

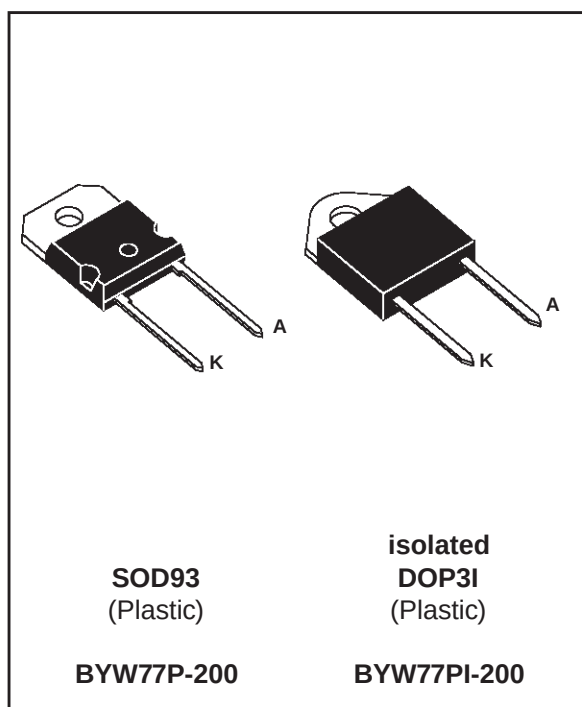
## HIGH EFFICIENCY FAST RECOVERY RECTIFIER DIODES

### FEATURES

- SUITED FOR SMPS
- VERY LOW FORWARD LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- HIGH SURGE CURRENT CAPABILITY
- HIGH AVALANCHE ENERGY CAPABILITY
- INSULATED VERSION :  
Insulating voltage = 2500 V DC  
Capacitance = 12 pF

### DESCRIPTION

Single chip rectifier suited for switchmode power supply and high frequency DC to DC converters. Packaged in SOD93, or DOP3I 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                       |       |                                   | 50                             | A                                    |
| $I_{F(AV)}$        | Average forward current<br>$\delta = 0.5$ | SOD93 | $T_c = 125^\circ\text{C}$         | 25                             | A                                    |
|                    |                                           | TOP3I | $T_c = 100^\circ\text{C}$         | 25                             |                                      |
| $I_{FSM}$          | Surge non repetitive forward current      |       | $t_p = 10\text{ms}$<br>sinusoidal | 500                            | A                                    |
| $T_{stg}$<br>$T_j$ | Storage and junction temperature range    |       |                                   | - 40 to + 150<br>- 40 to + 150 | $^\circ\text{C}$<br>$^\circ\text{C}$ |

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

**THERMAL RESISTANCE**

| Symbol    | Parameter        |       | Value | Unit |
|-----------|------------------|-------|-------|------|
| Rth (j-c) | Junction to case | SOD93 | 1.0   | °C/W |
|           |                  | DOP3I | 1.8   |      |

**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> |      |      | 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 : \* tp = 5 ms, duty cycle < 2 %

\*\* tp = 380 μs, duty cycle < 2 %

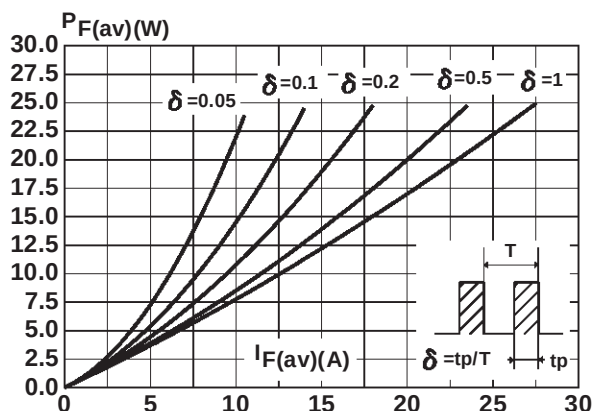
To evaluate the conduction losses use the following equation :

$$P = 0.7 \times I_{F(AV)} + 0.0075 \times I_{F(RMS)}^2$$

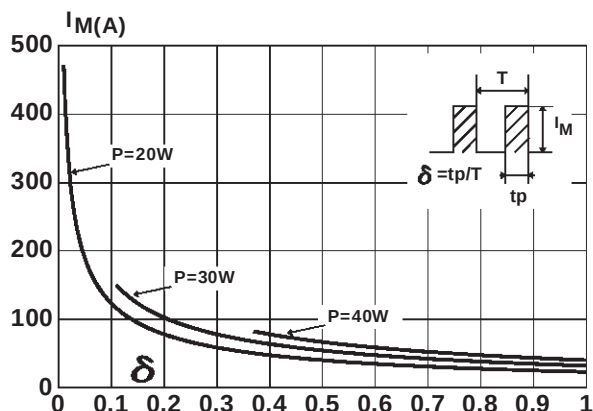
**RECOVERY CHARACTERISTICS**

| Symbol          | Test Conditions       |                                                                              | Min. | Typ. | Max. | Unit |
|-----------------|-----------------------|------------------------------------------------------------------------------|------|------|------|------|
| trr             | T <sub>j</sub> = 25°C | I <sub>F</sub> = 0.5A<br>I <sub>R</sub> = 1A<br>I <sub>rr</sub> = 0.25A      |      |      | 35   | ns   |
|                 |                       | I <sub>F</sub> = 1A<br>V <sub>R</sub> = 30V<br>dI <sub>F</sub> /dt = -50A/μs |      |      | 50   |      |
| tfr             | T <sub>j</sub> = 25°C | I <sub>F</sub> = 1A<br>V <sub>FR</sub> = 1.1 x V <sub>F</sub><br>tr = 5 ns   |      | 10   |      | ns   |
| V <sub>FP</sub> | T <sub>j</sub> = 25°C | I <sub>F</sub> = 1A<br>tr = 5 ns                                             |      | 1.5  |      | V    |

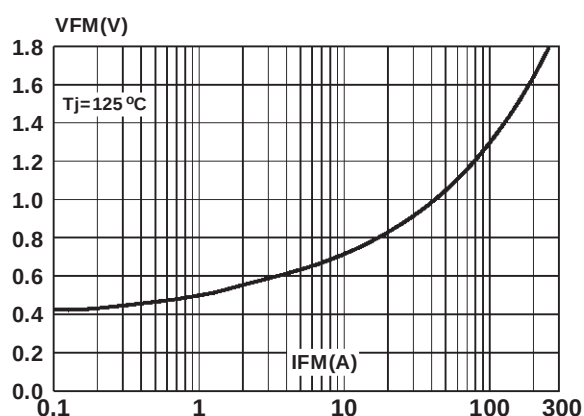
**Fig.1** : Average forward power dissipation versus average forward current.



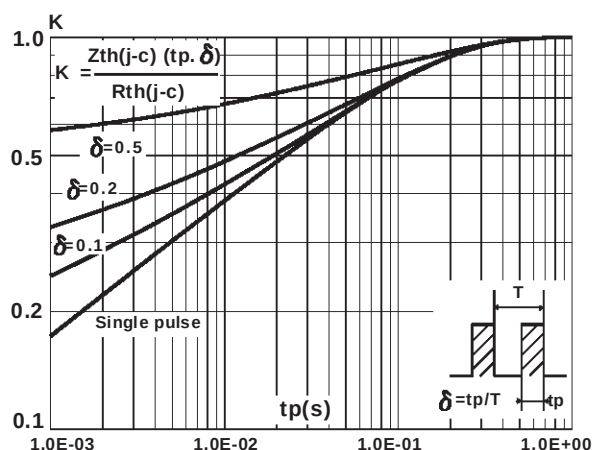
**Fig.2** : Peak current versus form factor.



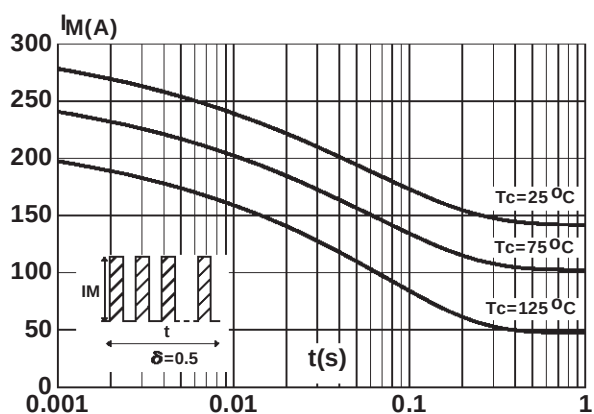
**Fig.3** : Forward voltage drop versus forward current (maximum values).



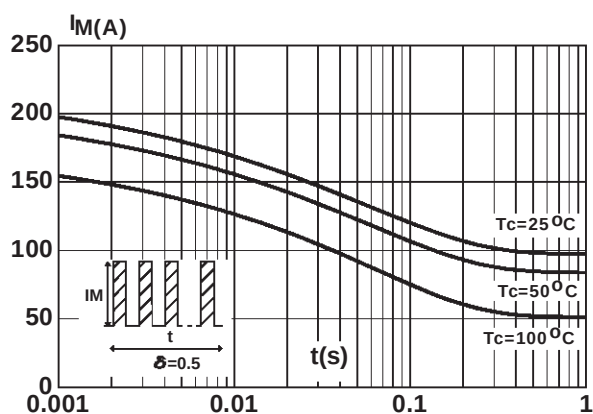
**Fig.4** : Relative variation of thermal impedance junction to case versus pulse duration.



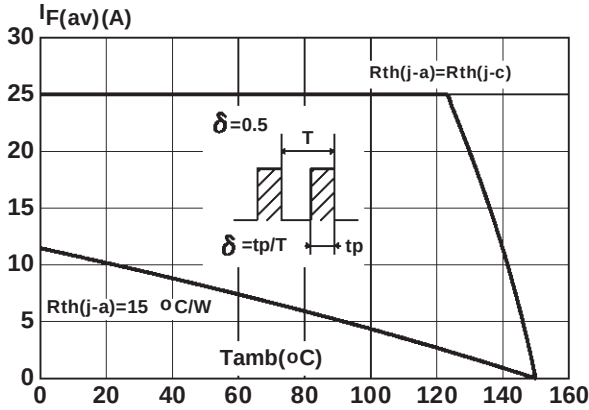
**Fig.5** : Non repetitive surge peak forward current versus overload duration. (BYW81P)



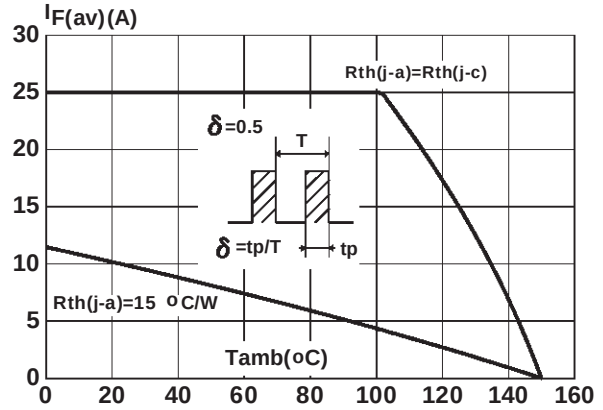
**Fig.6** : Non repetitive surge peak forward current versus overload duration. (BYW81PI)



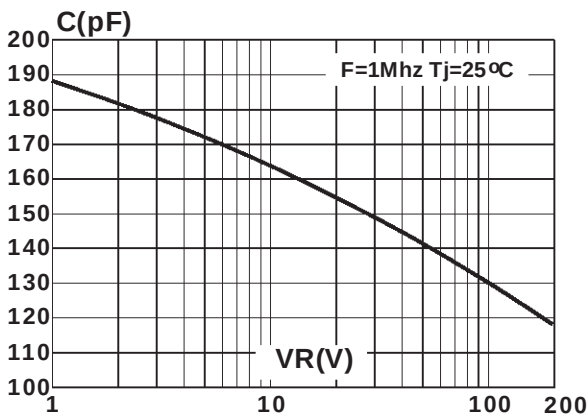
**Fig.7** : Average current versus ambient temperature.  
(duty cycle : 0.5) (SOD93)



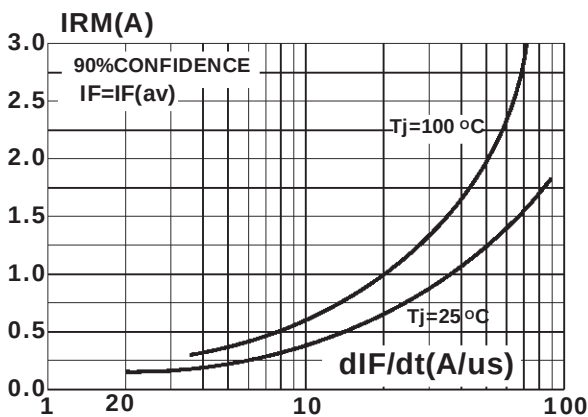
**Fig.8** : Average current versus ambient temperature.  
(duty cycle : 0.5) (DOP3I)



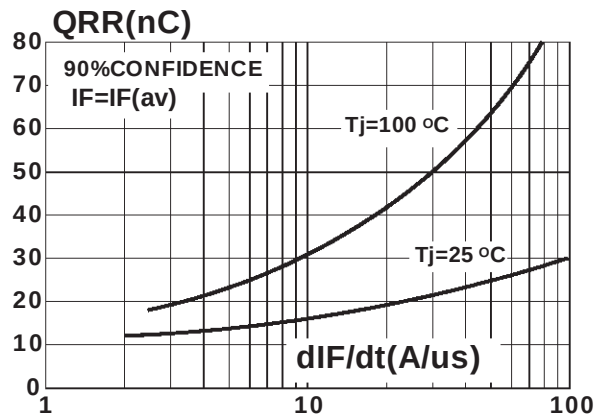
**Fig.9** : Junction capacitance versus reverse voltage applied (Typical values).



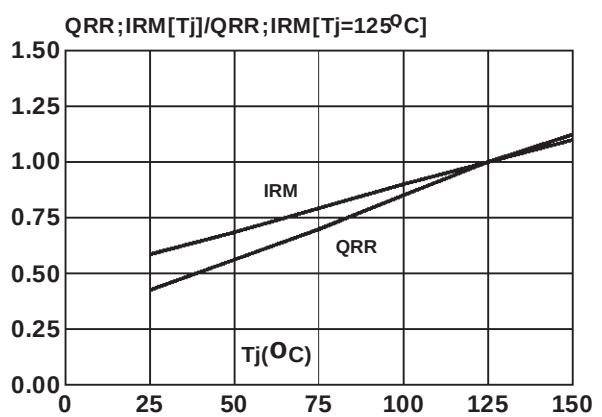
**Fig.11** : Peak reverse current versus  $dI_F/dt$ .



**Fig.10** : Recovery charges versus  $dI_F/dt$ .

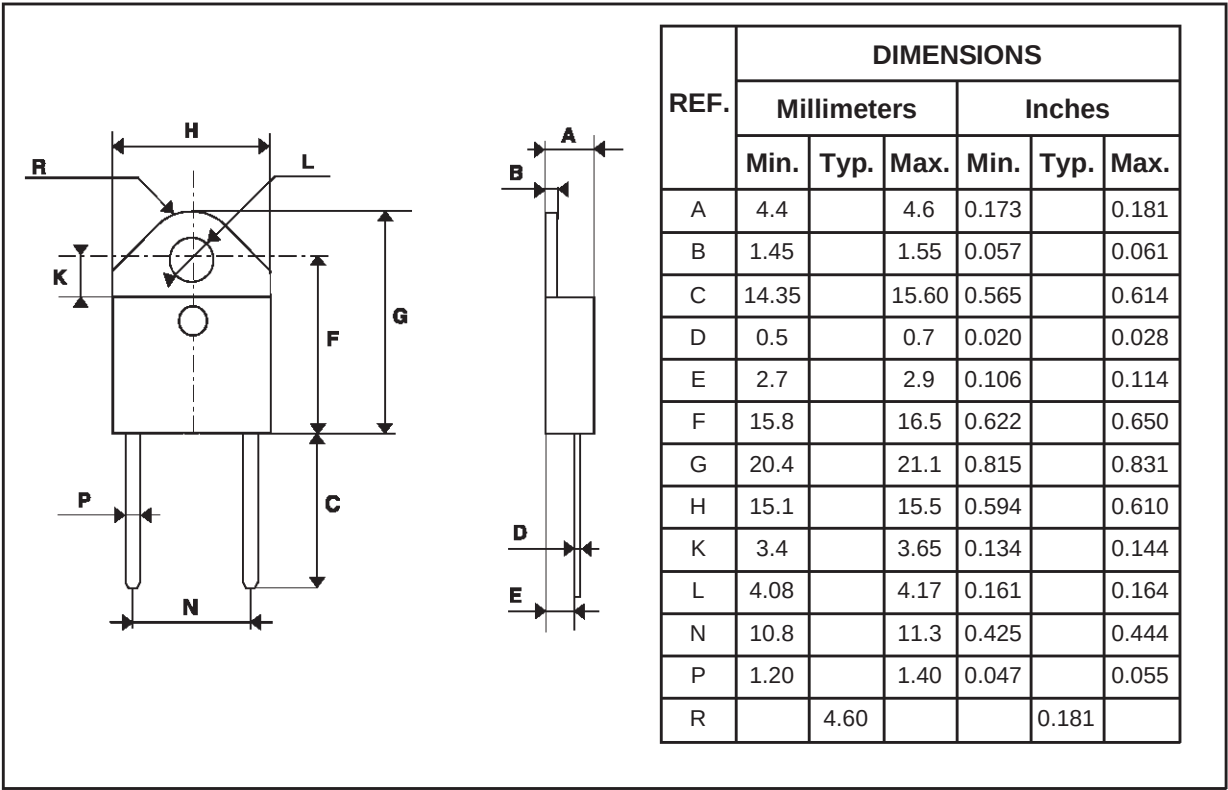


**Fig.12** : Dynamic parameters versus junction temperature.



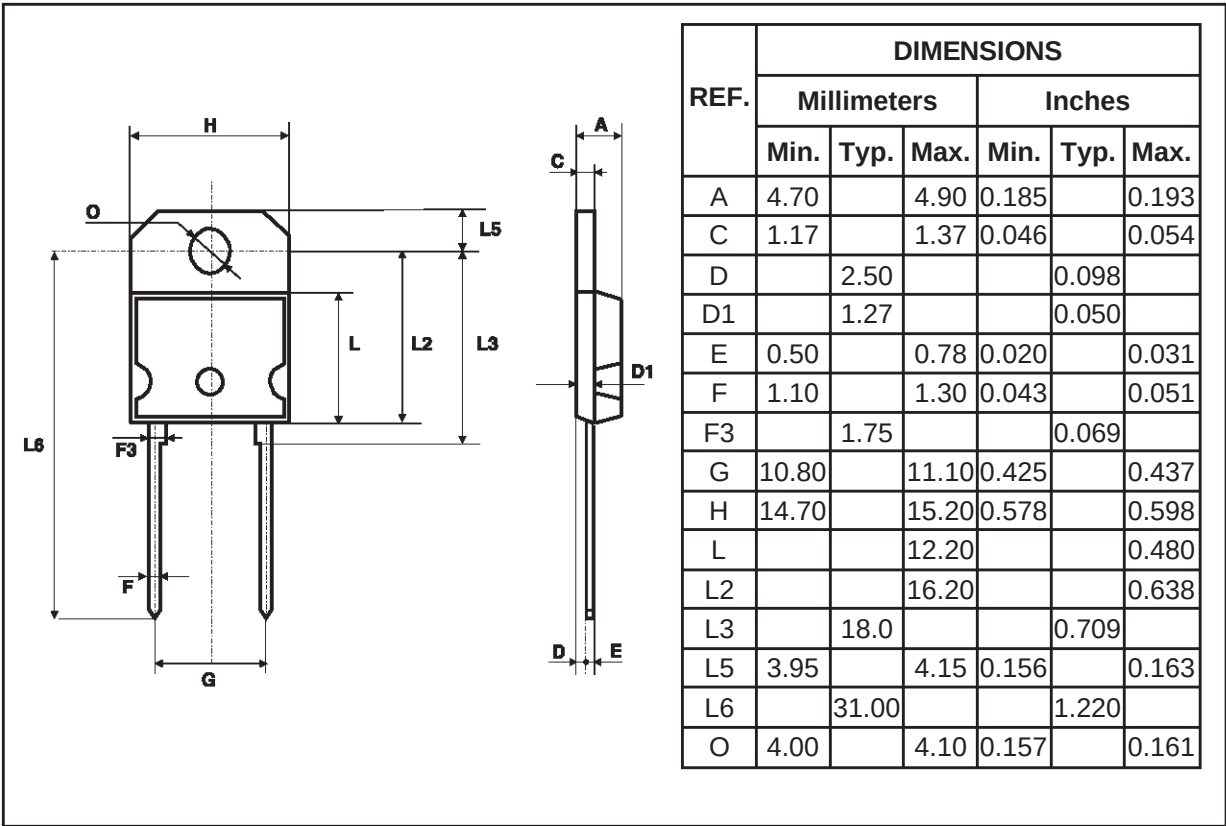
PACKAGE MECHANICAL DATA

DOP3I (isoluted)



Cooling method : C  
Marking : Type number  
Weight : 4.52 g  
Recommended torque value : 0.8m.N  
Maximum torque value : 1.0m.N

PACKAGE MECHANICAL DATA  
SOD93



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

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