

- Manual soldering operations should only be for repairs and reworks unless otherwise noted on product specifications.
- Maximum soldering iron temperatures for manual soldering:
 - Pb-Sn solder: 300°C
 - Pb-Free solder: 350°C
 - All LEDs using InGaN material (e.g. Blue, Green, White): 280°C
- The soldering iron should never touch the epoxy lens. Contact duration with the component should not exceed 3 seconds.
- Do not apply stress or pressure to the leads when the component is heated above 80°C as possible damage to the internal wire bonds may occur.
- During soldering, component covers and holders should leave enough clearance to avoid any stress applied to the LED. Refer to below diagram (Fig. 2) for examples of proper method.

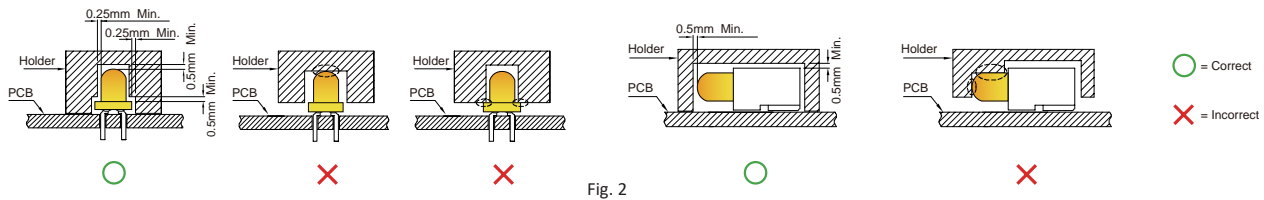
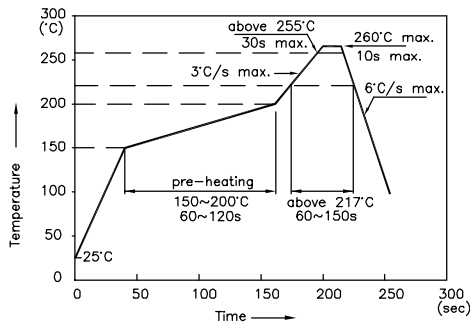


Fig. 2

- Refer to below diagrams for recommended soldering profiles.
 - SMD LEDs: Reflow Soldering – Pb-Free Solder (Fig. 3) | Pb-Sn Solder (Fig. 4)
 - No more than two soldering passes except SMD CBIs which should not exceed one pass
 - Through-hole LEDs: Wave Soldering – Pb-Free Solder (Fig. 5) | Pb-Sn Solder (Fig. 6)
 - No more than one soldering pass

Reflow Soldering Profile for SMD Products (Pb-Free Components)



Notes:

- All temperatures refer to the center of the package, measured on the package body surface facing up during reflow.
- Do not apply any stress to the LED during high temperature conditions.
- Maximum number of soldering passes: 2

Fig. 3

Reflow Soldering Profile (Pb-Sn Solder)

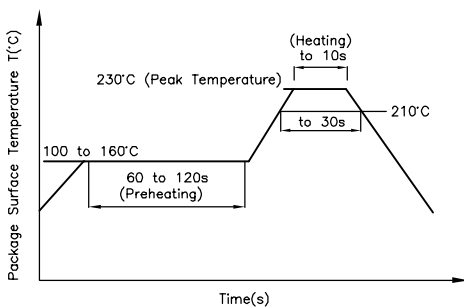
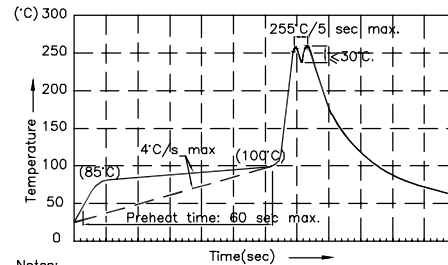


Fig. 4

Wave Soldering Profile (Pb-Free Solder)



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 280°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.
- During wave soldering, the PCB top-surface temperature should be kept below 105°C.

Fig. 5

Wave Soldering Profile (Pb-Sn Solder)

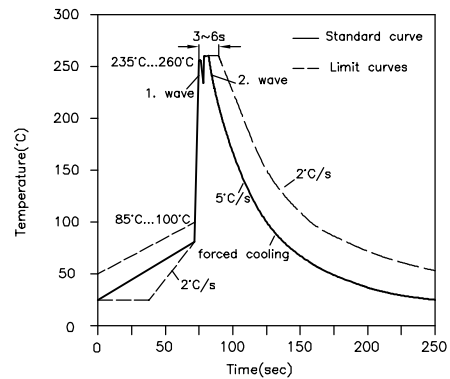


Fig. 6

7. Refer to the appropriate product datasheet for details on specific soldering pay layout. To ensure proper bonding and setting of the LED, solder paste must be evenly applied to each soldering pad. Refer to below diagram (Fig. 7) for example of improper solder application.

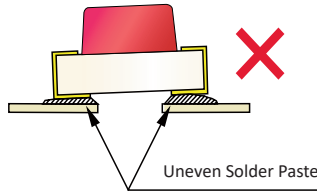


Fig. 7

8. After soldering, allow at least three minutes for the component to cool to room temperature before further processing.

9. Refer to below table for summary of soldering instructions for dip, wave, and manual solder. Note that these are considered general instructions and all soldering notes indicated above should take precedence.

Types	Dip soldering / *Wave Soldering			Iron soldering (with 1.5mm iron tip)		
	Temperature of the soldering bath	Maximum soldering time	Distance from solder joint to package	Temperature of soldering iron	Maximum soldering time	Distance from solder joint to package
LEDs	<=260°C	3s	>=2mm	<=350°C	3s	>2mm
	<=260°C	5s	>=5mm	<=350°C	5s	>5mm
SMDs	/	/	/	<=350°C	3s (one time only)	/
DISPLAYs	*<=260°C	*3s	*>2mm	<=350°C	3s	>2mm

APPLICATION NOTES

Cleaning

1. Do not use harsh organic solvents such as acetone, trichloroethylene, Chlorsan, and/or diflon solvent for cleaning as they may cause damage or hazing to the LED lens.
2. Do not use acidic solvents or unknown chemicals for cleaning as they may damage or degrade the LED. Always check the properties of the chemical to ensure it will not corrode or damage epoxy resin, silicone resin, silver plating, or organosilicates.
3. Recommended solvents for cleaning: deionized water or isopropyl alcohol.
4. Special attention should be taken if other chemicals are used for cleaning as they may damage the epoxy lens or housing.
5. Any cleaning should take place at room temperature and the wash duration should not exceed one minute.
6. Use forced-air drying immediately following water wash to remove excess moisture.

Lead Forming

1. Any lead forming or bending must be done prior to soldering.
2. Avoid bending leads at the same point more than once as it may compromise the integrity of the leads.
3. Minimum clearance of 3mm is required between the base of the LED lens and the bend location. Refer to below diagram (Fig. 8).