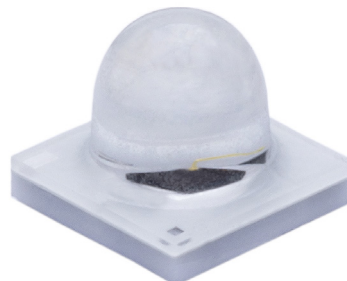


# **SST-05-IR-850 nm**

## **Surface Mount Series**

### **Infrared LED**



#### **Table of Contents**

Technology Overview . . . . .	2
Product Binning. . . . .	3
Ordering Information . . . . .	3
Optical and Electrical Characteristics . . . . .	4
Mechanical Dimensions . . . . .	7
Tape and Reel . . . . .	8
Reel Information . . . . .	9
Shipping information . . . . .	10
Soldering Profile . . . . .	11
Precautions . . . . .	12
Revision History. . . . .	13

#### **Features**

- High Power Infrared LED with typical 850 nm wavelength
- 20 and 35 degree half-angle dome for high-irradiance and simpler optical design for directional applications
- Operation at up to 1A CW and 2A pulse
- 850 nm typical centroid wavelength
- Built-in ESD protection
- Low Thermal Resistance
- Suitable for all SMT Assembly Methods
- RoHS and REACH compliant

#### **Applications**

- Surveillance Systems / CCTV
- Iris and Face Recognition
- License Plate Scanning
- Automotive Sensing
- Machine Vision
- Night Vision
- Replacement of legacy 5 mm IR LEDs for improved designs

## Technology Overview

Luminus SST-05-IR-850nm LEDs benefit from innovations in device technology, chip packaging and thermal management. This suite of technologies give engineers and system designers the freedom to develop solutions both high in power and efficiency.

### Reliability

Luminus SST-05-IR-850nm LEDs have passed a rigorous suite of environmental and mechanical stress tests, including mechanical shock, vibration, temperature cycling and humidity. They are fully qualified for use in a wide range of high performance and high efficacy applications.

### REACH & RoHS Compliance

The Luminus SST-05-IR-850nm LED is compliant to the Restriction of Hazardous Substances Directive or RoHS. The restricted materials including lead, mercury cadmium hexavalent chromium, polybrominated biphenyls (PBB) and polybrominated diphenyl ether (PBDE) are not used.

## Understanding Luminus SST-05-IR-850nm LED Test Specifications

Every Luminus LED is fully tested to ensure it meets the high quality standards customers have come to expect from Luminus products.

### Testing Temperature

Luminus SST-05-IR-850nm LEDs are tested and binned at 25°C junction temperature. Temperature curves are provided to allow users to scale the data for actual operating temperature conditions.

## Product Ordering and Shipping Part Number Nomenclature

All SST-05-IR-850nm products are packaged and labeled with part numbers as outlined in below. When shipped, each reel will contain only a single flux wavelength and Vf bin. The part number designation is as follows:

Products	Ordering Part Number	Description
SST-05-IR-Bxx	SST-05-IR-Bxx-F###	SST-05 surface mount infrared LED

**SST** — **05** — **IR** — **Bxx** — **F###**

Product Family	Chip Area	Color	Package Configuration	Bin Kit <sup>1,2</sup>
SST - Ceramic Surface Mount package w/ encapsulation	05: 0.5 mm <sup>2</sup>	IR = Infrared	B40 - 40 deg Beam Angle B70 - 70 deg Beam Angle  Ceramic 3.45 mm x 3.45 mm See Pages 6-7 for Detailed Drawings	See below for flux and wavelength binning information

Peak Wavelength	Minimum Flux Bin (mW)	Lens Angle	Ordering Part Number
850	235	40	SST-05-IR-B40-J850
	235	70	SST-05-IR-B70-J850

### Flux Bins<sup>1</sup>

Bin Code	Radiometric Power at 350mA, t <sub>p</sub> =20ms		Correlated radiant intensity at 1.0A, t <sub>p</sub> =20ms - B40	
	Minimum Flux (mW)	Maximum Flux (mW)	Min. Radiant Intensity (mW/sr)	Max. Radiant Intensity (mW/sr)
J	235	265	697	786
K	265	295	786	875
L	295	325	875	964
M	325	355	964	1053

### Wavelength Bins<sup>1</sup>

Bin Code	Minimum Peak Wavelength (nm)	Maximum Peak Wavelength (nm)
850	840	870

## Optical and Electrical Characteristics

### Optical and Electrical Characteristics<sup>1</sup>

Parameter	Symbol	Package Type		Unit
		B40	B70	
Forward Current	$I_f$	350		mA
Output Power Typical	PO	295		mW
Output Power at 1.0A, $t_r=20\text{ms}$ (typ.)	$PO_{1.0A}$	800		mW
Radiant Intensity at 1.0A, $t_r=20\text{ms}$ (typ.)	$f_e$	875	500	mW/sr
Minimum Forward Voltage <sup>1</sup>	$V_{fmin}$	1.2		V
Forward Voltage Typical	$V_f$	1.6		V
Maximum Forward Voltage <sup>1</sup>	$V_{fmax}$	2.0		V
Viewing Angle	$2\theta_{1/2}$	40	70	deg
Peak Wavelength Typical	$\lambda_p$	850		nm
Centroid Wavelength Typical	$\lambda_c$	860		nm
FWHM Typical	$\Delta\lambda_{1/2}$	30		nm
Temperature Coefficient of Forward voltage	$TC_{V_f}$	-1.5		mV/°C
Temperature Coefficient of Radiometric Power	$TC_{PO}$	-0.3		%/°C
Temperature Coefficient of Wavelength	$TC_\lambda$	0.3		nm/°C
Thermal Resistance (Electrical)	$R_{TH}$	9.2		°C/W

Note 1: Binning based on operation at a current of 350mA, 20ms single pulse and a constant junction temperature of  $T_j = 25^\circ\text{C}$ . Parts are binned and shipped in 0.2V Vf increments.

## Optical and Electrical Characteristics

### Absolute Maximum Ratings<sup>2</sup>

Parameter	Symbol	Rating	Unit
Forward Current <sup>3,4</sup>	I	1.0	A
Power Dissipation	P <sub>D</sub>	2.5	W
Reverse Voltage	V <sub>R</sub>	5	V
Storage Temperature	T <sub>STG</sub>	-40~100	°C
Junction Temperature <sup>3,4</sup>	T <sub>J</sub>	115 °C	°C
Soldering Temperature	T <sub>SLD</sub>	JEDEC 020 , 260 °C	
ESD Sensitivity (HBM)	V <sub>B</sub>	6000	V

Note 2: To prevent damage refer to operating conditions and derating curves for appropriate maximum operating conditions

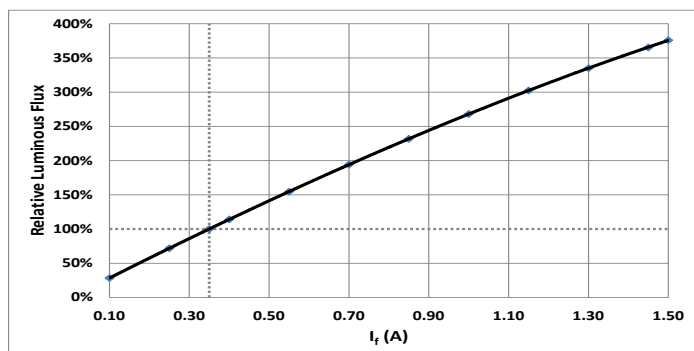
Note 3: Luminus SST-05-IR-850nm LEDs are designed for operation up to an absolute maximum forward drive current as specified above. Product lifetime data is specified at typical forward drive currents. Sustained operation at absolute maximum currents will result in a reduction of device lifetime compared to typical forward drive currents. Actual device lifetimes will also depend on junction temperature.

Note 4: Maximum operating case temperature combined with maximum drive current defines the total maximum operating condition for the device. To prevent damage, please operate devices within specified conditions.

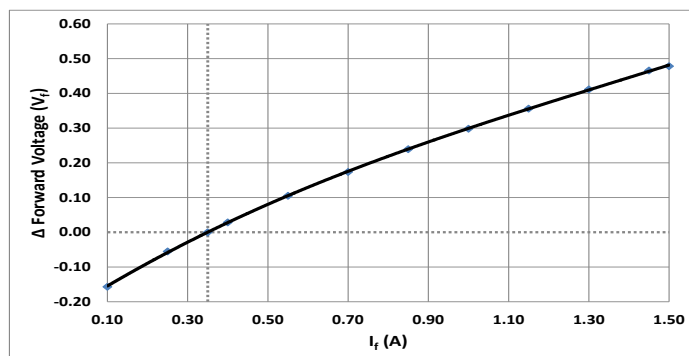
Note 5: Caution must be taken not to stare at the light emitted from these LEDs. Under special circumstances, the high intensity could damage the eye.

## Optical and Electrical Characteristics

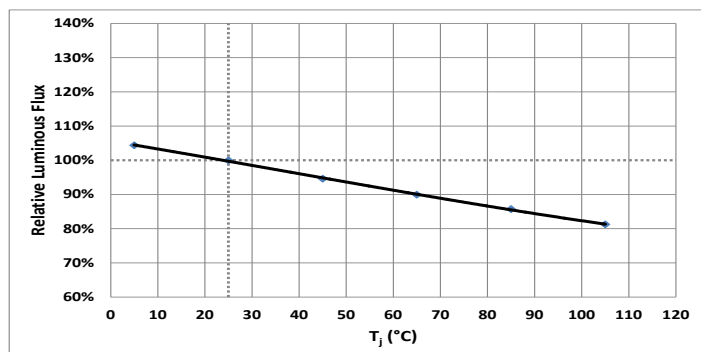
**Relative Output Flux vs. Forward Current**



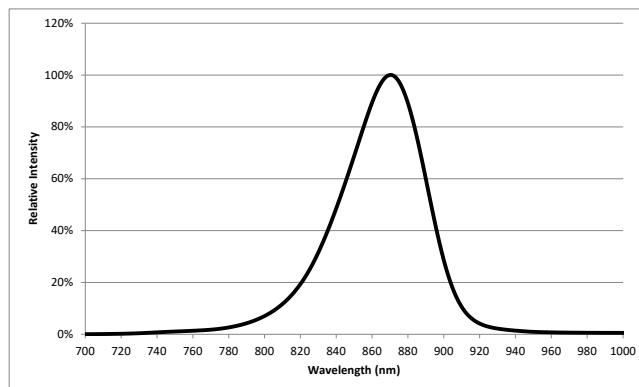
**Relative Voltage vs Forward Current**



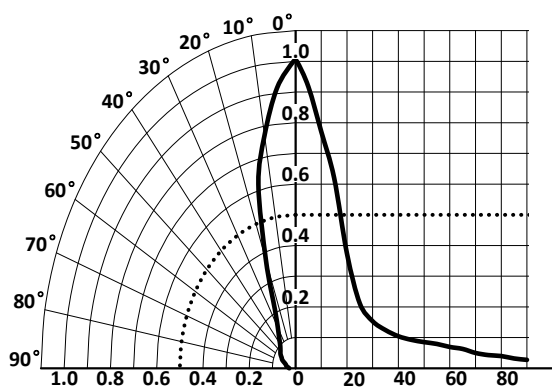
**Relative Output Flux vs. Temperature**



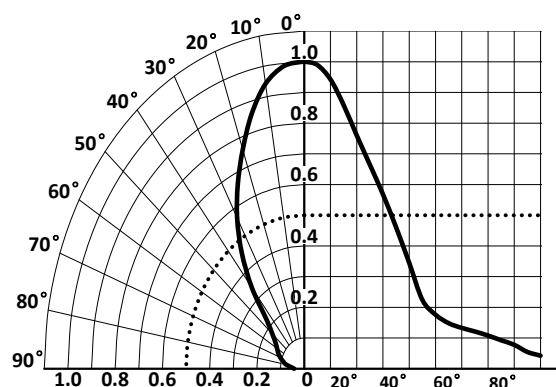
**Typical Spectra**



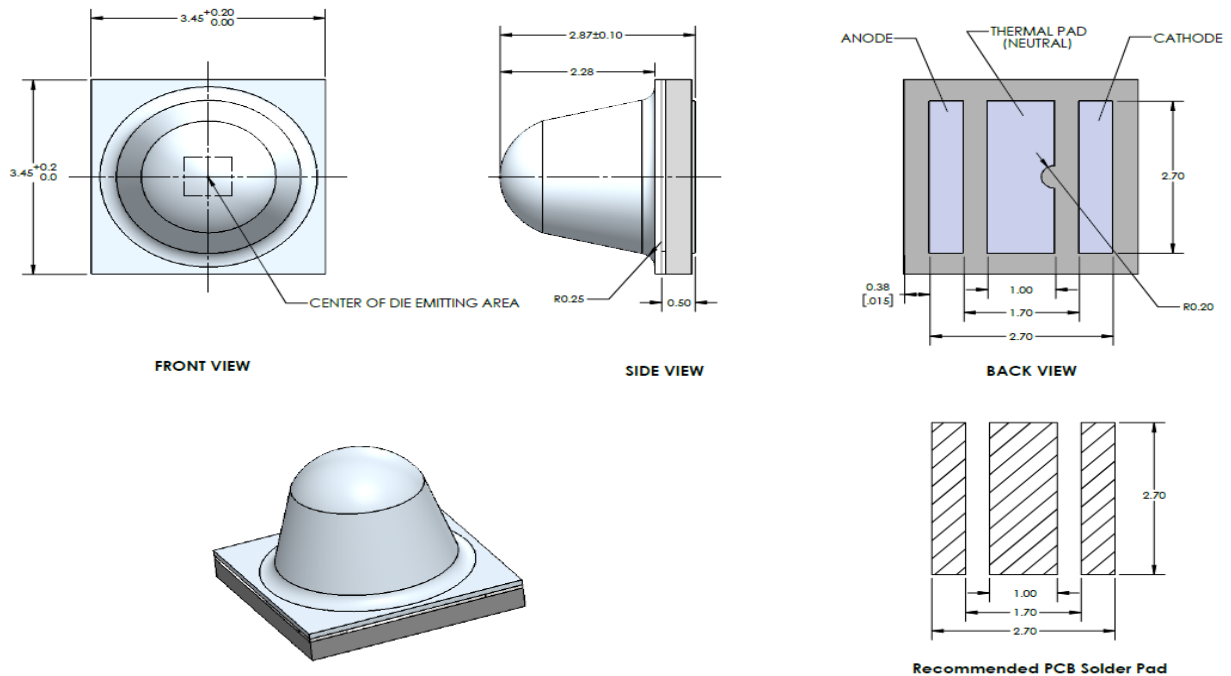
**Typical Polar Radiation Plot - B40**



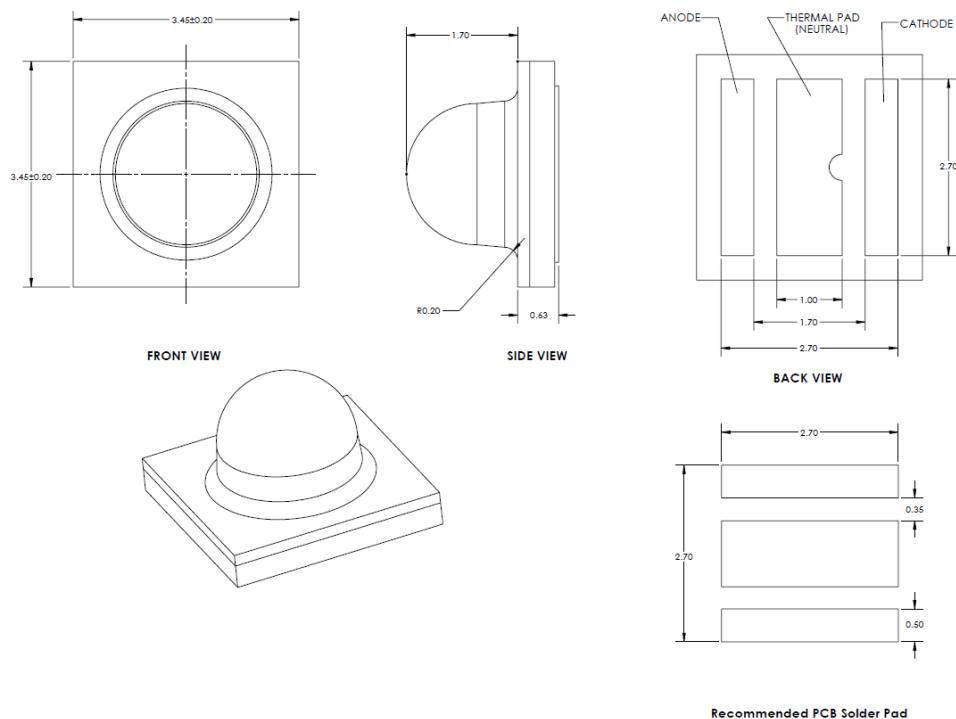
**Typical Polar Radiation Plot - B70**



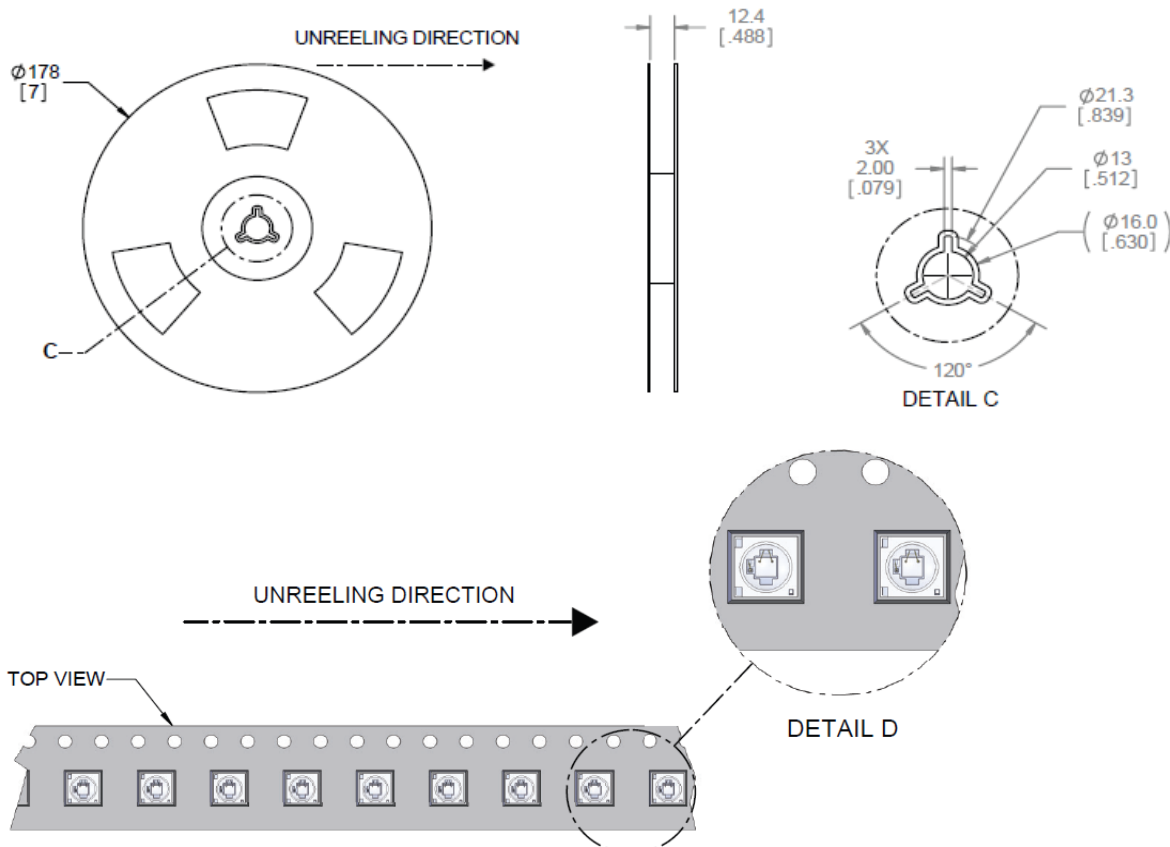
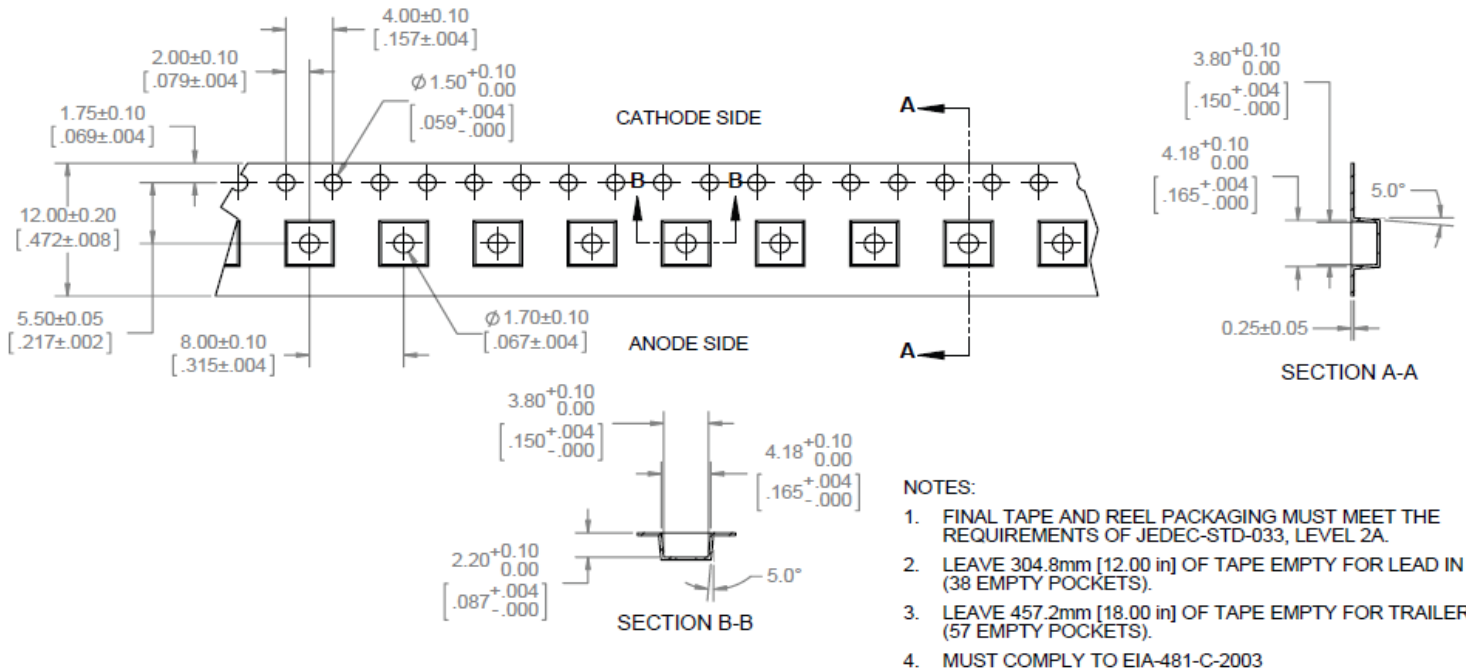
## Mechanical Dimensions - B40 Package



## Mechanical Dimensions - B70 Package

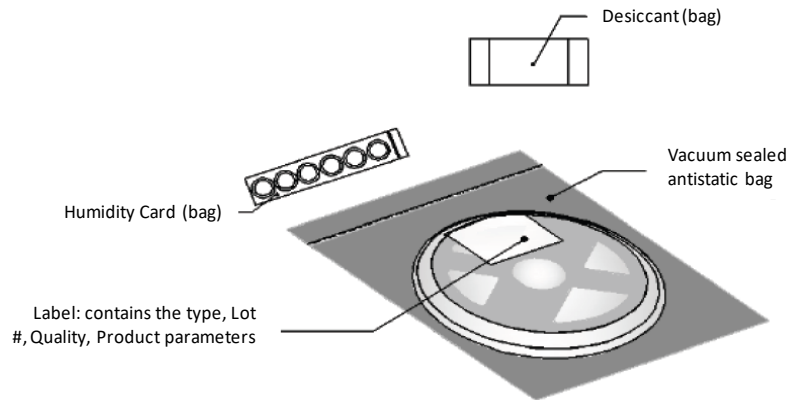


### Tape and Reel

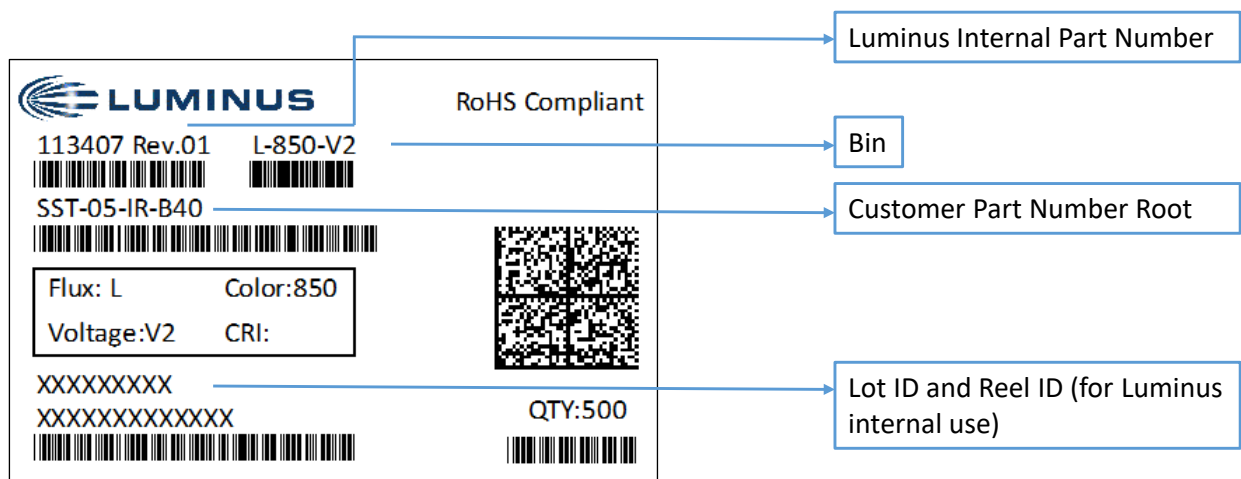




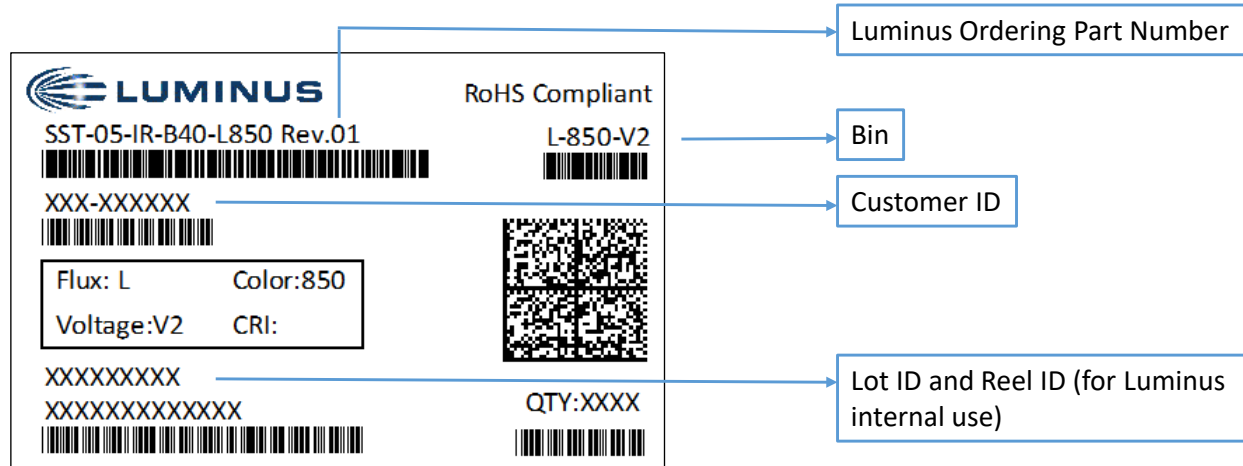
### Reel Packaging (500 parts per reel)



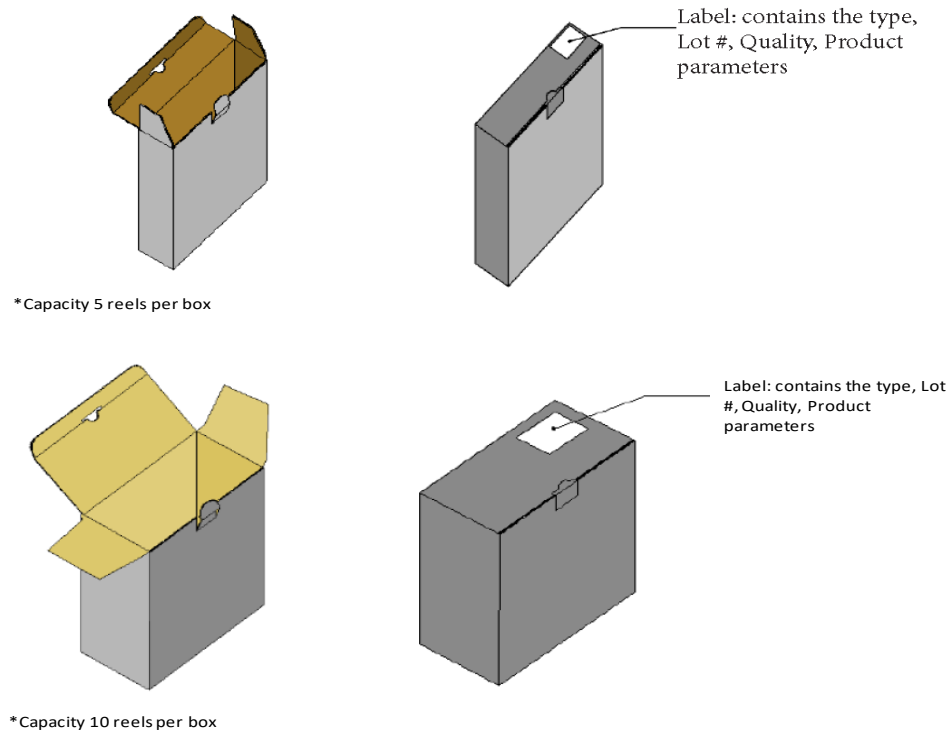
### Reel Label



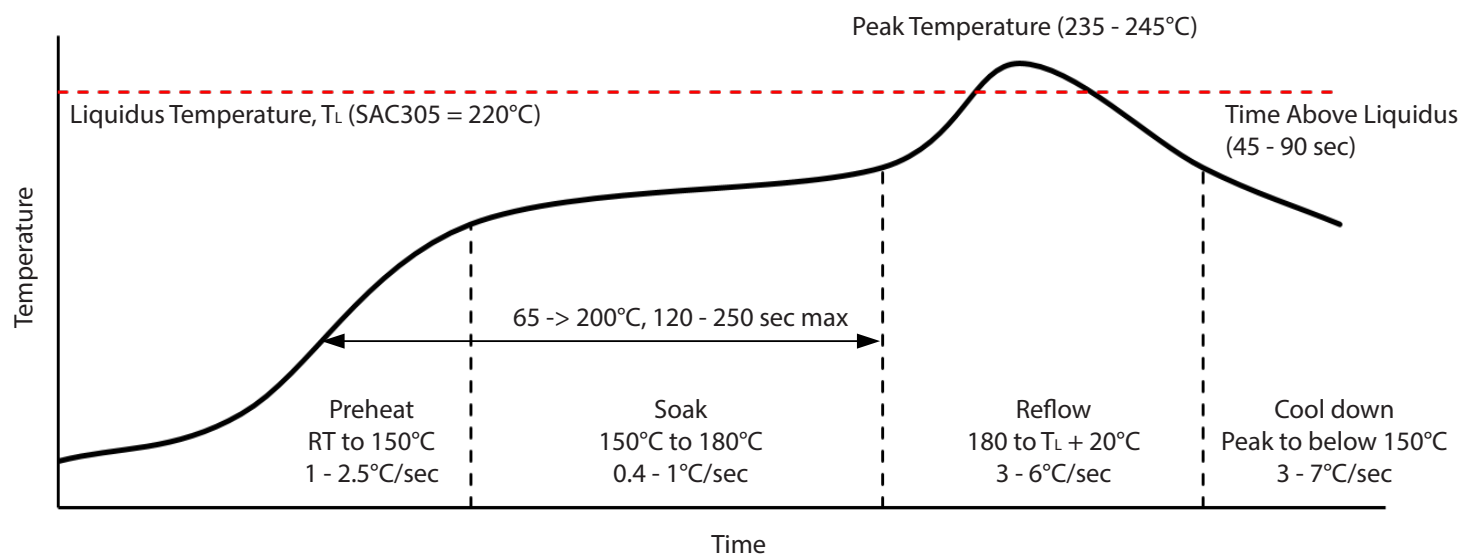
### Shipping Label



### Box Packaging Information



## Soldering Profile



SMT Rework Guideline	Manual Hotplate Reflow	Hot Air Gun Reflow
Heating Time	< 60 sec	
Hotplate Temperature	< 245°C	< 150°C

### Note:

- Product complies to Moisture Sensitivity Level 1 (MSL 1).
- The numbers in the table are specific to SAC305. Luminus recommends using an SAC305 solder paste with a no-clean flux for RoHS compliant products.
- During the pick and place process, axial forces on the dome (or window) should not exceed 0.5 Newtons (N).
- Use of a multi-zone IR reflow oven with a nitrogen blanket is recommended.
- Time-temperature profile of the reflow process showing the four functional profile zones are defined in IPC-7801. Temperature is referenced to the center of the PCB.
- Luminus recommends to use the solder paste data sheet information as a starting point in time-temperature process development.
- These are general guidelines. Consult the solder paste manufacturer's datasheet for guidelines specific to the alloy and flux combination used in your application. For more information, please refer to: <https://luminusdevices.zendesk.com/hc/en-us/articles/360060306692-How-do-I-Reflow-Solder-Luminus-SMD-Components->
- For any technical questions about soldering process, please contact Luminus at techsupport@luminus.com.

## Precautions

### Static Electricity:

This product is sensitive to static electricity, and care should be taken when handling them. Static electricity or surge voltage will damage the LEDs. It is recommended to wear an anti-electrostatic wristband or anti-electrostatic gloves when handling the LEDs. All devices, equipment and machinery must be properly grounded. It is recommended that measures be taken to isolate LED processing equipment from potential sources of voltage surges.

Reference: APN-002815 Electrical Stress Damage to LEDs and How to Prevent It

### Corrosion Robustness:

The LEDs passed the test: AEC-Q102 Rev A – Test Group C #12 - Corrosion Class A, without any significant change in electrical and optical characteristics.

Test condition: 25°C / 90 % RH / 15 ppm H<sub>2</sub>S / 14 days (stricter than IEC 60068-2-43)

Optical and Electrical Pass/Fail criteria as defined in AEC-Q102 Rev A – “Appendix 5: Parametric Test Requirements and Failure Criteria”

Corrosion test: Class 3B (discoloration possible)

## History of Changes

Rev	Date	Description of Change
01	10/15/2018	Initial Release
02	01/01/2019	Added B70 package type
03	03/26/2024	Added B70 package drawing

The products, their specifications and other information appearing in this document are subject to change by Luminus Devices without notice. Luminus Devices assumes no liability for errors that may appear in this document, and no liability otherwise arising from the application or use of the product or information contained herein. None of the information provided herein should be considered to be a representation of the fitness or suitability of the product for any particular application or as any other form of warranty. Luminus Devices' product warranties are limited to only such warranties as accompany a purchase contract or purchase order for such products. Nothing herein is to be construed as constituting an additional warranty. No information contained in this publication may be considered as a waiver by Luminus Devices of any intellectual property rights that Luminus Devices may have in such information. Big Chip LEDs™ is a registered trademark of Luminus Devices, Inc., all rights reserved.

This product is protected by U.S. Patents 6,831,302; 7,074,631; 7,083,993; 7,084,434; 7,098,589; 7,105,861; 7,138,666; 7,166,870; 7,166,871; 7,170,100; 7,196,354; 7,211,831; 7,262,550; 7,274,043; 7,301,271; 7,341,880; 7,344,903; 7,345,416; 7,348,603; 7,388,233; 7,391,059 Patents Pending in the U.S. and other countries.