

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

## eSMP<sup>®</sup> 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
- Compatible to SOD-123W package case outline
- 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

|  |                |
|--|----------------|
| $I_{F(AV)}$                            | 1.0 A          |
| $V_{RRM}$                              | 100 V          |
| $I_{FSM}$                              | 30 A           |
| $V_F$ at $I_F = 1$ A ( $T_A = 125$ °C) | 0.59 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                     | V1FM10      | UNIT |
|--|----------------------------|-------------|------|
| Device marking code  |                            | 1MB         |      |
| Maximum repetitive peak reverse voltage  | $V_{RRM}$                  | 100         | V    |
| Maximum average forward rectified current (fig.1)                                  | $I_{F(AV)}$ <sup>(1)</sup> | 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   | $T_J$ <sup>(2)</sup>       | -40 to +175 | °C   |
| Storage temperature range  | $T_{STG}$                  | -55 to +175 |      |

### Notes

<sup>(1)</sup> Free air, mounted on FR4 PCB, 2 oz. standard footprint

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



| <b>ELECTRICAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted) |                      |                                   |             |      |      |               |
|--|----------------------|-----------------------------------|-------------|------|------|---------------|
| PARAMETER  | TEST CONDITIONS      |                                   | SYMBOL      | TYP. | MAX. | UNIT          |
| Instantaneous forward voltage  | $I_F = 0.5\text{ A}$ | $T_A = 25\text{ }^\circ\text{C}$  | $V_F^{(1)}$ | 0.57 | -    | V             |
|  | $I_F = 1.0\text{ A}$ |                                   |             | 0.69 | 0.77 |               |
|  | $I_F = 0.5\text{ A}$ | $T_A = 125\text{ }^\circ\text{C}$ |             | 0.49 | -    |               |
|  | $I_F = 1.0\text{ A}$ |                                   |             | 0.59 | 0.67 |               |
| Reverse current  | $V_R = 70\text{ V}$  | $T_A = 25\text{ }^\circ\text{C}$  | $I_R^{(2)}$ | 0.20 | -    | $\mu\text{A}$ |
|  |                      | $T_A = 125\text{ }^\circ\text{C}$ |             | 150  | -    |               |
|  | $V_R = 100\text{ V}$ | $T_A = 25\text{ }^\circ\text{C}$  |             | -    | 50   |               |
|  |                      | $T_A = 125\text{ }^\circ\text{C}$ |             | 250  | 1500 |               |
| Typical junction capacitance   | 4.0 V, 1 MHz         |                                   | $C_J$       | 95   | -    | pF            |

**Notes**

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

| <b>THERMAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted) |                          |        |                    |
|---|--------------------------|--------|--------------------|
| PARAMETER   | SYMBOL                   | V1FM10 | UNIT               |
| Typical thermal resistance  | $R_{\theta JA}^{(1)(2)}$ | 125    | $^\circ\text{C/W}$ |
|   | $R_{\theta JM}^{(2)}$    | 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

| <b>ORDERING INFORMATION</b> (Example) |                 |                        |               |                                    |
|---------------------------------------|-----------------|------------------------|---------------|------------------------------------|
| PREFERRED P/N                         | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                      |
| V1FM10-M3/H                           | 0.015           | H                      | 3000          | 7" diameter plastic tape and reel  |
| V1FM10-M3/I                           | 0.015           | I                      | 10 000        | 13" diameter plastic tape and reel |
| V1FM10HM3/H <sup>(1)</sup>            | 0.015           | H                      | 3000          | 7" diameter plastic tape and reel  |
| V1FM10HM3/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)

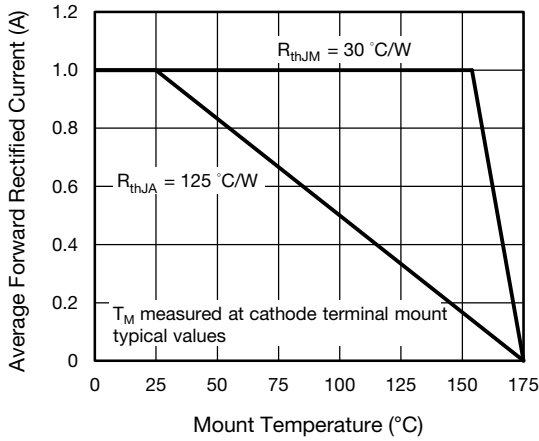


Fig. 1 - Maximum Forward Current Derating Curve

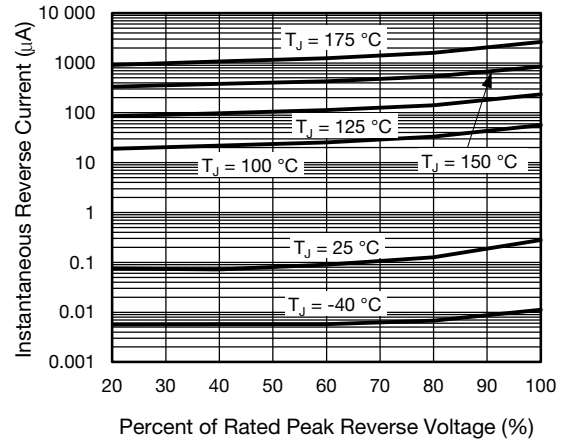


Fig. 4 - Typical Reverse Leakage Characteristics

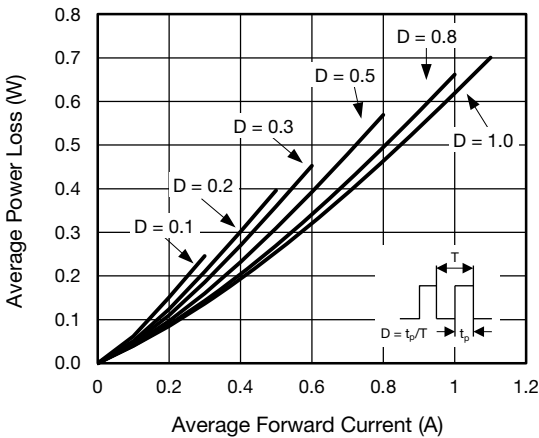


Fig. 2 - Average Power Loss Characteristics

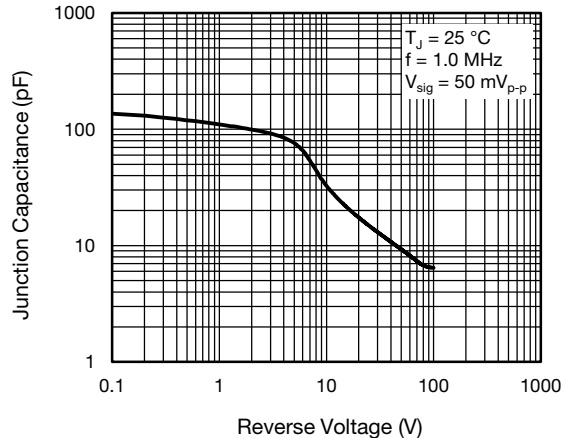


Fig. 5 - Typical Junction Capacitance

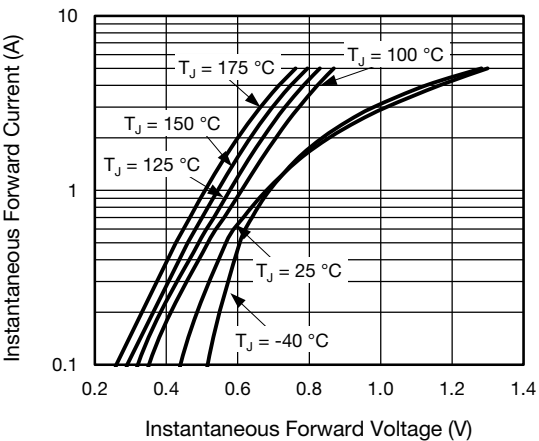


Fig. 3 - Typical Instantaneous Forward Characteristics

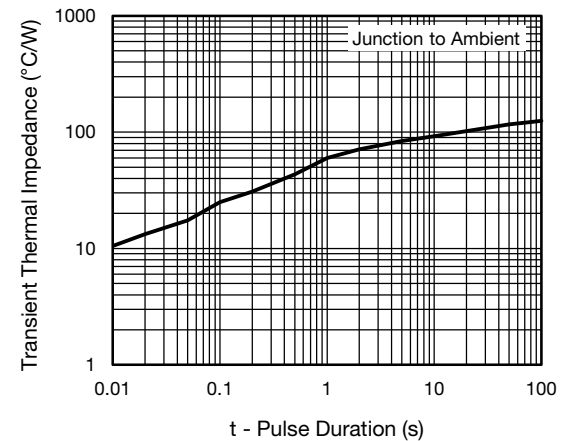
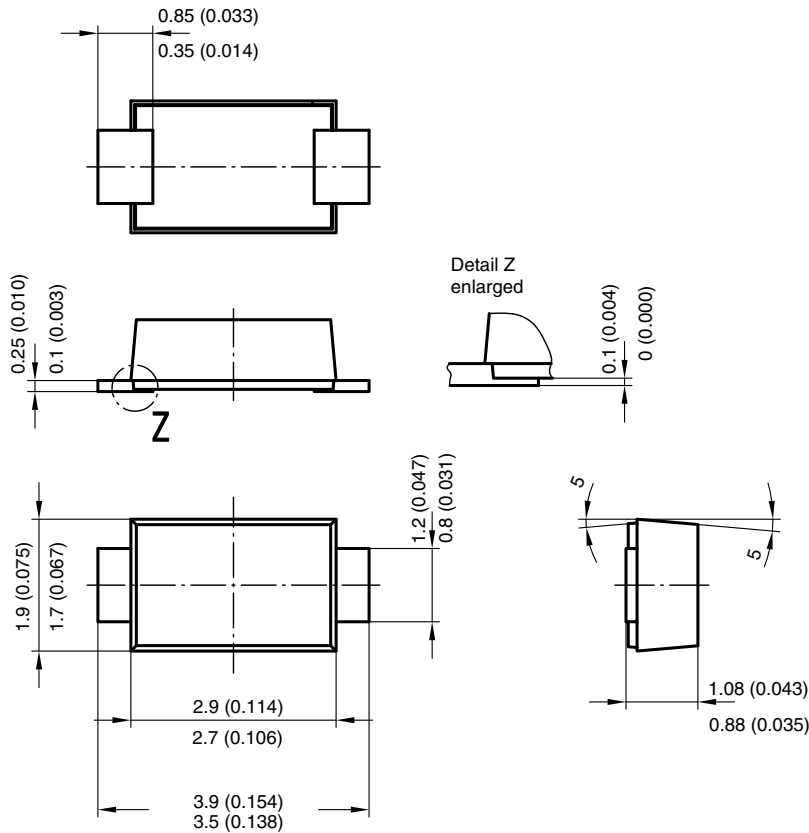
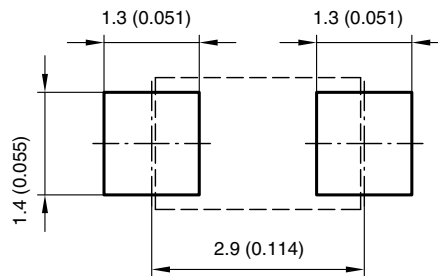


Fig. 6 - Typical Transient Thermal Impedance

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



Foot print recommendation:



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 17247



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