COMPLIANT

HALOGEN FREE

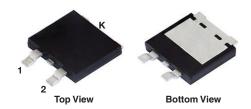


Vishay General Semiconductor

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

Ultra Low $V_F = 0.5 \text{ V}$ at $I_F = 2.5 \text{ A}$

eSMP[®] Series SMPD (TO-263AC)





DESIGN SUPPORT TOOLS AVAILABLE



| PRIMARY CHARACTERISTICS | | | |
|------------------------------------------------------|-----------------|--|--|
| I _{F(AV)} | 2 x 5 A | | |
| V_{RRM} | 100 V | | |
| I _{FSM} | 80 A | | |
| V_F at $I_F = 5$ A $(T_A = 125 ^{\circ}\text{C})$ | 0.62 V | | |
| T _J max. | 175 °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.vishav.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 meet JESD 201 class 2 whisker test

Polarity: as marked

| MAXIMUM RATINGS (T _A = 25 °C unless otherwise noted) | | | | | |
|------------------------------------------------------------------------------------|------------|-------------------------------|-------------|------|--|
| PARAMETER | | SYMBOL | V10DM100C | UNIT | |
| Device marking code | | | V10DM100C | | |
| Maximum repetitive peak reverse voltage | | V _{RRM} | 100 | V | |
| Maximum average forward rectified current (fig. 1) | per device | I _{F(AV)} (1) | 10 | ^ | |
| | per diode | | 5 | А | |
| Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load | | I _{FSM} | 80 | А | |
| Operating junction temperature range | | T _J ⁽²⁾ | -40 to +175 | 90 | |
| Storage temperature range | | T _{STG} | -55 to +175 | - °C | |

Notes

⁽¹⁾ Mounted on infinite heatsink

 $^{^{(2)}}$ The heat generated must be less than the thermal conductivity from junction-to-ambient: $dP_D/dT_J < 1/R_{\theta,JA}$



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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 = 2.5 A | T _∧ = 25 °C | V _F ⁽¹⁾ | 0.58 | - | V |
| | I _F = 5 A | | | 0.71 | 0.79 | |
| | I _F = 2.5 A | T _A = 125 °C | | 0.50 | - | |
| | I _F = 5 A | | | 0.62 | 0.70 | |
| Reverse current at rated V _R per diode | V _R = 70 V | T _A = 25 °C | I _R ⁽²⁾ | 0.01 | - | mA |
| | | T _A = 125 °C | | 0.70 | - | |
| | V _R = 100 V | T _A = 25 °C | | - | 0.1 | |
| | v _R = 100 v | T _A = 125 °C | | 1.4 | 4.0 | |
| Typical junction capacitance | 4.0 V, 1 MHz | | CJ | 480 | - | pF |

Notes

 $^{(1)}$ Pulse test: 300 μ s pulse width, 1 % duty cycle

(2) Pulse test: Pulse width $\leq 5 \text{ ms}$

| THERMAL CHARACTERISTICS (T _A = 25 °C unless otherwise noted) | | | | |
|-------------------------------------------------------------------------|----------------------------------|-----------|------|--|
| PARAMETER | SYMBOL | V10DM100C | UNIT | |
| Typical thermal resistance per device | R ₀ JC ⁽¹⁾ | 2.5 | °C/W | |
| | R ₀ JA (2)(3) | 58 | C/VV | |

Notes

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

| ORDERING INFORMATION (Example) | | | | | |
|--------------------------------|-----------------|--------------|---------------|------------------------------------|--|
| PREFERRED P/N | UNIT WEIGHT (g) | PACKAGE CODE | BASE QUANTITY | DELIVERY MODE | |
| V10DM100C-M3/I | 0.55 | I | 2000/reel | 13" diameter plastic tape and reel | |
| V10DM100CHM3/I (1) | 0.55 | I | 2000/reel | 13" diameter plastic tape and reel | |

Note

(1) AEC-Q101 qualified



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RATINGS AND CHARACTERISTICS CURVES (T_A = 25 °C unless otherwise noted)

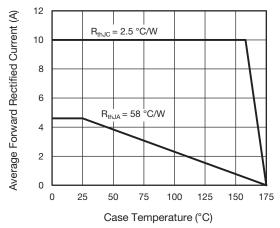


Fig. 1 - Maximum Forward Current Derating Curve

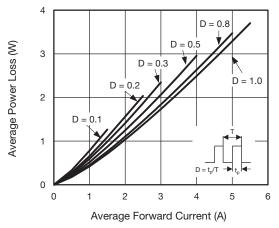


Fig. 2 - Average Power Loss Characteristics

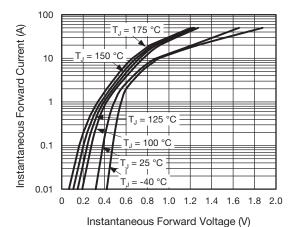


Fig. 3 - Typical Instantaneous Forward Characteristics

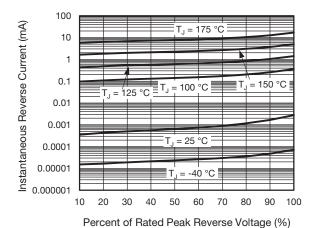


Fig. 4 - Typical Reverse Leakage Characteristics

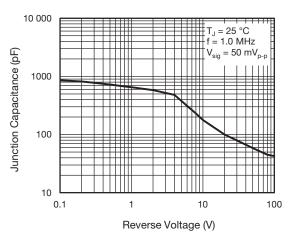


Fig. 5 - Typical Junction Capacitance

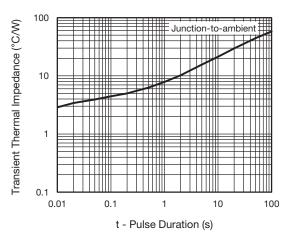


Fig. 6 - Typical Transient Thermal Impedance



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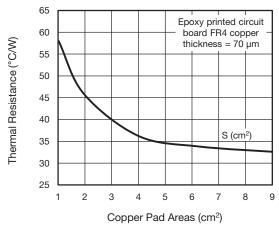


Fig. 7 - Thermal Resistance Junction-to-Ambient vs. Copper Pad Areas

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

SMPD (TO-263AC) 0.402 (10.20) 0.071 (1.80) 0.063 (1.60) 0.386 (9.80) 0.020 (0.52) 0.011 (0.27) -0.059 (1.50) REF. 0.048 (1.21) 0.032 (0.81) 0.354 (8.99) 0.338 (8.59) 0.509 (12.93) 0.485 (12.33) 0 to 0.01 (0 to 0.254) 0.069 (1.74) 0.053 (1.34) 0.063 (1.60) 0.020 (0.52) 0.047 (1.20) 0.011 (0.27) 0.052 (1.23) 0.028 (0.72)

Mounting Pad Layout 0.339 (8.60) 0.323 (8.20) 0.194 NOM. 0.194 NOM. 0.604 (15.33) 0.525 (13.33) 0.080 (2.03) MIN. 0.105 (2.67) 0.095 (2.41)



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