

**HIGH OUTPUT CURRENT PHOTO TRIAC OUTPUT TYPE**  
**10-PIN PHOTOCOUPLER****DESCRIPTION**

The PS3901 and PS3901L are optically coupled isolators containing a GaAs light emitting diode and photo triacs.

The PS3901 is in a plastic DIP (Dual In-line Package) and the PS3901L is lead bending type (Gull-wing) for surface mounting.

**FEATURES**

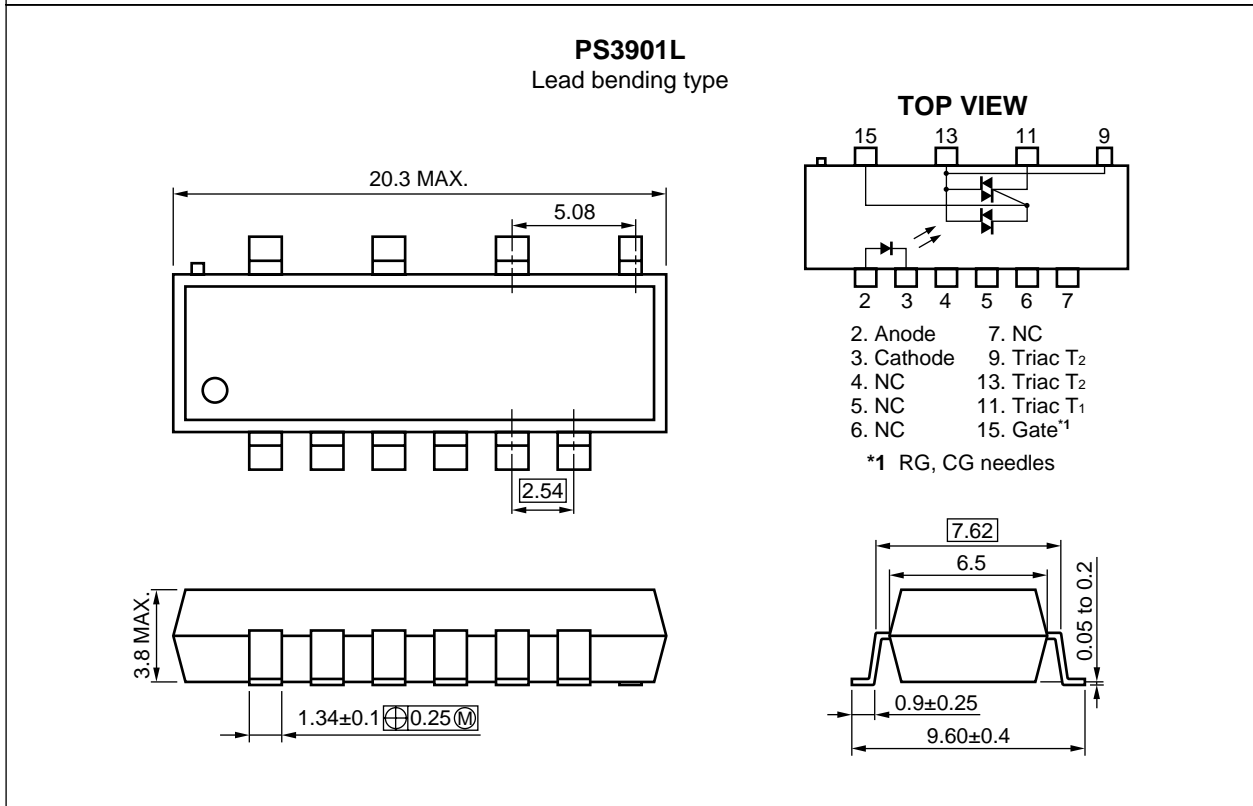
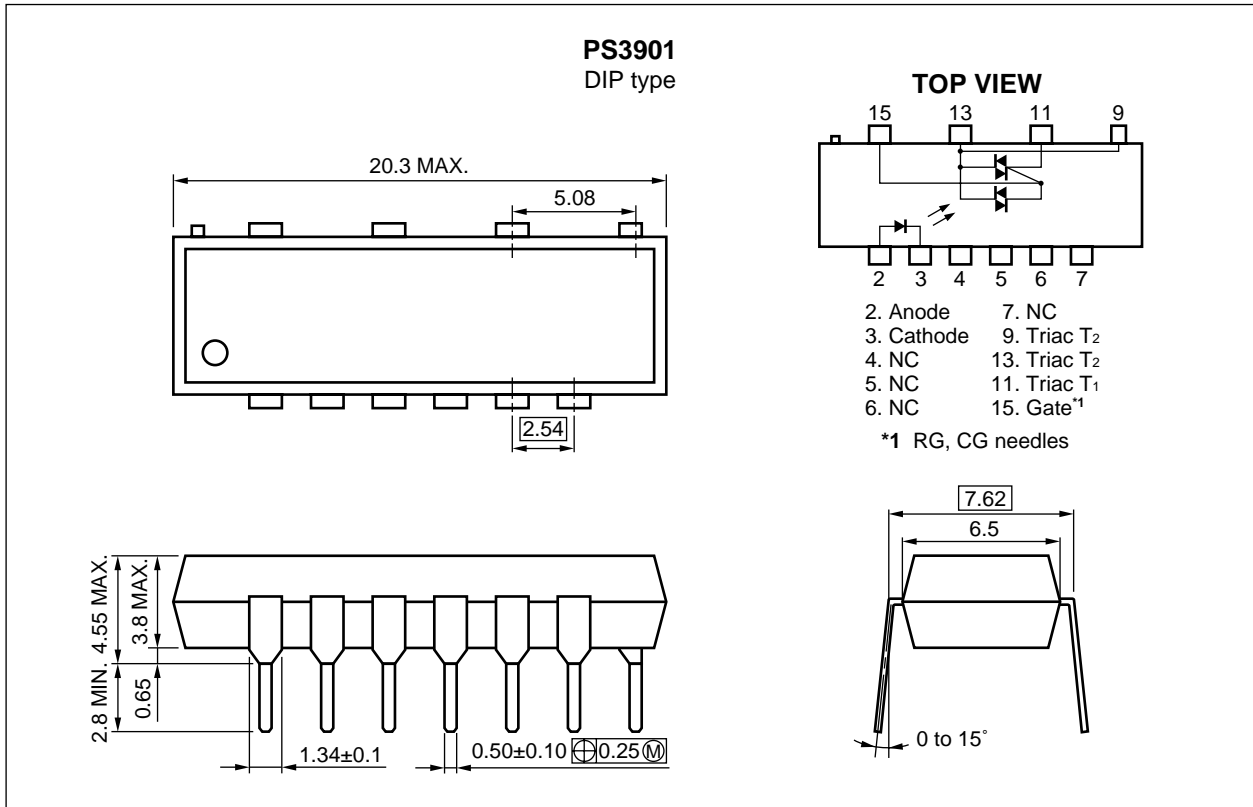
- High RMS on-state current ( $I_T (RMS) = 1.2 \text{ A}$ )
- High critical rate of rise of off-state voltage ( $dV/dt = 500 \text{ V}/\mu\text{s}$  TYP.)
- Low input trigger current ( $I_{FT} = 5 \text{ mA MAX.}$ )
- High repetitive peak off-state voltage ( $V_{DRM} = 600 \text{ V}$ )
- High Isolation voltage ( $BV = 5\,000 \text{ Vr.m.s.}$ )
- Lead bended for long distance type (PS3901L1, L2)
- UL approved (File No. E72422 (S) )

**APPLICATIONS**

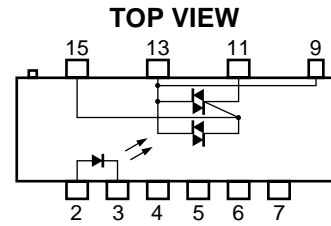
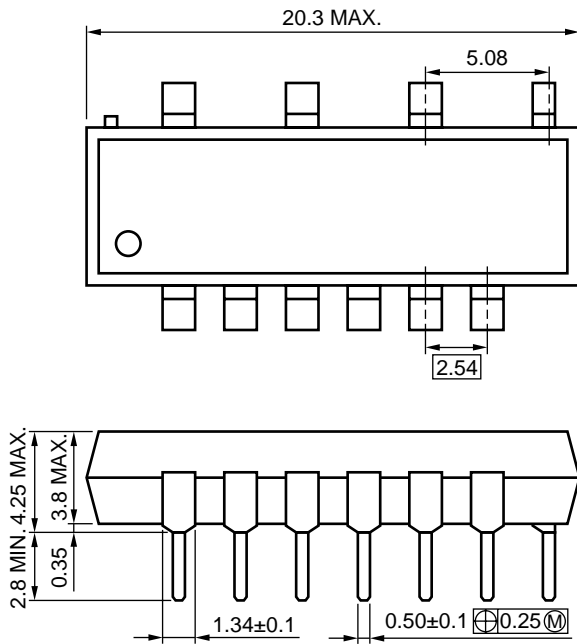
- ★ • Vending machine
- Electric home appliances
- Fan heaters, Air conditioner

The information in this document is subject to change without notice.

PACKAGE DIMENSIONS (in millimeters)

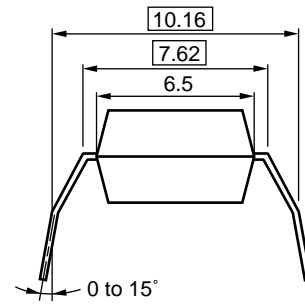


**PS3901L1**  
DIP type  
(for Long Distance)

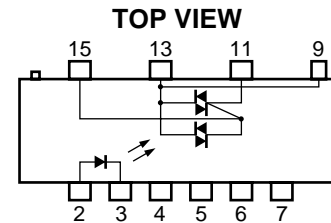
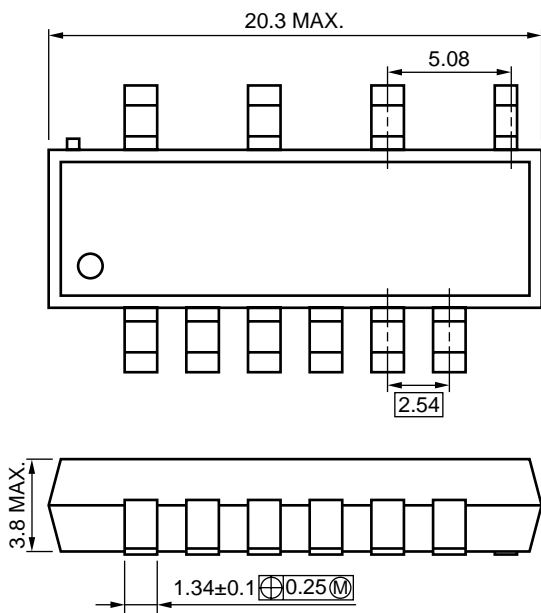


- 2. Anode
- 3. Cathode
- 4. NC
- 5. NC
- 6. NC
- 7. NC
- 9. Triac T<sub>2</sub>
- 13. Triac T<sub>2</sub>
- 11. Triac T<sub>1</sub>
- 15. Gate\*1

\*1 RG, CG needles

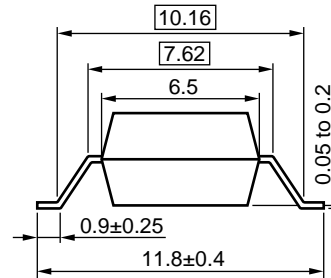


**PS3901L2**  
Lead bending type  
(for Long Distance)



- 2. Anode
- 3. Cathode
- 4. NC
- 5. NC
- 6. NC
- 7. NC
- 9. Triac T<sub>2</sub>
- 13. Triac T<sub>2</sub>
- 11. Triac T<sub>1</sub>
- 15. Gate\*1

\*1 RG, CG needles



**ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = 25 °C, unless otherwise specified)**

| Parameter                       |   | Symbol               | Ratings     | Unit                |
|---------------------------------|---|----------------------|-------------|---------------------|
| Diode                           | Forward Current                             | I <sub>F</sub>       | 80          | mA                  |
|                                 | Reverse Voltage                             | V <sub>R</sub>       | 6.0         | V                   |
|                                 | Power Dissipation Derating                  | ΔP <sub>D</sub> /°C  | 1.5         | mW/°C               |
|                                 | Power Dissipation                           | P <sub>D</sub>       | 150         | mW                  |
|                                 | Peak Forward Current <sup>*1</sup>          | I <sub>FP</sub>      | 1           | A                   |
| Triac                           | Repetitive Peak Off-state Voltage           | V <sub>DRM</sub>     | 600         | V                   |
|                                 | RMS On-state Current <sup>*2</sup>          | I <sub>T (RMS)</sub> | 1.2         | A                   |
|                                 | Peak 1 Cycle Surge On Current <sup>*3</sup> | I <sub>TSM</sub>     | 10          | A                   |
|                                 | Power Dissipation Derating                  | ΔP <sub>C</sub> /°C  | 15          | mW/°C               |
|                                 | Power Dissipation                           | P <sub>C</sub>       | 1.5         | W                   |
| Isolation Voltage <sup>*4</sup> |   | BV                   | 5 000       | V <sub>r.m.s.</sub> |
| Operating Ambient Temperature   |   | T <sub>A</sub>       | -25 to +85  | °C                  |
| Storage Temperature             |   | T <sub>stg</sub>     | -40 to +125 | °C                  |

\*1 PW = 100 μs, Duty Cycle = 1 %

★ \*2 Current for operation of this device differs depending on conditions such as load, operating temperature, and supply voltage.

\*3 Sine Wave f = 50 Hz

\*4 AC voltage for 1 minute at T<sub>A</sub> = 25 °C, RH = 60 % between input and output.

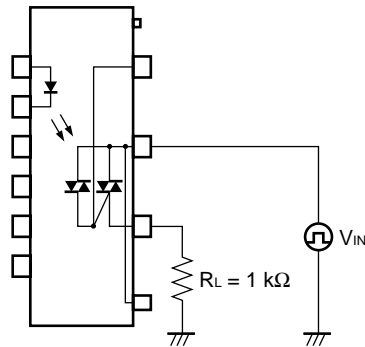
**RECOMMENDED OPERATING CONDITIONS**

| Parameter                     | Symbol          | MIN. | TYP. | MAX. | Unit            |
|-------------------------------|-----------------|------|------|------|-----------------|
| Supply Voltage                | V <sub>AC</sub> |      |      | 240  | V <sub>AC</sub> |
| Forward Current               | I <sub>F</sub>  | 10   | 15   | 20   | mA              |
| Operating Ambient Temperature | T <sub>A</sub>  | -20  |      | +80  | °C              |

**ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25 °C)**

| Parameter |                          | Symbol           | Conditions                            | MIN.             | TYP. | MAX. | Unit |
|-----------|--------------------------|------------------|---------------------------------------|------------------|------|------|------|
| Diode     | Forward Voltage          | V <sub>F</sub>   | I <sub>F</sub> = 10 mA                |                  | 1.1  | 1.4  | V    |
|           | Reverse Current          | I <sub>R</sub>   | V <sub>R</sub> = 5 V                  |                  |      | 10   | μA   |
|           | Terminal Capacitance     | C <sub>t</sub>   | V = 0 V, f = 1 MHz                    |                  | 30   |      | pF   |
| Triac     | Peak Off-state Current   | I <sub>DRM</sub> | V <sub>DRM</sub> = ±Rated             |                  |      | 100  | μA   |
|           | Peak On-state Voltage    | V <sub>TM</sub>  | I <sub>TM</sub> = Rated               |                  |      | 3    | V    |
|           | Holding Current          | I <sub>H</sub>   |                                       |                  |      | 25   | mA   |
|           | Rate Off-state Voltage*1 | dV/dt            | V <sub>IN</sub> = ±1/√2 Rated         |                  | 500  |      | V/μs |
| Coupled   | LED Trigger Current      | I <sub>FT</sub>  | V <sub>T</sub> = ±6 V                 |                  |      | 5    | mA   |
|           | Isolation Resistance     | R <sub>I-o</sub> | V <sub>I-o</sub> = 1 kV <sub>DC</sub> | 10 <sup>11</sup> |      |      | Ω    |
|           | Isolation Capacitance    | C <sub>I-o</sub> | V = 0 V, f = 1 MHz                    |                  | 1.5  |      | pF   |

\*1 Test circuit for critical rate of rise of off-state voltage

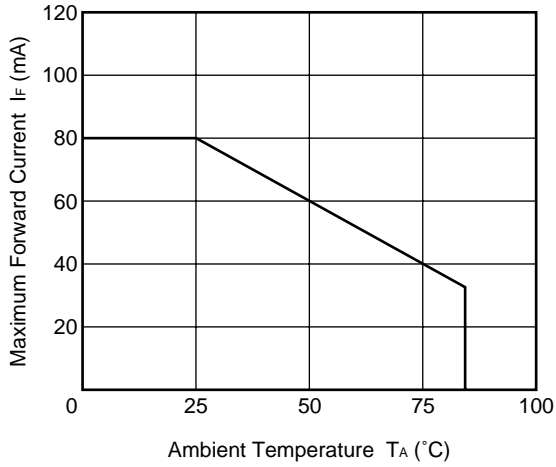


**USAGE CAUTIONS**

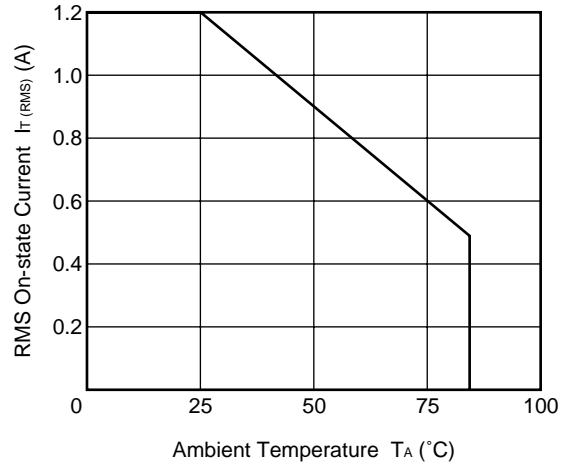
1. All pins should be soldered for heat sink.
2. Be sure to connect a circuit for surge absorbent.
- ★ 3. Trigger input current is changed by pulse, temperature and load voltage, therefore it must be careful examined.
4. An appropriate circuit must be chosen according to the load (for CR, chose its constant). This must be carefully done especially for an inductive load.
5. On the phase control, load current at initial input signal input should be applied to 50 mA (MIN).

TYPICAL CHARACTERISTICS ( $T_A = 25\text{ }^\circ\text{C}$ , unless otherwise specified)

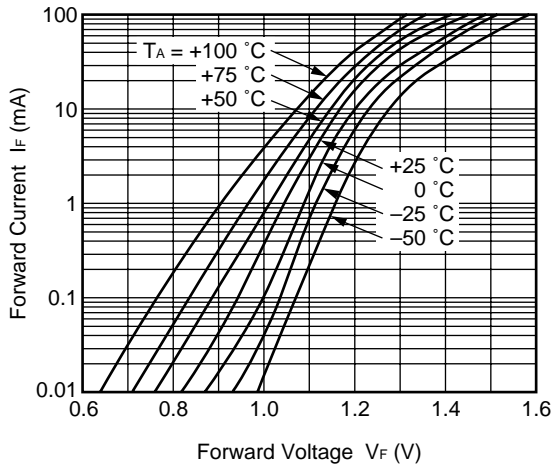
MAXIMUM FORWARD CURRENT vs. AMBIENT TEMPERATURE



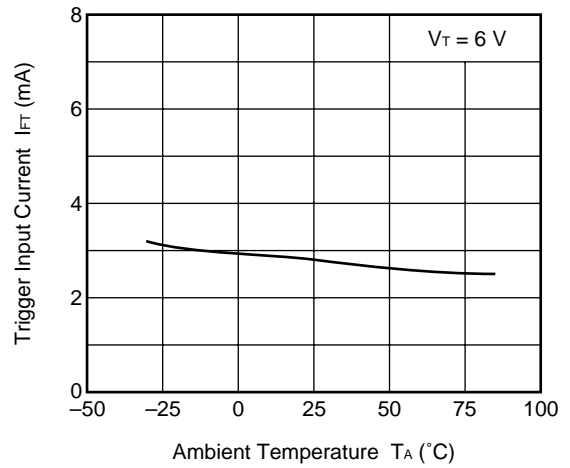
RMS ON-STATE CURRENT vs. AMBIENT TEMPERATURE



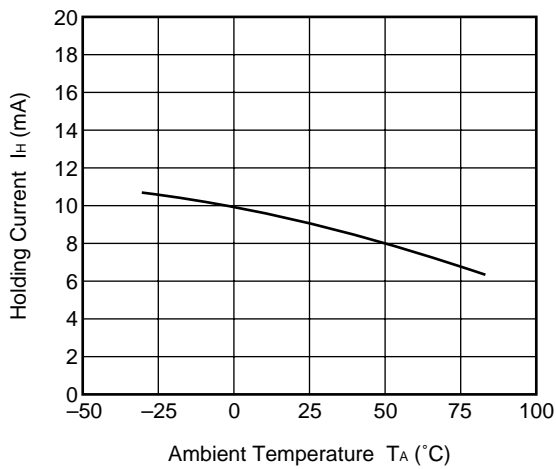
FORWARD CURRENT vs. FORWARD VOLTAGE



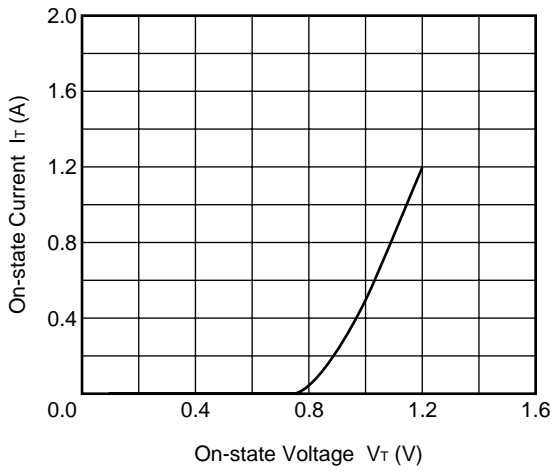
TRIGGER INPUT CURRENT vs. AMBIENT TEMPERATURE



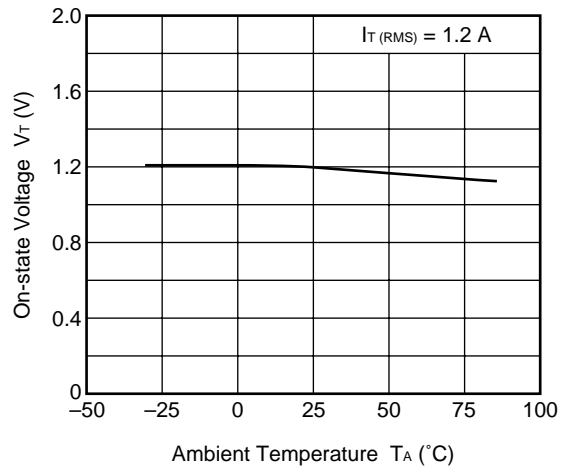
HOLDING CURRENT vs. AMBIENT TEMPERATURE



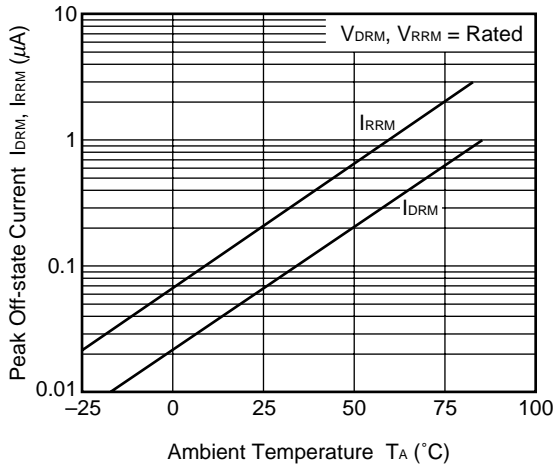
ON-STATE CURRENT vs. ON-STATE VOLTAGE



ON-STATE VOLTAGE vs. AMBIENT TEMPERATURE



PEAK OFF-STATE CURRENT vs. AMBIENT TEMPERATURE

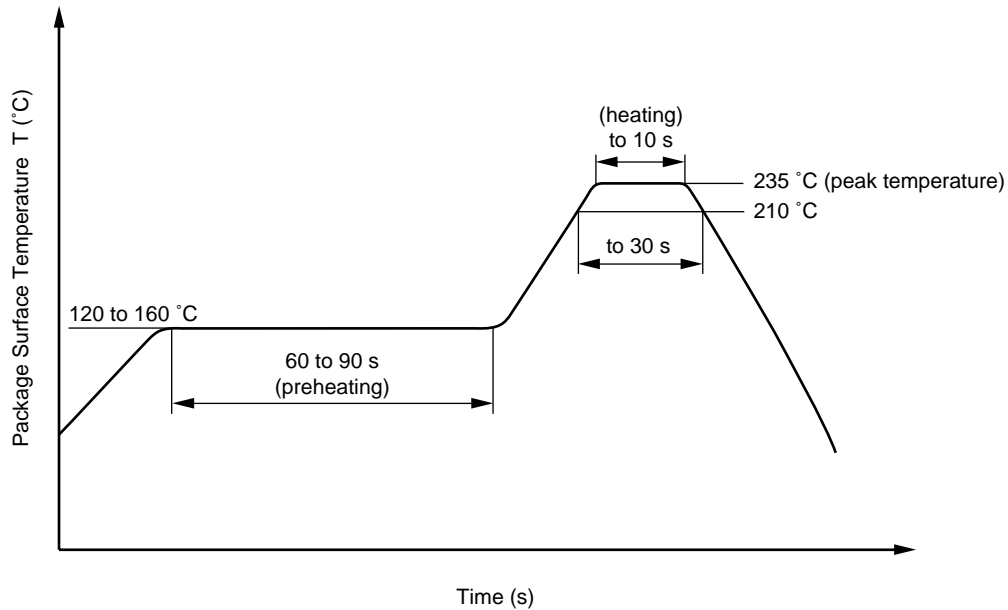


**RECOMMENDED SOLDERING CONDITIONS**

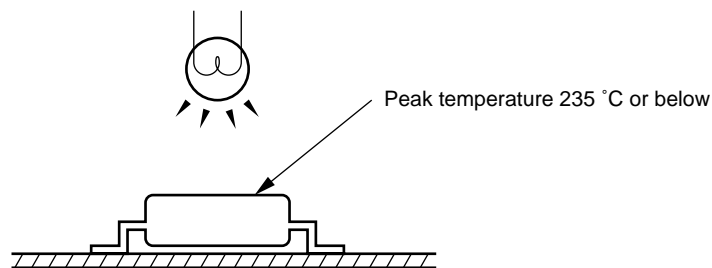
**(1) Infrared reflow soldering**

- Peak reflow temperature 235 °C (package surface temperature)
- Time of temperature higher than 210 °C 30 seconds or less
- Number of reflows Three
- Flux Rosin flux containing small amount of chlorine (The flux with a maximum chlorine content of 0.2 Wt % is recommended.)

Recommended Temperature Profile of Infrared Reflow



**Caution** Please avoid to removed the residual flux by water after the first reflow processes.



**(2) Dip soldering**

- Temperature 260 °C or below (molten solder temperature)
- Time 10 seconds or less
- Number of times One
- Flux Rosin flux containing small amount of chlorine (The flux with a maximum chlorine content of 0.2 Wt % is recommended.)



[MEMO]

[MEMO]

[MEMO]

**CAUTION**

**Within this device there exists GaAs (Gallium Arsenide) material which is a harmful substance if ingested. Please do not under any circumstances break the hermetic seal.**

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Anti-radioactive design is not implemented in this product.