

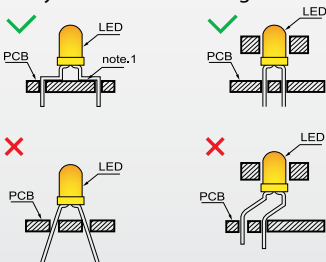
Application Notes

Cleaning

1. Do not use harsh organic solvents such as acetone, trichloroethylene, Chlorson, and diflon S3MC for cleaning because they may blur or damage the LED lens.
2. Recommended solvents for cleaning: Deionized water or Isopropyl alcohol.
3. Special attention should be taken if other chemicals are used for cleaning, as other solvents may damage the epoxy lens or housing.
4. Any cleaning should take place at room temperature and the devices should be washed for one minute or less.
5. When water is used for cleaning, use forced-air drying immediately to remove excess moisture from the LED.

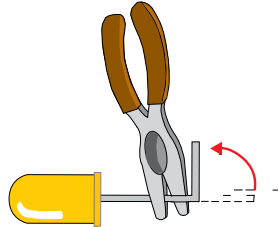
Lead Forming

1. Any lead forming or bending must be done before soldering, never during or after soldering.
2. Avoid bending leads at the same point more than once.
3. Must have a minimum clearance of 2mm between the base of the LED lens and the lead form or bend location.
4. During lead forming, LED base should be firmly secured by means of a jig, radio pliers, or equivalent to prevent bending force to be transmitted to the LED lens and its internal structures.
5. Avoid placing stress to the LED lens in order to prevent fracture to the lens epoxy and to prevent damage to the internal wire bonding.
6. Once LED have been mounted on PCB, avoid any further lead forming.



7. Assembly Precautions
The lead pitch of the LED must match the pitch of the mounting holes on the PCB during component placement. In situations

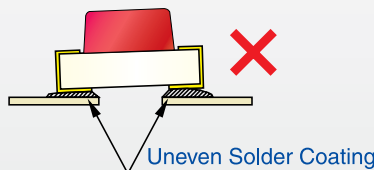
where the lead pitch is different than the mounting holes, lead forming may be required for proper placement. Please refer to the figures below for proper lead forming.



Soldering

General Notes

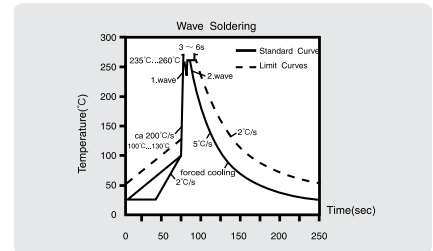
1. Manual soldering operations should only be for repairs and rework.
2. The maximum soldering iron temperature:
 - a. Pb-Sn solder - 300°C
 - b. Pb-Free solder - 350°C
 - c. For all InGaN (Blue and Green) - 280°C
3. The soldering iron should never touch the epoxy lens and should not exceed 3 seconds when soldering.
4. Do not apply stress or pressure to the leads when the component is heated above 85°C; possible damage to the internal wire bonds may occur.
5. Soldering SMD products: Please refer to the appropriate product datasheet for details on specified soldering pad patterns. To insure proper bonding and setting of the SMD LED, solder paste must be evenly applied to each



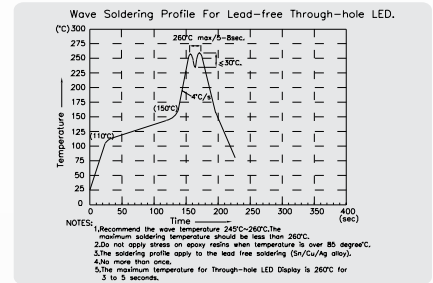
- soldering pad.
6. After soldering, allow at least three minutes for the component to cool to room temperature before further process.

Recommended Wave Soldering Profiles For Thru-Hole Products

1. Wave Soldering Profile (Pb-Sn Solder)



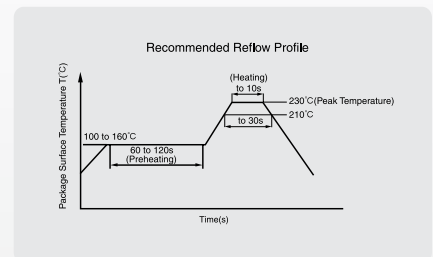
2. Wave Soldering Profile (Pb-Free components)



Recommended Reflow Soldering Profiles For SMD Products

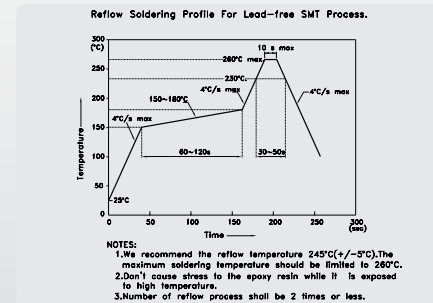
1. Reflow Soldering Profile (Pb-Sn Solder)

No more than two soldering passes with the recommended profile.



2. Reflow Soldering (Pb-Free components)

No more than two soldering passes with the recommended profile.



Static Electricity and Voltage Spikes in InGaN/GaN Products

InGaN/GaN Products are sensitive to electrostatic discharge (ESD) and other transient voltage spikes. ESD and voltage spikes can affect the component's reliability, increase reverse current, and decrease forward voltage. This may result in reduced in reduced light intensity or cause component failure.

InGaN/GaN Design Safety Measures

SunLED InGaN/GaN products are stored in anti-static packaging for protection during transportation and storage. Please note the anti-static measures below when handling SunLED InGaN/GaN products:

1. Products using InGaN/GaN components must incorporate protection circuitry to prevent ESD and to control voltage spikes to exceed the recommended max voltage.
2. Static discharge may occur when static-sensitive products come in contact with the user or other conductive devices.

ESD Protection During Production

Static discharge can result when static-sensitive products come in contact with the operator or other conductors. The following procedures may decrease the possibility of ESD damage:

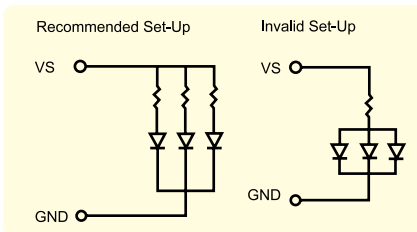
- A. Operators must wear anti-static wristbands.
- B. Wear anti-static suits when entering work areas with conductive machinery.
- C. All test instruments and production machinery must be grounded.
- D. Minimize friction between the product and surroundings to avoid static build up.
- E. When in production a humidity level of 50% or higher should be maintained.
- F. All ESD protection areas and anti-static equipment should be periodically checked and inspected to insure proper functionality.
- G. All workstations that handle ESD-sensitive components must maintain an electrostatic condition of 150V or less.

Design Notes

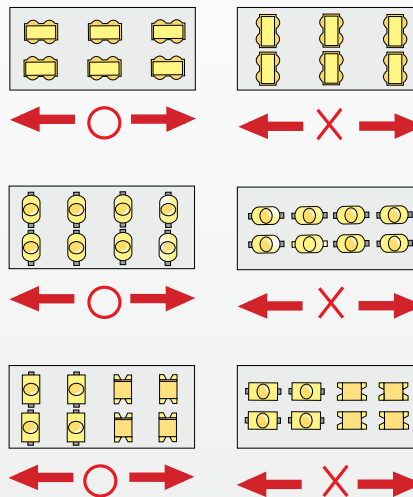
1. Protective current-limiting resistors are used in conjunction with LEDs to

maintain within the specified range.

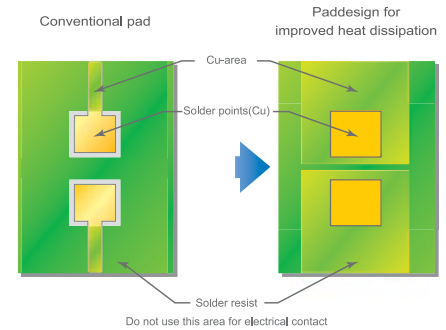
2. When LEDs are mounted in parallel, there should be an individual current-limiting resistor set in series with each LED. Please see below for the recommended set up.



3. The driving circuit should be designed to avoid reverse voltages and transient voltage spikes when the circuit is powered up or shut down.
4. Mounting direction of SMD components should be placed perpendicular to the direction of PCB travel. This will insure the solder on each lead to melt simultaneously during reflow.



5. High-power LED devices require the design engineer to optimize heat dissipation. Increasing size of metal backing(pad) will help improve heat dissipation. Refer to product datasheet for specific design recommendations.



6. High temperatures may reduce component's performance and reliability. For best performance, keep LED components away from any heat sources.

Restrictions on Product Use

1. LED devices may contain gallium arsenide (GaAs) material. GaAs dust and fumes are toxic; harmful if ingested. Do not immerse or expose LEDs in chemical solvents. Do not break or cut LED devices.
2. The light output from UV, blue, and other high-power LEDs may cause injury to the human eye when viewed directly.
3. Semiconductor devices can fail or malfunction due to their sensitivity to electrical fluctuation and physical stress. In design development, please make certain that the SunLED products are used within the specified operating conditions as indicated on our most recent product datasheets. The user is responsible to observe and follow all safety measures to avoid situations when the failure or malfunction of a SunLED product could cause injury, property damage, or the loss of a human life.
4. The information in this document is subject to change without notice.