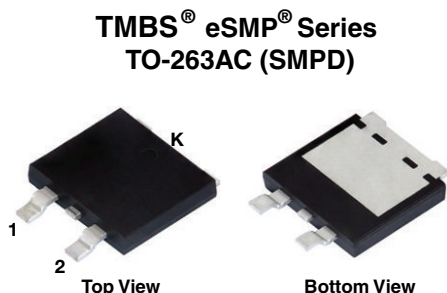
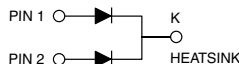


# Dual High-Voltage Trench MOS Barrier Schottky Rectifier

Ultra Low  $V_F = 0.45\text{ V}$  at  $I_F = 5\text{ A}$



**V40D120C**



## 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
- AEC-Q101 qualified
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- 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.

## PRIMARY CHARACTERISTICS

|                                                        |                     |
|--------------------------------------------------------|---------------------|
| $I_{F(AV)}$                                            | 2 x 20 A            |
| $V_{RRM}$                                              | 120 V               |
| $I_{FSM}$                                              | 250 A               |
| $V_F$ at $I_F = 20\text{ A}$ ( $T_A = 125\text{ °C}$ ) | 0.64 V              |
| $T_J$ max.                                             | 150 °C              |
| Package                                                | TO-263AC (SMPD)     |
| Diode variations                                       | Dual common cathode |

## MECHANICAL DATA

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

Molding compound meets UL 94 V-0 flammability rating  
Base P/N-M3 - halogen-free, RoHS-compliant, and commercial grade

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 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         | V40D120C      | UNIT       |
|-----------------------------------------------------------------------------------|----------------|---------------|------------|
| Maximum repetitive peak reverse voltage                                           | $V_{RRM}$      | 120           | V          |
| Maximum average forward rectified current<br>(fig. 1)                             | $I_{F(AV)}$    | 40            | A          |
|                                                                                   |                | 20            |            |
| 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** ( $T_A = 25\text{ }^{\circ}\text{C}$  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> | 0.51 | -    | V    |
|                                                   | I <sub>F</sub> = 10 A  |                         |                               | 0.63 | -    |      |
|                                                   | I <sub>F</sub> = 20 A  |                         |                               | 0.78 | 0.89 |      |
|                                                   | I <sub>F</sub> = 5 A   | T <sub>A</sub> = 125 °C |                               | 0.45 | -    |      |
|                                                   | I <sub>F</sub> = 10 A  |                         |                               | 0.55 | -    |      |
|                                                   | I <sub>F</sub> = 20 A  |                         |                               | 0.64 | 0.71 |      |
| Reverse current at rated V <sub>R</sub> per diode | V <sub>R</sub> = 90 V  | T <sub>A</sub> = 25 °C  | I <sub>R</sub> <sup>(2)</sup> | 11   | -    | μA   |
|                                                   |                        | T <sub>A</sub> = 125 °C |                               | 9.4  | -    | mA   |
|                                                   | V <sub>R</sub> = 120 V | T <sub>A</sub> = 25 °C  |                               | -    | 500  | μA   |
|                                                   |                        | T <sub>A</sub> = 125 °C |                               | 23   | 70   | mA   |

**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                   | V40D120C | UNIT                 |
|----------------------------|------------|--------------------------|----------|----------------------|
| Typical thermal resistance | per diode  | $R_{\theta JC}$          | 1.9      | $^{\circ}\text{C/W}$ |
|                            | per device |                          | 1.0      |                      |
|                            | per device | $R_{\theta JA}^{(1)(2)}$ | 45       |                      |

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

(2) Free air, without heatsink

**ORDERING INFORMATION** (Example)

| PACKAGE | PREFERRED P/N                | UNIT WEIGHT (g) | PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                      |
|---------|------------------------------|-----------------|--------------|---------------|------------------------------------|
| SMPD    | V40D120C-M3/I                | 0.55            | I            | 2000/reel     | 13" diameter plastic tape and reel |
| SMPD    | V40D120CHM3/I <sup>(1)</sup> | 0.55            | I            | 2000/reel     | 13" diameter plastic tape and reel |

**Note**

(1) AEC-Q101 qualified

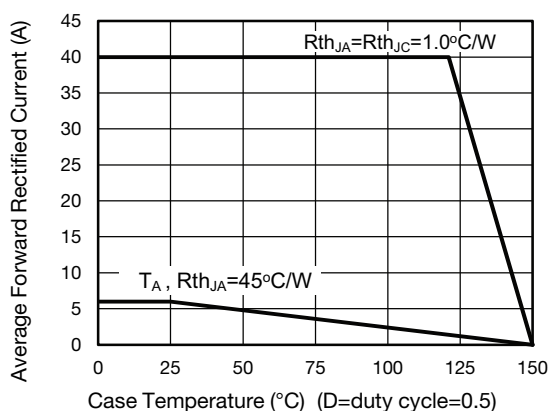
**RATINGS AND CHARACTERISTICS CURVES**( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)

Fig. 1 - Forward Current Derating Curve

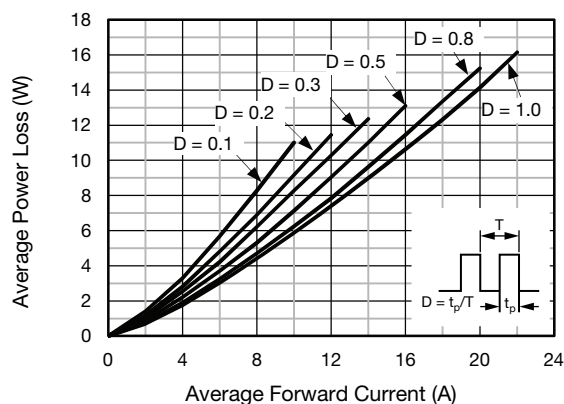


Fig. 2 - Forward Power Loss Characteristics Per Diode

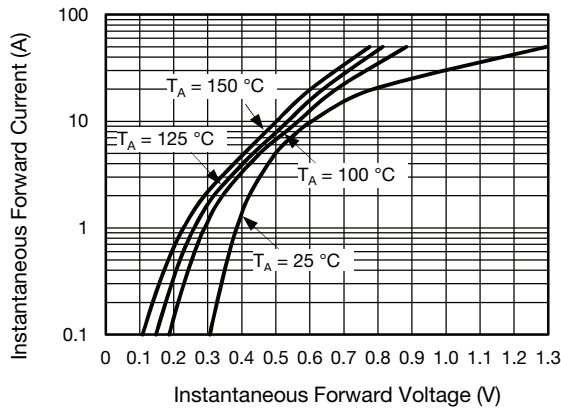


Fig. 3 - Typical Instantaneous Forward Characteristics Per Diode

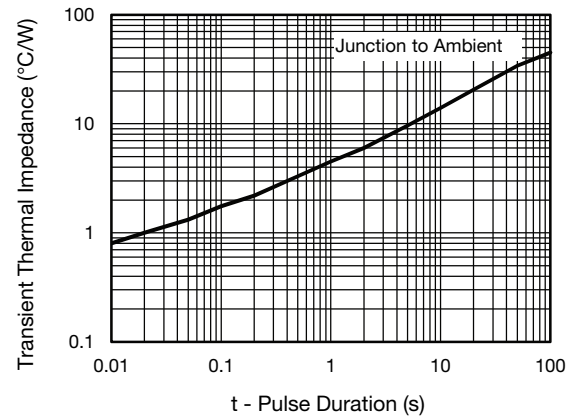


Fig. 6 - Typical Transient Thermal Impedance Per Device

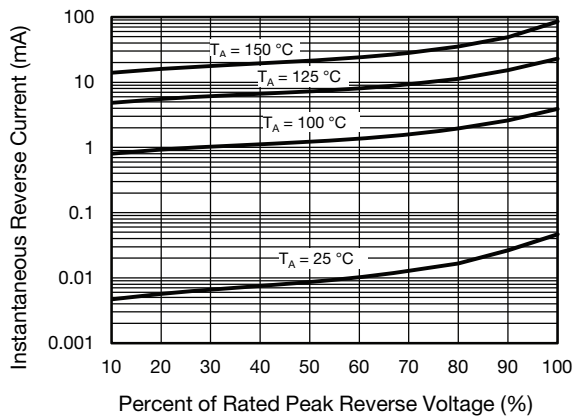


Fig. 4 - Typical Reverse Characteristics Per Diode

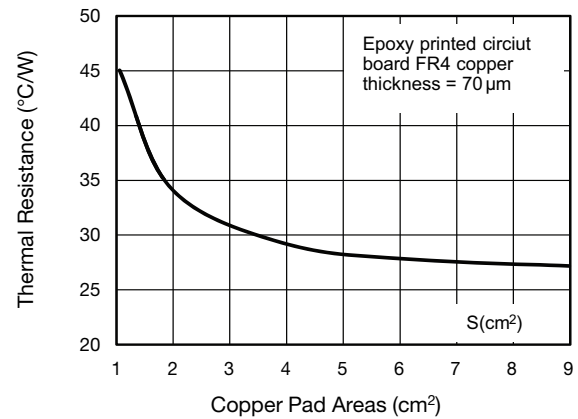


Fig. 7 - Thermal Resistance Junction-to-Ambient vs. Copper Pad Areas

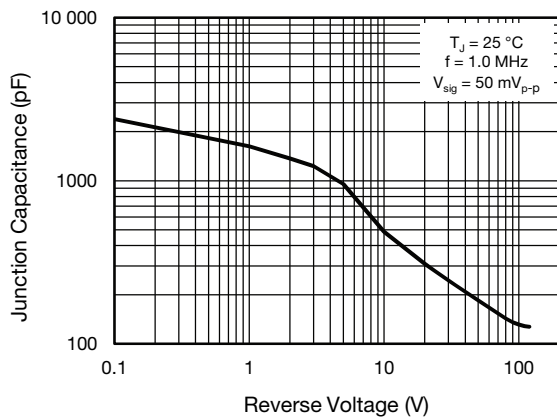
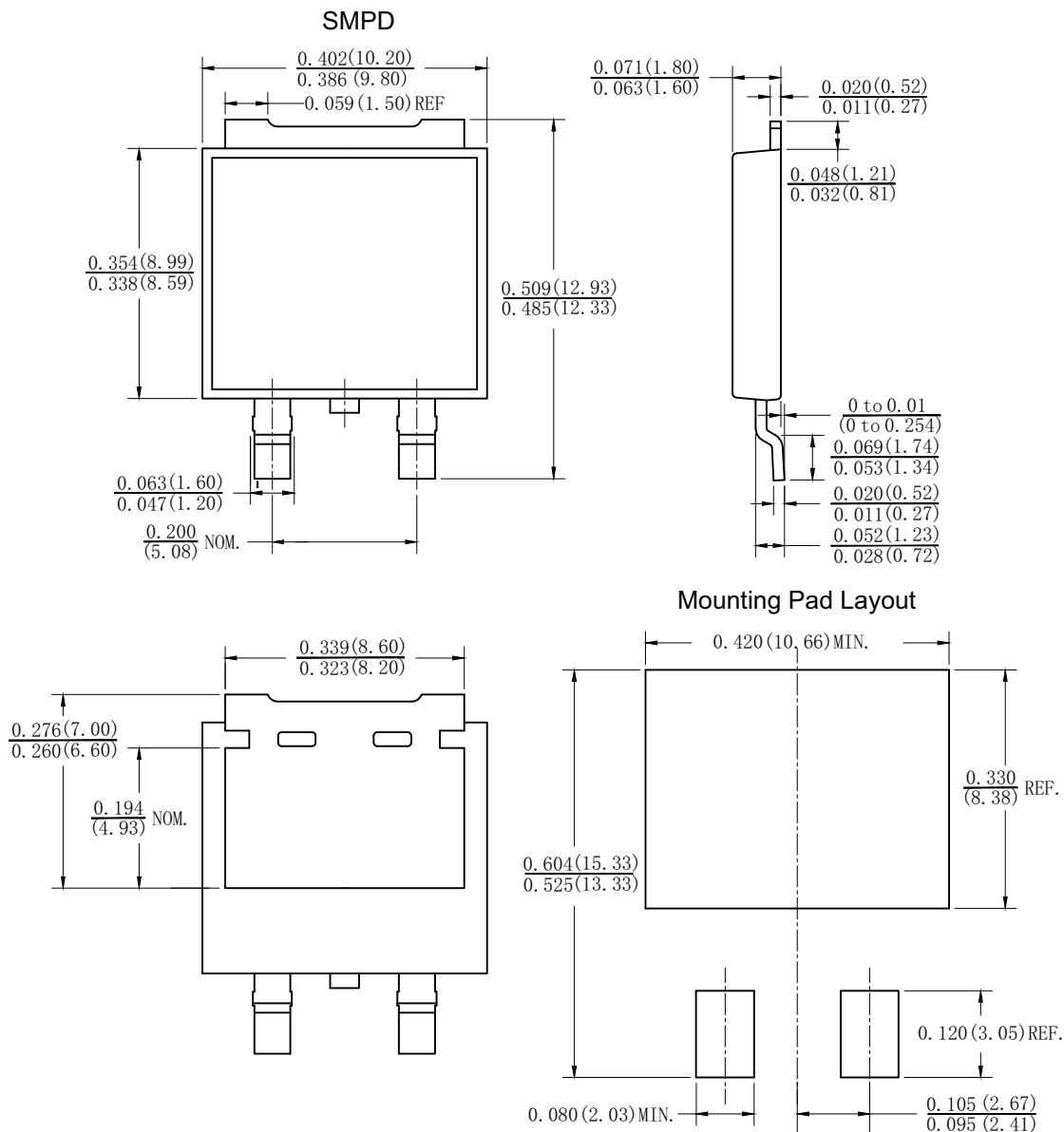


Fig. 5 - Typical Junction Capacitance Per Diode



## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)





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