

## U1A THRU U1M

### High Efficiency Rectifier


**Voltage:** 50~1000 Volts

**Current:** 1 Amperes

**Package:** SOD-123FL

**Features**

- NH'S High Efficiency Rectifier Chip Technology
- Low Switching Loss For High Efficiency
- Low Leakage Current For High Reliability
- Ultra Fast Switching Speed

**Mechanical Data**

- **Case:** Molded With UL-94 Class V-0 Recognized, RoHS-Compliant
- **Polarity:** Look At The Diagram And Polarity On The Right
- **Terminals:** Tin Plated Leads, Solderable Per J-STD-002 And JESD22-B102

**Typical Applications**

- Switch Mode Power Supplies (SMPS)
- Fast Chargers
- LED Driver And Monitor Lighting
- Automotive Electronics And Charging Posts

**Diagram:**

**Polarity:**


Single Phase, Half Wave, 60Hz, Resistive Or Inductive Load. For Capacitive Load, Derate Current By 20%

**Maximum Ratings (Ta=25°C Unless Otherwise Specified)**

| Parameter                                 | Test Conditions                                          | Symbol<br>Mark | U1A<br>UA | U1B<br>UB | U1D<br>UD | U1G<br>UG | U1J<br>UJ | U1K<br>UK | U1M<br>UM | Unit               |
|-------------------------------------------|----------------------------------------------------------|----------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|--------------------|
| 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 |                                                          | $I_{F(AV)}$    | 1         |           |           |           |           |           |           | A                  |
| Peak Forward Surge Current                | 8.3ms Single Half Sine-wave<br>Superimposed On Rate Load | $I_{FSM}$      | 30        |           |           |           |           |           |           | A                  |
| Current Squared Time                      | $t < 8.3ms$                                              | $I^2t$         | 3.7       |           |           |           |           |           |           | A <sup>2</sup> sec |

**Electrical Characteristics (Ta=25°C Unless Otherwise Specified)**

| Parameter                                               | Test Conditions                                                   | Symbol<br>Mark   | U1A<br>UA | U1B<br>UB | U1D<br>UD | U1G<br>UG | U1J<br>UJ | U1K<br>UK | U1M<br>UM | Unit     |
|---------------------------------------------------------|-------------------------------------------------------------------|------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|----------|
| Maximum Instantaneous Forward Voltage                   | I <sub>F</sub> = 1.0 A                                            | V <sub>F</sub>   | 1.00      |           |           | 1.30      | 1.70      |           |           | V        |
| Maximum DC Reverse Current at Rated DC Blocking Voltage | Ta=25℃ ,V <sub>R</sub> =VRRM<br>Ta=125℃ ,V <sub>R</sub> =VRRM*80% | I <sub>RRM</sub> | 5<br>200  |           |           |           |           |           |           | uA<br>uA |
| Typical Junction Capacitance                            | 4 V,1MHz                                                          | C <sub>J</sub>   | 15        |           |           | 10        | 8         |           |           | pF       |
| Maximum Reverse Recovery Time                           | IF=0.5A, IR=1.0A, IRR=0.25A                                       | Trr              | 50        |           |           | 75        |           |           |           | nS       |

**Thermal Characteristics (Ta=25°C Unless Otherwise Specified)**

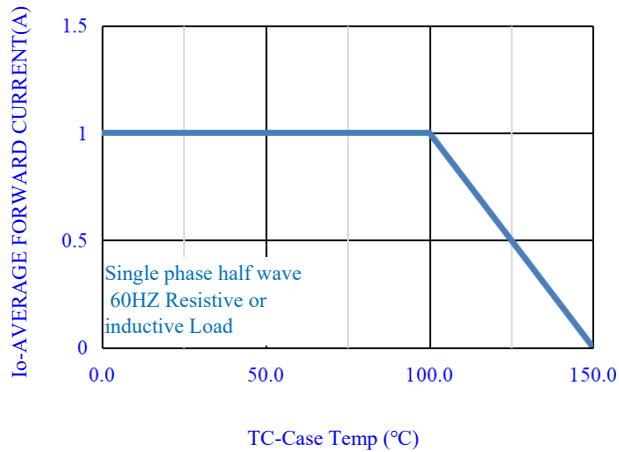
| Parameter                                                   | Test Conditions                                        | Symbol<br>Mark   | U1A<br>UA | U1B<br>UB | U1D<br>UD | U1G<br>UG | U1J<br>UJ | U1K<br>UK | U1M<br>UM | Unit |
|-------------------------------------------------------------|--------------------------------------------------------|------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------|
| Operating Junction Temperature Range                        |                                                        | T <sub>J</sub>   | -55~150   |           |           |           |           |           |           | ℃    |
| Storage Temperature Range                                   |                                                        | T <sub>STD</sub> | -55~150   |           |           |           |           |           |           |      |
| Thermal Resistance Junction To Ambient<br>With Steady-State | Still Air Environment<br>With Ta=25℃                   | R <sub>θJA</sub> | 78.0      |           |           |           |           |           |           | ℃/W  |
| Thermal Resistance Junction-Case<br>With Steady-State       | Device Mounted On<br>1 in2 FR-4 Board With 2oz. Copper | R <sub>θJC</sub> | 25.0      |           |           |           |           |           |           |      |

Notes: 1. Pulse Test: 300 Us Pulse Width, 1% Duty Cycle

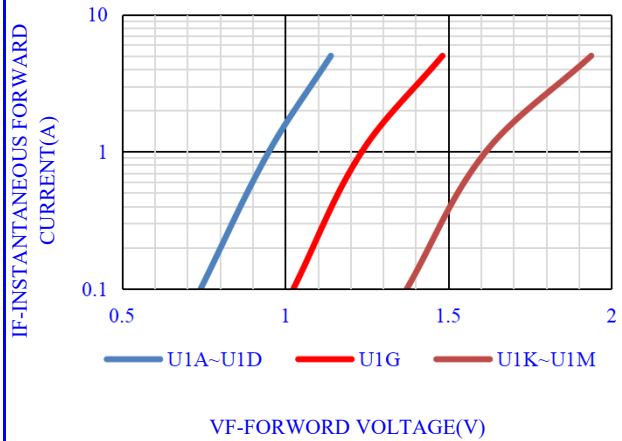
**U1A THRU U1M**  
**High Efficiency Rectifier**



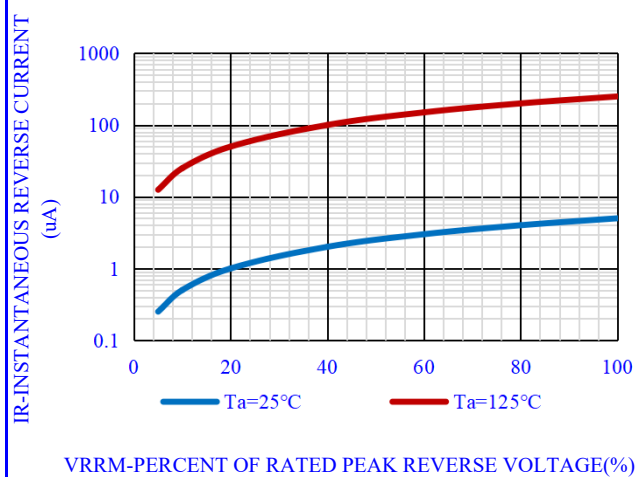
**Typical Characteristics Curves**



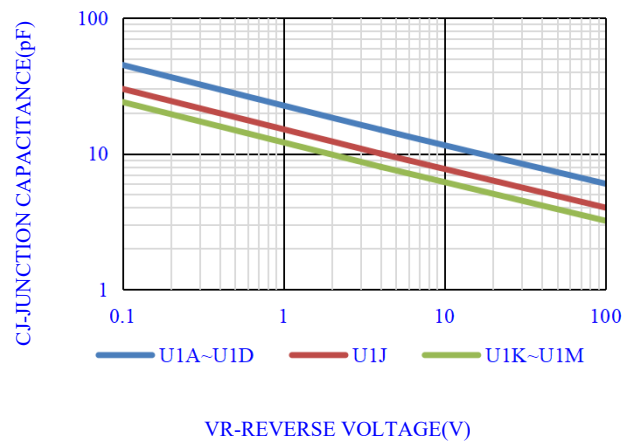
**Fig.1-FORWARD CURRENT DERATING CURVE**



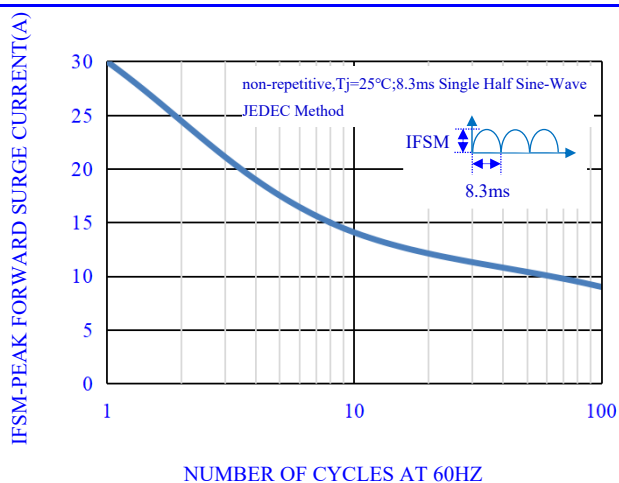
**Fig.2- TYPICAL INSTANTANEOUS FORWARD**



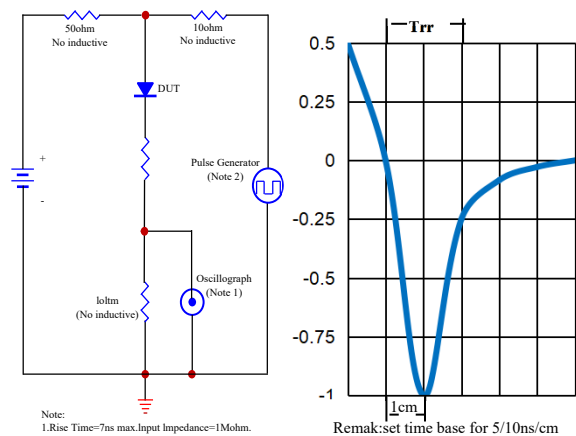
**Fig.3- TYPICAL REVERSE CHARACTERISTICS**



**Fig.4- TYPICAL JUNCTION CAPACITANCE**



**Fig.5-MAX. NON-REPETITIVE SURGE CURRENT**

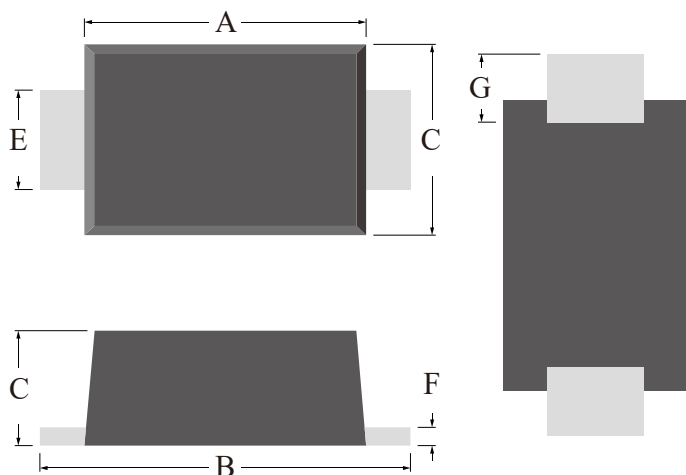


**Fig.6-REVERSE RECOVERY TIME CHARACTERISTIC AND TEST CIRCUIT**

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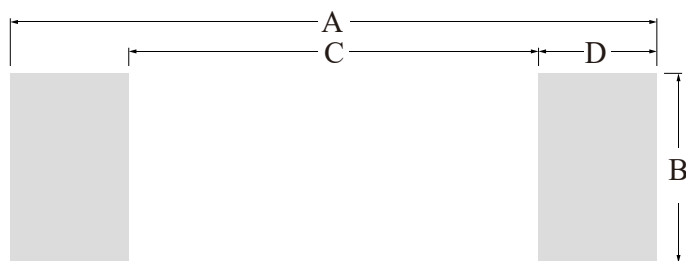
**OUTLINE DRAWINGS**



**SOD-123FL**

| OUTLINE DIMENSIONS |            |      |      |        |      |        |
|--------------------|------------|------|------|--------|------|--------|
| Dim.               | Milimeters |      |      | Inches |      |        |
|                    | Min.       | Typ. | Max. | Min.   | Typ. | Max.   |
| A                  | 2.65       | -    | 2.90 | 0.1043 | -    | 0.1142 |
| B                  | 3.50       | -    | 3.80 | 0.1378 | -    | 0.1496 |
| C                  | 1.70       | -    | 1.95 | 0.0669 | -    | 0.0768 |
| D                  | 0.90       | -    | 1.30 | 0.0354 | -    | 0.0512 |
| E                  | 0.80       | -    | 1.10 | 0.0315 | -    | 0.0433 |
| F                  | 0.10       | -    | 0.25 | 0.0039 | -    | 0.0098 |
| G                  | 0.45       | -    | 0.85 | 0.0177 | -    | 0.0335 |

**RECOMMEDNED LAYOUT DRAWINGS**



**SOD-123FL**

| OUTLINE DIMENSIONS |            |      |      |        |        |      |
|--------------------|------------|------|------|--------|--------|------|
| Dim.               | Milimeters |      |      | Inches |        |      |
|                    | Min.       | Typ. | Max. | Min.   | Typ.   | Max. |
| A                  | -          | 4.26 | -    | -      | 0.1677 | -    |
| B                  | -          | 1.22 | -    | -      | 0.0480 | -    |
| C                  | -          | 2.70 | -    | -      | 0.1063 | -    |
| D                  | -          | 0.78 | -    | -      | 0.0307 | -    |

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MARKING



MARKING INSTRUCTION

U<sub>x</sub>=Model,x=A,B,D,G,J,K,M  
White band denotes cathode

PACKING INFORMATION

| Package Type | Package Code | Product Weight<br>Approx(g/Pcs) | Package Method | Quantity<br>(Pcs/Min. Pack.) | Quantity<br>(Pcs/Inner Box) | Quantity<br>(Pcs/Carton) |
|--------------|--------------|---------------------------------|----------------|------------------------------|-----------------------------|--------------------------|
| SOD-123FL    | P1           | 0.0161                          | 7" Reel        | 3000                         | 6000                        | 180000                   |
| SOD-123FL    | P2           | 0.0161                          | 7" Reel        | 3000                         | 6000                        | 60000                    |

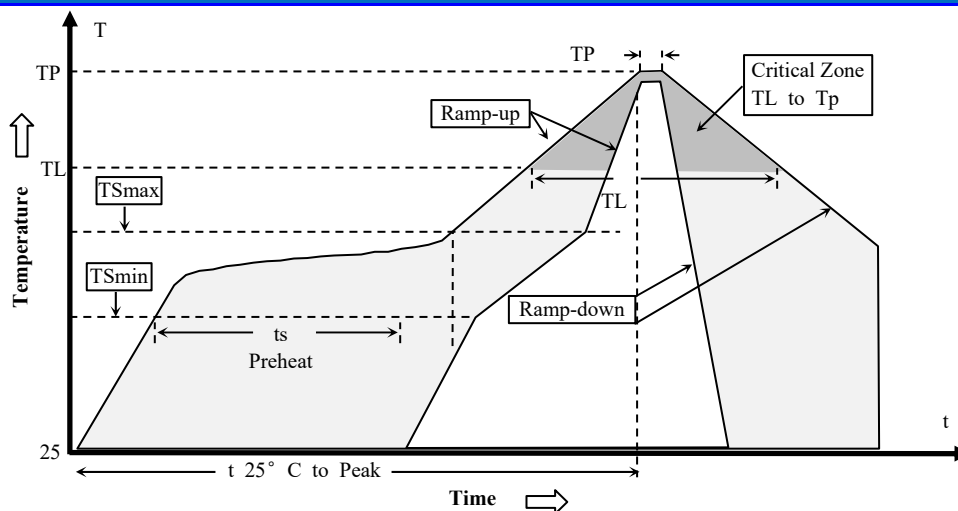
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**Recommended wave soldering condition**

| Product         | Peak Temperature | Soldering Time  |
|-----------------|------------------|-----------------|
| Pb-free devices | 260 +0/-5 °C     | 5 +1/-1 seconds |

**Recommended temperature profile for IR reflow**



| Profile feature                                                                            | Sn-Pb eutectic Assembly          | Pb-free Assembly                 |
|--------------------------------------------------------------------------------------------|----------------------------------|----------------------------------|
| Average ramp-up rate (T <sub>smax</sub> to T <sub>p</sub> )                                | 3°C/second max.                  | 3°C/second max.                  |
| Preheat<br>-Temperature Min(TS min)<br>-Temperature Max(TS max)<br>-Time(ts min to ts max) | 100°C<br>150°C<br>60-120 seconds | 150°C<br>200°C<br>60-180 seconds |
| Time maintained above:<br>-Temperature (TL)<br>- Time (tL)                                 | 183°C<br>60-150 seconds          | 217°C<br>60-150 seconds          |
| Peak Temperature(TP)                                                                       | 240 +0/-5 °C                     | 260 +0/-5 °C                     |
| Time within 5°C of actual peak temperature(tp)                                             | 10-30 seconds                    | 20-40 seconds                    |
| Ramp down rate                                                                             | 6°C/second max.                  | 6°C/second max.                  |
| Time 25 °C to peak temperature                                                             | 6 minutes max.                   | 8 minutes max.                   |

Note : All temperatures refer to topside of the package, measured on the package body surface.

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