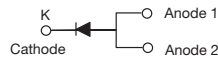


## Surface-Mount ESD Capability Rectifiers

### eSMP® Series



#### SMPC (TO-277A)



### FEATURES

- Very low profile - typical height of 1.1 mm
- Ideal for automated placement
- Oxid 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)

 AUTOMOTIVE  
GRADE  
Available

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

### DESIGN SUPPORT TOOLS

[click logo to get started](#)
**3D**  
Models  
Available

### 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          |                            |
|----------------------------------|----------------------------|
| $I_{F(AV)}$                      | 4.0 A                      |
| $V_{RRM}$                        | 100 V, 200 V, 400 V, 600 V |
| $I_{FSM}$                        | 60 A                       |
| $I_R$                            | 10 $\mu$ A                 |
| $V_F$ at $I_F = 4.0$ A, (125 °C) | 0.91 V                     |
| $T_J$ max.                       | 175 °C                     |
| Package                          | SMPC (TO-277A)             |
| Circuit configuration            | Single                     |

| MAXIMUM RATINGS ( $T_A = 25$ °C unless otherwise noted)                           |                |             |        |        |        |      |
|---|----------------|-------------|--------|--------|--------|------|
| PARAMETER   | SYMBOL         | SE40PB      | SE40PD | SE40PG | SE40PJ | UNIT |
| Device marking code   |                | 40B         | 40D    | 40G    | 40J    |      |
| Maximum repetitive peak reverse voltage   | $V_{RRM}$      | 100         | 200    | 400    | 600    | V    |
| Maximum DC forward current  | $I_F^{(1)}$    | 4.0         |        |        |        | A    |
|   | $I_F^{(2)}$    | 2.4         |        |        |        |      |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load | $I_{FSM}$      | 60          |        |        |        | A    |
| Operating junction and storage temperature range                                  | $T_J, T_{STG}$ | -55 to +175 |        |        |        | °C   |

### Notes

(1) Mounted on 14 mm x 14 mm pad areas, 2 oz. FR4 PCB

(2) Free air, mounted on recommended copper pad area



| <b>ELECTRICAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted) |  |                                   |             |      |      |               |
|--|--|-----------------------------------|-------------|------|------|---------------|
| PARAMETER  | TEST CONDITIONS  |                                   | SYMBOL      | TYP. | MAX. | UNIT          |
| Instantaneous forward voltage  | $I_F = 2.0\text{ A}$   | $T_A = 25\text{ }^\circ\text{C}$  | $V_F^{(1)}$ | 0.92 | -    | V             |
|  | $I_F = 4.0\text{ A}$   |                                   |             | 1.00 | 1.05 |               |
|  | $I_F = 2.0\text{ A}$   | $T_A = 125\text{ }^\circ\text{C}$ |             | 0.82 | -    |               |
|  | $I_F = 4.0\text{ A}$   |                                   |             | 0.91 | 0.96 |               |
| Reverse current  | rated $V_R$  | $T_A = 25\text{ }^\circ\text{C}$  | $I_R^{(2)}$ | 0.1  | 10   | $\mu\text{A}$ |
|  |  | $T_A = 125\text{ }^\circ\text{C}$ |             | 19   | 150  |               |
| Typical reverse recovery time  | $I_F = 0.5\text{ A}$ , $I_R = 1.0\text{ A}$ , $I_{rr} = 0.25\text{ A}$ |                                   | $t_{rr}$    | 2.2  | -    | $\mu\text{s}$ |
| Typical junction capacitance   | 4.0 V, 1 MHz   |                                   | $C_J$       | 28   | -    | 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> ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted) |                       |        |        |        |        |                    |
|---|-----------------------|--------|--------|--------|--------|--------------------|
| PARAMETER   | SYMBOL                | SE40PB | SE40PD | SE40PG | SE40PJ | UNIT               |
| Typical thermal resistance  | $R_{\theta JA}^{(1)}$ | 70     |        |        |        | $^\circ\text{C/W}$ |
|   | $R_{\theta JM}^{(2)}$ | 6.6    |        |        |        |                    |

**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 14 mm x 14 mm pad areas, 2 oz. FR4 PCB;  $R_{\theta JM}$  - junction to mount

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

| <b>ORDERING INFORMATION</b> (Example) |                 |                        |               |                                    |
|---------------------------------------|-----------------|------------------------|---------------|------------------------------------|
| PREFERRED P/N                         | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                      |
| SE40PJ-M3/86A                         | 0.10            | 86A                    | 1500          | 7" diameter plastic tape and reel  |
| SE40PJ-M3/87A                         | 0.10            | 87A                    | 6500          | 13" diameter plastic tape and reel |
| SE40PJHM3_A/H <sup>(1)</sup>          | 0.10            | H                      | 1500          | 7" diameter plastic tape and reel  |
| SE40PJHM3_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)

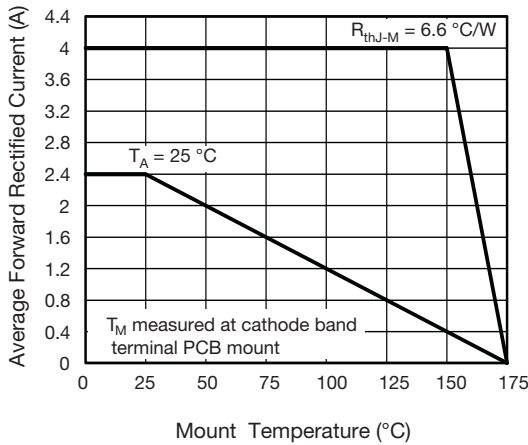


Fig. 1 - Maximum Forward Current Derating Curve

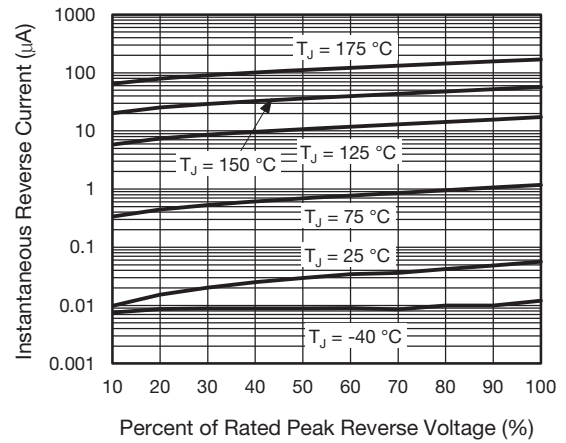


Fig. 4 - Typical Reverse Leakage Characteristics

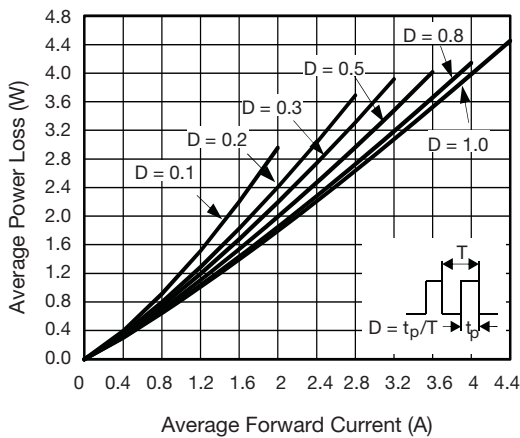


Fig. 2 - Forward Power Loss Characteristics

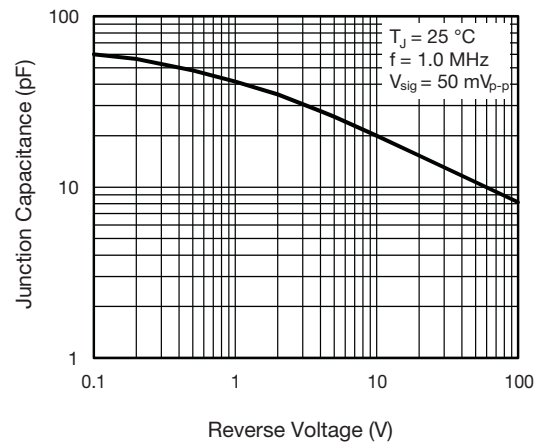


Fig. 5 - Typical Junction Capacitance

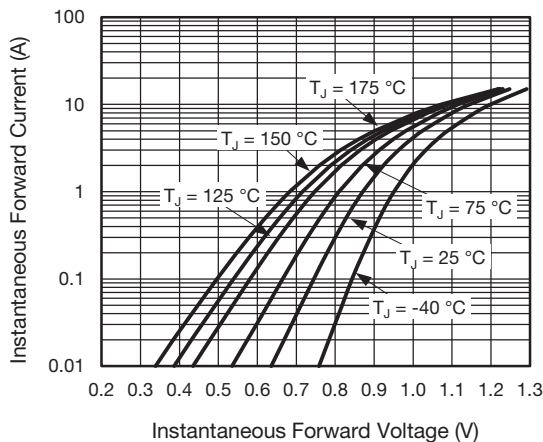


Fig. 3 - Typical Instantaneous Forward Characteristics

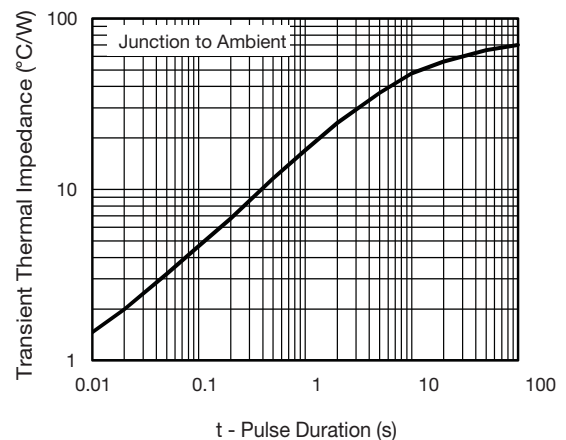
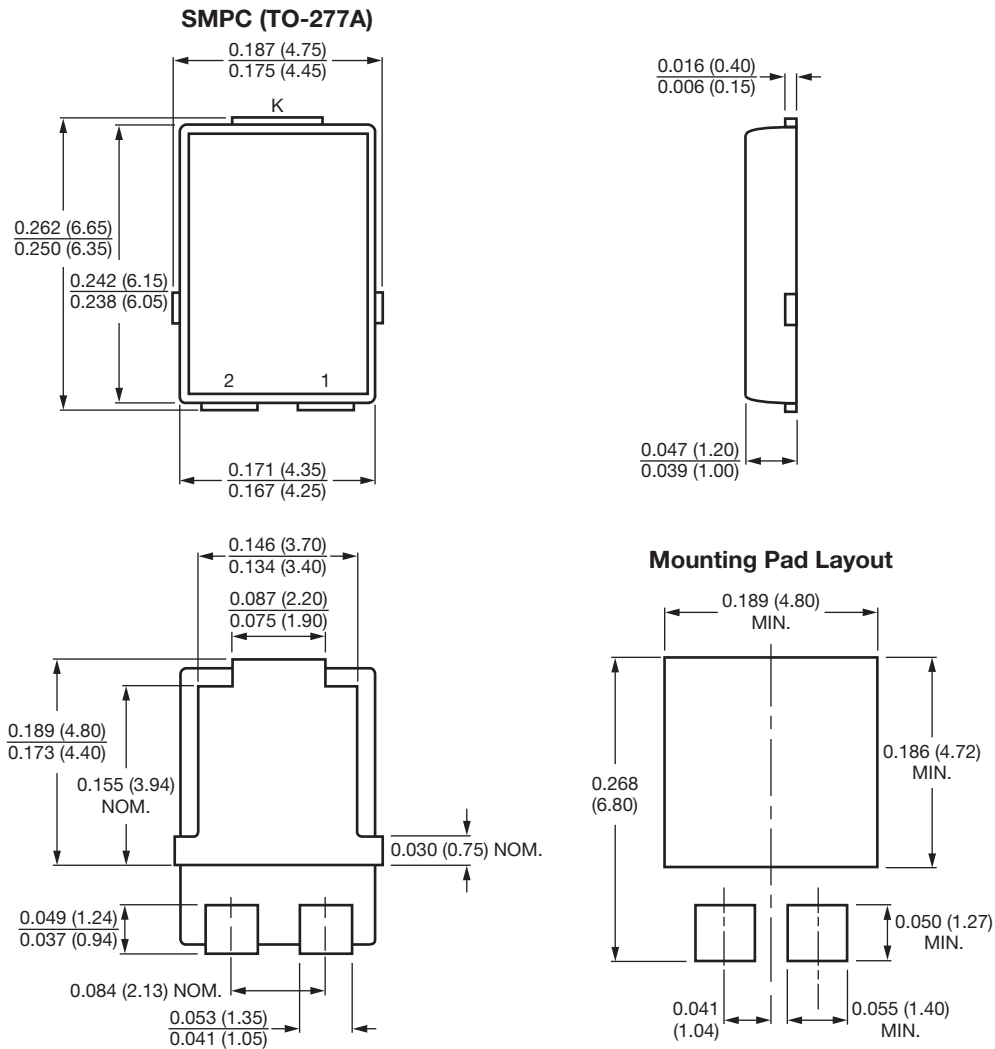


Fig. 6 - Typical Transient Thermal Impedance



## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)



Conform to JEDEC® TO-277A



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