Vishay General Semiconductor

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

Ultra Low $V_F = 0.39$ V at $I_F = 5$ A





LINKS TO ADDITIONAL RESOURCES



| PRIMARY CHARACTERISTICS | | | | |
|---|-----------------|--|--|--|
| I _{F(AV)} | 2 x 30 A | | | |
| V _{RRM} | 120 V | | | |
| I _{FSM} | 320 A | | | |
| V_F at I_F = 30 A (T_A = 125 °C) | 0.70 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 <u>www.vishay.com/doc?99912</u>

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 °C unless otherwise noted) | | | | | |
|--|------------|-----------------------------------|-------------|------|--|
| PARAMETER | | SYMBOL | V60D120C | UNIT | |
| Maximum repetitive peak reverse voltage | | V _{RRM} | 120 | V | |
| Maximum average forward rectified current (fig. 1) | per device | | 60 | ^ | |
| | per diode | IF(AV) | 30 | - A | |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load | | I _{FSM} | 320 | А | |
| Voltage rate of change (rated V _R) | | dV/dt | 10 000 | V/µs | |
| Operating junction and storage temperature range | | T _J , T _{STG} | -40 to +150 | °C | |

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RoHS COMPLIANT HALOGEN



V60D120C



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| ELECTRICAL CHARACTERISTICS (T _A = 25 °C unless otherwise noted) | | | | | | | |
|--|------------------------|-------------------------|-------------------------------|------|------|------|--|
| PARAMETER | TEST CONDITIONS | | SYMBOL | TYP. | MAX. | UNIT | |
| Instantaneous forward voltage per diode | I _F = 5 A | T _A = 25 °C | V _F ⁽¹⁾ | 0.48 | - | V | |
| | I _F = 15 A | | | 0.68 | - | | |
| | I _F = 30 A | | | 0.91 | 0.96 | | |
| | I _F = 5 A | T _A = 125 °C | | 0.39 | - | | |
| | I _F = 15 A | | | 0.59 | - | | |
| | I _F = 30 A | | | 0.70 | 0.76 | | |
| Reverse current at rated V_R per diode | V _R = 90 V | T _A = 25 °C | I _R (2) | 14 | - | μA | |
| | | T _A = 125 °C | | 11 | - | mA | |
| | V _R = 120 V | T _A = 25 °C | | - | 800 | μA | |
| | | T _A = 125 °C | | 27 | 75 | mA | |

Notes

⁽¹⁾ Pulse test: 300 µs pulse width, 1 % duty cycle

⁽²⁾ Pulse test: Pulse width \leq 5 ms

| THERMAL CHARACTERISTICS ($T_A = 25 \text{ °C}$ unless otherwise noted) | | | | | |
|--|------------|-------------------------|----------|------|--|
| PARAMETER | | SYMBOL | V60D120C | UNIT | |
| Typical thermal resistance | per diode | R _{θJC} | 1.8 | | |
| | per device | | 0.95 | °C/W | |
| | per device | R _{0JA} (1)(2) | 45 | | |

Notes

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

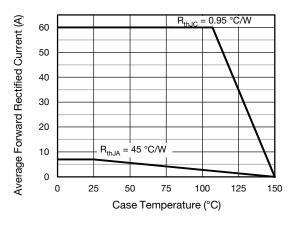
⁽²⁾ Free air, without heatsink

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





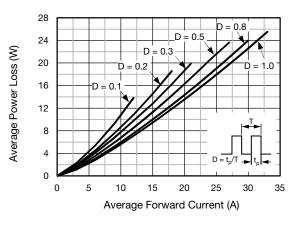


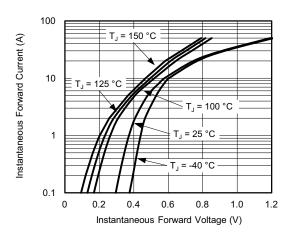
Fig. 2 - Forward Power Loss Characteristics Per Diode

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Fig. 3 - Typical Instantaneous Forward Characteristics Per Diode

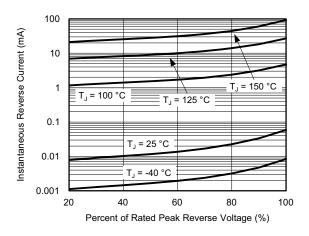


Fig. 4 - Typical Reverse Characteristics Per Diode

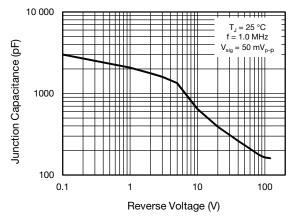


Fig. 5 - Typical Junction Capacitance Per Diode

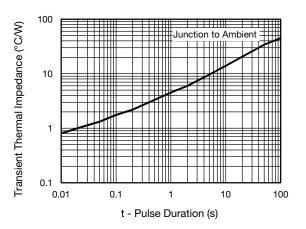


Fig. 6 - Typical Transient Thermal Impedance Per Device

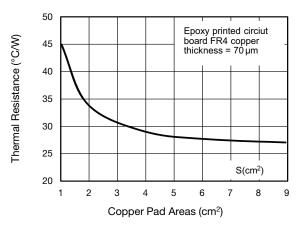


Fig. 7 - Thermal Resistance Junction-to-Ambient vs. Copper Pad Areas

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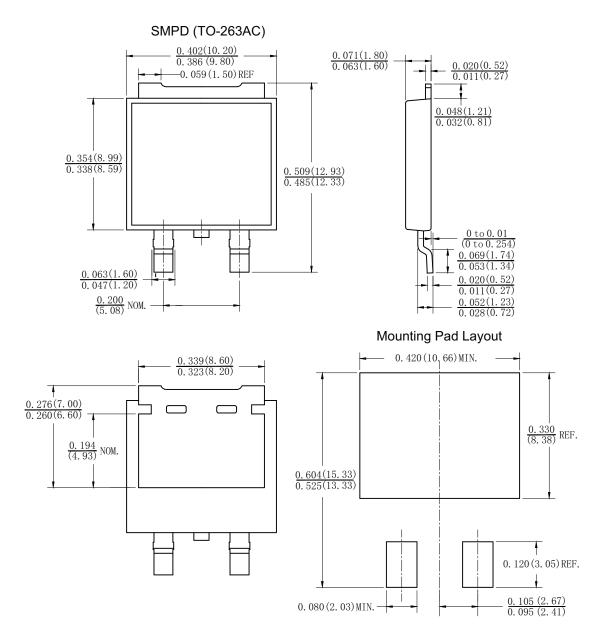
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PACKAGE OUTLINE DIMENSIONS in inches (millimeters)





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