFL (M111)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD4013 | SUMIL25 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter
4. Emitter

### DESCRIPTION

The SD4013 is a gold metallized epitaxial silicon NPN planar transistor using diffused emitter ballast resistors for superior ruggedness.

The SD4013 can withstand 20:1 VSWR under rated operating conditions and is internally input matched to optimize power gain and efficiency over the band.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 60 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 30 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.5 | V |
| $I_C$ | Device Current | 3.0 | A |
| $P_{DISS}$ | Power Dissipation | 70 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 2.5 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

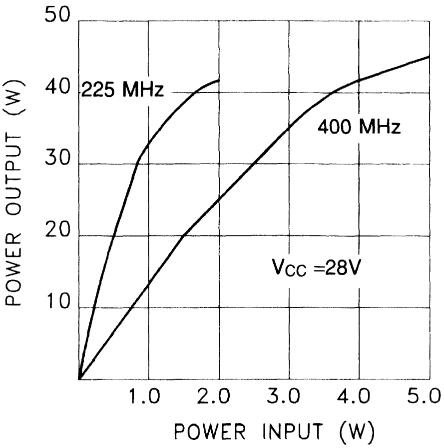
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 50mA | $I_E$ = 0mA | 60 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 5mA | $I_C$ = 0mA | 3.5 | — | — | V |
| $BV_{CES}$ | $I_C$ = 50mA | $V_{BE}$ = 0mA | 60 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 30V | $I_E$ = 0mA | — | — | 3.0 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 500mA | 10 | 30 | 120 | — |

DYNAMIC

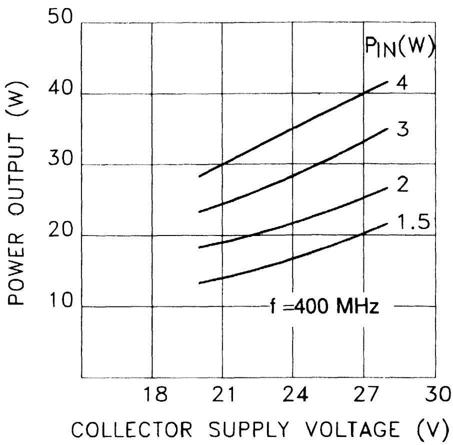
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 400 MHz | $V_{CC}$ = 28V | 25 | — | — | W |
| $P_{IN}$ | f = 400 MHz | $V_{CC}$ = 28V | — | — | 3.15 | W |
| $\eta_C$ | f = 400 MHz | $V_{CC}$ = 28V | 50 | 55 | — | % |
| $G_P$ | f = 400 MHz | $V_{CC}$ = 28V | 9.0 | 10.5 | — | dB |
| VSWR | f = 400 MHz | $V_{CC}$ = 28V | 20:1 | — | — | — |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 28V | — | — | 30 | pF |

## TYPICAL PERFORMANCE

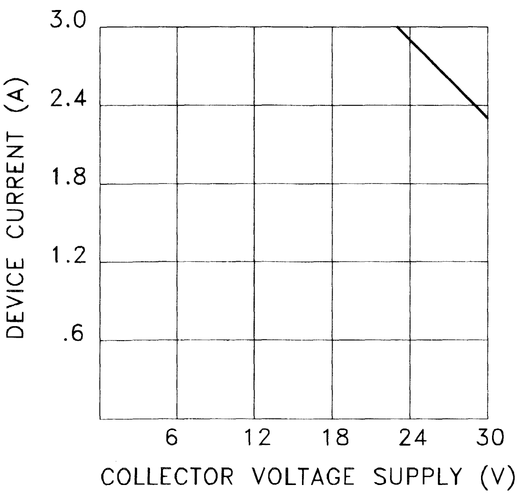
### POWER INPUT vs POWER OUTPUT




### POWER OUTPUT vs COLLECTOR SUPPLY VOLTAGE

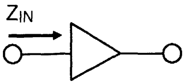



### DC SAFE OPERATING AREA

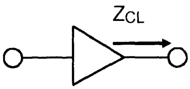


## IMPEDANCE DATA

**TYPICAL INPUT IMPEDANCE**



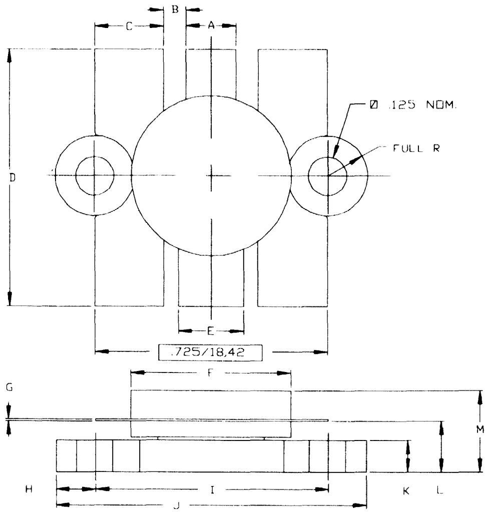

**TYPICAL COLLECTOR LOAD IMPEDANCE**




| FREQ. | $Z_{IN}$ ($\Omega$) | $Z_{CL}$ ($\Omega$) |
|---|---|---|
| 225 MHz | 1.40 + j 2.5 | 7.55 + j 0.0 |
| 275 MHz | 1.25 + j 3.3 | 7.5 − j 0.05 |
| 300 MHz | 1.10 + j 4.0 | 7.5 − j 1.00 |
| 350 MHz | 1.10 + j 4.7 | 6.8 − j 1.15 |
| 400 MHz | 1.70 + j 5.1 | 6.0 − j 1.30 |

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No. 12-0111




| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .150/3,43 | .160/4,06 |
| B | .045/1,14 | |
| C | .210/5,33 | .220/5,59 |
| D | .835/21,21 | .865/21,97 |
| E | .200/5,08 | .210/5,33 |
| F | .490/12,45 | .510/12,95 |
| G | .003/0,08 | .007/0,18 |
| H | .125/3,18 | |
| I | .720/18,29 | .730/18,54 |
| J | .970/24,64 | .980/24,89 |

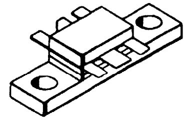
| CONT'D | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| K | .095/2,41 | .105/2,67 |
| L | .150/3,81 | .170/4,32 |
| M | | .280/7,11 |

SGS-THOMSON
MICROELECTRONICS

# SD4017

## RF & MICROWAVE TRANSISTORS
## 806-960 MHz CELLULAR BASE STATIONS

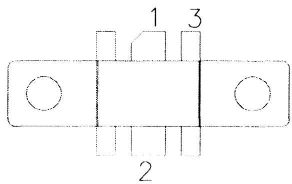
- GOLD METALLIZATION
- DIFFUSED EMITTER BALLASTING
- INTERNAL INPUT MATCHING
- DESIGNED FOR LINEAR OPERATION
- HIGH SATURATED POWER CAPABILITY
- COMMON EMITTER CONFIGURATION
- $P_{OUT}$ = 30 W MIN. WITH 7.5 dB GAIN
- $\eta_C$ = 55% TYPICAL
- TYPICAL LOAD MISMATCH CAPABILITY:
  20:1 ALL ANGLES RATED CONDITIONS 10:1 ALL ANGLES @ ± 20% RATED VOLTAGE
- TYPICAL OVERDRIVE SURVIVABILITY 5 dB



**.230 6LFL (M142)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD4017 | SD4017 |

**PIN CONNECTION**




1. Collector
2. Base
3. Emitter

## DESCRIPTION

The SD4017 is a gold metallized epitaxial silicon NPN planar transistor using diffused emitter ballast resistors for high linearity class AB operation for cellular base station applications.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 48 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 25 | V |
| $V_{EBO}$ | Collector-Supply Voltage | 3.5 | V |
| $P_{DISS}$ | Power Dissipation | 88 | W |
| $I_C$ | Device Current | 7.5 | A |
| $T_J$ | Junction Temperature | 200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 2.0 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case} = 25°C$)

STATIC

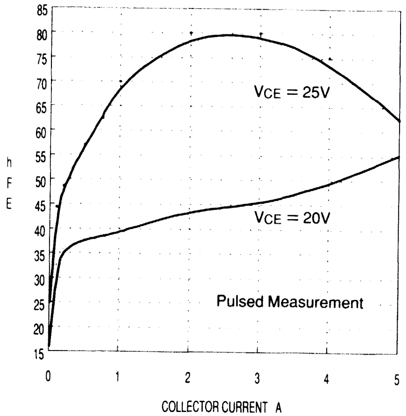
| Symbol | Test Conditions | Value | | | Unit |
|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C = 100mA$ | 48 | 55 | — | V |
| $BV_{EBO}$ | $I_E = 10mA$ | 3.5 | 5 | — | V |
| $BV_{CEO}$ | $I_C = 40mA$ | 25 | 28 | — | V |
| $BV_{CER}$ | $I_C = 40mA$ $R_{BE} = 150\Omega$ | 30 | 40 | — | V |
| $I_{CBO}$ | $V_{CE} = 24V$ | 10 | — | — | mA |
| $h_{FE}$ | $V_{CE} = 20V$ $I_C = 2A$ | 15 | 40 | 100 | — |

DYNAMIC

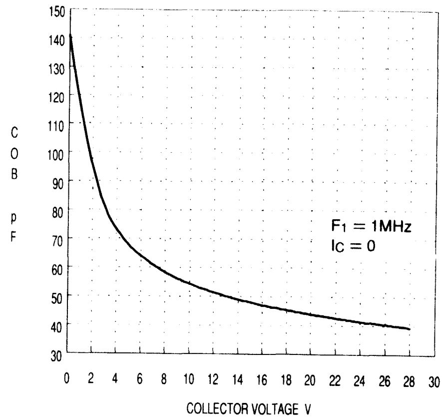
| Symbol | Test Conditions | Value | | | Unit |
|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 860 MHz $V_{CE} = 25V$ $I_{CQ} = 60mA$ | 30 | — | — | W |
| $\eta_C$ | f = 860 MHz $V_{CE} = 25V$ $I_{CQ} = 60mA$ | — | 55 | — | % |
| $G_P$ | f = 860 MHz $V_{CE} = 25V$ $I_{CQ} = 60mA$ | 7.5 | 9 | — | dB |
| $C_{OB}$ | VCB = 25V $f_o = 1MHz$ | — | 42 | — | pf |
| $IMD_3$ | $P_{OUT}$ = 30 WPEP $f_1 = 860.0MHz$ $f_2 = 860.1MHz$ | — | –35 | — | dBc |
| $VSWR_1$ | VSWR = 20:1$V_{CE} = 25V$<br>VSWR = 10:1$V_{CE} = 25V \pm 20\%$ | No Degradation in Output Device | | | Typ. |
| $VSWR_2$ | VSWR = 5:1 $V_{CE} = 25V \pm 20\%$<br>$P_{IN} = P_{IN}$ (norm) +3dB | No Degradation in Output Device | | | Typ. |
| OVD | $P_{IN}$(norm) = +5dB $V_{CE} = 25V$<br>$P_{IN}$(norm) = +3dB $V_{CE} = 25V \pm 20\%$ | No Degradation in Output Device | | | Typ. |

## TYPICAL PERFORMANCE

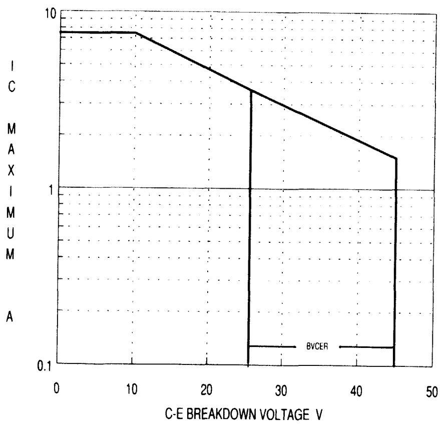
DC CURRENT GAIN vs COLLECTOR CURRENT



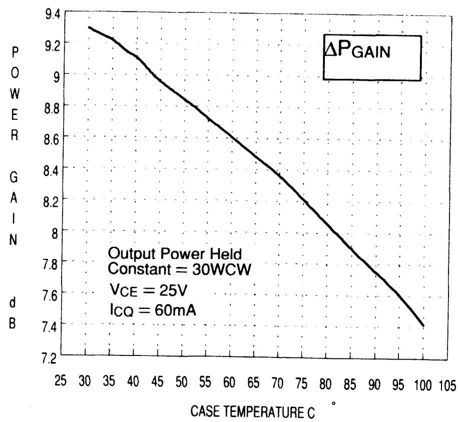

OUTPUT CAPACITANCE vs C-B VOLTAGE



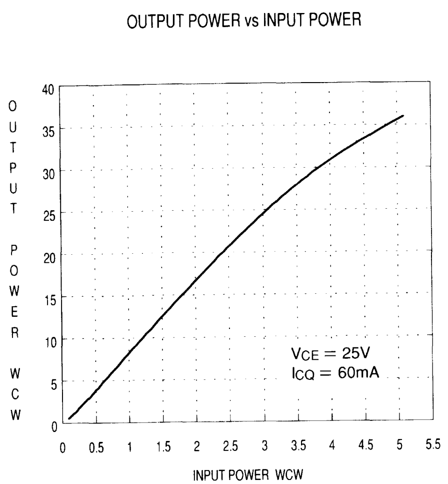

DC SAFE OPERATING AREA

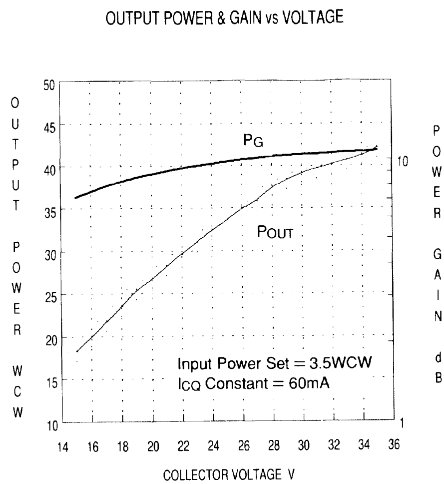


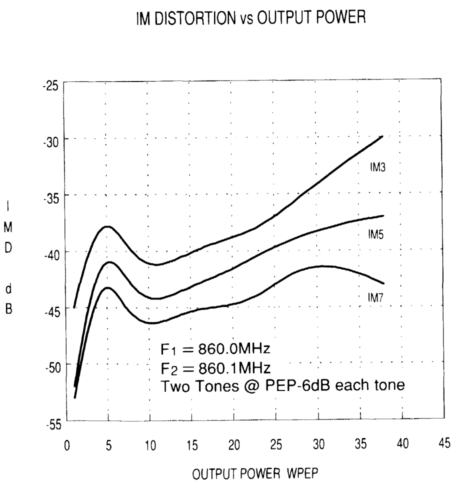

POWER GAIN vs CASE TEMPERATURE

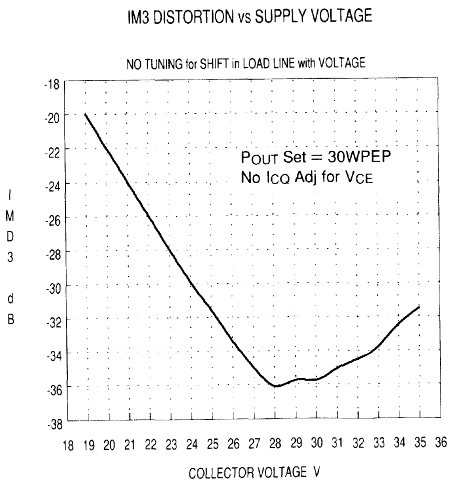


## TYPICAL PERFORMANCE (cont'd)



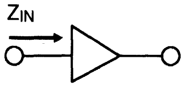



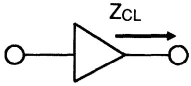



## IMPEDANCE DATA

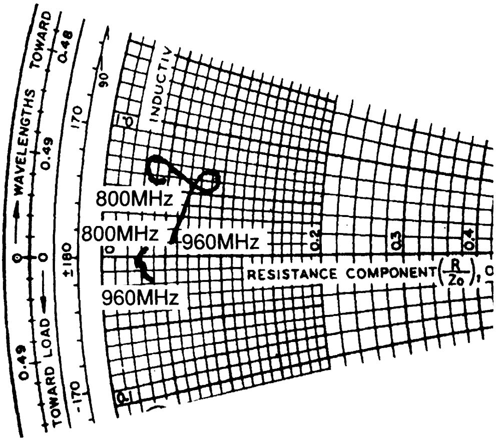
**TYPICAL INPUT IMPEDANCE**




**TYPICAL COLLECTOR LOAD IMPEDANCE**

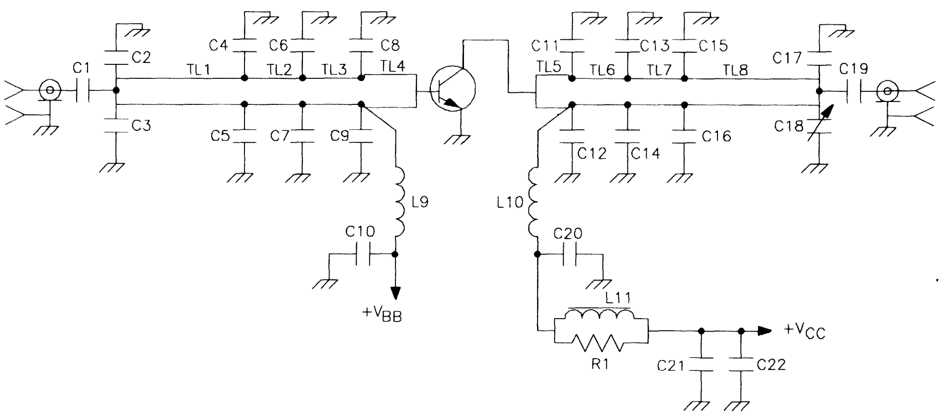



| FREQ. | ZIN (Ω) | ZCL (Ω) |
|---|---|---|
| 800 MHz | 4.3 + j 5.8 | 3.5 + j 0.2 |
| 830 MHz | 3.2 + j 6.1 | 3.5 + j 0.1 |
| 860 MHz | 3.5 + j 7.1 | 2.9 − j 0.2 |
| 900 MHz | 5.3 + j 6.4 | 3.0 − j 0.6 |
| 915 MHz | 6.1 + j 6.3 | 3.2 − j 0.7 |
| 930 MHz | 9.4 + j 6.3 | 3.2 − j 1.1 |
| 945 MHz | 6.6 + j 3.0 | 3.3 − j 1.2 |
| 960 MHz | 5.9 + j 1.0 | 3.4 − j 1.5 |




$P_{OUT}$ = 30W
$V_{CE}$ = 25 V
Normalized to 50 ohms

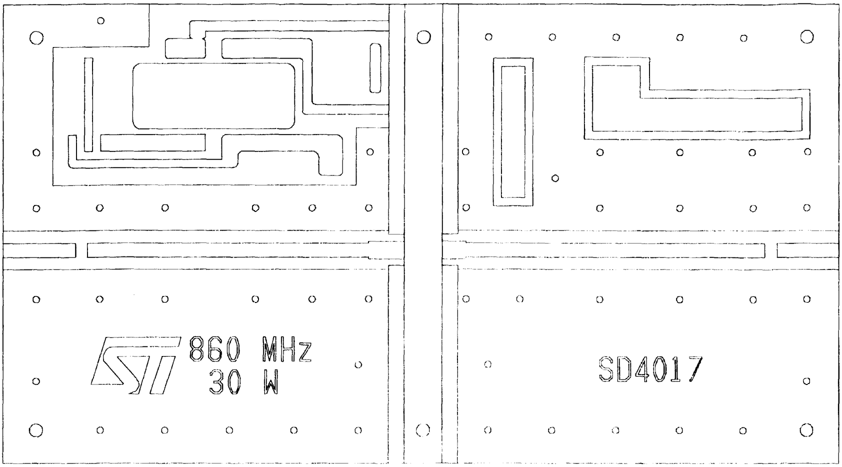
## TEST CIRCUIT




C1, C19 : 33pF ATC 100B Chip Capacitor
C2, C15 : 3.6pF ATC 100B Chip Capacitor
C3 : 4.5pF ATC 100B Chip Capacitor
C4, C16
C17 : 5.0pF ATC 100B Chip Capacitor
C5 : 2.9pF ATC 100B Chip Capacitor
C6, C7 : 1.8pF ATC 100B Chip Capacitor
C8,C9,
C14 : 6.2pF ATC 100B Chip Capacitor
C10,C22 : 300pF ATC 100B Chip Capacitor
C11,C12

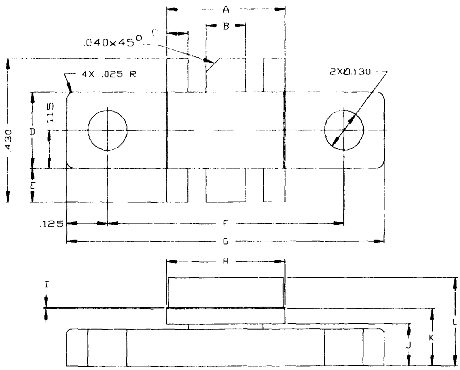
C18 : .5 - 6.0pF Gigatrim Adjustable Capacitor
C20 : 10pF ATC 100B Chip Capacitor
C21 : 10µF (50V) Electrolytic Capacitor
L9 : 4 Turns (tight) I.D. 120mil ENAM Cu 20 AWG
L10 : 4 Turns (tight) I.D. 158mil ENAM Cu 18 AWG
L11 : 1.5 Turns VK-200 Ferrite H.F. Choke
TL1,TL8 : 964 x 85.69 mils (50Ω/36.84°)
TL2,TL3 : 352 x 85.69 mils (50Ω/13.46°)
TL4 : 222 x 109.03 mils (42.6Ω/8.56°)
TL5 : 149 x 109.03 mils (42.6Ω/5.74°)
TL6 : 334 x 85.69 mils (50Ω/12.75°)

## BOARD LAYOUT




## PACKAGE MECHANICAL DATA

Ref. Dwg.No. 12-0142




| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .355/9,02 | .365/9,27 |
| B | .115/2,92 | .125/3,18 |
| C | .075/1,91 | .085/2,16 |
| D | 225/5,72 | .235/5,97 |
| E | .090/2,29 | .110/2,79 |
| F | 720/18,29 | .730/18,54 |
| G | 970/24,64 | 980/24,89 |
| H | .355/9,02 | .365/9,27 |
| I | .004/0,10 | .006/0,15 |
| J | .120/3,05 | .130/3,30 |

| CONT'D | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| K | .160/4,06 | .180/4,57 |
| L | .230/5,84 | .260/6,60 |

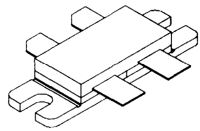
SGS-THOMSON
MICROELECTRONICS

# SD4590

## RF & MICROWAVE TRANSISTORS
## 800-960MHz CELLULAR BASE STATION

PRELIMINARY DATA

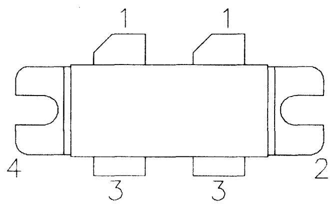
- GOLD METALLIZATION
- INTERNAL INPUT/OUTPUT MATCHING
- DIFFUSED EMITTER BALLASTING
- COMMON EMITTER CONFIGURATION
- DESIGNED FOR LINEAR OPERATION
- HIGH SATURATED POWER CAPABILITY
- $P_{OUT}$ = 150 W PEP
- MIN. GAIN 8.0 dB @ 900 MHz
- MAX. INTERMODULATION DISTORTION −28dBc @ 150 W PEP
- 5:1 VSWR CAPABILITY @ RATED CONDITIONS
- 3 dB OVERDRIVE CAPABILITY



**.400 x .860 4LFL (M208)**
epoxy sealed

| **ORDER CODE** | **BRANDING** |
|---|---|
| SD4590 | SD4590 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

### DESCRIPTION

The SD4590 is a gold metallized epitaxial silicon NPN planar transistor using diffused emitter ballast resistors for high linearity Class AB operation in 900 MHz cellular base station applications.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CEO}$ | Collector-Emitter Voltage | 28 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 60 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.5 | V |
| $I_C$ | Device Current | 25 | A |
| $P_{DISS}$ | Power Dissipation | 300 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | − 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 0.60 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CEO}$ | $I_C$ = 100mA | $I_B$ = 0mA | 26 | 30 | — | V |
| $BV_{CER}$ | $I_C$ = 100mA | $R_{BE}$ = 200Ω | 35 | 40 | — | V |
| $BV_{CES}$ | $I_C$ = 50mA | $V_{BE}$ = 0V | 60 | 80 | — | V |
| $BV_{EBO}$ | $I_E$ = 10mA | $I_C$ = 0mA | 3.5 | 4.0 | — | V |
| $I_{CES}$ | $V_{CE}$ = 30V | $V_{BE}$ = 0V | — | — | 10 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1A | 30 | 45 | 120 | — |

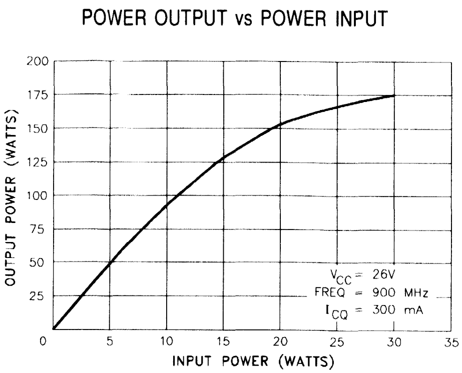
Tested per side

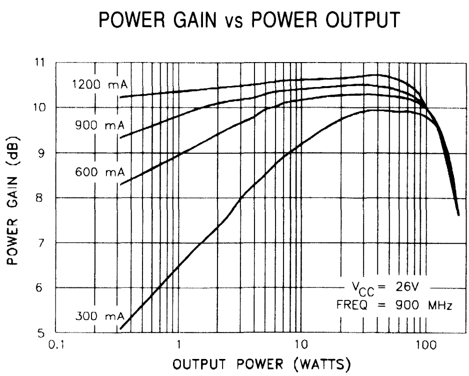
DYNAMIC

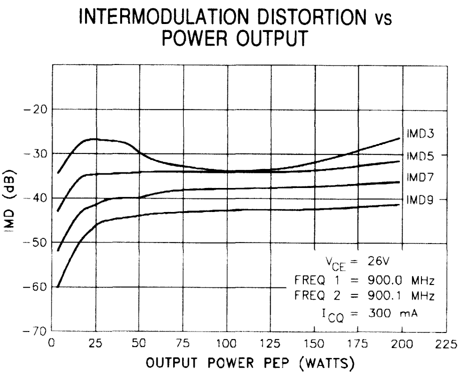
| Symbol | Test Conditions | Value | | | Unit |
|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | |
| $C_{OB}$ | f = 1.0 MHz $V_{CB}$ = 26 Vdc<br>for information only - this part is collector matched | — | 75 | — | pF |
| $G_P$* | $V_{CC}$ = 26 Vdc $P_{OUT}$ = 150W PEP $I_{CQ}$ = 2 x 150mA | 8.0 | 9.0 | — | dB |
| $\eta_C$* | $V_{CC}$ = 26 Vdc $P_{OUT}$ = 150W PEP $I_{CQ}$ = 2 x 150mA | 35 | 45 | — | % |
| IMD* | $V_{CC}$ = 26 Vdc $P_{OUT}$ = 150W PEP $I_{CQ}$ = 2 x 150mA | — | –32 | –28 | dBc |
| Load* Mismatch | $V_{CC}$ = 26 Vdc $P_{OUT}$ = 150W PEP $I_{CQ}$ = 2 x 150mA<br>VSWR = 5:1 @ all phase angles | No Degradation in Output Power | | | |

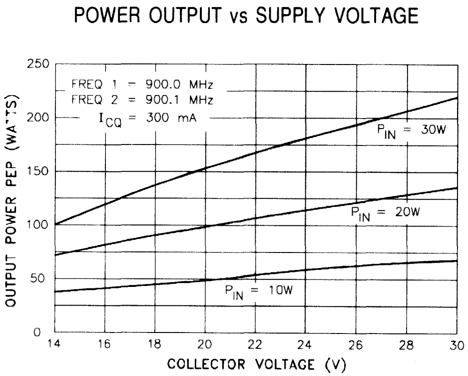
*Note: $f_1$ = 900.0 MHz
$f_2$ = 900.1 MHz

## TYPICAL PERFORMANCE

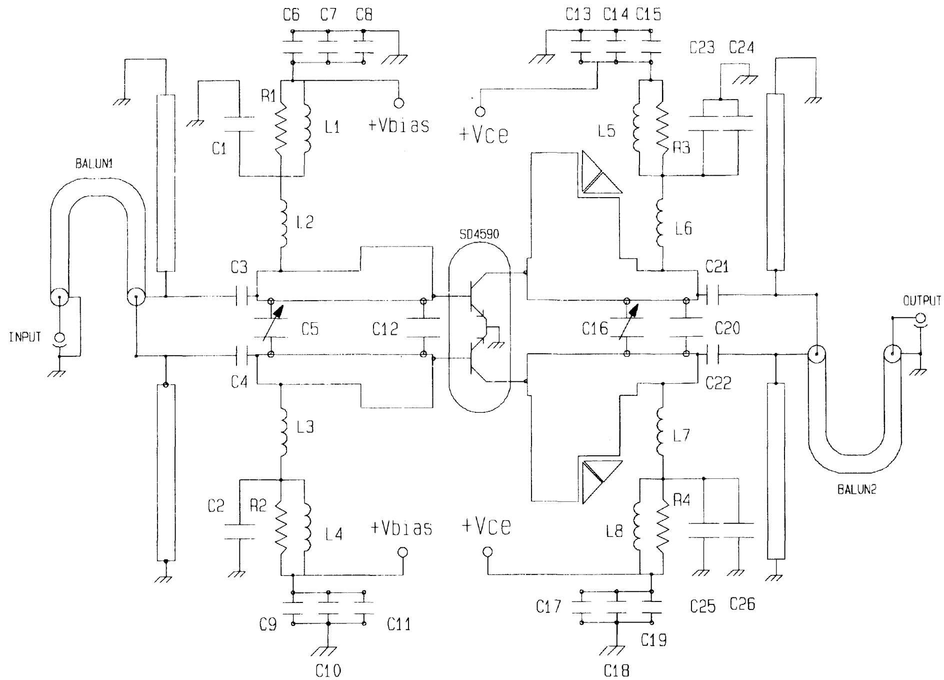


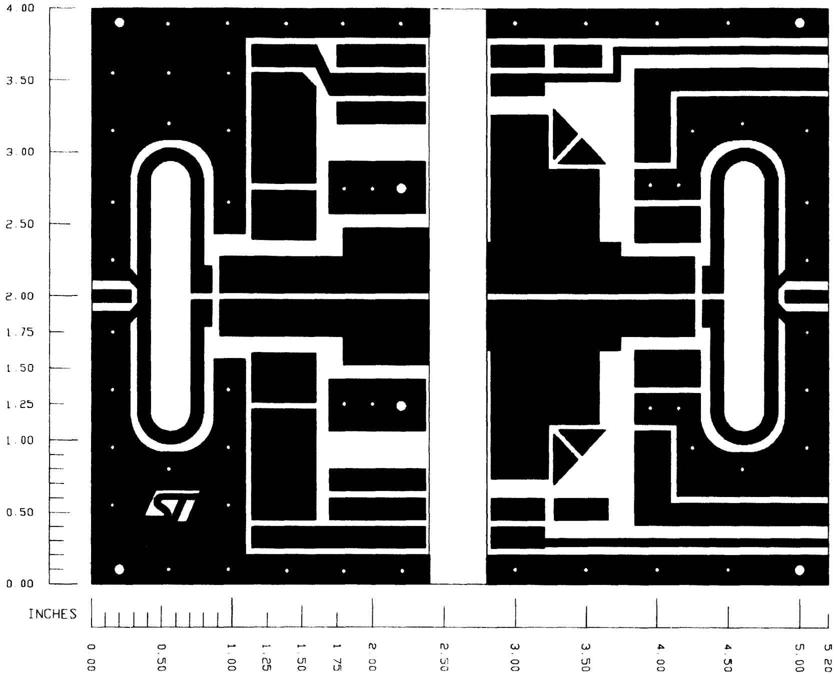
## TEST CIRCUIT




| | | | |
|---|---|---|---|
| Balun 1, 2 : | 50Ω Coaxial Cable Length 2.2" | C20 : | 1.3pF Ceramic Chip, ATC B |
| | | C24, C26 : | 47µF, 35V Tantalum |
| C1, C2, C23, C25 : | 91pF Ceramic Chip, ATC B | L1, L4, L5, L8 : | 12 Turns, #22 AWG, 0.15" I.D. (Tight) |
| C3, C4, C21, C22 : | 2 x 39pF Ceramic Chip, ATC B | L2, L3, L6, L7 : | 4 Turns, #20 AWG, 0.13" I.D. (1:1) |
| C5, C16 : | 0.8 - 8pF Variable, JOHANSON Giga-Trim | | |
| C6, C9, C15, C19 : | 1000pF Ceramic Chip, ATC B | R1, R2, R3, R4 : | 5 x 50Ω Chip Resistor |
| C7, C10, C14, C18 : | 20nF Ceramic Chip, ATC B | | |
| C8, C11 : | 100µF , 50V Electrolytic | Board Material : | ROGERS, Er = 2.55, Height = 31.25 mil 1 oz. Cu. |
| C13, C17 : | 470µF , 50V Electrolytic | | |
| C12 : | 9.1pF, Ceramic Chip, ATC A | | |

See Photomaster for Microstrip Lines.

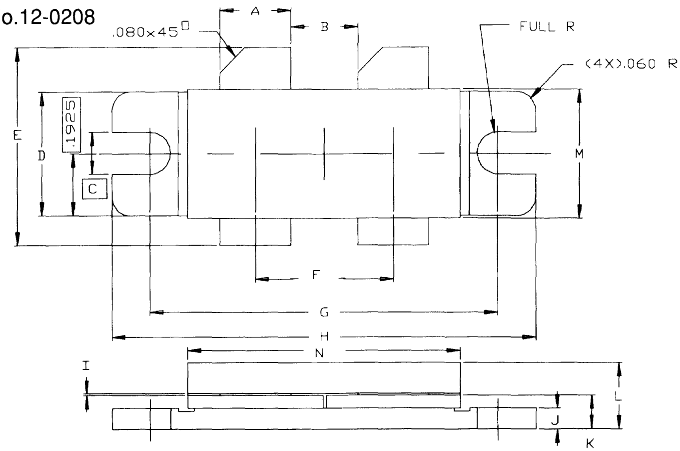
## PHOTOMASTER OF TEST CIRCUIT




Approximately 75% of Original

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.12-0208




| SGS-THOMSON MICROELECTRONICS | MINIMUM Inches/mm | MAXIMUM Inches/mm | CONT'D | MINIMUM Inches/mm | MAXIMUM Inches/mm |
|---|---|---|---|---|---|
| A | .220/5,59 | .230/5,84 | K | .082/2,08 | .097/2,46 |
| B | .210/5,33 | | L | | .205/5,21 |
| C | .125/3,18 | | M | .395/10,03 | .407/10,34 |
| D | .380/9,65 | .390/9,91 | N | .850/21.59 | .870/2210 |
| E | .580/14,73 | .620/15,75 | | | |
| F | .435/11,05 | | | | |
| G | 1.090/27,69 | 1.105/28,07 | | | |
| H | 1.335/33,91 | 1.345/34,16 | | | |
| I | .003/0,08 | .007/0,18 | | | |
| J | .060/1,52 | .070/1,78 | | | |

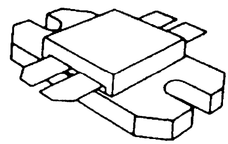
SGS-THOMSON MICROELECTRONICS

# SD4600

## RF & MICROWAVE TRANSISTORS CELLULAR BASE STATION APPLICATIONS

PRELIMINARY DATA

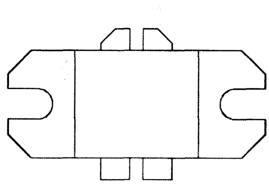
- GOLD METALLIZATION
- 860-960 MHz
- 26 VOLTS
- EFFICIENCY 50% MIN.
- $P_{OUT}$ = 60 W MIN. WITH 7.5 dB GAIN



**.438 x .450 2LFL (M173)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD4600 | SD4600 |

**PIN CONNECTION**



1. Collector
2. Base
3. Emitter

### DESCRIPTION

The SD4600 is designed for 960MHz mobile base stations in both analog and digital applications. Including double input and output matching networks, the SD4600 features high impedances allowing operation over the full 860 to 960 MHz bandwidth.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 60 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 28 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.5 | V |
| $I_C$ | Device Current | 8 | A |
| $P_{DISS}$ | Power Dissipation | 146 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 1.2 | °C/W |

*Applies only to rated RF amplifier operation

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC (Total Device)

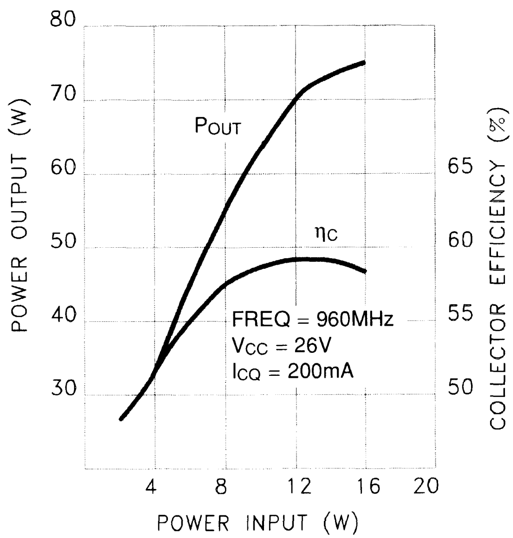
| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 100mA | | 60 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 20mA | | 3.5 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 100mA | | 28 | — | — | V |
| $I_{CEO}$ | $V_{CE}$ = 25V | | — | — | 30 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 3A | 25 | — | 80 | — |

DYNAMIC (Total Device)

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ | f = 960MHz | $V_{CC}$ = 26V | $I_{CQ}$ = .200A | 60 | 65 | — | W |
| $\eta_c$ | f = 960MHz | $V_{CC}$ = 26V | $I_{CQ}$ = .200A | 50 | 58 | — | % |
| $G_P$ | f = 960MHz | $V_{CC}$ = 26V | $I_{CQ}$ = .200A | 7.5 | 8.0 | — | dB |
| VSWR | f = 960MHz | $V_{CC}$ = 26V | | 5:1 | — | — | — |

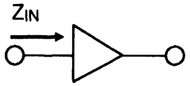
## TYPICAL PERFORMANCE

**POWER OUTPUT & COLLECTOR EFFICIENCY vs POWER INPUT**

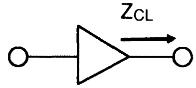


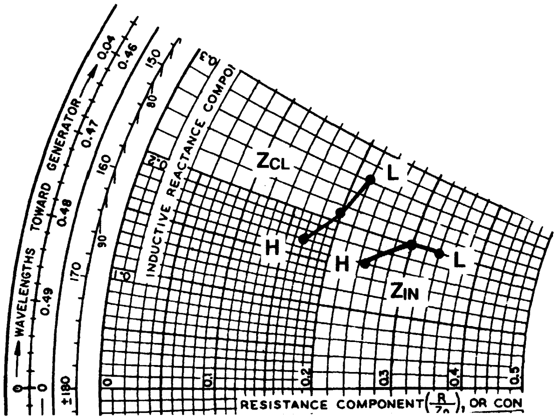
## IMPEDANCE DATA

**TYPICAL INPUT IMPEDANCE**




**TYPICAL COLLECTOR LOAD IMPEDANCE**

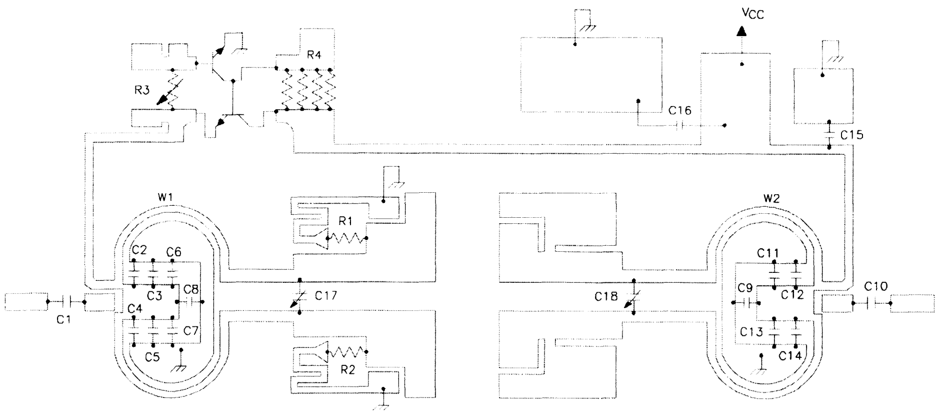



| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 860 MHz | 17 + j 10 | 11 + j 12 |
| 900 MHz | 14 + j 10 | 10 + j 10.5 |
| 960 MHz | 12.5 + j 8 | 8.5 + j 8.5 |

$P_{OUT}$ = 60W
$V_{CC}$ = 26V
Normalized to 50ohms

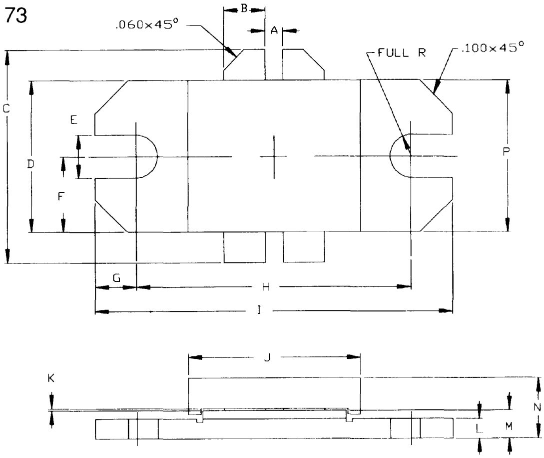
## TEST CIRCUIT




C1,C10 : 120pF Chip Capacitor B Size
C2,C5
C11,C14: 470pF Chip Capacitor B Size
C6,C7 : 100µF Electrolytic Capacitor
C8 : 4.7µF Electrolytic Capacitor
C9 : 10µF Electrolytic Capacitor
C15 : 39,000pF Chip Capacitor
C16 : 63µF Capacitor
C17 : .6 - 4.5pF Johanson Variable Capacitor
C18 : .8 - 8.0pF Johanson Variable Capacitor
R1, R2 : 20Ω (.5W) Chip Resistor
R3 : 10K Potentiometer
R4 : 4 3.17KΩ (.25W) Chip Resistor
S1 : Teflon Glass Er = 2.33 H = .020

## PACKAGE MECHANICAL DATA

Ref. Dwg. No.: 12-0173



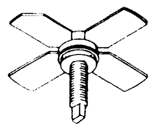

| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | .055/1,40 | |
| B | .120/3,05 | .130/3,30 |
| C | | .785/19,94 |
| D | .455/11,56 | .465/11,81 |
| E | 125/3,18 | |
| F | .230/5,84 | |
| G | .128/3,25 | |
| H | .838/21,28 | .850/21,59 |
| I | 1.095/27,81 | 1.105/28,07 |
| J | .525/13,34 | .535/13,59 |

| CONT'D | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| K | .002/0,05 | .006/0,15 |
| L | .055/1,40 | .065/1,65 |
| M | .080/2,03 | .095/2,41 |
| N | | .195/4,95 |
| P | .455/11,56 | .465/11,81 |

# RF & MICROWAVE TRANSISTORS GENERAL PURPOSE LINEAR APPLICATIONS

PRELIMINARY DATA

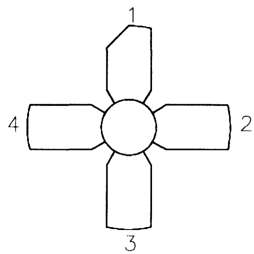
- GOLD METALLIZATION
- EMITTER SITE BALLASTING
- INTERNAL INPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC PACKAGE
- COMMON EMITTER CONFIGURATION
- $P_{OUT}$ = 1.5 W MIN. WITH 9.5 dB GAIN



**.280 4L STUD (M122)**
epoxy sealed

| ORDER CODE | BRANDING |
|---|---|
| SD5000 | S10A015 |

**PIN CONNECTION**




1. Collector
2. Emitter
3. Base
4. Emitter

## DESCRIPTION

The SD5000 is a NPN Silicon Transistor designed for high gain linear performance at 1000 MHz.

This part uses gold metallized die and polysilicon site ballasting to achieve high reliability and ruggedness.

The SD5000 can be used for applications such as Telecommunications, Radar, ECM, Space and other commercial and military systems.

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 50 | V |
| $V_{CES}$ | Collector-Emitter Voltage | 50 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 3.5 | V |
| $I_C$ | Device Current | 1.0 | A |
| $P_{DISS}$ | Power Dissipation | 7.0 | W |
| $T_J$ | Junction Temperature | +200 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +150 | °C |

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance | 25 | °C/W |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $BV_{CBO}$ | $I_C$ = 10mA | | 50 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 5mA | | 3.5 | — | — | V |
| $BV_{CES}$ | $I_C$ = 10mA | | 50 | — | — | V |
| $BV_{CEO}$ | $I_C$ = 5mA | | 23 | — | — | V |
| $I_{CBO}$ | $V_{CB}$ = 28V | | — | 0.2 | — | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 100mA | 18 | — | 200 | — |

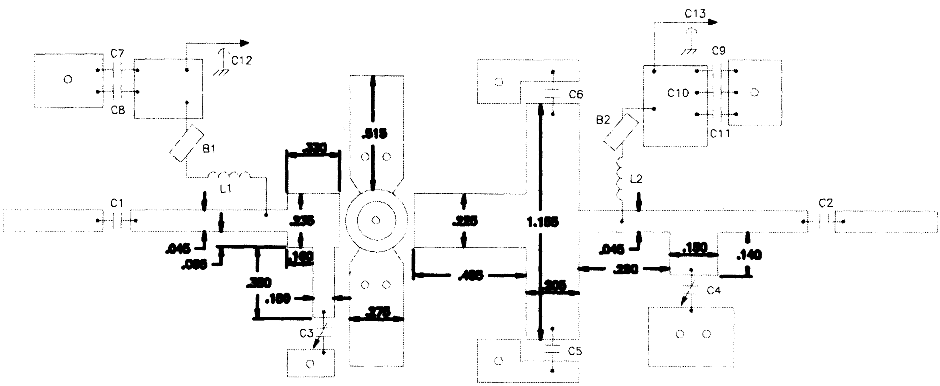
DYNAMIC

| Symbol | Test Conditions | | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| $P_{OUT}$ 1dB | f = 1 GHz | $V_{CC}$ = 20 V | $I_C$ = 220 mA | 1.5 | — | — | W |
| $G_P$ | f = 1 GHz | $V_{CC}$ = 20 V | $I_C$ = 220 mA | 9.5 | — | — | dB |
| VSWR | f = 1 GHz | $V_{CC}$ = 20 V | $I_C$ = 220 mA | — | — | 25:1 | — |
| $C_{OB}$ | f = 1 MHz | $V_{CB}$ = 20 V | | — | — | 4.0 | pF |

## IMPEDANCE DATA

| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| 1000 MHz | 4.0 + j 3.3 | 20.8 + j 33.3 |

## TEST CIRCUIT




B1, B2 : Ferrite Beads

C1,C2 : 120 pF Chip Capacitor
C3 : .4 - 2.5 pF Johanson Capacitor
C4 : .8 - 8 pF Johanson Capacitor
C5,C6
C7,C8 : 220 pF Chip Capacitor

C9,C10 : 1000 pF Chip Capacitor
C11 : .1μF Capacitor
C12,C13 : 15,000 pF EMI Filter

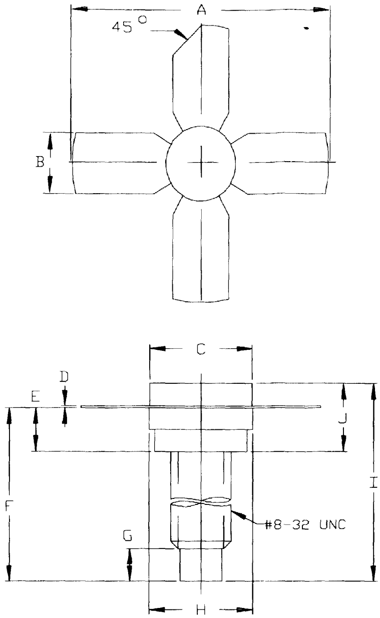
L1,L2 : 5 Turn Choke; Wire Diameter .025", I.D. 0.125"

Substrate material: Er = 10.2, H = .050", 1oz. Copper

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No. 12-0122

| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM Inches/mm | MAXIMUM Inches/mm |
| A | 1.010/25,65 | 1.055/26,80 |
| B | .220/5,59 | .230/5,84 |
| C | .270/6,86 | .285/7,24 |
| D | .003/0,08 | .007/0,18 |
| E | .117/2,97 | .137/3,48 |
| F | .572/14,53 | |
| G | .130/3,30 | |
| H | .275/6,99 | .285/7,24 |
| I | .640/16,26 | |
| J | .175/4,45 | .217/5,51 |

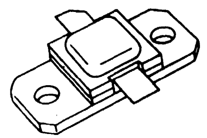


SGS-THOMSON MICROELECTRONICS

# SD8250

## RF & MICROWAVE TRANSISTORS AVIONICS APPLICATIONS

- REFRACTORY/GOLD METALLIZATION
- EMITTER SITE BALLASTED
- 5:1 VSWR CAPABILITY @ 1.75 dB RF OVERDRIVE
- LOW THERMAL RESISTANCE
- INPUT/OUTPUT MATCHING
- OVERLAY GEOMETRY
- METAL/CERAMIC HERMETIC PACKAGE
- $P_{OUT}$ = 250 W MIN. WITH 8.0 dB GAIN



**.400 x .400 2LFL (S036)**
hermetically sealed

| ORDER CODE | BRANDING |
|---|---|
| SD8250 | 8250 |

### DESCRIPTION

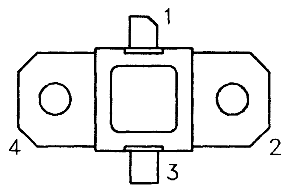
The SD8250 is a high power Class C transistor specifically designed for TACAN/DME pulsed output and driver applications.

This device is designed for operation under moderate pulse width and duty cycle pulse conditions and is capable of withstanding 5:1 output VSWR at rated RF overdrive.

Low RF thermal resistance and computerized automatic wire bonding techniques ensure high reliability and product consistency.

The SD8250 is supplied in the AMPAC™ Hermetic Metal/Ceramic package with internal Input/Output matching structures.

### PIN CONNECTION




1. Collector
2. Base
3. Emitter
4. Base

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_{DISS}$ | Power Dissipation* ($T_C \leq 90°C$) | 575 | W |
| $I_C$ | Device Current* | 20 | A |
| $V_{CC}$ | Collector-Supply Voltage* | 50 | V |
| $T_J$ | Junction Temperature (Pulsed RF Operation) | 250 | °C |
| $T_{STG}$ | Storage Temperature | – 65 to +200 | °C |

### THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{TH(j-c)}$ | Junction-Case Thermal Resistance(1) | 0.28 | °C/W |

*Applies only to rated RF amplifier operation
(1) Infra-Red Scan of Hot Spot Junction Temperature at Rated RF Operating Conditions

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C)

STATIC

| Symbol | Test Conditions | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | $I_C$ = 35mA | $I_E$ = 0mA | 65 | — | — | V |
| $BV_{EBO}$ | $I_E$ = 15mA | $I_C$ = 0mA | 4.0 | — | — | V |
| $BV_{CES}$ | $I_C$ = 25mA | $I_B$ = 0mA | 60 | — | — | V |
| $I_{CES}$ | $V_{BE}$ = 0V | $V_{CE}$ = 50V | — | — | 20 | mA |
| $h_{FE}$ | $V_{CE}$ = 5V | $I_C$ = 1A | 10 | — | — | — |

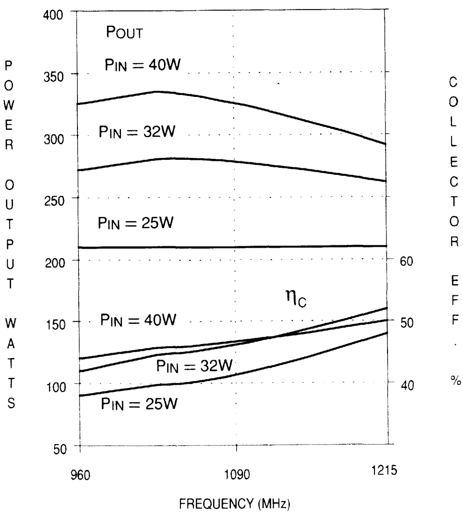
DYNAMIC

| Symbol | Test Conditions | | | Value Min. | Value Typ. | Value Max. | Unit |
|---|---|---|---|---|---|---|---|
| $P_{OUT}$ | f = 960 — 1215 MHz | $P_{IN}$ = 40 W | $V_{CC}$ = 50 V | 250 | 295 | — | W |
| $\eta_C$ | f = 960 — 1215 MHz | $P_{IN}$ = 40 W | $V_{CC}$ = 50 V | 38 | 44 | — | % |
| $G_P$ | f = 960 — 1215 MHz | $P_{IN}$ = 40 W | $V_{CC}$ = 50 V | 8.0 | 8.7 | — | dB |

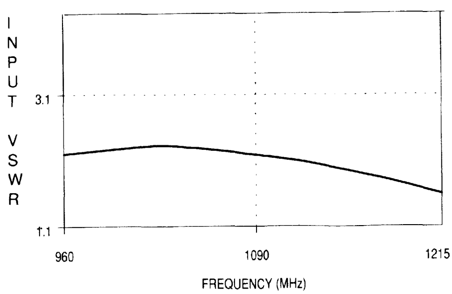
Note: Pulse Width = 20µSec
Duty Cycle = 5%
$T_C$ = 25°C

## TYPICAL PERFORMANCE

**TYPICAL BROADBAND POWER AMPLIFIER**

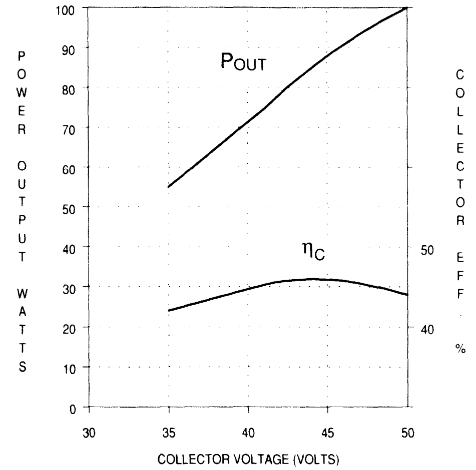



**INPUT VSWR vs FREQUENCY**



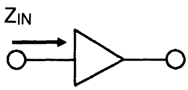
## TYPICAL PERFORMANCE (cont'd)

### TYPICAL POWER OUTPUT & COLLECTOR EFFICIENCY vs COLLECTOR VOLTAGE

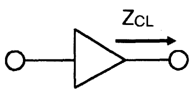



## IMPEDANCE DATA

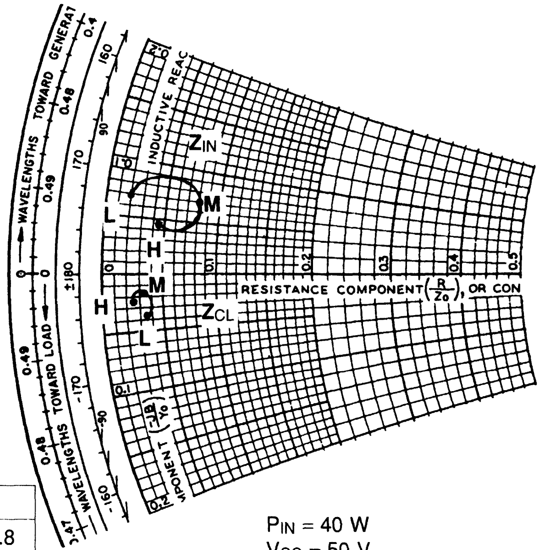
### TYPICAL INPUT IMPEDANCE




### TYPICAL COLLECTOR LOAD IMPEDANCE

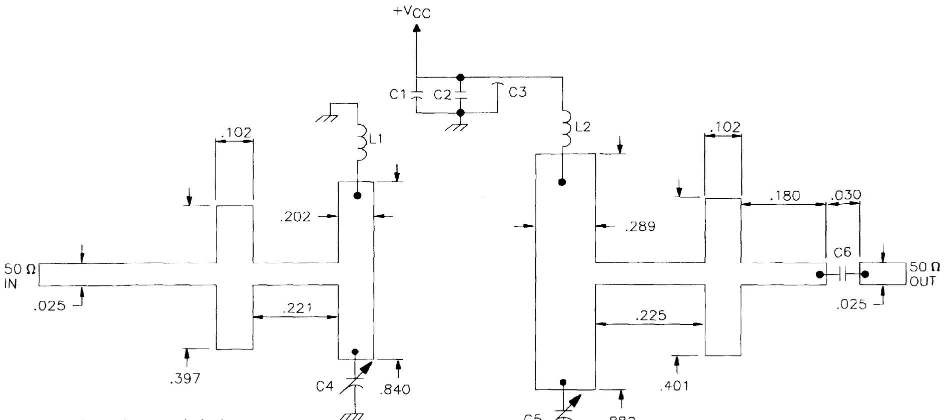



| FREQ. | $Z_{IN}$ (Ω) | $Z_{CL}$ (Ω) |
|---|---|---|
| L = 960 MHz | 1.0 + j 3.5 | 1.9 − j 1.8 |
| M = 1090 MHz | 4.0 + j 3.5 | 1.6 − j 0.9 |
| H =1215 MHz | 2.2 + j 2.2 | 1.4 − j 1.1 |




$P_{IN}$ = 40 W
$V_{CC}$ = 50 V
Normalized to 50 ohms

## TEST CIRCUIT

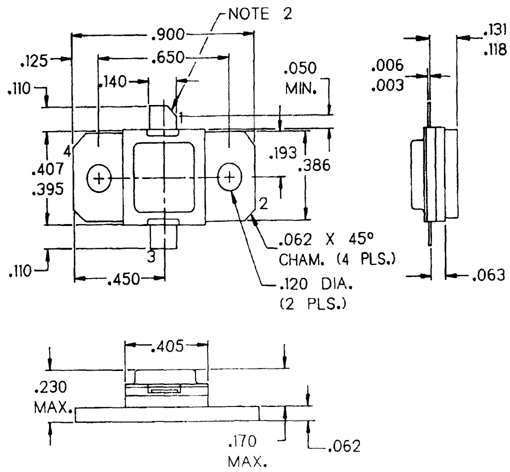



All dimensions are in inches.
Substrate material: .025 thick $Al_2O_3$

| | | |
|---|---|---|
| C1 | : | 100 μF Electrolytic Capacitor, 63V |
| C2 | : | .1 μF Ceramic Capacitor |
| C3 | : | Feedthru Bypass SCI 712-022 |
| C4 | : | Johanson 7475 Gigatrim .6 — 4.5 pF |
| C5 | : | Johanson 7475 Gigatrim .6 — 4.5 pF |
| C6 | : | D.C. Block 100 pF |
| L1 | : | #26 Wire, 4 Turn .062 I.D. |
| L2 | : | #26 Wire, 4 Turn .062 I.D. |

## PACKAGE MECHANICAL DATA

Ref.: Dwg. No.: J133102E




NOTES:
1. ALL TOLERANCE ± .010 EXCEPT WHERE NOTED; DIMENSIONS IN INCHES.
2. COLLECTOR LEAD CHAMFER 45° NOM. X .040 NOM.



SGS-THOMSON MICROELECTRONICS

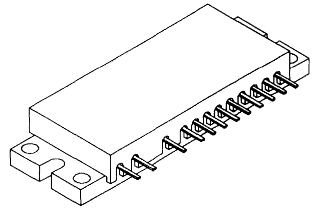
SGS-THOMSON MICROELECTRONICS

# STM900-30

## RF POWER MODULE DIGITAL CELLULAR APPLICATIONS

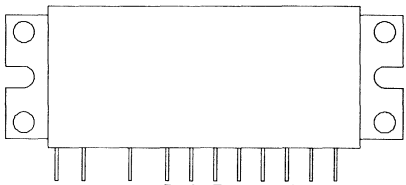
PRELIMINARY DATA

- LINEAR POWER AMPLIFIER
- 860 - 900 MHz
- 26 VOLTS
- INPUT/OUTPUT 50 OHMS
- $P_{OUT}$ = +45 dBm PEP
- GAIN = 36 dB MIN.



| **ORDER CODE** | **BRANDING** |
|---|---|
| STM900-30 | STM900-30 |

**PIN CONNECTION**




| | | | |
|---|---|---|---|
| 1. RF Input | 2. $V_{G1}$ | 3. deleted | 4. $V_{G2}$ |
| 5. $V_D$ | 6. $V_{B1}$ | 7. $D_1$ | 8. $V_{C1}$ |
| 9. $V_{B2}$ | 10. $D_2$ | 11. $V_{C2}$ | 12. RF Output |

## DESCRIPTION

The STM900-30 module is designed for digital cellular radio base station applications in the 860-900 MHz frequency range operating at 26V.

The STM900-30 is designed to meet the low distortion, high linearity requirements of modern digital cellular base station equipment.

## ABSOLUTE MAXIMUM RATINGS (Tcase = 25°C)

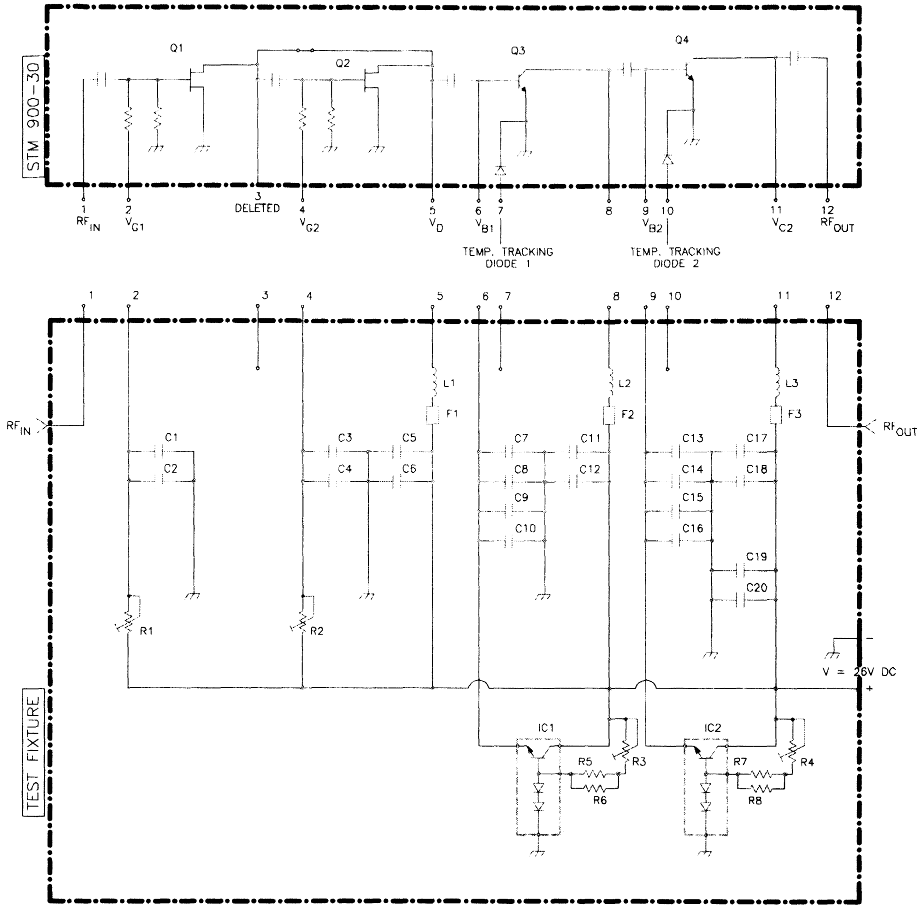
| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| V, $V_D$, $V_{C1}$, $V_{C2}$ | DC Supply Voltage | 28 | Vdc |
| $I_{Q1}$ | Bias Current @ V = 26V, 1st Stage | 0.40 | Adc |
| $I_{Q2}$ | Bias Current @ V = 26V, 2nd Stage | 0.40 | Adc |
| $I_{Q3}$ | Bias Current @ V = 26V, 3rd Stage | 0.54 | Adc |
| $I_{Q4}$ | Bias Current @ V = 26V, 4th Stage | 1.62 | Adc |
| $P_{IN}$ | RF Input Power ($P_{OUT}$ < 45 dBm PEP) | 14 | dBm PEP |
| $P_{OUT}$ | RF Output Power (V = 26V) | 48 | dBm PEP |
| $T_{STG}$ | Storage Temperature | – 30 to +100 | °C |

**ELECTRICAL SPECIFICATIONS** ($T_{case}$ = 25°C, $V_D$, $V_{C1}$, $V_{C2}$ = 26V) ($I_{DQ1}$ = 100mA, $I_{DQ2}$ = 180mA, $I_{CQ1}$ = 180mA, $I_{CQ2}$ = 200mA)

| Symbol | Parameter | Test Conditions | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| BW | Frequency Range | | 860 | — | 900 | MHz |
| $G_P$ | Power Gain | $P_{OUT}$ = +42 dBm CW | 36 | 38 | — | dB |
| $\eta_{dt}$* | Double-Tone Efficiency | $P_{OUT}$ = +45 dBm PEP | 25 | 28 | — | % |
| $Z_{IN}$ | Input Impedance | $P_{OUT}$ = +42 dBm CW $Z_S$, $Z_L$ = 50Ω | — | 1.5 | 2.0 | VSWR |
| IMD* | Intermodulation Distortion | $P_{OUT}$ = +45 dBm PEP | — | –34 | –30 | dBT** |
| — | Power Degradation | $P_{OUT}$ = +42 dBm CW<br>$T_C$ = 0°C to 70°C | — | 1.5 | — | — |
| — | Load Mismatch | VSWR = 5:1 V = 26Vdc<br>$P_{OUT}$ = +45 dBm PEP | No Degradation in Output Power | | | |

Note: * Two-Tone test; 20 KHz separation ** dBT - in dB, referenced to tone level

## MODULE DC AND TEST FIXTURE CONFIGURATION




| | | |
|---|---|---|
| C1, C3, C5, C7, C11, C13, C17 | : | 100 pF |
| C2, C4, C6, C8, C12, C14, C18 | : | .001 μF |
| C9, C15, C19 | : | .1 μF |
| C10, C16, C20 | : | 100 μF |
| F1, F2, F3 | : | FAIR-RITE #2664000101 |
| IC1, IC2 | : | TCCABB |

L1, L2, L3 : 5 Turns of 24 AWG Wire, Inner Diameter 1.27mm

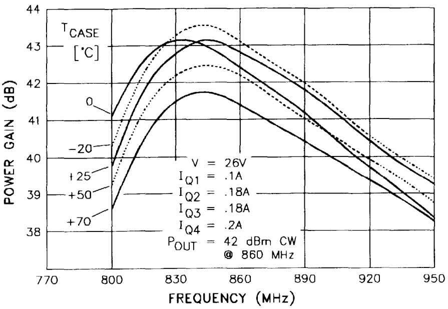
| | | |
|---|---|---|
| R1, R2, R3, R4 | : | 5 KOHM |
| R5, R6, R7, R8 | : | 1 KOHM |

Setting Bias: (Ex.: $I_{Q1} = .1A$, $I_{Q2} = .18A$, $I_{Q3} = .18A$, $I_{Q4} = .2A$)

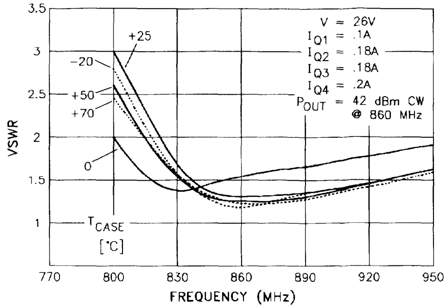
1. Set all variable resistors clockwise. (No bias current flows through transistors when all variable resistors are set clockwise.)
2. Record stationary current $I_O$.
3. Adjust R1 for ($I_O$ + 100)mA.
4. Adjust R2 for ($I_O$ + 100 + 180)mA.
5. Adjust R3 for ($I_O$ + 100 + 180 + 180)mA.
6. Adjust R4 for ($I_O$ + 100 + 180 + 180 + 200)mA.

## TYPICAL PERFORMANCE

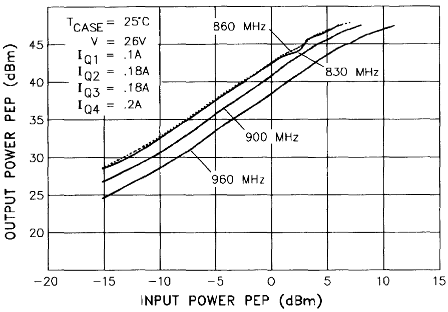
### GAIN vs FREQUENCY & TEMPERATURE



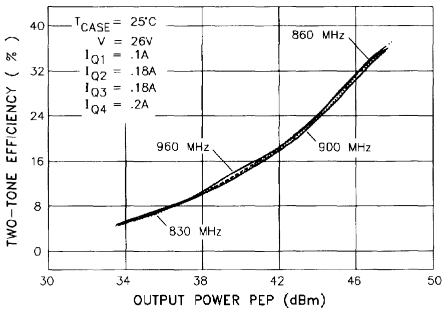

### VSWR vs FREQUENCY & TEMPERATURE



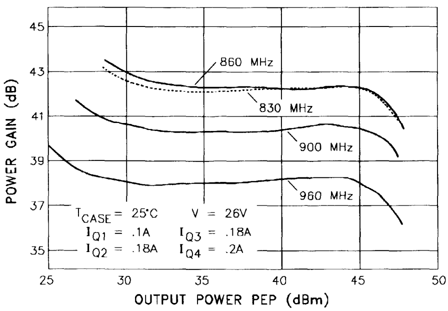

### POWER OUTPUT vs POWER INPUT



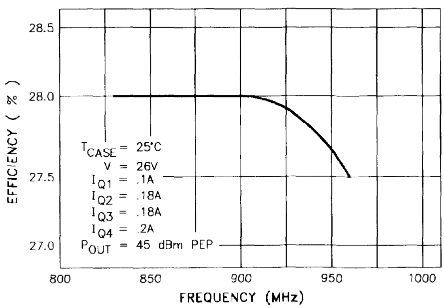

### TWO-TONE EFFICIENCY vs POWER OUTPUT




### POWER GAIN vs POWER OUTPUT

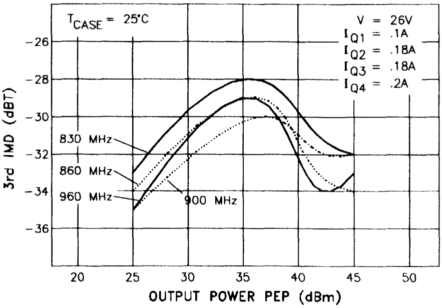



### EFFICIENCY vs FREQUENCY

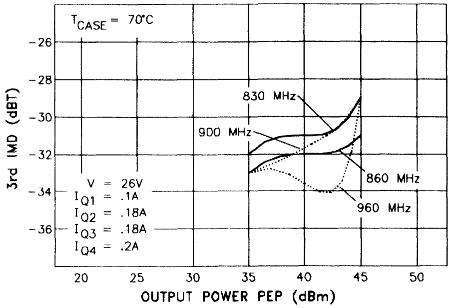


## TYPICAL PERFORMANCE

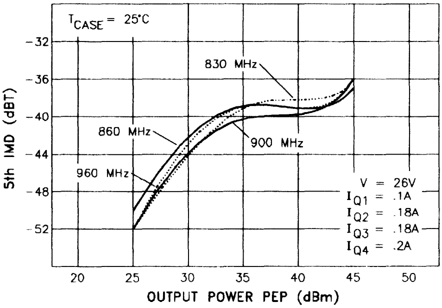
3rd IMD vs POWER OUTPUT & TEMPERATURE



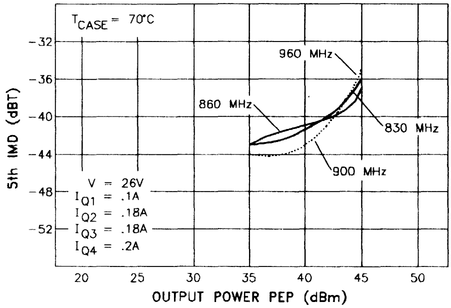

3rd IMD vs POWER OUTPUT & TEMPERATURE



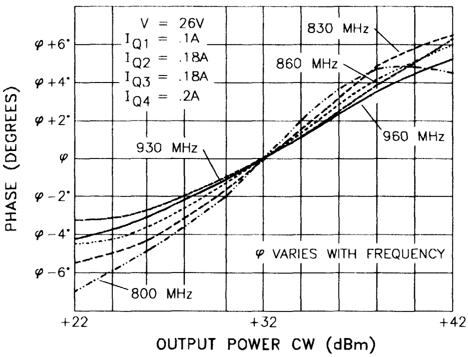

5th IMD vs POWER OUTPUT & TEMPERATURE




5th IMD vs POWER OUTPUT & TEMPERATURE




PHASE THROUGH MODULE vs POWER OUTPUT



## APPLICATIONS RECOMMENDATIONS

### OPERATION LIMITS

The STM900-30 power module should never be operated under any condition which exceeds the Absolute Maximum Ratings presented on this data sheet. Nor should the module be operated continuously at any of the specified maximum ratings. If the module is to be operated under any condition such that it may be subjected to one or more of the maximum rating conditions, care must be taken to monitor other parameters which may be affected.

### DECOUPLING

Failure to properly decouple any of the voltage supply pins will result in oscillations at certain operating frequencies. Therefore, it is recommended that these pins be bypassed as indicated in the Module DC and Test Fixture Configuration drawing of this data sheet.

### MODULE MOUNTING

To insure adequate thermal transfer from the module to the heatsink, it is recommended that a satisfactory thermal compound such as Dow Corning 340, Wakefield 120-2 or equivalent be applied between the module flange and the heatsink.

The heatsink mounting surface under the module should be flat to within +/- 0.05 mm (+/- 0.002 inch).

The module should be mounted to the heatsink using 3 mm (or 6-32) or equivalent screws torqued to 5-6 kg-cm (4-6 in-lb).

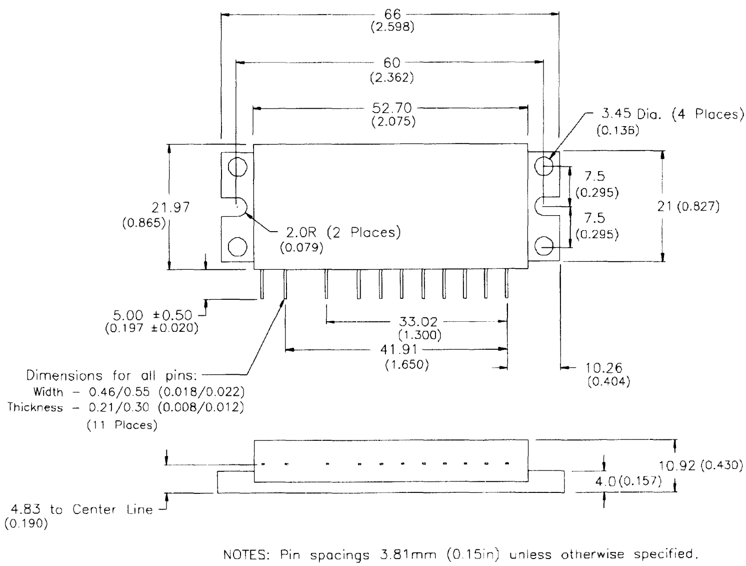
The module leads are attached to the PC board using 180˚C solder. When soldering the leads to the application circuit, care must be taken to avoid time or temperature which may result in reflow of the lead connection inside the module.

### THERMAL CONSIDERATIONS

It will be necessary to provide a suitable heatsink in order to maintain the module flange temperature at or below the maximum case operating temperature. In a case where the module output power will be limited to +45 dBm (32W PEP) and designing for the worst case double-tone efficiency of 25%, the power dissipated by the module will be 48 watts. The heatsink must be designed such that the thermal rise will be less than the difference between the maximum ambient temperature at which the module will operate and the maximum operating case temperature of the module while dissipating 48 watts.

At $T_{case}$ = +70 ˚C, V = 26v, $I_{Q1}$ = 0.1A, $I_{Q2}$ = 0.18A, $I_{Q3}$ = 0.18A, $I_{Q4}$ = 0.2A, $Z_L$ = 50 ohms and $P_{OUT}$ = +45dBm PEP, maximum junction temperatures for the individual transistors should be below the following values:
Q1 - 85˚C, Q2 - 110˚C, Q3 - 120˚C and Q4 - 120˚C.

## PACKAGE MECHANICAL DATA



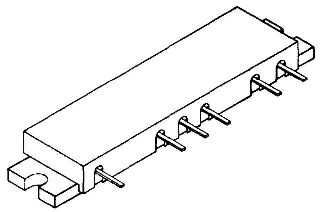

NOTES: Pin spacings 3.81mm (0.15in) unless otherwise specified.
All tolerances ±0.25mm (±0.010in) unless otherwise specified.
Numbers in ( ) are inches.

# STM915-14

## RF POWER MODULE GSM MOBILE APPLICATIONS

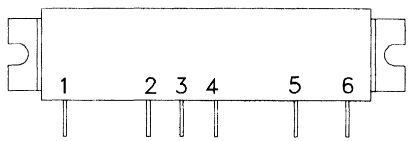
PRELIMINARY DATA

- LINEAR POWER AMPLIFIER
- 890 - 915 MHz
- 12.5 VOLTS
- INPUT/OUTPUT 50 OHMS
- $P_{OUT}$ = 14 W MIN.
- GAIN = 41.5 dB MIN.



| ORDER CODE | BRANDING |
|---|---|
| STM915-14 | STM915-14 |

**PIN CONNECTION**




| | | |
|---|---|---|
| 1. RF Input/$V_{CONTROL}$ | 2. $V_{S1}$ 8.0 Vdc | 3. $V_{S2}$ 12.5 Vdc |
| 4. $V_{S3}$ 8.0 Vdc | 5. $V_{S4}$ 12.5 Vdc | 6. RF Output |

### DESCRIPTION

The STM915-14 is a linear power module designed for 12.5 V applications in GSM Cellular Radio Systems. The STM915-14 uses gold metallized transistors with diffused emitter ballast resistors for high linearity Class AB operation

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{S2}$, $V_{S4}$ | DC Supply Voltage (RF applied/No RF applied) | 15.6/30.0 | Vdc |
| $V_{S1}$, $V_{S3}$ | DC Supply Voltage | 8.5 | Vdc |
| $V_{CONTROL}$ | DC Control Voltage | 4.5 | Vdc |
| $P_{IN}$ | RF Input Power ($P_{OUT} \leq$ 15W) | 3.0 | mW |
| $P_{OUT}$ | RF Output Power ($V_{S2}$, $V_{S4}$ = 12.5V) | 15 | W |
| $T_{STG}$ | Storage Temperature | – 30 to +100 | °C |
| $T_C$ | Operating Case Temperature | – 30 to +100 | °C |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25°C, $V_{S1}$, $V_{S3}$ = 8.0 Vdc; $V_{S2}$, $V_{S4}$ = 12.5 Vdc)

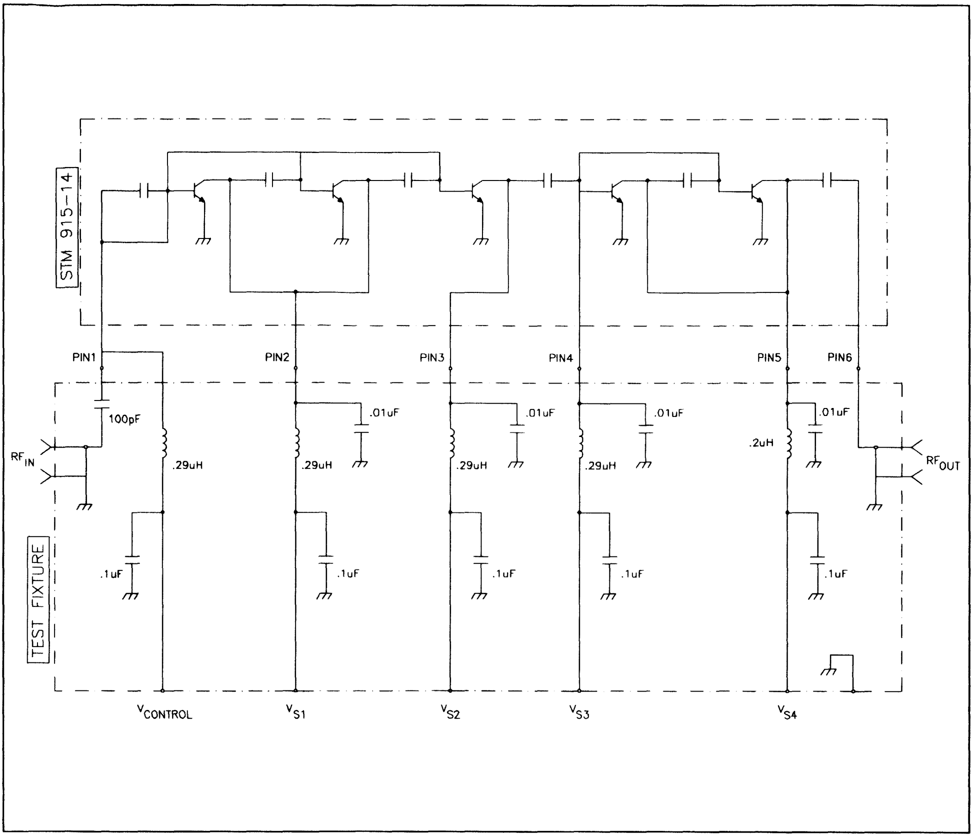
| Symbol | Parameter | Test Conditions | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| BW | Frequency Range | | 890 | — | 915 | MHz |
| $P_{IN}$ | Input Power | $V_{CONT}$ = 4.0Vdc $P_{OUT}$ = +41.5dBm | — | — | 0 | dBm |
| η | Efficiency[1, 2] | $P_{OUT}$ = +41.5dBm | 35 | 40 | — | % |
| $I_{Q1}$ | Quiescent Current, $V_{S1}$ $V_{S2}$ | $V_{CONT}$ = 0Vdc $P_{IN}$ = 1mW | — | 0.5 | 2.0 | mA |
| $I_{Q2}$ | Quiescent Current, $V_{S3}$ | $V_{CONT}$ = 0Vdc $P_{IN}$ = 1mW | — | 120 | 130 | mA |
| $I_{Q3}$ | Quiescent Current, $V_{S4}$ | $V_{CONT}$ = 0Vdc $P_{IN}$ = 1mW | — | 200 | 250 | mA |
| — | Control Dynamic Range | $V_{CONT}$ = 0 to 4.0V | — | 80 | — | dB |
| H | Harmonics[1, 2] | $P_{OUT}$ = +41.5dBm reference | — | –45 | –40 | dBc |
| $Z_{IN}$ | Input Impedance[1] | $P_{OUT}$ = +13dBm to +41.5dBm | — | 2.0 | — | VSWR |
| $V_{CONT}$ | Control Voltage | | 0 | — | 4.0 | Vdc |
| $I_{CONT}$ | Control Current | | — | 0.1 | 0.5 | mA |
| $t_R$ | Rise Time[1, 2] | $P_{OUT}$ = +13 to +41.5dBm | — | 1.0 | — | µSec |
| — | Noise Power[1, 2] | 30KHz Bandwidth, 20MHz above $f_0$ <br> $P_{OUT}$ = +13dBm to +41.5dBm | — | –70 | — | dBm |
| — | Stability[1, 2] | $P_{OUT}$ = – 36 to +41.5dBm <br> $V_{S2}$, $V_{S4}$ = 10.8 to 15.6V <br> Load VSWR = 6:1 Source VSWR = 3:1 <br> $T_C$ = – 20 to +60°C | All Spurious outputs more than 60dB below carrier | | | |
| — | Load Mismatch | VSWR = 10:1 V = 15.6Vdc <br> $P_{OUT}$ = +41.5dBm | No Degradation in Output Power | | | |

Notes: 1) $P_{IN}$ = 1.0mW adjust $V_{CONTROL}$ for specified $P_{OUT}$.
2) Pulse Width = 577 µsec.
Repetition rate = 4.6 msec.

## GSM SPECIFIC TESTS

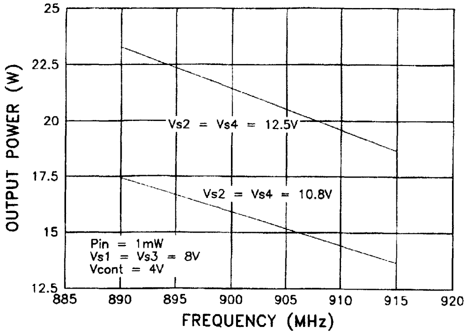
| Symbol | Parameter | Test Conditions | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| — | AM/AM Conversion Gain | $P_{IN}$ = $f_o$ (0 dBm)+[$f_o$ + 200kHz (– 40dBm)] <br> $V_{CONTROL}$ adjusted for <br> $P_{OUT}$ = 13, 30, 41.5dBm <br> $P_{OUT}$ ($f_o$ + 200 kHz) <br> $P_{OUT}$ ($f_o$ – 200 kHz) | | – 41 <br> – 45 | | dBc |
| — | AM/PM Conversion | $P_{OUT}$ = +13 to + 41.5dBm <br> $P_{IN}$ varied +/– 1.0dB | | 4 | | °/dB |

## MODULE DC AND TEST FIXTURE CONFIGURATION

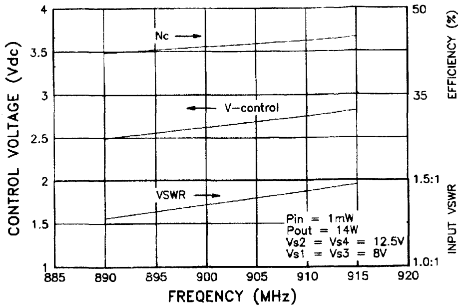


## TYPICAL PERFORMANCE

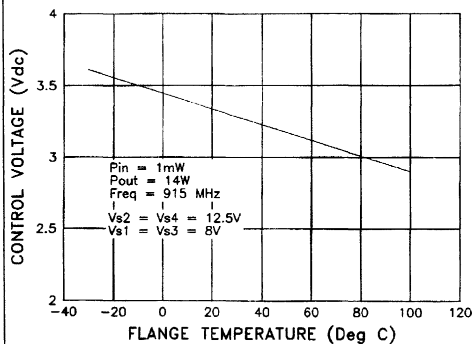
POWER OUTPUT vs FREQUENCY



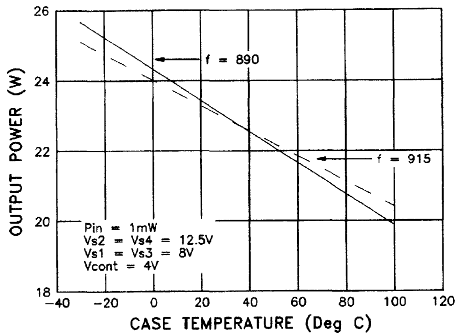

CONTROL VOLTAGE, EFFICIENCY & INPUT VSWR vs FREQUENCY



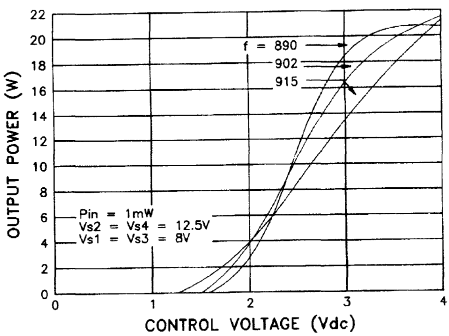

CONTROL VOLTAGE vs CASE TEMPERATURE




POWER OUTPUT vs CASE TEMPERATURE




POWER OUTPUT vs CONTROL VOLTAGE



## APPLICATIONS RECOMMENDATIONS

### OPERATION LIMITS

The STM915-14 power module should never be operated under any condition which exceeds the Absolute Maximum Ratings presented on this data sheet. Nor should the module be operated continuously at any of the specified maximum ratings. If the module is to be operated under any condition such that it may be subjected to one or more of the maximum rating conditions, care must be taken to monitor other parameters which may be affected. For example, a combination of high $V_{S3}$ and input overdrive could result in exceeding the maximum output power rating; in this condition, the output power must be maintained below the maximum rating by use of the gain control pin.

### GAIN CONTROL

The module output power should be limited to 15 watts (41.76 dBm). The module is designed to be operated with $V_{S1}$ and $V_{S3}$ set to 8.0 Vdc, $V_{S2}$ and $V_{S4}$ set to 12.5 Vdc and input power set to 1.0 mW (0 dBm). Module gain is adjusted by varying $V_{CONTROL}$.

### DECOUPLING

The bypassing internal to the module is sufficient for the frequency range 90 - 1300 MHz. Care should be taken to insure proper decoupling for each application as the module is capable of a wide range of operating characteristics including "linear" operation, in which an important design criteria is the use of appropriate bypassing. For bypassing low frequencies while maintaining the electrical specifications contained in this data sheet, use of the decoupling network shown in the "Module DC and Test Fixture Configuration" diagram herein is recommended.

### MODULE MOUNTING

To insure adequate thermal transfer from the module to the heatsink, it is recommended that a satisfactory thermal compound such as Dow Corning 340, Wakefield 120-2 or equivalent be applied between the module flange and the heatsink.

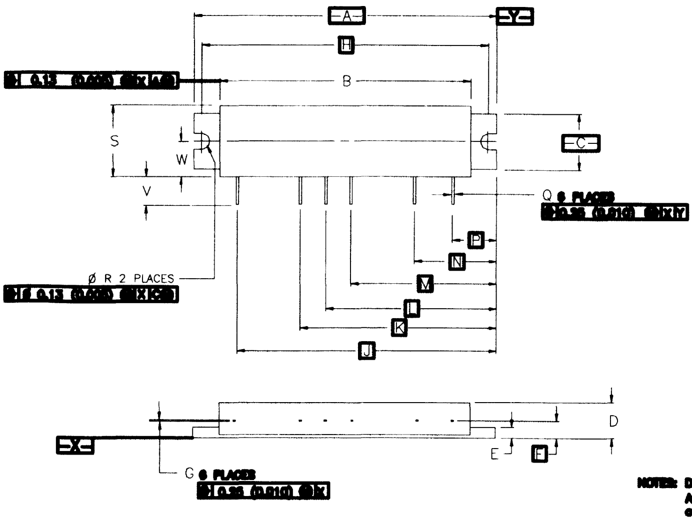
The heatsink mounting surface under the module should be flat to within +/- 0.05 mm (+/- 0.002 inch). The module should be mounted to the heatsink using 3 mm (or 4-40) or equivalent screws torqued to 5-6 kg-cm (4-6 in-lb).

The module leads are attached to the PC board using 180°C solder. When soldering the leads to the application circuit, care must be taken to avoid time or temperature which may result in reflow of the lead connection inside the module.

### THERMAL CONSIDERATIONS

It will be necessary to provide a suitable heatsink in order to maintain the module flange temperature at or below the maximum case operating temperature. In a case where the module output power will be limited to +41.5 dBm (14 W) and designing for the worst case efficiency of 35%, the power dissipated by the module will be 26 watts. The heatsink must be designed such that the thermal rise will be less than the difference between the maximum ambient temperature at which the module will operate and the maximum operating case temperature of the module while dissipating 26 watts.

## PACKAGE MECHANICAL DATA




| SGS-THOMSON MICROELECTRONICS | | |
|---|---|---|
| | MINIMUM inches/mm | MAXIMUM inches/mm |
| A | 2.380/60.45 | 2.395/60.83 |
| B | 1.970/50.04 | 1.990/50.54 |
| C | 0.445/11.31 | 0.465/11.81 |
| D | 0.250/6.35 | 0.265/6.73 |
| E | 0.085/2.16 | 0.100/2.54 |
| F | 0.132/3.35 | |
| G | 0.008/0.21 | 0.012/0.30 |
| H | 2.260/57.40 | |
| J | 2.042/51.87 | |
| K | 1.542/39.17 | |
| L | 1.342/34.09 | |
| M | 1.142/29.01 | |
| N | 0.642/16.31 | |
| P | 0.342/8.69 | |
| Q | 0.018/0.46 | 0.022/0.56 |
| R | 0.120/3.05 | 0.130/3.30 |
| S | 0.535/13.59 | 0.555/14.09 |
| V | 0.177/4.49 | 0.217/5.51 |
| W | 0.267/6.78 | 0.278/7.06 |

NOTES: Dimension F to Center of Leads.
All tolerances ±0.25mm (±0.010in) unless otherwise specified.

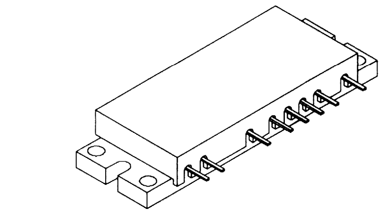
SGS-THOMSON MICROELECTRONICS

# STM960-10

## RF POWER MODULE DIGITAL CELLULAR APPLICATIONS

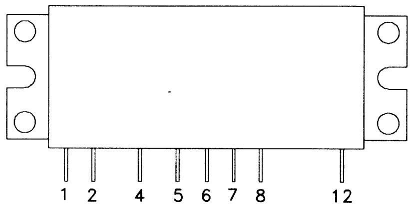
PRELIMINARY DATA

- LINEAR POWER AMPLIFIER
- 915 - 960 MHz
- 26 VOLTS
- INPUT/OUTPUT 50 OHMS
- $P_{OUT}$ = 10 W CW or PEP
- GAIN = 26 dB MIN.



| ORDER CODE | BRANDING |
|---|---|
| STM960 -10 | STM960-10 |

**PIN CONNECTION**




1. RF Input 2. $V_{G1}$ 4. $V_{G2}$ 5. $V_D$
6. $V_B$ 7. Diode 8. $V_C$ 12. RF Output
3, 9, 10, 11 - Deleted

## DESCRIPTION

The STM960-10 module is designed for digital cellular radio base station applications in the 915-960 MHz frequency range operating at 26V.
The STM960-10 is designed to meet the low distortion, high linearity requirements of modern digital cellular base station equipment.

**ABSOLUTE MAXIMUM RATINGS** (Tcase = 25°C)

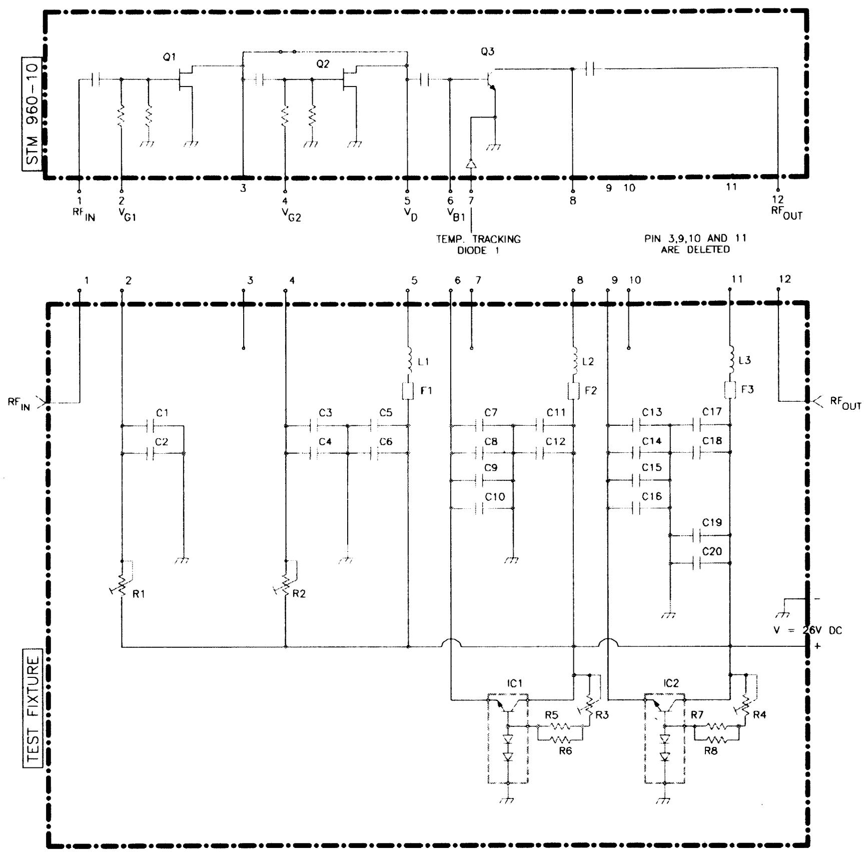
| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| V, $V_C$, $V_D$ | DC Supply Voltage | 28 | Vdc |
| $I_{Q1}$ | Bias Current @ V = 26V, 1st Stage | 0.40 | Adc |
| $I_{Q2}$ | Bias Current @ V = 26V, 2nd Stage | 0.40 | Adc |
| $I_{Q3}$ | Bias Current @ V = 26V, 3rd Stage | 0.54 | Adc |
| $P_{IN}$ | RF Input Power ($P_{OUT} \leq$ 41.8 dBm CW) | 15.8 | dBm |
| $P_{OUT}$, CW | RF Output Power (V = 26V) | 41.8 | dBm |
| $P_{OUT}$, PEP | RF Output Power (V = 26V) | 44.8 | dBm |
| $T_{STG}$ | Storage Temperature | – 30 to +100 | °C |

**ELECTRICAL SPECIFICATIONS** ($T_{case}$ = 25°C, $V_D$, $V_C$ = 26V)
($I_{DQ1}$ = 100mA, $I_{DQ2}$ = 50mA, $I_{CQ}$ = 50mA)

| Symbol | Parameter | Test Conditions | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| BW | Frequency Range | | 915 | — | 960 | MHz |
| $G_P$ | Power Gain | $P_{OUT}$ = 40 dBm CW | 26 | 28 | — | dB |
| IMD* | Intermodulation Distortion | $P_{OUT}$ = 40 dBm PEP | — | –34 | — | dBT** |
| η | Efficiency | $P_{OUT}$ = 40 dBm CW | 30 | 35 | — | % |
| $Z_{IN}$ | Input Impedance | $P_{OUT}$ = 40 dBm CW $Z_S$, $Z_L$ = 50Ω | — | 1.5 | 2.0 | VSWR |
| — | Power Degradation | $P_{OUT}$ = 40 dBm CW $T_C$ = 0°C to 70°C | — | — | 1.7 | dB |
| — | Load Mismatch | VSWR = 5:1 V = 26Vdc<br>$P_{OUT}$ = 40 dBm CW | No Degradation in Output Power | | | |

Notes: *Two-Tone Test Signal, 20kHz Separation.
**dBT - in dB, referenced to tone level

## MODULE DC AND TEST FIXTURE CONFIGURATION




| | | |
|---|---|---|
| C1, C3, C5, C7, C11, C13, C17 | : | 100 pF |
| C2, C4, C6, C8, C12, C14, C18 | : | .001 µF |
| C9, C15, C19 | : | .1 µF |
| C10, C16, C20 | : | 100 µF |
| F1, F2, F3 | : | FAIR-RITE #2664000101 |
| IC1, IC2 | : | TCCABB |

L1, L2, L3 : 5 Turns of 24 AWG Wire, Inner Diameter 1.27mm

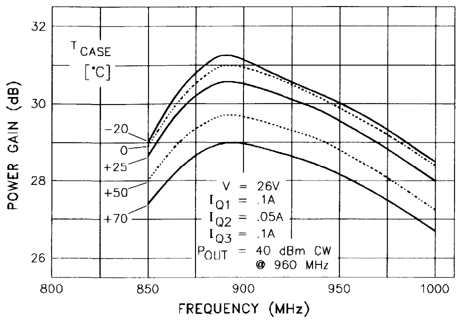
| | | |
|---|---|---|
| R1, R2, R3, R4 | : | 5 KOHM |
| R5, R6, R7, R8 | : | 1 KOHM |

Setting Bias: (Ex. $I_{Q1} = 100mA$, $I_{Q2} = 50mA$, $I_{Q3} = 50mA$)

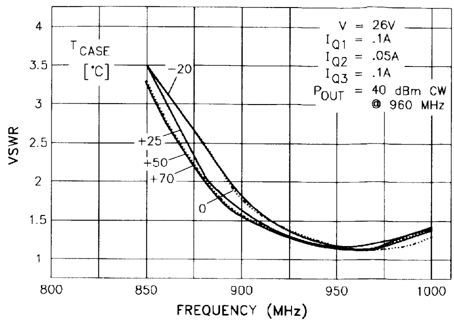
1. Set all variable resistors clockwise. (No bias current flows through transistors when all variable resistors are set clockwise.)
2. Record residual current $I_O$. (mA)
3. Adjust R1 for ($I_O$ + 100)mA.
4. Adjust R2 for ($I_O$ + 100 + 50)mA.
5. Adjust R3 for ($I_O$ + 100 + 50 + 50)mA.

## TYPICAL PERFORMANCE

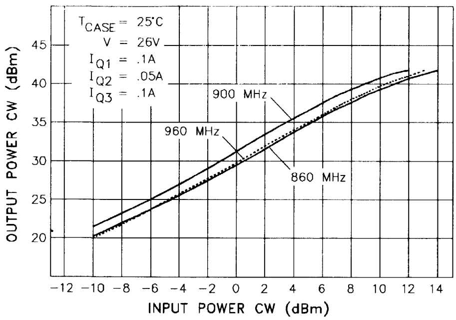
POWER GAIN vs FREQUENCY & TEMPERATURE



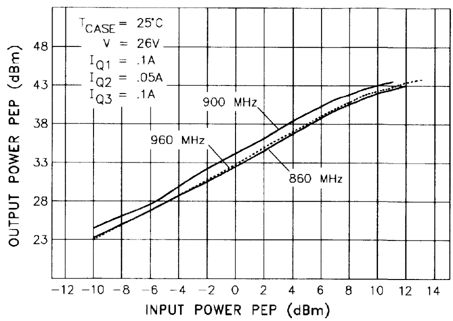

VSWR vs FREQUENCY & TEMPERATURE



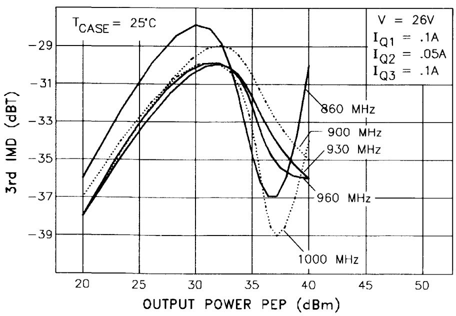

POWER OUTPUT vs POWER INPUT, CW



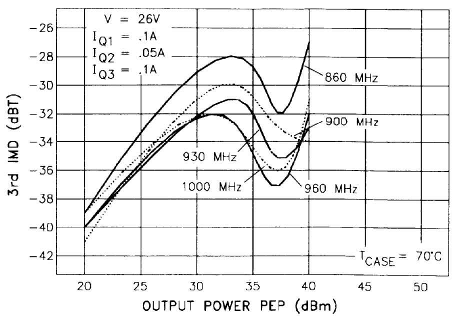

POWER OUTPUT vs POWER INPUT, PEP




3rd IMD vs POWER OUTPUT & TEMPERATURE

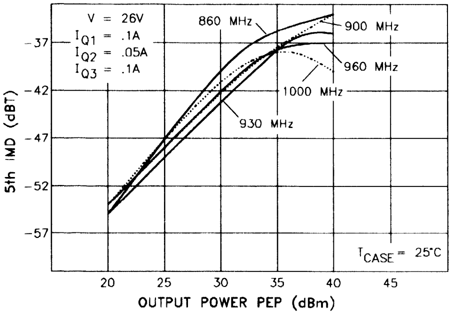



3rd IMD vs POWER OUTPUT & TEMPERATURE

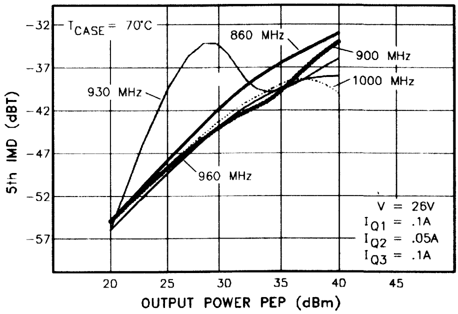


## TYPICAL PERFORMANCE

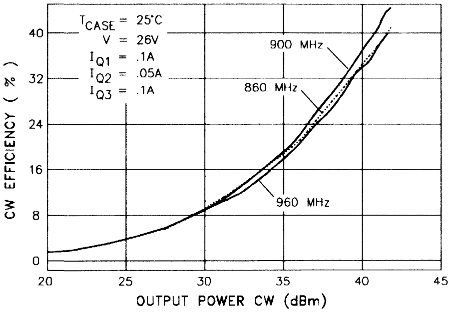
### 5th IMD vs POWER OUTPUT & TEMPERATURE



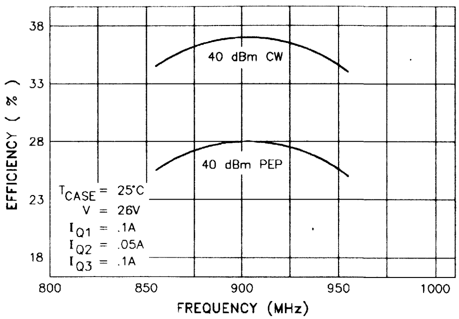

### 5th IMD vs POWER OUTPUT & TEMPERATURE



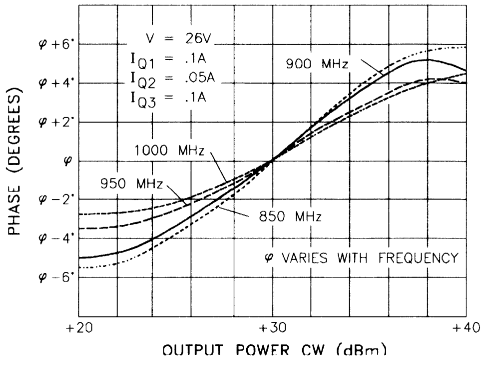

### CW EFFICIENCY vs POWER OUTPUT




### EFFICIENCY vs FREQUENCY




### PHASE THROUGH MODULE vs POWER OUTPUT



## APPLICATIONS RECOMMENDATIONS

### OPERATION LIMITS

The STM960-10 power module should never be operated under any condition which exceeds the Absolute Maximum Ratings presented on this data sheet. Nor should the module be operated continuously at any of the specified maximum ratings. If the module is to be operated under any condition such that it may be subjected to one or more of the maximum rating conditions, care must be taken to monitor other parameters which may be affected.

### DECOUPLING

Failure to properly decouple any of the voltage supply pins will result in oscillations at certain operating frequencies. Therefore, it is recommended that these pins be bypassed as indicated in the Module DC and Test Fixture Configuration drawing of this data sheet.

### MODULE MOUNTING

To insure adequate thermal transfer from the module to the heatsink, it is recommended that a satisfactory thermal compound such as Wakefield 120-2 or equivalent be applied between the module flange and the heatsink.

The heatsink mounting surface under the module should be flat to within +/- 0.05 mm (+/- 0.002 inch). The module should be mounted to the heatsink using 6-32 or equivalent screws torqued to 5-6 kg-cm (4-6 in-lb).

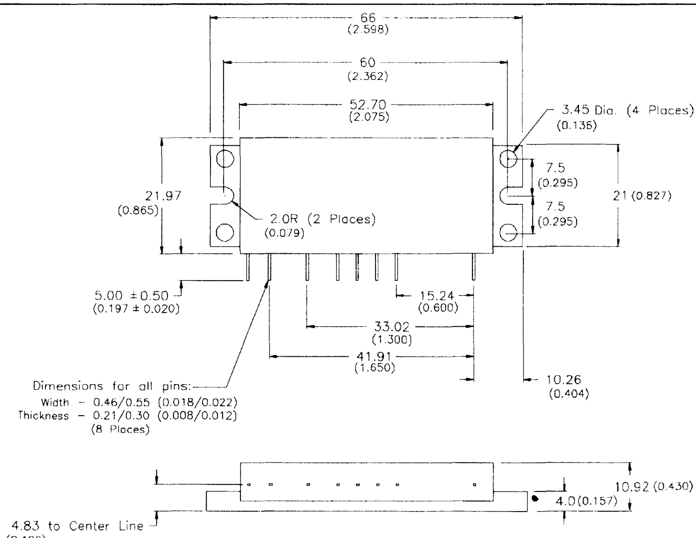
The module leads are attached to the PC board using 180°C solder. When soldering the leads to the application circuit, care must be taken to avoid time or temperature which may result in reflow of the lead connection inside the module.

### THERMAL CONSIDERATIONS

A suitable heatsink should be provided in order to maintain the module flange temperature at or below the maximum case operating temperature. If the module output power is +40dBm (10W), the power dissipated by the module will be 23.3 watts, assuming worst case efficiency of 30%. The heatsink must be designed so as to ensure that the thermal rise will be less than the difference between the maximum ambient temperature at which the module will operate and the maximum operating case temperature of the module while dissipating 23.3 watts.

At $T_{case}$ = +70 °C, V = 26v, $I_{Q1}$ = 0.1A, $I_{Q2}$ = 0.05A, $I_{Q3}$ = 0.1A, $Z_L$ = 50 ohms and $P_{OUT}$ = 10w CW, maximum junction temperatures for the individual transistors should be below the following values: Q1 - 110°C, Q2 - 115°C, and Q3 - 140°C.

## PACKAGE MECHANICAL DATA




NOTES: Pin spacings 3.81mm (0.15in) unless otherwise specified.
All tolerances ±0.25mm (±0.010in) unless otherwise specified.
Numbers in ( ) are inches.

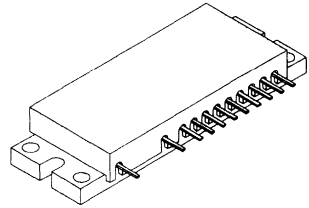
SGS-THOMSON MICROELECTRONICS

# STM960-15

## RF POWER MODULE DIGITAL CELLULAR APPLICATIONS

PRELIMINARY DATA

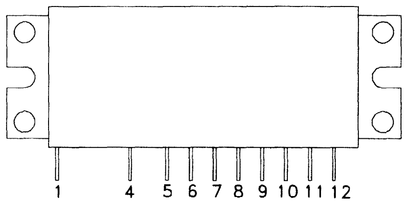
- LINEAR POWER AMPLIFIER
- 915 - 960 MHz
- 26 VOLTS
- INPUT/OUTPUT 50 OHMS
- $P_{OUT}$ = 42 dBm CW or PEP
- GAIN = 26 dB TYP.



**ORDER CODE** STM960-15

**BRANDING** STM960-15

**PIN CONNECTION**




| | | | |
|---|---|---|---|
| 1. RF Input | 2. deleted | 3. deleted | 4. $V_G$ |
| 5. $V_D$ | 6. $V_{B1}$ | 7. D1 | 8. $V_{C1}$ |
| 9. $V_{B2}$ | 10. $D_2$ | 11. $V_{C2}$ | 12. RF Output |

## DESCRIPTION

The STM960-15 module is designed for digital cellular radio base station applications in the 915-960 MHz frequency range operating at 26V.

The STM960-15 is designed to meet the low distortion, high linearity requirements of modern digital cellular base station equipment.

## ABSOLUTE MAXIMUM RATINGS (Tcase = 25°C)

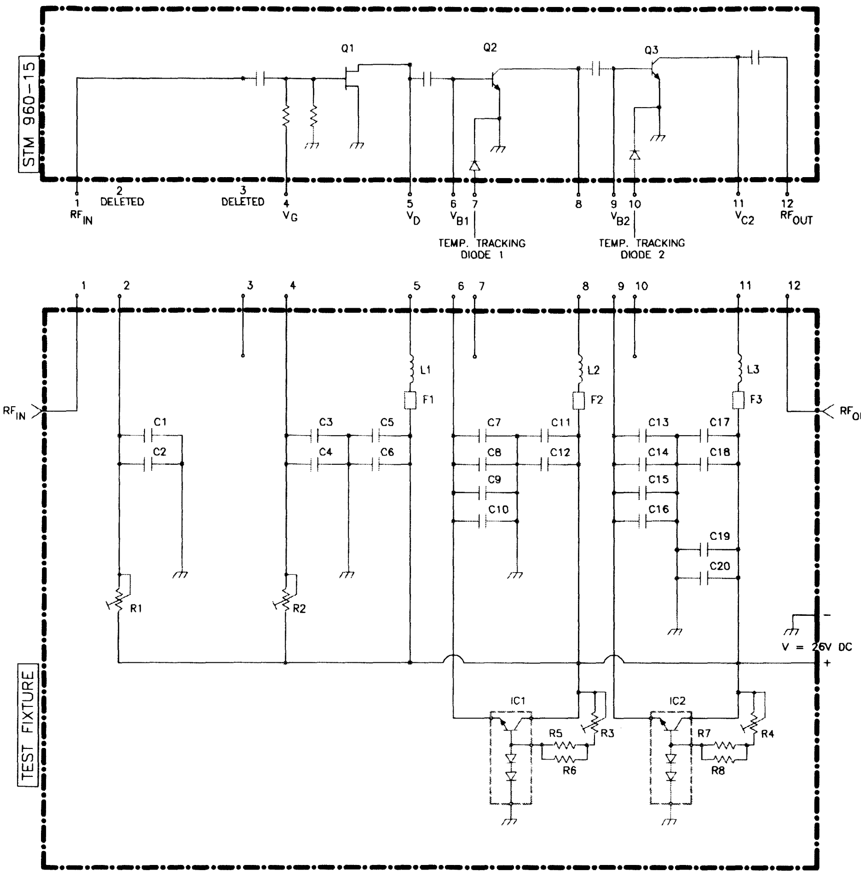
| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| V, $V_D$, $V_{C1}$, $V_{C2}$ | DC Supply Voltage | 28 | Vdc |
| $I_{Q1}$ | Bias Current @ V = 26V, 1st Stage | 0.40 | Adc |
| $I_{Q2}$ | Bias Current @ V = 26V, 2nd Stage | 0.54 | Adc |
| $I_{Q3}$ | Bias Current @ V = 26V, 3rd Stage | 1.08 | Adc |
| $P_{IN}$ | RF Input Power ($P_{OUT}$ < 42 dBm CW) | 22 | dBm CW |
| $P_{OUT}$ | RF Output Power (V = 26V) | 44 | dBm CW |
| $T_{STG}$ | Storage Temperature | – 30 to +100 | °C |

**ELECTRICAL SPECIFICATIONS** ($T_{case}$ = 25°C, $V_D$, $V_{C1}$, $V_{C2}$ = 26V)
($I_{DQ1}$ = 180mA, $I_{CQ2}$ = 150mA, $I_{CQ3}$ = 200mA)

| Symbol | Parameter | Test Conditions | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| BW | Frequency Range | | 915 | — | 960 | MHz |
| $G_P$ | Power Gain | $P_{OUT}$ = +42 dBm CW | 22 | 26 | — | dB |
| $\eta$ | Efficiency | $P_{OUT}$ = +42 dBm CW | 31 | 36 | — | % |
| $Z_{IN}$ | Input Impedance | $P_{OUT}$ = +42 dBm CW $Z_S$, $Z_L$ = 50Ω | — | 1.5 | 2.0 | VSWR |
| IMD* | Intermodulation Distortion | $P_{OUT}$ = +42 dBm PEP | — | – 34 | – 30 | dBT** |
| — | Power Degradation | $P_{OUT}$ = +42 dBm CW<br>$T_C$ = 0°C to 70°C | — | TBD | — | — |
| — | Load Mismatch | VSWR = 5:1 V = 26Vdc<br>$P_{OUT}$ = +42 dBm CW | No Degradation in Output Power | | | |

Note: * Two-Tone test; 20 KHz separation ** dBT - in dB, referenced to tone level

## MODULE DC AND TEST FIXTURE CONFIGURATION




C1, C3, C5, C7, C11, C13, C17 : 100 pF
C2, C4, C6, C8, C12, C14, C18 : .001 µF
C9, C15, C19 : .1 µF
C10, C16, C20 : 100 µF

F1, F2, F3 : FAIR-RITE #2664000101

IC1, IC2 : TCCABB

L1, L2, L3 : 5 Turns of 24 AWG Wire, Inner Diameter 1.27mm

R1, R2, R3, R4 : 5 KOHM
R5, R6, R7, R8 : 1 KOHM

Setting Bias: (Ex.: $I_{Q1} = .18A$, $I_{Q2} = .15A$, $I_{Q3} = .2A$)

1. Set all variable resistors clockwise. (No bias current flows through transistors when all variable resistors are set clockwise.)
2. Record stationary current $I_O$.
3. Adjust R2 for ($I_O$ + .18)A.
4. Adjust R3 for ($I_O$ + .18 + .15)A.
5. Adjust R4 for ($I_O$ + .18 + .15 + .2)A.

## APPLICATIONS RECOMMENDATIONS

### OPERATION LIMITS

The STM960-15 power module should never be operated under any condition which exceeds the Absolute Maximum Ratings presented on this data sheet. Nor should the module be operated continuously at any of the specified maximum ratings. If the module is to be operated under any condition such that it may be subjected to one or more of the maximum rating conditions, care must be taken to monitor other parameters which may be affected.

### DECOUPLING

Failure to properly decouple any of the voltage supply pins will result in oscillations at certain operating frequencies. Therefore, it is recommended that these pins be bypassed as indicated in the Module DC and Test Fixture Configuration drawing of this data sheet.

### MODULE MOUNTING

To insure adequate thermal transfer from the module to the heatsink, it is recommended that a satisfactory thermal compound such as Dow Corning 340, Wakefield 120-2 or equivalent be applied between the module flange and the heatsink.

The heatsink mounting surface under the module should be flat to within +/- 0.05 mm (+/- 0.002 inch).

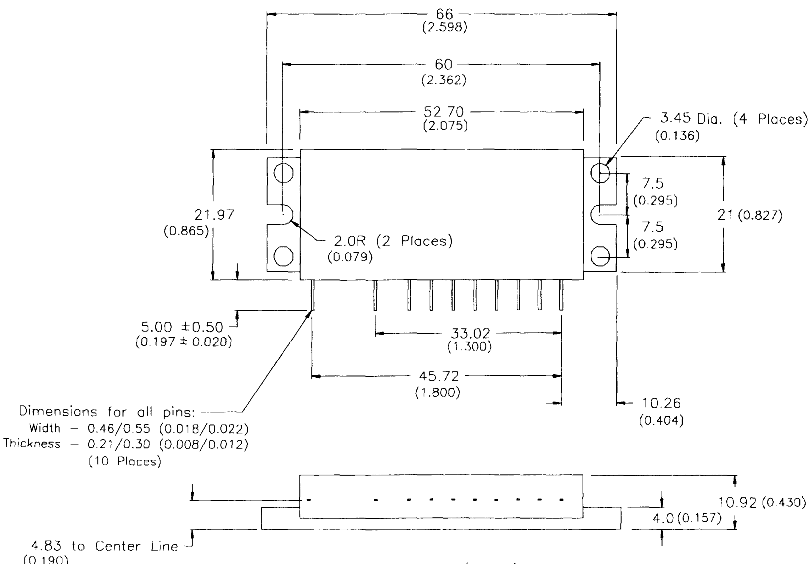
The module should be mounted to the heatsink using 3 mm (or 6-32) or equivalent screws torqued to 5-6 kg-cm (4-6 in-lb).

The module leads are attached to the PC board using 180°C solder. When soldering the leads to the application circuit, care must be taken to avoid time or temperature which may result in reflow of the lead connection inside the module.

### THERMAL CONSIDERATIONS

It will be necessary to provide a suitable heatsink in order to maintain the module flange temperature at or below the maximum case operating temperature. In a case where the module output power will be limited to +42 dBm (15.8W CW) and designing for the worst case double-tone efficiency of 31%, the power dissipated by the module will be 35 watts. The heatsink must be designed such that the thermal rise will be less than the difference between the maximum ambient temperature at which the module will operate and the maximum operating case temperature of the module while dissipating 35 watts.

## PACKAGE MECHANICAL DATA




NOTES: Pin spacings 3.81mm (0.15in) unless otherwise specified.
All tolerances ±0.25mm (±0.010in) unless otherwise specified.
Numbers in ( ) are inches.

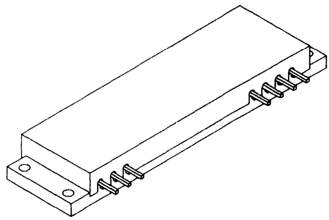
# SGS-THOMSON MICROELECTRONICS

# STM1645-30

## RF POWER MODULE
## SATELLITE COMMUNICATIONS APPLICATIONS

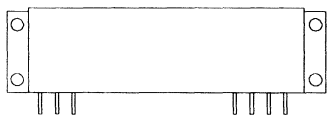
ADVANCED PRODUCT INFORMATION

- CLASS C STATELLITE COMMUNICATIONS AMPLIFIER
- 1625 - 1665 MHz
- 28 VOLTS
- INPUT/OUTPUT 50 OHMS
- $P_{OUT}$ = 30 W MIN.
- GAIN = 35 dB MIN.



| ORDER CODE | BRANDING |
|---|---|
| STM1645-30 | STM1645-30 |

**PIN CONNECTION**




1. RF Input 2. Ground 3. $V_{C1}$ 12V 4. $V_{C2}$ 28V
5. $V_{C3}$ 28V 6. Ground 7. RF Output

### DESCRIPTION

The STM1645-30 hybrid RF power module is designed for high power satellite communications application in the 1.6 GHz frequency range.

High $f_T$, gold metallized silicon microwave power devices, optimized for use in STM1645-30, are employed to provide high gain and efficiency while ensuring excellent reliability.

### ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C)

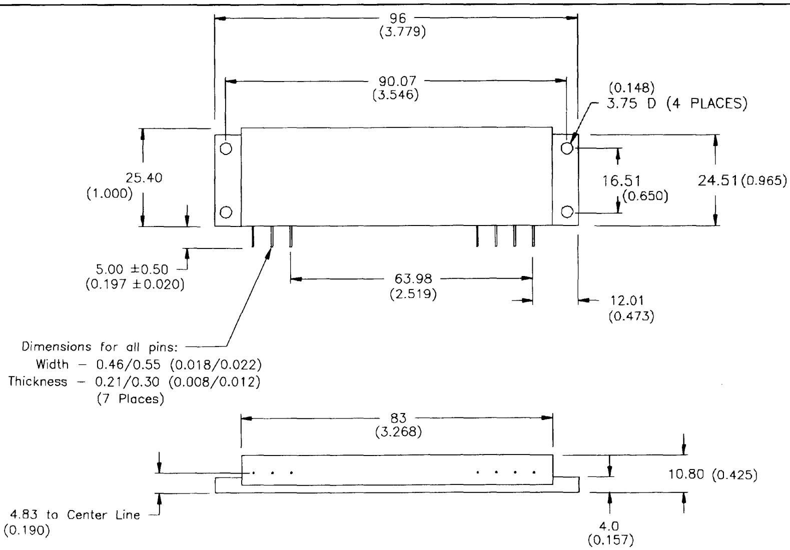
| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| V | DC Supply Voltage | 30 | Vdc |
| $P_{IN}$ | RF Input Power ($P_{OUT} \leq 30$ W) | 20 | mW |
| $T_{STG}$ | Storage Temperature | – 40 to +100 | °C |
| $T_C$ | Operating Case Temperature | – 35 to +70 | °C |

## ELECTRICAL SPECIFICATIONS ($T_{case}$ = 25 °C, $V_{C1}$ = 12 V, $V_{C2}$, $V_{C3}$ = 28 V)

| Symbol | Parameter | Test Conditions | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| BW | Frequency Range | | 1625 | — | 1665 | MHz |
| $P_{OUT}$ | Power Output | $P_{IN}$ = ≤ 10 mW | 30 | 35 | 40 | W |
| $G_P$ | Power Gain | $P_{OUT}$ = 30 W | 35 | 35.5 | — | dB |
| $\eta$ | Efficiency | $P_{OUT}$ = 30 W | 40 | — | — | % |
| $Z_{IN}$ | Input Impedance | $P_{OUT}$ = 30 W $Z_G$, $Z_L$ = 50Ω | — | 1.5:1 | 2:1 | VSWR |
| H | Harmonics | $P_{OUT}$ = 30 W reference | — | –45 | –40 | dB |
| — | $\Delta P_{OUT}$ vs $T_{CASE}$ | $T_C$ = – 35˚C to +70˚C | — | — | 2 | dB |
| — | $\Delta P_{OUT}$ vs Frequency | f = 1625 - 1665 MHz | — | — | 1 | dB |
| — | Load Mismatch | VSWR = 10:1 V = 28Vdc $P_{OUT}$ = 30 W | No Degradation in Output Power | | | |
| — | $P_{OUT}$ Control Range | $P_{OUT}$ = 30 W | 8 | 10 | — | dB |
| — | Stability | $P_{OUT}$ = 5 to 30 W* $T_C$ = –35˚C to +70˚C Load VSWR = 3:1, any phase | All Spurious outputs more than 60dB below carrier | | | |

*Note: $P_{OUT}$ adjusted by varying $V_{C3}$

## PACKAGE MECHANICAL DATA




NOTES: Pin spacing 5.0mm (0.197) unless otherwise specified.
All tolerances ±0.25mm (±0.010in) unless otherwise specified.
Numbers in ( ) are inches.

NOTES

NOTES

## NOTES

NOTES

# NOTES

# SALES OFFICES

## EUROPE

### DENMARK

**2730 HERLEV**
Herlev Torv, 4
Tel. (45-44) 94.85.33
Telex: 35411
Telefax: (45-44) 948694

### FINLAND

**LOHJA SF-08150**
Ratakatu, 26
Tel. (358-12) 155.11
Telefax. (358-12) 155.66

### FRANCE

**94253 GENTILLY Cedex**
7 - avenue Gallieni - BP. 93
Tel.: (33-1) 47.40.75.75
Telex: 632570 STMHQ
Telefax: (33-1) 47.40.79.10

**67000 STRASBOURG**
20, Place des Halles
Tel. (33-88) 75.50.66
Telefax: (33-88) 22.29.32

### GERMANY

**8011 GRASBRUNN**
Bretonischer Ring 4
Postfach 1122
Tel.: (49-89) 460060
Telefax: (49-89) 4605454
Teletex: 897107=STDISTR

**1000 BERLIN 37**
Clay Allee 323
Tel.: (49-30) 8017087-89
Telefax: (49-30) 8015552

**6000 FRANKFURT**
Gutleutstrasse 322
Tel. (49-69) 237492-3
Telefax: (49-69) 231957
Teletex: 6997689=STVBF

**3000 HANNOVER 51**
Rotenburger Strasse 28A
Tel. (49-511) 615960-3
Teletex: 5118418 CSFBEH
Telefax: (49-511) 6151243

**8500 NÜRNBERG 20**
Erlenstegenstrasse, 72
Tel.: (49-911) 59893-0
Telefax: (49-911) 5980701

**7000 STUTTGART 31**
Mittlerer Pfad 2-4
Tel. (49-711) 13968-0
Telefax: (49-711) 8661427

### ITALY

**20090 ASSAGO (MI)**
V.le Milanofiori - Strada 4 - Palazzo A/4/A
Tel. (39-2) 89213.1 (10 linee)
Telex: 330131 - 330141 SGSAGR
Telefax: (39-2) 8250449

**40033 CASALECCHIO DI RENO (BO)**
Via R. Fucini, 12
Tel. (39-51) 593029
Telex: 512442
Telefax: (39-51) 591305

**00161 ROMA**
Via A. Torlonia, 15
Tel. (39-6) 8443341
Telex: 620653 SGSATE I
Telefax: (39-6) 8444474

### NETHERLANDS

**5652 AR EINDHOVEN**
Meerenakkerweg 1
Tel.: (31-40) 550015
Telex: 51186
Telefax: (31-40) 528835

### SPAIN

**08021 BARCELONA**
Calle Platon, 6 4$^{th}$ Floor, 5$^{th}$ Door
Tel. (34-3) 4143300-4143361
Telefax: (34-3) 2021461

**28027 MADRID**
Calle Albacete, 5
Tel. (34-1) 4051615
Telex: 46033 TCCEE
Telefax: (34-1) 4031134

### SWEDEN

**S-16421 KISTA**
Borgarfjordsgatan, 13 - Box 1094
Tel.: (46-8) 7939220
Telex: 12078 THSWS
Telefax: (46-8) 7504950

### SWITZERLAND

**1218 GRAND-SACONNEX (GENEVA)**
Chemin Francois-Lehmann, 18/A
Tel. (41-22) 7986462
Telex: 415493 STM CH
Telefax: (41-22) 7984869

### UNITED KINGDOM and EIRE

**MARLOW, BUCKS**
Planar House, Parkway
Globe Park
Tel.: (44-628) 890800
Telex: 847458
Telefax: (44-628) 890391

## AMERICAS

### BRAZIL

**05413 SÃO PAULO**
R. Henrique Schaumann 286-CJ33
Tel. (55-11) 883-5455
Telex: (391)11-37988 "UMBR BR"
Telefax : (55-11) 282-2367

### CANADA

**NEPEAN ONTARIO K2H 9C4**
301 Moodie Drive
Suite 307
Tel. (613) 829-9944

### U.S.A.

**Montgomeryville PA 18936-1002**
16 Commerce Drive
Tel. (215) 361-6400
Telefax (215) 362-1293

FOR OTHER SEMICONDUCTOR PRODUCTS CONTACT ONE OF THE FOLLOWING REGIONAL OFFICES IN THE U.S.A.

**ALABAMA**
Huntsville - (205) 533-5995

**ARIZONA**
Phoenix - (602) 867-6217

**CALIFORNIA**
Santa Ana - (714) 957-6018
San Jose - (408) 452-8585

**COLORADO**
Boulder (303) 449-9000

**ILLINOIS**
Schaumburg - (708) 517-1890

**INDIANA**
Kokomo - (317) 455-3500

**MASSACHUSETTS**
Lincoln - (617) 259-0300

**MICHIGAN**
Livonia - (313) 953-1700

**NEW JERSEY**
Voorhees - (609) 772-6222

**NEW YORK**
Poughkeepsie - (914) 454-8813

**NORTH CAROLINA**
Raleigh - (919) 787-6555

**TEXAS**
Carrollton - (214) 466-8844

## ASIA / PACIFIC

### AUSTRALIA

**NSW 2220 HURTSVILLE**
Suite 3, Level 7, Otis House
43 Bridge Street
Tel. (61-2) 5803811
Telefax: (61-2) 5806440

### HONG KONG

**WANCHAI**
22nd Floor - Hopewell centre
183 Queen's Road East
Tel. (852) 8615788
Telex: 60955 ESGIES HX
Telefax: (852) 8656589

### INDIA

**NEW DELHI 110001**
LiasonOffice
62, Upper Ground Floor
World Trade Centre
Barakhamba Lane
Tel. (91-11) 3715191
Telex: 031-66816 STMI IN
Telefax: (91-11) 3715192

### MALAYSIA

**PETALING JAYA, 47400**
11C, Jalan SS21/60
Damansara Utama
Tel.: (03) 717 3976
Telefax: (03) 719 9512

**PULAU PINANG 10400**
4th Floor - Suite 4-03
Bangunan FOP-123D Jalan Anson
Tel. (04) 379735
Telefax (04) 379816

### KOREA

**SEOUL 121**
8th floor Shinwon Building
823-14, Yuksam-Dong
Kang-Nam-Gu
Tel. (82-2) 553-0399
Telex: SGSKOR K29998
Telefax: (82-2) 552-1051

### SINGAPORE

**SINGAPORE 2056**
28 Ang Mo Kio - Industrial Park 2
Tel. (65) 4821411
Telex: RS 55201 ESGIES
Telefax: (65) 4820240

### TAIWAN

**TAIPEI**
12th Floor
325, Section 1 Tun Hua South Road
Tel. (886-2) 755-4111
Telex: 10310 ESGIE TW
Telefax: (886-2) 755-4008

## JAPAN

**TOKYO 108**
Nisseki - Takanawa Bld. 4F
2-18-10 Takanawa
Minato-Ku
Tel. (81-3) 3280-4121
Telefax: (81-3) 3280-4131

Printed by Arti Grafiche Colombo - Gessate (MI) – Italy

SGS-THOMSON Microelectronics GROUP OF COMPANIES
Australia - Brazil - France - Germany - Hong Kong - Italy - Japan - Korea - Malaysia - Malta - Morocco - The Netherlands - Singapore - Spain - Sweden - Switzerland - Taiwan - United Kingdom - U.S.A.