

## High Current Density Surface Mount Schottky Barrier Rectifiers



### 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**

### TYPICAL APPLICATIONS

For use in high frequency rectifier of switching mode power supplies, freewheeling diodes, DC/DC converters, and polarity protection application.

### 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

| PRIMARY CHARACTERISTICS |                |
|-------------------------|----------------|
| $I_{F(AV)}$             | 5.0 A          |
| $V_{RRM}$               | 90 V, 100 V    |
| $I_{FSM}$               | 150 A          |
| $V_F$ at $I_F = 5.0$ A  | 0.649 V        |
| $I_R$                   | 4.5 $\mu$ A    |
| $T_J$ max.              | 150 °C         |
| Package                 | TO-277A (SMPC) |
| Diode variations        | Single         |

| MAXIMUM RATINGS ( $T_A = 25$ °C unless otherwise noted)                           |                |             |        |      |
|-----------------------------------------------------------------------------------|----------------|-------------|--------|------|
| PARAMETER                                                                         | SYMBOL         | SS5P9       | SS5P10 | UNIT |
| Device marking code                                                               |                | S59         | S510   |      |
| Maximum repetitive peak reverse voltage                                           | $V_{RRM}$      | 90          | 100    | V    |
| Maximum average forward rectified current (fig. 1)                                | $I_{F(AV)}$    | 5.0         |        | A    |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load | $I_{FSM}$      | 150         |        | 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 |
|-------------------------------|------------------------|-------------------------|-------------------------------|-------|------|------|
| Instantaneous forward voltage | I <sub>F</sub> = 2.5 A | T <sub>A</sub> = 25 °C  | V <sub>F</sub> <sup>(1)</sup> | 0.708 | -    | V    |
|                               | I <sub>F</sub> = 5.0 A |                         |                               | 0.832 | 0.88 |      |
|                               | I <sub>F</sub> = 2.5 A | T <sub>A</sub> = 125 °C |                               | 0.571 | -    |      |
|                               | I <sub>F</sub> = 5.0 A |                         |                               | 0.649 | 0.68 |      |
| Reverse current               | Rated V <sub>R</sub>   | T <sub>A</sub> = 25 °C  | I <sub>R</sub> <sup>(2)</sup> | 4.5   | 15   | μA   |
|                               |                        | T <sub>A</sub> = 125 °C |                               | 2.7   | 5    | mA   |
| Typical junction capacitance  | 4.0 V, 1 MHz           |                         | C <sub>J</sub>                | 130   | -    | 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                | SS5P9 | SS5P10 | UNIT |
|----------------------------|-----------------------|-------|--------|------|
| Typical thermal resistance | $R_{\theta JA}^{(1)}$ | 65    |        | °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                      |
|------------------------------|-----------------|--------------|---------------|------------------------------------|
| SS5P10-M3/86A                | 0.10            | 86A          | 1500          | 7" diameter plastic tape and reel  |
| SS5P10-M3/87A                | 0.10            | 87A          | 6500          | 13" diameter plastic tape and reel |
| SS5P10HM3/86A <sup>(1)</sup> | 0.10            | 86A          | 1500          | 7" diameter plastic tape and reel  |
| SS5P10HM3/87A <sup>(1)</sup> | 0.10            | 87A          | 6500          | 13" diameter plastic tape and reel |
| SS5P10HM3_A/H <sup>(1)</sup> | 0.10            | H            | 1500          | 7" diameter plastic tape and reel  |
| SS5P10HM3_A/I <sup>(1)</sup> | 0.10            | I            | 6500          | 13" diameter plastic tape and reel |

**Note**

(1) AEC-Q101 qualified

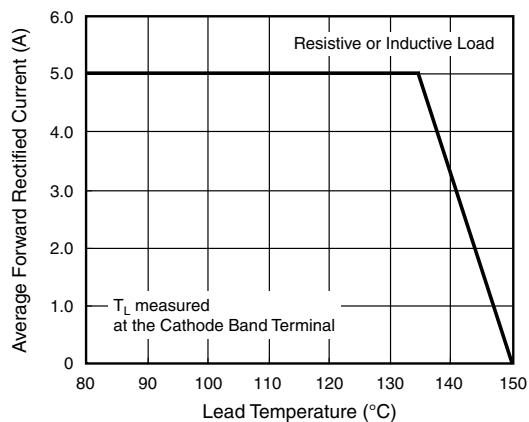
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve

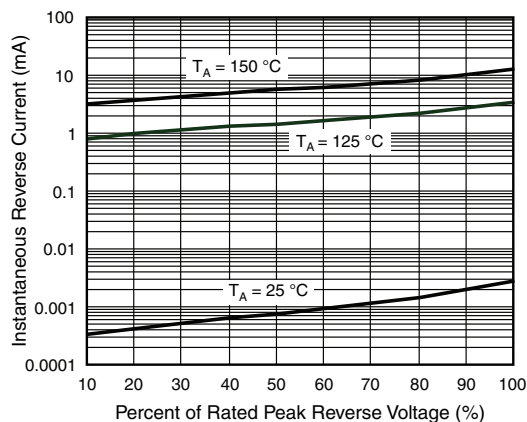


Fig. 4 - Typical Reverse Characteristics

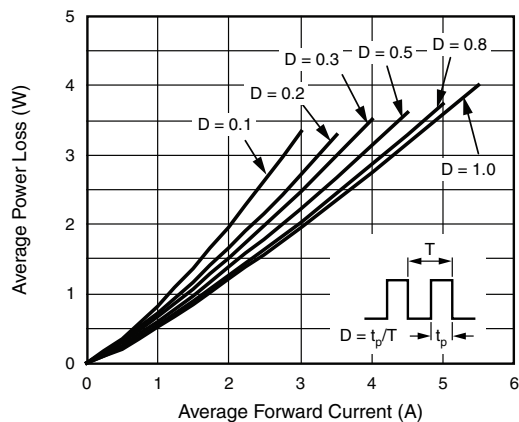


Fig. 2 - Forward Power Loss Characteristics

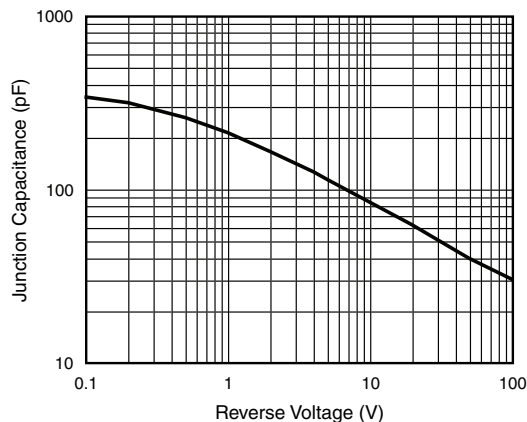


Fig. 5 - Typical Junction Capacitance

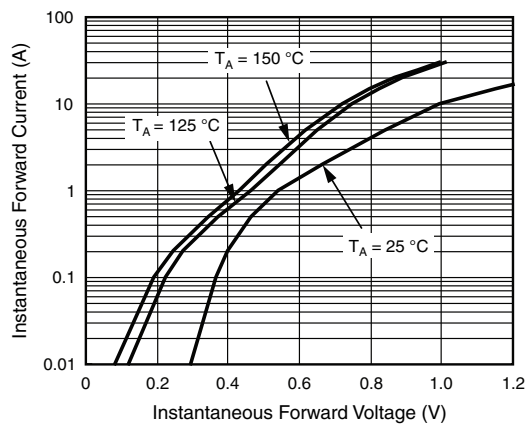


Fig. 3 - Typical Instantaneous Forward Characteristics

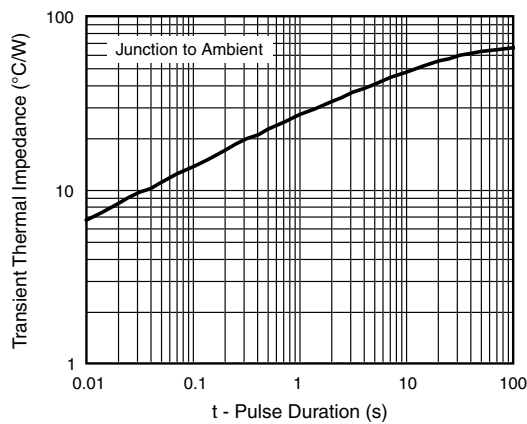
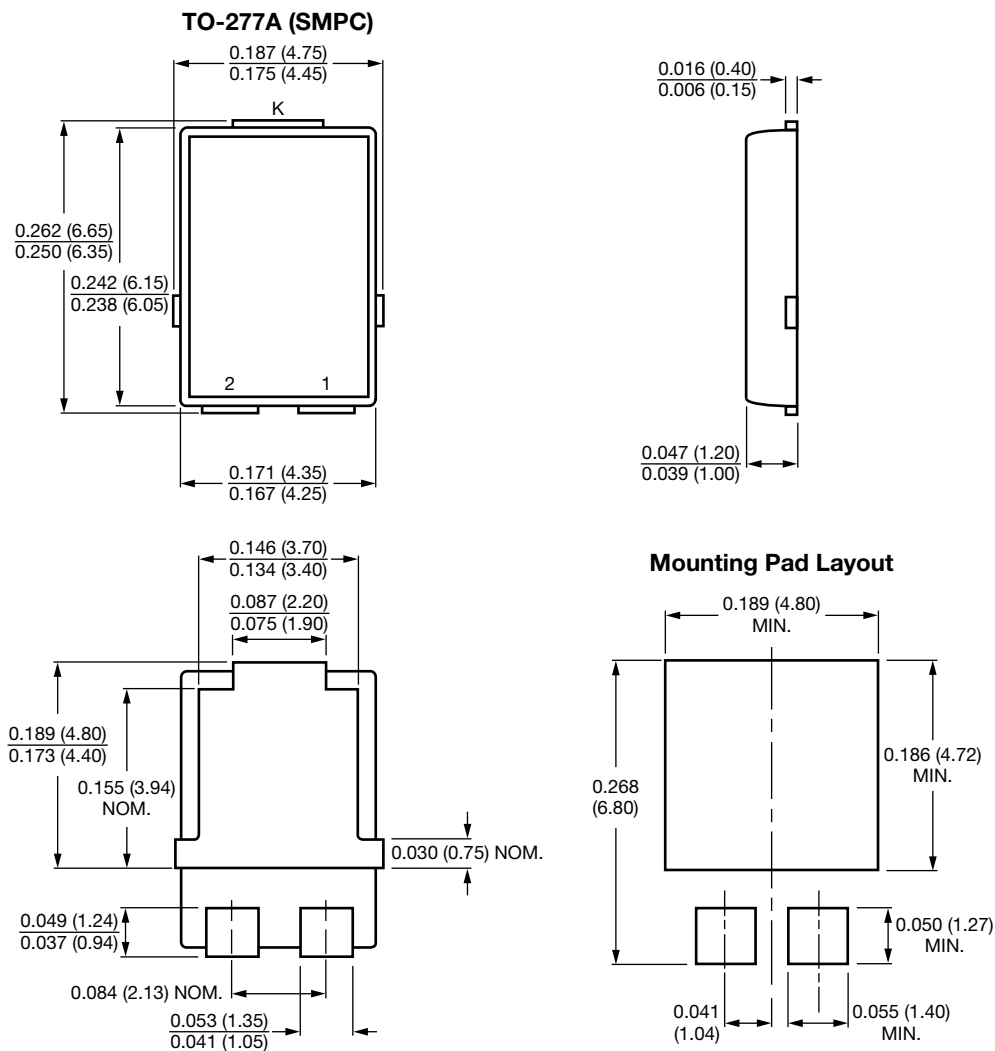


Fig. 6 - Typical Transient Thermal Impedance



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





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