# Surface Mount Trench MOS Barrier Schottky Rectifiers

**TMBS® eSMP® Series**

Top view Bottom view

**SMF (DO-219AB)**

Cathode Anode

## FEATURES

- Trench MOS Schottky technology
- Low profile package
- Ideal for automated placement
- Low forward voltage drop, low power losses
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Wave and reflow solderable
- 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

## DESIGN SUPPORT TOOLS

click logo to get started

3D Models Available

| PRIMARY CHARACTERISTICS | |
|---|---|
| $I_{F(AV)}$ | 1.0 A |
| $V_{RRM}$ | 120 V |
| $I_{FSM}$ | 30 A |
| $V_F$ at $I_F$ = 1 A ($T_A$ = 125 °C) | 0.61 V |
| $T_J$ max. | 175 °C |
| Package | SMF (DO-219AB) |
| 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:** SMF (DO-219AB)
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 meet JESD 201 class 2 whisker test

**Polarity:** color band denotes the cathode end

| MAXIMUM RATINGS ($T_A$ = 25 °C unless otherwise noted) | | | |
|---|---|---|---|
| **PARAMETER** | **SYMBOL** | **V1FM12** | **UNIT** |
| Device marking code | | 1MS | |
| Maximum repetitive peak reverse voltage | $V_{RRM}$ | 120 | V |
| Maximum average forward rectified current (fig.1) | $I_{F(AV)}$ (1) | 1.0 | A |
| Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load | $I_{FSM}$ | 30 | A |
| Operating junction temperature range | $T_J$ (2) | -40 to +175 | °C |
| Storage temperature range | $T_{STG}$ | -55 to +175 | |

**Notes**

(1) Free air, mounted on FR4 PCB, 2 oz. standard footprint

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

| **ELECTRICAL CHARACTERISTICS** ($T_A$ = 25 °C unless otherwise noted) | | | | | | |
|---|---|---|---|---|---|---|
| **PARAMETER** | **TEST CONDITIONS** | | **SYMBOL** | **TYP.** | **MAX.** | **UNIT** |
| Instantaneous forward voltage | $I_F$ = 0.5 A | $T_A$ = 25 °C | $V_F$ (1) | 0.62 | - | V |
| | $I_F$ = 1.0 A | | | 0.77 | 0.87 | |
| | $I_F$ = 0.5 A | $T_A$ = 125 °C | | 0.52 | - | |
| | $I_F$ = 1.0 A | | | 0.61 | 0.69 | |
| Reverse current | $V_R$ = 90 V | $T_A$ = 25 °C | $I_R$ (2) | 0.30 | - | µA |
| | | $T_A$ = 125 °C | | 180 | - | |
| | $V_R$ = 120 V | $T_A$ = 25 °C | | - | 65 | |
| | | $T_A$ = 125 °C | | 300 | 1500 | |
| Typical junction capacitance | 4.0 V, 1 MHz | | $C_J$ | 95 | - | pF |

**Notes**

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

(2) Pulse test: Pulse width ≤ 5 ms

| **THERMAL CHARACTERISTICS** ($T_A$ = 25 °c unless otherwise noted) | | | |
|---|---|---|---|
| **PARAMETER** | **SYMBOL** | **V1FM12** | **UNIT** |
| Typical thermal resistance | $R_{\theta JA}$ (1)(2) | 125 | °C/W |
| | $R_{\theta JM}$ (2) | 30 | |

**Notes**

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

(2) Device mounted on FR4 PCB, 2 oz. standard footprint, thermal resistance $R_{\theta JA}$ – junction-to-ambient; thermal resistance $R_{\theta JM}$ – junction-to-mount

| **ORDERING INFORMATION** (Example) | | | | |
|---|---|---|---|---|
| **PREFERRED P/N** | **UNIT WEIGHT (g)** | **PREFERRED PACKAGE CODE** | **BASE QUANTITY** | **DELIVERY MODE** |
| V1FM12-M3/H | 0.015 | H | 3000 | 7" diameter plastic tape and reel |
| V1FM12-M3/I | 0.015 | I | 10 000 | 13" diameter plastic tape and reel |
| V1FM12HM3/H (1) | 0.015 | H | 3000 | 7" diameter plastic tape and reel |
| V1FM12HM3/I (1) | 0.015 | I | 10 000 | 13" diameter plastic tape and reel |

**Note**

(1) AEC-Q101 qualified

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

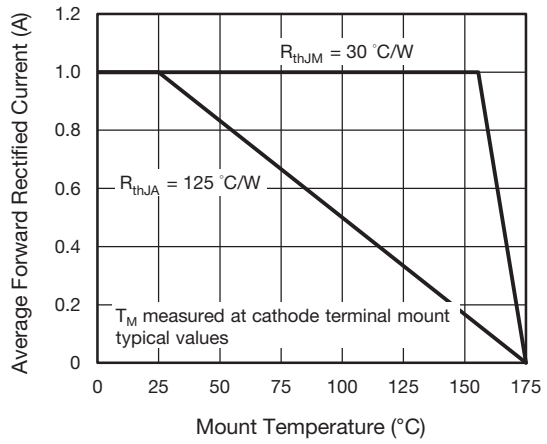



Fig. 1 - Maximum Forward Current Derating Curve

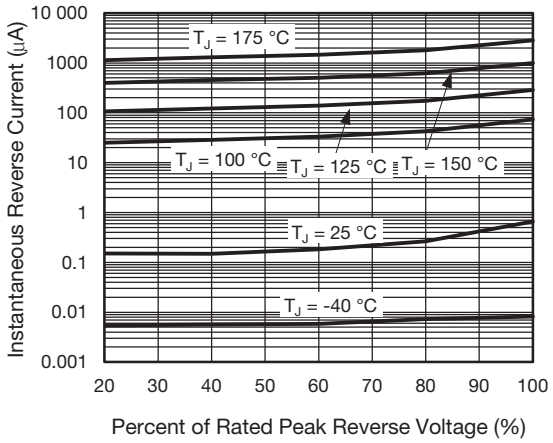



Fig. 4 - Typical Reverse Leakage Characteristics

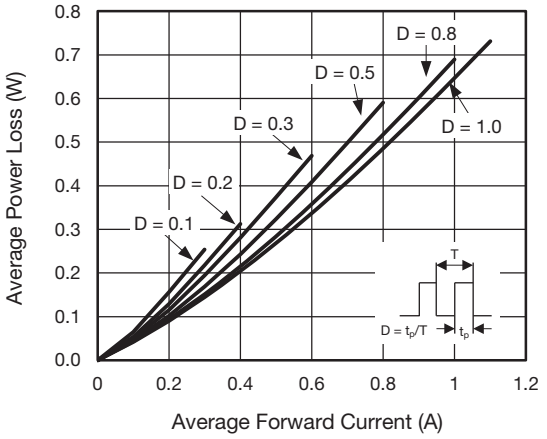



Fig. 2 - Average Power Loss Characteristics

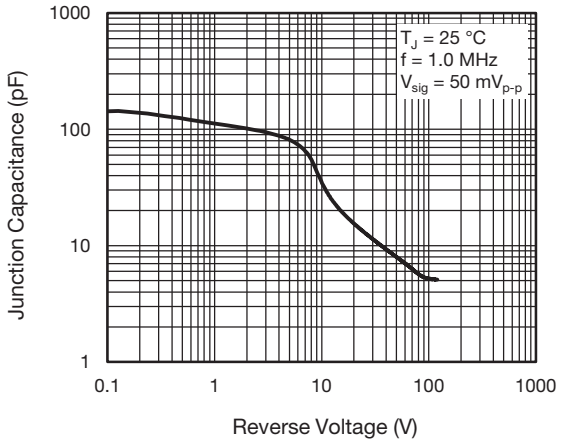



Fig. 5 - Typical Junction Capacitance

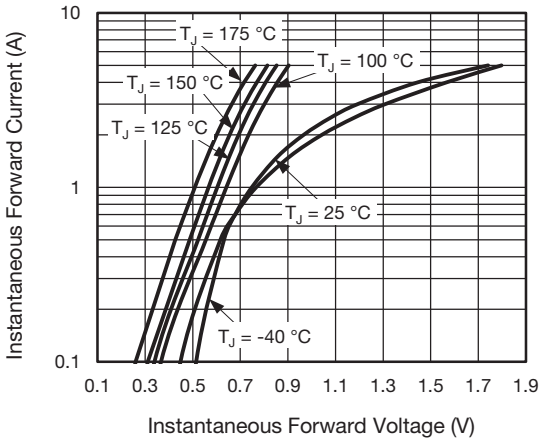



Fig. 3 - Typical Instantaneous Forward Characteristics

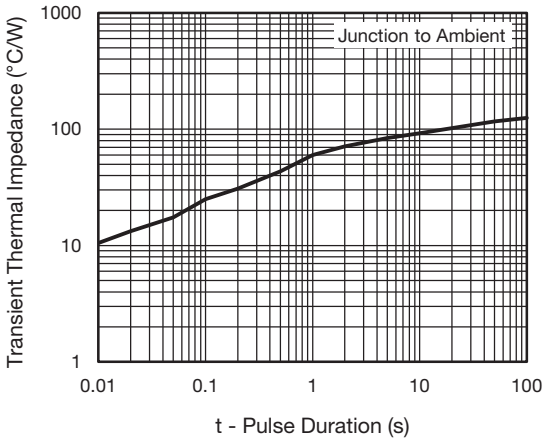
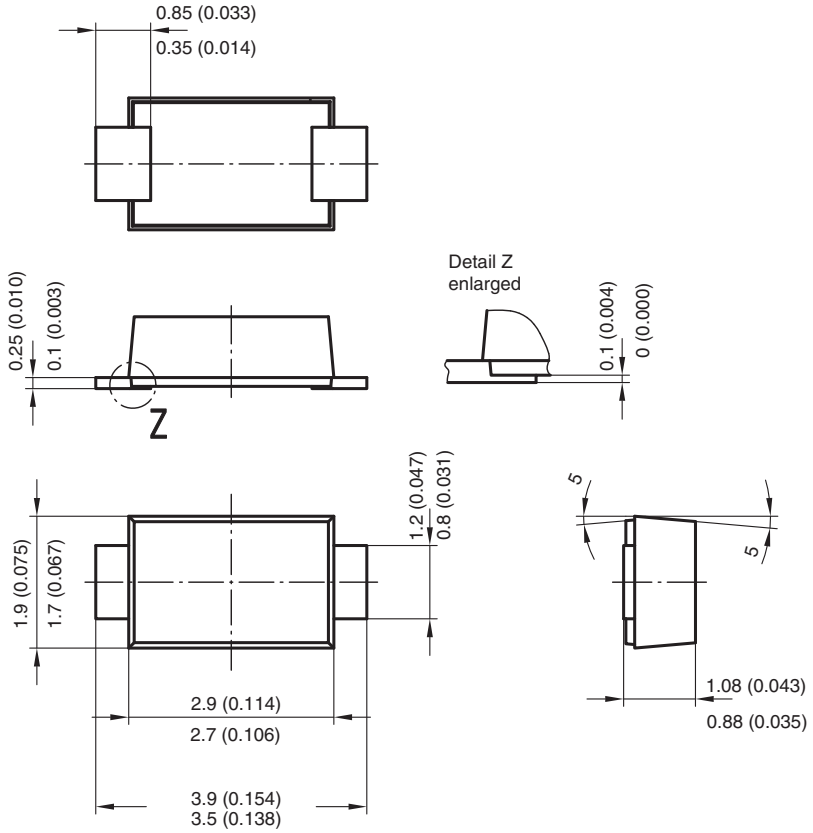
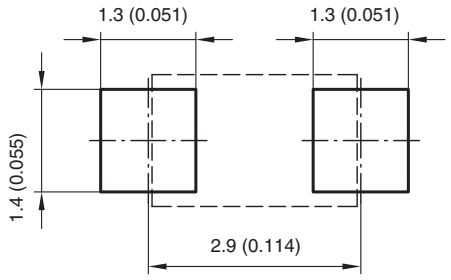



Fig. 6 - Typical Transient Thermal Impedance

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




Foot print recommendation:




Created - Date: 15. February 2005
Rev. 3 - Date: 13. March 2007
Document no.:S8-V-3915.01-001 (4)
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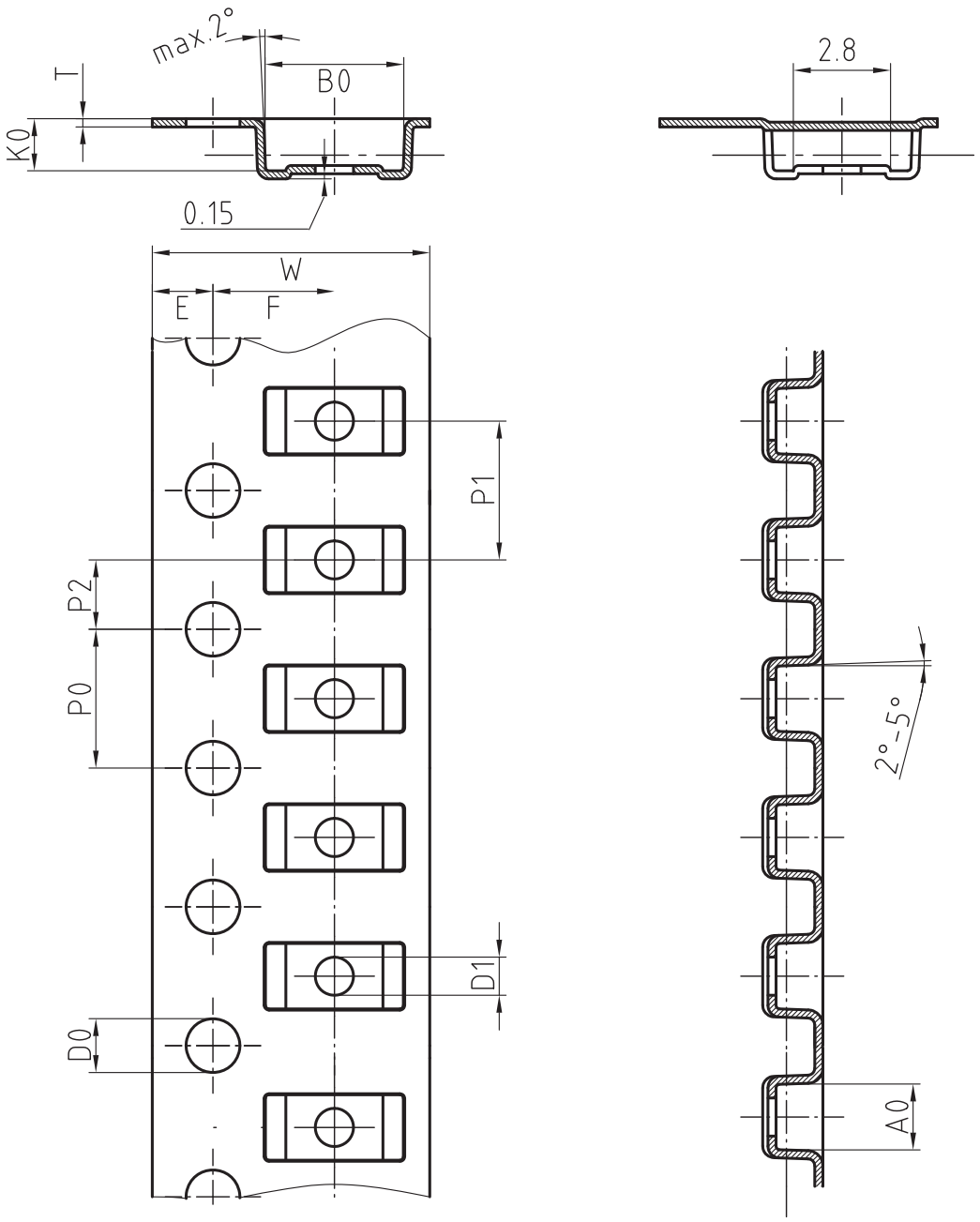
**BLISTERTAPE DIMENSIONS** in millimeters: **SMF (DO-219AB)**




| Mat: | A0 | B0 | K0 | W | T | P0 | P2 | P1 | D0 | D1 | E | F |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PS | 1.9 | 4.0 | 1.5 | 8.0 | 0.235 | 4.0 | 2.0 | 4.0 | 1.5 | 1 | 1.75 | 3.5 |

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