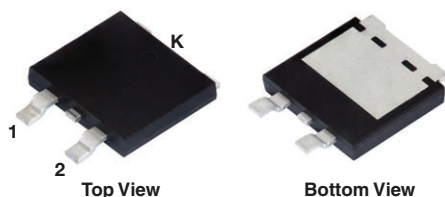


# Dual High-Voltage TMBS® (Trench MOS Barrier Schottky) Rectifier

Ultra Low  $V_F = 0.40\text{ V}$  at  $I_F = 5\text{ A}$

## eSMP® Series SMPD (TO-263AC)



## 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**

## LINKS TO ADDITIONAL RESOURCES



## 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.

## PRIMARY CHARACTERISTICS

|                                                        |                 |
|--------------------------------------------------------|-----------------|
| $I_{F(AV)}$                                            | 2 x 20 A        |
| $V_{RRM}$                                              | 100 V           |
| $I_{FSM}$                                              | 250 A           |
| $V_F$ at $I_F = 20\text{ A}$ ( $T_A = 125\text{ °C}$ ) | 0.63 V          |
| $T_J$ max.                                             | 150 °C          |
| Package                                                | SMPD (TO-263AC) |
| Circuit configuration                                  | Common cathode  |

## 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 meets JESD 201 class 2 whisker test

**Polarity:** as marked

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

| PARAMETER                                                                         | SYMBOL         | V40D100C    | UNIT       |
|-----------------------------------------------------------------------------------|----------------|-------------|------------|
| Maximum repetitive peak reverse voltage                                           | $V_{RRM}$      | 100         | V          |
| Maximum average forward rectified current<br>(fig. 1)                             | $I_{F(AV)}$    | 40          | A          |
| per device                                                                        |                | 20          |            |
| per diode                                                                         |                |             |            |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load | $I_{FSM}$      | 250         | A          |
| Voltage rate of change (rated $V_R$ )                                             | $dV/dt$        | 10 000      | V/ $\mu$ s |
| Operating junction and storage temperature range                                  | $T_J, T_{STG}$ | -40 to +150 | °C         |

| 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> = 5 A   | T <sub>A</sub> = 25 °C  | V <sub>F</sub> <sup>(1)</sup> | 0.48 | -    | V    |
|                                                                            | I <sub>F</sub> = 10 A  |                         |                               | 0.56 | -    |      |
|                                                                            | I <sub>F</sub> = 20 A  |                         |                               | 0.71 | 0.75 |      |
|                                                                            | I <sub>F</sub> = 5 A   | T <sub>A</sub> = 125 °C |                               | 0.40 | -    |      |
|                                                                            | I <sub>F</sub> = 10 A  |                         |                               | 0.51 | -    |      |
|                                                                            | I <sub>F</sub> = 20 A  |                         |                               | 0.63 | 0.69 |      |
| Reverse current at rated V <sub>R</sub> per diode                          | V <sub>R</sub> = 70 V  | T <sub>A</sub> = 25 °C  | I <sub>R</sub> <sup>(2)</sup> | 11   | -    | μA   |
|                                                                            |                        | T <sub>A</sub> = 125 °C |                               | 11   | -    | mA   |
|                                                                            | V <sub>R</sub> = 100 V | T <sub>A</sub> = 25 °C  |                               | -    | 1000 | μA   |
|                                                                            |                        | T <sub>A</sub> = 125 °C |                               | 24   | 80   | mA   |

**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                   | UNIT                 |
| Typical thermal resistance                                                                  | per diode  | $R_{\theta JC}$          | $^{\circ}\text{C/W}$ |
|                                                                                             | per device |                          |                      |
|                                                                                             | per device | $R_{\theta JA}^{(1)(2)}$ |                      |
|                                                                                             |            |                          | V40D100C             |
|                                                                                             |            |                          | 1.9                  |
|                                                                                             |            |                          | 1.0                  |
|                                                                                             |            |                          | 45                   |

**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) Free air, without heatsink

| <b>ORDERING INFORMATION</b> (Example) |                              |                 |              |               |                                    |
|---------------------------------------|------------------------------|-----------------|--------------|---------------|------------------------------------|
| PACKAGE                               | PREFERRED P/N                | UNIT WEIGHT (g) | PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                      |
| SMPD (TO-263AC)                       | V40D100C-M3/I                | 0.55            | I            | 2000/reel     | 13" diameter plastic tape and reel |
| SMPD (TO-263AC)                       | V40D100CHM3/I <sup>(1)</sup> | 0.55            | I            | 2000/reel     | 13" diameter plastic tape and reel |

**Note**

(1) AEC-Q101 qualified

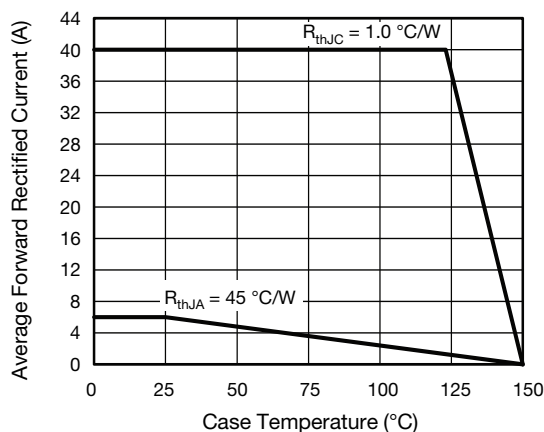
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)


Fig. 1 - Forward Current Derating Curve

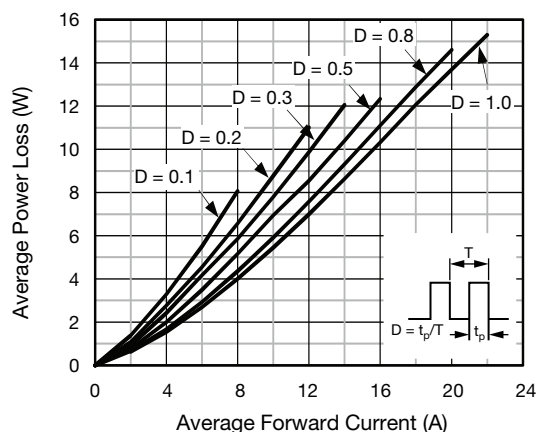


Fig. 2 - Forward Power Loss Characteristics Per Diode

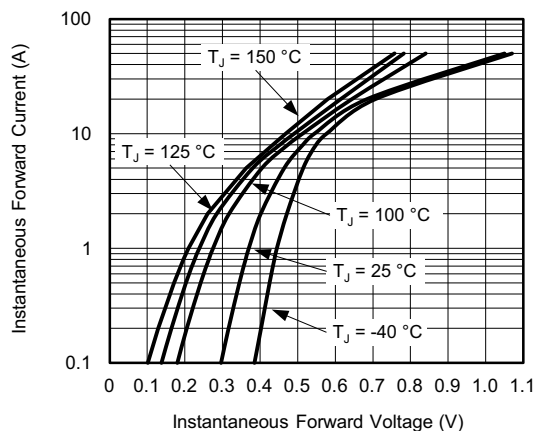


Fig. 3 - Typical Instantaneous Forward Characteristics Per Diode

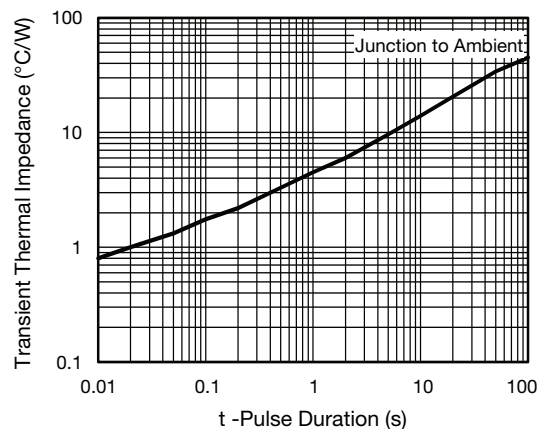


Fig. 6 - Typical Transient Thermal Impedance Per Device

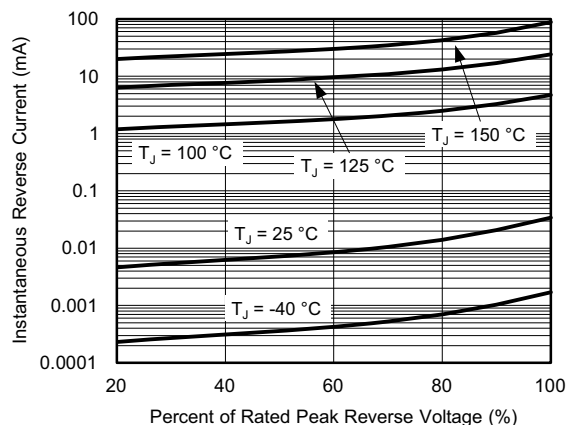


Fig. 4 - Typical Reverse Characteristics Per Diode

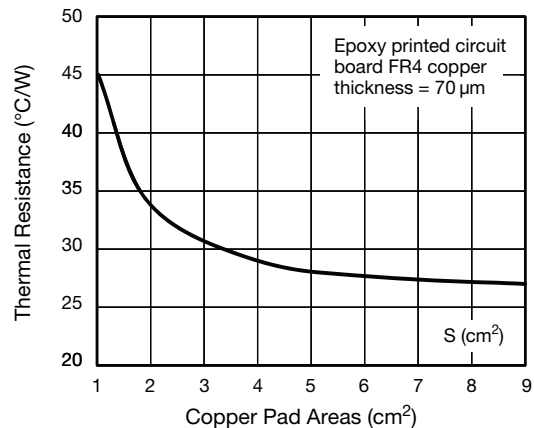


Fig. 7 - Thermal Resistance Junction-to-Ambient vs. Copper Pad Areas

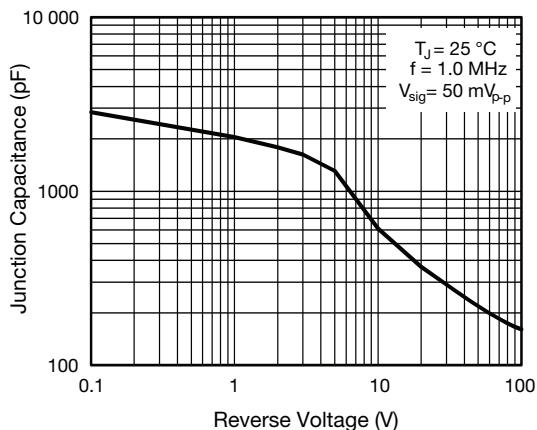
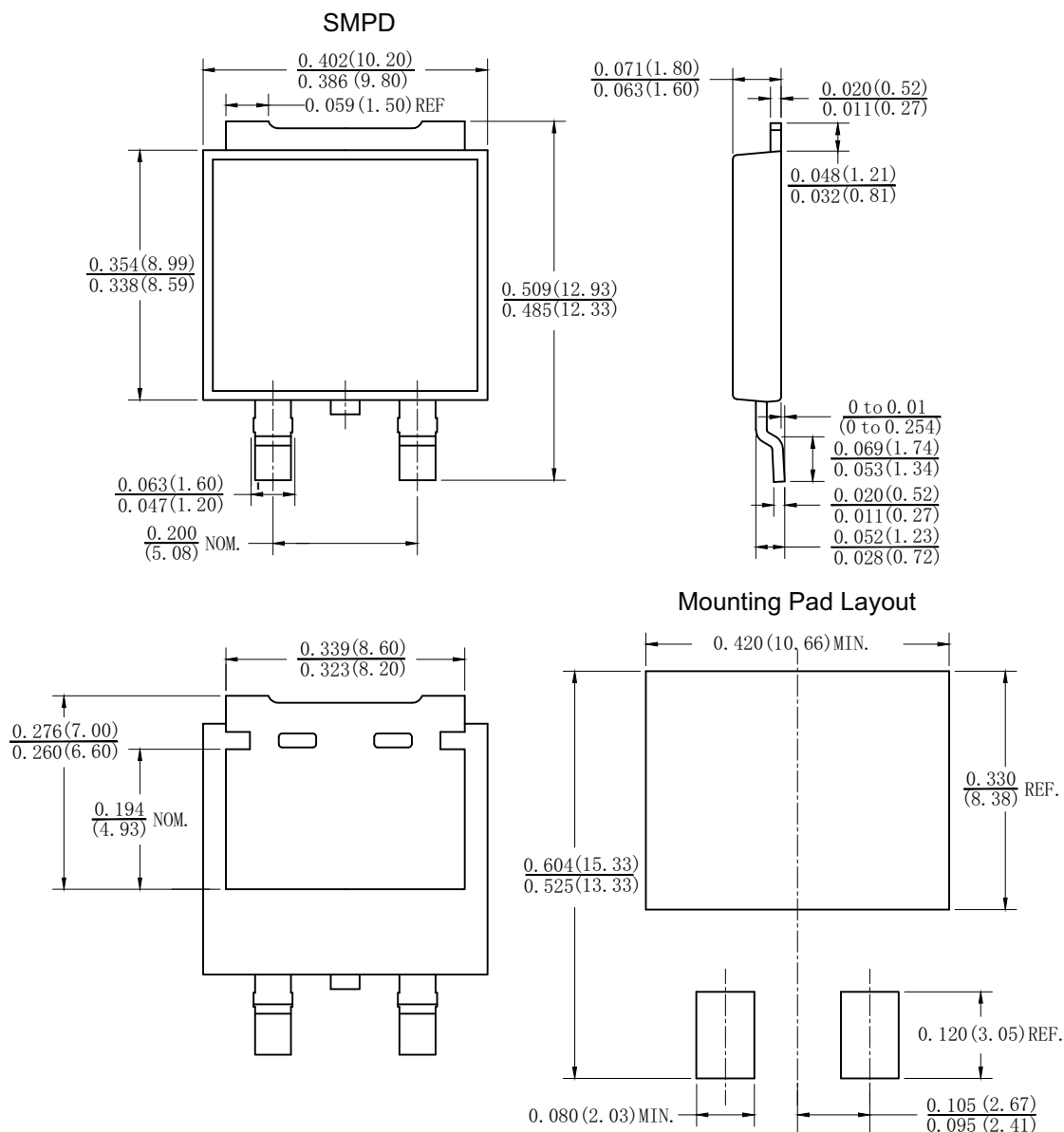


Fig. 5 - Typical Junction Capacitance Per Diode

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




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