

## High Current Density Surface Mount Schottky Barrier Rectifiers

### eSMP® Series



TO-277A (SMPC)



### FEATURES

- Very low profile - typical height of 1.1 mm
- Ideal for automated placement
- Guardring for overvoltage protection
- Low forward voltage drop, low power losses
- High efficiency
- Low thermal resistance
- 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**

### PRIMARY CHARACTERISTICS

|                       |            |
|-----------------------|------------|
| $I_{F(AV)}$           | 12 A       |
| $V_{RRM}$             | 20 V, 30 V |
| $I_{FSM}$             | 280 A      |
| $E_{AS}$              | 20 mJ      |
| $V_F$ at $I_F = 12$ A | 0.38 V     |
| $T_J$ max.            | 150 °C     |
| Package               | TO-277A    |
| Diode variations      | Single     |

### TYPICAL APPLICATIONS

For use in low voltage high frequency inverters, freewheeling, DC/DC converters, and polarity protection applications.

### MECHANICAL DATA

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

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

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

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

| PARAMETER                                                                         | SYMBOL         | SS12P2L     | SS12P3L | UNIT |
|-----------------------------------------------------------------------------------|----------------|-------------|---------|------|
| Device marking code                                                               |                | S122        | S123    |      |
| Maximum repetitive peak reverse voltage                                           | $V_{RRM}$      | 20          | 30      | V    |
| Maximum average forward rectified current (fig. 1)                                | $I_{F(AV)}$    | 12          |         | A    |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load | $I_{FSM}$      | 280         |         | A    |
| Non-repetitive avalanche energy at $I_{AS} = 2.0$ A, $T_J = 25$ °C                | $E_{AS}$       | 20          |         | mJ   |
| Operating junction and storage temperature range                                  | $T_J, T_{STG}$ | -55 to +150 |         | °C   |

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

| PARAMETER                             | TEST CONDITIONS       |                         | SYMBOL                        | TYP. | MAX. | UNIT |
|---------------------------------------|-----------------------|-------------------------|-------------------------------|------|------|------|
| Maximum instantaneous forward voltage | I <sub>F</sub> = 6 A  | T <sub>A</sub> = 25 °C  | V <sub>F</sub> <sup>(1)</sup> | 0.41 | -    | V    |
|                                       | I <sub>F</sub> = 12 A |                         |                               | 0.48 | 0.56 |      |
|                                       | I <sub>F</sub> = 6 A  | T <sub>A</sub> = 125 °C |                               | 0.30 | -    |      |
|                                       | I <sub>F</sub> = 12 A |                         |                               | 0.38 | 0.46 |      |
| Maximum reverse current               | Rated V <sub>R</sub>  | T <sub>A</sub> = 25 °C  | I <sub>R</sub> <sup>(2)</sup> | 150  | 1000 | μA   |
|                                       |                       | T <sub>A</sub> = 125 °C |                               | 59   | 120  | mA   |
| Typical junction capacitance          | 4.0 V, 1 MHz          |                         | C <sub>J</sub>                | 930  | -    | 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** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise specified)

| PARAMETER                  | SYMBOL                | SS12P2L | SS12P3L | UNIT |
|----------------------------|-----------------------|---------|---------|------|
| Typical thermal resistance | $R_{\theta JA}^{(1)}$ | 60      |         | °C/W |
|                            | $R_{\theta JL}$       | 3       |         |      |

**Note**

(1) Units mounted on recommended PCB 1 oz. pad layout

**ORDERING INFORMATION** (Example)

| PREFERRED P/N                 | UNIT WEIGHT (g) | PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                      |
|-------------------------------|-----------------|--------------|---------------|------------------------------------|
| SS12P3L-M3/86A                | 0.10            | 86A          | 1500          | 7" diameter plastic tape and reel  |
| SS12P3L-M3/87A                | 0.10            | 87A          | 6500          | 13" diameter plastic tape and reel |
| SS12P3LHM3/86A <sup>(1)</sup> | 0.10            | 86A          | 1500          | 7" diameter plastic tape and reel  |
| SS12P3LHM3/87A <sup>(1)</sup> | 0.10            | 87A          | 6500          | 13" diameter plastic tape and reel |
| SS12P3LHM3_A/H <sup>(1)</sup> | 0.10            | H            | 1500          | 7" diameter plastic tape and reel  |
| SS12P3LHM3_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)

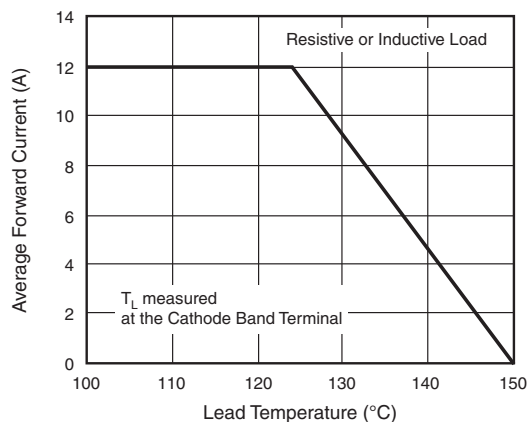


Fig. 1 - Maximum Forward Current Derating Curve

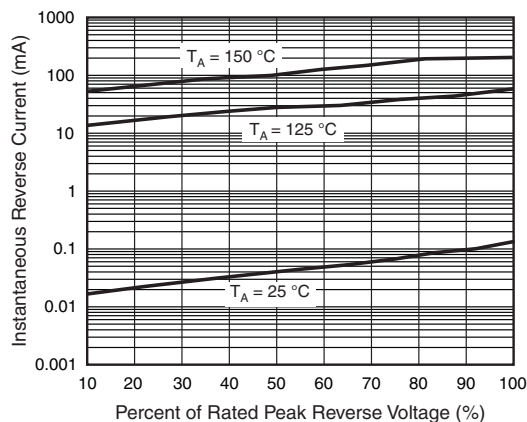


Fig. 4 - Typical Reverse Leakage Characteristics

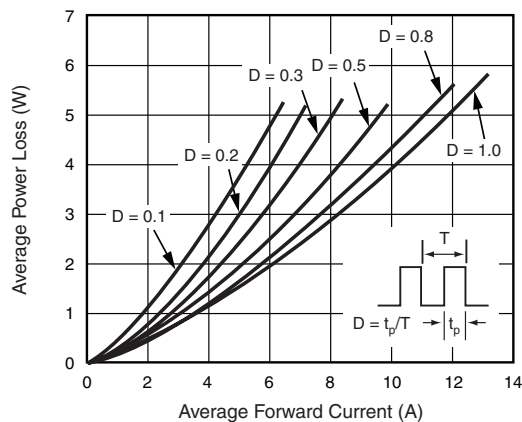


Fig. 2 - Forward Power Loss Characteristics

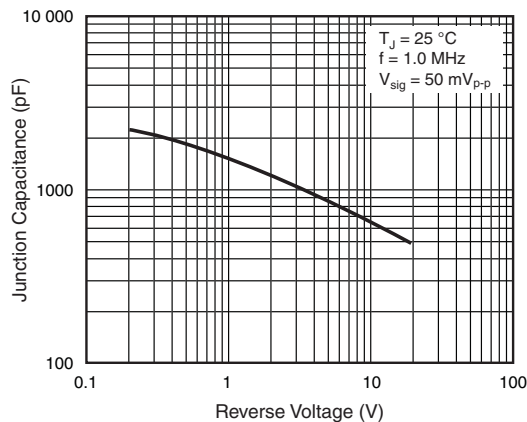


Fig. 5 - Typical Junction Capacitance

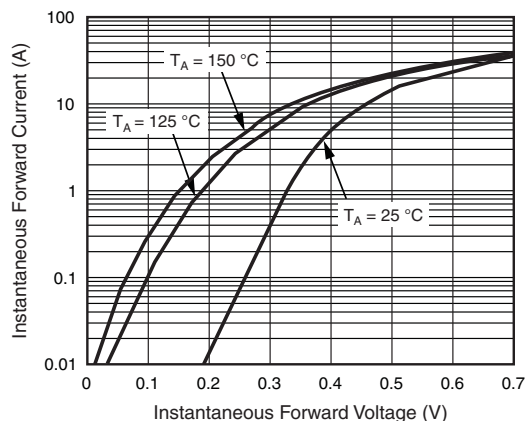


Fig. 3 - Typical Instantaneous Forward Characteristics

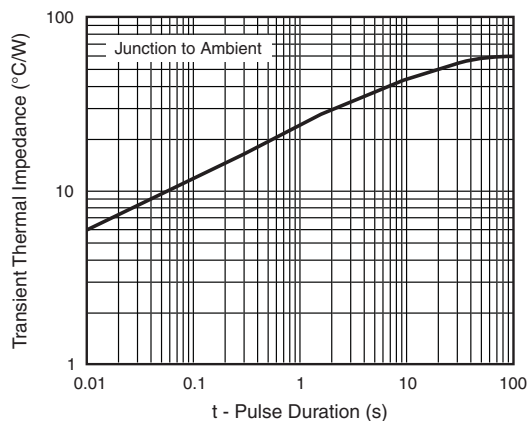
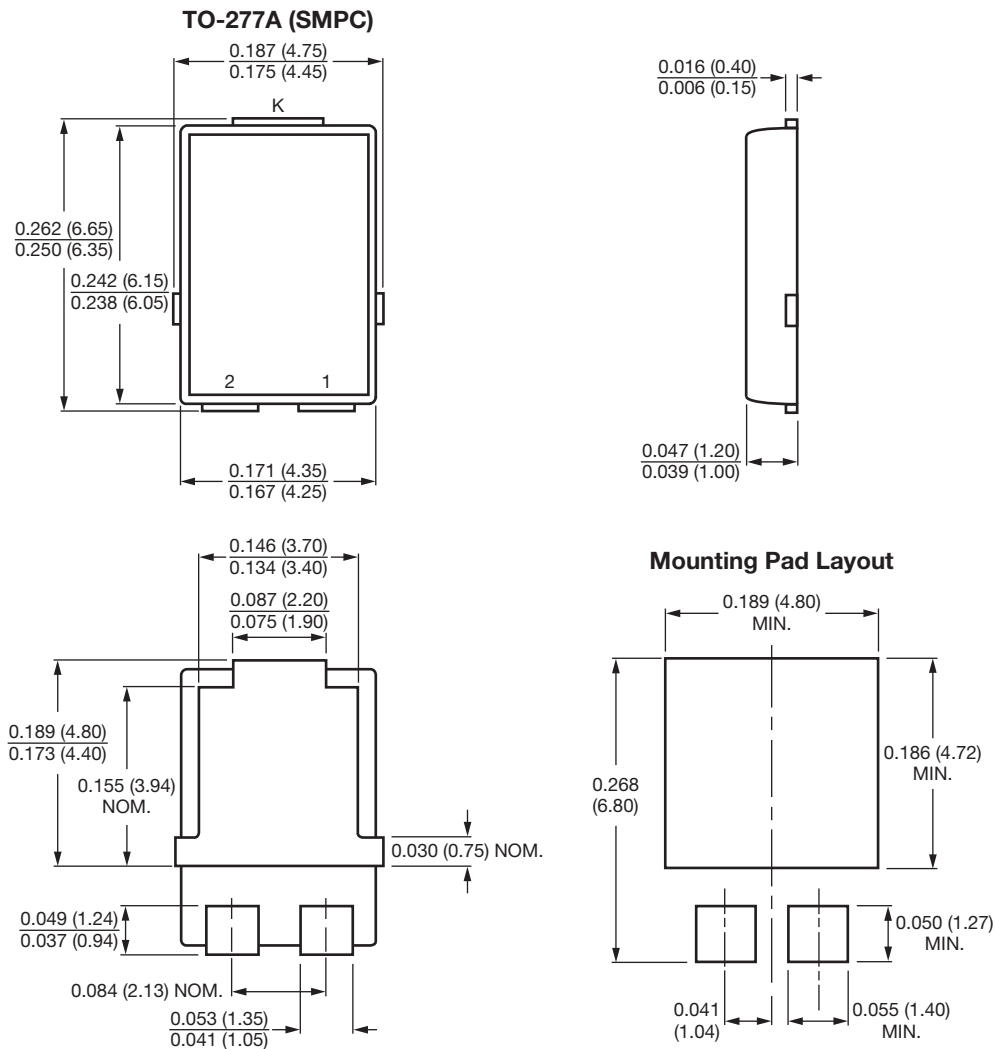


Fig. 6 - Typical Transient Thermal Impedance



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



Conform to JEDEC® TO-277A



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