

Dual Low-Voltage TMBS[®] (Trench MOS Barrier Schottky) Rectifier

 Ultra Low $V_F = 0.31\text{ V}$ at $I_F = 5.0\text{ A}$

eSMP[®] Series SMPD (TO-263AC)



DESIGN SUPPORT TOOLS AVAILABLE



| PRIMARY CHARACTERISTICS | |
|--|-----------------|
| $I_{F(AV)}$ | 2 x 20 A |
| V_{RRM} | 60 V |
| I_{FSM} | 250 A |
| V_F at $I_F = 20\text{ A}$ ($T_A = 125\text{ °C}$) | 0.47 V |
| T_J max. | 150 °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


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 | V40D60C | UNIT |
| Device marking code | | V40D60C | |
| Maximum repetitive peak reverse voltage | V_{RRM} | 60 | V |
| Maximum average forward rectified current (fig. 1) | $I_{F(AV)}$ ⁽¹⁾ | per device | 40 |
| | | per diode | 20 |
| Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load | I_{FSM} | 250 | A |
| Operating junction temperature range | T_J ⁽²⁾ | -40 to +150 | °C |
| Storage temperature range | T_{STG} | -55 to +150 | |

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 ($T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted) | | | | | | |
|--|---------------------|-----------------------------------|-------------|------|------|----|
| PARAMETER | TEST CONDITIONS | SYMBOL | TYP. | MAX. | UNIT | |
| Instantaneous forward voltage per diode | $I_F = 5\text{ A}$ | $T_A = 25\text{ }^\circ\text{C}$ | $V_F^{(1)}$ | 0.43 | - | V |
| | $I_F = 10\text{ A}$ | | | 0.47 | - | |
| | $I_F = 20\text{ A}$ | | | 0.54 | 0.62 | |
| | $I_F = 5\text{ A}$ | $T_A = 125\text{ }^\circ\text{C}$ | | 0.31 | - | |
| | $I_F = 10\text{ A}$ | | | 0.38 | - | |
| | $I_F = 20\text{ A}$ | | | 0.47 | 0.55 | |
| Reverse current per diode | $V_R = 60\text{ V}$ | $T_A = 25\text{ }^\circ\text{C}$ | $I_R^{(2)}$ | - | 4 | mA |
| | | $T_A = 125\text{ }^\circ\text{C}$ | | 17 | 50 | |
| Typical junction capacitance | 4.0 V, 1 MHz | C_J | 3020 | - | pF | |

Notes

- (1) Pulse test: 300 μs 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 | V40D60C | UNIT |
| Typical thermal resistance per device | $R_{\theta JC}^{(1)}$ | 0.8 | $^\circ\text{C/W}$ |
| | $R_{\theta JA}^{(2)(3)}$ | 45 | |

Notes

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

| ORDERING INFORMATION (Example) | | | | |
|---------------------------------------|-----------------|------------------------|---------------|------------------------------------|
| PREFERRED P/N | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |
| V40D60C-M3/I | 0.55 | I | 2000/reel | 13" diameter plastic tape and reel |
| V40D60CHM3/I ⁽¹⁾ | 0.55 | I | 2000/reel | 13" diameter plastic tape and reel |

Note

- (1) AEC-Q101 qualified

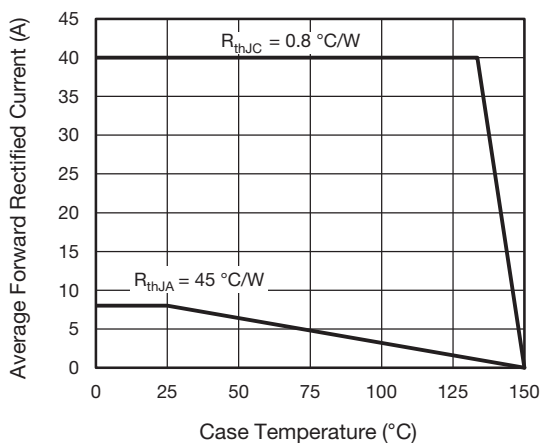
RATINGS AND CHARACTERISTICS CURVES ($T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve

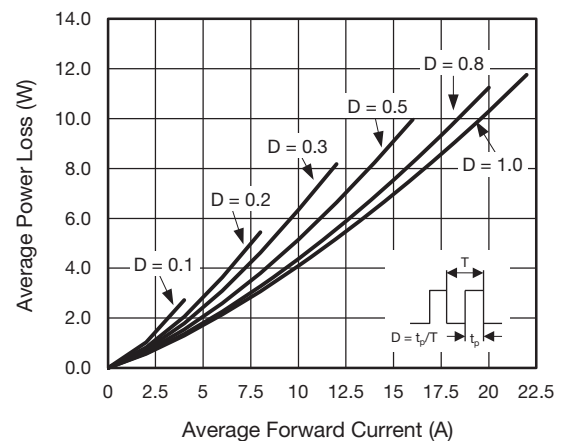


Fig. 2 - Average Power Loss Characteristics

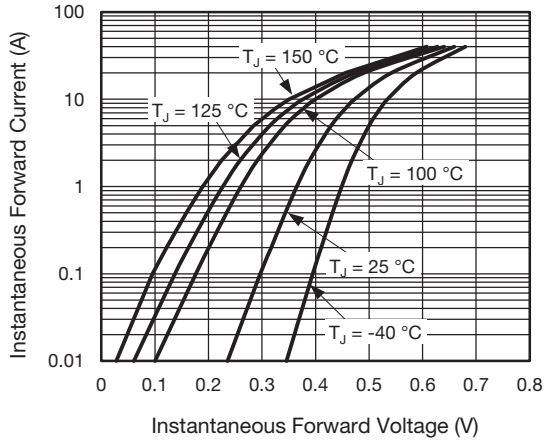


Fig. 3 - Typical Instantaneous Forward Characteristics

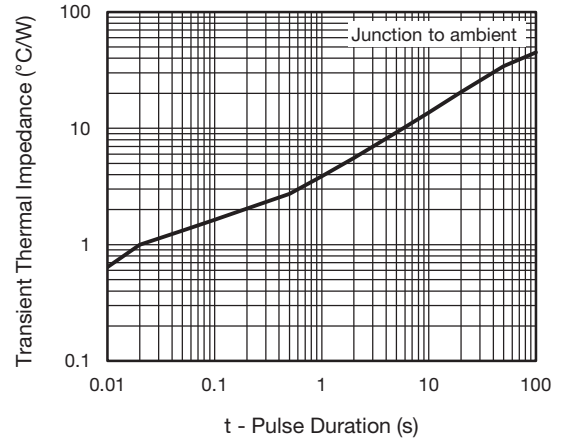


Fig. 6 - Typical Transient Thermal Impedance

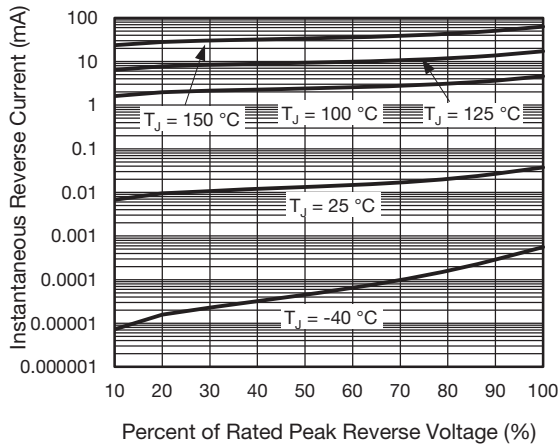


Fig. 4 - Typical Reverse Leakage Characteristics

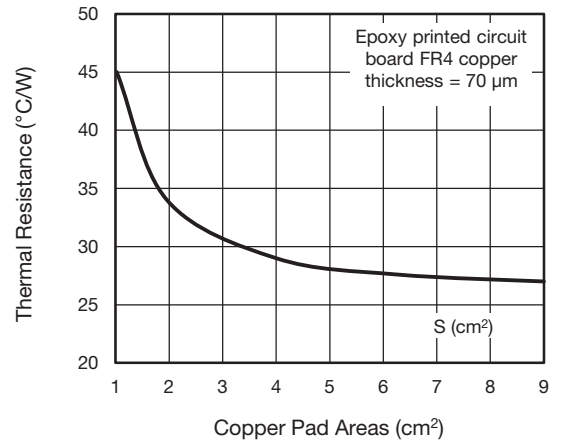


Fig. 7 - Thermal Resistance Junction-to-Ambient vs. Copper Pad Areas

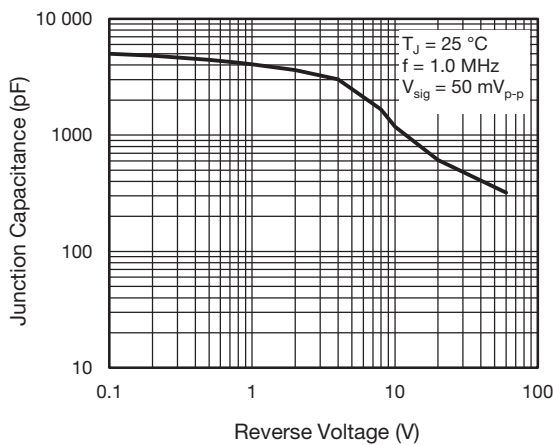
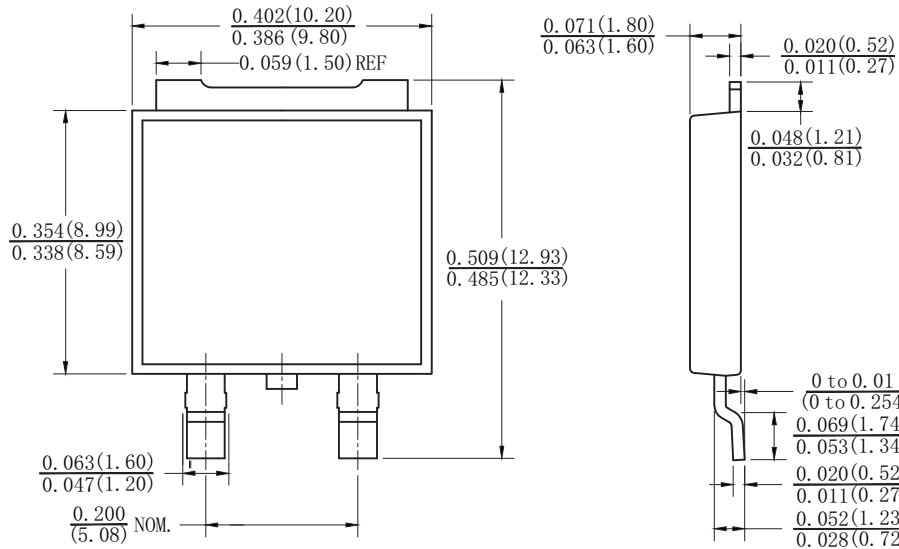


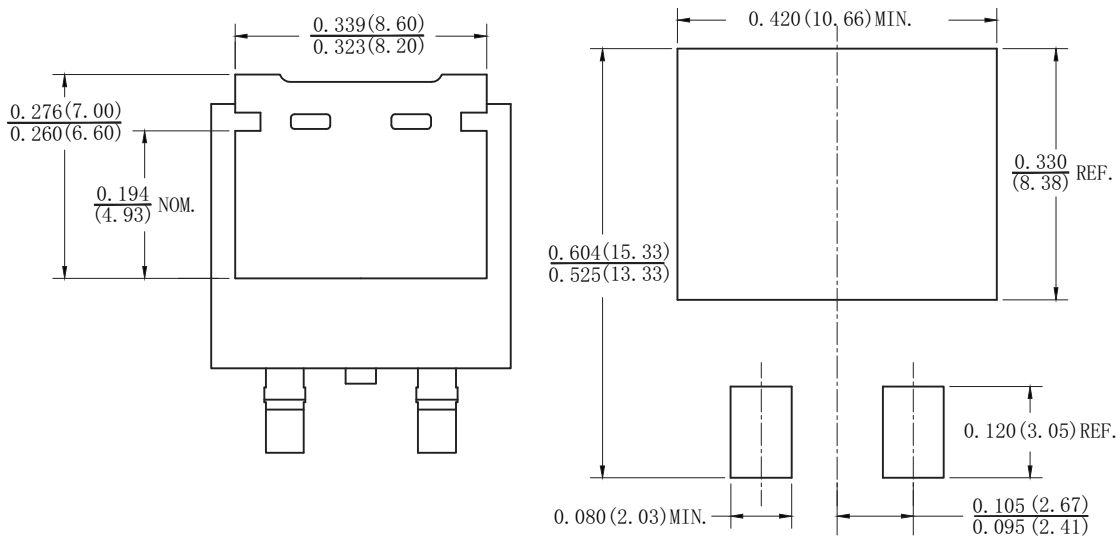
Fig. 5 - Typical Junction Capacitance

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

SMPD (TO-263AC)



Mounting Pad Layout





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