# Surface Mount Trench MOS Barrier Schottky Rectifier

TMBS® SlimSMA™

Top View Bottom View

DO-221AC

## 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

RoHS COMPLIANT HALOGEN FREE

## 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:** DO-221AC (SlimSMA)
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 JESD22-B102
M3 and HM3 suffix meets JESD 201 class 2 whisker test

**Polarity:** Color band denotes cathode end

| 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 | DO-221AC (SlimSMA) |
| Diode variations | Single die |

**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 | $I_{F(AV)}$ (1) | 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 | $T_J$, $T_{STG}$ | -40 to +150 | °C |

**Note**

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

| ELECTRICAL CHARACTERISTICS ($T_A$ = 25 °C unless otherwise noted) | | | | | | |
|---|---|---|---|---|---|---|
| **PARAMETER** | **TEST CONDITIONS** | | **SYMBOL** | **TYP.** | **MAX.** | **UNIT** |
| Instantaneous forward voltage | $I_F$ = 1.5 A | $T_A$ = 25 °C | $V_F$ (1) | 0.41 | - | V |
| | $I_F$ = 3.0 A | | | 0.46 | 0.54 | |
| | $I_F$ = 1.5 A | $T_A$ = 125 °C | | 0.31 | - | |
| | $I_F$ = 3.0 A | | | 0.37 | 0.46 | |
| Reverse current | $V_R$ = 45 V | $T_A$ = 25 °C | $I_R$ (2) | - | 450 | µA |
| | | $T_A$ = 125 °C | | 5 | 25 | mA |
| Typical junction capacitance | 4.0 V, 1 MHz | | $C_J$ | 425 | - | pF |

**Notes**

(1) Pulse test: 300 µs pulse width, 1 % duty cycle

(2) Pulse test: Pulse width ≤ 40 ms

| THERMAL CHARACTERISTICS ($T_A$ = 25 °C unless otherwise specified) | | | |
|---|---|---|---|
| **PARAMETER** | **SYMBOL** | **VSSAF3L45** | **UNIT** |
| Typical thermal resistance | $R_{\theta JA}$ (1) | 115 | °C/W |
| | $R_{\theta JM}$ (2) | 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: $dP_D/dT_J < 1/R_{\theta JA}$

| 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 |
| VSSAF3L45HM3/6A (1) | 0.032 | 6A | 3500 | 7" diameter plastic tape and reel |
| VSSAF3L45HM3/6B (1) | 0.032 | 6B | 14 000 | 13" diameter plastic tape and reel |

**Note**

(1) AEC-Q101 qualified

## RATINGS AND CHARACTERISTICS CURVES ($T_A$ = 25 °C unless otherwise specified)

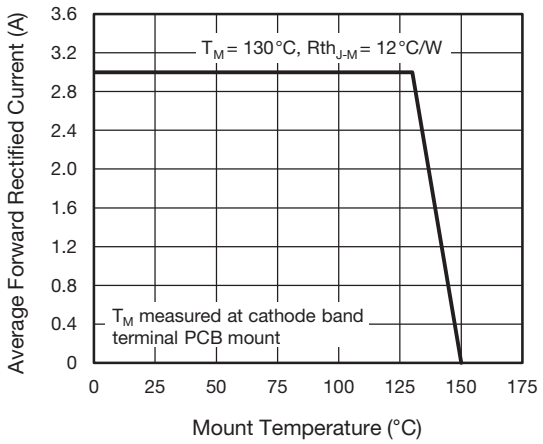



Fig. 1 - Maximum Forward Current Derating Curve

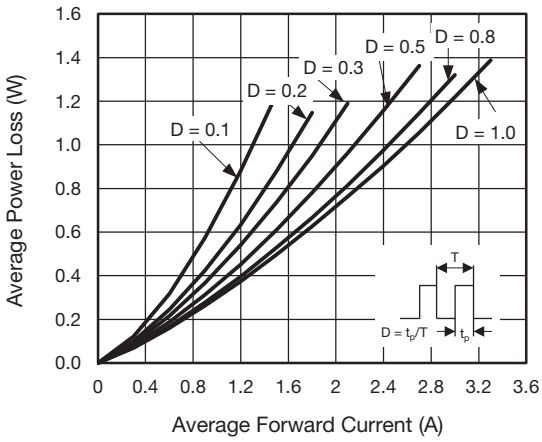



Fig. 2 - Average Power Loss Characteristics

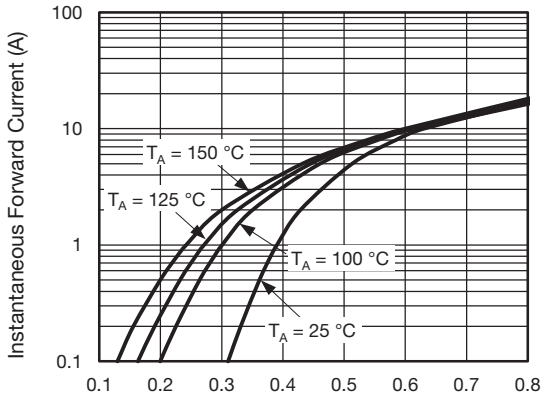



Fig. 3 - Typical Instantaneous Forward Characteristics

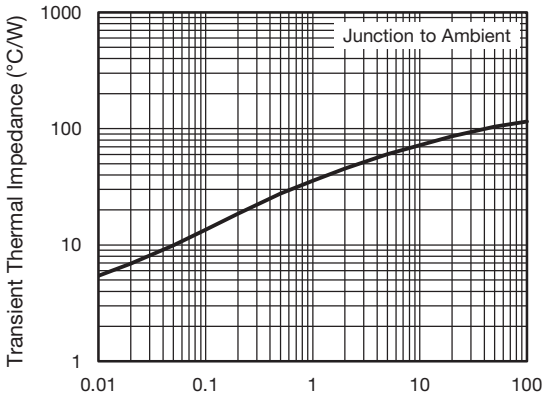



Fig. 6 - Typcial Transient Thermal Impedance

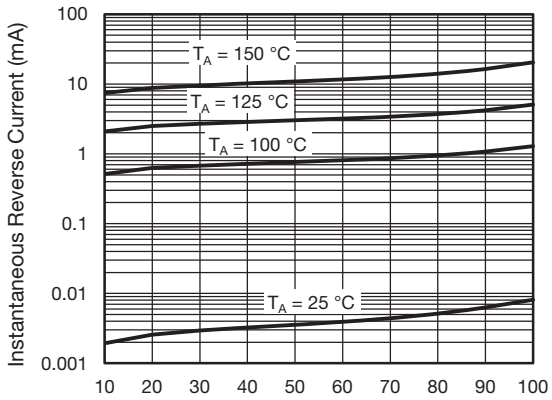



Fig. 4 - Typcial Reverse Leakage Characteristics

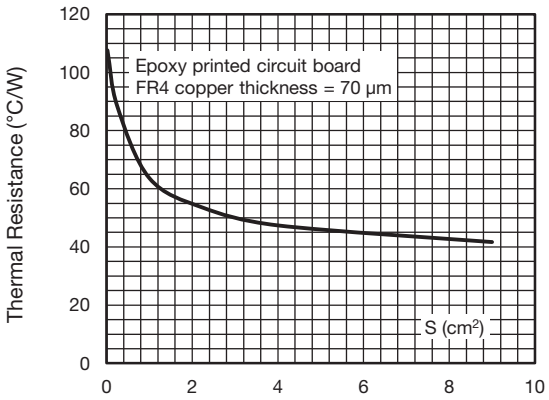



Fig. 7 - Thermal Resistance Junction to Ambient vs. Copper Pad Areas

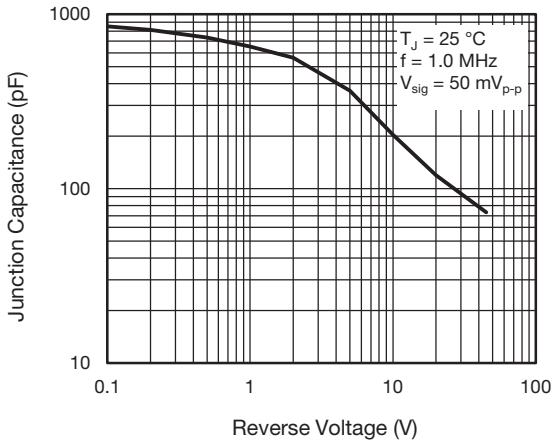
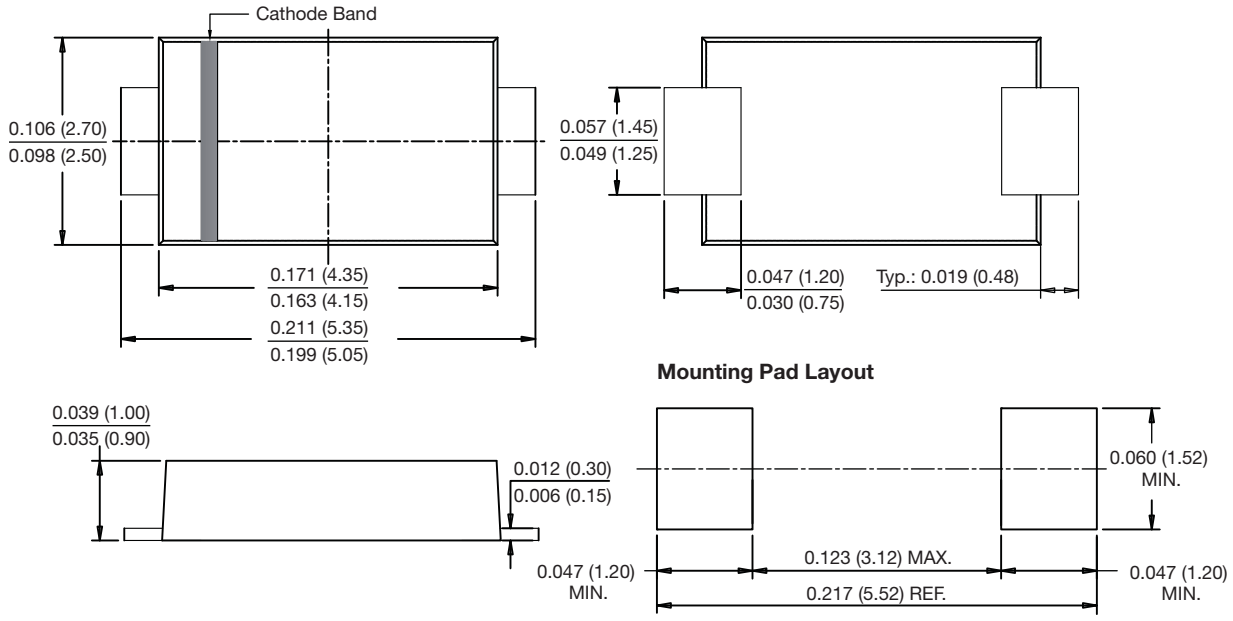



Fig. 5 - Typical Junction Capacitance

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

**DO-221AC (SlimSMA)**



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