



# THE DATASHEET OF US1A-13

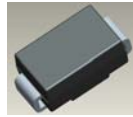


## Features

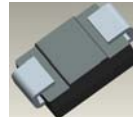
- Glass Passivated Die Construction
- Ultra-Fast Recovery Time for High Efficiency
- Surge Overload Rating to 30A Peak
- High Current Capability
- Ideally Suited for Automated Assembly
- **Lead-Free Finish; RoHS Compliant (Note 1)**
- **Halogen and Antimony Free. "Green" Device (Note 2)**

## Mechanical Data

- Case: SMA
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Lead Free Plating (Matte Tin Finish). Solderable per MIL-STD-202, Method 208
- Polarity: Cathode Band or Cathode Notch
- Weight: 0.064 grams (Approximate)



Top View



Bottom View

## Ordering Information (Note 3)

| Part Number* | Case | Packaging         |
|--------------|------|-------------------|
| US1x-13-F    | SMA  | 5,000/Tape & Reel |

\*x = Device type, e.g. US1A-13-F.

- Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
  2. See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
  3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.

## Marking Information



US1x = Product Type Marking Code, ex: US1A  
 DII = Manufacturers' Code Marking  
 YWW = Date Code Marking  
 Y = Last Digit of Year (ex: 4 for 2014)  
 WW = Week Code (01 to 53)

**Maximum Ratings** (@T<sub>A</sub> = +25°C unless otherwise specified.)

Single phase, half wave, 60Hz, resistive or inductive load.  
For capacitance load, derate current by 20%.

| Characteristic   | Symbol              | US1A | US1B | US1D | US1G | US1J | US1K | US1M | Unit |
|--|---------------------|------|------|------|------|------|------|------|------|
| Peak Repetitive Reverse Voltage  | V <sub>RRM</sub>    |      |      |      |      |      |      |      |      |
| Working Peak Reverse Voltage   | V <sub>RWM</sub>    | 50   | 100  | 200  | 400  | 600  | 800  | 1000 | V    |
| DC Blocking Voltage (Note 4)   | V <sub>R</sub>      |      |      |      |      |      |      |      |      |
| RMS Reverse Voltage  | V <sub>R(RMS)</sub> | 35   | 70   | 140  | 280  | 420  | 560  | 700  | V    |
| Average Rectified Output Current @ T <sub>T</sub> = +75°C  | I <sub>O</sub>      | 1.0  |      |      |      |      |      |      | A    |
| Non-Repetitive Peak Forward Surge Current 8.3ms Single Half Sine-Wave Superimposed on Rated Load | I <sub>FSM</sub>    | 30   |      |      |      |      |      |      | A    |

**Thermal Characteristics**

| Characteristic                                   | Symbol                            | Value       | Unit |
|--|-----------------------------------|-------------|------|
| Maximum Thermal Resistance, Junction to Terminal | R <sub>θJT</sub>                  | 30          | °C/W |
| Operating and Storage Temperature Range          | T <sub>J</sub> , T <sub>STG</sub> | -65 to +150 | °C   |

**Electrical Characteristics** (@T<sub>A</sub> = +25°C unless otherwise specified.)

| Characteristic  | Symbol          | US1A | US1B | US1D | US1G | US1J | US1K | US1M | Unit |
|---|-----------------|------|------|------|------|------|------|------|------|
| Forward Voltage Drop @ I <sub>F</sub> = 1.0A  | V <sub>FM</sub> | 1.0  |      |      | 1.3  | 1.7  |      |      | V    |
| Peak Reverse Current @ T <sub>A</sub> = +25°C at Rated DC Blocking Voltage (Note 4) @ T <sub>A</sub> = +100°C | I <sub>RM</sub> |      |      |      | 5.0  |      |      |      | μA   |
| Reverse Recovery Time (Note 5)  | t <sub>rr</sub> | 50   |      |      | 75   |      |      | ns   |      |
| Typical Total Capacitance (Note 6)  | C <sub>T</sub>  | 20   |      |      | 10   |      |      | pF   |      |

- Notes: 4. Short duration pulse test used to minimize self-heating effect.  
5. Measured with I<sub>F</sub> = 0.5A, I<sub>R</sub> = 1.0A, I<sub>rr</sub> = 0.25A. See Figure 5.  
6. Measured at 1.0MHz and applied reverse voltage of 4.0V DC.

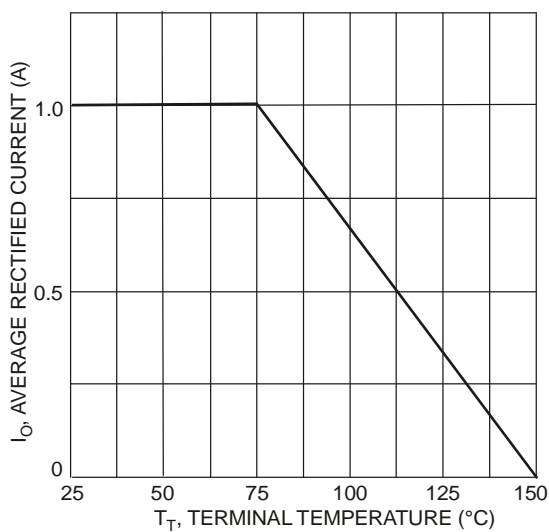


Fig. 1 Forward Current Derating Curve

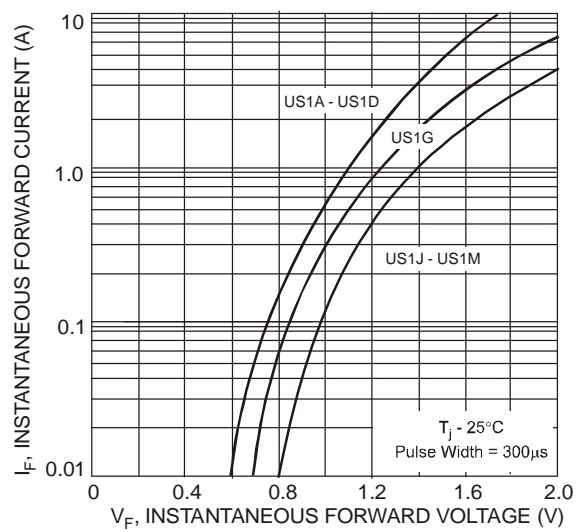


Fig. 2 Typical Forward Characteristics

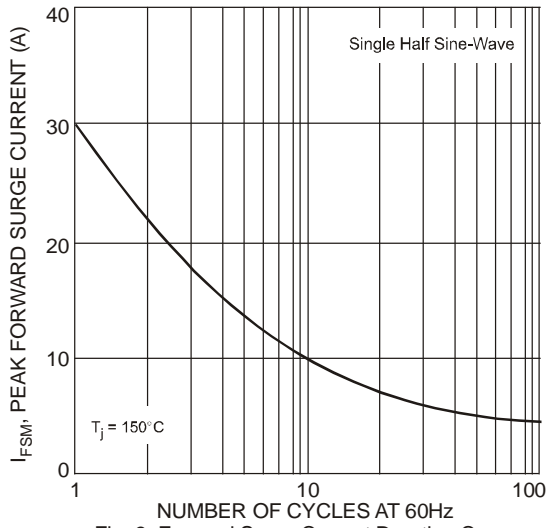


Fig. 3 Forward Surge Current Derating Curve

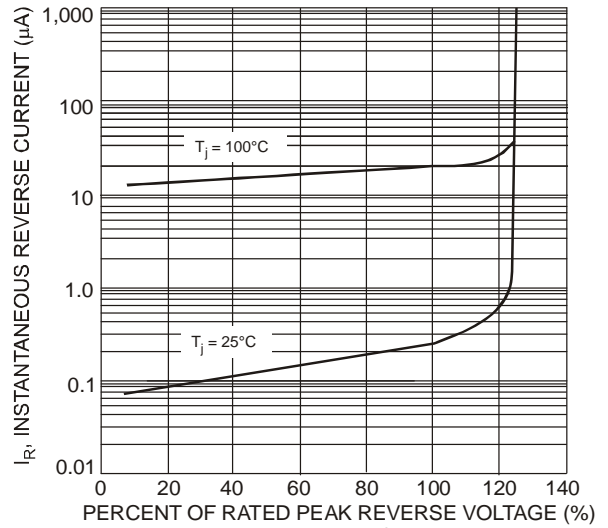
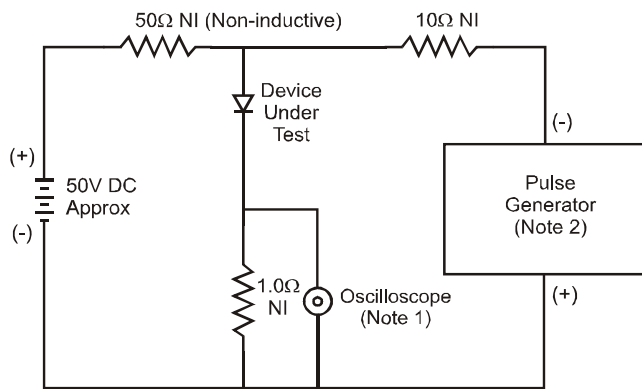
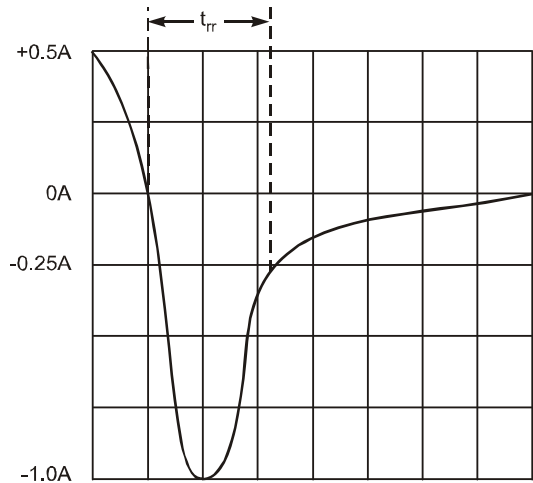


Fig. 4 Typical Reverse Characteristics



- Notes:
1. Rise Time = 7.0ns max. Input Impedance = 1.0MΩ, 22pF.
  2. Rise Time = 10ns max. Input Impedance = 50Ω.

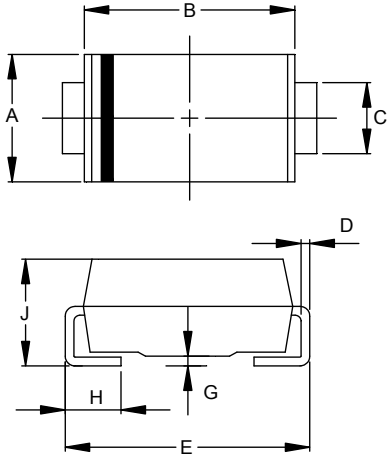
Fig. 5 Reverse Recovery Time Characteristic and Test Circuit



Set time base for 50/100 ns/cm

**Package Outline Dimensions**

Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.

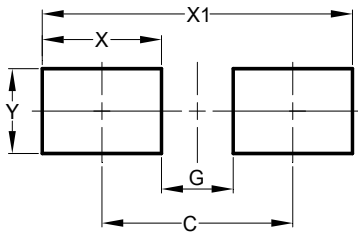


| SMA                  |      |      |
|----------------------|------|------|
| Dim                  | Min  | Max  |
| A                    | 2.29 | 2.92 |
| B                    | 4.00 | 4.60 |
| C                    | 1.27 | 1.63 |
| D                    | 0.15 | 0.31 |
| E                    | 4.80 | 5.59 |
| G                    | 0.05 | 0.20 |
| H                    | 0.76 | 1.52 |
| J                    | 1.96 | 2.40 |
| All Dimensions in mm |      |      |

**Suggested Pad Layout**

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for latest version.

**SMA**



| Dimensions | Value (in mm) |
|------------|---------------|
| C          | 4.00          |
| G          | 1.50          |
| X          | 2.50          |
| X1         | 6.50          |
| Y          | 1.70          |

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