

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

eSMP® Series



Top View

Bottom View

SlimSMA (DO-221AC)

Cathode  Anode

FEATURES

- Very low profile - typical height of 0.95 mm
- 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
- AEC-Q101 qualified available
- Automotive ordering code: base P/NHM3
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

AUTOMOTIVE
GRADE
Available

RoHS
COMPLIANT
HALOGEN
FREE

LINKS TO ADDITIONAL RESOURCES



3D Models

PRIMARY CHARACTERISTICS

| | |
|---------------------------------|--------------------|
| $I_{F(AV)}$ | 5.0 A |
| V_{RRM} | 60 V |
| I_{FSM} | 100 A |
| V_F at $I_F = 5.0$ A (125 °C) | 0.54 V |
| T_J max. | 175 °C |
| Package | SlimSMA (DO-221AC) |
| Circuit configuration | Single |

MECHANICAL DATA

Case: SlimSMA (DO-221AC)

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 meets JESD 201 class 2 whisker test

Polarity: color band denotes cathode end

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

| PARAMETER | SYMBOL | VSSAF5M63 | UNIT |
|--|-------------------|-------------|------|
| Device marking code | | 5M63 | |
| Maximum repetitive peak reverse voltage | V_{RRM} | 60 | V |
| Maximum DC forward current | $I_{F(AV)}^{(1)}$ | 2.6 | A |
| | $I_{F(AV)}^{(2)}$ | 5.0 | |
| Peak forward surge current 8.3 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 | °C |

Notes

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

(2) Mounted on 30 mm x 30 mm pad area

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

**ELECTRICAL CHARACTERISTICS** ($T_J = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)

| PARAMETER | TEST CONDITIONS | | SYMBOL | TYP. | MAX. | UNIT |
|-------------------------------|------------------------|-------------------------|-------------------------------|------|------|------|
| Instantaneous forward voltage | I _F = 2.5 A | T _J = 25 °C | V _F ⁽¹⁾ | 0.53 | - | V |
| | I _F = 5.0 A | | | 0.60 | 0.66 | |
| | I _F = 2.5 A | T _J = 125 °C | | 0.44 | - | |
| | I _F = 5.0 A | | | 0.54 | 0.6 | |
| Reverse current | V _R = 60 V | T _J = 25 °C | I _R ⁽²⁾ | - | 0.01 | mA |
| | | T _J = 125 °C | | 0.5 | 2 | |
| Typical junction capacitance | 4.0 V, 1 MHz | | C _J | 700 | - | pF |

Notes(1) Pulse test: 300 μs pulse width, 1 % duty cycle(2) Pulse test: Pulse width $\leq 40\text{ ms}$ **THERMAL CHARACTERISTICS** ($T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)

| PARAMETER | SYMBOL | VSSAF5M63 | UNIT |
|----------------------------|--------------------------|-----------|----------------------|
| Typical thermal resistance | $R_{\theta JA}^{(1)(2)}$ | 115 | $^{\circ}\text{C/W}$ |
| | $R_{\theta JM}^{(3)}$ | 12 | |

Notes(3) Free air, mounted on recommended PCB, 2 oz. pad area; thermal resistance $R_{\theta JA}$ - junction to ambient(4) The heat generated must be less than thermal conductivity from junction-to-ambient: $dP_D/DT_J < 1/R_{\theta JA}$ (5) Mounted on 30 mm x 30 mm pad area, $R_{\theta JM}$ - junction to mount**ORDERING INFORMATION** (Example)

| PREFERRED P/N | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |
|-------------------------------|-----------------|------------------------|---------------|------------------------------------|
| VSSAF5M63-M3/H | 0.032 | H | 3500 | 7" diameter plastic tape and reel |
| VSSAF5M63-M3/I | 0.032 | I | 14 000 | 13" diameter plastic tape and reel |
| VSSAF5M63HM3/H ⁽¹⁾ | 0.032 | H | 3500 | 7" diameter plastic tape and reel |
| VSSAF5M63HM3/I ⁽¹⁾ | 0.032 | I | 14 000 | 13" diameter plastic tape and reel |

Note

(1) AEC-Q101 qualified

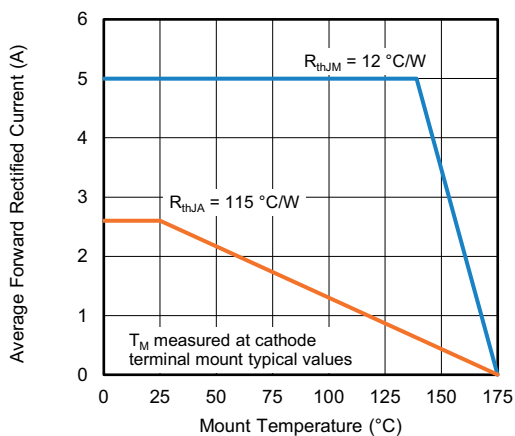
RATINGS AND CHARACTERISTICS CURVES ($T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve

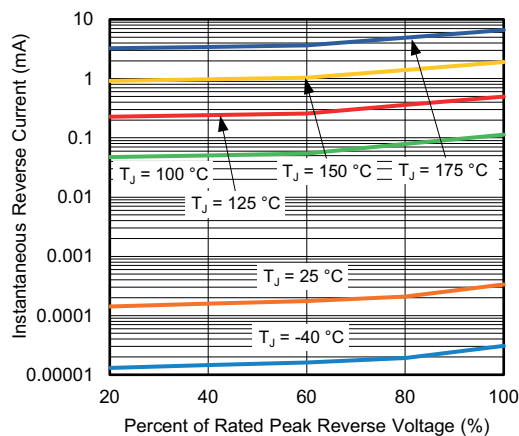


Fig. 4 - Typical Reverse Leakage Characteristics

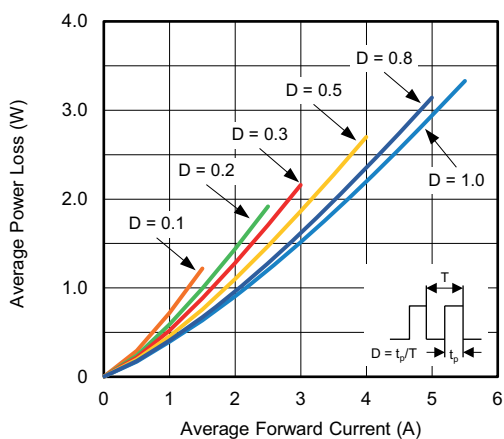


Fig. 2 - Forward Power Loss Characteristics

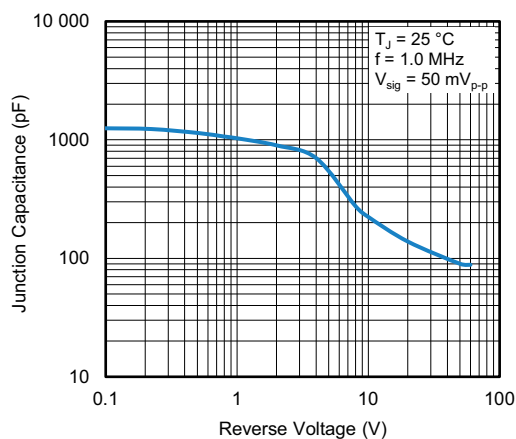


Fig. 5 - Typical Junction Capacitance

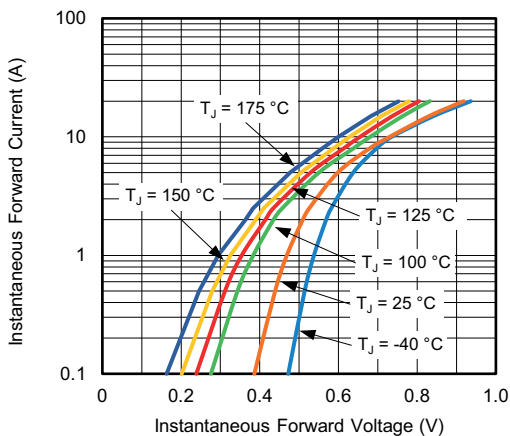


Fig. 3 - Typical Instantaneous Forward Characteristics

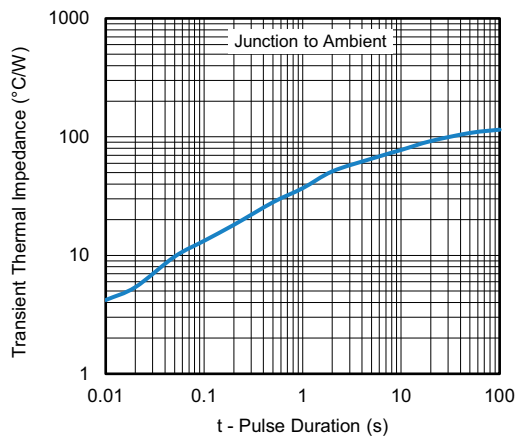


Fig. 6 - Typical Transient Thermal Impedance

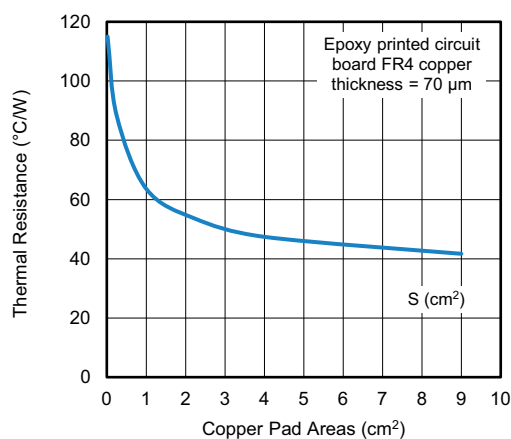
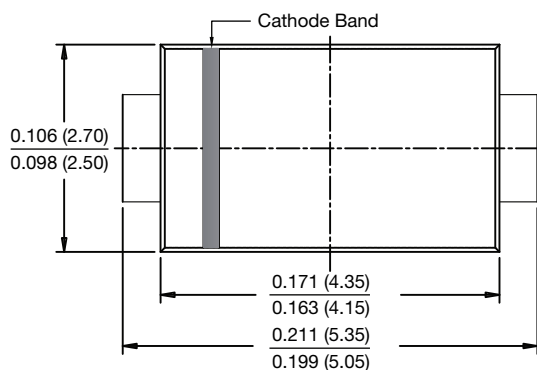


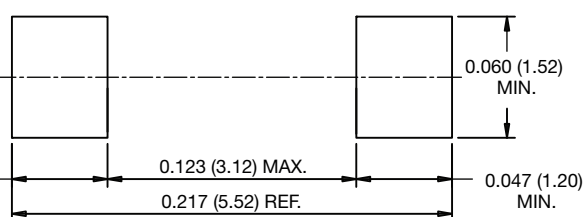
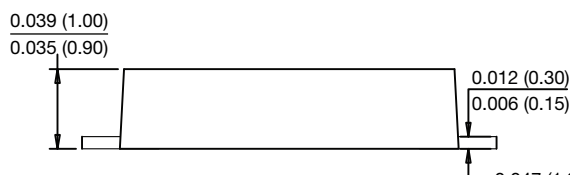
Fig. 7 - Thermal Resistance Junction to Ambient vs. Copper Pad Area

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

SlimSMA (DO-221AC)



Mounting Pad Layout





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