

# Surface-Mount TMBS® (Trench MOS Barrier Schottky) Rectifiers

## eSMP® Series



Top view

Bottom view

### SMF (DO-219AB)

Cathode  Anode

## LINKS TO ADDITIONAL RESOURCES



3D Models

## 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         |

## 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)


**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                     | V1FM12      | UNIT |
|--|----------------------------|-------------|------|
| Device marking code  |                            | 1MS         |      |
| Maximum repetitive peak reverse voltage  | $V_{RRM}$                  | 120         | V    |
| Maximum average forward rectified current (fig.1)                                  | $I_{F(AV)}$ <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:  $dP_D/dT_J < 1/R_{\theta JA}$

**ELECTRICAL CHARACTERISTICS** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)

| ELECTRICAL CHARACTERISTICS (TA = 25 °C unless otherwise noted) |                 |             |        |      |      |      |
|--|-----------------|-------------|--------|------|------|------|
| PARAMETER  | TEST CONDITIONS |             | SYMBOL | TYP. | MAX. | UNIT |
| Instantaneous forward voltage                                  | IF = 0.5 A      | TA = 25 °C  | VF (1) | 0.62 | -    | V    |
|  | IF = 1.0 A      |             |        | 0.77 | 0.87 |      |
|  | IF = 0.5 A      | TA = 125 °C |        | 0.52 | -    |      |
|  | IF = 1.0 A      |             |        | 0.61 | 0.69 |      |
| Reverse current  | VR = 90 V       | TA = 25 °C  | IR (2) | 0.30 | -    | µA   |
|  |                 | TA = 125 °C |        | 180  | -    |      |
|  | VR = 120 V      | TA = 25 °C  |        | -    | 65   |      |
|  |                 | TA = 125 °C |        | 300  | 1500 |      |
| Typical junction capacitance                                   | 4.0 V, 1 MHz    |             | CJ     | 95   | -    | 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                   | V1FM12 | 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**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 <sup>(1)</sup> | 0.015           | H                      | 3000          | 7" diameter plastic tape and reel  |
| V1FM12HM3/I <sup>(1)</sup> | 0.015           | I                      | 10 000        | 13" diameter plastic tape and reel |

**Note**

(1) AEC-Q101 qualified

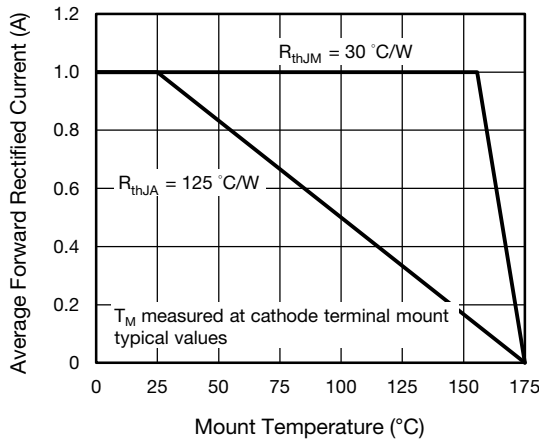
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve

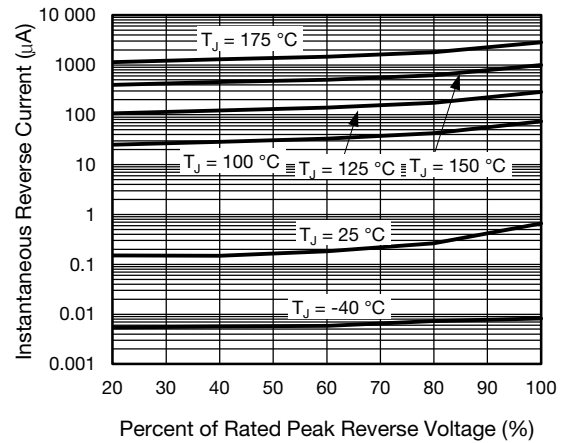


Fig. 4 - Typical Reverse Leakage Characteristics

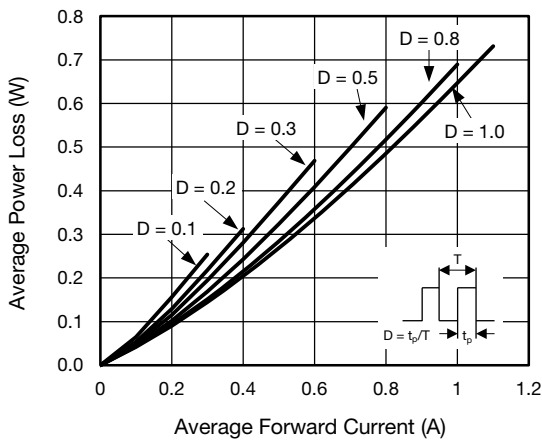


Fig. 2 - Average Power Loss Characteristics

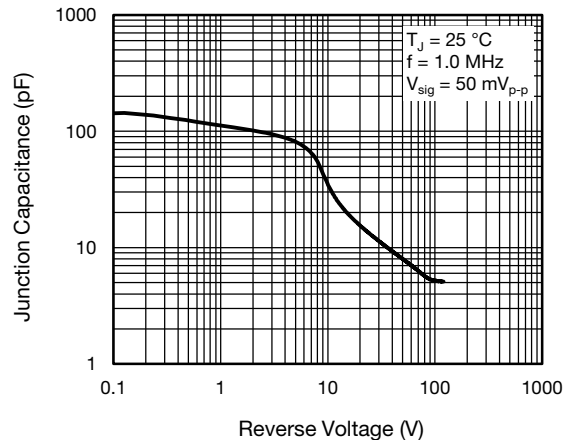


Fig. 5 - Typical Junction Capacitance

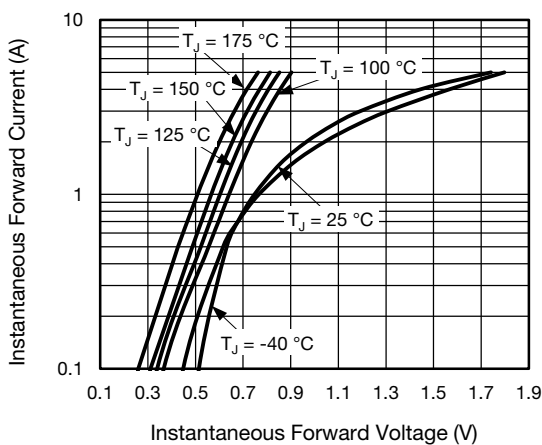


Fig. 3 - Typical Instantaneous Forward Characteristics

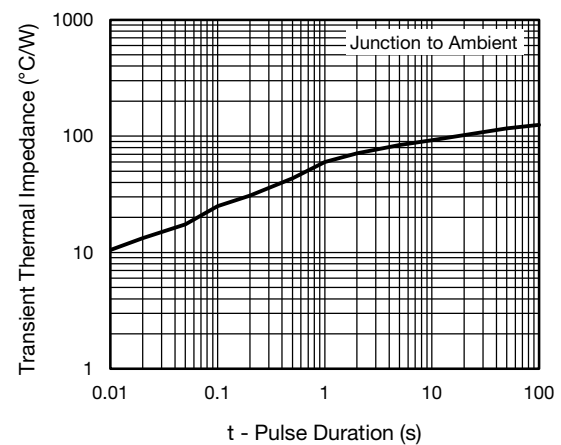
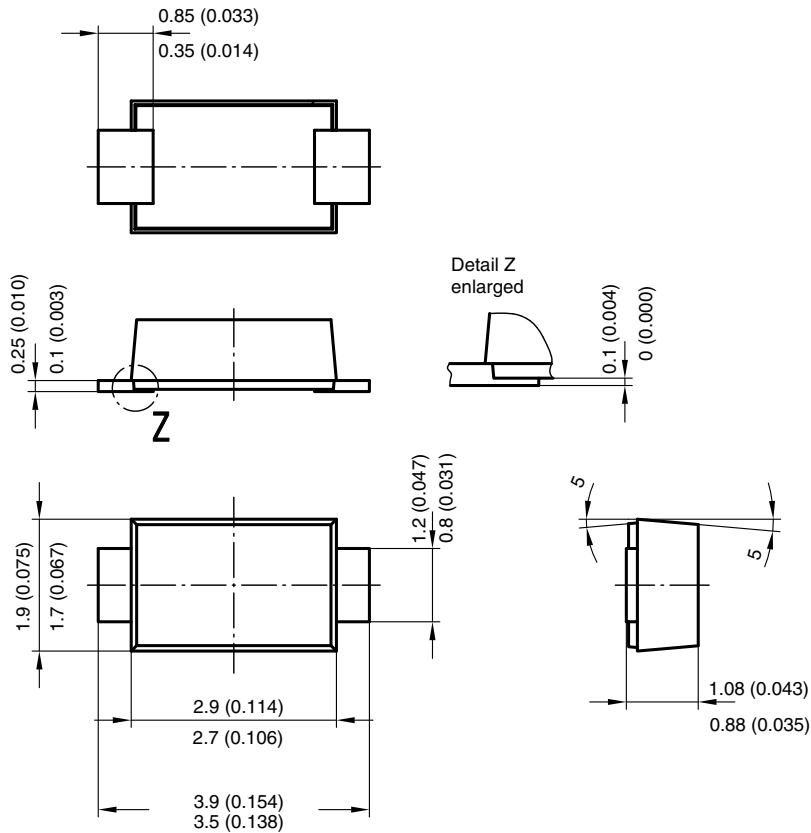
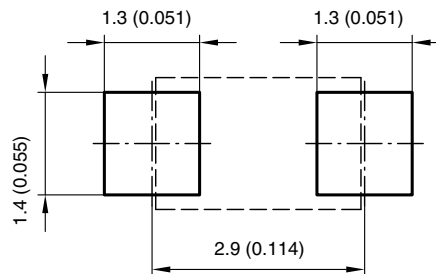


Fig. 6 - Typical Transient Thermal Impedance

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


Foot print recommendation:



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