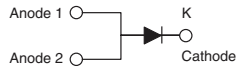
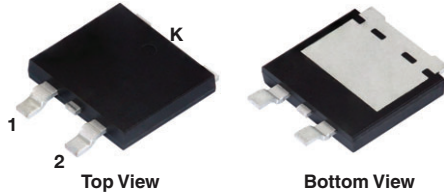


# Low-Voltage TMBS<sup>®</sup> (Trench MOS Barrier Schottky) Rectifier

 Ultra Low  $V_F = 0.31\text{ V}$  at  $I_F = 5\text{ A}$ 

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



### ADDITIONAL RESOURCES


[3D Models](#)

#### PRIMARY CHARACTERISTICS

|  |                 |
|--|-----------------|
| $I_{F(AV)}$  | 20 A            |
| $V_{RRM}$  | 45 V            |
| $I_{FSM}$  | 160 A           |
| $V_F$ at $I_F = 20\text{ A}$ ( $T_A = 125\text{ °C}$ ) | 0.50 V          |
| $T_J$ max.   | 150 °C          |
| Package  | SMPD (TO-263AC) |
| Circuit configuration                                  | Single          |

### 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)


**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.

### MECHANICAL DATA

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

Molding compound meets UL 94 V-0 flammability rating  
 Base P/N-M3 - halogen-free, RoHS-compliant, and commercial grade  
 Base P/NHM3\_X - halogen-free, RoHS-compliant, and AEC-Q101 qualified  
 (“\_X” denotes revision code e.g. A, B,.....)

**Terminals:** matte tin plated leads, solderable per J-STD-002 and JESD 22-B102  
 M3 suffix meets JESD 201 class 2 whisker test, HM3 suffix meets JESD 201 class 2 whisker test

**Polarity:** as marked

#### MAXIMUM RATINGS ( $T_A = 25\text{ °C}$ unless otherwise noted)

| PARAMETER   | SYMBOL                     | V20DL45     | UNIT |
|---|----------------------------|-------------|------|
| Maximum repetitive peak reverse voltage   | $V_{RRM}$                  | 45          | V    |
| Maximum average forward rectified current (fig. 1)                                | $I_{F(AV)}$ <sup>(1)</sup> | 20          | A    |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load | $I_{FSM}$                  | 160         | A    |
| Operating junction and storage temperature range                                  | $T_J, T_{STG}$             | -40 to +150 | °C   |

#### Note

(1) With heatsink

| <b>ELECTRICAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted) |                     |                                   |      |      |      |
|--|---------------------|-----------------------------------|------|------|------|
| PARAMETER  | TEST CONDITIONS     | SYMBOL                            | TYP. | MAX. | UNIT |
| Instantaneous forward voltage  | $I_F = 5\text{ A}$  | $T_A = 25\text{ }^\circ\text{C}$  | 0.42 | -    | V    |
|  | $I_F = 10\text{ A}$ |                                   | 0.48 | -    |      |
|  | $I_F = 20\text{ A}$ |                                   | 0.55 | 0.64 |      |
|  | $I_F = 5\text{ A}$  | $T_A = 125\text{ }^\circ\text{C}$ | 0.31 | -    |      |
|  | $I_F = 10\text{ A}$ |                                   | 0.38 | -    |      |
|  | $I_F = 20\text{ A}$ |                                   | 0.50 | 0.58 |      |
| Reverse current  | $V_R = 45\text{ V}$ | $T_A = 25\text{ }^\circ\text{C}$  | -    | 2.5  | mA   |
|  |                     | $T_A = 125\text{ }^\circ\text{C}$ | 20   | 50   |      |

**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                         | V20DL45 | UNIT               |
| Typical thermal resistance  | $R_{\theta\text{JC}}$          | 1.6     | $^\circ\text{C/W}$ |
|   | $R_{\theta\text{JA}}^{(1)(2)}$ | 45      |                    |

**Notes**

- (1) The heat generated must be less than the thermal conductivity from junction-to-ambient:  $dP_D/dT_J < 1/R_{\theta\text{JA}}$   
 (2) Free air, without heatsink

| <b>ORDERING INFORMATION</b> (Example) |                 |                        |               |                                    |
|---------------------------------------|-----------------|------------------------|---------------|------------------------------------|
| PREFERRED P/N                         | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                      |
| V20DL45-M3/I                          | 0.54            | I                      | 2000/reel     | 13" diameter plastic tape and reel |
| V20DL45HM3_A/I (1)                    | 0.54            | I                      | 2000/reel     | 13" diameter plastic tape and reel |

**Note**

- (1) AEC-Q101 qualified

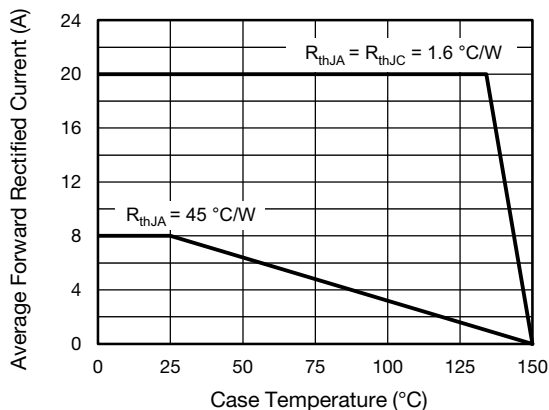
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^\circ\text{C}$  unless otherwise noted)


Fig. 1 - Forward Current Derating Curve

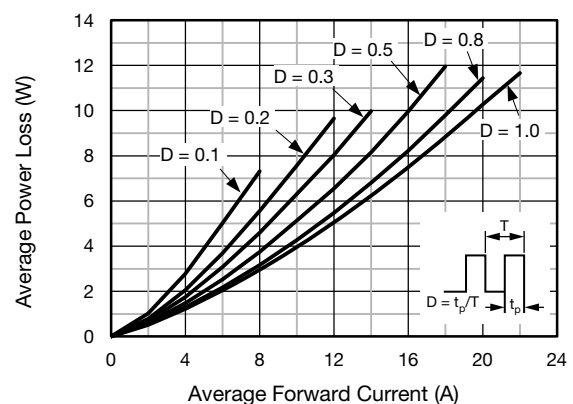


Fig. 2 - Forward Power Loss Characteristics

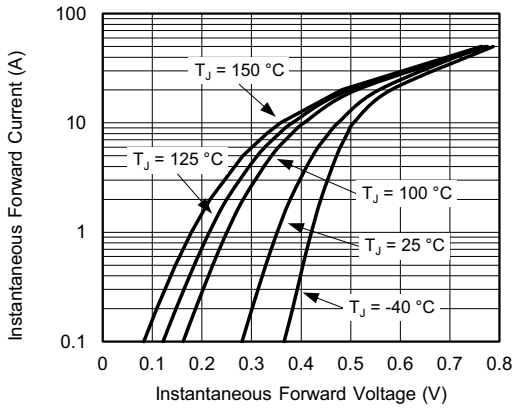


Fig. 3 - Typical Instantaneous Forward Characteristics

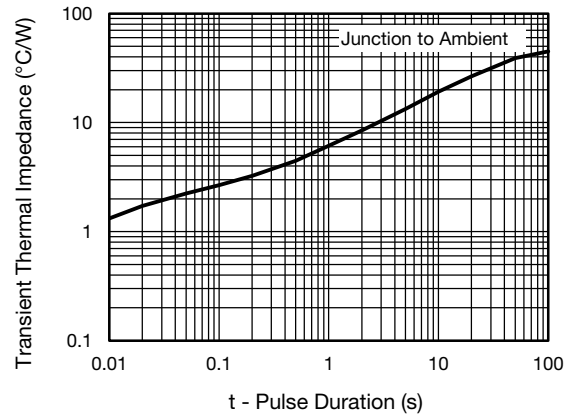


Fig. 6 - Typical Transient Thermal Impedance

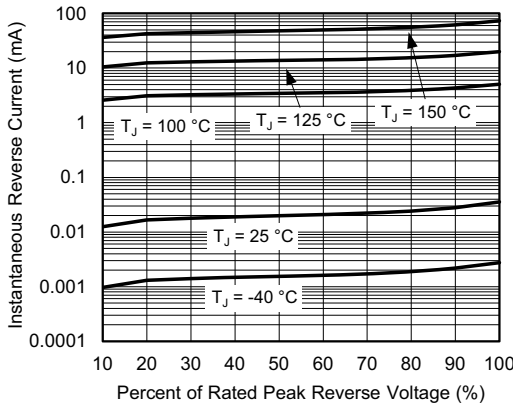


Fig. 4 - Typical Reverse Characteristics

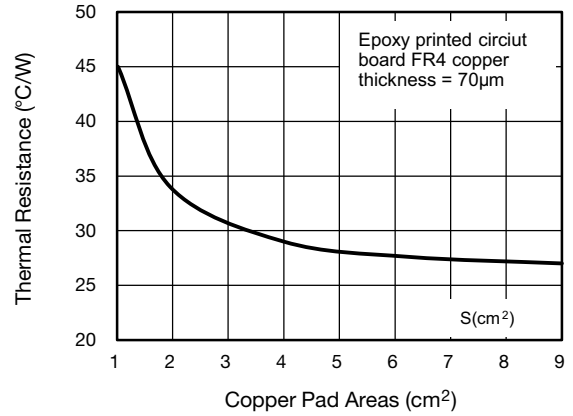


Fig. 7 - Thermal Resistance Junction-to-Ambient vs. Copper Pad Areas

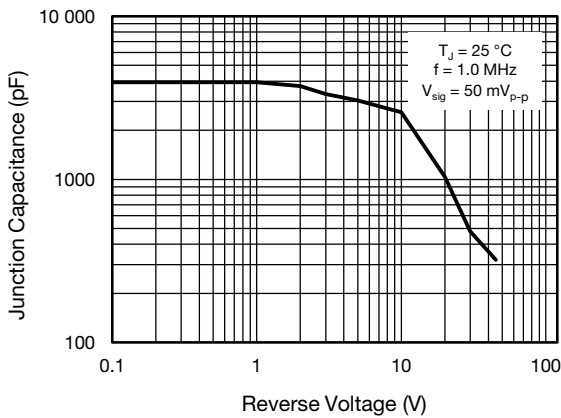
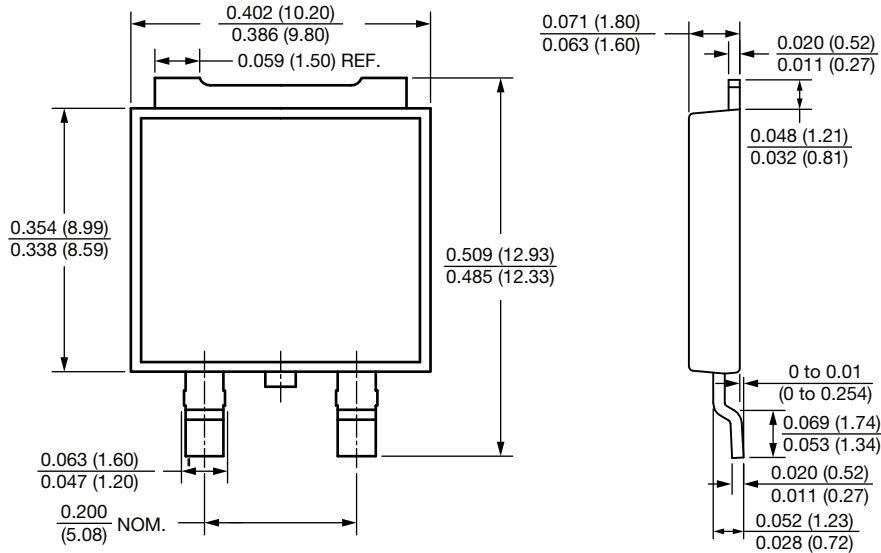


Fig. 5 - Typical Junction Capacitance

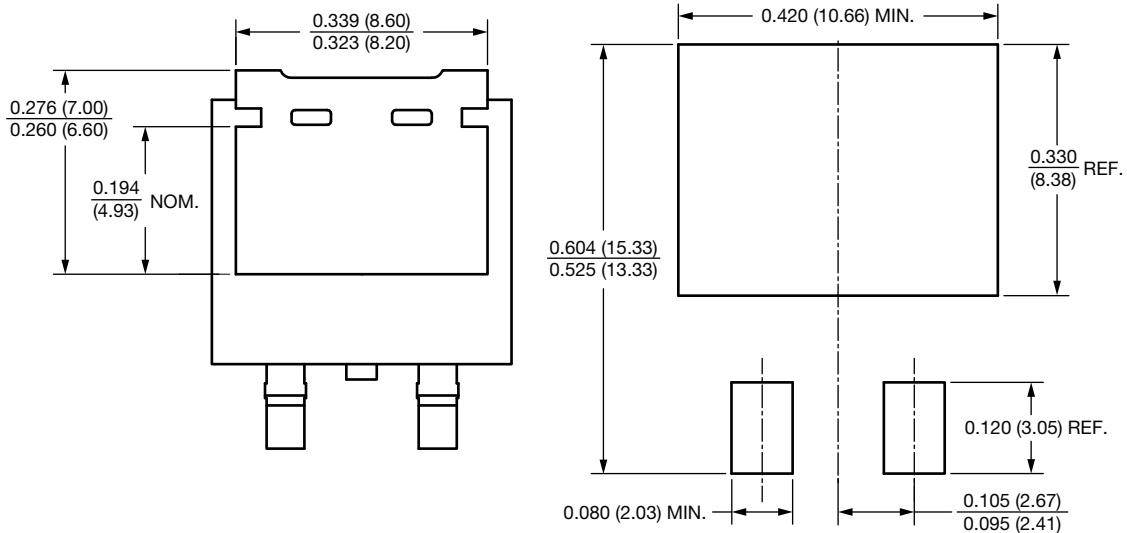


PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

SMPD (TO-263AC)



Mounting Pad Layout





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