



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



SMB (DO-214AA)



## 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 |                |
|-------------------------|----------------|
| $I_{F(AV)}$             | 4.0 A          |
| $V_{RRM}$               | 100 V          |
| $I_{FSM}$               | 80 A           |
| $E_{AS}$                | 50 mJ          |
| $V_F$ at $I_F = 4.0$ A  | 0.61 V         |
| $T_J$ max.              | 150 °C         |
| Package                 | SMB (DO-214AA) |
| Circuit configuration   | Single         |

| MAXIMUM RATINGS ( $T_A = 25$ °C unless otherwise noted)                           |                |             |      |
|---|----------------|-------------|------|
| PARAMETER   | SYMBOL         | VSSB410S    | UNIT |
| Device marking code   |                | V4B         |      |
| Maximum repetitive peak reverse voltage   | $V_{RRM}$      | 100         | V    |
| Maximum DC forward current  | $I_F^{(1)}$    | 4.0         | A    |
|   | $I_F^{(2)}$    | 1.9         |      |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load | $I_{FSM}$      | 80          | A    |
| Non-repetitive avalanche energy at $T_J = 25$ °C, $L = 60$ mH                     | $E_{AS}$       | 50          | mJ   |
| Peak repetitive reverse current at $t_p = 2$ μs, 1 kHz, $T_J = 38$ °C ± 2 °C      | $I_{RRM}$      | 1.0         | A    |
| Operating junction and storage temperature range                                  | $T_J, T_{STG}$ | -40 to +150 | °C   |

### Notes

(1) Mounted on 14 mm x 14 mm pad areas, 1 oz. FR4 P.C.B.

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



| <b>ELECTRICAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted) |                       |                                   |             |               |      |               |
|--|-----------------------|-----------------------------------|-------------|---------------|------|---------------|
| PARAMETER  | TEST CONDITIONS       |                                   | SYMBOL      | TYP.          | MAX. | UNIT          |
| Breakdown voltage  | $I_R = 1.0\text{ mA}$ | $T_A = 25\text{ }^\circ\text{C}$  | $V_{BR}$    | 100 (minimum) | -    | V             |
| Instantaneous forward voltage  | $I_F = 4.0\text{ A}$  | $T_A = 25\text{ }^\circ\text{C}$  | $V_F^{(1)}$ | 0.68          | 0.77 | V             |
|  |                       | $T_A = 125\text{ }^\circ\text{C}$ |             | 0.61          | 0.69 |               |
| Reverse current  | $V_R = 70\text{ V}$   | $T_A = 25\text{ }^\circ\text{C}$  | $I_R^{(2)}$ | 1.5           | -    | $\mu\text{A}$ |
|  |                       | $T_A = 125\text{ }^\circ\text{C}$ |             | 1.2           | -    | mA            |
|  | $V_R = 100\text{ V}$  | $T_A = 25\text{ }^\circ\text{C}$  |             | 7.0           | 250  | $\mu\text{A}$ |
|  |                       | $T_A = 125\text{ }^\circ\text{C}$ |             | 3.6           | 20   | mA            |
| Typical junction capacitance   | 4.0 V, 1 MHz          |                                   | $C_J$       | 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                | VSSB410S | 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 P.C.B. 1 oz. pad area. Thermal resistance  $R_{\theta JA}$  - junction to ambient  
(2) Units mounted on P.C.B. with 14 mm x 14 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                      |
| VSSB410S-M3/52T                       | 0.096           | 52T                    | 750           | 7" diameter plastic tape and reel  |
| VSSB410S-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)

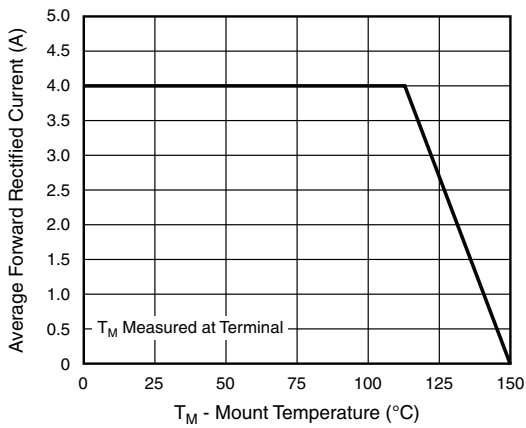


Fig. 1 - Maximum Forward Current Derating Curve

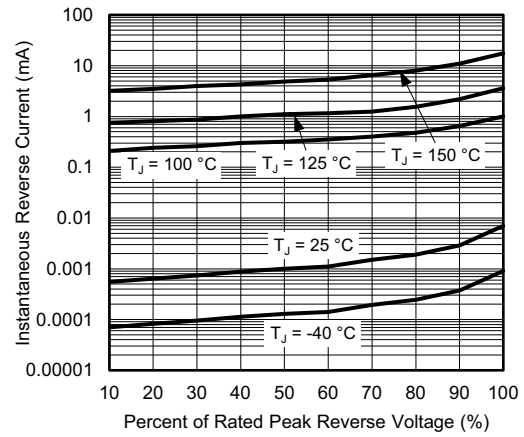


Fig. 4 - Typical Reverse Characteristics

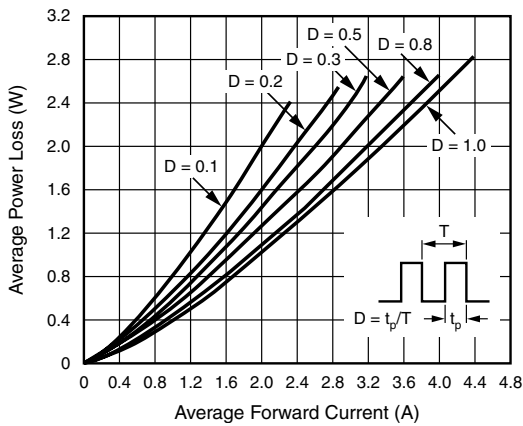


Fig. 2 - Forward Power Loss Characteristics

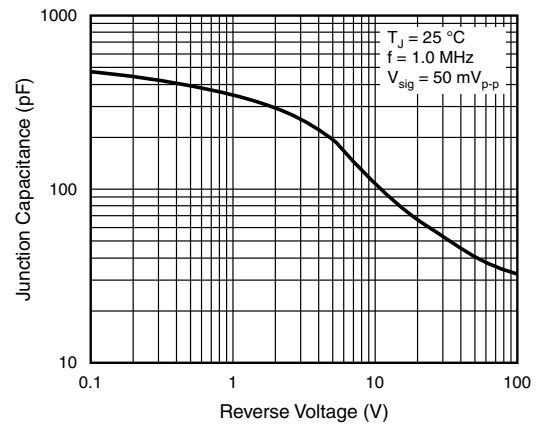


Fig. 5 - Typical Junction Capacitance

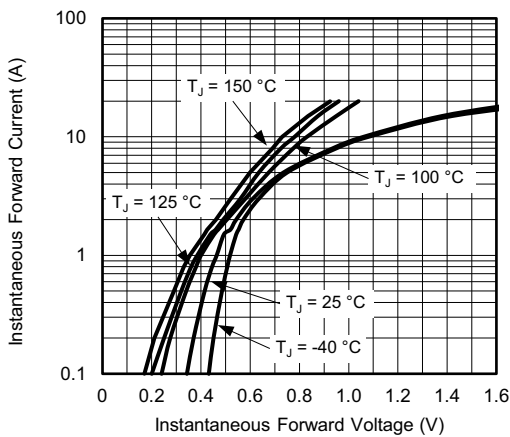


Fig. 3 - Typical Instantaneous Forward Characteristics

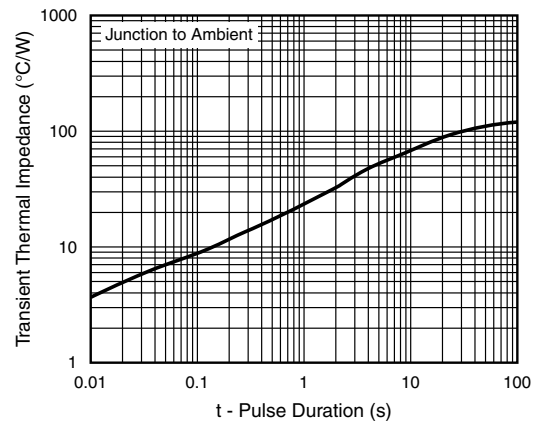
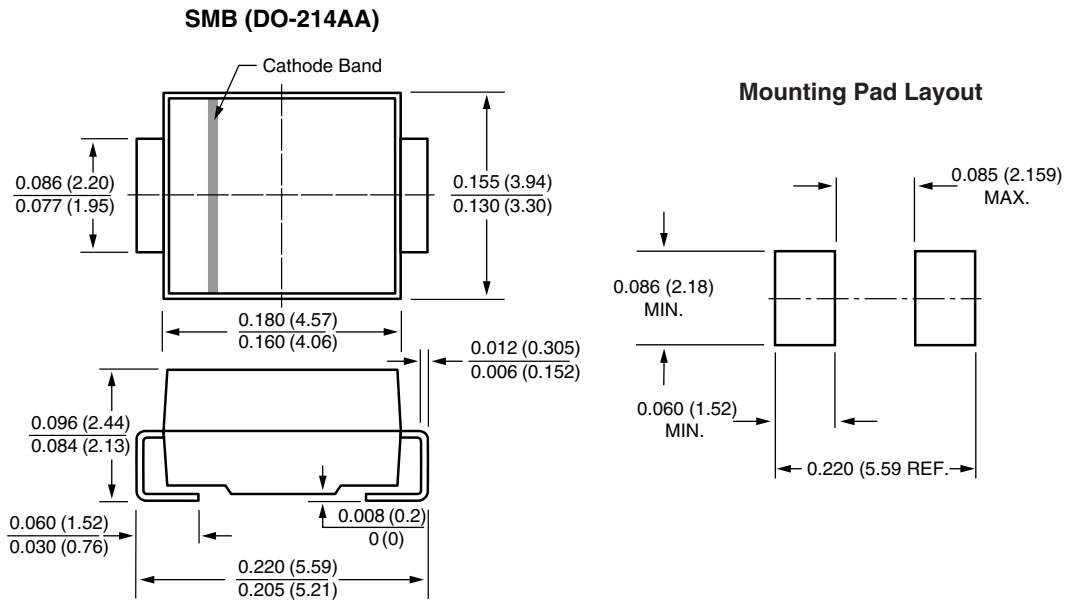


Fig. 6 - Typical Transient Thermal Impedance



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





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