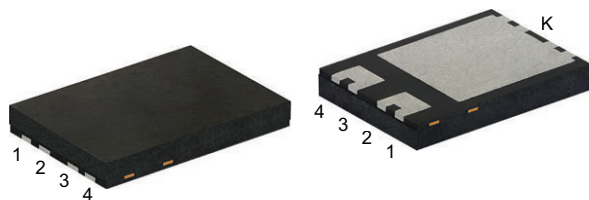
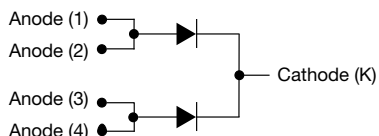


# High Current Density Surface-Mount TMBS® (Trench MOS Barrier Schottky) Rectifier

Ultra Low  $V_F = 0.34\text{ V}$  at  $I_F = 2.5\text{ A}$



DFN6546A



## LINKS TO ADDITIONAL RESOURCES



| PRIMARY CHARACTERISTICS                               |                |
|-------------------------------------------------------|----------------|
| $I_{F(AV)}$                                           | 2 x 5 A        |
| $V_{RRM}$                                             | 60 V           |
| $I_{FSM}$                                             | 120 A          |
| $V_F$ at $I_F = 5\text{ A}$ ( $T_J = 125\text{ °C}$ ) | 0.43 V         |
| $T_J$ max.                                            | 150 °C         |
| Package                                               | DFN6546A       |
| Circuit configuration                                 | Common cathode |

## 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)



**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: 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                     | V10N6L63C   | UNIT |
| Device marking code                                                                         |                            | 10LFC       |      |
| Maximum repetitive peak reverse voltage                                                     | $V_{RRM}$                  | 60          | V    |
| Maximum average forward rectified current (fig. 1)                                          | $I_{F(AV)}$ <sup>(1)</sup> | 10          | A    |
|                                                                                             |                            | 5           | A    |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load per diode | $I_{FSM}$                  | 120         | A    |
| Operating junction temperature range                                                        | $T_J$ <sup>(2)</sup>       | -40 to +150 | °C   |
| Storage temperature range                                                                   | $T_{STG}$                  | -55 to +150 | °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 per diode                                    | I <sub>F</sub> = 2.5 A | T <sub>J</sub> = 25 °C  | V <sub>F</sub> <sup>(1)</sup> | 0.43 | -    | V    |
|                                                                            | I <sub>F</sub> = 5 A   |                         |                               | 0.50 | 0.56 |      |
|                                                                            | I <sub>F</sub> = 2.5 A | T <sub>J</sub> = 125 °C |                               | 0.34 | -    |      |
|                                                                            | I <sub>F</sub> = 5 A   |                         |                               | 0.43 | 0.50 |      |
| Reverse current per diode                                                  | V <sub>R</sub> = 60 V  | T <sub>J</sub> = 25 °C  | I <sub>R</sub> <sup>(2)</sup> | -    | 0.1  | mA   |
|                                                                            |                        | T <sub>J</sub> = 125 °C |                               | 5.5  | 12   |      |
| Typical junction capacitance per diode                                     | 4.0 V, 1 MHz           |                         | C <sub>J</sub>                | 950  | -    | 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 per device                                                        | $R_{\theta JM}^{(1)}$ | 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 | L | 6 | 3 | C | H | M3 |
|             | ①                                                                                                          | ②  | ③  | ④ | ⑤ | ⑥ | ⑦ | ⑧ | ⑨  |
| ①           | - Vishay TMBS product                                                                                      |    |    |   |   |   |   |   |    |
| ②           | - Current rating (10 = 10 A)                                                                               |    |    |   |   |   |   |   |    |
| ③           | - Package type (N6 = DFN6546A package)                                                                     |    |    |   |   |   |   |   |    |
| ④           | - Process type (L = low $V_F$ )                                                                            |    |    |   |   |   |   |   |    |
| ⑤           | - Voltage rating (6 = 60 V)                                                                                |    |    |   |   |   |   |   |    |
| ⑥           | - TMBS generation option (3 = Gen 3)                                                                       |    |    |   |   |   |   |   |    |
| ⑦           | - Circuit configuration (C = common cathode)                                                               |    |    |   |   |   |   |   |    |
| ⑧           | - Quality grade (H = AEC-Q101 qualified, otherwise = industry grade)                                       |    |    |   |   |   |   |   |    |
| ⑨           | - 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                      |
| V10N6L63C-M3/I                 | 0.086           | I                      | 6000          | 13" diameter plastic tape and reel |
| V10N6L63CHM3/I <sup>(1)</sup>  | 0.086           | I                      | 6000          | 13" diameter plastic tape and reel |

**Note**

(1) AEC-Q101 qualified

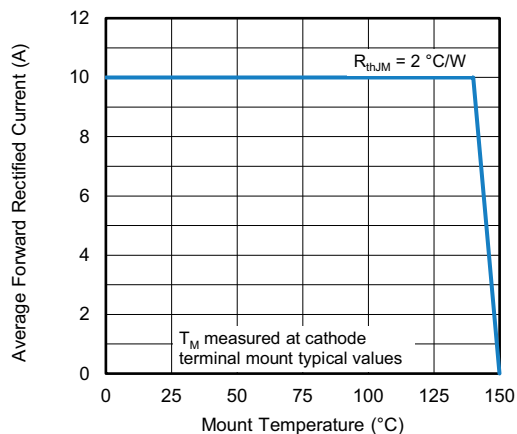
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)


Fig. 1 - Forward Current Derating Curve

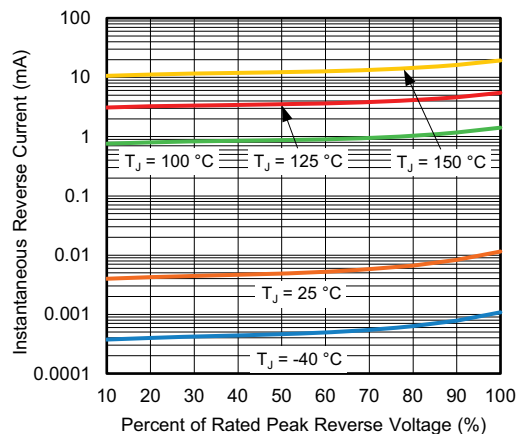


Fig. 4 - Typical Reverse Leakage Characteristics Per Diode

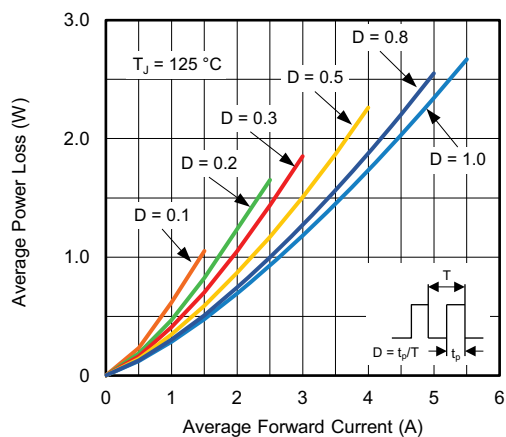


Fig. 2 - Forward Power Loss Characteristics Per Diode

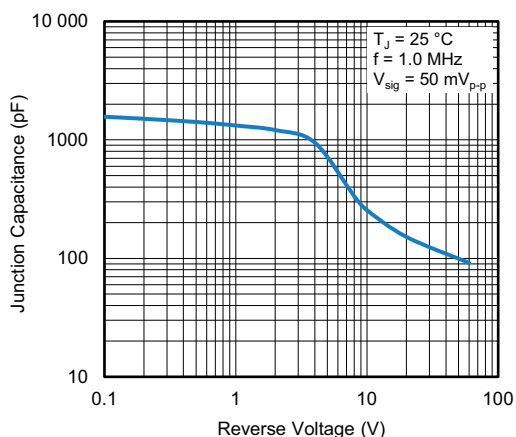


Fig. 5 - Typical Junction Capacitance Per Diode

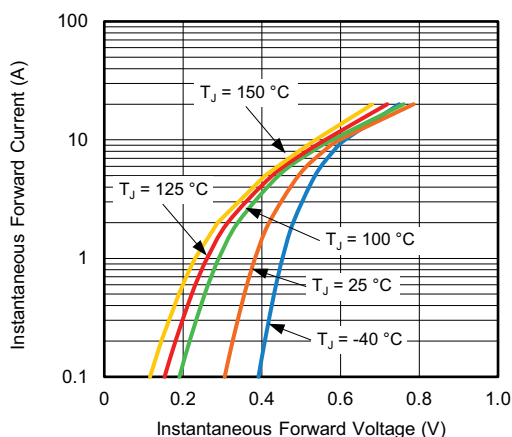


Fig. 3 - Typical Instantaneous Forward Characteristics Per Diode

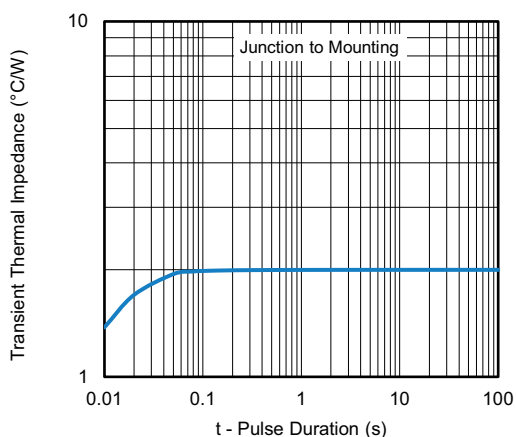
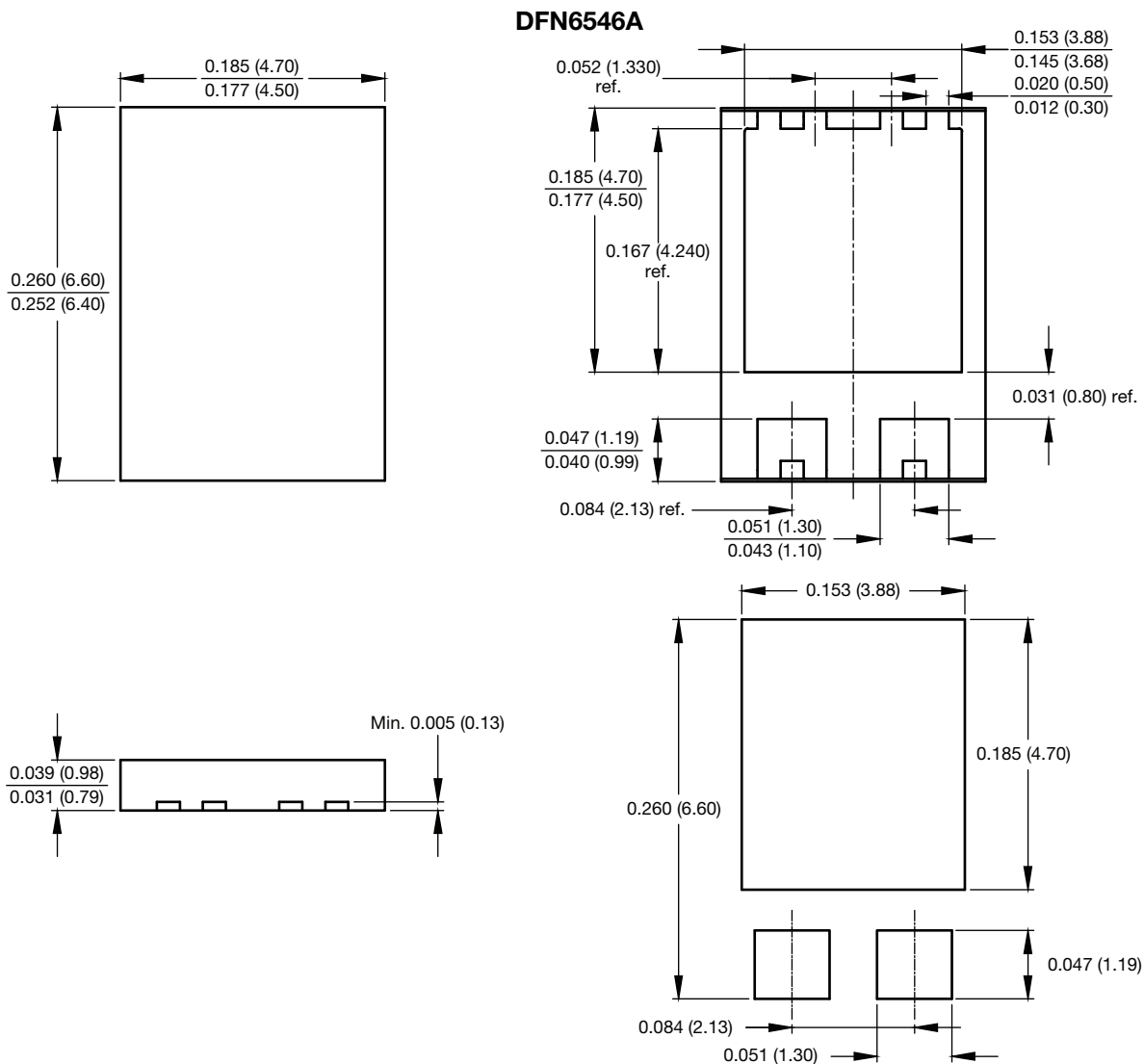


Fig. 6 - Typical Transient Thermal Impedance



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





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