

# Surface Mount Schottky Barrier Rectifiers



## FEATURES

- Low profile package
- Ideal for automated placement
- Low forward voltage drop, low power losses
- 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 high frequency inverters, freewheeling, DC/DC converters, and polarity protection in commercial, industrial, and automotive applications.

## MECHANICAL DATA

**Case:** DO-219AB (SMF)

Molding compound meets UL 94 V-0 flammability rating

Base P/N-M3 - halogen-free, RoHS-compliant

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

**Polarity:** Color band denotes the cathode end

| PRIMARY CHARACTERISTICS                  |                |
|------------------------------------------|----------------|
| $I_{F(AV)}$                              | 1.0 A          |
| $V_{RRM}$                                | 40 V           |
| $I_{FSM}$                                | 40 A           |
| $V_F$ at $I_F = 1.0$ A ( $T_A = 125$ °C) | 0.37 V         |
| $T_J$ max. (AC mode)                     | 150 °C         |
| $T_J$ max. (DC forward current)          | 175 °C         |
| Package                                  | DO-219AB (SMF) |
| Diode variations                         | Single die     |

| MAXIMUM RATINGS ( $T_A = 25$ °C unless otherwise noted)                      |                   |             |      |
|------------------------------------------------------------------------------|-------------------|-------------|------|
| PARAMETER                                                                    | SYMBOL            | SS1F4       | UNIT |
| Device marking code                                                          |                   | 14          |      |
| Maximum repetitive peak reverse voltage                                      | $V_{RRM}$         | 40          | V    |
| Maximum average forward rectified current (fig.1)                            | $I_{F(AV)}^{(1)}$ | 1.0         | A    |
| Peak forward surge current 8.3 ms single half sine-wave $T_J (init) = 25$ °C | $I_{FSM}$         | 40          | A    |
| Operating junction and storage temperature range                             | $T_J, T_{STG}$    | -55 to +175 | °C   |
| Junction temperature in DC forward current without reverse bias              | $T_J$             | 175         | °C   |

### Note

- (1) Free air, mounted on recommended copper pad area



| ELECTRICAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted) |                        |                         |                               |      |      |      |
|----------------------------------------------------------------------------|------------------------|-------------------------|-------------------------------|------|------|------|
| PARAMETER                                                                  | TEST CONDITIONS        |                         | SYMBOL                        | TYP. | MAX. | UNIT |
| Instantaneous forward voltage                                              | I <sub>F</sub> = 0.7 A | T <sub>A</sub> = 25 °C  | V <sub>F</sub> <sup>(1)</sup> | 0.43 | -    | V    |
|                                                                            | I <sub>F</sub> = 1.0 A |                         |                               | 0.46 | 0.52 |      |
|                                                                            | I <sub>F</sub> = 0.7 A | T <sub>A</sub> = 125 °C |                               | 0.33 | -    |      |
|                                                                            | I <sub>F</sub> = 1.0 A |                         |                               | 0.37 | 0.43 |      |
| Reverse current                                                            | V <sub>R</sub> = 40 V  | T <sub>A</sub> = 25 °C  | I <sub>R</sub> <sup>(2)</sup> | -    | 150  | μA   |
|                                                                            |                        | T <sub>A</sub> = 125 °C |                               | 7    | 25   | mA   |
| Typical junction capacitance                                               | 4.0 V, 1 MHz           |                         | C <sub>J</sub>                | 85   | -    | 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                      | SS1F4 | UNIT                 |
| Typical thermal resistance                                                           | $R_{\theta JA}^{(1)(2)(3)}$ | 125   | $^{\circ}\text{C/W}$ |
|                                                                                      | $R_{\theta JM}^{(1)(2)(3)}$ | 16.5  |                      |

**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) Device mounted on FR4 PCB, 2 oz. standard footprint

(3) Thermal resistance  $R_{\theta JA}$  - junction to ambient;  $R_{\theta JM}$  - junction to mount

| ORDERING INFORMATION (Example) |                 |                        |               |                                    |
|--------------------------------|-----------------|------------------------|---------------|------------------------------------|
| PREFERRED P/N                  | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                      |
| SS1F4-M3/H                     | 0.015           | H                      | 3000          | 7" diameter plastic tape and reel  |
| SS1F4-M3/I                     | 0.015           | I                      | 10 000        | 13" diameter plastic tape and reel |
| SS1F4HM3/H <sup>(1)</sup>      | 0.015           | H                      | 3000          | 7" diameter plastic tape and reel  |
| SS1F4HM3/I <sup>(1)</sup>      | 0.015           | I                      | 10 000        | 13" diameter plastic tape and reel |

**Note**<sup>(1)</sup> AEC-Q101 qualified

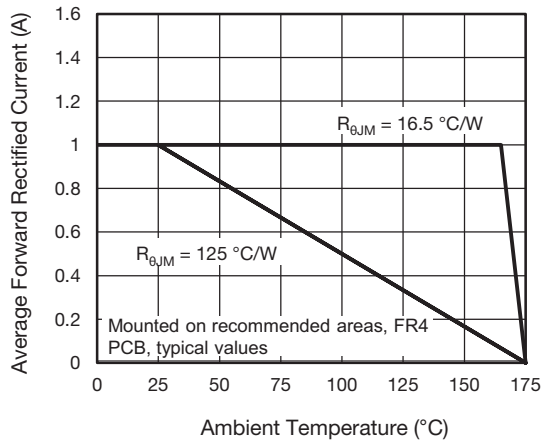
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve

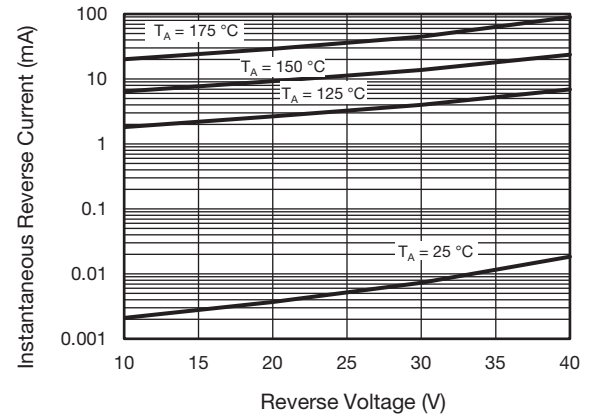


Fig. 4 - Typical Reverse Leakage Characteristics

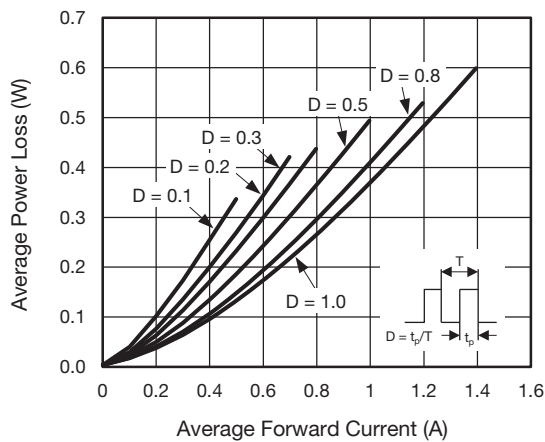


Fig. 2 - Average Power Loss Characteristics

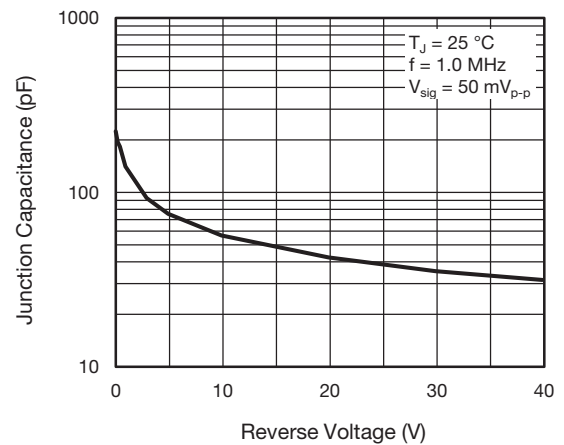


Fig. 5 - Typical Junction Capacitance

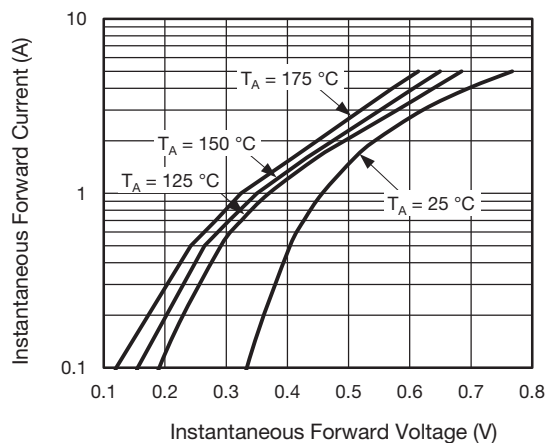


Fig. 3 - Typical Instantaneous Forward Characteristics

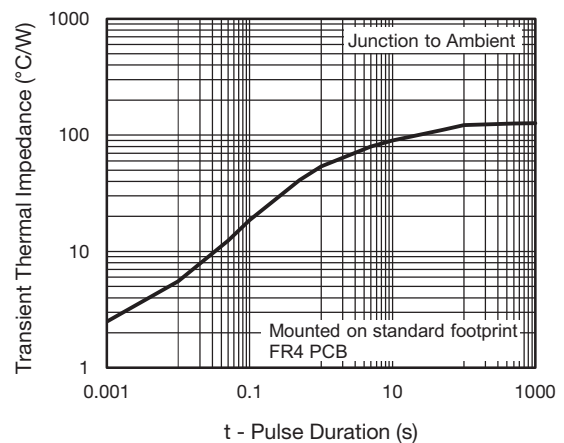
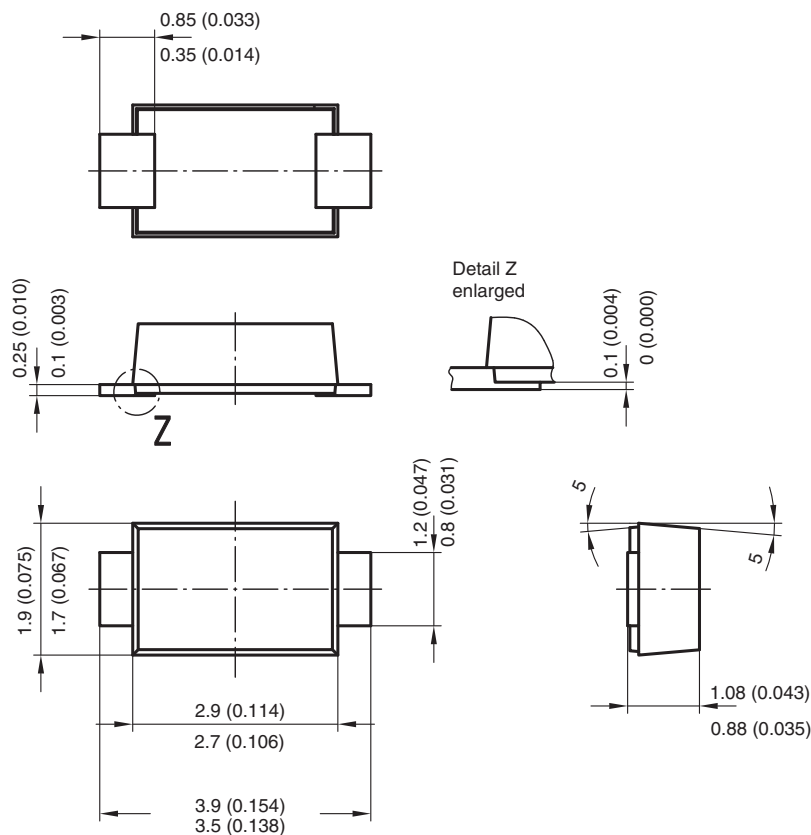
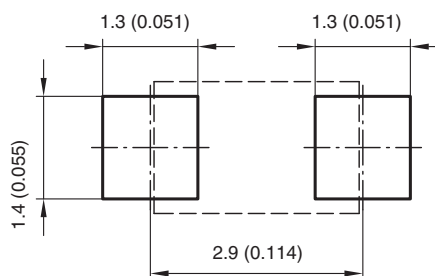


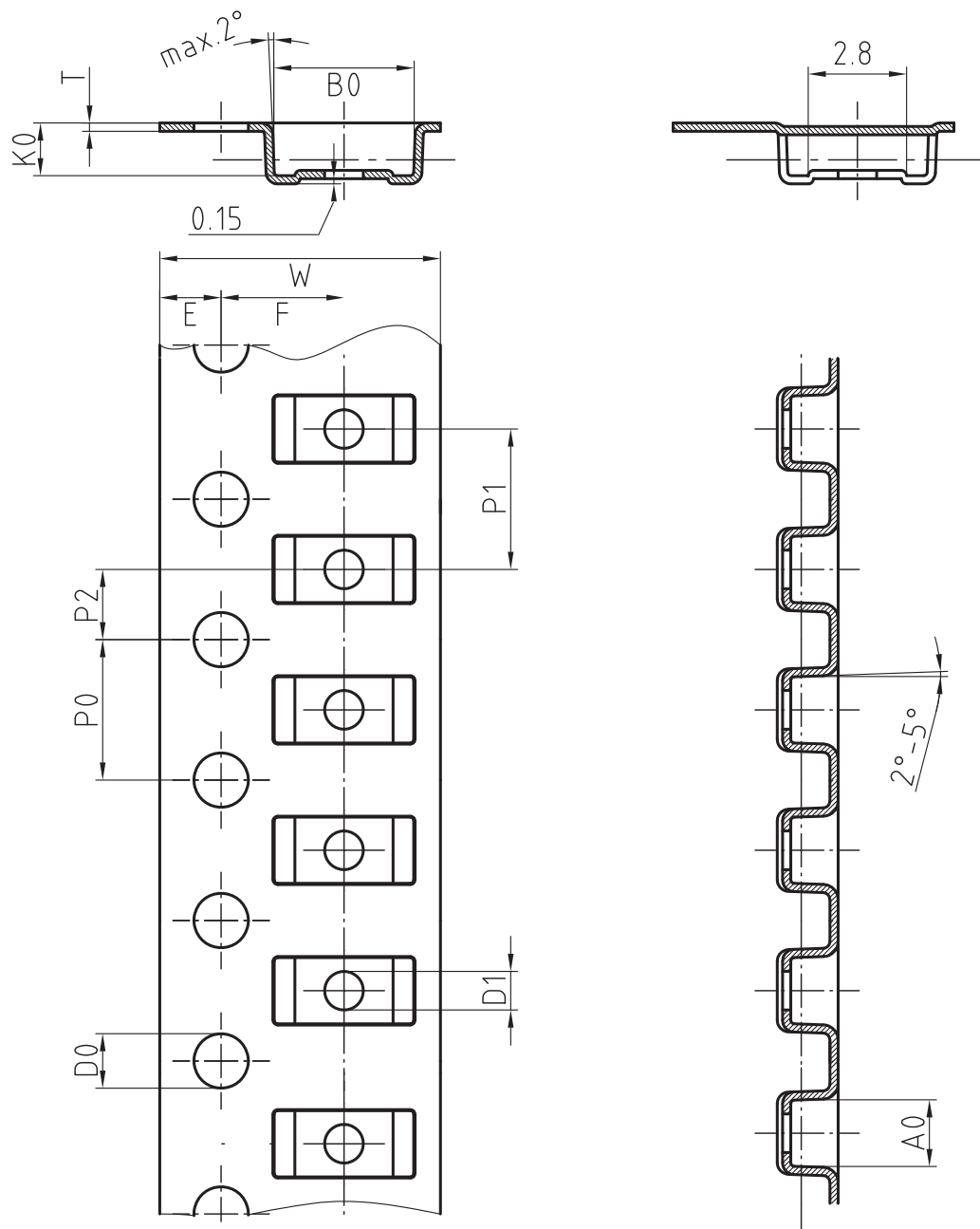
Fig. 6 - Typical Transient Thermal Impedance

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


Foot print recommendation:



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17247

**BLISTERTAPE DIMENSIONS** in millimeters: **DO-219AB (SMF)**


| Mat: | A0  | B0  | K0  | W   | T     | P0  | P2  | P1  | D0  | D1 | E    | F   |
|------|-----|-----|-----|-----|-------|-----|-----|-----|-----|----|------|-----|
| PS   | 1.9 | 4.0 | 1.5 | 8.0 | 0.235 | 4.0 | 2.0 | 4.0 | 1.5 | 1  | 1.75 | 3.5 |

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