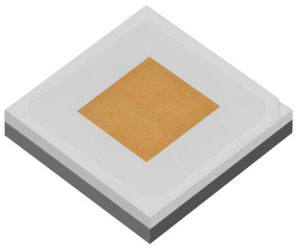
SFT-70X-WE-HV2 (CRI>70)

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.

- 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.
- 6 V or 12 V configurable through PCB layout, excellent color and brightness uniformity across emitting surface of a single multi-junction monolithic chip.
- Maximum Drive Current: 2.5 A (12 V), 5 A (6 V)
- Color Temperature: 4000K
- Color Rendering Index: 70
- Low thermal resistance: 0.6°C/W
- ANSI-compatible chromaticity bins
- Electrically isolated thermal path
- 8 kV HBM ESD rating per ANSI/ESDA/JEDEC JS-001

Table of Contents

Applications

- Track Light
- Spotlight
- Wall Washer
- Task Light
- Downlight
- Broadcasting Light
- Stage and Studio Light
- Surgical Light
- Portable Lighting
- Landscape Lighting
- Industrial Lighting

Ordering Information

Ordering Part Numbers[1]

CRI	CCT	Luminous Flux		Chromaticity Bin Kit[3]	Ordering Part Number
		Minimum Flux Bin[1]	Minimum Flux[2]		
> 70	4000K	H1	1205 lm	401	SFT-70X-WE40-HV2-H1401
				402	SFT-70X-WE40-HV2-H1402
		H2	1290 lm	401	SFT-70X-WE40-HV2-H2401
				402	SFT-70X-WE40-HV2-H2402

Part Number Nomenclature

SFT **70X** **W<xyy>** **HV2** **<ffccc>**

Product Family	Chip Area	Color	Package Configuration	Bin Kit
S: Surface Mount **F**: Flat Window **T**: Single Emitter	**70X**: 7.0 mm^2	**W**: White <**x**> CRI Category Code **E**: CRI > 70 <**yy**> Color Temperature **40**: 4000K	**HV2**: 5050 package code	<**ff**> Minimum Flux Bin, see 'Luminus Flux Bins' table for details <**ccc**> 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 =750 mA (12 V), 1500 mA (6 V), 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 Code	Binning @ 750 mA (12 V), 1500 mA (6 V)			Correlated Minimum Flux (lm) @ T_j=85°C[2]			
	T_j= 85°C[1]		T_j= 25°C[1]	350 mA (12 V)	1000 mA (12 V)	1500mA (12 V)	2500mA (12 V)
	Minimum Flux (lm)	Maximum Flux (lm)	Minimum Flux (lm)	700 mA (6 V)	2000 mA (6 V)	3000 mA (6 V)	5000 mA (6 V)
G9	1135	1205	1271	568	1453	2009	2940
H1	1205	1290	1350	603	1542	2133	3121
H2	1290	1375	1445	645	1651	2283	3341
H3	1375	1460	1540	688	1760	2434	3561

Forward Voltage Bins[3]

Voltage Bin Code	Binning @ 750 mA (12 V), T_j = 85°C	
	Minimum Voltage (V)	Maximum Voltage (V)
V1	10.50	12.50

Notes:

1. LEDs are measured at 25°C ambient temperature with 750 mA (12 V), 1500 mA (6 V), 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.

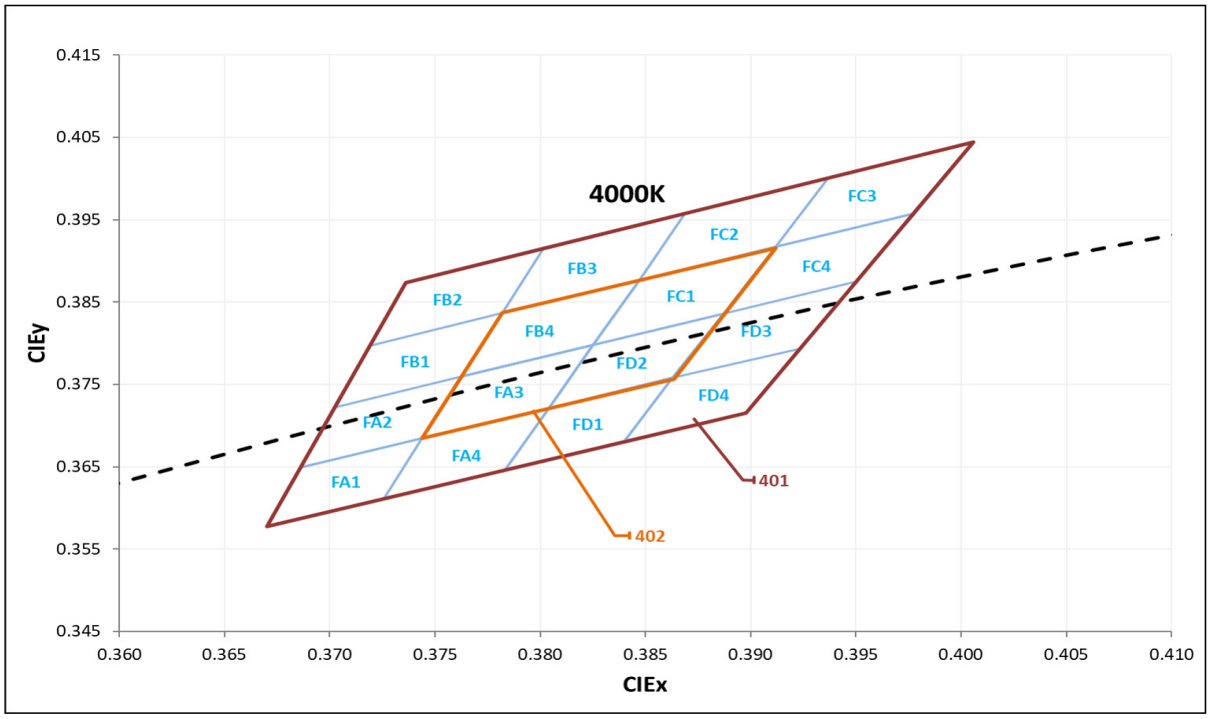
Binning Structure

Chromaticity Binning Coordinates

CCT	Bin	CIEx	CIEy	Bin	CIEx	CIEy	Bin	CIEx	CIEy	Bin	CIEx	CIEy
4000K	FA1	0.3670	0.3578	FA2	0.3686	0.3649	FA3	0.3744	0.3685	FA4	0.3726	0.3612
		0.3686	0.3649		0.3702	0.3722		0.3763	0.3760		0.3744	0.3685
		0.3744	0.3685		0.3763	0.3760		0.3825	0.3798		0.3804	0.3721
		0.3726	0.3612		0.3744	0.3685		0.3804	0.3721		0.3783	0.3646
	FB1	0.3702	0.3722	FB2	0.3719	0.3797	FB3	0.3782	0.3837	FB4	0.3763	0.3760
		0.3719	0.3797		0.3736	0.3874		0.3802	0.3916		0.3782	0.3837
		0.3782	0.3837		0.3802	0.3916		0.3869	0.3958		0.3847	0.3877
		0.3763	0.3760		0.3782	0.3837		0.3847	0.3877		0.3825	0.3798
	FC1	0.3825	0.3798	FC2	0.3847	0.3877	FC3	0.3912	0.3917	FC4	0.3887	0.3836
		0.3847	0.3877		0.3869	0.3958		0.3937	0.4001		0.3912	0.3917
		0.3912	0.3917		0.3937	0.4001		0.4006	0.4044		0.3978	0.3958
		0.3887	0.3836		0.3912	0.3917		0.3978	0.3958		0.3950	0.3875
	FD1	0.3783	0.3646	FD2	0.3804	0.3721	FD3	0.3863	0.3758	FD4	0.3840	0.3681
		0.3804	0.3721		0.3825	0.3798		0.3887	0.3836		0.3863	0.3758
		0.3863	0.3758		0.3887	0.3836		0.3950	0.3875		0.3924	0.3794
		0.3840	0.3681		0.3863	0.3758		0.3924	0.3794		0.3898	0.3716

Binning Structure

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



Chromaticity Bin Kit Codes

CCT	Bin Kit	Chromaticity Bins
4000K	401	FA1, FA2, FA3, FA4, FB1, FB2, FB3, FB4, FC1,FC2, FC3, FC4, FD1, FD2, FD3, FD4
	402	FA3, FB4, FC1, FD2

Notes:

1. LED chromaticity is measured and binned at 25°C ambient temperature with 750 mA (12 V), 1500 mA (6 V), 20 ms single pulse.
2. Luminus maintains a tolerance of ±0.005 on Chromaticity (CIEx, CIEy) measurement.

Absolute Maximum Ratings

Parameter		Symbol	Values		Unit
			12V	6V	
Forward Current	Minimum	$I_{f\,min}$	0.1	0.2	A
	Maximum	$I_{f\,max}$	2.5	5	
Surge Current (t<10 ms, Duty Cycle < 10%)		I_s	4	8	
Reverse Voltage (@ I_f= 10 mA)		V_r	20	10	V
Power Dissipation		P_D	34		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 (T_j=85°C)		Symbol	Value		Unit
			12V @ 750mA	6V @ 1500mA	
Color Rendering Index[1]		CRI	> 70		
Viewing Angle		$2\theta_{1/2}$	117		°
Forward Voltage	Minimum	$V_{f\,min}$	10.5	5.25	V
	Typical	$V_{f\,typ}$	11.5	5.75	
	Maximum	$V_{f\ max}$	12.5	6.25	
Temperature Coefficient of Voltage		Δ_{Vf}/Δ_T	-5.3	-2.7	mV/°C
Electrical Thermal Resistance (Junction to Solder Point)[2]		$R_{th\ JS\ elec}$	0.6		°C/W

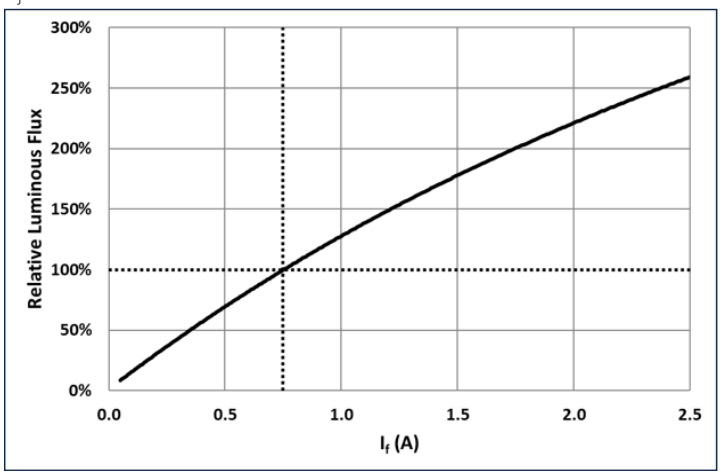
Notes:

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

2. Thermal measurements are in accordance with JEDEC 51-14.

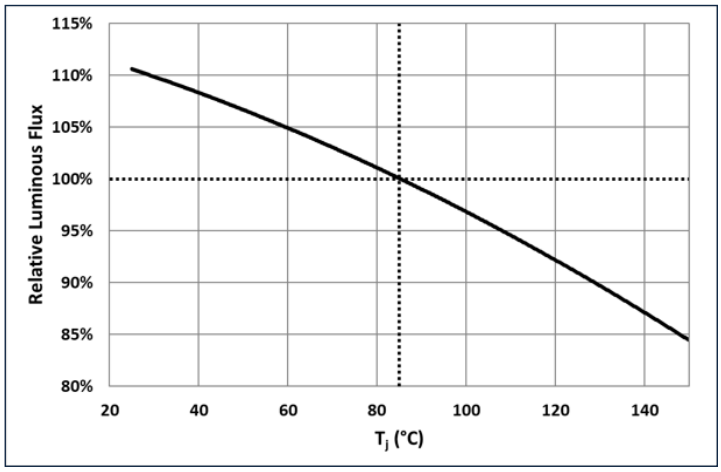
Relative Luminous Flux vs Forward Current

T_j = 85°C, 12 V



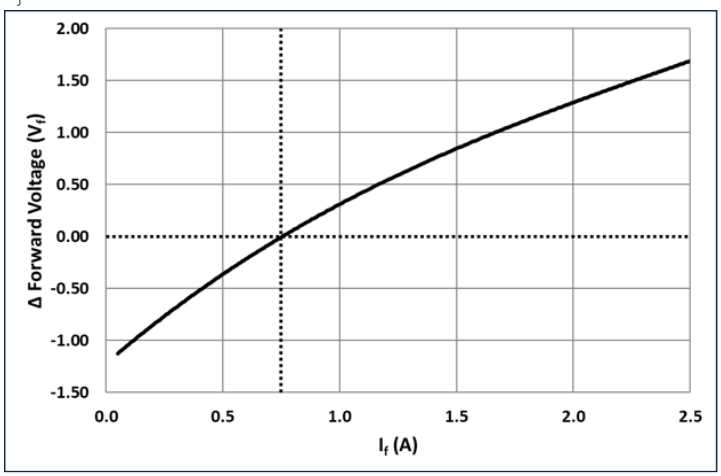
Relative Luminous Flux vs Temperature

I_f = 0.75 A, 12 V



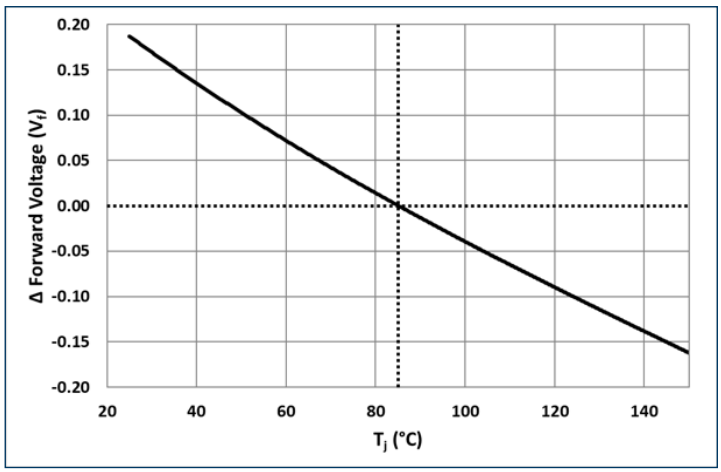
Forward Voltage vs Forward Current

T_j = 85°C, 12 V



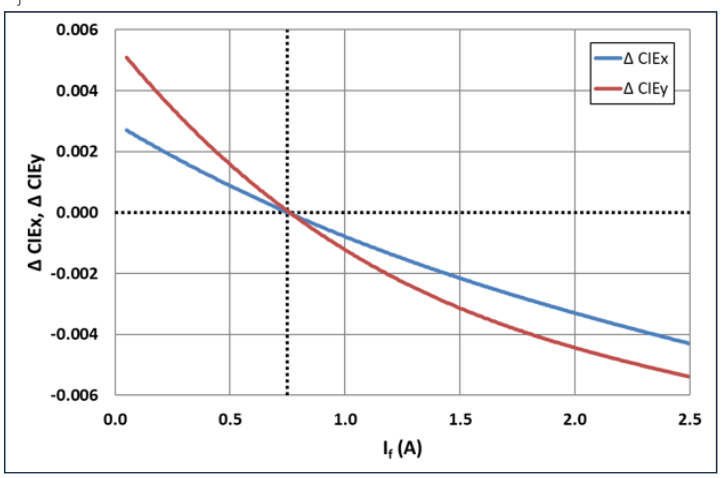
Forward Voltage vs Temperature

I_f = 0.75 A, 12 V



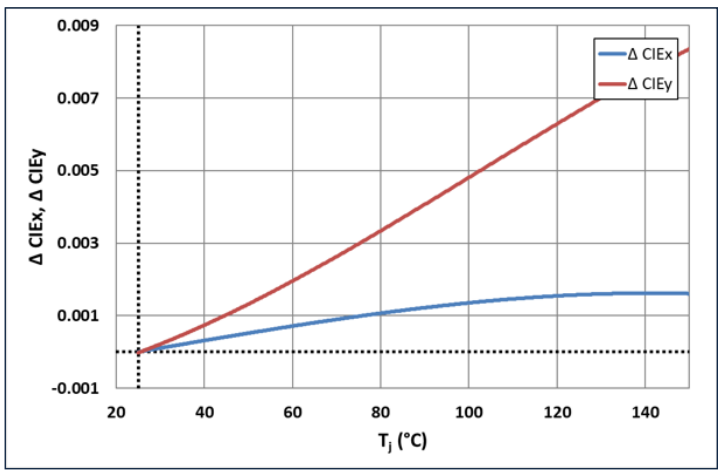
Relative Chromaticity vs Forward Current

T_j = 85°C, 12 V



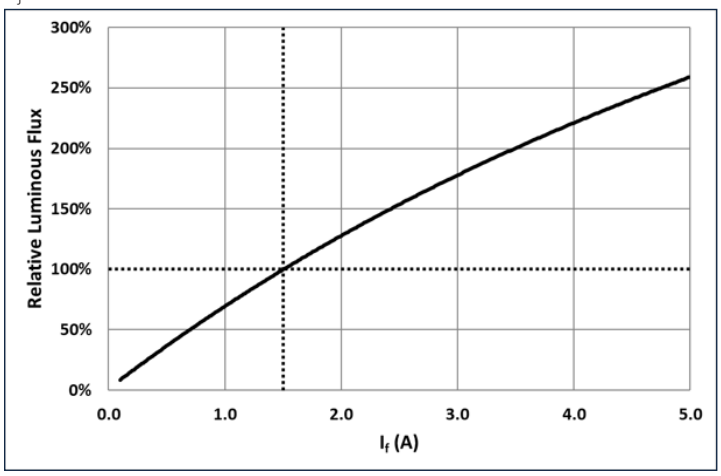
Relative Chromaticity vs Temperature

I_f = 0.75 A, 12 V



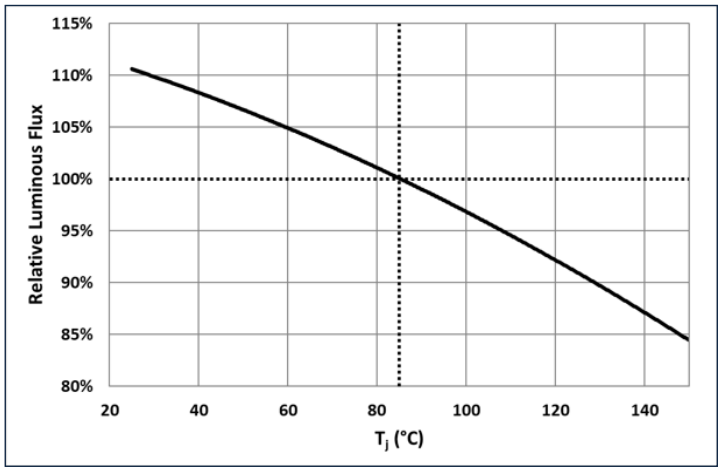
Relative Luminous Flux vs Forward Current

T_j = 85°C, 6 V



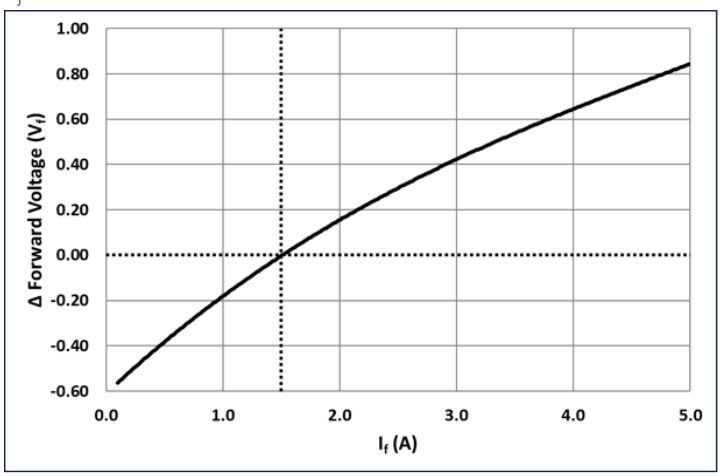
Relative Luminous Flux vs Temperature

I_f = 1.5 A, 6 V



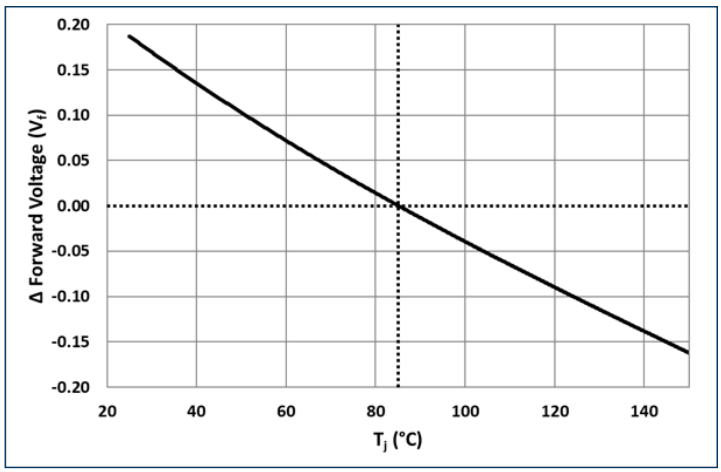
Forward Voltage vs Forward Current

T_j = 85°C, 6 V



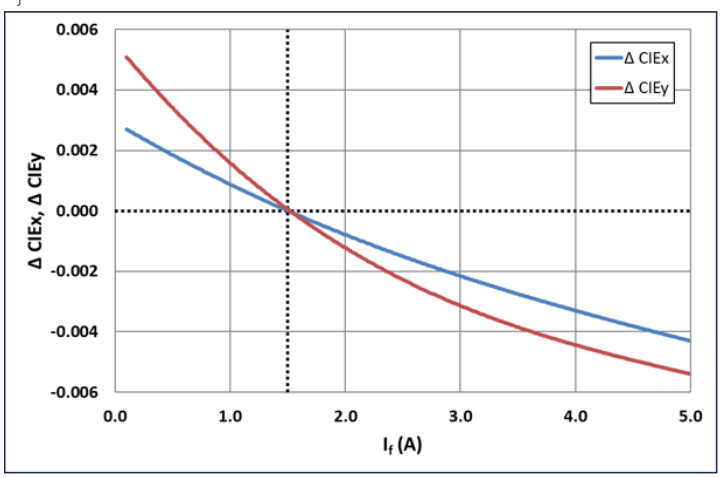
Forward Voltage vs Temperature

I_f = 1.5 A, 6 V



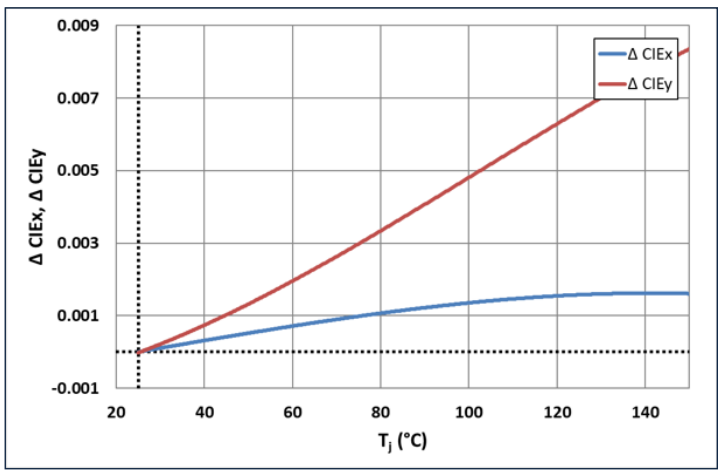
Relative Chromaticity vs Forward Current

T_j = 85°C, 6 V



Relative Chromaticity vs Temperature

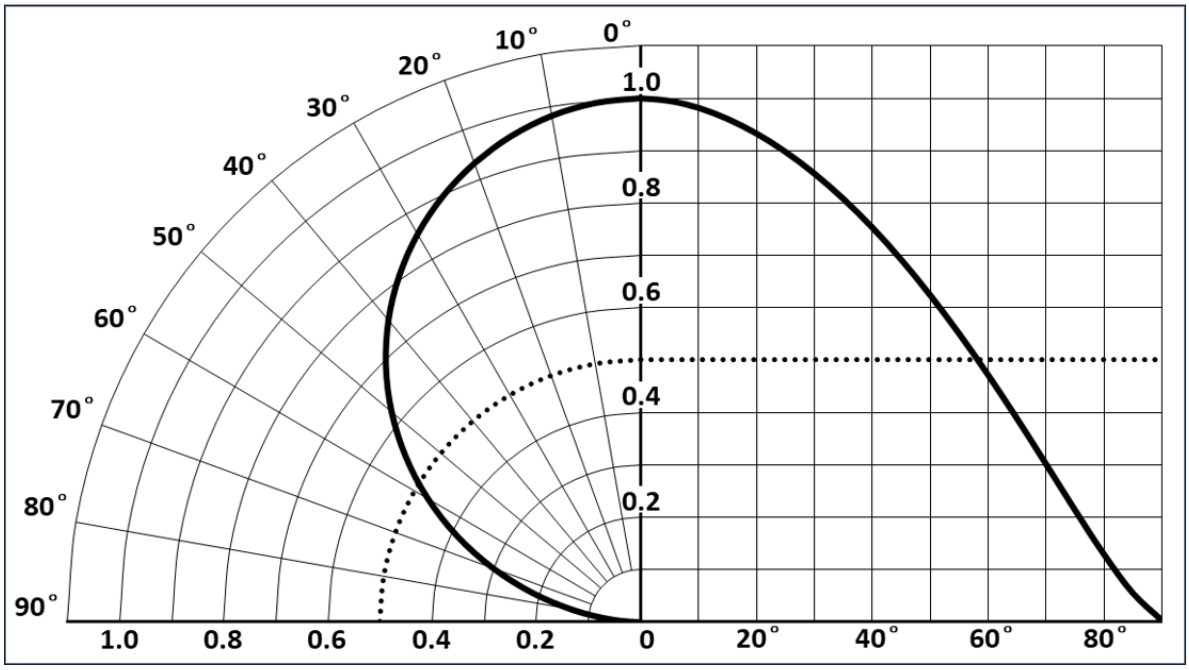
I_f = 1.5 A, 6 V



Angular Distribution and Typical Spectrum

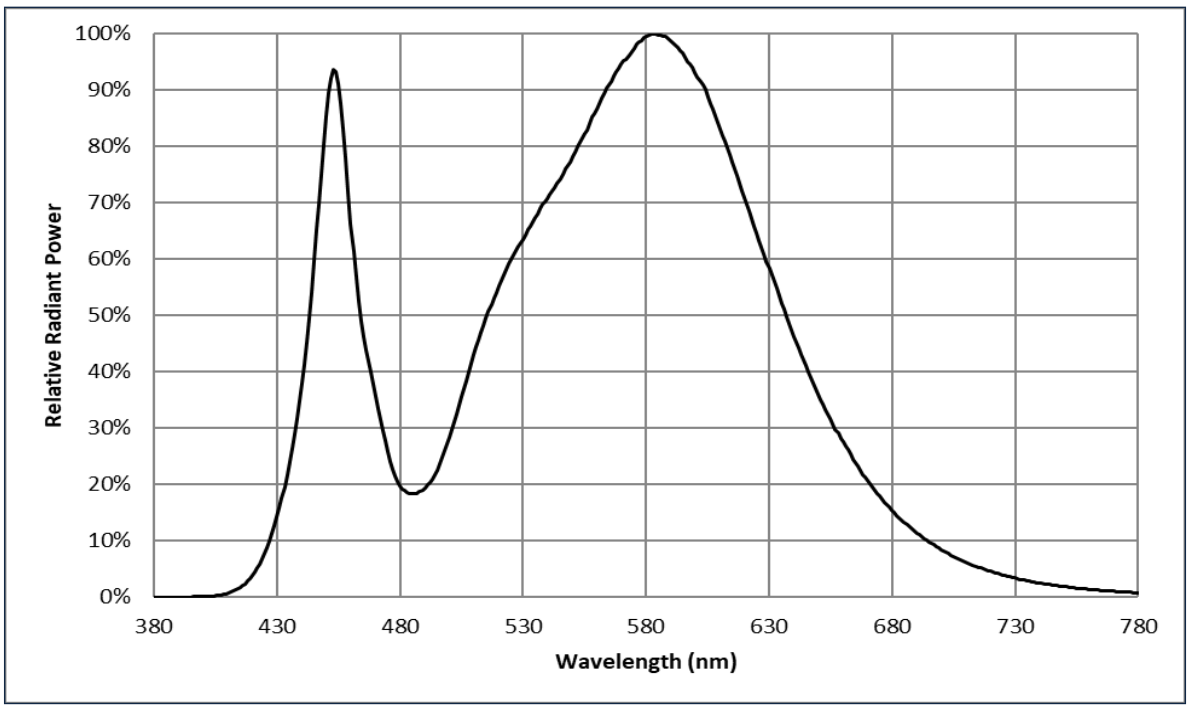
Angular Distribution

I_f = 0.75 A (12 V); T_j = 25°C

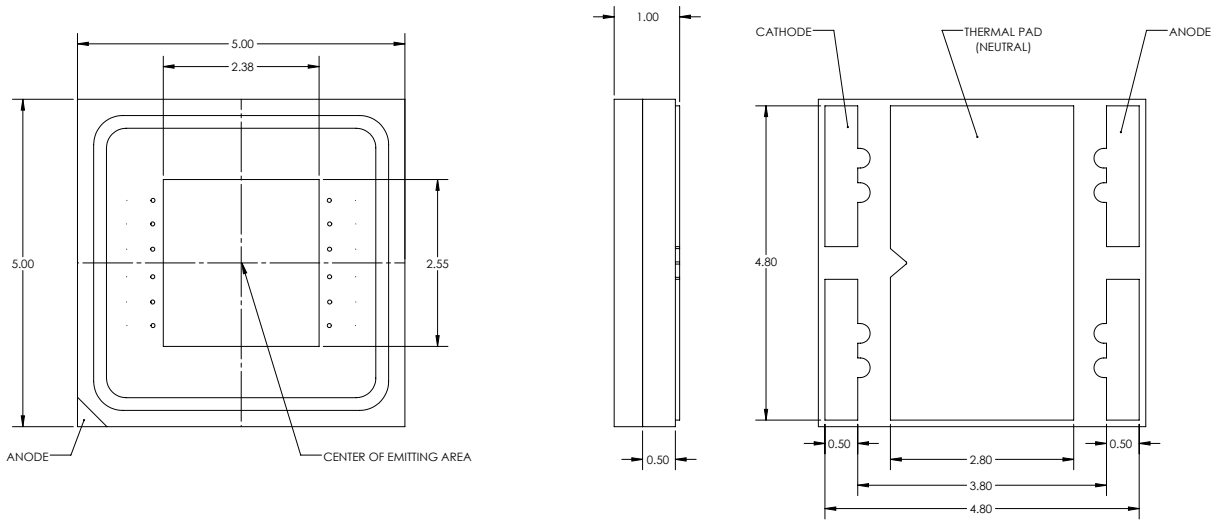


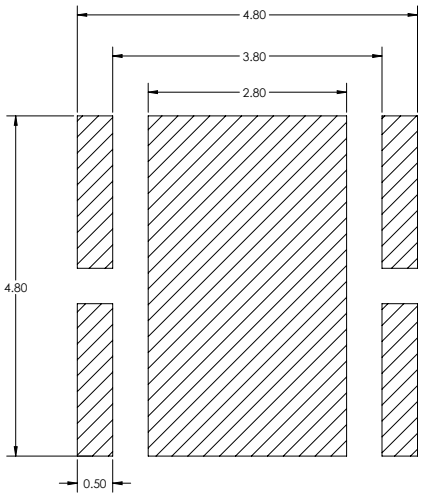
Relative Spectral Power Distribution

I_f = 0.75 A (12 V); T_j = 85°C

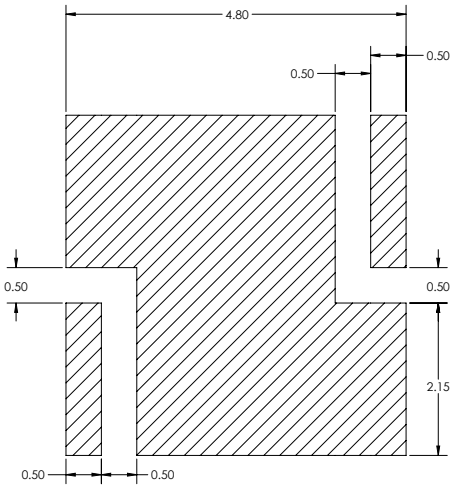


Mechanical Dimensions[1]

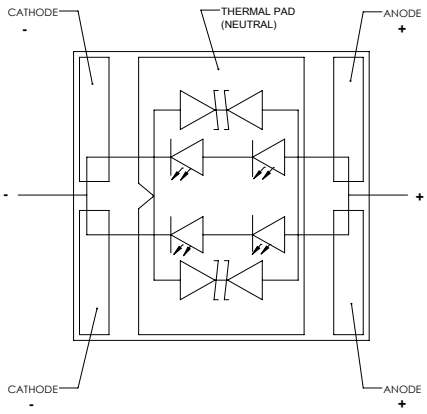




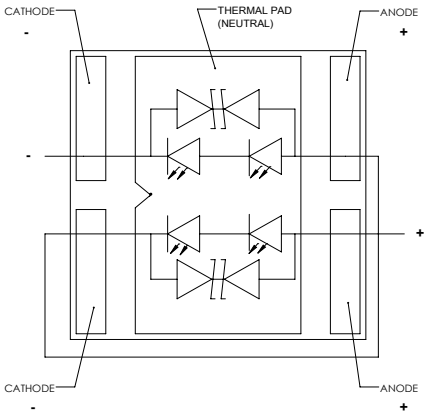
RECOMMENDED PCB SOLDER PAD
6V CONFIGURATION



RECOMMENDED PCB SOLDER PAD
12V CONFIGURATION



RECOMMENDED PCB SOLDER PAD
6V CONFIGURATION

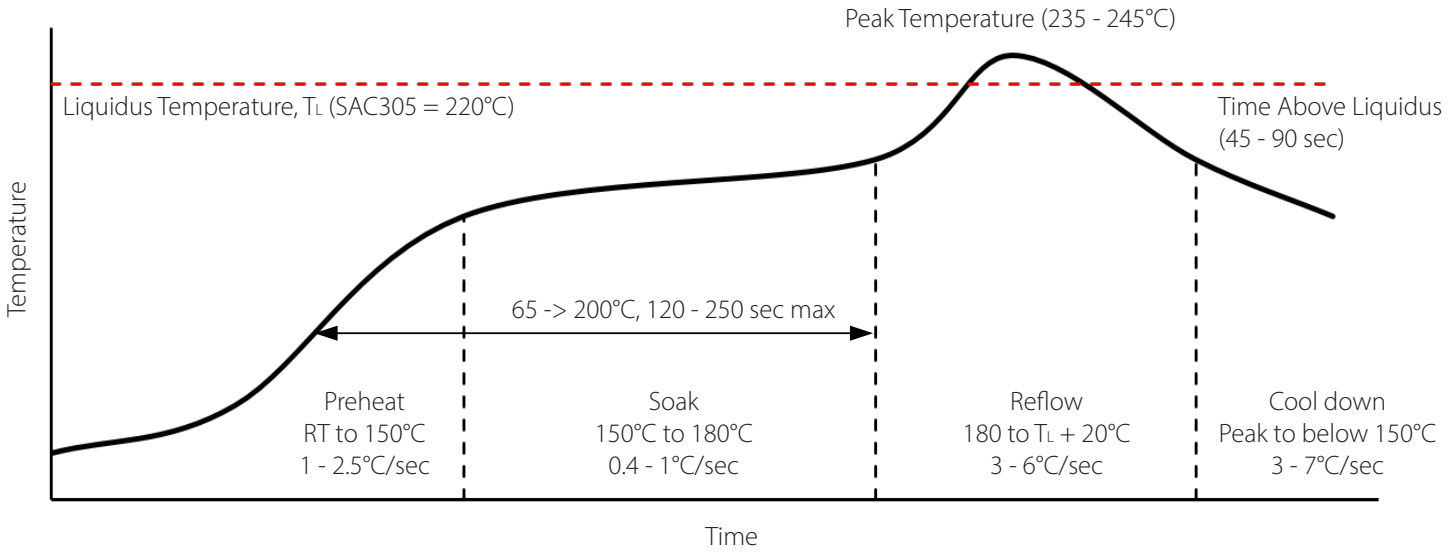


RECOMMENDED PCB SOLDER PAD
12V CONFIGURATION

Note:

1. All dimensions are in millimeter ± 0.13 mm.

Soldering Profile



SMT Solder Rework Temperature Guidelines

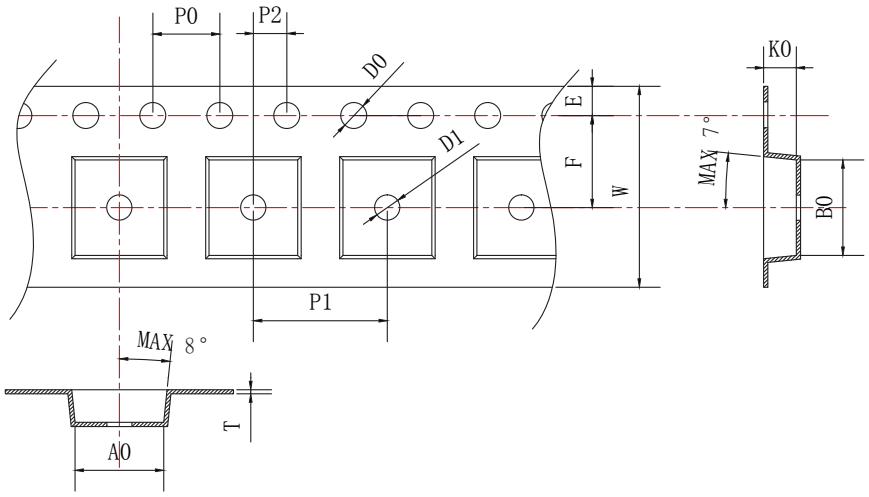
Parameter	Manual Hotplate Reflow	Hot Air Gun Reflow
Heating Time	< 60 sec	
Hotplate Temperature	< 245°C	< 150°C

Notes:

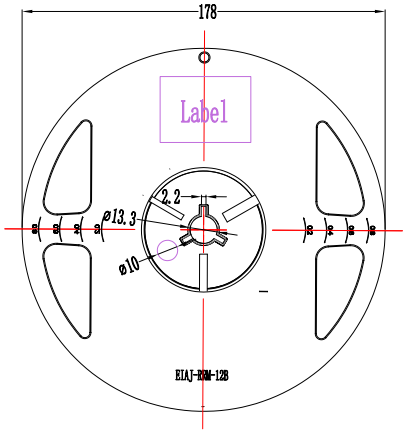
1. Product complies to Moisture Sensitivity Level 3 (MSL 3).
2. The numbers in the table are specific to SAC305. Luminus recommends using an SAC305 solder paste with a no-clean flux for RoHS compliant products.
3. During the pick and place process, axial forces on the dome (or window) should not exceed 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 to use 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:

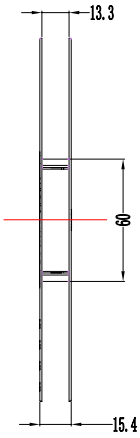
   https://luminusdevices.zendesk.com/hc/en-us/articles/360060306692-How-do-I-Reflow-Solder-Luminus-SMD-Components-
8. For any technical questions about soldering process, please contact Luminus at techsupport@luminus.com.

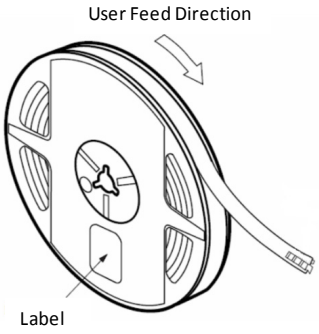
Tape and Reel Outline



Parameter	Dimension (mm)
A0	5.3±0.1
B0	5.3±0.1
D0	1.5±0.1
D1	1.5±0.25
E	1.75±0.1
F	5.5±0.1
K0	1.7±0.1
P0	4.0±0.1
P1	8.0±0.1
P2	2.0±0.1
T	0.25±0.02
W	12+0.3 12-0.1





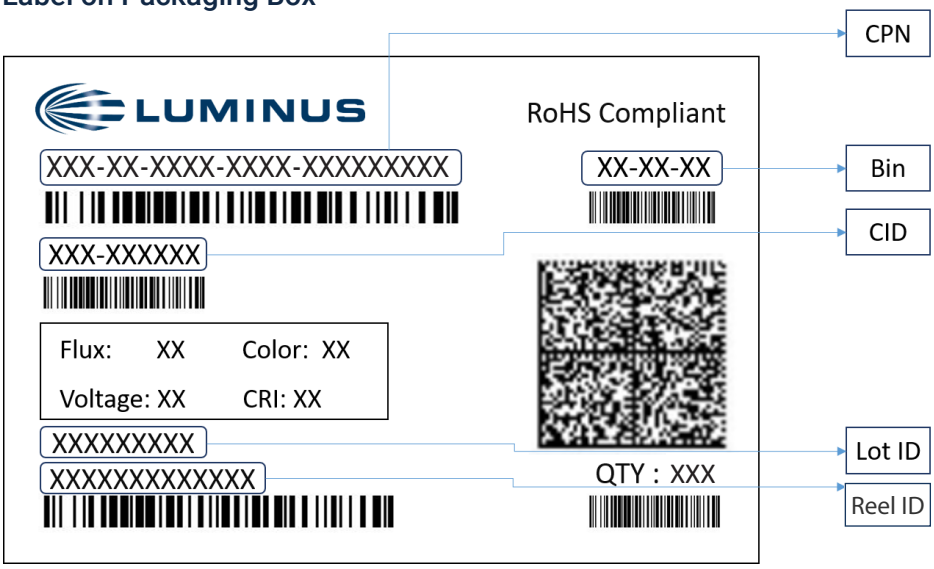


Notes:

1. Each Reel contains 500 units of LEDs.
2. Black anti-static tape material (Denka ECM3/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

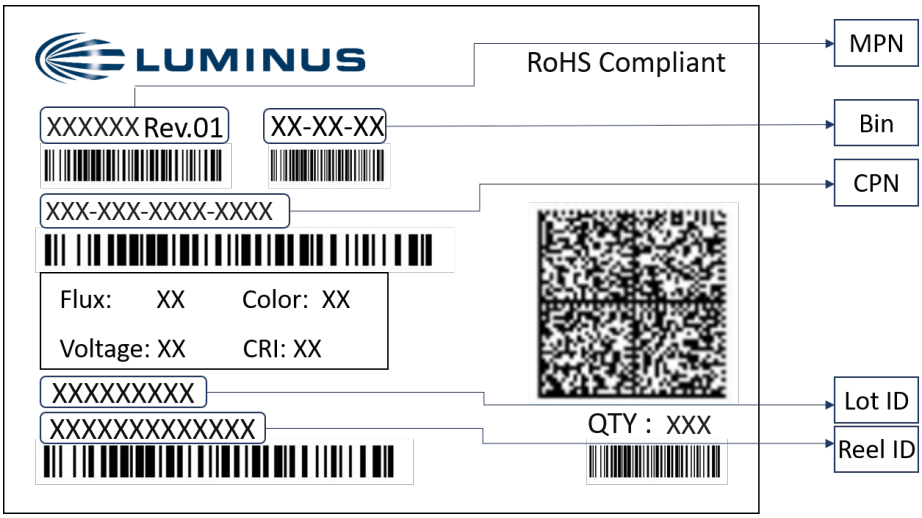
Label on Packaging Box



Label Fields:

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

Label on Reel

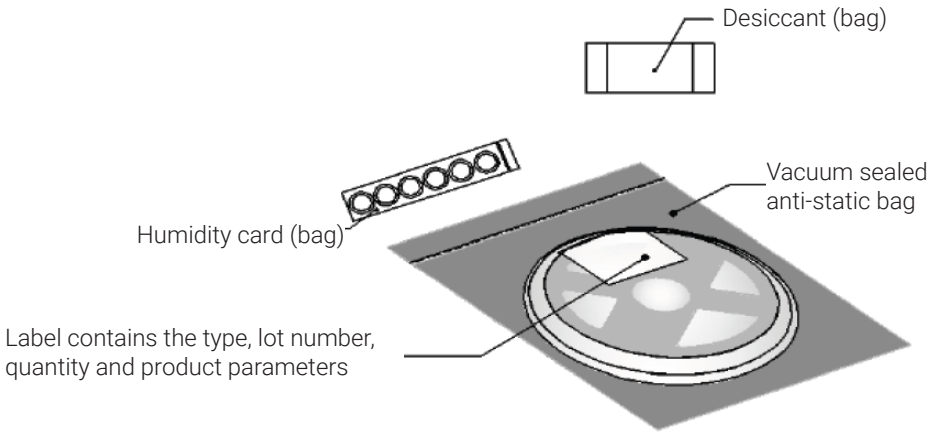


Label Fields:

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

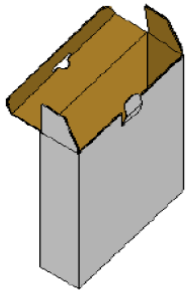
Packaging

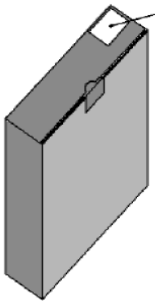
Packaged Reel



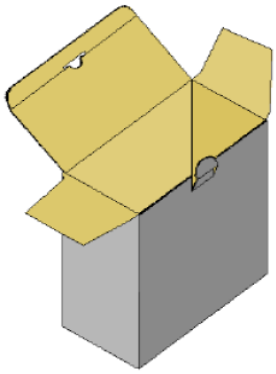
Packaging boxes

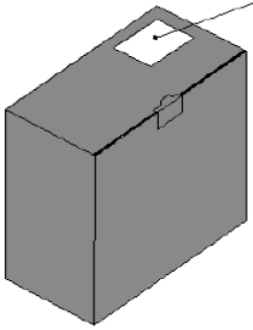
Box Size 1 - 5 reels per box
Size: 22.5 x 24.5 x 6.5 cm





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 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.