

Handling PLCC-type Products

This document provides an overview of the handling of Stanley LED products, primarily PLCC package products (-4B and -7L types).

Precautions During Mounting

(1) Product storage

The table below shows the recommended conditions for product storage. Very dusty locations or locations exposed to corrosive gas emissions should be avoided.

Temperature	+5°C to 30°C
Humidity	70% or less

Table 1 Recommended product storage conditions

To keep moisture absorption to a minimum during shipping, Stanley products are baked prior to shipment and packed in moisture-proof containers. Even so, products should be stored under the conditions given above or in a dry box. The moisture-proof packets used in the packaging are made using antistatic materials, but this does not necessarily apply to the boxes used for shipping.

(2) Product exposure time after unpacking

The moisture-proof packets should not be opened until immediately before the product is to be used, and all soldering should be completed within the time stipulated for each product following unpacking. If components are soldered twice, the stipulated time applies up to completion of the second soldering. Any products left unused after unpacking should be returned to the moisture-proof packets. The packets should then be resealed using the slide fastener and stored under the conditions in the table above.

In the event of either of the following, the affected product should be baked for between 48 and 72 hours at 60°C ±5°C:

- The moisture-absorption indicator is discolored or faded.
- The product has been left out of its moisture-proof packet for longer than the stipulated time.

While products can be baked while still on the tape (reel), sections of reel may overlap and exert stress during baking, leading to deformation of the reel or tape. This can then interfere with subsequent

mounting processes. Baking can be repeated up to twice and products should always be removed from the moisture-proof packet beforehand.

(3) Product handling during installation in the chip mounter

The figure below shows the correct areas where suction should be applied by the pick-up nozzle.

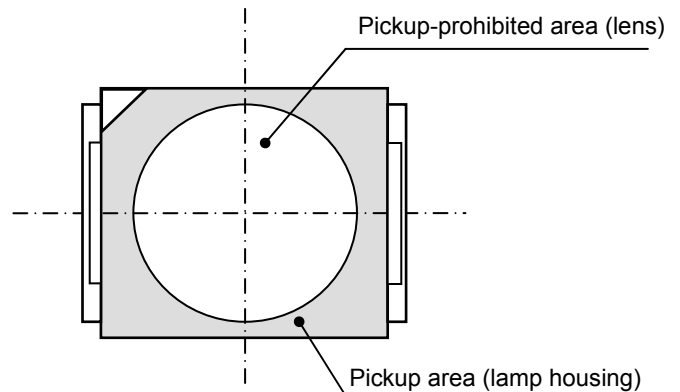


Fig. 1 Pick-up position for LS/BS-type devices

A low-hardness silicon resin is used in the lenses of LS and BS products. For this reason, the suction nozzle should only be applied to the lamp housing.

(4) Soldering

The amount of thermal stress that is applied during soldering has a considerable impact on the product, but the extent of that impact varies according to the heating method used. Where parts with different shapes are being mounted together, it is recommended that the components with the greatest susceptibility to heat stress (chip LEDs, etc..) be used as the standard.

Immediately following soldering and before the components cool down to room temperature, the constituent materials included in the resin do not revert stably, so any application of mechanical stress may damage the product. After soldering, avoid stacking PCBs or storing them in ways that may result in warping, and avoid friction or contact with rigid objects. The temperature distribution during reflow soldering frequently varies depending on factors such as the heating method, the PCB materials, the other mounted components and the packaging density. For this reason, the recommended temperature profile shows the upper limits for the temperature on the surface of

the resin in the product. To achieve higher levels of reliability, the heating temperature should be lower than these limits and the duration of heating should be shorter.

The heating process used in reflow soldering is assured for up to 2 times, but when the second reflow is carried out, a short interval should be set between the first and second reflows so that the workpiece heated during the first reflow is allowed to cool naturally to room temperature before the second reflow begins.

For manual soldering, a soldering iron with a temperature adjustment function is recommended. During actual soldering work, take care not to touch the product directly with the soldering iron. Work so that the heat applied to pads on the PCB does not result in excessively high temperatures in the product electrodes. During repair work, solder each terminal only once and do not re-use removed products. Also, take care not to touch the product immediately after soldering before the solder is fully hardened, as this can impair the quality of the soldered joints and of the product itself.

As a temporary adhesives, use resins that harden either through heating or through a combination of ultraviolet light and heat. Resins should have a hardening temperature of 150°C or less and a hardening time of 120 seconds or less.

For cleaning, isopropyl alcohol is recommended. Applying chemical products that include CFC-substitute cleaning agents to the surface of the lens or casing can cause discoloration, clouding or cracking. Check the ingredients carefully beforehand (see Table 2).

Chemical substance	OK/NG
	○/×
Ethyl alcohol	○
Isopropyl alcohol	○
Purified water	○
Trichlorethylene	×
Chlorocene	×
Acetone	×
Thinners	×

Table 2 Suitable/Unsuitable Cleaning Agents

ESD

LED products that use InGaN elements have the characteristic of being highly sensitive to surge voltages generated by events such as electrostatic discharges or the power being turned on or off. Exposure to such surges can damage the element and lead to impaired reliability. Products with damaged elements will show problems such as extremely large reverse current (leak current) and declines in forward voltage rise characteristics in low-current areas leading to abnormal light emission.

Stanley LED products that use InGaN elements are designed to meet the 1,000 V JEITA standard (EIAJ ED-4701/300 (304/HBM)) test, and antistatic materials are also used in the packaged forms. Even so, the precautions and measures outlined below must be taken to ensure product quality is maintained during shipment.

Antistatic and discharge prevention measures during work

A number of causes can lead to a product becoming charged. These include being touched by a person carrying an electrostatic charge, induction charging from nearby charged objects, and friction. If this occurs, the discharge that is released when the product touches a metal object can damage the LED element. To avoid this, observe the following countermeasures and precautions:

1. Avoid close contact with easily charged insulators. (If the product is charged, avoid contact with conductors (metal, etc.) also.)
2. Avoid processes that subject the product to friction.
3. Always ensure that objects that provide a ground connection (manufacturing equipment, measuring instruments, etc.) are themselves grounded, and use surge-protection measures.
4. Create an antistatic environment by installing static elimination equipment such as conductive mats (1 MΩ or less) and aeroionized flooring.
5. Have workers wear wrist straps to ground their bodies. Workers should also wear conductive work clothes and footwear.
6. For processes that involve direct contact with the product, use ceramic tweezers.

RoHS/ELV Directives

Stanley PLCC package products comply with the RoHS and ELV directives. The table below shows the regulated substances under the directives and the standard values for each of those substances.

Substances	Standard value
Lead and its compounds	1,000 ppm or less
Cadmium and its compounds	100 ppm or less
Mercury and its compounds	1,000 ppm or less
Hexavalent chromium compounds	1,000 ppm or less
Polybrominated biphenyls	1,000 ppm or less
Polybrominated diphenyl ethers	1,000 ppm or less

Table 3 Standard values for RoHS/ELV regulated substances

Other

1. Stanley LED products utilize the characteristics of optical semiconductors and are designed to ensure higher levels of reliability. However, some variations arise depending on the conditions in which the products are actually used.
2. Subjecting LED products to excessive amounts of stress (in terms of temperature, current or voltage, etc.) runs the risk of damaging the products and limits apply to the absolute maximum ratings. These ratings are upper limits that must not be exceeded even momentarily. Ensure that none of the limits are reached.
3. To achieve the highest possible reliability when using LED products, consideration must be given to derating the power consumption and setting the forward current to suit the actual operating temperature. Margins must also be considered that allow for variations arising from the device characteristics.
4. To ensure that the LED operates stably and that the product is not damaged by excessive current, a series protection resistance should be included in the drive circuit.
5. Products with -LS or -BS in the model name use viscous encapsulating resins, so care should be

taken to prevent foreign objects from adhering to the resin.

6. Take care to avoid looking directly at LEDs when they are lit as this can be injurious to your eyes.
7. Stanley products are designed such that failures should not occur when they are used in the recommended operating conditions. Even so, safety features such as failsafe design should be planned so that if a product does fail, accidents such as fires or personal injuries and the consequent public liability are avoided.
8. Stanley visible-light LED products are designed and manufactured on the assumption that they will be used in display applications in everyday electronic equipment. If they are to be used as functional devices in applications such as optical sensing or in applications that require very high levels of product quality and reliability where any fault or malfunction may lead directly to loss of life or personal injury (aircraft instrumentation, aerospace equipment, transportation equipment, medical equipment, nuclear power control equipment, etc.), consult with your Stanley sales representative beforehand.