

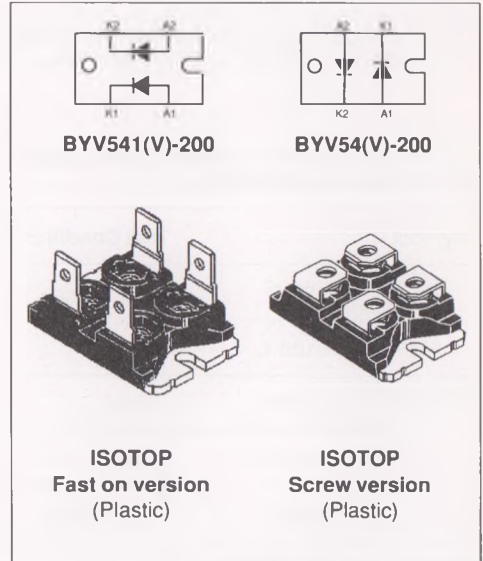
## HIGH EFFICIENCY FAST RECOVERY RECTIFIER DIODES

### 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<br>sinusoidal | Per diode                      | 1000     | A |
| T <sub>stg</sub><br>T <sub>j</sub> | Storage and junction temperature range |                      |                                    | - 40 to + 150<br>- 40 to + 150 | °C<br>°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<br>I <sub>R</sub> = 1A                  |      |      | 40   | ns   |
|                 |                       | I <sub>F</sub> = 1A<br>V <sub>R</sub> = 30V                   |      |      | 60   |      |
| tfr             | T <sub>j</sub> = 25°C | I <sub>F</sub> = 1A<br>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.

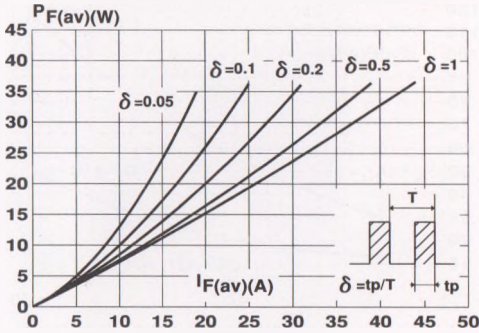


Fig.2 : Peak current versus form factor.

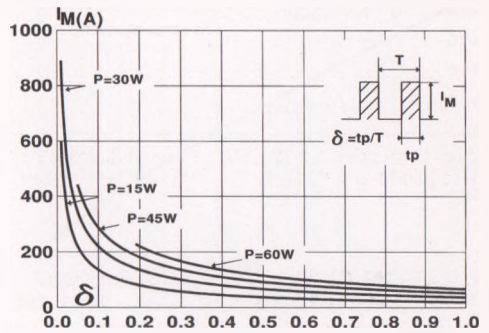


Fig.3 : Forward voltage drop versus forward current (maximum values).

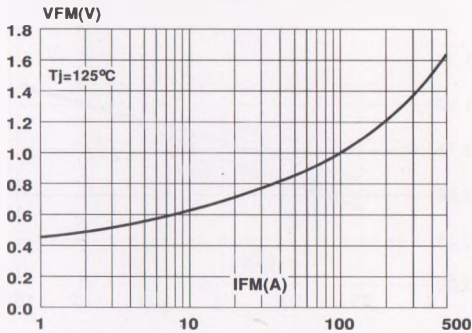


Fig.4 : Relative variation of thermal impedance junction to case versus pulse duration.

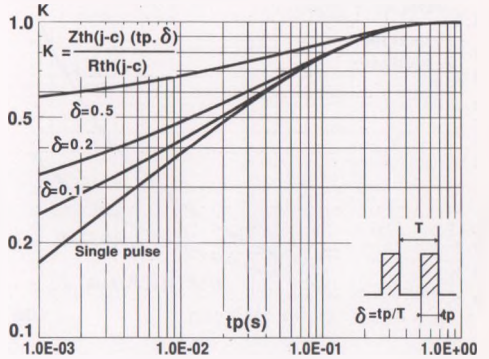


Fig.5 : Non repetitive surge peak forward current versus overload duration.

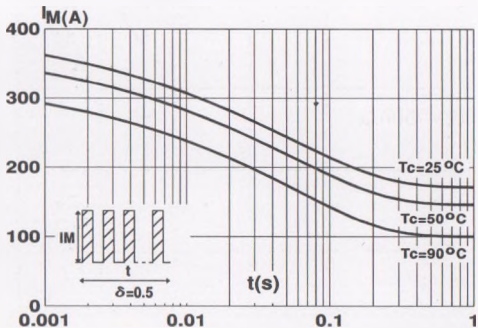


Fig.6 : Average current versus ambient temperature. (duty cycle : 0.5)

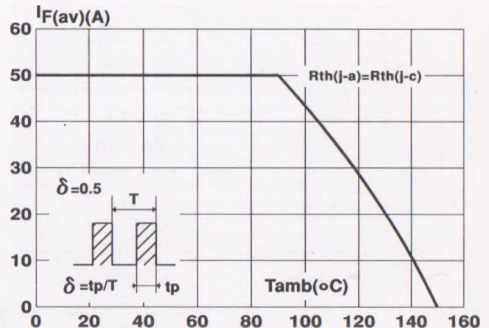


Fig.7 : Junction capacitance versus reverse voltage applied (Typical values).

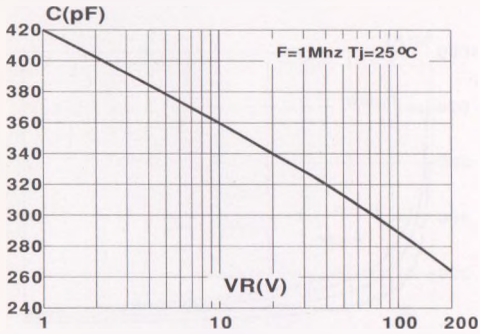


Fig.9 : Peak reverse current versus  $dI_F/dt$ .

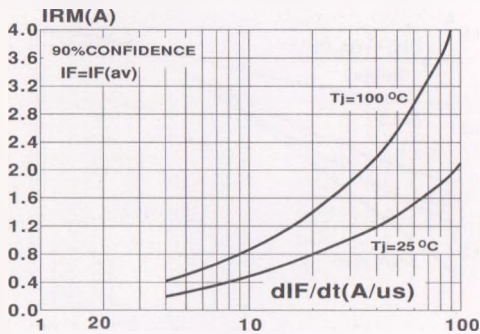


Fig.8 : Recovery charges versus  $dI_F/dt$ .

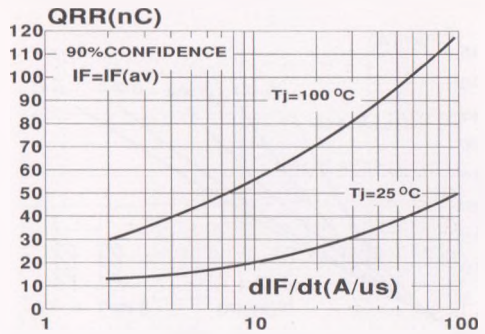


Fig.10 : Dynamic parameters versus junction temperature.

