

## High Current Density Surface Mount High Voltage Schottky Rectifiers

### eSMP® Series



TO-277A (SMPC)



### FEATURES

- Power pack
- Very low profile - typical height of 1.1 mm
- Ideal for automated placement
- Guardring for overvoltage protection
- High barrier technology,  $T_J = 175\text{ }^{\circ}\text{C}$  maximum
- Low leakage current
- Meets MSL level 1, per J-STD-020
- 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)



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

### TYPICAL APPLICATIONS

For use in high frequency rectifier of switching mode power supplies, freewheeling diodes, DC/DC converters, or 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      |                        |
|------------------------------|------------------------|
| $I_{F(AV)}$                  | 10 A                   |
| $V_{RRM}$                    | 90 V, 100 V            |
| $I_{FSM}$                    | 200 A                  |
| $E_{AS}$                     | 20 mJ                  |
| $V_F$ at $I_F = 10\text{ A}$ | 0.661 V                |
| $I_R$                        | 0.3 $\mu\text{A}$      |
| $T_J$ max.                   | 175 $^{\circ}\text{C}$ |
| Package                      | TO-277A (SMPC)         |
| Diode variations             | Single die             |

| MAXIMUM RATINGS ( $T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)                    |                   |             |          |                    |
|-------------------------------------------------------------------------------------------------|-------------------|-------------|----------|--------------------|
| PARAMETER                                                                                       | SYMBOL            | SS10PH9     | SS10PH10 | UNIT               |
| Device marking code                                                                             |                   | 10H9        | 10H10    |                    |
| Maximum repetitive peak reverse voltage                                                         | $V_{RRM}$         | 90          | 100      | V                  |
| Maximum average forward rectified current (fig. 1)                                              | $I_{F(AV)}$       | 10          |          | A                  |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load               | $I_{FSM}$         | 200         |          | A                  |
| Non-repetitive avalanche energy at $I_{AS} = 2.0\text{ A}$ , $T_J = 25\text{ }^{\circ}\text{C}$ | $E_{AS}$          | 20          |          | mJ                 |
| Operating junction and storage temperature range                                                | $T_J$ , $T_{STG}$ | -55 to +175 |          | $^{\circ}\text{C}$ |

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

| PARAMETER                     | TEST CONDITIONS     | SYMBOL                              | TYP.  | MAX. | UNIT          |
|-------------------------------|---------------------|-------------------------------------|-------|------|---------------|
| Instantaneous forward voltage | $I_F = 5\text{ A}$  | $T_A = 25\text{ }^{\circ}\text{C}$  | 0.725 | -    | V             |
|                               | $I_F = 10\text{ A}$ |                                     | 0.800 | 0.88 |               |
|                               | $I_F = 5\text{ A}$  | $T_A = 125\text{ }^{\circ}\text{C}$ | 0.581 | -    |               |
|                               | $I_F = 10\text{ A}$ |                                     | 0.661 | 0.74 |               |
| Reverse current               | Rated $V_R$         | $T_A = 25\text{ }^{\circ}\text{C}$  | 0.3   | 10   | $\mu\text{A}$ |
|                               |                     | $T_A = 125\text{ }^{\circ}\text{C}$ | 0.3   | 3    | mA            |
| Typical junction capacitance  | 4.0 V, 1 MHz        | $C_J$                               | 270   | -    | 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                | SS10PH9 | SS10PH10 | UNIT                 |
|----------------------------|-----------------------|---------|----------|----------------------|
| Typical thermal resistance | $R_{\theta JA}^{(1)}$ | 60      |          | $^{\circ}\text{C/W}$ |
|                            | $R_{\theta JL}$       | 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                      |
|--------------------------------|-----------------|--------------|---------------|------------------------------------|
| SS10PH10-M3/86A                | 0.10            | 86A          | 1500          | 7" diameter plastic tape and reel  |
| SS10PH10-M3/87A                | 0.10            | 87A          | 6500          | 13" diameter plastic tape and reel |
| SS10PH10HM3/86A <sup>(1)</sup> | 0.10            | 86A          | 1500          | 7" diameter plastic tape and reel  |
| SS10PH10HM3/87A <sup>(1)</sup> | 0.10            | 87A          | 6500          | 13" diameter plastic tape and reel |
| SS10PH10HM3_A/H <sup>(1)</sup> | 0.10            | H            | 1500          | 7" diameter plastic tape and reel  |
| SS10PH10HM3_A/I <sup>(1)</sup> | 0.10            | I            | 6500          | 13" diameter plastic tape and reel |

**Note**

(1) AEC-Q101 qualified

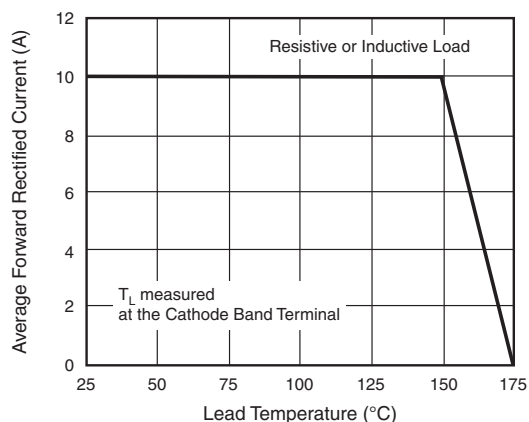
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise specified)

Fig. 1 - Maximum Forward Current Derating Curve

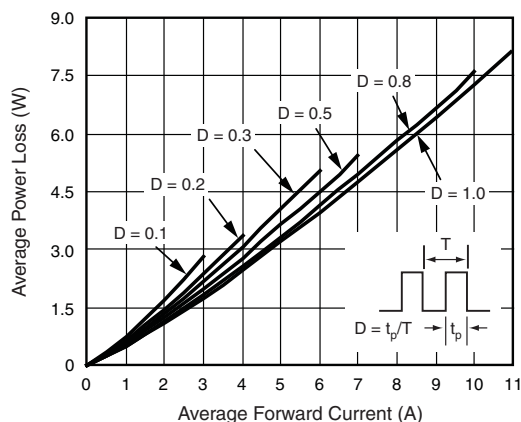


Fig. 2 - Forward Power Loss Characteristics

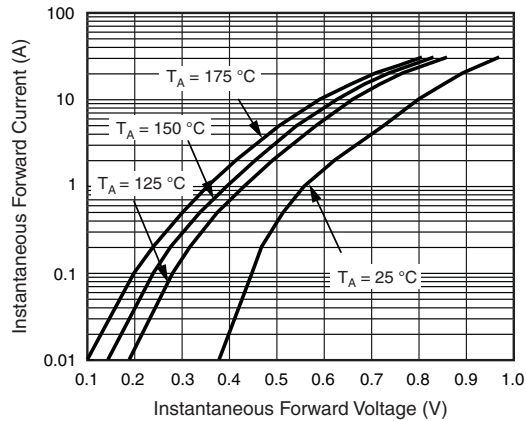


Fig. 3 - Typical Instantaneous Forward Characteristics

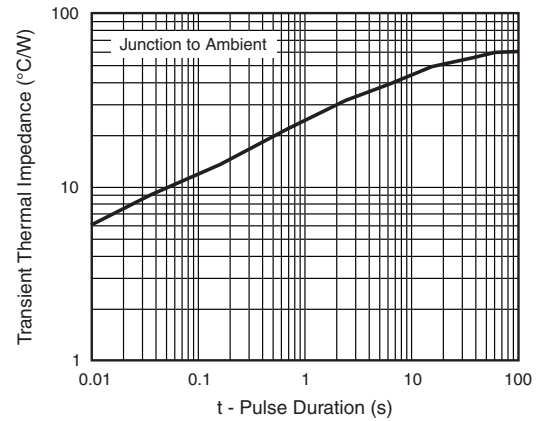


Fig. 6 - Typical Transient Thermal Impedance

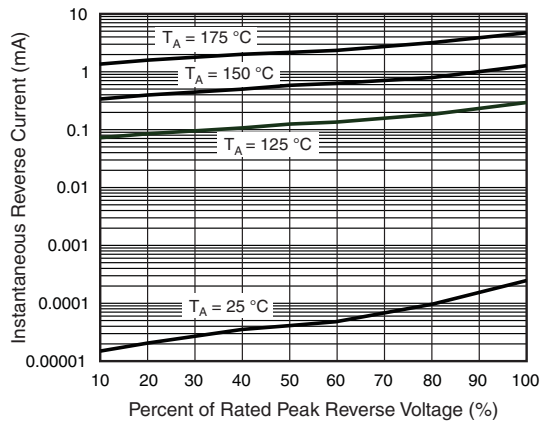


Fig. 4 - Typical Reverse Characteristics

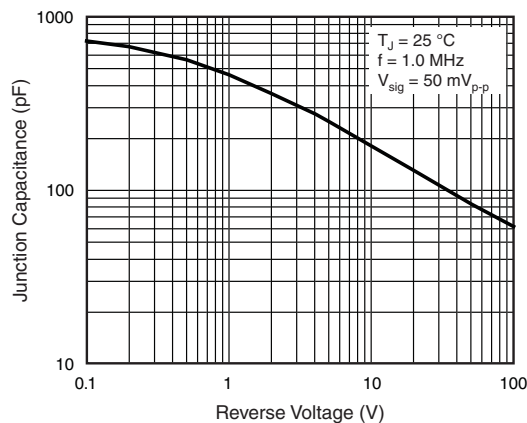
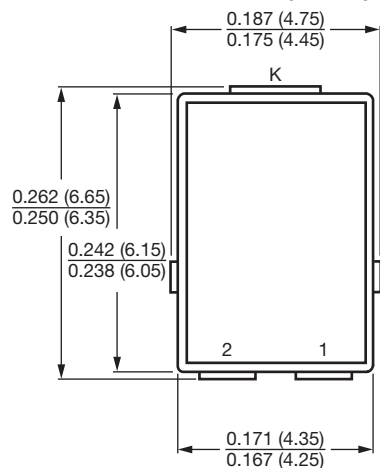


Fig. 5 - Typical Junction Capacitance

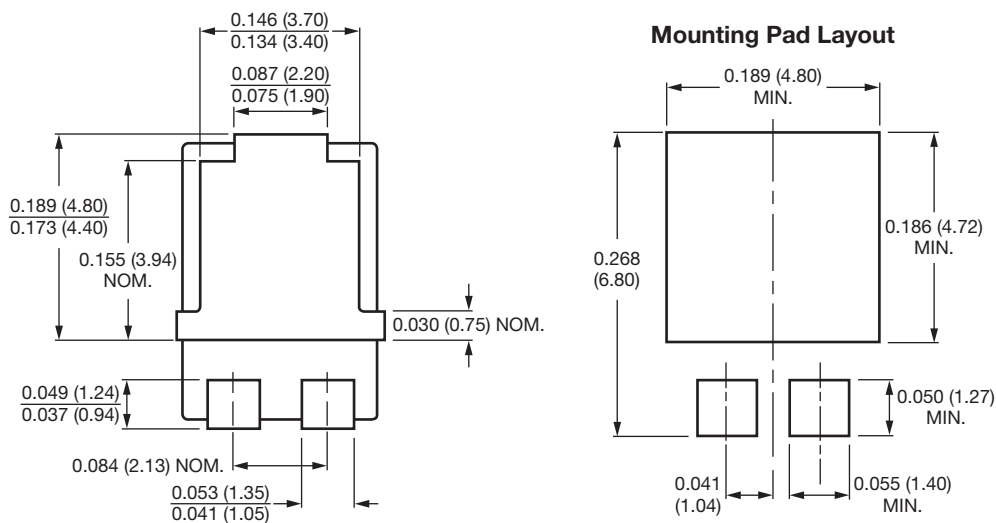


## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

### TO-277A (SMPC)



### Mounting Pad Layout



Conform to JEDEC® TO-277A



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