

## HIGH EFFICIENCY FAST RECOVERY RECTIFIER DIODES

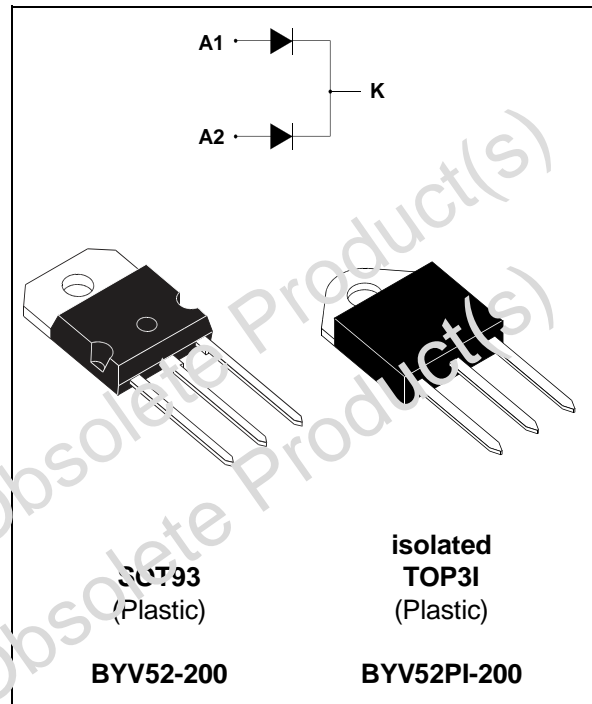
### FEATURES

- 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

### 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	$T_c = 110^\circ\text{C}$	Per diode	30	A
		TOP3I	$T_c = 90^\circ\text{C}$	Per diode	30	
$I_{FSM}$	Surge non repetitive forward current		$t_p = 10\text{ms}$ sinusoidal	Per diode	500	A
$T_{stg}$ [ $T_j$ ]	Storage and junction temperature range			- 40 to + 150 - 40 to + 150	$^\circ\text{C}$ $^\circ\text{C}$	

Symbol	Parameter	Value	Unit
$V_{RRM}$	Repetitive peak reverse voltage	200	V

## BYV52/PI

### 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 :

$$T_j - T_c (\text{diode 1}) = P(\text{diode 1}) \times R_{th(j-c)}(\text{Per diode}) + P(\text{diode 2}) \times R_{th(c)}$$

### ELECTRICAL CHARACTERISTICS (Per diode)

#### 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>			25	μA
	T <sub>j</sub> = 100°C				2.5	mA
V <sub>F</sub> **	T <sub>j</sub> = 125°C	I <sub>F</sub> = 20 A			0.85	V
	T <sub>j</sub> = 125°C	I <sub>F</sub> = 40 A			1.00	
	T <sub>j</sub> = 25°C	I <sub>F</sub> = 40 A			1.15	

Pulse test : \* t<sub>p</sub> = 5 ms, duty cycle < 2 %

\*\* t<sub>p</sub> = 300 μs, duty cycle < 2 %

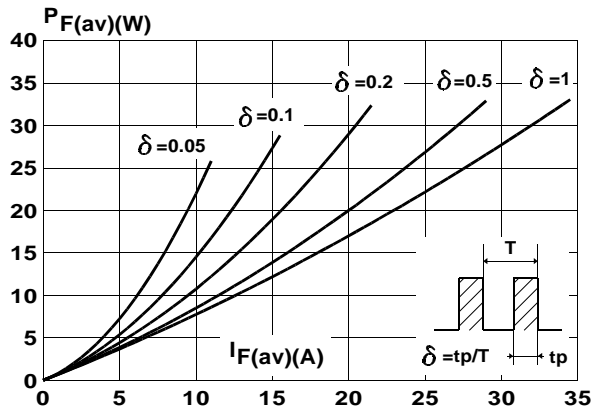
To evaluate the conduction losses use the following equation :

$$P = 0.7 \times I_F(AV) + 0.0075 \times I_F^2(RMS)$$

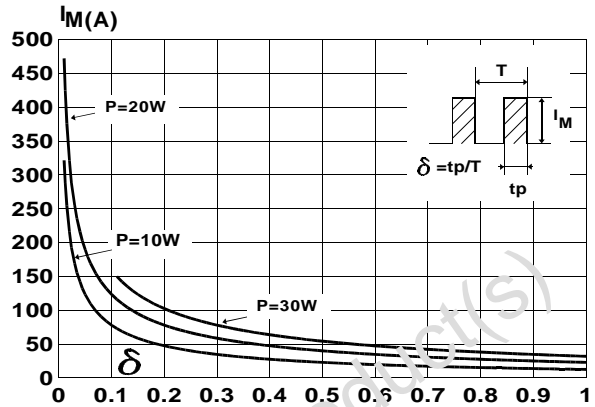
### RECOVERY CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
trr	T <sub>j</sub> = 25°C	I <sub>F</sub> = 0.5A I <sub>R</sub> = 1A			35	ns
		I <sub>F</sub> = 1A V <sub>R</sub> = 30V			50	
tfr	T <sub>j</sub> = 25°C	I <sub>F</sub> = 1A V <sub>FR</sub> = 1.1 x V <sub>F</sub>		10		ns
V <sub>FP</sub>	T <sub>j</sub> = 25°C	I <sub>F</sub> = 1A		1.5		V

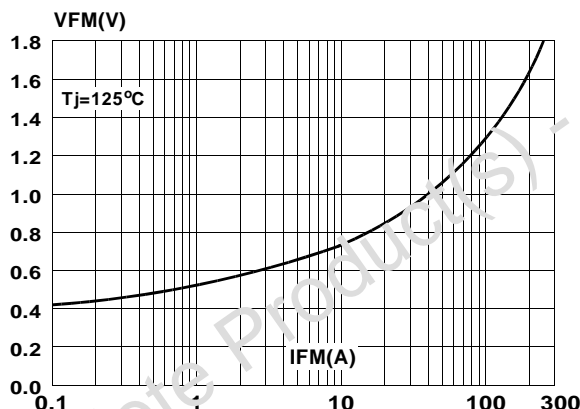
**Fig.1** : Average forward power dissipation versus average forward current.



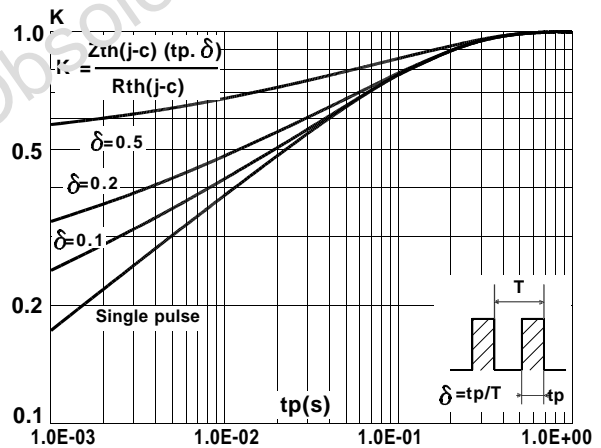
**Fig.2** : Peak current versus form factor.



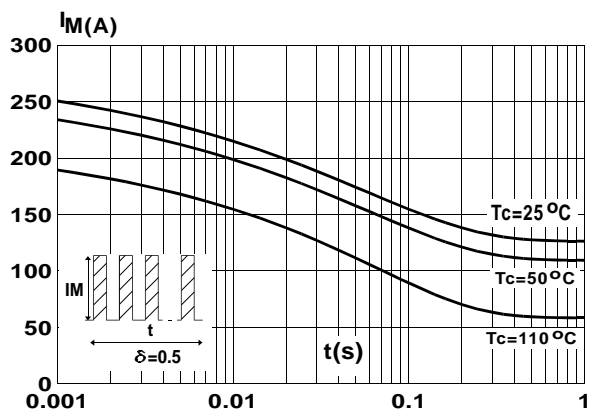
**Fig.3** : Forward voltage drop versus forward current (maximum values).



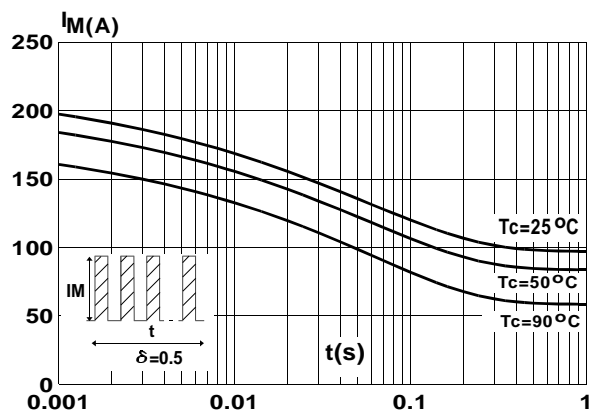
**Fig.4** : Relative variation of thermal impedance junction to case versus pulse duration.



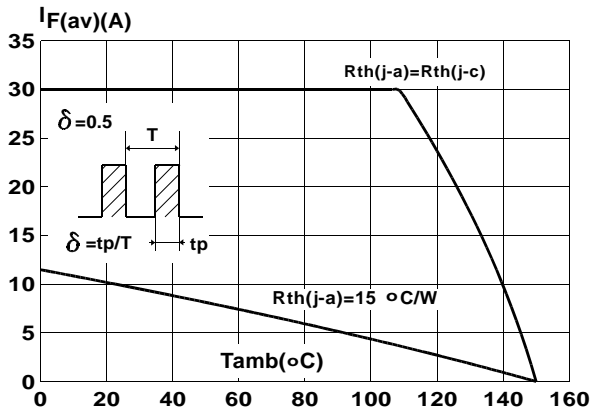
**Fig.5** : Non repetitive surge peak forward current versus overload duration. (SOD93)



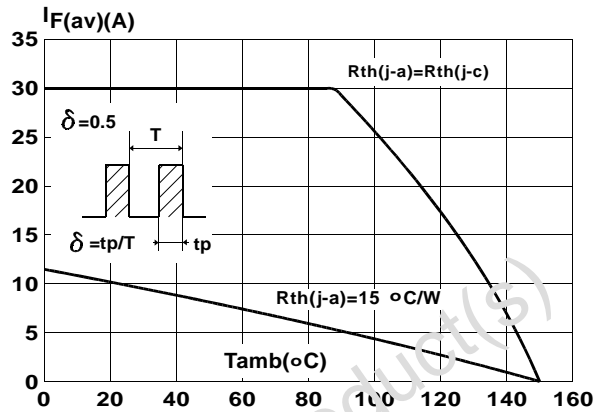
**Fig.6** : Non repetitive surge peak forward current versus overload duration. (TOP31)



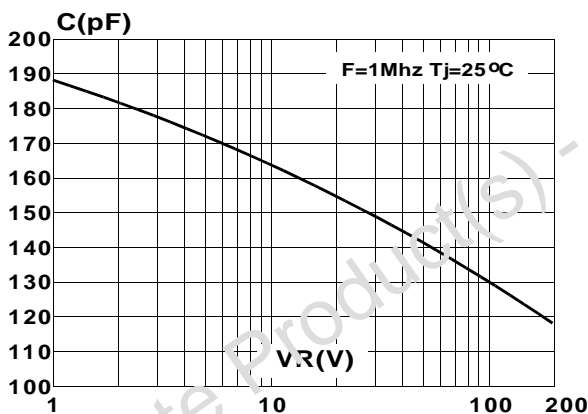
**Fig.7** : Average current versus ambient temperature.  
(duty cycle : 0.5) (SOD93)



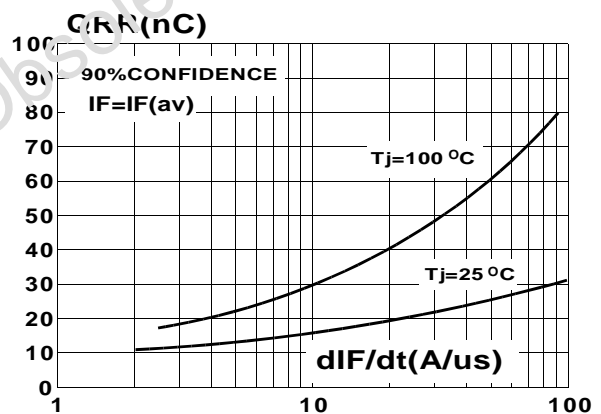
**Fig.8** : Average current versus ambient temperature.  
(duty cycle : 0.5) (TOP3I)



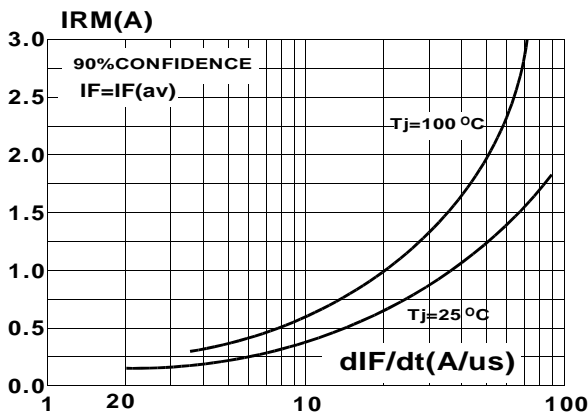
**Fig.9** : Junction capacitance versus reverse voltage applied (Typical values).



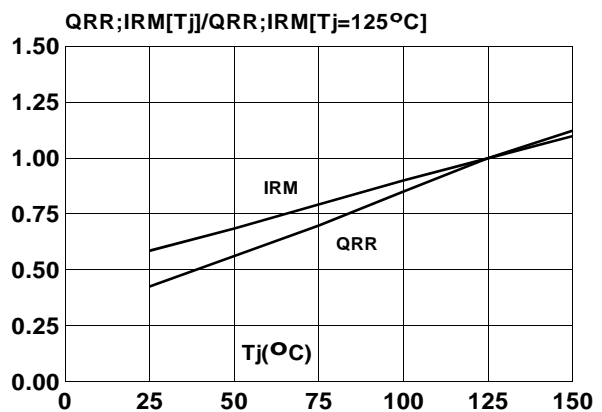
**Fig.10** : Recovery charges versus dI\_F/dt.



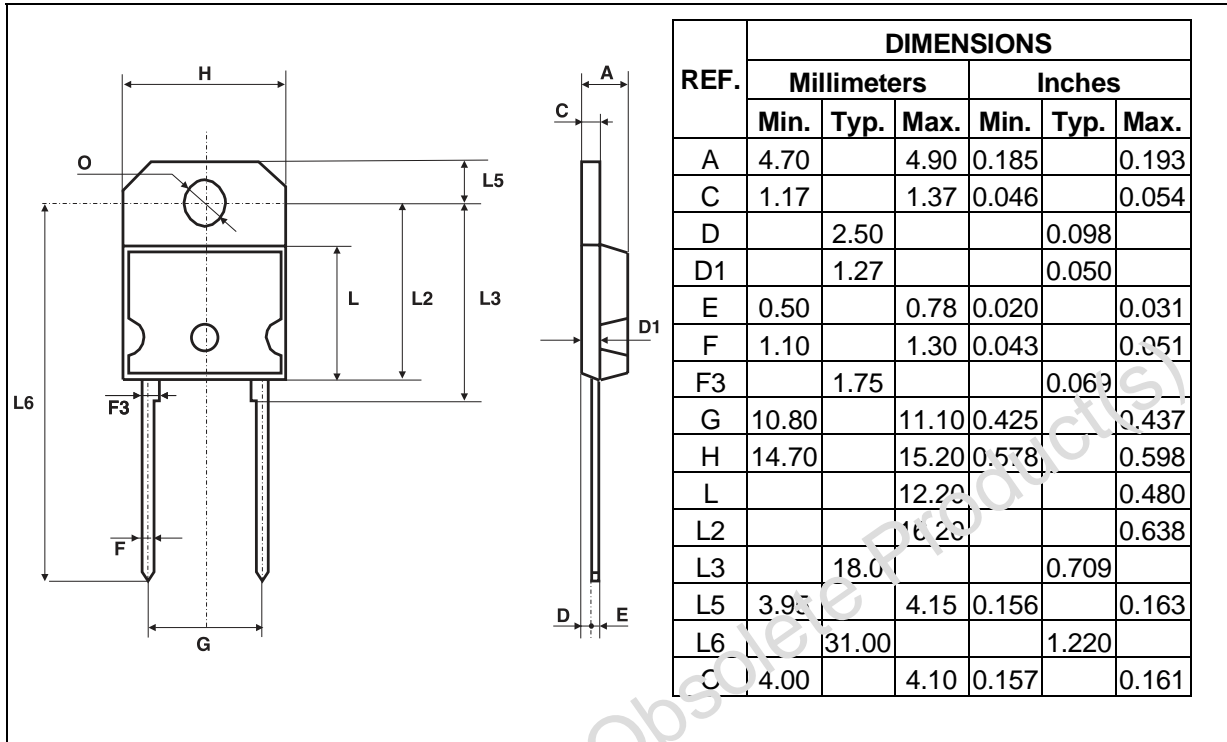
**Fig.11** : Peak reverse current versus dI\_F/dt.



**Fig.12** : Dynamic parameters versus junction temperature.



**PACKAGE MECHANICAL DATA**  
SOD93

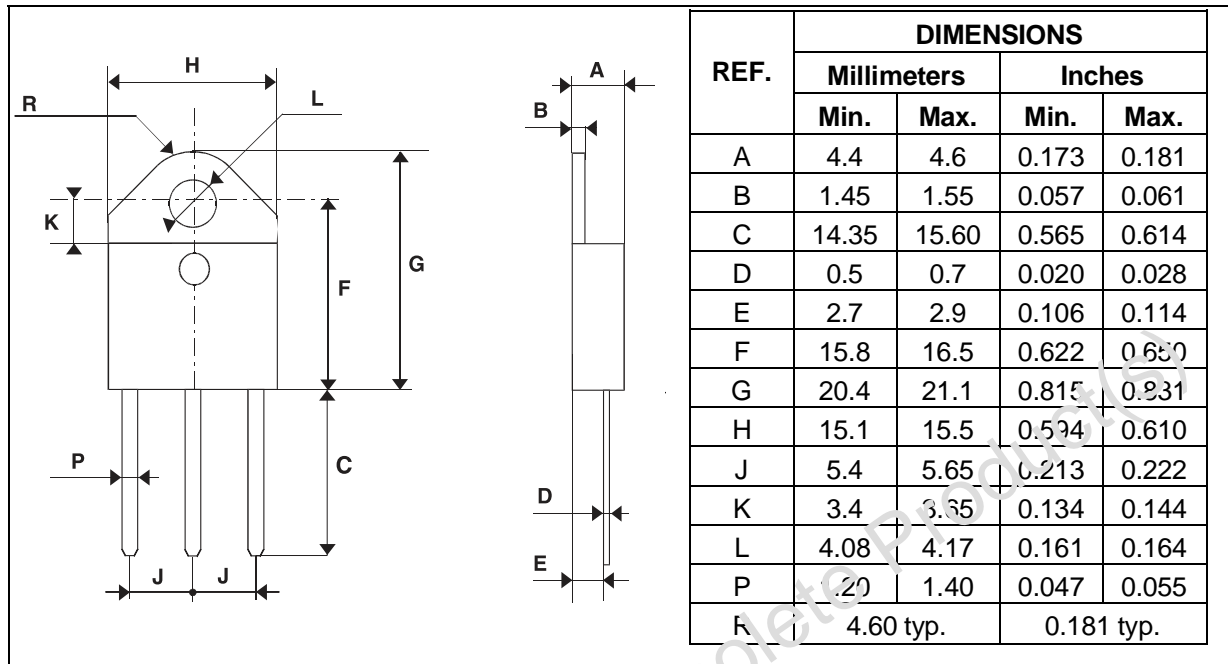


- **Marking** : Type number
- **Cooling method** : C
- **Weight** : 3.79 g
- **Recommended torque value** : 0.8 m N
- **Maximum torque value** : 1.0 m N

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### PACKAGE MECHANICAL DATA

TOP3I (isolated)



- **Marking** : Type number
- **Cooling method** : C
- **Weight** : 4.46 g
- **Recommended torque value** : 0.8m.N
- **Maximum torque value** : 1.0m.N

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