

## Surface-Mount Standard Rectifiers

### eSMP® Series



Top view

Bottom view

### SMF (DO-219AB)

Cathode  Anode

### LINKS TO ADDITIONAL RESOURCES



3D Models


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

### FEATURES

- Low profile package
- Ideal for automated placement
- Oxide planar chip junction
- Low forward voltage drop, low leakage current
- ESD capability
- 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)

### TYPICAL APPLICATIONS

General purpose, power line 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 - for, halogen-free, and RoHS-compliant

Base P/NHM3 - for 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

|                                          |                     |
|------------------------------------------|---------------------|
| $I_{F(AV)}$                              | 2.0 A               |
| $V_{RRM}$                                | 200 V, 400 V, 600 V |
| $I_{FSM}$                                | 35 A                |
| $V_F$ at $I_F = 2.0$ A ( $T_A = 125$ °C) | 0.85 V              |
| $I_R$                                    | 5 $\mu$ A           |
| $T_J$ max.                               | 175 °C              |
| Package                                  | SMF (DO-219AB)      |
| Circuit configuration                    | Single              |

### MAXIMUM RATINGS ( $T_A = 25$ °C unless otherwise noted)

| PARAMETER                                                                         | SYMBOL                            | SE20FD      | SE20FG | SE20FJ | UNIT |
|-----------------------------------------------------------------------------------|-----------------------------------|-------------|--------|--------|------|
| Device marking code                                                               |                                   | CD          | CG     | CJ     |      |
| Maximum repetitive peak reverse voltage                                           | V <sub>RRM</sub>                  | 200         | 400    | 600    | V    |
| Maximum DC forward current                                                        | I <sub>F(AV)</sub> <sup>(1)</sup> | 2.0         |        |        | A    |
|                                                                                   | I <sub>F(AV)</sub> <sup>(2)</sup> | 1.7         |        |        |      |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load | I <sub>FSM</sub>                  | 35          |        |        | A    |
| Operating junction and storage temperature range                                  | T <sub>J</sub> , T <sub>STG</sub> | -55 to +175 |        |        | °C   |

### Notes

(1) Mounted on 10 mm x 10 mm pad areas, 2 oz. FR4 PCB

(2) 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 | $I_F = 2.0\text{ A}$                                                   | $T_A = 25\text{ }^{\circ}\text{C}$  | $V_F^{(1)}$ | 0.96 | 1.10 | V             |
|                               |                                                                        | $T_A = 125\text{ }^{\circ}\text{C}$ |             | 0.85 | 1.00 |               |
| Reverse current               | Rated $V_R$                                                            | $T_A = 25\text{ }^{\circ}\text{C}$  | $I_R^{(2)}$ | -    | 5    | $\mu\text{A}$ |
|                               |                                                                        | $T_A = 125\text{ }^{\circ}\text{C}$ |             | 7.6  | 100  |               |
| Typical reverse recovery time | $I_F = 0.5\text{ A}$ , $I_R = 1.0\text{ A}$ , $I_{rr} = 0.25\text{ A}$ |                                     | $t_{rr}$    | 920  | -    | ns            |
| Typical junction capacitance  | 4.0 V, 1 MHz                                                           |                                     | $C_J$       | 13   | -    | pF            |

**Notes**(1) Pulse test: 300  $\mu\text{s}$  pulse width, 1 % duty cycle(2) Pulse test: Pulse width  $\leq 40\text{ ms}$ **THERMAL CHARACTERISTICS** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)

| PARAMETER                  | SYMBOL                          | SE20FD | SE20FG | SE20FJ | UNIT |
|----------------------------|---------------------------------|--------|--------|--------|------|
| Typical thermal resistance | R <sub>θJA</sub> <sup>(1)</sup> | 130    |        |        | °C/W |
|                            | R <sub>θJM</sub> <sup>(1)</sup> | 20     |        |        |      |

**Note**(1) Free air, mounted on recommended PCB, 2 oz. pad area; thermal resistance  $R_{\theta JA}$  - junction to ambient;  $R_{\theta JM}$  - junction to mount**IMMUNITY TO ELECTRICAL STATIC DISCHARGE TO THE FOLLOWING STANDARDS**( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)

| STANDARD     | TEST TYPE                       | TEST CONDITIONS                                | SYMBOL | CLASS | VALUE           |
|--------------|---------------------------------|------------------------------------------------|--------|-------|-----------------|
| AEC-Q101-001 | Human body model (contact mode) | $C = 100\text{ pF}$ , $R = 1.5\text{ k}\Omega$ | $V_C$  | H3B   | $> 8\text{ kV}$ |

**ORDERING INFORMATION** (Example)

| PREFERRED P/N              | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                      |
|----------------------------|-----------------|------------------------|---------------|------------------------------------|
| SE20FJ-M3/H                | 0.015           | H                      | 3000          | 7" diameter plastic tape and reel  |
| SE20FJ-M3/I                | 0.015           | I                      | 10 000        | 13" diameter plastic tape and reel |
| SE20FJHM3/H <sup>(1)</sup> | 0.015           | H                      | 3000          | 7" diameter plastic tape and reel  |
| SE20FJHM3/I <sup>(1)</sup> | 0.015           | I                      | 10 000        | 13" diameter plastic tape and reel |

**Note**

(1) AEC-Q101 qualified



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

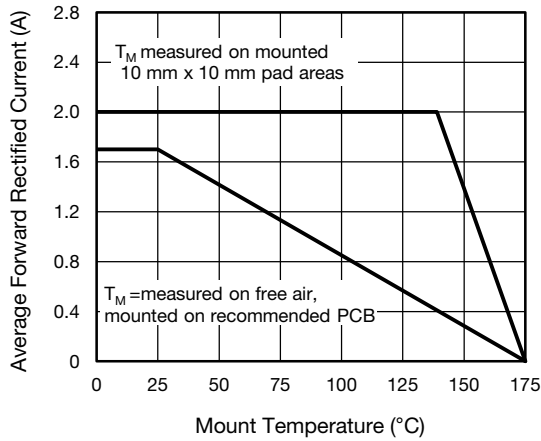


Fig. 1 - Maximum Forward Current Derating Curve

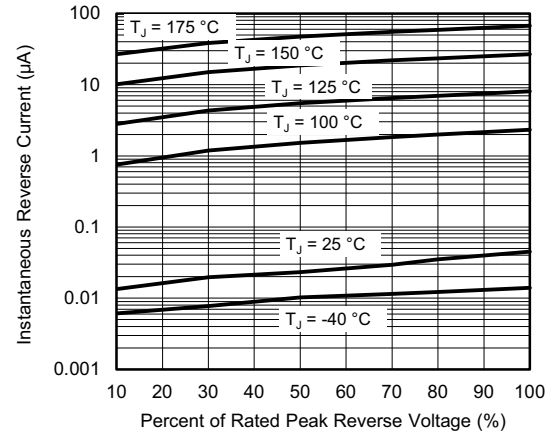


Fig. 4 - Typical Reverse Leakage Characteristics

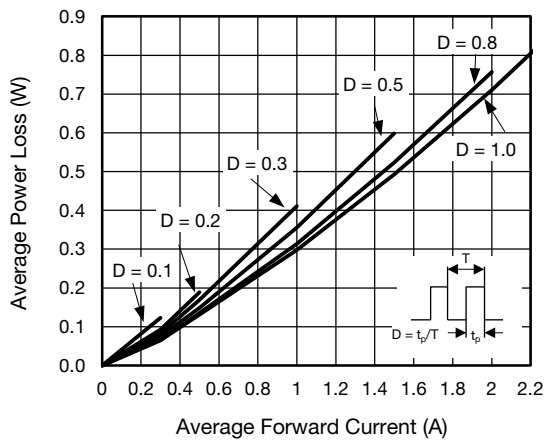


Fig. 2 - Average Power Loss Characteristics

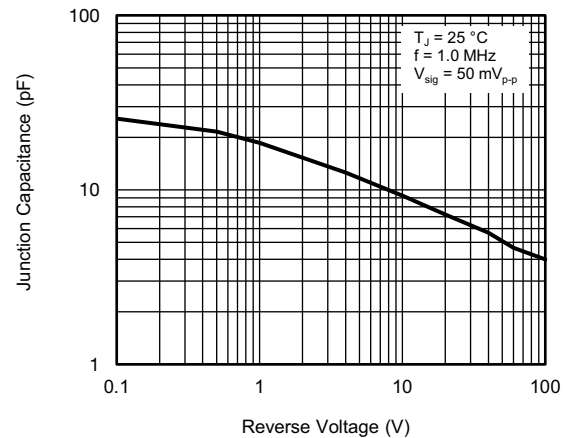


Fig. 5 - Typical Junction Capacitance

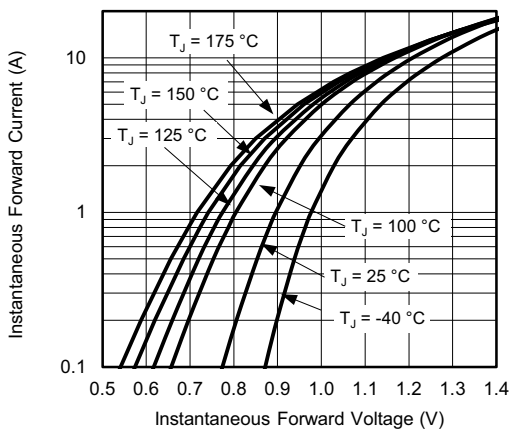


Fig. 3 - Typical Instantaneous Forward Characteristics

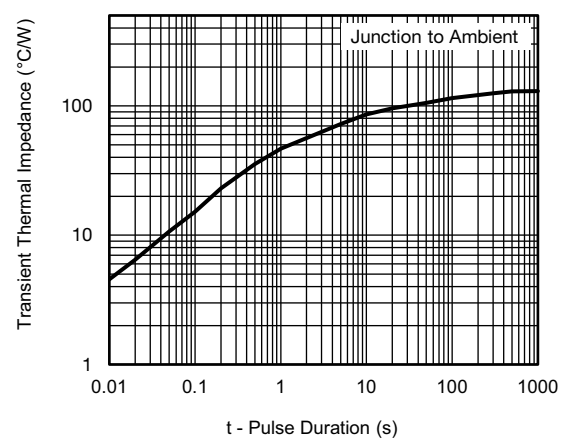
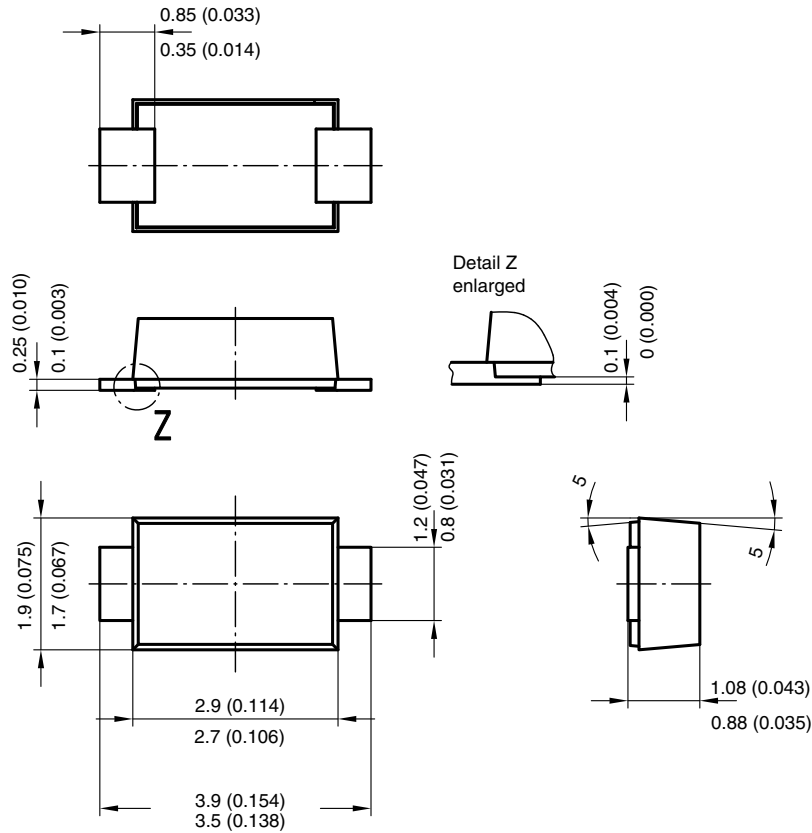


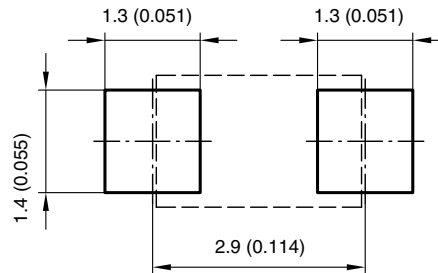
Fig. 6 - Typical Transient Thermal Impedance



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



Foot print recommendation:



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17247



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