

## Surface-Mount ESD Capability Rectifier



### FEATURES

- Very low profile - typical height of 1.3 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?999912](http://www.vishay.com/doc?999912)



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

### TYPICAL APPLICATIONS

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

### MECHANICAL DATA

**Case:** SlimDPAK (TO-252AE)

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

| PRIMARY CHARACTERISTICS                |                            |
|----------------------------------------|----------------------------|
| $I_{F(AV)}$                            | 2 x 3 A                    |
| $V_{RRM}$                              | 100 V, 200 V, 400 V, 600 V |
| $I_{FSM}$                              | 42 A                       |
| $V_F$ at $I_F = 3$ A ( $T_A = 125$ °C) | 0.94 V                     |
| $T_J$ max.                             | 175 °C                     |
| Package                                | SlimDPAK (TO-252AE)        |
| Diode variation                        | Common cathode             |

| MAXIMUM RATINGS (T <sub>A</sub> = 25 °C unless otherwise noted)                    |                                   |                                   |          |          |          |      |
|------------------------------------------------------------------------------------|-----------------------------------|-----------------------------------|----------|----------|----------|------|
| PARAMETER                                                                          | SYMBOL                            | SE60PWBC                          | SE60PWDC | SE60PWGC | SE60PWJC | UNIT |
| Device marking code                                                                |                                   | SE60PWBC                          | SE60PWDC | SE60PWGC | SE60PWJC |      |
| Maximum repetitive peak reverse voltage                                            | V <sub>RRM</sub>                  | 100                               | 200      | 400      | 600      | V    |
| Maximum average forward rectified current<br>(fig. 1)                              | per device                        | I <sub>F(AV)</sub> <sup>(1)</sup> | 6        |          |          | A    |
|                                                                                    | per diode                         |                                   | 3        |          |          |      |
| Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load | I <sub>FSM</sub>                  | 42                                |          |          | A        |      |
| Peak forward surge current 1 ms square wave on rated load                          |                                   | 80                                |          |          | A        |      |
| Operating junction and storage temperature range                                   | T <sub>J</sub> , T <sub>STG</sub> | -55 to +175                       |          |          | °C       |      |

### Notes

<sup>(1)</sup> With infinite heatsink



| ELECTRICAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted) |                                                                          |                         |                               |      |      |      |
|----------------------------------------------------------------------------|--------------------------------------------------------------------------|-------------------------|-------------------------------|------|------|------|
| PARAMETER                                                                  | TEST CONDITIONS                                                          |                         | SYMBOL                        | TYP. | MAX. | UNIT |
| Maximum Instantaneous forward voltage                                      | I <sub>F</sub> = 1.5 A                                                   | T <sub>A</sub> = 25 °C  | V <sub>F</sub> <sup>(1)</sup> | 0.94 | -    | V    |
|                                                                            | I <sub>F</sub> = 3.0 A                                                   |                         |                               | 1.03 | 1.1  |      |
|                                                                            | I <sub>F</sub> = 1.5 A                                                   | T <sub>A</sub> = 125 °C |                               | 0.84 | -    |      |
|                                                                            | I <sub>F</sub> = 3.0 A                                                   |                         |                               | 0.94 | 1.01 |      |
| Reverse current                                                            | Rated V <sub>R</sub>                                                     | T <sub>A</sub> = 25 °C  | I <sub>R</sub> <sup>(2)</sup> | -    | 10   | μA   |
|                                                                            |                                                                          | T <sub>A</sub> = 125 °C |                               | 12   | 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>               | 1200 | -    | ns   |
| Typical junction capacitance                                               | 4.0 V, 1 MHz                                                             |                         | C <sub>J</sub>                | 22   | -    | 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                             | SE60PWBC | SE60PWDC | SE60PWGC | SE60PWJC | UNIT |
| Typical thermal resistance per device                                   | R <sub>θJA</sub> <sup>(1)(2)</sup> | 63       |          |          |          | °C/W |
|                                                                         | R <sub>θJM</sub> <sup>(3)</sup>    | 2.3      |          |          |          |      |

**Notes**

- (1) The heat generated must be less than thermal conductivity from junction-to-ambient:  $dP_D/dT_J < 1/R_{\theta JA}$   
 (2) Free air, mounted on recommended copper pad area; thermal resistance  $R_{\theta JA}$  - junction to ambient  
 (3) Mounted on infinite heat sink; thermal resistance  $R_{\theta JM}$  - junction-to-mount

| <b>IMMUNITY TO ELECTRICAL STATIC DISCHARGE TO THE FOLLOWING STANDARDS</b><br>( $T_A = 25\text{ }^{\circ}\text{C}$ 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                      |
| SE60PWJC-M3/I                         | 0.20            | I                      | 4500          | 13" diameter plastic tape and reel |
| SE60PWJCHM3/I <sup>(1)</sup>          | 0.20            | I                      | 4500          | 13" diameter plastic tape and reel |

**Note**

- (1) AEC-Q101 qualified



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

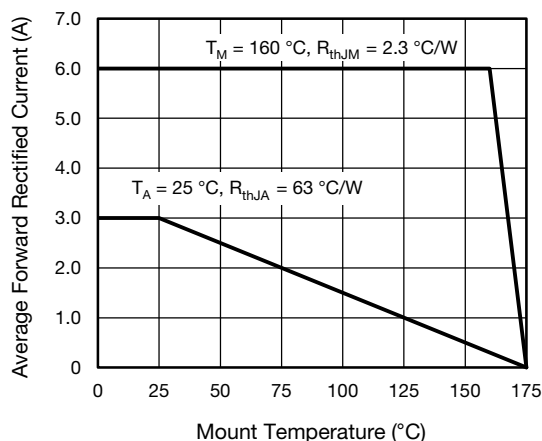


Fig. 1 - Maximum Forward Current Derating Curve

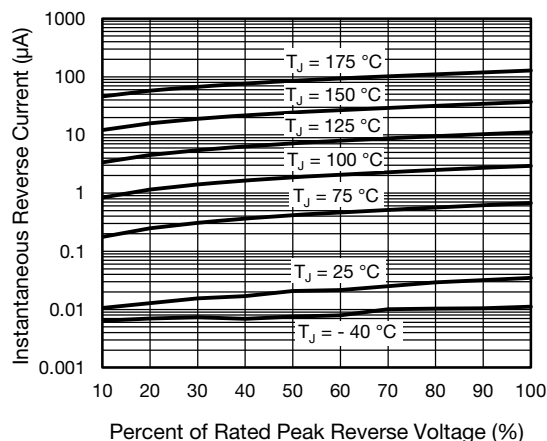


Fig. 4 - Typical Reverse Leakage Characteristics

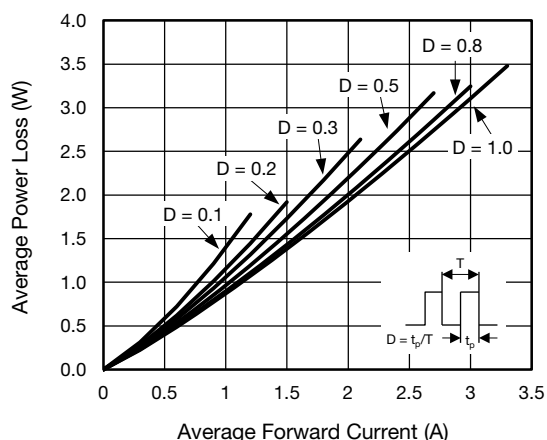


Fig. 2 - Forward Power Loss Characteristics

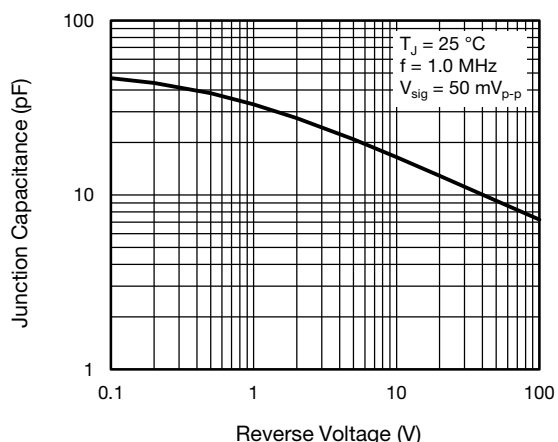


Fig. 5 - Typical Junction Capacitance

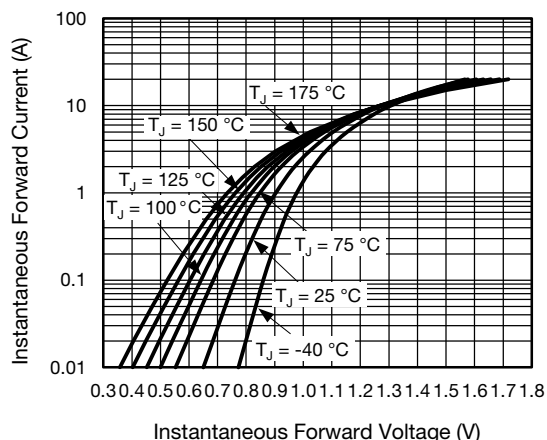


Fig. 3 - Typical Instantaneous Forward Characteristics

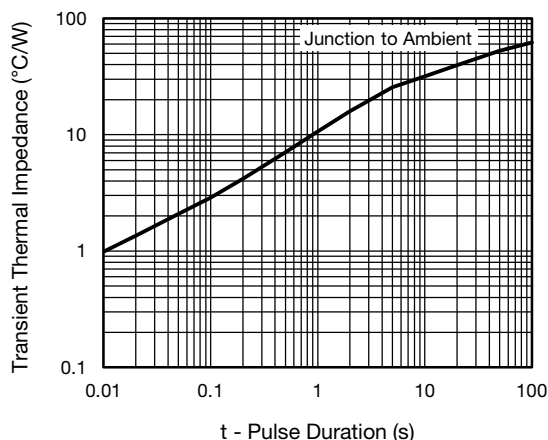
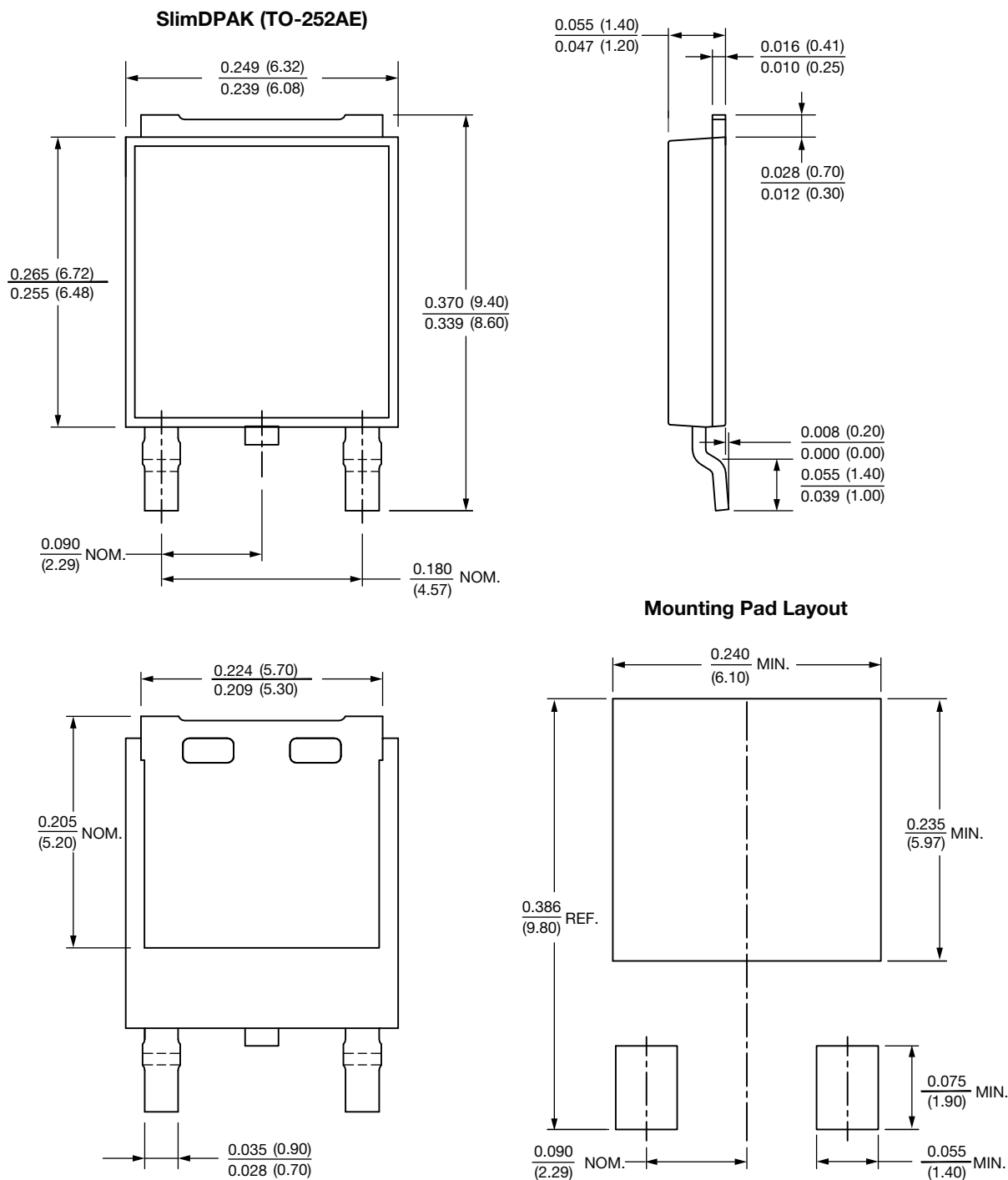


Fig. 6 - Typical Transient Thermal Impedance



PACKAGE OUTLINE DIMENSIONS in inches (millimeters)





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