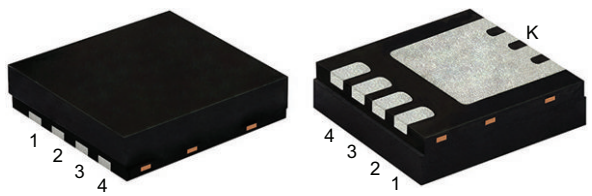
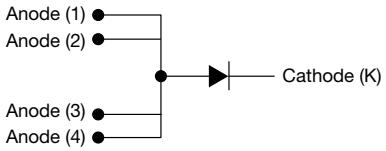
# Surface-Mount TMBS® (Trench MOS Barrier Schottky) Rectifier




DFN33A




## 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 reverse leakage 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

AUTOMOTIVE GRADE Available

RoHS COMPLIANT

HALOGEN FREE

## LINKS TO ADDITIONAL RESOURCES

Ultra Librarian EDA / CAD | Related Documents | Packages | Marking | Application Notes

| PRIMARY CHARACTERISTICS | |
|---|---|
| $I_{F(AV)}$ | 7 A |
| $V_{RRM}$ | 60 V |
| $I_{FSM}$ | 120 A |
| $V_F$ at $I_F$ = 3.5 A ($T_J$ = 125 °C) | 0.43 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** | **V7N3M63** | **UNIT** |
| Device marking code | | 7M63 | |
| Maximum repetitive peak reverse voltage | $V_{RRM}$ | 60 | V |
| Maximum average forward rectified current (fig. 1) | $I_{F(AV)}$ (1) | 7 | A |
| | $I_{F(AV)}$ (2) | 2.8 | 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: $dP_D/dT_J < 1/R_{\theta JA}$



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| 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) | 0.52 | - | V |
| | $I_F$ = 7 A | | | 0.59 | 0.64 | |
| | $I_F$ = 3.5 A | $T_J$ = 125 °C | | 0.43 | - | |
| | $I_F$ = 7 A | | | 0.52 | 0.57 | |
| Reverse current | $V_R$ = 60 V | $T_J$ = 25 °C | $I_R$ (2) | - | 0.015 | mA |
| | | $T_J$ = 125 °C | | 0.8 | 2.5 | |
| Typical junction capacitance | 4.0 V, 1 MHz | | $C_J$ | 1060 | - | pF |

**Notes**

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

(2) Pulse test: pulse width ≤ 5 ms

| THERMAL CHARACTERISTICS ($T_A$ = 25 °C unless otherwise specified) | | | | |
|---|---|---|---|---|
| PARAMETER | SYMBOL | TYP. | MAX. | UNIT |
| Thermal resistance | $R_{\theta JA}$ (1)(2) | 118 | 148 | °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 | 6 | 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 (6 = 60 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 |
| V7N3M63-M3/I | 0.031 | I | 6000 | 13" diameter plastic tape and reel |
| V7N3M63HM3/I (1) | 0.031 | I | 6000 | 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)

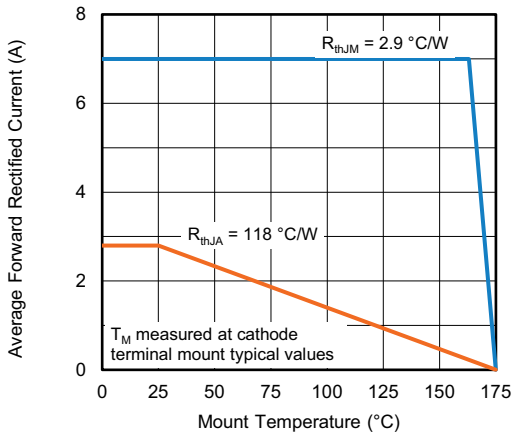


Fig. 1 - Maximum Forward Current Derating Curve

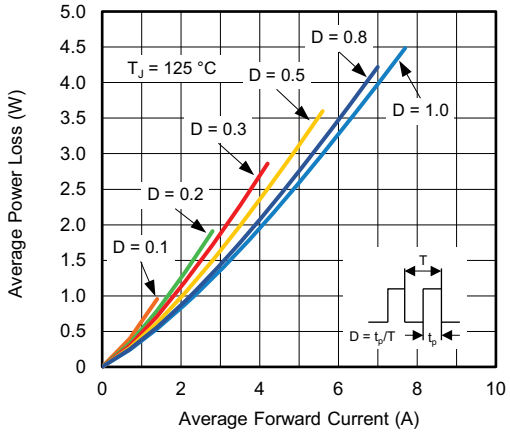


Fig. 2 - Forward Power Loss Characteristics

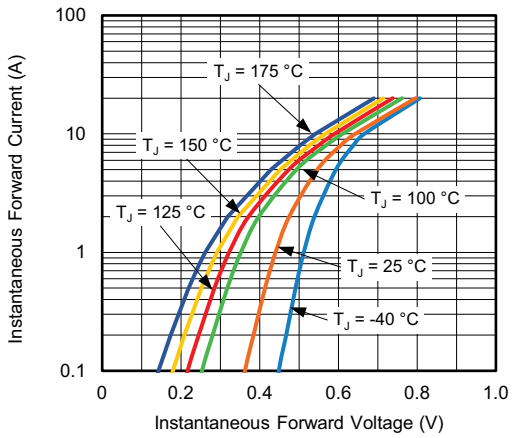


Fig. 3 - Typical Instantaneous Forward Characteristics

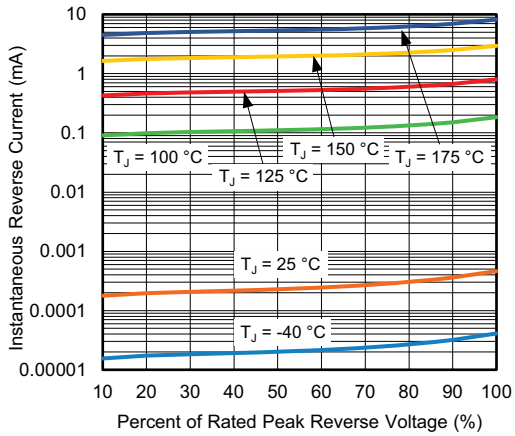


Fig. 4 - Typical Reverse Characteristics

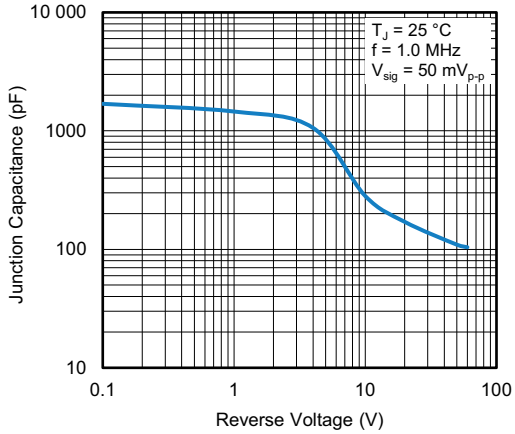


Fig. 5 - Typical Junction Capacitance

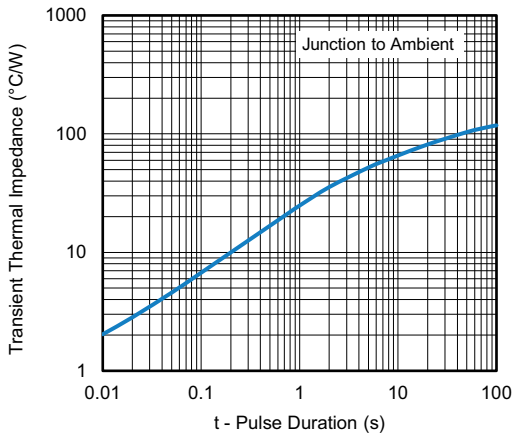


Fig. 6 - Typical Transient Thermal Impedance


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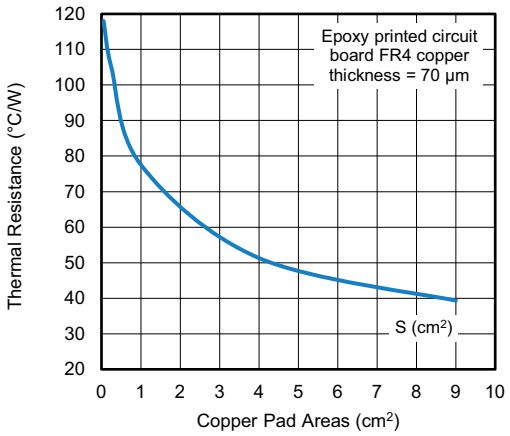
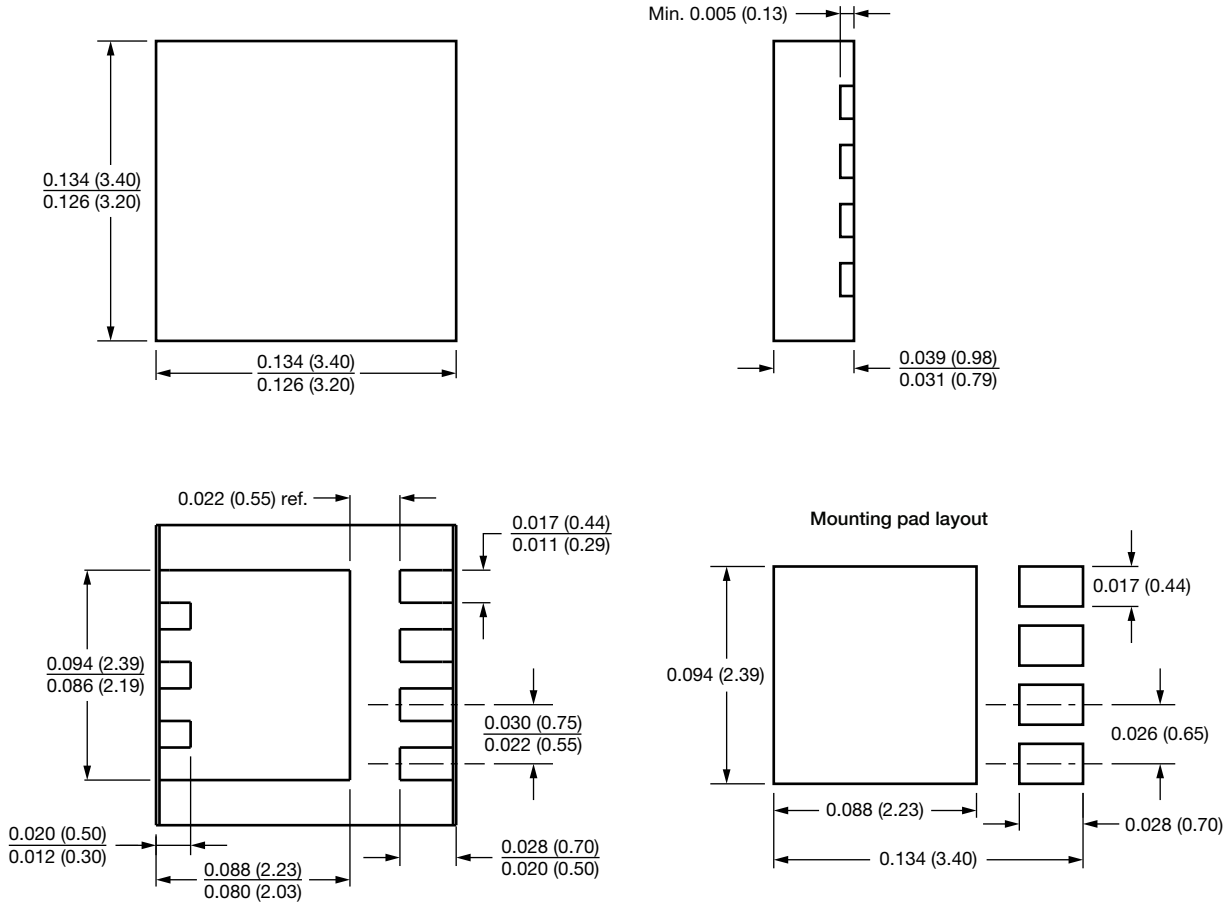



Fig. 7 - Thermal Resistance Junction-to-Ambient vs. Copper Pad Areas

## **PACKAGE OUTLINE DIMENSIONS** in inches (millimeters)

### DFN33A





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