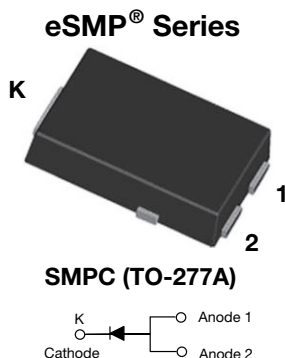


## Surface-Mount ESD Capability Rectifiers



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

### 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

### LINKS TO ADDITIONAL RESOURCES



| 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 <sub>A</sub> = 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 <sub>RRM</sub>                  | 100         | 200    | 400    | 600    | V    |
| Maximum DC forward current                                                        | I <sub>F</sub> <sup>(1)</sup>     | 7.0         |        |        |        | A    |
|                                                                                   | I <sub>F</sub> <sup>(2)</sup>     | 2.9         |        |        |        |      |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load | I <sub>FSM</sub>                  | 120         |        |        |        | A    |
| Operating junction and storage temperature range                                  | T <sub>J</sub> , T <sub>STG</sub> | -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



| 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> = 3.5 A                                                   | T <sub>A</sub> = 25 °C  | V <sub>F</sub> <sup>(1)</sup> | 0.90 | -    | V    |
|                                                                            | I <sub>F</sub> = 7.0 A                                                   |                         |                               | 0.97 | 1.05 |      |
|                                                                            | I <sub>F</sub> = 3.5 A                                                   | T <sub>A</sub> = 125 °C |                               | 0.79 | -    |      |
|                                                                            | I <sub>F</sub> = 7.0 A                                                   |                         |                               | 0.87 | 0.96 |      |
| Reverse current                                                            | rated V <sub>R</sub>                                                     | T <sub>A</sub> = 25 °C  | I <sub>R</sub> <sup>(2)</sup> | 0.1  | 10   | μA   |
|                                                                            |                                                                          | T <sub>A</sub> = 125 °C |                               | 20   | 150  |      |
| Typical reverse recovery time                                              | I <sub>F</sub> = 0.5 A, I <sub>R</sub> = 1.0 A, I <sub>rr</sub> = 0.25 A |                         | t <sub>rr</sub>               | 2.6  | -    | μs   |
| Typical junction capacitance                                               | 4.0 V, 1 MHz                                                             |                         | C <sub>J</sub>                | 76   | -    | 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 <sub>A</sub> = 25 °C unless otherwise noted) |                                 |        |        |        |        |      |
|-------------------------------------------------------------------------|---------------------------------|--------|--------|--------|--------|------|
| PARAMETER                                                               | SYMBOL                          | SE70PB | SE70PD | SE70PG | SE70PJ | UNIT |
| Typical thermal resistance                                              | R <sub>θJA</sub> <sup>(1)</sup> | 62     |        |        |        | °C/W |
|                                                                         | R <sub>θJM</sub> <sup>(2)</sup> | 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

| 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                      |
| 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

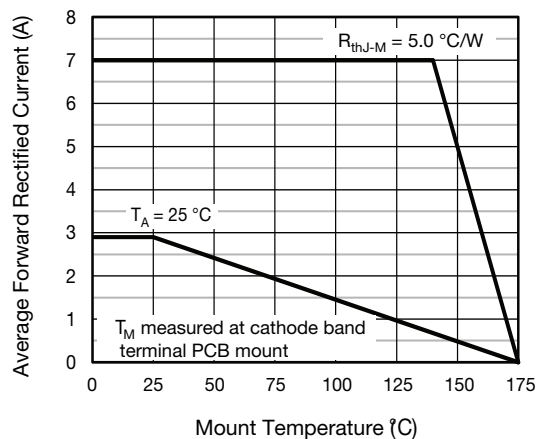
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve

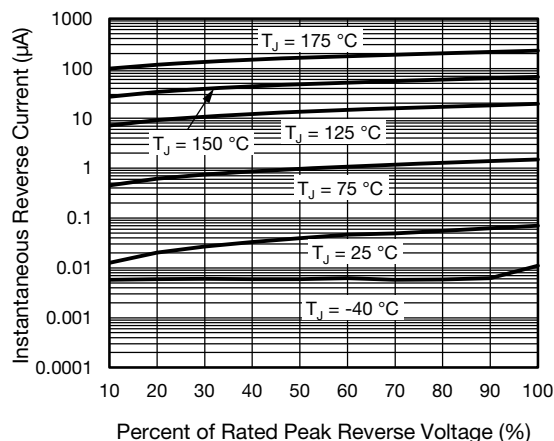


Fig. 4 - Typical Reverse Leakage Characteristics

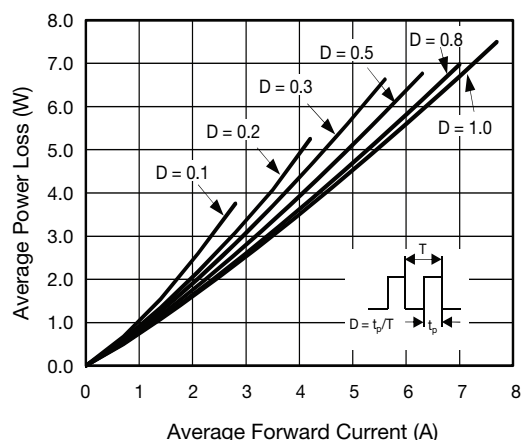


Fig. 2 - Forward Power Loss Characteristics

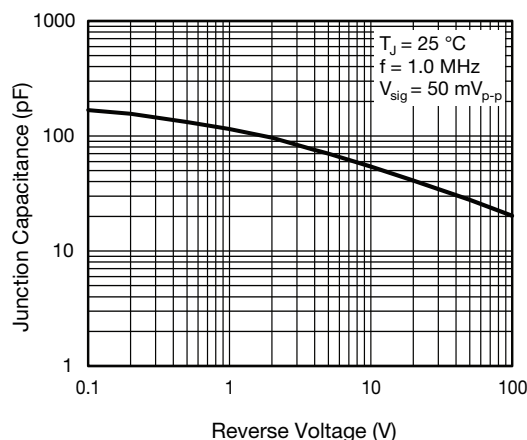


Fig. 5 - Typical Junction Capacitance

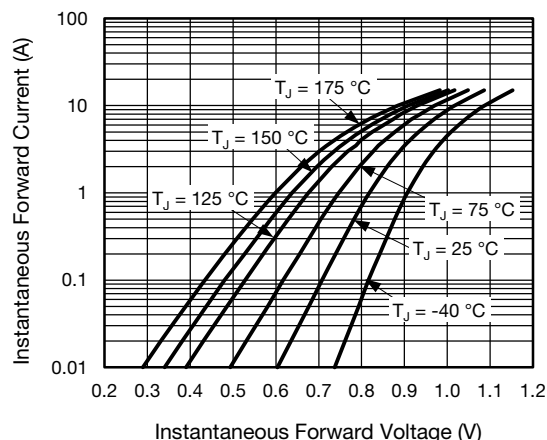


Fig. 3 - Typical Instantaneous Forward Characteristics

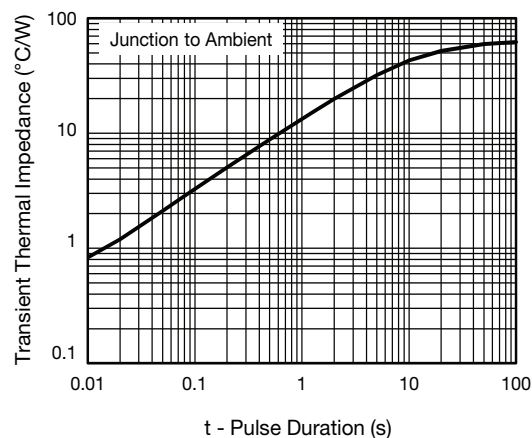
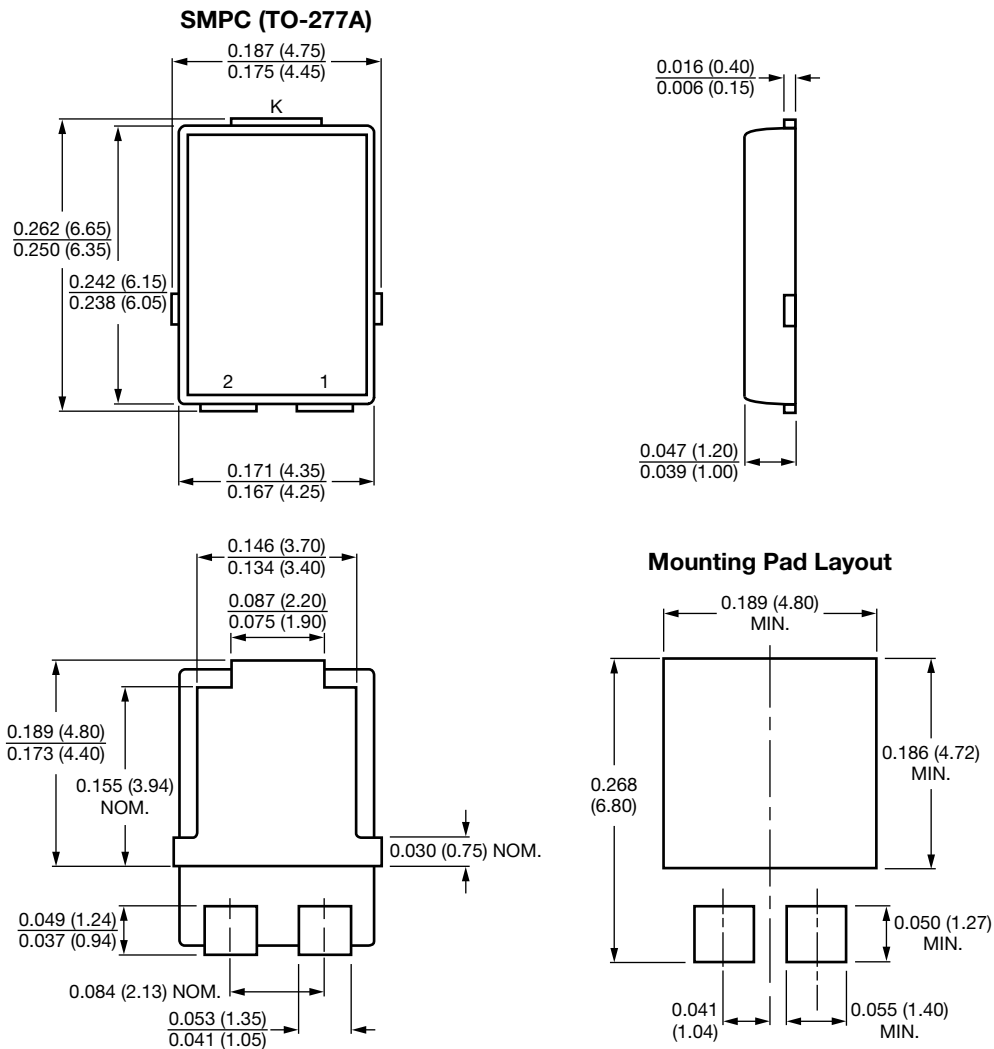


Fig. 6 - Typical Transient Thermal Impedance



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





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