

## Surface Mount Ultra Fast Recovery Rectifier

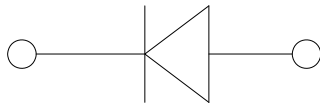


### Features

- Low profile package
- Ideal for automated placement
- Glass passivated chip junction
- High forward surge capability
- Super Fast reverse recovery time
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C

### Typical Applications

For use in high frequency rectification of power supplies, inverters, converters, and freewheeling diodes for consumer and telecommunication.



### Mechanical Data

- **Package:** SOD-123FL  
Molding compound meets UL 94 V-0 flammability rating, RoHS-compliant, halogen-free
- **Terminals:** Tin plated leads, solderable per J-STD-002 and JESD22-B102
- **Polarity:** Cathode line denotes the cathode end

### ■ Maximum Ratings ( $T_a=25^\circ\text{C}$ Unless otherwise specified)

| PARAMETER   | SYMBOL    | UNIT                 | U1A        | U1B | U1C | U1D | U1F | U1G | U1H | U1J |
|---|-----------|----------------------|------------|-----|-----|-----|-----|-----|-----|-----|
| Device marking code   |           |                      | U1A        | U1B | U1C | U1D | U1F | U1G | U1H | U1J |
| Maximum Repetitive Peak Reverse Voltage   | $V_{RRM}$ | V                    | 50         | 100 | 150 | 200 | 300 | 400 | 500 | 600 |
| Maximum RMS Voltage   | $V_{RMS}$ | V                    | 35         | 70  | 105 | 140 | 210 | 280 | 350 | 420 |
| Maximum DC blocking Voltage   | $V_{DC}$  | V                    | 50         | 100 | 150 | 200 | 300 | 400 | 500 | 600 |
| Average rectified output current<br>@60Hz sine wave, Resistance load, TL (FIG.1)                | $I_O$     | A                    | 1.0        |     |     |     |     |     |     |     |
| Forward Surge Current (Non-repetitive)<br>@60Hz Half-sine wave, 1 cycle, $T_j=25^\circ\text{C}$ | $I_{FSM}$ | A                    | 30         |     |     |     |     |     |     |     |
| Forward Surge Current (Non-repetitive)<br>@1ms, square wave, 1 cycle, $T_j=25^\circ\text{C}$    |           |                      | 60         |     |     |     |     |     |     |     |
| Current squared time<br>@1ms $\leq$ t $\leq$ 8.3ms $T_j=25^\circ\text{C}$                       | $I^2t$    | $\text{A}^2\text{s}$ | 3.735      |     |     |     |     |     |     |     |
| Storage temperature   | $T_{stg}$ | $^\circ\text{C}$     | -55 ~ +150 |     |     |     |     |     |     |     |
| Junction temperature  | $T_j$     | $^\circ\text{C}$     | -55 ~ +150 |     |     |     |     |     |     |     |



# U1A THRU U1J

## ■ Electrical Characteristics (Ta=25°C Unless otherwise specified)

| PARAMETER   | SYMBOL          | UNIT | TEST CONDITIONS   | U1A  | U1B | U1C | U1D  | U1F | U1G | U1H | U1J |
|---|-----------------|------|---|------|-----|-----|------|-----|-----|-----|-----|
| Maximum instantaneous forward voltage                   | V <sub>F</sub>  | V    | I <sub>F</sub> =1.0A  | 0.92 |     |     | 1.25 |     | 1.7 |     |     |
| Maximum reverse recovery time                           | t <sub>rr</sub> | ns   | I <sub>F</sub> =0.5A, I <sub>R</sub> =1.0A,<br>I <sub>rr</sub> =0.25A | 25   |     |     |      |     |     | 35  |     |
| Maximum DC reverse current at rated DC blocking voltage | I <sub>R</sub>  | μA   | T <sub>j</sub> =25°C  | 5    |     |     |      |     |     |     |     |
|   |                 |      | T <sub>j</sub> =125°C   | 50   |     |     |      |     |     |     |     |
| Typical junction capacitance                            | C <sub>j</sub>  | pF   | Measured at 1MHz and Applied Reverse Voltage of 4.0 V.D.C             | 17   |     |     | 15   |     | 16  |     |     |

## ■ Dynamic Characteristics

### ◆ U1A THRU U1D

| PARAMETER                       | SYMBOL           | UNIT | TEST CONDITIONS       |   | Min  | Typ  | Max |
|---------------------------------|------------------|------|-----------------------|---|------|------|-----|
| Reverse Recovery Time           | T <sub>RR</sub>  | ns   | T <sub>j</sub> =25°C  | I <sub>F</sub> =1A, di/dt=-50A/us<br>V <sub>RM</sub> =30V     | -    | 27   | -   |
|                                 |                  |      | T <sub>j</sub> =25°C  | I <sub>F</sub> =1A<br>di/dt=-200A/us<br>V <sub>RM</sub> =100V | -    | 18   | -   |
|                                 |                  |      | T <sub>j</sub> =125°C |   | -    | 24   | -   |
| Peak recovery current           | I <sub>RRM</sub> | A    | T <sub>j</sub> =25°C  | I <sub>F</sub> =1A<br>di/dt=-200A/us<br>V <sub>RM</sub> =100V | -    | 2.4  | -   |
|                                 |                  |      | T <sub>j</sub> =125°C |   | -    | 3.9  | -   |
| Reverse recovery charge         | Q <sub>rr</sub>  | nC   | T <sub>j</sub> =25°C  | I <sub>F</sub> =1A<br>di/dt=-200A/us<br>V <sub>RM</sub> =100V | -    | 21.6 | -   |
|                                 |                  |      | T <sub>j</sub> =125°C |   | -    | 46.6 | -   |
| Non-repetitive avalanche energy | E <sub>AS</sub>  | mJ   | T <sub>j</sub> =25°C  | I <sub>R</sub> =1.5 A, L=15 mH                                | 16.9 | -    | -   |

### ◆ U1F THRU U1G

| PARAMETER                       | SYMBOL           | UNIT | TEST CONDITIONS       |   | Min | Typ  | Max |
|---------------------------------|------------------|------|-----------------------|---|-----|------|-----|
| Reverse Recovery Time           | T <sub>RR</sub>  | ns   | T <sub>j</sub> =25°C  | I <sub>F</sub> =1A, di/dt=-50A/us<br>V <sub>RM</sub> =30V     | -   | 26   | -   |
|                                 |                  |      | T <sub>j</sub> =25°C  | I <sub>F</sub> =1A<br>di/dt=-200A/us<br>V <sub>RM</sub> =200V | -   | 22   | -   |
|                                 |                  |      | T <sub>j</sub> =125°C |   | -   | 31   | -   |
| Peak recovery current           | I <sub>RRM</sub> | A    | T <sub>j</sub> =25°C  | I <sub>F</sub> =1A<br>di/dt=-200A/us<br>V <sub>RM</sub> =200V | -   | 1.9  | -   |
|                                 |                  |      | T <sub>j</sub> =125°C |   | -   | 3.5  | -   |
| Reverse recovery charge         | Q <sub>rr</sub>  | nC   | T <sub>j</sub> =25°C  | I <sub>F</sub> =1A<br>di/dt=-200A/us<br>V <sub>RM</sub> =200V | -   | 21.1 | -   |
|                                 |                  |      | T <sub>j</sub> =125°C |   | -   | 54.9 | -   |
| Non-repetitive avalanche energy | E <sub>AS</sub>  | mJ   | T <sub>j</sub> =25°C  | I <sub>R</sub> =0.4A, L=15 mH                                 | 1.2 | -    | -   |

### ◆ U1H THRU U1J

| PARAMETER                       | SYMBOL           | UNIT | TEST CONDITIONS       |   | Min | Typ   | Max |
|---------------------------------|------------------|------|-----------------------|---|-----|-------|-----|
| Reverse Recovery Time           | T <sub>RR</sub>  | ns   | T <sub>j</sub> =25°C  | I <sub>F</sub> =1A, di/dt=-50A/us<br>V <sub>RM</sub> =30V     | -   | 38    | -   |
|                                 |                  |      | T <sub>j</sub> =25°C  | I <sub>F</sub> =1A<br>di/dt=-200A/us<br>V <sub>RM</sub> =400V | -   | 32    | -   |
|                                 |                  |      | T <sub>j</sub> =125°C |   | -   | 52    | -   |
| Peak recovery current           | I <sub>RRM</sub> | A    | T <sub>j</sub> =25°C  | I <sub>F</sub> =1A<br>di/dt=-200A/us<br>V <sub>RM</sub> =400V | -   | 2.9   | -   |
|                                 |                  |      | T <sub>j</sub> =125°C |   | -   | 4.7   | -   |
| Reverse recovery charge         | Q <sub>rr</sub>  | nC   | T <sub>j</sub> =25°C  | I <sub>F</sub> =1A<br>di/dt=-200A/us<br>V <sub>RM</sub> =400V | -   | 45.8  | -   |
|                                 |                  |      | T <sub>j</sub> =125°C |   | -   | 121.9 | -   |
| Non-repetitive avalanche energy | E <sub>AS</sub>  | mJ   | T <sub>j</sub> =25°C  | I <sub>R</sub> =0.3A, L=15 mH                                 | 0.7 | -     | -   |



# U1A THRU U1J

## ■ Thermal Characteristics (Ta=25°C Unless otherwise specified)

| PARAMETER                  | SYMBOL                        | UNIT | U1A | U1B | U1C | U1D | U1F | U1G | U1H | U1J |
|----------------------------|-------------------------------|------|-----|-----|-----|-----|-----|-----|-----|-----|
| Typical Thermal resistance | R $\theta$ J-A <sup>(1)</sup> | °C/W | 65  |     |     |     |     |     |     |     |
|                            | R $\theta$ J-L <sup>(1)</sup> |      | 25  |     |     |     |     |     |     |     |
|                            | R $\theta$ J-C <sup>(1)</sup> |      | 20  |     |     |     |     |     |     |     |

Note:  
 (1) Thermal resistance between junction and ambient and between junction and lead mounted on P.C.B with 3mm\*3mm copper pad areas.

## ■ Characteristics (Typical)

FIG.1: Io-TL Cure

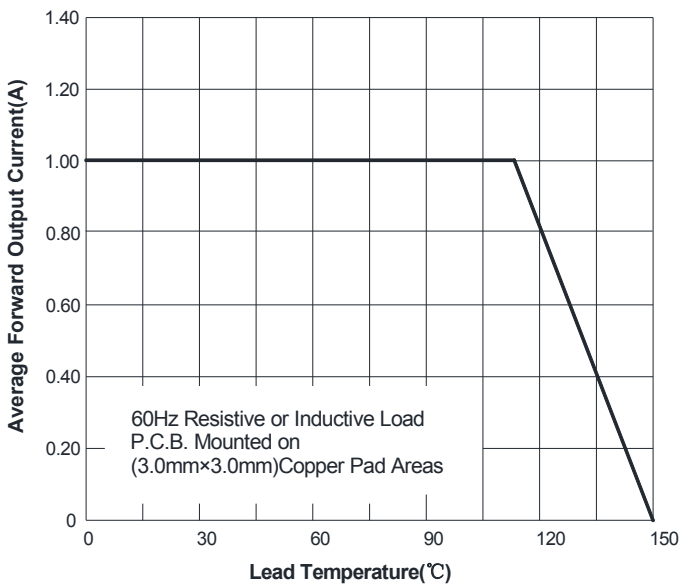


FIG.2: Forward Surge Current Capability

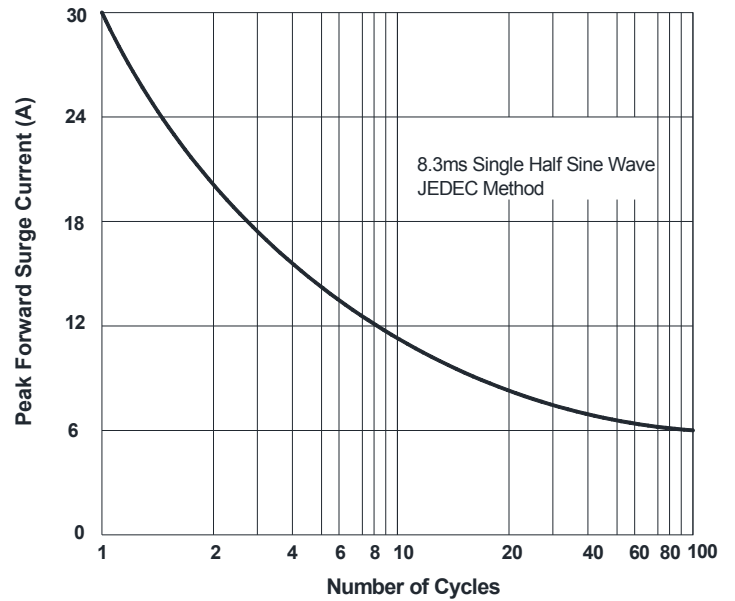


FIG.3: Typical Forward Characteristics

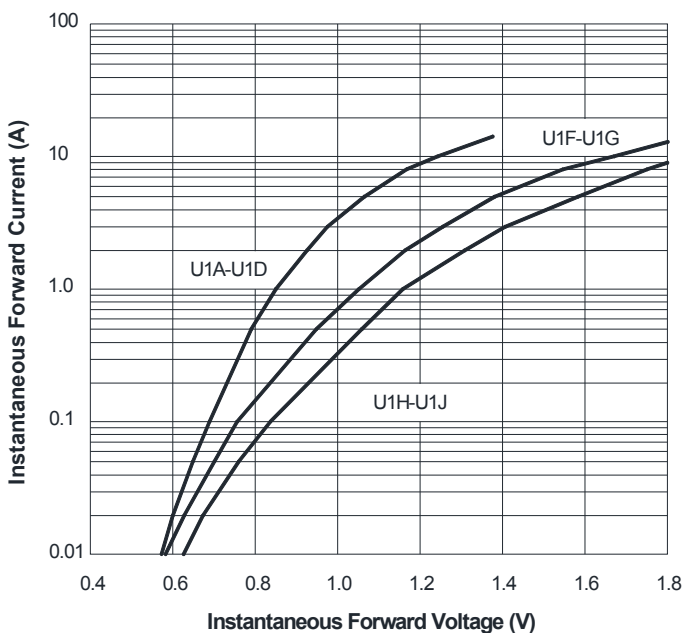


FIG.4: Typical Reverse Characteristics

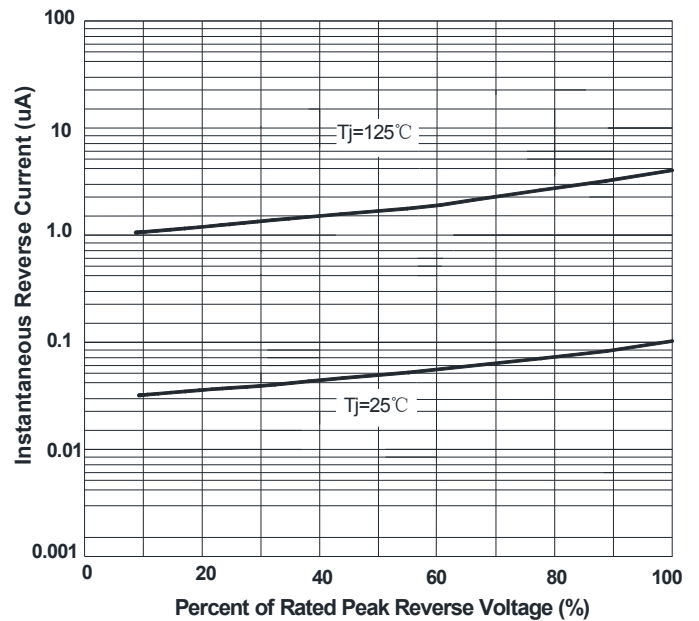
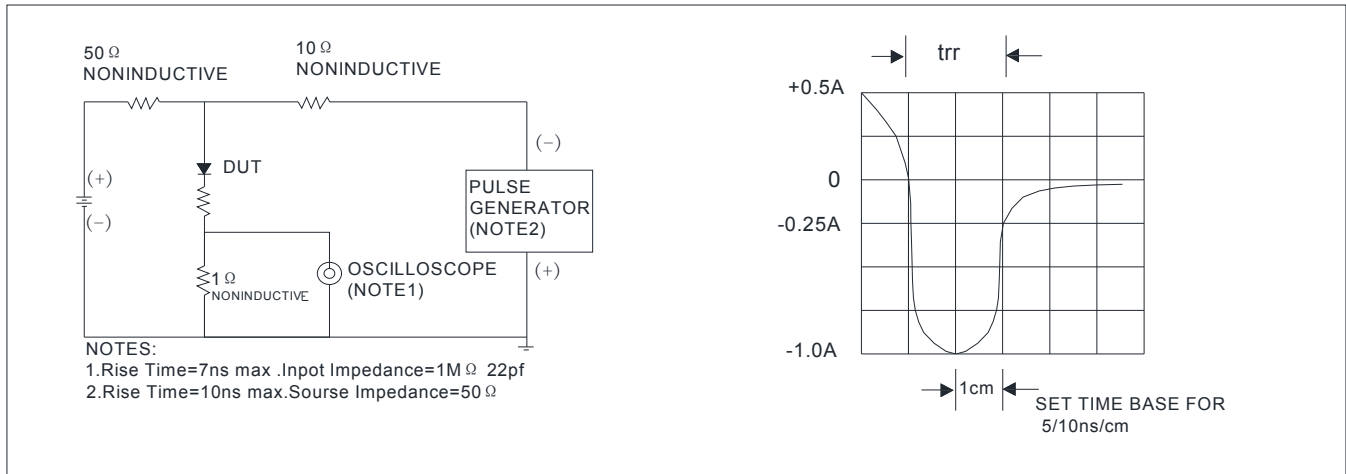


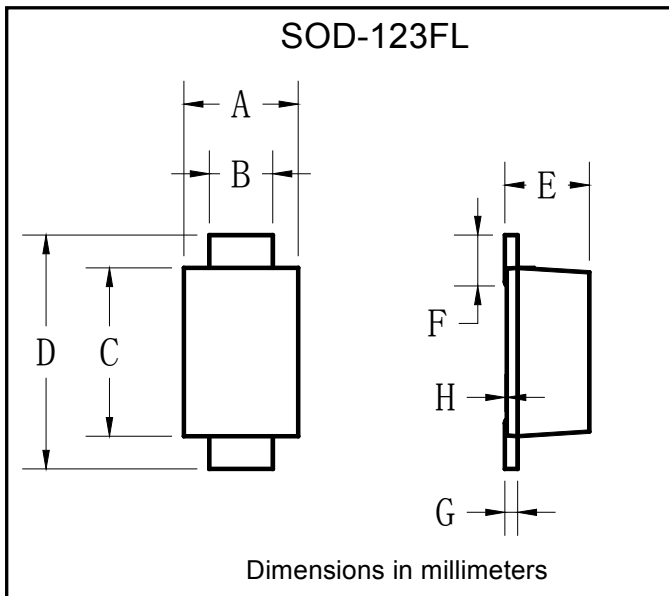
FIG.5: Diagram of circuit and Testing wave form of reverse recovery time



## Ordering Information (Example)

| PREFERRED P/N | PACKING CODE | UNIT WEIGHT(g)     | MINIMUM PACKAGE(pcs) | INNER BOX QUANTITY(pcs) | OUTER CARTON QUANTITY(pcs) | DELIVERY MODE |
|---------------|--------------|--------------------|----------------------|-------------------------|----------------------------|---------------|
| U1A THRU U1J  | F1           | Approximate 0.0169 | 3000                 | 30000                   | 120000                     | 7" reel       |
| U1A THRU U1J  | F2           | Approximate 0.0169 | 2500                 | 25000                   | 100000                     | 7" reel       |
| U1A THRU U1J  | F3           | Approximate 0.0169 | 10000                | /                       | 210000                     | 13" reel      |
| U1A THRU U1J  | F4           | Approximate 0.0169 | 3000                 | 54000                   | 108000                     | 7" reel       |
| U1A THRU U1J  | F5           | Approximate 0.0169 | 10000                | /                       | 160000                     | 13" reel      |
| U1A THRU U1J  | F6           | Approximate 0.0169 | 3000                 | 12000                   | 60000                      | 7" reel       |

## Outline Dimensions

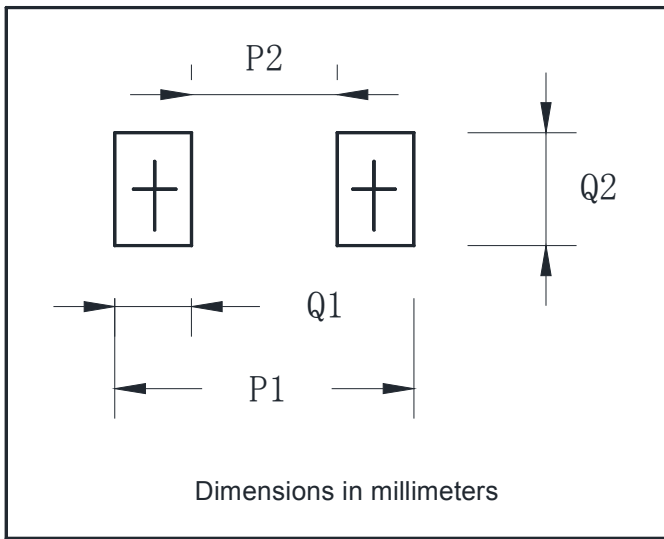


| SOD-123FL |      |      |
|-----------|------|------|
| Dim       | Min  | Max  |
| A         | 1.60 | 1.90 |
| B         | 0.90 | 1.10 |
| C         | 2.55 | 2.85 |
| D         | 3.60 | 3.90 |
| E         | 1.00 | 1.20 |
| F         | 0.40 | 0.90 |
| G         | 0.10 | 0.25 |
| H         | 0.02 | 0.05 |



## U1A THRU U1J

### ■ Suggested pad layout



| SOD-123FL |             |
|-----------|-------------|
| Dim       | Millimeters |
| P1        | 3.90        |
| P2        | 1.90        |
| Q1        | 1.00        |
| Q2        | 1.50        |



## U1A THRU U1J

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