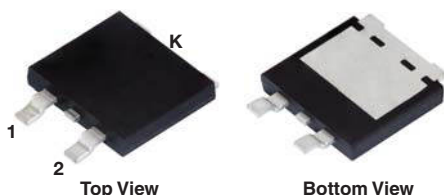
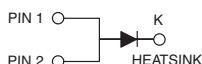


## Surface Mount ESD Capability Rectifiers

### eSMP® Series TO-263AC (SMPD)



#### SE12DX



### FEATURES

- Very low profile - typical height of 1.7 mm
- Ideal for automated placement
- Oxide planar chip junction
- Low forward voltage drop
- ESD capability
- AEC-Q101 qualified
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



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

### TYPICAL APPLICATIONS

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

### PRIMARY CHARACTERISTICS

|                                         |                            |
|-----------------------------------------|----------------------------|
| $I_{F(AV)}$                             | 12 A                       |
| $V_{RRM}$                               | 100 V, 200 V, 400 V, 600 V |
| $I_{FSM}$                               | 125 A                      |
| $V_F$ at $I_F = 12$ A ( $T_A = 125$ °C) | 0.96 V                     |
| $I_R$                                   | 20 $\mu$ A                 |
| $T_J$ max.                              | 175 °C                     |
| Package                                 | TO-263AC (SMPD)            |
| Diode variations                        | Single                     |

### MECHANICAL DATA

**Case:** TO-263AC (SMPD)

Molding compound meets UL 94 V-0 flammability rating  
Base P/N-M3 - halogen-free, RoHS-compliant, and commercial grade

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 suffix meets JESD 201 class 2 whisker test, HM3 suffix meets JESD 201 class 2 whisker test

**Polarity:** As marked

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

| MAXIMUM RATINGS (T <sub>A</sub> = 25 °C unless otherwise noted)                   |                                   |             |        |        |        |      |
|-----------------------------------------------------------------------------------|-----------------------------------|-------------|--------|--------|--------|------|
| PARAMETER                                                                         | SYMBOL                            | SE12DB      | SE12DD | SE12DG | SE12DJ | UNIT |
| 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>     | 12          |        |        |        | A    |
|                                                                                   | I <sub>F</sub> <sup>(2)</sup>     | 3.2         |        |        |        |      |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load | I <sub>FSM</sub>                  | 125         |        |        |        | A    |
| Operating junction and storage temperature range                                  | T <sub>J</sub> , T <sub>STG</sub> | -55 to +175 |        |        |        | °C   |

#### Notes

(1) With heatsink

(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> = 6 A                                                     | T <sub>A</sub> = 25 °C  | V <sub>F</sub> <sup>(1)</sup> | 0.95 | -    | V    |
|                                                                            | I <sub>F</sub> = 12 A                                                    |                         |                               | 1.04 | 1.15 |      |
|                                                                            | I <sub>F</sub> = 6 A                                                     | T <sub>A</sub> = 125 °C |                               | 0.85 | -    |      |
|                                                                            | I <sub>F</sub> = 12 A                                                    |                         |                               | 0.96 | 1.10 |      |
| Reverse current                                                            | Rated V <sub>R</sub>                                                     | T <sub>A</sub> = 25 °C  | I <sub>R</sub> <sup>(2)</sup> | -    | 20   | μA   |
|                                                                            |                                                                          | T <sub>A</sub> = 125 °C |                               | 27   | 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>               | 3000 | -    | ns   |
| Typical junction capacitance                                               | 4.0 V, 1 MHz                                                             |                         | C <sub>J</sub>                | 90   | -    | 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                          | SE12DB | SE12DD | SE12DG | SE12DJ | UNIT |
| Typical thermal resistance                                              | R <sub>θJA</sub> <sup>(1)</sup> | 60     |        |        |        | °C/W |
|                                                                         | R <sub>θJM</sub> <sup>(2)</sup> | 1.6    |        |        |        |      |

**Notes**(1) Free air, mounted on recommended PCB, 2 oz. pad area; thermal resistance  $R_{\theta JA}$  - junction to ambient

(2) With heatsink

| IMMUNITY TO ELECTRICAL STATIC DISCHARGE TO THE FOLLOWING STANDARDS<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   | $> 8\text{ kV}$ |

| ORDERING INFORMATION (Example) |                            |                 |                        |               |                                    |
|--------------------------------|----------------------------|-----------------|------------------------|---------------|------------------------------------|
| STANDARD                       | PREFERRED P/N              | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                      |
| TO-263AC (SMPD)                | SE12DJ-M3/I                | 0.54            | I                      | 2000/reel     | 13" diameter plastic tape and reel |
| TO-263AC (SMPD)                | SE12DJHM3/I <sup>(1)</sup> | 0.54            | I                      | 2000/reel     | 13" diameter plastic tape and reel |

**Note**

(1) AEC-Q101 qualified



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

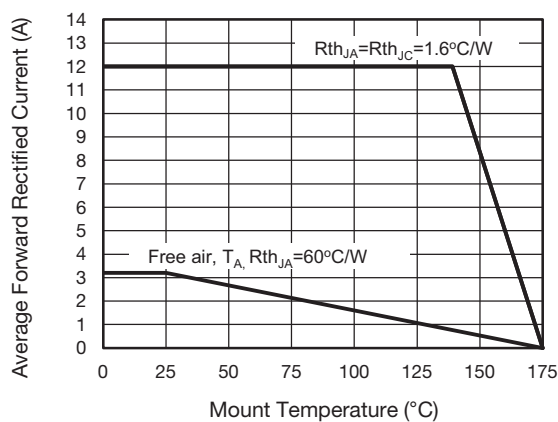


Fig. 1 - Forward Current Derating Curve

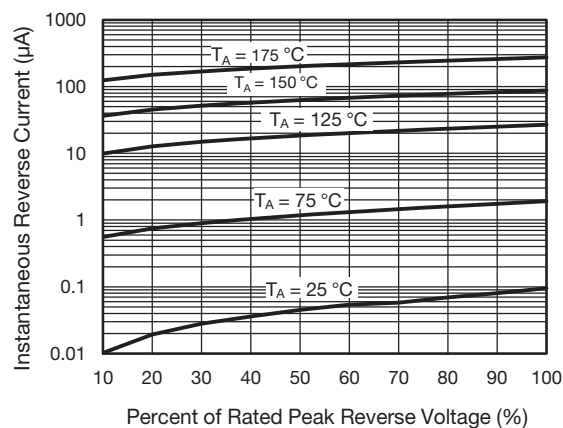


Fig. 4 - Typical Reverse Leakage Characteristics

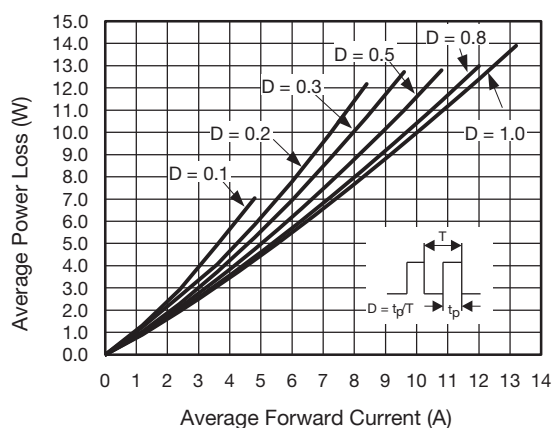


Fig. 2 - Forward Power Loss Characteristics

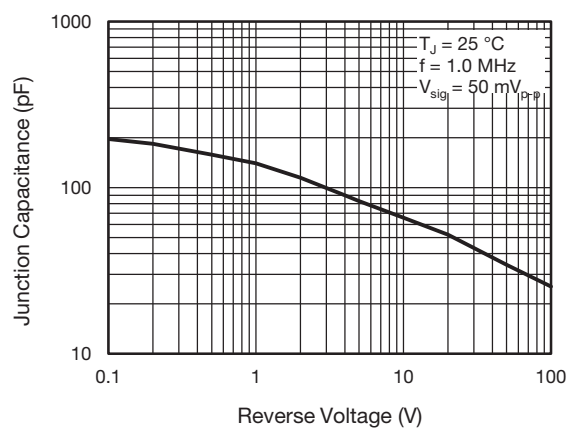


Fig. 5 - Typical Junction Capacitance

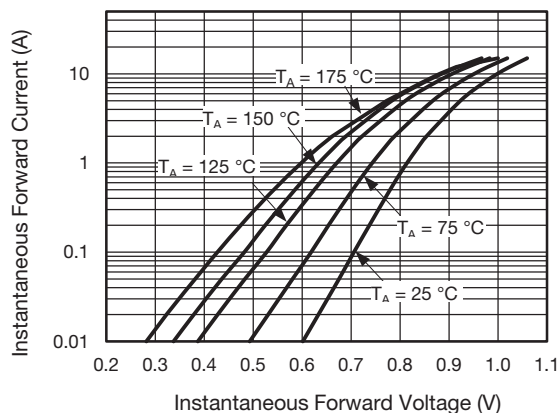


Fig. 3 - Typical Instantaneous Forward Characteristics

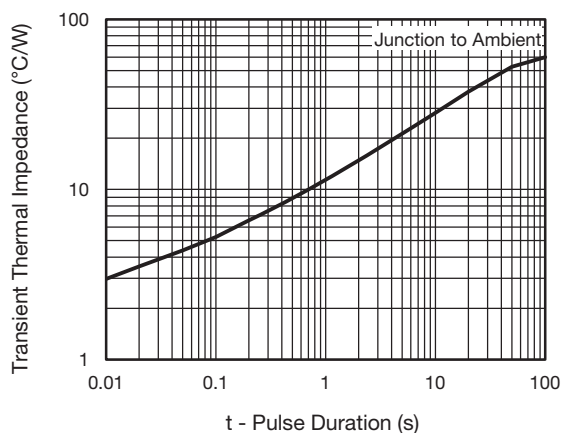
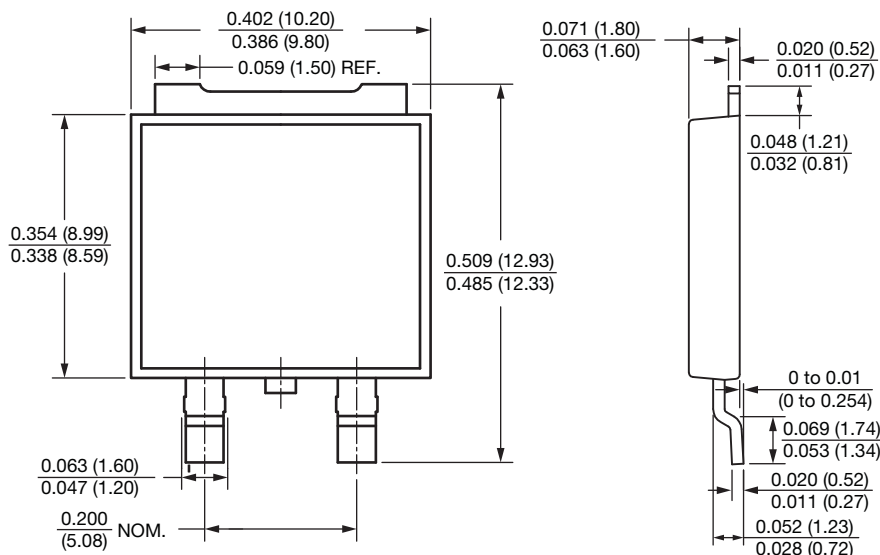


Fig. 6 - Typical Transient Thermal Impedance

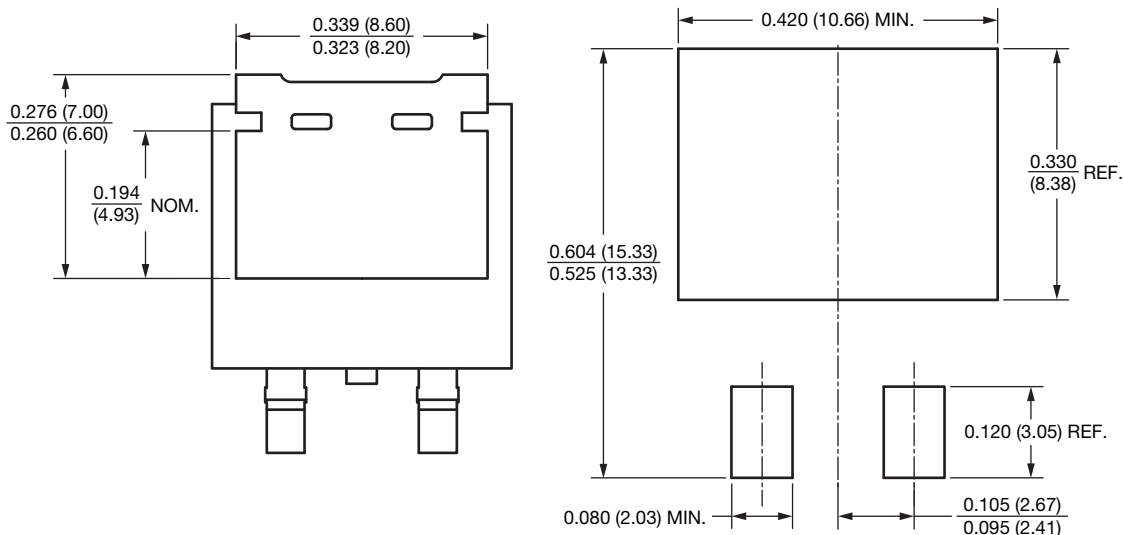


## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

### TO-263AC (SMPD)



### Mounting Pad Layout





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