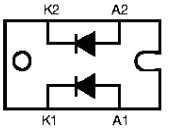
SGS-THOMSON MICROELECTRONICS

# BYV54V
# BYV541V

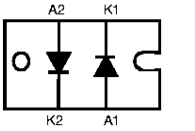
## HIGH EFFICIENCY FAST RECOVERY RECTIFIER DIODES

### FEATURES

- SUITED FOR SMPS
- VERY LOW FORWARD LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- HIGH SURGE CURRENT CAPABILITY
- HIGH AVALANCHE ENERGY CAPABILITY
- INSULATED :
  Insulating voltage = 2500 $V_{RMS}$
  Capacitance = 45 pF




**BYV541V-200**

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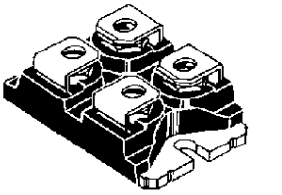


**ISOTOP**
(Plastic)

### 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 |
|---|---|---|---|---|---|
| $I_{F(RMS)}$ | RMS forward current | | Per diode | 100 | A |
| $I_{F(AV)}$ | Average forward current $\delta = 0.5$ | Tc=90°C | Per diode | 50 | A |
| $I_{FSM}$ | Surge non repetitive forward current | tp=10ms sinusoidal | Per diode | 1000 | A |
| Tstg<br>Tj | Storage and junction temperature range | | | - 40 to + 150<br>- 40 to + 150 | °C<br>°C |

| Symbol | Parameter | BYV54V / BYV541V | | | | Unit |
|---|---|---|---|---|---|---|
| | | 50 | 100 | 150 | 200 | |
| $V_{RRM}$ | 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 :
Tj-Tc (diode 1) = P(diode 1) x Rth(j-c)(Per diode) + P(diode 2) x Rth(c)

## ELECTRICAL CHARACTERISTICS (Per diode)
## STATIC CHARACTERISTICS

| Symbol | Test Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $I_R$ * | $T_j = 25°C$ | $V_R = V_{RRM}$ | | | 50 | µA |
| | $T_j = 100°C$ | | | | 5 | mA |
| $V_F$ ** | $T_j = 125°C$ | $I_F = 50$ A | | | 0.85 | V |
| | $T_j = 125°C$ | $I_F = 100$ A | | | 1.00 | |
| | $T_j = 25°C$ | $I_F = 100$ 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 :
$P = 0.7 \times I_{F(AV)} + 0.003 \times I_{F^2(RMS)}$

## RECOVERY CHARACTERISTICS

| Symbol | Test Conditions | | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| trr | $T_j = 25°C$ | $I_F = 0.5A$<br>$I_R = 1A$ | $I_{rr} = 0.25A$ | | | 40 | ns |
| | | $I_F = 1A$<br>$V_R = 30V$ | $dI_F/dt = -50A/µs$ | | | 60 | |
| tfr | $T_j = 25°C$ | $I_F = 1A$<br>$V_{FR} = 1.1 \times V_F$ | tr = 5 ns | | 10 | | ns |
| $V_{FP}$ | $T_j = 25°C$ | $I_F = 1A$ | tr = 5 ns | | 1.5 | | V |

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

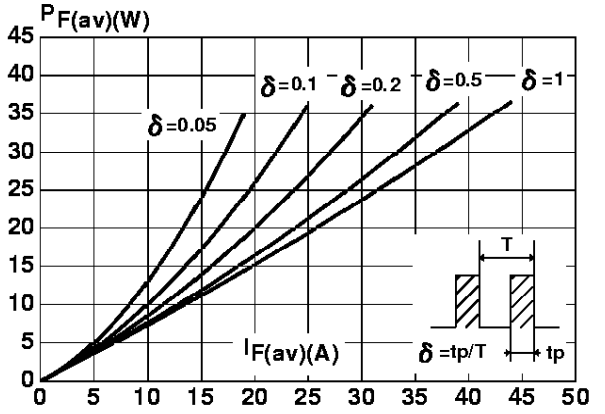



**Fig.2 :** Peak current versus form factor.

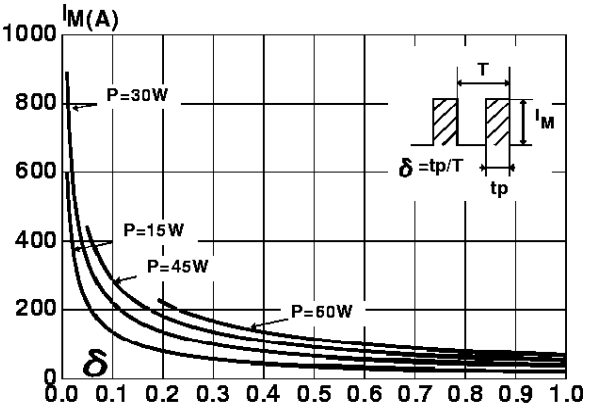



**Fig.3 :** Forward voltage drop versus forward current (maximum values).

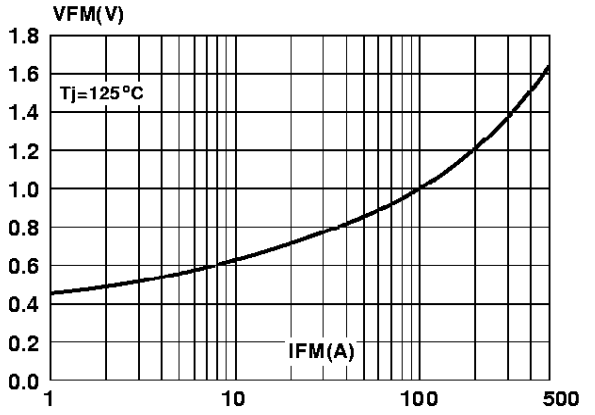



**Fig.4 :** Relative variation of thermal impedance junction to case versus pulse duration.

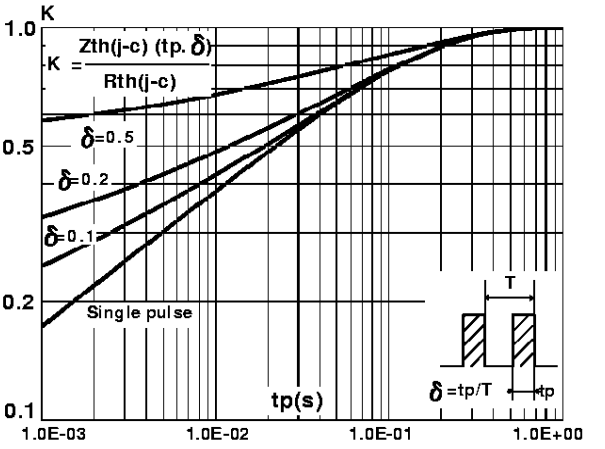



**Fig.5 :** Non repetitive surge peak forward current versus overload duration.

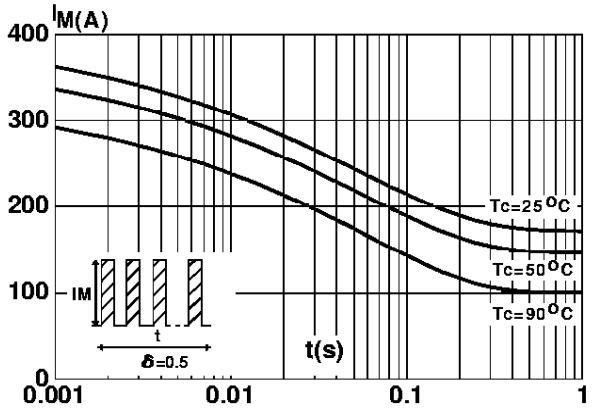



**Fig.6 :** Average current versus ambient temperature. (duty cycle : 0.5)

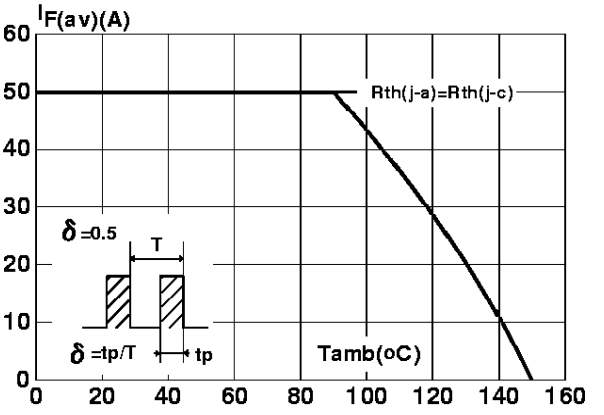


**Fig.7 :** Junction capacitance versus reverse voltage applied (Typical values).

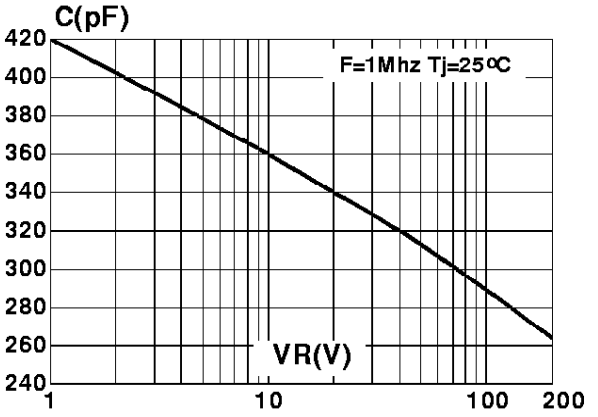



**Fig.8 :** Recovery charges versus $dI_F/dt$.

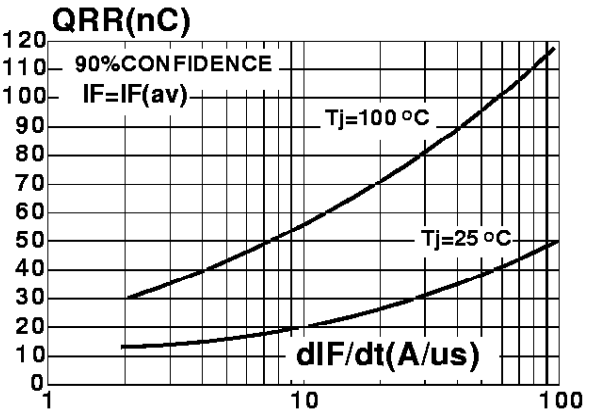



**Fig.9 :** Peak reverse current versus dIF/dt.

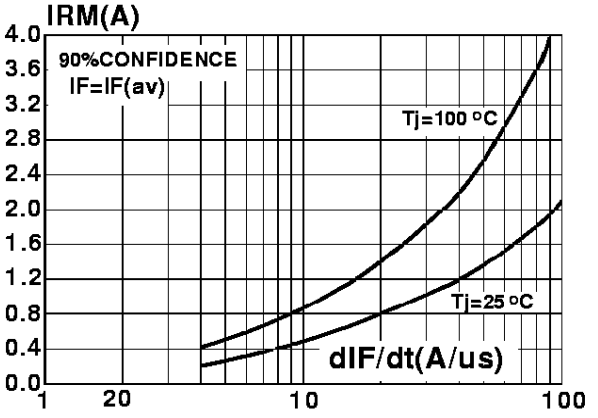
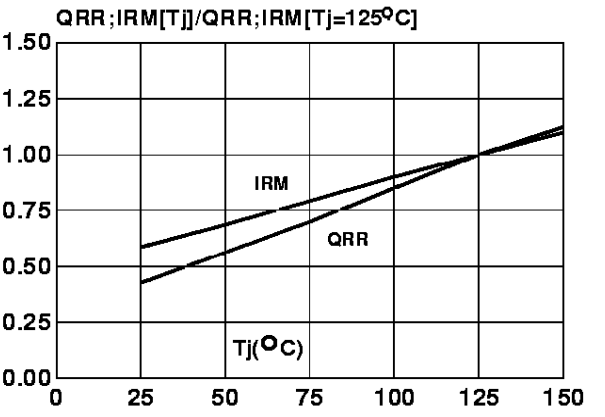
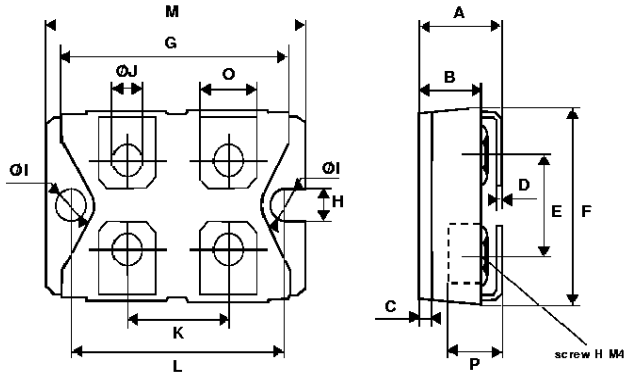



**Fig.10 :** Dynamic parameters versus junction temperature.



## PACKAGE MECHANICAL DATA
ISOTOP




| REF. | DIMENSIONS | | | |
|---|---|---|---|---|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A | 11.80 | 12.20 | 0.465 | 0.480 |
| B | 8.90 | 9.10 | 0.350 | 0.358 |
| C | 1.95 | 2.05 | 0.077 | 0.081 |
| D | 0.75 | 0.85 | 0.029 | 0.034 |
| E | 12.60 | 12.80 | 0.496 | 0.504 |
| F | 25.10 | 25.50 | 0.988 | 1.004 |
| G | 31.50 | 31.70 | 1.240 | 1.248 |
| H | 4.00 | | 0.157 | |
| I | 4.10 | 4.30 | 0.161 | 0.169 |
| J | 4.10 | 4.30 | 0.161 | 0.169 |
| K | 14.90 | 15.10 | 0.586 | 0.595 |
| L | 30.10 | 30.30 | 1.185 | 1.193 |
| M | 37.80 | 38.20 | 1.488 | 1.504 |
| O | 7.80 | 8.20 | 0.307 | 0.323 |
| P | 5.50 | | 0.216 | |

Cooling method : C
Marking : Type number
Weight : 28 g