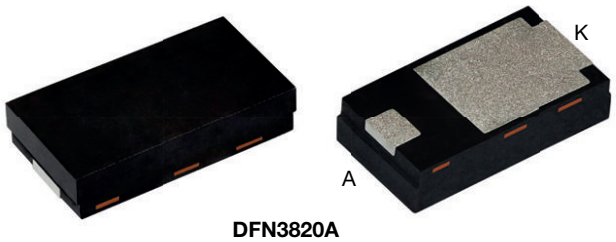
# Surface-Mount TMBS® (Trench MOS Barrier Schottky) Rectifier




DFN3820A

Anode ○—▶|—○ Cathode

## LINKS TO ADDITIONAL RESOURCES

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

| PRIMARY CHARACTERISTICS | |
|---|---|
| $I_{F(AV)}$ | 2.0 A |
| $V_{RRM}$ | 200 V |
| $I_{FSM}$ | 50 A |
| $V_F$ at $I_F$ = 1.0 A ($T_J$ = 125 °C) | 0.60 V |
| $T_J$ max. | 175 °C |
| Package | DFN3820A |
| Circuit configuration | Single |

## FEATURES

AUTOMOTIVE GRADE Available

RoHS COMPLIANT

HALOGEN FREE

- 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

## 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** | **V2N22** | **UNIT** |
| Device marking code | | V2D | |
| Maximum repetitive peak reverse voltage | $V_{RRM}$ | 200 | V |
| Maximum average forward rectified current (fig. 1) | $I_{F(AV)}$ (1) | 2 | A |
| | $I_{F(AV)}$ (2) | 1.5 | A |
| Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load | $I_{FSM}$ | 50 | 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 | $I_F$ = 1.0 A | $T_J$ = 25 °C | $V_F$ (1) | 0.74 | - | V |
| | $I_F$ = 2.0 A | | | 0.80 | 0.85 | |
| | $I_F$ = 1.0 A | $T_J$ = 125 °C | | 0.60 | - | |
| | $I_F$ = 2.0 A | | | 0.66 | 0.72 | |
| Reverse current | $V_R$ = 160 V | $T_J$ = 25 °C | $I_R$ (2) | 0.00015 | - | mA |
| | | $T_J$ = 125 °C | | 0.14 | - | |
| | $V_R$ = 200 V | $T_J$ = 25 °C | | - | 0.04 | |
| | | $T_J$ = 125 °C | | 0.3 | 1.0 | |
| Typical junction capacitance | 4.0 V, 1 MHz | | $C_J$ | 110 | - | 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) | 140 | 175 | °C/W |
| | $R_{\theta JM}$ (3) | 6 | 7.5 | |

**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 | 2 | N | 2 | 2 | H | M3 |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

1 - Vishay TMBS product

2 - Current rating (2 = 2 A)

3 - Package type (N = DFN3820A)

4 - Voltage rating (2 = 200 V)

5 - TMBS generation option (2 = gen 2)

6 - Quality grade (H = AEC-Q101 qualified, - = industry grade)

7 - 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** |
| V2N22-M3/H | 0.023 | H | 3500 | 7" diameter plastic tape and reel |
| V2N22-M3/I | 0.023 | I | 14 000 | 13" diameter plastic tape and reel |
| V2N22HM3/H (1) | 0.023 | H | 3500 | 7" diameter plastic tape and reel |
| V2N22HM3/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 °C unless otherwise noted)

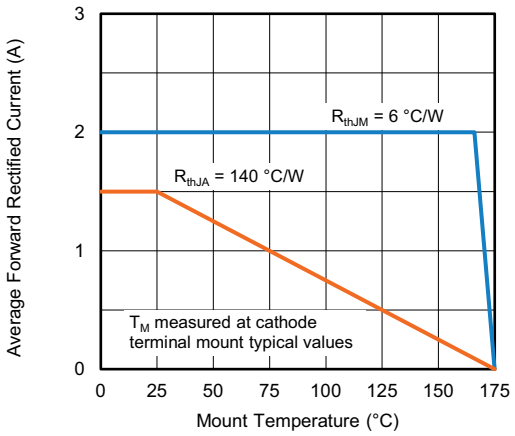



Fig. 1 - Maximum Forward Current Derating Curve

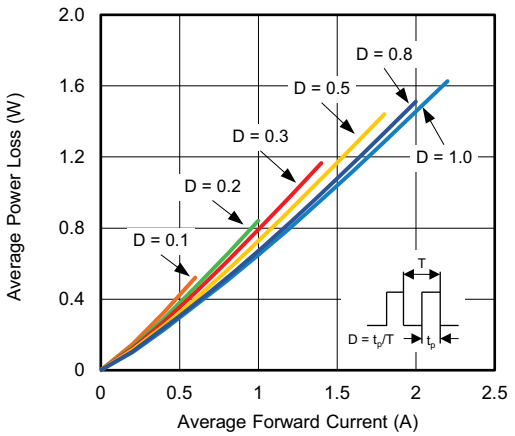



Fig. 2 - Forward Power Loss Characteristics

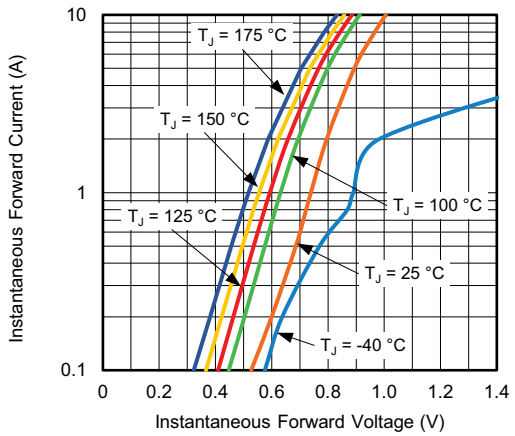



Fig. 3 - Typical Instantaneous Forward Characteristics

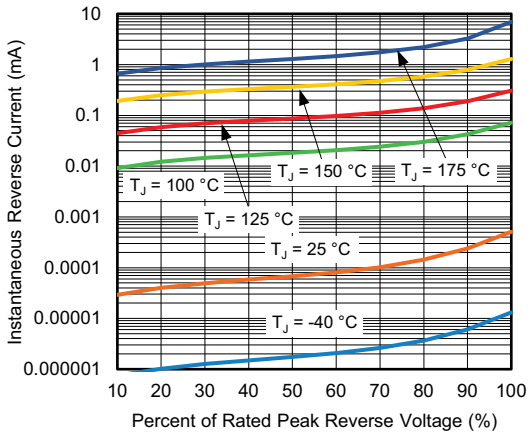



Fig. 4 - Typical Reverse Characteristics

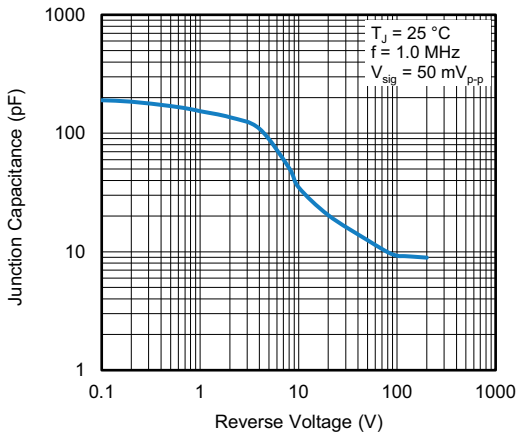



Fig. 5 - Typical Junction Capacitance

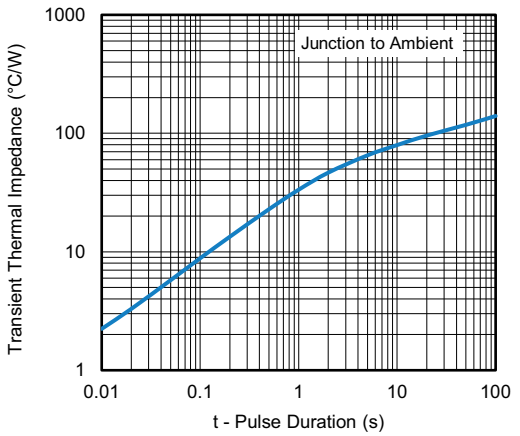
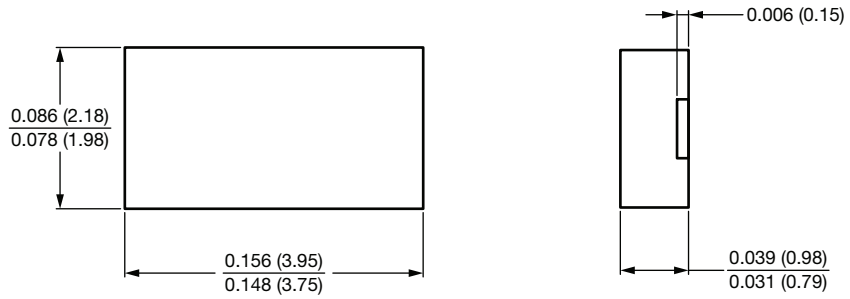
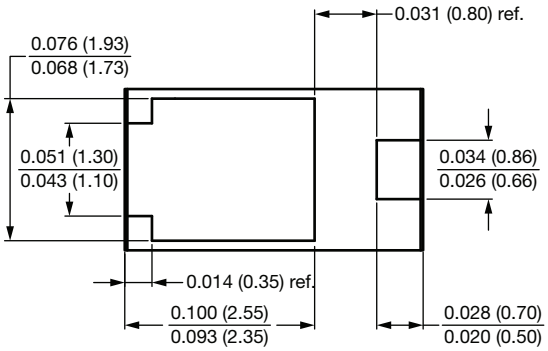



Fig. 6 - Typical Transient Thermal Impedance

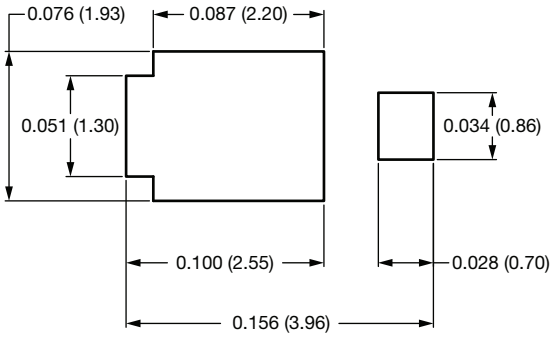
**PACKAGE OUTLINE DIMENSIONS** in inches (millimeters)

**DFN3820A**




Mounting Pad Layout



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