

**SFF1006GSU**

Ultrafast Soft Recovery Rectifier



**Voltage:** 600 Volts

**Current:** 10 Amperes

**Package:** TO-252

**Features**

- NH'S Epiraxial Chip Technology
- Low Switching Loss For High Efficiency
- Low Leakage Current For High Reliability
- Ultra Fast Soft Switching Feature

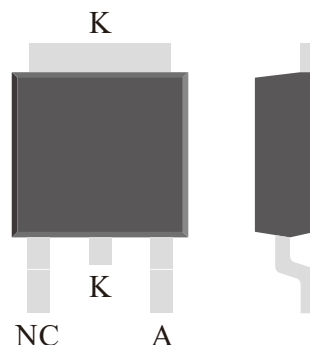
**Mechanical Data**

- **Case:** Molded With UL-94 ClassV-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

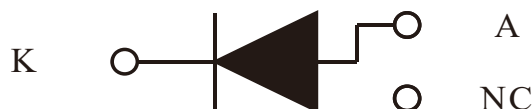
**Typical Applications**

- 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      | Ratings | Unit               |
|-------------------------------------------|----------------------------------------------------------|-------------|---------|--------------------|
| Maximum Repetitive Peak Reverse Voltage   |                                                          | $V_{RRM}$   | 600     | V                  |
| Maximum RMS Voltag                        |                                                          | $V_{RMS}$   | 420     | V                  |
| Maximum DC Blocking Voltage               |                                                          | $V_{DC}$    | 600     | V                  |
| Maximum Average Forward Rectified Current |                                                          | $I_{F(AV)}$ | 10      | A                  |
| Peak Forward Surge Current                | 8.3ms Single Half Sine-wave<br>Superimposed On Rate Load | $I_{FSM}$   | 100     | A                  |
| Current Squared Time                      | $t < 8.3ms$                                              | $I^2t$      | 41.5    | A <sup>2</sup> sec |

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

| Parameter                                               | Test Conditions                           | Symbol    | Ratings |      |      | Unit    |
|---------------------------------------------------------|-------------------------------------------|-----------|---------|------|------|---------|
|                                                         |                                           |           | Min.    | Typ. | Max. |         |
| Maximum Instaneous Forward Voltage                      | $I_F = 10.0 A$                            | $V_F$     | --      | 1.35 | 1.7  | V       |
| Maximum DC Reverse Current at Rated DC Blocking Voltage | $T_a = 25^\circ C, V_R = V_{RRM}$         | $I_{RRM}$ | --      | 1    | 5    | $\mu A$ |
|                                                         | $T_a = 125^\circ C, V_R = V_{RRM} * 80\%$ |           | --      | 30   | 200  | $\mu A$ |
| Typical Junction Capacitance                            | 4 V,1MHz                                  | $C_J$     | --      | 90   | --   | pF      |
| Maximum Reverse Recovery Time                           | $I_F = 0.5A, I_R = 1.0A, I_{RR} = 0.25A$  | $T_{rr}$  | --      | 30   | 50   | nS      |

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

| Parameter                                                   | Test Conditions                                        | Symbol          | Ratings    | Unit |
|-------------------------------------------------------------|--------------------------------------------------------|-----------------|------------|------|
| Operating Junction Temperature Range                        |                                                        | $T_J$           | -55 to 150 | °C   |
| Storage Temperature Range                                   |                                                        | $T_{STD}$       | -55 to 150 |      |
| Thermal Resistance Junction To Ambient<br>With Steady-State | Still Air Environment<br>With $T_a = 25^\circ C$       | $R_{\theta JA}$ | 50.0       | °C/W |
| Thermal Resistance Junction-Case<br>With Steady-State       | Device Mounted On<br>1 in2 FR-4 Board With 2oz. Copper | $R_{\theta JC}$ | 2.8        |      |

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

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Typical Characteristics Curves

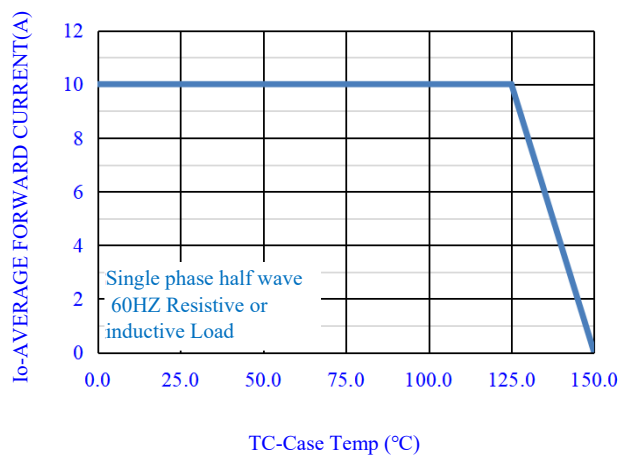


Fig.1-FORWARD CURRENT DERATING CURVE

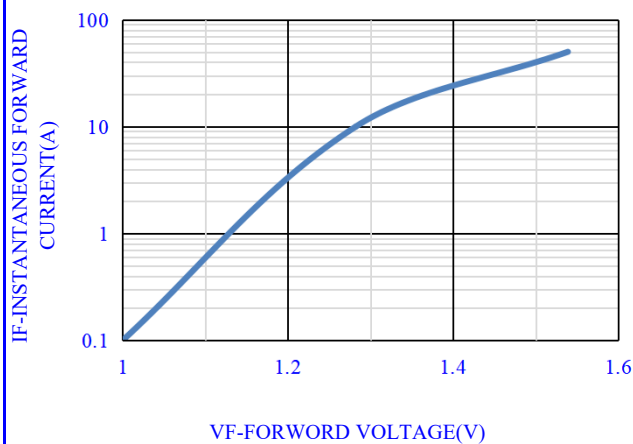


Fig.2- TYPICAL INSTANTANEOUS FORWARD

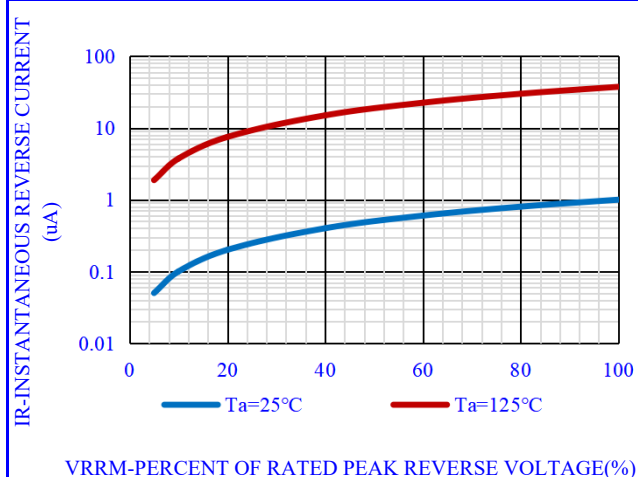


Fig.3- TYPICAL REVERSE CHARACTERISTICS

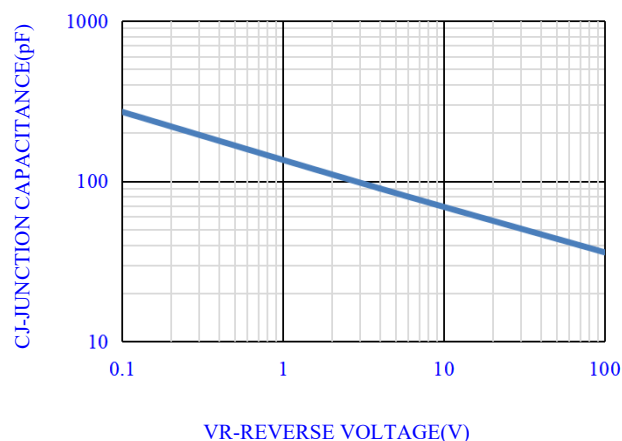


Fig.4- TYPICAL JUNCTION CAPACITANCE

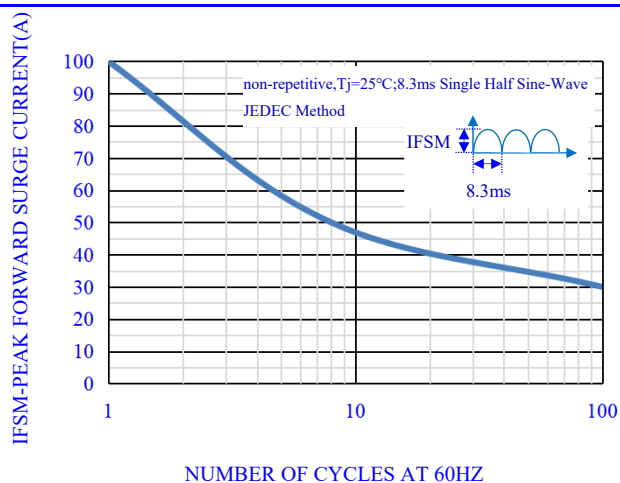


Fig.5-MAX. NON-REPETITIVE SURGE CURRENT

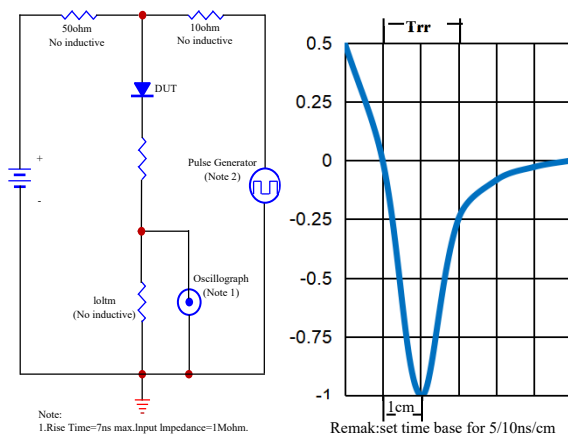


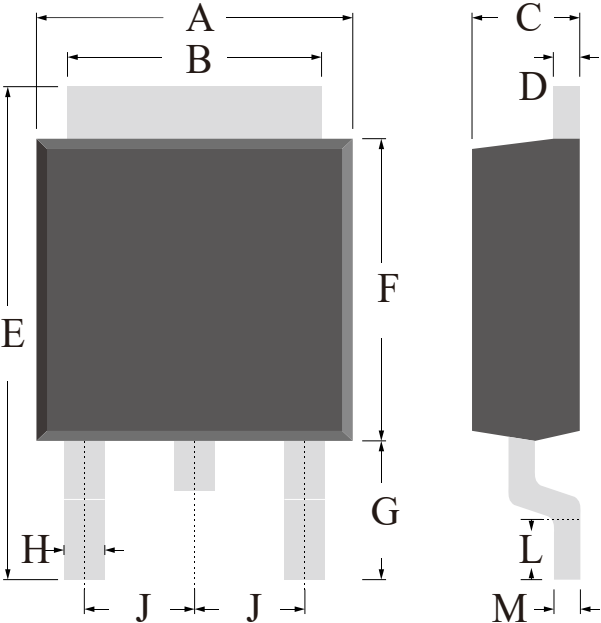
Fig.6-REVERSE RECOVERY TIME CHARACTERISTIC AND TEST CIRCUIT

SFF1006GSU

Ultrafast Soft Recovery Rectifier



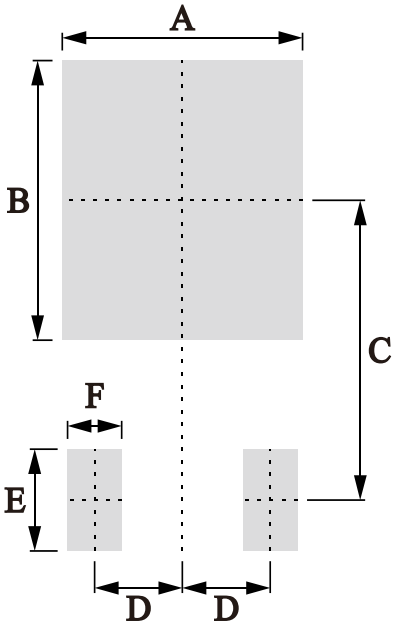
OUTLINE DRAWINGS



TO-252

| OUTLINE DIMENSIONS |            |      |       |        |      |        |
|--------------------|------------|------|-------|--------|------|--------|
| Dim.               | Milimeters |      |       | Inches |      |        |
|                    | Min.       | Typ. | Max.  | Min.   | Typ. | Max.   |
| A                  | 6.10       | -    | 7.10  | 0.2402 | -    | 0.2795 |
| B                  | 4.80       | -    | 5.80  | 0.1890 | -    | 0.2283 |
| C                  | 1.95       | -    | 2.55  | 0.0768 | -    | 0.1004 |
| D                  | 0.35       | -    | 0.75  | 0.0138 | -    | 0.0295 |
| E                  | 9.25       | -    | 10.75 | 0.3642 | -    | 0.4232 |
| F                  | 5.60       | -    | 6.60  | 0.2205 | -    | 0.2598 |
| G                  | 2.50       | -    | 3.10  | 0.0984 | -    | 0.1220 |
| H                  | 0.65       | -    | 1.05  | 0.0256 | -    | 0.0413 |
| J                  | 2.10       | -    | 2.50  | 0.0827 | -    | 0.0984 |
| L                  | 1.00       | -    | 1.40  | 0.0394 | -    | 0.0551 |
| M                  | 0.35       | -    | 0.75  | 0.0138 | -    | 0.0295 |

RECOMMEDND LAYOUT DRAWINGS



TO-252

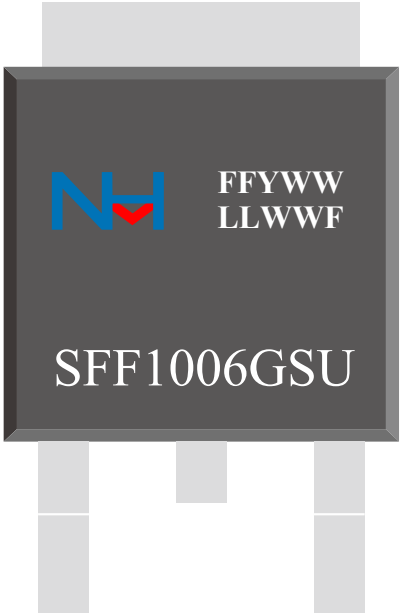
| OUTLINE DIMENSIONS |            |      |      |        |        |      |
|--------------------|------------|------|------|--------|--------|------|
| Dim.               | Milimeters |      |      | Inches |        |      |
|                    | Min.       | Typ. | Max. | Min.   | Typ.   | Max. |
| A                  | -          | 6.09 | -    | -      | 0.2398 | -    |
| B                  | -          | 7.57 | -    | -      | 0.2980 | -    |
| C                  | -          | 6.64 | -    | -      | 0.2610 | -    |
| D                  | -          | 2.30 | -    | -      | 0.0910 | -    |
| E                  | -          | 2.76 | -    | -      | 0.1090 | -    |
| F                  | -          | 1.42 | -    | -      | 0.0560 | -    |

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MARKING



MARKING INSTRUCTION

NH=Niuhang Trademark  
FF=Product Line Code,According To Actual Changes  
YWW=Date Code,According To Actual Changes  
LLWWF=Inernal Code,According To Actual Changes  
SFF1006GSU=Model

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) |
|--------------|--------------|---------------------------------|----------------|------------------------------|-----------------------------|--------------------------|
| TO-252       | P1           | 0.321                           | 13" Reel       | 2500                         | 5000                        | 30000                    |
| TO-252       | P2           | 0.321                           | 13" Reel       | 2500                         | 2500                        | 25000                    |

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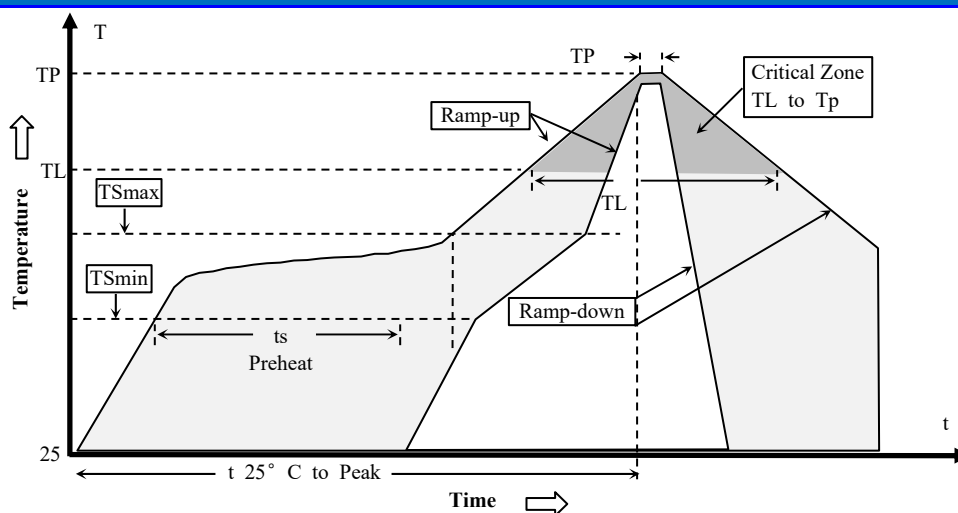
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**Recommended wave soldering condition**

| 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<br>(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<br>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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