



## SMBYW01-200

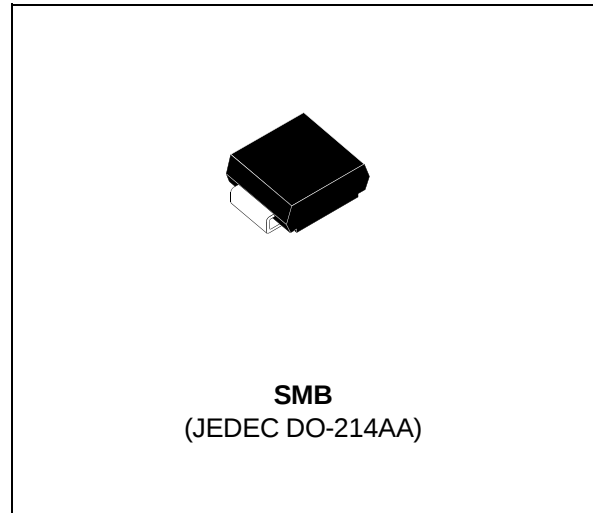
### HIGH EFFICIENCY FAST RECOVERY DIODE

#### MAIN PRODUCT CHARACTERISTICS

|             |        |
|-------------|--------|
| $I_{F(AV)}$ | 1 A    |
| $V_{RRM}$   | 200 V  |
| $V_F(max)$  | 0.71 V |
| $T_j(max)$  | 150 °C |

#### FEATURES AND BENEFITS

- VERY LOW SWITCHING LOSSES
- LOW FORWARD VOLTAGE DROP BIPOLAR DEVICE
- LOW PEAK FORWARD VOLTAGE FOR TELECOM TRANSIENT OPERATION SUCH AS IN LIGHTING PROTECTION CIRCUITS



#### DESCRIPTION

Single chip rectifier suited to Switch Mode Power Supplies and high frequency DC to DC converters. Packaged in SMB, this surface mount device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

#### ABSOLUTE RATINGS (limiting values)

| Symbol       | Parameter                              |                                           | Value         | Unit |
|--------------|----------------------------------------|-------------------------------------------|---------------|------|
| $V_{RRM}$    | Repetitive peak reverse voltage        |                                           | 200           | V    |
| $I_{F(RMS)}$ | RMS forward current                    |                                           | 8             | A    |
| $I_{F(AV)}$  | Average forward current                | $T_{lead}=140^{\circ}C$<br>$\delta = 0.5$ | 1             | A    |
| $I_{FSM}$    | Surge non repetitive forward current   | $t_p=10ms$<br>sinusoidal                  | 60            | A    |
| $T_{stg}$    | Storage and junction temperature range |                                           | - 65 to + 150 | °C   |
| $T_j$        | Maximum operating junction temperature |                                           | 150           | °C   |

**THERMAL RESISTANCES**

| Symbol    | Parameter        | Value | Unit |
|-----------|------------------|-------|------|
| Rth (j-l) | Junction to lead | 13    | °C/W |

**STATIC ELECTRICAL CHARACTERISTICS**

| Symbol            | Parameters              | Test Conditions        |                                   | Min. | Typ. | Max. | Unit |
|-------------------|-------------------------|------------------------|-----------------------------------|------|------|------|------|
| V <sub>F</sub> *  | Forward voltage drop    | T <sub>j</sub> = 25°C  | I <sub>F</sub> = 1 A              |      |      | 0.9  | V    |
|                   |                         | T <sub>j</sub> = 150°C | I <sub>F</sub> = 1 A              |      | 0.65 | 0.71 |      |
| I <sub>R</sub> ** | Reverse leakage current | T <sub>j</sub> = 25°C  | V <sub>R</sub> = V <sub>RRM</sub> |      |      | 3    | μA   |
|                   |                         | T <sub>j</sub> = 125°C |                                   |      | 180  | 400  |      |

Pulse test : \* tp = 380 μs, δ < 2 %

\*\* tp = 5 ms, δ < 2 %

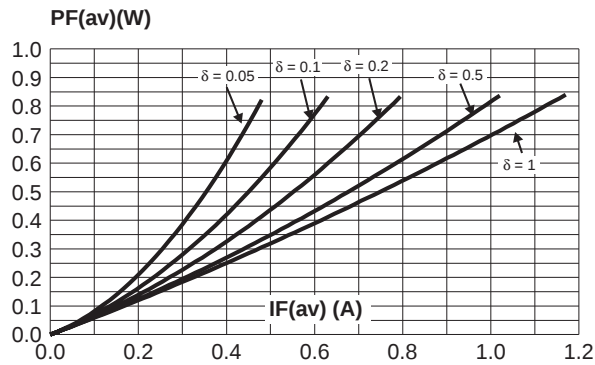
To evaluate the maximum conduction losses use the following equation :

$$P = 0.58 \times I_{F(AV)} + 0.118 \times I_F^2 (RMS)$$

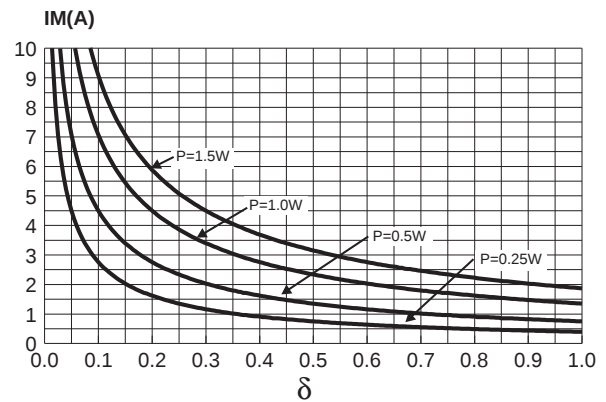
**RECOVERY CHARACTERISTICS**

| Symbol          | Test Conditions       |                                                                               |  | Min. | Typ. | Max. | Unit |
|-----------------|-----------------------|-------------------------------------------------------------------------------|--|------|------|------|------|
| t <sub>rr</sub> | T <sub>j</sub> = 25°C | I <sub>F</sub> = 0.5 A   I <sub>rr</sub> = 0.25 A   I <sub>R</sub> = 1A       |  |      |      | 25   | ns   |
|                 |                       | I <sub>F</sub> = 1 A   dI <sub>F</sub> /dt = - 50 A/μs   V <sub>R</sub> = 30V |  |      | 25   | 35   |      |
| t <sub>fr</sub> | T <sub>j</sub> = 25°C | I <sub>F</sub> = 1A   dI <sub>F</sub> /dt = 100 A/μs                          |  |      |      | 25   | ns   |
| V <sub>FP</sub> | T <sub>j</sub> = 25°C | I <sub>F</sub> = 1A   dI <sub>F</sub> /dt = 100 A/μs                          |  |      |      | 5    | V    |

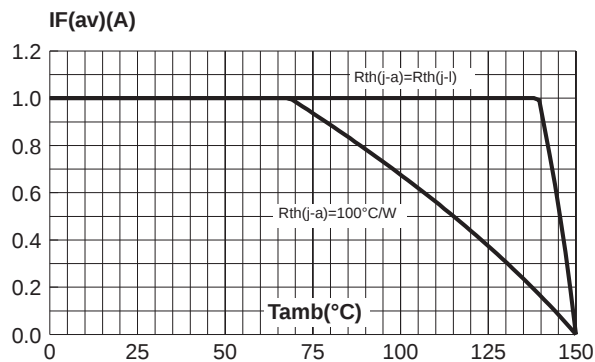
**Fig. 1:** Average forward power dissipation versus average forward current .



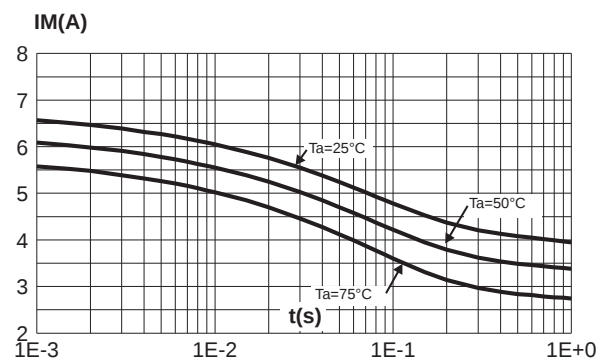
**Fig. 2:** Peak current versus form factor.



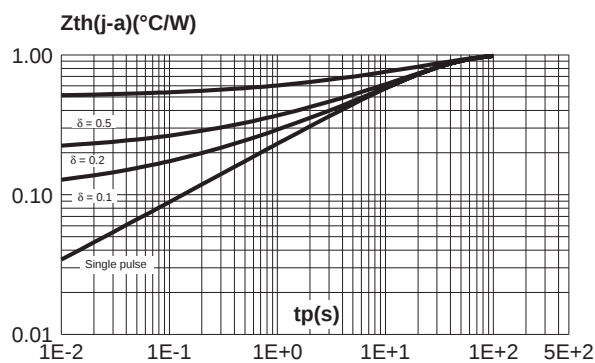
**Fig. 3:** Average forward current versus ambient temperature ( $\delta=0.5$ ).



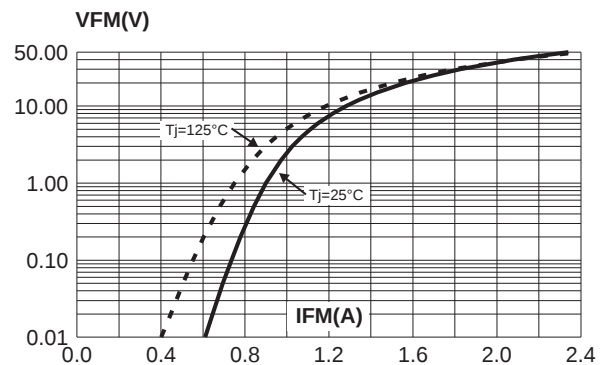
**Fig. 4:** Non repetitive surge peak forward current versus overload duration.



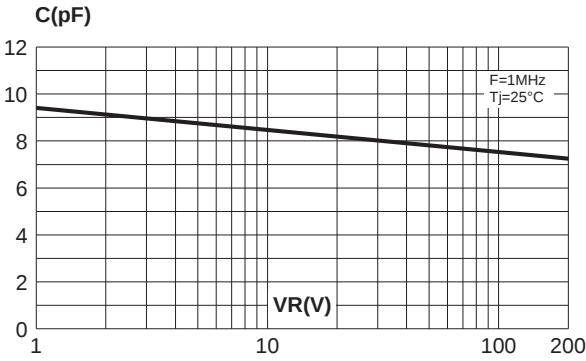
**Fig. 5:** Variation of thermal impedance junction to ambient versus pulse duration (recommended pad layout, epoxy FR4,  $e(Cu)=35\mu m$ ).



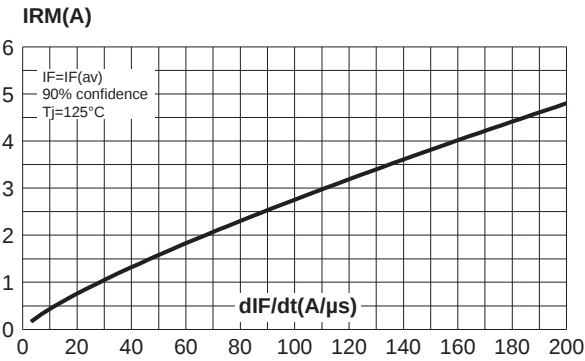
**Fig 6:** Forward voltage drop versus forward current (maximum values).



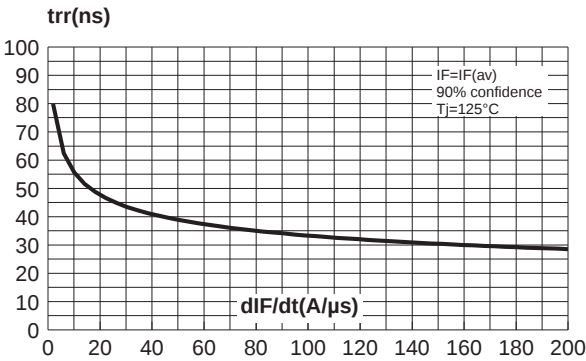
**Fig. 7:** Junction capacitance versus reverse voltage applied (typical values).



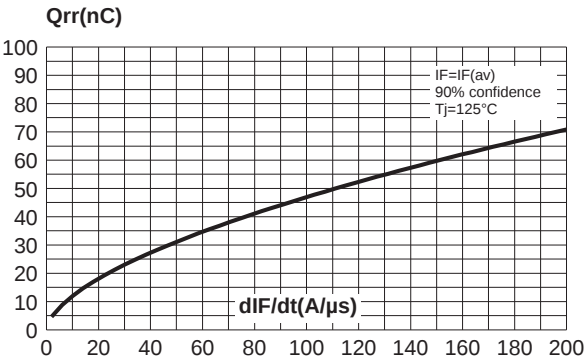
**Fig. 8:** Reverse recovery current versus  $dI_F/dt$ .



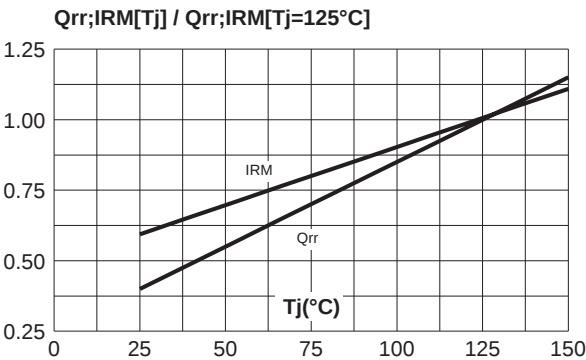
**Fig. 9:** Reverse recovery time versus  $dI_F/dt$ .



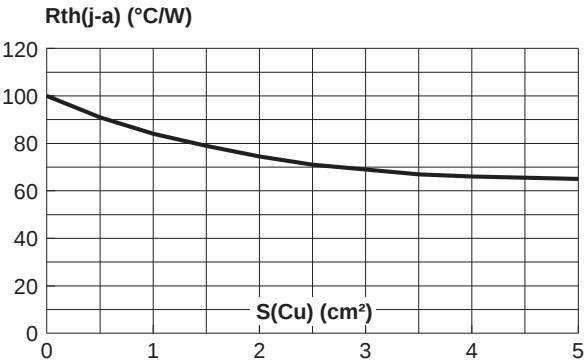
**Fig. 10:** Reverse recovery charges versus  $dI_F/dt$ .



**Fig. 11:** Dynamic parameters versus junction temperature.

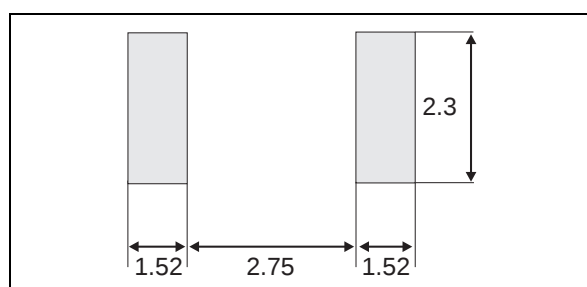


**Fig. 12:** Thermal resistance junction to ambient versus copper surface under each lead (Epoxy printed circuit board FR4, copper thickness: 35 $\mu\text{m}$ )



**PACKAGE MECHANICAL DATA****SMB**

| REF. | DIMENSIONS  |      |        |       |
|------|-------------|------|--------|-------|
|      | Millimeters |      | Inches |       |
|      | Min.        | Max. | Min.   | Max.  |
| A1   | 1.90        | 2.45 | 0.075  | 0.096 |
| A2   | 0.05        | 0.20 | 0.002  | 0.008 |
| b    | 1.95        | 2.20 | 0.077  | 0.087 |
| c    | 0.15        | 0.41 | 0.006  | 0.016 |
| E    | 5.10        | 5.60 | 0.201  | 0.220 |
| E1   | 4.05        | 4.60 | 0.159  | 0.181 |
| D    | 3.30        | 3.95 | 0.130  | 0.156 |
| L    | 0.75        | 1.60 | 0.030  | 0.063 |

**FOOT PRINT DIMENSIONS (in millimeters)****SMB (Plastic)**

| Ordering type | Marking | Package | Weight | Base qty | Delivery mode |
|---------------|---------|---------|--------|----------|---------------|
| SMBYW01-200   | B20     | SMB     | 0.11g  | 2500     | Tape & reel   |

- Band indicates cathode
- Epoxy meets UL94,V0

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

© 1999 STMicroelectronics - Printed in Italy - All rights reserved.

STMicroelectronics GROUP OF COMPANIES

Australia - Brazil - China - Finland - France - Germany - Hong Kong - India - Italy - Japan - Malaysia  
Malta - Morocco - Singapore - Spain - Sweden - Switzerland - United Kingdom - U.S.A.

<http://www.st.com>