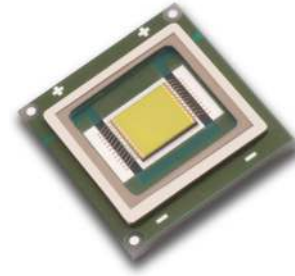


# SBT-90-WxS

## Specialty White LED



### Features

- Large, monolithic chip with uniform emitting area of 9 mm<sup>2</sup>
- Extremely high optical output: up to 5,400 lumens at 18 A from a single chip
- Un-encapsulated die ideal for optical coupling in Etendue-limited applications
- 5700K typical color temperature
- High thermal conductivity package - junction to case thermal resistance of only 0.35°C/W
- Compact 10 x 11 mm<sup>2</sup> isolated surface mount package



### Applications

- Fiber-coupled Illumination
- Architectural and Entertainment Lighting
- Beacons
- Search lights
- Tactical portable lighting
- Automotive after-market/  
Tuning spotlights

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## Ordering Information

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

Color	Luminous Flux		Chromaticity Bins	Ordering Part Number
	Min. Flux Bin	Min. Flux		
White	RB	2,600 lm	G3, G4, H3, H4, J3, J4, DG2, EH, DJ	SBT-90-WDS-F72-RB600
	SA	2,780 lm		SBT-90-WDS-F72-SA600

### Part Number Nomenclature

SBT	90	W<xy>	F72	<Bin kit>
Product Family	Chip Area	Color	Package Configuration	Bin Kit
SBT: Surface Mount (Window)	90: 9 mm <sup>2</sup>	W: White <x>: Color Temperature D: Daylight C: Cool White S: Stage White <y>: CRI S: Standard	Internal package code F71: Ceramic Package F72: Second generation	Refer to ordering part numbers in this document

**Note:**

1. Flux Bin listed is minimum bin shipped, higher bins may be included at Luminus' discretion.



## Binning Structure

All SBT-90 LEDs are tested for luminous flux/dominant wavelength and placed into one of the following flux/wavelength bins. The binning structure is universally applied across each color of the SBT-90 product line.

### Flux Bins<sup>1,2</sup>

Color	Luminous Flux Bin <sup>3</sup>	Binning @ 9 A, T <sub>c</sub> = 25°C <sup>4</sup>	
		Minimum Flux (lm)	Maximum Flux (lm)
WDS White Daylight Standard CRI (typ. 70)	RB	2,600	2,780
	SA	2,780	2,990
	SB	2,990	3,200
	TA	3,200	3,400
	TB	3,400	3,680
	UA	3,680	3,955
	UB	3,955	4,230

**Note:**

1. Luminus maintains a +/- 6% tolerance on flux measurements.
2. Products are production tested then sorted and packed by bin.
3. Individual bins are not orderable. Please refer to the Product Ordering information page for a list of orderable bin kits.
4. T<sub>c</sub> = Case temperature.



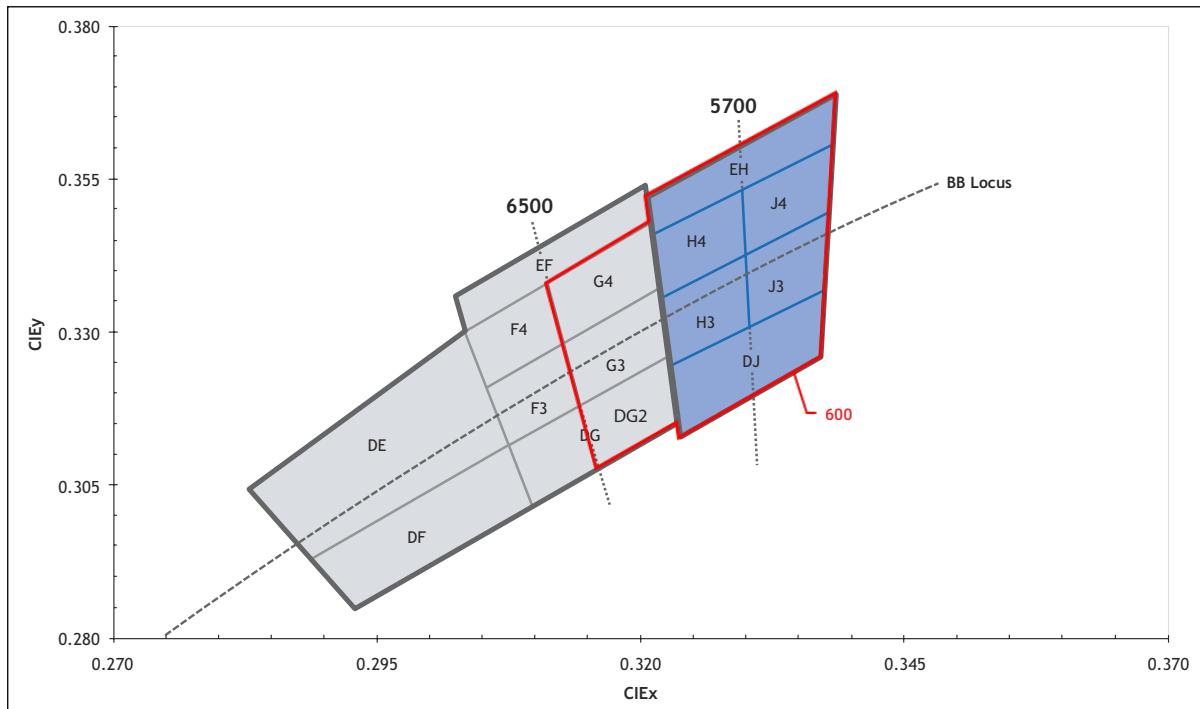
## Binning Structure

All SBT-90 LEDs are tested for luminous flux/ dominant wavelength and placed into one of the following flux/wavelength bins. The binning structure is universally applied across each color of the SBT-90 product line.

### Chromaticity Binning Coordinates

CCT	Bin Code	CIEx	CIEy	Bin Code	CIEx	CIEy	Bin Code	CIEx	CIEy
5700K	DJ	0.322	0.324	H3	0.321	0.335	H4	0.321	0.346
		0.337	0.337		0.329	0.342		0.329	0.354
		0.336	0.326		0.329	0.331		0.329	0.342
		0.323	0.314		0.322	0.324		0.321	0.335
	J3	0.329	0.342	J4	0.329	0.354	EH	0.320	0.352
		0.337	0.349		0.338	0.362		0.338	0.368
		0.337	0.337		0.337	0.349		0.338	0.362
		0.330	0.331		0.329	0.342		0.321	0.346
6500K	DG2	0.315	0.319	G3	0.313	0.329	G4	0.312	0.339
		0.322	0.326		0.321	0.337		0.321	0.348
		0.323	0.316		0.322	0.326		0.321	0.337
		0.316	0.309		0.315	0.319		0.313	0.329

### Chromaticity Binning Diagram





## Absolute Maximum Ratings

	Symbol	Values	Unit
Forward Current (CW) <sup>1,2</sup>	$I_{f \min}$	0.2	A
	$I_{f \max}$	18	
Forward Surge Current (Pulsed) Duty cycle <10%, t=10 ms)	$I_{\text{surge max}}$	27	A
Storage Temperature	$T_{s \min}$	-40	°C
	$T_{s \max}$	100	
Operating Temperature	$T_{\text{opr min}}$	-40	°C
	$T_{\text{opr max}}$	85	
Junction Temperature <sup>4</sup>	$T_{j \max}$	150	°C

**Note:**

1. Sustained operation at maximum current will result in shortened lifetime.
2. Device is designed and optimized for operation near 9 A and operation at low current may result in variable performance. Contact Luminus for more information.
3. Not designed for reverse current operation.
4. Sustained operation at maximum operating  $T_j$  will result in shortened lifetime and may cause premature product failure.



## Device Characteristics

Optical and Electrical Characteristics	Symbol	Value	Unit
Emitting Area	$A_E$	9.0	mm <sup>2</sup>
Emitting Area Dimension		3.0 x 3.0	mm x mm
Reference Duty Cycle		100	%
Test Peak Drive Current	$I_f$	9.0	A
Peak Luminous Flux <sup>1,2</sup>	$\Phi_V$	3,100	lm
Peak Radiometric Flux <sup>1,2</sup>	$\Phi_E$	9.25	W
Forward Voltage <sup>1</sup>	$V_{f\ min}$	2.8	V
	$V_f$	3.1	
	$V_{f\ max}$	3.8	
Thermal Characteristics			
Thermal Resistance (junction to case)-Real <sup>3</sup>	$R_{th\ j-c\_real}$	0.35	°C/W

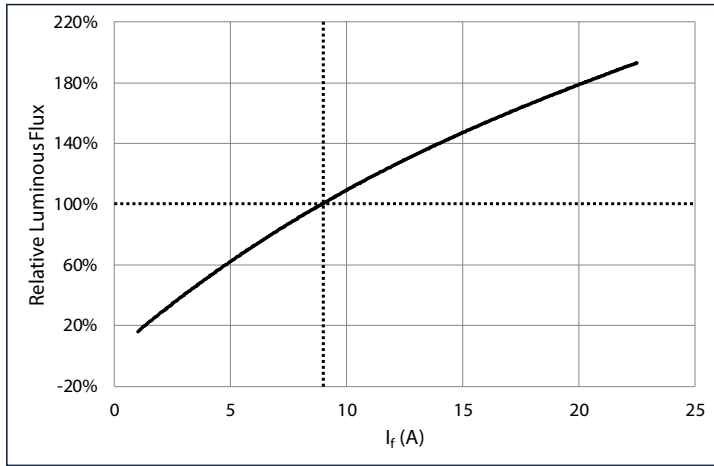
**Note:**

1. Unless otherwise noted, values listed are typical. All ratings are based on operation with a constant temperature = 25°C.
2. For specific minimum and maximum values, use bin tables. For product roadmap and future performance of devices, contact Luminus.
3. Measurements are in accordance with JEDEC 51-14. For more about thermal resistance calculation, please see <https://luminusdevices.zendesk.com/hc/en-us/articles/4416807960717-Thermal-Heatsink-Required-Rth-Calculator>.

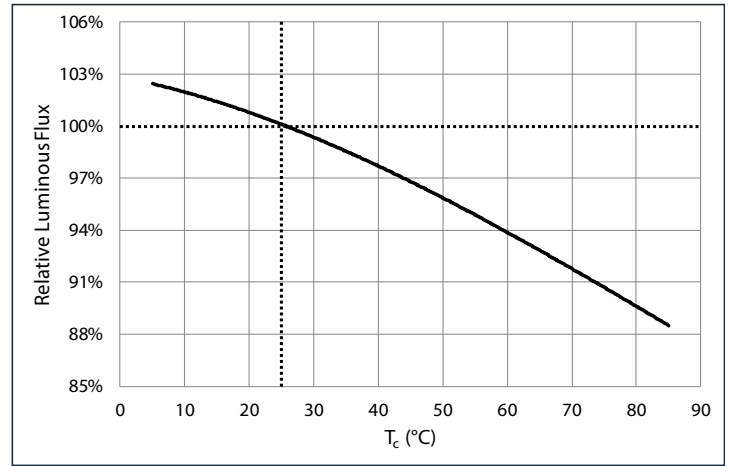


### Relative Luminous Flux

Forward current:  $\phi_v/\phi_v(9\text{ A}), T_c = 25^\circ\text{C}$

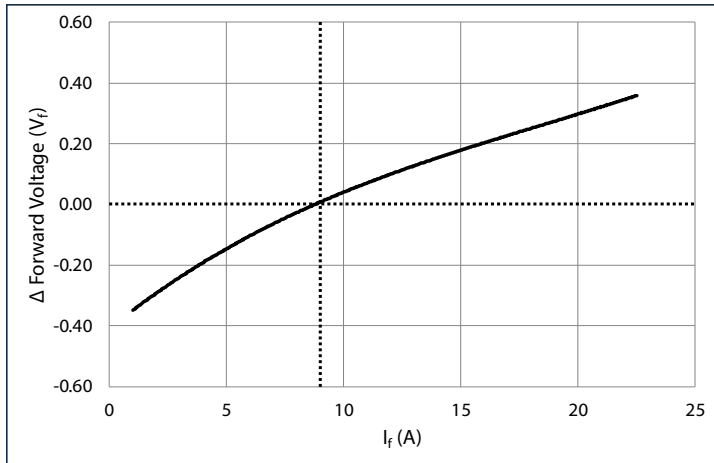


Temperature:  $\phi_v/\phi_v(25^\circ\text{C}), I_f = 9\text{ A}$

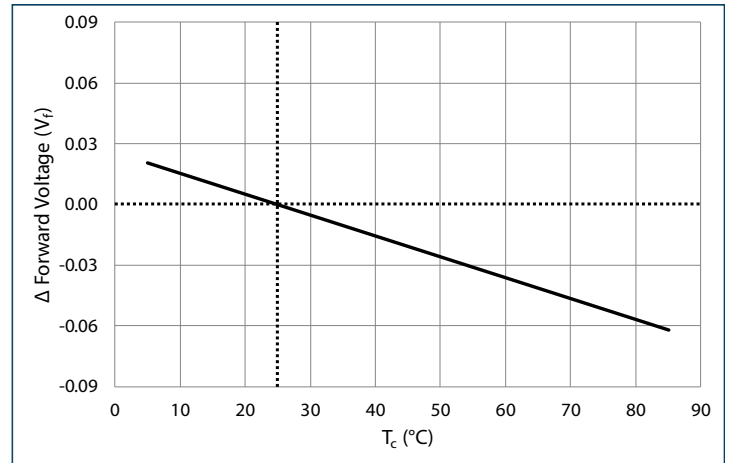


### Forward Voltage

Forward current:  $V_f = V(I_f), T_c = 25^\circ\text{C}$

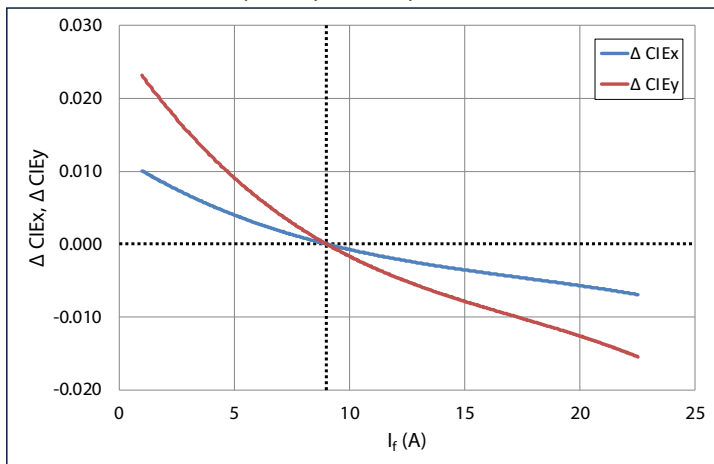


Temperature:  $\Delta V_f = V(T_c) - V(25^\circ\text{C}), I_f = 9\text{ A}$

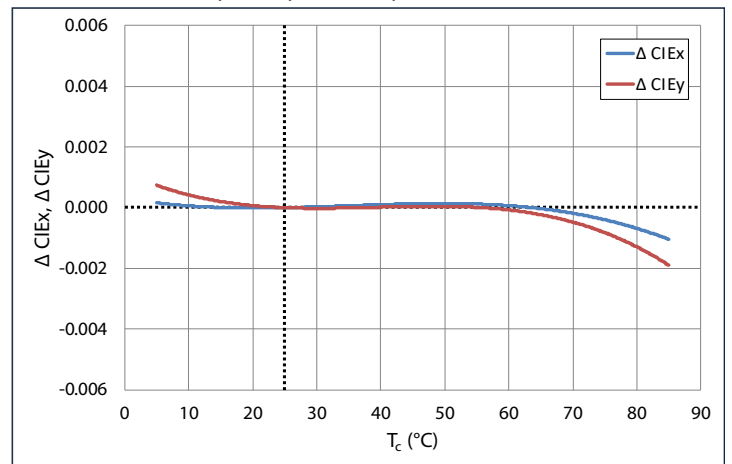


### Relative Chromaticity

Forward current:  $\Delta CIE_{xy} = CIE_{xy}(I_f) - CIE_{xy}(9\text{ A}), T_c = 25^\circ\text{C}$



Temperature:  $\Delta CIE_{xy} = CIE_{xy}(T_c) - CIE_{xy}(25^\circ\text{C}), I_f = 9\text{ A}$

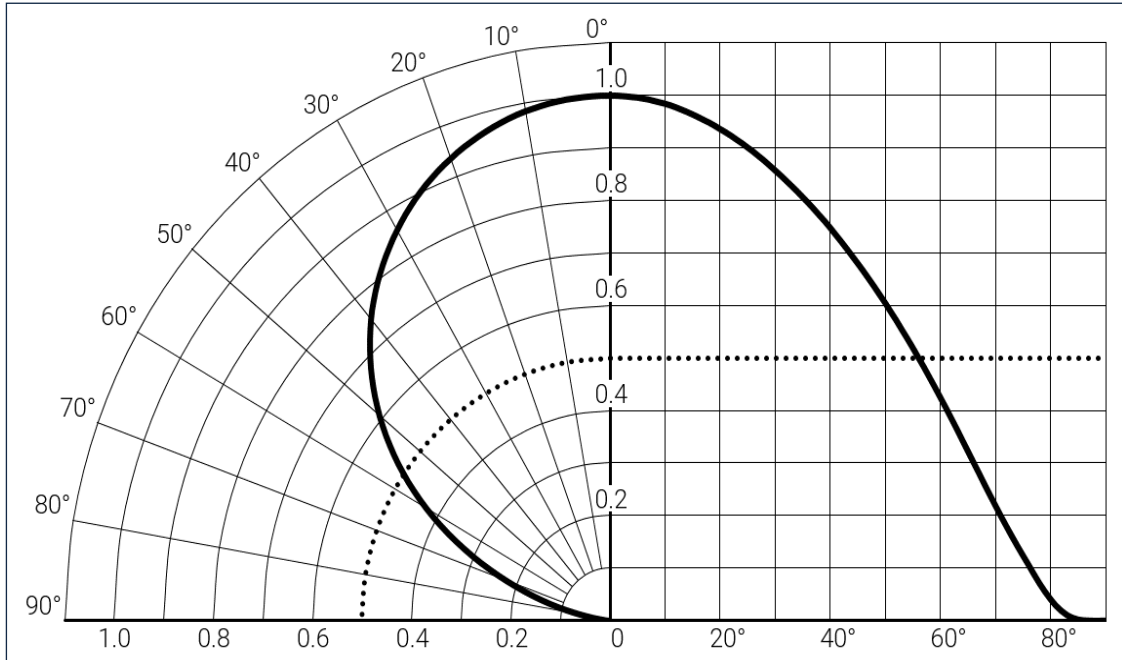




## Angular Distribution and Typical Spectrum

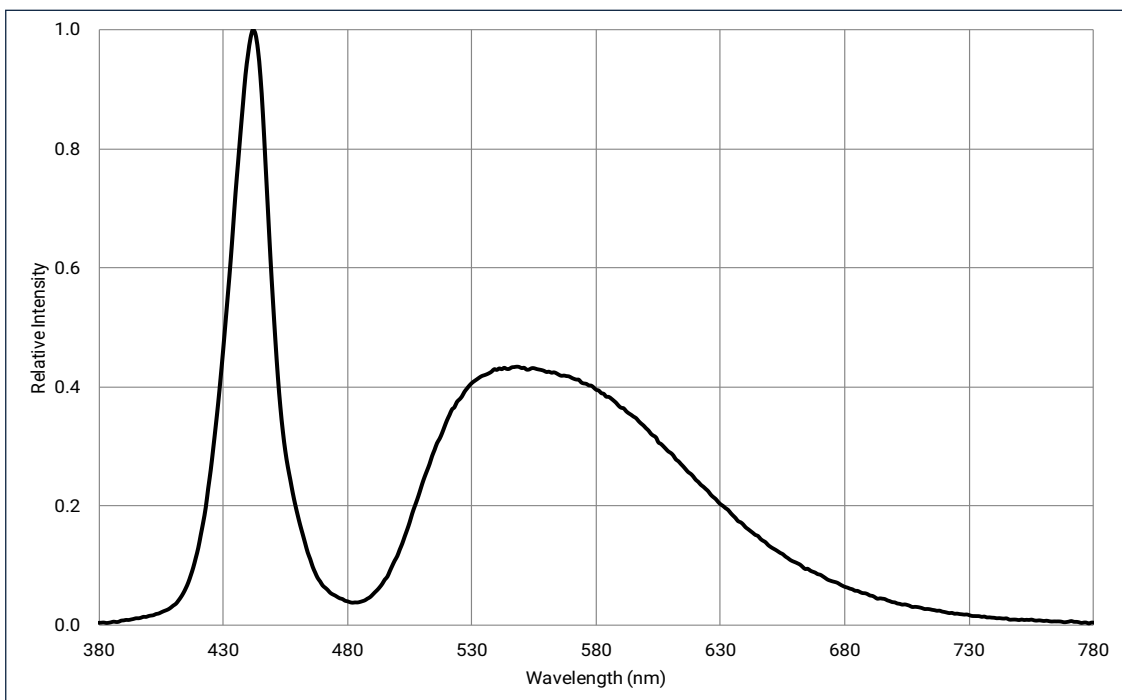
### Angular Intensity Distribution

$$I_{\text{ref}} = f(\Phi); T_c = 25^\circ\text{C}$$



### Typical Spectrum

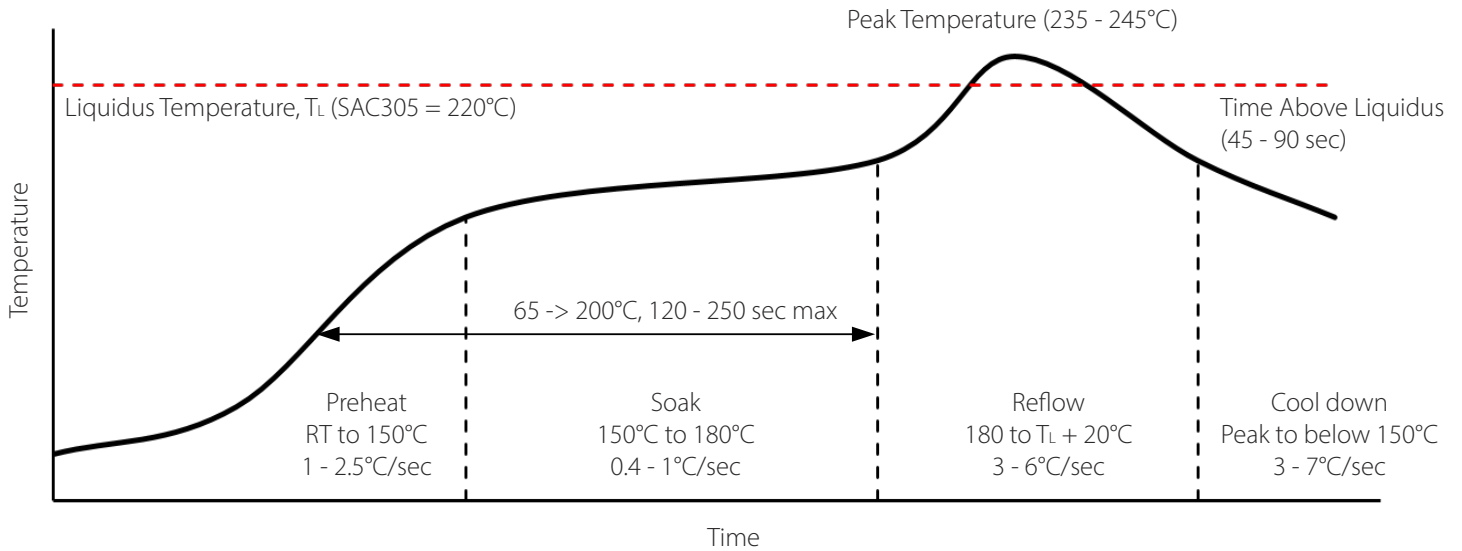
$$\Phi_{\text{ref}} = f(\lambda); I_f = 9 \text{ A}; T_c = 25^\circ\text{C}$$







## Soldering Profile



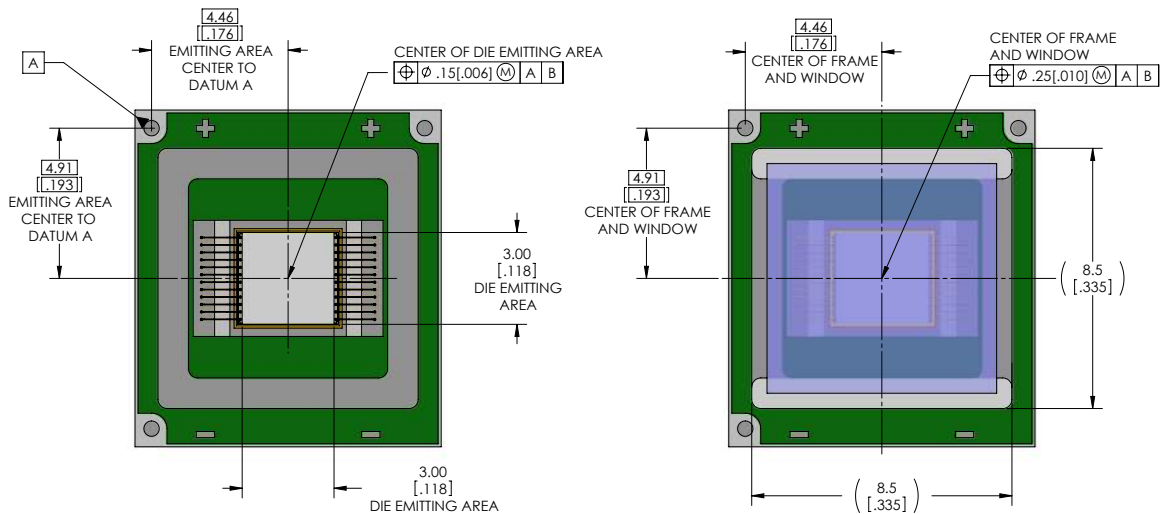
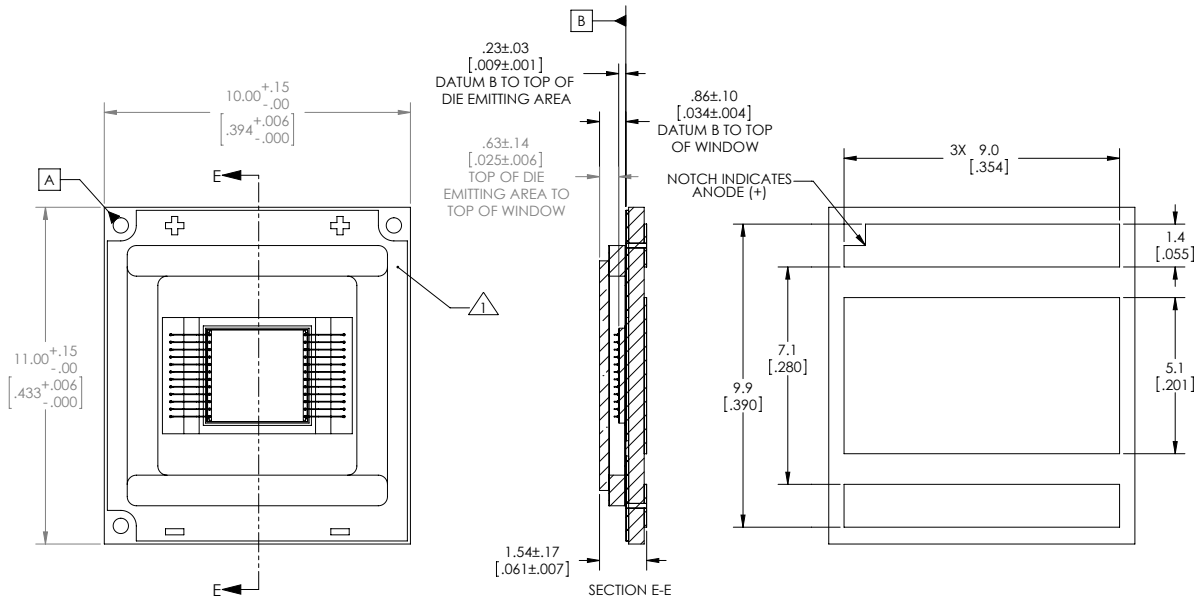
SMT Rework Guideline	Manual Hotplate Reflow	Hot Air Gun Reflow
Heating Time	< 60 sec	
Hotplate Temperature	< 245°C	< 150°C

**Note:**

- Product complies to Moisture Sensitivity Level 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.
- This part is not compatible with vapor phase reflow processes.

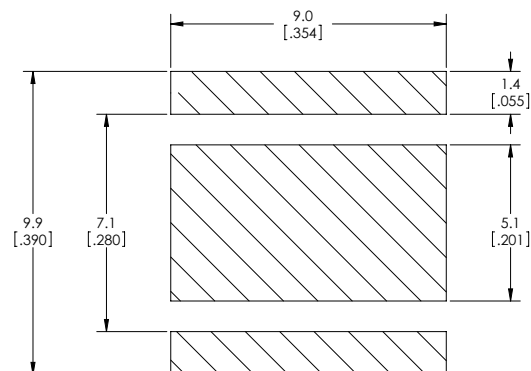


## Mechanical Dimensions



DIE EMITTING AREA LOCATION

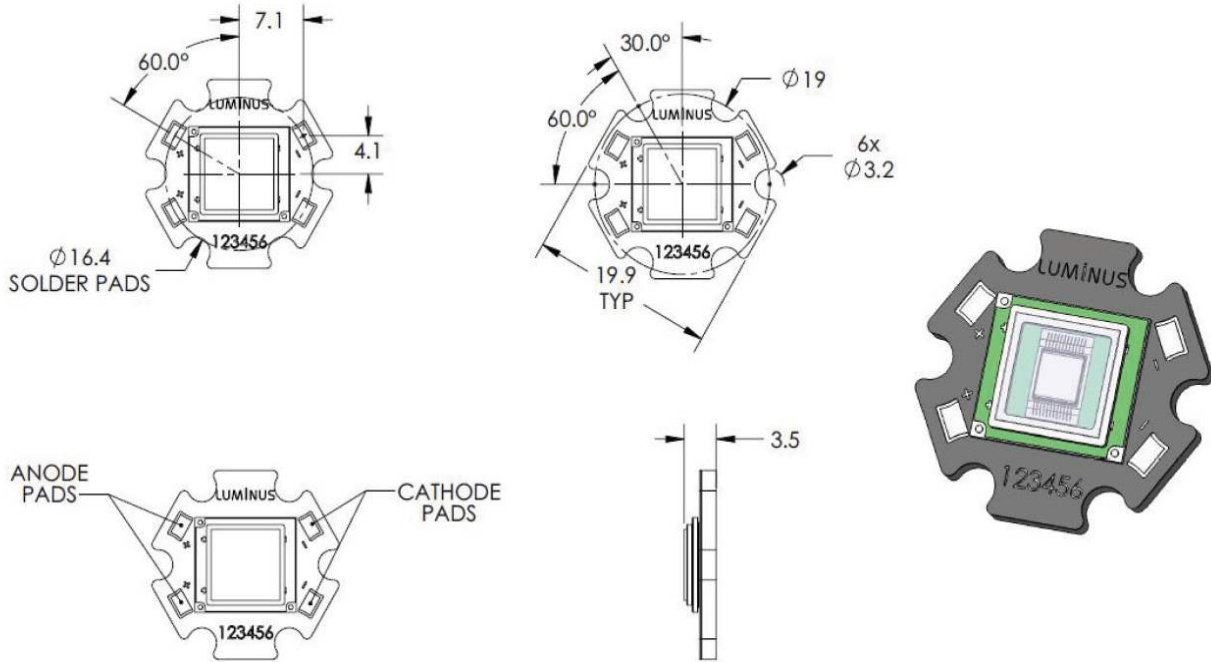
FRAME AND WINDOW LOCATION



RECOMMENDED SOLDER PAD



## Mechanical Dimensions

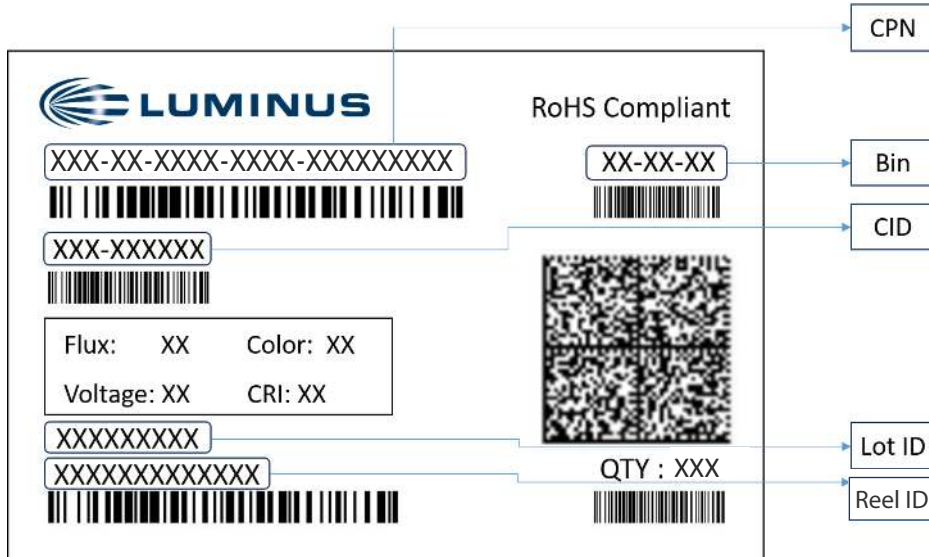


**Note:**

1. All dimensions in millimeters.
2. Tolerances per IPC610, Class 2.
3. Recommended mounting screw: M3 or #4.
4. All anode pads on board are interconnected. All cathode pads on board are interconnected.



## Shipping Label



### Label Fields:

- CPN: Luminus ordering part number
- CID: Customer's part number
- QTY: Quantity of devices in pack
- Flux: Bin as defined on page 3
- Voltage: NA
- Color: Bin as defined on page 3
- CRI: NA

### Packing Configuration:

- Partial pack or tray may be shipped
- Each pack is enclosed in anti-static bag
- Shipping label is placed on top of each pack



## Notes

### **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



## Revision History

Rev	Date	Description of Change
01	04/10/2018	Initial release
02	05/09/2023	Template update