

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



FEATURES

- Low profile package - typical height of 0.88 mm
- Leadless DFN package with side-wettable flanks suitable for customer AOI (Automatic Optical Inspection)
- Very low voltage drop by TMBS Gen3 technology
- Low power losses, high efficiency
- 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

LINKS TO ADDITIONAL RESOURCES



PRIMARY CHARACTERISTICS

| | |
|--|--------|
| $I_{F(AV)}$ | 7 A |
| V_{RRM} | 150 V |
| I_{FSM} | 120 A |
| V_F at $I_F = 3.5$ A ($T_J = 125$ °C) | 0.56 V |
| T_J max. | 175 °C |
| Package | DFN33A |
| Circuit configuration | Single |

TYPICAL APPLICATIONS

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

MECHANICAL DATA

Case: DFN33A

Molding compound meets UL 94 V-0 flammability rating

Base P/N-M3 - halogen-free, RoHS-compliant, and commercial grade

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 | V7N3M153 | UNIT |
|--|-------------------|-------------|------|
| Device marking code | | 7M153 | |
| Maximum repetitive peak reverse voltage | V_{RRM} | 150 | V |
| Maximum average forward rectified current (fig. 1) | $I_{F(AV)}^{(1)}$ | 7 | A |
| | $I_{F(AV)}^{(2)}$ | 2.2 | A |
| Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load | I_{FSM} | 120 | A |
| Operating junction temperature range | $T_J^{(3)}$ | -40 to +175 | °C |
| Storage temperature range | T_{STG} | -55 to +175 | °C |

Notes

(1) With infinite heatsink

(2) Free air, mounted on FR4 PCB, 2 oz., standard footprint

(3) 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 _J = 25 °C unless otherwise noted) | | | | | | |
|--|------------------------|-------------------------|-------------------------------|--------|------|------|
| PARAMETER | TEST CONDITIONS | | SYMBOL | TYP. | MAX. | UNIT |
| Instantaneous forward voltage | I _F = 3.5 A | T _J = 25 °C | V _F ⁽¹⁾ | 0.71 | - | V |
| | I _F = 7 A | | | 0.9 | 0.98 | |
| | I _F = 3.5 A | T _J = 125 °C | | 0.56 | - | |
| | I _F = 7 A | | | 0.64 | 0.69 | |
| Reverse current | V _R = 100 V | T _J = 25 °C | I _R ⁽²⁾ | 0.0012 | - | mA |
| | | T _J = 125 °C | | 1.0 | - | |
| | V _R = 150 V | T _J = 25 °C | I _R ⁽²⁾ | - | 0.07 | mA |
| | | T _J = 125 °C | | 2.5 | 7 | |
| Typical junction capacitance | 4.0 V, 1 MHz | | C _J | 390 | - | 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 specified) | | | | |
|--|--------------------------|------|------|----------------------|
| PARAMETER | SYMBOL | TYP. | MAX. | UNIT |
| Thermal resistance | $R_{\theta JA}^{(1)(2)}$ | 118 | 148 | $^{\circ}\text{C/W}$ |
| | $R_{\theta JA}^{(3)}$ | - | 65 | |
| | $R_{\theta JM}^{(4)}$ | 2.9 | 3.63 | |
| | | | | |

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) Thermal resistance junction-to-ambient to follow JEDEC[®] 51-2A, device mounted on FR4 PCB, 2 oz., standard footprint
 (3) Thermal resistance junction-to-ambient, free air with device mounted on FR4 PCB, 2 oz., 20 mm x 20 mm pad area
 (4) Thermal resistance junction-to-mount to follow JEDEC 51-14 transient dual interface test method (TDIM)

ORDERING INFORMATION TABLE

| Device code | V | 7 | N3 | M | 15 | 3 | H | M3 |
|-------------|---|---|----|---|----|---|---|----|
| | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ | ⑧ |
| ① | - Vishay TMBS product | | | | | | | |
| ② | - Current rating (7 = 7 A) | | | | | | | |
| ③ | - Package type (N3 = DFN33A) | | | | | | | |
| ④ | - Process type option (M = low I_R) | | | | | | | |
| ⑤ | - Voltage rating (15 = 150 V) | | | | | | | |
| ⑥ | - TMBS generation option (3 = Gen3) | | | | | | | |
| ⑦ | - Quality grade (H = AEC-Q101 qualified, otherwise = industry grade) | | | | | | | |
| ⑧ | - Material / environmental category (M3 = halogen-free, RoHS-compliant, and termination lead (Pb)-free) | | | | | | | |

| ORDERING INFORMATION (Example) | | | | |
|--------------------------------|-----------------|------------------------|---------------|------------------------------------|
| PREFERRED P/N | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |
| V7N3M153-M3/I | 0.031 | I | 6000 | 13" diameter plastic tape and reel |
| V7N3M153HM3/I (1) | 0.031 | I | 6000 | 13" diameter plastic tape and reel |

Note

- (1) AEC-Q101 qualified

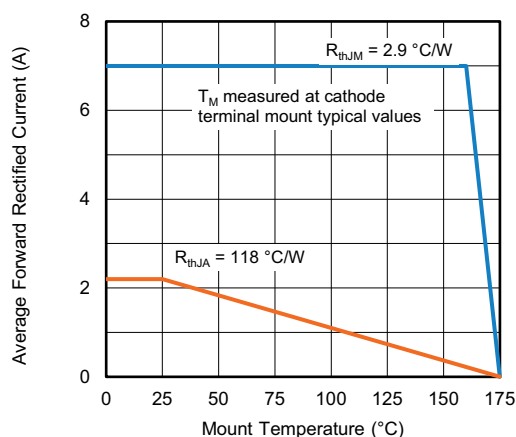
RATINGS AND CHARACTERISTICS CURVES ($T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve

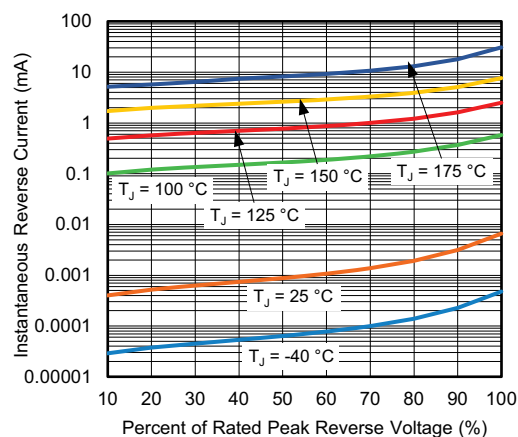


Fig. 4 - Typical Reverse Characteristics

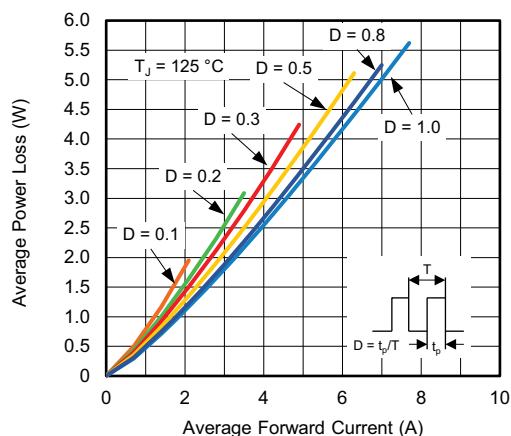


Fig. 2 - Forward Power Loss Characteristics

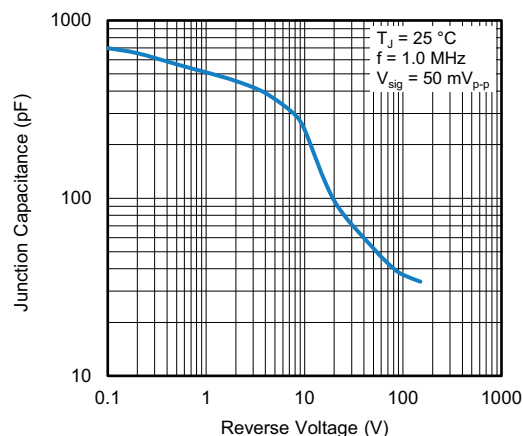


Fig. 5 - Typical Junction Capacitance

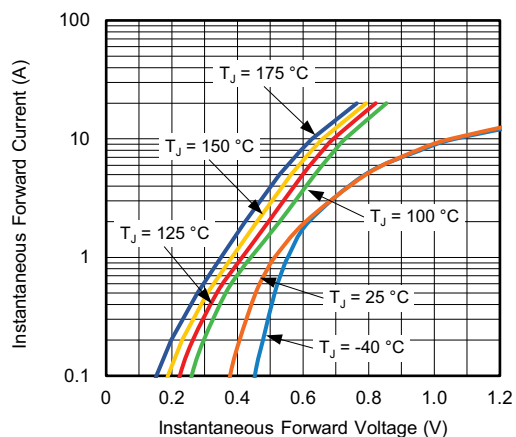


Fig. 3 - Typical Instantaneous Forward Characteristics

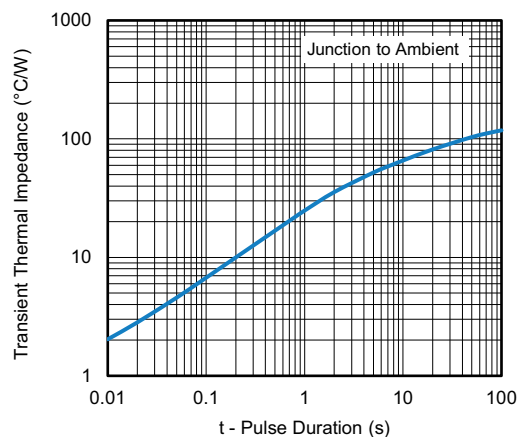


Fig. 6 - Typical Transient Thermal Impedance

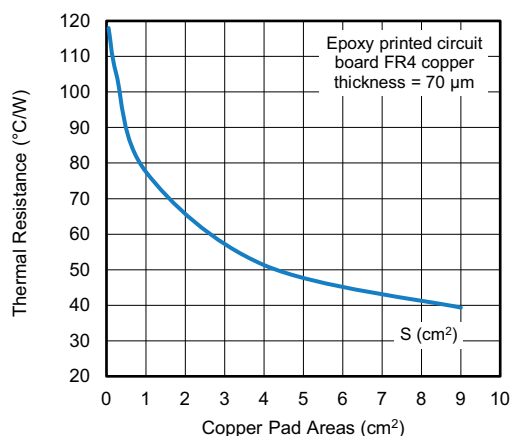


Fig. 7 - Thermal Resistance Junction-to-Ambient vs. Copper Pad Areas

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

DFN33A





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