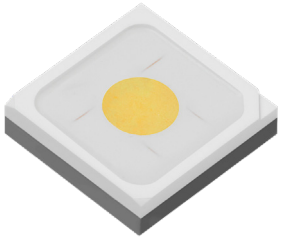
SFT-12R-WDE (CRI > 70, 75)

High Power White LEDs



Features

With Luminus' advanced chip and packaging technologies, SFT-12R-W maximizes the Candela/Lumen K-Factor for high optical performance in directional lighting:

- A small emitter enables high intensity, long beam distance and small optics.
- A patented round emitter, in comparison with a square emitter, enables better uniformity and higher intensity in beam spots.
- A flat window, in comparison with a domed cover, allows the optics to be closer to the emitter to achieve higher intensity and longer beam distance.

In addition, Luminus phosphor-on-chip technology's high uniformity of color over radiation angle enables superior beam spot light quality.

- Package Size: 3535
- Maximum Drive Current: 3 A
- Color Temperature: 3000K - 5700K
- Color Rendering Index: > 70, 75
- Low thermal resistance: 1.7°C/W
- ANSI-compatible chromaticity bins
- Electrically isolated thermal path
- 8 kV HBM ESD rating per ANSI/ESDA/JEDEC JS-001

Table of Contents

RoHS REACH

Applications

- Stadium and Sports Field Lighting
- Roadway and Street Lighting
- Outdoor Area Lighting
- Landscape Lighting
- Garage and Canopy Lights
- High / Low Bay Industrial Lighting
- Track Light
- Spotlight
- Wall Washer
- Task Light

Ordering Information

Ordering Part Numbers[1]

CRI	CCT	Luminous Flux		Ordering Part Number	
		Minimum Flux Bin[1]	Minimum Flux[2]	Chromaticity Bin Kit 3-Step Ellipse[3]	Chromaticity Bin Kit ANSI Centers[3]
> 70	3000K	C8	238 lm	SFT-12R-WE30-AV2-C830E3	SFT-12R-WE30-AV2-C8302
	4000K	D1	265 lm	SFT-12R-WE40-AV2-D140E3	SFT-12R-WE40-AV2-D1402
> 75	5700K	D1	265 lm	SFT-12R-WD57-AV2-D157E3	SFT-12R-WD57-AV2-D1572

Part Number Nomenclature

SFT **12R** **W<xyy>** **AV2** **<ffcccc>**

Product Family	Chip Area	Color	Package Configuration	Bin Kit
S: Surface Mount **F**: Flat Window **T**: Single Emitter	**12**: 1.2 mm^2 **R**: Round Shape	**W**: White <**x**> CRI Category Code **E**: CRI > 70 **D**: CRI > 75 <**yy**> Color Temperature **30**: 3000K **57**: 5700K	**AV2**: 3535 package code	<**ff**> Minimum Flux Bin, see 'Luminous Flux Bins' table for details <**cccc**> Chromaticity Bin Kit, see 'Chromaticity Bin Kit Codes' table for details

Notes:

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 Bins' table for details of all flux bins.
2. Product test condition: I_f = 700 mA, T_j = 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 Bins[1, 2]

Flux Bin	Binning @ 700 mA			Correlated Minimum Flux (lm) @ T_j = 85°C[2]			
	T_j = 85°C		T_j = 25°C				
	Minimum Flux (lm)	Maximum Flux (lm)	Minimum Flux (lm)	1000 mA	1500 mA	2000 mA	3000 mA
C7	226	238	253	303	414	511	664
C8	238	250	267	319	436	538	700
C9	250	265	280	335	458	565	735
D1	265	280	297	355	485	599	779
D2	280	295	314	375	512	633	823
D3	295	310	330	395	540	667	867
D4	310	325	347	415	567	701	911

Forward Voltage Bins[3]

Voltage Bin	Binning @ 700 mA, T_j = 85°C	
	Minimum Voltage (V)	Maximum Voltage (V)
VJ	2.7	2.9
VK	2.9	3.1

Notes:

1. LEDs are measured at 25°C ambient temperature with 700 mA 20 ms single pulse. The measured values are correlated to values at 85°C junction temperature (T_j). Luminus maintains a ±6% tolerance on flux measurement.
2. Flux values at other junction temperature (T_j) and/or forward current conditions are calculated and for reference only.
3. Individual voltage bins are not orderable.

Binning Structure

Chromaticity Binning Coordinates (3-Step Ellipse)

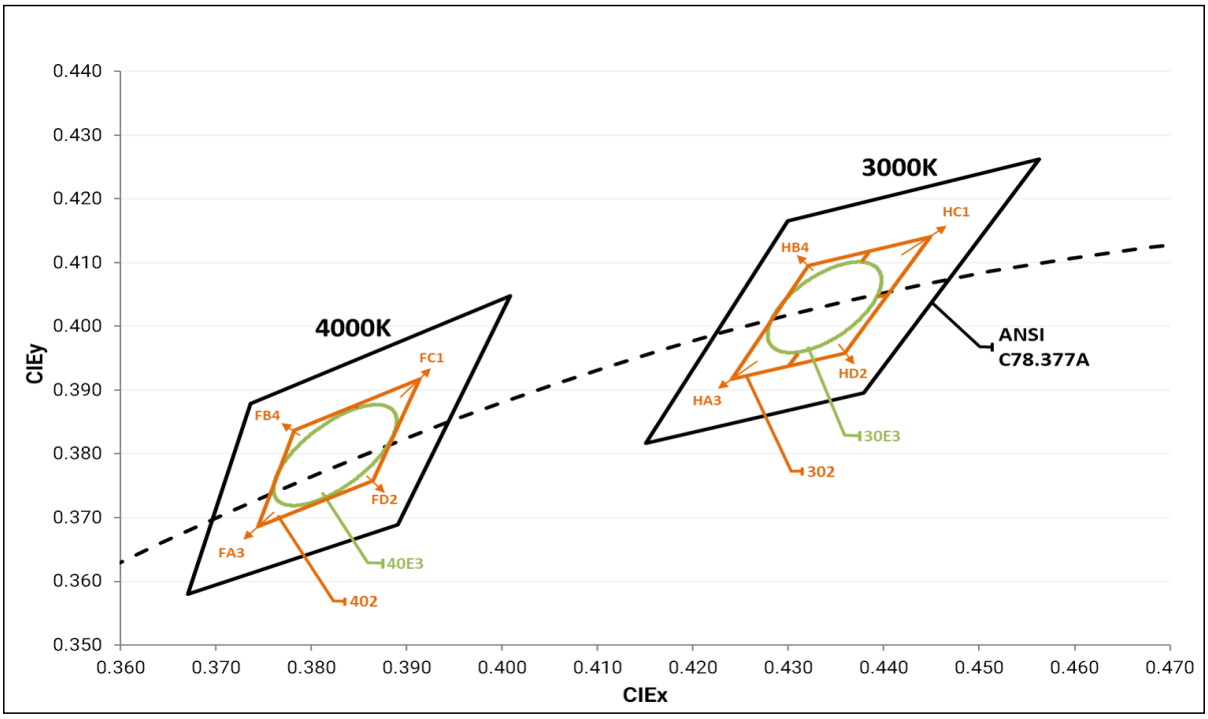
CCT	Center Point		3-Step Ellipse		Angle
	CIEx	CIEy	a	b	
3000K	0.4338	0.4030	0.0083	0.0041	53.20°
4000K	0.3825	0.3798	0.0094	0.0040	53.43°
5700K	0.3287	0.3417	0.0072	0.0032	59.09°

Chromaticity Binning Coordinates (ANSI Centers)

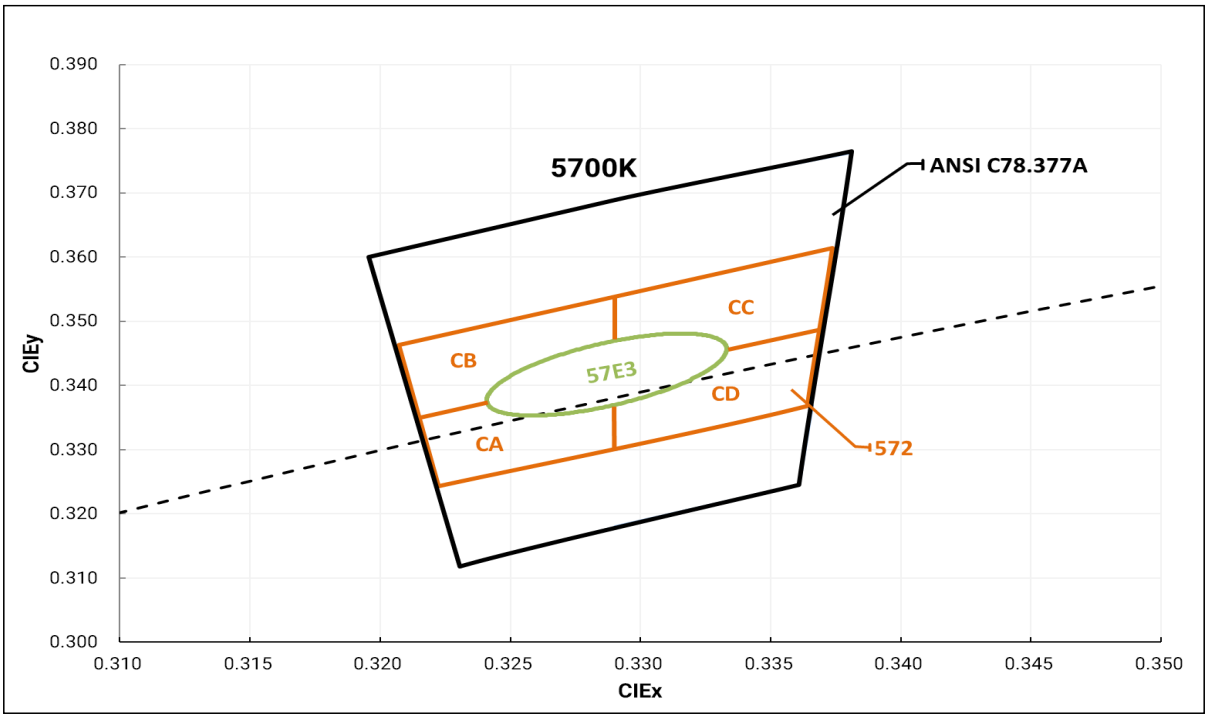
CCT	Bin	CIEx	CIEy	Bin	CIEx	CIEy	Bin	CIEx	CIEy	Bin	CIEx	CIEy
3000K	HA3	0.4242	0.3919	HB4	0.4281	0.4006	HC1	0.4342	0.4028	HD2	0.4300	0.3939
		0.4281	0.4006		0.4322	0.4096		0.4385	0.4119		0.4342	0.4028
		0.4342	0.4028		0.4385	0.4119		0.4449	0.4141		0.4403	0.4049
		0.4300	0.3939		0.4342	0.4028		0.4403	0.4049		0.4359	0.3960
4000K	FA3	0.3744	0.3685	FB4	0.3763	0.3760	FC1	0.3825	0.3798	FD2	0.3804	0.3721
		0.3763	0.3760		0.3782	0.3837		0.3847	0.3877		0.3825	0.3798
		0.3825	0.3798		0.3847	0.3877		0.3912	0.3917		0.3887	0.3836
		0.3804	0.3721		0.3825	0.3798		0.3887	0.3836		0.3863	0.3758
5700K	CA	0.3241	0.3373	CB	0.3241	0.3373	CC	0.3290	0.3469	CD	0.3333	0.3457
		0.3215	0.3350		0.3215	0.3350		0.3290	0.3538		0.3371	0.3490
		0.3222	0.3243		0.3207	0.3462		0.3376	0.3616		0.3366	0.3369
		0.3290	0.3300		0.3290	0.3538		0.3371	0.3490		0.3290	0.3300
		0.3289	0.3369		0.3290	0.3469		0.3333	0.3457		0.3290	0.3370

Binning Structure

Chromaticity Binning Diagram (Warm White)[1, 2, 3]



Chromaticity Binning Diagram (Cool White)[1, 2, 3]



Binning Structure

Chromaticity Bin Kit Codes

CCT	3-Step Ellipse		ANSI Centers	
	Bin Kit Code	Chromaticity Bins	Bin Kit Code	Chromaticity Bins
3000K	30E3	30E3	302	30E3, HA3, HB4, HC1, HD2
4000K	40E3	40E3	402	40E3, FA3, FB4, FC1, FD2
5700K	57E3	57E3	572	57E3, CA, CB, CC, CD

Notes:

1. LED chromaticity is measured and binned at 25°C ambient temperature with 700 mA 20 ms single pulse.
2. Luminus maintains a tolerance of ±0.005 on Chromaticity (CIEx, CIEy) measurement.
3. Chromaticity binning is based on CIEx and CIEy coordinates only. CCT values shown in the datasheet are for informational purposes and do not represent binning criteria.

Absolute Maximum Ratings

Parameter		Symbol	Values	Unit
Forward Current	Minimum	$I_{f\,min}$	0.1	A
	Maximum	$I_{f\,max}$	3.0	
Surge Current (t < 10 ms, Duty Cycle < 10%)		I_s	4.0	
Reverse Voltage (@ I_f = 10 mA)		V_r	5	V
Power Dissipation		P_D	11	W
Junction Temperature		T_j	150	°C
Operating Temperature Range		T_{opr}	-40 to 100	
Storage Temperature Range		T_{stg}	-40 to 100	
ESD withstand Voltage ANSI/ESDA/JEDEC JS-001 (HBM)		V_{ESD}	8	kV
ESD withstand Voltage ANSI/ESDA/JEDEC JS-002 (CDM)		V_{CDM}	1	

Characteristics

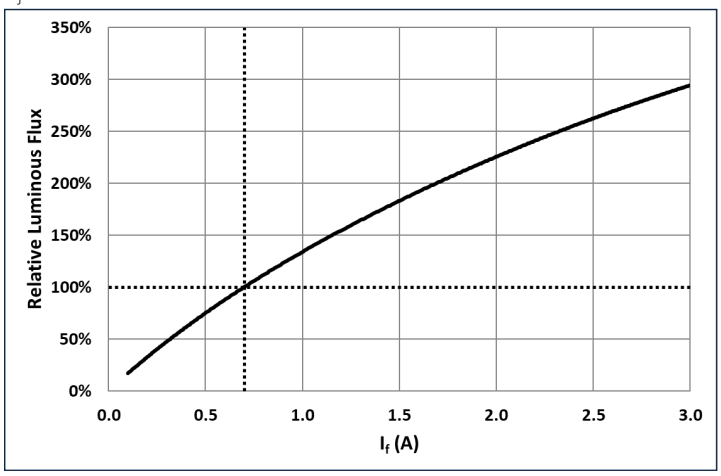
Parameter (I_f = 700 mA, T_j = 85°C)		Symbol	Value		Unit
			WE	WD	
Color Rendering Index[1]		CRI	> 70	> 75	
Forward Voltage	Minimum	$V_{f\,min}$	2.7		V
	Typical	$V_{f\,typ}$	2.9		
	Maximum	$V_{f\,max}$	3.1		
Viewing Angle[2]		$2\theta_{1/2}$	119		°
Temperature Coefficient of Voltage		Δ_{Vf}/Δ_T	-1.2		mV/°C
Electrical Thermal Resistance (Junction to Solder Point)[3]		$R_{th\,JS\,elec}$	1.7		°C/W

Notes:

1. Luminus maintains a tolerance of ±2 on Color Rendering Index (CRI) measurement.
2. Please contact Luminus Sales regarding the details of Viewing Angle vs Chromaticity.
3. Thermal measurements are in accordance with JEDEC 51-14.

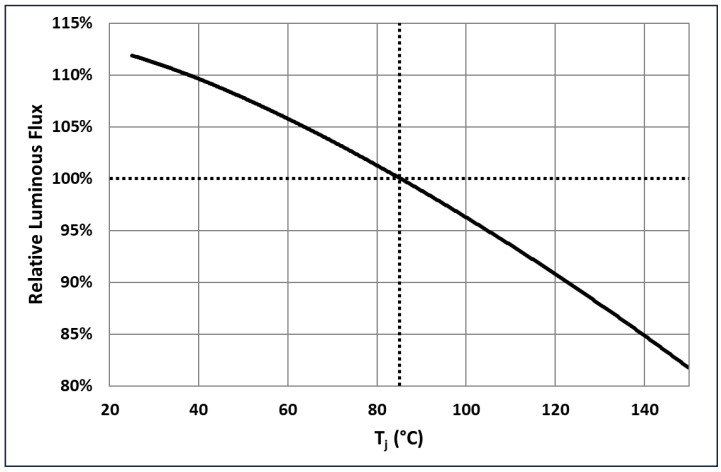
Relative Luminous Flux vs Forward Current

T_j = 85°C (3000K - 4000K)



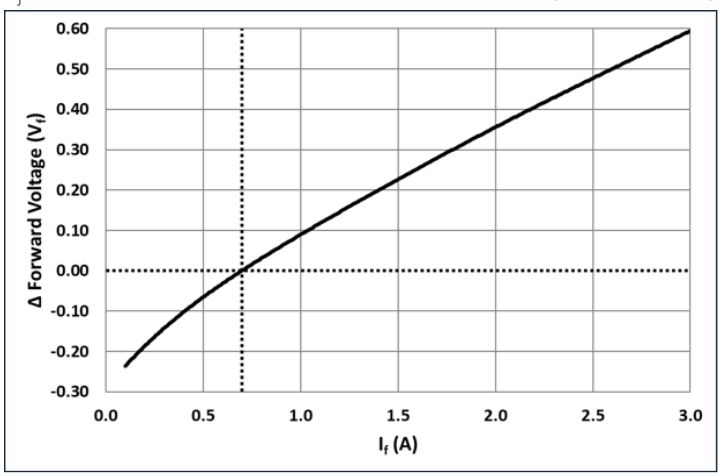
Relative Luminous Flux vs Temperature

I_f = 0.7 A (3000K - 4000K)



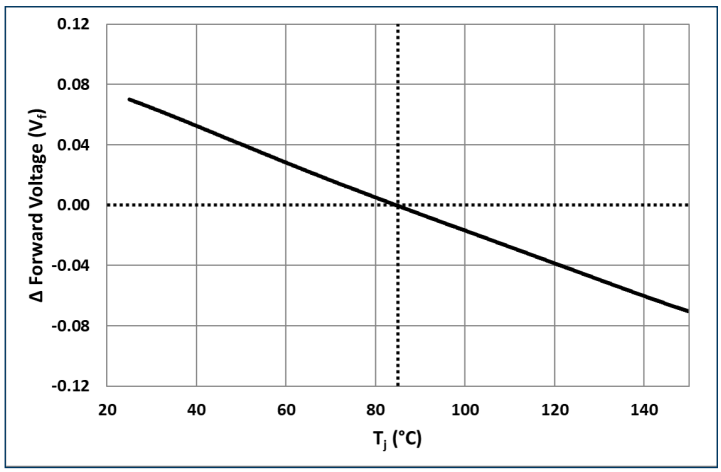
Forward Voltage vs Forward Current

T_j = 85°C (3000K - 4000K)



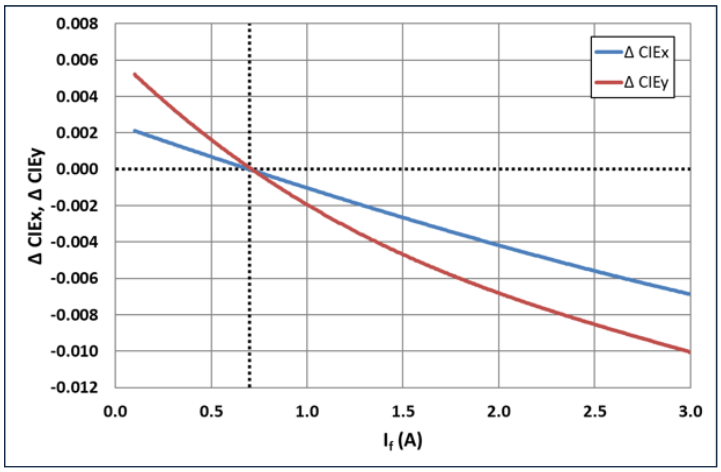
Forward Voltage vs Temperature

I_f = 0.7 A (3000K - 4000K)



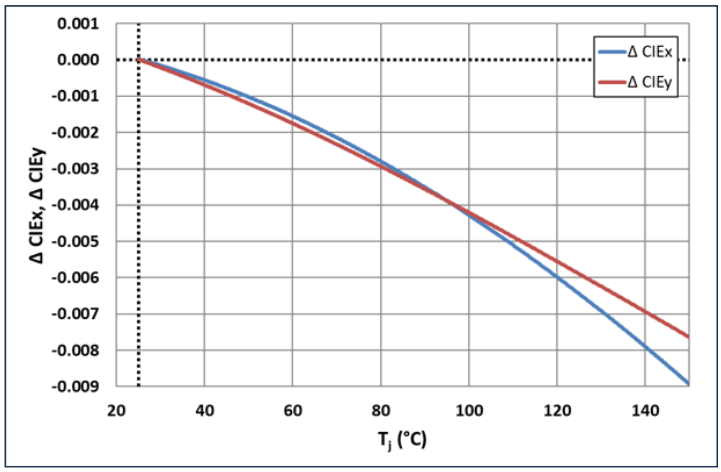
Relative Chromaticity vs Forward Current

T_j = 85°C (3000K - 4000K)



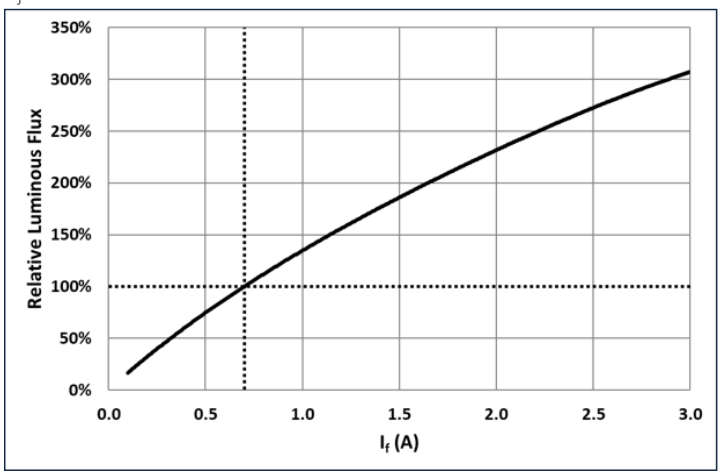
Relative Chromaticity vs Temperature

I_f = 0.7 A (3000K - 4000K)



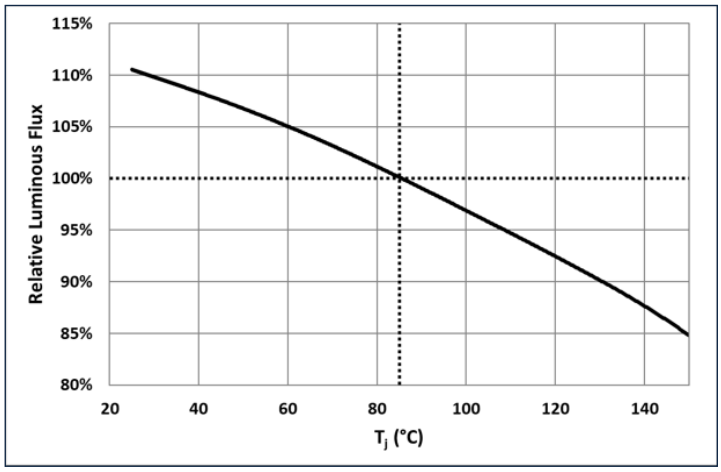
Relative Luminous Flux vs Forward Current

T_j = 85°C (5700K)



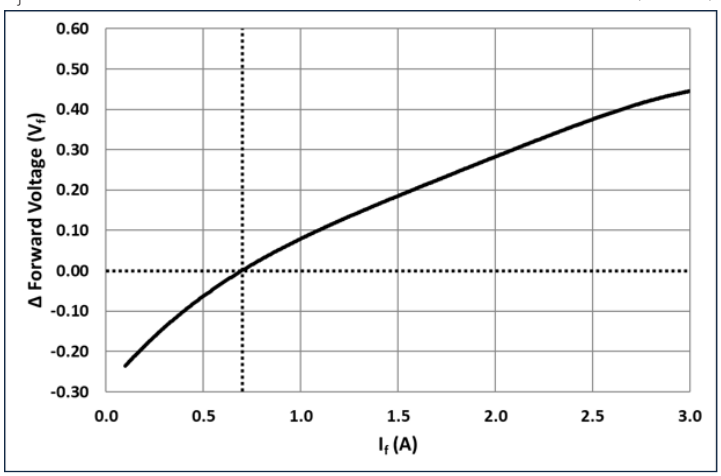
Relative Luminous Flux vs Temperature

I_f = 0.7 A (5700K)



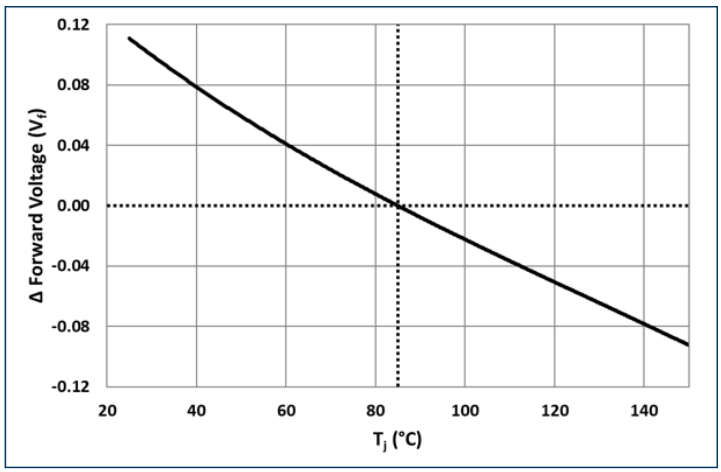
Forward Voltage vs Forward Current

T_j = 85°C (5700K)



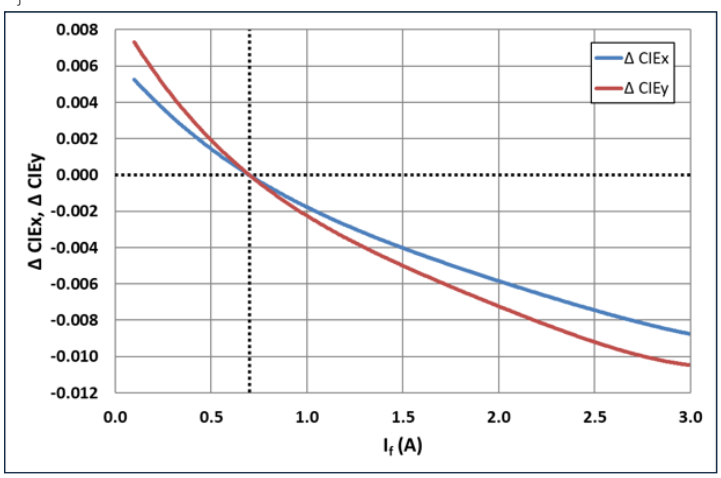
Forward Voltage vs Temperature

I_f = 0.7 A (5700K)



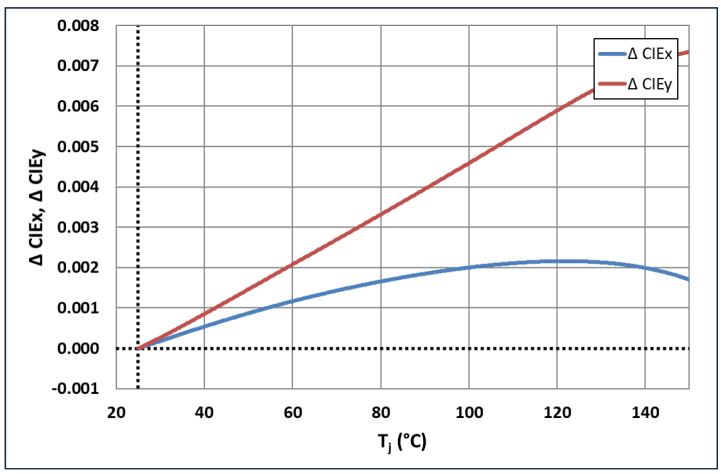
Relative Chromaticity vs Forward Current

T_j = 85°C (5700K)



Relative Chromaticity vs Temperature

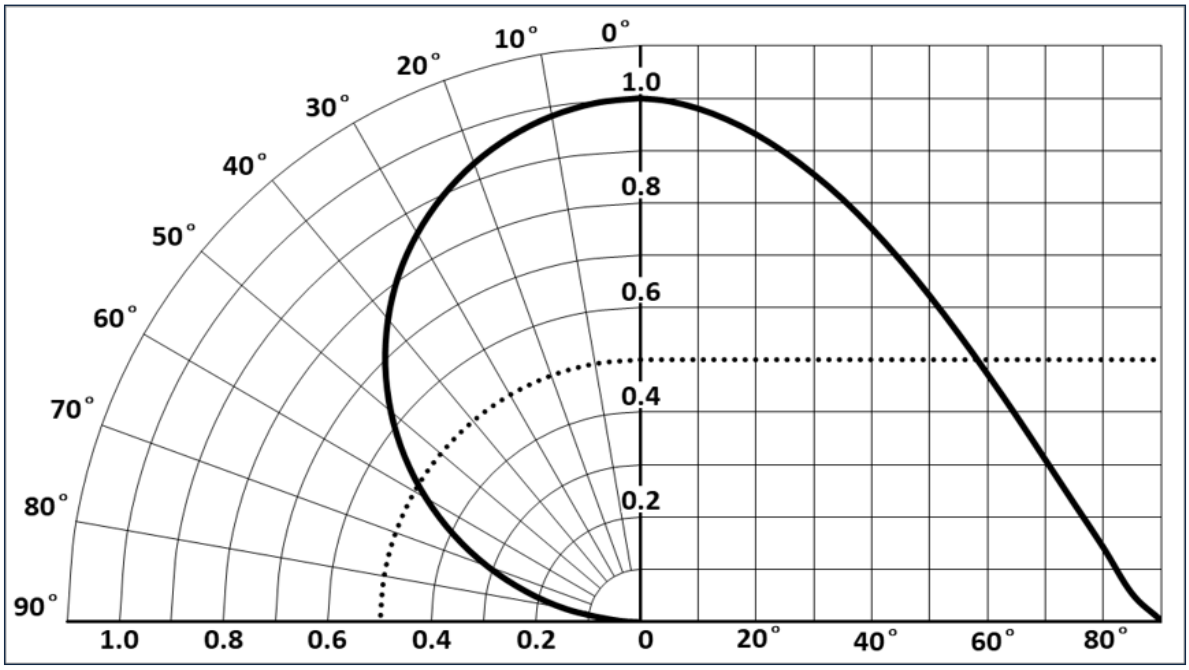
I_f = 0.7 A (5700K)



Angular Distribution and Typical Spectrum

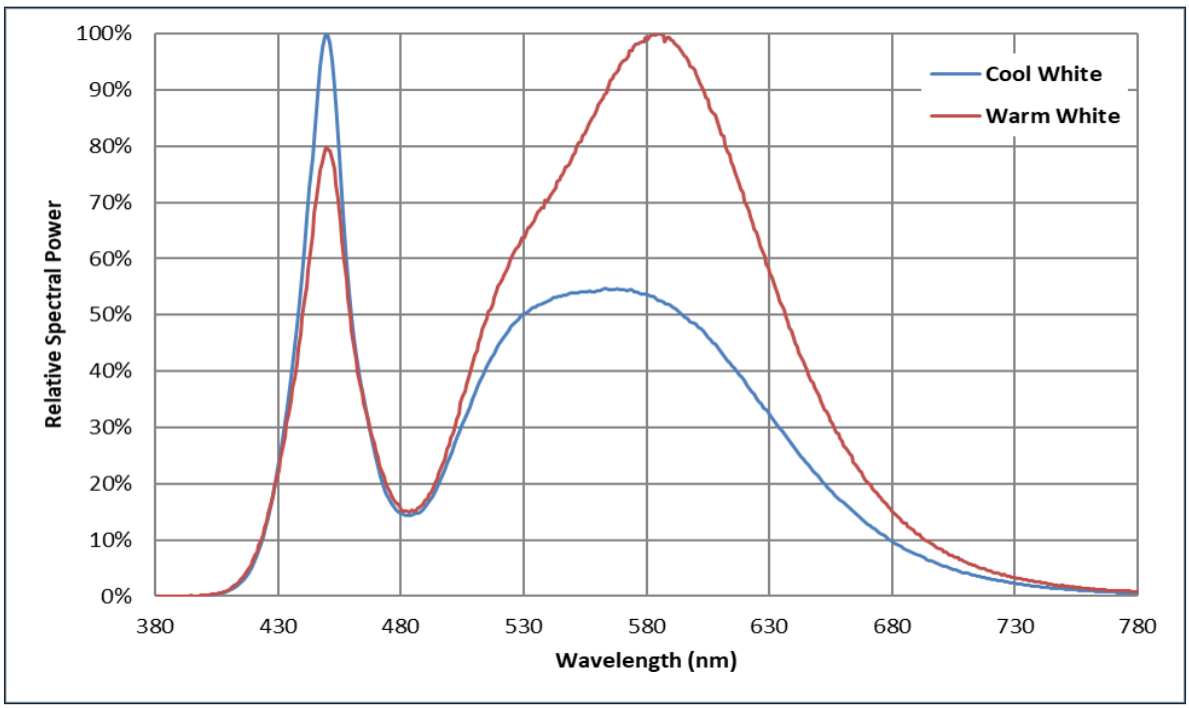
Angular Distribution

I_f = 0.7 A; T_j = 25°C

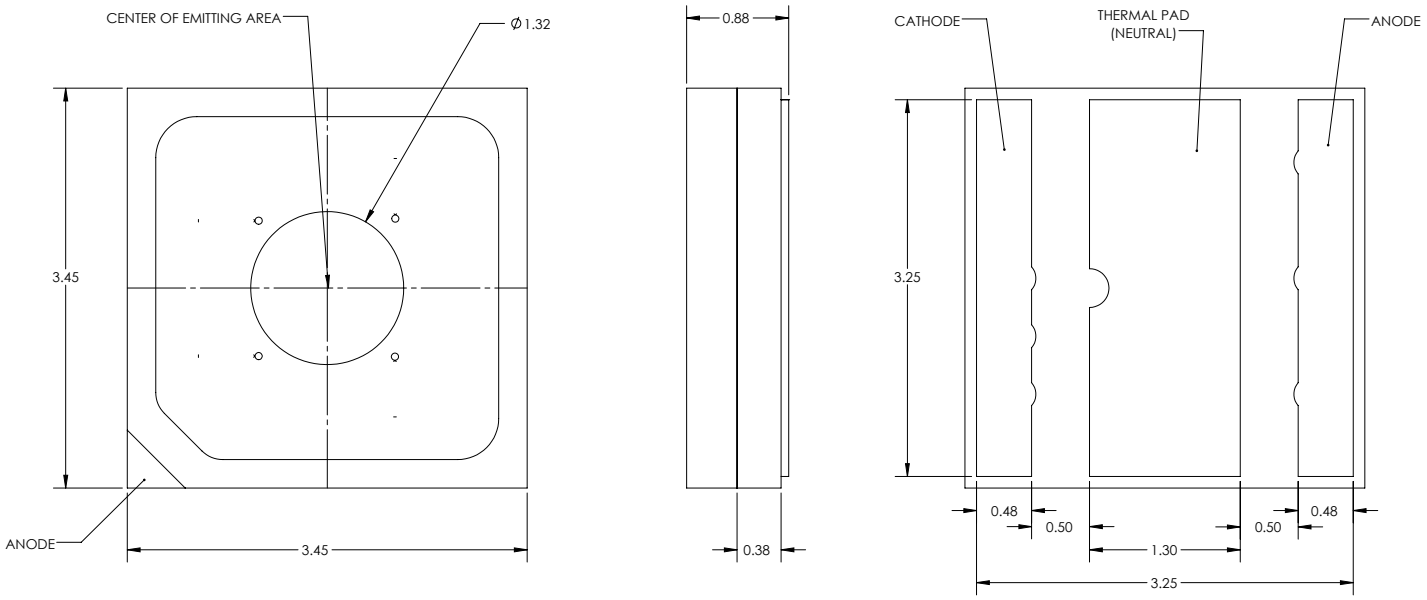


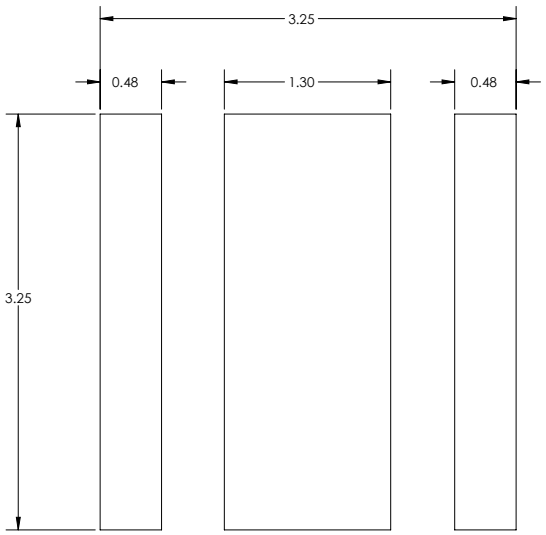
Relative Spectral Power Distribution

I_f = 0.7 A; T_j = 85°C

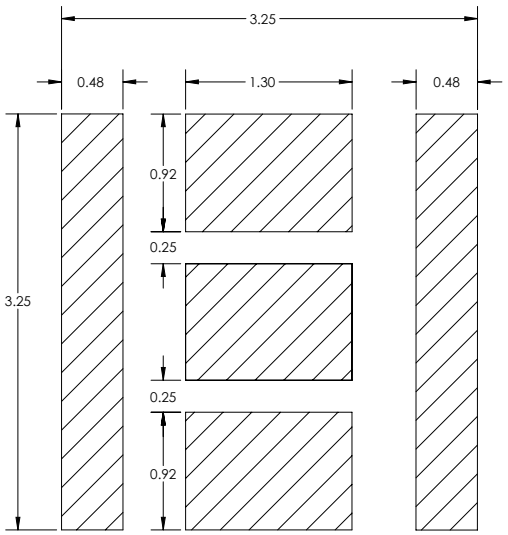


Mechanical Dimensions[1]





RECOMMENDED PCB SOLDER PAD DESIGN

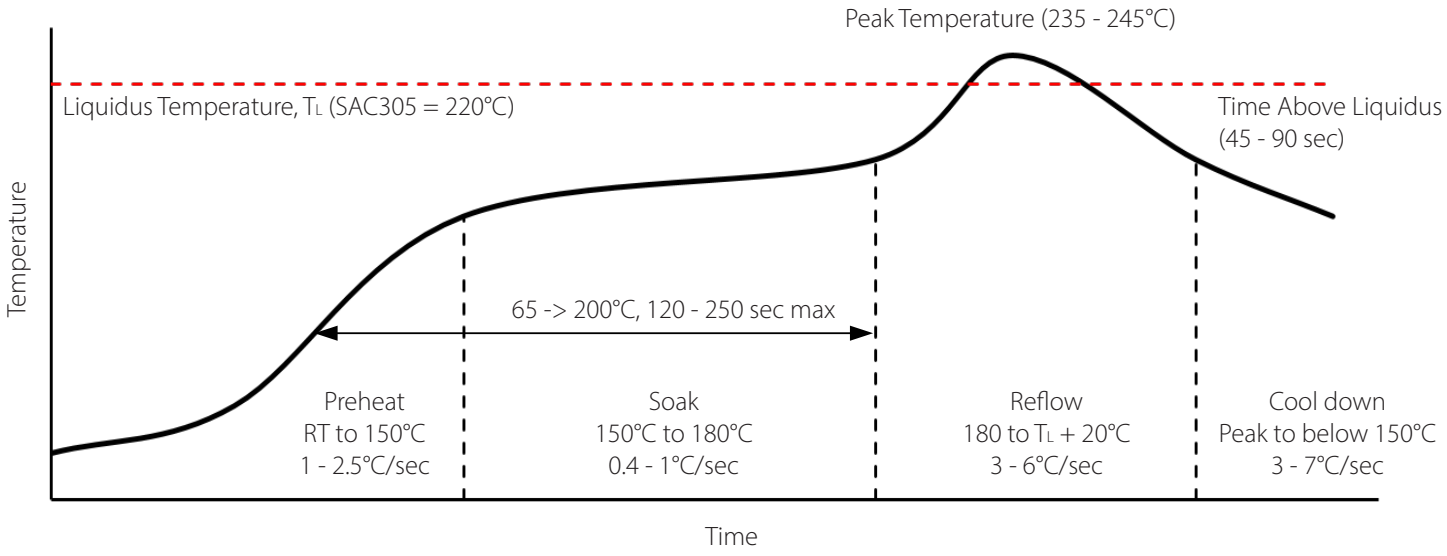


RECOMMENDED STENCIL PATTERN DESIGN

Note:

1. All dimensions are in millimeter ± 0.13 mm.

Soldering Profile



SMT Solder Rework Temperature Guidelines

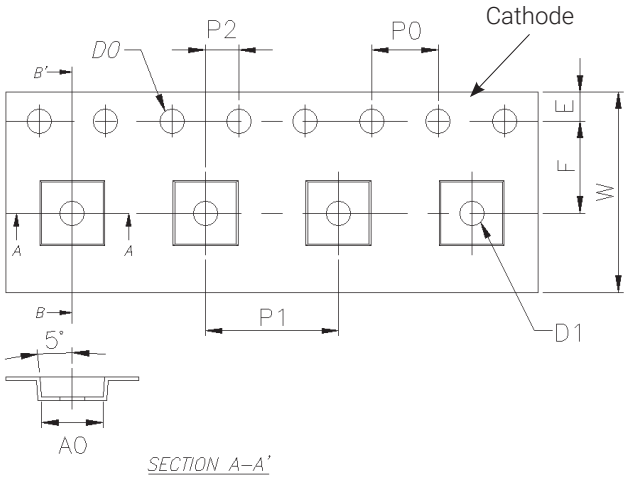
Parameter	Manual Hotplate Reflow	Hot Air Gun Reflow
Heating Time	< 60 sec	
Hotplate Temperature	< 245°C	< 150°C

Notes:

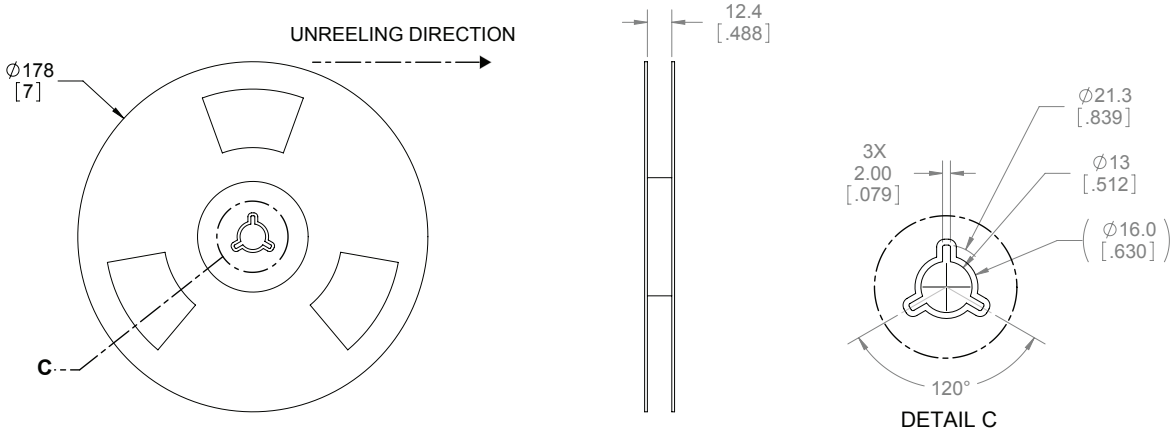
1. Product complies to Moisture Sensitivity Level 3 (MSL 3).
2. The numbers in the table are specific to SAC305. Luminus recommends using an SAC305 solder paste with a no-clean flux for RoHS compliant products.
3. During the pick and place process, axial forces on the dome (or window) should not exceed 0.5 Newtons (N).
4. Use of a multi-zone IR reflow oven with a nitrogen blanket is recommended.
5. 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.
6. Luminus recommends using the solder paste data sheet information as a starting point in time-temperature process development.
7. 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-
8. For any technical questions about soldering process, please contact Luminus at techsupport@luminus.com.

Tape and Reel Outline



Parameter	Dimension (mm)
A0	3.70±0.10
B0	3.70±0.10
D0	1.50+0.10, -0
D1	1.50±0.10
E	1.75±0.10
F	5.50±0.10
K0	1.20±0.10
P0	4.00±0.10
P1	8.00±0.10
P2	2.00±0.10
t	0.23±0.05
W	12±0.3

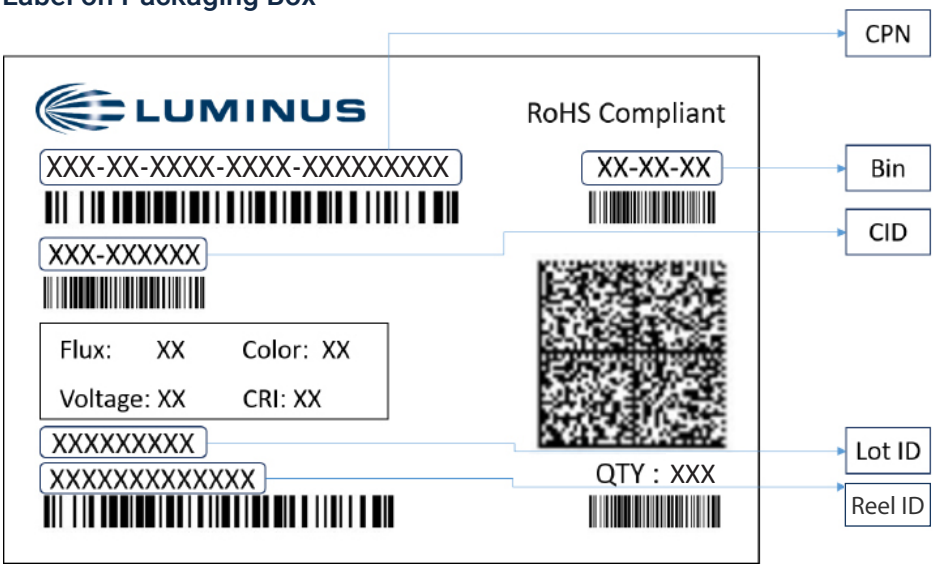


Notes:

1. Each Reel contains 500 units of LEDs.
2. Black ant-static tape material (Denka ECMB/ECAP3).
3. The accumulated tolerance for ten chain holes should be no more than 0.2 mm.
4. The tortuosity of 250 mm tape should be no more than 1 mm.
5. Leave minimum 800 mm with empty compartments sealed by cover tape for lead in.
6. Leave minimum 1200 mm with empty compartments sealed by cover tape for trailer.
7. All dimensions must comply to EIA-481-D
8. Final tape and reel packaging must meet the requirements of JEDEC-STD-033, LEVEL 2A.

Shipping Label

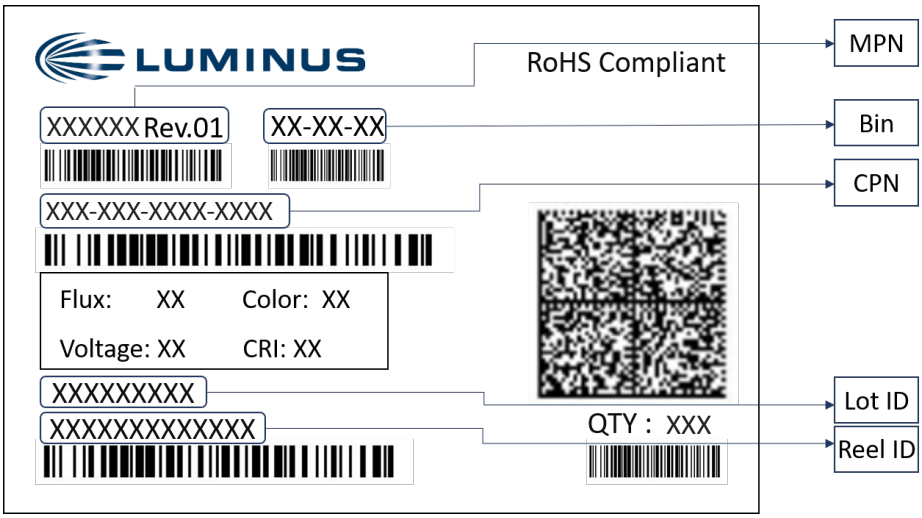
Label on Packaging Box



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 - 6
CRI: NA
Lot ID & Reel ID: For Luminus internal use

Label on Reel

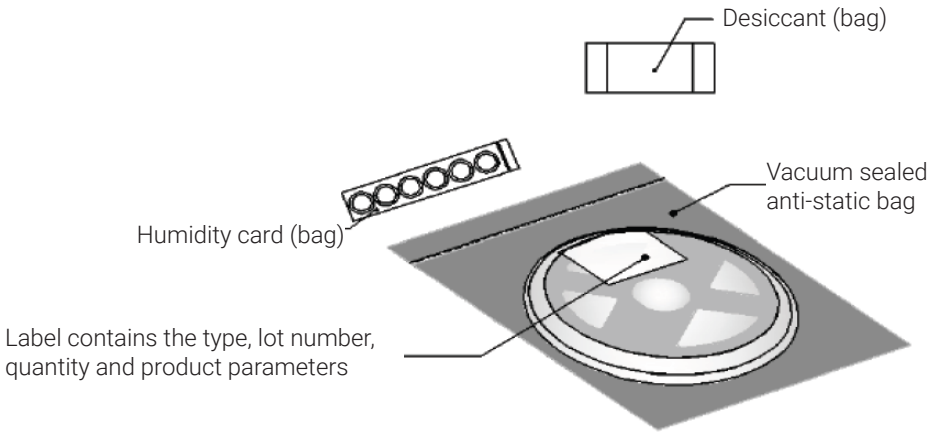


Label Fields:

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 - 6
CRI: NA
Lot ID & Reel ID: For Luminus internal use

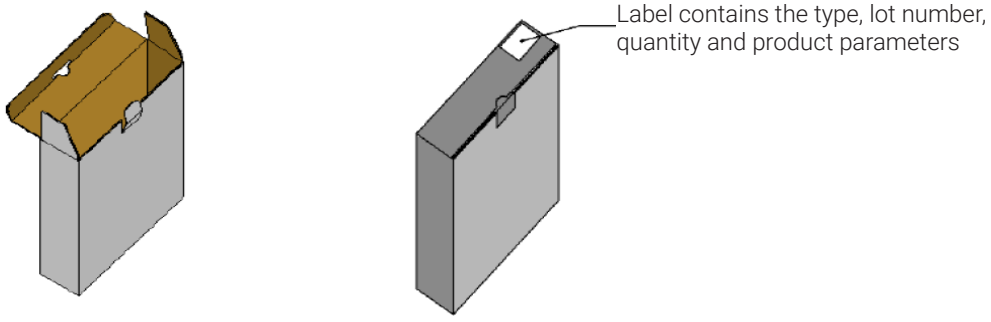
Packaging

Packaged Reel

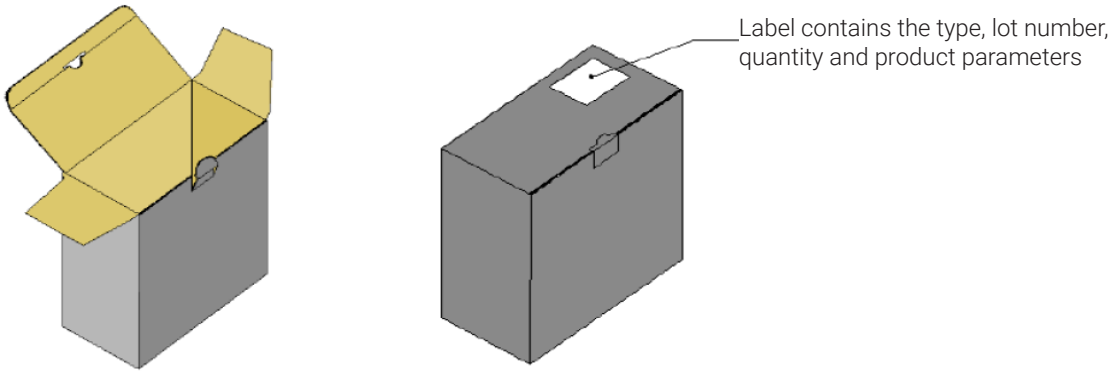


Packaging boxes

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



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



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

Environmental Compliance

Luminus complies with RoHS and REACH. Luminus is committed to selling environmentally friendly and sustainable products. We do not use harmful or hazardous substances in our composites and products. Luminus will not intentionally add the following restricted materials to our products: lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB), or polybrominated diphenyl ethers (PBDE).

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 a 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

Please follow J-STD-033D guidance on safe storage and bake treatment.

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.