

## 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



### 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	$T_C = 100^\circ C$ $\delta = 0.5$	50	A
$I_{FSM}$	Surge non Repetitive Forward Current	$t_p = 10ms$ Sinusoidal	1500	A
$P_{tot}$	Power Dissipation	$T_C = 90^\circ C$	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 <sub>R</sub>	T <sub>j</sub> = 25°C	V <sub>R</sub> = V <sub>RRM</sub>			50	μA
	T <sub>j</sub> = 100°C				5	mA
V <sub>F</sub>	T <sub>j</sub> = 25°C	I <sub>F</sub> = 160A			1.1	V
	T <sub>j</sub> = 100°C	I <sub>F</sub> = 50A			0.85	

RECOVERY CHARACTERISTICS

Symbol	Test conditions			Min.	Typ.	Max.	Unit
t <sub>rr</sub>	T <sub>j</sub> = 25°C V <sub>R</sub> = 30V	I <sub>F</sub> = 1A see figure 12	dI <sub>F</sub> /dt = - 50A/μs			60	ns
t <sub>fr</sub>	T <sub>j</sub> = 25°C Measured at 1.1 x V <sub>F</sub>	I <sub>F</sub> = 1A	t <sub>r</sub> = 5ns		10		ns
V <sub>FP</sub>	T <sub>j</sub> = 25°C	I <sub>F</sub> = 1A	t <sub>r</sub> = 5ns		1.5		V

To evaluate the conduction losses use the following equations :

$$V_F = 0.66 + 0.0021 I_F$$

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

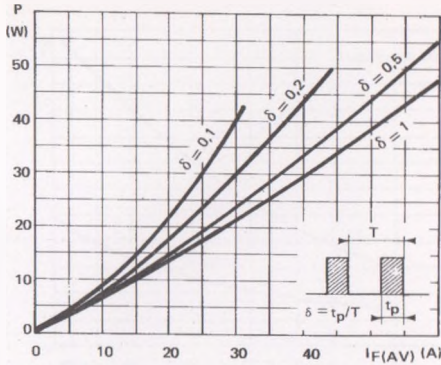


FIGURE 1 : Power losses versus average current

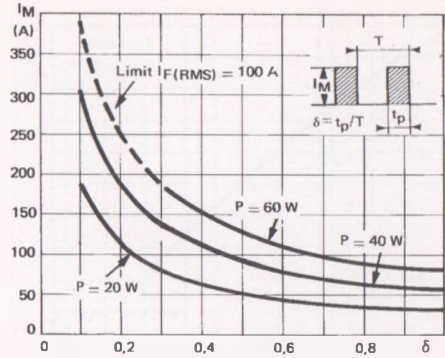


FIGURE 2 : Peak current versus form factor

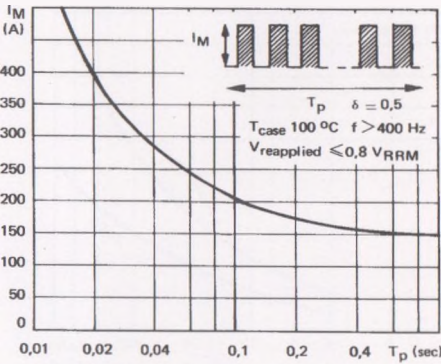


FIGURE 3 : Non repetitive peak surge current versus duration

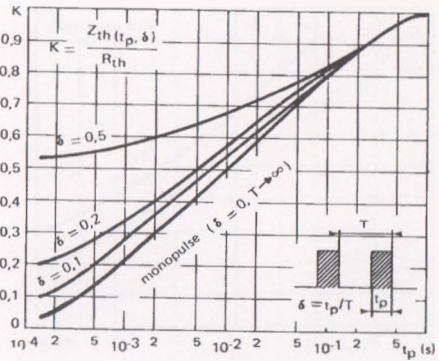


FIGURE 4 : Thermal impedance versus pulse width

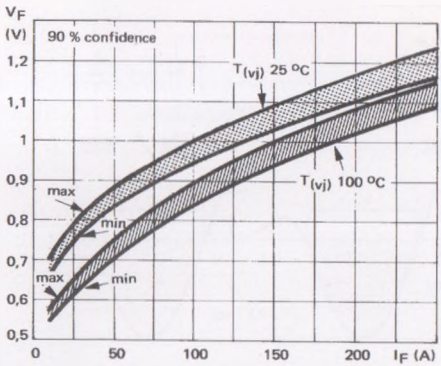


FIGURE 5 : Voltage drop and speed versus forward current

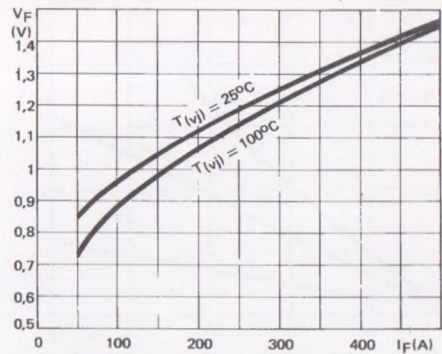


FIGURE 6 : Voltage drop versus forward current

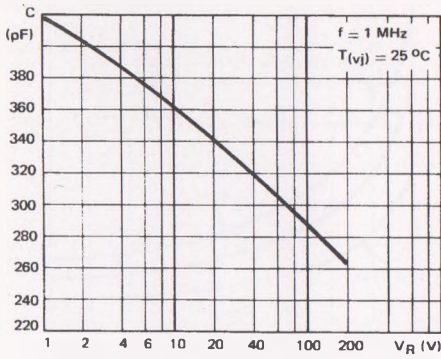


FIGURE 7 : Capacitance versus reverse voltage applied

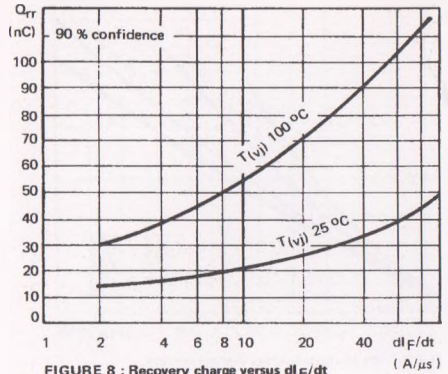


FIGURE 8 : Recovery charge versus  $dI_F/dt$

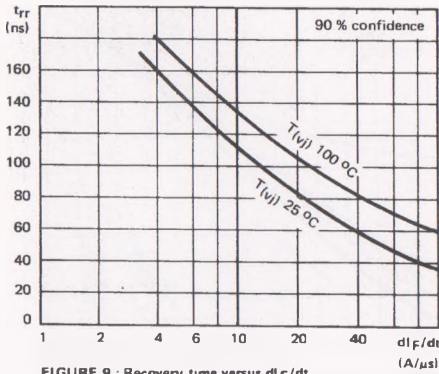


FIGURE 9 : Recovery time versus  $dI_F/dt$

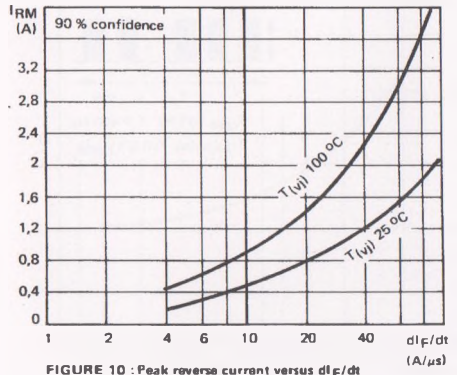


FIGURE 10 : Peak reverse current versus  $dI_F/dt$

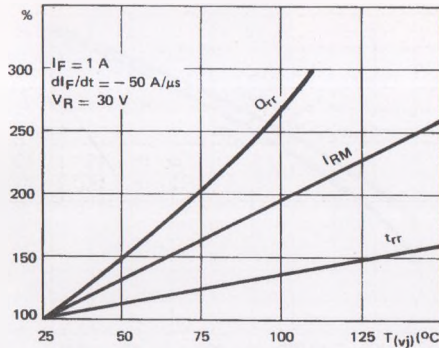


FIGURE 11 : Dynamic parameters versus junction temperature

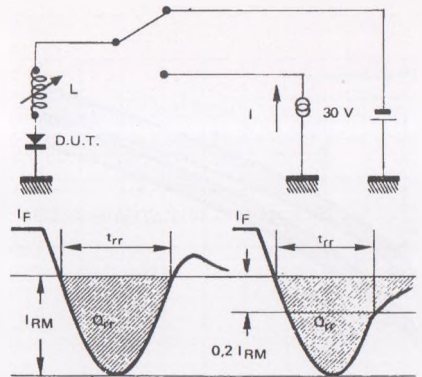


FIGURE 12 : Measurement of  $t_{rr}$  (fig. 9) and  $I_{RM}$  (fig. 10)