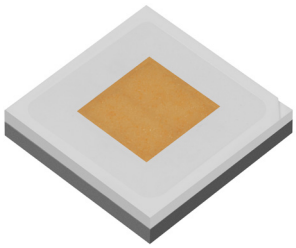
SFT-70X-W High CRI

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 A (12 V), 4 A (6 V)
- Color Temperature: 2200K - 5700K
- Color Rendering Index: 80, 90, 95
- 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

RoHS REACH

Applications

- Track Light
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Ordering Information

Ordering Part Numbers[1]

CRI	CCT	Luminous Flux		Ordering Part Number[3]		
		Minimum Flux Bin[1]	Minimum Flux[2]	Chromaticity Bin Kit 2-Step Ellipse	Chromaticity Bin Kit 3-Step Ellipse	Chromaticity Bin Kit ANSI Centers
> 80	2200K	G3	760 lm	SFT-70X-WF22-HV2-G322E2	SFT-70X-WF22-HV2-G322E3	
		G4	815 lm	SFT-70X-WF22-HV2-G422E2	SFT-70X-WF22-HV2-G422E3	
> 90	2700K	G3	760 lm	SFT-70X-WG27-HV2-G327E2	SFT-70X-WG27-HV2-G327E3	SFT-70X-WG27-HV2-G3272
		G4	815 lm	SFT-70X-WG27-HV2-G427E2	SFT-70X-WG27-HV2-G427E3	SFT-70X-WG27-HV2-G4272
	3000K	G4	815 lm	SFT-70X-WG30-HV2-G430E2	SFT-70X-WG30-HV2-G430E3	SFT-70X-WG30-HV2-G4302
		G5	870 lm	SFT-70X-WG30-HV2-G530E2	SFT-70X-WG30-HV2-G530E3	SFT-70X-WG30-HV2-G5302
	3500K	G5	870 lm	SFT-70X-WG35-HV2-G535E2	SFT-70X-WG35-HV2-G535E3	SFT-70X-WG35-HV2-G5352
		G6	925 lm	SFT-70X-WG35-HV2-G635E2	SFT-70X-WG35-HV2-G635E3	SFT-70X-WG35-HV2-G6352
	4000K	G5	870 lm	SFT-70X-WG40-HV2-G540E2	SFT-70X-WG40-HV2-G540E3	SFT-70X-WG40-HV2-G5402
		G6	925 lm	SFT-70X-WG40-HV2-G640E2	SFT-70X-WG40-HV2-G640E3	SFT-70X-WG40-HV2-G6402
	5700K	G5	870 lm	SFT-70X-WG57-HV2-G557E2		SFT-70X-WG57-HV2-G5572
		G6	925 lm	SFT-70X-WG57-HV2-G657E2		SFT-70X-WG57-HV2-G6572
> 95	2700K	G1	680 lm	SFT-70X-WH27-HV2-G127E2	SFT-70X-WH27-HV2-G127E3	SFT-70X-WH27-HV2-G1272
		G2	720 lm	SFT-70X-WH27-HV2-G227E2	SFT-70X-WH27-HV2-G227E3	SFT-70X-WH27-HV2-G2272
	3000K	G2	720 lm	SFT-70X-WH30-HV2-G230E2	SFT-70X-WH30-HV2-G230E3	SFT-70X-WH30-HV2-G2302
		G3	760 lm	SFT-70X-WH30-HV2-G330E2	SFT-70X-WH30-HV2-G330E3	SFT-70X-WH30-HV2-G3302
	3500K	G3	760 lm	SFT-70X-WH35-HV2-G335E2	SFT-70X-WH35-HV2-G335E3	SFT-70X-WH35-HV2-G3352
		G4	815 lm	SFT-70X-WH35-HV2-G435E2	SFT-70X-WH35-HV2-G435E3	SFT-70X-WH35-HV2-G4352
	4000K	G4	815 lm	SFT-70X-WH40-HV2-G440E2	SFT-70X-WH40-HV2-G440E3	SFT-70X-WH40-HV2-G4402
		G5	870 lm	SFT-70X-WH40-HV2-G540E2	SFT-70X-WH40-HV2-G540E3	SFT-70X-WH40-HV2-G5402

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.

Ordering Information

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 **F**: CRI > 80 **G**: CRI > 90 **H**: CRI > 95 <**yy**> Color Temperature **22**: 2200K **57**: 5700K	**HV2**: 5050 package code	**<ff>** Minimum Flux Bin, see 'Luminous Flux Bins' table for details **<ccc>** Chromaticity Bin Kit, see 'Chromaticity Bin Kit Codes' table for details

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)	2000mA (12 V)
	Minimum Flux (lm)	Maximum Flux (lm)	Minimum Flux (lm)	700 mA (6 V)	2000 mA (6 V)	3000 mA (6 V)	4000 mA (6 V)
G1	680	720	762	340	870	1190	1476
G2	720	760	806	360	922	1260	1562
G3	760	815	851	380	973	1330	1649
G4	815	870	913	408	1043	1426	1769
G5	870	925	974	435	1114	1523	1888
G6	925	995	1036	463	1184	1619	2007
G7	995	1065	1114	498	1274	1741	2159
G8	1065	1135	1193	533	1363	1864	2311
G9	1135	1205	1271	568	1453	1986	2463

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 (ANSI Centers)

CCT	Bin	CIEx	CIEy	Bin	CIEx	CIEy	Bin	CIEx	CIEy	Bin	CIEx	CIEy
2700K	JA3	0.4475	0.3994	JB4	0.4523	0.4085	JC1	0.4582	0.4099	JD2	0.4532	0.4008
		0.4523	0.4085		0.4573	0.4178		0.4634	0.4193		0.4582	0.4099
		0.4582	0.4099		0.4634	0.4193		0.4695	0.4207		0.4641	0.4112
		0.4532	0.4008		0.4582	0.4099		0.4641	0.4112		0.4589	0.4021
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
3500K	GA3	0.3981	0.3800	GB4	0.4010	0.3882	GC1	0.4080	0.3916	GD2	0.4048	0.3832
		0.4010	0.3882		0.4040	0.3966		0.4113	0.4001		0.4080	0.3916
		0.4080	0.3916		0.4113	0.4001		0.4186	0.4037		0.4150	0.3950
		0.4048	0.3832		0.4080	0.3916		0.4150	0.3950		0.4116	0.3865
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	0.3215	0.3350	CB	0.3207	0.3462	CC	0.3290	0.3538	CD	0.3290	0.3417
		0.3290	0.3417		0.3290	0.3538		0.3376	0.3616		0.3371	0.3490
		0.3290	0.3300		0.3290	0.3417		0.3371	0.3490		0.3366	0.3369
		0.3222	0.3243		0.3215	0.3350		0.3290	0.3417		0.3290	0.3300

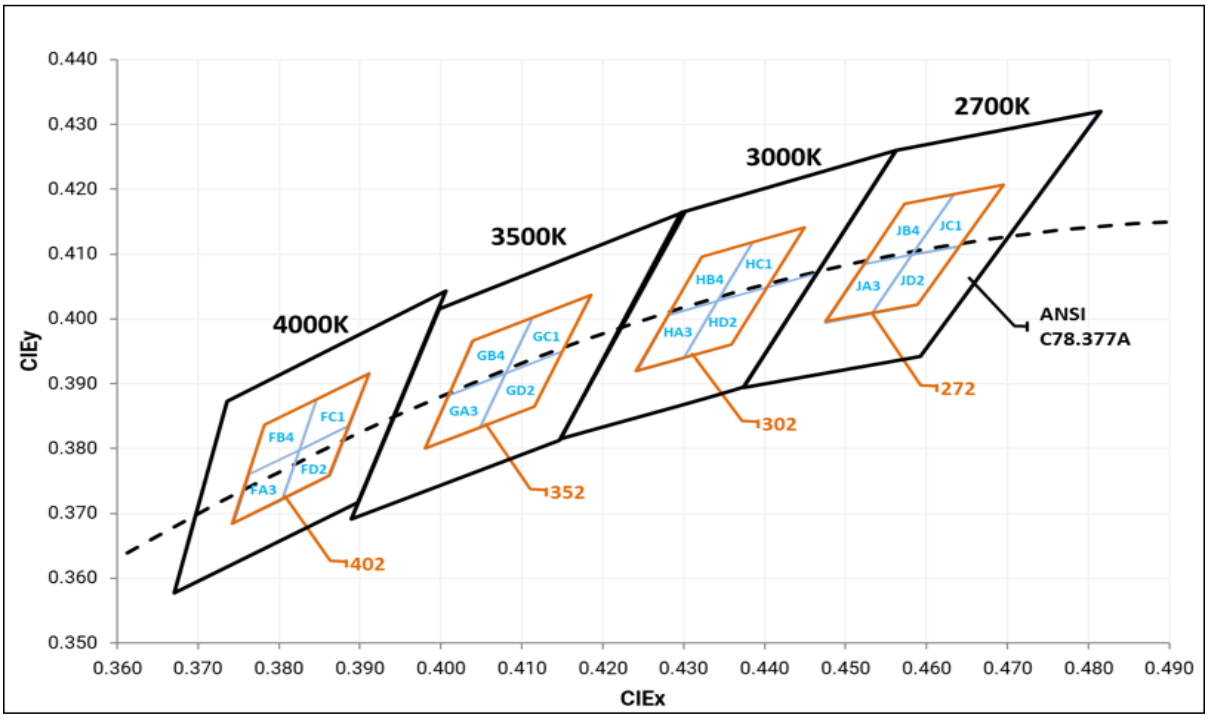
Binning Structure

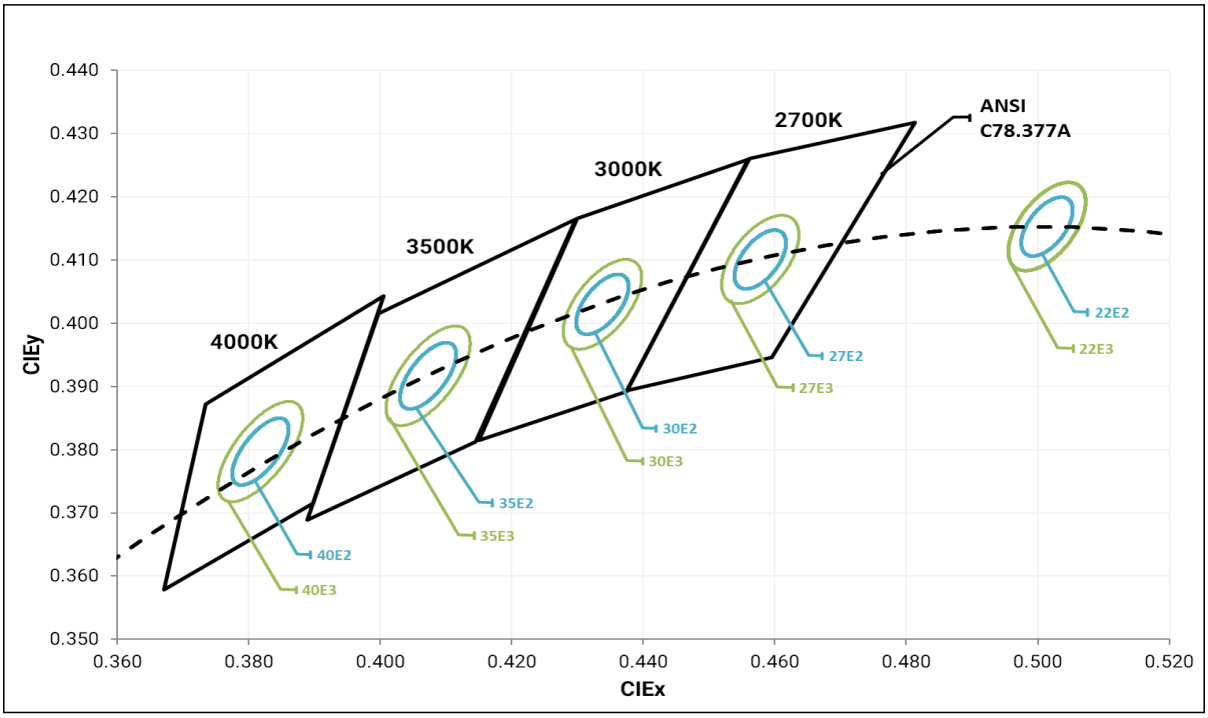
Chromaticity Binning Coordinates (2-Step & 3-Step Ellipse)

CCT	Center Point		2-Step Ellipse		3-Step Ellipse		Angle
	CIEx	CIEy	a	b	a	b	
2200K	0.5014	0.4153	0.0054	0.0028	0.0081	0.0042	53.70°
2700K	0.4578	0.4101	0.0054	0.0028	0.0081	0.0042	53.70°
3000K	0.4338	0.4030	0.0056	0.0027	0.0083	0.0041	53.20°
3500K	0.4073	0.3917	0.0062	0.0028	0.0093	0.0041	54.00°
4000K	0.3818	0.3797	0.0063	0.0027	0.0094	0.0040	53.70°
5700K	0.3287	0.3417	0.0050	0.0021	-		59.10°

Binning Structure

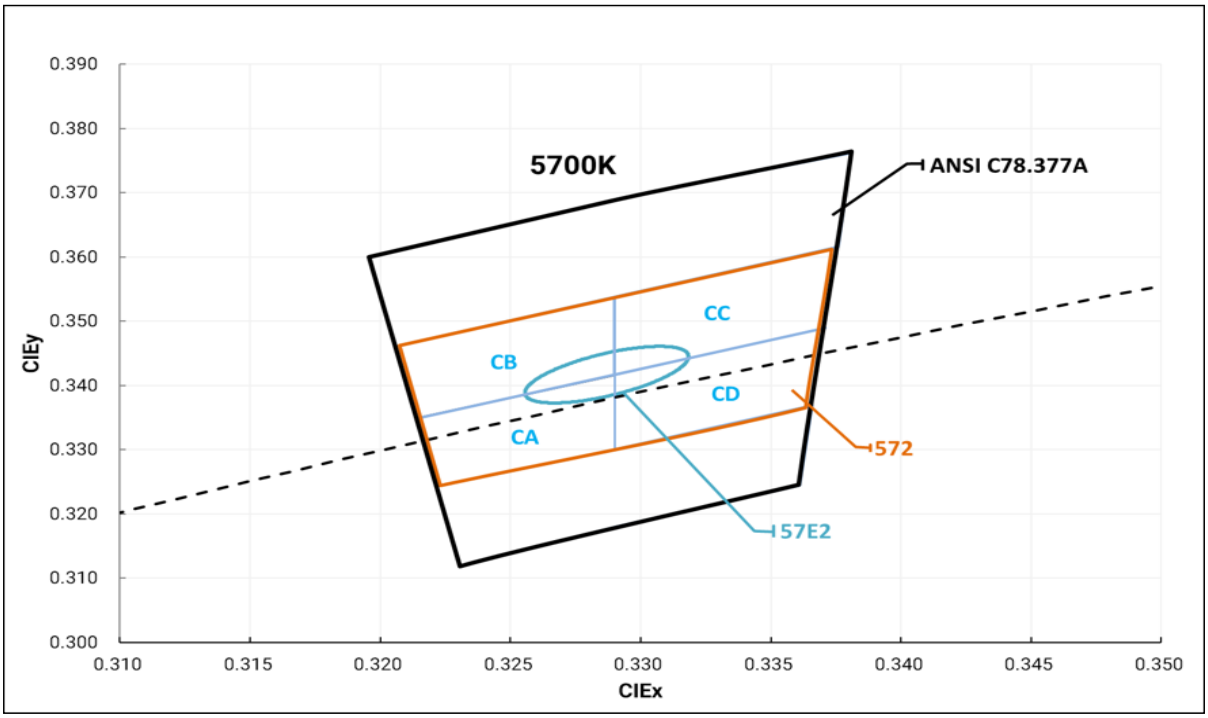
Chromaticity Binning Diagram (Warm White)[1,2]





Binning Structure

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



Binning Structure

Chromaticity Bin Kit Codes

CCT	Bin Kit	Chromaticity Bins
2200K	22E2	22E2
	22E3	22E3
2700K	272	JA3, JB4, JC1, JD2, 27E2
	27E2	27E2
	27E3	27E3
3000K	302	HA3, HB4, HC1, HD2, 30E2
	30E2	30E2
	30E3	30E3
3500K	352	GA3, GB4, GC1, GD2, 35E2
	35E2	35E2
	35E3	35E3
4000K	402	FA3, FB4, FC1, FD2, 40E2
	40E2	40E2
	40E3	40E3
5700K	572	CA, CB, CC, CD, 57E2
	57E2	57E2

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	4	
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	26		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	
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
Viewing Angle		$2\theta_{1/2}$	114		°
Electrical Thermal Resistance (Junction to Solder Point)[2]		$R_{th\ JS\ elec}$	0.6		°C/W
			WF	WG	WH
Color Rendering Index[1] (T_j=25°C)		$CRI_{25°C}$	> 80	> 90	> 95
Color Rendering R9 (T_j=25°C)		$R9_{25°C}$	-	> 40	> 60

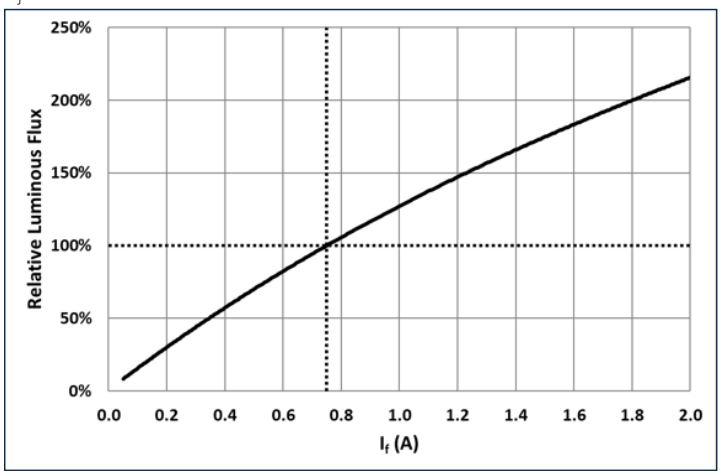
Notes:

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

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

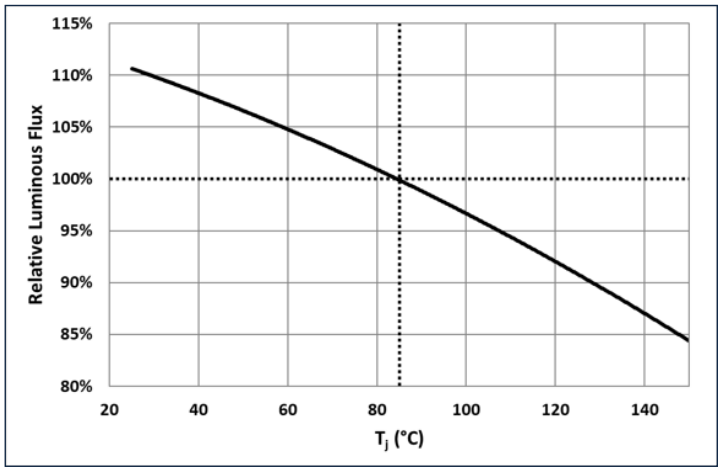
Relative Luminous Flux vs Forward Current

T_j = 85°C, 12 V



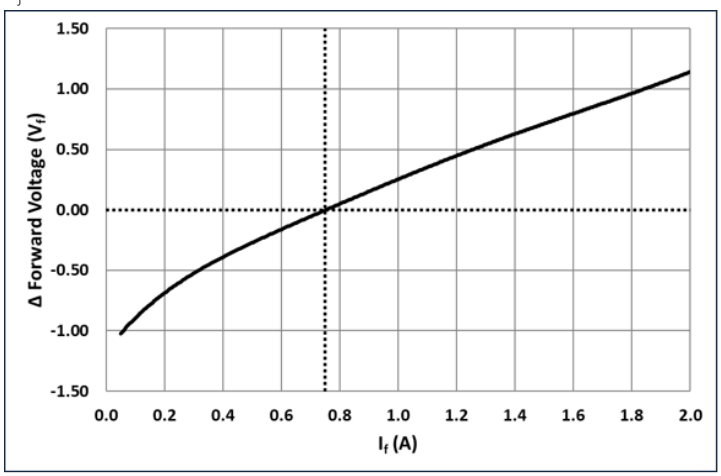
Relative Luminous Flux vs Temperature

I_f = 0.75 A, 12 V



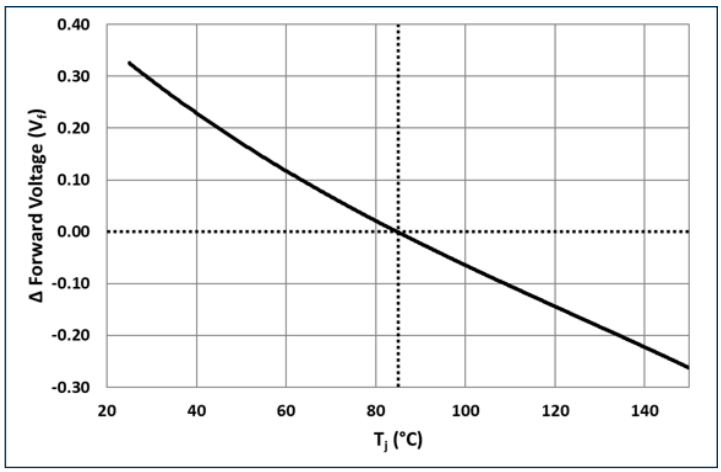
Forward Voltage vs Forward Current

T_j = 85°C, 12 V



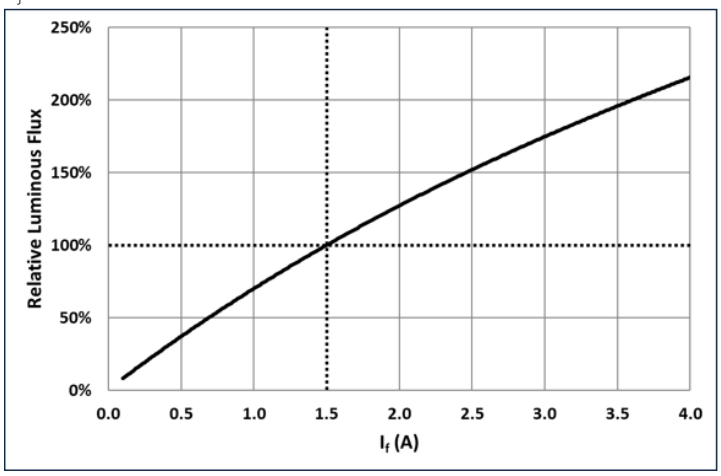
Forward Voltage vs Temperature

I_f = 0.75 A, 12 V



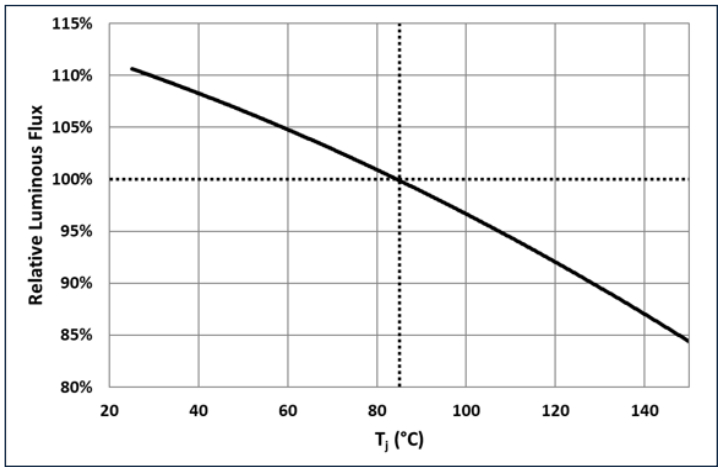
Relative Luminous Flux vs Forward Current

T_j = 85°C, 6 V



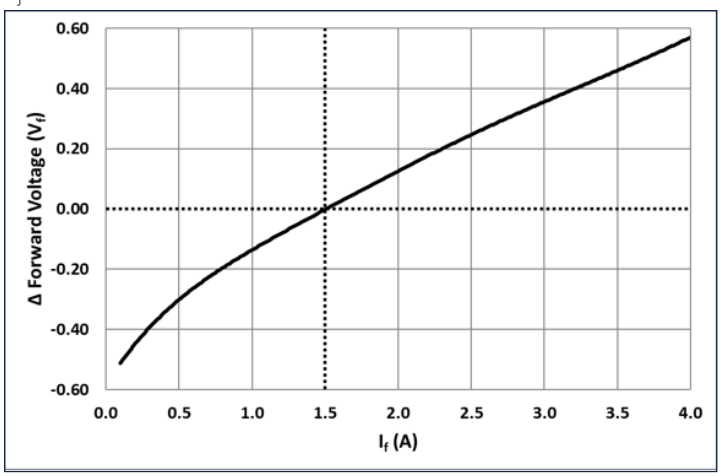
Relative Luminous Flux vs Temperature

I_f = 1.5 A, 6 V



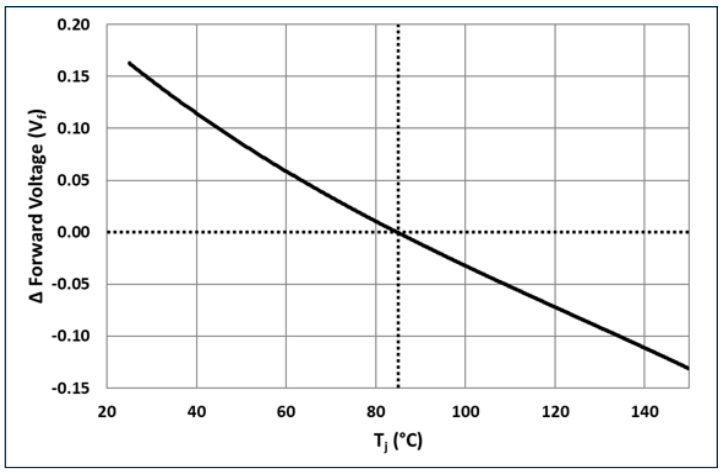
Forward Voltage vs Forward Current

T_j = 85°C, 6 V



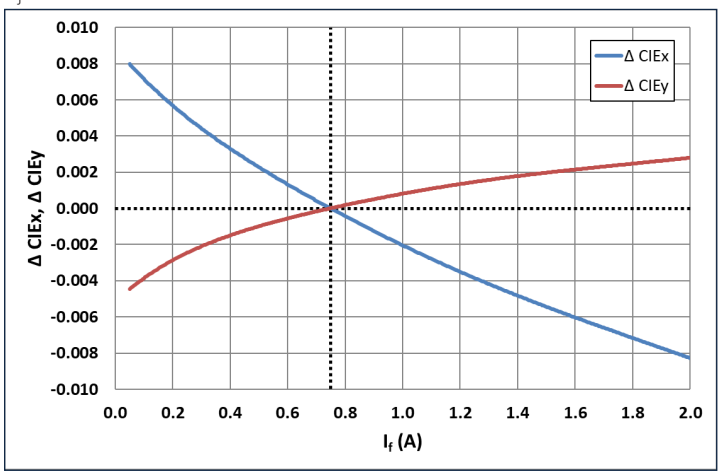
Forward Voltage vs Temperature

I_f = 1.5 A, 6 V



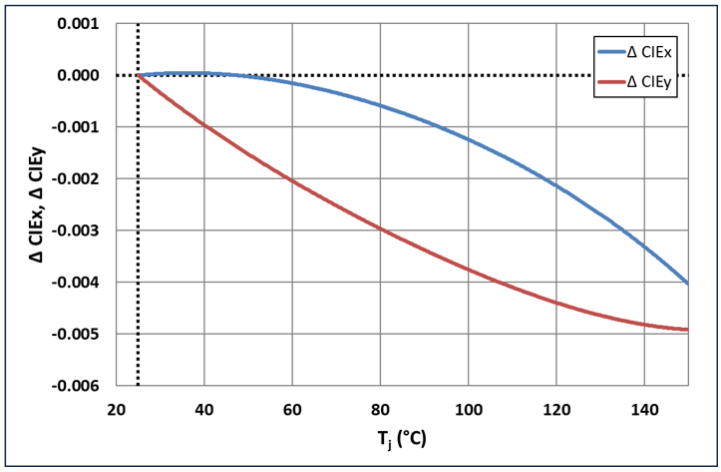
Relative Chromaticity vs Forward Current

T_j = 85°C, 12 V (2200K, CRI 80)



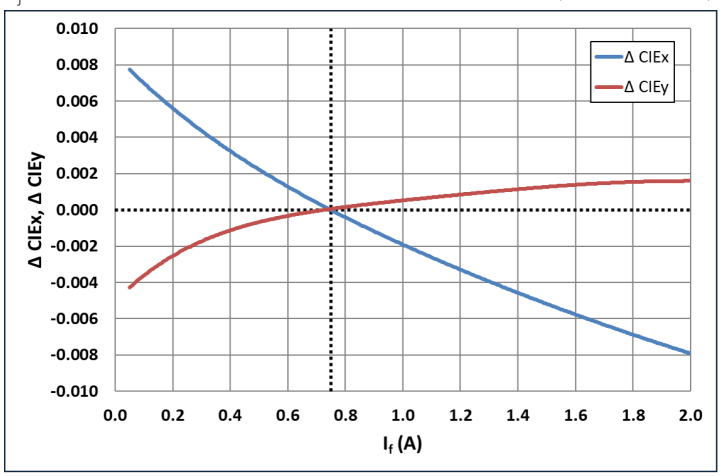
Relative Chromaticity vs Temperature

I_f = 0.75 A, 12 V (2200K, CRI 80)



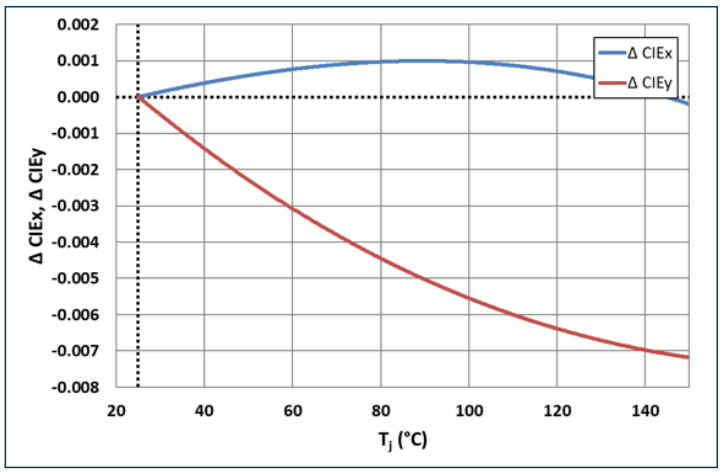
Relative Chromaticity vs Forward Current

T_j = 85°C, 12 V (3000K, CRI 90)



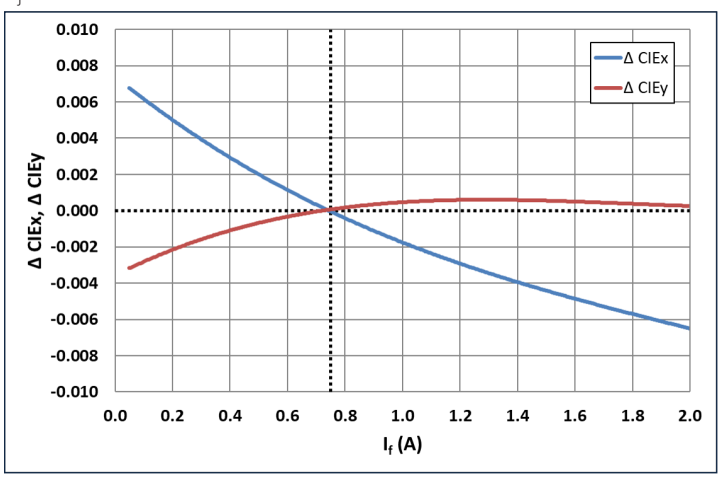
Relative Chromaticity vs Temperature

I_f = 0.75 A, 12 V (3000K, CRI 90)



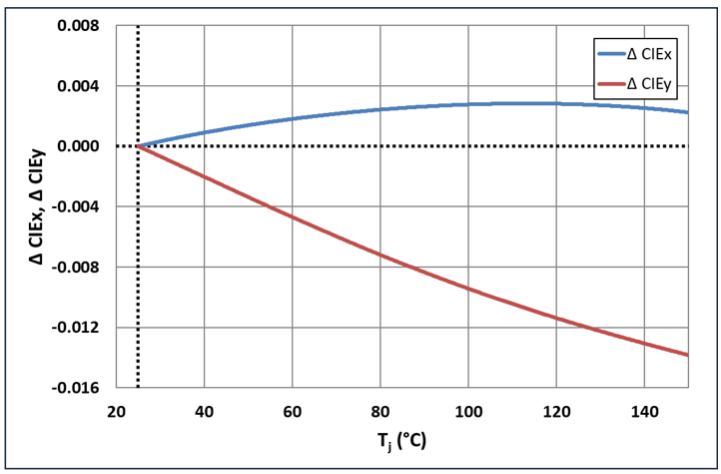
Relative Chromaticity vs Forward Current

T_j = 85°C, 12 V (3000K, CRI 95)



Relative Chromaticity vs Temperature

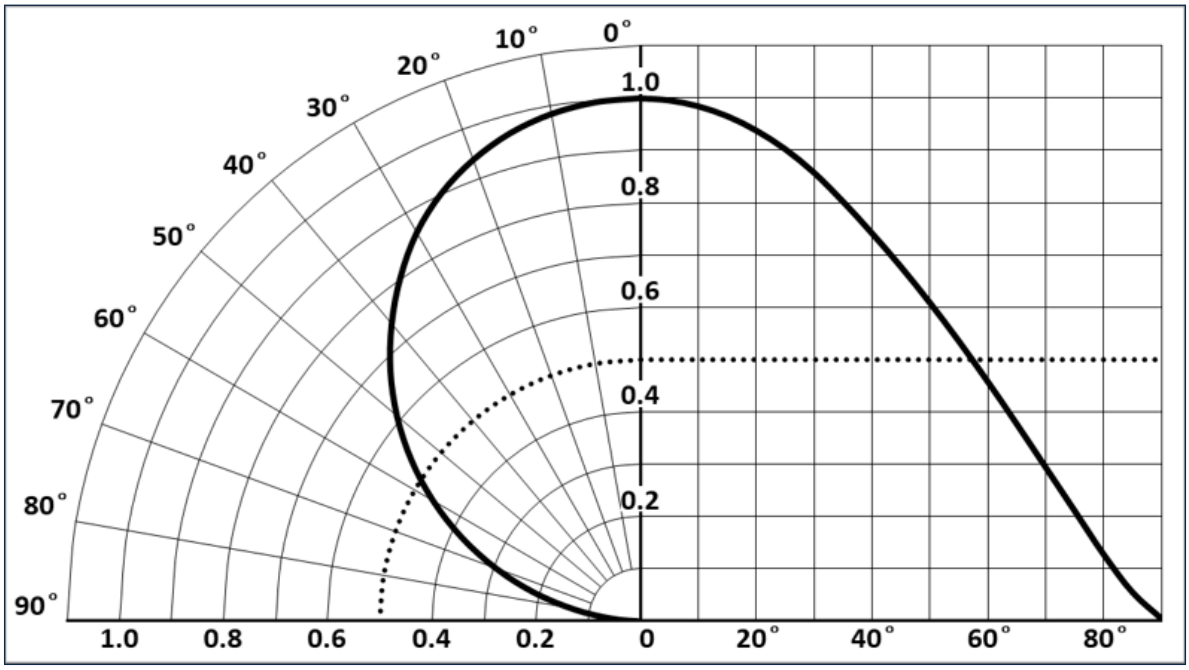
I_f = 0.75 A, 12 V (3000K, CRI 95)



Angular Distribution and Typical Spectrum

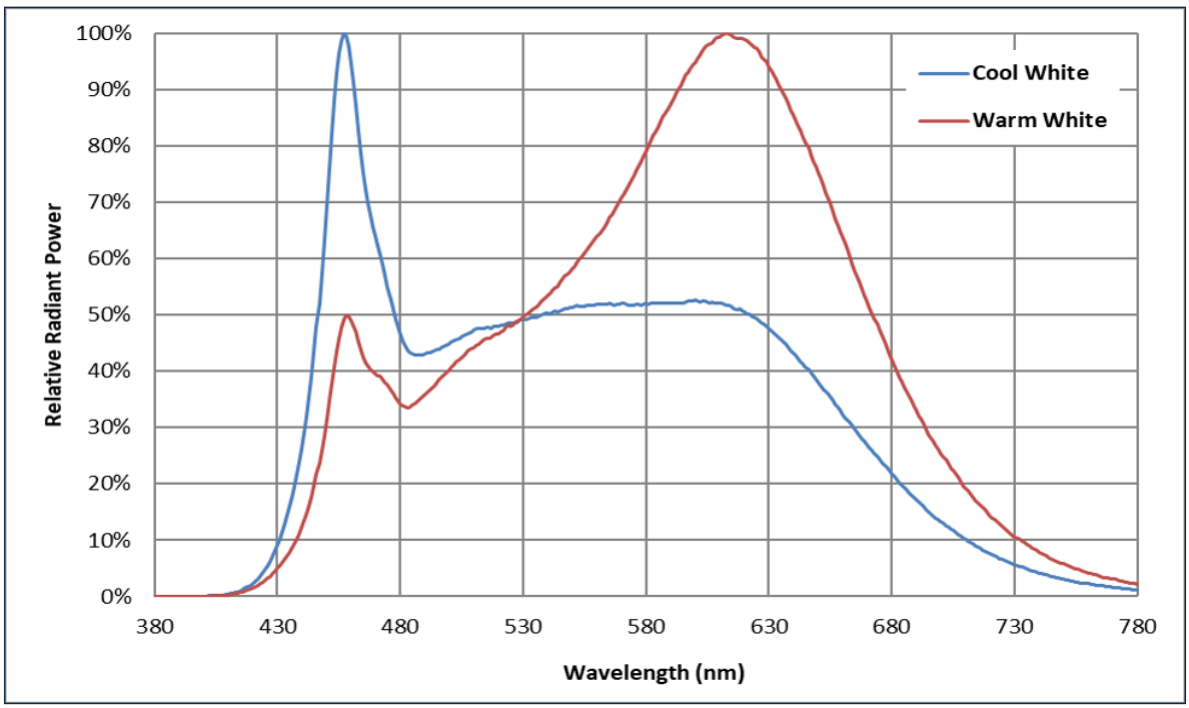
Angular Distribution

I_f = 0.75 A (12 V); T_j = 25°C

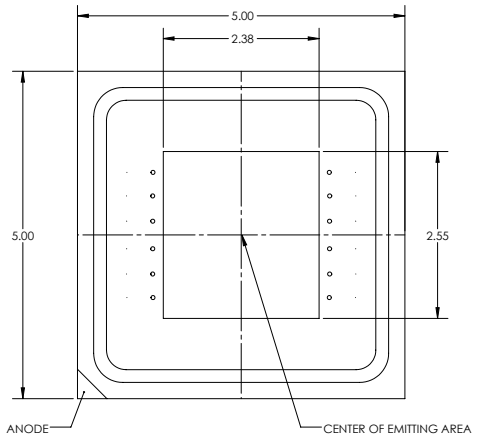


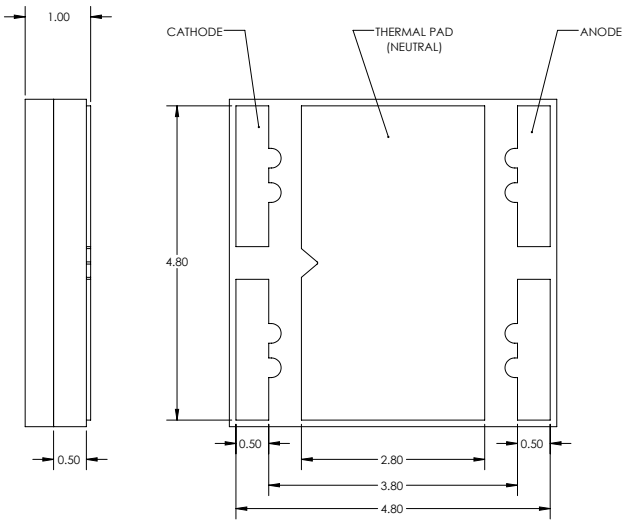
Relative Spectral Power Distribution (Warm White)

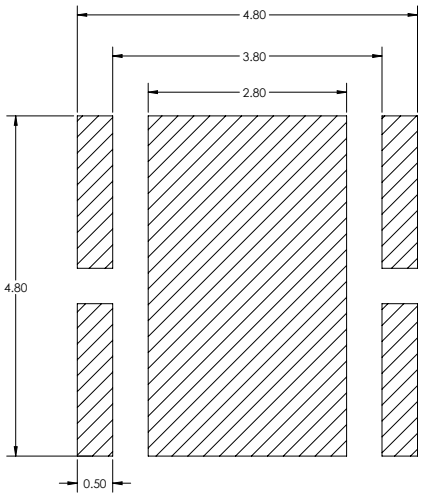
I_f = 0.75 A (12 V); T_j = 25°C



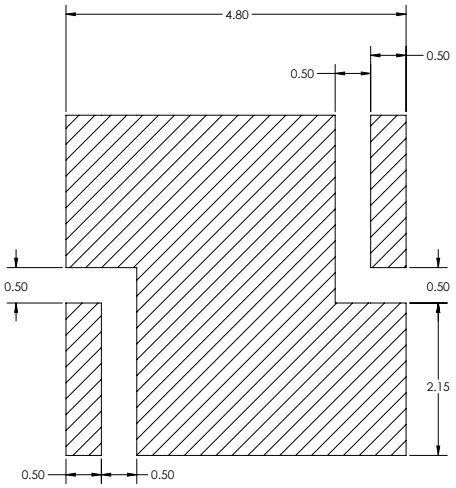
Mechanical Dimensions[1]



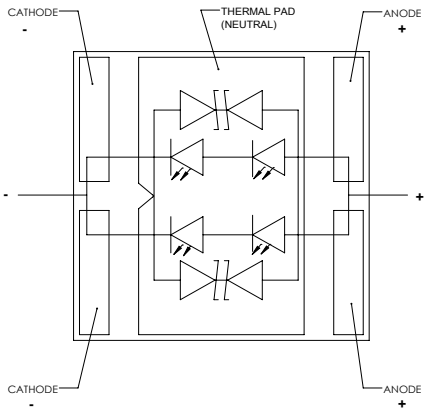




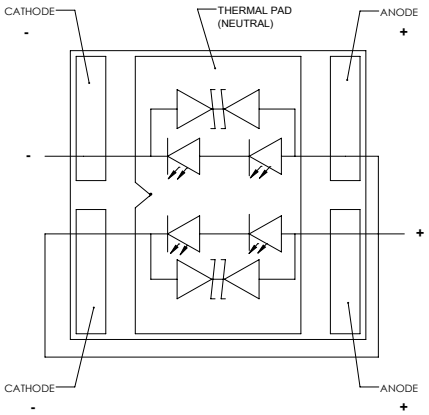
RECOMMENDED PCB SOLDER PAD
6V CONFIGURATION



RECOMMENDED PCB SOLDER PAD
12V CONFIGURATION



RECOMMENDED PCB SOLDER PAD
6V CONFIGURATION

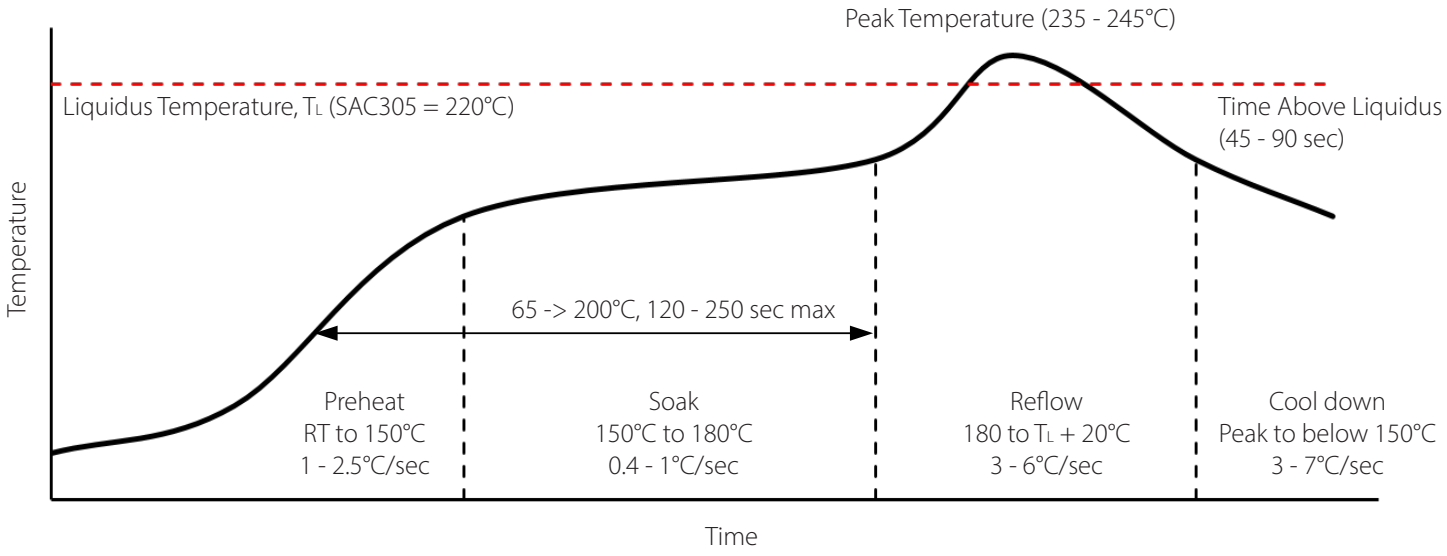


RECOMMENDED PCB SOLDER PAD
12V CONFIGURATION

Note:

1. All dimensions are in millimeter ± 0.13 mm.

Soldering Profile



SMT Solder Rework Temperature Guidelines

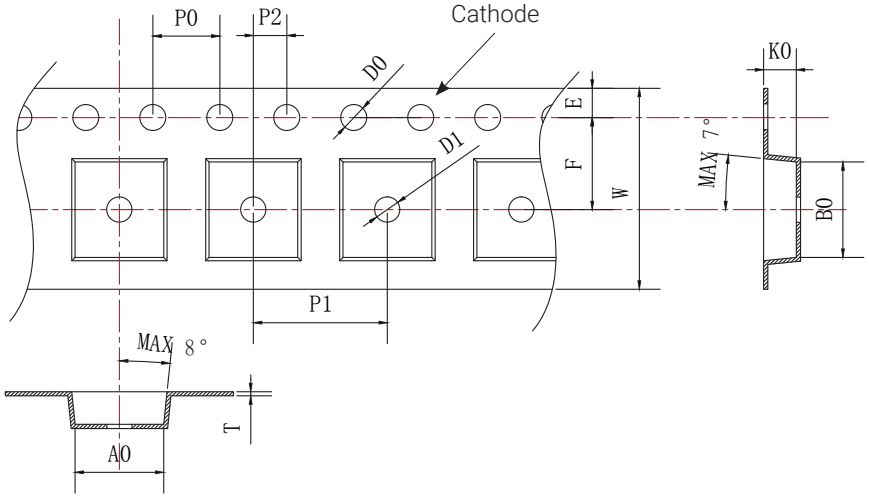
Parameter	Manual Hotplate Reflow	Hot Air Gun Reflow
Heating Time	< 60 sec	
Hotplate Temperature	< 245°C	< 150°C

Notes:

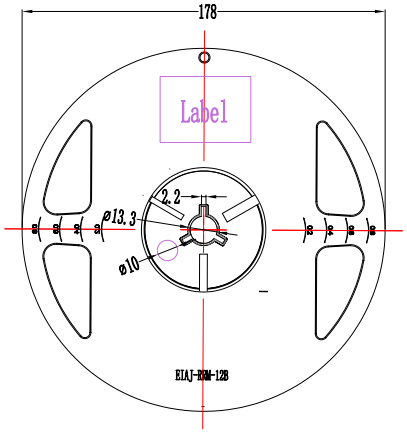
1. Product complies to Moisture Sensitivity Level 3 (MSL 3).
2. The numbers in the table are specific to SAC305. Luminus recommends using an SAC305 solder paste with a no-clean flux for RoHS compliant products.
3. During the pick and place process, axial forces on the dome (or window) should not exceed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

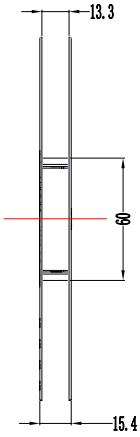
   https://luminusdevices.zendesk.com/hc/en-us/articles/360060306692-How-do-I-Reflow-Solder-Luminus-SMD-Components-
8. For any technical questions about soldering process, please contact Luminus at techsupport@luminus.com.

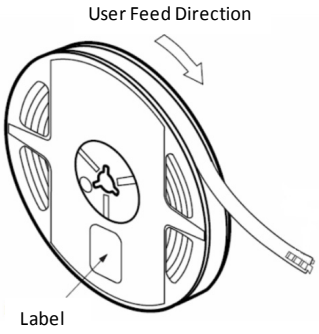
Tape and Reel Outline



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





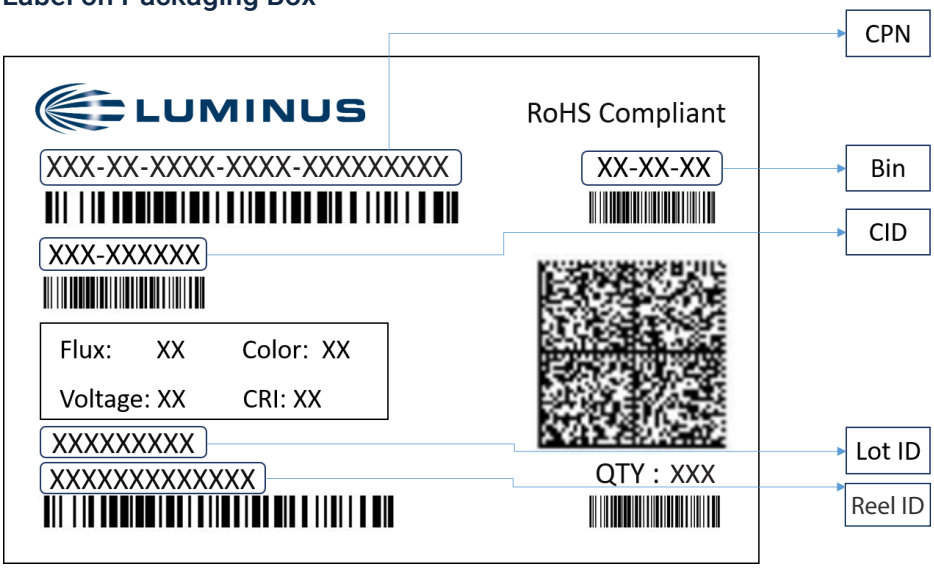


Notes:

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

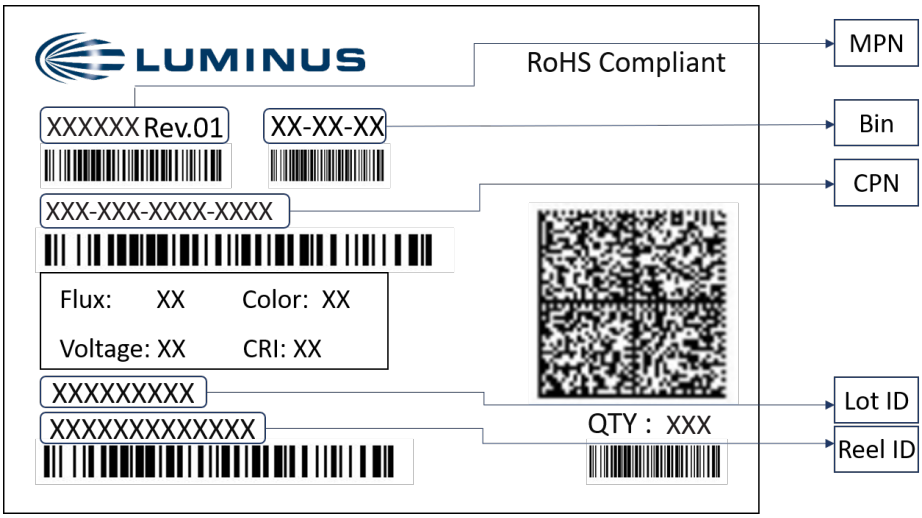
Label on Packaging Box



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

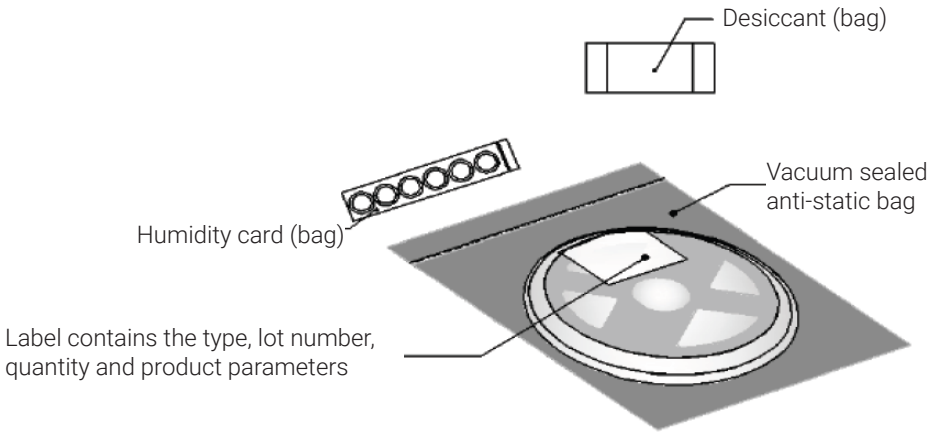


Label Fields:

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

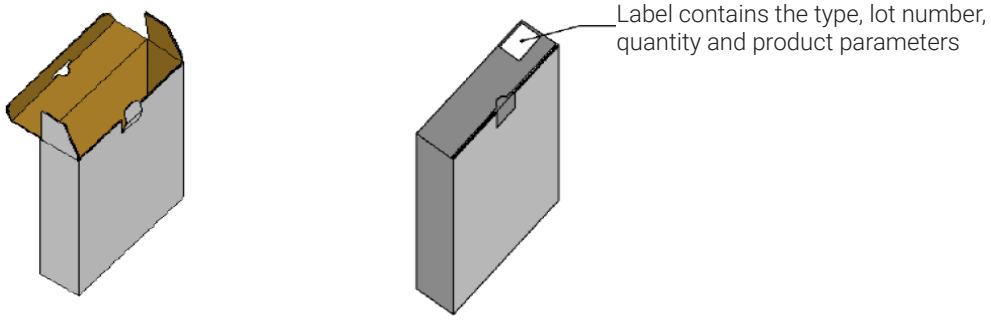
Packaging

Packaged Reel

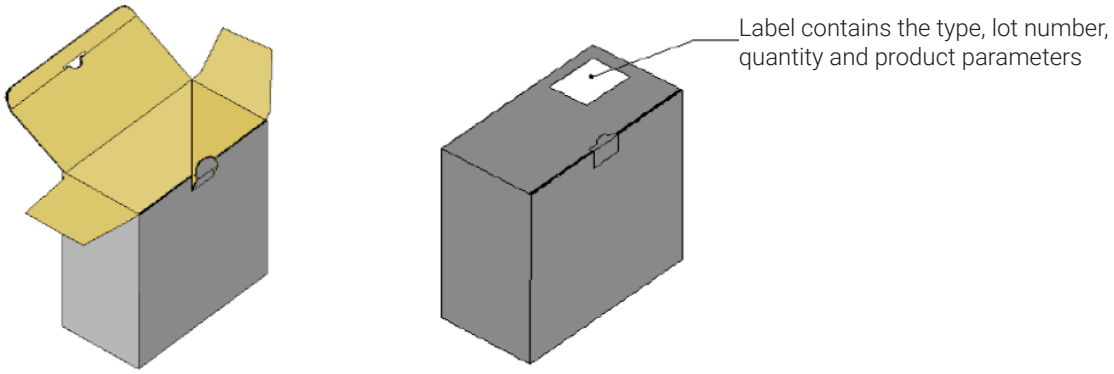


Packaging boxes

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.