

## 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   |
| $T_J$ max.  | 150 °C         |

### 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   |

**ELECTRICAL CHARACTERISTICS** ( $T_A = 25\text{ }^{\circ}\text{C}$  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**
<sup>(1)</sup> Pulse test: 300  $\mu\text{s}$  pulse width, 1 % duty cycle

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

| PARAMETER                  | SYMBOL                | US1A | US1B | US1D | US1G | US1J | US1K | US1M | UNIT |
|----------------------------|-----------------------|------|------|------|------|------|------|------|------|
| Maximum thermal resistance | $R_{\theta JA}^{(1)}$ | 75   |      |      |      |      |      |      | °C/W |
|                            | $R_{\theta JL}^{(1)}$ | 27   |      |      |      |      |      |      |      |

**Note**
<sup>(1)</sup> PCB mounted on 0.2" x 0.2" (5.0 mm x 5.0 mm) copper pad area

**ORDERING INFORMATION** (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**
<sup>(1)</sup> AEC-Q101 qualified

**RATINGS AND CHARACTERISTICS CURVES**

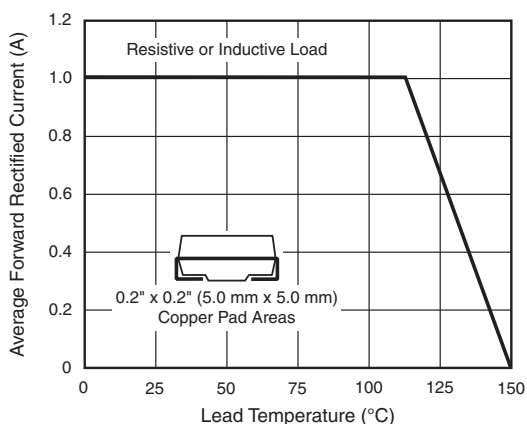
( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)


Fig. 1 - Forward Current Derating Curve

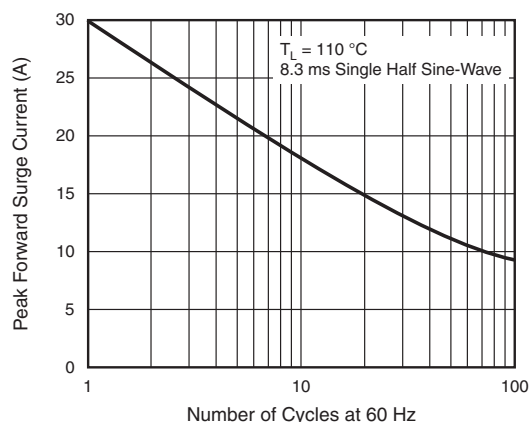


Fig. 2 - Maximum Non-Repetitive Peak Forward Surge Current

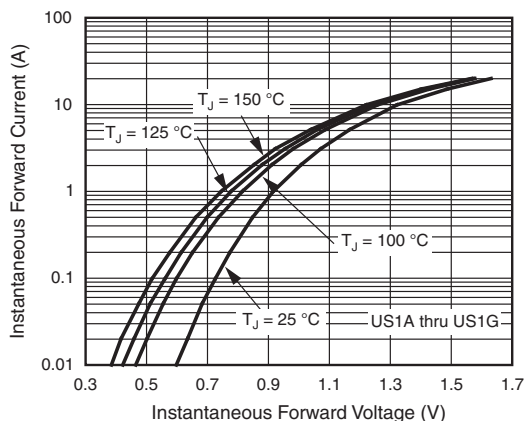


Fig. 3 - Typical Instantaneous Forward Characteristics

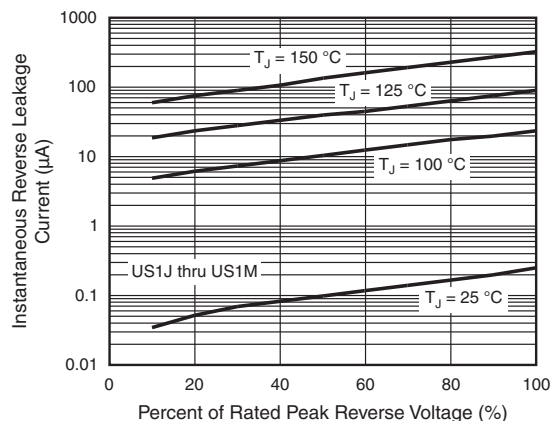


Fig. 6 - Typical Reverse Leakage Characteristics

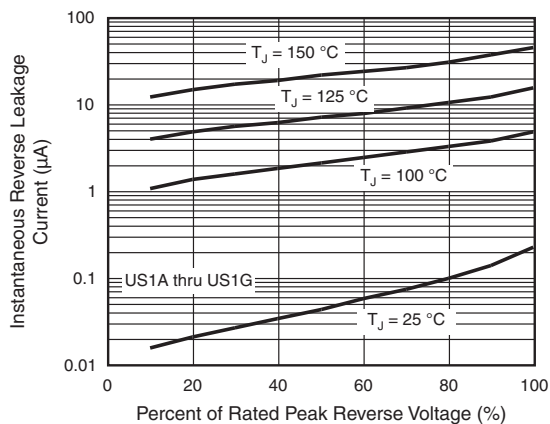


Fig. 4 - Typical Reverse Leakage Characteristics

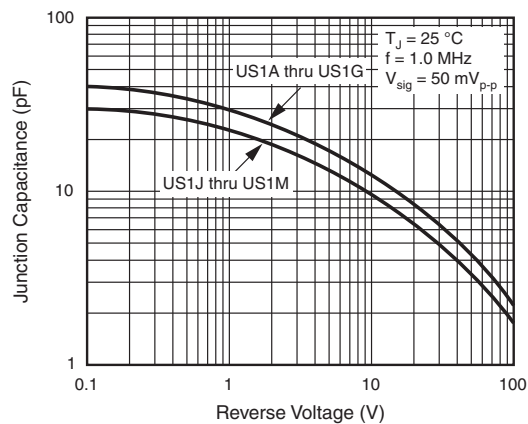


Fig. 7 - Typical Junction Capacitance

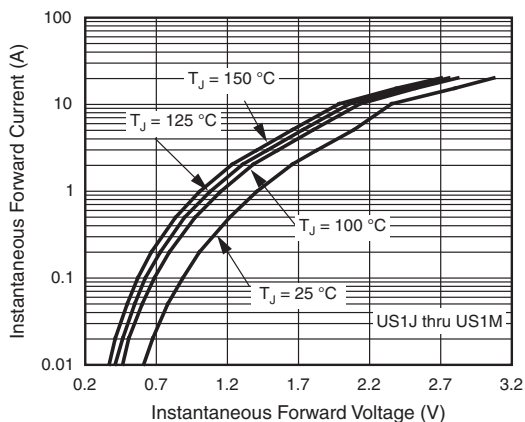


Fig. 5 - Typical Instantaneous Forward Characteristics

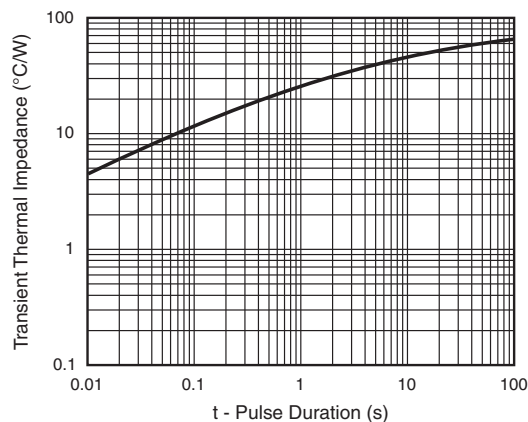
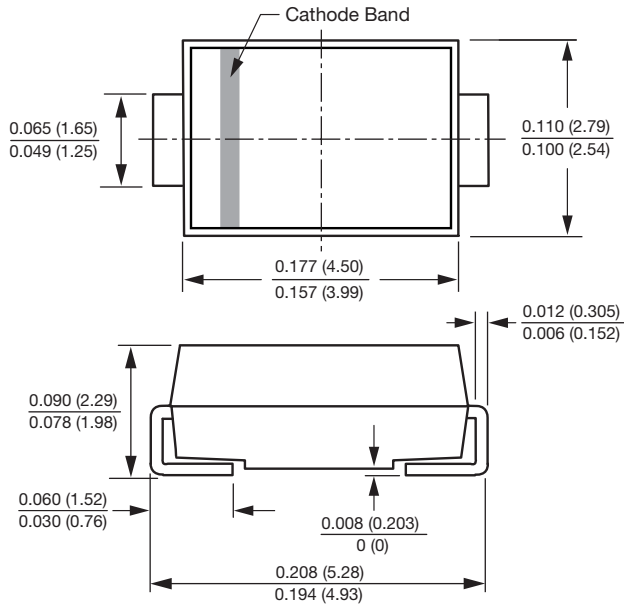


Fig. 8 - Typical Transient Thermal Impedance

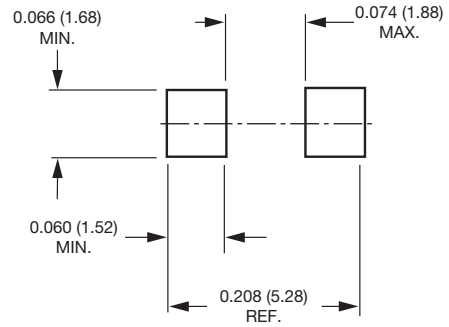


**PACKAGE OUTLINE DIMENSIONS** in inches (millimeters)

**DO-214AC (SMA)**



**Mounting Pad Layout**





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