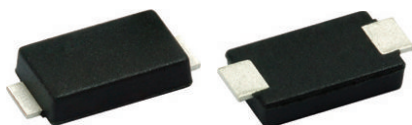


# Surface-Mount TMBS® (Trench MOS Barrier Schottky) Rectifier

## eSMP® Series



Top View

Bottom View

### SlimSMA (DO-221AC)

Cathode  Anode

## FEATURES

- Very low profile - typical height of 0.95 mm
- 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](http://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              |
| $V_{RRM}$                       | 200 V              |
| $I_{FSM}$                       | 90 A               |
| $V_F$ at $I_F = 5.0$ A (125 °C) | 0.69 V             |
| $T_J$ max.                      | 175 °C             |
| Package                         | SlimSMA (DO-221AC) |
| Circuit configuration           | Single             |

## TYPICAL APPLICATIONS

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

## MECHANICAL DATA

**Case:** SlimSMA (DO-221AC)

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

Base P/NHM3\_X - halogen-free, RoHS-compliant, and AEC-Q101 qualified

("\_X" denotes revision code e.g. A, B,.....)

**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            | VSSAF522    | UNIT |
|-----------------------------------------------------------------------------------|-------------------|-------------|------|
| Device marking code                                                               |                   | V522        |      |
| Maximum repetitive peak reverse voltage                                           | $V_{RRM}$         | 200         | V    |
| Maximum average forward rectified current                                         | $I_{F(AV)}^{(1)}$ | 2           | A    |
|                                                                                   | $I_{F(AV)}^{(2)}$ | 5.0         |      |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load | $I_{FSM}$         | 90          | 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 areas aluminum PCB

(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 <sub>A</sub> = 25 °C unless otherwise noted) |                        |                         |                               |       |      |      |
|----------------------------------------------------------------------------|------------------------|-------------------------|-------------------------------|-------|------|------|
| PARAMETER                                                                  | TEST CONDITIONS        |                         | SYMBOL                        | TYP.  | MAX. | UNIT |
| Instantaneous forward voltage                                              | I <sub>F</sub> = 2.5 A | T <sub>A</sub> = 25 °C  | V <sub>F</sub> <sup>(1)</sup> | 0.76  | -    | V    |
|                                                                            | I <sub>F</sub> = 5.0 A |                         |                               | 0.82  | 0.90 |      |
|                                                                            | I <sub>F</sub> = 2.5 A | T <sub>A</sub> = 125 °C |                               | 0.61  | -    |      |
|                                                                            | I <sub>F</sub> = 5.0 A |                         |                               | 0.69  | 0.77 |      |
| Reverse current                                                            | V <sub>R</sub> = 160 V | T <sub>A</sub> = 25 °C  | I <sub>R</sub> <sup>(2)</sup> | 0.001 | -    | mA   |
|                                                                            |                        | T <sub>A</sub> = 125 °C |                               | 0.3   | -    |      |
|                                                                            | V <sub>R</sub> = 200 V | T <sub>A</sub> = 25 °C  |                               | -     | 0.05 |      |
|                                                                            |                        | T <sub>A</sub> = 125 °C |                               | 0.7   | 3    |      |
| Typical junction capacitance                                               | 4.0 V, 1 MHz           |                         | C <sub>J</sub>                | 240   | -    | pF   |

**Notes**

- (1) Pulse test: 300  $\mu\text{s}$  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                   | VSSAF522 | UNIT                 |
| Typical thermal resistance                                                               | $R_{\theta JA}^{(1)(2)}$ | 115      | $^{\circ}\text{C/W}$ |
|                                                                                          | $R_{\theta JM}^{(3)}$    | 12       |                      |

**Notes**

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

| ORDERING INFORMATION (Example) |                 |                        |               |                                    |
|--------------------------------|-----------------|------------------------|---------------|------------------------------------|
| PREFERRED P/N                  | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                      |
| VSSAF522-M3/H                  | 0.032           | H                      | 3500          | 7" diameter plastic tape and reel  |
| VSSAF522-M3/I                  | 0.032           | I                      | 14 000        | 13" diameter plastic tape and reel |
| VSSAF522HM3_A/H <sup>(1)</sup> | 0.032           | H                      | 3500          | 7" diameter plastic tape and reel  |
| VSSAF522HM3_A/I <sup>(1)</sup> | 0.032           | I                      | 14 000        | 13" diameter plastic tape and reel |

**Note**

- (1) AEC-Q101 qualified

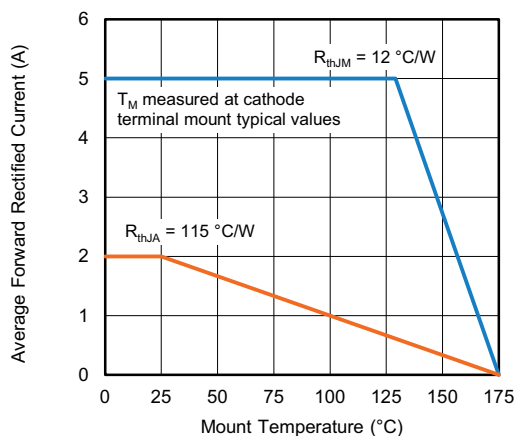
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve

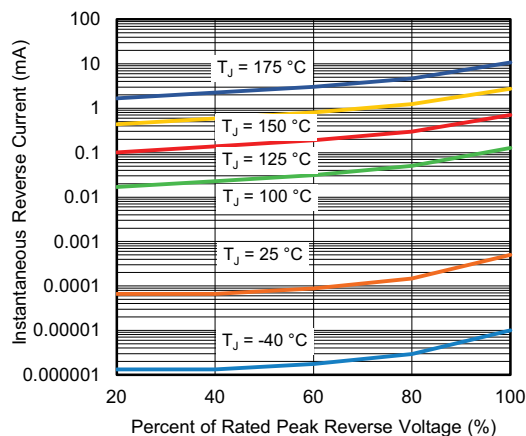


Fig. 4 - Typical Reverse Leakage Characteristics

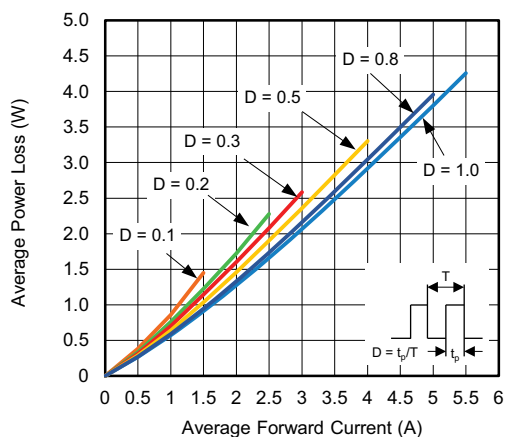


Fig. 2 - Forward Power Loss Characteristics

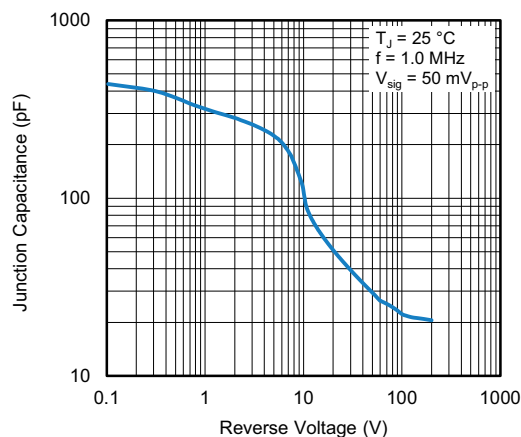


Fig. 5 - Typical Junction Capacitance

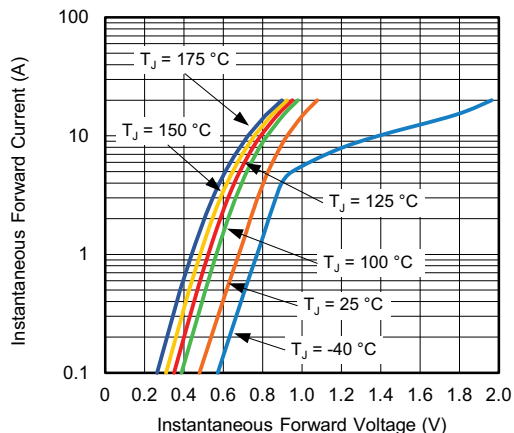


Fig. 3 - Typical Instantaneous Forward Characteristics

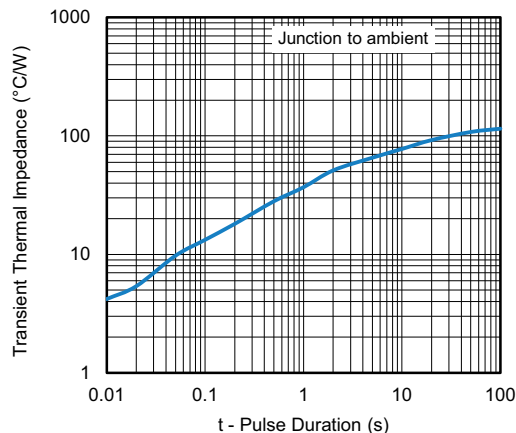


Fig. 6 - Typical Transient Thermal Impedance

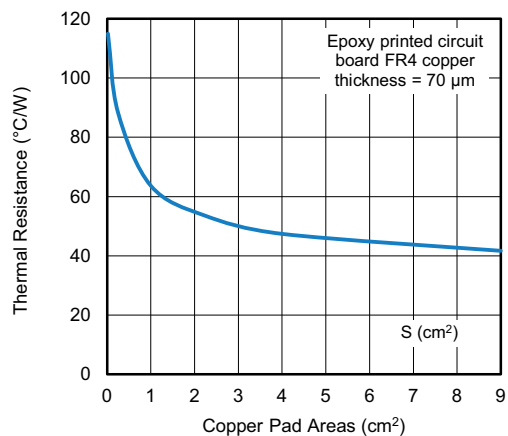
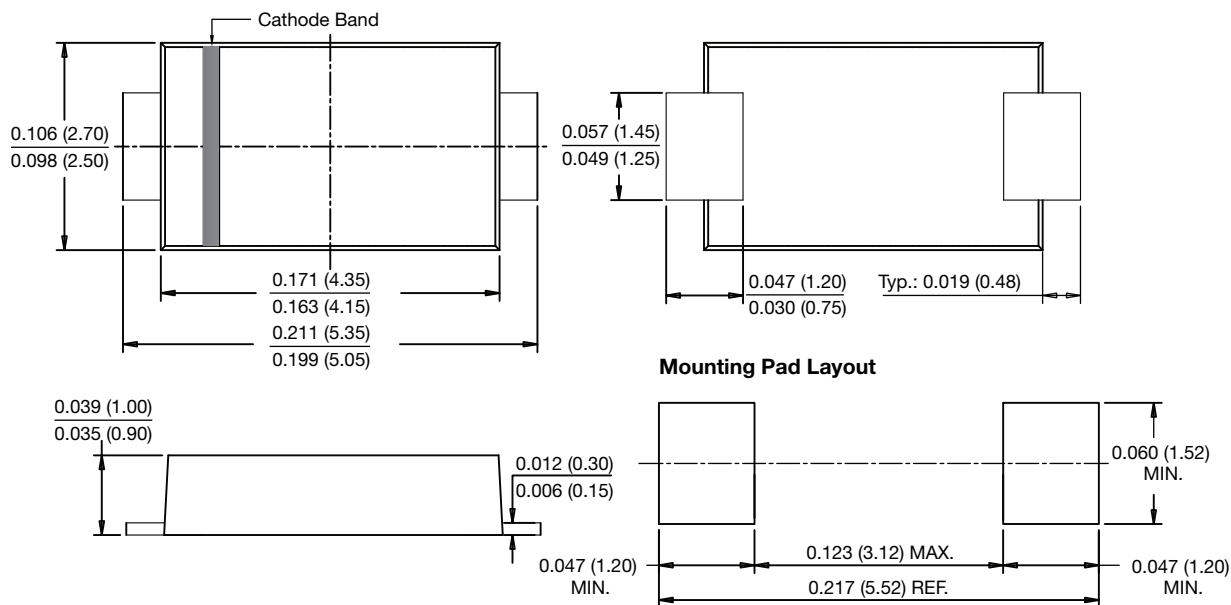


Fig. 7 - Thermal Resistance Junction to Ambient vs. Copper Pad Area

## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

### SlimSMA (DO-221AC)





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