

# Dual Low-Voltage TMBS<sup>®</sup> (Trench MOS Barrier Schottky) Rectifier

 Ultra Low  $V_F = 0.39\text{ V}$  at  $I_F = 2.5\text{ A}$ 

## eSMP<sup>®</sup> Series SMPD (TO-263AC)



### DESIGN SUPPORT TOOLS AVAILABLE


[3D Models](#)

| PRIMARY CHARACTERISTICS                               |                 |
|---|-----------------|
| $I_{F(AV)}$   | 2 x 5 A         |
| $V_{RRM}$   | 45 V            |
| $I_{FSM}$   | 80 A            |
| $V_F$ at $I_F = 5\text{ A}$ ( $T_A = 125\text{ °C}$ ) | 0.46 V          |
| $T_J$ max.  | 175 °C          |
| Package   | SMPD (TO-263AC) |
| Circuit configuration                                 | Common cathode  |

### FEATURES

- Trench MOS Schottky technology
- Very low profile - typical height of 1.7 mm
- Ideal for automated placement
- Low forward voltage drop, low power losses
- High efficiency operation
- 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](http://www.vishay.com/doc?99912)

 AUTOMOTIVE  
GRADE  
Available

**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

### TYPICAL APPLICATIONS

For use in high frequency DC/DC converters, switching power supplies, freewheeling diodes, OR-ing diode, and reverse battery protection in commercial, industrial, and automotive application.

### MECHANICAL DATA

**Case:** SMPD (TO-263AC)

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:** as marked

| MAXIMUM RATINGS ( $T_A = 25\text{ °C}$ unless otherwise noted)                     |            |             |      |
|--|------------|-------------|------|
| PARAMETER  | SYMBOL     | V10DM45C    | UNIT |
| Device marking code  |            | V10DM45C    |      |
| Maximum repetitive peak reverse voltage  | $V_{RRM}$  | 45          | V    |
| Maximum average forward rectified current (fig. 1)                                 | per device | 10          | A    |
|  | per diode  | 5           |      |
| Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load | $I_{FSM}$  | 80          | A    |
| Operating junction temperature range   | $T_J$ (2)  | -40 to +175 | °C   |
| Storage temperature range  | $T_{STG}$  | -55 to +175 |      |

### Notes

(1) Mounted on infinite heatsink

 (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 <sub>A</sub> = 25 °C unless otherwise noted) |                        |                         |                               |      |      |      |
|--|------------------------|-------------------------|-------------------------------|------|------|------|
| PARAMETER  | TEST CONDITIONS        |                         | SYMBOL                        | TYP. | MAX. | UNIT |
| Instantaneous forward voltage per diode                                    | I <sub>F</sub> = 2.5 A | T <sub>A</sub> = 25 °C  | V <sub>F</sub> <sup>(1)</sup> | 0.50 | -    | V    |
|  | I <sub>F</sub> = 5 A   |                         |                               | 0.54 | 0.62 |      |
|  | I <sub>F</sub> = 2.5 A | T <sub>A</sub> = 125 °C |                               | 0.39 | -    |      |
|  | I <sub>F</sub> = 5 A   |                         |                               | 0.46 | 0.54 |      |
| Reverse current at rated V <sub>R</sub> per diode                          | V <sub>R</sub> = 45 V  | T <sub>A</sub> = 25 °C  | I <sub>R</sub> <sup>(2)</sup> | -    | 0.1  | mA   |
|  |                        | T <sub>A</sub> = 125 °C |                               | 1.1  | 4    |      |
| Typical junction capacitance   | 4.0 V, 1 MHz           |                         | C <sub>J</sub>                | 840  | -    | pF   |

**Notes**

- (1) Pulse test: 300 μs pulse width, 1 % duty cycle  
(2) Pulse test: Pulse width ≤ 5 ms

| THERMAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted) |                                    |          |      |
|---|------------------------------------|----------|------|
| PARAMETER   | SYMBOL                             | V10DM45C | UNIT |
| Typical thermal resistance per device                                   | R <sub>θJC</sub> <sup>(1)</sup>    | 2.5      | °C/W |
|   | R <sub>θJA</sub> <sup>(2)(3)</sup> | 58       |      |

**Notes**

- (1) Mounted on infinite heatsink  
(2) The heat generated must be less than the thermal conductivity from junction-to-ambient: dP<sub>D</sub>/dT<sub>J</sub> < 1/R<sub>θJA</sub> - junction-to-ambient  
(3) Free air, without heatsink

| ORDERING INFORMATION (Example) |                 |              |               |                                    |
|--------------------------------|-----------------|--------------|---------------|------------------------------------|
| PREFERRED P/N                  | UNIT WEIGHT (g) | PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                      |
| V10DM45C-M3/I                  | 0.55            | I            | 2000/reel     | 13" diameter plastic tape and reel |
| V10DM45CHM3/I <sup>(1)</sup>   | 0.55            | I            | 2000/reel     | 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)

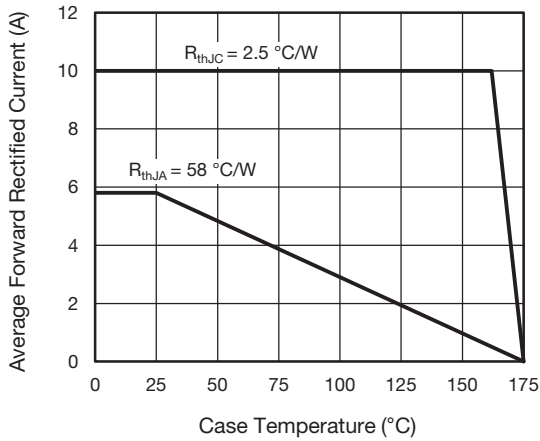


Fig. 1 - Maximum Forward Current Derating Curve

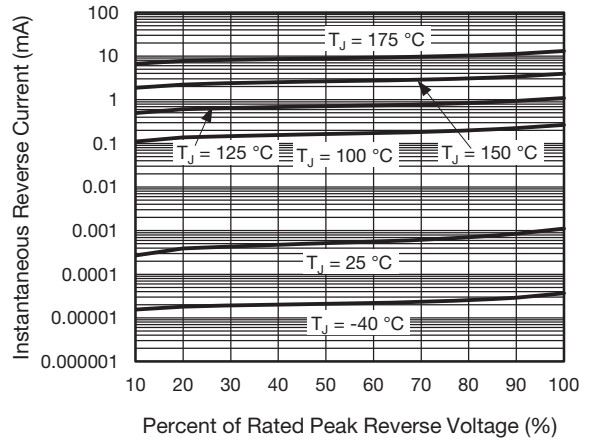


Fig. 4 - Typical Reverse Leakage Characteristics

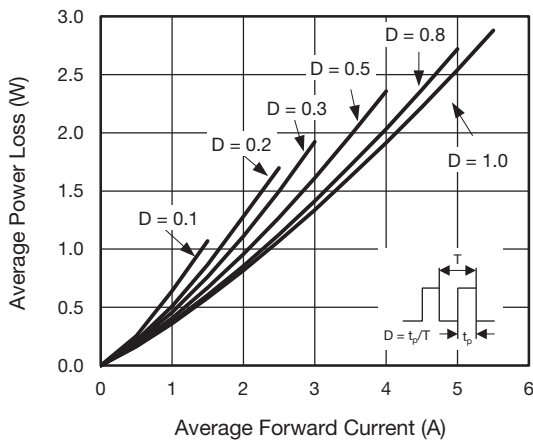


Fig. 2 - Average Power Loss Characteristics

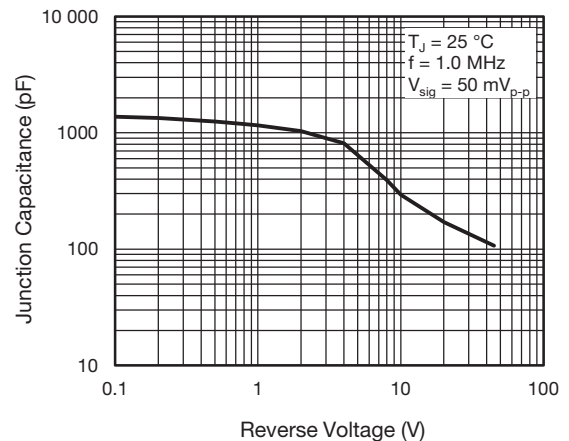


Fig. 5 - Typical Junction Capacitance

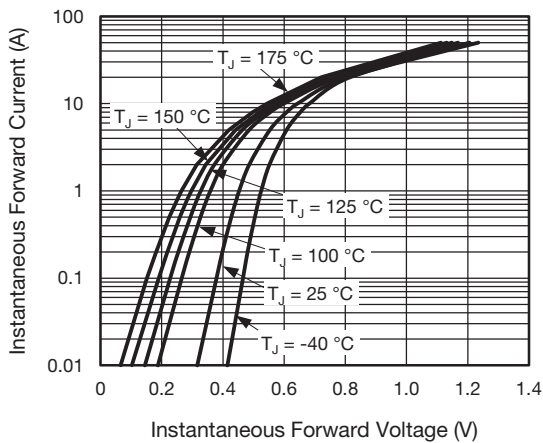


Fig. 3 - Typical Instantaneous Forward Characteristics

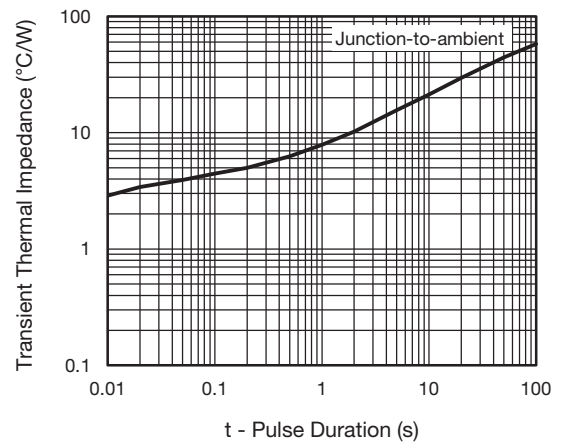


Fig. 6 - Typical Transient Thermal Impedance

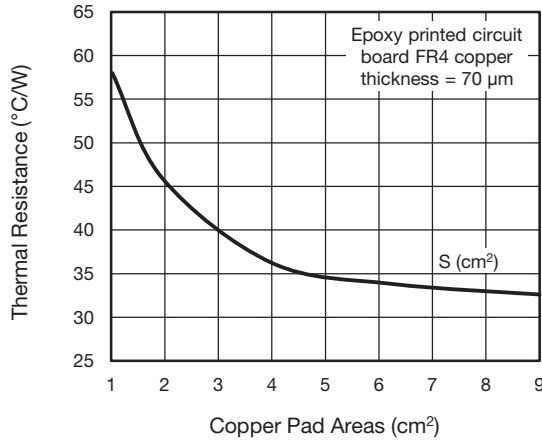
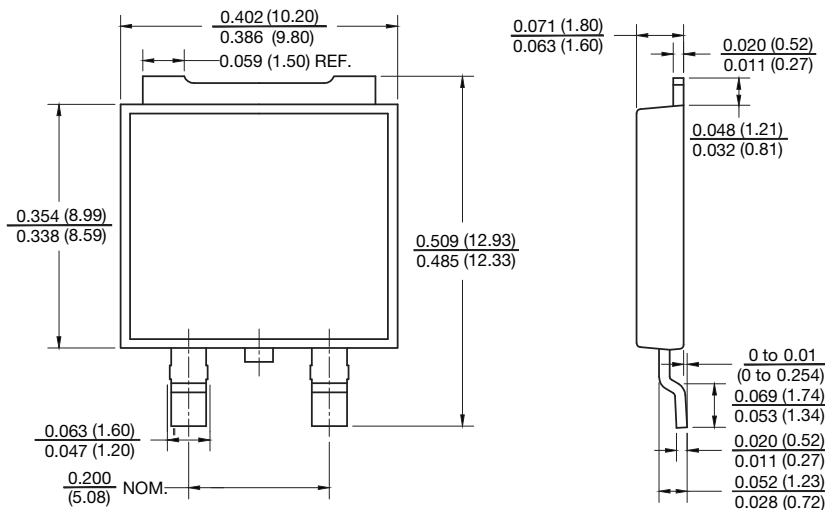


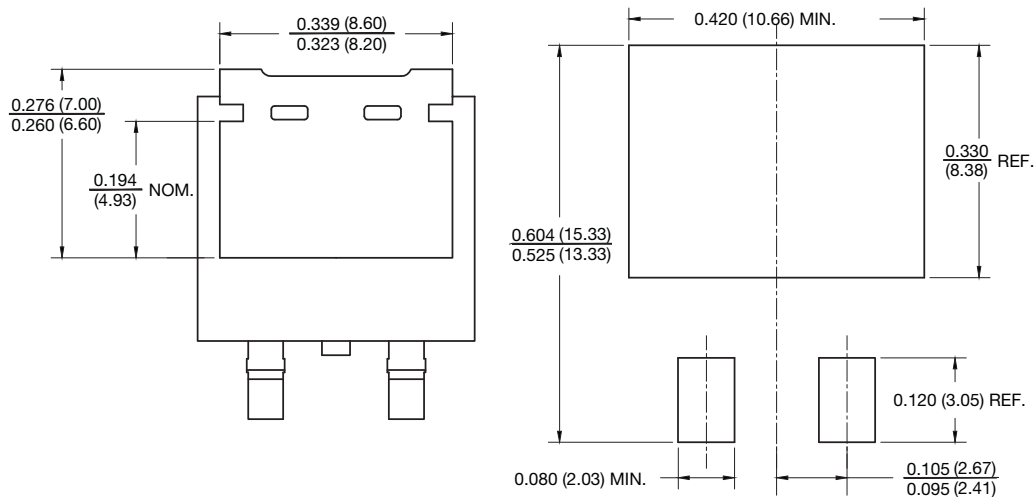
Fig. 7 - Thermal Resistance Junction-to-Ambient vs. Copper Pad Areas

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

**SMPD (TO-263AC)**



**Mounting Pad Layout**





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