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LED SMD



Lead-Free Parts

## LG-110HRF/9UG-CT

# DATA SHEET

DOC. NO : QW0905-LG-110HRF/9UG-CT

REV. : B

DATE : 25 - May - 2009





**Features:**

- 1. Package in 8.0mm carrier tape on 7" diameter reel.
- 2. Compatible with automatic placement equipment.
- 3. Compatible with reflow solder process.

**Descriptions:**

- 1. The LG-110HRF/9UG SMD Taping is much smaller than lead frame type components, thus enable smaller board size, higher packing density, reduced storage space and finally smaller equipment to be obtained.
- 2. Besides, lightweight makes them ideal for miniature applications. etc.

**Applications:**

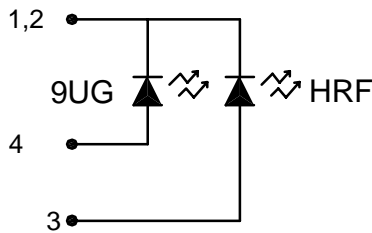
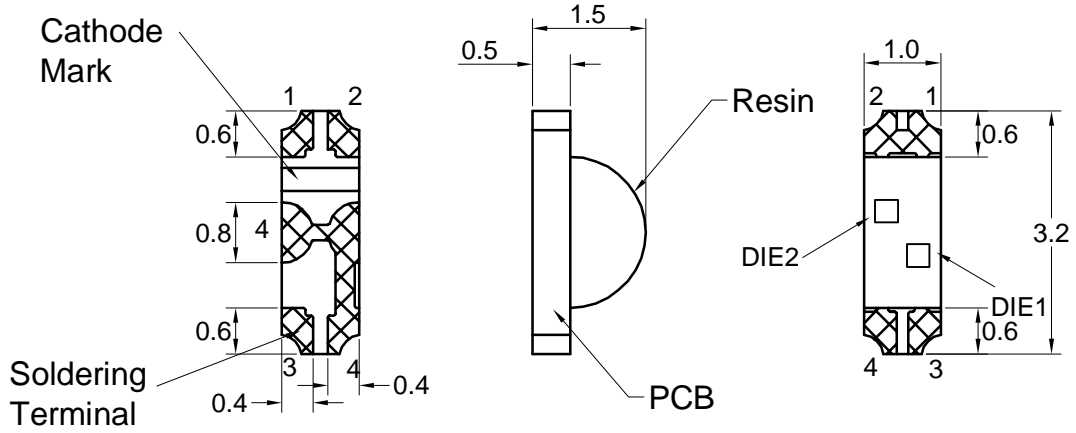
- 1. Automotive : backlighting in dashboard and switch.
- 2. Telecommunication : indicator and backlighting in telephone and fax.
- 3. Flat backlight for LCD, switch and symbol
- 4. General use.

**Device Selection Guide:**

| PART NO          | MATERIAL | COLOR   |             |
|------------------|----------|---------|-------------|
|                  |          | Emitted | Lens        |
| LG-110HRF/9UG-CT | AlGaInP  | Red     | Water Clear |
|                  | AlGaInP  | Green   |             |

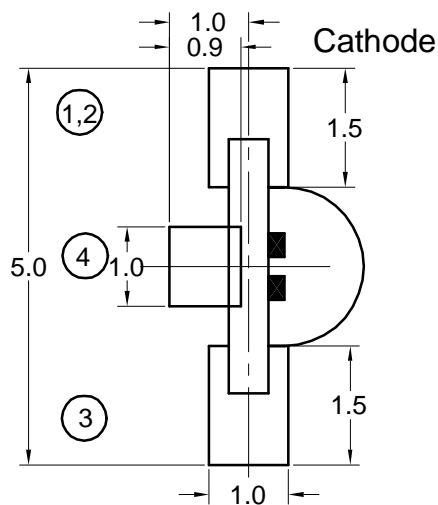


### Package Dimensions



Note : 1.All dimension are in millimeter tolerance is  $\pm 0.1\text{mm}$  unless otherwise noted.  
2.Specifications are subject to change without notice.

### Recommended Soldering Pad Dimensions



Note : The tolerances unless mentioned is  $\pm 0.1\text{mm}$ , Angle  $\pm 0.5$ . Unit=mm.

**Absolute Maximum Ratings at Ta=25**

| Parameter                               | Symbol           | Ratings               |     | UNIT |
|---|------------------|-----------------------|-----|------|
|   |                  | HRF                   | 9UG |      |
| Power Dissipation                       | PD               | 72                    | 78  | mW   |
| Peak Forward Current<br>Duty 1/10@10KHz | IFP              | 90                    | 60  | mA   |
| Forward Current                         | IF               | 30                    | 30  | mA   |
| Reverse Current @5V                     | Ir               | 10                    |     | μ A  |
| Electrostatic Discharge                 | ESD              | 2000                  |     | V    |
| Operating Temperature                   | T <sub>opr</sub> | -40 ~ +85             |     |      |
| Storage Temperature                     | T <sub>stg</sub> | -40 ~ +90             |     |      |
| Soldering Temperature                   | T <sub>sol</sub> | Max 260 for 5 sec Max |     |      |

**Typical Electrical & Optical Characteristics (Ta=25 )**

| Items                    | Symbol         | Min. | Typ. | Max. | UNIT | CONDITION |         |
|--------------------------|----------------|------|------|------|------|-----------|---------|
| Luminous Intensity       | I <sub>v</sub> | HRF  | 32   | 70   | ---- | mcd       | IF=20mA |
|                          |                | 9UG  | 20   | 40   | ---- |           |         |
| Peak Wavelength          | P              | HRF  | ---- | 642  | ---- | nm        | IF=20mA |
|                          |                | 9UG  | ---- | 575  | ---- |           |         |
| Dominant Wavelength      | D              | HRF  | ---- | 630  | ---- | nm        | IF=20mA |
|                          |                | 9UG  | ---- | 574  | ---- |           |         |
| Spectral Line Half-Width |                | HRF  | ---- | 20   | ---- | nm        | IF=20mA |
|                          |                | 9UG  | ---- | 20   | ---- |           |         |
| Forward Voltage          | V <sub>F</sub> | HRF  | 1.5  | ---- | 2.4  | V         | IF=20mA |
|                          |                | 9UG  | 1.7  | ---- | 2.6  |           |         |
| Viewing Angle            | 2 1/2          | HRF  | ---- | 120  | ---- | deg       | IF=20mA |
|                          |                | 9UG  | ---- | 120  | ---- |           |         |

Note : 1. The forward voltage data did not including ±0.1V testing tolerance.  
2. The luminous intensity data did not including ±15% testing tolerance.



### Typical Electro-Optical Characteristics Curve HRF CHIP

Fig.1 Forward current vs. Forward Voltage

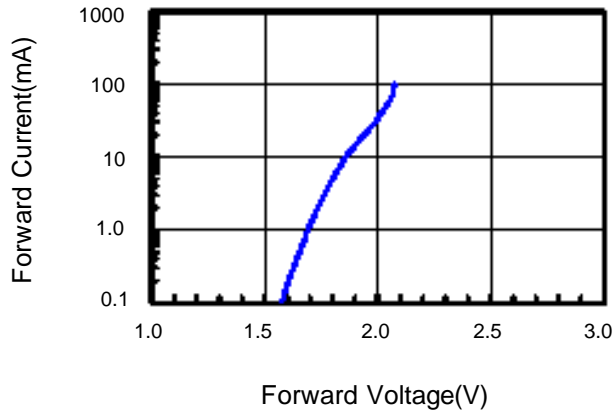


Fig.2 Relative Intensity vs. Forward Current

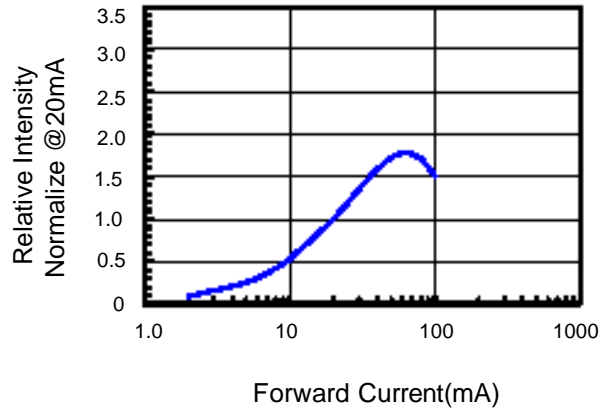


Fig.3 Forward Voltage vs. Temperature

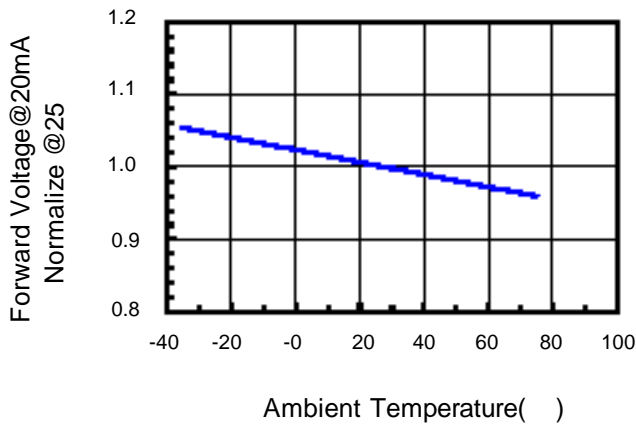


Fig.4 Relative Intensity vs. Temperature

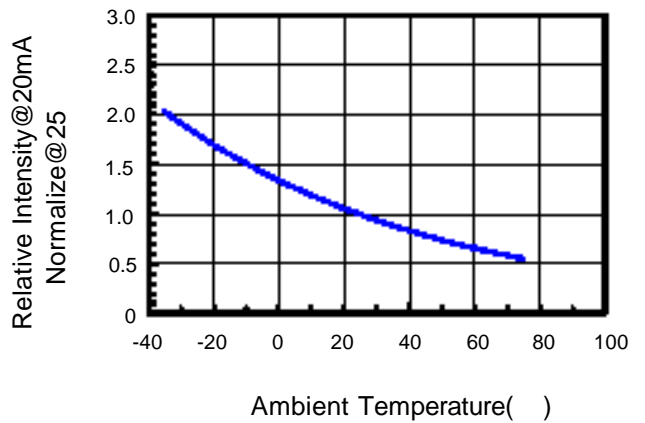


Fig.5 Relative Intensity vs. Wavelength

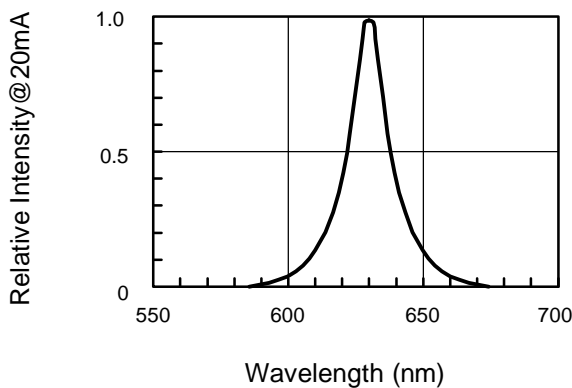
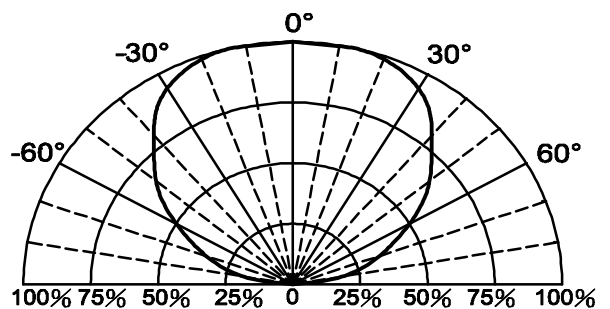


Fig.6 Directive Radiation





### Typical Electro-Optical Characteristics Curve 9UG CHIP

Fig.1 Forward current vs. Forward Voltage

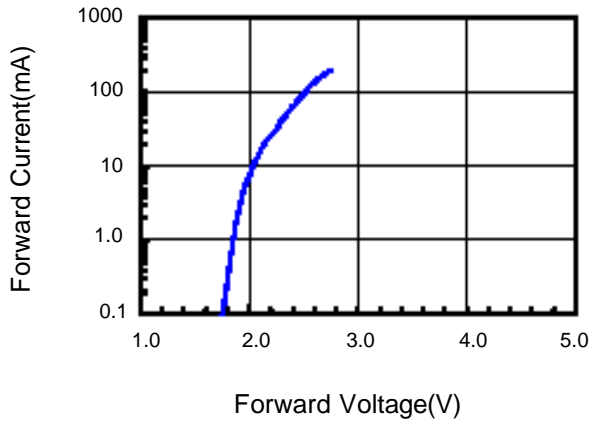


Fig.2 Relative Intensity vs. Forward Current

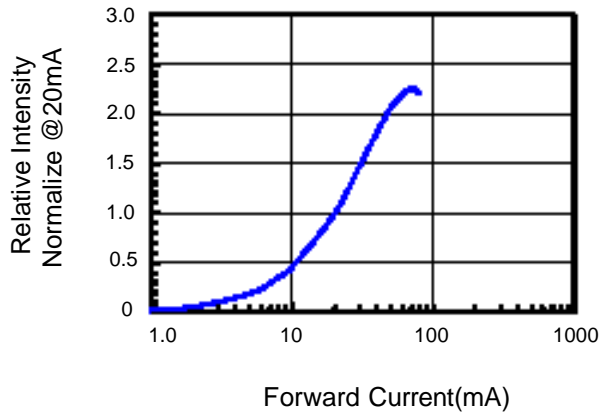


Fig.3 Forward Voltage vs. Temperature

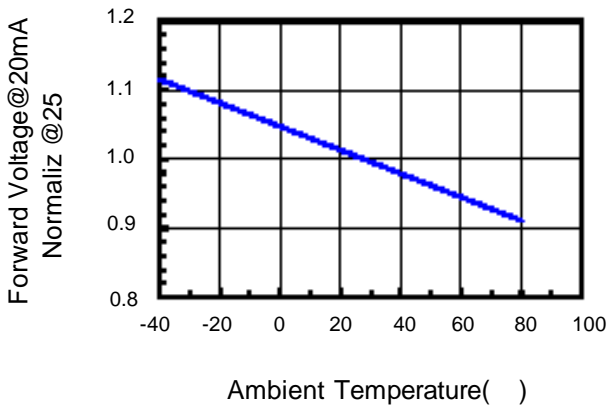


Fig.4 Relative Intensity vs. Temperature

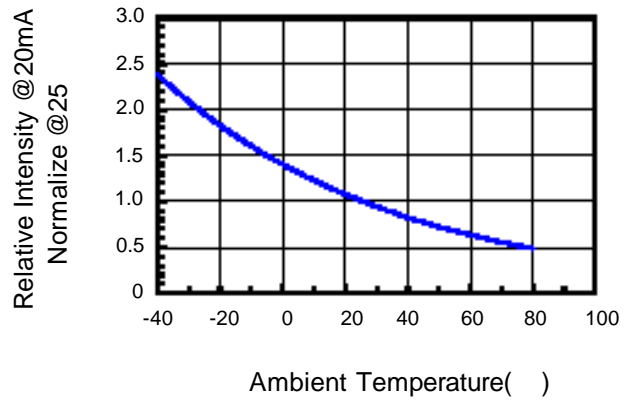


Fig.5 Relative Intensity vs. Wavelength

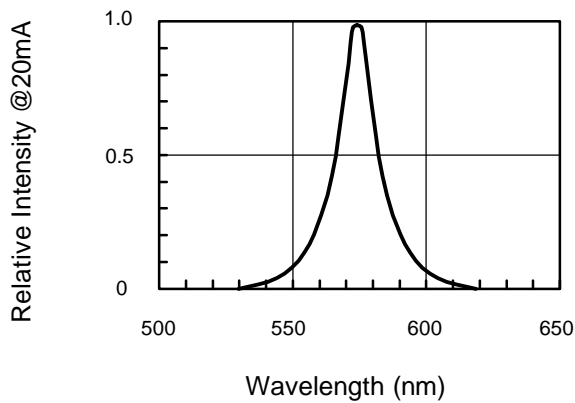
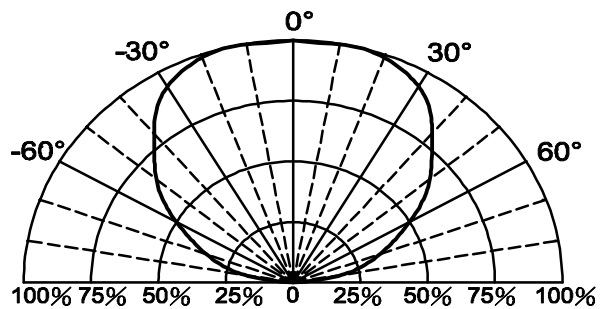
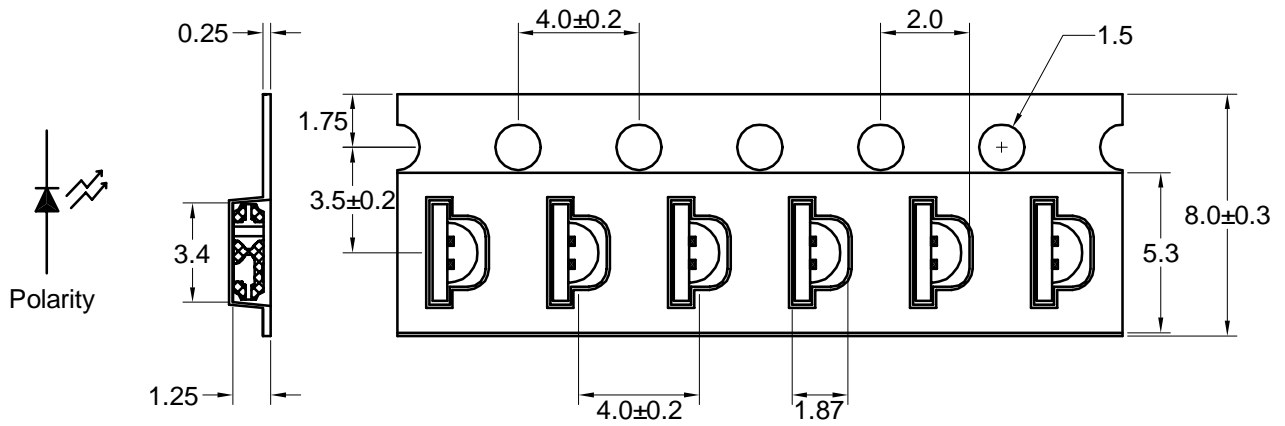


Fig.6 Directive Radiation



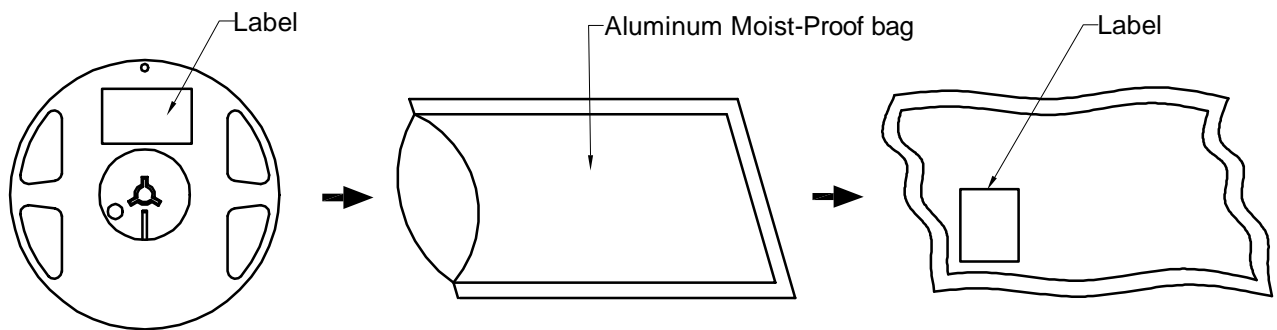


### Carrier Type Dimensions



Note : The tolerances unless mentioned is  $\pm 0.1\text{mm}$ , Angle  $\pm 0.5$ . Unit=mm.

### Packing Specifications



| Part No.         | Description        | Quantity/Reel |
|------------------|--------------------|---------------|
| LG-110HRF/9UG-CT | 8.0mm tape,7" reel | 3000 devices  |



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PART NO. LG-110HRF/9UG-CT

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### Label Explanation

|   |              |
|---|--------------|
| 立基電子工業股份有限公司<br>LIGITEK ELECTRONICS CO., LTD. |              |
| PART NO. : LG-110HRF/9UG-CT                   |              |
| LOT NO. : MC9400418                           |              |
| Q'TY(PCS) : 3000 PCS                          | VF:1.6 - 2.4 |
| BIN/HUE : P/30-N/8                            | VF:1.8 - 2.6 |

BIN P : Red Chip Luminous Intensity

BIN N : Green Chip Luminous Intensity

HUE 30 : Red Chip Dominant Wavelength

HUE 8 : Green Chip Dominant Wavelength

1.8 - 2.6 : Forward Voltage

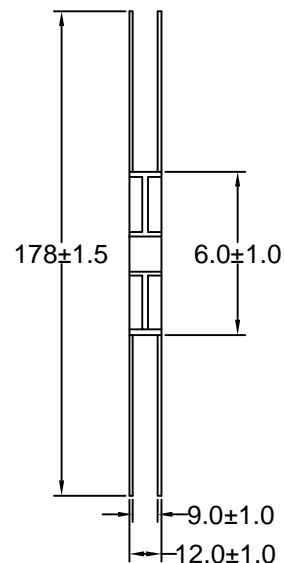
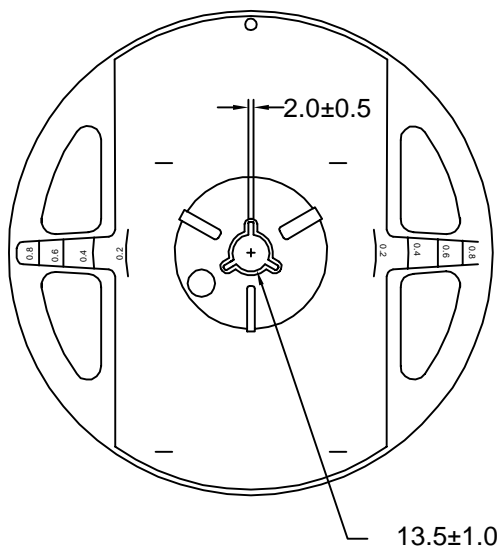
### Brightness Code For Visible SMD

| Group |   | (mcd) at 20mA |     |
|-------|---|---------------|-----|
|       |   | MIN           | MAX |
| HRF   | N | 32            | 50  |
|       | P | 50            | 80  |
| 9UG   | M | 20            | 32  |
|       | N | 32            | 50  |

### Color Code For Visible SMD

| Group |    | (nm) at 20mA |     |
|-------|----|--------------|-----|
|       |    | MIN          | MAX |
| HRF   | 29 | 624          | 627 |
|       | 30 | 627          | 630 |
|       | 31 | 630          | 633 |
|       | 32 | 633          | 636 |
| 9UG   | 7  | 568          | 570 |
|       | 8  | 570          | 572 |
|       | 9  | 572          | 574 |
|       | 10 | 574          | 576 |
|       | 11 | 576          | 578 |

### Reel Dimensions







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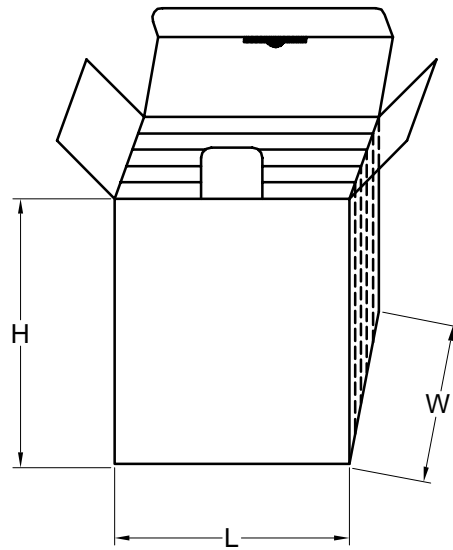
**LIGITEK ELECTRONICS CO.,LTD.**  
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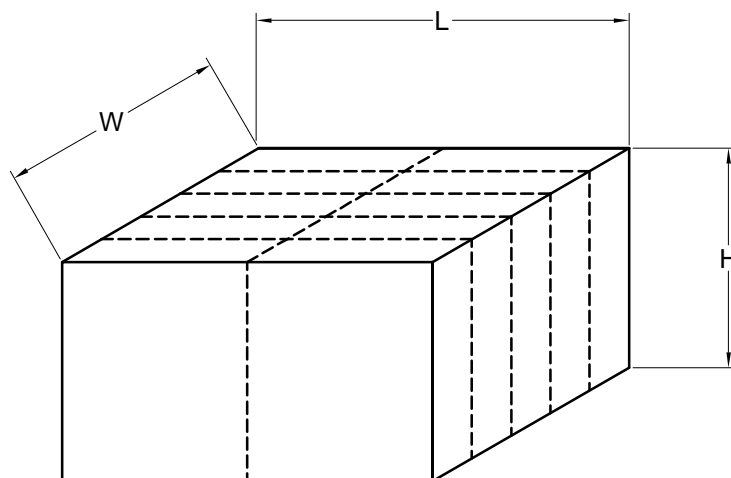
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## Box Explanation

1. 5 BAG / INNER BOX
2. INNER BOX SIZE : L X W X H 23cm X 8.5cm x 26cm



3. 10 INNER BOXES / CARTON
4. CARTON SIZE : L X W X H 49cm X 46cm x 29cm



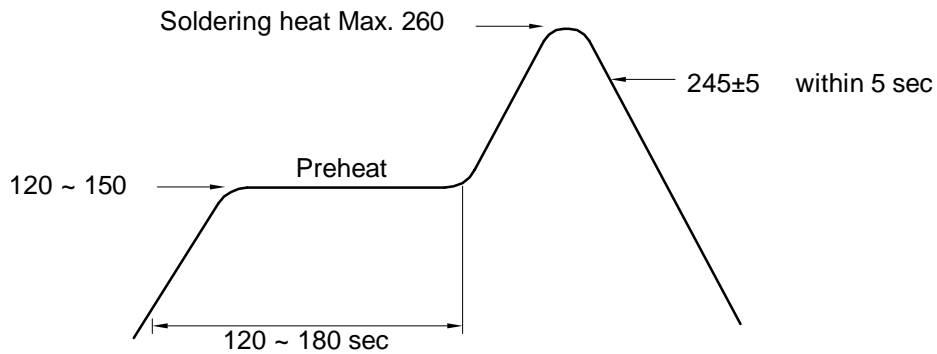


Recommended Soldering Conditions

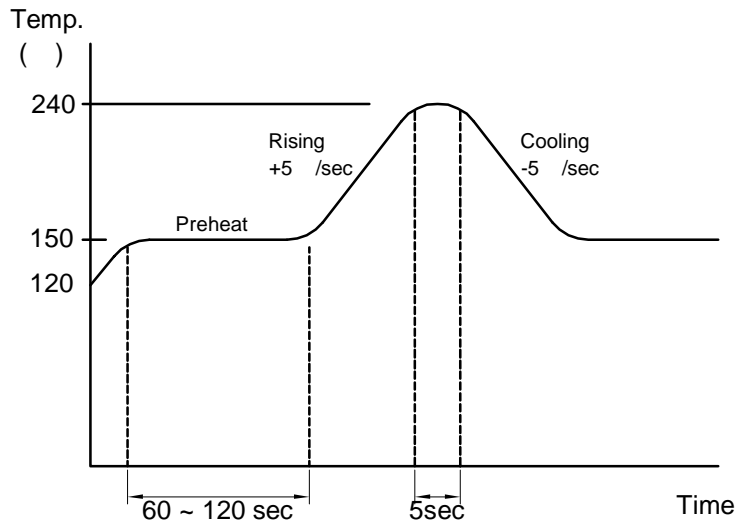
1. Hand Solder

Basic spec is 280 3 sec one time only.

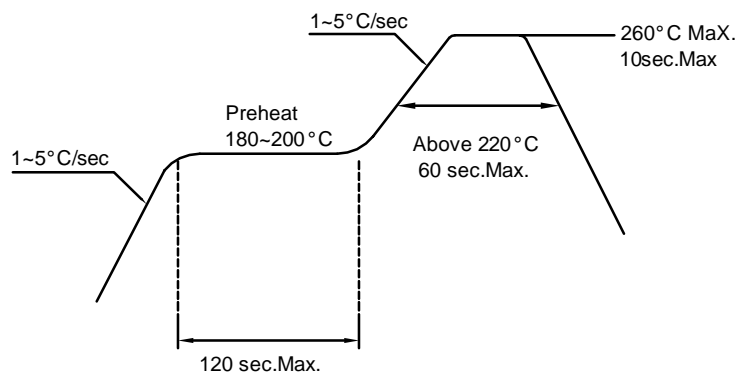
2. Wave Solder



3-1. LEAD Reflow Solder



3-2 PB-Free Reflow Solder



Reflow Soldering should not be done more than two times.



Precautions For Use:

Storage time:

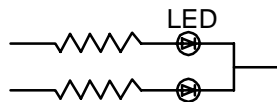
- 1.The operation of Temperatures and RH are : 5 ~35 ,RH60%.
- 2.Once the package is opened, the products should be used within a week.  
Otherwise, they should be kept in a damp proof box with descanting agent.  
Considering the tape life, we suggest our customers to use our products within a year(from production date).
- 3.If opened more than one week in an atmosphere 5 ~ 35 ,RH60%, they should be treated at 60 ±5 for 15hrs.

Drive Method:

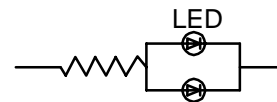
LED is a current operated device, and therefore, requirer some kind of current limiting incorporated into the driver circuit. This current limiting typically takes the form of a current limiting resistor placed in series with the LED.

Consider worst case voltage variations than could occur across the current limiting resistor. The forwr d current should not be allowed to change by more than 40% of its desired value.

Circuit model A



Circuit model B



(A) Recommended circuit.

(B) The difference of brightness between LED could be found due to the VF-IF characteristics of LED.

Cleaning:

Use alcohol-based cleaning solvents such as isopropyl alcohol to clean the LED.

ESD(Electrostatic Discharge):

Static Electricity or power surge will damage the LED. Use of a conductive wrist band or anti-electrosatic glove is recommended when handing these LED. All devices, equipment and machinery must be properly grounded.



Reliability Test:

| Classification     | Test Item                                   | Test Condition  | Reference Standard  |
|--------------------|---|---|---|
| Endurance Test     | Operating Life Test                         | 1.Ta=Under Room Temperature As Per Data Sheet Maximum Rating.<br>2.If=20mA<br>3.t=1000 hrs (-24hrs, +72hrs) | MIL-STD-750D: 1026<br>MIL-STD-883D: 1005<br>JIS C 7021: B-1   |
|                    | High Temperature Storage Test               | 1.Ta=105 ±5<br>2.t=1000 hrs (-24hrs, +72hrs)  | MIL-STD-883D:1008<br>JIS C 7021: B-10   |
|                    | Low Temperature Storage Test                | 1.Ta=-40 ±5<br>2.t=1000 hrs (-24hrs, +72hrs)  | JIS C 7021: B-12  |
|                    | High Temperature High Humidity Storage Test | 1.Ta=65 ±5<br>2.RH=90%~95%<br>3.t=1000hrs ±2hrs   | MIL-STD-202F:103B<br>JIS C 7021: B-11   |
| Environmental Test | Thermal Shock Test                          | 1.Ta=105 ±5 & -40 ±5<br>(10min) (10min)<br>2.total 10 cycles  | MIL-STD-202F: 107D<br>MIL-STD-750D: 1051<br>MIL-STD-883D: 1011  |
|                    | Solderability Test                          | 1.T.Sol=235 ±5<br>2.Immersion time 2 ±0.5sec<br>3.Coverage 95% of the dipped surface                        | MIL-STD-202F: 208D<br>MIL-STD-750D: 2026<br>MIL-STD-883D: 2003<br>IEC 68 Part 2-20<br>JIS C 7021: A-2 |
|                    | Temperature Cycling                         | 1.105 ~ 25 ~ -55 ~ 25<br>30mins 5mins 30mins 5mins<br>2.10 Cycles   | MIL-STD-202F: 107D<br>MIL-STD-750D: 1051<br>MIL-STD-883D: 1010<br>JIS C 7021: A-4                     |
|                    | IR Reflow                                   | 1.T=260°C Max. 10sec.Max.<br>2. 6 Min   | MIL-STD-750D:2031.2<br>J-STD-020  |