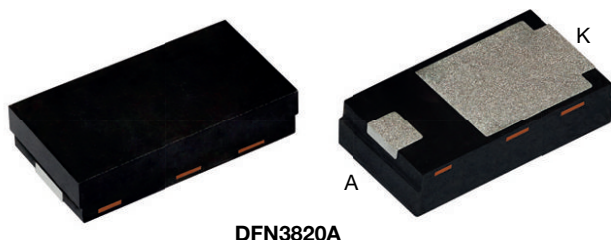


# Surface-Mount TMBS® (Trench MOS Barrier Schottky) Rectifier



DFN3820A

## 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                                  | DFN3820A |
| Circuit configuration                    | Single   |

## 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](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

## 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            | V7NM153     | UNIT |
| Device marking code                                                                |                   | 7MP         |      |
| 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           | A    |
| Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load | $I_{FSM}$         | 120         | 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 <sub>J</sub> = 25 °C unless otherwise noted) |                        |                         |                               |       |      |      |
|----------------------------------------------------------------------------|------------------------|-------------------------|-------------------------------|-------|------|------|
| PARAMETER                                                                  | TEST CONDITIONS        |                         | SYMBOL                        | TYP.  | MAX. | UNIT |
| Instantaneous forward voltage                                              | I <sub>F</sub> = 3.5 A | T <sub>J</sub> = 25 °C  | V <sub>F</sub> <sup>(1)</sup> | 0.71  | -    | V    |
|                                                                            | I <sub>F</sub> = 7 A   |                         |                               | 0.90  | 0.98 |      |
|                                                                            | I <sub>F</sub> = 3.5 A | T <sub>J</sub> = 125 °C |                               | 0.56  | -    |      |
|                                                                            | I <sub>F</sub> = 7 A   |                         |                               | 0.64  | 0.69 |      |
| Reverse current                                                            | V <sub>R</sub> = 100 V | T <sub>J</sub> = 25 °C  | I <sub>R</sub> <sup>(2)</sup> | 0.001 | -    | mA   |
|                                                                            |                        | T <sub>J</sub> = 125 °C |                               | 1.2   | -    |      |
|                                                                            | V <sub>R</sub> = 150 V | T <sub>J</sub> = 25 °C  |                               | -     | 0.07 |      |
|                                                                            |                        | T <sub>J</sub> = 125 °C |                               | 3     | 7    |      |
| Typical junction capacitance                                               | 4.0 V, 1 MHz           |                         | C <sub>J</sub>                | 390   | -    | pF   |

**Notes**(1) Pulse test: 300  $\mu\text{s}$  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 | 7                                                                                                   | N | 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 (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                      |
| V7NM153-M3/H                   | 0.023           | H                      | 3500          | 7" diameter plastic tape and reel  |
| V7NM153-M3/I                   | 0.023           | I                      | 14 000        | 13" diameter plastic tape and reel |
| V7NM153HM3/H <sup>(1)</sup>    | 0.023           | H                      | 3500          | 7" diameter plastic tape and reel  |
| V7NM153HM3/I <sup>(1)</sup>    | 0.023           | I                      | 14 000        | 13" diameter plastic tape and reel |

**Note**

(1) AEC-Q101 qualified

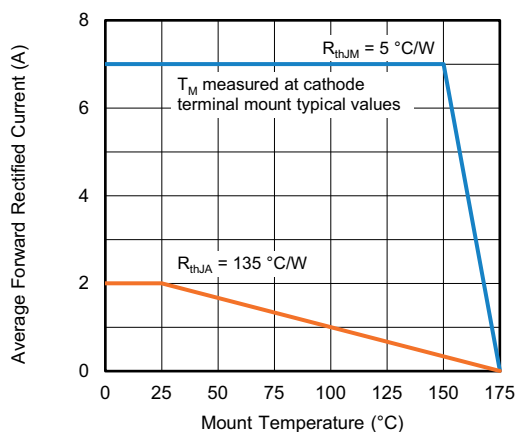
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve

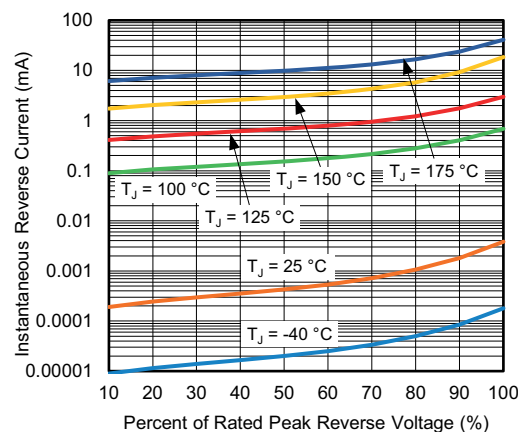


Fig. 4 - Typical Reverse Characteristics

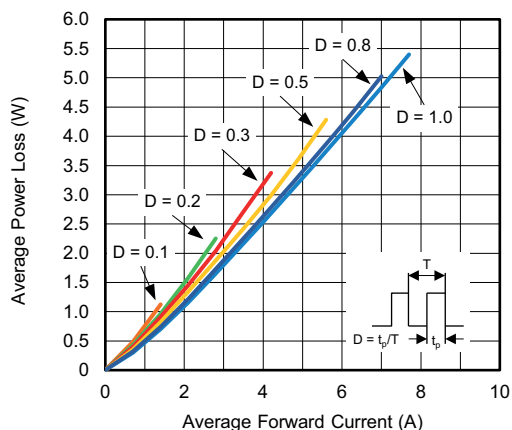


Fig. 2 - Forward Power Loss Characteristics

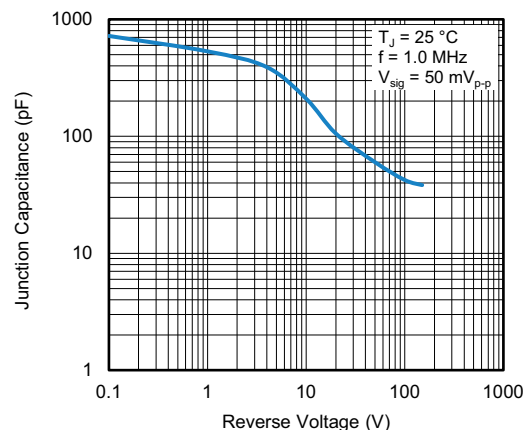


Fig. 5 - Typical Junction Capacitance

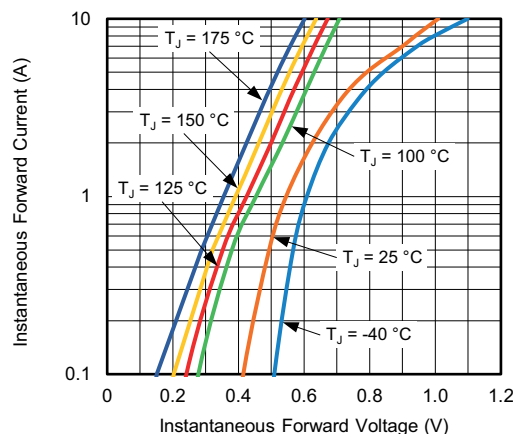


Fig. 3 - Typical Instantaneous Forward Characteristics

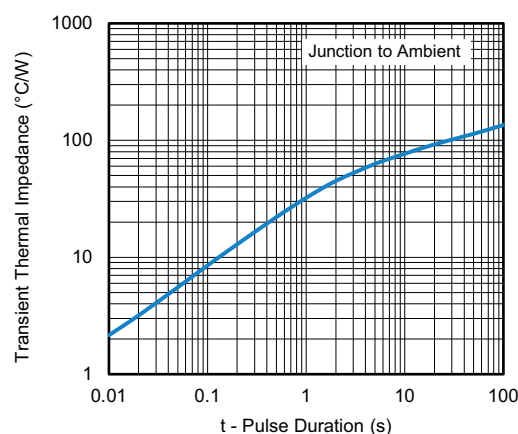
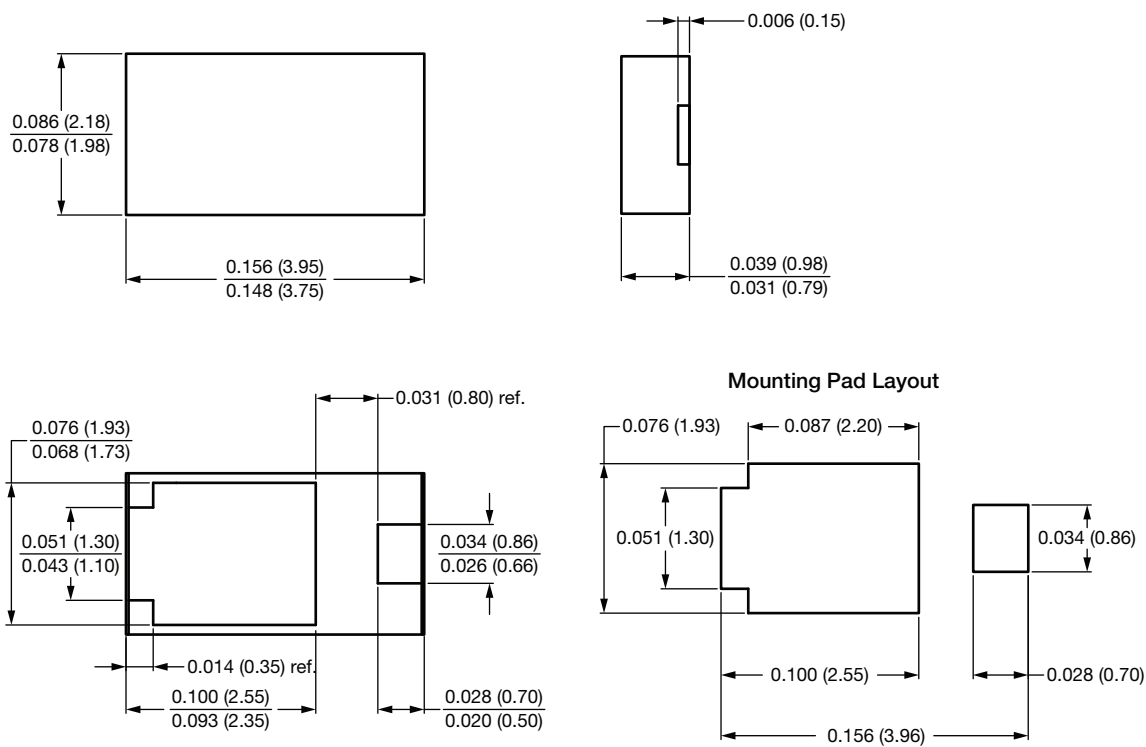


Fig. 6 - Typical Transient Thermal Impedance

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

**DFN3820A**




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