



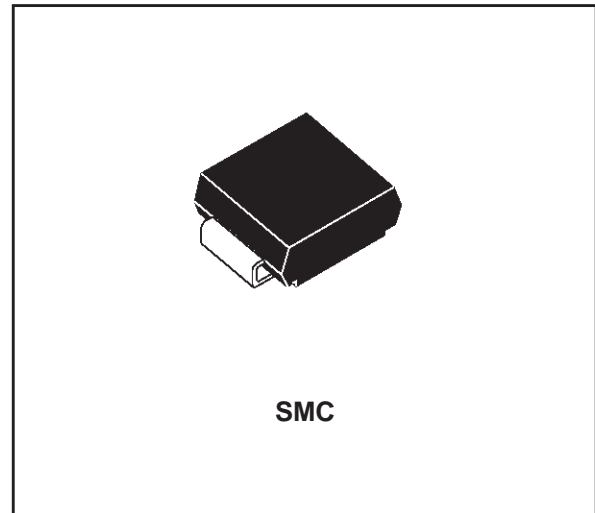
## FAST RECOVERY RECTIFIER DIODES

### 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>$\delta = 0.5$ | A  |
| $I_{FSM}$          | Non repetitive surge peak forward current | $t_p=10\text{ms}$<br>sinusoidal            | 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    | $^{\circ}\text{C/W}$ |

## SMBYT03

### 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 : \*  $t_p = 380\ \mu\text{s}$ , 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   |
|        |                          | $I_F = 1\text{ A}$ $dl_F/dt = -15\text{ A}/\mu\text{s}$<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>$T_j = 100^\circ\text{C}$ | $I_F = 3\text{ A}$ $L_p \leq 0.05\ \mu\text{H}$<br>$dl_F/dt = -50\text{ A}/\mu\text{s}$ |      | 35   | 50   | ns   |
| $I_{RM}$  |  |   |      | 1.5  | 2    | A    |

To evaluate the conduction losses use the following equation :

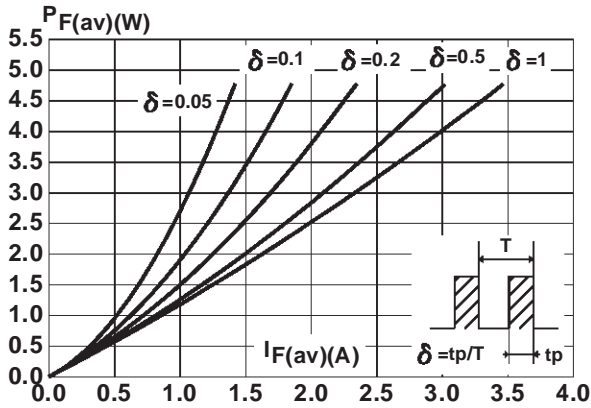
$$P = 1.1 \times I_{F(AV)} + 0.08 \times I_{F(RMS)}^2$$

|                    |     |     |     |
|--------------------|-----|-----|-----|
| <b>Voltage (V)</b> | 200 | 300 | 400 |
| <b>Marking</b>     | C2  | C3  | C4  |

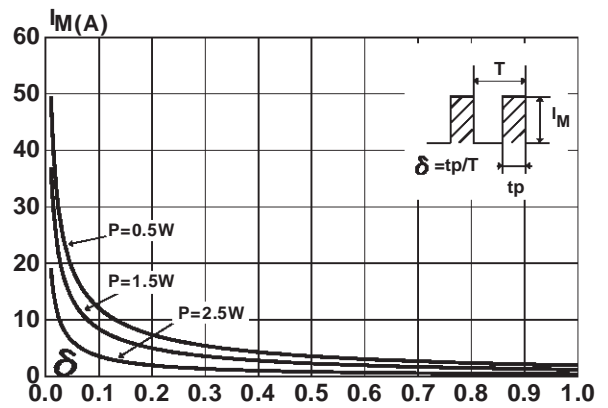
Laser marking

Logo indicates cathode

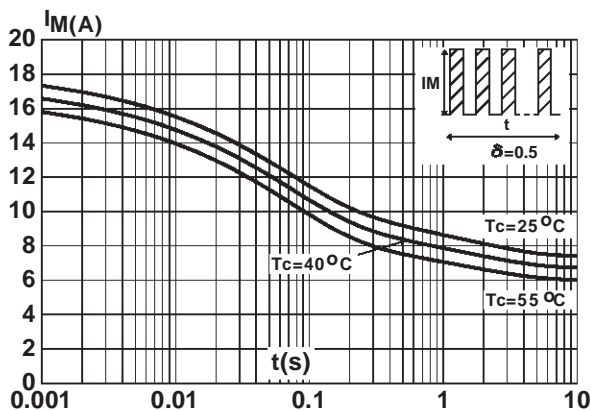
**Fig.1 :** Low frequency power losses versus average current.



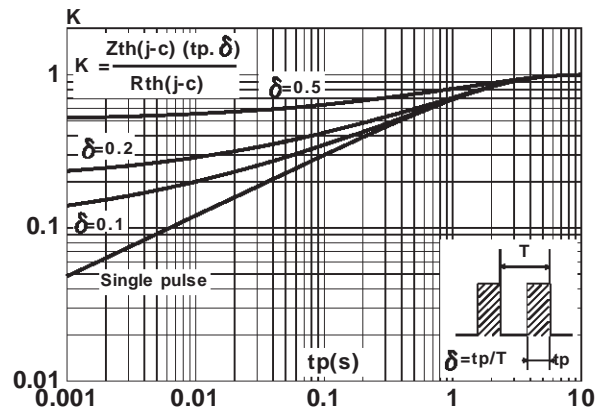
**Fig.2 :** Peak current versus form factor.



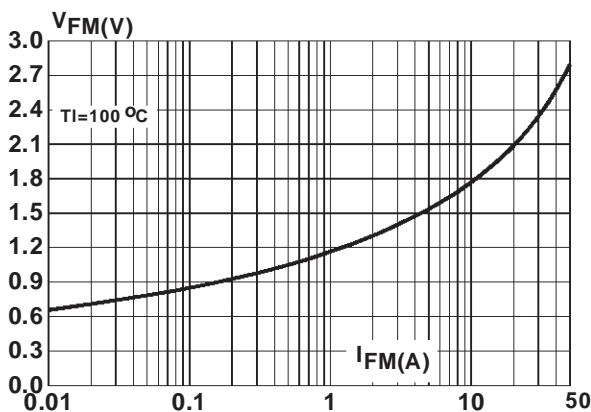
**Fig.3 :** Non repetitive surge peak forward current versus overload duration.



**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)

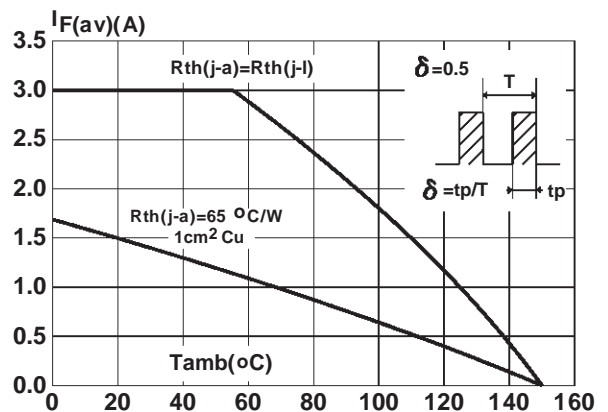


Fig.7 : Recovery time versus  $di_F/dt$ .

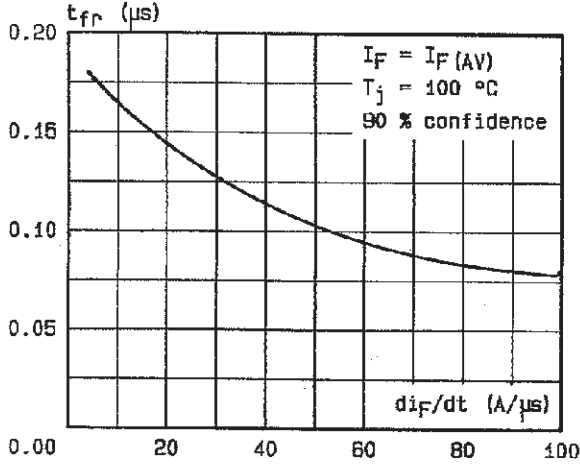


Fig.9 : Peak reverse current versus  $di_F/dt$ .

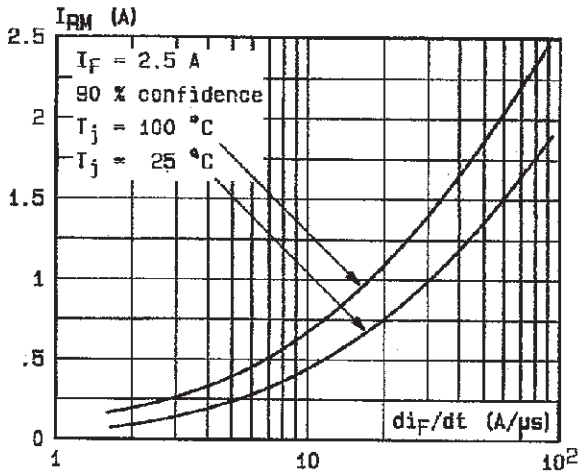


Fig.11 : Dynamic parameters versus junction temperature.

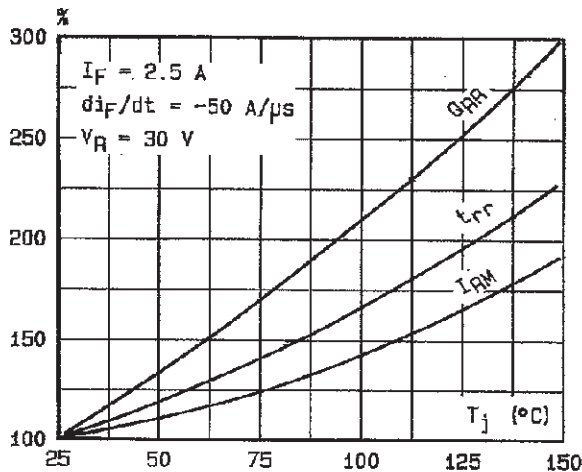


Fig.8 : Peak forward voltage versus  $di_F/dt$ .

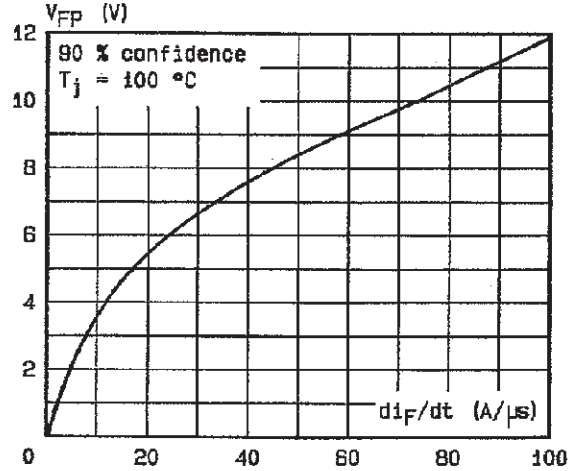


Fig.10 : Recovery charge versus  $di_F/dt$ . (typical values)

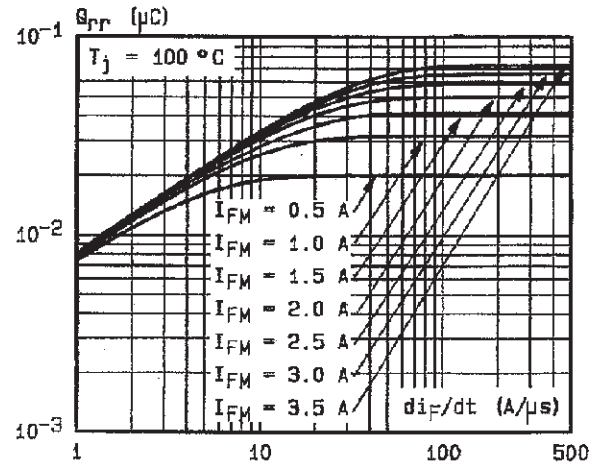
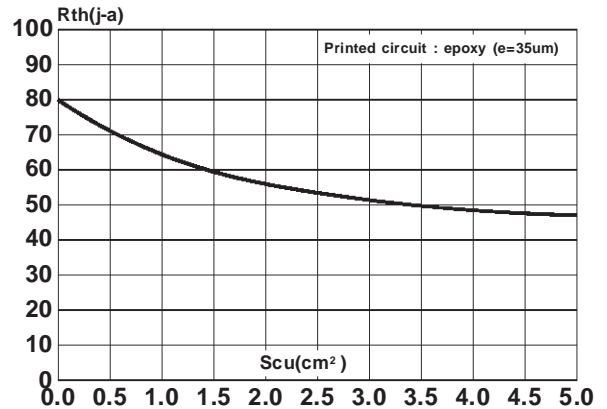
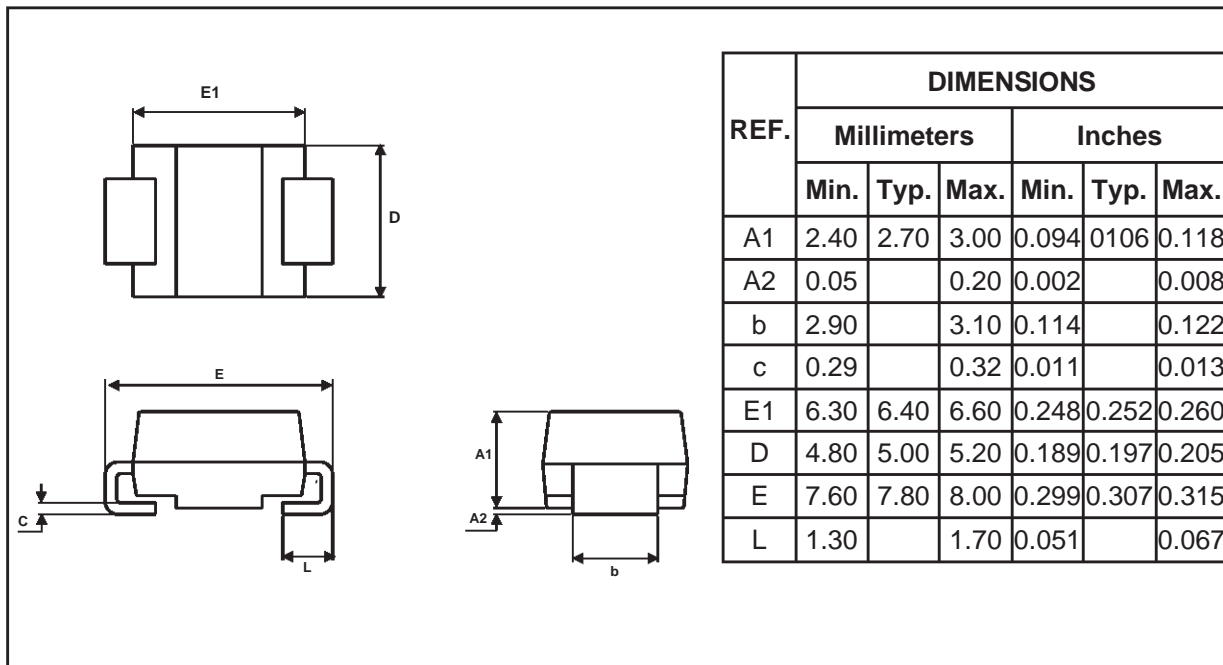


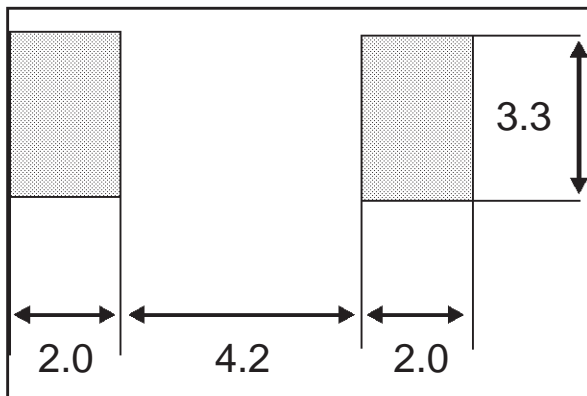
Fig.12 : Thermal resistance junction to ambient versus copper surface under each lead.



**PACKAGE MECHANICAL DATA**  
SMC



**FOOTPRINT DIMENSIONS**  
SMC



Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

The ST logo is a registered trademark of STMicroelectronics

© 1998 STMicroelectronics - Printed in Italy - All rights reserved.

STMicroelectronics GROUP OF COMPANIES

Australia - Brazil - Canada - China - France - Germany - Italy - Japan - Korea - Malaysia - Malta - Mexico - Morocco - The Netherlands - Singapore - Spain - Sweden - Switzerland - Taiwan - Thailand - United Kingdom - U.S.A.