

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

eSMP® Series



Top View

Bottom View

SlimSAW (DO-221AD)

Cathode  Anode

LINKS TO ADDITIONAL RESOURCES



3D Models

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


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} | 120 | 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** ($T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)

| PARAMETER | TEST CONDITIONS | | SYMBOL | TYP. | MAX. | UNIT |
|-------------------------------|------------------------|-------------------------|-------------------------------|------|------|------|
| Instantaneous forward voltage | I _F = 2.5 A | T _A = 25 °C | V _F ⁽¹⁾ | 0.62 | - | V |
| | I _F = 5 A | | | 0.81 | 0.89 | |
| | I _F = 2.5 A | T _A = 125 °C | | 0.53 | - | |
| | I _F = 5 A | | | 0.64 | 0.74 | |
| Reverse current | V _R = 90 V | T _A = 25 °C | I _R ⁽²⁾ | 0.01 | - | mA |
| | | T _A = 125 °C | | 0.9 | - | |
| | V _R = 120 V | T _A = 25 °C | | - | 0.35 | |
| | | T _A = 125 °C | | 1.6 | 6 | |
| Typical junction capacitance | 4.0 V, 1 MHz | | C _J | 460 | - | pF |

Notes(1) Pulse test: 300 μs 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 ⁽¹⁾ | 0.033 | H | 3500 | 7" diameter plastic tape and reel |
| VSS8D5M12HM3/I ⁽¹⁾ | 0.033 | I | 14 000 | 13" diameter plastic tape and reel |

Note

(1) AEC-Q101 qualified

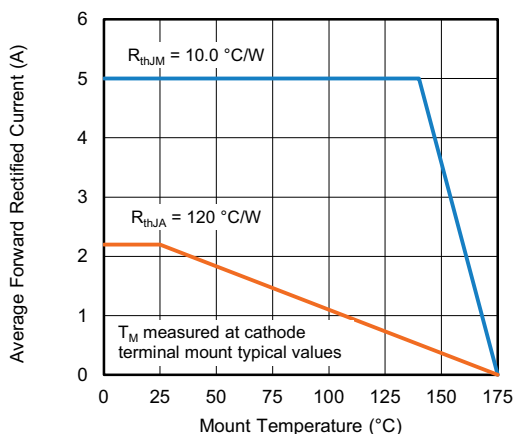
RATINGS AND CHARACTERISTICS CURVES ($T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve

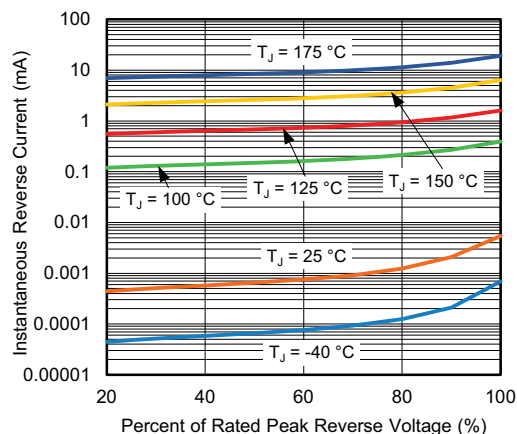


Fig. 4 - Typical Reverse Leakage Characteristics

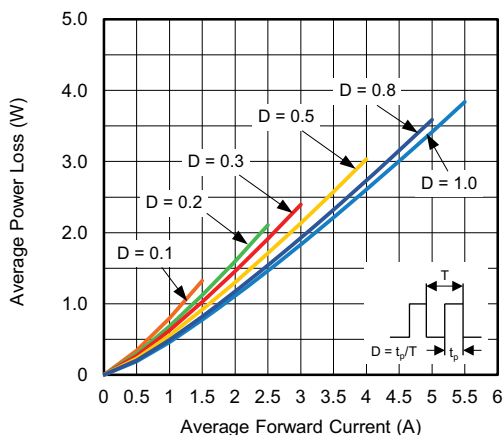


Fig. 2 - Forward Power Loss Characteristics

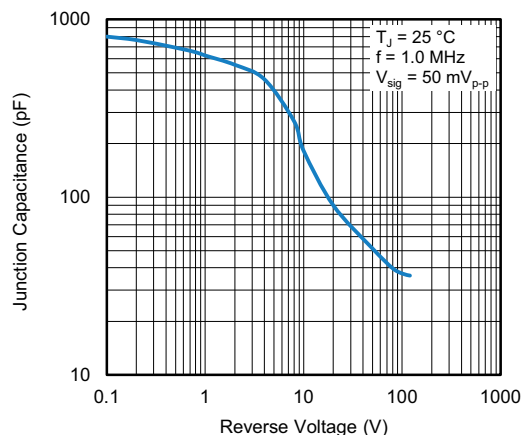


Fig. 5 - Typical Junction Capacitance

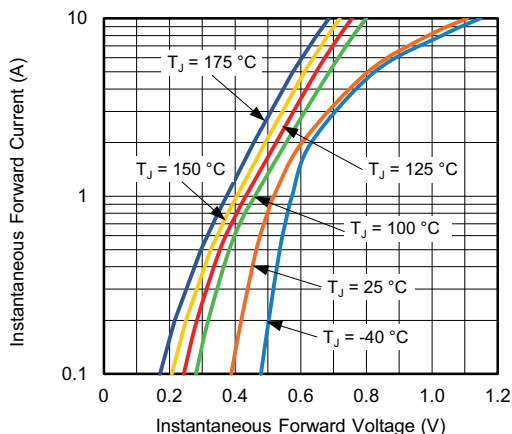


Fig. 3 - Typical Instantaneous Forward Characteristics

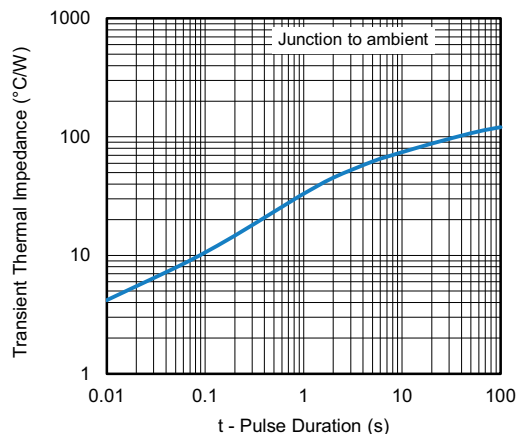
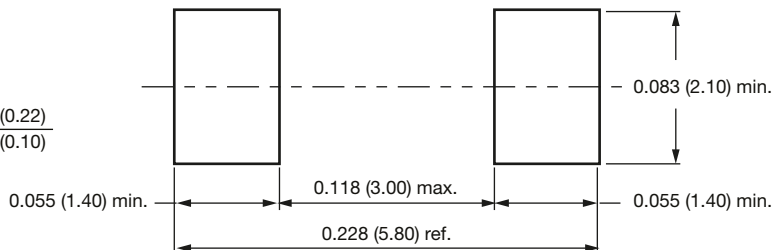
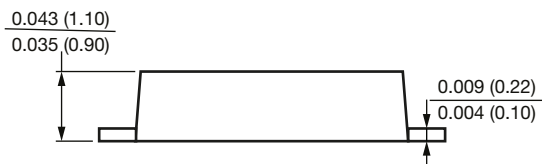
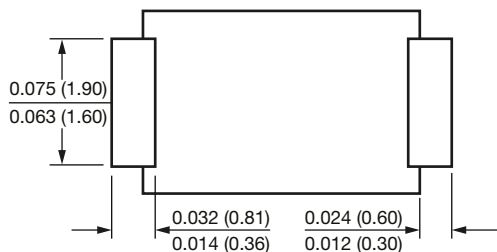
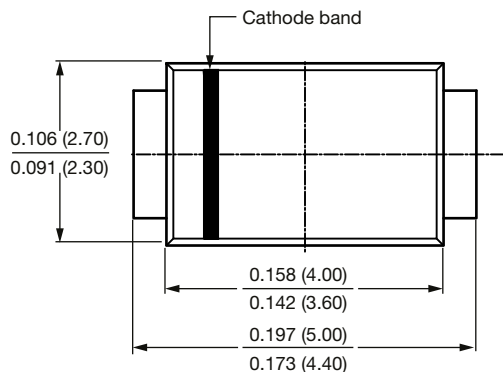


Fig. 6 - Typical Transient Thermal Impedance



PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

SlimSMAW (DO-221AD)



Mounting pad layout



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