

**HIGH EFFICIENCY  
 FAST RECOVERY DIODES**
**MAIN PRODUCT CHARACTERISTICS**

$I_{F(AV)}$	<b>30 A</b>
$V_{RRM}$	<b>400 V</b>
$t_{rr}$	<b>50 ns</b>
$V_F$	<b>1.4 V</b>

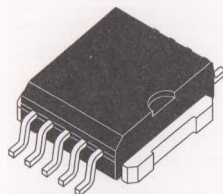
**FEATURES AND BENEFITS**

- VERY LOW REVERSE RECOVERY TIME
- VERY LOW SWITCHING LOSSES
- LOW NOISE TURN-OFF SWITCHING
- HIGH DISSIPATION MINIATURE PACKAGE
- SURFACE MOUNT TECHNOLOGY COMPATIBLE

**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.



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

**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	$T_C=100^{\circ}C$ $\delta = 0.5$	A
$I_{FSM}$	Surge non repetitive forward current (All pins connected)	$t_p=10ms$ sinusoidal	A
$I_{FRM}$	Repetitive peak forward current	$t_p = 5\mu s$ $f = 5 kHz$	A
$T_{stg}$ $T_j$	Storage and junction temperature range	- 40 to + 150	$^{\circ}C$

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 <sub>R</sub> *	Reverse leakage current	V <sub>R</sub> = V <sub>RRM</sub>	T <sub>j</sub> = 25°C			35	μA
			T <sub>j</sub> = 100°C			6	mA
V <sub>F</sub> **	Forward voltage drop	I <sub>F</sub> = 30 A	T <sub>j</sub> = 100°C			1.4	V
		I <sub>F</sub> = 30 A	T <sub>j</sub> = 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 <sub>rr</sub>	Reverse recovery time	T <sub>j</sub> = 25°C	I <sub>F</sub> = 0.5A			50	ns
		I <sub>rr</sub> = 0.25 A	I <sub>R</sub> = 1A				
		T <sub>j</sub> = 25°C	I <sub>F</sub> = 1A			100	
		di <sub>F</sub> /dt = -15A/μs	V <sub>R</sub> = 30V				

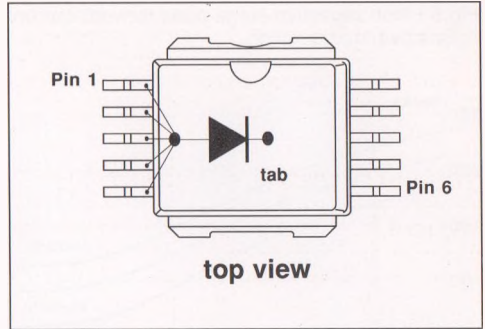
## TURN-OFF SWITCHING CHARACTERISTICS

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
t <sub>IRM</sub>	Maximum reverse recovery time	T <sub>j</sub> = 100°C	di <sub>F</sub> /dt = -120A/μs			75	ns
		I <sub>F</sub> = 30 A	di <sub>F</sub> /dt = -240A/μs		50		
I <sub>RM</sub>	Maximum reverse recovery current	V <sub>CC</sub> = 200 V	di <sub>F</sub> /dt = -120A/μs			9	ns
		L <sub>p</sub> < 0.05 μH	di <sub>F</sub> /dt = -240A/μs		12		
C factor	Turn-off overvoltage coefficient	T <sub>j</sub> = 100°C	I <sub>F</sub> = I <sub>F(AV)</sub>		3.3		/
		V <sub>CC</sub> = 60 V	L <sub>p</sub> = 1 μH				
		di <sub>F</sub> /dt = -30A/μs					

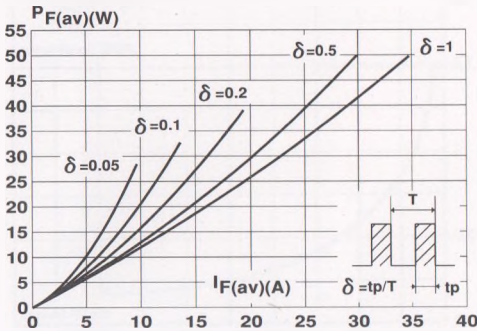
**PIN OUT configuration in PowerSO-10 :**

Anode = pin 1 to 5

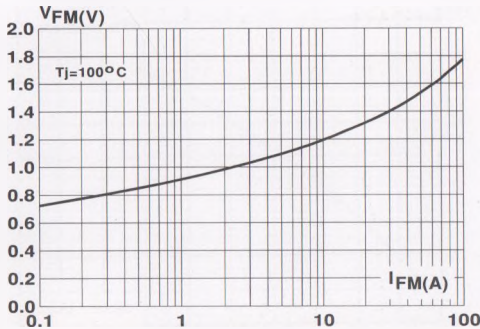
Cathode = connected to base tab



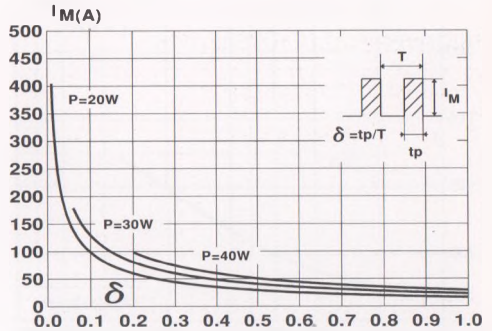
**Fig.1 :** Average forward power dissipation versus average forward current.



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



**Fig.2 :** Peak current versus form factor.



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

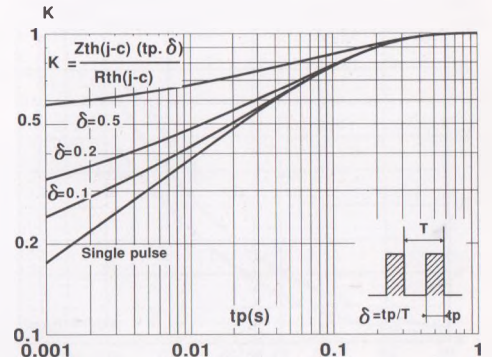


Fig.5 : Non repetitive surge peak forward current versus overload duration.

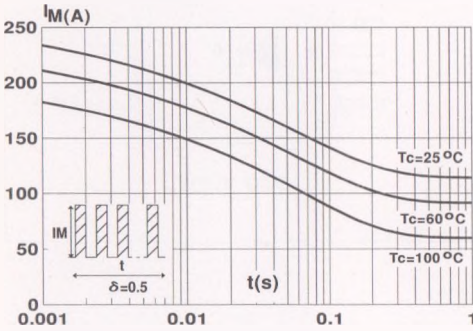


Fig.6 : Average current versus ambient temperature. (duty cycle)

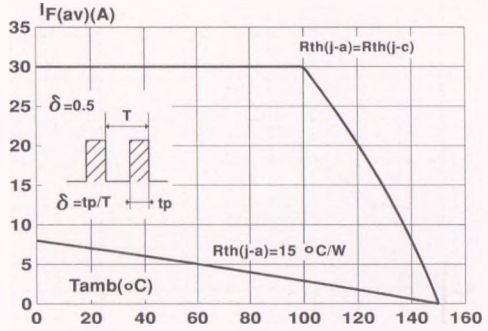


Fig.7 : Recovery charge versus  $di_F/dt..$

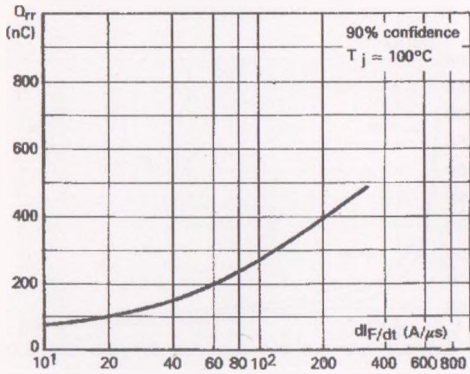


Fig.8 : Recovery times versus  $di_F/dt..$

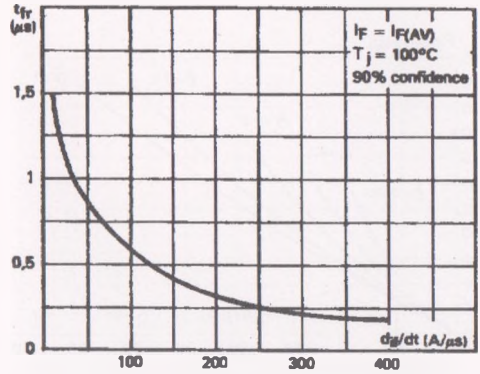


Fig.9 : Peak reverse current versus  $di_F/dt..$

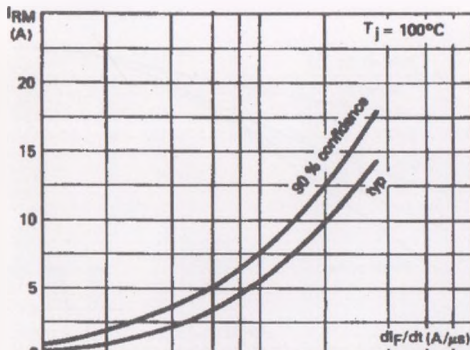


Fig.10 : Peak forward voltage versus  $di_F/dt..$

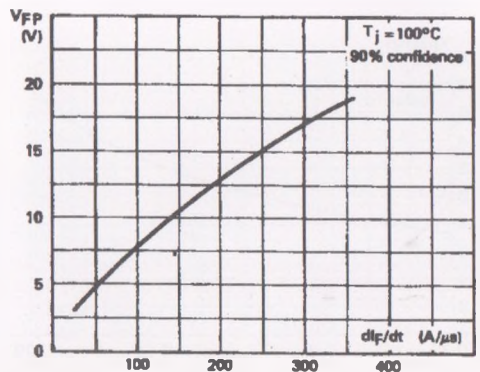


Fig.11: Dynamic parameters versus junction temperature.

