Handling and Soldering of SFT Window-less LED Chipsets

SFT-10
SFT-16
SFT-20

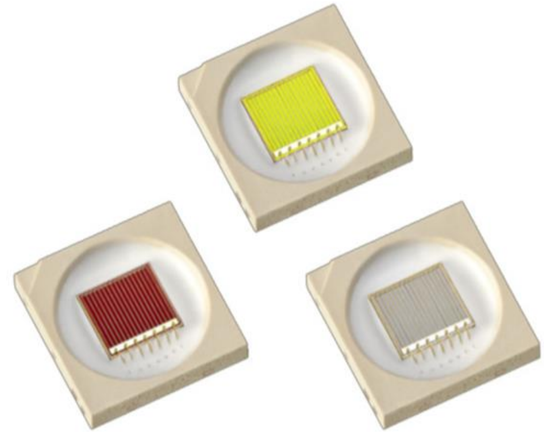

Table of Contents

1. Handling SFT Window-less LED Chipsets 2
   1.1 Manual Handling 2
   1.2 Handling with Pick and Place Tool 2
2. Cleaning Guidelines 4
3. Processing 4
   3.1 Applying Solder to Circuit Board 4
   3.2 Solder Temperature Profile 5
   3.3 Electrical Pinout/Solder Pad Layout 6
4. Moisture Sensitivity 7

Introduction

The high performance Luminus SFT window-less LED chipsets enable cost effective solutions for coloring or white lighting, including Pico projection, automotive, entertainment, fiber illumination, emergency lighting, and beacons.

This document provides information on all Luminus SFT window-less LED chipsets (SFT-10, SFT-16 and SFT-20). Luminus SFT window-less LED chipsets are surface mount devices which are ESD and moisture sensitive. This document describes specific requirements of handling, cleaning and processing Luminus SFT window-less LED chipsets.

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1. Handling SFT Window-less LED Chipsets

Luminus recommends the following at all times when handling SFT window-less LED chipsets. This device is ESD sensitive. Please handle it according to ESD Class 2.

1.1 Manual Handling

- If manual assembly or manual handling is necessary, handle the device only at the perimeter of the package lightly with tweezers. Do not handle the devices with bare hands.
- Do not touch the light emitting surface.
- Do not touch the white potting material surrounding the light emitting surface.
- Do not touch the wire bonds.
- Do not stack anything on top of the device.
- Care should be exercised when handling the devices. Avoid sudden forces such as those caused by dropping the device on a hard surface which may damage the device.

1.2 Handling with Pick and Place Tool

Luminus recommends the use of pick and place tools to remove SFT window-less LED chipsets from the factory tape & reel packaging.

- For pick and place of SFT products, a vacuum pick-up tool having a beveled edge or peripheral contact should be designed such that it does not make any contact with the light emitting surface, the potting material, nor the wire bonds.
- The following diagrams shows an example of pick and place tools to remove SFT window-less LED chipsets from the factory tape and reel packaging.

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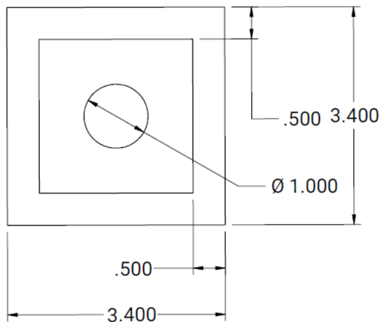
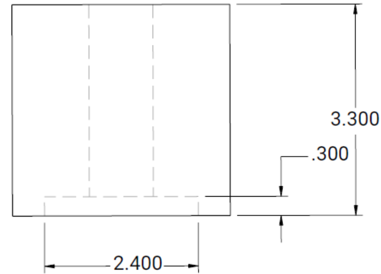
All dimensions in mm

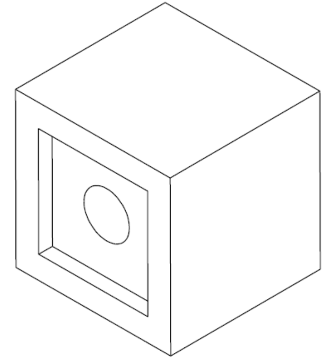
Tolerance: ±0.001



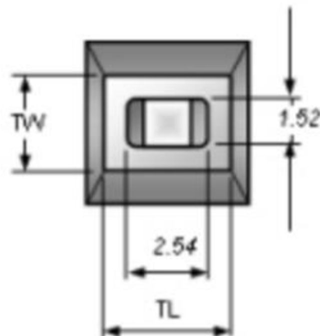
Top View

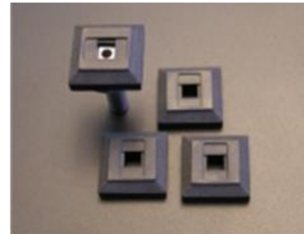


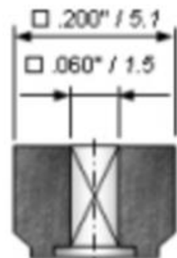
Side View

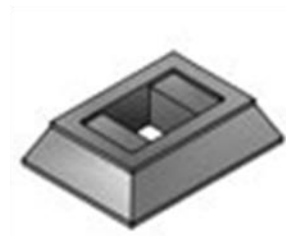


- Luminus recommends http://www.smallprecisiontools.com/ for pick and place tool acquisition. Two recommended pick and place tips are shown below.
  Part No.: HRTR-B-130×130









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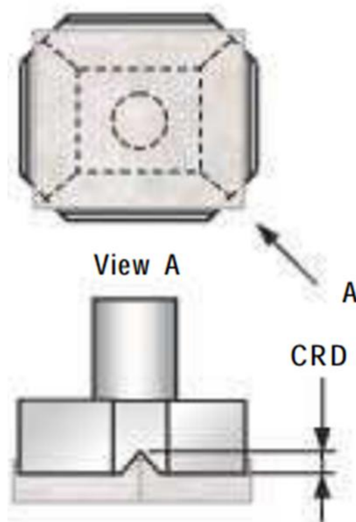
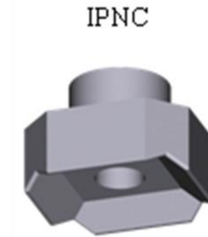
Part No.:IPNC120-.120-.120





2. Cleaning Guidelines

The white potting material surrounding the light emitting surface is slightly sticky and may attract dust, fibers, other particles or dirt.

If any dust, fiber, other particles or dirt need to be removed from the white potting material or from the light emitting surface, use only Clean Dry Air or Nitrogen to blow it off. Recommended pressure is 30 psi maximum.

Do not use any chemical or liquid. Do not attempt to clean the device by wiping.

3. Processing

3.1 Applying Solder to Circuit Board

Solder paste can be applied to the PCB solder landing pads by a screen or stencil at a thickness of 0.15 mm (0.006”) to 0.25 mm (0.010”). For solder paste printing, Luminus recommends that the equipment be located in a controlled environment maintained at a temperature of 23 +/- 5 ºC and a relative humidity less than 60%.

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3.2 Solder Temperature Profile

Convection reflow, not wave soldering, is the preferred technique of soldering surface mount products, as the latter may deteriorate the integrity of the package. The reflow process consists of applying solder paste to a circuit board, placing devices onto the paste using standard pick and place techniques or manually, and then conveying the board through a convection oven with successive heating zones of varying temperatures. In the convection oven, each board goes through:

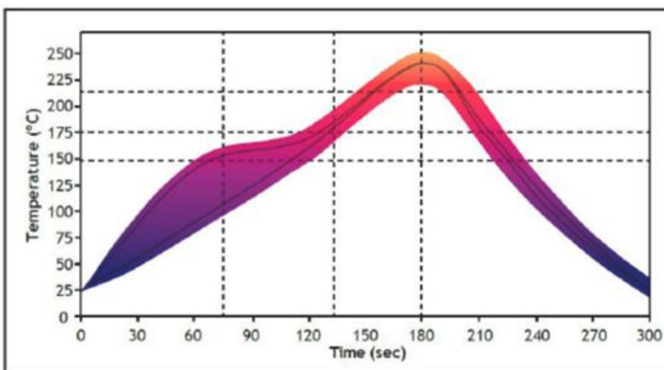
1. Gradual preheating
2. Brief duration at liquidous alloy temperature
3. Controlled cooling

Luminus recommends solder profiles as shown in the following figures and tables. The optimum profile for any given build may differ due to solder type, oven type, circuit board or assembly layout. All temperatures are monitored at the component dielectric layer.

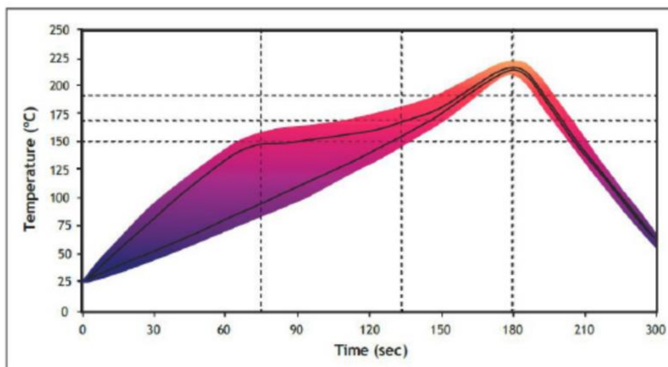
Recommended lead free, no-clean solders include: AIM NC254- SAC305, FD7024582-SAC305, SHENMAO Formosa PF606-P-SAC305.

Recommended leaded, no-clean solders include: EFD7019530- SN63, SHENMAO Formosa SH-6309RMA-SN63.

Reliability and solder tests have demonstrated that 250º C is both a satisfactory and safe maximum body temperature for surface mount products during reflow.



SAC305 Solder Profile Graph



Sn63& Sn62 Solder Profile Graph

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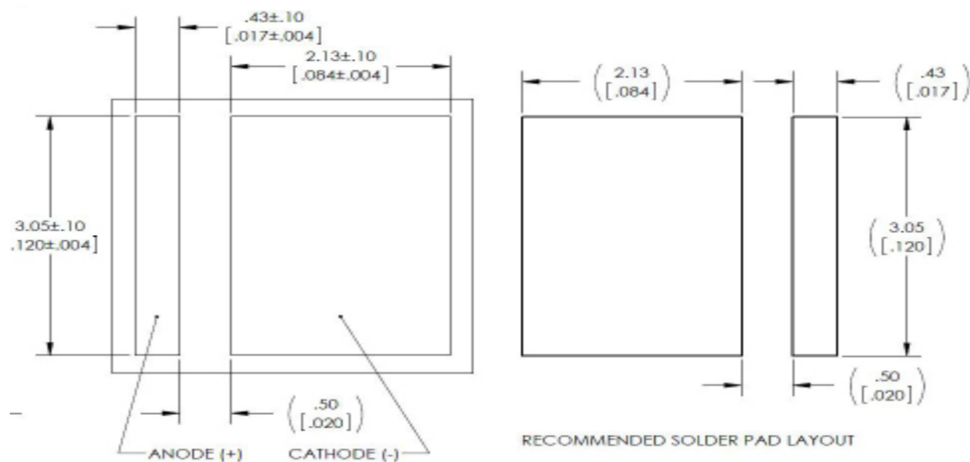
SAC 305 and Sn63 & Sn62 Solder Profile			
Feature	**SAC 305**	**Sn63 & Sn62**	**Unit**
Ramp Up Rate Ambient to Preheat (min)	1.15	1	Degrees Celsius Per Second (ºC/s)
Preheat Temperature	175	150	Degrees Celsius (ºC)
Profile Length (Preheat to Peak)	165-210	165-210	Seconds (s)
Ramp Up Rate Preheat to Peak (min)	1.5	0.84	Degrees Celsius Per Second (ºC/s)
Liquid Temperature	217	183	Degrees Celsius (ºC)
Peak Temperature	235	225	Degrees Celsius (ºC)
Time Above Liquid Temperature	30-60	30-60	Seconds (s)
Time Within 5C of Peak	20	10	Seconds (s)
Cool down Rate	<4	<4	Degrees Celsius Per Second (ºC/s)
Cool Down Duration	30-60	30-60	Seconds (s)
25 C to peak Temperature	180	180	Seconds (s)

3.3 Electrical Pinout/Solder Pad Layout

This is the layout of SFT-Series LEDs. Please refer to datasheet for layout of specific products.



Note: Layout is common to all colors.

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4. Moisture Sensitivity

Luminus ships SFT window-less LED chipsets in a ‘dry pack’ consisting of a Humidity Indicator Card (HIC) and desiccant material sealed with the SFT-xx inside a Moisture Barrier Bag (MBB). Once the parts are removed from the MBB, they have a specific floor life, defined by IPC/JEDEC J-STD-033B.1 as ‘the allowable time period after removal from a moisture barrier bag, dry storage or dry bake and before the solder reflow process’. All high temperature processes including solder reflow and rework must be completed within the specified floor life. Contact Luminus for the floor life and the moisture sensitivity level (MSL) classification of different SMDs. To keep the plated surfaces solderable, it is recommended that new packages, partial trays and reels be stored in a nitrogen cabinet or in resealed dry bags containing a desiccant until they are required. Luminus surface mount devices can be stored in an unopened moisture barrier bag (MBB) for 12 months. If the actual shelf life has exceeded 12 months and the humidity indicator card (HIC) indicates that baking is not required, it is safe to reflow the SMDs per their original MSL rating. Otherwise, a re-bake is required- refer to IPC/JEDEC J-STD-033B.1 for further details.

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