

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

## eSMP® Series



Top View

Bottom View

### SlimSAW (DO-221AD)

Cathode  Anode

## DESIGN SUPPORT TOOLS

[click logo to get started](#)


## PRIMARY CHARACTERISTICS

|                                        |                    |
|----------------------------------------|--------------------|
| $I_{F(AV)}$                            | 5 A                |
| $V_{RRM}$                              | 120 V              |
| $I_{FSM}$                              | 100 A              |
| $V_F$ at $I_F = 5$ A ( $T_A = 125$ °C) | 0.64 V             |
| $T_J$ max.                             | 175 °C             |
| Package                                | SlimSAW (DO-221AD) |
| Circuit configuration                  | Single             |

## FEATURES

- Low-profile package
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- AEC-Q101 qualified available
  - Automotive ordering code: base P/NHM3
- Compatible to SOD-128 package case outline
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


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

## TYPICAL APPLICATIONS

For use in high frequency inverters, freewheeling, DC/DC converters, and polarity protection in commercial, industrial, and automotive applications.

## MECHANICAL DATA

**Case:** SlimSAW (DO-221AD)

Molding compound meets UL 94 V-0 flammability rating

Base P/N-M3 - halogen-free, RoHS-compliant

Base P/NHM3 - halogen-free, RoHS-compliant, and AEC-Q101 qualified

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

M3 and HM3 suffix meet JESD 201 class 2 whisker test

**Polarity:** color band denotes cathode end

## MAXIMUM RATINGS ( $T_A = 25$ °C unless otherwise noted)

| PARAMETER                                                                         | SYMBOL            | VSS8D5M12   | UNIT |
|-----------------------------------------------------------------------------------|-------------------|-------------|------|
| Device marking code                                                               |                   | 5M12        |      |
| Maximum repetitive peak reverse voltage                                           | $V_{RRM}$         | 100         | V    |
| Maximum average forward rectified current (fig.1)                                 | $I_{F(AV)}^{(1)}$ | 5           | A    |
|                                                                                   | $I_{F(AV)}^{(2)}$ | 2.2         |      |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load | $I_{FSM}$         | 100         | A    |
| Operating junction temperature range                                              | $T_J^{(3)}$       | -40 to +175 | °C   |
| Storage temperature range                                                         | $T_{STG}$         | -55 to +175 |      |

## Notes

(1) Mounted on 30 mm x 30 mm aluminum PCB pad areas

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

(3) The heat generated must be less than the thermal conductivity from junction-to-ambient:  $dP_D/dT_J < 1/R_{\theta JA}$



| ELECTRICAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted) |                        |                         |                               |      |      |      |
|----------------------------------------------------------------------------|------------------------|-------------------------|-------------------------------|------|------|------|
| PARAMETER                                                                  | TEST CONDITIONS        |                         | SYMBOL                        | TYP. | MAX. | UNIT |
| Instantaneous forward voltage                                              | I <sub>F</sub> = 2.5 A | T <sub>A</sub> = 25 °C  | V <sub>F</sub> <sup>(1)</sup> | 0.62 | -    | V    |
|                                                                            | I <sub>F</sub> = 5 A   |                         |                               | 0.81 | 0.89 |      |
|                                                                            | I <sub>F</sub> = 2.5 A | T <sub>A</sub> = 125 °C |                               | 0.53 | -    |      |
|                                                                            | I <sub>F</sub> = 5 A   |                         |                               | 0.64 | 0.74 |      |
| Reverse current                                                            | V <sub>R</sub> = 90 V  | T <sub>A</sub> = 25 °C  | I <sub>R</sub> <sup>(2)</sup> | 0.01 | -    | mA   |
|                                                                            |                        | T <sub>A</sub> = 125 °C |                               | 0.9  | -    |      |
|                                                                            | V <sub>R</sub> = 120 V | T <sub>A</sub> = 25 °C  |                               | -    | 0.35 |      |
|                                                                            |                        | T <sub>A</sub> = 125 °C |                               | 1.6  | 6    |      |
| Typical junction capacitance                                               | 4.0 V, 1 MHz           |                         | C <sub>J</sub>                | 460  | -    | pF   |

**Notes**

- (1) Pulse test: 300  $\mu\text{s}$  pulse width, 1 % duty cycle  
 (2) Pulse test: pulse width  $\leq 5\text{ ms}$

| THERMAL CHARACTERISTICS ( $T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise specified) |                          |      |      |                      |
|------------------------------------------------------------------------------------------|--------------------------|------|------|----------------------|
| PARAMETER                                                                                | SYMBOL                   | TYP. | MAX. | UNIT                 |
| Typical thermal resistance                                                               | $R_{\theta JA}^{(1)(2)}$ | 120  | 150  | $^{\circ}\text{C/W}$ |
|                                                                                          | $R_{\theta JM}^{(3)}$    | 10   | 12   |                      |

**Notes**

- (1) The heat generated must be less than the thermal conductivity from junction-to-ambient:  $dP_D/dT_J < 1/R_{\theta JA}$   
 (2) Thermal resistance junction-to-ambient to follow JEDEC® 51-2A, device mounted on FR4 PCB, 2 oz., standard footprint  
 (3) Thermal resistance junction-to-mount to follow JEDEC 51-14 transient dual interface test method (TDIM)

| ORDERING INFORMATION (Example) |                 |                        |               |                                    |
|--------------------------------|-----------------|------------------------|---------------|------------------------------------|
| PREFERRED P/N                  | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                      |
| VSS8D5M12-M3/H                 | 0.033           | H                      | 3500          | 7" diameter plastic tape and reel  |
| VSS8D5M12-M3/I                 | 0.033           | I                      | 14 000        | 13" diameter plastic tape and reel |
| VSS8D5M12HM3/H <sup>(1)</sup>  | 0.033           | H                      | 3500          | 7" diameter plastic tape and reel  |
| VSS8D5M12HM3/I <sup>(1)</sup>  | 0.033           | I                      | 14 000        | 13" diameter plastic tape and reel |

**Note**

- (1) AEC-Q101 qualified

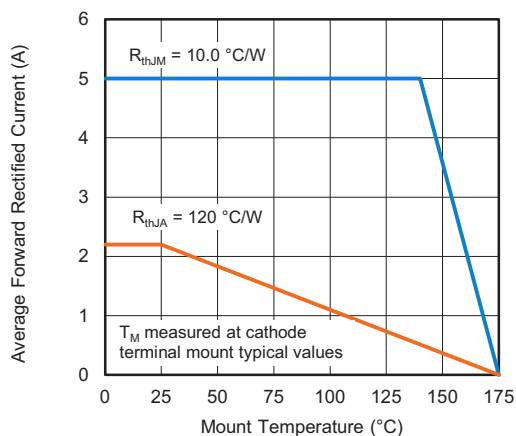
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve

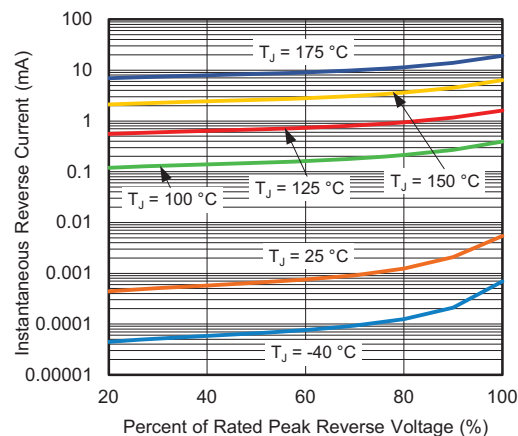


Fig. 4 - Typical Reverse Leakage Characteristics

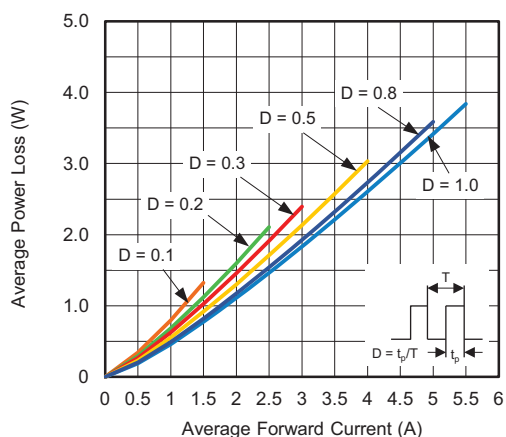


Fig. 2 - Forward Power Loss Characteristics

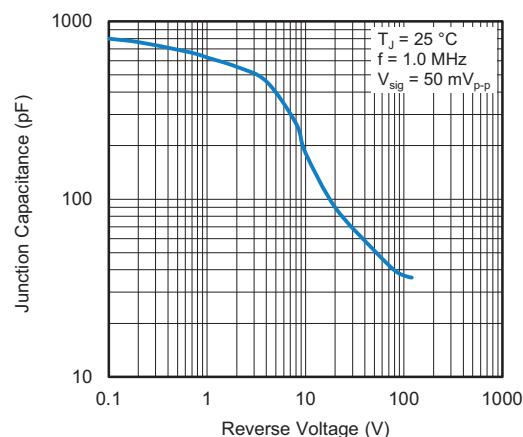


Fig. 5 - Typical Junction Capacitance

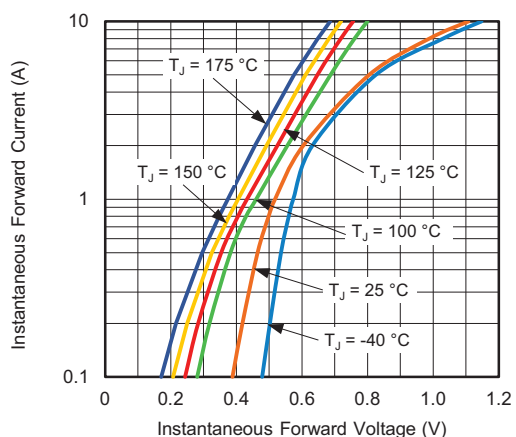


Fig. 3 - Typical Instantaneous Forward Characteristics

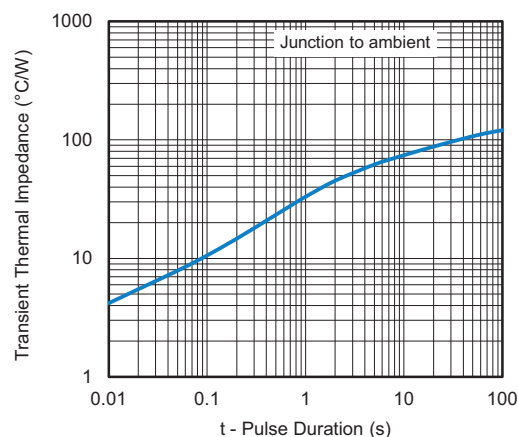
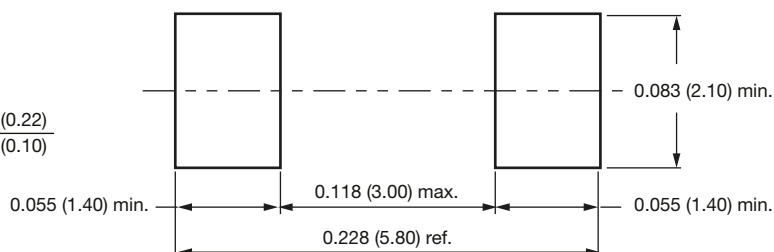
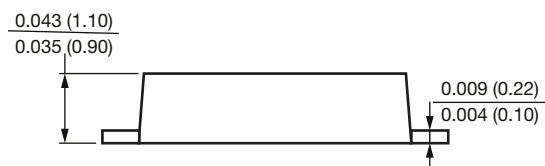
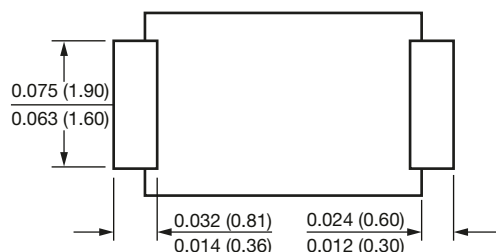
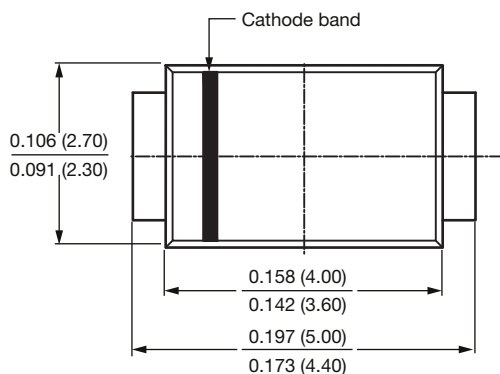


Fig. 6 - Typical Transient Thermal Impedance



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

**SlimSMAW (DO-221AD)**



**Mounting pad layout**



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