



## Surface Mount Ultra Fast Rectifier



SMA (DO-214AC)

### FEATURES

- Low profile package
- Ideal for automated placement
- Glass passivated pallet chip junction
- Ultrafast reverse recovery time
- Low switching losses, high efficiency
- High forward surge capability
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- AEC-Q101 qualified available
  - Automotive ordering code: base P/NHE3 or 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**  
Available

| PRIMARY CHARACTERISTICS |   |
|-------------------------|---|
| $I_{F(AV)}$             | 1.0 A   |
| $V_{RRM}$               | 50 V, 100 V, 200 V, 400 V, 600 V, 800 V, 1000 V |
| $I_{FSM}$               | 30 A  |
| $t_{rr}$                | 50 ns, 75 ns                                    |
| $V_F$ at $I_F$          | 1.0 V, 1.7 V                                    |
| $T_J$ max.              | 150 °C  |
| Package                 | SMA (DO-214AC)                                  |
| Diode variations        | Single  |

### TYPICAL APPLICATIONS

For use in high frequency rectification and freewheeling application in switching mode converters and inverters for consumer, computer, automotive, and telecommunication.

### MECHANICAL DATA

**Case:** SMA (DO-214AC)

Molding compound meets UL 94 V-0 flammability rating

Base P/N-E3 - RoHS-compliant, commercial grade

Base P/N-M3 - halogen-free, RoHS-compliant, commercial grade

Base P/NHE3\_X - 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

E3, M3, HE3, and HM3 suffix meets JESD 201 class 2 whisker test

**Polarity:** color band denotes cathode end

| MAXIMUM RATINGS ( $T_A = 25\text{ °C}$ unless otherwise noted)                     |                |             |      |      |      |      |      |      |      |
|--|----------------|-------------|------|------|------|------|------|------|------|
| PARAMETER  | SYMBOL         | US1A        | US1B | US1D | US1G | US1J | US1K | US1M | UNIT |
| Device marking code  |                | UA          | UB   | UD   | UG   | UJ   | UK   | UM   |      |
| Maximum repetitive peak reverse voltage  | $V_{RRM}$      | 50          | 100  | 200  | 400  | 600  | 800  | 1000 | V    |
| Maximum RMS voltage  | $V_{RMS}$      | 35          | 70   | 140  | 280  | 420  | 560  | 700  | V    |
| Maximum DC blocking voltage  | $V_{DC}$       | 50          | 100  | 200  | 400  | 600  | 800  | 1000 | V    |
| Maximum average forward rectified current at $T_L = 110\text{ °C}$                 | $I_{F(AV)}$    | 1.0         |      |      |      |      |      |      | A    |
| Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load | $I_{FSM}$      | 30          |      |      |      |      |      |      | A    |
| Operating and storage temperature range  | $T_J, T_{STG}$ | -55 to +150 |      |      |      |      |      |      | °C   |



| <b>ELECTRICAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted) |   |             |      |      |      |      |      |      |      |               |
|--|---|-------------|------|------|------|------|------|------|------|---------------|
| PARAMETER  | TEST CONDITIONS   | SYMBOL      | US1A | US1B | US1D | US1G | US1J | US1K | US1M | UNIT          |
| Maximum instantaneous forward voltage  | 1.0 A   | $V_F^{(1)}$ | 1.0  |      |      | 1.7  |      |      |      | V             |
| Maximum DC reverse current at rated DC blocking voltage                                      | $T_A = 25\text{ }^\circ\text{C}$  | $I_R$       | 10   |      |      |      |      |      |      | $\mu\text{A}$ |
|  | $T_A = 100\text{ }^\circ\text{C}$   |             | 50   |      |      |      |      |      |      |               |
| Maximum reverse recovery time  | $I_F = 0.5\text{ A}$ , $I_R = 1.0\text{ A}$ ,<br>$I_{rr} = 0.25\text{ A}$ | $t_{rr}$    | 50   |      |      | 75   |      |      |      | ns            |
| Typical junction capacitance   | 4.0 V, 1 MHz  | $C_J$       | 15   |      |      | 10   |      |      |      | pF            |

**Note**

(1) Pulse test: 300  $\mu\text{s}$  pulse width, 1 % duty cycle

| <b>THERMAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted) |                       |      |      |      |      |      |      |      |                    |  |
|---|-----------------------|------|------|------|------|------|------|------|--------------------|--|
| PARAMETER   | SYMBOL                | US1A | US1B | US1D | US1G | US1J | US1K | US1M | UNIT               |  |
| Maximum thermal resistance  | $R_{\theta JA}^{(1)}$ | 75   |      |      |      |      |      |      | $^\circ\text{C/W}$ |  |
|   | $R_{\theta JL}^{(1)}$ | 27   |      |      |      |      |      |      |                    |  |

**Note**

(1) PCB mounted on 0.2" x 0.2" (5.0 mm x 5.0 mm) copper pad area

| <b>ORDERING INFORMATION</b> (Example) |                 |                        |               |                                    |
|---------------------------------------|-----------------|------------------------|---------------|------------------------------------|
| PREFERRED P/N                         | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                      |
| US1J-E3/61T                           | 0.064           | 61T                    | 1800          | 7" diameter plastic tape and reel  |
| US1J-E3/5AT                           | 0.064           | 5AT                    | 7500          | 13" diameter plastic tape and reel |
| US1JHE3_A/H (1)                       | 0.064           | H                      | 1800          | 7" diameter plastic tape and reel  |
| US1JHE3_A/I (1)                       | 0.064           | I                      | 7500          | 13" diameter plastic tape and reel |
| US1J-M3/61T                           | 0.064           | 61T                    | 1800          | 7" diameter plastic tape and reel  |
| US1J-M3/5AT                           | 0.064           | 5AT                    | 7500          | 13" diameter plastic tape and reel |
| US1JHM3_A/H (1)                       | 0.064           | H                      | 1800          | 7" diameter plastic tape and reel  |
| US1JHM3_A/I (1)                       | 0.064           | I                      | 7500          | 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)

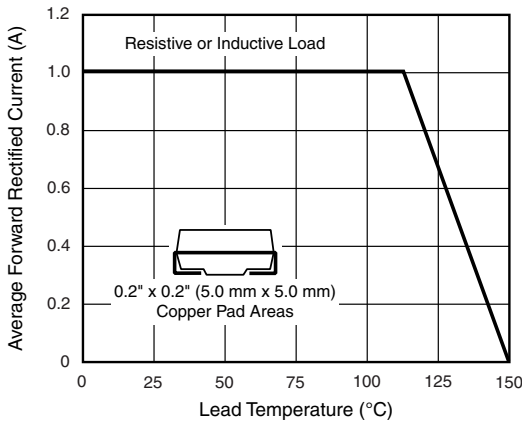


Fig. 1 - Forward Current Derating Curve

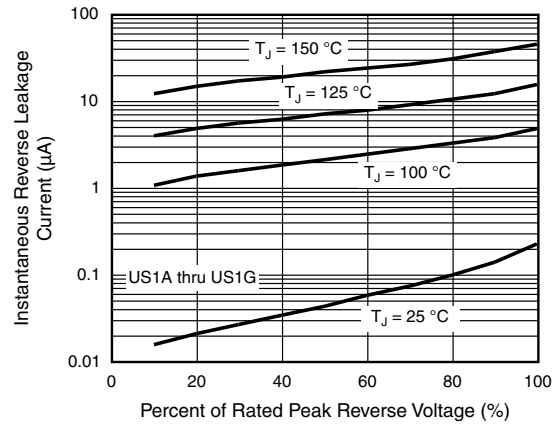


Fig. 4 - Typical Reverse Leakage Characteristics

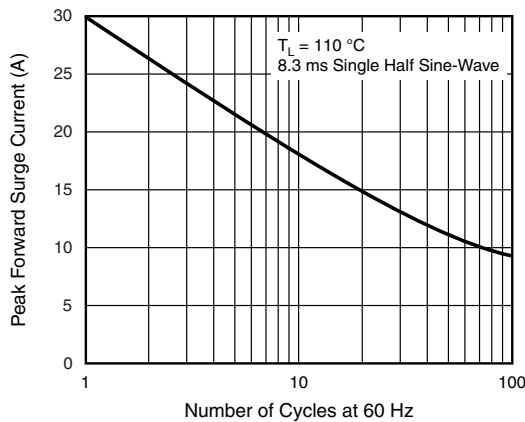


Fig. 2 - Maximum Non-Repetitive Peak Forward Surge Current

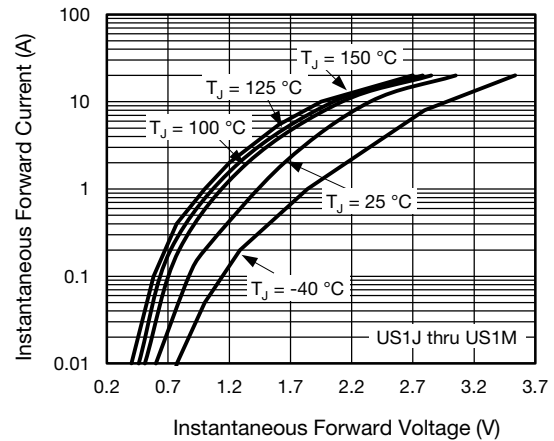


Fig. 5 - Typical Instantaneous Forward Characteristics

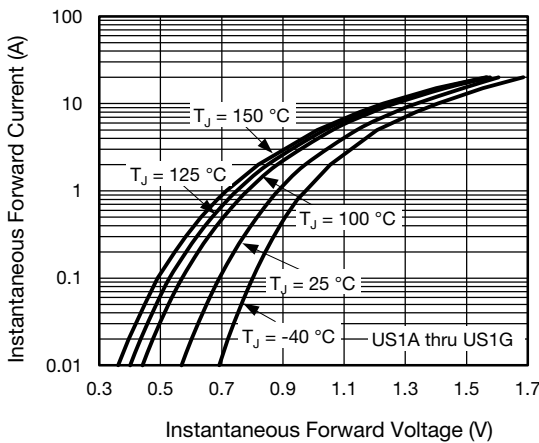


Fig. 3 - Typical Instantaneous Forward Characteristics

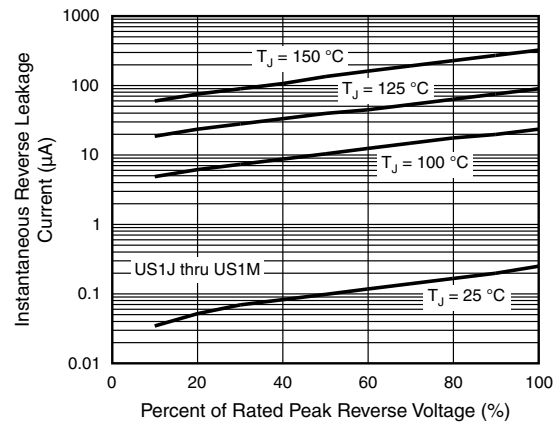


Fig. 6 - Typical Reverse Leakage Characteristics

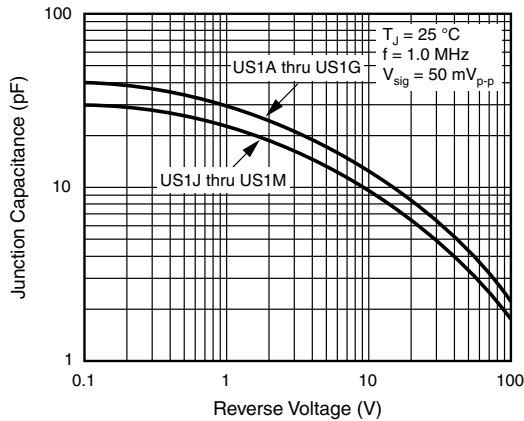


Fig. 7 - Typical Junction Capacitance

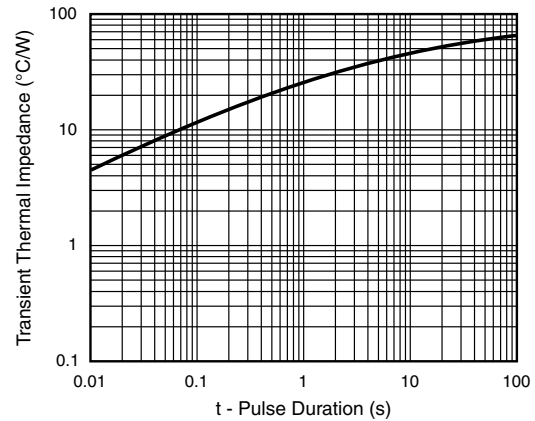
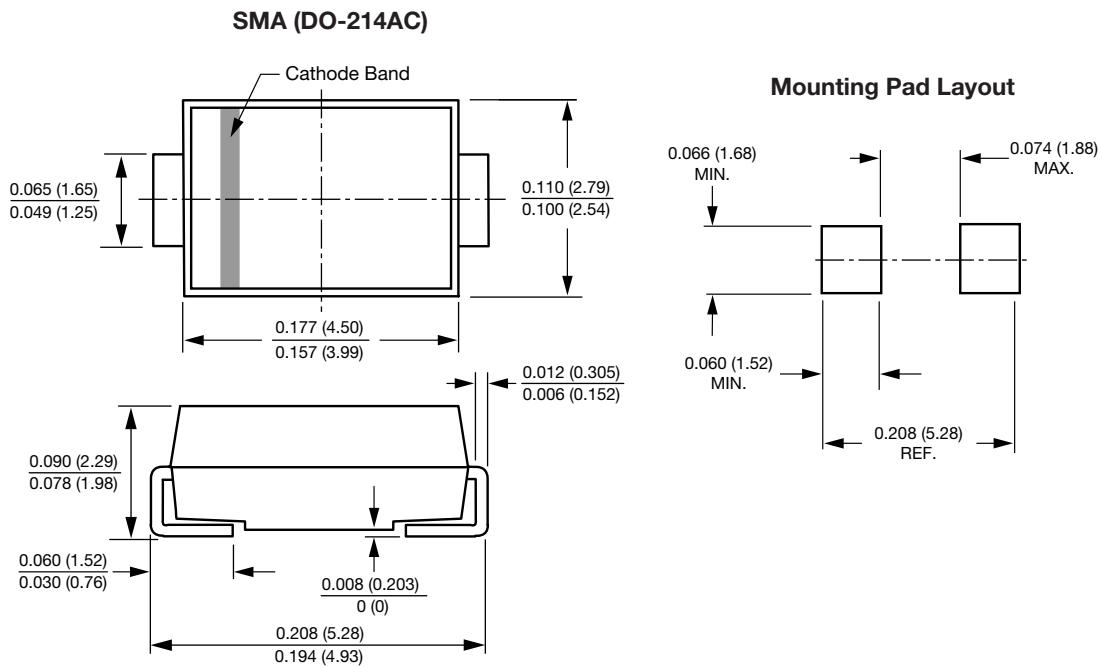


Fig. 8 - Typical Transient Thermal Impedance

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





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