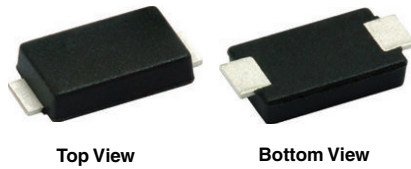


# Surface-Mount TMBS<sup>®</sup> (Trench MOS Barrier Schottky) Rectifier

## eSMP<sup>®</sup> 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](http://www.vishay.com/doc?99912)

 AUTOMOTIVE  
GRADE  
Available

**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

## LINKS TO ADDITIONAL RESOURCES



| PRIMARY CHARACTERISTICS         |                    |
|---------------------------------|--------------------|
| $I_{F(AV)}$                     | 3.0 A              |
| $V_{RRM}$                       | 45 V               |
| $I_{FSM}$                       | 80 A               |
| $I_R$ at $V_R = 45$ V (125 °C)  | 5 mA               |
| $V_F$ at $I_F = 3.0$ A (125 °C) | 0.37 V             |
| $T_J$ max.                      | 150 °C             |
| Package                         | SlimSMA (DO-221AC) |
| Circuit configuration           | Single             |

## TYPICAL APPLICATIONS

For use in low voltage, 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 JESD22-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                           | VSSAF3L45   | UNIT |
| Device marking code   |                                  | 3L45        |      |
| Maximum repetitive peak reverse voltage   | $V_{RRM}$                        | 45          | V    |
| Maximum DC forward rectified current  | $I_{F(AV)}$ <sup>(1)</sup>       | 3.0         | A    |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load | $I_{FSM}$                        | 80          | A    |
| Operating junction and storage temperature range                                  | $T_J$ <sup>(2)</sup> , $T_{STG}$ | -40 to +150 | °C   |

### Note

<sup>(1)</sup> Mounted on 10 mm x 10 mm pad areas, 2 oz. FR4 PCB

<sup>(2)</sup> The heat generated must be less than 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> = 1.5 A | T <sub>A</sub> = 25 °C  | V <sub>F</sub> <sup>(1)</sup> | 0.41 | -    | V |
|  | I <sub>F</sub> = 3.0 A |                         |                               | 0.46 | 0.54 |   |
|  | I <sub>F</sub> = 1.5 A | T <sub>A</sub> = 125 °C |                               | 0.31 | -    |   |
|  | I <sub>F</sub> = 3.0 A |                         |                               | 0.37 | 0.46 |   |
| Reverse current  | V <sub>R</sub> = 45 V  | T <sub>A</sub> = 25 °C  | -                             | 450  | μA   |   |
|  |                        | T <sub>A</sub> = 125 °C | 5                             | 25   | mA   |   |
| Typical junction capacitance   | 4.0 V, 1 MHz           | C <sub>J</sub>          | 425                           | -    | pF   |   |

**Notes**

- (1) Pulse test: 300 μs pulse width, 1 % duty cycle
- (2) Pulse test: pulse width ≤ 40 ms

| THERMAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise specified) |                                    |           |      |
|---|------------------------------------|-----------|------|
| PARAMETER   | SYMBOL                             | VSSAF3L45 | UNIT |
| Typical thermal resistance  | R <sub>θJA</sub> <sup>(1)(2)</sup> | 115       | °C/W |
|   | R <sub>θJM</sub> <sup>(2)(3)</sup> | 12        |      |

**Notes**

- (1) Free air, mounted on recommended PCB, 2 oz. pad area; thermal resistance R<sub>θJA</sub> - junction to ambient
- (2) The heat generated must be less than thermal conductivity from junction to ambient: dP<sub>D</sub>/DT<sub>J</sub> < 1/R<sub>θJA</sub>
- (3) Mounted on 10 mm x 10 mm pad areas, 2 oz. FR4 PCB, R<sub>θJM</sub> - junction to mount

| ORDERING INFORMATION (Example)  |                 |                        |               |                                    |
|---------------------------------|-----------------|------------------------|---------------|------------------------------------|
| PREFERRED P/N                   | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                      |
| VSSAF3L45-M3/6A                 | 0.032           | 6A                     | 3500          | 7" diameter plastic tape and reel  |
| VSSAF3L45-M3/6B                 | 0.032           | 6B                     | 14 000        | 13" diameter plastic tape and reel |
| VSSAF3L45HM3_A/H <sup>(1)</sup> | 0.032           | H                      | 3500          | 7" diameter plastic tape and reel  |
| VSSAF3L45HM3_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<sub>A</sub> = 25 °C unless otherwise specified)**

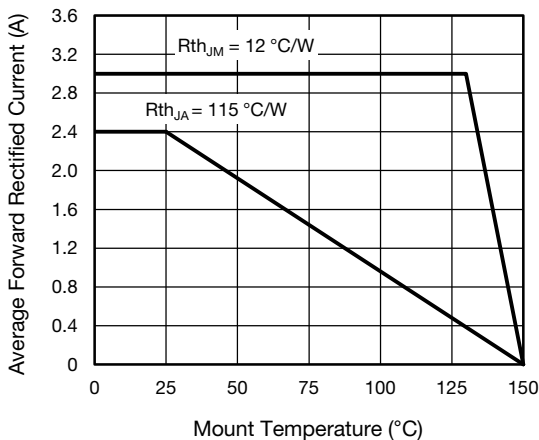


Fig. 1 - Maximum Forward Current Derating Curve

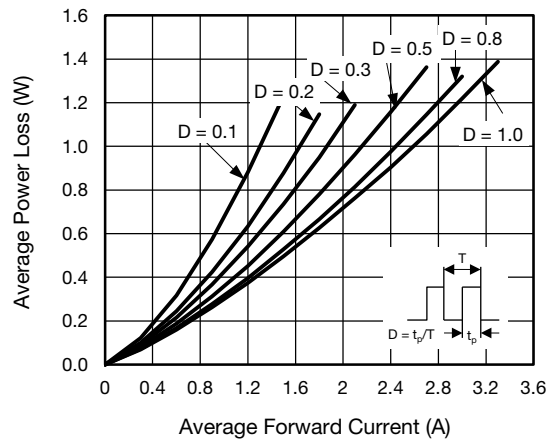


Fig. 2 - Average Power Loss Characteristics

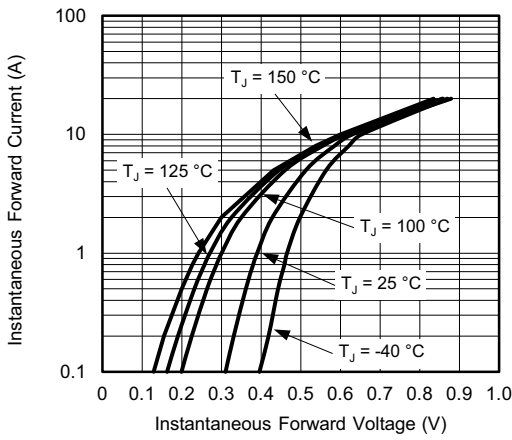


Fig. 3 - Typical Instantaneous Forward Characteristics

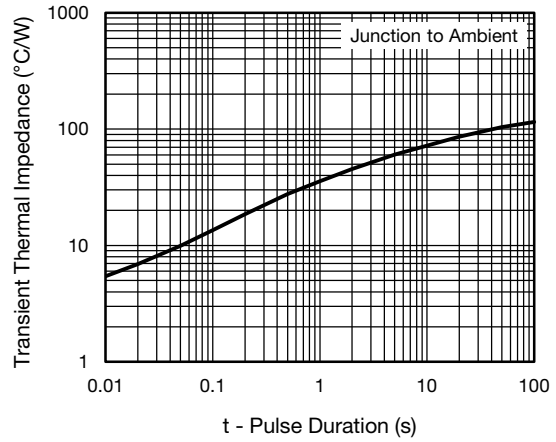


Fig. 6 - Typical Transient Thermal Impedance

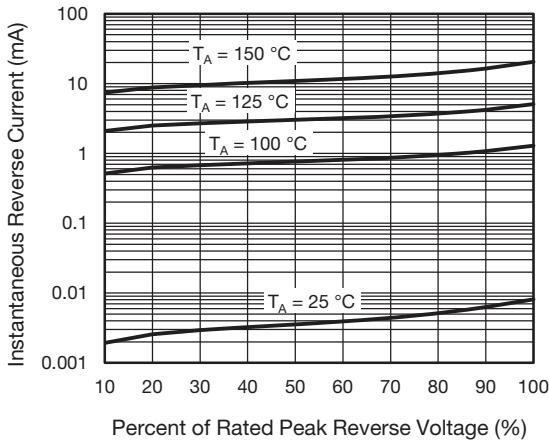


Fig. 4 - Typical Reverse Leakage Characteristics

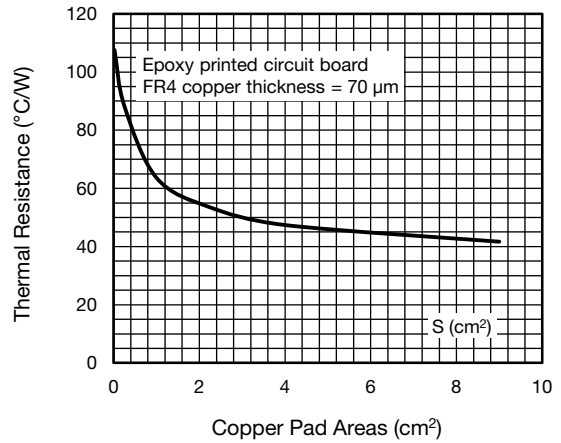


Fig. 7 - Thermal Resistance Junction to Ambient vs. Copper Pad Areas

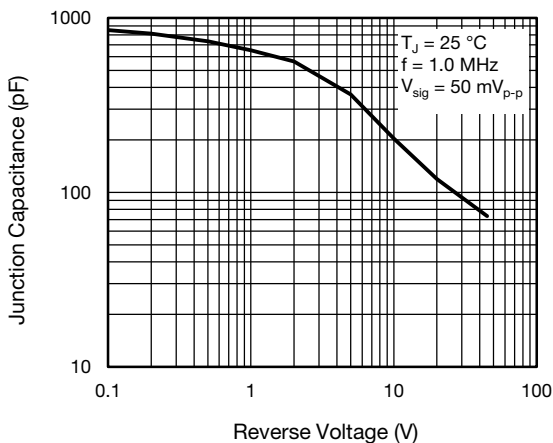
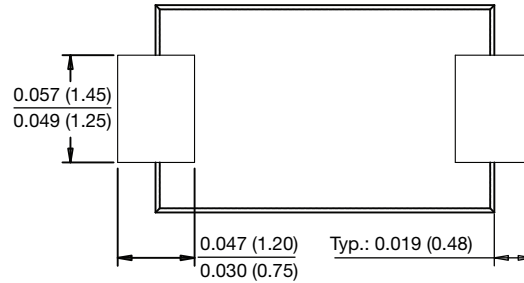
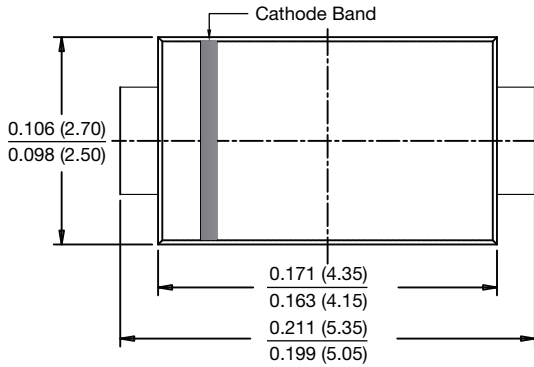


Fig. 5 - Typical Junction Capacitance

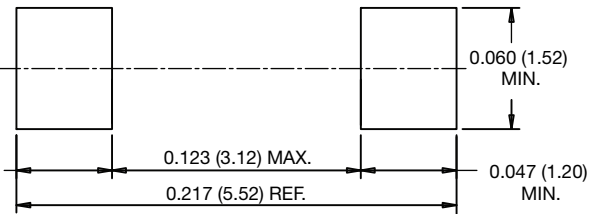
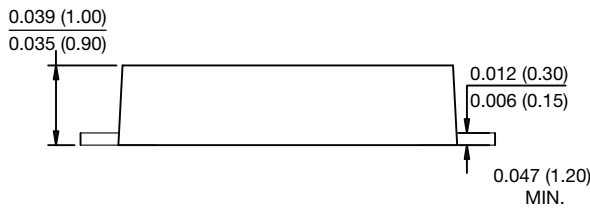


**PACKAGE OUTLINE DIMENSIONS** in inches (millimeters)

**SlimSMA (DO-221AC)**



**Mounting Pad Layout**





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