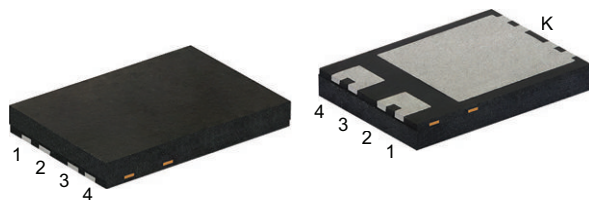
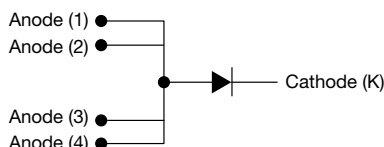


# High Current Density Surface-Mount TMBS® (Trench MOS Barrier Schottky) Rectifier

Ultra Low  $V_F = 0.41\text{ V}$  at  $I_F = 5\text{ A}$



DFN6546A



## LINKS TO ADDITIONAL RESOURCES



| PRIMARY CHARACTERISTICS                                  |          |
|----------------------------------------------------------|----------|
| $I_{F(AV)}$                                              | 10 A     |
| $V_{RRM}$                                                | 60 V     |
| $I_{FSM}$                                                | 200 A    |
| $V_F$ at $I_F = 10.0\text{ A}$ ( $T_J = 125\text{ °C}$ ) | 0.49 V   |
| $T_J$ max.                                               | 175 °C   |
| Package                                                  | DFN6546A |
| 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)
- Very low reverse leakage by TMBS Gen3 technology
- Low power losses, high efficiency
- Compatible to SMPC (TO-277A) package case outline
- 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](http://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:** DFN6546A

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 meets JESD 201 class 2 whisker test

| MAXIMUM RATINGS ( $T_A = 25\text{ °C}$ unless otherwise noted)                    |                   |             |      |
|-----------------------------------------------------------------------------------|-------------------|-------------|------|
| PARAMETER                                                                         | SYMBOL            | V10N6M63    | UNIT |
| Device marking code                                                               |                   | 10M63       |      |
| Maximum repetitive peak reverse voltage                                           | $V_{RRM}$         | 60          | V    |
| Maximum average forward rectified current (fig. 1)                                | $I_{F(AV)}^{(1)}$ | 10          | A    |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load | $I_{FSM}$         | 200         | A    |
| Operating junction temperature range                                              | $T_J^{(2)}$       | -40 to +175 | °C   |
| Storage temperature range                                                         | $T_{STG}$         | -55 to +175 | °C   |

### Notes

(1) With infinite heatsink

(2) 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> = 5.0 A  | T <sub>J</sub> = 25 °C  | V <sub>F</sub> <sup>(1)</sup> | 0.51 | -     | V    |
|                                                                            | I <sub>F</sub> = 10.0 A |                         |                               | 0.57 | 0.67  |      |
|                                                                            | I <sub>F</sub> = 5.0 A  | T <sub>J</sub> = 125 °C |                               | 0.41 | -     |      |
|                                                                            | I <sub>F</sub> = 10.0 A |                         |                               | 0.49 | 0.59  |      |
| Reverse current                                                            | V <sub>R</sub> = 60 V   | T <sub>J</sub> = 25 °C  | I <sub>R</sub> <sup>(2)</sup> | -    | 0.025 | mA   |
|                                                                            |                         | T <sub>J</sub> = 125 °C |                               | 1.3  | 5.0   |      |
| Typical junction capacitance                                               | 4.0 V, 1 MHz            |                         | C <sub>J</sub>                | 1760 | -     | 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 noted) |                       |      |      |                      |
|--------------------------------------------------------------------------------------|-----------------------|------|------|----------------------|
| PARAMETER                                                                            | SYMBOL                | TYP. | MAX. | UNIT                 |
| Thermal resistance                                                                   | $R_{\theta JM}^{(1)}$ | 2    | 2.5  | $^{\circ}\text{C/W}$ |

**Note**

(1) Thermal resistance junction to mount follows JEDEC® 51-14 transient dual interface test method (TDIM)

**ORDERING INFORMATION TABLE**

|             |                                                                                                            |    |    |   |   |   |   |    |
|-------------|------------------------------------------------------------------------------------------------------------|----|----|---|---|---|---|----|
| Device code | V                                                                                                          | 10 | N6 | M | 6 | 3 | H | M3 |
|             | ①                                                                                                          | ②  | ③  | ④ | ⑤ | ⑥ | ⑦ | ⑧  |
| ①           | - Vishay TMBS product                                                                                      |    |    |   |   |   |   |    |
| ②           | - Current rating (10 = 10 A)                                                                               |    |    |   |   |   |   |    |
| ③           | - Package type (N6 = DFN6546A package)                                                                     |    |    |   |   |   |   |    |
| ④           | - Process type (M = low $I_R$ )                                                                            |    |    |   |   |   |   |    |
| ⑤           | - Voltage rating (6 = 60 V)                                                                                |    |    |   |   |   |   |    |
| ⑥           | - TMBS generation option (3 = Gen 3)                                                                       |    |    |   |   |   |   |    |
| ⑦           | - Quality grade (H = AEC-Q101 qualified, otherwise = industry grade)                                       |    |    |   |   |   |   |    |
| ⑧           | - Material / environmental category<br>(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                      |
| V10N6M63-M3/I                  | 0.086           | I                      | 6000          | 13" diameter plastic tape and reel |
| V10N6M63HM3/I <sup>(1)</sup>   | 0.086           | I                      | 6000          | 13" diameter plastic tape and reel |

**Note**

(1) AEC-Q101 qualified

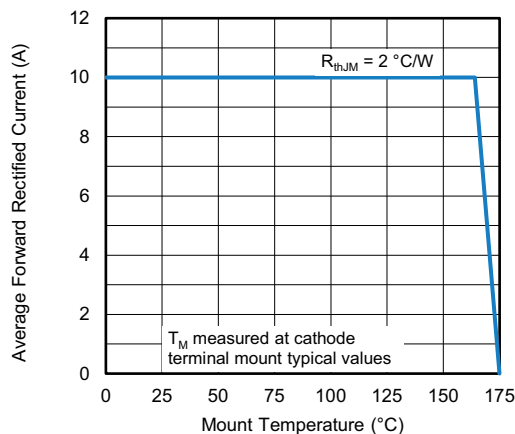
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)


Fig. 1 - Forward Current Derating Curve

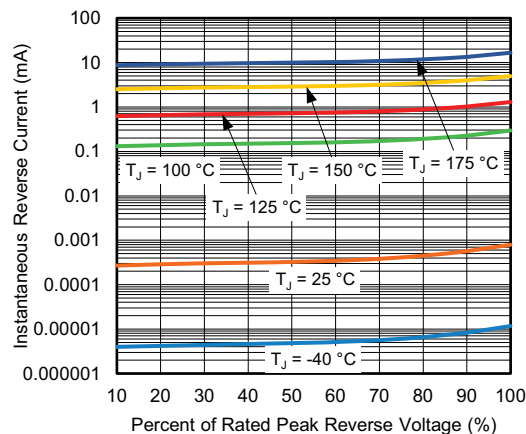


Fig. 4 - Typical Reverse Leakage Characteristics Per Diode

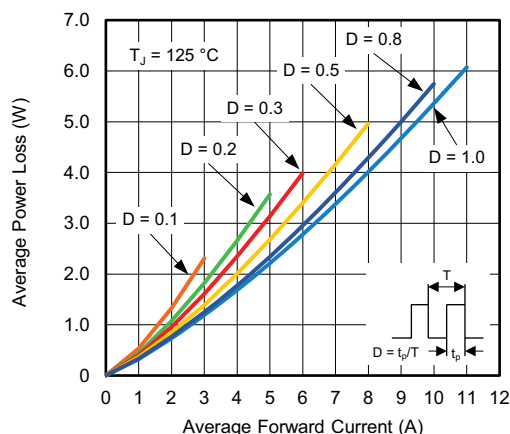


Fig. 2 - Forward Power Loss Characteristics

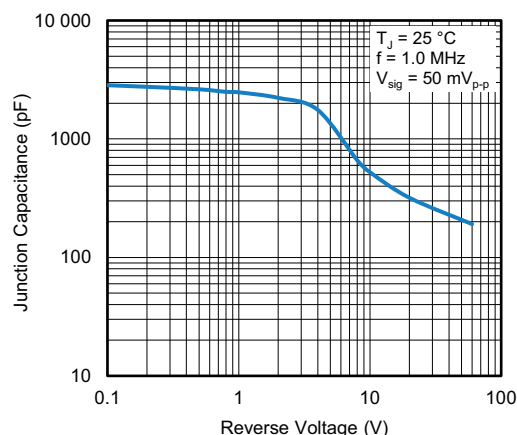


Fig. 5 - Typical Junction Capacitance

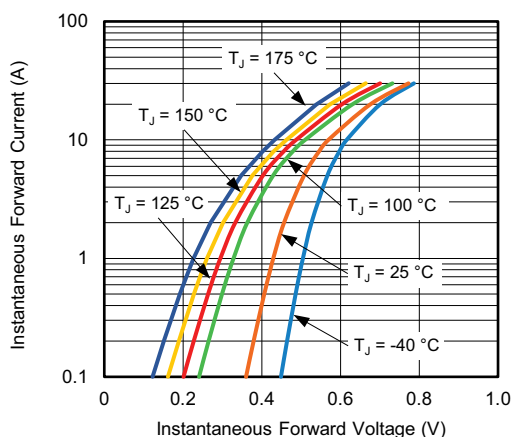


Fig. 3 - Typical Instantaneous Forward Characteristics

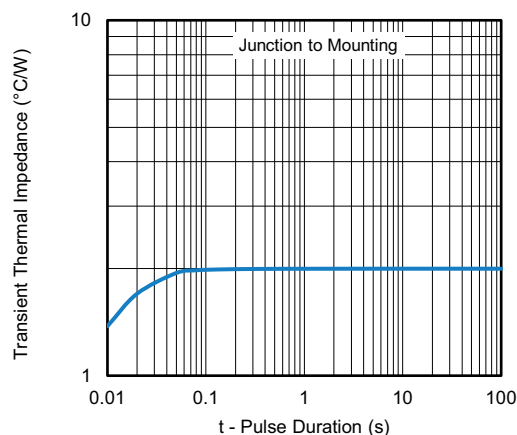
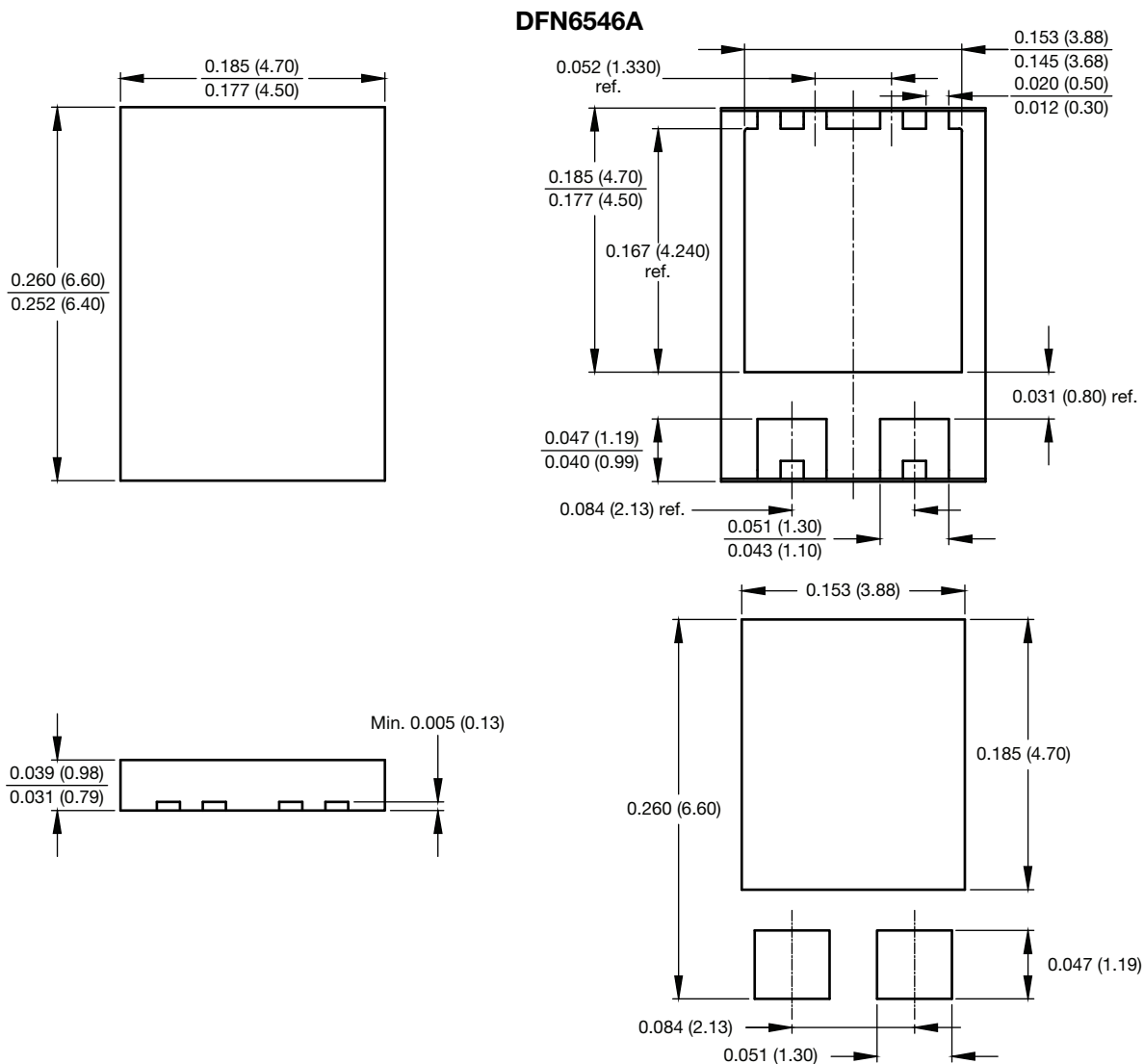


Fig. 6 - Typical Transient Thermal Impedance



PACKAGE OUTLINE DIMENSIONS in inches (millimeters)





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