SCHOTTKY & RECTIFIER DIODES

DATABOOK

2nd EDITION

MARCH 1994

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ALPHANUMERICAL INDEX

SELECTOR GUIDES

C	Overvoltage coefficient
C_0	Junction capacitance
dI_F/dt	Rate of decrease of forward current
δ	Duty cycle
F	Frequency
I_F	Forward continuous current
$I_{F(AV)}$, Io	Average forward current
$I_{F(RMS)}$	RMS forward current
I_{FM}	Peak forward current
I_{FRM}	Repetitive peak forward current
I_{FSM}	Surge non repetitive forward current
I_M	Maximum peak forward current
I_R	Continuous reverse laekage current
I_{RM}	Peak reverse recovery current
I_{rr}	Test point of reverse recovery time on reverse recovery current
P	Power dissipation
P_{TOT}	Total power dissipation
Q_{rr}	Reverse recovery charge
Q_S	Stored charge
R_d	Dynamic resistance
R_L	Load resistance
$R_{th(c)}$	Coupling thermal resistance
$R_{th(j-a)}$	Junction-ambient thermal resistance
$R_{th(j-c)}$	Junction-case thermal resistance
$R_{th(j-l)}$	Junction-leads thermal resistance
$R_{th(j-SR)}$	Junction-substrate thermal resistance
S	Softness factor
T_{amb}	Ambient temperature
t_b	Time between I_{RM} and zero crossing
T_c, T_{case}	Case temperature
t_{fr}	Forward recovery time
$t_{(a)}$, t_a	Time after IRM is reached
T_j	Junction temperature
T_L	Maximum lead temperature for soldering
τ	Minority carrier life time
T_{oper}	Operation temperature (at zero dissipation)
t_p	Pulse width
t_{rr}	Reverse recovery time
T_{stg}	Storage temperature
V_{BR}	Breakown voltage
V_F	Forward voltage
V_{FM}	Peak forward voltage
[illegible]	Transient peak forward voltage
[illegible]	Continuous reverse voltage
[illegible]	Transient peak reverse voltage
[illegible]	Repetitive peak reverse voltage
[illegible]	Non repetitive peak reverse voltage
[illegible]	Peak working reverse voltage
[illegible]	Threshold voltage
[illegible]	Thermal impedance

STANDARD DIODES

I_F(av) (A)	P/N	Package	V_{RRM} (V)										Page
			50	100	200	300	400	500	600	700	800	1000	
6	BY214	AG			✔		✔		✔		✔	✔	37
6	1N3990	DO4			✔		✔		✔		✔	✔	39
10	BY239(L)	TO220AC			✔		✔		✔		✔		41
12	BYW88	DO4	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	43
20	1N1195..8	DO5				✔	✔	✔	✔				47
40	1N1186..90	DO5	✔	✔	✔	✔	✔	✔	✔		✔	✔	45
40	1N3766..68	DO5									✔	✔	45

FAST DIODES

I_F(av) (A)	P/N	Package	V_{RRM} (V)										Page
			50	80	100	200	300	400	500	600	800	1000	
1	PLQ08..1	F126		✔	✔								51
1	BYT11	F126								✔	✔	✔	55
3	PFR856	DO27A	✔		✔	✔		✔		✔			59
3	BYT13	DO27A								✔	✔	✔	63
6	BYT71	TO220AC				✔		✔		✔	✔		67
6	BYT71F	ISOWATT220AC				✔		✔		✔	✔		67
6	1N3879..83	DO4	✔		✔	✔	✔	✔					73
10	BY233	TO220AC				✔		✔		✔			75
10	ESM765	TO220AC			✔	✔		✔		✔	✔		79
10	ESM765PI	Isol. TO220AC								✔	✔		83
12	BYX61	DO4	✔		✔	✔	✔	✔					87
12	1N3889..93	DO4	✔		✔	✔	✔	✔					89
12	BYX62	DO4								✔			89
20	1N3899..3903	DO5	✔		✔	✔	✔	✔					91
20	BYX63	DO5								✔			91
30	1N3909..13	DO5	✔		✔	✔	✔	✔					93
30	BYX64	DO5								✔			93
30	BYX65	DO4	✔		✔	✔	✔	✔					95
60	ESM243	DO5	✔		✔	✔	✔	✔					97
60	ESM244	DO5	✔		✔	✔	✔	✔	✔	✔			99

ULTRA-FAST DIODES

$I_{F(av)}$ (A)	P/N	Package	V_{RRM} (V)										Page
			50	100	150	200	400	500	600	700	800	1000	
1	BYW100	F126	✔	✔	✔	✔							103
2	SMBYW02	SOD6	✔	✔	✔	✔							107
3	BYW98	DO27A	✔	✔	✔	✔							111
4	SMBYW04	SOD15	✔	✔	✔	✔							115
8	BYW29	TO220AC	✔	✔	✔	✔							119
8	BYW29F	ISOWATT220AC	✔	✔	✔	✔							119
8	BYW29M	PowerSO-10™				✔							125
8	BYW80	TO220AC	✔	✔	✔	✔							129
8	BYW80F	ISOWATT220AC	✔	✔	✔	✔							129
8	BYW80PI	Isol. TO220AC	✔	✔	✔	✔							135
15	BYW81P	TO220AC	✔	✔	✔	✔							139
15	BYW81PI	Isol. TO220AC	✔	✔	✔	✔							139
15	BYW81M	PowerSO-10™				✔							143
15	BYW81	DO4	✔	✔	✔	✔							147
2x10	BYW51	TO220AB	✔	✔	✔	✔							151
2x10	BYW51F	ISOWATT220AB	✔	✔	✔	✔							151
2x10	BYW51M	PowerSO-10™				✔							157
25	BYW77P	SOD93	✔	✔	✔	✔							161
25	BYW77PI	DOP3I	✔	✔	✔	✔							161
25	BYW77M	PowerSO-10™				✔							165
25	BYW77	DO4	✔	✔	✔	✔							169
2x15	BYW99P	SOT93	✔	✔	✔	✔							173
2x15	BYW99PI	TOP3I	✔	✔	✔	✔							173
35	BYW92	DO5	✔	✔	✔	✔							177
50	BYW78	DO5	✔	✔	✔	✔							181
2x30	BYV52	SOT93	✔	✔	✔	✔							185
2x30	BYV52PI	TOP3I	✔	✔	✔	✔							185
80	BYW08	DO5	✔	✔	✔	✔							189
2x50	BYV54(V)	ISOTOP™	✔	✔	✔	✔							193
2x50	BYV541(V)	ISOTOP™	✔	✔	✔	✔							193

ULTRA-FAST DIODES (cont'd)

I_F(av) (A)	P/N	Package	V_{RRM} (V)										Page
			50	100	150	200	400	500	600	700	800	1000	
3	STPR320	F126		✔		✔							201
3	STPR320D	TO220AC		✔		✔							205
3	STPR320F	ISOWATT220AC		✔		✔							205
5	STPR520D	TO220AC		✔		✔							209
5	STPR520F	ISOWATT220AC		✔		✔							209
2x3	STPR620CT	TO220AB		✔		✔							213
2x3	STPR620CF	ISOWATT220AB		✔		✔							213
8	STPR820D	TO220AC		✔		✔							217
8	STPR820F	ISOWATT220AC		✔		✔							217
2x5	STPR1020CT	TO220AB		✔		✔							221
2x5	STPR1020CF	ISOWATT220AB		✔		✔							221
12	STPR1220D	TO220AC		✔		✔							225
12	STPR1220F	ISOWATT220AC		✔		✔							225
15	STPR1520D	TO220AC		✔		✔							229
15	STPR1520F	ISOWATT220AC		✔		✔							229
2x8	STPR1620CT	TO220AB		✔		✔							233
2x12	STPR2420CT	TO220AB		✔		✔							237

HIGH VOLTAGE ULTRA-FAST DIODES

$I_{F(av)}$ (A)	P/N	Package	V_{RRM} (V)								Page
			200	300	400	500	600	800	1000	1200	
5	STTA506D	TO220AC					✔				243
5	STTA506F	ISOWATT220AC					✔				243
5	STTA506M	PowerSO-10™					✔				251
5	STTB506D	TO220AC					✔				257
5	STTB506F	ISOWATT220AC					✔				257
5	STTB506M	PowerSO-10™					✔				263
5	STTA512D	TO220AC								✔	271
5	STTA512F	ISOWATT220AC								✔	271
8	STTA806D	TO220AC					✔				277
8	STTA806DI	Isol. TO220AC					✔				277
8	STTA806M	PowerSO-10™					✔				283
8	STTB806D	TO220AC					✔				289
8	STTB806DI	Isol. TO220AC					✔				289
8	STTB806M	PowerSO-10™					✔				295
8	STTA812D	TO220AC								✔	303
8	STTA812DI	Isol. TO220AC								✔	303
12	STTA1206D	TO220AC					✔				309
12	STTA1206DI	Isol. TO220AC					✔				309
12	STTA1206M	PowerSO-10™					✔				315
12	STTB1206D	TO220AC					✔				321
12	STTB1206DI	Isol. TO220AC					✔				321
12	STTB1206M	PowerSO-10™					✔				327
12	STTA1212D	TO220AC								✔	335
15	STTA1512P	SOD93								✔	341
15	STTA1512PI	DOP3I								✔	341
20	STTA2006P	SOD93					✔				347
20	STTA2006PI	DOP3I					✔				347
20	STTA2006M	PowerSO-10™					✔				353
20	STTB2006P	SOD93					✔				359
20	STTB2006PI	DOP3I					✔				359
20	STTB2006M	PowerSO-10™					✔				365

HIGH VOLTAGE ULTRA-FAST DIODES (cont'd)

$I_F(av)$ (A)	P/N	Package	V_{RRM} (V)								Page
			200	300	400	500	600	800	1000	1200	
25	STTA2512P	SOD93								✔	373
30	STTA3006P	SOD93					✔				379
30	STTA3006PI	DOP3I					✔				379
30	STTB3006P	SOD93					✔				385
30	STTB3006PI	DOP3I					✔				385
2x25	STTA5012T(V)1/2	ISOTOP™								✔	389
2x30	STTA6006T(V)1/2	ISOTOP™					✔				395
2x30	STTB6006T(V)1/2	ISOTOP™					✔				401
2x45	STTA9012T(V)1/2	ISOTOP™								✔	405
2x60	STTA12006T(V)1/2	ISOTOP™					✔				411
2x60	STTB12006T(V)1/2	ISOTOP™					✔				417
1	BYT01	F126	✔	✔	✔						421
1	SMBYT01	SOD6	✔	✔	✔						425
3	BYT03	DO27A	✔	✔	✔						429
3	SMBYT03	SOD15	✔	✔	✔						433
8	BYT08P	TO220AC	✔	✔	✔						437
8	BYT08PI	Isol. TO220AC	✔	✔	✔						443
8	BYT08P	TO220AC					✔	✔			449
8	BYT08PI	Isol. TO220AC					✔	✔			453
8	BYT08P	TO220AC							✔		457
8	BYT08PI	Isol. TO220AC							✔		461
12	BYT12	DO4	✔	✔	✔						465
12	BYT12P	TO220AC					✔	✔			471
12	BYT12PI	Isol. TO220AC					✔	✔			477
12	BYT12	DO4					✔	✔			483
12	BYT12P	TO220AC							✔		489
12	BYT12PI	Isol. TO220AC							✔		495
12	BYT12	DO4							✔		501
2x8	BYT16P	TO220AC	✔	✔	✔						507

HIGH VOLTAGE ULTRA-FAST DIODES (cont'd)

$I_{F(av)}$ (A) 700	P/N	Package	V_{RRM} (V)								Page
			200	300	400	500	600	800	1000	1200	
30	BYT30P	SOD93	✔	✔	✔						513
30	BYT30PI	DOP3I	✔	✔	✔						519
30	BYT30M	PowerSO-10™			✔						525
30	BYT30	DO5	✔	✔	✔						531
30	BYT30P	SOD93					✔	✔			537
30	BYT30PI	DOP3I					✔	✔			543
30	BYT30	DO5					✔	✔			549
30	BYT30P	SOD93							✔		555
30	BYT30PI	DOP3I							✔		561
30	BYT30	DO5							✔		567
60	BYT60P	SOD93	✔	✔	✔						573
60	BYT60	DO5	✔	✔	✔						579
60	BYT60	DO5					✔	✔			585
60	BYT60P	SOD93							✔		589
60	BYT60	DO5							✔		593
2x30	BYT230/1PI(V)	ISOTOP™	✔	✔	✔						597
2x30	BYT230/1PI(V)	ISOTOP™					✔	✔			601
2x30	BYT230/1PI(V)	ISOTOP™							✔		605
2x60	BYT260/1PI(V)	ISOTOP™	✔	✔	✔						609
2x60	BYT260/1PI(V)	ISOTOP™					✔	✔			613
2x60	BYT260/1PI(V)	ISOTOP™							✔		617

DEFLECTION DIODES

IF(av) (A)	P/N	Package	VRRM (V)									Page
			100	200	400	500	600	800	1000	1200	1500	
3	MTV32-400	DO27A			✔							623
3	MTV32-600	DO27A					✔					627
3	DTV32-1000A	DO27A							✔			627
6	DTV32-1500A	TO220AC								✔	✔	631
6	DTV32F-1500A	ISOWATT220AC								✔	✔	631
6	DTV32-1500B	TO220AC								✔	✔	637
6	DTV32F-1500B	ISOWATT220AC								✔	✔	637
6	DTV64-1200C	TO220AC								✔		643
6	DTV64F-1200C	ISOWATT220AC								✔		643

POWER SCHOTTKY DIODES

IF(av) (A)	P/N	Package	VRRM (V)									Page
			20	25	30	35	40	45	50	60	100	
1	STPS140E	SOT223	✔		✔		✔					649
1	STPS160E	SOT223								✔		651
2x1	STPS240CE	SOT223	✔		✔		✔					653
2x1	STPS260CE	SOT223								✔		655
3	STPS340U	SOD6	✔		✔		✔					657
3	STPS340S	SOD15	✔		✔		✔					661
2x3	STPS640CT	TO220AB	✔		✔		✔					665
2x3	STPS640CF	ISOWATT220AB	✔		✔		✔					665
2x3	STPS640CM	PowerSO-10™	✔		✔		✔					669
7.5	STPS745D	TO220AC				✔		✔				673
7.5	STPS745F	ISOWATT220AC				✔		✔				673
7.5	STPS745M	PowerSO-10™						✔				677
10	STPS1045D	TO220AC				✔		✔				681
10	STPS1045F	ISOWATT220AC				✔		✔				681
10	STPS1045M	PowerSO-10™						✔				685
15	STPS1545D	TO220AC				✔		✔				689
15	STPS1545F	ISOWATT220AC				✔		✔				689

POWER SCHOTTKY DIODES (cont'd)

$I_{F(av)}$ (A)	P/N	Package	V_{RRM} (V)									Page
			20	25	30	35	40	45	50	60	100	
2x7.5	STPS1545CT	TO220AB				✔		✔				693
2x7.5	STPS1545CF	ISOWATT220AB				✔		✔				693
2x7.5	STPS1545CM	PowerSO-10™						✔				697
2x10	STPS2045CT	TO220AB				✔		✔				701
2x10	STPS2045CF	ISOWATT220AB				✔		✔				701
2x10	STPS2045CM	PowerSO-10™						✔				705
2x10	STPS20100CT	TO220AB									✔	709
30	STPS3045M	PowerSO-10™						✔				713
2x15	STPS3045CT	TO220AB				✔		✔				717
2x15	STPS3045CP	SOT93				✔		✔				721
2x15	STPS3045CPI	TOP3I				✔		✔				721
2x15	STPS3045CM	PowerSO-10™						✔				725
2x20	STPS4045CP	SOT93				✔		✔				729
2x30	STPS6045CP	SOT93				✔		✔				733
2x30	STPS6045CPI	TOP3I				✔		✔				733
2x40	STPS80100TV	ISOTOP™									✔	737
2x60	STPS12045T(V)	ISOTOP™				✔		✔				741
2x80	STPS16045T(V)	ISOTOP™				✔		✔				745
2x120	STPS24045T(V)	ISOTOP™				✔		✔				749

SCHOTTKY SIGNAL DIODES

$I_F(av)$ (mA)	P/N	Package	V_{RRM} (V)											Page
			4	5	10	15	20	30	40	60	70	80	100	
10	BAR18 / BAS70	SOT23									✔			767
15	1N5711	DO35									✔			755
15	1N6263	DO35								✔				761
15	BAR28	DO35									✔			773
15	TMM5711	MINIMELF									✔			827
15	TMM6263	MINIMELF								✔				833
15	TMMBAR28	MINIMELF									✔			853
20	BAR11	DO35				✔								763
20	TMMBAR11	MINIMELF				✔								847
30	BAR19	DO35	✔											771
30	BAT17	SOT23	✔											783
30	BAT19	DO35			✔									787
30	BAT29	DO35		✔										789
30	BAT45	DO35				✔								799
30	TMMBAR19	MINIMELF	✔											851
30	TMMBAT19	MINIMELF			✔									855
30	TMMBAT29	MINIMELF		✔										857
30	TMMBAT45	MINIMELF				✔								867
35	1N5712	DO35					✔							757
35	BAR10	DO35					✔							763
35	TMM5712	MINIMELF					✔							829
35	TMMBAR10	MINIMELF					✔							847
100	BAR42 / BAR43	SOT23						✔						775
100	BAR46 / BAR46A	SOT23											✔	779
100	BAT41	DO35											✔	791
100	TMMBAT41	MINIMELF											✔	859
150	BAT46	DO35											✔	803
150	TMMBAT46	MINIMEL											✔	871
200	BAT42 / BAT43	DO35						✔						795
200	TMMBAT42 / 43	MINIMELF						✔						863

SCHOTTKY SIGNAL DIODES (cont'd)

$I_F(av)$ (mA)	P/N	Package	V_{RRM} (V)											Page
			4	5	10	15	20	30	40	60	70	80	100	
350	BAT47	DO35					✔							807
350	TMMBAT47	MINIMELF					✔							875
350	BAT48	DO35							✔					807
350	TMMBAT48	MINIMELF							✔					875
500	BAT49	DO41										✔		811
500	TMBAT49	MELF										✔		879
1A	BYV10-40	DO41					✔	✔	✔					815
1A	TMBYV10-40	MELF					✔	✔	✔					835
1A	BYV10-20A	DO41					✔							819
1A	TMBYV10-20A	MELF					✔							839
1A	BYV10-60	DO41								✔				823
1A	TMBYV10-60	MELF								✔				843

HIGH VOLTAGE STANDARD PLANAR TECHNOLOGY

$I_F(av)$ (A)	P/N	Package	V_{RRM} (V)								Page
			100	150	200	300	400	600	800	1000	
6	JBY239	DICE					✔	✔	✔		891
12	JBYW88	DICE					✔	✔	✔		891
40	J1N1188 / J1N3768	DICE					✔	✔	✔		891

HIGH VOLTAGE FAST MESA TECHNOLOGY

$I_F(av)$ (A)	P/N	Package	V_{RRM} (V)								Page
			100	150	200	300	400	600	800	1000	
6	JBYT71	DICE			✔		✔	✔	✔		892
8	JBY233	DICE			✔		✔	✔			892
10	JESM765	DICE			✔		✔	✔	✔		892
12	JBYX62	DICE			✔		✔	✔			892
30	JBYX64	DICE			✔		✔	✔			892
60	JESM244	DICE			✔		✔	✔			892

LOW VOLTAGE ULTRA FAST PLANAR TECHNOLOGY

$I_F(av)$ (A)	P/N	Package	V_{RRM} (V)								Page
			100	150	200	300	400	600	800	1000	
1.5	JBYW100	DICE	✔	✔	✔						893
1.5	JSBYW100	DICE	✔	✔	✔						894
3	JBYW98	DICE	✔	✔	✔						893
3	JSBYW98	DICE	✔	✔	✔						894
5	JBYW29	DICE	✔	✔	✔						895
7	JBYW80	DICE	✔	✔	✔						895
8	JBYW51	DICE	✔	✔	✔						896
12	JBYW81	DICE	✔	✔	✔						895
20	JBYW77	DICE	✔	✔	✔						895
35	JBYW92	DICE	✔	✔	✔						895
50	JBYW78	DICE	✔	✔	✔						895

HIGH VOLTAGE ULTRA FAST PLANAR TECHNOLOGY

$I_{F(av)}$ (A)	P/N	Package	V_{RRM} (V)									Page
			100	150	200	300	400	600	800	1000	1200	
1	JBYT01	DICE			✔	✔	✔					893
1	JSBYT01	DICE			✔	✔	✔					894
1	JTA106	DICE						✔				899
1	JTB106	DICE						✔				900
1	JTA112	DICE									✔	901
2	JTA206	DICE						✔				899
2	JTB206	DICE						✔				900
2	JTA212	DICE									✔	901
3	JBYT03	DICE			✔	✔	✔					893
5	JTA506	DICE						✔				899
5	JTB506	DICE						✔				900
5	JTA512	DICE									✔	901
8	JBYT08	DICE			✔	✔	✔					897
8	JBYT16	DICE			✔	✔	✔					896
8	JTA806	DICE						✔				899
8	JTB806	DICE						✔				900
8	JTA812	DICE									✔	901
12	JBYT12	DICE			✔	✔	✔					897
12	JBYT12	DICE								✔		898
12	JTA1206	DICE						✔				899
12	JTB1206	DICE						✔				900
12	JTA1212	DICE									✔	901
15	JTA1512	DICE									✔	901
20	JTA2006	DICE						✔				899
20	JTB2006	DICE						✔				900
25	JTA2512	DICE									✔	901

HIGH VOLTAGE ULTRA FAST PLANAR TECHNOLOGY (cont'd)

I_F(av) (A)	P/N	Package	V_{RRM} (V)									Page
			100	150	200	300	400	600	800	1000	1200	
30	JBYT30	DICE			✔	✔	✔					897
30	JBYT30	DICE								✔		898
30	JTA3006	DICE						✔				899
30	JTB3006	DICE						✔				900
45	JTA4512	DICE									✔	901
60	JBYT60	DICE			✔	✔	✔					897
60	JBYT60	DICE								✔		898
60	JTA6006	DICE						✔				899
60	JTB6006	DICE						✔				900

POWER SCHOTTKY

I_F(av) (A)	P/N	Package	V_{RRM} (V)									Page
			20	25	30	35	40	45	50	60	100	
3	JTPS3..	DICE	✔		✔		✔					902
2x3	JTPS6..	DICE	✔		✔		✔					902
7.5	JTPS7..	DICE				✔		✔				902
2x7.5	JTPS15..C	DICE				✔		✔				902
10	JTPS10..	DICE				✔		✔				902
2x10	JTPS20..C	DICE				✔		✔				902
15	JTPS15..	DICE				✔		✔				903
2x15	JTPS30..C	DICE				✔		✔				903
30	JTPS30..	DICE				✔		✔				903
2x30	JTPS60..C	DICE				✔		✔				903
60	JTPS60..	DICE				✔		✔				903
80	JTPS80..	DICE				✔		✔				903

CROSS REFERENCES

INDUSTRY PART NUMBER	SGS-THOMSON DIRECT REPLACEMENT	SGS-THOMSON SIMILAR REPLACEMENT
1N4942		BYT11-600
1N4942GP		BYT11-600
1N4944		BYT11-600
1N4944GP		BYT11-600
1N4946		BYT11-600
1N4946GP		BYT11-600
1N4947		BYT11-800
1N4947GP		BYT11-800
1N4948		BYT11-1000
1N4948GP		BYT11-1000
1N5615		BYT11-600
1N5615GP	BYT11-600	
1N5617		BYT11-600
1N5617GP	BYT11-600	
1N5619		BYT11-600
1N5619GP	BYT11-600	
1N5621		BYT11-800
1N5621GP	BYT11-800	
1N5623		BYT11-1000
1N5623GP	BYT11-1000	
31DF2		BYW98-200
31DF4		BYT03-400
31DF6		MTV32-600
BY229-600	STTA/B806D	
BY329F-1200	DTV64F-1200C	DTV32F-1200A/B
BY329-1200	DTV64-1200C	DTV32-1200A/B
BY359F-1500	DTV32F-1500A/B	
BY359-1500	DTV32-1500A/B	
BYD33D		BYT01-200
BYD33G		BYT01-400
BYD33J		BYT11-600
BYD33K		BYT11-800
BYD33M		BYT11-800
BYP101	STTA1512P	
BYP102		STTA2512P
BYR29F-600		STTA/B806DI
BYR29F-700		BYT08PI-1000
BYR29F-800		BYT08PI-1000
BYR29-500	STTA/B806D	
BYR29-600	STTA/B806D	
BYR29-700		BYT08P-1000
BYR29-800		BYT08P-1000
BYR79-500		STTA/B1206D
BYR79-600		STTA/B1206D
BYT08P-1000		STTA812D
BYT08P-600	STTA/B806D	
BYT08P-800		BYT08P-1000
BYT12P-1000		STTA1212D
BYT12P-600	STTA/B1206D	
BYT12P-800		BYT12P-1000
BYT30P-1000		STTA2512P
BYT30P-600	STTA/B3006P	
BYT30P-800		BYT30P-1000
BYT60P-600	STTA/B6006P	
BYT60P-800		BYT60P-1000
BYT79-500		STTA/B1206D
BYT85-1000		BYT08P-1000
BYT85-600	STTA/B506D	
BYT85-800		BYT08P-1000
BYT230PIV-1000		STTA5012TV2
BYT230PIV-600	STTA/B6006TV2	
BYT230PIV-800		BYT230PIV-100
BYT231PIV-1000		STTA5012TV1
BYT231PIV-600	STTA/B6006TV1	
BYT231PIV-800		BYT231PIV-1000
BYT260PIV-1000		STTA9012TV2
BYT260PIV-600	STTA/B12006TV2	
BYT260PIV-800		BYT260PIV-1000
BYT261PIV-1000		STTA9012TV1
BYT261PIV-600	STTA/B12006TV1	
BYT261PIV-800		BYT261PIV-1000
BYV7-250	BYW99P-50	
BYV27-100		BYW98-100
BYV27-150		BYW98-150
BYV27-200		BYW98-200
BYV27-50		BYW98-50
BYV28-100		BYW98-100
BYV28-150		BYW98-150
BYV28-200		BYW98-200
BYV28-50		BYW98-50
BYV29F-500		STTA/B806DI
BYV29-300	BYT08-300	
BYV29-400	BYT08-400	
BYV29-500		STTA/B806D
BYV32-100	BYW51-100	
BYV32-150	BYW51-150	
BYV32-200	BYW51-200	
BYV32-50	BYW51-50	
BYV34-300		BYT16P-300
BYV34-400		BYT16P-400
BYV36A		BYT11-600
BYV36B		BYT11-600
BYV36C		BYT11-600
BYV36D		BYT11-800
BYV36E		BYT11-1000
BYV42-100		BYW51-100
BYV42-150		BYW51-150
BYV42-200		BYW51-200
BYV42-50		BYW51-50
BYV72-100	BYW99P-100	
BYV72-150	BYW99P-150	
BYV72-200	BYW99P-200	
BYV74F-600		STTA/B2006PI
BYV79-100	BYW81P-100	
BYV79-150	BYW81P-150	
BYV79-200	BYW81P-200	

Note: STTA/B... means STTA... or STTB..., depending on the applications.

INDUSTRY PART NUMBER	SGS-THOMSON DIRECT REPLACEMENT	SGS-THOMSON SIMILAR REPLACEMENT
BYV79-50	BYW81P-50	
BYV95A		BYT13-600
BYV95A		BYT11-600
BYV95B		BYT13-600
BYV95B		BYT11-600
BYV95C		BYT11-600
BYV95C		BYT13-600
BYV96D		BYT11-800
BYV96E		BYT11-1000
BYW29F-100		STPR510F
BYW29F-200		STPR520F
BYW29-100	BYW80-100	
BYW29-100		STPR510D
BYW29-150	BYW80-150	
BYW29-200	BYW80-200	
BYW29-200		STPR520D
BYW29-50	BYW80-50	
BYW30-100	BYW81-100	
BYW30-150	BYW81-150	
BYW30-200	BYW81-200	
BYW30-50	BYW81-50	
BYW31-100	BYW77-100	
BYW31-150	BYW77-150	
BYW31-200	BYW77-200	
BYW31-50	BYW77-50	
BYW51F-100		STPR1610CF
BYW51F-200		STPR1620CF
BYW51-100		STPR1610CT
BYW51-200		STPR1620CT
BYW80F-100		STPR810F
BYW80F-200		STPR820F
BYW80-100		STPR810D
BYW80-200		STPR820D
BYW81P-100		STPR1510D
BYW81P-200		STPR1520D
BYW92-100	BYW92-100	
BYW92-150	BYW92-150	
BYW92-200	BYW92-200	
BYW92-50	BYW92-50	
BYW93-100		BYW78-100
BYW93-150		BYW78-150
BYW93-2000		BYW78-200
BYW93-50		BYW78-50
BYW94-100	BYW08-100	
BYW94-150	BYW08-150	
BYW94-200	BYW08-200	
BYW94-50	BYW08-50	
BYW96D		BYT13-800
BYW96E		BYT13-1000
BYW98-100		STPR310
BYW98-200		STPR320
C6P40F		STTA506F
CTL22S	STPR620CT	
D20LC20	BYW51F-200	
DSEI8-04A	BYT08P-400	
DSEI8-06A	STTA/B806D	
DSEI12-04A	BYT12P-400	
DSEI12-06A	STTA/B1206D	
DSEI12-08A		BYT12P-1000
DSEI12-10A	BYT12P-1000	
DSEI2x30-04C	BYT230PIV-400	
DSEI2x30-06B	STTA/B6006TV2	
DSEI2x30-06C	STTA/B6006TV2	
DSEI2x30-08B		BYT230PIV-1000
DSEI2x30-10B	BYT230PIV-1000	
DSEI2x31-04C	BYT231PIV-400	
DSEI2x31-06B	STTA/B6006TV1	
DSEI2x31-06C	STTA/B6006TV1	
DSEI2x31-08B		BYT231PIV-1000
DSEI2x31-10B	BYT231PIV-1000	
DSEI2x61-04C	BYT261PIV-400	
DSEI2x61-06B	STTA/B12006TV1	
DSEI2x61-06C	STTA/B12006TV1	
DSEI2x61-08B		BYT261PIV-1000
DSEI2x61-10B	BYT261PIV-1000	
DSEI30-04A	BYT30P-400	
DSEI30-06A	STTA/B3006P	
DSEI30-06C	STTA/B3006P	
DSEI30-08A		BYT30P-1000
DSEI30-10A	BYT30P-1000	
DSEI60-04A	BYT60P-400	
DSEI60-06A	STTA/B6006P	
DSEI60-08A		BYT60P-1000
DSEI60-10A	BYT60P-1000	
EGP10A		BYW100-50
EGP10B		BYW100-100
EGP10C		BYW100-150
EGP10D		BYW100-200
EGP10F		BYT01-300
EGP10G		BYT01-400
EGP20A		BYW98-50
EGP20B		BYW98-100
EGP20C		BYW98-150
EGP20D		BYW98-200
EGP20F		BYT03-300
EGP20G		BYT03-400
EGP30A		BYW98-50
EGP30B		BYW98-100
EGP30C		BYW98-150
EGP30D		BYW98-200
EGP30F		BYT03-300
EGP30G		BYT03-400
ES2A	SMBYW02-50	
ES2B	SMBYW02-100	
ES2C	SMBYW02-150	
ES2D	SMBYW02-200	
ES3A	SMBYW04-50	
ES3B	SMBYW04-100	
ES3C	SMBYW04-150	
ES3D	SMBYW04-200	

INDUSTRY PART NUMBER	SGS-THOMSON DIRECT REPLACEMENT	SGS-THOMSON SIMILAR REPLACEMENT
ESA25M	STPR620CT	
FE1A		BYW100-50
FE1B		BYW100-100
FE1C		BYW100-150
FE1D		BYW100-200
FE2A		BYW98-50
FE2B		BYW98-100
FE2C		BYW98-150
FE2D		BYW98-200
FE3A		BYW98-50
FE3B		BYW98-100
FE3C		BYW98-150
FE3D		BYW98-200
FEP16AT		BYW51-50
FEP16BT		BYW51-100
FEP16CT		BYW51-150
FEP16CT		BYW51-150
FEP16DT		BYW51-200
FEP30AP		BYW99P-50
FEP30BP		BYW99P-100
FEP30CP		BYW99P-150
FEP30DP		BYW99P-200
FEP30HP	STTA/B3006P	
FEP30JP	STTA/B3006P	
FEPF30HP	STTA/B3006PI	
FEPF30JP	STTA/B3006PI	
FES16AT	BYW81P-50	
FES16BT	BYW81P-100	
FES16CT	BYW81P-150	
FES16DT	BYW81P-200	
FES16FT		BYT12P-300
FES16GT		BYT12P-400
FES16HT		STTA/B2006P
FES16HT		STTA/B1206D
FES16JT		STTA/B1206D
FES16JT		STTA/B2006P
FES8AT	BYW80-50	
FES8BT	BYW80-100	
FES8CT	BYW80-150	
FES8DT	BYW80-200	
FES8FT	BYT08P-300	
FES8GT	BYT08P-400	
FES8HT	STTA/B806D	
FES8JT	STTA/B806D	
FESF16HT		STTA/B2006PI
FESF16JT		STTA/B2006PI
FESF8HT		STTA/B806DI
FESF8JT		STTA/B806DI
GI812		BYT01-200
GI814		BYT01-400
GI816		BYT11-600
GI817		BYT11-800
GI818		BYT11-1000
GI917	BYT13-800	
GI918	BYT13-1000	
GI1001		BYW100-50
GI1002		BYW100-100
GI1003		BYW100-150
GI1004		BYW100-200
GI1101		BYW98-50
GI1102		BYW98-100
GI1103		BYW98-150
GI1104		BYW98-200
GI1401		BYW80-50
GI1402		BYW80-100
GI1403		BYW80-150
GI1404		BYW80-200
GI12401	BYW51-50	
GI12402	BYW51-100	
GI12403	BYW51-150	
GI12404	BYW51-200	
HFA08TB60	STTA/B806D	
HFA15PB60	STTA/B2006P	
HFA15TB60	STTA/B1206D	
HFA20PB120	STTA2512P	
HFA25PB60	STTA/B3006P	
MR812		BYT01-200
MR813		BYT01-300
MR814		BYT01-400
MR816		BYT11-600
MR817		BYT11-800
MR818		BYT11-1000
MR917	BYT13-800	
MR918	BYT13-1000	
MUR105	BYW100-50	
MUR110	BYW100-100	
MUR115	BYW100-150	
MUR120	BYW100-200	
MUR130	BYT01-300	
MUR140	BYT01-400	
MUR405	BYW98-50	
MUR410	BYW98-100	
MUR415	BYW98-150	
MUR420	BYW98-200	
MUR430	BYT03-300	
MUR440	BYT03-400	
MUR605CT	BYW51-50	
MUR610CT	BYW51-100	
MUR615CT	BYW51-150	
MUR620CT	BYW51-200	
MUR805	BYW80-50	
MUR810	BYW80-100	
MUR815	BYW80-150	
MUR820	BYW80-200	
MUR830	BYT08P-300	
MUR840	BYT08P-400	
MUR850	STTA/B806D	
MUR860	STTA/B806D	
MUR870		BYT12P-1000
MUR880		BYT12P-1000

INDUSTRY PART NUMBER	SGS-THOMSON DIRECT REPLACEMENT	SGS-THOMSON SIMILAR REPLACEMENT
MUR890		BYT12P-1000
MUR1012E		DTV64-1200C
MUR1015E		DTV32-1500B
MUR1505	BYW81P-50	
MUR1510	BYW81P-100	
MUR1515	BYW81P-150	
MUR1520	BYW81P-200	
MUR1550		STTA/B1206D
MUR1560		STTA/B1206D
MUR1605CT	BYW51-50	
MUR1610CT	BYW51-100	
MUR1615CT	BYW51-150	
MUR1620CT	BYW51-200	
MUR2505	BYW77-50	
MUR2510	BYW77-100	
MUR2515	BYW77-150	
MUR2520	BYW77-200	
MUR3005PT	BYW99P-50	
MUR3010PT	BYW99P-100	
MUR3015PT	BYW99P-150	
MUR3020PT	BYW99P-200	
MUR5005	BYW78-50	
MUR5010	BYW78-100	
MUR5015	BYW78-150	
MUR5020	BYW78-200	
MUR6040	BYT60P-400	
MUR7005	BYW08-50	
MUR7010	BYW08-100	
MUR7015	BYW08-150	
MUR7020	BYW08-200	
MUR8100	BYT08P-1000	
MURS110T3	SMBYW02-100	
MURS115T3	SMBYW02-150	
MURS120T3	SMBYW02-200	
MURS130T3	SMBYT01-300	
MURS140T3	SMBYT01-400	
MURS160T3	STTA/B106U	
NS502		BYT01-200
NS504		BYT01-400
NS505		BYT11-600
NS506		BYT11-600
NS1002		BYT01-200
NS1004		BYT01-400
NS1005		BYT11-600
NS1006		BYT11-600
PHS1001	BYW100-50	
PHS1002	BYW100-100	
PHS1003	BYW100-150	
PHS2401	BYW51-50	
PHS2402	BYW51-100	
PHS2403	BYW51-150	
PHS2404	BYW51-200	
PLR812	BYT01-200	
PLR813	BYT01-300	
PLR814	BYT01-400	
PLR816	BYT11-600	
PLR817	BYT11-800	
PLR818	BYT11-1000	
RF1A		SMBYW02-50
RF1B		SMBYW02-100
RF1D		SMBYW02-200
RF1G		SMBYT01-400
RF1J		STTB106U
RG1D		BYT01-200
RG1G		BYT01-400
RG1J		BYT11-600
RG1K		BYT11-800
RG1M		BYT11-1000
RG2J		BYT13-600
RG2K		BYT13-800
RG2M		BYT13-1000
RG3J		BYT13-600
RG3K		BYT13-800
RG3M		BYT13-1000
RGP10D		BYT01-200
RGP10F		BYT01-300
RGP10G		BYT01-400
RGP10H		BYT11-600
RGP10J		BYT11-600
RGP10K		BYT11-800
RGP10M		BYT11-1000
RGP15K		BYT13-800
RGP15M		BYT13-1000
RGP20K		BYT13-800
RGP20M		BYT13-1000
RGP25K		BYT13-800
RGP25M		BYT13-1000
RGP30K		BYT13-800
RGP30M		BYT13-1000
RGP80A	BYW80-50	
RGP80B	BYW80-100	
RGP80D	BYW80-200	
RGP80G		STTA/B1206D
RGP80J	STTA/B1206D	
RGP80J	STTA/B806D	
RGP80K		BYT12P-1000
RMC020		BYT01-200
RMC040		BYT01-400
RMC060		BYT11-600
RMC080		BYT11-800
RMC0100		BYT11-1000
RP16AT		BYW51-50
RP16BT		BYW51-100
RP16DT		BYW51-200
RP300K	BYT13-800	
RP300M	BYT13-1000	
RS2A	SMBYW02-50	
RS2B	SMBYW02-100	
RS2D	SMBYW02-200	
RS2G		SMBYT01-400

INDUSTRY PART NUMBER	SGS-THOMSON DIRECT REPLACEMENT	SGS-THOMSON SIMILAR REPLACEMENT
RS2J		STTB106U
RS3A		SMBYW04-50
RS3B		SMBYW04-100
RS3D		SMBYW04-200
RS3G		SMBYT03-400
RS3J		STTB306S
RS8AT		BYW80-50
RS8BT		BYW80-100
RS8DT		BYW80-200
RS8GT		BYT08P-400
RS8JT		STTA/B1206D
RS8KT		BYT12P-1000
RS8MT		BYT12P-1000
RUD805	BYW80-50	
RUD810	BYW80-100	
RUD815	BYW80-150	
RUD820	BYW80-200	
RUR805	BYW80-50	
RUR810	BYW80-100	
RUR815	BYW80-150	
RUR820	BYW80-200	
RUR840	BYT08P-400	
RUR850	STTA/B806D	
RUR860	STTA/B806D	
RUR880		BYT08P-1000
RUR1510	BYW81P-100	
RUR1515	BYW81P-150	
RUR1520	BYW81P-200	
RUR1540		
RUR1560		STTA/B1206D
RUR1580		BYT12P-1000
RUR8100	BYT08P-1000	
RUR15100		BYT12P-1000
RURD805	BYW51-50	
RURD810	BYW51-100	
RURD815	BYW51-150	
RURD820	BYW51-200	
RURD1610	BYW99P-100	
RURD1615	BYW99P-150	
RURD1620	BYW99P-200	
RURG3010		BYW77P-100
RURG3015		BYW77P-150
RURG3020		BYW77P-200
RURG3040	BYT30P-400	
RURG3060	STTA/B3006P	
RURG3080		BYT30P-1000
RURG50100	BYT60P-1000	
RURG5040	BYT60P-400	
RURG5060	STTA/B6006P	
RURG5080		BYT60P-1000
RURG30100	BYT30P-1000	
S1A2F		BYT01-200
S1A3F		BYT01-300
S1A4F		BYT01-400
S1A5F		BYT11-600

INDUSTRY PART NUMBER	SGS-THOMSON DIRECT REPLACEMENT	SGS-THOMSON SIMILAR REPLACEMENT
S3A	SMBYW04-50	
S3A8F		BYT13-800
S3B	SMBYW04-100	
S3D	SMBYW04-200	
S3G		SMBYT03-400
S3J		STTB306S
S110F		BYT11-1000
S310F		BYT13-1000
SES5401	BYW80-50	
SES5401C	BYW51-50	
SES5402C	BYW51-100	
SES5403	BYW80-150	
SES5403C	BYW51-150	
SES5404	BYW80-200	
SES5404C	BYW51-200	
SES5501	BYW81-50	
SES5502	BYW81-100	
SES5503	BYW81-150	
SES5504	BYW81-200	
SES5701	BYW77-50	
SES5702	BYW77-100	
SES5703	BYW77-150	
SES5801	BYW78-50	
SES5802	BYW78-100	
SES5803	BYW78-150	
SGI5401	BYW80-50	
SGI5401C	BYW51-50	
SGI5402	BYW80-100	
SGI5402C	BYW51-100	
SGI5403	BYW80-150	
SGI5403C	BYW51-150	
SGI5404	BYW80-200	
SGI5404C	BYW51-200	
SRP100D		BYT01-200
SRP100G		BYT01-400
SRP100J		BYT11-600
SRP100K		BYT11-800
SRP300J		BYT13-600
SRP300K		BYT13-800
SRSFR120		BYT01-200
SRSFR140		BYT01-400
SRSFR150		BYT11-600
SRSFR160		BYT11-600
SRSFR180		BYT11-800
TS3		BYT01-300
TS5		BYT11-600
TS20		BYT01-200
TS40		BYT01-400
TS60		BYT11-600
UES701	BYW77-50	
UES702	BYW77-100	
UES703	BYW77-150	
UES704	BYW77-200	
UES801	BYW08-50	
UES802	BYW08-100	

INDUSTRY PART NUMBER	SGS-THOMSON DIRECT REPLACEMENT	SGS-THOMSON SIMILAR REPLACEMENT
UES803	BYW08-150	
UES804	BYW08-200	
UES1001		BYW100-50
UES1001		BYW100-50
UES1002		BYW100-100
UES1003		BYW100-150
UES1102		BYW100-100
UES1103		BYW100-150
UES1104		BYT01-200
UES1105		BYT01-300
UES1106		BYT01-400
UES1301		BYW98-50
UES1302		BYW98-100
UES1303		BYW98-150
UES1304		BYW98-200
UES1305		BYT03-300
UES1306		BYT03-400
UES1401	BYW80-50	
UES1402	BYW80-100	
UES1403	BYW80-150	
UES1404	BYW80-200	
UES1421	STTA/B1206D	
UES1422		BYT12P-1000
UES1423	BYT12P-1000	
UES1501	BYW81P-50	
UES1502	BYW81P-100	
UES1503	BYW81P-150	
UES1504	BYW81P-200	
UES2401	BYW51-50	
UES2402	BYW51-100	
UES2403	BYW51-150	
UES2404	BYW51-200	
UES2601		BYW99P-50
UES2602		BYW99P-100
UES2603		BYW99P-150
UES2604		BYW99P-200
UF4001	BYW100-50	
UF4002	BYW100-100	
UF4003	BYW100-200	
UF4004	BYT01-400	
UF54001	BYW98-50	
UF54002	BYW98-100	
UF54003	BYW98-200	
UF54004	BYT03-400	
UG30BPT	BYW99P-100	
UG30CPT	BYW99P-150	
UG30DPT	BYW99P-200	
VHE205	BYW10-050	
VHE210	BYW100-100	
VHE215	BYW100-150	
VHE220	BYW100-200	
VHE605		BYW98-50
VHE610		BYW98-100
VHE615		BYW98-150
VHE620		BYW98-200

INDUSTRY PART NUMBER	SGS-THOMSON DIRECT REPLACEMENT	SGS-THOMSON SIMILAR REPLACEMENT
VHE701	BYW77-50	
VHE702	BYW77-100	
VHE703	BYW77-150	
VHE704	BYW77-20	
VHE801	BYW08-50	
VHE802	BYW08-100	
VHE803	BYW08-150	
VHE804	BYW08-200	
VHE1401	BYW80-50	
VHE1402	BYW80-100	
VHE1403	BYW80-150	
VHE1404	BYW80-200	
VHE2401	BYW51-50	
VHE2402	BYW51-100	
VHE2403	BYW51-150	
VHE2404	BYW51-200	
POWER SCHOTTKY		
10TQ035	STPS1035D	
10TQ045	STPS1045D	
12CTQ035	STPS1535CT	
12CTQ045	STPS1545CT	
18TQ035		STPS1535D
18TQ045		STPS1545D
200CNQ035		STPS24035TV
200CNQ040		STPS24045TV
200CNQ045		STPS24045TV
20CTQ035	STPS2035CT	
20CTQ045	STPS2045CT	
28CPQ035	STPS3035CPI	
28CPQ045	STPS3045CPI	
30CPQ035	STPS3035CPI	
30CPQ045	STPS3045CPI	
30CTQ035	STPS3035CT	
30CTQ045	STPS3045CT	
30WQ03F		STPS330S
30WQ04F		STPS340S
BYV118F-35	STPS1535CF	
BYV118F-35	STPS1535CT	
BYV118F-40	STPS1545CT	
BYV118F-40	STPS1545CF	
BYV118F-45	STPS1545CF	
BYV118F-45	STPS1545CT	
BYV133F-35	STPS2035CF	
BYV133F-40	STPS2045CF	
BYV133F-45	STPS2045CF	
BYV133-35	STPS2035CT	
BYV133-40	STPS2045CT	
BYV133-45	STPS2045CT	
BYV143F-35		STPS3035CPI
BYV143F-40		STPS3045CPI
BYV143F-45		STPS3045CPI
BYV143-35	STPS3035CT	
BYV143-40	STPS3045CT	
BYV143-45	STPS3045CT	

INDUSTRY PART NUMBER	SGS-THOMSON DIRECT REPLACEMENT	SGS-THOMSON SIMILAR REPLACEMENT
MBR735	STPS735D	
MBR745	STPS745D	
MBR1035	STPS1035D	
MBR1045	STPS1045D	
MBR1535CT	STPS1535CT	
MBR1545CT	STPS1545CT	
MBR1635		STPS1535D
MBR1645		STPS1545D
MBR2035CT	STPS2035CT	
MBR2045CT	STPS2045CT	
MBR2535CT	STPS3035CT	
MBR2545CT	STPS3045CT	
MBR3035PT	STPS3035CP	
MBR3045PT	STPS3045CP	
MBR12035CT		STPS12035TV
MBR12045CT		STPS12045TV
MBR20035CT		STPS24035TV
MBR20045CT		STPS24045TV
MBR20100CT	STPS2010CT	
MBR240100TV	STPS80100TV	
MBR28035CT	STPS16035TV	
MBR28045CT	STPS16045TV	
MBRD320		STPS320S
MBRD330		STPS330S
MBRD340		STPS340S
MBRD1535CT		STPS1535CF
MBRD1545CT		STPS1545CF
MBRF735		STPS735F
MBRF745		STPS745F
MBRF1035		STPS1035F
MBRF1045		STPS1045F
MBRF1635		STPS1535F
MBRF1645		STPS1545F
MBRF2035CT		STPS2035CF
MBRF2045CT		STPS2045CF
MBRF3035PT	STPS3035CPI	
MBRF3045PT	STPS3045CPI	
MBRS320T3	STPS320S	
MBRS330T3	STPS330S	
MBRS340T3	STPS340S	
PBYR235CT	STPS240CE	
PBYR240CT	STPS240CE	
PBYR245CT	STPS260CE	
PBYR635CT		STPS635CT
PBYR640CT		STPS640CT
PBYR735	STPS735D	
PBYR735F	STPS735F	
PBYR740	STPS745D	
PBYR740F	STPS745F	
PBYR745	STPS745D	
PBYR745F	STPS745F	
PBYR1035	STPS1035D	
PBYR1035F	STPS1035F	
PBYR1040	STPS1045D	
PBYR1040F	STPS1045F	

INDUSTRY PART NUMBER	SGS-THOMSON DIRECT REPLACEMENT	SGS-THOMSON SIMILAR REPLACEMENT
PBYR1045	STPS1045D	
PBYR1045F	STPS1045F	
PBYR1535CT	STPS1535CT	
PBYR1535CTF	STPS1535CF	
PBYR1540CT	STPS1545CT	
PBYR1540CTF	STPS1545CF	
PBYR1545CT	STPS1545CT	
PBYR1545CTF	STPS1545CF	
PBYR1635		STPS1535D
PBYR1635F		STPS1535F
PBYR1640		STPS1545D
PBYR1640F		STPS1545F
PBYR1645		STPS1545D
PBYR1645F		STPS1545F
PBYR2035CT	STPS2035CT	
PBYR2035CTF	STPS2035CF	
PBYR2040CT	STPS2045CT	
PBYR2040CT	STPS3045CT	
PBYR2040CTF	STPS2045CF	
PBYR2045CT	STPS2045CT	
PBYR2045CTF	STPS2045CF	
PBYR2535CT	STPS3035CT	
PBYR2545CT	STPS3045CT	
PBYR3035PT	STPS3035CP	
PBYR3040PT	STPS3045CP	
PBYR3045PT	STPS3045CP	
PBYR12035TV	STPS12035TV	
PBYR12040TV	STPS12045TV	
PBYR12045TV	STPS12045TV	
PBYR16035TV	STPS16035TV	
PBYR16040TV	STPS16045TV	
PBYR16045TV	STPS16045TV	
PBYR20100CT	STPS20100CT	
S08C35		STPS735D
S08C45		STPS745D
S15SC3M		STPS1535CF
S15SC4M		STPS1545CF
S30SC3M	STPS3035CPI	STPS3035CP
S30SC4M	STPS3045CPI	STPS3045CP
S60SC3M	STPS6035CPI	STPS6035CP
S60SC4M	STPS6045CPI	STPS6045CP
SBL530		STPS735D
SBL540		STPS745D
SBL1030		STPS1035D
SBL1040		STPS1045D
SBL1630CT		STPS1535CT
SBL1640CT		STPS1545CT
SBL3030PT		STPS3035CP
SBL3040PT		STPS3045CP
SBLF530		STPS735F
SBLF530CT		STPS630CF
SBLF540		STPS745F
SBLF540CT		STPS640CF
SBLF1030		STPS1035F
SBLF1040		STPS1045F

INDUSTRY PART NUMBER	SGS-THOMSON DIRECT REPLACEMENT	SGS-THOMSON SIMILAR REPLACEMENT
SBLF1630CT		STPS1535CF
SBLF1640CT		STPS1545CF
SBLF3030PT	STPS3035CPI	
SBLF3040PT	STPS3045CPI	
SD41P	STPS3045CP	
SD241P		STPS2045CT
SS1B		STPS1100U
SS12		STPS120E
SS13		STPS130E
SS14		STPS140E
SS16		STPS160E
SS19		STPS1100U
SS22	STPS320U	
SS23	STPS330U	
SS24	STPS340U	
SS26		STPS1100U
SS29		STPS1100U
SS2B		STPS1100U
SS32	STPS320S	
SS33	STPS330S	
SS34	STPS340S	
UES1605S		BYW81P-50
UES1610S		BYW81P-100
UES1615S		BYW81P-150
UES1620S		BYW81P-200
UES3005C	BYW99P-50	
UES3005S		BYW77P-50
UES3010C	BYW99P-100	
UES3010S		BYW77P-100
UES3015C	BYW99P-150	
UES3015S		BYW77P-150
USD3030C	STPS3045CP	
USD3040C	STPS3045CP	
USD3045C	STPS3045CP	
USD4530C		STPS4045CP
USD4540C		STPS4045CP
USD4545C		STPS4045CP

INDUSTRY PART NUMBER	SGS-THOMSON DIRECT REPLACEMENT	SGS-THOMSON SIMILAR REPLACEMENT

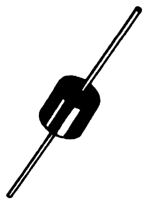
STANDARD DIODES DATASHEETS

SGS-THOMSON MICROELECTRONICS

BY214-200 —> 1000

RECTIFIER DIODES

- STANDARD RECTIFIER
- HIGH SURGE CURRENT CAPABILITY
- LOW FORWARD VOLTAGE DROP



AG
(Plastic)

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
$I_{F(AV)}$	Average Forward Current*	T_a = 90°C	6	A
I_{FSM}	Surge non Repetitive Forward Current	t_p = 10ms Sinusoidal	400	A
P_{tot}	Power Dissipation*	T_a = 90°C	6	W
T_{stg} T_j	Storage and Junction Temperature Range		– 65 to 150	°C
T_L	Maximun Lead Temperature For Soldering During 10s at 4mm From Case		230	°C

Symbol	Parameter	BY 214-					Unit
		200	400	600	800	1000	
V_{RRM}	Repetitive Peak Reverse Voltage	200	400	600	800	1000	V

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-a)}$	Junction-ambient*	10	°C/W

ELECTRICAL CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R	T_j = 100°C	$V_R = V_{RRM}$			250	µA
V_F	T_j = 25°C	I_F = 20A			1.2	V

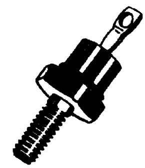
* On infinite heatsink with 10mm lead length
Single phase, half wave, resistive or inductive load

SGS-THOMSON MICROELECTRONICS

1N1344B —> 48B
1N3988 / 1N3990

RECTIFIER DIODES

- STANDARD RECTIFIER
- HIGH SURGE CURRENT CAPABILITY
- LOW FORWARD VOLTAGE DROP



DO4
(Metal)

ABSOLUTE MAXIMUM RATINGS (limiting values)

Symbol	Parameter		Value	Unit
$I_{F(AV)}$	Average forward current *	Tc=150°C	6	A
I_{FSM}	Surge non repetitive forward current	tp=10ms sinusoidal	450	A
P_{tot}	Power dissipation *	Tc=150°C	25	W
Tstg Tj	Storage and junction temperature range		- 55 to + 175	°C

* Single phase, half wave, resistive or inductive load.

Symbol	Parameter	1N							Unit
		1344B	1345B	1346B	1347B	1348B	3988	3990	
V_{RRM}	Repetitive peak reverse voltage	200	300	400	500	600	800	1000	V

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
Rth (j-c)	Junction to case	3.5	°C/W

ELECTRICAL CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
V_F *	Tj = 25°C	I_F = 20 A			1.2	V
I_R **	T_j = 150°C	$V_R = V_{RRM}$			500	µA

Pulse test : * tp = 380 µs, duty cycle < 2 %
** tp = 5 ms, duty cycle < 2 %

August 1993

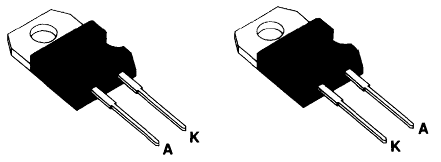
BY239(L)-800

RECTIFIER DIODES

MAIN PRODUCTS CHARACTERISTICS

$I_{F(av)}$	10 A
V_{RRM}	800 V
V_F (max)	1.45 V

- STANDARD RECTIFIER
- HIGH SURGE CURRENT CAPABILITY
- LOW FORWARD VOLTAGE DROP



TO220AC (Plastic) **BY239-800**

TO220AC (Plastic) **BY239L-800**

ABSOLUTE MAXIMUM RATINGS (limiting values)

Symbol	Parameter		Value	Unit
$I_{F(AV)}$	Average forward current *	Tc=100°C	10	A
I_{FSM}	Surge non repetitive forward current	tp=10ms sinusoidal	140	A
P_{tot}	Power dissipation *	Tc=100°C	12.5	W
Tstg Tj	Storage and junction temperature range		- 40 to + 125	°C

* Single phase, half wave, resistive or inductive load.

Symbol	Parameter	BY239(L)-				Unit
		200	400	600	800	
V_{RRM}	Repetitive peak reverse voltage	200	400	600	800	V

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
Rth (j-c)	Junction to case	2	°C/W

ELECTRICAL CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
V_F *	Tj = 25°C	I_F = 30 A			1.45	V
I_R **	T_j = 125°C	$V_R = V_{RRM}$			500	µA

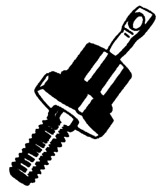
Pulse test : * tp = 380 µs, duty cycle < 2 %
** tp = 5 ms, duty cycle < 2 %

SGS-THOMSON MICROELECTRONICS

BYW 88-50 → 1000

RECTIFIER DIODES

- STANDARD RECTIIFER
- HIGH SURGE CURRENT CAPABILITY
- LOW FORWARD VOLTAGE DROP



DO 4
(Metal)

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
$I_{F\ (AV)}$	Average Forward Current*	T_c = 125°C	12	A
I_{FSM}	Surge non Repetitive Forward Current	t_p = 10ms Sinusoidal	230	A
P_{tot}	Power Dissipation*	T_c = 125°C	12.5	W
T_{stg} T_j	Storage and Junction Temperature Range		– 40 to 150	°C

Symbol	Parameter	BYW 88–									Unit
		50	100	200	300	400	500	600	800	1000	
V_{RRM}	Repetitive Peak Reverse Voltage	50	100	200	300	400	500	600	800	1000	V

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-c)}$	Junction-case	2	°C/W

ELECTRICAL CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R	T_j = 125°C	$V_R = V_{RRM}$			3	mA
V_F	T_j = 25°C	I_F = 35A			1.25	V

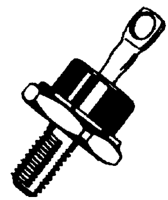
* Single phase, half wave, resistive or inductive load

SGS-THOMSON
MICROELECTRONICS

1N1186 —> 90
1N3766 / 1N3768

RECTIFIER DIODES

- STANDARD RECTIFIER
- HIGH SURGE CURRENT CAPABILITY
- LOW FORWARD VOLTAGE DROP



DO5
(Metal)

ABSOLUTE MAXIMUM RATINGS (limiting values)

Symbol	Parameter		Value	Unit
$I_{F(AV)}$	Average forward current *	Tc=140°C	40	A
I_{FSM}	Surge non repetitive forward current	tp=10ms sinusoidal	700	A
P_{tot}	Power dissipation *	Tc=140°C	44	W
Tstg Tj	Storage and junction temperature range		- 55 to + 175	°C

* Single phase, half wave, resistive or inductive load.

Symbol	Parameter	1N							Unit
		1186	1187	1188	1189	1190	3766	3768	
V_{RRM}	Repetitive peak reverse voltage	200	300	400	500	600	800	1000	V

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
Rth (j-c)	Junction to case	0.8	°C/W

ELECTRICAL CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
V_F *	Tj = 25°C	I_F = 110 A			1.5	V
I_R **	T_j = 150°C	$V_R = V_{RRM}$			5	mA

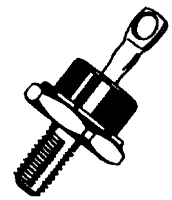
Pulse test : * tp = 380 µs, duty cycle < 2 %
** tp = 5 ms, duty cycle < 2 %

SGS-THOMSON MICROELECTRONICS

1N1195A / 1N1196A 1N1197A / 1N1198A

RECTIFIER DIODES

- STANDARD RECTIFIER
- HIGH SURGE CURRENT CAPABILITY
- LOW FORWARD VOLTAGE DROP



DO5
(Metal)

ABSOLUTE MAXIMUM RATINGS (limiting values)

Symbol	Parameter		Value	Unit
$I_{F(AV)}$	Average forward current *	Tc=150°C	20	A
I_{FSM}	Surge non repetitive forward current	tp=10ms sinusoidal	450	A
P_{tot}	Power dissipation *	Tc=150°C	25	W
Tstg Tj	Storage and junction temperature range		- 55 to + 175	°C

* Single phase, half wave, resistive or inductive load.

Symbol	Parameter	1N				Unit
		1195A	1196A	1197A	1198A	
V_{RRM}	Repetitive peak reverse voltage	300	400	500	600	V

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
Rth (j-c)	Junction to case	1	°C/W

ELECTRICAL CHARACTERISTICS

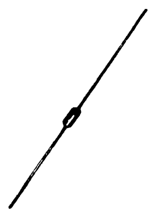
Symbol	Test Conditions		Min.	Typ.	Max.	Unit
V_F *	Tj = 25°C	I_F = 70 A			1.5	V
I_R **	T_j = 150°C	$V_R = V_{RRM}$			5	mA

Pulse test : * tp = 380 µs, duty cycle < 2 %
** tp = 5 ms, duty cycle < 2 %

FAST DIODES

FAST RECOVERY RECTIFIER DIODES

- VERY FAST FORWARD AND REVERSE RECOVERY DIODES



F 126
(Plastic)

SUITED FOR
- SWITCHING POWER TRANSISTORS DRIVER CIRCUITS (SERIES DIODES IN ANTISATURATION CLAMP SPEED UP DIODE IN DISCRETE DARLINGTON...)
- THYRISTORS GATE DRIVER CIRCUITS
- HIGH FREQUENCY RECTIFICATION

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
I_{FRM}	Repetitive Peak Forward Current	$t_p \leq 20\mu s$	20	A
$I_{F(AV)}$	Average Forward Current	$T_a = 25°C$ $\delta = 0.5$	1	A
I_{FSM}	Surge non Repetitive Forward Current	$t_p = 10ms$ Sinusoidal	20	A
P_{tot}	Power Dissipation*	$T_a = 25°C$	1.7	W
T_{stg} T_j	Storage and Junction Temperature Range		– 40 to 125	°C
T_L	Maximum Lead Temperature for Soldering during 10s at 4mm from Case		230	°C

Symbol	Parameter	PLQ 08	PLQ 1	Unit
V_{RRM}	Repetitive Peak Reverse Voltage	80	100	V
V_{RSM}	Non Repetitive Peak Reverse Voltage	80	100	V

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-a)}$	Junction-ambient*	60	°C/W

* On infinite heatsink with 10mm lead length.

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R	T_j = 25°C	$V_R = V_{RRM}$			10	μA
	T_j = 100°C				0.5	mA
V_F	T_j = 25°C	I_F = 1A			1.1	V

RECOVERY CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
t_{rr}	T_j = 25°C V_R = 30V	I_F = 1A See figure 12	di_F/dt = – 50A/μs			50	ns
t_{fr}	T_j = 25°C Measured at 1.1 x V_F	I_F = 1A	t_r = 20ns			50	ns

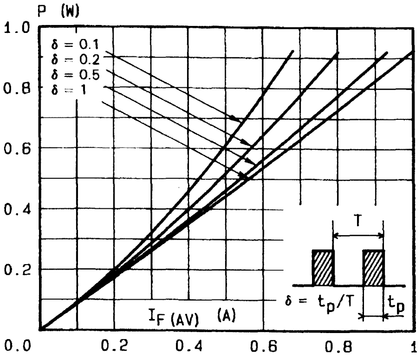


FIGURE 1 : Power losses versus average current.

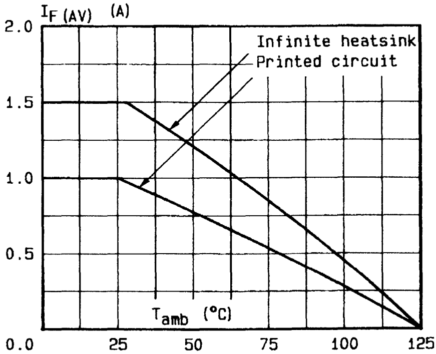


FIGURE 2 : Allowable DC current versus ambient temperature.

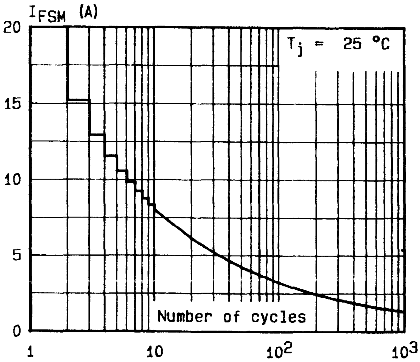


FIGURE 3 : Non repetitive surge peak current versus number of cycles.

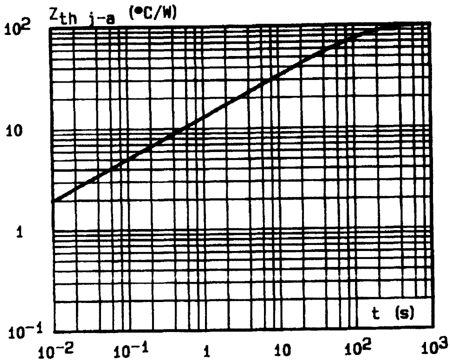


Fig.4 - Transient thermal impedance junction-ambient Printed circuit versus pulse duration (L = 10 mm).

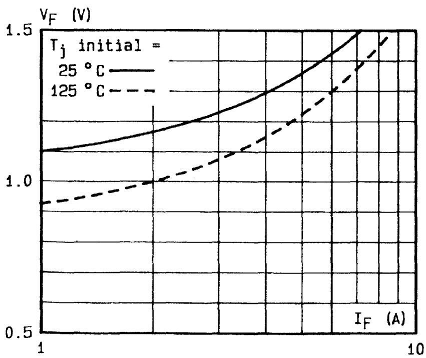


FIGURE 5 : Voltage drop versus forward current.

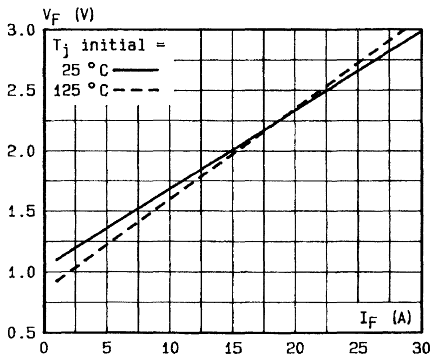


FIGURE 6 : Voltage drop versus forward current.

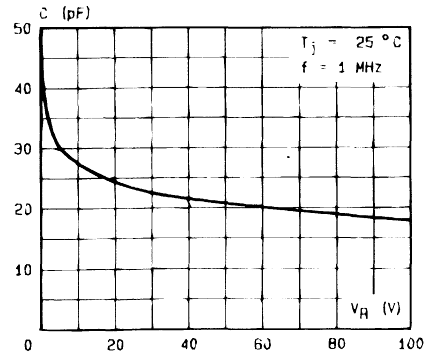


FIGURE 7 : Capacitance versus reverse voltage applied.

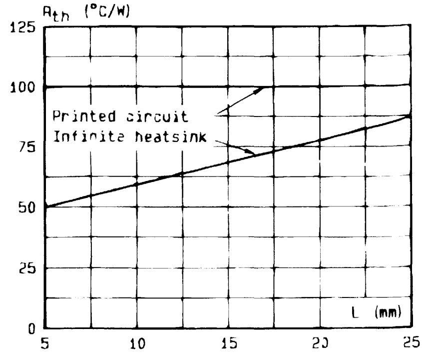


FIGURE 8 : Thermal resistance junction-ambient versus lead length.

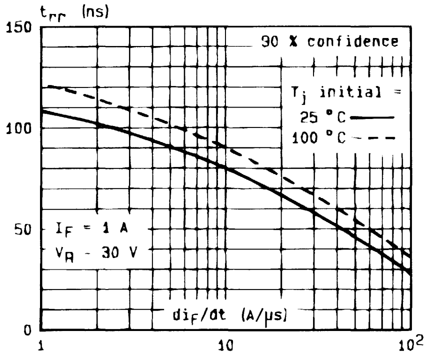


FIGURE 9 : Recovery time versus di_F/dt.

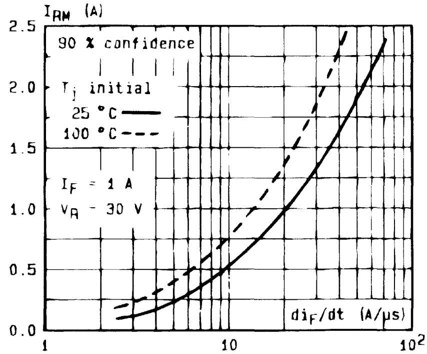


FIGURE 10 : Peak reverse current versus di_F/dt.

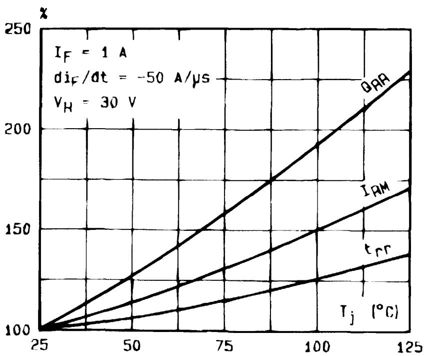


FIGURE 11 : Dynamic parameters versus junction temperature.

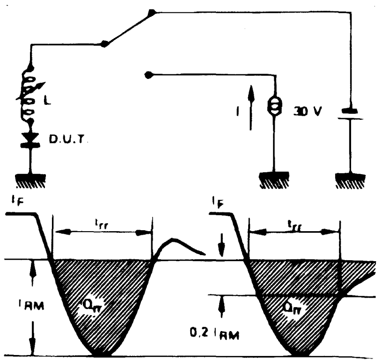


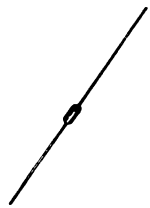
FIGURE 12 : Measurement of t_{rr} (fig.9) and I_{RM} (fig.10).

SGS-THOMSON MICROELECTRONICS

BYT 11-600 → 1000

FAST RECOVERY RECTIFIER DIODES

- SOFT RECOVERY
- VERY HIGH VOLTAGE
- SMALL RECOVERY CHARGE



F 126
(Plastic)

APPLICATIONS

- ANTISATURATION DIODES FOR TRANSISTOR BASE DRIVE
- SNUBBER DIODES

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
I_{FRM}	Repetitive Peak Forward Current	$t_p \leq 20\mu s$	20	A
$I_{F(AV)}$	Average Forward Current*	$T_a = 75°C$ $\delta = 0.5$	1	A
I_{FSM}	Surge non Repetitive Forward Current	$t_p = 10ms$ Sinusoidal	35	A
P_{tot}	Power Dissipation*	$T_a = 75°C$	1.25	W
T_{stg} T_j	Storage and Junction Temperature Range		– 55 to 150	°C
T_L	Maximum Lead Temperature for Soldering during 10s at 4mm from Case		230	°C

Symbol	Parameter	BYT 11–			Unit
		600	800	1000	
V_{RRM}	Repetitive Peak Reverse Voltage	600	800	1000	V

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-a)}$	Junction-ambient*	60	°C/W

* On infinite heatsink with 10mm lead length

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R	T_j = 25°C	$V_R = V_{RRM}$			20	μA
V_F	T_j = 25°C	I_F = 1A			1.3	V

RECOVERY CHARACTERISTICS

Symbol	Test Conditions				Min.	Typ.	Max.	Unit
t_{rr}	T_j = 25°C	I_F = 0.5A	I_R = 1A	I_{rr} = 0.25A			100	ns

To evaluate the conduction losses use the following equations :

$V_F = 1.1 + 0.075\ I_F$ $\qquad$ $P = 1.1 \times I_{F(AV)} + 0.075 \times I_F{}^2{}_{(RMS)}$

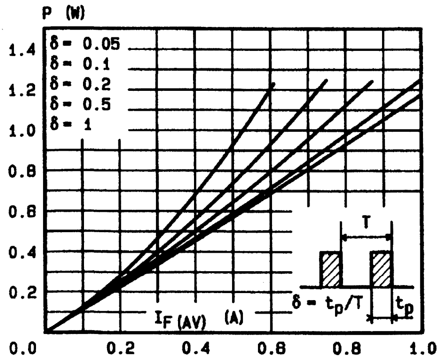


Fig.1 - Maximum average power dissipation versus average forward current.

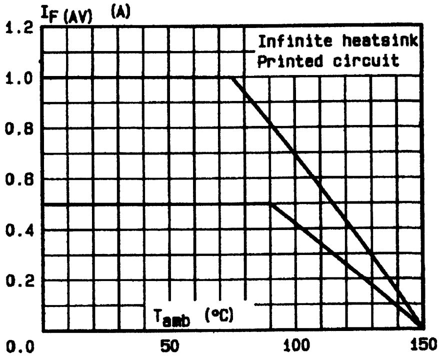


Fig.2 - Average forward current versus ambient temperature.

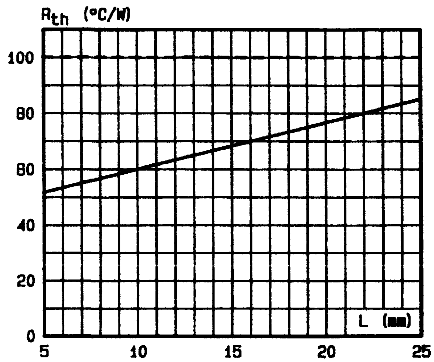
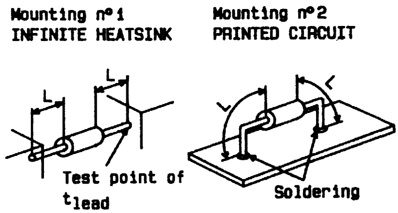


Fig.3 - Thermal resistance versus lead length.



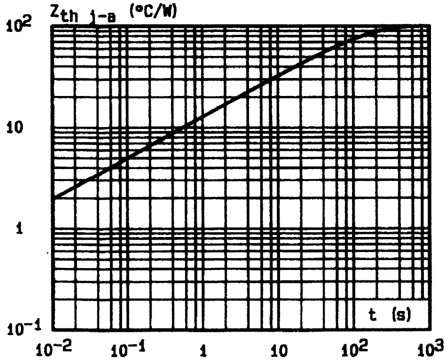


Fig.4 - Transient thermal impedance junction-ambient for mounting n°2 versus pulse duration (L = 10 mm).

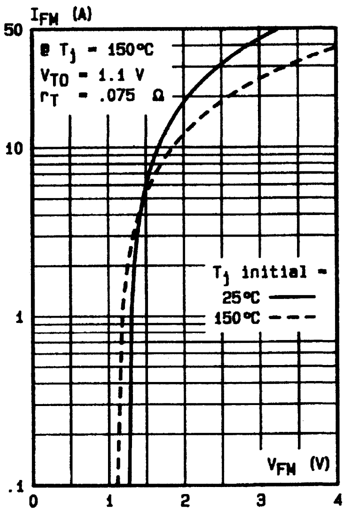


Fig.5 - Peak forward current versus peak forward voltage drop (maximum values).

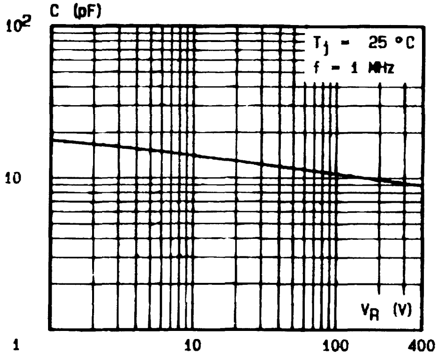


Fig.6 - Capacitance versus reverse applied voltage

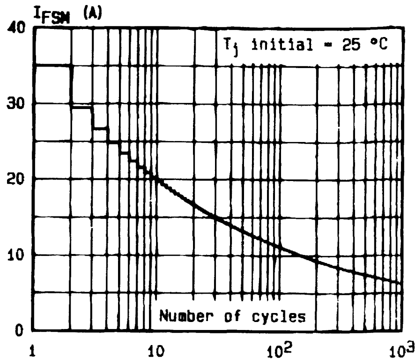
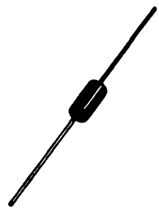


Fig.7 - Non repetitive surge peak current versus number of cycles

FAST RECOVERY RECTIFIER DIODES

- LOW FORWARD VOLTAGE DROP
- HIGH SURGE CURRENT CAPABILITY

APPLICATIONS
- AC-DC POWER SUPPLIES AND CONVERTERS
- FREE WHEELING DIODES, etc.



DO 27 A
(Plastic)

DESCRIPTION

Their high efficiency and high reliability combined with small size and low cost make these fast recovery rectifier diodes very attractive components for many demanding applications.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
I_{FRM}	Repetitive Peak Forward Current	$t_p \le 20\mu s$	100	A
$I_{F(AV)}$	Average Forward Current*	$T_a = 90°C$	3	A
I_{FSM}	Surge non Repetitive Forward Current	$t_p = 10ms$ Sinusoidal	150	A
P_{tot}	Power Dissipation*	$T_a = 90°C$	3.5	W
T_{stg} T_j	Storage and Junction Temperature Range		– 40 to 175	°C
T_L	Maximum Lead Temperature for Soldering during 10s at 4mm from Case		230	°C

Symbol	Parameter	PFR					Unit
		850	851	852	854	856	
V_{RRM}	Repetitive Peak Reverse Voltage	50	100	200	400	600	V
V_{RSM}	Non Repetitive Peak Reverse Voltage	75	150	250	450	650	V

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-a)}$	Junction-ambient*	25	°C/W

* On infinite heatsink with 10mm lead length.

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R	T_j = 25°C	$V_R = V_{RRM}$			10	µA
	T_j = 100°C				500	
V_F	T_j = 25°C	I_F = 3A			1.25	V

RECOVERY CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
t_{rr}	T_j = 25°C V_R = 30V	I_F = 1A d_{iF}/dt = – 25A/µs	PFR 850 → 854			150	ns
			PFR 856			200	
I_{RM}	T_j = 25°C V_R = 30V	I_F = 1A d_{iF}/dt = – 25A/µs				2	A

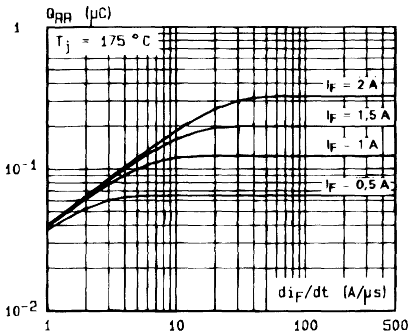
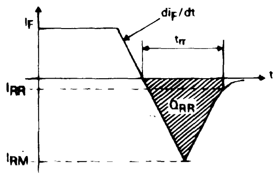


Fig.1 Recovered charge versus di_F/dt (typical values).



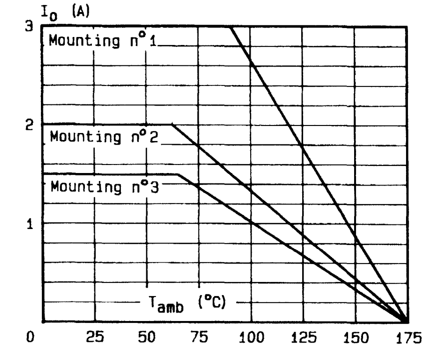


Fig.2 - Mean forward current I_0 versus ambient temperature (maximum values).

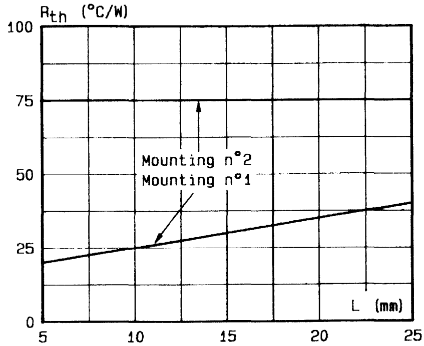


Fig.3 - Thermal resistance versus lead length (maximum values).

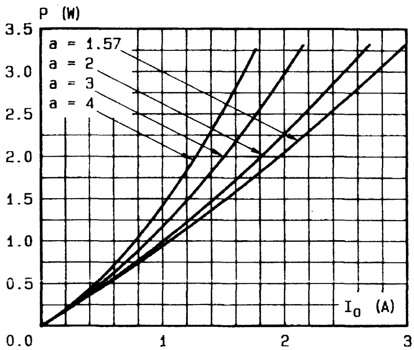
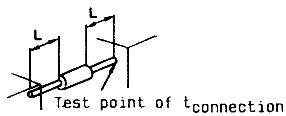
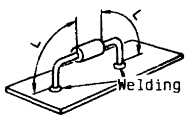


Fig.4 - Mean power dissipation versus mean forward current I for different rectifying types, in the case of :
- a resistive load (a = 1.57)
- a capacitive load (a > 1.57)

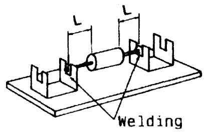
Mounting n°1 : INFINITE HEATSINK



Mounting n°2 : PRINTED CIRCUIT



Mounting n°3 :
L = 10 mm
R_{th} = 55 °C/W



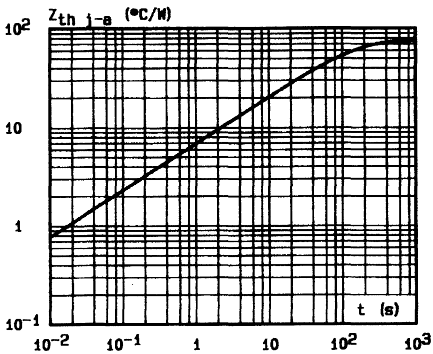


Fig.5 - Transient thermal impedance junction-ambient for mounting n°2 versus pulse duration (L = 10 mm)

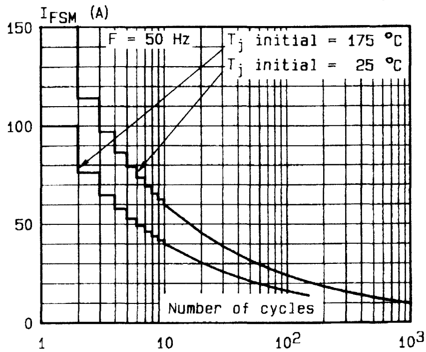


Fig.6 - Non repetitive surge peak forward current versus number of cycles.

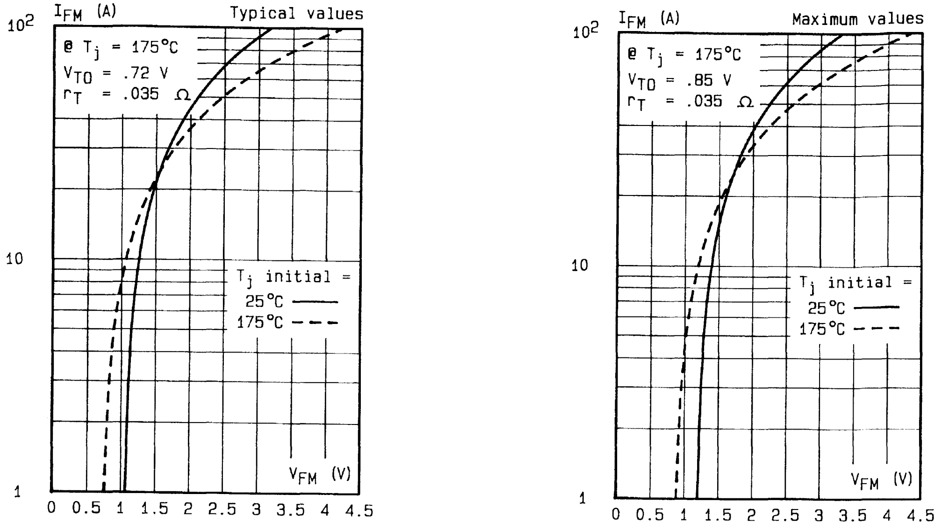


Fig.3a/3b - Peak forward current versus peak forward voltage drop.

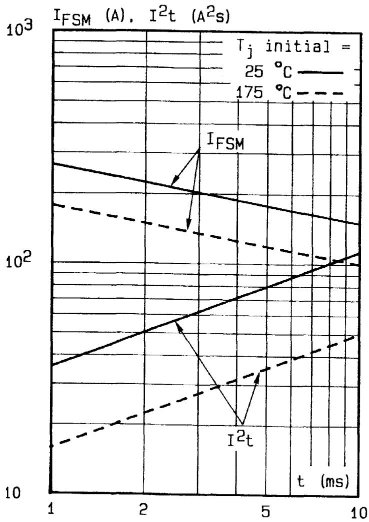


Fig.8 - Non repetitive surge peak forward current for a sinusoidal pulse with width : t ⩽ 10 ms, and corresponding value of I^2t.

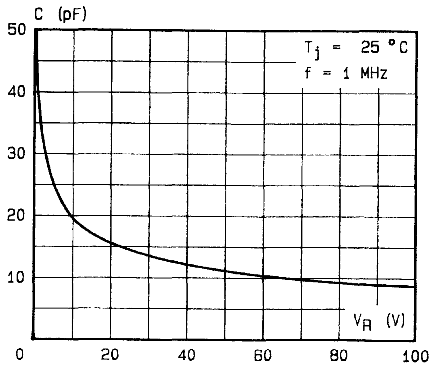


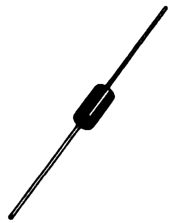
Fig.9 - Capacity C versus reverse applied voltage V_R (typical values).

SGS-THOMSON
MICROELECTRONICS

BYT 13-600 → 1000

FAST RECOVERY RECTIFIER DIODES

- SOFT RECOVERY
- VERY HIGH VOLTAGE
- SMALL RECOVERY CHARGE



DO 27 A
(Plastic)

APPLICATIONS
- ANTISATURATION DIODES FOR TRANSISTOR BASE DRIVE
- SNUBBER DIODES

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
I_{FRM}	Repetitive Peak Forward Current	$t_p \le 20\mu s$	50	A
$I_{F(AV)}$	Average Forward Current*	$T_a = 55°C$ $\delta = 0.5$	3	A
I_{FSM}	Surge non Repetitive Forward Current	$t_p = 10ms$ Sinusoidal	100	A
P_{tot}	Power Dissipation*	$T_a = 55°C$	3.75	W
T_{stg} T_j	Storage and Junction Temperature Range		– 40 to 150	°C
T_L	Maximum Lead Temperature for Soldering during 10s at 4mm from Case		230	°C

Symbol	Parameter	BYT 13–			Unit
		600	800	1000	
V_{RRM}	Repetitive Peak Reverse Voltage	600	800	1000	V

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j\text{-}a)}$	Junction-ambient*	25	°C/W

* On infinite heatsink with 10mm lead length.

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R	T_j = 25°C	$V_R = V_{RRM}$			20	µA
V_F	T_j = 25°C	I_F = 3A			1.3	V

RECOVERY CHARACTERISTICS

Symbol	Test Conditions				Min.	Typ.	Max.	Unit
t_{rr}	T_j = 25°C	I_F = 0.5A	I_R = 1A	I_{rr} = 0.25A			150	ns

To evaluate the conduction losses use the following equations :

$V_F = 0.95 + 0.050\ I_F$ $P = 0.95 \times I_{F(AV)} + 0.050\ I_{F}^{2}{}_{(RMS)}$

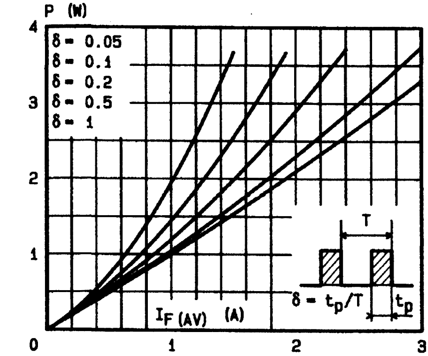


Fig.1 - Maximum average power dissipation versus average forward current.

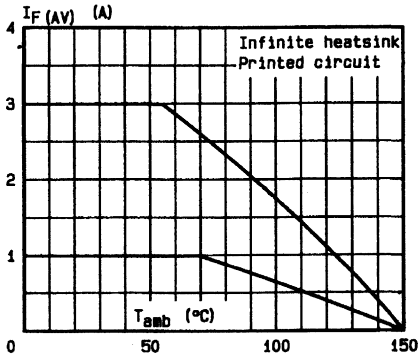


Fig.2 - Average forward current versus ambient temperature.

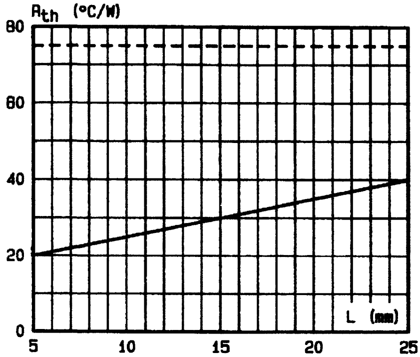
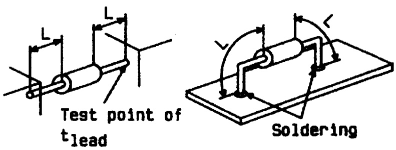


Fig.3 - Thermal resistance versus lead length.

Mounting n°1
INFINITE HEATSINK

Mounting n°2
PRINTED CIRCUIT



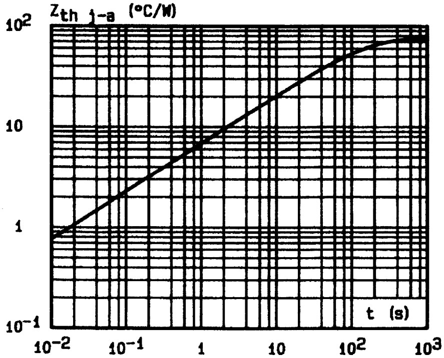


Fig.4 - Transient thermal impedance junction-ambient for mounting n°2 versus pulse duration (L = 10 mm).

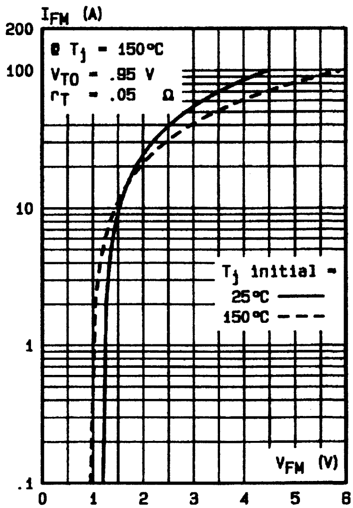


Fig.5 - Peak forward current versus peak forward voltage drop (maximum values).

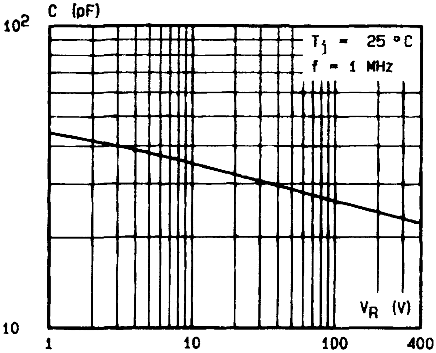


Fig.6 - Capacitance versus reverse applied voltage

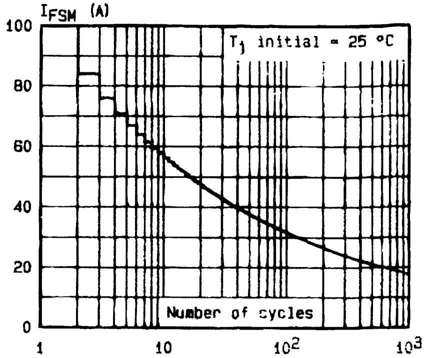


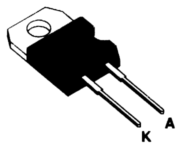
Fig.7 - Non repetitive surge peak current versus number of cycles

BYT71(F)-800

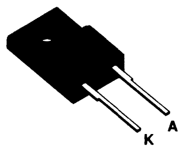
FAST RECOVERY RECTIFIER DIODES

FEATURES

- HIGH VOLTAGE CAPABILITY
- FAST AND SOFT RECOVERY
- INSULATED PACKAGE :
  insulating voltage = 2000V_{DC}
  capacitance = 12 pF



TO220AC
(Plastic)



ISOWATT220AC
(Plastic)

DESCRIPTION

Single chip rectifier suited for power conversion and polarity protection applications.
This device is packaged in TO220AC and in ISOWATT220AC.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter			Value	Unit
$I_{F(RMS)}$	RMS on-state current			12	A
$I_{F(AV)}$	Average forward current δ = 0.5	TO220AC	Tc=130°C	6	A
		ISOWATT220AC	Tc=105°C	6	
I_{FSM}	Surge non repetitive forward current		tp=10ms sinusoidal	90	A
Tstg Tj	Storage and junction temperature range			- 65 to + 150 - 65 to + 150	°C °C

Symbol	Parameter	BYT71- (F)					Unit
		100	200	400	600	800	
V_{RRM}	Repetitive peak off-state voltage	100	200	400	600	800	V

THERMAL RESISTANCES

Symbol	Parameter		Value	Unit
Rth (j-c)	Junction to case	TO220AC	2.3	°C/W
		ISOWATT220AC	4.9	

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R **	T_j = 25°C	$V_R = V_{RRM}$			20	µA
	T_j = 100°C				1	mA
V_F *	T_j = 100°C	I_F = 6 A			1.3	V
	T_j = 25°C	I_F = 6 A			1.4	

Pulse test : * tp = 380 µs, duty cycle < 2 %
** tp = 5 ms, duty cycle < 2 %

RECOVERY CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
trr	T_j = 25°C	I_F = 1A dI_F/dt = -15A/µs V_R = 30V			300	ns

To evaluate the conduction losses use the following equations :
$P = 1.15 \times I_{F(AV)} + 0.025 \times I_F{}^2{}_{(RMS)}$

Fig.1 : Average forward power dissipation versus average forward current.

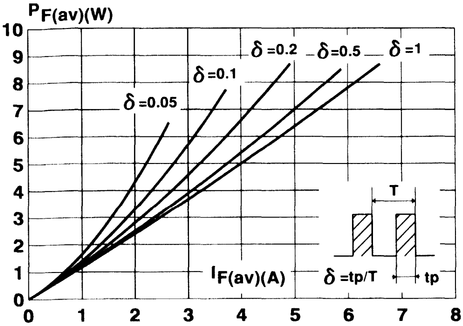


Fig.2 : Peak current versus form factor.

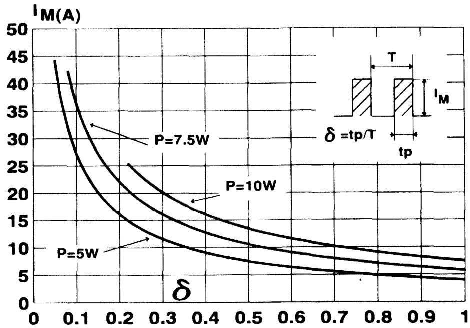


Fig.3 : Forward voltage drop versus forward current (maximum values).

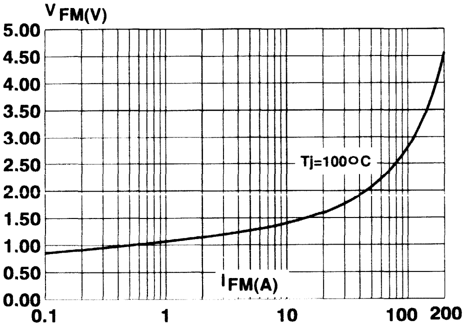


Fig.4 : Relative variation of thermal impedance junction to case versus pulse duration.
(TO 220 AC)

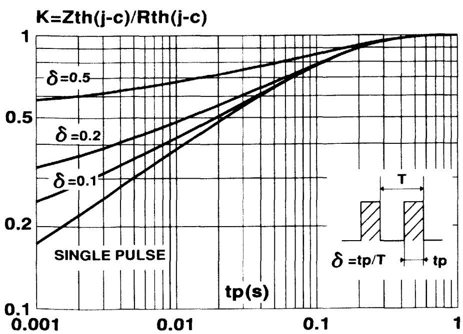


Fig.5 : Relative variation of thermal impedance junction to case versus pulse duration.
(ISOWATT220AC)

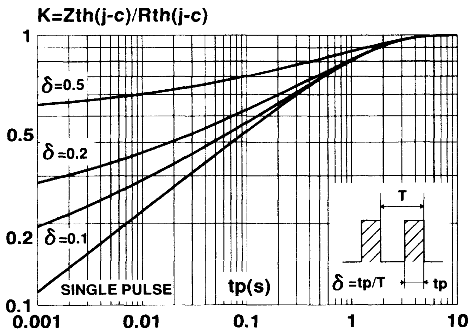


Fig.6 : Non repetitive surge peak forward current versus overload duration.
(TO 220 AB)

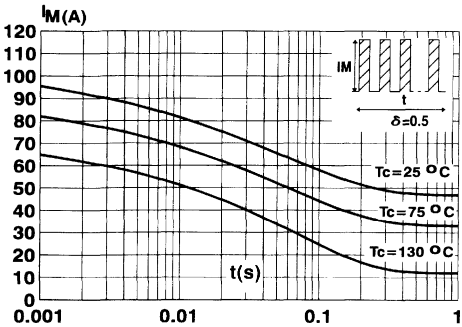


Fig.7 : Non repetitive surge peak forward current versus overload duration.
(ISOWATT220AB)

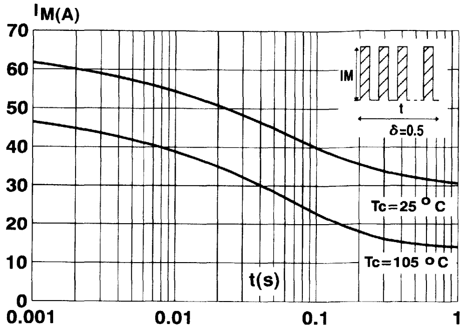


Fig.8 : Average current versus ambient temperature.
(duty cycle : 0.5) (TO 220 AB)

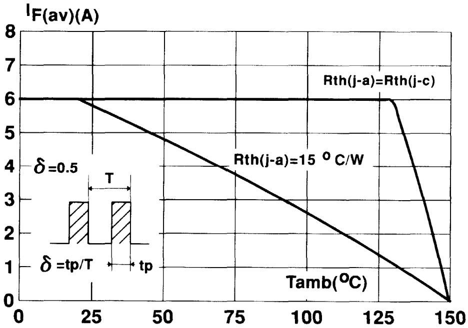


Fig.9 : Average current versus ambient temperature.
(duty cycle : 0.5) (ISOWATT220AB)

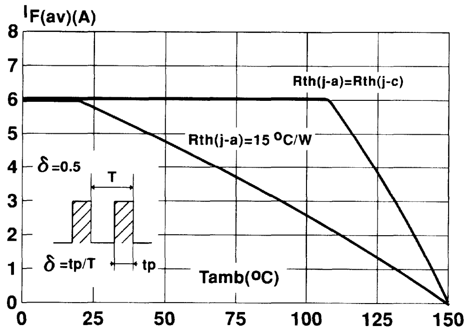


Fig.10 : Junction capacitance versus reverse voltage applied (Typical values).

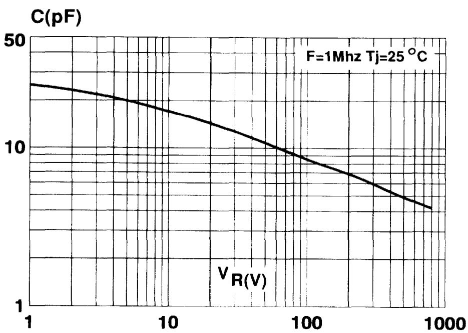


Fig.11 : Recovery charges versus dI_F/dt.

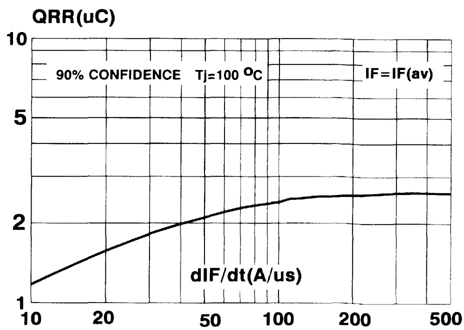


Fig.12 : Peak reverse current versus dIF/dt.

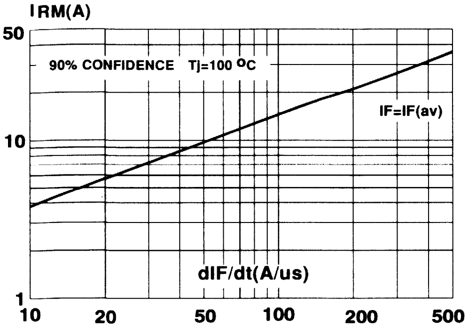


Fig.13 : Dynamic parameters versus junction temperature.

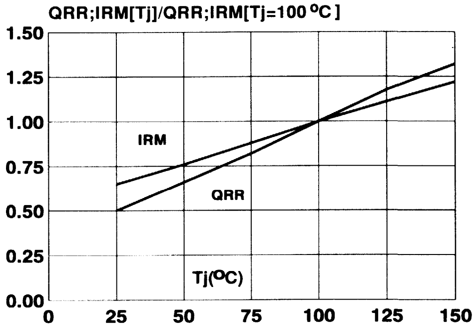


Fig.14 : Peak forward voltage versus dIF/dt.

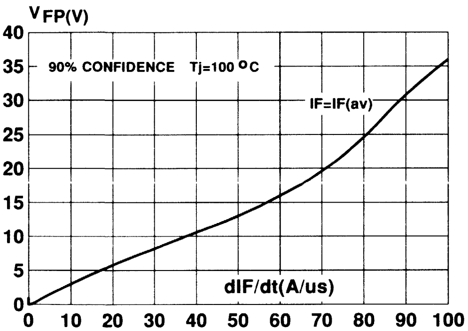
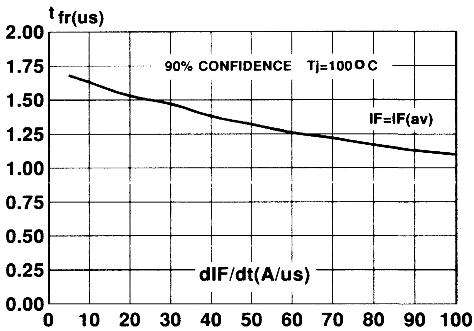


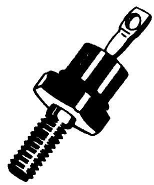
Fig.15 : Recovery time versus dIF/dt.



1N 3879 → 1N 3883

FAST RECOVERY RECTIFIER DIODES

- FAST RECOVERY TIME
- LOW FORWARD RECOVERY TIME



DO 4
(Metal)

APPLICATIONS
- DC AND AC MOTOR CONTROL
- SWITCHMODE POWER SUPPLY
- HIGH FREQUENCY CHOPPERS
- HIGH FREQUENCY RECTIFIERS

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
I_{FRM}	Repetitive Peak Forward Current	$t_p \leq 20\mu s$	130	A
$I_{F(AV)}$	Average Forward Current	$T_C = 100°C$	6	A
I_{FSM}	Surge non Repetitive Forward Current	$t_p = 10ms$ Sinusoidal	150	A
P_{tot}	Power Dissipation	$T_C = 100°C$	20	W
T_{stg} T_j	Storage and Junction Temperature Range		– 65 to 150	°C

Symbol	Parameter	1N					Unit
		3879	3880	3881	3882	3883	
V_{RRM}	Repetitive Peak Reverse Voltage	50	100	200	300	400	V

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-c)}$	Junction-case	2.5	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R	T_j = 25°C	$V_R = V_{RRM}$			15	µA
	T_j = 100°C				1	mA
V_F	T_j = 25°C	I_F = 6A			1.4	V

RECOVERY CHARACTERISTICS

Symbol	Test Conditions	Min.	Typ.	Max.	Unit
t_{rr}	T_j = 25°C I_F = 1A di_F/dt = – 15A/µs V_R = 30V			200	ns
Q_{rr}	T_j = 25°C I_F = 1A di_F/dt = – 15A/µs V_R = 30V			0.2	µC
I_{RM}	T_j = 25°C I_F = 1A di_F/dt = – 15A/µs V_R = 30V			2	A

To evaluate the conduction losses use the following equations :

$V_F = 1.2 + 0.02\ I_F$ $P = 1.2 \times I_{F(AV)} + 0.02\ I_F{}^2{}_{(RMS)}$.

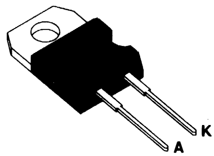
BY 233-200 → 600

FAST RECOVERY RECTIFIER DIODES

- LOW SWITCHING LOSSES
- LOW PEAK RECOVERY CURRENT I_{RM}
- THE SPECIFICATIONS AND CURVES ENABLE THE DETERMINATION OF t_{rr} AND I_{RM} AT 100°C UNDER USERS CONDITIONS

APPLICATIONS

- MOTOR CONTROLS (FREE-WHEELING DIODE)
- SWITCHMODE POWER SUPPLIES
- SNUBBER DIODES



TO220AC
(Plastic)

DESCRIPTION

Fast recovery rectifiers suited for power switching applications.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
I_{FRM}	Repetitive Peak Forward Current	$t_p \leq 20\mu s$	100	A
$I_{F\,(RMS)}$	RMS Forward Current		20	A
$I_{F\,(AV)}$	Average Forward Current	$T_C = 115°C$ $\delta = 0.5$	10	A
I_{FSM}	Surge non Repetitive Forward Current	$t_p = 10ms$ Sinusoidal	100	A
P_{tot}	Power Dissipation	$T_C = 90°C$	20	W
T_{stg} T_j	Storage and Junction Temperature Range		– 40 to 150	°C

Symbol	Parameter	BYX 233–			Unit
		200	400	600	
V_{RRM}	Repetitive Peak Reverse Voltage	200	400	600	V
V_{RSM}	Non Repetitive Peak Reverse Voltage	250	450	650	V

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\,(j-c)}$	Junction-case	3	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R	T_j = 25°C	$V_R = V_{RRM}$			20	µA
	T_j = 100°C				1	mA
V_F	T_j = 25°C	I_F = 8A			1.5	V
	T_j = 100°C				1.25	

RECOVERY CHARACTERISTICS

Symbol	Test Conditions	Min.	Typ.	Max.	Unit
t_{rr}	T_j = 25°C I_F = 1A di_F/dt = – 15A/µs V_R = 30V			150	ns
Q_{rr}	T_j = 25°C I_F = 8A di_F/dt = – 20A/µs V_R = 100V		2.2		µC
I_{RM}	T_j = 25°C I_F = 8A di_F/dt = – 20A/µs V_R = 100V			4	A

To evaluate the conduction losses use the following equations :

$V_F = 0.95 + 0.012\ I_F$ $\qquad P = 0.95 \times I_{F(AV)} + 0.012\ I_F{}^2{}_{(RMS)}$

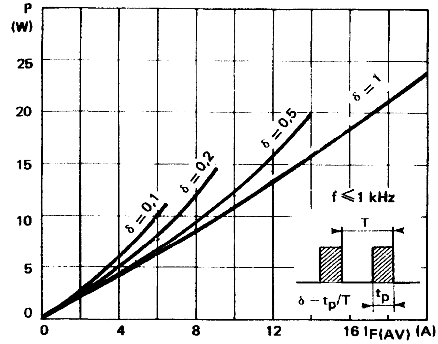


FIGURE 1 : Low frequency power losses versus average current

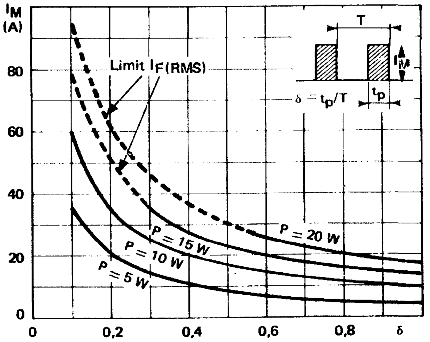


FIGURE 2 : Peak current versus form factor

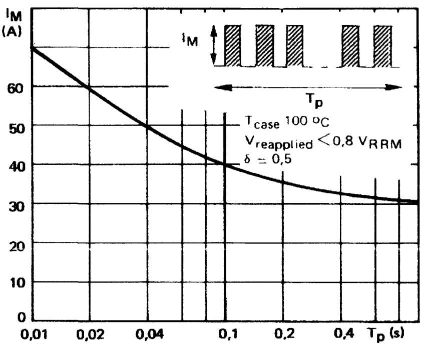


FIGURE 3 : Non repetitive peak surge current versus overload duration

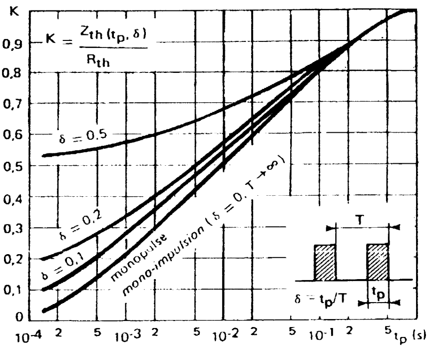


FIGURE 4 : Thermal impedance versus pulse width

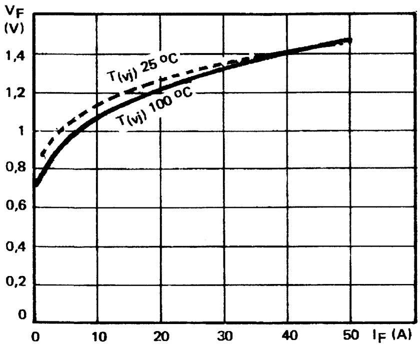


FIGURE 5 : Voltage drop versus forward current

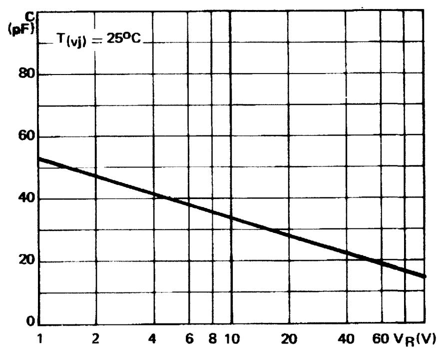


FIGURE 6 : Capacitance versus reverse voltage

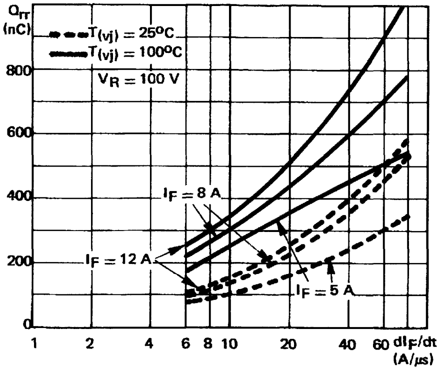


FIGURE 7 : Recovery charge versus dI_F/dt

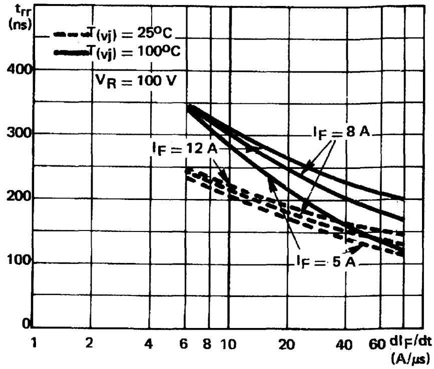


FIGURE 8 : Recovery time versus dI_F/dt

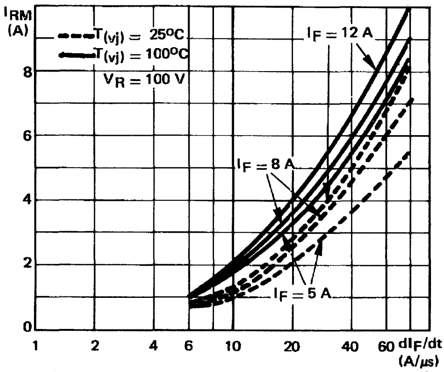


FIGURE 9 : Peak reverse current versus dI_F/dt

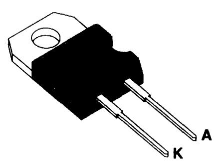
ESM 765-100 → 800

FAST RECOVERY RECTIFIER DIODES

- HIGH VOLTAGE CAPABILITY
- FAST AND SOFT RECOVERY
- THE SPECIFICATIONS AND CURVES ENABLE THE DETERMINATION OF THE trr AND I_{RM} AT 100°C UNDER USERS CONDITIONS

APPLICATIONS

- MOTOR CONTROLS AND CONVERTERS
- SWITCHMODE POWER SUPPLIES



TO220AC
(Plastic)

DESCRIPTION

Fast recovery rectifiers suited for applications in combination with superswitch transistors

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
I_{FRM}	Repetitive Peak Forward Current	$t_p \le 20\mu s$	120	A
$I_{F(RMS)}$	RMS Forward Current		16	A
$I_{F(AV)}$	Average Forward Current	$T_C = 100°C$ $\delta = 0.5$	10	A
I_{FSM}	Surge non Repetitive Forward Current	$t_p = 10ms$ Sinusoidal	120	A
P_{tot}	Power Dissipation	$T_C = 100°C$	20	W
T_{stg} T_j	Storage and Junction Temperature Range		– 40 to 150	°C

Symbol	Parameter	ESM 765-					Unit
		100	200	400	600	800	
V_{RRM}	Repetitive Peak Reverse Voltage	100	200	400	600	800	V
V_{RSM}	Non Repetitive Peak Reverse Voltage	100	200	400	600	800	V

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th(j-c)}$	Junction-case	2	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R	T_j = 25°C	$V_R = V_{RRM}$			20	µA
	T_j = 100°C				1	mA
V_F	T_j = 25°C	I_F = 10A			1.4	V
	T_j = 100°C				1.35	

RECOVERY CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
t_{rr}	T_j = 25°C V_R = 30V	I_F = 1A	di_F/dt = − 15A/µs			300	ns
Q_{rr}	T_j = 25°C V_R = 200V	I_F = 10A	di_F/dt = − 50A/µs		2.3		µC

To evaluate the conduction losses use the following equations :

$V_F = 1.2 + 0.015\ I_F$ $\qquad$ $P = 1.2 \times I_{F(AV)} + 0.015\ I_F{}^2{}_{(RMS)}$

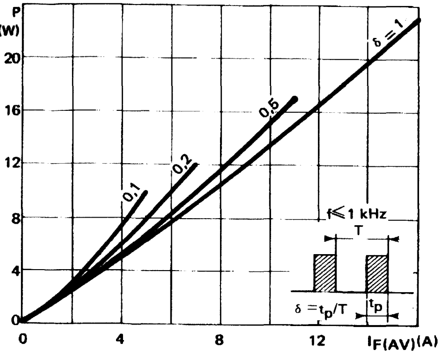


FIGURE 1: Low frequency power losses versus average current

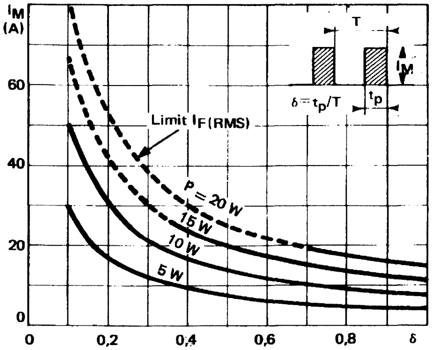


FIGURE 2: Peak current versus form factor

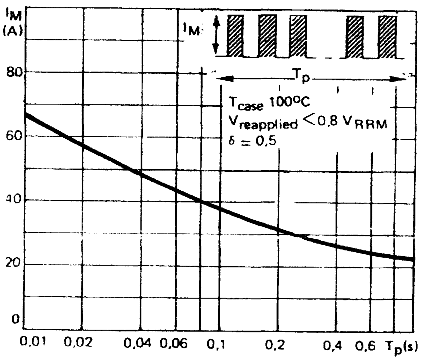


FIGURE 3: Non repetitive peak surge current versus overload duration

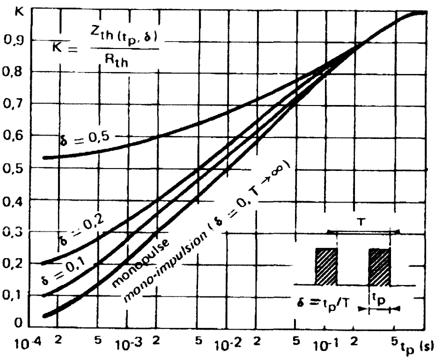


FIGURE 4: Thermal impedance versus pulse width

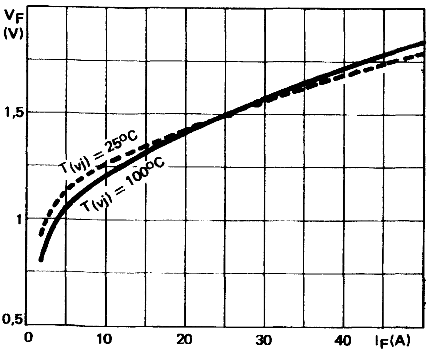


FIGURE 5: Forward voltage drop versus forward current

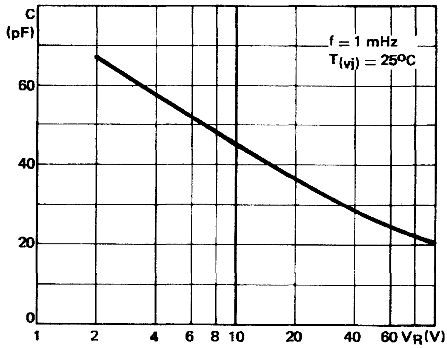


FIGURE 6: Capacitance versus applied reverse voltage

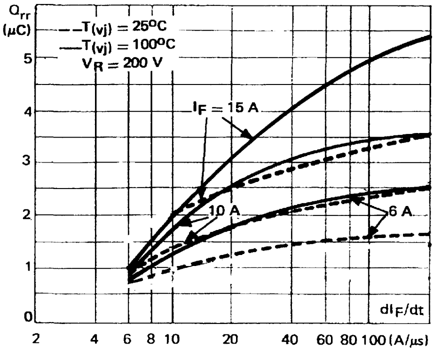


FIGURE 7: Recovery charge versus dI_F/dt

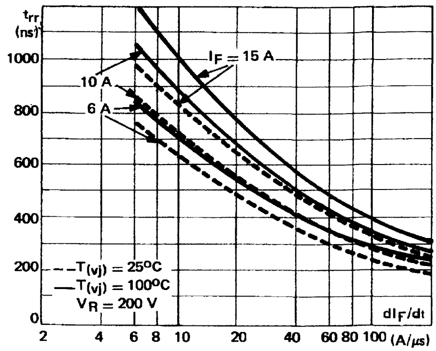


FIGURE 8: Recovery time versus dI_F/dt

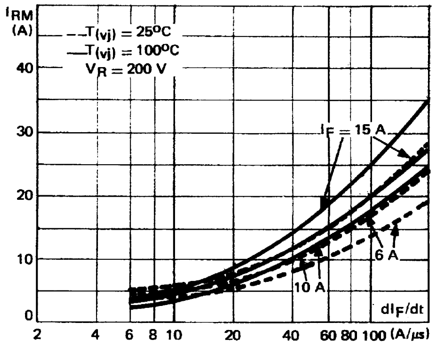


FIGURE 9: Peak reverse current versus dI_F/dt

SGS-THOMSON MICROELECTRONICS

SGS-THOMSON
MICROELECTRONICS

ESM 765PI-600/800

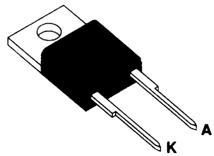
FAST RECOVERY RECTIFIER DIODES

- HIGH VOLTAGE CAPABILITY
- FAST AND SOFT RECOVERY
- THE SPECIFICATIONS AND CURVES ENABLE THE DETERMINATION OF t_{rr} AND I_{RM} AT 100°C UNDER USERS CONDITIONS
- INSULATED

APPLICATIONS

- MOTOR CONTROLS AND CONVERTERS
- SWITCHMODE POWER SUPPLIES

Insulating voltage 2500 V_{RMS}



Isolated
TO220AC
(Plastic)

DESCRIPTION

Fast recovery rectifiers suited for applications in combination with superswitch transistors.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
I_{FRM}	Repetitive Peak Forward Current	$t_p \leq 20\mu s$	120	A
$I_{F\ (RMS)}$	RMS Forward Current		16	A
$I_{F\ (AV)}$	Average Forward Current	T_C = 100°C δ = 0.5	10	A
I_{FSM}	Surge non Repetitive Forward Current	t_p = 10ms Sinusoidal	120	A
P_{tot}	Power Dissipation	T_C = 100°C	20	W
T_{stg} T_j	Storage and Junction Temperature Range		– 40 to 150	°C

Symbol	Parameter	ESM 765PI-		Unit
		600	800	
V_{RRM}	Repetitive Peak Reverse Voltage	600	800	V
V_{RSM}	Non Repetitive Peak Reverse Voltage	600	800	V

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-c)}$	Junction-case	3.5	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R	T_j = 25°C	$V_R = V_{RRM}$			20	µA
	T_j = 100°C				1	mA
V_F	T_j = 25°C	I_F = 10A			1.4	V
	T_j = 100°C				1.35	

RECOVERY CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
t_{rr}	T_j = 25°C V_R = 30V	I_F = 1A	di_F/dt = – 15A/µs			300	ns
Q_{rr}	T_j = 25°C V_R = 200V	I_F = 10A	di_F/dt = – 50A/µs		2.3		µC

To evaluate the conduction losses use the following equations :

$V_F = 1.2 + 0.015\ I_F$ $\qquad P = 1.2 \times I_{F(AV)} + 0.015\ I_F{}^2{}_{(RMS)}$

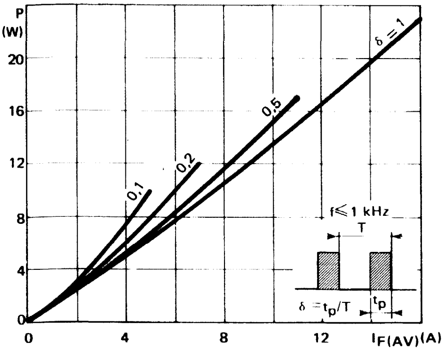


FIGURE 1: Low frequency power losses versus average current

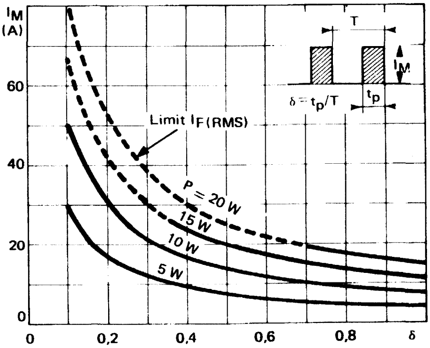


FIGURE 2: Peak current versus form factor

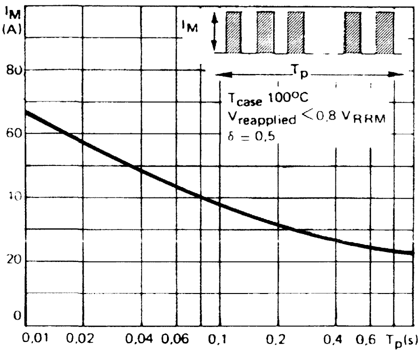


FIGURE 3: Non repetitive peak surge current versus overload duration

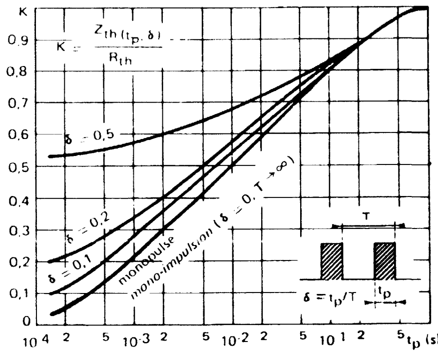


FIGURE 4: Thermal impedance versus pulse width

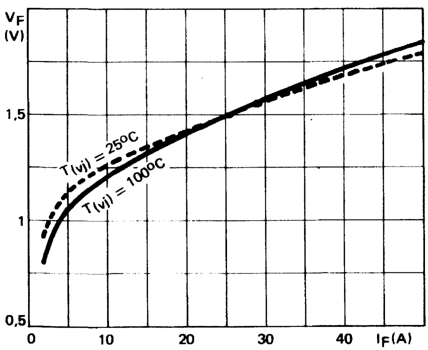


FIGURE 5: Forward voltage drop versus forward current

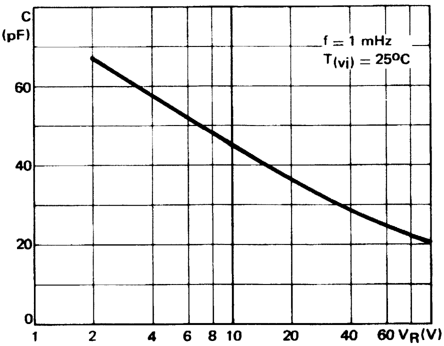


FIGURE 6: Capacitance versus applied reverse voltage

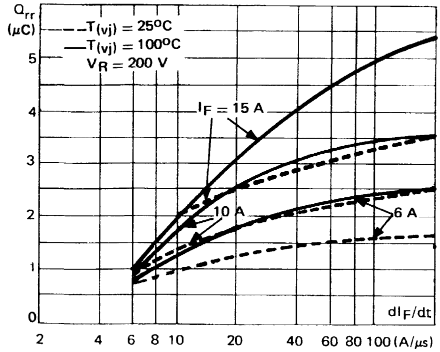


FIGURE 7: Recovery charge versus dI_F/dt

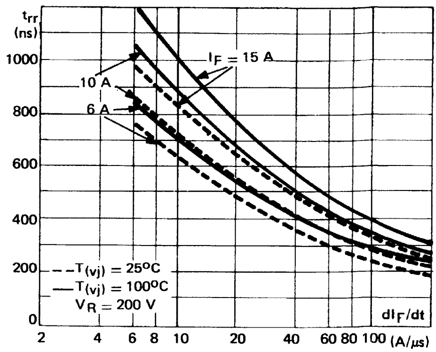


FIGURE 8:Recovery time versus dI_F/dt

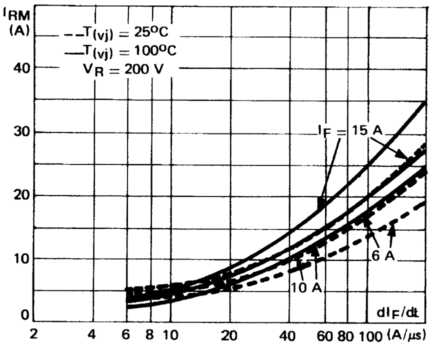


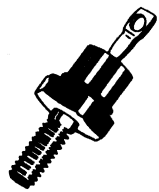
FIGURE 9: Peak reverse current versus dI_F/dt

SGS-THOMSON MICROELECTRONICS

BYX 61-50 → 400

FAST RECOVERY RECTIFIER DIODES

- VERY FAST RECOVERY TIME
- VERY LOW FORWARD RECOVERY TIME
- VERY LOW RECOVERED CHARGE



DO 4
(Metal)

APPLICATIONS

- DC AND AC MOTOR CONTROL
- SWITCHMODE POWER SUPPLY
- HIGH FREQUENCY CHOPPERS

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
I_{FRM}	Repetitive Peak Forward Current	$t_p \le 20\mu s$	130	A
$I_{F\,(AV)}$	Average Forward Current	$T_C = 100°C$	12	A
I_{FSM}	Surge non Repetitive Forward Current	$t_p = 10ms$ Sinusoidal	150	A
P_{tot}	Power Dissipation	$T_C = 100°C$	20	W
T_{stg} T_j	Storage and Junction Temperature Range		– 65 to 150	°C

Symbol	Parameter	BYX61-					Unit
		50	100	200	300	400	
V_{RRM}	Repetitive Peak Reverse Voltage	50	100	200	300	400	V

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\,(j-c)}$	Junction-case	2.5	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
I_R	T_j = 100°C	$V_R = V_{RRM}$				3	mA
V_F	T_j = 25°C	I_F = 12A				1.5	V

RECOVERY CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
t_{rr}	T_j = 25°C V_R = 30V	I_F = 1A	di_F/dt = – 15A/µs			100	ns
Q_{rr}	T_j = 25°C V_R = 30V	I_F = 1A	di_F/dt = – 15A/µs			0.075	µC
I_{RM}	T_j = 25°C V_R = 30V	I_F = 1A	di_F/dt = – 15A/µs			1.5	A

To evaluate the conduction losses use the following equations :

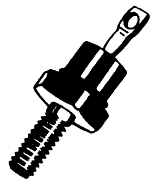
$V_F = 1.15 + 0.015\ I_F$ $\qquad$ $P = 1.5 \times I_{F(AV)} + 0.015\ I_F{}^2{}_{(RMS)}$

SGS-THOMSON
MICROELECTRONICS

1N 3889→1N 3893
BYX 62-600

FAST RECOVERY RECTIFIER DIODES

- FAST RECOVERY TIME
- LOW FORWARD RECOVERY TIME
- AVAILABLE UP TO 600V



DO 4
(Metal)

APPLICATIONS

- DC AND AC MOTOR CONTROL
- SWITCHMODE POWER SUPPLY
- HIGH FREQUENCY CHOPPERS
- HIGH FREQUENCY RECTIFIERS

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
I_{FRM}	Repetitive Peak Forward Current	$t_p \leq 20\mu s$	130	A
$I_{F(AV)}$	Average Forward Current	$T_C = 100°C$	12	A
I_{FSM}	Surge non Repetitive Forward Current	$t_p = 10ms$ Sinusoidal	150	A
P_{tot}	Power Dissipation	$T_C = 100°C$	20	W
T_{stg} T_j	Storage and Junction Temperature Range		– 65 to 150	°C

Symbol	Parameter	1N					BYX	Unit
		3889	3890	3891	3892	3893	62-600	
V_{RRM}	Repetitive Peak Reverse Voltage	50	100	200	300	400	600	V

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-c)}$	Junction-case	2.5	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R	T_j = 25°C	$V_R = V_{RRM}$			25	μA
	T_j = 100°C				3	mA
V_F	T_j = 25°C	I_F = 12A			1.4	V

RECOVERY CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
t_{rr}	T_j = 25°C V_R = 30V	I_F = 1A	di_F/dt = – 15A/μs			200	ns
Q_{rr}	T_j = 25°C V_R = 30V	I_F = 1A	di_F/dt = – 15A/μs			0.2	μC
I_{RM}	T_j = 25°C V_R = 30V	I_F = 1A	di_F/dt = – 15A/μs			2	A

To evaluate the conduction losses use the following equations :

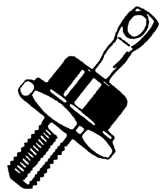
$V_F = 1.2 + 0.012\ I_F$ $\qquad$ $P = 1.2 \times I_{F(AV)} + 0.012\ I_F^2{}_{(RMS)}$

SGS-THOMSON MICROELECTRONICS

1N 3899→1N 3903 BYX 63-600

FAST RECOVERY RECTIFIER DIODES

- FAST RECOVERY TIME
- LOW FORWARD RECOVERY TIME
- AVAILABLE UP TO 600V



DO 5
(Metal)

APPLICATIONS
- DC AND AC MOTOR CONTROL
- SWITCHMODE POWER SUPPLY
- HIGH FREQUENCY CHOPPERS
- HIGH FREQUENCY RECTIFIERS

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
I_{FRM}	Repetitive Peak Forward Current	$t_p \leq 20\mu s$	200	A
$I_{F(AV)}$	Average Forward Current	$T_C = 100°C$	20	A
I_{FSM}	Surge non Repetitive Forward Current	$t_p = 10ms$ Sinusoidal	225	A
P_{tot}	Power Dissipation	$T_C = 100°C$	35	W
T_{stg} T_j	Storage and Junction Temperature Range		– 65 to 150	°C

Symbol	Parameter	1N					BYX	Unit
		3899	3900	3901	3902	3903	63-600	
V_{RRM}	Repetitive Peak Reverse Voltage	50	100	200	300	400	600	V

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-c)}$	Junction-case	1.5	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R	T_j = 25°C	$V_R = V_{RRM}$			50	µA
	T_j = 100°C				6	mA
V_F	T_j = 25°C	I_F = 20A			1.4	V

RECOVERY CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
t_{rr}	T_j = 25°C V_R = 30V	I_F = 1A	di_F/dt = – 15A/µs			200	ns
Q_{rr}	T_j = 25°C V_R = 30V	I_F = 1A	di_F/dt = – 15A/µs			0.3	µC
I_{RM}	T_j = 25°C V_R = 30V	I_F = 1A	di_F/dt = – 15A/µs			3	A

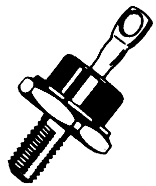
To evaluate the conduction losses use the following equations :

$V_F = 1.2 + 0.008\ I_F$ $P = 1.2 \times I_{F(AV)} + 0.008\ I_F{}^2{}_{(RMS)}$

1N 3909→1N 3913 BYX 64-600

FAST RECOVERY RECTIFIER DIODES

- FAST RECOVERY TIME
- LOW FORWARD RECOVERY TIME
- AVAILABLE UP TO 600V



DO 5
(Metal)

APPLICATIONS

- DC AND AC MOTOR CONTROL
- SWITCHMODE POWER SUPPLY
- HIGH FREQUENCY CHOPPERS
- HIGH FREQUENCY RECTIFIERS

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
I_{FRM}	Repetitive Peak Forward Current	$t_p \leq 20\mu s$	250	A
$I_{F(AV)}$	Average Forward Current	T_c = 100°C	30	A
I_{FSM}	Surge non Repetitive Forward Current	t_p = 10ms Sinusoidal	300	A
P_{tot}	Power Dissipation	T_c = 100°C	50	W
T_{stg} T_j	Storage and Junction Temperature Range		– 65 to 150	°C

Symbol	Parameter	1N					BYX 64-600	Unit
		3909	3910	3911	3912	3913		
V_{RRM}	Repetitive Peak Reverse Voltage	50	100	200	300	400	600	V

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-c)}$	Junction-case	1	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R	T_j = 25°C	$V_R = V_{RRM}$			50	µA
	T_j = 100°C				6	mA
V_F	T_j = 25°C	I_F = 30A			1.4	V

RECOVERY CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
t_{rr}	T_j = 25°C V_R = 30V	I_F = 1A	di_F/dt = – 15A/µs			200	ns
Q_{rr}	T_j = 25°C V_R = 30V	I_F = 1A	di_F/dt = – 15A/µs			0.3	µC
I_{RM}	T_j = 25°C V_R = 30V	I_F = 1A	di_F/dt = – 15A/µs			3	A

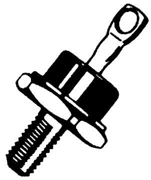
To evaluate the conduction losses use the following equations :

$V_F = 1.2 + 0.006\ I_F$ $\qquad$ $P = 1.2 \times I_{F(AV)} + 0.006\ I_F{}^2{}_{(RMS)}$

BYX 65-50 → 400

FAST RECOVERY RECTIFIER DIODES

- VERY FAST RECOVERY TIME
- VERY LOW FORWARD RECOVERY TIME
- VERY LOW RECOVERED CHARGE



DO 5
(Metal)

APPLICATIONS

- DC AND AC MOTOR CONTROL
- SWITCHMODE POWER SUPPLY
- HIGH FREQUENCY CHOPPERS

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
I_{FRM}	Repetitive Peak Forward Current	$t_p \leq 20\mu s$	250	A
$I_{F(AV)}$	Average Forward Current	$T_C = 100°C$	30	A
I_{FSM}	Surge non Repetitive Forward Current	$t_p = 10ms$ Sinusoidal	300	A
P_{tot}	Power Dissipation	$T_C = 100°C$	50	W
T_{stg} T_j	Storage and Junction Temperature Range		– 65 to 150	°C

Symbol	Parameter	BYX 65–					Unit
		50	100	200	300	400	
V_{RRM}	Repetitive Peak Reverse Voltage	50	100	200	300	400	V

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-c)}$	Junction-case	1	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R	T_j = 100°C	$V_R = V_{RRM}$			10	mA
V_F	T_j = 25°C	I_F = 30A			1.5	V

RECOVERY CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
t_{rr}	T_j = 25°C V_R = 30V	I_F = 1A	di_F/dt = – 15A/µs			100	ns
Q_{rr}	T_j = 25°C V_R = 30V	I_F = 1A	di_F/dt = – 15A/µs			0.075	µC
I_{RM}	T_j = 25°C V_R = 30V	I_F = 1A	di_F/dt = – 15A/µs			1.5	A

To evaluate the conduction losses use the following equations :

$V_F = 1.15 + 0.008\ I_F$ $\qquad$ $P = 1.15 \times I_{F(AV)} + 0.008\ I_{F}^{2}{}_{(RMS)}$

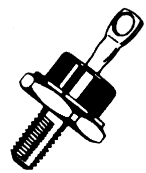
SGS-THOMSON MICROELECTRONICS

ESM243-50 → 400

FAST RECOVERY RECTIFIER DIODES

- VERY FAST RECOVERY TIME
- HIGH SURGE CURRENT CAPABILITY
- VERY LOW FORWARD RECOVERY TIME
- VERY LOW RECOVERED CHARGE

(Metric thread)



DO 5
(Metal)

APPLICATIONS

- DC AND AC MOTOR CONTROL
- SWITCHMODE POWER SUPPLY
- HIGH FREQUENCY CHOPPERS

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
I_{FRM}	Repetitive Peak Forward Current	$t_p \leq 20\mu s$	500	A
$I_{F(AV)}$	Average Forward Current	$T_C = 90°C$	60	A
I_{FSM}	Surge non Repetitive Forward Current	$t_p = 10ms$ Sinusoidal	800	A
P_{tot}	Power Dissipation	$T_C = 90°C$	110	W
T_{stg} T_j	Storage and Junction Temperature Range		– 65 to 165	°C

Symbol	Parameter	ESM 243–					Unit
		50	100	200	300	400	
V_{RRM}	Repetitive Peak Reverse Voltage	50	100	200	300	400	V

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-c)}$	Junction-case	0.7	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions	Min.	Typ.	Max.	Unit
I_R	T_j = 100°C $V_R = V_{RRM}$			10	mA
V_F	T_j = 25°C I_F = 60A			1.5	V

RECOVERY CHARACTERISTICS

Symbol	Test Conditions	Min.	Typ.	Max.	Unit
t_{rr}	T_j = 25°C I_F = 1A di_F/dt = – 15A/µs V_R = 30V			100	ns
Q_{rr}	T_j = 25°C I_F = 1A di_F/dt = – 15A/µs V_R = 30V			0.075	µC
I_{RM}	T_j = 25°C I_F = 1A di_F/dt = – 15A/µs V_R = 30V			1.5	A

To evaluate the conduction losses use the following equations :

$V_F = 1.15 + 0.004\ I_F$ $P = 1.15 \times I_{F(AV)} + 0.004\ I_{F}^{2}{}_{(RMS)}$

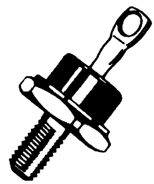
SGS-THOMSON MICROELECTRONICS

ESM 244-50 → 600

FAST RECOVERY RECTIFIER DIODES

- FAST RECOVERY TIME
- LOW FORWARD RECOVERY TIME
- HIGH SURGE CURRENT CAPABILITY
- AVAILABLE UP TO 600V

(Metric thread)



DO 5
(Metal)

APPLICATIONS

- DC AND AC MOTOR CONTROL
- SWITCHMODE POWER SUPPLY
- HIGH FREQUENCY CHOPPERS
- HIGH FREQUENCY RECTIFIERS

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
I_{FRM}	Repetitive Peak Forward Current	$t_p \leq 20\mu s$	500	A
$I_{F(AV)}$	Average Forward Current	$T_C = 90°C$	60	A
I_{FSM}	Surge non Repetitive Forward Current	$t_p = 10ms$ Sinusoidal	800	A
P_{tot}	Power Dissipation	$T_C = 90°C$	110	W
T_{stg} T_j	Storage and Junction Temperature Range		– 65 to 165	°C

Symbol	Parameter	ESM 244–							Unit
		50	100	200	300	400	500	600	
V_{RRM}	Repetitive Peak Reverse Voltage	50	100	200	300	400	500	600	V

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-c)}$	Junction-case	0.7	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R	T_j = 100°C	$V_R = V_{RRM}$			6	mA
V_F	T_j = 25°C	I_F = 60A			1.5	V

RECOVERY CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
t_{rr}	T_j = 25°C V_R = 30V	I_F = 1A	di_F/dt = – 15A/μs			200	ns
Q_{rr}	T_j = 25°C V_R = 30V	I_F = 1A	di_F/dt = – 15A/μs			0.3	μC
I_{RM}	T_j = 25°C V_R = 30V	I_F = 1A	di_F/dt = – 15A/μs			3	A

To evaluate the conduction losses use the following equations :

$V_F = 1.15 + 0.004\ I_F$ $\qquad$ $P = 1.15 \times I_{F(AV)} + 0.004\ I_F^2{}_{(RMS)}$

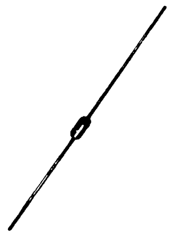
ULTRA-FAST DIODES

SGS-THOMSON MICROELECTRONICS

BYW 100-50 → 200

HIGH EFFICIENCY FAST RECOVERY RECTIFIER DIODES

- VERY LOW CONDUCTION LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- LOW FORWARD AND REVERSE RECOVERY TIMES
- HIGH SURGE CURRENT
- THE SPECIFICATIONS AND CURVES ENABLE THE DETERMINATION OF t_{rr} AND I_{RM} AT 100°C UNDER USERS CONDITIONS



F 126
(Plastic)

DESCRIPTION

Low voltage drop rectifiers suited for switching mode base drive and transistor circuits

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
I_{FRM}	Repetitive Peak Forward Current	$t_p \leq 20\mu s$	50	A
$I_{F(AV)}$	Average Forward Current*	$T_a = 90°C$ $\delta = 0.5$	1.5	A
I_{FSM}	Surge non Repetitive Forward Current	$t_p = 10ms$ Sinusoidal	50	A
P_{tot}	Power Dissipation*	$T_a = 90°C$	1.3	W
T_{stg} T_j	Storage and Junction Temperature Range		– 40 to 150	°C
T_L	Maximum Lead Temperature for Soldering during 10s at 4mm from Case		230	°C

Symbol	Parameter	BYW 100–				Unit
		50	100	150	200	
V_{RRM}	Repetitive Peak Reverse Voltage	50	100	150	200	V
V_{RSM}	Non Repetitive Peak Reverse Voltage	55	110	165	220	V

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\,(j-a)}$	Junction-ambient*	45	°C/W

* On infinite heatsink with 10mm lead length

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R	T_j = 25°C	$V_R = V_{RRM}$			10	µA
	T_j = 100°C				0.5	mA
V_F	T_j = 25°C	I_F = 4.5A			1.2	V
	T_j = 100°C	I_F = 1.5A			0.85	

RECOVERY CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
t_{rr}	T_j = 25°C V_R = 30V	I_F = 1A See figure 10	di_F/dt = – 50A/µs			35	ns
Q_{rr}	T_j = 25°C $V_R \leq$ 30V	I_F = 1A	di_F/dt = – 20A/µs		10		nC
t_{fr}	T_j = 25°C Measured at 1.1 x V_F	I_F = 1A	t_r = 10ns		30		ns
V_{FP}	T_j = 25°C	I_F = 1A	t_r = 10ns		5		V

To evaluate the conduction losses use the following equations :
$V_F = 0.66 + 0.075\ I_F$
$P = 0.06 \times I_{F(AV)} + 0.075\ I_F{}^2{}_{(RMS)}$

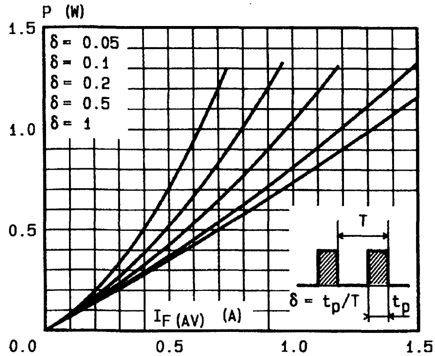


Fig.1 - Maximum average power dissipation versus average forward current.

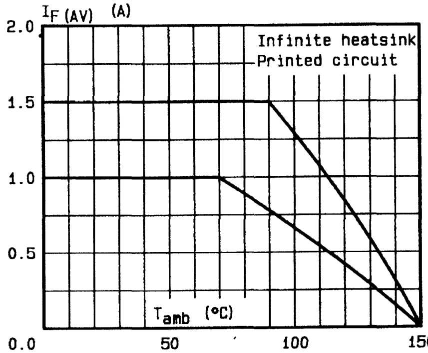


Fig.2 - Average forward current versus ambient temperature.

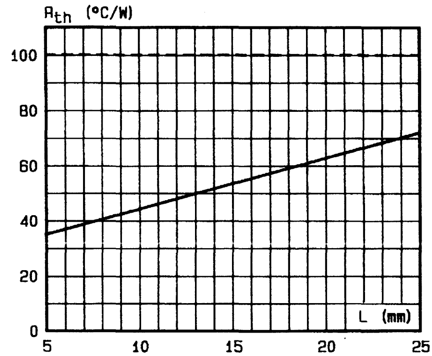
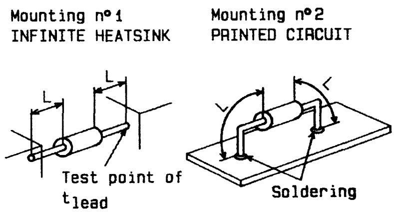


Fig.3 - Thermal resistance versus lead length.



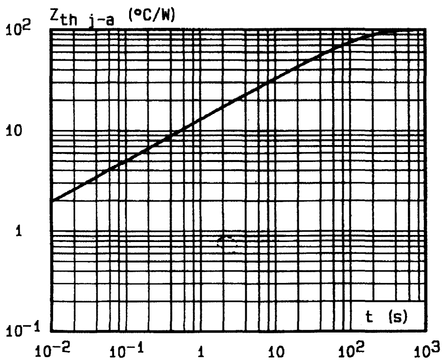


Fig.4 - Transient thermal impedance junction-ambient for mounting n°2 versus pulse duration (L = 10 mm).

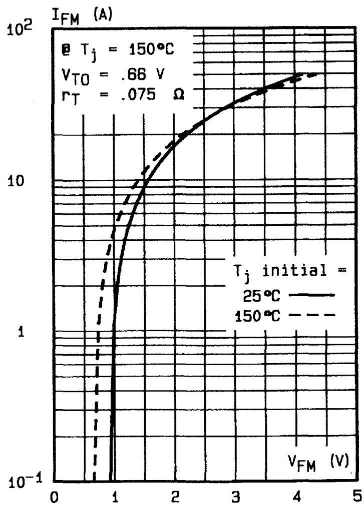


Fig.5 - Peak forward current versus peak forward voltage drop (maximum values).

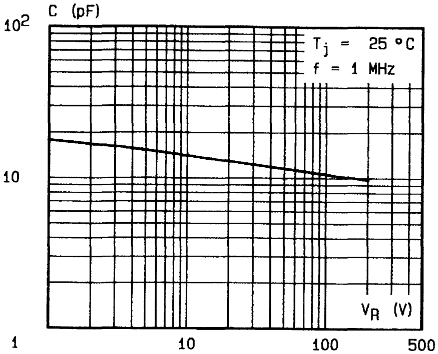


Fig.6 - Capacitance versus reverse voltage applied.

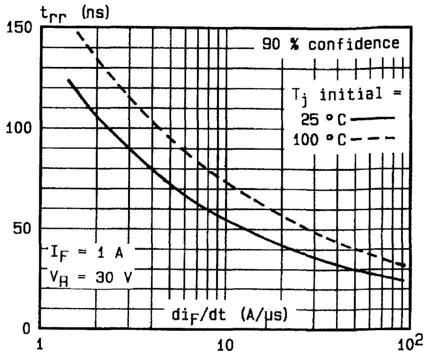


Fig.7 - Recovery time versus di_F/dt.

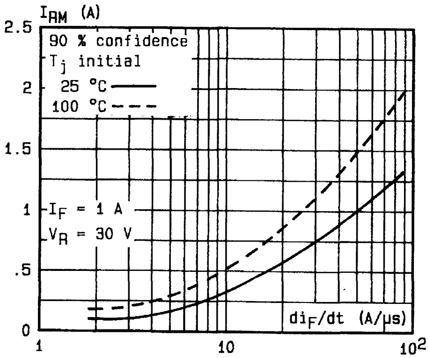


Fig.8 - Peak reverse current versus di_F/dt.

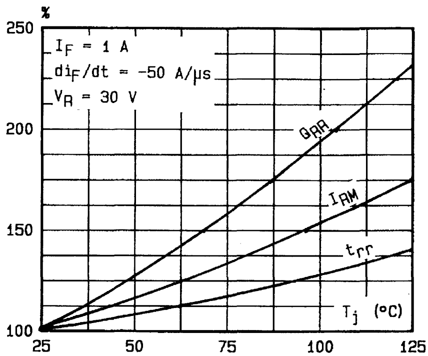


Fig.9 - Dynamic parameters versus junction temperature.

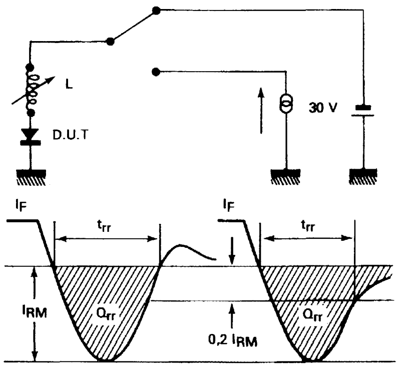


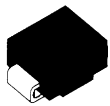
Fig.10 - Measurement of t_{rr} (Fig.7) and I_{RM} (Fig.8).

SGS-THOMSON MICROELECTRONICS

HIGH EFFICIENCY FAST RECOVERY RECTIFIER DIODES

FEATURES

- SUITED FOR SMPS
- VERY LOW FORWARD LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- HIGH SURGE CURRENT CAPABILITY
- HIGH AVALANCHE ENERGY CAPABILITY
- SURFACE MOUNT DEVICE



SOD6
(Plastic)

DESCRIPTION

Single chip rectifier suited for Switch Mode Power Supply and high frequency DC to DC converters. Packaged in SOD6, this surface mount device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter		Value	Unit
$I_{F(RMS)}$	RMS forward current		10	A
$I_{F(AV)}$	Average forward current	Tl=100°C δ = 0.5	2	A
I_{FSM}	Non repetitive surge peak forward current	tp=10ms sinusoidal	50	A
Tstg Tj	Storage and junction temperature range		- 40 to + 150 - 40 to + 150	°C °C

Symbol	Parameter	SMBYW02-				Unit
		50	100	150	200	
V_{RRM}	Repetitive peak reverse voltage	50	100	150	200	V

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
Rth (j-l)	Junction-leads	25	°C/W

ELECTRICAL CHARACTERISTICS
STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
V_F *	$T_j = 25°C$	$I_F = 6$ A			1.25	V
	$T_j = 100°C$	$I_F = 2$ A			0.85	
I_R **	$T_j = 25°C$	$V_R = V_{RRM}$			20	µA
	$T_j = 100°C$				0.5	mA

Pulse test : * tp = 380 µs, duty cycle < 2 %
** tp = 5 ms, duty cycle < 2 %

RECOVERY CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
trr	$T_j = 25°C$	$I_F = 1A$ $V_R = 30V$	$dI_F/dt = -50A/µs$			35	ns
tfr	$T_j = 25°C$	$I_F = 1A$ $V_{FR} = 1.1 \times V_F$	tr = 10 ns		30		ns
V_{FP}	$T_j = 25°C$	$I_F = 1A$	tr = 10 ns		5		V

To evaluate the conduction losses use the following equation :
$P = 0.7 \times I_{F(AV)} + 0.075 \times I_F{}^2{}_{(RMS)}$

Voltage (V)	50	100	150	200
Marking	A05	A10	A15	A20

Laser marking
Logo indicates cathode

Fig.1 : Low frequency power losses versus average current.

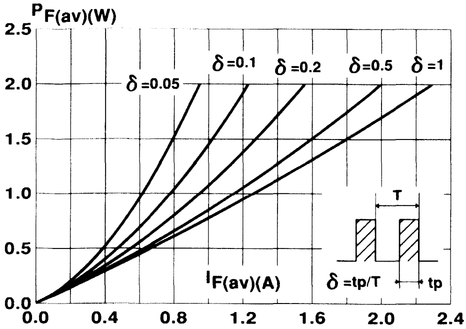


Fig.2 : Peak current versus form factor.

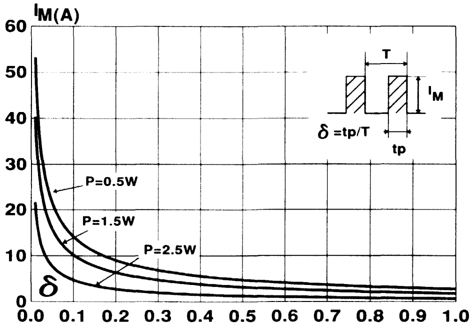


Fig.3 : Non repetitive surge peak forward current versus overload duration.

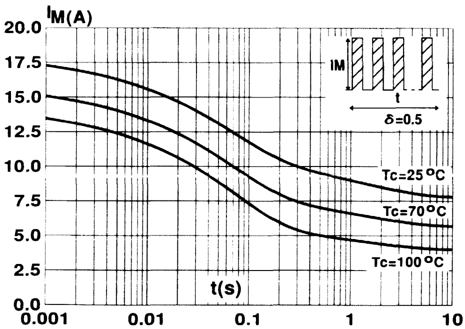


Fig.4 : Relative variation of thermal impedance junction to lead versus pulse duration.

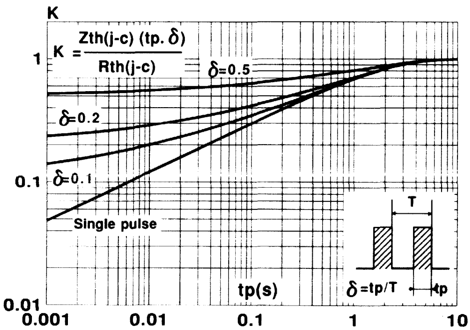


Fig.5 : Voltage drop versus forward current. (Maximum values)

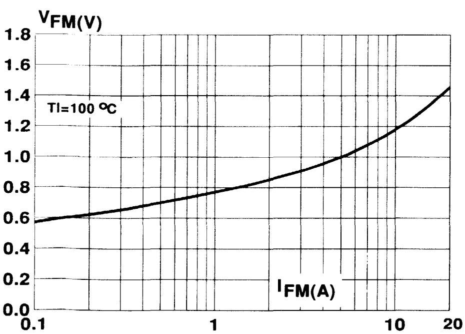


Fig.6 : Average current versus ambient temperature. (duty cycle : 0.5)

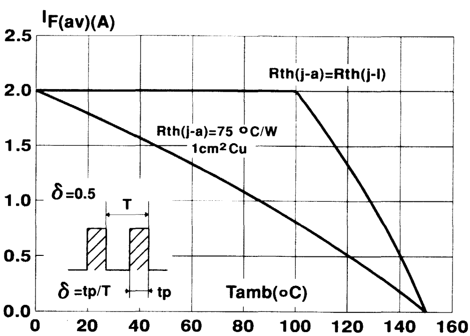


Fig.7 : Capacitance versus reverse voltage applied.

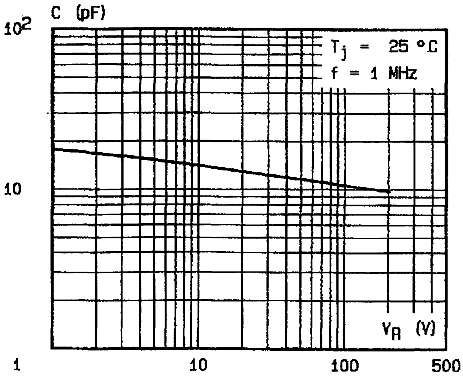


Fig.8 : Recovery time versus dIF/dt.

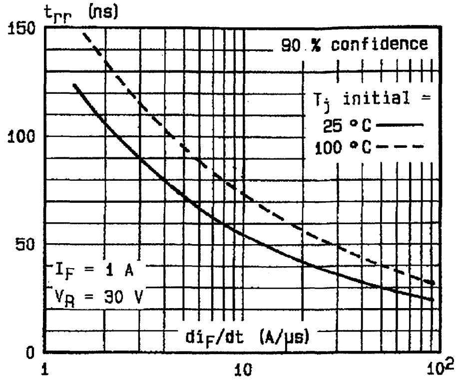


Fig.9 : Peak reverse current versus dIF/dt.

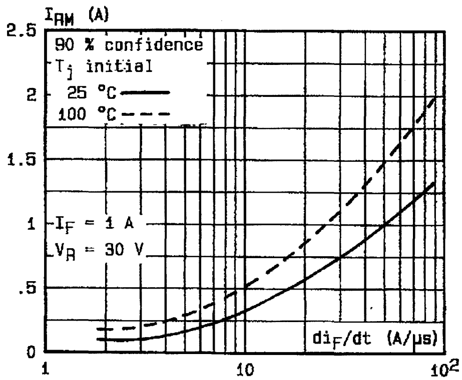


Fig.10 : Dynamic parameters versus junction temperature.

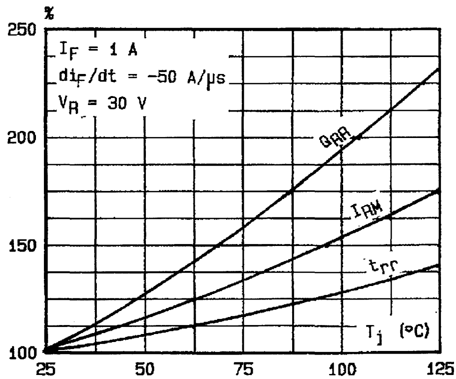
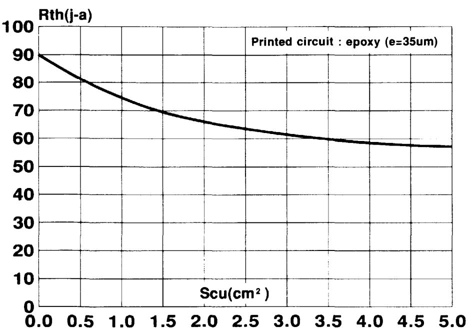


Fig.11 : Thermal resistance junction to ambient versus copper surface under each lead.

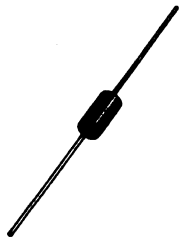


SGS-THOMSON MICROELECTRONICS

BYW 98-50 → 200

HIGH EFFICIENCY FAST RECOVERY RECTIFIER DIODES

- VERY LOW CONDUCTION LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- LOW FORWARD AND REVERSE RECOVERY TIMES
- HIGH SURGE CURRENT
- THE SPECIFICATIONS AND CURVES ENABLE THE DETERMINATION OF t_{rr} AND I_{RM} AT 100°C UNDER USERS CONDITIONS



DO 27A
(Plastic)

DESCRIPTION

Low voltage drop rectifiers suited for switching mode base drive and transistor circuits.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
I_{FRM}	Repetitive Peak Forward Current	$t_p \le 20\mu s$	70	A
$I_{F(AV)}$	Average Forward Current*	T_a = 85°C δ = 0.5	3	A
I_{FSM}	Surge non Repetitive Forward Current	t_p = 10ms Sinusoidal	70	A
P_{tot}	Power Dissipation*	T_a = 85°C	2.5	W
T_{stg} T_j	Storage and Junction Temperature Range		– 40 to 150	°C
T_L	Maximum Lead Temperature for Soldering during 10s at 4mm from Case		230	°C

Symbol	Parameter	BYW 98–				Unit
		50	100	150	200	
V_{RRM}	Repetitive Peak Reverse Voltage	50	100	150	200	V
V_{RSM}	Non Repetitive Peak Reverse Voltage	55	110	165	220	V

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\,(j-a)}$	Junction-ambient*	25	°C/W

* On infinite heatsink with 10mm lead length

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R	T_j = 25°C	$V_R = V_{RRM}$			10	μA
	T_j = 100°C				0.5	mA
V_F	T_j = 25°C	I_F = 9A			1.1	V
	T_j = 100°C	I_F = 3A			0.85	

RECOVERY CHARACTERISTICS

Symbol	Test Conditions	Min.	Typ.	Max.	Unit
t_{rr}	T_j = 25°C I_F = 1A di_F/dt = – 50A/μs V_R = 30V See figure 10			35	ns
Q_{rr}	T_j = 25°C I_F = 2A di_F/dt = – 20A/μs $V_R \leq$ 30V		12		nC
t_{fr}	T_j = 25°C I_F = 1A t_r = 10ns Measured at 1.1 x V_F		20		ns
V_{FP}	T_j = 25°C I_F = 1A t_r = 10ns		5		V

To evaluate the conduction losses use the following equations :

$V_F = 0.66 + 0.03\ I_F$

$P = 0.06 \times I_{F(AV)} + 0.03\ I_F{}^2{}_{(RMS)}$

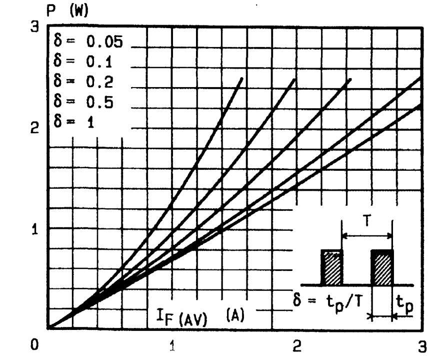


Fig.1 - Maximum average power dissipation versus average forward current.

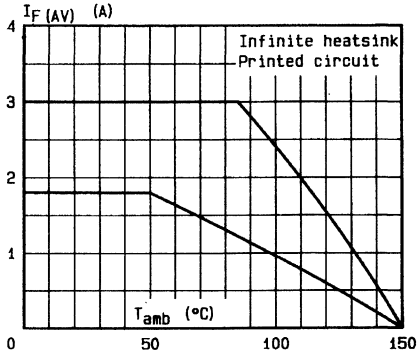


Fig.2 - Average forward current versus ambient temperature.

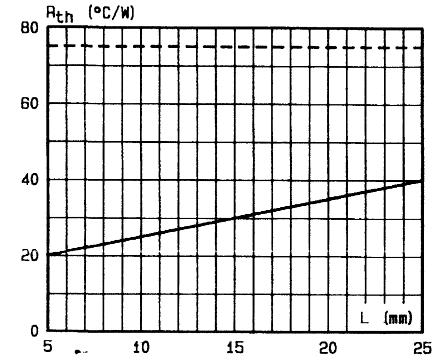
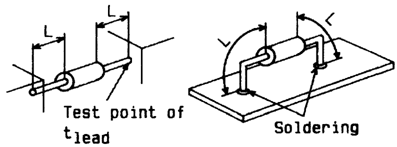


Fig.3 - Thermal resistance versus lead length.

Mounting n°1
INFINITE HEATSINK

Mounting n°2
PRINTED CIRCUIT



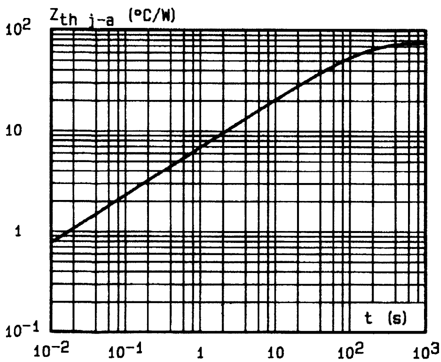


Fig.4 - Transient thermal impedance junction-ambient for mounting n°2 versus pulse duration (L = 10 mm).

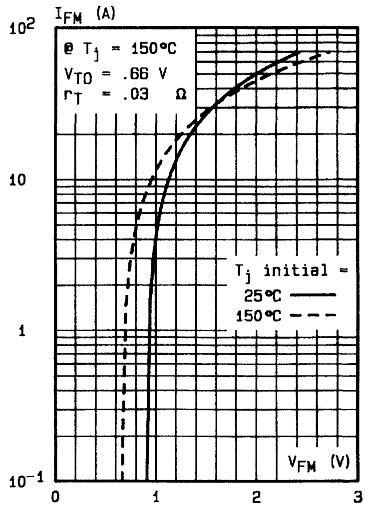


Fig.5 - Peak forward current versus peak forward voltage drop (maximum values).

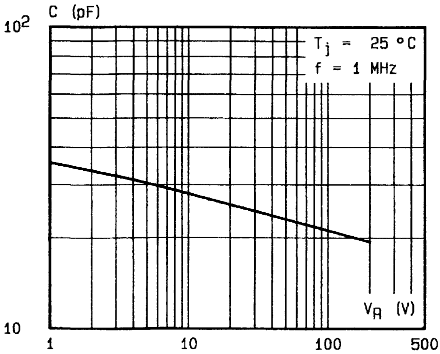


Fig.6 - Capacitance versus reverse voltage applied.

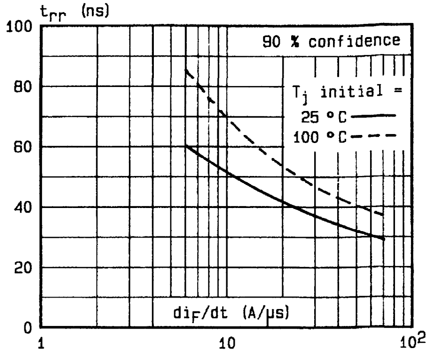


Fig.7 - Recovery time versus di_F/dt.

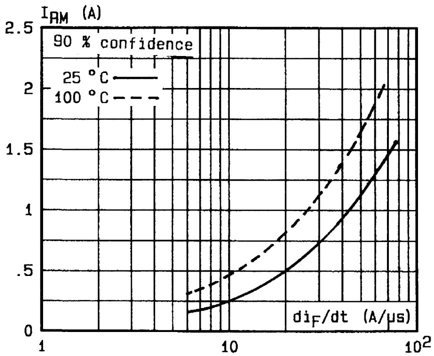


Fig.8 - Peak reverse current versus di_F/dt.

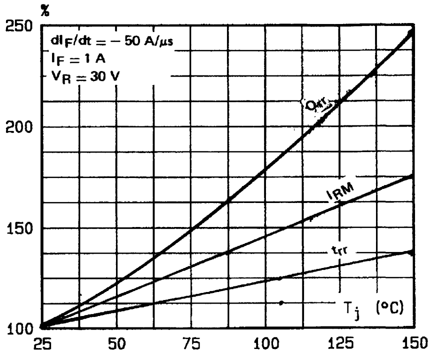


Fig.9 - Dynamic parameters versus junction temperature.

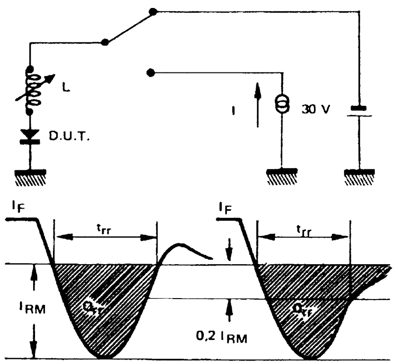


Fig.10 - Measurement of t_{rr} (Fig.7) and I_{RM} (Fig.8).

SMBYW04

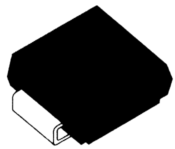
HIGH EFFICIENCY FAST RECOVERY RECTIFIER DIODES

FEATURES

- SUITED FOR SMPS
- VERY LOW FORWARD LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- HIGH SURGE CURRENT CAPABILITY
- HIGH AVALANCHE ENERGY CAPABILITY
- SURFACE MOUNT DEVICE

DESCRIPTION

Single chip rectifier suited for Switch Mode Power Supply and high frequency DC to DC converters. Packaged in SOD15, this surface mount device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.



SOD15
(Plastic)

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter		Value	Unit
$I_{F(RMS)}$	RMS forward current		10	A
$I_{F(AV)}$	Average forward current	Tl=70°C δ = 0.5	4	A
I_{FSM}	Non repetitive surge peak forward current	tp=10ms sinusoidal	70	A
Tstg Tj	Storage and junction temperature range		- 40 to + 150 - 40 to + 150	°C °C

Symbol	Parameter	SMBYW04-				Unit
		50	100	150	200	
V_{RRM}	Repetitive peak reverse voltage	50	100	150	200	V

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
Rth (j-l)	Junction-leads	20	°C/W

ELECTRICAL CHARACTERISTICS
STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
V_F *	$T_j = 25°C$	$I_F = 12$ A			1.25	V
	$T_j = 100°C$	$I_F = 4$ A			0.85	
I_R **	$T_j = 25°C$	$V_R = V_{RRM}$			20	µA
	$T_j = 100°C$				0.5	mA

Pulse test : * tp = 380 µs, duty cycle < 2 %
** tp = 5 ms, duty cycle < 2 %

RECOVERY CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
trr	$T_j = 25°C$	$I_F = 1A$ $dI_F/dt = -50A/µs$ $V_R = 30V$			35	ns
tfr	$T_j = 25°C$	$I_F = 1A$ tr = 10 ns $V_{FR} = 1.1 \times V_F$		20		ns
V_{FP}	$T_j = 25°C$	$I_F = 1A$ tr = 10 ns		5		V

To evaluate the conduction losses use the following equation :
$P = 0.7 \times I_{F(AV)} + 0.037 \times I_F^2{}_{(RMS)}$

Voltage (V)	50	100	150	200
Marking	D05	D10	D15	D20

Laser marking
Logo indicates cathode

Fig.1 : Low frequency power losses versus average current.

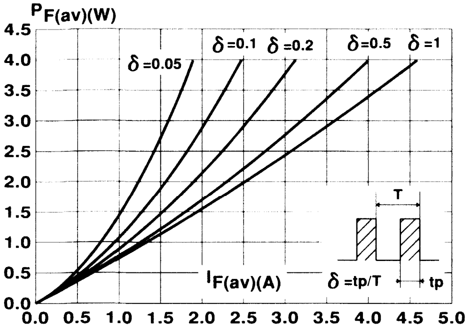


Fig.2 : Peak current versus form factor.

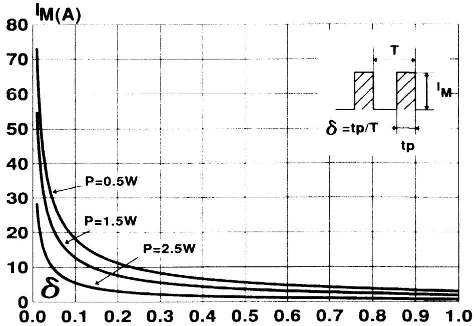


Fig.3 : Non repetitive surge peak forward current versus overload duration.

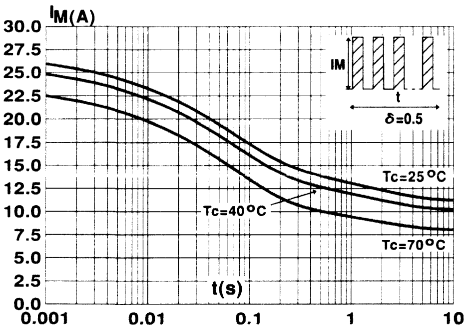


Fig.4 : Relative variation of thermal impedance junction to lead versus pulse duration.

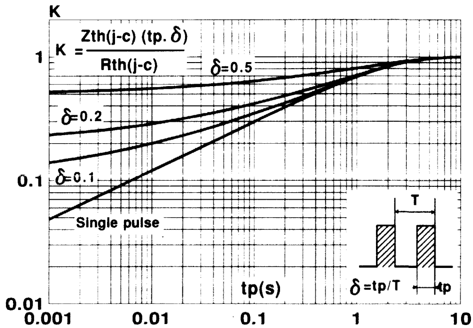


Fig.5 : Voltage drop versus forward current. (Maximum values)

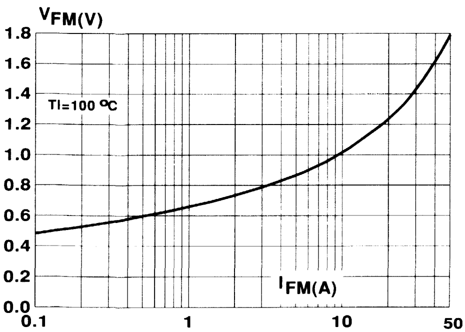
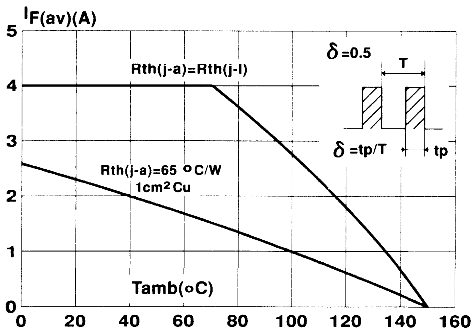


Fig.6 : Average current versus ambient temperature. (duty cycle : 0.5)



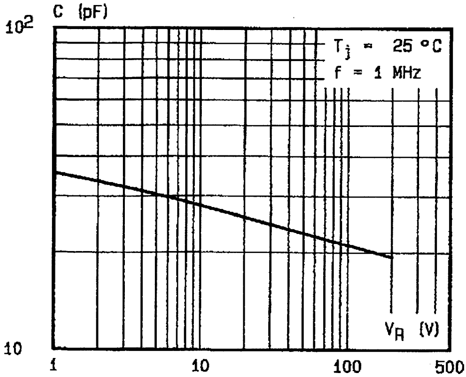


Fig.7 : Capacitance versus reverse voltage applied.

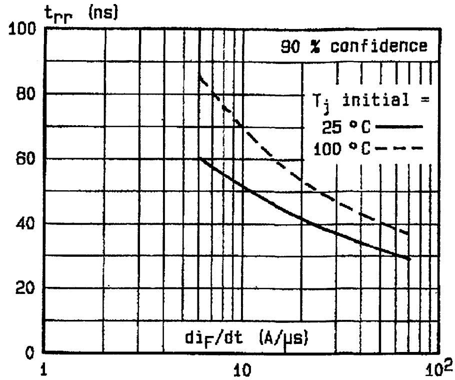


Fig.8 : Recovery time versus dIF/dt.

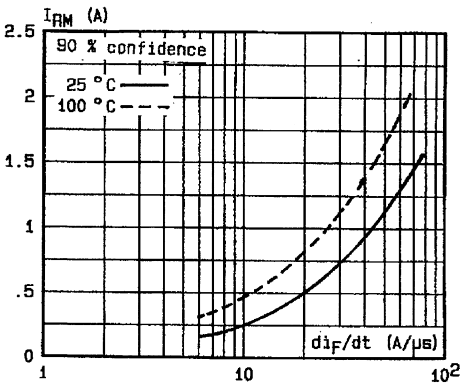


Fig.9 : Peak reverse current versus dIF/dt.

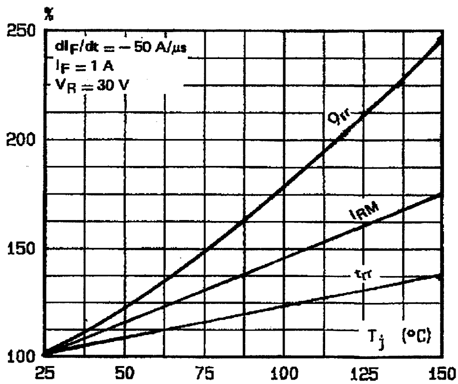


Fig.10 : Dynamic parameters versus junction temperature.

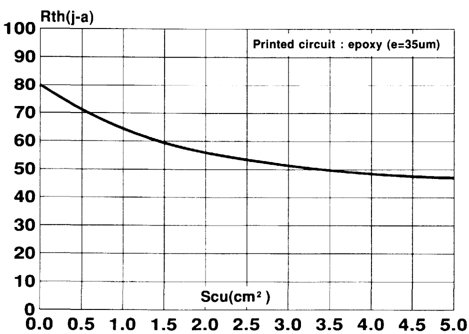
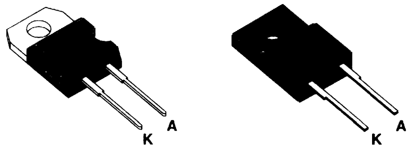


Fig.11 : Thermal resistance junction to ambient versus copper surface under each lead.

HIGH EFFICIENCY FAST RECOVERY RECTIFIER DIODES

FEATURES

- SUITED FOR SMPS
- VERY LOW FORWARD LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- HIGH SURGE CURRENT CAPABILITY
- HIGH AVALANCHE ENERGY CAPABILITY
- INSULATED VERSION (ISOWATT220AC) :
  Insulating voltage = 2000 V DC
  Capacitance = 12 pF



TO220AC
(Plastic)

BYW29-200

isolated ISOWATT220AC
(Plastic)

BYW29F-200

DESCRIPTION

Single chip rectifier suited for switchmode power supply and high frequency DC to DC converters. Packaged in TO220AC or ISOWATT220AC this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter			Value	Unit
$I_{F(RMS)}$	RMS forward current			16	A
$I_{F(AV)}$	Average forward current $\delta = 0.5$	TO220AC	Tc=120°C	8	A
		ISOWATT220AC	Tc=100°C	8	
I_{FSM}	Surge non repetitive forward current		tp=10ms sinusoidal	80	A
Tstg Tj	Storage and junction temperature range			- 65 to + 150 - 65 to + 150	°C °C

Symbol	Parameter	BYW29-(F)				Unit
		50	100	150	200	
V_{RRM}	Repetitive peak reverse voltage	50	100	150	200	V

THERMAL RESISTANCE

Symbol	Parameter		Value	Unit
Rth (j-c)	Junction to case	TO220AC	2.8	°C/W
		ISOWATT220AC	5.0	

ELECTRICAL CHARACTERISTICS
STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R *	T_j = 25°C	$V_R = V_{RRM}$			10	µA
	T_j = 100°C				0.6	mA
V_F **	T_j = 125°C	I_F = 5 A			0.85	V
	T_j = 125°C	I_F = 10 A			1.05	
	T_j = 25°C	I_F = 10 A			1.15	

Pulse test :* tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2 %

To evaluate the conduction losses use the following equation :
$P = 0.65 \times I_{F(AV)} + 0.040 \times I_F{}^2{}_{(RMS)}$

RECOVERY CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
trr	T_j = 25°C	I_F = 0.5A Irr = 0.25A I_R = 1A			25	ns
		I_F = 1A dI_F/dt = -50A/µs V_R = 30V			35	
tfr	T_j = 25°C	I_F = 1A tr = 10 ns $V_{FR} = 1.1 \times V_F$		15		ns
V_{FP}	T_j = 25°C	I_F = 1A tr = 10 ns		2		V

Fig.1 : Average forward power dissipation versus average forward current.

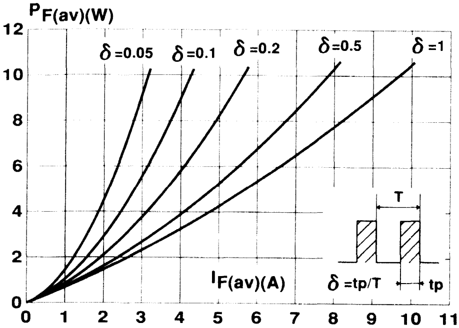


Fig.2 : Peak current versus form factor.

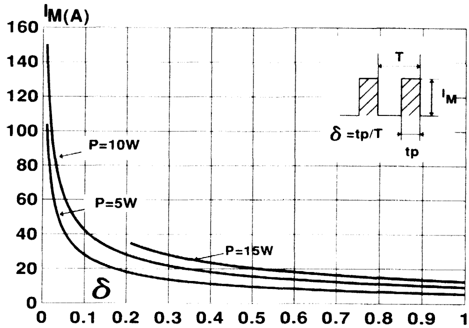


Fig.3 : Forward voltage drop versus forward current (maximum values).

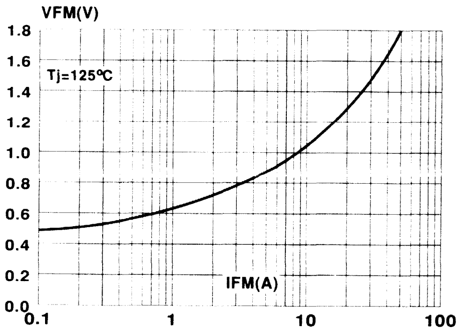


Fig.4 : Relative variation of thermal impedance junction to case versus pulse duration. (TO220AC)

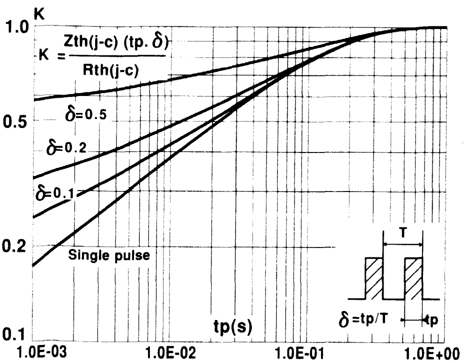


Fig.5 : Relative variation of thermal impedance junction to case versus pulse duration. (ISOWATT220AC)

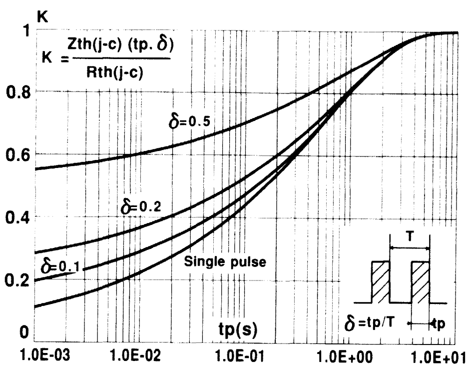


Fig.6 : Non repetitive surge peak forward current versus overload duration.
(TO220AC)

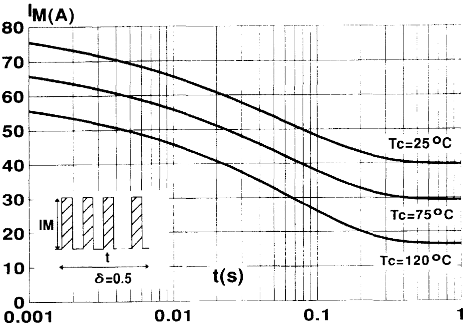


Fig.7 : Non repetitive surge peak forward current versus overload duration.
(ISOWATT220AC)

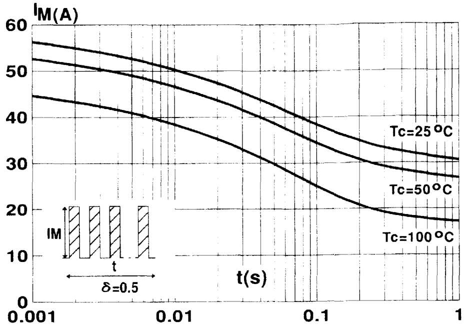


Fig.8 : Average current versus ambient temperature.
(duty cycle : 0.5) (TO220AC)

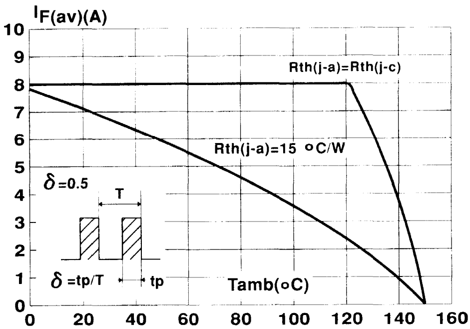


Fig.9 : Average current versus ambient temperature.
(duty cycle : 0.5) (ISOWATT220AC)

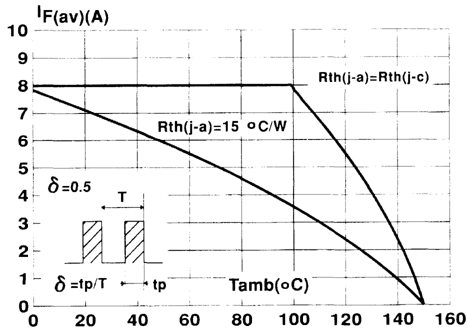


Fig.10 : Junction capacitance versus reverse voltage applied (Typical values).

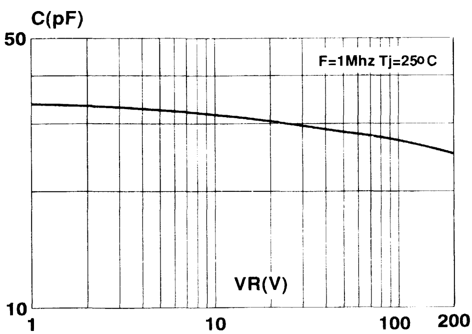


Fig.11 : Recovery charges versus dI_F/dt.

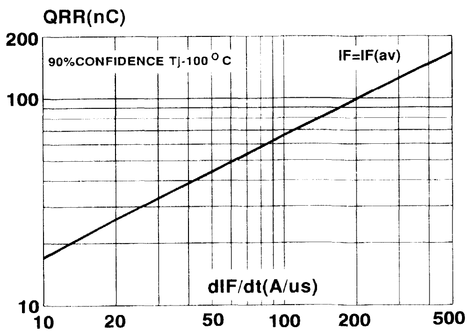


Fig.12 : Peak reverse current versus dIF/dt.

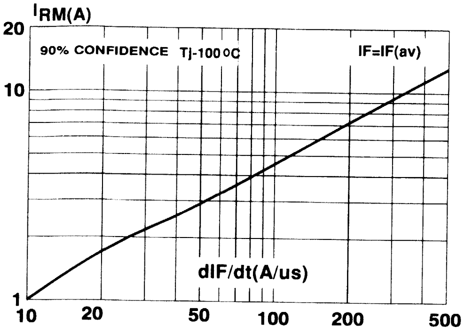
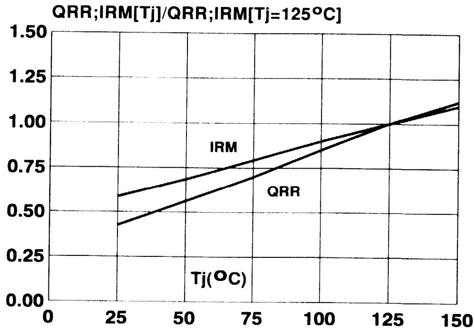


Fig.13 : Dynamic parameters versus junction temperature.



SGS-THOMSON MICROELECTRONICS

BYW29M-200

HIGH EFFICIENCY FAST RECOVERY DIODES

MAIN PRODUCT CHARACTERISTICS

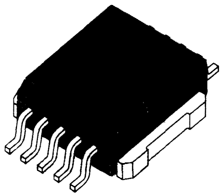
$I_{F(AV)}$	8 A
V_{RRM}	200 V
trr	35 ns
V_F	0.85 V

FEATURES AND BENEFITS

- VERY SMALL CONDUCTION LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- LOW FORWARD AND REVERSE RECOVERY TIMES
- HIGH SURGE CURRENT
- HIGH DISSIPATION MINIATURE PACKAGE
- SURFACE MOUNT TECHNOLOGY COMPATIBLE

DESCRIPTION

Single rectifier suited for switchmode power supply and high frequency DC to DC converters.
Packaged in a high performance surface mount package PSO-10, this device is intended for use in high frequency inverters, free wheeling and polarity protection applications.



Power SO-10™
Plastic, non isolated SMD
with copper tab

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		200	V
$I_{F(RMS)}$	RMS forward current	(All pins connected)	17	A
$I_{F(AV)}$	Average forward current	Tc=120°C $\delta = 0.5$	8	A
I_{FSM}	Surge non repetitive forward current (All pins connected)	tp=10ms sinusoidal	80	A
I_{FRM}	Repetitive peak forward current	tp = 5 µs f = 5 kHz	75	A
Tstg Tj	Storage and junction temperature range		- 40 to + 150	°C

TM : PowerSO-10 and TURBOSWITCH are trademarks of SGS-THOMSON Microelectronics.

August 1993 Ed : 2A

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j\text{-}c)}$	Junction to case thermal resistance	2.8	°C/W

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
I_R *	Reverse leakage current	$V_R = V_{RRM}$	$T_j = 25°C$			10	µA
			$T_j = 100°C$			0.6	mA
V_F **	Forward voltage drop	$I_F = 5$ A	$T_j = 125°C$			0.85	V
		$I_F = 10$ A	$T_j = 125°C$			1.05	
		$I_F = 10$ A	$T_j = 25°C$			1.15	

Pulse test : * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2 %

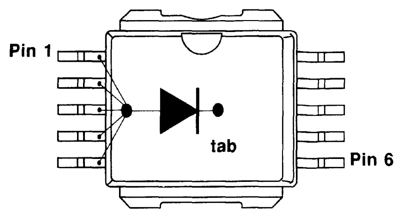
To evaluate the conduction losses use the following equation :
$P = 0.65 \times I_{F(AV)} + 0.040\ I_{F}^{2}{}_{(RMS)}$

RECOVERY CHARACTERISTICS

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
t_{rr}	Reverse recovery time	$T_j = 25°C$ $I_F = 0.5A$ $I_{rr} = 0.25$ A $I_R = 1A$			25	ns
		$T_j = 25°C$ $I_F = 1A$ $dI_F/dt = -50A/µs$ $V_R = 30V$			35	
t_{fr}	Forward recovery time	$T_j = 25°C$ $I_F = 1A$ $dI_F/dt = 100A/µs$ $V_{FR} = 1.1 \times V_F$ max		15		ns
V_{FP}	Peak forward voltage	$T_j = 25°C$ $I_F = 1A$ $dI_F/dt = 100A/µs$		2		V

PIN OUT configuration in PowerSO-10 :

Anode = pin 1 to 5
Cathode = connected to base tab



top view

Fig.1 : Average forward power dissipation versus average forward current.

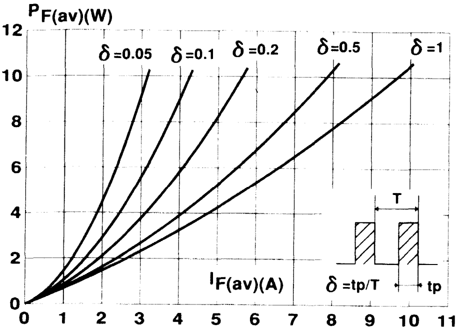


Fig.2 : Peak current versus form factor.

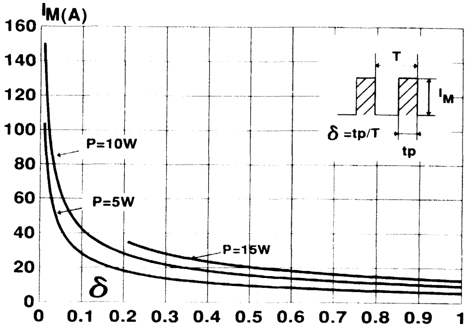


Fig.3 : Forward voltage drop versus forward current (maximum values).

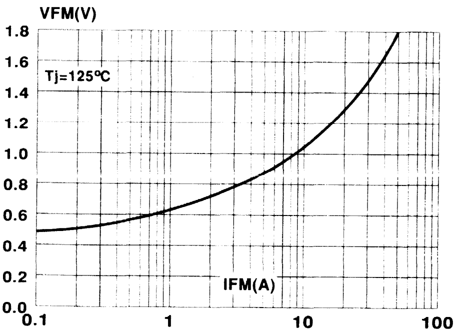


Fig.4 : Relative variation of thermal impedance junction to case versus pulse duration.

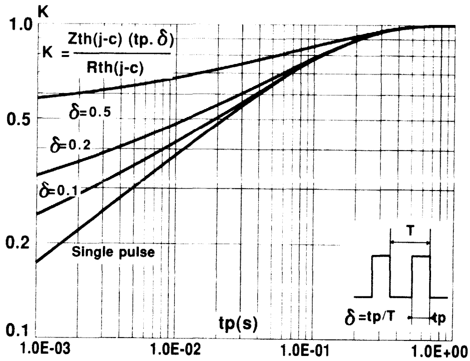


Fig.5 : Non repetitive surge peak forward current versus overload duration.

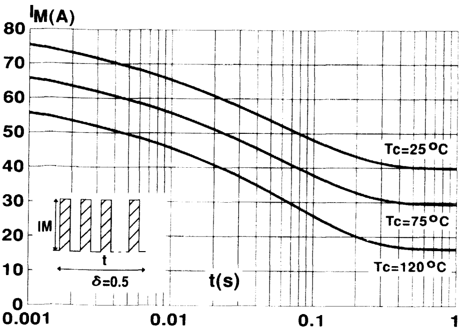


Fig.6 : Average current versus ambient temperature. (duty cycle : 0.5)

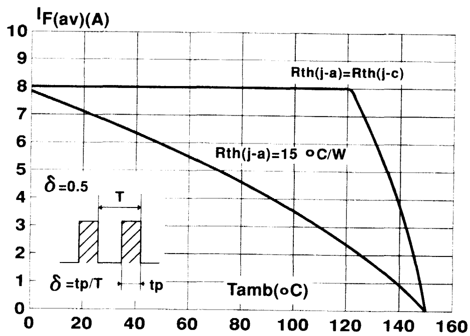


Fig.7 : Junction capacitance versus reverse voltage applied (Typical values).

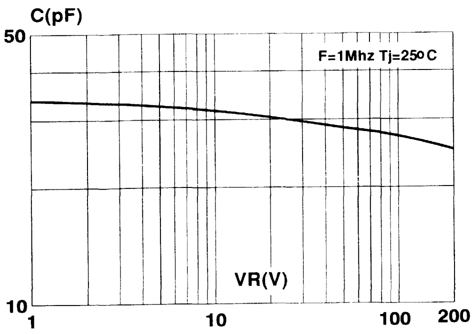


Fig.8 : Recovery charges versus dIF/dt.

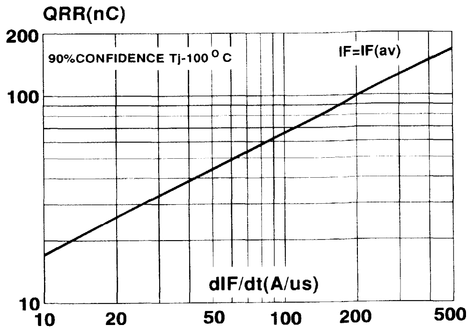


Fig.9 : Peak reverse current versus dIF/dt.

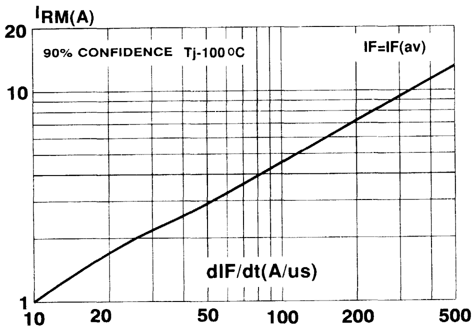
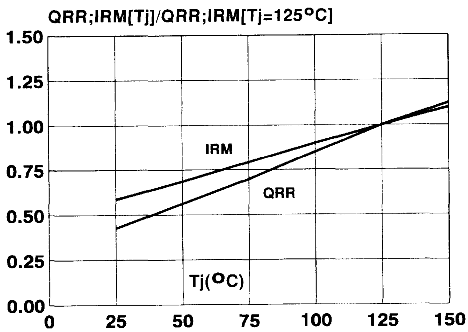


Fig.10 : Dynamic parameters versus junction temperature.

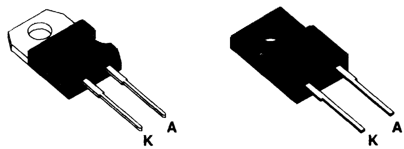


SGS-THOMSON MICROELECTRONICS

HIGH EFFICIENCY FAST RECOVERY RECTIFIER DIODES

FEATURES

- SUITED FOR SMPS
- VERY LOW FORWARD LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- HIGH SURGE CURRENT CAPABILITY
- HIGH AVALANCHE ENERGY CAPABILITY
- INSULATED VERSION (ISOWATT220AC) : Insulating voltage = 2000 V DC Capacitance = 12 pF



TO220AC (Plastic)	isolated ISOWATT220AC (Plastic)
BYW80-200	**BYW80F-200**

DESCRIPTION

Single chip rectifier suited for switchmode power supply and high frequency DC to DC converters. Packaged in TO220AC, or ISOWATT220AC this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter			Value	Unit
$I_{F(RMS)}$	RMS forward current			20	A
$I_{F(AV)}$	Average forward current $\delta = 0.5$	TO220AC	Tc=120°C	10	A
		ISOWATT220AC	Tc=95°C	10	
I_{FSM}	Surge non repetitive forward current		tp=10ms sinusoidal	100	A
Tstg Tj	Storage and junction temperature range			- 65 to + 150 - 65 to + 150	°C °C

Symbol	Parameter	BYW80-(F)				Unit
		50	100	150	200	
V_{RRM}	Repetitive peak reverse voltage	50	100	150	200	V

THERMAL RESISTANCE

Symbol	Parameter		Value	Unit
Rth (j-c)	Junction to case	TO220AC	2.5	°C/W
		ISOWATT220AC	4.7	

ELECTRICAL CHARACTERISTICS
STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R *	$T_j = 25°C$	$V_R = V_{RRM}$			10	µA
	$T_j = 100°C$				1	mA
V_F **	$T_j = 125°C$	$I_F = 7$ A			0.85	V
	$T_j = 125°C$	$I_F = 15$ A			1.05	
	$T_j = 25°C$	$I_F = 15$ A			1.15	

Pulse test : * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2 %

To evaluate the conduction losses use the following equation :
$P = 0.65 \times I_{F(AV)} + 0.027 \times I_{F}^{2}{}_{(RMS)}$

RECOVERY CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
trr	$T_j = 25°C$	$I_F = 0.5A$ $I_{rr} = 0.25A$ $I_R = 1A$			25	ns
		$I_F = 1A$ $dI_F/dt = -50A/µs$ $V_R = 30V$			35	
tfr	$T_j = 25°C$	$I_F = 1A$ $t_r = 10$ ns $V_{FR} = 1.1 \times V_F$		15		ns
V_{FP}	$T_j = 25°C$	$I_F = 1A$ $t_r = 10$ ns		2		V

Fig.1 : Average forward power dissipation versus average forward current.

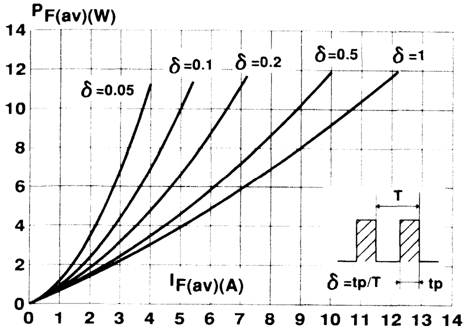


Fig.2 : Peak current versus form factor.

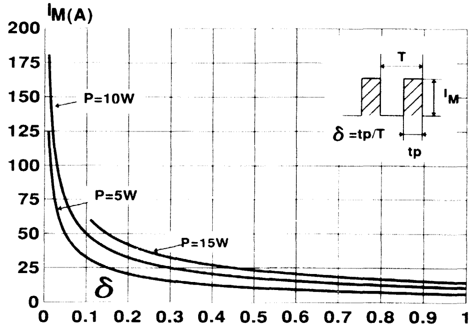


Fig.3 : Forward voltage drop versus forward current (maximum values).

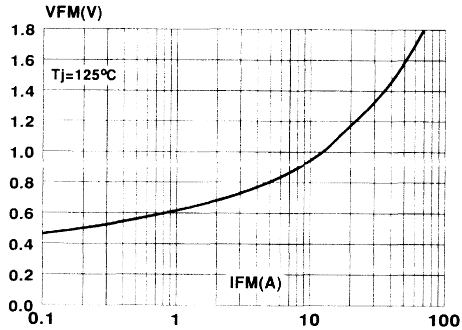


Fig.4 : Relative variation of thermal impedance junction to case versus pulse duration. (TO220AC)

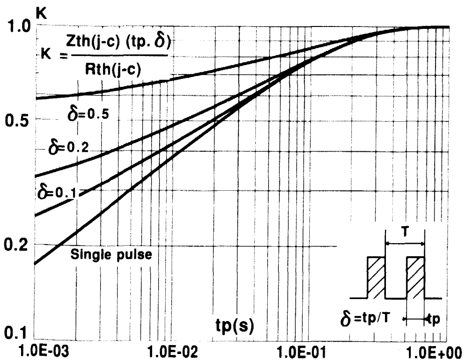


Fig.5 : Relative variation of thermal impedance junction to case versus pulse duration. (ISOWATT220AC)

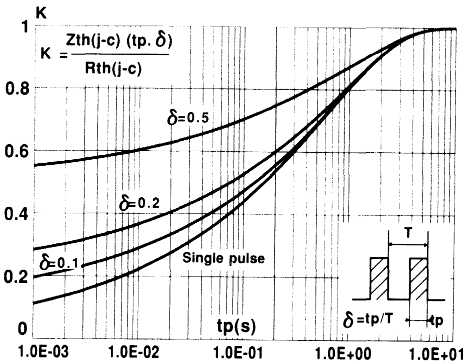


Fig.6 : Non repetitive surge peak forward current versus overload duration.
(TO220AC)

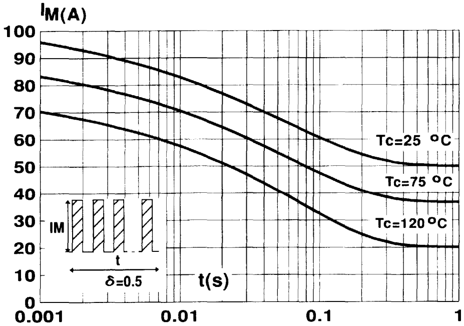


Fig.7 : Non repetitive surge peak forward current versus overload duration.
(ISOWATT220AC)

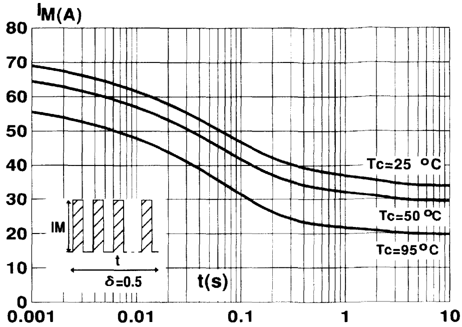


Fig.8 : Average current versus ambient temperature.
(duty cycle : 0.5) (TO220AC)

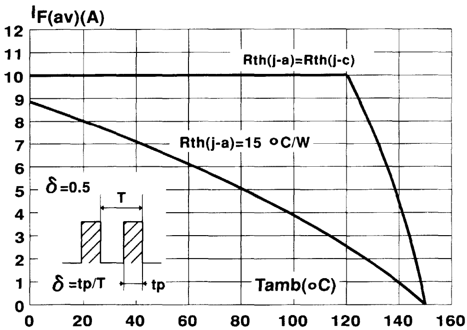


Fig.9 : Average current versus ambient temperature.
(duty cycle : 0.5) (ISOWATT220AC)

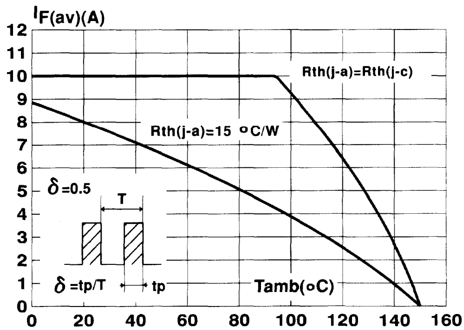


Fig.10 : Junction capacitance versus reverse voltage applied (Typical values).

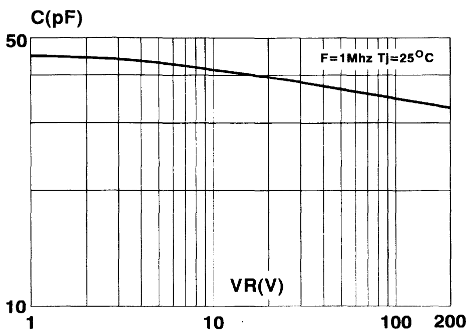


Fig.11 : Recovery charges versus dIF/dt.

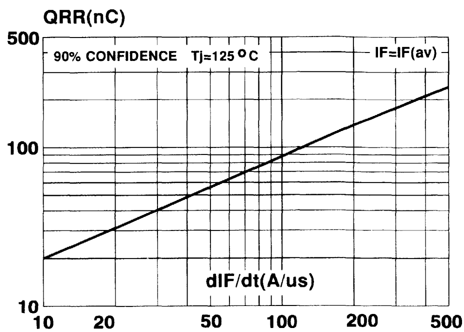


Fig.12 : Peak reverse current versus dIF/dt.

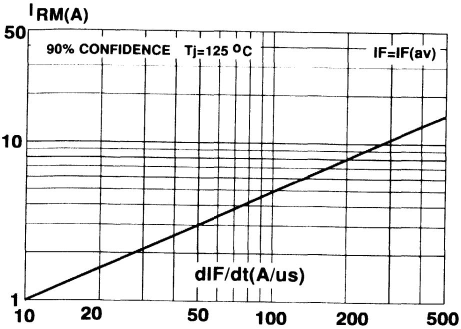
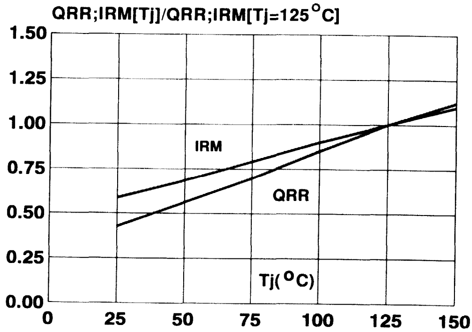


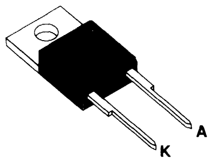
Fig.13 : Dynamic parameters versus junction temperature.



HIGH EFFICIENCY FAST RECOVERY RECTIFIER DIODES

FEATURES

- SUITED FOR SMPS
- VERY LOW FORWARD LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- HIGH SURGE CURRENT CAPABILITY
- HIGH AVALANCHE ENERGY CAPABILITY
- INSULATED PACKAGE :
  Insulating voltage = 2500 V_{RMS}
  Capacitance = 7 pF



isolated
TO220AC
(Plastic)

BYW80PI-200

DESCRIPTION

Single chip rectifier suited for switchmode power supply and high frequency DC to DC converters. Packaged in Isolated TO220AC, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter		Value	Unit
$I_{F(RMS)}$	RMS forward current		20	A
$I_{F(AV)}$	Average forward current $\delta = 0.5$	Tc=110°C	10	A
I_{FSM}	Surge non repetitive forward current	tp=10ms sinusoidal	100	A
Tstg Tj	Storage and junction temperature range		- 65 to + 150 - 65 to + 150	°C °C

Symbol	Parameter	BYW80PI-				Unit
		50	100	150	200	
V_{RRM}	Repetitive peak reverse voltage	50	100	150	200	V

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
Rth (j-c)	Junction to case	3.5	°C/W

ELECTRICAL CHARACTERISTICS
STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R *	T_j = 25°C	$V_R = V_{RRM}$			10	µA
	T_j = 100°C				1	mA
V_F **	T_j = 125°C	I_F = 7 A			0.85	V
	T_j = 125°C	I_F = 15 A			1.05	
	T_j = 25°C	I_F = 15 A			1.15	

Pulse test : * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2 %

To evaluate the conduction losses use the following equation :
$P = 0.65 \times I_{F(AV)} + 0.027 \times I_{F}^{2}{}_{(RMS)}$

RECOVERY CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
trr	T_j = 25°C	I_F = 0.5A I_R = 1A	Irr = 0.25A			25	ns
		I_F = 1A V_R = 30V	dI_F/dt = -50A/µs			35	
tfr	T_j = 25°C	I_F = 1A $V_{FR} = 1.1 \times V_F$	tr = 10 ns		15		ns
V_{FP}	T_j = 25°C	I_F = 1A	tr = 10 ns		2		V

Fig.1 : Average forward power dissipation versus average forward current.

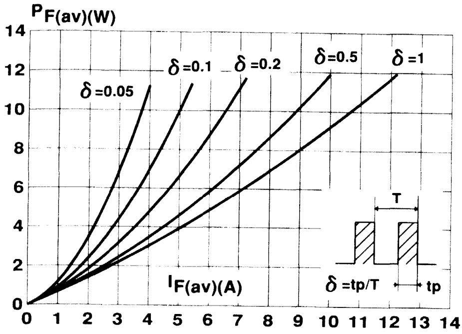


Fig.2 : Peak current versus form factor.

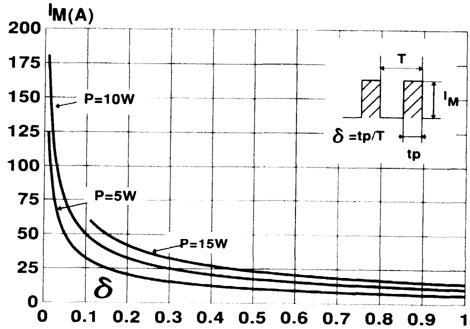


Fig.3 : Forward voltage drop versus forward current (maximum values).

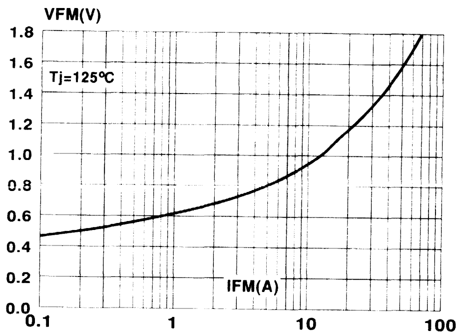


Fig.4 : Relative variation of thermal impedance junction to case versus pulse duration.

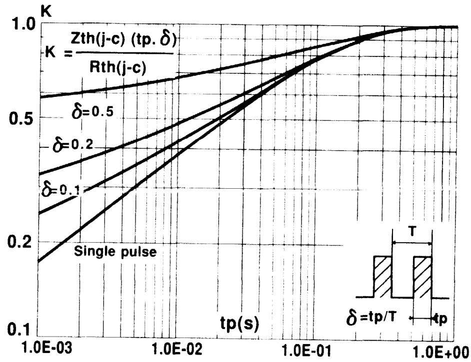


Fig.5 : Non repetitive surge peak forward current versus overload duration.

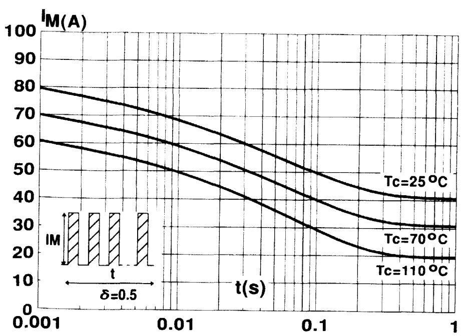


Fig.6 : Average current versus ambient temperature. (duty cycle : 0.5)

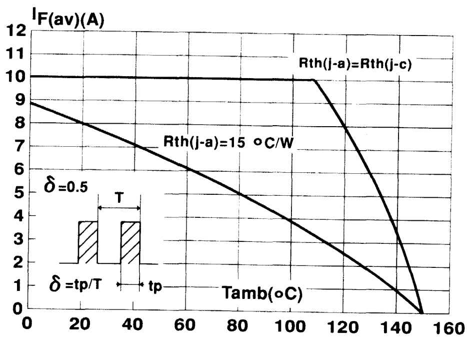


Fig.7 : Junction capacitance versus reverse voltage applied (Typical values).

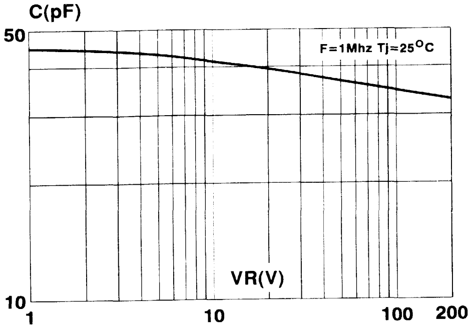


Fig.8 : Recovery charges versus dI_F/dt.

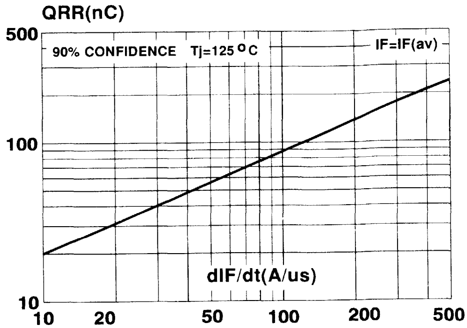


Fig.9 : Peak reverse current versus dIF/dt.

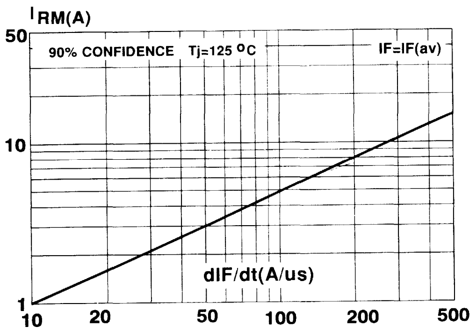
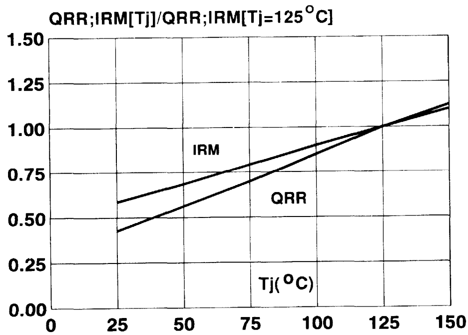


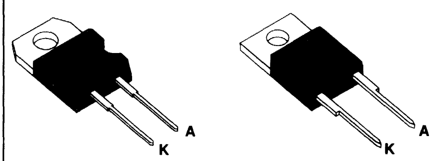
Fig.10 : Dynamic parameters versus junction temperature.



HIGH EFFICIENCY FAST RECOVERY RECTIFIER DIODES

FEATURES

- SUITED FOR SMPS
- VERY LOW FORWARD LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- HIGH SURGE CURRENT CAPABILITY
- HIGH AVALANCHE ENERGY CAPABILITY
- INSULATED VERSION :
  Insulating voltage = 2500 V_{RMS}
  Capacitance = 7 pF



TO220AC
(Plastic)

BYW81P-200

isolated TO220AC
(Plastic)

BYW81PI-200

DESCRIPTION

Single chip rectifier suited for switchmode power supply and high frequency DC to DC converters. Packaged in TO220AC this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter			Value	Unit
$I_{F(RMS)}$	RMS forward current			35	A
$I_{F(AV)}$	Average forward current $\delta = 0.5$	BYW81P	Tc=115°C	15	A
		BYW81PI	Tc=90°C	15	
I_{FSM}	Surge non repetitive forward current		tp=10ms sinusoidal	200	A
Tstg Tj	Storage and junction temperature range			- 40 to + 150 - 40 to + 150	°C °C

Symbol	Parameter	BYW81P-/PI-				Unit
		50	100	150	200	
V_{RRM}	Repetitive peak reverse voltage	50	100	150	200	V

THERMAL RESISTANCE

Symbol	Parameter		Value	Unit
R_{th} (j-c)	Junction to case	BYW81P	2.0	°C/W
		BYW81PI	3.5	

ELECTRICAL CHARACTERISTICS
STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R *	$T_j = 25°C$	$V_R = V_{RRM}$			20	µA
	$T_j = 100°C$				1.5	mA
V_F **	$T_j = 125°C$	$I_F = 12$ A			0.85	V
	$T_j = 125°C$	$I_F = 25$ A			1.05	
	$T_j = 25°C$	$I_F = 25$ A			1.15	

Pulse test : * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2 %

To evaluate the conduction losses use the following equation :
$P = 0.65 \times I_{F(AV)} + 0.016 \times I_F{}^2{}_{(RMS)}$

RECOVERY CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
trr	$T_j = 25°C$	$I_F = 0.5A$ $I_R = 1A$	$I_{rr} = 0.25A$			25	ns
		$I_F = 1A$ $V_R = 30V$	$dI_F/dt = -50A/µs$			40	
tfr	$T_j = 25°C$	$I_F = 1A$ $V_{FR} = 1.1 \times V_F$	tr = 10 ns		15		ns
V_{FP}	$T_j = 25°C$	$I_F = 1A$	tr = 10 ns		2		V

Fig.1 : Average forward power dissipation versus average forward current.

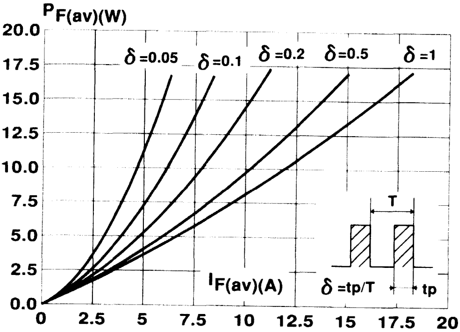


Fig.2 : Peak current versus form factor.

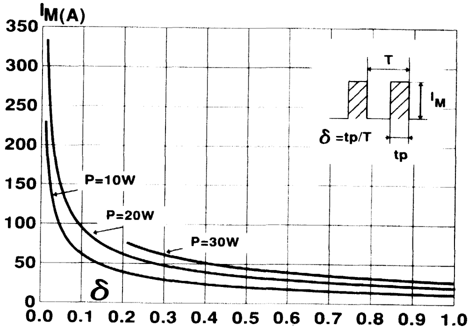


Fig.3 : Forward voltage drop versus forward current (maximum values).

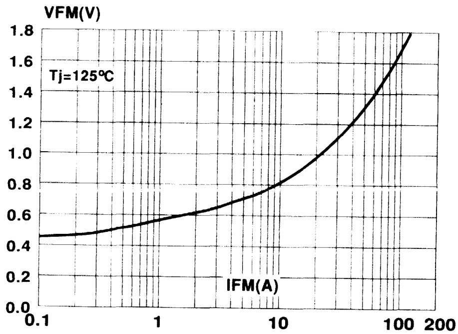


Fig.4 : Relative variation of thermal impedance junction to case versus pulse duration.

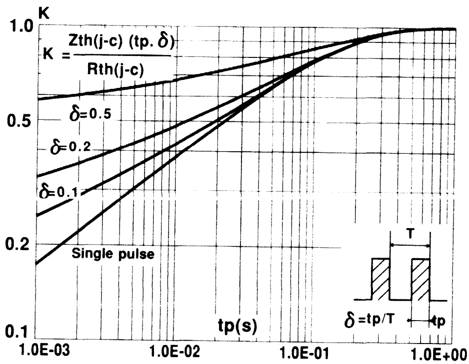


Fig.5 : Non repetitive surge peak forward current versus overload duration.
(BYW81P)

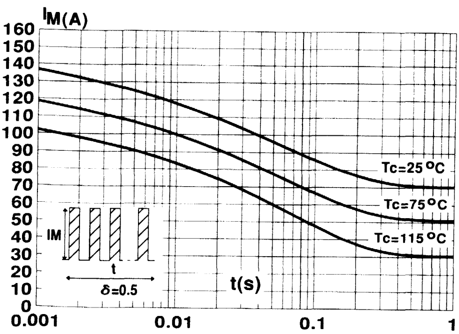


Fig.6 : Non repetitive surge peak forward current versus overload duration.
(BYW81PI)

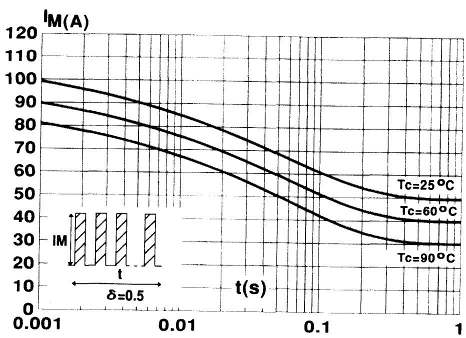


Fig.7 : Average current versus ambient temperature.
(duty cycle : 0.5) (BYW81P)

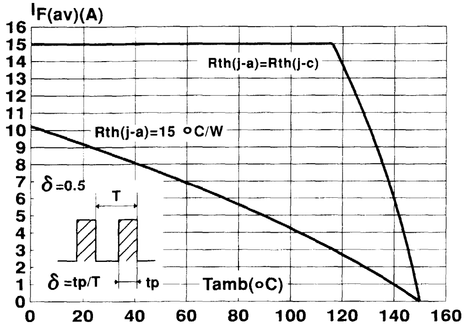


Fig.8 : Average current versus ambient temperature.
(duty cycle : 0.5) (BYW81PI)

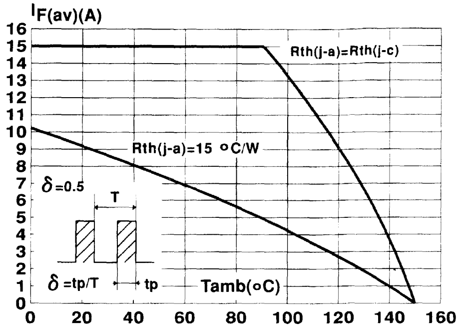


Fig.9 : Junction capacitance versus reverse voltage applied (Typical values).

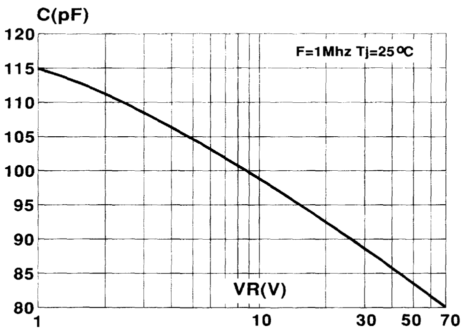


Fig.10 : Recovery charges versus dIF/dt.

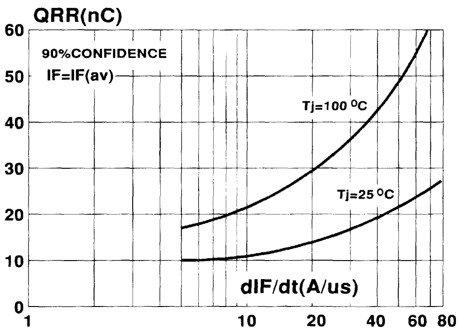


Fig.11 : Peak reverse current versus dIF/dt.

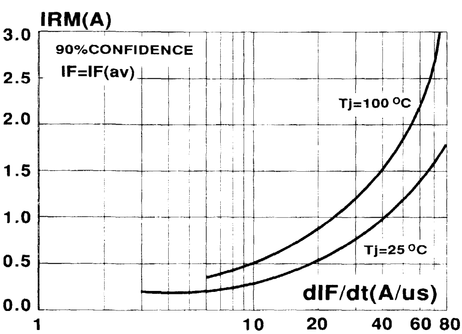
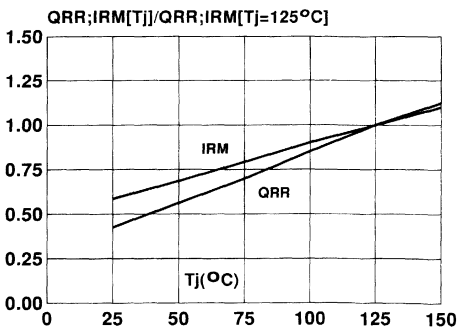


Fig.12 : Dynamic parameters versus junction temperature.



BYW81M-200

HIGH EFFICIENCY FAST RECOVERY DIODES

MAIN PRODUCT CHARACTERISTICS

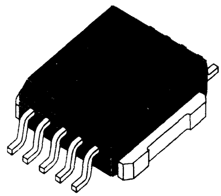
$I_{F(AV)}$	15 A
V_{RRM}	200 V
trr	35 ns
V_F	0.85 V

FEATURES AND BENEFITS

- VERY SMALL CONDUCTION LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- LOW FORWARD AND REVERSE RECOVERY TIMES
- HIGH SURGE CURRENT
- HIGH DISSIPATION MINIATURE PACKAGE
- SURFACE MOUNT TECHNOLOGY COMPATIBLE

DESCRIPTION

Single rectifier suited for switchmode power supply and high frequency DC to DC converters.
Packaged in a high performance surface mount package PSO-10, this device is intended for use in high frequency inverters, free wheeling and polarity protection applications.



Power SO-10™
Plastic, non isolated SMD
with copper tab

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		200	V
$I_{F(RMS)}$	RMS forward current (All pins connected)		27	A
$I_{F(AV)}$	Average forward current	Tc=115°C δ = 0.5	15	A
I_{FSM}	Surge non repetitive forward current (All pins connected)	tp=10ms sinusoidal	200	A
I_{FRM}	Repetitive peak forward current	tp = 5 µs f = 5 kHz	160	A
Tstg Tj	Storage and junction temperature range		- 40 to + 150	°C

TM : PowerSO-10 is a trademark of SGS-THOMSON Microelectronics.

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
R_{th} (j-c)	Junction to case thermal resistance	2.0	°C/W

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
I_R *	Reverse leakage current	$V_R = V_{RRM}$	$T_j = 25°C$			20	µA
			$T_j = 100°C$			1.5	mA
V_F **	Forward voltage drop	$I_F = 12$ A	$T_j = 125°C$			0.85	V
		$I_F = 25$ A	$T_j = 125°C$			1.05	
		$I_F = 25$ A	$T_j = 25°C$			1.15	

Pulse test : * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2 %

To evaluate the conduction losses use the following equation :
$P = 0.65 \times I_{F(AV)} + 0.0016 \, I_F{}^2{}_{(RMS)}$

RECOVERY CHARACTERISTICS

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
t_{rr}	Reverse recovery time	$T_j = 25°C$ $I_F = 0.5A$ $I_{rr} = 0.25$ A $I_R = 1A$			25	ns
		$T_j = 25°C$ $I_F = 1A$ $dI_F/dt = -50A/µs$ $V_R = 30V$			40	
t_{fr}	Forward recovery time	$T_j = 25°C$ $I_F = 1A$ $dI_F/dt = 100A/µs$ $V_{FR} = 1.1 \times V_F$ max		15		ns
V_{FP}	Peak forward voltage	$T_j = 25°C$ $I_F = 1A$ $dI_F/dt = 100A/µs$		2		V

PIN OUT configuration in PowerSO-10 :

Anode = pin 1 to 5
Cathode = connected to base tab

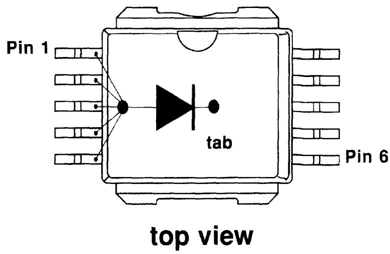


Fig.1 : Average forward power dissipation versus average forward current.

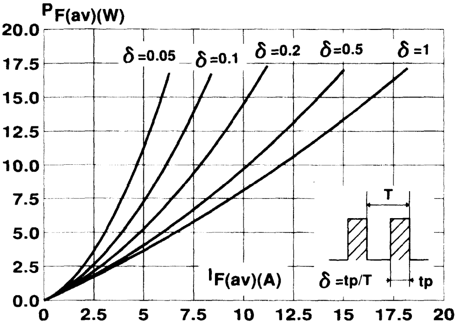


Fig.2 : Peak current versus form factor.

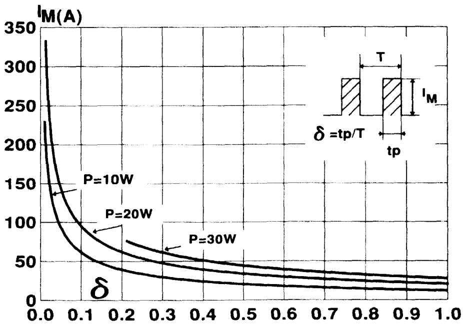


Fig.3 : Forward voltage drop versus forward current (maximum values).

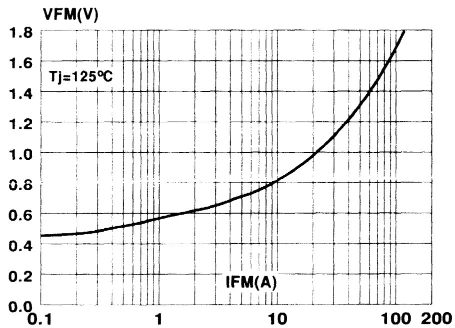


Fig.4 : Relative variation of thermal impedance junction to case versus pulse duration.

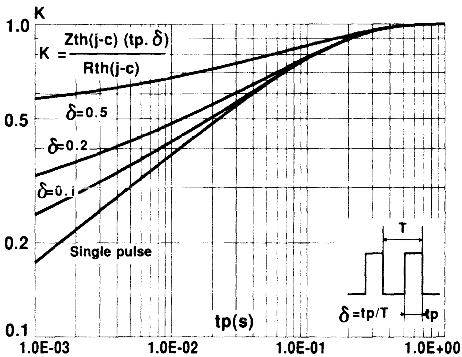


Fig.5 : Non repetitive surge peak forward current versus overload duration.

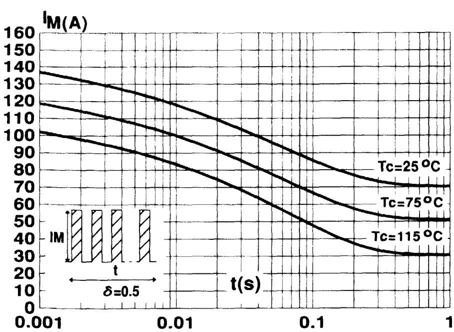


Fig.6 : Average current versus ambient temperature. (duty cycle : 0.5)

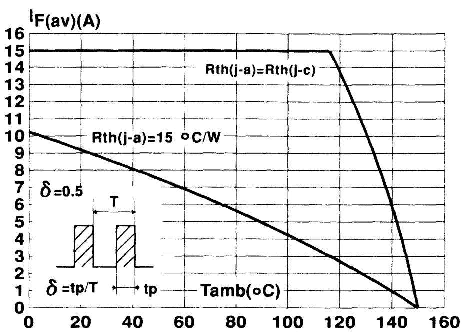


Fig.7 : Junction capacitance versus reverse voltage applied (Typical values).

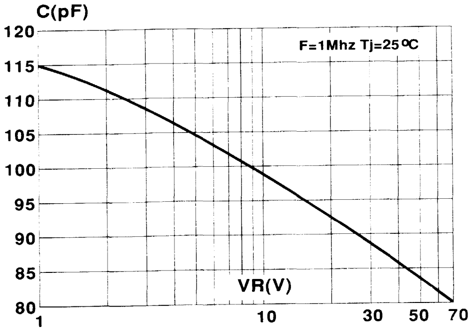


Fig.8 : Recovery charges versus dIF/dt.

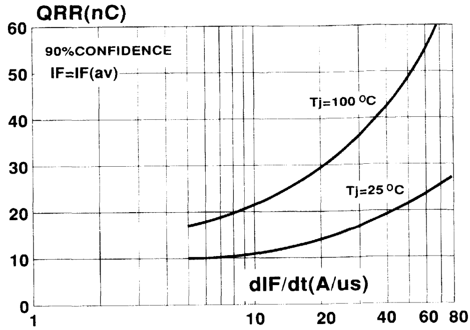


Fig.9 : Peak reverse current versus dIF/dt.

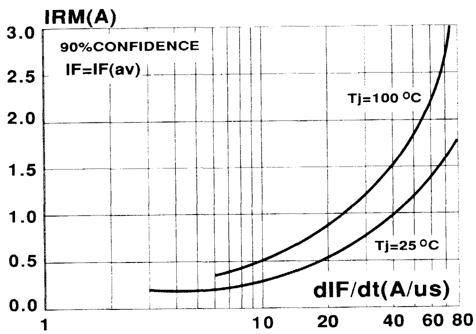
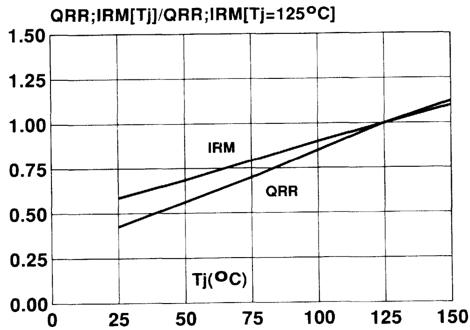


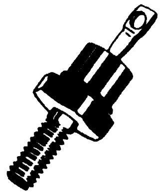
Fig.10 : Dynamic parameters versus junction temperature.



BYW 81-50 → 200

HIGH EFFICIENCY FAST RECOVERY RECTIFIER DIODES

- VERY LOW CONDUCTION LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- LOW FORWARD AND REVERSE RECOVERY TIMES
- HIGH SURGE CURRENT AND AVALANCHE CAPABILITY
- THE SPECIFICATIONS AND CURVES ENABLE THE DETERMINATION OF t_{rr} AND I_{RM} AT 100°C UNDER USERS CONDITIONS



DO 4
(Metal)

DESCRIPTION

Low voltage drop rectifiers suited for switchmode power supply.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
I_{FRM}	Repetitive Peak Forward Current	$t_p \leq 20\mu s$	200	A
$I_{F(RMS)}$	RMS Forward Current		35	A
$I_{F(AV)}$	Average Forward Current	$T_C = 120°C$ $\delta = 0.5$	15	A
I_{FSM}	Surge non Repetitive Forward Current	$t_p = 10ms$ Sinusoidal	200	A
P_{tot}	Power Dissipation	$T_C = 100°C$	22	W
T_j	Junction Temperature		– 40 to 150	°C

Symbol	Parameter	BYW 81-				Unit
		50	100	150	200	
V_{RRM}	Repetitive Peak Reverse Voltage	50	100	150	200	V
V_{RSM}	Non Repetitive Peak Reverse Voltage	55	110	165	220	V

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-c)}$	Junction-case	2.3	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R	T_j = 25°C	$V_R = V_{RRM}$			15	µA
	T_j = 100°C				1.5	mA
V_F	T_j = 25°C	I_F = 38A			1.25	V
	T_j = 100°C	I_F = 12A			0.85	

RECOVERY CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
t_{rr}	T_j = 25°C V_R = 30V	I_F = 1A see figure 12	di_F/dt = – 50A/µs			35	ns
Q_{rr}	T_j = 25°C $V_R \leq$ 30V	I_F = 2A	di_F/dt = – 20A/µs			15	nC
t_{fr}	T_j = 25°C Measured at 1.1 x V_F	I_F = 1A	t_r = 5ns		15		ns
V_{FP}	T_j = 25°C	I_F = 1A	t_r = 5ns		2		V

To evaluate the conduction losses use the following equations :

$V_F = 0.66 + 0.0077\ I_F$ $\quad$ $P = 0.66 \times I_{F(AV)} + 0.0077 {I_F}^2{}_{(RMS)}$

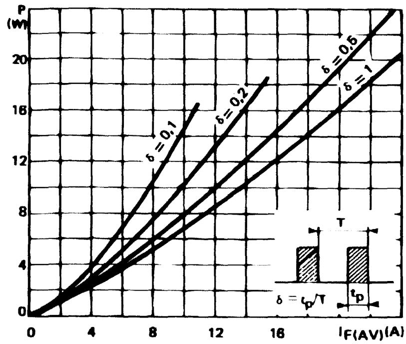


FIGURE 1 : Power losses versus average current

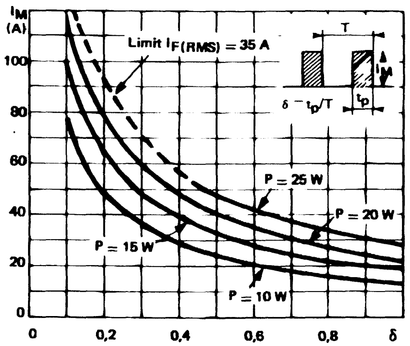


FIGURE 2 : Peak current versus form factor

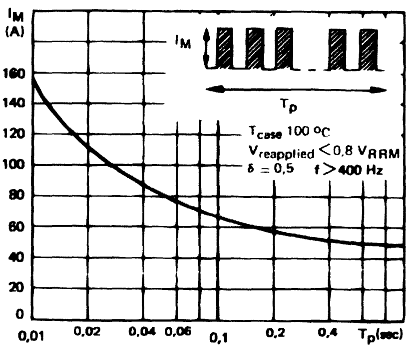


FIGURE 3 : Non repetitive peak surge current versus duration

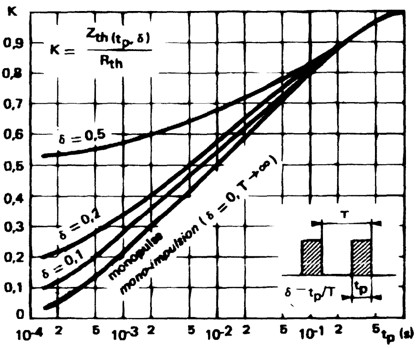


FIGURE 4 : Thermal impedance versus pulse width

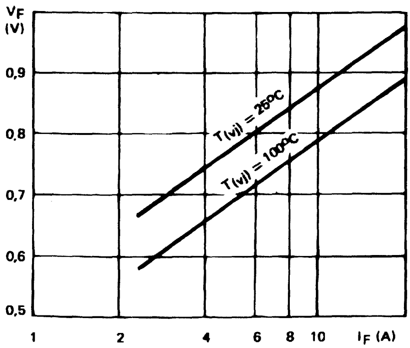


FIGURE 5 : Voltage drop versus forward current

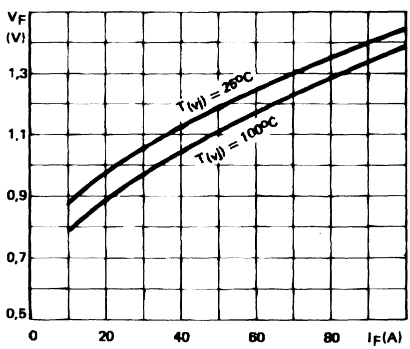


FIGURE 6 : Voltage drop versus forward current

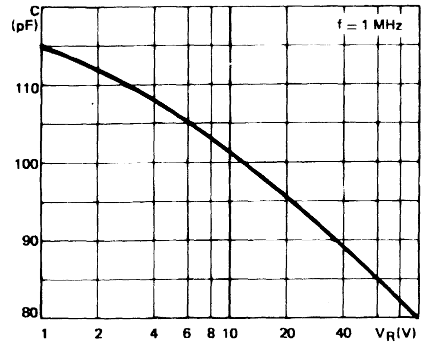


FIGURE 7 : Capacitance versus reverse voltage applied

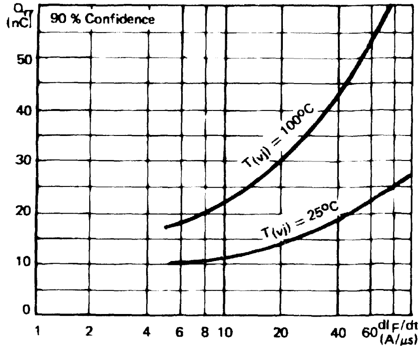


FIGURE 8 : Recovery charge versus dI_F/dt

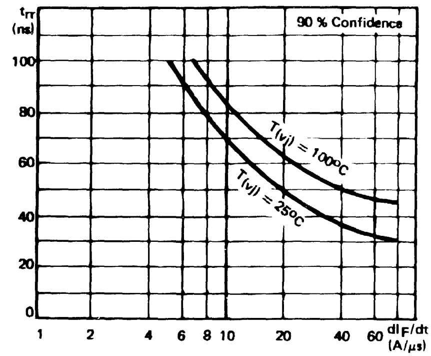


FIGURE 9 : Recovery time versus dI_F/dt

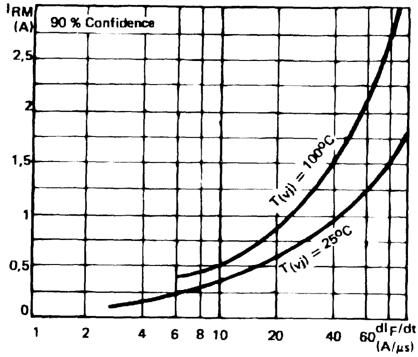


FIGURE 10 : Peak reverse current versus dI_F/dt

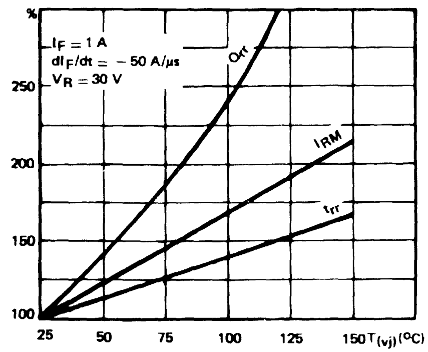


FIGURE 11 : Dynamic parameters versus junction temperature

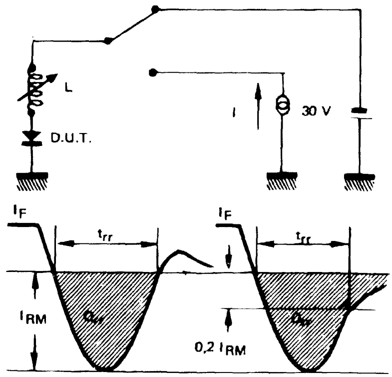


FIGURE 12 : Measurement of t_{rr} (fig. 9) and I_{RM}

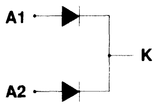
SGS-THOMSON MICROELECTRONICS

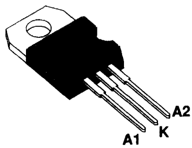
BYW51(F)

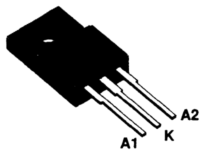
HIGH EFFICIENCY FAST RECOVERY RECTIFIER DIODES

FEATURES

- SUITED FOR SMPS
- VERY LOW FORWARD LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- HIGH SURGE CURRENT CAPABILITY
- HIGH AVALANCHE ENERGY CAPABILITY
- INSULATED VERSION (ISOWATT220AB) :
  Insulating voltage = 2000 V DC
  Capacitance = 12 pF







TO220AB (Plastic)	isolated ISOWATT220AB (Plastic)
BYW51-200	**BYW51F-200**

DESCRIPTION

Dual center tap rectifier suited for switchmode power supply and high frequency DC to DC converters.
Packaged in TO220AB, or ISOWATT220AB this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter				Value	Unit
$I_{F(RMS)}$	RMS forward current			Per diode	20	A
$I_{F(AV)}$	Average forward current $\delta = 0.5$	TO220AB	Tc=120°C	Per diode	10	A
		ISOWATT220AB	Tc=95°C	Per diode	10	
I_{FSM}	Surge non repetitive forward current		tp=10ms sinusoidal	Per diode	100	A
Tstg Tj	Storage and junction temperature range				- 65 to + 150 - 65 to + 150	°C °C

Symbol	Parameter	BYW51-(F)				Unit
		50	100	150	200	
V_{RRM}	Repetitive peak reverse voltage	50	100	150	200	V

THERMAL RESISTANCE

Symbol	Parameter			Value	Unit
Rth (j-c)	Junction to case	TO220AB	Per diode	2.5	°C/W
			Total	1.4	
		ISOWATT220AB	Per diode	5.1	
			Total	4.05	
Rth (c)	Coupling	TO220AB		0.25	°C/W
		ISOWATT220AB		3.0	

When the diodes 1 and 2 are used simultaneously :
Tj-Tc (diode 1) = P(diode 1) x Rth(j-c) (Per diode) + P(diode 2) x Rth(c)

ELECTRICAL CHARACTERISTICS (Per diode)
STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R *	T_j = 25°C	$V_R = V_{RRM}$			15	µA
	T_j = 100°C				1	mA
V_F **	T_j = 125°C	I_F = 8 A			0.85	V
	T_j = 125°C	I_F = 16 A			1.05	
	T_j = 25°C	I_F = 16 A			1.15	

Pulse test : * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2 %

To evaluate the conduction losses use the following equation :
$P = 0.65 \times I_{F(AV)} + 0.025 \times I_{F}^{2}{}_{(RMS)}$

RECOVERY CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
trr	T_j = 25°C	I_F = 0.5A Irr = 0.25A I_R = 1A			25	ns
		I_F = 1A dI_F/dt = -50A/µs V_R = 30V			35	
tfr	T_j = 25°C	I_F = 1A tr = 10 ns $V_{FR} = 1.1 \times V_F$		15		ns
V_{FP}	T_j = 25°C	I_F = 1A tr = 10 ns		2		V

Fig.1 : Average forward power dissipation versus average forward current.

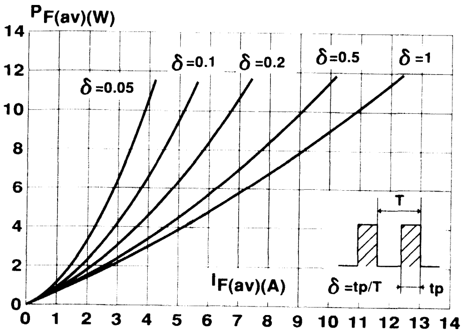


Fig.2 : Peak current versus form factor.

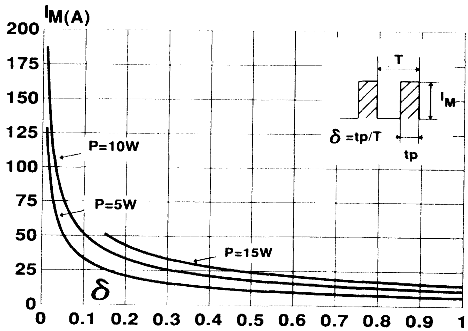


Fig.3 : Forward voltage drop versus forward current (maximum values).

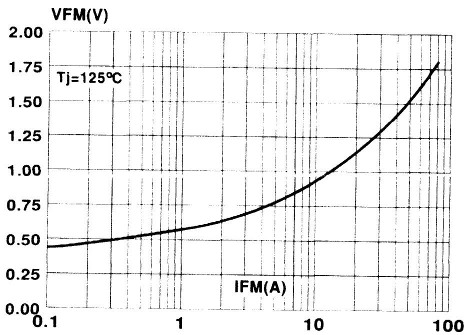


Fig.4 : Relative variation of thermal impedance junction to case versus pulse duration. (TO220AB)

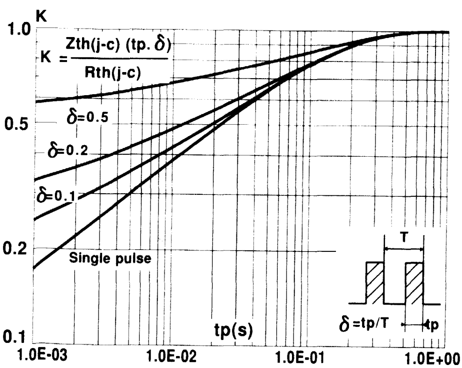


Fig.5 : Relative variation of thermal impedance junction to case versus pulse duration. (ISOWATT220AB)

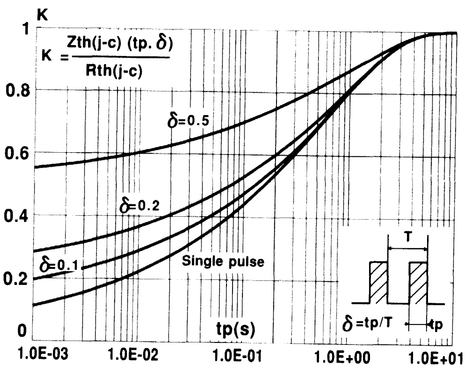


Fig.6 : Non repetitive surge peak forward current versus overload duration.
(TO220AB)

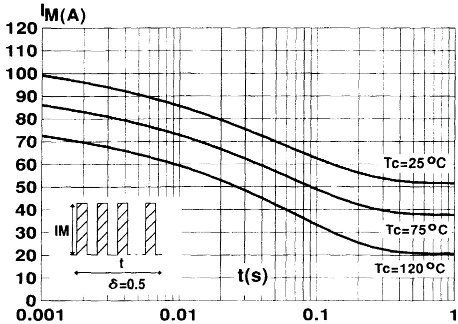


Fig.7 : Non repetitive surge peak forward current versus overload duration.
(ISOWATT220AB)

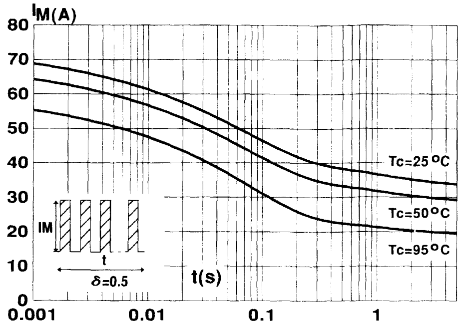


Fig.8 : Average current versus ambient temperature.
(duty cycle : 0.5) (TO220AB)

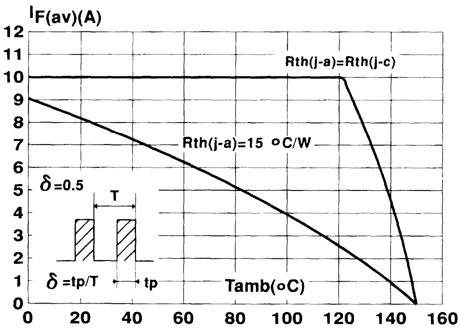


Fig.9 : Average current versus ambient temperature.
(duty cycle : 0.5) (ISOWATT220AB)

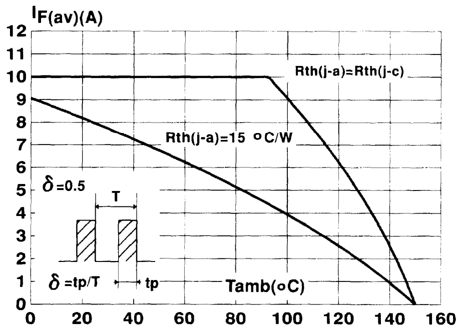


Fig.10 : Junction capacitance versus reverse voltage applied (Typical values).

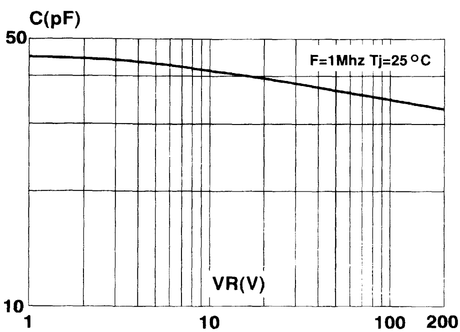


Fig.11 : Recovery charges versus dI_F/dt.

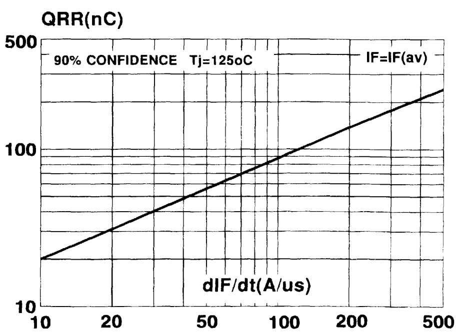


Fig.12 : Peak reverse current versus dIF/dt.

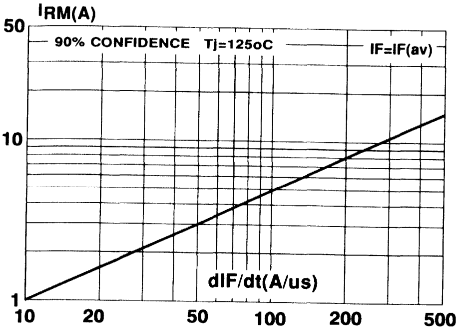
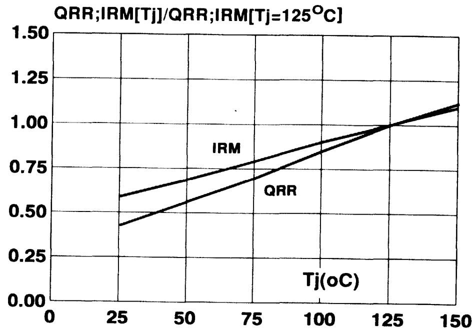


Fig.13 : Dynamic parameters versus junction temperature.



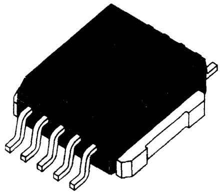
SGS-THOMSON MICROELECTRONICS

BYW51M-200

HIGH EFFICIENCY FAST RECOVERY DIODES

MAIN PRODUCT CHARACTERISTICS

$I_{F(AV)}$	2 x 8 A
V_{RRM}	200 V
trr	35 ns
V_F	0.85 V



Power SO-10™
Plastic, non isolated SMD with copper tab

FEATURES AND BENEFITS

- VERY SMALL CONDUCTION LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- LOW FORWARD AND REVERSE RECOVERY TIMES
- HIGH SURGE CURRENT
- HIGH DISSIPATION MINIATURE PACKAGE
- SURFACE MOUNT TECHNOLOGY COMPATIBLE

DESCRIPTION

Single rectifier suited for switchmode power supply and high frequency DC to DC converters.
Packaged in a high performance surface mount package PSO-10, this device is intended for use in high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			200	V
$I_{F(RMS)}$	RMS forward current	All pins connected	Per diode	17	A
$I_{F(AV)}$	Average forward current	Tc=120°C $\delta = 0.5$	Per diode	10	A
			Per device	20	
I_{FSM}	Surge non repetitive forward current	tp=10ms sinusoidal All pins connected	Per diode	100	A
I_{FRM}	Repetitive peak forward current	tp =5 µs f = 5 kHz	Per diode	100	A
Tstg Tj	Storage and junction temperature range			- 40 to + 150	°C

TM : PowerSO-10 is a trademark of SGS-THOMSON Microelectronics.

August 1993 Ed : 2A

THERMAL RESISTANCES

Symbol	Parameter		Value	Unit
Rth (j-c)	Junction to case thermal resistances	Per diode	2.5	°C/W
		Total	1.4	
Rth (c)	Coupling thermal resistance		0.25	°C/W

STATIC ELECTRICAL CHARACTERISTICS (Per diode)

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
I_R *	Reverse leakage current	$V_R = V_{RRM}$	$T_j = 25°C$			15	µA
			$T_j = 100°C$			1	mA
V_F **	Forward voltage drop	$I_F = 8$ A	$T_j = 125°C$			0.9	V
		$I_F = 16$ A	$T_j = 125°C$			1.05	
		$I_F = 16$ A	$T_j = 25°C$			1.15	

Pulse test : * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2 %

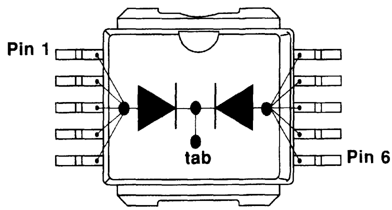
To evaluate the conduction losses use the following equation :
$P = 0.65 \times I_{F(AV)} + 0.025\ I_F^2{}_{(RMS)}$

RECOVERY CHARACTERISTICS

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
t_{rr}	Reverse recovery time	$T_j = 25°C$ $I_F = 0.5A$ $I_{rr} = 0.25$ A $I_R = 1A$			25	ns
		$T_j = 25°C$ $I_F = 1A$ $dI_F/dt = -50A/µs$ $V_R = 30V$			35	
t_{fr}	Forward recovery time	$T_j = 25°C$ $I_F = 1A$ $dI_F/dt = 100A/µs$ $V_{FR} = 1.1 \times V_F$ max		15		ns
V_{FP}	Peak forward voltage	$T_j = 25°C$ $I_F = 1A$ $dI_F/dt = 100A/µs$		2		V

PIN OUT configuration in PowerSO-10 :

Anode 1 = pin 1 to 5
Anode 2 = pin 6 to 10
Cathodes = connected to base tab



top view

Fig.1 : Average forward power dissipation versus average forward current.

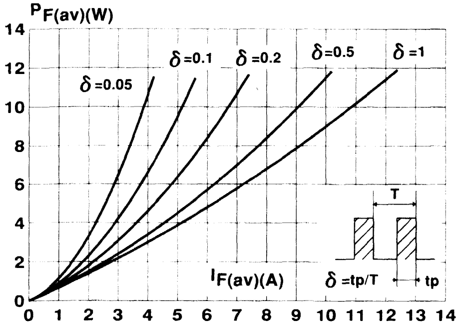


Fig.2 : Peak current versus form factor.

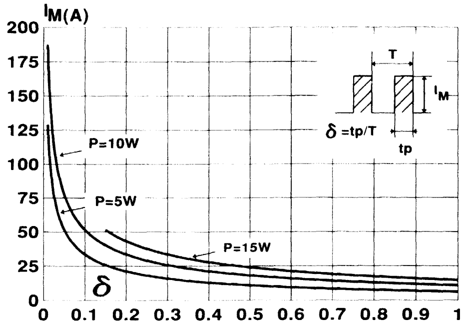


Fig.3 : Forward voltage drop versus forward current (maximum values).

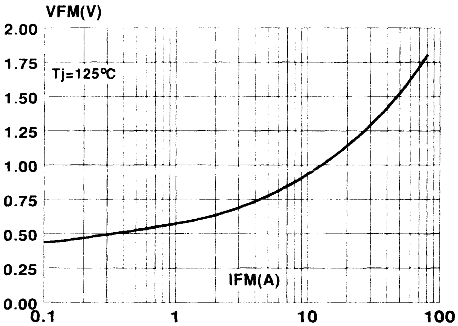


Fig.4 : Relative variation of thermal impedance junction to case versus pulse duration.

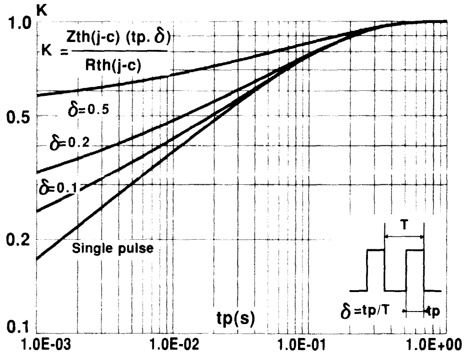


Fig.5 : Non repetitive surge peak forward current versus overload duration.

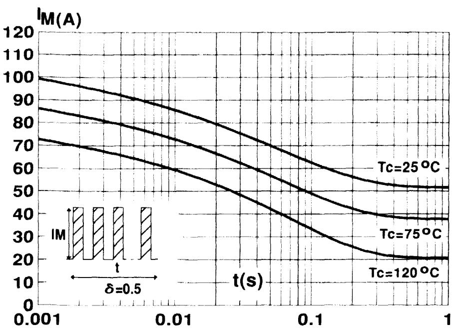


Fig.6 : Average current versus ambient temperature. (duty cycle : 0.5)

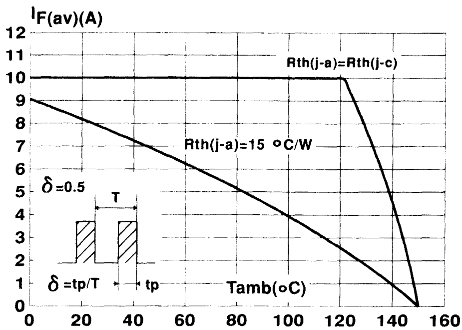


Fig.7 : Junction capacitance versus reverse voltage applied (Typical values).

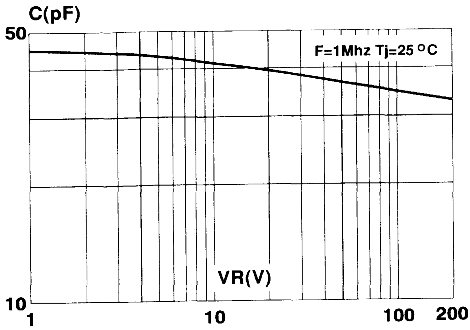


Fig.8 : Recovery charges versus dIF/dt.

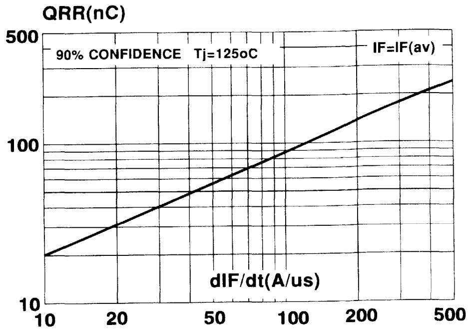


Fig.9 : Peak reverse current versus dIF/dt.

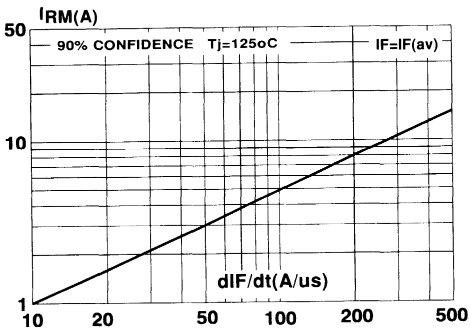
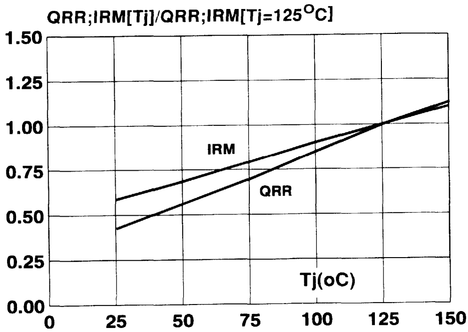


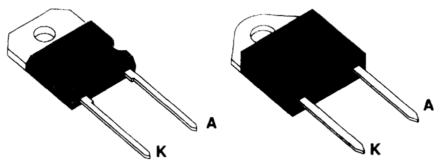
Fig.10 : Dynamic parameters versus junction temperature.



HIGH EFFICIENCY FAST RECOVERY RECTIFIER DIODES

FEATURES

- SUITED FOR SMPS
- VERY LOW FORWARD LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- HIGH SURGE CURRENT CAPABILITY
- HIGH AVALANCHE ENERGY CAPABILITY
- INSULATED VERSION :
  Insulating voltage = 2500 V DC
  Capacitance = 12 pF



SOD93 (Plastic)	isolated DOP3I (Plastic)
BYW77P-200	**BYW77PI-200**

DESCRIPTION

Single chip rectifier suited for switchmode power supply and high frequency DC to DC converters. Packaged in SOD93, or DOP3I this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter			Value	Unit
$I_{F(RMS)}$	RMS forward current			50	A
$I_{F(AV)}$	Average forward current $\delta = 0.5$	SOD93	Tc=125°C	25	A
		TOP3I	Tc=100°C	25	
I_{FSM}	Surge non repetitive forward current		tp=10ms sinusoidal	500	A
Tstg Tj	Storage and junction temperature range			- 40 to + 150 - 40 to + 150	°C °C

Symbol	Parameter	BYW77P-/PI-				Unit
		50	100	150	200	
V_{RRM}	Repetitive peak reverse voltage	50	100	150	200	V

THERMAL RESISTANCE

Symbol	Parameter		Value	Unit
Rth (j-c)	Junction to case	SOD93	1.0	°C/W
		DOP3I	1.8	

ELECTRICAL CHARACTERISTICS
STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R *	T_j = 25°C	$V_R = V_{RRM}$			25	µA
	T_j = 100°C				2.5	mA
V_F **	T_j = 125°C	I_F = 20 A			0.85	V
	T_j = 125°C	I_F = 40 A			1.00	
	T_j = 25°C	I_F = 40 A			1.15	

Pulse test : * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2 %

To evaluate the conduction losses use the following equation :
$P = 0.7 \times I_{F(AV)} + 0.0075 \times I_F{}^2{}_{(RMS)}$

RECOVERY CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
trr	T_j = 25°C	I_F = 0.5A I_R = 1A	Irr = 0.25A			35	ns
		I_F = 1A V_R = 30V	dI_F/dt = -50A/µs			50	
tfr	T_j = 25°C	I_F = 1A $V_{FR} = 1.1 \times V_F$	tr = 5 ns		10		ns
V_{FP}	T_j = 25°C	I_F = 1A	tr = 5 ns		1.5		V

Fig.1 : Average forward power dissipation versus average forward current.

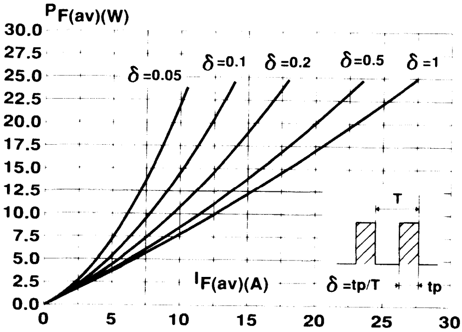


Fig.2 : Peak current versus form factor.

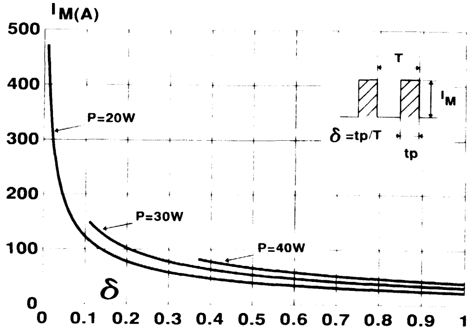


Fig.3 : Forward voltage drop versus forward current (maximum values).

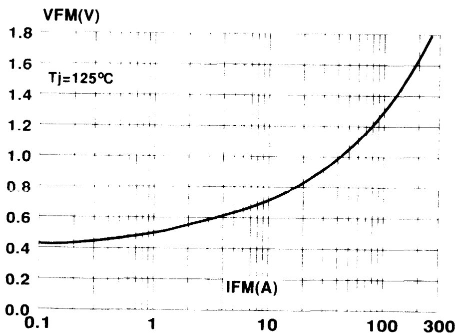


Fig.4 : Relative variation of thermal impedance junction to case versus pulse duration.

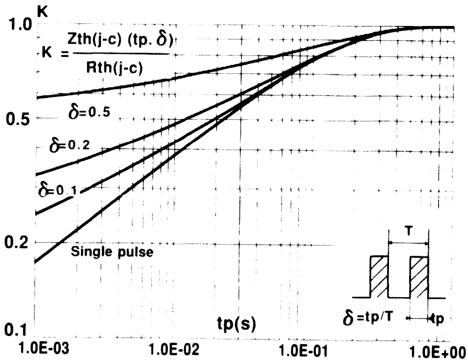


Fig.5 : Non repetitive surge peak forward current versus overload duration.
(BYW81P)

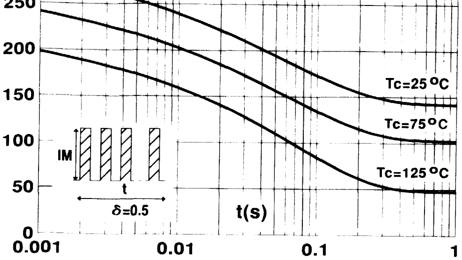


Fig.6 : Non repetitive surge peak forward current versus overload duration.
(BYW81PI)

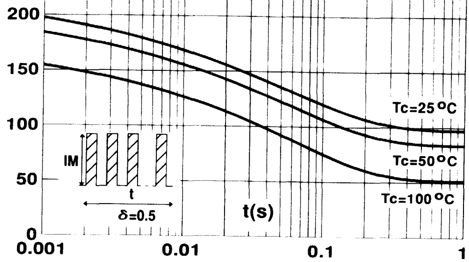


Fig.7 : Average current versus ambient temperature.
(duty cycle : 0.5) (SOD93)

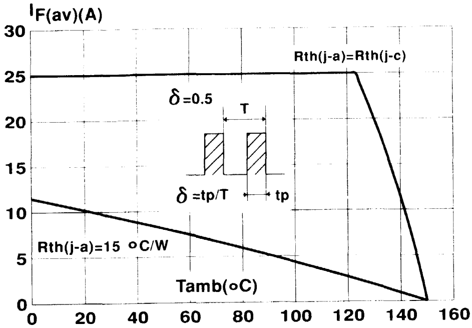


Fig.8 : Average current versus ambient temperature.
(duty cycle : 0.5) (DOP3I)

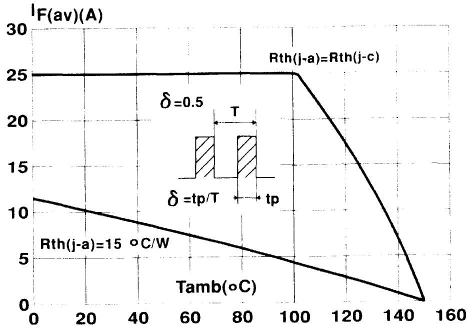


Fig.9 : Junction capacitance versus reverse voltage applied (Typical values).

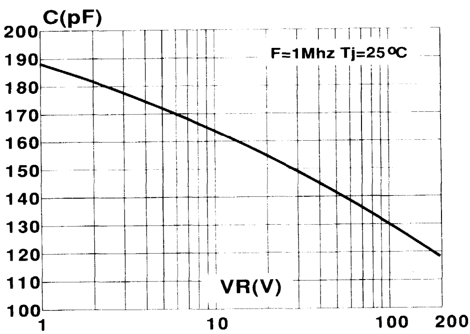


Fig.10 : Recovery charges versus dI_F/dt.

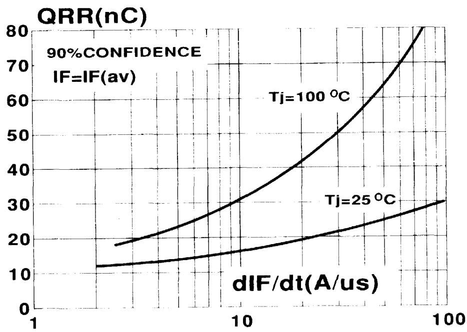


Fig.11 : Peak reverse current versus dIF/dt.

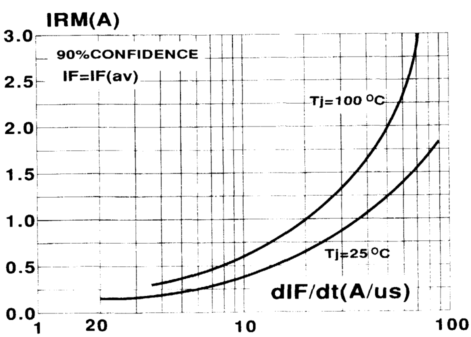
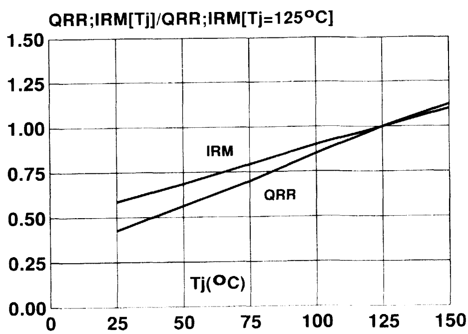


Fig.12 : Dynamic parameters versus junction temperature.



SGS-THOMSON MICROELECTRONICS

BYW77M-200

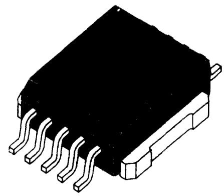
HIGH EFFICIENCY FAST RECOVERY DIODES

MAIN PRODUCT CHARACTERISTICS

$I_{F(AV)}$	25 A
V_{RRM}	200 V
trr	50 ns
V_F	0.85 V

FEATURES AND BENEFITS

- VERY SMALL CONDUCTION LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- LOW FORWARD AND REVERSE RECOVERY TIMES
- HIGH SURGE CURRENT
- HIGH DISSIPATION MINIATURE PACKAGE
- SURFACE MOUNT TECHNOLOGY COMPATIBLE



Power SO-10™
Plastic, non isolated SMD with copper tab

DESCRIPTION

Single rectifier suited for switchmode power supply and high frequency DC to DC converters.
Packaged in a high performance surface mount package PSO-10, this device is intended for use in high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		200	V
$I_{F(RMS)}$	RMS forward current	(All pins connected)	44	A
$I_{F(AV)}$	Average forward current	Tc=125°C δ = 0.5	25	A
I_{FSM}	Surge non repetitive forward current (All pins connected)	tp=10ms sinusoidal	200	A
I_{FRM}	Repetitive peak forward current	tp = 5µs f = 5 kHz	310	A
Tstg Tj	Storage and junction temperature range		- 40 to + 150	°C

TM : PowerSO-10 is a trademark of SGS-THOMSON Microelectronics.

August 1993 Ed : 2A

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
Rth (j-c)	Junction to case thermal resistance	1.0	°C/W

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
I_R *	Reverse leakage current	$V_R = V_{RRM}$	$T_j = 25°C$			25	µA
			$T_j = 100°C$			2.5	mA
V_F **	Forward voltage drop	$I_F = 20$ A	$T_j = 125°C$			0.85	V
		$I_F = 40$ A	$T_j = 125°C$			1.05	
		$I_F = 40$ A	$T_j = 25°C$			1.15	

Pulse test : * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2 %

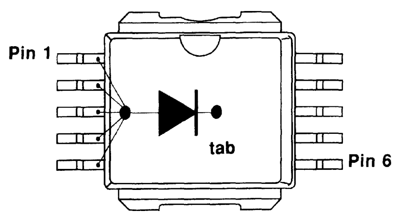
To evaluate the conduction losses use the following equation :
$P = 0.65 \times I_{F(AV)} + 0.0075\ I_{F}^{2}{}_{(RMS)}$

RECOVERY CHARACTERISTICS

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
t_{rr}	Reverse recovery time	$T_j = 25°C$ $I_F = 0.5A$ $I_{rr} = 0.25$ A $I_R = 1A$			35	ns
		$T_j = 25°C$ $I_F = 1A$ $dI_F/dt = -50A/µs$ $V_R = 30V$			50	
t_{fr}	Forward recovery time	$T_j = 25°C$ $I_F = 1A$ $dI_F/dt = 100A/µs$ $V_{FR} = 1.1 \times V_F$ max		10		ns
V_{FP}	Peak forward voltage	$T_j = 25°C$ $I_F = 1A$ $dI_F/dt = 100A/µs$		1.5		V

PIN OUT configuration in PowerSO-10 :

Anode = pin 1 to 5
Cathode = connected to base tab



top view

Fig.1 : Average forward power dissipation versus average forward current.

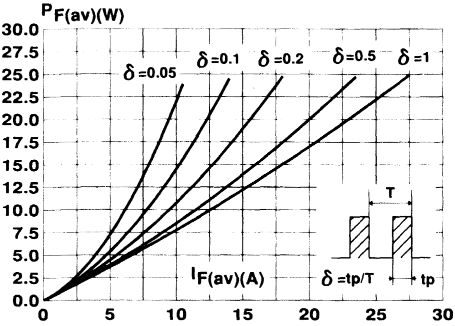


Fig.2 : Peak current versus form factor.

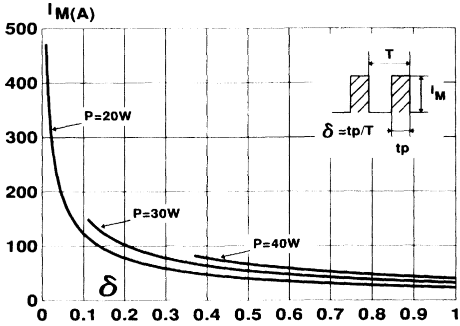


Fig.3 : Forward voltage drop versus forward current (maximum values).

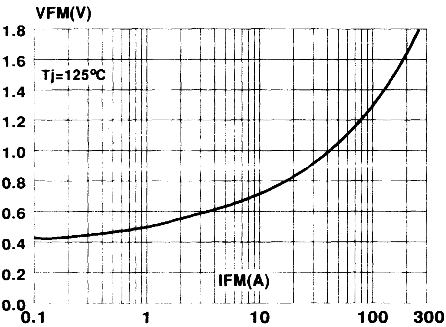


Fig.4 : Relative variation of thermal impedance junction to case versus pulse duration.

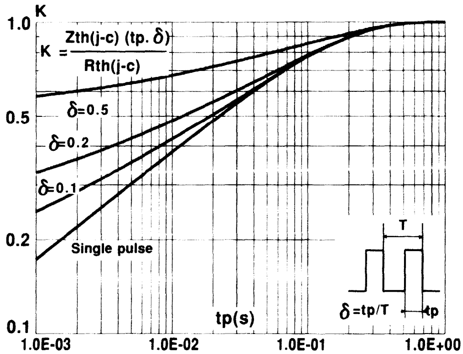


Fig.5 : Non repetitive surge peak forward current versus overload duration.

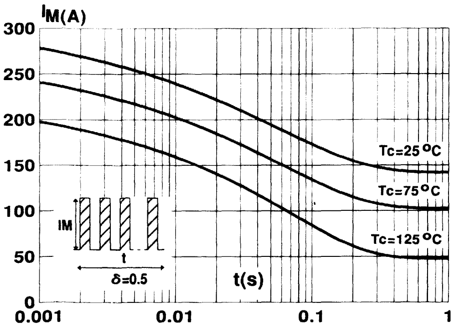


Fig.6 : Average current versus ambient temperature. (duty cycle : 0.5)

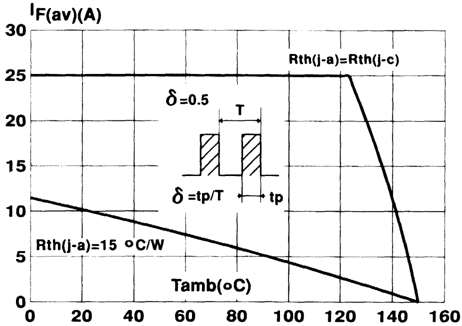


Fig.7 : Junction capacitance versus reverse voltage applied (Typical values).

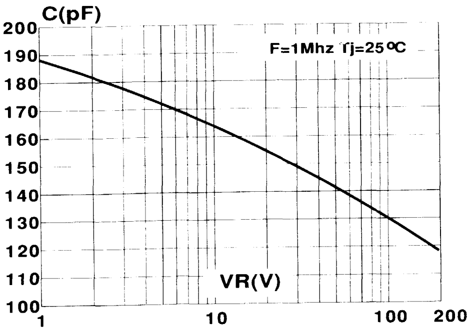


Fig.8 : Recovery charges versus dI_F/dt.

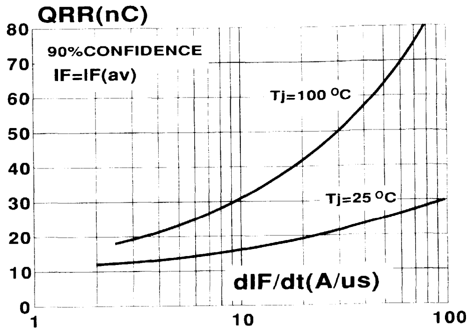


Fig.9 : Peak reverse current versus dIF/dt.

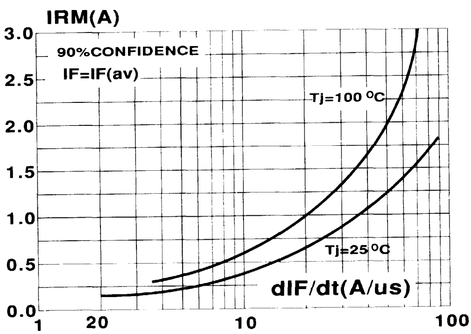
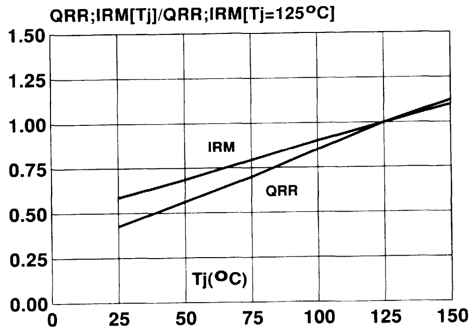


Fig.10 : Dynamic parameters versus junction temperature.

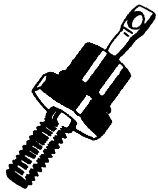


SGS-THOMSON MICROELECTRONICS

BYW 77-50 → 200

HIGH EFFICIENCY FAST RECOVERY RECTIFIER DIODES

- VERY LOW CONDUCTION LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- LOW FORWARD AND REVERSE RECOVERY TIMES
- HIGH SURGE CURRENT AND AVALANCHE CAPABILITY
- THE SPECIFICATIONS AND CURVES ENABLE THE DETERMINATION OF t_{rr} AND I_{RM} AT 100°C UNDER USERS CONDITIONS



DO 4
(Metal)

DESCRIPTION

Low voltage drop rectifiers suited for switching mode power supply.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
I_{FRM}	Repetitive Peak Forward Current	$t_p \leq 20\mu s$	500	A
$I_{F\,(RMS)}$	RMS Forward Current		50	A
$I_{F\,(AV)}$	Average Forward Current	$T_C = 115°C$ $\delta = 0.5$	25	A
I_{FSM}	Surge non Repetitive Forward Current	$t_p = 10ms$ Sinusoidal	500	A
P_{tot}	Power Dissipation	$T_C = 100°C$	33	W
T_{stg} T_j	Storage and Junction Temperature Range		– 40 to 150	°C

Symbol	Parameter	BYW 77-				Unit
		50	100	150	200	
V_{RRM}	Repetitive Peak Reverse Voltage	50	100	150	200	V
V_{RSM}	Non Repetitive Peak Reverse Voltage	55	110	165	220	V

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\,(j-c)}$	Junction-case	1.5	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R	T_j = 25°C	$V_R = V_{RRM}$			25	µA
	T_j = 100°C				2.5	mA
V_F	T_j = 25°C	I_F = 63A			1.1	V
	T_j = 100°C	I_F = 20A			0.85	

RECOVERY CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
t_{rr}	T_j = 25°C V_R = 30V	I_F = 1A see figure 12	di_F/dt = – 50A/µs			50	ns
Q_{rr}	T_j = 25°C V_R ≤ 30V	I_F = 2A	di_F/dt = – 20A/µs			20	nC
t_{fr}	T_j = 25°C Measured at 1.1 x V_F	I_F = 1A	t_r = 5ns		10		ns
V_{FP}	T_j = 25°C	I_F = 1A	t_r = 5ns		1.5		V

To evaluate the conduction losses use the following equations :

$V_F = 0.66 + 0.0047\ I_F$ $\qquad$ $P = 0.66 \times I_{F(AV)} + 0.0047 I_F{}^2{}_{(RMS)}$

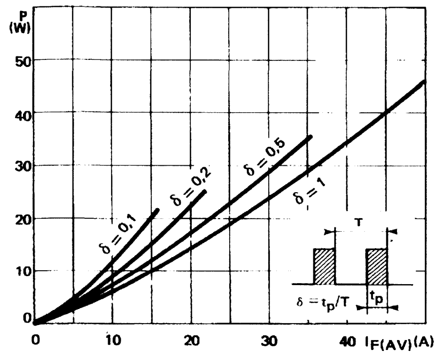


FIGURE 1 : Power losses versus average current

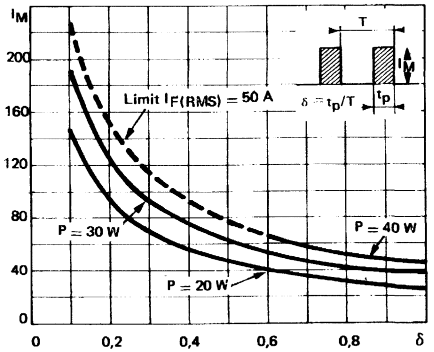


FIGURE 2 : Peak current versus form factor

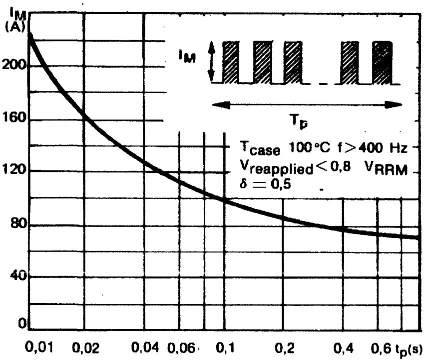


FIGURE 3 : Non repetitive peak surge current versus duration

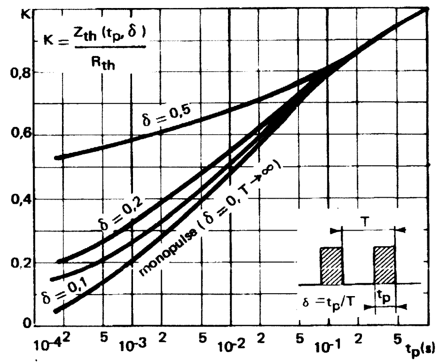


FIGURE 4 : Thermal impedance versus pulse width

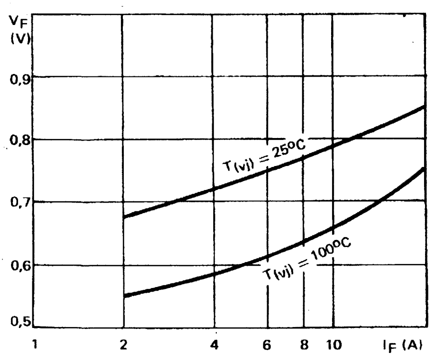


FIGURE 5 : Voltage drop and dispersion versus forward current

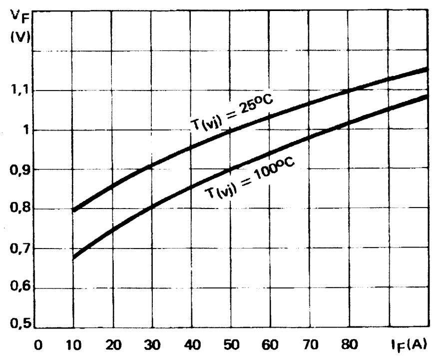


FIGURE 6 : Voltage drop versus forward current

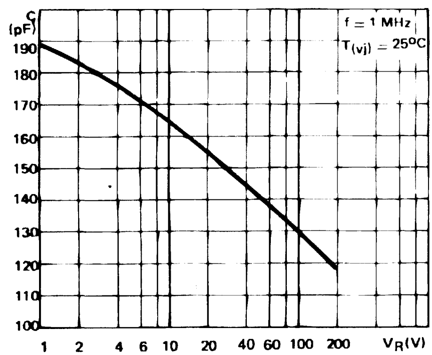


FIGURE 7 : Capacitance versus reverse voltage applied

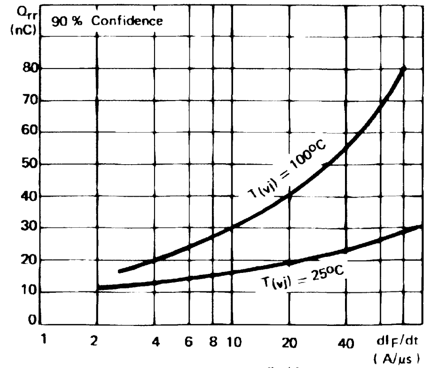


FIGURE 8 Recovery charge versus dI_F/dt

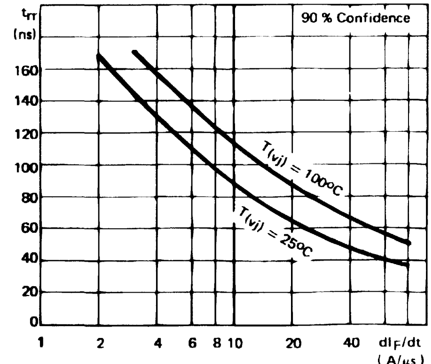


FIGURE 9 : Recovery time versus dI_F/dt

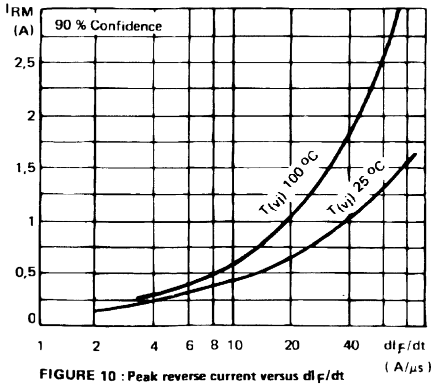


FIGURE 10 : Peak reverse current versus dI_F/dt

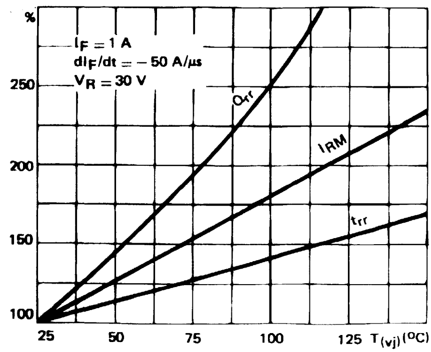


FIGURE 11 : Dynamic parameters versus junction temperature

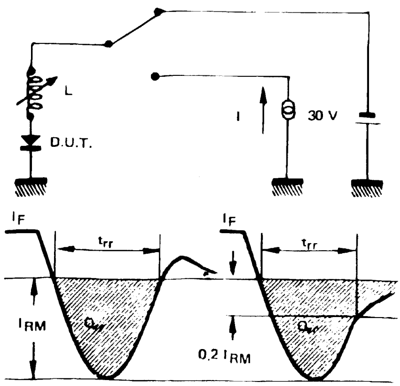
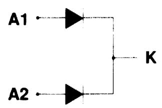


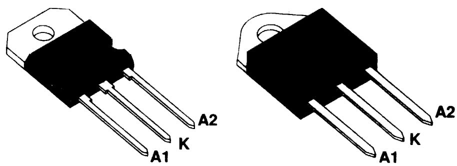
FIGURE 12 : Measurement of t_{rr} (fig. 9) and I_{RM} (fig. 10)

HIGH EFFICIENCY FAST RECOVERY RECTIFIER DIODES

FEATURES

- SUITED FOR SMPS
- VERY LOW FORWARD LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- HIGH SURGE CURRENT CAPABILITY
- HIGH AVALANCHE ENERGY CAPABILITY
- INSULATED VERSION TOP3I :
  Insulating voltage = 2500 V DC
  Capacitance = 12 pF





SOT93
(Plastic)

BYW99P-200

isolated TOP3I
(Plastic)

BYW99PI-200

DESCRIPTION

Dual center tap rectifier suited for switchmode power supply and high frequency DC to DC converters.
Packaged in SOT93, or TOP3I this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter				Value	Unit
$I_{F(RMS)}$	RMS forward current			Per diode	35	A
$I_{F(AV)}$	Average forward current $\delta = 0.5$	SOT93	Tc=120°C	Per diode	15	A
		TOP3I	Tc=115°C	Per diode	15	
I_{FSM}	Surge non repetitive forward current		tp=10ms sinusoidal	Per diode	200	A
Tstg Tj	Storage and junction temperature range				- 40 to + 150 - 40 to + 150	°C °C

Symbol	Parameter	BYW99P-/PI-				Unit
		50	100	150	200	
V_{RRM}	Repetitive peak reverse voltage	50	100	150	200	V

THERMAL RESISTANCE

Symbol	Parameter			Value	Unit
Rth (j-c)	Junction to case	SOT93	Per diode	1.8	°C/W
			Total	1.0	
		TOP3I	Per diode	2.0	
			Total	1.25	
Rth (c)	Coupling	SOT93		0.2	°C/W
		TOP3I		0.5	

When the diodes 1 and 2 are used simultaneously :
Tj-Tc (diode 1) = P(diode 1) x Rth(j-c) (Per diode) + P(diode 2) x Rth(c)

ELECTRICAL CHARACTERISTICS (Per diode)
STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R *	T_j = 25°C	$V_R = V_{RRM}$			20	µA
	T_j = 100°C				1.5	mA
V_F **	T_j = 125°C	I_F = 12 A			0.85	V
	T_j = 125°C	I_F = 25 A			1.05	
	T_j = 25°C	I_F = 25 A			1.15	

Pulse test : * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2 %

To evaluate the conduction losses use the following equation :
$P = 0.65 \times I_{F(AV)} + 0.016 \times I_F^2{}_{(RMS)}$

RECOVERY CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
trr	T_j = 25°C	I_F = 0.5A I_R = 1A	Irr = 0.25A			25	ns
		I_F = 1A V_R = 30V	dI_F/dt = -50A/µs			40	
tfr	T_j = 25°C	I_F = 1A $V_{FR} = 1.1 \times V_F$	tr = 10 ns		15		ns
V_{FP}	T_j = 25°C	I_F = 1A	tr = 10 ns		2		V

Fig.1 : Average forward power dissipation versus average forward current.

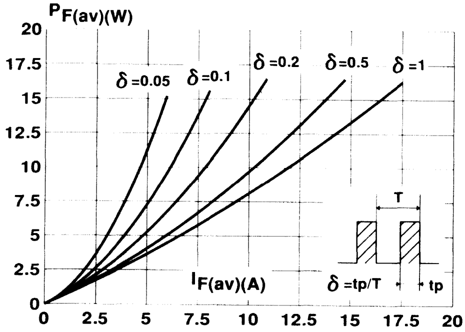


Fig.2 : Peak current versus form factor.

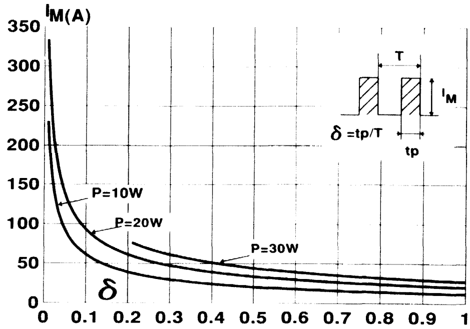


Fig.3 : Forward voltage drop versus forward current (maximum values).

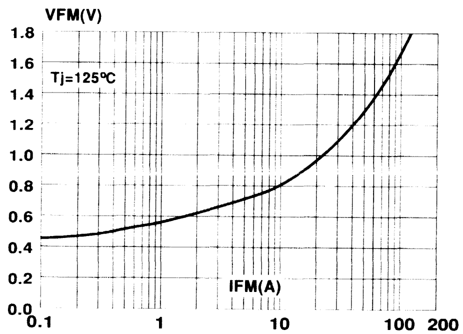


Fig.4 : Relative variation of thermal impedance junction to case versus pulse duration.

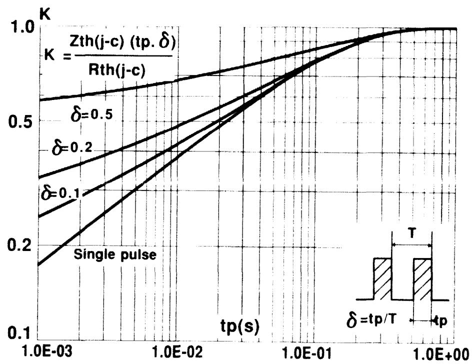


Fig.5 : Non repetitive surge peak forward current versus overload duration.
(SOD93)

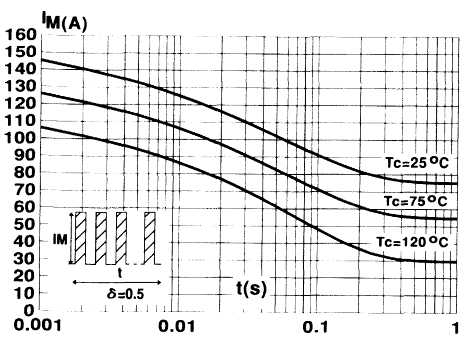


Fig.6 : Non repetitive surge peak forward current versus overload duration.
(TOP3I)

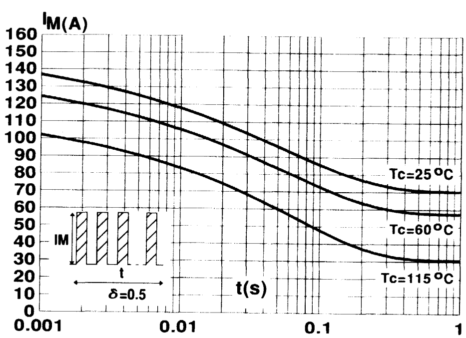


Fig.7 : Average current versus ambient temperature.
(duty cycle : 0.5) (SOD93)

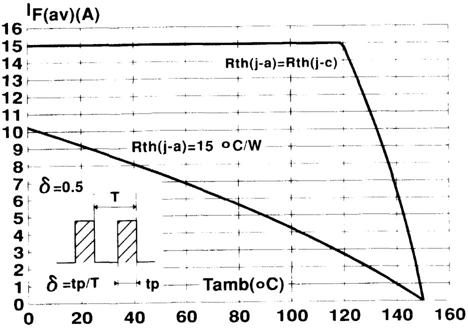


Fig.8 : Average current versus ambient temperature.
(duty cycle : 0.5) (TOP3I)

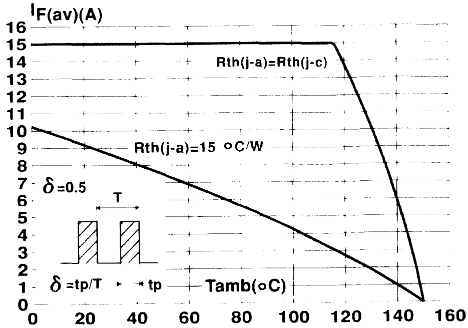


Fig.9 : Junction capacitance versus reverse voltage applied (Typical values).

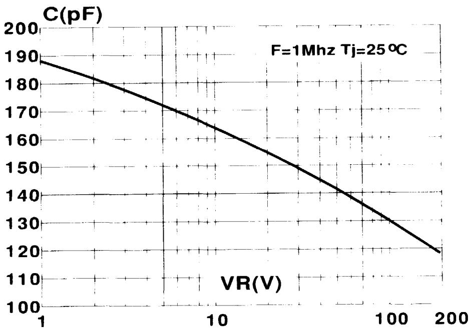


Fig.10 : Recovery charges versus dIF/dt.

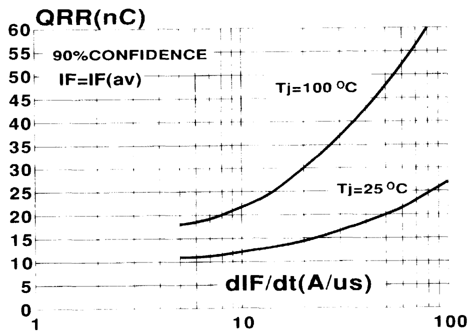


Fig.11 : Peak reverse current versus dIF/dt.

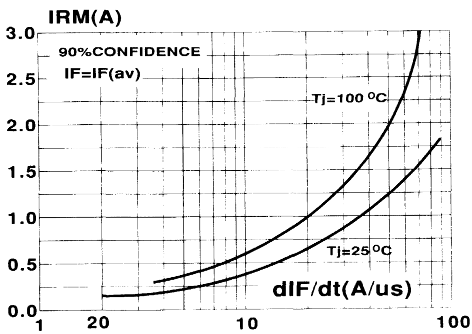
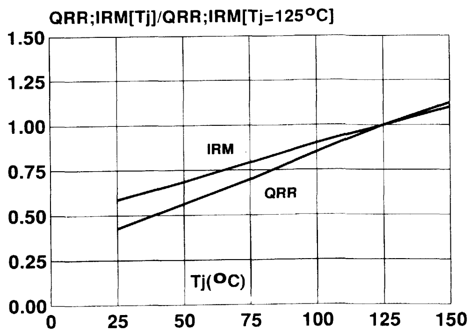


Fig.12 : Dynamic parameters versus junction temperature.



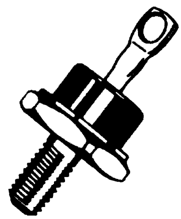
SGS-THOMSON MICROELECTRONICS

SGS-THOMSON MICROELECTRONICS

BYW 92-50 → 200

HIGH EFFICIENCY FAST RECOVERY RECTIFIER DIODES

- VERY LOW CONDUCTION LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- LOW FORWARD AND REVERSE RECOVERY TIMES
- HIGH SURGE CURRENT AND AVALANCHE CAPABILITY
- THE SPECIFICATIONS AND CURVES ENABLE THE DETERMINATION OF t_{rr} AND I_{RM} AT 100°C UNDER USERS CONDITIONS



DO 5
(Metal)

DESCRIPTION

Low voltage drop rectifiers suited for switching mode power supply.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
I_{FRM}	Repetitive Peak Forward Current	$t_p \leq 20\mu s$	500	A
$I_{F(RMS)}$	RMS Forward Current		70	A
$I_{F(AV)}$	Average Forward Current	$T_C = 115°C$ $\delta = 0.5$	35	A
I_{FSM}	Surge non Repetitive Forward Current	$t_p = 10ms$ Sinusoidal	500	A
P_{tot}	Power Dissipation	$T_C = 100°C$	50	W
T_{stg} T_j	Storage and Junction Temperature Range		– 40 to 150	°C

Symbol	Parameter	BYW 92-				Unit
		50	100	150	200	
V_{RRM}	Repetitive Peak Reverse Voltage	50	100	150	200	V
V_{RSM}	Non Repetitive Peak Reverse Voltage	55	110	165	220	V

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th(j-c)}$	Junction-case	1	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R	T_j = 25°C	$V_R = V_{RRM}$			50	µA
	T_j = 100°C				5	mA
V_F	T_j = 25°C	I_F = 100A			1.3	V
	T_j = 100°C	I_F = 35A			0.92	

RECOVERY CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
t_{rr}	T_j = 25°C V_R = 30V	I_F = 1A see figure 12	di_F/dt = – 50A/µs			50	ns
Q_{rr}	T_j = 25°C V_R ≤ 30V	I_F = 2A	di_F/dt = – 20A/µs			20	nC
t_{fr}	T_j = 25°C Measured at 1.1 x V_F	I_F = 1A	t_r = 5ns		10		ns
V_{FP}	T_j = 25°C	I_F = 1A	t_r = 5ns		1.5		V

To evaluate the conduction losses use the following equations :

$V_F = 0.66 + 0.0047\ I_F$ $\qquad$ $P = 0.66 \times I_{F(AV)} + 0.0047 I_F{}^2{}_{(RMS)}$

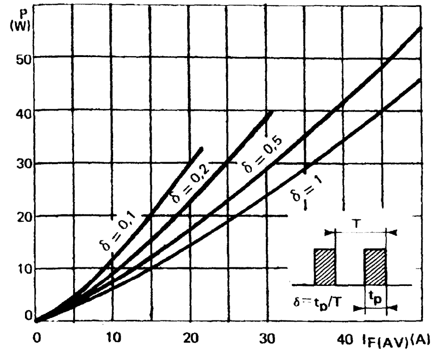


FIGURE 1 : Power losses versus average current

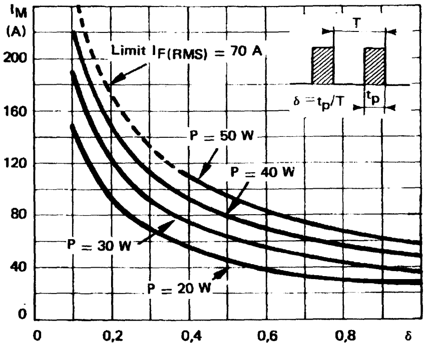


FIGURE 2 : Peak current versus form factor

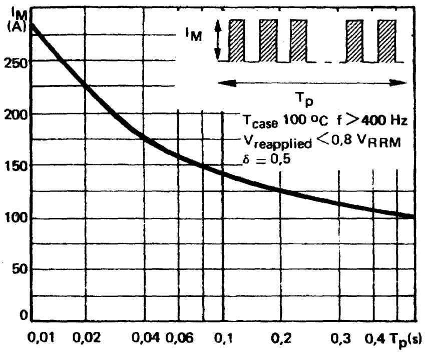


FIGURE 3 : Non repetitive peak surge current versus duration

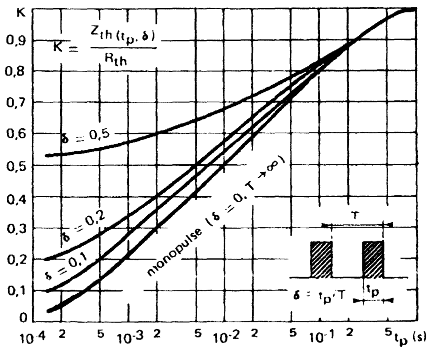


FIGURE 4 : Thermal impedance versus pulse width

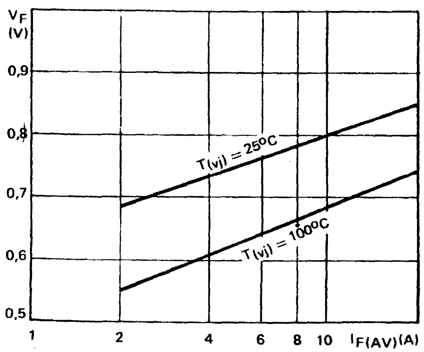


FIGURE 5 : Voltage drop versus forward current

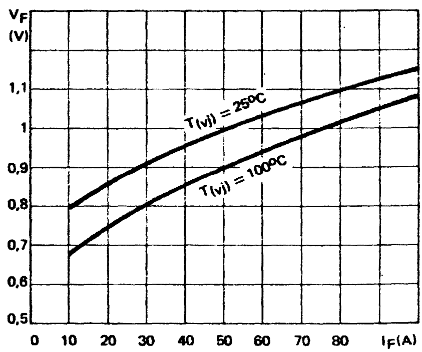


FIGURE 6 : Voltage drop versus forward current

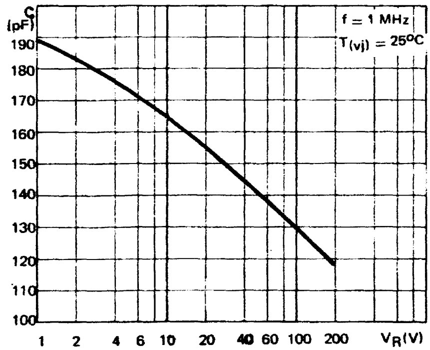


FIGURE 7 : Capacitance versus reverse voltage applied

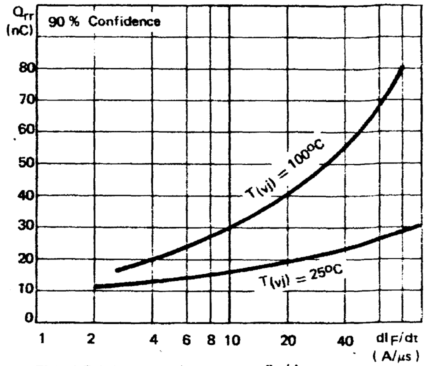


FIGURE 8 Recovery charge versus dI_F/dt

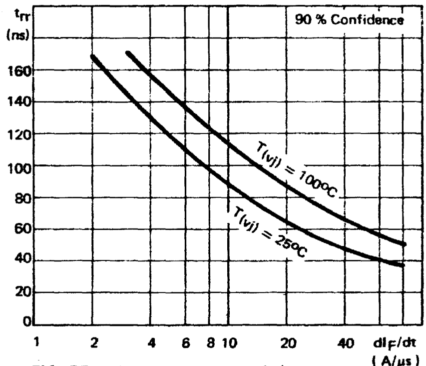


FIGURE 9 : Recovery time versus dI_F/dt

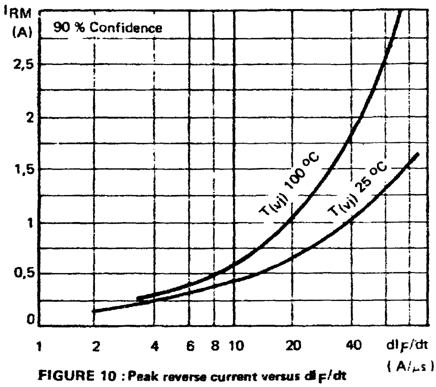


FIGURE 10 : Peak reverse current versus dI_F/dt

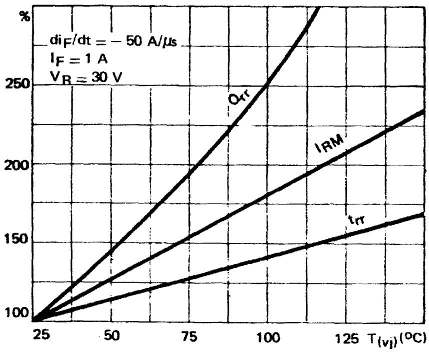


FIGURE 11 : Dynamic parameters versus junction temperature

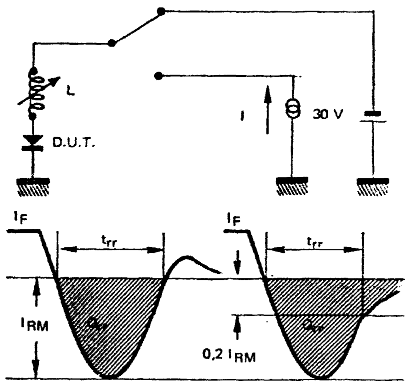
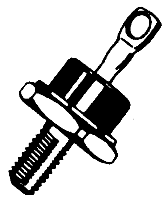


FIGURE 12 : Measurement of t_{rr} (fig. 9) and I_{RM} (fig. 10)

BYW 78-50 → 200

HIGH EFFICIENCY FAST RECOVERY RECTIFIER DIODES

- VERY LOW CONDUCTION LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- LOW FORWARD AND REVERSE RECOVERY TIMES
- HIGH SURGE CURRENT AND AVALANCHE CAPABILITY
- THE SPECIFICATIONS AND CURVES ENABLE THE DETERMINATION OF t_{rr} and I_{RM} AT 100°C UNDER USERS CONDITIONS



DO 5
(Metal)

DESCRIPTION

Low voltage drop rectifiers suited for switching mode power supply.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
I_{FRM}	Repetitive Peak Forward Current	$t_p \leq 20\mu s$	1000	A
$I_{F\ (RMS)}$	RMS Forward Current		100	A
$I_{F\ (AV)}$	Average Forward Current	$T_C = 100°C$ $\delta = 0.5$	50	A
I_{FSM}	Surge non Repetitive Forward Current	$t_p = 10ms$ Sinusoidal	1500	A
P_{tot}	Power Dissipation	$T_C = 90°C$	60	W
T_{stg} T_j	Storage and Junction Temperature Range		– 40 to 150	°C

Symbol	Parameter	BYW 78-				Unit
		50	100	150	200	
V_{RRM}	Repetitive Peak Reverse Voltage	50	100	150	200	V
V_{RSM}	Non Repetitive Peak Reverse Voltage	55	110	165	220	V

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-c)}$	Junction-case	1	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R	T_j = 25°C	$V_R = V_{RRM}$			50	µA
	T_j = 100°C				5	mA
V_F	T_j = 25°C	I_F = 160A			1.1	V
	T_j = 100°C	I_F = 50A			0.85	

RECOVERY CHARACTERISTICS

Symbol	Test conditions			Min.	Typ.	Max.	Unit
t_{rr}	T_j = 25°C V_R = 30V	I_F = 1A see figure 12	di_F/dt = – 50A/µs			60	ns
t_{fr}	T_j = 25°C Measured at 1.1 x V_F	I_F = 1A	t_r = 5ns		10		ns
V_{FP}	T_j = 25°C	I_F = 1A	t_r = 5ns		1.5		V

To evaluate the conduction losses use the following equations :

$V_F = 0.66 + 0.0021\ I_F$ $\quad\quad$ $P = 0.66 \times I_{F(AV)} + 0.0021 I_F{}^2{}_{(RMS)}$

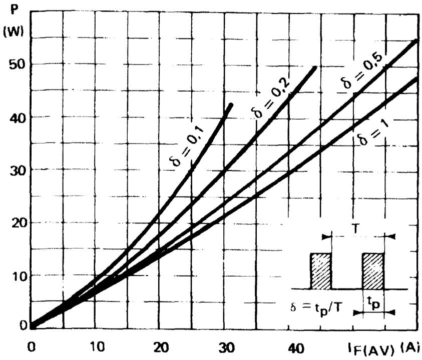


FIGURE 1 : Power losses versus average current

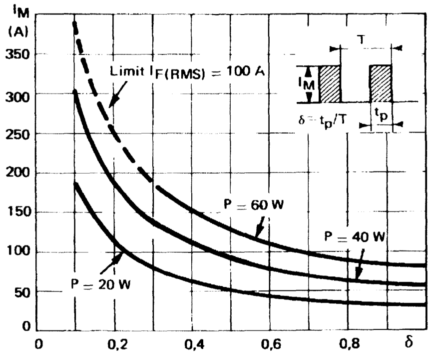


FIGURE 2 : Peak current versus form factor

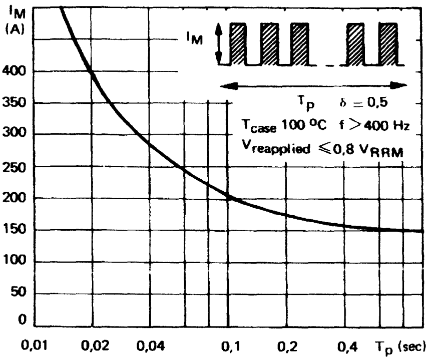


FIGURE 3 : Non repetitive peak surge current versus duration

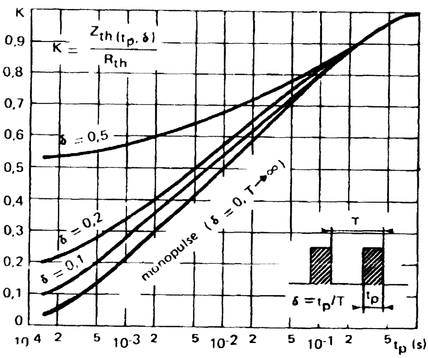


FIGURE 4 : Thermal impedance versus pulse width

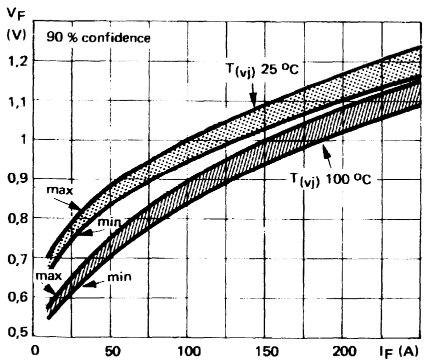


FIGURE 5 : Voltage drop and spread versus forward current

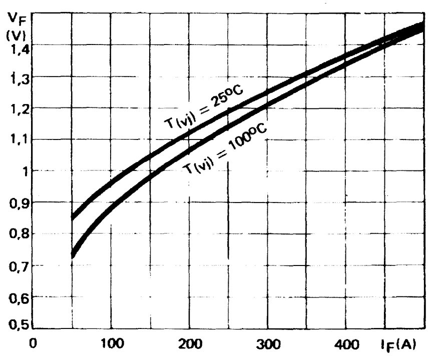


FIGURE 6 : Voltage drop versus forward current

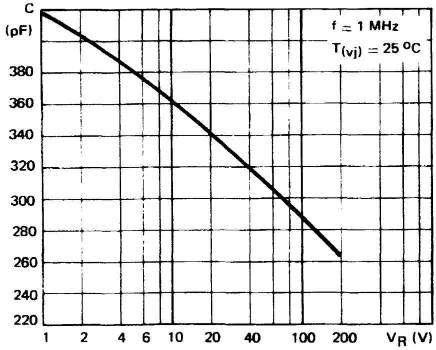


FIGURE 7 : Capacitance versus reverse voltage applied

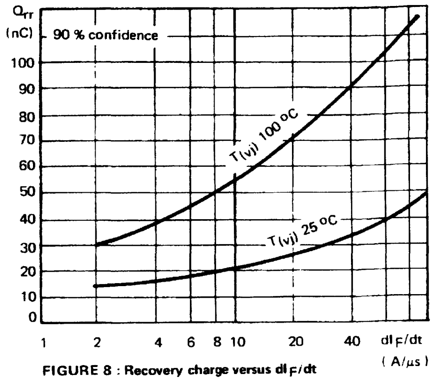


FIGURE 8 : Recovery charge versus dI_F/dt

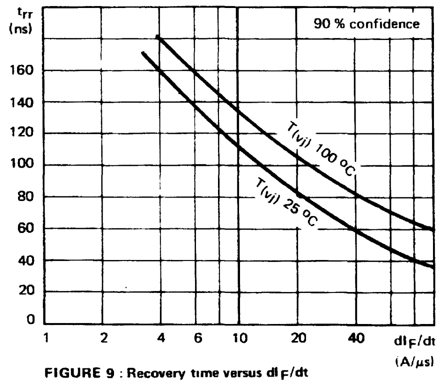


FIGURE 9 : Recovery time versus dI_F/dt

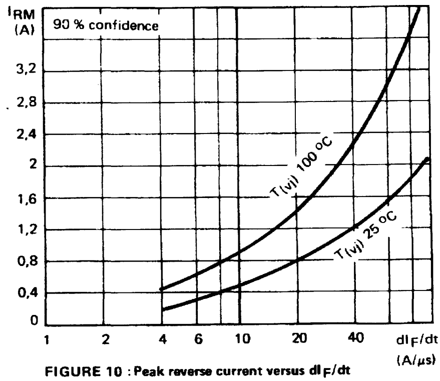


FIGURE 10 : Peak reverse current versus dI_F/dt

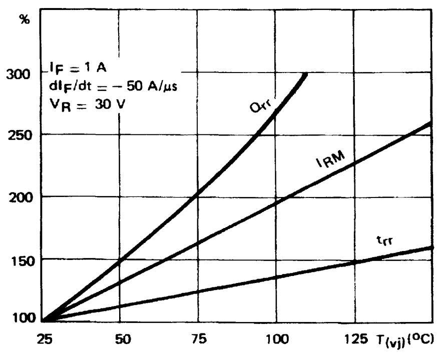


FIGURE 11 : Dynamic parameters versus junction temperature

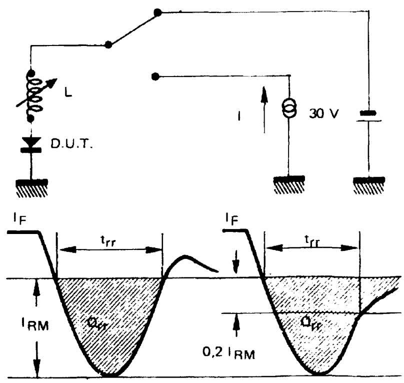
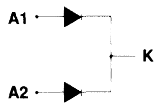


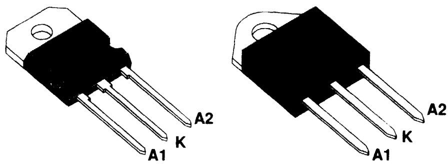
FIGURE 12 : Measurement of t_{rr} (fig. 9) and I_{RM} (fig. 10)

HIGH EFFICIENCY FAST RECOVERY RECTIFIER DIODES

FEATURES

- SUITED FOR SMPS
- VERY LOW FORWARD LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- HIGH SURGE CURRENT CAPABILITY
- HIGH AVALANCHE ENERGY CAPABILITY
- INSULATED VERSION TOP3I :
  Insulating voltage = 2500 V DC
  Capacitance = 12 pF





SOT93
(Plastic)

BYV52-200

isolated TOP3I
(Plastic)

BYV52PI-200

DESCRIPTION

Dual center tap rectifier suited for switchmode power supply and high frequency DC to DC converters.
Packaged in SOT93, or TOP3I this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter				Value	Unit
$I_{F(RMS)}$	RMS forward current			Per diode	50	A
$I_{F(AV)}$	Average forward current $\delta = 0.5$	SOT93	T_c=110°C	Per diode	30	A
		TOP3I	T_c=90°C	Per diode	30	
I_{FSM}	Surge non repetitive forward current		tp=10ms sinusoidal	Per diode	500	A
Tstg Tj	Storage and junction temperature range				- 40 to + 150 - 40 to + 150	°C °C

Symbol	Parameter	BYV52-/PI-				Unit
		50	100	150	200	
V_{RRM}	Repetitive peak reverse voltage	50	100	150	200	V

THERMAL RESISTANCE

Symbol	Parameter			Value	Unit
Rth (j-c)	Junction to case	SOT93	Per diode	1.2	°C/W
			Total	0.75	
		TOP3I	Per diode	1.8	
			Total	1.2	
Rth (c)	Coupling	SOT93		0.3	°C/W
		TOP3I		0.6	

When the diodes 1 and 2 are used simultaneously :
Tj-Tc (diode 1) = P(diode 1) x Rth(j-c)(Per diode) + P(diode 2) x Rth(c)

ELECTRICAL CHARACTERISTICS (Per diode)
STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R *	T_j = 25°C	$V_R = V_{RRM}$			25	µA
	T_j = 100°C				2.5	mA
V_F **	T_j = 125°C	I_F = 20 A			0.85	V
	T_j = 125°C	I_F = 40 A			1.00	
	T_j = 25°C	I_F = 40 A			1.15	

Pulse test : * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2 %

To evaluate the conduction losses use the following equation :
$P = 0.7 \times I_{F(AV)} + 0.0075 \times I_{F}^{2}{}_{(RMS)}$

RECOVERY CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
trr	T_j = 25°C	I_F = 0.5A Irr = 0.25A I_R = 1A			35	ns
		I_F = 1A dI_F/dt = -50A/µs V_R = 30V			50	
tfr	T_j = 25°C	I_F = 1A tr = 5 ns $V_{FR} = 1.1 \times V_F$		10		ns
V_{FP}	T_j = 25°C	I_F = 1A tr = 5 ns		1.5		V

Fig.1 : Average forward power dissipation versus average forward current.

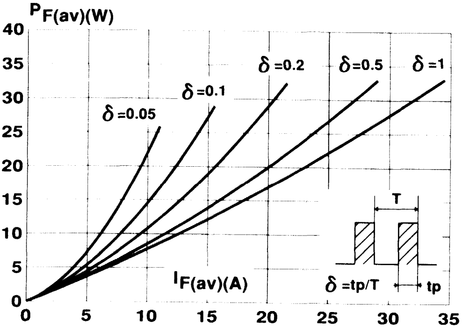


Fig.2 : Peak current versus form factor.

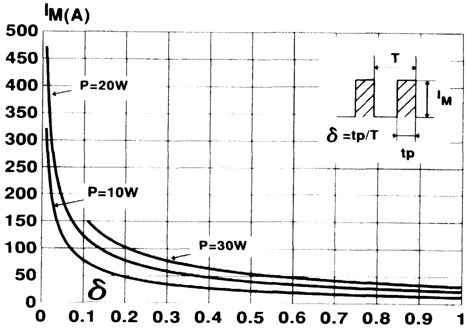


Fig.3 : Forward voltage drop versus forward current (maximum values).

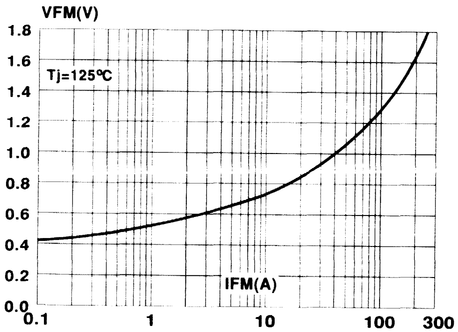


Fig.4 : Relative variation of thermal impedance junction to case versus pulse duration.

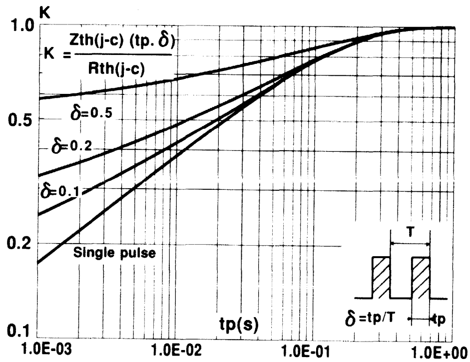


Fig.5 : Non repetitive surge peak forward current versus overload duration.
(SOD93)

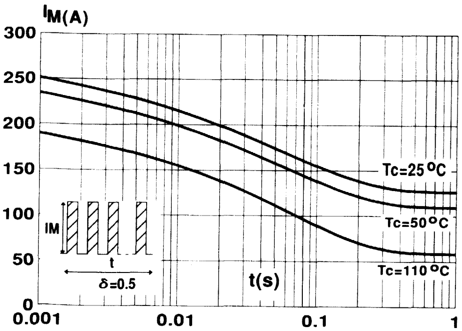


Fig.6 : Non repetitive surge peak forward current versus overload duration.
(TOP3I)

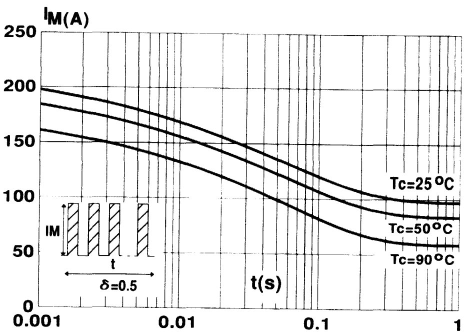


Fig.7 : Average current versus ambient temperature.
(duty cycle : 0.5) (SOD93)

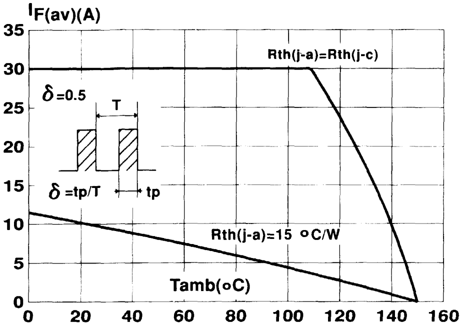


Fig.8 : Average current versus ambient temperature.
(duty cycle : 0.5) (TOP3I)

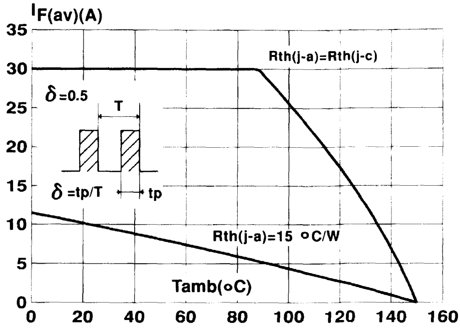


Fig.9 : Junction capacitance versus reverse voltage applied (Typical values).

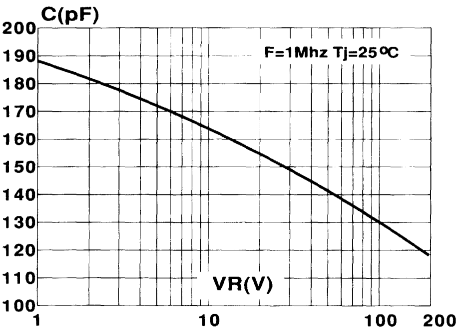


Fig.10 : Recovery charges versus dI_F/dt.

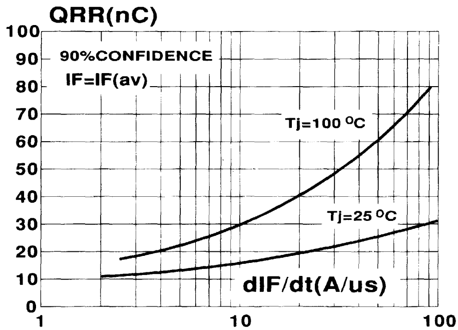


Fig.11 : Peak reverse current versus dIF/dt.

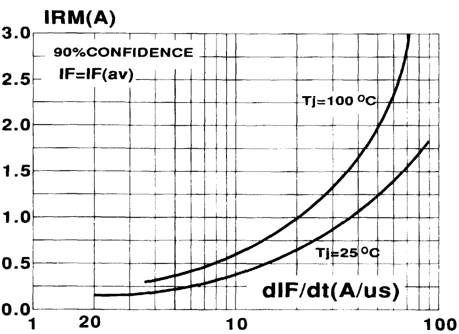
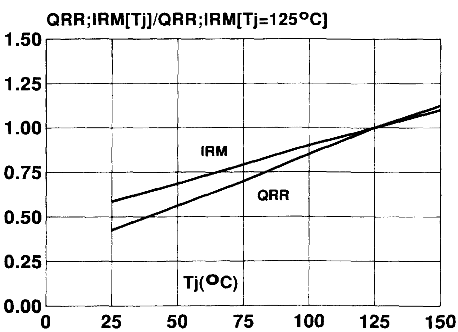


Fig.12 : Dynamic parameters versus junction temperature.

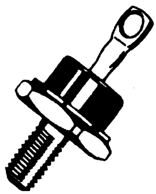


SGS-THOMSON
MICROELECTRONICS

BYW 08-50 → 200

HIGH EFFICIENCY FAST RECOVERY RECTIFIER DIODES

- VERY LOW CONDUCTION LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- LOW FORWARD AND REVERSE RECOVERY TIMES
- HIGH SURGE CURRENT AND AVALANCHE CAPABILITY
- THE SPECIFICATIONS AND CURVES ENABLE THE DETERMINATION OF t_{rr} and I_{RM} AT 100°C UNDER USERS CONDITIONS
- EASE OF PARALLELING



DO 5
(Metal)

DESCRIPTION

Low voltage drop rectifiers suited for switching mode power supply.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
I_{FRM}	Repetitive Peak Forward Current	$t_p \leq 20\mu s$	1000	A
$I_{F\ (RMS)}$	RMS Forward Current		100	A
$I_{F\ (AV)}$	Average Forward Current	$T_C = 85°C$ $\delta = 0.5$	80	A
I_{FSM}	Surge non Repetitive Forward Current	$t_p = 10ms$ Sinusoidal	1500	A
P_{tot}	Power Dissipation	$T_C = 90°C$	80	W
T_{stg} T_j	Storage and Junction Temperature Range		– 40 to 150	°C

Symbol	Parameter	BYW 08-				Unit
		50	100	150	200	
V_{RRM}	Repetitive Peak Reverse Voltage	50	100	150	200	V
V_{RSM}	Non Repetitive Peak Reverse Voltage	55	110	165	220	V

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-c)}$	Junction-case	0.75	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R	T_j = 25°C	$V_R = V_{RRM}$			50	µA
	T_j = 100°C				5	mA
V_F	T_j = 25°C	I_F = 80A			1.05	V
	T_j = 100°C				0.92	

RECOVERY CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
t_{rr}	T_j = 25°C V_R = 30V	I_F = 1A see figure 12	di_F/dt = – 50A/µs			60	ns
t_{fr}	T_j = 25°C Measured at 1.1 x V_F	I_F = 1A	t_r = 5ns		10		ns
V_{FP}	T_j = 25°C	I_F = 1A	t_r = 5ns		1.5		V

To evaluate the conduction losses use the following equations :

$V_F = 0.66 + 0.0021\ I_F$ $\quad\quad$ $P = 0.66 \times I_{F(AV)} + 0.0021\, I_F{}^2{}_{(RMS)}$

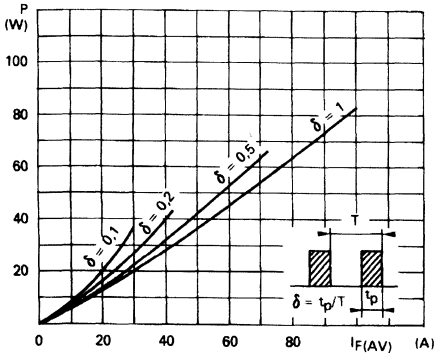


FIGURE 1 : Power losses versus average current

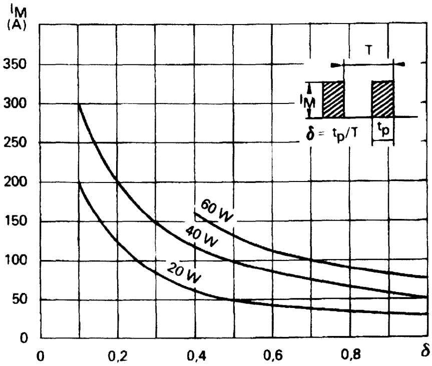


FIGURE 2 : Peak current versus form factor

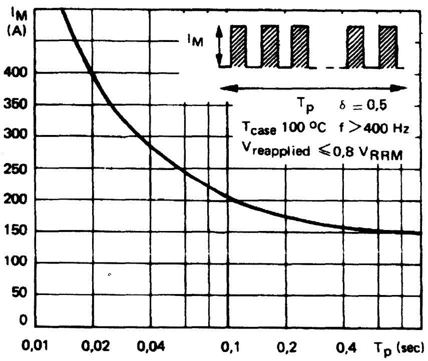


FIGURE 3 : Non repetitive peak surge current versus duration

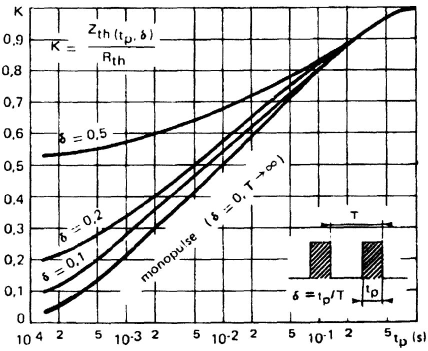


FIGURE 4 : Thermal impedance versus pulse width

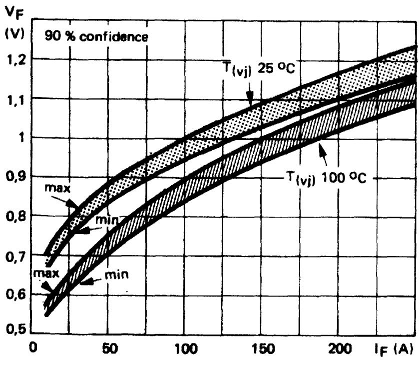


FIGURE 5 : Voltage drop and spread versus forward current

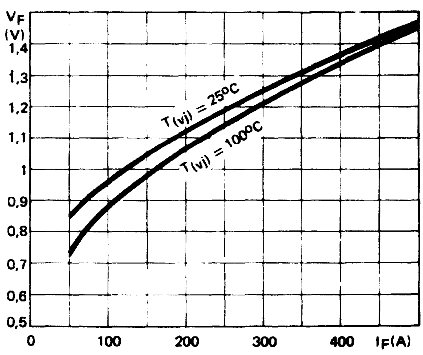


FIGURE 6 : Voltage drop versus forward current

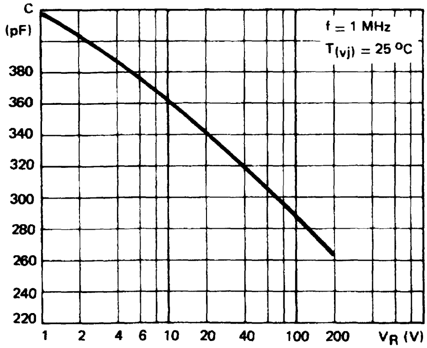


FIGURE 7 : Capacitance versus reverse voltage applied

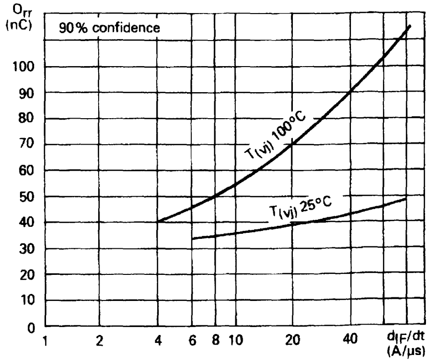


FIGURE 8 : Recovery charge versus dI_F/dt

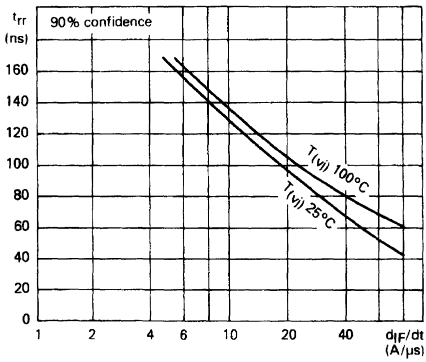


FIGURE 9 : Recovery time versus dI_F/dt

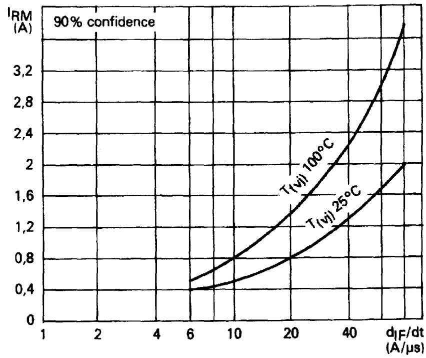


FIGURE 10 : Peak reverse current versus dI_F/dt

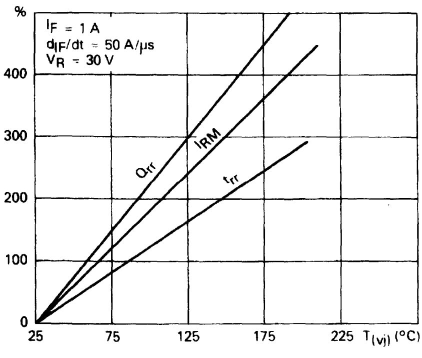


FIGURE 11 : Dynamic parameters versus junction temperature

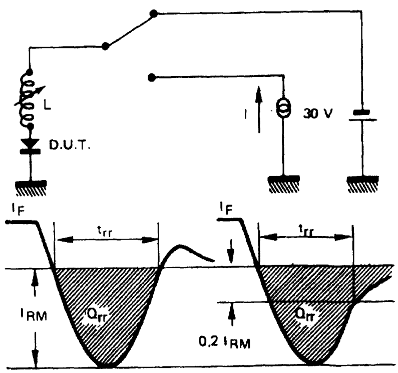
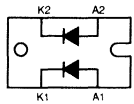


FIGURE 12 : Measurement of t_{rr} (fig. 9) and I_{RM} (fig. 10)

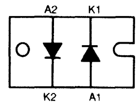
HIGH EFFICIENCY FAST RECOVERY RECTIFIER DIODES

FEATURES

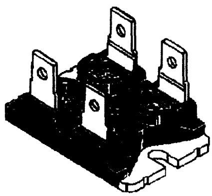
- SUITED FOR SMPS
- VERY LOW FORWARD LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- HIGH SURGE CURRENT CAPABILITY
- HIGH AVALANCHE ENERGY CAPABILITY
- INSULATED :
  Insulating voltage = 2500 V_{RMS}
  Capacitance = 45 pF



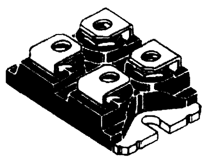
BYV541(V)-200



BYV54(V)-200



ISOTOP
Fast on version
(Plastic)



ISOTOP
Screw version
(Plastic)

DESCRIPTION

Dual rectifier suited for switchmode power supply and high frequency DC to DC converters. Packaged in ISOTOP™ this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter			Value	Unit
$I_{F(RMS)}$	RMS forward current		Per diode	100	A
$I_{F(AV)}$	Average forward current $\delta = 0.5$	Tc=90°C	Per diode	50	A
I_{FSM}	Surge non repetitive forward current	tp=10ms sinusoidal	Per diode	1000	A
Tstg Tj	Storage and junction temperature range			- 40 to + 150 - 40 to + 150	°C °C

Symbol	Parameter	BYV54(V) / BYV541(V)				Unit
		50	100	150	200	
V_{RRM}	Repetitive peak reverse voltage	50	100	150	200	V

THERMAL RESISTANCE

Symbol	Parameter		Value	Unit
Rth (j-c)	Junction to case	Per diode	1.2	°C/W
		Total	0.85	
Rth (c)	Coupling		0.1	°C/W

When the diodes 1 and 2 are used simultaneously :
Tj-Tc (diode 1) = P(diode 1) x Rth(j-c)(Per diode) + P(diode 2) x Rth(c)

ELECTRICAL CHARACTERISTICS (Per diode)
STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R *	T_j = 25°C	$V_R = V_{RRM}$			50	µA
	T_j = 100°C				5	mA
V_F **	T_j = 125°C	I_F = 50 A			0.85	V
	T_j = 125°C	I_F = 100 A			1.00	
	T_j = 25°C	I_F = 100 A			1.15	

Pulse test : * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2 %

To evaluate the conduction losses use the following equation :
$P = 0.7 \times I_{F(AV)} + 0.003 \times I_F^2{}_{(RMS)}$

RECOVERY CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
trr	T_j = 25°C	I_F = 0.5A Irr = 0.25A I_R = 1A			40	ns
		I_F = 1A dI_F/dt = -50A/µs V_R = 30V			60	
tfr	T_j = 25°C	I_F = 1A tr = 5 ns V_{FR} = 1.1 x V_F		10		ns
V_{FP}	T_j = 25°C	I_F = 1A tr = 5 ns		1.5		V

Fig.1 : Average forward power dissipation versus average forward current.

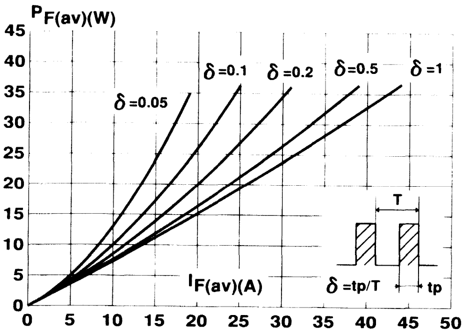


Fig.2 : Peak current versus form factor.

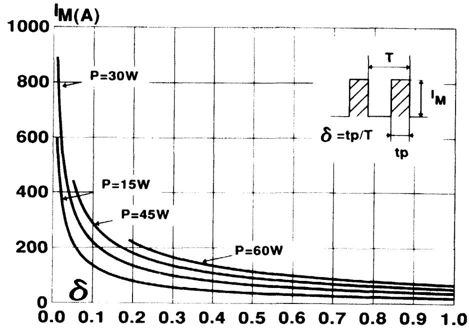


Fig.3 : Forward voltage drop versus forward current (maximum values).

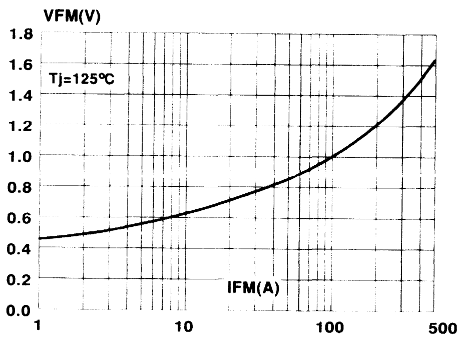


Fig.4 : Relative variation of thermal impedance junction to case versus pulse duration.

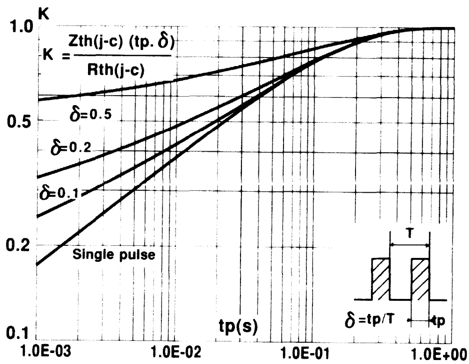


Fig.5 : Non repetitive surge peak forward current versus overload duration.

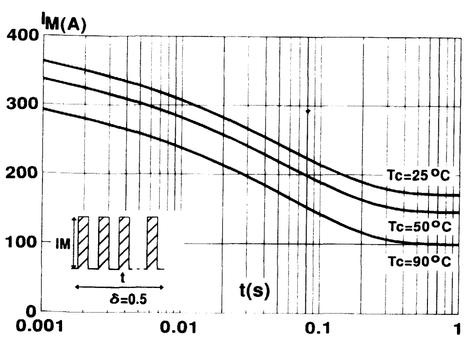


Fig.6 : Average current versus ambient temperature. (duty cycle : 0.5)

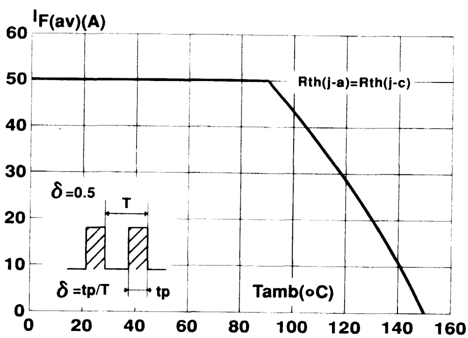


Fig.7 : Junction capacitance versus reverse voltage applied (Typical values).

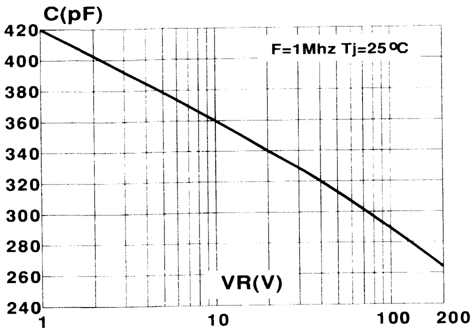


Fig.8 : Recovery charges versus dI_F/dt.

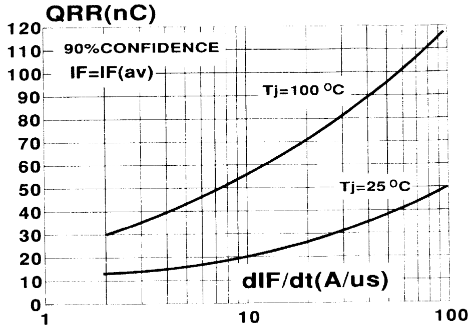


Fig.9 : Peak reverse current versus dIF/dt.

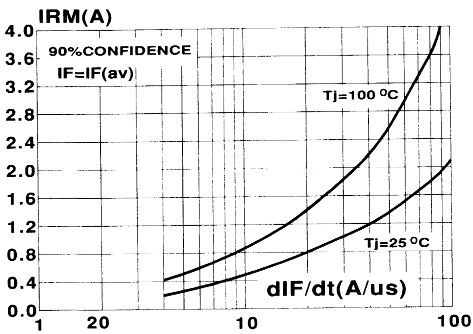
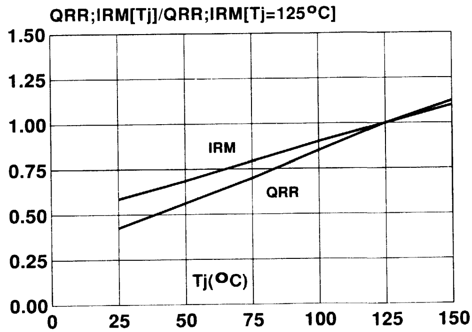


Fig.10 : Dynamic parameters versus junction temperature.



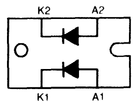
SGS-THOMSON MICROELECTRONICS

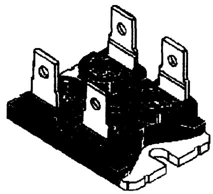
BYV255(V)

HIGH EFFICIENCY FAST RECOVERY RECTIFIER DIODES

FEATURES

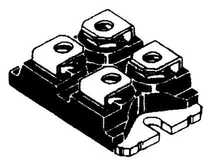
- SUITED FOR SMPS
- VERY LOW FORWARD LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- HIGH SURGE CURRENT CAPABILITY
- HIGH AVALANCHE ENERGY CAPABILITY
- INSULATED :
  Insulating voltage = 2500 V_{RMS}
  Capacitance = 55 pF





ISOTOP
Fast on version
(Plastic)

BYV255-200



ISOTOP
Screw version
(Plastic)

BYV255V-200

DESCRIPTION

Dual rectifier suited for switchmode power supply and high frequency DC to DC converters. Packaged in ISOTOP[TM] this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter			Value	Unit
$I_{F(RMS)}$	RMS forward current		Per diode	150	A
$I_{F(AV)}$	Average forward current $\delta = 0.5$	Tc=110°C	Per diode	100	A
I_{FSM}	Surge non repetitive forward current	tp=10ms sinusoidal	Per diode	1600	A
Tstg Tj	Storage and junction temperature range			- 40 to + 150 - 40 to + 150	°C °C

Symbol	Parameter	BYV255-(V)				Unit
		50	100	150	200	
V_{RRM}	Repetitive peak reverse voltage	50	100	150	200	V

TM : ISOTOP is a trademark of SGS-THOMSON Microelectronics.

THERMAL RESISTANCE

Symbol	Parameter		Value	Unit
Rth (j c)	Junction to case	Per diode	0.4	°C/W
		Total	0.25	
Rth (c)	Coupling		0.1	°C/W

When the diodes 1 and 2 are used simultaneously :
Tj-Tc (diode 1) = P(diode 1) x Rth(j-c)(Per diode) + P(diode 2) x Rth(c)

ELECTRICAL CHARACTERISTICS (Per diode)
STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R *	T_j = 25°C	$V_R = V_{RRM}$			100	µA
	T_j = 100°C				10	mA
V_F **	T_j = 125°C	I_F = 100 A			0.85	V
	T_j = 125°C	I_F = 200 A			1.00	
	T_j = 25°C	I_F = 200 A			1.15	

Pulse test : * tp = 5 ms. duty cycle < 2 %
** tp = 380 µs. duty cycle < 2 %

To evaluate the conduction losses use the following equation :
$P = 0.7 \times I_{F(AV)} + 0.0015 \times I_{F}^{2}{}_{(RMS)}$

RECOVERY CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
trr	T_j = 25°C	I_F = 0.5A Irr = 0.25A I_R = 1A			55	ns
		I_F = 1A dI_F/dt = -50A/µs V_R = 30V			80	
tfr	T_j = 25°C	I_F = 1A tr = 5 ns $V_{FR} = 1.1 \times V_F$		10		ns
V_{FP}	T_j = 25°C	I_F = 1A tr = 5 ns		1.5		V

TURN-OFF SWITCHING CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
I_{RM}	T_j = 100°C	I_F = 100A Lp ≤ 0.05µH Vcc ≤ 0.6 V_{RRM}	dIF/dt = -200A/µs			16	A
			dI_F/dt = -400A/µs		24		

Fig.1 : Average forward power dissipation versus average forward current.

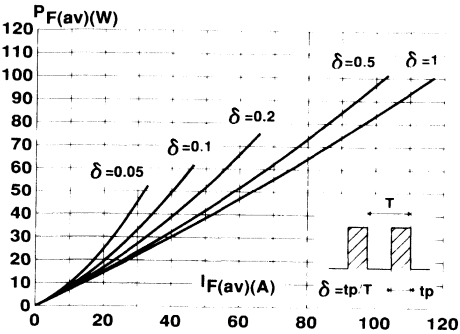


Fig.2 : Peak current versus form factor.

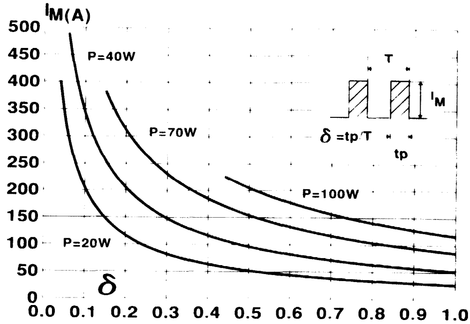


Fig.3 : Forward voltage drop versus forward current (maximum values).

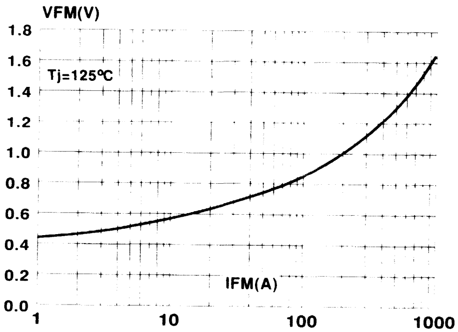


Fig.4 : Relative variation of thermal impedance junction to case versus pulse duration.

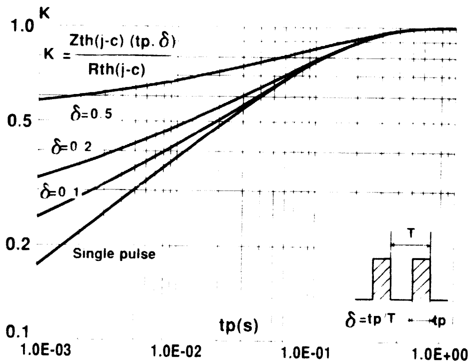


Fig.5 : Non repetitive surge peak forward current versus overload duration.

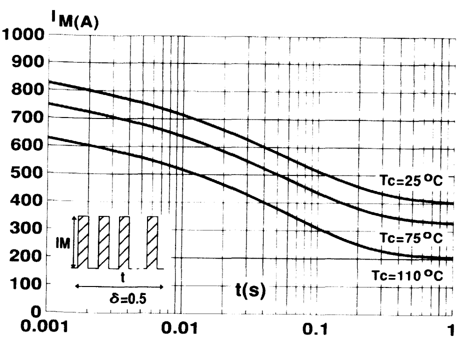


Fig.6 : Average current versus ambient temperature. (duty cycle : 0.5)

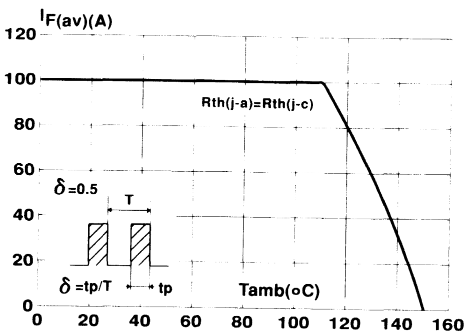


Fig.7 : Junction capacitance versus reverse voltage applied (Typical values).

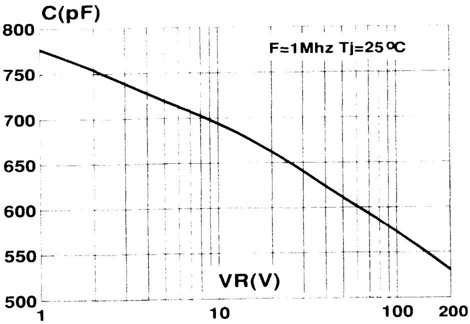


Fig.8 : Recovery charges versus dIF/dt.

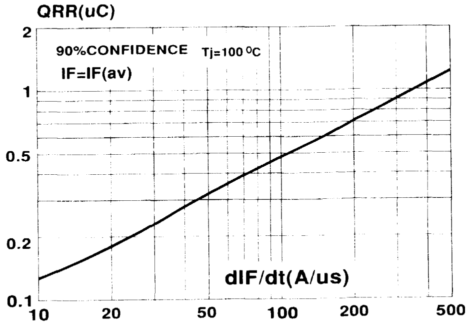


Fig.9 : Peak reverse current versus dIF/dt.

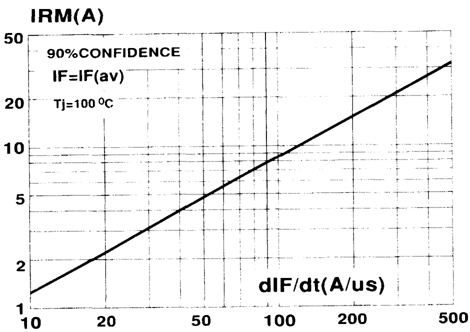
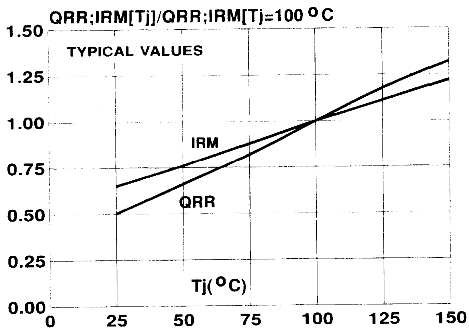


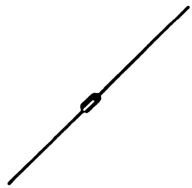
Fig.10 : Dynamic parameters versus junction temperature.



ULTRA FAST RECOVERY RECTIFIER DIODES

FEATURES

- SUITED FOR SMPS
- LOW LOSSES
- LOW FORWARD AND REVERSE RECOVERY TIME
- HIGH SURGE CURRENT CAPABILITY
- HIGH AVALANCHE ENERGY CAPABILITY



F 126
(Plastic)

DESCRIPTION

Low cost single chip rectifier suited for switchmode power supply and high frequency DC to DC converters.

Packaged in F 126, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
$I_{F(AV)}$	Average Forward Current	$T_l = 60°C$ $\delta = 0.5$	3	A
I_{FSM}	Surge Non Repetitive Forward Current	Tp = 10 ms Sinusoidal	30	A
T_{stg} T_j	Storage and Junction Temperature Range		- 65 to + 150 - 65 to + 150	°C

Symbol	Parameter	STPR		Unit
		310	320	
V_{RRM}	Repetitive Peak Reverse Voltage	100	200	V

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-l)}$*	Junction-leads	25	°C/W

* ou infinite heatsink with L = 5mm lead length.

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Tests Conditions		Min.	Typ.	Max.	Unit
I_R *	Tj = 25°C	$V_R = V_{RRM}$			10	µA
	Tj = 100°C				0.5	mA
V_F **	Tj = 125°C	I_F = 3 A			0.99	V
	Tj = 125°C	I_F = 6 A			1.20	
	Tj = 25°C	I_F = 6 A			1.25	

Pulse test : * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2%

RECOVERY CHARACTERISTICS

Symbol	Tests Conditions		Min.	Typ.	Max.	Unit
trr	Tj = 25°C	I_F = 0.5 A I_R = 1A Irr = 0.25 A			30	ns
tfr	Tj = 25°C	I_F = 1 A tr = 10 ns $V_{FR} = 1.1 \times V_F$		20		ns
V_{FP}	Tj = 25°C	I_F = 1 A tr = 10 ns		3		V

To evaluate the conduction losses use the following equation :
$P = 0.78 \times I_{F(AV)} + 0.070\ I_F^2(RMS)$

Fig.1 : Average forward power dissipation versus average forward current.

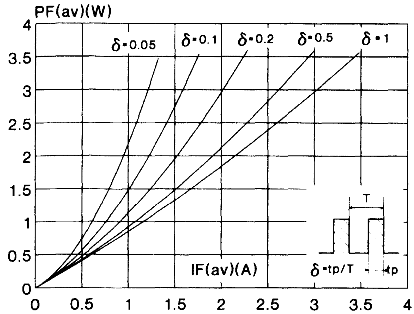


Fig.2 : Peak current versus form factor.

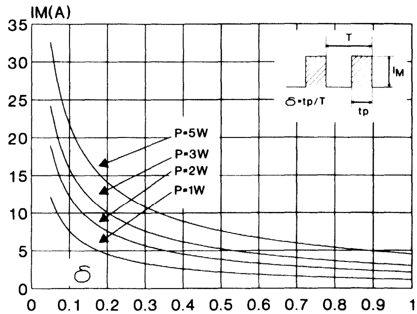


Fig.3 : Average current versus ambient temperature. (duty cycle : 0.5)
* circuit board e (Cu) = 35μm, S (cu) = $12mm^2$ $L_{(LEADS)}$= 20mm

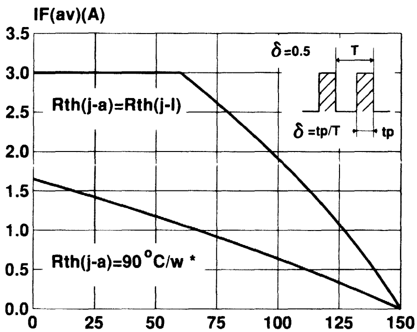


Fig.4 : Non repetitive surge peak forward current versus overload duration. (Maximum values)

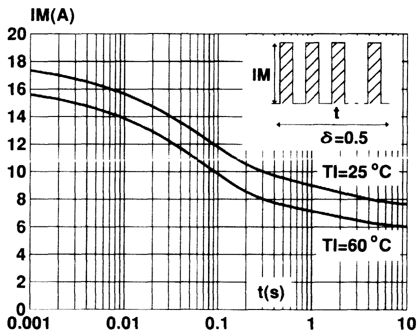


Fig.5 : Relative variation of thermal transient impedance junction to case versus pulse duration.

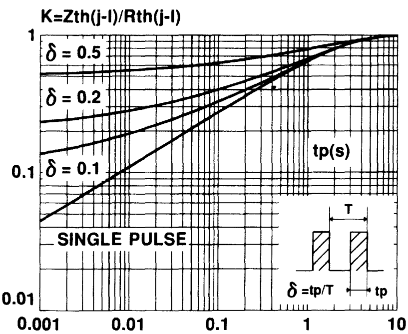


Fig.6 : Forward voltage drop versus forward current. (Maximum values)

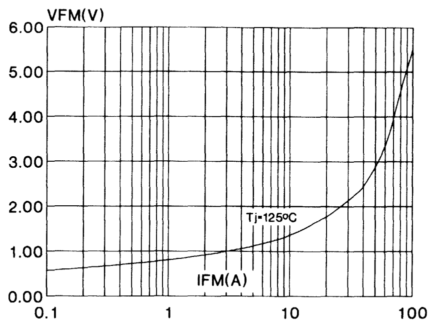


Fig.7 : Junction capacitance versus reverse voltage applied. (Typical values)

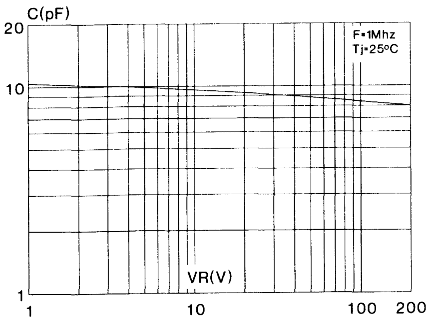


Fig.8 : Recovery charge versus dIF/dt.

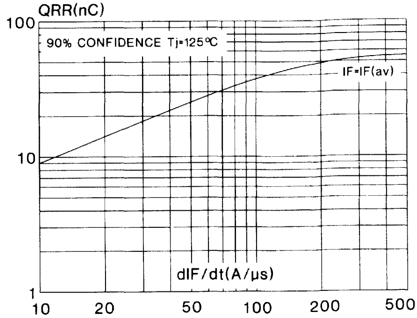


Fig.9 : Peak reverse current versus dIF/dt.

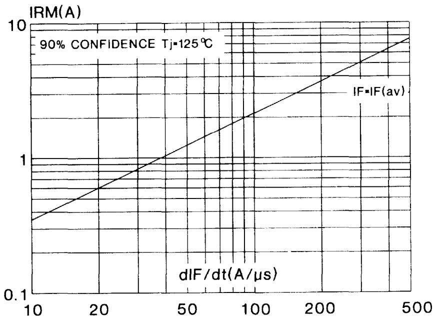
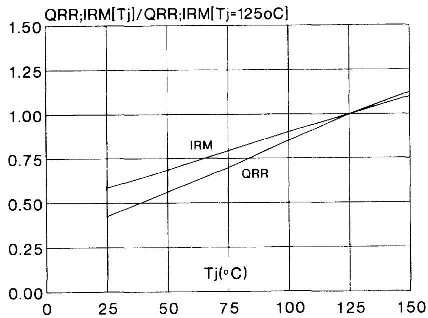


Fig.10 : Dynamic parameters versus junction temperature.

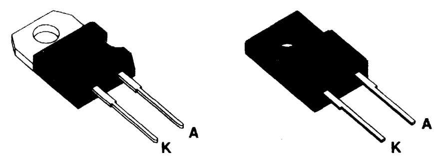


STPR310D/F
STPR320D/F

ULTRA FAST RECOVERY RECTIFIER DIODES

FEATURES

- SUITED FOR SMPS
- LOW LOSSES
- LOW FORWARD AND REVERSE RECOVERY TIME
- HIGH SURGE CURRENT CAPABILITY
- HIGH AVALANCHE ENERGY CAPABILITY



TO220AC (Plastic)	**ISOWATT220AC** (Plastic)
STPR310D STPR320D	STPR310F STPR320F

DESCRIPTION

Low cost single chip rectifier suited for switchmode power supply and high frequency DC to DC converters.

Packaged in TO220AC and ISOWATT220AC, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter			Value	Unit
$I_{F(RMS)}$	RMS Forward Current			10	A
$I_{F(AV)}$	Average Forward Current $\delta = 0.5$	TO220AC	Tc = 125°C	3	A
		ISOWATT220AC	Tc = 120°C		
I_{FSM}	Surge Non Repetitive Forward Current		Tp = 10 ms Sinusoidal	30	A
Tstg Tj	Storage and Junction Temperature Range			- 65 to + 150 - 65 to + 150	°C

Symbol	Parameter	STPR		Unit
		310D 310F	**320D 320F**	
V_{RRM}	Repetitive Peak Reverse Voltage	100	200	V

THERMAL RESISTANCE

Symbol	Parameter		Value	Unit
Rth (j-c)	Junction-case	TO220AC	6.5	°C/W
		ISOWATT220AC	8.5	

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Tests Conditions		Min.	Typ.	Max.	Unit
I_R *	Tj = 25°C	$V_R = V_{RRM}$			50	µA
	Tj = 100°C				0.5	mA
V_F **	Tj = 125°C	I_F = 3 A			0.99	V
	Tj = 125°C	I_F = 6 A			1.20	
	Tj = 25°C	I_F = 6 A			1.25	

Pulse test : * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2%

RECOVERY CHARACTERISTICS

Symbol	Tests Conditions		Min.	Typ.	Max.	Unit
trr	Tj = 25°C	I_F = 0.5 A I_R = 1A Irr = 0.25 A			30	ns
tfr	Tj = 25°C	I_F = 1 A tr = 10 ns $V_{FR} = 1.1 \times V_F$		20		ns
V_{FP}	Tj = 25°C	I_F = 1 A tr = 10 ns		3		V

To evaluate the conduction losses use the following equation :
$P = 0.78 \times I_{F(AV)} + 0.070\ I_F^2(RMS)$

Fig.1 : Average forward power dissipation versus average forward current.

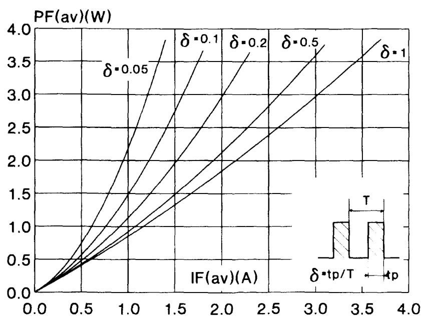


Fig.2 : Peak current versus form factor.

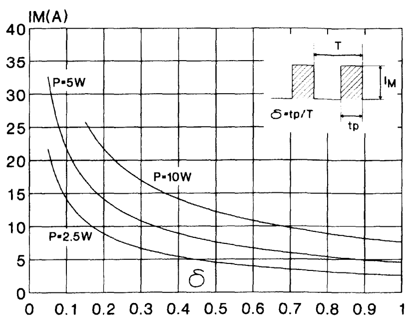


Fig.3 : Average current versus ambient temperature. (duty cycle : 0.5) (TO220AC)

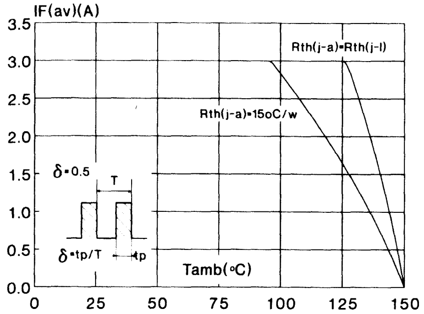


Fig.4 : Average current versus ambient temperature. (duty cycle : 0.5) (ISOWATT220AC)

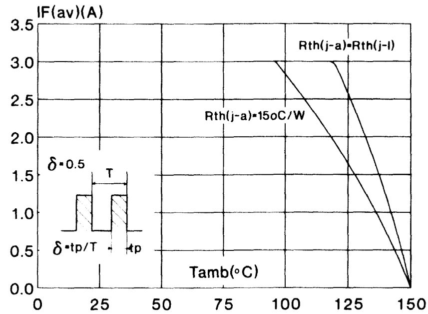


Fig.5 : Non repetitive surge peak forward current versus overload duration.
(Maximum values) (TO220AC)

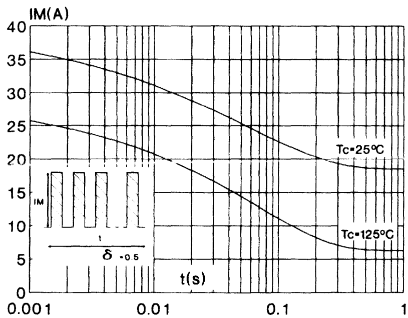


Fig.6 : Non repetitive surge peak forward current versus overload duration.
(Maximum values) (ISOWATT220AC)

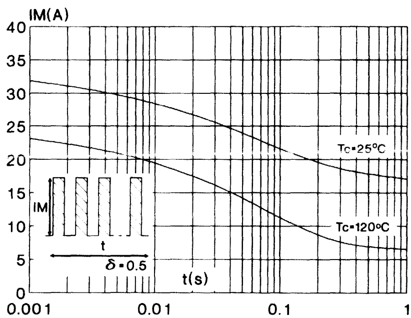


Fig.7 : Relative variation of thermal transient impedance junction to case versus pulse duration.
(TO220AC)

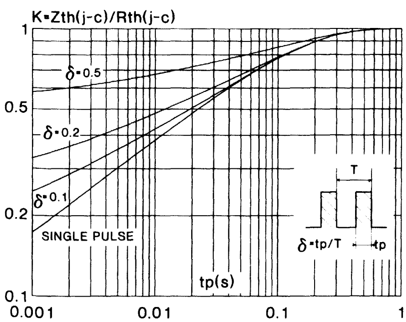


Fig.8 : Relative variation of thermal transient impedance junction to case versus pulse duration.
(ISOWATT220AC)

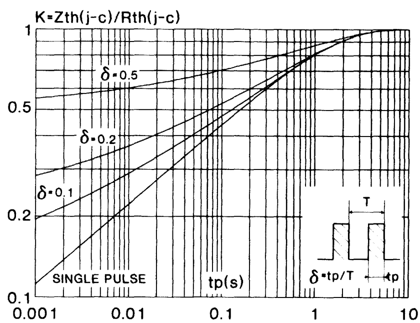


Fig.9 : Forward voltage drop versus forward current. (Maximum values)

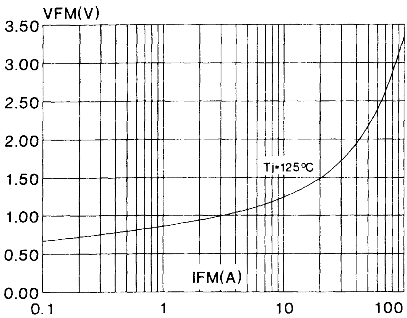


Fig.10 : Junction capacitance versus reverse voltage applied. (Typical values)

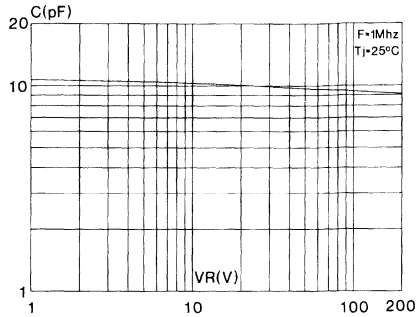


Fig.11 : Recovery charge versus dIF/dt.

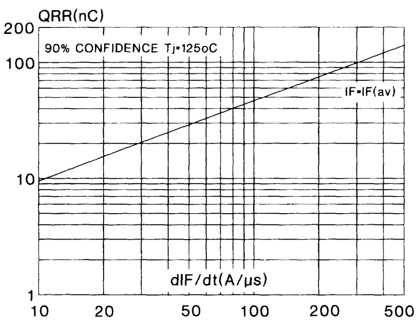


Fig.12 : Peak reverse current versus dIF/dt.

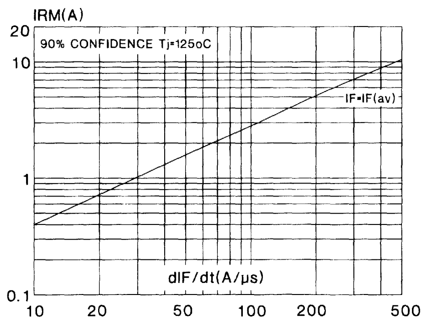
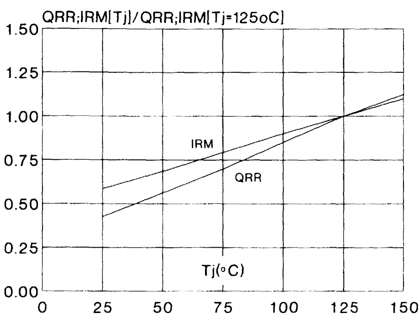


Fig.13 : Dynamic parameters versus junction temperature.

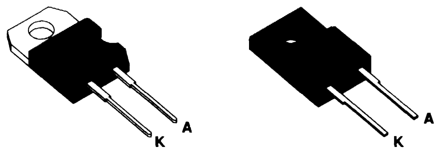


STPR510D/F
STPR520D/F

ULTRA FAST RECOVERY RECTIFIER DIODES

FEATURES

- SUITED FOR SMPS
- LOW LOSSES
- LOW FORWARD AND REVERSE RECOVERY TIME
- HIGH SURGE CURRENT CAPABILITY
- HIGH AVALANCHE ENERGY CAPABILITY



TO220AC
(Plastic)

STPR510D
STPR520D

ISOWATT220AC
(Plastic)

STPR510F
STPR520F

DESCRIPTION

Low cost single chip rectifier suited for switchmode power supply and high frequency DC to DC converters.

Packaged in TO220AC and ISOWATT220AC, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter			Value	Unit
$I_{F(RMS)}$	RMS Forward Current			10	A
$I_{F(AV)}$	Average Forward Current $\delta = 0.5$	TO220AC	Tc = 125°C	5	A
		ISOWATT220AC	Tc = 115°C		
I_{FSM}	Surge Non Repetitive Forward Current		Tp = 10 ms Sinusoidal	50	A
Tstg Tj	Storage and Junction Temperature Range			- 65 to + 150 - 65 to + 150	°C

Symbol	Parameter	STPR		Unit
		510D 510F	520D 520F	
V_{RRM}	Repetitive Peak Reverse Voltage	100	200	V

THERMAL RESISTANCE

Symbol	Parameter		Value	Unit
Rth (j-c)	Junction-case	TO220AC	4	°C/W
		ISOWATT220AC	6	

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Tests Conditions		Min.	Typ.	Max.	Unit
I_R *	Tj = 25°C	$V_R = V_{RRM}$			50	µA
	Tj = 100°C				0.5	mA
V_F **	Tj = 125°C	I_F = 5 A			0.99	V
	Tj = 125°C	I_F = 10 A			1.20	
	Tj = 25°C	I_F = 10 A			1.25	

Pulse test : * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2%

RECOVERY CHARACTERISTICS

Symbol	Tests Conditions		Min.	Typ.	Max.	Unit
trr	Tj = 25°C	I_F = 0.5 A I_R = 1A Irr = 0.25 A			30	ns
tfr	Tj = 25°C	I_F = 1 A tr = 10 ns $V_{FR} = 1.1 \times V_F$		20		ns
V_{FP}	Tj = 25°C	I_F = 1 A tr = 10 ns		3		V

To evaluate the conduction losses use the following equation :
$P = 0.78 \times I_{F(AV)} + 0.042\ I_F^2{}_{(RMS)}$

Fig.1 : Average forward power dissipation versus average forward current.

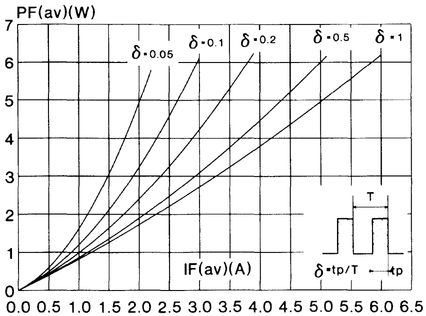


Fig.2 : Peak current versus form factor.

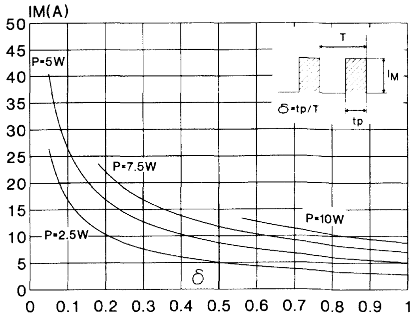


Fig.3 : Average current versus ambient temperature. (duty cycle : 0.5) (TO220AC)

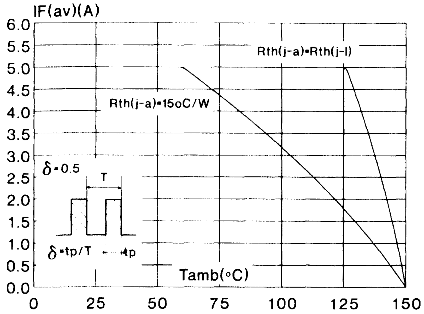


Fig.4 : Average current versus ambient temperature. (duty cycle : 0.5) (ISOWATT220AC)

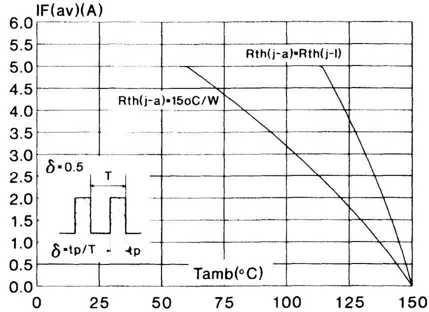


Fig.5 : Non repetitive surge peak forward current versus overload duration. (Maximum values) (TO220AC)

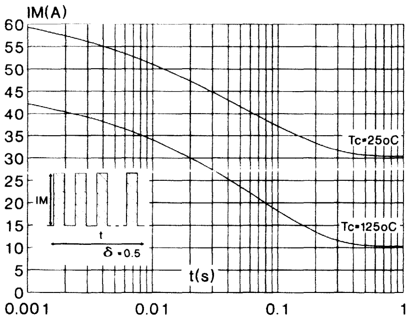


Fig.6 : Non repetitive surge peak forward current versus overload duration. (Maximum values) (ISOWATT220AC)

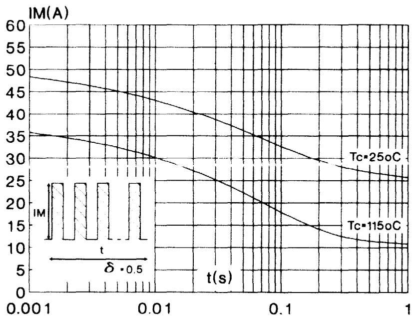


Fig.7 : Relative variation of thermal transient impedance junction to case versus pulse duration. (TO220AC)

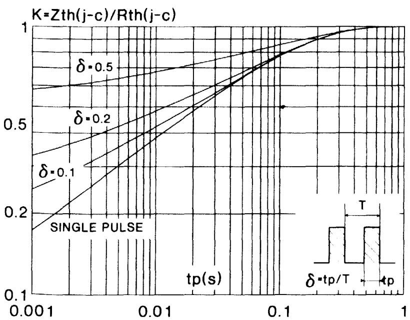


Fig.8 : Relative variation of thermal transient impedance junction to case versus pulse duration. (ISOWATT220AC)

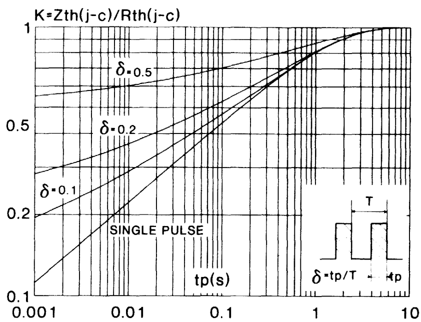


Fig.9 : Forward voltage drop versus forward current. (Maximum values)

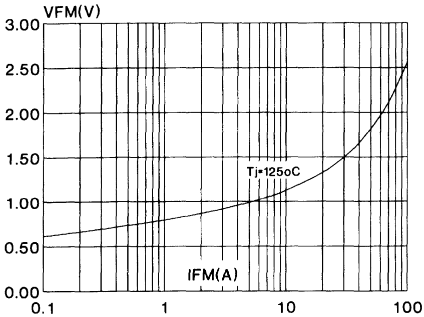


Fig.10 : Junction capacitance versus reverse voltage applied. (Typical values)

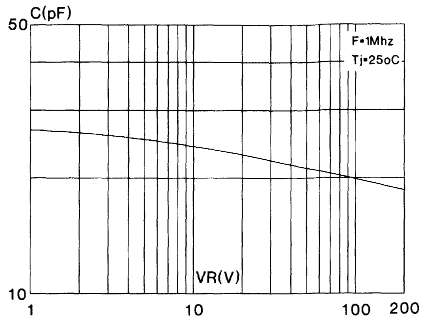


Fig.11 : Recovery charge versus dIF/dt.

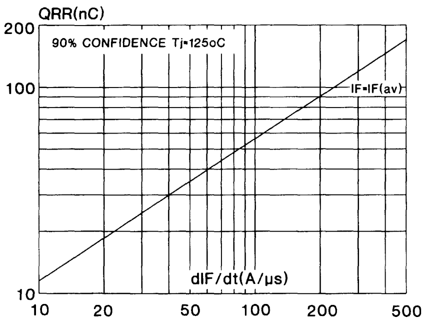


Fig.12 : Peak reverse current versus dIF/dt.

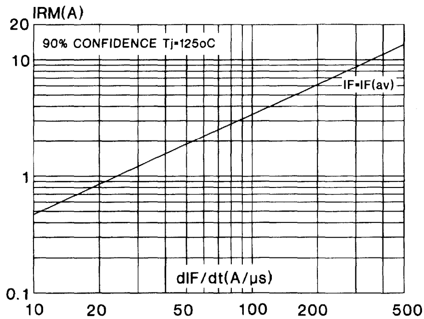
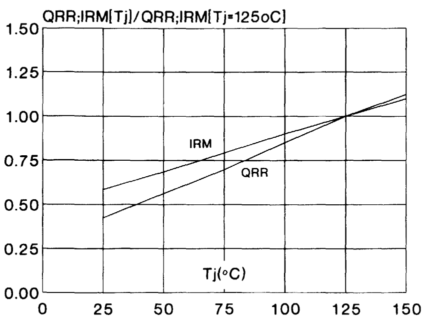


Fig.13 : Dynamic parameters versus junction temperature.



SGS-THOMSON MICROELECTRONICS

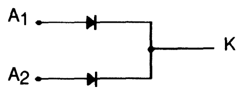
SGS-THOMSON MICROELECTRONICS

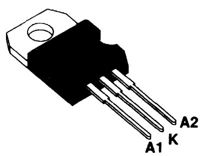
STPR610CT/CF
STPR620CT/CF

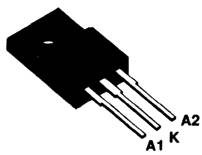
ULTRA FAST RECOVERY RECTIFIER DIODES

FEATURES

- SUITED FOR SMPS
- LOW LOSSES
- LOW FORWARD AND REVERSE RECOVERY TIME
- HIGH SURGE CURRENT CAPABILITY
- HIGH AVALANCHE ENERGY CAPABILITY







TO220AB
(Plastic)

STPR610CT
STPR620CT

ISOWATT220AB
(Plastic)

STPR610CF
STPR620CF

DESCRIPTION

Low cost dual center tap rectifier suited for switch-mode power supply and high frequency DC to DC converters.

Packaged in TO220AB and ISOWATT220AB, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter				Value	Unit
$I_{F(RMS)}$	RMS Forward Current			Per diode	10	A
$I_{F(AV)}$	Average Forward Current δ = 0.5	TO220AB	Tc = 125°C	Per diode	3	A
		ISOWATT220AB	Tc = 120°C	Per device	6	
I_{FSM}	Surge Non Repetitive Forward Current		Tp = 10 ms Sinusoidal	Per diode	30	A
Tstg Tj	Storage and Junction Temperature Range				- 65 to + 150 - 65 to + 150	°C

Symbol	Parameter	STPR		Unit
		610CT **610CF**	**620CT** **620CF**	
V_{RRM}	Repetitive Peak Reverse Voltage	100	200	V

THERMAL RESISTANCE

Symbol	Parameter			Value	Unit
Rth (j-c)	Junction-case	TO220AB	Per diode total	6.5	°C/W
		ISOWATT220AB	Per diode total	8.5	
Rth (c)	Coupling				°C/W

When the diodes 1 and 2 are used simultaneously :
Δ Tj(diode 1) = P(diode1) x Rth(Per diode) + P(diode 2) x Rth(c)

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Tests Conditions		Min.	Typ.	Max.	Unit
I_R *	Tj = 25°C	$V_R = V_{RRM}$			50	µA
	Tj = 100°C				0.5	mA
V_F **	Tj = 125°C	I_F = 3 A			0.99	V
	Tj = 125°C	I_F = 6 A			1.20	
	Tj = 25°C	I_F = 6 A			1.25	

Pulse test : * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2%

RECOVERY CHARACTERISTICS

Symbol	Tests Conditions		Min.	Typ.	Max.	Unit
trr	Tj = 25°C	I_F = 0.5 A I_R = 1A Irr = 0.25 A			30	ns
tfr	Tj = 25°C	I_F = 1 A tr = 10 ns $V_{FR} = 1.1 \times V_F$		20		ns
V_{FP}	Tj = 25°C	I_F = 1 A tr = 10 ns		3		V

To evaluate the conduction losses use the following equation :
$P = 0.78 \times I_{F(AV)} + 0.070\ I_F{}^2{}_{(RMS)}$

Fig.1 : Average forward power dissipation versus average forward current. (Per diode)

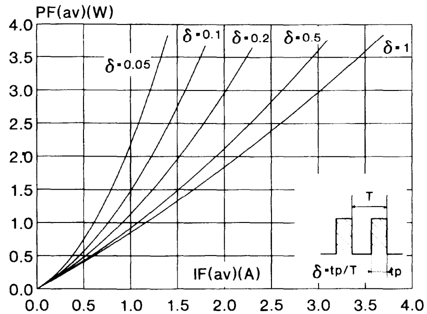


Fig.2 : Peak current versus form factor. (Per diode)

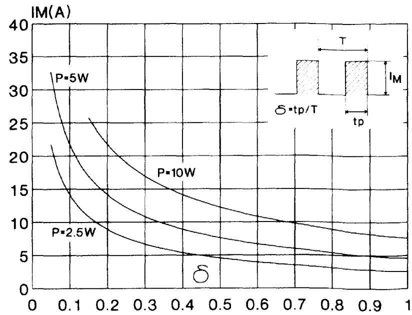


Fig.3 : Average current versus ambient temperature. (duty cycle : 0.5) (TO220AB)

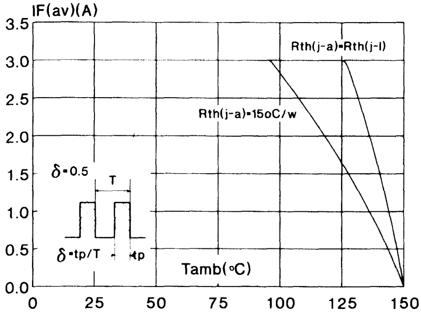


Fig.4 : Average current versus ambient temperature. (duty cycle : 0.5) (ISOWATT220AB)

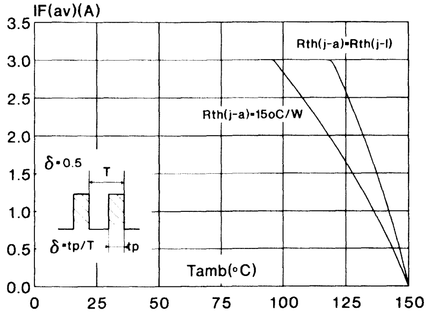


Fig.5 : Non repetitive surge peak forward current versus overload duration. (Maximum values) (TO220AB) (Per diode)

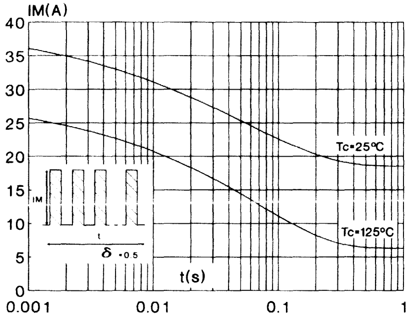


Fig.6 : Non repetitive surge peak forward current versus overload duration. (Maximum values) (ISOWATT220AB) (Per diode)

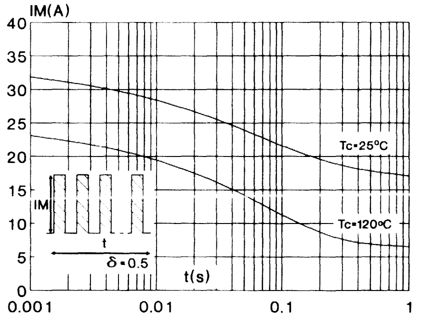


Fig.7 : Relative variation of thermal transient impedance junction to case versus pulse duration. (TO220AB) (Per diode)

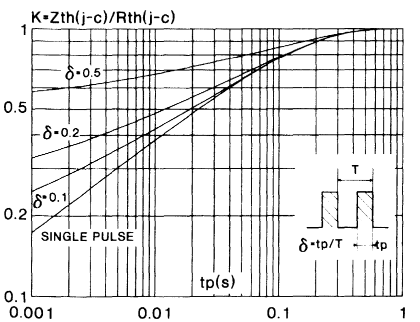


Fig.8 : Relative variation of thermal transient impedance junction to case versus pulse duration. (ISOWATT220AB) (Per diode)

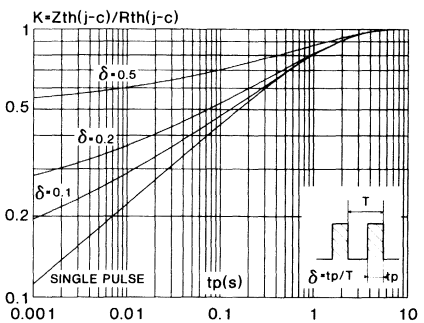


Fig.9 : Forward voltage drop versus forward current. (Maximum values) (Per diode)

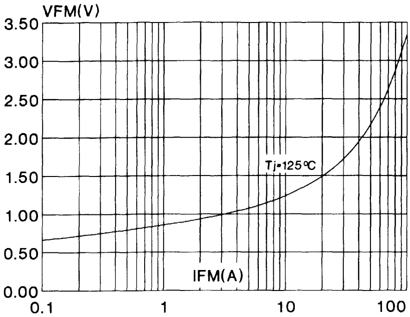


Fig.10 : Junction capacitance versus reverse voltage applied. (Typical values) (Per diode)

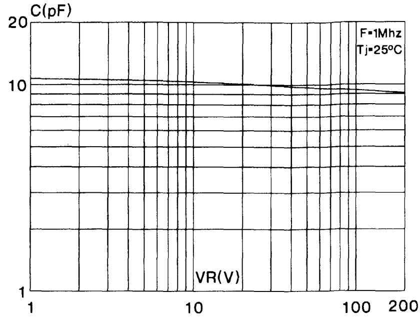


Fig.11 : Recovery charge versus dIF/dt. (Per diode)

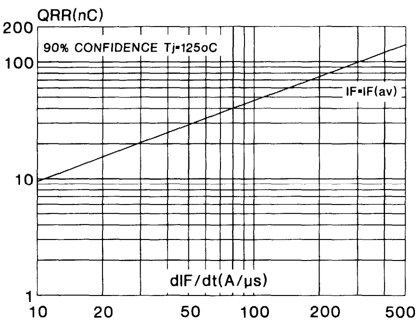


Fig.12 : Peak reverse current versus dIF/dt. (Per diode)

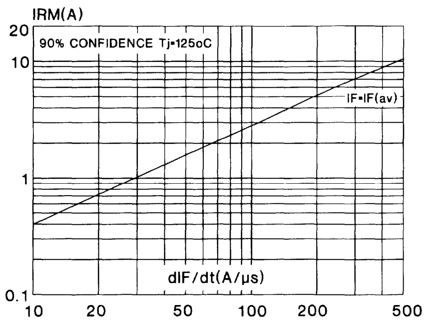
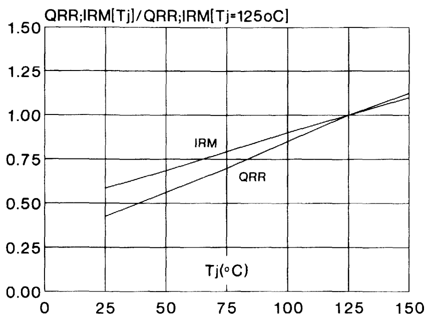


Fig.13 : Dynamic parameters versus junction temperature. (Per diode)



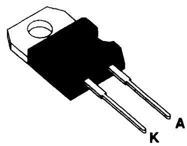
SGS-THOMSON
MICROELECTRONICS

STPR810D/F
STPR820D/F

ULTRA FAST RECOVERY RECTIFIER DIODES

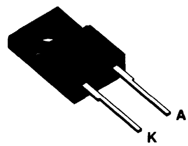
FEATURES

- SUITED FOR SMPS
- LOW LOSSES
- LOW FORWARD AND REVERSE RECOVERY TIME
- HIGH SURGE CURRENT CAPABILITY
- HIGH AVALANCHE ENERGY CAPABILITY



TO220AC
(Plastic)

STPR810D
STPR820D



ISOWATT220AC
(Plastic)

STPR810F
STPR820F

DESCRIPTION

Low cost single chip rectifier suited for switchmode power supply and high frequency DC to DC converters.

Packaged in TO220AC and ISOWATT220AC, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter			Value	Unit
$I_{F(RMS)}$	RMS Forward Current			20	A
$I_{F(AV)}$	Average Forward Current $\delta = 0.5$	TO220AC	Tc = 120°C	8	A
		ISOWATT220AC	Tc = 100°C		
I_{FSM}	Surge Non Repetitive Forward Current		Tp = 10 ms Sinusoidal	80	A
Tstg Tj	Storage and Junction Temperature Range			- 65 to + 150 - 65 to + 150	°C

Symbol	Parameter	STPR		Unit
		810D 810F	820D 820F	
V_{RRM}	Repetitive Peak Reverse Voltage	100	200	V

THERMAL RESISTANCE

Symbol	Parameter		Value	Unit
Rth (j-c)	Junction-case	TO220AC	3.0	°C/W
		ISOWATT220AC	5.5	

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Tests Conditions		Min.	Typ.	Max.	Unit
I_R *	Tj = 25°C	$V_R = V_{RRM}$			50	µA
	Tj = 100°C				0.6	mA
V_F **	Tj = 125°C	I_F = 8 A			0.99	V
	Tj = 125°C	I_F = 16 A			1.20	
	Tj = 25°C	I_F = 16 A			1.25	

Pulse test : * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2%

RECOVERY CHARACTERISTICS

Symbol	Tests Conditions		Min.	Typ.	Max.	Unit
trr	Tj = 25°C	I_F = 0.5 A I_R = 1A Irr = 0.25 A			30	ns
tfr	Tj = 25°C	I_F = 1 A tr = 10 ns $V_{FR} = 1.1 \times V_F$		20		ns
V_{FP}	Tj = 25°C	I_F = 1 A tr = 10 ns		3		V

To evaluate the conduction losses use the following equation :
$P = 0.78 \times I_{F(AV)} + 0.026\ I_F^2{}_{(RMS)}$

Fig.1 : Average forward power dissipation versus average forward current.

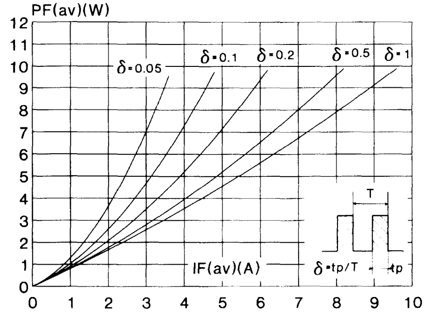


Fig.2 : Peak current versus form factor.

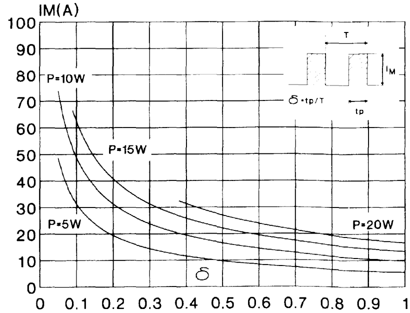


Fig.3 : Average current versus ambient temperature. (duty cycle : 0.5) (TO220AC)

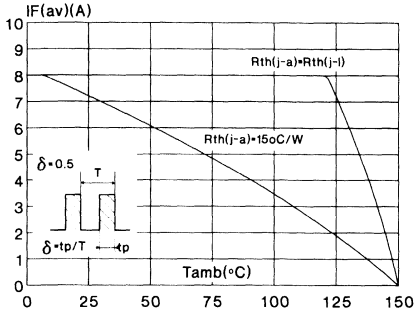


Fig.4 : Average current versus ambient temperature. (duty cycle : 0.5) (ISOWATT220AC)

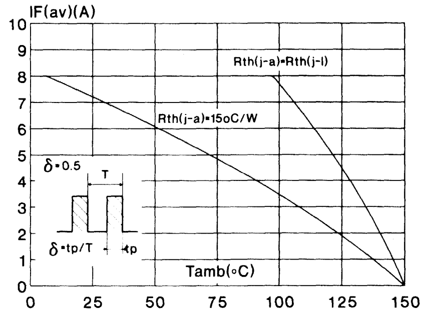


Fig.5 : Non repetitive surge peak forward current versus overload duration.
(Maximum values) (TO220AC)

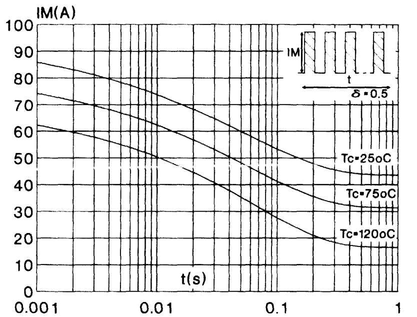


Fig.6 : Non repetitive surge peak forward current versus overload duration.
(Maximum values) (ISOWATT220AC)

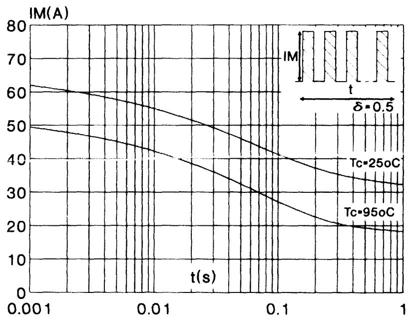


Fig.7 : Relative variation of thermal transient impedance junction to case versus pulse duration.
(TO220AC)

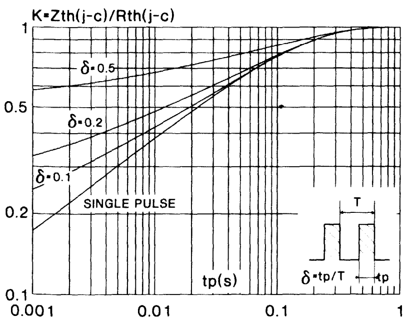


Fig.8 : Relative variation of thermal transient impedance junction to case versus pulse duration.
(ISOWATT220AC)

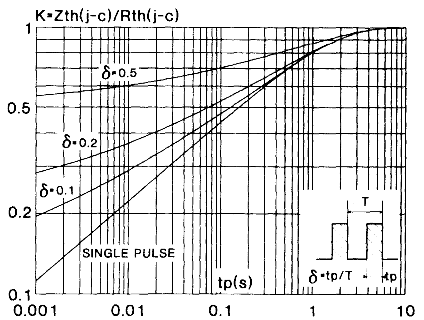


Fig.9 : Forward voltage drop versus forward current. (Maximum values)

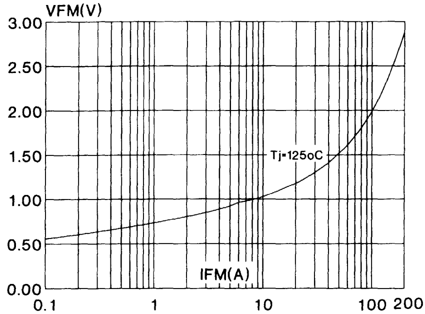


Fig.10 : Junction capacitance versus reverse voltage applied. (Typical values)

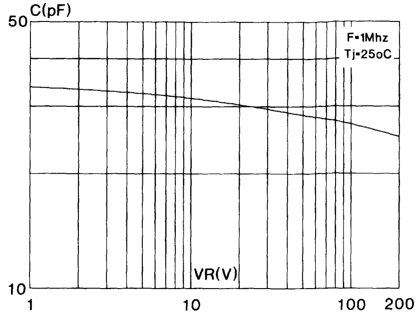


Fig.11 : Recovery charge versus dIF/dt.

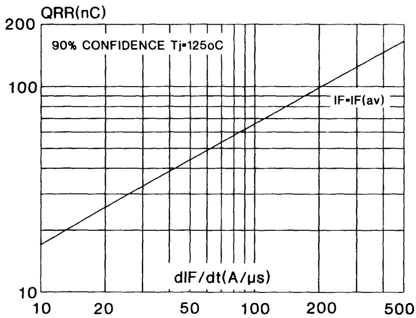


Fig.12 : Peak reverse current versus dIF/dt.

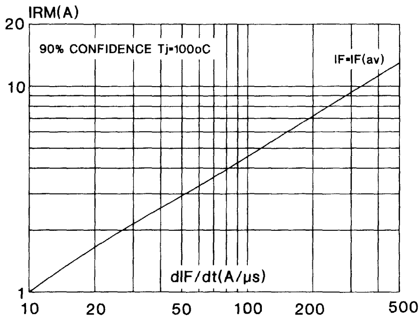
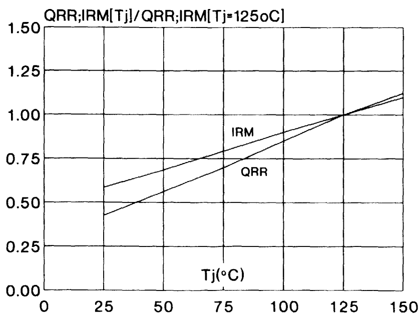


Fig.13 : Dynamic parameters versus junction temperature.



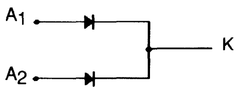
SGS-THOMSON MICROELECTRONICS

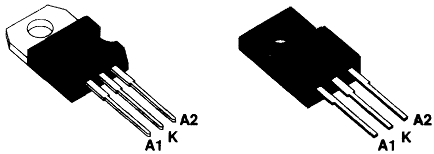
STPR1010CT/CF STPR1020CT/CF

ULTRA FAST RECOVERY RECTIFIER DIODES

FEATURES

- SUITED FOR SMPS
- LOW LOSSES
- LOW FORWARD AND REVERSE RECOVERY TIME
- HIGH SURGE CURRENT CAPABILITY
- HIGH AVALANCHE ENERGY CAPABILITY





TO220AB (Plastic)	ISOWATT220AB (Plastic)
STPR1010CT STPR1020CT	STPR1010CF STPR1020CF

DESCRIPTION

Low cost dual center tap rectifier suited for switch-mode power supply and high frequency DC to DC converters.

Packaged in TO220AB and ISOWATT220AB, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter				Value	Unit
$I_{F(RMS)}$	RMS Forward Current			Per diode	10	A
$I_{F(AV)}$	Average Forward Current $\delta = 0.5$	TO220AB	Tc = 125°C	Per diode	5	A
		ISOWATT220AB	Tc = 115°C	Per device	10	
I_{FSM}	Surge Non Repetitive Forward Current		Tp = 10 ms Sinusoidal	Per diode	50	A
Tstg Tj	Storage and Junction Temperature Range				- 65 to + 150 - 65 to + 150	°C

Symbol	Parameter	STPR		Unit
		1010CT 1010CF	1020CT 1020CF	
V_{RRM}	Repetitive Peak Reverse Voltage	100	200	V

THERMAL RESISTANCE

Symbol	Parameter			Value	Unit
Rth (j-c)	Junction-case	TO220AB	Per diode total	4.0	°C/W
		ISOWATT220AB	Per diode total	6.0	
Rth (c)	Coupling				°C/W

When the diodes 1 and 2 are used simultaneously :
Δ Tj(diode 1) = P(diode1) x Rth(Per diode) + P(diode 2) x Rth(c)

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Tests Conditions		Min.	Typ.	Max.	Unit
I_R *	Tj = 25°C	$V_R = V_{RRM}$			50	µA
	Tj = 100°C				0.5	mA
V_F **	Tj = 125°C	I_F = 5 A			0.99	V
	Tj = 125°C	I_F = 10 A			1.20	
	Tj = 25°C	I_F = 10 A			1.25	

Pulse test : * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2%

RECOVERY CHARACTERISTICS

Symbol	Tests Conditions		Min.	Typ.	Max.	Unit
trr	Tj = 25°C	I_F = 0.5 A I_R = 1A Irr = 0.25 A			30	ns
tfr	Tj = 25°C	I_F = 1 A tr = 10 ns V_{FR} = 1.1 x V_F		20		ns
V_{FP}	Tj = 25°C	I_F = 1 A tr = 10 ns		3		V

To evaluate the conduction losses use the following equation :
$P = 0.78 \times I_{F(AV)} + 0.042\ I_F{}^2{}_{(RMS)}$

Fig.1 : Average forward power dissipation versus average forward current. (Per diode)

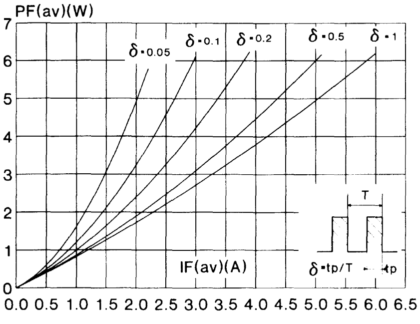


Fig.2 : Peak current versus form factor. (Per diode)

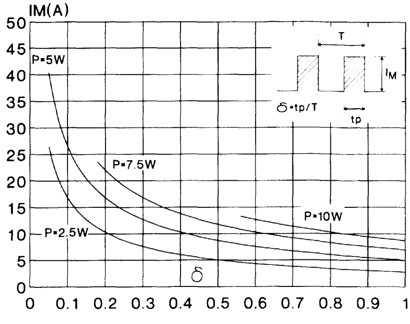


Fig.3 : Average current versus ambient temperature.
(duty cycle : 0.5) (TO220AB)

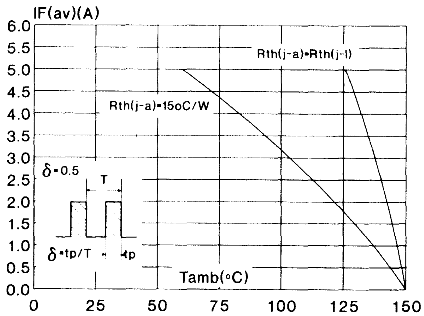


Fig.4 : Average current versus ambient temperature.
(duty cycle : 0.5) (ISOWATT220AB)

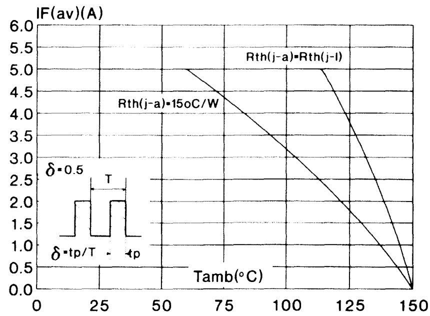


Fig.5 : Non repetitive surge peak forward current versus overload duration.
(Maximum values) (TO220AB) (Per diode)

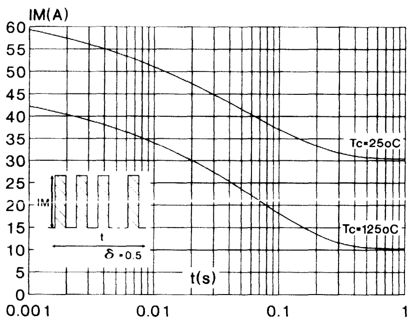


Fig.6 : Non repetitive surge peak forward current versus overload duration.
(Maximum values) (ISOWATT220AB) (Per diode)

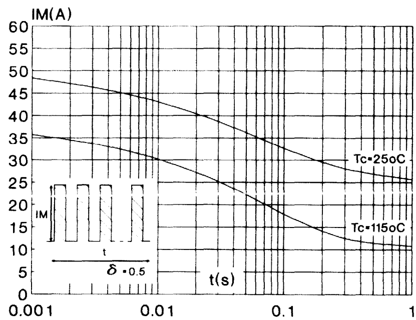


Fig.7 : Relative variation of thermal transient impedance junction to case versus pulse duration.
(TO220AB) (Per diode)

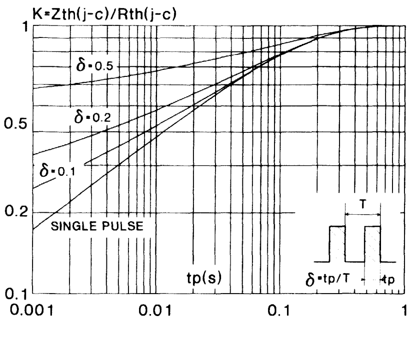


Fig.8 : Relative variation of thermal transient impedance junction to case versus pulse duration.
(ISOWATT220AB) (Per diode)

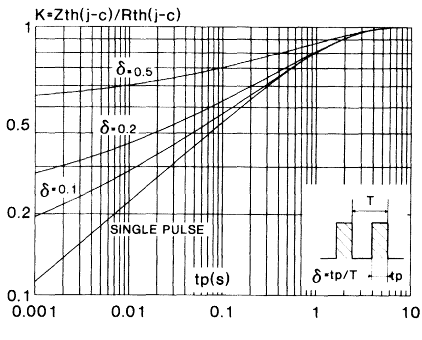


Fig.9 : Forward voltage drop versus forward current. (Maximum values) (Per diode)

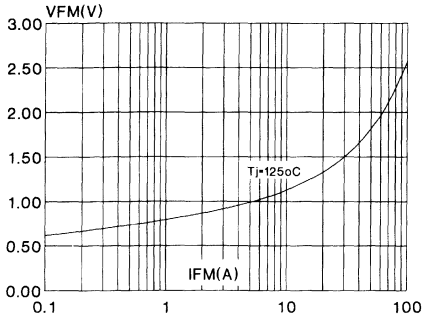


Fig.10 : Junction capacitance versus reverse voltage applied. (Typical values) (Per diode)

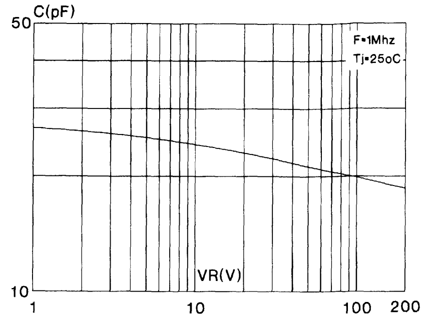


Fig.11 : Recovery charge versus dIF/dt. (Per diode)

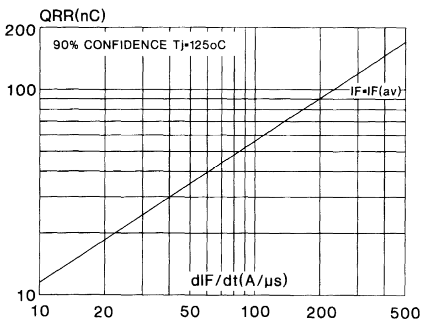


Fig.12 : Peak reverse current versus dIF/dt. (Per diode)

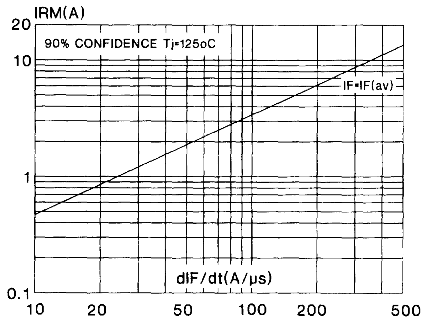
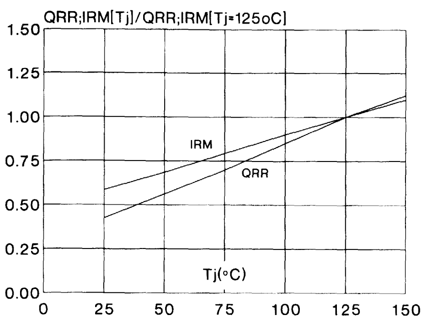


Fig.13 : Dynamic parameters versus junction temperature. (Per diode)



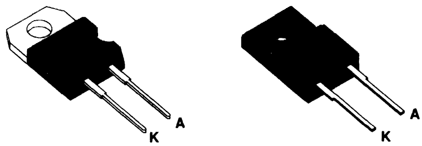
SGS-THOMSON MICROELECTRONICS

STPR1210D/F
STPR1220D/F

ULTRA FAST RECOVERY RECTIFIER DIODES

FEATURES

- SUITED FOR SMPS
- LOW LOSSES
- LOW FORWARD AND REVERSE RECOVERY TIME
- HIGH SURGE CURRENT CAPABILITY
- HIGH AVALANCHE ENERGY CAPABILITY



TO220AC (Plastic)	ISOWATT220AC (Plastic)
STPR1210D STPR1220D	STPR1210F STPR1220F

DESCRIPTION

Low cost single chip rectifier suited for switchmode power supply and high frequency DC to DC converters.

Packaged in TO220AC and ISOWATT220AC, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter			Value	Unit
$I_{F(RMS)}$	RMS Forward Current			30	A
$I_{F(AV)}$	Average Forward Current $\delta = 0.5$	TO220AC	Tc = 115°C	12	A
		ISOWATT220AC	Tc = 80°C		
I_{FSM}	Surge Non Repetitive Forward Current		Tp = 10 ms Sinusoidal	120	A
Tstg Tj	Storage and Junction Temperature Range			- 65 to + 150 - 65 to + 150	°C

Symbol	Parameter	STPR		Unit
		1210D 1210F	1220D 1220F	
V_{RRM}	Repetitive Peak Reverse Voltage	100	200	V

THERMAL RESISTANCE

Symbol	Parameter		Value	Unit
Rth (j-c)	Junction-case	TO220AC	2.5	°C/W
		ISOWATT220AC	5.0	

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Tests Conditions		Min.	Typ.	Max.	Unit
I_R *	Tj = 25°C	$V_R = V_{RRM}$			50	µA
	Tj = 100°C				0.8	mA
V_F **	Tj = 125°C	I_F = 12 A			0.99	V
	Tj = 125°C	I_F = 24 A			1.20	
	Tj = 25°C	I_F = 24 A			1.25	

Pulse test : * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2%

RECOVERY CHARACTERISTICS

Symbol	Tests Conditions		Min.	Typ.	Max.	Unit
trr	Tj = 25°C	I_F = 0.5 A I_R = 1A Irr = 0.25 A			30	ns
tfr	Tj = 25°C	I_F = 1 A tr = 10 ns $V_{FR} = 1.1 \times V_F$		20		ns
V_{FP}	Tj = 25°C	I_F = 1 A tr = 10 ns		3		V

To evaluate the conduction losses use the following equation :
$P = 0.78 \times I_{F(AV)} + 0.0175\ I_F^2{}_{(RMS)}$

Fig.1 : Average forward power dissipation versus average forward current.

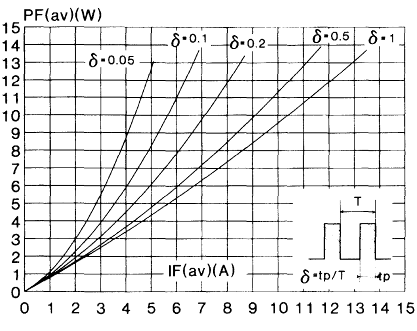


Fig.2 : Peak current versus form factor.

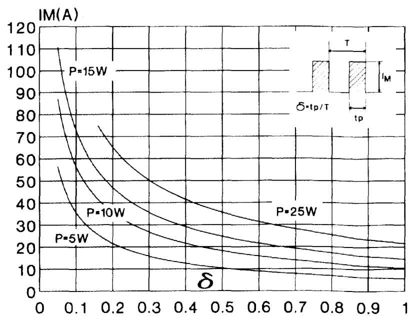


Fig.3 : Average current versus ambient temperature.
(duty cycle : 0.5) (TO220AC)

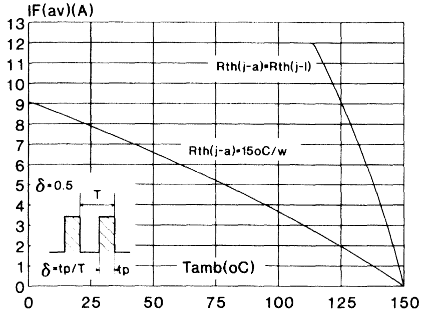


Fig.4 : Average current versus ambient temperature.
(duty cycle : 0.5) (ISOWATT220AC)

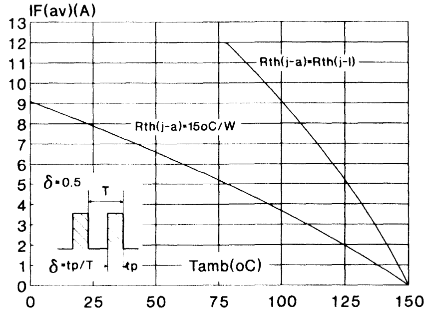


Fig.5 : Non repetitive surge peak forward current versus overload duration.
(Maximum values) (TO220AC)

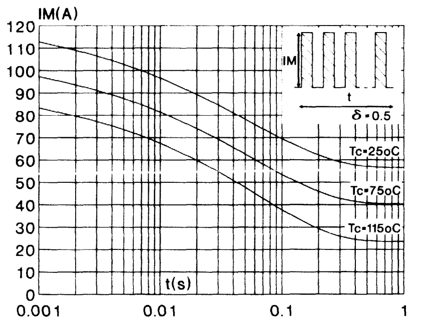


Fig.6 : Non repetitive surge peak forward current versus overload duration.
(Maximum values) (ISOWATT220AC)

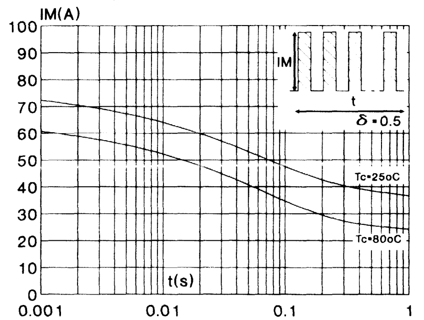


Fig.7 : Relative variation of thermal transient impedance junction to case versus pulse duration.
(TO220AC)

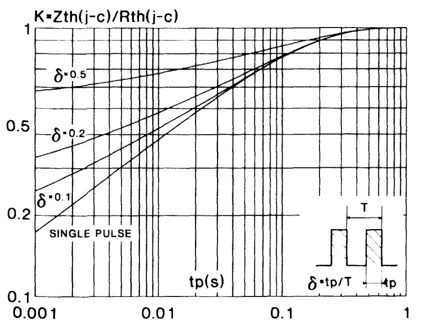


Fig.8 : Relative variation of thermal transient impedance junction to case versus pulse duration.
(ISOWATT220AC)

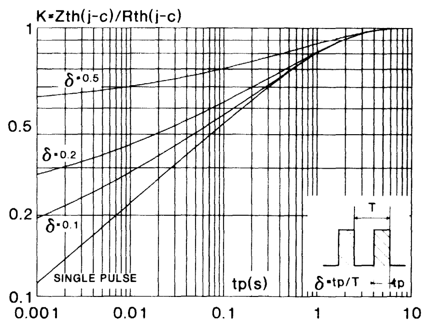


Fig.9 : Forward voltage drop versus forward current. (Maximum values)

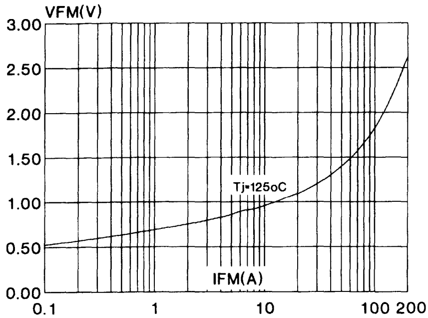


Fig.10 : Junction capacitance versus reverse voltage applied. (Typical values)

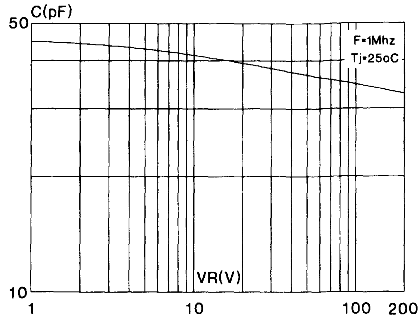


Fig.11 : Recovery charge versus dIF/dt.

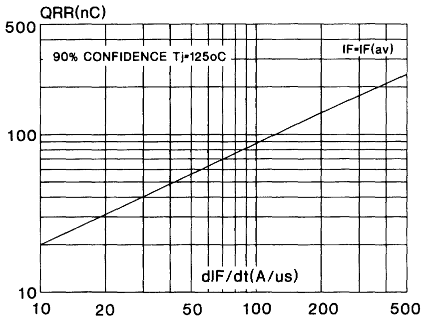


Fig.12 : Peak reverse current versus dIF/dt.

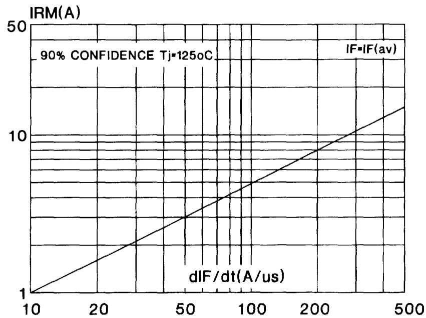
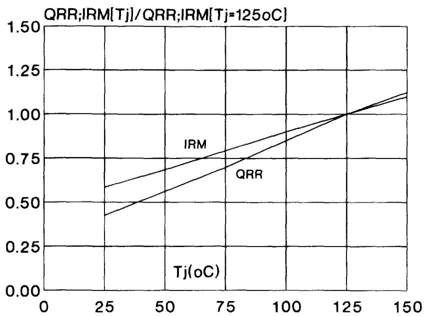


Fig.13 : Dynamic parameters versus junction temperature.

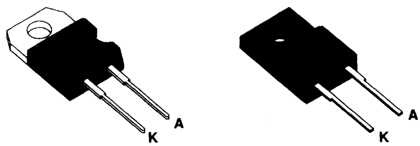


STPR1510D/F
STPR1520D/F

ULTRA FAST RECOVERY RECTIFIER DIODES

FEATURES

- SUITED FOR SMPS
- LOW LOSSES
- LOW FORWARD AND REVERSE RECOVERY TIME
- HIGH SURGE CURRENT CAPABILITY
- HIGH AVALANCHE ENERGY CAPABILITY



TO220AC (Plastic)	**ISOWATT220AC** (Plastic)
STPR1510D STPR1520D	STPR1510F STPR1520F

DESCRIPTION

Low cost single chip rectifier suited for switchmode power supply and high frequency DC to DC converters.

Packaged in TO220AC and ISOWATT220AC, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter			Value	Unit
$I_{F(RMS)}$	RMS Forward Current			30	A
$I_{F(AV)}$	Average Forward Current $\delta = 0.5$	TO220AC	Tc = 115°C	15	A
		ISOWATT220AC	Tc = 70°C		
I_{FSM}	Surge Non Repetitive Forward Current		Tp = 10 ms Sinusoidal	150	A
Tstg Tj	Storage and Junction Temperature Range			- 65 to + 150 - 65 to + 150	°C

Symbol	Parameter	STPR		Unit
		1510D 1510F	1520D 1520F	
V_{RRM}	Repetitive Peak Reverse Voltage	100	200	V

THERMAL RESISTANCE

Symbol	Parameter		Value	Unit
Rth (j-c)	Junction-case	TO220AC	2.0	°C/W
		ISOWATT220AC	4.5	

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Tests Conditions		Min.	Typ.	Max.	Unit
I_R *	Tj = 25°C	$V_R = V_{RRM}$			50	µA
	Tj = 100°C				1.0	mA
V_F **	Tj = 125°C	I_F = 15 A			0.99	V
	Tj = 125°C	I_F = 30 A			1.20	
	Tj = 25°C	I_F = 30 A			1.25	

Pulse test : * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2%

RECOVERY CHARACTERISTICS

Symbol	Tests Conditions				Min.	Typ.	Max.	Unit
trr	Tj = 25°C	I_F = 0.5 A	I_R = 1A	Irr = 0.25 A			30	ns
tfr	Tj = 25°C	I_F = 1 A	tr = 10 ns	$V_{FR} = 1.1 \times V_F$		20		ns
V_{FP}	Tj = 25°C	I_F = 1 A	tr = 10 ns			3		V

To evaluate the conduction losses use the following equation :
$P = 0.78 \times I_{F(AV)} + 0.014\, I_F^2{}_{(RMS)}$

Fig.1 : Average forward power dissipation versus average forward current.

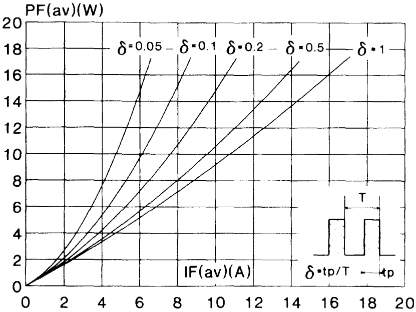


Fig.2 : Peak current versus form factor.

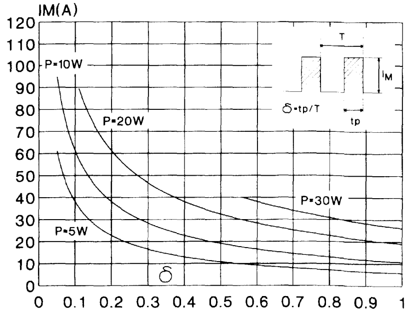


Fig.3 : Average current versus ambient temperature.
(duty cycle : 0.5) (TO220AC)

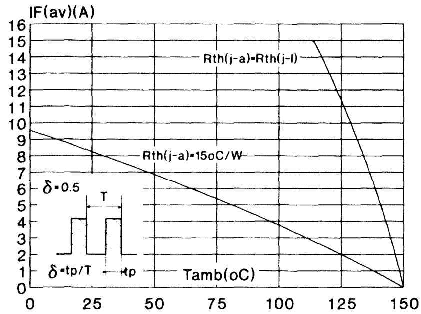


Fig.4 : Average current versus ambient temperature.
(duty cycle : 0.5) (ISOWATT220AC)

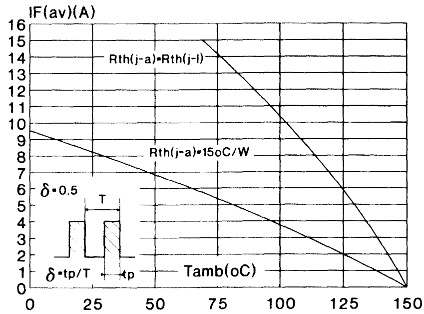


Fig.5 : Non repetitive surge peak forward current versus overload duration.
(Maximum values) (TO220AC)

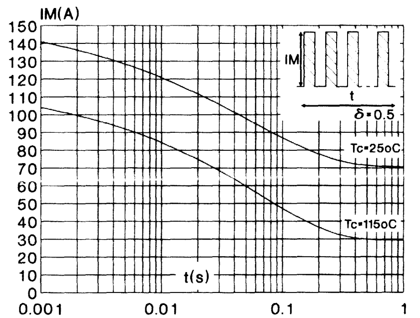


Fig.6 : Non repetitive surge peak forward current versus overload duration.
(Maximum values) (ISOWATT220AC)

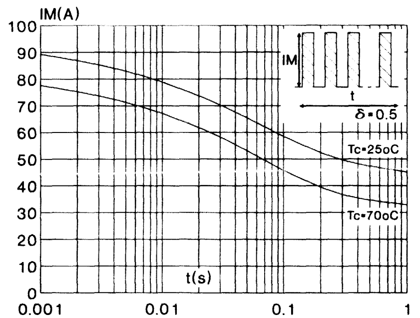


Fig.7 : Relative variation of thermal transient impedance junction to case versus pulse duration.
(TO220AC)

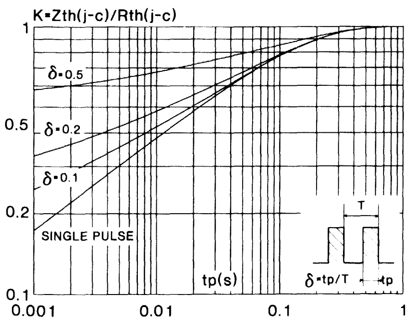


Fig.8 : Relative variation of thermal transient impedance junction to case versus pulse duration.
(ISOWATT220AC)

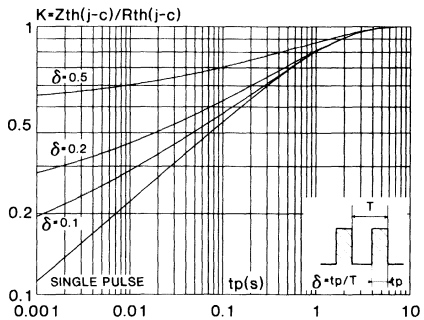


Fig.9 : Forward voltage drop versus forward current. (Maximum values)

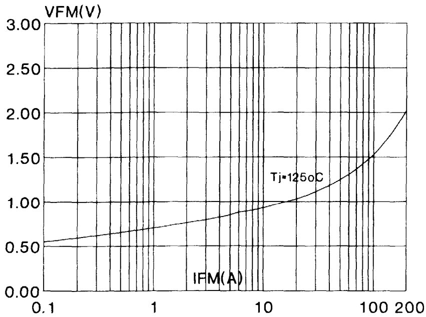


Fig.10 : Junction capacitance versus reverse voltage applied. (Typical values)

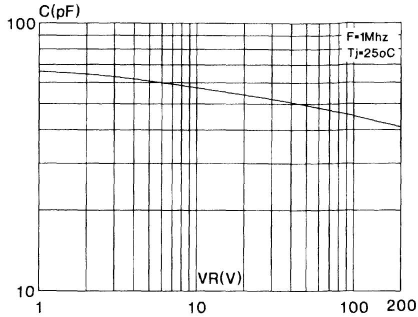


Fig.11 : Recovery charge versus dIF/dt.

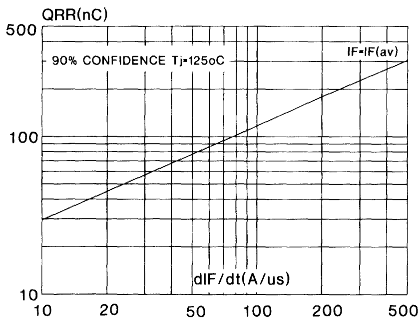


Fig.12 : Peak reverse current versus dIF/dt.

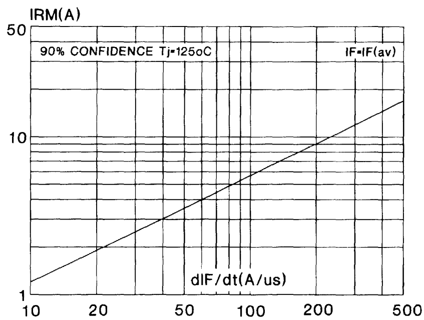
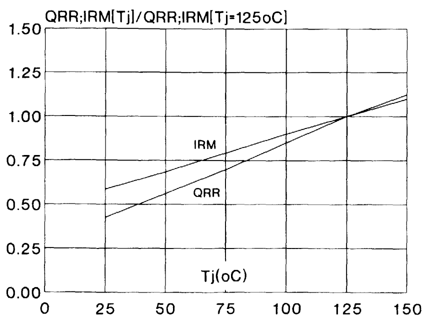


Fig.13 : Dynamic parameters versus junction temperature.



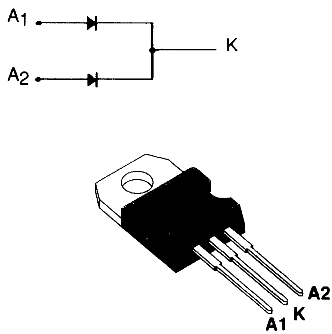
SGS-THOMSON MICROELECTRONICS

STPR1610CT
STPR1620CT

ULTRA FAST RECOVERY RECTIFIER DIODES

FEATURES

- SUITED FOR SMPS
- LOW LOSSES
- LOW FORWARD AND REVERSE RECOVERY TIME
- HIGH SURGE CURRENT CAPABILITY
- HIGH AVALANCHE ENERGY CAPABILITY



TO220AB
(Plastic)

DESCRIPTION

Low cost dual center tap rectifier suited for switch-mode power supply and high frequency DC to DC converters.

Packaged in TO220AB, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter			Value	Unit
$I_{F(RMS)}$	RMS Forward Current		Per diode	20	A
$I_{F(AV)}$	Average Forward Current	Tc = 120°C δ = 0.5	Per diode Per device	8 16	A
I_{FSM}	Surge Non Repetitive Forward Current	Tp = 10 ms Sinusoidal	Per diode	80	A
Tstg Tj	Storage and Junction Temperature Range			- 65 to + 150 - 65 to + 150	°C

Symbol	Parameter	STPR		Unit
		1610CT	1620CT	
V_{RRM}	Repetitive Peak Reverse Voltage	100	200	V

THERMAL RESISTANCE

Symbol	Parameter		Value	Unit
Rth (j-c)	Junction-case	Per diode total	3.0	°C/W
Rth (c)	Coupling			°C/W

When the diodes 1 and 2 are used simultaneously :
Δ Tj(diode 1) = P(diode1) x Rth(Per diode) + P(diode 2) x Rth(c)

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Tests Conditions		Min.	Typ.	Max.	Unit
I_R *	Tj = 25°C	$V_R = V_{RRM}$			50	µA
	Tj = 100°C				0.6	mA
V_F **	Tj = 125°C	I_F = 8 A			0.99	V
	Tj = 125°C	I_F = 16 A			1.20	
	Tj = 25°C	I_F = 16 A			1.25	

Pulse test : * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2%

RECOVERY CHARACTERISTICS

Symbol	Tests Conditions		Min.	Typ.	Max.	Unit
trr	Tj = 25°C	I_F = 0.5 A I_R = 1A Irr = 0.25 A			30	ns
tfr	Tj = 25°C	I_F = 1 A tr = 10 ns V_{FR} = 1.1 x V_F		20		ns
V_{FP}	Tj = 25°C	I_F = 1 A tr = 10 ns		3		V

To evaluate the conduction losses use the following equation :
$P = 0.78 \times I_{F(AV)} + 0.026\ I_F^2{}_{(RMS)}$

Fig.1 : Average forward power dissipation versus average forward current. (Per diode)

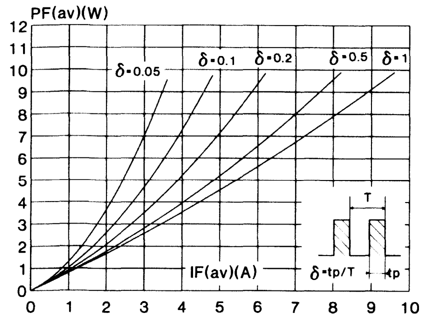


Fig.2 : Peak current versus form factor. (Per diode)

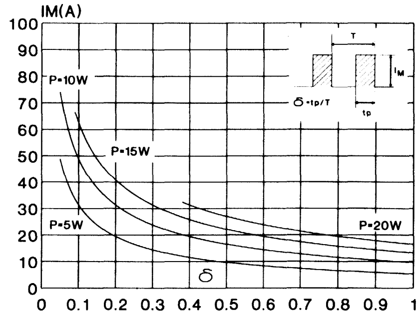


Fig.3 : Average current versus ambient temperature. (duty cycle : 0.5) (Per diode)

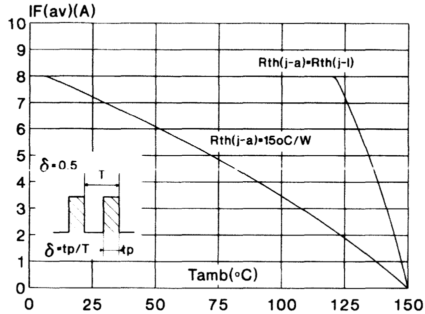


Fig.4 : Non repetitive surge peak forward current versus overload duration. (Maximum values)

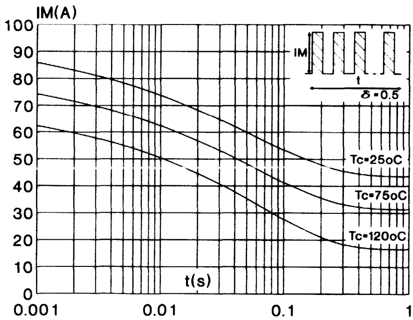


Fig.5 : Relative variation of thermal transient impedance junction to case versus pulse duration. (Per diode)

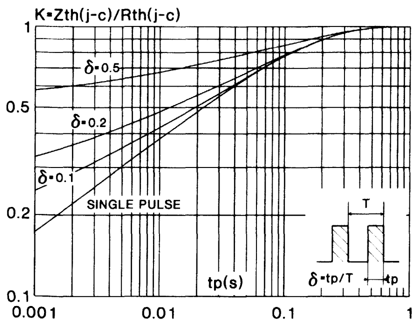


Fig.6 : Forward voltage drop versus forward current. (Maximum values) (Per diode)

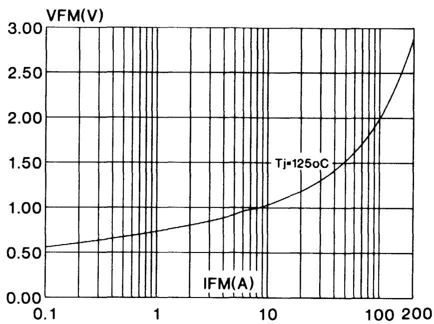


Fig.7 : Junction capacitance versus reverse voltage applied. (Typical values) (Per diode)

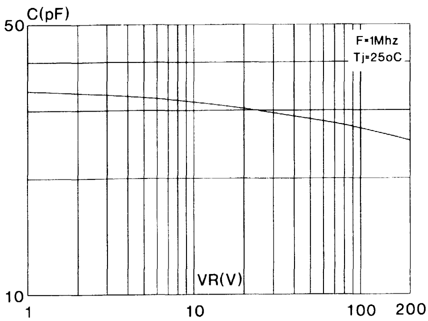


Fig.8 : Recovery charge versus dIF/dt. (Per diode)

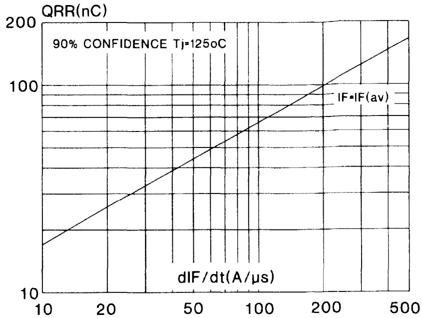


Fig.9 : Peak reverse current versus dIF/dt. (Per diode)

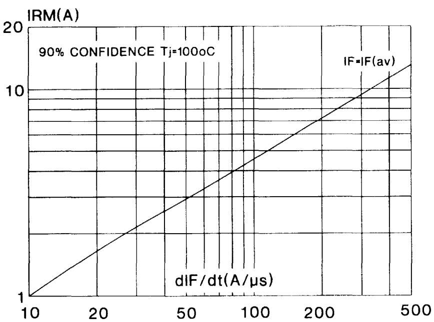
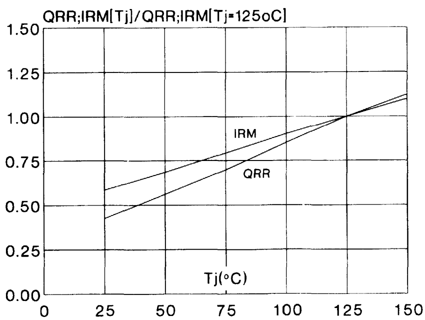


Fig.10 : Dynamic parameters versus junction temperature. (Per diode)

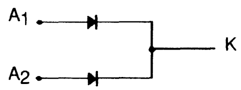


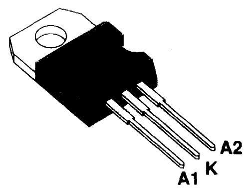
STPR2410CT
STPR2420CT

ULTRA FAST RECOVERY RECTIFIER DIODES

FEATURES

- SUITED FOR SMPS
- LOW LOSSES
- LOW FORWARD AND REVERSE RECOVERY TIME
- HIGH SURGE CURRENT CAPABILITY
- HIGH AVALANCHE ENERGY CAPABILITY





TO220AB
(Plastic)

DESCRIPTION

Low cost dual center tap rectifier suited for switch-mode power supply and high frequency DC to DC converters.

Packaged in TO220AB, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter			Value	Unit
$I_{F(RMS)}$	RMS Forward Current		Per diode	30	A
$I_{F(AV)}$	Average Forward Current	Tc = 115°C δ = 0.5	Per diode Per device	12 24	A
I_{FSM}	Surge Non Repetitive Forward Current	Tp = 10 ms Sinusoidal	Per diode	120	A
Tstg Tj	Storage and Junction Temperature Range			- 65 to + 150 - 65 to + 150	°C

Symbol	Parameter	STPR		Unit
		2410CT	2420CT	
V_{RRM}	Repetitive Peak Reverse Voltage	100	200	V

THERMAL RESISTANCE

Symbol	Parameter		Value	Unit
Rth (j-c)	Junction-case	Per diode total	2.5 1.4	°C/W
Rth (c)	Coupling		0.23	°C/W

When the diodes 1 and 2 are used simultaneously :
Δ Tj(diode 1) = P(diode1) x Rth(Per diode) + P(diode 2) x Rth(c)

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Tests Conditions		Min.	Typ.	Max.	Unit
I_R *	Tj = 25°C	$V_R = V_{RRM}$			50	µA
	Tj = 100°C				0.8	mA
V_F **	Tj = 125°C	I_F = 12 A			0.99	V
	Tj = 125°C	I_F = 24 A			1.20	
	Tj = 25°C	I_F = 24 A			1.25	

Pulse test : * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2%

RECOVERY CHARACTERISTICS

Symbol	Tests Conditions		Min.	Typ.	Max.	Unit
trr	Tj = 25°C	I_F = 0.5 A I_R = 1A Irr = 0.25 A			30	ns
tfr	Tj = 25°C	I_F = 1 A tr = 10 ns V_{FR} = 1.1 x V_F		20		ns
V_{FP}	Tj = 25°C	I_F = 1 A tr = 10 ns		3		V

To evaluate the conduction losses use the following equation :
$P = 0.78 \times I_{F(AV)} + 0.0175\ I_F^2{}_{(RMS)}$

Fig.1 : Average forward power dissipation versus average forward current. (Per diode)

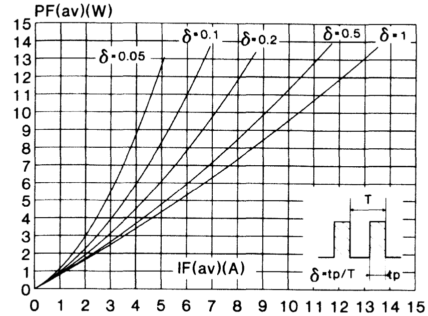


Fig.2 : Peak current versus form factor. (Per diode)

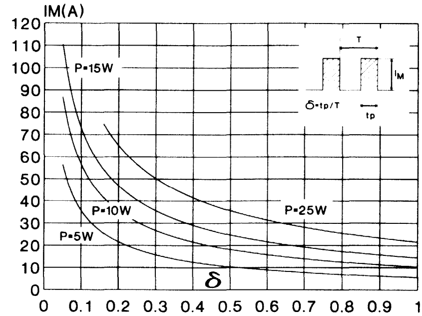


Fig.3 : Average current versus ambient temperature. (duty cycle : 0.5) (Per diode)

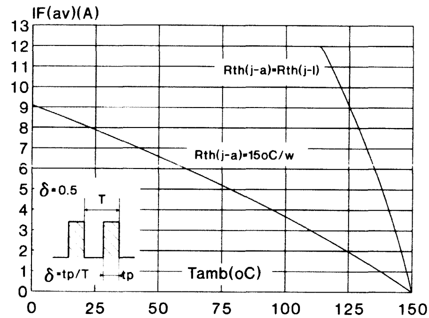


Fig.4 : Non repetitive surge peak forward current versus overload duration. (Maximum values)

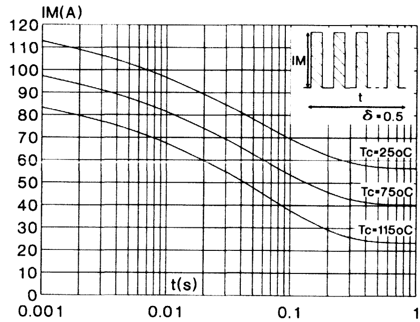


Fig.5 : Relative variation of thermal transient impedance junction to case versus pulse duration. (Per diode)

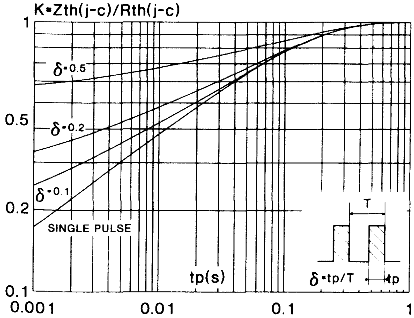


Fig.6 : Forward voltage drop versus forward current. (Maximum values) (Per diode)

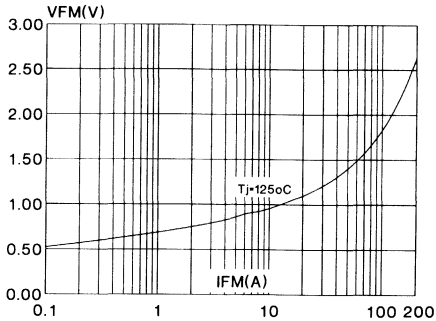


Fig.7 : Junction capacitance versus reverse voltage applied. (Typical values) (Per diode)

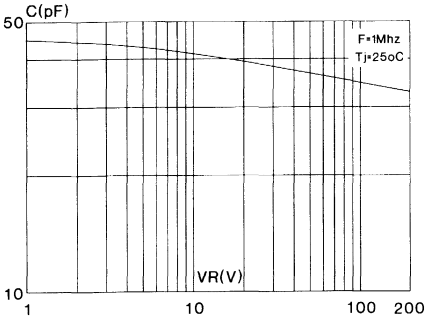


Fig.8 : Recovery charge versus dIF/dt. (Per diode)

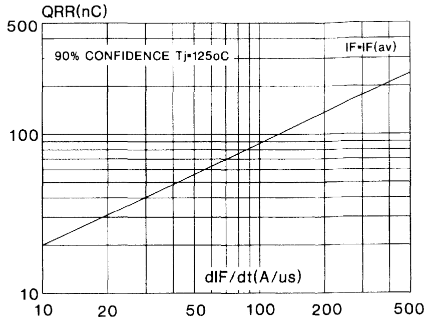


Fig.9 : Peak reverse current versus dIF/dt. (Per diode)

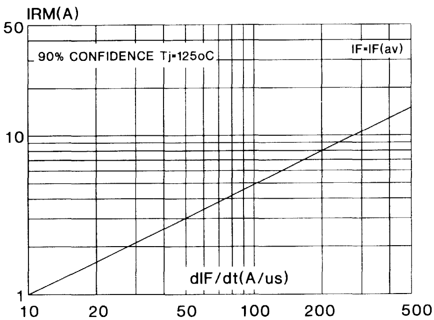
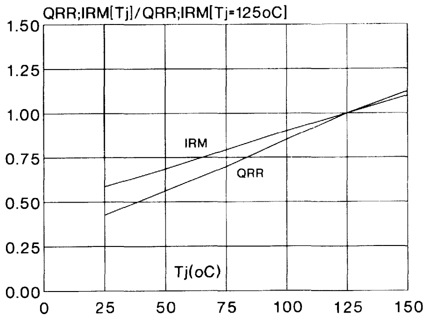


Fig.10 : Dynamic parameters versus junction temperature. (Per diode)

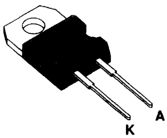


HIGH VOLTAGE ULTRA-FAST DIODES

TURBOSWITCH ™ "A". ULTRA-FAST HIGH VOLTAGE DIODE

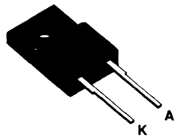
MAIN PRODUCTS CHARACTERISTICS

$I_{F(AV)}$	**5A**
V_{RRM}	**600V**
t_{rr} (typ)	**20ns**
V_F (max)	**1.5V**



TO220AC
(Plastic)

STTA506D



Isolated
ISOWATT220AC
(Plastic)

STTA506F

FEATURES AND BENEFITS

- SPECIFIC TO "FREEWHEEL MODE" OPERATIONS: Freewheel or Booster Diode.
- ULTRA-FAST RECOVERY.
- VERY LOW OVERALL POWER LOSSES IN BOTH THE DIODE AND THE COMPANION TRANSISTOR.
- HIGH FREQUENCY OPERATIONS.

DESCRIPTION

The TURBOSWITCH is a very high performance series of ultra-fast high voltage power diodes from 600V to 1200V.
TURBOSWITCH, A family, drastically cuts losses in both the diode and the associated switching IGBT or MOSFET in all "Freewheel Mode" operations and is particularly suitable and efficient in Motor Control Freewheel applications and in Booster diode applications in Power Factor Control circuitries.
Packaged in TO220AC and in isolated ISOWATT220AC, these 600V devices are particularly intended for use on 240V domestic mains.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{RRM}	Repetitive peak reverse voltage	600	V
V_{RSM}	Non repetitive peak reverse voltage	600	V
$I_{F(RMS)}$	RMS forward current	20	A
I_{FRM}	Repetitive peak forward current (tp = 5 µs, f = 5kHz)	65	A
T_j	Max operating junction temperature	-65 to 150	°C
T_{stg}	Storage temperature	-65 to 150	°C

TM : TURBOSWITCH is a trademark of **SGS-THOMSON MICROELECTRONICS.**

THERMAL AND POWER DATA

Symbol	Parameter	Conditions	Value	Unit
$R_{th(j-c)}$	Junction to case thermal resistance	STTA506D STTA506F	3.5 6.0	°C/W
P_1	Conduction power dissipation (see fig. 2)	$I_{F(AV)} = 5A$ $\delta = 0.5$ STTA506D Tc= 118°C STTA506F Tc= 96°C	9	W
P_{max}	Total power dissipation Pmax = P1 + P3 (P3 = 10% P1)	STTA506D Tc= 115°C STTA506F Tc= 90°C	10	W

STATIC ELECTRICAL CHARACTERISTICS (see Fig.2)

Symbol	Parameter	Test Conditions		Min	Typ	Max	Unit
V_F *	Forward voltage drop	I_F =5A	Tj = 25°C Tj = 125°C			1.75 1.5	V V
I_R **	Reverse leakage current	V_R =0.8 x V_{RRM}	Tj = 25°C Tj = 125°C			100 2	µA mA

Test pulses widths : * tp = 380 µs, duty cycle < 2%
** tp = 5 ms , duty cycle < 2%

DYNAMIC ELECTRICAL CHARACTERISTICS

TURN-OFF SWITCHING (see Fig.3)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{rr}	Reverse recovery time	Tj = 25°C I_F = 0.5 A I_R = 1A Irr = 0.25A I_F = 1 A dI_F/dt =-50A/µs V_R =30V		20	 50	ns
I_{RM}	Maximum reverse recovery current	Tj = 125°C VR = 400V I_F =5A dI_F/dt = -40 A/µs dI_F/dt = -500 A/µs		 11	 3.0	A
S factor	Softness factor	Tj = 125°C V_R = 400V I_F =5A dI_F/dt = -500 A/µs		0.55		/

TURN-ON SWITCHING (see Fig.4)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{fr}	Forward recovery time	Tj = 25°C I_F =5 A, dI_F/dt = 40 A/µs measured at, 1.1 × $V_F$max			500	ns
V_{Fp}	Peak forward voltage	Tj = 25°C I_F =5A, dI_F/dt = 40 A/µs			10	V

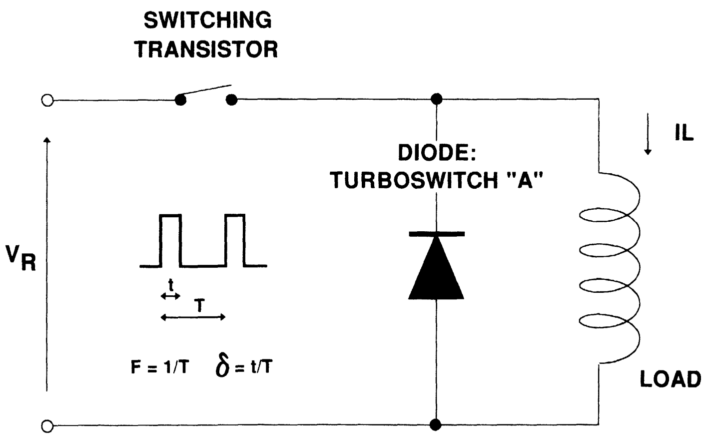
APPLICATION DATA

The TURBOSWITCH “A” is especially designed to provide the lowest overall power losses in any “FREEWHEEL Mode” application (Fig.1) considering both the diode and the companion transistor, thus optimizing the overall performance in the end application.
The way of calculating the power losses is given below:

TOTAL LOSSES
due to the diode
P = P1+ P2+ P3+ P4+ P5 Watts

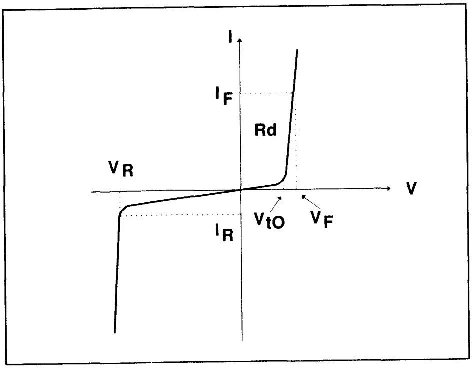
CONDUCTION LOSSES in the diode	REVERSE LOSSES in the diode	SWITCHING LOSSES in the diode	SWITCHING LOSSES in the tansistor due to the diode
P1 Watts (Fig. 2)	**P2 Watts (Fig. 2)**	**OFF : P3 Watts ON : P4 Watts (Fig. 3 & 4)**	**P5 Watts (Fig. 3)**

Fig. 1 : “FREEWHEEL” MODE.



APPLICATION DATA (Cont'd)

Fig. 2: STATIC CHARACTERISTICS



Conduction losses :

$P1 = V_{t0} . I_{F(AV)} + R_d . I_{F}^{2}{}_{(RMS)}$

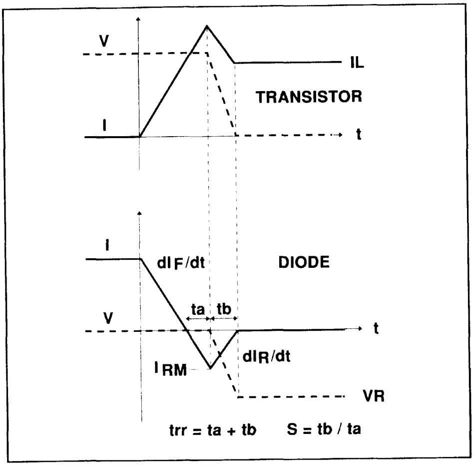
with

$V_{t0} = 1.15$ V
$R_d = 0.070$ Ohm
(Max values at 125°C)

Reverse losses :

$P2 = V_R . I_R . (1 - \delta)$

Fig. 3: TURN-OFF CHARACTERISTICS



Turn-on losses :
(in the transistor, due to the diode)

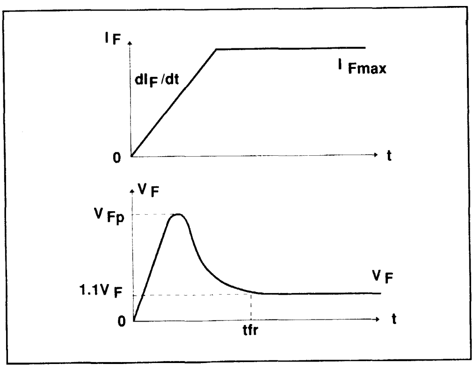
$$P5 = \frac{V_R \times I_{RM}^2 \times (3 + 2 \times S) \times F}{6 \times dI_F/dt} + \frac{V_R \times I_{RM} \times I_L \times (S + 2) \times F}{2 \times dI_F/dt}$$

Turn-off losses (in the diode) :

$$P3 = \frac{V_R \times I_{RM}^2 \times S \times F}{6 \times dI_F/dt}$$

P3 and P5 are suitable for power MOSFET and IGBT

Fig. 4: TURN-ON CHARACTERISTICS



Turn-on losses :

$P4 = 0.4 (V_{FP} - V_F) . I_{Fmax} . t_{fr} . F$

Fig 5 : Conduction losses versus average current

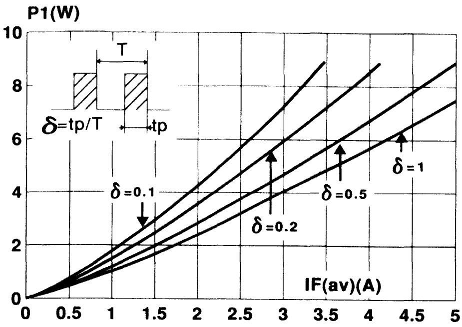


Fig 6 : Switching OFF losses versus dIF/dt

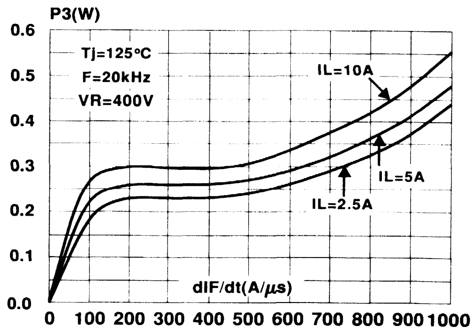


Fig 7 : Switching ON losses versus dIF/dt

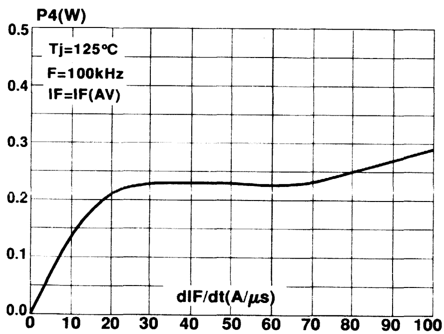


Fig 8 : Switching losses in transistor due to the diode

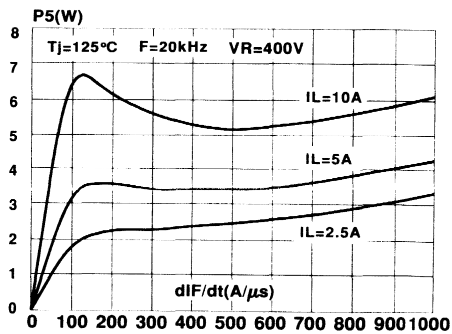


Fig 9 : Forward voltage drop versus forward current

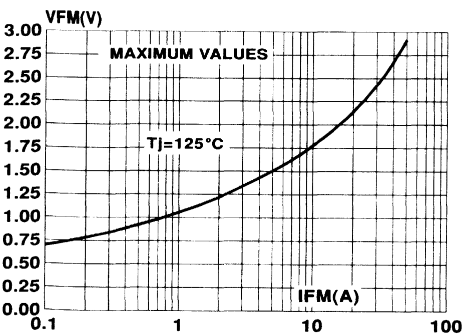


Fig 10 : Peak reverse recovery current versus dIF/dt

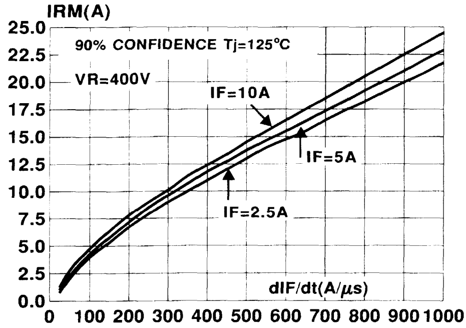


Fig 11 : Reverse recovery time versus dIF/dt

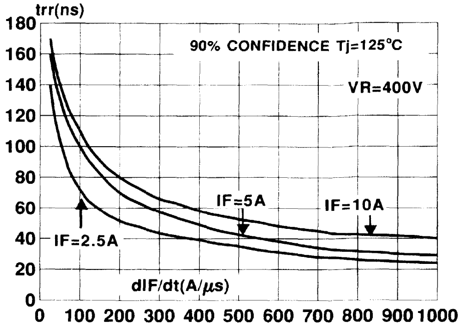


Fig 12 : Softness factor (tb/ta) versus dIF/dt

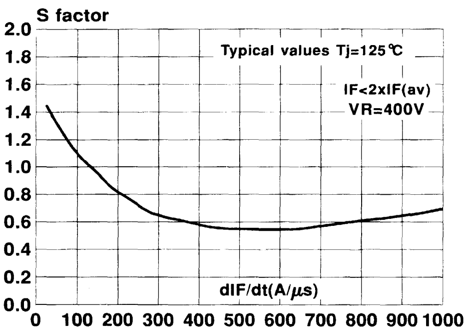


Fig 13 : Relative variation of dynamic parameters versus junction temperature (Reference Tj=125°c)

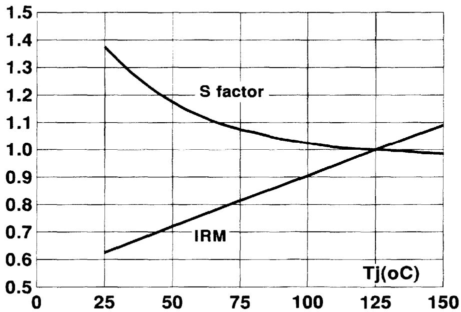


Fig 14 : Transient peak forward voltage versus dIF/dt

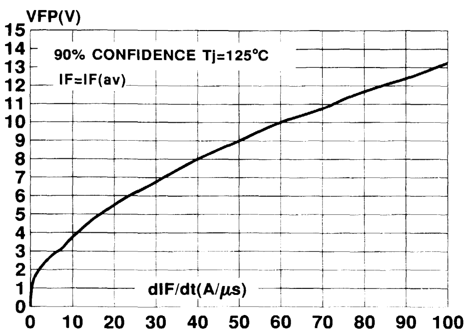


Fig 15 : Forward recovery time versus dIF/dt

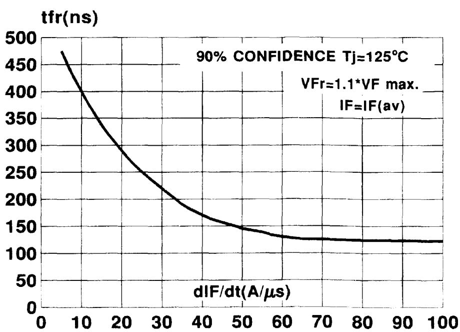


Fig 16 : Relative variation of thermal transient impedance junction to case versus pulse duration (TO220AC)

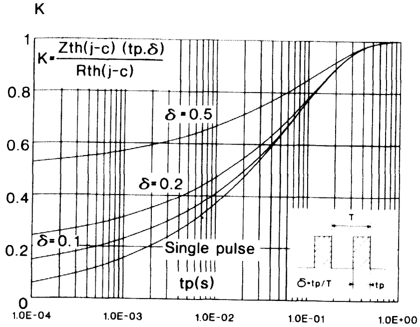
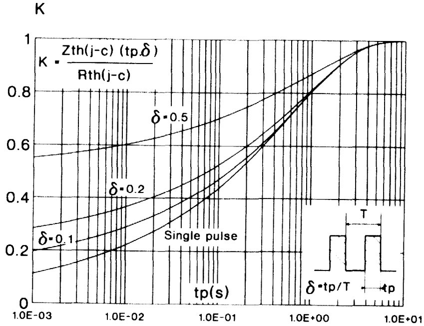


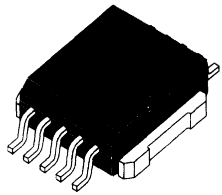
Fig 17 : Relative variation of thermal transient impedance junction to case versus pulse duration (ISOWATT220AC)



ULTRA-FAST HIGH VOLTAGE DIODE

MAIN PRODUCT CHARACTERISTICS

$I_{F(AV)}$	**5A**
V_{RRM}	**600V**
t_{rr} (typ)	**20ns**
V_F (max)	**1.5V**



Power SO-10™
Plastic, non isolated SMD
with copper tab

FEATURES AND BENEFITS

- SPECIFIC TO "FREEWHEEL MODE" OPERATIONS: Freewheel or Booster Diode.
- ULTRA-FAST AND SOFT RECOVERY.
- VERY LOW OVERALL POWER LOSSES IN BOTH THE DIODE AND THE COMPANION TRANSISTOR.
- HIGH FREQUENCY OPERATIONS.
- HIGH DISSIPATION MINIATURE PACKAGE.
- SURFACE MOUNT TECHNOLOGY COMPATIBLE.

DESCRIPTION

The TURBOSWITCH is a very high performance series of ultra-fast high voltage power diodes from 600V to 1200V.
TURBOSWITCH, A family, drastically cuts losses in both the diode and the associated switching IGBT or MOSFET in all "Freewheel Mode" operations and is particularly suitable and efficient in motor control freewheel applications and in booster diode applications in Power Factor Control circuitries.
Packaged in a very high performance surface mount package PSO-10, this 600V device is particularly intended for use on 240V domestic mains.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		600	V
V_{RSM}	Non repetitive peak reverse voltage		600	V
$I_{F(RMS)}$	RMS forward current	(All pins connected)	17	A
I_{FRM}	Repetitive peak forward current (tp = 5 µs, f = 5kHz)		65	A
T_j	Max operating junction temperature		- 65 to + 150	°C
T_{stg}	Storage temperature		- 65 to + 150	°C

TM : PowerSO-10 and TURBOSWITCH are trademarks of SGS-THOMSON Microelectronics.

THERMAL AND POWER DATA

Symbol	Parameter	Conditions	Value	Unit
$R_{th(j-c)}$	Junction to case thermal resistance		3.5	°C/W
P_1	Conduction power dissipation (see fig. 2)	$I_{F(AV)}$ = 5A δ = 0.5 Tc = 118°C	9	W
P_{max}	Total power dissipation Pmax = P1 + P3 (P3 = 10% P1)	Tc = 115°C	10	W

STATIC ELECTRICAL CHARACTERISTICS (see Fig.2)

Symbol	Parameter	Test Conditions		Min	Typ	Max	Unit
V_F *	Forward voltage drop	I_F = 5A	Tj = 25°C			1.75	V
			Tj = 125°C			1.5	
I_R **	Reverse leakage current	V_R = 0.8 x V_{RRM}	Tj = 25°C			100	µA
			Tj = 125°C			2	mA

Test pulses widths : * tp = 380 µs, duty cycle < 2%
** tp = 5 ms , duty cycle < 2%

DYNAMIC ELECTRICAL CHARACTERISTICS
TURN-OFF SWITCHING (see Fig.3)

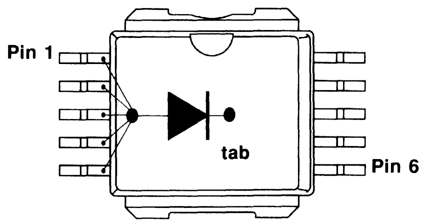
Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{rr}	Reverse recovery time	Tj = 25°C I_F = 0.5 A I_R = 1A I_{rr} = 0.25A I_F = 1A dI_F/dt = -50A/µs V_R = 30V		20	50	ns
I_{RM}	Maximum reverse recovery current	Tj = 125°C V_R = 400V I_F = 5A dI_F/dt = -40 A/µs dI_F/dt = -500 A/µs		11	3	A
S factor	Softness factor	Tj = 125°C V_R = 400V I_F = 5A dI_F/dt = -500 A/µs		0.55		/

TURN-ON SWITCHING (see Fig.4)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{fr}	Forward recovery time	Tj = 25°C I_F = 5A dI_F/dt = 40 A/µs measured at, 1.1 × V_{Fmax}			500	ns
V_{Fp}	Peak forward voltage	Tj = 25°C I_F = 5A dI_F/dt = 40 A/µs			10	V

PIN OUT configuration in PowerSO-10 :

Anode = pin 1 to 5
Cathode = connected to base tab



top view

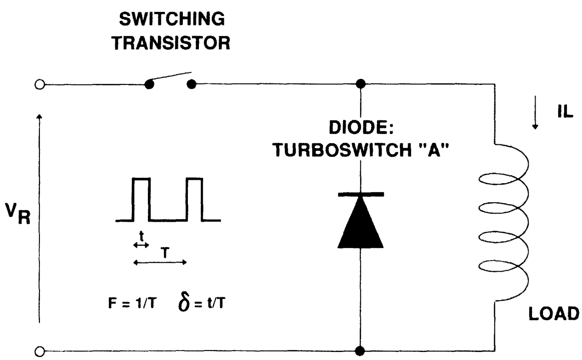
APPLICATION DATA

The TURBOSWITCH "A" is especially designed to provide the lowest overall power losses in any "FREEWHEEL Mode" application (Fig.1) considering both the diode and the companion transistor, thus optimizing the overall performance in the end application.
The way of calculating the power losses is given below:

TOTAL LOSSES
due to the diode
P = P1+ P2+ P3+ P4+ P5 Watts

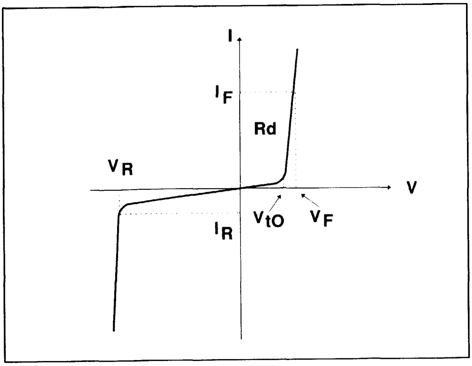
CONDUCTION LOSSES in the diode	REVERSE LOSSES in the diode	SWITCHING LOSSES in the diode	SWITCHING LOSSES in the tansistor due to the diode
P1 Watts (Fig. 2)	**P2 Watts (Fig. 2)**	**OFF : P3 Watts ON : P4 Watts (Fig. 3 & 4)**	**P5 Watts (Fig. 3)**

Fig. 1 : "FREEWHEEL" MODE.



APPLICATION DATA (Cont'd)

Fig. 2: STATIC CHARACTERISTICS



Conduction losses :

$P1 = V_{t0} \cdot I_{F(AV)} + R_d \cdot I_{F}^{2}{}_{(RMS)}$

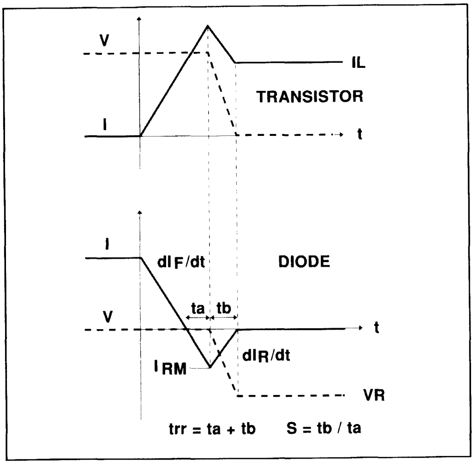
with

$V_{t0} = 1.15$ V
$R_d = 0.070$ Ohm
(Max values at 125°C)

Reverse losses :

$P2 = V_R \cdot I_R \cdot (1 - \delta)$

Fig. 3: TURN-OFF CHARACTERISTICS



Turn-on losses :
(in the transistor, due to the diode)

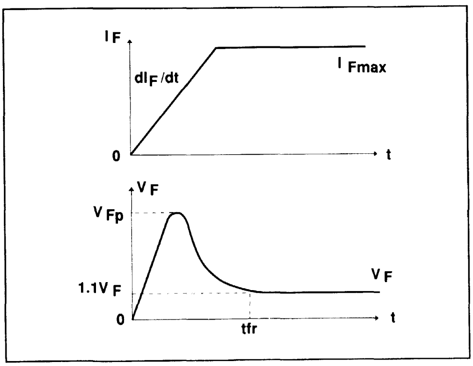
$$P5 = \frac{V_R \times I_{RM}{}^2 \times (3 + 2 \times S) \times F}{6 \; x \; dI_F/dt} + \frac{V_R \times I_{RM} \times I_L \times (S + 2) \times F}{2 \; x \; dI_F/dt}$$

Turn-off losses (in the diode) :

$$P3 = \frac{V_R \times I_{RM}{}^2 \times S \times F}{6 \; x \; dI_F/dt}$$

P3 and P5 are suitable for power MOSFET and IGBT

Fig. 4: TURN-ON CHARACTERISTICS



Turn-on losses :

$P4 = 0.4 \, (V_{FP} - V_F) \cdot I_{Fmax} \cdot t_{fr} \cdot F$

Fig 5 : Conduction losses versus average current

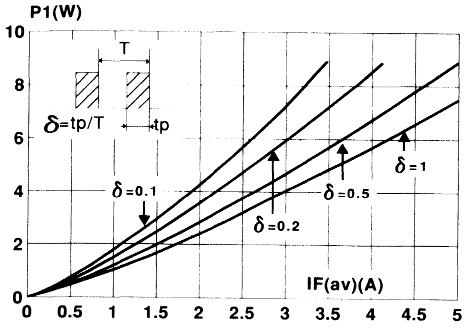


Fig 6 : Switching OFF losses versus dIF/dt

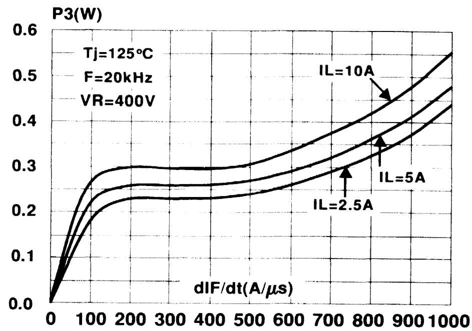


Fig 7 : Switching ON losses versus dIF/dt

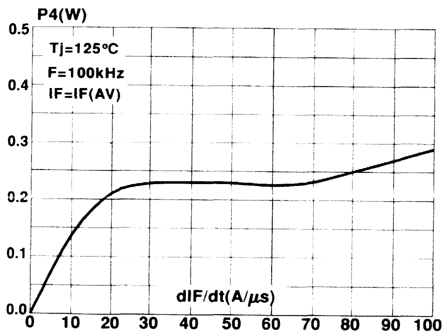


Fig 8 : Switching losses in transistor due to the diode

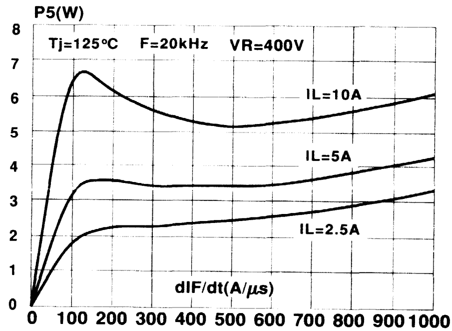


Fig 9 : Forward voltage drop versus forward current

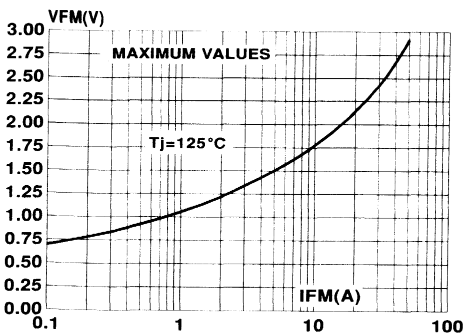


Fig 10 : Relative variation of thermal transient impedance junction to case versus pulse duration

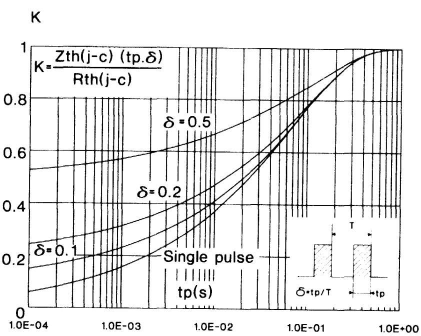


Fig 11 : Peak reverse recovery current versus dIF/dt

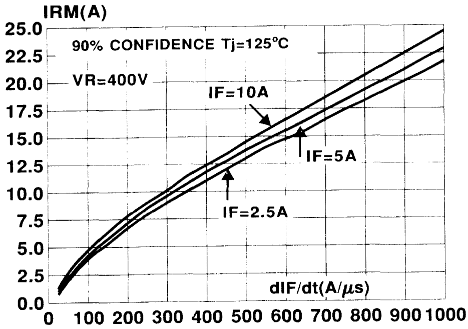


Fig 12 : Reverse recovery time versus dIF/dt

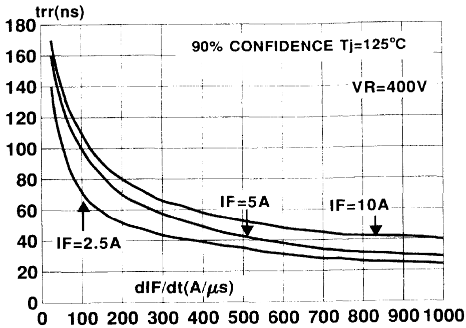


Fig 13 : Softness factor (tb/ta) versus dIF/dt

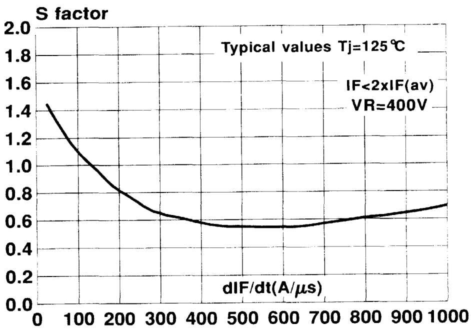


Fig 14 : Relative variation of dynamic parameters versus junction temperature (Reference Tj=125°C)

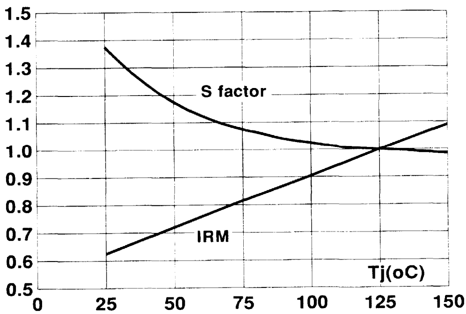


Fig 15 : Transient peak forward voltage versus dIF/dt

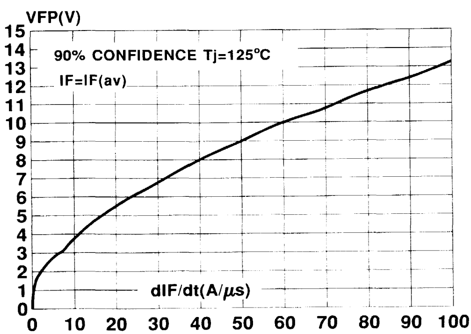
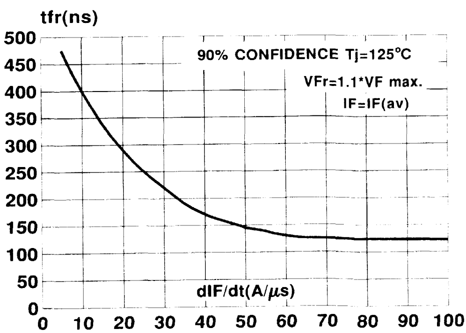


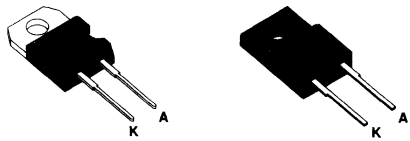
Fig 16 : Forward recovery time versus dIF/dt



TURBOSWITCH ™ "B". ULTRA-FAST HIGH VOLTAGE DIODE

MAIN PRODUCTS CHARACTERISTICS

$I_{F(AV)}$	5A
V_{RRM}	600V
t_{rr} (typ)	45ns
V_F (max)	1.3V



TO220AC (Plastic)	Isolated ISOWATT220AC (Plastic)
STTB506D	STTB506F

FEATURES AND BENEFITS

- SPECIFIC TO THE FOLLOWING OPERATIONS: Snubbing or clamping, demagnetization and rectification.
- ULTRA-FAST, SOFT AND NOISE-FREE RECOVERY.
- VERY LOW OVERALL POWER LOSSES AND PARTICULARY LOW FORWARD VOLTAGE.
- DESIGNED FOR HIGH PULSED CURRENT OPERATIONS.

DESCRIPTION

The TURBOSWITCH is a very high performance series of ultra-fast high voltage power diodes from 600V to 1200V.
TURBOSWITCH, B family, drastically cuts losses in all high voltage operations which require extremely fast, soft and noise-free power diodes.
They are particularly suitable in the primary circuit of an SMPS as snubber, clamping or demagnetizing diodes, and also in most power converters as high performance rectifier diodes.
Packaged in TO220AC and in isolated ISOWATT220AC, these 600V devices are particularly intended for use on 240V domestic mains.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{RRM}	Repetitive peak reverse voltage	600	V
V_{RSM}	Non repetitive peak reverse voltage	600	V
$I_{F(RMS)}$	RMS forward current	20	A
I_{FRM}	Repetitive peak forward current (tp = 5 µs, f = 1kHz)	175	A
T_j	Max operating junction temperature	-65 to 150	°C
T_{stg}	Storage temperature	-65 to 150	°C

TM : TURBOSWITCH is a trademark of SGS-THOMSON Microelectronics.

THERMAL AND POWER DATA

Symbol	Parameter	Conditions	Value	Unit
$R_{th(j-c)}$	Junction to case thermal resistance	STTB506D STTB506F	3.5 6.0	°C/W
P_1	Conduction power dissipation (see fig. 5)	$I_{F(AV)}$ = 5A δ =0.5 STTB506D Tc= 122°C STTB506F Tc= 102°C	8	W
P_{max}	Total power dissipation Pmax = P1 + P3 (P3 = 10% P1)	STTB506D Tc= 115°C STTB506F Tc= 90°C	10	W

STATIC ELECTRICAL CHARACTERISTICS (see Fig.5)

Symbol	Parameter	Test Conditions		Min	Typ	Max	Unit
V_F *	Forward voltage drop	I_F =5A	Tj = 25°C Tj = 125°C			1.4 1.3	V V
I_R **	Reverse leakage current	V_R =0.8 x V_{RRM}	Tj = 25°C Tj = 125°C			100 0.75	µA mA

Test pulses widths : * tp = 380 µs, duty cycle < 2%
** tp = 5 ms , duty cycle < 2%

DYNAMIC ELECTRICAL CHARACTERISTICS

TURN-OFF SWITCHING (see Fig.6)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{rr}	Reverse recovery time	Tj = 25°C I_F = 0.5 A I_R = 1A Irr = 0.25A I_F = 1 A dI_F/dt =-50A/µs V_R =30V		45	95	ns
I_{RM}	Maximum reverse recovery current	Tj = 125°C VR = 400V I_F =5A dI_F/dt = -40 A/µs dI_F/dt = -500 A/µs		20	7.5	A
S factor	Softness factor	Tj = 125°C V_R = 400V I_F =5A dI_F/dt = -500 A/µs		1		/

TURN-ON SWITCHING (see Fig.7)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{fr}	Forward recovery time	Tj = 25°C I_F =5 A, dI_F/dt = 40 A/µs measured at, 1.1 × $V_F$max			500	ns
V_{Fp}	Peak forward voltage	Tj = 25°C I_F =5A, dI_F/dt = 40 A/µs I_F =25A, dI_F/dt = 500 A/µs		10	8	V

APPLICATION DATA

The TURBOSWITCH “B” is especially designed to provide the lowest overall power losses in any application such as snubbing,clamping, demagnetization and rectification. In such applications (fig.1 to fig.4), the way of calculating the power losses is given below :

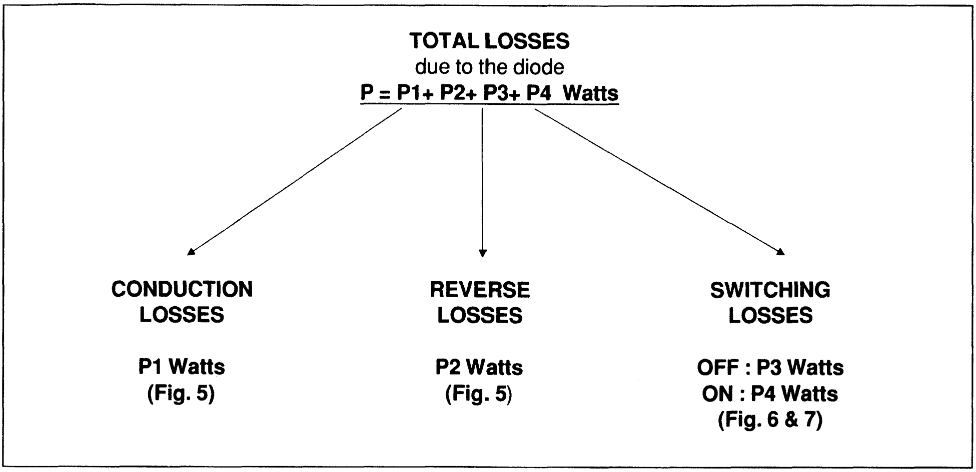


Fig. 1 : SNUBBER DIODE.

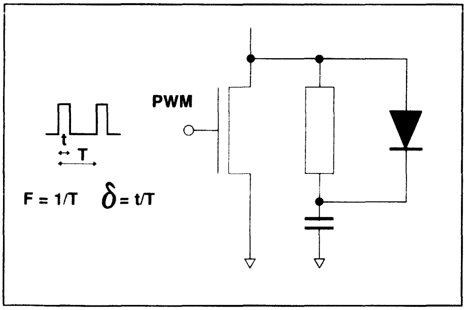


Fig. 2 : CLAMPING DIODE.

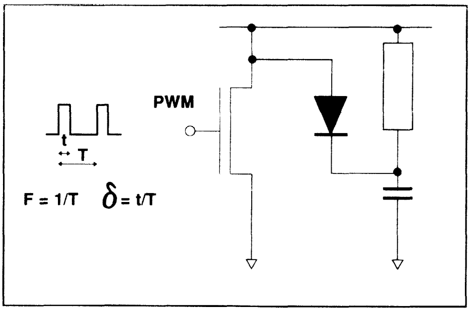


Fig. 3 : DEMAGNETIZING DIODE.

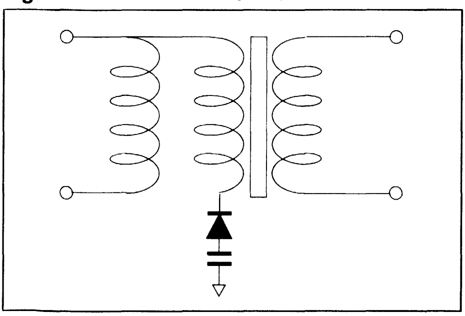
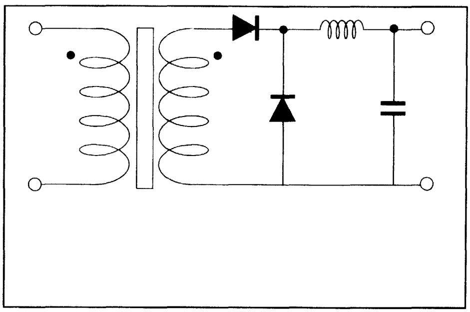
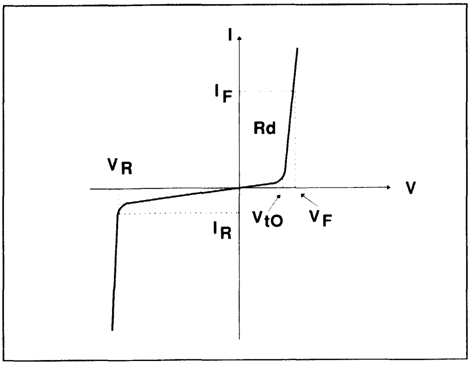


Fig. 4 : RECTIFIER DIODE.



APPLICATION DATA (Cont'd)

Fig. 5: STATIC CHARACTERISTICS



Conduction losses :

$P1 = V_{t0} \cdot I_{F(AV)} + R_d \cdot I_F^2{}_{(RMS)}$

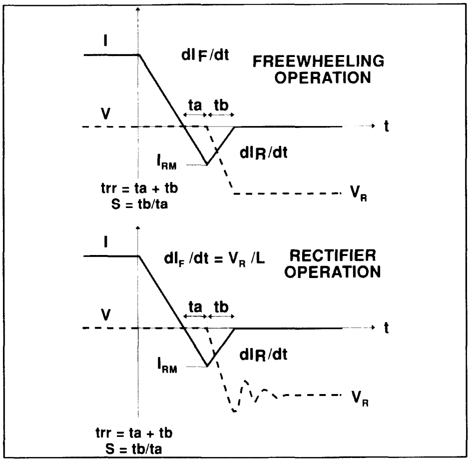
with

$V_{t0} = 1.00$ V
$R_d = 0.060$ Ohm
(Max values at 125°C)

Reverse losses :

$P2 = V_R \cdot I_R \cdot (1 - \delta)$

Fig. 6: TURN-OFF CHARACTERISTICS



Turn-off losses :

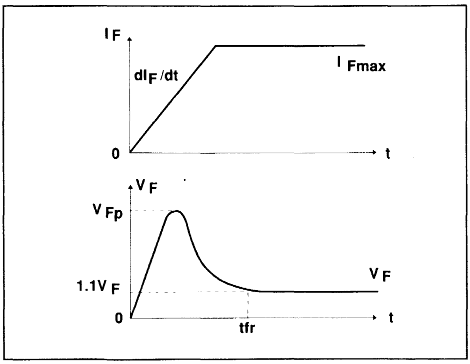
$$P3 = \frac{V_R \times I_{RM}^2 \times S \times F}{6 \times dI_F/dt}$$

Turn-off losses :
(with non negligible serial inductance)

$$P3' = \frac{V_R \times I_{RM}^2 \times S \times F}{6 \times dI_F/dt} + \frac{L \times I_{RM}^2 \times F}{2}$$

P3 and P3' are suitable for power MOSFET and IGBT

Fig. 7: TURN-ON CHARACTERISTICS



Turn-on losses :

$P4 = 0.4\,(V_{FP} - V_F) \cdot I_{Fmax} \cdot t_{fr} \cdot F$

Fig 8 : Conduction losses versus average current

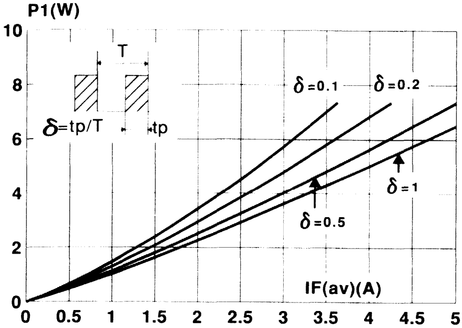


Fig 9 : Switching OFF losses versus dIF/dt

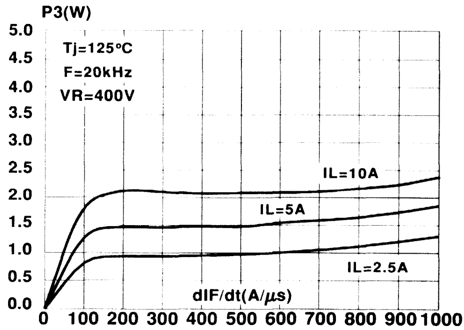


Fig 10 : Switching ON losses versus dIF/dt

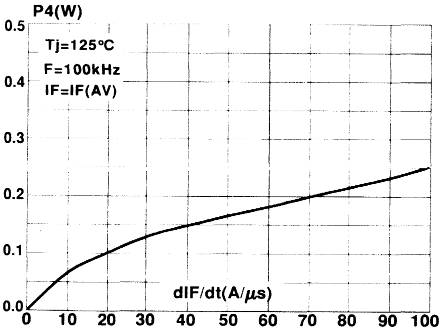


Fig 11 : Forward voltage drop versus forward current

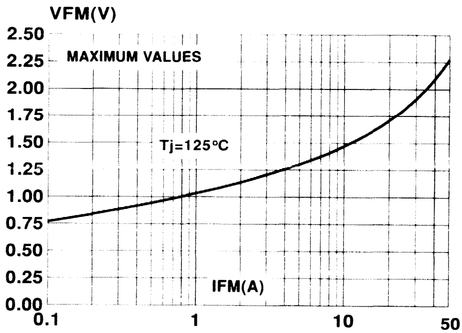


Fig 12 : Relative variation of thermal transient impedance junction to case versus pulse duration (TO220AC)

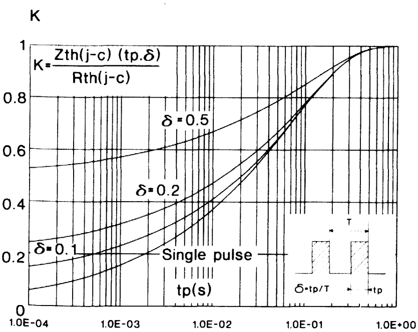


Fig 13 : Relative variation of thermal transient impedance junction to case versus pulse duration (ISOWATT220AC)

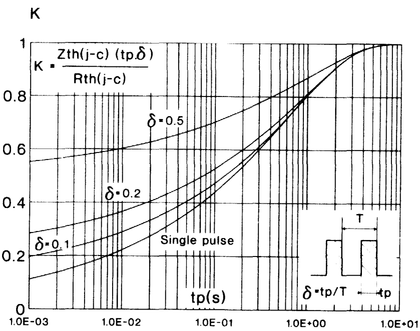


Fig 14 : Peak reverse recovery current versus dIF/dt

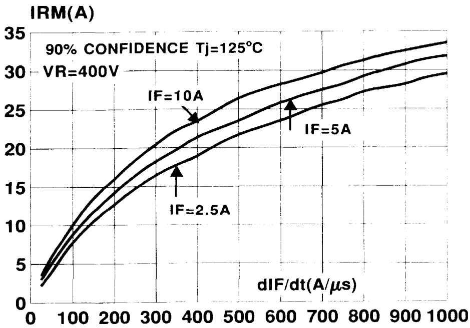


Fig 15 : Reverse recovery time versus dIF/dt

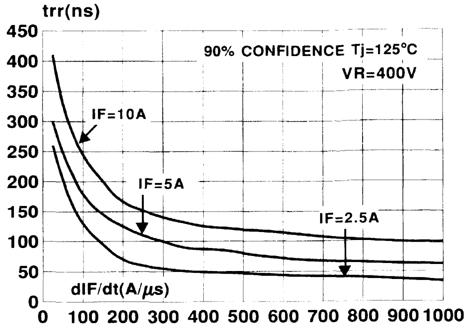


Fig 16 : Softness factor (tb/ta) versus dIF/dt

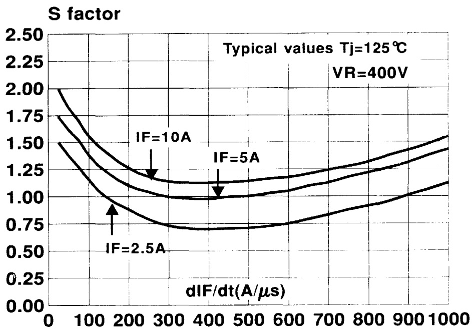


Fig 17 : Relative variation of dynamic parameters versus junction temperature (Reference Tj=125°C)

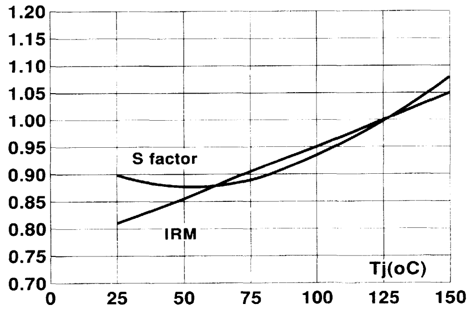


Fig 18 : Transient peak forward voltage versus dIF/dt

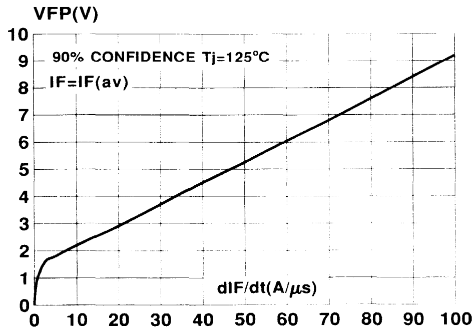
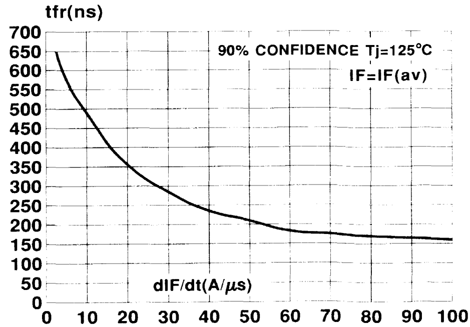


Fig 19 : Forward recovery time versus dIF/dt



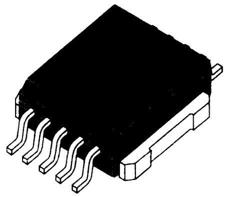
SGS-THOMSON MICROELECTRONICS

STTB506M

ULTRA-FAST HIGH VOLTAGE DIODE

MAIN PRODUCT CHARACTERISTICS

$I_{F(AV)}$	5A
V_{RRM}	600V
t_{rr} (typ)	45ns
V_F (max)	1.3V



Power SO-10™
Plastic, non isolated SMD
with copper tab

FEATURES AND BENEFITS

- SPECIFIC TO THE FOLLOWING OPERATIONS: Snubbing or clamping, demagnetization and rectification.
- ULTRA-FAST,VERY SOFT AND NOISE-FREE RECOVERY.
- VERY LOW OVERALL POWER LOSSES AND PARTICULARY LOW FORWARD VOLTAGE.
- DESIGNED FOR HIGH PULSED CURRENT OPERATIONS.
- HIGH FREQUENCY OPERATIONS
- HIGH DISSIPATION MINIATURE PACKAGE
- SURFACE MOUNT TECHNOLOGY COMPATIBLE

DESCRIPTION

The TURBOSWITCH is a very high performance series of ultra-fast high voltage power diodes from 600V to 1200V.
TURBOSWITCH, B family, drastically cuts losses in all high voltage operations which require extremely fast, soft and noise-free power diodes.
They are particularly suitable in the primary circuit of an SMPS as snubber, clamping or demagnetizing diodes, and also in most power converters as high performance rectifier diodes.
Packaged in PSO-10, this 600V devices are particularly intended for use on 240V domestic mains.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		600	V
V_{RSM}	Non repetitive peak reverse voltage		600	V
$I_{F(RMS)}$	RMS forward current	(All pins connected)	17	A
I_{FRM}	Repetitive peak forward current (tp = 5 µs, f = 1kHz)		175	A
T_j	Max operating junction temperature		- 65 to + 150	°C
T_{stg}	Storage temperature		- 65 to + 150	°C

TM : PowerSO-10 and TURBOSWITCH are trademarks of SGS-THOMSON Microelectronics.

THERMAL AND POWER DATA

Symbol	Parameter	Conditions	Value	Unit
$R_{th(j-c)}$	Junction to case thermal resistance		3.5	°C/W
P_1	Conduction power dissipation (see fig. 5)	$I_{F(AV)}$ = 5A δ = 0.5 Tc = 122°C	8	W
P_{max}	Total power dissipation Pmax = P1 + P3 (P3 = 10% P1)	Tc = 115°C	10	W

STATIC ELECTRICAL CHARACTERISTICS (see Fig.5)

Symbol	Parameter	Test Conditions		Min	Typ	Max	Unit
V_F *	Forward voltage drop	I_F = 5A	Tj = 25°C			1.4	V
			Tj = 125°C			1.3	
I_R **	Reverse leakage current	V_R = 0.8 x V_{RRM}	Tj = 25°C			100	µA
			Tj = 125°C			0.75	mA

Test pulses widths : * tp = 380 µs, duty cycle < 2%
** tp = 5 ms , duty cycle < 2%

DYNAMIC ELECTRICAL CHARACTERISTICS
TURN-OFF SWITCHING (see Fig.6)

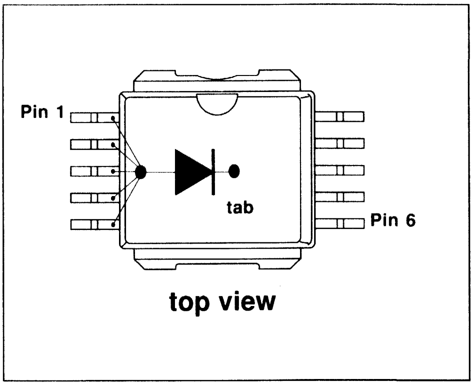
Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{rr}	Reverse recovery time	Tj = 25°C I_F = 0.5 A I_R = 1A I_{rr} = 0.25A I_F = 1 A dI_F/dt = -50A/µs V_R = 30V		45	95	ns
I_{RM}	Maximum reverse recovery current	Tj = 125°C V_R = 400V I_F = 5A dI_F/dt = -40 A/µs dI_F/dt = -500 A/µs		20	7.5	A
S factor	Softness factor	Tj = 125°C V_R = 400V I_F = 5A dI_F/dt = -500 A/µs		1.0		/

TURN-ON SWITCHING (see Fig.7)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{fr}	Forward recovery time	Tj = 25°C I_F = 5 A, dI_F/dt = 40 A/µs measured at, 1.1 × $V_F$max			500	ns
V_{Fp}	Peak forward voltage	Tj = 25°C I_F = 5A, dI_F/dt = 40 A/µs			8	V

PIN OUT configuration in PowerSO-10 :

Anode = pin 1 to 5
Cathode = connected to base tab



APPLICATION DATA

The TURBOSWITCH "B" is especially designed to provide the lowest overall power losses in any application such as snubbing,clamping, demagnetization and rectification. In such applications (fig.1 to fig.4), the way of calculating the power losses is given below :

TOTAL LOSSES
due to the diode
P = P1+ P2+ P3+ P4 Watts

CONDUCTION LOSSES	REVERSE LOSSES	SWITCHING LOSSES
P1 Watts (Fig. 5)	P2 Watts (Fig. 5)	OFF : P3 Watts ON : P4 Watts (Fig. 6 & 7)

Fig. 1 : SNUBBER DIODE.

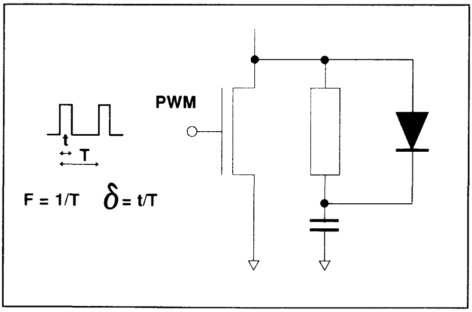


Fig. 2 : CLAMPING DIODE.

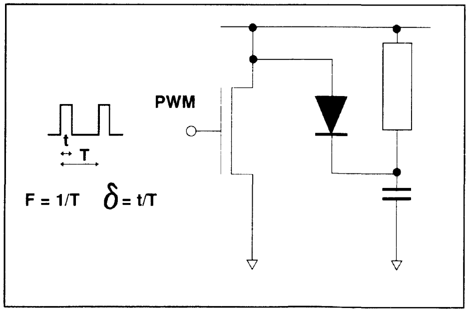


Fig. 3 : DEMAGNETIZING DIODE.

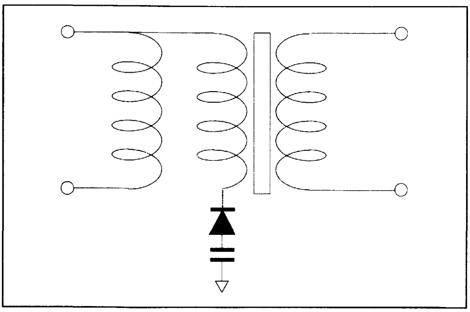
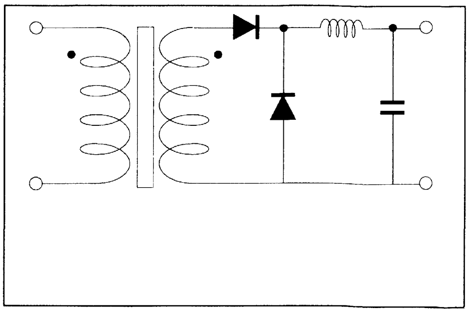
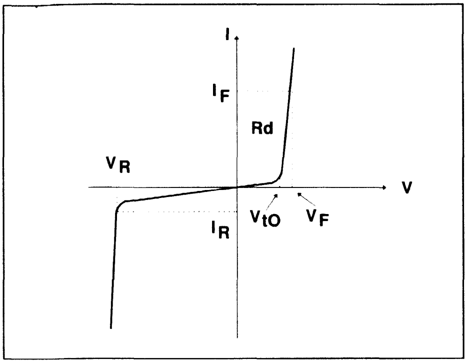


Fig. 4 : RECTIFIER DIODE.



APPLICATION DATA (Cont'd)

Fig. 5: STATIC CHARACTERISTICS



Conduction losses :

$P1 = V_{t0} \cdot I_{F(AV)} + R_d \cdot I_F^2(RMS)$

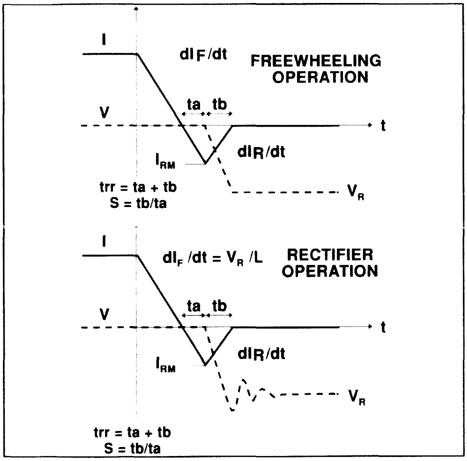
with

$V_{t0} = 1.00$ V
$R_d = 0.060$ Ohm
(Max values at 125°C)

Reverse losses :

$P2 = V_R \cdot I_R \cdot (1 - \delta)$

Fig. 6: TURN-OFF CHARACTERISTICS



Turn-off losses :

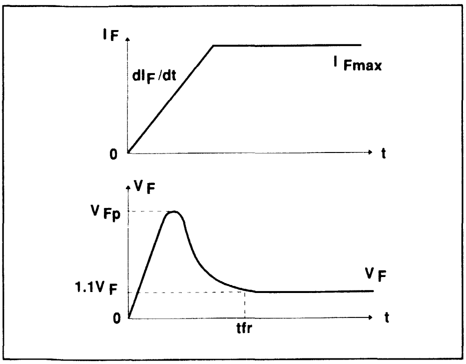
$$P3 = \frac{V_R \times I_{RM}^2 \times S \times F}{6\ x\ dI_F/dt}$$

Turn-off losses :
(with non negligible serial inductance)

$$P3' = \frac{V_R \times I_{RM}^2 \times S \times F}{6\ x\ dI_F/dt} + \frac{L \times I_{RM}^2 \times F}{2}$$

P3 and P3' are suitable for power MOSFET and IGBT

Fig. 7: TURN-ON CHARACTERISTICS



Turn-on losses :

$P4 = 0.4\ (V_{FP} - V_F) \cdot I_{Fmax} \cdot t_{fr} \cdot F$

Fig 8 : Conduction losses versus average current

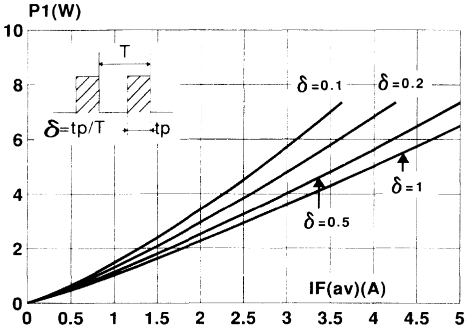


Fig 9 : Switching OFF losses versus dIF/dt

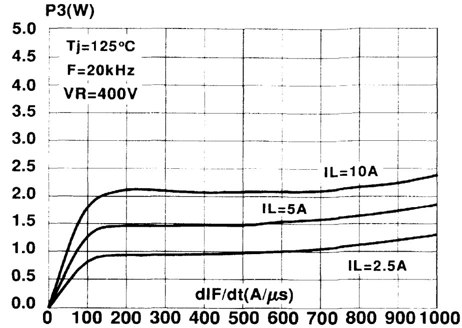


Fig 10 : Switching ON losses versus dIF/dt

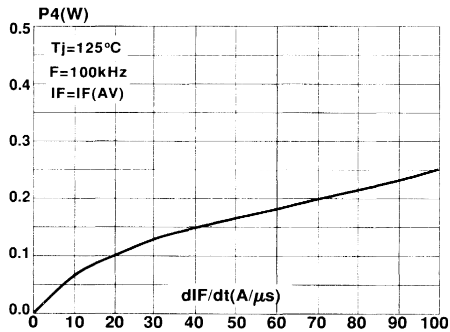


Fig 11 : Forward voltage drop versus forward current

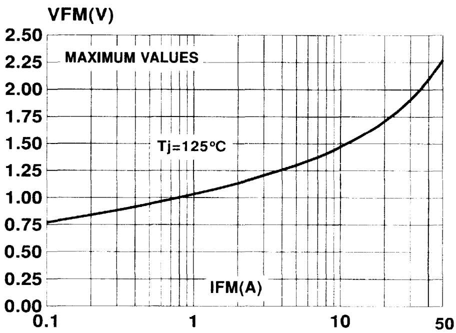


Fig 12 : Relative variation of thermal transient impedance junction to case versus pulse duration

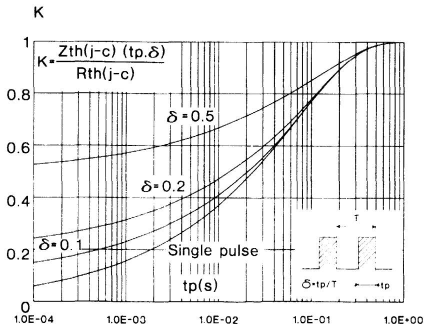


Fig 13 : Peak reverse recovery current versus dIF/dt

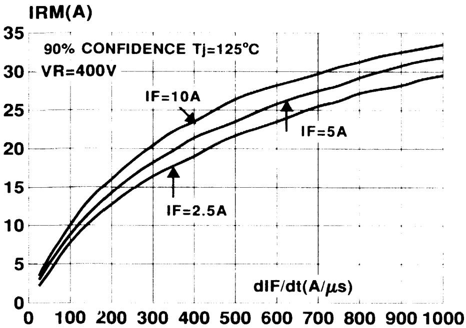


Fig 14 : Reverse recovery time versus dIF/dt

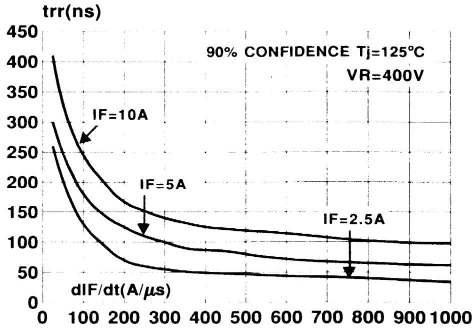


Fig 15 : Softness factor (tb/ta) versus dIF/dt

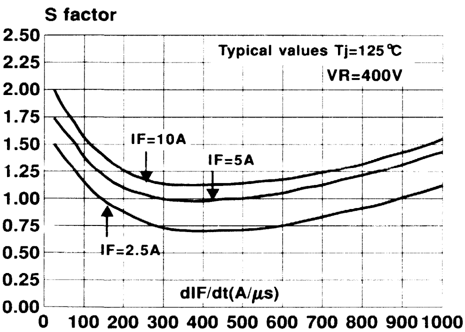


Fig 16 : Relative variation of dynamic parameters versus junction temperature (Reference Tj=125°C)

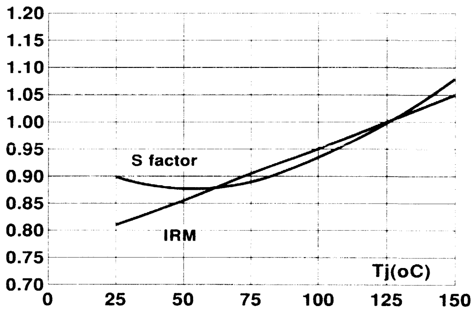


Fig 17 : Transient peak forward voltage versus dIF/dt

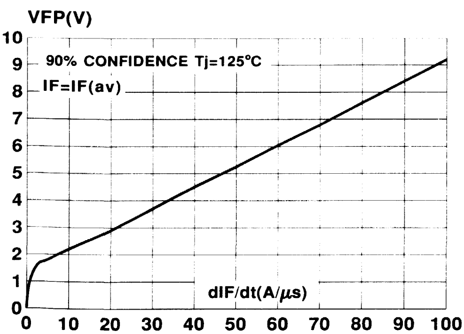
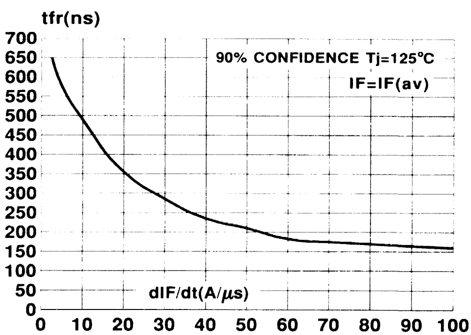


Fig 18 : Forward recovery time versus dIF/dt



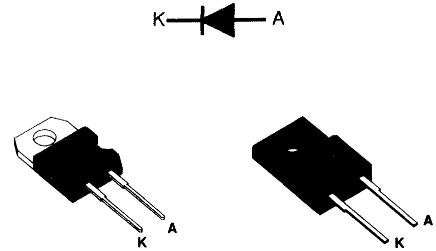
SGS-THOMSON MICROELECTRONICS

STTA512D/F

TURBOSWITCH ™ "A". ULTRA-FAST HIGH VOLTAGE DIODE

MAIN PRODUCTS CHARACTERISTICS

$I_{F(AV)}$	5A
V_{RRM}	1200V
t_{rr} (typ)	45ns
V_F (max)	2.0V



TO220AC (Plastic)	ISOWATT220AC (Plastic)
STTA512D	STTA512F

FEATURES AND BENEFITS

- ULTRA-FAST, SOFT AND NOISE-FREE RECOVERY.
- VERY LOW OVERALL POWER LOSSES IN BOTH THE DIODE AND THE COMPANION TRANSISTOR.
- HIGH FREQUENCY AND/OR HIGH PULSED CURRENT OPERATIONS.

DESCRIPTION

The TURBOSWITCH is a very high performance series of ultra-fast high voltage power diodes from 600V to 1200V.

TURBOSWITCH 1200V drastically cuts losses in all high voltage operations which require extremely fast, soft and noise-free power diodes. Due to their optimized switching performances they also highly decrease power losses in any associated switching IGBT or MOSFET in all "Freewheel Mode" operations.

They are particularly suitable in Motor Control circuitries, or in the primary of SMPS as snubber, clamping or demagnetizing diodes, and also at the secondary of SMPS as high voltage rectifier diodes.

Packaged in TO220AC and in ISOWATT220AC, these 1200V devices are particularly intended for use on 3 phase 400V industrial mains.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{RRM}	Repetitive peak reverse voltage	1200	V
V_{RSM}	Non repetitive peak reverse voltage	1200	V
$I_{F(RMS)}$	RMS forward current	20	A
I_{FRM}	Repetitive peak forward current (tp = 5 µs, f = 5kHz)	75	A
T_j	Max operating junction temperature	150	°C
T_{stg}	Storage temperature	-65 to 150	°C

TM : TURBOSWITCH is a trademark of SGS-THOMSON Microelectronics.

THERMAL AND POWER DATA

Symbol	Parameter	Conditions	Value	Unit
$R_{th(j-c)}$	Junction to case thermal resistance	STTA512D STTA512F	4.0 5.5	°C/W
P_1	Conduction power dissipation (see fig. 6)	$I_{F(AV)}$ = 5A δ =0.5 STTA512D Tc= 102°C STTA512F Tc= 84°C	12	W
P_{max}	Total power dissipation Pmax = P1 + P3 (P3 = 10% P1)	STTA512D Tc= 98°C STTA512F Tc= 78°C	13	W

STATIC ELECTRICAL CHARACTERISTICS (see Fig.6)

Symbol	Parameter	Test Conditions		Min	Typ	Max	Unit
V_F *	Forward voltage drop	I_F =5A	Tj = 25°C Tj = 125°C			2.2 2.0	V V
I_R **	Reverse leakage current	V_R =0.8 x V_{RRM}	Tj = 25°C Tj = 125°C			100 2.0	µA mA

Test pulses widths : * tp = 380 µs, duty cycle < 2%
** tp = 5 ms , duty cycle < 2%

DYNAMIC ELECTRICAL CHARACTERISTICS

TURN-OFF SWITCHING (see Fig.7)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{rr}	Reverse recovery time	Tj = 25°C I_F = 0.5 A I_R = 1A Irr = 0.25A I_F = 1 A dI_F/dt =-50A/µs V_R =30V		45	95	ns
I_{RM}	Maximum reverse recovery current	Tj = 125°C VR = 600V I_F =5A dI_F/dt = -40 A/µs dI_F/dt = -500 A/µs		20	7.5	A
S factor	Softness factor	Tj = 125°C V_R = 600V I_F =5A dI_F/dt = -500 A/µs		1.2		/

TURN-ON SWITCHING (see Fig.8)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{fr}	Forward recovery time	Tj = 25°C I_F =5 A, dI_F/dt = 40 A/µs measured at, 1.1 × $V_F$max			900	ns
V_{Fp}	Peak forward voltage	Tj = 25°C I_F =5A, dI_F/dt = 40 A/µs I_F =40A, dI_F/dt = 500 A/µs			35 50	V

APPLICATION DATA

The 1200V TURBOSWITCH series has been designed to provide the lowest overall power losses in all high frequency or high pulsed current operations. In such applications (Fig 1 to 5),the way of calculating the power losses is given below :

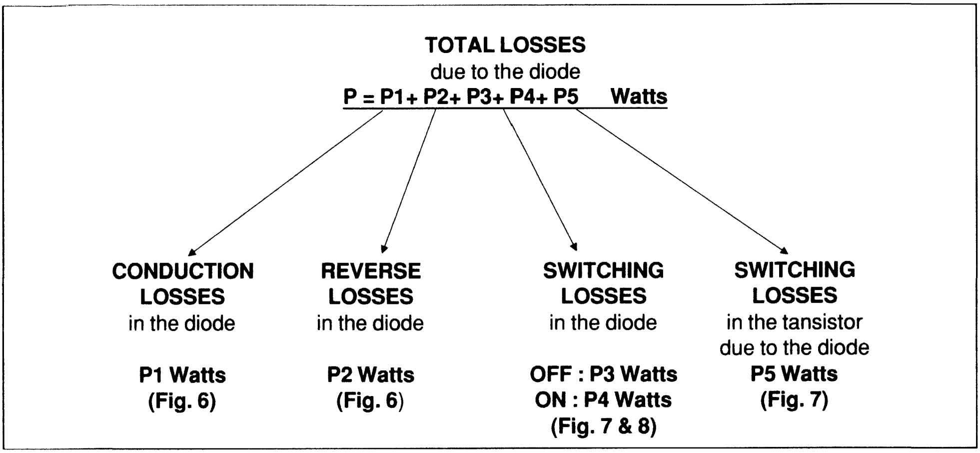


Fig. 1 : "FREEWHEEL" MODE.

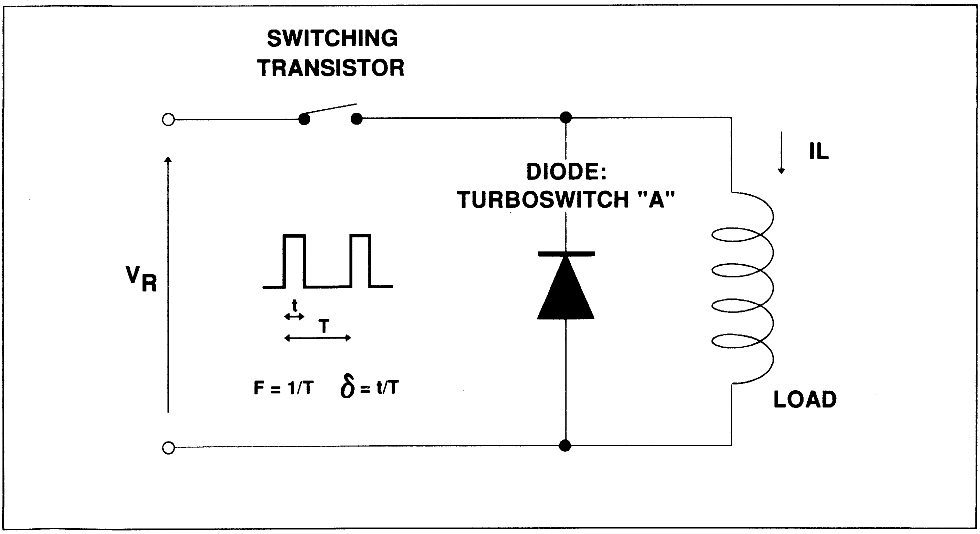


Fig. 2 : SNUBBER DIODE.

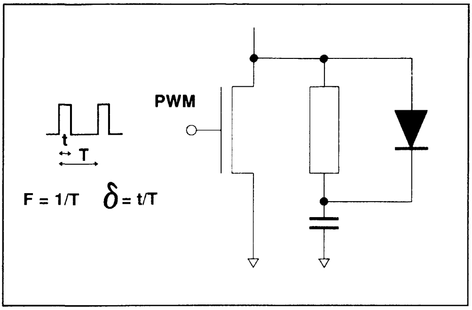


Fig. 3 : CLAMPING DIODE.

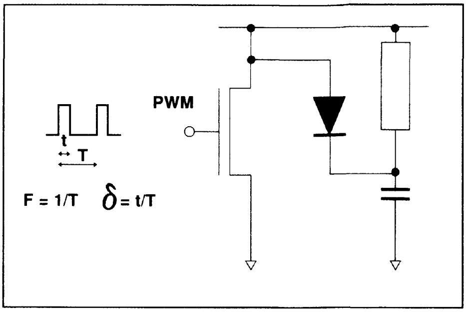


Fig. 4 : DEMAGNETIZING DIODE.

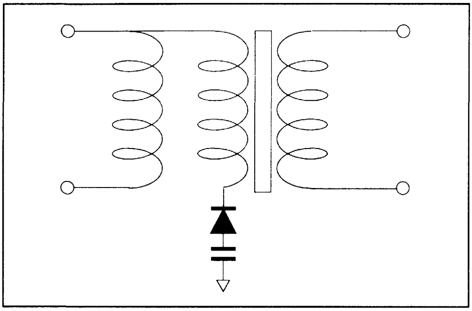
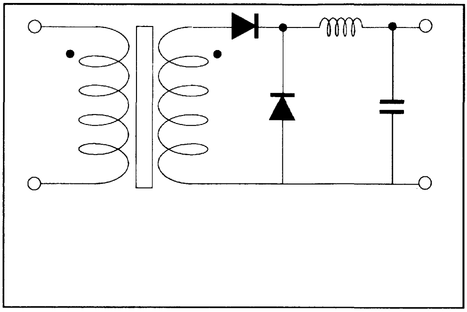
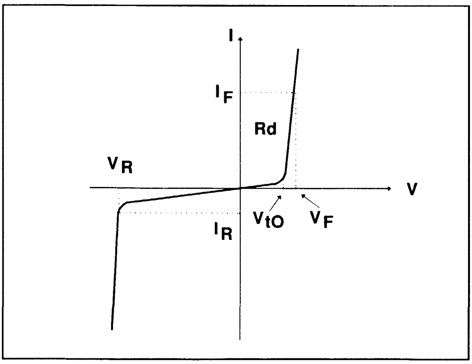


Fig. 5 : RECTIFIER DIODE.



STATIC & DYNAMIC CHARACTERISTICS . POWER LOSSES .

Fig. 6: STATIC CHARACTERISTICS



Conduction losses :

$P1 = V_{t0} . I_{F(AV)} + R_d . I_F{}^2{}_{(RMS)}$

with

$V_{t0} = 1.57$ V

$R_d = 0.086$ Ohm

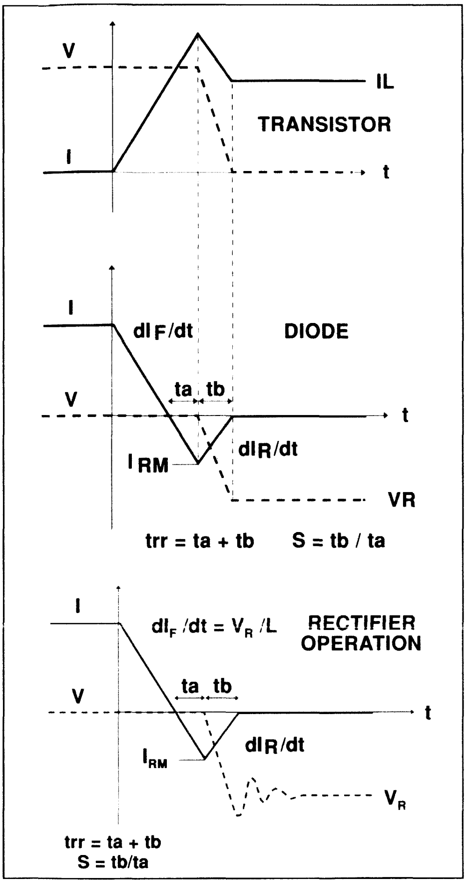
(Max values at 125°C,suitable for Ipeak < $3.I_{F(av)}$)

Reverse losses :

$P2 = V_R . I_R . (1 - \delta)$

APPLICATION DATA (Cont'd)

Fig. 7: TURN-OFF CHARACTERISTICS



Turn-on losses :
(in the transistor, due to the diode)

$$P5 = \frac{V_R \times I_{RM}^2 \times (3 + 2 \times S) \times F}{6 \; x \; dI_F/dt} + \frac{V_R \times I_{RM} \times I_L \times (S + 2) \times F}{2 \; x \; dI_F/dt}$$

Turn-off losses (in the diode) :

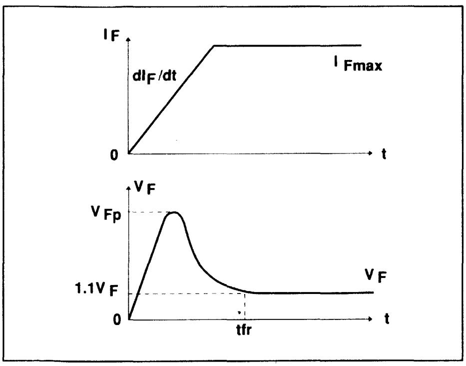
$$P3 = \frac{V_R \times I_{RM}^2 \times S \times F}{6 \; x \; dI_F/dt}$$

Turn-off losses :
(with non negligible serial inductance)

$$P3' = \frac{V_R \times I_{RM}^2 \times S \times F}{6 \; x \; dI_F/dt} + \frac{L \times I_{RM}^2 \times F}{2}$$

P3,P3' and P5 are suitable for power MOSFET and IGBT

Fig. 8: TURN-ON CHARACTERISTICS



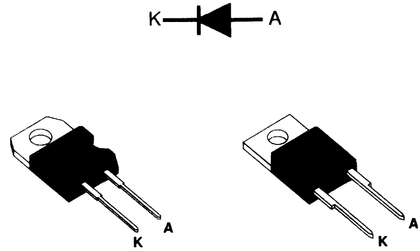
Turn-on losses :

$P4 = 0.4\,(V_{FP} - V_F)\,.\,I_{Fmax}\,.\,t_{fr}\,.\,F$

TURBOSWITCH ™ "A". ULTRA-FAST HIGH VOLTAGE DIODE

MAIN PRODUCTS CHARACTERISTICS

$I_{F(AV)}$	8A
V_{RRM}	600V
t_{rr} (typ)	25ns
V_F (max)	1.5V



TO220AC (Plastic)	Isolated TO220AC (Plastic)
STTA806D	STTA806DI

FEATURES AND BENEFITS

- SPEÇIFIC TO "FREEWHEEL MODE" OPERATIONS: Freewheel or Booster Diode.
- ULTRA-FAST RECOVERY.
- VERY LOW OVERALL POWER LOSSES IN BOTH THE DIODE AND THE COMPANION TRANSISTOR.
- HIGH FREQUENCY OPERATIONS.

DESCRIPTION

The TURBOSWITCH is a very high performance series of ultra-fast high voltage power diodes from 600V to 1200V.
TURBOSWITCH, A family, drastically cuts losses in both the diode and the associated switching IGBT or MOSFET in all "Freewheel Mode" operations and is particularly suitable and efficient in Motor Control Freewheel applications and in Booster diode applications in Power Factor Control circuitries.
Packaged in TO220AC and in isolated TO220AC, these 600V devices are particularly intended for use on 240V domestic mains.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{RRM}	Repetitive peak reverse voltage	600	V
V_{RSM}	Non repetitive peak reverse voltage	600	V
$I_{F(RMS)}$	RMS forward current	20	A
I_{FRM}	Repetitive peak forward current (tp = 5 µs, f = 5kHz)	120	A
T_j	Max operating junction temperature	-65 to 150	°C
T_{stg}	Storage temperature	-65 to 150	°C

TM : TURBOSWITCH is a trademark of SGS-THOMSON Microelectronics.

THERMAL AND POWER DATA

Symbol	Parameter	Conditions	Value	Unit
$R_{th(j-c)}$	Junction to case thermal resistance	STTA806D STTA806DI	2.2 3.3	°C/W
P_1	Conduction power dissipation (see fig. 2)	$I_{F(AV)}$ = 8A δ = 0.5 STTA806D Tc = 118°C STTA806DI Tc = 102°C	14.5	W
P_{max}	Total power dissipation Pmax = P1 + P3 (P3 = 10% P1)	STTA806D Tc = 115°C STTA806DI Tc = 97°C	16	W

STATIC ELECTRICAL CHARACTERISTICS (see Fig.2)

Symbol	Parameter	Test Conditions		Min	Typ	Max	Unit
V_F *	Forward voltage drop	I_F = 8A	Tj = 25°C Tj = 125°C			1.75 1.5	V V
I_R **	Reverse leakage current	V_R = 0.8 x V_{RRM}	Tj = 25°C Tj = 125°C			100 4	µA mA

Test pulses widths : * tp = 380 µs, duty cycle < 2%
** tp = 5 ms , duty cycle < 2%

DYNAMIC ELECTRICAL CHARACTERISTICS

TURN-OFF SWITCHING (see Fig.3)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{rr}	Reverse recovery time	Tj = 25°C I_F = 0.5 A I_R = 1A Irr = 0.25A I_F = 1 A dI_F/dt = -50A/µs V_R = 30V		25	52	ns
I_{RM}	Maximum reverse recovery current	Tj = 125°C VR = 400V I_F = 8A dI_F/dt = -64 A/µs dI_F/dt = -500 A/µs		14	5.5	A
S factor	Softness factor	Tj = 125°C V_R = 400V I_F = 8A dI_F/dt = -500 A/µs		0.47		/

TURN-ON SWITCHING (see Fig.4)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{fr}	Forward recovery time	Tj = 25°C I_F = 8 A, dI_F/dt = 64 A/µs measured at, 1.1 × $V_F$max			500	ns
V_{Fp}	Peak forward voltage	Tj = 25°C I_F = 8A, dI_F/dt = 64 A/µs			10	V

APPLICATION DATA

The TURBOSWITCH "A" is especially designed to provide the lowest overall power losses in any "FREEWHEEL Mode" application (Fig.1) considering both the diode and the companion transistor, thus optimizing the overall performance in the end application.
The way of calculating the power losses is given below:

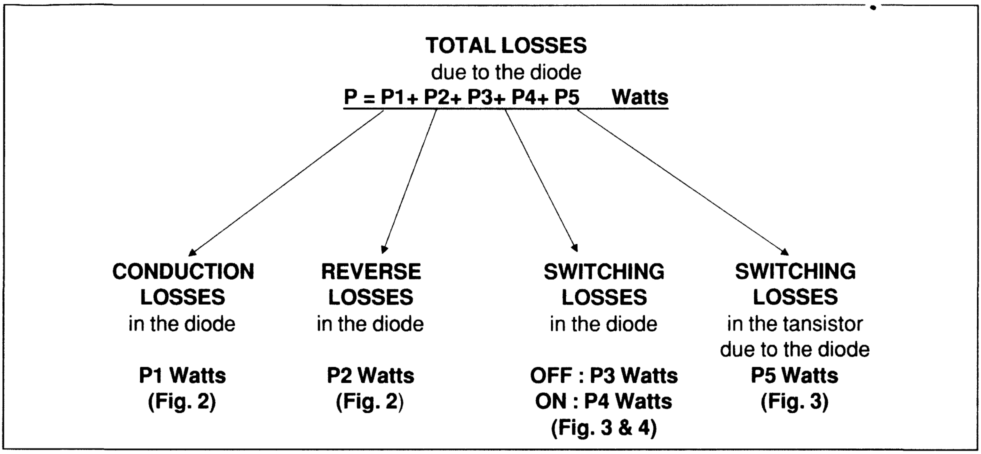
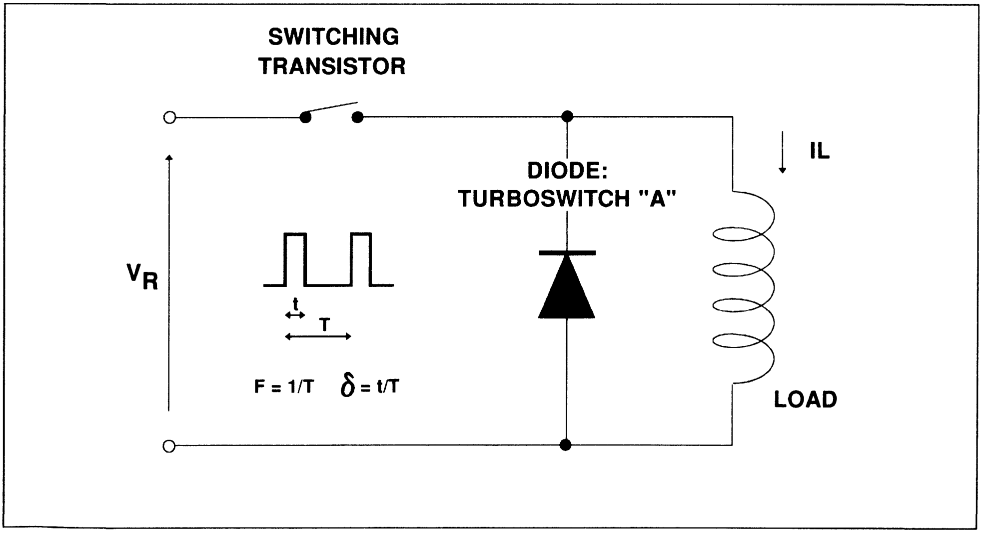
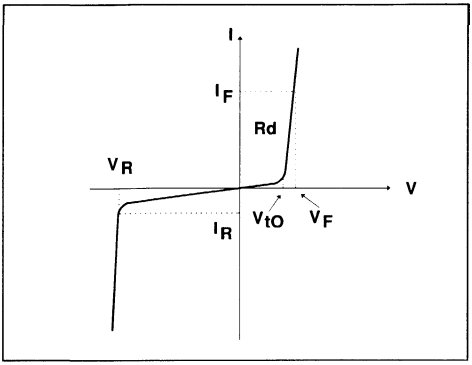


Fig. 1 : "FREEWHEEL" MODE.



APPLICATION DATA (Cont'd)

Fig. 2: STATIC CHARACTERISTICS



Conduction losses :

$P1 = V_{t0} \cdot I_{F(AV)} + R_d \cdot I_F^2{}_{(RMS)}$

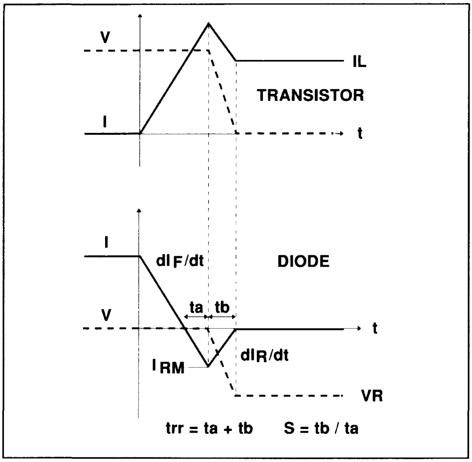
with

$V_{t0} = 1.15$ V
$R_d = 0.043$ Ohm
(Max values at 125°C)

Reverse losses :

$P2 = V_R \cdot I_R \cdot (1 - \delta)$

Fig. 3: TURN-OFF CHARACTERISTICS



Turn-on losses :
(in the transistor, due to the diode)

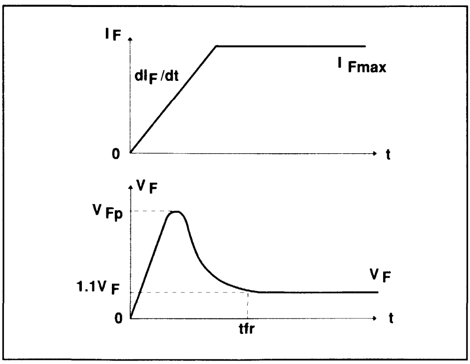
$$P5 = \frac{V_R \times I_{RM}^2 \times (3 + 2 \times S) \times F}{6 \times dI_F/dt} + \frac{V_R \times I_{RM} \times I_L \times (S + 2) \times F}{2 \times dI_F/dt}$$

Turn-off losses (in the diode) :

$$P3 = \frac{V_R \times I_{RM}^2 \times S \times F}{6 \times dI_F/dt}$$

P3 and P5 are suitable for power MOSFET and IGBT

Fig. 4: TURN-ON CHARACTERISTICS



Turn-on losses :

$P4 = 0.4\,(V_{FP} - V_F) \cdot I_{Fmax} \cdot t_{fr} \cdot F$

Fig 5 : Conduction losses versus average current

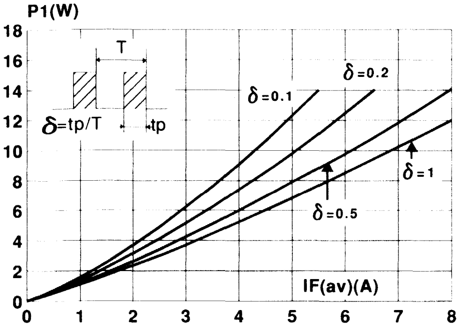


Fig 6 : Switching OFF losses versus dIF/dt

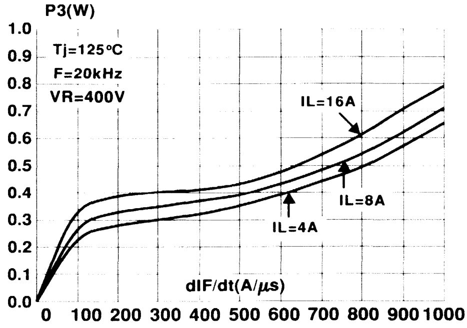


Fig 7 : Switching ON losses versus dIF/dt

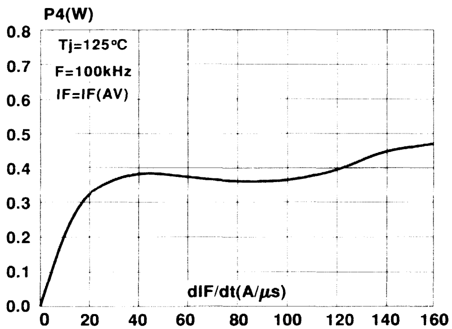


Fig 8 : Switching losses in transistor due to the diode

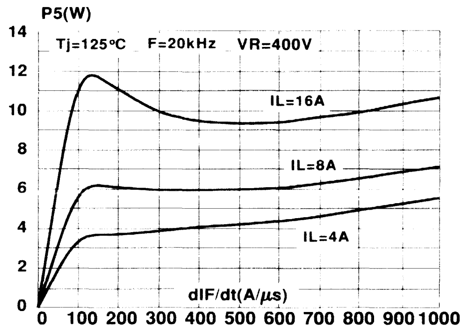


Fig 9 : Forward voltage drop versus forward current

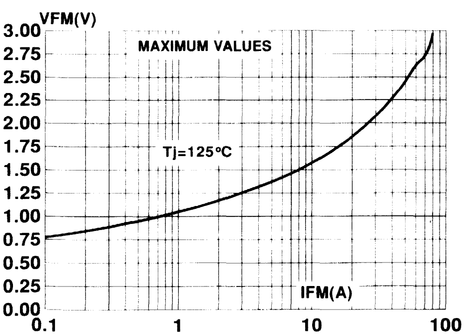


Fig 10 : Relative variation of thermal transient impedance junction to case versus pulse duration

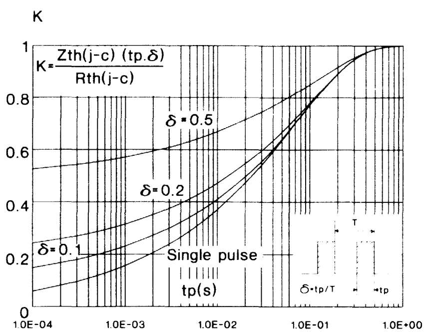


Fig 11 : Peak reverse recovery current versus dI_F/dt

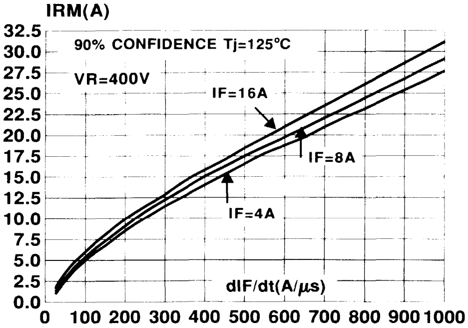


Fig 12 : Reverse recovery time versus dI_F/dt

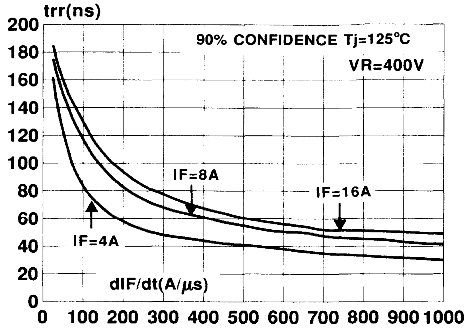


Fig 13 : Softness factor (tb/ta) versus dI_F/dt

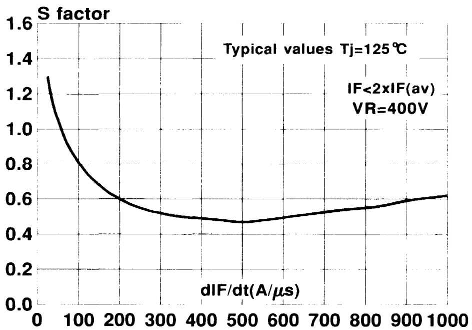


Fig 14 : Relative variation of dynamic parameters versus junction temperature (Reference Tj=125°C)

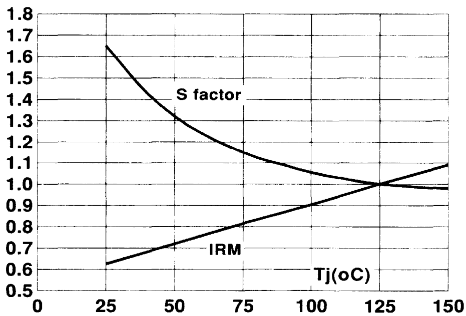


Fig 15 : Transient peak forward voltage versus dI_F/dt

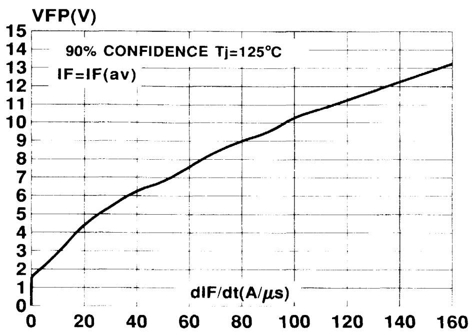
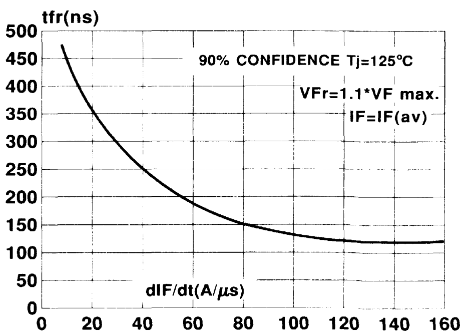


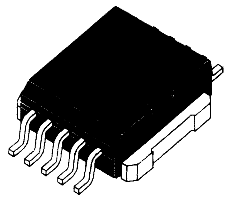
Fig 16 : Forward recovery time versus dI_F/dt



ULTRA-FAST HIGH VOLTAGE DIODE

MAIN PRODUCT CHARACTERISTICS

$I_{F(AV)}$	8A
V_{RRM}	600V
t_{rr} (typ)	25ns
V_F (max)	1.5V



Power SO-10™
Plastic, non isolated SMD
with copper tab

FEATURES AND BENEFITS

- SPECIFIC TO "FREEWHEEL MODE" OPERATIONS: Freewheel or Booster Diode.
- ULTRA-FAST AND SOFT RECOVERY.
- VERY LOW OVERALL POWER LOSSES IN BOTH THE DIODE AND THE COMPANION TRANSISTOR.
- HIGH FREQUENCY OPERATIONS.
- HIGH DISSIPATION MINIATURE PACKAGE.
- SURFACE MOUNT TECHNOLOGY COMPATIBLE.

DESCRIPTION

The TURBOSWITCH is a very high performance series of ultra-fast high voltage power diodes from 600V to 1200V.
TURBOSWITCH, A family, drastically cuts losses in both the diode and the associated switching IGBT or MOSFET in all "Freewheel Mode" operations and is particularly suitable and efficient in motor control freewheel applications and in booster diode applications in Power Factor Control circuitries.
Packaged in a very high performance surface mount package PSO-10, this 600V device is particularly intended for use on 240V domestic mains.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{RRM}	Repetitive peak reverse voltage	600	V
V_{RSM}	Non repetitive peak reverse voltage	600	V
$I_{F(RMS)}$	RMS forward current (All pins connected)	27	A
I_{FRM}	Repetitive peak forward current (tp = 5 µs, f = 5kHz)	100	A
T_j	Max operating junction temperature	- 65 to + 150	°C
T_{stg}	Storage temperature	- 65 to + 150	°C

TM : PowerSO-10 and TURBOSWITCH are trademarks of SGS-THOMSON Microelectronics.

THERMAL AND POWER DATA

Symbol	Parameter	Conditions	Value	Unit
$R_{th(j-c)}$	Junction to case thermal resistance		2.2	°C/W
P_1	Conduction power dissipation (see fig. 2)	$I_{F(AV)}$ = 8A δ = 0.5 Tc = 118°C	14.5	W
P_{max}	Total power dissipation Pmax = P1 + P3 (P3 = 10% P1)	Tc = 115°C	16	W

STATIC ELECTRICAL CHARACTERISTICS (see Fig.2)

Symbol	Parameter	Test Conditions		Min	Typ	Max	Unit
V_F *	Forward voltage drop	I_F = 8A	Tj = 25°C			1.75	V
			Tj = 125°C			1.5	
I_R **	Reverse leakage current	V_R = 0.8 x V_{RRM}	Tj = 25°C			100	µA
			Tj = 125°C			4	mA

Test pulses widths : * tp = 380 µs, duty cycle < 2%
** tp = 5 ms , duty cycle < 2%

DYNAMIC ELECTRICAL CHARACTERISTICS
TURN-OFF SWITCHING (see Fig.3)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{rr}	Reverse recovery time	Tj = 25°C I_F = 0.5 A I_R = 1A I_{rr} = 0.25A I_F = 1A dI_F/dt = -50A/µs V_R = 30V		25	52	ns
I_{RM}	Maximum reverse recovery current	Tj = 125°C V_R = 400V I_F = 8A dI_F/dt = -64 A/µs dI_F/dt = -500 A/µs		14	5.5	A
S factor	Softness factor	Tj = 125°C V_R = 400V I_F = 8A dI_F/dt = -500 A/µs		0.47		/

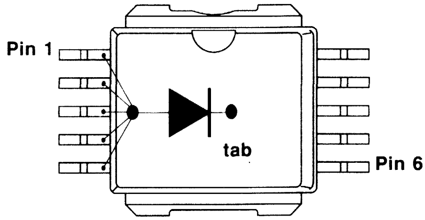
TURN-ON SWITCHING (see Fig.4)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{fr}	Forward recovery time	Tj = 25°C I_F = 8 A dI_F/dt = 64 A/µs measured at, 1.1 × V_{Fmax}			500	ns
V_{Fp}	Peak forward voltage	Tj = 25°C I_F = 8 A dI_F/dt = 64 A/µs			10	V

PIN OUT configuration in PowerSO-10 :

Anode = pin 1 to 5

Cathode = connected to base tab



top view

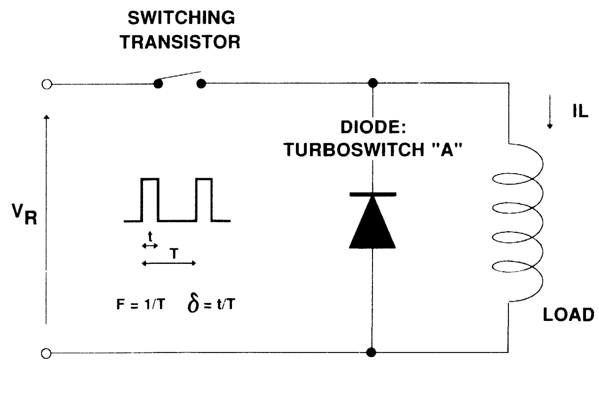
APPLICATION DATA

The TURBOSWITCH "A" is especially designed to provide the lowest overall power losses in any "FREEWHEEL Mode" application (Fig.1) considering both the diode and the companion transistor, thus optimizing the overall performance in the end application.
The way of calculating the power losses is given below:

TOTAL LOSSES
due to the diode
P = P1+ P2+ P3+ P4+ P5 Watts

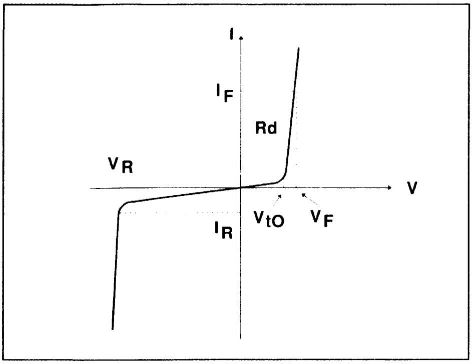
CONDUCTION LOSSES in the diode	**REVERSE LOSSES** in the diode	**SWITCHING LOSSES** in the diode	**SWITCHING LOSSES** in the tansistor due to the diode
P1 Watts (Fig. 2)	**P2 Watts (Fig. 2)**	**OFF : P3 Watts ON : P4 Watts (Fig. 3 & 4)**	**P5 Watts (Fig. 3)**

Fig. 1 : "FREEWHEEL" MODE.



APPLICATION DATA (Cont'd)

Fig. 2: STATIC CHARACTERISTICS



Conduction losses :

$P1 = V_{t0} \cdot I_{F(AV)} + R_d \cdot I_F^2{}_{(RMS)}$

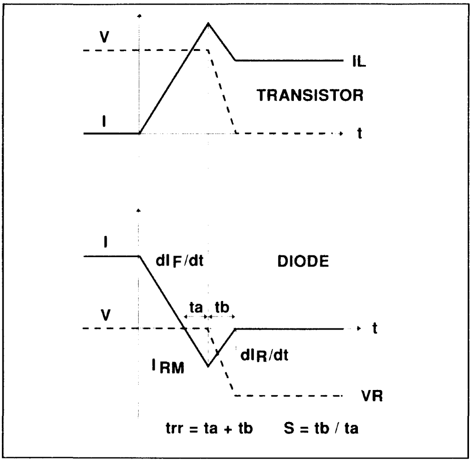
with

$V_{t0} = 1.15$ V
$R_d = 0.043$ Ohm
(Max values at 125°C)

Reverse losses :

$P2 = V_R \cdot I_R \cdot (1 - \delta)$

Fig. 3: TURN-OFF CHARACTERISTICS



Turn-on losses :
(in the transistor, due to the diode)

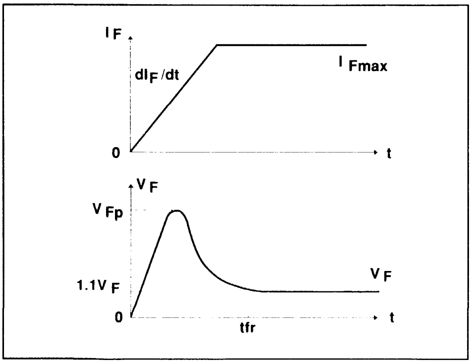
$$P5 = \frac{V_R \times I_{RM}^2 \times (3 + 2 \times S) \times F}{6 \times dI_F/dt} + \frac{V_R \times I_{RM} \times I_L \times (S + 2) \times F}{2 \times dI_F/dt}$$

Turn-off losses (in the diode) :

$$P3 = \frac{V_R \times I_{RM}^2 \times S \times F}{6 \times dI_F/dt}$$

P3 and P5 are suitable for power MOSFET and IGBT

Fig. 4: TURN-ON CHARACTERISTICS



Turn-on losses :

$P4 = 0.4\ (V_{FP} - V_F) \cdot I_{Fmax} \cdot t_{fr} \cdot F$

Fig 5 : Conduction losses versus average current

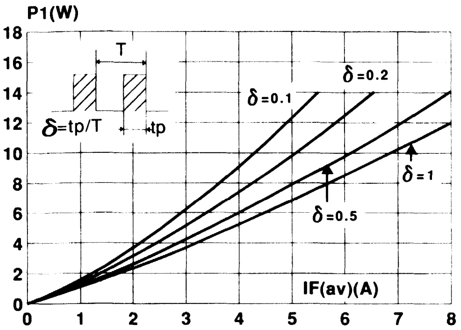


Fig 6 : Switching OFF losses versus dIF/dt

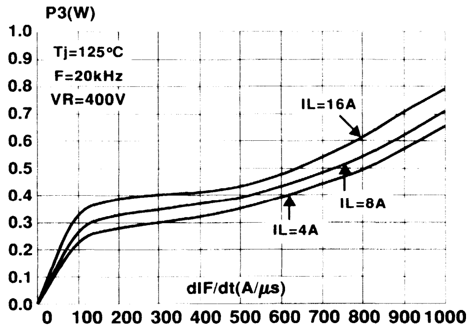


Fig 7 : Switching ON losses versus dIF/dt

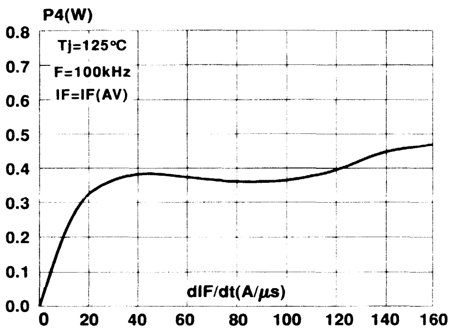


Fig 8 : Switching losses in transistor due to the diode

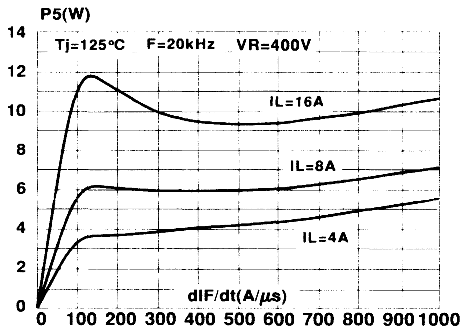


Fig 9 : Forward voltage drop versus forward current

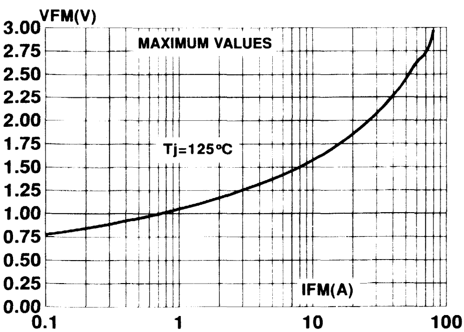


Fig 10 : Relative variation of thermal transient impedance junction to case versus pulse duration

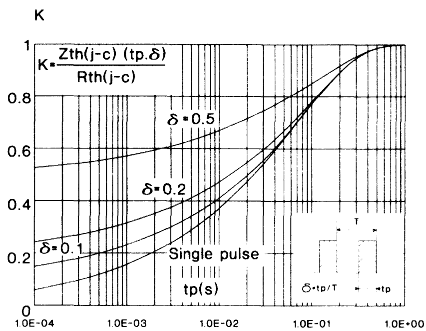


Fig 11 : Peak reverse recovery current versus dIF/dt

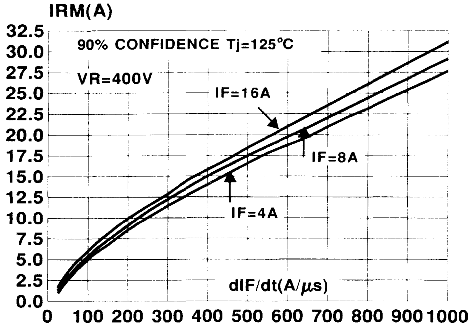


Fig 12 : Reverse recovery time versus dIF/dt

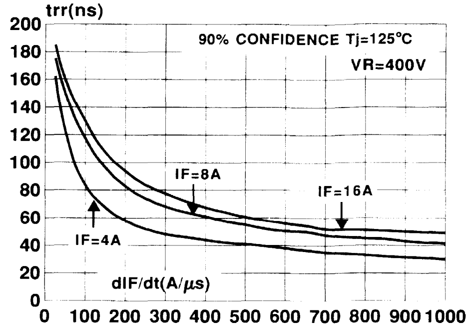


Fig 13 : Softness factor (tb/ta) versus dIF/dt

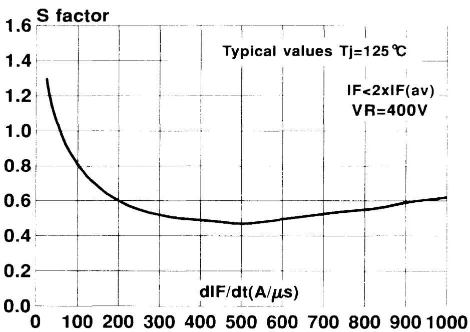


Fig 14 : Relative variation of dynamic parameters versus junction temperature (Reference Tj=125°C)

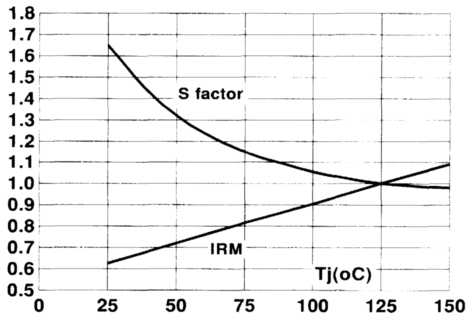


Fig 15 : Transient peak forward voltage versus dIF/dt

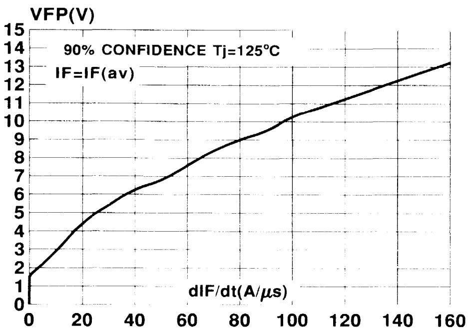
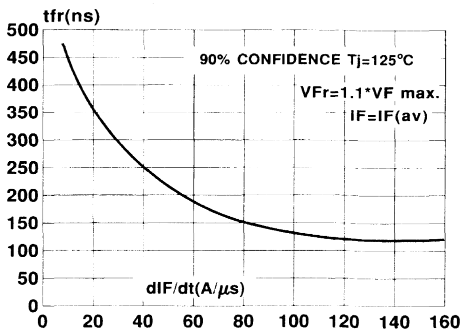


Fig 16 : Forward recovery time versus dIF/dt

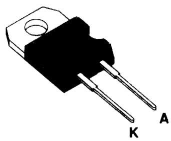


TURBOSWITCH ™ "B". ULTRA-FAST HIGH VOLTAGE DIODE

PRELIMINARY DATA

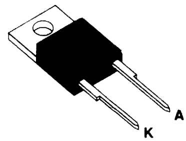
MAIN PRODUCTS CHARACTERISTICS

$I_{F(AV)}$	**8A**
V_{RRM}	**600V**
t_{rr} (typ)	**50ns**
V_F (max)	**1.3V**



TO220AC
(Plastic)

STTB806D



Isolated TO220AC
(Plastic)

STTB806DI

FEATURES AND BENEFITS

- SPECIFIC TO THE FOLLOWING OPERATIONS: Snubbing or clamping, demagnetization and rectification.
- ULTRA-FAST, SOFT AND NOISE-FREE RECOVERY.
- VERY LOW OVERALL POWER LOSSES AND PARTICULARY LOW FORWARD VOLTAGE.
- DESIGNED FOR HIGH PULSED CURRENT OPERATIONS.

DESCRIPTION

The TURBOSWITCH is a very high performance series of ultra-fast high voltage power diodes from 600V to 1200V.
TURBOSWITCH, B family, drastically cuts losses in all high voltage operations which require extremely fast, soft and noise-free power diodes.
They are particularly suitable in the primary circuit of an SMPS as snubber, clamping or demagnetizing diodes, and also in most power converters as high performance rectifier diodes.
Packaged in TO220AC and in isolated TO220AC, these 600V devices are particularly intended for use on 240V domestic mains.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{RRM}	Repetitive peak reverse voltage	600	V
V_{RSM}	Non repetitive peak reverse voltage	600	V
$I_{F(RMS)}$	RMS forward current	20	A
I_{FRM}	Repetitive peak forward current (tp = 5 µs, f = 1kHz)	280	A
T_j	Max operating junction temperature	-65 to 150	°C
T_{stg}	Storage temperature	-65 to 150	°C

TM : TURBOSWITCH is a trademark of SGS-THOMSON Microelectronics.

THERMAL AND POWER DATA

Symbol	Parameter	Conditions	Value	Unit
$R_{th(j-c)}$	Junction to case thermal resistance	STTB806D STTB806DI	2.2 3.3	°C/W
P_1	Conduction power dissipation (see fig. 5)	$I_{F(AV)}$ = 8A δ = 0.5 STTB806D Tc= 122°C STTB806DI Tc= 108°C	12.5	W
P_{max}	Total power dissipation Pmax = P1 + P3 (P3 = 10% P1)	STTB806D Tc= 115°C STTB806DI Tc= 97°C	16	W

STATIC ELECTRICAL CHARACTERISTICS (see Fig.5)

Symbol	Parameter	Test Conditions		Min	Typ	Max	Unit
V_F *	Forward voltage drop	I_F =8A	Tj = 25°C Tj = 125°C			1.4 1.3	V V
I_R **	Reverse leakage current	V_R =0.8 x V_{RRM}	Tj = 25°C Tj = 125°C			100 1.5	µA mA

Test pulses widths : * tp = 380 µs, duty cycle < 2%
** tp = 5 ms , duty cycle < 2%

DYNAMIC ELECTRICAL CHARACTERISTICS

TURN-OFF SWITCHING (see Fig.6)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{rr}	Reverse recovery time	Tj = 25°C I_F = 0.5 A I_R = 1A Irr = 0.25A I_F = 1 A dI_F/dt =-50A/µs V_R =30V		50	100	ns
I_{RM}	Maximum reverse recovery current	Tj = 125°C VR = 400V I_F =8A dI_F/dt = -64 A/µs dI_F/dt = -500 A/µs		25	12	A
S factor	Softness factor	Tj = 125°C V_R = 400V I_F =8A dI_F/dt = -500 A/µs		0.8		/

TURN-ON SWITCHING (see Fig.7)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{fr}	Forward recovery time	Tj = 25°C I_F =8 A, dI_F/dt = 64 A/µs measured at, 1.1 × V_{Fmax}			500	ns
V_{Fp}	Peak forward voltage	Tj = 25°C I_F =8A, dI_F/dt = 64 A/µs I_F =40A, dI_F/dt = 500 A/µs		10	8	V

APPLICATION DATA

The TURBOSWITCH "B" is especially designed to provide the lowest overall power losses in any application such as snubbing,clamping, demagnetization and rectification. In such applications (fig.1 to fig.4), the way of calculating the power losses is given below :

TOTAL LOSSES
due to the diode
P = P1+ P2+ P3+ P4 Watts

CONDUCTION LOSSES	REVERSE LOSSES	SWITCHING LOSSES
P1 Watts (Fig. 5)	P2 Watts (Fig. 5)	OFF : P3 Watts ON : P4 Watts (Fig. 6 & 7)

Fig. 1 : SNUBBER DIODE.

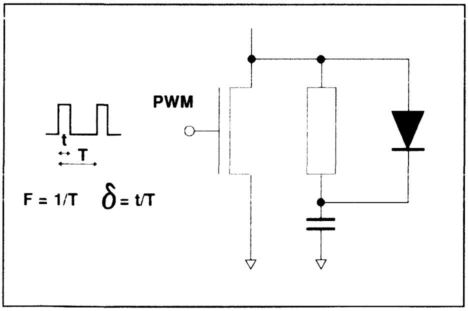


Fig. 2 : CLAMPING DIODE.

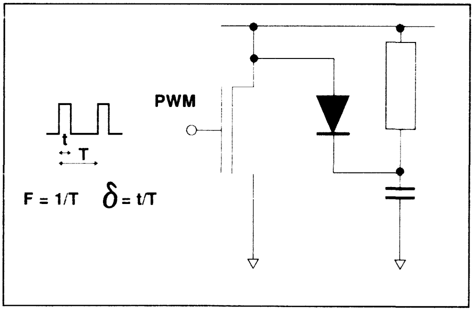


Fig. 3 : DEMAGNETIZING DIODE.

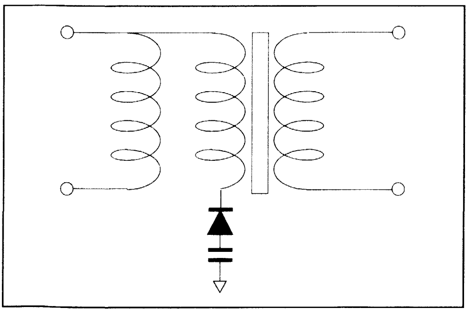
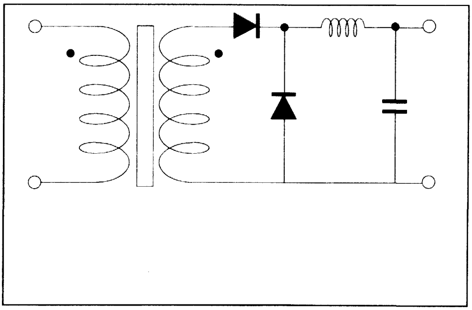
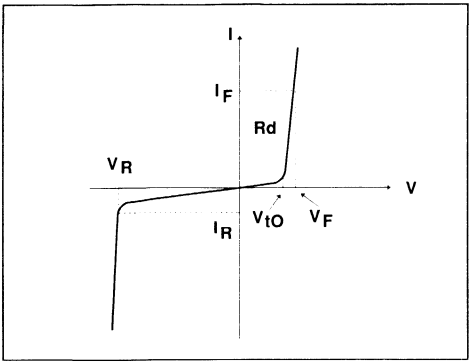


Fig. 4 : RECTIFIER DIODE.



APPLICATION DATA (Cont'd)

Fig. 5: STATIC CHARACTERISTICS



Conduction losses :

$P1 = V_{t0} \cdot I_{F(AV)} + R_d \cdot I_F^2{}_{(RMS)}$

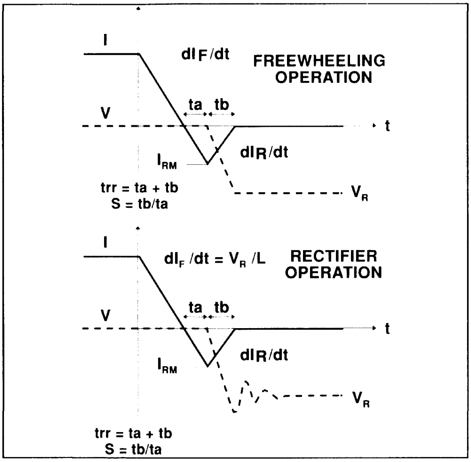
with

$V_{t0} = 1.00$ V
$R_d = 0.037$ Ohm
(Max values at 125°C)

Reverse losses :

$P2 = V_R \cdot I_R \cdot (1 - \delta)$

Fig. 6: TURN-OFF CHARACTERISTICS



Turn-off losses :

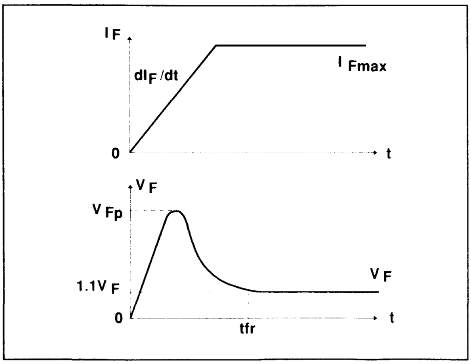
$$P3 = \frac{V_R \times I_{RM}^2 \times S \times F}{6 \times dI_F/dt}$$

Turn-off losses :
(with non negligible serial inductance)

$$P3' = \frac{V_R \times I_{RM}^2 \times S \times F}{6 \times dI_F/dt} + \frac{L \times I_{RM}^2 \times F}{2}$$

P3 and P3' are suitable for power MOSFET and IGBT

Fig. 7: TURN-ON CHARACTERISTICS



Turn-on losses :

$P4 = 0.4\,(V_{FP} - V_F) \cdot I_{Fmax} \cdot t_{fr} \cdot F$

Fig 8 : Conduction losses versus average current

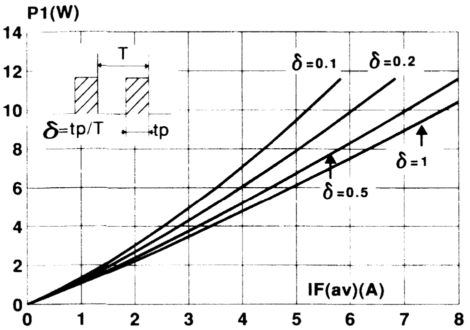


Fig 9 : Switching OFF losses versus dIF/dt

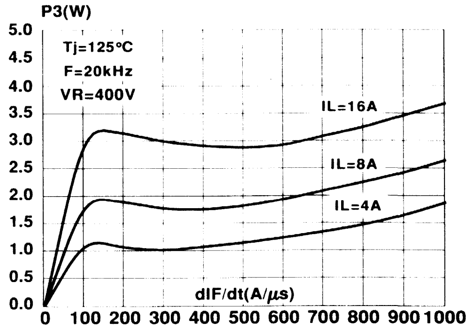


Fig 10 : Switching ON losses versus dIF/dt

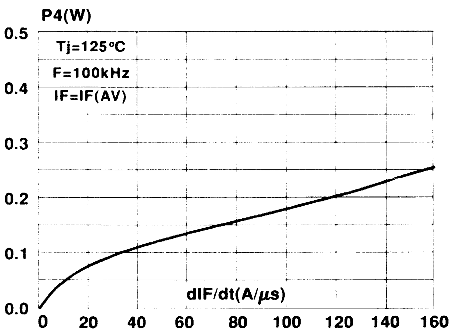


Fig 11 : Forward voltage drop versus forward current

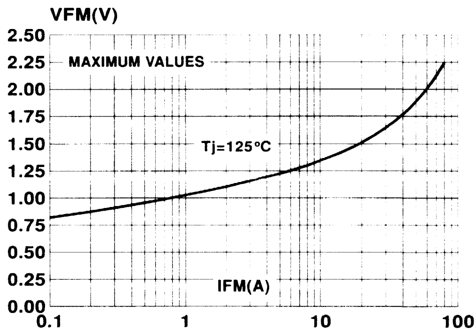


Fig 12 : Relative variation of thermal transient impedance junction to case versus pulse duration

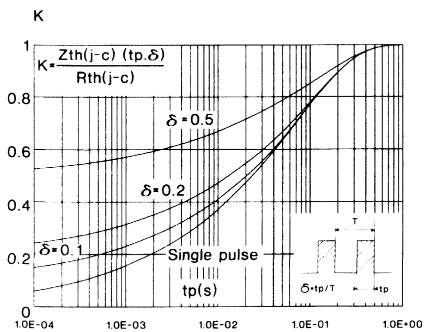


Fig 13 : Peak reverse recovery current versus dIF/dt

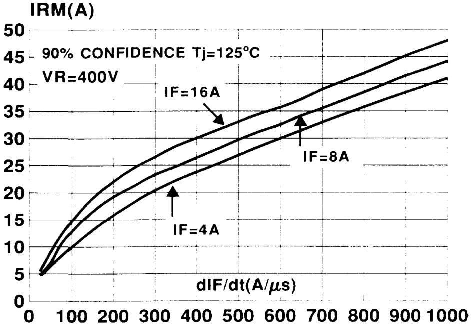


Fig 14 : Reverse recovery time versus dIF/dt

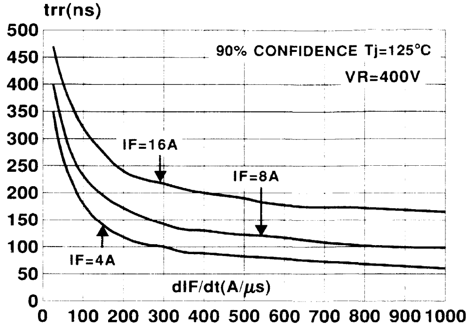


Fig 15 : Softness factor (tb/ta) versus dIF/dt

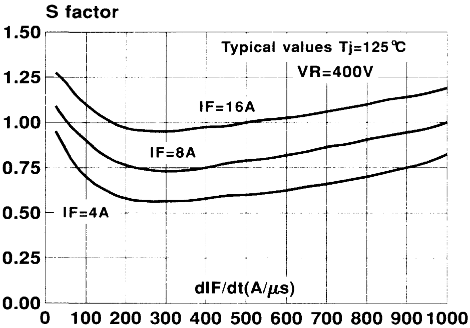


Fig 16 : Relative variation of dynamic parameters versus junction temperature (Reference Tj=125°C)

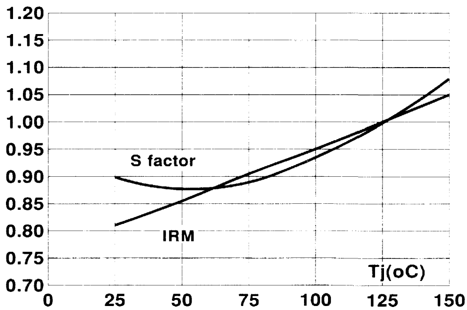


Fig 17 : Transient peak forward voltage versus dIF/dt

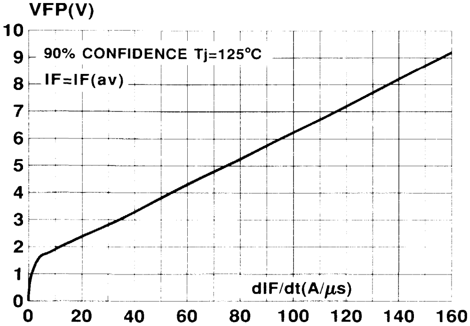
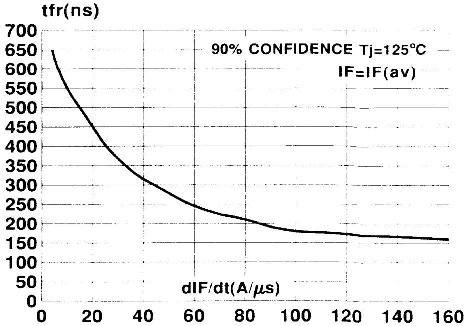


Fig 18 : Forward recovery time versus dIF/dt

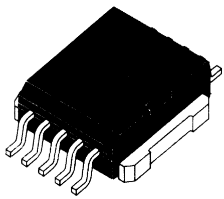


STTB806M

ULTRA-FAST HIGH VOLTAGE DIODE

MAIN PRODUCT CHARACTERISTICS

$I_{F(AV)}$	8A
V_{RRM}	600V
t_{rr} (typ)	50ns
V_F (max)	1.3V



Power SO-10™
Plastic, non isolated SMD
with copper tab

FEATURES AND BENEFITS

- SPECIFIC TO THE FOLLOWING OPERATIONS: Snubbing or clamping, demagnetization and rectification.
- ULTRA-FAST,VERY SOFT AND NOISE-FREE RECOVERY.
- VERY LOW OVERALL POWER LOSSES AND PARTICULARY LOW FORWARD VOLTAGE.
- DESIGNED FOR HIGH PULSED CURRENT OPERATIONS.
- HIGH FREQUENCY OPERATIONS
- HIGH DISSIPATION MINIATURE PACKAGE
- SURFACE MOUNT TECHNOLOGY COMPATIBLE

DESCRIPTION

The TURBOSWITCH is a very high performance series of ultra-fast high voltage power diodes from 600V to 1200V.
TURBOSWITCH, B family, drastically cuts losses in all high voltage operations which require extremely fast, soft and noise-free power diodes.
They are particularly suitable in the primary circuit of an SMPS as snubber, clamping or demagnetizing diodes, and also in most power converters as high performance rectifier diodes.
Packaged in PSO-10, this 600V devices are particularly intended for use on 240V domestic mains.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{RRM}	Repetitive peak reverse voltage	600	V
V_{RSM}	Non repetitive peak reverse voltage	600	V
$I_{F(RMS)}$	RMS forward current (All pins connected)	27	A
I_{FRM}	Repetitive peak forward current (tp = 5 µs, f = 1kHz)	230	A
T_j	Max operating junction temperature	- 65 to + 150	°C
T_{stg}	Storage temperature	- 65 to + 150	°C

TM : PowerSO-10 and TURBOSWITCH are trademarks of SGS-THOMSON Microelectronics.

THERMAL AND POWER DATA

Symbol	Parameter	Conditions	Value	Unit
$R_{th(j-c)}$	Junction to case thermal resistance		2.2	°C/W
P_1	Conduction power dissipation (see fig. 5)	$I_{F(AV)}$ = 8A δ = 0.5 Tc = 122°C	12.5	W
P_{max}	Total power dissipation Pmax = P1+ P3 (P3 = 10% P1)	Tc = 115°C	16	W

STATIC ELECTRICAL CHARACTERISTICS (see Fig.5)

Symbol	Parameter	Test Conditions		Min	Typ	Max	Unit
V_F *	Forward voltage drop	I_F = 8A	Tj = 25°C			1.4	V
			Tj = 125°C			1.3	
I_R **	Reverse leakage current	V_R = 0.8 x V_{RRM}	Tj = 25°C			100	µA
			Tj = 125°C			1.5	mA

Test pulses widths : * tp = 380 µs, duty cycle < 2%
** tp = 5 ms , duty cycle < 2%

DYNAMIC ELECTRICAL CHARACTERISTICS
TURN-OFF SWITCHING (see Fig.6)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{rr}	Reverse recovery time	Tj = 25°C I_F = 0.5 A I_R = 1A I_{rr} = 0.25A I_F = 1 A dI_F/dt = -50A/µs V_R = 30V		50	100	ns
I_{RM}	Maximum reverse recovery current	Tj = 125°C V_R = 400V I_F = 8A dI_F/dt = -64 A/µs dI_F/dt = -500 A/µs		25	12	A
S factor	Softness factor	Tj = 125°C V_R = 400V I_F = 8A dI_F/dt = -500 A/µs		0.8		/

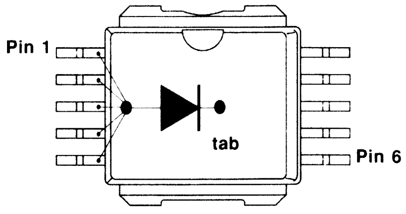
TURN-ON SWITCHING (see Fig.7)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{fr}	Forward recovery time	Tj = 25°C I_F = 8A, dI_F/dt = 64 A/µs measured at, 1.1 × V_{Fmax}			500	ns
V_{Fp}	Peak forward voltage	Tj = 25°C I_F = 8A, dI_F/dt = 64 A/µs			8	V

PIN OUT configuration in PowerSO-10 :

Anode = pin 1 to 5

Cathode = connected to base tab



APPLICATION DATA

The TURBOSWITCH “B” is especially designed to provide the lowest overall power losses in any application such as snubbing,clamping, demagnetization and rectification. In such applications (fig.1 to fig.4), the way of calculating the power losses is given below :

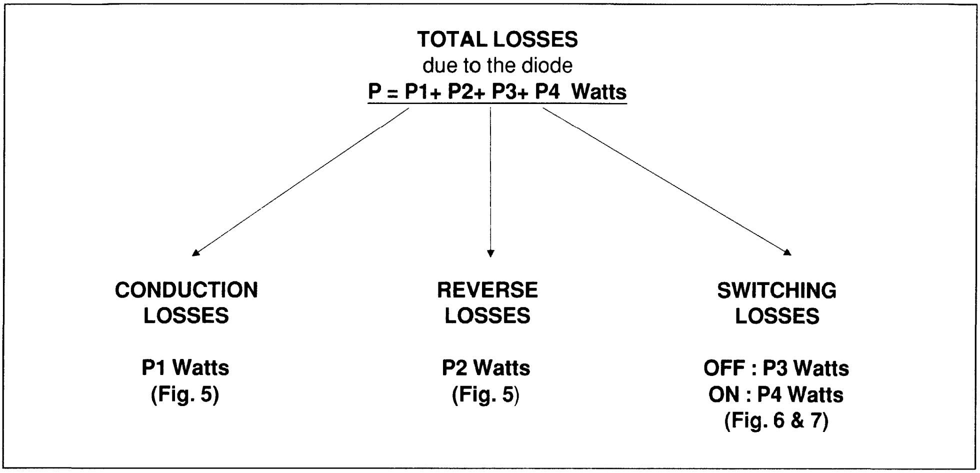


Fig. 1 : SNUBBER DIODE.

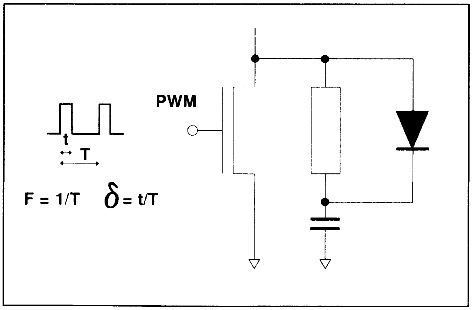


Fig. 2 : CLAMPING DIODE.

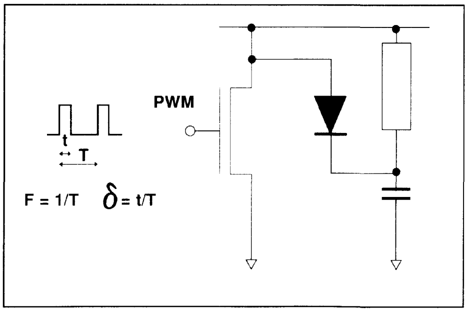


Fig. 3 : DEMAGNETIZING DIODE.

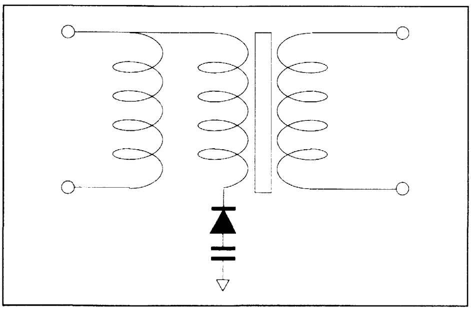
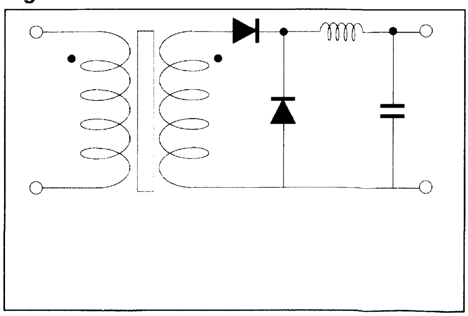
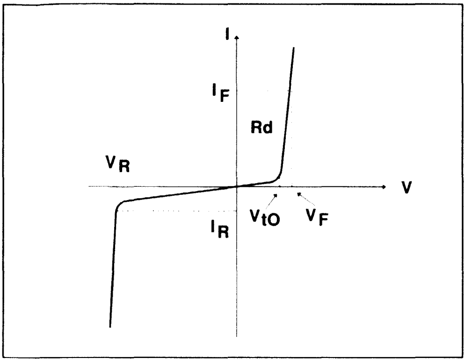


Fig. 4 : RECTIFIER DIODE.



APPLICATION DATA (Cont'd)

Fig. 5: STATIC CHARACTERISTICS



Conduction losses :

$P1 = V_{t0} \cdot I_{F(AV)} + R_d \cdot I_F^2(RMS)$

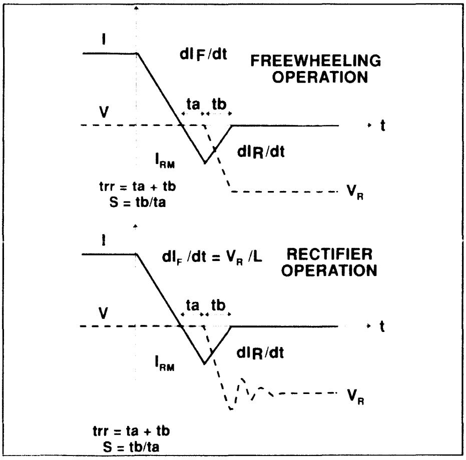
with

$V_{t0} = 1.00$ V
$R_d = 0.037$ Ohm
(Max values at 125°C)

Reverse losses :

$P2 = V_R \cdot I_R \cdot (1 - \delta)$

Fig. 6: TURN-OFF CHARACTERISTICS



Turn-off losses :

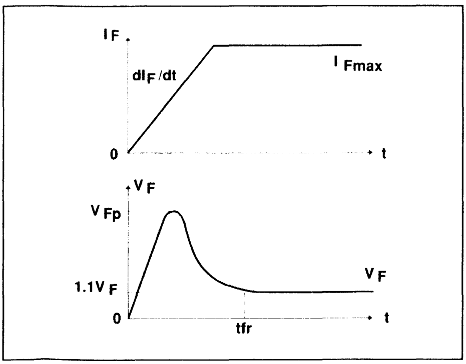
$$P3 = \frac{V_R \times I_{RM}^2 \times S \times F}{6 \times dI_F/dt}$$

Turn-off losses :
(with non negligible serial inductance)

$$P3' = \frac{V_R \times I_{RM}^2 \times S \times F}{6 \times dI_F/dt} + \frac{L \times I_{RM}^2 \times F}{2}$$

P3 and P3' are suitable for power MOSFET and IGBT

Fig. 7: TURN-ON CHARACTERISTICS



Turn-on losses :

$P4 = 0.4 (V_{FP} - V_F) \cdot I_{Fmax} \cdot t_{fr} \cdot F$

Fig 8 : Conduction losses versus average current

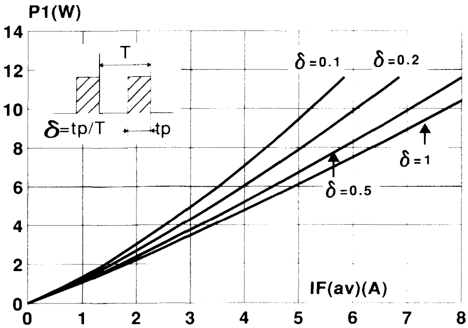


Fig 9 : Switching OFF losses versus dIF/dt

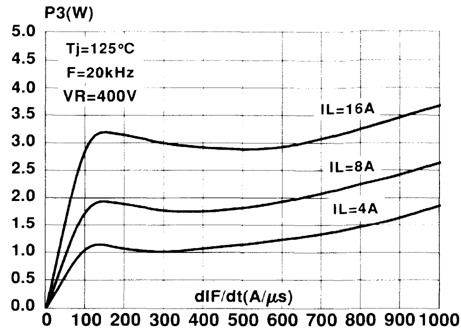


Fig 10 : Switching ON losses versus dIF/dt

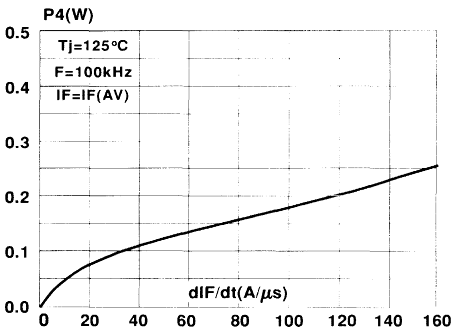


Fig 11 : Forward voltage drop versus forward current

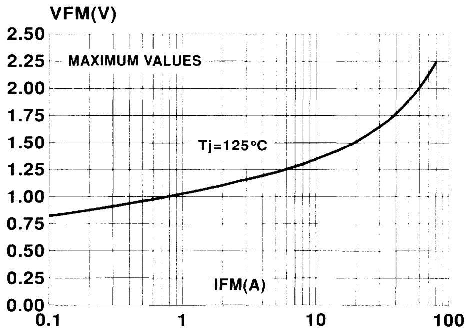


Fig 12 : Relative variation of thermal transient impedance junction to case versus pulse duration

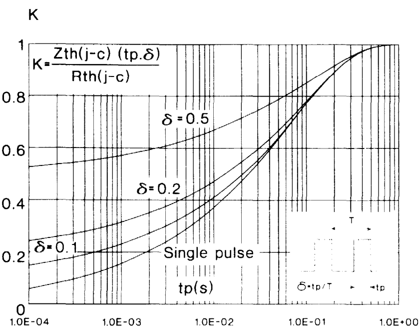


Fig 13 : Peak reverse recovery current versus dIF/dt

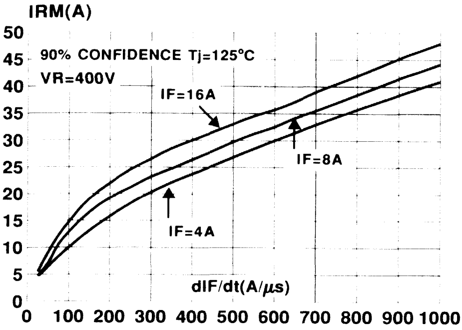


Fig 14 : Reverse recovery time versus dIF/dt

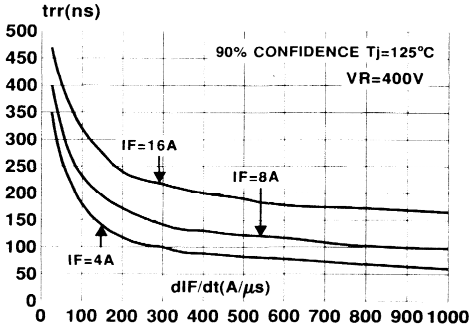


Fig 15 : Softness factor (tb/ta) versus dIF/dt

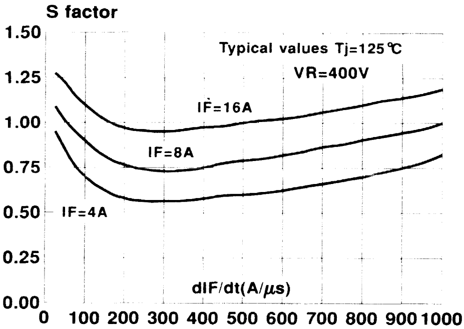


Fig 16 : Relative variation of dynamic parameters versus junction temperature (Reference Tj=125°C)

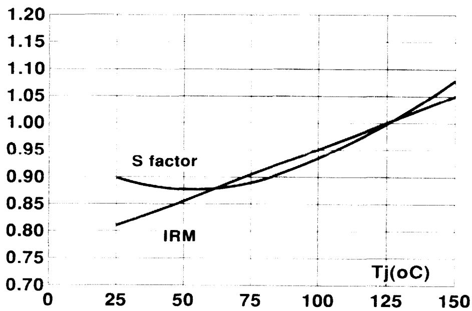


Fig 17 : Transient peak forward voltage versus dIF/dt

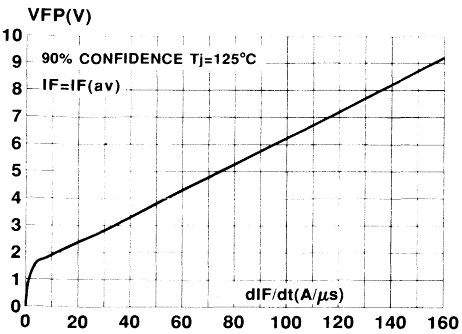
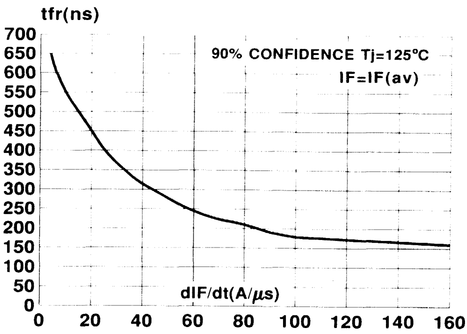


Fig 18 : Forward recovery time versus dIF/dt



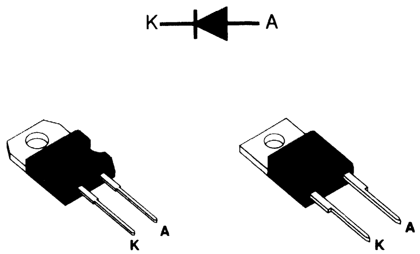
SGS-THOMSON MICROELECTRONICS

STTA812D(I)

TURBOSWITCH ™ "A". ULTRA-FAST HIGH VOLTAGE DIODE

MAIN PRODUCTS CHARACTERISTICS

$I_{F(AV)}$	8A
V_{RRM}	1200V
t_{rr} (typ)	50ns
V_F (max)	2.0V



TO220AC (Plastic)

STTA812D

Isolated TO220AC (Plastic)

STTA812DI

FEATURES AND BENEFITS

- ULTRA-FAST, SOFT AND NOISE-FREE RECOVERY.
- VERY LOW OVERALL POWER LOSSES IN BOTH THE DIODE AND THE COMPANION TRANSISTOR.
- HIGH FREQUENCY AND/OR HIGH PULSED CURRENT OPERATIONS.

DESCRIPTION

The TURBOSWITCH is a very high performance series of ultra-fast high voltage power diodes from 600V to 1200V.
TURBOSWITCH 1200V drastically cuts losses in all high voltage operations which require extremely fast, soft and noise-free power diodes. Due to their optimized switching performances they also highly decrease power losses in any associated switching IGBT or MOSFET in all "Freewheel Mode" operations.
They are particularly suitable in Motor Control circuitries, or in the primary of SMPS as snubber, clamping or demagnetizing diodes, and also at the secondary of SMPS as high voltage rectifier diodes.
Packaged in TO220AC and in isolated TO220AC, these 1200V devices are particularly intended for use on 3 phase 400V industrial mains.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{RRM}	Repetitive peak reverse voltage	1200	V
V_{RSM}	Non repetitive peak reverse voltage	1200	V
$I_{F(RMS)}$	RMS forward current	20	A
I_{FRM}	Repetitive peak forward current (tp = 5 µs, f = 5kHz)	120	A
T_j	Max operating junction temperature	150	°C
T_{stg}	Storage temperature	-65 to 150	°C

TM : TURBOSWITCH is a trademark of SGS-THOMSON Microelectronics.

THERMAL AND POWER DATA

Symbol	Parameter	Conditions	Value	Unit
$R_{th(j-c)}$	Junction to case thermal resistance	STTA812D STTA812DI	2.3 3.3	°C/W
P_1	Conduction power dissipation (see fig. 6)	$I_{F(AV)}$ = 8A δ = 0.5 STTA812D Tc= 105°C STTA812DI Tc= 85°C	19.5	W
P_{max}	Total power dissipation Pmax = P1 + P3 (P3 = 10% P1)	STTA812D Tc= 100°C STTA812DI Tc= 79°C	21.5	W

STATIC ELECTRICAL CHARACTERISTICS (see Fig.6)

Symbol	Parameter	Test Conditions		Min	Typ	Max	Unit
V_F *	Forward voltage drop	I_F =8A	Tj = 25°C Tj = 125°C			2.2 2.0	V V
I_R **	Reverse leakage current	V_R =0.8 x V_{RRM}	Tj = 25°C Tj = 125°C			100 4	µA mA

Test pulses widths : * tp = 380 µs, duty cycle < 2%
** tp = 5 ms , duty cycle < 2%

DYNAMIC ELECTRICAL CHARACTERISTICS

TURN-OFF SWITCHING (see Fig.7)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{rr}	Reverse recovery time	Tj = 25°C I_F = 0.5 A I_R = 1A Irr = 0.25A I_F = 1 A dI_F/dt =-50A/µs V_R =30V		50	100	ns
I_{RM}	Maximum reverse recovery current	Tj = 125°C VR = 600V I_F =8A dI_F/dt = -64 A/µs dI_F/dt = -500 A/µs		25	12	A
S factor	Softness factor	Tj = 125°C V_R = 600V I_F =8A dI_F/dt = -500 A/µs		1.2		/

TURN-ON SWITCHING (see Fig.8)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{fr}	Forward recovery time	Tj = 25°C I_F =8 A, dI_F/dt = 64 A/µs measured at, 1.1 × $V_F$max			900	ns
V_{Fp}	Peak forward voltage	Tj = 25°C I_F =8A, dI_F/dt = 64 A/µs I_F =40A, dI_F/dt = 500 A/µs			35 45	V

APPLICATION DATA

The 1200V TURBOSWITCH series has been designed to provide the lowest overall power losses in all high frequency or high pulsed current operations. In such applications (Fig 1 to 5),the way of calculating the power losses is given below

TOTAL LOSSES
due to the diode
P = P1+ P2+ P3+ P4+ P5 Watts

CONDUCTION LOSSES	REVERSE LOSSES	SWITCHING LOSSES	SWITCHING LOSSES
in the diode	in the diode	in the diode	in the tansistor due to the diode
P1 Watts (Fig. 6)	**P2 Watts (Fig. 6)**	**OFF : P3 Watts ON : P4 Watts (Fig. 7 & 8)**	**P5 Watts (Fig. 7)**

Fig. 1 : "FREEWHEEL" MODE.

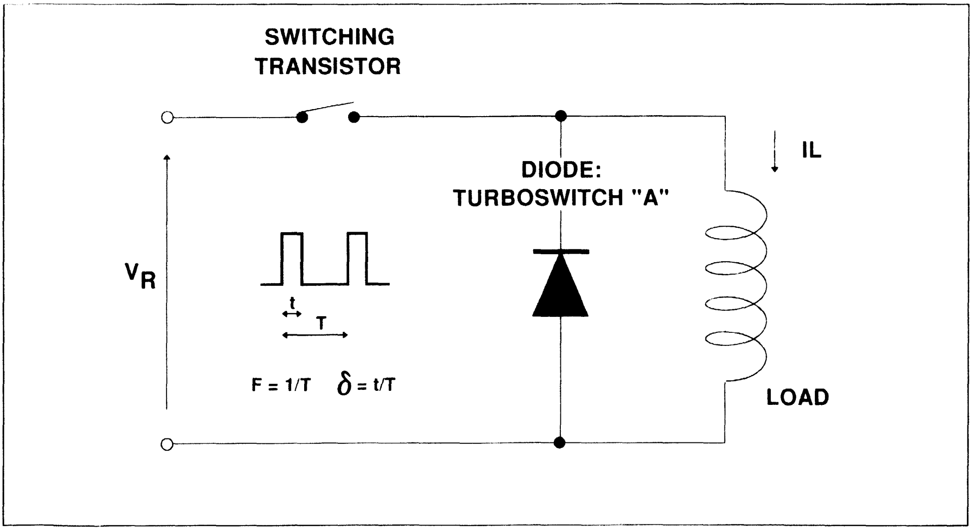


Fig. 2 : SNUBBER DIODE.

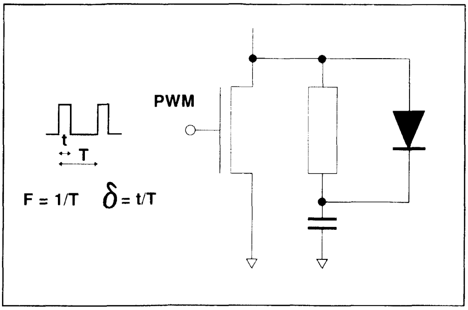


Fig. 3 : CLAMPING DIODE.

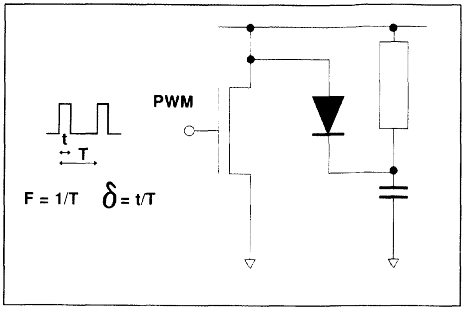


Fig. 4 : DEMAGNETIZING DIODE.

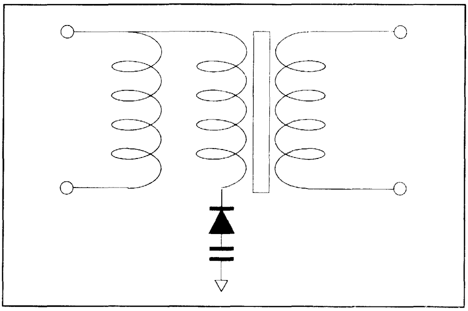
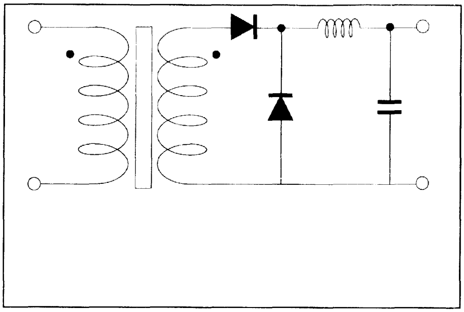
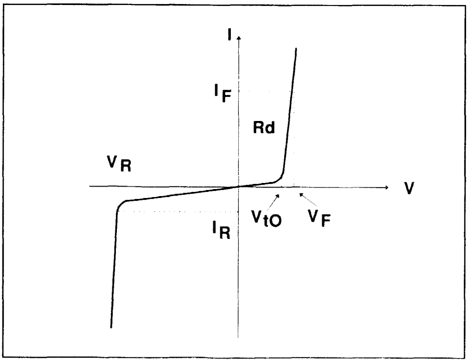


Fig. 5 : RECTIFIER DIODE.



STATIC & DYNAMIC CHARACTERISTICS . POWER LOSSES .

Fig. 6: STATIC CHARACTERISTICS



Conduction losses :

$P1 = V_{t0} \cdot I_{F(AV)} + R_d \cdot I_F^2(RMS)$

with

$V_{t0} = 1.57$ V

$R_d = 0.054$ Ohm

(Max values at 125°C,suitable for Ipeak < $3.I_{F(av)}$)

Reverse losses :

$P2 = V_R \cdot I_R \cdot (1 - \delta)$

APPLICATION DATA (Cont'd)

Fig. 7: TURN-OFF CHARACTERISTICS

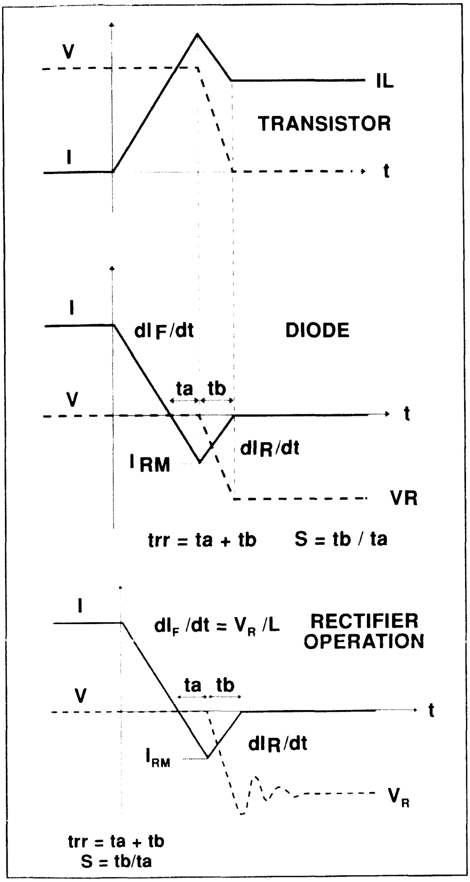
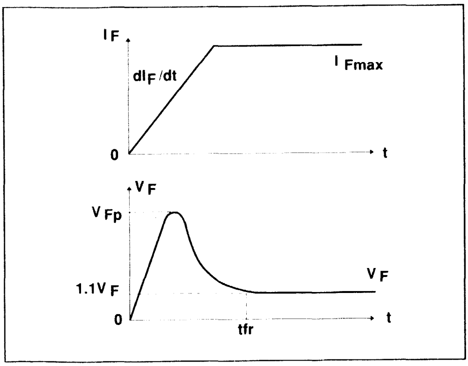


Fig. 8: TURN-ON CHARACTERISTICS



Turn-on losses :
(in the transistor, due to the diode)

$$P5 = \frac{V_R \times I_{RM}^2 \times (3 + 2 \times S) \times F}{6 \ x \ dI_F/dt} + \frac{V_R \times I_{RM} \times I_L \times (S + 2) \times F}{2 \ x \ dI_F/dt}$$

Turn-off losses (in the diode) :

$$P3 = \frac{V_R \times I_{RM}^2 \times S \times F}{6 \ x \ dI_F/dt}$$

Turn-off losses :
(with non negligible serial inductance)

$$P3' = \frac{V_R \times I_{RM}^2 \times S \times F}{6 \ x \ dI_F/dt} + \frac{L \times I_{RM}^2 \times F}{2}$$

P3,P3' and P5 are suitable for power MOSFET and IGBT

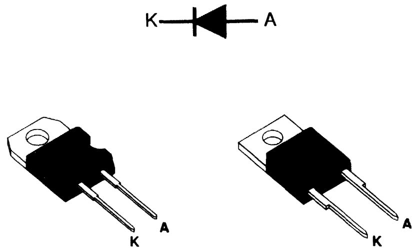
Turn-on losses :

$P4 = 0.4 \ (V_{FP} - V_F) \ . \ I_{Fmax} \ . \ t_{fr} \ . \ F$

TURBOSWITCH ™ "A". ULTRA-FAST HIGH VOLTAGE DIODE

MAIN PRODUCTS CHARACTERISTICS

$I_{F(AV)}$	12A
V_{RRM}	600V
t_{rr} (typ)	28ns
V_F (max)	1.5V



TO220AC (Plastic) STTA1206D

Isolated TO220AC (Plastic) STTA1206DI

FEATURES AND BENEFITS

- SPECIFIC TO "FREEWHEEL MODE" OPERATIONS: Freewheel or Booster Diode.
- ULTRA-FAST RECOVERY.
- VERY LOW OVERALL POWER LOSSES IN BOTH THE DIODE AND THE COMPANION TRANSISTOR.
- HIGH FREQUENCY OPERATIONS.

DESCRIPTION

The TURBOSWITCH is a very high performance series of ultra-fast high voltage power diodes from 600V to 1200V.
TURBOSWITCH, A family, drastically cuts losses in both the diode and the associated switching IGBT or MOSFET in all "Freewheel Mode" operations and is particularly suitable and efficient in Motor Control Freewheel applications and in Booster diode applications in Power Factor Control circuitries.
Packaged in TO220AC and in isolated TO220AC, these 600V devices are particularly intended for use on 240V domestic mains.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		600	V
V_{RSM}	Non repetitive peak reverse voltage		600	V
$I_{F(RMS)}$	RMS forward current	STTA1206D STTA1206DI	30 20	A
I_{FRM}	Repetitive peak forward current (tp = 5 µs, f = 5kHz)	STTA1206D STTA1206DI	140 120	A
T_j	Max operating junction temperature		-65 to 150	°C
T_{stg}	Storage temperature		-65 to 150	°C

TM : TURBOSWITCH is a trademark of SGS-THOMSON Microelectronics.

THERMAL AND POWER DATA

Symbol	Parameter	Conditions	Value	Unit
$R_{th(j-c)}$	Junction to case thermal resistance	STTA1206D STTA1206DI	1.9 3.0	°C/W
P_1	Conduction power dissipation (see fig. 2)	$I_{F(AV)}$ = 12A δ =0.5 STTA1206D Tc= 108°C STTA1206DI Tc= 84°C	22	W
P_{max}	Total power dissipation Pmax = P1 + P3 (P3 = 10% P1)	STTA1206D Tc= 104°C STTA1206DI Tc= 78°C	24	W

STATIC ELECTRICAL CHARACTERISTICS (see Fig.2)

Symbol	Parameter	Test Conditions		Min	Typ	Max	Unit
V_F *	Forward voltage drop	I_F =12A	Tj = 25°C Tj = 125°C			1.75 1.5	V V
I_R **	Reverse leakage current	V_R =0.8 x V_{RRM}	Tj = 25°C Tj = 125°C			100 5	µA mA

Test pulses widths : * tp = 380 µs, duty cycle < 2%
** tp = 5 ms , duty cycle < 2%

DYNAMIC ELECTRICAL CHARACTERISTICS

TURN-OFF SWITCHING (see Fig.3)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{rr}	Reverse recovery time	Tj = 25°C I_F = 0.5 A I_R = 1A Irr = 0.25A I_F = 1 A dI_F/dt =-50A/µs V_R =30V		28	55	ns
I_{RM}	Maximum reverse recovery current	Tj = 125°C VR = 400V I_F =12A dI_F/dt = -96 A/µs dI_F/dt = -500 A/µs		16	7.5	A
S factor	Softness factor	Tj = 125°C V_R = 400V I_F =12A dI_F/dt = -500 A/µs		0.45		/

TURN-ON SWITCHING (see Fig.4)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{fr}	Forward recovery time	Tj = 25°C I_F =12 A, dI_F/dt = 96 A/µs measured at, 1.1 × $V_F$max			500	ns
V_{Fp}	Peak forward voltage	Tj = 25°C I_F =12A, dI_F/dt = 96 A/µs			10	V

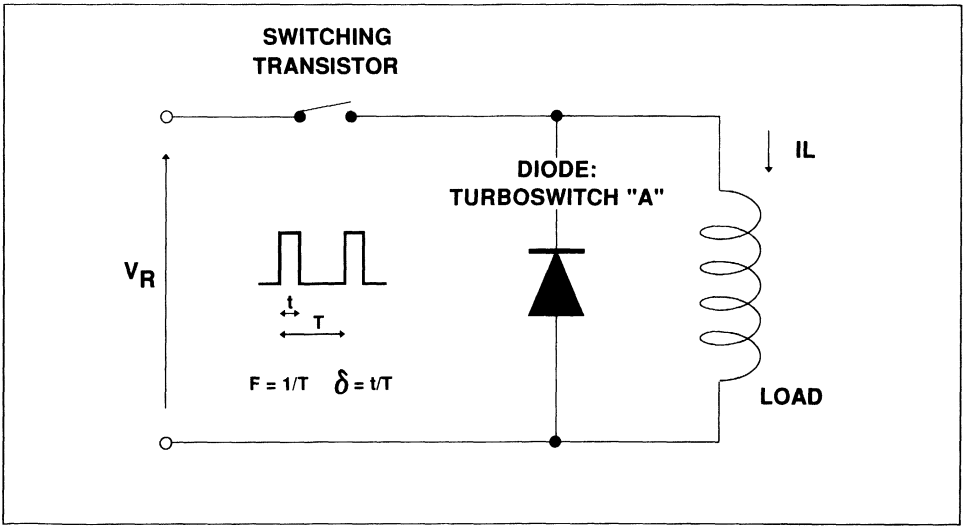
APPLICATION DATA

The TURBOSWITCH "A" is especially designed to provide the lowest overall power losses in any "FREEWHEEL Mode" application (Fig.1) considering both the diode and the companion transistor, thus optimizing the overall performance in the end application.
The way of calculating the power losses is given below:

TOTAL LOSSES
due to the diode
P = P1+ P2+ P3+ P4+ P5 Watts

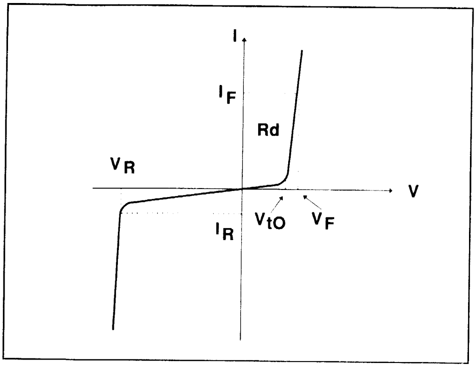
CONDUCTION LOSSES in the diode	REVERSE LOSSES in the diode	SWITCHING LOSSES in the diode	SWITCHING LOSSES in the tansistor due to the diode
P1 Watts (Fig. 2)	**P2 Watts (Fig. 2)**	**OFF : P3 Watts ON : P4 Watts (Fig. 3 & 4)**	**P5 Watts (Fig. 3)**

Fig. 1 : "FREEWHEEL" MODE.



APPLICATION DATA (Cont'd)

Fig. 2: STATIC CHARACTERISTICS



Conduction losses :

P1 = $V_{t0} . I_{F(AV)} + R_d . I_F{}^2{}_{(RMS)}$

with

V_{t0} = 1.15 V

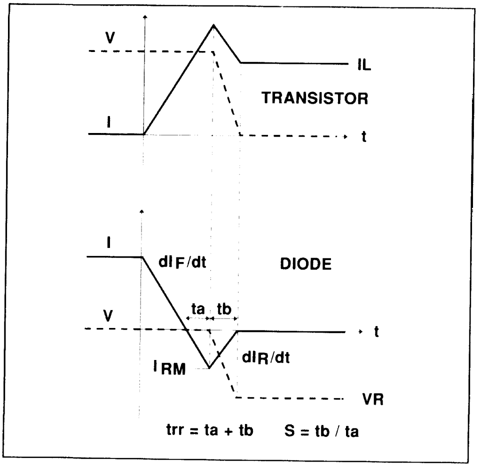
R_d = 0.029 Ohm

(Max values at 125°C)

Reverse losses :

P2 = $V_R . I_R . (1 - \delta)$

Fig. 3: TURN-OFF CHARACTERISTICS



Turn-on losses :
(in the transistor, due to the diode)

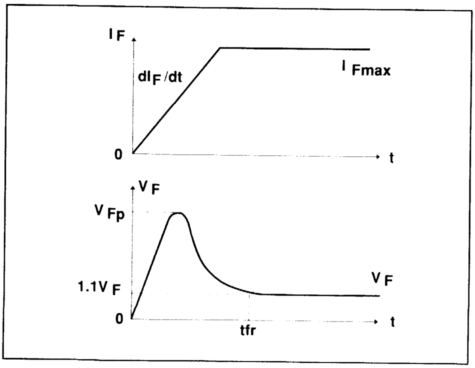
$$P5 = \frac{V_R \times I_{RM}{}^2 \times (3 + 2 \times S) \times F}{6 \; x \; dI_F/dt} + \frac{V_R \times I_{RM} \times I_L \times (S + 2) \times F}{2 \; x \; dI_F/dt}$$

Turn-off losses (in the diode) :

$$P3 = \frac{V_R \times I_{RM}{}^2 \times S \times F}{6 \; x \; dI_F/dt}$$

P3 and P5 are suitable for power MOSFET and IGBT

Fig. 4: TURN-ON CHARACTERISTICS



Turn-on losses :

P4 = 0.4 $(V_{FP} - V_F) . I_{Fmax} . t_{fr} . F$

Fig 5 : Conduction losses versus average current

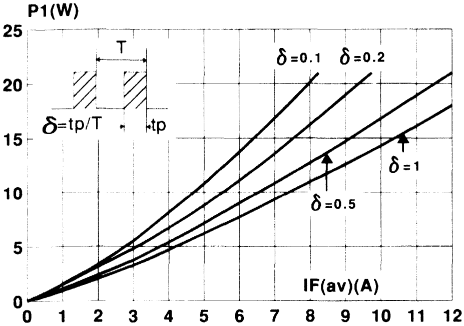


Fig 6 : Switching OFF losses versus dIF/dt

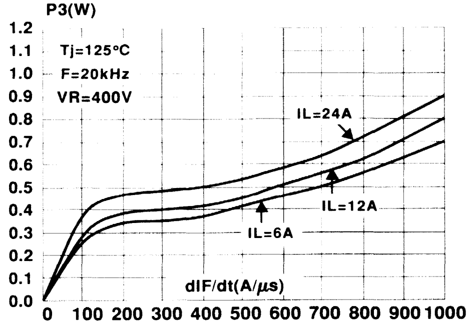


Fig 7 : Switching ON losses versus dIF/dt

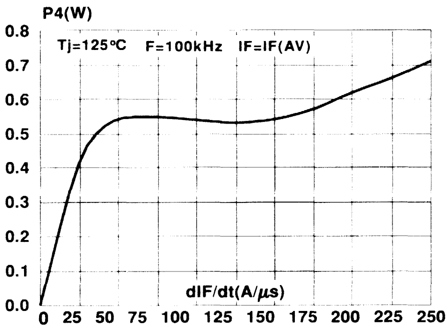


Fig 8 : Switching losses in transistor due to the diode

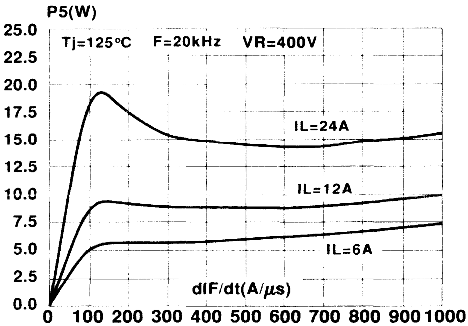


Fig 9 : Forward voltage drop versus forward current

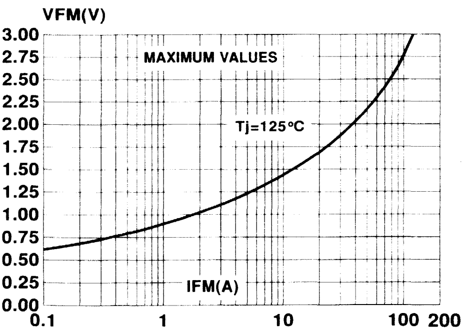


Fig 10 : Relative variation of thermal transient impedance junction to case versus pulse duration

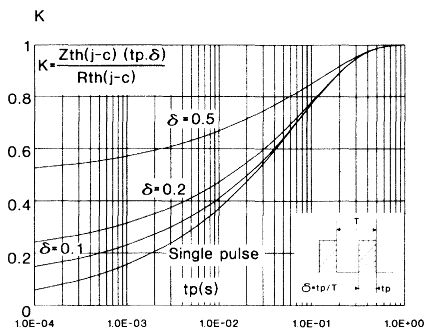


Fig 11 : Peak reverse recovery current versus dIF/dt

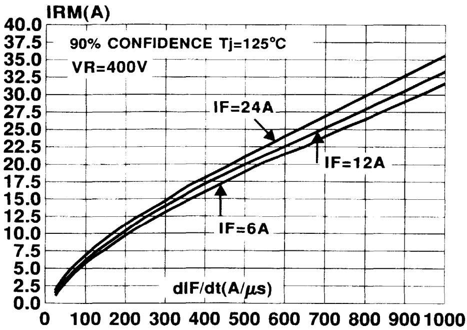


Fig 12 : Reverse recovery time versus dIF/dt

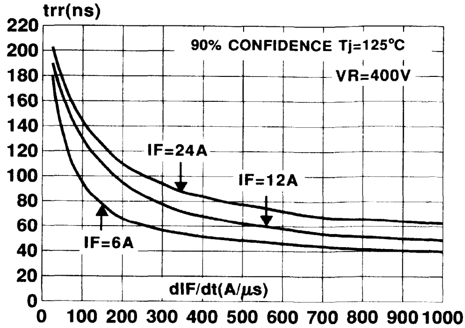


Fig 13 : Softness factor (tb/ta) versus dIF/dt

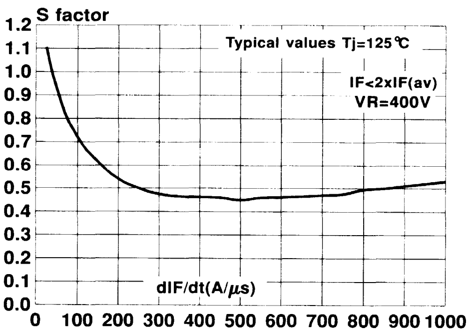


Fig 14 : Relative variation of dynamic parameters versus junction temperature (Reference Tj=125°C)

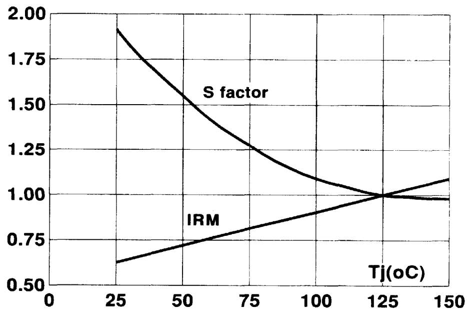


Fig 15 : Transient peak forward voltage versus dIF/dt

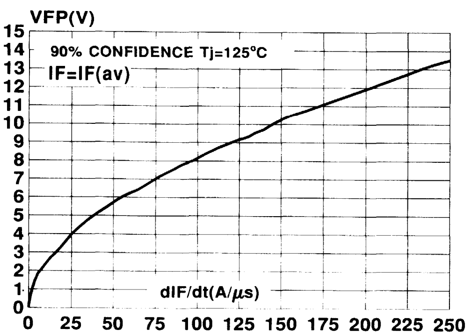
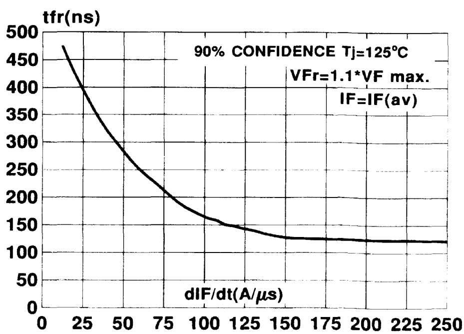


Fig 16 : Forward recovery time versus dIF/dt



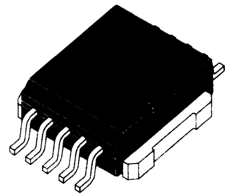
SGS-THOMSON MICROELECTRONICS

STTA1206M

ULTRA-FAST HIGH VOLTAGE DIODE

MAIN PRODUCT CHARACTERISTICS

$I_{F(AV)}$	12A
V_{RRM}	600V
t_{rr} (typ)	28ns
V_F (max)	1.5V



Power SO-10™
Plastic, non isolated SMD
with copper tab

FEATURES AND BENEFITS

- SPECIFIC TO "FREEWHEEL MODE" OPERATIONS: Freewheel or Booster Diode.
- ULTRA-FAST AND SOFT RECOVERY.
- VERY LOW OVERALL POWER LOSSES IN BOTH THE DIODE AND THE COMPANION TRANSISTOR.
- HIGH FREQUENCY OPERATIONS.
- HIGH DISSIPATION MINIATURE PACKAGE.
- SURFACE MOUNT TECHNOLOGY COMPATIBLE.

DESCRIPTION

The TURBOSWITCH is a very high performance series of ultra-fast high voltage power diodes from 600V to 1200V.
TURBOSWITCH, A family, drastically cuts losses in both the diode and the associated switching IGBT or MOSFET in all "Freewheel Mode" operations and is particularly suitable and efficient in motor control freewheel applications and in booster diode applications in Power Factor Control circuitries.
Packaged in a very high performance surface mount package PSO-10, this 600V device is particularly intended for use on 240V domestic mains.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{RRM}	Repetitive peak reverse voltage	600	V
V_{RSM}	Non repetitive peak reverse voltage	600	V
$I_{F(RMS)}$	RMS forward current (All pins connected)	27	A
I_{FRM}	Repetitive peak forward current (t_p = 5 µs, f = 5kHz)	100	A
T_j	Max operating junction temperature	- 65 to + 150	°C
T_{stg}	Storage temperature	- 65 to + 150	°C

TM : PowerSO-10 and TURBOSWITCH are trademarks of SGS-THOMSON Microelectronics.

THERMAL AND POWER DATA

Symbol	Parameter	Conditions	Value	Unit
$R_{th(j-c)}$	Junction to case thermal resistance		1.9	°C/W
P_1	Conduction power dissipation (see fig. 2)	$I_{F(AV)}$ = 12A δ = 0.5 Tc = 108°C	22	W
P_{max}	Total power dissipation Pmax = P1 + P3 (P3 = 10% P1)	Tc = 104°C	24	W

STATIC ELECTRICAL CHARACTERISTICS (see Fig.2)

Symbol	Parameter	Test Conditions		Min	Typ	Max	Unit
V_F *	Forward voltage drop	I_F = 12A	Tj = 25°C			1.75	V
			Tj = 125°C			1.5	
I_R **	Reverse leakage current	V_R = 0.8 x V_{RRM}	Tj = 25°C			100	µA
			Tj = 125°C			5	mA

Test pulses widths : * tp = 380 µs, duty cycle < 2%
** tp = 5 ms , duty cycle < 2%

DYNAMIC ELECTRICAL CHARACTERISTICS
TURN-OFF SWITCHING (see Fig.3)

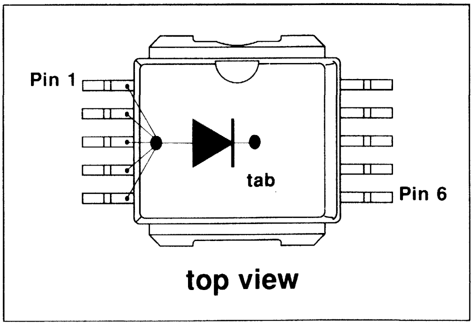
Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{rr}	Reverse recovery time	Tj = 25°C I_F = 0.5 A I_R = 1A I_{rr} = 0.25A I_F = 1A dI_F/dt = -50A/µs V_R = 30V		28	55	ns
I_{RM}	Maximum reverse recovery current	Tj = 125°C V_R = 400V I_F = 12A dI_F/dt = -96 A/µs dI_F/dt = -500 A/µs		16	7.5	A
S factor	Softness factor	Tj = 125°C V_R = 400V I_F = 12A dI_F/dt = -500 A/µs		0.45		/

TURN-ON SWITCHING (see Fig.4)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{fr}	Forward recovery time	Tj = 25°C I_F = 12A dI_F/dt = 96 A/µs measured at, 1.1 × V_{Fmax}			500	ns
V_{Fp}	Peak forward voltage	Tj = 25°C I_F = 12A dI_F/dt = 96 A/µs			10	V

PIN OUT configuration in PowerSO-10 :

Anode = pin 1 to 5
Cathode = connected to base tab



APPLICATION DATA

The TURBOSWITCH "A" is especially designed to provide the lowest overall power losses in any "FREEWHEEL Mode" application (Fig.1) considering both the diode and the companion transistor, thus optimizing the overall performance in the end application.
The way of calculating the power losses is given below:

TOTAL LOSSES
due to the diode
P = P1+ P2+ P3+ P4+ P5 Watts

CONDUCTION LOSSES in the diode	**REVERSE LOSSES** in the diode	**SWITCHING LOSSES** in the diode	**SWITCHING LOSSES** in the tansistor due to the diode
P1 Watts **(Fig. 2)**	**P2 Watts** **(Fig. 2)**	**OFF : P3 Watts** **ON : P4 Watts** **(Fig. 3 & 4)**	**P5 Watts** **(Fig. 3)**

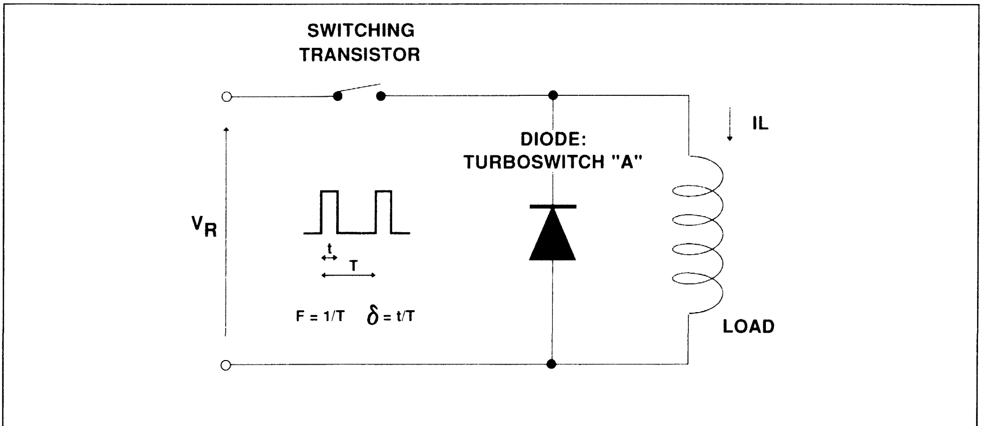
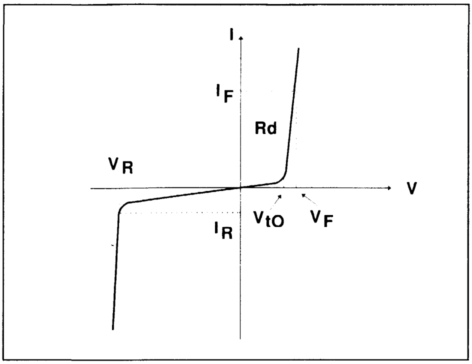


Fig. 1 : "FREEWHEEL" MODE.

APPLICATION DATA (Cont'd)

Fig. 2: STATIC CHARACTERISTICS



Conduction losses :

$$P1 = V_{t0} \cdot I_{F(AV)} + R_d \cdot I_F^2{}_{(RMS)}$$

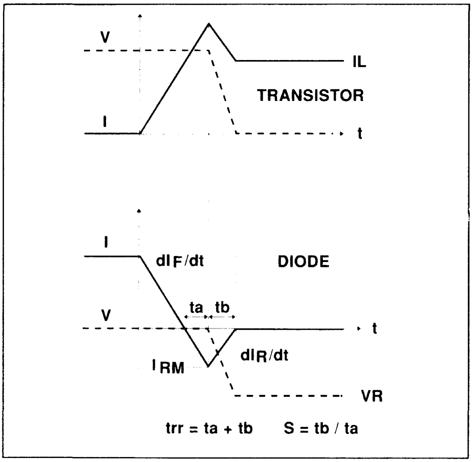
with

$V_{t0} = 1.15$ V
$R_d = 0.029$ Ohm
(Max values at 125°C)

Reverse losses :

$$P2 = V_R \cdot I_R \cdot (1 - \delta)$$

Fig. 3: TURN-OFF CHARACTERISTICS



Turn-on losses :
(in the transistor, due to the diode)

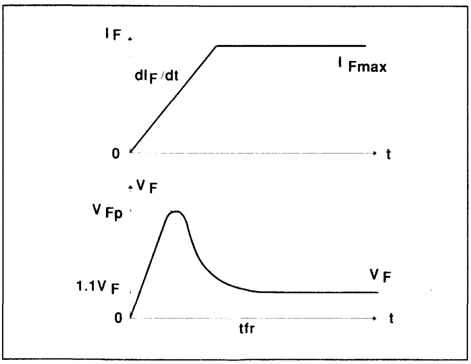
$$P5 = \frac{V_R \times I_{RM}{}^2 \times (3 + 2 \times S) \times F}{6 \times dI_F/dt} + \frac{V_R \times I_{RM} \times I_L \times (S + 2) \times F}{2 \times dI_F/dt}$$

Turn-off losses (in the diode) :

$$P3 = \frac{V_R \times I_{RM}{}^2 \times S \times F}{6 \times dI_F/dt}$$

P3 and P5 are suitable for power MOSFET and IGBT

Fig. 4: TURN-ON CHARACTERISTICS



Turn-on losses :

$$P4 = 0.4\,(V_{FP} - V_F) \cdot I_{Fmax} \cdot t_{fr} \cdot F$$

Fig 5 : Conduction losses versus average current

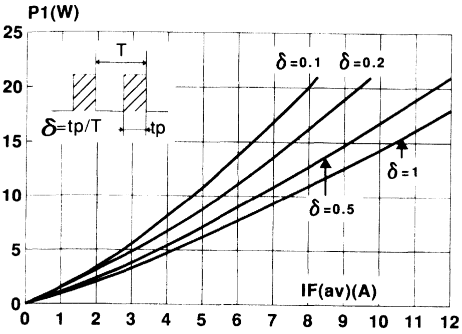


Fig 6 : Switching OFF losses versus dIF/dt

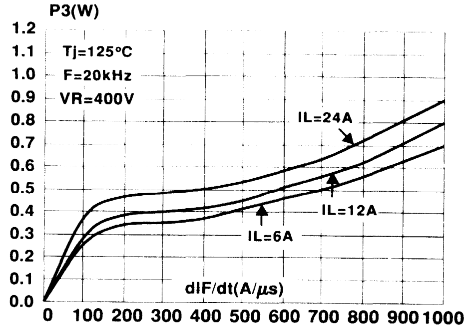


Fig 7 : Switching ON losses versus dIF/dt

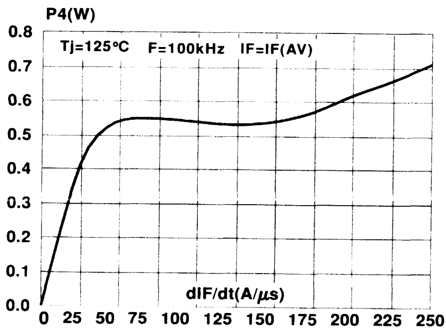


Fig 8 : Switching losses in transistor due to the diode

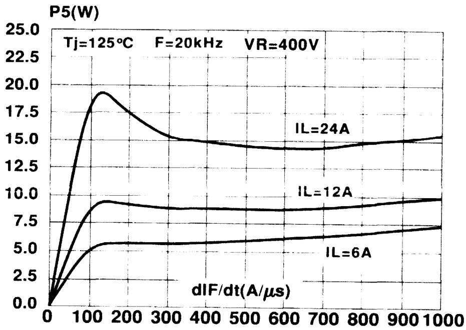


Fig 9 : Forward voltage drop versus forward current

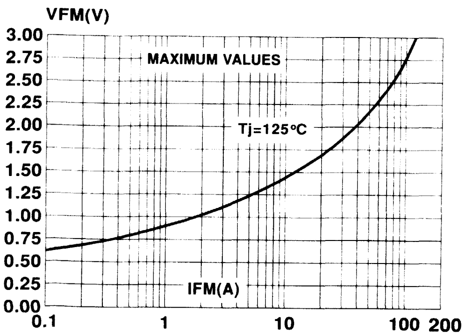


Fig 10 : Relative variation of thermal transient impedance junction to case versus pulse duration

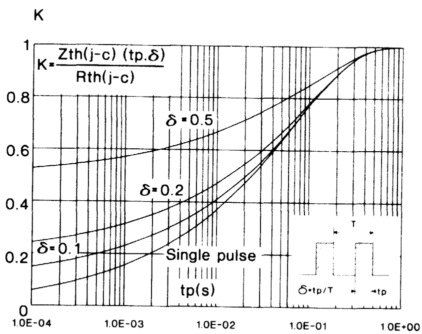


Fig 11 : Peak reverse recovery current versus dIF/dt

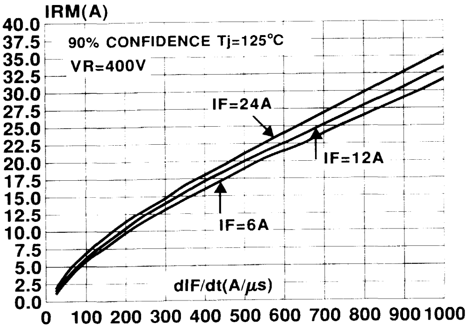


Fig 12 : Reverse recovery time versus dIF/dt

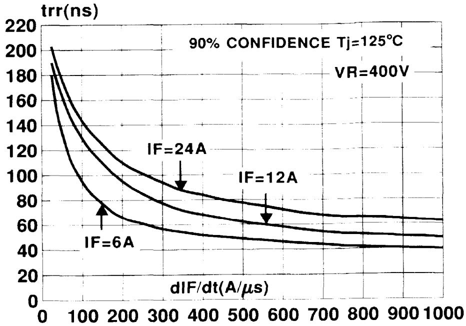


Fig 13 : Softness factor (tb/ta) versus dIF/dt

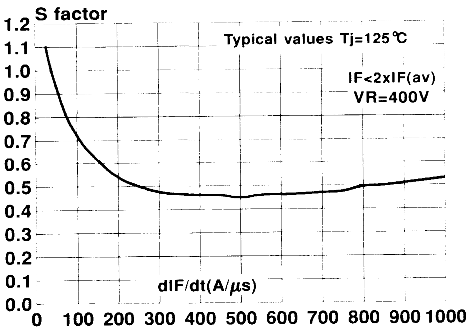


Fig 14 : Relative variation of dynamic parameters versus junction temperature (Reference Tj=125°C)

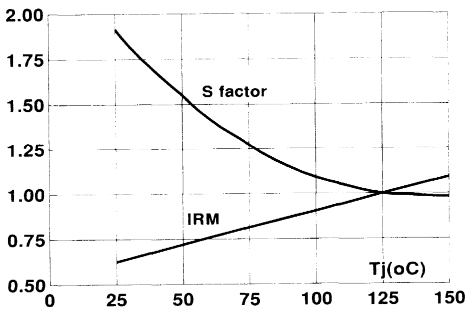


Fig 15 : Transient peak forward voltage versus dIF/dt

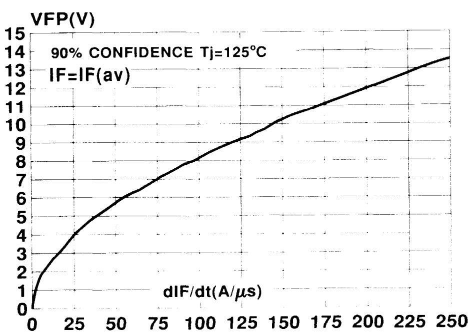
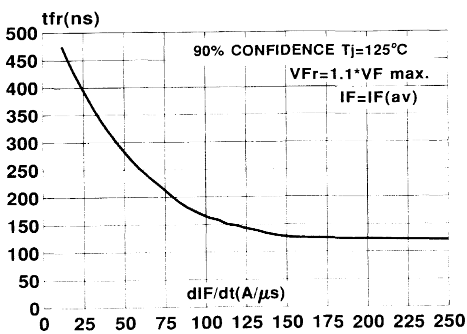


Fig 16 : Forward recovery time versus dIF/dt



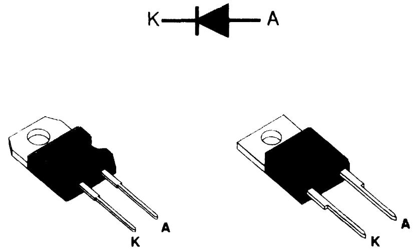
SGS-THOMSON MICROELECTRONICS

STTB1206D(I)

TURBOSWITCH ™ "B". ULTRA-FAST HIGH VOLTAGE DIODE

MAIN PRODUCTS CHARACTERISTICS

$I_{F(AV)}$	**12A**
V_{RRM}	**600V**
t_{rr} (typ)	**50ns**
V_F (max)	**1.3V**



TO220AC (Plastic)	Isolated TO220AC (Plastic)
STTB1206D	**STTB1206DI**

FEATURES AND BENEFITS

- SPECIFIC TO THE FOLLOWING OPERATIONS: Snubbing or clamping, demagnetization and rectification.
- ULTRA-FAST, SOFT AND NOISE-FREE RECOVERY.
- VERY LOW OVERALL POWER LOSSES AND PARTICULARY LOW FORWARD VOLTAGE.
- DESIGNED FOR HIGH PULSED CURRENT OPERATIONS.

DESCRIPTION

The TURBOSWITCH is a very high performance series of ultra-fast high voltage power diodes from 600V to 1200V.
TURBOSWITCH, B family, drastically cuts losses in all high voltage operations which require extremely fast, soft and noise-free power diodes.
They are particularly suitable in the primary circuit of an SMPS as snubber, clamping or demagnetizing diodes, and also in most power converters as high performance rectifier diodes.
Packaged in TO220AC and in isolated TO220AC, these 600V devices are particularly intended for use on 240V domestic mains.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		600	V
V_{RSM}	Non repetitive peak reverse voltage		600	V
$I_{F(RMS)}$	RMS forward current	STTB1206D STTB1206DI	30 20	A
I_{FRM}	Repetitive peak forward current (tp = 5 µs, f = 1kHz)	STTB1206D STTB1206DI	420 280	A
T_j	Max operating junction temperature		-65 to 150	°C
T_{stg}	Storage temperature		-65 to 150	°C

TM : TURBOSWITCH is a trademark of SGS-THOMSON Microelectronics.

THERMAL AND POWER DATA

Symbol	Parameter	Conditions	Value	Unit
$R_{th(j-c)}$	Junction to case thermal resistance	STTB1206D STTB1206DI	1.9 3.0	°C/W
P_1	Conduction power dissipation (see fig. 5)	$I_{F(AV)}$ = 12A δ =0.5 STTB1206D Tc= 114°C STTB1206DI Tc= 93°C	19	W
P_{max}	Total power dissipation Pmax = P1 + P3 (P3 = 10% P1)	STTB1206D Tc= 104°C STTB1206DI Tc= 78°C	24	W

STATIC ELECTRICAL CHARACTERISTICS (see Fig.5)

Symbol	Parameter	Test Conditions		Min	Typ	Max	Unit
V_F *	Forward voltage drop	I_F =12A	Tj = 25°C Tj = 125°C			1.4 1.3	V V
I_R **	Reverse leakage current	V_R =0.8 x V_{RRM}	Tj = 25°C Tj = 125°C			100 2	µA mA

Test pulses widths : * tp = 380 µs, duty cycle < 2%
** tp = 5 ms , duty cycle < 2%

DYNAMIC ELECTRICAL CHARACTERISTICS

TURN-OFF SWITCHING (see Fig.6)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{rr}	Reverse recovery time	Tj = 25°C I_F = 0.5 A I_R = 1A Irr = 0.25A I_F = 1 A dI_F/dt =-50A/µs V_R =30V		50	100	ns
I_{RM}	Maximum reverse recovery current	Tj = 125°C VR = 400V I_F =12A dI_F/dt = -96 A/µs dI_F/dt = -500 A/µs		30	18	A
S factor	Softness factor	Tj = 125°C V_R = 400V I_F =12A dI_F/dt = -500 A/µs		0.9		/

TURN-ON SWITCHING (see Fig.7)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{fr}	Forward recovery time	Tj = 25°C I_F =12 A, dI_F/dt = 96 A/µs measured at, 1.1 × $V_F$max			500	ns
V_{Fp}	Peak forward voltage	Tj = 25°C I_F =12A, dI_F/dt = 96 A/µs I_F =60A, dI_F/dt = 500 A/µs		10	8	V

APPLICATION DATA

The TURBOSWITCH "B" is especially designed to provide the lowest overall power losses in any application such as snubbing,clamping, demagnetization and rectification. In such applications (fig.1 to fig.4), the way of calculating the power losses is given below :

TOTAL LOSSES
due to the diode
P = P1+ P2+ P3+ P4 Watts

CONDUCTION LOSSES	REVERSE LOSSES	SWITCHING LOSSES
P1 Watts (Fig. 5)	**P2 Watts (Fig. 5)**	**OFF : P3 Watts ON : P4 Watts (Fig. 6 & 7)**

Fig. 1 : SNUBBER DIODE.

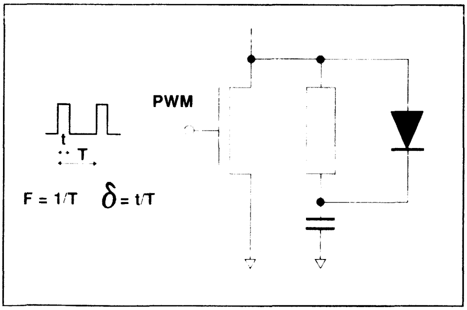


Fig. 2 : CLAMPING DIODE.

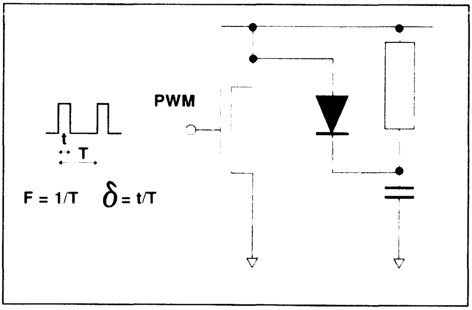


Fig. 3 : DEMAGNETIZING DIODE.

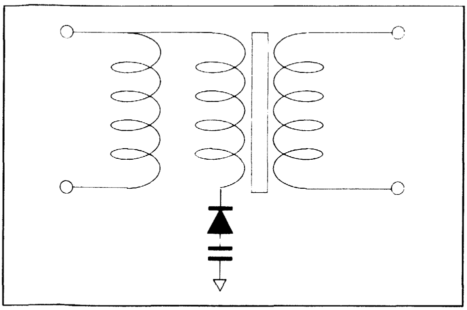
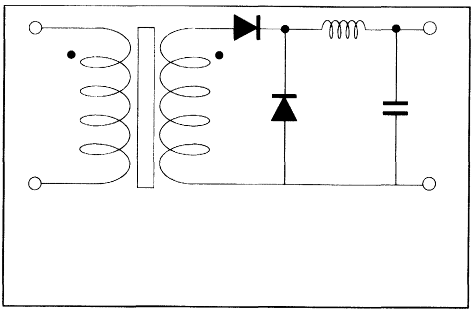
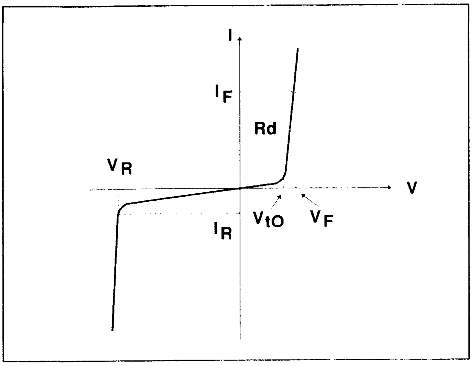


Fig. 4 : RECTIFIER DIODE.



APPLICATION DATA (Cont'd)

Fig. 5: STATIC CHARACTERISTICS



Conduction losses :

$P1 = V_{t0} \cdot I_{F(AV)} + R_d \cdot I_F{}^2{}_{(RMS)}$

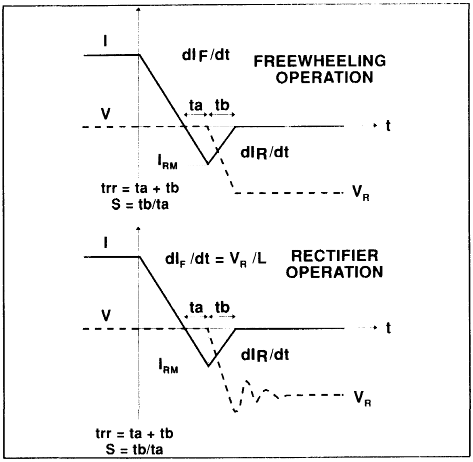
with

$V_{t0} = 1.00$ V
$R_d = 0.025$ Ohm
(Max values at 125°C)

Reverse losses :

$P2 = V_R \cdot I_R \cdot (1 - \delta)$

Fig. 6: TURN-OFF CHARACTERISTICS



Turn-off losses :

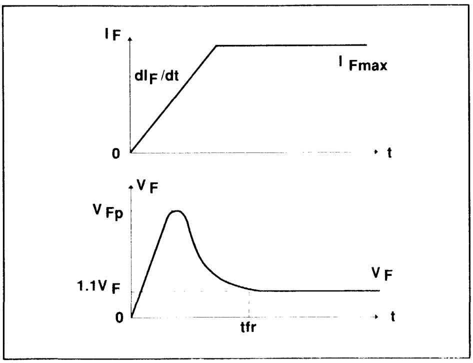
$$P3 = \frac{V_R \times I_{RM}{}^2 \times S \times F}{6 \ x \ dI_F/dt}$$

Turn-off losses :
(with non negligible serial inductance)

$$P3' = \frac{V_R \times I_{RM}{}^2 \times S \times F}{6 \ x \ dI_F/dt} + \frac{L \times I_{RM}{}^2 \times F}{2}$$

P3 and P3' are suitable for power MOSFET and IGBT

Fig. 7: TURN-ON CHARACTERISTICS



Turn-on losses :

$P4 = 0.4 \ (V_{FP} - V_F) \cdot I_{Fmax} \cdot t_{fr} \cdot F$

Fig 8 : Conduction losses versus average current

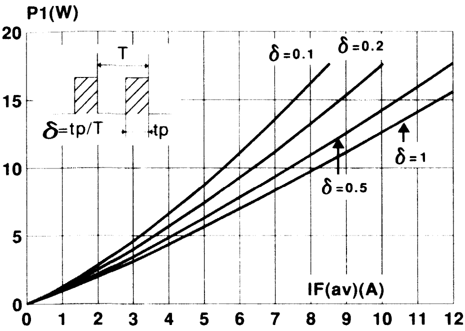


Fig 9 : Switching OFF losses versus dIF/dt

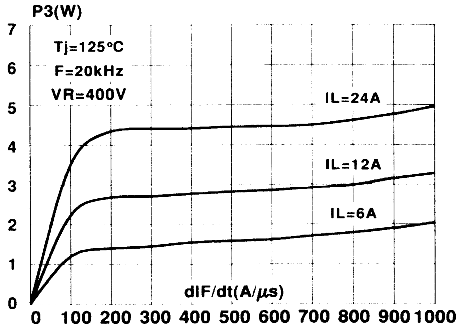


Fig 10 : Switching ON losses versus dIF/dt

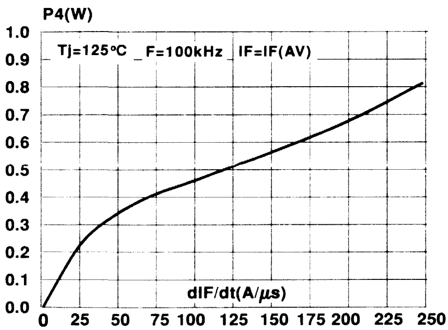


Fig 11 : Forward voltage drop versus forward current

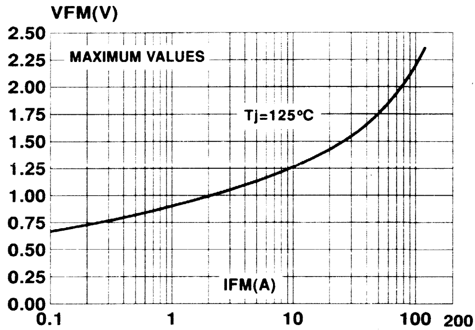


Fig 12 : Relative variation of thermal transient impedance junction to case versus pulse duration

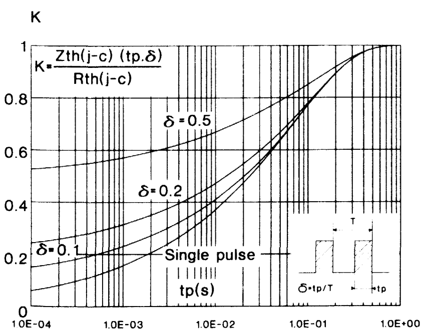


Fig 13 : Peak reverse recovery current versus dIF/dt

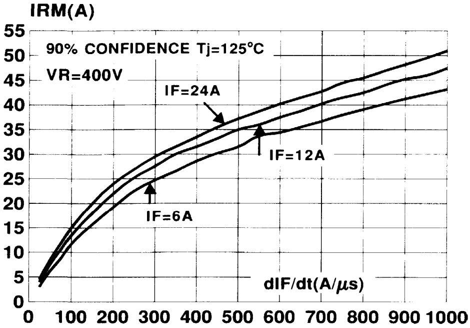


Fig 14 : Reverse recovery time versus dIF/dt

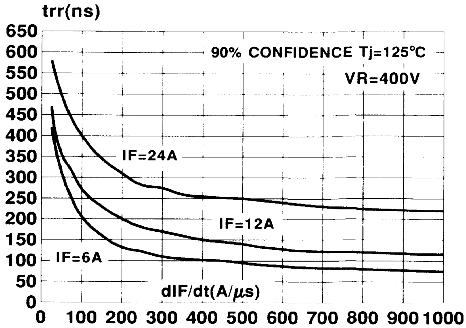


Fig 15 : Softness factor (tb/ta) versus dIF/dt

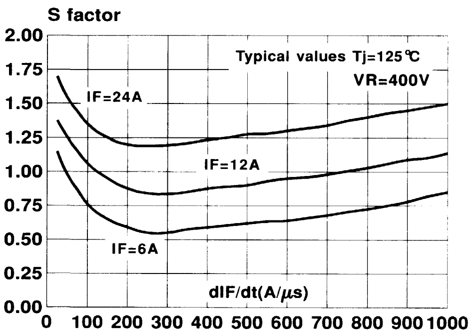


Fig 16 : Relative variation of dynamic parameters versus junction temperature (Reference Tj=125°C)

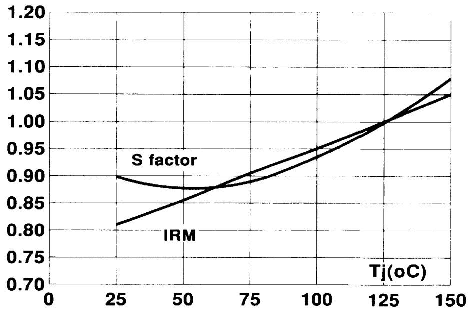


Fig 17 : Transient peak forward voltage versus dIF/dt

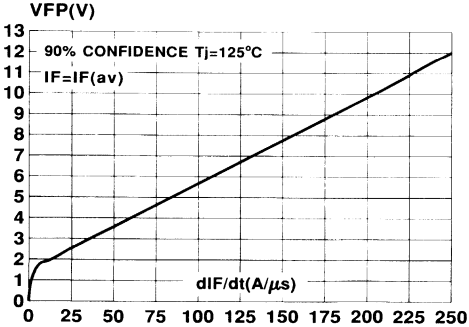
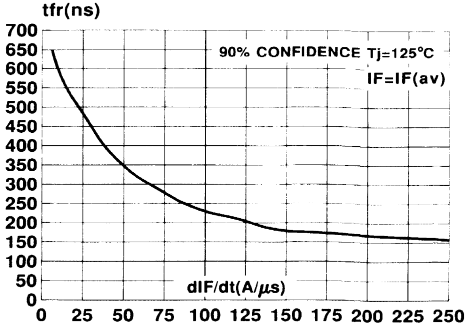


Fig 18 : Forward recovery time versus dIF/dt



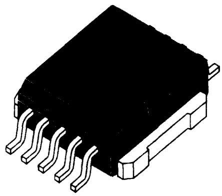
PowerSO-10™ TURBOSWITCH™ "B" ULTRA-FAST HIGH VOLTAGE DIODE

MAIN PRODUCT CHARACTERISTICS

$I_{F(AV)}$	12A
V_{RRM}	600V
t_{rr} (typ)	50ns
V_F (max)	1.3V

FEATURES AND BENEFITS

- SPECIFIC TO THE FOLLOWING OPERATIONS: Snubbing or clamping, demagnetization and rectification.
- ULTRA-FAST,VERY SOFT AND NOISE-FREE RECOVERY.
- VERY LOW OVERALL POWER LOSSES AND PARTICULARY LOW FORWARD VOLTAGE.
- DESIGNED FOR HIGH PULSED CURRENT OPERATIONS.
- HIGH FREQUENCY OPERATIONS
- HIGH DISSIPATION MINIATURE PACKAGE
- SURFACE MOUNT TECHNOLOGY COMPATIBLE



Power SO-10™
Plastic, non isolated SMD with copper tab

DESCRIPTION

The TURBOSWITCH is a very high performance series of ultra-fast high voltage power diodes from 600V to 1200V.
TURBOSWITCH, B family, drastically cuts losses in all high voltage operations which require extremely fast, soft and noise-free power diodes.
They are particularly suitable in the primary circuit of an SMPS as snubber, clamping or demagnetizing diodes, and also in most power converters as high performance rectifier diodes.
Packaged in PSO-10, this 600V devices are particularly intended for use on 240V domestic mains.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{RRM}	Repetitive peak reverse voltage	600	V
V_{RSM}	Non repetitive peak reverse voltage	600	V
$I_{F(RMS)}$	RMS forward current (All pins connected)	27	A
I_{FRM}	Repetitive peak forward current (tp = 5 µs, f = 1kHz)	320	A
T_j	Max operating junction temperature	- 65 to + 150	°C
T_{stg}	Storage temperature	- 65 to + 150	°C

TM : PowerSO-10 and TURBOSWITCH are trademarks of SGS-THOMSON Microelectronics.

THERMAL AND POWER DATA

Symbol	Parameter	Conditions	Value	Unit
$R_{th(j-c)}$	Junction to case thermal resistance		1.9	°C/W
P_1	Conduction power dissipation (see fig. 5)	$I_{F(AV)}$ = 12A δ = 0.5 Tc = 114°C	19	W
P_{max}	Total power dissipation Pmax = P1+ P3 (P3 = 10% P1)	Tc = 104°C	24	W

STATIC ELECTRICAL CHARACTERISTICS (see Fig.5)

Symbol	Parameter	Test Conditions		Min	Typ	Max	Unit
V_F *	Forward voltage drop	I_F = 12A	Tj = 25°C			1.4	V
			Tj = 125°C			1.3	
I_R **	Reverse leakage current	V_R = 0.8 x V_{RRM}	Tj = 25°C			100	µA
			Tj = 125°C			2.0	mA

Test pulses widths : * tp = 380 µs, duty cycle < 2%
** tp = 5 ms , duty cycle < 2%

DYNAMIC ELECTRICAL CHARACTERISTICS
TURN-OFF SWITCHING (see Fig.6)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{rr}	Reverse recovery time	Tj = 25°C I_F = 0.5 A I_R = 1A I_{rr} = 0.25A I_F = 1 A dI_F/dt = -50A/µs V_R = 30V		50	100	ns
I_{RM}	Maximum reverse recovery current	Tj = 125°C V_R = 400V I_F = 12A dI_F/dt = -96 A/µs dI_F/dt = -500 A/µs		30	18	A
S factor	Softness factor	Tj = 125°C V_R = 400V I_F = 12A dI_F/dt = -500 A/µs		0.9		/

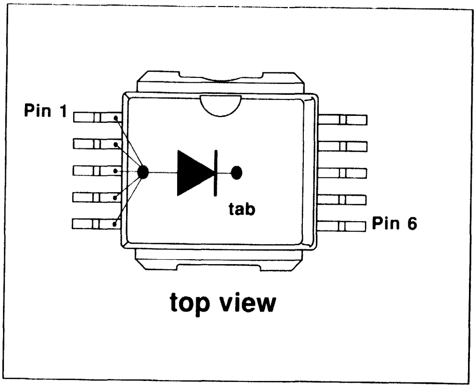
TURN-ON SWITCHING (see Fig.7)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{fr}	Forward recovery time	Tj = 25°C I_F = 12A, dI_F/dt = 96 A/µs measured at, 1.1 × V_{Fmax}			500	ns
V_{Fp}	Peak forward voltage	Tj = 25°C I_F = 12A, dI_F/dt = 96 A/µs			8	V

PIN OUT configuration in PowerSO-10 :

Anode = pin 1 to 5

Cathode = connected to base tab



APPLICATION DATA

The TURBOSWITCH "B" is especially designed to provide the lowest overall power losses in any application such as snubbing,clamping, demagnetization and rectification. In such applications (fig.1 to fig.4), the way of calculating the power losses is given below :

TOTAL LOSSES
due to the diode
P = P1+ P2+ P3+ P4 Watts

CONDUCTION LOSSES	REVERSE LOSSES	SWITCHING LOSSES
P1 Watts (Fig. 5)	P2 Watts (Fig. 5)	OFF : P3 Watts ON : P4 Watts (Fig. 6 & 7)

Fig. 1 : SNUBBER DIODE.

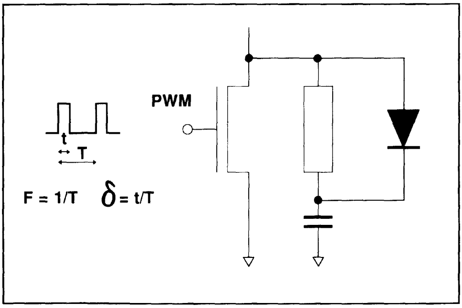


Fig. 2 : CLAMPING DIODE.

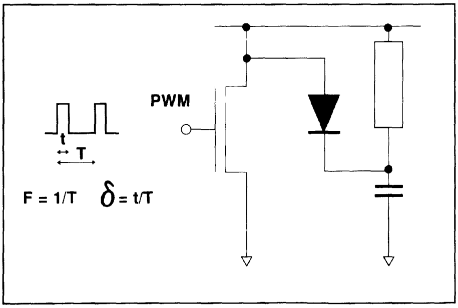


Fig. 3 : DEMAGNETIZING DIODE.

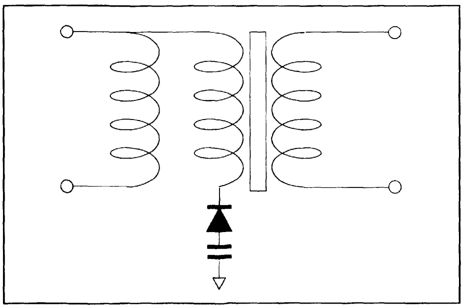
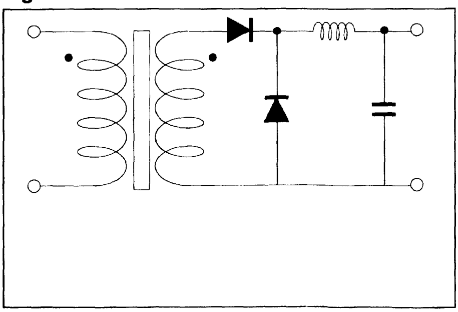
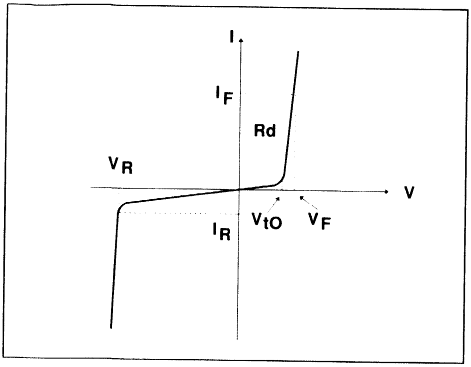


Fig. 4 : RECTIFIER DIODE.



APPLICATION DATA (Cont'd)

Fig. 5: STATIC CHARACTERISTICS



Conduction losses :

$$P1 = V_{t0} \cdot I_{F(AV)} + R_d \cdot I_F^2{}_{(RMS)}$$

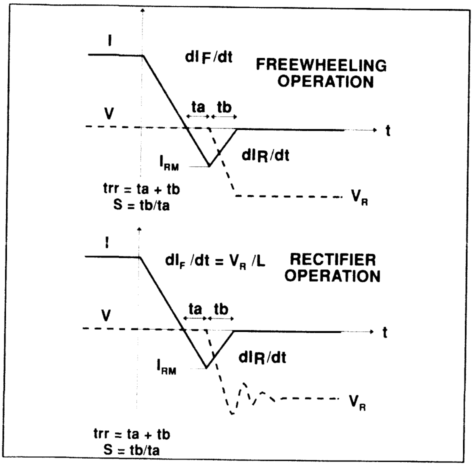
with

$V_{t0} = 1.00$ V
$R_d = 0.025$ Ohm
(Max values at 125°C)

Reverse losses :

$$P2 = V_R \cdot I_R \cdot (1 - \delta)$$

Fig. 6: TURN-OFF CHARACTERISTICS



Turn-off losses :

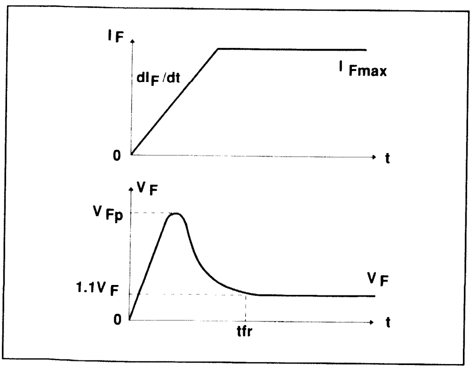
$$P3 = \frac{V_R \times I_{RM}^2 \times S \times F}{6 \times dI_F/dt}$$

Turn-off losses :
(with non negligible serial inductance)

$$P3' = \frac{V_R \times I_{RM}^2 \times S \times F}{6 \times dI_F/dt} + \frac{L \times I_{RM}^2 \times F}{2}$$

P3 and P3' are suitable for power MOSFET and IGBT

Fig. 7: TURN-ON CHARACTERISTICS



Turn-on losses :

$$P4 = 0.4\,(V_{FP} - V_F) \cdot I_{Fmax} \cdot t_{fr} \cdot F$$

Fig 8 : Conduction losses versus average current

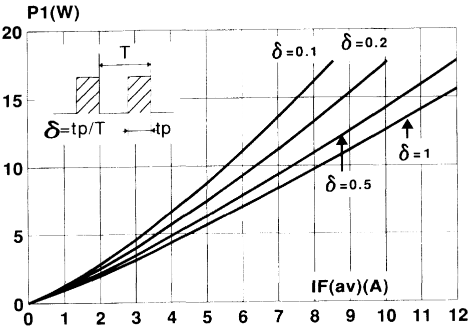


Fig 9 : Switching OFF losses versus dIF/dt

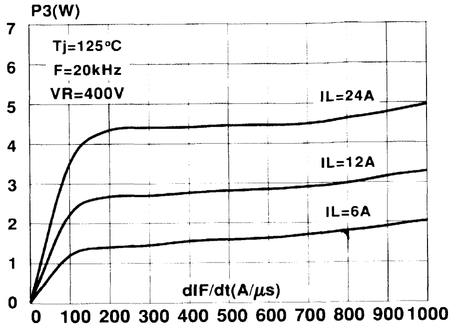


Fig 10 : Switching ON losses versus dIF/dt

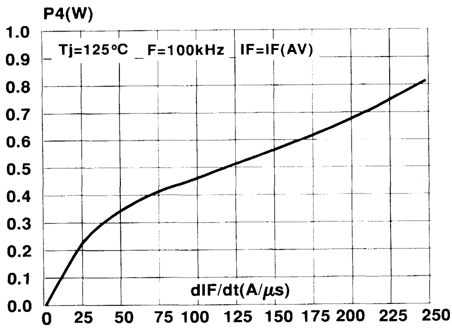


Fig 11 : Forward voltage drop versus forward current

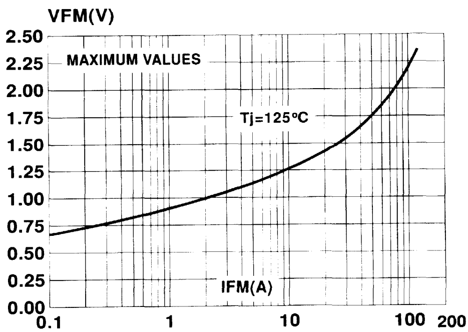


Fig 12 : Relative variation of thermal transient impedance junction to case versus pulse duration

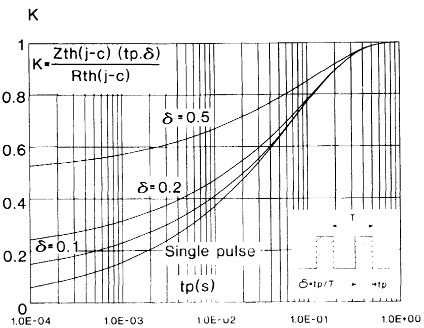


Fig 13 : Peak reverse recovery current versus dIF/dt

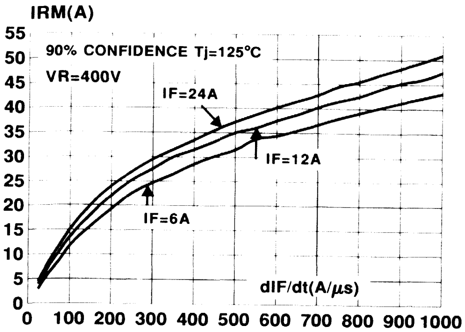


Fig 14 : Reverse recovery time versus dIF/dt

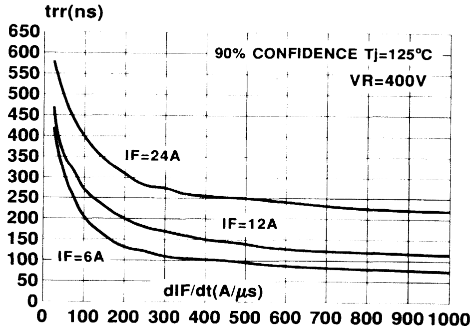


Fig 15 : Softness factor (tb/ta) versus dIF/dt

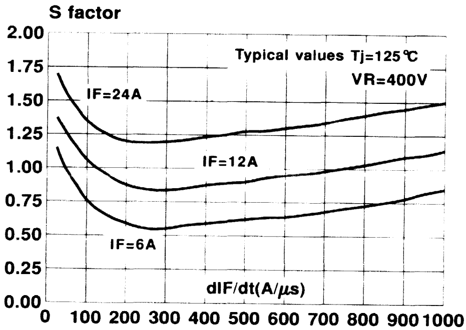


Fig 16 : Relative variation of dynamic parameters versus junction temperature (Reference Tj=125°C)

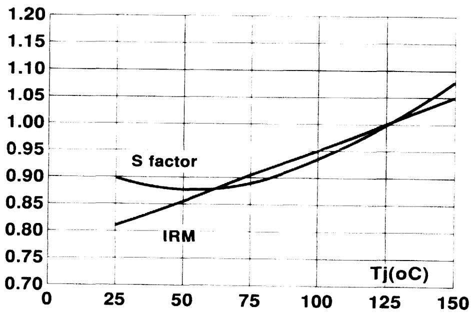


Fig 17 : Transient peak forward voltage versus dIF/dt

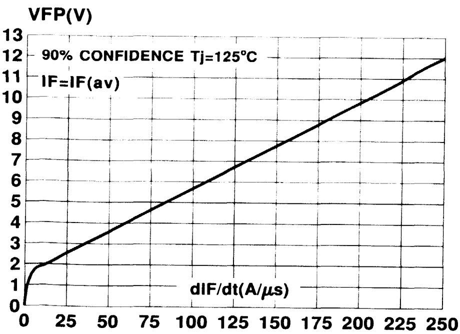
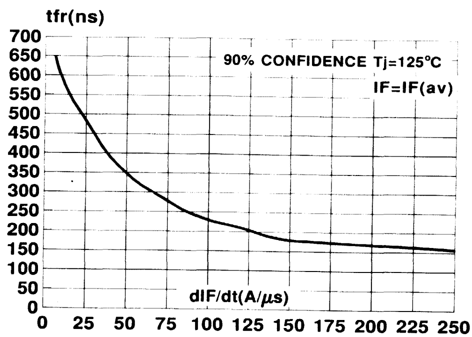


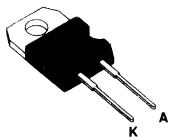
Fig 18 : Forward recovery time versus dIF/dt



TURBOSWITCH ™ "A". ULTRA-FAST HIGH VOLTAGE DIODE

MAIN PRODUCT CHARACTERISTICS

$I_{F(AV)}$	12A
V_{RRM}	1200V
t_{rr} (typ)	ns
V_F (max)	V



TO220AC
(Plastic)

STTA1212D

FEATURES AND BENEFITS

- ULTRA-FAST, SOFT AND NOISE-FREE RECOVERY.
- VERY LOW OVERALL POWER LOSSES IN BOTH THE DIODE AND THE COMPANION TRANSISTOR.
- HIGH FREQUENCY AND/OR HIGH PULSED CURRENT OPERATIONS.

DESCRIPTION

The TURBOSWITCH is a very high performance series of ultra-fast high voltage power diodes from 600V to 1200V.
TURBOSWITCH 1200V drastically cuts losses in all high voltage operations which require extremely fast, soft and noise-free power diodes. Due to their optimized switching performances they also highly decrease power losses in any associated switching IGBT or MOSFET in all "Freewheel Mode" operations.
They are particularly suitable in Motor Control circuitries, or in the primary of SMPS as snubber, clamping or demagnetizing diodes, and also at the secondary of SMPS as high voltage rectifier diodes.
Packaged in TO220AC, this 1200V device is particularly intended for use on 3 phase 400V industrial mains.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{RRM}	Repetitive peak reverse voltage	1200	V
V_{RSM}	Non repetitive peak reverse voltage	1200	V
$I_{F(RMS)}$	RMS forward current	30	A
I_{FRM}	Repetitive peak forward current (tp = 5 μs, f = 5kHz)	180	A
T_j	Max operating junction temperature	150	°C
T_{stg}	Storage temperature	-65 to 150	°C

TM : TURBOSWITCH is a trademark of SGS-THOMSON Microelectronics.

THERMAL AND POWER DATA

Symbol	Parameter	Conditions	Value	Unit
$R_{th(j-c)}$	Junction to case thermal resistance		1.9	°C/W
P_1	Conduction power dissipation (see fig. 6)	$I_{F(AV)}$ = 12A δ = 0.5 Tc= 95°C	29.2	W
P_{max}	Total power dissipation Pmax = P1 + P3 (P3 = 10% P1)	Tc= 89°C	32.1	W

STATIC ELECTRICAL CHARACTERISTICS (see Fig.6)

Symbol	Parameter	Test Conditions		Min	Typ	Max	Unit
V_F *	Forward voltage drop	I_F =12A	Tj = 25°C Tj = 125°C			2.2 2.0	V V
I_R **	Reverse leakage current	V_R =0.8 x V_{RRM}	Tj = 25°C Tj = 125°C			100 5.0	µA mA

Test pulses widths : * tp = 380 µs, duty cycle < 2%
** tp = 5 ms . duty cycle < 2%

DYNAMIC ELECTRICAL CHARACTERISTICS

TURN-OFF SWITCHING (see Fig.7)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{rr}	Reverse recovery time	Tj = 25°C I_F = 0.5 A I_R = 1A Irr = 0.25A I_F = 1 A dI_F/dt =-50A/µs V_R =30V		50	100	ns
I_{RM}	Maximum reverse recovery current	Tj = 125°C VR = 600V I_F =12A dI_F/dt = -96 A/µs dI_F/dt = -500 A/µs		30	18	A
S factor	Softness factor	Tj = 125°C V_R = 600V I_F =12A dI_F/dt = -500 A/µs		1.2		/

TURN-ON SWITCHING (see Fig.8)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{fr}	Forward recovery time	Tj = 25°C I_F =12 A, dI_F/dt = 96 A/µs measured at, 1.1 × $V_F$max			TBD	ns
V_{Fp}	Peak forward voltage	Tj = 25°C I_F =12A, dI_F/dt = 96 A/µs I_F =40A, dI_F/dt = 500 A/µs			TBD TBD	V

APPLICATION DATA

The 1200V TURBOSWITCH series has been designed to provide the lowest overall power losses in all high frequency or high pulsed current operations. In such applications (Fig 1 to 5),the way of calculating the power losses is given below :

TOTAL LOSSES
due to the diode
P = P1+ P2+ P3+ P4+ P5 Watts

CONDUCTION LOSSES
in the diode
P1 Watts
(Fig. 6)

REVERSE LOSSES
in the diode
P2 Watts
(Fig. 6)

SWITCHING LOSSES
in the diode
OFF : P3 Watts
ON : P4 Watts
(Fig. 7 & 8)

SWITCHING LOSSES
in the tansistor
due to the diode
P5 Watts
(Fig. 7)

Fig. 1 : "FREEWHEEL" MODE.

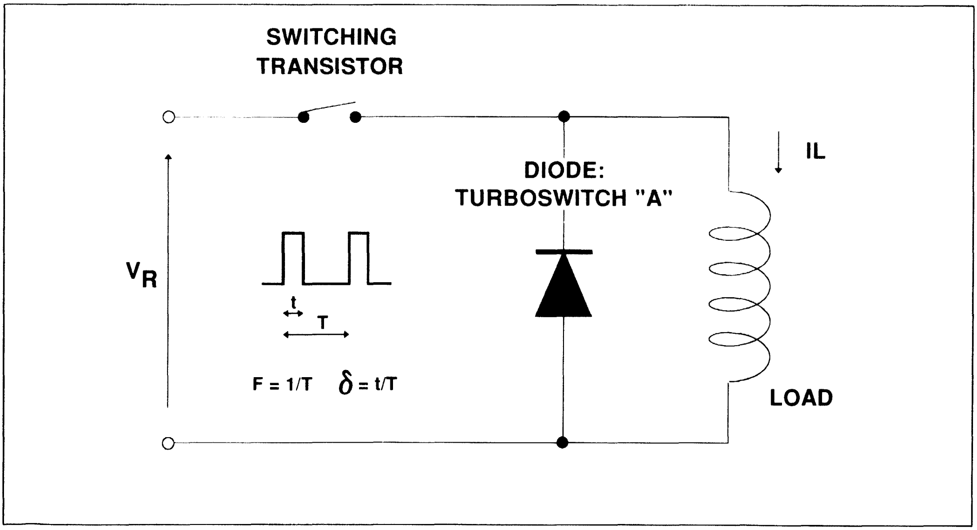


Fig. 2 : SNUBBER DIODE.

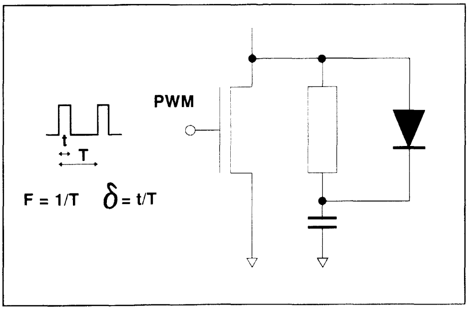


Fig. 3 : CLAMPING DIODE.

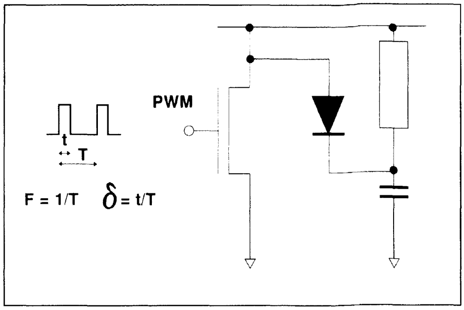


Fig. 4 : DEMAGNETIZING DIODE.

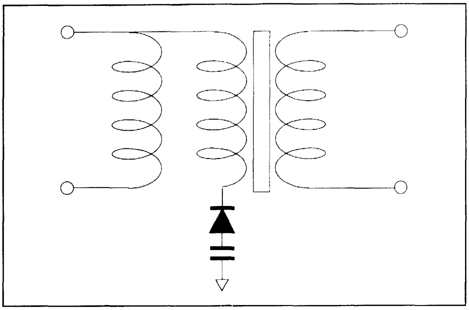
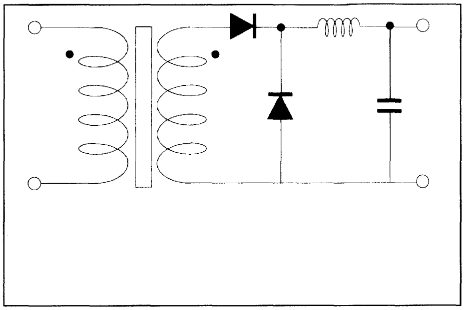
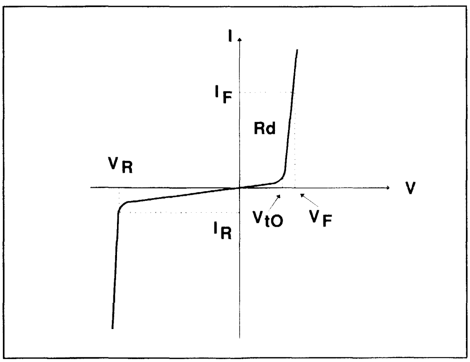


Fig. 5 : RECTIFIER DIODE.



STATIC & DYNAMIC CHARACTERISTICS . POWER LOSSES .

Fig. 6: STATIC CHARACTERISTICS



Conduction losses :

$P1 = V_{t0} . I_{F(AV)} + R_d . I_F{}^2{}_{(RMS)}$

with

$V_{t0} = 1.57$ V

$R_d = 0.036$ Ohm

(Max values at 125°C,suitable for Ipeak < $3.I_{F(av)}$)

Reverse losses :

$P2 = V_R . I_R . (1 - \delta)$

APPLICATION DATA (Cont'd)

Fig. 7: TURN-OFF CHARACTERISTICS

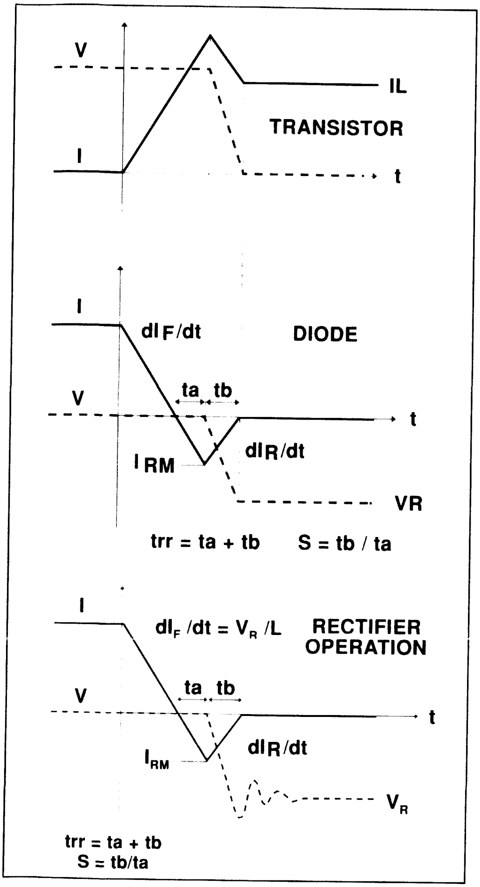
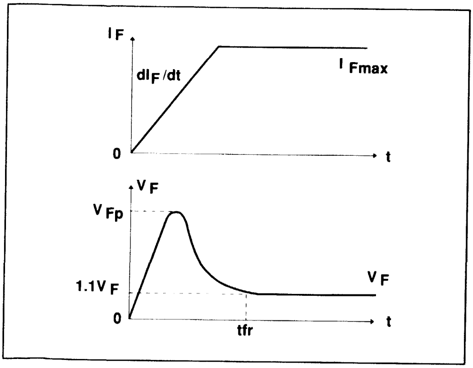


Fig. 8: TURN-ON CHARACTERISTICS



Turn-on losses :
(in the transistor, due to the diode)

$$P5 = \frac{V_R \times I_{RM}^2 \times (3 + 2 \times S) \times F}{6 \times dI_F/dt} + \frac{V_R \times I_{RM} \times I_L \times (S + 2) \times F}{2 \times dI_F/dt}$$

Turn-off losses (in the diode) :

$$P3 = \frac{V_R \times I_{RM}^2 \times S \times F}{6 \times dI_F/dt}$$

Turn-off losses :
(with non negligible serial inductance)

$$P3' = \frac{V_R \times I_{RM}^2 \times S \times F}{6 \times dI_F/dt} + \frac{L \times I_{RM}^2 \times F}{2}$$

P3,P3' and P5 are suitable for power MOSFET and IGBT

Turn-on losses :

$P4 = 0.4\ (V_{FP} - V_F)\ .\ I_{Fmax}\ .\ t_{fr}\ .\ F$

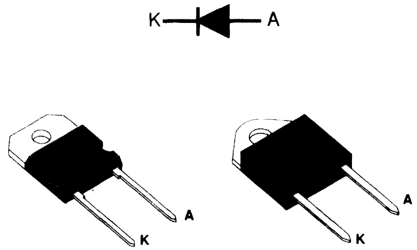
SGS-THOMSON MICROELECTRONICS

STTA1512P/PI

TURBOSWITCH ™ "A". ULTRA-FAST HIGH VOLTAGE DIODE

MAIN PRODUCTS CHARACTERISTICS

$I_{F(AV)}$	**15A**
V_{RRM}	**1200V**
t_{rr} (typ)	**55ns**
V_F (max)	**1.9V**



SOD93
(Plastic)
STTA1512P

isolated DOP3I
(Plastic)
STTA1512PI

FEATURES AND BENEFITS

- ULTRA-FAST, SOFT AND NOISE-FREE RECOVERY.
- VERY LOW OVERALL POWER LOSSES IN BOTH THE DIODE AND THE COMPANION TRANSISTOR.
- HIGH FREQUENCY AND/OR HIGH PULSED CURRENT OPERATIONS.

DESCRIPTION

The TURBOSWITCH is a very high performance series of ultra-fast high voltage power diodes from 600V to 1200V.
TURBOSWITCH 1200V drastically cuts losses in all high voltage operations which require extremely fast, soft and noise-free power diodes. Due to their optimized switching performances they also highly decrease power losses in any associated switching IGBT or MOSFET in all "Freewheel Mode" operations.
They are particularly suitable in Motor Control circuitries, or in the primary of SMPS as snubber, clamping or demagnetizing diodes, and also at the secondary of SMPS as high voltage rectifier diodes.
Packaged in SOD93 and in DOP3I, these 1200V devices are particularly intended for use on 3 phase 400V industrial mains.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{RRM}	Repetitive peak reverse voltage	1200	V
V_{RSM}	Non repetitive peak reverse voltage	1200	V
$I_{F(RMS)}$	RMS forward current	50	A
I_{FRM}	Repetitive peak forward current (tp = 5 µs, f = 5kHz)	300	A
T_j	Max operating junction temperature	150	°C
T_{stg}	Storage temperature	-65 to 150	°C

TM : TURBOSWITCH is a trademark of SGS-THOMSON Microelectronics.

THERMAL AND POWER DATA

Symbol	Parameter	Conditions	Value	Unit
$R_{th(j-c)}$	Junction to case thermal resistance	STTA1512P STTA1512PI	1.6 2.1	°C/W
P_1	Conduction power dissipation (see fig. 6)	$I_{F(AV)}$ = 15A δ =0.5 STTA1512P Tc= 95°C STTA1512PI Tc= 78°C	34	W
P_{max}	Total power dissipation Pmax = P1 + P3 (P3 = 10% P1)	STTA1512P Tc= 89°C STTA1512PI Tc= 70°C	38	W

STATIC ELECTRICAL CHARACTERISTICS (see Fig.6)

Symbol	Parameter	Test Conditions		Min	Typ	Max	Unit
V_F *	Forward voltage drop	I_F =15A	Tj = 25°C Tj = 125°C			2.1 1.9	V V
I_R **	Reverse leakage current	V_R =0.8 x V_{RRM}	Tj = 25°C Tj = 125°C			100 6.0	µA mA

Test pulses widths : * tp = 380 µs, duty cycle < 2%
** tp = 5 ms , duty cycle < 2%

DYNAMIC ELECTRICAL CHARACTERISTICS

TURN-OFF SWITCHING (see Fig.7)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{rr}	Reverse recovery time	Tj = 25°C I_F = 0.5 A I_R = 1A Irr = 0.25A I_F = 1 A dI_F/dt =-50A/µs V_R =30V		55	105	ns
I_{RM}	Maximum reverse recovery current	Tj = 125°C VR = 600V I_F =15A dI_F/dt = -120 A/µs dI_F/dt = -500 A/µs		TBD	TBD	A
S factor	Softness factor	Tj = 125°C V_R = 600V I_F =15A dI_F/dt = -500 A/µs		1.2		/

TURN-ON SWITCHING (see Fig.8)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{fr}	Forward recovery time	Tj = 25°C I_F =15 A, dI_F/dt = 120 A/µs measured at, 1.1 × $V_F$max			TBD	ns
V_{Fp}	Peak forward voltage	Tj = 25°C I_F =15A, dI_F/dt = 120 A/µs I_F =40A, dI_F/dt = 500 A/µs			TBD TBD	V

APPLICATION DATA

The 1200V TURBOSWITCH series has been designed to provide the lowest overall power losses in all high frequency or high pulsed current operations. In such applications (Fig 1 to 5),the way of calculating the power losses is given below :

TOTAL LOSSES
due to the diode
P = P1+ P2+ P3+ P4+ P5 Watts

CONDUCTION LOSSES	REVERSE LOSSES	SWITCHING LOSSES	SWITCHING LOSSES
in the diode	in the diode	in the diode	in the tansistor due to the diode
P1 Watts	**P2 Watts**	**OFF : P3 Watts**	**P5 Watts**
(Fig. 6)	**(Fig. 6)**	**ON : P4 Watts**	**(Fig. 7)**
		(Fig. 7 & 8)	

Fig. 1 : "FREEWHEEL" MODE.

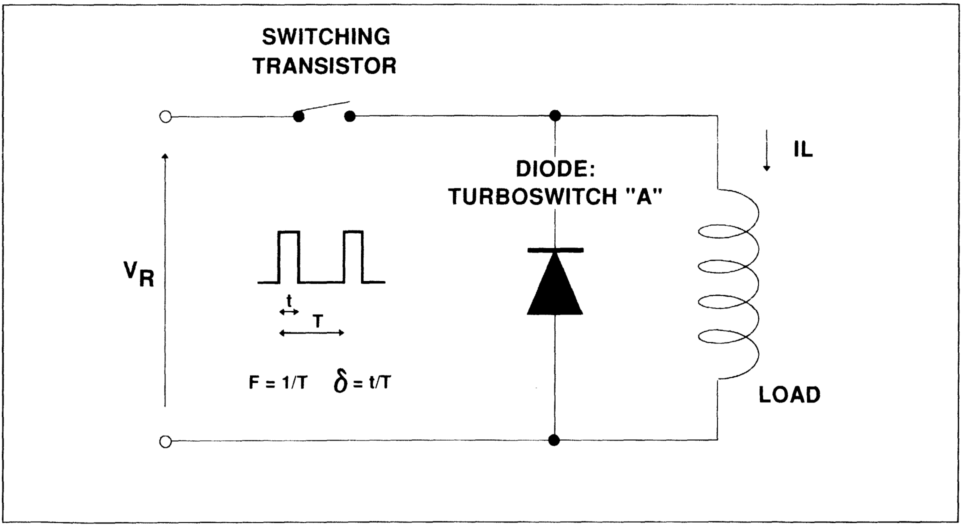


Fig. 2 : SNUBBER DIODE.

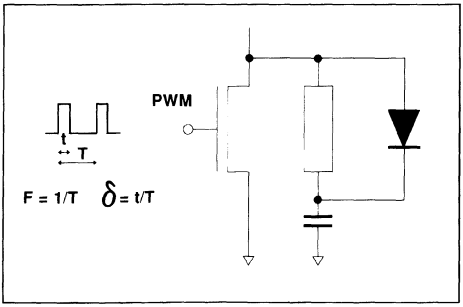


Fig. 3 : CLAMPING DIODE.

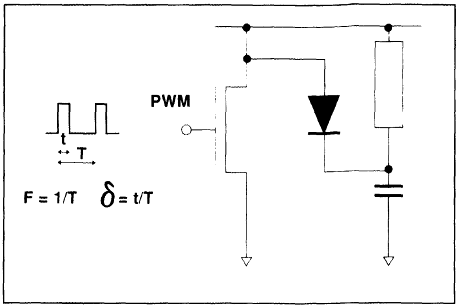


Fig. 4 : DEMAGNETIZING DIODE.

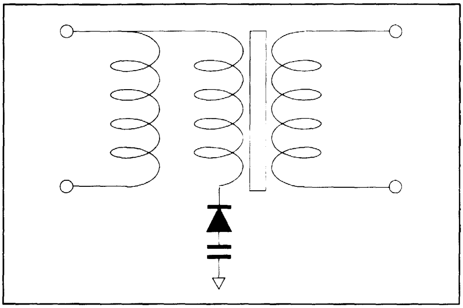
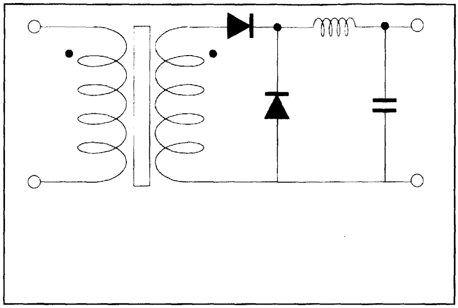
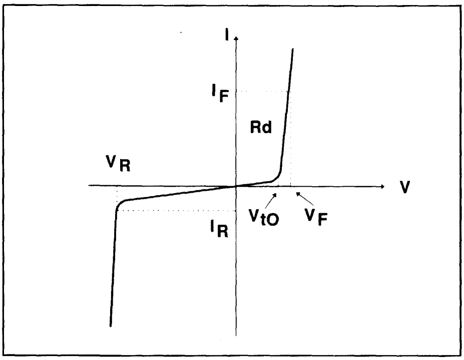


Fig. 5 : RECTIFIER DIODE.



STATIC & DYNAMIC CHARACTERISTICS . POWER LOSSES .

Fig. 6: STATIC CHARACTERISTICS



Conduction losses :

$P1 = V_{t0} \cdot I_{F(AV)} + R_d \cdot I_F^2{}_{(RMS)}$

with

$V_{t0} = 1.48$ V

$R_d = 0.027$ Ohm

(Max values at 125°C,suitable for Ipeak < $3.I_{F(av)}$)

Reverse losses :

$P2 = V_R \cdot I_R \cdot (1 - \delta)$

APPLICATION DATA (Cont'd)

Fig. 7: TURN-OFF CHARACTERISTICS

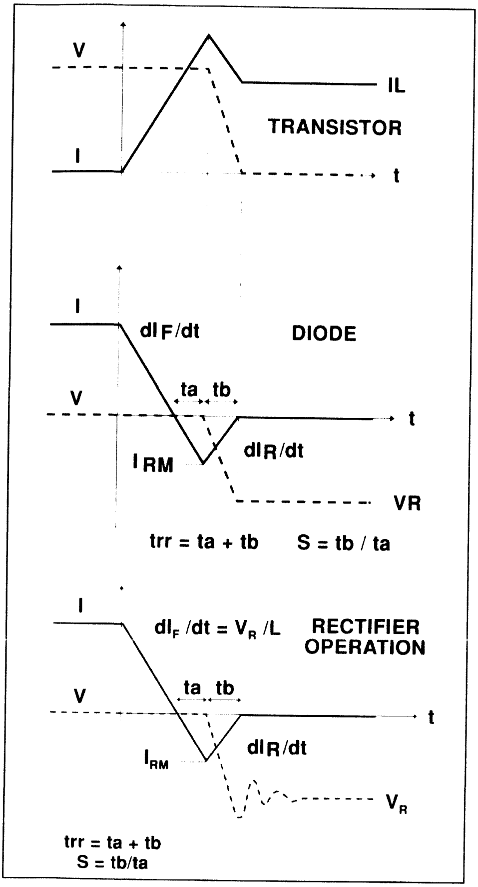
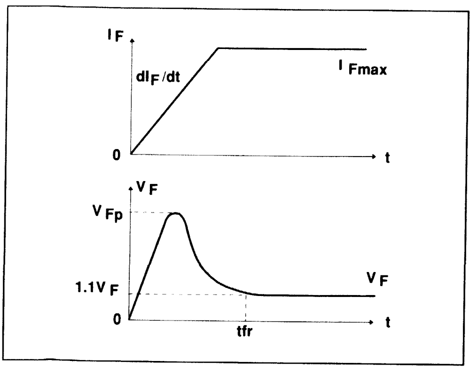


Fig. 8: TURN-ON CHARACTERISTICS



Turn-on losses :
(in the transistor, due to the diode)

$$P5 = \frac{V_R \times I_{RM}^2 \times (3 + 2 \times S) \times F}{6 \; x \; dI_F/dt} + \frac{V_R \times I_{RM} \times I_L \times (S + 2) \times F}{2 \; x \; dI_F/dt}$$

Turn-off losses (in the diode) :

$$P3 = \frac{V_R \times I_{RM}^2 \times S \times F}{6 \; x \; dI_F/dt}$$

Turn-off losses :
(with non negligible serial inductance)

$$P3' = \frac{V_R \times I_{RM}^2 \times S \times F}{6 \; x \; dI_F/dt} + \frac{L \times I_{RM}^2 \times F}{2}$$

P3,P3' and P5 are suitable for power MOSFET and IGBT

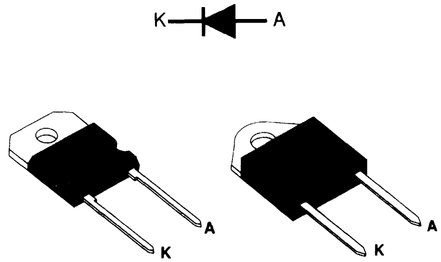
Turn-on losses :

$P4 = 0.4\,(V_{FP} - V_F)\,.\,I_{Fmax}\,.\,t_{fr}\,.\,F$

TURBOSWITCH ™ "A". ULTRA-FAST HIGH VOLTAGE DIODE

MAIN PRODUCTS CHARACTERISTICS

$I_{F(AV)}$	**20A**
V_{RRM}	**600V**
t_{rr} (typ)	**30ns**
V_F (max)	**1.5V**



SOD93
(Plastic)

STTA2006P

Isolated DOP3I
(Plastic)

STTA2006PI

FEATURES AND BENEFITS

- SPECIFIC TO "FREEWHEEL MODE" OPERATIONS: Freewheel or Booster Diode.
- ULTRA-FAST RECOVERY.
- VERY LOW OVERALL POWER LOSSES IN BOTH THE DIODE AND THE COMPANION TRANSISTOR.
- HIGH FREQUENCY OPERATIONS.

DESCRIPTION

The TURBOSWITCH is a very high performance series of ultra-fast high voltage power diodes from 600V to 1200V.
TURBOSWITCH, A family, drastically cuts losses in both the diode and the associated switching IGBT or MOSFET in all "Freewheel Mode" operations and is particularly suitable and efficient in Motor Control Freewheel applications and in Booster diode applications in Power Factor Control circuitries.
Packaged in SOD93 and in isolated DOP3I, these 600V devices are particularly intended for use on 240V domestic mains.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{RRM}	Repetitive peak reverse voltage	600	V
V_{RSM}	Non repetitive peak reverse voltage	600	V
$I_{F(RMS)}$	RMS forward current	50	A
I_{FRM}	Repetitive peak forward current (tp = 5 μs, f = 5kHz)	270	A
T_j	Max operating junction temperature	-65 to 150	°C
T_{stg}	Storage temperature	-65 to 150	°C

TM : TURBOSWITCH is a trademark of SGS-THOMSON Microelectronics.

THERMAL AND POWER DATA

Symbol	Parameter	Conditions	Value	Unit
$R_{th(j-c)}$	Junction to case thermal resistance	STTA2006P STTA2006PI	1.5 2.1	°C/W
P_1	Conduction power dissipation (see fig. 2)	$I_{F(AV)}$ = 20A δ =0.5 STTA2006P Tc= 96°C STTA2006PI Tc= 74°C	36	W
P_{max}	Total power dissipation Pmax = P1 + P3 (P3 = 10% P1)	STTA2006P Tc= 90°C STTA2006PI Tc= 66°C	40	W

STATIC ELECTRICAL CHARACTERISTICS (see Fig.2)

Symbol	Parameter	Test Conditions		Min	Typ	Max	Unit
V_F *	Forward voltage drop	I_F =20A	Tj = 25°C Tj = 125°C			1.75 1.5	V V
I_R **	Reverse leakage current	V_R =0.8 x V_{RRM}	Tj = 25°C Tj = 125°C			100 6	µA mA

Test pulses widths : * tp = 380 µs, duty cycle < 2%
** tp = 5 ms , duty cycle < 2%

DYNAMIC ELECTRICAL CHARACTERISTICS

TURN-OFF SWITCHING (see Fig.3)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{rr}	Reverse recovery time	Tj = 25°C I_F = 0.5 A I_R = 1A Irr = 0.25A I_F = 1A dI_F/dt =-50A/µs V_R =30V		30	60	ns
I_{RM}	Maximum reverse recovery current	Tj = 125°C VR = 400V I_F =20A dI_F/dt = -160 A/µs dI_F/dt = -500 A/µs		17.5	12.5	A
S factor	Softness factor	Tj = 125°C V_R = 400V I_F =20A dI_F/dt = -500 A/µs		0.42		/

TURN-ON SWITCHING (see Fig.4)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{fr}	Forward recovery time	Tj = 25°C I_F =20A, dI_F/dt = 160 A/µs measured at, 1.1 × $V_F$max			600	ns
V_{Fp}	Peak forward voltage	Tj = 25°C I_F =20A, dI_F/dt = 160 A/µs			12	V

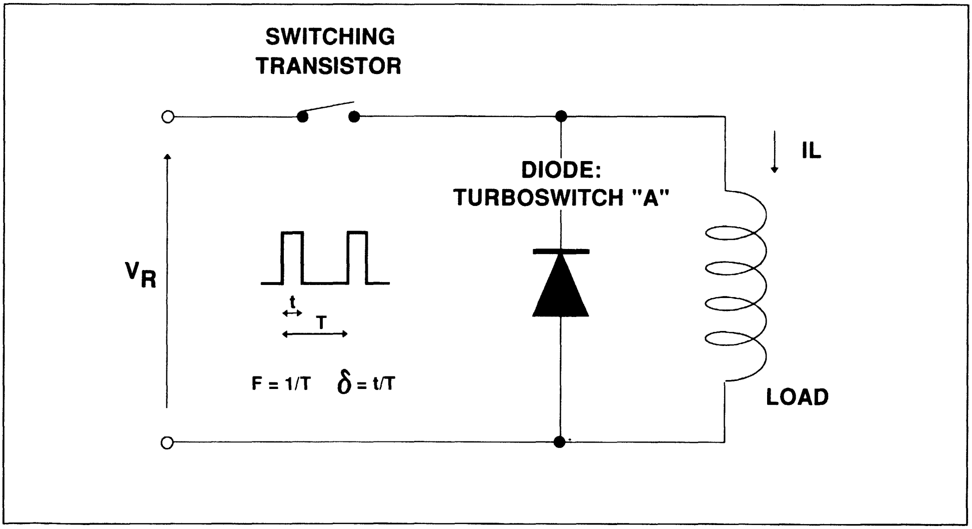
APPLICATION DATA

The TURBOSWITCH "A" is especially designed to provide the lowest overall power losses in any "FREEWHEEL Mode" application (Fig.1) considering both the diode and the companion transistor, thus optimizing the overall performance in the end application.
The way of calculating the power losses is given below:

TOTAL LOSSES
due to the diode
P = P1+ P2+ P3+ P4+ P5 Watts

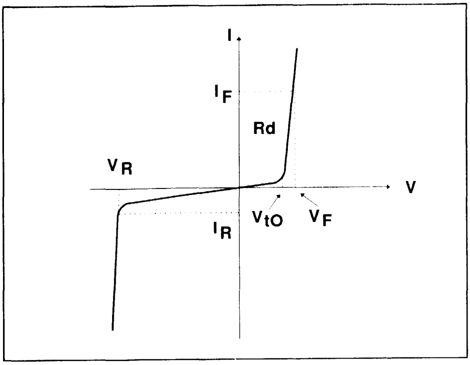
CONDUCTION LOSSES in the diode **P1 Watts (Fig. 2)**	**REVERSE LOSSES** in the diode **P2 Watts (Fig. 2)**	**SWITCHING LOSSES** in the diode **OFF : P3 Watts ON : P4 Watts (Fig. 3 & 4)**	**SWITCHING LOSSES** in the tansistor due to the diode **P5 Watts (Fig. 3)**

Fig. 1 : "FREEWHEEL" MODE.



APPLICATION DATA (Cont'd)

Fig. 2: STATIC CHARACTERISTICS



Conduction losses :

$P1 = V_{t0} \cdot I_{F(AV)} + R_d \cdot I_F{}^2{}_{(RMS)}$

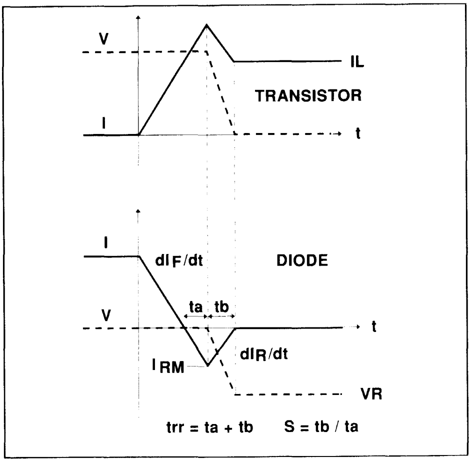
with

$V_{t0} = 1.15$ V
$R_d = 0.017$ Ohm
(Max values at 125°C)

Reverse losses :

$P2 = V_R \cdot I_R \cdot (1 - \delta)$

Fig. 3: TURN-OFF CHARACTERISTICS



Turn-on losses :
(in the transistor, due to the diode)

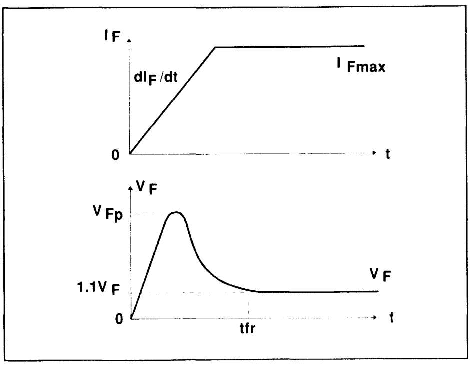
$$P5 = \frac{V_R \times I_{RM}{}^2 \times (3 + 2 \times S) \times F}{6 \times dI_F/dt} + \frac{V_R \times I_{RM} \times I_L \times (S + 2) \times F}{2 \times dI_F/dt}$$

Turn-off losses (in the diode) :

$$P3 = \frac{V_R \times I_{RM}{}^2 \times S \times F}{6 \times dI_F/dt}$$

P3 and P5 are suitable for power MOSFET and IGBT

Fig. 4: TURN-ON CHARACTERISTICS



Turn-on losses :

$P4 = 0.4\,(V_{FP} - V_F) \cdot I_{Fmax} \cdot t_{fr} \cdot F$

Fig 5 : Conduction losses versus average current

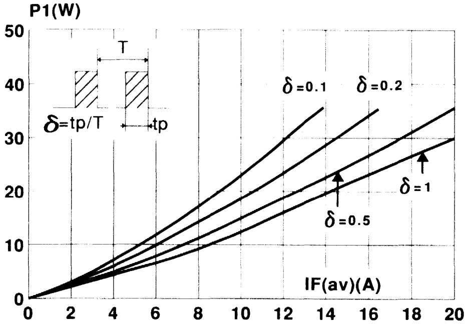


Fig 6 : Switching OFF losses versus dIF/dt

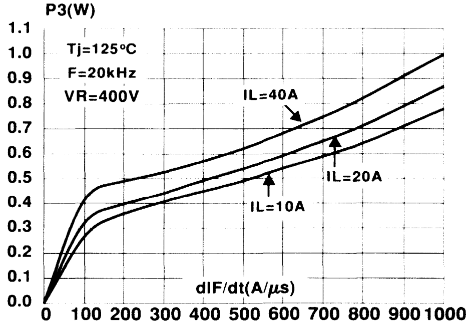


Fig 7 : Switching ON losses versus dIF/dt

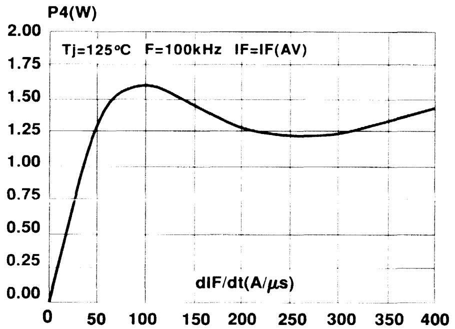


Fig 8 : Switching losses in transistor due to the diode

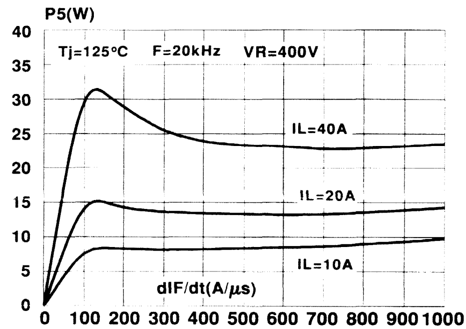


Fig 9 : Forward voltage drop versus forward current

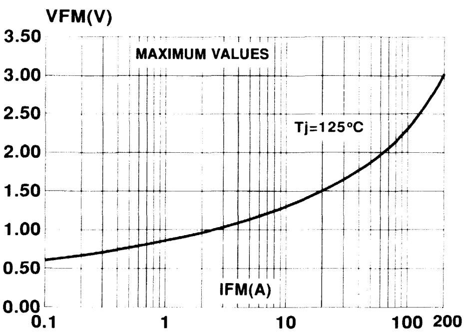


Fig 10 : Relative variation of thermal transient impedance junction to case versus pulse duration

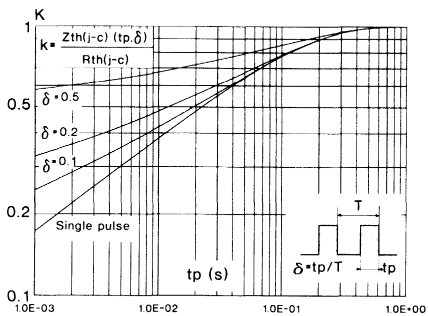


Fig 11 : Peak reverse recovery current versus dIF/dt

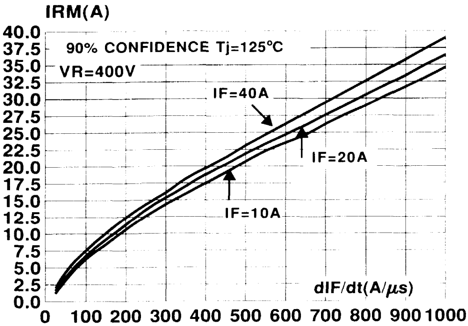


Fig 12 : Reverse recovery time versus dIF/dt

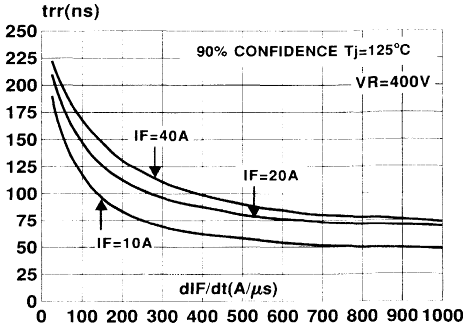


Fig 13 : Softness factor (tb/ta) versus dIF/dt

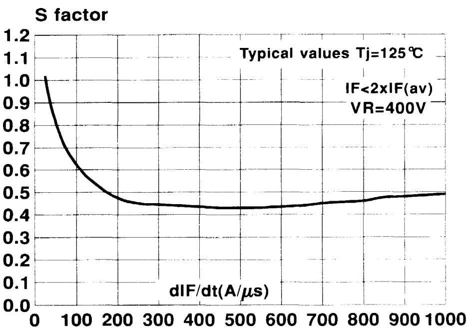


Fig 14 : Relative variation of dynamic parameters versus junction temperature (Reference Tj=125°C)

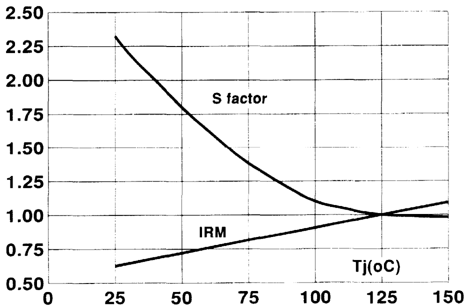


Fig 15 : Transient peak forward voltage versus dIF/dt

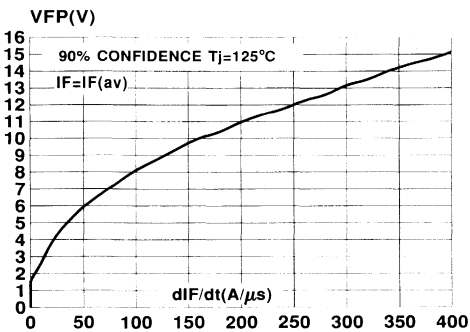
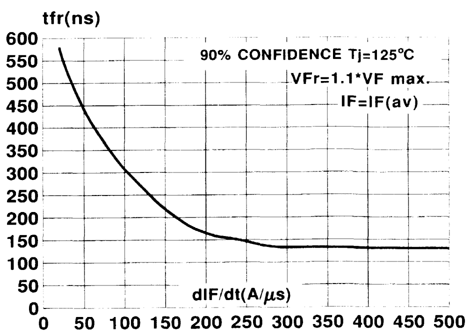


Fig 16 : Forward recovery time versus dIF/dt



STTA2006M

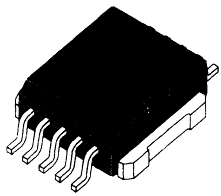
ULTRA-FAST HIGH VOLTAGE DIODE

MAIN PRODUCT CHARACTERISTICS

$I_{F(AV)}$	**20A**
V_{RRM}	**600V**
t_{rr} (typ)	**30ns**
V_F (max)	**1.5V**

FEATURES AND BENEFITS

- SPECIFIC TO "FREEWHEEL MODE" OPERATIONS: Freewheel or Booster Diode.
- ULTRA-FAST AND SOFT RECOVERY.
- VERY LOW OVERALL POWER LOSSES IN BOTH THE DIODE AND THE COMPANION TRANSISTOR.
- HIGH FREQUENCY OPERATIONS.
- HIGH DISSIPATION MINIATURE PACKAGE.
- SURFACE MOUNT TECHNOLOGY COMPATIBLE.



Power SO-10™
Plastic, non isolated SMD
with copper tab

DESCRIPTION

The TURBOSWITCH is a very high performance series of ultra-fast high voltage power diodes from 600V to 1200V.
TURBOSWITCH, A family, drastically cuts losses in both the diode and the associated switching IGBT or MOSFET in all "Freewheel Mode" operations and is particularly suitable and efficient in motor control freewheel applications and in booster diode applications in Power Factor Control circuitries.
Packaged in a very high performance surface mount package PSO-10, this 600V device is particularly intended for use on 240V domestic mains.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{RRM}	Repetitive peak reverse voltage	600	V
V_{RSM}	Non repetitive peak reverse voltage	600	V
$I_{F(RMS)}$	RMS forward current (All pins connected)	44	A
I_{FRM}	Repetitive peak forward current (t_p = 5 µs, f = 5kHz)	180	A
T_j	Max operating junction temperature	- 65 to + 150	°C
T_{stg}	Storage temperature	- 65 to + 150	°C

TM : PowerSO-10 and TURBOSWITCH are trademarks of SGS-THOMSON Microelectronics.

THERMAL AND POWER DATA

Symbol	Parameter	Conditions	Value	Unit
$R_{th(j-c)}$	Junction to case thermal resistance		1.5	°C/W
P_1	Conduction power dissipation (see fig. 2)	$I_{F(AV)}$ = 20A δ = 0.5 Tc = 96°C	36	W
P_{max}	Total power dissipation Pmax = P1+ P3 (P3 = 10% P1)	Tc = 90°C	40	W

STATIC ELECTRICAL CHARACTERISTICS (see Fig.2)

Symbol	Parameter	Test Conditions		Min	Typ	Max	Unit
V_F *	Forward voltage drop	I_F = 20A	Tj = 25°C			1.75	V
			Tj = 125°C			1.5	
I_R **	Reverse leakage current	V_R = 0.8 x V_{RRM}	Tj = 25°C			100	µA
			Tj = 125°C			6	mA

Test pulses widths : * tp = 380 µs, duty cycle < 2%
** tp = 5 ms , duty cycle < 2%

DYNAMIC ELECTRICAL CHARACTERISTICS
TURN-OFF SWITCHING (see Fig.3)

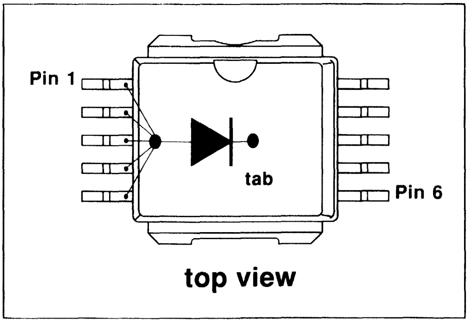
Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{rr}	Reverse recovery time	Tj = 25°C I_F = 0.5 A I_R = 1A I_{rr} = 0.25A I_F = 1A dI_F/dt = -50A/µs V_R = 30V		30	60	ns
I_{RM}	Maximum reverse recovery current	Tj = 125°C V_R = 400V I_F = 20A dI_F/dt = -160 A/µs dI_F/dt = -500 A/µs		17.5	12.5	A
S factor	Softness factor	Tj = 125°C V_R = 400V I_F = 20A dI_F/dt = -500 A/µs		0.42		/

TURN-ON SWITCHING (see Fig.4)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{fr}	Forward recovery time	Tj = 25°C I_F = 20A dI_F/dt = 160 A/µs measured at, 1.1 × V_{Fmax}			600	ns
V_{Fp}	Peak forward voltage	Tj = 25°C I_F = 20A dI_F/dt = 160 A/µs			12	V

PIN OUT configuration in PowerSO-10 :

Anode = pin 1 to 5
Cathode = connected to base tab



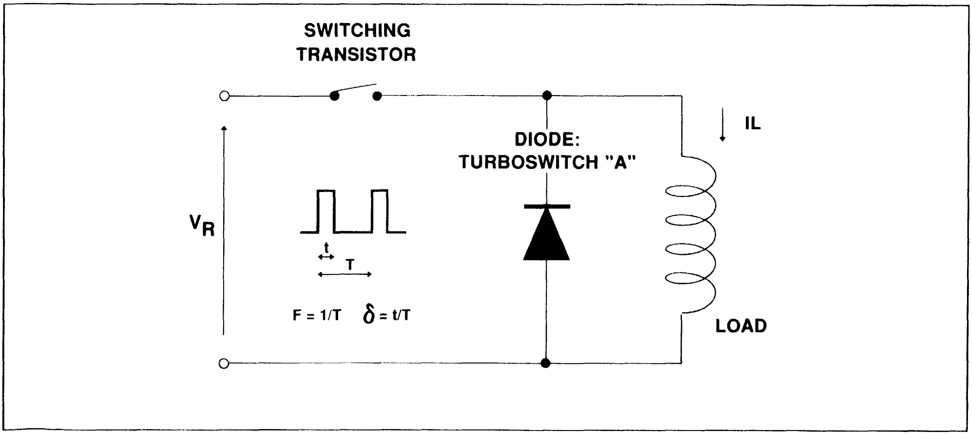
APPLICATION DATA

The TURBOSWITCH "A" is especially designed to provide the lowest overall power losses in any "FREEWHEEL Mode" application (Fig.1) considering both the diode and the companion transistor, thus optimizing the overall performance in the end application.
The way of calculating the power losses is given below:

TOTAL LOSSES
due to the diode
P = P1+ P2+ P3+ P4+ P5 Watts

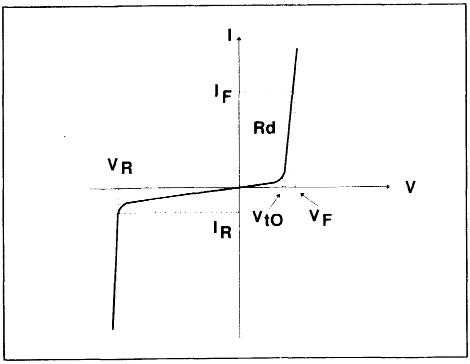
CONDUCTION LOSSES	REVERSE LOSSES	SWITCHING LOSSES	SWITCHING LOSSES
in the diode	in the diode	in the diode	in the tansistor due to the diode
P1 Watts (Fig. 2)	**P2 Watts (Fig. 2)**	**OFF : P3 Watts ON : P4 Watts (Fig. 3 & 4)**	**P5 Watts (Fig. 3)**

Fig. 1 : "FREEWHEEL" MODE.



APPLICATION DATA (Cont'd)

Fig. 2: STATIC CHARACTERISTICS



Conduction losses :

$P1 = V_{t0} \, . \, I_{F(AV)} + R_d \, . \, I_F^2{}_{(RMS)}$

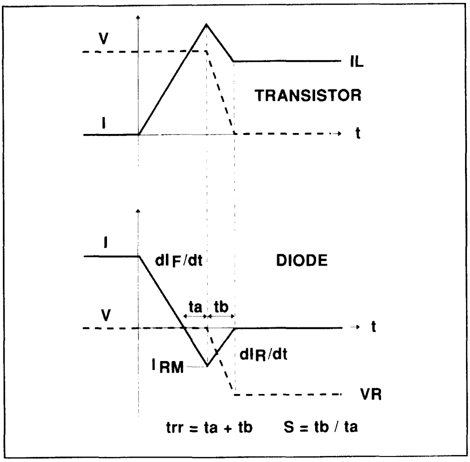
with

$V_{t0} = 1.15$ V
$R_d = 0.017$ Ohm
(Max values at 125°C)

Reverse losses :

$P2 = V_R \, . \, I_R \, . \, (1 - \delta)$

Fig. 3: TURN-OFF CHARACTERISTICS



Turn-on losses :
(in the transistor, due to the diode)

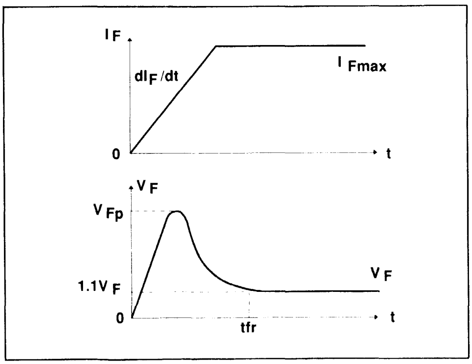
$$P5 = \frac{V_R \times I_{RM}^2 \times (3 + 2 \times S) \times F}{6 \, x \, dI_F/dt} + \frac{V_R \times I_{RM} \times I_L \times (S + 2) \times F}{2 \, x \, dI_F/dt}$$

Turn-off losses (in the diode) :

$$P3 = \frac{V_R \times I_{RM}^2 \times S \times F}{6 \, x \, dI_F/dt}$$

P3 and P5 are suitable for power MOSFET and IGBT

Fig. 4: TURN-ON CHARACTERISTICS



Turn-on losses :

$P4 = 0.4 \, (V_{FP} - V_F) \, . \, I_{Fmax} \, . \, t_{fr} \, . \, F$

Fig 5 : Conduction losses versus average current

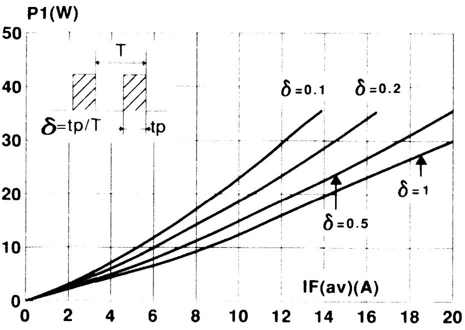


Fig 6 : Switching OFF losses versus dIF/dt

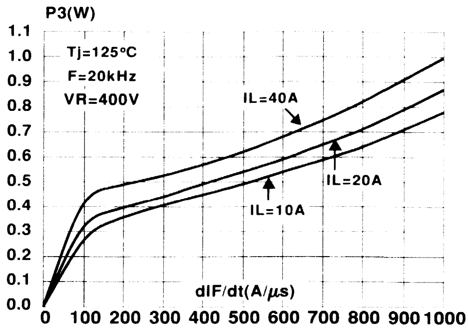


Fig 7 : Switching ON losses versus dIF/dt

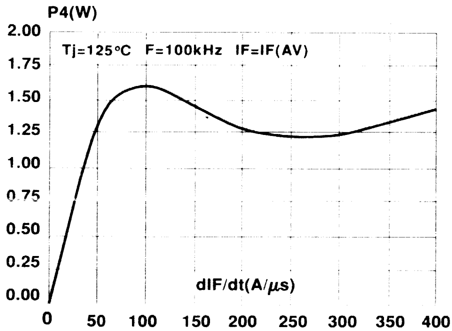


Fig 8 : Switching losses in transistor due to the diode

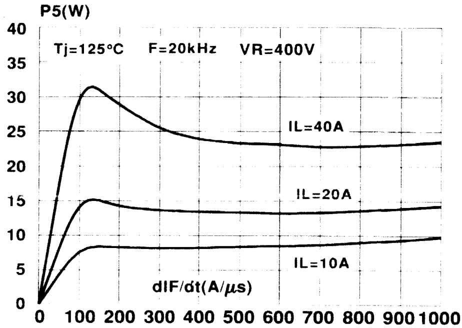


Fig 9 : Forward voltage drop versus forward current

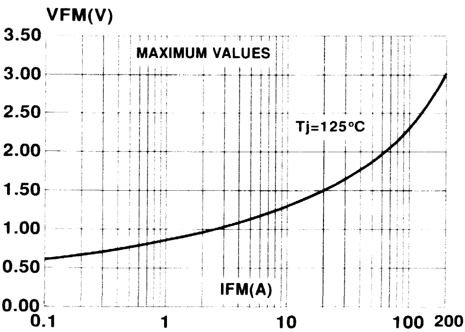


Fig 10 : Relative variation of thermal transient impedance junction to case versus pulse duration

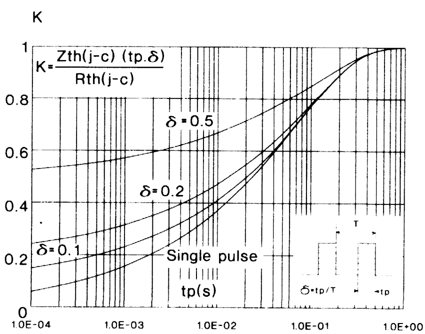


Fig 11 : Peak reverse recovery current versus dIF/dt

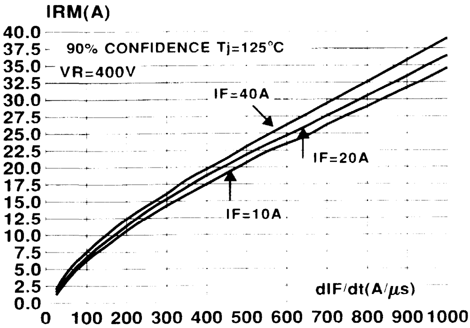


Fig 12 : Reverse recovery time versus dIF/dt

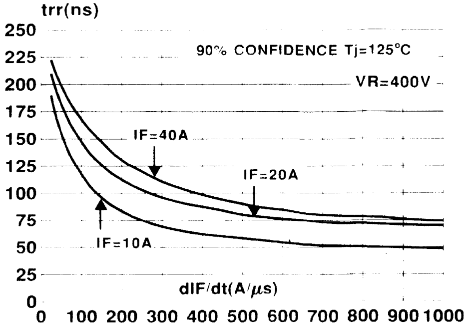


Fig 13 : Softness factor (tb/ta) versus dIF/dt

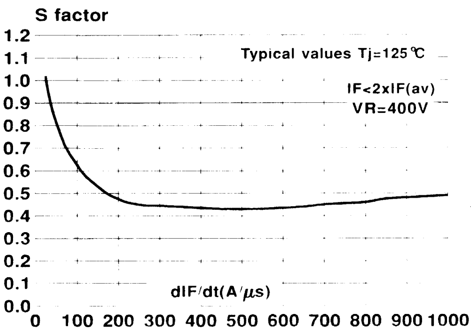


Fig 14 : Relative variation of dynamic parameters versus junction temperature (Reference Tj=125 °C)

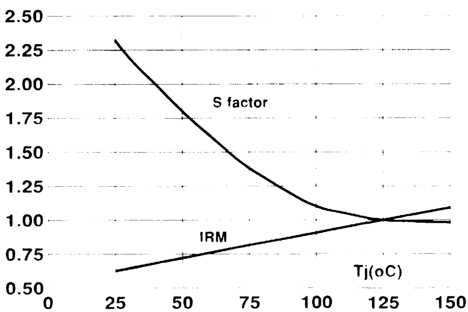


Fig 15 : Transient peak forward voltage versus dIF/dt

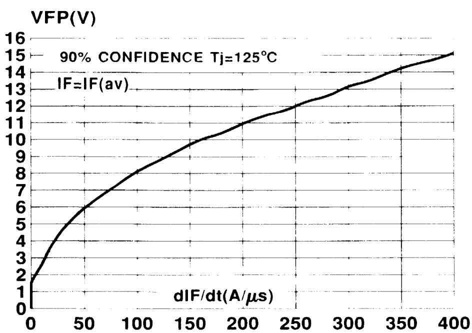
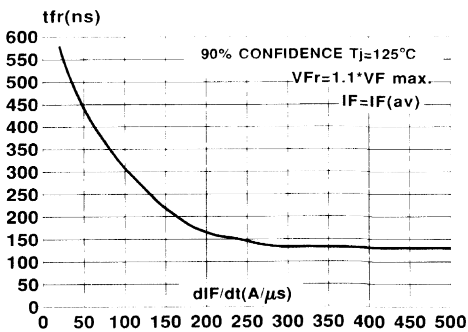


Fig 16 : Forward recovery time versus dIF/dt



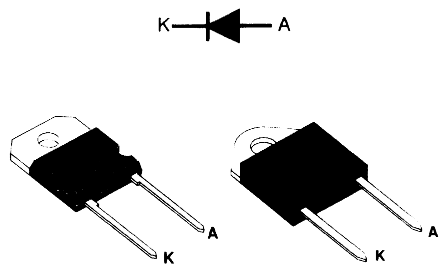
SGS-THOMSON
MICROELECTRONICS

STTB2006P(I)

TURBOSWITCH ™ “B”. ULTRA-FAST HIGH VOLTAGE DIODE

MAIN PRODUCTS CHARACTERISTICS

$I_{F(AV)}$	**20A**
V_{RRM}	**600V**
t_{rr} (typ)	**55ns**
V_F (max)	**1.3V**



SOD93
(Plastic)
STTB2006P

Isolated
DOP3I
(Plastic)
STTB2006PI

FEATURES AND BENEFITS

- SPECIFIC TO THE FOLLOWING OPERATIONS: Snubbing or clamping, demagnetization and rectification.
- ULTRA-FAST, SOFT AND NOISE-FREE RECOVERY.
- VERY LOW OVERALL POWER LOSSES AND PARTICULARY LOW FORWARD VOLTAGE.
- DESIGNED FOR HIGH PULSED CURRENT OPERATIONS.

DESCRIPTION

The TURBOSWITCH is a very high performance series of ultra-fast high voltage power diodes from 600V to 1200V.
TURBOSWITCH, B family, drastically cuts losses in all high voltage operations which require extremely fast, soft and noise-free power diodes.
They are particularly suitable in the primary circuit of an SMPS as snubber, clamping or demagnetizing diodes, and also in most power converters as high performance rectifier diodes.
Packaged in SOD93 and in isolated DOP3I, these 600V devices are particularly intended for use on 240V domestic mains.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{RRM}	Repetitive peak reverse voltage	600	V
V_{RSM}	Non repetitive peak reverse voltage	600	V
$I_{F(RMS)}$	RMS forward current	50	A
I_{FRM}	Repetitive peak forward current (tp = 5 µs, f = 1kHz)	680	A
T_j	Max operating junction temperature	-65 to 150	°C
T_{stg}	Storage temperature	-65 to 150	°C

TM : TURBOSWITCH is a trademark of SGS-THOMSON Microelectronics.

THERMAL AND POWER DATA

Symbol	Parameter	Conditions	Value	Unit
$R_{th(j-c)}$	Junction to case thermal resistance	STTB2006P STTB2006PI	1.3 2.1	°C/W
P_1	Conduction power dissipation (see fig. 5)	$I_{F(AV)} = 20A$ $\delta = 0.5$ STTB2006P Tc= 108°C STTB2006PI Tc= 82°C	32	W
P_{max}	Total power dissipation Pmax = P1 + P3 (P3 = 10% P1)	STTB2006P Tc= 98°C STTB2006PI Tc= 66°C	40	W

STATIC ELECTRICAL CHARACTERISTICS (see Fig.5)

Symbol	Parameter	Test Conditions		Min	Typ	Max	Unit
V_F *	Forward voltage drop	I_F =20A	Tj = 25°C Tj = 125°C			1.4 1.3	V V
I_R **	Reverse leakage current	V_R =0.8 x V_{RRM}	Tj = 25°C Tj = 125°C			100 3.0	µA mA

Test pulses widths : * tp = 380 µs, duty cycle < 2%
** tp = 5 ms , duty cycle < 2%

DYNAMIC ELECTRICAL CHARACTERISTICS

TURN-OFF SWITCHING (see Fig.6)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{rr}	Reverse recovery time	Tj = 25°C I_F = 0.5 A I_R = 1A Irr = 0.25A I_F = 1A dI_F/dt =-50A/µs V_R = 30V		55	105	ns
I_{RM}	Maximum reverse recovery current	Tj = 125°C VR = 400V I_F =20A dI_F/dt = -160 A/µs dI_F/dt = -500 A/µs		33	30	A
S factor	Softness factor	Tj = 125°C V_R = 400V I_F =20A dI_F/dt = -500 A/µs		1.1		/

TURN-ON SWITCHING (see Fig.7)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{fr}	Forward recovery time	Tj = 25°C I_F =20 A, dI_F/dt = 160 A/µs measured at, 1.1 × $V_F$max			500	ns
V_{Fp}	Peak forward voltage	Tj = 25°C I_F =20A, dI_F/dt = 160 A/µs I_F =100A, dI_F/dt = 500 A/µs		10	8	V

APPLICATION DATA

The TURBOSWITCH "B" is especially designed to provide the lowest overall power losses in any application such as snubbing,clamping, demagnetization and rectification. In such applications (fig.1 to fig.4), the way of calculating the power losses is given below :

TOTAL LOSSES
due to the diode
P = P1+ P2+ P3+ P4 Watts

CONDUCTION LOSSES	REVERSE LOSSES	SWITCHING LOSSES
P1 Watts (Fig. 5)	**P2 Watts (Fig. 5)**	**OFF : P3 Watts ON : P4 Watts (Fig. 6 & 7)**

Fig. 1 : SNUBBER DIODE.

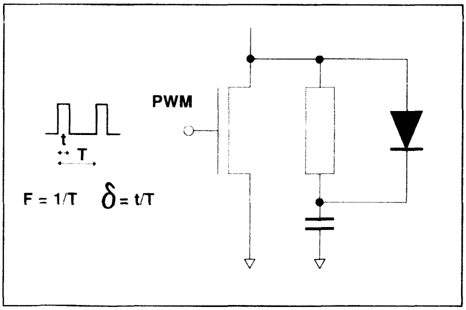


Fig. 2 : CLAMPING DIODE.

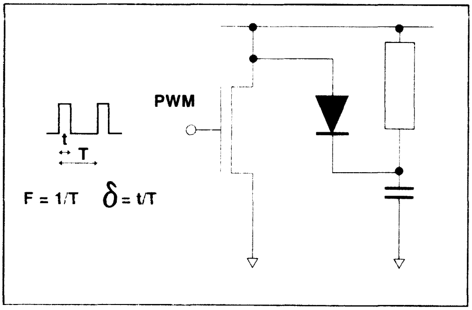


Fig. 3 : DEMAGNETIZING DIODE.

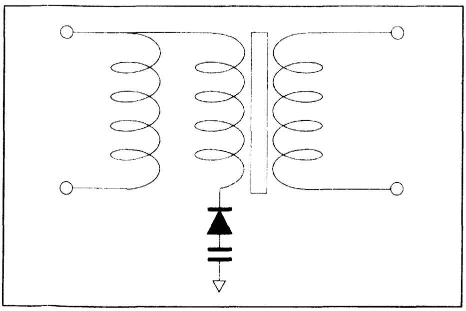
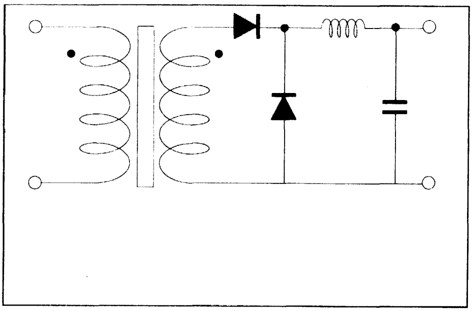
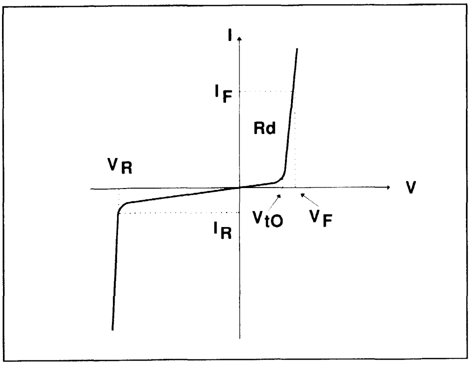


Fig. 4 : RECTIFIER DIODE.



APPLICATION DATA (Cont'd)

Fig. 5: STATIC CHARACTERISTICS



Conduction losses :

$P1 = V_{t0} \cdot I_{F(AV)} + R_d \cdot I_F^2{}_{(RMS)}$

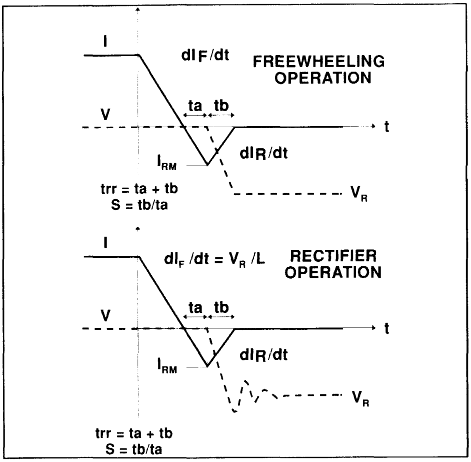
with

$V_{t0} = 1.00$ V
$R_d = 0.015$ Ohm
(Max values at 125°C)

Reverse losses :

$P2 = V_R \cdot I_R \cdot (1 - \delta)$

Fig. 6: TURN-OFF CHARACTERISTICS



Turn-off losses :

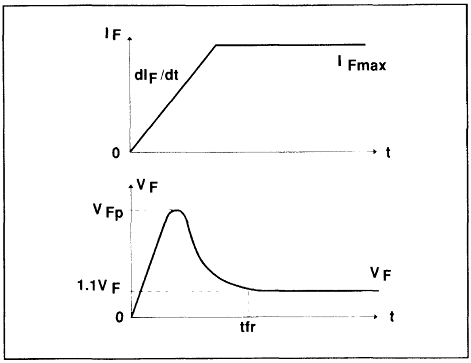
$$P3 = \frac{V_R \times I_{RM}^2 \times S \times F}{6 \times dI_F/dt}$$

Turn-off losses :
(with non negligible serial inductance)

$$P3' = \frac{V_R \times I_{RM}^2 \times S \times F}{6 \times dI_F/dt} + \frac{L \times I_{RM}^2 \times F}{2}$$

P3 and P3' are suitable for power MOSFET and IGBT

Fig. 7: TURN-ON CHARACTERISTICS



Turn-on losses :

$P4 = 0.4\ (V_{FP} - V_F) \cdot I_{Fmax} \cdot t_{fr} \cdot F$

Fig 8 : Conduction losses versus average current

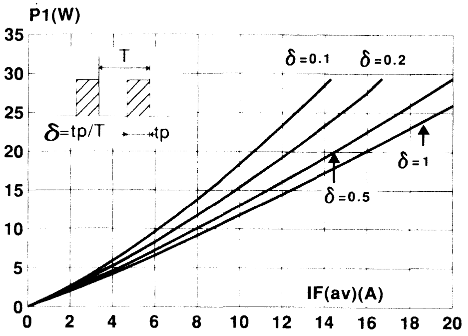


Fig 9 : Switching OFF losses versus dIF/dt

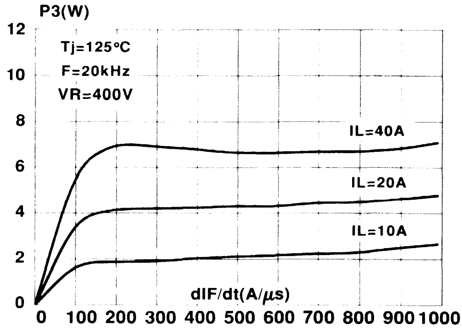


Fig 10 : Switching ON losses versus dIF/dt

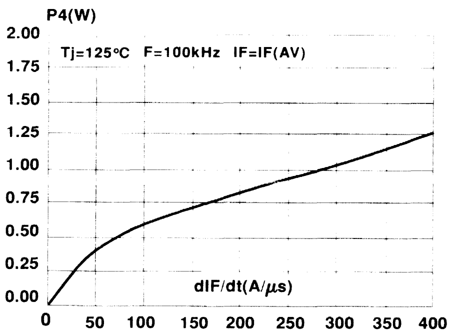


Fig 11 : Forward voltage drop versus forward current

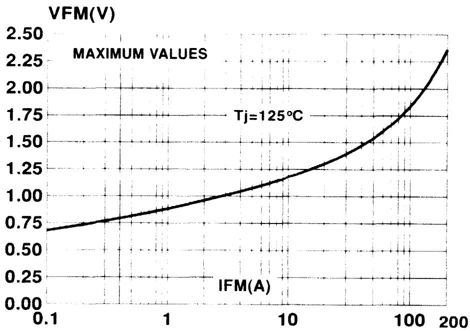


Fig 12 : Relative variation of thermal transient impedance junction to case versus pulse duration

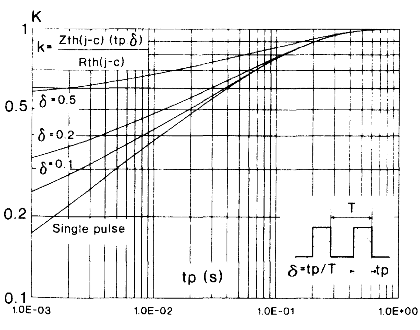


Fig 13 : Peak reverse recovery current versus dIF/dt

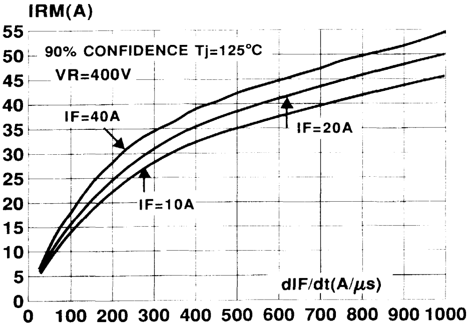


Fig 14 : Reverse recovery time versus dIF/dt

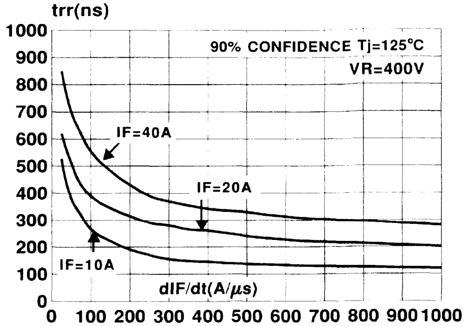


Fig 15 : Softness factor (tb/ta) versus dIF/dt

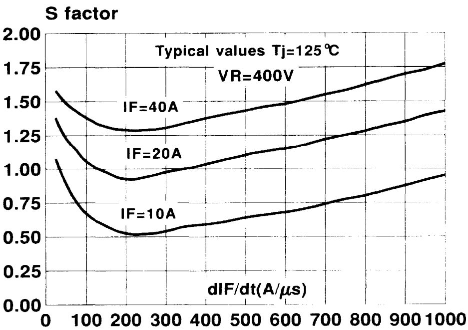


Fig 16 : Relative variation of dynamic parameters versus junction temperature (Reference Tj=125°C)

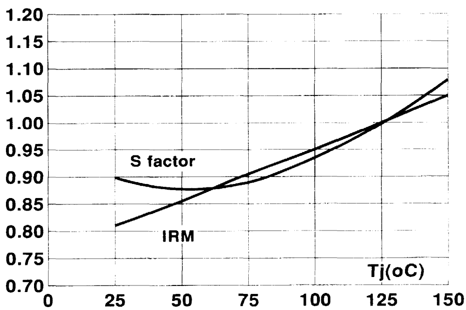


Fig 17 : Transient peak forward voltage versus dIF/dt

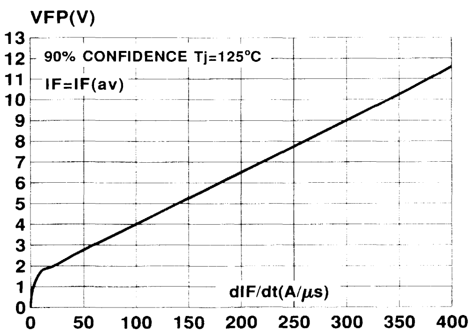
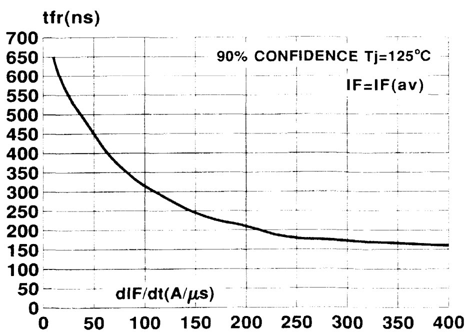


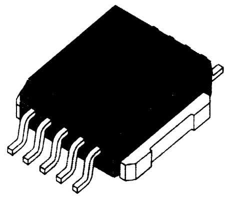
Fig 18 : Forward recovery time versus dIF/dt



ULTRA-FAST HIGH VOLTAGE DIODE

MAIN PRODUCT CHARACTERISTICS

$I_{F(AV)}$	20A
V_{RRM}	600V
t_{rr} (typ)	55ns
V_F (max)	1.3V



Power SO-10™
Plastic, non isolated SMD
with copper tab

FEATURES AND BENEFITS

- SPECIFIC TO THE FOLLOWING OPERATIONS: Snubbing or clamping, demagnetization and rectification.
- ULTRA-FAST,VERY SOFT AND NOISE-FREE RECOVERY.
- VERY LOW OVERALL POWER LOSSES AND PARTICULARY LOW FORWARD VOLTAGE.
- DESIGNED FOR HIGH PULSED CURRENT OPERATIONS.
- HIGH FREQUENCY OPERATIONS
- HIGH DISSIPATION MINIATURE PACKAGE
- SURFACE MOUNT TECHNOLOGY COMPATIBLE

DESCRIPTION

The TURBOSWITCH is a very high performance series of ultra-fast high voltage power diodes from 600V to 1200V.
TURBOSWITCH, B family, drastically cuts losses in all high voltage operations which require extremely fast, soft and noise-free power diodes.
They are particularly suitable in the primary circuit of an SMPS as snubber, clamping or demagnetizing diodes, and also in most power converters as high performance rectifier diodes.
Packaged in PSO-10, this 600V devices are particularly intended for use on 240V domestic mains.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{RRM}	Repetitive peak reverse voltage	600	V
V_{RSM}	Non repetitive peak reverse voltage	600	V
$I_{F(RMS)}$	RMS forward current (All pins connected)	44	A
I_{FRM}	Repetitive peak forward current (tp = 5 µs, f = 1kHz)	600	A
T_j	Max operating junction temperature	- 65 to + 150	°C
T_{stg}	Storage temperature	- 65 to + 150	°C

TM PowerSO-10 and TURBOSWITCH are trademarks of SGS-THOMSON Microelectronics.

THERMAL AND POWER DATA

Symbol	Parameter	Conditions	Value	Unit
$R_{th(j-c)}$	Junction to case thermal resistance		1.3	°C/W
P_1	Conduction power dissipation (see fig. 5)	$I_{F(AV)}$ = 20A δ = 0.5 Tc = 108°C	32	W
P_{max}	Total power dissipation Pmax = P1+ P3 (P3 = 10% P1)	Tc = 98°C	40	W

STATIC ELECTRICAL CHARACTERISTICS (see Fig.5)

Symbol	Parameter	Test Conditions		Min	Typ	Max	Unit
V_F *	Forward voltage drop	I_F = 20A	Tj = 25°C			1.4	V
			Tj = 125°C			1.3	
I_R **	Reverse leakage current	V_R = 0.8 x V_{RRM}	Tj = 25°C			100	µA
			Tj = 125°C			3.0	mA

Test pulses widths : * tp = 380 µs, duty cycle < 2%
** tp = 5 ms , duty cycle < 2%

DYNAMIC ELECTRICAL CHARACTERISTICS
TURN-OFF SWITCHING (see Fig.6)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{rr}	Reverse recovery time	Tj = 25°C I_F = 0.5 A I_R = 1A I_{rr} = 0.25A I_F = 1 A dI_F/dt = -50A/µs V_R = 30V		55	105	ns
I_{RM}	Maximum reverse recovery current	Tj = 125°C V_R = 400V I_F = 20A dI_F/dt = -160 A/µs dI_F/dt = -500 A/µs		33	30	A
S factor	Softness factor	Tj = 125°C V_R = 400V I_F = 12A dI_F/dt = -500 A/µs		1.1		/

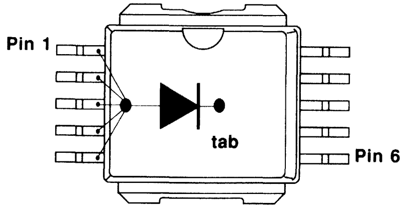
TURN-ON SWITCHING (see Fig.7)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{fr}	Forward recovery time	Tj = 25°C I_F = 20A, dI_F/dt = 160 A/µs measured at, 1.1 × V_{Fmax}			500	ns
V_{Fp}	Peak forward voltage	Tj = 25°C I_F = 20A, dI_F/dt = 160 A/µs			8	V

PIN OUT configuration in PowerSO-10 :

Anode = pin 1 to 5

Cathode = connected to base tab



top view

APPLICATION DATA

The TURBOSWITCH "B" is especially designed to provide the lowest overall power losses in any application such as snubbing,clamping, demagnetization and rectification. In such applications (fig.1 to fig.4), the way of calculating the power losses is given below :

TOTAL LOSSES
due to the diode
P = P1+ P2+ P3+ P4 Watts

CONDUCTION LOSSES	REVERSE LOSSES	SWITCHING LOSSES
P1 Watts (Fig. 5)	**P2 Watts (Fig. 5)**	**OFF : P3 Watts** **ON : P4 Watts** **(Fig. 6 & 7)**

Fig. 1 : SNUBBER DIODE.

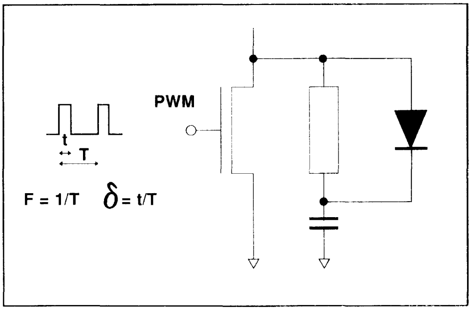


Fig. 2 : CLAMPING DIODE.

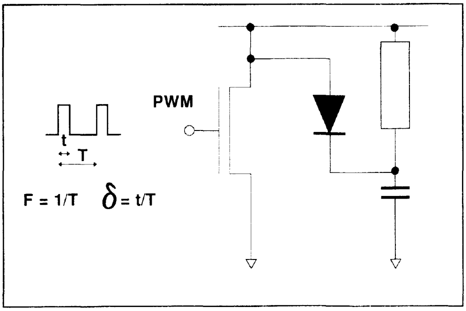


Fig. 3 : DEMAGNETIZING DIODE.

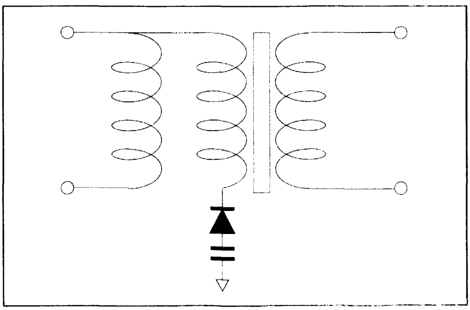
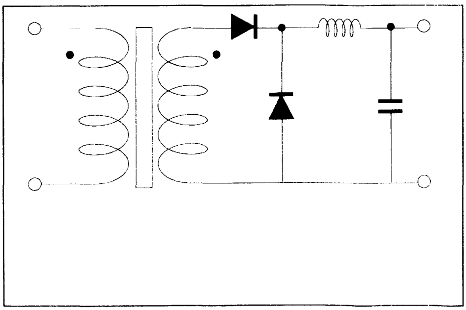
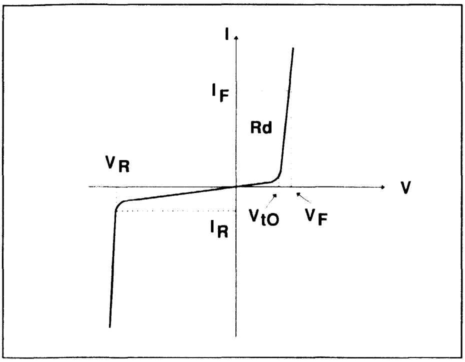


Fig. 4 : RECTIFIER DIODE.



APPLICATION DATA (Cont'd)

Fig. 5: STATIC CHARACTERISTICS



Conduction losses :

$P1 = V_{t0} \cdot I_{F(AV)} + R_d \cdot I_F^2{}_{(RMS)}$

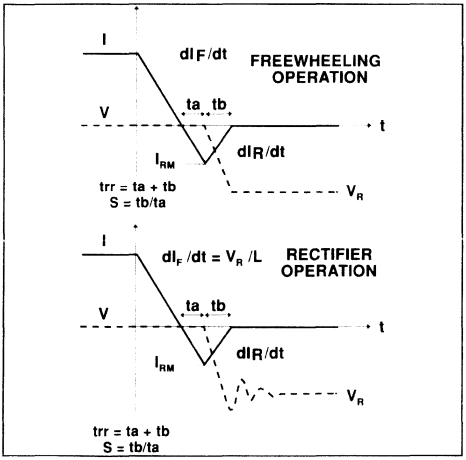
with

$V_{t0} = 1.00$ V
$R_d = 0.015$ Ohm
(Max values at 125°C)

Reverse losses :

$P2 = V_R \cdot I_R \cdot (1 - \delta)$

Fig. 6: TURN-OFF CHARACTERISTICS



Turn-off losses :

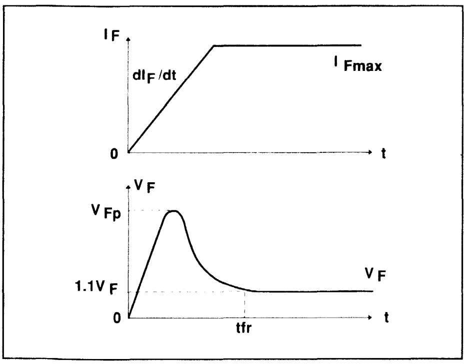
$$P3 = \frac{V_R \times I_{RM}^2 \times S \times F}{6 \; x \; dI_F/dt}$$

Turn-off losses :
(with non negligible serial inductance)

$$P3' = \frac{V_R \times I_{RM}^2 \times S \times F}{6 \; x \; dI_F/dt} + \frac{L \times I_{RM}^2 \times F}{2}$$

P3 and P3' are suitable for power MOSFET and IGBT

Fig. 7: TURN-ON CHARACTERISTICS



Turn-on losses :

$P4 = 0.4 \, (V_{FP} - V_F) \cdot I_{Fmax} \cdot t_{fr} \cdot F$

Fig 8 : Conduction losses versus average current

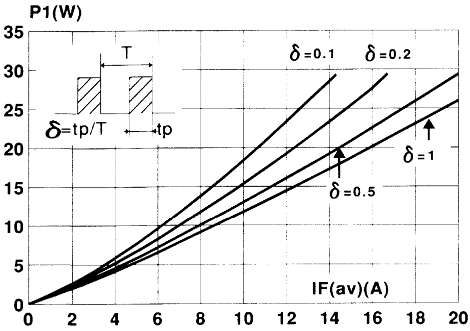


Fig 9 : Switching OFF losses versus dIF/dt

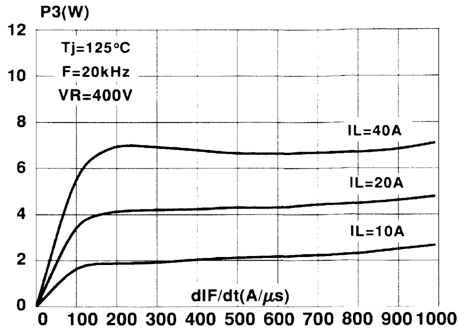


Fig 10 : Switching ON losses versus dIF/dt

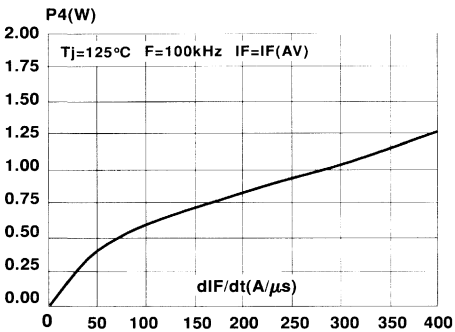


Fig 11 : Forward voltage drop versus forward current

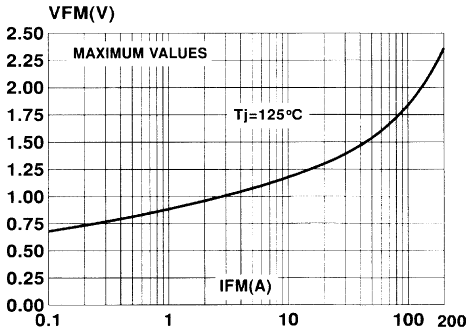


Fig 12 : Relative variation of thermal transient impedance junction to case versus pulse duration

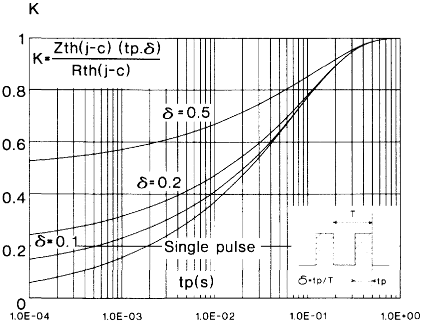


Fig 13 : Peak reverse recovery current versus dI_F/dt

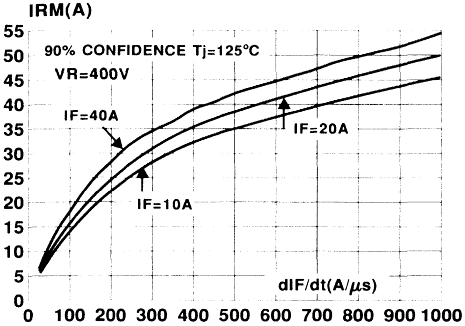


Fig 14 : Reverse recovery time versus dI_F/dt

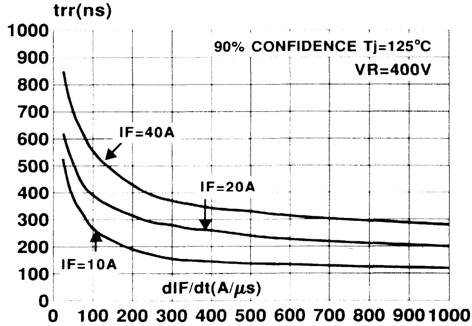


Fig 15 : Softness factor (tb/ta) versus dI_F/dt

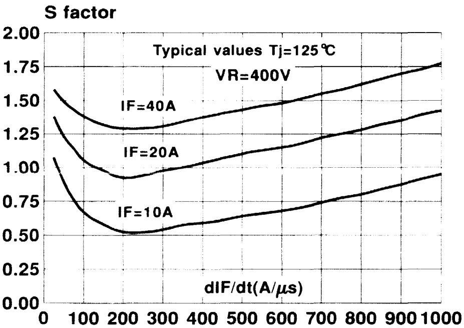


Fig 16 : Relative variation of dynamic parameters versus junction temperature (Reference Tj=125°C)

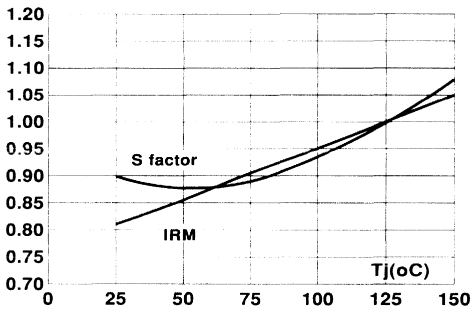


Fig 17 : Transient peak forward voltage versus dI_F/dt

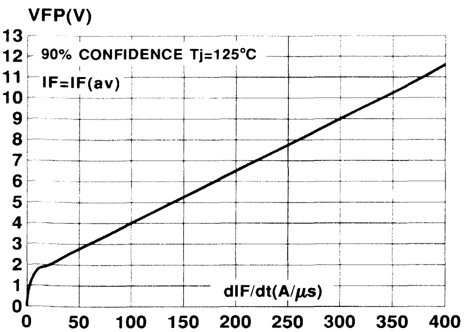
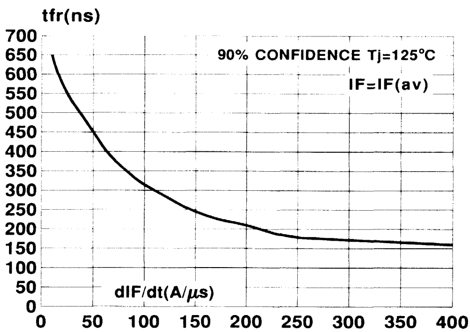


Fig 18 : Forward recovery time versus dI_F/dt



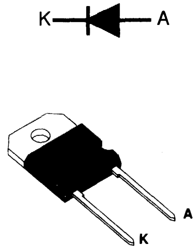
SGS-THOMSON MICROELECTRONICS

STTA2512P

TURBOSWITCH ™ "A". ULTRA-FAST HIGH VOLTAGE DIODE

MAIN PRODUCT CHARACTERISTICS

$I_{F(AV)}$	**25A**
V_{RRM}	**1200V**
t_{rr} (typ)	**60ns**
V_F (max)	**1.9V**



SOD93
(Plastic)

STTA2512P

FEATURES AND BENEFITS

- ULTRA-FAST, SOFT AND NOISE-FREE RECOVERY.
- VERY LOW OVERALL POWER LOSSES IN BOTH THE DIODE AND THE COMPANION TRANSISTOR.
- HIGH FREQUENCY AND/OR HIGH PULSED CURRENT OPERATIONS.

DESCRIPTION

The TURBOSWITCH is a very high performance series of ultra-fast high voltage power diodes from 600V to 1200V.
TURBOSWITCH 1200V drastically cuts losses in all high voltage operations which require extremely fast, soft and noise-free power diodes. Due to their optimized switching performances they also highly decrease power losses in any associated switching IGBT or MOSFET in all "Freewheel Mode" operations.
They are particularly suitable in Motor Control circuitries, or in the primary of SMPS as snubber, clamping or demagnetizing diodes, and also at the secondary of SMPS as high voltage rectifier diodes.
Packaged in SOD93, this 1200V device is particularly intended for use on 3 phase 400V industrial mains.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{RRM}	Repetitive peak reverse voltage	1200	V
V_{RSM}	Non repetitive peak reverse voltage	1200	V
$I_{F(RMS)}$	RMS forward current	50	A
I_{FRM}	Repetitive peak forward current (tp = 5 µs, f = 5kHz)	300	A
T_j	Max operating junction temperature	150	°C
T_{stg}	Storage temperature	-65 to 150	°C

TM : TURBOSWITCH is a trademark of SGS-THOMSON Microelectronics.

THERMAL AND POWER DATA

Symbol	Parameter	Conditions	Value	Unit
$R_{th(j-c)}$	Junction to case thermal resistance		1.2	°C/W
P_1	Conduction power dissipation (see fig. 6)	$I_{F(AV)} = 25A$ $\delta = 0.5$ Tc= 82°C	57	W
P_{max}	Total power dissipation Pmax = P1 + P3 (P3 = 10% P1)	Tc= 75°C	62.5	W

STATIC ELECTRICAL CHARACTERISTICS (see Fig.6)

Symbol	Parameter	Test Conditions		Min	Typ	Max	Unit
V_F *	Forward voltage drop	I_F =25A	Tj = 25°C Tj = 125°C			2.1 1.9	V V
I_R **	Reverse leakage current	V_R =0.8 x V_{RRM}	Tj = 25°C Tj = 125°C			150 8.0	µA mA

Test pulses widths : * tp = 380 µs, duty cycle < 2%
** tp = 5 ms , duty cycle < 2%

DYNAMIC ELECTRICAL CHARACTERISTICS

TURN-OFF SWITCHING (see Fig.7)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{rr}	Reverse recovery time	Tj = 25°C I_F = 0.5 A I_R = 1A Irr = 0.25A I_F = 1 A dI_F/dt =-50A/µs V_R =30V		60	110	ns
I_{RM}	Maximum reverse recovery current	Tj = 125°C VR = 600V I_F =25A dI_F/dt = -200 A/µs dI_F/dt = -500 A/µs		TBD	TBD	A
S factor	Softness factor	Tj = 125°C V_R = 600V I_F =25A dI_F/dt = -500 A/µs		1.2		/

TURN-ON SWITCHING (see Fig.8)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{fr}	Forward recovery time	Tj = 25°C I_F =25 A, dI_F/dt = 200 A/µs measured at, 1.1 × $V_F$max			TBD	ns
V_{Fp}	Peak forward voltage	Tj = 25°C I_F =25A, dI_F/dt = 200 A/µs I_F =40A, dI_F/dt = 500 A/µs			TBD TBD	V

APPLICATION DATA

The 1200V TURBOSWITCH series has been designed to provide the lowest overall power losses in all high frequency or high pulsed current operations. In such applications (Fig 1 to 5),the way of calculating the power losses is given below :

TOTAL LOSSES
due to the diode
P = P1+ P2+ P3+ P4+ P5 Watts

CONDUCTION LOSSES	REVERSE LOSSES	SWITCHING LOSSES	SWITCHING LOSSES
in the diode	in the diode	in the diode	in the tansistor due to the diode
P1 Watts (Fig. 6)	**P2 Watts (Fig. 6)**	**OFF : P3 Watts ON : P4 Watts (Fig. 7 & 8)**	**P5 Watts (Fig. 7)**

Fig. 1 : "FREEWHEEL" MODE.

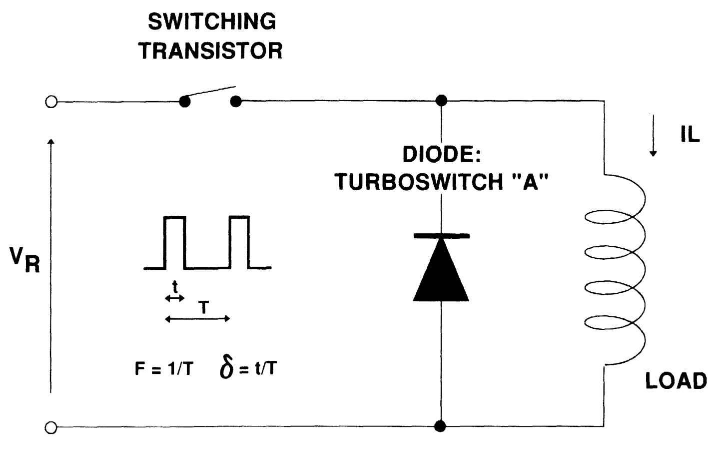


Fig. 2 : SNUBBER DIODE.

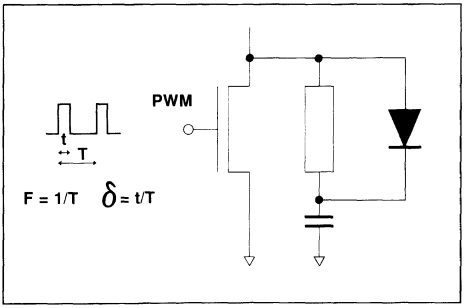


Fig. 3 : CLAMPING DIODE.

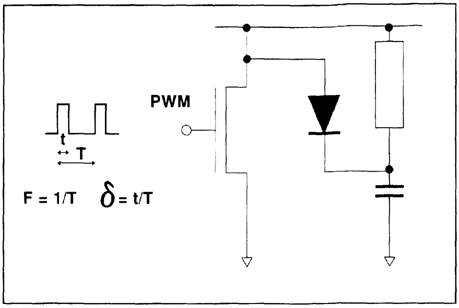


Fig. 4 : DEMAGNETIZING DIODE.

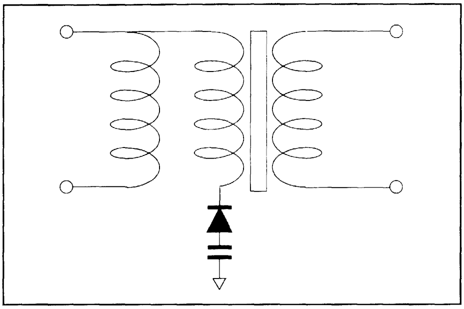
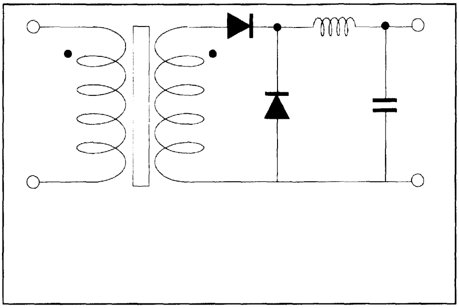
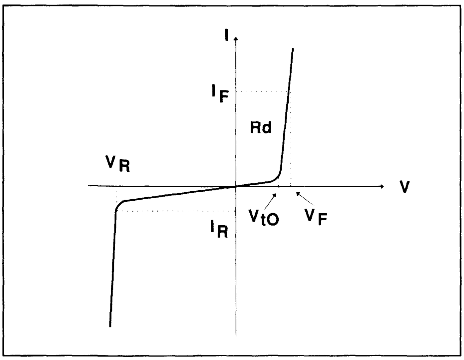


Fig. 5 : RECTIFIER DIODE.



STATIC & DYNAMIC CHARACTERISTICS . POWER LOSSES .

Fig. 6: STATIC CHARACTERISTICS



Conduction losses :

$P1 = V_{t0} \cdot I_{F(AV)} + R_d \cdot I_F^2{}_{(RMS)}$

with

$V_{t0} = 1.52$ V

$R_d = 0.015$ Ohm

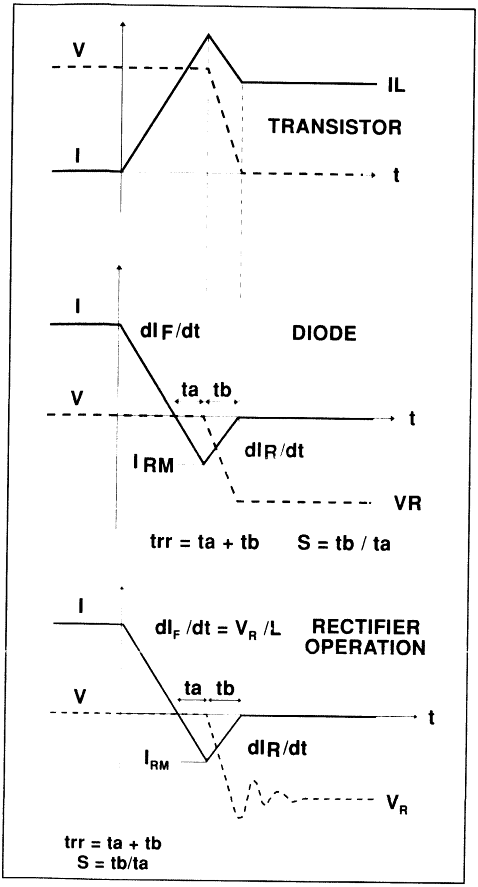
(Max values at 125°C,suitable for Ipeak < $3.I_{F(av)}$)

Reverse losses :

$P2 = V_R \cdot I_R \cdot (1 - \delta)$

APPLICATION DATA (Cont'd)

Fig. 7: TURN-OFF CHARACTERISTICS



Turn-on losses :
(in the transistor, due to the diode)

$$P5 = \frac{V_R \times I_{RM}^2 \times (3 + 2 \times S) \times F}{6 \times dI_F/dt} + \frac{V_R \times I_{RM} \times I_L \times (S + 2) \times F}{2 \times dI_F/dt}$$

Turn-off losses (in the diode) :

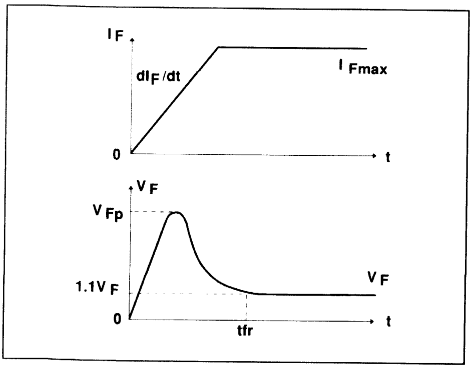
$$P3 = \frac{V_R \times I_{RM}^2 \times S \times F}{6 \times dI_F/dt}$$

Turn-off losses :
(with non negligible serial inductance)

$$P3' = \frac{V_R \times I_{RM}^2 \times S \times F}{6 \times dI_F/dt} + \frac{L \times I_{RM}^2 \times F}{2}$$

P3,P3' and P5 are suitable for power MOSFET and IGBT

Fig. 8: TURN-ON CHARACTERISTICS



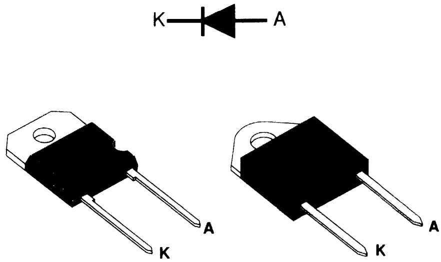
Turn-on losses :

$P4 = 0.4\ (V_{FP} - V_F)\ .\ I_{Fmax}\ .\ t_{fr}\ .\ F$

TURBOSWITCH ™ "A". ULTRA-FAST HIGH VOLTAGE DIODE

MAIN PRODUCTS CHARACTERISTICS

$I_{F(AV)}$	**30A**
V_{RRM}	**600V**
t_{rr} (typ)	**35ns**
V_F (max)	**1.5V**



SOD93
(Plastic)

STTA3006P

Isolated
DOP3I
(Plastic)

STTA3006PI

FEATURES AND BENEFITS

- SPECIFIC TO "FREEWHEEL MODE" OPERATIONS: Freewheel or Booster Diode.
- ULTRA-FAST RECOVERY.
- VERY LOW OVERALL POWER LOSSES IN BOTH THE DIODE AND THE COMPANION TRANSISTOR.
- HIGH FREQUENCY OPERATIONS.

DESCRIPTION

The TURBOSWITCH is a very high performance series of ultra-fast high voltage power diodes from 600V to 1200V.
TURBOSWITCH, A family, drastically cuts losses in both the diode and the associated switching IGBT or MOSFET in all "Freewheel Mode" operations and is particularly suitable and efficient in Motor Control Freewheel applications and in Booster diode applications in Power Factor Control circuitries.
Packaged in SOD93 and in isolated DOP3I, these 600V devices are particularly intended for use on 240V domestic mains.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{RRM}	Repetitive peak reverse voltage	600	V
V_{RSM}	Non repetitive peak reverse voltage	600	V
$I_{F(RMS)}$	RMS forward current	50	A
I_{FRM}	Repetitive peak forward current (tp = 5 µs, f = 5kHz)	300	A
T_j	Max operating junction temperature	-65 to 150	°C
T_{stg}	Storage temperature	-65 to 150	°C

TM : TURBOSWITCH is a trademark of SGS-THOMSON Microelectronics.

THERMAL AND POWER DATA

Symbol	Parameter	Conditions	Value	Unit
$R_{th(j-c)}$	Junction to case thermal resistance	STTA3006P STTA3006PI	1.2 1.8	°C/W
P_1	Conduction power dissipation (see fig. 2)	$I_{F(AV)}$ = 30A δ =0.5 STTA 3006P Tc= 85°C STTA3006PI Tc= 52°C	54	W
P_{max}	Total power dissipation Pmax = P1 + P3 (P3 = 10% P1)	STTA 3006P Tc= 78°C STTA3006PI Tc= 42°C	60	W

STATIC ELECTRICAL CHARACTERISTICS (see Fig.2)

Symbol	Parameter	Test Conditions		Min	Typ	Max	Unit
V_F *	Forward voltage drop	I_F =30A	Tj = 25°C Tj = 125°C			1.75 1.5	V V
I_R **	Reverse leakage current	V_R =0.8 x V_{RRM}	Tj = 25°C Tj = 125°C			150 8	μA mA

Test pulses widths : * tp = 380 μs, duty cycle < 2%
** tp = 5 ms . duty cycle < 2%

DYNAMIC ELECTRICAL CHARACTERISTICS

TURN-OFF SWITCHING (see Fig.3)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{rr}	Reverse recovery time	Tj = 25°C I_F = 0.5 A I_R = 1A Irr = 0.25A I_F = 1 A dI_F/dt =-50A/μs V_R =30V		35	65	ns
I_{RM}	Maximum reverse recovery current	Tj = 125°C VR = 400V I_F =30A dI_F/dt = -240 A/μs dI_F/dt = -500 A/μs		20	19	A
S factor	Softness factor	Tj = 125°C V_R = 400V I_F =30A dI_F/dt = -500 A/μs		0.40		/

TURN-ON SWITCHING (see Fig.4)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{fr}	Forward recovery time	Tj = 25°C I_F =30A, dI_F/dt = 240 A/μs measured at, 1.1 × $V_F$max			600	ns
V_{Fp}	Peak forward voltage	Tj = 25°C I_F =30A, dI_F/dt = 240 A/μs			12	V

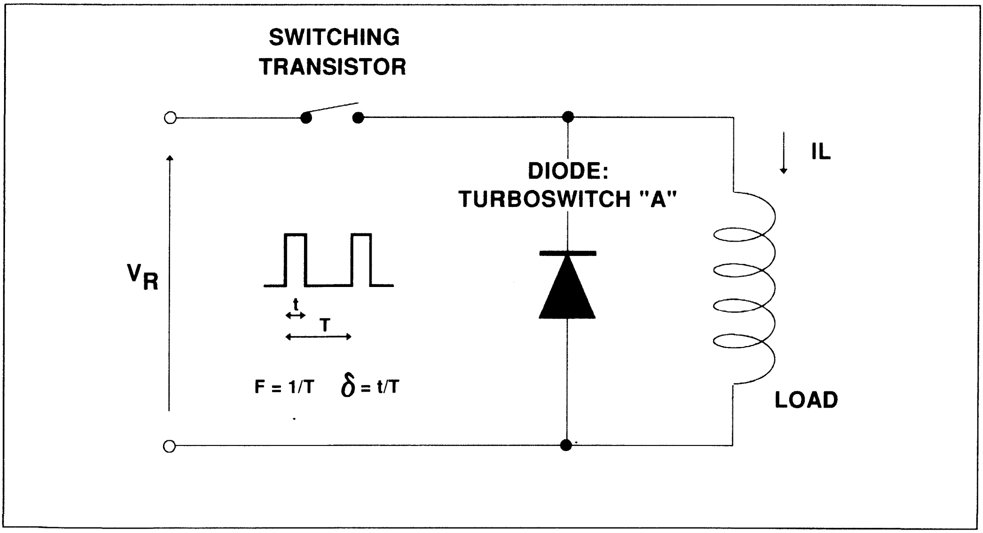
APPLICATION DATA

The TURBOSWITCH "A" is especially designed to provide the lowest overall power losses in any "FREEWHEEL Mode" application (Fig.1) considering both the diode and the companion transistor, thus optimizing the overall performance in the end application.
The way of calculating the power losses is given below:

TOTAL LOSSES
due to the diode
P = P1+ P2+ P3+ P4+ P5 Watts

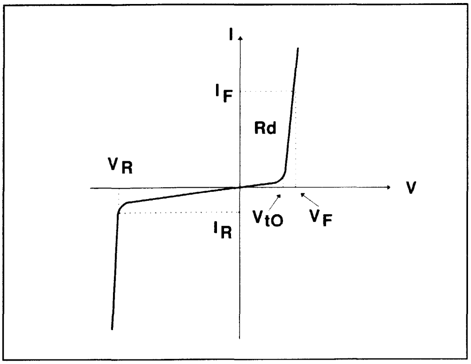
CONDUCTION LOSSES in the diode	**REVERSE LOSSES** in the diode	**SWITCHING LOSSES** in the diode	**SWITCHING LOSSES** in the tansistor due to the diode
P1 Watts (Fig. 2)	**P2 Watts (Fig. 2)**	**OFF : P3 Watts ON : P4 Watts (Fig. 3 & 4)**	**P5 Watts (Fig. 3)**

Fig. 1 : "FREEWHEEL" MODE.



APPLICATION DATA (Cont'd)

Fig. 2: STATIC CHARACTERISTICS



Conduction losses :

$P1 = V_{t0} \cdot I_{F(AV)} + R_d \cdot I_F^2{}_{(RMS)}$

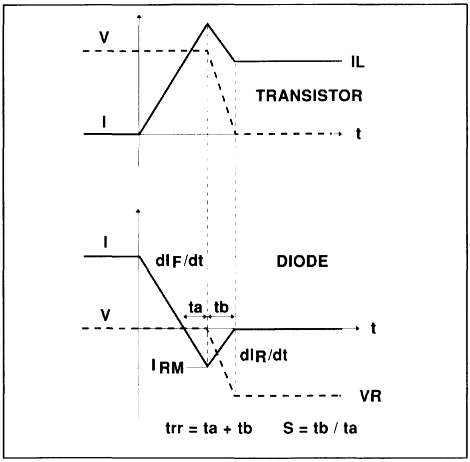
with

$V_{t0} = 1.15$ V
$R_d = 0.011$ Ohm
(Max values at 125°C)

Reverse losses :

$P2 = V_R \cdot I_R \cdot (1 - \delta)$

Fig. 3: TURN-OFF CHARACTERISTICS



Turn-on losses :
(in the transistor, due to the diode)

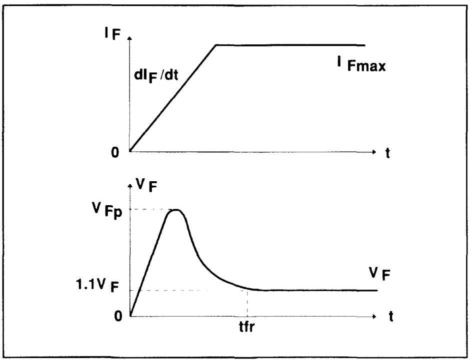
$$P5 = \frac{V_R \times I_{RM}^2 \times (3 + 2 \times S) \times F}{6 \, x \, dI_F/dt} + \frac{V_R \times I_{RM} \times I_L \times (S + 2) \times F}{2 \, x \, dI_F/dt}$$

Turn-off losses (in the diode) :

$$P3 = \frac{V_R \times I_{RM}^2 \times S \times F}{6 \, x \, dI_F/dt}$$

P3 and P5 are suitable for power MOSFET and IGBT

Fig. 4: TURN-ON CHARACTERISTICS



Turn-on losses :

$P4 = 0.4 \, (V_{FP} - V_F) \cdot I_{Fmax} \cdot t_{fr} \cdot F$

Fig 5 : Conduction losses versus average current

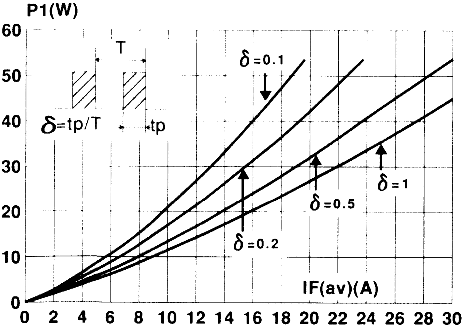


Fig 6 : Switching OFF losses versus dIF/dt

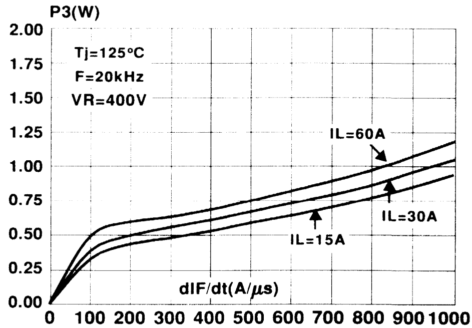


Fig 7 : Switching ON losses versus dIF/dt

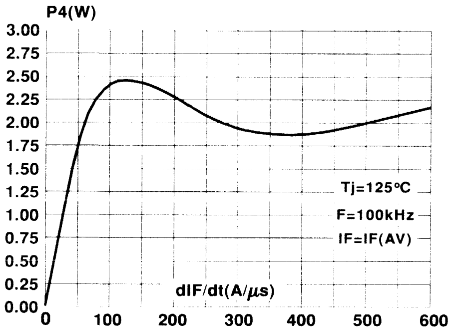


Fig 8 : Switching losses in transistor due to the diode

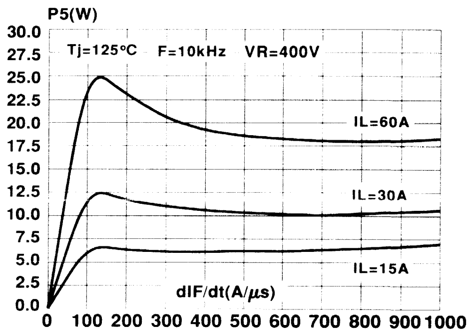


Fig 9 : Forward voltage drop versus forward current

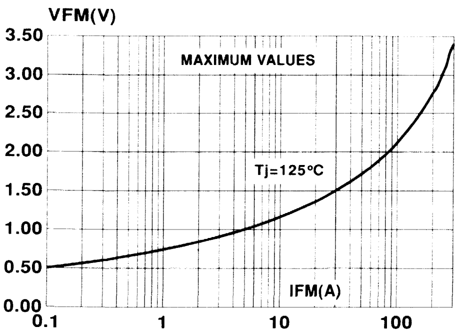


Fig 10 : Relative variation of thermal transient impedance junction to case versus pulse duration

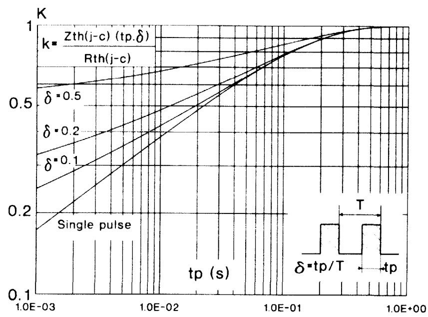


Fig 11 : Peak reverse recovery current versus dIF/dt

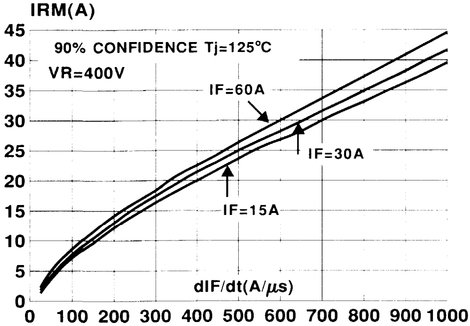


Fig 12 : Reverse recovery time versus dIF/dt

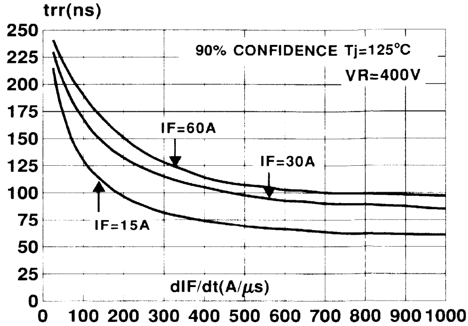


Fig 13 : Softness factor (tb/ta) versus dIF/dt

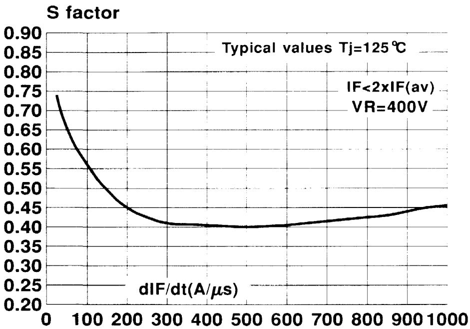


Fig 14 : Relative variation of dynamic parameters versus junction temperature (Reference Tj=125°C)

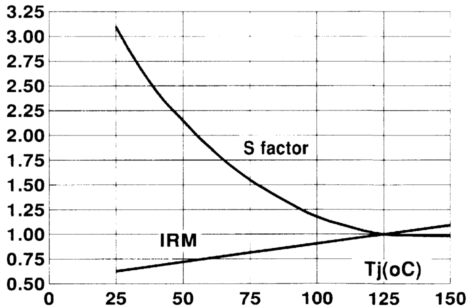


Fig 15 : Transient peak forward voltage versus dIF/dt

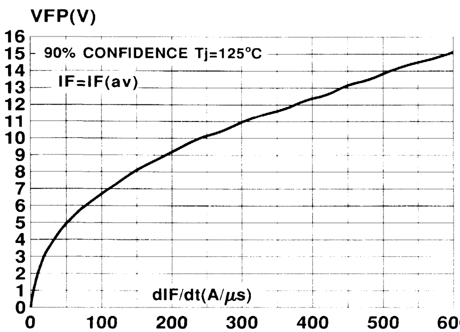
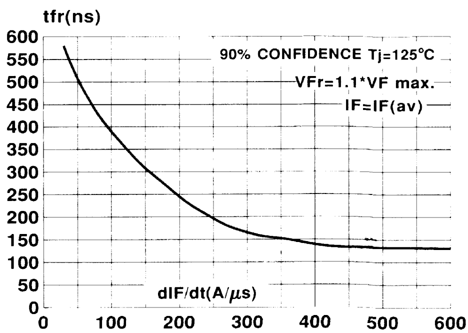


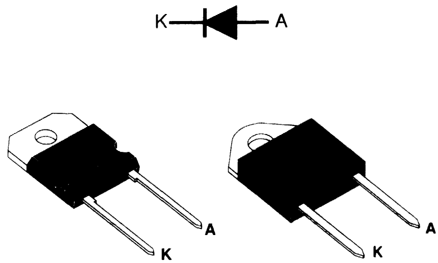
Fig 16 : Forward recovery time versus dIF/dt



TURBOSWITCH ™ "B". ULTRA-FAST HIGH VOLTAGE DIODE

MAIN PRODUCTS CHARACTERISTICS

$I_{F(AV)}$	**30A**
V_{RRM}	**600V**
t_{rr} (typ)	**60ns**
V_F (max)	**1.3V**



SOD93
(Plastic)
STTB3006P

Isolated DOP3I
(Plastic)
STTB3006PI

FEATURES AND BENEFITS

- SPECIFIC TO THE FOLLOWING OPERATIONS: Snubbing or clamping, demagnetization and rectification.
- ULTRA-FAST,SOFT AND NOISE-FREE RECOVERY.
- VERY LOW OVERALL POWER LOSSES AND PARTICULARY LOW FORWARD VOLTAGE.
- DESIGNED FOR HIGH PULSED CURRENT OPERATIONS.

DESCRIPTION

The TURBOSWITCH is a very high performance series of ultra-fast high voltage power diodes from 600V to 1200V.
TURBOSWITCH, B family, drastically cuts losses in all high voltage operations which require extremely fast, soft and noise-free power diodes.
They are particularly suitable in the primary circuit of an SMPS as snubber, clamping or demagnetizing diodes, and also in most power converters as high performance rectifier diodes.
Packaged in SOD93 and in isolated DOP3I, these 600V devices are particularly intended for use on 240V domestic mains.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{RRM}	Repetitive peak reverse voltage	600	V
V_{RSM}	Non repetitive peak reverse voltage	600	V
$I_{F(RMS)}$	RMS forward current	50	A
I_{FRM}	Repetitive peak forward current (tp = 5 µs, f = 1kHz)	700	A
T_j	Max operating junction temperature	-65 to 150	°C
T_{stg}	Storage temperature	-65 to 150	°C

TM : TURBOSWITCH is a trademark of SGS-THOMSON Microelectronics.

THERMAL AND POWER DATA

Symbol	Parameter	Conditions	Value	Unit
$R_{th(j-c)}$	Junction to case thermal resistance	STTB3006P STTB3006PI		°C/W
P_1	Conduction power dissipation (see fig. 5)	$I_{F(AV)}$ = 30A δ =0.5 STTB3006P Tc= 85°C STTB3006PI Tc= 45°C		W
P_{max}	Total power dissipation Pmax = P1 + P3 (P3 = 10% P1)	STTB 3006P Tc= °C STTB3006PI Tc= °C		W

STATIC ELECTRICAL CHARACTERISTICS (see Fig.5)

Symbol	Parameter	Test Conditions		Min	Typ	Max	Unit
V_F *	Forward voltage drop	I_F =30A	Tj = 25°C Tj = 125°C			1.4 1.3	V V
I_R **	Reverse leakage current	V_R =0.8 x V_{RRM}	Tj = 25°C Tj = 125°C			150 5.0	µA mA

Test pulses widths : * tp = 380 µs, duty cycle < 2%
** tp = 5 ms , duty cycle < 2%

DYNAMIC ELECTRICAL CHARACTERISTICS

TURN-OFF SWITCHING (see Fig.6)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{rr}	Reverse recovery time	Tj = 25°C I_F = 0.5 A I_R = 1A Irr = 0.25A I_F = 1 A dI_F/dt =-50A/µs V_R =30V		60	 110	ns
I_{RM}	Maximum reverse recovery current	Tj = 125°C VR = 400V I_F =30A dI_F/dt = -240 A/µs dI_F/dt = -500 A/µs		 TBD	 TBD	A
S factor	Softness factor	Tj = 125°C V_R = 400V I_F =30A dI_F/dt = -500 A/µs		TBD		/

TURN-ON SWITCHING (see Fig.7)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{fr}	Forward recovery time	Tj = 25°C I_F =30 A, dI_F/dt = 240 A/µs measured at, 1.1 × $V_F$max			TBD	ns
V_{Fp}	Peak forward voltage	Tj = 25°C I_F =30A, dI_F/dt = 240 A/µs I_F =150A, dI_F/dt = 500 A/µs		 TBD	 TBD	V

TBD : To Be Defined

APPLICATION DATA

The TURBOSWITCH "B" is especially designed to provide the lowest overall power losses in any application such as snubbing,clamping, demagnetization and rectification. In such applications (fig.1 to fig.4), the way of calculating the power losses is given below :

TOTAL LOSSES
due to the diode
P = P1+ P2+ P3+ P4 Watts

CONDUCTION LOSSES	REVERSE LOSSES	SWITCHING LOSSES
P1 Watts (Fig. 5)	**P2 Watts (Fig. 5)**	**OFF : P3 Watts ON : P4 Watts (Fig. 6 & 7)**

Fig. 1 : SNUBBER DIODE.

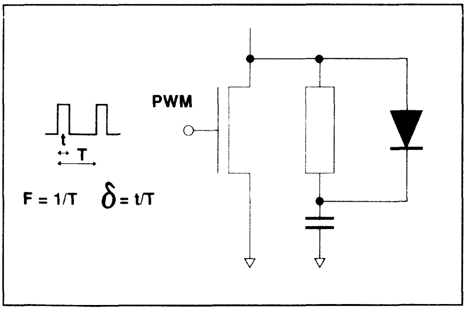


Fig. 2 : CLAMPING DIODE.

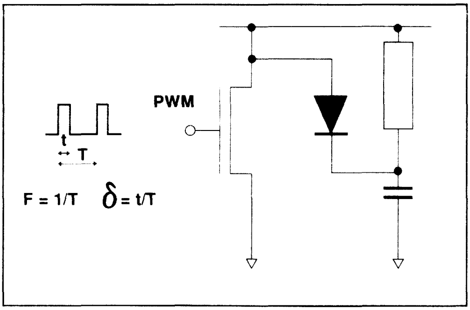


Fig. 3 : DEMAGNETIZING DIODE.

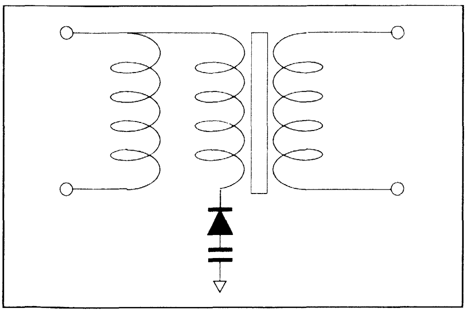
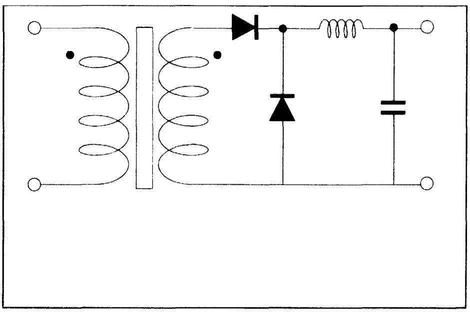
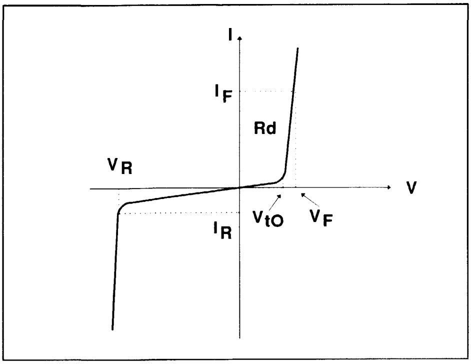


Fig. 4 : RECTIFIER DIODE.



APPLICATION DATA (Cont'd)

Fig. 5: STATIC CHARACTERISTICS



Conduction losses :

$P1 = V_{t0} \cdot I_{F(AV)} + R_d \cdot I_{F}^2{}_{(RMS)}$

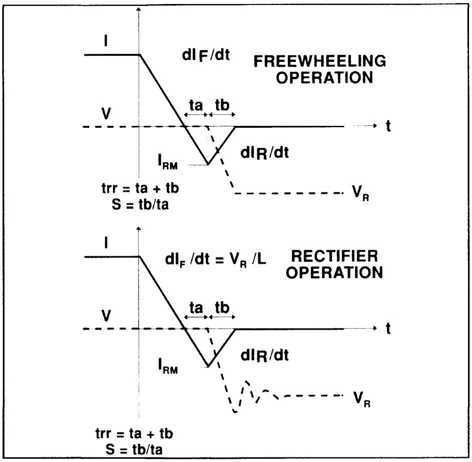
with

$V_{t0} = 1.00$ V
$R_d = 0.010$ Ohm
(Max values at 125°C)

Reverse losses :

$P2 = V_R \cdot I_R \cdot (1 - \delta)$

Fig. 6: TURN-OFF CHARACTERISTICS



Turn-off losses :

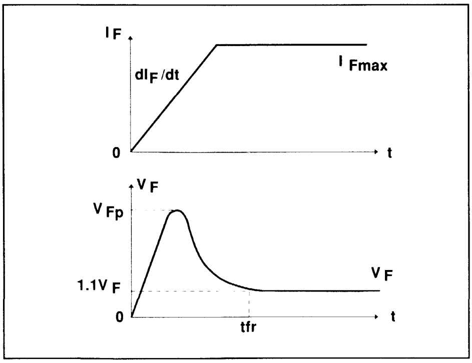
$$P3 = \frac{V_R \times I_{RM}{}^2 \times S \times F}{6 \, x \, dI_F / dt}$$

Turn-off losses :
(with non negligible serial inductance)

$$P3' = \frac{V_R \times I_{RM}{}^2 \times S \times F}{6 \, x \, dI_F / dt} + \frac{L \times I_{RM}{}^2 \times F}{2}$$

P3 and P3' are suitable for power MOSFET and IGBT

Fig. 7: TURN-ON CHARACTERISTICS



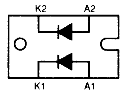
Turn-on losses :

$P4 = 0.4 \, (V_{FP} - V_F) \cdot I_{Fmax} \cdot t_{fr} \cdot F$

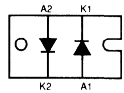
TURBOSWITCH ™ "A". ULTRA-FAST HIGH VOLTAGE DIODE

MAIN PRODUCTS CHARACTERISTICS

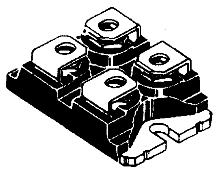
$I_{F(AV)}$	25A
V_{RRM}	1200V
t_{rr} (typ)	65ns
V_F (max)	1.85V



STTA5012T(V)1



STTA5012T(V)2



ISOTOP ®
(Plastic)
Screw version (*)

FEATURES AND BENEFITS

- ULTRA-FAST, SOFT AND NOISE-FREE RECOVERY.
- VERY LOW OVERALL POWER LOSSES IN BOTH THE DIODE AND THE COMPANION TRANSISTOR.
- HIGH FREQUENCY AND/OR HIGH PULSED CURRENT OPERATIONS.

DESCRIPTION

The TURBOSWITCH is a very high performance series of ultra-fast high voltage power diodes from 600V to 1200V.
TURBOSWITCH 1200V drastically cuts losses in all high voltage operations which require extremely fast, soft and noise-free power diodes. Due to their optimized switching performances they also highly decrease power losses in any associated switching IGBT or MOSFET in all "Freewheel Mode" operations.
They are particularly suitable in Motor Control circuitries, or in the primary of SMPS as snubber, clamping or demagnetizing diodes, and also at the secondary of SMPS as high voltage rectifier diodes.
Packaged in ISOTOP®, this 1200V device is particularly intended for use on 3 phase 400V industrial mains.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{RRM}	Repetitive peak reverse voltage	1200	V
V_{RSM}	Non repetitive peak reverse voltage	1200	V
$I_{F(RMS)}$	RMS forward current	50	A
I_{FRM}	Repetitive peak forward current (tp = 5 µs, f = 5kHz)	300	A
T_j	Max operating junction temperature	150	°C
T_{stg}	Storage temperature	-65 to 150	°C

(*) : Tin plasted Fast-on version is also available (Without V suffix).

THERMAL AND POWER DATA

Symbol	Parameter	Conditions	Value	Unit
$R_{th(j-c)}$	Junction to case thermal resistance	Per diode	1.4	°C/W
		Total	0.75	
		Coupling	0.1	
P_1	Conduction power dissipation (see fig. 6)	$I_{F(AV)}$ = 25A δ =0.5 Per diode Tc= 70°C	57	W
P_{max}	Total power dissipation Pmax = P1 + P3 (P3 = 10% P1)	Per diode Tc= 62°C	62.5	W

STATIC ELECTRICAL CHARACTERISTICS (see Fig.6)

Symbol	Parameter	Test Conditions		Min	Typ	Max	Unit
V_F *	Forward voltage drop	I_F =25A	Tj = 25°C Tj = 125°C			2.1 1.9	V V
I_R **	Reverse leakage current	V_R =0.8 x V_{RRM}	Tj = 25°C Tj = 125°C			150 8	µA mA

Test pulses widths : * tp = 380 µs, duty cycle < 2%
** tp = 5 ms , duty cycle < 2%

DYNAMIC ELECTRICAL CHARACTERISTICS

TURN-OFF SWITCHING (see Fig.7)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{rr}	Reverse recovery time	Tj = 25°C I_F = 0.5 A I_R = 1A Irr = 0.25A I_F = 1 A dI_F/dt =-50A/µs V_R =30V		60	110	ns
I_{RM}	Maximum reverse recovery current	Tj = 125°C VR = 600V I_F =25A dI_F/dt = -200 A/µs dI_F/dt = -500 A/µs		TBD	TBD	A
S factor	Softness factor	Tj = 125°C V_R = 600V I_F =25A dI_F/dt = -500 A/µs		1.2		/

TURN-ON SWITCHING (see Fig.8)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{fr}	Forward recovery time	Tj = 25°C I_F =25 A, dI_F/dt = 200 A/µs measured at, 1.1 × $V_F$max			TBD	ns
V_{Fp}	Peak forward voltage	Tj = 25°C I_F =25A, dI_F/dt = 200 A/µs I_F =40A, dI_F/dt = 500 A/µs			TBD TBD	V

APPLICATION DATA

The 1200V TURBOSWITCH series has been designed to provide the lowest overall power losses in all high frequency or high pulsed current operations. In such applications (Fig 1 to 5),the way of calculating the power losses is given below :

TOTAL LOSSES
due to the diode
P = P1+ P2+ P3+ P4+ P5 Watts

CONDUCTION LOSSES	REVERSE LOSSES	SWITCHING LOSSES	SWITCHING LOSSES
in the diode	in the diode	in the diode	in the tansistor due to the diode
P1 Watts (Fig. 6)	**P2 Watts (Fig. 6)**	**OFF : P3 Watts ON : P4 Watts (Fig. 7 & 8)**	**P5 Watts (Fig. 7)**

Fig. 1 : "FREEWHEEL" MODE.

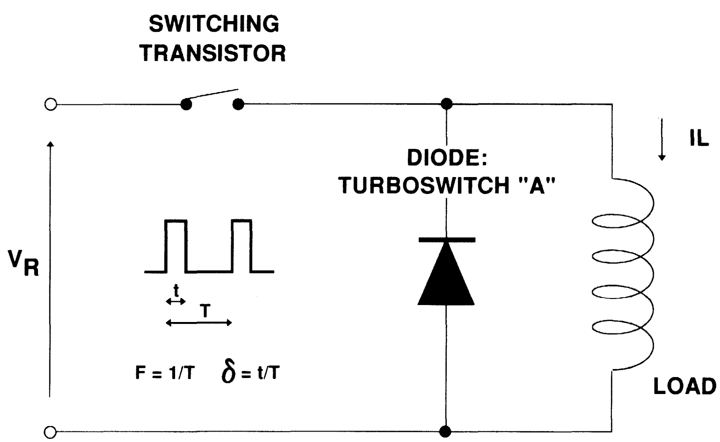


Fig. 2 : SNUBBER DIODE.

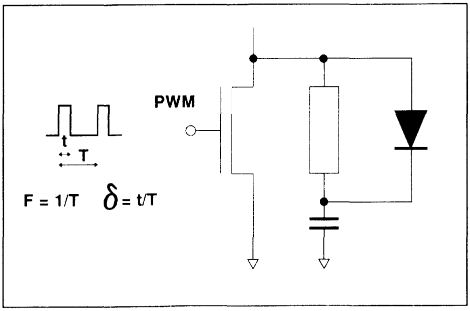


Fig. 3 : CLAMPING DIODE.

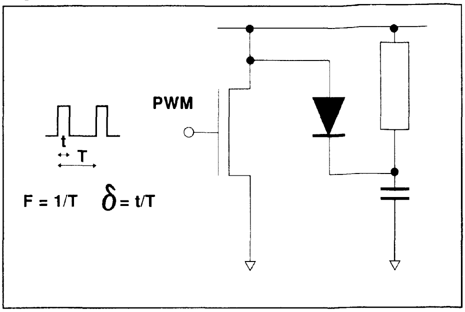


Fig. 4 : DEMAGNETIZING DIODE.

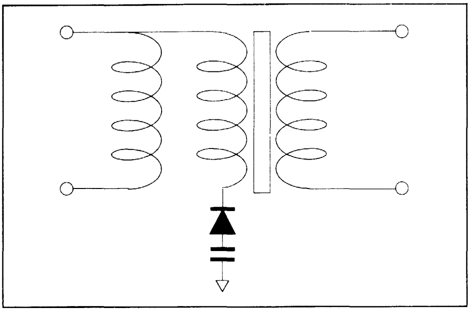
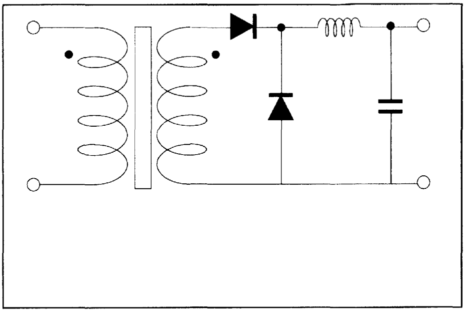
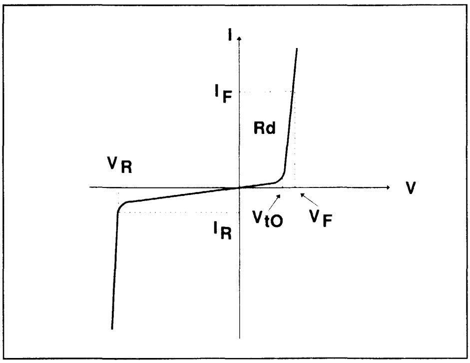


Fig. 5 : RECTIFIER DIODE.



STATIC & DYNAMIC CHARACTERISTICS . POWER LOSSES .

Fig. 6: STATIC CHARACTERISTICS



Conduction losses :

$P1 = V_{t0} \cdot I_{F(AV)} + R_d \cdot I_F{}^2{}_{(RMS)}$

with

$V_{t0} = 1.52$ V

$R_d = 0.015$ Ohm

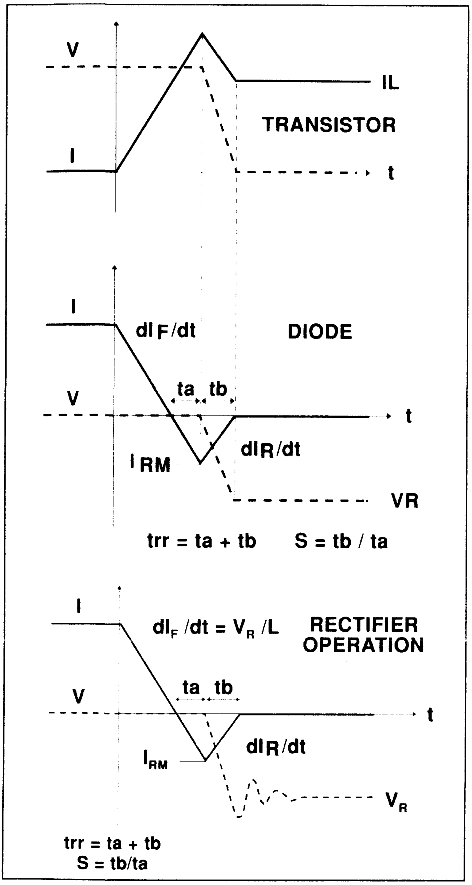
(Max values at 125°C,suitable for Ipeak < $3.I_{F(av)}$)

Reverse losses :

$P2 = V_R \cdot I_R \cdot (1 - \delta)$

APPLICATION DATA (Cont'd)

Fig. 7: TURN-OFF CHARACTERISTICS



Turn-on losses :
(in the transistor, due to the diode)

$$P5 = \frac{V_R \times I_{RM}^2 \times (3 + 2 \times S) \times F}{6 \ x \ dI_F/dt} + \frac{V_R \times I_{RM} \times I_L \times (S + 2) \times F}{2 \ x \ dI_F/dt}$$

Turn-off losses (in the diode) :

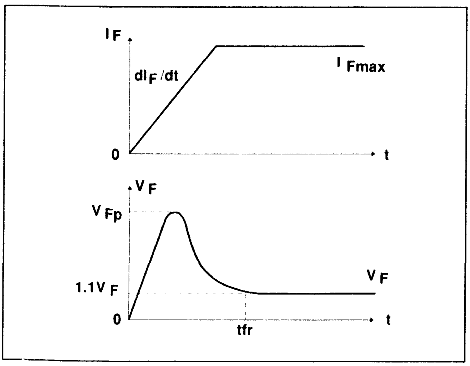
$$P3 = \frac{V_R \times I_{RM}^2 \times S \times F}{6 \ x \ dI_F/dt}$$

Turn-off losses :
(with non negligible serial inductance)

$$P3' = \frac{V_R \times I_{RM}^2 \times S \times F}{6 \ x \ dI_F/dt} + \frac{L \times I_{RM}^2 \times F}{2}$$

P3,P3' and P5 are suitable for power MOSFET and IGBT

Fig. 8: TURN-ON CHARACTERISTICS



Turn-on losses :

$P4 = 0.4 (V_{FP} - V_F) . I_{Fmax} . t_{fr} . F$

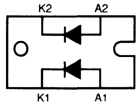
SGS-THOMSON
MICROELECTRONICS

STTA6006T(V)1/2

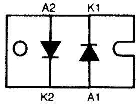
TURBOSWITCH ™ "A". ULTRA-FAST HIGH VOLTAGE DIODE

MAIN PRODUCTS CHARACTERISTICS

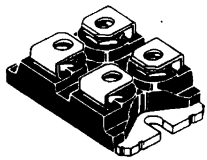
$I_{F(AV)}$	2*30A
V_{RRM}	600V
t_{rr} (typ)	35ns
V_F (max)	1.5V



STTA6006T(V)1



STTA6006T(V)2



ISOTOP ®
(Plastic)
Screw version (*)

FEATURES AND BENEFITS

- SPECIFIC TO "FREEWHEEL MODE" OPERATIONS: Freewheel or Booster Diode
- ULTRA-FAST RECOVERY.
- VERY LOW OVERALL POWER LOSSES IN BOTH THE DIODE AND THE COMPANION TRANSISTOR.
- HIGH FREQUENCY OPERATIONS.

DESCRIPTION

The TURBOSWITCH is a very high performance series of ultra-fast high voltage power diodes from 600V to 1200V.
TURBOSWITCH, A family, drastically cuts losses in both the diode and the associated switching IGBT or MOSFET in all "Freewheel Mode" operations and is particularly suitable and efficient in Motor Control Freewheel applications and in Booster diode applications in Power Factor Control circuitries.
Packaged in ISOTOP, these 600V devices are particularly intended for use on 240V domestic mains.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{RRM}	Repetitive peak reverse voltage.	600	V
V_{RSM}	Non repetitive peak reverse voltage.	600	V
$I_{F(RMS)}$	RMS forward current.	50	A
I_{FRM}	Repetitive peak forward current (tp = 5 µs, f = 5kHz)	300	A
T_j	Max operating junction temperature.	-65 to 150	°C
T_{stg}	Storage temperature.	-65 to 150	°C

(*) : Tin plated Fast-on version is also available (without V suffix).
TM : ISOTOP and TURBOSWITCH are trademarks of SGS-THOMSON Microelectronics.

THERMAL AND POWER DATA

Symbol	Parameter	Conditions	Value	Unit
$R_{th(j-c)}$	Junction to case thermal resistance	Per diode	1.4	°C/W
		Total	0.75	
		Coupling	0.1	
P_1	Conduction power dissipation (see fig. 2)	Per diode $I_{F(AV)}$ = 30A δ =0.5 Tc= 74°C	54	W
P_{max}	Total power dissipation Pmax = P1 + P3 (P3 = 10% P1)	Per diode Tc= 66°C	60	W

STATIC ELECTRICAL CHARACTERISTICS (see Fig.2)

Symbol	Parameter	Test Conditions		Min	Typ	Max	Unit
V_F *	Forward voltage drop	I_F =30A	Tj = 25°C Tj = 125°C			1.75 1.5	V V
I_R **	Reverse leakage current	V_R =0.8 × V_{RRM}	Tj = 25°C Tj = 125°C			150 8	µA mA

Test pulses widths : * tp = 380 µs, duty cycle < 2%
** tp = 5 ms , duty cycle < 2%

DYNAMIC ELECTRICAL CHARACTERISTICS

TURN-OFF SWITCHING (see Fig.3)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{rr}	Reverse recovery time	Tj = 25°C I_F = 0.5 A I_R = 1A Irr = 0.25A I_F = 1 A dI_F/dt =-50A/µs V_R =30V		35	65	ns
I_{RM}	Maximum reverse recovery current	Tj = 125°C VR = 400V I_F =30A dI_F/dt = -240 A/µs dI_F/dt = -500 A/µs		20	19	A
S factor	Softness factor	Tj = 125°C V_R = 400V I_F =30A dI_F/dt = -500 A/µs		0.40		/

TURN-ON SWITCHING (see Fig.4)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{fr}	Forward recovery time	Tj = 25°C I_F =30A, dI_F/dt = 240 A/µs measured at, 1.1 × $V_F$max			600	ns
V_{Fp}	Peak forward voltage	Tj = 25°C I_F =30A, dI_F/dt = 240 A/µs			12	V

APPLICATION DATA

The TURBOSWITCH "A" is especially designed to provide the lowest overall power losses in any "FREEWHEEL Mode" application (Fig.1) considering both the diode and the companion transistor, thus optimizing the overall performance in the end application.
The way of calculating the power losses is given below:

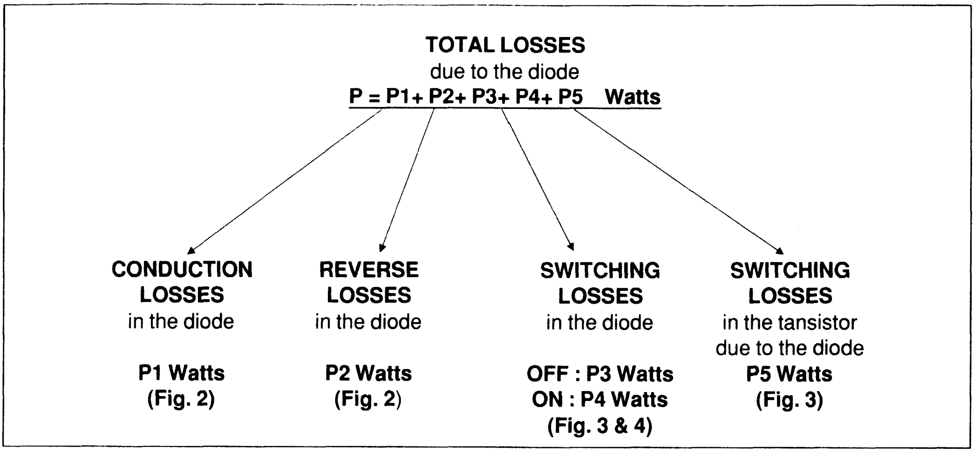
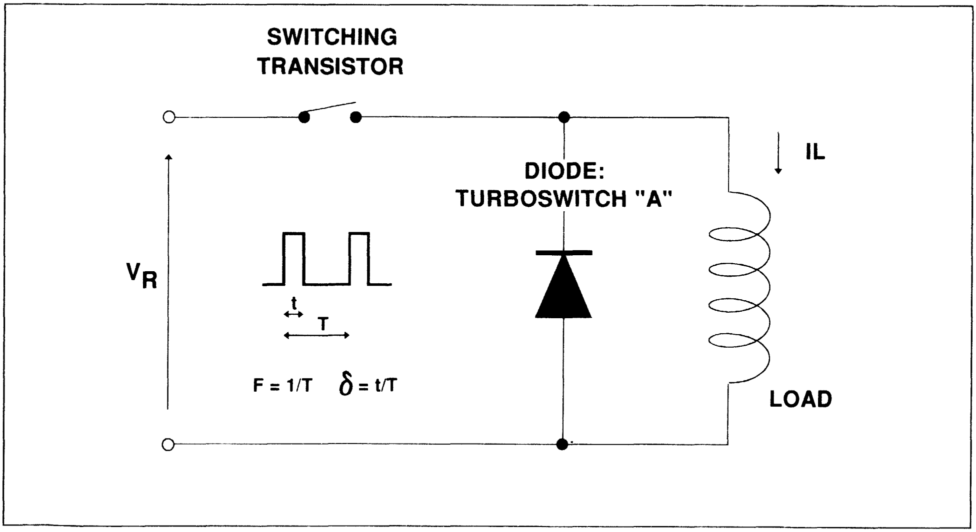
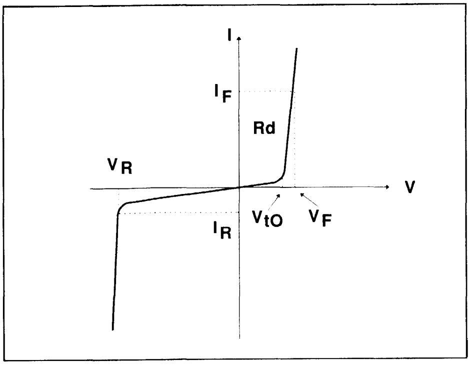


Fig. 1 : "FREEWHEEL" MODE.



APPLICATION DATA (Cont'd)

Fig. 2: STATIC CHARACTERISTICS



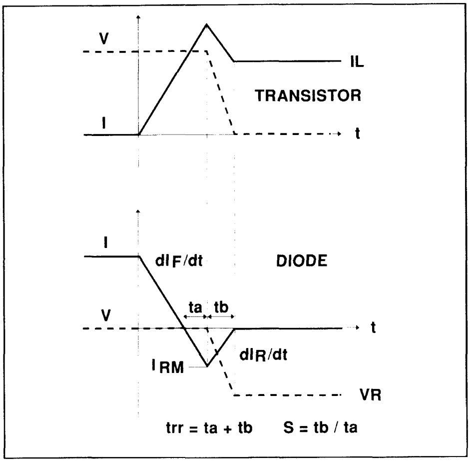
Conduction losses :
$P1 = V_{t0} \cdot I_{F(AV)} + R_d \cdot I_F^2(RMS)$

with

$V_{t0} = 1.15$ V
$R_d = 0.011$ Ohm
(Max values at 125°C)

Reverse losses :
$P2 = V_R \cdot I_R \cdot (1 - \delta)$

Fig. 3: TURN-OFF CHARACTERISTICS



Turn-on losses :
(in the transistor, due to the diode)

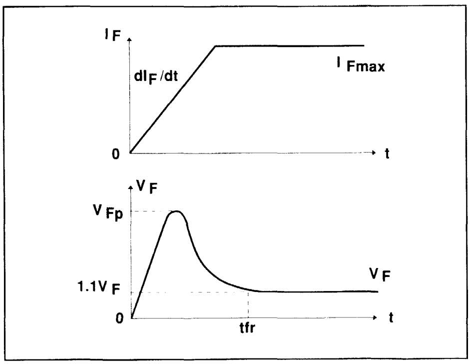
$$P5 = \frac{V_R \times I_{RM}^2 \times (3 + 2 \times S) \times F}{6 \, x \, dI_F/dt} + \frac{V_R \times I_{RM} \times I_L \times (S + 2) \times F}{2 \, x \, dI_F/dt}$$

Turn-off losses (in the diode) :

$$P3 = \frac{V_R \times I_{RM}^2 \times S \times F}{6 \, x \, dI_F/dt}$$

P3 and P5 are suitable for power MOSFET and IGBT

Fig. 4: TURN-ON CHARACTERISTICS



Turn-on losses :
$P4 = 0.4 \, (V_{FP} - V_F) \cdot I_{Fmax} \cdot t_{fr} \cdot F$

Fig 5 : Conduction losses versus average current

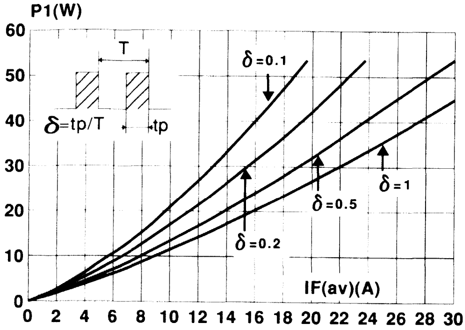


Fig 6 : Switching OFF losses versus dIF/dt

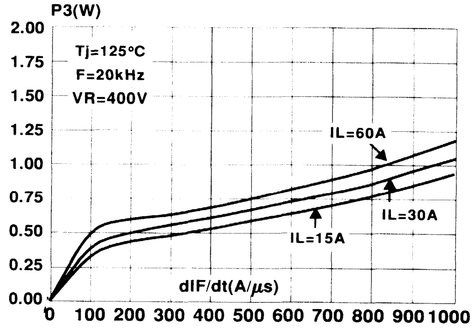


Fig 7 : Switching ON losses versus dIF/dt

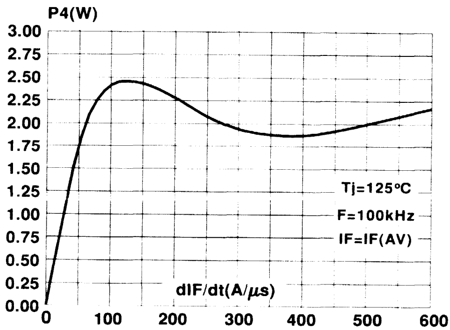


Fig 8 : Switching losses in transistor due to the diode

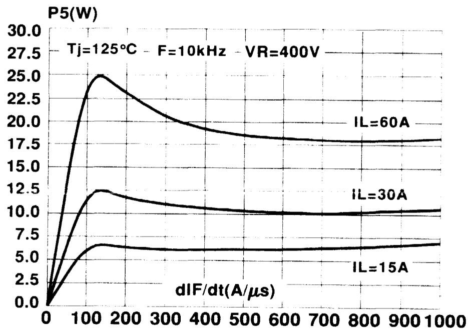


Fig 9 : Forward voltage drop versus forward current

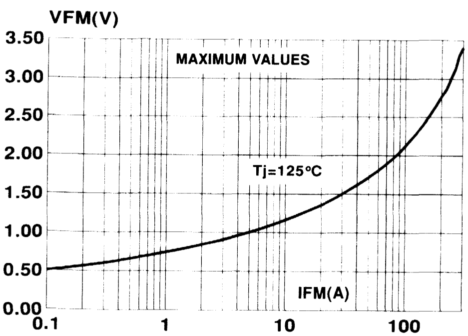


Fig 10 : Relative variation of thermal transient impedance junction to case versus pulse duration

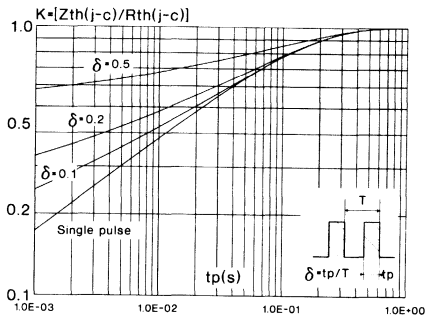


Fig 11 : Peak reverse recovery current versus dIF/dt

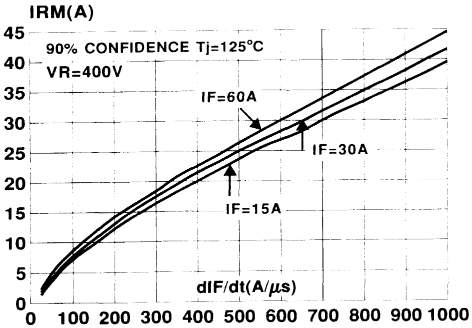


Fig 12 : Reverse recovery time versus dIF/dt

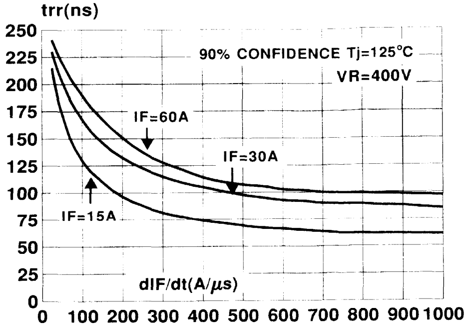


Fig 13 : Softness factor (tb/ta) versus dIF/dt

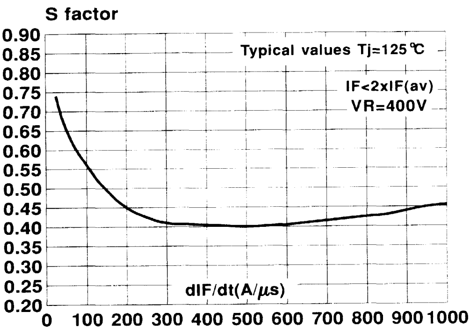


Fig 14 : Relative variation of dynamic parameters versus junction temperature (Reference Tj=125°C)

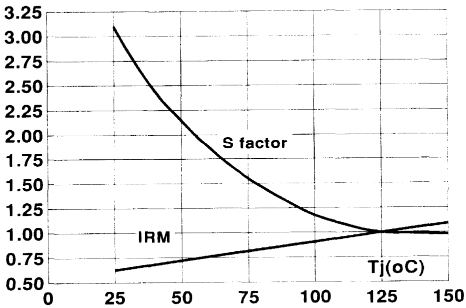


Fig 15 : Transient peak forward voltage versus dIF/dt

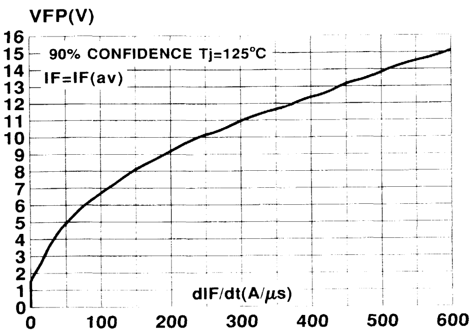
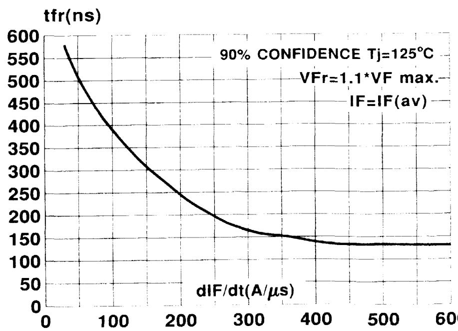


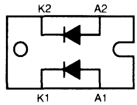
Fig 16 : Forward recovery time versus dIF/dt



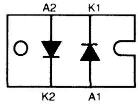
TURBOSWITCH ™ "B". ULTRA-FAST HIGH VOLTAGE DIODE

MAIN PRODUCTS CHARACTERISTICS

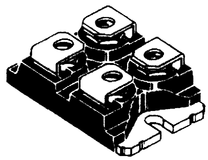
$I_{F(AV)}$	**2*30A**
V_{RRM}	**600V**
t_{rr} (typ)	**60ns**
V_F (max)	**1.3V**



STTB6006T(V)1



STTB6006T(V)2


ISOTOP ®
(Plastic)
Screw version (*)

FEATURES AND BENEFITS

- SPECIFIC TO THE FOLLOWING OPERATIONS: Snubbing or clamping, demagnetization and rectification.
- ULTRA-FAST, SOFT AND NOISE-FREE RECOVERY.
- VERY LOW OVERALL POWER LOSSES AND PARTICULARITY LOW FORWARD VOLTAGE.
- DESIGNED FOR HIGH PULSED CURRENT OPERATIONS.

DESCRIPTION

The TURBOSWITCH is a very high performance series of ultra-fast high voltage power diodes from 600V to 1200V.
TURBOSWITCH, B family, drastically cuts losses in all high voltage operations which require extremely fast, soft and noise-free power diodes.
They are particularly suitable in the primary circuit of an SMPS as snubber, clamping or demagnetizing diodes, and also in most power converters as high performance rectifier diodes.
Packaged in ISOTOP these 600V devices are particularly intended for use on 240V domestic mains.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{RRM}	Repetitive peak reverse voltage	600	V
V_{RSM}	Non repetitive peak reverse voltage	600	V
$I_{F(RMS)}$	RMS forward current	50	A
I_{FRM}	Repetitive peak forward current (tp = 5 µs, f = 1kHz)	700	A
T_j	Max operating junction temperature	-65 to 150	°C
T_{stg}	Storage temperature	-65 to 150	°C

(*) : Tin plated Fast-on version is also available (without V suffix).

THERMAL AND POWER DATA

Symbol	Parameter	Conditions	Value	Unit
$R_{th(j-c)}$	Junction to case thermal resistance	Per diode		°C/W
		Total		
		Coupling		
P_1	Conduction power dissipation (see fig. 5)	Per diode $I_{F(AV)}$ = 30A δ = 0.5 T_C = 74°C		W
P_{max}	Total power dissipation Pmax = P1 + P3 (P3 = 10% P1)	Per diode T_C = 66°C		W

STATIC ELECTRICAL CHARACTERISTICS (see Fig.5)

Symbol	Parameter	Test Conditions		Min	Typ	Max	Unit
V_F *	Forward voltage drop	I_F = 30A	Tj = 25°C Tj = 125°C			1.4 1.3	V V
I_R **	Reverse leakage current	V_R = 0.8 x V_{RRM}	Tj = 25°C Tj = 125°C			150 5	µA mA

Test pulses widths : * tp = 380 µs, duty cycle < 2%
** tp = 5 ms , duty cycle < 2%

DYNAMIC ELECTRICAL CHARACTERISTICS

TURN-OFF SWITCHING (see Fig.6)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{rr}	Reverse recovery time	Tj = 25°C I_F = 0.5 A I_R = 1A Irr = 0.25A I_F = 1 A dI_F/dt = -50A/µs V_R = 30V		60	 110	ns
I_{RM}	Maximum reverse recovery current	Tj = 125°C VR = 400V I_F = 30A dI_F/dt = -240 A/µs dI_F/dt = -500 A/µs		 TBD	 TBD	A
S factor	Softness factor	Tj = 125°C V_R = 400V I_F = 30A dI_F/dt = -240 A/µs dI_F/dt = -500 A/µs		 TBD TBD		/

TURN-ON SWITCHING (see Fig.7)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{fr}	Forward recovery time	Tj = 25°C I_F = 30 A, dI_F/dt = 240 A/µs measured at, 1.1 × V_{F}max			TBD	ns
V_{Fp}	Peak forward voltage	Tj = 25°C I_F = 30A, dI_F/dt = 240 A/µs I_F = 150A, dI_F/dt = 500 A/µs		 TBD	 TBD	V

TBD : To Be Defined

APPLICATION DATA

The TURBOSWITCH "B" is especially designed to provide the lowest overall power losses in any application such as snubbing,clamping, demagnetization and rectification. In such applications (fig.1 to fig.4), the way of calculating the power losses is given below :

TOTAL LOSSES
due to the diode
P = P1+ P2+ P3+ P4 Watts

CONDUCTION LOSSES	REVERSE LOSSES	SWITCHING LOSSES
P1 Watts (Fig. 5)	**P2 Watts (Fig. 5)**	**OFF : P3 Watts ON : P4 Watts (Fig. 6 & 7)**

Fig. 1 : SNUBBER DIODE.

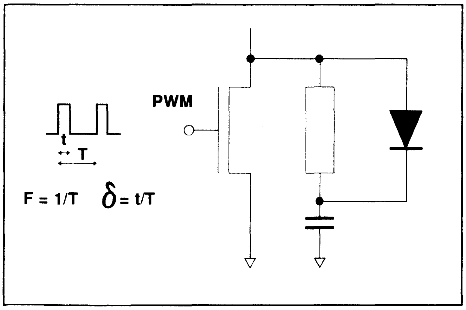


Fig. 2 : CLAMPING DIODE.

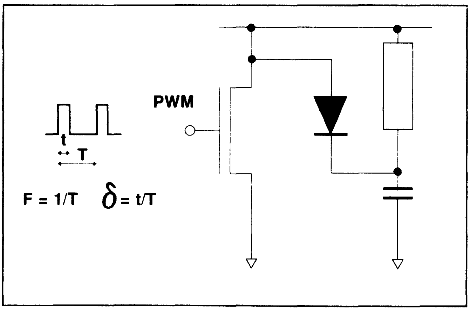


Fig. 3 : DEMAGNETIZING DIODE.

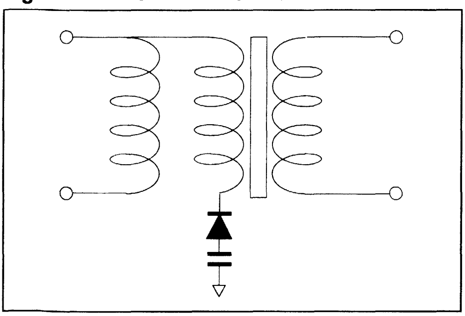
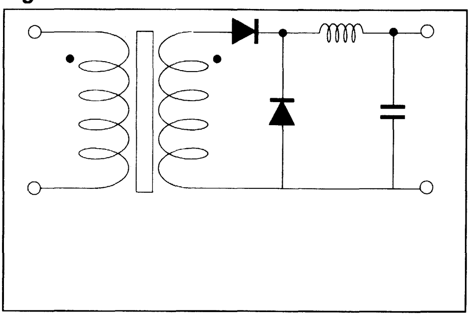
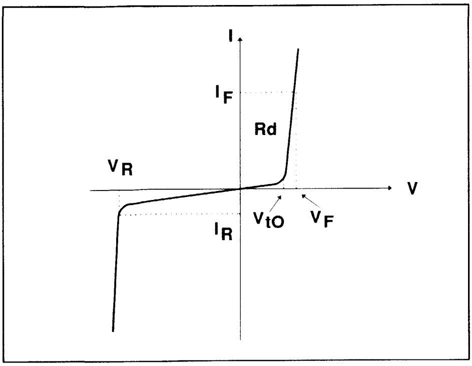


Fig. 4 : RECTIFIER DIODE.



APPLICATION DATA (Cont'd)

Fig. 5: STATIC CHARACTERISTICS



Conduction losses :

$P1 = V_{t0} . I_{F(AV)} + R_d . I_F{}^2{}_{(RMS)}$

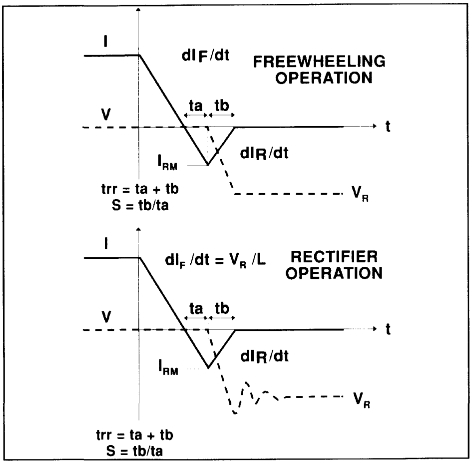
with

$V_{t0} = 1.00$ V
$R_d = 0.010$ Ohm
(Max values at 125°C)

Reverse losses :

$P2 = V_R . I_R . (1 - \delta)$

Fig. 6: TURN-OFF CHARACTERISTICS



Turn-off losses :

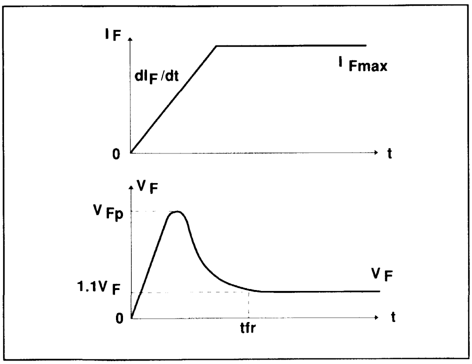
$$P3 = \frac{V_R \times I_{RM}{}^2 \times S \times F}{6 \; x \; dI_F/dt}$$

Turn-off losses :
(with non negligible serial inductance)

$$P3' = \frac{V_R \times I_{RM}{}^2 \times S \times F}{6 \; x \; dI_F/dt} + \frac{L \times I_{RM}{}^2 \times F}{2}$$

P3 and P3' are suitable for power MOSFET and IGBT

Fig. 7: TURN-ON CHARACTERISTICS



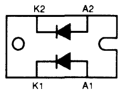
Turn-on losses :

$P4 = 0.4 \; (V_{FP} - V_F) \; . \; I_{Fmax} \; . \; t_{fr} \; . \; F$

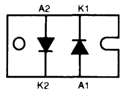
TURBOSWITCH ™ "A". ULTRA-FAST HIGH VOLTAGE DIODE

MAIN PRODUCTS CHARACTERISTICS

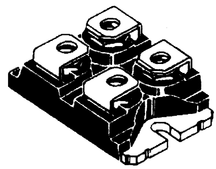
$I_{F(AV)}$	**45A**
V_{RRM}	**1200V**
t_{rr} (typ)	**65ns**
V_F (max)	**1.85V**



STTA9012T(V)1



STTA9012T(V)2



ISOTOP ®
(Plastic)
Screw version (*)

FEATURES AND BENEFITS

- ULTRA-FAST, SOFT AND NOISE-FREE RECOVERY.
- VERY LOW OVERALL POWER LOSSES IN BOTH THE DIODE AND THE COMPANION TRANSISTOR.
- HIGH FREQUENCY AND/OR HIGH PULSED CURRENT OPERATIONS.

DESCRIPTION

The TURBOSWITCH is a very high performance series of ultra-fast high voltage power diodes from 600V to 1200V.
TURBOSWITCH 1200V drastically cuts losses in all high voltage operations which require extremely fast, soft and noise-free power diodes. Due to their optimized switching performances they also highly decrease power losses in any associated switching IGBT or MOSFET in all "Freewheel Mode" operations.
They are particularly suitable in Motor Control circuitries, or in the primary of SMPS as snubber, clamping or demagnetizing diodes, and also at the secondary of SMPS as high voltage rectifier diodes.
Packaged in ISOTOP®, this 1200V device is particularly intended for use on 3 phase 400V industrial mains.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{RRM}	Repetitive peak reverse voltage	1200	V
V_{RSM}	Non repetitive peak reverse voltage	1200	V
$I_{F(RMS)}$	RMS forward current	150	A
I_{FRM}	Repetitive peak forward current (tp = 5 µs, f = 5kHz)	900	A
T_j	Max operating junction temperature	150	°C
T_{stg}	Storage temperature	-65 to 150	°C

(*) : Tin plasted Fast-on version is also available (Without V suffix).

TM : ISOTOP and TURBOSWITCH are trademarks of SGS-THOMSON Microelectronics.

THERMAL AND POWER DATA

Symbol	Parameter	Conditions	Value	Unit
$R_{th(j-c)}$	Junction to case thermal resistance	Per diode	0.85	°C/W
		Total	0.48	
		Coupling	0.1	
P_1	Conduction power dissipation (see fig. 6)	$I_{F(AV)}$ = 45A δ =0.5 Per diode Tc= 70°C	94	W
P_{max}	Total power dissipation Pmax = P1 + P3 (P3 = 10% P1)	Per diode Tc= 62°C	104	W

STATIC ELECTRICAL CHARACTERISTICS (see Fig.6)

Symbol	Parameter	Test Conditions		Min	Typ	Max	Unit
V_F *	Forward voltage drop	I_F =45A	Tj = 25°C Tj = 125°C			2.05 1.85	V V
I_R **	Reverse leakage current	V_R =0.8 x V_{RRM}	Tj = 25°C Tj = 125°C			200 12	µA mA

Test pulses widths : * tp = 380 µs, duty cycle < 2%
** tp = 5 ms , duty cycle < 2%

DYNAMIC ELECTRICAL CHARACTERISTICS

TURN-OFF SWITCHING (see Fig.7)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{rr}	Reverse recovery time	Tj = 25°C I_F = 0.5 A I_R = 1A Irr = 0.25A I_F = 1 A dI_F/dt =-50A/µs V_R =30V		65	115	ns
I_{RM}	Maximum reverse recovery current	Tj = 125°C VR = 600V I_F =45A dI_F/dt = -360 A/µs dI_F/dt = -500 A/µs		TBD	TBD	A
S factor	Softness factor	Tj = 125°C V_R = 600V I_F =45A dI_F/dt = -500 A/µs		1.2		/

TURN-ON SWITCHING (see Fig.8)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{fr}	Forward recovery time	Tj = 25°C I_F =45 A, dI_F/dt = 360 A/µs measured at, 1.1 × $V_F$max			TBD	ns
V_{Fp}	Peak forward voltage	Tj = 25°C I_F =45A, dI_F/dt = 360 A/µs I_F =40A, dI_F/dt = 500 A/µs			TBD TBD	V

APPLICATION DATA

The 1200V TURBOSWITCH series has been designed to provide the lowest overall power losses in all high frequency or high pulsed current operations. In such applications (Fig 1 to 5),the way of calculating the power losses is given below :

TOTAL LOSSES
due to the diode
P = P1+ P2+ P3+ P4+ P5 Watts

CONDUCTION LOSSES in the diode	REVERSE LOSSES in the diode	SWITCHING LOSSES in the diode	SWITCHING LOSSES in the tansistor due to the diode
P1 Watts (Fig. 6)	**P2 Watts (Fig. 6)**	**OFF : P3 Watts** **ON : P4 Watts** **(Fig. 7 & 8)**	**P5 Watts (Fig. 7)**

Fig. 1 : "FREEWHEEL" MODE.

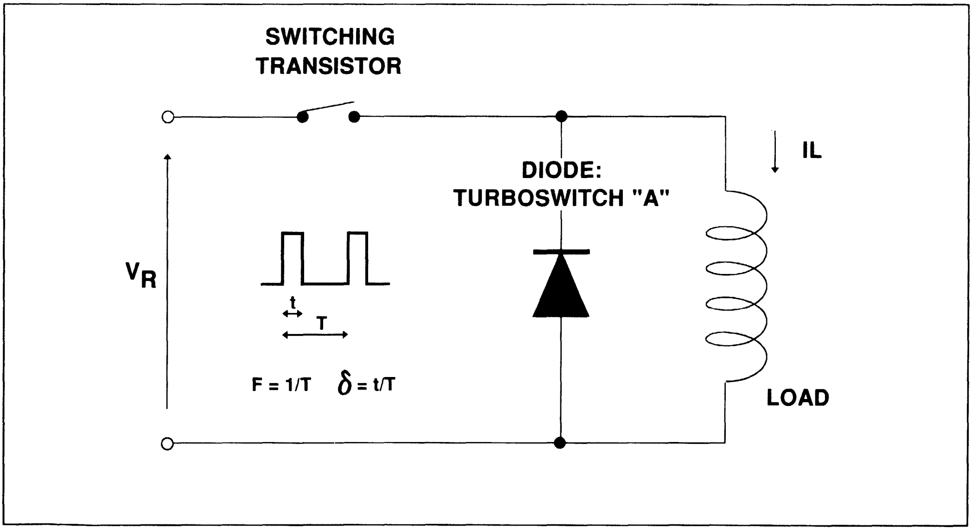


Fig. 2 : SNUBBER DIODE.

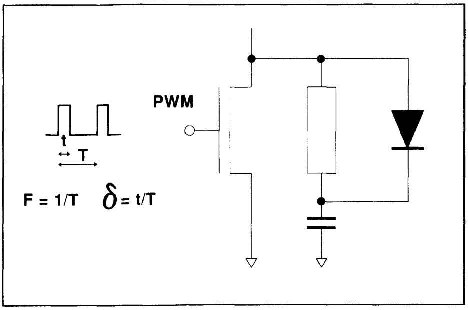


Fig. 3 : CLAMPING DIODE.

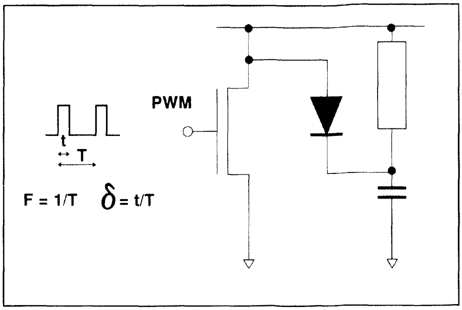


Fig. 4 : DEMAGNETIZING DIODE.

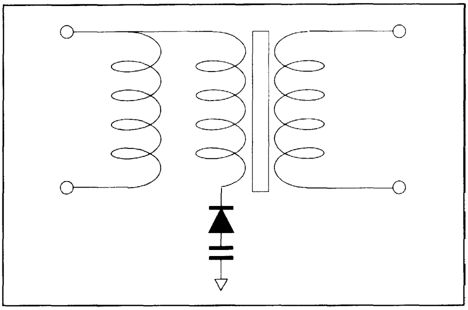
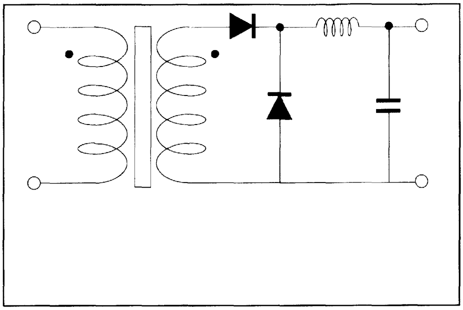
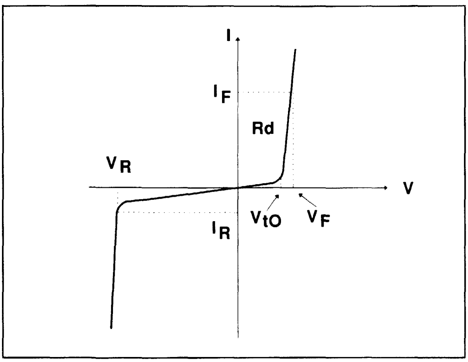


Fig. 5 : RECTIFIER DIODE.



STATIC & DYNAMIC CHARACTERISTICS . POWER LOSSES .

Fig. 6: STATIC CHARACTERISTICS



Conduction losses :

$P1 = V_{t0} \, . \, I_{F(AV)} + R_d \, . \, I_F{}^2{}_{(RMS)}$

with

$V_{t0} = 1.57$ V
$R_d = 0.006$ Ohm
(Max values at 125°C,suitable for Ipeak < $3.I_{F(av)}$)

Reverse losses :

$P2 = V_R \, . \, I_R \, . \, (1 - \delta)$

APPLICATION DATA (Cont'd)

Fig. 7: TURN-OFF CHARACTERISTICS

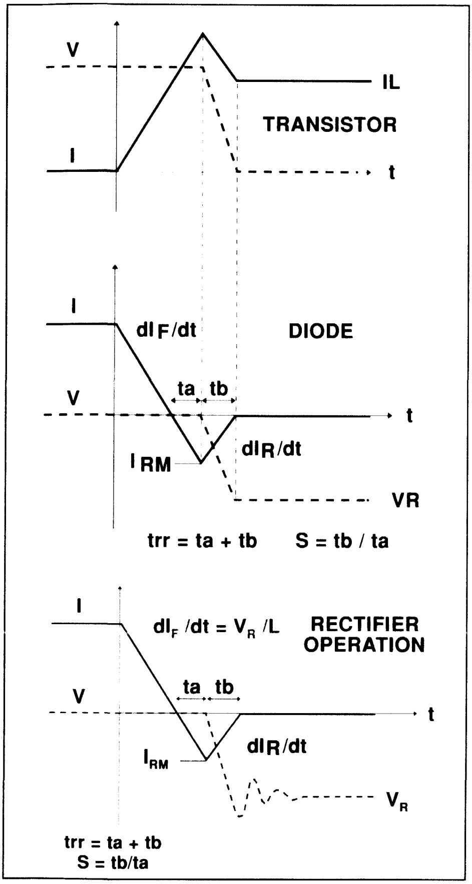
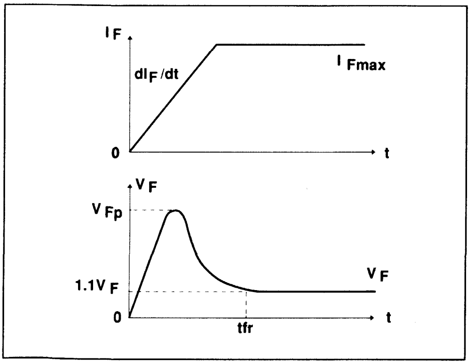


Fig. 8: TURN-ON CHARACTERISTICS



Turn-on losses :
(in the transistor, due to the diode)

$$P5 = \frac{V_R \times I_{RM}^2 \times (3 + 2 \times S) \times F}{6 \ x \ dI_F/dt} + \frac{V_R \times I_{RM} \times I_L \times (S + 2) \times F}{2 \ x \ dI_F/dt}$$

Turn-off losses (in the diode) :

$$P3 = \frac{V_R \times I_{RM}^2 \times S \times F}{6 \ x \ dI_F/dt}$$

Turn-off losses :
(with non negligible serial inductance)

$$P3' = \frac{V_R \times I_{RM}^2 \times S \times F}{6 \ x \ dI_F/dt} + \frac{L \times I_{RM}^2 \times F}{2}$$

P3,P3' and P5 are suitable for power MOSFET and IGBT

Turn-on losses :

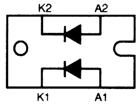
$P4 = 0.4\ (V_{FP} - V_F)\ .\ I_{Fmax}\ .\ t_{fr}\ .\ F$

STTA12006T(V)1/2

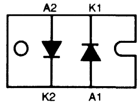
TURBOSWITCH ™ "A". ULTRA-FAST HIGH VOLTAGE DIODE

MAIN PRODUCTS CHARACTERISTICS

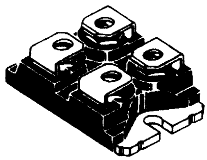
$I_{F(AV)}$	2*60A
V_{RRM}	600V
t_{rr} (typ)	45ns
V_F (max)	1.5V



STTA12006T(V)1



STTA12006T(V)2



ISOTOP ®
(Plastic)
Screw version (*)

FEATURES AND BENEFITS

- SPECIFIC TO "FREEWHEEL MODE" OPERATIONS: Freewheel or Booster Diode.
- ULTRA-FAST RECOVERY.
- VERY LOW OVERALL POWER LOSSES IN BOTH THE DIODE AND THE COMPANION TRANSISTOR.
- HIGH FREQUENCY OPERATIONS.

DESCRIPTION

The TURBOSWITCH is a very high performance series of ultra-fast high voltage power diodes from 600V to 1200V.
TURBOSWITCH, A family, drastically cuts losses in both the diode and the associated switching IGBT or MOSFET in all "Freewheel Mode" operations and is particularly suitable and efficient in Motor Control Freewheel applications and in Booster diode applications in Power Factor Control circuitries.
Packaged in ISOTOP, these 600V devices are particularly intended for use on 240V domestic mains.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		600	V
V_{RSM}	Non repetitive peak reverse voltage		600	V
$I_{F(RMS)}$	RMS forward current	Per diode	150	A
I_{FRM}	Repetitive peak forward current (tp = 5 µs, f = 5kHz)	Per diode	450	A
T_j	Max operating junction temperature		-65 to 150	°C
T_{stg}	Storage temperature		-65 to 150	°C

(*) : Tin plated Fast-on version is also available (without V suffix).

TM : ISOTOP and TURBOSWITCH are trademarks of SGS-THOMSON Microelectronics.

THERMAL AND POWER DATA

Symbol	Parameter	Conditions	Value	Unit
$R_{th(j-c)}$	Junction to case thermal resistance	Per diode	085	°C/W
		Total	0.47	
		Coupling	0.1	
P_1	Conduction power dissipation (see fig. 2)	Per diode $I_{F(AV)}$ = 60A δ =0.5 Tc= 58°C	108	W
P_{max}	Total power dissipation Pmax = P1 + P3 (P3 = 10% P1)	Per diode Tc= 48°C	120	W

STATIC ELECTRICAL CHARACTERISTICS (see Fig.2)

Symbol	Parameter	Test Conditions		Min	Typ	Max	Unit
V_F *	Forward voltage drop	I_F =60A	Tj = 25°C Tj = 125°C			1.75 1.5	V V
I_R **	Reverse leakage current	V_R =0.8 x V_{RRM}	Tj = 25°C Tj = 125°C			200 12	µA mA

Test pulses widths : * tp = 380 µs, duty cycle < 2%
** tp = 5 ms , duty cycle < 2%

DYNAMIC ELECTRICAL CHARACTERISTICS

TURN-OFF SWITCHING (see Fig.3)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{rr}	Reverse recovery time	Tj = 25°C I_F = 0.5 A I_R = 1A Irr = 0.25A I_F = 1 A dI_F/dt =-50A/µs V_R =30V		45	80	ns
I_{RM}	Maximum reverse recovery current	Tj = 125°C VR = 400V I_F =60A dI_F/dt = -480 A/µs dI_F/dt = -500 A/µs		24	38	A
S factor	Softness factor	Tj = 125°C V_R = 400V I_F =60A dI_F/dt = -500 A/µs		0.37		/

TURN-ON SWITCHING (see Fig.4)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{fr}	Forward recovery time	Tj = 25°C I_F =60 A, dI_F/dt = 480 A/µs measured at, 1.1 × $V_F$max			700	ns
V_{Fp}	Peak forward voltage	Tj = 25°C I_F =60A, dI_F/dt = 480 A/µs			14	V

APPLICATION DATA

The TURBOSWITCH "A" is especially designed to provide the lowest overall power losses in any "FREEWHEEL Mode" application (Fig.1) considering both the diode and the companion transistor, thus optimizing the overall performance in the end application.
The way of calculating the power losses is given below:

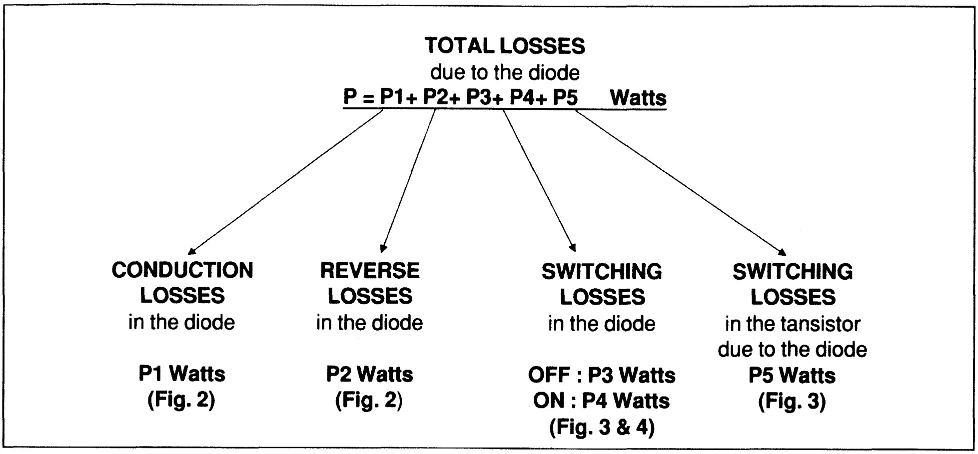
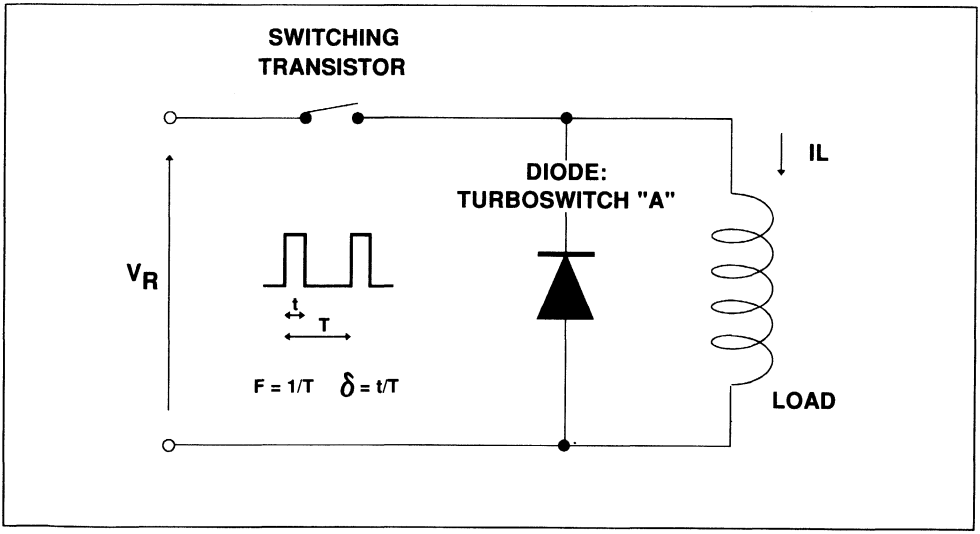
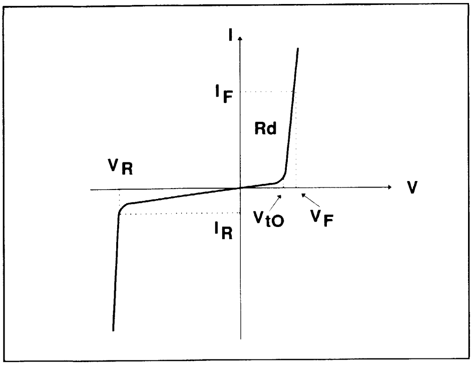


Fig. 1 : "FREEWHEEL" MODE.



APPLICATION DATA (Cont'd)

Fig. 2: STATIC CHARACTERISTICS



Conduction losses :

$P1 = V_{t0} \cdot I_{F(AV)} + R_d \cdot I_F^2{}_{(RMS)}$

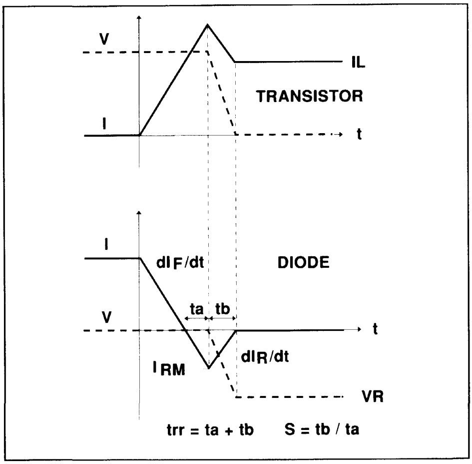
with

$V_{t0} = 1.15$ V
$R_d = 0.0055$ Ohm
(Max values at 125°C)

Reverse losses :

$P2 = V_R \cdot I_R \cdot (1 - \delta)$

Fig. 3: TURN-OFF CHARACTERISTICS



Turn-on losses :
(in the transistor, due to the diode)

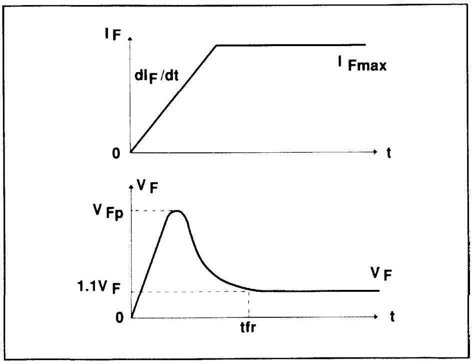
$$P5 = \frac{V_R \times I_{RM}^2 \times (3 + 2 \times S) \times F}{6 \times dI_F/dt} + \frac{V_R \times I_{RM} \times I_L \times (S + 2) \times F}{2 \times dI_F/dt}$$

Turn-off losses (in the diode) :

$$P3 = \frac{V_R \times I_{RM}^2 \times S \times F}{6 \times dI_F/dt}$$

P3 and P5 are suitable for power MOSFET and IGBT

Fig. 4: TURN-ON CHARACTERISTICS



Turn-on losses :

$P4 = 0.4\,(V_{FP} - V_F) \cdot I_{Fmax} \cdot t_{fr} \cdot F$

Fig 5 : Conduction losses versus average current

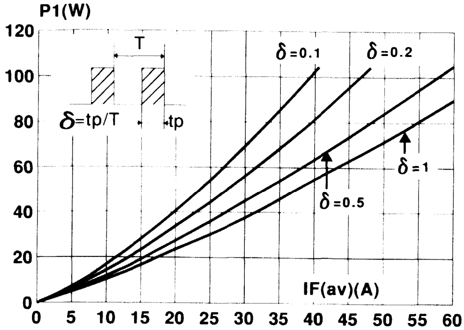


Fig 6 : Switching OFF losses versus dIF/dt

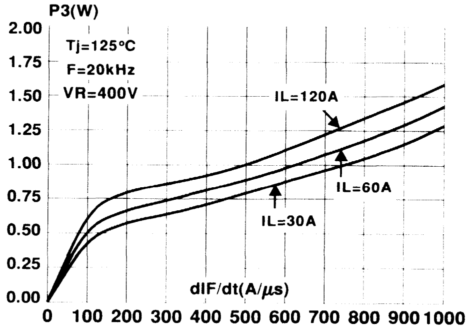


Fig 7 : Switching ON losses versus dIF/dt

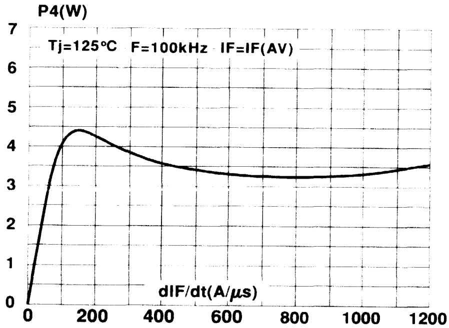


Fig 8 : Switching losses in transistor due to the diode

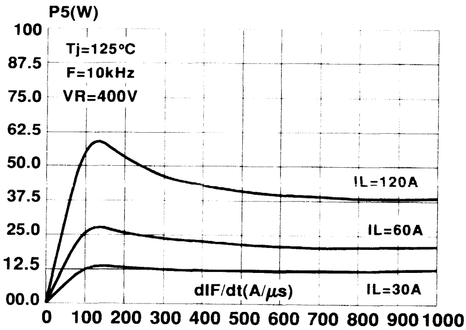


Fig 9 : Forward voltage drop versus forward current

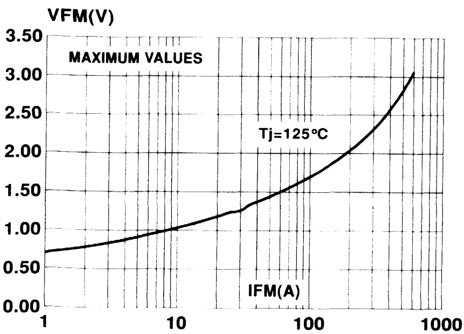


Fig 10 : Relative variation of thermal transient impedance junction to case versus pulse duration

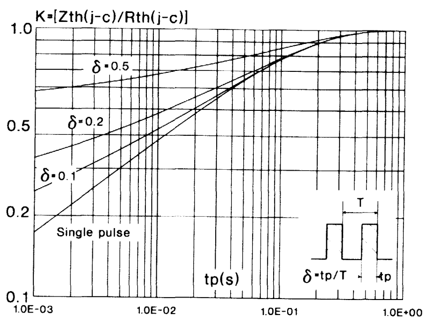


Fig 11 : Peak reverse recovery current versus dIF/dt

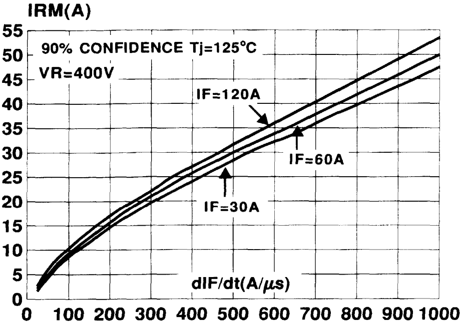


Fig 12 : Reverse recovery time versus dIF/dt

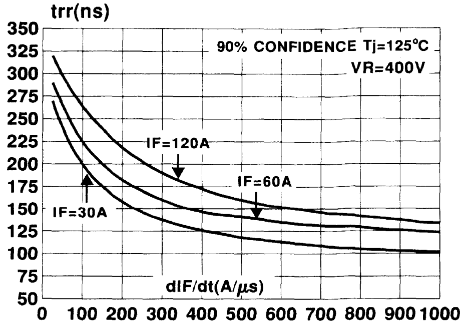


Fig 13 : Softness factor (tb/ta) versus dIF/dt

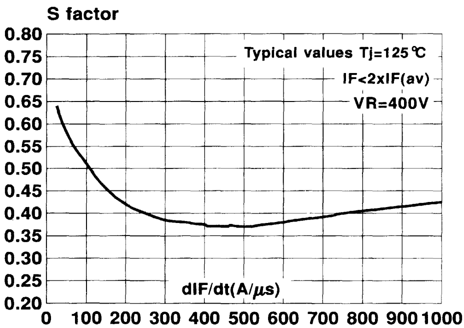


Fig 14 : Relative variation of dynamic parameters versus junction temperature (Reference Tj=125°C)

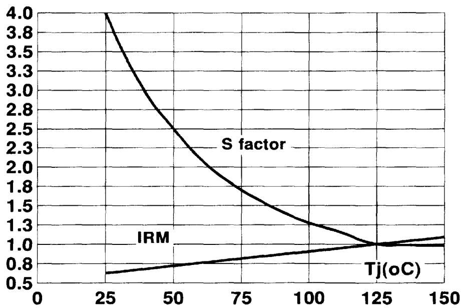


Fig 15 : Transient peak forward voltage versus dIF/dt

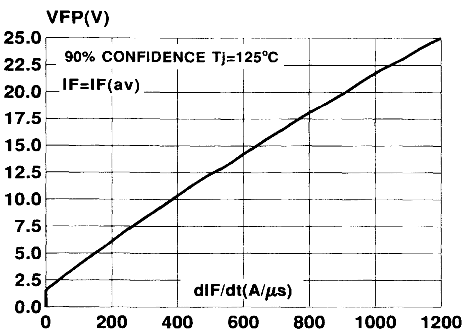
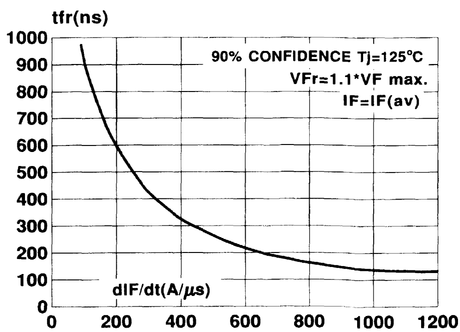


Fig 16 : Forward recovery time versus dIF/dt



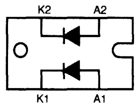
SGS-THOMSON MICROELECTRONICS

STTB12006T(V)1/2

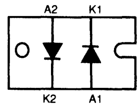
TURBOSWITCH ™ "B". ULTRA-FAST HIGH VOLTAGE DIODE

MAIN PRODUCTS CHARACTERISTICS

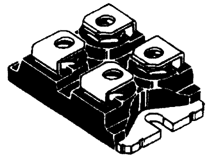
$I_{F(AV)}$	2*60A
V_{RRM}	600V
t_{rr} (typ)	65ns
V_F (max)	1.3V



STTB12006T(V)1



STTB12006T(V)2



ISOTOP ®
(Plastic)
Screw version (*)

FEATURES AND BENEFITS

- SPECIFIC TO THE FOLLOWING OPERATIONS: Snubbing or clamping, demagnetization and rectification.
- ULTRA-FAST, SOFT AND NOISE-FREE RECOVERY.
- VERY LOW OVERALL POWER LOSSES AND PARTICULARY LOW FORWARD VOLTAGE.
- DESIGNED FOR HIGH PULSED CURRENT OPERATIONS.

DESCRIPTION

The TURBOSWITCH is a very high performance series of ultra-fast high voltage power diodes from 600V to 1200V.
TURBOSWITCH, B family, drastically cuts losses in all high voltage operations which require extremely fast, soft and noise-free power diodes.
They are particularly suitable in the primary circuit of an SMPS as snubber, clamping or demagnetizing diodes, and also in most power converters as high performance rectifier diodes.
Packaged in ISOTOP, these 600V devices are particularly intended for use on 240V domestic mains.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{RRM}	Repetitive peak reverse voltage	600	V
V_{RSM}	Non repetitive peak reverse voltage	600	V
$I_{F(RMS)}$	RMS forward current	150	A
I_{FRM}	Repetitive peak forward current (tp = 5 µs, f = 1kHz)	2100	A
T_j	Max operating junction temperature	-65 to 150	°C
T_{stg}	Storage temperature	-65 to 150	°C

(*) : Tin plated Fast-on version is also available (without V suffix).

TM : ISOTOP and TURBOSWITCH are trademarks of SGS-THOMSON Microelectronics.

THERMAL AND POWER DATA

Symbol	Parameter	Conditions	Value	Unit
$R_{th(j-c)}$	Junction to case thermal resistance	Per diode	085	°C/W
		Total	0.47	
		Coupling	0.1	
P_1	Conduction power dissipation (see fig. 5)	Per diode $I_{F(AV)}$ = 60A δ =0.5 Tc= 58°C	108	W
P_{max}	Total power dissipation Pmax = P1 + P3 (P3 = 10% P1)	Per diode Tc= 48°C	120	W

STATIC ELECTRICAL CHARACTERISTICS (see Fig.5)

Symbol	Parameter	Test Conditions		Min	Typ	Max	Unit
V_F *	Forward voltage drop	I_F =60A	Tj = 25°C Tj = 125°C			1.4 1.3	V V
I_R **	Reverse leakage current	V_R =0.8 x V_{RRM}	Tj = 25°C Tj = 125°C			200 9	µA mA

Test pulses widths : * tp = 380 µs, duty cycle < 2%
** tp = 5 ms , duty cycle < 2%

DYNAMIC ELECTRICAL CHARACTERISTICS

TURN-OFF SWITCHING (see Fig.6)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{rr}	Reverse recovery time	Tj = 25°C I_F = 0.5 A I_R = 1A Irr = 0.25A I_F = 1 A dI_F/dt =-50A/µs V_R =30V		65	115	ns
I_{RM}	Maximum reverse recovery current	Tj = 125°C VR = 400V I_F =60A dI_F/dt = -480 A/µs			TBD	A
S factor	Softness factor	Tj = 125°C V_R = 400V I_F =60A dI_F/dt = -500 A/µs		TBD		/

TURN-ON SWITCHING (see Fig.7)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
t_{fr}	Forward recovery time	Tj = 25°C I_F =60 A, dI_F/dt = 480 A/µs measured at, 1.1 × $V_F$max			TBD	ns
V_{Fp}	Peak forward voltage	Tj = 25°C I_F =60A, dI_F/dt = 480 A/µs			TBD	V

TBD : To Be Defined

APPLICATION DATA

The TURBOSWITCH "B" is especially designed to provide the lowest overall power losses in any application such as snubbing,clamping, demagnetization and rectification. In such applications (fig.1 to fig.4), the way of calculating the power losses is given below :

TOTAL LOSSES
due to the diode
P = P1+ P2+ P3+ P4 Watts

CONDUCTION LOSSES
P1 Watts
(Fig. 5)

REVERSE LOSSES
P2 Watts
(Fig. 5)

SWITCHING LOSSES
OFF : P3 Watts
ON : P4 Watts
(Fig. 6 & 7)

Fig. 1 : SNUBBER DIODE.

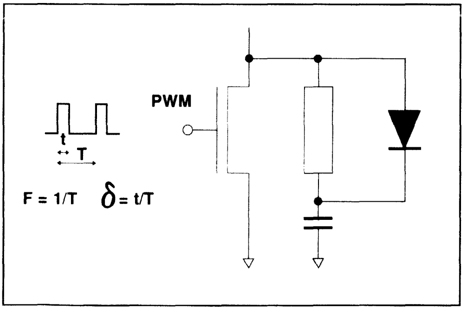


Fig. 2 : CLAMPING DIODE.

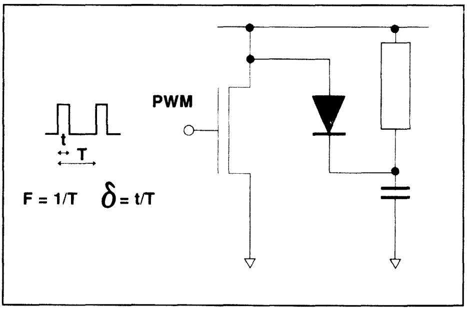


Fig. 3 : DEMAGNETIZING DIODE.

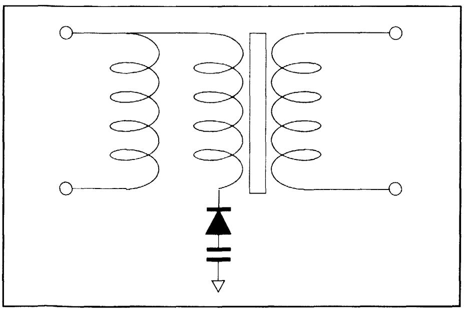
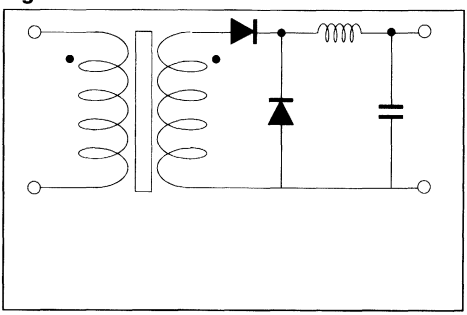
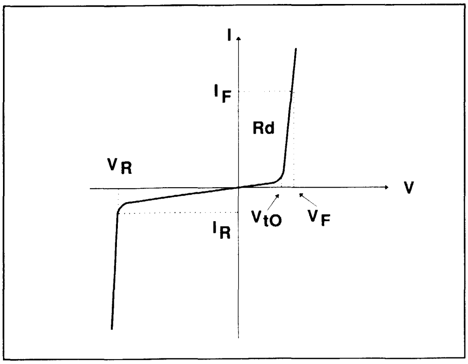


Fig. 4 : RECTIFIER DIODE.



APPLICATION DATA (Cont'd)

Fig. 5: STATIC CHARACTERISTICS



Conduction losses :

$P1 = V_{t0} . I_{F(AV)} + R_d . I_F^2{}_{(RMS)}$

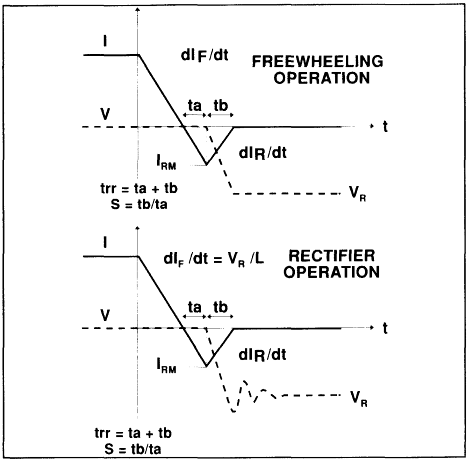
with

$V_{t0} = 1.00$ V
$R_d = 0.005$ Ohm
(Max values at 125°C)

Reverse losses :

$P2 = V_R . I_R . (1 - \delta)$

Fig. 6: TURN-OFF CHARACTERISTICS



Turn-off losses :

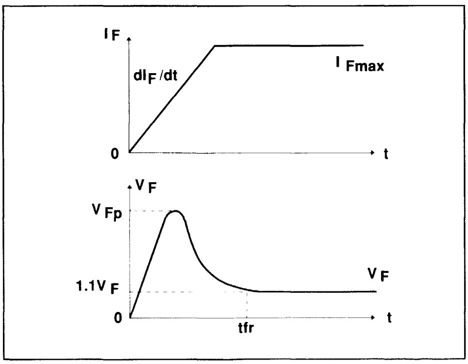
$$P3 = \frac{V_R \times I_{RM}^2 \times S \times F}{6 \times dI_F/dt}$$

Turn-off losses :
(with non negligible serial inductance)

$$P3' = \frac{V_R \times I_{RM}^2 \times S \times F}{6 \times dI_F/dt} + \frac{L \times I_{RM}^2 \times F}{2}$$

P3 and P3' are suitable for power MOSFET and IGBT

Fig. 7: TURN-ON CHARACTERISTICS



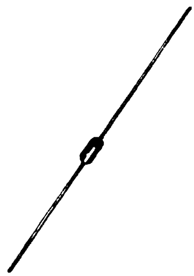
Turn-on losses :

$P4 = 0.4 (V_{FP} - V_F) . I_{Fmax} . t_{fr} . F$

FAST RECOVERY RECTIFIER DIODES

FAST RECOVERY RECTIFIER

- VERY LOW REVERSE RECOVERY TIME
- VERY LOW SWITCHING LOSSES
- LOW NOISE TURN-OFF SWITCHING



F-126
(Plastic)

SUITABLE APPLICATIONS

- FREE WHEELING DIODE IN CONVERTERS AND MOTORS CIRCUITS
- RECTIFIER IN S.M.P.S.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
I_{FRM}	Repetitive Peak Forward Current	$t_p \leq 10\mu s$	30	A
$I_{F(AV)}$	Average Forward Current *	$T_a = 70°C$ $\delta = 0.5$	1	A
I_{FSM}	Surge non Repetitive Forward Current	$t_p = 10ms$ Sinusoïdal	30	A
P	Power Dissipation *	$T_a = 70°C$	1.33	W
T_{stg} T_j	Storage and Junction Temperature Range		– 40 to + 150	°C

Symbol	Parameter	BYT 01-			Unit
		200	300	400	
V_{RRM}	Repetitive Peak Reverse Voltage	200	300	400	V
V_{RSM}	Non Repetitive Peak Reverse Voltage	220	330	440	V

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-a)}$	Junction-ambient *	60	°C/W

* On infinite heatsink with 10mm lead lengh.

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R	T_j = 25°C	$V_R = V_{RRM}$			20	μA
	T_j = 100°C				0.5	mA
V_F	T_j = 25°C	I_F = 1A			1.5	V
	T_j = 100°C				1.4	

RECOVERY CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{rr}	T_j = 25°C	I_F = 1A dI_F/dt = – 15A/μs V_R = 30V			55	ns
	T_j = 25°C	I_F = 0.5A I_R = 1A I_{rr} = 0.25A			25	

TURN -OFF SWITCHING CHARACTERISTICS (Without Series Inductance)

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{IRM}	di_F/dt = – 50A/μs	T_j = 100°C V_{CC} = 200V I_F = 1A		35	50	ns
I_{RM}	di_F/dt = – 50A/μs	$L_p \leq$ 0.05μA See figure 12		1.5	2	A

To evaluate the conduction losses use the following equations :

$V_F = 1.05 + 0.145\ I_F$ $P = 1.05 \times I_{F(AV)} + 0.145\ I_F{}^2{}_{(RMS)}$

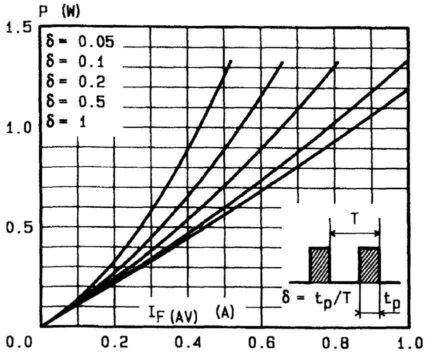


Fig.1 - Maximum average power dissipation versus average forward current.

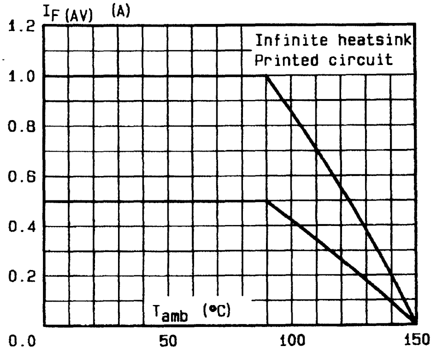


Fig.2 - Average forward current versus ambient temperature.

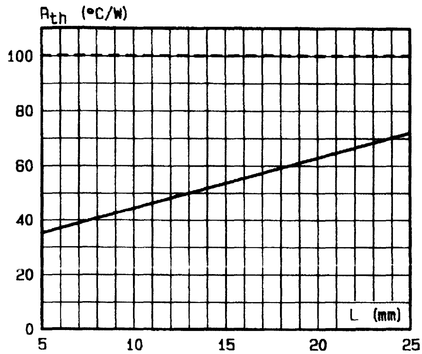
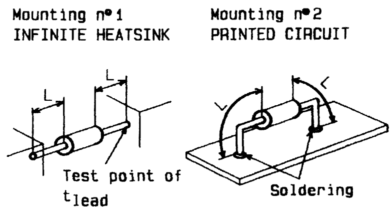


Fig.3 - Thermal resistance versus lead length.



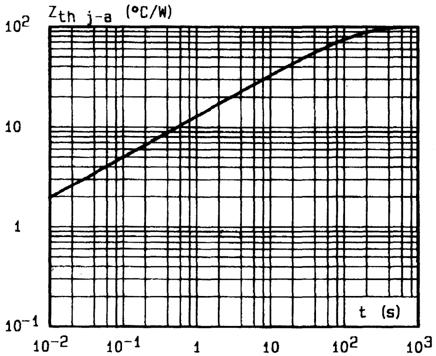


Fig.4 - Transient thermal impedance junction-ambient for mounting n°2 versus pulse duration (L = 10 mm).

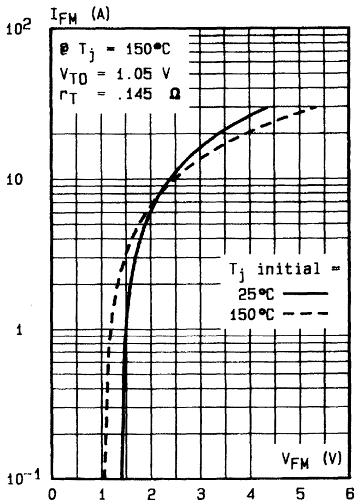


Fig.5 - Peak forward current versus peak forward voltage drop (maximum values).

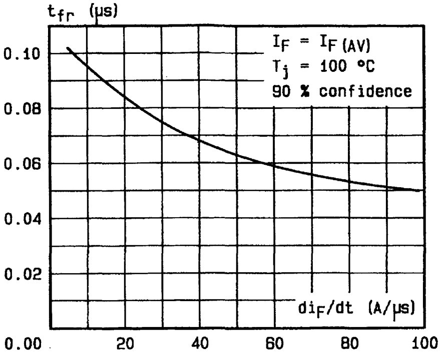


Fig.7 - Recovery time versus di_F/dt.

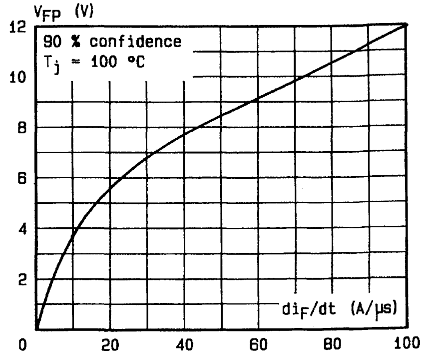


Fig.8 - Peak forward voltage versus di_F/dt.

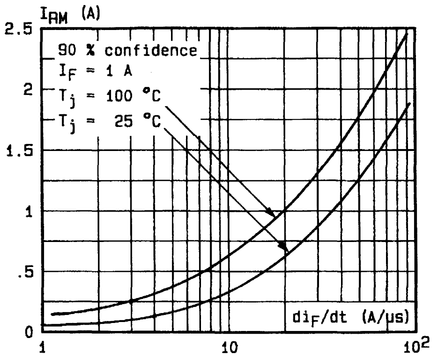


Fig.9 - Peak reverse current versus di_F/dt.

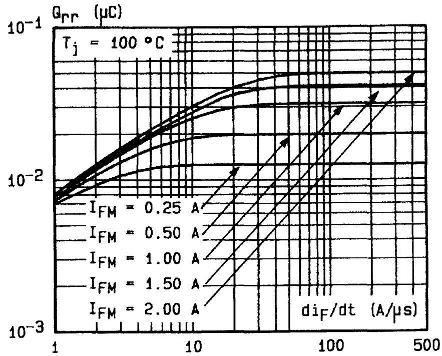


Fig.10 - Recovered charge versus di_F/dt (typical values).

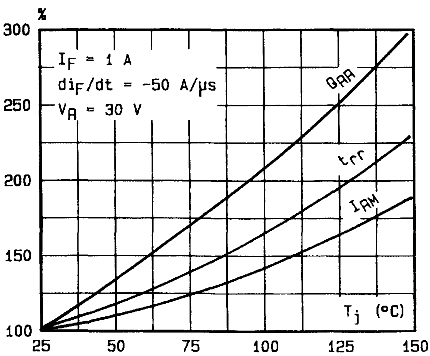


Fig.11 - Dynamic parameters versus junction temperature.

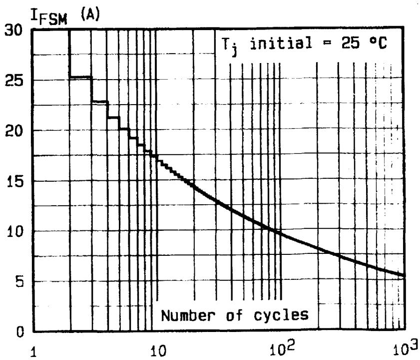
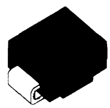


Fig.12 - Non repetitive surge peak current versus number of cycles

FAST RECOVERY RECTIFIER DIODES

FEATURES

- VERY LOW REVERSE RECOVERY TIME
- VERY LOW SWITCHING LOSSES
- LOW NOISE TURN-OFF SWITCHING
- SURFACE MOUNT DEVICE



SOD6
(Plastic)

DESCRIPTION

Single high voltage rectifier ranging from 200V to 400 V suited for Switch Mode Power Supplies and other power converters.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter		Value	Unit
$I_{F(RMS)}$	RMS forward current		10	A
$I_{F(AV)}$	Average forward current	Tl=110°C $\delta = 0.5$	1	A
I_{FSM}	Non repetitive surge peak forward current	tp=10ms sinusoidal	30	A
Tstg Tj	Storage and junction temperature range		- 40 to + 150 - 40 to + 150	°C °C

Symbol	Parameter	SMBYT01-			Unit
		200	300	400	
V_{RRM}	Repetitive peak reverse voltage	200	300	400	V

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
Rth (j-l)	Junction-leads	25	°C/W

ELECTRICAL CHARACTERISTICS
STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
V_F *	T_j = 25°C	I_F = 1 A			1.5	V
	T_j = 100°C				1.4	
I_R **	T_j = 25°C	$V_R = V_{RRM}$			20	µA
	T_j = 100°C				0.5	mA

Pulse test : * tp = 380 µs, duty cycle < 2 %
** tp = 5 ms, duty cycle < 2 %

RECOVERY CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
trr	T_j = 25°C	I_F = 0.5A Irr = 0.25A I_R = 1A			25	ns
		I_F = 1A dI_F/dt = -15A/µs V_R = 30V			60	

TURN-OFF SWITCHING CHARACTERISTICS (Without serie inductance)

Symbol	Test Conditions	Min.	Typ.	Max.	Unit
t_{IRM}	V_{CC} = 200V I_F = 1A Lp ≤ 0.05µH T_j = 100°C dI_F/dt = -50A/µs		35	50	ns
I_{RM}			1.5	2	A

To evaluate the conduction losses use the following equation :
$P = 1.1 \times I_{F(AV)} + 0.25 \times I_F^{2}{}_{(RMS)}$

Voltage (V)	200	300	400
Marking	B2	B3	B4

Laser marking
Logo indicates cathode

Fig.1 : Low frequency power losses versus average current.

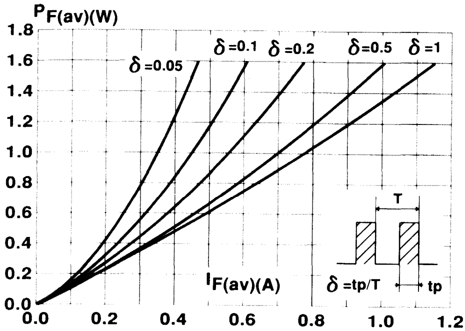


Fig.2 : Peak current versus form factor.

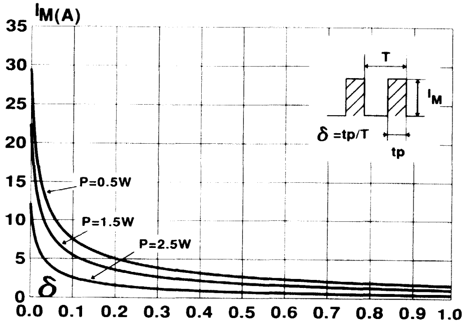


Fig.3 : Non repetitive surge peak forward current versus overload duration.

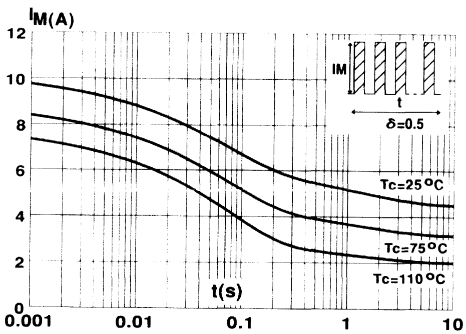


Fig.4 : Relative variation of thermal impedance junction to lead versus pulse duration.

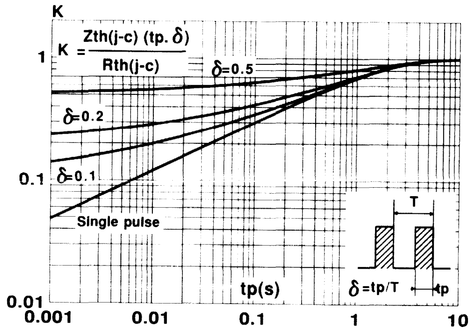


Fig.5 : Voltage drop versus forward current. (Maximum values)

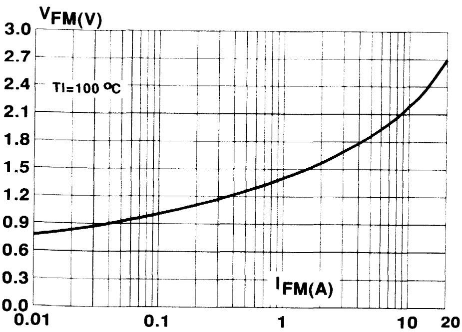


Fig.6 : Average current versus ambient temperature. (duty cycle : 0.5)

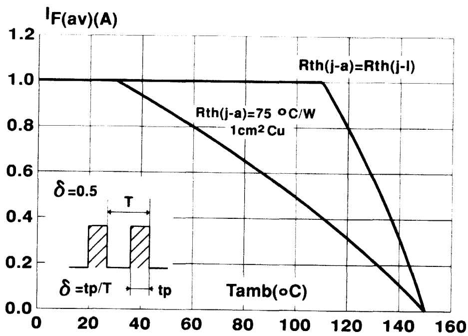


Fig.7 : Recovery time versus dI_F/dt.

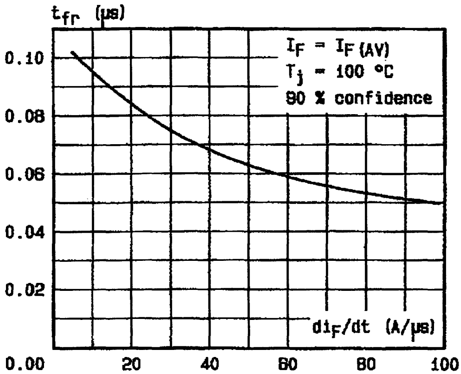


Fig.8 : Peak forward voltage versus dI_F/dt.

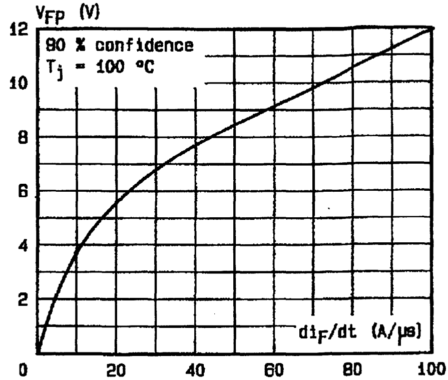


Fig.9 : Peak reverse current versus dIF/dt.

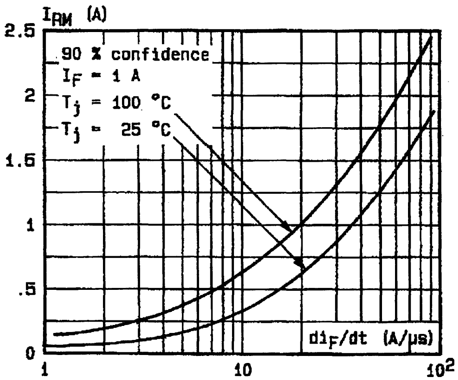


Fig.10 : Recovery charge versus dIF/dt.
(typical values)

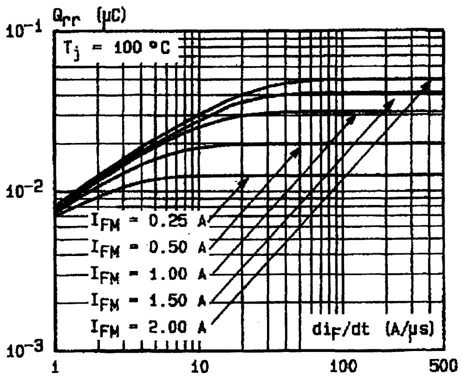


Fig.11 : Dynamic parameters versus junction temperature.

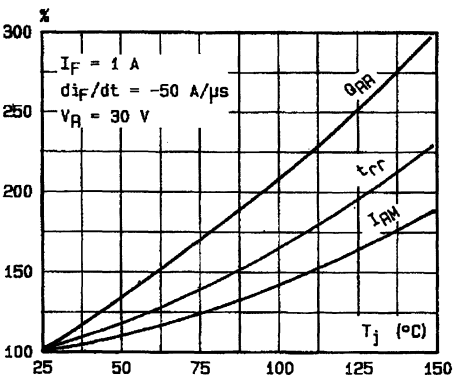
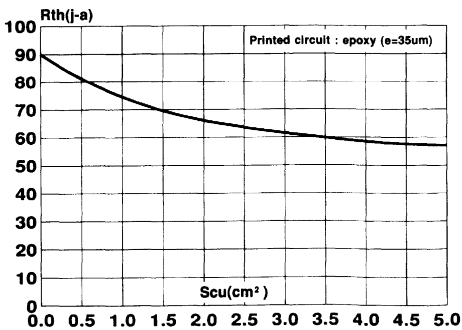


Fig.12 : Thermal resistance junction to ambient versus copper surface under each lead.

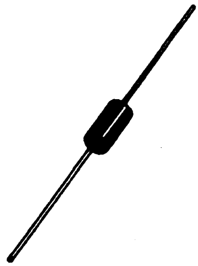


BYT 03-200→400

FAST RECOVERY RECTIFIER DIODES

FAST RECOVERY RECTIFIER

- VERY LOW REVERSE RECOVERY TIME
- VERY LOW SWITCHING LOSSES
- LOW NOISE TURN-OFF SWITCHING



DO 27A
(Plastic)

SUITABLE APPLICATIONS

- FREE WHEELING DIODE IN CONVERTERS AND MOTOR CONTROL CIRCUITS
- RECTIFIERS IN S.M.P.S.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
I_{FRM}	Repetitive Peak Forward Current	$t_p \leq 10\mu s$	60	A
$I_{F(AV)}$	Average Forward Current *	$T_a = 65°C$ $\delta = 0.5$	3	A
I_{FSM}	Surge non Repetitive Forward Current	$t_p = 10ms$ Sinusoïdal	60	A
P	Power Dissipation *	$T_a = 65°C$	4.2	W
T_{stg} T_j	Storage and Junction Temperature Range		– 40 to + 150	°C

Symbol	Parameter	BYT 03-			Unit
		200	300	400	
V_{RRM}	Repetitive Peak Reverse Voltage	200	300	400	V
V_{RSM}	Non Repetitive Peak Reverse Voltage	220	330	440	V

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-a)}$	Junction-ambient*	20	°C/W

* On infinite heatsink with 10mm lead lengh

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R	T_j = 25°C	$V_R = V_{RRM}$			20	μA
	T_j = 100°C				0.5	mA
V_F	T_j = 25°C	I_F = 3A			1.5	V
	T_j = 100°C				1.4	

RECOVERY CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{rr}	T_j = 25°C	I_F = 1A di_F/dt = – 15A/μs V_R = 30V			55	ns
		I_F = 0.5A I_R = 1A I_{rr} = 0.25A			25	

TURN -OFF SWITCHING CHARACTERISTICS - Without Series Inductance

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{IRM}	di_F/dt = – 50A/μs	T_j = 100°C V_{CC} = 200V I_F = 3A		35	50	ns
I_{RM}	di_F/dt = – 50A/μs	$L_P \le 0.05\mu H$		1.5	2	A

To evaluate the conduction losses use the following equations :

$V_F = 1.1 + 0.050\ I_F$ $P = 1.1 \times I_{F\,(AV)} + 0.050\ I_{F}^{2}{}_{(RMS)}$

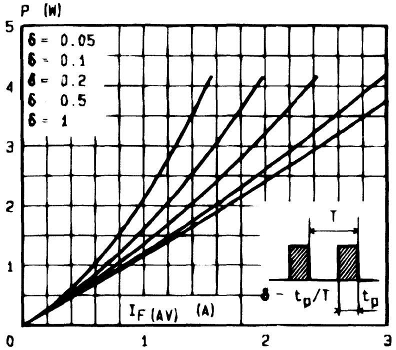


Fig.1 - Maximum average power dissipation versus average forward current.

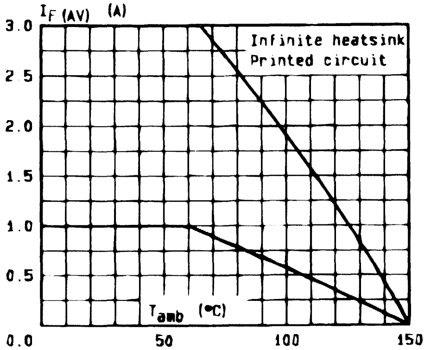


Fig.2 - Average forward current versus ambient temperature.

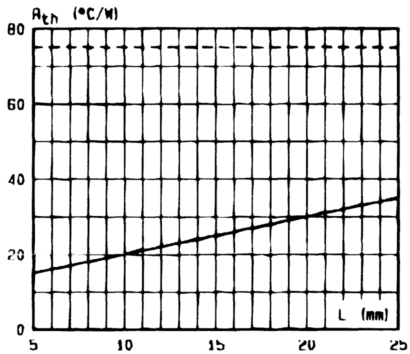
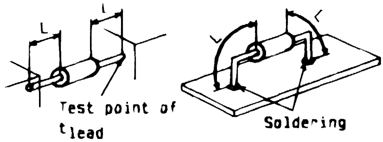


Fig.3 Thermal resistance versus lead length.



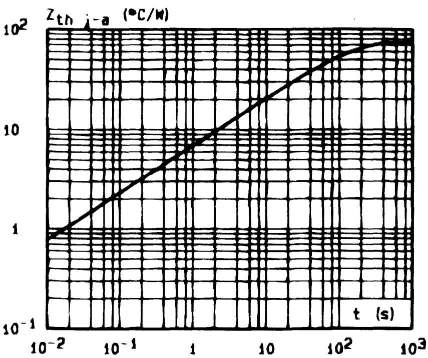


Fig.4 - Transient thermal impedance junction-ambient for mounting n°2 versus pulse duration (L = 10 mm).

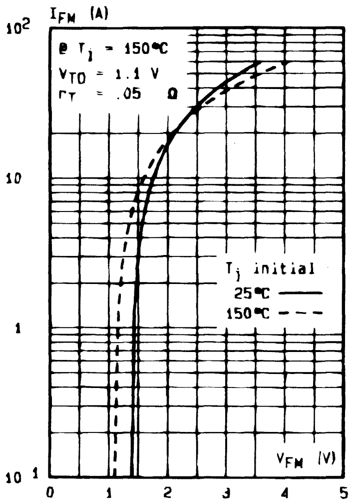


Fig.5 - Peak forward current versus peak forward voltage drop (maximum values).

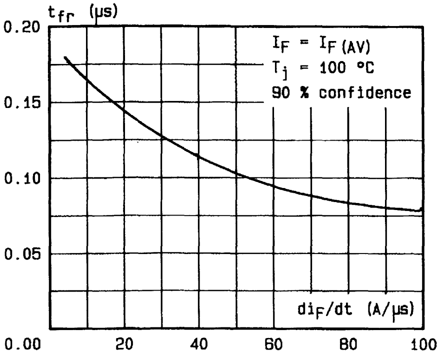


Fig.7 - Recovery time versus di_F/dt.

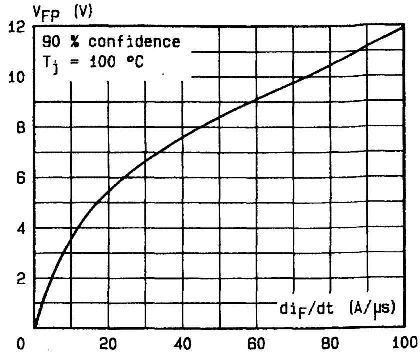


Fig.8 - Peak forward voltage versus di_F/dt.

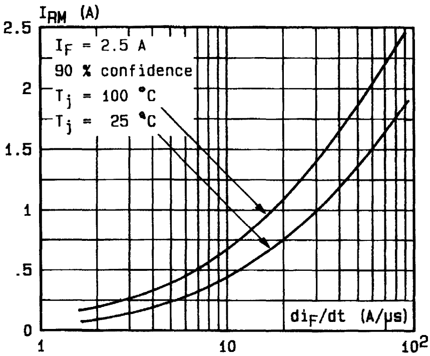


Fig.9 - Peak reverse current versus di_F/dt.

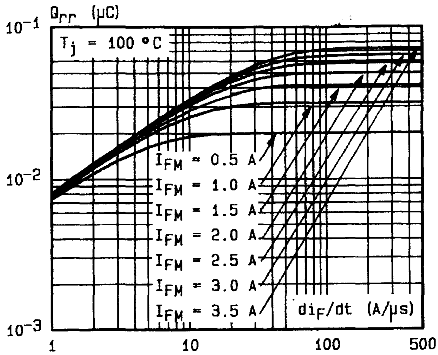


Fig.10 - Recovered charge versus di_F/dt (typical values).

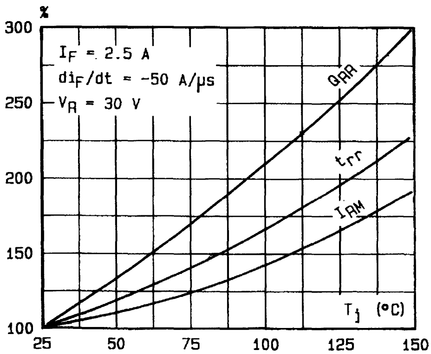


Fig.11 - Dynamic parameters versus junction temperature.

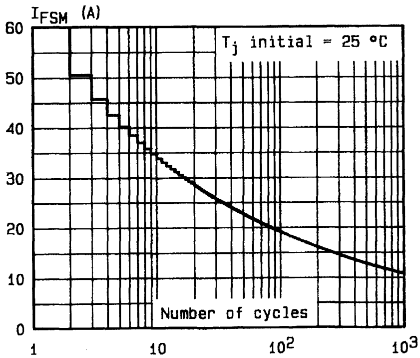


Fig.12 - Non repetitive surge peak current versus number of cycles

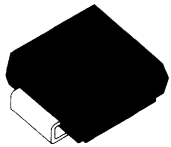
SGS-THOMSON
MICROELECTRONICS

SMBYT03

FAST RECOVERY RECTIFIER DIODES

FEATURES

- VERY LOW REVERSE RECOVERY TIME
- VERY LOW SWITCHING LOSSES
- LOW NOISE TURN-OFF SWITCHING
- SURFACE MOUNT DEVICE



SOD15
(Plastic)

DESCRIPTION

Single high voltage rectifier ranging from 200V to 400 V suited for Switch Mode Power Supplies and other power converters.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter		Value	Unit
$I_{F(RMS)}$	RMS forward current		10	A
$I_{F(AV)}$	Average forward current	Tl=55°C $\delta = 0.5$	3	A
I_{FSM}	Non repetitive surge peak forward current	tp=10ms sinusoidal	60	A
Tstg Tj	Storage and junction temperature range		- 40 to + 150 - 40 to + 150	°C °C

Symbol	Parameter	SMBYT03-			Unit
		200	300	400	
V_{RRM}	Repetitive peak reverse voltage	200	300	400	V

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
Rth (j-l)	Junction-leads	20	°C/W

ELECTRICAL CHARACTERISTICS
STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
V_F *	$T_j = 25°C$	$I_F = 3$ A			1.5	V
	$T_j = 100°C$				1.4	
I_R **	$T_j = 25°C$	$V_R = V_{RRM}$			20	µA
	$T_j = 100°C$				0.5	mA

Pulse test : * tp = 380 µs, duty cycle < 2 %
** tp = 5 ms, duty cycle < 2 %

RECOVERY CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
trr	$T_j = 25°C$	$I_F = 0.5A$ Irr = 0.25A $I_R = 1A$			25	ns
		$I_F = 1A$ $dI_F/dt = -15A/\mu s$ $V_R = 30V$			60	

TURN-OFF SWITCHING CHARACTERISTICS (Without serie inductance)

Symbol	Test Conditions	Min.	Typ.	Max.	Unit
t_{IRM}	$V_{CC} = 200V$ $I_F = 3A$ $Lp \leq 0.05\mu H$ $T_j = 100°C$ $dI_F/dt = -50A/\mu s$		35	50	ns
I_{RM}			1.5	2	A

To evaluate the conduction losses use the following equation :
$P = 1.1 \times I_{F(AV)} + 0.08 \times I_F^2{}_{(RMS)}$

Voltage (V)	200	300	400
Marking	C2	C3	C4

Laser marking
Logo indicates cathode

Fig.1 : Low frequency power losses versus average current.

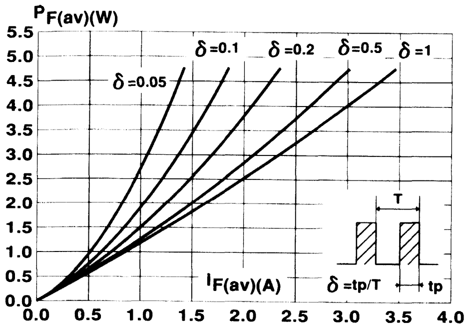


Fig.2 : Peak current versus form factor.

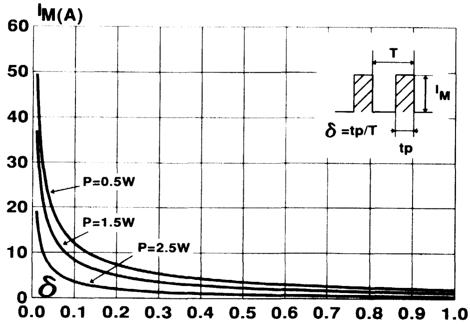


Fig.3 : Non repetitive surge peak forward current versus overload duration.

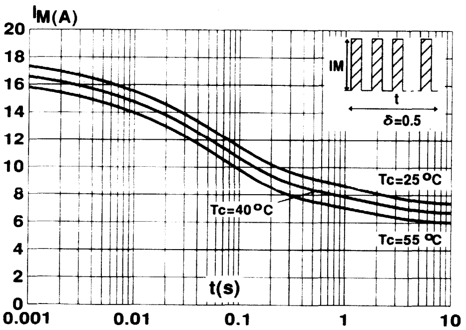


Fig.4 : Relative variation of thermal impedance junction to lead versus pulse duration.

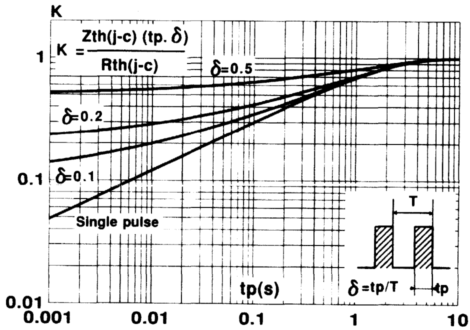


Fig.5 : Voltage drop versus forward current. (Maximum values)

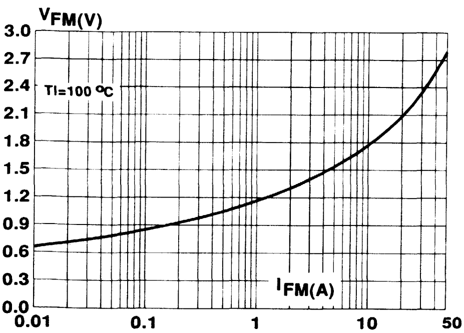


Fig.6 : Average current versus ambient temperature. (duty cycle : 0.5)

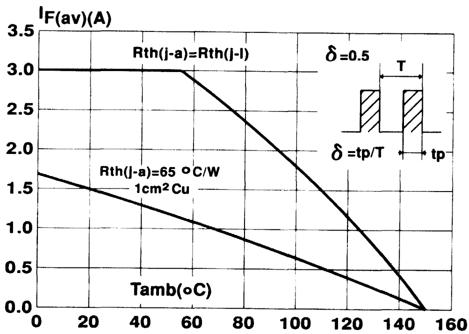


Fig.7 : Recovery time versus dI_F/dt.

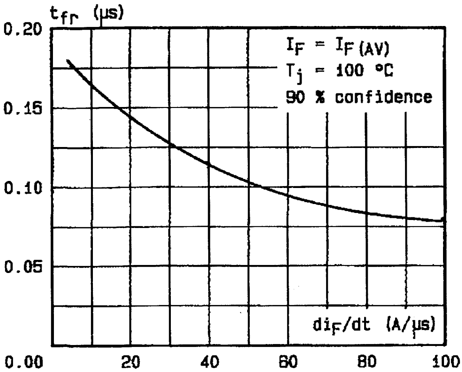


Fig.8 : Peak forward voltage versus dI_F/dt.

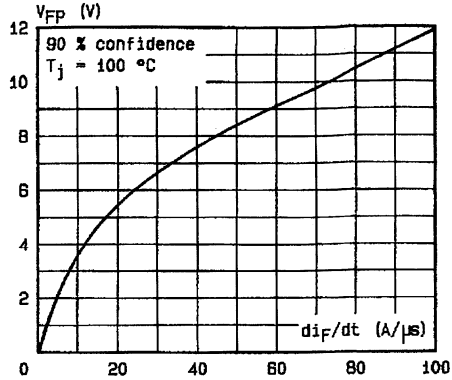


Fig.9 : Peak reverse current versus dIF/dt.

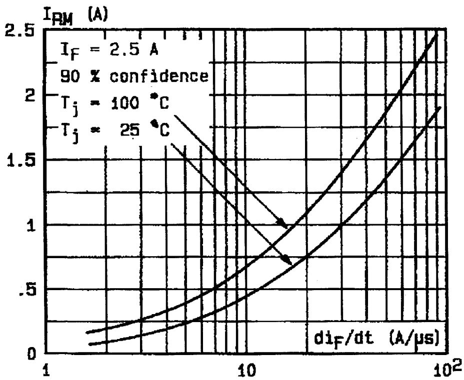


Fig.10 : Recovery charge versus dIF/dt. (typical values)

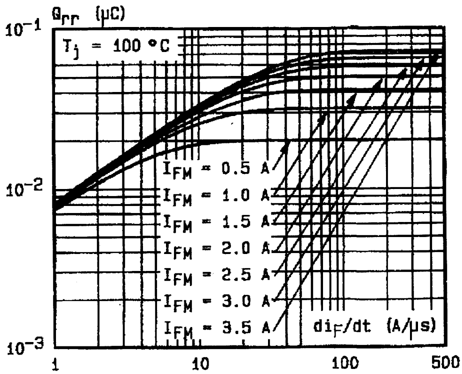


Fig.11 : Dynamic parameters versus junction temperature.

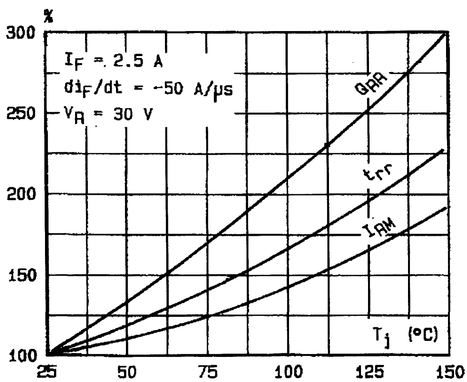
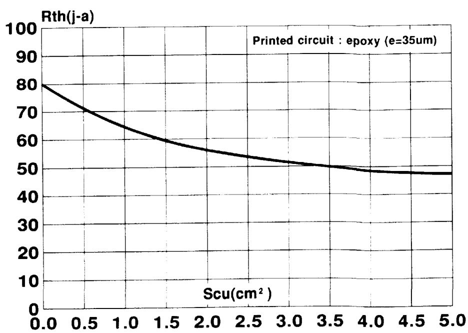


Fig.12 : Thermal resistance junction to ambient versus copper surface under each lead.



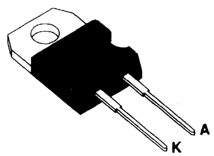
BYT 08P-200 → 400

FAST RECOVERY RECTIFIER DIODES

FEATURES

- VERY LOW REVERSE RECOVERY TIME
- VERY LOW SWITCHING LOSSES
- LOW NOISE TURN-OFF SWITCHING

Cathode connected to case



TO220AC
(Plastic)

SUITABLE APPLICATIONS

- FREE WHEELING DIODE IN CONVERTERS AND MOTOR CONTROL CIRCUITS
- RECTIFIER IN S.M.P.S.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
I_{FRM}	Repetitive Peak Forward Current	$t_p < 10\mu s$	130	A
$I_{F(RMS)}$	RMS Forward Current		16	A
$I_{F(AV)}$	Average Forward Current	$T_{case} = 120°C$ $\delta = 0.5$	8	A
I_{FSM}	Surge non Repetitive Forward Current	$t_p = 10ms$ sinusoidal	100	A
P	Power Dissipation	$T_{case} = 100°C$	20	W
T_{stg} T_j	Storage and Junction Temperature Range		− 40 to + 150	°C

Symbol	Parameter	BYT 08P-			Unit
		200	300	400	
V_{RRM}	Repetitive Peak Reverse Voltage	200	300	400	V
V_{RSM}	Non Repetitive Peak Reverse Voltage	220	330	440	V

THERMAL RESISTANCE

Symbol	Test Conditions	Value	Unit
$R_{th\ (j-c)}$	Junction-case	2.5	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R	T_j = 25°C	$V_R = V_{RRM}$			15	μA
	T_j = 100°C				2.5	mA
V_F	T_j = 25°C	I_F = 8A			1.5	V
	T_j = 100°C				1.4	

RECOVERY CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{rr}	T_j = 25°C	I_F = 1A di_F/dt = – 15A/μs V_R = 30V			75	ns
t_{rr}		I_F = 0.5A I_R = 1A I_{rr} = 0.25A			35	

TURN -OFF SWITCHING CHARACTERISTICS (Without Series Inductance)

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{IRM}	di_F/dt = – 32A/μs	V_{CC} = 200V I_F = 8A L_p ≤ 0.05μH T_j = 100°C See Figure 11			75	ns
	di_F/dt = – 64A/μs			50		
I_{RM}	di_F/dt = – 32A/μs				2.2	A
	di_F/dt = – 64A/μs			2.8		

TURN -OFF OVERVOLTAGE COEFFICIENT - (With Series Inductance)

Symbol	Test Conditions	Min.	Typ.	Max.	Unit
$C = \frac{V_{RP}}{V_{CC}}$	T_j = 100°C V_{CC} = 120V $I_F = I_{F(AV)}$ See note di_F/dt = – 8A/μs L_p = 9μH See figure 12		3.3		

Note : Applicable to BYT 08 P-400 only

To evaluate the conduction losses use the following equations :

$V_F = 1.1 + 0.024\ I_F$ $P = 1.1 \times I_{F(AV)} + 0.024\ I_F{}^2{}_{(RMS)}$

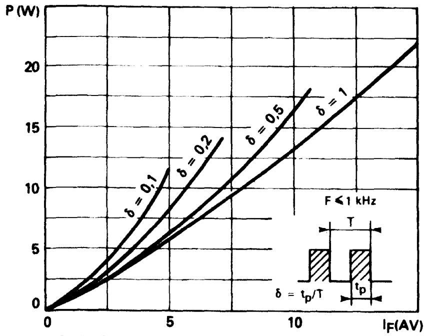


FIGURE 1 : Low frequency power losses versus average current.

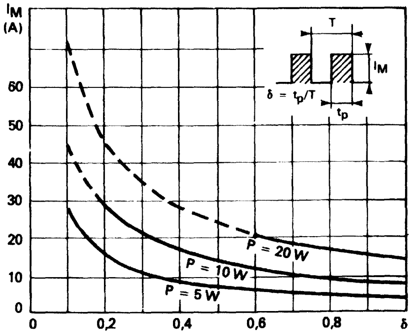


FIGURE 2 : Peak current versus form factor

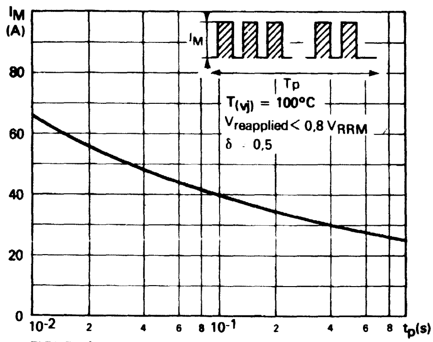


FIGURE 3 : Non repetitive peak surge current versus overload duration.

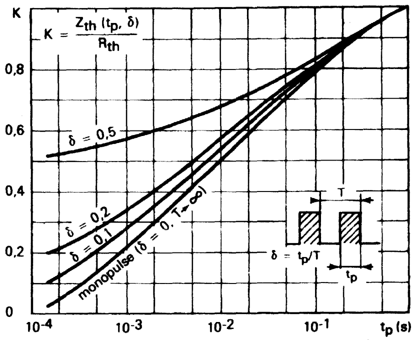


FIGURE 4 : Thermal impedance versus pulse width.

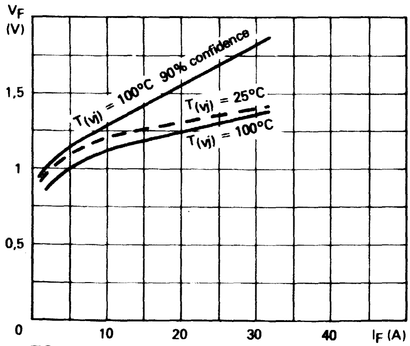


FIGURE 5 : Voltage drop versus forward current.

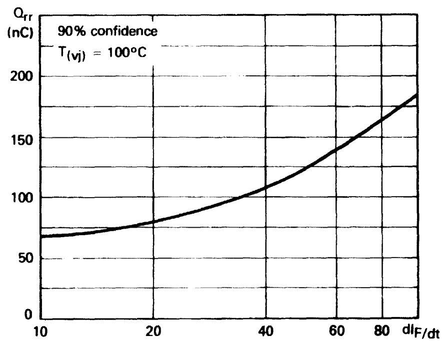


FIGURE 6 : Recovery charge versus dI_F/dt.

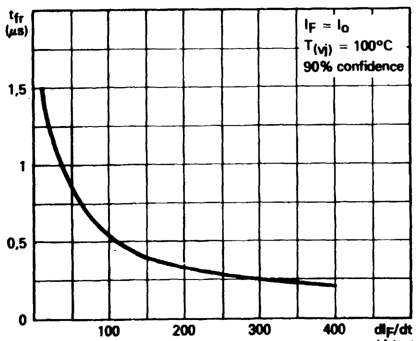


FIGURE 7 : Recovery time versus $dI_{F/dt}$.

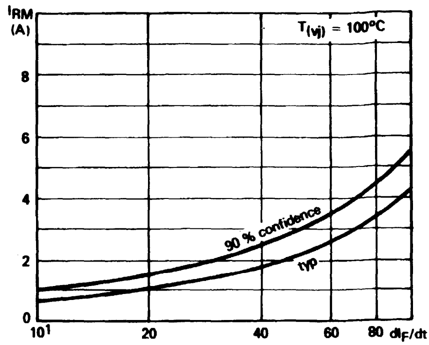


FIGURE 8 : Peak reverse current versus $dI_{F/dt}$.

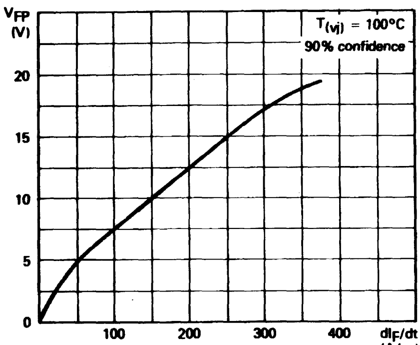


FIGURE 9 : Peak forward voltage versus $dI_{F/dt}$.

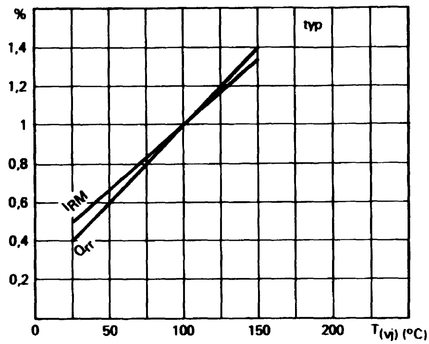


FIGURE 10 : Dynamic parameters versus junction temperature.

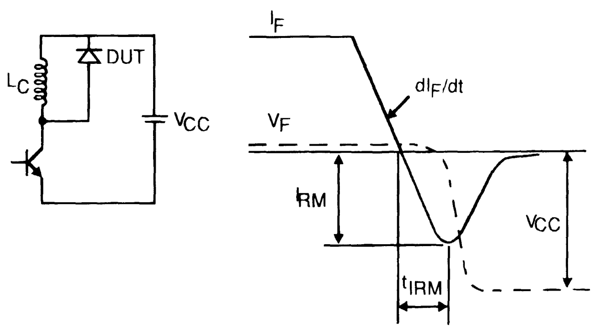


Figure 11 : Turn-off switching characteristics (without series inductance).

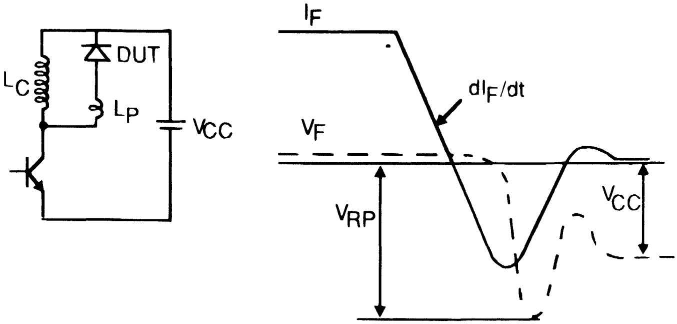


Figure 12 : Turn-off switching characteristics (with series inductance).

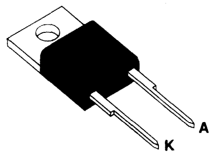
SGS-THOMSON MICROELECTRONICS

BYT 08PI-200→400

FAST RECOVERY RECTIFIER DIODES

- VERY LOW REVERSE RECOVERY TIME
- VERY LOW SWITCHING LOSSES
- LOW NOISE TURN-OFF SWITCHING
- INSULATED : Capacitance 7pF

Insulating voltage 2500 V_{RMS}



Isolated
TO220AC
(Plastic)

SUITABLE APPLICATIONS

- FREE WHEELING DIODE IN CONVERTERS AND MOTOR CONTROL CIRCUITS
- RECTIFIER IN S.M.P.S.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
I_{FRM}	Repetitive Peak Forward Current	$t_p \leq 10\mu s$	130	A
$I_{F(RMS)}$	RMS Forward Current		16	A
$I_{F(AV)}$	Average Forward Current	T_{case} = 105°C δ = 0.5	8	A
I_{FSM}	Surge non Repetitive Forward Current	t_p = 10ms Sinusoïdal	100	A
P	Power Dissipation	T_{case} = 80°C	20	W
T_{stg} T_j	Storage and Junction Temperature Range		– 40 to + 150	°C

Symbol	Parameter	BYT 08PI-			Unit
		200	300	400	
V_{RRM}	Repetitive Peak Reverse Voltage	200	300	400	V
V_{RSM}	Non Repetitive Peak Reverse Voltage	220	330	440	V

THERMAL RESISTANCE

Symbol	Test Conditions	Value	Unit
$R_{th\ (j-c)}$	Junction-case	3.5	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R	$T_j = 25°C$	$V_R = V_{RRM}$			15	μA
	$T_j = 100°C$				2.5	mA
V_F	$T_j = 25°C$	$I_F = 8A$			1.5	V
	$T_j = 100°C$				1.4	

RECOVERY CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{rr}	$T_j = 25°C$	$I_F = 1A$ $di_F/dt = -15A/\mu s$ $V_R = 30V$			75	ns
		$I_F = 0.5A$ $I_R = 1A$ $I_{rr} = 0.25A$			35	

TURN -OFF SWITCHING CHARACTERISTICS ((Without Series Inductance)

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{IRM}	$di_F/dt = -32A/\mu s$	$V_{CC} = 200V$ $I_F = 8A$ $L_p \leq 0.05\mu H$ $T_j = 100°C$ See Figure 11			75	ns
	$di_F/dt = -64A/\mu s$			50		
I_{RM}	$di_F/dt = -32A/\mu s$				2.2	A
	$di_F/dt = -64A/\mu s$			2.8		

TURN -OFF OVERVOLTAGE COEFFICIENT (With Series Inductance)

Symbol	Test Conditions	Min.	Typ.	Max.	Unit
$C = \frac{V_{RP}}{V_{CC}}$	$T_j = 100°C$ $V_{CC} = 120V$ $I_F = I_{F(AV)}$ See note $di_F/dt = -8A/\mu s$ $L_p = 9\mu H$ See Figure 12		3.3		

Note : Applicable to BYT 08 PI-400 only

To evaluate the conduction losses use the following equations :

$V_F = 1.1 + 0.024\ I_F$ $\qquad P = 1.1 \times I_{F(AV)} + 0.024 {I_F}^2_{(RMS)}$

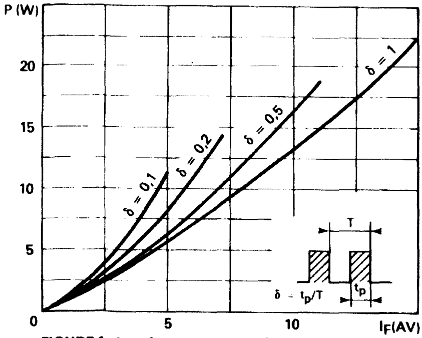


FIGURE 1 : Low frequency power losses versus average current.

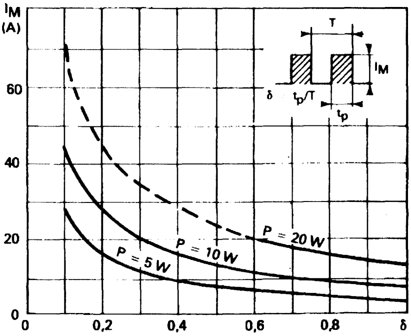


FIGURE 2 : Peak current versus form factor.

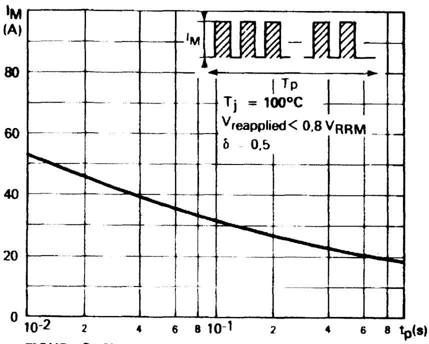


FIGURE 3 : Non repetitive peak surge current versus overload duration.

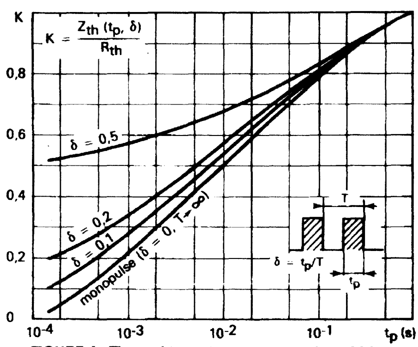


FIGURE 4 : Thermal impedance versus pulse width.

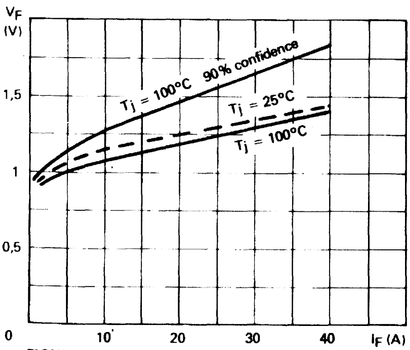


FIGURE 5 : Voltage drop versus forward current.

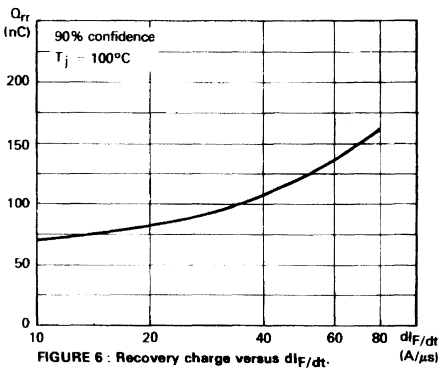


FIGURE 6 : Recovery charge versus $dI_{F/dt}$.

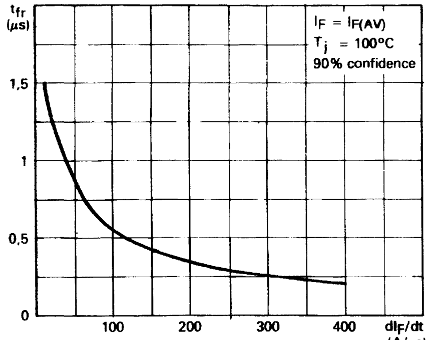


FIGURE 7 : Recovery time versus dI_F/dt.

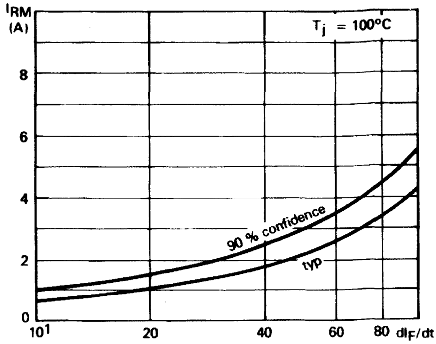


FIGURE 8 : Peak reverse current versus dI_F/dt.

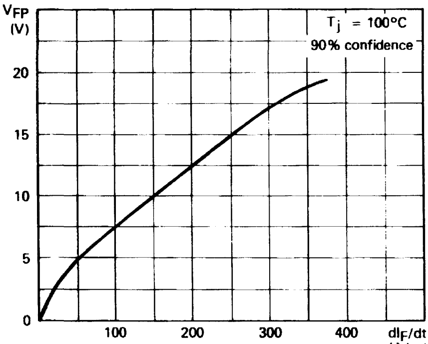


FIGURE 9 : Peak forward voltage versus dI_F/dt.

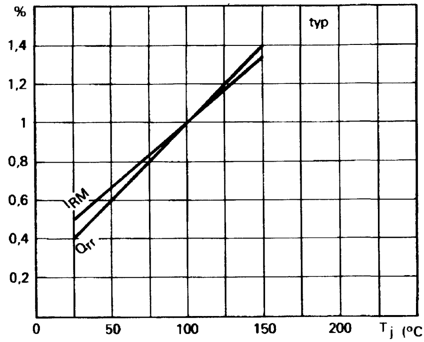


FIGURE 10 : Dynamic parameters versus junction temperature.

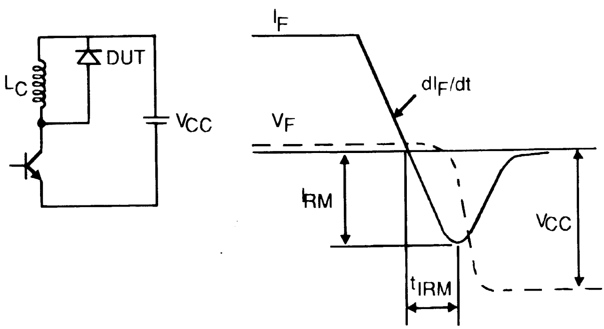


Figure 11 : Turn-off switching characteristics (without series inductance).

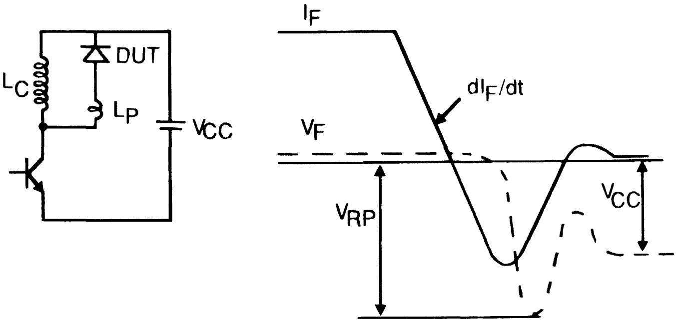


Figure 12 : Turn-off switching characteristics (with series inductance).

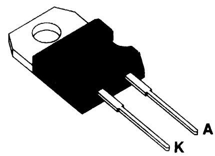
SGS-THOMSON MICROELECTRONICS

BYT 08P-600/800

FAST RECOVERY RECTIFIER DIODES

- HIGH REVERSE VOLTAGE CAPABILITY
- VERY LOW REVERSE RECOVERY TIME
- VERY LOW SWITCHING LOSSES
- LOW NOISE TURN-OFF SWITCHING

Cathode connected to case



TO220AC
(Plastic)

SUITABLE APPLICATIONS

- FREE WHEELING DIODE IN CONVERTERS AND MOTOR CONTROL CIRCUITS
- RECTIFIER IN S.M.P.S.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
I_{FRM}	Repetitive Peak Forward Current	$t_p < 10\mu s$	100	A
$I_{F(RMS)}$	RMS Forward Current		16	A
$I_{F(AV)}$	Average Forward Current	$T_{case} = 115°C$ $\delta = 0.5$	8	A
I_{FSM}	Surge non Repetitive Forward Current	$t_P = 10ms$ sinusoidal	50	A
P	Power Dissipation	$T_{case} = 115°C$	17	W
T_{stg} T_j	Storage and Junction Temperature Range		– 40 to + 150	°C

Symbol	Parameter	BYT 08P-		Unit
		600	800	
V_{RRM}	Repetitive Peak Reverse Voltage	600	800	V
V_{RSM}	Non Repetitive Peak Reverse Voltage	640	850	V

THERMAL RESISTANCE

Symbol	Test Conditions	Value	Unit
$R_{th\ (j-c)}$	Junction-case	2	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R	T_j = 25°C	$V_R = V_{RRM}$			35	µA
	T_j = 100°C				2	mA
V_F	T_j = 25°C	I_F = 8A			1.9	V
	T_j = 100°C				1.8	

RECOVERY CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{rr}	T_j = 25°C	I_F = 1A di_F/dt = − 15A/µs V_R = 30V			120	ns
		I_F = 0.5A I_R=1A I_{rr} = 0.25A			50	

TURN -OFF SWITCHING CHARACTERISTICS (Without Series Inductance)

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{IRM}	di_F/dt = − 32A/µs	V_{CC} = 200V I_F = 8A $L_p \leq$ 0.05µH T_j = 100°C See Figure 1			160	ns
	di_F/dt = − 64A/µs			100		
I_{RM}	di_F/dt = − 32A/µs				4	A
	di_F/dt = − 64A/µs			5		

TURN -OFF OVERVOLTAGE COEFFICIENT - With Series Inductance

Symbol	Test Conditions	Min.	Typ.	Max.	Unit
$C = \frac{V_{RP}}{V_{CC}}$	T_j = 100°C V_{CC} = 150V $I_F = I_{F(AV)}$ di_F/dt = − 8A/µs L_p = 12µH See figure 2			4	

To evaluate the conduction losses use the following equations :

$V_F = 1.47 + 0.04\ I_F$ $P = 1.47 \times I_{F(AV)} + 0.04\ I_F{}^2{}_{(RMS)}$

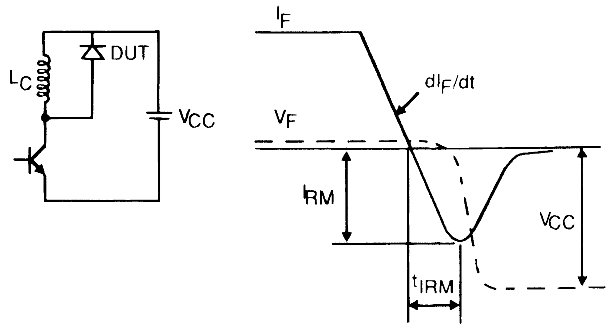


Figure 1 : Turn-off switching characteristics (without series inductance).

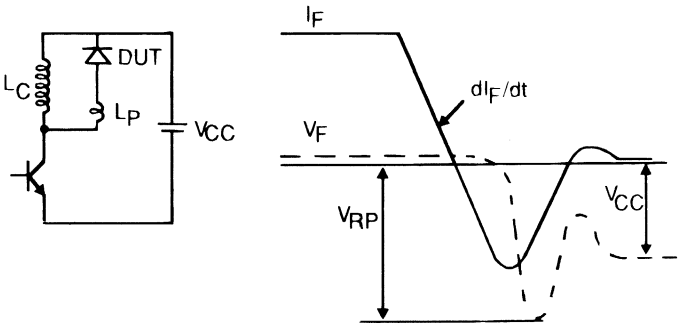
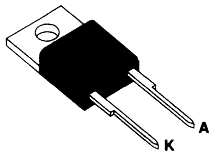


Figure 2 : Turn-off switching characteristics (with series inductance).

FAST RECOVERY RECTIFIER DIODES

- HIGH REVERSE VOLTAGE CAPABILITY
- VERY LOW REVERSES RECOVERY TIME
- VERY LOW SWITCHING LOSSES
- LOW NOISE TURN-OFF SWITCHING
- INSULATED : Capacitance 7pF

Insulting voltage 500 V_{RMS}



Isolated
TO220AC
(Plastic)

SUITABLE APPLICATIONS

- FREE WHEELING DIODE IN CONVERTERS AND MOTOR CONTROL CIRCUITS
- RECTIFIER IN S.M.P.S.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
I_{FRM}	Repetitive Peak Forward Current	$t_p \leq 10\mu s$	100	A
$I_{F(RMS)}$	RMS Forward Current		16	A
$I_{F(AV)}$	Average Forward Current	$T_{case} = 80°C$ $\delta = 0.5$	8	A
I_{FSM}	Surge non Repetitive Forward Current	$t_p = 10ms$ Sinusoïdal	50	A
P	Power Dissipation	$T_{case} = 80°C$	17	W
T_{stg} T_j	Storage and Junction Temperature Range		– 40 to + 150	°C

Symbol	Parameter	BYT 08PI-		Unit
		600	800	
V_{RRM}	Repetitive Peak Reverse Voltage	600	800	V
V_{RSM}	Non Repetitive Peak Reverse Voltage	640	850	V

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-c)}$	Junction-case	4	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R	T_j = 25°C	$V_R = V_{RRM}$			35	µA
	T_j = 100°C				2	mA
V_F	T_j = 25°C	I_F = 8A			1.9	V
	T_j = 100°C				1.8	

RECOVERY CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{rr}	T_j = 25°C	I_F = 1A di_F/dt = – 15A/µs V_R = 30V			120	ns
		I_F = 0.5A I_R=1A I_{rr} = 0.25A			50	

TURN -OFF SWITCHING CHARACTERISTICS (Without Series Inductance)

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{IRM}	di_F/dt = – 32A/µs	V_{CC} = 200V I_F = 8A L_p ≤ 0.05µH T_j = 100°C See Figure 1			160	ns
	di_F/dt = – 64A/µs			100		
I_{RM}	di_F/dt = – 32A/µs				4	A
	di_F/dt = – 64A/µs			5		

TURN -OFF OVERVOLTAGE COEFFICIENT (With Series Inductance)

Symbol	Test Conditions	Min.	Typ.	Max.	Unit
$C = \frac{V_{RP}}{V_{CC}}$	T_j = 100°C V_{CC} = 150V $I_F = I_{F(AV)}$ di_F/dt = – 8A/µs L_p = 12µH See Figure 2			4	

To evaluate the conduction losses use the following equations :

$V_F = 1.47 + 0.04\ I_F$ $P = 1.47 \times I_{F(AV)} + 0.04\ I_F^2{}_{(RMS)}$

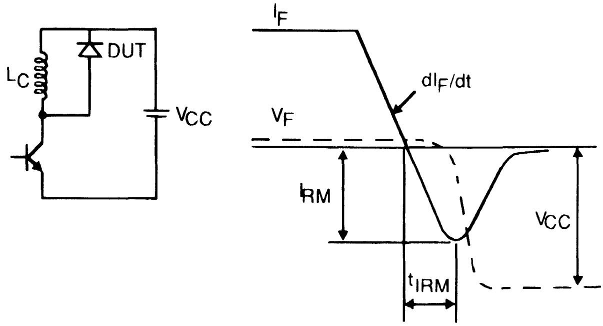


Figure 1 : Turn-off switching characteristics (without series inductance).

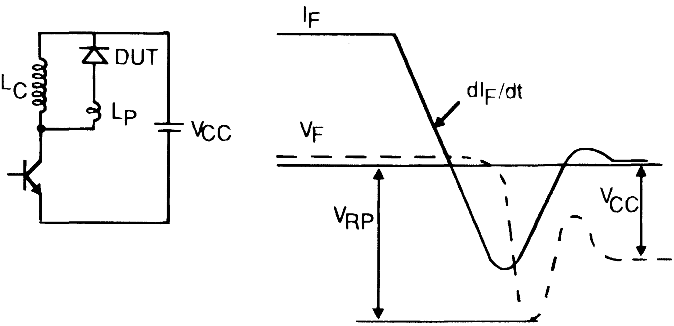
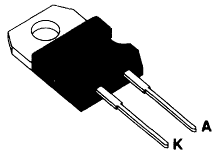


Figure 2 : Turn-off switching characteristics (with series inductance).

FAST RECOVERY RECTIFIER DIODE

- VERY HIGH REVERSE VOLTAGE CAPABILITY
- VERY LOW REVERSE RECOVERY TIME
- VERY LOW SWITCHING LOSSES
- LOW NOISE TURN-OFF SWITCHING

Cathode connected to case



TO220AC
(Plastic)

SUITABLE APPLICATIONS

- FREE WHEELING DIODE IN CONVERTERS AND MOTOR CONTROL CIRCUITS
- RECTIFIER IN S.M.P.S.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		1000	V
V_{RSM}	Non Repetitive Peak Reverse Voltage		1000	V
I_{FRM}	Repetitive Peak Forward Current	$t_p \leq 10\mu s$	100	A
$I_{F(RMS)}$	RMS Forward Current		16	A
$I_{F(AV)}$	Average Forward Current	T_{case} = 115°C $\delta = 0.5$	8	A
I_{FSM}	Surge non Repetitive Forward Current	t_p = 10ms Sinusoïdal	50	A
P	Power Dissipation	T_{case} = 115°C	17	W
T_{stg} T_j	Storage and Junction Temperature Range		– 40 to + 150	°C

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-c)}$	Junction-case	2	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R	T_j = 25°C	$V_R = V_{RRM}$			35	µA
	T_j = 100°C				2	mA
V_F	T_j = 25°C	I_F = 8A			1.9	V
	T_j = 100°C				1.8	

RECOVERY CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{rr}	T_j = 25°C	I_F = 1A di_F/dt = – 15A/µs V_R = 30V			155	ns
t_{rr}		I_F = 0.5A I_R=1A I_{rr} = 0.25A			65	

TURN -OFF SWITCHING CHARACTERISTICS (Without Series Inductance)

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{IRM}	di_F/dt = – 32A/µs	V_{CC} = 200V I_F = 8A $L_p \leq 0.05\mu H$ T_j = 100°C See Figure 1			200	ns
	di_F/dt = – 64A/µs			120		
I_{RM}	di_F/dt = – 32A/µs				5.5	A
	di_F/dt = – 64A/µs			6		

TURN -OFF OVERVOLTAGE COEFFICIENT (With Series Inductance)

Symbol	Test Conditions	Min.	Typ.	Max.	Unit
$C = \frac{V_{RP}}{V_{CC}}$	T_j = 100°C V_{CC} = 200V $I_F = I_{F(AV)}$ di_F/dt = – 8A/µs L_p = 12µH See Figure 2			4.5	

To evaluate the conduction losses use the following equations :

$V_F = 1.47 + 0.041\ I_F$ $P = 1.47 \times I_{F(AV)} + 0.041\ I_F{}^2{}_{(RMS)}$

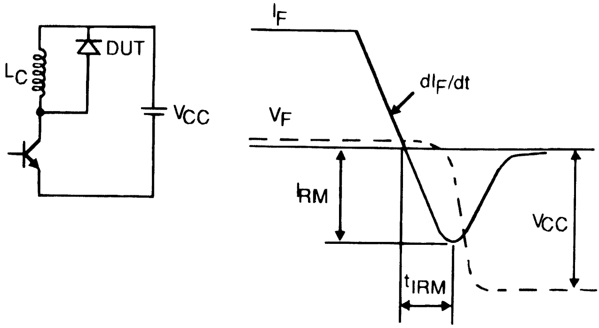


Figure 1 : Turn-off switching characteristics (without series inductance).

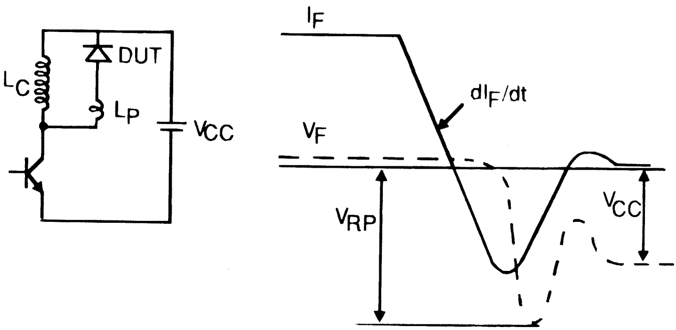


Figure 2 : Turn-off switching characteristics (with series inductance).

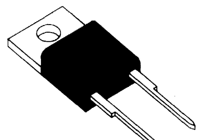
SGS-THOMSON MICROELECTRONICS

BYT 08PI-1000

FAST RECOVERY RECTIFIER DIODE

- VERY HIGH REVERSE VOLTAGE CAPABILITY
- VERY LOW REVERSES RECOVERY TIME
- VERY LOW SWITCHING LOSSES
- LOW NOISE TURN-OFF SWITCHING
- INSULATED : Capacitance 7pF

Insulting voltage 500 V_{RMS}



Isolated
TO220AC
(Plastic)

SUITABLE APPLICATIONS

- FREE WHEELING DIODE IN CONVERTERS AND MOTOR CONTROL CIRCUITS
- RECTIFIER IN S.M.P.S.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		1000	V
V_{RSM}	Non Repetitive Peak Reverse Voltage		1000	V
I_{FRM}	Repetitive Peak Forward Current	$t_p \leq 10\mu s$	100	A
$I_{F(RMS)}$	RMS Forward Current		16	A
$I_{F(AV)}$	Average Forward Current	$T_{case} = 80°C$ $\delta = 0.5$	8	A
I_{FSM}	Surge non Repetitive Forward Current	$t_p = 10ms$ Sinusoïdal	50	A
P	Power Dissipation	$T_{case} = 80°C$	17	W
T_{stg} T_j	Storage and Junction Temperature Range		– 40 to + 150	°C

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-c)}$	Junction-case	4	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R	T_j = 25°C	$V_R = V_{RRM}$			35	µA
	T_j = 100°C				2	mA
V_F	T_j = 25°C	I_F = 8A			1.9	V
	T_j = 100°C				1.8	

RECOVERY CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{rr}	T_j = 25°C	I_F = 1A di_F/dt = – 15A/µs V_R = 30V			155	ns
		I_F = 0.5A I_R=1A I_{rr} = 0.25A			65	

TURN -OFF SWITCHING CHARACTERISTICS (Without Series Inductance)

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{IRM}	di_F/dt = – 32A/µs	V_{CC} = 200V I_F = 8A L_p ≤ 0.05µH T_j = 100°C See Figure 1			200	ns
	di_F/dt = – 64A/µs			120		
I_{RM}	di_F/dt = – 32A/µs				5.5	A
	di_F/dt = – 64A/µs			6		

TURN -OFF OVERVOLTAGE COEFFICIENT (With Series Inductance)

Symbol	Test Conditions	Min.	Typ.	Max.	Unit
$C = \frac{V_{RP}}{V_{CC}}$	T_j = 100°C V_{CC} = 200V $I_F = I_{F(AV)}$ di_F/dt = – 8A/µs L_p = 12µH See Figure 2			4.5	

To evaluate the conduction losses use the following equations :

$V_F = 1.47 + 0.04\ I_F$ $\qquad$ $P = 1.47 \times I_{F(AV)} + 0.04\ I_F{}^2{}_{(RMS)}$

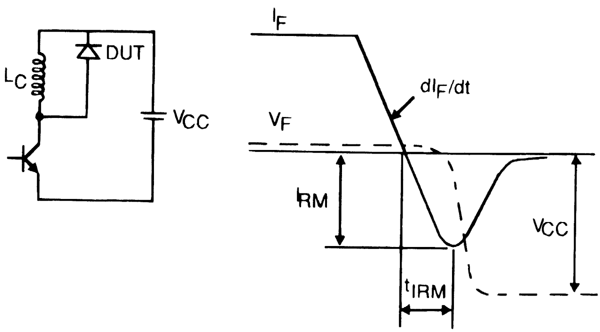


Figure 1 : Turn-off switching characteristics (without series inductance).

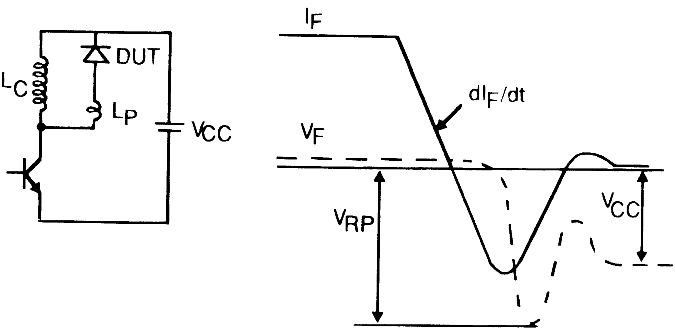
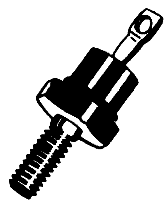


Figure 2 : Turn-off switching characteristics (with series inductance).

BYT 12-200 →400

FAST RECOVERY RECTIFIER DIODES

- VERY LOW REVERSE RECOVERY TIME
- VERY LOW SWITCHING LOSSES
- LOW NOISE TURN-OFF SWITCHING



DO 4
(Metal)

SUITABLE APPLICATIONS :

- FREE WHEELING DIODE IN CONVERTERS AND MOTOR CONTROL CIRCUITS
- RECTIFIER IN S.M.P.S.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
I_{FRM}	Repetitive Peak Forward Current	$t_p \leq 10\mu s$	200	A
$I_{F(RMS)}$	RMS Forward Current		25	A
$I_{F(AV)}$	Average Forward Current	$T_{case} = 100°C$ $\delta = 0.5$	12	A
I_{FSM}	Surge non Repetitive Forward Current	$t_P = 10ms$ sinusoidal	200	A
P	Power Dissipation	$T_{case} = 100°C$	20	W
T_{stg} T_j	Storage and Junction Temperature Range		− 40 to + 150	°C

Symbol	Parameter	BYT 12-			Unit
		200	**300**	**400**	
V_{RRM}	Repetitive Peak Reverse Voltage	200	300	400	V
V_{RSM}	Non Repetitive Peak Reverse Voltage	220	330	440	V

THERMAL RESISTANCE

Symbol	Test Conditions	Value	Unit
$R_{th\ (j\text{-}c)}$	Junction-case	2.5	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R	T_j = 25°C	$V_R = V_{RRM}$			15	μA
	T_j = 100°C				2.5	mA
V_F	T_j = 25°C	I_F = 12A			1.5	V
	T_j = 100°C				1.4	

RECOVERY CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{rr}	T_j = 25°C	I_F = 1A di_F/dt = – 15A/μs V_R = 30V			100	ns
		I_F = 0.5A I_R = 1A I_{rr} = 0.25A			50	

TURN -OFF SWITCHING CHARACTERISTICS (Without Series Inductance)

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{IRM}	di_F/dt = – 50A/μs	V_{CC} = 200V I_F = 12A L_p ≤ 0.05μH T_j = 100°C See Figure 11			75	ns
	di_F/dt = – 100A/μs			50		
I_{RM}	di_F/dt = – 50A/μs				3.8	A
	di_F/dt = – 100A/μs			4.3		

TURN -OFF OVERVOLTAGE COEFFICIENT (With Series Inductance)

Symbol	Test Conditions	Min.	Typ.	Max.	Unit
$C = \frac{V_{RP}}{V_{CC}}$	T_j = 100°C V_{CC} = 120V $I_F = I_{F(AV)}$ See note di_F/dt = – 12A/μs L_p = 7μH See Figure 12		3.3		

Note : Applicable to BYT12-400 only

To evaluate the conduction losses use the following equations :

$V_F = 1.1 + 0.022\ I_F$ $P = 1.1 \times I_{F(AV)} + 0.022\ I_F{}^2{}_{(RMS)}$

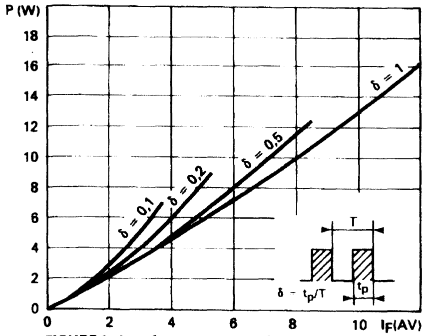


FIGURE 1 : Low frequency power losses versus average current.

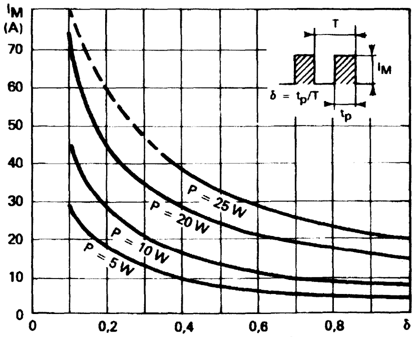


FIGURE 2 : Peak current versus form factor.

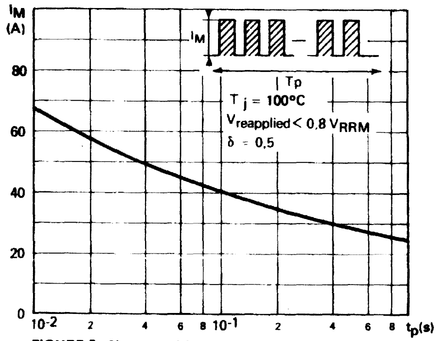


FIGURE 3 : Non repetitive peak surge current versus overload duration.

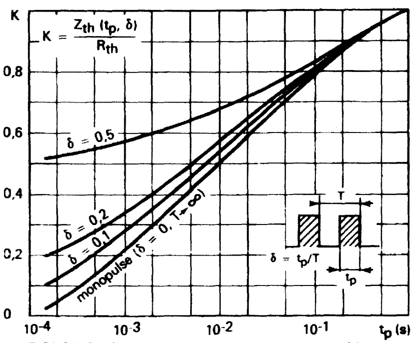


FIGURE 4 : Thermal impedance versus pulse width.

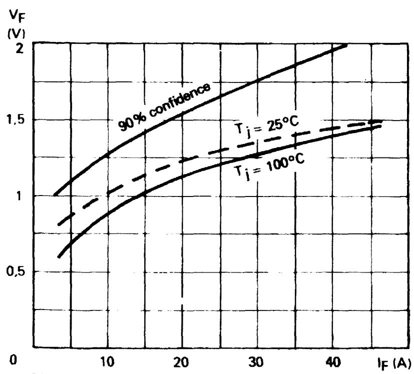


FIGURE 5 : Voltage drop versus forward current.

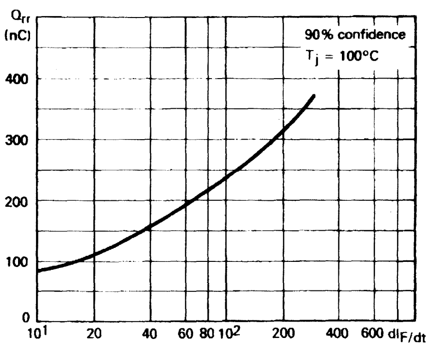


FIGURE 6 : Recovery charge versus $dI_{F/dt}$.

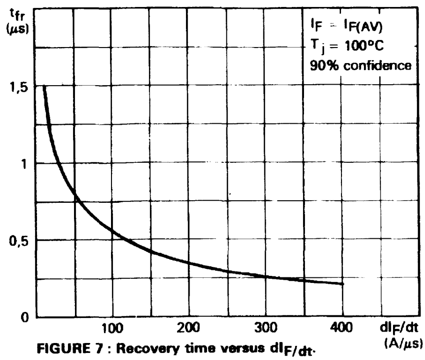


FIGURE 7 : Recovery time versus $dI_{F/dt}$.

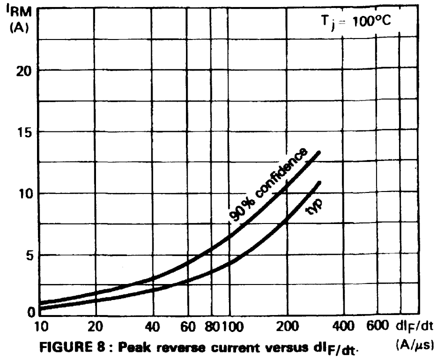


FIGURE 8 : Peak reverse current versus $dI_{F/dt}$.

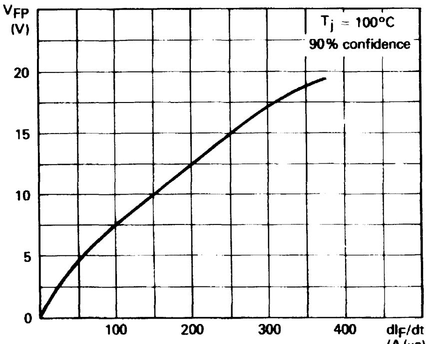


FIGURE 9 : Peak forward voltage versus $dI_{F/dt}$.

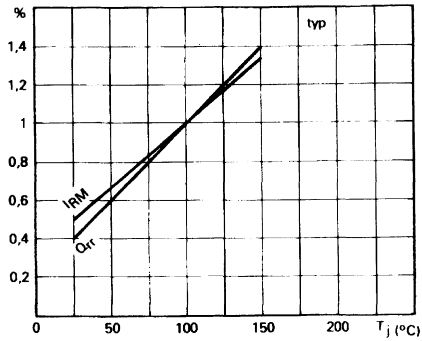


FIGURE 10 : Dynamic parameters versus junction temperature.

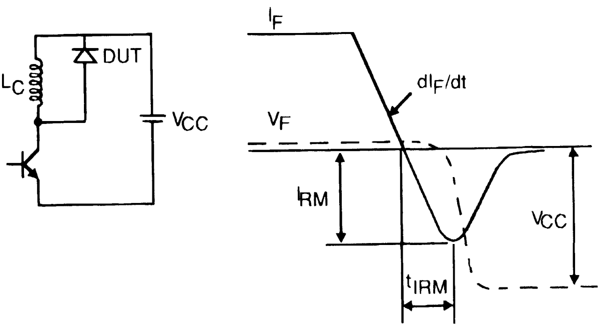


Figure 11 : Turn-off switching characteristics (without series inductance).

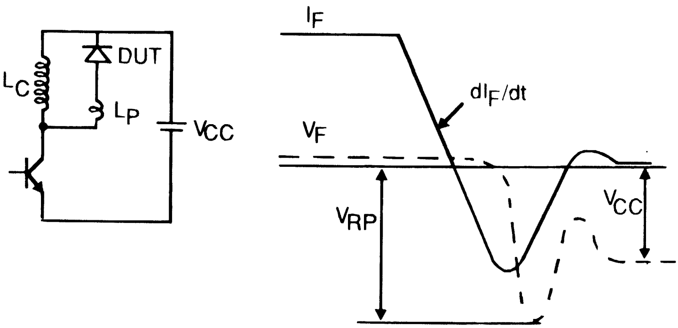
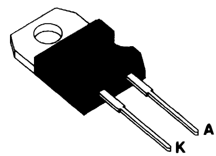


Figure 12 : Turn-off switching characteristics (with series inductance).

BYT 12P-600 → 800

FAST RECOVERY RECTIFIER DIODES

- VERY HIGH REVERSE VOLTAGE CAPABILITY
- VERY LOW REVERSE RECOVERY TIME
- VERY LOW SWITCHING LOSSES
- LOW NOISE TURN-OFF SWITCHING



TO220AC
(Plastic)

SUITABLE APPLICATIONS

- FREE WHEELING DIODE IN CONVERTERS AND MOTOR CONTROL CIRCUITS

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
I_{FRM}	Repetitive Peak Forward Current	$t_p \leq 10\mu s$	150	A
$I_{F(RMS)}$	RMS Forward Current		25	A
$I_{F(AV)}$	Average Forward Current	T_{case} = 100°C δ = 0.5	12	A
I_{FSM}	Surge non Repetitive Forward Current		75	A
P	Power Dissipation	T_{case} = 100°C	25	W
T_{stg} T_j	Storage and Junction Temperature Range		– 40 to + 150	°C

Symbol	Parameter	BYT 12 P-		Unit
		600	800	
V_{RRM}	Repetitive Peak Reverse Voltage	600	800	V
V_{RSM}	Non Repetitive Peak Reverse Voltage	640	850	V

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-c)}$	Junction-case	2	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R	T_j = 25°C	$V_R = V_{RRM}$			50	µA
	T_j = 100°C				2.5	mA
V_F	T_j = 25°C	I_F = 12A			1.9	V
	T_j = 100°C				1.8	

RECOVERY CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{rr}	T_j = 25°C	I_F = 1A dI_F/dt = – 15A/µs V_R = 30V			120	ns
		I_F = 0.5A I_R = 1A I_{rr} = 0.25A			50	

TURN -OFF SWITCHING CHARACTERISTICS (Without Series Inductance)

Symbol	Parameter		Min.	Typ.	Max.	Unit
t_{IRM}	dI_F/dt = - 50 A/µs	Vcc = 200V I_F = 12A Lp ≤ 0.05 µH Tj = 100°C See figure 11			160	ns
	dI_F/dt = - 100 A/µs			100		
I_{RM}	dI_F/dt = - 50 A/µs				6	A
	dI_F/dt = - 100 A/µs			7.5		

TURN -OFF OVERVOLTAGE COEFFICIENT (With Series Inductance)

Symbol	Test Conditions	Min.	Typ.	Max.	Unit
$C = \frac{V_{RP}}{V_{CC}}$	T_j = 100°C V_{CC} = 150V $I_F = I_{F(AV)}$ dI_F/dt = – 12A/µs L_p = 4µH See Figure 12			4	

Note : Applicable to BYT 12 P-800 only.

To evaluate the conduction losses use the following equation :

$V_F = 1.47 + 0.026\ I_F$ $P = 1.47 \times I_{F(AV)} + 0.026\ I_F{}^2{}_{(RMS)}$

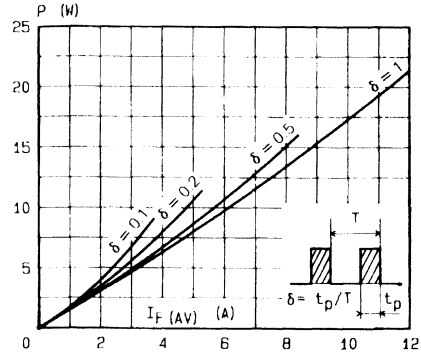


FIGURE 1 : Low frequency power losses versus average current.

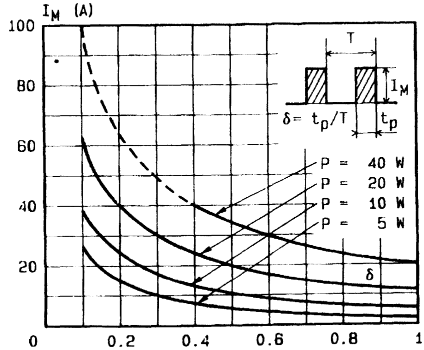


FIGURE 2 : Peak current versus form factor.

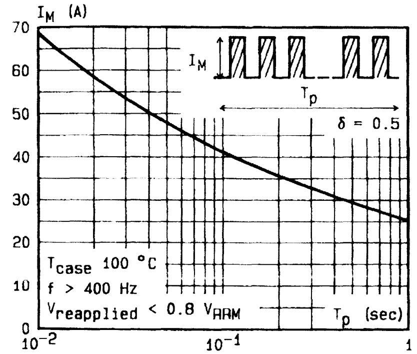


FIGURE 3 : Non repetitive peak surge current versus overload duration.

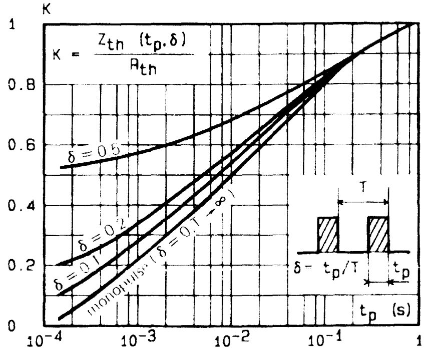


FIGURE 4 : Thermal impedance versus pulse width.

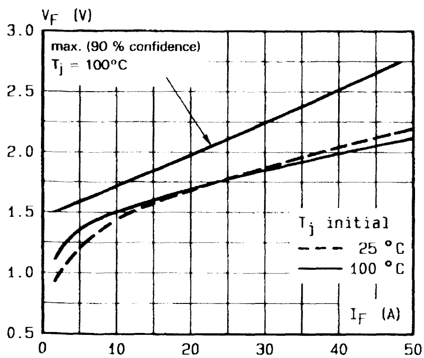


FIGURE 5 : Voltage drop versus forward current.

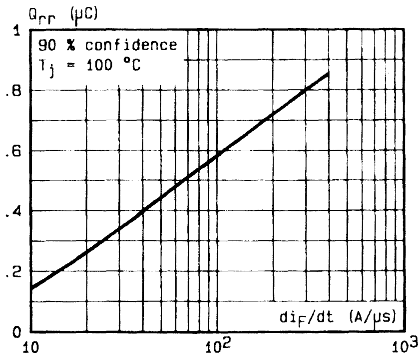


FIGURE 6 : Recovery charge versus di_F/dt.

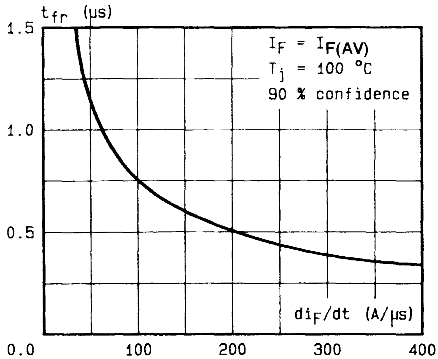


FIGURE 7 : Recovery time versus di_F/dt.

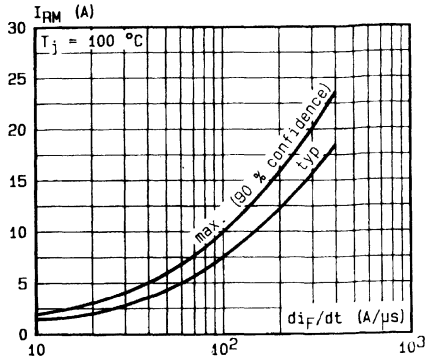


FIGURE 8 : Peak reverse current versus di_F/dt.

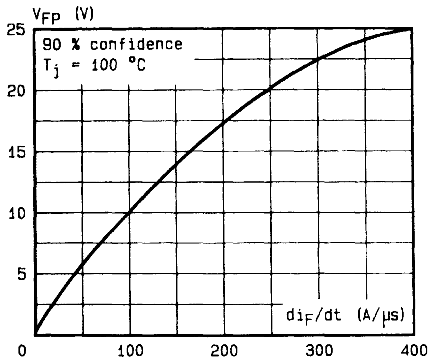


FIGURE 9 : Peak forward voltage versus di_F/dt.

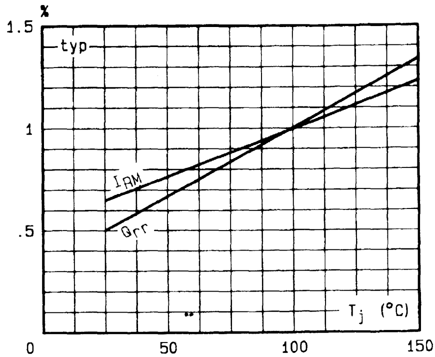


FIGURE 10 : Dynamic parameters versus junction temperature.

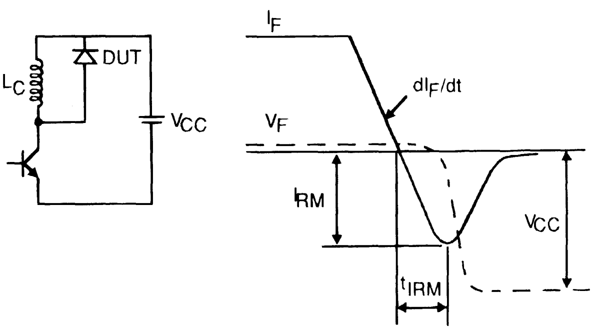


Figure 11 : Turn-off switching characteristics (without series inductance).

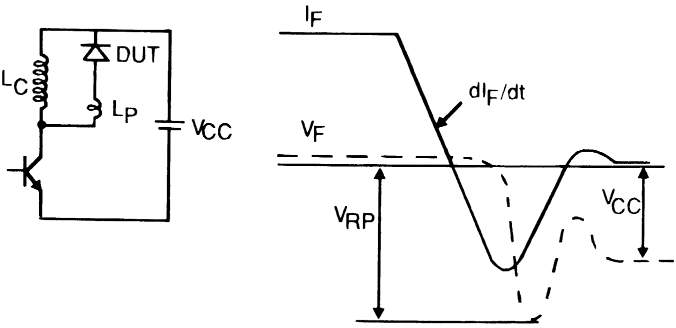


Figure 12 : Turn-off switching characteristics (with series inductance).

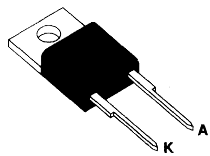
SGS-THOMSON
MICROELECTRONICS

BYT 12PI-600/800

FAST RECOVERY RECTIFIER DIODES

- HIGH REVERSE VOLTAGE CAPABILITY
- VERY LOW REVERSES RECOVERY TIME
- VERY LOW SWITCHING LOSSES
- LOW NOISE TURN-OFF SWITCHING
- INSULATED : Capacitance 7pF

Insulting voltage 2500 V_{RMS}



Isolated
TO220AC
(Plastic)

SUITABLE APPLICATIONS

- FREE WHEELING DIODE IN CONVERTERS AND MOTOR CONTROL CIRCUITS
- RECTIFIER IN S.M.P.S.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
I_{FRM}	Repetitive Peak Forward Current	$t_p \leq 10\mu s$	150	A
$I_{F(RMS)}$	RMS Forward Current		25	A
$I_{F(AV)}$	Average Forward Current	T_{case} = 50°C $\delta = 0.5$	12	A
I_{FSM}	Surge non Repetitive Forward Current	t_p = 10ms Sinusoidal	75	A
P	Power Dissipation	T_{case} = 50°C	25	W
T_{stg} T_j	Storage and Junction Temperature Range		– 40 to + 150	°C

Symbol	Parameter	BYT 12PI-		Unit
		600	800	
V_{RRM}	Repetitive Peak Reverse Voltage	600	800	V
V_{RSM}	Non Repetitive Peak Reverse Voltage	640	850	V

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-c)}$	Junction-case	4	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R	T_j = 25°C	$V_R = V_{RRM}$			50	µA
	T_j = 100°C				2.5	mA
V_F	T_j = 25°C	I_F = 12A			1.9	V
	T_j = 100°C				1.8	

RECOVERY CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{rr}	T_j = 25°C	I_F = 1A di_F/dt = – 15A/µs V_R = 30V			120	ns
		I_F = 0.5A I_R = 1A I_{rr} = 0.25A			50	

TURN -OFF SWITCHING CHARACTERISTICS (Without Series Inductance)

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{IRM}	di_F/dt = – 50A/µs	V_{CC} = 200V I_F = 12A $L_p \leq$ 0.05µH T_j = 100°C See Figure 11			160	ns
	di_F/dt = – 100A/µs			100		
I_{RM}	di_F/dt = – 50A/µs				6	A
	di_F/dt = – 100A/µs			7.5		

TURN -OFF OVERVOLTAGE COEFFICIENT (With Series Inductance)

Symbol	Test Conditions	Min.	Typ.	Max.	Unit
$C = \frac{V_{RP}}{V_{CC}}$	T_j = 100°C V_{CC} = 150V $I_F = I_{F(AV)}$ di_F/dt = – 12A/µs L_p = 4µH See Figure 12			4	

To evaluate the conduction losses use the following equations :

$V_F = 1.47 + 0.026\ I_F$ $P = 1.47 \times I_{F(AV)} + 0.026\ I_F{}^2{}_{(RMS)}$

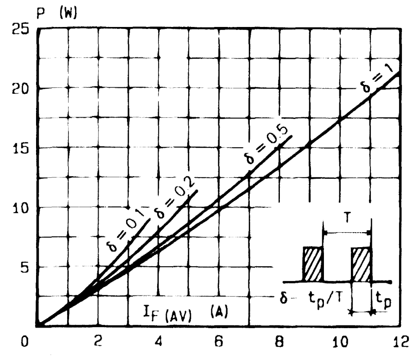


FIGURE 1 : Low frequency power losses versus average current.

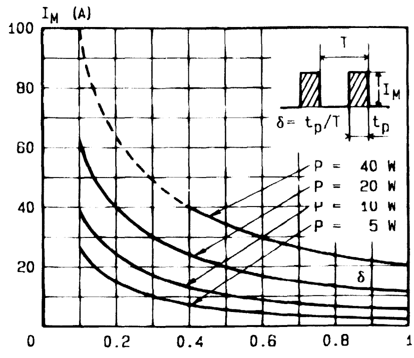


FIGURE 2 : Peak current versus form factor.

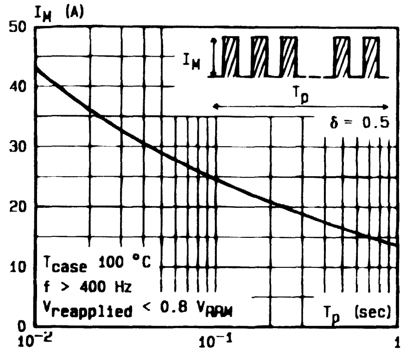


FIGURE 3 : Non repetitive peak surge current versus overload duration.

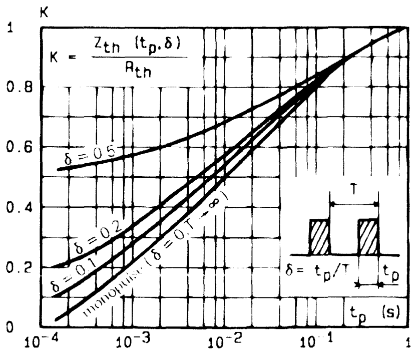


FIGURE 4 : Thermal impedance versus pulse width.

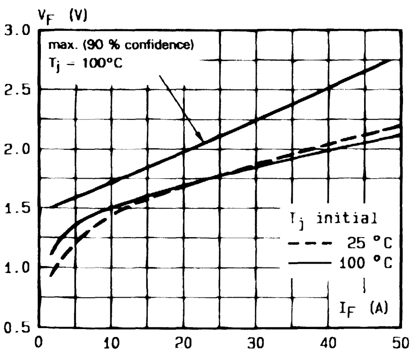


FIGURE 5 : Voltage drop versus forward current.

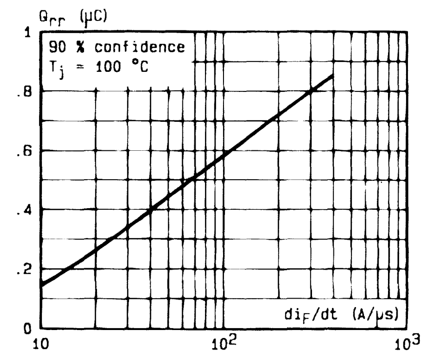


FIGURE 6 : Recovery charge versus di_F/dt.

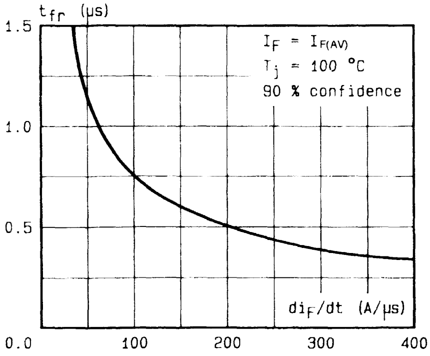


FIGURE 7 : Recovery time versus di_F/dt.

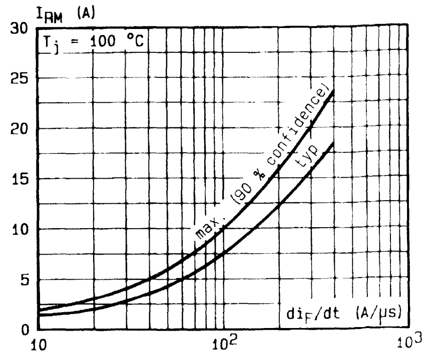


FIGURE 8 : Peak reverse current versus di_F/dt.

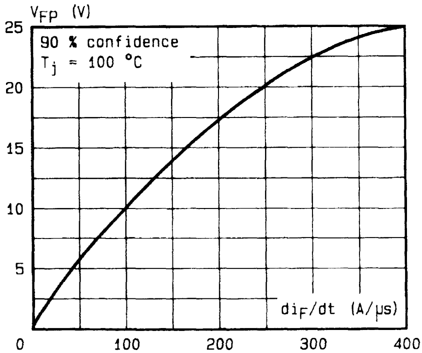


FIGURE 9 : Peak forward voltage versus di_F/dt.

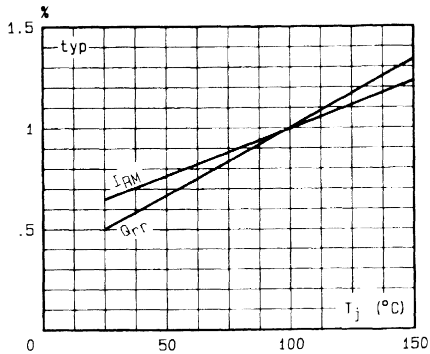


FIGURE 10 : Dynamic parameters versus junction temperature.

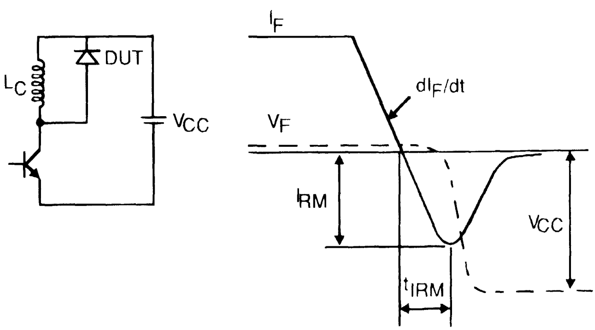


Figure 11 : Turn-off switching characteristics (without series inductance).

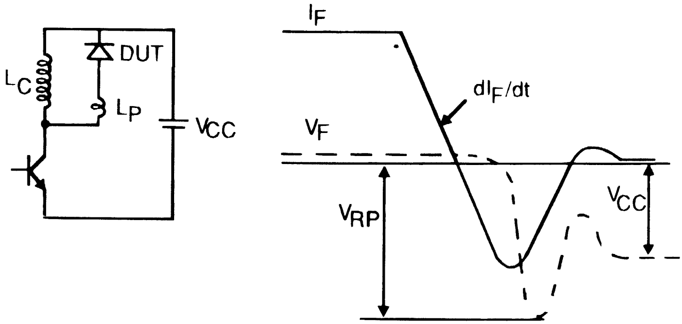


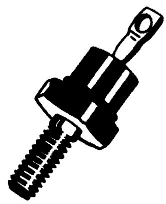
Figure 12 : Turn-off switching characteristics (with series inductance).

BYT 12-600→800

FAST RECOVERY RECTIFIER DIODES

- HIGH REVERSE VOLTAGE CAPABILITY
- VERY LOW REVERSE RECOVERY TIME
- VERY LOW SWITCHING LOSSES
- LOW NOISE TURN-OFF SWITCHING

Cathode connected to case



DO 4
(Metal)

SUITABLE APPLICATIONS

- FREE WHEELING DIODE IN CONVERTERS AND MOTOR CONTROL CIRCUITS
- RECTIFIER IN S.M.P.S.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
I_{FRM}	Repetitive Peak Forward Current	$tp \leq 10\mu s$	200	A
$I_{F(RMS)}$	RMS Forward Current		25	A
$I_{F(AV)}$	Average forward current	Tc=100°C $\delta = 0.5$	12	A
I_{FSM}	Surge non Repetitive Forward Current	tp=10ms sinusoidal	75	A
P	Power Dissipation	Tc=100°C	20	W
Tstg Tj	Storage and junction temperature range		- 40 to + 150	°C

Symbol	Parameter	BYT 12-		Unit
		600	800	
V_{RRM}	Repetitive Peak Reverse Voltage	600	800	V
V_{RSM}	Non Repetitive Peak Reverse Voltage	640	850	V

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-c)}$	Junction-case	2.5	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R	T_j = 25°C	$V_R = V_{RRM}$			50	µA
	T_j = 100°C				2.5	mA
V_F	T_j = 25°C	I_F = 12A			1.9	V
	T_j = 100°C				1.8	

RECOVERY CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{rr}	T_j = 25 °C	I_F = 1 A di_F/dt = – 15 A/µs V_R = 30 V			120	ns
		I_F = 0.5 A I_R = 1 A I_{rr} = 0.25 A			50	

TURN -OFF SWITCHING CHARACTERISTICS (Without Series Inductance)

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{IRM}	di_F/dt = – 50A/µs	V_{CC} = 200V I_F = 12A $L_p \le 0.05\mu H$ T_j = 100°C See Figure 11			160	ns
	di_F/dt = – 100A/µs			100		
I_{RM}	di_F/dt = – 50A/µs				6	A
	di_F/dt = – 100A/µs			7.5		

TURN -OFF OVERVOLTAGE COEFFICIENT (With Series Inductance)

Symbol	Test Conditions	Min.	Typ.	Max.	Unit
$C = \frac{V_{RP}}{V_{CC}}$	T_j = 100°C V_{CC} = 200V $I_F = I_{F(AV)}$ See note di_F/dt = – 12A/µs L_p = 12µH See Figure 12			4	

Note : Applicable to BYT 12-800 only

To evaluate the conduction losses use the following equations :

$V_F = 1.47 + 0.026\ I_F$ $P = 1.47 \times I_{F(AV)} + 0.026 I_F{}^2{}_{(RMS)}$

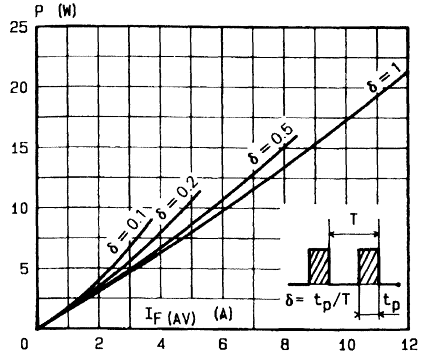


FIGURE 1 : Low frequency power losses versus average current.

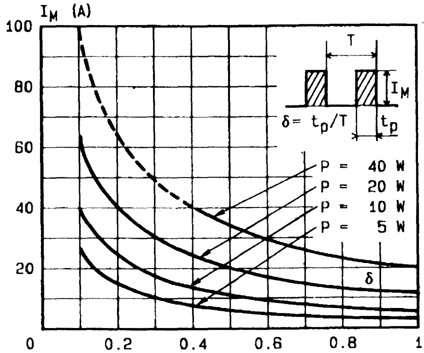


FIGURE 2 : Peak current versus form factor.

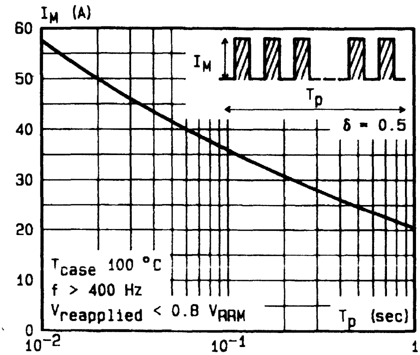


FIGURE 3 : Non repetitive peak surge current versus overload duration.

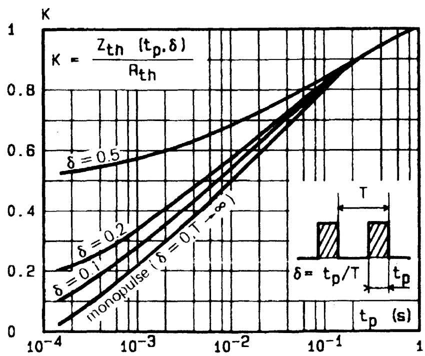


FIGURE 4 : Thermal impedance versus pulse width.

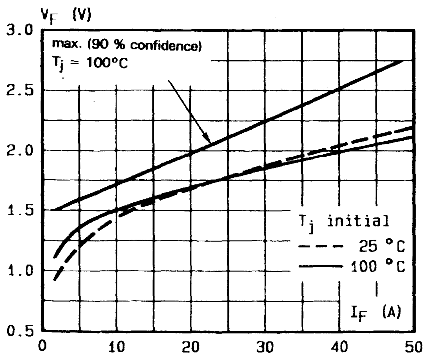


FIGURE 5 : Voltage drop versus forward current.

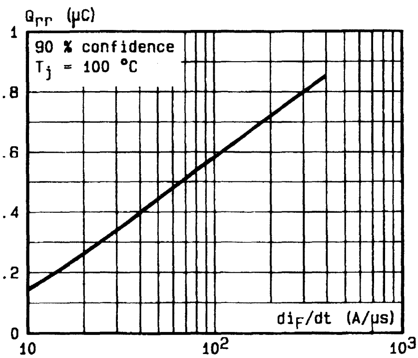


FIGURE 6 : Recovery charge versus di_F/dt.

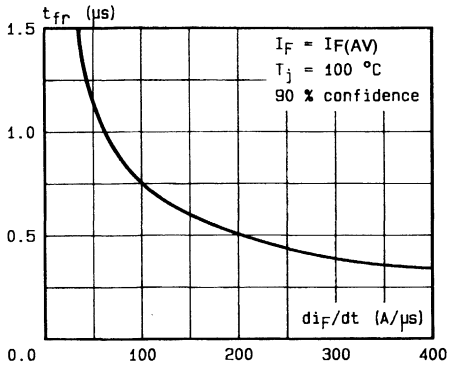


FIGURE 7 : Recovery time versus di_F/dt.

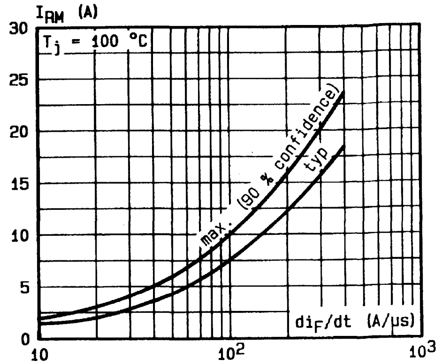


FIGURE 8 : Peak reverse current versus di_F/dt.

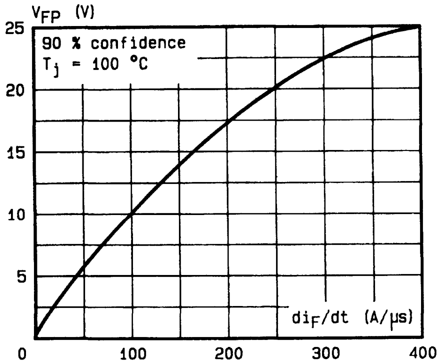


FIGURE 9 : Peak forward voltage versus di_F/dt.

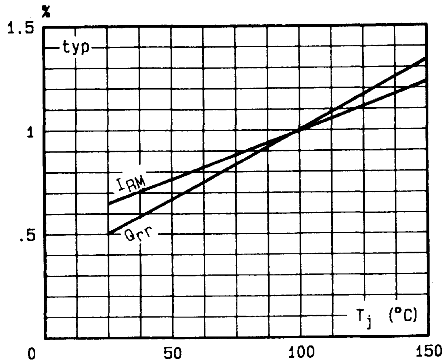


FIGURE 10 : Dynamic parameters versus junction temperature.

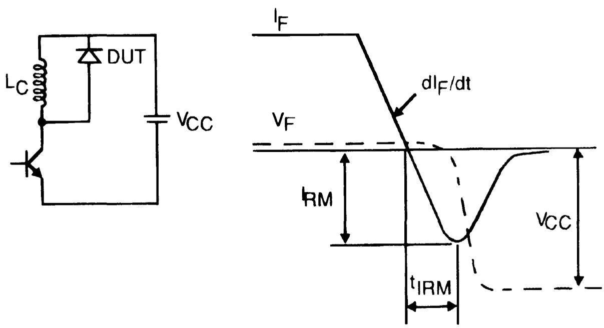


Figure 11 : Turn-off switching characteristics (without series inductance).

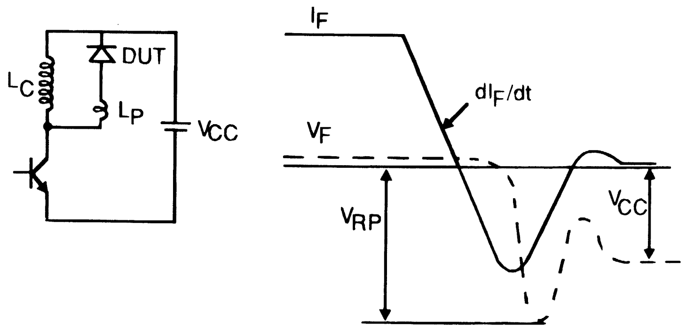


Figure 12 : Turn-off switching characteristics (with series inductance).

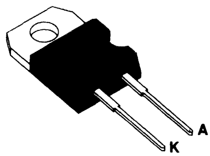
SGS-THOMSON MICROELECTRONICS

BYT 12P-1000

FAST RECOVERY RECTIFIER DIODE

- VERY HIGH REVERSE VOLTAGE CAPABILITY
- VERY LOW REVERSE RECOVERY TIME
- VERY LOW SWITHING LOSSES
- LOW NOISE TURN-OFF SWITCHING

Cathode connected to case



TO220AC
(Plastic)

SUITABLE APPLICATIONS

- FREE WHEELING DIODE IN CONVERTERS AND MOTOR CONTROL CIRCUITS
- RECTIFIER IN S.M.P.S.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		1000	V
V_{RSM}	Non Repetitive Peak Reverse Voltage		1000	V
I_{FRM}	Repetitive Peak Forward Current	$t_p \leq 10\mu s$	150	A
$I_{F(RMS)}$	RMS Forward Current		25	A
$I_{F(AV)}$	Average Forward Current	$T_{case}=100°C$ $\delta = 0.5$	12	A
I_{FSM}	Surge Non Repetitive Forward Current	$t_p = 10ms$ Sinusoïdal	75	A
P	Power Dissipation	$T_{case}=100°C$	25	W
T_{stg} T_j	Storage and Junction Temperature Range		– 40 to + 150	°C

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-c)}$	Junction-case	2	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R	T_j = 25°C	$V_R = V_{RRM}$			50	μA
	T_j = 100°C				2.5	mA
V_F	T_j = 25°C	I_F = 12A			1.9	V
	T_j = 100°C				1.8	

RECOVERY CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{rr}	T_j = 25°C	I_F = 1A di_F/dt = – 15A/μs V_R = 30V			155	ns
		I_F = 0.5A I_R = 1A I_{rr}=0.25A			65	

TURN-OFF SWITCHING CHARACTERISTICS (Without Series Inductance)

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{IRM}	di_F/dt = – 50A/μs	V_{CC} = 200V I_F = 12A $L_p \leq$ 0.05μH T_j = 100°C See Figure 11			200	ns
	di_F/dt = – 100A/μs			120		
I_{RM}	di_F/dt = – 50A/μs				7.8	A
	di_F/dt = – 100A/μs			9		

TURN-OFF OVERVOLTAGE COEFFICIENT (With Series Inductance)

Symbol	Test Conditions	Min.	Typ.	Max.	Unit
$C = \frac{V_{RP}}{V_{CC}}$	T_j = 100°C V_{CC} = 200V $I_F = I_{F(AV)}$ di_F/dt = – 12A/μs L_p = 12μH See Figure 12			4.5	

To evaluate the conduction losses use the following equations :

$V_F = 1.47 + 0.026\ I_F$ $P = 1.47 \times I_{F(AV)} + 0.026\ I_F{}^2{}_{(RMS)}$

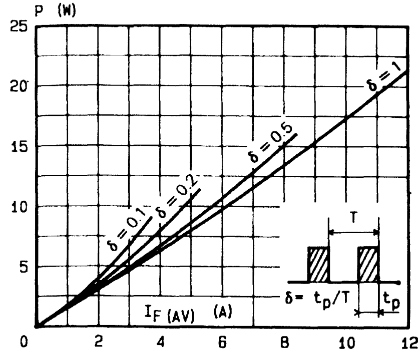


FIGURE 1 : Low frequency power losses versus average current.

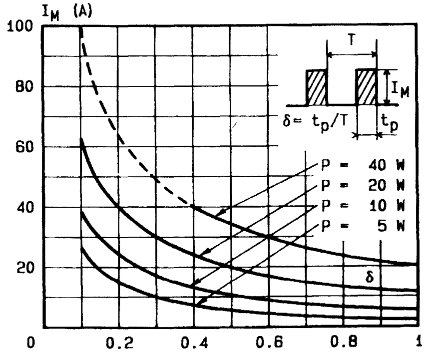


FIGURE 2 : Peak current versus form factor.

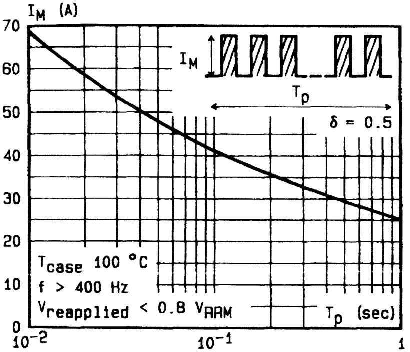


FIGURE 3 : Non repetitive peak surge current versus overload duration.

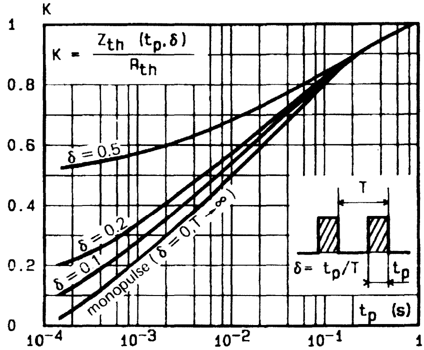


FIGURE 4 : Thermal impedance versus pulse width.

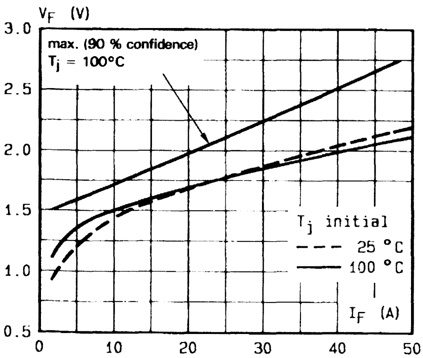


FIGURE 5 : Voltage drop versus forward current.

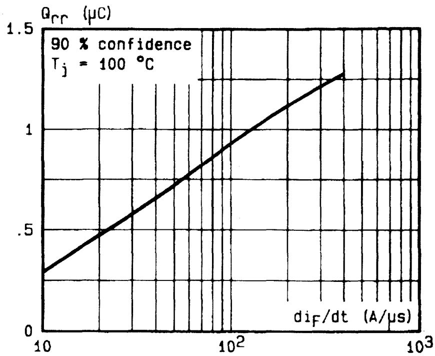


FIGURE 6 : Recovery charge versus di_F/dt.

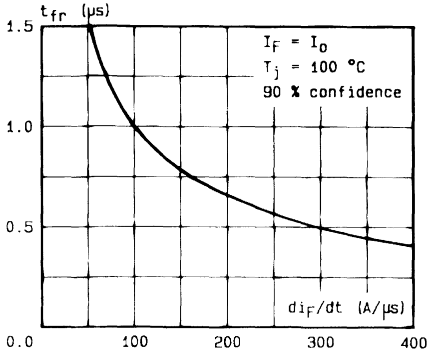


FIGURE 7 : Recovery time versus di_F/dt.

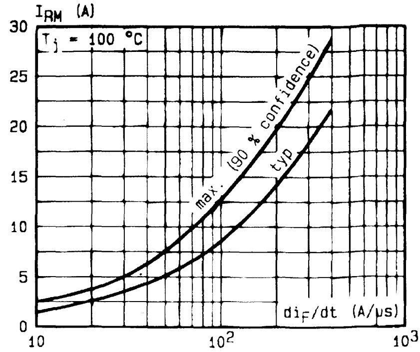


FIGURE 8 : Peak reverse current versus di_F/dt.

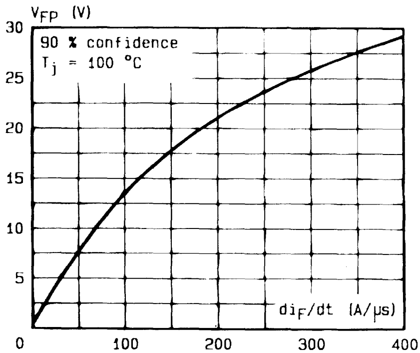


FIGURE 9 : Peak forward voltage versus di_F/dt.

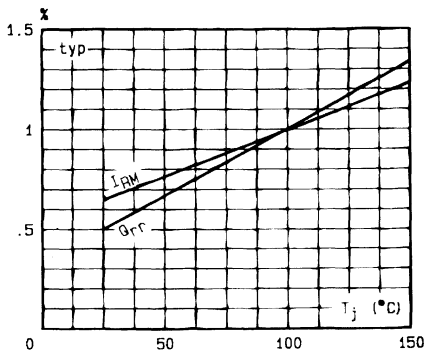


FIGURE 10 : Dynamic parameters versus junction temperature.

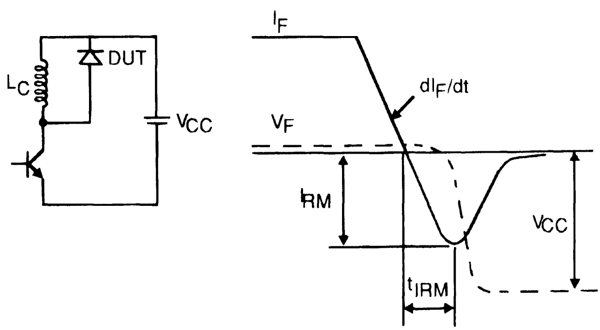


Figure 11 : Turn-off switching characteristics (without series inductance).

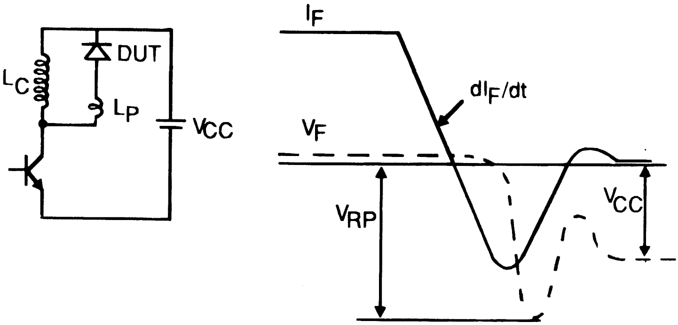


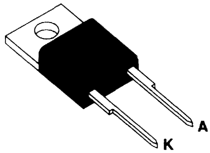
Figure 12 : Turn-off switching characteristics (with series inductance).

BYT 12PI-1000

FAST RECOVERY RECTIFIER DIODE

- VERY HIGH REVERSE VOLTAGE CAPABILITY
- VERY LOW REVERSE RECOVERY TIME
- VERY LOW SWITCHING LOSSES
- LOW NOISE TURN-OFF SWITCHING
- INSULATED : Capacitance 7pF

Insulating voltage 2500 V_{RMS}



Isolated TO220AC
(Plastic)

SUITABLE APPLICATIONS

- FREE WHEELING DIODE IN CONVERTERS AND MOTOR CONTROL CIRCUITS
- RECTIFIER IN S.M.P.S.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		1000	V
V_{RSM}	Non Repetitive Peak Reverse Voltage		1000	V
I_{FRM}	Repetitive Peak Forward Current	$t_p \le 10\mu s$	150	A
$I_{F(RMS)}$	RMS Forward Current		25	A
$I_{F(AV)}$	Average Forward Current	$T_{case} = 50°C$ $\delta = 0.5$	12	A
I_{FSM}	Surge Non Repetitive Forward Current	$t_p = 10ms$ Sinusoïdal	75	A
P	Power Dissipation	$T_{case} = 50°C$	25	W
T_{stg} T_j	Storage and Junction Temperature Range		− 40 to + 150	°C

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-c)}$	Junction-case	4	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R	T_j = 25°C	$V_R = V_{RRM}$			50	µA
	T_j = 100°C				2.5	mA
V_F	T_j = 25°C	I_F = 12A			1.9	V
	T_j = 100°C				1.8	

RECOVERY CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{rr}	T_j = 25°C	I_F = 1A di_F/dt = – 15A/µs V_R = 30V			155	ns
		I_F = 0.5A I_R = 1A I_{rr} = 0.25A			65	

TURN-OFF SWITCHING CHARACTERISTICS (Without Series Inductance)

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{IRM}	di_F/dt = – 50A/µs	V_{CC} = 200V I_F = 12A L_p ≤ 0.05µH T_j = 100°C See Figure 11			200	ns
	di_F/dt = – 100A/µs			120		
I_{RM}	di_F/dt = – 50A/µs				7.8	A
	di_F/dt = – 100A/µs			9		

TURN-OFF OVERVOLTAGE COEFFICIENT (With Series Inductance)

Symbol	Test Conditions	Min.	Typ.	Max.	Unit
$C = \frac{V_{RP}}{V_{CC}}$	T_j = 100°C V_{CC} = 200V $I_F = I_{F(AV)}$ di_F/dt = – 12A/µs L_p = 12µH See Figure 12			4.5	

To evaluate the conduction losses use the following equation :

$V_F = 1.47 + 0.026\ I_F$ $P = 1.47 \times I_{F(AV)} + 0.026\ I_F{}^2{}_{(RMS)}$

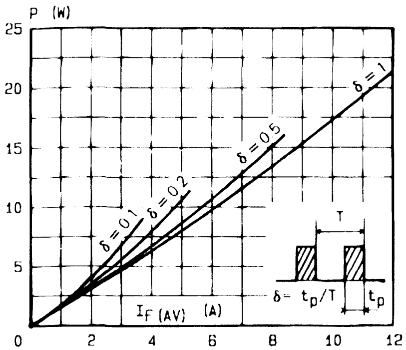


FIGURE 1 : Low frequency power losses versus average current.

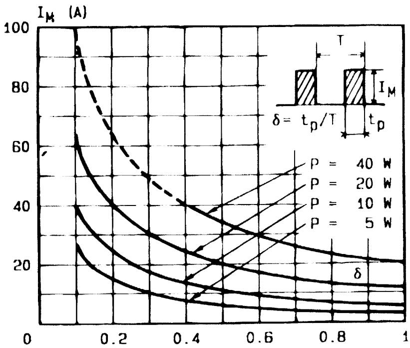


FIGURE 2 : Peak current versus form factor.

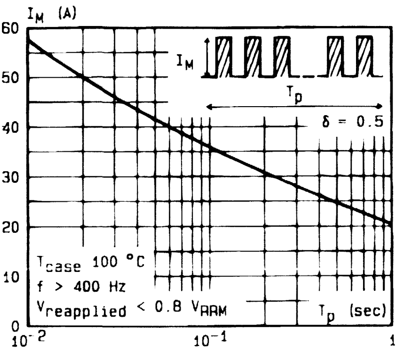


FIGURE 3 : Non repetitive peak surge current versus overload duration.

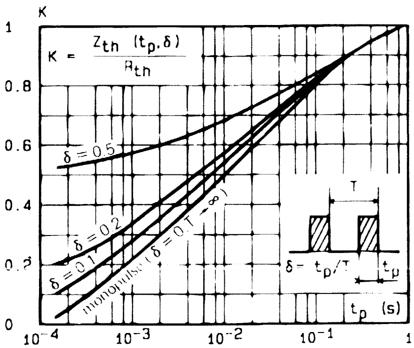


FIGURE 4 : Thermal impedance versus pulse width.

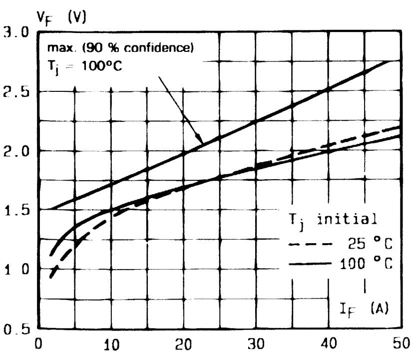


FIGURE 5 : Voltage drop versus forward current.

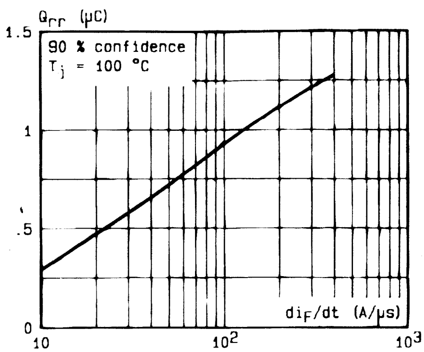


FIGURE 6 : Recovery charge versus di_F/dt.

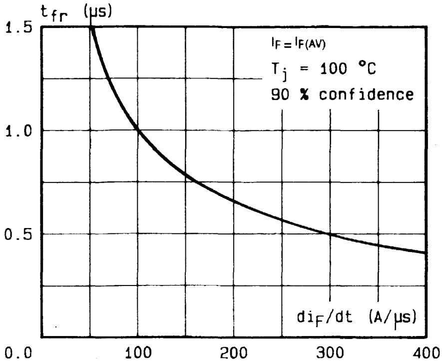


FIGURE 7 : Recovery time versus di_F/dt.

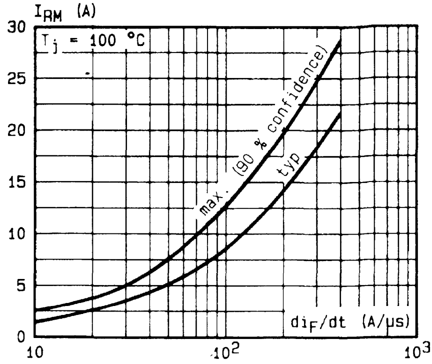


FIGURE 8 : Peak reverse current versus di_F/dt.

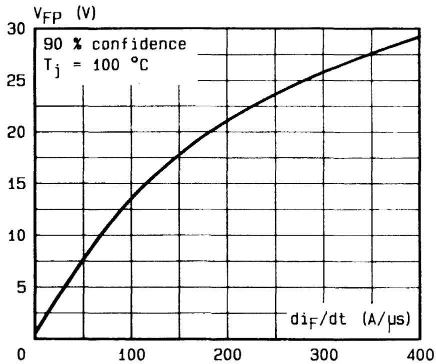


FIGURE 9 : Peak forward voltage versus di_F/dt.

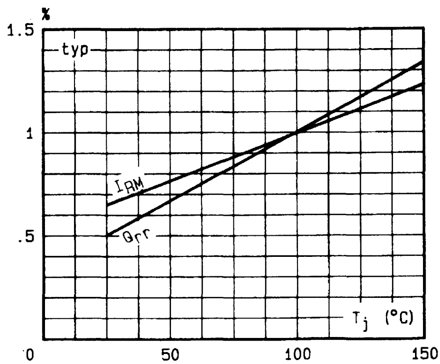


FIGURE 10 : Dynamic parameters versus junction temperature.

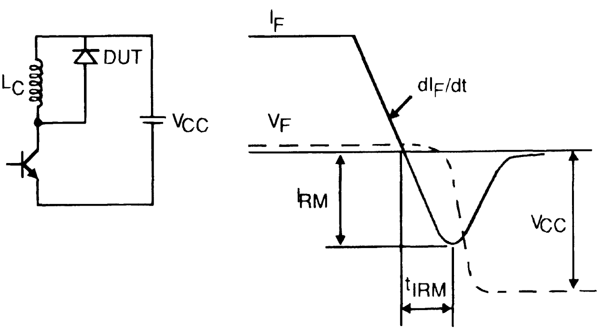


Figure 11 : Turn-off switching characteristics (without series inductance).

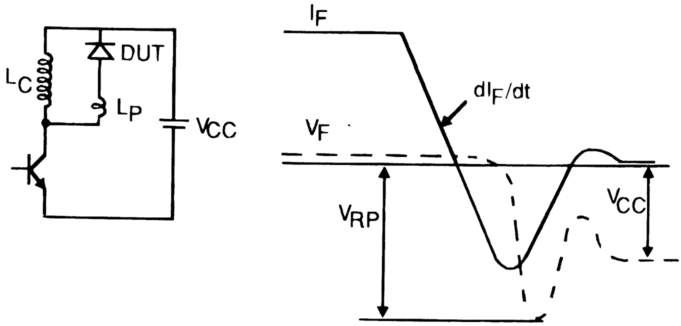


Figure 12 : Turn-off switching characteristics (with series inductance).

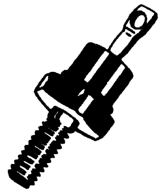
SGS-THOMSON MICROELECTRONICS

BYT 12-1000

FAST RECOVERY RECTIFIER DIODES

- VERY HIGH REVERSE VOLTAGE CAPABILITY
- VERY LOW REVERSE RECOVERY TIME
- VERY LOW SWITCHING LOSSES
- LOW NOISE TURN-OFF SWITCHING

Cathode connected to case



DO 4
(Metal)

SUITABLE APPLICATIONS

- FREE WHEELING DIODE IN CONVERTERS AND MOTOR CONTROL CIRCUITS
- RECTIFIER IN S.M.P.S.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		1000	V
V_{RSM}	Non Repetitive Peak Reverse Voltage		1000	V
I_{FRM}	Repetitive Peak Forward Current	$t_p \leq 10\mu s$	150	A
$I_{F(RMS)}$	RMS Forward Current		25	A
$I_{F(AV)}$	Average Forward Current	T_{case} = 85°C δ = 0.5	12	A
I_{FSM}	Surge Non Repetitive Forward Current	t_p = 10ms Sinusoïdal	75	A
P	Power Dissipation	T_{case} = 85°C	26	W
T_{stg} T_j	Storage and Junction Temperature Range		– 40 to + 150	°C

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-c)}$	Junction-case	2.5	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R	T_j = 25°C	$V_R = V_{RRM}$			50	µA
	T_j = 100°C				2.5	mA
V_F	T_j = 25°C	I_F = 12A			1.9	V
	T_j = 100°C				1.8	

RECOVERY CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{rr}	T_j = 25°C	I_F = 1A di_F/dt = – 15A/µs V_R = 30V			155	ns
		I_F = 0.5A I_R = 1A I_{rr} = 0.25A			65	

TURN-OFF SWITCHING CHARACTERISTICS (Without Series Inductance)

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{IRM}	di_F/dt = – 50A/µs	V_{CC} = 200V I_F = 12A L_p ≤ 0.05µH T_j = 100°C See Figure 11			200	ns
	di_F/dt = – 100A/µs			120		
I_{RM}	di_F/dt = – 50A/µs				7.8	A
	di_F/dt = – 100A/µs			9		

TURN-OFF OVERVOLTAGE COEFFICIENT (With Series Inductance)

Symbol	Test Conditions	Min.	Typ.	Max.	Unit
$C = \frac{V_{RP}}{V_{CC}}$	T_j = 100°C V_{CC} = 200V $I_F = I_{F(AV)}$ di_F/dt = – 12A/µs L_p = 12µH See Figure 12			4.5	

To evaluate the conduction losses use the following equations :

$V_F = 1.47 + 0.026\ I_F$ $P = 1.47 \times I_{F(AV)} + 0.026\ I_{F}^{2}{}_{(RMS)}$

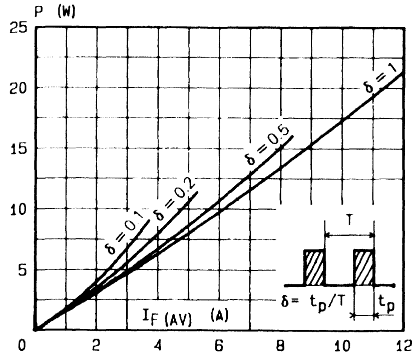


FIGURE 1 : Low frequency power losses versus average current.

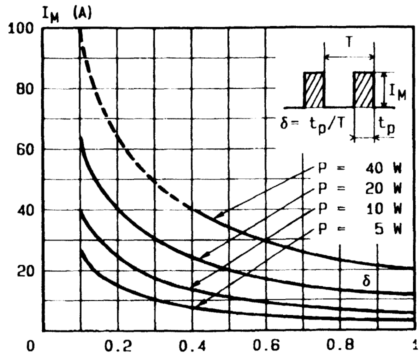


FIGURE 2 : Peak current versus form factor.

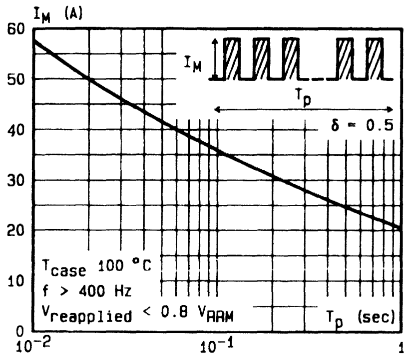


FIGURE 3 : Non repetitive peak surge current versus overload duration.

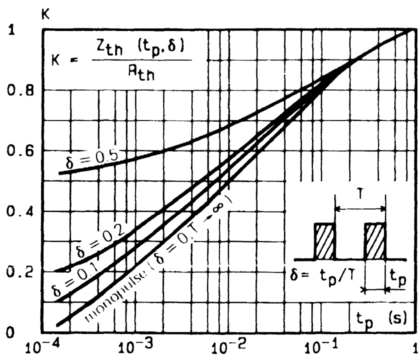


FIGURE 4 : Thermal impedance versus pulse width.

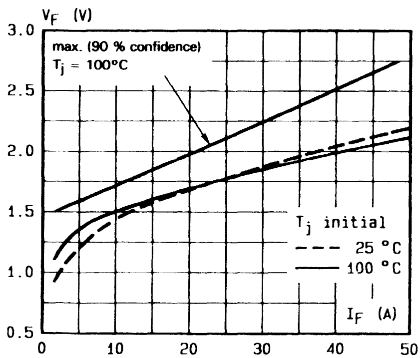


FIGURE 5 : Voltage drop versus forward current.

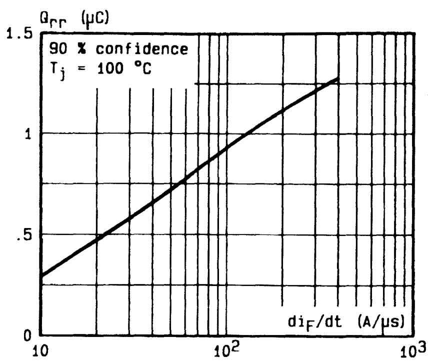


FIGURE 6 : Recovery charge versus di_F/dt.

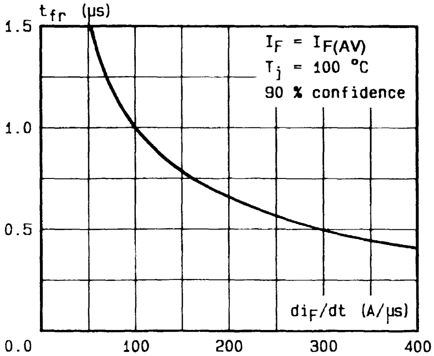


FIGURE 7 : Recovery time versus di_F/dt.

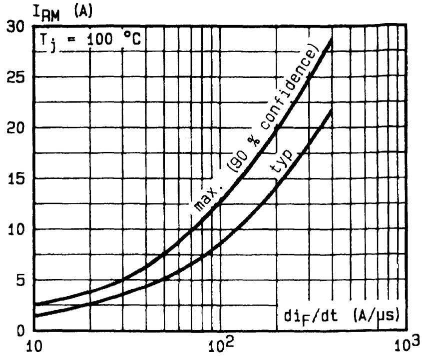


FIGURE 8 : Peak reverse current versus di_F/dt.

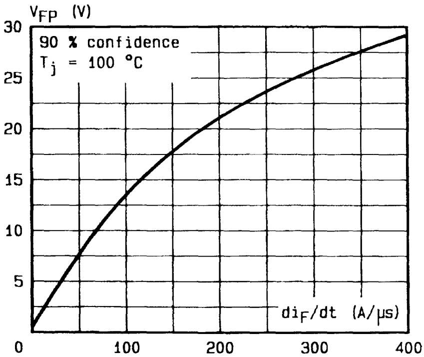


FIGURE 9 : Peak forward voltage versus di_F/dt.

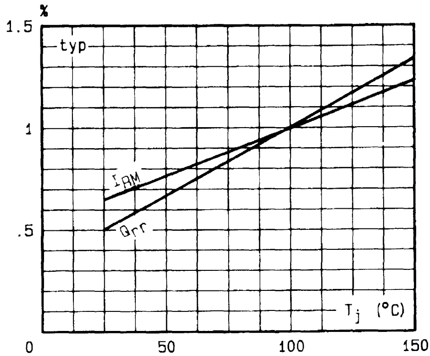


FIGURE 10 : Dynamic parameters versus junction temperature.

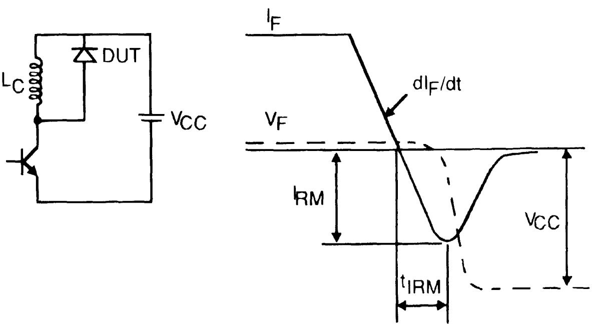


Figure 11 : Turn-off switching characteristics (without series inductance).

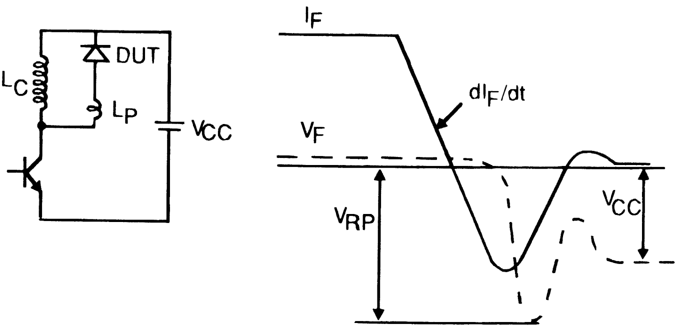


Figure 12 : Turn-off switching characteristics (withseries inductance).

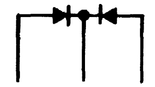
SGS-THOMSON MICROELECTRONICS

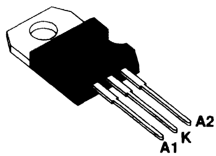
BYT 16P-200 → 400

FAST RECOVERY RECTIFIER DIODES

- VERY LOW REVERSE RECOVERY TIME
- VERY LOW SWITCHING LOSSES
- LOW NOISE TURN-OFF SWITCHING

Cathode connected to case

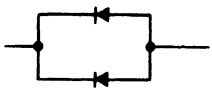




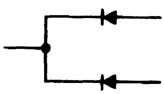
TO220AB
(Plastic)

SUITABLE APPLICATIONS :

- The BYT 16 P can be used :



16A



2 x 8A

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
I_{FRM}	Repetitive Peak Forward Current	$t_p \leq 10\mu s$	130	A
$I_{F(RMS)}$	RMS Forward Current		30	A
$I_{F(AV)}$	Average Forward Current	$T_{case} = 100°C$ $\delta = 0.5$	16	A
I_{FSM}	Surge non Repetitive Forward Current	$t_p = 10ms$ Sinusoïdal	100	A
P	Power Dissipation	$T_{case} = 100°C$	25	W
T_{stg} T_j	Storage and Junction Temperature Range		– 40 to + 150	°C

Symbol	Parameter	BYT 16P–			Unit
		200	300	400	
V_{RRM}	Repetitive Peak Reverse Voltage	200	300	400	V
V_{RSM}	Non Repetitive Peak Reverse Voltage	220	330	440	V

THERMAL RESISTANCE

Symbol	Test Conditions		Value	Unit
$R_{th\ (j-c)}$	Junction-case	per leg total	3.75 2	°C/W
$R_{th\ (c)}$	Coupling		0.25	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R	T_j = 25°C	$V_R = V_{RRM}$			15	µA
	T_j = 100°C				2.5	mA
V_F	T_j = 25°C	I_F = 8A			1.5	V
	T_j = 100°C				1.4	

RECOVERY CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{rr}	T_j = 25°C	I_F = 1A di_F/dt = – 15A/µs V_R = 30V			75	ns
		I_F = 0.5A I_R = 1A I_{rr} = 0.25A			35	

TURN -OFF SWITCHING CHARACTERISTICS (Without Series Inductance)

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{IRM}	di_F/dt = – 32A/µs	V_{CC} = 200V I_F = 8A L_p ≤ 0.05µH T_j = 100°C See Figure 11			75	ns
	di_F/dt = – 64A/µs			50		
I_{RM}	di_F/dt = – 32A/µs				2.2	A
	di_F/dt = – 64A/µs			2.8		

TURN -OFF OVERVOLTAGE COEFFICIENT (With Series Inductance)

Symbol	Test Conditions	Min.	Typ.	Max.	Unit
$C = \frac{V_{RP}}{V_{CC}}$	T_j = 100°C V_{CC} = 120V $I_F = I_{F(AV)}$ See note di_F/dt = – 8A/µs L_p = 9µH See Figure 12		3.3		

Note : Applicable to BYT 16P-400 only

To evaluate the conduction losses use the following equations :

$V_F = 1.1 + 0.024 I_F$

$P = 1.1 \times I_{F(AV)} + 0.024 I_F^2{}_{(RMS)}$ (1 leg) $P = 1.1 \times I_{F(AV)} + 0.012 I_F^2{}_{(RMS)}$ (2 legs)

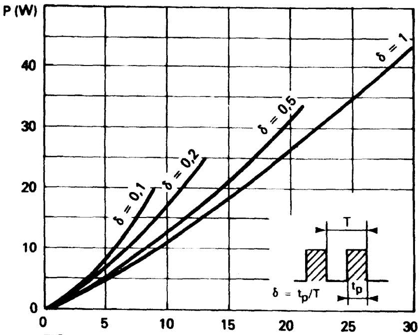


FIGURE 1 : Low frequency power losses versus average current.

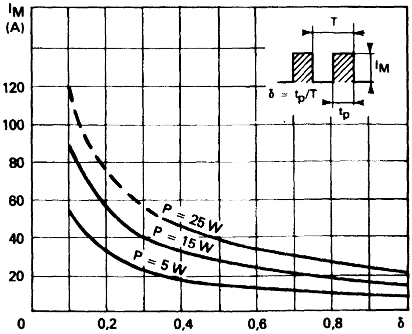


FIGURE 2 : Peak current versus form factor.

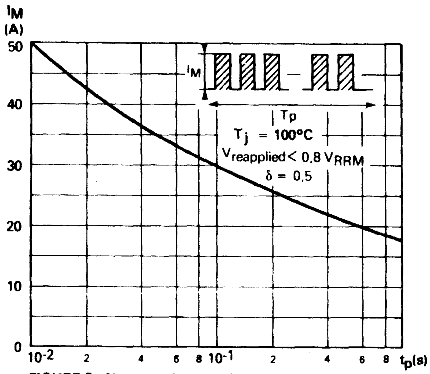


FIGURE 3 : Non repetitive peak surge current versus overload duration.

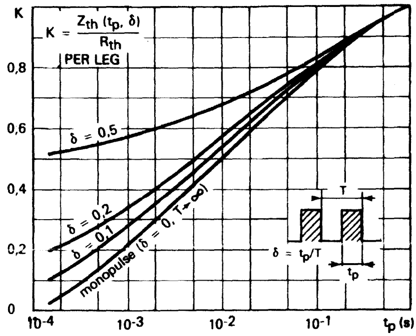


FIGURE 4 : Thermal impedance versus pulse width.

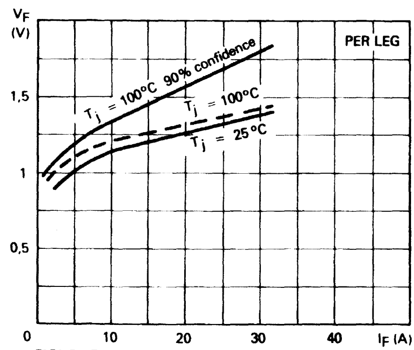


FIGURE 5 : Voltage drop versus forward current.

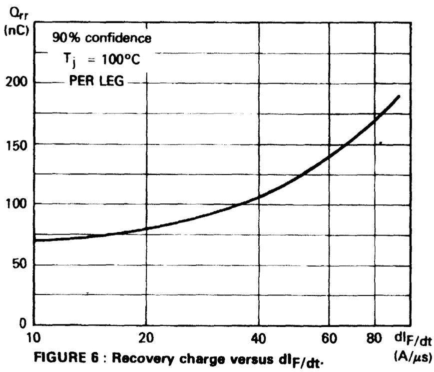


FIGURE 6 : Recovery charge versus dI_F/dt.

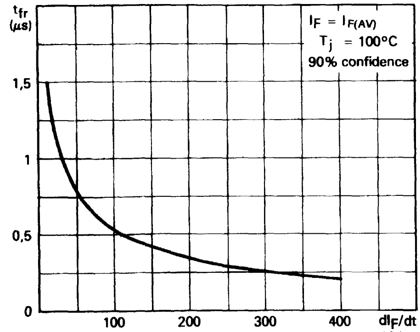


FIGURE 7 : Recovery time versus $dI_{F/dt}$.

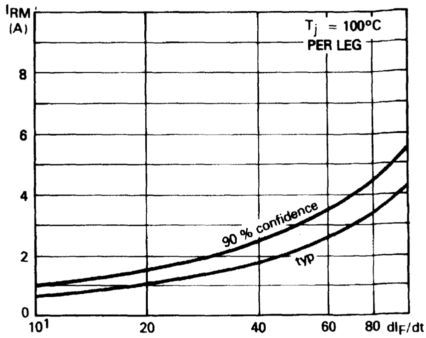


FIGURE 8 : Peak reverse current versus $dI_{F/dt}$.

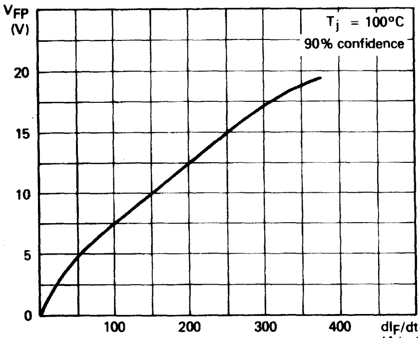


FIGURE 9 : Peak forward voltage versus $dI_{F/dt}$.

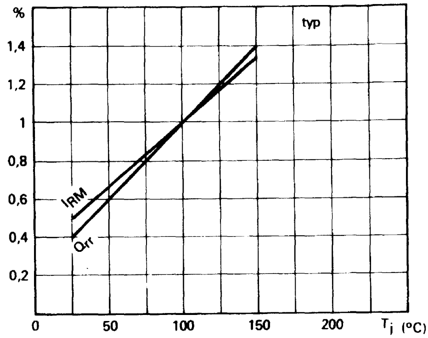


FIGURE 10 : Dynamic parameters versus junction temperature.

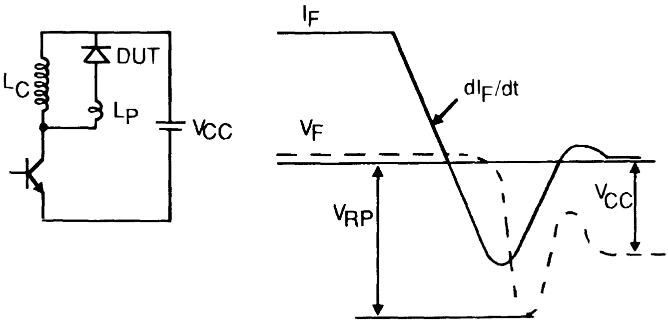


Figure 11 : Turn-off switching characteristics (without series inductance).

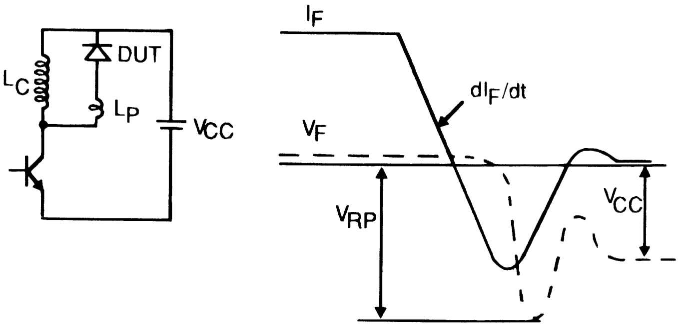


Figure 12 : Turn-off switching characteristics (with series inductance).

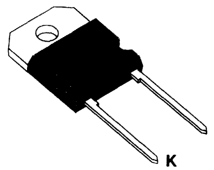
SGS-THOMSON MICROELECTRONICS

BYT 30P-200→400

FAST RECOVERY RECTIFIER DIODES

- VERY LOW REVERSE RECOVERY TIME
- VERY LOW SWITCHING LOSSES
- LOW NOISE TURN-OFF SWITCHING

Cathode connected to case



SOD93
(Plastic)

SUITABLE APPLICATIONS

- FREE WHEELING DIODE IN CONVERTERS AND MOTOR CONTROL CIRCUITS
- RECTIFIER IN S.M.P.S.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
I_{FRM}	Repetitive Peak Forward Current	$t_p \leq 10\mu s$	500	A
$I_{F(RMS)}$	RMS Forward Current		50	A
$I_{F(AV)}$	Average Forward Current	T_{case} = 100°C $\delta = 0.5$	30	A
I_{FSM}	Surge non Repetitive Forward Current	t_p = 10ms Sinusoïdal	350	A
P	Power Dissipation	T_{case} = 100°C	50	W
T_{stg} T_j	Storage and Junction Temperature Range		– 40 to + 150	°C

Symbol	Parameter	BYT 30P-			Unit
		200	300	400	
V_{RRM}	Repetitive Peak Reverse Voltage	200	300	400	V
V_{RSM}	Non Repetitive Peak Reverse Voltage	220	330	440	V

THERMAL RESISTANCE

Symbol	Test Conditions	Value	Unit
$R_{th\ (j-c)}$	Junction-case	1	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R	T_j = 25°C	$V_R = V_{RRM}$			35	µA
	T_j = 100°C				6	mA
V_F	T_j = 25°C	I_F = 30A			1.5	V
	T_j = 100°C				1.4	

RECOVERY CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{rr}	T_j = 25°C	I_F = 1A di_F/dt = – 15A/µs V_R = 30V			100	ns
		I_F = 0.5A I_R = 1A I_{rr} = 0.25A			50	

TURN -OFF SWITCHING CHARACTERISTICS (Without Series Inductance)

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{IRM}	di_F/dt = – 120A/µs	V_{CC} = 200V I_F = 30A L_p < 0.05µH T_j = 100°C See Figure 11			75	ns
	di_F/dt = – 240A/µs			50		
I_{RM}	di_F/dt = – 120A/µs				9	A
	di_F/dt = – 240A/µs			12		

TURN -OFF OVERVOLTAGE COEFFICIENT (With Series Inductance)

Symbol	Test Conditions	Min.	Typ.	Max.	Unit
$C = \frac{V_{RP}}{V_{CC}}$	T_j = 100°C V_{CC} = 60V $I_F = I_{F(AV)}$ di_F/dt = – 30A/µs L_p = 1µH See Figure 12		3.3		

To evaluate the conduction losses use the following equations :

$V_F = 1.1 + 0.0095 I_F$ $P = 1.1 \times I_{F(AV)} = 0.0095 I_F{}^2{}_{(RMS)}$

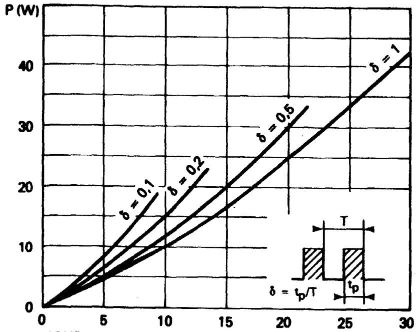


FIGURE 1 : Low frequency power losses versus average current

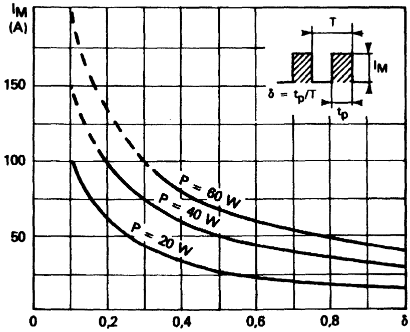


FIGURE 2 : Peak current versus form factor.

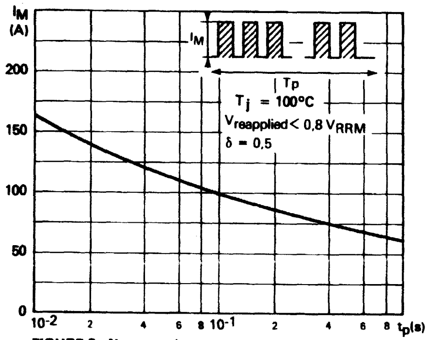


FIGURE 3 : Non repetitive peak surge current versus overload duration.

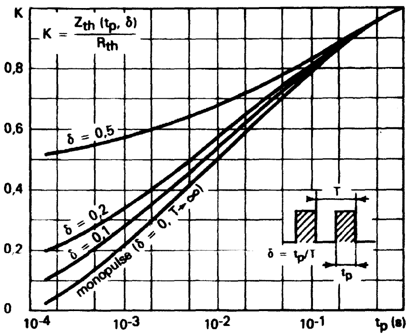


FIGURE 4 : Thermal impedance versus pulse width.

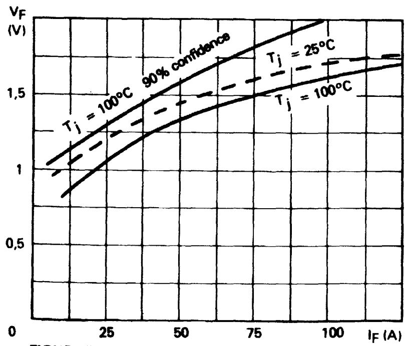


FIGURE 5 : Voltage drop versus forward current.

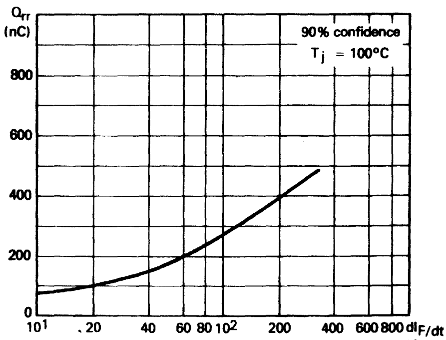


FIGURE 6 : Recovery charge versus dIF/dt.

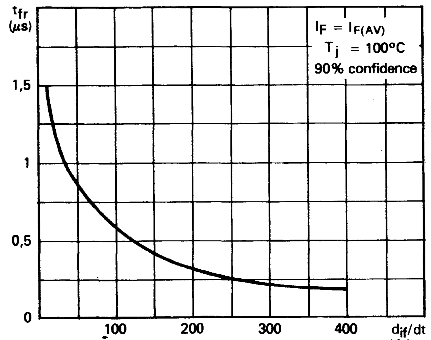


FIGURE 7 : Recovery time versus dI_F/dt.

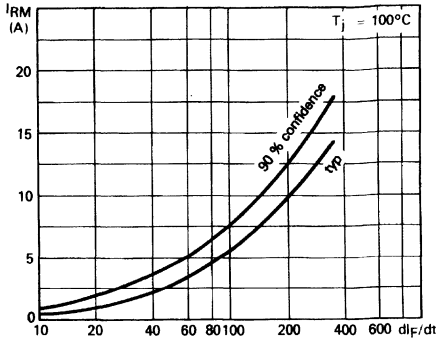


FIGURE 8 : Peak reverse current versus dI_F/dt.

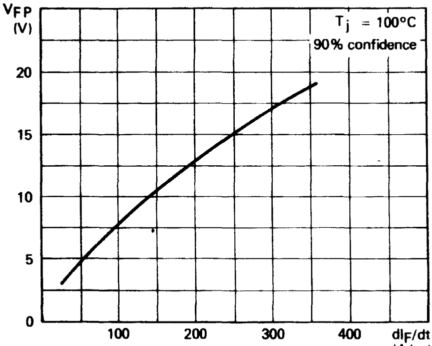


FIGURE 9 : Peak forward voltage versus dI_F/dt.

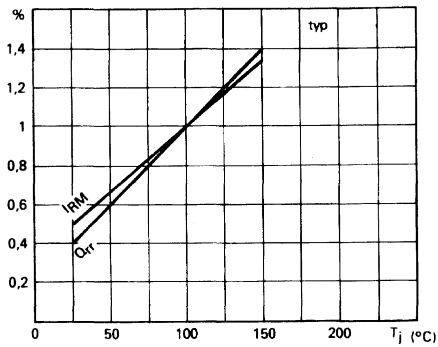


FIGURE 10 : Dynamic parameters versus junction temperature.

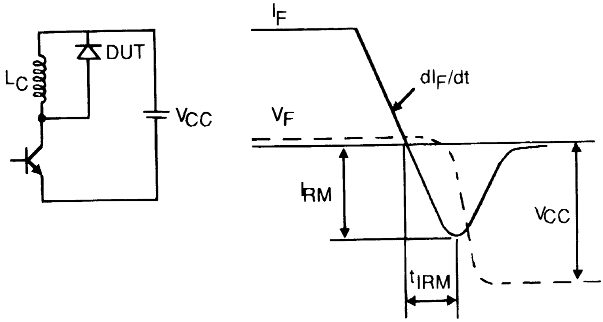


Figure 11 : Turn-off switching characteristics (without series inductance).

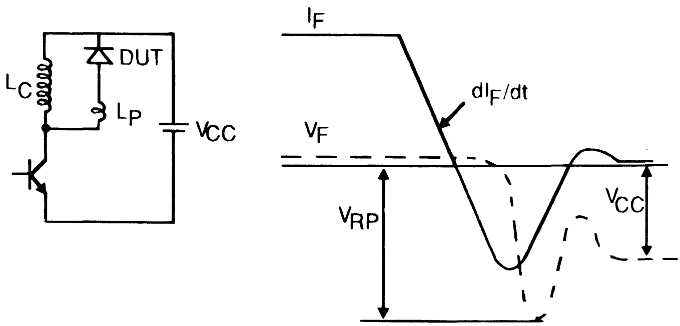


Figure 12 : Turn-off switching characteristics (with series inductance).

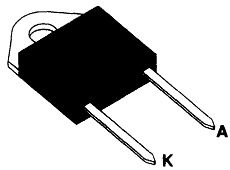
SGS-THOMSON MICROELECTRONICS

BYT 30PI-200→400

FAST RECOVERY RECTIFIER DIODES

- VERY LOW REVERSE RECOVERY TIME
- VERY LOW SWITCHING LOSSES
- LOW NOISE TURN-OFF SWITCHING
- INSULATED : Capacitance 15pF

Insulating voltage 2500 V_{RMS}



Isolated
DOP3I
(Plastic)

SUITABLE APPLICATIONS

- FREE WHEELING DIODE IN CONVERTERS AND MOTOR CONTROL CIRCUITS
- RECTIFIER IN S.M.P.S.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
I_{FRM}	Repetitive Peak Forward Current	$t_p \leq 10\mu s$	500	A
$I_{F(RMS)}$	RMS Forward Current		50	A
$I_{F(AV)}$	Average Forward Current	$T_{case} = 60°C$ $\delta = 0.5$	30	A
I_{FSM}	Surge non Repetitive Forward Current	$t_p = 10ms$ Sinusoïdal	350	A
P	Power Dissipation	$T_{case} = 60°C$	50	W
T_{stg} T_j	Storage and Junction Temperature Range		– 40 to + 150	°C

Symbol	Parameter	BYT 30PI-			Unit
		200	300	400	
V_{RRM}	Repetitive Peak Reverse Voltage	200	300	400	V
V_{RSM}	Non Repetitive Peak Reverse Voltage	220	330	440	V

THERMAL RESISTANCE

Symbol	Test Conditions	Value	Unit
$R_{th\ (j-c)}$	Junction-case	1.8	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R	$T_j = 25°C$	$V_R = V_{RRM}$			35	µA
	$T_j = 100°C$				6	mA
V_F	$T_j = 25°C$	$I_F = 30A$			1.5	V
	$T_j = 100°C$				1.4	

RECOVERY CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{rr}	$T_j = 25°C$	$I_F = 1A$ $di_F/dt = -15A/\mu s$ $V_R = 30V$			100	ns
		$I_F = 0.5A$ $I_R = 1A$, $I_{rr} = 0.25A$			50	

TURN -OFF SWITCHING CHARACTERISTICS (Without Series Inductance)

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{IRM}	$di_F/dt = -120A/\mu s$	$V_{CC} = 200V$ $I_F = 30A$			75	ns
	$di_F/dt = -240A/\mu s$	$L_p \le 0.05\mu H$ $T_j = 100°C$		50		
I_{RM}	$di_F/dt = -120A/\mu s$	See Figure 11			9	A
	$di_F/dt = -240A/\mu s$			12		

TURN -OFF OVERVOLTAGE COEFFICIENT (With Series Inductance)

Symbol	Test Conditions	Min.	Typ.	Max.	Unit
$C = \frac{V_{RP}}{V_{CC}}$	$T_j = 100°C$ $V_{CC} = 60V$ $I_F = I_{F(AV)}$ See note $di_F/dt = -30A/\mu s$ $L_p = 1\mu H$ See Figure 12		3.3		

Note : Applicable to BYT 30 PI-400 only

To evaluate the conduction losses use the following equations :

$V_F = 1.1 + 0.0095\ I_F$ $P = 1.1 \times I_{F(AV)} + 0.0095 I_F{}^2{}_{(RMS)}$

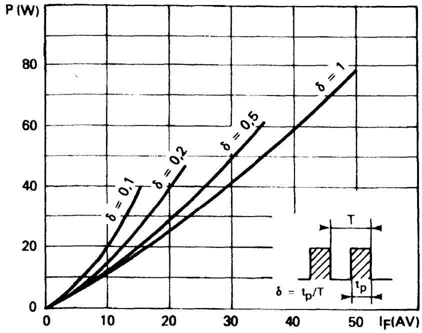


FIGURE 1 : Low frequency power losses versus average current.

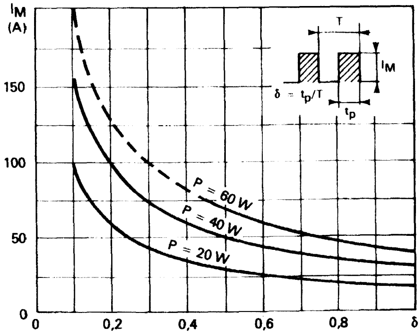


FIGURE 2 : Peak current versus form factor.

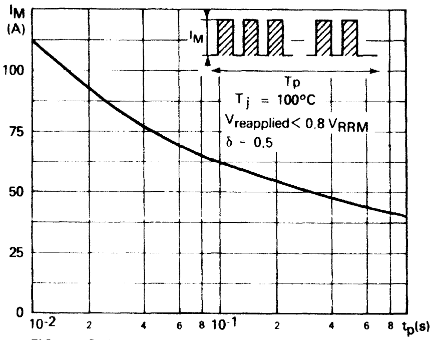


FIGURE 3 : Non repetitive peak surge current versus overload duration.

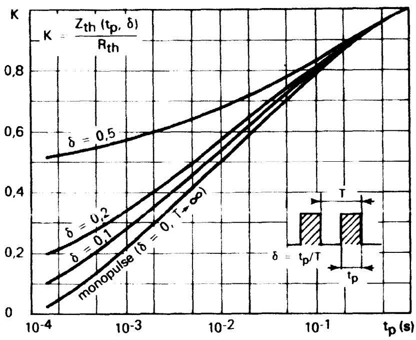


FIGURE 4 : Thermal impedance versus pulse width.

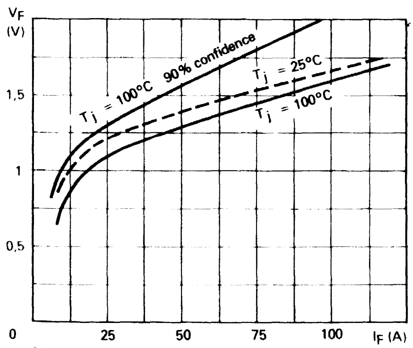


FIGURE 5 : Voltage drop versus forward current.

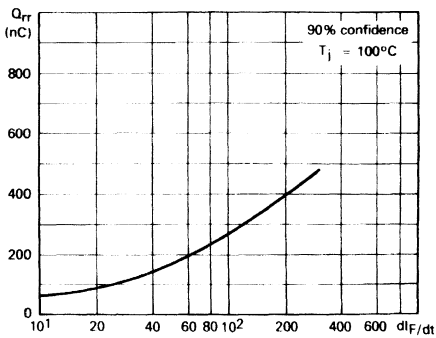


FIGURE 6 : Recovery charge versus $dI_{F/dt}$.

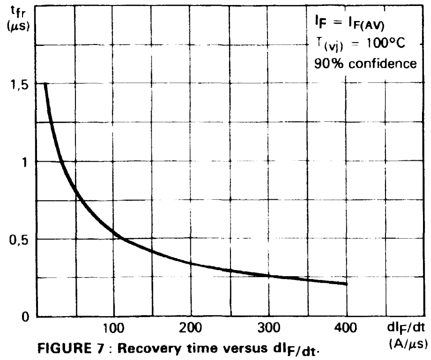


FIGURE 7 : Recovery time versus $dI_{F/dt}$.

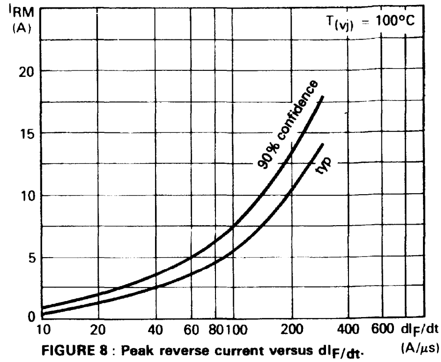


FIGURE 8 : Peak reverse current versus $dI_{F/dt}$.

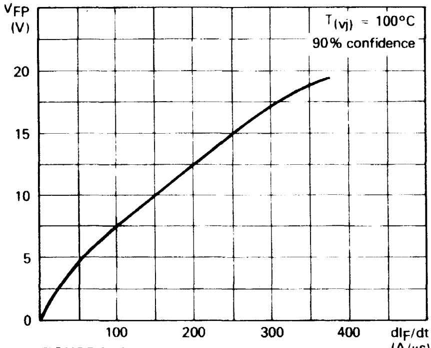


FIGURE 9 : Peak forward voltage versus $dI_{F/dt}$.

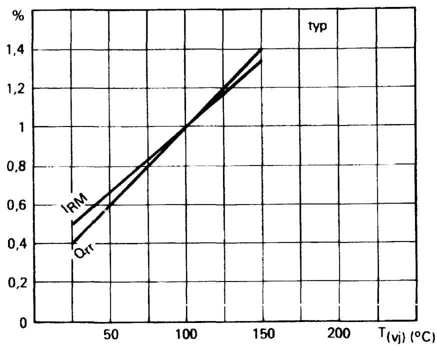


FIGURE 10 : Dynamic parameters versus junction temperature.

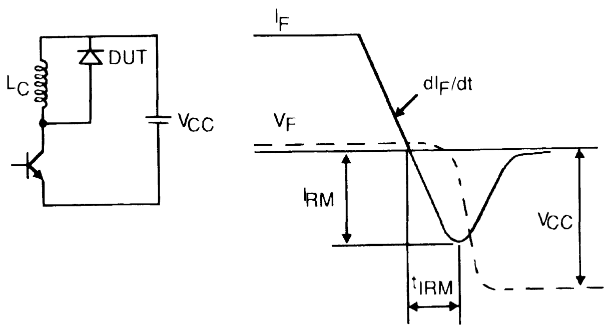


Figure 11 : Turn-off switching characteristics (without series inductance).

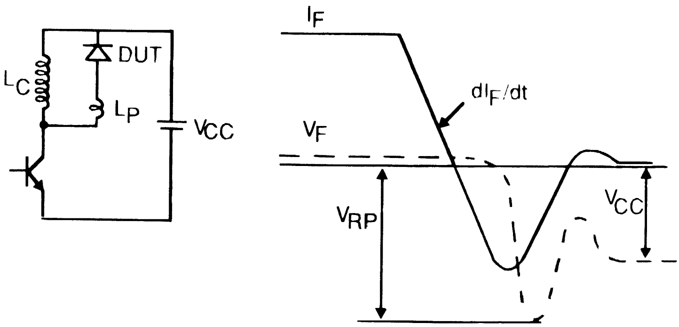


Figure 12 : Turn-off switching characteristics (with series inductance).

SGS-THOMSON MICROELECTRONICS

BYT30M-400

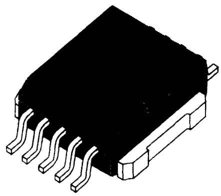
HIGH EFFICIENCY FAST RECOVERY DIODES

MAIN PRODUCT CHARACTERISTICS

$I_{F(AV)}$	30 A
V_{RRM}	400 V
trr	50 ns
V_F	1.4 V

FEATURES AND BENEFITS

- VERY LOW REVERSE RECOVERY TIME
- VERY LOW SWITCHING LOSSES
- LOW NOISE TURN-OFF SWITCHING
- HIGH DISSIPATION MINIATURE PACKAGE
- SURFACE MOUNT TECHNOLOGY COMPATIBLE



Power SO-10™
Plastic, non isolated SMD
with copper tab

DESCRIPTION

Single rectifier suited for freewheeling in converters and motor control circuits.
Packaged in a high performance surface mount package PSO-10, this device is intended for use in high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		400	V
$I_{F(RMS)}$	RMS forward current	(All pins connected)	44	A
$I_{F(AV)}$	Average forward current	Tc=100°C δ = 0.5	30	A
I_{FSM}	Surge non repetitive forward current (All pins connected)	tp=10ms sinusoidal	350	A
I_{FRM}	Repetitive peak forward current	tp = 5µs f = 5 kHz	280	A
Tstg Tj	Storage and junction temperature range		- 40 to + 150	°C

TM : PowerSO-10 is a trademark of SGS-THOMSON Microelectronics.

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
Rth (j-c)	Junction to case thermal resistance	1.0	°C/W

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
I_R *	Reverse leakage current	$V_R = V_{RRM}$	$T_j = 25°C$			35	µA
			$T_j = 100°C$			6	mA
V_F **	Forward voltage drop	$I_F = 30$ A	$T_j = 100°C$			1.4	V
		$I_F = 30$ A	$T_j = 25°C$			1.5	

Pulse test : * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2 %

To evaluate the conduction losses use the following equation :
$P = 1.1 \times I_{F(AV)} + 0.0095\ I_F{}^2{}_{(RMS)}$

RECOVERY CHARACTERISTICS

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
t_{rr}	Reverse recovery time	$T_j = 25°C$ $I_F = 0.5A$ Irr = 0.25 A $I_R = 1A$			50	ns
		$T_j = 25°C$ $I_F = 1A$ $dI_F/dt = -15A/µs$ $V_R = 30V$			100	

TURN-OFF SWITCHING CHARACTERISTICS

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
t_{IRM}	Maximum reverse recovery time	$T_j = 100°C$	$dI_F/dt = -120A/µs$			75	ns
		$I_F = 30$ A	$dI_F/dt = -240A/µs$		50		
I_{RM}	Maximum reverse recovery current	$V_{CC} = 200$ V	$dI_F/dt = -120A/µs$			9	ns
		Lp < 0.05 µH	$dI_F/dt = -240A/µs$		12		
C factor	Turn-off overvoltage coefficient	$T_j = 100°C$ $I_F = I_{F(AV)}$ $V_{CC} = 60$ V Lp = 1 µH $dI_F/dt = -30A/µs$			3.3		/

PIN OUT configuration in PowerSO-10 :

Anode = pin 1 to 5

Cathode = connected to base tab

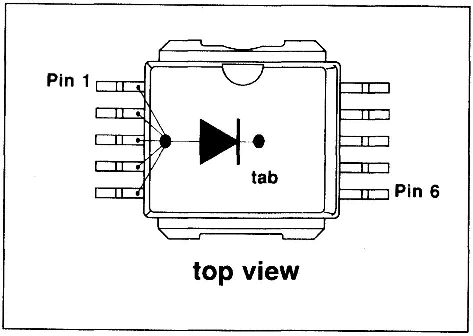


Fig.1 : Average forward power dissipation versus average forward current.

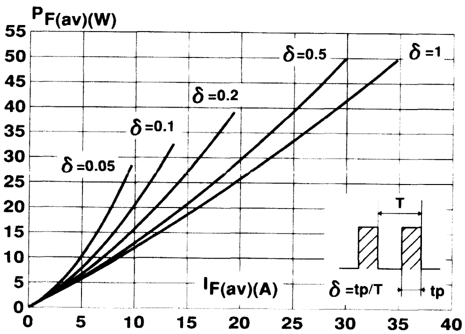


Fig.2 : Peak current versus form factor.

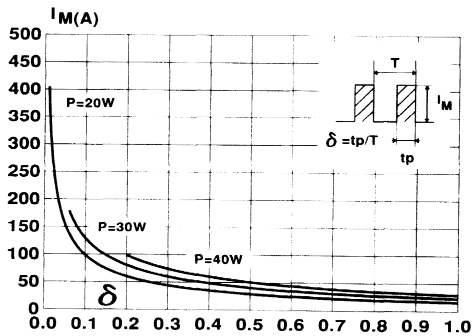


Fig.3 : Forward voltage drop versus forward current (maximum values).

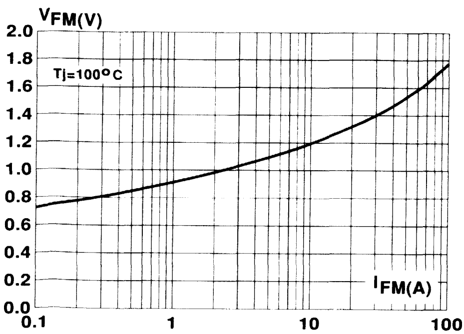


Fig.4 : Relative variation of thermal impedance junction to case versus pulse duration.

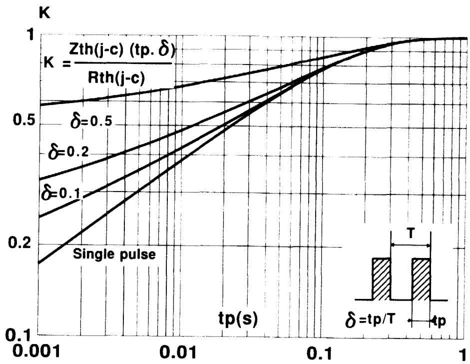


Fig.5 : Non repetitive surge peak forward current versus overload duration.

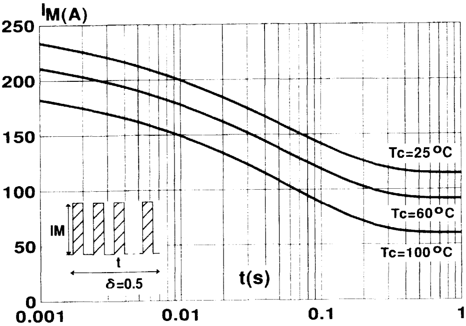


Fig.6 : Average current versus ambient temperature. (duty cycle)

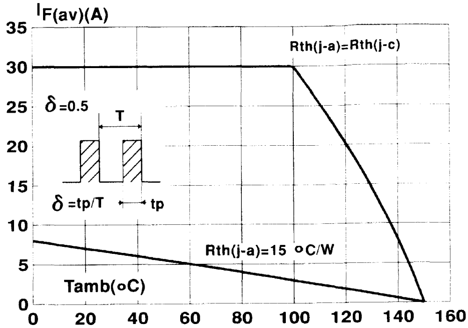


Fig.7 : Recovery charge versus dIF/dt..

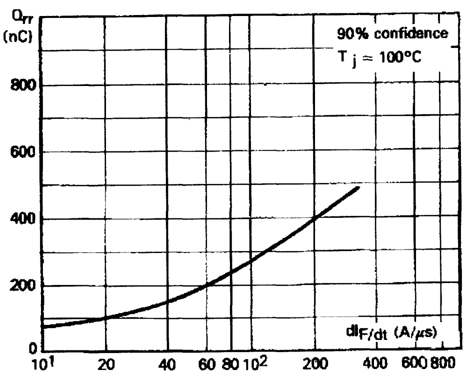


Fig.8 : Recovery times versus dIF/dt..

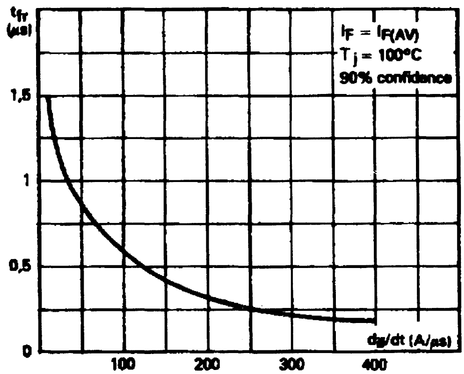


Fig.9 : Peak reverse current versus dIF/dt..

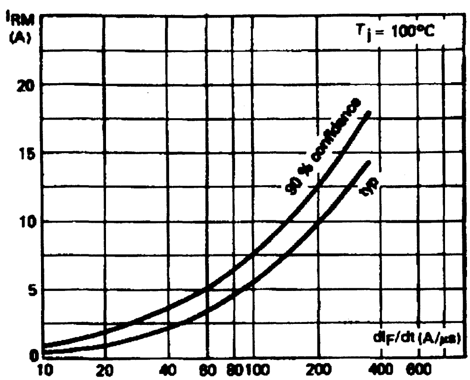


Fig.10 : Peak forward voltage versus dIF/dt..

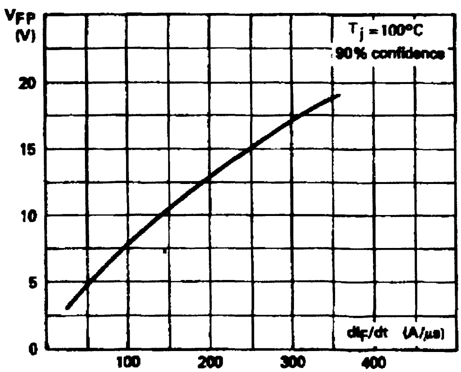
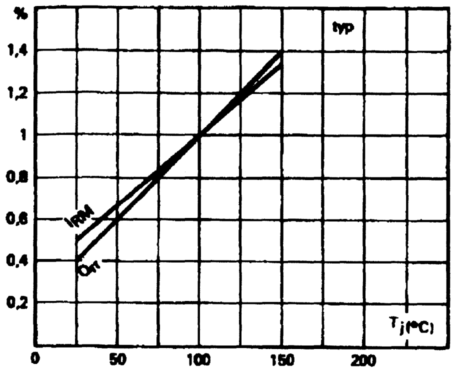
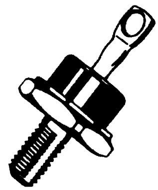


Fig.11: Dynamic parameters versus junction temperature.



FAST RECOVERY RECTIFIER DIODES

- VERY LOW REVERSE RECOVERY TIME
- VERY LOW SWITCHING LOSSES
- LOW NOISE TURN-OFF SWITCHING



DO 5
(Metal)

SUITABLE APPLICATIONS

- FREE WHEELING DIODE IN CONVERTERS AND MOTOR CONTROL CIRCUITS
- RECTIFIER IN S.M.P.S.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
I_{FRM}	Repetitive Peak Forward Current	$t_p \leq 10\mu s$	500	A
$I_{F(RMS)}$	RMS Forward Current		50	A
$I_{F(AV)}$	Average Forward Current	$T_{case} = 90°C$ $\delta = 0.5$	30	A
I_{FSM}	Surge non Repetitive Forward Current	$t_P = 10ms$ sinusoidal	500	A
P	Power Dissipation	$T_{case} = 90°C$	50	W
T_{stg} T_j	Storage and Junction Temperature Range		– 40 to + 150	°C

Symbol	Parameter	BYT 30–			Unit
		200	300	400	
V_{RRM}	Repetitive Peak Reverse Voltage	200	300	400	V
V_{RSM}	Non Repetitive Peak Reverse Voltage	220	330	440	V

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-c)}$	Junction-case	1.2	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R	T_j = 25°C	$V_R = V_{RRM}$			35	µA
	T_j = 100°C				6	mA
V_F	T_j = 25°C	I_F = 30A			1.5	V
	T_j = 100°C				1.4	

RECOVERY CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{rr}	T_j = 25°C	I_F = 1A di_F/dt = – 15A/µs V_R = 30V			100	ns
		I_F = 0.5A I_R = 1A I_{rr} = 0.25A			50	

TURN -OFF SWITCHING CHARACTERISTICS (Without Series Inductance)

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{IRM}	di_F/dt = – 120A/µs	V_{CC} = 200V I_F = 30A L_p ≤ 0.05µH T_j = 100°C See Figure 11			75	ns
	di_F/dt = – 240A/µs			50		
I_{RM}	di_F/dt = – 120A/µs				9	A
	di_F/dt = – 240A/µs			12		

TURN -OFF OVERVOLTAGE COEFFICIENT (With Series Inductance)

Symbol	Test Conditions	Min.	Typ.	Max.	Unit
$C = \frac{V_{RP}}{V_{CC}}$	T_j = 100°C V_{CC} = 60V $I_F = I_{F(AV)}$ di_F/dt = – 30A/µs L_p = 1µH See Figure 12		3.3		

To evaluate the conduction losses use the following equations :

$V_F = 1.1 + 0.0095\ I_F$ $P = 1.1 \times I_{F(AV)} + 0.0095\ I_F{}^2{}_{(RMS)}$

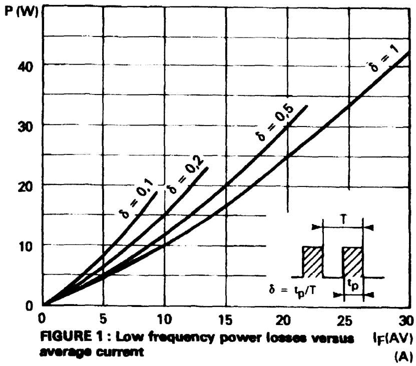


FIGURE 1 : Low frequency power losses versus average current

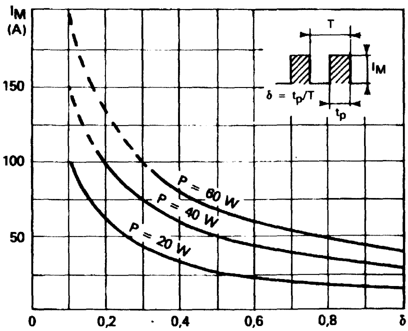


FIGURE 2 : Peak current versus form factor.

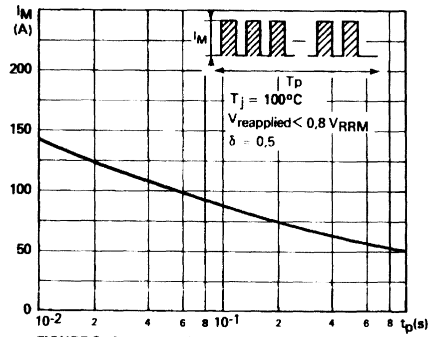


FIGURE 3 : Non repetitive peak surge current versus overload duration.

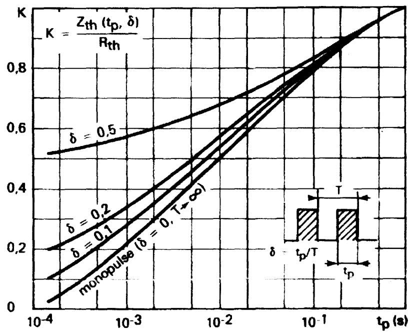


FIGURE 4 : Thermal impedance versus pulse width.

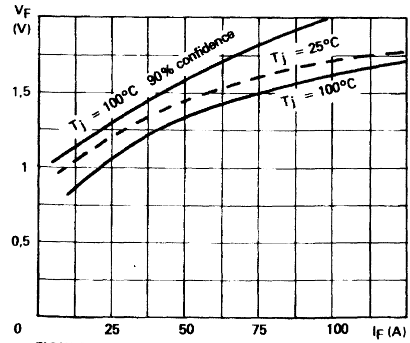


FIGURE 5 : Voltage drop versus forward current.

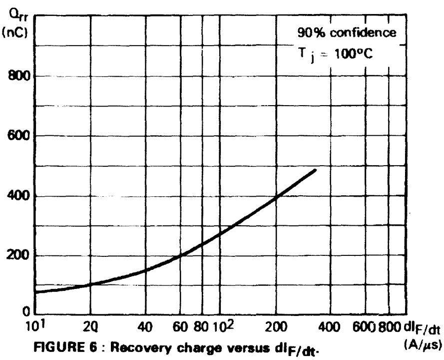


FIGURE 6 : Recovery charge versus $dI_{F/dt}$.

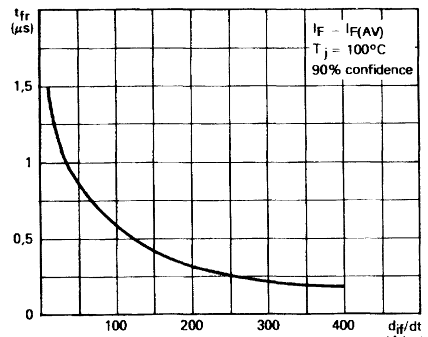


FIGURE 7 : Recovery time versus dI_F/dt.

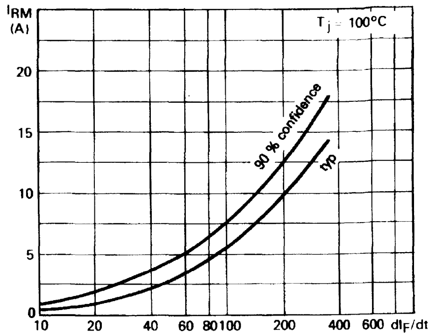


FIGURE 8 : Peak reverse current versus dI_F/dt.

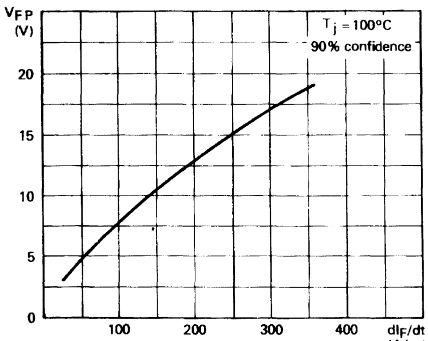


FIGURE 9 : Peak forward voltage versus dI_F/dt.

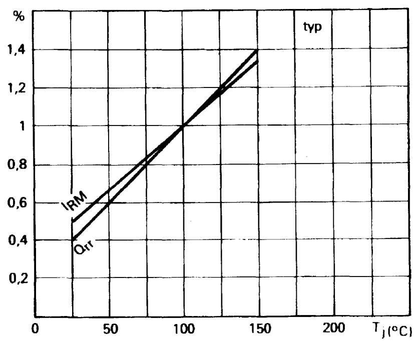


FIGURE 10 : Dynamic parameters versus junction temperature.

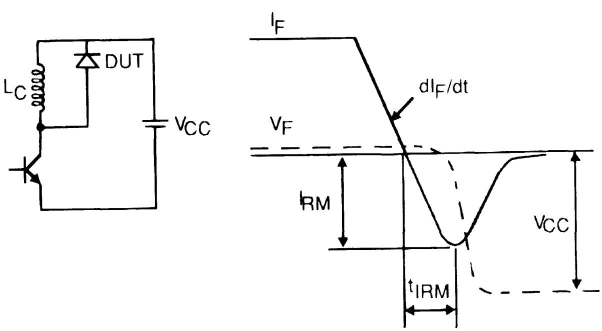


Figure 11 : Turn-off switching characteristics (without series inductance).

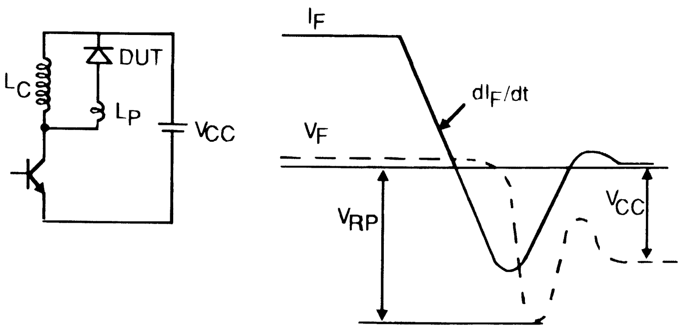


Figure 12 : Turn-off switching characteristics (with series inductance).

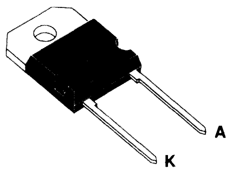
SGS-THOMSON MICROELECTRONICS

BYT 30P-600/800

FAST RECOVERY RECTIFIER DIODES

- HIGH REVERSE VOLTAGE CAPABILITY
- VERY LOW REVERSE RECOVERY TIME
- VERY LOW SWITCHING LOSSES
- LOW NOISE TURN-OFF SWITCHING

Cathode connected to case



SOD93
(Plastic)

SUITABLE APPLICATIONS

- FREE WHEELING DIODE IN CONVERTERS AND MOTOR CONTROL CIRCUITS
- RECTIFIER IN S.M.P.S.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
I_{FRM}	Repetitive Peak Forward Current	$t_p \leq 10\mu s$	375	A
$I_{F(RMS)}$	RMS Forward Current		70	A
$I_{F(AV)}$	Average Forward Current	T_{case} = 85°C δ = 0.5	30	A
I_{FSM}	Surge non Repetitive Forward Current	t_p = 10ms Sinusoïdal	200	A
P	Power Dissipation	T_{case} = 85°C	65	W
T_{stg} T_j	Storage and Junction Temperature Range		– 40 to + 150	°C

Symbol	Parameter	BYT 30P-		Unit
		600	800	
V_{RRM}	Repetitive Peak Reverse Voltage	600	800	V
V_{RSM}	Non Repetitive Peak Reverse Voltage	640	850	V

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-c)}$	Junction-case	1	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R	$T_j = 25°C$	$V_R = V_{RRM}$			100	µA
	$T_j = 100°C$				5	mA
V_F	$T_j = 25°C$	$I_F = 30A$			1.9	V
	$T_j = 100°C$				1.8	

RECOVERY CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{rr}	$T_j = 25°C$	$I_F = 1A$ $di_F/dt = -15A/\mu s$ $V_R = 30V$			130	ns
		$I_F = 0.5A$ $I_R = 1A$ $I_{rr} = 0.25A$			55	

TURN -OFF SWITCHING CHARACTERISTICS (Without Series Inductance)

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{IRM}	$di_F/dt = -120A/\mu s$	$V_{CC} = 200V$ $I_F = 30A$ $L_p \leq 0.05\mu H$ $T_j = 100°C$ See Figure 11			160	ns
	$di_F/dt = -240A/\mu s$			100		
I_{RM}	$di_F/dt = -120A/\mu s$				15	A
	$di_F/dt = -240A/\mu s$			19		

TURN -OFF OVERVOLTAGE COEFFICIENT (With Series Inductance)

Symbol	Test Conditions	Min.	Typ.	Max.	Unit
$C = \frac{V_{RP}}{V_{CC}}$	$T_j = 100°C$ $V_{CC} = 200V$ $I_F = I_{F(AV)}$ See note $di_F/dt = -30A/\mu s$ $L_p = 5\mu H$ See Figure 12			4	

Note : Applicable to BYT 30 P-800 only.

To evaluate the conduction losses use the following equations :

$V_F = 1.47 + 0.01\ I_F$ $\qquad$ $P = 1.47 \times I_{F(AV)} + 0.01\ I_{F}^{2}{}_{(RMS)}$

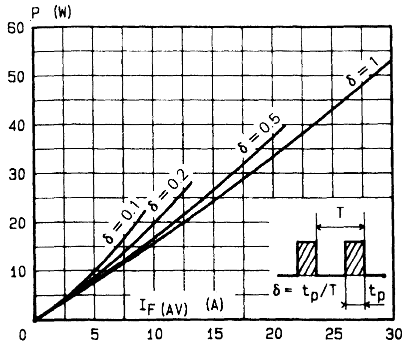


FIGURE 1 : Low frequency power losses versus average current.

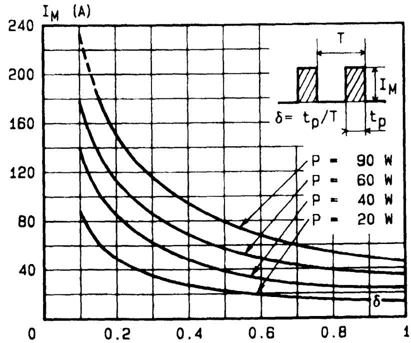


FIGURE 2 : Peak current versus form factor.

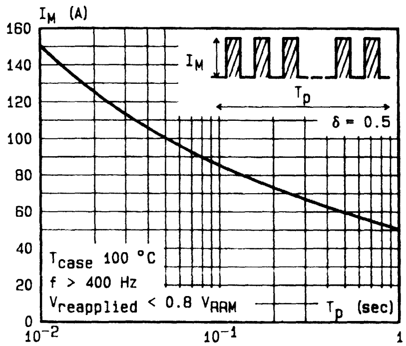


FIGURE 3 : Non repetitive peak surge current versus overload duration.

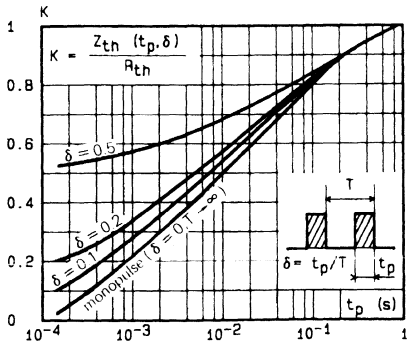


FIGURE 4 : Thermal impedance versus pulse width.

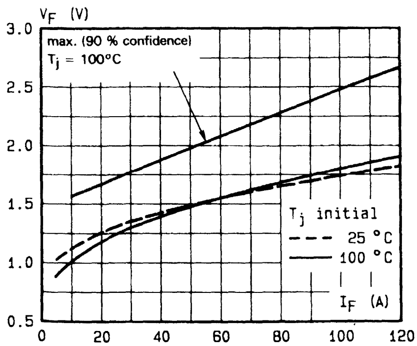


FIGURE 5 : Voltage drop versus forward current.

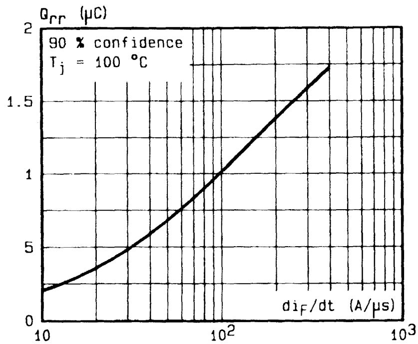


FIGURE 6 : Recovery charge versus di_F/dt.

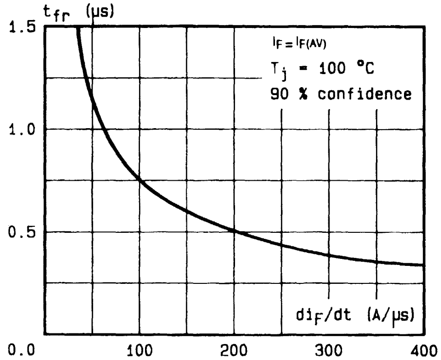


FIGURE 7 : Recovery time versus di_F/dt.

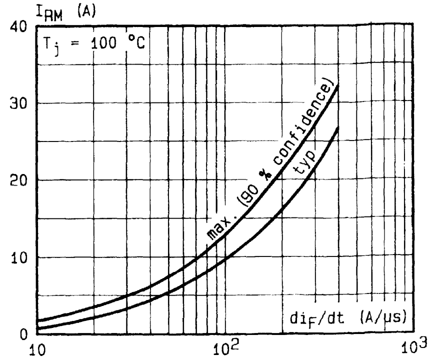


FIGURE 8 : Peak reverse current versus di_F/dt.

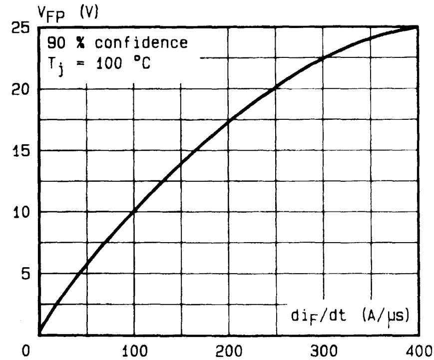


FIGURE 9 : Peak forward voltage versus di_F/dt.

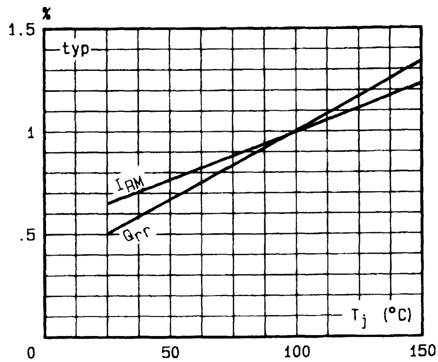


FIGURE 10 : Dynamic parameters versus junction temperature.

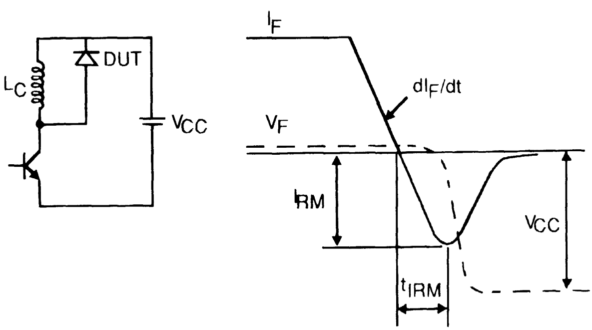


Figure 11 : Turn-off switching (without series inductance).

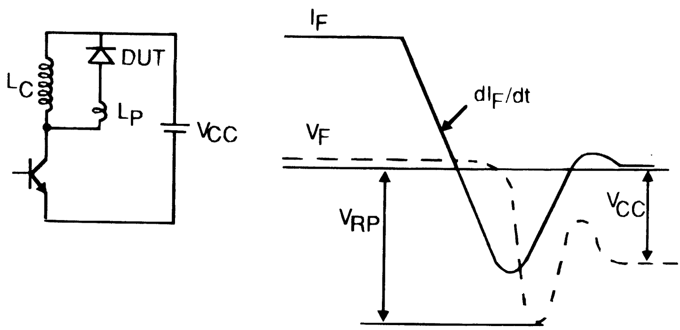


Figure 12 : Turn-off switching characteristics (with series inductance).

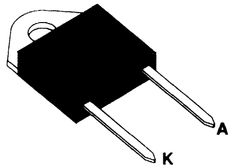
SGS-THOMSON
MICROELECTRONICS

BYT 30PI-600/800

FAST RECOVERY RECTIFIER DIODES

- HIGH REVERSE VOLTAGE CAPABILITY
- VERY LOW REVERSE RECOVERY TIME
- VERY LOW SWITCHING LOSSES
- LOW NOISE TURN–OFF SWITCHING
- INSULATED : Capacitance 15pF

Insulating voltage 2500 V_{RMS}



Isolated
DOP3I
(Plastic)

SUITABLE APPLICATIONS

- FREE WHEELING DIODE IN CONVERTERS AND MOTOR CONTROL CIRCUITS
- RECTIFIER IN S.M.P.S.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
I_{FRM}	Repetitive Peak Forward Current	$t_p \leq 10\mu s$	375	A
$I_{F(RMS)}$	RMS Forward Current		70	A
$I_{F(AV)}$	Average Forward Current	$T_{case} = 50°C$ $\delta = 0.5$	30	A
I_{FSM}	Surge non Repetitive Forward Current	$t_p = 10ms$ Sinusoidal	200	A
P	Power Dissipation	$T_{case} = 50°C$	62	W
T_{stg} T_j	Storage and Junction Temperature Range		– 40 to + 150	°C

Symbol	Parameter	BYT 30PI-		Unit
		600	800	
V_{RRM}	Repetitive Peak Reverse Voltage	600	800	V
V_{RSM}	Non Repetitive Peak Reverse Voltage	640	850	V

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-c)}$	Junction-case	1.6	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R	$T_j = 25°C$	$V_R = V_{RRM}$			100	μA
	$T_j = 100°C$				5	mA
V_F	$T_j = 25°C$	$I_F = 30A$			1.9	V
	$T_j = 100°C$				1.8	

RECOVERY CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{rr}	$T_j = 25°C$	$I_F = 1A$ $dI_F/dt = -15A/\mu s$ $V_R = 30V$			130	ns
		$I_F = 0.5A$ $I_R = 1A$ $I_{rr} = 0.25A$			55	

TURN -OFF SWITCHING CHARACTERISTICS (Without Series Inductance)

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{IRM}	$dI_F/dt = -120A/\mu s$	$V_{CC} = 200V$ $I_F = 30A$ $L_p \leq 0.05\mu H$ $T_j = 100°C$ See Figure 11			160	ns
	$dI_F/dt = -240A/\mu s$			100		
I_{RM}	$dI_F/dt = -120A/\mu s$				15	A
	$dI_F/dt = -240A/\mu s$			19		

TURN -OFF OVERVOLTAGE COEFFICIENT (With Series Inductance)

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
$C = \frac{V_{RP}}{V_{CC}}$	$T_j = 100°C$ $dI_F/dt = -30A/\mu s$	$V_{CC} = 150V$ $L_p = 4\mu H$	$I_F = I_{F(AV)}$ See Figure 12			4	

To evaluate the conduction losses use the following equations :

$V_F = 1.47 + 0.010\ I_F$ $\qquad P = 1.47 \times I_{F(AV)} + 0.010\ I_F^2{}_{(RMS)}$

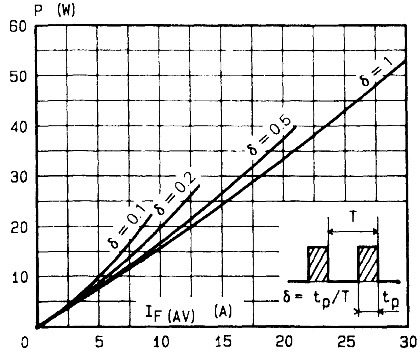


FIGURE 1 : Low frequency power losses versus average current.

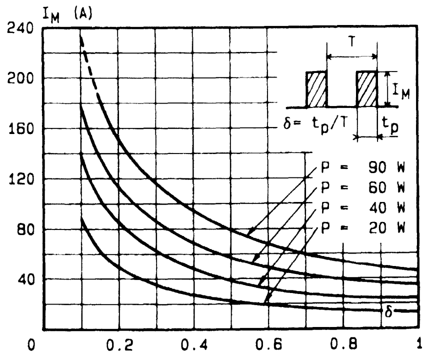


FIGURE 2 : Peak current versus form factor.

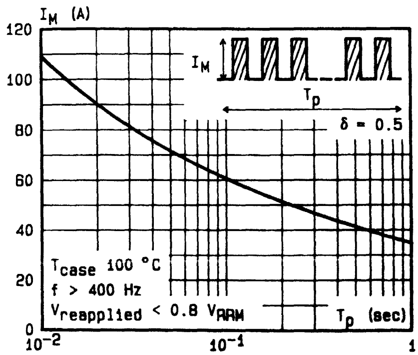


FIGURE 3 : Non repetitive peak surge current versus overload duration.

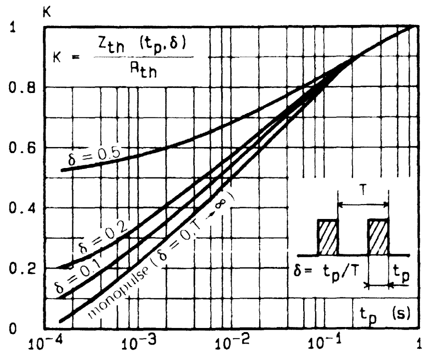


FIGURE 4 : Thermal impedance versus pulse width.

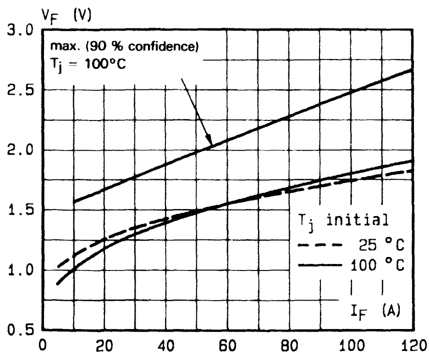


FIGURE 5 : Voltage drop versus forward current.

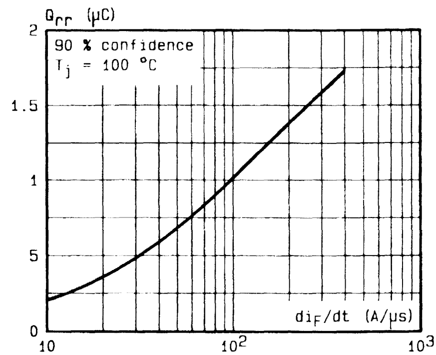


FIGURE 6 : Recovery charge versus di_F/dt.

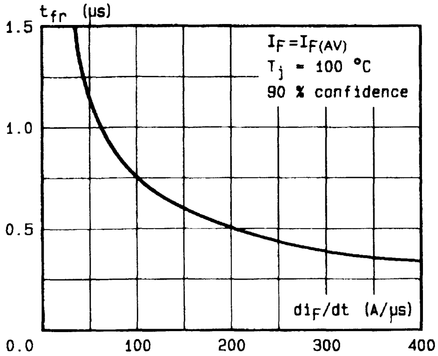


FIGURE 7 : Recovery time versus dI_F/dt.

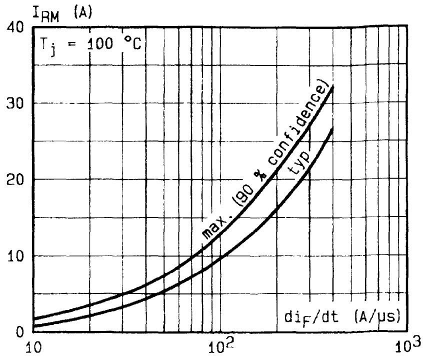


FIGURE 8 : Peak reverse current versus dI_F/dt.

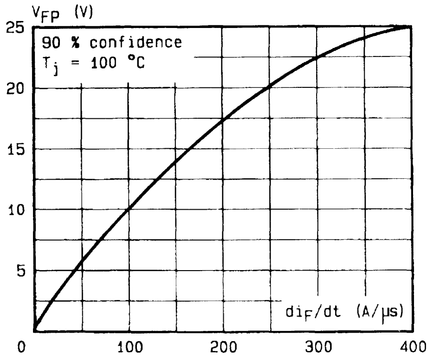


FIGURE 9 : Peak forward voltage versus dI_F/dt.

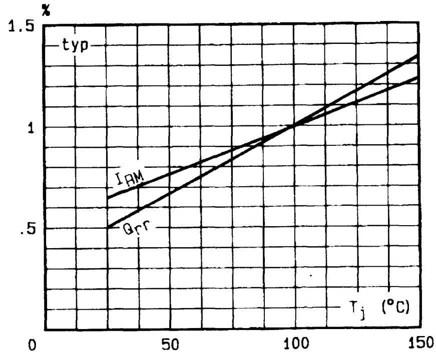


FIGURE 10 : Dynamic parameters versus junction temperature.

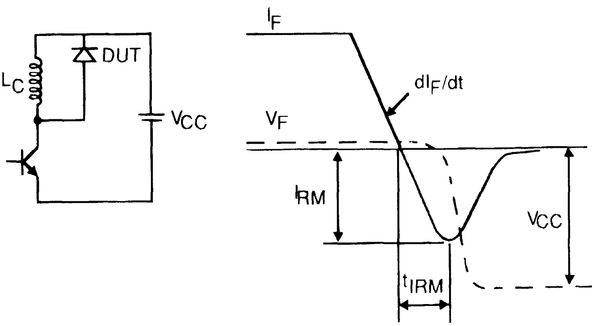


Figure 11 : Turn-off switching characteristics (without series inductance).

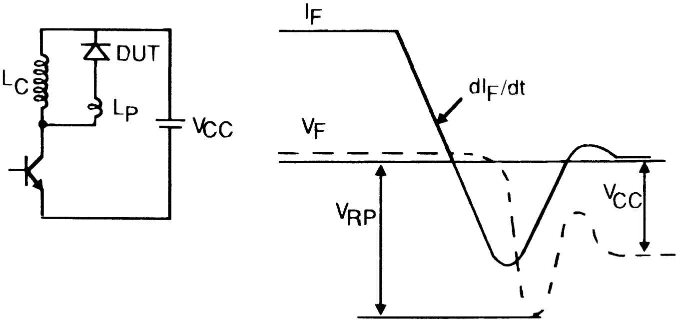


Figure 12 : Turn-off switching characteristics (with series inductance).

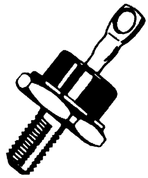
SGS-THOMSON MICROELECTRONICS

BYT 30-600/800

FAST RECOVERY RECTIFIER DIODES

- HIGH REVERSE VOLTAGE CAPABILITY
- VERY LOW REVERSE RECOVERY TIME
- VERY LOW SWITCHING LOSSES
- LOW NOISE TURN-OFF SWITCHING

Cathode connected to case



DO 5
(Metal)

SUITABLE APPLICATIONS

- FREE WHEELING DIODE IN CONVERTERS AND MOTOR CONTROL CIRCUITS
- RECTIFIER IN S.M.P.S.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
I_{FRM}	Repetitive Peak Forward Current	$t_p \leq 10\mu s$	375	A
$I_{F(RMS)}$	RMS Forward Current		70	A
$I_{F(AV)}$	Average Forward Current	$T_{case} = 75°C$ $\delta = 0.5$	30	A
I_{FSM}	Surge non Repetitive Forward Current	$t_p = 10ms$ Sinusoidal	200	A
P	Power Dissipation	$T_{case} = 75°C$	62	W
T_{stg} T_j	Storage and Junction Temperature Range		– 40 to + 150	°C

Symbol	Parameter	BYT 30-		Unit
		600	800	
V_{RRM}	Repetitive Peak Reverse Voltage	600	800	V
V_{RSM}	Non Repetitive Peak Reverse Voltage	640	850	V

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-c)}$	Junction-case	1.2	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R	$T_j = 25°C$	$V_R = V_{RRM}$			100	µA
	$T_j = 100°C$				5	mA
V_F	$T_j = 25°C$	$I_F = 30A$			1.9	V
	$T_j = 100°C$				1.8	

RECOVERY CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{rr}	$T_j = 25°C$	$I_F = 1A$ $di_F/dt = -15A/\mu s$ $V_R = 30V$			130	ns
		$I_F = 0.5A$ $I_R = 1A$ $I_{rr} = 0.25A$			55	

TURN -OFF SWITCHING CHARACTERISTICS (Without Series Inductance)

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{IRM}	$di_F/dt = -120A/\mu s$	$V_{CC} = 200V$ $I_F = 30A$ $L_p \leq 0.05\mu H$ $T_j = 100°C$ See figure 11			160	ns
	$di_F/dt = -240A/\mu s$			100		
I_{RM}	$di_F/dt = -120A/\mu s$				15	A
	$di_F/dt = -240A/\mu s$			19		

TURN -OFF OVERVOLTAGE COEFFICIENT (With Series Inductance)

Symbol	Test Conditions	Min.	Typ.	Max.	Unit
$C = \frac{V_{RP}}{V_{CC}}$	$T_j = 100°C$ $V_{CC} = 150V$ $I_F = I_{F(AV)}$ $di_F/dt = -30A/\mu s$ $L_p = 4\mu H$ See figure 12			4	

To evaluate the conduction losses use the following equation :

$V_F = 1.47 + 0.010\ I_F$ $\qquad$ $P = 1.47 \times I_{F(AV)} + 0.010\ I_F{}^2{}_{(RMS)}$

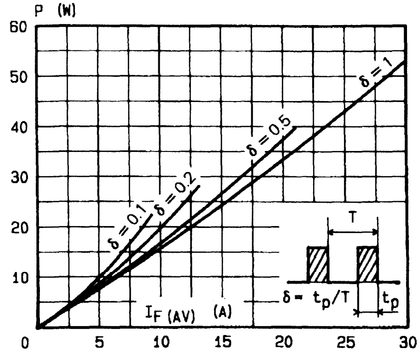


FIGURE 1 : Low frequency power losses versus average current.

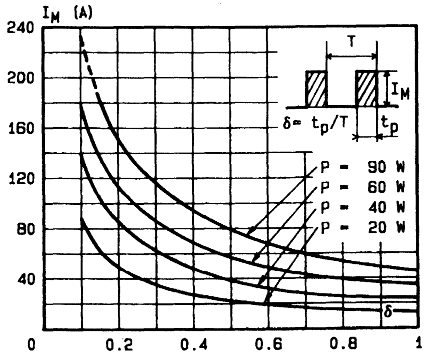


FIGURE 2 : Peak current versus form factor.

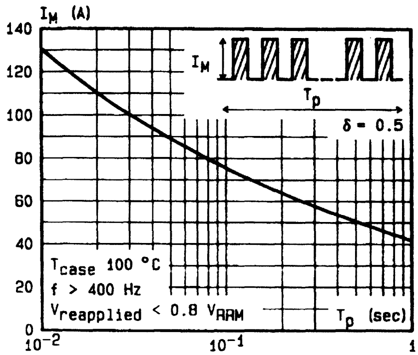


FIGURE 3 : Non repetitive peak surge current versus overload duration.

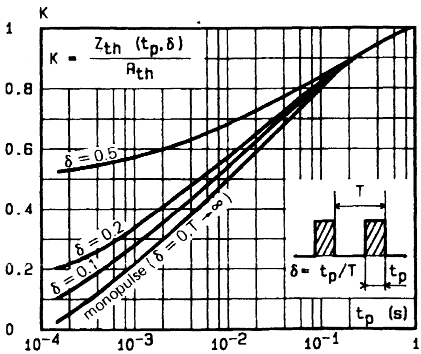


FIGURE 4 : Thermal impedance versus pulse width.

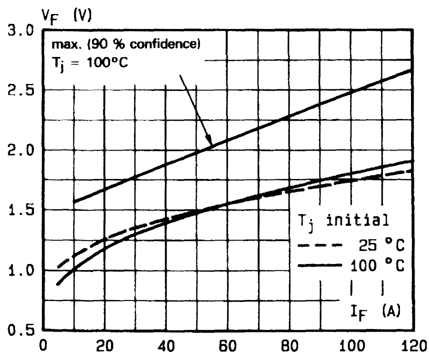


FIGURE 5 : Voltage drop versus forward current.

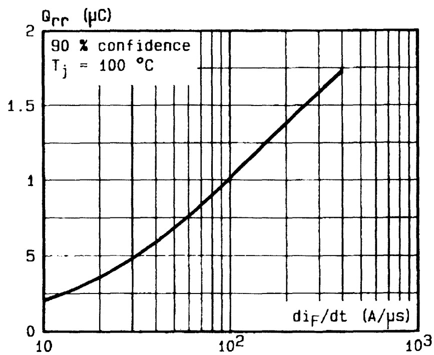


FIGURE 6 : Recovery charge versus di_F/dt.

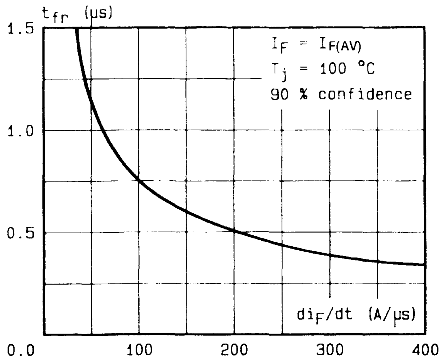


FIGURE 7 : Recovery time versus di_F/dt.

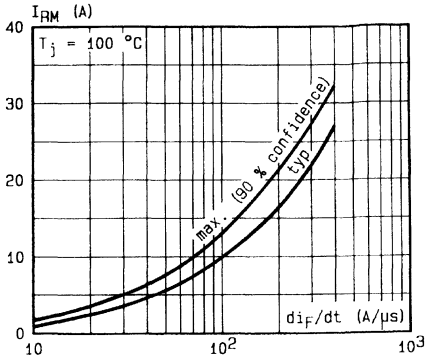


FIGURE 8 : Peak reverse current versus di_F/dt.

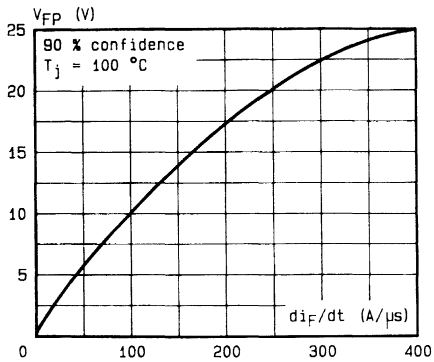


FIGURE 9 : Peak forward voltage versus di_F/dt.

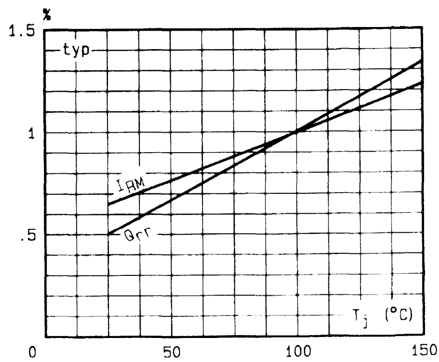


FIGURE 10 : Dynamic parameters versus junction temperature.

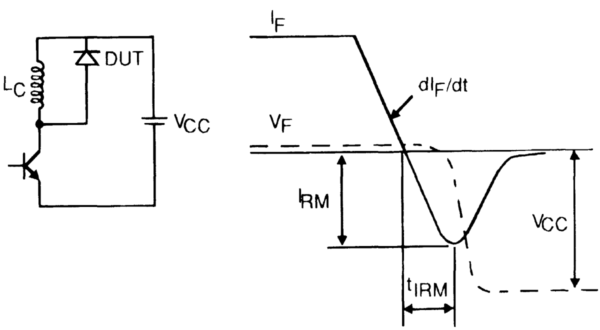


Figure 11 : Turn-off switching characteristics (without series inductance)

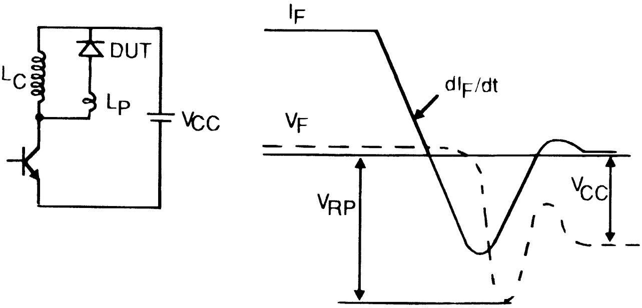


Figure 12 : Turn-off switching characteristics (with series inductance)

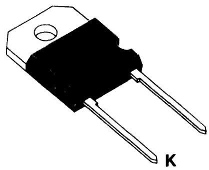
SGS-THOMSON MICROELECTRONICS

BYT 30P-1000

FAST RECOVERY RECTIFIER DIODE

- VERY HIGH REVERSE VOLTAGE CAPABILITY
- VERY LOW REVERSE RECOVERY TIME
- VERY LOW SWITCHING LOSSES
- LOW NOISE TURN-OFF SWITCHING

Cathode connected to case



SOD93
(Plastic)

SUITABLE APPLICATIONS

- FREE WHEELING DIODE IN CONVERTERS AND MOTOR CONTROL CIRCUITS
- RECTIFIER IN S.M.P.S.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		1000	V
V_{RSM}	Non Repetitive Peak Reverse Voltage		1000	V
I_{FRM}	Repetitive Peak Forward Current	$t_p \leq 10\mu s$	375	A
$I_{F(RMS)}$	RMS Forward Current		70	A
$I_{F(AV)}$	Average Forward Current	$T_{case} = 85°C$ $\delta = 0.5$	30	A
I_{FSM}	Surge Non Repetitive Forward Current	$t_p = 10ms$ Sinusoïdal	200	A
P	Power Dissipation	$T_{case} = 85°C$	65	W
T_{stg} T_j	Storage and Junction Temperature Range		– 40 to + 150	°C

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-c)}$	Junction-case	1	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R	T_j = 25°C	$V_R = V_{RRM}$			100	µA
	T_j = 100°C				5	mA
V_F	T_j = 25°C	I_F = 30A			1.9	V
	T_j = 100°C				1.8	

RECOVERY CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{rr}	T_j = 25°C	I_F = 1A dI_F/dt = – 15A/µs V_R = 30V			165	ns
		I_F = 0.5A I_R = 1A I_{rr} = 0.25A			70	

TURN-OFF SWITCHING CHARACTERISTICS (without series inductance)

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{IRM}	dI_F/dt = – 120A/µs	V_{CC} = 200V I_F = 30A $L_p \le$ 0.05µH T_j = 100°C See Figure 11			200	ns
	dI_F/dt = – 240A/µs			120		
I_{RM}	dI_F/dt = – 120A/µs				19.5	A
	dI_F/dt = – 240A/µs			22		

TURN-OFF OVERVOLTAGE COEFFICIENT (With Series Inductance)

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
$C = \frac{V_{RP}}{V_{CC}}$	T_j = 100°C dI_F/dt = – 30A/µs	V_{CC} = 200V L_p = 5µH	$I_F = I_{F(AV)}$ See figure 12			4.5	

To evaluate the conduction losses use the following equations :

$V_F = 1.47 + 0.010\ I_F$ $\qquad$ $P = 1.47 \times I_{F(AV)} + 0.010\ I_F{}^2{}_{(RMS)}$

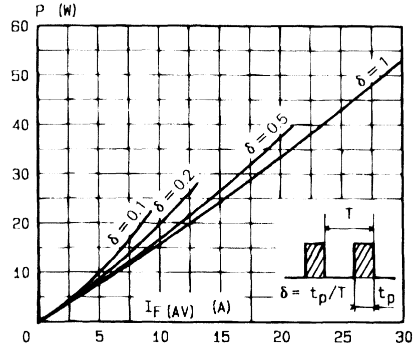


FIGURE 1 : Low frequency power losses versus average current.

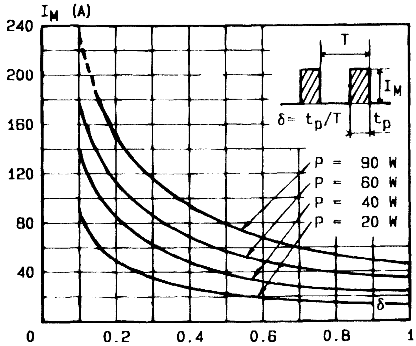


FIGURE 2 : Peak current versus form factor.

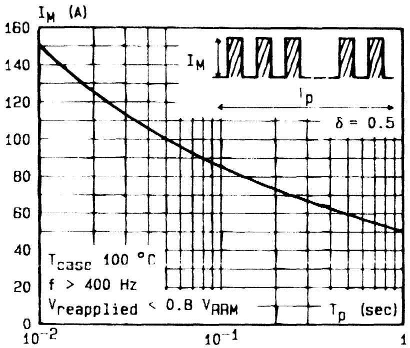


FIGURE 3 : Non repetitive peak surge current versus overload duration.

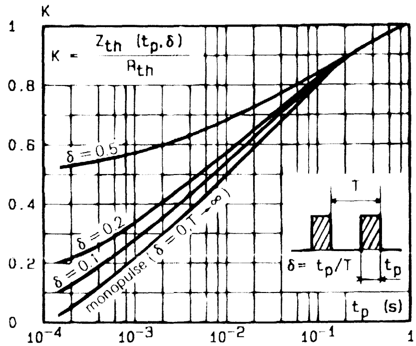


FIGURE 4 : Thermal impedance versus pulse width.

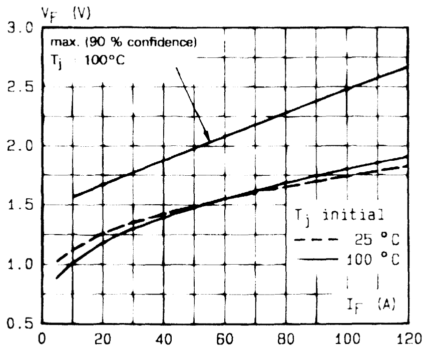


FIGURE 5 : Voltage drop versus forward current.

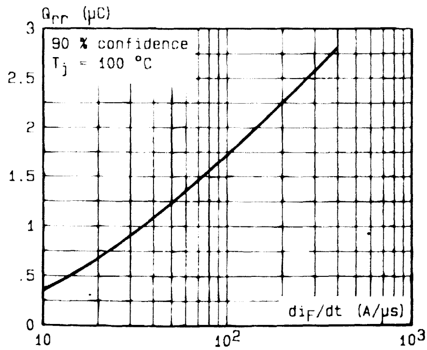


FIGURE 8 : Recovery charge versus di_F/dt.

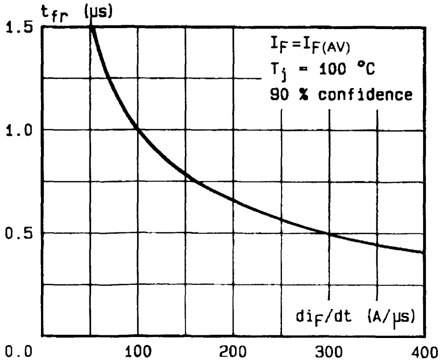


FIGURE 7 : Recovery time versus di_F/dt.

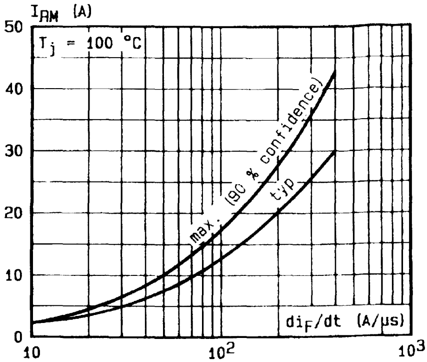


FIGURE 8 : Peak reverse current versus di_F/dt.

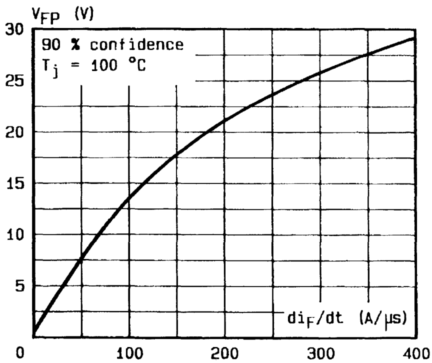


FIGURE 9 : Peak forward voltage versus di_F/dt.

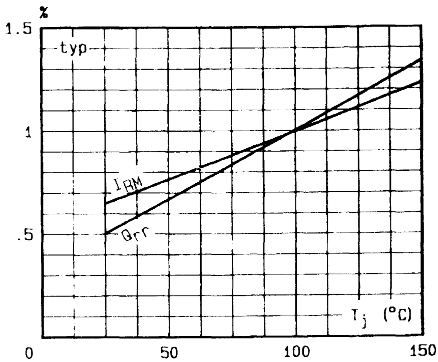


FIGURE 10 : Dynamic parameters versus junction temperature.

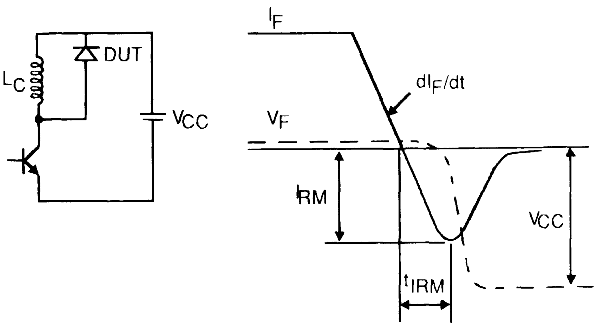


Figure 11 : Turn-off switching characteristics (without series inductance).

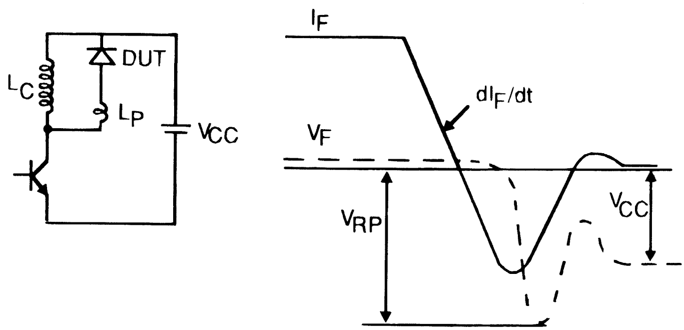


Figure 12 : Turn-off switching characteristics (with series inductance).

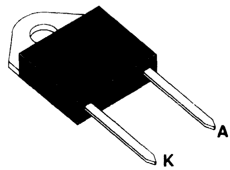
SGS-THOMSON MICROELECTRONICS

BYT 30PI-1000

FAST RECOVERY RECTIFIER DIODE

- VERY HIGH REVERSE VOLTAGE CAPABILITY
- VERY LOW REVERSE RECOVERY TIME
- VERY LOW SWITCHING LOSSES
- LOW NOISE TURN-OFF SWITCHING
- INSULATED : Capacitance 15pF

Insulating voltage 2500 V_{RMS}



Isolated
DOP3I
(Plastic)

SUITABLE APPLICATIONS

- FREE WHEELING DIODE IN CONVERTERS AND MOTOR CONTROL CIRCUITS
- RECTIFIER IN S.M.P.S.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		1000	V
V_{RSM}	Non Repetitive Peak Reverse Voltage		1000	V
I_{FRM}	Repetitive Peak Forward Current	$t_p \leq 10\mu s$	375	A
$I_{F(RMS)}$	RMS Forward Current		70	A
$I_{F(AV)}$	Average Forward Current	$T_{case} = 50°C$ $\delta = 0.5$	30	A
I_{FSM}	Surge Non Repetitive Forward Current	$t_p = 10ms$ Sinusoïdal	200	A
P	Power Dissipation	$T_{case} = 50°C$	60	W
T_{stg} T_j	Storage and Junction Temperature Range		– 40 to + 150	°C

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-c)}$	Junction-case	1.6	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R	T_j = 25°C	$V_R = V_{RRM}$			100	µA
	T_j = 100°C				5	mA
V_F	T_j = 25°C	I_F = 30A			1.9	V
	T_j = 100°C				1.8	

RECOVERY CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{rr}	T_j = 25°C	I_F = 1A di_F/dt = – 15A/µs V_R = 30V			165	ns
		I_F = 0.5A I_R = 1A I_{rr} = 0.25A			70	

TURN-OFF SWITCHING CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{IRM}	di_F/dt = – 120A/µs	V_{CC} = 200V I_F = 30A $L_p \le$ 0.05µH T_j = 100°C See Figure 11			200	ns
	di_F/dt = – 240A/µs			120		
I_{RM}	di_F/dt = – 120A/µs				19.5	A
	di_F/dt = – 240A/µs			22		

TURN-OFF OVERVOLTAGE COEFFICIENT

Symbol	Test Conditions	Min.	Typ.	Max.	Unit
$C = \frac{V_{RP}}{V_{CC}}$	T_j = 100°C V_{CC} = 200V $I_F = I_{F(AV)}$ di_F/dt = – 30A/µs L_p = 5µH See Figure 12			4.5	

To evaluate the conduction losses use the following equations :

$V_F = 1.47 + 0.010\ I_F$ $P = 1.47 \times I_{F(AV)} + 0.010\ I_F^2{}_{(RMS)}$

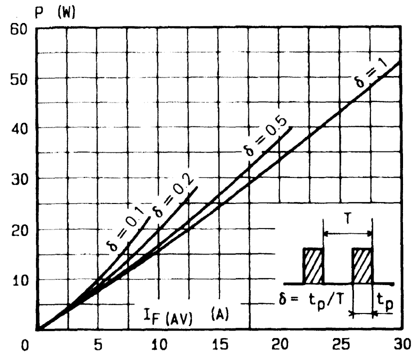


FIGURE 1 : Low frequency power losses versus average current.

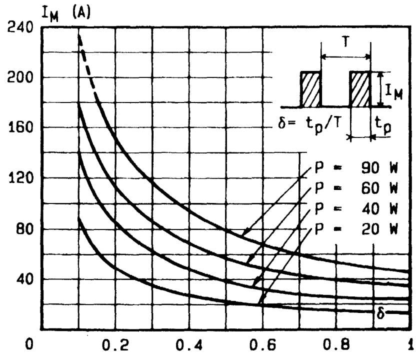


FIGURE 2 : Peak current versus form factor.

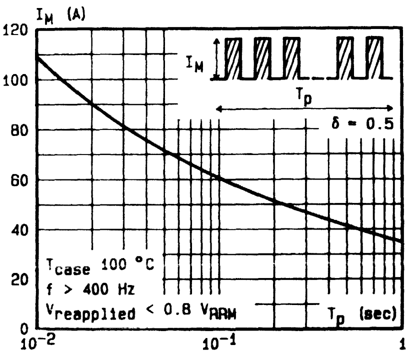


FIGURE 3 : Non repetitive peak surge current versus overload duration.

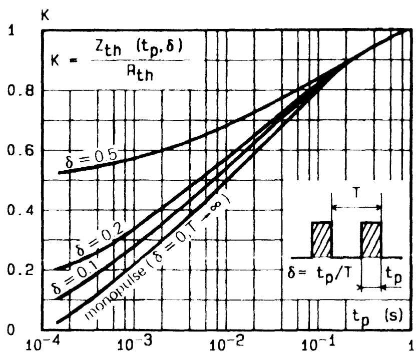


FIGURE 4 : Thermal impedance versus pulse width.

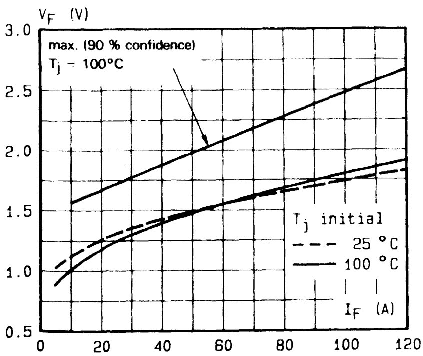


FIGURE 5 : Voltage drop versus forward current.

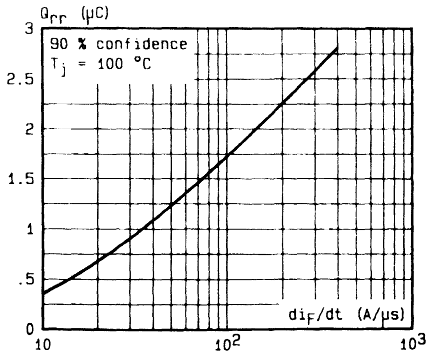


FIGURE 6 : Recovery charge versus di_F/dt.

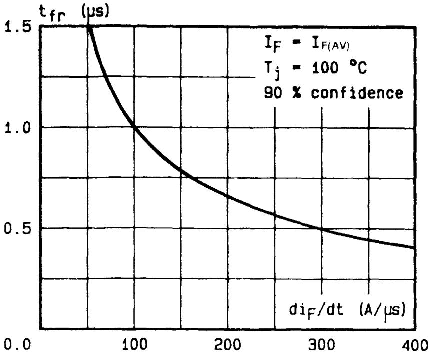


FIGURE 7 : Recovery time versus di_F/dt.

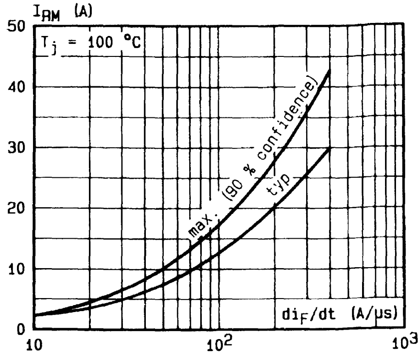


FIGURE 8 : Peak reverse current versus di_F/dt.

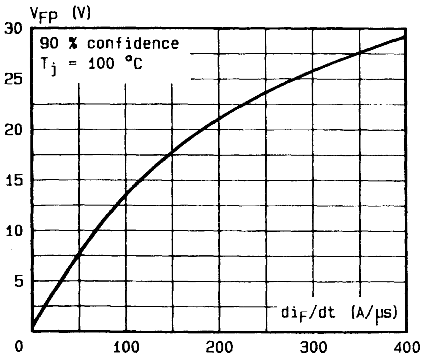


FIGURE 9 : Peak forward voltage versus di_F/dt.

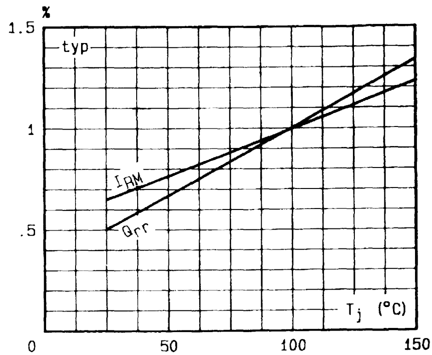


FIGURE 10 : Dynamic parameters versus junction temperature.

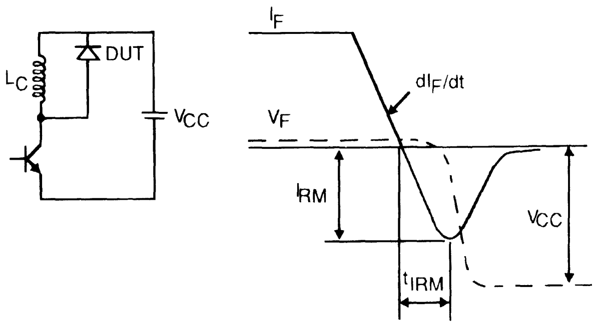


Figure 11 : Turn-off switching characteristics (without series inductance).

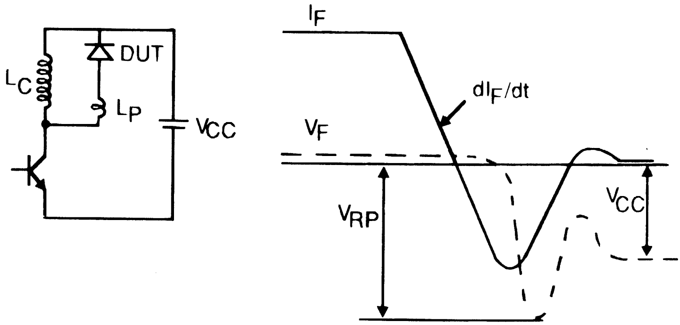


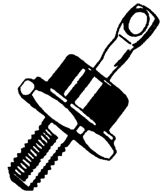
Figure 12 : Turn-off switching characteristics (with series inductance).

BYT 30-1000

FAST RECOVERY RECTIFIER DIODE

- VERY HIGH REVERSE VOLTAGE CAPABILITY
- VERY LOW REVERSE RECOVERY TIME
- VERY LOW SWITCHING LOSSES
- LOW NOISE TURN-OFF SWITCHING

Cathode connected to case



DO 5
(Metal)

SUITABLE APPLICATIONS

- FREE WHEELING DIODE IN CONVERTERS AND MOTOR CONTROL CIRCUITS
- RECTIFIER IN S.M.P.S.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		1000	V
V_{RSM}	Non Repetitive Peak Reverse Voltage		1000	V
I_{FRM}	Repetitive Peak Forward Current	$t_p \le 10\mu s$	375	A
$I_{F(RMS)}$	RMS Forward Current		70	A
$I_{F(AV)}$	Average Forward Current	$T_{case} = 75°C$ $\delta = 0.5$	30	A
I_{FSM}	Surge Non Repetitive Forward Current	$t_p = 10ms$ Sinusoïdal	200	A
P	Power Dissipation	$T_{case} = 75°C$	62	W
T_{stg} T_j	Storage and Junction Temperature Range		– 40 to + 150	°C

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-c)}$	Junction-case	1.2	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R	T_j = 25°C	$V_R = V_{RRM}$			100	µA
	T_j = 100°C				5	mA
V_F	T_j = 25°C	I_F = 30A			1.9	V
	T_j = 100°C				1.8	

RECOVERY CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{rr}	T_j = 25°C	I_F = 1A di_F/dt = – 15A/µs V_R = 30V			165	ns
		I_F = 0.5A I_R = 1A I_{rr}=0.25A			70	

TURN-OFF SWITCHING CHARACTERISTICS (Without Series Inductance)

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{IRM}	di_F/dt = – 120A/µs	V_{CC} = 200V I_F = 30A $L_p \leq$ 0.05µH T_j = 100°C See figure 11			200	ns
	di_F/dt = – 240A/µs			120		
I_{RM}	di_F/dt = – 120A/µs				19.5	A
	di_F/dt = – 240A/µs			22		

TURN-OFF OVERVOLTAGE COEFFICIENT (With Series Inductance)

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
$C = \frac{V_{RP}}{V_{CC}}$	T_j = 100°C di_F/dt = – 30A/µs	V_{CC} = 200V L_p = 5µH	$I_F = I_{F\,(AV)}$ See figure 12			4.5	

To evaluate the conduction losses use the following equation :

$V_F = 1.47 + 0.010\ I_F$ $P = 1.47 \times I_{F(AV)} + 0.010\ I_F^2\ {}_{(RMS)}$

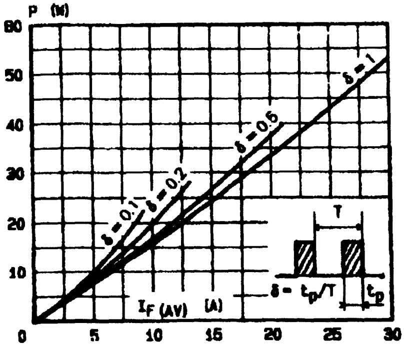


FIGURE 1 : Low frequency power losses versus average current.

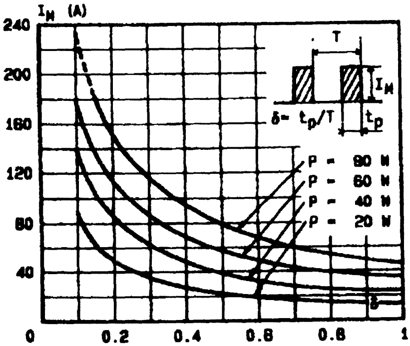


FIGURE 2 : Pesk current versus form factor.

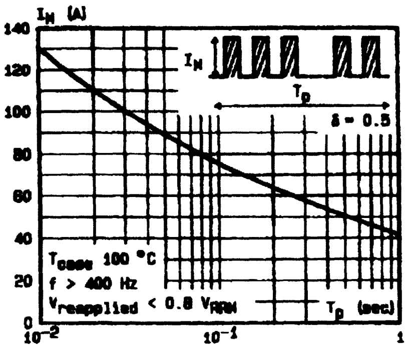


FIGURE 3 : Non repetitive pesk surge current versus overload duration.

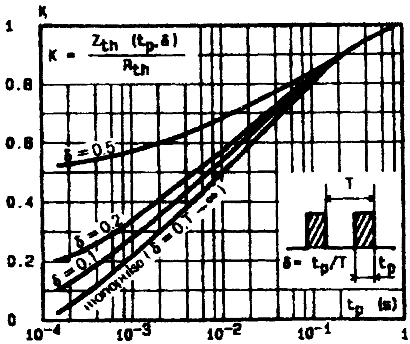


FIGURE 4 : Thermal impedance versus pulse width.

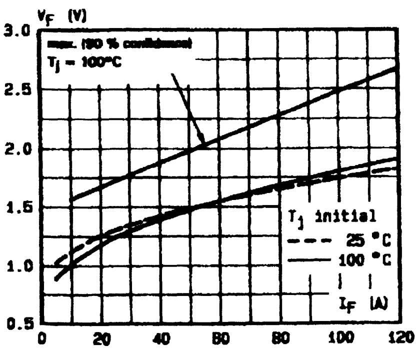


FIGURE 5 : Voltage drop versus forward current.

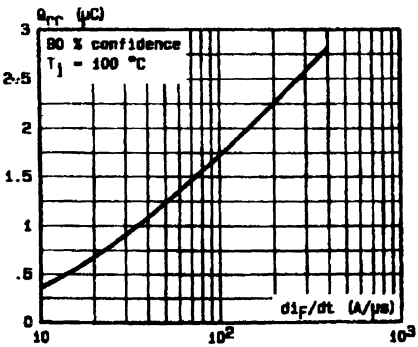


FIGURE 6 : Recovery charge versus dIF/dt.

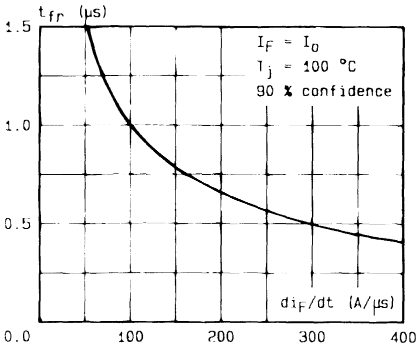


FIGURE 7 : Recovery time versus di_F/dt.

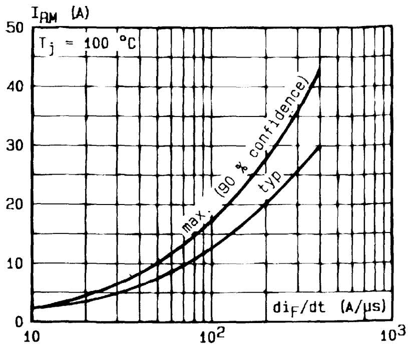


FIGURE 8 : Peak reverse current versus di_F/dt.

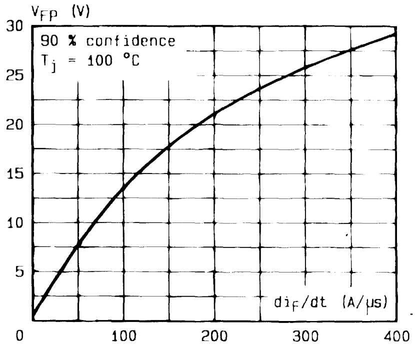


FIGURE 9 : Peak forward voltage versus di_F/dt.

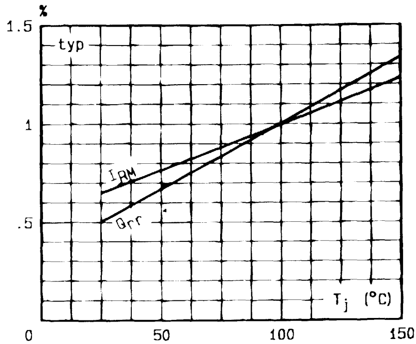


FIGURE 10 : Dynamic parameters versus junction temperature.

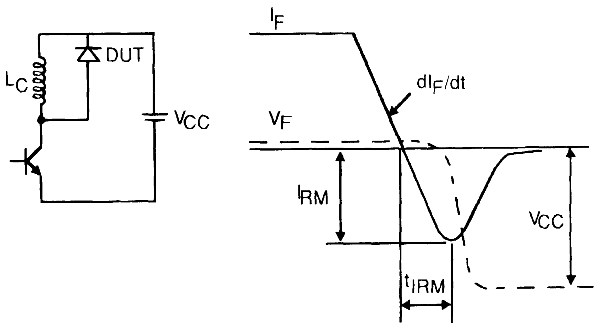


Figure 11 : Turn-off switching characteristics (without series inductance).

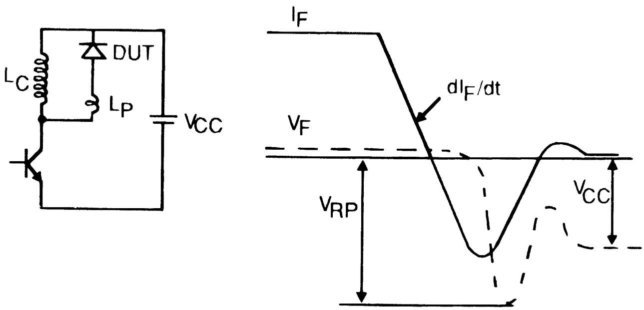


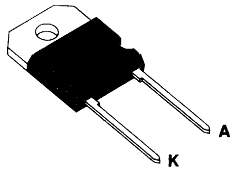
Figure 12 : Turn-off switching characteristics (with series inductance).

BYT 60P-200→400

FAST RECOVERY RECTIFIER DIODES

- VERY LOW REVERSE RECOVERY TIME
- VERY LOW SWITCHING LOSSES
- LOW NOISE TURN-OFF SWITCHING

Cathode connected to case



SOD93
(Plastic)

SUITABLE APPLICATIONS

- FREE WHEELING DIODE IN CONVERTERS AND MOTOR CONTROL CIRCUITS
- RECTIFIER IN S.M.P.S.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
I_{FRM}	Repetitive Peak Forward Current	$t_p \leq 10\mu s$	800	A
$I_{F(RMS)}$	RMS Forward Current		100	A
$I_{F(AV)}$	Average Forward Current	$T_{case} = 70°C$ $\delta = 0.5$	60	A
I_{FSM}	Surge non Repetitive Forward Current	$t_p = 10ms$ Sinusoïdal	550	A
P	Power Dissipation	$T_{case} = 70°C$	100	W
T_{stg} T_j	Storage and Junction Temperature Range		– 40 to + 150	°C

Symbol	Parameter	BYT 60P-			Unit
		200	300	400	
V_{RRM}	Repetitive Peak Reverse Voltage	200	300	400	V
V_{RSM}	Non Repetitive Peak Reverse Voltage	220	330	440	V

THERMAL RESISTANCE

Symbol	Test Conditions	Value	Unit
$R_{th\ (j-c)}$	Junction-case	0.8	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R	T_j = 25°C	$V_R = V_{RRM}$			60	μA
	T_j = 100°C				10	mA
V_F	T_j = 25°C	I_F = 60A			1.5	V
	T_j = 100°C				1.4	

RECOVERY CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{rr}	T_j = 25°C	I_F = 1A di_F/dt = – 15A/μs V_R = 30V			100	ns
		I_F = 0.5A I_R = 1A I_{rr} = 0.25A			50	

TURN -OFF SWITCHING CHARACTERISTICS (Without Series Inductance)

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{IRM}	di_F/dt = – 240A/μs	V_{CC} = 200V I_F = 60A L_p < 0.05μH T_j = 100°C See Figure 11			75	ns
	di_F/dt = – 480A/μs			50		
I_{RM}	di_F/dt = – 240A/μs				18	A
	di_F/dt = – 480A/μs			24		

TURN -OFF OVERVOLTAGE COEFFICIENT (With Series Inductance)

Symbol	Test Conditions	Min.	Typ.	Max.	Unit
$C = \frac{V_{RP}}{V_{CC}}$	T_j = 100°C V_{CC} = 120V $I_F = I_{F(AV)}$ See note di_F/dt = – 60A/μs L_p = 1.3μH See Figure 12		3.3		

Note : Applicable to BYT 60P 400 V only

To evaluate the conduction losses use the following equations :

$V_F = 1.1 + 0.0045\ I_F$ $\qquad$ $P = 1.1 \times I_{F(AV)} + 0.0045 I_F{}^2{}_{(RMS)}$

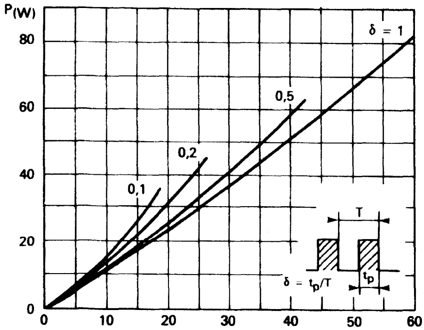


FIGURE 1 : Low frequency power losses versus average current

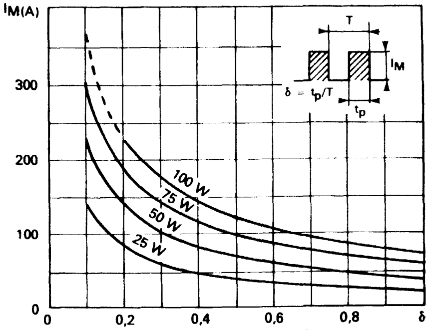


FIGURE 2 : Peak current versus form factor.

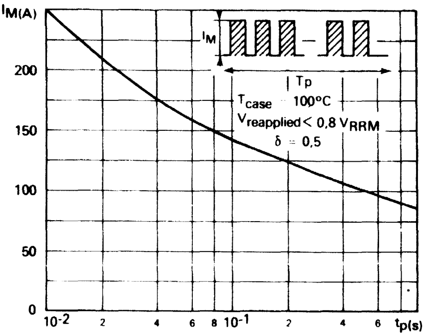


FIGURE 3 : Non repetitive peak surge current versus overload duration.

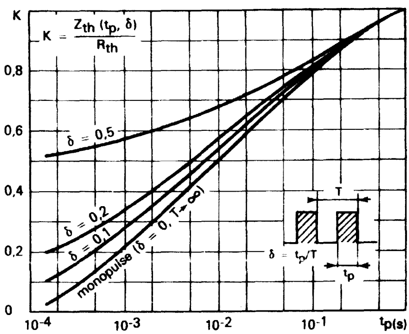


FIGURE 4 : Thermal impedance versus pulse width.

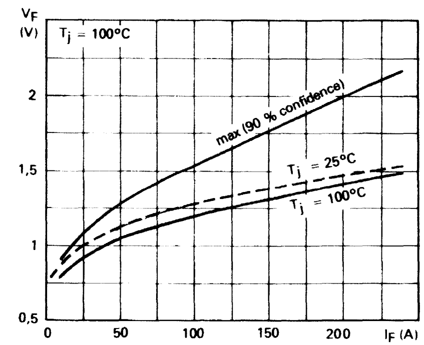


FIGURE 5 : Voltage drop versus forward current.

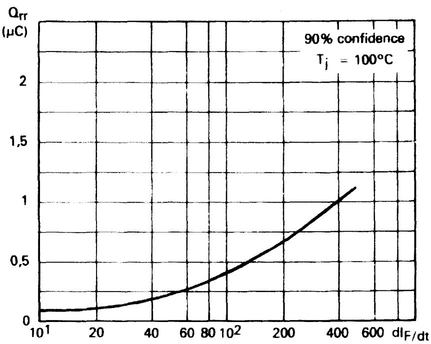


FIGURE 6 : Recovery charge versus $dI_{F/dt}$.

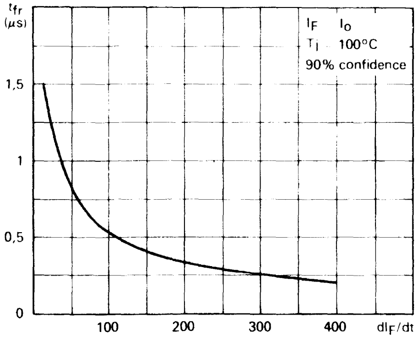


FIGURE 7 : Recovery time versus $dI_{F/dt}$.

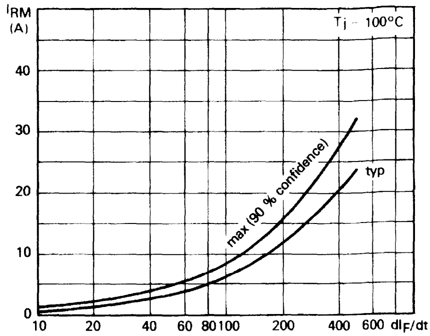


FIGURE 8 : Peak reverse current versus $dI_{F/dt}$.

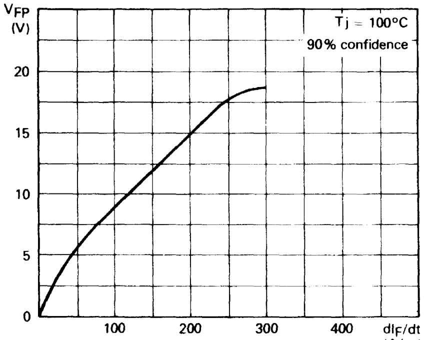


FIGURE 9 : Peak forward voltage versus $dI_{F/dt}$.

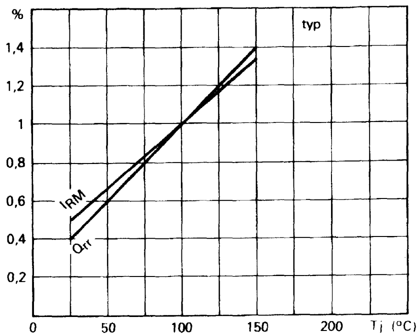


FIGURE 10 : Dynamic parameters versus junction temperature.

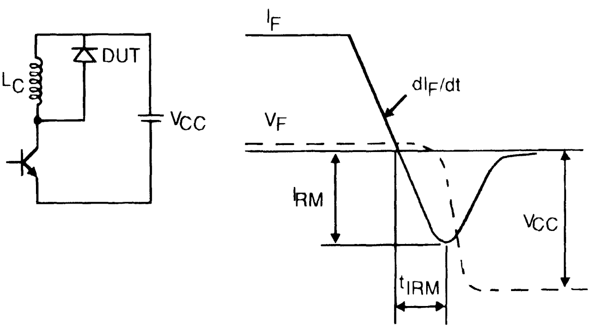


Figure 11 : Turn-off switching characteristics (without series inductance).

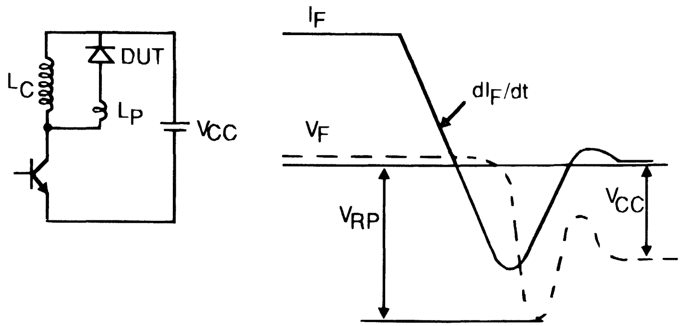


Figure 12 : Turn-off switching characteristics (with series inductance).

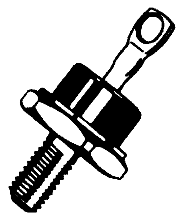
SGS-THOMSON
MICROELECTRONICS

BYT 60-200→400

FAST RECOVERY RECTIFIER DIODES

- VERY LOW REVERSE RECOVERY TIME
- VERY LOW SWITCHING LOSSES
- LOW NOISE TURN-OFF SWITCHING

(Metric thread)



DO 5
(Metal)

SUITABLE APPLICATIONS

- FREE WHEELING DIODE IN CONVERTERS AND MOTOR CONTROL CIRCUITS
- RECTIFIER IN S.M.P.S.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
I_{FRM}	Repetitive Peak Forward Current	$t_p \leq 10\mu s$	800	A
$I_{F(RMS)}$	RMS Forward Current		100	A
$I_{F(AV)}$	Average Forward Current	$T_{case} = 80°C$ $\delta = 0.5$	60	A
I_{FSM}	Surge non Repetitive Forward Current	$t_P = 10ms$ sinusoidal	800	A
P	Power Dissipation	$T_{case} = 80°C$	100	W
T_{stg} T_j	Storage and Junction Temperature Range		– 40 to + 150	°C

Symbol	Parameter	BYT 60–			Unit
		200	300	400	
V_{RRM}	Repetitive Peak Reverse Voltage	200	300	400	V
V_{RSM}	Non Repetitive Peak Reverse Voltage	220	330	440	V

THERMAL RESISTANCE

Symbol	Test Conditions	Value	Unit
$R_{th\ (j-c)}$	Junction-case	0.7	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R	$T_j = 25°C$	$V_R = V_{RRM}$			60	µA
	$T_j = 100°C$				10	mA
V_F	$T_j = 25°C$	$I_F = 60A$			1.5	V
	$T_j = 100°C$				1.4	

RECOVERY CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{rr}	$T_j = 25°C$	$I_F = 1A$ $di_F/dt = -15A/\mu s$ $V_R = 30V$			100	ns
		$I_F = 0.5A$ $I_R = 1A$ $I_{rr} = 0.25A$			50	

TURN -OFF SWITCHING CHARACTERISTICS (Without Series Inductance)

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{IRM}	$di_F/dt = -240A/\mu s$	$V_{CC} = 200V$ $I_F = 60A$ $L_p \le 0.05\mu H$ $T_j = 100°C$ See Figure 11			75	ns
	$di_F/dt = -480A/\mu s$			50		
I_{RM}	$di_F/dt = -240A/\mu s$				18	A
	$di_F/dt = -480A/\mu s$			24		

TURN -OFF OVERVOLTAGE COEFFICIENT (With Series Inductance)

Symbol	Test Conditions	Min.	Typ.	Max.	Unit
$C = \frac{V_{RP}}{V_{CC}}$	$T_j = 100$ °C $V_{CC} = 120$ V $I_F = I_{F(AV)}$ See note $di_F/dt = -60$ A/µs $L_p = 1.3$ µH See Figure 12		3		

Note : Applicable to BYT 60-400 only

To evaluate the conduction losses use the following equations :

$V_F = 1.1 + 0.0045\ I_F$ $P = 1.1 \times I_{F(AV)} + 0.0045\ I_{F}^{2}{}_{(RMS)}$

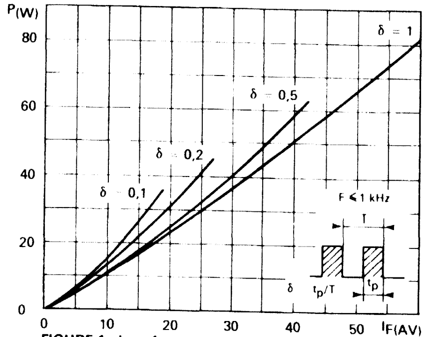


FIGURE 1 : Low frequence power losses versus average current.

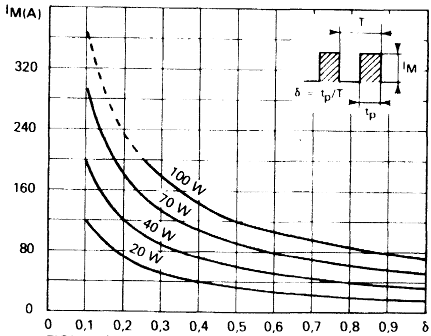


FIGURE 2 : Peak current versus form factor.

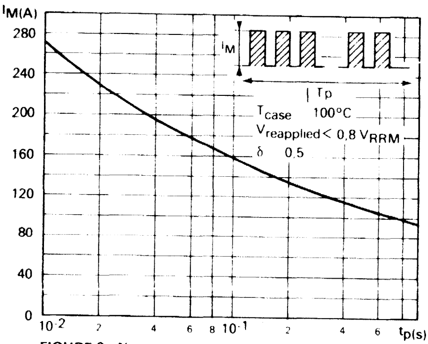


FIGURE 3 : Non repetitive peak surge current versus overload duration.

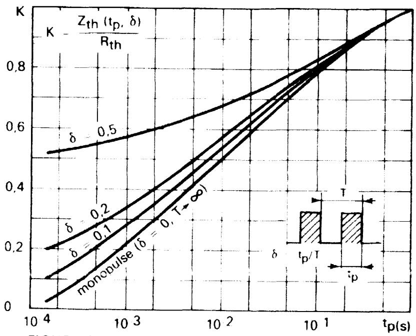


FIGURE 4 : Thermal impedance versus pulse width.

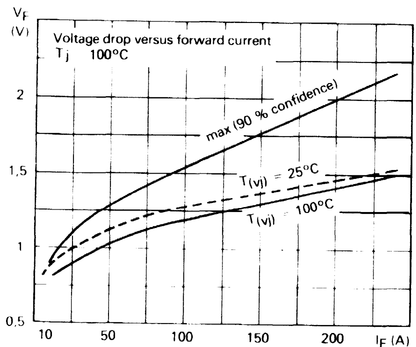


FIGURE 5 : Voltage drop versus forward current.

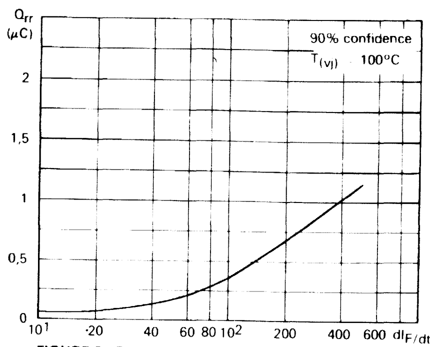


FIGURE 6 : Recovery charge versus $dI_{F/dt}$. (A/μs)

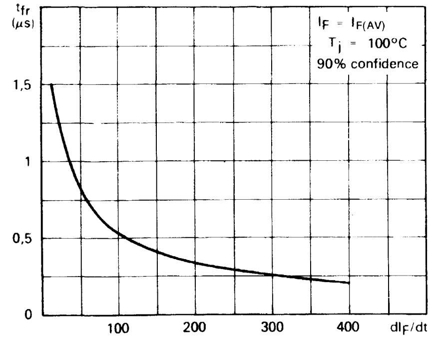


FIGURE 7 : Recovery time versus $dI_{F/dt}$.

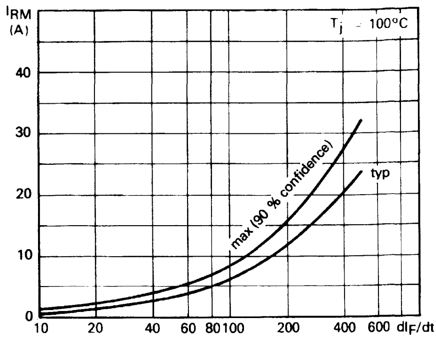


FIGURE 8 : Peak reverse current versus $dI_{F/dt}$.

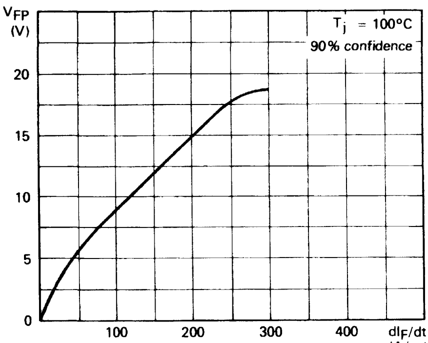


FIGURE 9 : Peak forward voltage versus $dI_{F/dt}$.

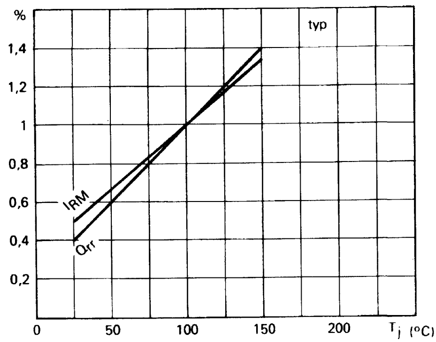


FIGURE 10 : Dynamic parameters versus junction temperature.

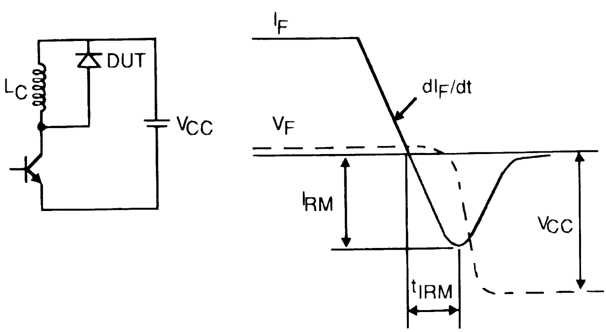


Figure 11 : Turn-off switching characteristics (without series inductance).

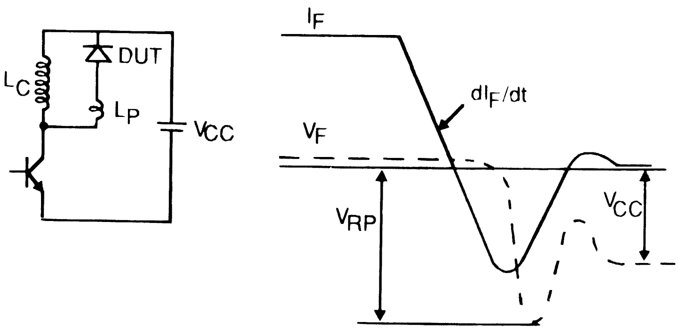


Figure 12 : Turn-off switching characteristics (with series inductance).

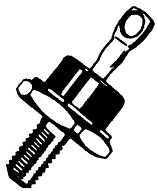
SGS-THOMSON
MICROELECTRONICS

BYT 60-600/800

FAST RECOVERY RECTIFIER DIODES

- VERY LOW REVERSE RECOVERY TIME
- VERY LOW SWITCHING LOSSES
- LOW NOISE TURN-OFF SWITCHING

Cathode connected to case



DO 5
(Metal)

SUITABLE APPLICATIONS

- FREE WHEELING DIODE IN CONVERTERS AND MOTOR CONTROL CIRCUITS
- RECTIFIER IN S.M.P.S.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
I_{FRM}	Repetitive Peak Forward Current	$t_p \leq 10\mu s$	750	A
$I_{F(RMS)}$	RMS Forward Current		140	A
$I_{F(AV)}$	Average Forward Current	$T_{case} = 50°C$ $\delta = 0.5$	60	A
I_{FSM}	Surge non Repetitive Forward Current	$t_p = 10ms$ Sinusoidal	400	A
P	Power Dissipation	$T_{case} = 50°C$	125	W
T_{stg} T_j	Storage and Junction Temperature Range		– 40 to + 150	°C

Symbol	Parameter	BYT 60-		Unit
		600	800	
V_{RRM}	Repetitive Peak Reverse Voltage	600	800	V
V_{RSM}	Non Repetitive Peak Reverse Voltage	640	850	V

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-c)}$	Junction-case	0.8	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R	T_j = 25°C	$V_R = V_{RRM}$			100	µA
	T_j = 100°C				6	mA
V_F	T_j = 25°C	I_F = 60A			1.9	V
	T_j = 100°C				1.8	

RECOVERY CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{rr}	T_j = 25°C	I_F = 1A di_F/dt = – 15A/µs V_R = 30V			135	ns
		I_F = 0.5A I_R=1A I_{rr} = 0.25A			65	

TURN -OFF SWITCHING CHARACTERISTICS - Without Series Inductance

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{IRM}	di_F/dt = – 240A/µs	V_{CC} = 200V I_F = 60A $L_p \leq$ 0.05µH T_j = 100°C See fig. 2			160	ns
	di_F/dt = – 480A/µs			100		
I_{RM}	di_F/dt = – 240A/µs				30	A
	di_F/dt = – 480A/µs			38		

TURN -OFF OVERVOLTAGE COEFFICIENT - With Series Inductance

Symbol	Test Conditions	Min.	Typ.	Max.	Unit
$C = \frac{V_{RM}}{V_{CC}}$	T_j = 100°C V_{CC} = 150V $I_F = I_{F(AV)}$ di_F/dt = – 60A/µs L_p = 2µH See fig. 3		3.3	4	

To evaluate the conduction losses use the following equations :

$V_F = 1.47 + 0.005\ I_F$ $P = 1.47 \times I_{F(AV)} + 0.005\ I_{F(RMS)}^2$

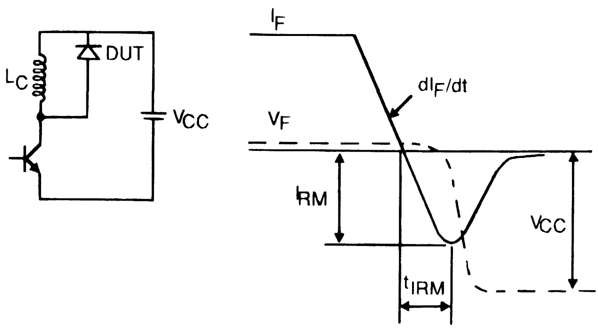


Figure 1 : Turn-off switching characteristics (without series inductance).

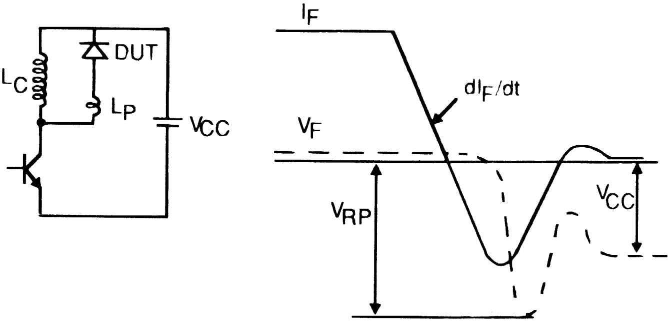


Figure 2 : Turn-off switching characteristics (with series inductance).

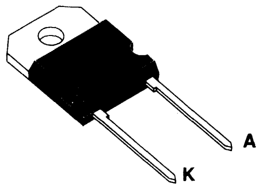
SGS-THOMSON MICROELECTRONICS

BYT60P-1000

FAST RECOVERY RECTIFIER DIODES

FEATURES

- VERY LOW REVERSE RECOVERY TIME
- VERY LOW SWITCHING LOSSES
- LOW NOISE TURN-OFF SWITCHING



SOD 93
(Plastic)

DESCRIPTION

Single high voltage rectifier suited for Switch Mode Power Supplies and other power converters.

ABSOLUTE MAXIMUM RATINGS (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		1000	V
I_{FRM}	Repetitive peak forward current	$t_p \leq 10\mu s$	750	A
$I_{F(RMS)}$	RMS forward current		85	A
$I_{F(AV)}$	Average forward current	$T_c=50°C$ $\delta = 0.5$	60	A
I_{FSM}	Surge non repetitive forward current	tp=10ms sinusoidal	400	A
Tstg Tj	Storage and junction temperature range		- 65 to + 150 - 65 to + 150	°C °C

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\,(j-c)}$	Junction to case	0.8	°C/W

ELECTRICAL CHARACTERISTICS (Per diode)
STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
V_F *	T_j = 25°C	I_F = 60 A			1.9	V
	T_j = 100°C				1.8	
I_R **	T_j = 25°C	$V_R = V_{RRM}$			100	µA
	T_j = 100°C				6	mA

Pulse test : * tp = 380 µs, duty cycle < 2 %
** tp = 5 ms, duty cycle < 2 %

RECOVERY CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
trr	T_j = 25°C	I_F = 0.5A I_{rr} = 0.25A I_R = 1A			70	ns
		I_F = 1A dI_F/dt = -15A/µs V_R = 30V			170	

TURN-OFF SWITCHING CHARACTERISTICS (Without serie inductance)

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{IRM}	dI_F/dt = -240A/µs	V_{CC} = 200V I_F = 60A $L_p \leq 0.05$µH T_j = 100°C see fig. 1			200	ns
	dI_F/dt = -480A/µs			120		
I_{RM}	dI_F/dt = -240A/µs				40	A
	dI_F/dt = -480A/µs			44		

TURN-OFF OVERVOLTAGE COEFFICIENT (With serie inductance)

Symbol	Test Conditions	Min.	Typ.	Max.	Unit
$C = \frac{V_{RP}}{V_{CC}}$	T_j = 100°C V_{CC} = 200V $I_F = I_{F(AV)}$ dI_F/dt = -60A/µs L_p = 2µH see fig12		3.3	4.5	/

To evaluate the conduction losses use the following equation :
$P = 1.47 \times I_{F(AV)} + 0.005 \times I_{F}^{2}{}_{(RMS)}$

Fig.1 : Low frequency power losses versus average current.

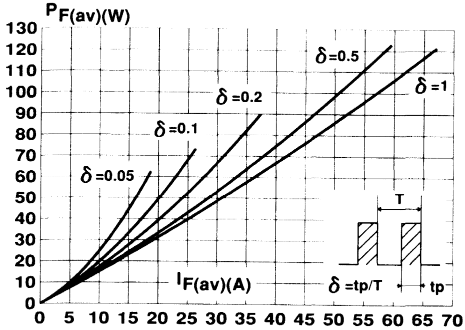


Fig.2 : Peak current versus form factor.

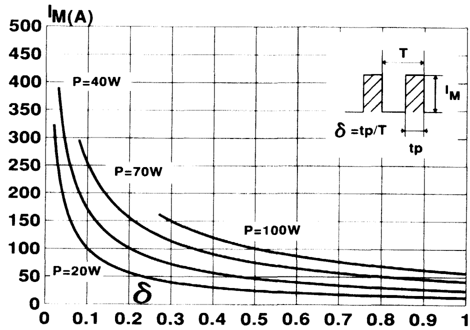


Fig.3 : Non repetitive peak surge current versus overload duration.

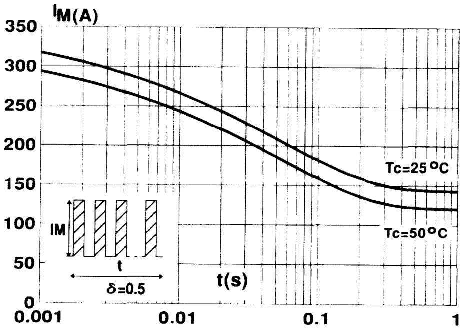


Fig.4 : Relative variation of thermal impedance junction to case versus pulse duration.

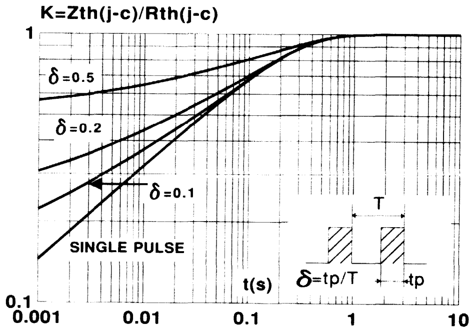


Fig.5 : Voltage drop versus forward current.

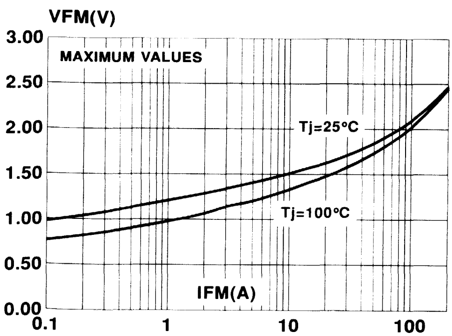


Fig.6 : Recovery charge versus dI_F/dt.

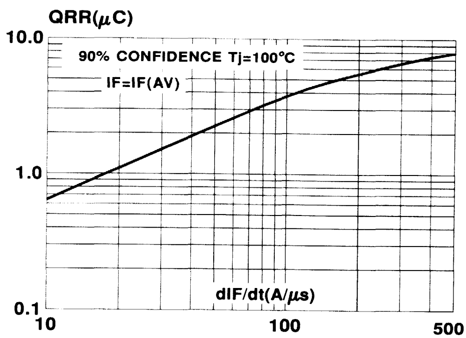


Fig.7 : Recovery time versus dI_F/dt.

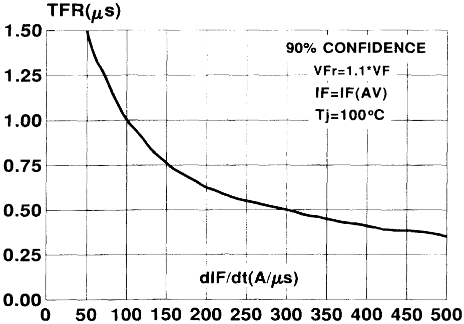


Fig.8 : Peak reverse current versus dIF/dt.

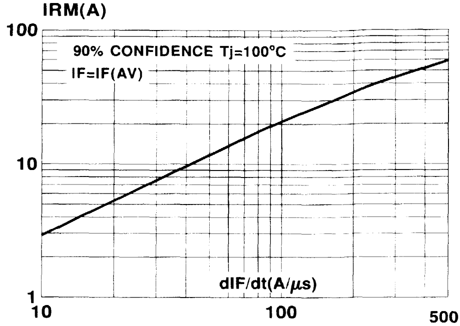


Fig.9 : Peak forward voltage versus dI_F/dt.

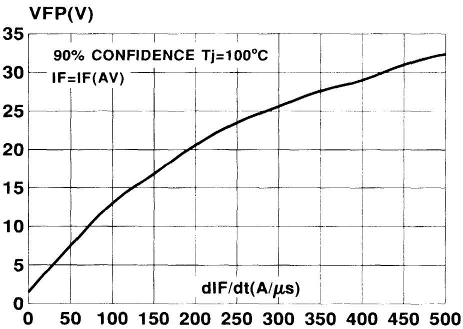


Fig.10 : Dynamic parameters versus junction temperature.

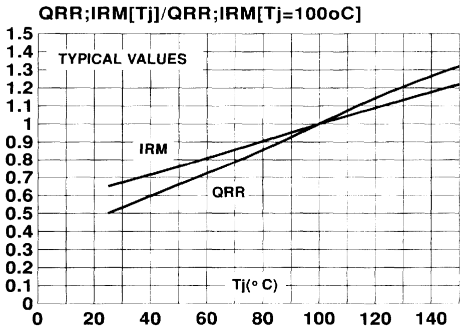


Fig.11 : TURN-OFF SWITCHING CHARACTERISTICS (Without serie inductance)

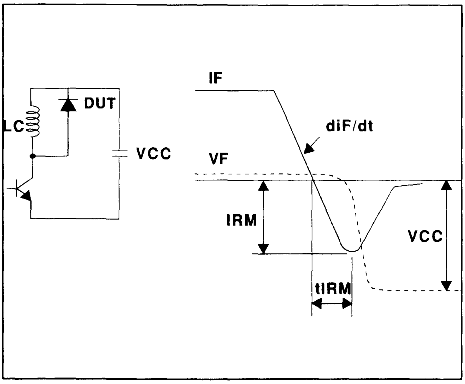
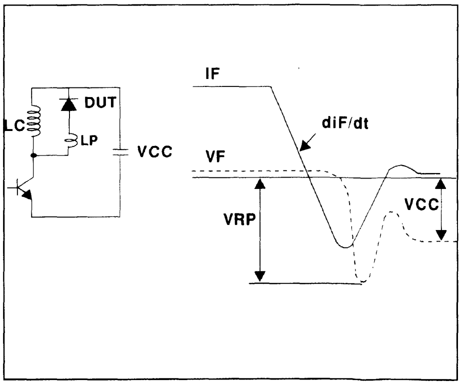


Fig.12 : TURN-OFF SWITCHING CHARACTERISTICS (With serie inductance)



SGS-THOMSON
MICROELECTRONICS

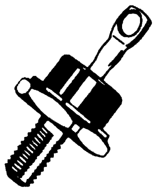
BYT 60-1000

FAST RECOVERY RECTIFIER DIODE

FEATURES

- VERY HIGH REVERSE VOLTAGE CAPABILITY
- VERY LOW REVERSE RECOVERY TIME
- VERY LOW SWITCHING LOSSES
- LOW NOISE TURN-OFF SWITCHING

Cathode connected to case



DO 5
(Metal)

SUITABLE APPLICATIONS

- FREE WHEELING DIODE IN CONVERTERS AND MOTOR CONTROL CIRCUITS
- RECTIFIER IN S.M.P.S.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		1000	V
V_{RSM}	Non Repetitive Peak Reverse Voltage		1000	V
I_{FRM}	Repetitive Peak Forward Current	$t_p \le 10\mu s$	750	A
$I_{F(RMS)}$	RMS Forward Current		140	A
$I_{F(AV)}$	Average Forward Current	$T_{case} = 50°C$ $\delta = 0.5$	60	A
I_{FSM}	Surge Non Repetitive Forward Current	$t_p = 10ms$ Sinusoïdal	400	A
P	Power Dissipation	$T_{case} = 50°C$	125	W
T_{stg} T_j	Storage and Junction Temperature Range		– 40 to + 150	°C

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th(j-c)}$	Junction-case	0.8	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R	T_j = 25°C	$V_R = V_{RRM}$			100	µA
	T_j = 100°C				6	mA
V_F	T_j = 25°C	I_F = 60A			1.9	V
	T_j = 100°C				1.8	

RECOVERY CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{rr}	T_j = 25°C	I_F = 1A di_F/dt = – 15A/µs V_R = 30V			170	ns
		I_F = 0.5A I_R = 1A I_{rr}=0.25A			70	

TURN-OFF SWITCHING CHARACTERISTICS (Without Series Inductance)

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{IRM}	di_F/dt = – 240A/µs	V_{CC} = 200V I_F = 60A $L_p \leq 0.05$µH T_j = 100°C See figure 1			200	ns
	di_F/dt = – 480A/µs			120		
I_{RM}	di_F/dt = – 240A/µs				40	A
	di_F/dt = – 480A/µs			44		

TURN-OFF OVERVOLTAGE COEFFICIENT (With Series Inductance)

Symbol	Test Conditions	Min.	Typ.	Max.	Unit
$C = \frac{V_{RP}}{V_{CC}}$	T_j = 100°C V_{CC} = 200V $I_F = I_{F\,(AV)}$ di_F/dt = – 60A/µs L_p = 2.5µH See figure 2		3.3	4.5	

To evaluate the conduction losses use the following equation :

$V_F = 1.47 + 0.005\ I_F$ $P = 1.47 \times I_{F(AV)} + 0.005\ I_F^{2}{}_{(RMS)}$

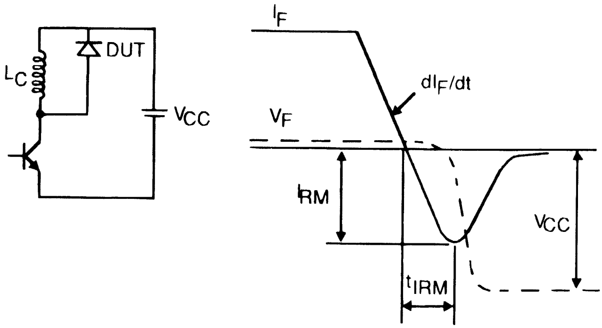


Figure 1 : Turn-off switching characteristics (without series inductance).

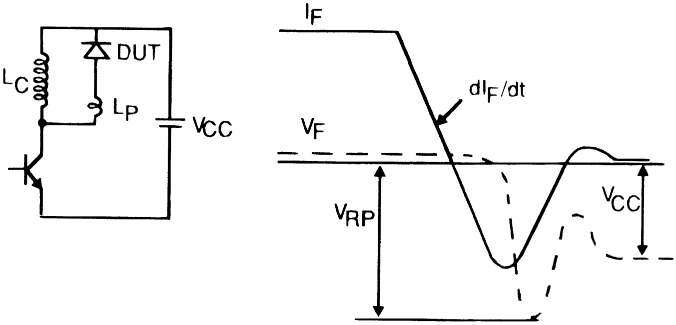


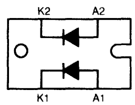
Figure 2 : Turn-off switching characteristics (without series inductance).

BYT230PI(V)-400
BYT231PI(V)-400

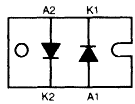
FAST RECOVERY RECTIFIER DIODES

FEATURES

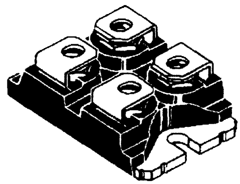
- VERY LOW REVERSE RECOVERY TIME
- VERY LOW SWITCHING LOSSES
- LOW NOISE TURN-OFF SWITCHING
- INSULATED PACKAGE :
  Insulating voltage = 2500 V_{RMS}
  Capacitance = 45 pF



BTY231PI(V)-400



BTY230PI(V)-400



ISOTOP ®
(Plastic)
Screw version (*)

DESCRIPTION

Dual high voltage rectifiers ranging from 200V to 400V suited for Switch Mode Power Supplies and other power converters.
The devices are packaged in ISOTOP.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter			Value	Unit
I_{FRM}	Repetitive peak forward current	$t_p \leq 10\mu s$		500	A
$I_{F(RMS)}$	RMS forward current		Per diode	50	A
$I_{F(AV)}$	Average forward current	$T_c=75°C$ $\delta = 0.5$	Per diode	30	A
I_{FSM}	Surge non repetitive forward current	tp=10ms sinusoidal	Per diode	350	A
Tstg Tj	Storage and junction temperature range			- 40 to + 150 - 40 to + 150	°C °C

Symbol	Parameter	BYT230PI(V)- / BYT231PI(V)-			Unit
		200	300	400	
V_{RRM}	Repetitive peak reverse voltage	200	300	400	V

* : Tin plated Fast-on version is also available (without V suffix).
TM : ISOTOP is a trademark of SGS-THOMSON Microelectronics.

THERMAL RESISTANCE

Symbol	Parameter		Value	Unit
Rth (j-c)	Junction to case	Per diode	1.5	°C/W
		Total	0.8	
Rth (c)	Coupling		0.1	°C/W

When the diodes 1 and 2 are used simultaneously :
Δ Tj(diode 1) = P(diode) x Rth(Per diode) + P(diode 2) x Rth(c)

ELECTRICAL CHARACTERISTICS (Per diode)
STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
V_F *	T_j = 25°C	I_F = 30 A			1.5	V
	T_j = 100°C				1.4	
I_R **	T_j = 25°C	$V_R = V_{RRM}$			35	µA
	T_j = 100°C				6	mA

Pulse test : * tp = 380 µs, duty cycle < 2 %
** tp = 5 ms, duty cycle < 2 %

RECOVERY CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
trr	T_j = 25°C	I_F = 0.5A Irr = 0.25A I_R = 1A			50	ns
		I_F = 1A dI_F/dt = -15A/µs V_R = 30V			100	

TURN-OFF SWITCHING CHARACTERISTICS (Without serie inductance)

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{IRM}	dI_F/dt = -120A/µs	V_{CC} = 200V I_F = 30A Lp ≤ 0.05µH T_j = 100°C see fig. 11			75	ns
	dI_F/dt = -240A/µs			50		
I_{RM}	dI_F/dt = -120A/µs				9	A
	dI_F/dt = -240A/µs			12		

TURN-OFF OVERVOLTAGE COEFFICIENT (With serie inductance)

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
$C = \frac{V_{RP}}{V_{CC}}$	T_j = 100°C V_{CC} = 60V $I_F = I_{F(AV)}$ dI_F/dt = -30A/µs Lp = 1µH	see note see fig.12		3.3		/

Note : Applicable to BYT230PI(V)-400 / BYT231PI(V)-400 only

To evaluate the conduction losses use the following equation :
$P = 1.1 \times I_{F(AV)} + 0.0095 \times I_F{}^2{}_{(RMS)}$

Fig.1 : Low frequency power losses versus average current.

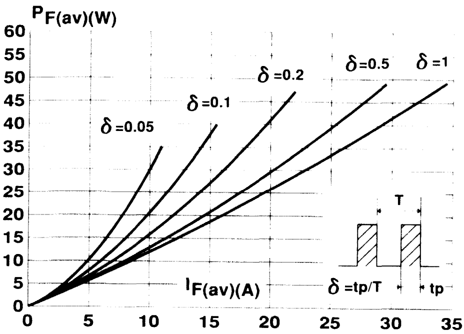


Fig.2 : Peak current versus form factor.

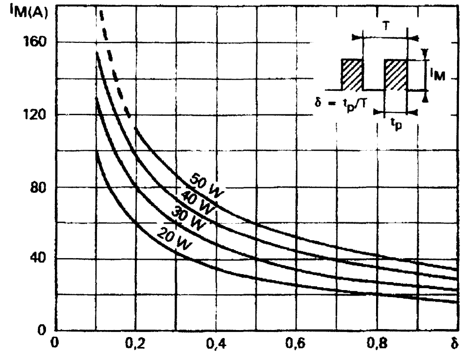


Fig.3 : Non repetitive peak surge current versus overload duration.

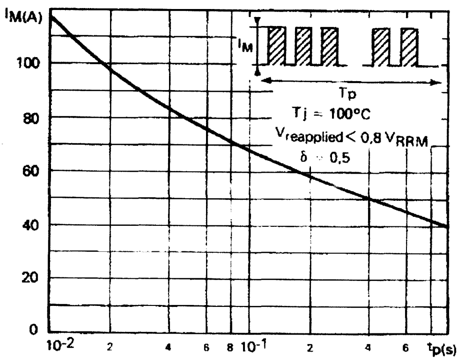


Fig.4 : Relative variation of thermal impedance junction to case versus pulse duration.

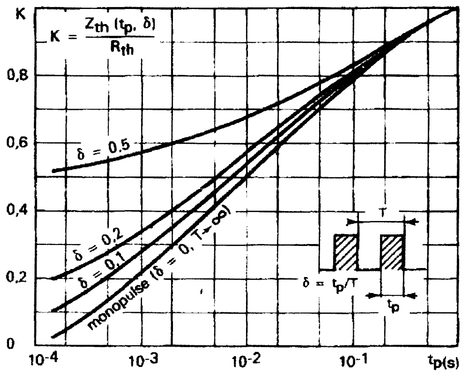


Fig.5 : Voltage drop versus forward current.

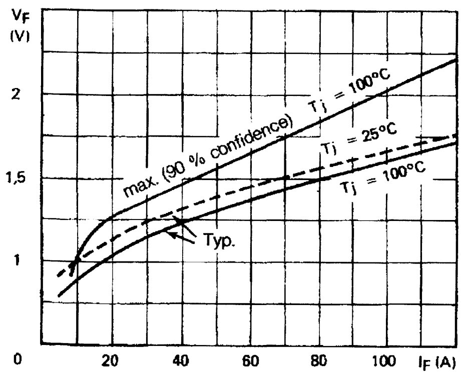


Fig.6 : Recovery charge versus di_F/dt.

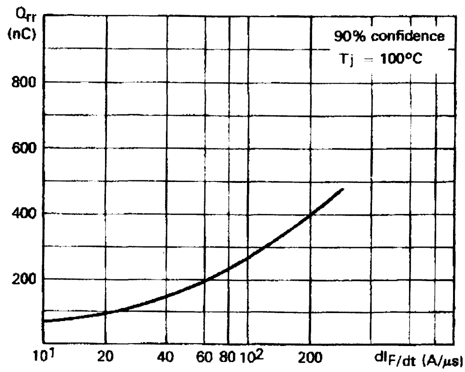


Fig.7 : Recovery time versus dI_F/dt.

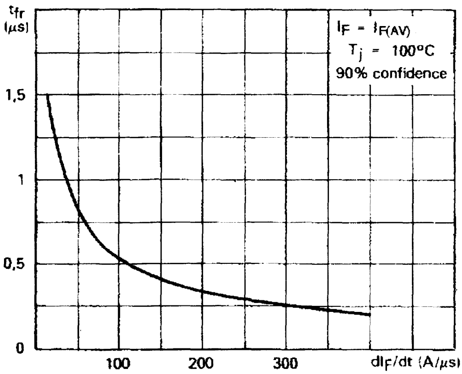


Fig.8 : Peak reverse current versus dIF/dt.

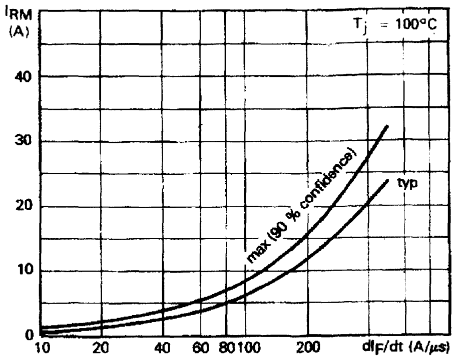


Fig.9 : Peak forward voltage versus dI_F/dt.

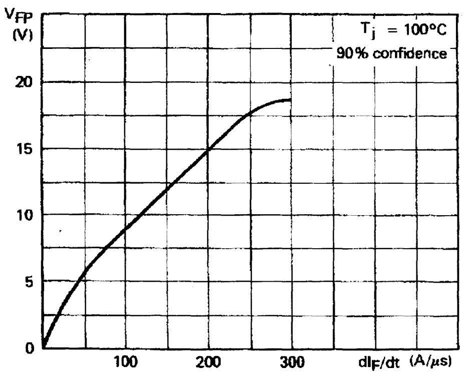


Fig.10 : Dynamic parameters versus junction temperature.

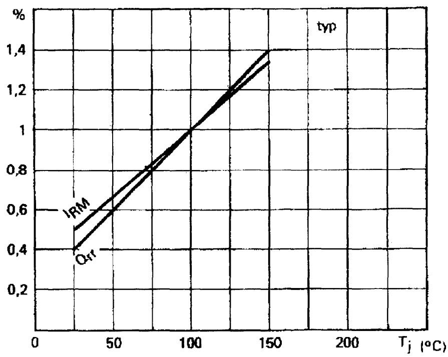


Fig.11 : TURN-OFF SWITCHING CHARACTERISTICS (Without serie inductance)

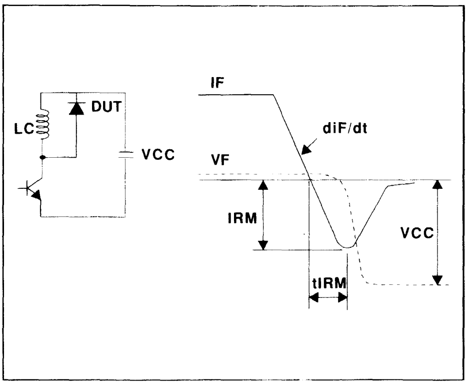
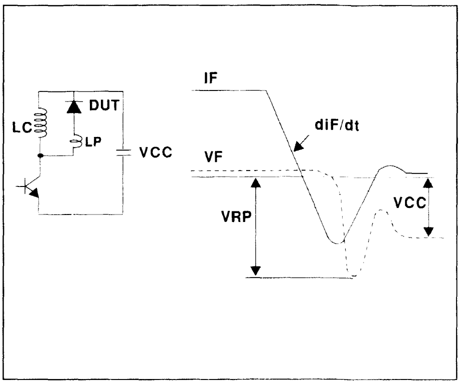


Fig.12 : TURN-OFF SWITCHING CHARACTERISTICS (With serie inductance)



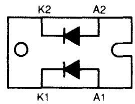
SGS-THOMSON MICROELECTRONICS

BYT230PI(V)-800
BYT231PI(V)-800

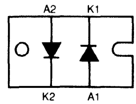
FAST RECOVERY RECTIFIER DIODES

FEATURES

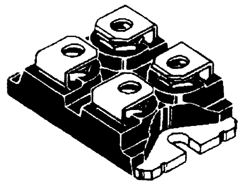
- VERY LOW REVERSE RECOVERY TIME
- VERY LOW SWITCHING LOSSES
- LOW NOISE TURN-OFF SWITCHING
- INSULATED PACKAGE :
  Insulating voltage = 2500 V_{RMS}
  Capacitance = 45 pF



BTY231PI(V)-800



BTY230PI(V)-800



ISOTOP ®
(Plastic)
Screw version (*)

DESCRIPTION

Dual high voltage rectifiers ranging from 600V to 800V suited for Switch Mode Power Supplies and other power converters.
The devices are packaged in ISOTOP.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter			Value	Unit
I_{FRM}	Repetitive peak forward current	tp ≤ 10µs		375	A
$I_{F(RMS)}$	RMS forward current		Per diode	70	A
$I_{F(AV)}$	Average forward current	Tc=55°C δ = 0.5	Per diode	30	A
I_{FSM}	Surge non repetitive forward current	tp=10ms sinusoidal	Per diode	200	A
Tstg Tj	Storage and junction temperature range			- 40 to + 150 - 40 to + 150	°C °C

Symbol	Parameter	BYT230PI(V)- / BYT231PI(V)-		Unit
		600	800	
V_{RRM}	Repetitive peak reverse voltage	600	800	V

* : Tin plated Fast-on version is also available (without V suffix).
TM : ISOTOP is a trademark of SGS-THOMSON Microelectronics.

THERMAL RESISTANCE

Symbol	Parameter		Value	Unit
Rth (j-c)	Junction to case	Per diode	1.5	°C/W
		Total	0.8	
Rth (c)	Coupling		0.1	°C/W

When the diodes 1 and 2 are used simultaneously :
Δ Tj(diode 1) = P(diode) x Rth(Per diode) + P(diode 2) x Rth(c)

ELECTRICAL CHARACTERISTICS (Per diode)
STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
V_F *	$T_j = 25°C$	$I_F = 30$ A			1.9	V
	$T_j = 100°C$				1.8	
I_R **	$T_j = 25°C$	$V_R = V_{RRM}$			100	µA
	$T_j = 100°C$				5	mA

Pulse test : * tp = 380 µs, duty cycle < 2 %
** tp = 5 ms, duty cycle < 2 %

RECOVERY CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
trr	$T_j = 25°C$	$I_F = 0.5A$ $I_{rr} = 0.25A$ $I_R = 1A$			55	ns
		$I_F = 1A$ $dI_F/dt = -15A/µs$ $V_R = 30V$			130	

TURN-OFF SWITCHING CHARACTERISTICS (Without serie inductance)

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{IRM}	$dI_F/dt = -120A/µs$	$V_{CC} = 200V$ $I_F = 30A$ $Lp \le 0.05µH$ $T_j = 100°C$ see fig. 11			160	ns
	$dI_F/dt = -240A/µs$			100		
I_{RM}	$dI_F/dt = -120A/µs$				15	A
	$dI_F/dt = -240A/µs$			19		

TURN-OFF OVERVOLTAGE COEFFICIENT (With serie inductance)

Symbol	Test Conditions	Min.	Typ.	Max.	Unit
$C = \frac{V_{RP}}{V_{CC}}$	$T_j = 100°C$ $V_{CC} = 150V$ $I_F = I_{F(AV)}$ $dI_F/dt = -30A/µs$ $Lp = 4µH$ see fig.12			4	/

To evaluate the conduction losses use the following equation :
$P = 1.47 \times I_{F(AV)} + 0.010 \times I_F^2{}_{(RMS)}$

Fig.1 : Low frequency power losses versus average current.

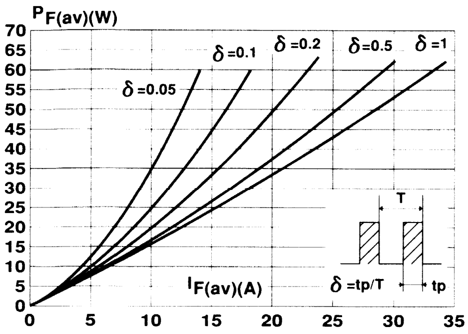


Fig.2 : Peak current versus form factor.

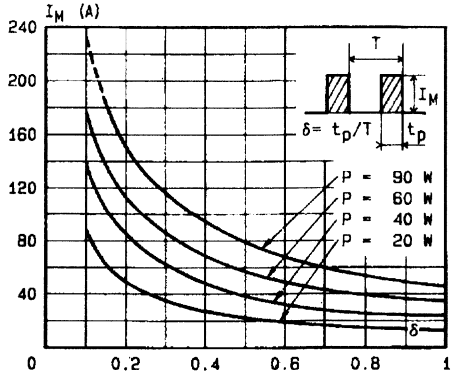


Fig.3 : Non repetitive peak surge current versus overload duration.

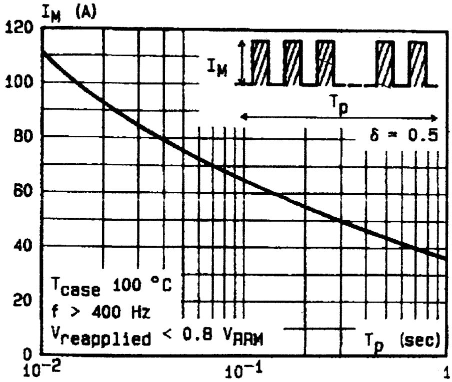


Fig.4 : Relative variation of thermal impedance junction to case versus pulse duration.

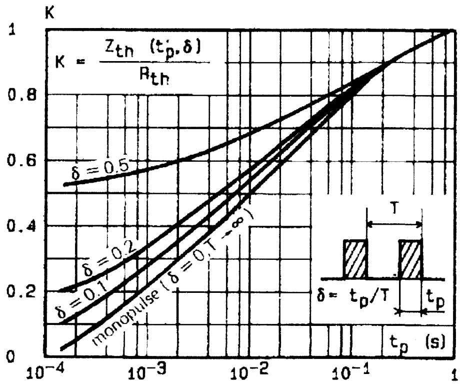


Fig.5 : Voltage drop versus forward current.

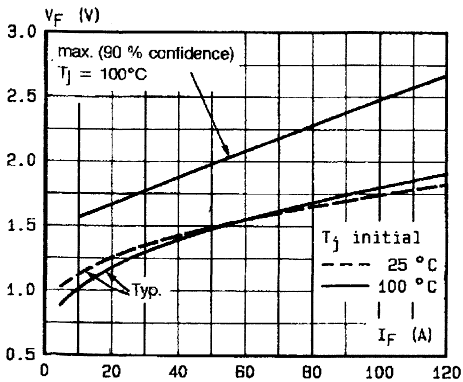


Fig.6 : Recovery charge versus di_F/dt.

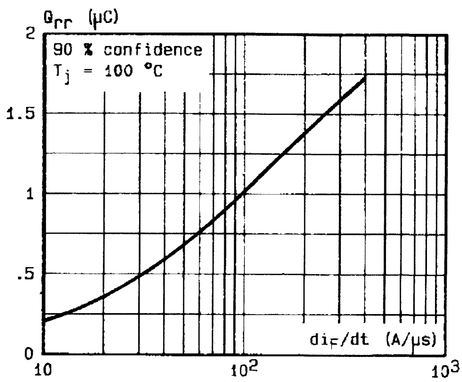


Fig.7 : Recovery time versus dI_F/dt.

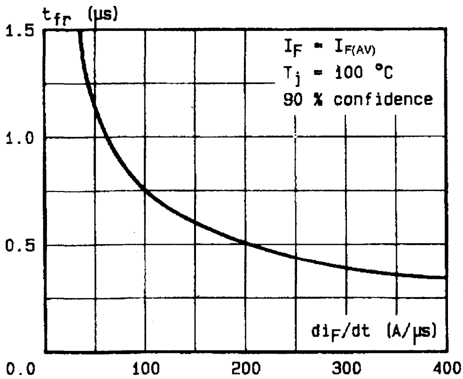


Fig.8 : Peak reverse current versus dIF/dt.

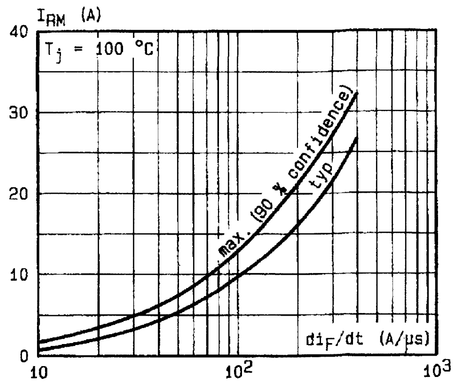


Fig.9 : Peak forward voltage versus dI_F/dt.

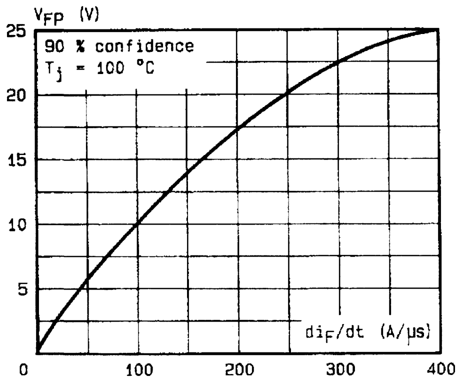


Fig.10 : Dynamic parameters versus junction temperature.

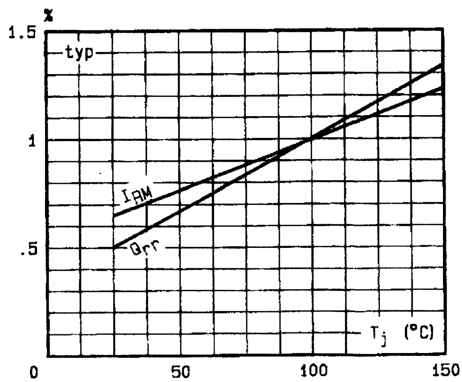


Fig.11 : TURN-OFF SWITCHING CHARACTERISTICS (Without serie inductance)

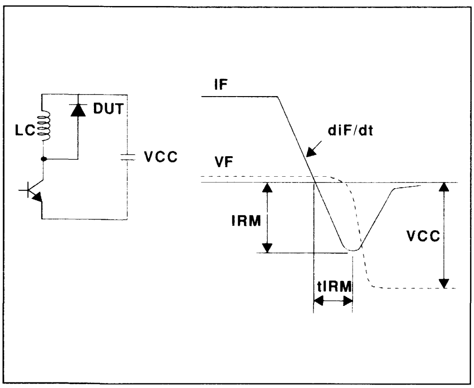
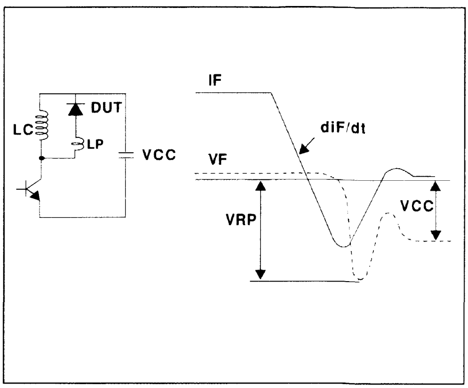


Fig.12 : TURN-OFF SWITCHING CHARACTERISTICS (With serie inductance)



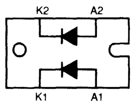
SGS-THOMSON
MICROELECTRONICS

BYT230PI(V)-1000
BYT231PI(V)-1000

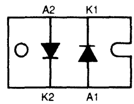
FAST RECOVERY RECTIFIER DIODES

FEATURES

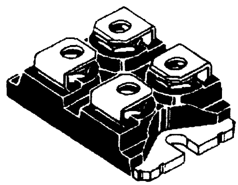
- VERY LOW REVERSE RECOVERY TIME
- VERY LOW SWITCHING LOSSES
- LOW NOISE TURN-OFF SWITCHING
- INSULATED PACKAGE :
  Insulating voltage = 2500 V_{RMS}
  Capacitance = 45 pF



BTY231PI(V)-1000



BTY230PI(V)-1000



ISOTOP ®
(Plastic)
Screw version (*)

DESCRIPTION

Dual high voltage rectifiers suited for Switch Mode Power Supplies and other power converters.
The devices are packaged in ISOTOP.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			1000	V
I_{FRM}	Repetitive peak forward current	$tp \leq 10\mu s$		375	A
$I_{F(RMS)}$	RMS forward current		Per diode	70	A
$I_{F(AV)}$	Average forward current	Tc=55°C $\delta = 0.5$	Per diode	30	A
I_{FSM}	Surge non repetitive forward current	tp=10ms sinusoidal	Per diode	200	A
Tstg Tj	Storage and junction temperature range			- 40 to + 150 - 40 to + 150	°C °C

* : Tin plated Fast-on version is also available (without V suffix).
TM : ISOTOP is a trademark of SGS-THOMSON Microelectronics.

THERMAL RESISTANCE

Symbol	Parameter		Value	Unit
Rth (j-c)	Junction to case	Per diode	1.5	°C/W
		Total	0.8	
Rth (c)	Coupling		0.1	°C/W

When the diodes 1 and 2 are used simultaneously :
Δ Tj(diode 1) = P(diode) x Rth(Per diode) + P(diode 2) x Rth(c)

ELECTRICAL CHARACTERISTICS (Per diode)
STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
V_F *	T_j = 25°C	I_F = 30 A			1.9	V
	T_j = 100°C				1.8	
I_R **	T_j = 25°C	V_R = V_{RRM}			100	µA
	T_j = 100°C				5	mA

Pulse test : * tp = 380 µs, duty cycle < 2 %
** tp = 5 ms, duty cycle < 2 %

RECOVERY CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
trr	T_j = 25°C	I_F = 0.5A Irr = 0.25A I_R = 1A			70	ns
		I_F = 1A dI_F/dt = -15A/µs V_R = 30V			165	

TURN-OFF SWITCHING CHARACTERISTICS (Without serie inductance)

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{IRM}	dI_F/dt = -120A/µs	V_{CC} = 200V I_F = 30A Lp ≤ 0.05µH T_j = 100°C see fig. 11			200	ns
	dI_F/dt = -240A/µs			120		
I_{RM}	dI_F/dt = -120A/µs				19.5	A
	dI_F/dt = -240A/µs			22		

TURN-OFF OVERVOLTAGE COEFFICIENT (With serie inductance)

Symbol	Test Conditions	Min.	Typ.	Max.	Unit
$C = \frac{V_{RP}}{V_{CC}}$	T_j = 100°C V_{CC} = 200V I_F=$I_{F(AV)}$ dI_F/dt = -30A/µs Lp = 5µH see fig.12			4.5	/

To evaluate the conduction losses use the following equation :
$P = 1.47 \times I_{F(AV)} + 0.010 \times I_F{}^2{}_{(RMS)}$

Fig.1 : Low frequency power losses versus average current.

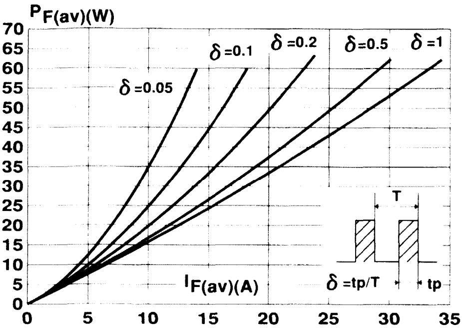


Fig.2 : Peak current versus form factor.

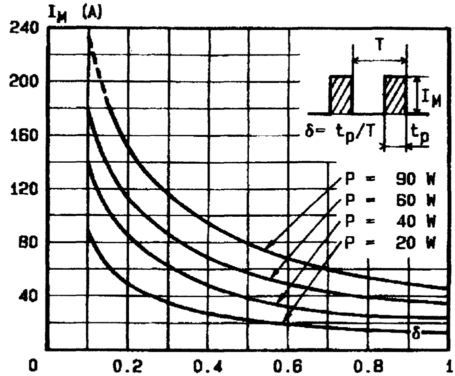


Fig.3 : Non repetitive peak surge current versus overload duration.

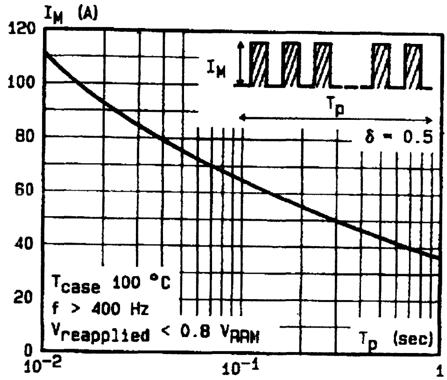


Fig.4 : Relative variation of thermal impedance junction to case versus pulse duration.

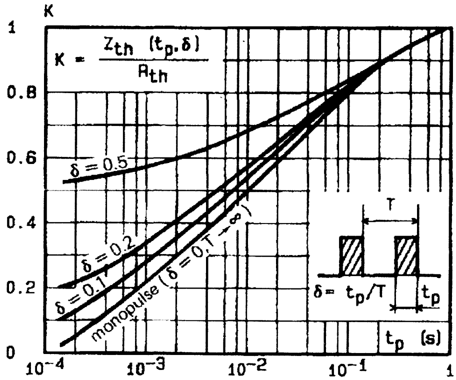


Fig.5 : Voltage drop versus forward current.

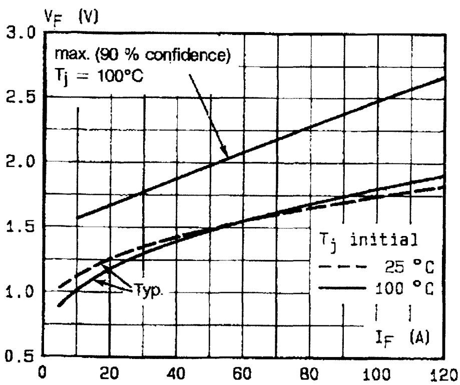


Fig.6 : Recovery charge versus dI_F/dt.

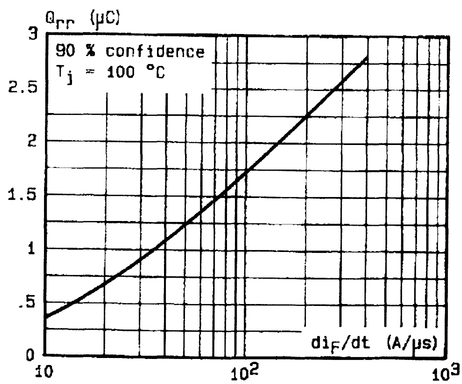


Fig.7 : Recovery time versus dI_F/dt.

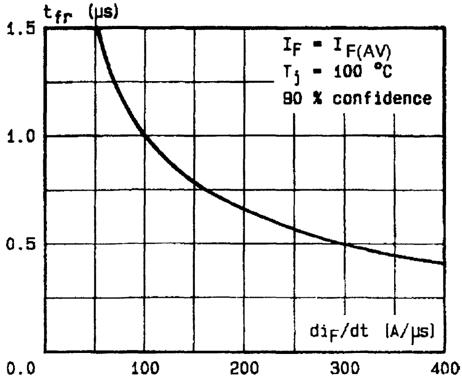


Fig.8 : Peak reverse current versus dIF/dt.

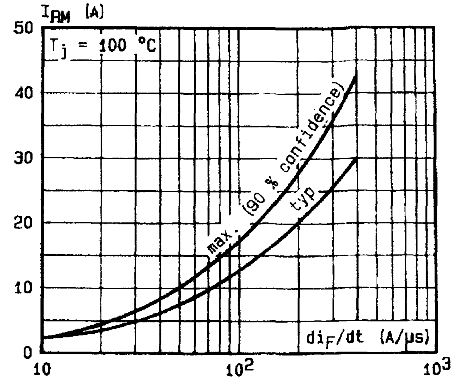


Fig.9 : Peak forward voltage versus dI_F/dt.

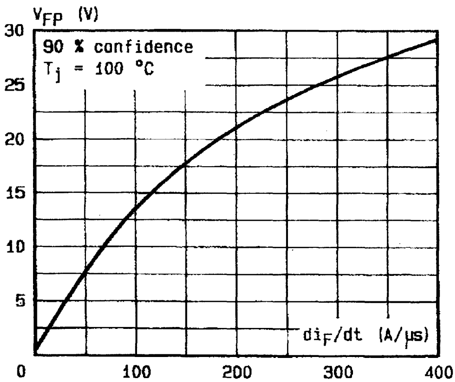


Fig.10 : Dynamic parameters versus junction temperature.

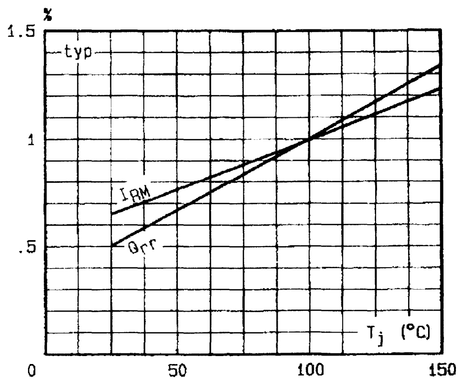


Fig.11 : TURN-OFF SWITCHING CHARACTERISTICS (Without serie inductance)

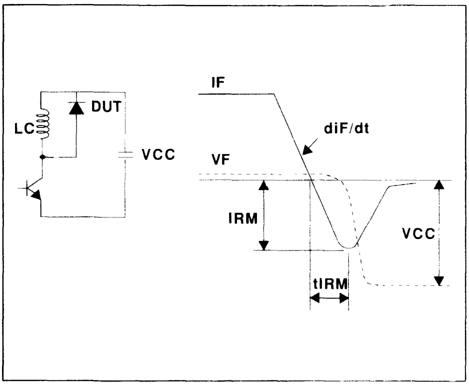
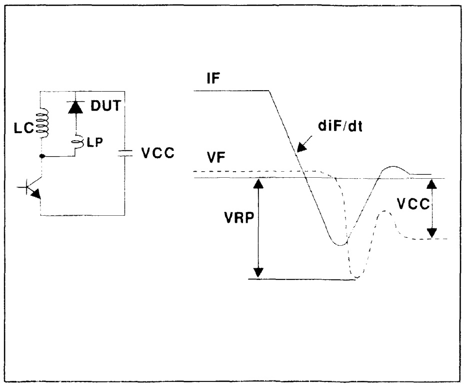


Fig.12 : TURN-OFF SWITCHING CHARACTERISTICS (With serie inductance)



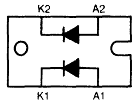
SGS-THOMSON MICROELECTRONICS

BYT260PI(V)-400
BYT261PI(V)-400

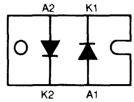
FAST RECOVERY RECTIFIER DIODES

FEATURES

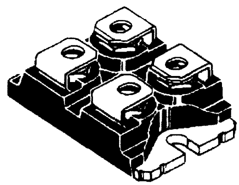
- VERY LOW REVERSE RECOVERY TIME
- VERY LOW SWITCHING LOSSES
- LOW NOISE TURN-OFF SWITCHING
- INSULATED PACKAGE :
  Insulating voltage = 2500 V_{RMS}
  Capacitance = 45 pF



BTY261PI(V)-400



BTY260PI(V)-400



ISOTOP ®
(Plastic)
Screw version (*)

DESCRIPTION

Dual high voltage rectifiers ranging from 400V to 200V suited for Switch Mode Power Supplies and other power converters.
The devices are packaged in ISOTOP.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter			Value	Unit
I_{FRM}	Repetitive peak forward current	tp ≤ 10μs		800	A
$I_{F(RMS)}$	RMS forward current		Per diode	140	A
$I_{F(AV)}$	Average forward current	Tc=80°C δ = 0.5	Per diode	60	A
I_{FSM}	Surge non repetitive forward current	tp=10ms sinusoidal	Per diode	600	A
Tstg Tj	Storage and junction temperature range			- 40 to + 150 - 40 to + 150	°C °C

Symbol	Parameter	BYT261PI(V)-/BYT260PI(V)-			Unit
		200	300	400	
V_{RRM}	Repetitive peak reverse voltage	200	300	400	V

* : Tin plated Fast-on version is also available (without V suffix).
TM : ISOTOP is a trademark of SGS-THOMSON Microelectronics.

THERMAL RESISTANCE

Symbol	Parameter		Value	Unit
Rth (j-c)	Junction to case	Per diode	0.7	°C/W
		Total	0.4	
Rth (c)	Coupling		0.1	°C/W

When the diodes 1 and 2 are used simultaneously :
Δ Tj(diode 1) = P(diode) x Rth(Per diode) + P(diode 2) x Rth(c)

ELECTRICAL CHARACTERISTICS (Per diode)
STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
V_F *	T_j = 25°C	I_F = 60 A			1.5	V
	T_j = 100°C				1.4	
I_R **	T_j = 25°C	V_R = V_{RRM}			60	µA
	T_j = 100°C				6	mA

Pulse test : * tp = 380 µs, duty cycle < 2 %
** tp = 5 ms, duty cycle < 2 %

RECOVERY CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
trr	T_j = 25°C	I_F = 0.5A Irr = 0.25A I_R = 1A			50	ns
		I_F = 1A dI_F/dt = -15A/µs V_R = 30V			100	

TURN-OFF SWITCHING CHARACTERISTICS (Without serie inductance)

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{IRM}	dI_F/dt = -240A/µs	V_{CC} = 200V I_F = 60A Lp ≤ 0.05µH T_j = 100°C see fig. 11			75	ns
	dI_F/dt = -480A/µs			50		
I_{RM}	dI_F/dt = -240A/µs				18	A
	dI_F/dt = -480A/µs			24		

TURN-OFF OVERVOLTAGE COEFFICIENT (With serie inductance)

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
$C = \frac{V_{RP}}{V_{CC}}$	T_j = 100°C V_{CC} = 120V I_F=$I_{F(AV)}$ dI_F/dt = -60A/µs Lp = 0.8µH	see note see fig.12		3.3	4	/

Note : Applicable to BYT261PI(V)-400 only

To evaluate the conduction losses use the following equation :
$P = 1.1 \times I_{F(AV)} + 0.0045 \times I_{F}^{2}{}_{(RMS)}$

Fig.1 : Low frequency power losses versus average current.

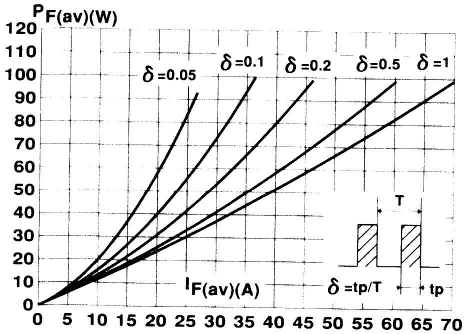


Fig.2 : Peak current versus form factor.

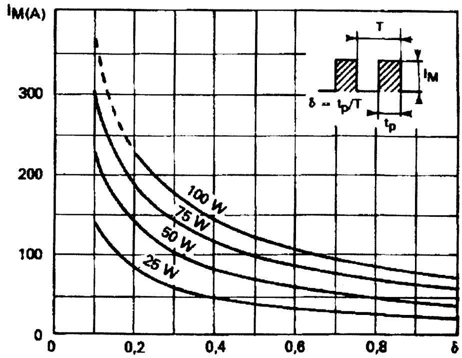


Fig.3 : Non repetitive peak surge current versus overload duration.

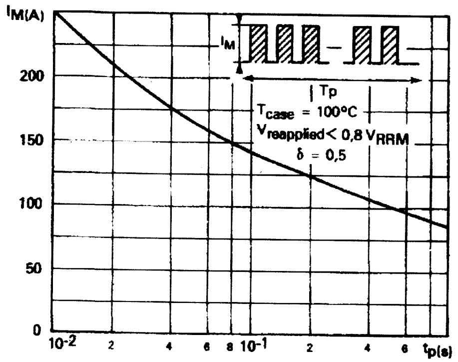


Fig.4 : Relative variation of thermal impedance junction to case versus pulse duration.

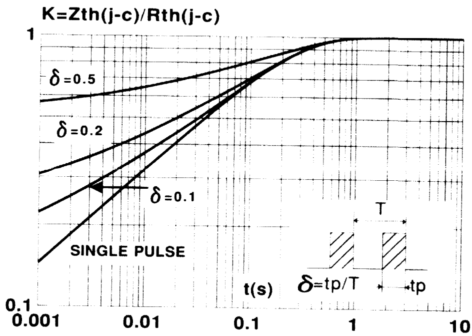


Fig.5 : Voltage drop versus forward current.

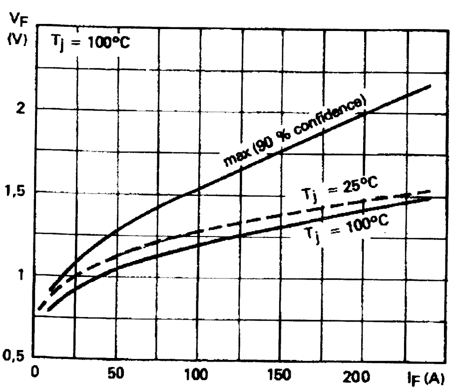


Fig.6 : Recovery charge versus di_F/dt.

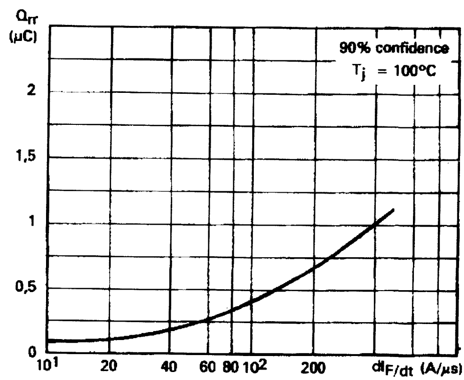


Fig.7 : Recovery time versus dI_F/dt.

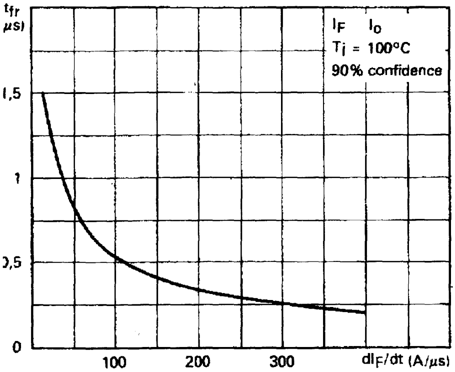


Fig.8 : Peak reverse current versus dIF/dt.

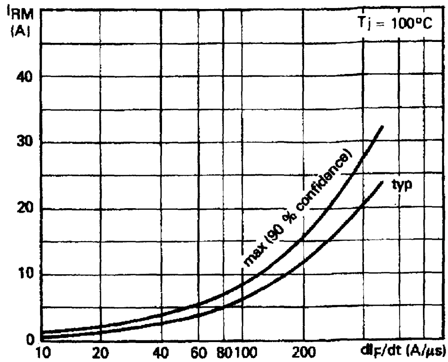


Fig.9 : Peak forward voltage versus dI_F/dt.

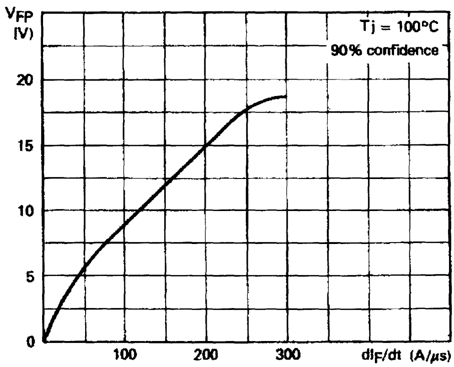


Fig.10 : Dynamic parameters versus junction temperature.

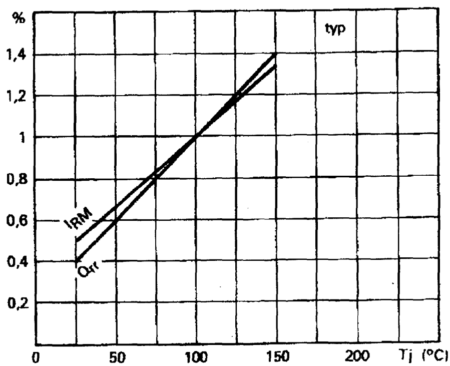


Fig.11 : TURN-OFF SWITCHING CHARACTERISTICS (Without serie inductance)

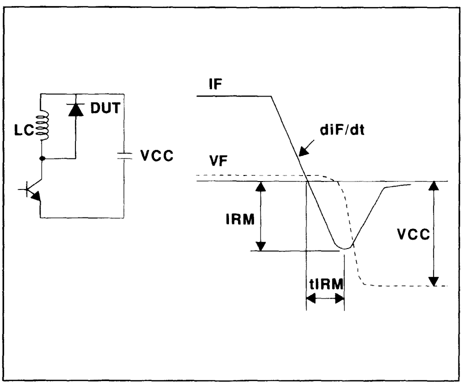
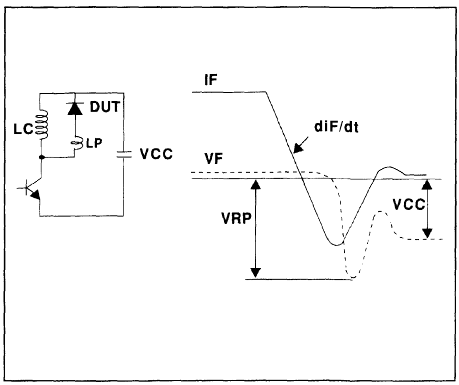


Fig.12 : TURN-OFF SWITCHING CHARACTERISTICS (With serie inductance)



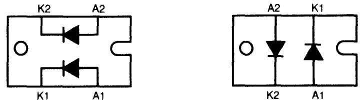
SGS-THOMSON MICROELECTRONICS

BYT260PI(V)-800
BYT261PI(V)-800

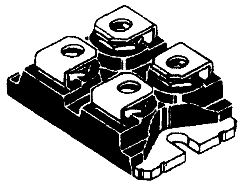
FAST RECOVERY RECTIFIER DIODES

FEATURES

- VERY LOW REVERSE RECOVERY TIME
- VERY LOW SWITCHING LOSSES
- LOW NOISE TURN-OFF SWITCHING
- INSULATED PACKAGE :
  Insulating voltage = 2500 V_{RMS}
  Capacitance = 45 pF



BTY261PI(V)-800 **BTY260PI(V)-800**



ISOTOP ®
(Plastic)
Screw version (*)

DESCRIPTION

Dual high voltage rectifiers ranging from 600V to 800V suited for Switch Mode Power Supplies and other power converters.
The devices are packaged in ISOTOP.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter			Value	Unit
I_{FRM}	Repetitive peak forward current	$tp \leq 10\mu s$		750	A
$I_{F(RMS)}$	RMS forward current		Per diode	140	A
$I_{F(AV)}$	Average forward current	Tc=60°C $\delta = 0.5$	Per diode	60	A
I_{FSM}	Surge non repetitive forward current	tp=10ms sinusoidal	Per diode	400	A
Tstg Tj	Storage and junction temperature range			- 40 to + 150 - 40 to + 150	°C °C

Symbol	Parameter	BYT260PI(V)- / BYT261PI(V)-		Unit
		600	800	
V_{RRM}	Repetitive peak reverse voltage	600	800	V

* : Tin plated Fast-on version is also available (without V suffix).
TM : ISOTOP is a trademark of SGS-THOMSON Microelectronics.

THERMAL RESISTANCE

Symbol	Parameter		Value	Unit
Rth (j-c)	Junction to case	Per diode	0.7	°C/W
		Total	0.4	
Rth (c)	Coupling		0.1	°C/W

When the diodes 1 and 2 are used simultaneously :
Δ Tj(diode 1) = P(diode) x Rth(Per diode) + P(diode 2) x Rth(c)

ELECTRICAL CHARACTERISTICS (Per diode)
STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
V_F *	Tj = 25°C	I_F = 60 A			1.9	V
	T_j = 100°C				1.8	
I_R **	T_j = 25°C	$V_R = V_{RRM}$			100	µA
	T_j = 100°C				6	mA

Pulse test : * tp = 380 µs, duty cycle < 2 %
** tp = 5 ms, duty cycle < 2 %

RECOVERY CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
trr	T_j = 25°C	I_F = 0.5A Irr = 0.25A I_R = 1A			65	ns
		I_F = 1A dI_F/dt = -15A/µs V_R = 30V			135	

TURN-OFF SWITCHING CHARACTERISTICS (Without serie inductance)

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{IRM}	dI_F/dt = -240A/µs	V_{CC} = 200V I_F = 60A Lp ≤ 0.05µH T_j = 100°C see fig. 11			160	ns
	dI_F/dt = -480A/µs			100		
I_{RM}	dI_F/dt = -240A/µs				30	A
	dI_F/dt = -480A/µs			38		

TURN-OFF OVERVOLTAGE COEFFICIENT (With serie inductance)

Symbol	Test Conditions	Min.	Typ.	Max.	Unit
$C = \frac{V_{RP}}{V_{CC}}$	T_j = 100°C V_{CC} = 150V $I_F = I_{F(AV)}$ dI_F/dt = -60A/µs Lp = 2µH see fig.12		3.3	4	/

To evaluate the conduction losses use the following equation :
$P = 1.47 \times I_{F(AV)} + 0.005 \times I_F{}^2{}_{(RMS)}$

Fig.1 : Low frequency power losses versus average current.

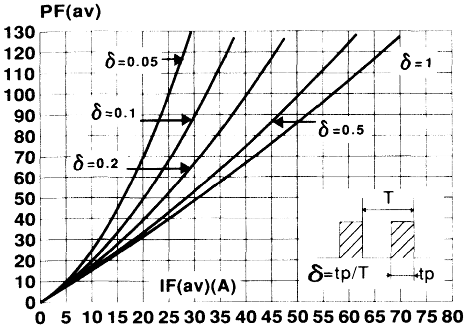


Fig.2 : Peak current versus form factor.

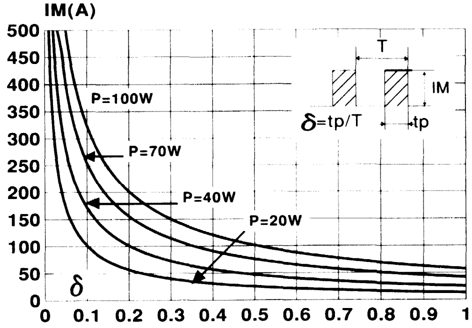


Fig.3 : Non repetitive peak surge current versus overload duration.

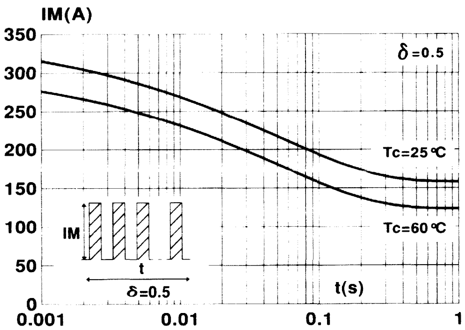


Fig.4 : Relative variation of thermal impedance junction to case versus pulse duration.

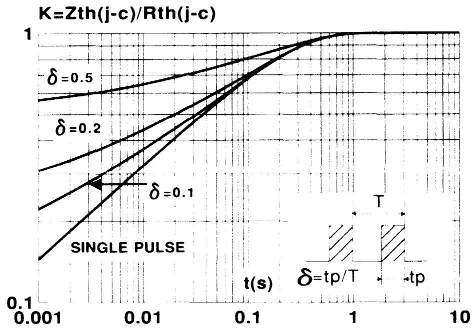


Fig.5 : Voltage drop versus forward current.

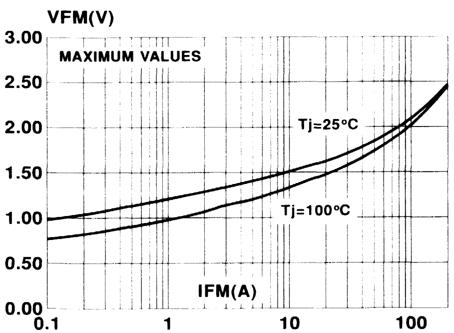


Fig.6 : Recovery charge versus di_F/dt.

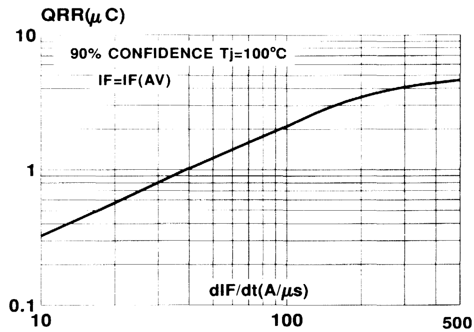


Fig.7 : Recovery time versus dI_F/dt.

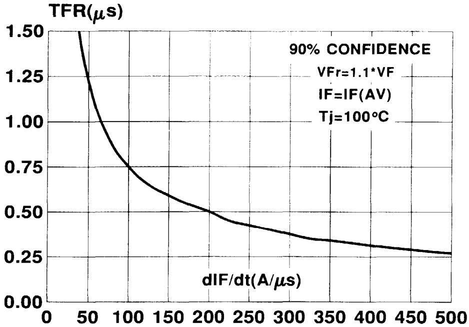


Fig.8 : Peak reverse current versus dIF/dt.

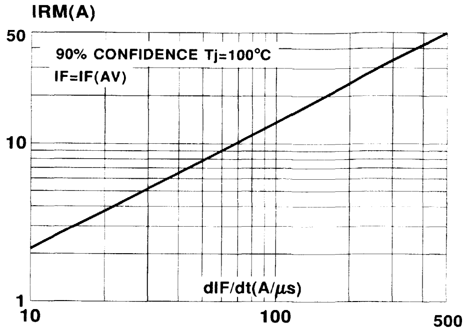


Fig.9 : Peak forward voltage versus dI_F/dt.

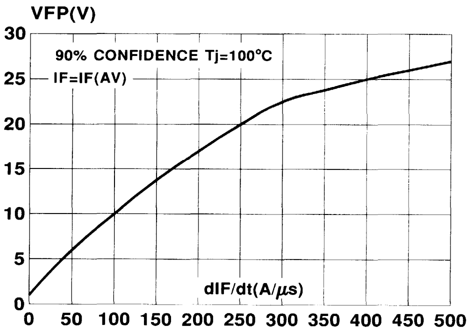


Fig.10 : Dynamic parameters versus junction temperature.

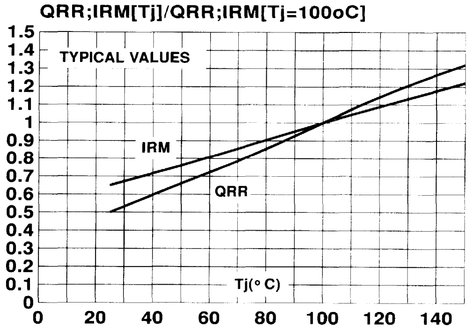


Fig.11 : TURN-OFF SWITCHING CHARACTERISTICS (Without serie inductance)

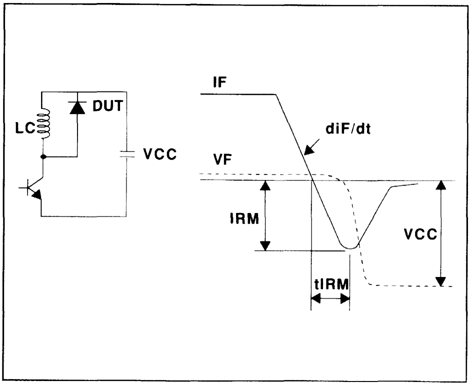
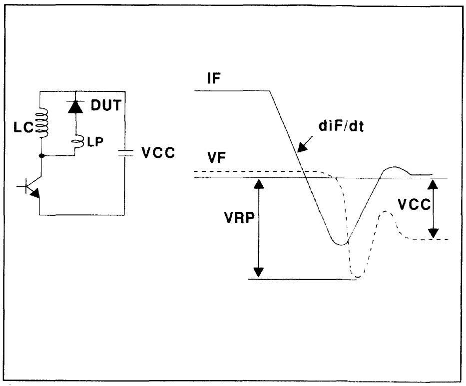


Fig.12 : TURN-OFF SWITCHING CHARACTERISTICS (With serie inductance)



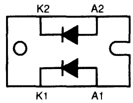
SGS-THOMSON MICROELECTRONICS

BYT260PI(V)-1000
BYT261PI(V)-1000

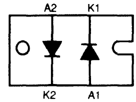
FAST RECOVERY RECTIFIER DIODES

FEATURES

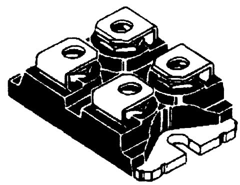
- VERY LOW REVERSE RECOVERY TIME
- VERY LOW SWITCHING LOSSES
- LOW NOISE TURN-OFF SWITCHING
- INSULATED PACKAGE :
  Insulating voltage = 2500 V_{RMS}
  Capacitance = 45 pF



BTY261PI(V)-1000



BTY260PI(V)-1000



ISOTOP ®
(Plastic)
Screw version (*)

DESCRIPTION

Dual high voltage rectifiers suited for Switch Mode Power Supplies and other power converters.
The devices are packaged in ISOTOP.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			1000	V
I_{FRM}	Repetitive peak forward current	tp ≤ 10µs		750	A
$I_{F(RMS)}$	RMS forward current		Per diode	140	A
$I_{F(AV)}$	Average forward current	Tc=60°C δ = 0.5	Per diode	60	A
I_{FSM}	Surge non repetitive forward current	tp=10ms sinusoidal	Per diode	400	A
Tstg Tj	Storage and junction temperature range			- 40 to + 150 - 40 to + 150	°C °C

* : Tin plated Fast-on version is also available (without V suffix).
TM : ISOTOP is a trademark of SGS-THOMSON Microelectronics.

THERMAL RESISTANCE

Symbol	Parameter		Value	Unit
Rth (j-c)	Junction to case	Per diode	0.7	°C/W
		Total	0.4	
Rth (c)	Coupling		0.1	°C/W

When the diodes 1 and 2 are used simultaneously :
Δ Tj(diode 1) = P(diode) x Rth(Per diode) + P(diode 2) x Rth(c)

ELECTRICAL CHARACTERISTICS (Per diode)
STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
V_F *	Tj = 25°C	I_F = 60 A			1.9	V
	T_j = 100°C				1.8	
I_R **	T_j = 25°C	$V_R = V_{RRM}$			100	µA
	T_j = 100°C				6	mA

Pulse test : * tp = 380 µs, duty cycle < 2 %
** tp = 5 ms, duty cycle < 2 %

RECOVERY CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
trr	T_j = 25°C	I_F = 0.5A Irr = 0.25A I_R = 1A			70	ns
		I_F = 1A dI_F/dt = -15A/µs V_R = 30V			170	

TURN-OFF SWITCHING CHARACTERISTICS (Without serie inductance)

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{IRM}	dI_F/dt = -240A/µs	V_{CC} = 200V I_F = 60A Lp ≤ 0.05µH T_j = 100°C see fig. 11			200	ns
	dI_F/dt = -480A/µs			120		
I_{RM}	dI_F/dt = -240A/µs				40	A
	dI_F/dt = -480A/µs			44		

TURN-OFF OVERVOLTAGE COEFFICIENT (With serie inductance)

Symbol	Test Conditions	Min.	Typ.	Max.	Unit
$C = \frac{V_{RP}}{V_{CC}}$	T_j = 100°C V_{CC} = 200V $I_F = I_{F(AV)}$ dI_F/dt = -60A/µs Lp = 2.5µH see fig.12		3.3	4.5	/

To evaluate the conduction losses use the following equation :
$P = 1.47 \times I_{F(AV)} + 0.005 \times I_F^2{}_{(RMS)}$

Fig.1 : Low frequency power losses versus average current.

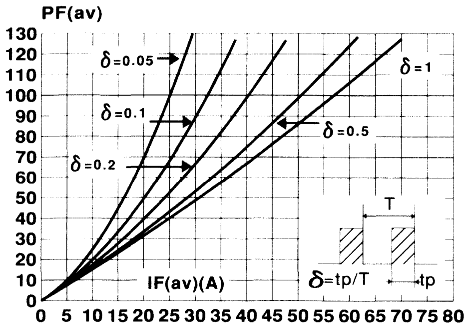


Fig.2 : Peak current versus form factor.

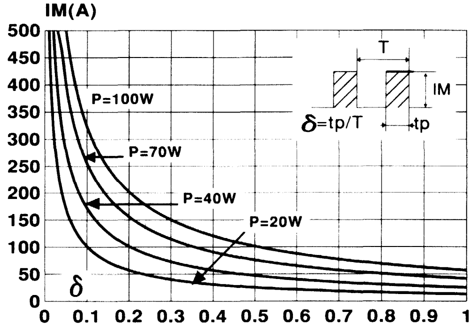


Fig.3 : Non repetitive peak surge current versus overload duration.

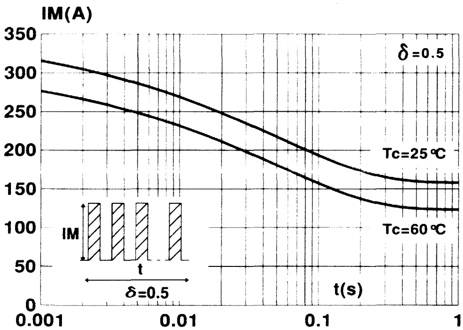


Fig.4 : Relative variation of thermal impedance junction to case versus pulse duration.

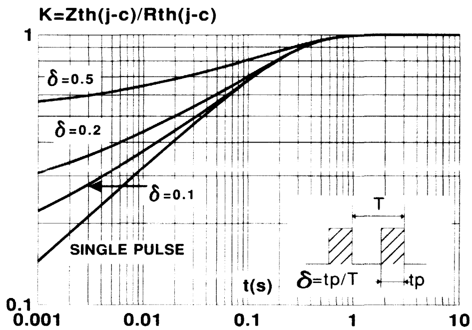


Fig.5 : Voltage drop versus forward current.

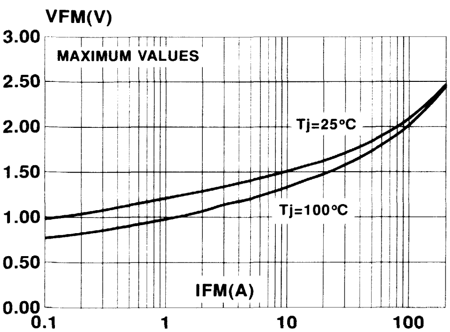


Fig.6 : Recovery charge versus dI_F/dt.

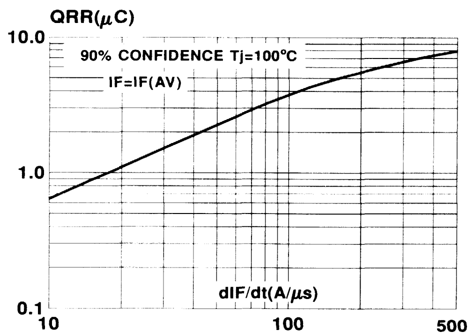


Fig.7 : Recovery time versus dIF/dt.

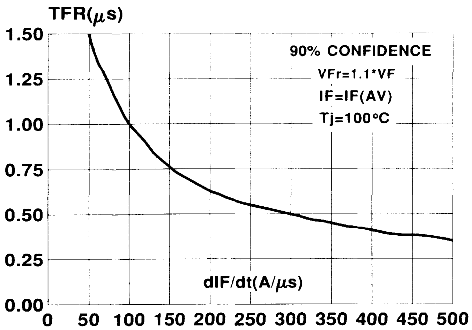


Fig.8 : Peak reverse current versus dIF/dt.

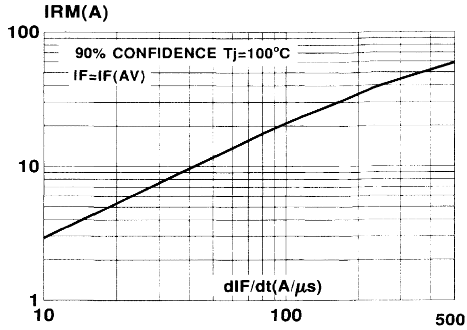


Fig.9 : Peak forward voltage versus dIF/dt.

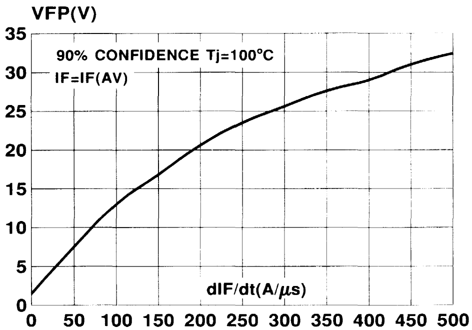


Fig.10 : Dynamic parameters versus junction temperature.

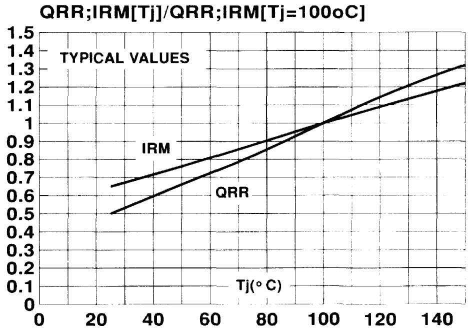


Fig.11 : TURN-OFF SWITCHING CHARACTERISTICS (Without serie inductance)

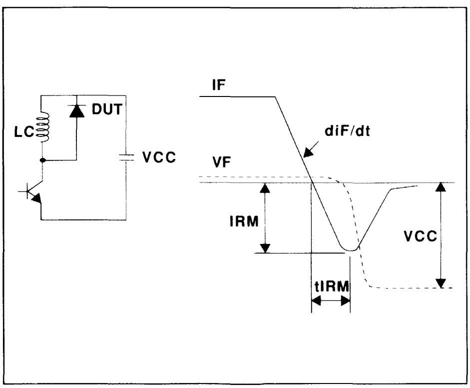
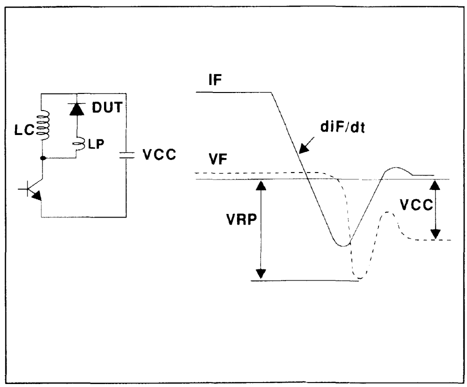


Fig.12 : TURN-OFF SWITCHING CHARACTERISTICS (With serie inductance)



VIDEO DEFLECTION DIODES

SGS-THOMSON
MICROELECTRONICS

MTV32-400A

(CRT HORIZONTAL DEFLECTION) MODULATION DIODE

MAIN PRODUCT CHARACTERISTICS

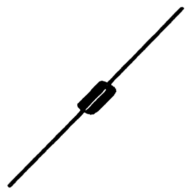
I_F peak	3A
V_{RRM}	400V
trr	22ns
V_F	1.35V

FEATURES

- PRODUCT SPECIFIC TO HORIZONTAL DEFLECTION
- HIGH REVERSE VOLTAGE
- LOW SWITCHING LOSSES DUE TO SMALL RECOVERY CHARGES

DESCRIPTION

High voltage diode especially designed for horizontal deflection stage in standard and high resolution displays for TV's and monitors.
This device is packaged in DO27A and is intented for use as a MODULATION diode in deflection circuitry with east-west correction.



DO27A
(Plastic)

MTV32-400A

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		400	V
V_{RWM}	Reverse working voltage		400	V
I_F peak	Peak forward current (1)	T_{amb}=130°C (2)	3	A
I_{FRM}	Repetitive peak forward current	tp ≤ 10µs	60	A
I_{FSM}	Surge non repetitive forward current	tp=10ms sinusoidal	60	A
Tstg Tj	Storage and junction temperature range		- 40 to + 150 - 40 to + 150	°C °C

(1) δ = 0.5 and triangular waveform
(2) on infinite heatsink with 10mm lead length

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
Rth (j-a)	Junction to ambient (*)	20	°C/W

(*) on infinite heatsink with 10mm lead length

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
I_R *	Reverse leakage current	$V_R = V_{RWM}$	$T_j = 25°C$			20	µA
			$T_j = 100°C$			0.5	mA
V_F **	Forward voltage drop	$I_F = 3$ A	$T_j = 25°C$			1.45	V
			$T_j = 100°C$			1.35	

Pulse test : * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2 %

DYNAMIC ELECTRICAL CHARACTERISTICS
TURN-OFF SWITCHING

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
trr	Reverse recovery time	$I_F = 0.5$ A $I_R = 1$ A Irr = 0.25 A $T_j = 25°C$			22	ns

TURN ON SWITCHING

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
t_{FR}	Forward recovery time	$I_F = 3$ A $dI_F/dt = 100$ A/µs Mesured at 1.1 x V_F $T_j = 25°C$			0.1	µs
V_{FP}	Peak forward voltage				17	V

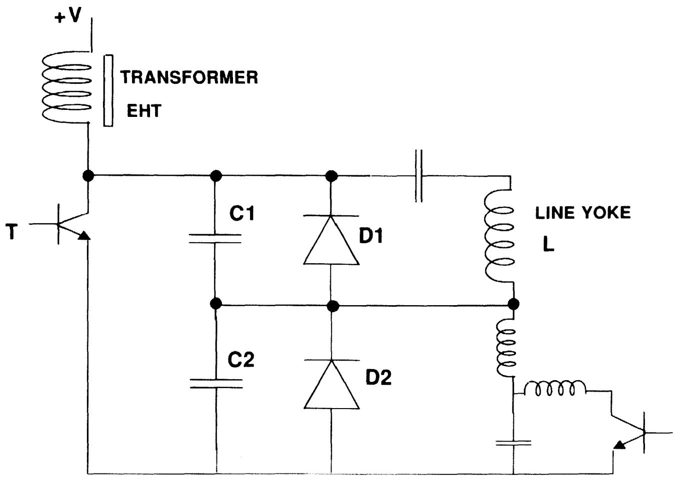
To evaluate the conduction losses, in case of triangular current, use the following equation :

$$P = \frac{1.17 \times I_P \times \delta}{2} + \frac{0.06 \times I_P^2 \times \delta}{3}$$

δ : duty cycle
I_P : Peak current

for $I_P = 3$A and $\delta = 0.5$, P = 0.97 W

BASIC E-W DIODE MODULATOR CIRCUIT



D1=DTV32-1000A   D2=MTV32-400A

SGS-THOMSON MICROELECTRONICS

DTV32-1000A MTV32-600A

(CRT HORIZONTAL DEFLECTION) HIGH VOLTAGE DAMPER & MODULATION DIODES

MAIN PRODUCTS CHARACTERISTICS

	MTV32	DTV32
I_F peak	3A	3A
V_{RRM}	600V	1000V
trr	50ns	70ns
V_F	1.6V	1.6V

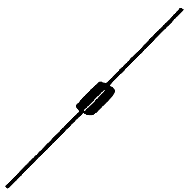
FEATURES

- PRODUCTS SPECIFIC TO HORIZONTAL DEFLECTION
- HIGH REVERSE VOLTAGE
- LOW SWITCHING LOSSES DUE TO SMALL RECOVERY CHARGES
- FULL KIT IN AXIAL PACKAGE

DESCRIPTION

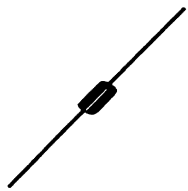
High voltage diodes especially designed for horizontal deflection stage in standard and high resolution displays for TV's and monitors.
The kit includes both the DAMPER diode and the MODULATION diode. These devices are packaged in DO27A and are intented for use as a low cost kit solution in deflection circuitry with east-west correction.

KIT



DO27A
(Plastic)

MTV32-600A



DO27A
(Plastic)

DTV32-1000A

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter		Value		Unit
			MTV32	DTV32	
V_{RRM}	Repetitive peak reverse voltage		600	1000	V
V_{RWM}	Reverse working voltage		600	1000	V
I_F peak	Peak forward current (1)	T_{amb}=120°C (2)	3	3	A
I_{FRM}	Repetitive peak forward current	tp ≤ 10µs	100	50	A
I_{FSM}	Surge non repetitive forward current	tp=10ms sinusoidal	150	150	A
Tstg Tj	Storage and junction temperature range		- 40 to + 150 - 40 to + 150		°C °C

(1) δ = 0.5 and triangular waveform
(2) on infinite heatsink with 10mm lead length

THERMAL AND ELECTRICAL CHARACTERISTICS OF THE DTV32-1000A (DAMPER diode)

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
Rth (j-a)	Junction to ambient (*)	25	°C/W

(*) on infinite heatsink with 10mm lead length

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
I_R *	Reverse leakage current	$V_R = V_{RWM}$	$T_j = 25°C$			20	µA
			$T_j = 125°C$			2	mA
V_F **	Forward voltage drop	$I_F = 3$ A	$T_j = 25°C$			2.0	V
			$T_j = 125°C$			1.6	

Pulse test : * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2 %

DYNAMIC ELECTRICAL CHARACTERISTICS
TURN-OFF SWITCHING

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
trr	Reverse recovery time	$I_F = 0.5$ A $I_R = 1$ A Irr = 0.25 A $T_j = 25°C$			72	ns

TURN ON SWITCHING

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
t_{FR}	Forward recovery time	$I_F = 3$ A $dI_F/dt = 100$ A/µs Mesured at 1.1 x V_F $T_j = 25°C$			0.5	µs
V_{FP}	Peak forward voltage				35	V

To evaluate the conduction losses, in case of triangular current, use the following equation :

$$P = \frac{1.33 \times I_P \times \delta}{2} + \frac{0.09 \times I_P^2 \times \delta}{3}$$

δ : duty cycle
I_P : Peak current

for $I_P = 3A$ and $\delta = 0.5$, P = 1.13 W

THERMAL AND ELECTRICAL CHARACTERISTICS OF THE MTV32-600A (MODULATION diode)

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
Rth (j-a)	Junction to ambient (*)	25	°C/W

(*) on infinite heatsink with 10mm lead length

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
I_R *	Reverse leakage current	$V_R = V_{RWM}$	$T_j = 25°C$			10	µA
			$T_j = 125°C$			1	mA
V_F **	Forward voltage drop	$I_F = 3$ A	$T_j = 25°C$			2.0	V
			$T_j = 125°C$			1.6	

Pulse test : * tp = 5 ms, duty cycle < 2 %

DYNAMIC ELECTRICAL CHARACTERISTICS
TURN-OFF SWITCHING

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
trr	Reverse recovery time	$I_F = 0.5$ A $I_R = 1$ A Irr = 0.25 A $T_j = 25°C$			55	ns

TURN ON SWITCHING

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
t_{FR}	Forward recovery time	$I_F = 3$ A $dI_F/dt = 100$ A/µs Mesured at 1.1 x V_F $T_j = 25°C$			0.5	µs
V_{FP}	Peak forward voltage				20	V

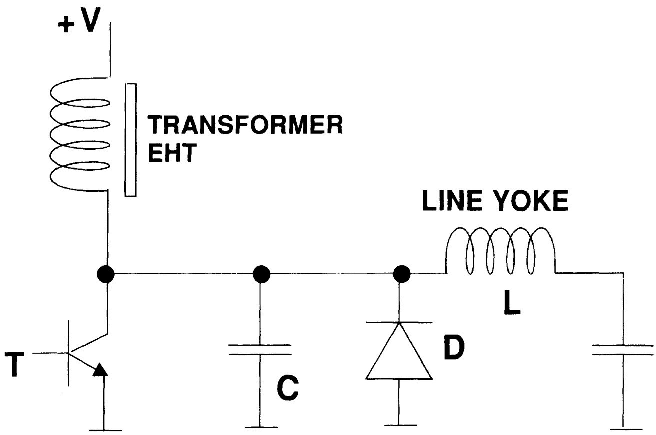
To evaluate the conduction losses, in case of triangular current, use the following equation :

$$P = \frac{1.33 \times I_P \times \delta}{2} + \frac{0.09 \times I_P^2 \times \delta}{3}$$

δ : duty cycle
I_P : Peak current

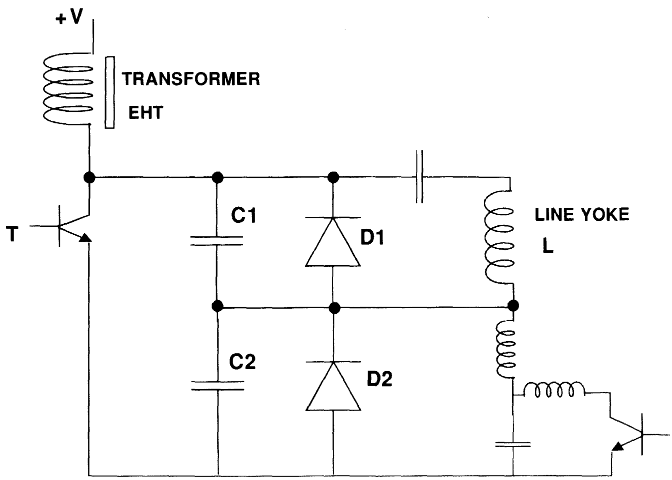
for $I_P = 3$A and $\delta = 0.5$, P = 1.13 W

BASIC HORIZONTAL DEFLECTION CIRCUIT



D = DTV32-1000A

BASIC E-W DIODE MODULATOR CIRCUIT



D1=DTV32-1000A D2=MTV32-600A

SGS-THOMSON
MICROELECTRONICS

DTV32(F)-1200A
DTV32(F)-1500A

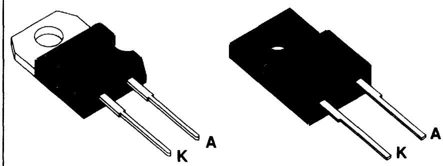
(CRT HORIZONTAL DEFLECTION) HIGH VOLTAGE DAMPER DIODE

FEATURES

- HIGH BREAKDOWN VOLTAGE CAPABILITY
- LOW AND MEDIUM FREQUENCY OPERATION
- SPECIFIED TURN ON SWITCHING CHARACTERISTICS
- TYPICAL TOTAL LOSSES : 2 W
  (I_{Fpeak} = 6 A, F = 32 kHz)
- SUITABLE WITH **BUH** TRANSISTORS SERIES
- INSULATED VERSION (ISOWATT220AC) :
  Insulating voltage = 2000 V DC
  Capacitance = 12 pF

DESCRIPTION

High voltage diode especially designed for horizontal deflection stage in standard and high resolution displays for TV's and monitors.
This device is packaged in TO220AC or ISOWATT220AC.



TO220AC (Plastic)	ISOWATT220AC (Plastic)
DTV32-1200A DTV32-1500A	DTV32F-1200A DTV32F-1500A

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter			Value	Unit
$I_{F(RMS)}$	RMS forward current			15	A
$I_{F(AV)}$	Average forward current δ = 0.5	TO220AC	Tc=130°C	6	A
		ISOWATT220AC	Tc=115°C	6	
I_{FSM}	Surge non repetitive forward current		tp=10ms sinusoidal	100	A
Tstg Tj	Storage and junction temperature range			- 40 to + 150 - 40 to + 150	°C °C

Symbol	Parameter	DTV32(F)-		Unit
		1200A	1500A	
V_{RRM}	Repetitive peak reverse voltage	1200	1500	V
V_{RWM}	Reverse working voltage	1000	1350	V

THERMAL RESISTANCES

Symbol	Parameter		Value	Unit
$R_{th\ (j-c)}$	Junction to case	TO220AC	2	°C/W
		ISOWATT220AC	4	

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R *	T_j = 25°C	$V_R = V_{RWM}$			100	µA
	T_j = 100°C				1	mA
V_F **	T_j = 25°C	I_F = 6 A			1.3	V
	T_j = 100°C	I_F = 6 A			1.2	

Pulse test : * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2 %

RECOVERY CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
trr (1)	T_j = 25°C	I_F = 1 A dI_F/dt = -15 A/µs V_R = 30 V		450	600	ns
trr (2)	T_j = 25°C	I_F = 1 A dI_F/dt = -50 A/µs VR = 30 V		300		ns
trr	T_j = 25°C	I_F = 100mA I_R = 100mA		250		ns

TURN ON SWITCHING CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
t_{FR} (2)	T_j = 100°C	I_F = 6 A dI_F/dt = 80 A/µs		0.5		µs
V_{FP} (2)		V_{FR} = 2 V		30		V

(1)Test following Jedec Standard
(2) Test representative of the application

To evaluate the conduction losses use the following equations :
$V_F = 1.0 + 0.025\ I_F$ $\qquad P = 1.0 \times I_{F(AV)} + 0.025 \times I_{F}^{2}{}_{(RMS)}$

Fig.1 : Average forward power dissipation versus average forward current.

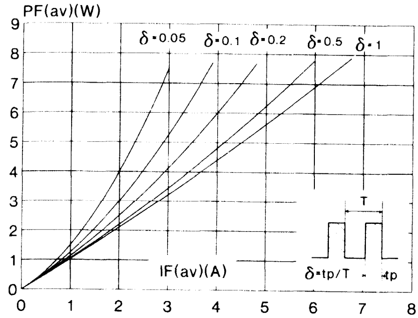


Fig.2 : Peak current versus form factor.

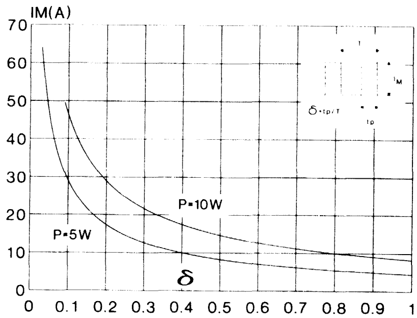


Fig.3 : Average current versus ambient temperature. (duty cycle : 0.5) (TO220AC)

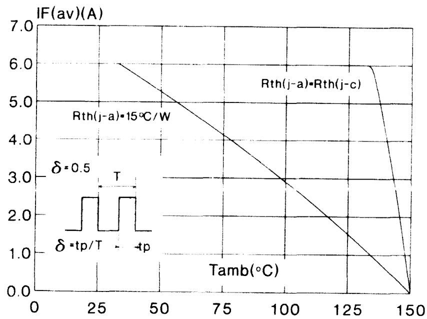


Fig.4 : Average current versus ambient temperature. (duty cycle : 0.5) (ISOWATT220AC)

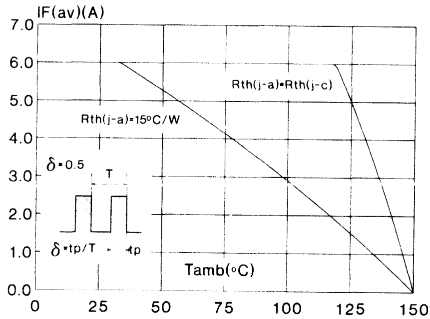


Fig.5 : Non repetitive surge peak forward current versus overload duration.
(Maximum values) (TO220AC)

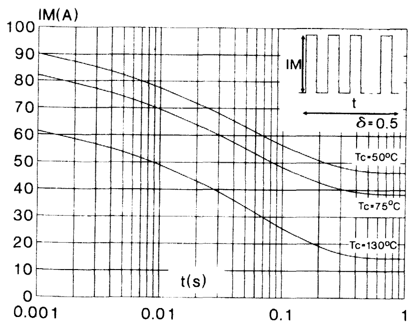


Fig.6 : Non repetitive surge peak forward current versus overload duration.
(Maximum values) (ISOWATT220AC)

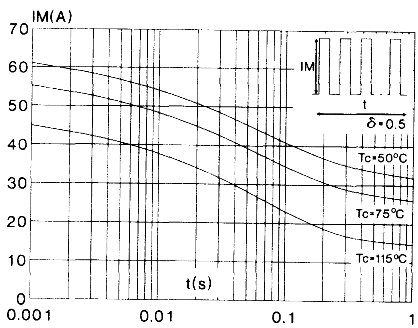


Fig.7 : Relative variation of thermal transient impedance junction to case versus pulse duration.
(TO220AC)

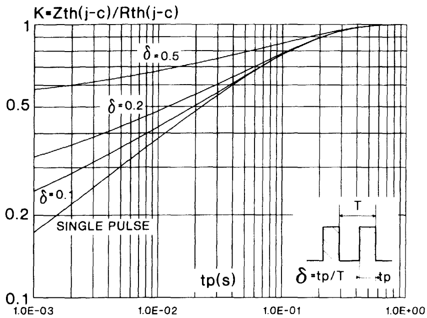


Fig.8 : Relative variation of thermal transient impedance junction to case versus pulse duration.
(ISOWATT220AC)

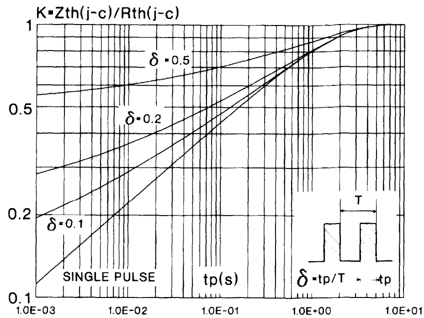


Fig.9 : Forward voltage drop versus forward current.
(Maximum values)

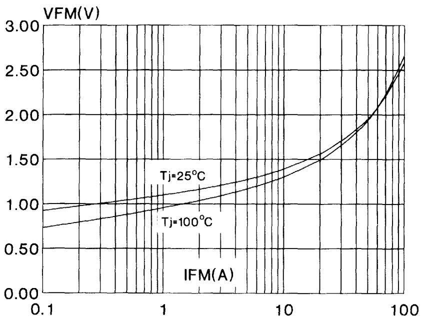


Fig.10 : Junction capacitance versus reverse voltage applied.
(Typical values)

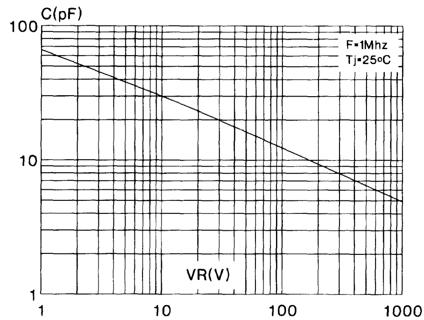


Fig.11 : Recovery charge versus dI_F/dt.

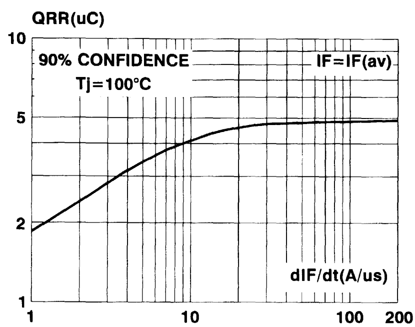


Fig.12 : Peak reverse current versus dI_F/dt.

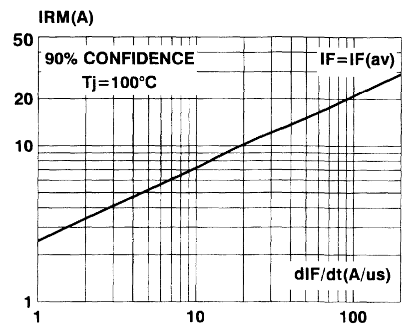


Fig.13 : Dynamic parameters versus junction temperature.

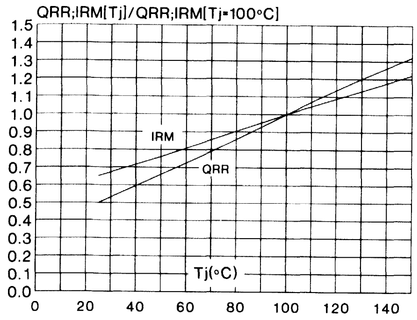


Fig.14 : Peak forward voltage versus dI_F/dt.

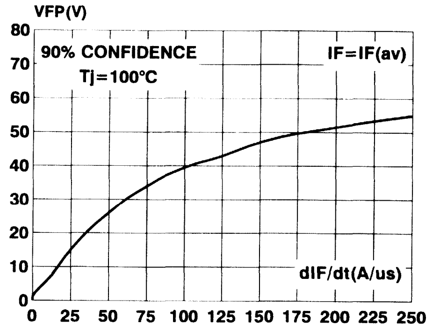
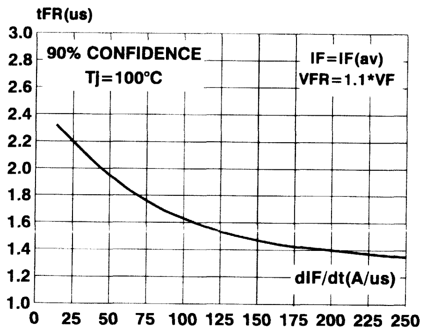
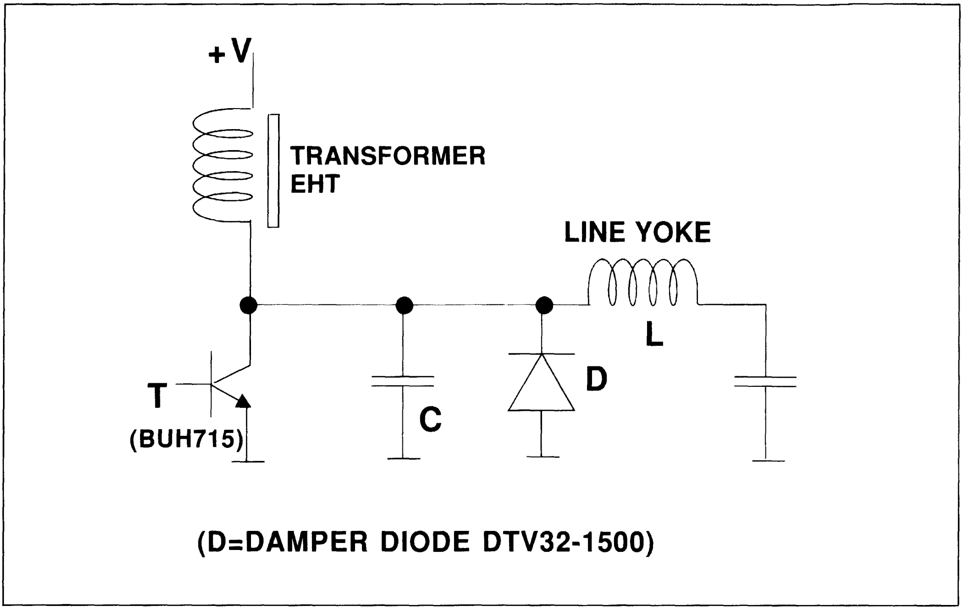


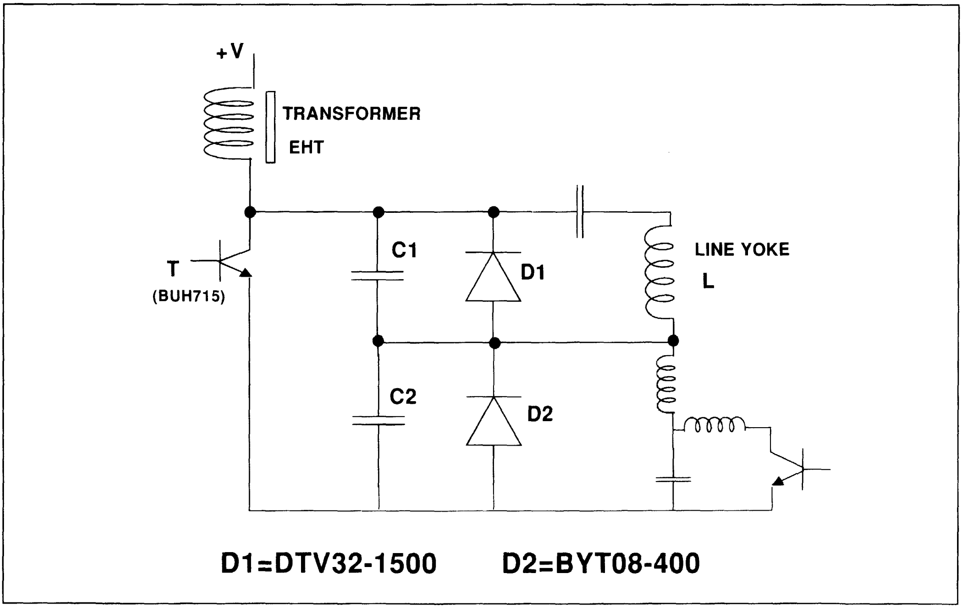
Fig.15 : Recovery time versus dI_F/dt.



BASIC HORIZONTAL DEFLECTION CIRCUIT



BASIC E-W DIODE MODULATOR CIRCUIT



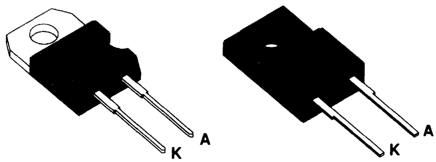
SGS-THOMSON MICROELECTRONICS

DTV32(F)-1200B
DTV32(F)-1500B

(CRT HORIZONTAL DEFLECTION) HIGH VOLTAGE DAMPER DIODE

FEATURES

- HIGH BREAKDOWN VOLTAGE CAPABILITY
- HIGH FREQUENCY OPERATION
- SPECIFIED TURN ON SWITCHING CHARACTERISTICS
- TYPICAL TOTAL LOSSES : 3.5W (I_{Fpeak} = 6 A, F = 64 kHz)
- SUITABLE WITH **BUH** TRANSISTORS SERIES
- INSULATED VERSION (ISOWATT220AC) :
  Insulating voltage = 2000 V DC
  Capacitance = 12 pF



TO220AC (Plastic)

DTV32-1200B
DTV32-1500B

ISOWATT220AC (Plastic)

DTV32F-1200B
DTV32F-1500B

DESCRIPTION

High voltage diode especially designed for horizontal deflection stage in standard and high resolution displays for TV's and monitors.
This device is packaged in TO220AC or ISOWATT220AC.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter			Value	Unit
$I_{F(RMS)}$	RMS forward current			15	A
$I_{F(AV)}$	Average forward current δ = 0.5	TO220AC	Tc=130°C	6	A
		ISOWATT220AC	Tc=110°C	6	
I_{FSM}	Surge non repetitive forward current		tp=10ms sinusoidal	100	A
Tstg Tj	Storage and junction temperature range			- 40 to + 150 - 40 to + 150	°C °C

Symbol	Parameter	DTV32(F)-		Unit
		1200B	1500B	
V_{RRM}	Repetitive peak reverse voltage	1200	1500	V
V_{RWM}	Reverse working voltage	1000	1350	V

THERMAL RESISTANCES

Symbol	Parameter		Value	Unit
Rth (j-c)	Junction to case	TO220AC	2	°C/W
		ISOWATT220AC	4	

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R *	T_j = 25°C	$V_R = V_{RWM}$			200	µA
	T_j = 100°C				1	mA
V_F **	T_j = 25°C	I_F = 6 A			1.5	V
	T_j = 100°C	I_F = 6 A			1.4	

Pulse test : * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2 %

RECOVERY CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
trr (1)	T_j = 25°C	I_F = 1 A V_R = 30 V	dI_F/dt = -50 A/µs			175	ns
trr (1)	T_j = 25°C		dI_F/dt = -15 A/µs		250		ns
trr	T_j = 25°C	I_F = 100mA	I_R = 100mA		140		ns

TURN ON SWITCHING CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
t_{FR} (2)	T_j = 100°C	I_F = 6 A	dI_F/dt = 80 A/µs		0.6		µs
V_{FP} (2)		V_{FR} = 2 V			39		V

(1)Test following Jedec Standard
(2) Test representative of the application

To evaluate the conduction losses use the following equations :

$V_F = 1.2 + 0.034\ I_F$ $\qquad P = 1.2 \times I_{F(AV)} + 0.034 \times I_F{}^2{}_{(RMS)}$

Fig.1 : Average forward power dissipation versus average forward current.

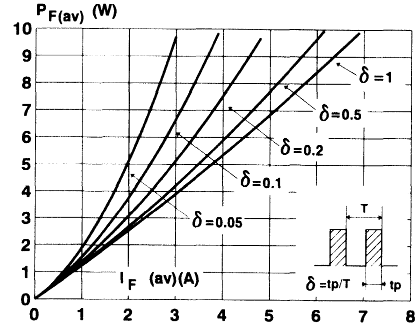


Fig.2 : Peak current versus form factor.

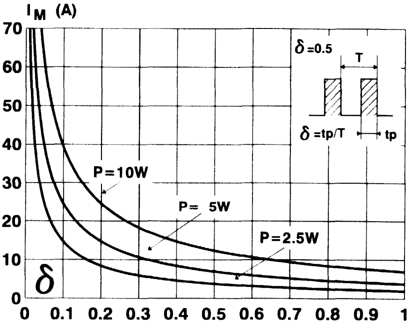


Fig.3 : Average current versus ambient temperature. (duty cycle : 0.5) (TO220AC)

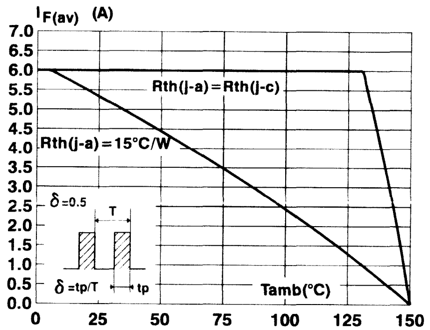


Fig.4 : Average current versus ambient temperature. (duty cycle : 0.5) (ISOWATT220AC)

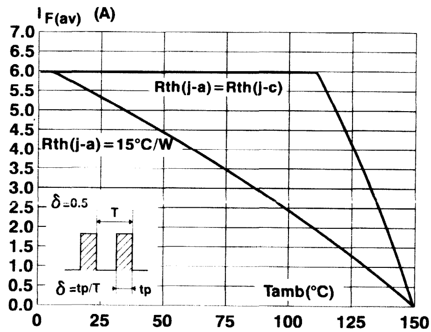


Fig.5 : Non repetitive surge peak forward current versus overload duration.
(Maximum values) (TO220AC)

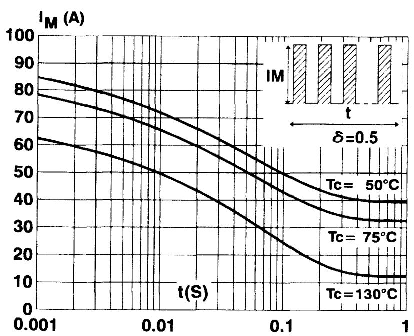


Fig.6 : Non repetitive surge peak forward current versus overload duration.
(Maximum values) (ISOWATT220AC)

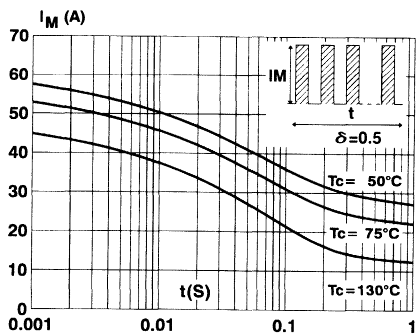


Fig.7 : Relative variation of thermal transient impedance junction to case versus pulse duration.
(TO220AC)

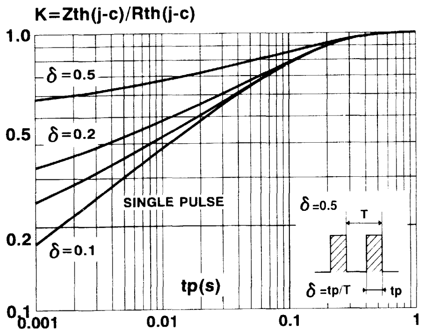


Fig.8 : Relative variation of thermal transient impedance junction to case versus pulse duration.
(ISOWATT220AC)

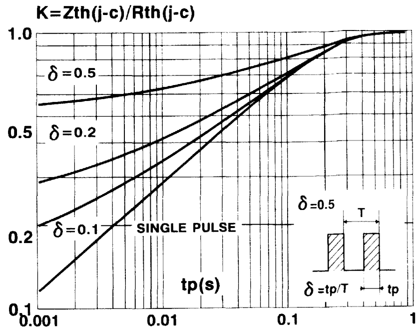


Fig.9 : Forward voltage drop versus forward current.
(Maximum values)

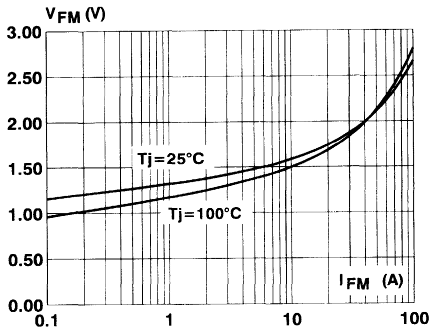


Fig.10 : Junction capacitance versus reverse voltage applied.
(Typical values)

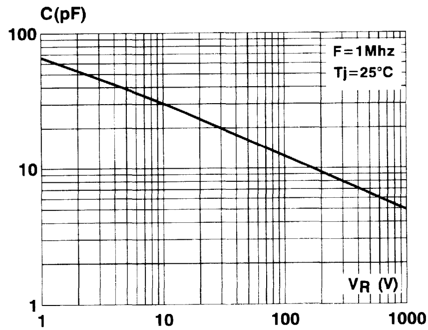


Fig.11 : Recovery charge versus dI_F/dt.

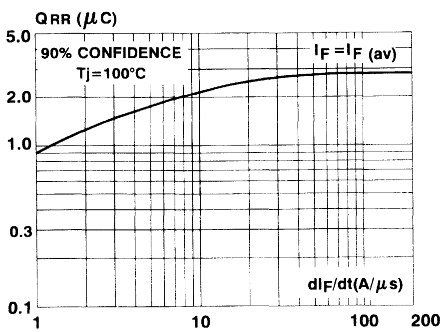


Fig.12 : Peak reverse current versus dI_F/dt.

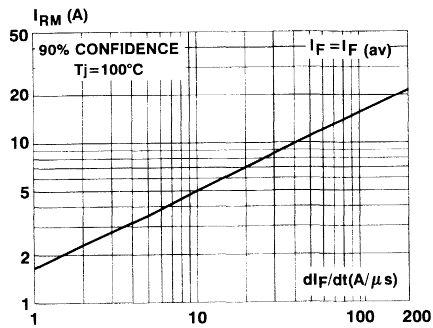


Fig.13 : Dynamic parameters versus junction temperature.

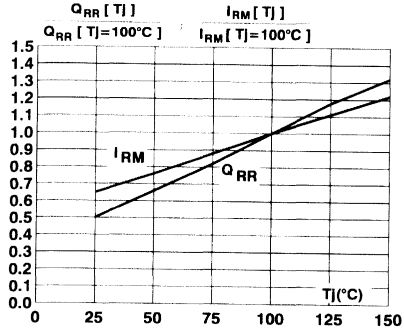


Fig.14 : Peak forward voltage versus dI_F/dt.

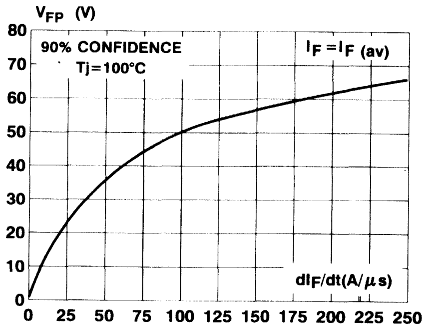
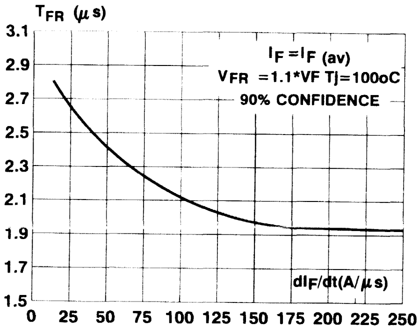
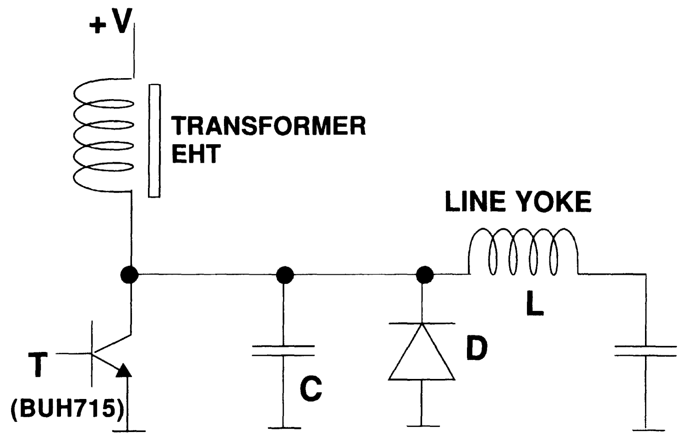


Fig.15 : Recovery time versus dI_F/dt.

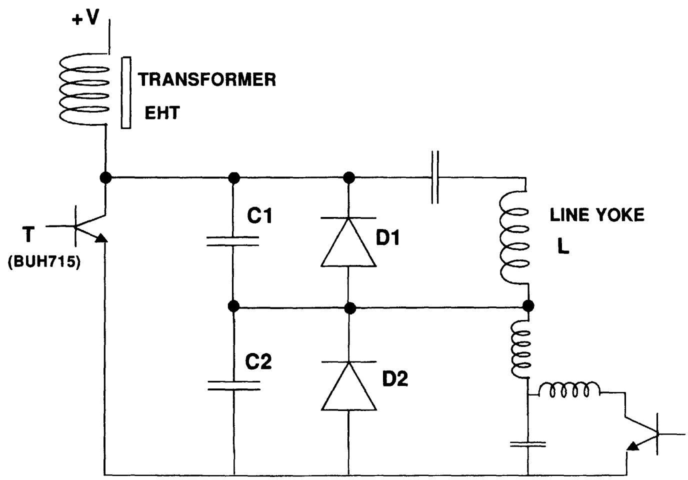


BASIC HORIZONTAL DEFLECTION CIRCUIT



(D=DAMPER DIODE DTV32-1500)

BASIC E-W DIODE MODULATOR CIRCUIT



D1=DTV32-1500 D2=BYT08-400

SGS-THOMSON
MICROELECTRONICS

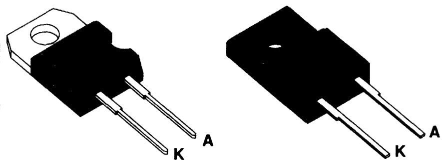
DTV64(F)-1200C

(CRT HORIZONTAL DEFLECTION) HIGH VOLTAGE DAMPER DIODE

TENTATIVE DATASHEET

FEATURES

- HIGH BREAKDOWN VOLTAGE CAPABILITY
- MEDIUM & HIGH FREQUENCY OPERATION
- SPECIFIED TURN ON SWITCHING CHARACTERISTICS
- TYPICAL TOTAL LOSSES : 3 W (I_{Fpeak} = 6 A, F = 64 kHz)
- SUITABLE WITH **BUH** TRANSISTORS SERIES
- INSULATED VERSION (ISOWATT220AC) :
  Insulating voltage = 2000 V DC
  Capacitance = 12 pF



TO220AC (Plastic)	ISOWATT220AC (Plastic)
DTV64-1200C	DTV64F-1200C

DESCRIPTION

High voltage diode especially designed for horizontal deflection stage in standard and high resolution displays for TV's and monitors.
This device is packaged in TO220AC or ISOWATT220AC.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			1200	V
V_{RWM}	Repetitive working voltage			1200	V
$I_{F(RMS)}$	RMS forward current			20	A
$I_{F(AV)}$	Average forward current $\delta = 0.5$	TO220AC	Tc=120°C	6	A
		ISOWATT220AC	Tc=90°C	6	
I_{FSM}	Surge non repetitive forward current		tp=10ms sinusoidal	100	A
Tstg Tj	Storage and junction temperature range			- 40 to + 150 - 40 to + 150	°C °C

THERMAL RESISTANCES

Symbol	Parameter		Value	Unit
Rth (j-c)	Junction to case	TO220AC	2.2	°C/W
		ISOWATT220AC	5.0	

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R *	T_j = 25°C	$V_R = V_{RWM}$			200	µA
	T_j = 100°C				2.0	mA
V_F **	T_j = 25°C	I_F = 6 A			2.0	V
	T_j = 100°C	I_F = 6 A			1.8	

Pulse test : * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2 %

RECOVERY CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
trr (1)	T_j = 25°C	I_F = 1 A V_R = 30 V	dI_F/dt = -50 A/µs			100	ns
trr (1)	T_j = 100°C		dI_F/dt = -15 A/µs		120		ns
trr	T_j = 25°C	I_F = 100mA	I_R = 100mA		70		ns

TURN ON SWITCHING CHARACTERISTICS

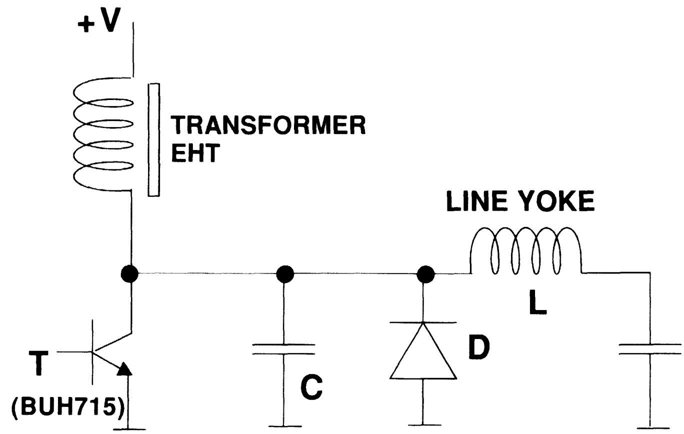
Symbol	Test Conditions			Min.	Typ.	Max.	Unit
t_{FR} (2)	T_j = 100°C	I_F = 6 A	dI_F/dt = 80 A/µs		0.5		µs
V_{FP} (2)		V_{FR} =1.1 x V_F			27		V

(1)Test following Jedec Standard
(2) Test representative of the application

To evaluate the conduction losses use the following equations :

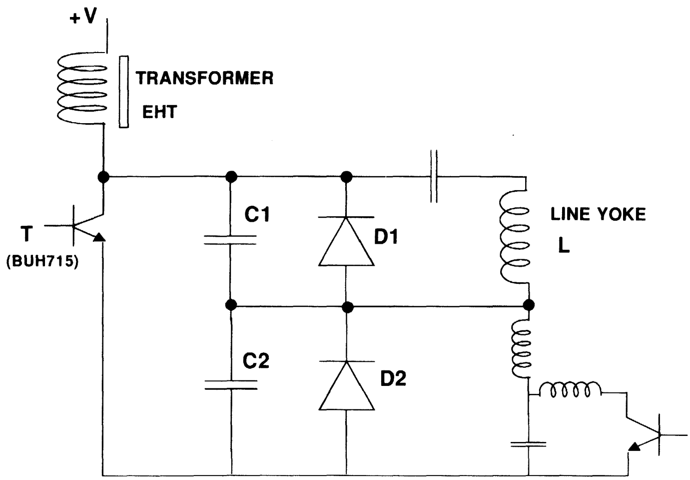
$V_F = 1.5 + 0.050\ I_F$ $\qquad P = 1.5 \times I_{F(AV)} + 0.050 \times I_{F\,(RMS)}^2$

BASIC HORIZONTAL DEFLECTION CIRCUIT



D=DAMPER DIODE DTV64(F)-1200C

BASIC E-W DIODE MODULATOR CIRCUIT



D1=DTV64(F)-1200C D2=STTB506D/F

POWER SCHOTTKY DIODES

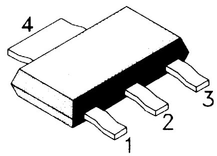
STPS120E
STPS130E
STPS140E

SCHOTTKY RECTIFIER

PRELIMINARY DATA

- VERY SMALL CONDUCTION LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- LOW FORWARD VOLTAGE DROP
- LOW THERMAL RESISTANCE
- EXTREMELY FAST SWITCHING
- SURFACE MOUNTED DEVICE

1 = NC
2 = K
3 = A
4 = K



SOT 223
(Plastic)

DESCRIPTION

Single chip schottky rectifier suited for switchmode power supply and high frequency DC to DC converters.

Packaged in SOT 223, this device is intended for surface mounting and use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
$I_{F(RMS)}$	RMS Forward Current		1.4	A
$I_{F(AV)}$	Average Forward Current	$T_L = 135°C$ $\delta = 0.5$	1	A
I_{FSM}	Surge Non Repetitive Forward Current	tp = 10 ms Sinusoidal	10	A
I_{RRM}	Peak Repetitive Reverse Current	tp = 2 µs F = 1KHz	1	A
Tstg Tj	Storage and Junction Temperature Range		- 65 to + 150 - 65 to + 150	°C
dV/dt	Critical Rate of Rise of Reverse Voltage		1000	V/µs

Symbol	Parameter	STPS			Unit
		120E	130E	140E	
V_{RRM}	Repetitive Peak Reverse Voltage	20	30	40	V

THERMAL RESISTANCE

Symbol	Parameter		Value	Unit
$R_{TH\ (j-t)}$ $R_{TH\ (j-a)}$	Junction to Tab for D.C Junction to Ambient with 5cm^2 Copper Surface Under Tab	Total	20 55	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Tests Conditions		Min.	Typ.	Max.	Unit
I_R **	Tj = 25°C	$V_R = V_{RRM}$			500	µA
	Tj = 100°C				10	mA
V_F *	Tj = 125°C	I_F = 2 A			0.72	V
	Tj = 125°C	I_F = 1 A			0.55	
	Tj = 25°C	I_F = 2 A			0.81	

Pulse test : * tp = 380 µs, duty cycle < 2 %
** tp = 5 ms, duty cycle < 2%

To evaluate the conduction losses use the following equation :
$P = 0.38 \times I_{F(AV)} + 0.17\ I_{F}^{2}{}_{(RMS)}$

Voltage (V)	20	30	40
Marking	S12	S13	S14

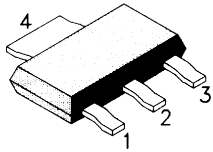
STPS160E

SCHOTTKY RECTIFIER

PRELIMINARY DATA

- VERY SMALL CONDUCTION LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- LOW FORWARD VOLTAGE DROP
- LOW THERMAL RESISTANCE
- EXTREMELY FAST SWITCHING
- SURFACE MOUNTED DEVICE

1 = NC
2 = K
3 = A
4 = K



SOT 223
(Plastic)

DESCRIPTION

Single chip schottky rectifier suited for switchmode power supply and high frequency DC to DC converters.

Packaged in SOT 223, this device is intended for surface mounting and use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		60	V
$I_{F(RMS)}$	RMS Forward Current		1.4	A
$I_{F(AV)}$	Average Forward Current	$T_L = 130°C$ $\delta = 0.5$	1	A
I_{FSM}	Surge Non Repetitive Forward Current	tp = 10 ms Sinusoidal	10	A
I_{RRM}	Peak Repetitive Reverse Current	tp = 2 µs F = 1KHz	1	A
Tstg Tj	Storage and Junction Temperature Range		- 65 to + 150 - 65 to + 150	°C
dV/dt	Critical Rate of Rise of Reverse Voltage		1000	V/µs

THERMAL RESISTANCE

Symbol	Parameter		Value	Unit
$R_{TH\ (j-t)}$ $R_{TH\ (j-a)}$	Junction to Tab for D.C Junction to Ambient with 5cm^2 Copper Surface Under Tab	Total	20 55	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Tests Conditions		Min.	Typ.	Max.	Unit
I_R **	Tj = 25°C	$V_R = V_{RRM}$			500	µA
	Tj = 100°C				8	mA
V_F *	Tj = 125°C	I_F = 2 A			0.82	V
	Tj = 125°C	I_F = 1 A			0.65	
	Tj = 25°C	I_F = 2 A			0.91	

Pulse test : * tp = 380 µs, duty cycle < 2 %
** tp = 5 ms, duty cycle < 2%

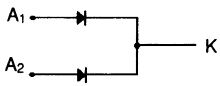
To evaluate the conduction losses use the following equation :
$P = 0.48 \times I_{F(AV)} + 0.17\ I_F{}^2{}_{(RMS)}$

Voltage (V)	60
Marking	S16

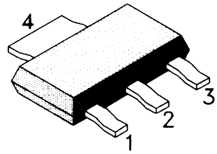
SCHOTTKY RECTIFIER

PRELIMINARY DATA

- VERY SMALL CONDUCTION LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- LOW FORWARD VOLTAGE DROP
- LOW THERMAL RESISTANCE
- EXTREMELY FAST SWITCHING
- SURFACE MOUNTED DEVICE



1 = A_1
2 = K
3 = A_2
4 = K



SOT 223
(Plastic)

DESCRIPTION

Dual center tap schottky rectifier suited for switch-mode power supply and high frequency DC to DC converters.

Packaged in SOT 223, this device is intended for surface mounting and use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter			Value	Unit
$I_{F(RMS)}$	RMS Forward Current		Per diode	1.4	A
$I_{F(AV)}$	Average Forward Current	T_L = 135°C δ = 0.5	Per diode Per device	1 2	A
I_{FSM}	Surge Non Repetitive Forward Current	tp = 10 ms Sinusoidal	Per diode	10	A
I_{RRM}	Peak Repetitive Reverse Current	tp = 2 µs F = 1KHz	Per diode	1	A
Tstg Tj	Storage and Junction Temperature Range			- 65 to + 150 - 65 to + 150	°C
dV/dt	Critical Rate of Rise of Reverse Voltage			1000	V/µs

Symbol	Parameter	STPS			Unit
		220CE	230CE	240CE	
V_{RRM}	Repetitive Peak Reverse Voltage	20	30	40	V

THERMAL RESISTANCE

Symbol	Parameter		Value	Unit
$R_{TH\ (j-t)}$	Junction to Tab for D.C	Total Per diode	12 20	°C/W
$R_{TH\ (j-a)}$	Junction to Ambient with 5cm² Copper Surface Under Tab		55	
$R_{TH\ (c)}$	Coupling		5	°C/W

When the diodes 1 and 2 are used simultaneously :
ΔT_J(diode 1) = P(diode1) x R_{TH}(Per diode) + P(diode 2) x $R_{TH(c)}$

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS (Per diode)

Symbol	Tests Conditions		Min.	Typ.	Max.	Unit
I_R **	Tj = 25°C	$V_R = V_{RRM}$			500	µA
	Tj = 100°C				10	mA
V_F *	Tj = 125°C	I_F = 2 A			0.72	V
	Tj = 125°C	I_F = 1 A			0.55	
	Tj = 25°C	I_F = 2 A			0.81	

Pulse test : * tp = 380 µs, duty cycle < 2 %
** tp = 5 ms, duty cycle < 2%

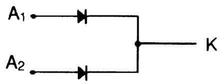
To evaluate the conduction losses use the following equation :
$P = 0.38 \times I_{F(AV)} + 0.17 I_F{}^2{}_{(RMS)}$

Voltage (V)	20	30	40
Marking	T22	T23	T24

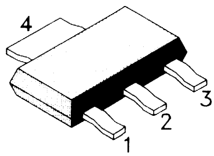
SCHOTTKY RECTIFIER

PRELIMINARY DATA

- VERY SMALL CONDUCTION LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- LOW FORWARD VOLTAGE DROP
- LOW THERMAL RESISTANCE
- EXTREMELY FAST SWITCHING
- SURFACE MOUNTED DEVICE



1 = A1
2 = K
3 = A2
4 = K



SOT 223
(Plastic)

DESCRIPTION

Dual center tap schottky rectifier suited for switch-mode power supply and high frequency DC to DC converters.

Packaged in SOT 223, this device is intended for surface mounting and use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage			60	V
$I_{F(RMS)}$	RMS Forward Current		Per diode	1.4	A
$I_{F(AV)}$	Average Forward Current	T_L = 130°C δ = 0.5	Per diode Per device	1 2	A
I_{FSM}	Surge Non Repetitive Forward Current	tp = 10 ms Sinusoidal	Per diode	10	A
I_{RRM}	Peak Repetitive Reverse Current	tp = 2 µs F = 1KHz	Per diode	1	A
Tstg Tj	Storage and Junction Temperature Range			- 65 to + 150 - 65 to + 150	°C
dV/dt	Critical Rate of Rise of Reverse Voltage			1000	V/µs

THERMAL RESISTANCE

Symbol	Parameter		Value	Unit
$R_{TH\ (j-t)}$ $R_{TH\ (j-a)}$	Junction to Tab for D.C Junction to Ambient with $5cm^2$ Copper Surface Under Tab	Total Per diode	12 20 55	°C/W
$R_{TH\ (c)}$	Coupling		5	°C/W

When the diodes 1 and 2 are used simultaneously :
ΔT_J(diode 1) = P(diode1) x R_{TH}(Per diode) + P(diode 2) x $R_{TH(c)}$

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS (Per diode)

Symbol	Tests Conditions		Min.	Typ.	Max.	Unit
I_R **	Tj = 25°C	$V_R = V_{RRM}$			500	µA
	Tj = 100°C				8	mA
V_F *	Tj = 125°C	I_F = 2 A			0.82	V
	Tj = 125°C	I_F = 1 A			0.65	
	Tj = 25°C	I_F = 2 A			0.91	

Pulse test : * tp = 380 µs, duty cycle < 2 %
** tp = 5 ms, duty cycle < 2%

To evaluate the conduction losses use the following equation :
$P = 0.48 \times I_{F(AV)} + 0.17\ I_F^2{}_{(RMS)}$

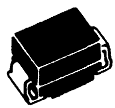
Voltage (V)	60
Marking	T26

SGS-THOMSON
MICROELECTRONICS

STPS320U
STPS330U
STPS340U

POWER SCHOTTKY RECTIFIER

- VERY SMALL CONDUCTION LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- LOW FORWARD VOLTAGE DROP
- LOW THERMAL RESISTANCE
- EXTREMELY FAST SWITCHING
- SURFACE MOUNTED DEVICE



SOD 6
(Plastic)

DESCRIPTION

Single chip schottky rectifier suited for switchmode power supply and high frequency DC to DC converters.

Packaged in SOD 6 *, this device is intended for surface mounting and use in low voltage, high frequency inverters, free wheeling and polarity protection applications.
(*) in accordance with DO214AA standard.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
$I_{F(RMS)}$	RMS Forward Current		10	A
$I_{F(AV)}$	Average Forward Current	T_L = 105°C δ = 0.5	3	A
I_{FSM}	Surge Non Repetitive Forward Current	Tp = 10 ms Sinusoidal	75	A
I_{RRM}	Peak Repetitive Reverse Current	Tp = 2 µs F = 1KHz	1	A
Tstg Tj	Storage and Junction Temperature Range		- 65 to + 150 - 65 to + 150	°C
dV/dt	Critical Rate of Rise of Reverse Voltage		1000	V/µs

Symbol	Parameter	STPS			Unit
		320U	330U	340U	
V_{RRM}	Repetitive Peak Reverse Voltage	20	30	40	V

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{TH\ (j-l)}$	Junction-leads	20	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Tests Conditions		Min.	Typ.	Max.	Unit
I_R **	Tj = 25°C	$V_R = V_{RRM}$			100	µA
	Tj = 125°C				10	mA
V_F *	Tj = 125°C	I_F = 6 A			0.72	V
	Tj = 125°C	I_F = 3 A			0.57	
	Tj = 25°C	I_F = 6 A			0.84	

Pulse test : * tp = 380 µs, duty cycle < 2 %
** tp = 5 ms, duty cycle < 2%

To evaluate the conduction losses use the following equation :
$P = 0.42 \times I_{F(AV)} + 0.050\, I_{F}^{2}{}_{(RMS)}$

Figure 1 : Average forward power dissipation versus average forward current.

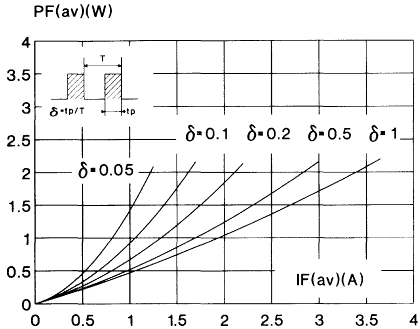


Figure 2 : Average current versus ambient temperature. (duty cycle : 0.5)

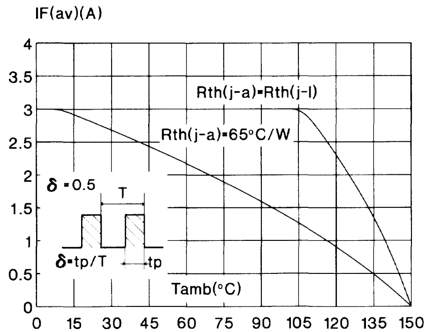


Figure 3 : Non repetitive surge peak forward current versus overload duration. (Maximum values)

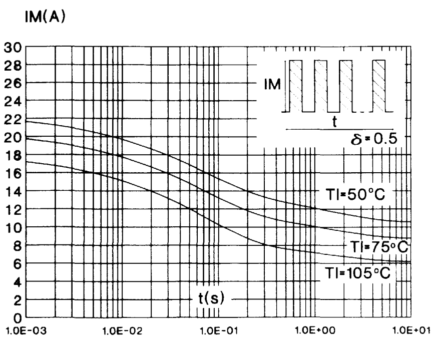


Figure 4 : Relative variation of thermal transient impedance junction to lead versus pulse duration.

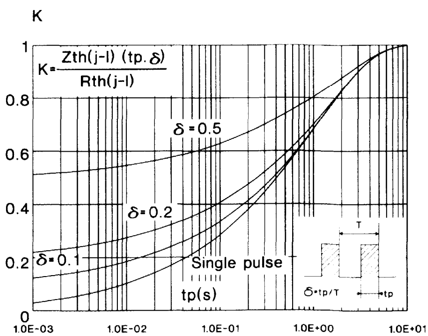


Figure 5 : Reverse leakage current versus reverse voltage applied. (Typical values)

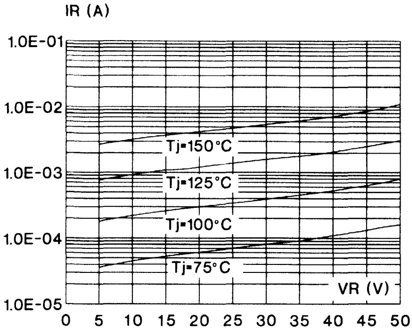


Figure 6 : Junction capacitance versus reverse voltage applied. (Typical values)

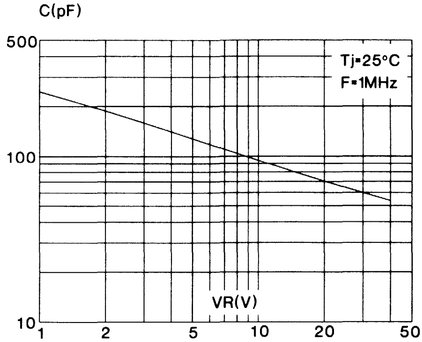
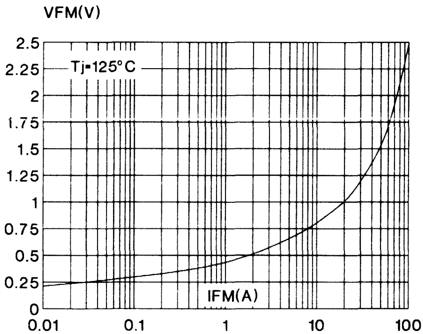


Figure 7 : Forward voltage drop versus forward current. (Maximum values)



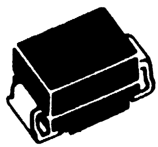
Voltage (V)	20	30	40
Marking	U32	U33	U34

Laser marking
Logo indicates cathode

STPS320S
STPS330S
STPS340S

POWER SCHOTTKY RECTIFIER

- VERY SMALL CONDUCTION LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- EXTREMELY FAST SWITCHING
- LOW FORWARD VOLTAGE DROP
- HIGH AVALANCHE CAPABILITY
- LOW THERMAL RESISTANCE
- SURFACE MOUNTED DEVICE



SOD 15
(Plastic)

DESCRIPTION

Single chip schottky rectifier suited for switchmode power supply and high frequency DC to DC converters.

Packaged in SOD 15, this device is intended for surface mounting and use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
$I_{F(RMS)}$	RMS Forward Current		10	A
$I_{F(AV)}$	Average Forward Current	T_L = 105°C δ = 0.5	3	A
I_{FSM}	Surge Non Repetitive Forward Current	Tp = 10 ms Sinusoidal	75	A
I_{RRM}	Peak Repetitive Reverse Current	Tp = 2 µs F = 1KHz	1	A
Tstg Tj	Storage and Junction Temperature Range		- 65 to + 150 - 65 to + 150	°C
dV/dt	Critical Rate of Rise of Reverse Voltage		1000	V/µs

Symbol	Parameter	STPS			Unit
		320S	330S	340S	
V_{RRM}	Repetitive Peak Reverse Voltage	20	30	40	V

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{TH\ (j\text{-}l)}$	Junction-leads	20	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Tests Conditions		Min.	Typ.	Max.	Unit
I_R *	Tj = 25°C	$V_R = V_{RRM}$			100	µA
	Tj = 125°C				10	mA
V_F **	Tj = 125°C	I_F = 6 A			0.72	V
	Tj = 125°C	I_F = 3 A			0.57	
	Tj = 25°C	I_F = 6 A			0.84	

Pulse test : * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2%

To evaluate the conduction losses use the following equation :
$P = 0.42 \times I_{F(AV)} + 0.050 \, I_F{}^2{}_{(RMS)}$

Figure 1 : Average forward power dissipation versus average forward current.

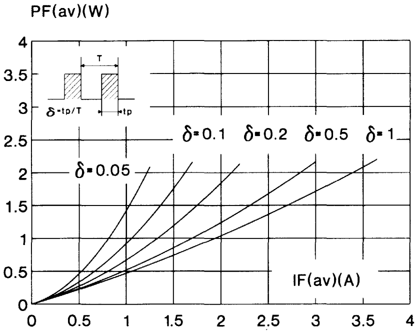


Figure 2 : Average current versus ambient temperature. (duty cycle : 0.5)

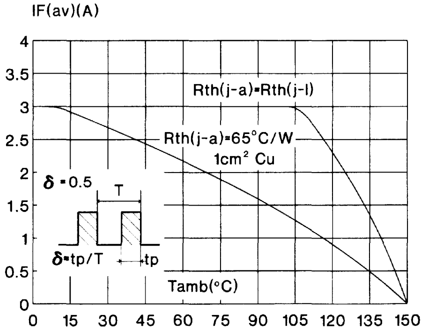


Figure 3 : Non repetitive surge peak forward current versus overload duration. (Maximum values)

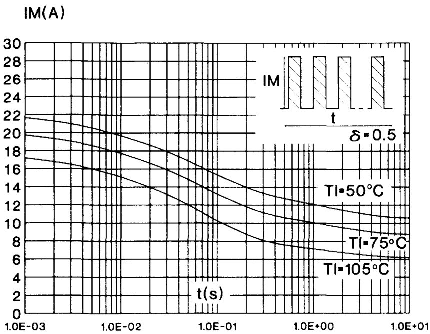
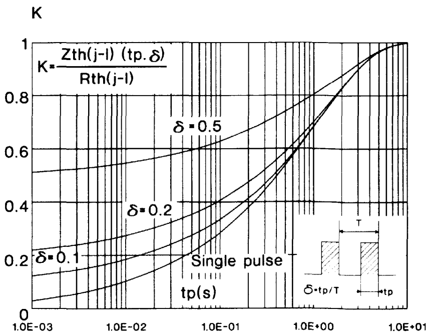


Figure 4 : Relative variation of thermal transient impedance junction to lead versus pulse duration.



SGS-THOMSON MICROELECTRONICS

Figure 5 : Reverse leakage current versus reverse voltage applied. (Typical values)

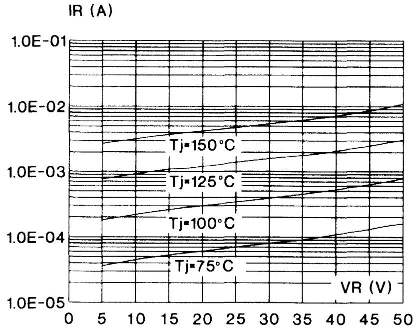


Figure 6 : Junction capacitance versus reverse voltage applied. (Typical values)

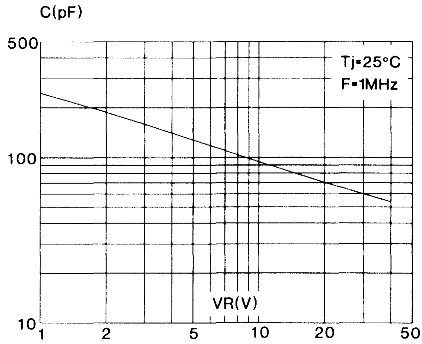
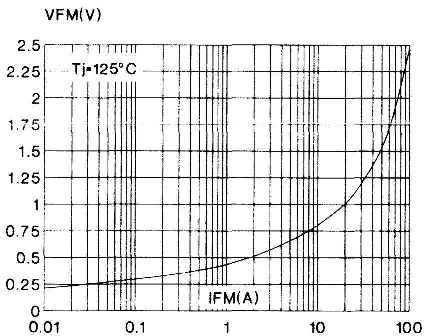


Figure 7 : Forward voltage drop versus forward current. (Maximum values)



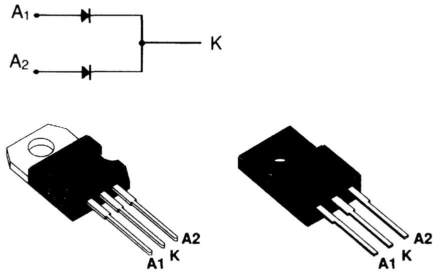
Voltage (V)	20	30	40
Marking	S32	S33	S34

Laser marking
Logo indicates cathode

STPS620CT/CF
STPS630CT/CF
STPS640CT/CF

POWER SCHOTTKY RECTIFIER

- VERY SMALL CONDUCTION LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- EXTREMELY FAST SWITCHING
- LOW FORWARD VOLTAGE DROP
- HIGH AVALANCHE CAPABILITY
- LOW THERMAL RESISTANCE
- INSULATED PACKAGE :
  Insulating voltage = 2000V DC
  Capacitance = 12pF



TO220AB (Plastic)

STPS620CT
STPS630CT
STPS640CT

ISOWATT220AB (Plastic)

STPS620CF
STPS630CF
STPS640CF

DESCRIPTION

Dual center tap schottky rectifier suited for switch-mode power supply and high frequency DC to DC converters.

Packaged in TO220AB and ISOWATT220AB, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter				Value	Unit
$I_{F(RMS)}$	RMS Forward Current			Per diode	10	A
$I_{F(AV)}$	Average Forward Current $\delta = 0.5$	TO220AB	Tc = 135°C	Per diode	3	A
		ISOWATT220AB	Tc = 130°C	Per device	6	
I_{FSM}	Surge Non Repetitive Forward Current		Tp = 10 ms Sinusoidal	Per diode	75	A
I_{RRM}	Peak Repetitive Reverse Current		Tp = 2 µs F = 1KHz	Per diode	1	A
Tstg Tj	Storage and Junction Temperature Range				- 65 to + 150 - 65 to + 150	°C
dV/dt	Critical Rate of Rise of Reverse Voltage				1000	V/µs

Symbol	Parameter	STPS			Unit
		620CT 620CF	630CT 630CF	640CT 640CF	
V_{RRM}	Repetitive Peak Reverse Voltage	20	30	40	V

THERMAL RESISTANCE

Symbol	Parameter			Value	Unit
$R_{TH\ (j-c)}$	Junction-case	TO220AB	Per diode total	5.5 3.0	°C/W
		ISOWATT220AB	Per diode total	7.5 5.2	
$R_{TH\ (c)}$	Coupling	TO220AB		0.5	°C/W
		ISOWATT220AB		3	

When the diodes 1 and 2 are used simultaneously :
ΔT_J(diode 1) = P(diode1) x R_{TH}(Per diode) + P(diode 2) x $R_{TH(c)}$

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS PER DIODE

Symbol	Tests Conditions		Min.	Typ.	Max.	Unit
I_R *	Tj = 25°C	$V_R = V_{RRM}$			100	µA
	Tj = 125°C				10	mA
V_F **	Tj = 125°C	I_F = 6 A			0.72	V
	Tj = 125°C	I_F = 3 A			0.57	
	Tj = 25°C	I_F = 6 A			0.84	

Pulse test : * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2%

To evaluate the conduction losses use the following equation :
$P = 0.42 \times I_{F(AV)} + 0.050\ I_F{}^2{}_{(RMS)}$

Fig. 1 : Average forward power dissipation versus average forward current. (Per diode)

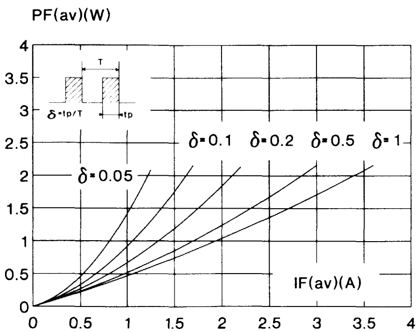


Fig. 2 : Average current versus ambient temperature. (duty cycle : 0.5) (Per diode) (TO220AB)

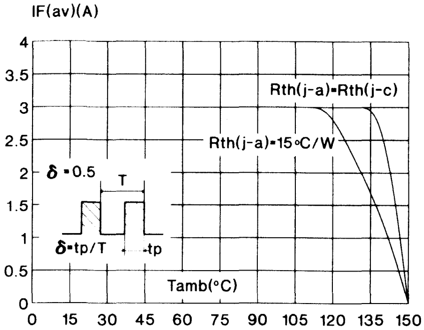


Fig. 3 : Average current versus ambient temperature. (duty cycle : 0.5) (Per diode) (ISOWATT220AB)

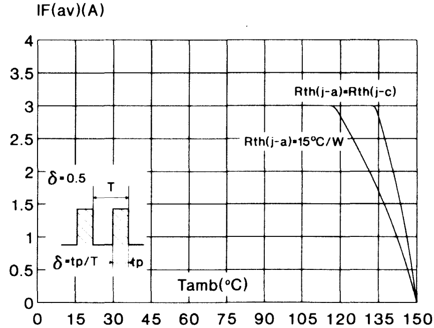


Fig. 4 : Non repetitive surge peak forward current versus overload duration. (Maximum values) (Per diode) (TO220AB)

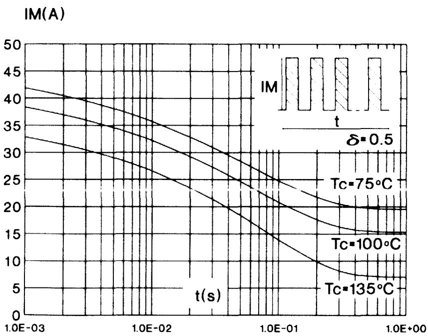


Fig. 5 : Non repetitive surge peak forward current versus overload duration. (Maximum values) (Per diode) (ISOWATT220AB)

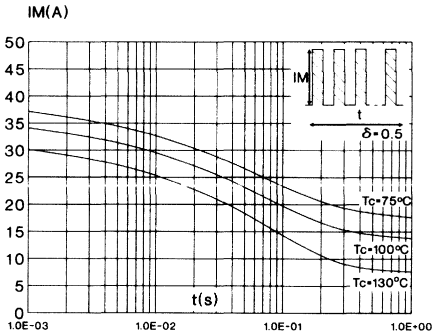


Fig. 6 : Relative variation of thermal transient impedance junction to case versus pulse duration. (TO220AB)

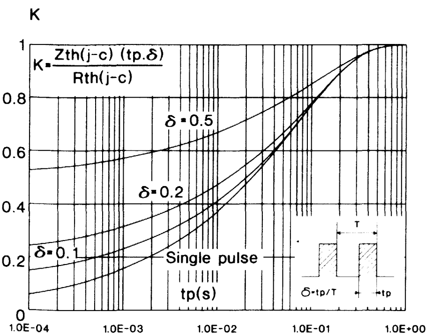


Fig. 7 : Relative variation of thermal transient impedance junction to case versus pulse duration. (ISOWATT220AB)

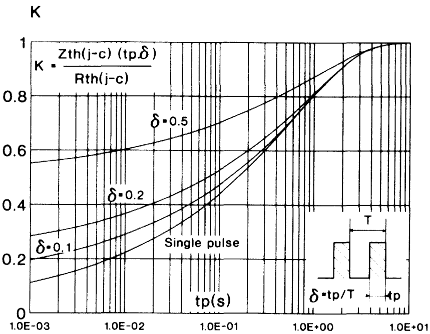


Fig. 8 : Reverse leakage current versus reverse voltage applied. (Typical values) (Per diode)

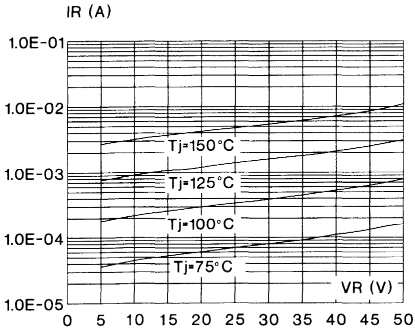


Fig. 9 : Junction capacitance versus reverse voltage applied. (Typical values) (Per diode)

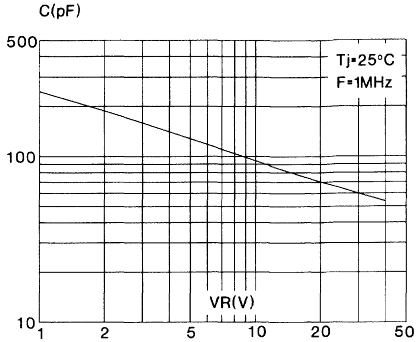
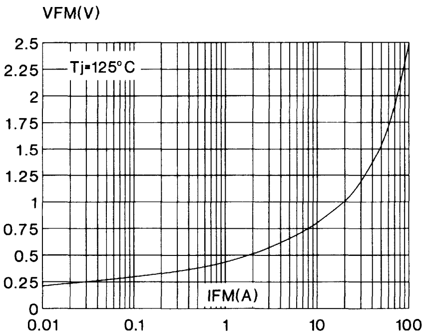


Fig. 10 : Forward voltage drop versus forward current. (Maximum values) (Per diode)



SGS-THOMSON MICROELECTRONICS

STPS640CM

POWER SCHOTTKY RECTIFIER

MAIN PRODUCT CHARACTERISTICS

$I_{F(AV)}$	2 x 3 A
V_{RRM}	45 V
V_F	0.57 V

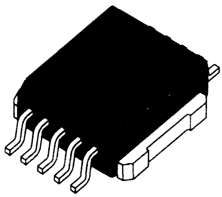
FEATURES AND BENEFITS

- VERY SMALL CONDUCTION LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- HIGH AVALANCHE CAPABILITY
- HIGH DISSIPATION MINIATURE PACKAGE
- SURFACE MOUNT TECHNOLOGY COMPATIBLE

DESCRIPTION

Dual schottky rectifier suited for switchmode power supply and high frequency DC to DC converters.

Packaged in a high performance surface mount package PSO-10, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.



Power SO-10™
Plastic, non isolated SMD
with copper tab

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage			40	V
$I_{F(RMS)}$	RMS Forward Current	All pins connected	Per diode	11	A
$I_{F(AV)}$	Average Forward Current $\delta = 0.5$	Tc = 135°C	Per diode	3	A
			Per device	6	
I_{FSM}	Surge Non Repetitive Forward Current	tp = 10 ms Sinusoidal All pins connected	Per diode	75	A
I_{RRM}	Repetitive Peak Reverse Current	tp = 2 µs F = 1KHz	Per diode	1	A
Tstg Tj	Storage and Junction Temperature Range			- 65 to + 150	°C
dV/dt	Critical Rate of Rise of Reverse Voltage			1000	V/µs

TM : ISOTOP is a trademark of SGS-THOMSON Microelectronics.

THERMAL RESISTANCES

Symbol	Parameter		Value	Unit
$R_{TH\ (j-c)}$	Junction to Case Thermal Resistance	Per diode total	5.5 3.0	°C/W
$R_{TH\ (c)}$	Coupling Thermal Resistance		0.5	°C/W

STATIC ELECTRICAL CHARACTERISTICS (Per diode)

Symbol	Tests Conditions	Tests Conditions		Min.	Typ.	Max.	Unit
I_R *	Reverse leakage Current	Tj = 25°C	$V_R = V_{RRM}$			100	µA
		Tj = 125°C				10	mA
V_F **	Forward Voltage drop	Tj = 125°C	I_F = 6 A			0.72	V
		Tj = 125°C	I_F = 3 A			0.57	
		Tj = 25°C	I_F = 6 A			0.84	

Pulse test : * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2%

To evaluate the conduction losses use the following equation :
$P = 0.42 \times I_{F(AV)} + 0.050\ I_F{}^2{}_{(RMS)}$

PIN OUT configuration in PowerSO-10 :

Anode 1 = pin 1 to 5
Anode 2 = pin 6 to 10
Cathodes = connected to base tab

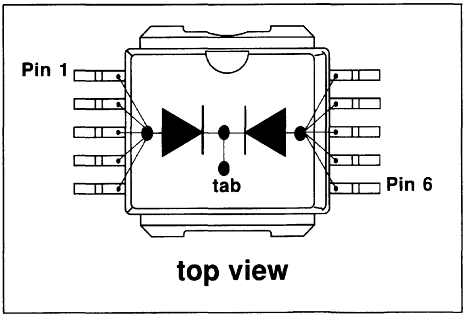


Fig. 1 : Average forward power dissipation versus average forward current. (Per diode)

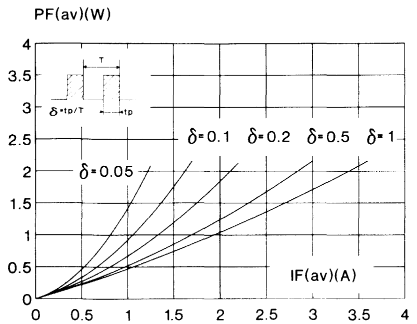


Fig. 2 : Average current versus ambient temperature.

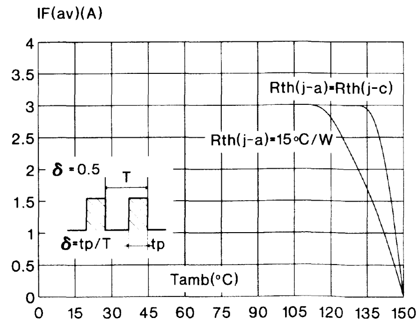


Fig. 3 : Non repetitive surge peak forward current versus overload duration. (Maximum values) (Per diode)

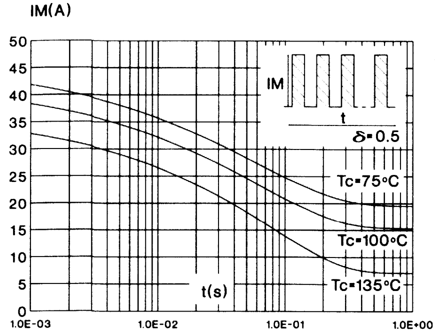


Fig. 4 : Relative variation of thermal transient impedance junction to case versus pulse duration.

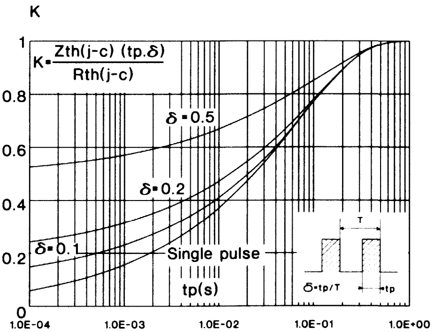


Fig. 5 : Reverse leakage current versus reverse voltage applied. (Typical values) (Per diode)

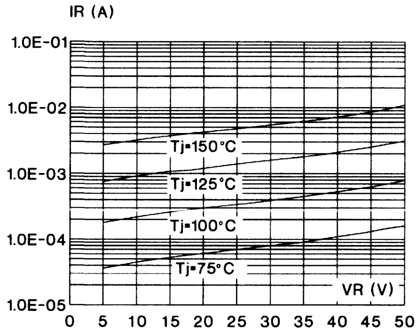


Fig. 6 : Junction capacitance versus reverse voltage applied. (Typical values) (Per diode)

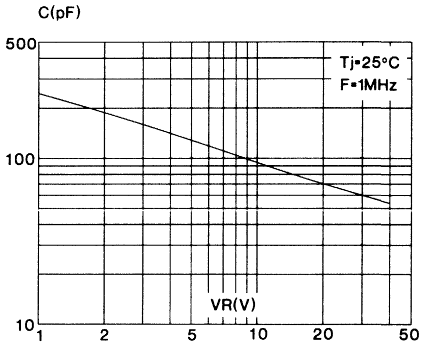
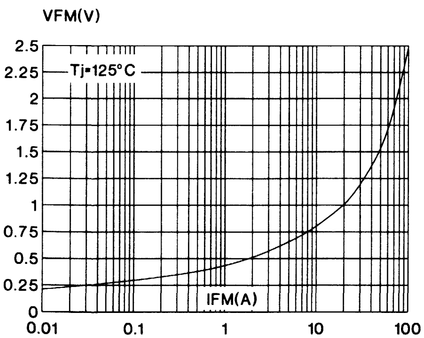


Fig. 7 : Forward voltage drop versus forward current. (Maximum values) (Per diode)

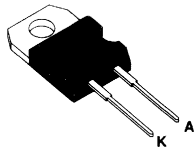


STPS735D/F
STPS745D/F

SGS-THOMSON MICROELECTRONICS

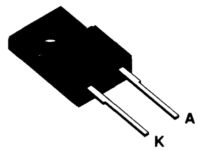
POWER SCHOTTKY RECTIFIER

- VERY SMALL CONDUCTION LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- EXTREMELY FAST SWITCHING
- LOW FORWARD VOLTAGE DROP
- HIGH AVALANCHE CAPABILITY
- LOW THERMAL RESISTANCE
- INSULATED PACKAGE :
  Insulating voltage = 2000V DC
  Capacitance = 12pF



TO220AC
(Plastic)

STPS735D
STPS745D



ISOWATT220AC
(Plastic)

STPS735F
STPS745F

DESCRIPTION

Single chip schottky rectifier suited for switchmode power supply and high frequency DC to DC converters.

Packaged in TO220AC and ISOWATT220AC, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter			Value	Unit
$I_{F(RMS)}$	RMS Forward Current			20	A
$I_{F(AV)}$	Average Forward Current δ = 0.5	TO220AC	Tc = 135°C	7.5	A
		ISOWATT220AC	Tc = 120°C		
I_{FSM}	Surge Non Repetitive Forward Current		Tp = 10 ms Sinusoidal	150	A
I_{RRM}	Peak Repetitive Reverse Current		Tp = 2 µs F = 1KHz	1	A
Tstg Tj	Storage and Junction Temperature Range			- 65 to + 150 - 65 to + 150	°C
dV/dt	Critical Rate of Rise of Reverse Voltage			1000	V/µs

Symbol	Parameter	STPS		Unit
		735D **735F**	**745D** **745F**	
V_{RRM}	Repetitive Peak Reverse Voltage	35	45	V

THERMAL RESISTANCE

Symbol	Parameter		Value	Unit
$R_{TH\ (j-c)}$	Junction-case	TO220AC	3.0	°C/W
		ISOWATT220AC	5.5	

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Tests Conditions		Min.	Typ.	Max.	Unit
I_R *	Tj = 25°C	$V_R = V_{RRM}$			100	µA
	Tj = 125°C				15	mA
V_F **	Tj = 125°C	I_F = 15 A			0.72	V
	Tj = 125°C	I_F = 7.5 A			0.57	
	Tj = 25°C	I_F = 15 A			0.84	

Pulse test : * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2%

To evaluate the conduction losses use the following equation :
$P = 0.42 \times I_{F(AV)} + 0.020\ I_F^2{}_{(RMS)}$

Fig. 1 : Average forward power dissipation versus average forward current.

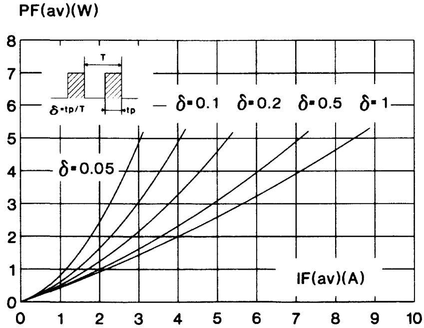


Fig. 2 : Average current versus ambient temperature.
(duty cycle : 0.5) (TO220AC)

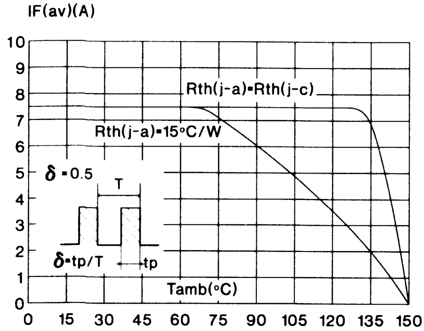


Fig. 3 : Average current versus ambient temperature.
(duty cycle : 0.5) (TISOWAT220AC)

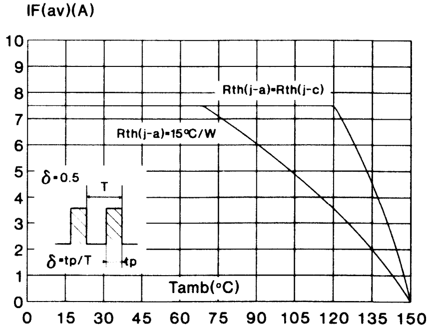


Fig. 4 : Non repetitive surge peak forward current versus overload duration.
(Maximum values) (TO220AC)

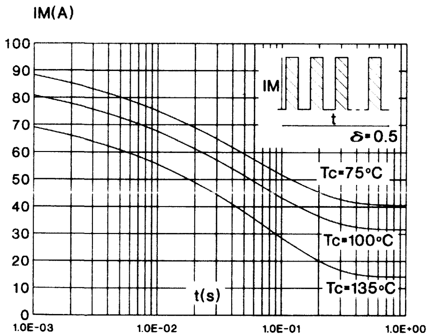


Fig. 5 : Non repetitive surge peak forward current versus overload duration.
(Maximum values) (ISOWATT220AC)

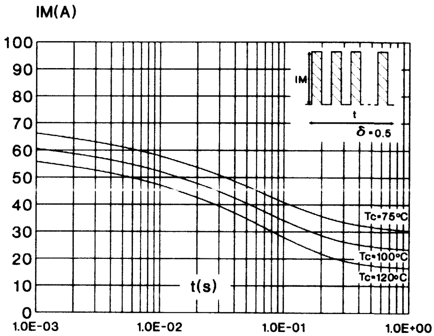


Fig. 6 : Relative variation of thermal transient impedance junction to case versus pulse duration.
(TO220AC)

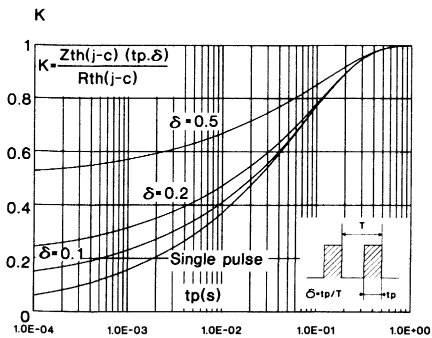


Fig. 7 : Relative variation of thermal transient impedance junction to case versus pulse duration.
(ISOWATT220AC)

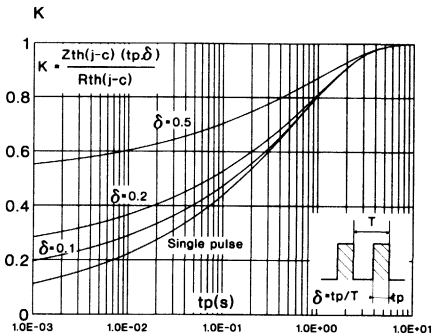


Fig. 8 : Reverse leakage current versus reverse voltage applied. (Typical values)

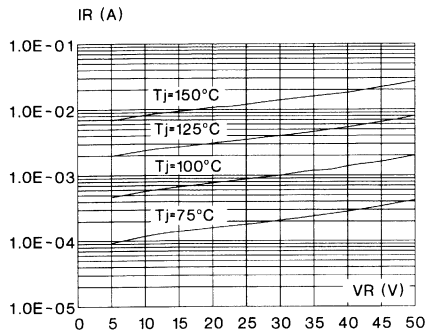


Fig. 9 : Junction capacitance versus reverse voltage applied. (Typical values)

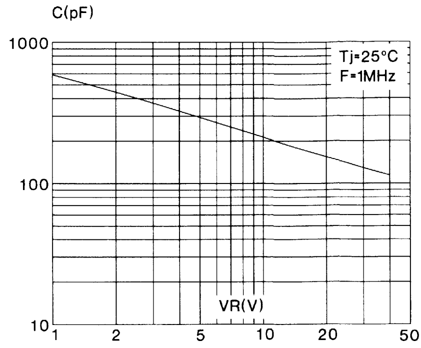
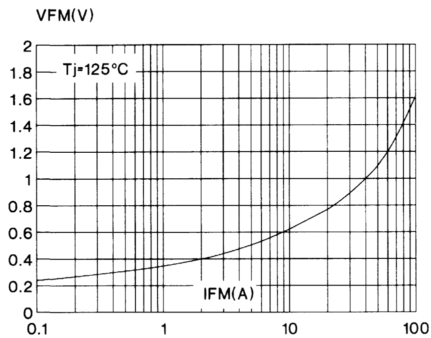


Fig. 10 : Forward voltage drop versus forward current. (Maximum values)



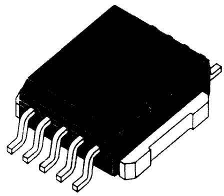
POWER SCHOTTKY RECTIFIER

MAIN PRODUCT CHARACTERISTICS

$I_{F(AV)}$	7.5 A
V_{RRM}	45 V
V_F	0.57 V

FEATURES AND BENEFITS

- VERY SMALL CONDUCTION LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- HIGH AVALANCHE CAPABILITY
- HIGH DISSIPATION MINIATURE PACKAGE
- SURFACE MOUNT TECHNOLOGY COMPATIBLE



Power SO-10™
Plastic, non isolated SMD with copper tab

DESCRIPTION

Dual schottky rectifier suited for switchmode power supply and high frequency DC to DC converters.

Packaged in a high performance surface mount package PSO-10, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		45	V
$I_{F(RMS)}$	RMS Forward Current (All pins connected)		17	A
$I_{F(AV)}$	Average Forward Current	Tc = 135°C δ = 0.5	7.5	A
I_{FSM}	Surge Non Repetitive Forward Current (All pins connected)	tp = 10 ms Sinusoidal	150	A
I_{RRM}	Repetitive Peak Reverse Current	tp = 2 µs F = 1KHz	1	A
Tstg Tj	Storage and Junction Temperature Range		- 65 to + 150	°C
dV/dt	Critical Rate of Rise of Reverse Voltage		1000	V/µs

TM : PowerSO-10 is a trademark of SGS-THOMSON Microelectronics.

THERMAL RESISTANCES

Symbol	Parameter	Value	Unit
$R_{TH\ (j-c)}$	Junction to Case Thermal Resistance	3.0	°C/W

STATIC ELECTRICAL CHARACTERISTICS (Per diode)

Symbol	Tests Conditions	Tests Conditions		Min.	Typ.	Max.	Unit
I_R *	Reverse leakage Current	Tj = 25°C	$V_R = V_{RRM}$			100	µA
		Tj = 125°C				15	mA
V_F **	Forward Voltage drop	Tj = 125°C	I_F = 15 A			0.72	V
		Tj = 125°C	I_F = 7.5 A			0.57	
		Tj = 25°C	I_F = 15 A			0.84	

Pulse test : * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2%

To evaluate the conduction losses use the following equation :
$P = 0.42 \times I_{F(AV)} + 0.020\ I_{F}^{2}{}_{(RMS)}$

PIN OUT configuration in PowerSO-10 :

Anode = pin 1 to 5
Cathode = connected to base tab

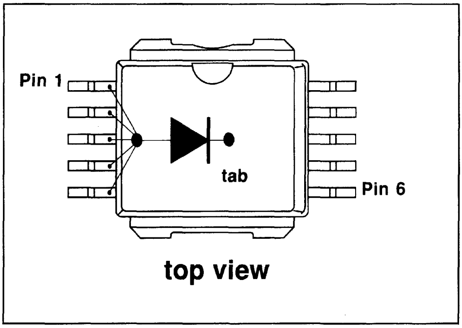


Fig. 1 : Average forward power dissipation versus average forward current.

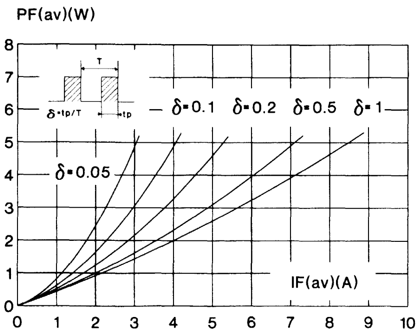
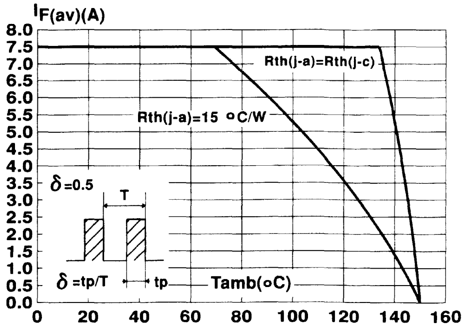


Fig. 2 : Average current versus ambient temperature. (duty cycle : 0.5)



SGS-THOMSON MICROELECTRONICS

Fig. 3 : Non repetitive surge peak forward current versus overload duration. (Maximum values)

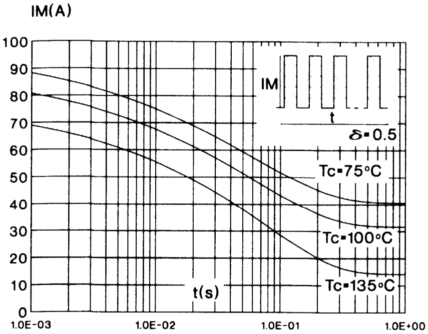


Fig. 4 : Relative variation of thermal transient impedance junction to case versus pulse duration.

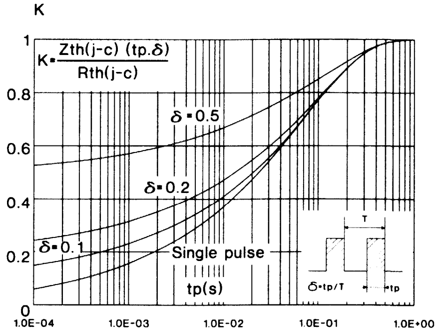


Fig. 5 : Reverse leakage current versus reverse voltage applied. (Typical values)

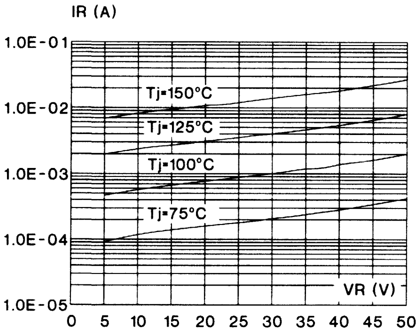


Fig. 6 : Junction capacitance versus reverse voltage applied. (Typical values)

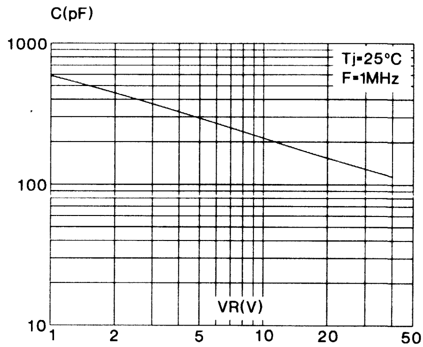
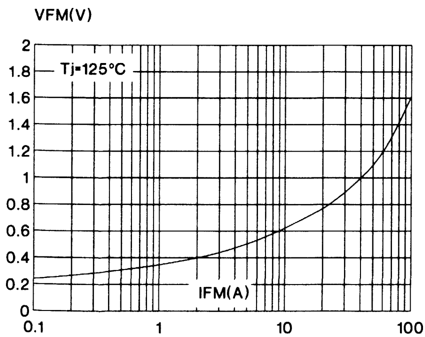


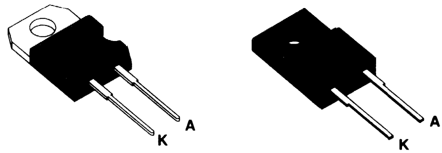
Fig. 7 : Forward voltage drop versus forward current. (Maximum values)



STPS1035D/F
STPS1045D/F

POWER SCHOTTKY RECTIFIER

- VERY SMALL CONDUCTION LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- EXTREMELY FAST SWITCHING
- LOW FORWARD VOLTAGE DROP
- HIGH AVALANCHE CAPABILITY
- LOW THERMAL RESISTANCE
- INSULATED PACKAGE :
  Insulating voltage = 2000V DC
  Capacitance = 12pF



TO220AC
(Plastic)

STPS1035D
STPS1045D

ISOWATT220AC
(Plastic)

STPS1035F
STPS1045F

DESCRIPTION

Single chip schottky rectifier suited for switchmode power supply and high frequency DC to DC converters.

Packaged in TO220AC and ISOWATT220AC, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter			Value	Unit
$I_{F(RMS)}$	RMS Forward Current			30	A
$I_{F(AV)}$	Average Forward Current $\delta = 0.5$	TO220AC	Tc = 135°C	10	A
		ISOWATT220AC	Tc = 120°C		
I_{FSM}	Surge Non Repetitive Forward Current		Tp = 10 ms Sinusoidal	180	A
I_{RRM}	Peak Repetitive Reverse Current		Tp = 2 µs F = 1KHz	1	A
Tstg Tj	Storage and Junction Temperature Range			- 65 to + 150 - 65 to + 150	°C
dV/dt	Critical Rate of Rise of Reverse Voltage			1000	V/µs

Symbol	Parameter	STPS		Unit
		1035D 1035F	1045D 1045F	
V_{RRM}	Repetitive Peak Reverse Voltage	35	45	V

THERMAL RESISTANCE

Symbol	Parameter		Value	Unit
$R_{TH\ (j-c)}$	Junction-case	TO220AC	2.2	°C/W
		ISOWATT220AC	4.5	

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Tests Conditions		Min.	Typ.	Max.	Unit
I_R *	Tj = 25°C	$V_R = V_{RRM}$			100	µA
	Tj = 125°C				15	mA
V_F **	Tj = 125°C	I_F = 20 A			0.72	V
	Tj = 125°C	I_F = 10 A			0.57	
	Tj = 25°C	I_F = 20 A			0.84	

Pulse test : * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2%

To evaluate the conduction losses use the following equation :
$P = 0.42 \times I_{F(AV)} + 0.015\ I_F^2{}_{(RMS)}$

Fig. 1 : Average forward power dissipation versus average forward current.

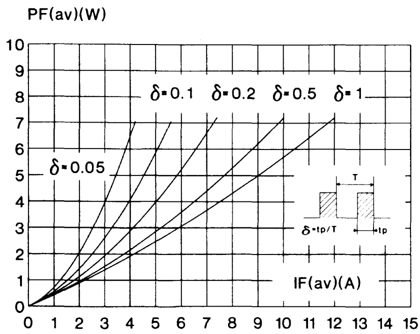


Fig. 2 : Average current versus ambient temperature. (duty cycle : 0.5) (TO220AC)

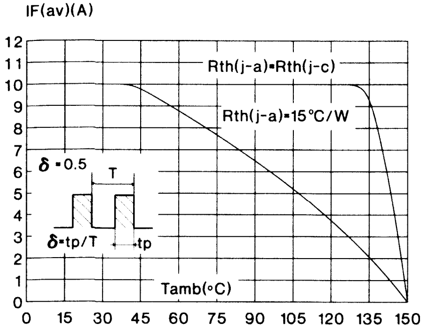


Fig. 3 : Average current versus ambient temperature. (duty cycle : 0.5) (ISOWATT220AC)

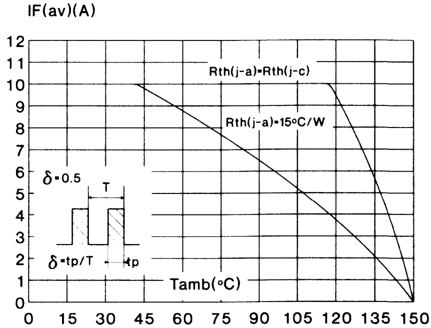


Fig. 4 : Non repetitive surge peak forward current versus overload duration. (Maximum values) (TO220AC)

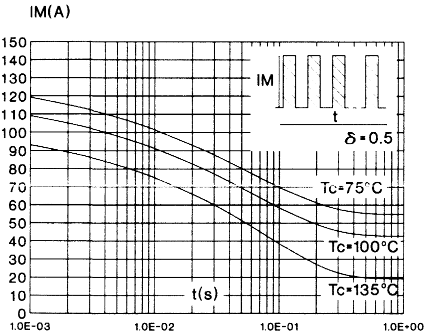


Fig. 5 : Non repetitive surge peak forward current versus overload duration. (Maximum values) (ISOWATT220AC)

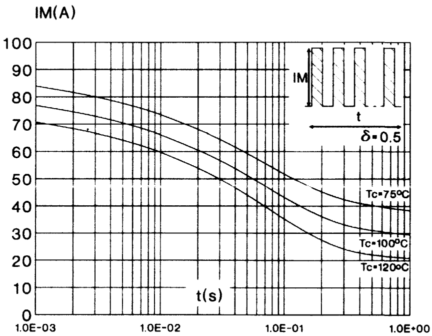


Fig. 6 : Relative variation of thermal transient impedance junction to case versus pulse duration. (TO220AC)

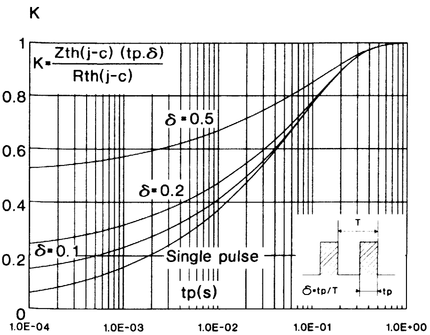


Fig. 7 : Relative variation of thermal transient impedance junction to case versus pulse duration. (ISOWATT220AC)

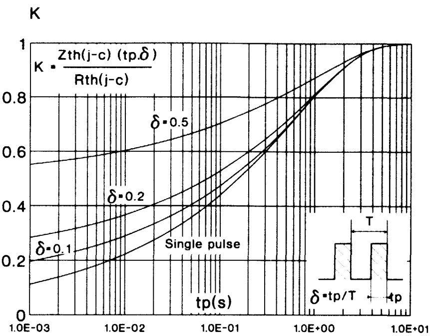


Fig. 8 : Reverse leakage current versus reverse voltage applied. (Typical values)

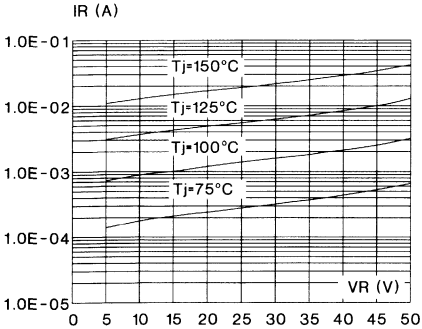


Fig. 9 : Junction capacitance versus reverse voltage applied. (Typical values)

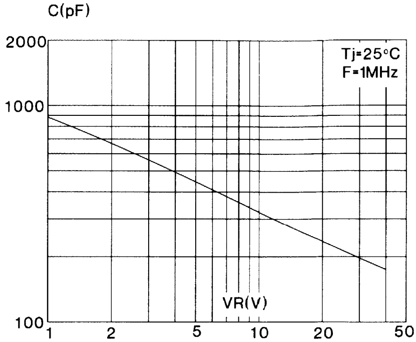
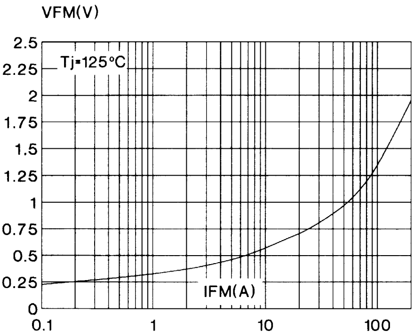


Fig. 10 : Forward voltage drop versus forward current. (Maximum values)



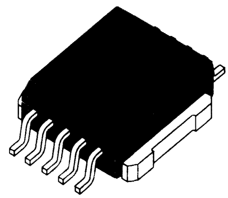
POWER SCHOTTKY RECTIFIER

MAIN PRODUCT CHARACTERISTICS

$I_{F(AV)}$	10 A
V_{RRM}	45 V
V_F	0.57 V

FEATURES AND BENEFITS

- VERY SMALL CONDUCTION LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- HIGH AVALANCHE CAPABILITY
- HIGH DISSIPATION MINIATURE PACKAGE
- SURFACE MOUNT TECHNOLOGY COMPATIBLE



Power SO-10™
Plastic, non isolated SMD
with copper tab

DESCRIPTION

Dual schottky rectifier suited for switchmode power supply and high frequency DC to DC converters.

Packaged in a high performance surface mount package PSO-10, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		45	V
$I_{F(RMS)}$	RMS Forward Current (All pins connected)		27	A
$I_{F(AV)}$	Average Forward Current	$T_c = 135°C$ $\delta = 0.5$	10	A
I_{FSM}	Surge Non Repetitive Forward Current (All pins connected)	$t_p = 10$ ms Sinusoidal	180	A
I_{RRM}	Repetitive Peak Reverse Current	$t_p = 2$ µs F = 1KHz	1	A
Tstg Tj	Storage and Junction Temperature Range		- 65 to + 150	°C
dV/dt	Critical Rate of Rise of Reverse Voltage		1000	V/µs

TM : PowerSO-10 is a trademark of SGS-THOMSON Microelectronics.

THERMAL RESISTANCES

Symbol	Parameter	Value	Unit
$R_{TH\ (j-c)}$	Junction to Case Thermal Resistance	2.2	°C/W

STATIC ELECTRICAL CHARACTERISTICS (Per diode)

Symbol	Tests Conditions	Tests Conditions		Min.	Typ.	Max.	Unit
I_R *	Reverse leakage Current	Tj = 25°C	$V_R = V_{RRM}$			100	µA
		Tj = 125°C				15	mA
V_F **	Forward Voltage drop	Tj = 125°C	I_F = 20 A			0.72	V
		Tj = 125°C	I_F = 10 A			0.57	
		Tj = 25°C	I_F = 20 A			0.84	

Pulse test : * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2%

To evaluate the conduction losses use the following equation :
$P = 0.42 \times I_{F(AV)} + 0.015\ I_F^2{}_{(RMS)}$

PIN OUT configuration in PowerSO-10 :

Anode = pin 1 to 5
Cathode = connected to base tab

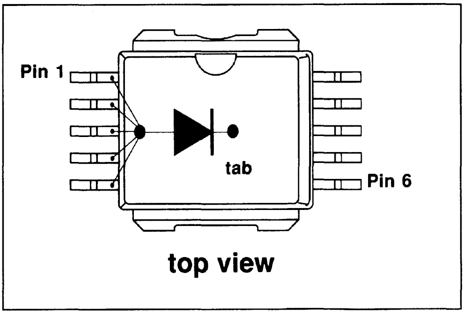


Fig. 1 : Average forward power dissipation versus average forward current.

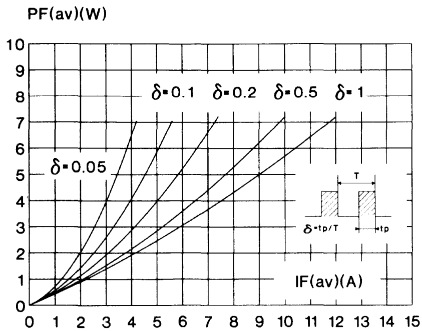


Fig. 2 : Average current versus ambient temperature. (duty cycle : 0.5)

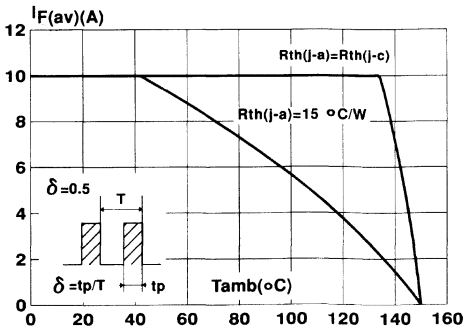


Fig. 3 : Non repetitive surge peak forward current versus overload duration. (Maximum values)

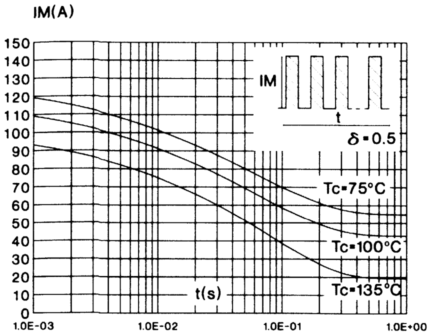


Fig. 4 : Relative variation of thermal transient impedance junction to case versus pulse duration.

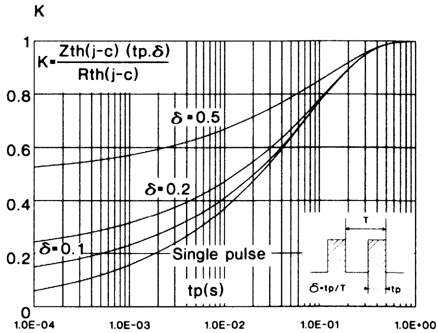


Fig. 5 : Reverse leakage current versus reverse voltage applied. (Typical values

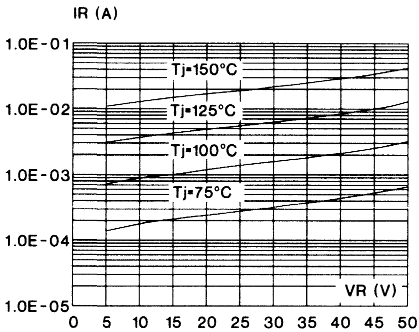


Fig. 6 : Junction capacitance versus reverse voltage applied. (Typical values)

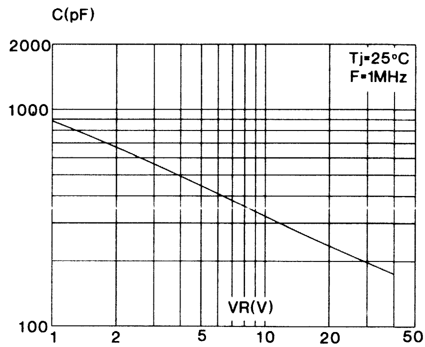
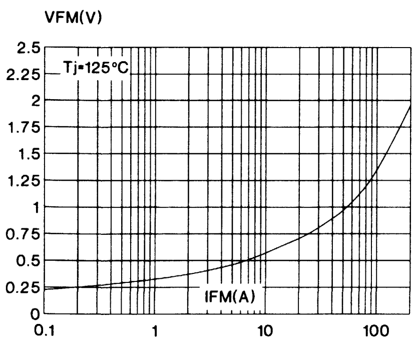


Fig. 7 : Forward voltage drop versus forward current. (Maximum values)

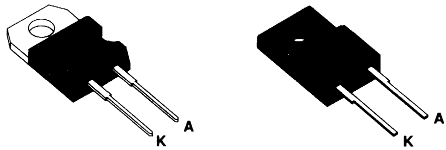


SGS-THOMSON
MICROELECTRONICS

STPS1535D/F
STPS1545D/F

POWER SCHOTTKY RECTIFIER

- VERY SMALL CONDUCTION LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- EXTREMELY FAST SWITCHING
- LOW FORWARD VOLTAGE DROP
- HIGH AVALANCHE CAPABILITY
- LOW THERMAL RESISTANCE
- INSULATED PACKAGE :
  Insulating voltage = 2000V DC
  Capacitance = 12pF



TO220AC (Plastic)	ISOWATT220AC (Plastic)
STPS1535D STPS1545D	STPS1535F STPS1545F

DESCRIPTION

Single chip schottky rectifier suited for switchmode power supply and high frequency DC to DC converters.

Packaged in TO220AC and ISOWATT220AC, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter			Value	Unit
$I_{F(RMS)}$	RMS Forward Current			30	A
$I_{F(AV)}$	Average Forward Current $\delta = 0.5$	TO220AC	Tc = 135°C	15	A
		ISOWATT220AC	Tc = 105°C		
I_{FSM}	Surge Non Repetitive Forward Current		Tp = 10 ms Sinusoidal	220	A
I_{RRM}	Peak Repetitive Reverse Current		Tp = 2 µs F = 1KHz	1	A
Tstg Tj	Storage and Junction Temperature Range			- 65 to + 150 - 65 to + 150	°C
dV/dt	Critical Rate of Rise of Reverse Voltage			1000	V/µs

Symbol	Parameter	STPS		Unit
		1535D 1535F	1545D 1545F	
V_{RRM}	Repetitive Peak Reverse Voltage	35	45	V

THERMAL RESISTANCE

Symbol	Parameter		Value	Unit
$R_{TH\ (j-c)}$	Junction-case	TO220AC	1.6	°C/W
		ISOWATT220AC	4.0	

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Tests Conditions		Min.	Typ.	Max.	Unit
I_R *	Tj = 25°C	$V_R = V_{RRM}$			200	µA
	Tj = 125°C				40	mA
V_F **	Tj = 125°C	I_F = 30 A			0.72	V
	Tj = 125°C	I_F = 15 A			0.57	
	Tj = 25°C	I_F = 30 A			0.84	

Pulse test : * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2%

To evaluate the conduction losses use the following equation :
$P = 0.42 \times I_{F(AV)} + 0.01\ I_F^2{}_{(RMS)}$

Fig. 1 : Average forward power dissipation versus average forward current.

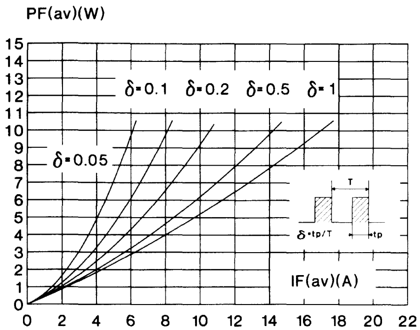


Fig. 2 : Average current versus ambient temperature. (duty cycle : 0.5) (TO220AC)

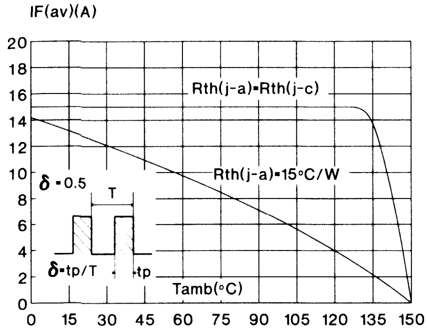


Fig. 3 : Average current versus ambient temperature. (duty cycle : 0.5) (ISOWATT220AC)

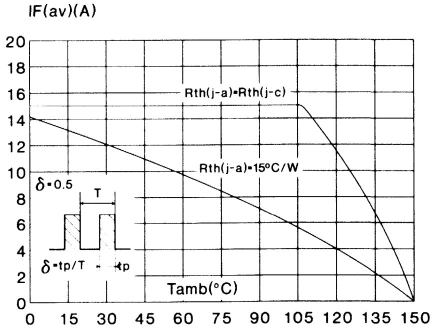


Fig. 4 : Non repetitive surge peak forward current versus overload duration.
(Maximum values) (TO220AC)

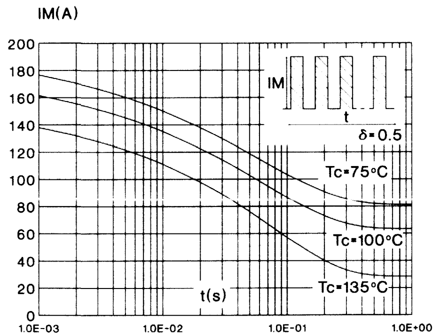


Fig. 5 : Non repetitive surge peak forward current versus overload duration.
(Maximum values) (ISOWATT220AC)

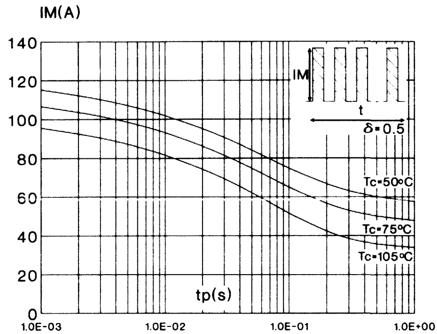


Fig. 6 : Relative variation of thermal transient impedance junction to case versus pulse duration.
(TO220AC)

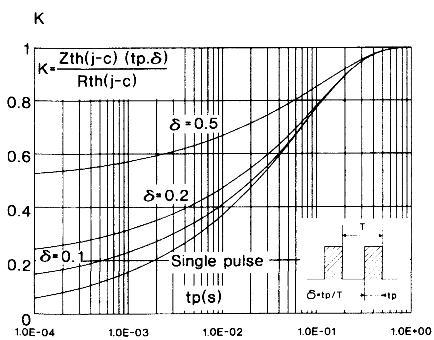


Fig. 7 : Relative variation of thermal transient impedance junction to case versus pulse duration.
(ISOWATT220AC)

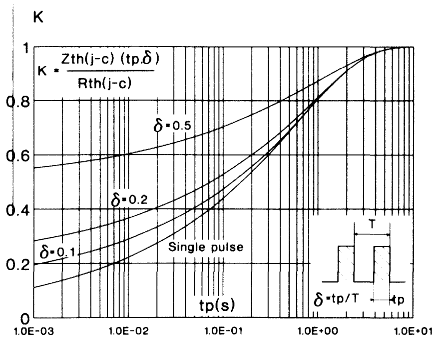


Fig. 8 : Reverse leakage current versus reverse voltage applied. (Typical values)

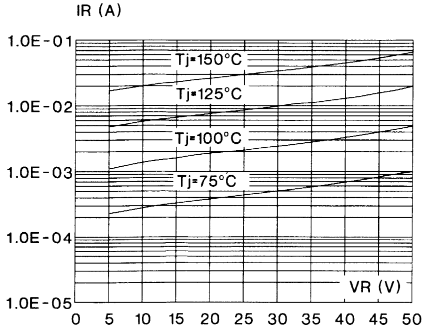


Fig. 9 : Junction capacitance versus reverse voltage applied. (Typical values)

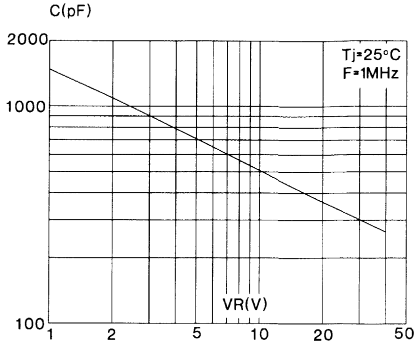
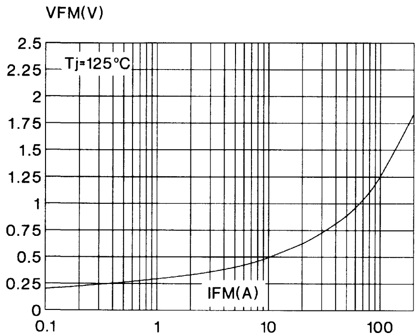


Fig. 10 : Forward voltage drop versus forward current. (Maximum values)

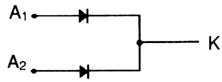


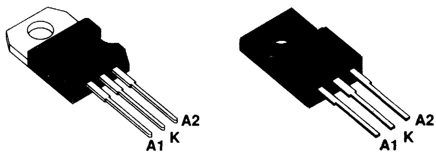
SGS-THOMSON MICROELECTRONICS

STPS1535CT/CF
STPS1545CT/CF

POWER SCHOTTKY RECTIFIER

- VERY SMALL CONDUCTION LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- EXTREMELY FAST SWITCHING
- LOW FORWARD VOLTAGE DROP
- HIGH AVALANCHE CAPABILITY
- LOW THERMAL RESISTANCE
- INSULATED PACKAGE :
  Insulating voltage = 2000V DC
  Capacitance = 12pF





TO220AB (Plastic)	**ISOWATT220AB** (Plastic)
STPS1535CT STPS1545CT	STPS1535CF STPS1545CF

DESCRIPTION

Dual center tap schottky rectifier suited for switch-mode power supply and high frequency DC to DC converters.

Packaged in TO220AB and ISOWATT220AB, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter				Value	Unit
$I_{F(RMS)}$	RMS Forward Current			Per diode	20	A
$I_{F(AV)}$	Average Forward Current $\delta = 0.5$	TO220AB	Tc = 135°C	Per diode	7.5	A
		ISOWATT220AB	Tc = 120°C	Per device	15	
I_{FSM}	Surge Non Repetitive Forward Current		Tp = 10 ms Sinusoidal	Per diode	150	A
I_{RRM}	Peak Repetitive Reverse Current		Tp = 2 µs F = 1KHz	Per diode	1	A
Tstg Tj	Storage and Junction Temperature Range				- 65 to + 150 - 65 to + 150	°C
dV/dt	Critical Rate of Rise of Reverse Voltage				1000	V/µs

Symbol	Parameter	STPS		Unit
		1535CT 1535CF	**1545CT 1545CF**	
V_{RRM}	Repetitive Peak Reverse Voltage	35	45	V

THERMAL RESISTANCE

Symbol	Parameter			Value	Unit
$R_{TH\ (j-c)}$	Junction-case	TO220AB	Per diode total	3.0 1.7	°C/W
		ISOWATT220AB	Per diode total	5.5 4.2	
$R_{TH\ (c)}$	Coupling	TO220AB		0.35	°C/W
		ISOWATT220AB		2.9	

When the diodes 1 and 2 are used simultaneously :

$\Delta\ T_J(\text{diode 1}) = P(\text{diode1}) \times R_{TH}(\text{Per diode}) + P(\text{diode 2}) \times R_{TH(c)}$

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS PER DIODE

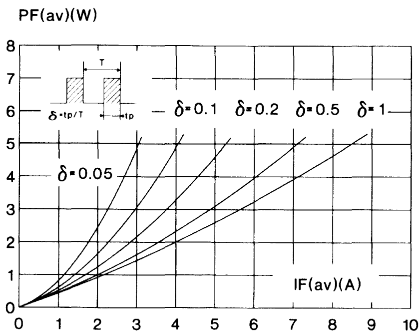
Symbol	Tests Conditions		Min.	Typ.	Max.	Unit
I_R *	Tj = 25°C	$V_R = V_{RRM}$			100	µA
	Tj = 125°C				15	mA
V_F **	Tj = 125°C	I_F = 15 A			0.72	V
	Tj = 125°C	I_F = 7.5 A			0.57	
	Tj = 25°C	I_F = 15 A			0.84	

Pulse test : * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2%

To evaluate the conduction losses use the following equation :

$P = 0.42 \times I_{F(AV)} + 0.020\ I_F^{2}{}_{(RMS)}$

Fig. 1 : Average forward power dissipation versus average forward current. (Per diode)



SGS-THOMSON MICROELECTRONICS

Fig. 2 : Average current versus ambient temperature. (duty cycle : 0.5) (Per diode) (TO220AB)

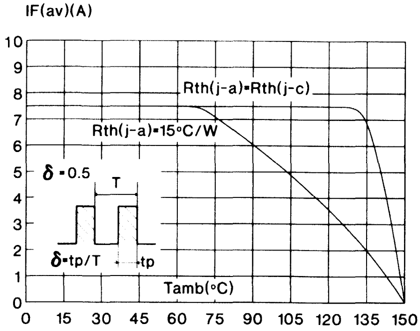


Fig. 3 : Average current versus ambient temperature. (duty cycle : 0.5) (Per diode) (ISOWATT220AB)

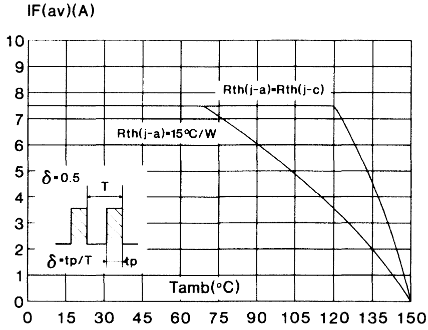


Fig. 4 : Non repetitive surge peak forward current versus overload duration. (Maximum values) (Per diode) (TO220AB)

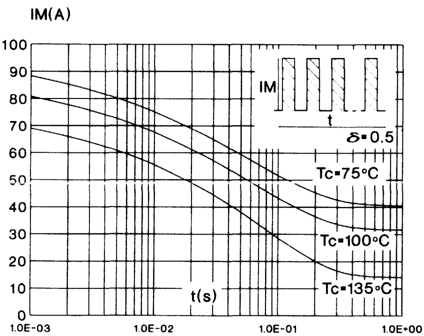


Fig. 5 : Non repetitive surge peak forward current versus overload duration. (Maximum values) (Per diode) (ISOWATT220AB)

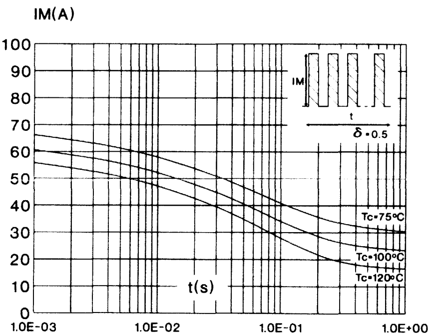


Fig. 6 : Relative variation of thermal transient impedance junction to case versus pulse duration. (TO220AB)

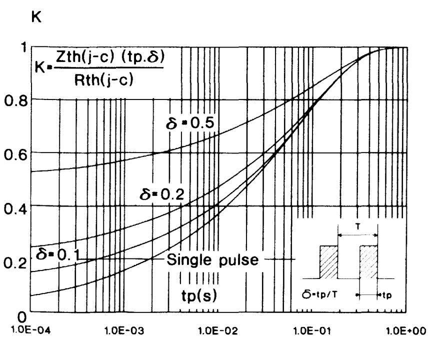


Fig. 7 : Relative variation of thermal transient impedance junction to case versus pulse duration. (ISOWATT220AB)

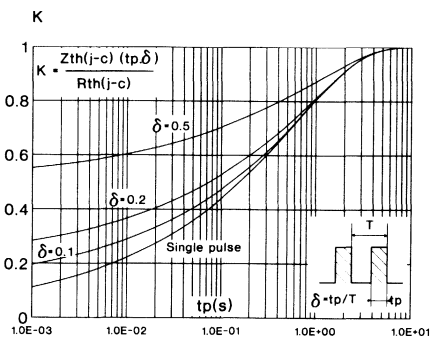


Fig. 8 : Reverse leakage current versus reverse voltage applied. (Typical values) (Per diode)

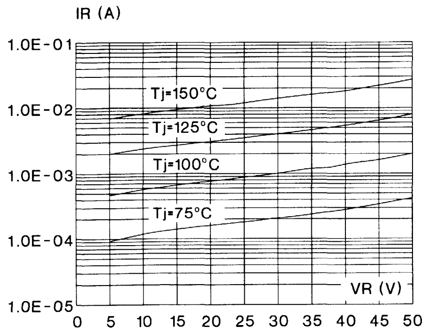


Fig. 9 : Junction capacitance versus reverse voltage applied. (Typical values) (Per diode)

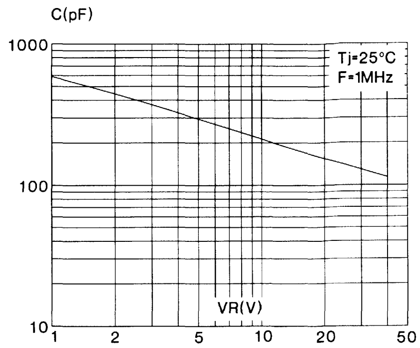
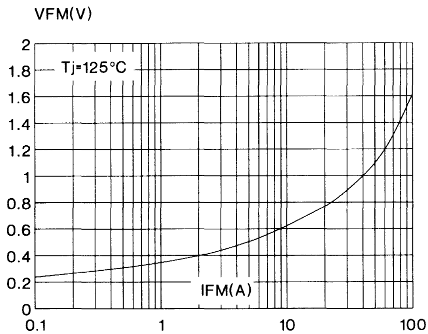


Fig. 10 : Forward voltage drop versus forward current. (Maximum values) (Per diode)



STPS1545CM

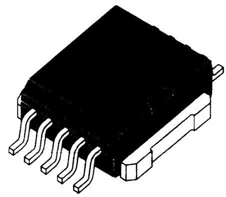
POWER SCHOTTKY RECTIFIER

MAIN PRODUCT CHARACTERISTICS

$I_{F(AV)}$	2 x 7.5 A
V_{RRM}	45 V
V_F	0.57 V

FEATURES AND BENEFITS

- VERY SMALL CONDUCTION LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- HIGH AVALANCHE CAPABILITY
- HIGH DISSIPATION MINIATURE PACKAGE
- SURFACE MOUNT TECHNOLOGY COMPATIBLE



Power SO-10™
Plastic, non isolated SMD
with copper tab

DESCRIPTION

Dual schottky rectifier suited for switchmode power supply and high frequency DC to DC converters.

Packaged in a high performance surface mount package PSO-10, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage			45	V
$I_{F(RMS)}$	RMS Forward Current	All pins connected	Per diode	17	A
$I_{F(AV)}$	Average Forward Current $\delta = 0.5$	Tc = 130°C	Per diode	7.5	A
			Per device	15	
I_{FSM}	Surge Non Repetitive Forward Current	tp = 10 ms Sinusoidal All pins connected	Per diode	150	A
I_{RRM}	Repetitive Peak Reverse Current	tp = 2 µs F = 1KHz	Per diode	1	A
Tstg Tj	Storage and Junction Temperature Range			- 65 to + 150	°C
dV/dt	Critical Rate of Rise of Reverse Voltage			1000	V/µs

TM : PowerSO-10 is a trademark of SGS-THOMSON Microelectronics.

August 1993 Ed : 2A

THERMAL RESISTANCES

Symbol	Parameter		Value	Unit
$R_{TH\ (j-c)}$	Junction to Case Thermal Resistance	Per diode total	3.5 2.2	°C/W
$R_{TH\ (c)}$	Coupling Thermal Resistance		0.7	°C/W

STATIC ELECTRICAL CHARACTERISTICS (Per diode)

Symbol	Tests Conditions	Tests Conditions		Min.	Typ.	Max.	Unit
I_R *	Reverse leakage Current	Tj = 25°C	$V_R = V_{RRM}$			100	µA
		Tj = 125°C				15	mA
V_F **	Forward Voltage drop	Tj = 125°C	I_F = 15 A			0.72	V
		Tj = 125°C	I_F = 7.5 A			0.57	
		Tj = 25°C	I_F = 15 A			0.84	

Pulse test : * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2%

To evaluate the conduction losses use the following equation :
$P = 0.42 \times I_{F(AV)} + 0.020\ I_F^2{}_{(RMS)}$

PIN OUT configuration in PowerSO-10 :

Anode 1 = pin 1 to 5
Anode 2 = pin 6 to 10
Cathodes = connected to base tab

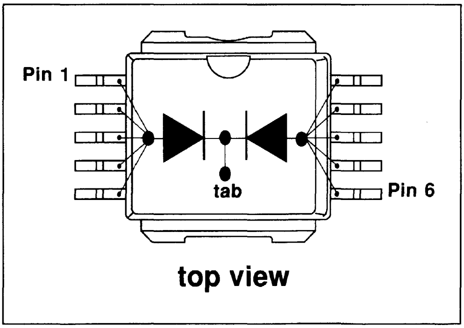


Fig. 1 : Average forward power dissipation versus average forward current. (Per diode)

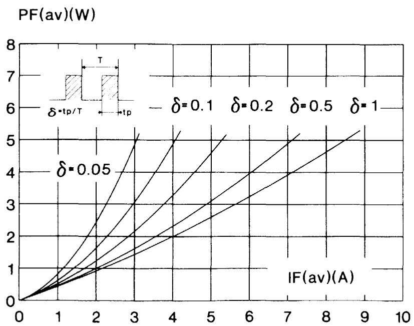


Fig. 2 : Average current versus ambient temperature.

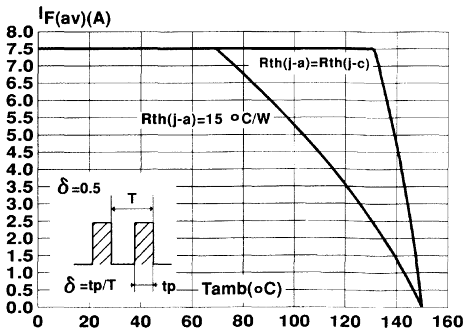


Fig. 3 : Non repetitive surge peak forward current versus overload duration. (Maximum values) (Per diode)

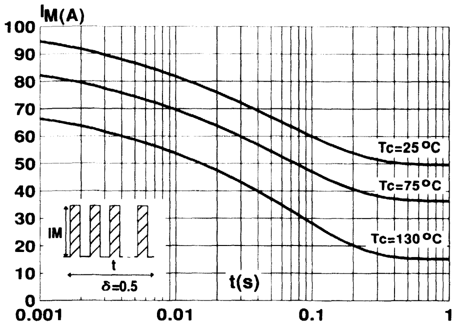


Fig. 4 : Relative variation of thermal transient impedance junction to case versus pulse duration.

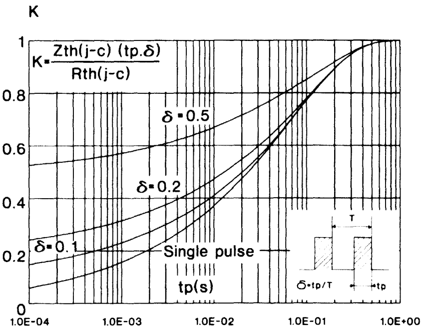


Fig. 5 : Reverse leakage current versus reverse voltage applied. (Typical values) (Per diode)

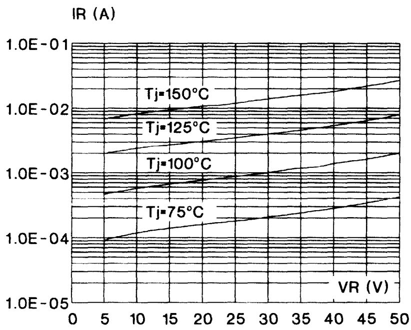


Fig. 6 : Junction capacitance versus reverse voltage applied. (Typical values) (Per diode)

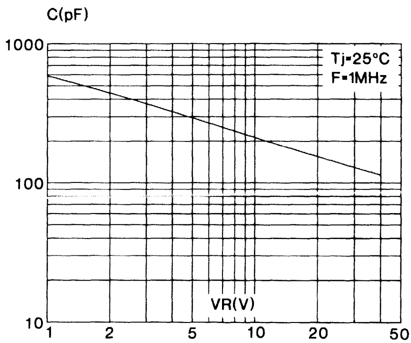
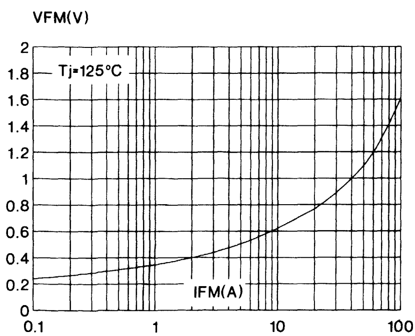


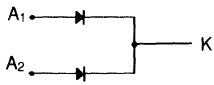
Fig. 7 : Forward voltage drop versus forward current. (Maximum values) (Per diode)

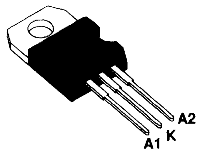


STPS2035CT/CF
STPS2045CT/CF

POWER SCHOTTKY RECTIFIER

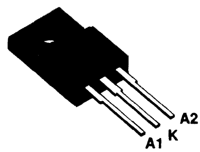
- VERY SMALL CONDUCTION LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- EXTREMELY FAST SWITCHING
- LOW FORWARD VOLTAGE DROP
- HIGH AVALANCHE CAPABILITY
- LOW THERMAL RESISTANCE
- INSULATED PACKAGE :
  Insulating voltage = 2000V DC
  Capacitance = 12pF





TO220AB
(Plastic)

STPS2035CT
STPS2045CT



ISOWATT220AB
(Plastic)

STPS2035CF
STPS2045CF

DESCRIPTION

Dual center tap schottky rectifier suited for switch-mode power supply and high frequency DC to DC converters.

Packaged in TO220AB and ISOWATT220AB, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter				Value	Unit
$I_{F(RMS)}$	RMS Forward Current			Per diode	30	A
$I_{F(AV)}$	Average Forward Current $\delta = 0.5$	TO220AB	Tc = 135°C	Per diode	10	A
		ISOWATT220AB	Tc = 120°C	Per device	20	
I_{FSM}	Surge Non Repetitive Forward Current		Tp = 10 ms Sinusoidal	Per diode	180	A
I_{RRM}	Peak Repetitive Reverse Current		Tp = 2 µs F = 1KHz	Per diode	1	A
Tstg Tj	Storage and Junction Temperature Range				- 65 to + 150 - 65 to + 150	°C
dV/dt	Critical Rate of Rise of Reverse Voltage				1000	V/µs

Symbol	Parameter	STPS		Unit
		2035CT 2035CF	**2045CT 2045CF**	
V_{RRM}	Repetitive Peak Reverse Voltage	35	45	V

THERMAL RESISTANCE

Symbol	Parameter			Value	Unit
$R_{TH\ (j-c)}$	Junction-case	TO220AB	Per diode total	2.2 1.3	°C/W
		ISOWATT220AB	Per diode total	4.5 3.5	
$R_{TH\ (c)}$	Coupling	TO220AB		0.3	°C/W
		ISOWATT220AB		2.5	

When the diodes 1 and 2 are used simultaneously :
ΔT_J(diode 1) = P(diode1) x R_{TH}(Per diode) + P(diode 2) x $R_{TH(c)}$

ELECTRICAL CHARACTERISTICS

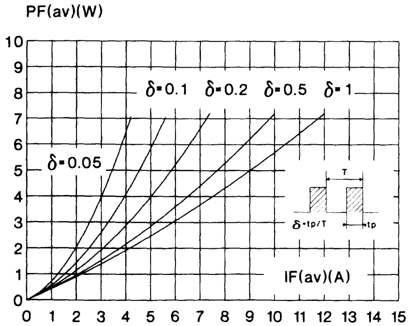
STATIC CHARACTERISTICS PER DIODE

Symbol	Tests Conditions		Min.	Typ.	Max.	Unit
I_R *	Tj = 25°C	$V_R = V_{RRM}$			100	µA
	Tj = 125°C				15	mA
V_F **	Tj = 125°C	I_F = 20 A			0.72	V
	Tj = 125°C	I_F = 10 A			0.57	
	Tj = 25°C	I_F = 20 A			0.84	

Pulse test : * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2%

To evaluate the conduction losses use the following equation :
$P = 0.42 \times I_{F(AV)} + 0.015\ I_F{}^2{}_{(RMS)}$

Fig. 1 : Average forward power dissipation versus average forward current. (Per diode)



SGS-THOMSON MICROELECTRONICS

Fig. 2 : Average current versus ambient temperature. (duty cycle : 0.5) (Per diode) (TO220AB)

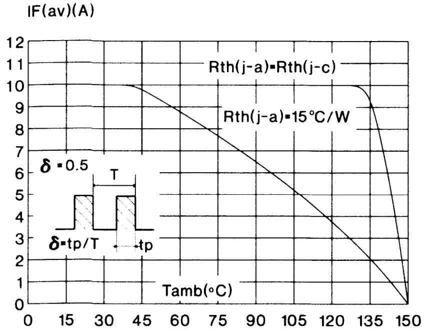


Fig. 3 : Average current versus ambient temperature. (duty cycle : 0.5) (Per diode) (ISOWATT220AB)

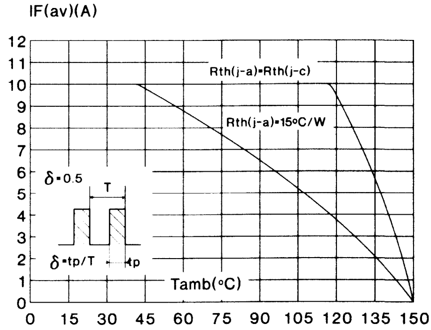


Fig. 4 : Non repetitive surge peak forward current versus overload duration.
(Maximum values) (Per diode) (TO220AB)

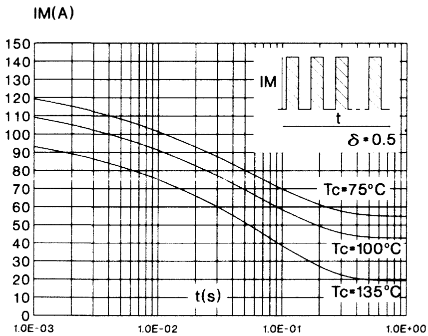


Fig. 5 : Non repetitive surge peak forward current versus overload duration.
(Maximum values) (Per diode) (ISOWATT220AB)

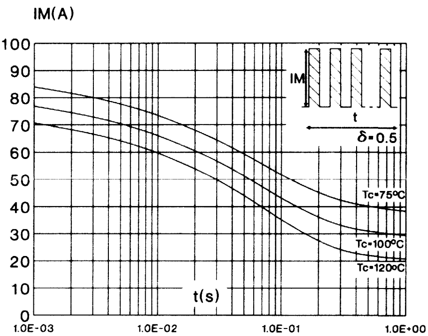


Fig. 6 : Relative variation of thermal transient impedance junction to case versus pulse duration.
(TO220AB)

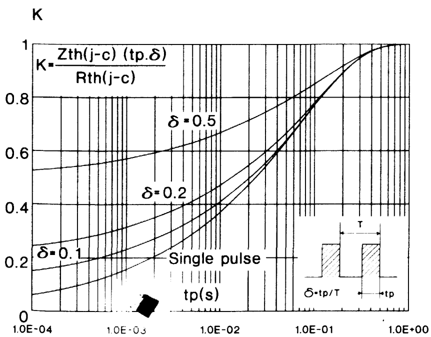


Fig. 7 : Relative variation of thermal transient impedance junction to case versus pulse duration.
(ISOWATT220AB)

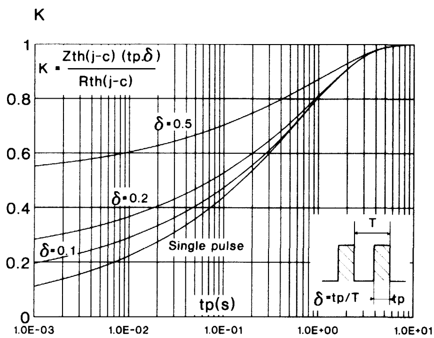


Fig. 8 : Reverse leakage current versus reverse voltage applied. (Typical values) (Per diode)

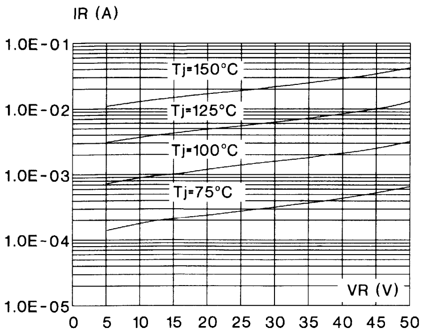


Fig. 9 : Junction capacitance versus reverse voltage applied. (Typical values) (Per diode)

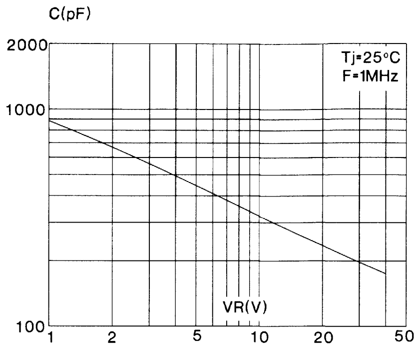
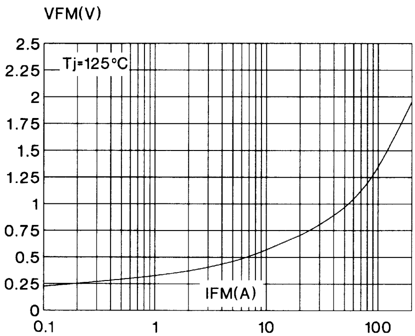


Fig. 10 : Forward voltage drop versus forward current. (Maximum values) (Per diode)

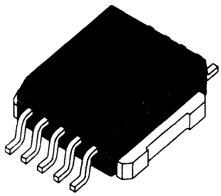


STPS2045CM

POWER SCHOTTKY RECTIFIER

MAIN PRODUCT CHARACTERISTICS

$I_{F(AV)}$	2 x 10 A
V_{RRM}	45 V
V_F	0.57 V



Power SO-10™
Plastic, non isolated SMD
with copper tab

FEATURES AND BENEFITS

- VERY SMALL CONDUCTION LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- HIGH AVALANCHE CAPABILITY
- HIGH DISSIPATION MINIATURE PACKAGE
- SURFACE MOUNT TECHNOLOGY COMPATIBLE

DESCRIPTION

Dual schottky rectifier suited for switchmode power supply and high frequency DC to DC converters.

Packaged in a high performance surface mount package PSO-10, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage			45	V
$I_{F(RMS)}$	RMS Forward Current	All pins connected	Per diode	27	A
$I_{F(AV)}$	Average Forward Current $\delta = 0.5$	Tc = 135°C	Per diode	10	A
			Per device	20	
I_{FSM}	Surge Non Repetitive Forward Current	tp = 10 ms Sinusoidal All pins connected	Per diode	180	A
I_{RRM}	Repetitive Peak Reverse Current	tp = 2 µs F = 1KHz	Per diode	1	A
Tstg Tj	Storage and Junction Temperature Range			- 65 to + 150	°C
dV/dt	Critical Rate of Rise of Reverse Voltage			1000	V/µs

TM : PowerSO-10 is a trademark of SGS-THOMSON Microelectronics.

August 1993 Ed : 2A

THERMAL RESISTANCES

Symbol	Parameter		Value	Unit
$R_{TH\,(j-c)}$	Junction to Case Thermal Resistance	Per diode total	2.2 1.3	°C/W
$R_{TH\,(c)}$	Coupling Thermal Resistance		0.3	°C/W

STATIC ELECTRICAL CHARACTERISTICS (Per diode)

Symbol	Tests Conditions	Tests Conditions		Min.	Typ.	Max.	Unit
I_R *	Reverse leakage Current	Tj = 25°C	$V_R = V_{RRM}$			100	µA
		Tj = 125°C				15	mA
V_F **	Forward Voltage drop	Tj = 125°C	I_F = 20 A			0.72	V
		Tj = 125°C	I_F = 10 A			0.57	
		Tj = 25°C	I_F = 20 A			0.84	

Pulse test : * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2%

To evaluate the conduction losses use the following equation :
$P = 0.42 \times I_{F(AV)} + 0.015\, I_{F\,(RMS)}^{2}$

PIN OUT configuration in PowerSO-10 :

Anode 1 = pin 1 to 5
Anode 2 = pin 6 to 10
Cathodes = connected to base tab

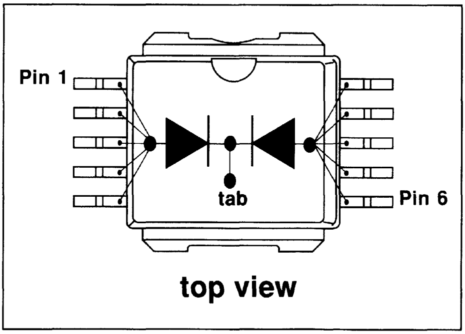


Fig. 1 : Average forward power dissipation versus average forward current. (Per diode)

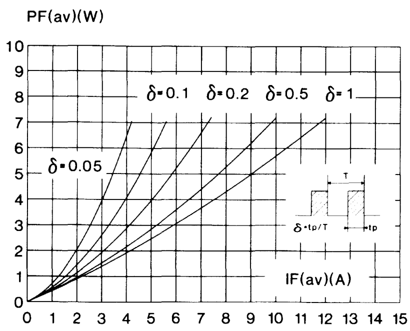


Fig. 2 : Average current versus ambient temperature.

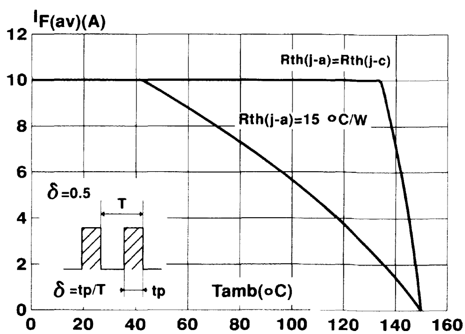


Fig. 3 : Non repetitive surge peak forward current versus overload duration. (Maximum values) (Per diode)

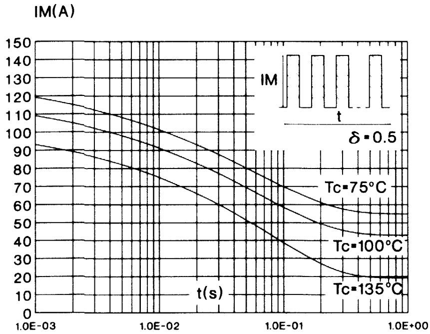


Fig. 4 : Relative variation of thermal transient impedance junction to case versus pulse duration.

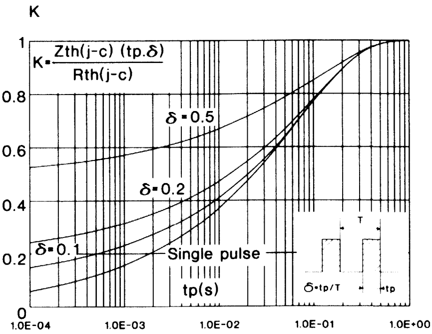


Fig. 5 : Reverse leakage current versus reverse voltage applied. (Typical values) (Per diode)

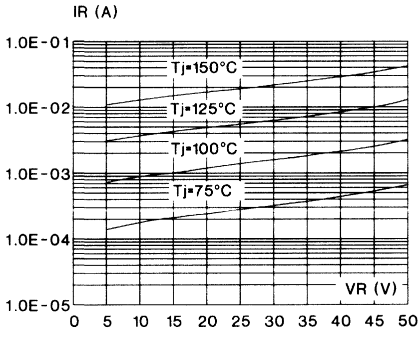


Fig. 6 : Junction capacitance versus reverse voltage applied. (Typical values) (Per diode)

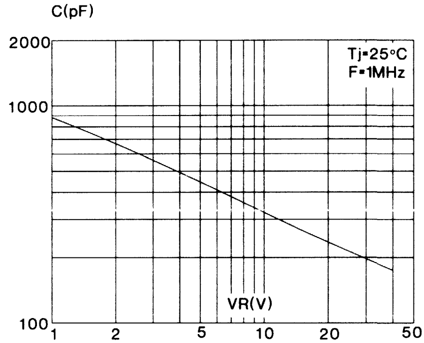
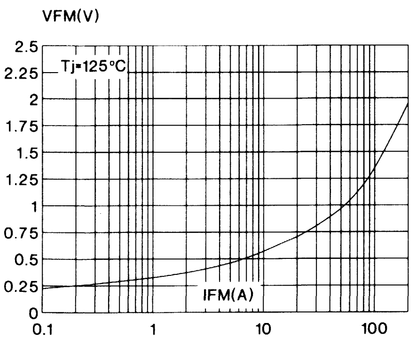


Fig. 7 : Forward voltage drop versus forward current. (Maximum values) (Per diode)



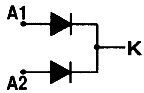
SGS-THOMSON MICROELECTRONICS

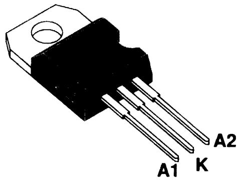
STPS20100CT

HIGH VOLTAGE POWER SCHOTTKY RECTIFIER

MAIN PRODUCT CHARACTERISTICS — **PRELIMINARY DATASHEET**

$I_{F(AV)}$	**2 x 10A**
V_{RRM}	**100V**
V_F (typ)	**0.60V**





TO220AB

(Plastic)

FEATURES AND BENEFITS

- NEGLIGIBLE SWITCHING LOSSES
- LOW FORWARD VOLTAGE DROP
- LOW CAPACITANCE
- HIGH REVERSE AVALANCHE SURGE CAPABILITY

DESCRIPTION

High voltage dual Schottky rectifier suited for switchmode power supplies and other power converters.
Packaged in TO220AC, this device is intended for use in medium voltage operation, and particularly, in high frequency circuitries where low switching losses and low noise are required.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			100	V
$I_{F(RMS)}$	RMS forward current		Per diode	30	A
$I_{F(AV)}$	Average forward current	Tc=110°C V_R = 60V δ = 0.5	Per diode Per device	10 20	A A
I_{FSM}	Surge non repetitive forward current	tp=10ms sinusoidal	Per diode	200	A
I_{RRM}	Repetitive peak reverse current	tp=2µs F=1KHz	Per diode	1	A
I_{RSM}	Non repetitive peak reverse current	tp=100µs	Per diode	1	A
Tstg	Junction temperature range			- 65 to + 150	°C
Tj	Max. Junction temperature			125	°C
dV/dt	Critical rate of rise of reverse voltage			1000	V/µs

THERMAL RESISTANCES

Symbol	Parameter		Value	Unit
Rth (j-c)	Junction to case	Per diode	1.6	°C/W
		Total	0.9	
Rth (c)	Coupling		0.15	°C/W

When the diodes 1 and 2 are used simultaneously :
Tj-Tc(diode 1)=P(diode1) x Rth(j-c)(Per diode) + P(diode 2) x Rth(c)

ELECTRICAL CHARACTERISTICS (Per diode)

STATIC CHARACTERISTICS

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
I_R *	Reverse leakage current	$V_R = V_{RRM}$	T_j = 25°C			150	µA
			T_j = 125°C			100	mA
V_F **	Forward voltage drop	I_F = 20 A	T_j = 125°C			0.85	V
		I_F = 10 A	T_j = 125°C		0.60	0.70	
		I_F = 20 A	T_j = 25°C			0.95	

Pulse test : * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2 %

To evaluate the conduction losses use the following equation :
$P = 0.55 \times I_{F(AV)} + 0.015 \times I_F^2{}_{(RMS)}$

Fig. 1 : Average forward power dissipation versus average forward current. (Per diode)

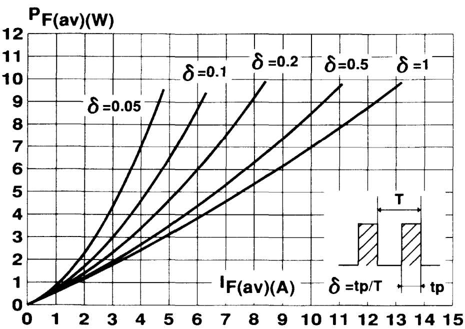


Fig. 2 : Average current versus ambient temperature. (duty cycle : 0.5) (Per diode)

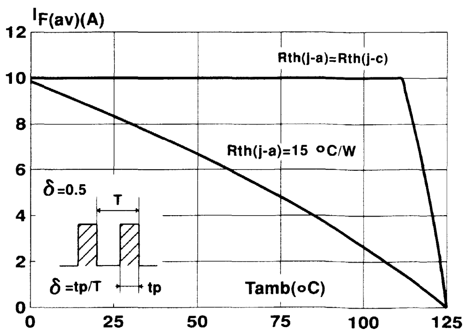


Fig. 3 : Non repetitive surge peak forward current versus overload duration. (Maximum values) (Per diode)

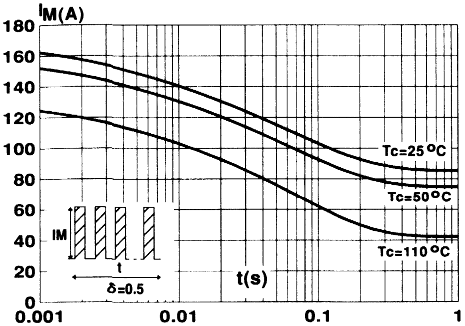


Fig. 4 : Relative variation of thermal transient impedance junction to case versus pulse duration.

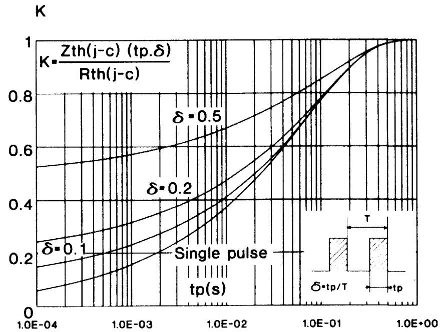


Fig. 5 : Reverse leakage current versus reverse voltage applied. (Typical values) (Per diode)

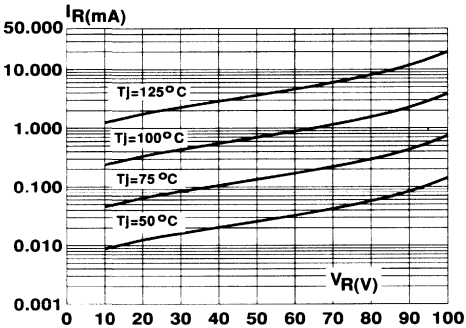


Fig. 6 : Junction capacitance versus reverse voltage applied. (Typical values) (Per diode)

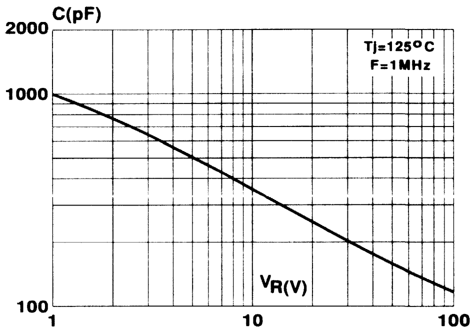
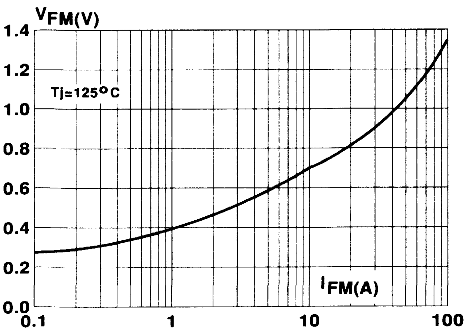


Fig. 7 : Forward voltage drop versus forward current. (Maximum values) (Per diode)



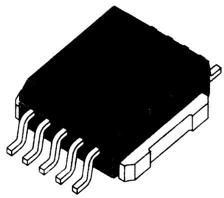
POWER SCHOTTKY RECTIFIER

MAIN PRODUCT CHARACTERISTICS

$I_{F(AV)}$	30 A
V_{RRM}	45 V
V_F	0.63 V

FEATURES AND BENEFITS

- VERY SMALL CONDUCTION LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- HIGH AVALANCHE CAPABILITY
- HIGH DISSIPATION MINIATURE PACKAGE
- SURFACE MOUNT TECHNOLOGY COMPATIBLE



Power SO-10™
Plastic, non isolated SMD
with copper tab

DESCRIPTION

Dual schottky rectifier suited for switchmode power supply and high frequency DC to DC converters.

Packaged in a high performance surface mount package PSO-10, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		45	V
$I_{F(RMS)}$	RMS Forward Current (All pins connected)		44	A
$I_{F(AV)}$	Average Forward Current	Tc = 125°C δ = 0.5	30	A
I_{FSM}	Surge Non Repetitive Forward Current (All pins connected)	tp = 10 ms Sinusoidal	200	A
I_{RRM}	Repetitive Peak Reverse Current	tp = 2 µs F = 1KHz	1	A
Tstg Tj	Storage and Junction Temperature Range		- 65 to + 150	°C
dV/dt	Critical Rate of Rise of Reverse Voltage		1000	V/µs

TM : PowerSO-10 is a trademark of SGS-THOMSON Microelectronics.

THERMAL RESISTANCES

Symbol	Parameter	Value	Unit
$R_{TH\ (j-c)}$	Junction to Case Thermal Resistance	1.0	°C/W

STATIC ELECTRICAL CHARACTERISTICS (Per diode)

Symbol	Tests Conditions	Tests Conditions		Min.	Typ.	Max.	Unit
I_R *	Reverse leakage Current	Tj = 25°C	$V_R = V_{RRM}$			500	µA
		Tj = 125°C				80	mA
V_F **	Forward Voltage drop	Tj = 125°C	I_F = 60 A			0.78	V
		Tj = 125°C	I_F = 30 A			0.63	
		Tj = 25°C	I_F = 60 A			0.84	

Pulse test : * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2%

To evaluate the conduction losses use the following equation :
$P = 0.48 \times I_{F(AV)} + 0.005\ I_{F}^{2}{}_{(RMS)}$

PIN OUT configuration in PowerSO-10 :

Anode = pin 1 to 5
Cathode = connected to base tab

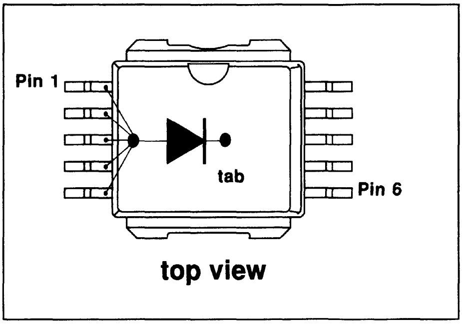


Fig. 1 : Average forward power dissipation versus average forward current.

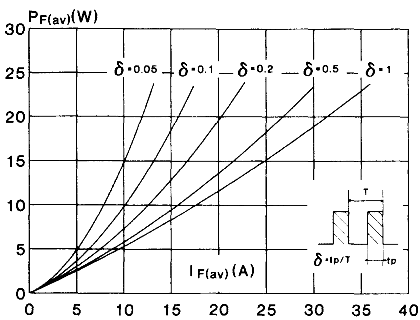


Fig. 2 : Average current versus ambient temperature. (duty cycle : 0.5)

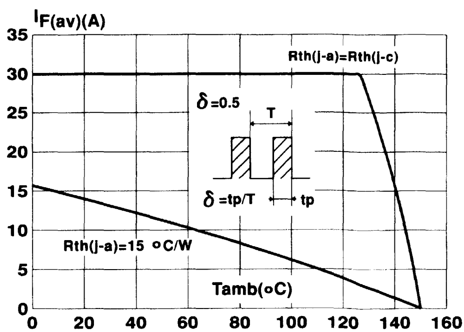


Fig. 3 : Non repetitive surge peak forward current versus overload duration. (Maximum values)

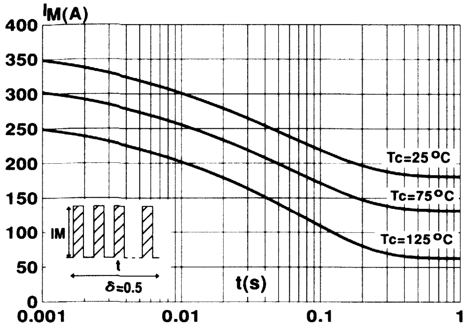


Fig. 4 : Relative variation of thermal transient impedance junction to case versus pulse duration.

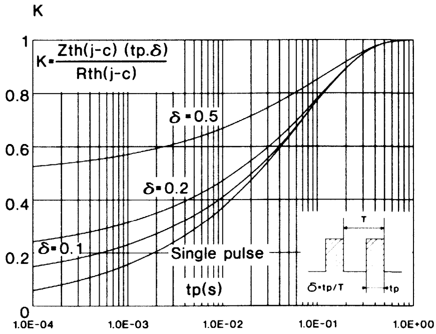


Fig. 5 : Reverse leakage current versus reverse voltage applied. (Typical values

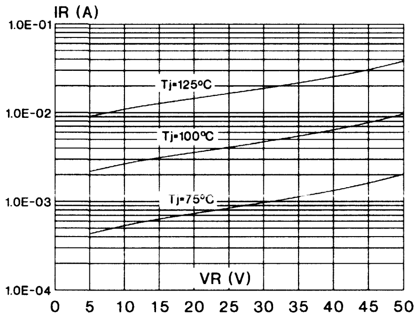


Fig. 6 : Junction capacitance versus reverse voltage applied. (Typical values)

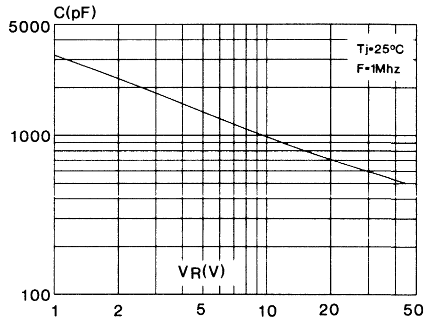
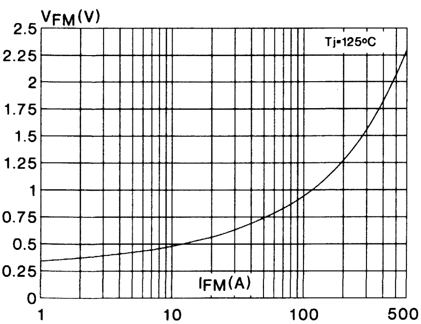


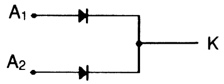
Fig. 7 : Forward voltage drop versus forward current. (Maximum values)

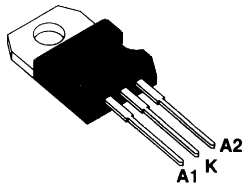


STPS3035CT
STPS3045CT

POWER SCHOTTKY RECTIFIER

- VERY SMALL CONDUCTION LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- EXTREMELY FAST SWITCHING
- LOW FORWARD VOLTAGE DROP
- HIGH AVALANCHE CAPABILITY
- LOW THERMAL RESISTANCE
- INSULATED PACKAGE :
  Insulating voltage = 2000V DC
  Capacitance = 12pF





TO220AB
(Plastic)

DESCRIPTION

Dual center tap schottky rectifier suited for switch-mode power supply and high frequency DC to DC converters.

Packaged in TO220AB, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter			Value	Unit
$I_{F(RMS)}$	RMS Forward Current		Per diode	30	A
$I_{F(AV)}$	Average Forward Current	Tc = 135°C δ = 0.5	Per diode Per device	15 30	A
I_{FSM}	Surge Non Repetitive Forward Current	Tp = 10 ms Sinusoidal	Per diode	220	A
I_{RRM}	Peak Repetitive Reverse Current	Tp = 2 µs F = 1KHz	Per diode	1	A
Tstg Tj	Storage and Junction Temperature Range			- 65 to + 150 - 65 to + 150	°C
dV/dt	Critical Rate of Rise of Reverse Voltage			1000	V/µs

Symbol	Parameter	STPS		Unit
		3035CT	3045CT	
V_{RRM}	Repetitive Peak Reverse Voltage	35	45	V

THERMAL RESISTANCE

Symbol	Parameter		Value	Unit
$R_{TH\ (j\text{-}c)}$	Junction-case	Per diode total	1.60 0.85	°C/W
$R_{TH\ (c)}$	Coupling		0.10	°C/W

When the diodes 1 and 2 are used simultaneously :
$\Delta T_J(\text{diode 1}) = P(\text{diode1}) \times R_{TH}(\text{Per diode}) + P(\text{diode 2}) \times R_{TH(c)}$

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS PER DIODE

Symbol	Tests Conditions		Min.	Typ.	Max.	Unit
I_R **	Tj = 25°C	$V_R = V_{RRM}$			200	μA
	Tj = 125°C				40	mA
V_F *	Tj = 125°C	I_F = 30 A			0.72	V
	Tj = 125°C	I_F = 15 A			0.57	
	Tj = 25°C	I_F = 30 A			0.84	

Pulse test : * tp = 380 μs, duty cycle < 2 %
** tp = 5 ms, duty cycle < 2%

To evaluate the conduction losses use the following equation :
$P = 0.42 \times I_{F(AV)} + 0.01\, I_{F}^{2}{}_{(RMS)}$

Fig. 1 : Average forward power dissipation versus average forward current. (Per diode)

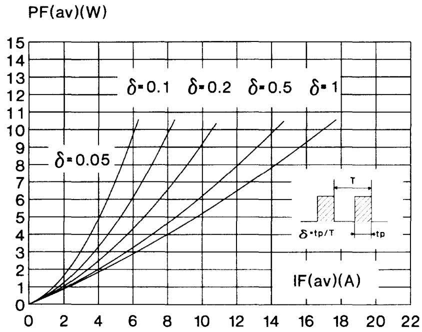


Fig. 2 : Average current versus ambient temperature. (duty cycle : 0.5) (Per diode)

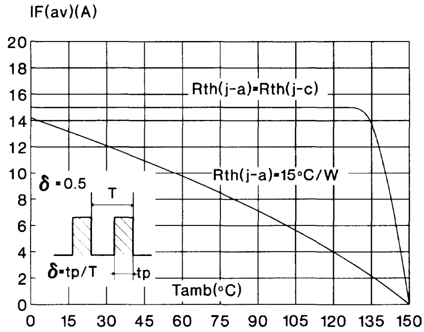


Fig. 3 : Non repetitive surge peak forward current versus overload duration.
(Maximum values) (Per diode)

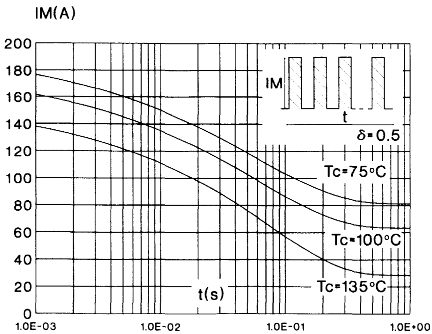


Fig. 4 : Relative variation of thermal transient impedance junction to case versus pulse duration.

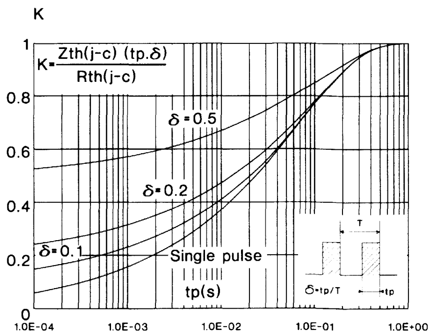


Fig. 5 : Reverse leakage current versus reverse voltage applied. (Typical values) (Per diode)

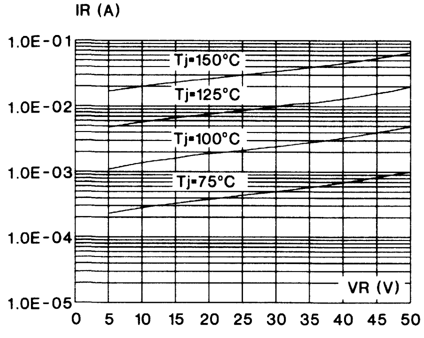


Fig. 6 : Junction capacitance versus reverse voltage applied. (Typical values) (Per diode)

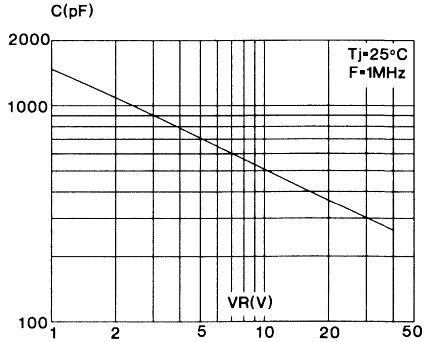
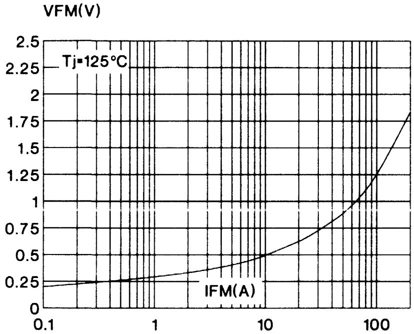


Fig. 7 : Forward voltage drop versus forward current. (Maximum values) (Per diode)

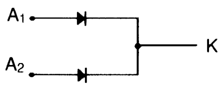


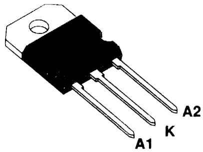
SGS-THOMSON
MICROELECTRONICS

STPS3035CP/CPI
STPS3045CP/CPI

POWER SCHOTTKY RECTIFIER

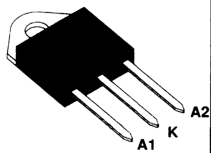
- VERY SMALL CONDUCTION LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- EXTREMELY FAST SWITCHING
- LOW FORWARD VOLTAGE DROP
- HIGH AVALANCHE CAPABILITY
- LOW THERMAL RESISTANCE
- INSULATED PACKAGE :
  Insulating voltage = 2500V_{RMS}
  Capacitance = 12pF





SOT 93
(Plastic)

STPS3035CP
STPS3045CP



TOP 3I
(Plastic)

STPS3035CPI
STPS3045CPI

DESCRIPTION

Dual center tap schottky rectifier suited for switch-mode power supply and high frequency DC to DC converters.

Packaged in SOT 93 and TOP 3I, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter				Value	Unit
$I_{F(RMS)}$	RMS Forward Current			Per diode	30	A
$I_{F(AV)}$	Average Forward Current $\delta = 0.5$	SOT 93	Tc = 135°C	Per diode	15	A
		TOP 3I	Tc = 125°C	Per device	30	
I_{FSM}	Surge Non Repetitive Forward Current		Tp = 10 ms Sinusoidal	Per diode	220	A
I_{RRM}	Peak Repetitive Reverse Current		Tp = 2 µs F = 1KHz	Per diode	1	A
Tstg Tj	Storage and Junction Temperature Range				- 65 to + 150 - 65 to + 150	°C
dV/dt	Critical Rate of Rise of Reverse Voltage				1000	V/µs

Symbol	Parameter	STPS		Unit
		3035CP 3035CPI	3045CP 3045CPI	
V_{RRM}	Repetitive Peak Reverse Voltage	35	45	V

THERMAL RESISTANCE

Symbol	Parameter			Value	Unit
$R_{TH\ (j\text{-}c)}$	Junction-case	SOT 93	Per diode total	1.5 0.8	°C/W
		TOP 3I	Per diode total	2.2 1.6	
$R_{TH\ (c)}$	Coupling	SOT 93		0.1	°C/W
		TOP 3I		1.0	

When the diodes 1 and 2 are used simultaneously :
ΔT_J(diode 1) = P(diode1) x R_{TH}(Per diode) + P(diode 2) x $R_{TH(c)}$

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS PER DIODE

Symbol	Tests Conditions		Min.	Typ.	Max.	Unit
I_R *	Tj = 25°C	$V_R = V_{RRM}$			200	µA
	Tj = 125°C				40	mA
V_F **	Tj = 125°C	I_F = 30 A			0.72	V
	Tj = 125°C	I_F = 15 A			0.57	
	Tj = 25°C	I_F = 30 A			0.84	

Pulse test : * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2%

To evaluate the conduction losses use the following equation :
$P = 0.42 \times I_{F(AV)} + 0.01\ I_F^2{}_{(RMS)}$

Fig. 1 : Average forward power dissipation versus average forward current. (Per diode)

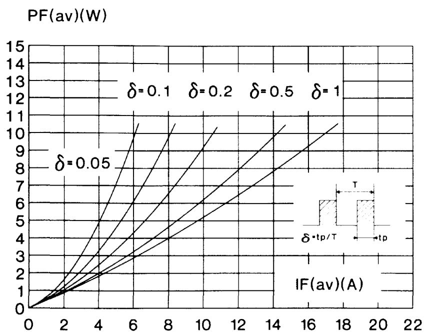


Fig. 2 : Average current versus ambient temperature. (duty cycle : 0.5) (Per diode) (SOT 93)

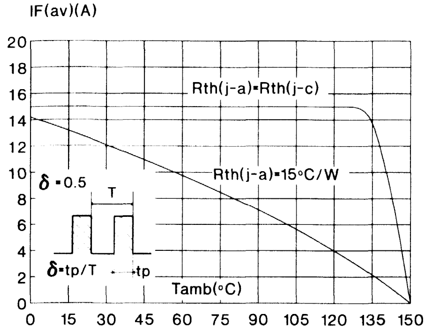


Fig. 2 : Average current versus ambient temperature. (duty cycle : 0.5) (Per diode) (TOP 3I)

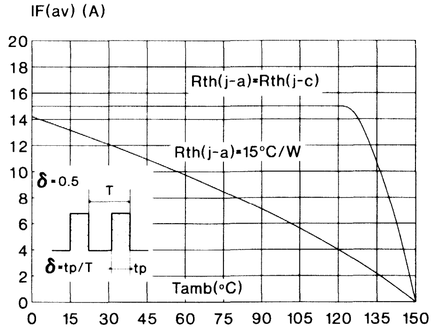


Fig. 4 : Non repetitive surge peak forward current versus overload duration.
(Maximum values) (Per diode) (SOT 93)

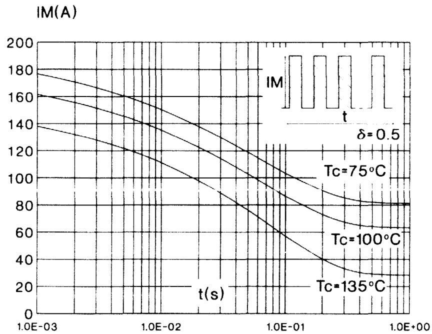


Fig. 5 : Non repetitive surge peak forward current versus overload duration.
(Maximum values) (Per diode) (TOP 3I)

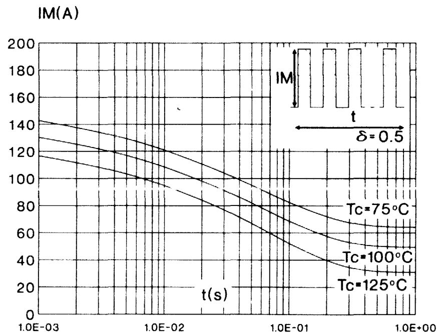


Fig. 6 : Relative variation of thermal transient impedance junction to case versus pulse duration.

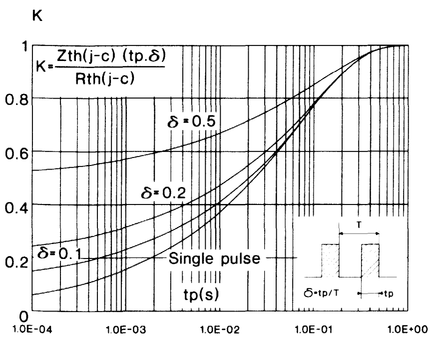


Fig. 7 : Reverse leakage current versus reverse voltage applied. (Typical values) (Per diode)

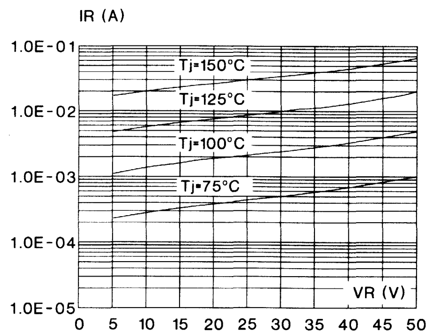


Fig. 8 : Junction capacitance versus reverse voltage applied. (Typical values) (Per diode)

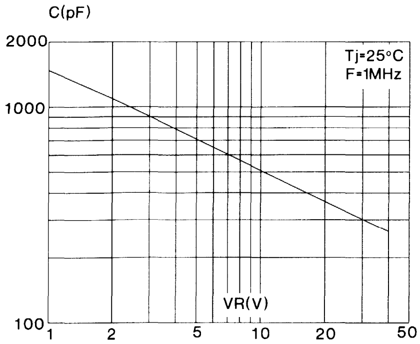
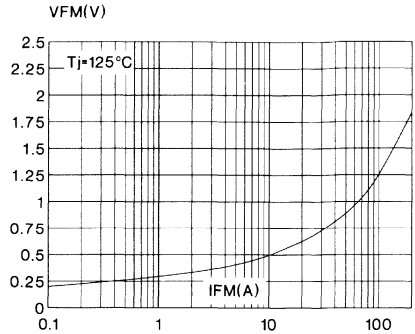


Fig. 9 : Forward voltage drop versus forward current. (Maximum values) (Per diode)



STPS3045CM

POWER SCHOTTKY RECTIFIER

MAIN PRODUCT CHARACTERISTICS

$I_{F(AV)}$	2 x 15 A
V_{RRM}	45 V
V_F	0.57 V

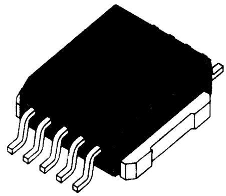
FEATURES AND BENEFITS

- VERY SMALL CONDUCTION LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- HIGH AVALANCHE CAPABILITY
- HIGH DISSIPATION MINIATURE PACKAGE
- SURFACE MOUNT TECHNOLOGY COMPATIBLE

DESCRIPTION

Dual schottky rectifier suited for switchmode power supply and high frequency DC to DC converters.

Packaged in a high performance surface mount package PSO-10, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.



Power SO-10™
Plastic, non isolated SMD
with copper tab

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage			45	V
$I_{F(RMS)}$	RMS Forward Current	All pins connected	Per diode	27	A
$I_{F(AV)}$	Average Forward Current $\delta = 0.5$	Tc = 135°C	Per diode	15	A
			Per device	30	
I_{FSM}	Surge Non Repetitive Forward Current	tp = 10 ms Sinusoidal All pins connected	Per diode	220	A
I_{RRM}	Repetitive Peak Reverse Current	tp = 2 µs F = 1KHz	Per diode	1	A
Tstg Tj	Storage and Junction Temperature Range			- 65 to + 150	°C
dV/dt	Critical Rate of Rise of Reverse Voltage			1000	V/µs

TM : PowerSO-10 is a trademark of SGS-THOMSON Microelectronics.

August 1993 Ed : 2A

THERMAL RESISTANCES

Symbol	Parameter		Value	Unit
$R_{TH\ (j-c)}$	Junction to Case Thermal Resistance	Per diode total	1.6 0.85	°C/W
$R_{TH\ (c)}$	Coupling Thermal Resistance		0.1	°C/W

STATIC ELECTRICAL CHARACTERISTICS (Per diode)

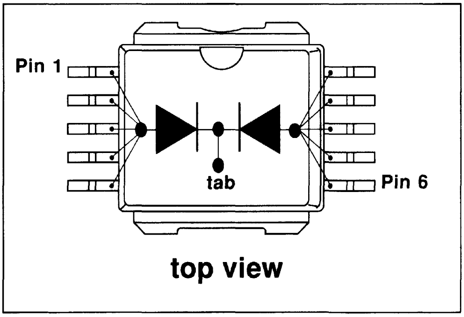
Symbol	Tests Conditions	Tests Conditions		Min.	Typ.	Max.	Unit
I_R *	Reverse leakage Current	Tj = 25°C	$V_R = V_{RRM}$			200	µA
		Tj = 125°C				40	mA
V_F **	Forward Voltage drop	Tj = 125°C	I_F = 30 A			0.72	V
		Tj = 125°C	I_F = 15 A			0.57	
		Tj = 25°C	I_F = 30 A			0.84	

Pulse test : * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2%

To evaluate the conduction losses use the following equation :
$P = 0.42 \times I_{F(AV)} + 0.010\ I_{F}^{2}{}_{(RMS)}$

PIN OUT configuration in PowerSO-10 :

Anode 1 = pin 1 to 5
Anode 2 = pin 6 to 10
Cathodes = connected to base tab



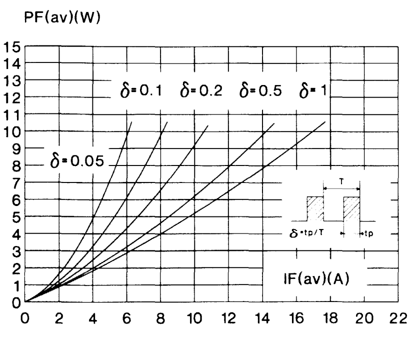


Fig. 1 : Average forward power dissipation versus average forward current. (Per diode)

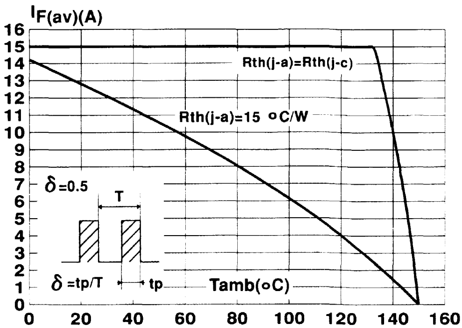


Fig. 2 : Average current versus ambient temperature.

SGS-THOMSON MICROELECTRONICS

Fig. 3 : Non repetitive surge peak forward current versus overload duration. (Maximum values) (Per diode)

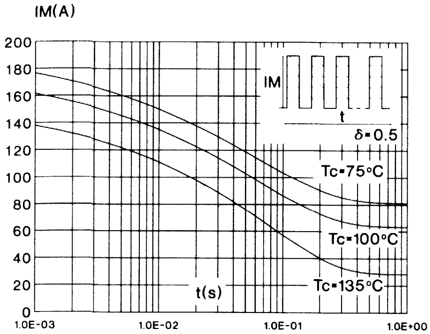


Fig. 4 : Relative variation of thermal transient impedance junction to case versus pulse duration.

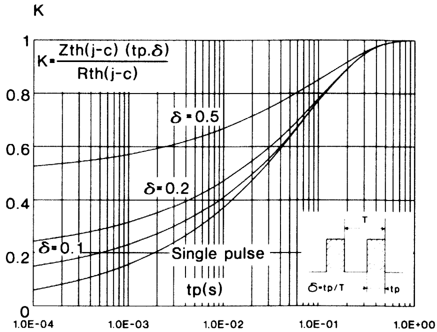


Fig. 5 : Reverse leakage current versus reverse voltage applied. (Typical values) (Per diode)

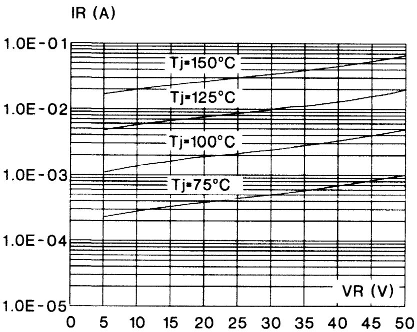


Fig. 6 : Junction capacitance versus reverse voltage applied. (Typical values) (Per diode)

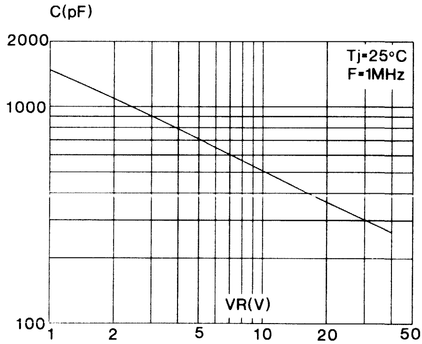
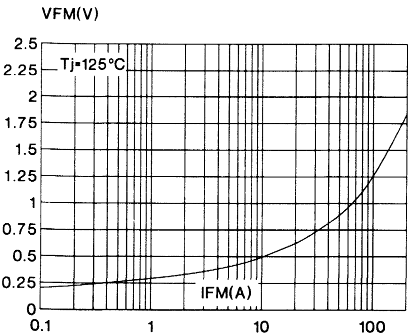


Fig. 7 : Forward voltage drop versus forward current. (Maximum values) (Per diode)



SGS-THOMSON MICROELECTRONICS

STPS4045CP

POWER SCHOTTKY RECTIFIER

MAJOR PRODUCTS CHARACTERISTICS

$I_{F(av)}$	2 * 20 A
V_{RRM}	45 V
V_F	0.63 V

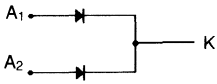
FEATURES AND BENEFITS

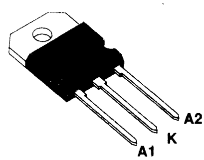
- VERY SMALL CONDUCTION LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- HIGH AVALANCHE CAPABILITY
- NON ISOLATED VERSION

DESCRIPTION

Dual center tap schottky rectifier suited for switch-mode power supply and high frequency DC to DC converters.

Packaged in SOT93, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.





SOT93
(Plastic)

STPS4045CP

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage			45	V
$I_{F(RMS)}$	RMS Forward Current		Per diode	35	A
$I_{F(AV)}$	Average Forward Current	Tc = 125°C δ = 0.5	Per diode Per device	20 40	A
I_{FSM}	Surge Non Repetitive Forward Current	Tp = 10 ms Sinusoidal	Per diode	220	A
I_{RRM}	Peak Repetitive Reverse Current	Tp = 2 µs F = 1KHz	Per diode	1	A
Tstg Tj	Storage and Junction Temperature Range			- 65 to + 150 - 65 to + 150	°C
dV/dt	Critical Rate of Rise of Reverse Voltage			1000	V/µs

THERMAL RESISTANCE

Symbol	Parameter		Value	Unit
$R_{TH\ (j-c)}$	Junction-case	Per diode total	1.5 0.8	°C/W
$R_{TH\ (c)}$	Coupling		0.1	°C/W

When the diodes 1 and 2 are used simultaneously :
ΔT_J(diode 1) = P(diode1) x R_{TH}(Per diode) + P(diode 2) x $R_{TH(c)}$

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS PER DIODE

Symbol	Parameter	Tests Conditions		Min.	Typ.	Max.	Unit
I_R *	Reverse leakage current	Tj = 25°C	$V_R = V_{RRM}$			200	µA
		Tj = 125°C				40	mA
V_F **	Forward voltage drop	Tj = 125°C	I_F = 15 A			0.57	V
		Tj = 125°C	I_F = 20 A			0.63	
		Tj = 125°C	I_F = 30 A			0.72	
		Tj = 125°C	I_F = 40 A			0.83	
		Tj = 25°C	I_F = 30 A			0.84	

Pulse test : * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2%

To evaluate the conduction losses use the following equation :
$P = 0.42 \times I_{F(AV)} + 0.01 \, I_{F}^{2}{}_{(RMS)}$

Fig. 1 : Average forward power dissipation versus average forward current. (Per diode)

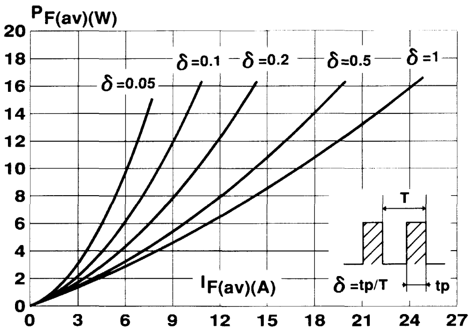


Fig. 2 : Average current versus ambient temperature. (duty cycle : 0.5) (Per diode)

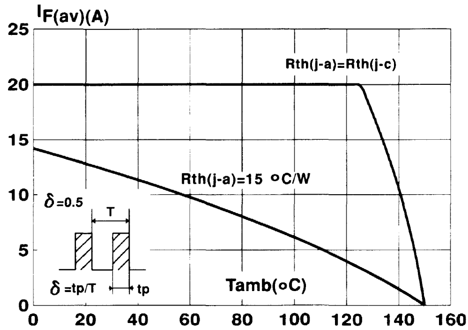


Fig. 3 : Non repetitive surge peak forward current versus overload duration. (Maximum values) (Per diode)

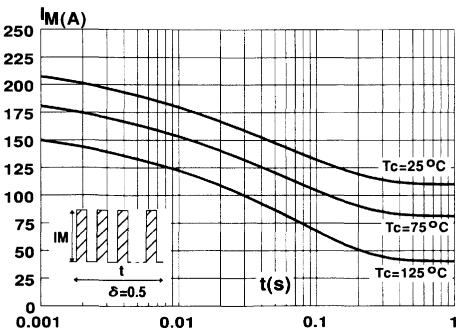
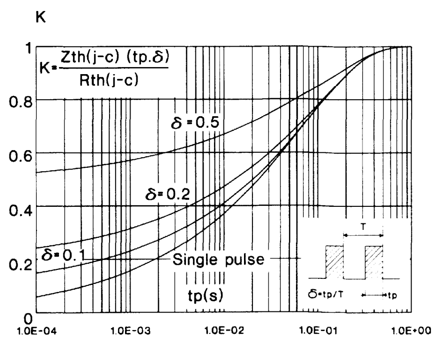


Fig. 4 : Relative variation of thermal transient impedance junction to case versus pulse duration.



SGS-THOMSON MICROELECTRONICS

Fig. 5 : Reverse leakage current versus reverse voltage applied. (Typical values) (Per diode)

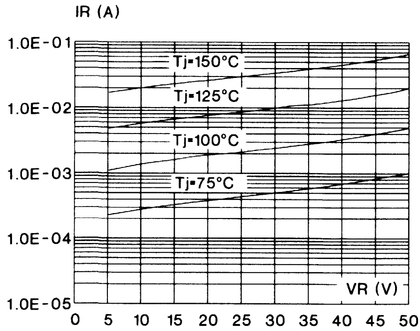


Fig. 6 : Junction capacitance versus reverse voltage applied. (Typical values) (Per diode)

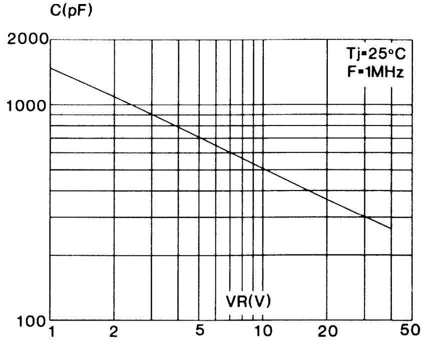
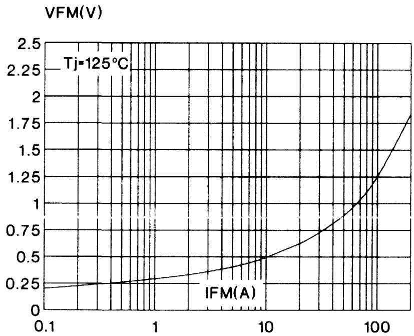


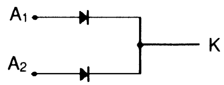
Fig. 7 : Forward voltage drop versus forward current. (Maximum values) (Per diode)

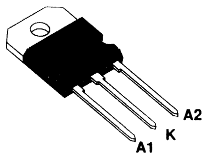


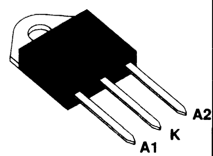
STPS6035CP/CPI
STPS6045CP/CPI

POWER SCHOTTKY RECTIFIER

- VERY SMALL CONDUCTION LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- EXTREMELY FAST SWITCHING
- LOW FORWARD VOLTAGE DROP
- HIGH AVALANCHE CAPABILITY
- LOW THERMAL RESISTANCE
- INSULATED PACKAGE :
  Insulating voltage = 2500V_{RMS}
  Capacitance = 12pF







SOT 93
(Plastic)

STPS6035CP
STPS6045CP

TOP 3I
(Plastic)

STPS6035CPI
STPS6045CPI

DESCRIPTION

Dual center tap schottky rectifier suited for switch-mode power supply and high frequency DC to DC converters.

Packaged in SOT 93 and TOP 3I, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter				Value	Unit
$I_{F(RMS)}$	RMS Forward Current			Per diode	60	A
$I_{F(AV)}$	Average Forward Current $\delta = 0.5$	SOT 93	Tc = 125°C	Per diode	30	A
		TOP 3I	Tc = 105°C	Per device	60	
I_{FSM}	Surge Non Repetitive Forward Current		Tp = 10 ms Sinusoidal	Per diode	400	A
I_{RRM}	Peak Repetitive Reverse Current		Tp = 2 µs F = 1KHz	Per diode	1	A
Tstg Tj	Storage and Junction Temperature Range				- 65 to + 150 - 65 to + 150	°C
dV/dt	Critical Rate of Rise of Reverse Voltage				1000	V/µs

Symbol	Parameter	STPS		Unit
		6035CP 6035CPI	6045CP 6045CPI	
V_{RRM}	Repetitive Peak Reverse Voltage	35	45	V

THERMAL RESISTANCE

Symbol	Parameter			Value	Unit
$R_{TH\ (j-c)}$	Junction-case	SOT 93	Per diode total	0.95 0.55	°C/W
		TOP 3I	Per diode total	1.8 1.1	
$R_{TH\ (c)}$	Coupling	SOT 93		0.15	°C/W
		TOP 3I		0.4	

When the diodes 1 and 2 are used simultaneously :
ΔT_J(diode 1) = P(diode1) x R_{TH}(Per diode) + P(diode 2) x $R_{TH(c)}$

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS PER DIODE

Symbol	Tests Conditions		Min.	Typ.	Max.	Unit
I_R *	Tj = 25°C	$V_R = V_{RRM}$			500	µA
	Tj = 125°C				80	mA
V_F **	Tj = 125°C	I_F = 60 A			0.78	V
	Tj = 125°C	I_F = 30 A			0.63	
	Tj = 25°C	I_F = 60 A			0.84	

Pulse test : * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2%

To evaluate the conduction losses use the following equation :
$P = 0.48 \times I_{F(AV)} + 0.005\ I_{F}^{2}{}_{(RMS)}$

Fig. 1 : Average forward power dissipation versus average forward current. (Per diode)

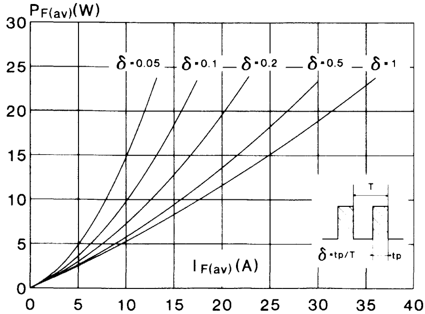


Fig. 2 : Average current versus ambient temperature. (duty cycle : 0.5) (Per diode) (SOT 93)

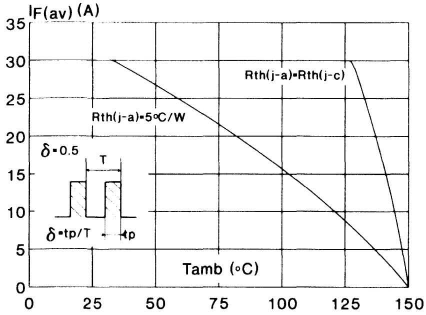


Fig. 3 : Average current versus ambient temperature. (duty cycle : 0.5) (Per diode) (TOP 3I)

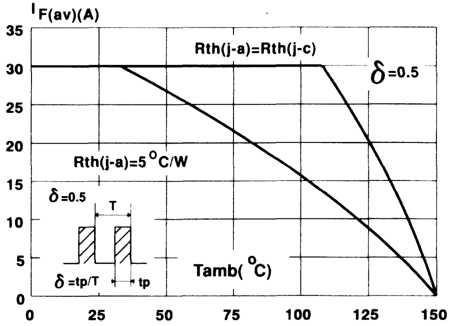


Fig. 4 : Non repetitive surge peak forward current versus overload duration. (Maximum values) (Per diode) (SOT 93)

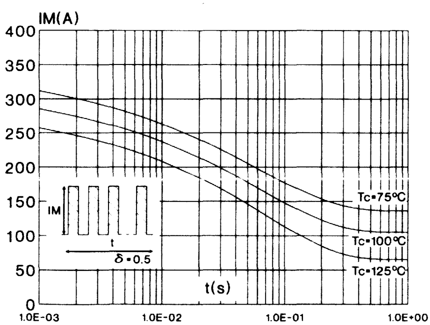


Fig. 5 : Non repetitive surge peak forward current versus overload duration. (Maximum values) (Per diode) (TOP 3I)

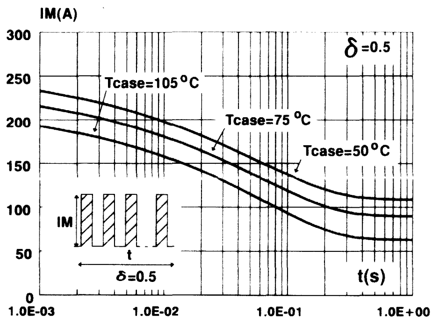


Fig. 6 : Relative variation of thermal transient impedance junction to case versus pulse duration.

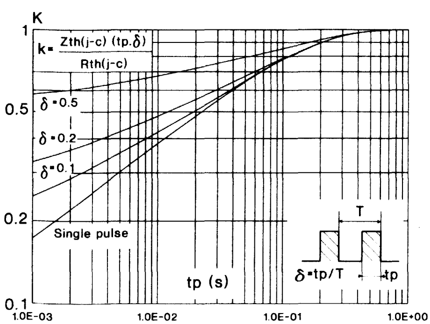


Fig. 7 : Reverse leakage current versus reverse voltage applied. (Typical values) (Per diode)

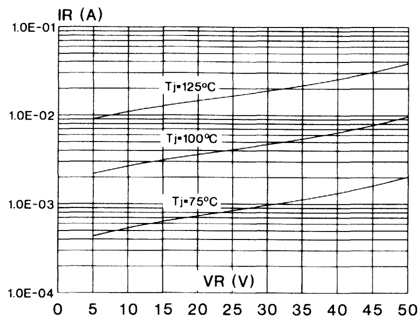


Fig. 8 : Junction capacitance versus reverse voltage applied. (Typical values) (Per diode)

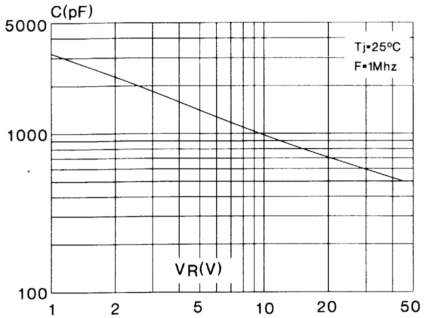
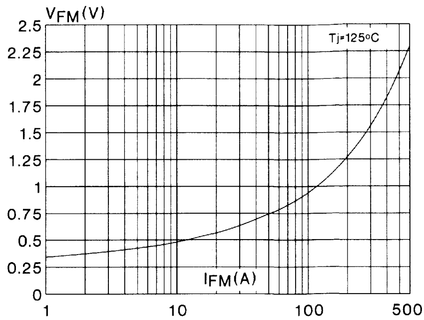


Fig. 9 : Forward voltage drop versus forward current. (Maximum values)



SGS-THOMSON
MICROELECTRONICS

STPS80100TV

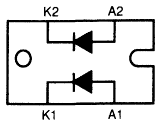
HIGH VOLTAGE POWER SCHOTTKY RECTIFIER

MAIN PRODUCT CHARACTERISTICS

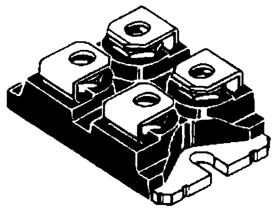
$I_{F(AV)}$	2 x 40A
V_{RRM}	100V
V_F (typ)	0.63V

PRELIMINARY DATASHEET

TOP VIEW



STPS80100TV



Screw version

ISOTOP™
(Plastic)

FEATURES AND BENEFITS

- NEGLIGIBLE SWITCHING LOSSES
- LOW FORWARD VOLTAGE DROP
- LOW CAPACITANCE
- HIGH REVERSE AVALANCHE SURGE CAPABILITY
- LOW INDUCTANCE PACKAGE

DESCRIPTION

High voltage dual Schottky rectifier suited for switchmode power supplies and other power converters.
Packaged in ISOTOP™, this device is intended for use in medium voltage operation, and particularly, in high frequency circuitries where low switching losses and low noise are required.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			100	V
$I_{F(RMS)}$	RMS forward current		Per diode	125	A
$I_{F(AV)}$	Average forward current	Tc=90°C V_R = 60V δ = 0.5	Per diode	40	A
I_{FSM}	Surge non repetitive forward current	tp=10ms sinusoidal	Per diode	700	A
I_{RRM}	Repetitive Peak reverse current	tp=2µs F=1KHz	Per diode	2	A
I_{RSM}	Non repetitive peak reverse current	tp=100µs	Per diode	2	A
Tstg	Junction temperature range			- 65 to + 150	°C
Tj	Max. Junction temperature			125	°C
dV/dt	Critical rate of rise of reverse voltage			1000	V/µs

TM : ISOTOP is a trademark of SGS-THOMSON Microelectronics.

THERMAL RESISTANCES

Symbol	Parameter		Value	Unit
Rth (j-c)	Junction to case	Per diode	0.9	°C/W
		Total	0.5	
Rth (c)	Coupling		0.1	°C/W

When the diodes 1 and 2 are used simultaneously :
Tj-Tc(diode 1)=P(diode1) x Rth(j-c)(Per diode) + P(diode 2) x Rth(c)

ELECTRICAL CHARACTERISTICS (Per diode)

STATIC CHARACTERISTICS

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
I_R *	Reverse leakage current	$V_R = V_{RRM}$	T_j = 25°C			400	µA
			T_j = 100°C			70	mA
V_F **	Forward voltage drop	I_F = 80 A	T_j = 100°C			0.90	V
		I_F = 40 A	T_j = 100°C		0.63	0.80	
		I_F = 80 A	T_j = 25°C			0.99	

Pulse test : * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2 %

To evaluate the conduction losses use the following equation :
$P = 0.7 \times I_{F(AV)} + 0.0025 \times I_F{}^2{}_{(RMS)}$

Fig. 1 : Average forward power dissipation versus average forward current. (Per diode)

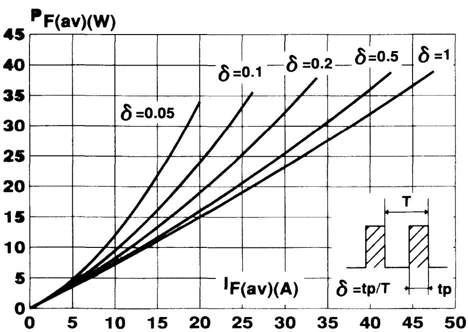


Fig. 2 : Average current versus ambient temperature. (duty cycle : 0.5) (Per diode)

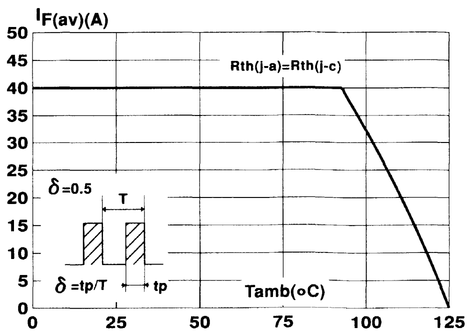


Fig. 3 : Non repetitive surge peak forward current versus overload duration.
(Maximum values) (Per diode)

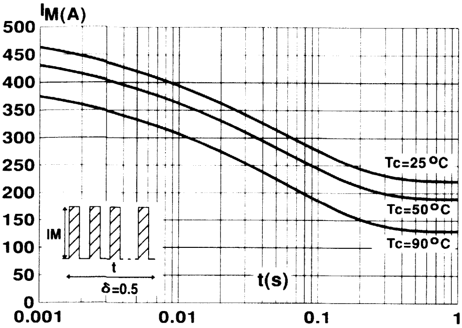


Fig. 4 : Relative variation of thermal transient impedance junction to case versus pulse duration.

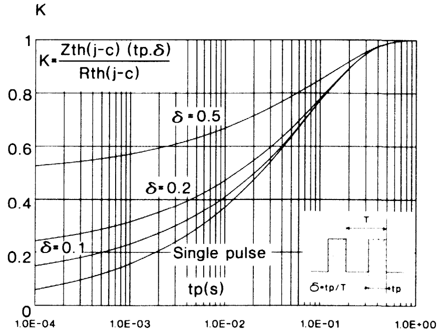


Fig. 5 : Reverse leakage current versus reverse voltage applied. (Typical values) (Per diode)

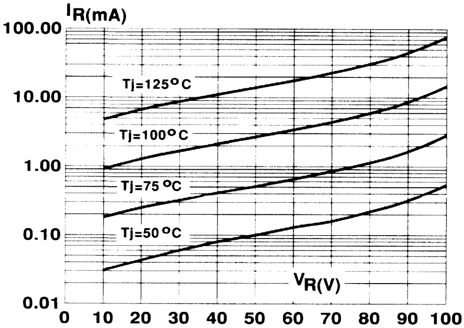


Fig. 6 : Junction capacitance versus reverse voltage applied. (Typical values) (Per diode)

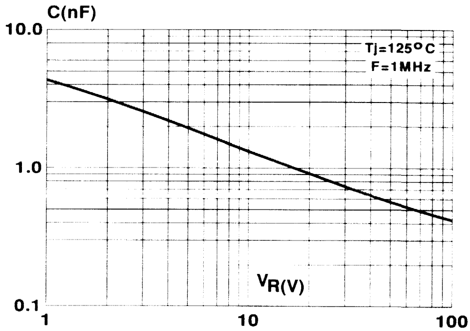
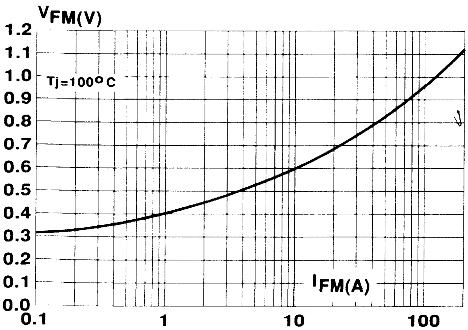


Fig. 7 : Forward voltage drop versus forward current. (Maximum values) (Per diode)

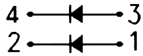


STPS12035T(V)
STPS12045T(V)

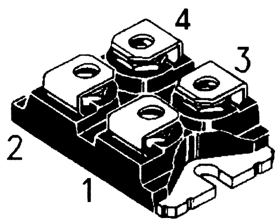
POWER SCHOTTKY RECTIFIER

FEATURES

- VERY SMALL CONDUCTION LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- LOW FORWARD VOLTAGE DROP
- LOW THERMAL RESISTANCE
- EXTREMELY FAST SWITCHING
- INSULATED PACKAGE :
  Insulating voltage = 2500 $V_{(RMS)}$



1 = A_1
2 = K_1
3 = A_2
4 = K_2



Screw version *

ISOTOP™
(Plastic)

DESCRIPTION

Dual power schottky rectifier suited for switchmode power supply and high frequency DC to DC converters.
Packaged in ISOTOP™, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter			Value	Unit
$I_{F(RMS)}$	RMS forward current		Per diode	125	A
$I_{F(AV)}$	Average forward current	Tc=100°C δ = 0.5	Per diode Per device	60 120	A A
I_{FSM}	Surge non repetitive forward current	tp=10ms sinusoidal	Per diode	700	A
I_{RRM}	Peak repetitive reverse current	tp=2µs F=1KHz	Per diode	2	A
Tstg Tj	Storage and junction temperature range			- 65 to + 150 - 65 to + 150	°C °C
dV/dt	Critical rate of rise of reverse voltage			1000	V/µs

Symbol	Parameter	STPS		Unit
		12035TV	12045TV	
V_{RRM}	Repetitive peak reverse voltage	35	45	V

* : Tin plated Fast-on version is also available (without V suffix).
TM : ISOTOP is a trademark of SGS-THOMSON Microelectronics.

THERMAL RESISTANCES

Symbol	Parameter		Value	Unit
Rth (j-c)	Junction to case	Per diode	1.0	°C/W
		Total	0.55	
Rth (c)	Coupling		0.1	°C/W

When the diodes 1 and 2 are used simultaneously :
Δ Tj(diode 1) = P(diode) x Rth(Per diode) + P(diode 2) x Rth(c)

ELECTRICAL CHARACTERISTICS (Per diode)

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R *	T_j = 25°C	$V_R = V_{RRM}$			1	mA
	T_j = 125°C				150	mA
V_F **	T_j = 125°C	I_F = 120 A			0.87	V
	T_j = 125°C	I_F = 60 A			0.67	
	T_j = 25°C	I_F = 120 A			0.91	

Pulse test : * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2 %

To evaluate the conduction losses use the following equation :
$P = 0.47 \times I_{F(AV)} + 0.00333 \times I_F{}^2{}_{(RMS)}$

Fig.1 : Average forward power dissipation versus average forward current. (Per diode)

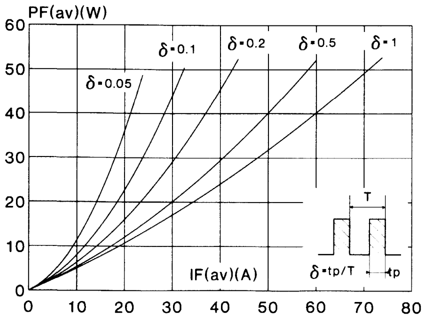


Fig.2 : Average current versus case temperature. (duty cycle : 0.5) (Per diode)

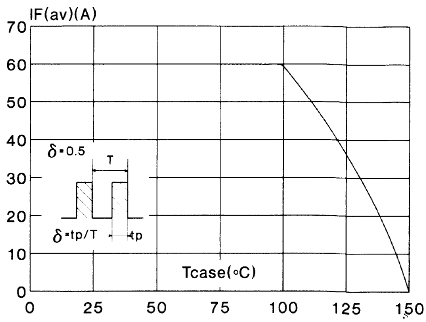


Fig.3 : Non repetitive surge peak forward current versus overload duration. (Maximum values) (Per diode)

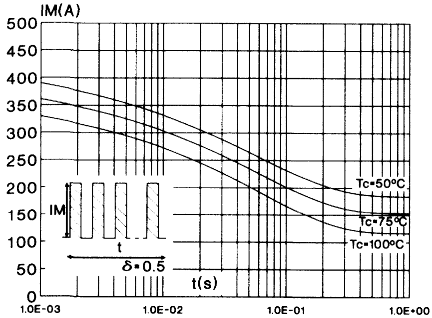


Fig.4 : Relative variation of thermal transient impedance junction to case versus pulse duration.

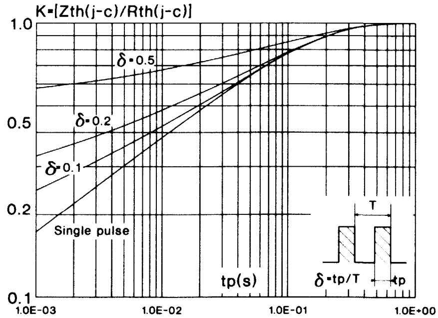


Fig.5 : Reverse leakage current versus reverse voltage applied. (Typical values) (Per diode)

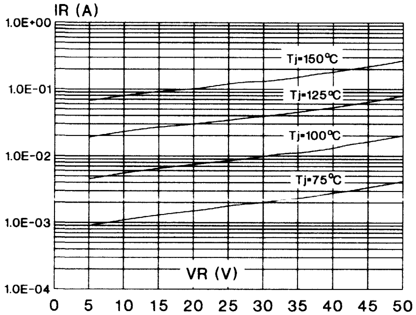


Fig.6 : Junction capacitance versus reverse voltage applied. (Typical values) (Per diode)

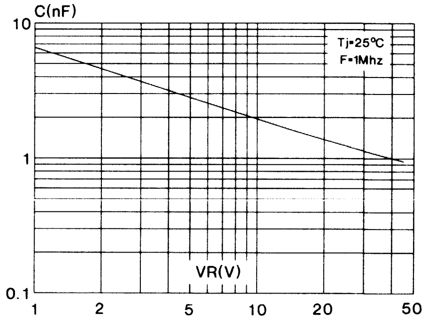
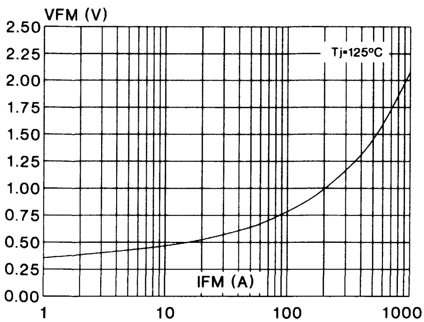


Fig.7 : Forward voltage drop versus forward current. (Maximum values) (Per diode)

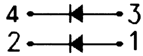


STPS16035T(V)
STPS16045T(V)

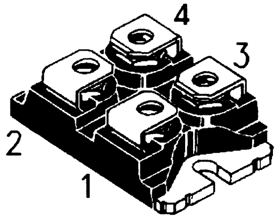
POWER SCHOTTKY RECTIFIER

FEATURES

- VERY SMALL CONDUCTION LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- LOW FORWARD VOLTAGE DROP
- LOW THERMAL RESISTANCE
- EXTREMELY FAST SWITCHING
- INSULATED PACKAGE :
  Insulating voltage = 2500 $V_{(RMS)}$



1 = A_1
2 = K_1
3 = A_2
4 = K_2



Screw version *

ISOTOP™
(Plastic)

DESCRIPTION

Dual power schottky rectifier suited for switchmode power supply and high frequency DC to DC converters.
Packaged in ISOTOP™, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter			Value	Unit
$I_{F(RMS)}$	RMS forward current		Per diode	125	A
$I_{F(AV)}$	Average forward current	Tc=85°C δ = 0.5	Per diode Per device	80 160	A A
I_{FSM}	Surge non repetitive forward current	tp=10ms sinusoidal	Per diode	900	A
I_{RRM}	Peak repetitive reverse current	tp=2µs F=1KHz	Per diode	2	A
Tstg Tj	Storage and junction temperature range			- 65 to + 150 - 65 to + 150	°C °C
dV/dt	Critical rate of rise of reverse voltage			1000	V/µs

Symbol	Parameter	STPS		Unit
		16035TV	16045TV	
V_{RRM}	Repetitive peak reverse voltage	35	45	V

* : Tin plated Fast-on version is also available (without V suffix).
TM : ISOTOP is a trademark of SGS-THOMSON Microelectronics.

THERMAL RESISTANCES

Symbol	Parameter		Value	Unit
Rth (j-c)	Junction to case	Per diode	0.9	°C/W
		Total	0.5	
Rth (c)	Coupling		0.1	°C/W

When the diodes 1 and 2 are used simultaneously :
Δ Tj(diode 1) = P(diode) x Rth(Per diode) + P(diode 2) x Rth(c)

ELECTRICAL CHARACTERISTICS (Per diode)

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R *	T_j = 25°C	$V_R = V_{RRM}$			1	mA
	T_j = 125°C				150	mA
V_F **	T_j = 125°C	I_F = 160 A			0.90	V
	T_j = 125°C	I_F = 80 A			0.69	
	T_j = 25°C	I_F = 160 A			0.95	

Pulse test : * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2 %

To evaluate the conduction losses use the following equation :
$P = 0.48 \times I_{F(AV)} + 0.00262 \times I_F^2{}_{(RMS)}$

Fig.1 : Average forward power dissipation versus average forward current. (Per diode)

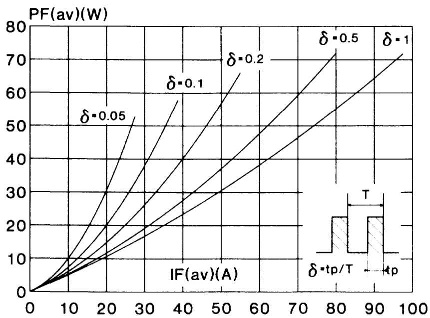


Fig.2 : Average current versus case temperature. (duty cycle : 0.5) (Per diode)

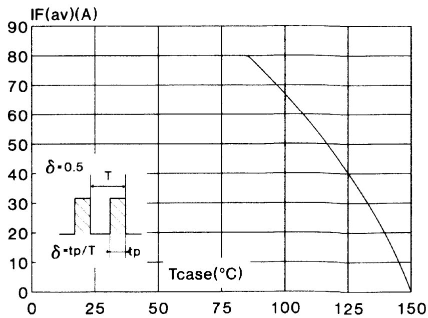


Fig.3 : Non repetitive surge peak forward current versus overload duration. (Maximum values) (Per diode)

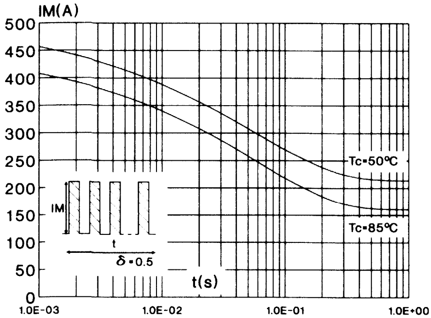


Fig.4 : Relative variation of thermal transient impedance junction to case versus pulse duration.

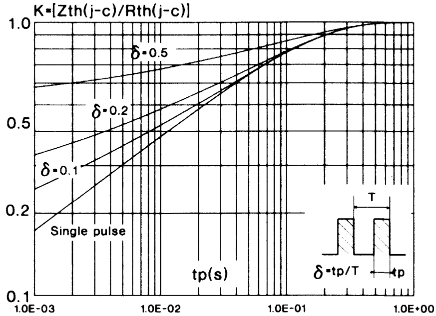


Fig.5 : Reverse leakage current versus reverse voltage applied. (Typical values) (Per diode)

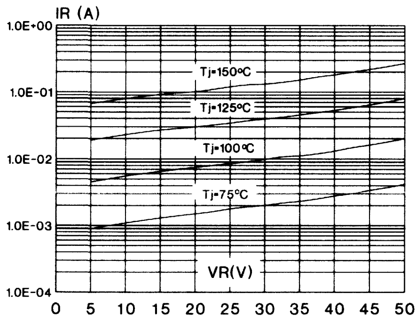


Fig.6 : Junction capacitance versus reverse voltage applied. (Typical values) (Per diode)

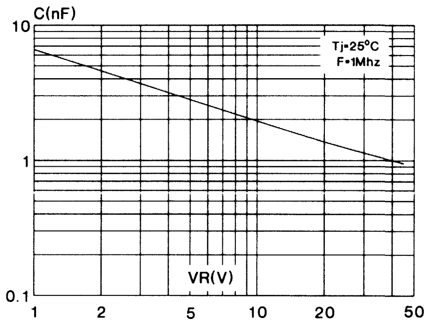
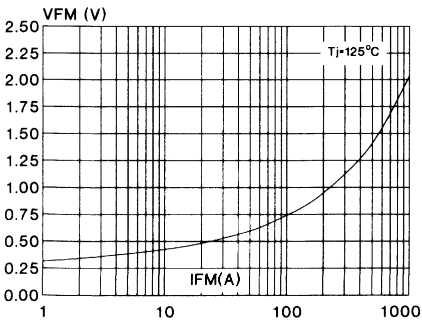


Fig.7 : Forward voltage drop versus forward current. (Maximum values) (Per diode)

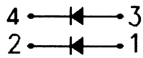


STPS24035T(V)
STPS24045T(V)

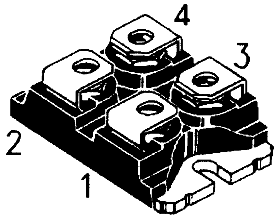
POWER SCHOTTKY RECTIFIER

FEATURES

- VERY SMALL CONDUCTION LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- LOW FORWARD VOLTAGE DROP
- LOW THERMAL RESISTANCE
- EXTREMELY FAST SWITCHING
- INSULATED PACKAGE : Insulating voltage = 2500 $V_{(RMS)}$



1 = A_1
2 = K_1
3 = A_2
4 = K_2



Screw version *

ISOTOP™
(Plastic)

DESCRIPTION

Dual power schottky rectifier suited for switchmode power supply and high frequency DC to DC converters.
Packaged in ISOTOP™, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter			Value	Unit
$I_{F(RMS)}$	RMS forward current		Per diode	170	A
$I_{F(AV)}$	Average forward current	Tc=105°C δ = 0.5	Per diode Per device	120 240	A A
I_{FSM}	Surge non repetitive forward current	tp=10ms sinusoidal	Per diode	1500	A
I_{RRM}	Peak repetitive reverse current	tp=2µs F=1KHz	Per diode	2	A
Tstg Tj	Storage and junction temperature range			- 65 to + 150 - 65 to + 150	°C °C
dV/dt	Critical rate of rise of reverse voltage			1000	V/µs

Symbol	Parameter	STPS		Unit
		24035TV	24045TV	
V_{RRM}	Repetitive peak reverse voltage	35	45	V

* : Tin plated Fast-on version is also available (without V suffix).
TM : ISOTOP is a trademark of SGS-THOMSON Microelectronics.

THERMAL RESISTANCES

Symbol	Parameter		Value	Unit
Rth (j-c)	Junction to case	Per diode	0.45	°C/W
		Total	0.28	
Rth (c)	Coupling		0.10	°C/W

When the diodes 1 and 2 are used simultaneously :
Δ Tj(diode 1) = P(diode) x Rth(Per diode) + P(diode 2) x Rth(c)

ELECTRICAL CHARACTERISTICS (Per diode)

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R *	T_j = 25°C	$V_R = V_{RRM}$			2	mA
	T_j = 125°C				300	mA
V_F **	T_j = 125°C	I_F = 240 A			0.87	V
	T_j = 125°C	I_F = 120 A			0.67	
	T_j = 25°C	I_F = 240 A			0.91	

Pulse test : * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2 %

To evaluate the conduction losses use the following equation :
$P = 0.47 \times I_{F(AV)} + 0.00167 \times I_F^2{}_{(RMS)}$

Fig.1 : Average forward power dissipation versus average forward current. (Per diode)

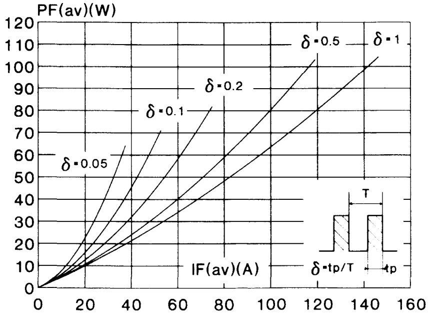


Fig.2 : Average current versus case temperature. (duty cycle : 0.5) (Per diode)

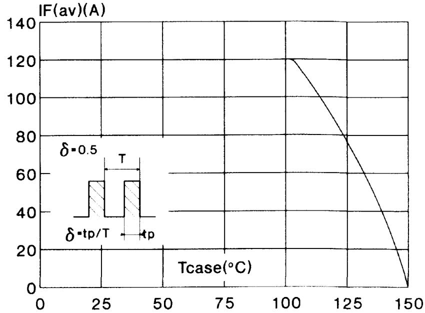


Fig.3 : Non repetitive surge peak forward current versus overload duration. (Maximum values) (Per diode)

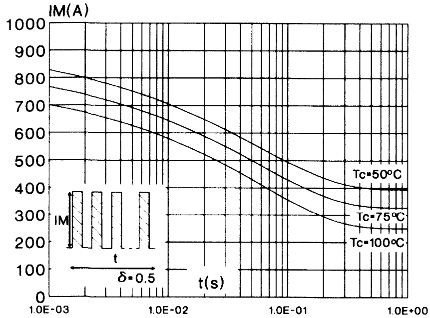


Fig.4 : Relative variation of thermal transient impedance junction to case versus pulse duration.

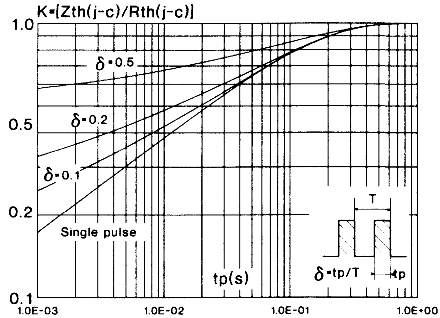


Fig.5 : Reverse leakage current versus reverse voltage applied. (Typical values) (Per diode)

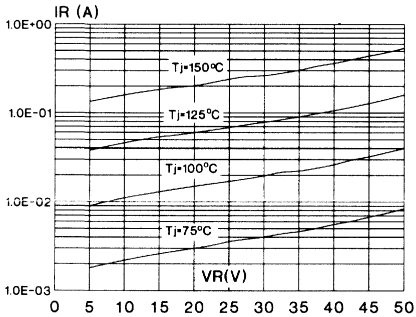


Fig.6 : Junction capacitance versus reverse voltage applied. (Typical values) (Per diode)

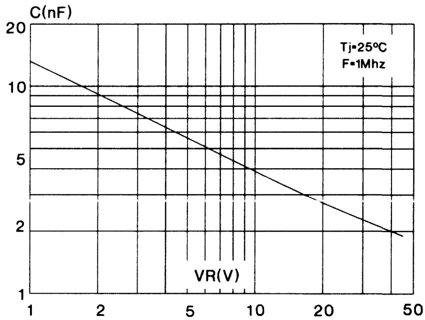
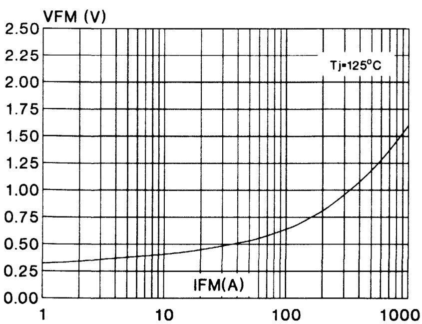


Fig.7 : Forward voltage drop versus forward current. (Maximum values) (Per diode)



SIGNAL SCHOTTKY DIODES

1N 5711

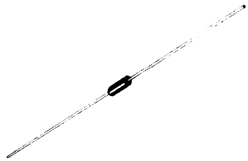
SMALL SIGNAL SCHOTTKY DIODE

DESCRIPTION

Metal to silicon junction diode featuring high breakdown, low turn-on voltage and ultrafast switching.

Primarily intended for high level UHF/VHF detection and pulse application with broad dynamic range.

Matched batches are available on request.



DO 35
(Glass)

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		70	V
I_F	Forward Continuous Current*	T_a = 25°C	15	mA
P_{tot}	Power Dissipation*	T_a = 25°C	430	mW
T_{stg} T_j	Storage and Junction Temperature Range		– 65 to 200	°C
T_L	Maximum Lead Temperature for Soldering during 10s at 4mm from Case		230	°C

THERMAL RESISTANCE

Symbol	Test Conditions	Value	Unit
$R_{th(j-a)}$	Junction-ambient*	400	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
$V_{(BR)}$	T_{amb} = 25°C	I_R = 10µA	70			V
V_F**	T_{amb} = 25°C	I_F = 1mA			0.41	V
	T_{amb} = 25°C	I_F = 15mA			1	
I_R**	T_{amb} = 25°C	V_R = 50V			0.2	µA

DYNAMIC CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
C	T_{amb} = 25°C	V_R = 0V	f = 1MHz			2	pF
τ	T_{amb} = 25°C	I_F = 5mA	Krakauer Method			100	ps

* On infinite heatsink with 4mm lead length
** Pulse test : $t_p \le 300\mu s$ $\delta < 2\%$.
Matched batches available on request. Test conditions (forward voltage and/or capacitance) according to customer specification.

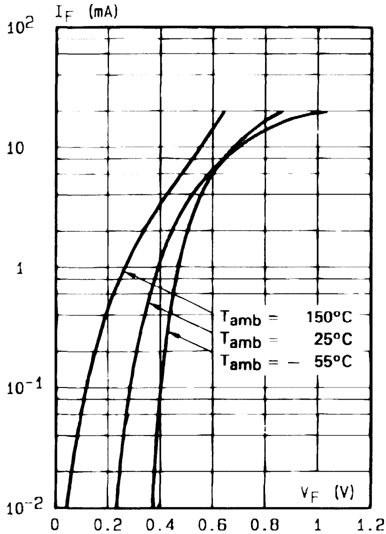


Fig.1 - Forward current versus forward voltage at low level (typical values).

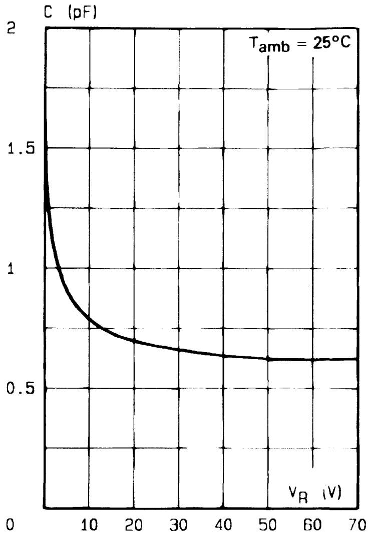


Fig.2 - Capacitance C versus reverse applied voltage V_R (typical values).

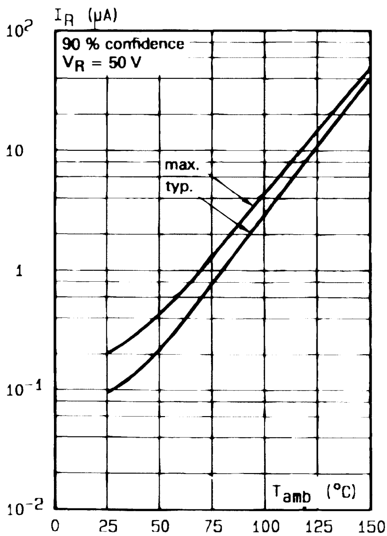


Fig.3 - Reverse current versus ambient temperature.

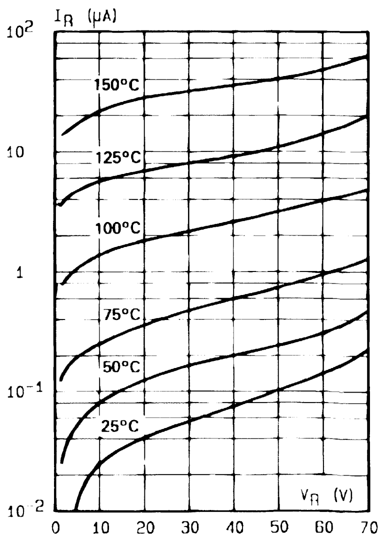


Fig.4 - Reverse current versus continuous reverse voltage (typical values).

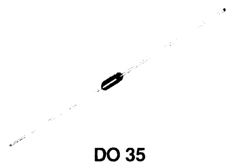
1N 5712

SMALL SIGNAL SCHOTTKY DIODE

DESCRIPTION

Metal to silicon junction diode featuring high breakdown voltage, low turn-on voltage and ultrafast switching.

Primarily intended for high level UHF/VHF detection and pulse application with broad dynamic range.



DO 35
(Glass)

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		20	V
I_F	Forward Continuous Current*	T_a = 25°C	35	mA
P_{tot}	Power Dissipation*	T_a = 25°C	430	mW
T_{stg} T_j	Storage and Junction Temperature Range		– 65 to 200	°C
T_L	Maximum Lead Temperature for Soldering during 10s at 4 mm from Case		230	°C

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-a)}$	Junction-ambient*	400	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
$V_{(BR)}$	T_{amb} = 25°C	I_R = 10μA	20			V
V_F **	T_{amb} = 25°C	I_F = 1mA			0.41	V
	T_{amb} = 25°C	I_F = 35mA			1	
I_R **	T_{amb} = 25°C	V_R = 15V			0.1	μA

DYNAMIC CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
C	T_{amb} = 25°C	V_R = 0V	f = 1MHz			1.2	pF
τ	T_{amb} = 25°C	I_F = 5mA	Krakauer Method			100	ps

* On infinite heatsink with 4mm lead length
* * Pulse test : $t_p \leq 300\mu s$ $\delta < 2\%$.
Matched batches available on request. Test conditions (forward voltage and/or capacitance) according to customer specification.

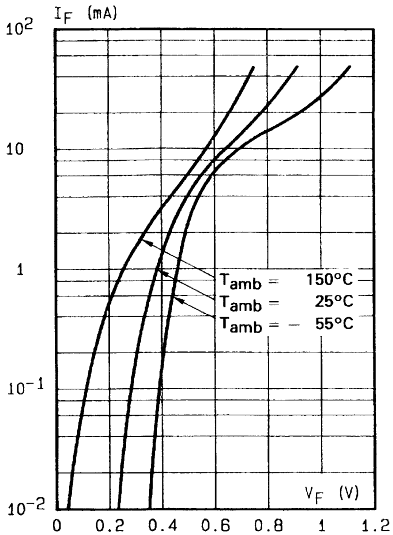


Fig.1 - Forward current versus forward voltage at different temperatures (typical values).

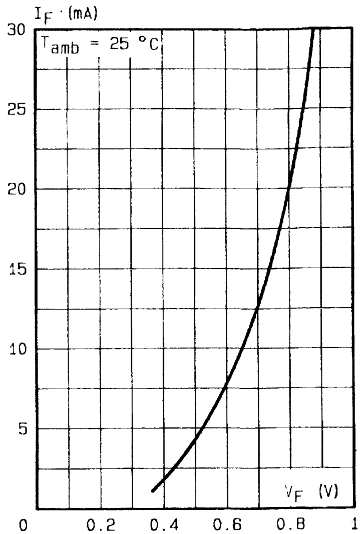


Fig.2 - Forward current versus forward voltage (typical values).

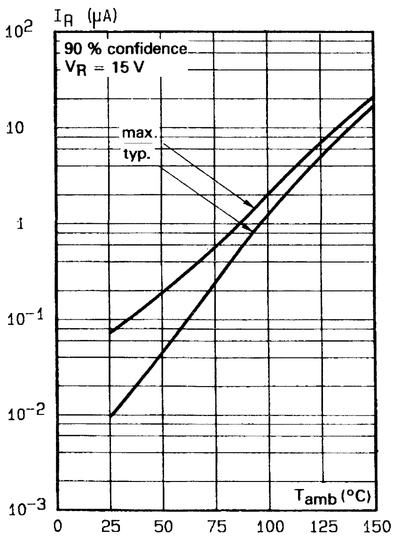


Fig.3 - Reverse current versus ambient temperature.

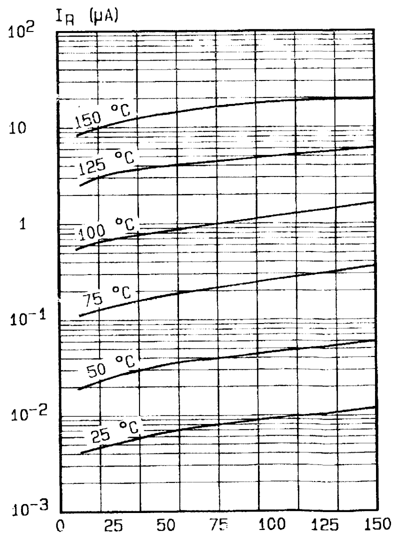


Fig.4 - Reverse current versus continuous reverse voltage (typical values).

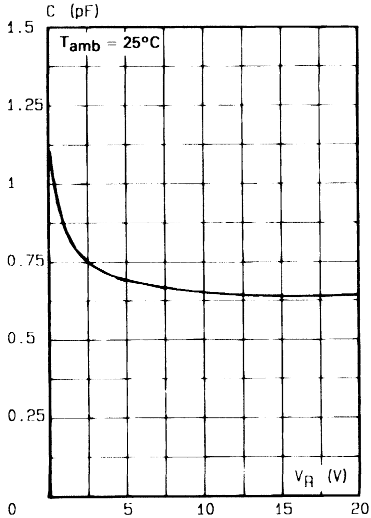


Fig.5 – Capacitance C versus reverse applied voltage V_R (typical values).

SGS-THOMSON MICROELECTRONICS

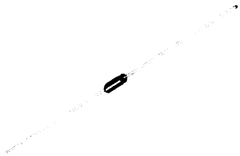
1N 6263

SMALL SIGNAL SCHOTTKY DIODE

DESCRIPTION

Metal to silicon junction diode featuring high breakdown, low turn-on voltage and ultrafast switching.

Primarily intended for high level UHF/VHF detection and pulse application with broad dynamic range.



DO 35
(Glass)

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		60	V
I_F	Forward Continuous Current*	T_a = 25°C	15	mA
I_{FSM}	Surge non Repetitive Forward Current*	$t_p \leq$ 1s	50	mA
T_{stg} T_j	Storage and Junction Temperature Range		– 65 to 200	°C
T_L	Maximum Lead Temperature for Soldering during 10s at 4mm from Case		230	°C

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-a)}$	Junction-ambient*	400	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
$V_{(BR)}$	T_{amb} = 25°C	I_R = 10μA	60			V
V_F**	T_{amb} = 25°C	I_F = 1mA			0.41	V
	T_{amb} = 25°C	I_F = 15mA			1	
I_R**	T_{amb} = 25°C	V_R = 50V			0.2	μA

DYNAMIC CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
C	T_{amb} = 25°C	V_R = 0V	f = 1MHz			2.2	pF
τ	T_{amb} = 25°C	I_F = 5mA	Krakauer Method			100	ps

* On infinite heatsink with 4mm lead length
** Pulse test : $t_p \leq 300\mu s$ $\delta < 2\%$.
Matched batches available on request. Test conditions (forward voltage and/or capacitance) according to customer specification.

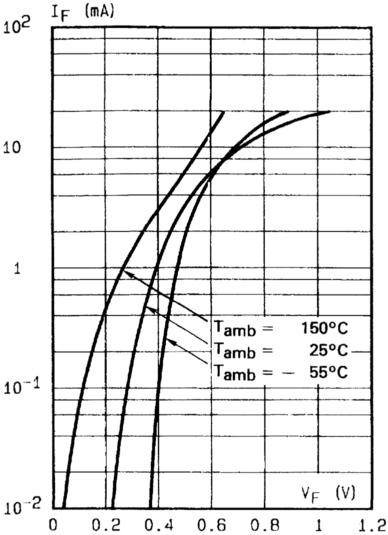


Fig.1 - Forward current versus forward voltage (typical values).

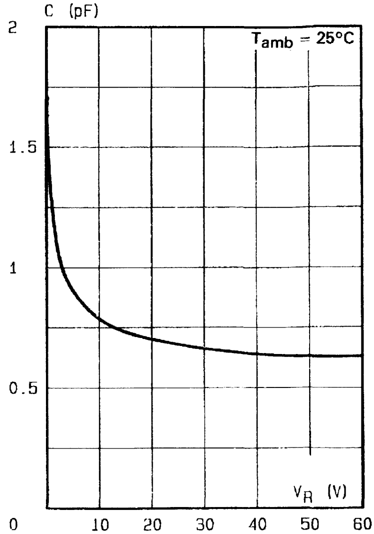


Fig.2 - Capacitance C versus reverse applied voltage V_R (typical values).

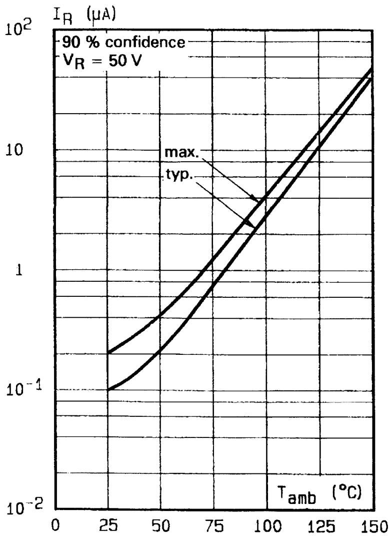


Fig.3 - Reverse current versus ambient temperature.

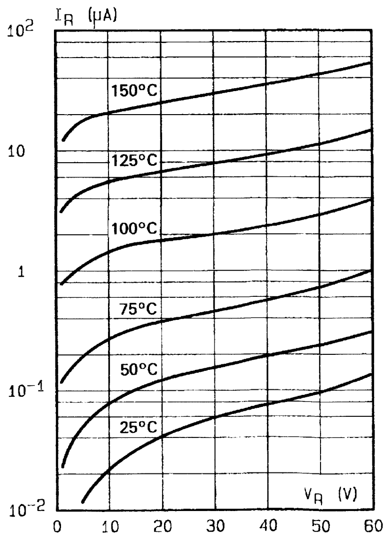
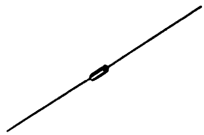


Fig.4 - Reverse current versus continuous reverse voltage (typical values).

SMALL SIGNAL SCHOTTKY DIODES

DESCRIPTION

Metal to silicon junction diodes featuring high breakdown, low turn-on voltage and ultrafast switching.
Primarly intended for high level UHF/VHF detection and pulse application with broad dynamic range.
Matched batches are available on request, (BAR 11 only).



DO 35
(Glass)

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		BAR 10	BAR 11	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		20	15	V
I_F	Forward Continuous Current*	T_a = 25°C	35	20	mA
I_{FSM}	Surge non Repetitive Forward Current*	$t_p \leq$ 1s	100		mA
T_{stg} T_j	Storage and Junction Temperature Range		– 65 to 200		°C
T_L	Maximum Lead Temperature for Soldering during 10s at 4mm from Case		230		°C

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th(j-a)}$	Junction-ambient*	400	°C/W

ELECTRICAL CHARACTERISITCS

STATIC CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
$V_{(BR)}$	T_{amb} = 25°C	I_R = 10μA	BAR 10	20			V
	T_{amb} = 25°C	I_R = 10μA	BAR 11	15			
V_F **	T_{amb} = 25°C	I_F = 1mA				0.41	V
	T_{amb} = 25°C	I_F = 35mA	BAR 10			1	
	T_{amb} = 25°C	I_F = 20mA	BAR 11			1	
I_R **	T_{amb} = 25°C	V_R = 15V	BAR 10			0.1	μA
	T_{amb} = 25°C	V_R = 8V	BAR 11			0.1	

DYNAMIC CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
C	T_{amb} = 25°C	V_R = 0V	f = 1MHz			1.2	pF
τ *	T_{amb} = 25°C	I_F = 5mA	Krakauer Method			100	ps

* On infinite heatsink with 4mm lead length
** Pulse test : $t_p \leq 300\mu s$ $\delta < 2\%$.
Matched batches available on request. Test conditions (forward voltage and/or capacitance) according to customer specification.

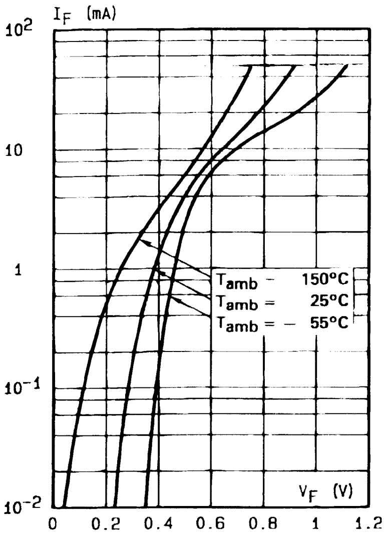


Fig.1 - Forward current versus forward voltage at different temperatures (typical values).

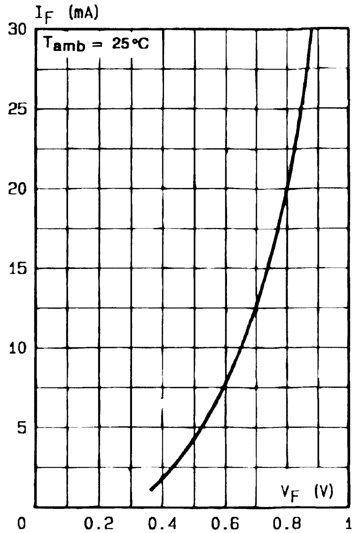
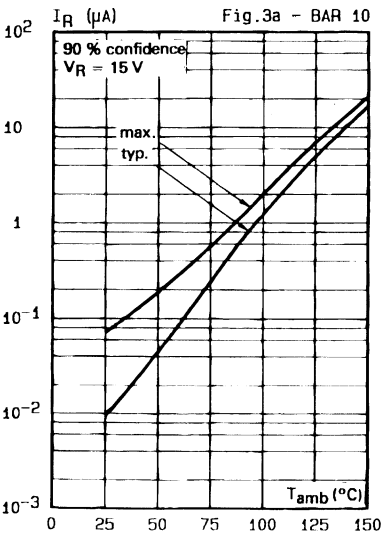


Fig.2 - Forward current versus forward voltage (typical values).



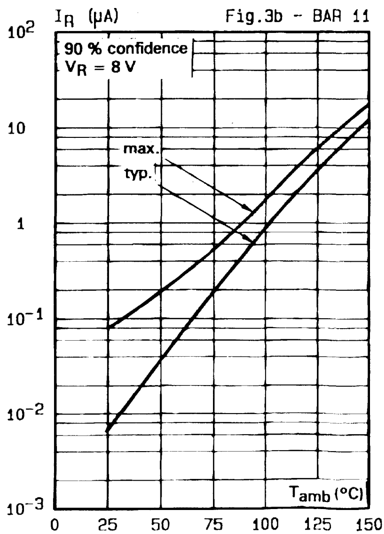


Fig.3a/3b - Reverse current versus ambient temperature.

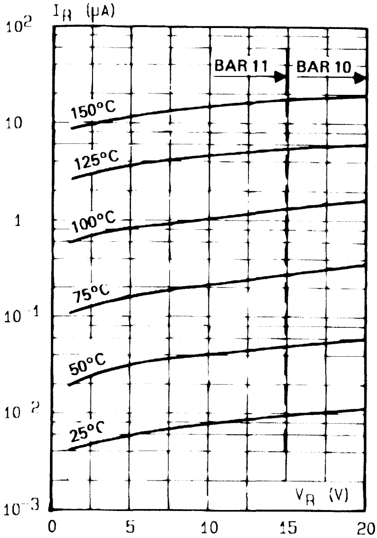


Fig.4 - Reverse current versus continuous reverse voltage (typical values).

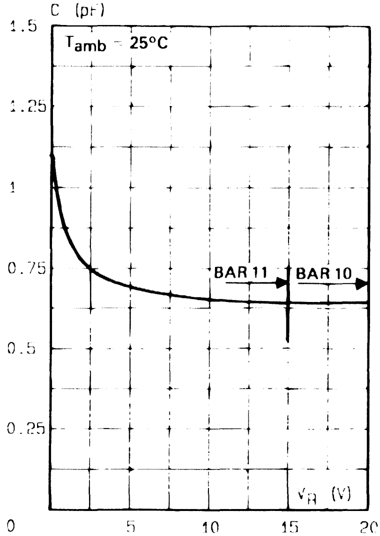
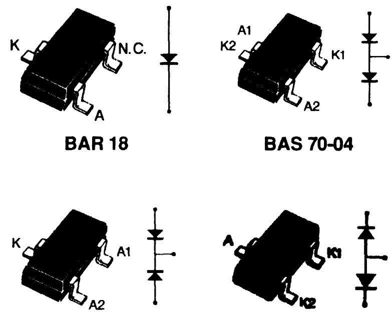


Fig.5 - Capacitance C versus reverse applied voltage V_R (typical values).

SGS-THOMSON
MICROELECTRONICS

BAR 18
BAS 70-04 → 06

SMALL SIGNAL SCHOTTKY DIODES



BAR 18 BAS 70-04

BAS 70-05 BAS 70-06

SOT 23
(Plastic)

DESCRIPTION

Low turn-on and high breakdown voltage diodes intended for ultrafast switching and UHF detectors in hybrid micro circuits.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		70	V
P_{tot}	Power Dissipation*	T_{amb} = 25°C	200	mW
T_{stg} T_j	Storage and Junction Temperature Range		– 55 to 150 150	°C °C

THERMAL RESISTANCES

Symbol	Parameter	Value	Unit
$R_{th\ (j-a)}$	Junction-ambient*	625	°C/W
$R_{th\ (j-SR)}$	Junction-substrate	400	°C/W

* Mounted on ceramic substrate : 7 x 5 x 0.5mm.

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
$V_{(BR)}$	T_{amb} = 25°C	I_R = 10μA		70			V
V_F	T_{amb} = 25°C	I_F = 1mA				410	mV
I_R	T_{amb} = 25°C	V_R = 50V				200	nA

DYNAMIC CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
C	T_{amb} = 25°C	V_R = 0	f = 1MHz			2	pF
τ*	T_{amb} = 25°C	I_F = 5mA	Krakauer Method			100	ps

* Effective carrier life time.

Type	BAR 18	BAS 70-04	BAS 70-05	BAS 70-06
Marking	D76	D96	D97	D98

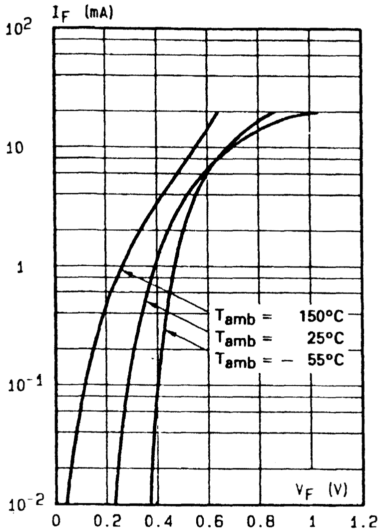


Fig.1 - Forward current versus forward voltage at low level (typical values).

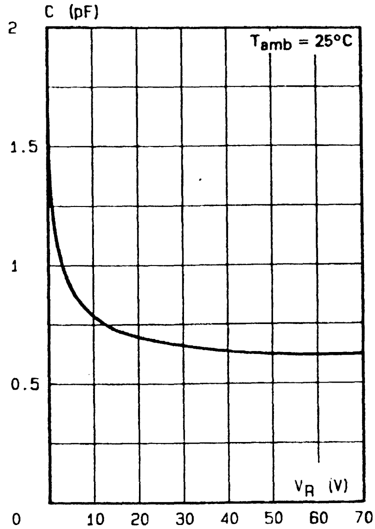


Fig.2 - Capacitance C versus reverse applied voltage V_R (typical values).

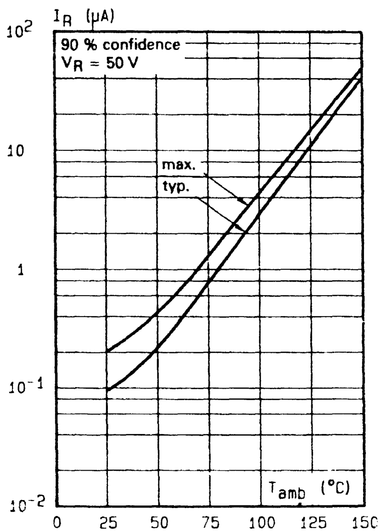


Fig.3 - Reverse current versus ambient temperature.

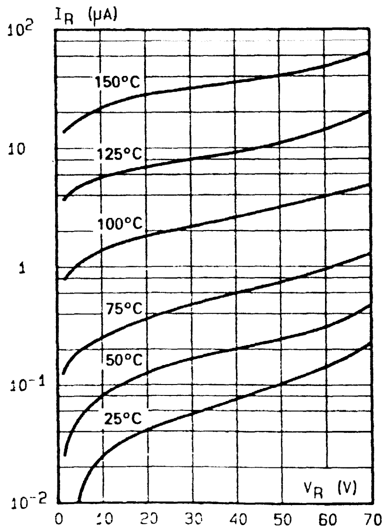
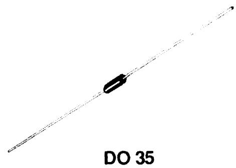


Fig.4 - Reverse current versus continuous reverse voltage (typical values).

BAR 19

SMALL SIGNAL SCHOTTKY DIODE



DO 35
(Glass)

DESCRIPTION

Metal to silicon junction diode primarily intented for UHF mixers and ultrafast switching applications.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		4	V
I_F	Forward Continuous Current*	$T_a = 25°C$	30	mA
I_{FSM}	Surge non Repetitive Forward Current*	$t_p \leq 1s$	60	mA
T_{stg} T_j	Storage and Junction Temperature Range		– 65 to 150 125	°C °C
T_L	Maximum Lead Temperature for Soldering during 10s at4mm from Case		230	°C

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-a)}$	Junction-ambient*	400	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
$V_{(BR)}$	$T_{amb} = 25°C$	$I_R = 10\mu A$	4			V
V_F (1)	$T_{amb} = 25°C$	$I_F = 10mA$			0.6	V
I_R (1)	$T_{amb} = 25°C$	$V_R = 3V$			0.25	µA

DYNAMIC CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
C	$T_{amb} = 25°C$	$V_R = 1V$	f = 1MHz			1	pF
F (2)	$T_{amb} = 25°C$	f = 1GHz			6		dB

* On infinite heatsink with 4mm lead length
(1) Pulse test : $t_p \leq 300\mu s$ $\delta < 2\%$.
(2) Noise figure test :
- diode is inserted in a tuned stripline circuit
- local oscillator frequency 1GHz
- local oscillator power 1mW
- intermediate frequency amplifier, tuned on 30MHz, has a noise figure 1.5dB.

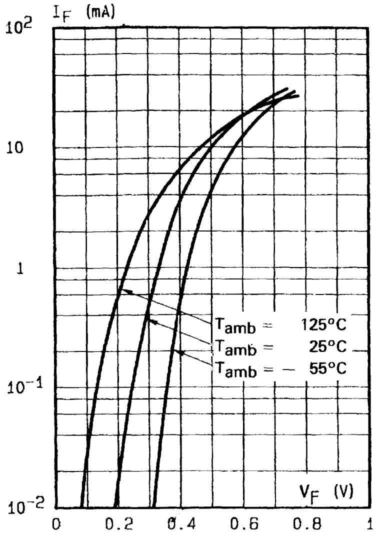


Fig.1 - Forward current versus forward voltage (typical values).

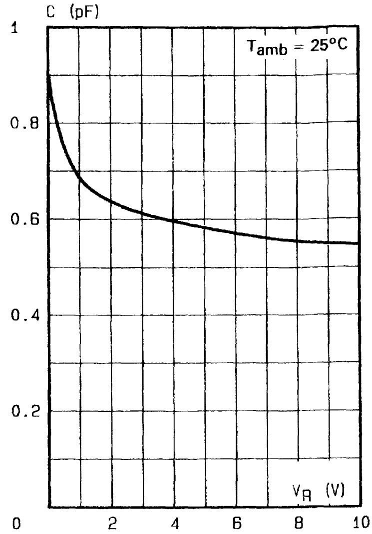


Fig.2 - Capacitance C versus reverse applied voltage V_R (typical values).

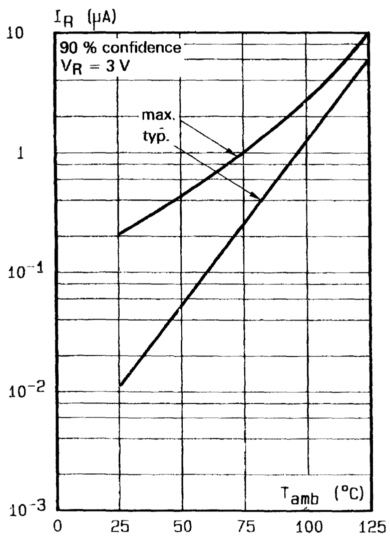


Fig.3 - Reverse current versus ambient temperature.

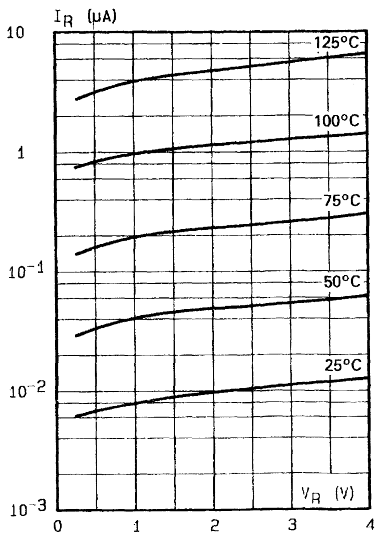


Fig.4 - Reverse current versus continuous reverse voltage (typical values).

SGS-THOMSON
MICROELECTRONICS

BAR 28

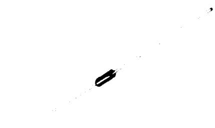
SMALL SIGNAL SCHOTTKY DIODE

DESCRIPTION

Metal to silicon junction diode featuring high breakdown, low turn-on voltage and ultrafast switching.

Primarly intended for high level UHF/VHF detection and pulse application with broad dynamic range.

Matched batches are available on request.



DO 35
(Glass)

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		70	V
I_F	Forward Continuous Current*	T_a = 25°C	15	mA
I_{FSM}	Surge non Repetitive Forward Current*	$t_p \leq 1s$	50	mA
T_{stg} T_j	Storage and Junction Temperature Range		– 65 to 200	°C
T_L	Maximum Lead Temperature for Soldering during 10s at 4mm from Case		230	°C

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-a)}$	Junction-ambient*	400	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
$V_{(BR)}$	T_{amb} = 25°C	I_R = 10µA	70			V
V_F**	T_{amb} = 25°C	I_F = 1mA			0.41	V
	T_{amb} = 25°C	I_F = 15mA			1	
I_R**	T_{amb} = 25°C	V_R = 50V			0.2	µA

DYNAMIC CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
C	T_{amb} = 25°C	V_R = 0V	f = 1MHz			2	pF
τ	T_{amb} = 25°C	I_F = 5mA	Krakauer Method			100	ps

* On infinite heatsink with 4mm lead length
** Pulse test : $t_p \leq 300\mu s$ $\delta < 2\%$.
Matched batches available on request. Test conditions (forward voltage and/or capacitance) according to customer specification.

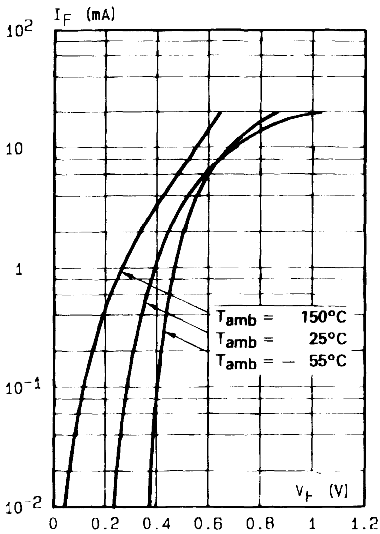


Fig.1 Forward current versus forward voltage at low level (typical values).

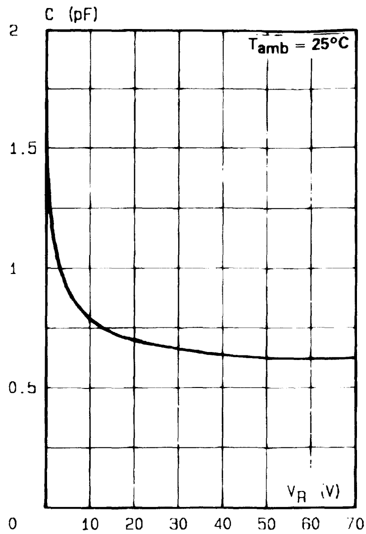


Fig.2 - Capacitance C versus reverse applied voltage V_R (typical values).

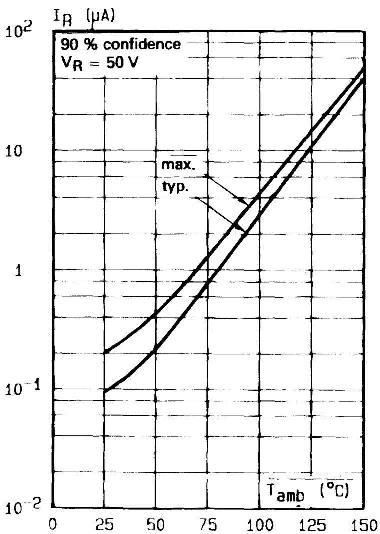


Fig.3 - Reverse current versus ambient temperature.

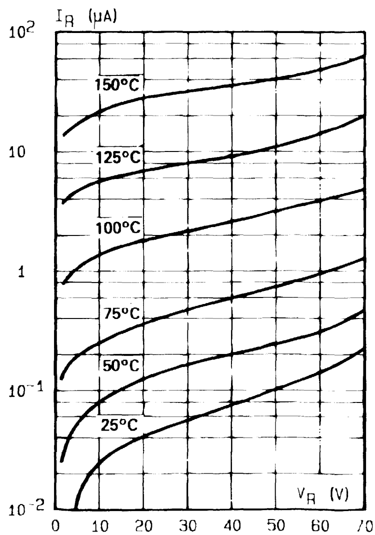
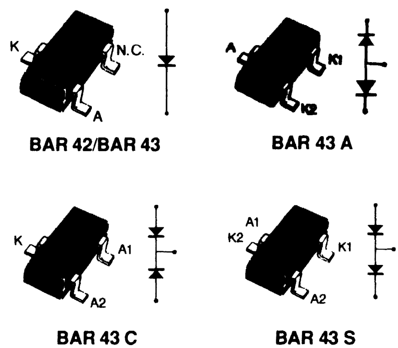


Fig.4 - Reverse current versus continuous reverse voltage (typical values).

SGS-THOMSON MICROELECTRONICS

BAR 42
BAR 43, A, C, S

SMALL SIGNAL SCHOTTKY DIODES



SOT 23
(Plastic)

DESCRIPTION

General purpose, metal to silicon diodes featuring very low turn-on voltage and fast switching.

ABSOLUTE RATINGS (limiting values) (T_{amb} = 25°C) (see note 1)

Symbol	Parameter	Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage	30	V
I_F	Forward Current	100	mA
I_{FRM}	Repetitive Peak Forward Current	350	mA
I_{FSM}	Surge non Repetitive Forward Current	750	mA
P_{tot}	Power Dissipation* (see note 2)	160	mW
T_{stg} T_j	Storage and Junction Temperature Range	– 55 to 150 125	°C °C

THERMAL RESISTANCES (see note 3)

Symbol	Parameter	Value	Unit
$R_{th\ (j-a)}$	Junction-ambient*	625	°C/W
$R_{th\ (j-SR)}$	Junction-substrate	400	°C/W

* Mounted on ceramic substrate : 7 x 5 x 0.5mm.

Notes : 1 For double diodes maximum ratings apply to each diode, provided that rated P_{tot} is not exceeded.
2 For double diodes, P_{tot} is the total power dissipation of the two diodes.
3 For double diodes, R_{th} refer to the total power dissipation in the two diodes and is given independently of the power distribution in the two diodes.

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
$V_{(BR)}$	T_{amb} = 25°C	I_R = 100μA		30			V
V_F	T_{amb} = 25°C	BAR 42	I_F = 10mA		0.35	0.4	V
			I_F = 50mA		0.5	0.65	
		BAR 43	I_F = 2mA	0.26		0.33	
			I_F = 15mA			0.45	
		All	I_F = 100mA			1	
I_R	T_{amb} = 25°C	V_R = 25V				500	nA
	T_{amb} = 100°C					100	μA

DYNAMIC CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
C	T_{amb} = 25°C	V_R = 1V	f = 1MHz		7		pF
t_{rr}	T_{amb} = 25°C I_{rr} = 1mA	I_F = 10mA R_L = 100Ω	I_R = 10mA			5	ns
η*	T_{amb} = 25°C F = 45MHz	R_L = 15kΩ V_I = 2V	C_L = 300pF for BAR 43	80			%

* Detection efficiency.

Type	BAR 42	BAR 43	BAR 43A	BAR 43C	BAR 43 S
Marking	D94	D95	DB1	DB2	DA5

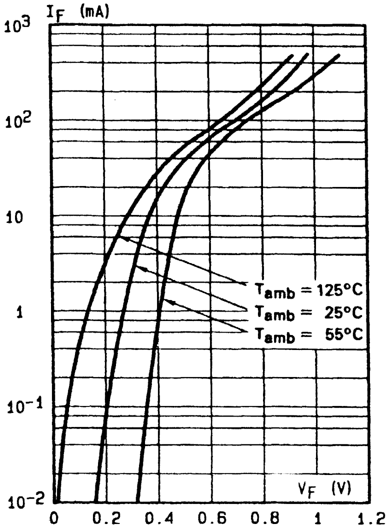


Fig.1 - Forward current versus forward voltage at different temperatures (typical values).

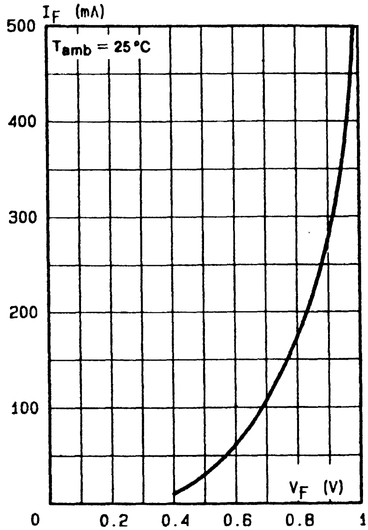


Fig.2 - Forward current versus forward voltage (typical values).

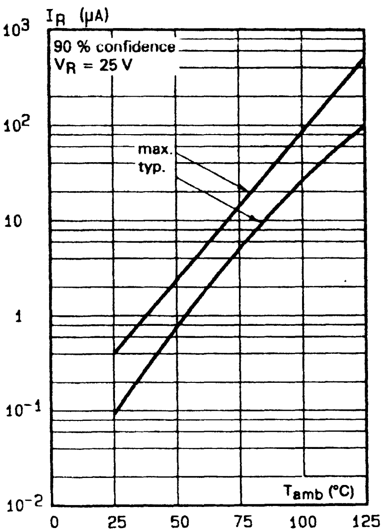


Fig.3 - Reverse current versus junction temperature.

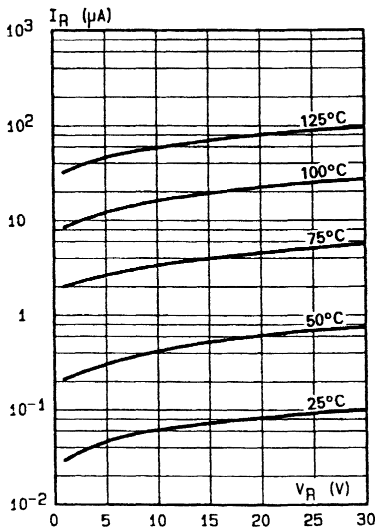


Fig.4 - Reverse current versus continuous reverse voltage (typical values).

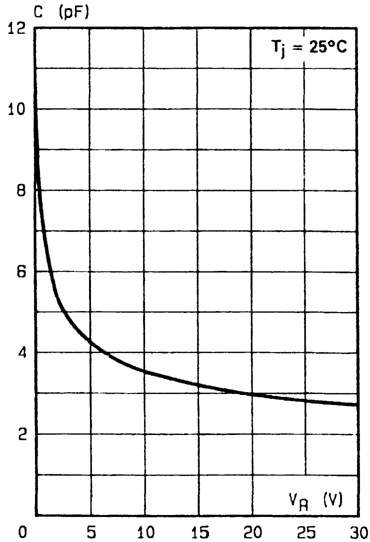
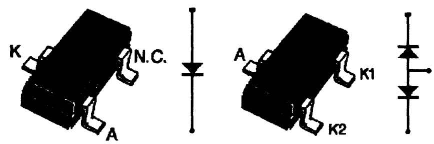


Fig.5 - Capacitance C versus reverse applied voltage V_R (typical values).

SMALL SIGNAL SCHOTTKY DIODES



BAR46 BAR46A

SOT23
(Plastic)

DESCRIPTION

High voltage Schottky rectifier suited for SLIC protection during the card insertion operation.

ABSOLUTE RATINGS(limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		100	V
Ptot	Power Dissipation *	Tamb=25°C	200	mW
Tstg Tj	Storage and Junction Temperature Range		- 55 to + 150 150	°C

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
Rth(j-a)	Junction-ambient *	625	°C/W
Rth(j-SR)	Junction-Substrate	400	°C/W

* Mounted on ceramic substrate : 7 x 5 x 0.5mm

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test conditions		Min.	Typ.	Max.	Unit
V_{BR}	Tj = 25 °C	I_R = 100 µA	100			V
V_F *	Tj = 25 °C	I_F = 0.1 mA			0.25	V
	Tj = 25 °C	I_F = 10 mA			0.45	
	Tj = 25 °C	I_F = 250 mA			1	
I_R*	Tj = 25 °C	V_R = 1.5 V			0.5	µA
	Tj = 60 °C				5	
	Tj = 25 °C	V_R = 10 V			0.8	
	Tj = 60 °C				7.5	
	Tj = 25 °C	V_R = 50 V			2	
	Tj = 60 °C				15	
	Tj = 25 °C	V_R = 75 V			5	
	Tj = 60 °C				20	

* Pulse test : tp ≤ 300µs δ < 2%

DYNAMIC CHARACTERISTICS

Symbol	Test conditions			Min.	Typ.	Max.	Unit
C	Tj = 25 °C	V_R = 0 V	f = 1MHz		10		pF
	Tj = 25 °C	V_R = 1 V			6		

Type	BAR46	BAR46A
Marking	S46	A46

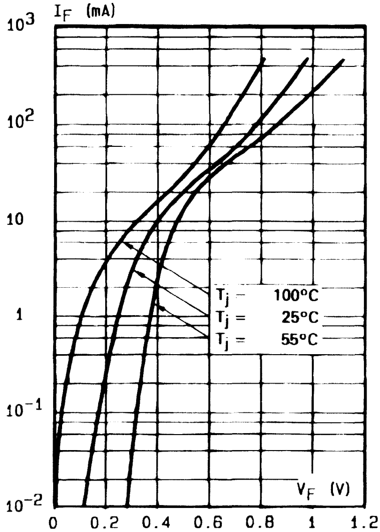


Fig.1 - Forward current versus forward voltage at different temperatures (typical values).

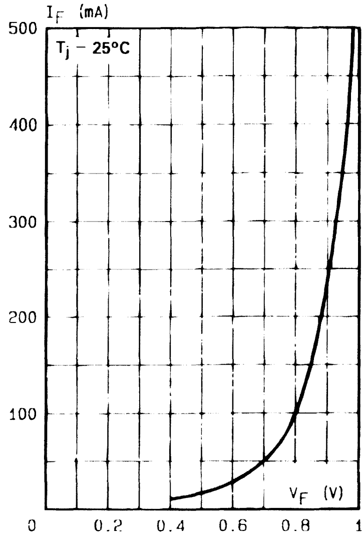


Fig.2 - Forward current versus forward voltage (typical values).

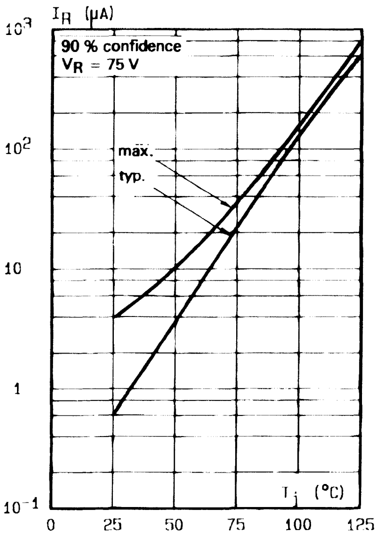


Fig.3 - Reverse current versus junction temperature (typical values).

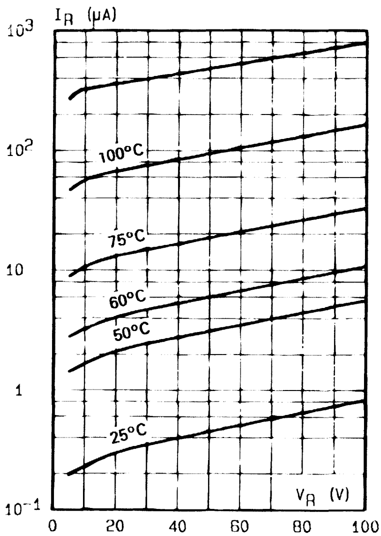


Fig.4 - Reverse current versus continuous reverse voltage

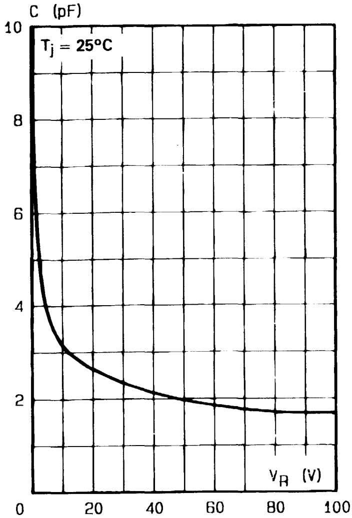
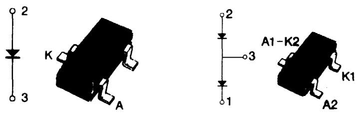


Fig.5 - Capacitance C versus reverse applied voltage V_R (typical values).

SMALL SIGNAL SCHOTTKY DIODES



SOT 23
(Plastic)

DESCRIPTION

BAT 17 is a metal to silicon junction diode featuring low turn-on voltage, low capacitance and ultrafast switching. Single or double series connected diodes are available. Two double diodes can be connected in bridge or ing configuration.
These devices are suited for single or double balanced UHF mixers, sampling circuits, modulators, phase detectors.

ABSOLUTE RATINGS (limiting values) (T_{amb} = 25°C)

Symbol	Parameter	Value	Unit
V_R	Continuous Reverse Voltage	4	V
I_F	Continuous Forward Current	30	mA
T_{stg} T_j	Storage and Junction Temperature Range	– 65 to 100 100	°C °C

THERMAL RESISTANCES

Symbol	Parameter	Value	Unit
$R_{th\ (j-a)}$	Junction-ambient*	625	°C/W
$R_{th\ (j-SR)}$	Junction-substrate	400	°C/W

* Mounted on ceramic substrate : 7 x 5 x 0.5mm.

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
$V_{(BR)}$	T_{amb} = 25°C	I_R = 10μA	4			V
V_F	T_{amb} = 25°C	I_F = 10mA			0.6	V
I_R	T_{amb} = 25°C	V_R = 3V			0.25	μA
	T_{amb} = 60°C				1.25	

DYNAMIC CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
C	T_{amb} = 25°C	V_R = 0	f = 1MHz			1	pF
F	T_{amb} = 25°C	F = 1GHz	See note			7	dB
r	T_{amb} = 25°C	I_F = 5mA	F = 1KHz			15	Ω

Note : NOISE FIGURE TEST
- Diode is inserted in a tuned stripline circuit
- Local oscillator frequency : 1GHz
- Local oscillator power : 1mW
- Intermediary frequency amplifier, tuned on 30MHz, has a noise figure : 1.5dB.

Marking : A3 for BAT 17
D85 for BAT 17DS

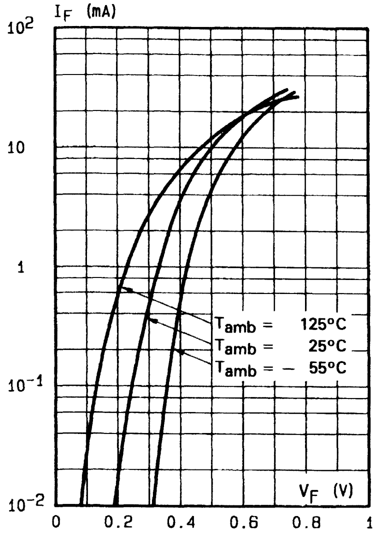


Fig.1 - Forward current versus forward voltage (typical values).

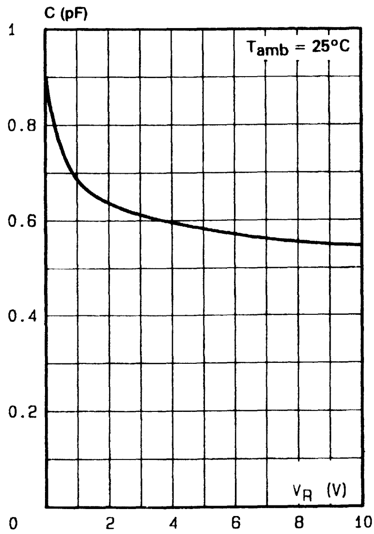


Fig.2 - Capacitance C versus reverse applied voltage V_R (typical values).

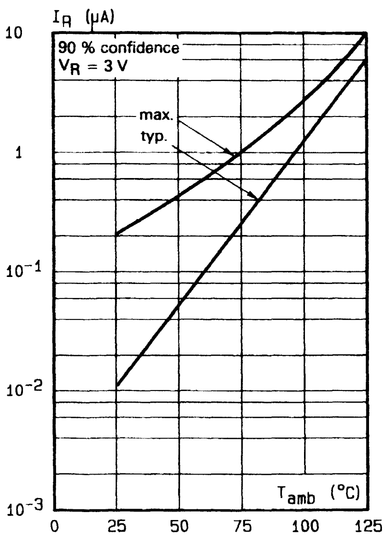


Fig.3 - Reverse current versus ambient temperature.

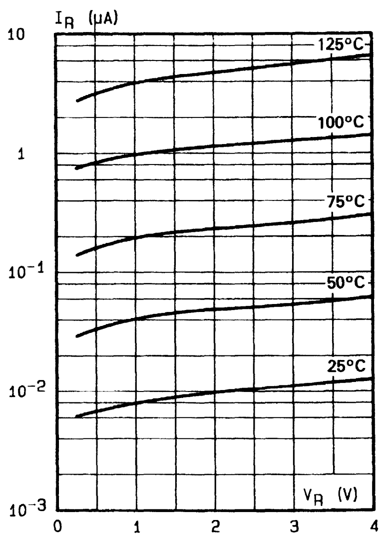
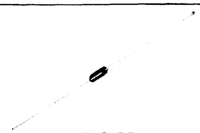


Fig.4 - Reverse current versus continuous reverse voltage (typical values).

SGS-THOMSON MICROELECTRONICS

BAT 19

SMALL SIGNAL SCHOTTKY DIODE



DO 35
(Glass)

DESCRIPTION

Metal to silicon junction diode primarily intented for UHF mixers and ultrafast switching applications.

Matched batches are available on request.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		10	V
I_F	Forward Continuous Current*	T_a = 25°C	30	mA
I_{FSM}	Surge non Repetitive Forward Current*	$t_p \leq 1s$	60	mA
T_{stg} T_j	Storage and Junction Temperature Range		– 65 to 150 125	°C °C
T_L	Maximum Lead Temperature for Soldering during 10s at 4mm from Case		230	°C

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j\text{-}a)}$	Junction-ambient*	400	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
$V_{(BR)}$	T_{amb} = 25°C	I_R = 10μA	10			V
V_F (1)	T_{amb} = 25°C	I_F = 1mA			0.4	V
	T_{amb} = 25°C	I_F = 20mA			1	
I_R (1)	T_{amb} = 25°C	V_R = 5V			0.1	μA

DYNAMIC CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
C	T_{amb} = 25°C	V_R = 0V	f = 1GHz			1.2	pF
τ	T_{amb} = 25°C	I_F = 20mA	Krakauer Method			100	ps
F (2)	T_{amb} = 25°C	f = 1GHz			6		dB

* On infinite heatsink with 4mm lead length
(1) Pulse test : $t_p \leq 300\mu s$ $\delta < 2\%$.
(2) Noise figure test :
- diode is inserted in a tuned stripline circuit
- local oscillator frequency 1GHz
- local oscillator power 1mW
- intermediate frequency amplifier, tuned on 30MHz, has a noise figure 1.5dB.

Matched batches available on request. Test conditions (forward voltage and/or capacitance) according to customer specification.

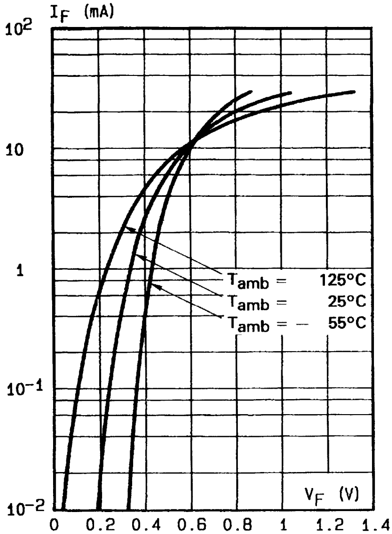


Fig.1 - Forward current versus forward voltage at low level (typical values).

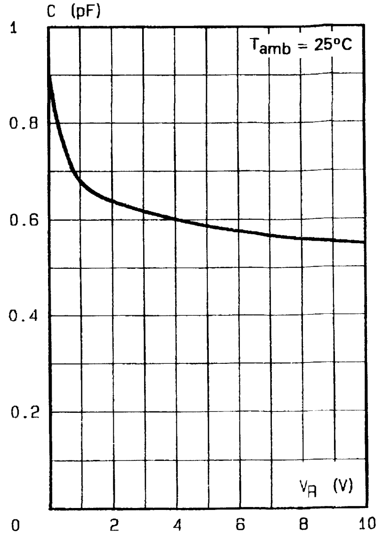


Fig.2 - Capacitance C versus reverse applied voltage V_R (typical values).

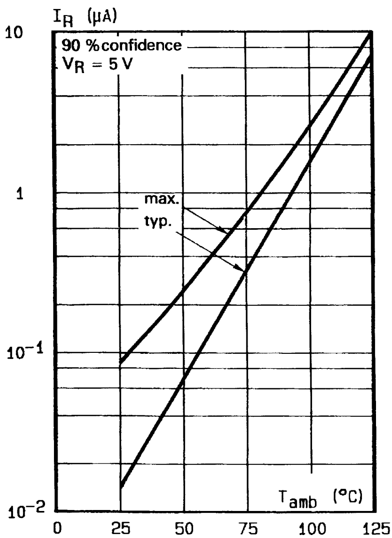


Fig.3 - Reverse current versus ambient temperature.

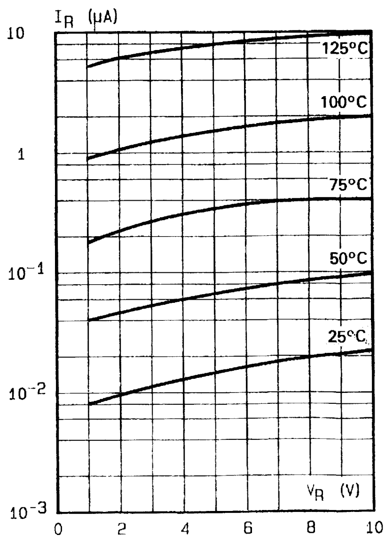
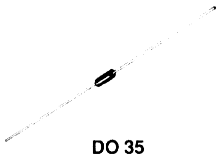


Fig.4 - Reverse current versus continuous reverse voltage (typical values).

BAT 29

SMALL SIGNAL SCHOTTKY DIODE



DO 35
(Glass)

DESCRIPTION

Metal to silicon junction diode primarly intented for UHF mixers and ultrafast switching applications.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		5	V
I_F	Forward Continuous Current*	T_a = 25°C	30	mA
I_{FSM}	Surge non Repetitive Forward Current*	$t_p \leq$ 1s	60	mA
T_{stg} T_j	Storage and Junction Temperature Range		– 65 to 150 125	°C °C
T_L	Maximum Lead Temperature for Soldering 10s at 4mm from Case		230	°C

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-a)}$	Junction-ambient*	400	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
$V_{(BR)}$	T_{amb} = 25°C	I_R = 100μA	5			V
V_F (1)	T_{amb} = 25°C	I_F = 10mA			0.55	V
I_R (1)	T_{amb} = 25°C	V_R = 1V			0.05	μA

DYNAMIC CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
C	T_{amb} = 25°C	V_R = 0V	f = 1MHz			1	pF
Q_S (2)	T_{amb} = 25°C	I_F = 10mA				3	pC
F (3)	T_{amb} = 25°C	f = 1GHz			6	7	dB

* On infinite heatsink with 4mm lead length
(1) Pulse test : $t_p \leq 300\mu s$ $\delta < 2\%$.
(2) Measured on B-line Electronics QS-3 stored charge meter.
(3) Noise figure test :
- diode is inserted in a tuned stripline circuit
- local oscillator frequency 1GHz
- local oscillator power 1mW
- intermediate frequency amplifier, tuned on 30MHz, has a noise figure, 1.5dB.

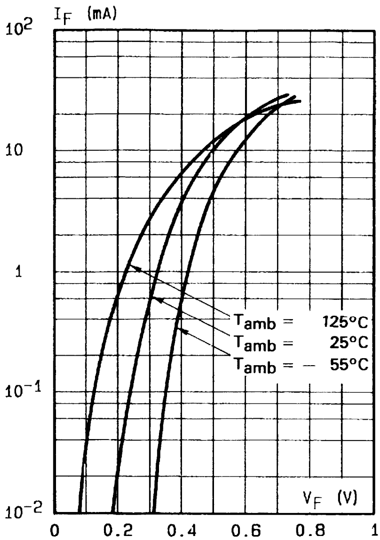


Fig.1 - Forward current versus forward voltage (typical values).

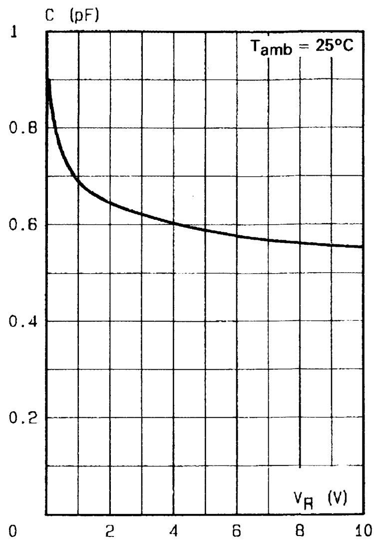


Fig.2 - Capacitance C versus reverse applied voltage V_R (typical values).

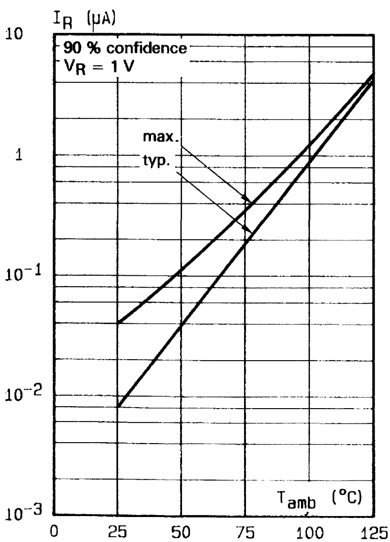


Fig.3 - Reverse current versus ambient temperature.

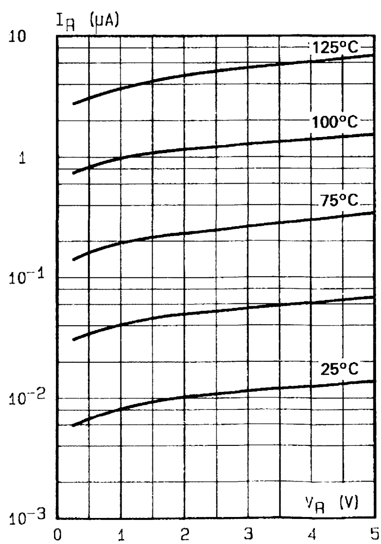


Fig.4 - Reverse current versus continuous reverse voltage (typical values).

SGS-THOMSON MICROELECTRONICS

SGS-THOMSON
MICROELECTRONICS

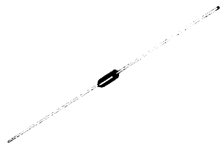
BAT 41

SMALL SIGNAL SCHOTTKY DIODE

DESCRIPTION

General purpose metal to silicon diode featuring very low turn-on voltage and fast switching.

This device has integrated protection against excessive voltage such as electrostatic discharges.



DO 35
(Glass)

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		100	V
I_F	Forward Continuous Current*	$T_a = 25°C$	100	mA
I_{FRM}	Repetitive Peak Forward Current*	$t_p \leq 1s$ $\delta \leq 0.5$	350	mA
I_{FSM}	Surge non Repetitive Forward Current*	$t_p = 10ms$	750	mA
P_{tot}	Power Dissipation*	$T_a = 95°C$	100	mW
T_{stg} T_j	Storage and Junction Temperature Range		– 65 to 150 – 65 to 125	°C °C
T_L	Maximum Lead Temperature for Soldering during 10s at 4mm from Case		230	°C

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-a)}$	Junction-ambient*	300	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
$V_{(BR)}$	$T_j = 25°C$	$I_R = 100\mu A$	100			V
V_F**	$T_j = 25°C$	$I_F = 1mA$		0.4	0.45	V
	$T_j = 25°C$	$I_F = 200mA$			1	
I_R**	$T_j = 25°C$	$V_R = 50V$			0.1	µA
	$T_j = 100°C$				20	

DYNAMIC CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
C	$T_j = 25°C$	$V_R = 1V$	f = 1MHz		2		pF

* On infinite heatsink with 4mm lead length
** Pulse test : $t_p \leq 300\mu s$ $\delta < 2\%$.

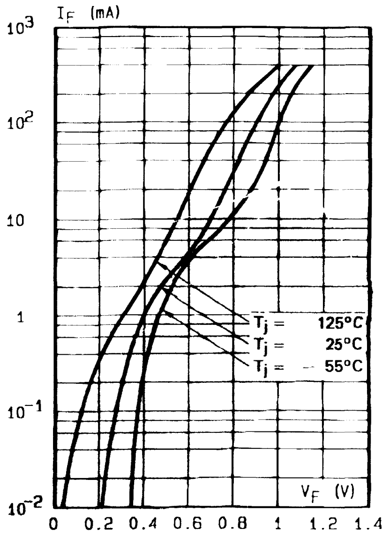


Fig.1 – Forward current versus forward voltage at different temperatures (typical values).

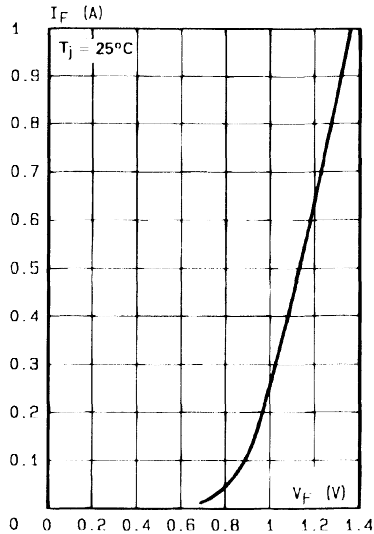


Fig.2 – Forward current versus forward voltage (typical values).

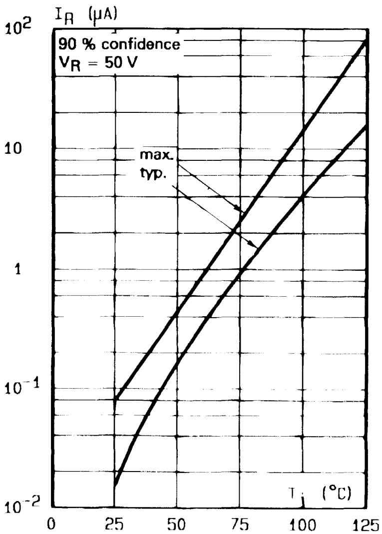


Fig.3 – Reverse current versus junction temperature.

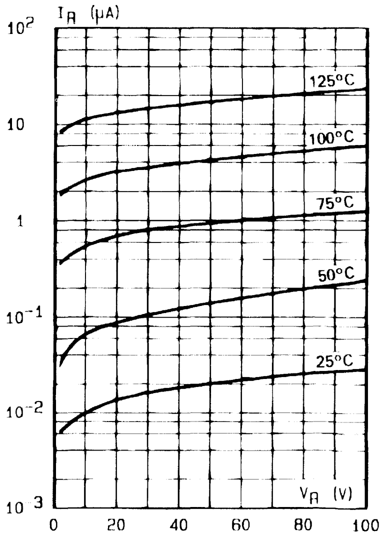


Fig.4 – Reverse current versus continuous reverse voltage (typical values).

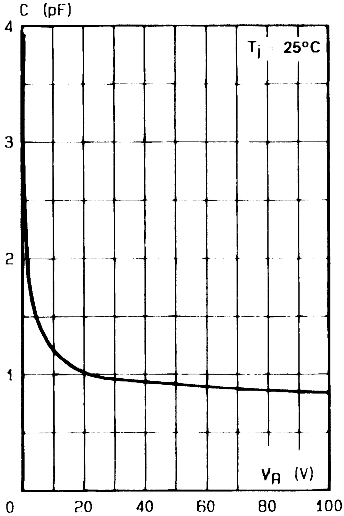
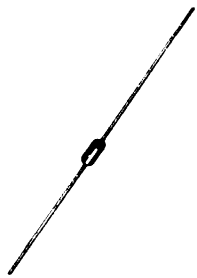


Fig.5 - Capacitance C versus reverse applied voltage V_R (typical values).

SMALL SIGNAL SCHOTTKY DIODES



DO 35
(Glass)

DESCRIPTION

General purpose metal to silicon diodes featuring very low turn-on voltage and fast switching.

These devices have integrated protection against excessive voltage such as electrostatic discharges.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		30	V
I_F	Forward Continuous Current*	$T_a = 25°C$	200	mA
I_{FRM}	Repetitive Peak Forward Current*	$t_p \leq 1s$ $\delta \leq 0.5$	500	mA
I_{FSM}	Surge non Repetitive Forward Current*	$t_p = 10ms$	4	A
P_{tot}	Power Dissipation*	$T_a = 65°C$	200	mW
T_{stg} T_j	Storage and Junction Temperature Range		– 65 to 150 – 65 to 125	°C °C
T_L	Maximum Lead Temperature for Soldering during 10s at 4mm from Case		230	°C

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-a)}$	Junction-ambient*	300	°C/W

* On infinite heatsink with 4mm lead length

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
$V_{(BR)}$	$T_j = 25°C$	$I_R = 100\mu A$		30			V
V_F*	$T_j = 25°C$	$I_F = 200mA$	All Types			1	V
	$T_j = 25°C$	$I_F = 10mA$	BAT 42			0.4	
	$T_j = 25°C$	$I_F = 50mA$				0.65	
	$T_j = 25°C$	$I_F = 2mA$	BAT 43	0.26		0.33	
	$T_j = 25°C$	$I_F = 15mA$				0.45	
I_R*	$T_j = 25°C$		$V_R = 25V$			0.5	µA
	$T_j = 100°C$					100	

DYNAMIC CHARACTERISTICS

Symbol	Test Conditions	Min.	Typ.	Max.	Unit
C	$T_j = 25°C$ $V_R = 1V$ $f = 1MHz$		7		pF
t_{rr}	$T_j = 25°C$ $I_F = 10mA$ $I_R = 10mA$ $i_{rr} = 1mA$ $R_L = 100\Omega$			5	ns
η	$T_j = 25°C$ $R_L = 15K\Omega$ $C_L = 300pF$ $f = 45MHz$ $V_i = 2V$	80			%

* Pulse test : $t_p \leq 300\mu s$ $\delta < 2\%$.

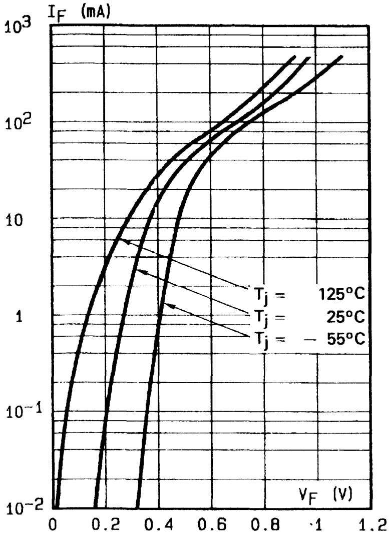


Fig.1 - Forward current versus forward voltage at different temperatures (typical values).

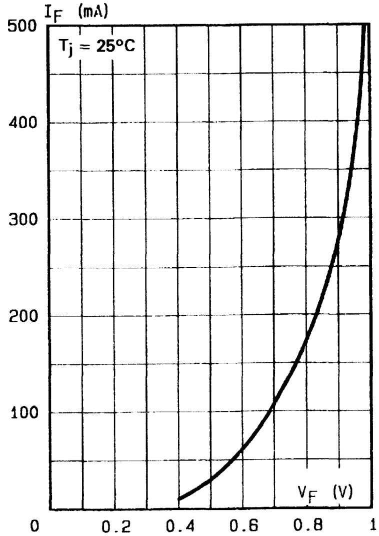


Fig.2 - Forward current versus forward voltage (typical values).

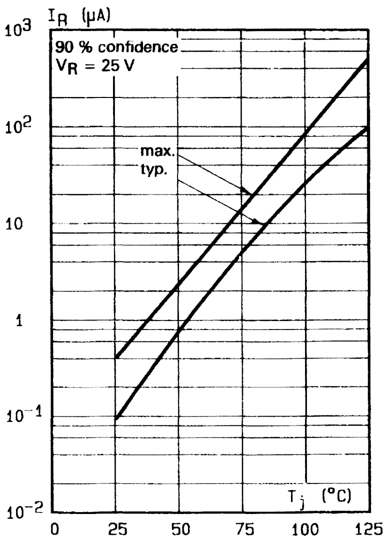


Fig.3 - Reverse current versus junction temperature.

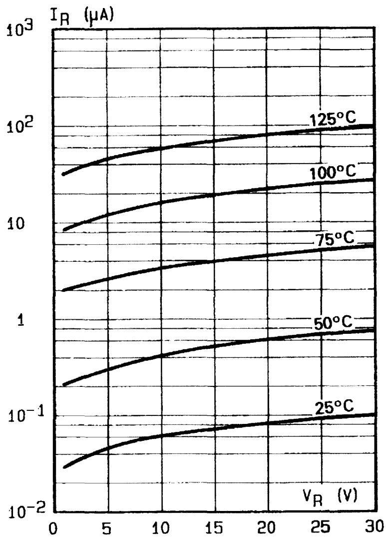


Fig.4 - Reverse current versus continuous reverse voltage (typical values).

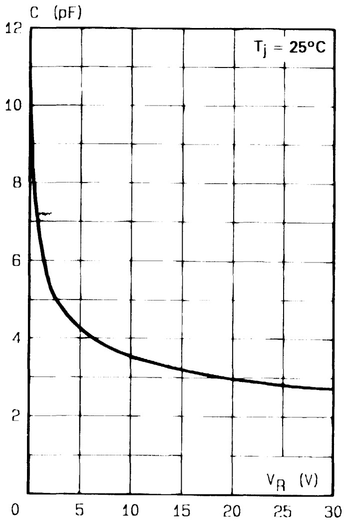
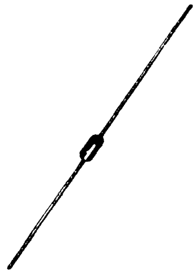


Fig.5 – Capacitance C versus reverse applied voltage V_R (typical values).

SGS-THOMSON
MICROELECTRONICS

BAT 45

SMALL SIGNAL SCHOTTKY DIODE



DO 35
(Glass)

DESCRIPTION

Metal to silicon junction diode primarily intented for UHF mixers and ultrafast switching applications.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		15	V
I_F	Forward Continuous Current*	T_a = 25°C	30	mA
I_{FSM}	Surge non Repetitive Forward Current*	$t_p \leq 1s$	60	mA
T_{stg} T_j	Storage and Junction Temperature Range		– 65 to 150 125	°C °C
T_L	Maximum Lead Temperature for Soldering durinf 10s at 4mm from Case		230	°C

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-a)}$	Junction-ambient*	400	°C/W

* On infinite heatsink with 4mm lead length

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
$V_{(BR)}$	T_{amb} = 25°C	I_R = 10μA	15			V
V_F (1)	T_{amb} = 25°C	I_F = 1mA			0.38	V
	T_{amb} = 25°C	I_F = 10mA			0.5	
	T_{amb} = 25°C	I_F = 30mA			1	
I_R (1)	T_{amb} = 25°C	V_R = 6V			0.1	μA

DYNAMIC CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
C	T_{amb} = 25°C	V_R = 1V	f = 1MHz			1.1	pF
τ	T_{amb} = 25°C	I_F = 20mA	Krakauer Method			100	ps
F (2)	T_{amb} = 25°C	f = 1GHz			6	7	dB

(1) Pulse test : $t_p \leq 300\mu s$ $\delta < 2\%$
(2) Noise figure test :
- diode is inserted in a tuned stripline circuit
- local oscillator frequency 1GHz
- local oscillator power 1mW
- intermediate frequency amplifier. tuned on 30MHz. has a noise figure 1.5dB

Matched batches avalailable on request. Test conditions (forward voltage and/or capacitance) according to customer specification.

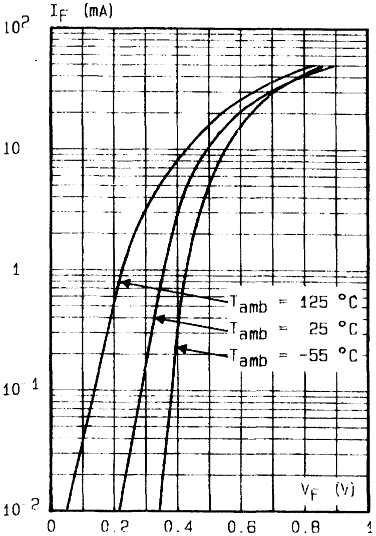


Fig.1 - Forward current versus forward voltage (typical values).

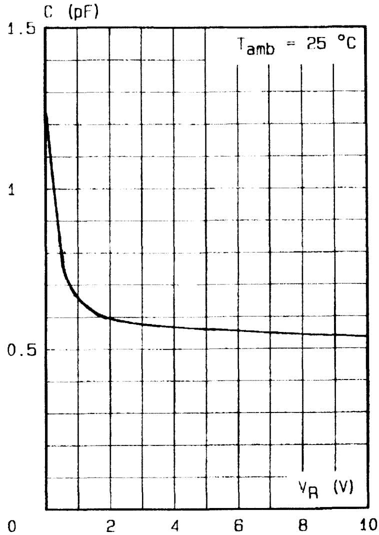


Fig.2 - Capacitance C versus reverse applied voltage V_R (typical values).

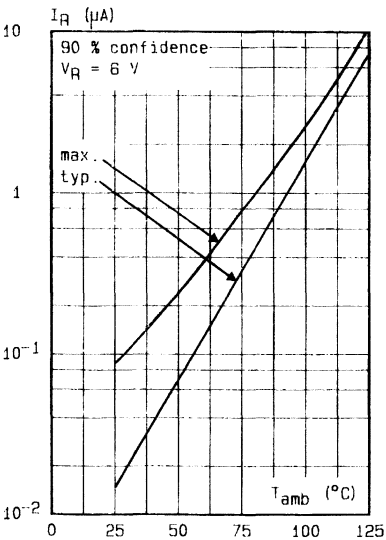


Fig.3 - Reverse current versus ambient temperature.

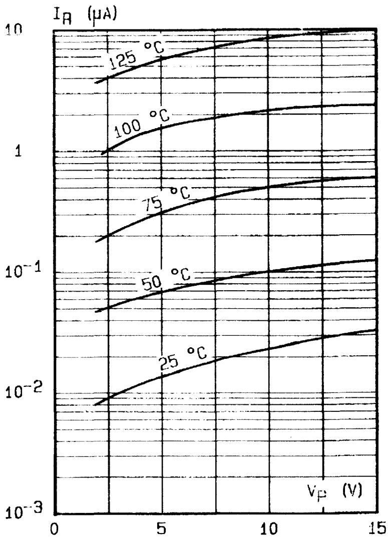
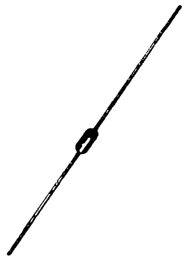


Fig.4 - Reverse current versus continuous reverse voltage (typical values).

BAT 46

SMALL SIGNAL SCHOTTKY DIODE



DO 35
(Glass)

DESCRIPTION

General purpose, metal to silicon diode featuring high breakdown voltage low turn-on voltage.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		100	V
I_F	Forward Continuous Current*	$T_a = 25°C$	150	mA
I_{FRM}	Repetitive Peak Forward Current*	$t_p \leq 1s$ $\delta \leq 0.5$	350	mA
I_{FSM}	Surge non Repetitive Forward Current*	$t_p = 10ms$	750	mA
P_{tot}	Power Dissipation*	$T_a = 80°C$	150	mW
T_{stg} T_j	Storage and Junction Temperature Range		– 65 to 150 – 65 to 125	°C °C
T_L	Maximum Lead Temperature for Soldering during 10s at 4mm from Case		230	°C

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j\text{-}a)}$	Junction-ambient*	300	°C/W

* On infinite heatsink with 4mm lead length.

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
$V_{(BR)}$	$T_j = 25°C$	$I_R = 100\mu A$	100			V
V_F*	$T_j = 25°C$	$I_F = 0.1mA$			0.25	V
	$T_j = 25°C$	$I_F = 10mA$			0.45	
	$T_j = 25°C$	$I_F = 250mA$			1	
I_R*	$T_j = 25°C$	$V_R = 1.5V$			0.5	µA
	$T_j = 60°C$				5	
	$T_j = 25°C$	$V_R = 10V$			0.8	
	$T_j = 60°C$				7.5	
	$T_j = 25°C$	$V_R = 50V$			2	
	$T_j = 60°C$				15	
	$T_j = 25°C$	$V_R = 75V$			5	
	$T_j = 60°C$				20	

DYNAMIC CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
C	$T_j = 25°C$	$V_R = 0V$	f = 1MHz		10		pF
	$T_j = 25°C$	$V_R = 1V$			6		

* Pulse test : $t_p \leq 300\mu s$ $\delta < 2\%$.

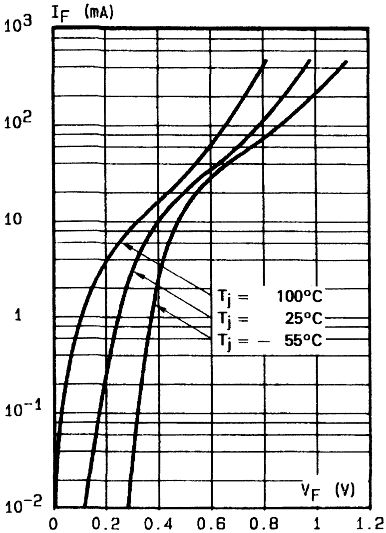


Fig.1 - Forward current versus forward voltage at different temperatures (typical values).

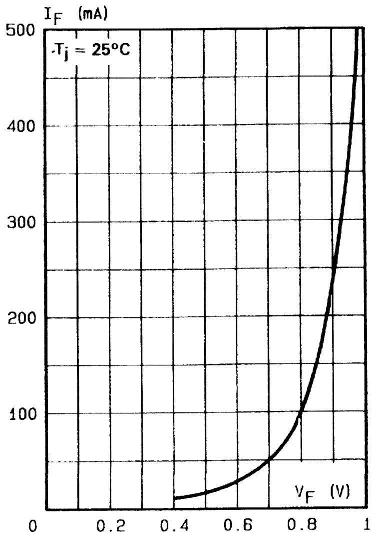


Fig.2 - Forward current versus forward voltage (typical values).

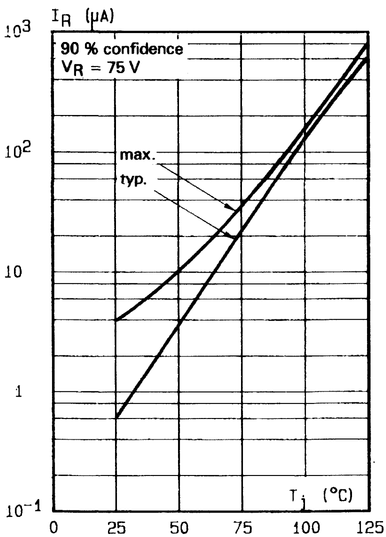


Fig.3 - Reverse current versus junction temperature (typical values).

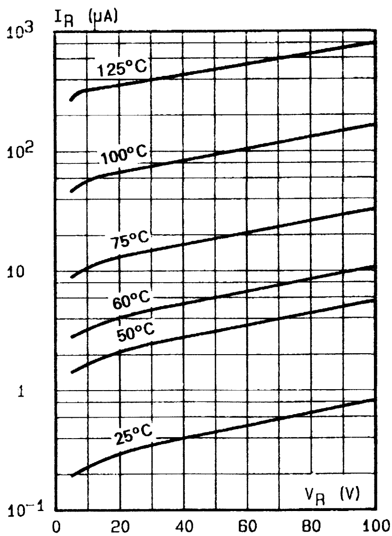


Fig.4 - Reverse current versus continuous reverse voltage

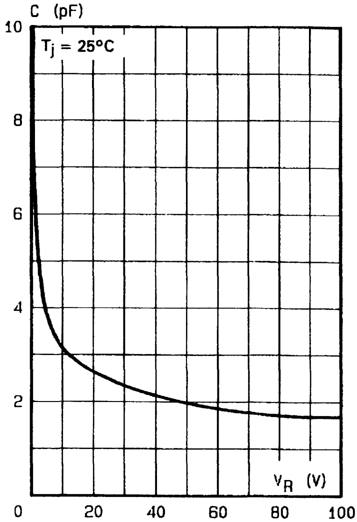
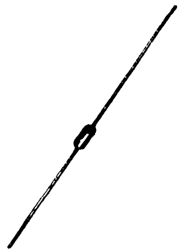


Fig.5 - Capacitance C versus reverse applied voltage V_R (typical values).

SGS-THOMSON MICROELECTRONICS

BAT 47
BAT 48

SMALL SIGNAL SCHOTTKY DIODES



DO 35
(Glass)

DESCRIPTION

General purpose metal to silicon diodes featuring very low turn-on voltage and fast switching.

These devices have integrated protection against excessive voltage such as electrostatic discharges.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		BAT 47	BAT 48	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		20	40	V
I_F	Forward Continuous Current*	$T_a = 25°C$	350		mA
I_{FRM}	Repetitive Peak Forward Current*	$t_p \leq 1s$ $\delta \leq 0.5$	1		A
I_{FSM}	Surge non Repetitive Forward Current*	$t_p = 10ms$	7.5		A
		$t_p = 1s$	1.5		
P_{tot}	Power Dissipation*	$T_a = 25°C$	330		mW
T_{stg} T_j	Storage and Junction Temperature Range		– 65 to 150 – 65 to 125		°C °C
T_L	Maximum Lead Temperature for Soldering during 10s at 4mm from Case		230		°C

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-a)}$	Junction-ambient*	300	°C/W

* On infinite heatsink with 4mm lead length

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
$V_{(BR)}$	I_R = 10μA		BAT 47	20			V
	I_R = 25μA		BAT 48	40			
V_F*	T_j = 25°C I_F = 0.1mA		All Types			0.25	V
	T_j = 25°C I_F = 1mA					0.3	
	T_j = 25°C I_F = 10mA					0.4	
	T_j = 25°C I_F = 30mA		BAT 47			0.5	
	T_j = 25°C I_F = 150mA					0.8	
	T_j = 25°C I_F = 300mA					1	
	T_j = 25°C I_F = 50mA		BAT 48			0.5	
	T_j = 25°C I_F = 200mA					0.75	
	T_j = 25°C I_F = 500mA					0.9	
I_R*	T_j = 25°C	V_R = 1.5V	All Types			1	μA
	T_j = 60°C					10	
	T_j = 25°C	V_R = 10V	BAT 47			4	
	T_j = 60°C					20	
	T_j = 25°C	V_R = 20V				10	
	T_j = 60°C					30	
	T_j = 25°C	V_R = 10V	BAT 48			2	
	T_j = 60°C					15	
	T_j = 25°C	V_R = 20V				5	
	T_j = 60°C					25	
	T_j = 25°C	V_R = 40V				25	
	T_j = 60°C					50	

DYNAMIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
C	T_j = 25°C V_R = 0V	f = 1MHz		20		pF
	T_j = 25°C V_R = 1V			12		
t_{rr}	T_j = 25°C I_F = 10mA V_R = 1V i_{rr} = 1mA R_L = 100Ω			10		ns

* Pulse test : $t_p \leq 300μs$ $\delta < 2\%$.

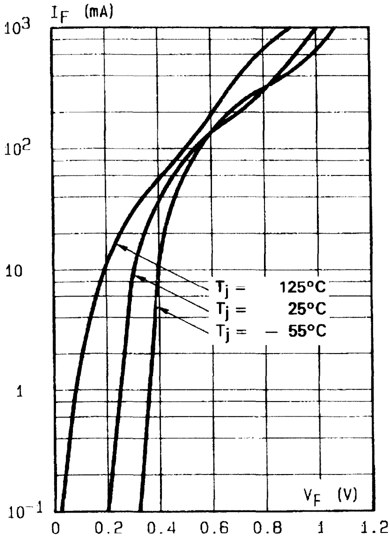


Fig.1 - Forward current versus forward voltage at different temperatures (typical values).

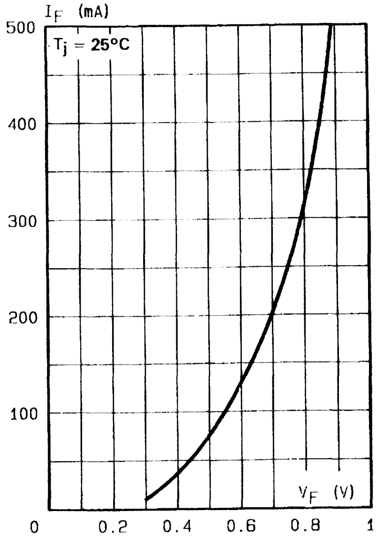


Fig.2 - Forward current versus forward voltage (typical values).

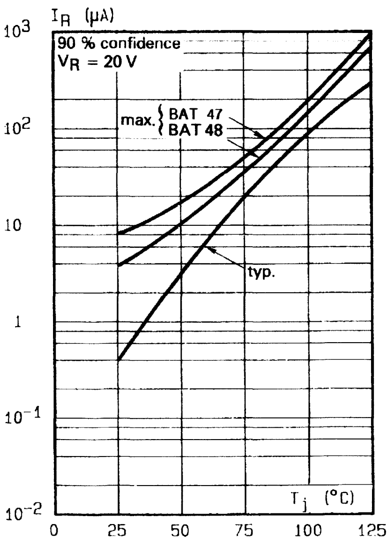


Fig.3 - Reverse current versus junction temperature.

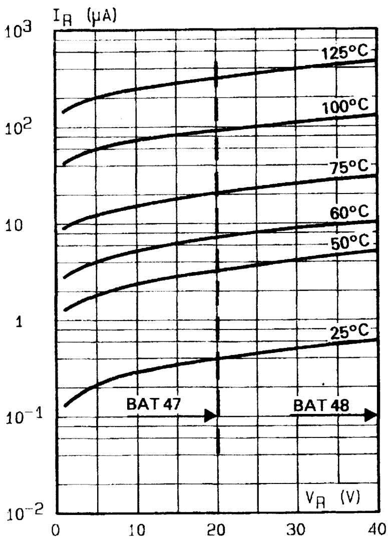


Fig.4 - Reverse current versus continuous reverse voltage (typical values).

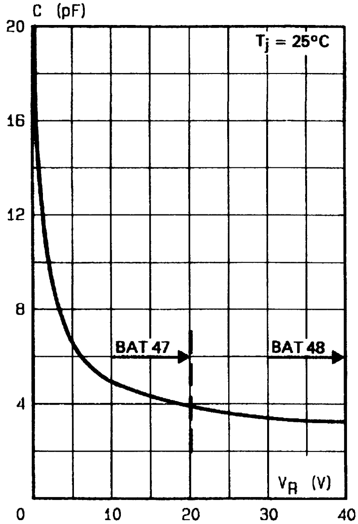


Fig.5 - Capacitance C versus reverse applied voltage V_R (typical values).

SGS-THOMSON MICROELECTRONICS

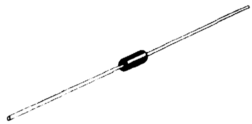
BAT 49

SMALL SIGNAL SCHOTTKY DIODE

DESCRIPTION

General purpose metal to silicon diode featuring very low turn-on voltage and fast switching.

This device has integrated protection against excessive voltage such as electrostatic discharges.



DO 41
(Glass)

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		80	V
I_F	Forward Continuous Current*	$T_a = 70°C$	500	mA
I_{FRM}	Repetitive Peak Forward Current*	$t_p = 1s$ $\delta \leq 0.5$	3	A
I_{FSM}	Surge non Repetitive Forward Current*	$t_p \leq 10ms$	10	A
T_{stg} T_j	Storage and Junction Temperature Range		– 65 to 150 – 65 to 125	°C °C
T_L	Maximum Lead Temperature for Soldering during 10s at 4mm from Case		230	°C

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-a)}$	Junction-ambient*	110	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R**	$T_j = 25°C$	$V_R = 80V$			200	µA
V_F**	$T_j = 25°C$	$I_F = 10mA$			0.32	V
	$T_j = 25°C$	$I_F = 100mA$			0.42	
	$T_j = 25°C$	$I_F = 1A$			1	

DYNAMIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
C	$T_j = 25°C$ f = 1MHz	$V_R = 0V$		120		pF
		$V_R = 5V$		35		

* On infinite heatsink with 4mm lead length

** Pulse test : $t_p \leq 300\mu s$ $\delta < 2\%$.

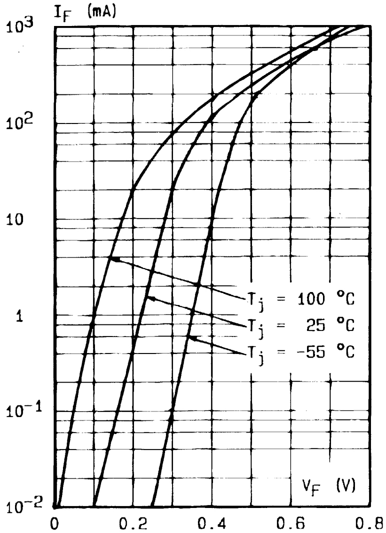


Fig.1 - Forward current versus forward voltage at low level (typical values).

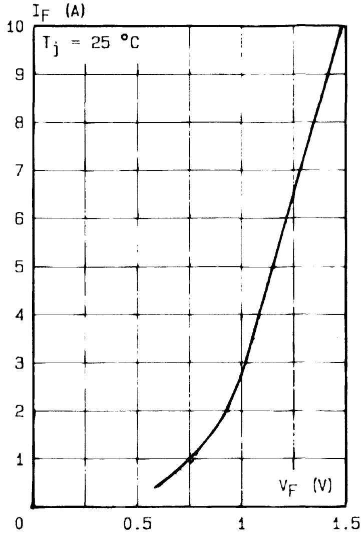


Fig.2 - Forward current versus forward voltage at high level (typical values).

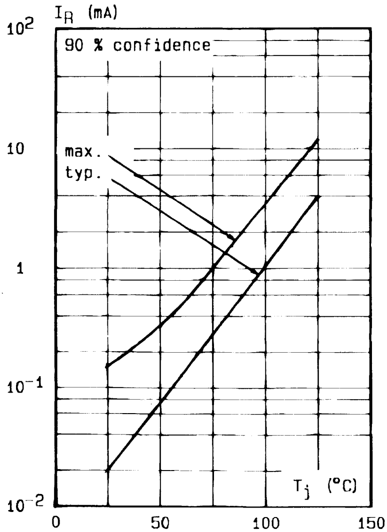


Fig.3 - Reverse current versus junction temperature.

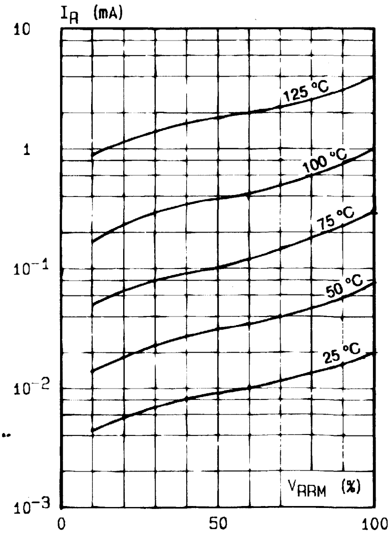


Fig.4 - Reverse current versus V_{RRM} in per cent.

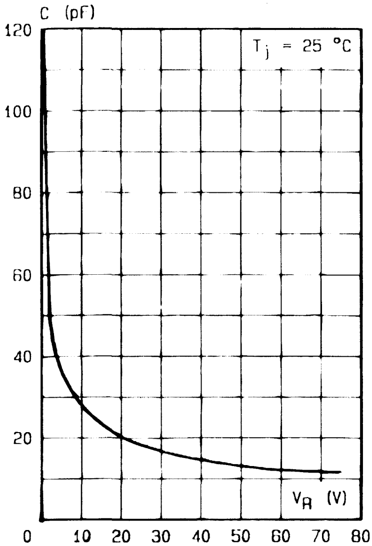


Fig.5 - Capacitance C versus reverse applied voltage V_R (typical values).

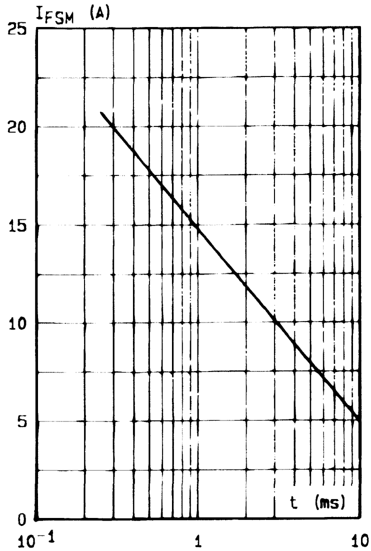


Fig.6 - Surge non repetitive forward current for a rectangular pulse with t ⩽ 10 ms.

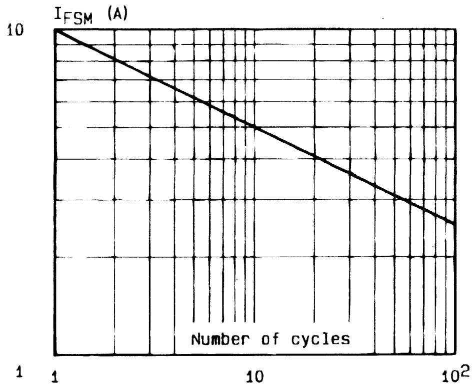
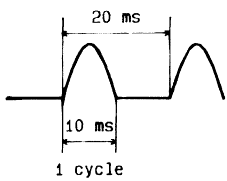
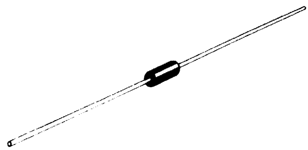


Fig.7 - Surge non repetitive forward current versus number of cycles.



SMALL SIGNAL SCHOTTKY DIODES



DO 41
(Glass)

DESCRIPTION

Metal to silicon rectifier diodes in glass case featuring very low foward voltage drop and fast recovery time, intended for low voltage switching mode power supply, polarity protection and high frequency circuits.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
$I_{F(AV)}$	Average Forward Current*	T_{amb} = 60°C	1	A
I_{FSM}	Surge non Repetitive Forward Current	T_{amb} = 25°C t_p = 10ms	25 Sinusoidal Pulse	A
		T_{amb} = 25°C t_p = 300μs	50 Rectangular Pulse	
T_{stg} T_j	Storage and Junction Temperature Range		– 65 to 150 – 65 to 125	°C °C
T_L	Maximum Lead Temperature for Soldering during 10s at 4mm from Case		230	°C

Symbol	Parameter	BYV 10-20	BYV 10-30	BYV 10-40	Unit
V_{RRM}	Repetitive Peak Reverse Voltage	20	30	40	V

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-a)}$	Junction-ambient*	110	°C/W

* On infinite heatsink with 4mm lead length.

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R*	T_j = 25°C	$V_R = V_{RRM}$			0.5	mA
	T_j = 100°C				10	
V_F*	I_F = 1A	T_j = 25°C			0.55	V
	I_F = 3A				0.85	

* Pulse test : $t_p \leq 300\mu s$ $\delta < 2\%$.

DYNAMIC CHARACTERISTICS

Symbol	Test Conditions	Min.	Typ.	Max.	Unit
C	T_j = 25°C V_R = 0		220		pF

Forward current flow in a schottky rectifier is due to majority carrier conduction. So reverse recovery is not affected by stored charge as in conventional PN junction diodes.

Nevertheless, when the device switches from forward biased condition to reverse blocking state, current is requiered to charge the depletion capacitance of the diode.

This current depends only of diode capacitance and external circuit impedance. Satisfactory circuit behaviour analysis may be performed assuming that schottky rectifier consists of an ideal diode in parallel with a variable capacitance equal to the junction capacitance (see fig. 5 page 4/4).

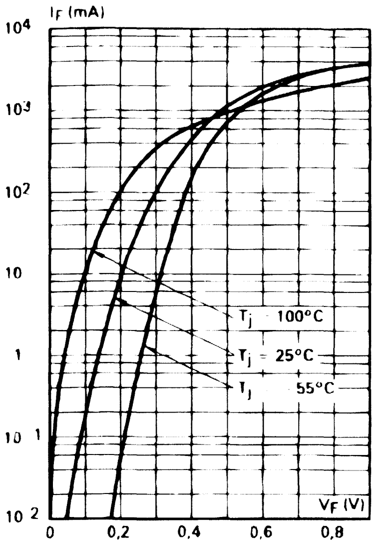


Fig.1 Forward current versus forward voltage at low level (typical values)

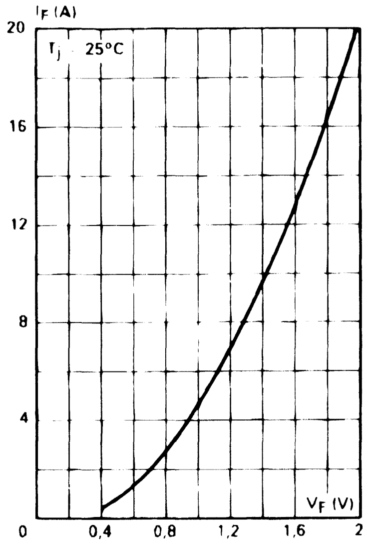


Fig.2 Forward current versus forward voltage at high level (typical values).

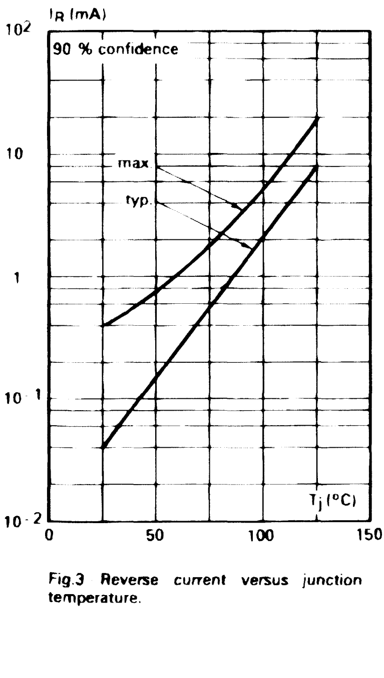


Fig.3 Reverse current versus junction temperature.

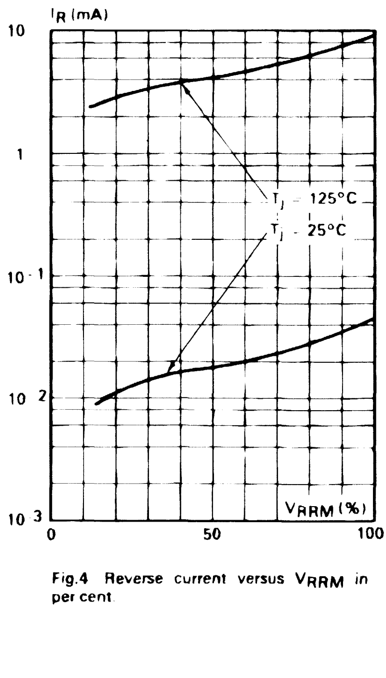


Fig.4 Reverse current versus V_{RRM} in per cent.

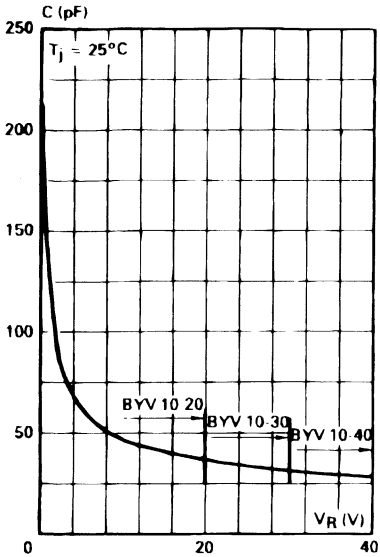


Fig.5 - Capacitance C versus reverse applied voltage V_R (typical values)

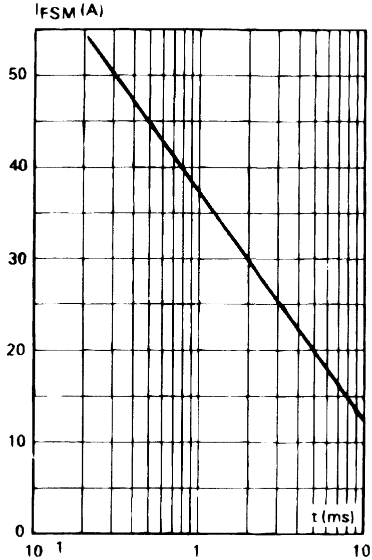


Fig.6 - Surge non repetitive forward current for a rectangular pulse with t ≤ 10 ms.

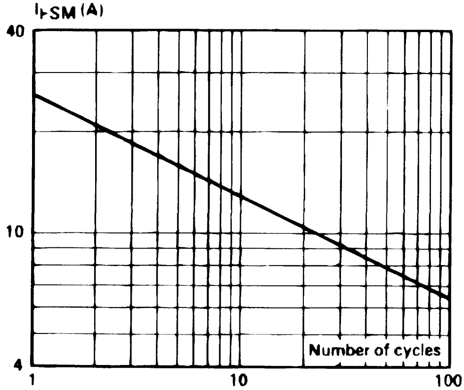
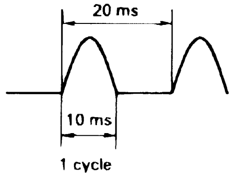
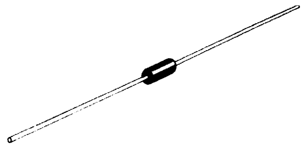


Fig.7 Surge non repetitive forward current versus number of cycles.



SMALL SIGNAL SCHOTTKY DIODE



DO 41
(Glass)

DESCRIPTION

Metal to silicon rectifier diode in glass case featuring very low foward voltage drop and fast recovery time, intended for low voltage switching mode power supply, polarity protection and high frequency circuits.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		20	V
$I_{F(AV)}$	Average Forward Current*	T_{amb} = 60°C	1	A
I_{FSM}	Surge non Repetitive Forward Current	T_{amb} = 25°C t_p = 10ms	25 Sinusoidal Pulse	A
		T_{amb} = 25°C t_p = 300µs	50 Rectangular Pulse	
T_{stg} T_j	Storage and Junction Temperature Range		– 65 to 150 – 65 to 125	°C °C
T_L	Maximum Lead Temperature for Soldering during 10s at 4mm from Case		230	°C

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-a)}$	Junction-ambient*	110	°C/W

* On infinite heatsink with 4mm lead length

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R*	T_j = 25°C	$V_R = V_{RRM}$			0.3	mA
	T_j = 100°C				10	
V_F*	I_F = 1A	T_j = 25°C			0.45	V
	I_F = 3A				0.75	

* Pulse test : $t_p \leq 300\mu s$ $\delta < 2\%$.

DYNAMIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
C	T_j = 25°C	V_R = 0		330		pF

Forward current flow in a schottky rectifier is due to majority carrier conduction. So reverse recovery is not affected by stored charge as in conventional PN junction diodes.

Nevertheless, when the device switches from forward biased condition to reverse blocking state, current is required to charge the depletion capacitance of the diode.

This current depends only of diode capacitance and external circuit impedance. Satisfactory circuit behaviour analysis may be performed assuming that schottky rectifier consists of an ideal diode in parallel with a variable capacitance equal to the junction capacitance (see fig. 5 page 4/4).

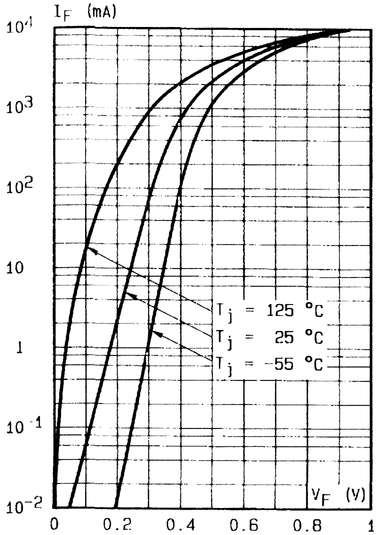


Fig.1 - Forward current versus forward voltage at low level (typical values).

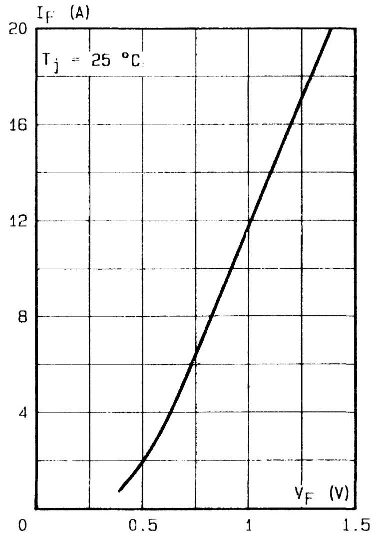


Fig.2 - Forward current versus forward voltage at high level (typical values).

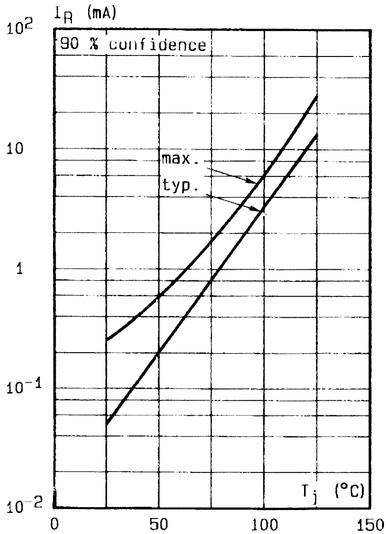


Fig.3 - Reverse current versus junction temperature.

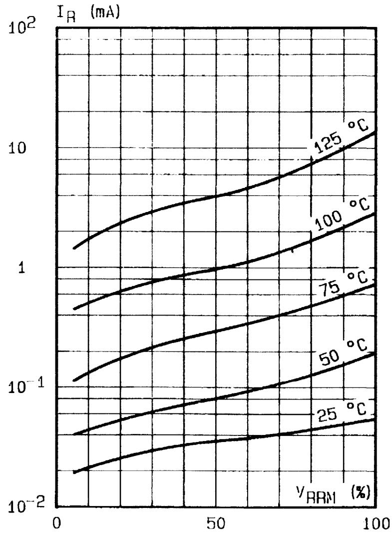


Fig.4 - Reverse current versus V_{RRM} in per cent.

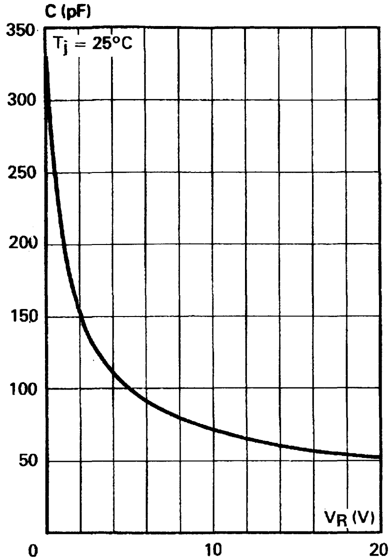


Fig.5 - Capacitance C versus reverse applied voltage V_R (typical values)

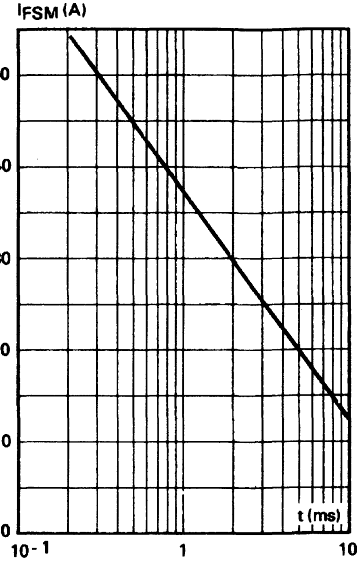


Fig.6 - Surge non repetitive forward current for a rectangular pulse with t ≤ 10 ms.

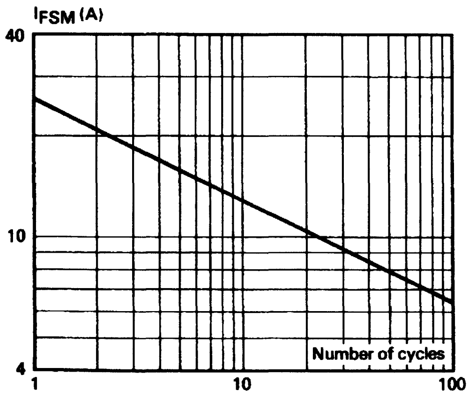
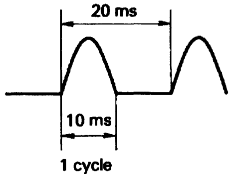
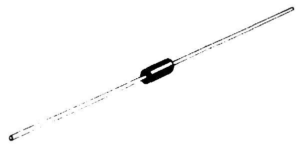


Fig.7 - Surge non repetitive forward current versus number of cycles.



SMALL SIGNAL SCHOTTKY DIODE



DO 41
(Glass)

DESCRIPTION

Metal to silicon rectifier diode in glass case featuring very low foward voltage drop and fast recovery time, intended for low voltage switching mode power supply, polarity protection and high frequency circuits.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		60	V
$I_{F(AV)}$	Average Forward Current*	T_{amb} = 25°C	1	A
I_{FSM}	Surge non Repetitive Forward Current	T_{amb} = 25°C t_p = 10ms	20 Sinusoidal Pulse	A
		T_{amb} = 25°C t_p = 300µs	40 Rectangular Pulse	
T_{stg} T_j	Storage and Junction Temperature Range		– 65 to 150 – 65 to 125	°C °C
T_L	Maximum Lead Temperature for Soldering during 10s at 4mm from Case		230	°C

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-a)}$	Junction-ambient*	110	°C/W

* On infinite heatsink with 4mm lead length.

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R*	T_j = 25°C	$V_R = V_{RRM}$			0.5	mA
	T_j = 100°C				10	
V_F*	I_F = 1A	T_j = 25°C			0.7	V
	I_F = 3A				1	

DYNAMIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
C	T_j = 25°C	V_R = 0		150		pF
	T_j = 25°C	V_R = 5V		40		

* Pulse test : $t_p \leq 300\mu s$ $\delta < 2\%$.

Forward current flow in a schottky rectifier is due to majority carrier conduction. So reverse recovery is not affected by stored charge as in conventional PN junction diodes.

Nevertheless, when the device switches from forward biased condition to reverse blocking state, current is requiered to charge the depletion capacitance of the diode.

This current depends only of diode capacitance and external circuit impedance. Satisfactory circuit behaviour analysis may be performed assuming that schottky rectifier consists of an ideal diode in parallel with a variable capacitance equal to the junction capacitance (see fig. 5 page 4/4).

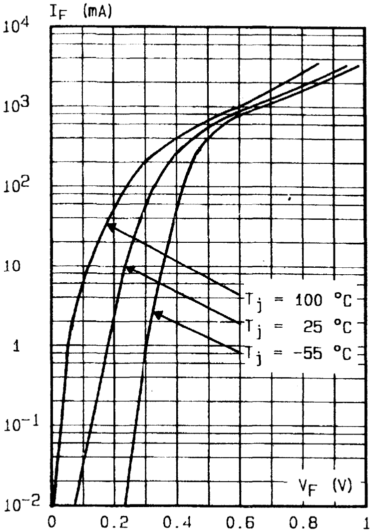


Fig.1 - Forward current versus forward voltage at low level (typical values).

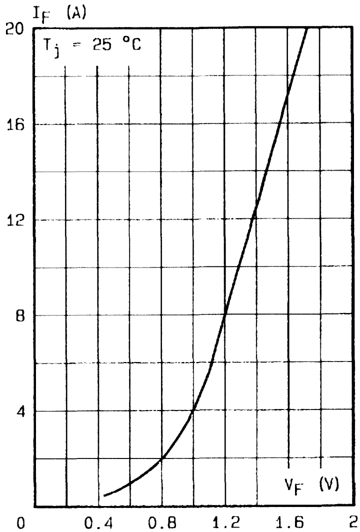


Fig.2 - Forward current versus forward voltage at high level (typical values).

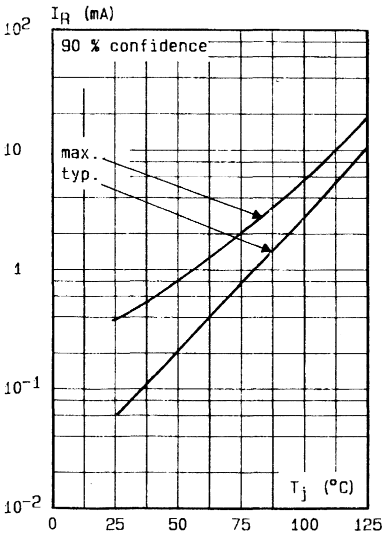


Fig.3 - Reverse current versus junction temperature.

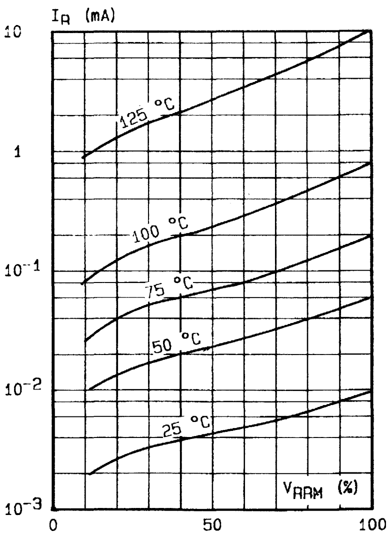


Fig.4 - Reverse current versus V_{RRM} in per cent.

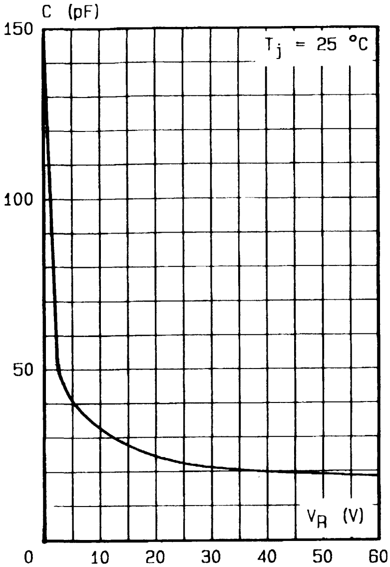


Fig.5 - Capacitance C versus reverse applied voltage V_R (typical values).

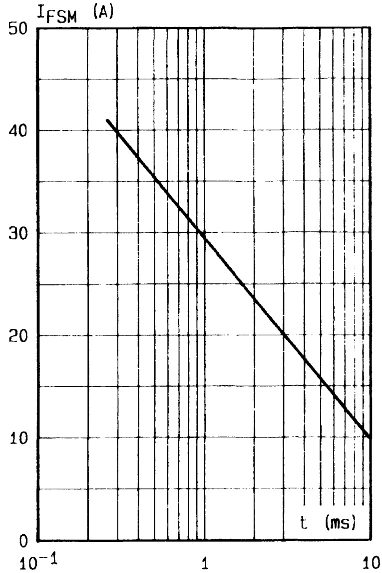


Fig.6 - Surge non repetitive forward current for a rectangular pulse with t ⩽ 10 ms.

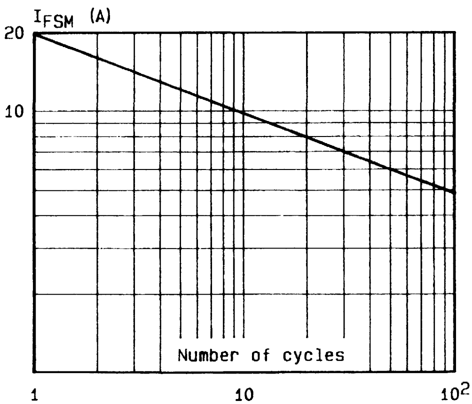
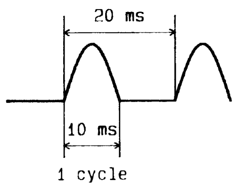
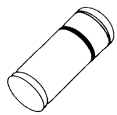


Fig.7 - Surge non repetitive forward current versus number of cycles.



SMALL SIGNAL SCHOTTKY DIODE



MINIMELF
(Glass)

DESCRIPTION

Metal to silicon junction diode featuring high breakdown, low turn-on voltage and ultrafast switching.

Primarly intended for high level UHF/VHF detection and pulse application with broad dynamic range.

Matched batches are available on request.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		70	V
I_F	Forward Continuous Current	T_l = 25°C	15	mA
P_{tot}	Power Dissipation	T_l = 25°C	430	mW
T_{stg} T_j	Storage and Junction Temperature Range		– 65 to 200	°C
T_L	Maximum Temperature for Soldering during 15s		260	°C

THERMAL RESISTANCE

Symbol	Test Conditions	Value	Unit
$R_{th(j-l)}$	Junction-leads	400	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
$V_{(BR)}$	T_{amb} = 25°C	I_R = 10µA	70			V
V_F*	T_{amb} = 25°C	I_F = 1mA			0.41	V
	T_{amb} = 25°C	I_F = 15mA			1	
I_R*	T_{amb} = 25°C	V_R = 50V			0.2	µA

DYNAMIC CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
C	T_{amb} = 25°C	V_R = 0V	f = 1MHz			2	pF
τ	T_{amb} = 25°C	I_F = 5mA	Krakauer Method			100	ps

* Pulse test : $t_p \leq 300\mu s$ $\delta < 2\%$.
Matched batches available on request. Test cnditions (forward voltage and/or capacitance) according to customer specification.

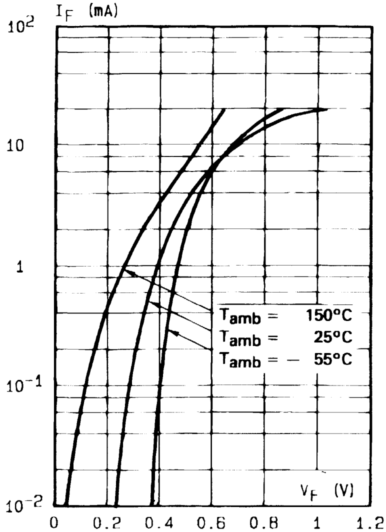


Fig.1 Forward current versus forward voltage at low level (typical values).

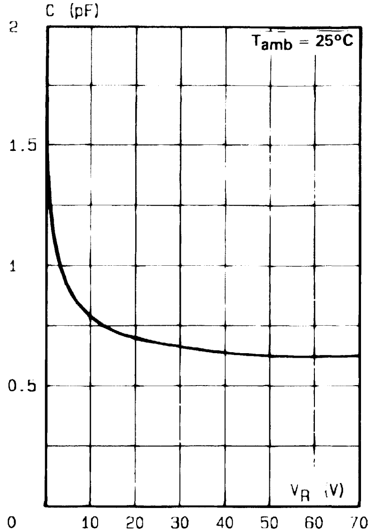


Fig.2 - Capacitance C versus reverse applied voltage V_R (typical values).

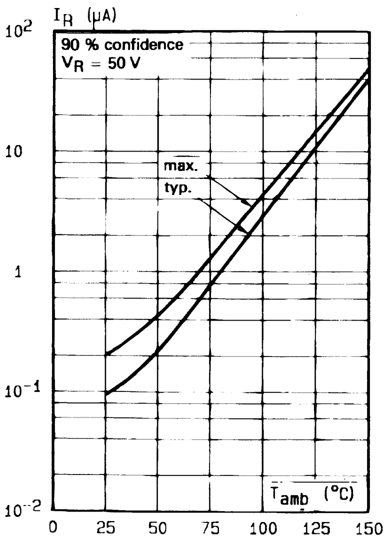


Fig.3 - Reverse current versus ambient temperature.

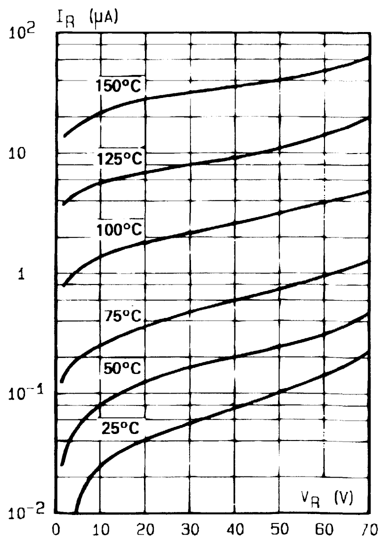
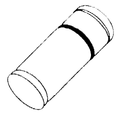


Fig.4 - Reverse current versus continuous reverse voltage (typical values).

SGS-THOMSON
MICROELECTRONICS

TMM 5712

SMALL SIGNAL SCHOTTKY DIODE



MINIMELF
(Glass)

DESCRIPTION

Metal to silicon junction diode featuring high breakdown voltage, low turn-on voltage and ultrafast switching.

Primarly intended for high level UHF/VHF detection and pulse application with broad dynamic range.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		20	V
I_F	Forward Continuous Current	T_l = 25°C	35	mA
P_{tot}	Power Dissipation	T_l = 25°C	430	mW
T_{stg} T_j	Storage and Junction Temperature Range		– 65 to 200	°C
T_L	Maximum Temperature for Soldering during 15s		260	°C

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-l)}$	Junction-leads	400	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
$V_{(BR)}$	T_{amb} = 25°C	I_R = 10µA	20			V
V_F *	T_{amb} = 25°C	I_F = 1mA			0.41	V
	T_{amb} = 25°C	I_F = 35mA			1	
I_R *	T_{amb} = 25°C	V_R = 15V			0.1	µA

DYNAMIC CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
C	T_{amb} = 25°C	V_R = 0V	f = 1MHz			1.2	pF
τ	T_{amb} = 25°C	I_F = 5mA	Krakauer Method			100	ps

* Pulse test : $t_p \leq 300\mu s$ $\delta < 2\%$.
Matched batches available on request. Test conditions (forward voltage and/or capacitance) according to customer specification.

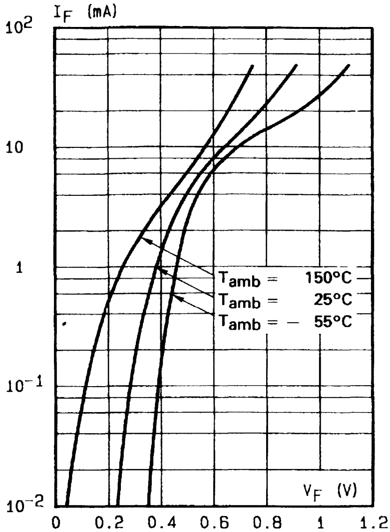


Fig.1 - Forward current versus forward voltage at different temperatures (typical values).

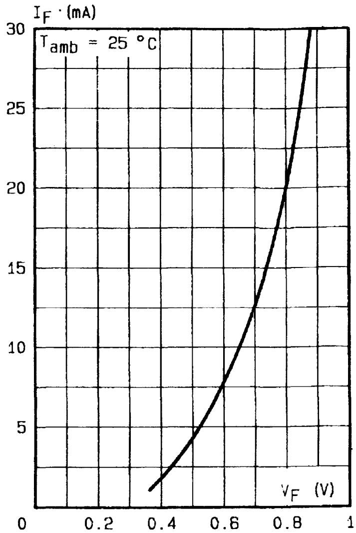


Fig.2 - Forward current versus forward voltage (typical values).

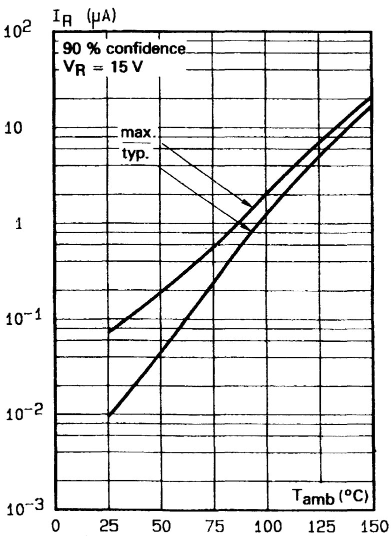


Fig.3 - Reverse current versus ambient temperature.

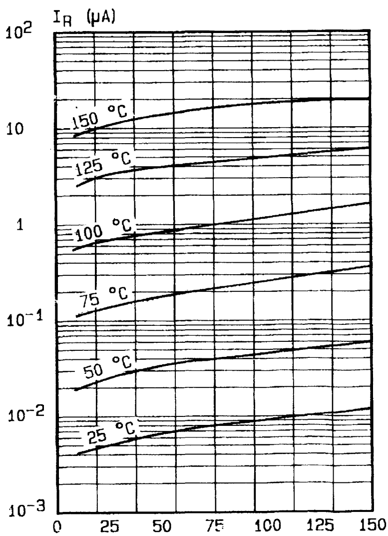


Fig.4 - Reverse current versus continuous reverse voltage (typical values).

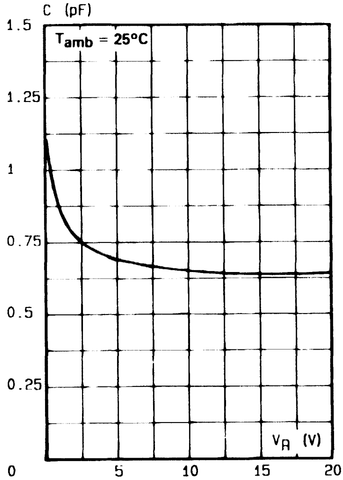
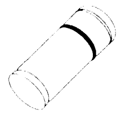


Fig.5 - Capacitance C versus reverse applied voltage V_R (typical values).

TMM 6263

SMALL SIGNAL SCHOTTKY DIODE



MINIMELF
(Glass)

DESCRIPTION

Metal to silicon junction diode featuring high breakdown, low turn-on voltage and ultrafast switching.

Primarily intended for high level UHF/VHF detection and pulse application with broad dynamic range.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		60	V
I_F	Forward Continuous Current	$T_l = 25°C$	15	mA
I_{FSM}	Surge non Repetitive Forward Current	$t_p \leq 1s$	50	mA
T_{stg} T_j	Storage and Junction Temperature Range		– 65 to 200	°C
T_L	Maximum Temperature for Soldering during 15s		260	°C

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-l)}$	Junction-leads	400	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
$V_{(BR)}$	$T_{amb} = 25°C$	$I_R = 10\mu A$	60			V
V_F*	$T_{amb} = 25°C$	$I_F = 1mA$			0.41	V
	$T_{amb} = 25°C$	$I_F = 15mA$			1	
I_R*	$T_{amb} = 25°C$	$V_R = 50V$			0.2	μA

DYNAMIC CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
C	$T_{amb} = 25°C$	$V_R = 0V$	f = 1MHz			2.2	pF
τ	$T_{amb} = 25°C$	$I_F = 5mA$	Krakauer Method			100	ps

* Pulse test : $t_p \leq 300\mu s$ $\delta < 2\%$.
Matched batches available on request. Test conditions (forward voltage and/or capacitance) according to customer specification.

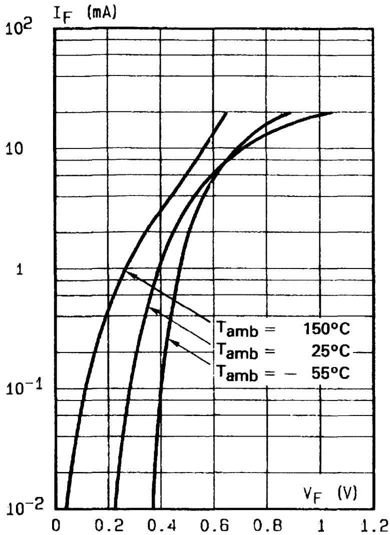


Fig.1 - Forward current versus forward voltage (typical values).

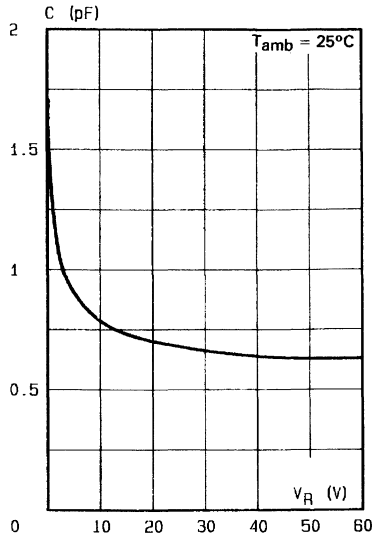


Fig.2 - Capacitance C versus reverse applied voltage V_R (typical values).

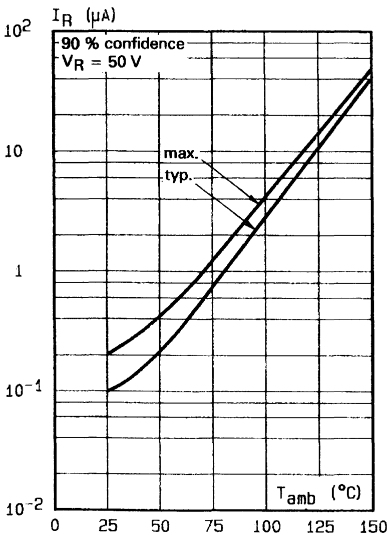


Fig.3 - Reverse current versus ambient temperature.

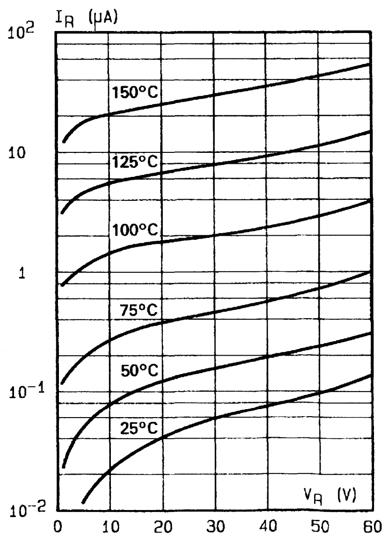
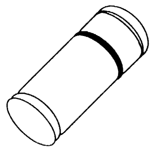


Fig.4 - Reverse current versus continuous reverse voltage (typical values).

TMBYV 10-20 → 40

SMALL SIGNAL SCHOTTKY DIODE



MELF
(Glass)

DESCRIPTION

Metal to silicon rectifier diodes in glass case featuring very low forward voltage drop and fast recovery time, intended for low voltage switching mode power supply, polarity protection and high frequency circuits.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
$I_{F(AV)}$	Average Forward Current	T_l = 60°C	1	A
I_{FSM}	Surge non Repetitive Forward Current	T_l = 25°C t_p = 10ms	25 Sinusoidal Pulse	A
		T_l = 25°C t_p = 300µs	50 Rectangular Pulse	
T_{stg} T_j	Storage and Junction Temperature Range		– 65 to 150 – 65 to 125	°C °C
T_L	Maximum Temperature for Soldering during 15s		260	°C

Symbol	Parameter	BYV 10-20	BYV 10-30	BYV 10-40	Unit
V_{RRM}	Repetitive Peak Reverse Voltage	20	30	40	V

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-l)}$	Junction-leads	110	°C/W

* Pulse test : $t_p \leq 300\mu s$ $\delta < 2\%$.

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R*	T_j = 25°C	$V_R = V_{RRM}$			0.5	mA
	T_j = 100°C				10	
V_F*	I_F = 1A	T_j = 25°C			0.55	V
	I_F = 3A				0.85	

* * Pulse test : $t_p \leq 300\mu s$ $\delta < 2\%$.

DYNAMIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
C	T_j = 25°C	V_R = 0		220		pF

Forward current flow in a schottky rectifier is due to majority carrier conduction. So reverse recovery is not affected by stored charge as in conventional PN junction diodes.
Nevertheless, when the device switches from forward biased condition to reverse blocking state, current is required to charge the depletion capacitance of the diode.

This current depends only of diode capacitance and external circuit impedance. Satisfactory circuit behaviour analysis may be performed assuming that schottky rectifer consists of an ideal diode in parallel with a variable capacitance equal to the junction capacitance (see fig. 5 page 4/4).

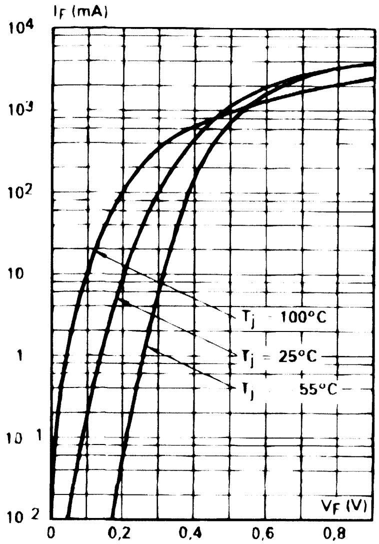


Fig.1 Forward current versus forward voltage at low level (typical values)

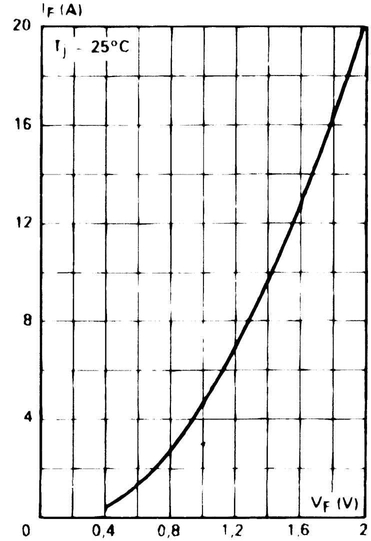


Fig.2 Forward current versus forward voltage at high level (typical values).

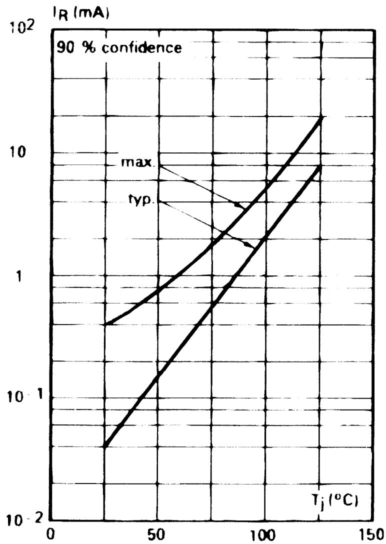


Fig.3 Reverse current versus junction temperature.

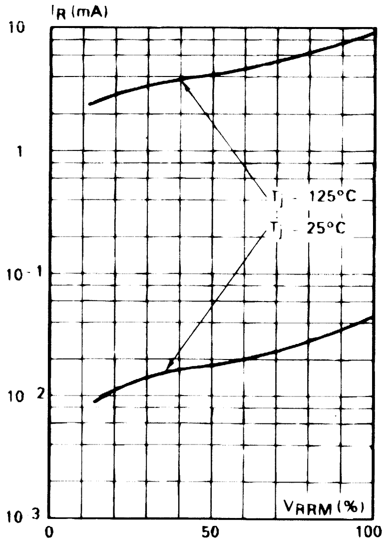


Fig.4 Reverse current versus V_{RRM} in per cent.

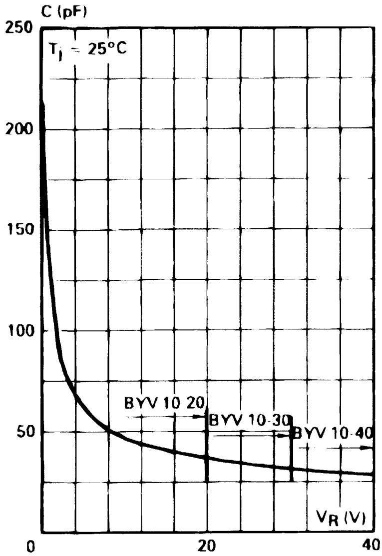


Fig.5 - Capacitance C versus reverse applied voltage V_R (typical values)

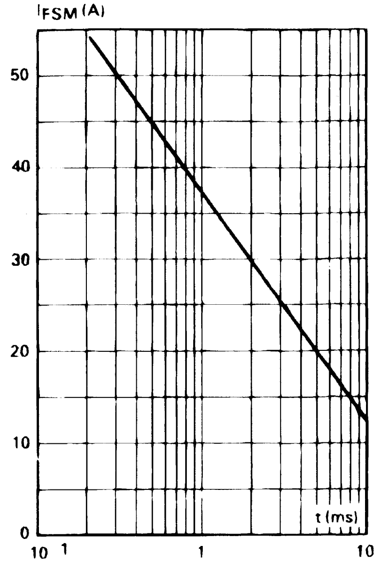


Fig.6 - Surge non repetitive forward current for a rectangular pulse with t ≤ 10 ms.

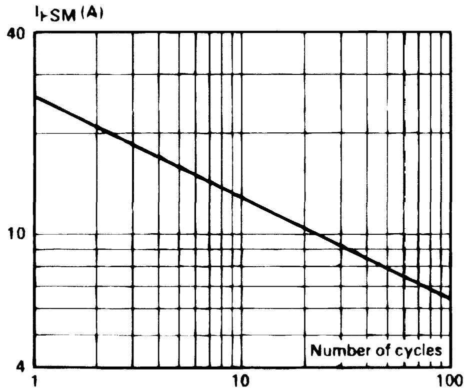
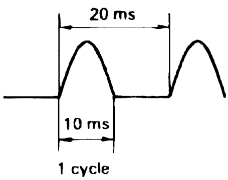
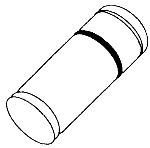


Fig.7 Surge non repetitive forward current versus number of cycles.



SMALL SIGNAL SCHOTTKY DIODE



MELF
(Glass)

DESCRIPTION

Metal to silicon rectifier diode in glass case featuring very low forward voltage drop and fast recovery time, intended for low voltage switching mode power supply, polarity protection and high frequency circuits.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		20	V
$I_{F(AV)}$	Average Forward Current	$T_l = 60°C$	1	A
I_{FSM}	Surge non Repetitive Forward Current	$T_l = 25°C$ $t_p = 10ms$	25 Sinusoidal Pulse	A
		$T_l = 25°C$ $t_p = 300\mu s$	50 Rectangular Pulse	
T_{stg} T_j	Storage and Junction Temperature Range		– 65 to 150 – 65 to 125	°C °C
T_L	Maximum Lead Temperature for Soldering during 15s		260	°C

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-l)}$	Junction-leads	110	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R*	$T_j = 25°C$	$V_R = V_{RRM}$			0.3	mA
	$T_j = 100°C$				10	
V_F*	$I_F = 1A$	$T_j = 25°C$			0.45	V
	$I_F = 3A$				0.75	

* Pulse test : $t_p \leq 300 \mu s$ $\delta < 2\%$.

DYNAMIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
C	$T_j = 25°C$	$V_R = 0$		330		pF

Forward current flow in a schottky rectifier is due to majority carrier conduction. So reverse recovery is not affected by stored charge as in conventional PN junction diodes.

Nevertheless, when the device switches from forward biased condition to reverse blocking state, current is required to charge the depletion capacitance of the diode.

This current depends only of diode capacitance and external circuit impedance. Satisfactory circuit behaviour analysis may be performed assuming that schottky rectifier consists of an ideal diode in parallel with a variable cpacitance equal to the junction capacitance (see fig. 5 page 4/4).

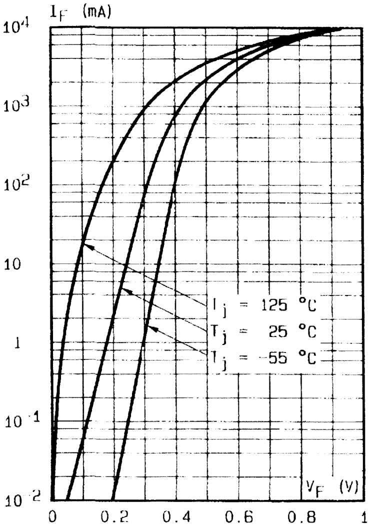


Fig.1 - Forward current versus forward voltage at low level (typical values).

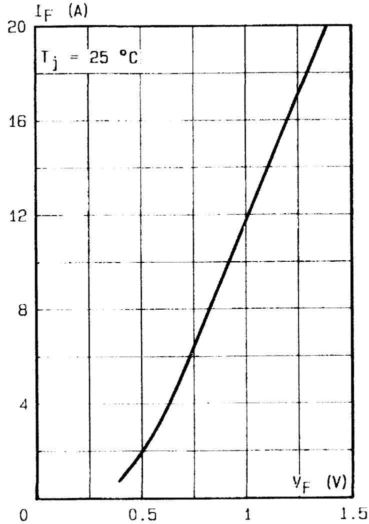


Fig.2 - Forward current versus forward voltage at high level (typical values).

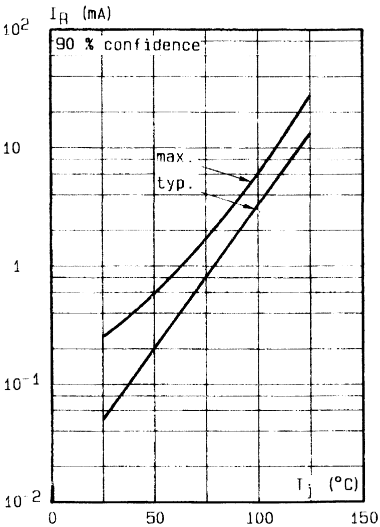


Fig.3 - Reverse current versus junction temperature.

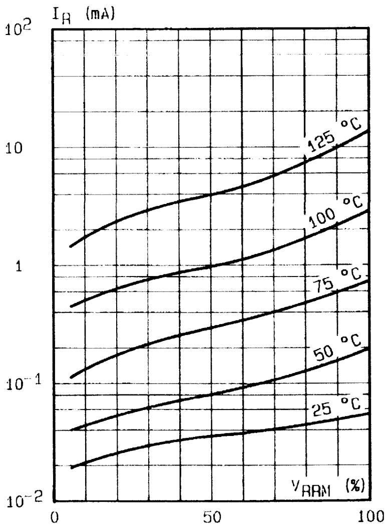


Fig.4 - Reverse current versus V_{RRM} in per cent.

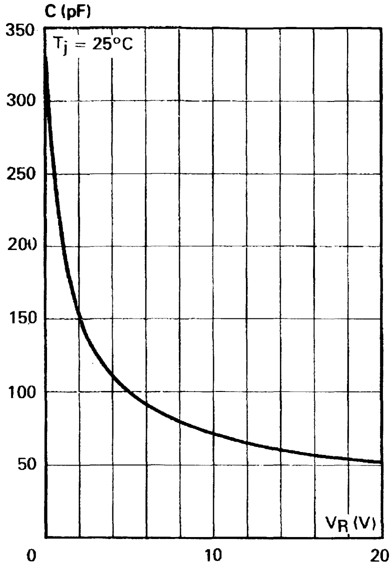


Fig.5 - Capacitance C versus reverse applied voltage V_R (typical values)

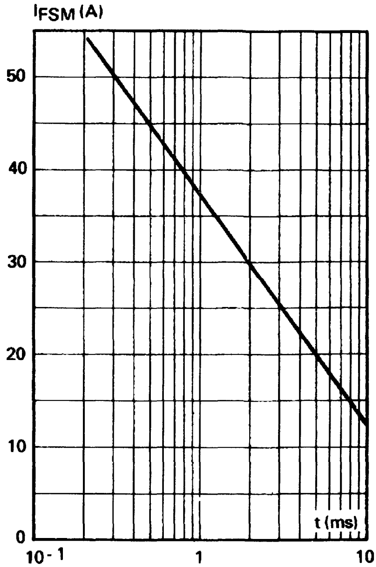


Fig.6 - Surge non repetitive forward current for a rectangular pulse with t ≤10 ms.

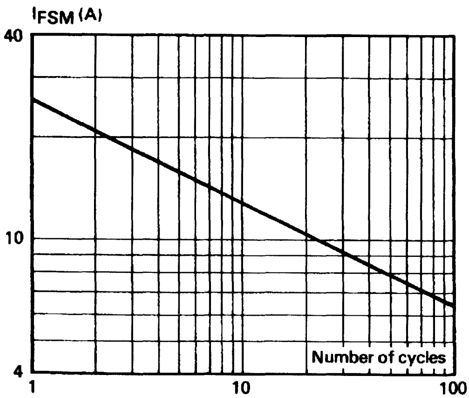
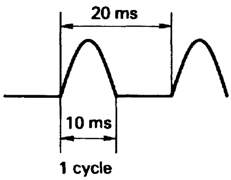
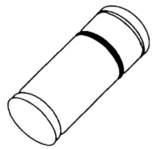


Fig.7 - Surge non repetitive forward current versus number of cycles.



SMALL SIGNAL SCHOTTKY DIODE



MELF
(Glass)

DESCRIPTION

Metal to silicon rectifier diode in glass case featuring very low forward voltage drop and fast recovery time, intended for low voltage switching mode power supply, polarity protection and high frequency circuits.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		60	V
$I_{F(AV)}$	Average Forward Current	T_l = 25°C	1	A
I_{FSM}	Surge non Repetitive Forward Current	T_l = 25°C t_p = 10ms	20 Sinusoidal Pulse	A
		T_l = 25°C t_p = 300µs	40 Rectangular Pulse	
T_{stg} T_j	Storage and Junction Temperature Range		– 65 to 150 – 65 to 125	°C °C
T_L	Maximum Temperature for Soldering during 15s		260	°C

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-l)}$	Junction-leads	110	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R*	T_j = 25°C	$V_R = V_{RRM}$			0.5	mA
	T_j = 100°C				10	
V_F*	I_F = 1A	T_j = 25°C			0.7	V
	I_F = 3A				1	

* Pulse test : $t_p \leq 300\mu s$ $\delta < 2\%$.

DYNAMIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
C	T_j = 25°C	V_R = 0		150		pF
	T_j = 25°C	V_R = 5V		40		

Forward current flow in a schottky rectifier is due to majority carrier conduction. So reverse recovery is not affected by stored charge as in conventional PN junction diodes.
Nevertheless, when the device switches from forward biased condition to reverse blocking state, current is required to charge the depletion capacitance of the diode.
This current depends only of diode capacitance and external circuit impedance. Satisfactory circuit behaviour analysis may be performed assuming that schottky rectifier consits of an ideal diode in parallel with a variable capacitance equal to the junction capacitance (see fig. 5 page 4/4).

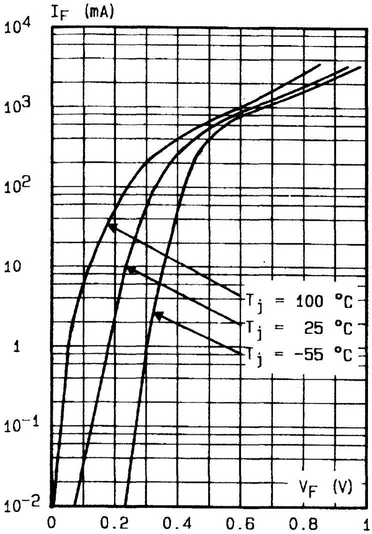


Fig.1 - Forward current versus forward voltage at low level (typical values).

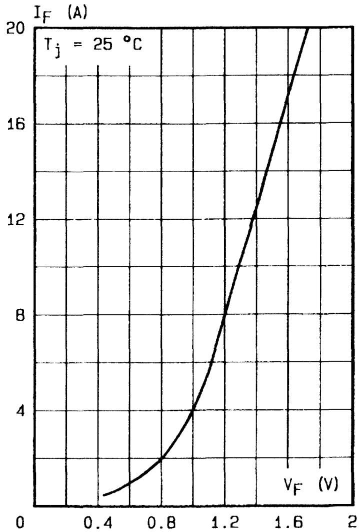


Fig.2 - Forward current versus forward voltage at high level (typical values).

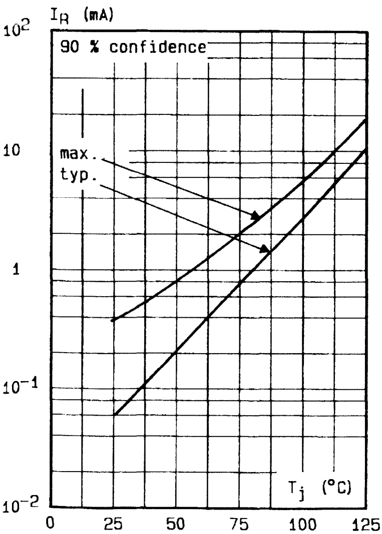


Fig.3 - Reverse current versus junction temperature.

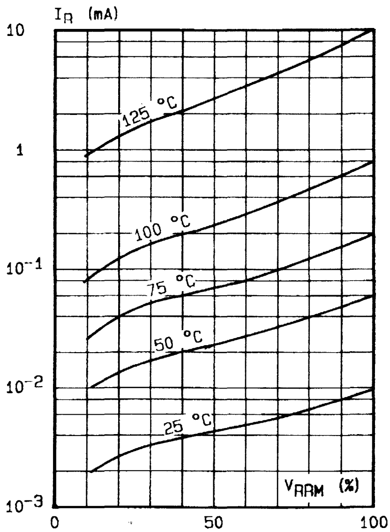


Fig.4 - Reverse current versus V_{RRM} in per cent.

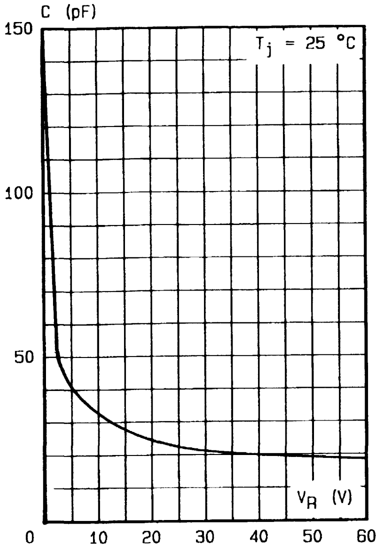


Fig.5 - Capacitance C versus reverse applied voltage V_R (typical values).

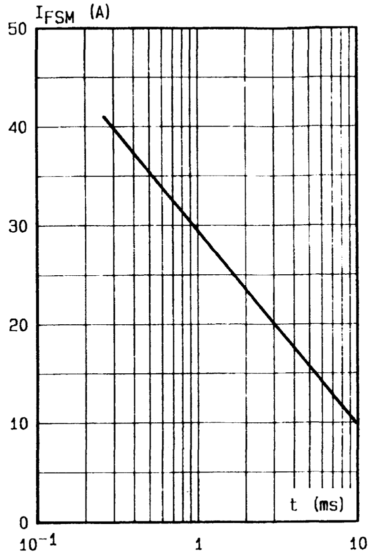
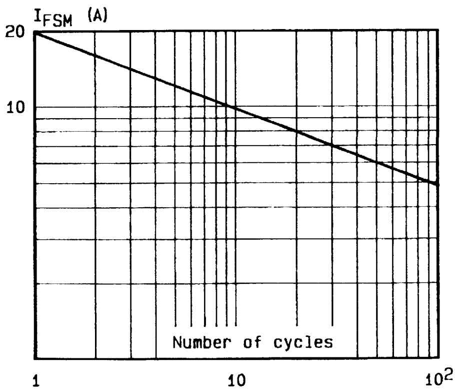


Fig.6 - Surge non repetitive forward current for a rectangular pulse with t ⩽ 10 ms.



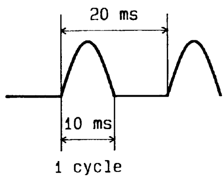


Fig.7 - Surge non repetitive forward current versus number of cycles.

SGS-THOMSON MICROELECTRONICS

TMMBAR 10
TMMBAR 11

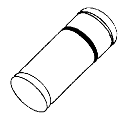
SMALL SIGNAL SCHOTTKY DIODES

DESCRIPTION

Metal to silicon junction diodes featuring high breakdown, low turn-on voltage and ultrafast switching.

Primarily intended for high level UHF/VHF detection and pulse application with broad dynamic range.

Matched batches are available on request, (TMMBAR11 only).



MINIMELF
(Glass)

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		TMMBAR 10	TMMBAR 11	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		20	15	V
I_F	Forward Continuous Current	T_l = 25°C	35	20	mA
I_{FSM}	Surge non Repetitive Forward Current	$t_p \leq$ 1s	100		mA
T_{stg} T_j	Storage and Junction Temperature Range		– 65 to 200		°C
T_L	Maximum Temperature for Soldering during 15s		260		°C

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-l)}$	Junction-leads	400	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
$V_{(BR)}$	T_{amb} = 25°C	I_R = 10μA	TMMBAR 10	20			V
	T_{amb} = 25°C	I_R = 10μA	TMMBAR 11	15			
V_F *	T_{amb} = 25°C	I_F = 1mA				0.41	V
	T_{amb} = 25°C	I_F = 35mA	TMMBAR 10			1	
	T_{amb} = 25°C	I_F = 20mA	TMMBAR 11			1	
I_R *	T_{amb} = 25°C	V_R = 15V	TMMBAR 10			0.1	μA
	T_{amb} = 25°C	V_R = 8V	TMMBAR 11			0.1	

DYNAMIC CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
C	T_{amb} = 25°C	V_R = 0V	f = 1MHz			1.2	pF
τ	T_{amb} = 25°C	I_F = 5mA	Krakauer Method			100	ps

* Pulse test : $t_p \leq 300\mu s$ $\delta < 2\%$.
Matched batches available on request. Test conditions (forward voltage and/or capacitance) according to customer specification.

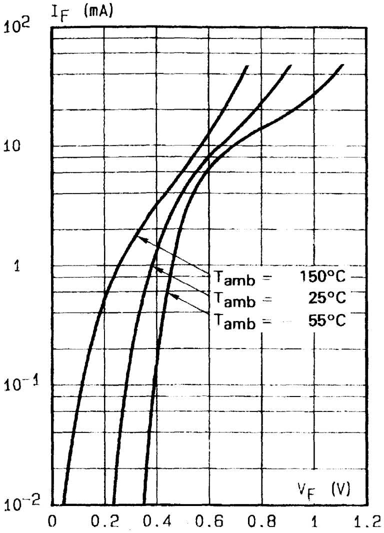


Fig.1 - Forward current versus forward voltage at different temperatures (typical values).

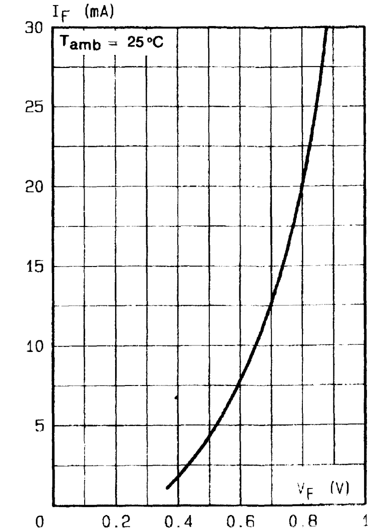
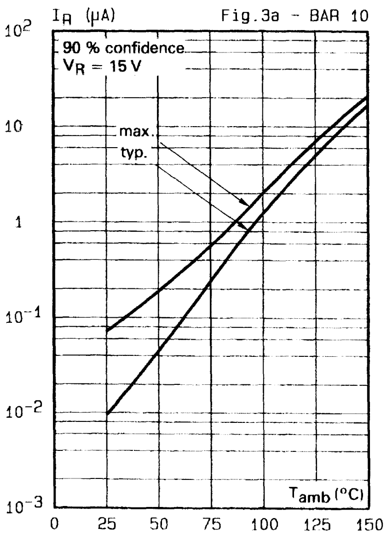


Fig.2 - Forward current versus forward voltage (typical values).



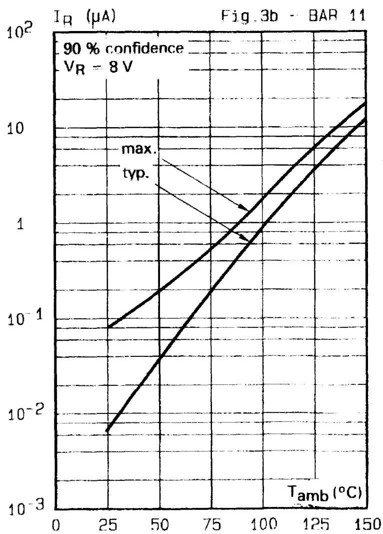


Fig.3a/3b - Reverse current versus ambient temperature.

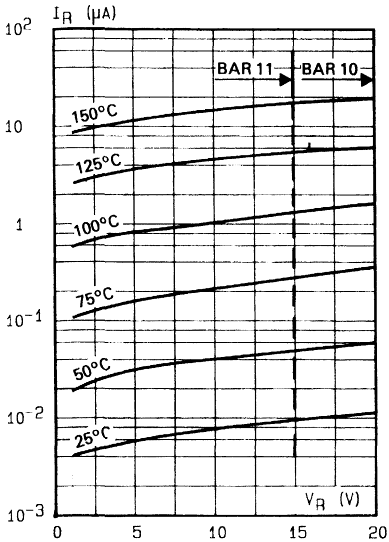


Fig.4 - Reverse current versus continuous reverse voltage (typical values).

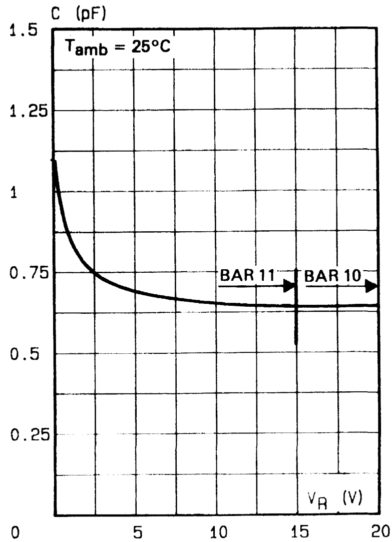
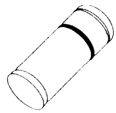


Fig.5 - Capacitance C versus reverse applied voltage V_R (typical values).

SMALL SIGNAL SCHOTTKY DIODE



MINIMELF
(Glass)

DESCRIPTION

Metal to silicon junction diode primarly intented for UHF mixers and ultrafast switching applications.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		4	V
I_F	Forward Continuous Current	T_l = 25°C	30	mA
I_{FSM}	Surge non Repetitive Forward Current	$t_p \leq 1s$	60	mA
T_{stg} T_j	Storage and Junction Temperature Range		– 65 to 150 125	°C °C
T_L	Maximum Temperature for Soldering during 15s		260	°C

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-l)}$	Junction-leads	400	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
$V_{(BR)}$	T_{amb} = 25°C	I_R = 10µA	4			V
V_F (1)	T_{amb} = 25°C	I_F = 10mA			0.6	V
I_R (1)	T_{amb} = 25°C	V_R = 3V			0.25	µA

DYNAMIC CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
C	T_{amb} = 25°C	V_R = 1V	f = 1MHz			1	pF
F (2)	T_{amb} = 25°C	f = 1GHz			6		dB

(1) Pulse test : $t_p \leq 300\mu s$ $\delta < 2\%$.
(2) Noise figure test :
- diode is inserted in a tuned stripline circuit
- local oscillator frequency 1GHz
- local oscillator power 1mW
- intermediate frequency amplifier, tuned on 30MHz, has a noise figure 1.5dB.

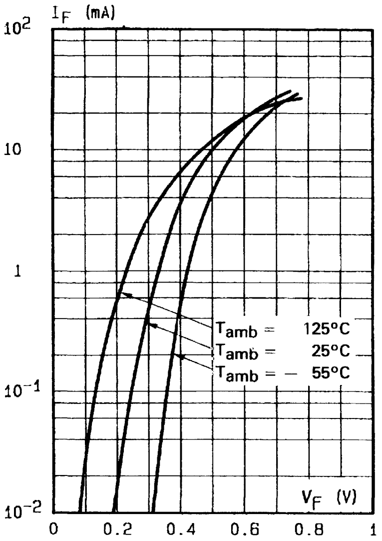


Fig.1 - Forward current versus forward voltage (typical values).

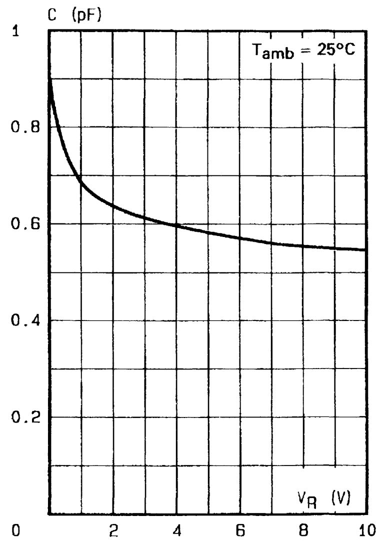


Fig.2 - Capacitance C versus reverse applied voltage V_R (typical values).

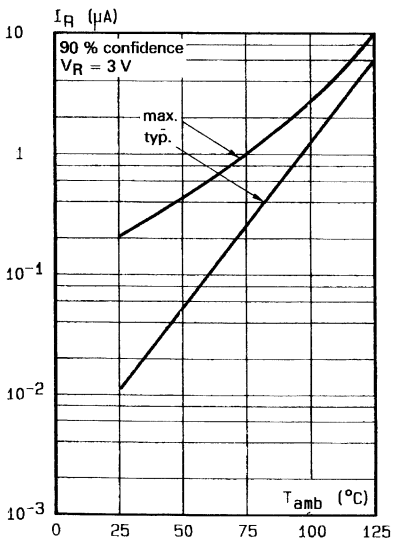


Fig.3 - Reverse current versus ambient temperature.

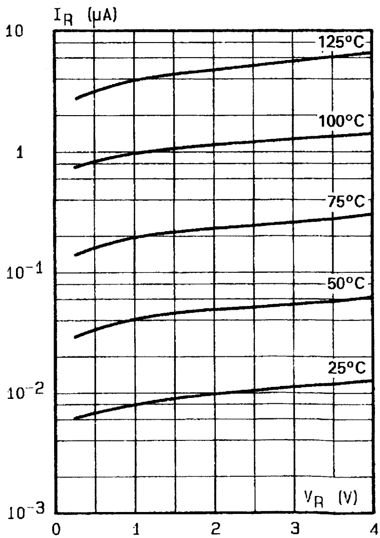
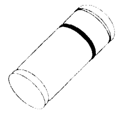


Fig.4 - Reverse current versus continuous reverse voltage (typical values).

SGS-THOMSON MICROELECTRONICS

TMMBAR 28

SMALL SIGNAL SCHOTTKY DIODE



MINIMELF
(Glass)

DESCRIPTION

Metal to silicon junction diode featuring high breakdown, low turn-on voltage and ultrafast switching.

Primarily intended for high level UHF/VHF detection and pulse application with broad dynamic range.

Matched batches are available on request.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		70	V
I_F	Forward Continuous Current	T_l = 25°C	15	mA
I_{FSM}	Surge non Repetitive Forward Current	$t_p \leq$ 1s	50	mA
T_{stg} T_j	Storage and Junction Temperature Range		– 65 to 200	°C
T_L	Maximum Temperature for Soldering during 15s		260	°C

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-l)}$	Junction-leads	400	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
$V_{(BR)}$	T_{amb} = 25°C	I_R = 10μA	70			V
V_F*	T_{amb} = 25°C	I_F = 1mA			0.41	V
	T_{amb} = 25°C	I_F = 15mA			1	
I_R*	T_{amb} = 25°C	V_R = 50V			0.2	μA

DYNAMIC CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
C	T_{amb} = 25°C	V_R = 0V	f = 1MHz			2	pF
τ	T_{amb} = 25°C	I_F = 5mA	Krakauer Method			100	ps

* Pulse test : $t_p \leq 300\mu s$ $\delta < 2\%$.
Matched batches available on request. Test conditions (forward voltage and/or capacitance) according to customer specification.

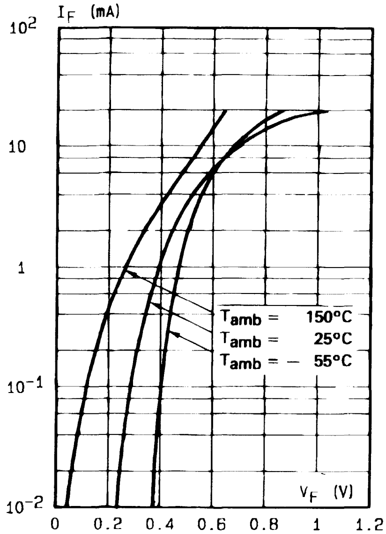


Fig.1 Forward current versus forward voltage at low level (typical values).

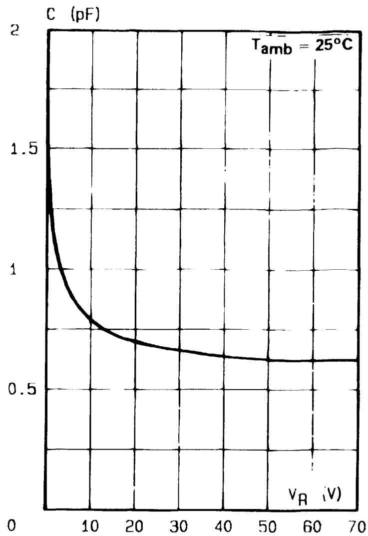


Fig.2 - Capacitance C versus reverse applied voltage V_R (typical values).

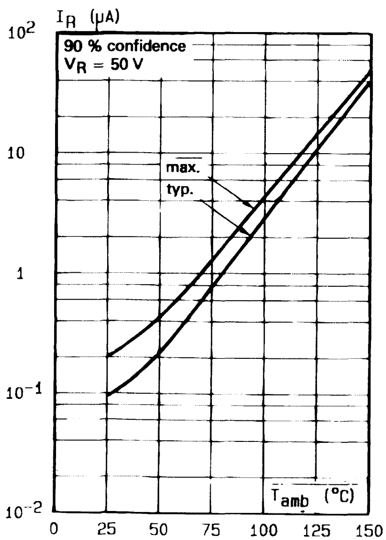


Fig.3 - Reverse current versus ambient temperature.

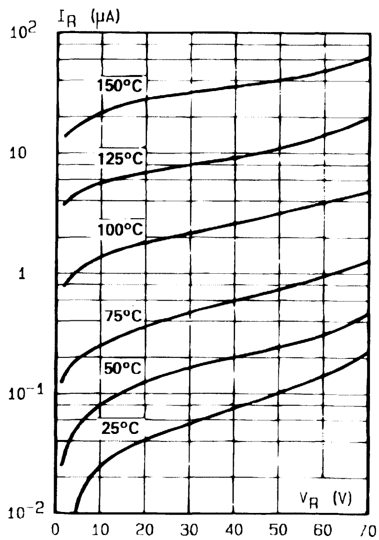
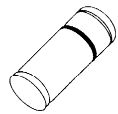


Fig.4 - Reverse current versus continuous reverse voltage (typical values).

SGS-THOMSON MICROELECTRONICS

TMMBAT 19

SMALL SIGNAL SCHOTTKY DIODE



MINIMELF
(Glass)

DESCRIPTION

Metal to silicon junction diode primarly intended for UHF mixers and ultrafast switching applications.

Matched batches are available on request.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		10	V
I_F	Forward Continuous Current	$T_l = 25°C$	30	mA
I_{FSM}	Surge non Repetitive Forward Current	$t_p \leq 1s$	60	mA
T_{stg} T_j	Storage and Junction Temperature Range		– 65 to 150 125	°C °C
T_L	Maximum Temperature for Soldering during 15s		260	°C

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-l)}$	Junction-leads	400	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
$V_{(BR)}$	$T_{amb} = 25°C$	$I_R = 10\mu A$	10			V
V_F (1)	$T_{amb} = 25°C$	$I_F = 1mA$			0.4	V
	$T_{amb} = 25°C$	$I_F = 20mA$			1	
I_R (1)	$T_{amb} = 25°C$	$V_R = 5V$			0.1	µA

DYNAMIC CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
C	$T_{amb} = 25°C$	$V_R = 0V$	f = 1GHz			1.2	pF
τ	$T_{amb} = 25°C$	$I_F = 20mA$	Krakauer Method			100	ps
F (2)	$T_{amb} = 25°C$	f = 1GHz			6		dB

(1) Pulse test : $t_p \leq 300\mu s$ $\delta < 2\%$.
(2) Noise figure test :
- diode is inserted in a tuned stripline circuit
- local oscillator frequency 1GHz
- local oscillator power 1mW
- intermediate frequency amplifier, tuned on 30MHz, has a noise figure 1.5dB

Matched batches available on request. Test conditions (forward voltage and/or capacitance) according to customer specification.

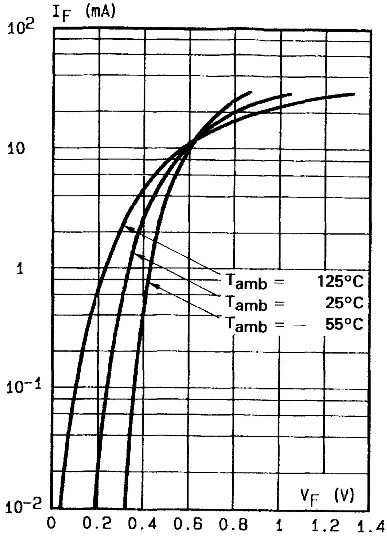


Fig.1 - Forward current versus forward voltage at low level (typical values).

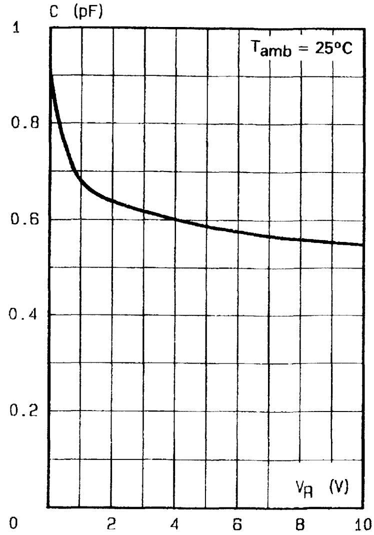


Fig.2 - Capacitance C versus reverse applied voltage V_R (typical values).

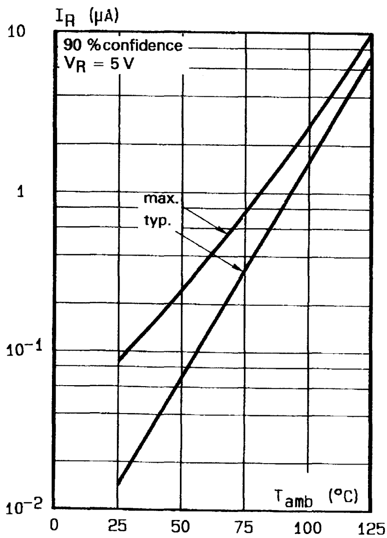


Fig.3 - Reverse current versus ambient temperature.

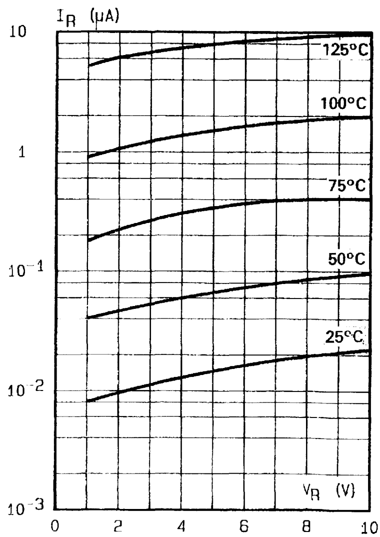
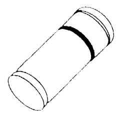


Fig.4 - Reverse current versus continuous reverse voltage (typical values).

SGS-THOMSON MICROELECTRONICS

TMMBAT 29

SMALL SIGNAL SCHOTTKY DIODE



MINIMELF
(Glass)

DESCRIPTION

Metal to silicon junction diode primarly intented for UHF mixers and ultrafast switching applications.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		5	V
I_F	Forward Continuous Current	$T_l = 25°C$	30	mA
I_{FSM}	Surge non Repetitive Forward Current	$t_p \leq 1s$	60	mA
T_{stg} T_j	Storage and Junction Temperature Range		– 65 to 150 125	°C °C
T_L	Maximum Temperature for Soldering during 15s		260	°C

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-l)}$	Junction-leads	400	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
$V_{(BR)}$	$T_{amb} = 25°C$	$I_R = 100\mu A$	5			V
V_F (1)	$T_{amb} = 25°C$	$I_F = 10mA$			0.55	V
I_R (1)	$T_{amb} = 25°C$	$V_R = 1V$			0.05	µA

DYNAMIC CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
C	$T_{amb} = 25°C$	$V_R = 0V$	f = 1MHz			1	pF
Q_S (2)	$T_{amb} = 25°C$	$I_F = 10mA$				3	pC
F (3)	$T_{amb} = 25°C$	f = 1GHz			6	7	dB

(1) Pulse test : $t_p \leq 300\mu s$ $\delta < 2\%$.
(2) Measured on B-line Electronics QS-3 stored charge meter.
(3) Noise figure test :

- diode is inserted in a tuned stripline circuit
- local oscillator frequency 1GHz
- local oscillator power 1mW

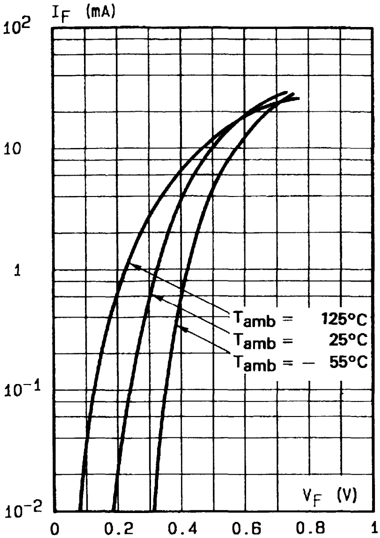


Fig.1 - Forward current versus forward voltage (typical values).

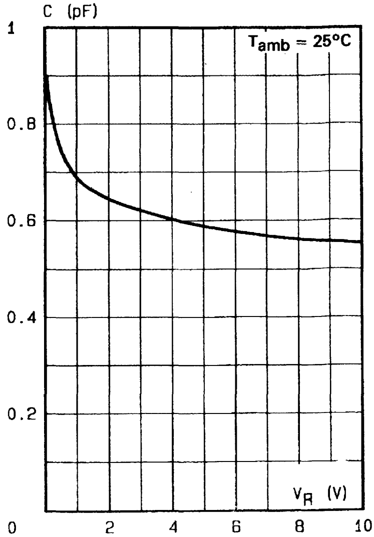


Fig.2 - Capacitance C versus reverse applied voltage V_R (typical values).

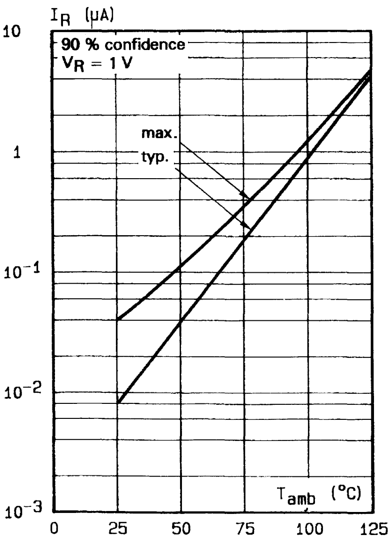


Fig.3 - Reverse current versus ambient temperature.

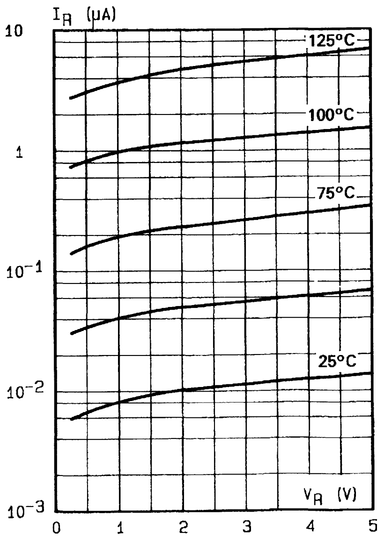
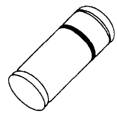


Fig.4 - Reverse current versus continuous reverse voltage (typical values).

SGS-THOMSON MICROELECTRONICS

SMALL SIGNAL SCHOTTKY DIODE



MINIMELF
(Glass)

DESCRIPTION

General purpose metal to silicon diode featuring very low turn-on voltage and fast switching.

This device has integrated protection against excessive voltage such as electrostatic discharges.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		100	V
I_F	Forward Continuous Current	T_l = 25°C	100	mA
I_{FRM}	Repetitive Peak Forward Current	$t_p \leq 1s$ $\delta \leq 0.5$	350	mA
I_{FSM}	Surge non Repetitive Forward Current	t_p = 10ms	750	mA
P_{tot}	Power Dissipation	T_l = 95°C	100	mW
T_{stg} T_j	Storage and Junction Temperature Range		– 65 to 150 – 65 to 125	°C °C
T_L	Maximum Temperature for Soldering during 15s		260	°C

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-l)}$	Junction-leads	300	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
$V_{(BR)}$	T_j = 25°C	I_R = 100µA	100			V
V_F*	T_j = 25°C	I_F = 1mA		0.4	0.45	V
	T_j = 25°C	I_F = 200mA			1	
I_R*	T_j = 25°C	V_R = 50V			0.1	µA
	T_j = 100°C				20	

DYNAMIC CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
C	T_j = 25°C	V_R = 1V	f = 1MHz		2		pF

* Pulse test : $t_p \leq 300\mu s$ $\delta < 2\%$

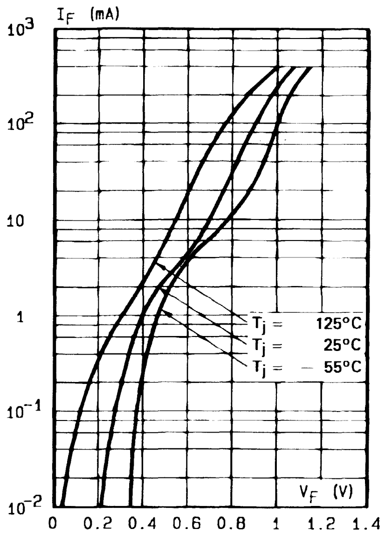


Fig.1 Forward current versus forward voltage at different temperatures (typical values).

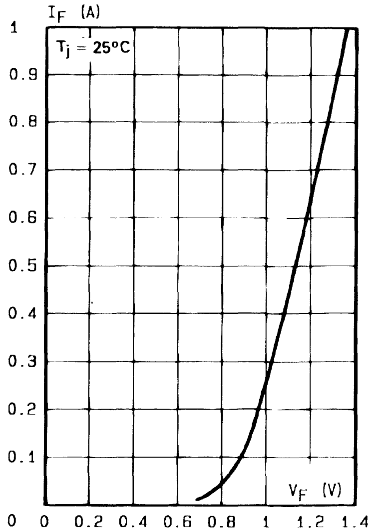


Fig.2 Forward current versus forward voltage (typical values).

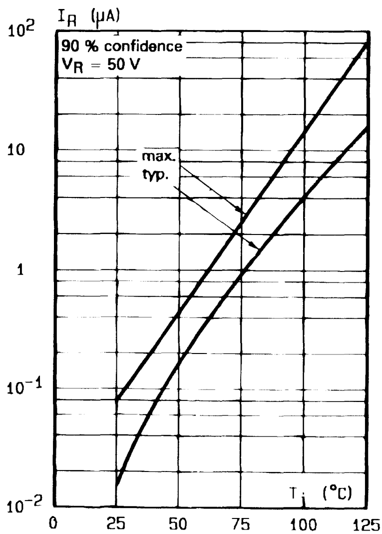


Fig.3 – Reverse current versus junction temperature.

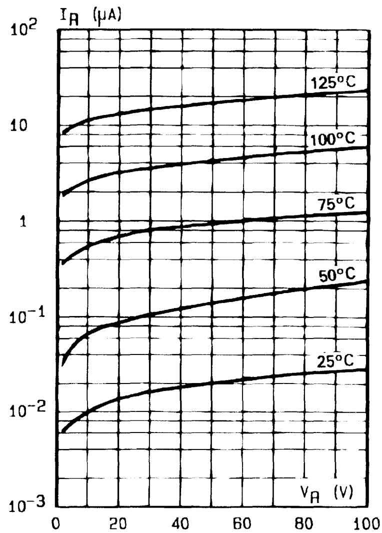


Fig.4 – Reverse current versus continuous reverse voltage (typical values).

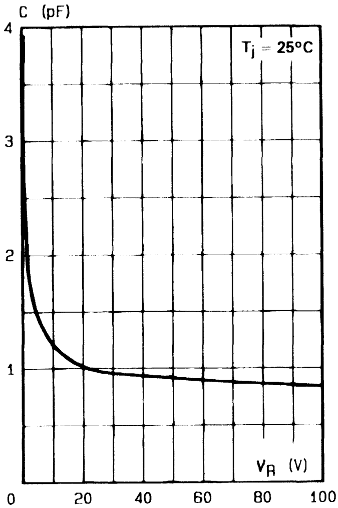
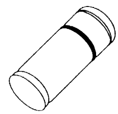


Fig.5 - Capacitance C versus reverse applied voltage V_R (typical values).

SGS-THOMSON
MICROELECTRONICS

TMMBAT 42
TMMBAT 43

SMALL SIGNAL SCHOTTKY DIODES



MINIMELF
(Glass)

DESCRIPTION

General purpose metal to silicon diodes featuring very low turn-on voltage fast switching.

These devices have integrated protection against excessive voltage such as electrostatic discharges.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		30	V
I_F	Forward Continuous Current	$T_l = 25°C$	200	mA
I_{FRM}	Repetitive Peak Forward Current	$t_p \leq 1s$ $\delta \leq 0.5$	500	mA
I_{FSM}	Surge non Repetitive Forward Current	$t_p = 10ms$	4	A
P_{tot}	Power Dissipation	$T_l = 65°C$	200	mW
T_{stg} T_j	Storage and Junction Temperature Range		– 65 to 150 – 65 to 125	°C °C
T_L	Maximum Temperature for Soldering during 15s		260	°C

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-l)}$	Junction-leads	300	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
$V_{(BR)}$	T_j = 25°C	I_R = 100µA		30			V
V_F*	T_j = 25°C	I_F = 200mA	All Types			1	V
	T_j = 25°C	I_F = 10mA	BAT 42			0.4	
	T_j = 25°C	I_F = 50mA				0.65	
	T_j = 25°C	I_F = 2mA	BAT 43	0.26		0.33	
	T_j = 25°C	I_F = 15mA				0.45	
I_R*	T_j = 25°C		V_R = 25V			0.5	µA
	T_j = 100°C					100	

DYNAMIC CHARACTERISTICS

Symbol	Test Conditions	Min.	Typ.	Max.	Unit
C	T_j = 25°C V_R = 1V f = 1MHz		7		pF
t_{rr}	T_j = 25°C I_F = 10mA I_R = 10mA i_{rr} = 1mA R_L = 100Ω			5	ns
η	T_j = 25°C R_L = 15KΩ C_L = 300pF f = 45MHz V_i = 2V	80			%

* Pulse test : $t_p \leq 300\mu s$ $\delta < 2\%$.

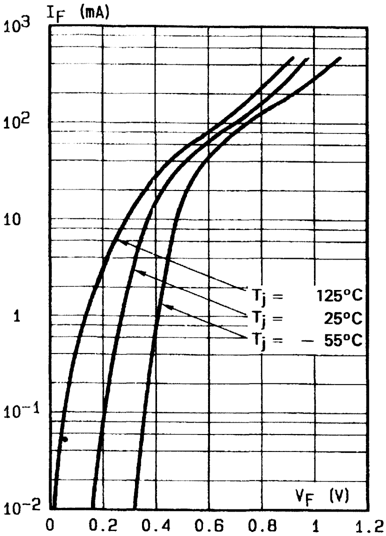


Fig.1 - Forward current versus forward voltage at different temperatures (typical values).

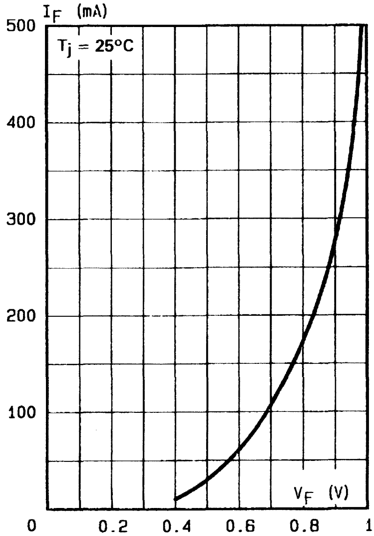


Fig.2 - Forward current versus forward voltage (typical values).

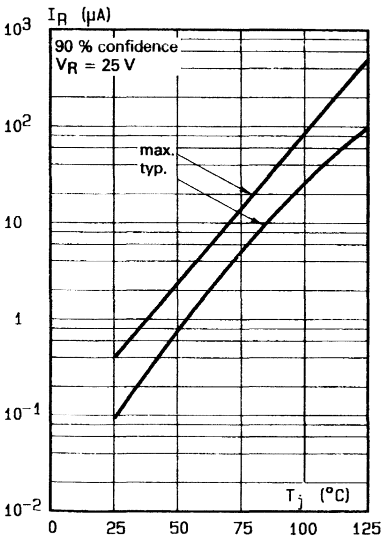


Fig.3 - Reverse current versus junction temperature.

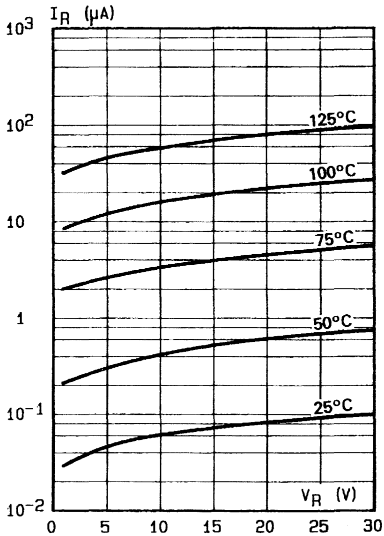


Fig.4 - Reverse current versus continuous reverse voltage (typical values).

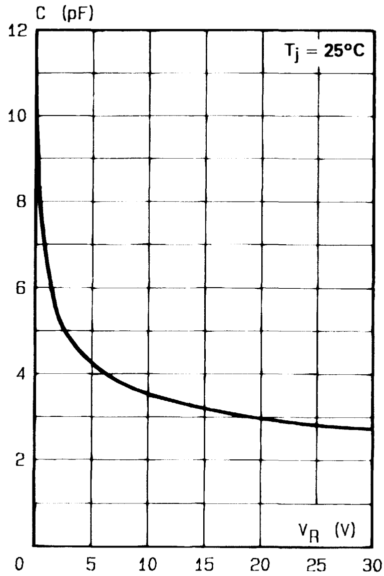


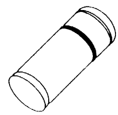
Fig.5 – Capacitance C versus reverse applied voltage V_R (typical values).

SGS-THOMSON MICROELECTRONICS

SGS-THOMSON MICROELECTRONICS

TMMBAT 45

SMALL SIGNAL SCHOTTKY DIODE



MINIMELF
(Glass)

DESCRIPTION

Metal to silicon junction diode primarily intented for UHF mixers and ultrafast switching applications.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		15	V
I_F	Forward Continuous Current	T_l = 25°C	30	mA
I_{FSM}	Surge non Repetitive Forward Current	$t_p \leq 1s$	60	mA
T_{stg} T_j	Storage and Junction Temperature Range		– 65 to 150 125	°C °C
T_L	Maximum Temperature for Soldering during 15s		260	°C

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-l)}$	Junction-leads	400	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
$V_{(BR)}$	T_{amb} = 25°C	I_R = 10µA	15			V
V_F (1)	T_{amb} = 25°C	I_F = 1mA			0.38	V
	T_{amb} = 25°C	I_F = 10mA			0.5	
	T_{amb} = 25°C	I_F = 30mA			1	
I_R (1)	T_{amb} = 25°C	V_R = 6V			0.1	µA

DYNAMIC CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
C	T_{amb} = 25°C	V_R = 1V	f = 1MHz			1.1	pF
τ	T_{amb} = 25°C	I_F = 20mA	Krakauer Method			100	ps
F (2)	T_{amb} = 25°C	f = 1GHz			6	7	dB

(1) Pulse test : $t_p \leq 300\mu s$ $\delta < 2\%$.
(2) Noise figure test :
- diode is inserted in a tuned stripline circuit
- local oscillator frequency 1GHz
- local oscillator power 1mW
- intermediate frequency amplifier, tuned on 30MHz, has a noise figure 1.5dB

Matched batches available on request. Test conditions (forward voltage and/or capacitance) according to customer specification.

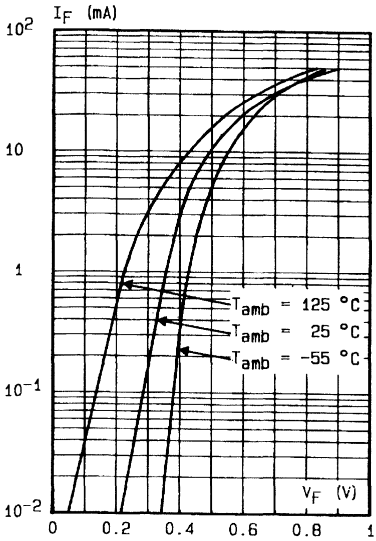


Fig.1 - Forward current versus forward voltage (typical values).

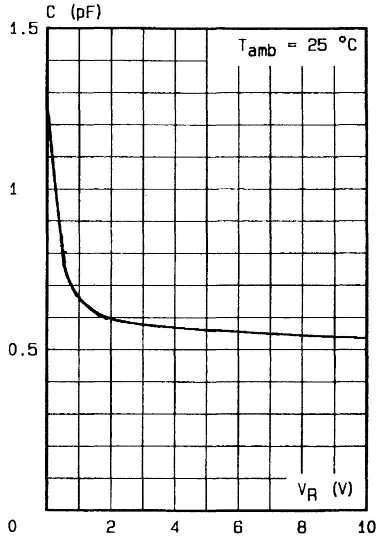


Fig.2 - Capacitance C versus reverse applied voltage V_R (typical values).

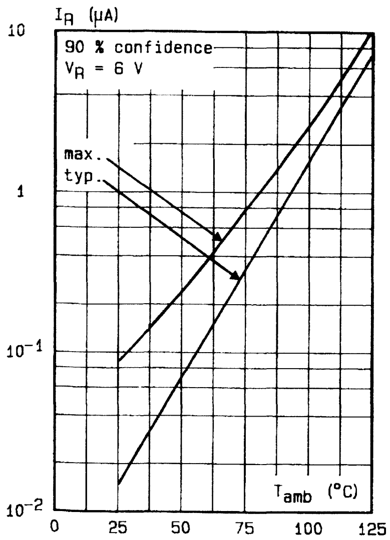


Fig.3 - Reverse current versus ambient temperature.

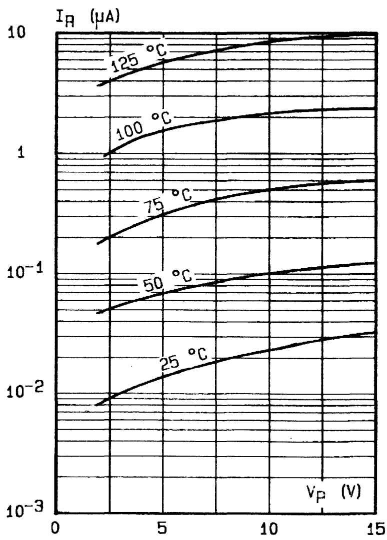
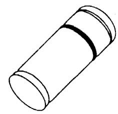


Fig.4 - Reverse current versus continuous reverse voltage (typical values).

SMALL SIGNAL SCHOTTKY DIODE



MINIMELF
(Glass)

DESCRIPTION

General purpose, metal to silicon diode featuring high breakdown voltage low turn-on voltage.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		100	V
I_F	Forward Continuous Current	T_l = 25°C	150	mA
I_{FRM}	Repetitive Peak Forward Current	$t_p \leq 1s$ $\delta \leq 0.5$	350	mA
I_{FSM}	Surge non Repetitive Forward Current	t_p = 10ms	750	mA
P_{tot}	Power Dissipation	T_l = 80°C	150	mW
T_{stg} T_j	Storage and Junction Temperature Range		– 65 to 150 – 65 to 125	°C °C
T_L	Maximum Temperature for Soldering during 15s		260	°C

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-l)}$	Junction-leads	300	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
$V_{(BR)}$	T_j = 25°C	I_R = 100µA	100			V
V_F*	T_j = 25°C	I_F = 0.1mA			0.25	V
	T_j = 25°C	I_F = 10mA			0.45	
	T_j = 25°C	I_F = 250mA			1	
I_R*	T_j = 25°C	V_R = 1.5V			0.5	µA
	T_j = 60°C				5	
	T_j = 25°C	V_R = 10V			0.8	
	T_j = 60°C				7.5	
	T_j = 25°C	V_R = 50V			2	
	T_j = 60°C				15	
	T_j = 25°C	V_R = 75V			5	
	T_j = 60°C				20	

DYNAMIC CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
C	T_j = 25°C	V_R = 0V	f = 1MHz		10		pF
	T_j = 25°C	V_R = 1V			6		

* Pulse test : $t_p \leq 300\mu s$ $\delta < 2\%$

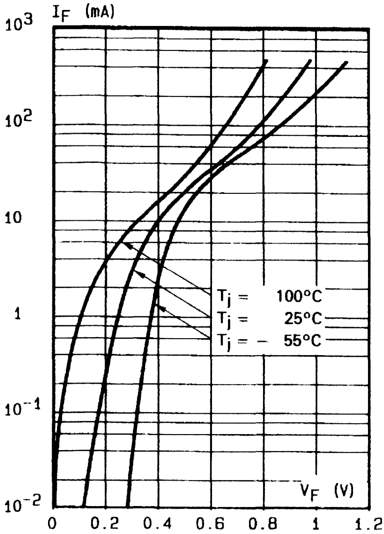


Fig.1 - Forward current versus forward voltage at different temperatures (typical values).

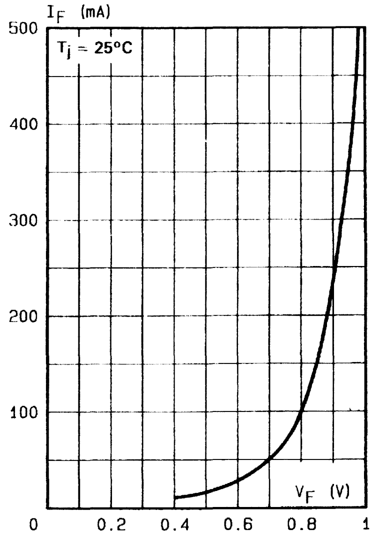


Fig.2 - Forward current versus forward voltage (typical values).

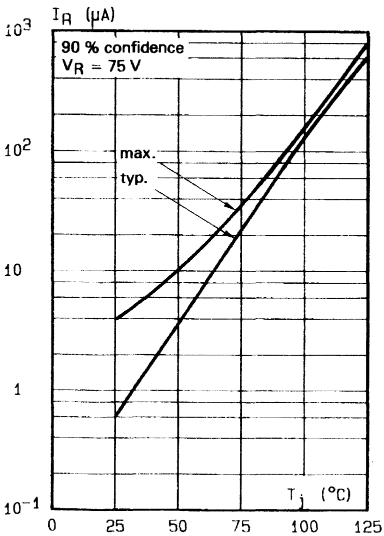


Fig.3 - Reverse current versus junction temperature (typical values).

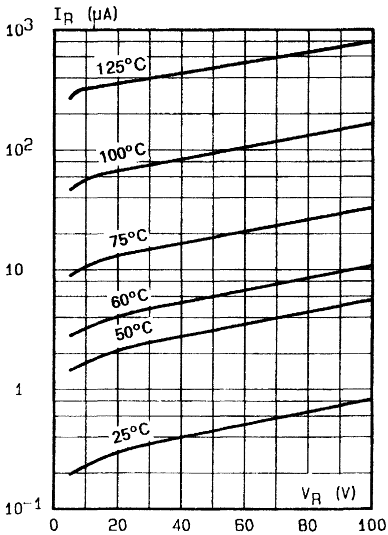


Fig.4 - Reverse current versus continuous reverse voltage

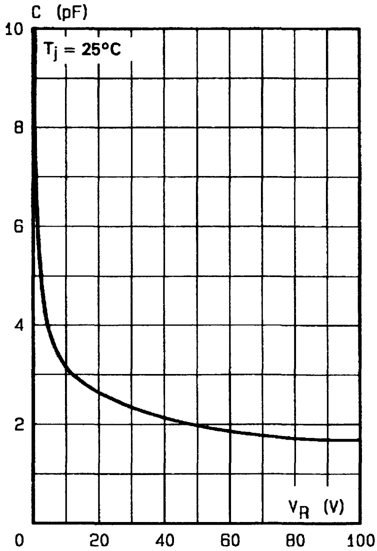
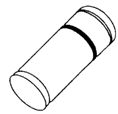


Fig.5 - Capacitance C versus reverse applied voltage V_R (typical values).

SGS-THOMSON MICROELECTRONICS

TMMBAT 47
TMMBAT 48

SMALL SIGNAL SCHOTTKY DIODES



MINIMELF
(Glass)

DESCRIPTION

General purpose metal to silicon diodes featuring very low turn-on voltage and fast switching.

These devices have integrated protection against excessive voltage such as electrostatic discharges.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		TMMBAT47	TMMBAT48	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		20	40	V
I_F	Forward Continuous Current	$T_l = 25°C$	350		mA
I_{FRM}	Repetitive Peak Forward Current	$t_p \leq 1s$ $\delta \leq 0.5$	1		A
I_{FSM}	Surge non Repetitive Forward Current	$t_p = 10ms$	7.5		A
		$t_p = 1s$	1.5		
P_{tot}	Power Dissipation	$T_l = 25°C$	330		mW
T_{stg} T_j	Storage and Junction Temperature Range		– 65 to 150 – 65 to 125		°C °C
T_L	Maximum Temperature for Soldering during 15s		260		°C

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j-l)}$	Junction-leads	300	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
$V_{(BR)}$	T_j = 25°C	I_R = 10μA	TMMBAT47	20			V
	T_j = 25°C	I_R = 25μA	TMMBAT48	40			
V_F*	T_j = 25°C	I_F = 0.1mA	All Types			0.25	V
	T_j = 25°C	I_F = 1mA				0.3	
	T_j = 25°C	I_F = 10mA				0.4	
	T_j = 25°C	I_F = 30mA	TMMBAT47			0.5	
	T_j = 25°C	I_F = 150mA				0.8	
	T_j = 25°C	I_F = 300mA				1	
	T_j = 25°C	I_F = 50mA	TMMBAT48			0.5	
	T_j = 25°C	I_F = 200mA				0.75	
	T_j = 25°C	I_F = 500mA				0.9	
I_R*	T_j = 25°C	V_R = 1.5V	All Types			1	μA
	T_j = 60°C					10	
	T_j = 25°C	V_R = 10V	TMMBAT47			4	
	T_j = 60°C					20	
	T_j = 25°C	V_R = 20V				10	
	T_j = 60°C					30	
	T_j = 25°C	V_R = 10V	TMMBAT48			2	
	T_j = 60°C					15	
	T_j = 25°C	V_R = 20V				5	
	T_j = 60°C					25	
	T_j = 25°C	V_R = 40V				25	
	T_j = 60°C					50	

DYNAMIC CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
C	T_j = 25°C	V_R = 0V	f = 1MHz		20		pF
	T_j = 25°C	V_R = 1V			12		
t_{rr}	T_j = 25°C I_F = 10mA V_R = 1V i_{rr} = 1mA R_L = 100Ω				10		ns

* Pulse test : $t_p \leq 300\mu s$ $\delta < 2\%$.

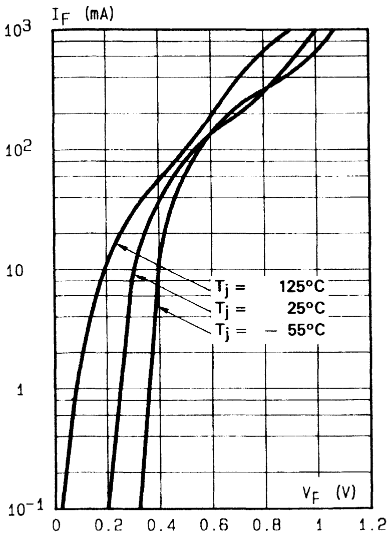


Fig.1 - Forward current versus forward voltage at different temperatures (typical values).

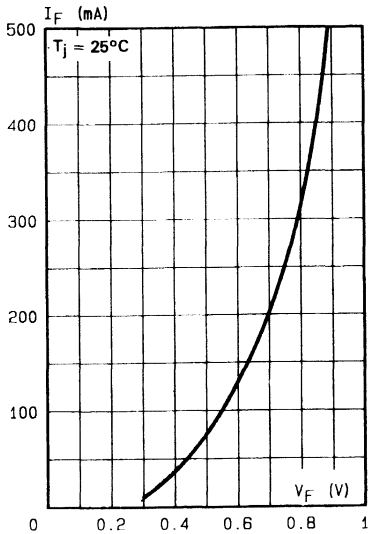


Fig.2 - Forward current versus forward voltage (typical values).

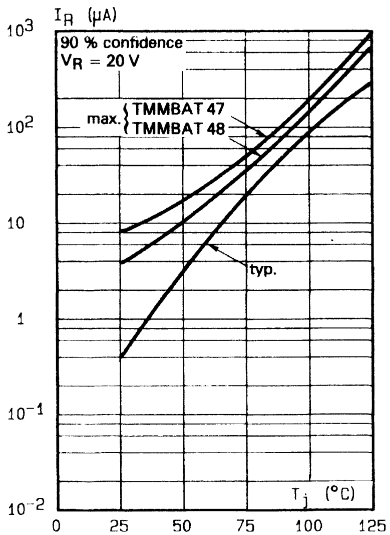


Fig.3 - Reverse current versus junction temperature.

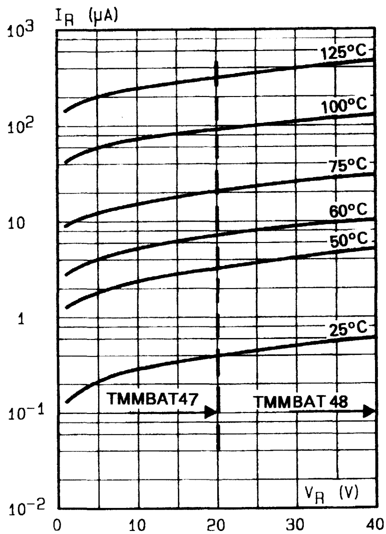


Fig.4 - Reverse current versus continuous reverse voltage (typical values).

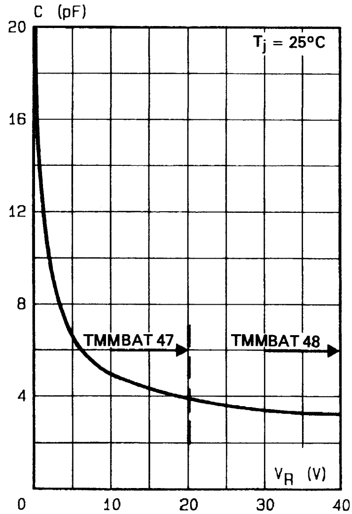
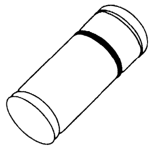


Fig.5 - Capacitance C versus reverse applied voltage V_R (typical values).

TMBAT49

SMALL SIGNAL SCHOTTKY DIODE



MELF
(Glass)

DESCRIPTION

General purpose metal to silicon diode featuring very low turn-on voltage and fast switching.

This device has integrated protection against excessive voltage such as electrostatic discharges.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive Peak Reverse Voltage		80	V
I_F	Forward Continuous Current	$T_l = 70°C$	500	mA
I_{FRM}	Repetitive Peak Forward Current	$t_p = 1s$ $\delta \leq 0.5$	3	A
I_{FSM}	Surge non Repetitive Forward Current	$t_p = 10ms$	10	A
T_{stg} T_j	Storage and Junction Temperature Range		– 65 to 150 – 65 to 125	°C °C
T_L	Maximum Temperature for Soldering during 15 s		260	°C

THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
$R_{th\ (j\text{-}l)}$	Junction-leads	110	°C/W

ELECTRICAL CHARACTERISTICS

STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R*	$T_j = 25°C$	$V_R = 80V$			200	μA
V_F*	$T_j = 25°C$	$I_F = 10mA$			0.32	V
	$T_j = 25°C$	$I_F = 100mA$			0.42	
	$T_j = 25°C$	$I_F = 1A$			1	

DYNAMIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
C	$T_j = 25°C$ f = 1MHz	$V_R = 0V$		120		pF
		$V_R = 5V$		35		

* Pulse test : $t_p \leq 300\mu s$ $\delta < 2\%$.

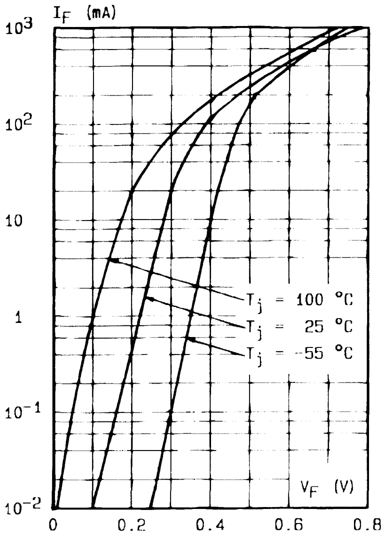


Fig.1 - Forward current versus forward voltage at low level (typical values).

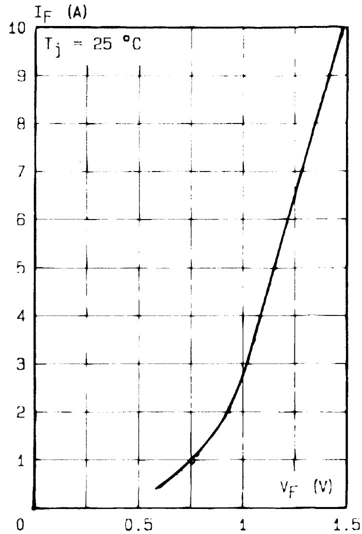


Fig.2 - Forward current versus forward voltage at high level (typical values).

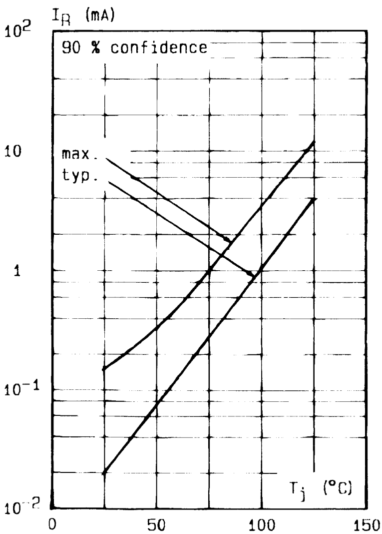


Fig.3 - Reverse current versus junction temperature.

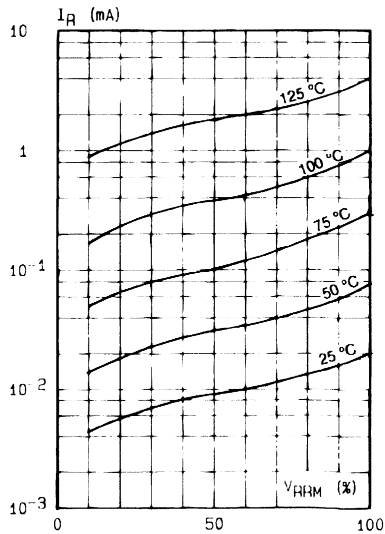


Fig.4 - Reverse current versus V_{RRM} in per cent.

SGS-THOMSON MICROELECTRONICS

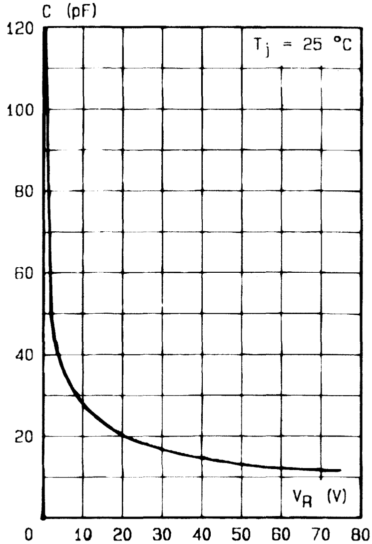


Fig.5 - Capacitance C versus reverse applied voltage V_R (typical values).

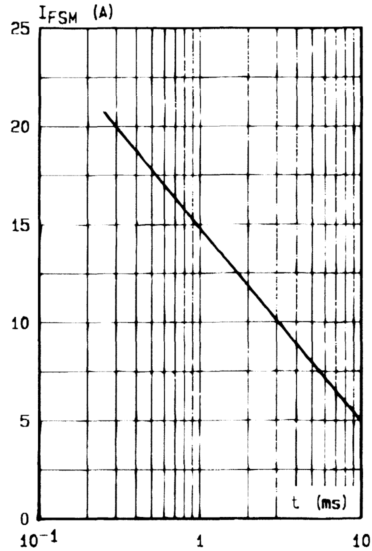


Fig.6 - Surge non repetitive forward current for a rectangular pulse with t ⩽ 10 ms.

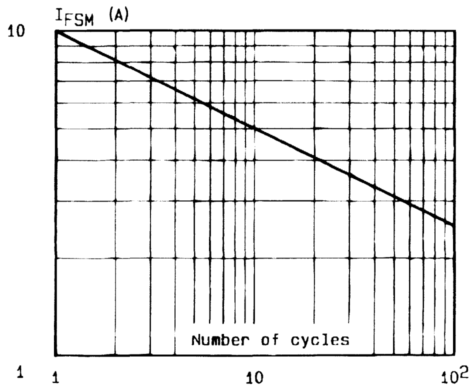
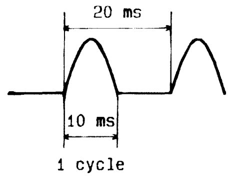
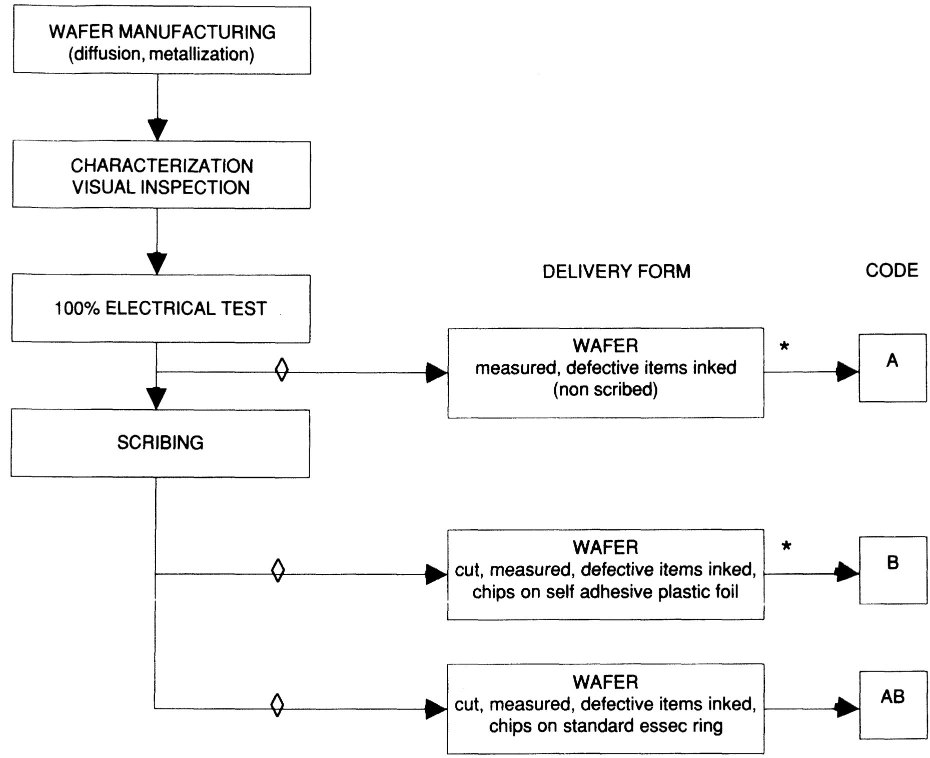


Fig.7 - Surge non repetitive forward current versus number of cycles.



DICE

POWER SCHOTTKY AND RECTIFIERS

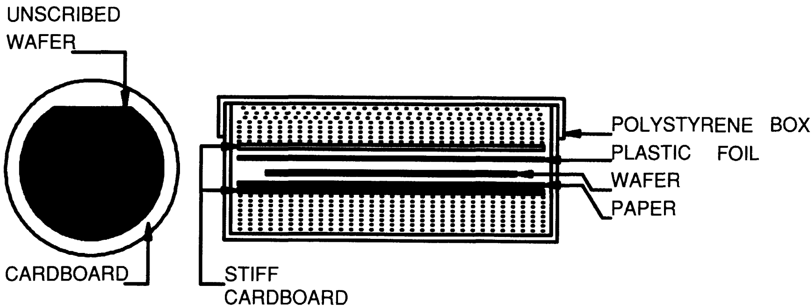


◊ QA INSPECTION * PREFERRED DELIVERY FORM

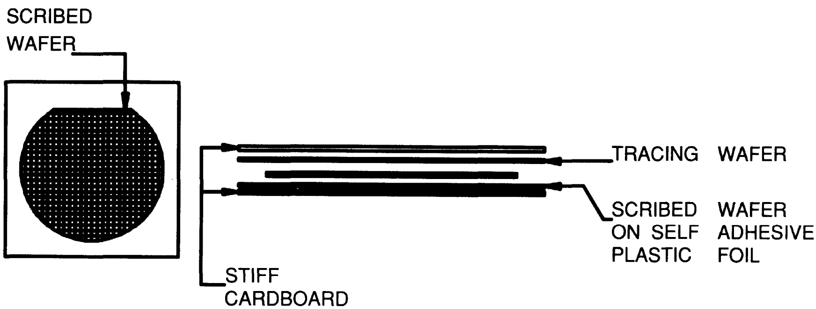
The chips are 100% tested or guaranteed with minimum yield.
The final quality control is done through sampling for all the batches.
The MIL STD 105D Standard defines the way of sampling.
AQL/Sampling guaranteed on 01/01/90 :

SUBGROUP	SAMPLING LEVEL	AQL	PARAMETERS
VISUAL (Mechanical dim. + General appearance)	II	0.65	QA019005
STATIC PARAMETERS AT 25°C (V_F / I_R)	II	0.65	V_F / I_R

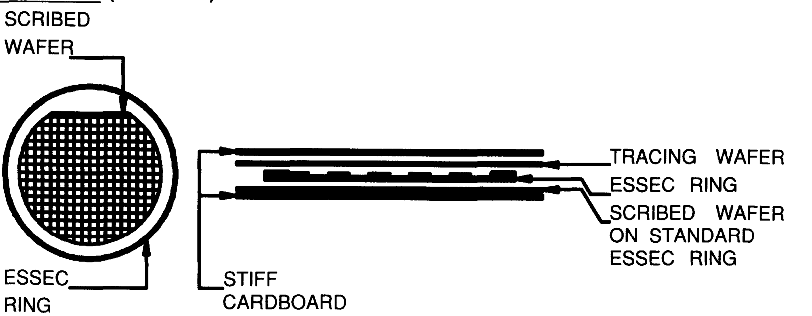
WAFER (A code)



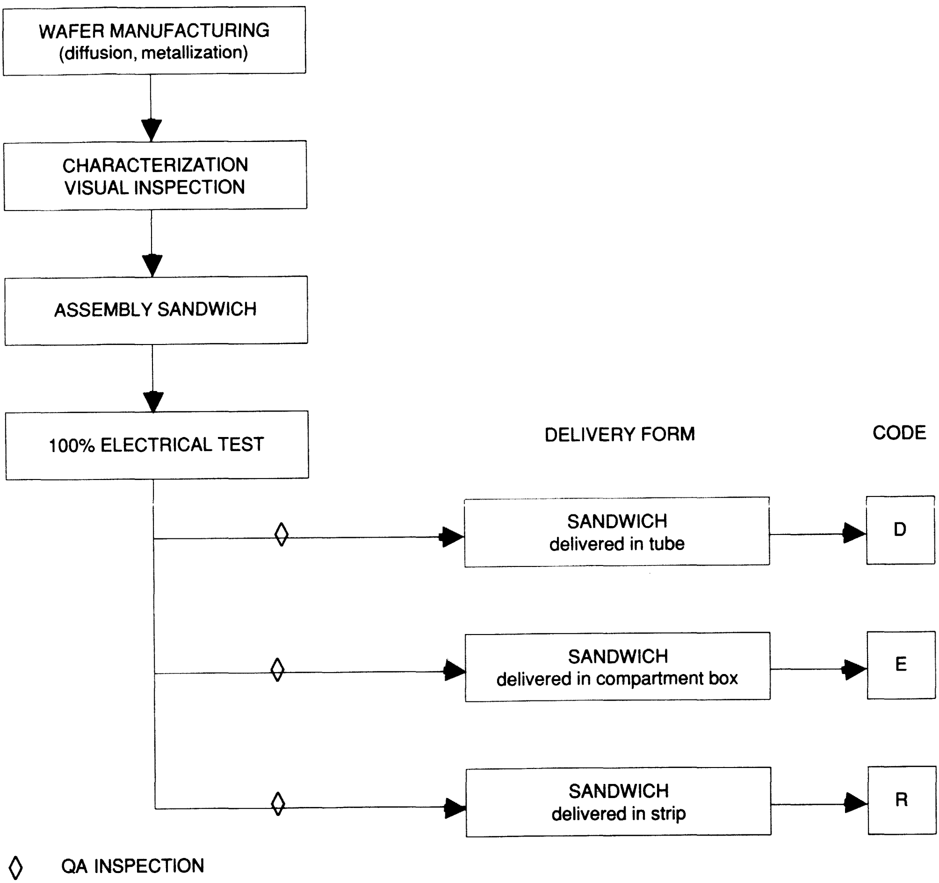
SAWED WAFER (B code)



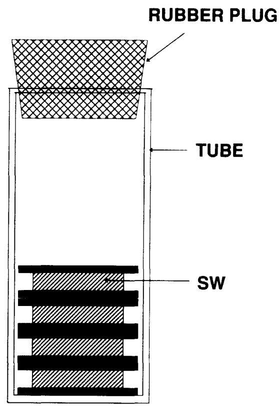
SAWED WAFER (AB code)



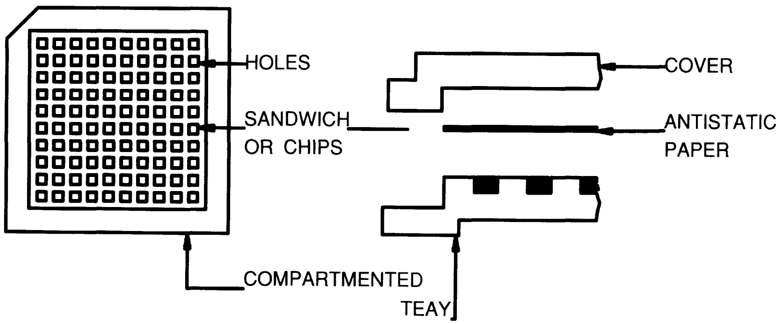
SANDWICH : RECTIFIERS ≤ 3A



SANDWICH IN TUBE (D code)



SANDWICH OR CHIPS IN COMPARTMENT BOX (V,E code)

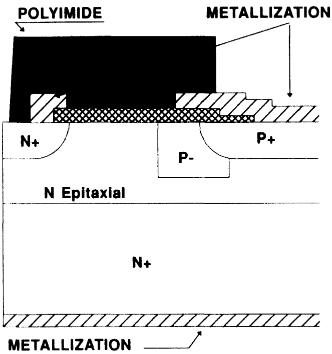


	A	B	AB	D	V	E
RECTIFIERS ≤ 3A	X	X	X	X	X	X
POWER RECTIFIERS	X	X	X			
POWER SCHOTTKY	X	X	X			

HIGH VOLTAGE PLANAR TECHNOLOGY

JBY239...

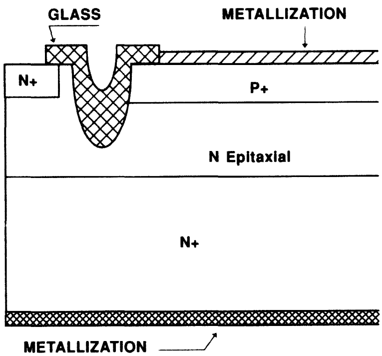
J1N...



MESA TECHNOLOGY

JBYT...

JR2A...

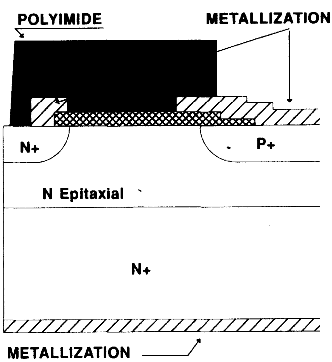


LOW VOLTAGE PLANAR TECHNOLOGY

JBYT...

JBYW...

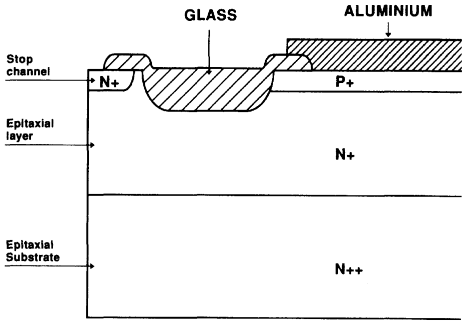
JBY...



HIGH VOLTAGE ULTRA FAST PLANAR TECHNOLOGY

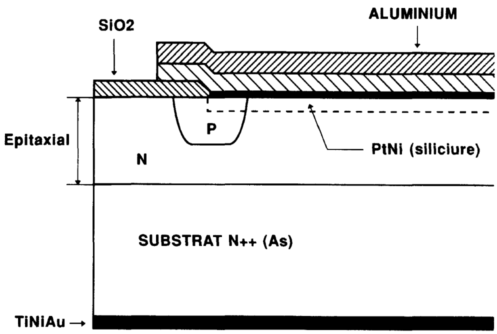
JTA...

JTB...



SCHOTTKY BARRIER TECHNOLOGY

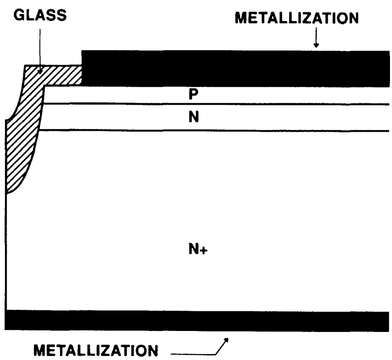
JTPS...



MESA TECHNOLOGY

JSBYW...

JBYT...

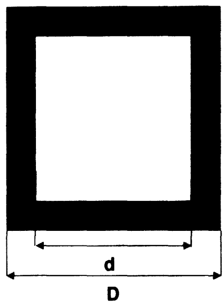


HIGH VOLTAGE STANDARD PLANAR TECHNOLOGY

TYPE	$I_{F(AV)}$	V_{RRM}	I_{FSM}	V_F @	I_F	I_R @ V_{RRM}	DICE			
			tp=10ms	Tj=25°C		Tj=25°C	Thick.	Dim.		Metal.
	(A)	(V)	(A)	max (V)	(A)	max (µA)	(µm)	D (mm)	d (mm)	
JBY239-40 JBY239-60 JBY239-80	10	400 600 800	140	1.45	30	5	400	2.8	2.06 1.70 1.70	10* & 2
JBYW88-40 JBYW88-60 JBYW88-80	12	400 600 800	230	1.25	35	5	400	3.3	2.56 2.28 2.28	2* & 10
J1N1188-40 J1N3768-60 J1N3768-80	40	400 600 800	700	1.5	110	20	400	5.3	4.28	2* & 10

* Preferred

TECHNO.	PLANAR HIGH VOLTAGE STANDARD	
PACKAGING	A	B
	x	x
DICE	MAX QTY PER WAFER	
2.8x2.8 3.3x3.3 5.3x5.3	895 635 235	
MIN QTY	Preferred : 2 WAFERS Not Preferred : 10 WAFERS	



White area : anode
Square die

EXAMPLE :

J BY239 - 40 - 10 B

JUNCTION (J)
TYPE (BY239)
VOLTAGE : 400V (40)
METALLIZATION (10)
DELIVERY FORM (B)

AVAILABLE METALLIZATION		
Ref.	FRONT SIDE	BACK SIDE
2	Al / Ni / Au	Ti / Ni / Au
10	Al	Ti / Ni / Au

HIGH VOLTAGE FAST MESA TECHNOLOGY

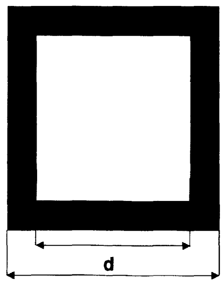
trr conditions (I_F=1A, V_R=30V, dI_F/dt=-15 A/µs)

TYPE	$I_{F(AV)}$	V_{RRM}	I_{FSM}	V_F @ I_F		I_R @ V_{RRM}	trr	DICE			
			tp=10ms	Tj=25°C		Tj=25°C		Thick.	Dim.		Metal.
	(A)	(V)	(A)	max (V)	(A)	max (µA)	(ns)	(µm)	D (mm)	d (mm)	
JBYT71-20 JBYT71-40 JBYT71-60 JBYT71-80	6	200 400 600 800	90	1.4	6	20	300	400	2.5	1.6	10* & 2
JBY233-20 JBY233-40 JBY233-60	8	200 400 600	100	1.5	8	20	150	400	2.8	1.9	10* & 2
JESM765-20 JESM765-40 JESM765-60 JESM765-80	10	200 400 600 800	120	1.4	10	20	300	400	2.8	1.9	10* & 2
JBYX62-20 JBYX62-40 JBYX62-60	12	200 400 600	150	1.4	12	25	200	400	3.3	2.2	2* & 10
JBYX64-20 JBYX64-40 JBYX64-60	30	200 400 600	300	1.4	30	50	200	400	4.8	3.7	2* & 10
JESM244-20 JESM244-40 JESM244-60	60	200 400 600	800	1.5	60	100	200	400	6.3	5.2	2* & 10

* Preferred

TECHNO.	MESA	
PACKAGING	A	B
	x	x
DICE	MAX QTY PER WAFER	
2.5 x2.5 2.8 x 2.8 3.3 x 3.3 4.8 x 4.8 6.3 x 6.3	1034 816 635 290 160	
MIN QTY	Preferred : 2 WAFERS Not Preferred : 10 WAFERS	

White area : anode
Square die



EXAMPLE : J BYT71 - 20 - 10 B

- J — JUNCTION
- BYT71 — TYPE
- 20 — VOLTAGE : 200V
- 10 — METALLIZATION
- B — DELIVERY FORM

AVAILABLE METALLIZATION		
Ref.	FRONT SIDE	BACK SIDE
2	Al / Ni / Au	Ti / Ni / Au
10	Al	Ti / Ni / Au

LOW VOLTAGE ULTRA FAST PLANAR TECHNOLOGY

trr=35ns conditions (I_F=1A, V_R=30V, dI_F/dt=-50 A/µs)

TYPE	$I_{F(AV)}$	V_{RRM}	I_{FSM}	V_F @	I_F	I_R @ V_{RRM}	DICE			
			tp=10ms	Tj=100°C		Tj=25°C	Thick.	Dim.		Metal.
	(A)	(V)	(A)	max (V)	(A)	max (µA)	(µm)	D (mm)	d (mm)	
JBYW100-10 JBYW100-15 JBYW100-20	1.5	100 150 200	70	0.85	1.5	10	400	1.6	0.85	10
JBYW98-10 JBYW98-15 JBYW98-20	3	100 150 200	70	0.85	3	10	400	2.0	1.25	10

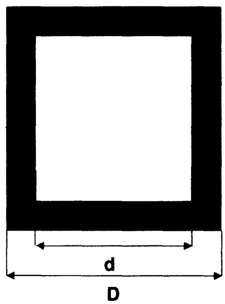
HIGH VOLTAGE ULTRA FAST PLANAR TECHNOLOGY

trr=55ns conditions (I_F=1A, V_R=30V, dI_F/dt=-15 A/µs)

TYPE	$I_{F(AV)}$	V_{RRM}	I_{FSM}	V_F @	I_F	I_R @ V_{RRM}	DICE			
			tp=10ms	Tj=100°C		Tj=25°C	Thick.	Dim.		Metal.
	(A)	(V)	(A)	max (V)	(A)	max (µA)	(µm)	D (mm)	d (mm)	
JBYT01-20 JBYT01-30 JBYT01-40	1	200 300 400	30	1.4	1	20	400	1.4	0.65	10
JBYT03-20 JBYT03-30 JBYT03-40	3	200 300 400	50	1.5	3	20	400	2.0	1.25	10

TECHNO.	PLANAR		
PACKAGING	A	AB	B
	x (p)	x	x (p)
DICE	MAX QTY PER WAFER		
1.4 x 1.4 1.6 x 1.6 2.0 x 2.0	3419 2587 1644		
MIN QTY	2 WAFERS		

(p) : Preferred



White area : anode
Square die

EXAMPLE :

J BYW100 - 10 - 10 B

- J — JUNCTION
- BYW100 — TYPE
- 10 — VOLTAGE : 100V
- 10 — METALLIZATION
- B — DELIVERY FORM

AVAILABLE METALLIZATION		
Ref.	FRONT SIDE	BACK SIDE
10	Al	Ti / Ni / Au

LOW VOLTAGE ULTRA FAST PLANAR TECHNOLOGY

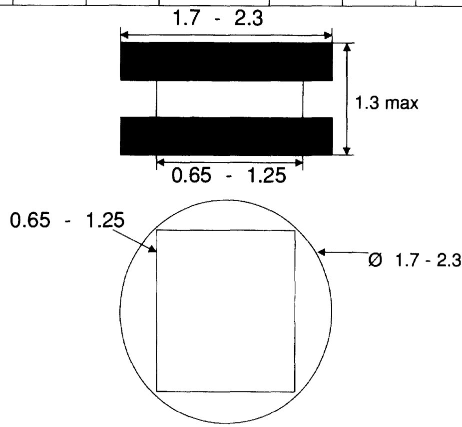
trr=35ns conditions (I_F=1A, V_R=30V, dI_F/dt=-50 A/µs)

TYPE	$I_{F(AV)}$	V_{RRM}	I_{FSM}	V_F @	I_F	I_R @ V_{RRM}	DICE		
			tp=10ms	Tj=100°C		Tj=25°C	Thick.	Ø	Metal.
	(A)	(V)	(A)	max (V)	(A)	max (µA)	(mm)	(mm)	
JSBYW100-10 JSBYW100-15 JSBYW100-20	1.5	100 150 200	70	0.85	1.5	10	1.3 max	1.7	8
JSBYW98-10 JSBYW98-15 JSBYW98-20	3	100 150 200	70	0.85	3	10	1.3 max	2.3	8

HIGH VOLTAGE ULTRA FAST PLANAR TECHNOLOGY

trr=55ns conditions (I_F=1A, V_R=30V, dI_F/dt=-15 A/µs)

TYPE	$I_{F(AV)}$	V_{RRM}	I_{FSM}	V_F @	I_F	I_R @ V_{RRM}	DICE		
			tp=10ms	Tj=100°C		Tj=25°C	Thick.	Ø	Metal.
	(A)	(V)	(A)	max (V)	(A)	max (µA)	(mm)	(mm)	
JSBYT01-20 JSBYT01-30 JSBYT01-40	1	200 300 400	30	1.4	1	20	1.3 max	1.7	8
JSBYT03-20 JSBYT03-30 JSBYT03-40	3	200 300 400	50	1.5	3	20	1.3 max	2.3	8



DIE Information Technology Dimension	MESA GLASS
PACKAGING E = Chip carrier D = Tube	 50 45
MIN QTY	500pcs

EXAMPLE :

JS BYW100 - 10 - 8 D

- JS: SANDWICH
- BYW100: TYPE
- 10: VOLTAGE : 100V
- 8: METALLIZATION
- D: DELIVERY FORM

AVAILABLE METALLIZATION		
Ref.	**FRONT SIDE**	**BACK SIDE**
8	Ag	Ag

LOW VOLTAGE ULTRA FAST PLANAR TECHNOLOGY

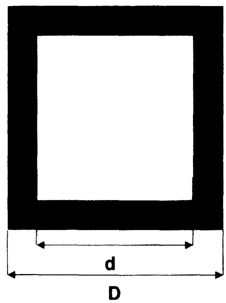
trr conditions (I_F=1A, V_R=30V, dI_F/dt=-50 A/µs)

TYPE	$I_{F(AV)}$	V_{RRM}	I_{FSM}	V_F @	I_F	I_R @ V_{RRM}	trr	DICE			
			tp=10ms	Tj=100°C		Tj=25°C		Thick.	Dim.		Metal.
	(A)	(V)	(A)	max (V)	(A)	max (µA)	(ns)	(µm)	D (mm)	d (mm)	
JBYW29-10 JBYW29-15 JBYW29-20	5	100 150 200	80	0.85	5	10	35	400	2.2	1.82	10* & 2
JBYW80-10 JBYW80-15 JBYW80-20	7	100 150 200	100	0.85	7	10	35	400	2.4	2.02	10* & 2
JBYW81-10 JBYW81-15 JBYW81-20	12	100 150 200	200	0.85	12	15	35	400	3.3	2.56	10* & 2
JBYW77-10 JBYW77-15 JBYW77-20	20	100 150 200	500	0.85	20	25	50	400	4.3	3.56	10* & 2
JBYW92-10 JBYW92-15 JBYW92-20	35	100 150 200	500	0.92	35	50	50	400	4.3	3.56	2* & 10
JBYW78-10 JBYW78-15 JBYW78-20	50	100 150 200	1000	0.85	50	50	60	400	6.3	5.56	10* & 2

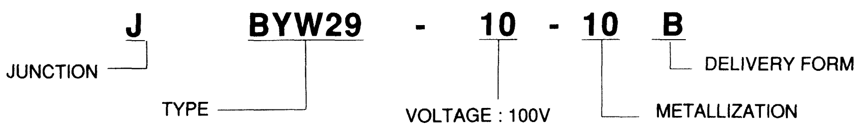
* Preferred

TECHNO.	LOW VOLTAGE PLANAR	
PACKAGING	A	B
	x	x
DICE	MAX QTY PER WAFER	
2.2 x2.2 2.4 x 2.4 3.3 x 3.3 4.3 x 4.3 6.3 x 6.3	1318 1104 583 336 144	
MIN QTY	Preferred : 2 WAFERS Not Preferred : 10 WAFERS	

White area : anode
Square die



EXAMPLE :



AVAILABLE METALLIZATION		
Ref.	FRONT SIDE	BACK SIDE
2	Al / Ni / Au	Ti / Ni / Au
10	Al	Ti / Ni / Au

LOW VOLTAGE ULTRA FAST PLANAR TECHNOLOGY

trr=35ns conditions (I_F=1A, V_R=30V, dI_F/dt=-50 A/µs) 2 x 8A

TYPE	$I_{F(AV)}$	V_{RRM}	I_{FSM}	V_F @ I_F		I_R @ V_{RRM}	DICE			
			tp=10ms	Tj=100°C		Tj=25°C	Thick.	Dim.		Metal.
	(A)	(V)	(A)	max (V)	(A)	max (µA)	(µm)	D1xD2 (mm)	d1xd2 (mm)	
JBYW51-10 JBYW51-15 JBYW51-20	8	100 150 200	100	0.89	8	15	400	2.8x4.0	2.42x1.67	10* & 2

* Preferred

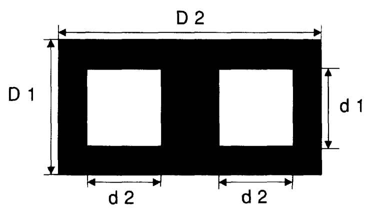
HIGH VOLTAGE ULTRA FAST PLANAR TECHNOLOGY

trr=75ns conditions (I_F=1A, V_R=30V, dI_F/dt=-15 A/µs)

TYPE	$I_{F(AV)}$	V_{RRM}	I_{FSM}	V_F @ I_F		I_R @ V_{RRM}	DICE			
			tp=10ms	Tj=100°C		Tj=25°C	Thick.	Dim.		Metal.
	(A)	(V)	(A)	max (V)	(A)	max (µA)	(µm)	D1xD2 (mm)	d1xd2 (mm)	
JBYT16-20 JBYT16-30 JBYT16-40	8	200 300 400	100	1.4	8	15	400	3.2x4.8	1.73x1.23	10* & 2

* Preferred

TECHNO.	LOW VOLTAGE PLANAR	
PACKAGING	A	B
	x	x
DICE	MAX QTY PER WAFER	
2.8 x4.0 4.8x3.2	558 406	
MIN QTY	Preferred : 2 WAFERS Not Preferred : 10 WAFERS	



White area : anode

EXAMPLE :

J BYW51 - 10 - 10 B

- J — JUNCTION
- BYW51 — TYPE
- 10 — VOLTAGE : 100V
- 10 — METALLIZATION
- B — DELIVERY FORM

AVAILABLE METALLIZATION		
Ref.	FRONT SIDE	BACK SIDE
2	Al / Ni / Au	Ti / Ni / Au
10	Al	Ti / Ni / Au

HIGH VOLTAGE ULTRA FAST PLANAR TECHNOLOGY

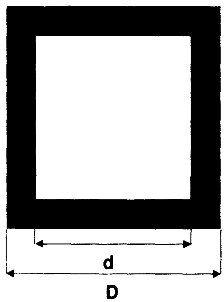
trr conditions (I_F=1A, V_R=30V, dI_F/dt=-15 A/µs)

TYPE	$I_{F(AV)}$	V_{RRM}	I_{FSM}	V_F @	I_F	I_R @ V_{RRM}	trr	DICE			
			tp=10ms	Tj=25°C		Tj=25°C		Thick.	Dim.		Metal.
	(A)	(V)	(A)	max (V)	(A)	max (µA)	(ns)	(µm)	D (mm)	d (mm)	
JBYT08-20 JBYT08-30 JBYT08-40	8	200 300 400	100	1.5	8	15	75	400	2.8	2.06	10* & 2
JBYT12-20 JBYT12-30 JBYT12-40	12	200 300 400	200	1.5	12	15	100	400	3.3	2.56	10* & 2
JBYT30-20 JBYT30-30 JBYT30-40	30	200 300 400	350	1.5	30	35	100	400	4.3	3.56	10* & 2
JBYT60-20 JBYT60-30 JBYT60-40	60	200 300 400	550	1.5	60	60	100	400	6.3	5.56	10* & 2

* Preferred

TECHNO.	LOW VOLTAGE PLANAR	
PACKAGING	A	B
	x	x
DICE	MAX QTY PER WAFER	
2.8 x2.8 3.3 x 3.3 4.3 x 4.3 6.3 x 6.3	823 583 336 144	
MIN QTY	Preferred : 2 WAFERS Not Preferred : 10 WAFERS	

White area : anode
Square die



EXAMPLE :

J **BYT08** - **20** - **10** **B**

- J — JUNCTION
- BYT08 — TYPE
- 20 — VOLTAGE : 200V
- 10 — METALLIZATION
- B — DELIVERY FORM

AVAILABLE METALLIZATION		
Ref.	**FRONT SIDE**	**BACK SIDE**
2	Al / Ni / Au	Ti / Ni / Au
10	Al	Ti / Ni / Au

HIGH VOLTAGE ULTRA FAST PLANAR TECHNOLOGY

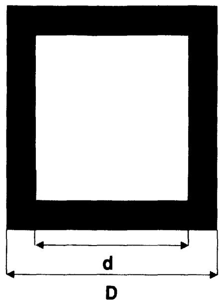
trr conditions (I_F=1A, V_R=30V, dI_F/dt=-15 A/µs)

TYPE	$I_{F(AV)}$	V_{RRM}	I_{FSM}	V_F @	I_F	I_R @ V_{RRM}	trr	DICE			
			tp=10ms	Tj=25°C		Tj=25°C		Thick.	Dim.		Metal.
	(A)	(V)	(A)	max (V)	(A)	max (µA)	(ns)	(µm)	D (mm)	d (mm)	
JBYT12-100	12	1000	75	1.9	12	50	155	280	2.8	1.96	10* & 2
JBYT30-100	30	1000	200	1.9	30	100	165	280	4.0	3.16	10* & 2
JBYT60-100	60	1000	400	1.9	60	100	170	280	5.3	4.46	10* & 2

* Preferred

TECHNO.	HIGH VOLTAGE ULTRA FAST PLANAR	
PACKAGING	A	B
	x	x
DICE	MIN QTY PER WAFER	
2.8x2.8	816	
4.0 x 4.0	390	
5.3 x 5.3	217	
MIN QTY	Preferred : 2 WAFERS Not Preferred : 10 WAFERS	

White area : anode
Square die



EXAMPLE :

J BYT12 - 100 - 10 B

- J — JUNCTION
- BYT12 — TYPE
- 100 — VOLTAGE : 1000V
- 10 — METALLIZATION
- B — DELIVERY FORM

AVAILABLE METALLIZATION		
Ref.	FRONT SIDE	BACK SIDE
2	Al / Ni / Au	Ti / Ni / Au
10	Al	Ti / Ni / Au

HIGH VOLTAGE ULTRA FAST PLANAR TECHNOLOGY

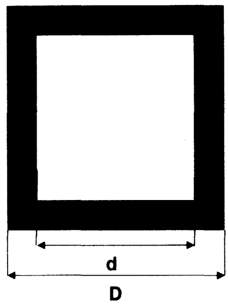
TURBOSWITCH "A"

V_{RRM} = 600V trr (1) 45ns

TYPE	$I_{F(AV)}$	V_F @	I_F	I_R (4)	trr (2)	I_{RM} (3)	DICE			
		Tj=125°C		Tj=125°C	Tj=25°C	Tj=125°C	Thick.	Dim.		Metal.
	(A)	max (V)	(A)	max (mA)	max (ns)	max (A)	(µm)	D (mm)	d (mm)	
JTA106	1	TBD	TBD	TBD	TBD	TBD	280	1.6	0.7	10
JTA206	2	TBD	TBD	TBD	TBD	TBD	280	1.9	1.0	
JTA506	5	1.5	5	2	50	3.0	280	2.2	1.3	
JTA806	8	1.5	8	4	52	5.5	280	2.8	1.9	
JTA1206	12	1.5	12	5	55	7.5	280	3.1	2.2	
JTA2006	20	1.5	20	6	60	12.5	280	3.7	2.8	
JTA3006	30	1.5	30	8	65	19.0	280	4.4	3.5	
JTA6006	60	1.5	60	12	80	38.0	280	5.9	5.0	

(1) I_F = 0.5A, I_P = 1A, I_{RR} = 0.25A
(2) I_F = 1A ,dI_F/td = -50 A/µs, V_R = 30 V
(3) dI_F/dt = 8 times $I_{F(AV)}$ A/µs, V_R = 400 V
(4) I_R @ 80 % of V_{RRM}
TBD = To Be Defined

TECHNO.	HIGH VOLTAGE PLANAR		
PACKAGING	A	AB	B
	x	x	x
DICE	MAX QTY PER WAFER		
1.6 x 1.6	2650		
1.9 x 1.9	1802		
2.2 x 2.2	1344		
2.8 x 2.8	816		
3.1 x 3.1	657		
3.7 x 3.7	460		
4.4 x 4.4	308		
5.9 x 5.9	175		
MIN QTY	2 WAFERS		



White area : anode
Square die

EXAMPLE :

J TA 12 06 - 10 A

- J — JUNCTION
- TA — TURBOSWITCH "A" SERIES
- 12 — AMP
- 06 — VOLTAGE : 600V
- 10 — METALLIZATION
- A — DELIVERY FORM

AVAILABLE METALLIZATION		
Ref.	FRONT SIDE	BACK SIDE
10	Al	Ti / Ni / Au

HIGH VOLTAGE ULTRA FAST PLANAR TECHNOLOGY

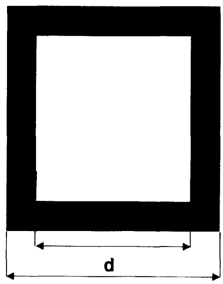
TURBOSWITCH "B"

V_{RRM} = 600V trr (1) 65ns

TYPE	$I_{F(AV)}$	V_F @	I_F	I_R (4)	trr (2)	I_{RM} (3)	DICE			
		Tj=125°C		Tj=125°C	Tj=25°C	Tj=125°C	Thick.	Dim.		Metal.
	(A)	max (V)	(A)	max (mA)	max (ns)	max (A)	(µm)	D (mm)	d (mm)	
JTB106	1	TBD	TBD	TBD	TBD	TBD	280	1.6	0.7	
JTB206	2	TBD	TBD	TBD	TBD	TBD	280	1.9	1.0	
JTB506	5	1.3	5	0.75	95	7.5	280	2.2	1.3	
JTB806	8	1.3	8	1.5	100	12	280	2.8	1.9	10
JTB1206	12	1.3	12	2	100	18	280	3.1	2.2	
JTB2006	20	1.3	20	3	105	30	280	3.7	2.8	
JTB3006	30	1.3	30	5	110	45	280	4.4	3.5	
JTB6006	60	1.3	60	9	115	90	280	5.9	5.0	

(1) I_F = 0.5A, I_P = 1A, I_{RR} = 0.25A
(2) I_F = 1A ,dI_F/td = -50 A/µs, V_R = 30 V
(3) dI_F/dt = 8 times $I_{F(AV)}$ A/µs, V_R = 400 V
(4) I_R @ 80 % of V_{RRM}
TBD = To Be Defined

TECHNO.	HIGH VOLTAGE PLANAR		
PACKAGING	A	AB	B
	x	x	x
DICE	MAX QTY PER WAFER		
1.6 x 1.6	2650		
1.9 x 1.9	1802		
2.2 x 2.2	1344		
2.8 x 2.8	816		
3.1 x 3.1	657		
3.7 x 3.7	460		
4.4 x 4.4	308		
5.9 x 5.9	175		
MIN QTY	2 WAFERS		



White area : anode
Square die

EXAMPLE :

J TB 12 06 - 10 A

- J : JUNCTION
- TB : TURBOSWITCH "B" SERIES
- 12 : AMP
- 06 : VOLTAGE : 600V
- 10 : METALLIZATION
- A : DELIVERY FORM

AVAILABLE METALLIZATION		
Ref.	FRONT SIDE	BACK SIDE
10	Al	Ti / Ni / Au

HIGH VOLTAGE ULTRA FAST PLANAR TECHNOLOGY

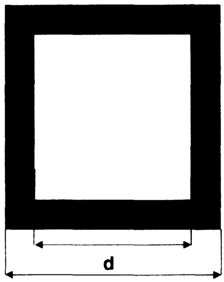
TURBOSWITCH "A"

V_{RRM} = 1200V trr (1) 65ns

TYPE	$I_{F(AV)}$	V_F @	I_F	I_R (4)	trr (2)	I_{RM} (3)	DICE			
		Tj=125°C		Tj=125°C	Tj=25°C	Tj=125°C	Thick.	Dim.		Metal.
	(A)	max (V)	(A)	max (mA)	max (ns)	max (A)	(µm)	D (mm)	d (mm)	
JTA112	1	TBD	TBD	TBD	TBD	TBD	280	1.6	0.7	
JTA212	2	TBD	TBD	TBD	TBD	TBD	280	1.9	1.0	
JTA512	5	2	5	2	95	7.5	280	2.2	1.3	
JTA812	8	2	8	4	100	12	280	2.8	1.9	10
JTA1212	12	2	12	5	100	18	280	3.1	2.2	
JTA1512	15	1.9	15	6	105	TBD	280	3.7	2.8	
JTA2512	25	1.9	25	8	110	TBD	280	4.4	3.5	
JTA4512	45	1.85	45	12	115	TBD	280	5.9	5.0	

(1) I_F = 0.5A, I_P = 1A, I_{RR} = 0.25A
(2) I_F = 1A ,dI_F/td = -50 A/µs, V_R = 30 V
(3) dI_F/dt = 8 times $I_{F(AV)}$ A/µs, V_R = 400 V
(4) I_R @ 80 % of V_{RRM}
TBD = To Be Defined

TECHNO.	HIGH VOLTAGE PLANAR		
PACKAGING	A	AB	B
	x	x	x
DICE	MAX QTY PER WAFER		
1.6 x 1.6	2650		
1.9 x 1.9	1802		
2.2 x 2.2	1344		
2.8 x 2.8	816		
3.1 x 3.1	657		
3.7 x 3.7	460		
4.4 x 4.4	308		
5.9 x 5.9	175		
MIN QTY	2 WAFERS		



White area : anode
Square die

EXAMPLE :

J TA 12 12 - 10 A

- J — JUNCTION
- TA — TURBOSWITCH "A" SERIES
- 12 — AMP
- 12 — VOLTAGE : 1200V
- 10 — METALLIZATION
- A — DELIVERY FORM

AVAILABLE METALLIZATION		
Ref.	FRONT SIDE	BACK SIDE
10	Al	Ti / Ni / Au

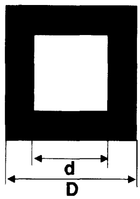
POWER SCHOTTKY

TYPE	$I_{F(AV)}$ (A)	V_{RRM} (V)	I_{FSM} tp=10ms (A)	V_F @ I_F Tj=125°C max (V)	I_F (A)	I_R @ V_{RRM} Tj=25°C max (µA)	DICE Thick. (µm)	DICE Dim. D (mm)	DICE Dim. d (mm)	DICE Metal.	WIRE Ø BY DIE (µm)
JTPS320 JTPS330 JTPS340	3	20 30 40	75	0.57	3	100	280	1.4	1.1	10	250
JTPS620 JTPS630 JTPS640	2x3	20 30 40	75	0.57	3	100	280	1.4	1.1	10	2x250
JTPS735 JTPS745	7.5	35 45	150	0.57	7.5	100	280	2	1.7	10	380
JTPS1535C JTPS1545C	2x7.5	35 45	150	0.57	7.5	100	280	2	1.7	10	2x380
JTPS1035 JTPS1045	10	35 45	150	0.57	10	100	280	2.4	2.1	10	500
JTPS2035C JTPS2045C	2x10	35 45	150	0.57	10	100	280	2.4	2.1	10	2x500

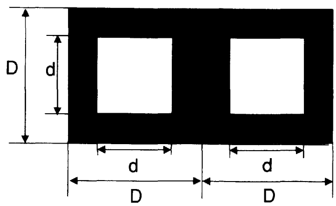
TECHNO.	SCHOTTKY		
PACKAGING	A	AB	B
	x	x	x
DICE	**MAX QTY PER WAFER**		
1.4 x 1.4	3404		
1.4 x 2.8	1670		
2.0 x 2.0	1634		
2.0 x4.0	794		
2.4 x 2.4	1132		
2.4 x 4.8	547		
MIN QTY	2 WAFERS		

SINGLE CHIP :

White area : anode
Square die



DUAL CHIP :



White area : anode

EXAMPLE : **J TPS 10 - 35 - 10 B**

- J — JUNCTION
- TPS — TYPE
- 10 — AMP
- 35 — VOLTAGE : 35V
- 10 — METALLIZATION
- B — DELIVERY FORM

AVAILABLE METALLIZATION		
Ref.	**FRONT SIDE**	**BACK SIDE**
10	Al	Ti / Ni / Au

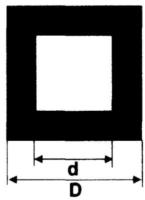
POWER SCHOTTKY

TYPE	$I_{F(AV)}$ (A)	V_{RRM} (V)	I_{FSM} tp=10ms (A)	V_F @ I_F Tj=125°C max (V)	I_F (A)	I_R @ V_{RRM} Tj=25°C max (µA)	DICE Thick. (µm)	DICE Dim. D (mm)	DICE Dim. d (mm)	DICE Metal.	WIRE Ø BY DIE (µm)
JTPS1535 JTPS1545	15	35 45	150	0.57	15	200	280	2.9	2.6	10	500
JTPS3035C JTPS3045C	2x15	35 45	150	0.57	15	200	280	(1)	(1)	10	2x500
JTPS3035 JTPS3045	30	35 45	400	0.63	30	500	280	3.8	3.4	10	2x500
JTPS6035C JTPS6045C	2x30	35 45	400	0.63	30	500	280	3.8	3.4	10	4x500
JTPS6035 JTPS6045	60	35 45	700	0.67	60	1mA	280	5.3	4.9	10	5x500
JTPS8035 JTPS8045	80	35 45	900	0.69	80	1mA	280	5.3	4.9	10	5x500
JTPS10100	10	100	200	0.70	10	150	280	2.9	2.6	10	500
JTPS40100	40	100	700	0.83	40	400	280	5.3	4.9	10	5x500

(1) : Special layout : consult us.

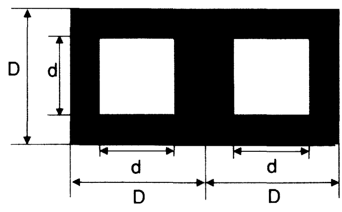
SINGLE CHIP :

White area : anode
Square die



TECHNO.	SCHOTTKY		
PACKAGING	A	AB	B
	x	x	x
DICE	MAX QTY PER WAFER		
2.9 x 2.9 4.4 x 3.9 3.8 x 3.8 3.8 x 7.6 5.3 x 5.3	759 362 432 208 216		
MIN QTY	2 WAFERS		

DUAL CHIP :



White area : anode

EXAMPLE : **J** **TPS** **30** - **35** - **10** **B**

- J — JUNCTION
- TPS — TYPE
- 30 — AMP
- 35 — VOLTAGE : 35V
- 10 — METALLIZATION
- B — DELIVERY FORM

AVAILABLE METALLIZATION		
Ref.	FRONT SIDE	BACK SIDE
10	Al	Ti / Ni / Au

APPLICATION NOTES

SERIES OPERATION OF FAST RECTIFIERS

B. Rivet

The use of several rectifiers connected in series is necessary to obtain voltage ratings beyond the capabilities of single diodes and also when some special requirement, such as very low switching losses, requires the implementation of several low voltage ultra fast diodes.

Rectifiers connected in series tend to unequally share the voltage across the string in blocking conditions because of the variations in reverse characteristics : leakage currents and turn-off switching parameters.

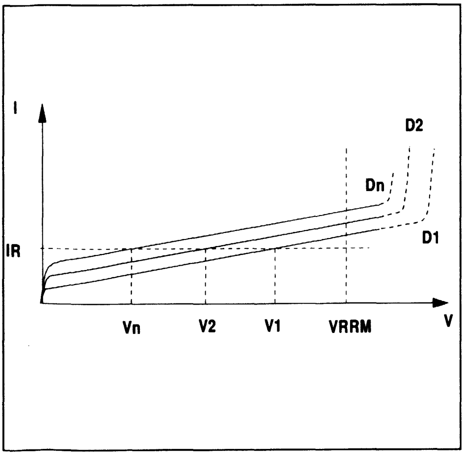
To ensure that each diode operates within its voltage rating, it is generally necessary to add a voltage sharing network.

This paper gives the rules of calculation of this auxiliary network and shows how this circuit could be optimized : reduction of power dissipation and cost.

I - STEADY STATE VOLTAGE SHARING :

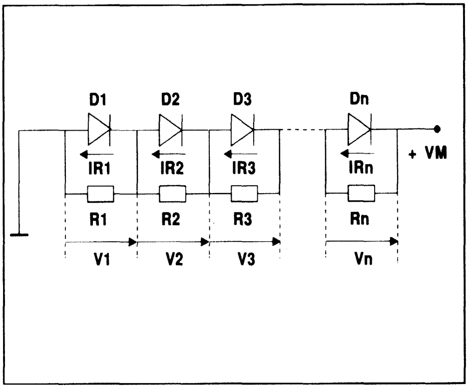
The difference in blocking characteristics results in unequal steady state voltage (fig.1).

Figure 1 : Dispersion of diodes reverse characteristics. The reverse current through the string D1, D2, ...Dn is I_R and the voltages across the diodes are respectively V1,V2;....Vn.



In order to equalize the voltage, a resistor is connected across each diode (Fig.2).

Figure 2 : Use of shunt resistors for steady state voltage sharing.



1) Calculation of sharing resistors :

The calculation of these resistances is based on the worst case situation.
The maximum imbalance in blocking voltage when n diodes are connected in series occurs when (n-1) diodes have the maximum leakage current and one diode D1 has the lowest possible leakage current.
In this case D1 will support the highest voltage V1, and this tendency is aggravated by the assumption that the corresponding resistor R1 is at the upper limit of its tolerance (a), while all the others are at the lowest limit so,

$$R1 = R(1+a)$$

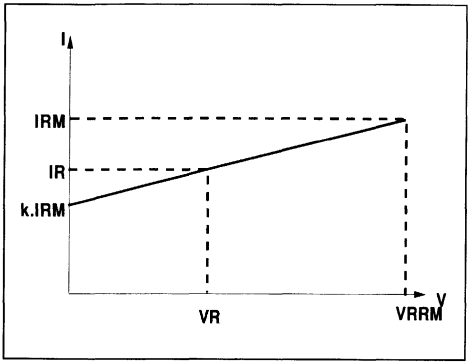
$$R2 = R3 = ... Rn = R$$

In order to calculate the current in the string we approximate the reverse characteristic with a straight line. We define the slope by the coefficient k according to fig.3.

Figure 3 : Reverse characteristic model of a fast rectifier.

$$I_R + I_{RM}(T_j).[k+\frac{V_R(1-k)}{V_{RRM}}]$$

With k = 0.8



The leakage current I_{RM} of diodes D2 ... Dn under the blocking voltage V2 ... Vn is :

$$I_{R2} = I_{R3} = ...I_{Rn} = I_{RM}[k+\frac{V_n(1-k)}{V_{RRM}}]$$

where IRM is the maximum leakage current at VRRM (maximum voltage specified for this diode) and at the operating junction temperature. For D1 the maximum reverse current at V_{RRM} is :

$$I_{RM} - \Delta I_R$$

In these conditions the leakage current of diode D1 is :

$$I_{R1} = (I_{RM} - \Delta I_R)(k+\frac{V_1(1-k)}{V_{RRM}})$$

Taking into account all these parameters, the voltage V1 across the diode D1 is given by the relation :

$$V_1 = \frac{V_M(1+a)(V_{RRM}+(1-k)I_{RM}R)+k(n-1)(1+a)\Delta I_R RV_{RRM}}{RI_{RM}n(1-k)(1+a)+V_{RRM}(n+a)-R\Delta I_R(1-k)(1+a)(n-1)} \quad (1)$$

The resistance R must be chosen to limit the voltage V1 under the maximum value V_{RRM} specified for this rectifier. Thus :

$$R < \frac{V_{RRM}(V_{RRM}(n+a)-V_M(1+a))}{\Delta I_R V_{RRM}(1+a)(n-1)-I_{RM}(1-k)(1+a)(nV_{RRM}-V_M)} \quad (2)$$

For today's fast rectifiers we can use k=0.8.

2) I_{RM} evaluation

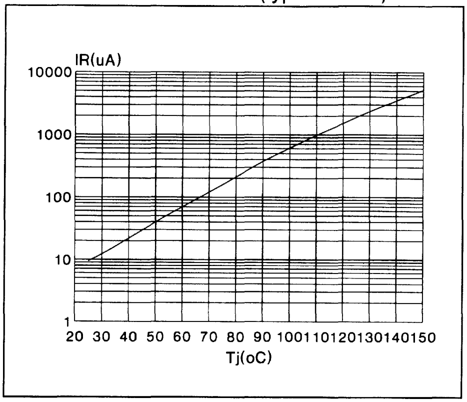
I_{RM} is the maximum leakage current at the maximum reverse voltage V_{RRM}. This current depends on the junction temperature (Fig.4).

Generally, the manufacturer specifies a maximum value I_{RM} at V_{RRM} at Tj=100°C, in the data sheet.

When we know the operating junction temperature (Tj), it is possible to calculate I_{RM} by using the following relation :

$$I_{RM}(T_j) = I_{RM}(100°C)\exp[-0.054(100-T_j)]$$

Figure 4 : Reverse leakage current versus junction temperature.
Example :
BYT 261-1000 (typical value)



3) Δ I_R estimation

In fact ΔI_R is the sum of ΔI_{R1} and ΔI_{R2}

- ΔI_{R1} is due to the leakage current dispersion of the rectifiers in the same conditions of voltage and temperature.

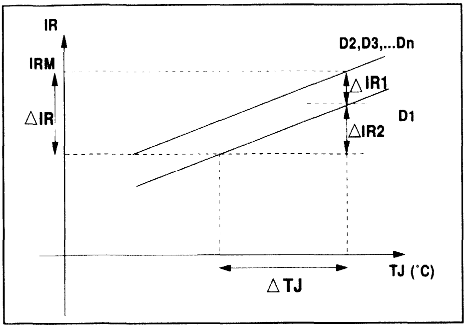
For the fast rectifiers available today on the market the dispersion of the reverse current at $V_R = V_{RRM}$ and Tj = 100°C is about :

$$\Delta I_{R1} = 0.6\ I_{RM}$$

This dispersion varies from one batch to another.

- ΔI_{R2} is due to the difference between the junction temperatures of each device (ΔTj).

Figure 5 : The variation ΔI_R is the dispersion of I_R at max operation junction temperature (ΔI_{R1}) plus the variation due to Tj (ΔI_{R2})



The junction temperature is given by the thermal resistance junction to ambient Rth (j-a) and the power dissipation due to the conduction losses (PC) and the switching losses (PS).

PC is linked to the forward voltage (V_F) and PS is linked to the reverse recovery charge (Q_{RR}). So the variation of the junction temperature is :

$$\Delta Tj = \Delta Rth\,(PC+PS) + Rth\,\left(\frac{\Delta V_F}{V_F}PC + \frac{\Delta Q_{RR}}{Q_{RR}}PS\right)$$

where ΔV_F is the dispersion of the forward voltage and Q_{RR} the dispersion of the reverse recovery charge.

For series operation, it is recommended to use pieces coming from the same lot, so the dispersion on the parameters V_F, Q_{RR} and Rth is minimized;

In most cases the evaluation of ΔTj is difficult but, from experience, it is generally lower than 10°C.

We propose to take a safety margin and to use :

$$\Delta I_R = 0.85\ I_{RM}$$

4) Simplified formula

The relation (2) is often used by using the following approximations

k = 1 : supposing the reverse current I_{RM} constant, whatever the blocking voltage across the diode.

a = 0 : Neglecting the effect of the tolerance of resistors. thus :

$$R < \frac{n\,V_{RRM} - V_M}{(n-1)\Delta I_R}$$

As for the ΔI_R the worst case is taken into account.

$\Delta I_R = I_R$ with $I_R = I_R$ max at Tj max specified (100°C)

$$R < \frac{n\,V_{RRM} - V_M}{(n-1)\,I_R}$$

This formula is "pessimistic" and induces a low resistance and then a high power dissipation.

5) Example

- Given

Maximum blocking voltage : V_M = 2500V
Part number used : BYT12PI-1000
Power dissipation per diode : P = 7W
Case temperature : Tcase = 52°C

- Rectifier specification :

V_{RRM} = 1000V
I_R (Max at Tj=100°C) = 2.5mA
Rth j-c = 4°C/W

- Problem :

Calculation of sharing resistors for 3 diodes in series.

- Solutions :

a) Simplified method :

$$R < \frac{n\,V_{RRM} - V_M}{(n-1)\,I_R}$$

With n = 3
V_{RRM} = 1000V
V_M = 2500V
I_R = 2.5mA
Thus Rmin = 100 kOhms

Power dissipation per resistor : 3.45 W ! (with duty cycle δ = .5)

b) Calculation with relation (2) :

$$R < \frac{V_{RRM}\,(V_{RRM}\,(n+a) - V_M\,(1+a))}{\Delta I_R\,V_{RRM}\,(1+a)(n-1) - I_{RM}\,(1-k)(1+a)(n V_{RRM} - V_M)}$$

General data for fast rectifiers :

$\Delta I_R = 0.85\ I_{RM}$
k = 0.8

Intermediate calculations :

Tj = P.Rth j-c + Tcase = 80°C

$I_{RM} = I_{RM}(80°C)$
$= I_{RM}(100°C) \exp[-0.0054(100-80)]$
$= 0.85mA$

$\Delta I_{RM} = 0.72mA$

Assuming we use resistors with 5% of tolerance, then a = .10
Let : Rmin = 220 kOhms

Power dissipation per resistor=1.58W(with δ=.5)

6) Question : is it possible to remove the sharing resistors ?

With the relation (1) we can find the value of V1 when the value of R tends to be infinite. Then we calculate the condition to have

$$V1 < V_{RRM}$$

Solving we find

$$\frac{\Delta I_R}{I_{RM}} < \frac{(1-k)\,(n\,V_{RRM} - V_M)}{V_{RRM}\,(n-1)}$$

In the previous example this condition should be

$$\frac{\Delta I_R}{I_{RM}} = 5\%$$

It is obvious that this condition is generally very difficult to meet without hard selection.

II - TRANSIENT VOLTAGE SHARING

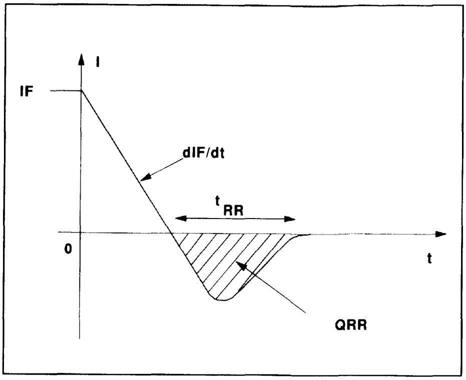
1) The problem

When a diode is switched from the forward conduction to the reverse blocking state, a reverse current flows through the device during the reverse recovery time trr.

After this delay all the charges (minority carriers) stored in the junction are eliminated and the diode turns off. The time integral of the reverse recovery current is called reverse recovery charge (Q_{RR}).

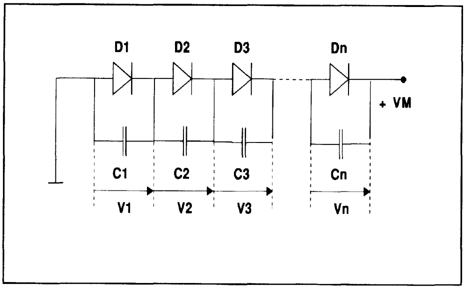
Fig.6 defines the reverse recovery parameters. When a string of n diodes in series switches off, the diode which has the lowest recovery charge turns off first and supports an important proportion of the total voltage VM. Its maximum reverse voltage V_{RRM} could be reached or exceeded.

Figure 6 : Reverse recovery current waveform.



Voltage sharing during the reverse recovery phase is achieved by using a shunt capacitor string connected across the diodes (Fig.7).

Figure 7 : Use of shunt capacitors for transient voltage sharing.



2) Calculation of sharing capacitors

The calculation of capacitance C is also based on the worst case situation.

We assume that (n-1) diodes D2, D3 ... Dn with a reverse recovery charge $Q_{RR} + \Delta Q_{RR}$, and one diode D1 with lowest value Q_{RR}.

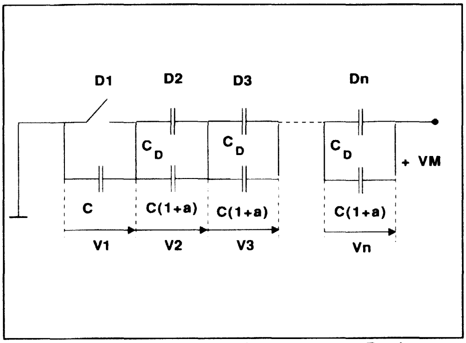
We suppose also that the corresponding capacitor C1 is at the lowest limit of tolerance (a) while the others are at the upper limit
so : C1 = C
C2 = C3 = ... = Cn = C(1+a)
When all the stored charges of diode D1 have been evacuated, the charge remaining in the other diodes is ΔQ_{RR}.
At this time the voltage across D1 is V1 and the voltage across the other diodes of the string is :

$$V_2 = V_3 = \ldots V_n = \frac{V_M - V_1}{(n-1)}$$

So these diodes can be assimilated to a capacitor

$$C_D = \frac{\Delta Q_{RR}}{V_n} = \frac{\Delta Q_{RR}(n-1)}{V_M - V_1}$$

Figure 8 : Equivalent diagram when D1 switches off. Diodes D2, D3, ...Dn are equivalent to a capacitor CD = $\Delta Q_{RR}(n-1) / (VM-V1)$



In these conditions the voltage across D1 is :

$$V_1 = \frac{\Delta Q_{RR}(n-1) + C\,V_M(1+a)}{C(n+a)}$$

In order to limit the voltage across D1 under the specified value V_{RRM} we calculate C by solving thus : $V1 < V_{RRM}$

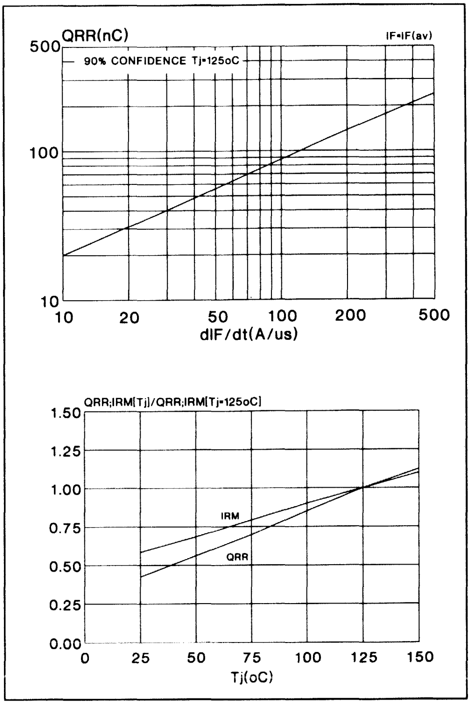
$$C > \frac{(n-1)\Delta Q_{RR}}{(n+a)V_{RRM} - V_M(1+a)}$$

3) Q_{RR} and ΔQ_{RR} consideration

For a given diode the reverse recovery charge QRR is a function of the circuit commutation conditions such as the magnitude of forward current (I_F), the rate of decay of this current (dIF/dt) and the junction temperature.

Typical values of QRR are given in the data sheet of each part number (Fig.9).

Figure 9 : Example of reverse recovery charge specification. (case of BYW 51)



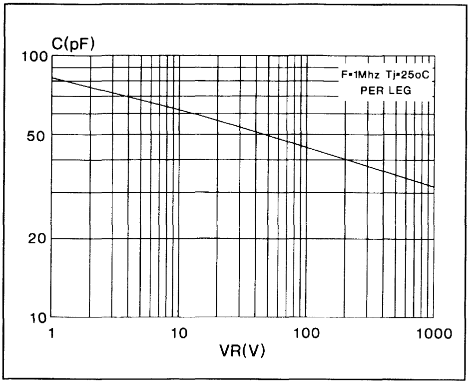
For fast rectifiers coming from the same lot the dispersion of this parameter is low and we can use, with a good safety margin :

$$\Delta Q_{RR} = .30\ Q_{RR}$$

4) Is it possible to remove the equalizing capacitor ?

In the blocking state, diodes have a junction capacitance. For a given diode this capacitance decreases with an increase in the applied reverse voltage according to Fig.10.

Figure 10 : Junction capacitance versus reverse voltage (example : BYT261PIV-1000)

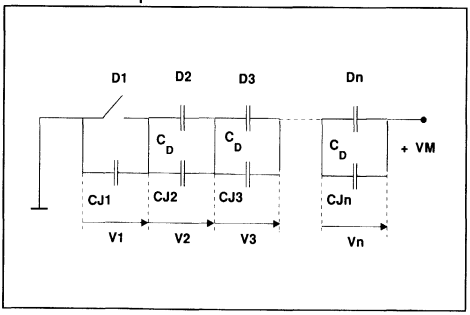


When D1 has evacuated all its stored charge, it is equivalent to a capacitor CJ1 and the other diodes D2, D3 ... Dn are equivalent to a capacitor which is the sum of the junction capacitance CJ2, CJ3 ... CJn and the capacitance

$$C_D = \frac{\Delta Q_{RR}\,(n-1)}{V_M - V_1}$$

Fig.11 shows the equivalent circuit

Figure 11 : Equivalent diagram when D1 switches off in case of low QRR : The junction capacitances CJ1, CJ2; ....CJn, play the role of sharing capacitors.



In the worst case CJ1 is the junction capacitor of D1 at the maximum voltage V_{RRM}
Putting

$$CJ1 = CJ \text{ at } V_{RRM}$$

$$C_{J2} = C_{J3} \ldots C_{Jn} = C_J \text{ at } \frac{V_M - V_{RRM}}{n-1}$$

We have

$$V_1 = \frac{\Delta Q_{RR}\,(n-1) + V_M\, C_{Jn}}{C_{J1}\,(n+1) + C_{Jn}}$$

Auxiliary capacitors are not necessary if

$$V1 < V_{RRM}$$

or $$\Delta Q_{RR} < \frac{V_{RRM}\,[C_{J1}\,(n-1) + C_{Jn}] - V_M\, C_{Jn}}{n-1}$$

Generally, the value of the junction capacitance at the operating voltage is very close to the value at V_{RRM} (CJ1) so we can write

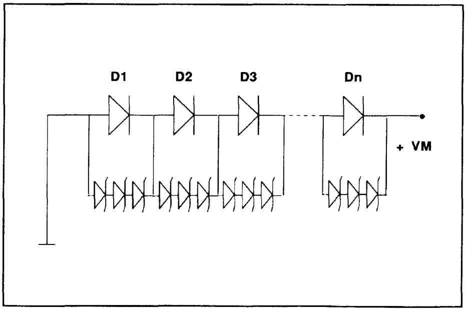
$$\Delta Q_{RR} < \frac{C_{J1}\,(n\,V_{RRM} - V_M)}{n-1}$$

This condition can be met by using very fast rectifiers in applications where the dIF/dt is low (like in some resonant converters or flyback converters) and consequently low Q_{RR}.

III - EQUALIZATION BY TRANSIL DIODES

TRANSIL diodes are avalanche diodes designed for operation in breakdown characteristic and they are used as clamping devices in a wide field of applications. To limit the voltage across the rectifiers of a string below the maximum value, TRANSIL diodes can be used according to diagram Fig.12.

Figure 12 : Voltage sharing by TRANSIL diodes.



TRANSIL operates as a voltage limiter at steady state, during the switching phase, and also in case of external voltage transients.

1) Steady state

In the blocking condition, the TRANSILS connected across the diode D1 (which has the lowest reverse current) operate in the breakdown characteristic. The current through these TRANSILS is I_R and the power dissipation is :

$$V_{BR}.\Delta I_R.\delta \quad (\delta = \text{duty cycle})$$

Where V_{BR} is the maximum breakdown voltage of TRANSILS. In general this extra power dissipation is lower than in the case of sharing by resistors and TRANSILS in axial packages can be used.

2) Switching phase

When the fastest diodes of the string switches off, the TRANSILS across it operate in breakdown characteristic, and the reverse recovery current of the other diodes flows through these TRANSILS. The charge remaining in the string at this moment is :

$$(n-1)\,\Delta Q_{RR}$$

and we can estimate the maximum energy in the TRANSILS with

$$E < 1/2(n-1)\,.\,\Delta Q_{RR}\,.\,V_{BR}$$

This relation does not take into account the losses due to the capacitive current through the string.

3) Example

GIVEN :
Use of a 3-BYT12PI-1000 for $V_M = 2500V$
Operating conditions :
$Tj = 100°C$
$di/dt = 20A/\mu s$
$F = 25$ kHz
$\delta = .5$
RECTIFIER SPECIFICATION :
$V_{RRM} = 1000V$
I_{RM} at $V_{RRM} = 2.5mA$ at $Tj = 100°C$
$Q_{RR} = .5\mu C$ (in operating conditions)

PROBLEM :
3 TRANSIL diodes are connected in series across each rectifier. What is the suitable part number ?

DESIGN STEPS :
- V_{BR} calculation :

$$V_{BR}\,\text{min} > \frac{2500}{3x3} = 277\,V$$

$$V_{BR}\,\text{max} < \frac{1000}{3} = 333\,V$$

- Power dissipation in steady state :
$P1 < I_R\,.\,V_{BR}\,\text{max}\,.\delta$

with $I_R = .85 \times 2.5 \approx 2mA$
$V_{BR}max = 330V$
$P1 < 330mW$

- Power dissipation in switching phase :
$P2 = E.F < 1/2\,(n-1)\,Q_{RR}\,.\,V_{BR}max\,.\,F$
with $\Delta Q_{RR} = .5 \times .3 = .15\mu C$
$F = 25$ kHz and $n = 3$
then $P2 < 1.2W$

- Max total power dissipation P1 + P2 1.530 W

Solution : 1.5 KE series can be used (1.5KE300CP)

CONCLUSION

When using several fast rectifiers in series it is necessary to make sure that no diode will be subjected to continuous or transient voltages in excess of their ratings.
In most cases, this is achieved by using sharing networks across each diode. It is important to optimize this circuit in order to reduce power consumption and to save space.
Parallel resistors can be optimized by using the model of the fast recovery diodes reverse characteristic proposed in this paper. Then, thanks to a good knowledge of the reverse current and its variation in the operating conditions (possibly by measurement and selection), it is possible to implement a resistor with a value as high as possible.
Parallel capacitors also have to be reduced as much as possible with the knowledge the switching characteristics of the string in the actual conditions. The reverse recovery charge (Q_{RR}) is not always accessible with the datasheet and a measurement is often necessary.
In certain applications using ultra fast diodes of the same lot, where the Q_{RR}, and therefore the ΔQ_{RR} are very low, the sharing capacitor can be reduced to zero.
In systems where there is a risk of external overvoltages or where there are transient states not well known, TRANSIL diodes are a solution to the sharing voltage problem insofar as the total power dissipation of the TRANSIL string remains compatible with the existing packages for these devices.

References :

1. B.M. BIRD and K.G. KING :
"An introduction to Power Electronics"
2. J.M. PETER - SGS-THOMSON Microelectronics : "Analysis and optimisation of high frequency Power rectification"

SGS-THOMSON
MICROELECTRONICS

APPLICATION NOTE

SURFACE MOUNT DEVICE SOD6/SOD15 PACKAGING AND SOLDERING METHOD

P. Rault

PACKAGING :

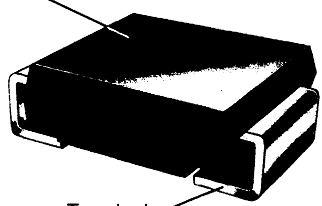
These devices are delivered in standard embossed 12 & 16 mm tapes and reels (E.I.A. 481A standards).

This packaging minimizes handling and is fully compatible with state-of-the-art assembly technology for hybrid circuits and printed circuit boards.

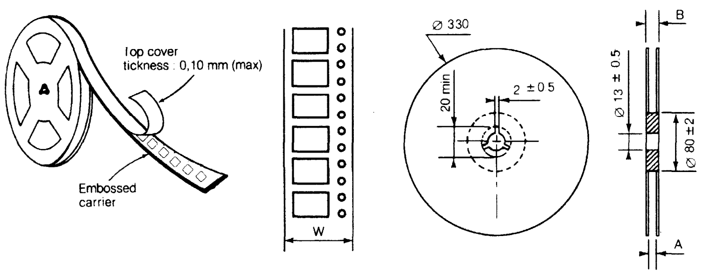
The diodes are pre-orientated and the tape can be used directly on automatic pick and place equipment.

Picking up is easy thanks to the rectangular parallelepiped shape. In particular, a vacuum chuck is very efficient due to the flatness of the upper side of the components, thus avoiding air leakage.

- Lead frame: copper alloy.
- Top connection: copper alloy.
- Die attach: Soft solder alloy.
- Encapsulation: high performance epoxy compound UL-94.
- Lead coating: Sn-Pb plating (10% Pb typical).
- Lead bending: suitable with surface mounting techniques (wave or re-flow)



Case	Quantity per reel	Film width	Reel dimensions	
			A	B
SOD 6	2500	12	12.4 ± 2	18.4 ± 2
SOD 15	2500	16	16.4 ± 2	22.4 ± 2



Note : Polarized devices have cathode lead oriented towards the perforated side of the film

SOLDERING METHODS :

SOD 6 & SOD 15 devices are suitable for mounting on various substrates (thick or thin films) and printed circuit boards.

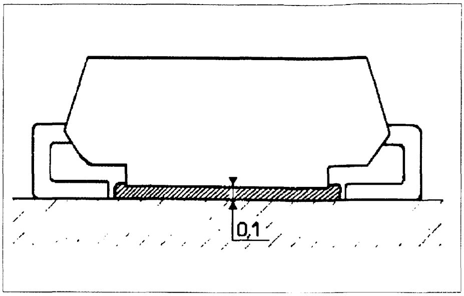
They are compatible with current soldering techniques.

1) WAVE SOLDERING :

This method is employed when surface mount components are used with conventional through-hole components on the same board. The through-hole mounting components are inserted from the top, and the SMD are attached to the under-side, using a suitable adhesive.

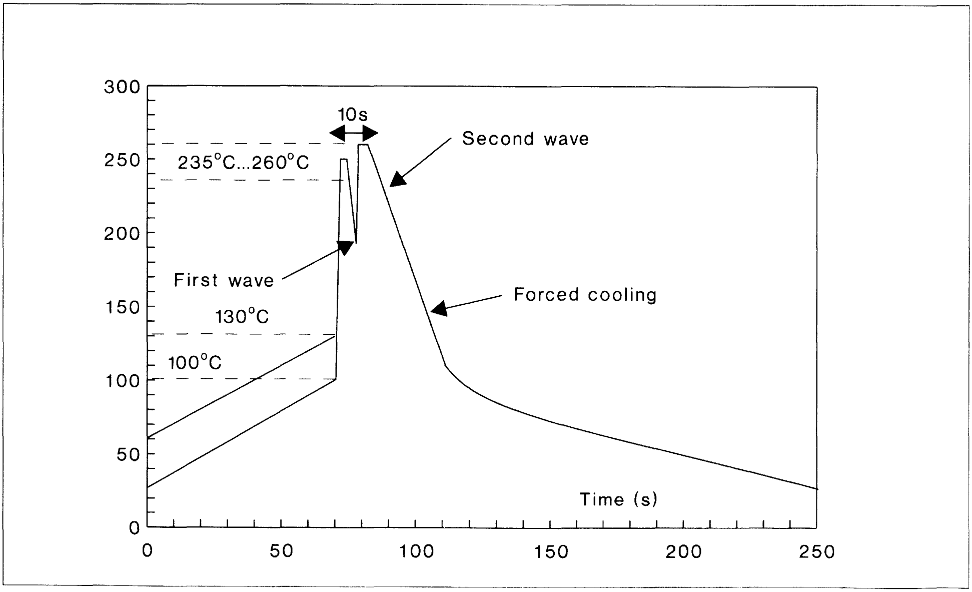
The lower part of the package allows a controlled thickness of the glue and ensures efficient adhesion.

The height (2.6 mm) provides a very low "screen effect".



Recommendations :
- The assembly should be pre-heated to about 100°C to minimize the thermal shock.
- The maximum solder temperature is 260°C and the exposure time should not exceed 10 seconds.
- A dual wave process gives the best results.

Figure 1: Temperature -Time-Profile Double-Wave Soldering (Lead temperature)



Note : According to CECC Standard Method SMD 50301188 - Oct 89

2) REFLOW SOLDERING :

The epoxy resin specially designed for the molding of these components is suitable for all reflow soldering techniques used today :

- vapour phase
- infrared tunnel
- pulse-heat
- etc...

According to these methods, components are first positioned on the substrate and kept in place thanks to the adhesive properties of the solder paste applied to the soldering areas (footprints).

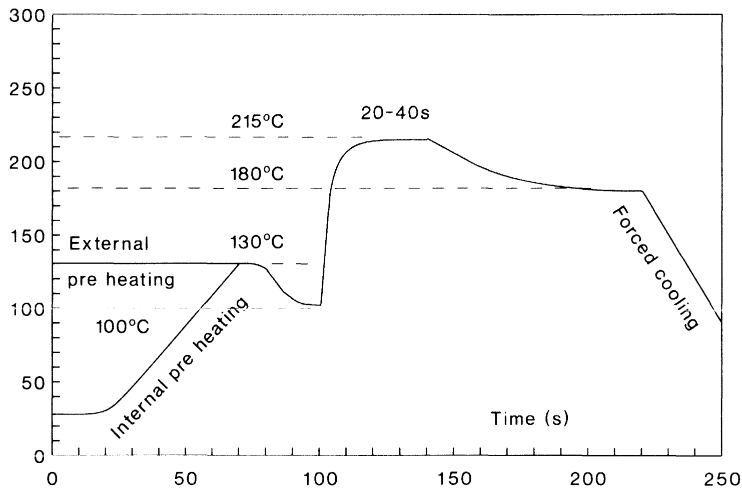
The wide surfaces of contact of SOD 6 & SOD 15 packages ensure a good stability of the assembly before reflowing process.

Recommendations :

The soldering temperature changes according to the method used. Pre-heating up to 100°C is required. The temperature during reflow should be limited in order to keep the plastic body of the device below 260°C. At this temperature, exposure time should be less than 10 seconds.

The vapour phase reflow soldering method provides the best control of the temperature and gives the most uniform results.

Figure 2 : In Line System with Preheating - Temp.-Time-Profile Vapour-Phase-Soldering (Lead Temperature)



Note : According to CECC Standard Method SMD 50301188 - Oct 89

3) PROTOTYPES :

In the laboratory, for low volume, reflow soldering using heat-plate can be implemented. The immersion method is also a possibility.

When the complete circuit board is immersed in a solder bath, the temperature should not exceed 260°C and the soldering cycle should not exceed 10 seconds. A forced cooling is then recommended.

PARALLEL OPERATION OF POWER RECTIFIERS

B. Rivet

INTRODUCTION

In parallel operation of several diodes, the current is not split into equal parts because of differences between forward characteristics.
The current through the rectifier having the lowest voltage drop will be higher than the current through the other diodes.

On the other hand the temperature coefficient of the forward voltage is negative and therefore this unbalanced situation at switching ON can become worse up to a stable equilibrium state.

The designer has to be sure that at this final state the diodes operate below the maximum specified limits.

The aim of this study is to calculate the acceptable difference between forward voltage drops of diodes to be paralleled in a given application.

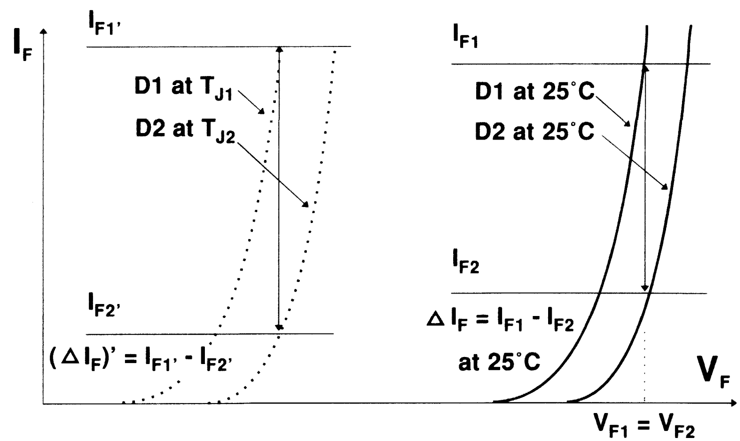
I - QUALITATIVE ANALYSIS AND LIMITATIONS

Let's assume that we have two diodes D1 and D2 connected in parallel.
The forward characteristics of the two diodes at $T_{J1} = T_{J2} = 25°C$ are shown in fig.1.
The total current $I_T = I_{F1} + I_{F2}$ is not split into equal parts.

The thermal dissipation makes the difference $\Delta I_F = I_{F1} - I_{F2}$ increase.

Indeed, the current through D1 is higher than through D_2 so $T_{J1} > T_{J2}$, and because the forward voltage has a negative temperature coefficient, the difference ΔI_F increases.

Fig.1 : Forward characteristics of two diodes D1 and D2 in parallel



at $T_{J1} = T_{J2} = 25°C$ ————

With $T_{J1} > T_{J2} > 25°C$: $(\Delta IF)' > \Delta I_F$ - - - - -

For a safe and reliable operation it is absolutely necessary to remain within the maximum ratings of the devices :

1) T_{J1} lower than the maximum junction temperature

2) Current through D1 compatible with the specified maximum RMS current.

II - SIMPLIFIED FORWARD CHARACTERISTIC MODEL

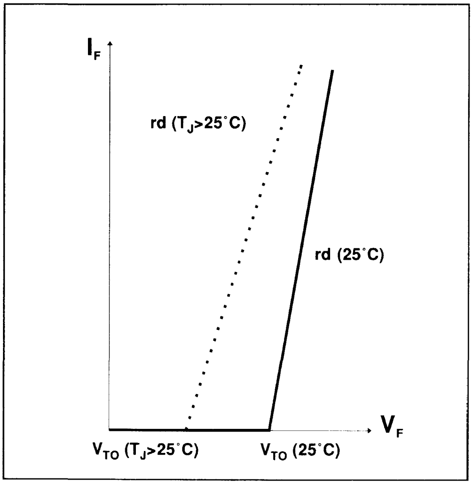
The forward characteristic of a diode may be assimilated to a straight line whose equation is :

$$V_F = V_{TO} + rd \times I_F \qquad \text{(fig.:2)}$$

V_{TO} and rd act as a function of the temperature.

V_{TO} has a negative temperature coefficient (α_{TO}) and rd has a positive temperature coefficient (α rd).

Fig.2 : Forward characteristics model of rectifier versus temperature

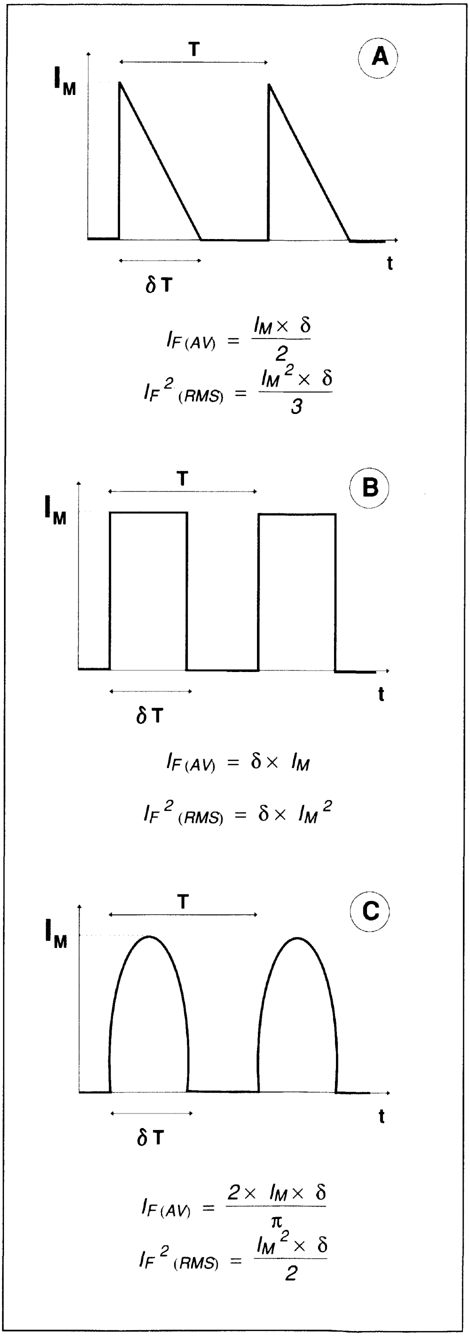


This model allows to easily calculate the operating point (V_F, I_F) of each diode and to evaluate the power losses due to the conduction.

$$P_{cond} = V_{TO} \times I_{F(AV)} + rd \times I_F{}^2{}_{(RMS)} \qquad (1)$$

In practice the waveforms of current can be assimilated to simple forms (rectangular, triangular, sinusoidal), so $I_{F(AV)}$ and $I_{F(RMS)}$ can be expressed with the peak current (I_M) and the duty cycle (δ) (Figure 3)

Fig.3 : Average and RMS values for different currents wave forms



(A)

$$I_{F(AV)} = \frac{I_M \times \delta}{2}$$

$$I_F{}^2{}_{(RMS)} = \frac{I_M{}^2 \times \delta}{3}$$

(B)

$$I_{F(AV)} = \delta \times I_M$$

$$I_F{}^2{}_{(RMS)} = \delta \times I_M{}^2$$

(C)

$$I_{F(AV)} = \frac{2 \times I_M \times \delta}{\pi}$$

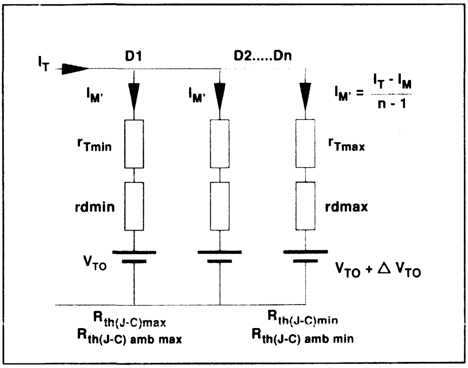
$$I_F{}^2{}_{(RMS)} = \frac{I_M{}^2 \times \delta}{2}$$

III - OPERATING WITH SEVERAL DIODES IN PARALLEL

Taking into consideration the dispersion of both the diodes parameters as well as the circuit parameters, we can calculate the maximum difference between V_F (measured at 25°C and at the nominal current specified for the device $I_F = I_{F(AV)}$) in order to be sure than no diode will operate out of its specification.

The calculation is based on the worst case situation (Figure 4) : we suppose that D1 has the lowest V_{TO} and rd and the highest $R_{th(j-c)}$ and T_{CASE}. This diode supports the highest current I_M and operates at the highest junction temperature.

Fig.4 : Worst configuration of several diodes in parallel



As a first step, we have to determine the maximum acceptable peak current (I_M) through D1 in these conditions.

III.1. Thermal limitation : I_{M1}

The maximun total power dissipation in the diode is given by :

$$P_T = \frac{T_{J\,max} - T_{CASE\,(max)}}{R_{th\,(j-c)\,max} + R_{th\,(c)}\,*}$$

The total power dissipation is

$$P_T = P_{COND} + P_{COM}$$

P_{COND} : conduction losses $\quad P_{COND} = \rho\, P_T$

P_{COM} : commutation losses $\quad P_{COM} = (1-\rho)\, P_T$

For SCHOTTKY diodes, the commutation losses are negligible ($\rho = 1$)

(*) Case of double diodes.
$R_{th(c)}$: Coupling thermal resistance

We can write P_{COND} versus I_M for rectangular waveform :
(For the other waveforms see the annex).

$$P_{COND} = V_{TO}\,(100°C)\,\delta . I_M + rd\,(100°C)\,\delta . I_M^2$$

So

$$I_{M1} = \frac{-\,V_{TO}\,.\delta + [(V_{TO}\,.\delta)^2 + 4\,.P_{COND}\,.rd\,.\delta\,]^{+1/2}}{2\,.\,rd\,.\,\delta} \quad (2)$$

III.2. R_{MS} current limitation : I_{M2}

If $I_{F(RMS)}$ is the maximum RMS current specified in the data sheet, the limit in the case of a rectangular waveform will be :

$$I_{M2} = \frac{I_{F\,(RMS)}}{\sqrt{\delta}}$$

It is obvious that we will take the minimum value of I_{M1} and I_{M2}

III.3. Calculation of Δ V_F

* THE DIODES PARAMETERS ARE :

$\propto_{TO}$	Temperature coefficient of V_{TO}
$\propto_{rd}$	Temperature coefficient of rd
V_{TO}	Threshold voltage at T_J = 25°C
rd	Dynamical resistance at T_J = 25°C and its dispersion (rd min, rd max)
$R_{th(j-c)}$	Junction to case thermal resistance and its dispersion $R_{th(j-c)min}$, $R_{th(j-c)max}$).
T_{Jmax}	max operating junction temperature

* THE "APPLICATION" PARAMETERS ARE :

I_T	Peak current through the diodes and its waveform.
δ	Duty cycle
n	Number of diodes
T_C	Case temperature and the dispersion T_C min (coldest case) and T_C max (hottest case)
$r_{t\,max}$ $r_{t\,min}$	Min and max values of the resistances of wires and various connections.

By solving electrical and thermal equations corresponding to the circuit of the fig.5 in the case of rectangular waveform , we find :

$$\Delta V_F < \frac{\Delta V_{F1} + \Delta V_{F2} + \Delta V_{F3} - \Delta V_{F4}}{\Delta}$$

With

$\Delta V_{F1} = (r_T\, min + rd\, min)\ I_M - (r_T\, max + rd\, max)\ I_M'$
$\Delta V_{F2} = R_{th(j-c)\,max}\,(\alpha_{TO} + \alpha\, rd\,.\,I_M)\,.\,P1$
$\Delta V_{F3} = (\alpha_{TO} + \alpha\, rd\,.\,I_M)\,.\,(T_{C\,max} - T_{C\,min})$
$\Delta V_{F4} = R_{th(j-c)\,min}\,.\,(\alpha_{TO} + \alpha\, rd\,.\,I_M')\,.\,P2$
$\Delta = 1 + R_{th(j-c)\,min}\,[\,\alpha_{TO} + rd\,.\,I_M'\,]\ \delta\,.\,I_M'$

$$P_1 = \frac{V_{TO}\,\delta\, I_M + rd\, min\,\delta\, I_M'^{\,2}}{\rho}$$

$$P_2 = \frac{V_{TO}\,.\,I_M' + rd\, max\,.\,I_M'^{\,2}}{\rho}$$

$$I_M' = \frac{I_T - I_M}{n-1}$$

III.4. Information about of diodes parameters

α_{TO} and α_{rd} are given for some part numbers in the following table :

	BYV255 -xxx	BYT60P -xxx	BYW51 -xxx
$\alpha_{TO}\left(\frac{V}{°C}\right)$	$-1.6\ 10^{-3}$	-1.6 10-3	$-1.6\ 10^{-3}$
$\alpha_{rd}\left(\frac{\Omega}{°C}\right)$	$+2\ 10^{-6}$	$+3\ 10^{-6}$	$+16\ 10^{-6}$

* Datasheet gives $V_{TO\ max}$ (100°C) and rd max (100°C)

with these values we can determine V_{TO}(25°C) and rd max (25°C) :

V_{TO} (25°C) = $V_{TO\,max}$ (100°C) - α_{TO} x 75

rd max (25°C) = rd max (100°C) - α_{rd} x 75

* rd min and $R_{th\,(j-c)min}$ can be calculated by :

rd min = k . rd max with k = 0.75

$R_{th(j-c)min}$ = k . $R_{tj(j-c)max}$ with k = 0.75

* We recommande to take T_{Jmax} = 110°C to increase the safety margin for parallel operation.

IV - EXAMPLES OF APPLICATION

IV.1. Example of rectifiers in discret package

In this example we look for the maximum peak current I_T versus V_F that can flow in three BYV255 (n = 6) connected in parallel.

The current is rectangular and we consider 3 different duty cycles (δ= 0.3 δ= 0.5 δ= 0.7).

As a good estimation, the conduction losses can be considered to be 95 % of the total losses (δ = 0.95)

Application data is

$T_{C\,max}$ = 80°C
$T_{C\,min}$ = 78°C
ρ = 0.95
rt max = 0.5 m Ω
rt min = 0.4 m Ω

Diodes data is

From data sheet of BYV255 we get :

$R_{th(j-c)max}$ = 0.4°C/W
$R_{th(c)}$ = 0.1°C/W
$V_{TO\,max}$ = 0.7 V (at 100°C)
rd max = 1.35m Ohms (at 100°C)
$I_{F(RMS)}$ = 150 A

From the recommandations of § 3.4 we can calculate :

$R_{th(j-c)\,min}$ = 0.3°C/W
V_{TO} at 25°C = 0.82 V
rd max at 25°C= 1.20m Ω
rd min at 25°C = 0.9m Ω

Calculations :

a) I_{M1}

In this example we have to take into account $R_{th(c)}$ because there are two diodes in the package. Thus :

$$P_{COND} = \frac{\rho\,(T_{J\,max} - T_{C\,max})}{R_{th\,(j-c)} + R_{th\,(c)}}$$

$P_{COND} = 57\ W$

The following table gives I_{M1} value for δ = 0.3 - 0.5 - 0.7 (according to the relation (2) of page 3)

δ	I_{M1} [A]
0.3	196
0.5	130
0.7	97

b) I_{M2}

$$I_{M2} = \frac{I_{F(RMS)}}{\sqrt{\delta}}$$

The following table gives the I_{M2} limits for δ = 0.3 - 0.5 - 0.7

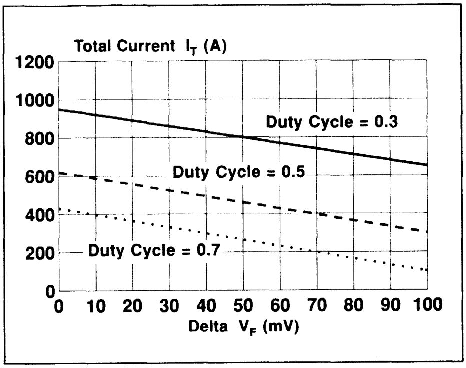
δ	I_{M2} [A]
0.3	274
0.5	212
0.7	179

c) Results

These two tables show that the I_M current is imposed by thermal considerations ($I_{M1} < I_{M2}$).

Using formulas (5) - (6) - (7) - (8) we can draw the

Fig.5 : Peak current I_T versus Δ V_F for different duty cycles with 3 BY255 in parallel



curve Fig.5 I_T versus ΔV_F for different duty cycles.

IV.2 Example of double rectifiers

In this example we consider a BYW51. The two diodes in the same package are connected in parallel. The current is rectangular with δ = 0.5 . The commutation losses are negligible (ρ = 1)

Application data is :

ρ = 1

$r_{T\,min}$ = 0.5 mΩ

$r_{T\,max}$ = 0.5 mΩ

Diode data :

From data sheet of BYW51 we get

$R_{th(j-c)}$ = 2.5C/W

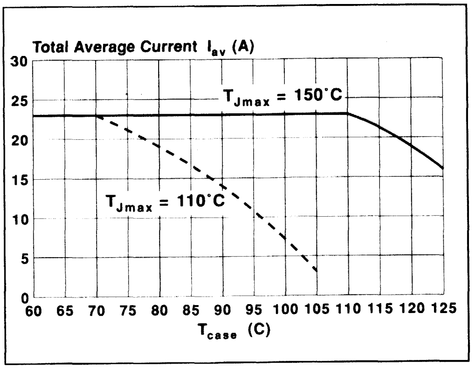
$R_{th(c)}$ = 0.1C/W

$V_{TO\,max}$ = 0.66 V(at 100C)

rd max = 14 mΩ (at 100C)

Fig.6 shows the total average current versus T_C. The flat part of the curves corresponds to the $I_{F(RMS)}$ limitation and the other part corresponds to the thermal limitation. The calculation is done with ΔV_F = 30 mV.

Fig.6 : I_{AV} versus Tc for BYW51 double rectifier in parallel operation (δ = 0.5)

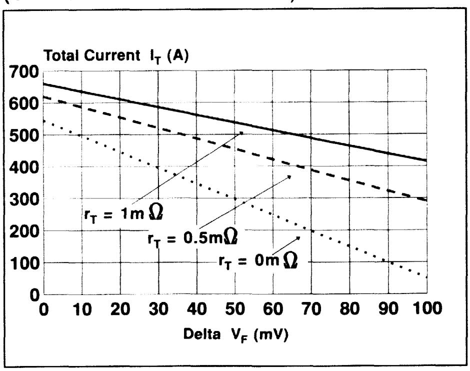


V - INFLUENCE OF THE WIRING RESISTANCE : rT

When all diodes are connected through the same wiring resistance, the total current is better split into the circuitry.

Fig.7 shows the good influence of the wiring resistance when all diodes are connected through the same r_T (Same conditions as BYV255 example, with δ = O.5)

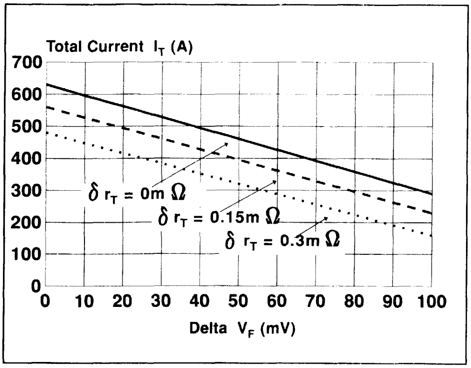
Fig.7 : It versus Δ V_F for different resistances of connections.
(Case of 3 BYV255 with δ = 0.5)



If diodes are connected through very different wiring resistance, the current imbalance can be important.

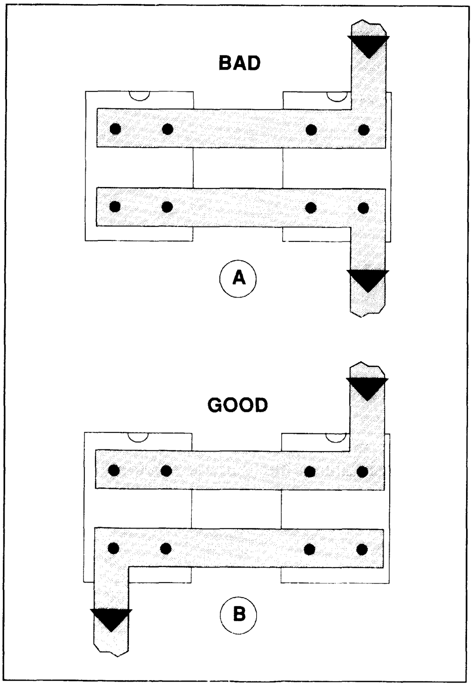
Fig.8 shows r_T influence for different values of r_T tolerance.

Fig.8 : It versus Δ V_F for different wiring resistance dispersion.
(Case of 3 BYV255 with δ = 0.5)



Particular care must be taken to connect several diodes in parallel. The assembly must be as symetrical as possible in order to reduce variation of r_T from one rectifier to another (see Fig.9). In the same way it is necessary to mount the packages on a single and efficient heat sink in order to reduce the variation of the case temperatures.

Fig.9 : Assembly of 2 ISOTOP packages :
(B) configuration provides a better balance of stray resistances



VI - COMMENTS ABOUT ΔV_F IN MANUFACTURING

VI.1 Double rectifiers (*) (2 diodes in the same package) :

These devices house 2 silicon dice coming from the same wafer and the dispersion is low :

90% of the production offers a ΔV_F lower than 30 mV.

VI.2 Rectifiers in separate packages : (or discrete)

In this case the dispersion is more important and when a ΔV_F lower than 100 mV is needed in the application, a screening is necessary.

VII - CONCLUSION

Ultra fast rectifiers and power schottky diodes can be easily connected in parallel to provide a reliable high current device if a few simple rules are applied.

This paper shows how we can calculate, for a given application, the maximum value of the forward voltage drop variation (ΔV_F) which guarantees that each diode will operate always below its maximum ratings.

This calculation takes into account the dispersion of the diode parameters (given by the manufacturer) and the electrical and thermal characteristics of the circuit.

Thus, it is possible to know if a special selection in term of V_F is needed or if the number of diodes connected in parallel is large enough to allow the use of standard parts without risk of overcurrent for one of the rectifiers.

(*) BYT261 - BYV255 - BYW51, ... etc

ANNEX

A - TRIANGULAR WAVEFORM

$$I_{M1} = \frac{-V_{TO}(\frac{\delta}{3}) + [(V_{TO} . \frac{\delta}{2})^2 + 4 . P_{COND} . rd . \frac{\delta}{3}]^{1/2}}{(2/3) . rd . \delta}$$

$$I_{M2} = \frac{I_{F(RMS)} \sqrt{3}}{\delta}$$

$$\Delta V_F < \frac{\Delta V_{F1} + \Delta V_{F2} + \Delta V_{F3} - \Delta V_{F4}}{\Delta}$$

With

$\Delta V_{F1} = (r_T\,min + rd\,min) . I_M - (r_T\,max + rd\,max) . I_M'$

$\Delta V_{F2} = R_{th(j-c)\,max}(\alpha_{TO} + \alpha_{rd} . I_M) . P1$

$\Delta V_{F3} = (\alpha_{TO} + \alpha_{rd} . I_M) . (T_{C\,max} - T_{C\,min})$

$\Delta V_{F4} = R_{th(j-c)\,min} . (\alpha_{TO} + \alpha_{rd} . I_M') . P2$

$\Delta = 1 + R_{th(j-c)\,min}[\alpha_{TO} + rd . I_M'](\delta/2) . I_M'$

$$P_1 = \frac{V_{TO}(\delta/2) . I_M + r_{d\,min}(\delta/3) . I_M^2}{\rho}$$

$$P_2 = \frac{V_{TO}(\delta/2) . I_M' + r_{d\,max}(\delta/3) . I_M'^2}{\rho}$$

$$I_M' = \frac{I_T - I_M}{n-1}$$

B - SINUSOIDAL WAVEFORM

$$I_{M1} = \frac{-2\,V_{TO}(\frac{\delta}{\pi}) + [(2\,V_{TO} . \frac{\delta}{\pi})^2 + 2 . P_{COND} . \delta . rd]^{1/2}}{rd . \delta}$$

$$I_{M2} = I_{F(RMS)} . (\sqrt{2}/\delta)$$

$$\Delta V_F < \frac{\Delta V_{F1} + \Delta V_{F2} + \Delta V_{F3} - \Delta V_{F4}}{\Delta}$$

With

$\Delta V_{F1} = (r_T\,min + rd\,min) . I_M - (r_T\,max + rd\,max) . I_M'$

$\Delta V_{F2} = R_{th(j-c)\,max}(\alpha_{TO} + \alpha_{rd} . I_M) . P1$

$\Delta V_{F3} = (\alpha_{TO} + \alpha_{rd} . I_M) . (T_{C\,max} - T_{C\,min})$

$\Delta V_{F4} = R_{th(j-c)\,min} . (\alpha_{TO} + \alpha_{rd} . I_M') . P2$

$\Delta = 1 + R_{th(j-c)\,min}[\alpha_{TO} + rd . I_M'](\delta/\pi) . I_M'$

$$P_1 = \frac{2\,V_{TO}(\delta/\pi) . I_M + r_{d\,min}(\delta/3) . I_M^2}{\rho}$$

$$P_2 = \frac{2\,V_{TO}(\delta/\pi) . I_M + r_{d\,max}(\delta/3) . I_M^2}{\rho}$$

$$I_M' = \frac{I_T - I_M}{n-1}$$

SGS-THOMSON MICROELECTRONICS

APPLICATION NOTE

TV AND MONITORS : CHOICE OF DIODE FOR A HORIZONTAL DEFLECTION

B. Rivet

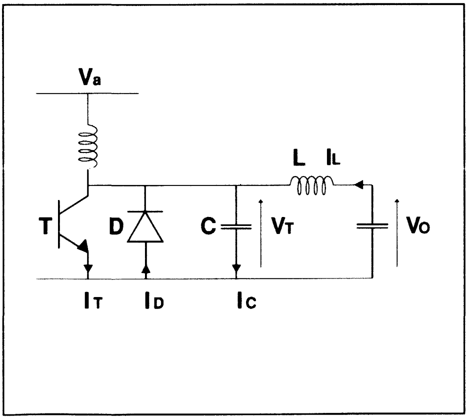
I - INTRODUCTION

The purpose of this note is to review the operation of the basic horizontal deflection circuit, to do an analysis of the different losses in the damper diode, and to suggest criteria for choosing between the DTV32-1500A and DTV32-1500B for a given application.

II - BEHAVIOUR OF THE BASIC HORIZONTAL DEFLECTION CIRCUIT

The basic horizontal deflection circuit is shown in Fig.1

Fig.1 : Basic horizontal deflection circuit



The current and voltage waveforms in the circuit are shown in Fig.2

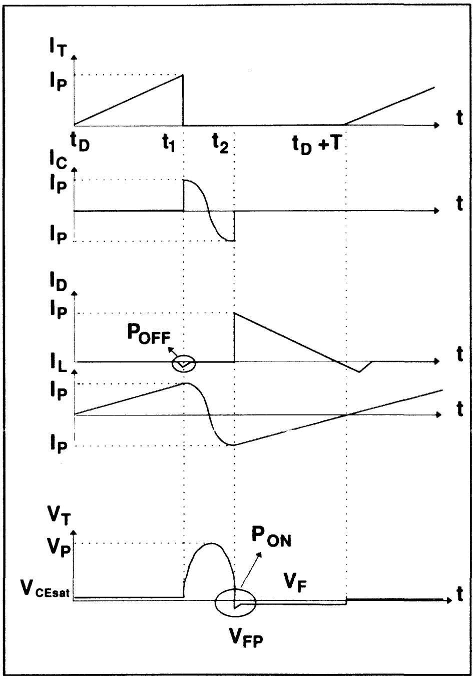
At $t = t_0$ the transistor starts to turn ON. The current in the line yoke and in the transistor is given by

$$I_T(t) = I_L(t) = \frac{Vo.t}{L}$$

The voltage V_T across the diode is equal to the V_{CEsat} of the transistor. The damper diode is blocked.

At t = t1 the transistor starts to turn OFF, the circuit becomes resonant (V_O . L . C). The current in the line decreases from Ip to -Ip and an overvoltage (V_{FP}) appears across the diode.

Fig.2 : Wavesforms in the basic horizontal deflection circuit



At $t = t_2$ the voltage V_T across the diode becomes negative and the damper diode conducts. The current in the diode and in the line Yoke is then :

$$I_D(t) = -I_L(t) = I_P - \frac{Vo.t}{L}$$

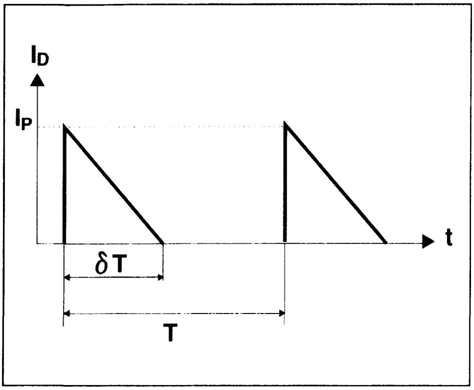
At $t = t_0 + T$ a new cycle starts

III - ANALYSIS OF THE POWER LOSSES IN THE DAMPER DIODE

a) Conduction losses : P_{COND}

The current in the damper diode is triangular Fig.3

Fig.3 : Current in the damper diode



The conduction losses are given by :

$P_{COND} = V_{TO} \cdot I_{F(AV)} + rd\, I_F^2(RMS)$

with

$$I_{F(AV)} = \frac{I_P\,\delta}{2}$$

and

$$I^2_{F(RMS)} = \frac{I^2_P\,\delta}{3}$$

Example : With a DTV32-1500 A

$V_{TO} = 1$ V
rd = 25 mΩ
and
$I_P = 6$ A
δ = 0.45

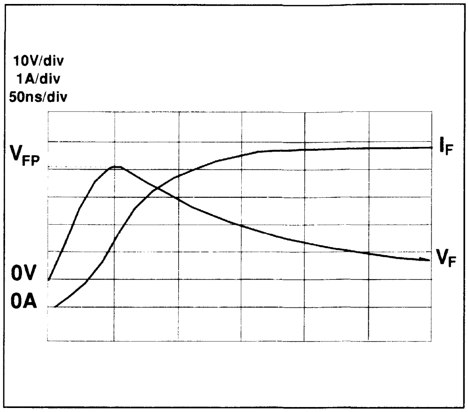
We find **P_{COND} = 1.5 W**

b) Switch ON losses : P_{ON}

When the diode switches ON (t=t2 Fig.2), the current in it increases from 0 to Ip with an high dI_F/dt (80A/μs). This current variation results in an overvoltage across the diode (V_{FP}) and switch ON losses.

Fig.4 shows the oscillogram of the current and the voltage across the damper diode when it is switched ON.

Fig.4 : Current and voltage in the damper diode at switch ON



P_{ON} is calculated with the oscillogram of Fig.4 and the following formula :

$$P_{ON} = \frac{1}{T}\int_0^{t_{fr}} V_F \cdot I_F\, dt$$

t_{fr} is the time during which the voltage accross the diode increases from OV to V_{FP} and then decreases from V_{FP} to V_{FR} = 2V

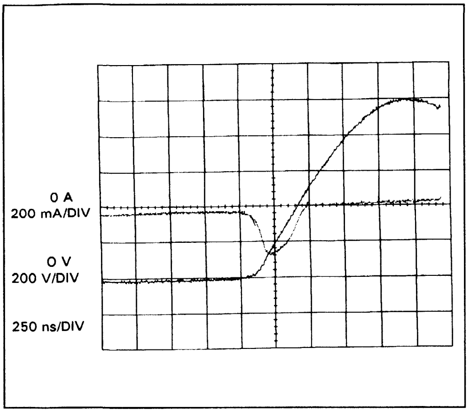
Example : With a DTV32-1500B
and
Tj = 100°C
dIF/dt = 80A/μs
V_{FP} = 42V
f = 32kHz
I_P = 6A

We find : **P_{ON} = 1 W**

c)Switch OFF losses : P_{OFF}

When the switching frequency of the horizontal deflection circuit is low (40 kHz), P_{OFF} is negligible. The diode disposes of all its stored charge with a low voltage across it (V_{CEsat}). At high frequencies there is insufficient time to complete this discharge during the conduction time of the transistor. In this case, when the transistor switches off, a current appears in the diode (at t=t1 Fig.2) and the voltage reaches a high value (600V) resulting in switch-OFF losses (Fig.5)

Fig.5 : Current and voltage in the damper diode at switch OFF (f = 70kHz)



Example : With a DTV32-1500A
and P = 6A
f = 70 kHz
Tj = 80°C
trr = 210 ns
(Tj = 25C IF = 1A VR = 30V dIF/dt = -50A/s)
P_{OFF} is estimated at P_{OFF} **= 0.9 W**

This estimate has been made by measurements on the board whose circuit diagram is given in appendix A.

IV - CHOICE BETWEEN THE DTV32-1500A AND THE DTV32-1500B FOR A GIVEN APPLICATION

SGS THOMSON offers two high voltage damper diodes : the DTV32- 1500A and the DTV32-1500B. The principal characteristics of these two diodes are given in the following table :

: Principal characteristics of the DTVV32-1500A and the DTV32-1500B

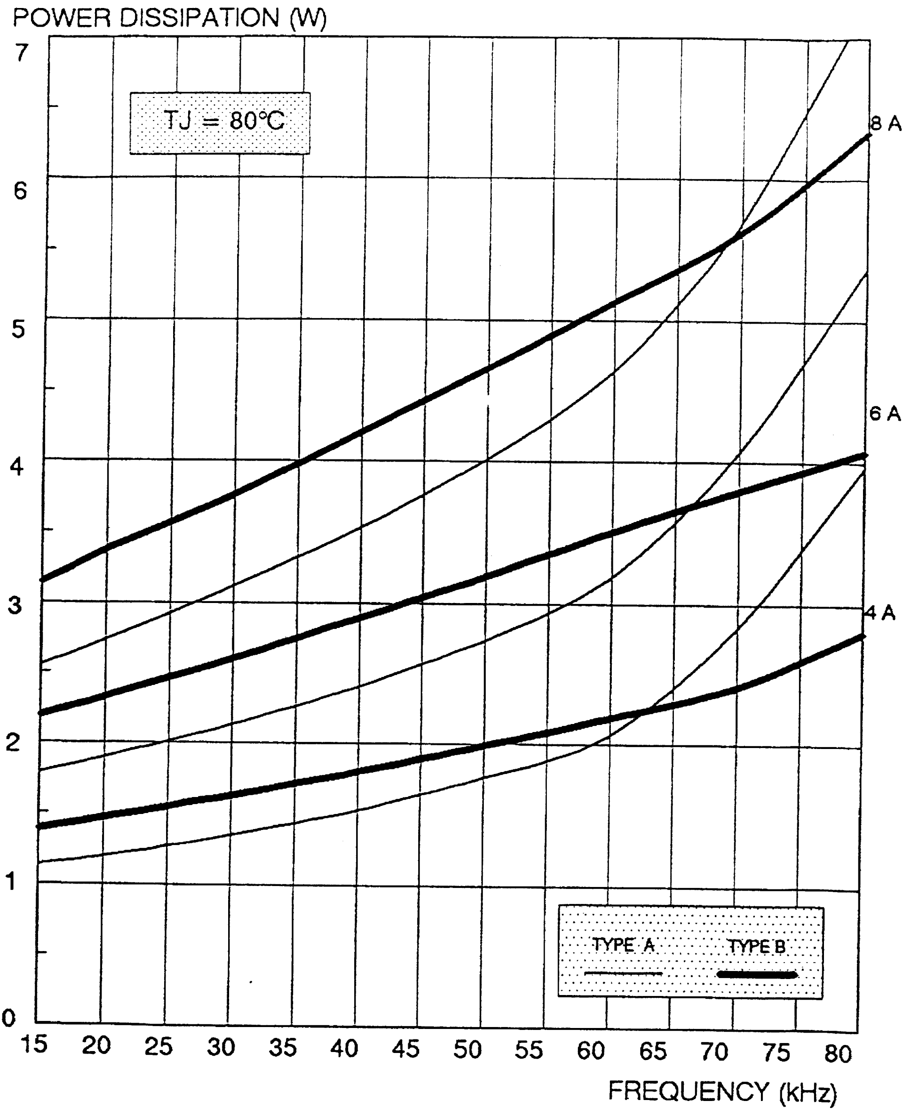
Parameters		DTV32-1500A	DTV32-1500B
V_{TO}	max	1 V	1.2 V
rd	max	25 mΩ	34 mΩ
V_{FP} typ	80 A/µs V_{FR} = 2 V	30 V	39 V
t_{fr}	typ	500 ns	600 ns
t_{rr}	25°C I_F = 1A V_R = 30 V -50 A/µs typ	250 ns	130 ns

Figs:7 - 9 show the total loss ($P_T = P_{COND} + P_{ON} + P_{OFF}$) in the damper diodes A and B versus frequency, for different currents I_P and different junction temperatures.

These curves have the same forms for the different junction temperatures (80°C - 100°C - 120°C)

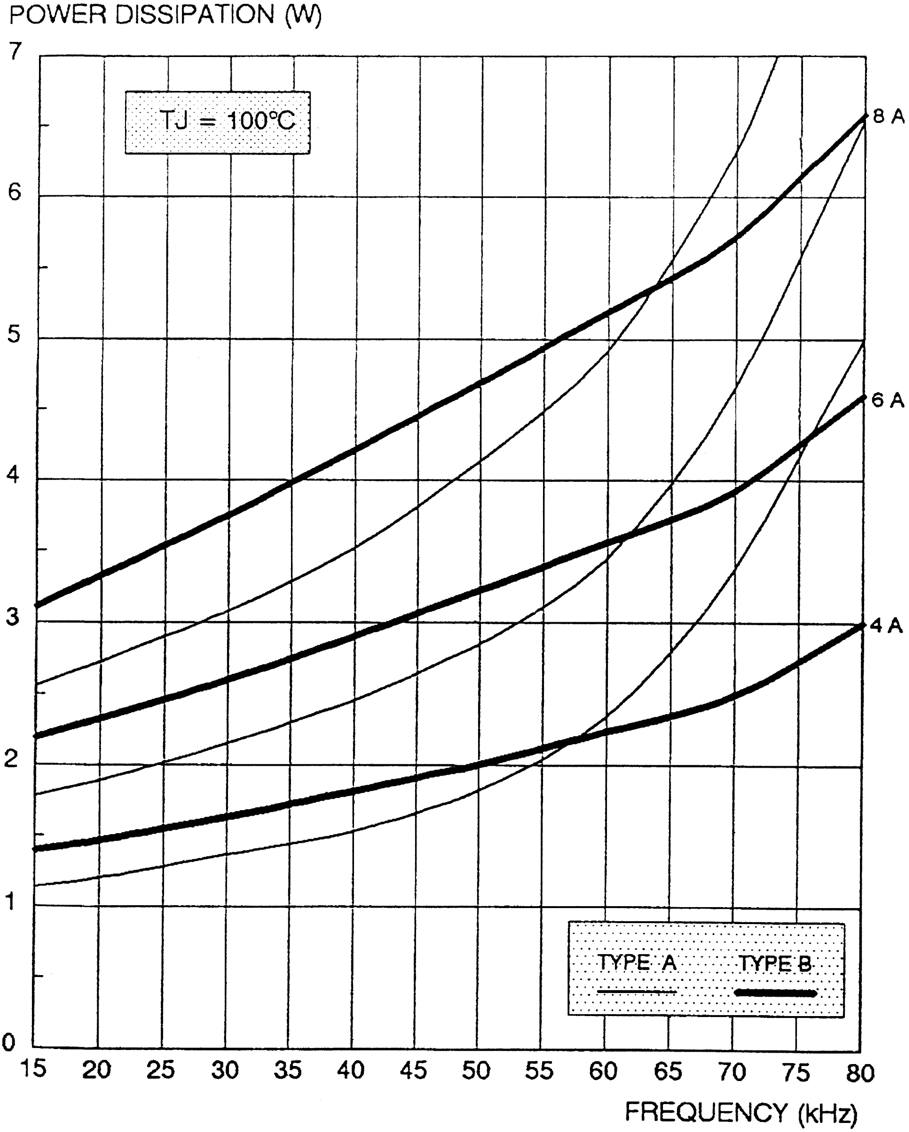
For the lower frequencies (< 55 kHz) total losses are greater in the DTV32-1500B. In this area conduction and switch ON losses are predominant. For the high frequencies (> 65 kHz) total losses become greater in the DTV32-1500A (switch OFF losses are more significant in this diode). This difference in high- frequency losses between the two devices also increases with temperature.

Fig.6 : Comparison type "A" and type "B" at Tj = 80˚C



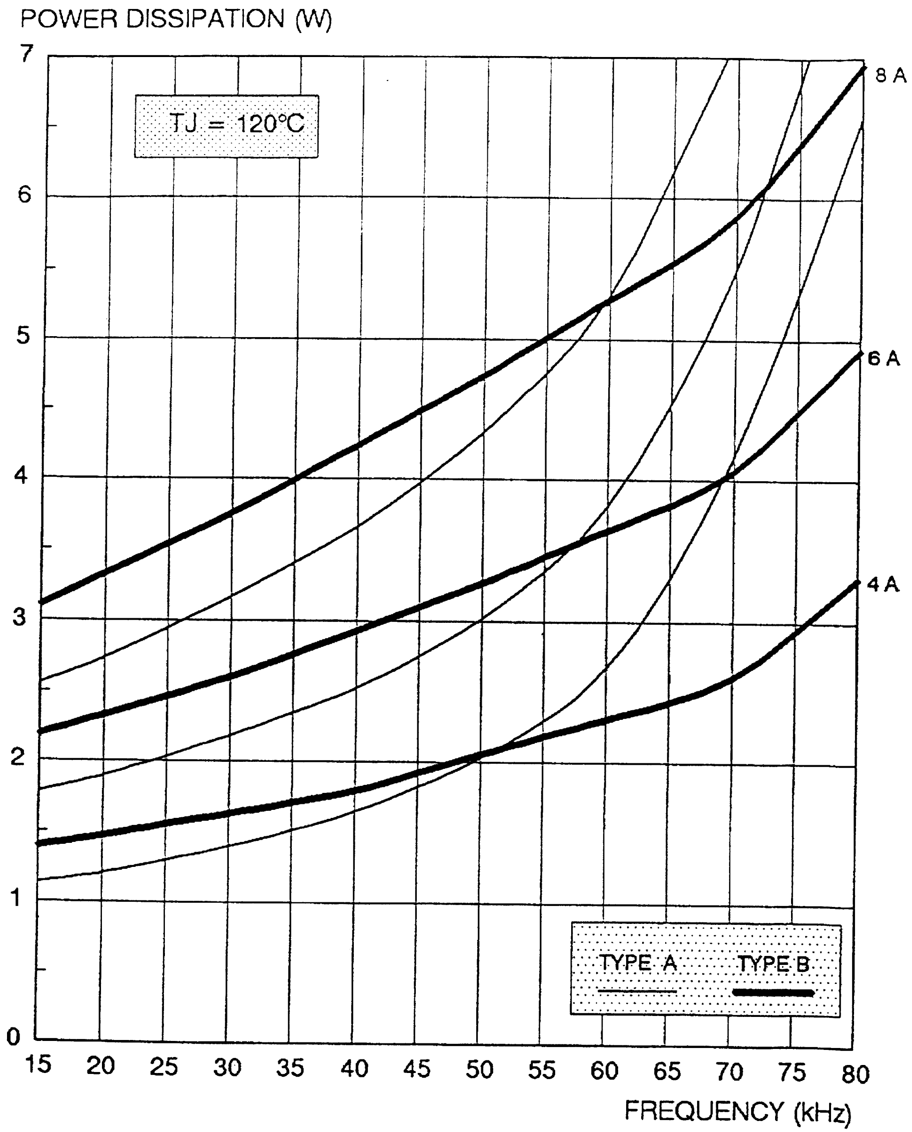
Total power dissipation versus operationg frequency for different peak currents

Fig.7 : Comparison type "A" and type "B" at Tj = 100˚C



Total power dissipation versus operationg frequency for different peak currents

Fig.8 : Comparison type "A" and type "B" at Tj = 120°C

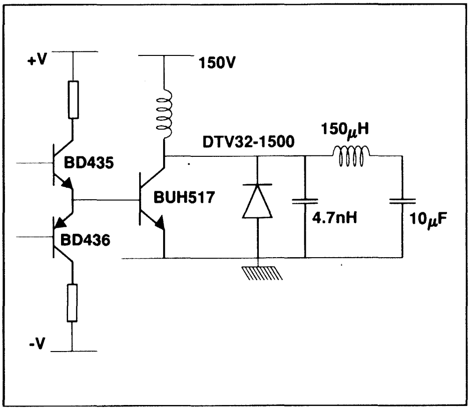


Total power dissipation versus operationg frequency for different peak currents

V - CONCLUSION

SGS-THOMSON offers two Damper diodes to cover the need in horizontal deflection circuit for televisions and monitors. The operating frequency determines the choice of damper diode. For frequencies below 55 kHz the DTV32-1500A is preferable while above 65 kHz the DTV32-1500B is the better choice.

APPENDIX A



SGS-THOMSON MICROELECTRONICS

APPLICATION NOTE

NEW HIGH VOLTAGE ULTRA-FAST DIODES : THE TURBOSWITCH™ A and B SERIES

B. Rivet

In today's power converter, the commutation speed of the transistor and the operating frequencies are higher and higher.

Fast diodes used for freewheel, snubber, and rectifier functions become one of the main causes of the power losses. In the range of 600V-1200V, SGS THOMSON has developed a new family of ultrafast diodes.

Taking into account these new constraints which are different from one application to another, SGS-THOMSON proposes two series : TURBOSWITCH "A" and TURBOSWITCH "B".

The specific characteristics of these two series offer to the designer a double choice, allowing him to use the best diode in this application.

I. INTRODUCTION

The choice of the optimum diode for a given application depends on the estimation of the power losses generated by the diode. This note explains how to calculate the different losses with information given in the datasheet and shows the difference between TURBOSWITCH"A" and TURBOSWITCH"B" and their respective advantages.

II. LOSSES CALCULATION

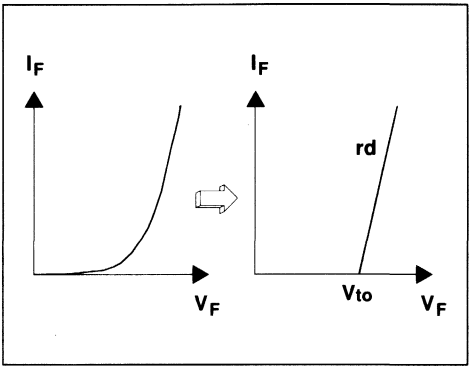
II.1 Conduction losses

Conduction losses are estimated with the classical formula :

$$P_{con} = V_{to}\, I_{F(AV)} + rd\, I^2_{F(RMS)}$$

Vto	: Threshold voltage (Fig.1)
rd	: Dynamical resistance (Fig.1)
$I_{F(AV)}$	: Average current
$I_{F(RMS)}$	: RMS current

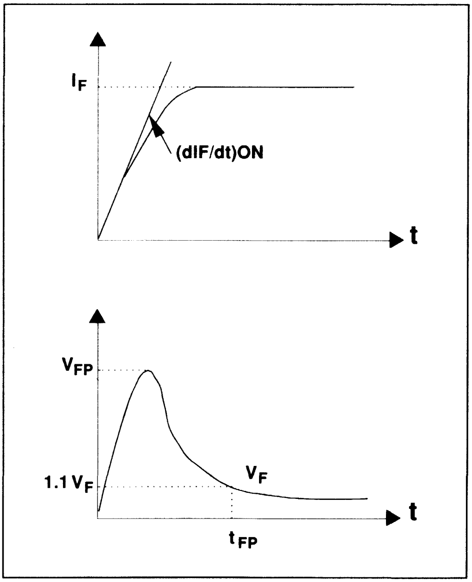
Fig.1 : Approximation of the forward characteristic



II.2. Turn on losses

When the diode turns ON, the voltage across the diode increases to V_{FP} (Peak forward voltage) before it decreases to 1.1 V_F at the time t_{FR} (Forward recovery time) (Fig.2).

Fig.2 : Turn ON waveforms



TM : TURBOSWITCH is a trademark of
SGS-THOMSON MIcroelectronics

Turn ON losses can be approximated by the following formula :

$$Pon = 0.4\,(V_{FP} - V_F) \times t_{FR} \times I_F \times f$$

Where f is the operating frequency :

V_{FP} and t_{FR} depend on $(dI_F/dt)ON$ and I_F. Curves in the datasheet giving V_{FP} and t_{FR} versus $(dI_F/dt)ON$ allow the estimation of Pon for each application.

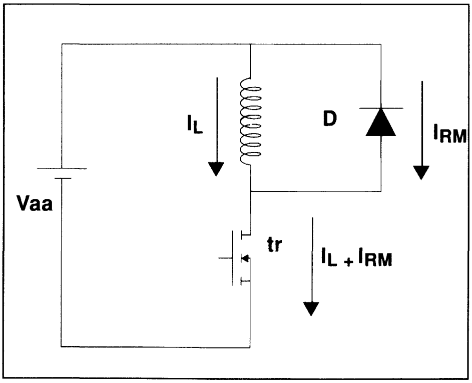
Example :

I_F = 8A
$(dI_F/dt)ON$ = 64A/µs
f = 100 kHz
With an STTA806D
(TURBOSWITCH A, 8 A / 600 V / TO220AC)
in these conditions
$V_{FP}(max)$ = 10V
$t_{FR}(max)$ = 500ns
Pon = 1.4 W

II.3. Turn-on losses

Turn-off losses are studied in the case of a freewheel function where the switch is a MOS transistor (Fig.3).

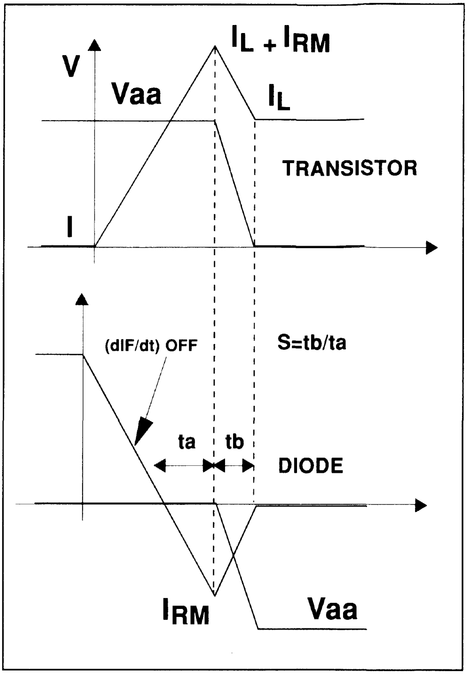
Fig.3 : Basic circuit with freewheel diode



I_L = Load current
I_{RM} = Maximum reverse recovery current of the freewheel diode D

The typical waveform of the current and the voltage when the transistor switches ON and the diode switches OFF is shown in Fig.4 in the case where the stray inductance is low (< 50 nH).

Fig.4 : Current and voltage waveforms of a free-wheel diode at turn-OFF and the associated transistor at turn-ON



The turn-OFF losses in the diode can be calculated by :

$$P_{OFF} = \frac{Vaa.I_{RM}{}^2\,.S.f}{6\,(dI_F/dt\,)_{OFF}}$$

II.4. Transistor losses due to the diode

When the diode switches OFF, the recovery current flows in the transistor which induces turn-ON losses in the transistor. The turn-ON losses in the transistor due to the diode can be estimated by :

$$P_{ON}\,(tr) = \frac{Vaa.I_{RM}{}^2\,(3{+}2S)\,f}{6\,(dI_F/dt\,)_{OFF}} + \frac{Vaa.I_{RM}.I_L\,(S{+}2)\,f}{2(dI_F/dt\,)_{OFF}}$$

Turn-ON losses in the transistor are generally much higher than turn-OFF losses in the diode.

These two formulas include I_{RM} and S parameters which characterize the turn ON behaviour. These parameters depend on the $(dI_F/dt)OFF$.

In the datasheet, curves giving I_{RM} and S versus $(dI_F/dt)OFF$ allow to calculate these losses for a given application.

Example :

Vaa = 400V
f = 30 kHz
IL = 12 A
$(dI_F/dt)OFF$ = -500A/µs
Tj = 125°C
with a STTA12060
(TURBOSWITCH"A", 12 A / 600 V / TO220AC)

we find :

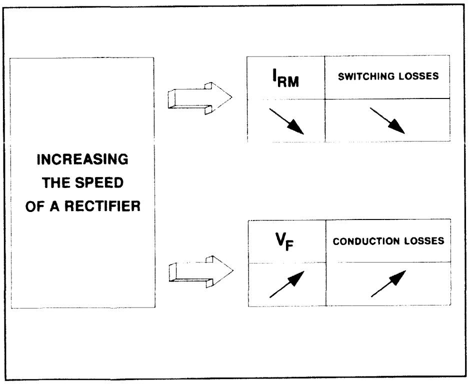
Poff = 0.43 W
Pon(tr) = 9.5 W

III. COMPARISON BETWEEN TURBOSWITCH "A" AND TURBOSWITCH "B"

III.1. Difference between characteristics

The design of a fast rectifier is known to be the result of a trade-off for a given reverse voltage, and the compromise can be explained in the fig.5.

Fig.5 : Compromise between I_{RM} and V_F for a given reverse voltage



For the diode of the family "A", the compromise V_F - I_{RM} has been chosen to reduce the total losses in both the diode and the companion transistor in a freewheel configuration.

On the other hand, the compromise of the family "B" has been chosen to minimize the conduction losses.

Table in Fig.6 summarizes the main characteristics of a STTA806D
(TURBOSWITCH"A", 8 A / 600V / TO220AC)
and a STTB806D
(TURBOWSITCH"B", 8 A / 600V / TO220AC)

Fig.6 : Main characteristics of a STTA806D and a STTB806D

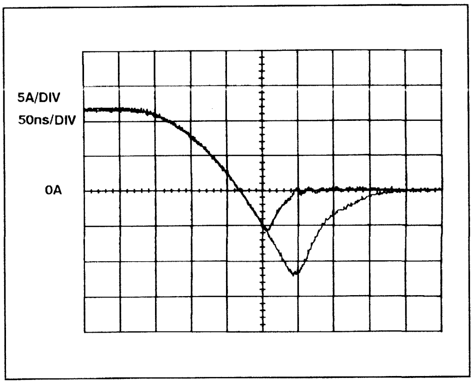
TYPE	$(dI_F/dt)OFF$ = 500 A/µs I_F = 8A Tj = 125°C		I_F = 8A Tj = 125°C	$(dI_F/dt)ON$ = 64 A/µs Tj = 25°C	
	I_{RM}	S	V_F	V_{FP}	t_{FR}
	typ	typ	max	max	max
STTA806D	14 A	0.45	1.5 V	10 V	500 ns
STTB806D	28 A	0.79	1.3 V	8 V	500 ns

Data in this table show that conduction losses and switch-ON losses will be lower in a TURBOSWITCH "B" while switch-OFF losses will be lower in a TURBOSWICH "A".

The oscillogram in Fig.7 shows the current in a STTA806D and in a STTB806D when the diodes switch-OFF in the following conditions :

V_R = 350V
$(dI_F/dt)OFF$ = -300 A/µs
Tj = 100°C
I_F = 12 A

Fig.7 : Switch-OFF oscillogram of STTA806D and STTB806D



This oscillogram shows that the IRM value is approximately two times lower with a STTA1206D, and that STTB1206D is a very soft diode.

III.2. Application examples

Example 1 : In this example, a comparison of the loss differences is done in a freewheel application where the current in the diode is rectangular. The main parameters are :

Peak current
I_M = 12 A
Vaa = 400 V

Duty cycle: $\delta = 0.6$
$(\delta I_F/dt)ON = 200\ A/\mu s$
$(dI_F/dt)OFF = 500\ A/\mu s$
$T_j = 125°C$
f = 30 kHz

In these conditions the reverse recovery characteristics of the diodes are given in fig.7 :

The losses of the table fig.8 are calculated by using relations given in part 2.

Fig.7 : Reverse recovery characteristics of STTA1206D and STTB1206D with the conditions of the example 1

TYPE	I_{RM}	S
STTA1206D	16 A	0.42
STTB1206D	30 A	0.90

In this type of application, the TURBOSWITCH "A" is obviously the better choice.

Fig.8 : Comparison between STTB1206D and STTA1206D in a freewheel diode function

TYPE	Con-duction losses	Switch ON losses	Switch OFF losses	Tran-sistor losses	Total losses
STTA1206D	9 W	0.1 W	0.43 W	9.5 W	19 W
STTB1206D	7.8 W	0.07 W	3.2 W	29.8 W	40.9 W

Example 2 : In this example, the diode is used as a rectifier diode with the following conditions :
$I_F = 12\ A$
$(dI_F/dt)ON = (dI_F/dt)OFF = 100\ A/\mu s$
Vaa = 350 V
$T_j = 125°C$
$\delta = 0.8$
f = 20 kHz

The estimated losses are summarized in the table fig.9

Fig.9 : Comparison between STTA1206D an STTB1206D in a rectifier function

TYPE	Conduc-tion losses	Switch ON losses	Switch OFF losses	Total losses
STTA1206D	14.4 W	negligible	0.2 W	14.6 W
STTB1206D	12.4 W	negligible	1 W	13.4 W

In this application, we have to take into account the leakage inductance and the fact that a very soft diode is required to limit the overvoltage. The total losses are 10% lower with the STTB1206D, therefore the TURBOSWITCH "B" is the best choice.

IV. CONCLUSION

This note shows how to calculate the different losses due to the diodes in basic power switching circuits. These calculations can be done by using the parameters given in the datasheet of the TURBOSWITCH "A" and the TURBOSWITCH "B".

In most of cases, it is easy to choose between the "A" type and the "B" type.

The "A" type is very efficient in freewheel diode applications with high frequencies (f > 10 kHz). The "B" type is better when conduction losses are predominant like in the case of the power factor corrector circuit in discontinuous mode (low $(dI_F/dt)OFF$), or for applications where very high soft recovery behaviour is required (commutation with series inductances, for example).

SGS-THOMSON MICROELECTRONICS

APPLICATION NOTE

MODELLING PARALLEL OPERATION OF POWER RECTIFIERS WITH PSPICE

B. Rivet

I - INTRODUCTION

The behaviour of semiconductor components is always linked with the junction temperature.

This is the case, for example, in current-sharing between diodes connected in parallel. The current in each diode depends on the forward characteristic but also on the junction temperature.

This study describes thermal and electrical modelling of diodes connected in parallel. It allows the variation in current and junction temperature of each diode to be visualized between turn on and the equilibrium state.

II - ELECTRICAL AND THERMAL MODELLING OF A DIODE

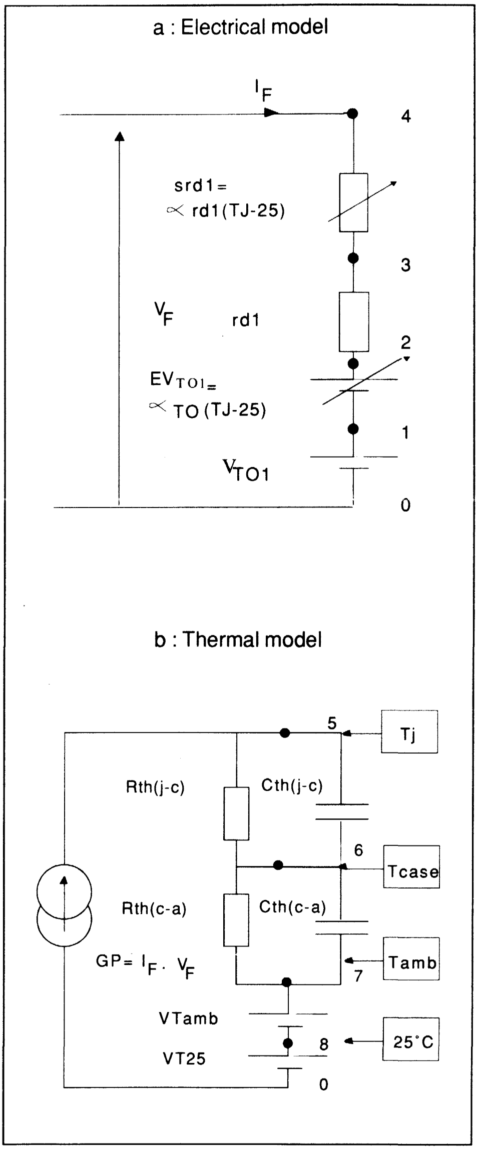
The forward characteristic of a diode is modelled by a threshold voltage V_{TO} in series with a dynamic resistance rd. These two parameters depend on the junction temperature of the diodes. V_{TO} has a negative temperature coefficient $\propto_{TO}$ and rd have a positive temperature coefficent $\propto$ rd.

One way to simulate the operation of such a device is to split the model into 2 different circuits : one "electrical" model and one "thermal" model.

The electrical and thermal models of a diode are shown in fig.1.

The thermal model is represented by electrical components.

Fig.1 : Electrical and thermal models of a diode



THE ELECTRICAL PARAMETERS ARE :

V_{TO1} : Threshold voltage at Tj = 25˚C

EV_{T01} : Threshold voltage versus junction temperature

EV_{T01} = $\propto_{TO}$ (Tj-Tamb)
= $\propto_{TO}$ (V(5) - V(8))

rd1 : Dynamic resistance at Tj =25˚C

srd1 : Dynamic resistance versus temperature
srd1 = $\propto$ rd1 (Tj - Tamb)
= $\propto$ rd1 (V(5) - V(8))

V_F : Instantaneous forward voltage across the diode

I_F : Instantaneous forward current in the diode

THE THERMAL PARAMETERS ARE :

GP : Generator current representing the instantaneous power dissipated in the diode.
GP = V_F x I_F

Rth(j-c) : Resistor representing the junction to case thermal resistance

Cth(j-c) : Capacitor representing the junction to case thermal capacitance

Rth(c-a) : Resistor representing the case to ambient thermal capacitance

Cth(c-a) : Capacitor representing the case to ambient thermal capacitance

VTamb : Voltage generator representing the ambient temperature
VTamb = Tamb - 25˚C

VT25 : Voltage generator representing the 25˚C temperature

III - MODELLING OF SEVERAL DIODES IN PARALLEL

See the application note : "Parallel operation of power rectifiers" (B.RIVET) for the qualitative analysis. In this note the acceptable difference between forward voltage drops (ΔV_F) is calculated so that the diodes can be safely connected in parallel.

The modelling will be based on the worst case situation. Suppose D1 has the lowest V_{TO} and rd and the highest Rth(j-c) so that this diode supports the highest current. The diode D2 and D3 have the same characteristics (maximum V_{TO} and rd, minimum Rth(j-c)).

The electrical and thermal models are shown in Fig.2.

Fig.2a : Thermal model of 3 rectifiers in parallel

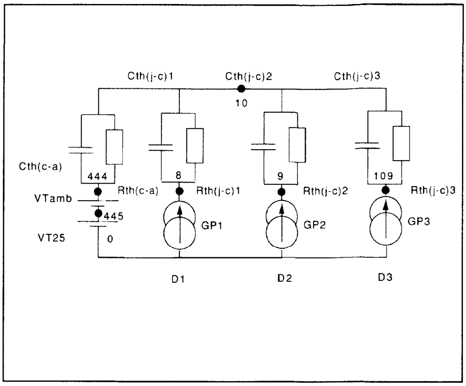
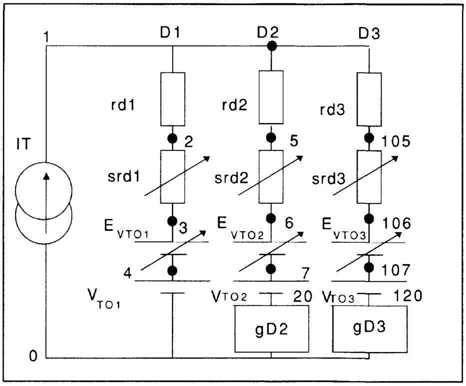


Fig.2b : Electrical model of 3 rectifiers in parallel



The modelling of several diodes in parallel will be treated with an example. Consider three BYV255 in parallel. The total current IT is rectangular with a duty cycle equal to 0.5, a peak current of 300 A and a frequency of 100 HZ.

In this example the following values have been taken.

rd1 = 1.2 mΩ
rd2 = rd3 = 0.9 mΩ

V_{T01} = 0.82 V
$\propto_{T0}$ = -1.6 x 10^{-3} V/˚C
$\propto$ rd = 2.10^{-6}Ω/˚C

Rth(j-c)1 = 0.4˚C/W
Rth(j-c)2 = Rth(j-c)3 = 0.3˚C/W

Their calculation is explained in the previously mentioned application note.

Cth(j-c)1, Cth(j-c)2, Cth(j-c)3, Cth(j-c) are not very important parameters; they influence only the transient behaviour of the circuit and not the equilibrium state.

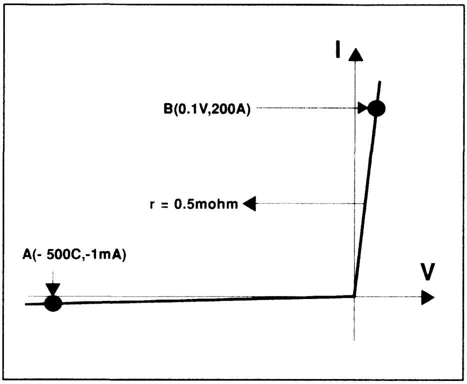
In the example Cth(j-c)1 = Cth(j-c)2 = Cth(j-c)3 = Cth(c-a) = 1 sW/°C has been assumed.

The simulation has been done with ΔV_F = 80 mV

Consider
$\Delta F \approx \Delta V_{T0}$ so $V_{T02} = V_{T03} = V_{T01} + \Delta V_F = 0.9V$

In the electrical modelling of the diode D2 and D3, components gD2, gD3 have been added. Their characteristic is drawn in Fig.3

Fig.3 : Characteristic of gD2 and gD3



These auxiliary components are needed to avoid a current flow in the diodes when the current IT is equal to zero. When the diodes conduct, these components are equivalent to the resistance of 0.5mΩ.

To take these resistances into account, make rd2 = rd3 = 0.4mΩ

The PSPICE description of this circuit is given in the appendix.

Fig.4 and 5 show the results of the simulation. These curves represent the variations of the current in D1 and D2 (fig.4) and the junction temperatures Tj1 and Tj2 (fig.5)

At t = 0s Tj1 = Tj2 = Tamb = 40°C : the current is higher in D1 than in D2 so Tj1 will increase more quickly than Tj2 and the difference between I_{F1} and I_{F2} will increase also.

When the equilibrium state is reached this difference becomes constant.

If the frequency and the thermal capacitor are high the simulation time needed to reach the equilibrium state is long. So to reduce this time the Cth values can be decreased (This change will affect only the transient behaviour).

IV - CONCLUSION

A very flexible analysis of operation of several rectifiers in parallel can be done easily by using simulation on PSPICE. Because of the importance of the thermal effect on the various parameters of each diode we have design 2 models operating simultaneously. The first circuit calculates the electrical parameters while the second monitors the junction temperature.

One example of calculation with 3 diodes in parallel has shown how the curves of the currents and the junction temperatures can be obtained.

This double model is very powerful. The designer can add other diodes, insert wiring resistance, change the current waveform and also the cooling characteristic of the design.

Fig.4 : Variation of the current in D1 (IRD1) and in D2 (IRD2) versus time

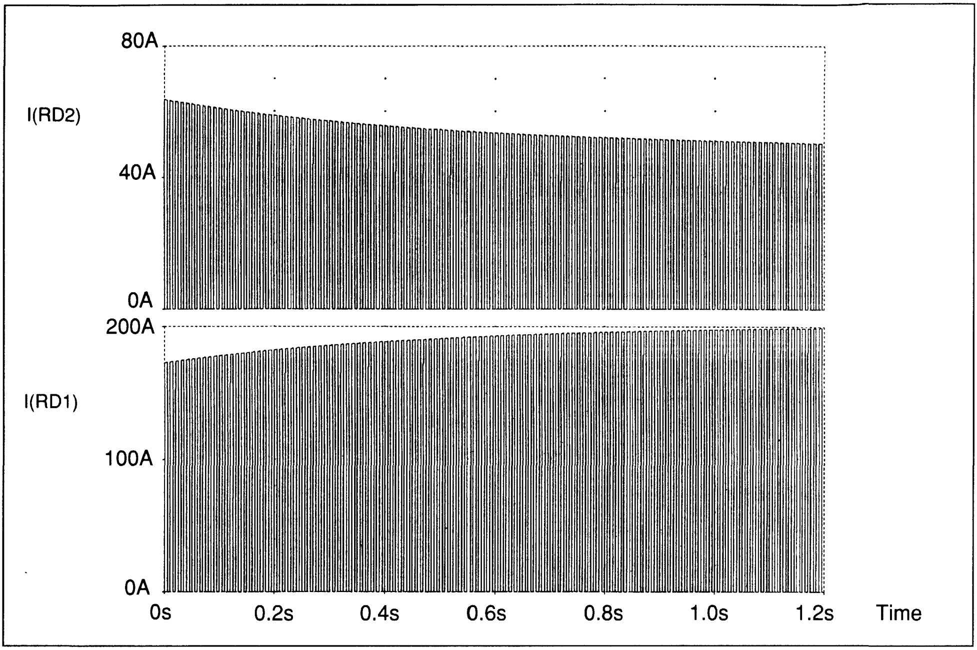
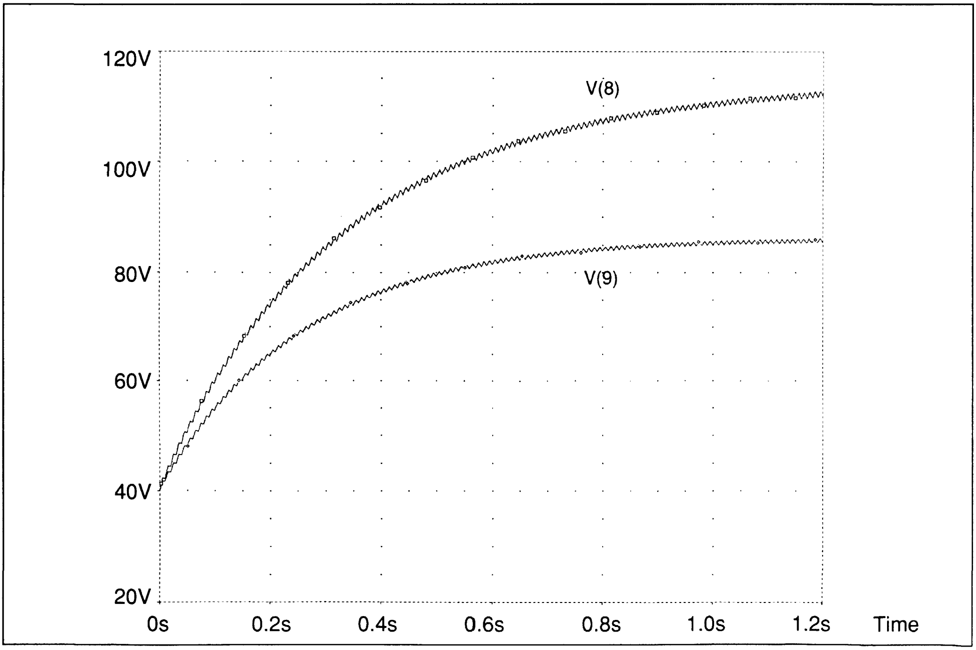


Fig.5 : Variation of the junction temperature of the diode D1 (V(8)) and D2 (V(9)) versus time



APPENDIX

```
DIODES-PARALLEL
I1 1 0 PULSE50 -300 0 0 0 5m 10m)
RD1 1 2 .9m
SRD1 2 3 8 445 SMOD
EVTO1 3 4 VALUE={-0.0016*V(8,445)}
VTO1 4 0 0.82
RD2 1 5 0.7m
SRD2 5 6 9 445 SMOD
EVTO2 6 7 VALUE={-0.0016*V(9,445)}
VTO2 7 20 0.9
GD2 20 0 TABLE {V(20)} =
+ (-500,-0.001)  (0.0)  (0.1,200)
RD3 1 105 0.7m
SRD3 105 106 109 445 SMOD
EVTO3 106 107 VALUE={-0.0016*V(109,445)}
VTO3 107 120 0.9
GR3 120 0 TABLE {V(120)} =
+ (-500,-0.001)  (0,0)  (0.1,200)
GP1 8 0 VALUE={-V(1,0)*V(1,2)*1111.11}
RTHJC1 8 10 .4
CTHJC1 8 10 1
GP2 9 0 VALUE={-V(1,0)*V(1,5)*1428.57}
RTHJC2 9 10 .3
CHTJC2 9 10 1
GP3  109  0  VALUE={-V(1,0)*V(1,105)*1428.57}
RTHJC3 109 10 .3
CTHJC3 109 10 1
RTHCA 10 444 .3
CTHCA 10 444 1
VTAMB 444 445 15
VT25 445 0 25
MODEL SMOD VSWITCH
(RON=0.0006      ROFF=0.00001      VON=250
VOFF=25)
tran    100.000u 1.2    0       0     ; *ipsp*
END
```

TURBOSWITCH ™ IN A PFC BOOST CONVERTER

B. Rivet

1.INTRODUCTION

SGS-THOMSON offers two families of 600V ultrafast diodes (TURBOSWITCH"A" and "B") having different compromises between the forward characteristics and the reverse recovery characteristics.

This paper explains why TURBOSWITCH"B" is a suitable family for PFC boost converters working in discontinuous mode, and why the TURBOSWITCH"A" should be used for PFC's working in continuous mode.

In this kind of application, the main concern for the designer is to evaluate the power losses. For that, SGS-THOMSON proposes a very powerful tool. A program has been developed in order to calculate the losses in the diode and in the transistor in a PFC working in continuous mode at a constant frequency. This application note describes how the calculations are performed. This software determines clearly that there is an optimum MOSFET turn on di/dt to increase the efficiency of the design and reduce EMI.

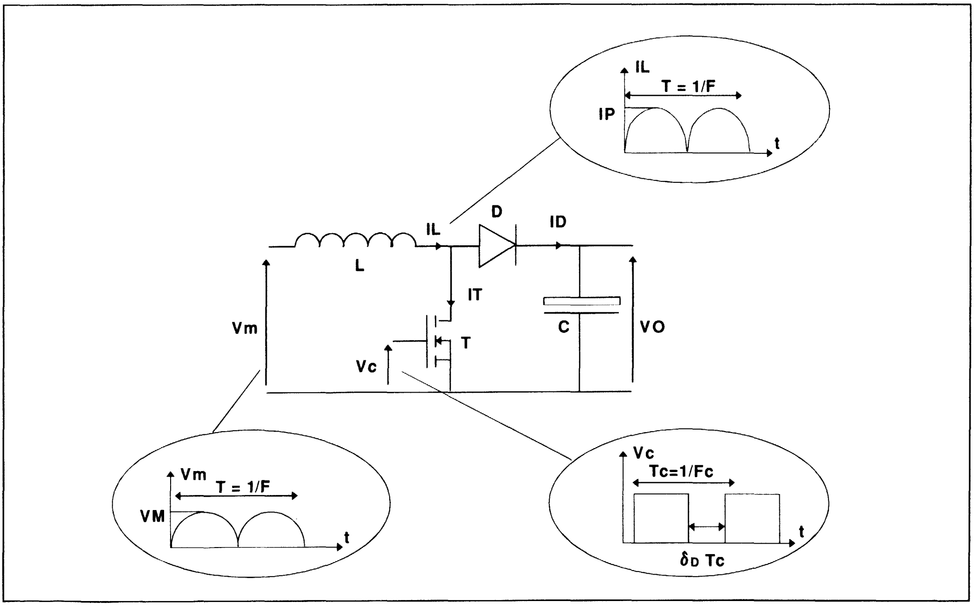
2.PARAMETERS DEFINITION

The basic circuit of the fig.1 shows the current, voltage and frequencies notations used in this paper.

List of the parameters :

Vm	:	mains voltage
V_M	:	peak value of the mains voltage
I_L	:	current in the coil
I_D	:	current in the diode
I_T	:	current in the transistor
I_P	:	peak current in the coil
δ_D	:	duty cycle of the diode
Fc	:	switching frequency
Vo	:	output voltage
F	:	mains frequency

Fig.1 : Boost PFC converter notations



3. TURBOSWITCH IN A PFC BOOST CONVERTER WORKING IN DISCONTINUOUS MODE

The discontinuous mode is used for power below 200-300W. In this mode, the current in the diode before reaching zero A decreases very slowly (less than 1A/µs). The slope is fixed by the coil and is equal to (Vm - Vo)/L. The low value of this slope generates low values of reverse recovery current (I_{RM}) and therefore low switch-off losses. For this reason the forward voltage (V_F) of the diode becomes the most important parameter. The best choice is to use a TURBOSWITCH"B" 1-2A/600V.

The major part of the losses is the conduction losses (Pcond). They can be calculated with a good approximation by :

$$Pcond = V_F\,(I_{F(AV)}) \times I_{F(AV)}$$

The average current in the diode is equal to the output power (POUT) divided by the output voltage Vo :

$$I_{F(AV)} = P_{OUT} / Vo$$

4.TURBOSWITCH IN PFC BOOST CONVERTER WORKING IN CONTINUOUS MODE

In continuous mode (output power higher than 200-300W) the current in the diode decreases very quickly. The $(di_F/dt)_{OFF}$ of the diode is fixed by the MOS transistor control and is equal to a few hundred A/µs ($(di_F/dt)_{OFF}$ of the diode is equal to the $(di_F/dt)_{ON}$ of the transistor).

The reverse recovery current of the diode when the transistor switches on flows in the transistor and generates high turn-on losses in the transistor. For this reason the most important parameter of the diode is the I_{RM}.

The TURBOSWITCH"A" family represents the optimum in term of V_F/I_{RM} compromise for this type of application and is recommended.

The calculations of the average current, RMS current and power losses in the diode and in the transistor are very complex. This is why SGS-THOMSON has developed a software which performs calculations and proposes the best TURBOSWITCH for the application. The boost converter is assumed to work in a continuous mode and at a constant frequency. This development tool, the PFC diskette, is available in a 5 1/4 inches format.The following paragraph explains how the calculations are performed.

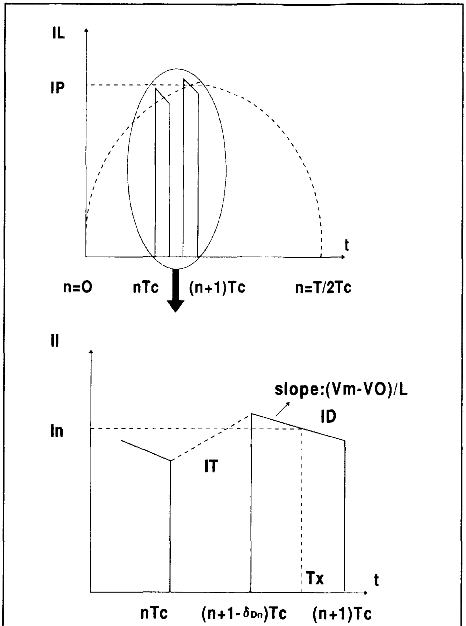
4.1. Results concerning the diode

4.1.1. Conduction losses

The current waveform in the diode is a succession of trapezoids. The duty cycle δ_{Dn} and the amplitude of the latter are varying as a function of the input mains voltage.

The fig.2 shows the current in the diode between the time nTc and (n+1)Tc.

Fig.2 : Current in the diode between nTc and (n+1)Tc



$$\delta_{Dn} = \frac{Vmn}{Vo}$$

$$Vmn = V_M \sin\left(\frac{2\,\Pi\,(n+1)\,Tc}{T}\right)$$

$$I_L = In = Ip \sin\left(\frac{2\,\Pi\,(n+1)\,Tc}{T}\right)$$

$$Tx = \left(n+1-\frac{\delta_{Dn}}{2}\right)Tc$$

Average current and RMS current in the diode

The program calculates the average and RMS current in the diode with the iterative formulae :

$$I_{D(AV)} = \frac{2}{T}\sum_{n=0}^{N-1}\left[\frac{A}{2}Tc^2\,\delta_{Dn}\,(2n+2-\delta_n)+BTc\delta_{Dn}\right]$$

$$I_{D(RMS)} = \left[\frac{2}{T}\sum_{n=0}^{N-1}(Cn + Dn)\right]^{1/2}$$

with :

$$A = \frac{Vmn - Vo}{L}$$

$$N = \frac{T}{2Tc}$$

$$B = In - A\,(n+1-\frac{\delta_{Dn}}{2})\,Tc$$

$$Cn = \frac{A^2}{3} Tc^3 \delta_{Dn}[3(n(n+2-\delta_{Dn})+1-\delta_{Dn})+\delta_{Dn}^{\;2}]$$

$$Dn = ABTc^2\,\delta_{Dn}\,(2n+2-\delta_{Dn}) + B^2\,Tc\,\delta_{Dn}$$

Conduction losses in the diode

The conduction losses in the diode are calculated with the maximum value of V_{TO} and Rd (respectively the threshold voltage and the dynamic resistance of the forward characteristic). It must be pointed out that these power losses correspond to a worst case situation.

$$Pcond = V_{TO}\, I_{D(AV)} + Rd\, I_{D(RMS)}^{2}$$

4.1.2.Turn-on losses in the diode

These losses are estimated with the formula

$$P_{ON} = 0.4\,(V_{FP}-V_F)I_F \,.\, t_{FR} \,.\, F$$

V_{FP} : Peak forward voltage

t_{FR} : forward recovery time

This formula provides only an estimate, which is sufficient because turn ON losses are low with regard to conduction losses. The program interpolates data of the curve V_{FP} and t_{FR} versus $(di_F/dt)_{ON}$ of the diode(Fig 3). These data have been stored on the disk for each part number.

Fig.3 : V_{FP} versus di_F/dt.
(STTA806D)

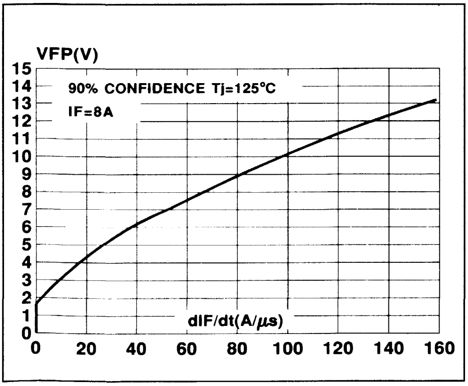
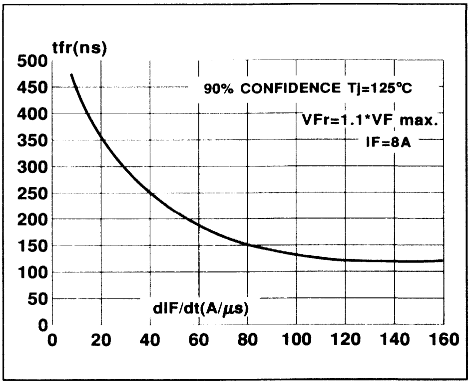


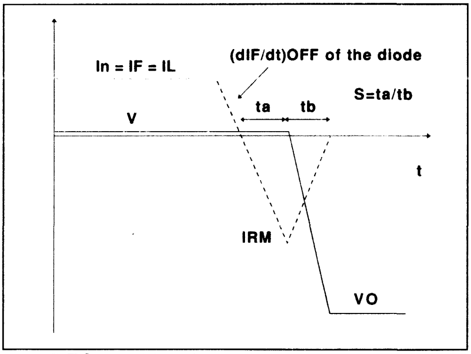
Fig.3 Bis : t_{FR} versus di_F/dt.
(STTA806D)



4.1.3.Turn-off losses in the diode

The fig.4 shows the theorical waveform of the current and the voltage when the diode switches off.

Fig.4 : Current and voltage waveform during diodes switch OFF



In a PFC working in a continuous mode, the $(di_F/dt)_{OFF}$ of the diode is fixed. But current ($I_F = I_L$) acts as a function of the time,as do the softness factors and the current IRM (Fig.5).

These data were also stored for each individual part number.

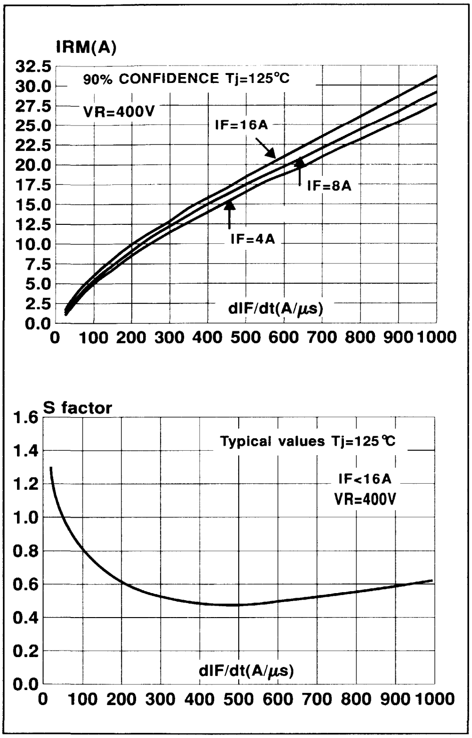
$$P_{OFF} = \frac{1}{T}\sum_{n=o}^{N-1} \frac{Vo\, I_{RMn}^{\;2}\, Sn}{3\,(\,di_F/dt\,)_{OFF}}$$

$I_{RM}n$ and Sn are respectively the reverse current and softness factor corresponding to the $(di_F/dt)_{OFF}$ of the application and at the time nTC when

$$IF = In = Ip \left(\sin \frac{2\Pi (n+1)\, Tc}{T} \right)$$

These losses are calculated with data (S, I_{RM}) at 90% confidence.

Fig.5 : I_{RM} and S versus di_F/dt.
(STTA806D)



4.1.4.Turn-on losses in the transistor due to the diode

When the transistor turns on the reverse recovery current flows in the transistor (Fig.6)

Turn-on losses in the transistor due to the diode are calculated with the same data as the turn-off losses in the diode.
The formula used is :

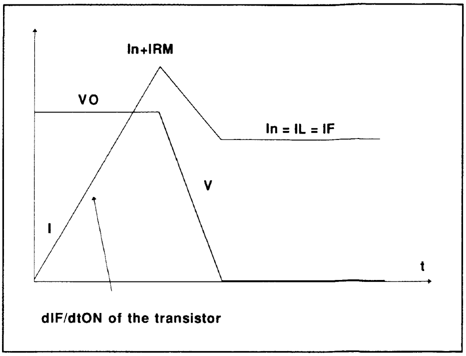
$$P_{ON} = 2 \frac{Vo}{T} \sum_{n=o}^{N-1} (Mn + Gn)$$

with :

$$Mn = \frac{I_{RMn}{}^2 (3 + 2\, Sn)}{6 (di_F/dt)_{OFF}}$$

$$Gn = \frac{In \;\; I_{RMn} (2 + Sn)}{2 (di_F/dt)_{OFF}}$$

Fig.6 : Current and voltage waveform during transistor turn-on.

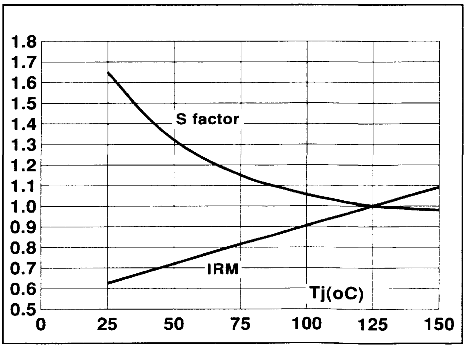


4.1.5. Junction temperature of the diode

S factor and IRM depend on the temperature (Fig.7). This program takes into account these variations to calculate the junction temperature. Two options are available :

Enter Tcase (case temperature) or, Enter Tamb (ambient temperature) and Rth (c-a) (case ambient thermal resistance).

Fig 7 : Relative variation of dynamic parameters versus junction temperature
(STTA806D)

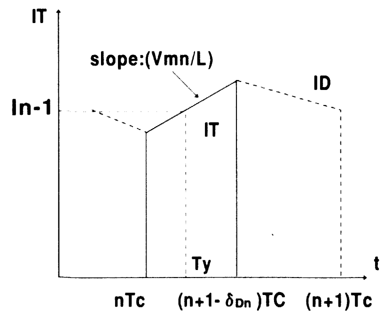


4.2.Results concerning the transistor

4.2.1.Conduction losses

The current waveform in the transistor is also a succession of N trapezoids and the duty cycle of the transistor, and the amplitude of which varies as a function of the input main voltage. Fig.8 shows the current in the transistor between the time nTc and (n+1)Tc.

Fig.8 : Current in the transistor betweenTc and (n+1)Tc



$$\delta_{Dn} = \frac{Vmn}{Vo}$$

$$Vmn = V_M \sin\left(\frac{2\Pi(n+1)Tc}{T}\right)$$

$$I_{n-1} = Ip \sin\left(\frac{2\Pi\, nTc}{T}\right)$$

$$Ty = \frac{(2n+1-\delta_{Dn})Tc}{2}$$

The program calculates the average and RMS current in the transistor with the formulae.

$$I_{T(AV)} = \frac{2}{T}\sum_{n=o}^{N-1}\left[\frac{A((n+1-\delta_{Dn})^2-n^2)Tc^2}{2}+Ln\right]$$

$$I_{T(RMS)} = \left[\frac{2}{T}\sum_{n=o}^{N-1}[In+Jn]\right]^{1/2}$$

with :

$$A = \frac{Vmn}{L}$$

$$B = I_{n-1} - A\left(\frac{2n+1-\delta_{Dn}}{2}\right)Tc$$

$$Ln = BTc(1-\delta_{Dn})$$

$$In = \frac{A^2}{3}Tc^3((n+1-\delta_{Dn})^3-n^3)$$

$$Jn = ABTc^2((n+1-\delta_{Dn})^2-n^2)+B^2Tc(1-\delta_{Dn})$$

Conduction losses

We have :

$$Pcond = rds_{ON}\, I_{T(RMS)}^2$$

rds_{ON} : rds_{ON} of the transistor

4.2.2.Total turn-on losses in the transistor

The principle of the calculation is the same as the calculation of turn-off losses in the diode.

The formula used is :

$$P_{ON}(T_R) = \frac{2Vo}{T}\sum_{n=o}^{N-1}[Kn/(dI_F/dt)_{OFF}]$$

with :

$$Kn = \frac{(In+I_{RMn})^2}{2}+Sn\frac{I_{RMn}^2}{3}+Sn\frac{I_{RMn}\,I_n}{2}$$

5. EXAMPLE OF SIMULATION

Data entered in the software :

Diode : STTA2006P

$(di_F/dt)_{OFF}$ of the diode= 500A/µs
$(di/dt)_{ON}$ of the diode = 500A/µs

F	=	50Hz
F_C	=	50 000HZ
V_M	=	300V
V_O	=	400V
L	=	100µH
Ip	=	20A
Rds_{ON}	=	0.1Ω
Tcase	=	60˚C

Results

Diode results

$I_{D(AV)}$	=	7.5A
$I_{D(RMS)}$	=	11.8A
P_{ON}	=	0.5W
P_{OFF}	=	1W
Pcond	=	11W
Tj	=	76˚C
$P_{ON}\ T_{R(D)}$	=	18.6W

Transistor results

$I_{T(AV)}$	=	5.2A
$I_{T(RMS)}$	=	9.1A
$P_{ON}(T_R)$	=	22.6W
$Pcond(T_R)$	=	8.3W

6. OPTIMUM MOSFET TURN ON di/dt

P_{OFF} in the diode and $P_{ON}(T_R)$ are the only losses depending on the $(di/dt)_{ON}$ of the transistor ((di/dt) of the diode)).

The software allows you to draw the curve $P_{ON}(T_R)$ + $P_{OFF}(D)$ versus the $(di/dt)_{ON}$ of the the transistor ($(di/dt)_{OFF}$ of the diode).

Example :

The curve fig.9 shows the variation of $P_{OFF}(D)$ + $P_{ON}(TR)$ versus the $(diF/dt)_{OFF}$ of the diodes. We enter in the program the following data :

Diode : STTA2006P

F	=	50Hz
F_C	=	50kHz
V_M	=	300V
V_O	=	400V
L	=	100µH
T_C	=	80°C
Ip	=	12A

This curve shows that in order to optimize the efficiency, the designer has to fix the $(di_F/dt)_{ON}$ of the transistor at 500A/µs. When the switching time decreases in the area of di/dt < 500A/µs, P_{OFF} + $P_{ON}(T_R)$ decreases. But for di_F/dt > 500A/µs, the increasing of I_{RM} takes over the influence of the switching time and P_{OFF} + $P_{ON}(T_R)$ increases.

The reverse recovery of the diode produces EMI that increases with the di_F/dt. In this application the best compromise to reduce the noise and have the best efficiency is to fix $di_F/dt \approx$ 350A/µs ($P_{OFF}(D)$ + $P_{ON}(T_R)$) at 350A/µs $\approx$ ($P_{OFF}(D)$ + $P_{ON}(T_R)$) at 500A/µs.

Another way to reduce EMI produced by the diode is to overdimension the diode. Indeed the noise generated by the diode decreases as a function of the junction temperature.

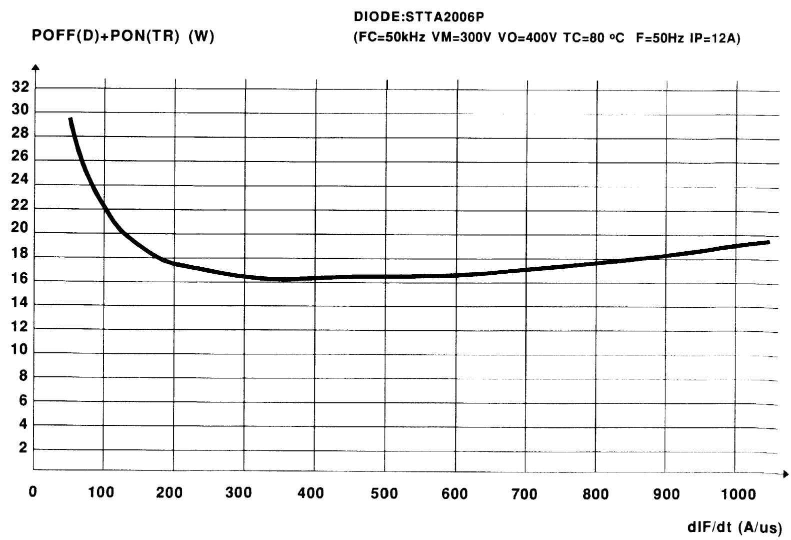
7. CONCLUSION

This paper explains why TURBOSWITCH"A" and TURBOSWITCH"B" are the right choices of diodes respectively for PFC working in continuous and discontinuous mode.

The software described in the application note is now available. It can help the designer to evaluate the influence of the different parameters (switching frequency, coil, (diF/dt)ON of the transistor ...) on the power losses in the diode and in the transistor.

This program is especially interesting to determine the optimum (di/dt)ON of the transistor. This will increase the efficiency of the converter and decrease noise.

Fig.8 : OFF losses (D) + ON losses (TR) versus $(di_F/dt)ON$ of the transistor .



THE CONDUCTION LOSSES IN A POWER RECTIFIER

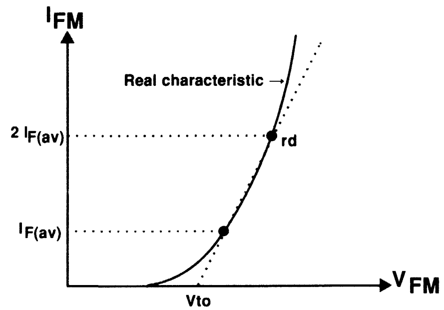
B. Rivet

INTRODUCTION

In spite of the high operating frequency, the conduction losses remain the main cause of the junction's temperature increase in the majority of the applications. Therefore, it is important to accurately estimate these losses.
The purpose of this note is to give data to calculate the conduction losses in the diodes.

The forward characteristic of a diode is shown in fig.1

Fig.1 : Forward characteristics of a diodes



$I_F(av)$: Average forward current of the diode

We can define two areas :

1) The peak current I_M is lower than 3 $I_{F(av)}$:

The forward characteristic of a diode may be assimilated to a straight line defined by Vto and rd (Fig.1).

The forward voltage can be expressed by

$$V_{FM} = Vto + rd\ I_{FM}$$

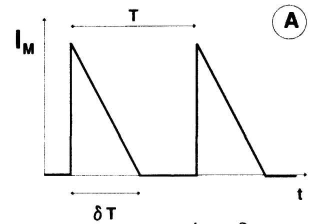
Vto and rd are given in the datasheet for each part number. With this model the expression of the conduction losses is :

$$Pcond = Vto\ I_{F(av)} + rd\ I_F^2{}_{(RMS)}$$

$I_{F(av)}$: average forward current in the diode
$I_{F(RMS)}$: RMS forward current in the diode

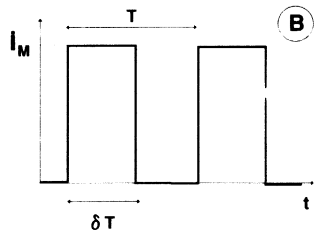
Fig.2 shows the average and RMS values for different current wave forms.

Fig.2 : Average and RMS values for different currents wave forms.



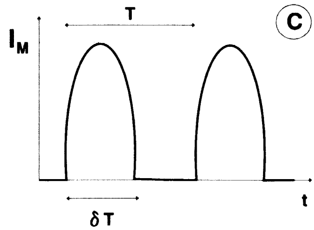
$$I_{F(AV)} = \frac{I_M \times \delta}{2}$$

$$I_F^2{}_{(RMS)} = \frac{I_M^2 \times \delta}{3}$$



$$I_{F(AV)} = \delta \times I_M$$

$$I_F^2{}_{(RMS)} = \delta \times I_M^2$$



$$I_{F(AV)} = \frac{2 \times I_M \times \delta}{\pi}$$

$$I_F^2{}_{(RMS)} = \frac{I_M^2 \times \delta}{2}$$

Example :
With a STTA1206D : Vto = 1.15V rd = 0.029 Ohm and a rectangular current : I_M = 20A δ = 0.5
we find :

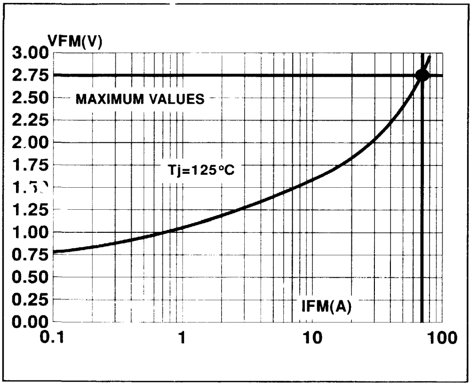
$$Pcond = 17.3W$$

2) The peak current I_M is higher than 3 $I_{F(av)}$:

When the peak current I_M is higher than 3 $I_{F(av)}$, the forward voltage and the conduction losses values calculated with Vto and rd becomes very pessimistic (Fig.1).

A more accurate estimation of the conduction losses can be done with the curve V_{FM} , I_{FM} given in the datasheet (fig.3).

Fig.3 : Forward voltage drop versus forward current of a STTA806D.



In the case of a rectangular current conduction losses can be expressed by :

$$Pcond = V_{FM}\ (I_M)\ x\ I_{F(av)}$$

Where V_F (I_M) is the V_{FM} value when I_{FM} = I_M

Example :
With a rectangular current : I_M = 70A δ = 0.1
and a STTA806D V_{FM}(70A) = 2.75V (Fig.3)
Pcond = V_{FM}(70A) x δ x I_M
we find :

$$Pcond = 19W$$

In these conditions, conduction losses calculated with Vto and rd give : Pcond = 29W !

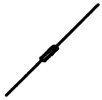
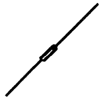
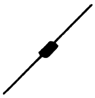
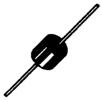
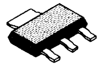
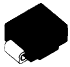
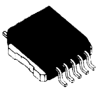
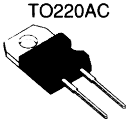
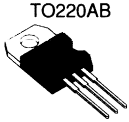
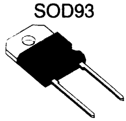
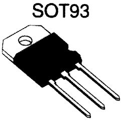
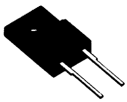
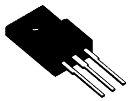
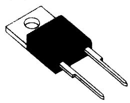
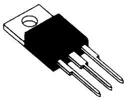
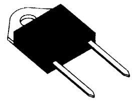
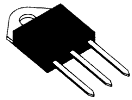
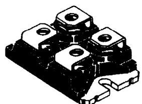
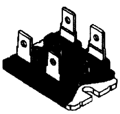
Conclusion

This short note provides the designer with the rules to properly estimate the conduction losses in a power diode. It also highlights the limitation of the traditional forward characteristic model V_F = Vto + rd I_F, gives a value very pessimistic at high level current.

PACKAGE INFORMATION

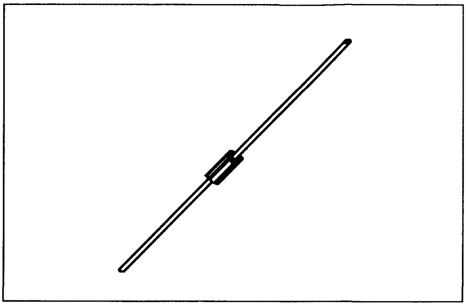
SGS-THOMSON
MICROELECTRONICS

RECTIFIERS AND SCHOTTKY DIODES PACKAGES

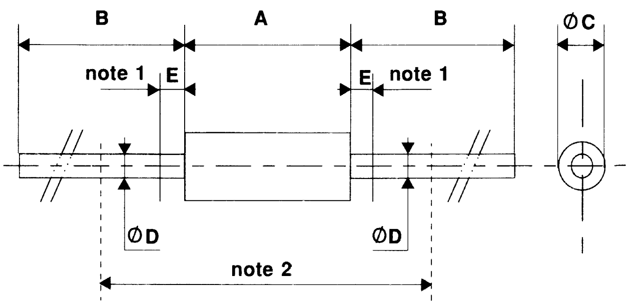
	DO35  P 2/27	DO41  P 3/27	F126  P 4/27
DO27A  P 5/27	AG  P 6/27	MINIMELF  P 7/27	MELF  P 8/27
SOT23  P 9/27	SOT223  P 10/27	SOD6  P 11/27	SOD15  P 12/27
PowerSO-10™  P 13/27	TO220AC  P 14/27	TO220AB  P 15/27	SOD93  P 16/27
SOT93  P 17/27	ISOWATT220AC  P 18/27	ISOWATT220AB  P 19/27	Isolated TO220AC  P 20/27
Isolated TO220AB  P 21/27	DOP3I  P 22/27	TOP3I  P 23/27	ISOTOP® screw version  P 24/27
ISOTOP® fast-on version  P 25/27	DO4  P 26/27	DO5  P 27/27	

AXIAL

Weight = 0.15 g
Marking : clear, ring at cathode end
Cooling method : by convertion and conduction

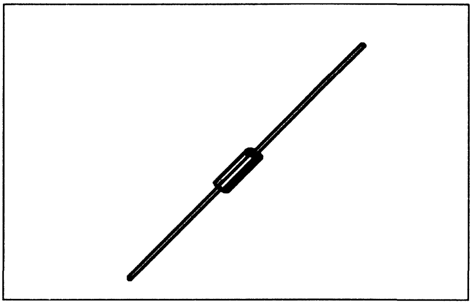


REF.	DIMENSIONS				NOTES
	Millimeters		Inches		
	Min.	Max.	Min.	Max.	
A	3.050	4.500	0.120	0.117	1 - The lead diameter ∅ D is not controlled over zone E
B	12.7		0.500		2 - The minimum axial lengh within which the device may be placed with its leads bent at right angles is 0.59"(15 mm)
∅ C	1.530	2.000	0.060	0.079	
∅ D	0.458	0.558	0.018	0.022	
E		1.27		0.050	

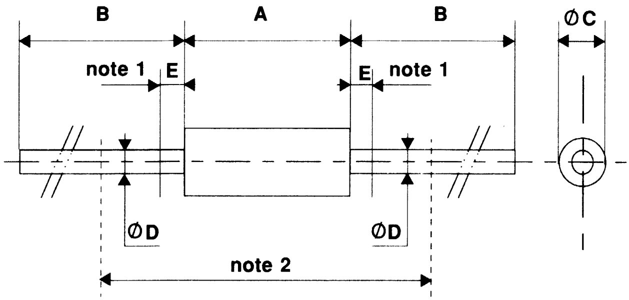


AXIAL

Weight = 0.34 g
Marking : clear, ring at cathode end
Cooling method : by convertion and conduction

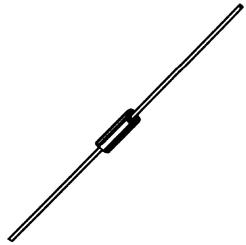


REF.	DIMENSIONS				NOTES
	Millimeters		Inches		
	Min.	Max.	Min.	Max.	
A	4.070	5.200	0.160	0.205	1 - The lead diameter ∅ D is not controlled over zone E 2 - The minimum axial lengh within which the device may be placed with its leads bent at right angles is 0.59"(15 mm)
B	28		1.102		
∅ C	2.040	2.710	0.080	0.107	
∅ D	0.712	0.863	0.028	0.034	
E		1.27		0.050	

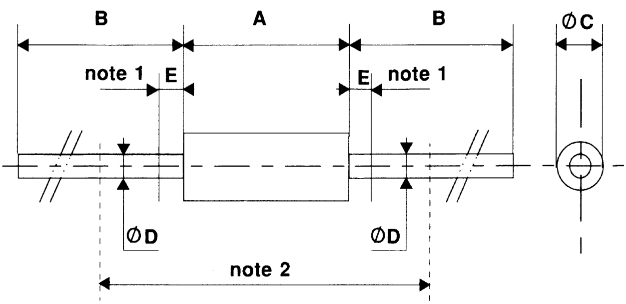


AXIAL

Weight = 0.4 g
Marking : clear, ring at cathode end
Cooling methode : by convertion (method A)



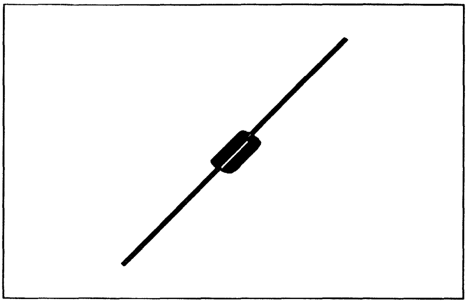
REF.	DIMENSIONS				NOTES
	Millimeters		Inches		
	Min.	Max.	Min.	Max.	
A	6.05	6.35	0.238	0.250	1 - The lead diameter ∅ D is not controlled over zone E 2 - The minimum axial lengh within which the device may be placed with its leads bent at right angles is 0.59"(15 mm)
B	26		1.024		
∅ C	2.95	3.05	0.116	0.120	
∅ D	0.76	0.86	0.029	0.034	
E		1.27		0.050	



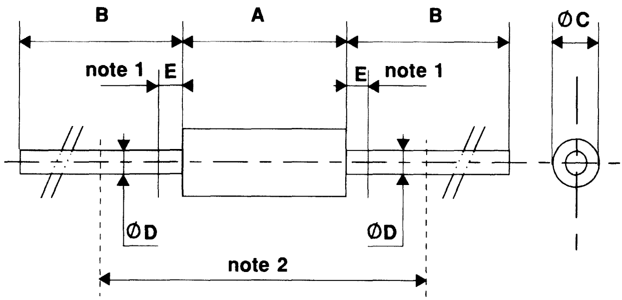
DO27A

AXIAL

Weight = 1 g
Marking : Type number
White band indicates cathode
Cooling method : by convertion (method A)

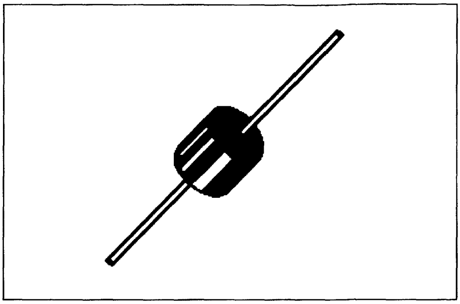


REF.	DIMENSIONS				NOTES
	Millimeters		Inches		
	Min.	Max.	Min.	Max.	
A		9.80		0.385	
B	26		1.024		1 - The lead diameter ∅ D is not controlled over zone E
∅ C		5.10		0.200	2 - The minimum axial lengh within which the device may be placed with its leads bent at right angles is 0.59"(15 mm)
∅ D		1.28		0.050	
E		1.25		0.049	

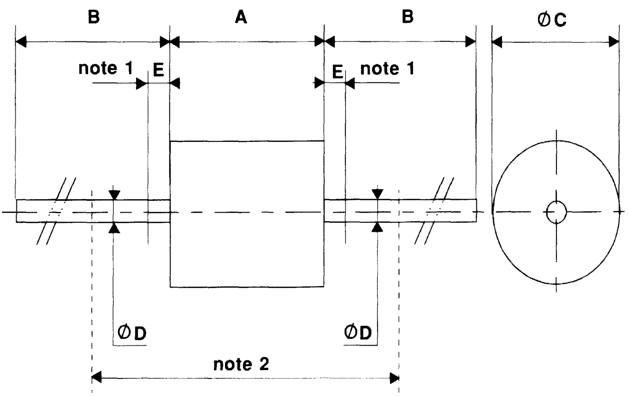


AXIAL

Weight = 1 g
Marking : Type number
White band indicates cathode
Cooling method : by convertion (method A)



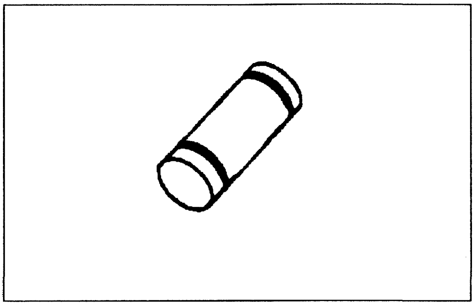
REF.	DIMENSIONS				NOTES
	Millimeters		Inches		
	Min.	Max.	Min.	Max.	
A		9		0.354	1- The lead diameter ∅ D is not controlled over zone E. 2- The minimum axial lengh within which the device may be placed bent at right angles is 0.79" (20 mm).
B	20		0.787		
∅ C		8		0.315	
∅ D	1.35	1.45	0.053	0.057	
E		1.27		0.050	



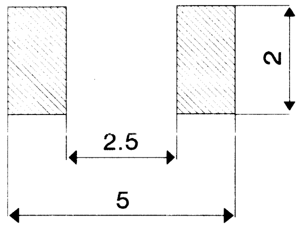
MINIMELF

SMD

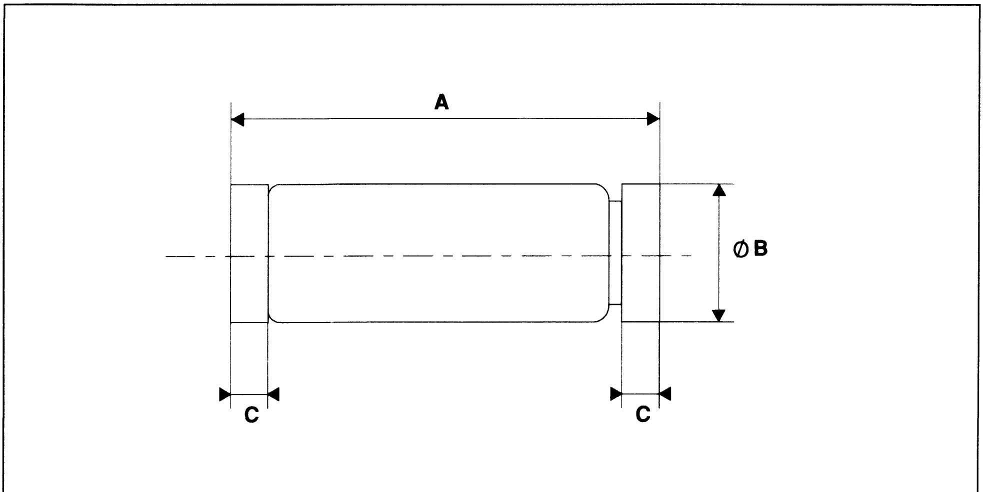
Weight = 0.15 g
Marking : clear, ring at cathode end



FOOT PRINT



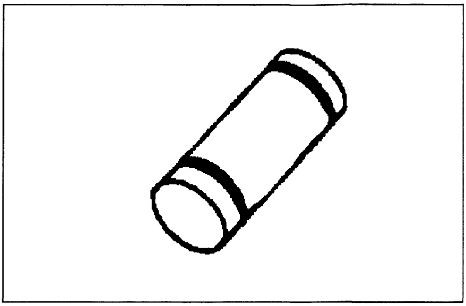
REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	3.3	3.6	0.13	0.14
B	1.59	1.62	0.06	0.06
C	0.4	0.5	0.02	0.02



Weight = 0.55 g

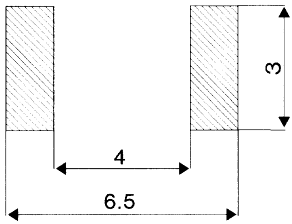
Marking : clear, ring at cathode end

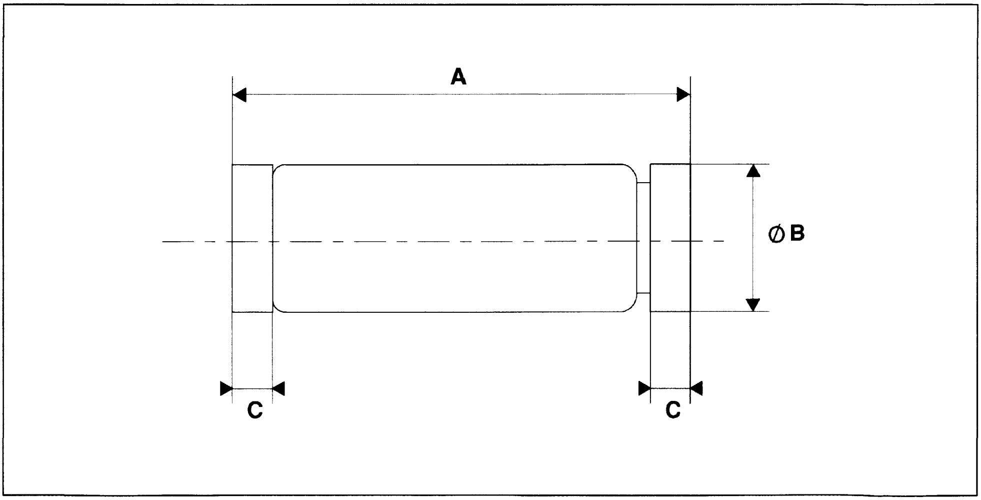
Cooling method : by convertion and conduction



REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.80	5.20	0.19	0.20
B	2.55	2.65	0.10	0.10
C	0.45	0.55	0.02	0.02

FOOT PRINT



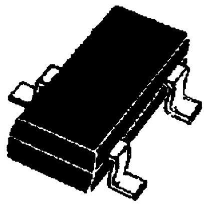


SGS-THOMSON MICROELECTRONICS

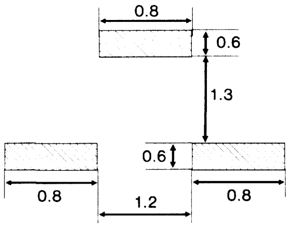
SOT23

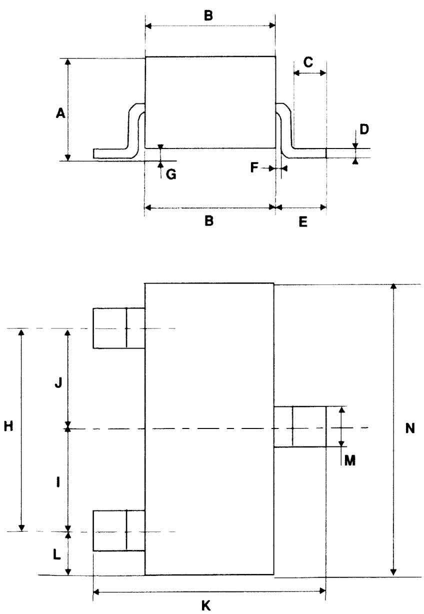
SMD

Weight = 0.007 g



FOOT PRINT



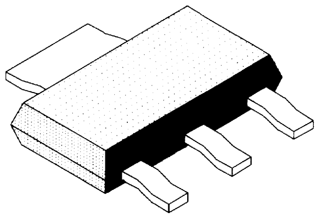


REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	0.93	1.04	0.0376	0.0410
B	1.20	1.40	0.0472	0.0551
C	0.15		0.0059	
D	0.085	0.115	0.0033	0.0045
E	0.45	0.60	0.0177	0.0236
F	0.08		0.00031	
G	0.013	0.10	0.00051	0.00039
H	1.90	2.05	0.0748	0.0807
I	0.95	1.05	0.0374	0.0413
J	0.95	1.05	0.0374	0.0413
K	2.10	2.50	0.0827	0.0984
L	0.45	0.60	0.0177	0.0236
M	0.37	0.46	0.0145	0.0181
N	2.80	3.00	0.110	0.118

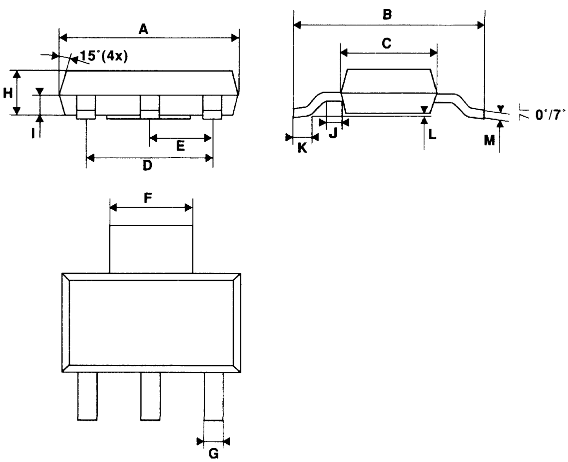
SOT223

SMD

Weight = 0.11 g



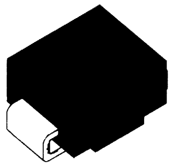
REF.	DIMENSIONS					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	6.30	6.50	6.70	0.248	0.256	0.264
B	6.70	7.00	7.30	0.264	0.275	0.287
C	3.30	3.50	3.70	0.130	0.139	0.146
D		4.60			0.181	
E		2.30			0.090	
F	2.90	3.00	3.10	0.114	0.118	0.122
G	0.60	0.70	0.80	0.023	0.027	0.031
H	1.50	1.60	1.70	0.059	0.063	0.067
I	0.43	0.45	0.47	0.017	0.018	0.019
J	0.50	0.60	0.70	0.019	0.023	0.027
K	0.63	0.65	0.67	0.024	0.025	0.026
L		0.05			0.002	
M			0.32			0.012



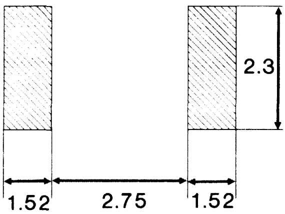
SOD6

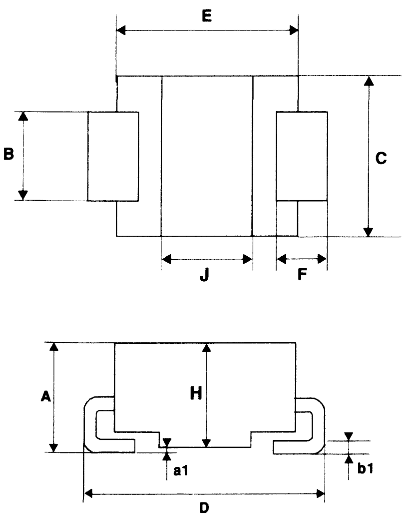
SMD

Marking laser



FOOT PRINT



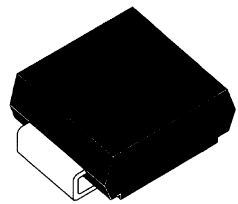


REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	2.44	2.62	0.096	0.103
a1	0.10	0.20	0.004	0.008
B	1.96	2.11	0.077	0.083
b1	0.25	0.35	0.010	0.014
C	3.65	3.93	0.143	0.155
D	5.39	5.59	0.212	0.220
E	4.15	4.30	0.163	0.170
F	1.00	1.27	0.039	0.050
H	2.33	2.41	0.092	0.095
J	2.05	2.13	0.080	0.084

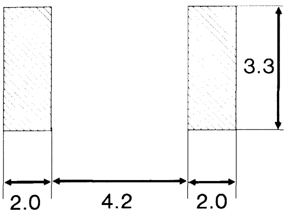
SOD15

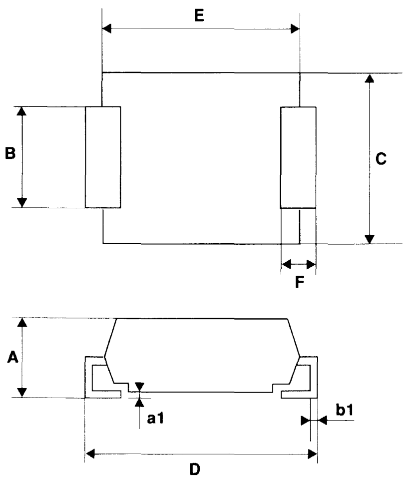
SMD

Marking laser



FOOT PRINT



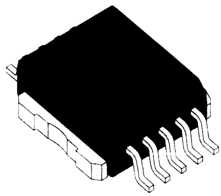


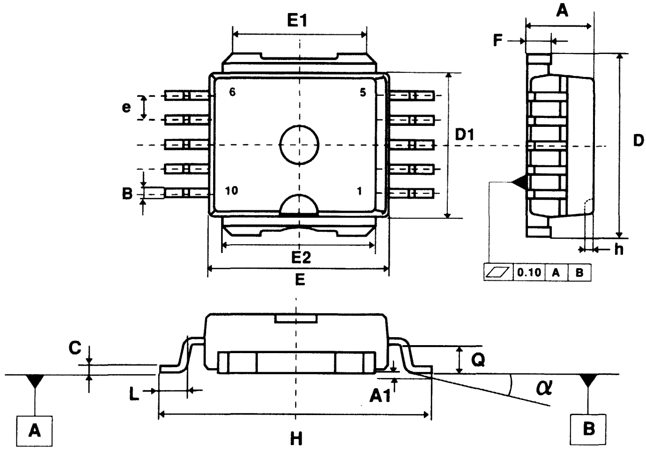
REF.	IMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	2.50	3.10	0.098	0.122
a1	0.05	0.20	0.002	0.008
B	2.90	3.10	0.114	0.122
b1	0.29	0.32	O.O11	0.012
C	4.80	5.20	0.189	0.204
D	7.60	8.00	0.299	0.315
E	6.30	6.60	2.225	0.259
F	1.30	1.70	0.051	0.056

PowerSO-10™

SMD

REF.	DIMENSIONS					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	3.35		3.65	0.132		0.144
A1			0.10			0.004
B	0.40		0.60	0.016		0.023
C	0.35		0.55	0.013		0.021
D	9.40		9.60	0.370		0.378
D1	7.40		7.60	0.290		0.300
E	9.30		9.50	0.366		0.374
E1		6.15			0.242	
E2	7.20		7.40	0.283		0.290
e		1.27			0.050	
F	1.25		1.35	0.049		0.053
H	13.80		14.40	0.425		0.567
h		0.50			0.002	
L	0.80		1.30	0.031		0.05
Q		1.70			0.067	
α	0°		8°			

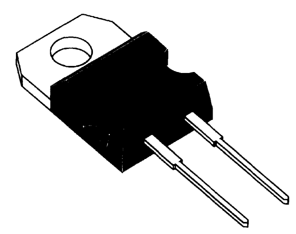




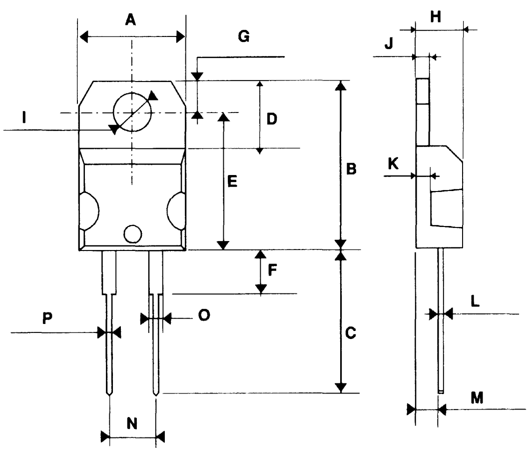
TO220AC

PLASTIC

REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	9.66	10.66	0.380	0.419
B	15.2	15.9	0.598	0.626
C	13	14	0.511	0.551
D	6.2	6.6	0.244	0.260
E	16.4 typ.		0.645 typ.	
F	3.5	4.2	0.137	0.165
G	2.65	2.95	0.104	0.116
H	4.4	4.6	0.173	0.181
I	3.75	3.85	0.147	0.151
J	1.23	1.32	0.048	0.051
K	1.27 typ.		0.050 typ.	
L	0.49	0.70	0.019	0.027
M	2.4	2.72	0.094	0.107
N	4.95	5.15	0.194	0.203
O	1.14	1.70	0.044	0.067
P	0.61	0.88	0.024	0.034



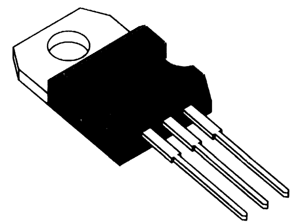
Weight = 1.9 g
Marking : Type number
Cooling method : C
Recommended torque value : 0.55 m.N.
Maximum torque value : 0.70 m.N.



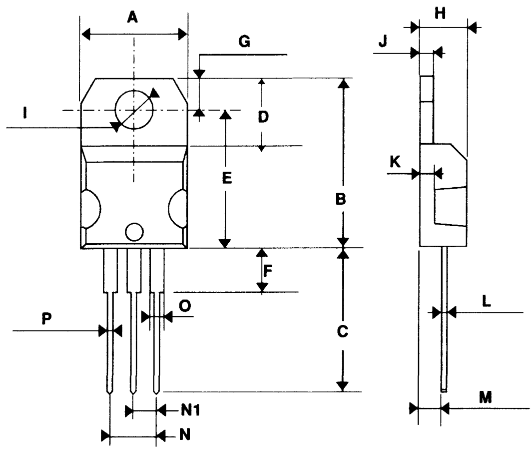
TO220AB

PLASTIC

REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	9.66	10.66	0.380	0.419
B	15.2	15.9	0.598	0.626
C	13	14	0.511	0.551
D	6.2	6.6	0.244	0.260
E	16.4 typ.		0.645 typ.	
F	3.5	4.2	0.137	0.165
G	2.65	2.95	0.104	0.116
H	4.4	4.6	0.173	0.181
I	3.75	3.85	0.147	0.151
J	1.23	1.32	0.048	0.051
K	1.27 typ.		0.050 typ.	
L	0.49	0.70	0.019	0.027
M	2.4	2.72	0.094	0.107
N	4.95	5.15	0.194	0.203
N1	2.40	2.70	0.094	0.106
O	1.14	1.70	0.044	0.067
P	0.61	0.88	0.024	0.034



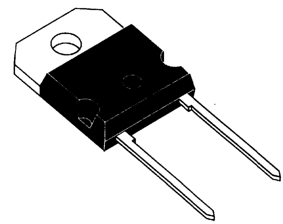
Weight = 2 g
Marking : Type number
Cooling method : C
Recommended torque value : 0.55 m.N.
Maximum torque value : 0.70 m.N.



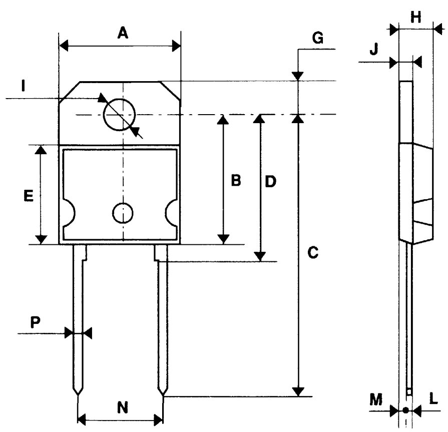
SOD93

PLASTIC

REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	14.7	15.2	0.578	0.596
B		16.2		0.637
C	31 typ		1.220 typ	
D	18 typ		0.708 typ	
E		12.2		0.480
G	3.95	4.15	0.155	0.163
H	4.7	4.9	0.185	0.193
I	4	4.1	0.157	0.161
J	1.17	1.37	0.046	0.054
L	0.5	0.78	0.019	0.030
M	2.5 typ		0.098 typ	
N	10.8	11.1	0.425	0.437
P	1.1	1.3	0.043	0.051

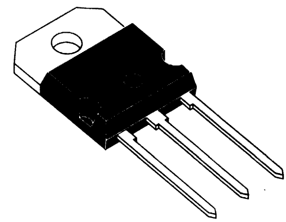


Weight = 4 g
Marking : Type number
Cooling method : C
Recommended torque value : 0.8 m.N.
Maximum torque value : 1.0 m.N.

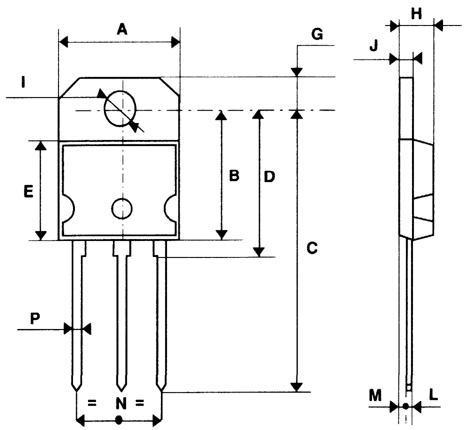


PLASTIC

REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	14.7	15.2	0.578	0.596
B		16.2		0.637
C	31 typ		1.220 typ	
D	18 typ		0.708 typ	
E		12.2		0.480
G	3.95	4.15	0.155	0.163
H	4.7	4.9	0.185	0.193
I	4	4.1	0.157	0.161
J	1.17	1.37	0.046	0.054
L	0.5	0.78	0.019	0.030
M	2.5 typ		0.098 typ	
N	10.8	11.1	0.425	0.437
P	1.1	1.3	0.043	0.051

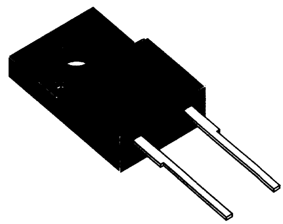


Weight = 4.1 g
Marking : Type number
Cooling method : C
Recommended torque value : 0.8 m.N.
Maximum torque value : 1.0 m.N.

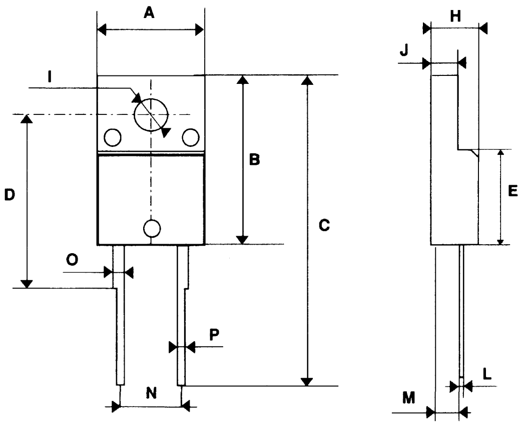


ISOLATED PLASTIC

REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	10	10.4	0.393	0.409
B	15.9	16.4	0.626	0.645
C	28.6	30.6	1.126	1.204
D	16 typ		0.630 typ	
E	9	9.3	0.354	0.366
H	4.4	4.6	0.173	0.181
I	3	3.2	0.118	0.126
J	2.5	2.7	0.098	0.106
L	0.4	0.7	0.015	0.027
M	2.4	2.75	0.094	0.108
N	4.95	5.2	0.195	0.204
O	1.15	1.7	0.045	0.067
P	0.75	1	0.030	0.039



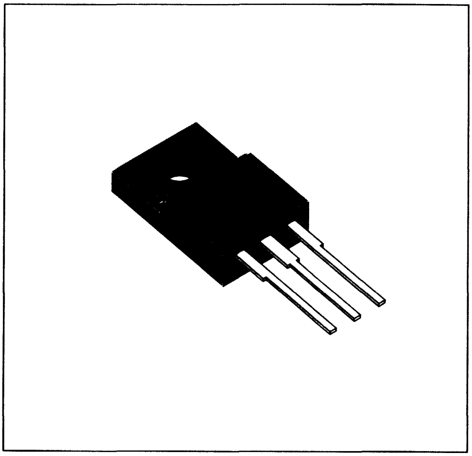
Weight = 2 g
Marking : Type number
Cooling method : C
Recommended torque value : 0.55 m.N.
Maximum torque value : 0.70 m.N.
Electrical isolation : 2000V DC
Capacitance : 12 pF



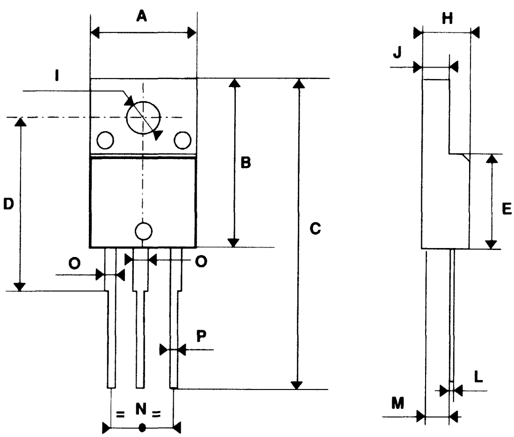
ISOWATT220AB

ISOLATED PLASTIC

REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	10	10.4	0.393	0.409
B	15.9	16.4	0.626	0.645
C	28.6	30.6	1.126	1.204
D	16 typ		0.630 typ	
E	9	9.3	0.354	0.366
H	4.4	4.6	0.173	0.181
I	3	3.2	0.118	0.126
J	2.5	2.7	0.098	0.106
L	0.4	0.7	0.015	0.027
M	2.4	2.75	0.094	0.108
N	4.95	5.2	0.195	0.204
O	1.15	1.7	0.045	0.067
P	0.75	1	0.030	0.039



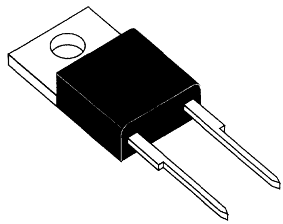
Weight = 2.1 g
Marking : Type number
Cooling method : C
Recommended torque value : 0.55 m.N.
Maximum torque value : 0.70 m.N.
Electrical isolation : 2000V DC
Capacitance : 12 pF



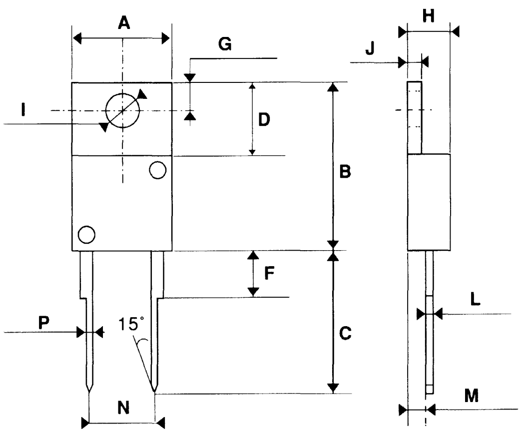
Isolated TO220AC

ISOLATED PLASTIC

REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	10.20	10.45	0.401	0.411
B	14.23	15.87	0.560	0.625
C	12.70	14.70	0.500	0.579
D	5.85	6.85	0.230	0.270
F		4.50		0.178
G	2.54	3.00	0.100	0.119
H	4.48	4.82	0.176	0.190
I	3.55	4.00	0.139	0.158
J	1.15	1.39	0.045	0.055
L	0.35	0.65	0.013	0.026
M	2.10	2.70	0.082	0.107
N	4.58	5.58	0.18	0.22
P	0.64	0.96	0.025	0.038

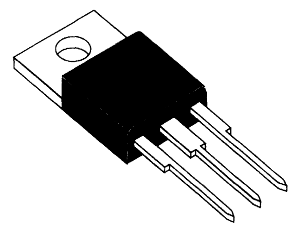


Weight = 2.2 g
Marking : Type number
Cooling method : C
Recommended torque value : 0.8 m.N.
Maximum torque value : 1.0 m.N.
Electrical isolation : 2500V DC
Capacitance : 7 pF

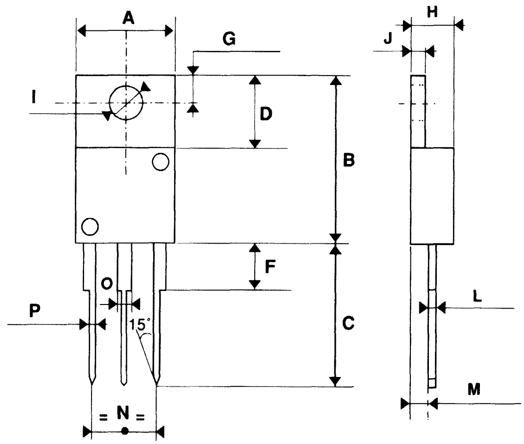


ISOLATED PLASTIC

REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	10.20	10.45	0.401	0.411
B	14.23	15.87	0.560	0.625
C	12.70	14.70	0.500	0.579
D	5.85	6.85	0.230	0.270
F		4.50		0.178
G	2.54	3.00	0.100	0.119
H	4.48	4.82	0.176	0.190
I	3.55	4.00	0.139	0.158
J	1.15	1.39	0.045	0.055
L	0.35	0.65	0.013	0.026
M	2.10	2.70	0.082	0.107
N	4.58	5.58	0.18	0.22
O	0.80	1.20	0.031	0.048
P	0.64	0.96	0.025	0.038

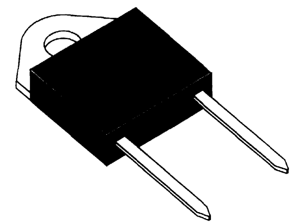


Weight = 2.3 g
Marking : Type number
Cooling method : C
Recommended torque value : 0.8 m.N.
Maximum torque value : 1.0 m.N.
Electrical isolation : 2500V DC
Capacitance : 7 pF

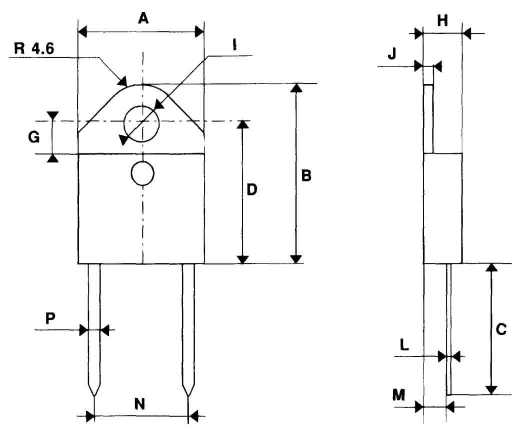


ISOLATED PLASTIC

REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	15.10	15.50	0.594	0.611
B	20.70	21.10	0.814	0.831
C	14.30	15.60	0.561	0.615
D	16.10	16.50	0.632	0.650
G	3.40	-	0.133	-
H	4.40	4.60	O.173	0.182
I	4.08	4.17	0.161	0.164
J	1.45	1.55	0.057	0.062
L	0.50	0.70	0.019	0.028
M	2.70	2.90	0.106	0.115
N	10.80	11.30	0.42	0.45
P	1.20	1.40	0.047	0.056

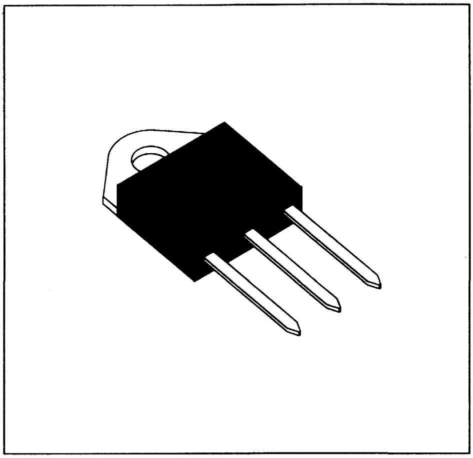


Weight = 4.6 g
Marking : Type number
Cooling method : C
Recommended torque value : 0.8 m.N.
Maximum torque value : 1.0 m.N.
Electrical isolation : 2500V DC
Capacitance : 12 pF

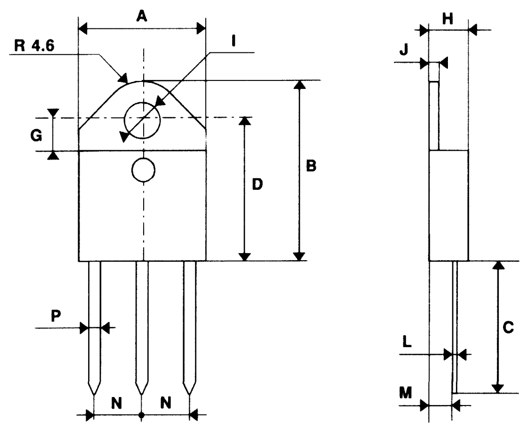


ISOLATED PLASTIC

REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	15.10	15.50	0.594	0.611
B	20.70	21.10	0.814	0.831
C	14.30	15.60	0.561	0.615
D	16.10	16.50	0.632	0.650
G	3.40	-	0.133	-
H	4.40	4.60	0.173	0.182
I	4.08	4.17	0.161	0.164
J	1.45	1.55	0.057	0.062
L	0.50	0.70	0.019	0.028
M	2.70	2.90	0.106	0.115
N	5.40	5.65	0.212	0.223
P	1.20	1.40	0.047	0.056

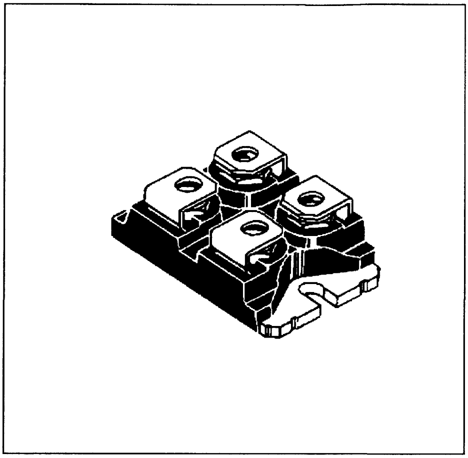


Weight = 4.7 g
Marking : Type number
Cooling method : C
Recommended torque value : 0.8 m.N.
Maximum torque value : 1.0 m.N.
Electrical isolation : 2500V DC
Capacitance : 12 pF

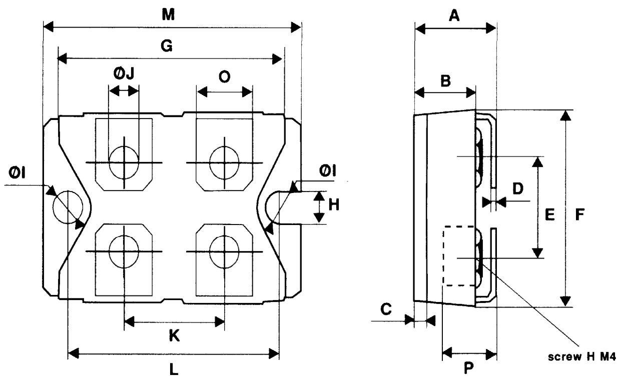


ISOLATED PLASTIC

REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	11.80	12.20	0.465	0.480
B	8.90	9.10	0.350	0.358
C	1.95	2.05	0.077	0.081
D	0.75	0.85	0.029	0.034
E	12.60	12.80	0.496	0.504
F	25.10	25.50	0.988	1.004
G	31.50	31.70	1.240	1.248
H	4.00		0.157	
I	4.10	4.30	0.161	0.169
J	4.10	4.30	0.161	0.169
K	14.90	15.10	0.586	0.595
L	30.10	30.30	1.185	1.193
M	37.80	38.20	1.488	1.504
O	7.80	8.20	0.307	0.323
P	5.50		0.216	



Weight = 28 g (without screws)
Marking : Type number
Cooling method : C
Electrical isolation : 2500V(RMS)
Capacitance : < 45 pF
Inductance : < 5 nH

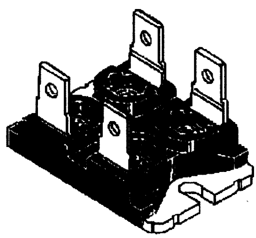


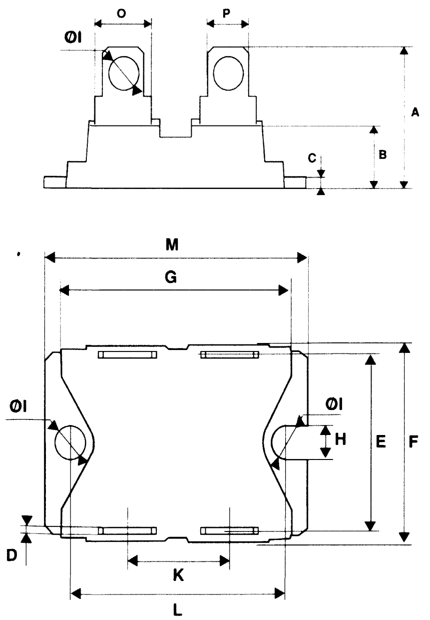
- Recommended torque value : 1.3 N.m (MAX 1.5 N.m) for the 6 x M4 screws. (2 x M4 screws recommended for mounting the package on the heatsink and the 4 screws given with the screw version).
- The screws supplied with the package are adapted for mounting on a board (or other types of terminals) with a thickness of 0.6 mm min and 2.2 mm max.

ISOTOP® fast-on version

ISOLATED PLASTIC

Weight = 28 g (without screws)
Marking : Type number
Cooling method : C
Electrical isolation : 2500V(RMS)
Capacitance : < 45 pF
Inductance : < 5 nH



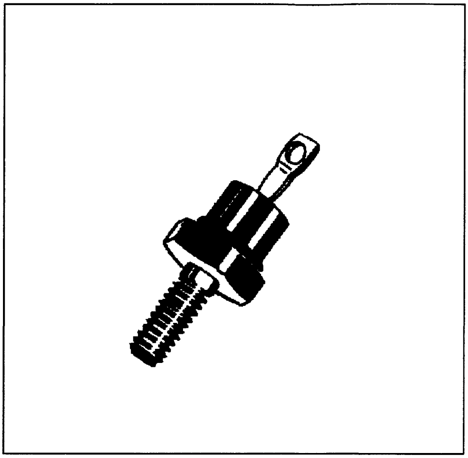


REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	20.30	20.70	0.799	0.815
B	8.90	9.10	0.350	0.358
C	1.958	2.05	0.078	0.081
D	0.75	0.87	0.029	0.034
E	22.00	22.40	0.866	0.882
F	25.10	25.50	0.988	1.004
G	31.50	31.70	1.240	1.248
H	4.00		1.57	
I	4.10	4.30	0.161	0.169
J	2.50	2.60	0.098	1.103
K	14.90	15.10	0.580	0.595
L	30.10	30.30	1.185	1.193
M	37.80	38.20	1.488	1.504
N	4.10	4.30	0.161	0.169
O	7.80	8.20	0.307	0.323
P	6.20	6.40	0.244	0.252

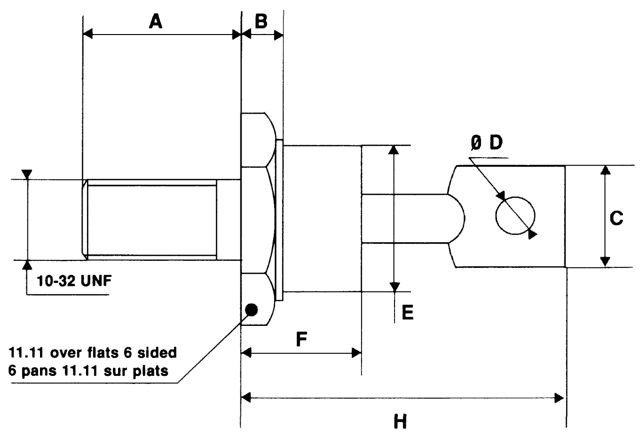
DO4

METALLIC

REF.	DIMENSIONS					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	10.72		11.50	0.422		0.453
B	2.00		4.40	0.079		0.0173
C			6.35			0.25
D	1.53			0.060		
E			10.76			0.424
F			10.28			0.405
H			20.32			0.800

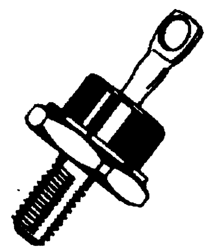


Weight = 5.1g
Marking : Cathode connected to case : type number
Cooling method : by convertion (method C)
Anode connected to case : type number + suffix R (consult us for these reserve version datasheets)
Recommended torque value : 1.8 m.N
Maximum torque value : 2.2 m.N



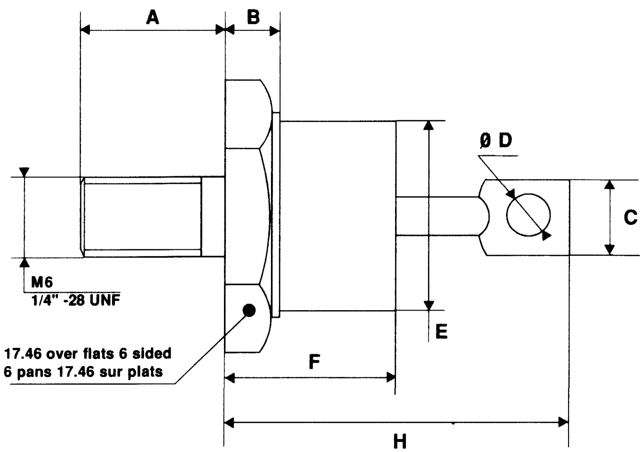
DO5

METALLIC



REF.	DIMENSIONS					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	10.72		12.70	0.422		0.500
B	2.93		5.08	0.115		0.200
C			9.52			0.375
D	3.56		4.44	0.140		0.175
E			16.94			0.667
F			12.70			0.500
H			25.40			1

Weight = 18.84g
Marking : Cathode connected to case : type number
Cooling method : by convertion (method C)
Anode connected to case : type number + suffix R (consult us for these reserve version datasheets)
Recommended torque value : 2.5 m.N
Maximum torque value : 3.1 m.N



PowerSO-10™

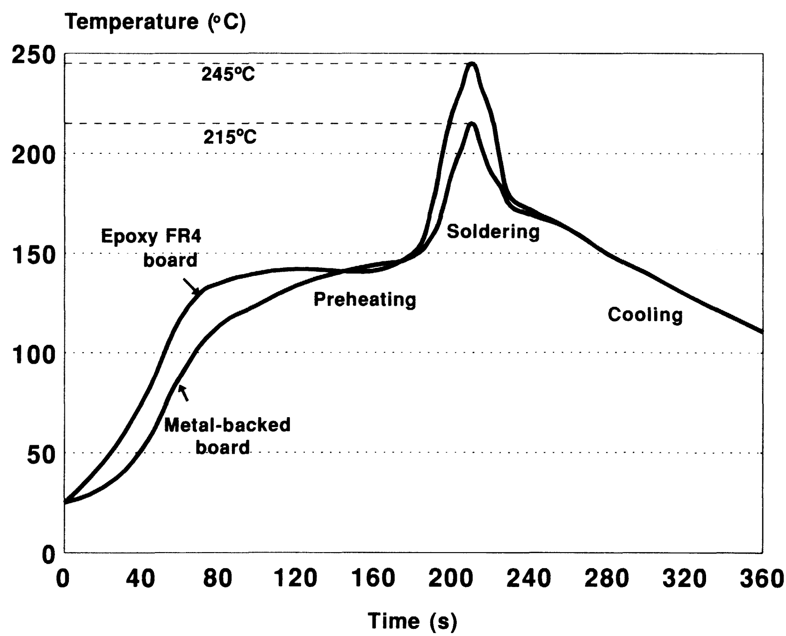
SOLDERING RECOMMENDATION

The soldering process causes considerable thermal stress to a semiconductor component. This has to be minimized to assure a reliable and extended lifetime of the device. The PowerSO-10 package can be exposed to a maximum temperature of 260°C for 10 seconds. However a proper soldering of the package could be done at 215°C for 3 seconds. Any solder temperature profile should be within these limits. As reflow techniques are most common in surface mounting, typical heating profiles are given in Figure 1,either for mounting on FR4 or on metal-backed boards. For each particular board, the appropriate heat profile has to be adjusted experimentally. The present proposal is just a starting point. In any case, the following precautions have to be considered :

- always preheat the device
- peak temperature should be at least 30 °C higher than the melting point of the solder alloy chosen
- thermal capacity of the base substrate

Voids pose a difficult reliability problem for large surface mount devices. Such voids under the package result in poor thermal contact and the high thermal resistance leads to component failures. The PowerSO-10 is designed from scratch to be solely a surface mount package, hence symmetry in the x- and y-axis gives the package excellent weight balance. Moreover, the PowerSO-10 offers the unique possibility to control easily the flatness and quality of the soldering process. Both the top and the bottom soldered edges of the package are accessible for visual inspection (soldering meniscus).
Coplanarity between the substrate and the package can be easily verified. The quality of the solder joints is very important for two reasons : (I) poor quality solder joints result directly in poor reliability and (II) solder thickness affects the thermal resistance significantly. Thus a tight control of this parameter results in thermally efficient and reliable solder joints.

Fig 1 : Typical reflow soldering heat profile



SUBSTRATES AND MOUNTING INFORMATION

The use of epoxy FR4 boards is quite common for surface mounting techniques, however, their poor thermal conduction compromises the otherwise outstanding thermal performance of the PowerSO-10. Some methods to overcome this limitation are discussed below.

One possibility to improve the thermal conduction is the use of large heat spreader areas at the copper layer of the PC board. This leads to a reduction of thermal resistance to 35 °C for 6 cm^2 of the board heatsink (see fig. 2).

Use of copper-filled through holes on conventional FR4 techniques will increase the metallization and decrease thermal resistance accordingly. Using a configuration with 16 holes under the spreader of the package with a pitch of 1.8 mm and a diameter of 0.7 mm, the thermal resistance (junction - heatsink) can be reduced to 12°C/W (see fig. 3). Beside the thermal advantage, this solution allows multi-layer boards to be used. However, a drawback of this traditional material prevent its use in very high power, high current circuits. For instance, it is not advisable to surface mount devices with currents greater than 10 A on FR4 boards. A Power Mosfet or Schottky diode in a surface mount power package can handle up to around 50 A if better substrates are used.

A new technology available today is IMS - an Insulated Metallic Substrate. This offers greatly enhanced thermal characteristics for surface mount components. IMS is a substrate consisting of three different layers, (I) the base material which is available as an aluminium or a copper plate, (II) a thermal conductive dielectrical layer and (III) a copper foil, which can be etched as a circuit layer. Using this material a thermal resistance of 8°C/W with 40 cm^2 of board floating in air is achievable (see fig. 4). If even higher power is to be dissipated an external heatsink could be applied which leads to an R_{th}(j-a) of 3.5°C/W (see Fig. 5), assuming that R_{th} (heatsink-air) is equal to R_{th} (junction-heatsink). This is commonly applied in practice, leading to reasonable heatsink dimensions. Often power devices are defined by considering the maximum junction temperature of the device. In practice , however, this is far from being exploited. A summary of various power management capabilities is made in table 1 based on a reasonable delta T of 70°C junction to air.

Fig 2 : Mounting on epoxy FR4 head dissipation by extending the area of the copper layer

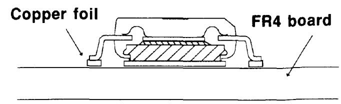


Fig 3 : Mounting on epoxy FR4 by using copper-filled through holes for heat transfer

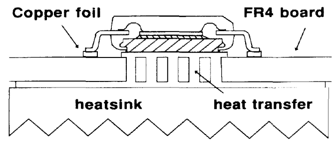


Fig 4 : Mounting on metal backed board

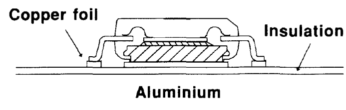
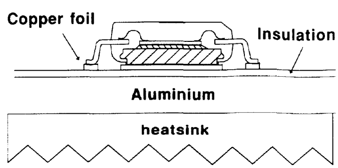


Fig 5 : Mounting on metal backed board with an external heatsink applied



SUBSTRATES AND MOUNTING INFORMATION

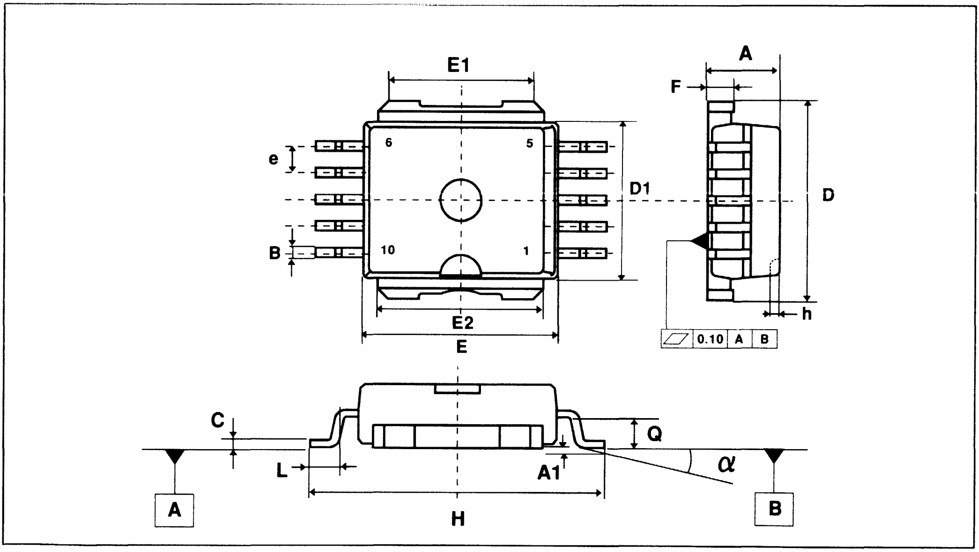
(cont'd)

The PowerSO-10 concept also represents an attractive alternative to C.O.B. techniques. PowerSO-10 offers devices fully tested at low and high temperature. Mounting is simple - only conventional SMT is required - enabling the users to get rid of bond wire problems and the problem to control the high temperature soft soldering as well. An optimized thermal management is guaranteed through PowerSO-10 as the power chips must in any case be mounted on heat spreaders before being mounted onto the substrate.

TABLE 1

PowerSo-10 package mounted on	R_{th} (j-a)	P Diss
1.FR4 using the recommended pad-layout	50 °C/W	1.5 W
2.FR4 with heatsink on board (6cm^2)	35 °C/W	2.0 W
3.FR4 with copper-filled through holes and external heatsink applied	12 °C/W	5.8 W
4. IMS floating in air (40 cm^2)	8 °C/W	8.8 W
5. IMS with external heatsink applied	3.5 °C/W	20 W

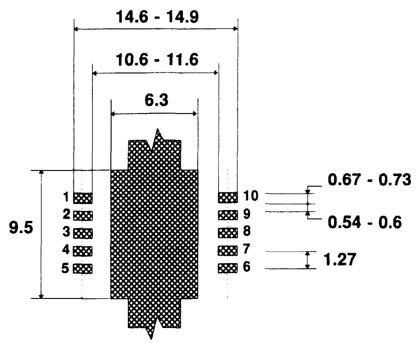
PACKAGE MECHANICAL DATA



DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	3.35		3.65	0.132		0.144
A1			0.10			0.004
B	0.40		0.60	0.016		0.023
C	0.35		0.55	0.013		0.021
D	9.40		9.60	0.370		0.378
D1	7.40		7.60	0.290		0.300
E	9.30		9.50	0.366		0.374
E1		6.15			0.242	

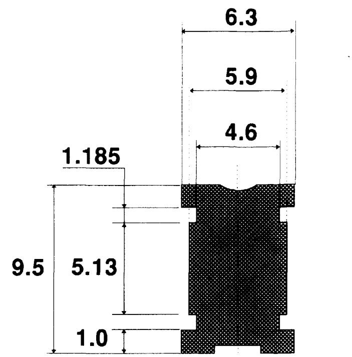
DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
E2	7.20		7.40	0.283		0.290
e		1.27			0.05	
F	1.25		1.35	0.049		0.053
H	13.80		14.40	0.425		0.567
h		0.50			0.002	
L	0.80		1.30	0.031		0.050
Q		1.70			0.067	
α	0°		8°			

FOOT PRINT
MOUNTING PAD LAYOUT RECOMMENDED



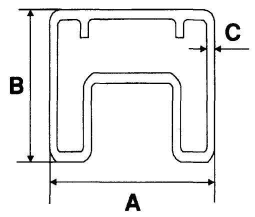
Dimensions in millimeters

HEADER SHAPE



Dimensions in millimeters

SHIPPING TUBE



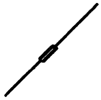
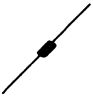
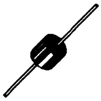
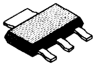
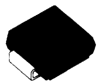
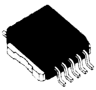
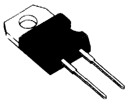
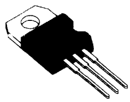
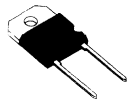
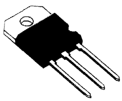
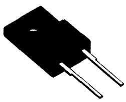
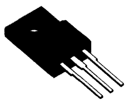
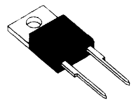
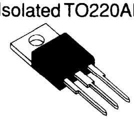
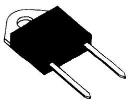
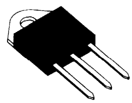
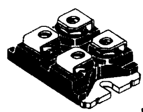
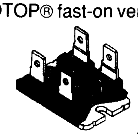
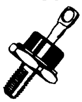
	DIMENSIONS (mm)
	TYP
A B C Length tube	18 12 0,8 532
Quantity per tube	50

Surface mount film taping : contact sales office

PACKAGING INFORMATION

SGS-THOMSON MICROELECTRONICS

RECTIFIERS AND SCHOTTKY DIODES PACKAGING

For the following packages :	DO35  P 2/17 3/17	DO41  P 3/17	F126  P 4/17
DO27A  P 5/17	AG  P 5/17	MINIMELF  P 6/17	MELF  P 6/17
SOT23  P 7/17	SOT223  P 8/17	SOD6  P 9/17	SOD15  P 9/17
PowerSO-10™  P 10/17	TO220AC  P 11/17	TO220AB  P 11/17	SOD93  P 12/17
SOT93  P 12/17	ISOWATT220AC  P 13/17	ISOWATT220AB  P 13/17	Isolated TO220AC  P 14/17
Isolated TO220AB  P 14/17	DOP3I  P 15/17	TOP3I  P 15/17	ISOTOP® screw version  P16/17
ISOTOP® fast-on version  P 16/17	DO4  P 17/17	DO5  P 17/17	

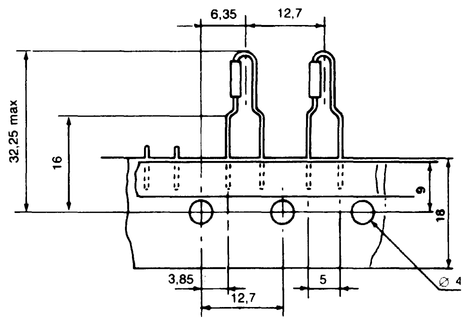
PACKAGING

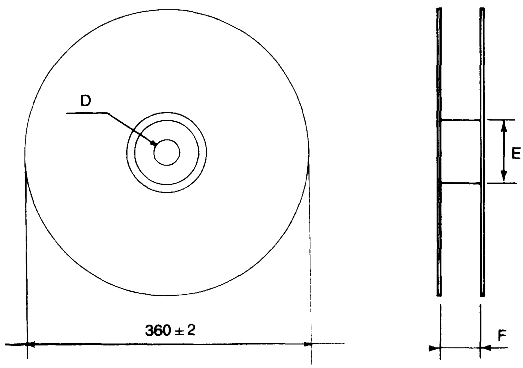
AXIAL

RADIAL TAPING

Suffixes	Base Qty	Reel dimensions		
		D	E	F
ARX AZX	400 350	30	80	40

Note : Sizes are given in millimeters





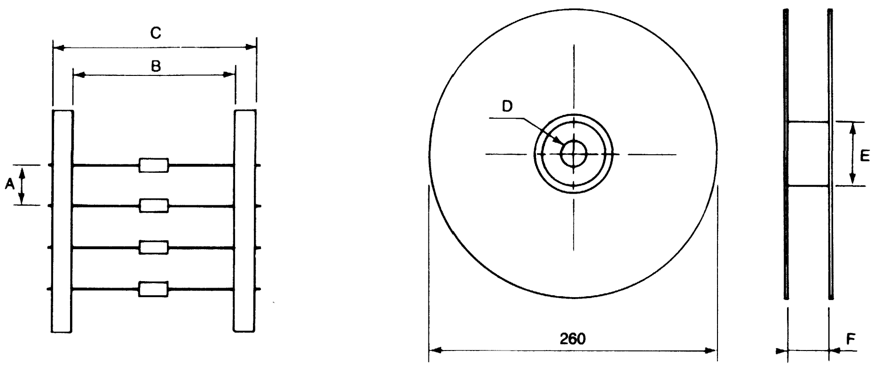
PACKAGING

AXIAL

RADIAL TAPING

Case	Suffixes	Base Qty	Component spacing	Tape spacing		Reel dimensions		
			A	B	C	D	E	F
DO35	-	5000	5 ± 0.5	53 ± 2	65 ± 2	20	40	70
DO35	B2	5000	5 ± 0.5	26 ± 2	65 ± 2	20	40	70
DO41	-	3000	5 ± 0.5	53 ± 2	65 ± 2	20	40	70

Note : Sizes are given in millimeters



Note: All polarized components must be oriented in one direction
The Cathode lead lape shall be red. and the anode tape shall be while.

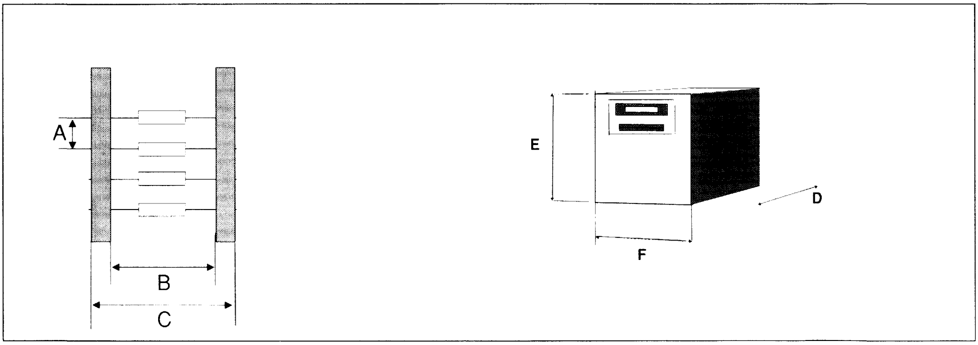
PACKAGING

AXIAL

FAN FOLD BOX PACKGING

Base Qty	Component spacing	Tape spacing		Reel dimensions		
	A	B	C	D	E	F
6000	5 ± 0.5	58 ± 2	65 ± 2	255	85	82

All dimensions are in millimeters



Note : All polarised components are oriented with their cathode tape coloured red and their anode tape white. Unpolarised components have both tapes coloured red.

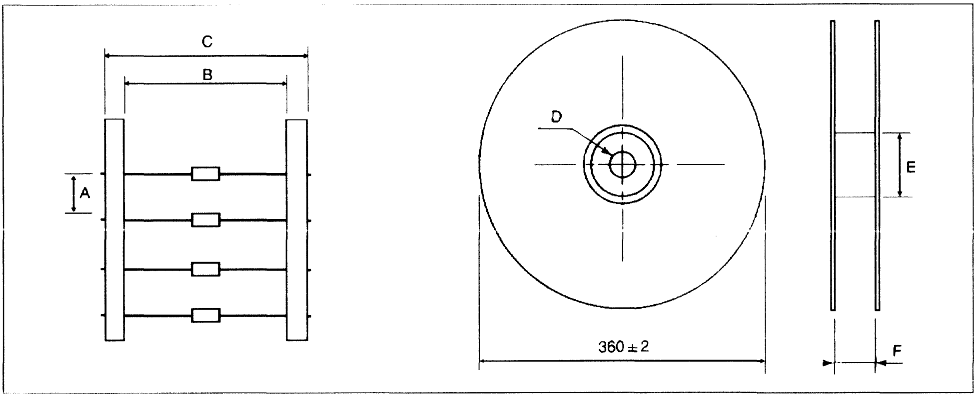
PACKAGING

AXIAL

TAPE AND REEL PACKAGING

Case	Base Qty	Component spacing	Tape spacing		Reel dimensions		
		A	B	C	D	E	F
DO27A AG	1900 1000	5 ± 0.5 10 ± 0.5	53 ± 2 43 ± 2	65 ± 2 55 ± 2	31.5 31.5	86 86	75min 75min

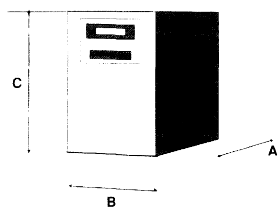
All dimensions are in millimeters



Note : All polarised components are oriented with their cathode tape coloured red and their anode tape white. Unpolarised components have both tapes coloured red.

MATCHBOX PACKAGING

Case	Base Qty	box dimensions		
		A	B	C
DO27A AG	600 100	149 149	62 62	80 80

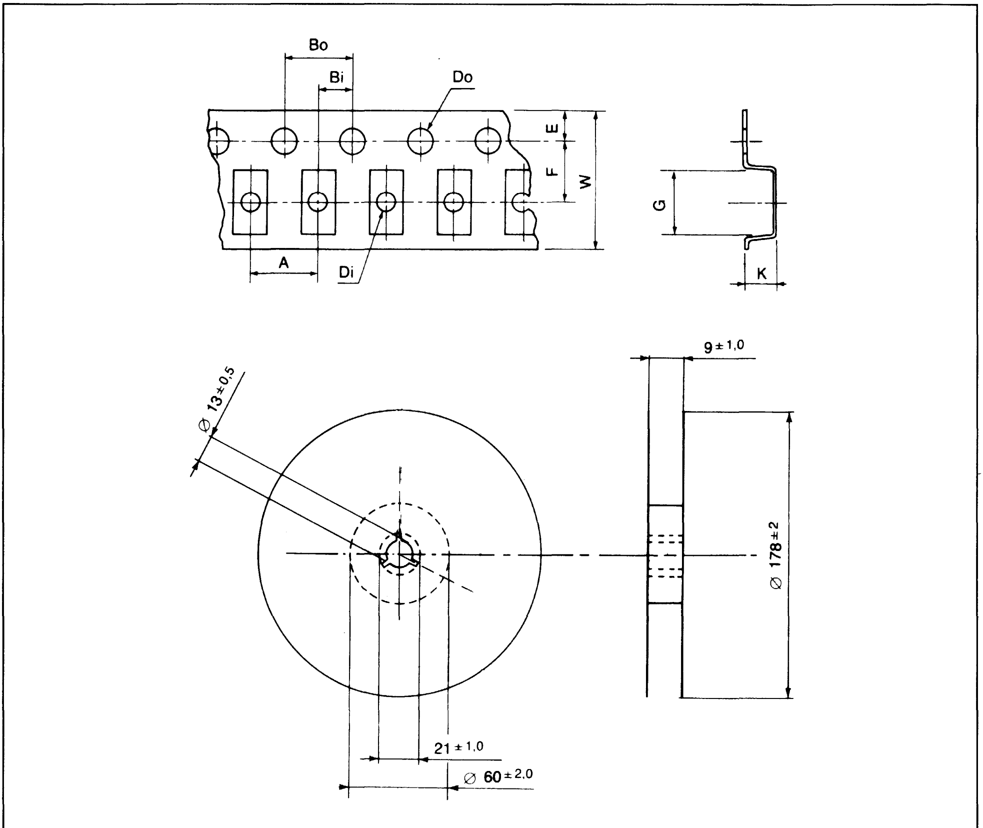


PACKAGING SMD

SURFACE MOUNT

Case	Base Qty	Component spacing	Holes spacing		Holes diameter		Holes Position		Compartment dimension	Compartment depth	Tape width
		A	Bo	Bi	Do	Di	E	F	G	K	W
MINIMELF	2500	4 ± 0.1	4 ± 0.1	2 ± 0.1	1.5	1.0	1.75	3.5	3.8	2.05	8
MELF	1500	4 ± 0.1	4 ± 0.1	2 ± 0.1	1.5	1.5	1.75	3.5	5.3	2.90	12

All dimensions are in millimeters



All Polarised components have Cathode lead oriented towards the perfored side of the film.

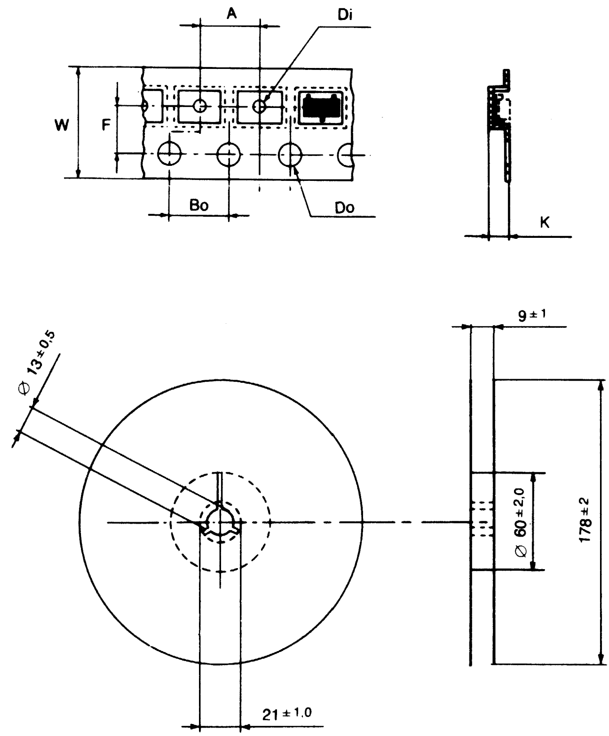
PACKAGING

SMD

SURFACE MOUNT

Base Qty	Component spacing	Holes spacing	Holes diameter		Holes Position	Compartment depth	Tape width
	A	Bo	Do	Di	F	K	W
3000	4 ± 0.1	4 ± 0.1	1.5	1.0	3.5	1.55	8

All dimensions are in millimeters

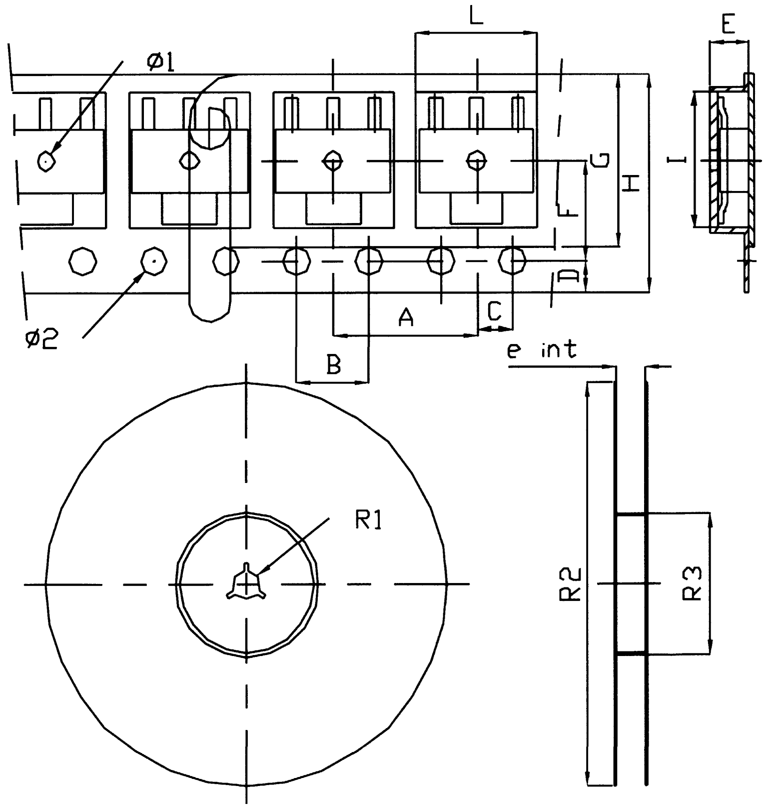


PACKAGING

SMD

SURFACE MOUNT

Base Qty	mm	Reel dimensions															
		A	B	C	D	E	e int	F	G	H	L	I	R1	R2	R3	Ø1	Ø2
1000	min	7.9	3.9	1.95	1.65	-	-	5.45	-	11.8	6.65	7.4				1.6	1.5
	typ	-	-	-	-	-	-	-	-	-	-	-	13	178	90	-	-
	max	8.1	4.1	2.05	1.85	2.2	13	5.55	9.5	12.2	6.85	7.6				1.8	1.6



PACKAGING

SMD

TAPE AND REEL PACKAGING

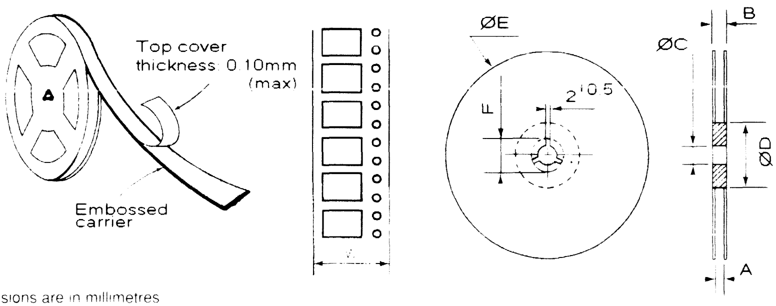
Case	Base Qty	Film width	Reel dimensions					
		W	A	B	C	D	E	F
SOD6[1]	2500	12 ± 0.2	12.4 ± 2	18.4max	13	60 ± 2	330	20.2
SOD15[2]	2500	16 ± 0.2	16.4 ± 2	22.4max	13	60 ± 2	330	20.2

All dimensions are in millimeters

(1) Also known as CB472

(2) Also known as CB473

Note : Polarized devices have their cathode lead orinted towards the perforated side of the film



All dimensions are in millimetres

(1) Also known as *CB472*

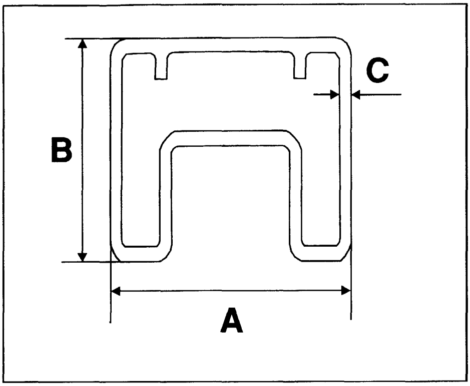
(2) Also known as *CB473*

Note : Polarized devices have their cathode lead oriented toward the perforated side of the film

PACKAGING

SMD

SHIPPING TUPE

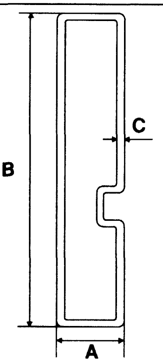


	Dimensions (mm)
	TYP
A	18
B	12
C	0.8
Tube length	532
Quantity per tube	50

Surface mount film taping : contact sales office

PACKAGING PLASTIC

SHIPPING TUPE

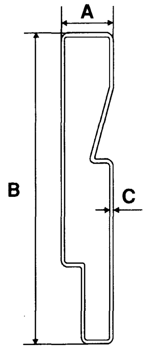


	Dimensions (mm)
	TYP
A	7
B	33
C	0.75
Tube length	532
Quantity per tube	50

PACKAGING

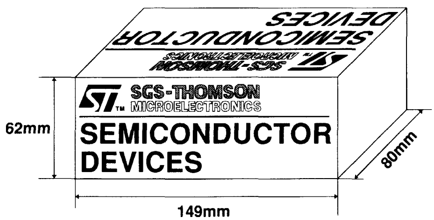
PLASTIC

SHIPPING TUPE



	Dimensions (mm)
	TYP
A	7.4
B	40.5
C	0.5
Tube length	532
Quantity per tube	30

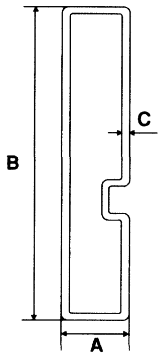
SHIPPING BOX



PACKAGING

ISOLATED PLASTIC

SHIPPING TUPE

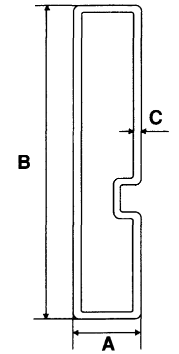


	Dimensions (mm)
	TYP
A	7
B	33
C	0.75
Tube length	532
Quantity per tube	50

PACKAGING

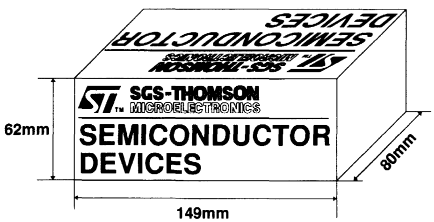
ISOLATED PLASTIC

SHIPPING TUPE



	Dimensions (mm)
	TYP
A	7
B	33
C	0.75
Tube length	532
Quantity per tube	50

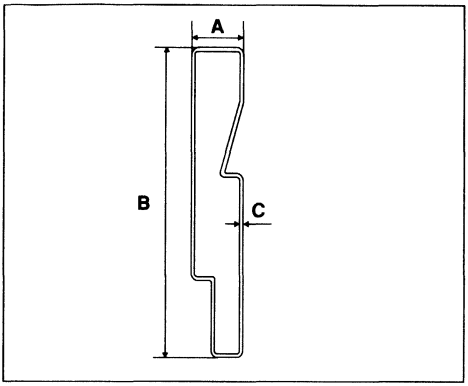
SHIPPING BOX



PACKAGING

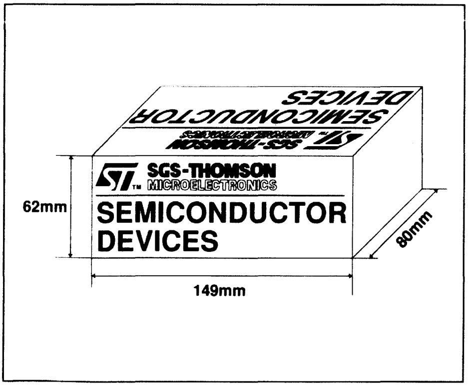
ISOLATED PLASTIC

SHIPPING TUPE



	Dimensions (mm)
	TYP
A	7.4
B	40.5
C	0.5
Tube length	532
Quantity per tube	30

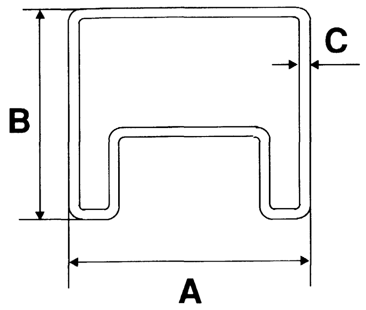
SHIPPING BOX



PACKAGING

ISOLATED PLASTIC

SHIPPING TUPE

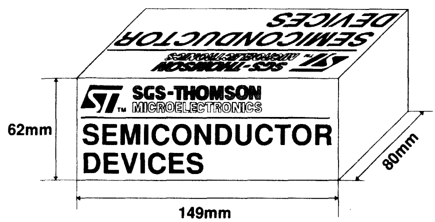


	Dimensions (mm)
	TYP
A	29
B	25
C	1.25
Tube length	532
Quantity per tube	10

PACKAGING

METALLIC

SHIPPING BOX



	Base Qty
DO4 DO5	100 50

QUALITY AND RELIABILITY

SGS-THOMSON
MICROELECTRONICS

QUALITY AND RELIABILITY

1. INTRODUCTION :

Using its technological know-how in the field and its historical position of leader, SGS-THOMSON will extend its product portfolio through new technologies and packages. This strategy will closely associate product performance and high reliability.

All of our working methods meet these requirements and result from an awareness at all levels of the necessity to design and product quality. In particular, a training along these lines is systematically given to our personnel.

The effort to strengthen our quality culture has put a new emphasis on the application of S.P.C. (Statistical Process control) techniques. In addition to this, technical improvements are done regularly. All these actions have been taken as a result of our continuous drive for progress, a theme we rely on to remain the leader.

2. BAR CODE AND TRACEABILITY :

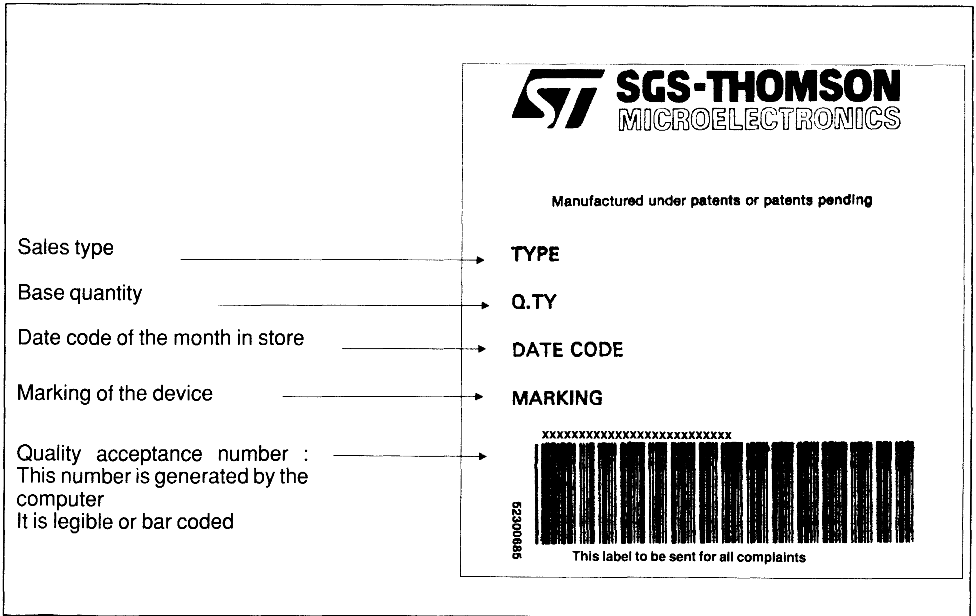
Bar Code

The bar code system applied to the shipments has the main following objectives :

* To reduce shipment errors to zero defect by avoiding human errors.

* To read, with a QA number key, the quantity shipped or remaining in the store. When the pieces have been shipped, the computer indicates to which customer they have been sent.

With the QA number (refer to drawing), full process traceability is provided : IN / OUT dates at diffusion, assembly, test as well as location. In addition shipment date and shipment number are provided.



The label is stuck on each boxe (qty per box = base qty).

3. QUALITY BY DESIGN :

3.1 QUALIFICATION OF A NEW PRODUCT :

* Requested for all new products.

* Qualification plan according to internal specification.

* Main documents requested are :
. Design rules manual
. Development report
. Characterization report on 3 manufacturing lots
. Reliability report on 3 manufacturing lots
. Product Specifications

* Requested internal approvals are :
. Originator
. Product manager
. Division QA manager

3.2 QUALIFICATION FOR A CHANGE OF TECHNOLOGY :

* Requested for :
. All major new processes (either wafer fab and assembly).
. Critical change of process step.
. Change of manufacturing location.
* Qualification plan according to internal specification.
* Main documents requested are :
. Characterization report on 3 manufacturing lots.
. Reliability report on 3 manufacturing lots.
. Manufacturing specifications.
. Failure mode defect analysis or criticity analysis .
. Provisions for traceability.

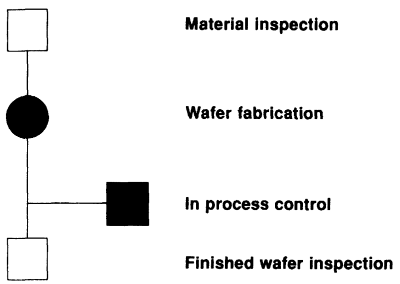
* Requested internal approvals are :
. Originator
. Product Manager
. Division QA Manager

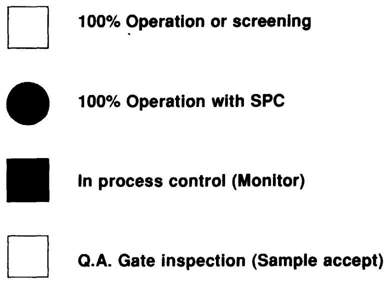
* Technology change notification to customers.

4 QUALITY ASSURANCE ORGANIZATION :

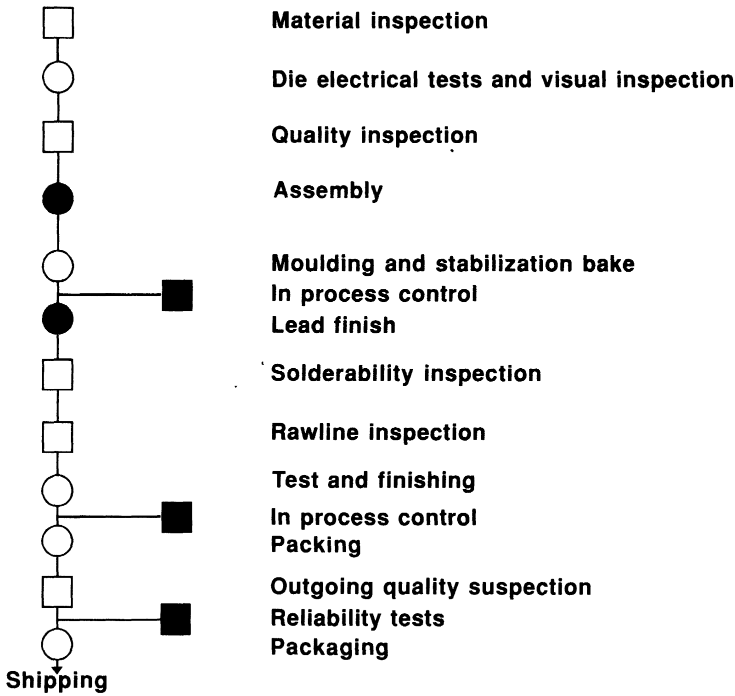
4.1 IN PROCESS CONTROL FLOW CHART :

Wafer Fab standard production process flow chart





Assembly standard production process Flow chart



4.2 OUTGOING QUALITY INSPECTION :

All product is submitted to the outgoing QC inspection.

All rejected lots should be 100% rescreened and resubmitted to the OQI.

Parameters	Minimum sample size	acceptance number
Visual and mechanical inspection	315	0
cumulative electrical and inoperative mechanical failures	315	0

4.3 RELIABILITY ASSURANCE :

ABSTRACT OF SURE 6.
RELIABILITY ASSURANCE.

The reliability approach : In a customer's finished product, semiconductor devices must work normally in a stable manner under the given operational conditions throughout the specified life of the product.

SGS-THOMSON, therefore, exercises meticulous care in the design and manufacturing stages and studies the various factors that affect the reliability of semiconductors such as operational and environmental conditions.

Reliability testing :

Reliability testing is an ongoing process adopted to identify and then improve reliability performance.

Accelerated tests are an important tool for evaluating long term reliability and stability of process and product parameters.

SGS-THOMSON performs rigorous tests throughout production to ensure that production devices have the properly designed reliability.

Two major actions are developed to monitor reliability performances :
. Real time control (RTC tests)
. Periodical reliability tests.

4.3.1 REAL TIME CONTROL (RTC TEST) :

This program requires the assembly plants to perform sampling of the manufacturing flow (after OQI acceptation) every week, on each technological family.

The tests are performed on assembly plants.
Corrective actions have to be taken by the local Q and R department when the failures exceed the target, and in a second time, if failures are confirmed, information is sent to the Q and R division in order to receive instructions.

4.3.2 PERIODICAL RELIABILITY TEST :

On each technological family, for data acquisition and quality monitoring, SGS-THOMSON performs long term reliability tests by periodical sampling after OQI acceptation.
These tests are performed either on assembly location or on Q.A. Division.

4.3.2.1 TEST SELECTION GUIDELINES

Specific emphasis is put on electrical, thermomechanical and environmental tests which are intended to accelerate failure mechanisms in order to define the limits of the products when they are submitted to industrial conditions.

The tests performed are split into 2 main families called die- oriented tests and package-oriented tests.
The tests are selected according to the knowledge of the application conditions of the products, the failure mode effect analysis performed at design / development, and to the history of the manufacturing process.
An intermediate family (die and package-oriented tests)is also described.

The attached sheets provide the relevant information on applicable tests, international standards, failure point, failure process, acceleration factors, usual failure rate as well as acceptance numbers.

4.3.2.2 ABBREVIATIONS AND MEANINGS

Failure : Any device which does not comply to its specification

Failure point : Physical localization of failure

Failure process : Physical or chemical or other mechanism resulting in a failure.

F I T : Failure unit ; 1 fit = 1 failure in 10^9 devices - Hours.

Failure rate : Also called "Lambda - λ" ; it is the incremental change in the number of failures per associated incremental change in time. Failure rate is expressed in fits.
Nota : MTBF (Mean Time Between Failure) = $1/\lambda$.
Currently "λ" is provided in the useful life of device (constant λ ; exponential modelization of the population reliability :
$R(t) = \frac{N(t)}{N(to)} = e^{-\lambda t}$

Accelerating factor : The physical or chemical factor increasing the failure rate.

Confidence level : A 60 % confidence level means there is 60 % possibility that the sample came from a population whose failure rate does not exceed the given failure rate.

Ea : Activation energy (eV : electron volt). Activation energy is introduced for example in the Arrhenius law - It is representative of the failure mechanism involved.
Ex : 1eV is used to modelize failure rate when surface charges are involved.

4.3.3.1 DIE ORIENTED TESTS

Test description	Failure point	Failure process	accelerating factors/ activ. energy	Usual samples size & acceptance number
High temperature storage (HST) MIL STD 750C -1032 1000Hrs - Ta=150°C	Melallization	Contact degradation Intermetallic growth	Temperature : 0.8eV Temperature : 0.8eV	45/0
High tempetarure reverse bias (HTRB) MIL STD 750C -1038 1000Hrs Ta = 110 /150°C	Passivation layers and silicon interfaces	Surface charges accumulation	Temp./elec field 1.0eV	45/0
Steady state life test (OLT) MIL STD 750C -1026	active area and mechanical interfaces	Charges accumulation / thermal runaway	Tj, J (current density)	45/0
Electrostatic discharges(ESD) MIL STD 750C -1020	silicon volume (active area)	Poor design and die process	Vpeak amplitude	22/0

4.3.3.2 DIE AND PACKAGE ORIENTED TESTS

Test description	Failure point	Failure process	accelerating factors/ activ. energy	Usual samples size & acceptance number
Intermittent life test MIL STD 750C -1037 thermal fatigue	Mechanical interfaces	Fatigue	Temperature variation Tj	22/0
Repetitives surges I_{PP}-100S and 1000S	Silicon volume and die attach	Silicon structure anomaly	Surges amplitude and duration	20/0

4.3.3.3 PACKAGE ORIENTED TESTS (main tests)

Test description	Failure point	Failure process	accelerating factors/ activ. energy	Usual samples size & acceptance number
Humidity bias 85°C 85% 1000H - Vr as specified in the applicable devices specif (THB °	Die periphery passivation bonds; metallization	Poor hermeticity contamination corrosion	Humidity / temperature / voltage Ea = 0.8eV	45/0
Autoclave test 121°C 2 ATM / 168Hrs 100% RH (PCT)	die periphery passivation	Poor hermeticity contamination	Temperature pressure	22/0
Thermal cycling (TCT) -55°C/ + 150°C 100cy 1000cy	Die volume structure interfaces	Silicon / package thermal expension coefficient mismatch	Temparature extremes in cycling	77/0
solderability MIL STD 750C - 2026 1H steam aging 245°C - 5s	Lead surface	Plating or dipping process material	Aging humidity / temperature	22/0

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