

# Surface Mount Trench MOS Barrier Schottky Rectifiers

**TMBS® eSMP® Series**


Top view

Bottom view

**SMF (DO-219AB)**

Cathode Anode

**DESIGN SUPPORT TOOLS**
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| PRIMARY CHARACTERISTICS                |                |
|--|----------------|
| $I_{F(AV)}$                            | 3.0 A          |
| $V_{RRM}$                              | 120 V          |
| $I_{FSM}$                              | 60 A           |
| $V_F$ at $I_F = 3$ A ( $T_A = 125$ °C) | 0.64 V         |
| $T_J$ max.                             | 175 °C         |
| Package                                | SMF (DO-219AB) |
| Circuit configuration                  | Single         |

**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](http://www.vishay.com/doc?99912)


**RoHS**  
 COMPLIANT  
 HALOGEN  
**FREE**
**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            | V3FM12      | UNIT |
| Device marking code  |                   | 3MS         |      |
| Maximum repetitive peak reverse voltage  | $V_{RRM}$         | 120         | V    |
| Maximum average forward rectified current (fig.1)                                  | $I_{F(AV)}^{(1)}$ | 2.5         | A    |
|  | $I_{F(AV)}^{(2)}$ | 3.0         |      |
| Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load | $I_{FSM}$         | 60          | A    |
| Operating junction temperature range   | $T_J^{(3)}$       | -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) Mounted on FR4 PCB, 2 oz. 10 mm x 10 mm copper pad area

 (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 ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted) |                      |                                   |             |      |      |               |
|---|----------------------|-----------------------------------|-------------|------|------|---------------|
| PARAMETER   | TEST CONDITIONS      |                                   | SYMBOL      | TYP. | MAX. | UNIT          |
| Instantaneous forward voltage   | $I_F = 1.5\text{ A}$ | $T_A = 25\text{ }^\circ\text{C}$  | $V_F^{(1)}$ | 0.65 | -    | V             |
|   | $I_F = 3.0\text{ A}$ |                                   |             | 0.84 | 0.94 |               |
|   | $I_F = 1.5\text{ A}$ | $T_A = 125\text{ }^\circ\text{C}$ |             | 0.55 | -    |               |
|   | $I_F = 3.0\text{ A}$ |                                   |             | 0.64 | 0.72 |               |
| Reverse current   | $V_R = 90\text{ V}$  | $T_A = 25\text{ }^\circ\text{C}$  | $I_R^{(2)}$ | 0.7  | -    | $\mu\text{A}$ |
|   |                      | $T_A = 125\text{ }^\circ\text{C}$ |             | 550  | -    |               |
|   | $V_R = 120\text{ V}$ | $T_A = 25\text{ }^\circ\text{C}$  |             | -    | 100  |               |
|   |                      | $T_A = 125\text{ }^\circ\text{C}$ |             | 950  | 3000 |               |
| Typical junction capacitance  | 4.0 V, 1 MHz         |                                   | $C_J$       | 220  | -    | pF            |

**Notes**

- (1) Pulse test: 300  $\mu\text{s}$  pulse width, 1 % duty cycle  
(2) Pulse test: Pulse width  $\leq 5\text{ ms}$

| THERMAL CHARACTERISTICS ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted) |                          |        |                    |
|--|--------------------------|--------|--------------------|
| PARAMETER  | SYMBOL                   | V3FM12 | UNIT               |
| Typical thermal resistance   | $R_{\theta JA}^{(1)(2)}$ | 125    | $^\circ\text{C/W}$ |
|  | $R_{\theta JM}^{(3)}$    | 22     |                    |

**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  
(3) Device mounted on 10 mm x 10 mm pad size area footprint; thermal resistance  $R_{\theta JM}$  – junction-to-mount

| ORDERING INFORMATION (Example) |                 |                        |               |                                    |
|--------------------------------|-----------------|------------------------|---------------|------------------------------------|
| PREFERRED P/N                  | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                      |
| V3FM12-M3/H                    | 0.015           | H                      | 3000          | 7" diameter plastic tape and reel  |
| V3FM12-M3/I                    | 0.015           | I                      | 10 000        | 13" diameter plastic tape and reel |
| V3FM12HM3/H <sup>(1)</sup>     | 0.015           | H                      | 3000          | 7" diameter plastic tape and reel  |
| V3FM12HM3/I <sup>(1)</sup>     | 0.015           | I                      | 10 000        | 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)

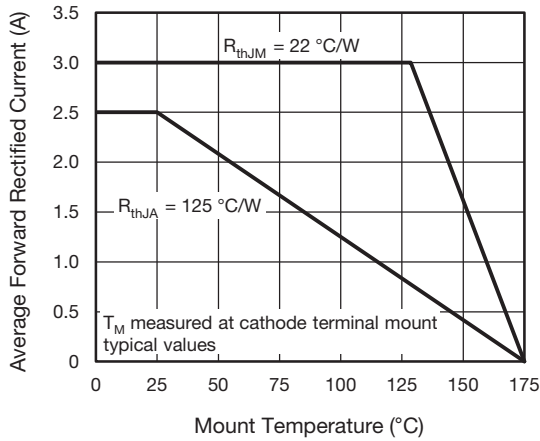


Fig. 1 - Maximum Forward Current Derating Curve

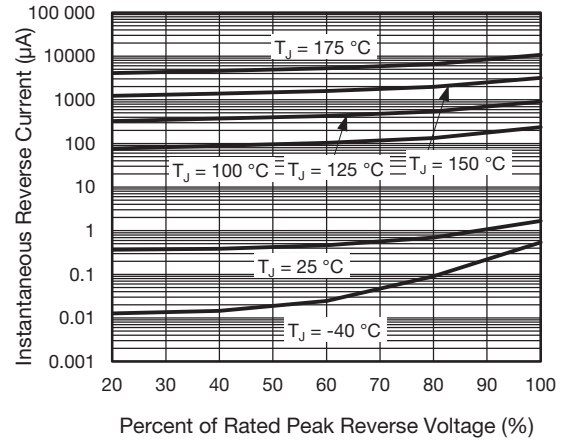


Fig. 4 - Typical Reverse Leakage Characteristics

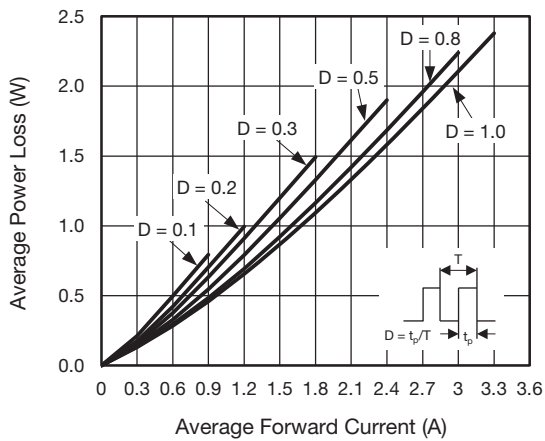


Fig. 2 - Average Power Loss Characteristics

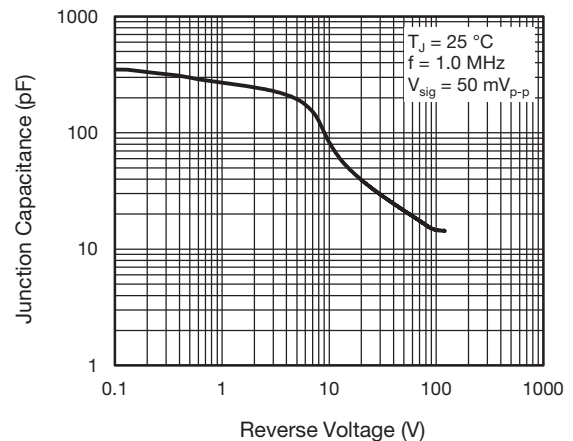


Fig. 5 - Typical Junction Capacitance

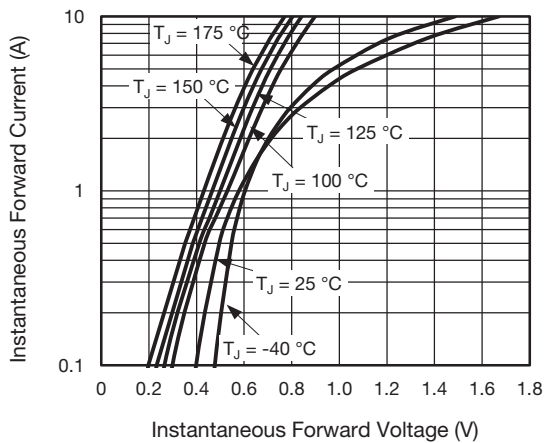


Fig. 3 - Typical Instantaneous Forward Characteristics

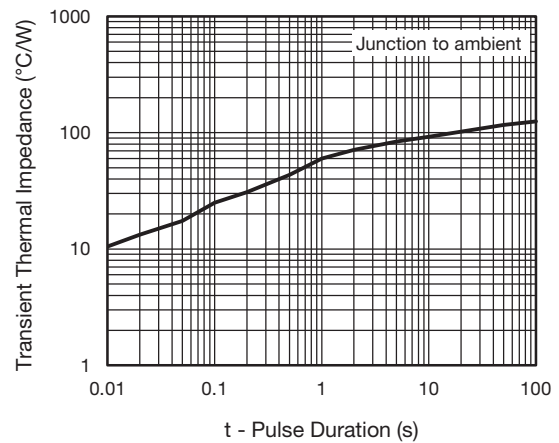
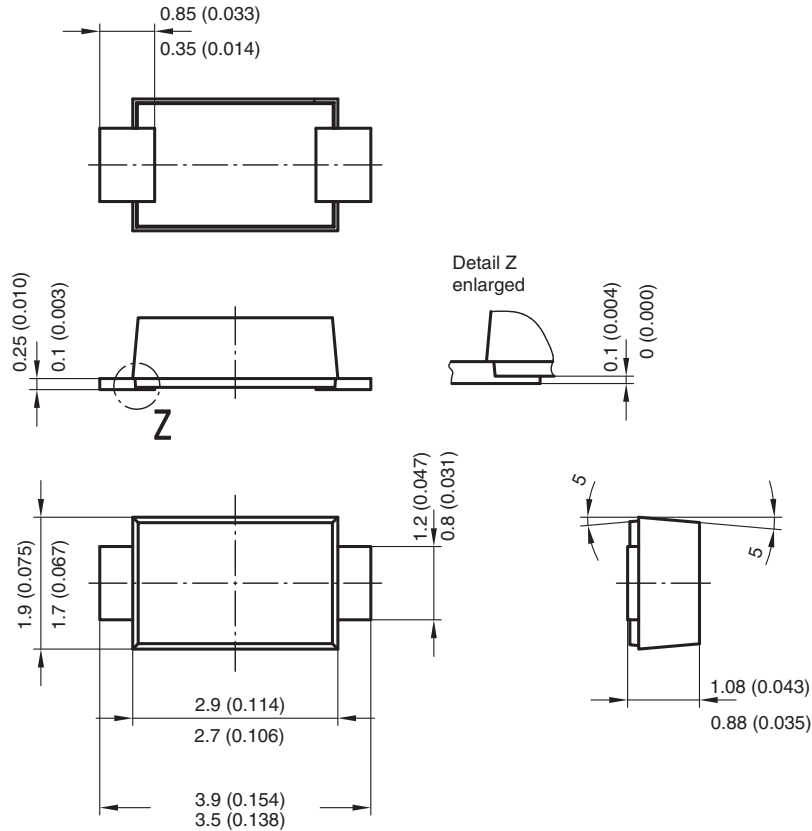


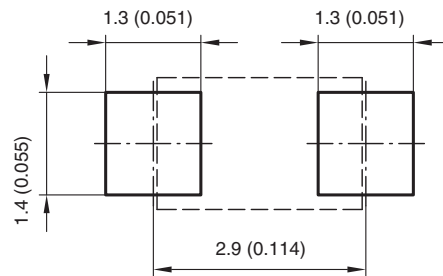
Fig. 6 - Typical Transient Thermal Impedance



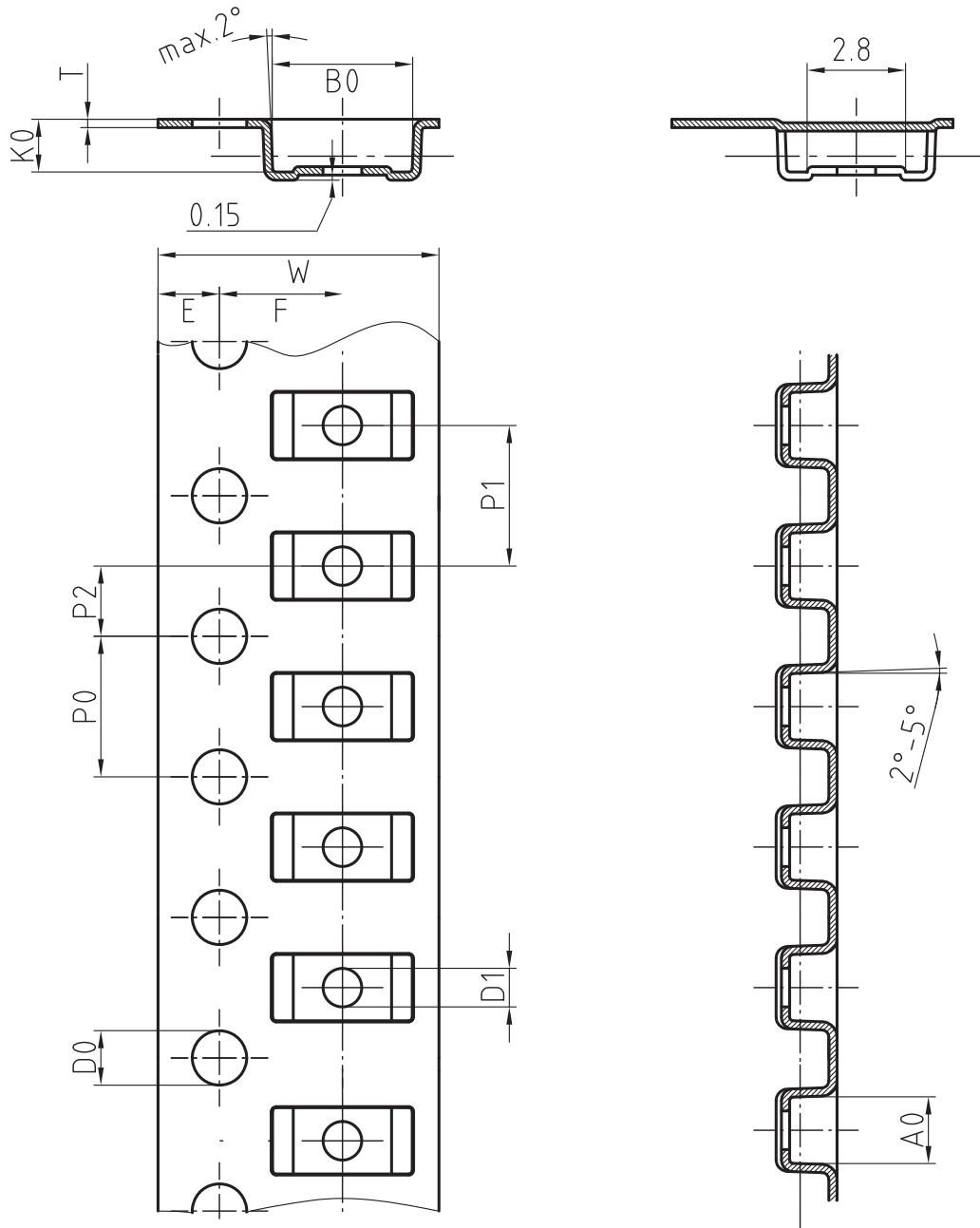
PACKAGE OUTLINE DIMENSIONS in millimeters (inches)



Foot print recommendation:



Created - Date: 15. February 2005  
 Rev. 3 - Date: 13. March 2007  
 Document no.: S8-V-3915.01-001 (4)  
 17247

**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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