

SST-70X-W

Specialty White LED

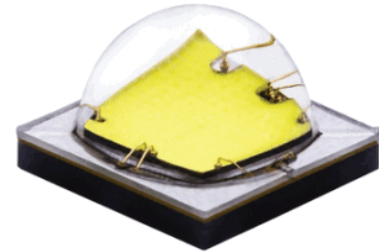


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Features:

- High Brightness Cool white LED with maximum output in excess of 3,200 lm
- Available in 6500K, 70 CRI (typical) color point
- Compact monolithic emitter ideal for directional lighting applications with high uniformity
- Rated and targeted at 85 °C
- Typical efficacy 162 lm/W at 700 mA, (6V)
- Maximum drive current: 5250 mA (6V) ,2625 mA (12V)
- High thermal conductivity package - junction thermal resistance of only 0.6° C/W
- Wide viewing angle: 120°
- 8000V HBM ESD rating per MIL STD-883D
- Electrically isolated thermal path
- RoHS and REACH compliant

Applications

- Flashlight
- Automotive accessory spotlights
- Portable lighting accessories
- Spot light
- Instrumentation
- Work light
- Battery and solar-powered applications
- Bicycle light

General Considerations

Environmental Considerations:

As a leading provider of solid-state Lighting solutions, Luminus implements strict substance control policies to ensure all of its products are environmentally friendly. As all Luminus LEDs, the SST-70X-W series are compliant with the Restriction of Hazardous Substances Directive (RoHS) and REACH directives from the European Community.

Product Testing:

Every SST-70X-W LED is fully production tested to ensure it meets the high quality standards customers have come to expect from Luminus products. Devices are binned to correlated values at 1500 mA, 6V, 20 msec pulse condition at $T_j = 85^\circ\text{C}$ current and temperature curves are provided in this document allowing users to predict the LED performance and characteristics under their own driving and thermal conditions.

Reliability:

Luminus SST-70X-W LED series are required to pass a rigorous suite of environmental and mechanical stress tests, including mechanical shock, vibration, temperature cycling and humidity. These tests ensure that the devices deliver high performance and achieve reliable long term operation in the automotive and other demanding environments. Please contact Luminus for further information.

Flux Binning Structure

SST-70X-W LEDs are binned for luminous flux based on $I_f = 1500$ mA and 85 °C junction temperature (T_j) conditions.

Flux Bin(FF)	Min flux (lm) 1500 mA,85 °C	Max flux (lm) 1500 mA,85 °C	Calculated Min flux (lm) 700mA, 25°C	Calculated Minimum Luminous Flux (lm)@ 85 °C				
				700 mA	2000 mA	3000 mA	4000 mA	5250 mA
LB	1290	1380	741	659	1641	2258	2874	3327
LA	1200	1290	689	613	1526	2100	2674	3095
KB	1120	1200	643	572	1425	1960	2495	2888
KA	1042	1120	598	532	1325	1824	2322	2687
JB	969	1042	556	495	1232	1696	2159	2499

Note 1: Luminus maintains a +/- 6% tolerance on flux measurement.

Note 2: Correlated flux values at 700mA, 2000 mA, 3000 mA, 4000 mA and 5250 mA are for reference only.

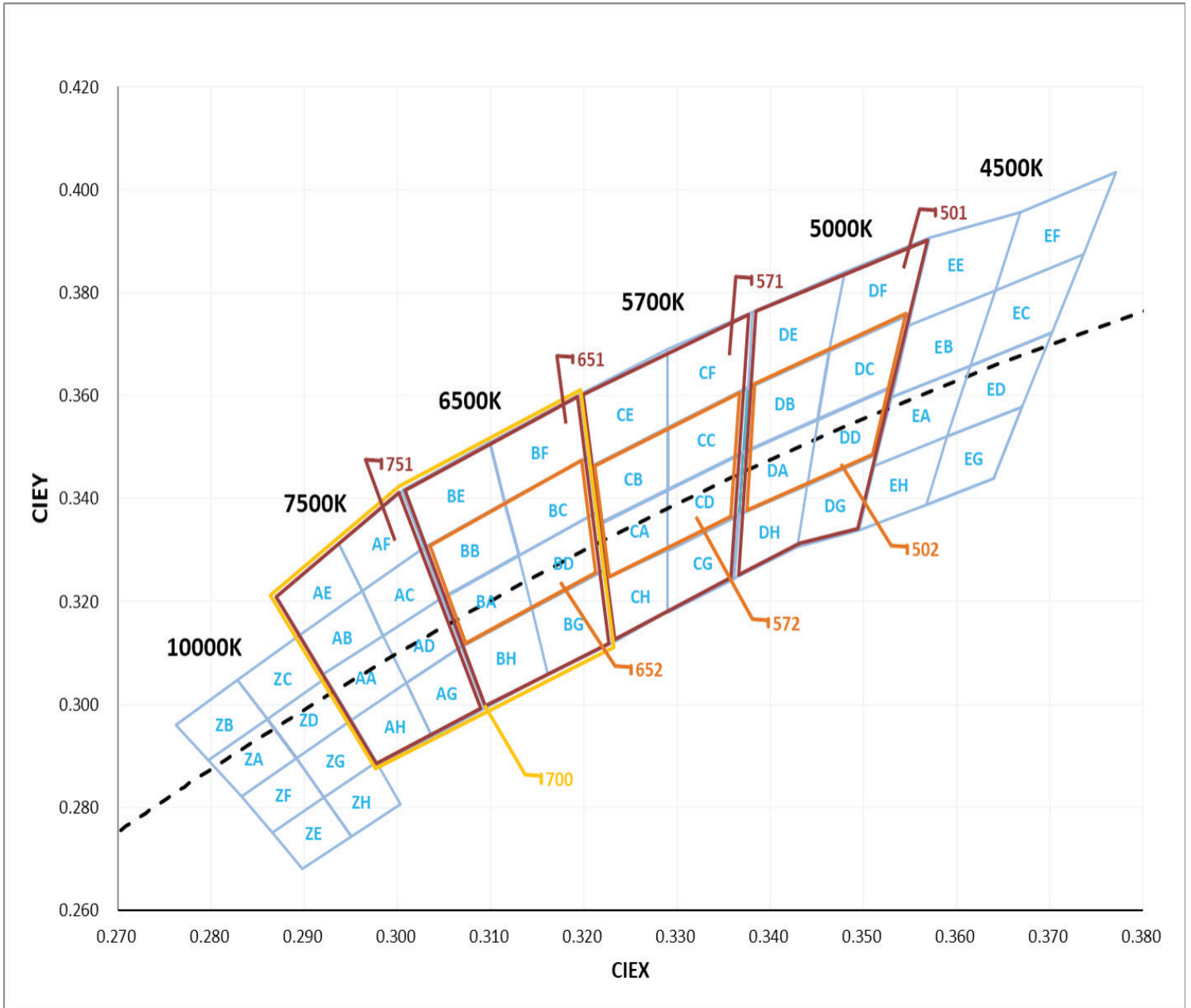
Chromaticity Bin Definitions

CCT	Bin Code	CIE-X	CIE-Y	Bin Code	CIE-X	CIE-Y	Bin Code	CIE-X	CIE-Y	Bin Code	CIE-X	CIE-Y
10000	ZA	0.286	0.2971	ZB	0.2828	0.3047	ZC	0.2895	0.3135	ZD	0.2923	0.3052
		0.2891	0.2896		0.286	0.2971		0.2923	0.3052		0.295	0.297
		0.2832	0.2821		0.2797	0.2891		0.286	0.2971		0.2891	0.2896
		0.2797	0.2891		0.2762	0.2961		0.2828	0.3047		0.286	0.2971
	ZE	0.2921	0.2819	ZF	0.2891	0.2896	ZG	0.2950	0.2970	ZH	0.2977	0.2888
		0.295	0.2743		0.2921	0.2819		0.2977	0.2888		0.3003	0.2807
		0.2898	0.2681		0.2865	0.2751		0.2921	0.2819		0.295	0.2743
		0.2865	0.2751		0.2832	0.2821		0.2891	0.2896		0.2921	0.2819
7500	AA	0.295	0.297	AB	0.292	0.306	AC	0.2984	0.3133	AD	0.2984	0.3133
		0.292	0.306		0.2895	0.3135		0.2962	0.322		0.3048	0.3207
		0.2984	0.3133		0.2962	0.322		0.3028	0.3304		0.3068	0.3113
		0.3009	0.3042		0.2984	0.3133		0.3048	0.3207		0.3009	0.3042
	AH	0.298	0.288	AE	0.2895	0.3135	AF	0.2962	0.322	AG	0.3037	0.2937
		0.295	0.297		0.287	0.321		0.2937	0.3312		0.3009	0.3042
		0.3009	0.3042		0.2937	0.3312		0.3005	0.3415		0.3068	0.3113
		0.3037	0.2937		0.2962	0.322		0.3028	0.3304		0.3093	0.2993
6500	BA	0.3048	0.3207	BB	0.3028	0.3304	BC	0.3115	0.3391	BD	0.313	0.329
		0.313	0.329		0.3115	0.3391		0.3205	0.3481		0.3213	0.3373
		0.3144	0.3186		0.313	0.329		0.3213	0.3373		0.3221	0.3261
		0.3068	0.3113		0.3048	0.3207		0.313	0.329		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	0.312
		0.3093	0.2993		0.3028	0.3304		0.3115	0.3391		0.3161	0.3059

Chromaticity Bin Definitions (continued)

CCT	Bin Code	CIE-X	CIE-Y	Bin Code	CIE-X	CIE-Y	Bin Code	CIE-X	CIE-Y	Bin Code	CIE-X	CIE-Y
5700	CA	0.3215	0.335	CB	0.3207	0.3462	CC	0.329	0.3538	CD	0.329	0.3417
		0.329	0.3417		0.329	0.3538		0.3376	0.3616		0.3371	0.349
		0.329	0.33		0.329	0.3417		0.3371	0.349		0.3366	0.3369
		0.3222	0.3243		0.3215	0.335		0.329	0.3417		0.3290	0.3300
	CH	0.3222	0.3243	CE	0.3196	0.3602	CF	0.329	0.369	CG	0.329	0.33
		0.329	0.33		0.329	0.369		0.3381	0.3762		0.3366	0.3369
		0.329	0.318		0.329	0.3538		0.3376	0.3616		0.3361	0.3245
		0.3231	0.312		0.3207	0.3462		0.329	0.3538		0.3290	0.3180
5000	DA	0.3371	0.349	DB	0.3376	0.3616	DC	0.3463	0.3687	DD	0.3451	0.3554
		0.3451	0.3554		0.3463	0.3687		0.3551	0.376		0.3533	0.362
		0.344	0.3427		0.3451	0.3554		0.3533	0.362		0.3515	0.3487
		0.3366	0.3369		0.3371	0.349		0.3451	0.3554		0.3440	0.3427
	DH	0.3366	0.3369	DE	0.3381	0.3762	DF	0.348	0.384	DG	0.344	0.3428
		0.344	0.3428		0.348	0.384		0.3571	0.3907		0.3515	0.3487
		0.3429	0.3307		0.3463	0.3687		0.3551	0.376		0.3495	0.3339
		0.3361	0.3245		0.3376	0.3616		0.3463	0.3687		0.3429	0.3307
4500	EA	0.353	0.3597	EB	0.3548	0.3736	EC	0.3641	0.3804	ED	0.3615	0.3659
		0.3615	0.3659		0.3641	0.3804		0.3736	0.3874		0.3702	0.3722
		0.359	0.3521		0.3615	0.3659		0.3702	0.3722		0.367	0.3578
		0.3512	0.3465		0.353	0.3597		0.3615	0.3659		0.3590	0.3521
	EH	0.3512	0.3465	EE	0.3571	0.3907	EF	0.3668	0.3957	EG	0.359	0.3521
		0.359	0.3521		0.3668	0.3957		0.3771	0.4034		0.367	0.3578
		0.3567	0.3389		0.3641	0.3804		0.3736	0.3874		0.364	0.344
		0.3495	0.3339		0.3548	0.3736		0.3641	0.3804		0.3567	0.3389

**SST-70X-W Cool White Color Space
Plotted on the ANSI 1931 Curve**



Chromaticity Bin Kit Codes

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

Part Numbering Nomenclature

SST — 70X — <WxS> — <H50> — <FFCCC>

Product Family	LED Emission Area	Color	Package Configuration	Bin Kit
S: Surface mount S: Lensed T: Single monolithic emitter	70=7.0 mm ² X=multi-junction	W: White x: Temperature C: Cool White D: Daylight White S: standard CRI 70	H50 package code	See Tables FF = minimum flux bin CCC: Chromaticity bin kit

Ordering Part Numbers

CCT	Min. Flux Bin ¹	Min. Flux (lm)	Chromaticity Bin Kit Code ²	Ordering Part Numbers
6500K	JB	969	651	SST-70X-WCS-H50-JB651
	KA	1042	651	SST-70X-WCS-H50-KA651
	JB	969	652	SST-70X-WCS-H50-JB652
	KA	1042	652	SST-70X-WCS-H50-KA652

Note 1: The minimum flux of each bin kit is determined by the minimum flux bin as defined on page 3. Higher flux bins are eligible to ship against shown bin kits and part numbers.

Note 2: See page 7 for chromaticity bin kit definitions.

Example: The part number SST-70X-WCS-H50-KA651 refers to a part with flux greater than 1042 lm and chromaticity bins BA, BB, BC, BD, BE, BF, BG, BH as defined on page 3.

SST-70X-W Product Characteristics¹

Parameter		Symbol	Minimum	Typical	Maximum	Unit
Forward Current at test		I_F		1500		mA
Forward Voltage(6V,@1500mA)		V_F	5.25	5.7	6.25	V
Forward Voltage(12V,@750mA)		V_F	10.5	11.4	12.5	V
Luminus Flux	6500K	ϕ_v		1120		lm
Radiometric Flux	6500K	ϕ_e		3650		mW
Viewing Angle	A120	$2\theta_{1/2}$		120		Degrees
Color Rendering Index		CRI	65	70		
Forward Current (CW) ²		I_{fmin} / I_{fmax}	0.2		5250	mA
Maximum Surge Current		I_{F-smax}			8000	mA
Maximum Reverse Current ³		I_{rev}			N.A.	
LED Junction Temperature		T_J			150	°C
ESD withstand Voltage HBM Per JEDEC/ESDA STANDARD JS-001		V_{HBM}	8000			V
ESD withstand Voltage CDM Per JEDEC/ESDA STANDARD JS-002		V_{CDM}	1000			V
Operating Temperature		T_{OPR}	- 40		100	°C
Thermal resistance junction to case (electrical)		$R_{\theta JC-EL}$		0.6		°C/W

Note 1: Values are at 85°C unless otherwise noted.

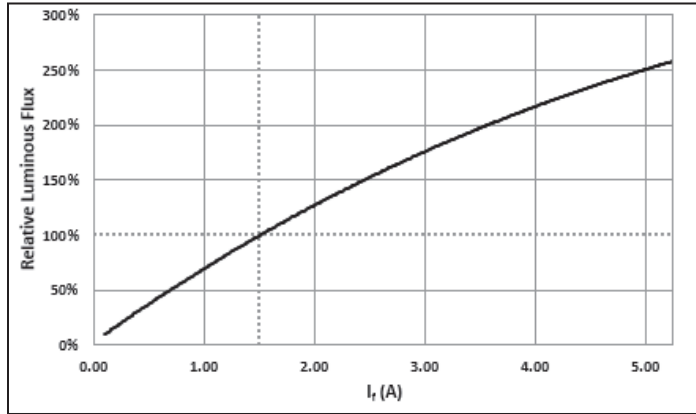
Note 2: Sustained operation at maximum current will result in shortened lifetime.

Note 3: Not designed for reverse voltage operation.

Optical & Electrical Characteristics

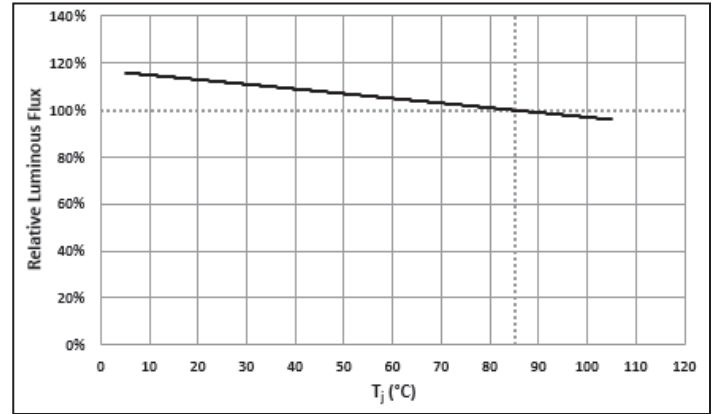
Relative Luminous Flux vs. Forward Current

$\phi_v/\phi_v(1.5A)$ Single Pulse 20ms $T_j = 85^\circ C$



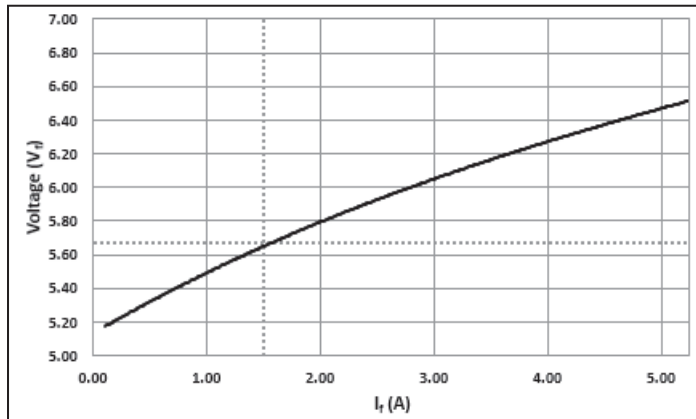
Relative Luminous Flux vs. Temperature (T_j)

$\phi_v/\phi_v(85^\circ C)$ Single Pulse 20ms $I_f = 1.5A$



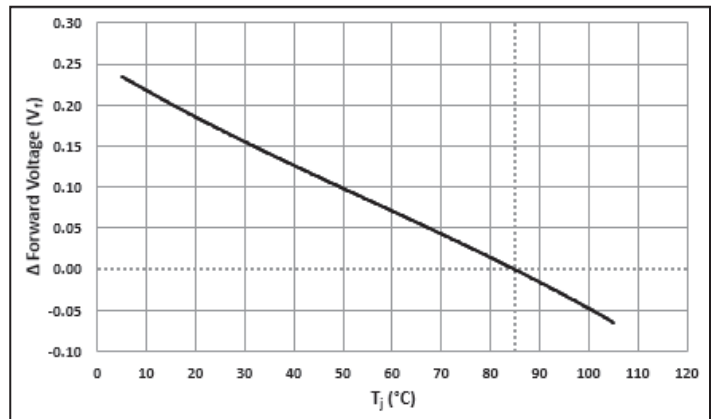
Forward Voltage vs. Forward Current

$V_f(I_f)$ Single Pulse 20ms $T_j = 85^\circ C$



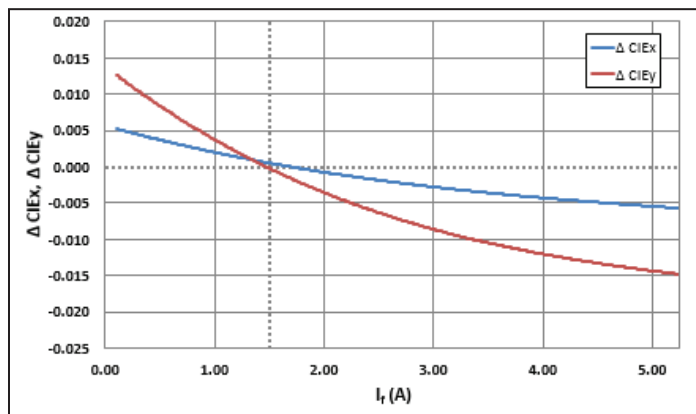
Relative Forward Voltage vs. Temperature (T_j)

$\Delta V_f = V(T_j) - V(85^\circ C)$ Single Pulse 20ms $I_f = 1.5A$



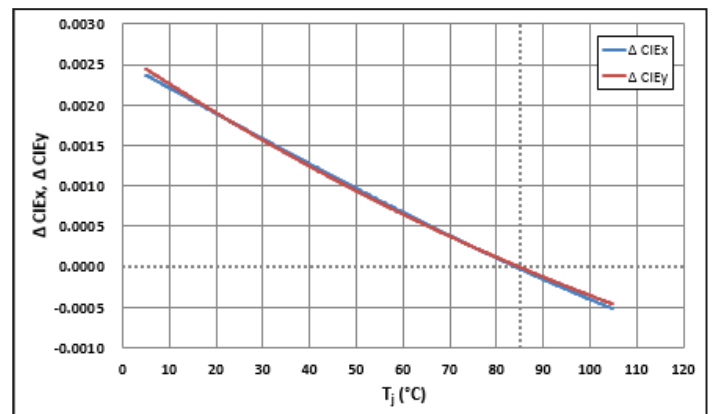
Relative Chromaticity vs. Forward Current

$\Delta CIE_{x,y} = CIE_{x,y}(I_f) - CIE_{x,y}(1.5A)$, Single Pulse 20ms $T_j = 85^\circ C$



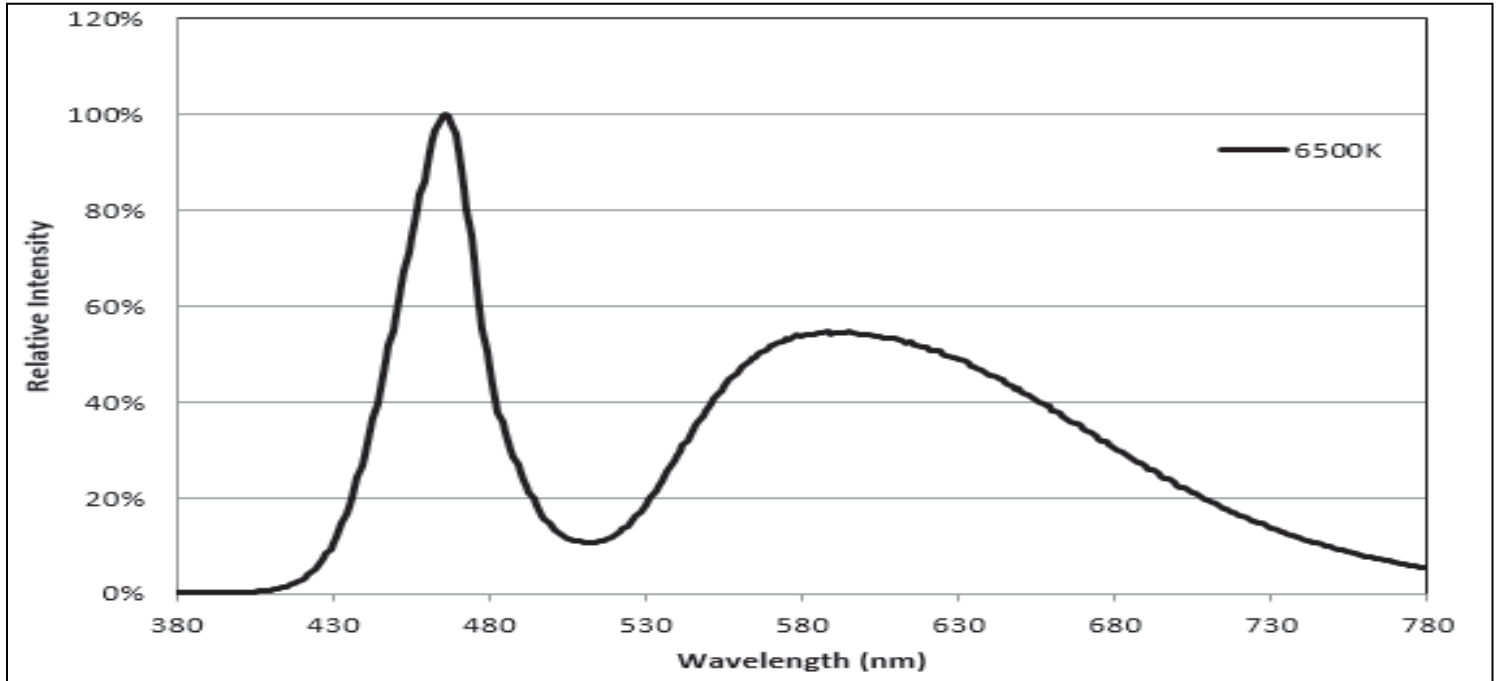
Relative Chromaticity vs. Temperature (T_j)

$\Delta CIE_{x,y} = CIE_{x,y}(T_j) - CIE_{x,y}(85^\circ C)$ Single Pulse 20ms $I_f = 1.5A$

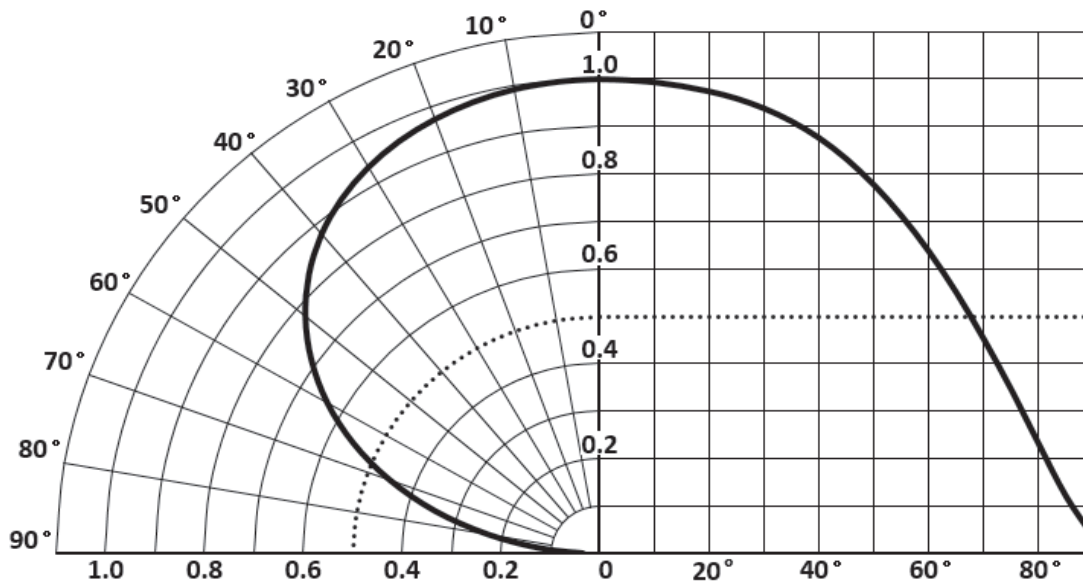


Optical & Electrical Characteristics

Typical Relative Radiant Power ¹



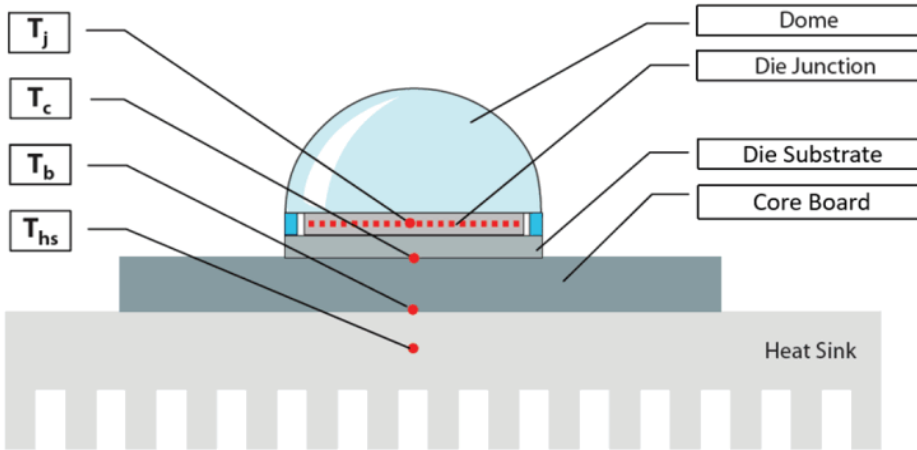
Typical Angular Pattern of Radiant Power ²



Note 1: Relative radiant power measurements were made at 1.5 A, 85 °C.

Note 2: Angular pattern measurements were made at 1.5 A, 25 °C.

Thermal Resistance



Typical Thermal Resistance

R_{j-c}^{-1}	0.6 °C/W
R_{j-b}^{-1}	0.84 °C/W

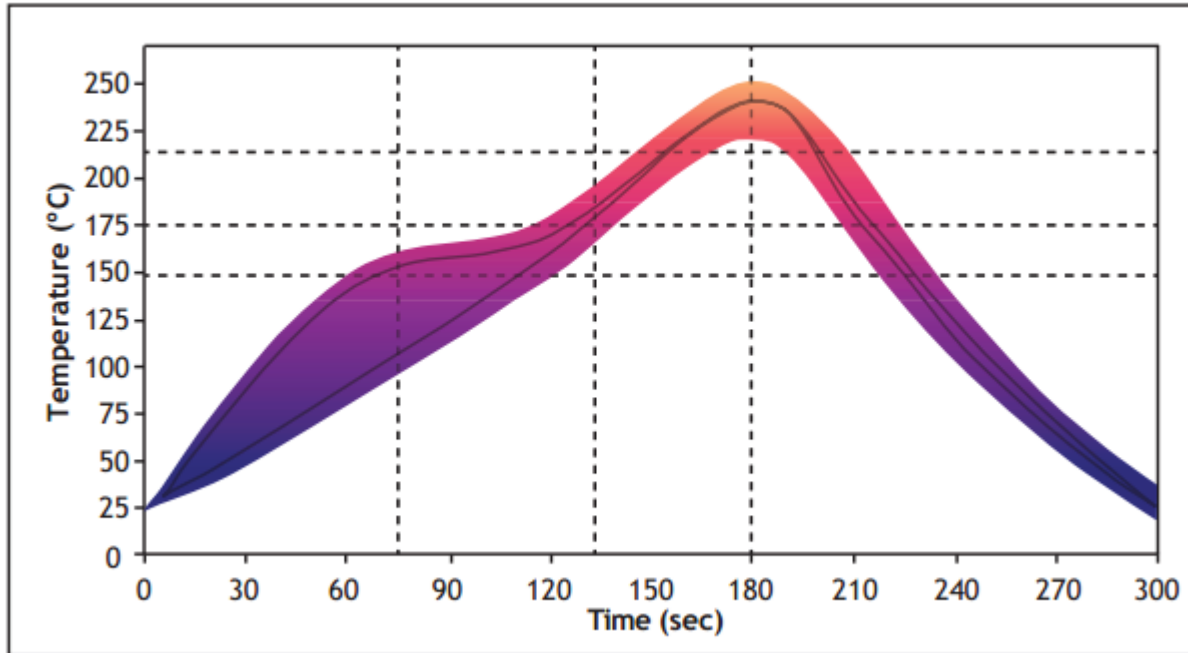
Note 1: Thermal resistance values are based on rapid thermal transient testing results.

Note 2: Thermal resistance is measured using a SAC305 solder and a Cu-pedestal MCPCB.

Note 3: The values represent the electrical thermal resistance @1.5A operation.

Soldering Profile

SAC 305 Reflow Profile Window For Low Density Boards



Lead free solder guideline for low density boards

Solder Profile Stage	Lead-Free Solder	Lead-based Solder
Profile length, Ambient to Peak	2.75 - 3.5 minutes	2.75 - 3.5 minutes
Time Maintained Above: Temperature	217 °C	183 °C
Time Maintained Above: Time	30 - 60 seconds	30 - 60 seconds
Cooldown Rate	≤4° C/sec	≤4° C/sec
Cooldown Duration	45 ± 15 sec	45 ± 15 sec

Note 1: Temperatures are taken and monitored at the component copper layer.

Note 2: Optimum profile may differ due to oven type, circuit board or assembly layout.

Note 3: Recommended lead free, no-clean solder: AIM NC254-SAC305.

Note 4: Refer to APN-001473 soldering and handling application note for additional solder profiles and details.

Precautions for Use

Storage:

1. The recommended storage condition is between 5 °C and 30 °C and relative humidity less than or equal to 60% RH in its original package.
2. After this bag is opened, devices that will be applied to infrared reflow, vapor - phase reflow, or equivalent soldering process must be:
 - a) Completed within 168 hours.
 - b) Stored at less than 60% relative humidity.
 - c) If not completely used within 168 hours, seal the remaining in the moisture barrier bag.
3. Devices require baking before mounting, if 2 a) is not met.
4. If baking is required, devices must be baked under below conditions:
24 hours at 60 C +/-5 °C

The LED's electrode and leadframe are a silver plated copper alloy. The silver surface may be affected by its environment. Please avoid conditions which may cause the LEDs to corrode or become discolored. The corrosion or discoloration might lower the solderability or affect the optical characteristics of the device.

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

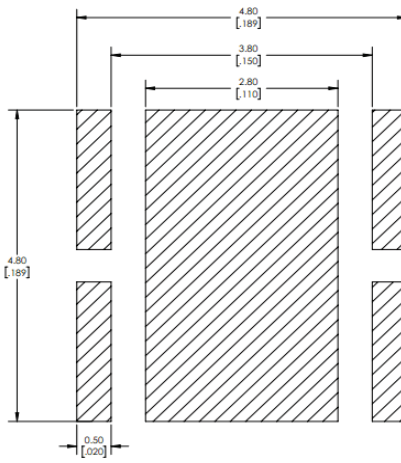
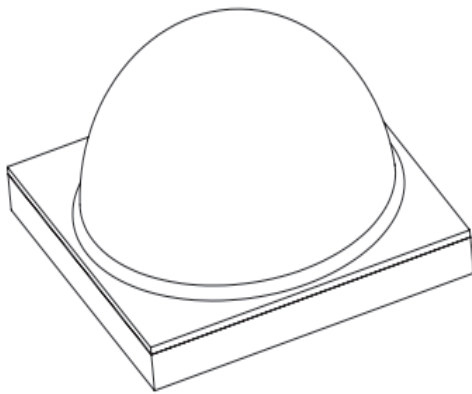
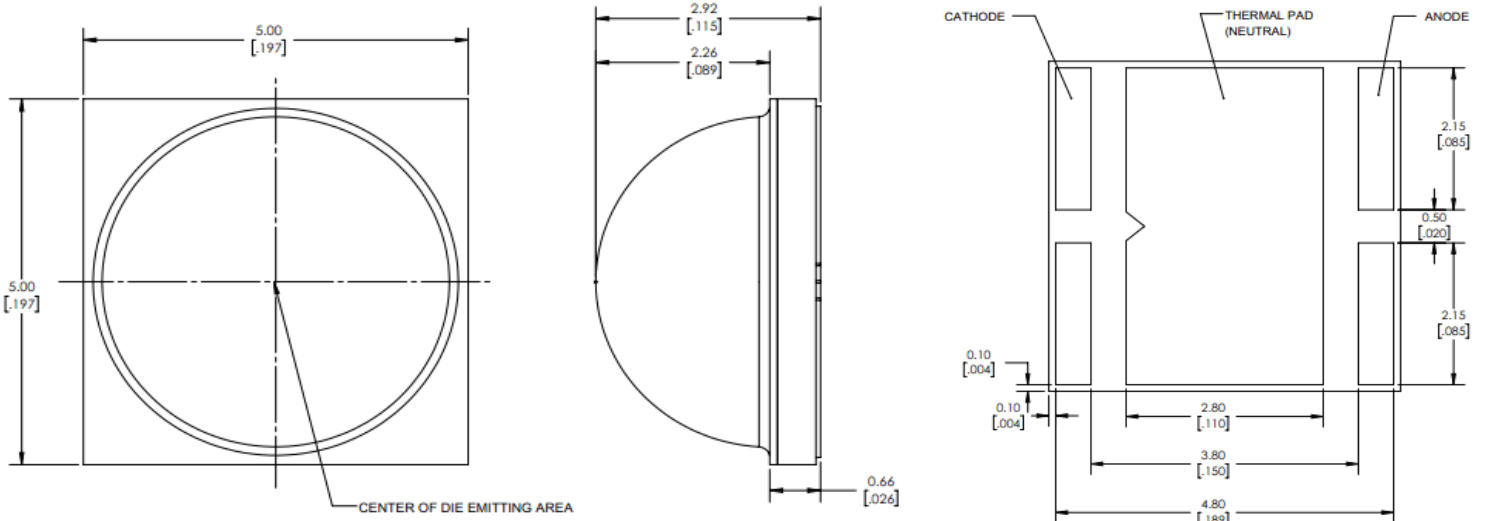
Static Electricity:

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 an anti-electrostatic wristband or anti-electrostatic gloves 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.

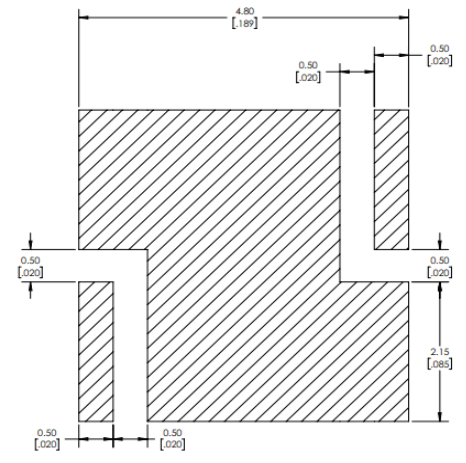
Vision Advisory

WARNING: Looking at an exposed LED during operation can result in eye injury.

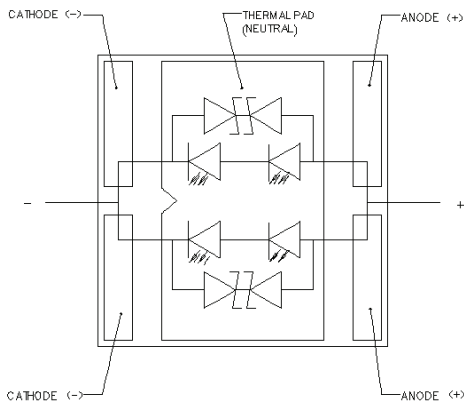
Mechanical Dimensions



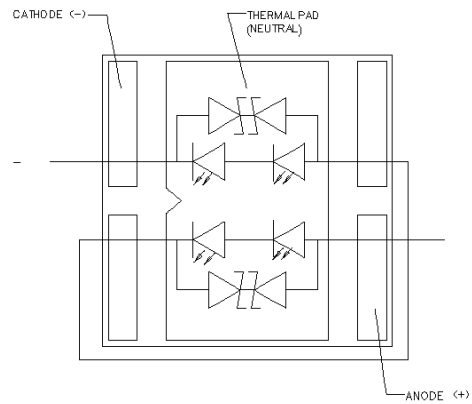
**RECOMMENDED PCB SOLDER PAD
6V CONFIGURATION**



**RECOMMENDED PCB SOLDER PAD
12V CONFIGURATION**



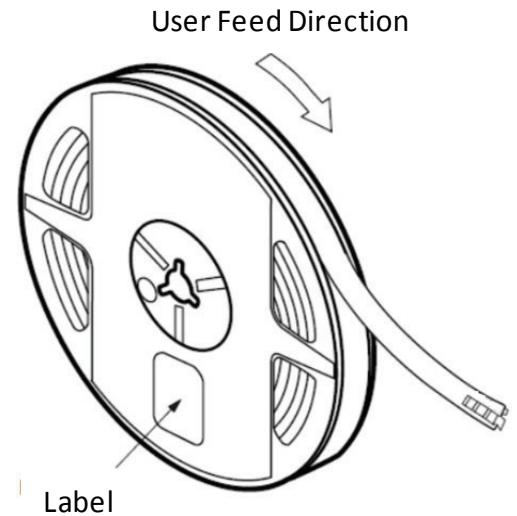
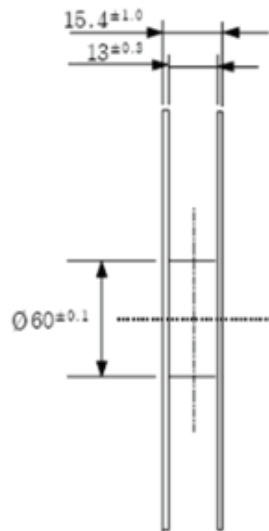
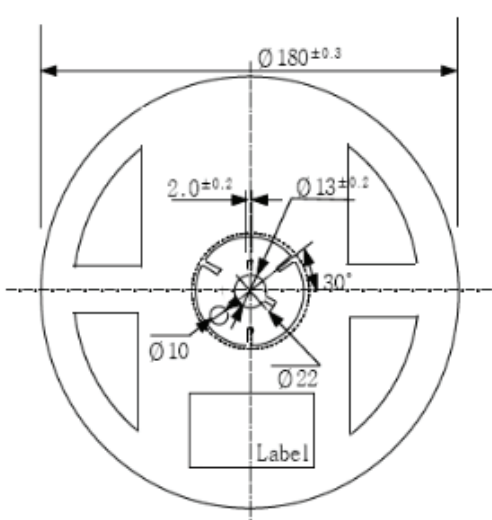
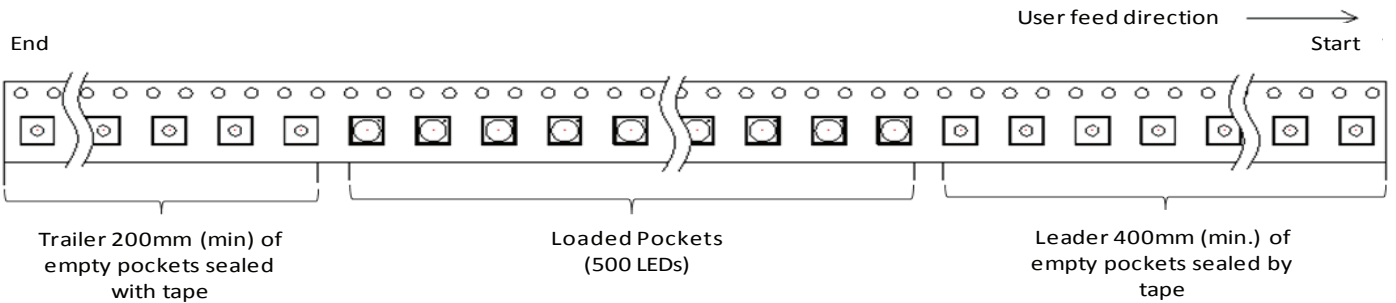
6V Configuration



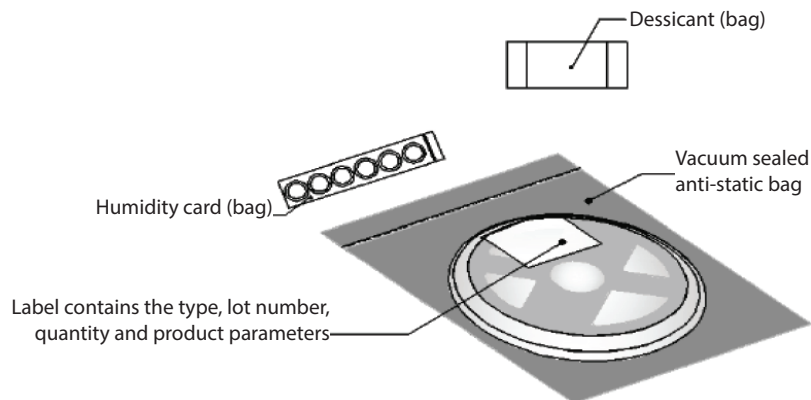
12V Configuration

Reel Package

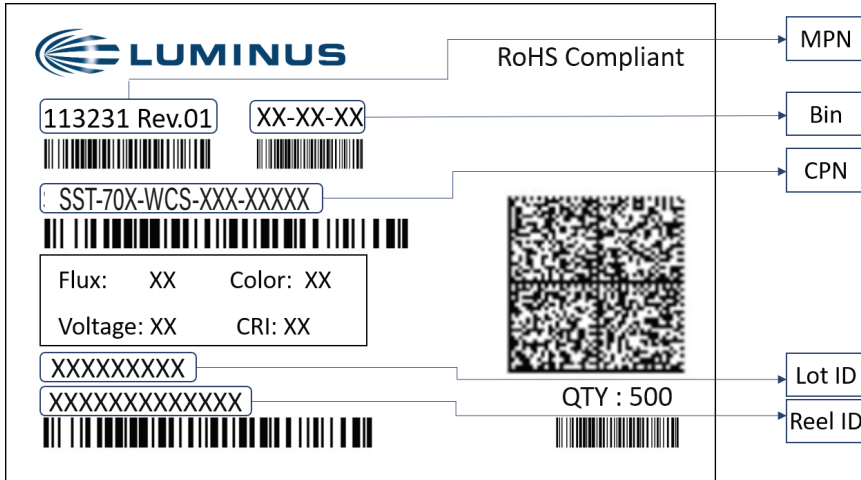
Tape Drawing



Reel dimensions are in millimeters.

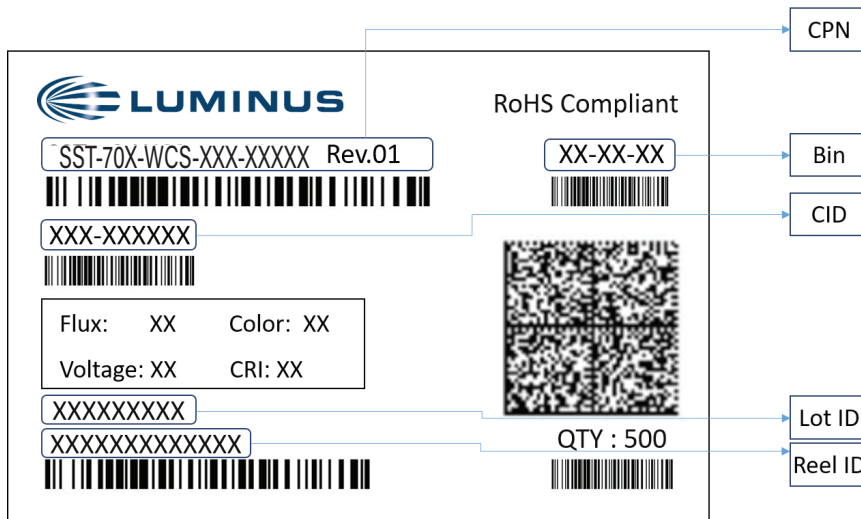


Reel Label


Label Fields:

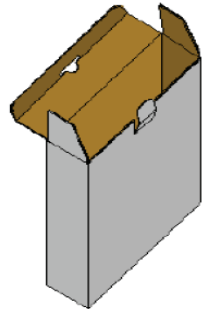
- CPN: Luminus ordering part number
- MPN: For Luminus internal use
- Qty: On reel
- Flux: Bin as defined on page 3
- Voltage: Bin as defined on page 3
- Color: Bin as defined on page 4
- Mfg Info: For Luminus internal use

Shipping Label

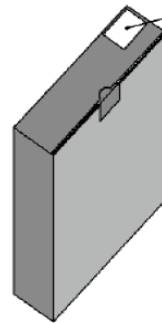

Label Fields:

- CPN: Luminus ordering part number
- CID: Customer ID (Optional)
- Qty: On reel
- Flux: Bin as defined on page 3
- Voltage: Bin as defined on page 3
- Color: Bin as defined on page 4

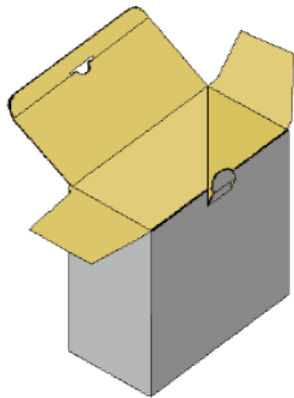
Box Packaging Information



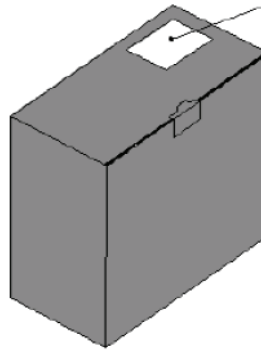
Size: 22.5*24.5*6.5 cm
Capacity: 5 reels per box



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



Size: 22.5*24.5*13 cm
Capacity: 10 reels per box



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

History of Changes

Revision	Date	Description of Change
1	11/01/2020	Initial revision

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