

# Surface-Mount TMBS<sup>®</sup> (Trench MOS Barrier Schottky) Rectifier

## eSMP<sup>®</sup> Series



Top View

Bottom View

### SlimSMAW (DO-221AD)

Cathode Anode

## DESIGN SUPPORT TOOLS

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| PRIMARY CHARACTERISTICS       |                     |
|-------------------------------|---------------------|
| $I_{F(AV)}$                   | 3 A                 |
| $V_{RRM}$                     | 120 V               |
| $I_{FSM}$                     | 60 A                |
| $V_F$ at $I_F = 3$ A (125 °C) | 0.61 V              |
| $T_J$ max.                    | 175 °C              |
| Package                       | SlimSMAW (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)



## TYPICAL APPLICATIONS

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

## MECHANICAL DATA

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

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

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

H3 and HM3 suffix meets JESD 201 class 2 whisker test

**Polarity:** color band denotes cathode end

| MAXIMUM RATINGS ( $T_A = 25$ °C unless otherwise noted)                            |                   |             |      |
|--|-------------------|-------------|------|
| PARAMETER  | SYMBOL            | VSS8D3M12   | UNIT |
| Device marking code  |                   | 3M12        |      |
| Maximum repetitive peak reverse voltage  | $V_{RRM}$         | 120         | V    |
| Maximum average forward rectified current (fig.1)                                  | $I_{F(AV)}^{(1)}$ | 3           | A    |
|  | $I_{F(AV)}^{(2)}$ | 2           |      |
| Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load | $I_{FSM}$         | 60          | 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 AL PCB pad area

(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 ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted) |                      |                                   |             |      |      |      |
|---|----------------------|-----------------------------------|-------------|------|------|------|
| PARAMETER   | TEST CONDITIONS      |                                   | SYMBOL      | TYP. | MAX. | UNIT |
| Instantaneous forward voltage   | $I_F = 1.5\text{ A}$ | $T_A = 25\text{ }^\circ\text{C}$  | $V_F^{(1)}$ | 0.61 | -    | V    |
|   | $I_F = 3\text{ A}$   |                                   |             | 0.75 | 0.83 |      |
|   | $I_F = 1.5\text{ A}$ | $T_A = 125\text{ }^\circ\text{C}$ |             | 0.52 | -    |      |
|   | $I_F = 3\text{ A}$   |                                   |             | 0.61 | 0.69 |      |
| Reverse current   | $V_R = 90\text{ V}$  | $T_A = 25\text{ }^\circ\text{C}$  | $I_R^{(2)}$ | 0.01 | -    | mA   |
|   |                      | $T_A = 125\text{ }^\circ\text{C}$ |             | 0.5  | -    |      |
|   | $V_R = 120\text{ V}$ | $T_A = 25\text{ }^\circ\text{C}$  |             | -    | 0.3  |      |
|   |                      | $T_A = 125\text{ }^\circ\text{C}$ |             | 1    | 4    |      |
| Typical junction capacitance  | 4.0 V, 1 MHz         |                                   | $C_J$       | 310  | -    | 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  | $^\circ\text{C/W}$ |
|  | $R_{\theta JM}^{(3)}$    | 12   | 15   |                    |

**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<sup>®</sup> 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                      |
| VSS8D3M12-M3/H                 | 0.033           | H                      | 3500          | 7" diameter plastic tape and reel  |
| VSS8D3M12-M3/I                 | 0.033           | I                      | 14 000        | 13" diameter plastic tape and reel |
| VSS8D3M12HM3/H <sup>(1)</sup>  | 0.033           | H                      | 3500          | 7" diameter plastic tape and reel  |
| VSS8D3M12HM3/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)

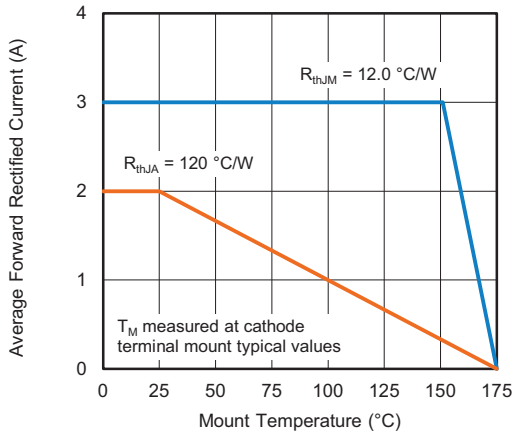


Fig. 1 - Maximum Forward Current Derating Curve

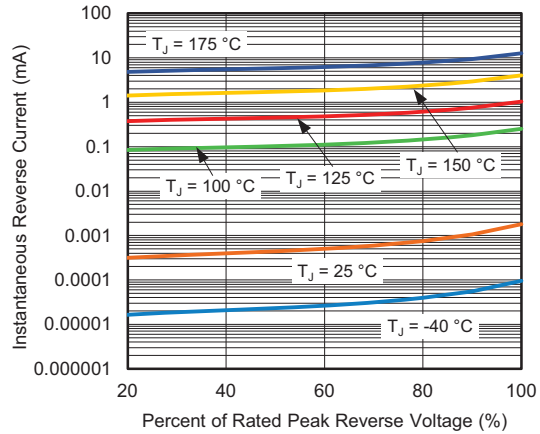


Fig. 4 - Typical Reverse Leakage Characteristics

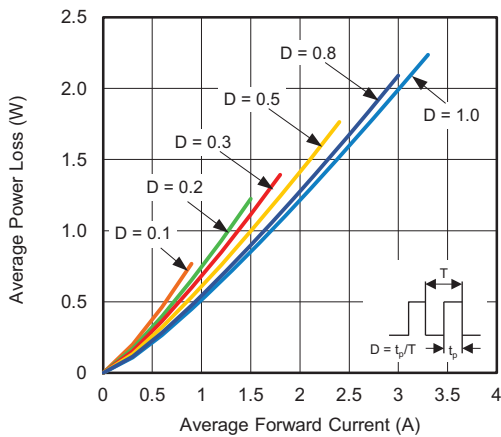


Fig. 2 - Forward Power Loss Characteristics

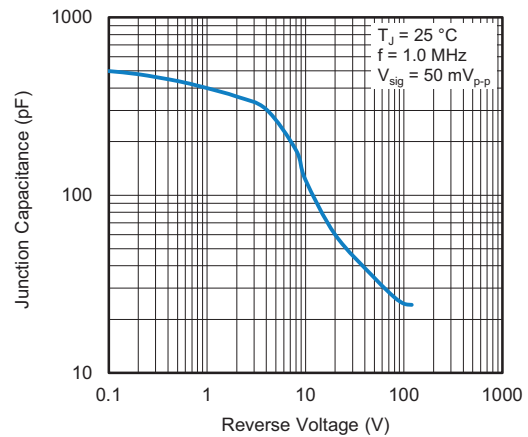


Fig. 5 - Typical Junction Capacitance

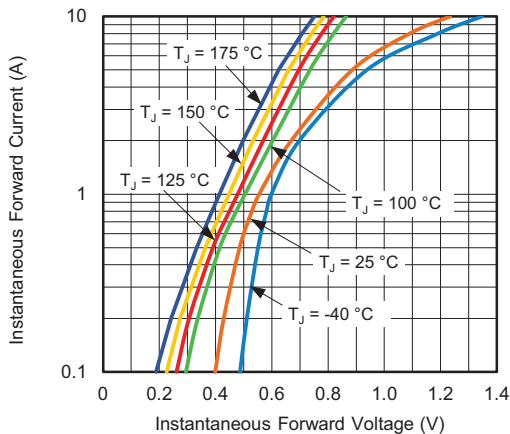


Fig. 3 - Typical Instantaneous Forward Characteristics

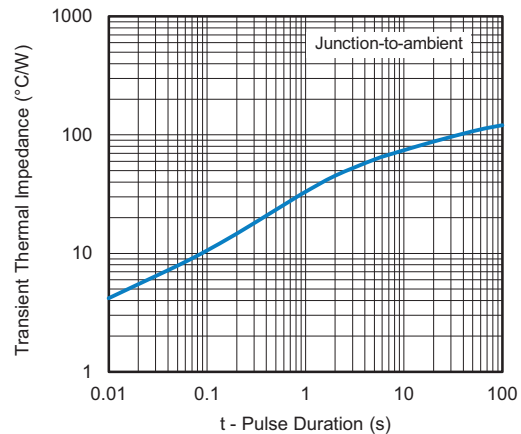
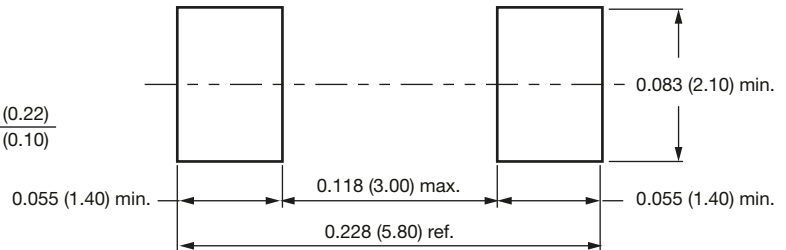
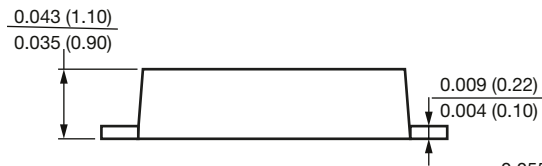
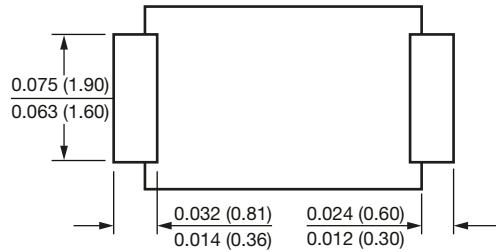
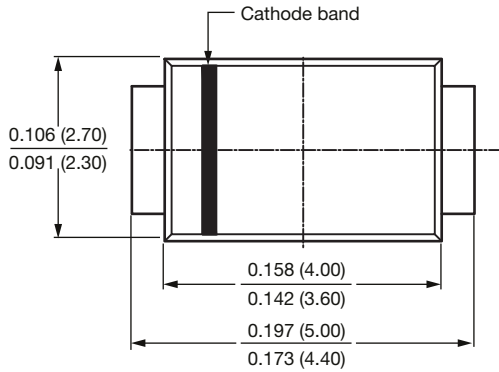


Fig. 6 - Typical Transient Thermal Impedance



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

**SlimSMAW (DO-221AD)**



**Mounting pad layout**



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### Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: [info@moschip.ru](mailto:info@moschip.ru)

Skype отдела продаж:

moschip.ru

moschip.ru\_4

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