

## 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
- Solder dip 260 °C, 40 s
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC



**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)

Epoxy meets UL 94V-0 flammability rating

**Terminals:** Matte tin plated leads, solderable per J-STD-002 and JESD22-B102

E3 suffix for consumer grade, meets JESD 201 class 1A whisker test, HE3 suffix for high reliability grade (AEC Q101 qualified), 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 ( $T_A = 25\text{ °C}$ 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 <sub>A</sub> = 25 °C unless otherwise noted) |                                                                             |                                                   |                 |          |      |      |      |      |      |      |      |
|----------------------------------------------------------------------------|-----------------------------------------------------------------------------|---------------------------------------------------|-----------------|----------|------|------|------|------|------|------|------|
| PARAMETER                                                                  | TEST CONDITIONS                                                             |                                                   | SYMBOL          | US1A     | US1B | US1D | US1G | US1J | US1K | US1M | UNIT |
| Maximum instantaneous forward voltage <sup>(1)</sup>                       | 1.0 A                                                                       |                                                   | V <sub>F</sub>  | 1.0      |      |      |      | 1.7  |      |      | V    |
| Maximum DC reverse current at rated DC blocking voltage                    |                                                                             | T <sub>A</sub> = 25 °C<br>T <sub>A</sub> = 100 °C | I <sub>R</sub>  | 10<br>50 |      |      |      |      |      |      | μA   |
| Maximum reverse recovery time                                              | I <sub>F</sub> = 0.5 A, I <sub>R</sub> = 1.0 A,<br>I <sub>rr</sub> = 0.25 A |                                                   | t <sub>rr</sub> | 50       |      |      |      | 75   |      |      | ns   |
| Typical junction capacitance                                               | 4.0 V, 1 MHz                                                                |                                                   | C <sub>J</sub>  | 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 <sup>(1)</sup>                                                   | $R_{\theta JA}$<br>$R_{\theta JL}$ |  | 75   |      |      | 27   |      |      |      | $^{\circ}\text{C/W}$ |

**Note:**

(1) P.C.B. mounted on 0.2 x 0.2" (5.0 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 |

**Note:**

(1) Automotive grade AEC Q101 qualified

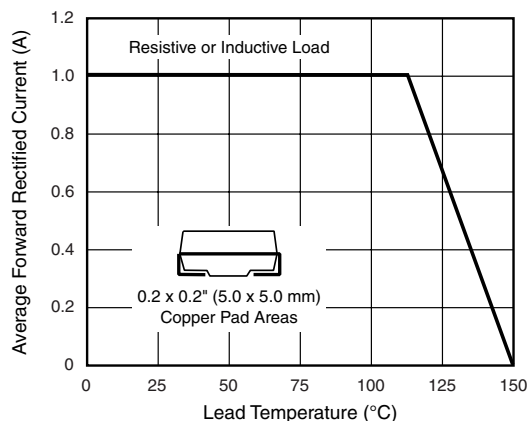
**RATINGS AND CHARACTERISTICS CURVES**( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)

Figure 1. Forward Current Derating Curve

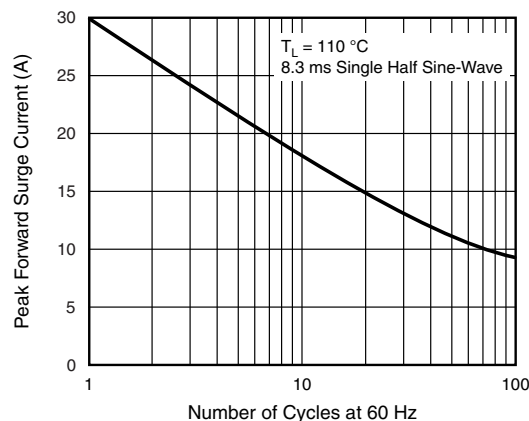


Figure 2. Maximum Non-Repetitive Peak Forward Surge Current

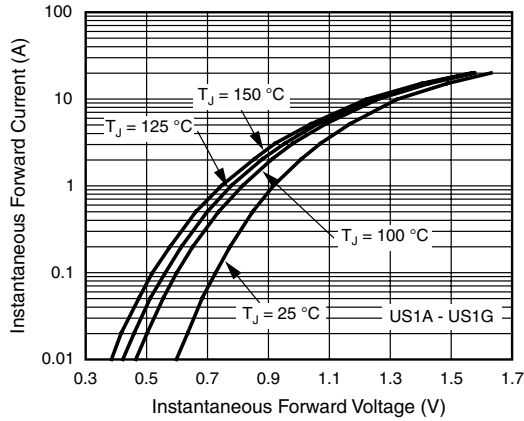


Figure 3. Typical Instantaneous Forward Characteristics

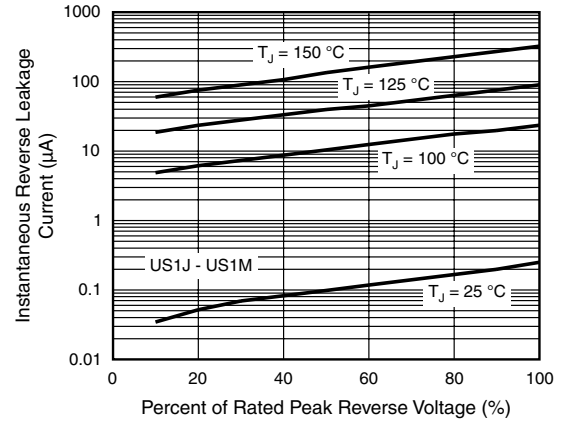


Figure 6. Typical Reverse Leakage Characteristics

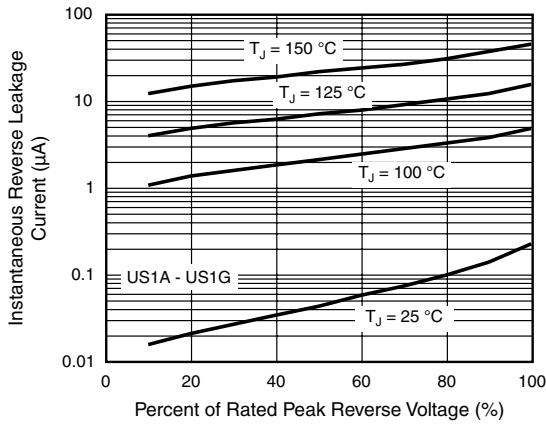


Figure 4. Typical Reverse Leakage Characteristics

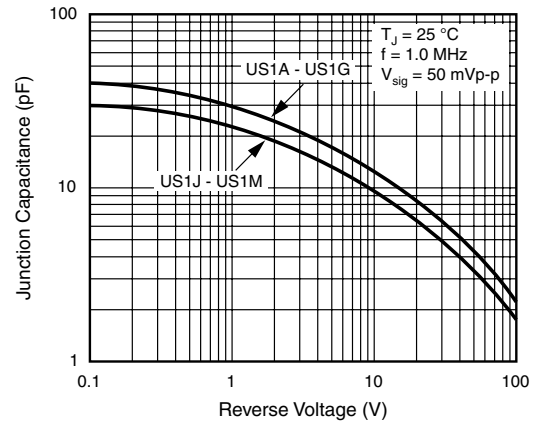


Figure 7. Typical Junction Capacitance

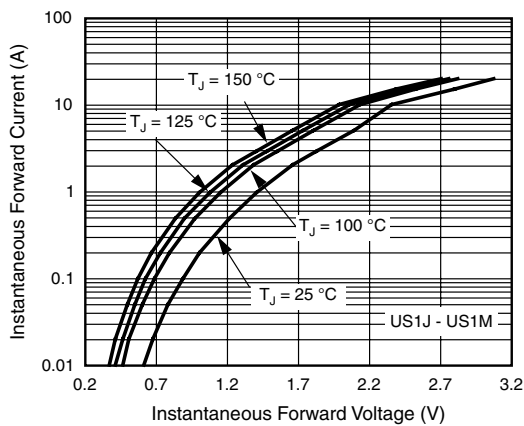


Figure 5. Typical Instantaneous Forward Characteristics

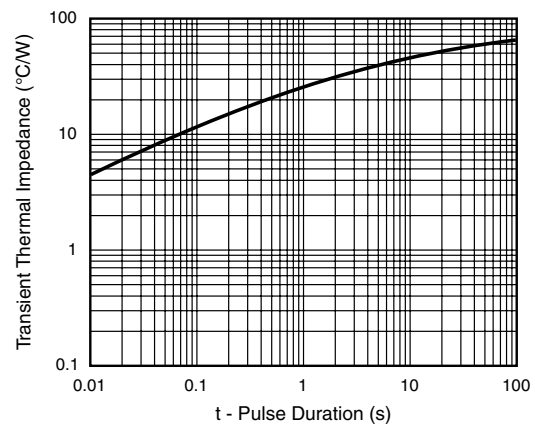
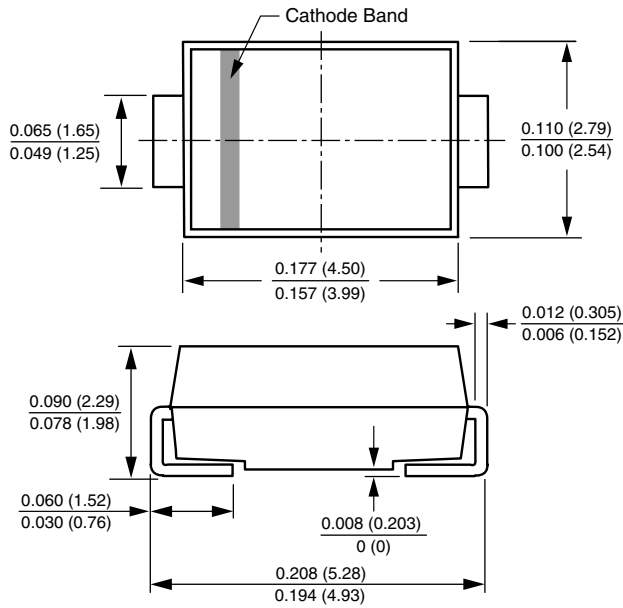


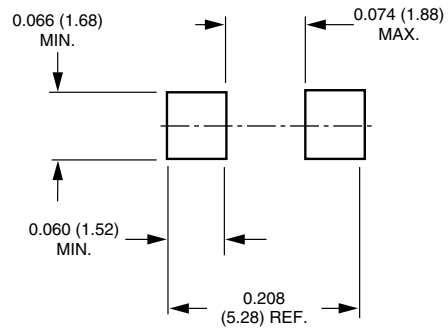
Figure 8. Typical Transient Thermal Impedance

## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

### DO-214AC (SMA)



### Mounting Pad Layout





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