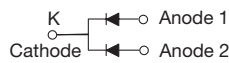


# High Current Density Surface-Mount Schottky Barrier Rectifier

## eSMP® Series



### SMPC (TO-277A)



## DESIGN SUPPORT TOOLS AVAILABLE



| PRIMARY CHARACTERISTICS |                |
|-------------------------|----------------|
| $I_{F(AV)}$             | 2 x 6.0 A      |
| $V_{RRM}$               | 40 V           |
| $I_{FSM}$               | 150 A          |
| $E_{AS}$                | 20 mJ          |
| $V_F$ at $I_F = 6.0$ A  | 0.40 V         |
| $T_J$ max.              | 125 °C         |
| Package                 | SMPC (TO-277A) |
| Circuit configuration   | Common cathode |

## FEATURES

- Very low profile - typical height of 1.1 mm
- Ideal for automated placement
- Low forward voltage drop, low power losses
- High efficiency
- Low thermal impedance
- 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

For use in low voltage high frequency inverters, freewheeling, DC/DC converters and polarity protection 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 2 whisker test, HM3 suffix meets JESD 201 class 2 whisker test

| MAXIMUM RATINGS ( $T_A = 25$ °C unless otherwise noted)                                     |                |             |      |
|---|----------------|-------------|------|
| PARAMETER   | SYMBOL         | SS12P4C     | UNIT |
| Device marking code   |                | S124C       |      |
| Maximum repetitive peak reverse voltage   | $V_{RRM}$      | 40          | V    |
| Maximum average forward rectified current (fig. 1) <sup>(1)</sup>                           | total device   | 12          | A    |
|   | per diode      | 6.0         |      |
| Maximum average forward rectified current <sup>(2)</sup>                                    | total device   | 3.5         | A    |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load per diode | $I_{FSM}$      | 150         | A    |
| Non-repetitive avalanche energy at $T_J = 25$ °C, $L = 60$ mH per diode                     | $E_{AS}$       | 20          | mJ   |
| Peak repetitive reverse current at $t_p = 2$ μs, 1 kHz, at $T_J = 25$ °C per diode          | $I_{RRM}$      | 1.0         | A    |
| Operating junction and storage temperature range  | $T_J, T_{STG}$ | -55 to +125 | °C   |

### Notes

- (1) Mounted on 30 mm x 30 mm Al PCB with 50 mm x 25 mm x 100 mm fin heat sink
- (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 per diode  | $I_F = 1\text{ A}$ | $T_A = 25\text{ }^\circ\text{C}$  | $V_F^{(1)}$ | 0.34 | -    | V             |
|  | $I_F = 3\text{ A}$ |                                   |             | 0.40 | -    |               |
|  | $I_F = 6\text{ A}$ |                                   |             | 0.46 | 0.52 |               |
|  | $I_F = 1\text{ A}$ | $T_A = 100\text{ }^\circ\text{C}$ |             | 0.24 | -    |               |
|  | $I_F = 3\text{ A}$ |                                   |             | 0.31 | -    |               |
|  | $I_F = 6\text{ A}$ |                                   |             | 0.40 | 0.45 |               |
| Reverse current per diode  | Rated $V_R$        | $T_A = 25\text{ }^\circ\text{C}$  | $I_R^{(2)}$ | 129  | 500  | $\mu\text{A}$ |
|  |                    | $T_A = 100\text{ }^\circ\text{C}$ |             | 11.9 | 25   | mA            |
| Typical junction capacitance per diode   | 4.0 V, 1 MHz       | $C_J$                             | 400         | -    | 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                | SS12P4C | UNIT               |
| Typical thermal resistance  | $R_{\theta JA}^{(1)}$ | 100     | $^\circ\text{C/W}$ |
|   | $R_{\theta JM}^{(2)}$ | 3       |                    |

**Notes**

- (1) Free air, mounted on recommended copper pad area. Thermal resistance  $R_{\theta JA}$  - junction to ambient  
 (2) Mounted on 30 mm x 30 mm Al PCB with 50 mm x 25 mm x 100 mm fin heat sink. Thermal resistance  $R_{\theta JM}$  - junction to mount

| <b>ORDERING INFORMATION</b> (Example) |                 |                        |               |                                    |
|---------------------------------------|-----------------|------------------------|---------------|------------------------------------|
| PREFERRED P/N                         | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                      |
| SS12P4C-M3/86A                        | 0.10            | 86A                    | 1500          | 7" diameter plastic tape and reel  |
| SS12P4C-M3/87A                        | 0.10            | 87A                    | 6500          | 13" diameter plastic tape and reel |
| SS12P4CHM3_A/H <sup>(1)</sup>         | 0.10            | H                      | 1500          | 7" diameter plastic tape and reel  |
| SS12P4CHM3_A/I <sup>(1)</sup>         | 0.10            | I                      | 6500          | 13" diameter plastic tape and reel |

**Note**

- (1) AEC-Q101 qualified

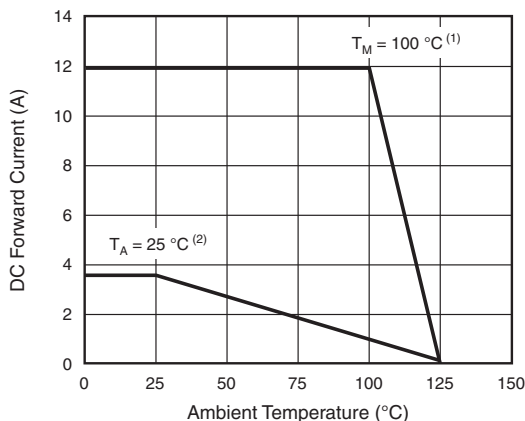
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^\circ\text{C}$  unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve

**Notes**

- Mounted on 30 mm x 30 mm Al PCB with 50 mm x 25 mm x 100 mm fin heat sink,  $T_M$  measured at the terminal of cathode band ( $R_{\theta JM} = 3\text{ }^\circ\text{C/W}$ )
- Free air, mounted on recommended copper pad area ( $R_{\theta JA} = 100\text{ }^\circ\text{C/W}$ )

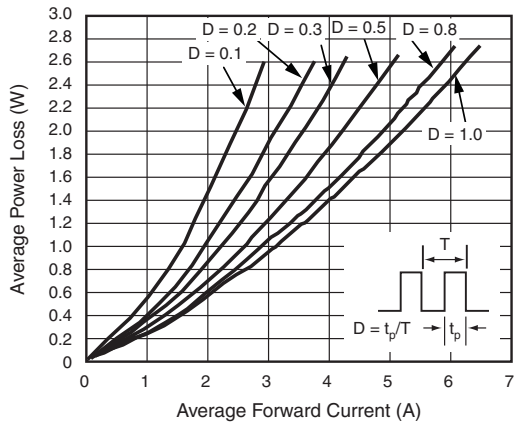


Fig. 2 - Forward Power Loss Characteristics Per Diode

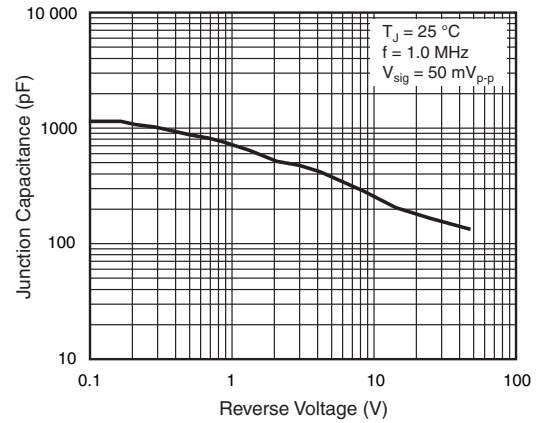


Fig. 5 - Typical Junction Capacitance Per Diode

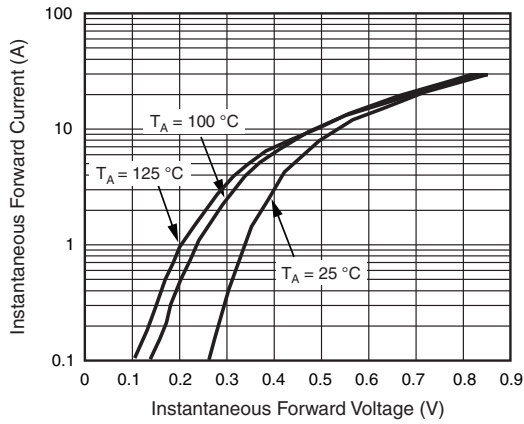


Fig. 3 - Typical Instantaneous Forward Characteristics Per Diode

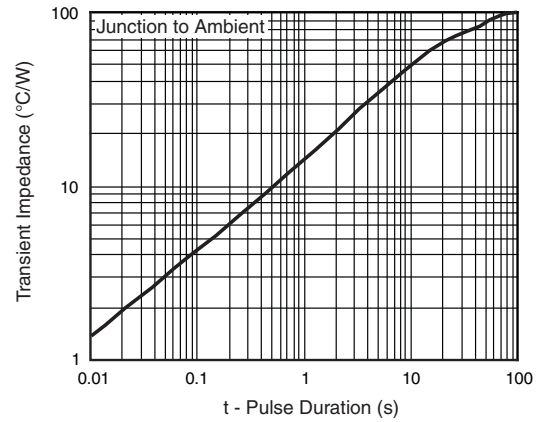


Fig. 6 - Typical Transient Thermal Impedance Per Diode

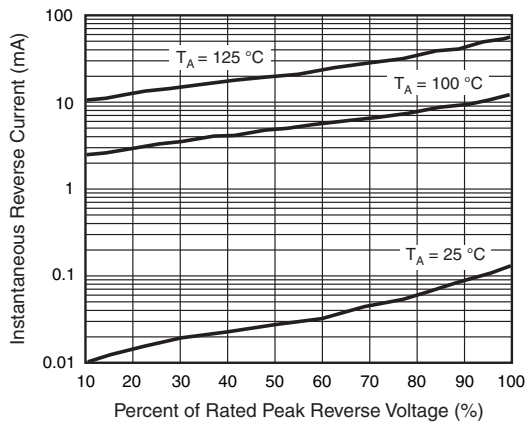
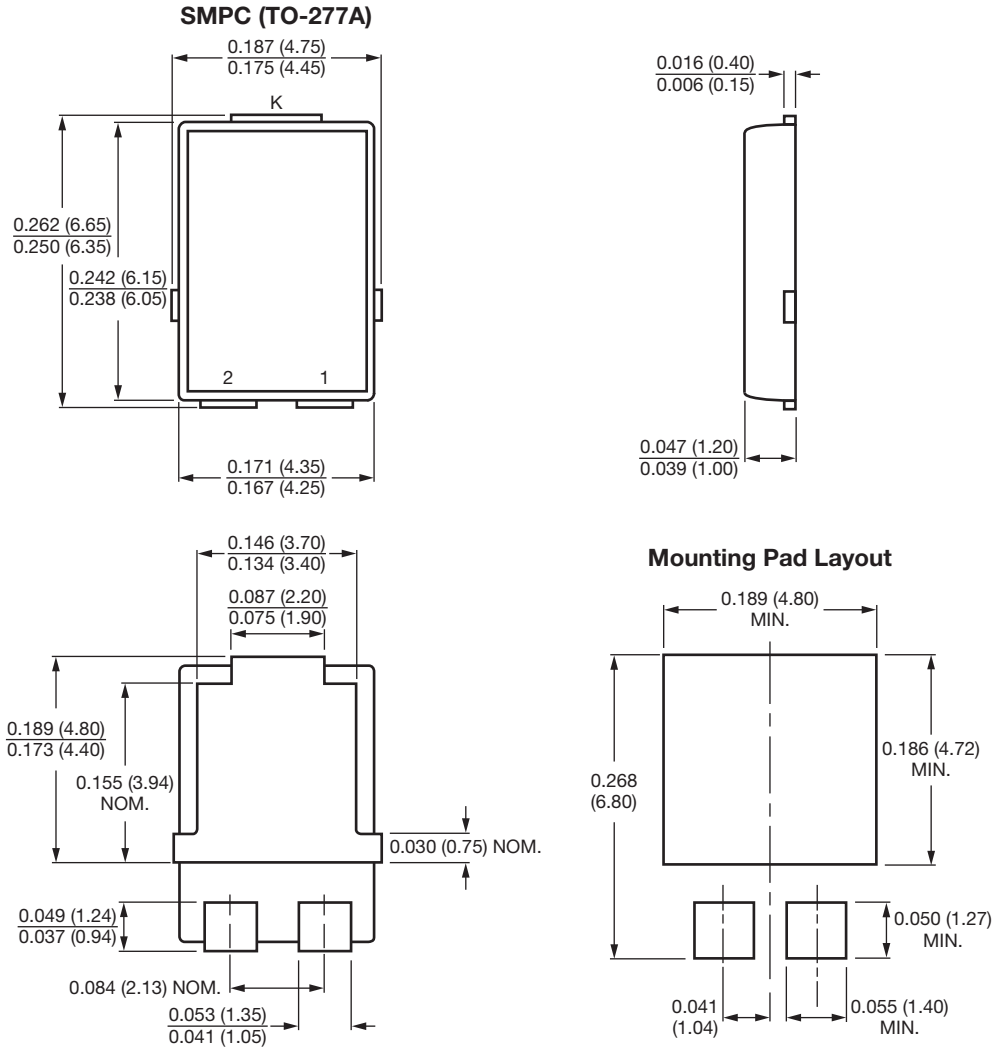


Fig. 4 - Typical Reverse Leakage Characteristics Per Diode



PACKAGE OUTLINE DIMENSIONS in inches (millimeters)



Conform to JEDEC® TO-277A



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