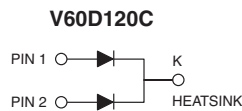


# Dual High-Voltage Trench MOS Barrier Schottky Rectifier

 Ultra Low  $V_F = 0.39\text{ V}$  at  $I_F = 5\text{ A}$ 


RoHS  
COMPLIANT  
HALOGEN  
FREE

## 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 available:
  - Automotive ordering code: base P/NHM3
- 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)

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

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

| PRIMARY CHARACTERISTICS                                |                     |
|--|---------------------|
| $I_{F(AV)}$  | 2 x 30 A            |
| $V_{RRM}$  | 120 V               |
| $I_{FSM}$  | 320 A               |
| $V_F$ at $I_F = 30\text{ A}$ ( $T_A = 125\text{ °C}$ ) | 0.70 V              |
| $T_J$ max.   | 150 °C              |
| Package  | TO-263AC (SMPD)     |
| Diode variations                                       | Dual common cathode |

| MAXIMUM RATINGS ( $T_A = 25\text{ °C}$ unless otherwise noted)                    |                |             |            |
|---|----------------|-------------|------------|
| PARAMETER   | SYMBOL         | V60D120C    | UNIT       |
| Maximum repetitive peak reverse voltage   | $V_{RRM}$      | 120         | V          |
| Maximum average forward rectified current (fig. 1)                                | $I_{F(AV)}$    | per device  | 60         |
|   |                | per diode   | 30         |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load | $I_{FSM}$      | 320         | 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> = 15 A  |                         |                               | 0.68 | -    |      |
|  | I <sub>F</sub> = 30 A  |                         |                               | 0.91 | 0.96 |      |
|  | I <sub>F</sub> = 5 A   | T <sub>A</sub> = 125 °C |                               | 0.39 | -    |      |
|  | I <sub>F</sub> = 15 A  |                         |                               | 0.59 | -    |      |
|  | I <sub>F</sub> = 30 A  |                         |                               | 0.70 | 0.76 |      |
| 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> | 14   | -    | μA   |
|  |                        | T <sub>A</sub> = 125 °C |                               | 11   | -    | mA   |
|  | V <sub>R</sub> = 120 V | T <sub>A</sub> = 25 °C  |                               | -    | 800  | μA   |
|  |                        | T <sub>A</sub> = 125 °C |                               | 27   | 75   | mA   |

**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     |                                    | V60D120C | UNIT |
| Typical thermal resistance  | per diode  | R <sub>θJC</sub>                   | 1.8      | °C/W |
|   | per device |                                    | 0.95     |      |
|   | per device | R <sub>θJA</sub> <sup>(1)(2)</sup> | 45       |      |

**Notes**

- (1) 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>
- (2) Free air, without heatsink

| ORDERING INFORMATION (Example) |                              |                 |              |               |                                    |
|--------------------------------|------------------------------|-----------------|--------------|---------------|------------------------------------|
| PACKAGE                        | PREFERRED P/N                | UNIT WEIGHT (g) | PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                      |
| TO-263AC (SMPD)                | V60D120C-M3/I                | 0.55            | I            | 2000/reel     | 13" diameter plastic tape and reel |
| TO-263AC (SMPD)                | V60D120CHM3/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<sub>A</sub> = 25 °C unless otherwise noted)**

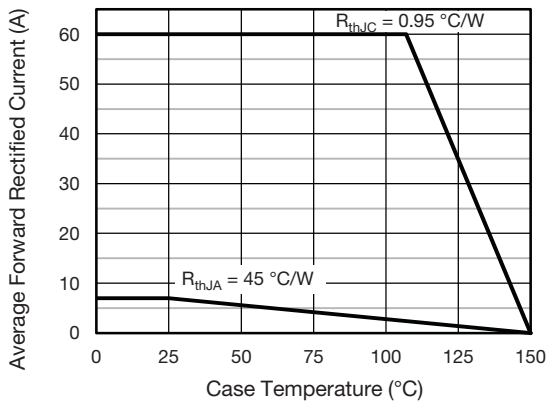


Fig. 1 - Forward Current Derating Curve

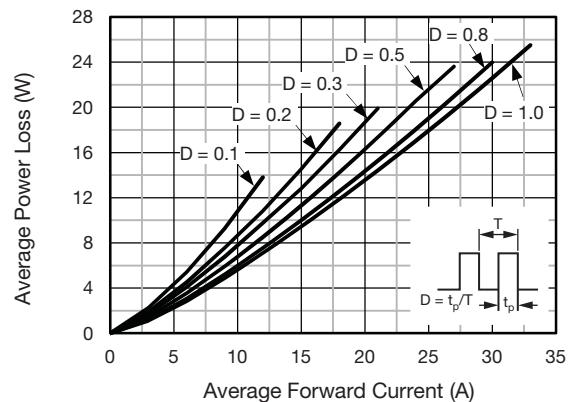


Fig. 2 - Forward Power Loss Characteristics Per Diode

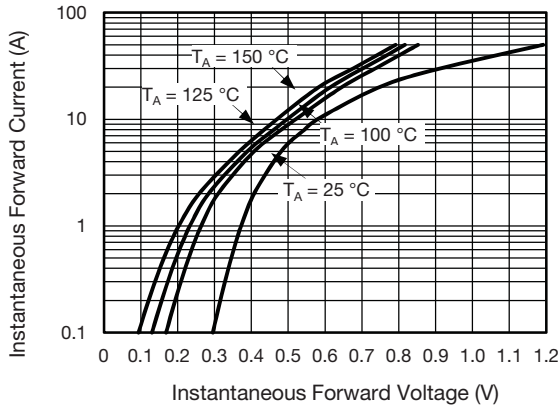


Fig. 3 - Typical Instantaneous Forward Characteristics Per Diode

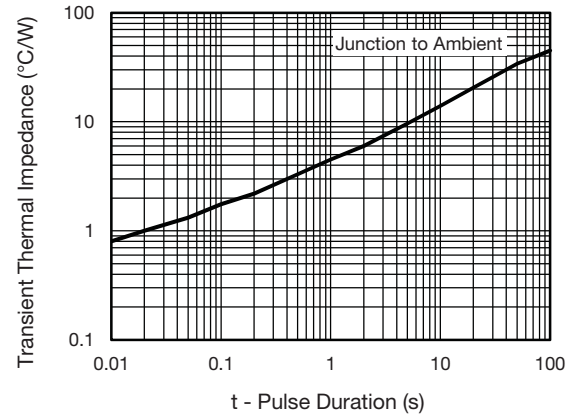


Fig. 6 - Typical Transient Thermal Impedance Per Device

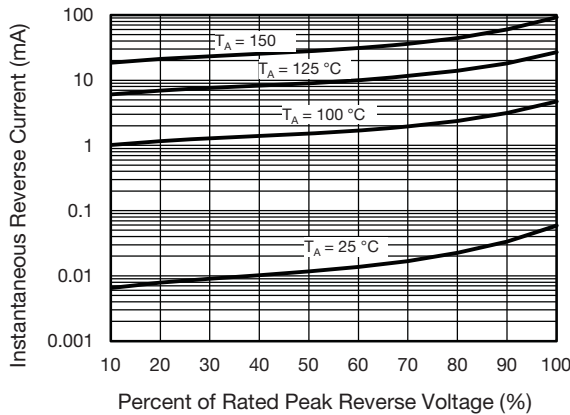


Fig. 4 - Typical Reverse Characteristics Per Diode

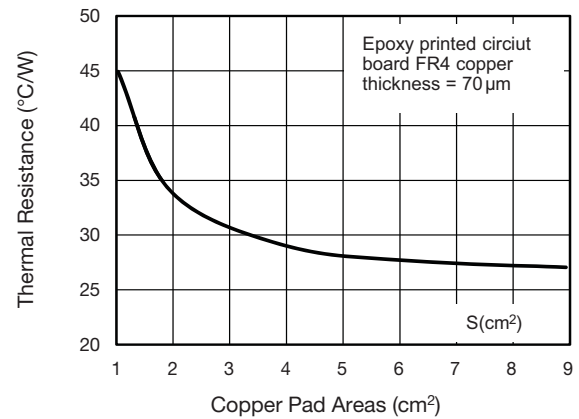


Fig. 7 - Thermal Resistance Junction-to-Ambient vs. Copper Pad Areas

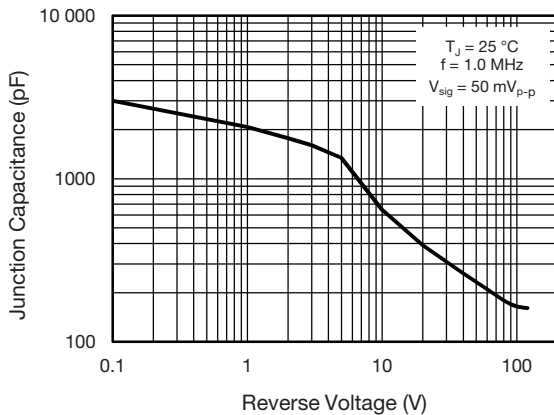
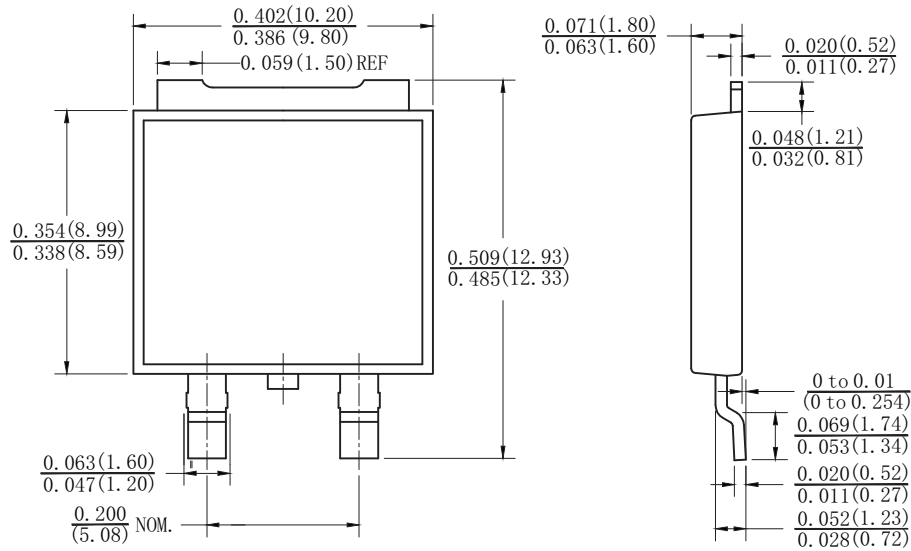


Fig. 5 - Typical Junction Capacitance Per Diode

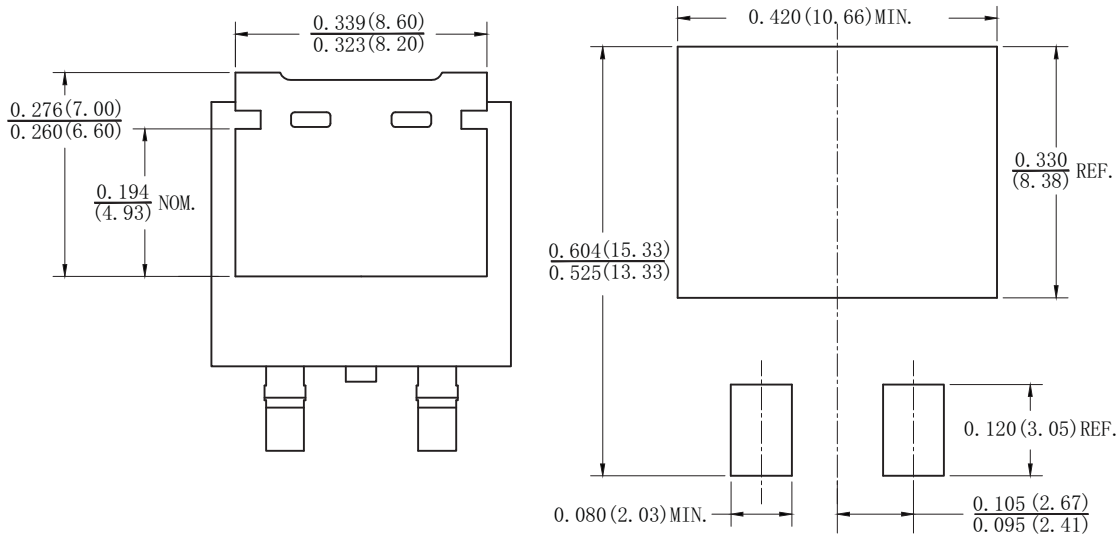


### PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

#### TO-263AC (SMPD)



#### Mounting Pad Layout





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