



## SMBYT03

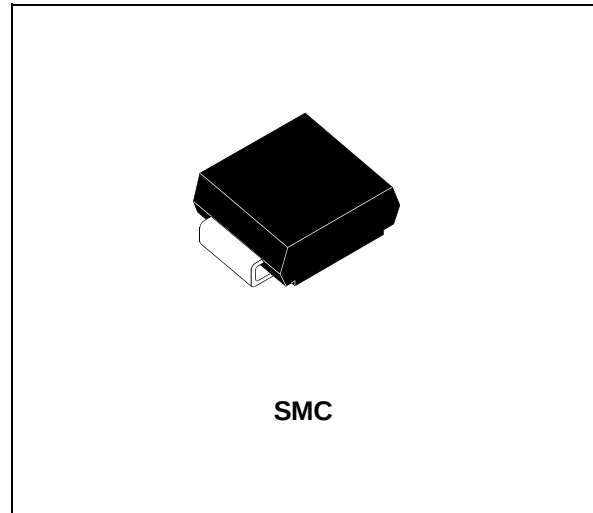
### FAST RECOVERY RECTIFIER DIODES

#### FEATURES

- VERY LOW REVERSE RECOVERY TIME
- VERY LOW SWITCHING LOSSES
- LOW NOISE TURN-OFF SWITCHING
- SURFACE MOUNT DEVICE

#### DESCRIPTION

Single high voltage rectifier ranging from 200V to 400 V suited for Switch Mode Power Supplies and other power converters.



#### ABSOLUTE MAXIMUM RATINGS

| Symbol             | Parameter                                 |                                            | Value                          | Unit                                     |
|--------------------|-------------------------------------------|--------------------------------------------|--------------------------------|------------------------------------------|
| $I_{F(RMS)}$       | RMS forward current                       |                                            | 10                             | A                                        |
| $I_{F(AV)}$        | Average forward current                   | $T_I=55^{\circ}\text{C}$<br>$\delta = 0.5$ | 3                              | A                                        |
| $I_{FSM}$          | Non repetitive surge peak forward current | $t_p=10\text{ms}$<br>sinusoidal            | 60                             | 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 | 400   | V    |

#### THERMAL RESISTANCE

| Symbol        | Parameter      | Value | Unit                 |
|---------------|----------------|-------|----------------------|
| $R_{th(j-l)}$ | Junction-leads | 20    | $^{\circ}\text{C/W}$ |

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### ELECTRICAL CHARACTERISTICS STATIC CHARACTERISTICS

| Symbol   | Test Conditions           |                    | Min. | Typ. | Max. | Unit          |
|----------|---------------------------|--------------------|------|------|------|---------------|
| $V_F$ *  | $T_j = 25^\circ\text{C}$  | $I_F = 3\text{ A}$ |      |      | 1.5  | V             |
|          | $T_j = 100^\circ\text{C}$ |                    |      | 1.05 | 1.4  |               |
| $I_R$ ** | $T_j = 25^\circ\text{C}$  | $V_R = V_{RRM}$    |      |      | 10   | $\mu\text{A}$ |
|          | $T_j = 100^\circ\text{C}$ |                    |      | 0.2  | 0.6  | mA            |

Pulse test : \*  $t_p = 380\text{ }\mu\text{s}$ , duty cycle < 2 %

\*\*  $t_p = 5\text{ ms}$ , duty cycle < 2 %

### RECOVERY CHARACTERISTICS

| Symbol | Test Conditions          |                                                                                | Min. | Typ. | Max. | Unit |
|--------|--------------------------|--------------------------------------------------------------------------------|------|------|------|------|
| trr    | $T_j = 25^\circ\text{C}$ | $I_F = 0.5\text{ A}$ $I_{rr} = 0.25\text{ A}$<br>$I_R = 1\text{ A}$            |      |      | 25   | ns   |
|        |                          | $I_F = 1\text{ A}$ $di_F/dt = -15\text{ A}/\mu\text{s}$<br>$V_R = 30\text{ V}$ |      |      | 60   |      |

### TURN-OFF SWITCHING CHARACTERISTICS (Without serie inductance)

| Symbol    | Test Conditions                                      |                                                       | Min. | Typ. | Max. | Unit |
|-----------|------------------------------------------------------|-------------------------------------------------------|------|------|------|------|
| $t_{IRM}$ | $V_{CC} = 200\text{ V}$<br>$T_j = 100^\circ\text{C}$ | $I_F = 3\text{ A}$ $L_p \leq 0.05\text{ }\mu\text{H}$ |      | 35   | 50   | ns   |
| $I_{RM}$  |                                                      | $di_F/dt = -50\text{ A}/\mu\text{s}$                  |      | 1.5  | 2    | A    |

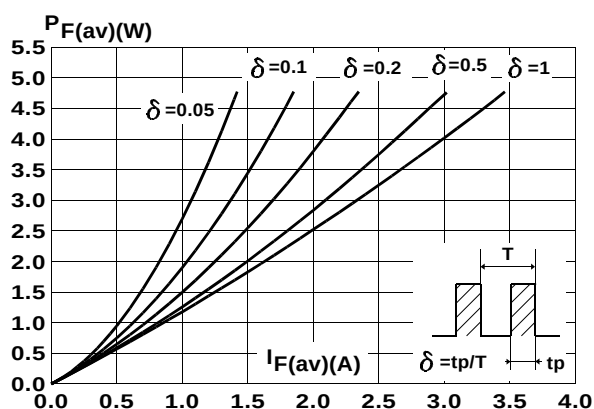
To evaluate the conduction losses use the following equation :

$$P = 1.1 \times I_{F(AV)} + 0.08 \times I_{F(RMS)}^2$$

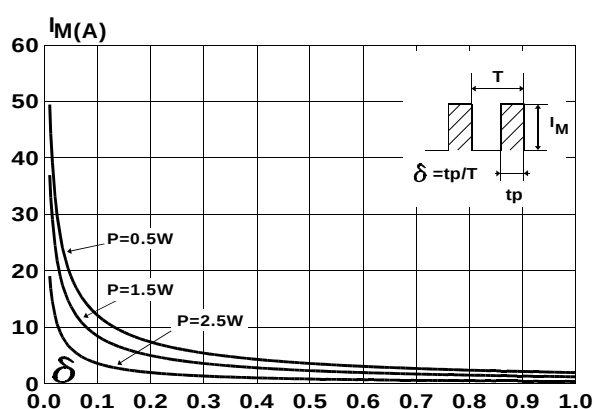
|             |     |     |     |
|-------------|-----|-----|-----|
| Voltage (V) | 200 | 300 | 400 |
| Marking     | C2  | C3  | C4  |

Laser marking  
Logo indicates cathode

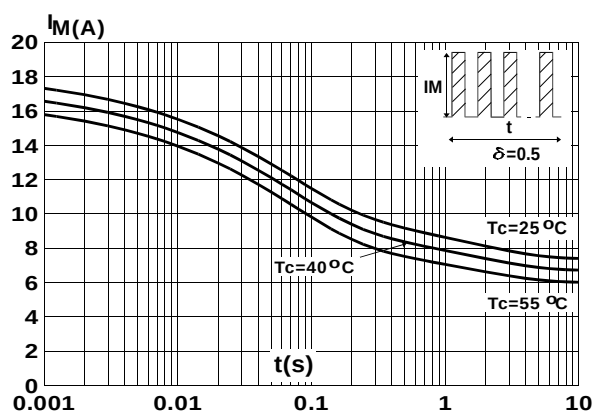
**Fig.1** : Low frequency power losses versus average current.



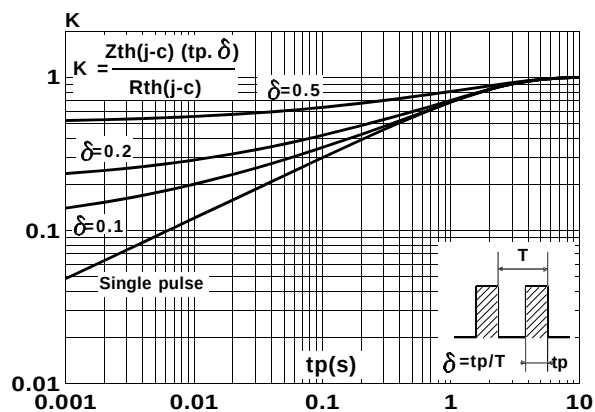
**Fig.2** : Peak current versus form factor.



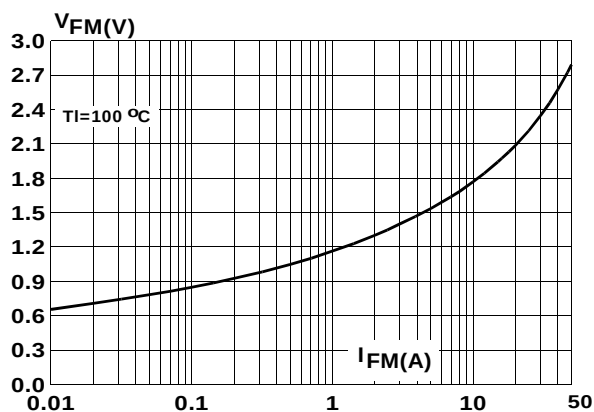
**Fig.3** : Non repetitive surge peak forward current versus overload duration.



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



**Fig.5** : Voltage drop versus forward current. (Maximum values)



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

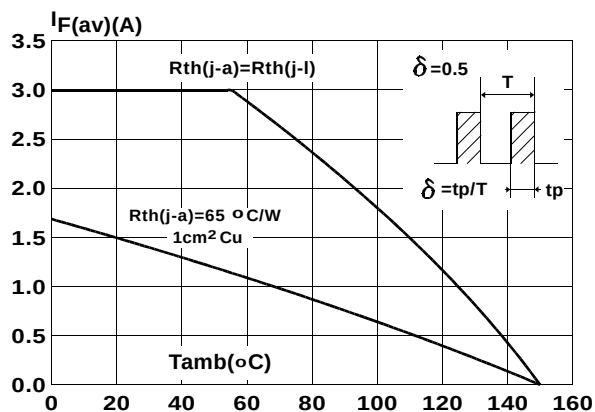


Fig.7 : Recovery time versus  $di_F/dt$ .

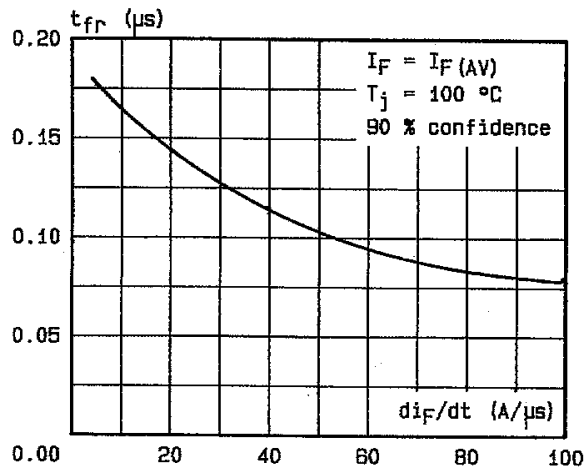


Fig.9 : Peak reverse current versus  $di_F/dt$ .

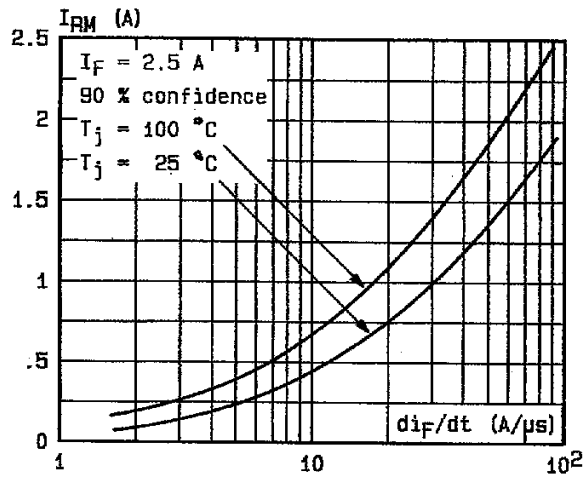


Fig.11 : Dynamic parameters versus junction temperature.

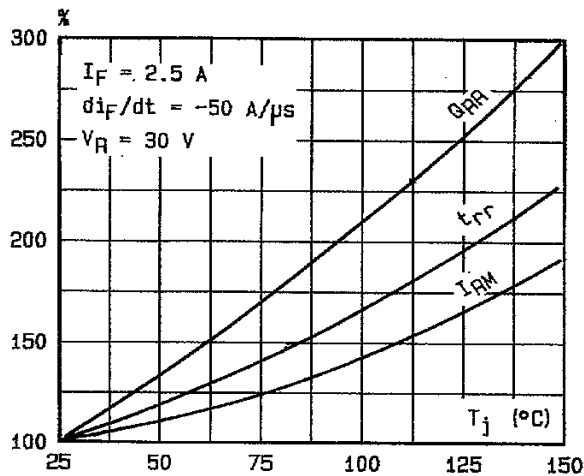


Fig.8 : Peak forward voltage versus  $di_F/dt$ .

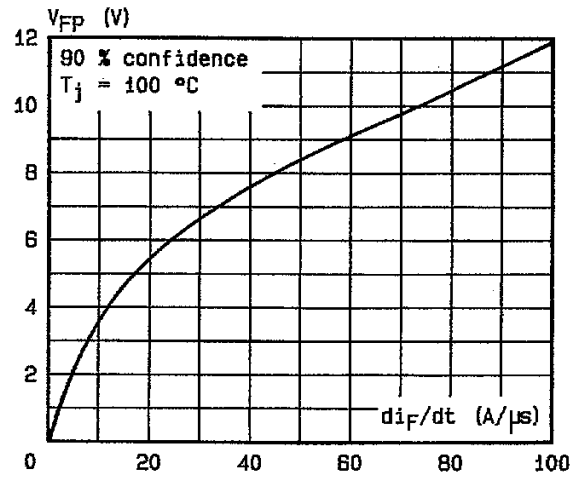


Fig.10 : Recovery charge versus  $di_F/dt$ . (typical values)

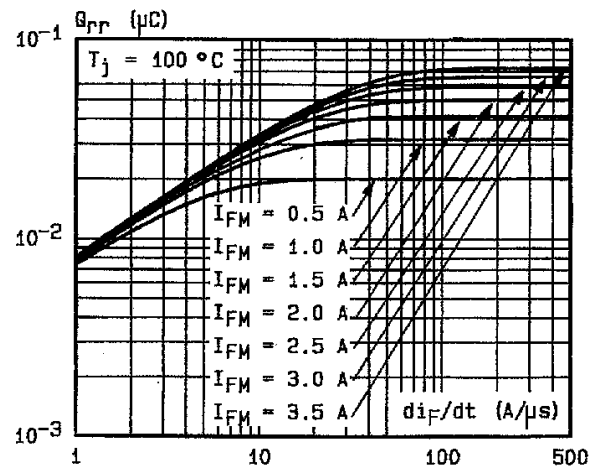
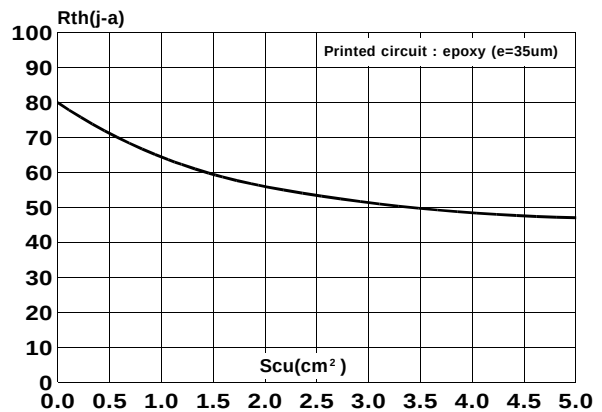
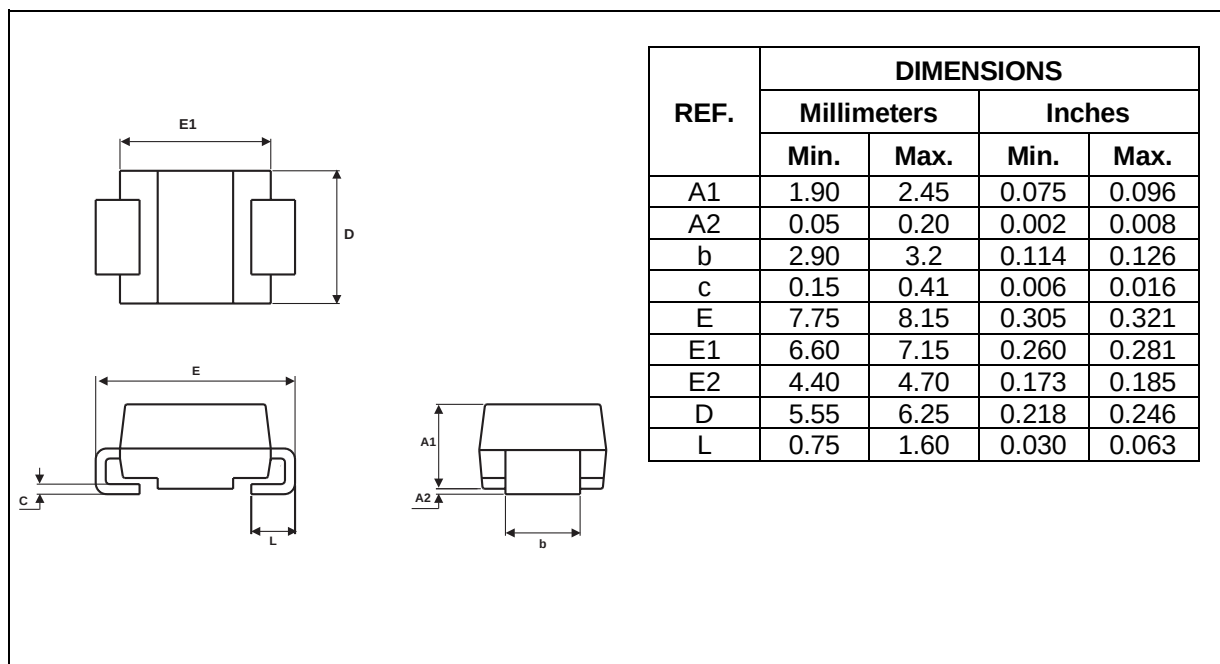


Fig.12 : Thermal resistance junction to ambient versus copper surface under each lead.



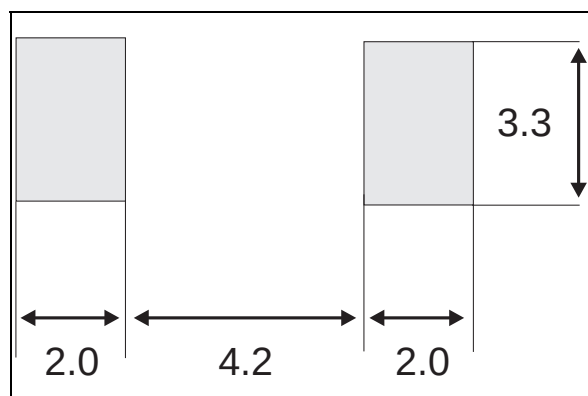
## PACKAGE MECHANICAL DATA

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## FOOTPRINT DIMENSIONS

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