1. Storage Conditions

1.1. Avoid continued exposure to the condensing moisture environment and keep the product away from rapid transitions in ambient temperature.

1.2. LEDs should be stored with temperature ≦ 30°C and relative humidity < 70%.

1.3. Product in the original sealed package is recommended to be assembled within 72 hours of opening. Product in opened package for more than a week should be baked for 30 (+10/-0) hours at 85 ~ 100°C.

1.4. The LED lead-frame surface is plated with silver. When the lead-frame is stored under high-humidity environments, or exposed to certain chemical elements or gases, the surface may become discolored. Please maintain the cleanliness of the storage environment.

2. Lead Forming & Assembly

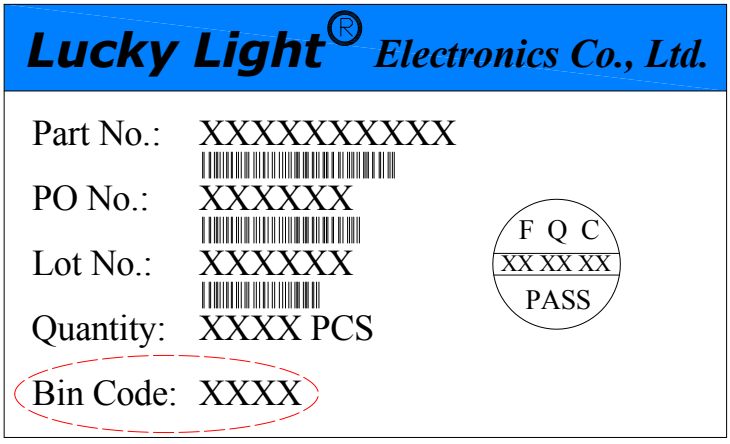
2.1. During lead forming, the leads should be bent at a point at least 2.0mm from the base of LED lens. Do not use the base of the lead frame as a fulcrum during forming. Lead forming must be done before soldering, at normal temperature. During assembly on PCB, use minimum clinch force possible to avoid excessive mechanical stress.

2.2. Pay attention to the polarity of the LEDs to prevent wrong assembly. Keep distance between LEDs and other heating devices. LED working condition should not exceed the prescribed limit.

2.3. Make sure the PIN is not deformed during LED installation.

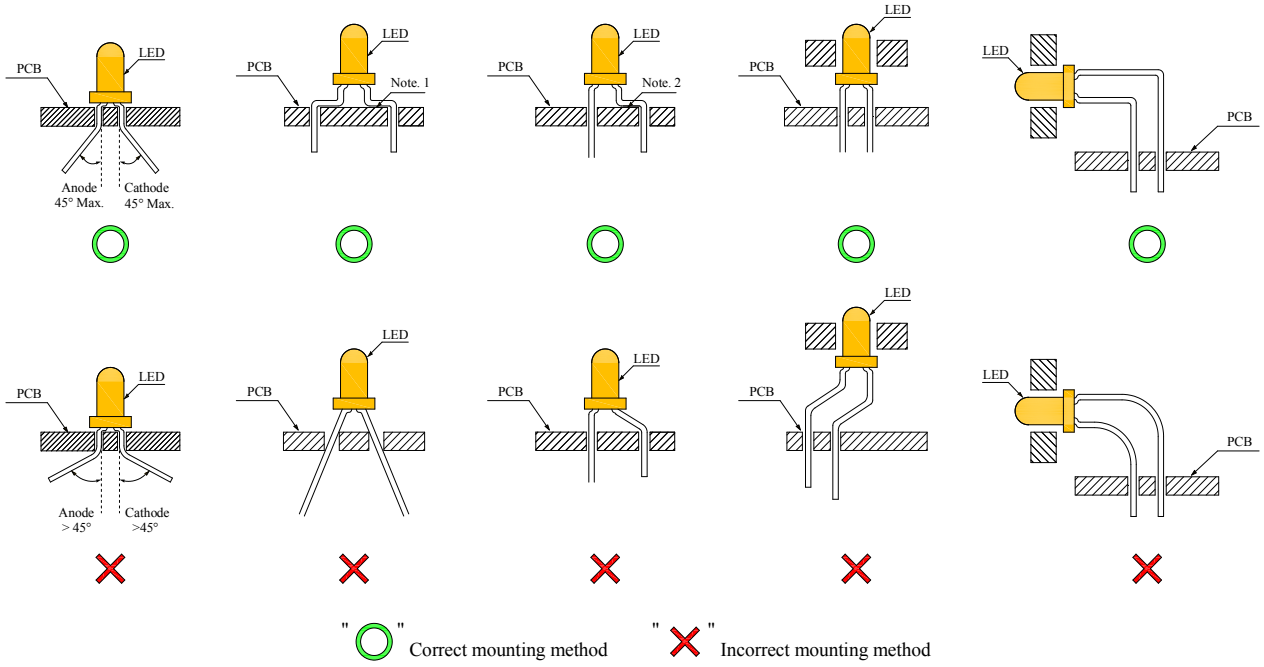
2.4. When deciding to install the LEDs through hole, calculate the dimensions between the PCB and tolerance of the hole spacing well to prevent the lead frame burdening too much excessive pressure.

2.5. It is not recommended to assemble LEDs of different color or intensity bins together, as there may be perceivable color or intensity variation. Each bag contains parts from the same bin code. The bin code is printed on the bag's label as below.



3. LED Mounting Method

3.1. The lead pitch of the LED must match the pitch of the mounting holes on the PCB during component placement. Lead-forming may be required to insure the lead pitch matches the hole pitch. Refer to the figure below for proper lead forming procedures. (Fig. 1)



Note 1~2 : Do not route PCB trace in the contact area between the leadframe and the PCB to prevent short-circuits.

Fig. 1

3.2. When soldering wires to the LED, each wire joint should be separately insulated with heat-shrink tube to prevent short-circuit contact. Do not bundle both wires in one heat shrink tube to avoid pinching the LED leads. Pinching stress on the LED leads may damage the internal structures and cause failure. (Fig. 2)

Fig. 2

3.3. Use stand-offs (Fig. 3) or spacers (Fig. 4) to securely position the LED above the PCB.

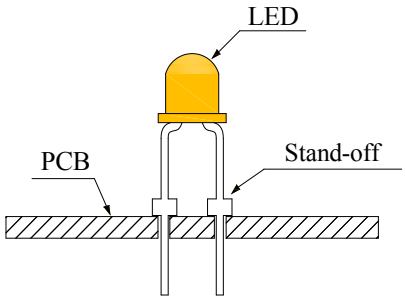


Fig. 3

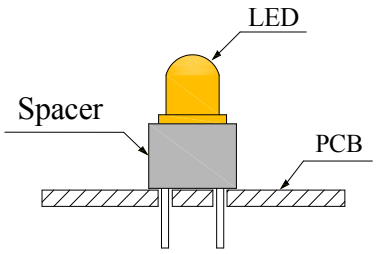


Fig. 4

4. Lead Forming Procedures

4.1. Maintain a minimum of 2mm clearance between the base of the LED lens and the first lead bend. (Fig. 5 and 6)

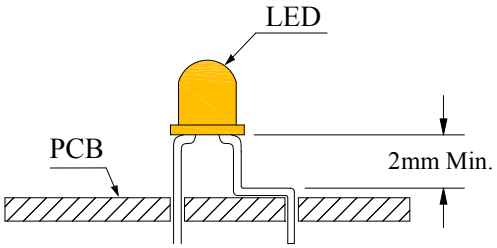


Fig. 5

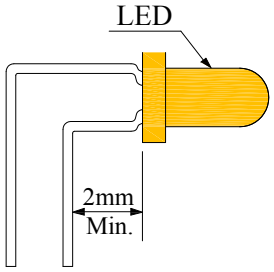


Fig. 6

4.2. Lead-forming or bending must be performed before soldering, never during or after Soldering.

4.3. Do not stress the LED lens during lead-forming in order to prevent fractures in the epoxy lens and damage the internal structures.

4.4. During lead forming, use tools or jigs to hold the leads securely so that the bending force will not be transmitted to the LED lens and its internal structures. Do not perform lead forming once the component has been mounted onto the PCB. (Fig. 7)

4.5. Do not bend the leads more than twice. (Fig. 8)

4.6. After soldering or other high-temperature assembly, allow the LED to cool down to 50°C before applying outside force (Fig. 9). In general, avoid placing excess force on the LED to avoid damage. For any questions please consult with Luckylight representative for proper handling procedures.

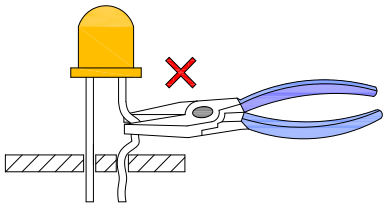


Fig. 7

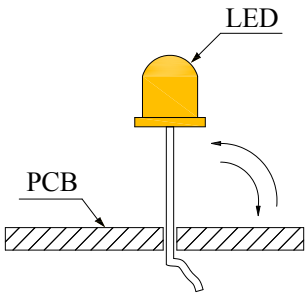


Fig. 8

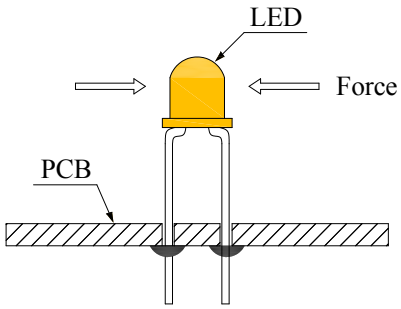


Fig. 9

5. Soldering

5.1. We recommend manual soldering operations only for repair and rework purposes. The soldering iron should not exceed 30W in power. The maximum soldering temperature is 300°C for Pb-Sn solder and 350°C for lead-free solder for normal lamps and displays. For blue (typical λd 465 nm), blue-green (typical λd 525 nm) and all white LEDs, the maximum soldering iron temperature is 280°C. Do not place the soldering iron on the component for more than 3 seconds.

5.2. The tip of the soldering iron should never touch the lens epoxy.

5.3. Do not apply stress to the leads when the component is heated above 85°C, otherwise internal wire bonds may be damaged.

5.4. After soldering, allow at least three minutes for the component to cool down to room temperature before further operations.

5.5. Through-hole LEDs are incompatible with reflow soldering.

5.6. If the LED will undergo multiple soldering passes or face other processes where the part may be subjected to intense heat, please check with Luckylight for compatibility.

5.7. In case of misalignment and re-position is required, do not force the LED while applying a soldering iron. The part should be first de-soldered, and then the LED may be re-soldered with the aid of a holder to place it correctly (as shown below).

Recommended Soldering Profile for Luckylight Through-Hole Products

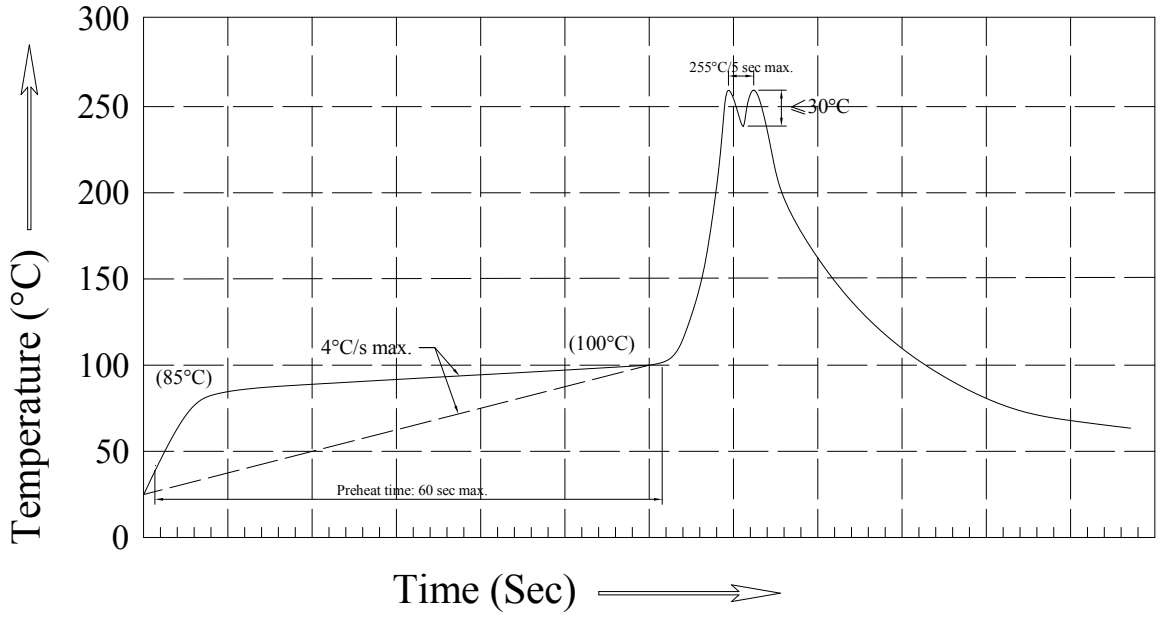
5.7.1. Iron soldering (with 1.5mm Iron tip)

Temperature of soldering iron	Maximum soldering time	Distance from solder joint to package
≦300℃	3s	>2mm
≦300℃	5s	>5mm

5.7.2. Dip Soldering / Wave Soldering

Temperature of soldering iron	Maximum soldering time	Distance from solder joint to package
≦260℃	3s	>2mm
≦260℃	5s	>5mm

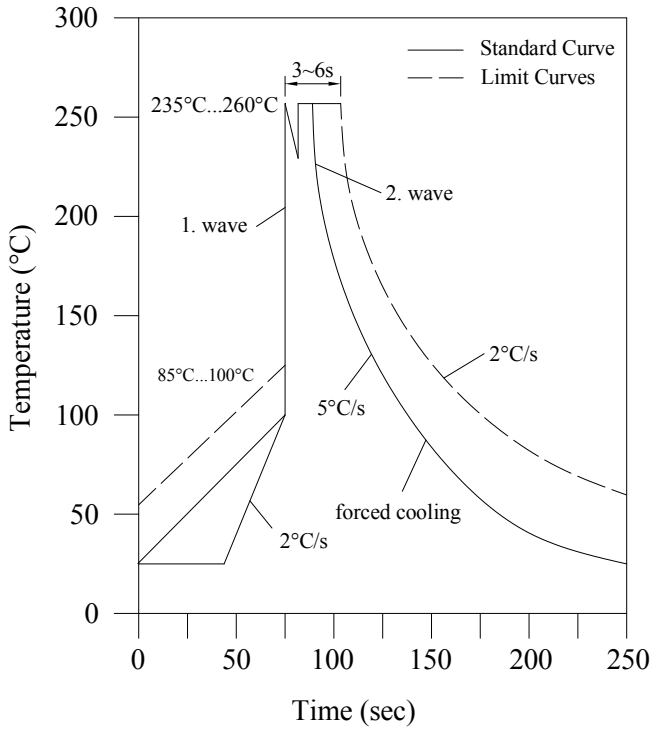
5.7.3. Lead-Free Wave Soldering Profile



Notes:

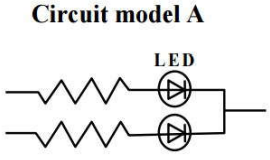
- Recommend pre-heat temperature of 105° C or less (as measured with a thermocouple attached to the LED pins) prior to immersion in the solder wave with a maximum solder bath temperature of 260° C.
- Peak wave soldering temperature between 245° C ~ 255°C for 3 sec. (5 sec max).
- Do not apply stress to the epoxy resin while the temperature is above 85°C.
- Fixtures should not incur stress on the component when mounting and during soldering process.
- SAC 305 solder alloy is recommended.
- No more than one wave soldering pass.

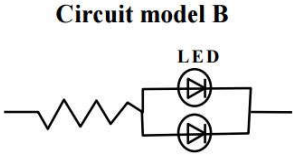
5.7.4. Wave Soldering Profile with Pb-Sn Solder



6. Drive Method

An LED is a current-operated device. In order to ensure intensity uniformity on multiple LEDs connected in parallel in an application, it is recommended that a current limiting resistor be incorporated in the drive circuit, in series with each LED as shown in Circuit A below.





(A) Recommended circuit
(B) The brightness of each LED might appear different due to the differences in the I-V characteristics of those LEDs.

7. Repairing

Repair should not be done after the LEDs have been soldered. When repairing is unavoidable, a double-head soldering iron should be used. It should be confirmed beforehand whether the characteristics of the LEDs will or will not be damaged by repairing.

8. ESD (Electrostatic Discharge)

Static Electricity or power surge will damage the LED. Suggestions to prevent ESD damage:

8.1. Use a conductive wrist band or anti- electrostatic glove when handling these LEDs.
8.2. All devices, equipment, and machinery must be properly grounded.
8.3. Work tables, storage racks, etc. should be properly grounded.
8.4. Use ion blower to neutralize the static charge which might have built up on surface of the LEDs plastic lens as a result of friction between LEDs during storage and handing.

ESD-damaged LEDs will exhibit abnormal characteristics such as high reverse leakage current, low forward voltage, or “no light up” at low currents.

To verify for ESD damage, check for “light up” and VF of the suspect LEDs at low currents. The VF of “good” LEDs should be >2.0V@0.1mA for InGaN product and >1.4V@0.1mA for AlInGaP product.

9. Others

9.1. The information included in this document reflects representative usage scenarios and is intended for technical reference only.
9.2. The part number, type, and specifications mentioned in this document are subject to future change and improvement without notice. Before production usage customer should refer to the latest datasheet for the updated specifications.
9.3. When using the products referenced in this document, please make sure the product is being operated within the environmental and electrical limits specified in the datasheet. If customer usage exceeds the specified limits, Luckylight will not be responsible for any subsequent issues.
9.4. The LEDs described here are intended to be used for ordinary electronic equipment (such as office equipment, communication equipment and household applications). Consult Luckylight’s Sales in advance for information on applications in which exceptional reliability is required, particularly when the failure or malfunction of the LEDs may directly jeopardize life or health, such as in aviation, transportation, traffic control equipment, medical and life support systems and safety devices.