

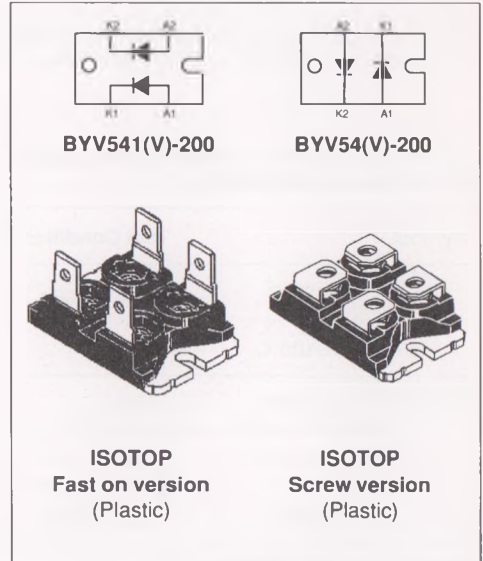
## HIGH EFFICIENCY FAST RECOVERY RECTIFIER DIODES

### FEATURES

- SUITED FOR SMPS
- VERY LOW FORWARD LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- HIGH SURGE CURRENT CAPABILITY
- HIGH AVALANCHE ENERGY CAPABILITY
- INSULATED :  
 Insulating voltage = 2500 V<sub>RMS</sub>  
 Capacitance = 45 pF

### 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 <sub>F(RMS)</sub>	RMS forward current		Per diode	100	A
I <sub>F(AV)</sub>	Average forward current $\delta = 0.5$	T <sub>c</sub> =90°C	Per diode	50	A
I <sub>FSM</sub>	Surge non repetitive forward current	t <sub>p</sub> =10ms sinusoidal	Per diode	1000	A
T <sub>stg</sub> T <sub>j</sub>	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 <sub>RRM</sub>	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	1.2	°C/W
		Total	0.85	
Rth (c)	Coupling		0.1	°C/W

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>			50	μA
	T <sub>j</sub> = 100°C				5	mA
V <sub>F</sub> **	T <sub>j</sub> = 125°C	I <sub>F</sub> = 50 A			0.85	V
	T <sub>j</sub> = 125°C	I <sub>F</sub> = 100 A			1.00	
	T <sub>j</sub> = 25°C	I <sub>F</sub> = 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 :

$$P = 0.7 \times I_{F(AV)} + 0.003 \times I_{F(RMS)}^2$$

## 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			40	ns
		I <sub>F</sub> = 1A V <sub>R</sub> = 30V			60	
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.

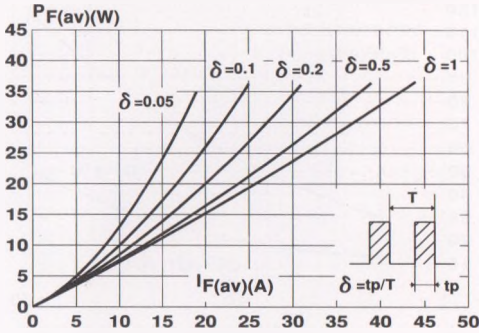


Fig.2 : Peak current versus form factor.

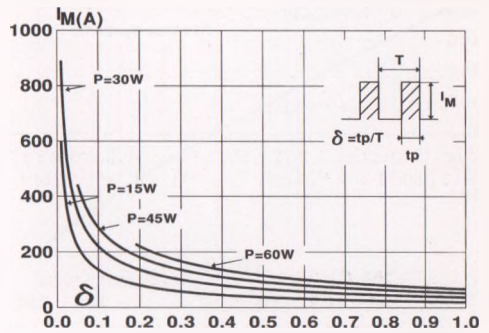


Fig.3 : Forward voltage drop versus forward current (maximum values).

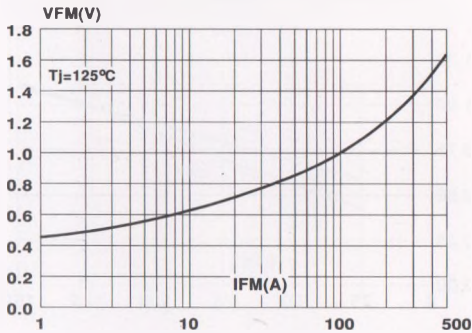


Fig.4 : Relative variation of thermal impedance junction to case versus pulse duration.

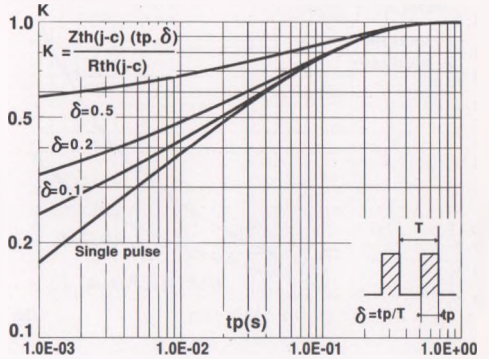


Fig.5 : Non repetitive surge peak forward current versus overload duration.

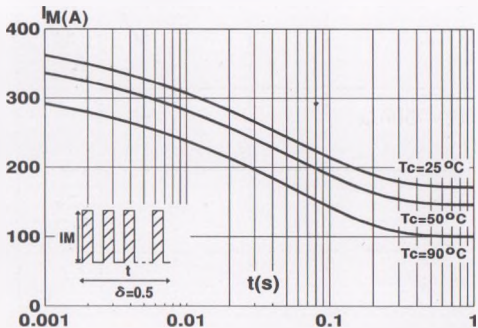


Fig.6 : Average current versus ambient temperature. (duty cycle : 0.5)

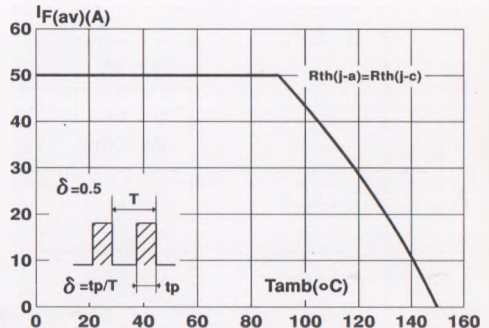


Fig.7 : Junction capacitance versus reverse voltage applied (Typical values).

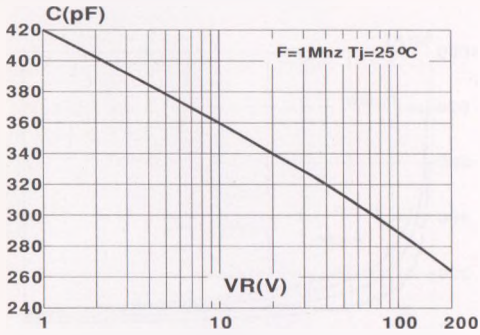


Fig.9 : Peak reverse current versus  $dI_F/dt$ .

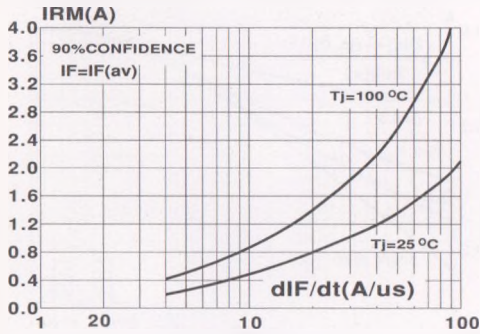


Fig.8 : Recovery charges versus  $dI_F/dt$ .

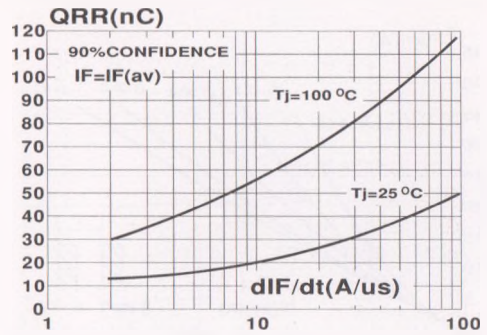


Fig.10 : Dynamic parameters versus junction temperature.

