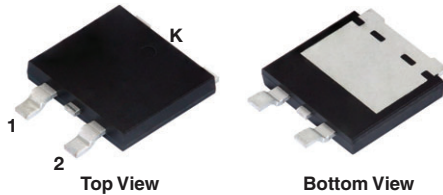


Dual High-Voltage TMBS® (Trench MOS Barrier Schottky) Rectifier

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

eSMP® Series SMPD (TO-263AC)



LINKS TO ADDITIONAL RESOURCES


[3D Models](#)

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 | 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

 AUTOMOTIVE
GRADE
Available

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 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 (fig. 1) | $I_{F(AV)}$ | per device | 40 |
| | | per diode | 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/ μ 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 | $I_F = 5\text{ A}$ | $T_A = 25\text{ }^\circ\text{C}$ | $V_F^{(1)}$ | 0.51 | - | V |
| | $I_F = 10\text{ A}$ | | | 0.63 | - | |
| | $I_F = 20\text{ A}$ | | | 0.78 | 0.89 | |
| | $I_F = 5\text{ A}$ | $T_A = 125\text{ }^\circ\text{C}$ | | 0.45 | - | |
| | $I_F = 10\text{ A}$ | | | 0.55 | - | |
| | $I_F = 20\text{ A}$ | | | 0.64 | 0.71 | |
| Reverse current at rated V_R per diode | $V_R = 90\text{ V}$ | $T_A = 25\text{ }^\circ\text{C}$ | $I_R^{(2)}$ | 11 | - | μA |
| | | $T_A = 125\text{ }^\circ\text{C}$ | | 9.4 | - | mA |
| | $V_R = 120\text{ V}$ | $T_A = 25\text{ }^\circ\text{C}$ | | - | 500 | μA |
| | | $T_A = 125\text{ }^\circ\text{C}$ | | 23 | 70 | mA |

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 | V40D120C | UNIT |
| Typical thermal resistance | $R_{\theta JC}$ | per diode | 1.9 |
| | | per device | 1.0 |
| | $R_{\theta JA}^{(1)(2)}$ | per device | 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 (TO-263AC) | V40D120C-M3/I | 0.55 | I | 2000/reel | 13" diameter plastic tape and reel |
| SMPD (TO-263AC) | V40D120CHM3/I (1) | 0.55 | I | 2000/reel | 13" diameter plastic tape and reel |

Note

- (1) AEC-Q101 qualified

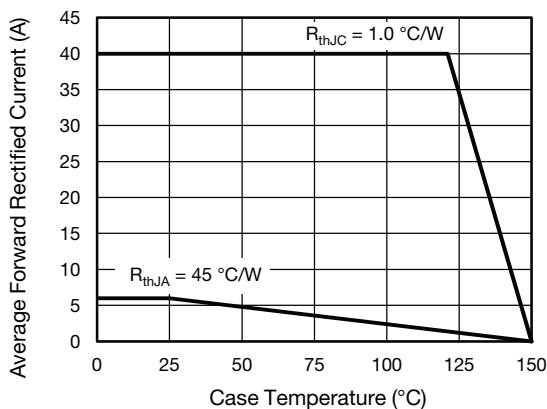
RATINGS AND CHARACTERISTICS CURVES ($T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)


Fig. 1 - Forward Current Derating Curve

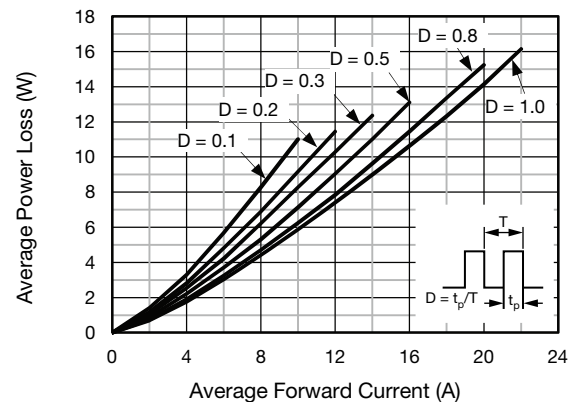


Fig. 2 - Forward Power Loss Characteristics Per Diode

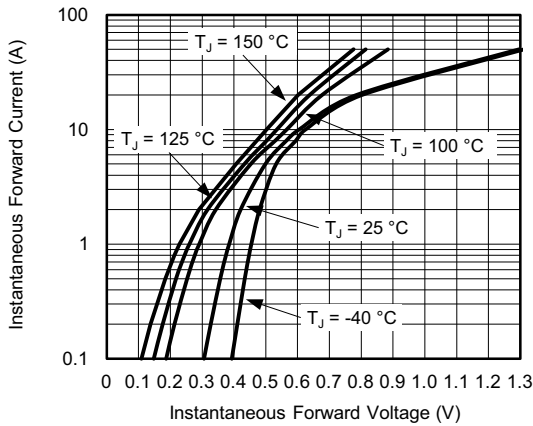


Fig. 3 - Typical Instantaneous Forward Characteristics Per Diode

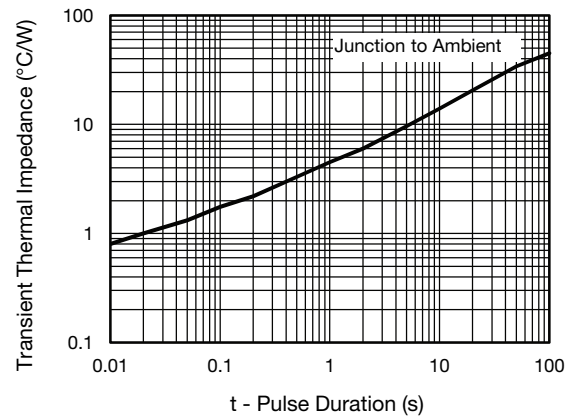


Fig. 6 - Typical Transient Thermal Impedance Per Device

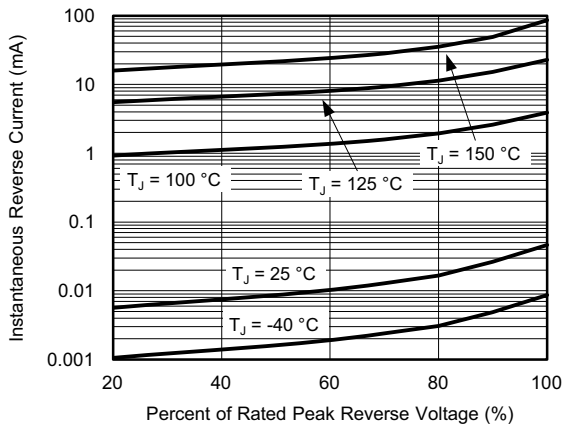


Fig. 4 - Typical Reverse Characteristics Per Diode

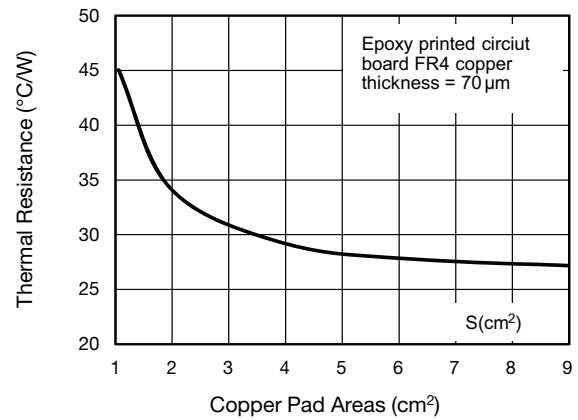


Fig. 7 - Thermal Resistance Junction-to-Ambient vs. Copper Pad Areas

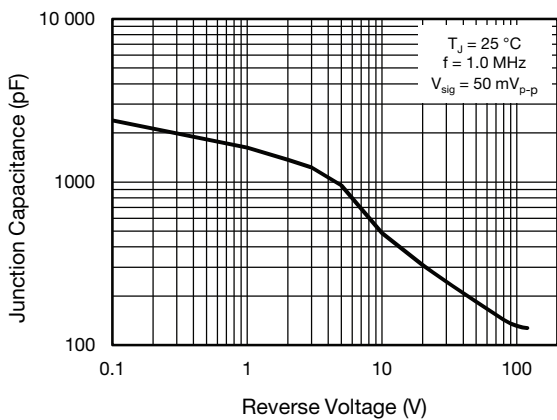
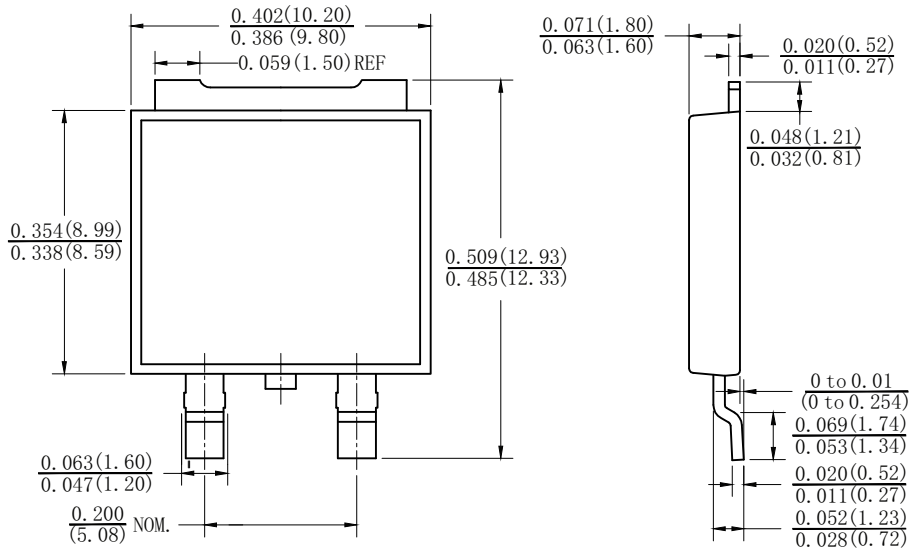


Fig. 5 - Typical Junction Capacitance Per Diode

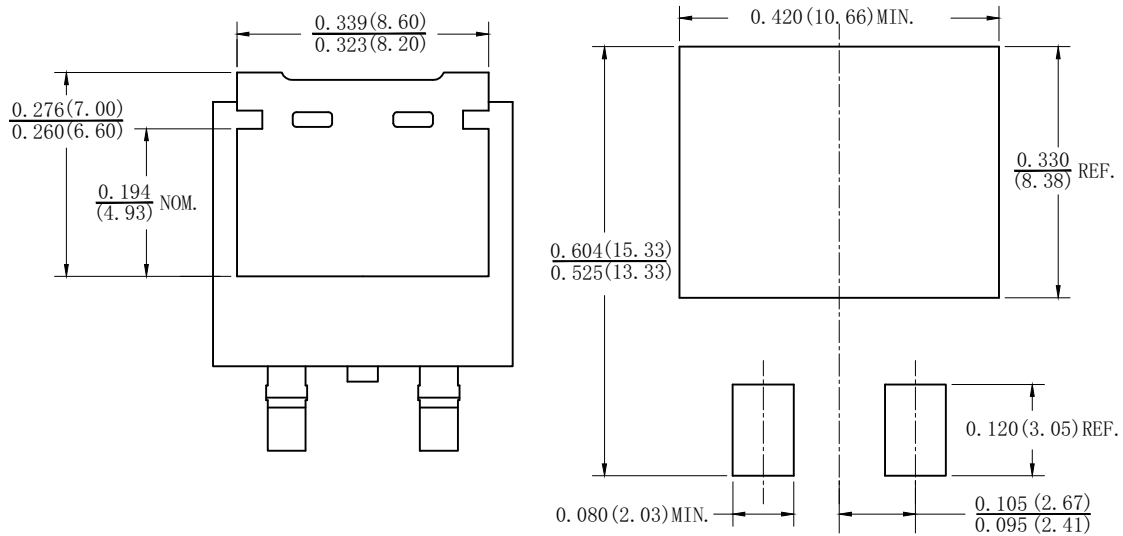


PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

SMPD (TO-263AC)



Mounting Pad Layout





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