

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



DFN3820A



RoHS
COMPLIANT
HALOGEN
FREE

FEATURES

- Low profile package - typical height of 0.88 mm
- Leadless DFN package with side-wettable flanks suitable for customer AOI (Automatic Optical Inspection)
- Trench MOS Schottky technology
- Low power losses, high efficiency
- Low forward voltage drop
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- AEC-Q101 qualified available
 - Automotive ordering code; base P/NHM3
- Compatible to SMP (DO-220AA) package case outline
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

LINKS TO ADDITIONAL RESOURCES



| PRIMARY CHARACTERISTICS | |
|--|----------|
| $I_{F(AV)}$ | 5 A |
| V_{RRM} | 150 V |
| I_{FSM} | 100 A |
| V_F at $I_F = 2.5$ A ($T_J = 125$ °C) | 0.56 V |
| T_J max. | 175 °C |
| Package | DFN3820A |
| Circuit configuration | Single |

TYPICAL APPLICATIONS

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

MECHANICAL DATA

Case: DFN3820A

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

Polarity: color band denotes the cathode end

| MAXIMUM RATINGS ($T_A = 25$ °C unless otherwise noted) | | | |
|--|-------------------|-------------|------|
| PARAMETER | SYMBOL | V5NM153 | UNIT |
| Device marking code | | 5MP | |
| Maximum repetitive peak reverse voltage | V_{RRM} | 150 | V |
| Maximum average forward rectified current (fig. 1) | $I_{F(AV)}^{(1)}$ | 5 | A |
| | $I_{F(AV)}^{(2)}$ | 1.9 | A |
| Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load | I_{FSM} | 100 | A |
| Operating junction and storage temperature range | $T_J^{(3)}$ | -40 to +175 | °C |
| Operating junction and 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 = 2.5 A | T _J = 25 °C | V _F ⁽¹⁾ | 0.70 | - | V |
| | I _F = 5 A | | | 0.89 | 0.97 | |
| | I _F = 2.5 A | T _J = 125 °C | | 0.56 | - | |
| | I _F = 5 A | | | 0.63 | 0.68 | |
| Reverse current | V _R = 100 V | T _J = 25 °C | I _R ⁽²⁾ | 0.0005 | - | mA |
| | | T _J = 125 °C | | 0.9 | - | |
| | V _R = 150 V | T _J = 25 °C | | - | 0.05 | |
| | | T _J = 125 °C | | 2 | 5 | |
| Typical junction capacitance | 4.0 V, 1 MHz | | C _J | 290 | - | 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 | $R_{\theta JA}^{(1)(2)}$ | 135 | 169 | $^{\circ}\text{C/W}$ |
| | $R_{\theta JM}^{(3)}$ | 5 | 6.3 | |

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-mount to follow JEDEC 51-14 transient dual interface test method (TDIM)

ORDERING INFORMATION TABLE

Device code

| | | | | | | | |
|---|---|---|---|----|---|---|----|
| V | 5 | N | M | 15 | 3 | H | M3 |
| ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ | ⑧ |

- 1** - Vishay TMBS product
- 2** - Current rating (5 = 5 A)
- 3** - Package type (N = DFN3820A)
- 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 / Environment 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 |
| V5NM153-M3/H | 0.023 | H | 3500 | 7" diameter plastic tape and reel |
| V5NM153-M3/I | 0.023 | I | 14 000 | 13" diameter plastic tape and reel |
| V5NM153HM3/H ⁽¹⁾ | 0.023 | H | 3500 | 7" diameter plastic tape and reel |
| V5NM153HM3/I ⁽¹⁾ | 0.023 | I | 14 000 | 13" diameter plastic tape and reel |

Note

(1) AEC-Q101 qualified

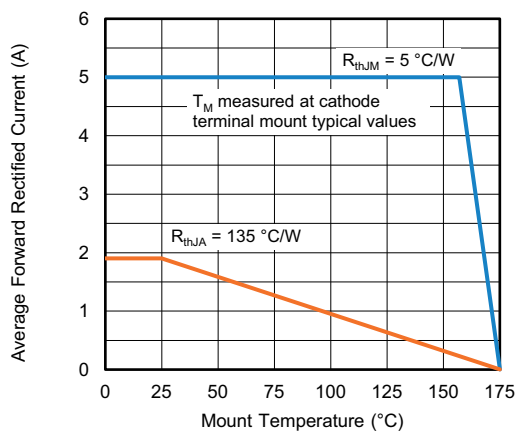
RATINGS AND CHARACTERISTICS CURVES ($T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve

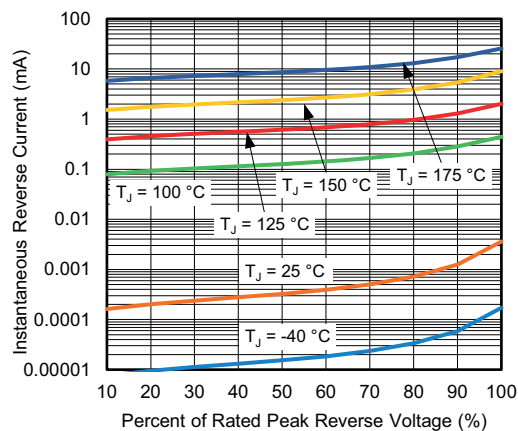


Fig. 4 - Typical Reverse Characteristics

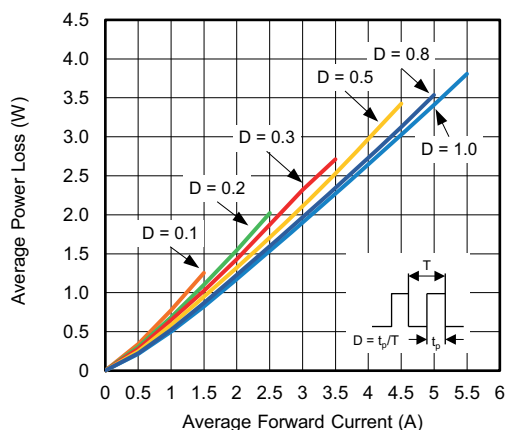


Fig. 2 - Forward Power Loss Characteristics

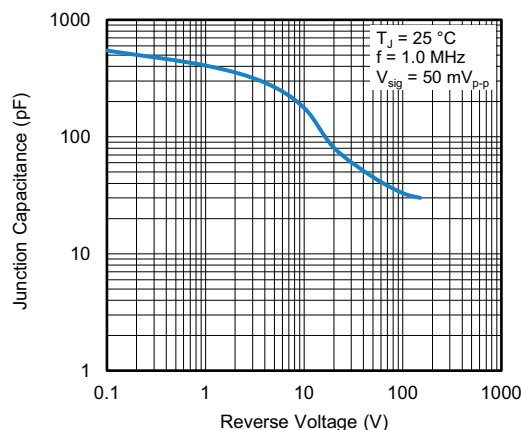


Fig. 5 - Typical Junction Capacitance

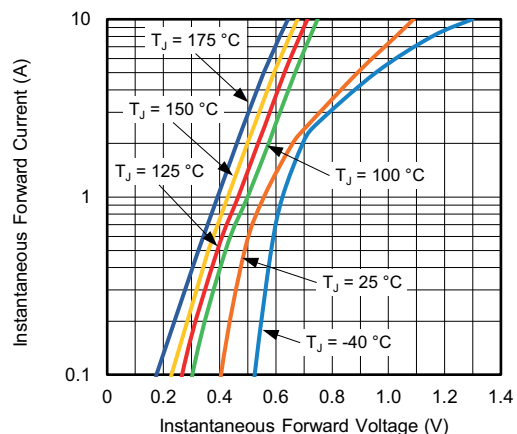


Fig. 3 - Typical Instantaneous Forward Characteristics

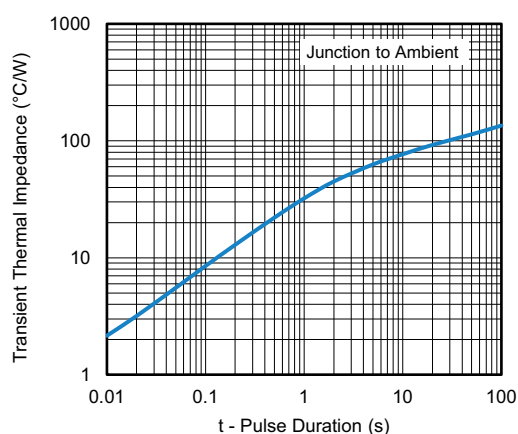
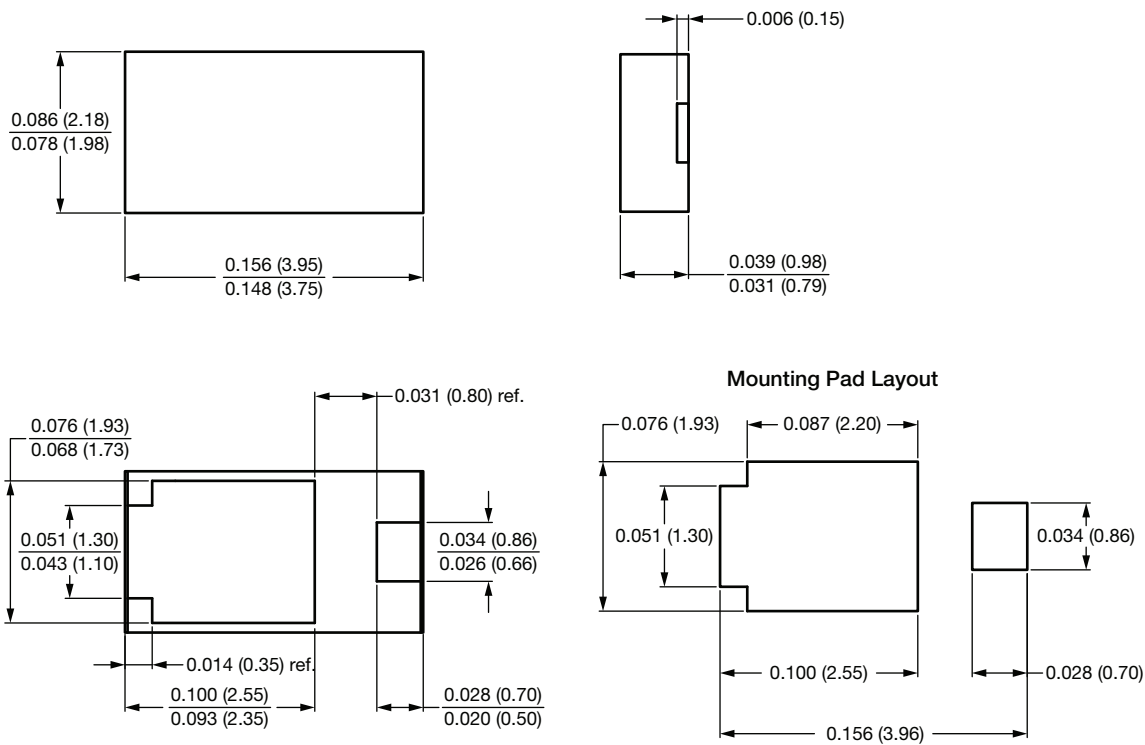


Fig. 6 - Typical Transient Thermal Impedance

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

DFN3820A




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