

## Surface Mount Ultrafast Plastic Rectifier



DO-214AC (SMA)

### FEATURES

- Oxide planar chip junction
- Ultrafast recovery time
- Low forward voltage, low power losses
- High forward surge capability
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- 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 low voltage, high frequency rectifier of switching power supplies, freewheeling diodes, DC/DC converters or polarity protection application.

### MECHANICAL DATA

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

Molding compound meets UL 94 V-0 flammability rating

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

**Terminals:** Matte tin plated leads, solderable per J-STD-002 and JESD 22-B102

E3 suffix meets JESD 201 class 1A whisker test

**Polarity:** Color band denotes cathode end

| PRIMARY CHARACTERISTICS |                     |
|-------------------------|---------------------|
| $I_{F(AV)}$             | 1.0 A               |
| $V_{RRM}$               | 100 V, 150 V, 200 V |
| $I_{FSM}$               | 30 A                |
| $t_{rr}$                | 15 ns               |
| $V_F$ at $I_F = 1.0$ A  | 0.76 V              |
| $T_J$ max.              | 150 °C              |

| MAXIMUM RATINGS ( $T_A = 25$ °C unless otherwise noted)                            |                |               |     |     |      |
|------------------------------------------------------------------------------------|----------------|---------------|-----|-----|------|
| PARAMETER                                                                          | SYMBOL         | U1B           | U1C | U1D | UNIT |
| Device marking code                                                                |                | U1B           | U1C | U1D |      |
| Maximum repetitive peak reverse voltage                                            | $V_{RRM}$      | 100           | 150 | 200 | V    |
| Maximum average forward rectified current (fig. 1)                                 | $I_{F(AV)}$    | 1.0           |     |     | A    |
| Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load | $I_{FSM}$      | 30            |     |     | A    |
| Operating junction 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                        | TYP. | MAX. | UNIT |
| Instantaneous forward voltage                                              | I <sub>F</sub> = 0.6 A                                                                                | T <sub>A</sub> = 25 °C  | V <sub>F</sub> <sup>(1)</sup> | 0.82 | 0.87 | V    |
|                                                                            | I <sub>F</sub> = 1.0 A                                                                                |                         |                               | 0.87 | 0.92 |      |
|                                                                            | I <sub>F</sub> = 0.6 A                                                                                | T <sub>A</sub> = 100 °C |                               | 0.71 | 0.78 |      |
|                                                                            | I <sub>F</sub> = 1.0 A                                                                                |                         |                               | 0.76 | 0.84 |      |
| Reverse current                                                            | Rated V <sub>R</sub>                                                                                  | T <sub>A</sub> = 25 °C  | I <sub>R</sub> <sup>(2)</sup> | -    | 5.0  | μA   |
|                                                                            |                                                                                                       | T <sub>A</sub> = 100 °C |                               | 55   | 100  |      |
| Reverse recovery time                                                      | I <sub>F</sub> = 0.5 A, I <sub>R</sub> = 1.0 A, I <sub>rr</sub> = 0.25 A                              | T <sub>A</sub> = 25 °C  | t <sub>rr</sub>               | -    | 15   | ns   |
|                                                                            | I <sub>F</sub> = 0.6 A, dI/dt = 50 A/μs, V <sub>R</sub> = 30 V, I <sub>rr</sub> = 0.1 I <sub>RM</sub> | T <sub>A</sub> = 25 °C  |                               | 24   | -    |      |
|                                                                            |                                                                                                       | T <sub>A</sub> = 100 °C |                               | 29   | -    |      |
| Storage charge                                                             | I <sub>F</sub> = 0.6 A, dI/dt = 50 A/μs, V <sub>R</sub> = 30 V, I <sub>rr</sub> = 0.1 I <sub>RM</sub> | T <sub>A</sub> = 25 °C  | Q <sub>rr</sub>               | 7    | -    | nC   |
|                                                                            |                                                                                                       | T <sub>A</sub> = 100 °C |                               | 13   | -    |      |
| Typical junction capacitance                                               | 4.0 V, 1 MHz                                                                                          |                         | C <sub>J</sub>                | 6.8  | -    | 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 <sub>A</sub> = 25 °C unless otherwise noted) |                                 |     |     |     |      |
|-------------------------------------------------------------------------|---------------------------------|-----|-----|-----|------|
| PARAMETER                                                               | SYMBOL                          | U1B | U1C | U1D | UNIT |
| Typical thermal resistance                                              | R <sub>θJA</sub> <sup>(1)</sup> | 115 |     |     | °C/W |
|                                                                         | R <sub>θJM</sub> <sup>(1)</sup> | 22  |     |     |      |

**Note**

- (1) Free air, mounted on recommended copper pad area

| <b>ORDERING INFORMATION</b> (Example) |                 |                        |               |                                    |
|---------------------------------------|-----------------|------------------------|---------------|------------------------------------|
| PREFERRED P/N                         | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                      |
| U1D-E3/61T                            | 0.064           | 61T                    | 1800          | 7" diameter plastic tape and reel  |
| U1D-E3/5AT                            | 0.064           | 5AT                    | 7500          | 13" diameter plastic tape and reel |

**RATINGS AND CHARACTERISTICS CURVES**

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

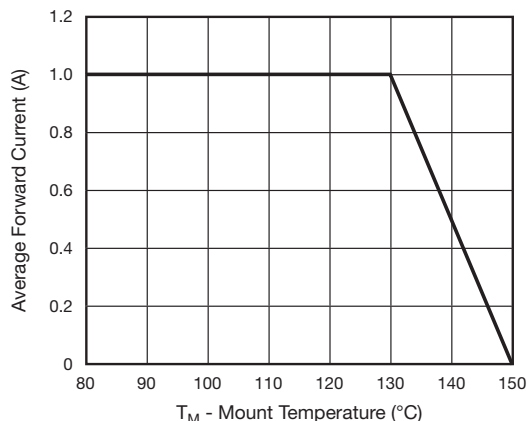


Fig. 1 - Forward Derating Curve

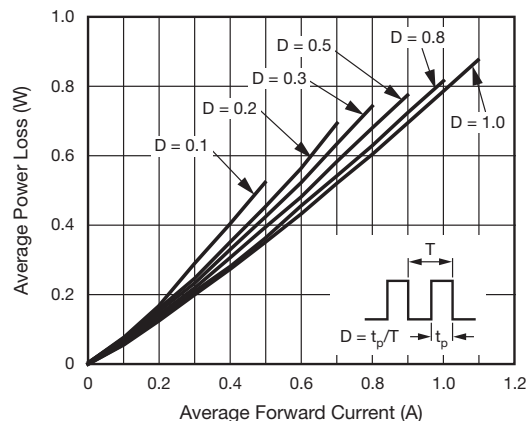


Fig. 2 - Forward Power Loss Characteristics

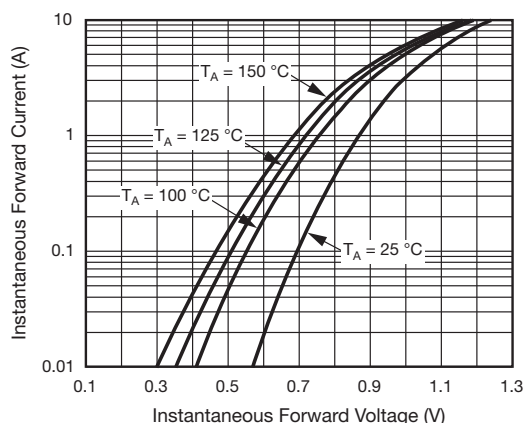


Fig. 3 - Typical Instantaneous Forward Characteristics

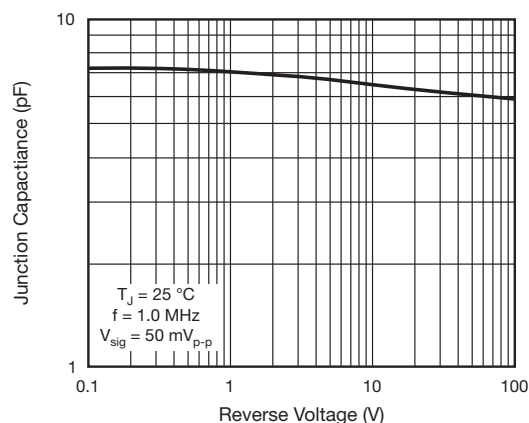


Fig. 5 - Typical Junction Capacitance

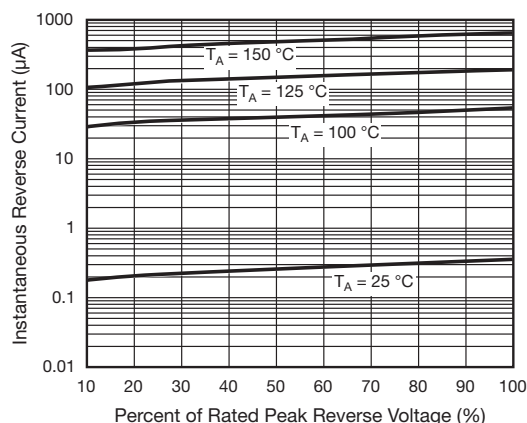


Fig. 4 - Typical Reverse Characteristics

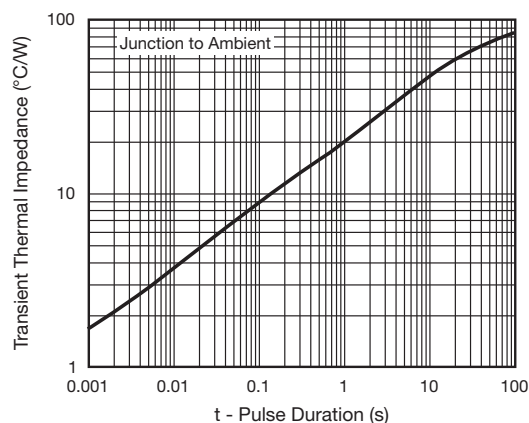
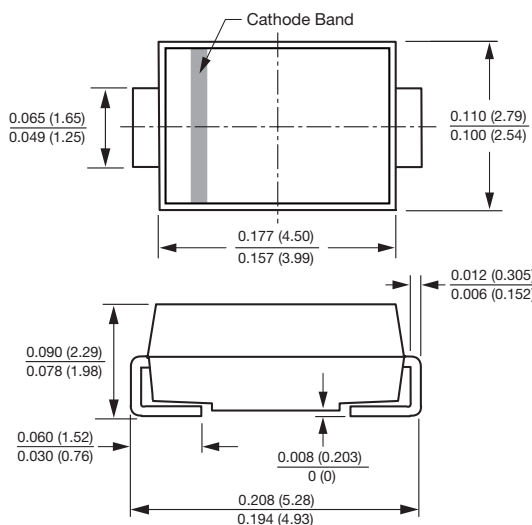
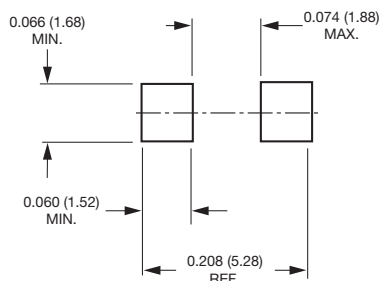


Fig. 6 - Typical Transient Thermal Impedance

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

**DO-214AC (SMA)**

**Mounting Pad Layout**




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