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	$T_{case} = 85°C$ $\delta = 0.5$	12	A
I_{FSM}	Surge Non Repetitive Forward Current	$t_p = 10ms$ Sinusoidal	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}	$di_F/dt = -50A/μs$	$V_{CC} = 200V$ $I_F = 12A$				200	ns
	$di_F/dt = -100A/μs$	$L_p \leq 0.05μH$ $T_j = 100°C$			120		
I_{RM}	$di_F/dt = -50A/μs$	See Figure 11				7.8	A
	$di_F/dt = -100A/μs$				9		

TURN-OFF OVERVOLTAGE COEFFICIENT (With Series Inductance)

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
$C = \dfrac{V_{RP}}{V_{CC}}$	$T_j = 100°C$ $di_F/dt = -12A/μs$	$V_{CC} = 200V$ $L_p = 12μH$	$I_F = I_{F(AV)}$ See Figure 12			4.5	

To evaluate the conduction losses use the following equations :

$V_F = 1.47 + 0.026 \, I_F$ $P = 1.47 \times I_{F(AV)} + 0.026 \, I_F^2{}_{(RMS)}$
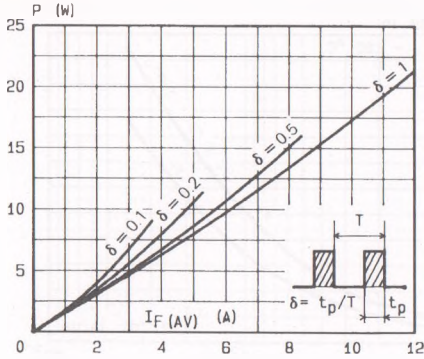
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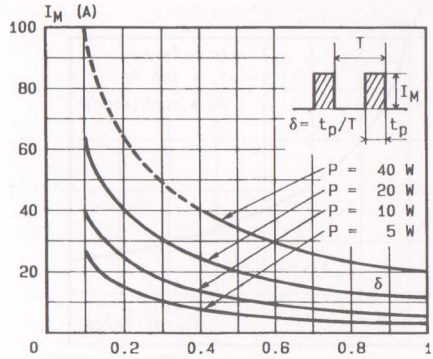FIGURE 1 : Low frequency power losses versus average current.

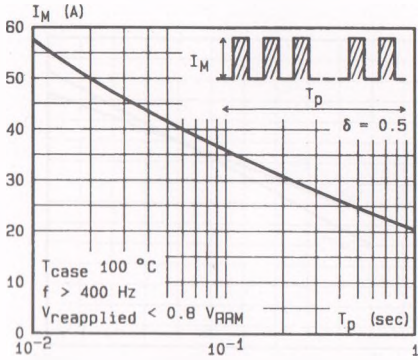FIGURE 2 : Peak current versus form factor.

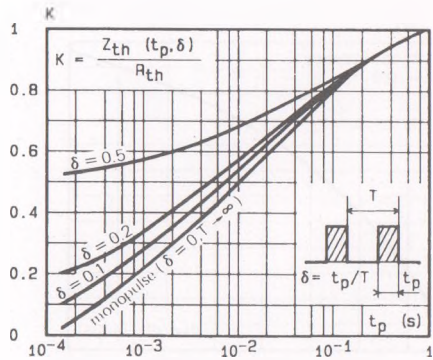FIGURE 3 : Non repetitive peak surge current versus overload duration.

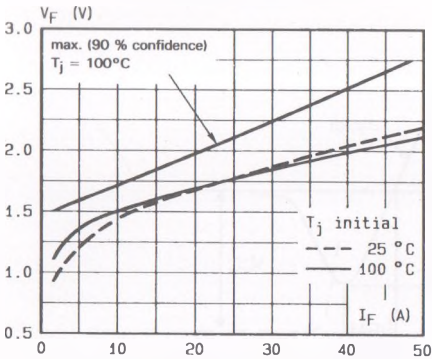FIGURE 4 : Thermal impedance versus pulse width.

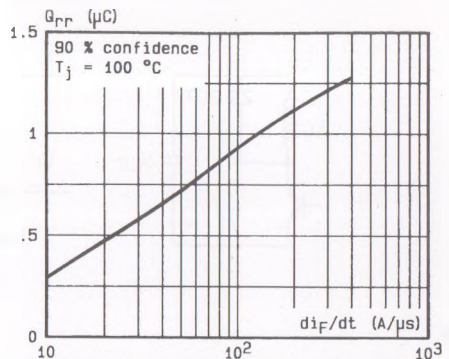FIGURE 5 : Voltage drop versus forward current.
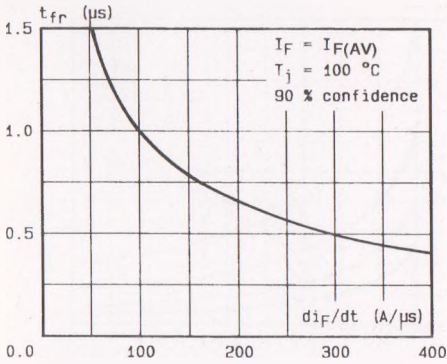

FIGURE 6 : Recovery charge versus di_F/dt.

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FIGURE 7 : Recovery time versus di$_F$/dt.

FIGURE 8 : Peak reverse current versus di$_F$/dt.
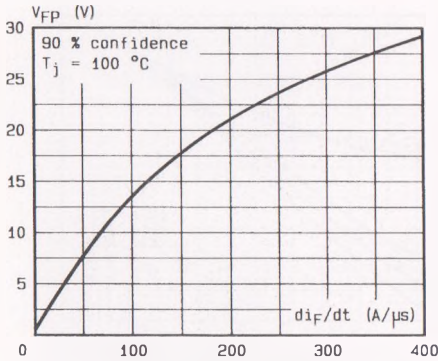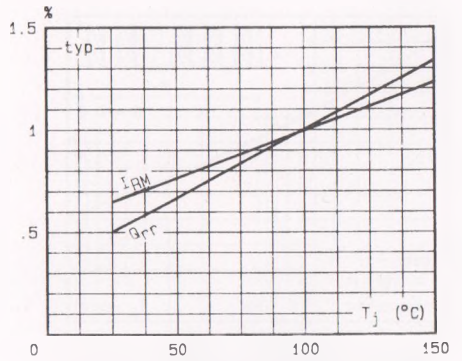

FIGURE 9 : Peak forward voltage versus di$_F$/dt.

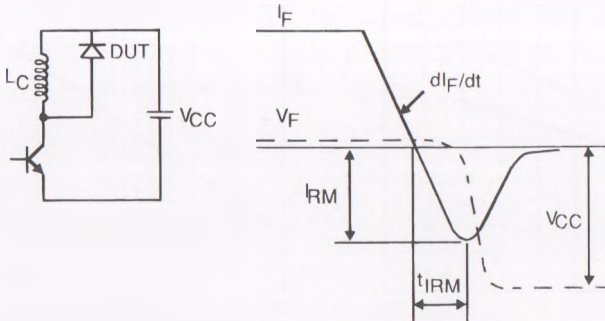FIGURE 10 : Dynamic parameters versus junction temperature.

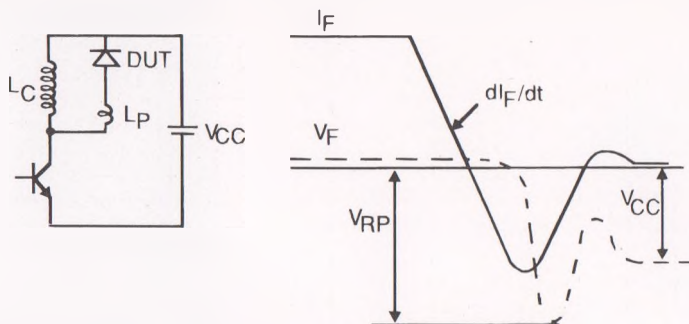Figure 11 : Turn-off switching characteristics (without series inductance).

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Figure 12 : Turn-off switching characteristics (withseries inductance).