

High Current Density Surface-Mount TMBS® (Trench MOS Barrier Schottky) Rectifier

Ultra Low $V_F = 0.51$ V at $I_F = 5$ A



FEATURES

- Very low profile - typical height of 1.3 mm
- Trench MOS Schottky technology
- 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

LINKS TO ADDITIONAL RESOURCES



TYPICAL APPLICATIONS

For use in low voltage high frequency DC/DC converters, freewheeling diodes, and polarity protection applications.

PRIMARY CHARACTERISTICS

| | |
|---|---------------------|
| $I_{F(AV)}$ | 2 x 10 A |
| V_{RRM} | 100 V |
| I_{FSM} | 150 A |
| V_F at $I_F = 10$ A ($T_A = 125$ °C) | 0.63 V |
| T_J max. | 150 °C |
| Package | SlimDPAK (TO-252AE) |
| Circuit configuration | Common cathode |

MECHANICAL DATA

Case: SlimDPAK (TO-252AE)

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

MAXIMUM RATINGS ($T_A = 25$ °C unless otherwise noted)

| PARAMETER | SYMBOL | V20PW10C | UNIT |
|--|------------|-------------|------|
| Device marking code | | V20PW10C | |
| Maximum repetitive peak reverse voltage | V_{RRM} | 100 | V |
| Maximum average forward rectified current (fig. 1) | per device | 20 | A |
| | per diode | 10 | A |
| Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load per diode | I_{FSM} | 150 | A |
| Operating junction temperature range | T_J (2) | -40 to +150 | °C |
| Storage temperature range | T_{STG} | -55 to +150 | °C |

Notes

(1) With 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 °C unless otherwise noted) | | | | | | |
|--|------------------------|-------------------------|-------------------------------|------|------|------|
| PARAMETER | TEST CONDITIONS | | SYMBOL | TYP. | MAX. | UNIT |
| Instantaneous forward voltage per diode | I _F = 5.0 A | T _A = 25 °C | V _F ⁽¹⁾ | 0.56 | - | V |
| | I _F = 10 A | | | 0.71 | 0.79 | |
| | I _F = 5.0 A | T _A = 125 °C | | 0.51 | - | |
| | I _F = 10 A | | | 0.63 | 0.71 | |
| Reverse current per diode | V _R = 70 V | T _A = 25 °C | I _R ⁽²⁾ | 0.01 | - | mA |
| | | T _A = 125 °C | | 4 | - | |
| | V _R = 100 V | T _A = 25 °C | | - | 0.3 | |
| | | T _A = 125 °C | | 9 | 20 | |
| Typical junction capacitance per diode | 4.0 V, 1 MHz | | C _J | 900 | - | 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 | V20PW10C | UNIT |
| Typical thermal resistance | $R_{\theta JA}^{(1)(2)}$ | 55 | $^{\circ}\text{C/W}$ |
| | $R_{\theta JM}^{(3)}$ | 1.8 | |

Notes(1) The heat generated must be less than thermal conductivity from junction-to-ambient: $dP_D/dT_J < 1/R_{\theta JA}$ (2) Free air, mounted on recommended copper pad area; thermal resistance $R_{\theta JA}$ - junction to ambient(3) Mounted on infinite heat sink; thermal resistance $R_{\theta JM}$ - junction-to-mount

| ORDERING INFORMATION (Example) | | | | |
|---------------------------------------|-----------------|------------------------|---------------|------------------------------------|
| PREFERRED P/N | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |
| V20PW10C-M3/I | 0.20 | I | 4500 | 13" diameter plastic tape and reel |
| V20PW10CHM3/I ⁽¹⁾ | 0.20 | I | 4500 | 13" diameter plastic tape and reel |

Note

(1) AEC-Q101 qualified

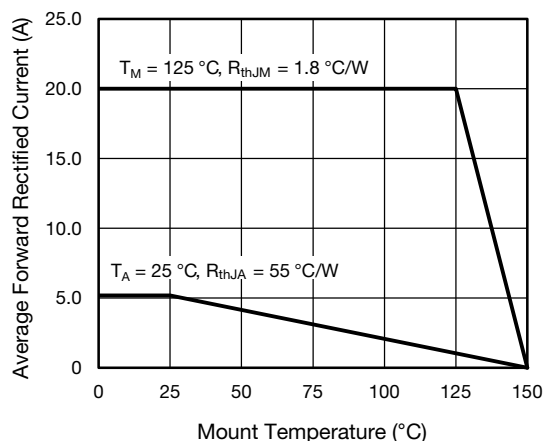
RATINGS AND CHARACTERISTICS CURVES ($T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve

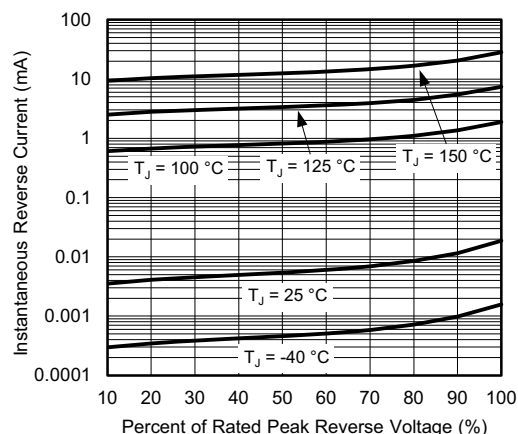


Fig. 4 - Typical Reverse Leakage Characteristics

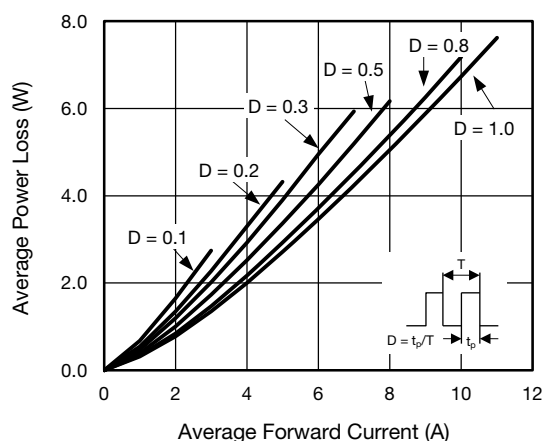


Fig. 2 - Forward Power Loss Characteristics

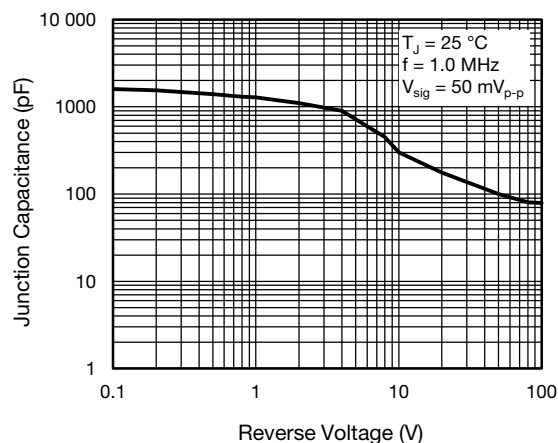


Fig. 5 - Typical Junction Capacitance

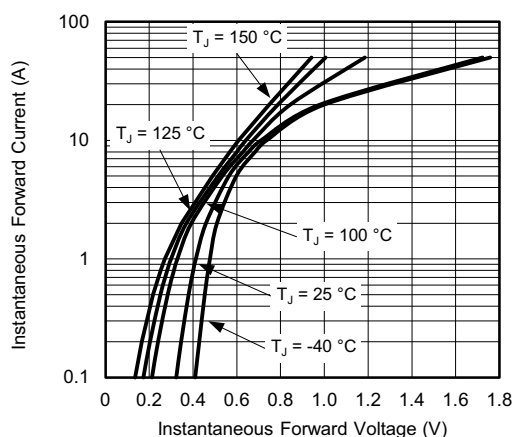


Fig. 3 - Typical Instantaneous Forward Characteristics

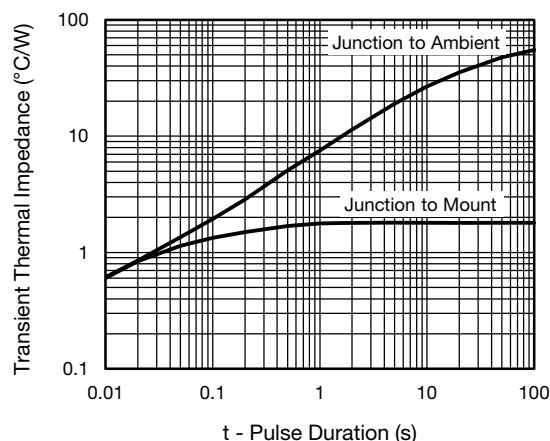


Fig. 6 - Typical Transient Thermal Impedance

Copper Pad Areas

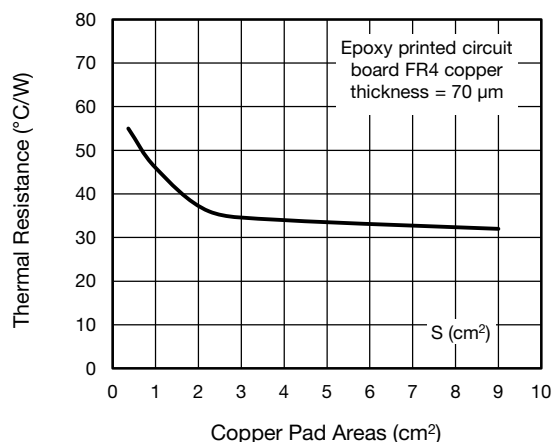
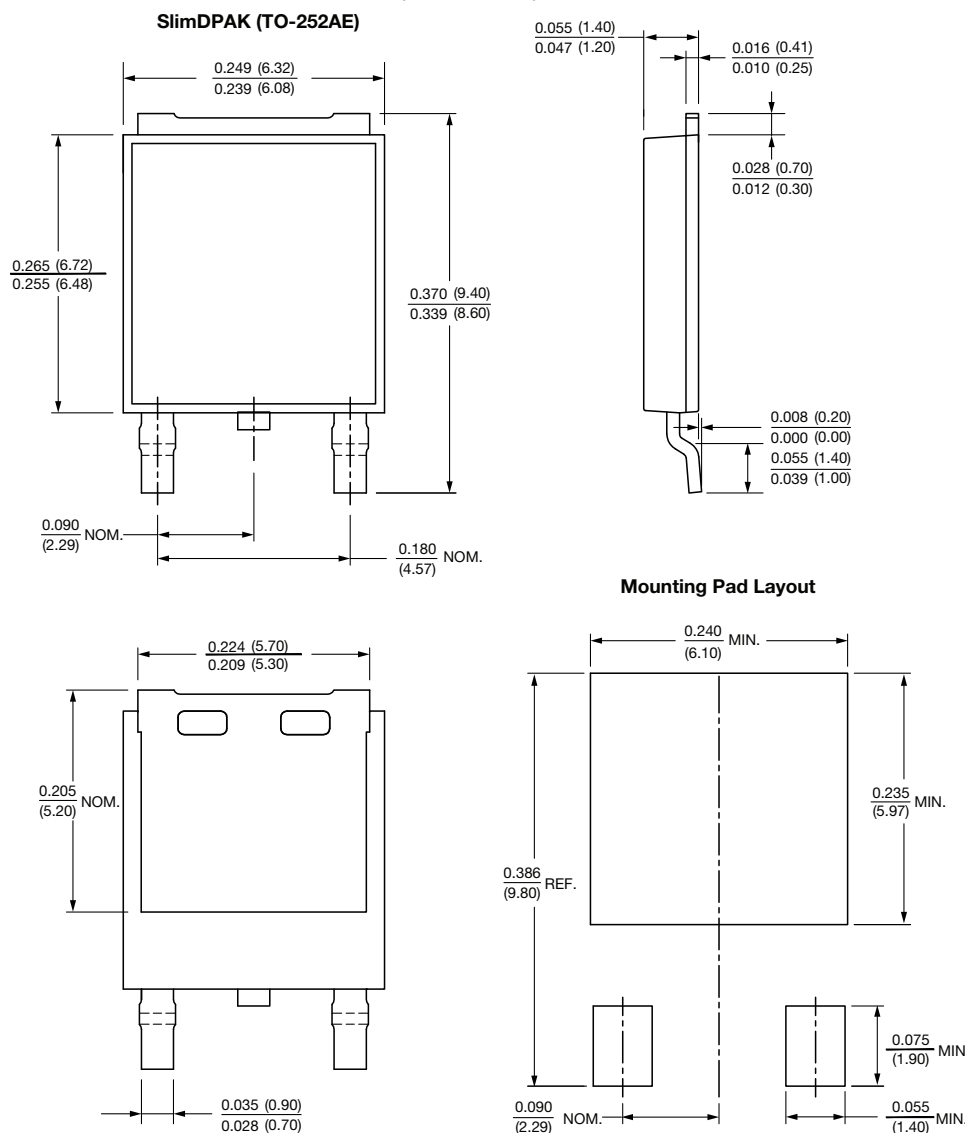


Fig. 7 - Typical Resistance Junction to Ambient vs.

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)




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