

# Surface-Mount TMBS® (Trench MOS Barrier Schottky) Rectifier


**SMB (DO-214AA)**

Cathode  Anode

## FEATURES

- Low profile package
- Ideal for automated placement
- Trench MOS Schottky technology
- Low power losses, high efficiency
- Low forward voltage drop
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

## LINKS TO ADDITIONAL RESOURCES



## TYPICAL APPLICATIONS

For use in low voltage, high frequency inverters, freewheeling, DC/DC converters, and polarity protection applications.

## MECHANICAL DATA

**Case:** SMB (DO-214AA)

Molding compound meets UL 94 V-0 flammability rating  
Base P/N-M3 - RoHS-compliant, commercial grade

**Terminals:** matte tin plated leads, solderable per J-STD-002 and JESD 22-B102

M3 suffix meets JESD 201 class 2 whisker test

**Polarity:** color band denotes the cathode end

| PRIMARY CHARACTERISTICS |                |
|-------------------------|----------------|
| $I_{F(AV)}$             | 3.0 A          |
| $V_{RRM}$               | 100 V          |
| $I_{FSM}$               | 80 A           |
| $E_{AS}$                | 50 mJ          |
| $V_F$ at $I_F = 3.0$ A  | 0.56 V         |
| $T_J$ max.              | 150 °C         |
| Package                 | SMB (DO-214AA) |
| Circuit configuration   | Single         |

| MAXIMUM RATINGS ( $T_A = 25$ °C unless otherwise noted)                           |                |             |      |
|-----------------------------------------------------------------------------------|----------------|-------------|------|
| PARAMETER                                                                         | SYMBOL         | VSSB310     | UNIT |
| Device marking code                                                               |                | V3B         |      |
| Maximum repetitive peak reverse voltage                                           | $V_{RRM}$      | 100         | V    |
| Maximum DC forward current                                                        | $I_F^{(1)}$    | 3.0         | A    |
|                                                                                   | $I_F^{(2)}$    | 1.9         |      |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load | $I_{FSM}$      | 80          | A    |
| Operating junction and storage temperature range                                  | $T_J, T_{STG}$ | -40 to +150 | °C   |

### Notes

(1) Mounted on 10 mm x 10 mm pad areas, 1 oz. FR4 P.C.B.

(2) Free air, mounted on recommended copper pad area



| ELECTRICAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted) |                         |                         |                               |               |      |      |
|----------------------------------------------------------------------------|-------------------------|-------------------------|-------------------------------|---------------|------|------|
| PARAMETER                                                                  | TEST CONDITIONS         |                         | SYMBOL                        | TYP.          | MAX. | UNIT |
| Breakdown voltage                                                          | I <sub>R</sub> = 1.0 mA | T <sub>A</sub> = 25 °C  | V <sub>BR</sub>               | 100 (minimum) | -    | V    |
| Instantaneous forward voltage                                              | I <sub>F</sub> = 3.0 A  | T <sub>A</sub> = 25 °C  | V <sub>F</sub> <sup>(1)</sup> | 0.62          | 0.70 | V    |
|                                                                            |                         | T <sub>A</sub> = 125 °C |                               | 0.56          | 0.65 |      |
| Reverse current                                                            | V <sub>R</sub> = 70 V   | T <sub>A</sub> = 25 °C  | I <sub>R</sub> <sup>(2)</sup> | 1.5           | -    | μA   |
|                                                                            |                         | T <sub>A</sub> = 125 °C |                               | 1.2           | -    | mA   |
|                                                                            | V <sub>R</sub> = 100 V  | T <sub>A</sub> = 25 °C  |                               | 7.0           | 250  | μA   |
|                                                                            |                         | T <sub>A</sub> = 125 °C |                               | 3.6           | 20   | mA   |
| Typical junction capacitance                                               | 4.0 V, 1 MHz            |                         | C <sub>J</sub>                | 230           | -    | pF   |

**Notes**(1) Pulse test: 300  $\mu\text{s}$  pulse width, 1 % duty cycle(2) Pulse test: Pulse width  $\leq 40\text{ ms}$ 

| <b>THERMAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted) |                       |         |                      |
|---------------------------------------------------------------------------------------------|-----------------------|---------|----------------------|
| PARAMETER                                                                                   | SYMBOL                | VSSB310 | UNIT                 |
| Typical thermal resistance                                                                  | $R_{\theta JA}^{(1)}$ | 120     | $^{\circ}\text{C/W}$ |
|                                                                                             | $R_{\theta JM}^{(2)}$ | 15      |                      |

**Notes**(1) Free air, mounted on recommended PCB 1 oz. pad area. Thermal resistance  $R_{\theta JA}$  - junction to ambient(2) Units mounted on PCB with 10 mm x 10 mm copper pad areas.  $R_{\theta JM}$  - junction to mount

| <b>ORDERING INFORMATION</b> (Example) |                 |                        |               |                                    |
|---------------------------------------|-----------------|------------------------|---------------|------------------------------------|
| PREFERRED P/N                         | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                      |
| VSSB310-M3/52T                        | 0.096           | 52T                    | 750           | 7" diameter plastic tape and reel  |
| VSSB310-M3/5BT                        | 0.096           | 5BT                    | 3200          | 13" diameter plastic tape and reel |

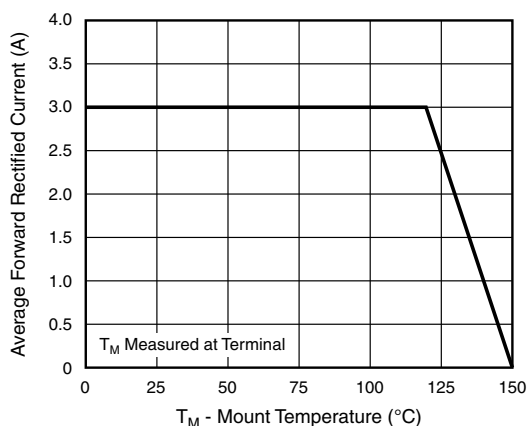
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve

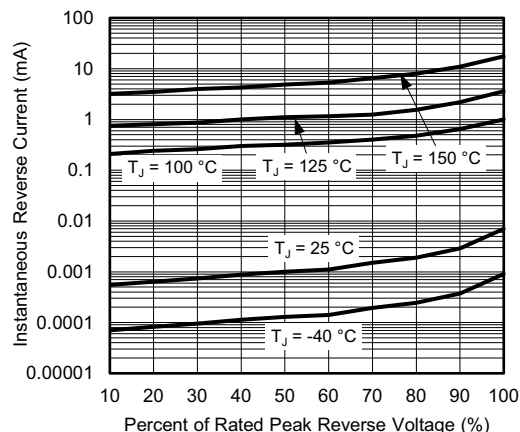


Fig. 4 - Typical Reverse Characteristics

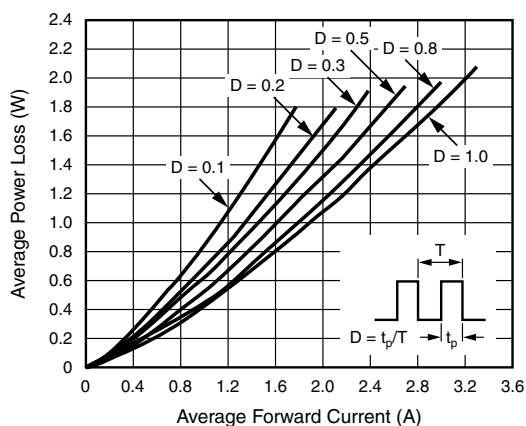


Fig. 2 - Forward Power Loss Characteristics

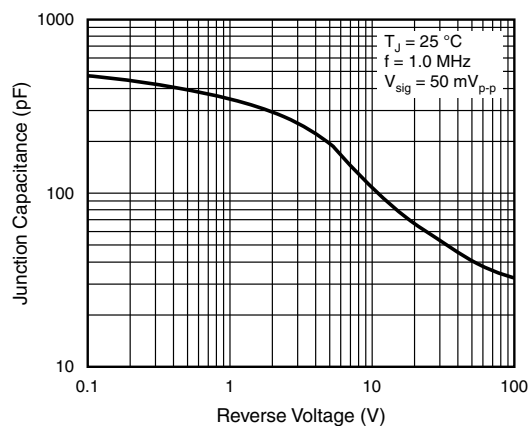


Fig. 5 - Typical Junction Capacitance

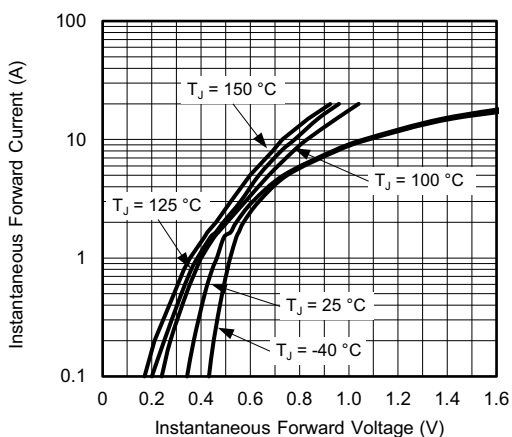


Fig. 3 - Typical Instantaneous Forward Characteristics

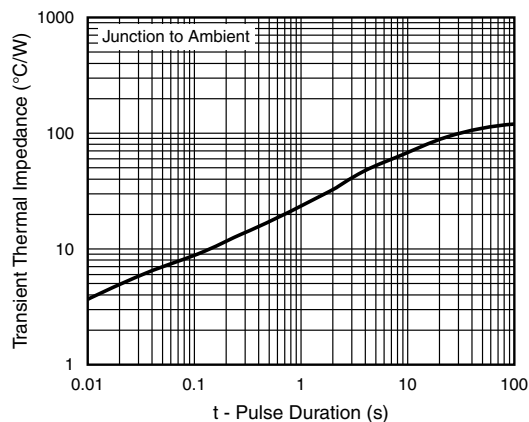
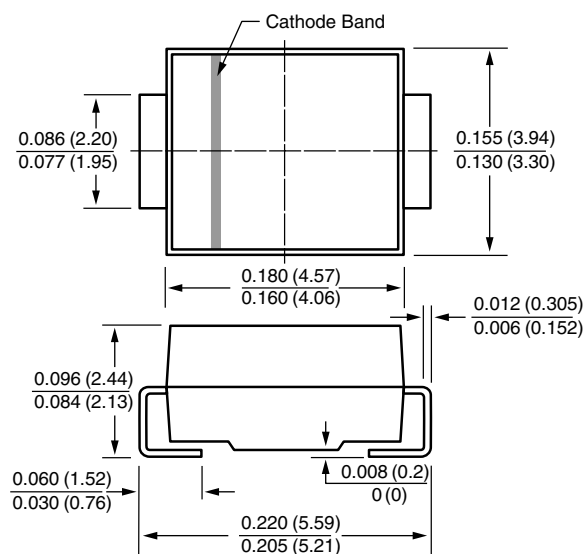


Fig. 6 - Typical Transient Thermal Impedance

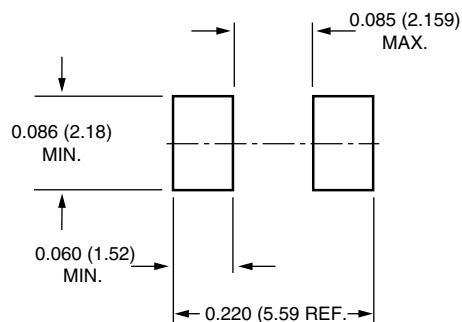


**PACKAGE OUTLINE DIMENSIONS** in inches (millimeters)

**SMB (DO-214AA)**



**Mounting Pad Layout**





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