

# Surface-Mount Schottky Barrier Rectifiers

## eSMP® Series



Top view

Bottom view

### SMF (DO-219AB)

Cathode  Anode

## 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
- Wave and reflow solderable
- AEC-Q101 qualified available  
- Automotive ordering code: base P/NHM3
- Compatible to SOD-123W package case outline
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

AUTOMOTIVE  
GRADE  
Available

RoHS  
COMPLIANT  
HALOGEN  
FREE

## LINKS TO ADDITIONAL RESOURCES



3D Models

## 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                                  | SMF (DO-219AB) |
| Circuit configuration                    | Single         |

## TYPICAL APPLICATIONS

For use in high frequency inverters, freewheeling, DC/DC converters, and polarity protection in commercial, industrial, and automotive applications.

## MECHANICAL DATA

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

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

## 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 +150 | °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** ( $T_A = 25\text{ }^{\circ}\text{C}$  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   | $^{\circ}\text{C/W}$ |
|                            | $R_{\theta JM}^{(2)(3)}$    | 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

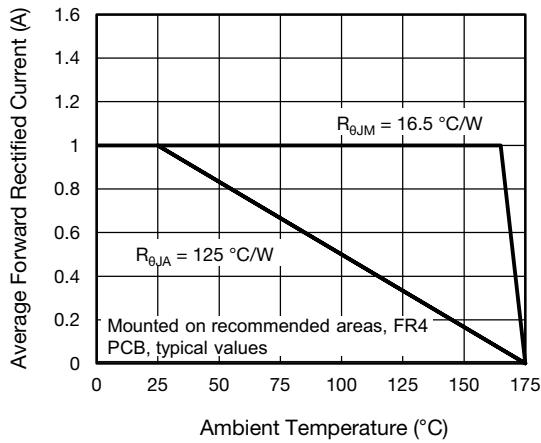
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve

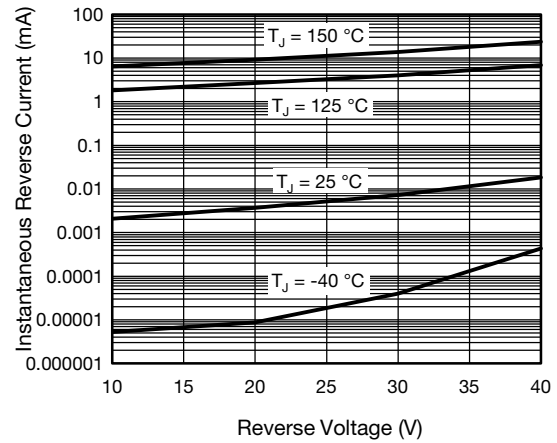


Fig. 4 - Typical Reverse Leakage Characteristics

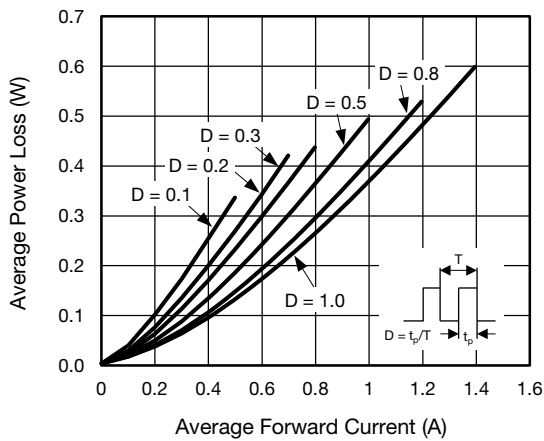


Fig. 2 - Average Power Loss Characteristics

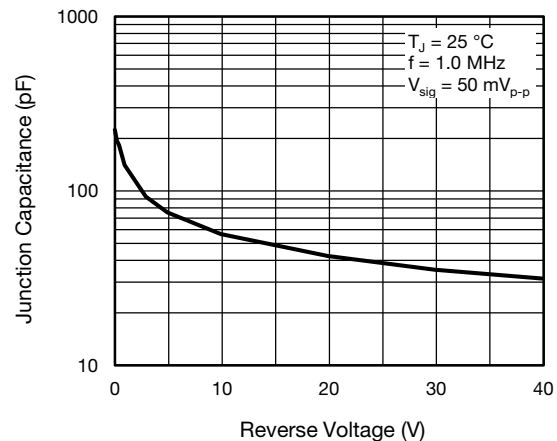


Fig. 5 - Typical Junction Capacitance

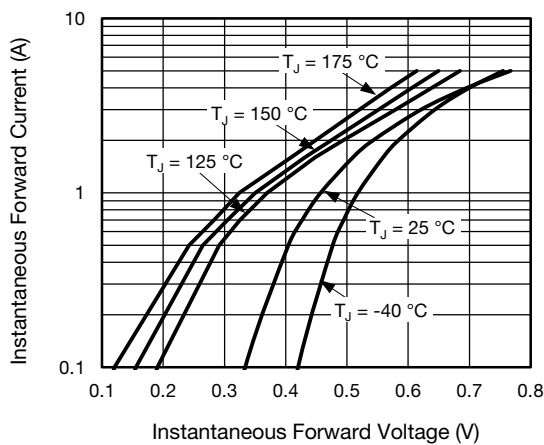


Fig. 3 - Typical Instantaneous Forward Characteristics

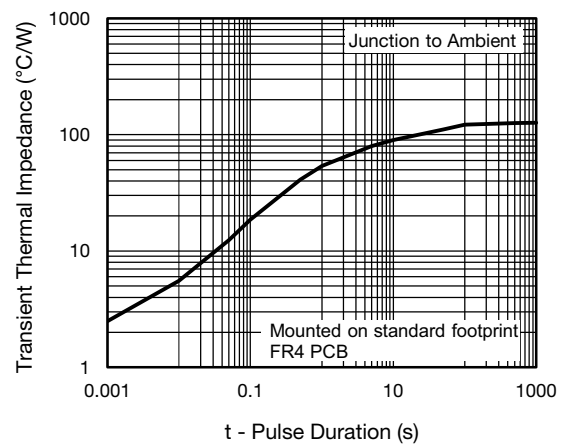
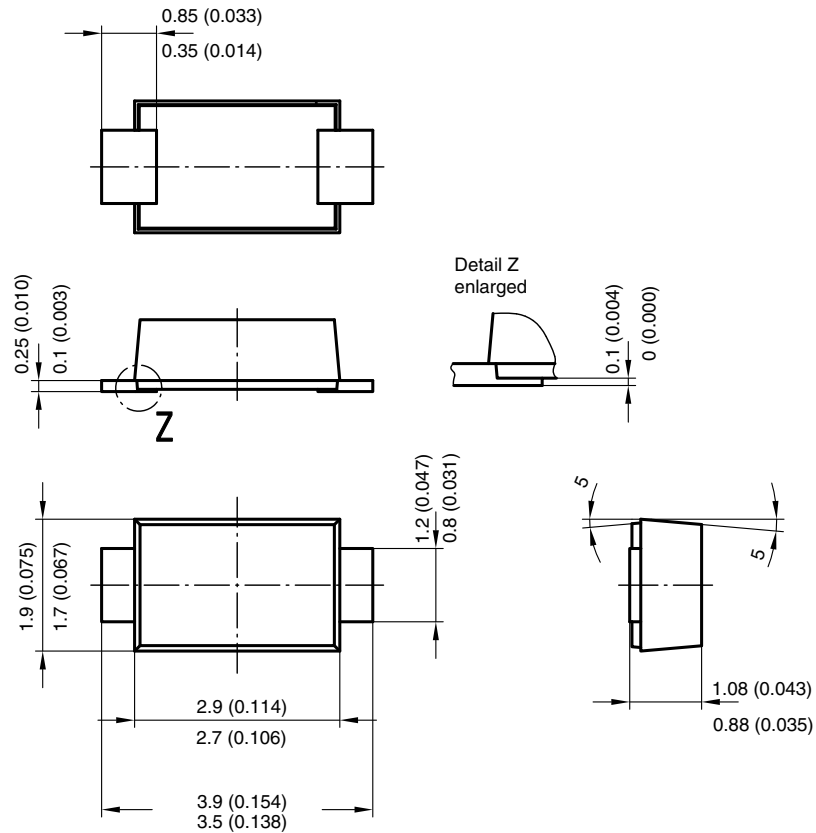
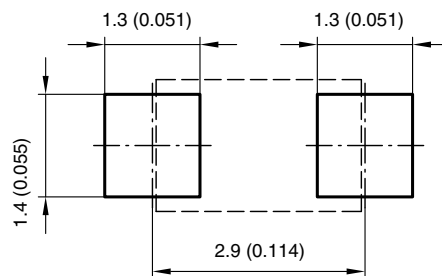


Fig. 6 - Typical Transient Thermal Impedance

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


Foot print recommendation:



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