

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

eSMP[®] Series



Top View

Bottom View

SlimSAW (DO-221AD)

Cathode Anode

DESIGN SUPPORT TOOLS

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| 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

 AUTOMOTIVE
GRADE
Available

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 ($T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted) | | | | | | |
|---|----------------------|-----------------------------------|-------------|------|------|------|
| PARAMETER | TEST CONDITIONS | | SYMBOL | TYP. | MAX. | UNIT |
| Instantaneous forward voltage | $I_F = 2.5\text{ A}$ | $T_A = 25\text{ }^\circ\text{C}$ | $V_F^{(1)}$ | 0.62 | - | V |
| | $I_F = 5\text{ A}$ | | | 0.81 | 0.89 | |
| | $I_F = 2.5\text{ A}$ | $T_A = 125\text{ }^\circ\text{C}$ | | 0.53 | - | |
| | $I_F = 5\text{ A}$ | | | 0.64 | 0.74 | |
| Reverse current | $V_R = 90\text{ V}$ | $T_A = 25\text{ }^\circ\text{C}$ | $I_R^{(2)}$ | 0.01 | - | mA |
| | | $T_A = 125\text{ }^\circ\text{C}$ | | 0.9 | - | |
| | $V_R = 120\text{ V}$ | $T_A = 25\text{ }^\circ\text{C}$ | | - | 0.35 | |
| | | $T_A = 125\text{ }^\circ\text{C}$ | | 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)

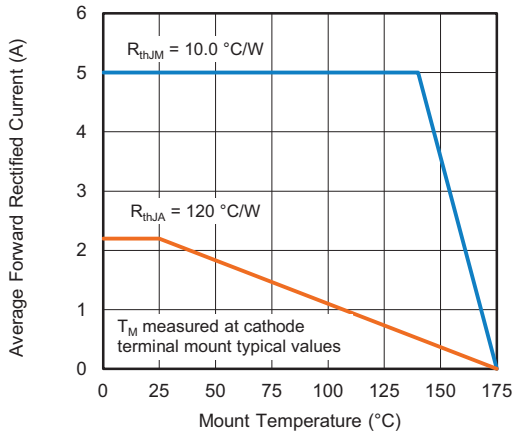


Fig. 1 - Maximum Forward Current Derating Curve

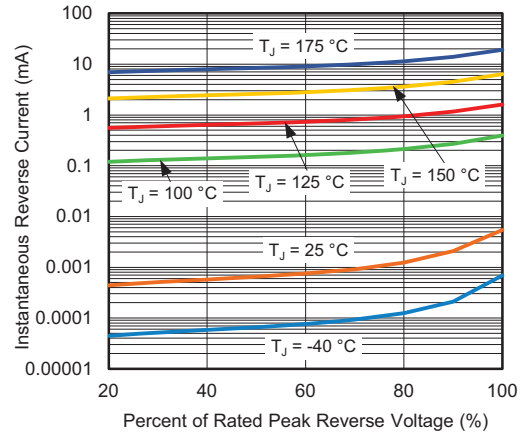


Fig. 4 - Typical Reverse Leakage Characteristics

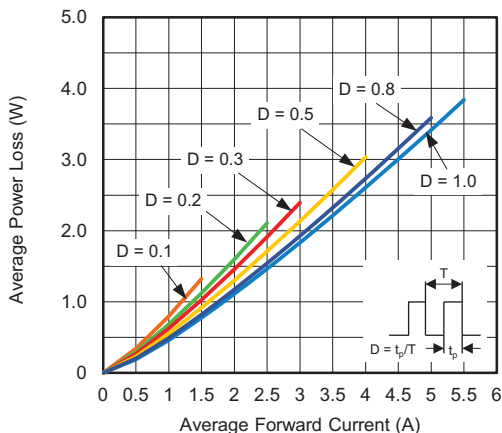


Fig. 2 - Forward Power Loss Characteristics

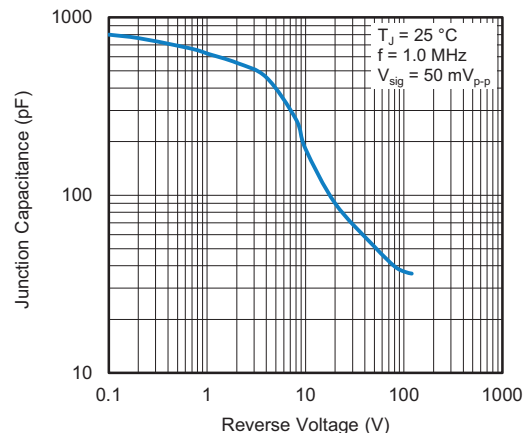


Fig. 5 - Typical Junction Capacitance

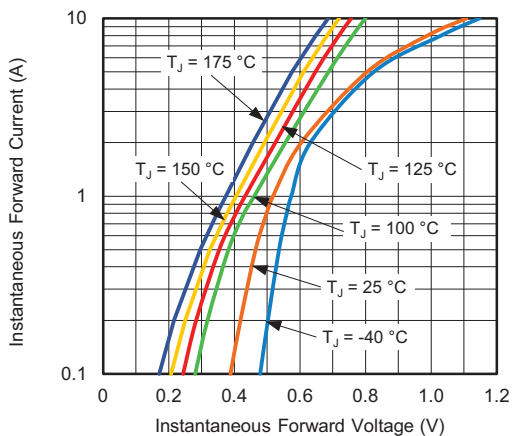


Fig. 3 - Typical Instantaneous Forward Characteristics

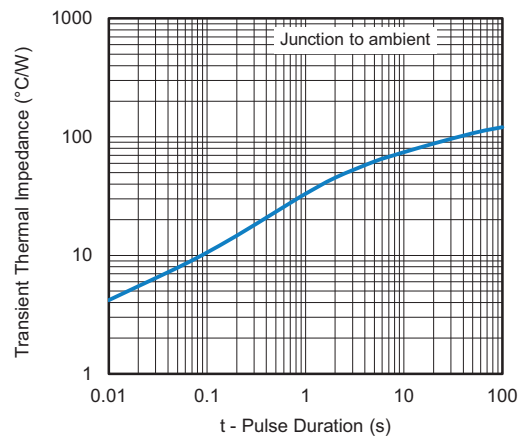


Fig. 6 - Typical Transient Thermal Impedance



PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

SlimSMAW (DO-221AD)



Mounting pad layout



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