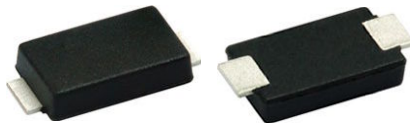


Surface Mount Trench MOS Barrier Schottky Rectifier

TMBS® eSMP® Series


Top View

Bottom View

SlimSMA (DO-221AC)

Cathode Anode


RoHS
 COMPLIANT
 HALOGEN
FREE
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

DESIGN SUPPORT TOOLS
[click logo to get started](#)
3D
 Models
 Available

TYPICAL APPLICATIONS

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

| PRIMARY CHARACTERISTICS | |
|---------------------------------|--------------------|
| $I_{F(AV)}$ | 5.0 A |
| V_{RRM} | 120 V |
| I_{FSM} | 100 A |
| V_F at $I_F = 5.0$ A (125 °C) | 0.64 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 | VSSAF5M12 | UNIT |
| Device marking code | | 5M12 | |
| Maximum repetitive peak reverse voltage | V_{RRM} | 120 | V |
| Maximum DC forward current | $I_{F(AV)}$ ⁽¹⁾ | 2.4 | A |
| | $I_{F(AV)}$ ⁽²⁾ | 5.0 | |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load | I_{FSM} | 100 | A |
| Operating junction and storage temperature range | T_J, T_{STG} | -40 to +175 | °C |

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

⁽²⁾ Mounted on 30 mm x 30 mm pad area



| ELECTRICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted) | | | | | | |
|--|----------------------|-----------------------------------|-------------|------|------|------|
| PARAMETER | TEST CONDITIONS | | SYMBOL | TYP. | MAX. | UNIT |
| Instantaneous forward voltage | $I_F = 2.5\text{ A}$ | $T_A = 25\text{ }^\circ\text{C}$ | $V_F^{(1)}$ | 0.64 | - | V |
| | $I_F = 5.0\text{ A}$ | | | 0.81 | 0.89 | |
| | $I_F = 2.5\text{ A}$ | $T_A = 125\text{ }^\circ\text{C}$ | | 0.55 | - | |
| | $I_F = 5.0\text{ A}$ | | | 0.64 | 0.74 | |
| Reverse current | $V_R = 90\text{ V}$ | $T_A = 25\text{ }^\circ\text{C}$ | $I_R^{(2)}$ | 0.01 | - | mA |
| | | $T_A = 125\text{ }^\circ\text{C}$ | | 0.8 | - | |
| | $V_R = 120\text{ V}$ | $T_A = 25\text{ }^\circ\text{C}$ | $I_R^{(2)}$ | - | 0.35 | mA |
| | | $T_A = 125\text{ }^\circ\text{C}$ | | 1.6 | 6 | |
| Typical junction capacitance | 4.0 V, 1 MHz | | C_J | 420 | - | 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 | VSSAF5M12 | UNIT |
| Typical thermal resistance | $R_{\theta JA}^{(1)(2)}$ | 115 | $^\circ\text{C/W}$ |
| | $R_{\theta JM}^{(3)}$ | 12 | |

Notes

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

| ORDERING INFORMATION (Example) | | | | |
|---------------------------------------|-----------------|------------------------|---------------|------------------------------------|
| PREFERRED P/N | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |
| VSSAF5M12-M3/H | 0.032 | H | 3500 | 7" diameter plastic tape and reel |
| VSSAF5M12-M3/I | 0.032 | I | 14 000 | 13" diameter plastic tape and reel |
| VSSAF5M12HM3/H ⁽¹⁾ | 0.032 | H | 3500 | 7" diameter plastic tape and reel |
| VSSAF5M12HM3/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

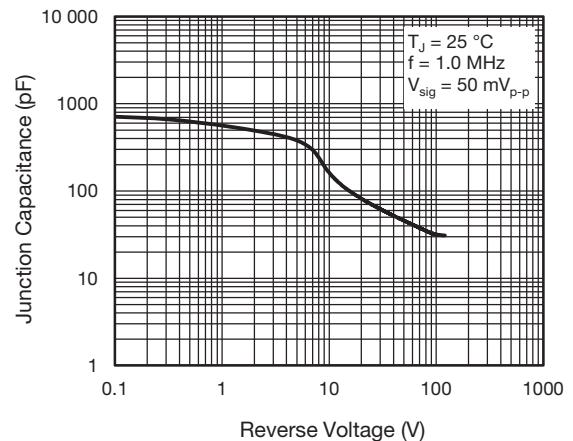


Fig. 5 - Typical Junction Capacitance



Fig. 3 - Typical Instantaneous Forward Characteristics



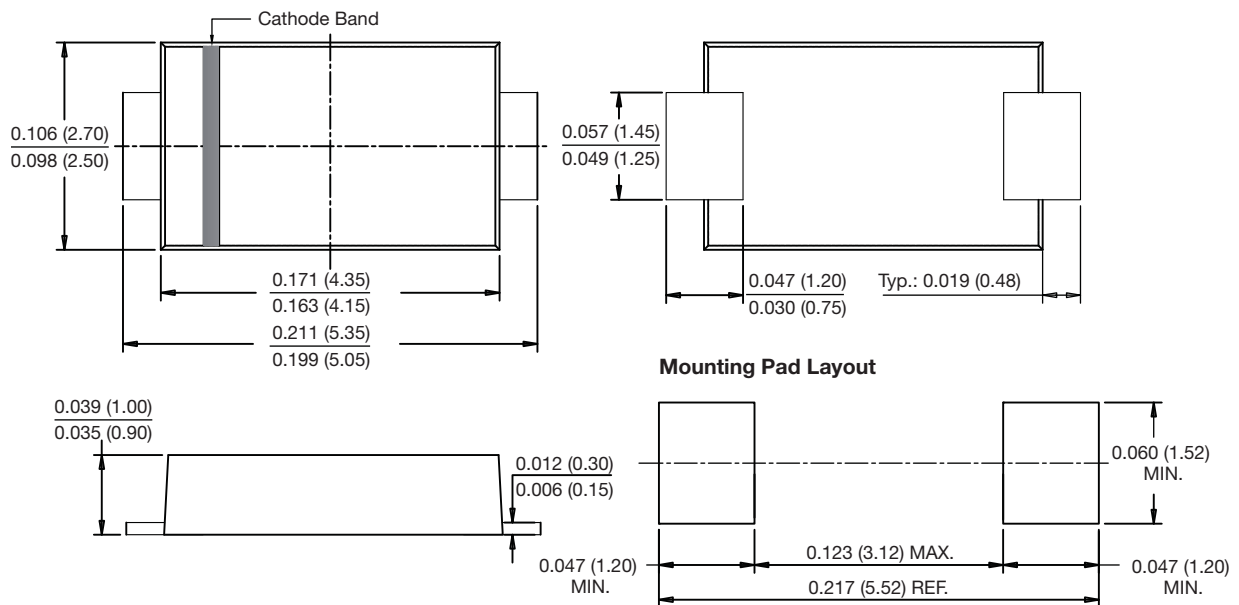
Fig. 6 - Typical Transient Thermal Impedance



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

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

DO-221AC (SlimSMA)





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