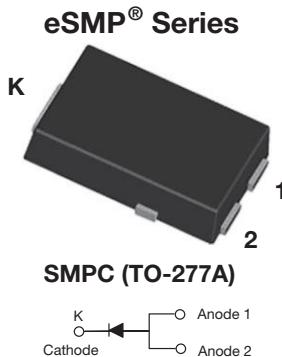


## Surface-Mount ESD Capability Rectifiers



### DESIGN SUPPORT TOOLS


[click logo to get started](#)


### FEATURES

- Very low profile - typical height of 1.1 mm
- Ideal for automated placement
- Oxide planar chip junction
- Low forward voltage drop
- ESD capability
- 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

General purpose, power line polarity protection in both consumer and automotive applications.

### MECHANICAL DATA

#### Case: SMPC (TO-277A)

Molding compound meets UL 94 V-0 flammability rating  
 Base P/N-M3 - halogen-free, RoHS-compliant, and commercial grade  
 Base P/NHM3\_X - halogen-free, RoHS-compliant and AEC-Q101 qualified  
 ("\_X" denotes revision code e.g. A, B,.....)

**Terminals:** matte tin plated leads, solderable per J-STD-002 and JESD 22-B102  
 M3 suffix meets JESD 201 class 1A whisker test, HM3 suffix meets JESD 201 class 2 whisker test

| PRIMARY CHARACTERISTICS          |                |
|----------------------------------|----------------|
| $I_{F(AV)}$                      | 7.0 A          |
| $V_{RRM}$                        | 100 V to 600 V |
| $I_{FSM}$                        | 120 A          |
| $I_R$                            | 10 $\mu$ A     |
| $V_F$ at $I_F = 7.0$ A, (125 °C) | 0.87 V         |
| $T_J$ max.                       | 175 °C         |
| Package                          | SMPC (TO-277A) |
| Circuit configuration            | Single         |

| MAXIMUM RATINGS ( $T_A = 25$ °C unless otherwise noted)                           |                      |             |        |        |        |      |
|---|----------------------|-------------|--------|--------|--------|------|
| PARAMETER   | SYMBOL               | SE70PB      | SE70PD | SE70PG | SE70PJ | UNIT |
| Device marking code   |                      | 70B         | 70D    | 70G    | 70J    |      |
| Maximum repetitive peak reverse voltage   | $V_{RRM}$            | 100         | 200    | 400    | 600    | V    |
| Maximum DC forward current  | $I_F$ <sup>(1)</sup> | 7.0         |        |        |        | A    |
|   | $I_F$ <sup>(2)</sup> | 2.9         |        |        |        |      |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load | $I_{FSM}$            | 120         |        |        |        | A    |
| Operating junction and storage temperature range                                  | $T_J, T_{STG}$       | -55 to +175 |        |        |        | °C   |

#### Notes

(1) Mounted on 30 mm x 30 mm pad areas, 2 oz. FR4 PCB  
 (2) Free air, mounted on recommended copper pad area

| <b>ELECTRICAL CHARACTERISTICS</b> ( $T_A = 25^\circ\text{C}$ unless otherwise noted) |   |                           |             |      |      |               |  |
|--|---|---------------------------|-------------|------|------|---------------|--|
| PARAMETER  | TEST CONDITIONS   |                           | SYMBOL      | TYP. | MAX. | UNIT          |  |
| Instantaneous forward voltage  | $I_F = 3.5 \text{ A}$   | $T_A = 25^\circ\text{C}$  | $V_F^{(1)}$ | 0.90 | -    | V             |  |
|  | $I_F = 7.0 \text{ A}$   |                           |             | 0.97 | 1.05 |               |  |
|  | $I_F = 3.5 \text{ A}$   | $T_A = 125^\circ\text{C}$ |             | 0.79 | -    |               |  |
|  | $I_F = 7.0 \text{ A}$   |                           |             | 0.87 | 0.96 |               |  |
| Reverse current  | rated $V_R$   | $T_A = 25^\circ\text{C}$  | $I_R^{(2)}$ | 0.1  | 10   | $\mu\text{A}$ |  |
|  |   | $T_A = 125^\circ\text{C}$ |             | 20   | 150  |               |  |
| Typical reverse recovery time  | $I_F = 0.5 \text{ A}$ , $I_R = 1.0 \text{ A}$ , $I_{rr} = 0.25 \text{ A}$ | $t_{rr}$                  |             | 2.6  | -    | $\mu\text{s}$ |  |
| Typical junction capacitance   | 4.0 V, 1 MHz  | $C_J$                     |             | 76   | -    | pF            |  |

**Notes**

(1) Pulse test: 300  $\mu\text{s}$  pulse width, 1 % duty cycle

(2) Pulse test: Pulse width  $\leq 40 \text{ ms}$

| <b>THERMAL CHARACTERISTICS</b> ( $T_A = 25^\circ\text{C}$ unless otherwise noted) |                       |        |        |        |        |                    |
|---|-----------------------|--------|--------|--------|--------|--------------------|
| PARAMETER   | SYMBOL                | SE70PB | SE70PD | SE70PG | SE70PJ | UNIT               |
| Typical thermal resistance  | $R_{\theta JA}^{(1)}$ | 62     |        |        |        | $^\circ\text{C/W}$ |
|   | $R_{\theta JM}^{(2)}$ | 5      |        |        |        |                    |

**Notes**

(1) Free air, mounted on recommended PCB 1 oz. pad area; thermal resistance  $R_{\theta JA}$  - junction to ambient

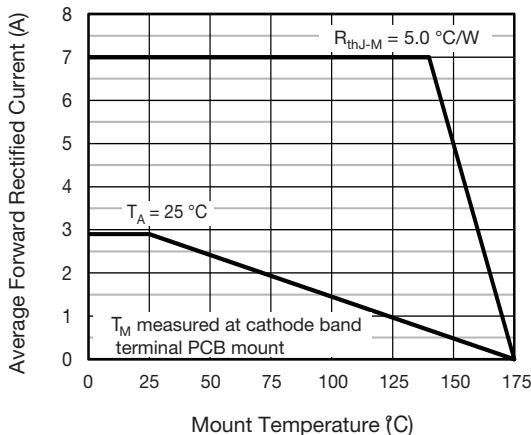
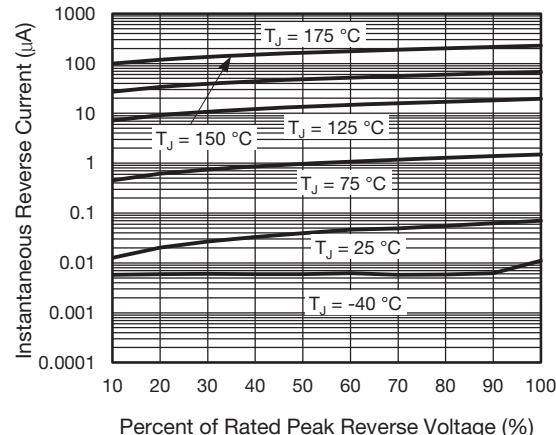
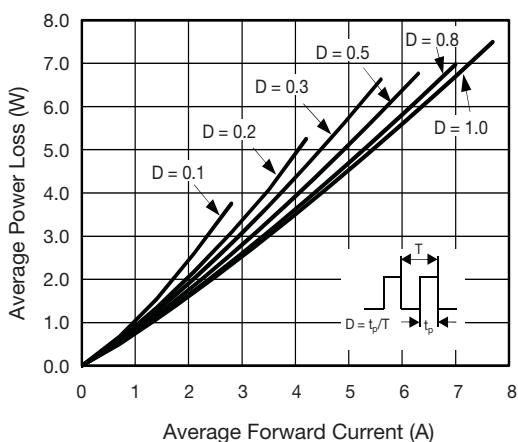
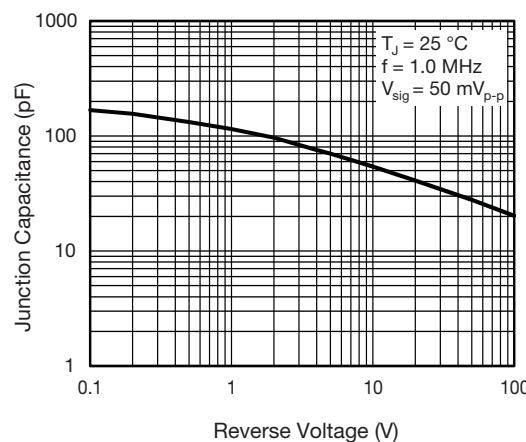
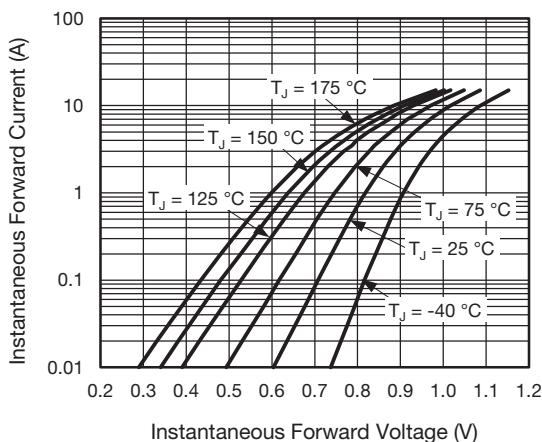
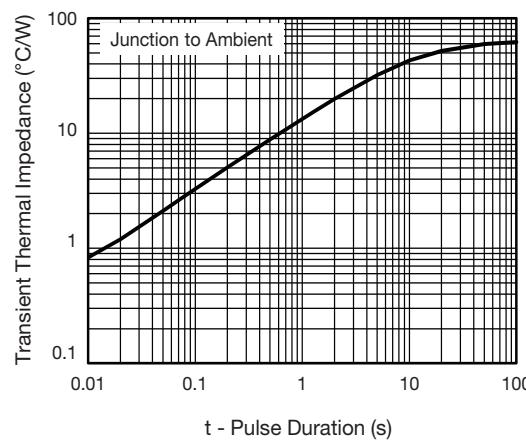
(2) Units mounted on PCB with 30 mm x 30 mm pad areas, 2 oz. FR4 PCB;  $R_{\theta JM}$  - junction to mount

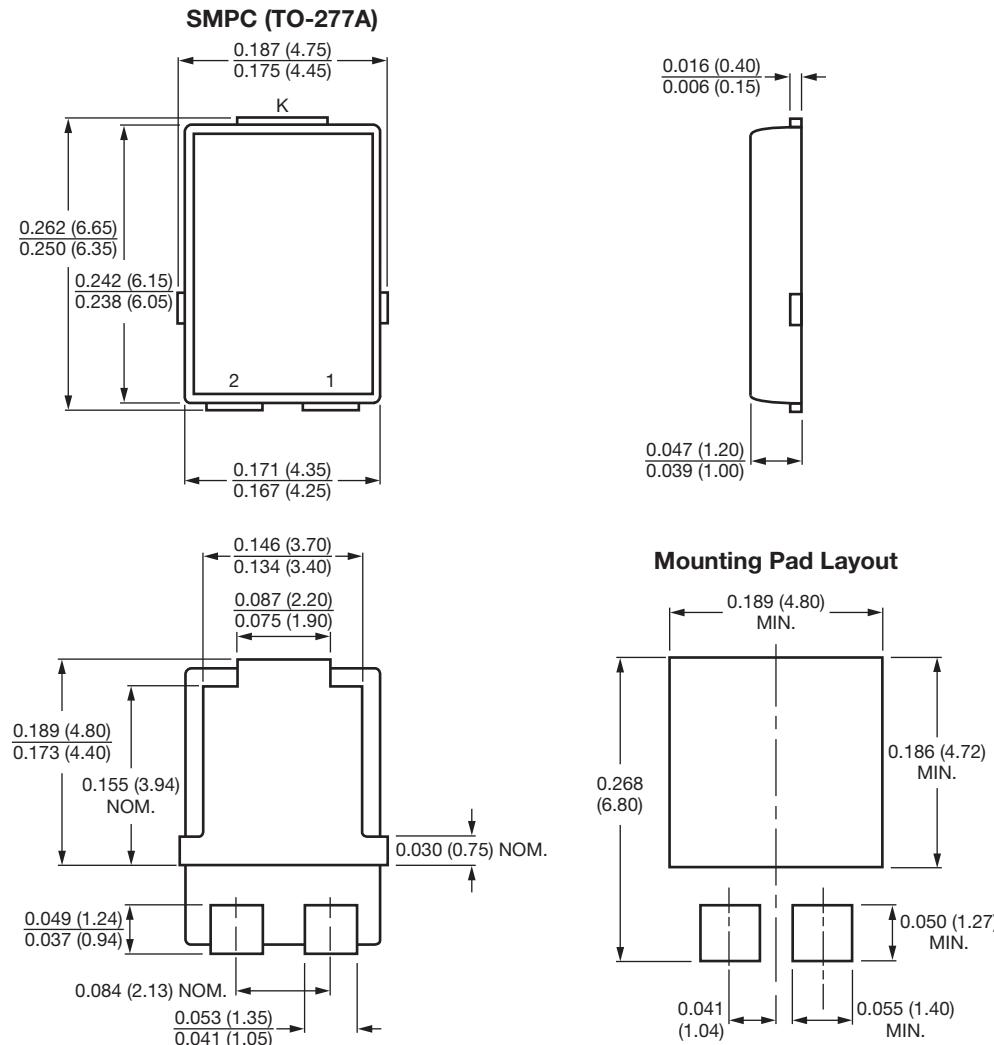
| <b>IMMUNITY TO ELECTRICAL STATIC DISCHARGE TO THE FOLLOWING STANDARDS</b> |                                 |  |        |       |                  |
|---|---------------------------------|--|--------|-------|------------------|
| $(T_A = 25^\circ\text{C}$ , unless otherwise noted)                       |                                 |  |        |       |                  |
| 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   | $> 8 \text{ kV}$ |

| <b>ORDERING INFORMATION</b> (Example) |                 |                        |               |                                    |
|---------------------------------------|-----------------|------------------------|---------------|------------------------------------|
| PREFERRED P/N                         | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                      |
| SE70PJ-M3/86A                         | 0.10            | 86A                    | 1500          | 7" diameter plastic tape and reel  |
| SE70PJ-M3/87A                         | 0.10            | 87A                    | 6500          | 13" diameter plastic tape and reel |
| SE70PJHM3_A/H <sup>(1)</sup>          | 0.10            | H                      | 1500          | 7" diameter plastic tape and reel  |
| SE70PJHM3_A/I <sup>(1)</sup>          | 0.10            | I                      | 6500          | 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 - 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)


Conform to JEDEC® TO-277A

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