

## Surface Mount Ultrafast Rectifier


**DO-214AC (SMA)**

### FEATURES

- Low profile package
- Ideal for automated placement
- Glass passivated 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
- Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

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

Molding compound meets UL 94 V-0 flammability rating  
 Base P/N-E3 - RoHS-compliant, commercial grade  
 Base P/NHE3 - RoHS-compliant, automotive grade  
 Base P/NHE3\_X - 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 suffix meets JESD 201 class 1A whisker test, HE3 suffix meets JESD 201 class 2 whisker test

**Polarity:** Color band denotes cathode end

### PRIMARY CHARACTERISTICS

|                    |                |
|--------------------|----------------|
| $I_{F(AV)}$        | 1.0 A          |
| $V_{RRM}$          | 50 V to 1000 V |
| $I_{FSM}$          | 30 A           |
| $t_{rr}$           | 50 ns, 75 ns   |
| $V_F$              | 1.0 V, 1.7 V   |
| $T_J \text{ max.}$ | 150 °C         |

### MAXIMUM RATINGS ( $T_A = 25$ °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 $T_L = 110$ °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  | $I_F = 0.5\text{ A}$ , $I_R = 1.0\text{ A}$ , $t_{rr} = 0.25\text{ A}$ | $t_{rr}$    | 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 |  |
| US1JHE3/61T <sup>(1)</sup>            | 0.064           | 61T                    | 1800          | 7" diameter plastic tape and reel  |  |
| US1JHE3/5AT <sup>(1)</sup>            | 0.064           | 5AT                    | 7500          | 13" diameter plastic tape and reel |  |
| US1JHE3_A/H <sup>(1)</sup>            | 0.064           | H                      | 1800          | 7" diameter plastic tape and reel  |  |
| US1JHE3_A/I <sup>(1)</sup>            | 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)

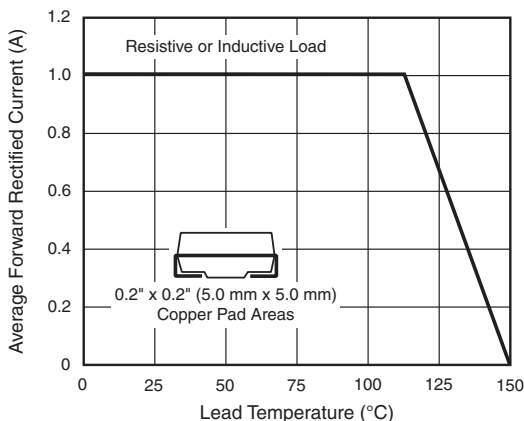


Fig. 1 - Forward Current Derating Curve

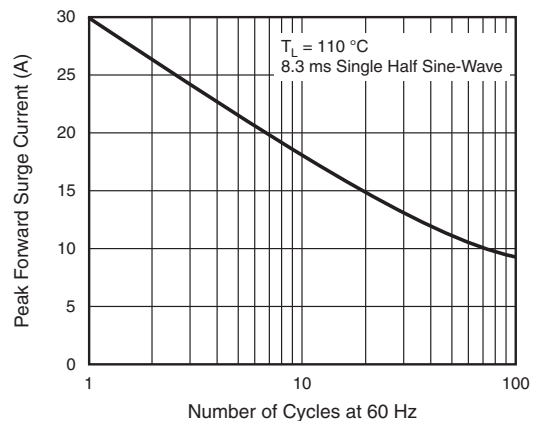


Fig. 2 - Maximum Non-Repetitive Peak Forward Surge Current

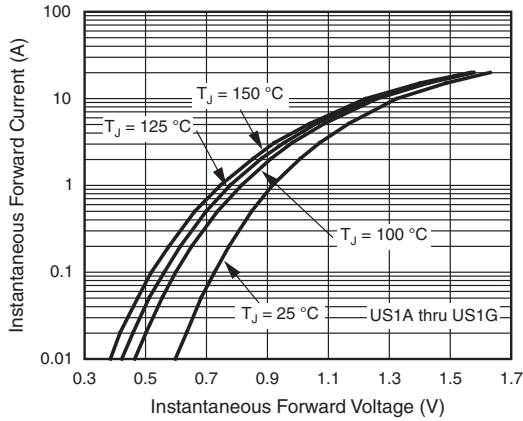


Fig. 3 - Typical Instantaneous Forward Characteristics

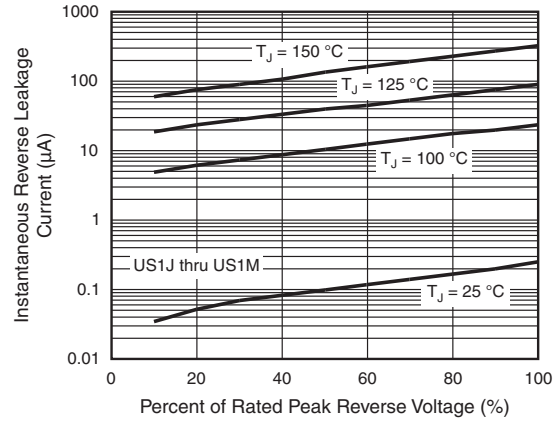


Fig. 6 - Typical Reverse Leakage Characteristics

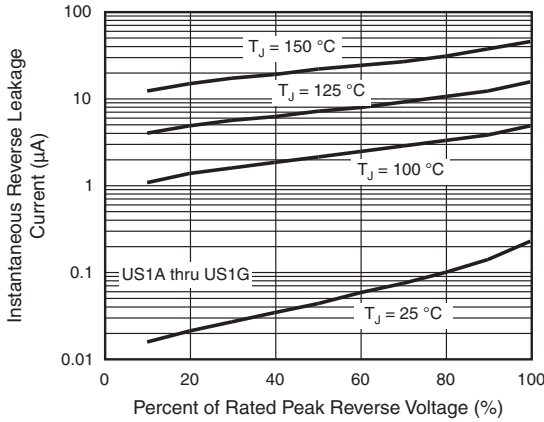


Fig. 4 - Typical Reverse Leakage Characteristics

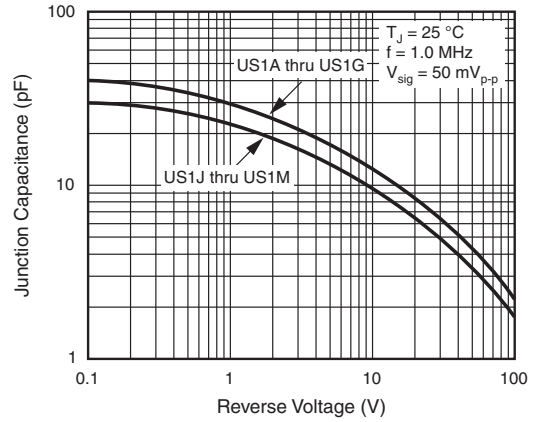


Fig. 7 - Typical Junction Capacitance

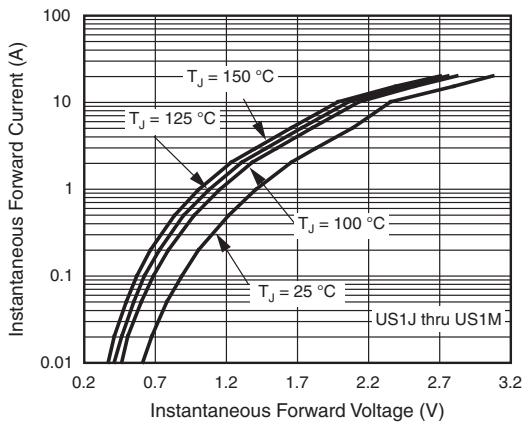


Fig. 5 - Typical Instantaneous Forward Characteristics

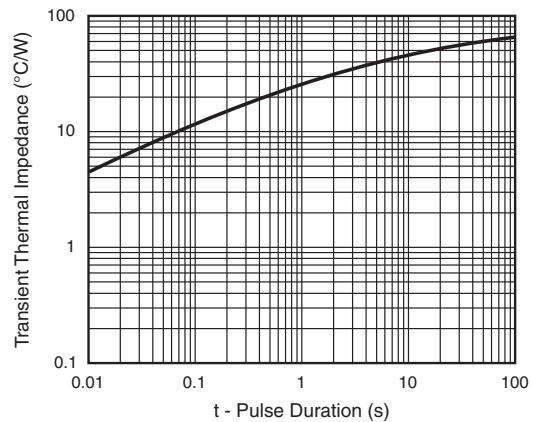
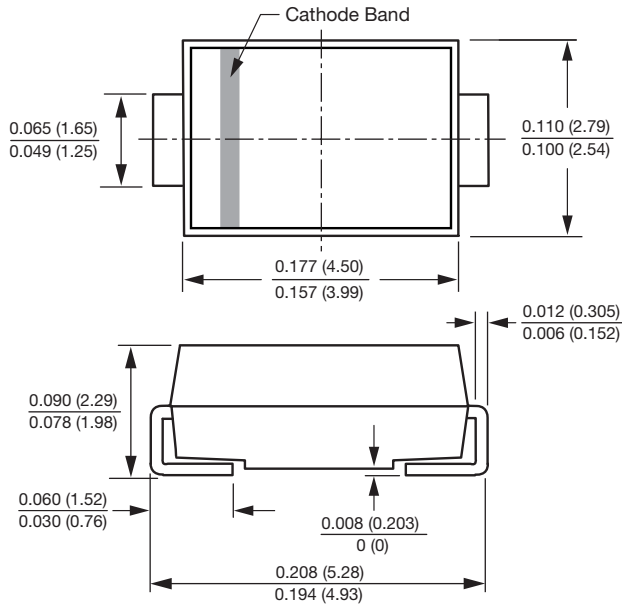


Fig. 8 - Typical Transient Thermal Impedance

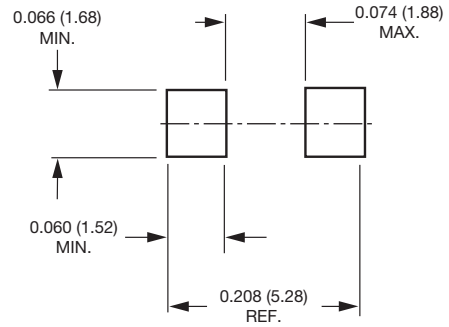


### PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

#### DO-214AC (SMA)



#### Mounting Pad Layout





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