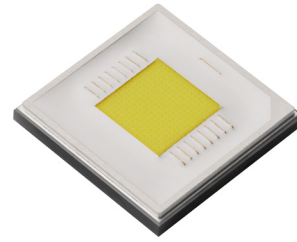


# SFT-90X-WS65-M

## High Power White LEDs



### Features

SFT white series is a powerful light source for beam pattern critical lighting applications. The flat window of an SFT white LED results in a much smaller light emitting surface than a dome-shaped cover, enabling smaller optics and higher optical efficiency in directional lighting systems.

- Ultra-high flux from a single large chip, with a maximum output of 5500 lm @ 20 A, 85°C.
- Vertical chip with high lumen density and small emitting angle, ideal for efficient optical beam shaping to achieve high intensity, narrow beam angle and long beam distance.
- Phosphor-on-chip with superior color uniformity over radiation angles, delivering homogeneous color in beam spots.
- Maximum Drive Current: 20 A
- Color Temperature: 6500K
- Color Rendering Index: Typ. 70
- Low thermal resistance: 0.3 - 0.6 °C/W
- Electrically isolated thermal path
- 8 kV HBM ESD rating per ANSI/ESDA/JEDEC JS-001



### Applications

- Portable Lighting
- Battery or Solar Powered Lights
- LED Work Lights
- Beacons
- Outdoor Lighting

### Table of Contents

Ordering Information.....	2
Binning Structure.....	3
Absolute Maximum Ratings.....	6
Product Characteristics.....	6
Soldering Profile.....	9
Mechanical Dimensions.....	10
Tape and Reel Outline.....	11
Shipping Label.....	12
Packaging.....	13
Notes.....	14



## Ordering Information

### Ordering Part Numbers<sup>1</sup>

CRI	CCT	Luminous Flux		Chromaticity Bin Kit <sup>3</sup>	Ordering Part Numbers
		Minimum Flux Bin <sup>1</sup>	Minimum Flux <sup>2</sup>		
Typ. 70 Min. 65	6500K	J7	3195 lm	651	SFT-90X-WS65-M-ENG

### Part Number Nomenclature

SFT	90X	W<x>	M	<ENG>
Product Family	Chip Area	Color	Package Configuration	Bin Kit
<b>S:</b> Surface Mount <b>F:</b> Flat Window <b>T:</b> Single Emitter	<b>90X:</b> 9.0 mm <sup>2</sup>	<b>W:</b> White <x> CRI Category Code <b>S:</b> CRI>65 <yy> Color Temperature <b>65:</b> 6500K	<b>M:</b> 7070 package	<b>ENG:</b> Pre-Production Parts

**Note:**

1. The Ordering Part Number specifies the Minimum Flux Bin in shipment; higher flux bins may be shipped without advance notice. Please refer to 'Luminous Flux Binning' table for details of all flux bins.
2. Product test condition: I<sub>f</sub>=10.0 A, T<sub>j</sub>=85°C.
3. Shipments always adhere to the color bins specified in each Chromaticity Bin Kit. See 'Chromaticity Bin Kit Codes' table for the color bins included in each Bin Kit.



## Binning Structure

### Luminous Flux Binning<sup>1,2</sup>

Flux Bin Code	Binning @ 10.0 A			Correlated Minimum Flux (lm) @ $T_j=85^\circ\text{C}^2$			
	$T_j = 85^\circ\text{C}^1$		$T_j = 25^\circ\text{C}^1$	2.0 A	5.0 A	15.0 A	20.0 A
	Minimum Flux (lm)	Maximum Flux (lm)	Minimum Flux (lm)				
J6	2990	3195	3325	777	1734	4037	4844
J7	3195	3400	3553	831	1853	4313	5176
J8	3400	3635	3781	884	1972	4590	5508
J9	3635	3870	4042	945	2108	4907	5889
K1	3870	4140	4303	1006	2245	5225	6269

### Forward Voltage Binning

Voltage Bin Code	Binning @ 10.0 A, $T_j = 85^\circ\text{C}$	
	Minimum Voltage (V)	Maximum Voltage (V)
VJ	2.7	2.9
VK	2.9	3.1
VL	3.1	3.3
VM	3.3	3.5

**Note:**

- LEDs are measured at  $25^\circ\text{C}$  ambient temperature with 10.0 A 20 ms single pulse. The measured values are correlated to values at  $85^\circ\text{C}$  junction temperature ( $T_j$ ). Luminus maintains a  $\pm 6\%$  tolerance on flux measurement.
- Flux values at other junction temperature ( $T_j$ ) and/or forward current conditions are calculated and for reference only.
- Individual voltage bins are not orderable.



## Binning Structure

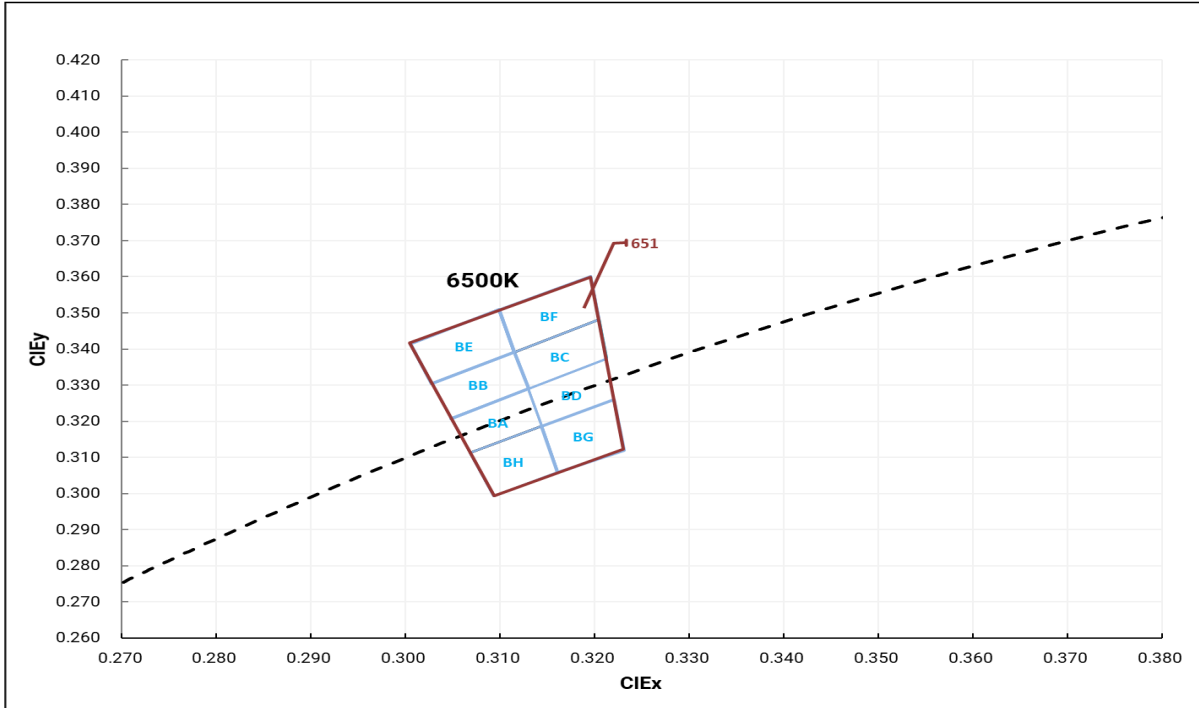
### Chromaticity Binning Coordinates

CCT	Bin Code	CIE <sub>x</sub>	CIE <sub>y</sub>	Bin Code	CIE <sub>x</sub>	CIE <sub>y</sub>	Bin Code	CIE <sub>x</sub>	CIE <sub>y</sub>	Bin Code	CIE <sub>x</sub>	CIE <sub>y</sub>
6500K	BA	0.3048	0.3207	BB	0.3028	0.3304	BC	0.3115	0.3391	BD	0.3130	0.3290
		0.3130	0.3290		0.3115	0.3391		0.3205	0.3481		0.3213	0.3373
		0.3144	0.3186		0.3130	0.3290		0.3213	0.3373		0.3221	0.3261
		0.3068	0.3113		0.3048	0.3207		0.3130	0.3290		0.3144	0.3186
	BH	0.3068	0.3113	BE	0.3005	0.3415	BF	0.3099	0.3509	BG	0.3144	0.3186
		0.3144	0.3186		0.3099	0.3509		0.3196	0.3602		0.3221	0.3261
		0.3161	0.3059		0.3115	0.3391		0.3205	0.3481		0.3231	0.3120
		0.3093	0.2993		0.3028	0.3304		0.3115	0.3391		0.3161	0.3059



## Binning Structure

Chromaticity Binning Diagram<sup>1,2</sup>



Chromaticity Bin Kit Codes

CCT	Bin Kit	Chromaticity Bins
6500K	651	BA, BB, BC, BD, BE, BF, BG, BH

**Note:**

- LED chromaticity is measured and binned at 25°C ambient temperature with 10.0 A 20 ms single pulse.
- Luminus maintains a tolerance of  $\pm 0.005$  on Chromaticity (CIE<sub>x</sub>, CIE<sub>y</sub>) measurement.



## Absolute Maximum Ratings

Parameter		Symbol	Value	Unit
DC Forward Current	Minimum	$I_{f\ min}$	0.1	A
	Maximum	$I_{f\ max}$	20	
Surge Current (t<10 ms, Duty Cycle < 10%)		$I_s$	22	A
Reverse Voltage ( $I_r= 10\ mA$ )		$V_r$	5	V
Power Dissipation		$P_D$	72	W
Junction Temperature		$T_{j\ max}$	150	°C
Operating Temperature Range		$T_{opr}$	-40 to 100	°C
Storage Temperature Range		$T_{stg}$	-40 to 100	°C
ESD withstand Voltage HBM Per ANSI/ESDA/JEDEC JS-001		$V_{HBM}$	8	kV
ESD withstand Voltage CDM Per ANSI/ESDA/JEDEC JS-002		$V_{CDM}$	1	kV

## Characteristics

Parameter		Symbol	Value	Unit
Color Rendering Index1 ( $T_j= 85^\circ\text{C}$ )	Minimum	$CRI_{\min}$	65	
	Typical	$CRI_{\text{typ}}$	70	
Forward Voltage ( $I_f= 10.0\ A, T_j= 85^\circ\text{C}$ )	Minimum	$V_{f\ \min}$	TBD	V
	Typical	$V_{f\ \text{typ}}$	3.1	
	Maximum	$V_{f\ \max}$	TBD	
Temperature Coefficient of Voltage		$\partial_{Vf}/\partial_T$	-1.0	mV/°C
Viewing Angle (FWHM)		$2\theta_{1/2}$	120	
Thermal Resistance (Electrical) Junction/Solder Point		$R_{\text{thjs-EL}}$	0.3 - 0.6	°C/W

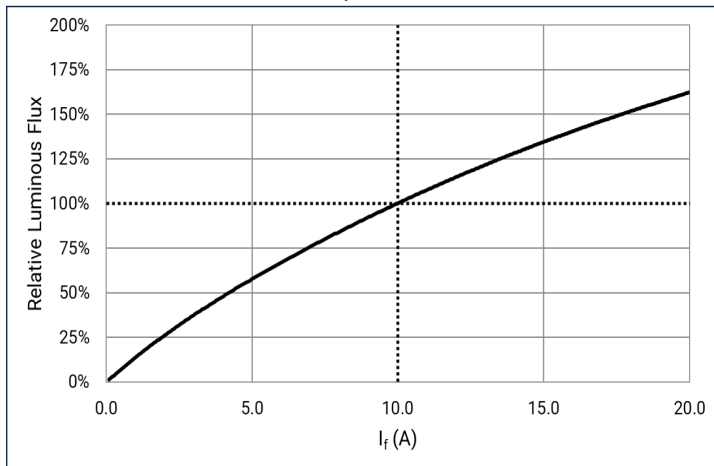
**Note:**

1. Luminus maintains a tolerance of  $\pm 2$  on Color Rendering Index (CRI) measurement.

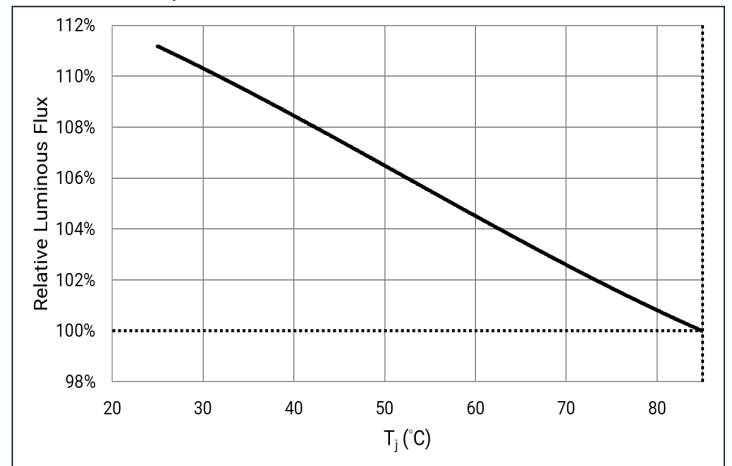


### Relative Luminous Flux

Forward Current:  $\phi_v/\phi_v(10.0\text{ A}), T_j = 85^\circ\text{C}$

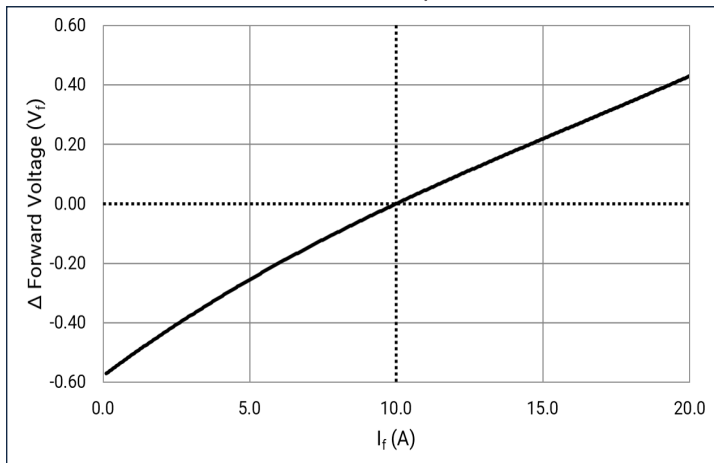


Temperature ( $T_j$ ):  $\phi_v/\phi_v(85^\circ\text{C}), I_f = 10.0\text{ A}$

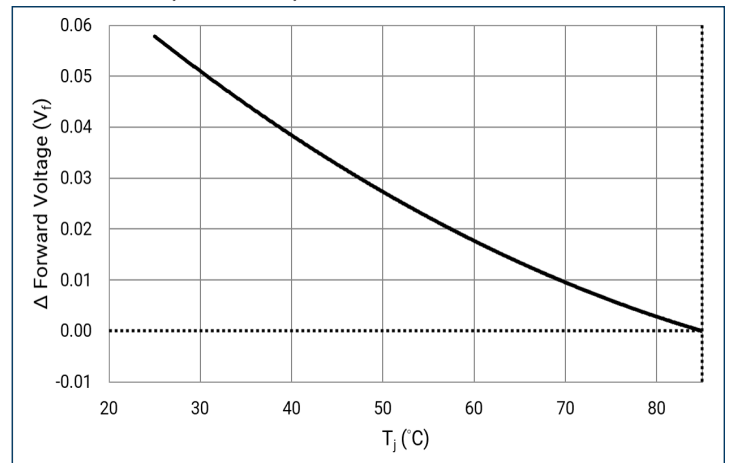


### Forward Voltage

Forward Current:  $\Delta V_f = V_f(I_f) - V_f(10.0\text{ A}), T_j = 85^\circ\text{C}$

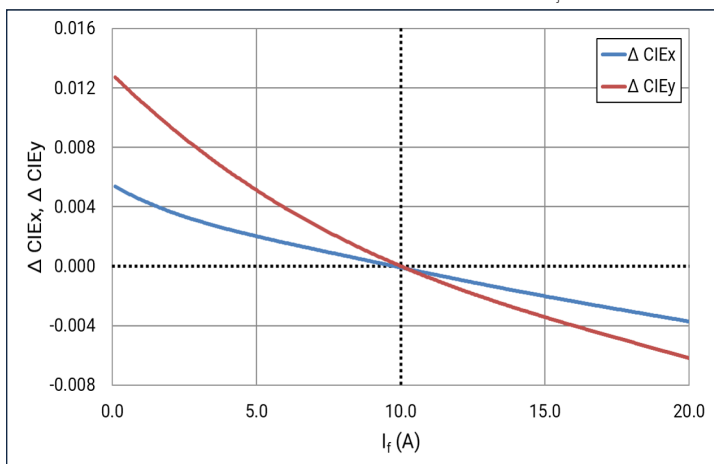


Temperature ( $T_j$ ):  $\Delta V_f = V_f(T_j) - V_f(85^\circ\text{C}), I_f = 10.0\text{ A}$

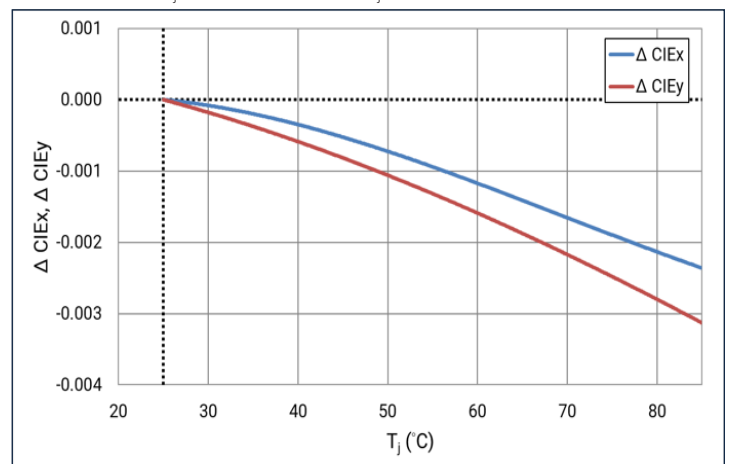


### Relative Chromaticity

Forward Current:  $\Delta \text{CIEx,y} = \text{CIEx,y}(I_f) - \text{CIEx,y}(10.0\text{ A}), T_j = 85^\circ\text{C}$



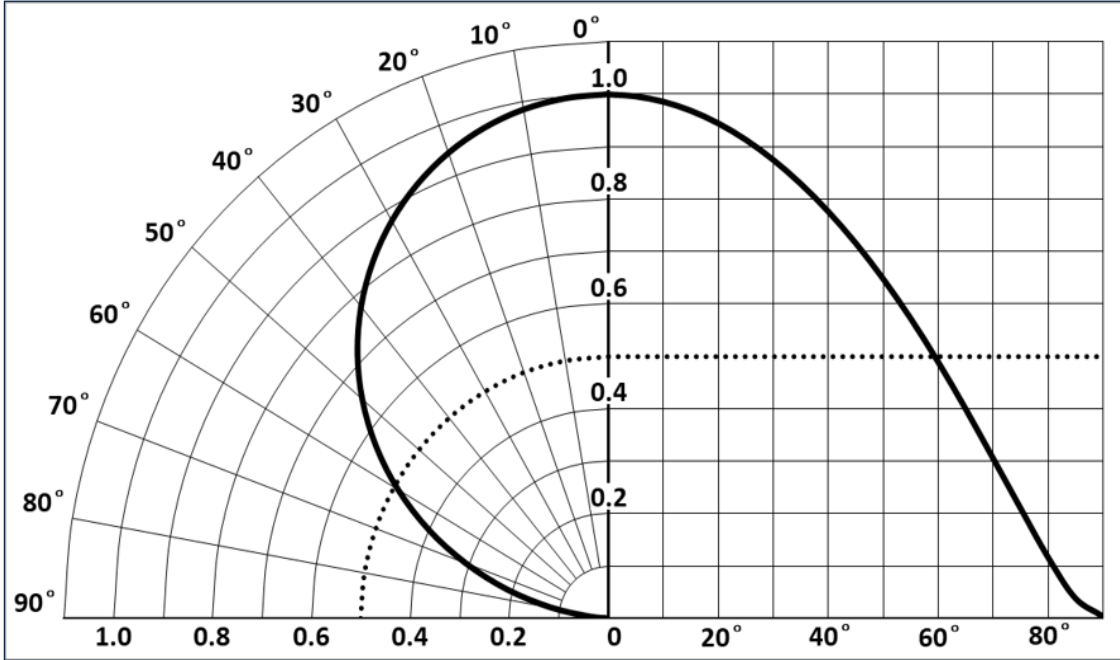
Temperature ( $T_j$ ):  $\Delta \text{CIEx,y} = \text{CIEx,y}(T_j) - \text{CIEx,y}(25^\circ\text{C}), I_f = 10.0\text{ A}$





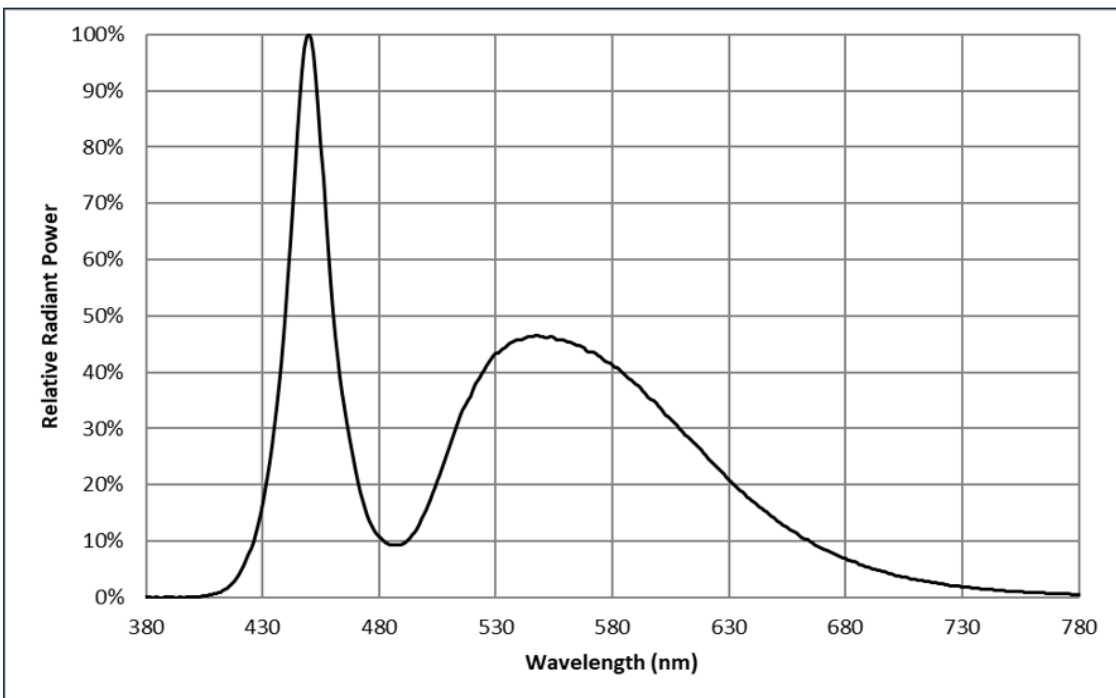
### Angular Distribution

$I_f = 10.0 \text{ A}; T_j = 25^\circ\text{C}$



### Relative Spectral Power Distribution

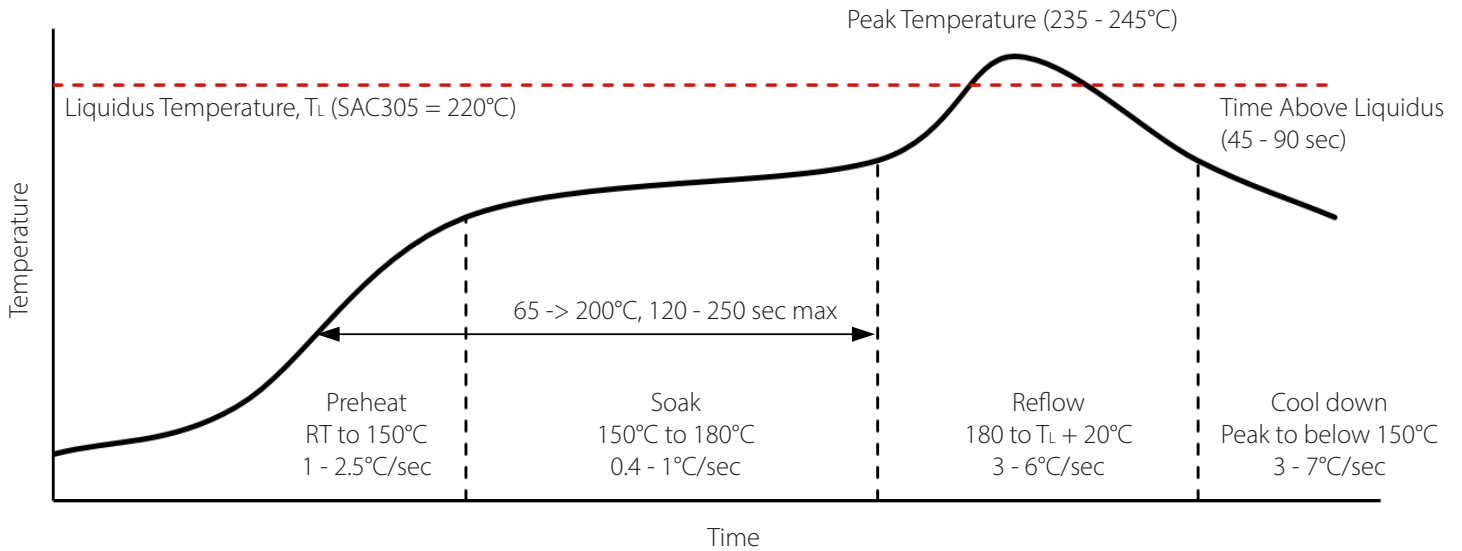
$I_f = 10.0 \text{ A}; T_j = 85^\circ\text{C}$







## Soldering Profile



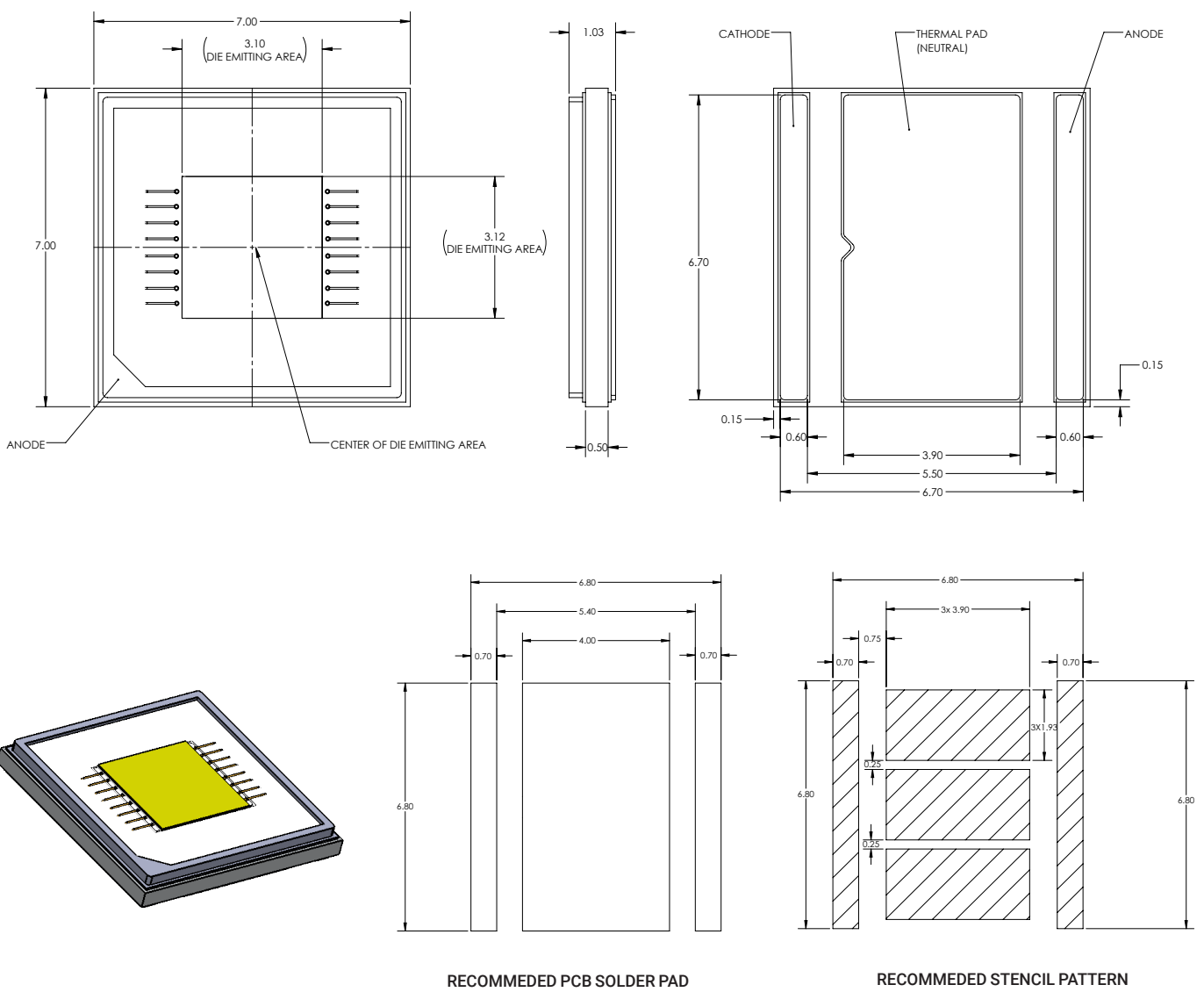
SMT Rework Guideline	Manual Hotplate Reflow	Hot Air Gun Reflow
Heating Time	< 60 sec	
Hotplate Temperature	< 245°C	< 150°C

**Note:**

- Product complies to Moisture Sensitivity Level 3 (MSL 3).
- 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.



## Mechanical Dimensions<sup>1</sup>

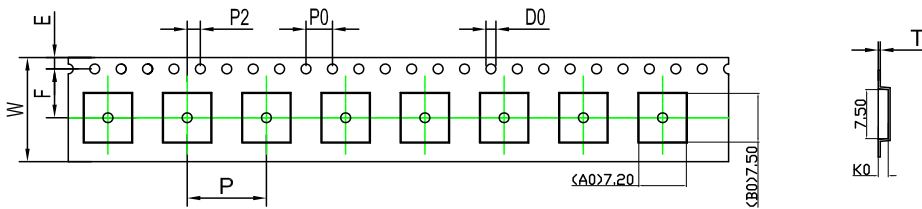


**Note:**

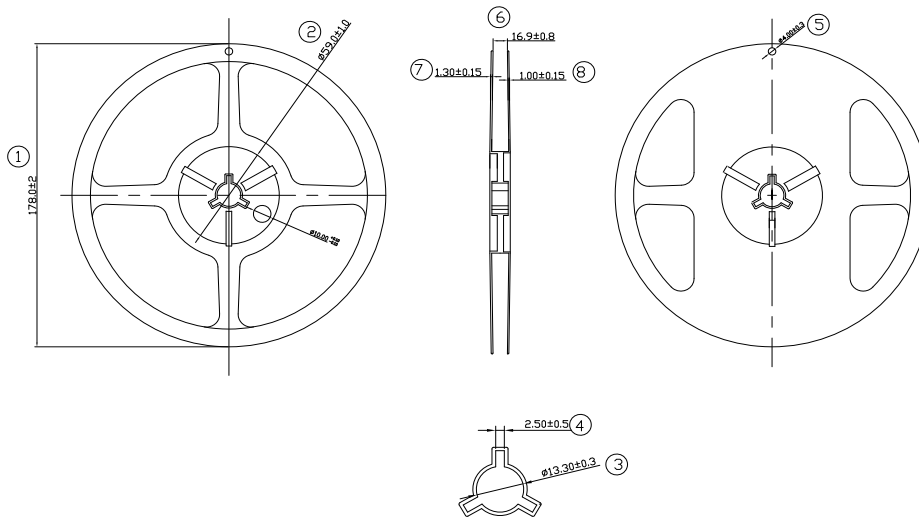
1. All dimensions are in millimeter  $\pm 0.13$  mm.



## Tape and Reel Outline



Parameter	Dimension (mm)
A0	7.2±0.1
B0	7.5±0.1
D0	1.5±0.1
D1	1.5±0.1
E	1.75±0.1
F	5.5±0.1
K0	1.6±0.1
P0	4.0±0.1
P	12.0±0.1
P2	2.0±0.1
T	0.30±0.05
W	16.0±0.3



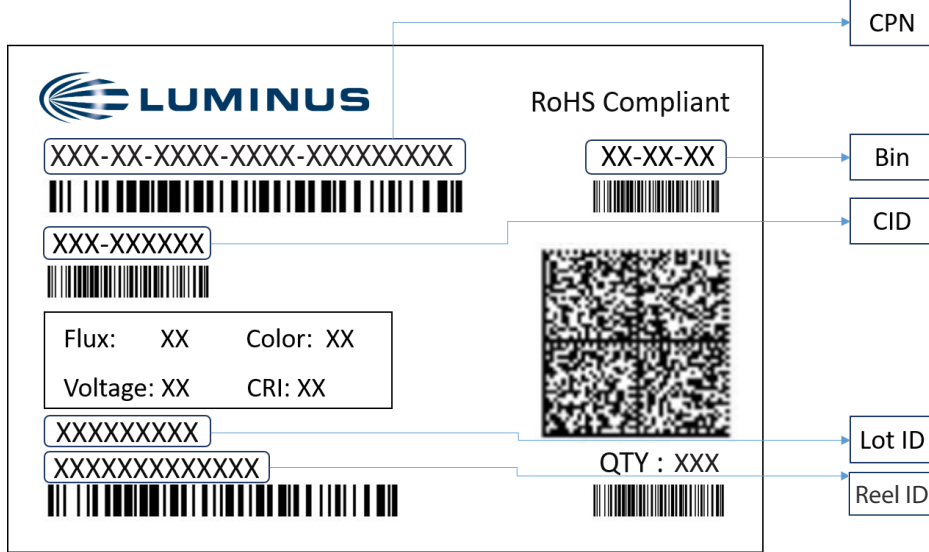
**Note:**

1. Each Reel contains 500 units of LEDs.
2. Black anti-static tape material (Denka ECM3/ECAP3)
3. The accumulated tolerance for ten sprocket holes should be no more than 0.2 mm.
4. The tortuosity of 250 mm tape should be no more than 1 mm per 100 mm.
5. Leave 800 mm of type empty for lead in (100 empty pockets).
6. Leave 1200 mm of type empty for trailer (150 empty pockets).
7. All dimensions must comply to EIA-481-B.
8. Final tape and reel packaging must meet the requirements of JEDEC-STD-033, LEVEL 2A.



## Shipping Label

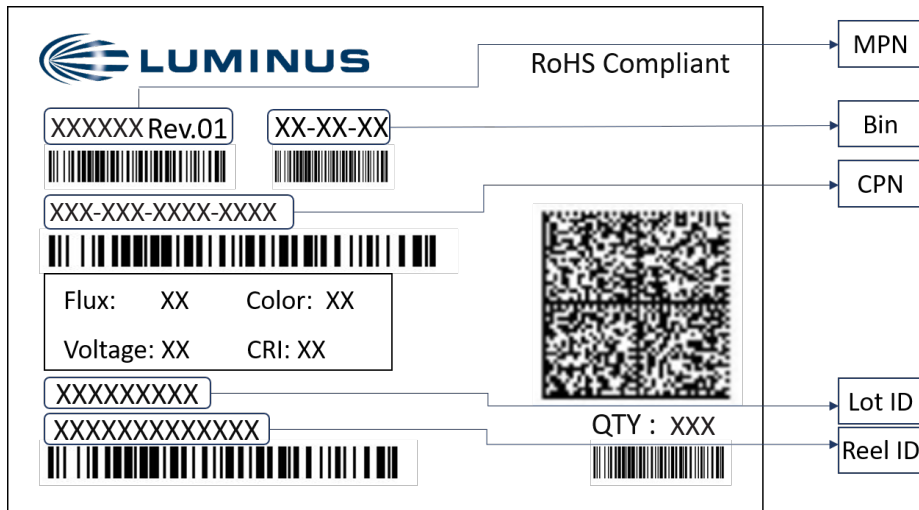
### Label on Packaging Box



#### Label Fields:

- CPN:** Luminus ordering part number
- CID:** Customer's part number
- QTY:** Quantity of parts per reel
- Flux:** Bin as defined on page 3
- Voltage:** Bin as defined on page 3
- Color:** Bin as defined on page 4 and 5
- CRI:** NA
- Lot ID & Reel ID:** For Luminus internal use

### Label on Reel



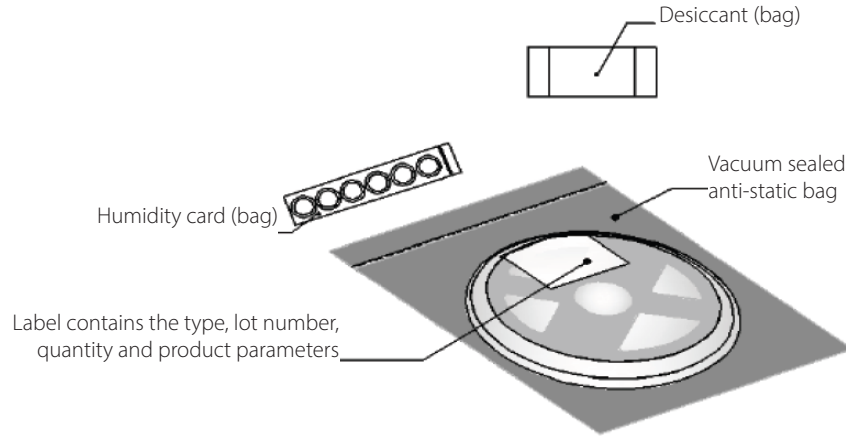
#### Label Fields:

- CPN:** Luminus ordering part number
- MPN:** For Luminus internal use
- QTY:** Quantity of parts per reel
- Flux:** Bin as defined on page 3
- Voltage:** Bin as defined on page 3
- Color:** Bin as defined on page 4 and 5
- CRI:** NA
- Lot ID & Reel ID:** For Luminus internal use



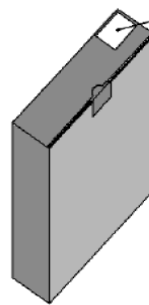
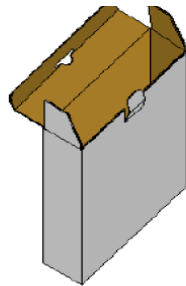
## Packaging

### Packaged Reel



### Packaging boxes

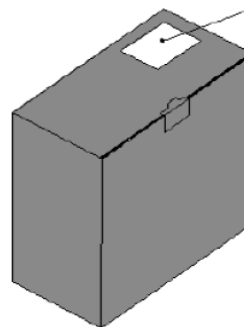
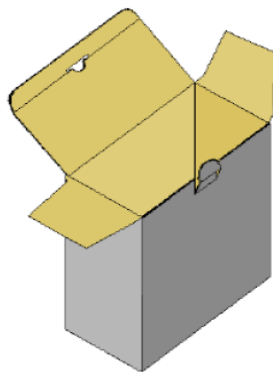
**Box Size 1** - 5 reels per box  
Size: 22.5 x 24.5 x 6.5 cm



Label contains the type, lot number, quantity and product parameters

\*Capacity 5 reels per box

**Box Size 2** - 10 reels per box  
Size: 22.5 x 24.5 x 13 cm



Label contains the type, lot number, quantity and product parameters

\*Capacity 10 reels per box

### Packing Configuration:

- 500 units per reel
- Each reel is enclosed in anti-static bag
- Shipping label is placed on top of each reel
- Multiple labels are attached to the box (one label per reel inside the box)



## Notes

### Static Electricity

1. The products are sensitive to static electricity, and care should be taken when handling them.
2. Static electricity or surge voltage will damage the LEDs. It is recommended to wear anti-electrostatic gloves or wristband when handling the LEDs.
3. All devices, equipment and machinery must be properly grounded. It is recommended that measures be taken against surge voltage to the equipment that mounts the LEDs.

Reference: [APN-002815](#) Electrical Stress Damage to LEDs and How to Prevent It

### Storage

1. Before opening the package

The LEDs should be kept at a temperature lower than 40°C and relative humidity lower than 90%. The LEDs should be used within a year. When storing the LEDs, moisture proof package with absorbent material (silica gel) is recommended.

2. After opening the package

The LEDs should be kept at a temperature lower than 30°C and relative humidity lower than 60%. The LEDs should be soldered within 168 hours (7 days) after opening the moisture proof package.

If unused LEDs remain, they should be stored in moisture proof packages, such as sealed containers with moisture absorbent material (silica gel). It is also recommended to return the unused LEDs to the original moisture proof package and to seal it again.

If the moisture absorbent material (silica gel) vaporizes or passes the expiration date, baking treatment should be performed by using the following conditions : 60°C for 20 hours.

The LED's electrode and lead frame comprise a silver plated copper alloy. The silver surface may be affected by environments. Please avoid conditions which may cause the LEDs to corrode or discolor. The corrosion or discoloration might lower solderability or affect optical characteristics.

Please avoid rapid transition in ambient temperature, especially in high humidity environments where condensation can occur.