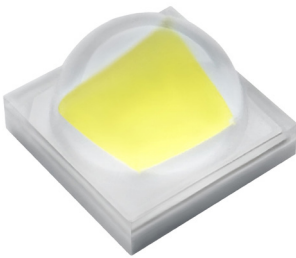


SST-20F-W-AL

The F-Line High Power White LEDs



Features

- Flip chip in an optimized ceramic package with a typical light output of 700 lm @ 1.5 A, 85 °C (6500K).
- Excellent cost per lumen performance.
- Luminous Efficacy: Up to 185 lm/W @700 mA, 85°C (6500K)
- Maximum Drive Current: 1.5 A
- Color Temperature: 2700K - 6500K
- Color Rendering Index: 65, 70, 80, 90, 95
- Low thermal resistance: 5.9°C/W
- Standard ANSI-compatible central 4 chromaticity bins, with 3-step options.
- Electrically isolated thermal path.
- 8 kV HBM ESD rating per ANSI/ESDA/JEDEC JS-001.



Applications

- Flood Lights
- Work Lights
- Portable Lights
- Outdoor and Roadway Lighting
- Indoor and Linear Lighting
- Stadium Lights

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Ordering Information

Ordering Part Numbers¹

CRI	CCT	Luminous Flux		Chromaticity Bin Kit ANSI Centers ³		Chromaticity Bin Kit 3-Step Ellipse ³	
		Minimum Flux Bin ¹	Minimum Flux ²	Bin Kit	Ordering Part Number	Bin Kit	Ordering Part Number
Typ. 70, Min. 65	5700K	D6	340 lm	572	SST-20F-WS57-AL-D6572		
	6500K	D6	340 lm	652	SST-20F-WS65-AL-D6652		
Min. 70	3000K	D5	325 lm	302	SST-20F-WE30-AL-D5302		
	3500K	D6	340 lm	352	SST-20F-WE35-AL-D6352		
	4000K	D6	340 lm	402	SST-20F-WE40-AL-D6402		
	5000K	D6	340 lm	502	SST-20F-WE50-AL-D6502		
	5700K	D6	340 lm	572	SST-20F-WE57-AL-D6572		
	6500K	D6	340 lm	652	SST-20F-WE65-AL-D6652		
Min. 80	3000K	D3	295 lm	302	SST-20F-WF30-AL-D3302	30E3	SST-20F-WF30-AL-D330E3
	4000K	D3	295 lm	402	SST-20F-WF40-AL-D3402		
	5000K	D4	310 lm	502	SST-20F-WF50-AL-D4502		
	5700K	D4	310 lm	572	SST-20F-WF57-AL-D4572		
Min. 90	2700K	C6	214 lm	272	SST-20F-WG27-AL-C6272	27E3	SST-20F-WG27-AL-C627E3
	3000K	C7	226 lm	302	SST-20F-WG30-AL-C7302	30E3	SST-20F-WG30-AL-C730E3
	3500K	D1	265 lm	352	SST-20F-WG35-AL-D1352	35E3	SST-20F-WG35-AL-D135E3
	4000K	D1	265 lm	402	SST-20F-WG40-AL-D1402	40E3	SST-20F-WG40-AL-D140E3
	5700K	C9	250 lm	572	SST-20F-WG57-AL-C9572		
Min. 95	2700K	C4	192 lm	272	SST-20F-WH27-AL-C4272	27E3	SST-20F-WH27-AL-C427E3
	3000K	C5	202 lm	302	SST-20F-WH30-AL-C5302	30E3	SST-20F-WH30-AL-C530E3
	3500K	C6	214 lm	352	SST-20F-WH35-AL-C6352	35E3	SST-20F-WH35-AL-C635E3
	4000K	C7	226 lm	402	SST-20F-WH40-AL-C7402	40E3	SST-20F-WH40-AL-C740E3

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: $I_f = 700 \text{ mA}$, $T_j = 85^\circ\text{C}$.
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

SST	20F	W<xyy>	AL	<ffcccc>
Product Family	Chip Area	Color	Package Configuration	Bin Kit
S: Surface Mount S: Dome Lensed T: Single Emitter	20: 2.0 mm ² F: F-Line, Flip Chip	W: White < x > CRI Category Code S: CRI>65 E: CRI>70 F: CRI>80 G: CRI>90 H: CRI>95 < yy > Color Temperature 30: 3000K 65: 6500K	AL: Package Code	< ff > Minimum Flux Bin, see 'Luminus Flux Bins' table for details < cccc > Chromaticity Bin Kit, see 'Chromaticity Bin Kit Codes' table for details



Binning Structure

Luminous Flux Bins^{1,2}

Flux Bin	Binning @ 700 mA			Correlated Minimum Flux (lm) @ $T_j = 85^{\circ}\text{C}^2$		
	$T_j = 85^{\circ}\text{C}^1$		$T_j = 25^{\circ}\text{C}$			
	Minimum Flux (lm)	Maximum Flux (lm)	Minimum Flux (lm)	350 mA	1000 mA	1500 mA
C4	192	202	213	104	261	367
C5	202	214	224	109	275	386
C6	214	226	238	116	291	409
C7	226	238	251	122	307	432
C8	238	250	264	129	324	455
C9	250	265	278	135	340	478
D1	265	280	294	143	360	506
D2	280	295	311	151	381	535
D3	295	310	328	159	401	563
D4	310	325	344	167	422	592
D5	325	340	361	176	442	621
D6	340	355	378	184	462	649
D7	355	375	394	192	483	678
D8	375	395	417	203	510	716
D9	395	415	439	213	537	754

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 $\pm 7\%$ tolerance on flux measurement.
2. Flux values at other junction temperature (T_j) and/or forward current conditions are calculated and for reference only.



Binning Structure

Forward Voltage Bins¹

Voltage Bin ³	Binning @ 700 mA, T _j = 85°C	
	Minimum Voltage (V)	Maximum Voltage (V)
VH	2.5	2.7
VJ	2.7	2.9
VK	2.9	3.1
VL	3.1	3.3

Notes:

1. Individual voltage bins are not orderable.



Binning Structure

Chromaticity Binning Coordinates^{1,2,3}

CCT	Bin	CIE _x	CIE _y	Bin	CIE _x	CIE _y	Bin	CIE _x	CIE _y	Bin	CIE _x	CIE _y
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
5000K	DA	0.3371	0.3490	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	0.3760		0.3533	0.3620
		0.3440	0.3427		0.3451	0.3554		0.3533	0.3620		0.3515	0.3487
		0.3366	0.3369		0.3371	0.3490		0.3451	0.3554		0.3440	0.3427
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
6500K	BA	0.3048	0.3207	BB	0.3028	0.3304	BC	0.3115	0.3391	BD	0.3130	0.3290
		0.3130	0.3290		0.3115	0.3391		0.3205	0.3481		0.3213	0.3373
		0.3144	0.3186		0.3130	0.3290		0.3213	0.3373		0.3221	0.3261
		0.3068	0.3113		0.3048	0.3207		0.3130	0.3290		0.3144	0.3186



Binning Structure

Chromaticity Binning Coordinates (3-Step Ellipse)

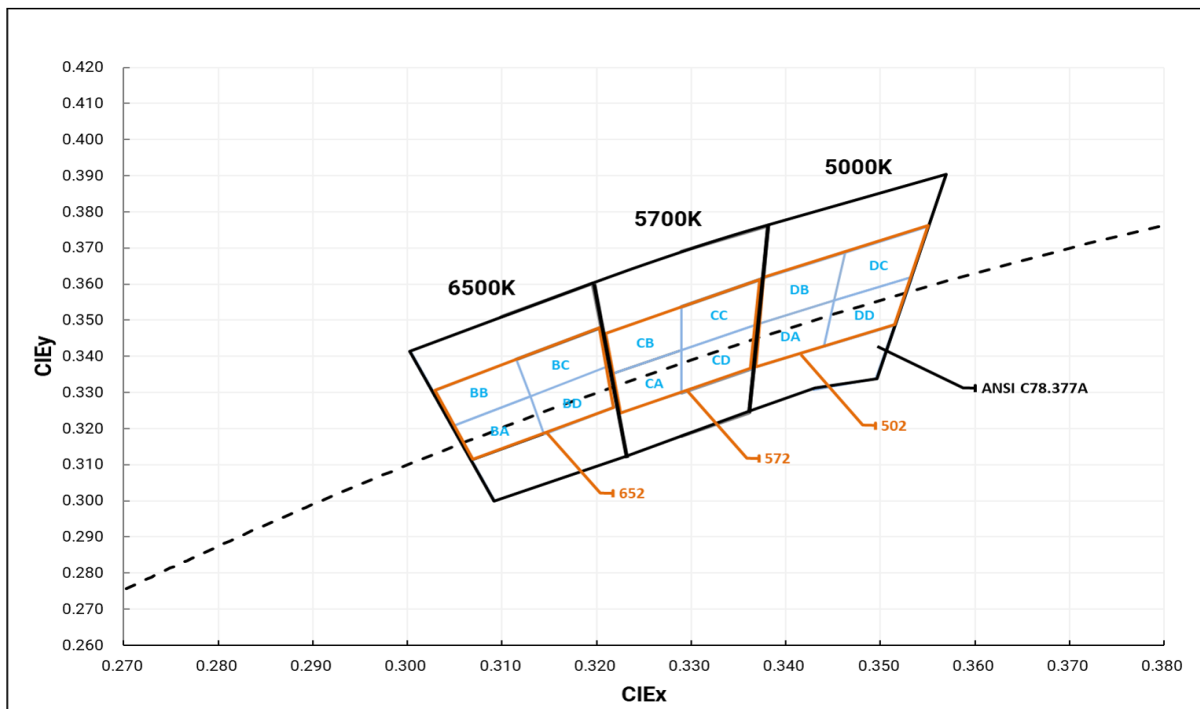
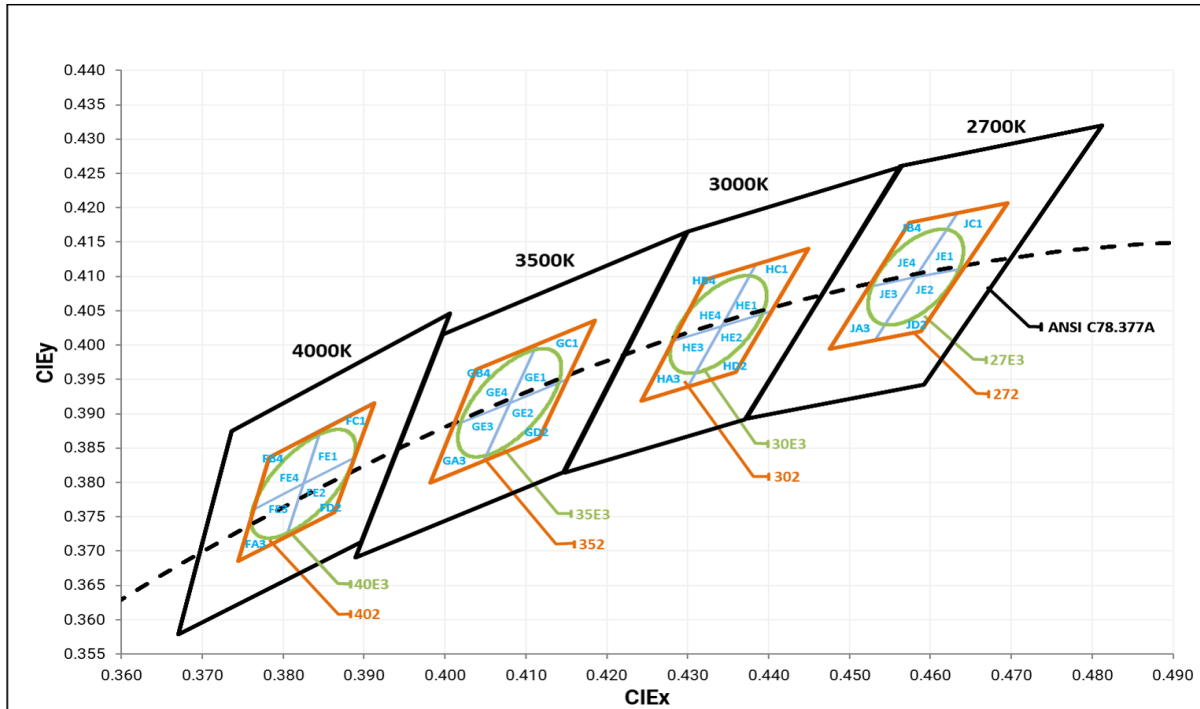
CCT	Bin Code	Center Point		3-Step Ellipse		
		CIE _x	CIE _y	a	b	Angle
2700K	JE1 - JE4	0.4582	0.4099	0.00810	0.00420	53.42°
3000K	HE1 - HE4	0.4338	0.4030	0.00834	0.00408	53.20°
3500K	GE1 - GE4	0.4080	0.3916	0.00927	0.00414	54.00°
4000K	FE1 - FE4	0.3825	0.3798	0.00939	0.00402	53.43°

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 (CIE_x, CIE_y) measurement.
3. Chromaticity binning is based on CIE_x and CIE_y coordinates only. CCT values shown in the datasheet are for informational purposes and do not represent binning criteria.

Binning Structure

Chromaticity Binning Diagram^{1,2}



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 (CIE_x, CIE_y) measurement.



Binning Structure

Chromaticity Bin Kit Codes

CCT	Bin Kit	Chromaticity Bins
2700K	272	JA3, JB4, JC1, JD2, JE1, JE2, JE3, JE4
	27E3	JE1, JE2, JE3, JE4
3000K	302	HA3, HB4, HC1, HD2, HE1, HE2, HE3, HE4
	30E3	HE1, HE2, HE3, HE4
3500K	352	GA3, GB4, GC1, GD2, GE1, GE2, GE3, GE4
	35E3	GE1, GE2, GE3, GE4
4000K	402	FA3, FB4, FC1, FD2, FE1, FE2, FE3, FE4
	40E3	FE1, FE2, FE3, FE4
5000K	502	DA, DB, DC, DD
5700K	572	CA, CB, CC, CD
6500K	652	BA, BB, BC, BD



Absolute Maximum Ratings

Parameter		Symbol	Values	Unit
Forward Current	Minimum	$I_{f \min}$	0.2	A
	Maximum	$I_{f \max}$	1.5	
Surge Current ($t < 10$ ms, Duty Cycle $< 10\%$)		I_s	2.0	
Reverse Voltage ($I_r = 10$ mA)		V_r	5.0	V
Power Dissipation		P_D	4.8	W
Junction Temperature		T_j	150	°C
Operating Temperature Range		T_{opr}	-40 to 105	
Storage Temperature Range		T_{stg}	-40 to 105	
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
			WS	WE	WF	WG	WH	
Color Rendering Index ¹	Minimum	CRI	65	70	80	90	95	
	Typical		70	-	-	-	-	
Viewing Angle (FWHM)		2θ _{1/2}	2700K to 4000K		5000K to 6500K			
			112		120		°	
Forward Voltage	Minimum	V _{f min}	2.50					V
	Typical	V _{f typ}	2.85					
	Maximum	V _{f max}	3.30					
Temperature Coefficient of Voltage		Δ _{Vf} /Δ _T	-1.4					mV/°C
Electrical Thermal Resistance (Junction to Solder Point) ²		R _{th JS elec}	5.9					°C/W

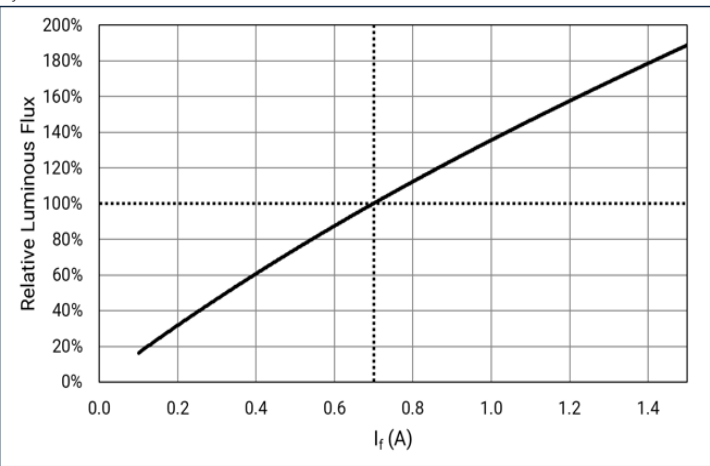
Notes:

- Luminus maintains a tolerance of ± 2 on Color Rendering Index (CRI) measurement.
- Thermal measurements are in accordance with JEDEC 51-14.



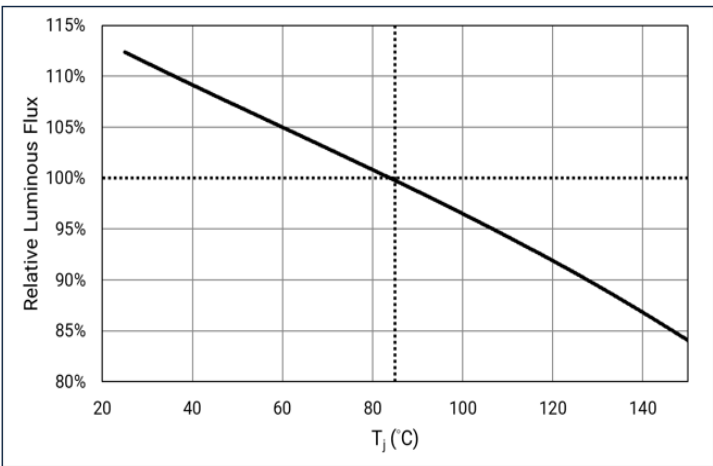
Relative Luminous Flux vs Forward Current

$T_j = 85^{\circ}\text{C}$ (2700K - 4000K)



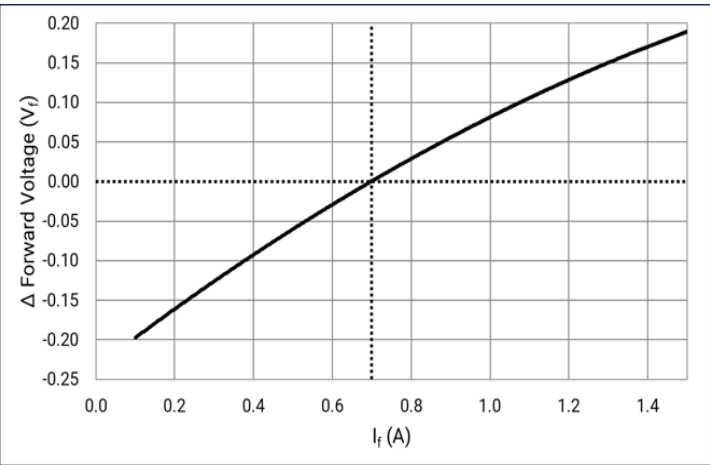
Relative Luminous Flux vs Temperature

$I_f = 0.7\text{ A}$ (2700K - 4000K)



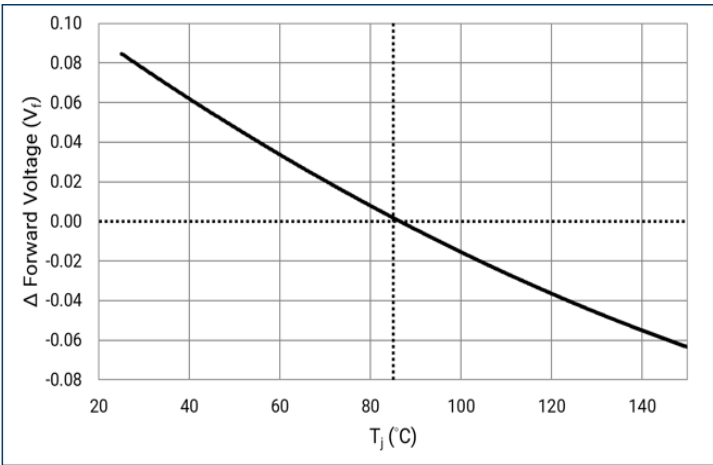
Forward Voltage Shift vs Forward Current

$T_j = 85^{\circ}\text{C}$ (2700K - 4000K)



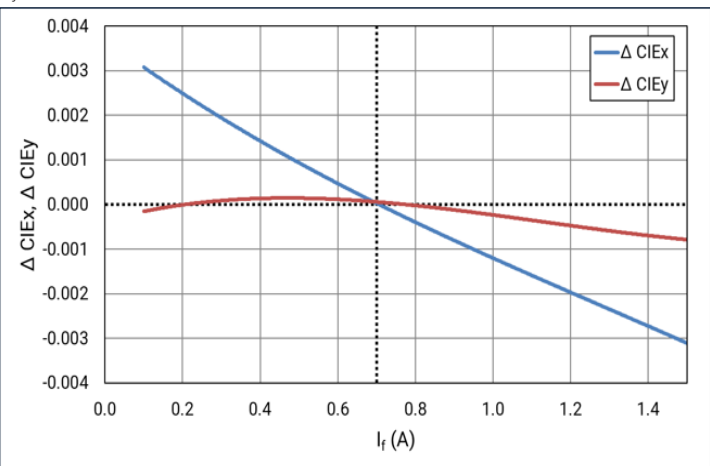
Forward Voltage Shift vs Temperature

$I_f = 0.7\text{ A}$ (2700K - 4000K)



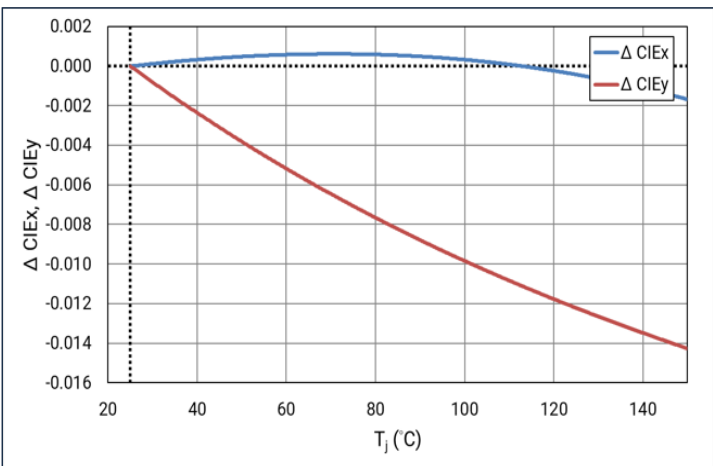
Relative Chromaticity vs Forward Current

$T_j = 85^{\circ}\text{C}$ (2700K - 4000K)



Relative Chromaticity vs Temperature

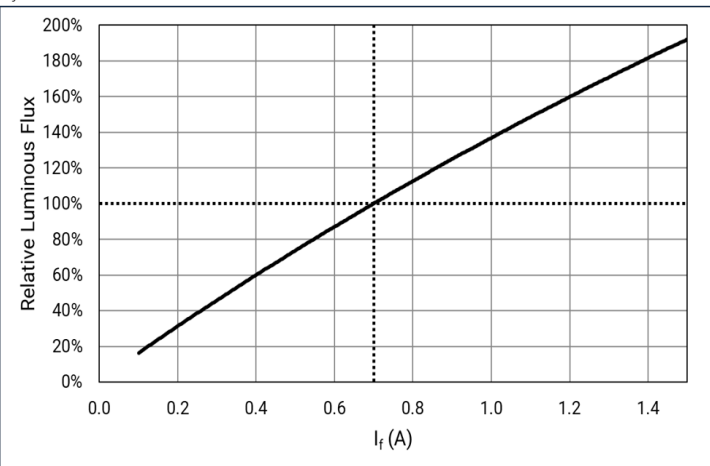
$I_f = 0.7\text{ A}$ (2700K - 4000K)





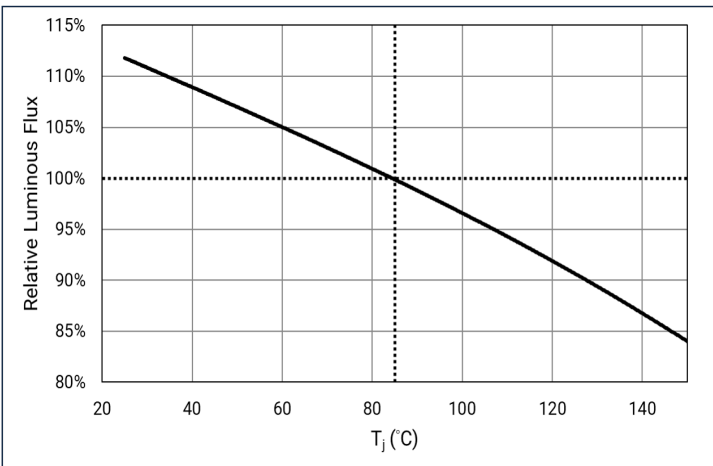
Relative Luminous Flux vs Forward Current

$T_j = 85^{\circ}\text{C}$ (5000K - 6500K)



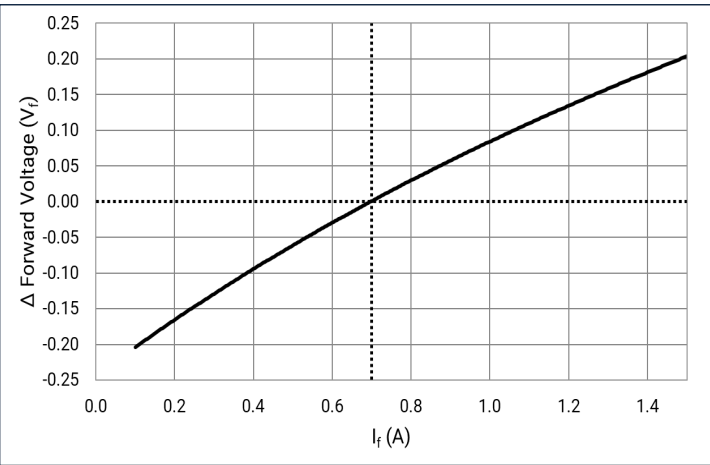
Relative Luminous Flux vs Temperature

$I_f = 0.7\text{ A}$ (5000K - 6500K)



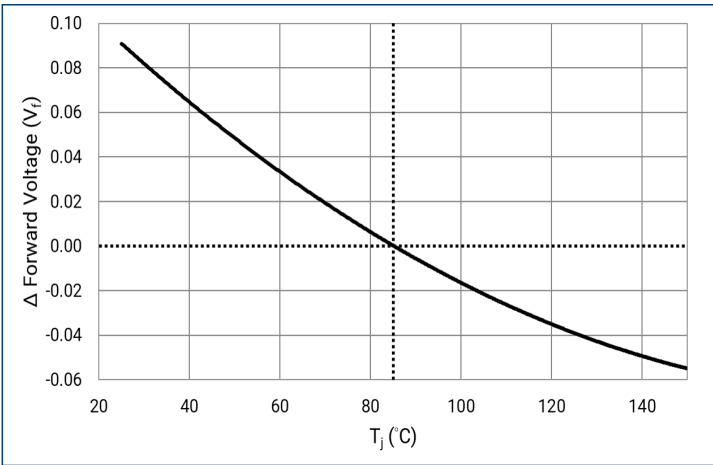
Forward Voltage Shift vs Forward Current

$T_j = 85^{\circ}\text{C}$ (5000K - 6500K)



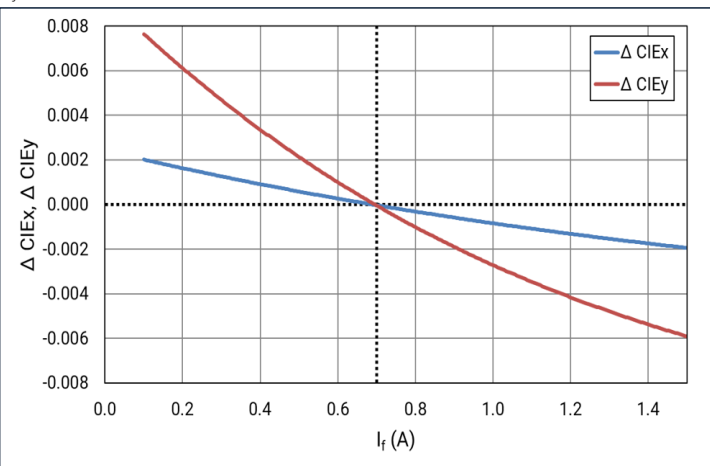
Forward Voltage Shift vs Temperature

$I_f = 0.7\text{ A}$ (5000K - 6500K)



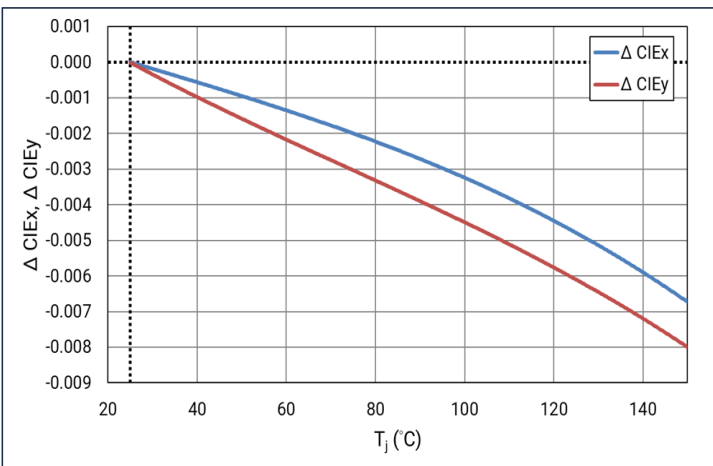
Relative Chromaticity vs Forward Current

$T_j = 85^{\circ}\text{C}$ (5000K - 6500K)



Relative Chromaticity vs Temperature

$I_f = 0.7\text{ A}$ (5000K - 6500K)

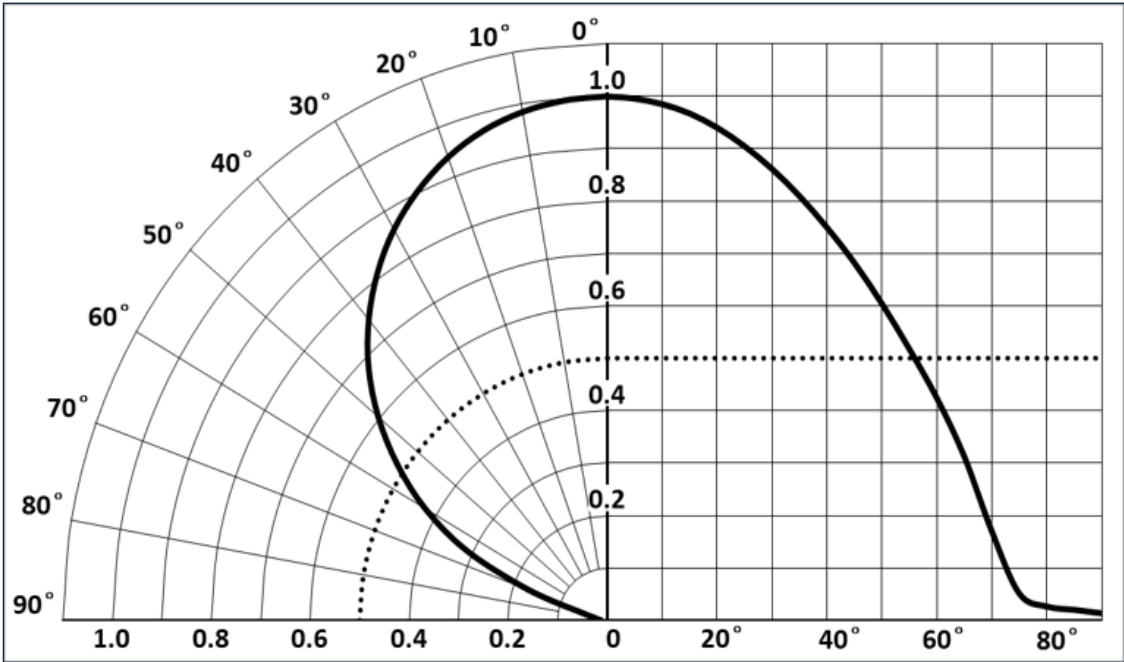




Angular Distribution and Typical Spectrum

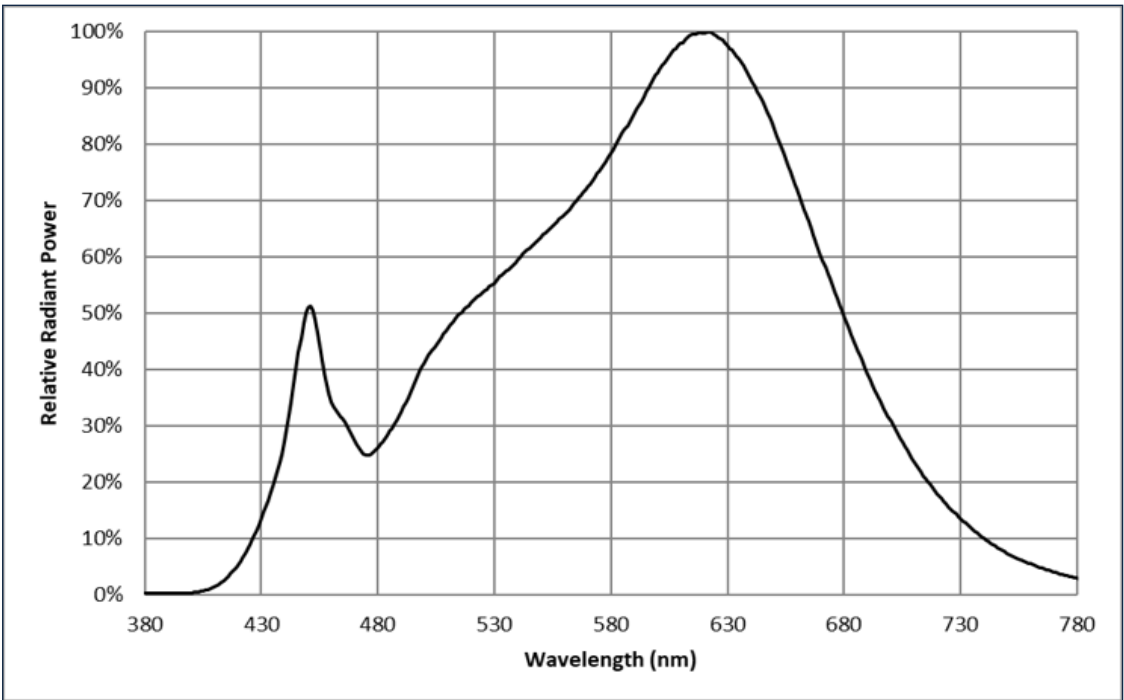
Angular Distribution (2700K - 4000K)

$I_f = 0.7\text{ A}$; $T_j = 25^\circ\text{C}$



Relative Spectral Power Distribution (2700K - 4000K)

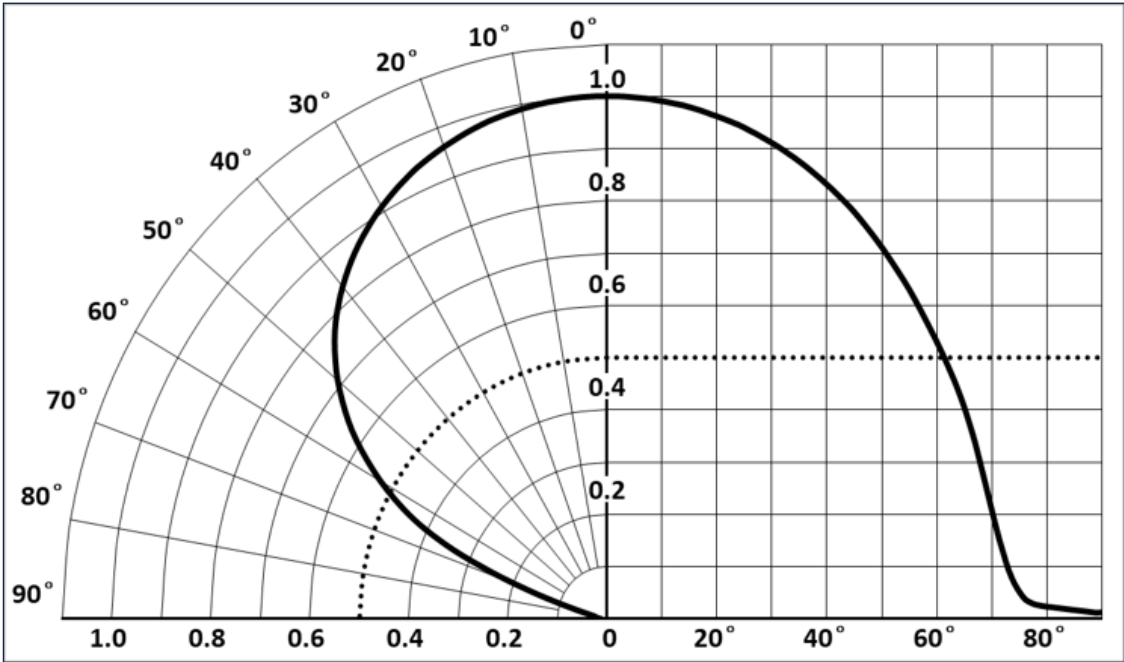
$I_f = 0.7\text{ A}$; $T_j = 85^\circ\text{C}$





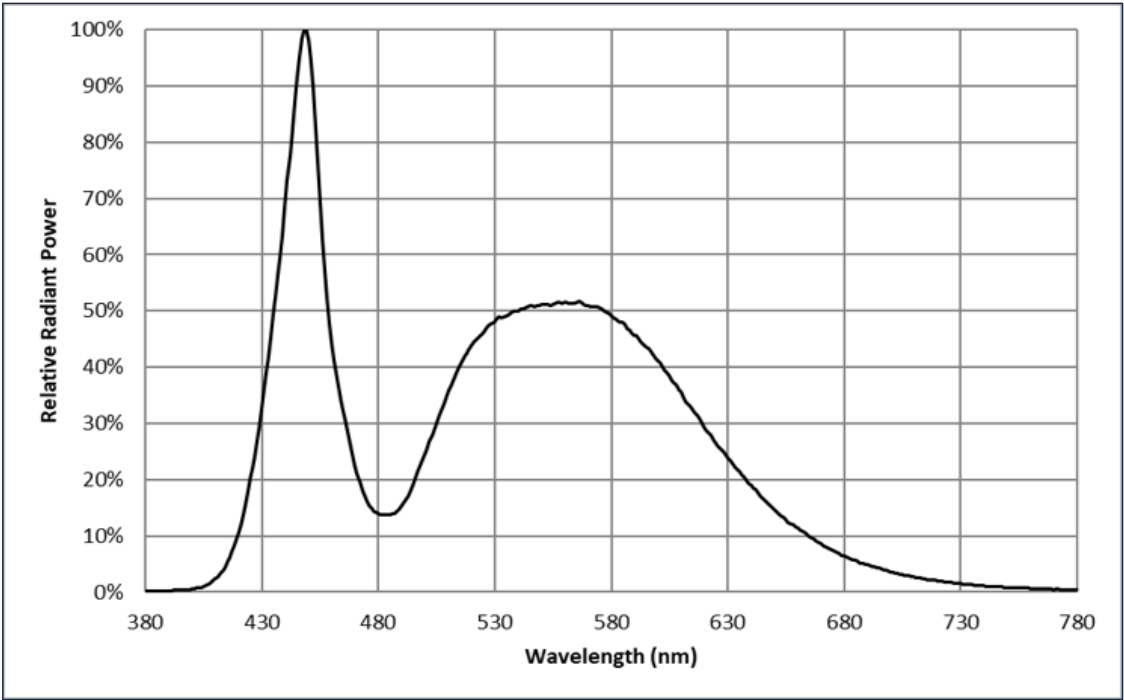
Angular Distribution (5000K - 6500K)

$I_f = 0.7\text{ A}$; $T_j = 25^\circ\text{C}$

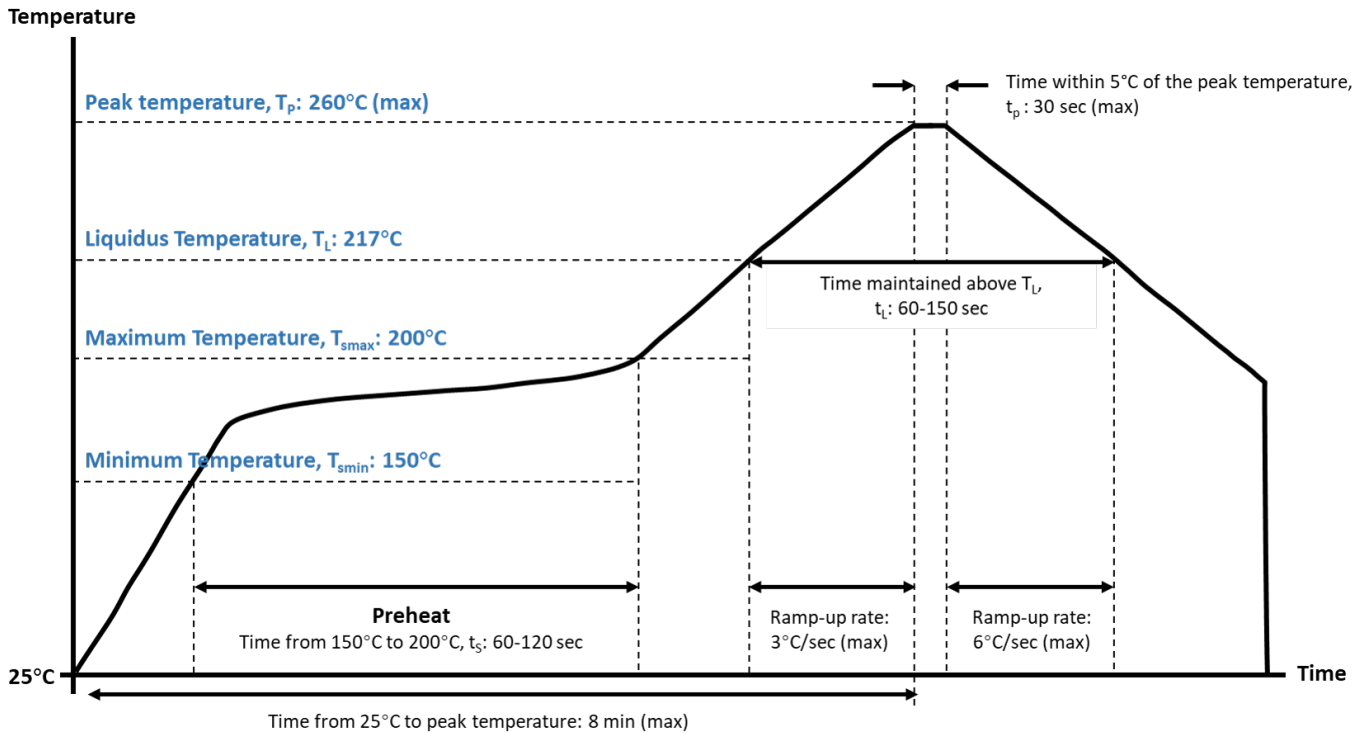


Relative Spectral Power Distribution (5000K - 6500K)

$I_f = 0.7\text{ A}$; $T_j = 85^\circ\text{C}$



Soldering Profile



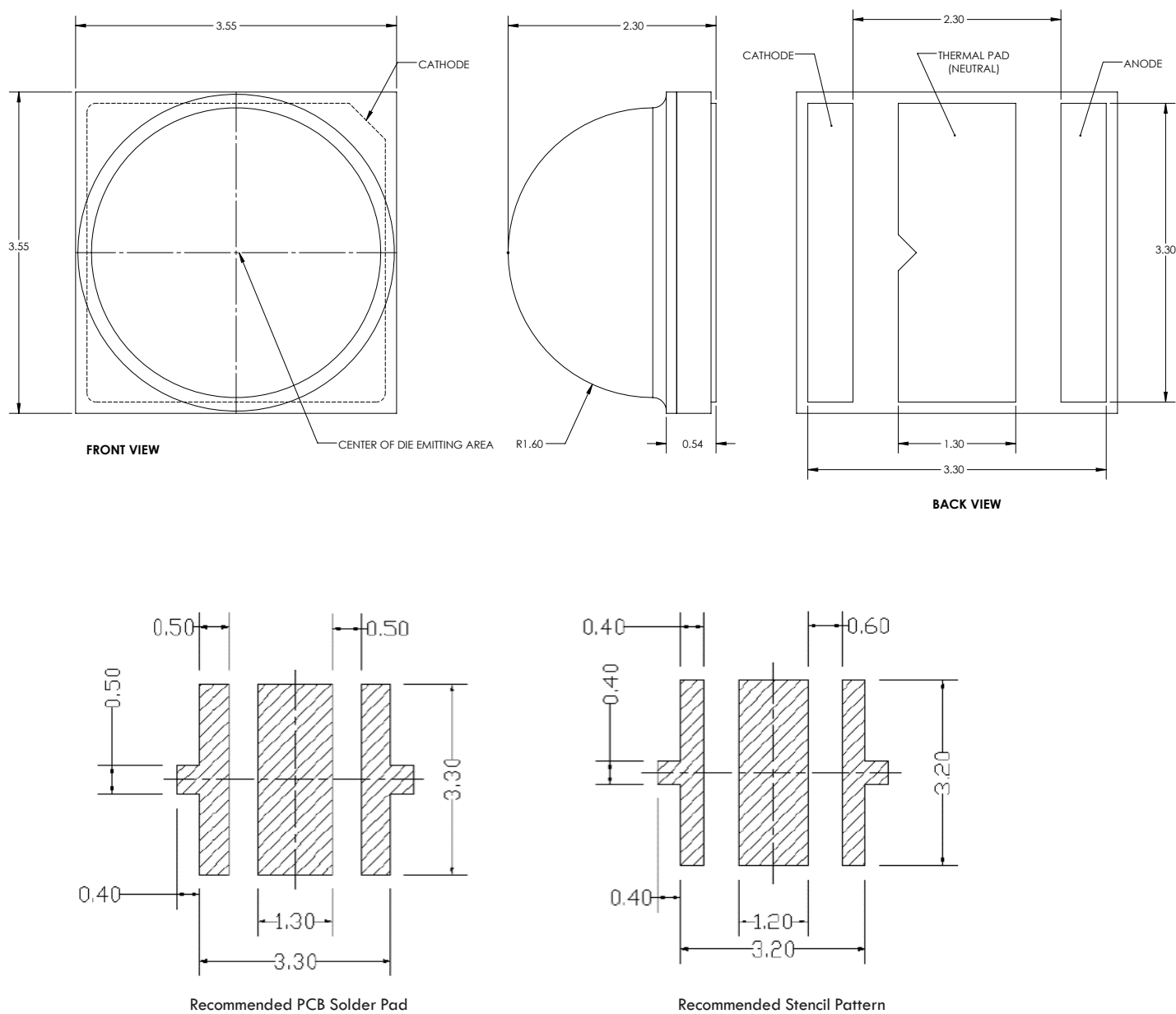
SMT Rework Guideline	Manual Hotplate Reflow	Hot Air Gun Reflow
Heating Time	< 60 sec	
Hotplate Temperature	< 245°C	< 150°C

Notes:

- Product complies to Moisture Sensitivity Level 3 (MSL 3).
- 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 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.



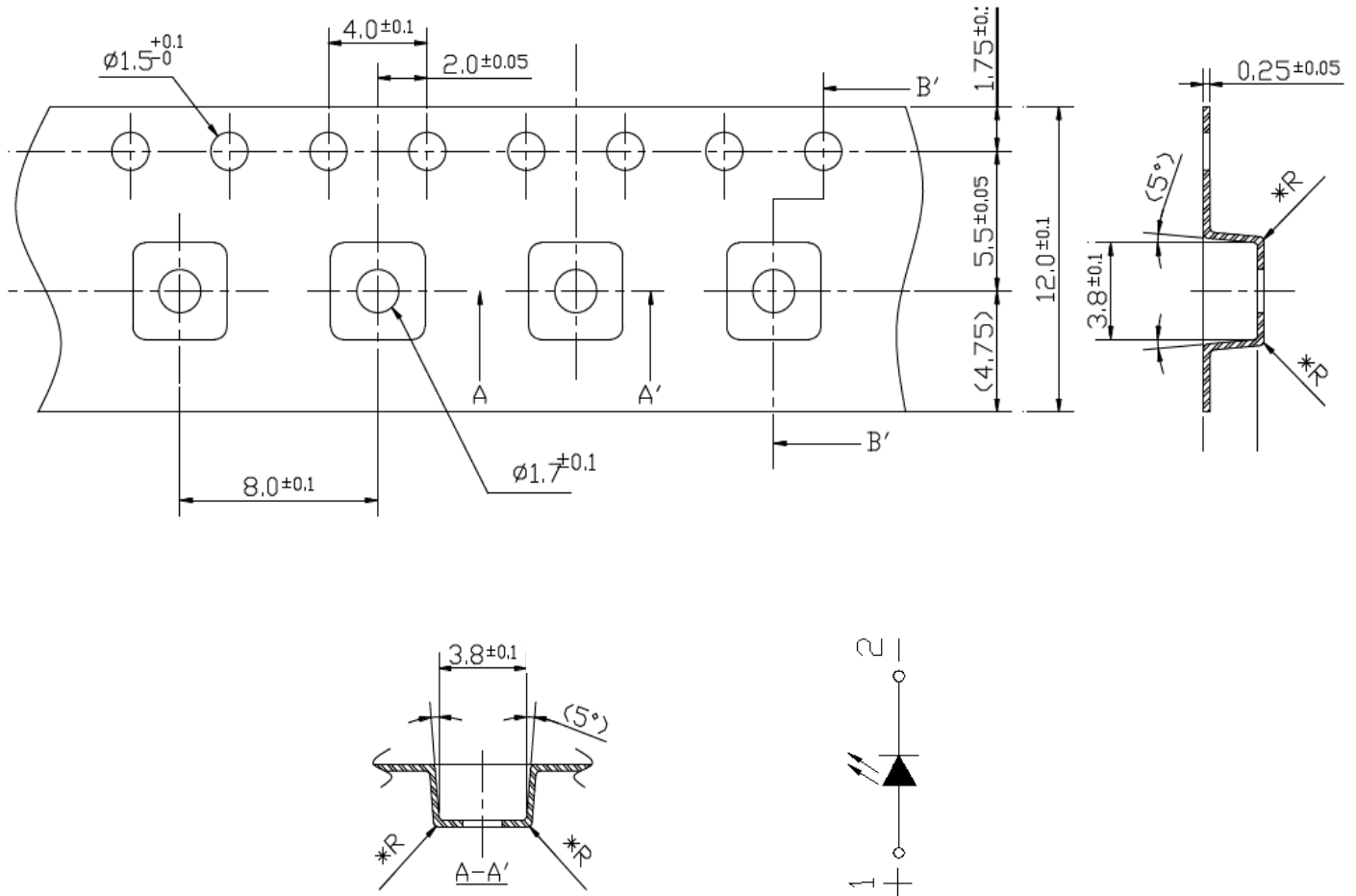
Mechanical Dimensions



Notes:

1. All dimensions are in millimeter ± 0.1 mm.

Tape and Reel Outline



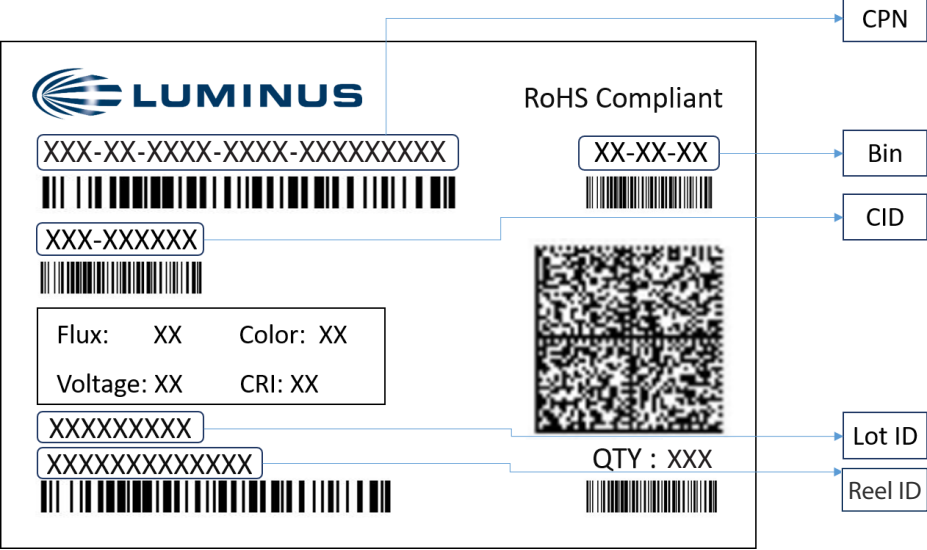
Notes:

1. Each reel contains 900 units.
2. Luminus maintains a cumulative tolerance of $\pm 0.25\text{mm}$ for every 10 pitches.
3. All dimensions are in millimeter.



Shipping Label

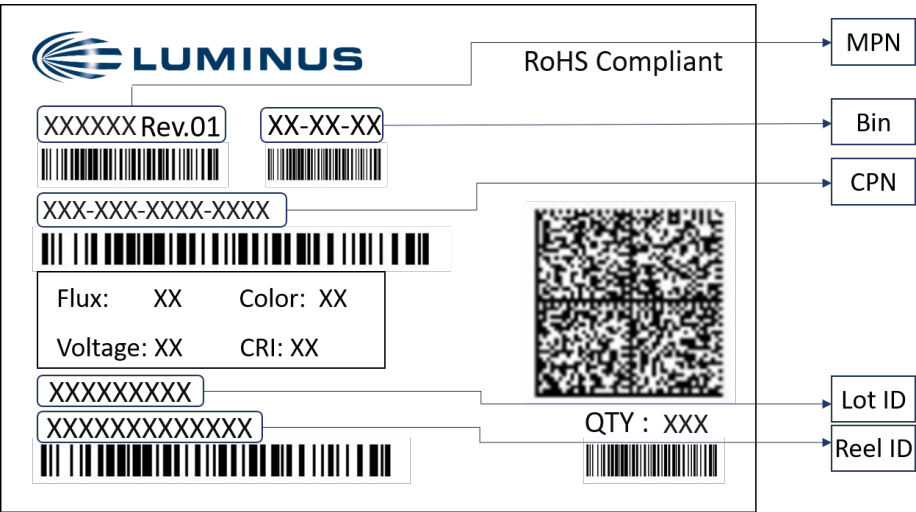
Label on Packaging Box



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 5
- Color:** Bin as defined on page 6 - 9
- CRI:** NA
- Lot ID & Reel ID:** For Luminus internal use

Label on Reel

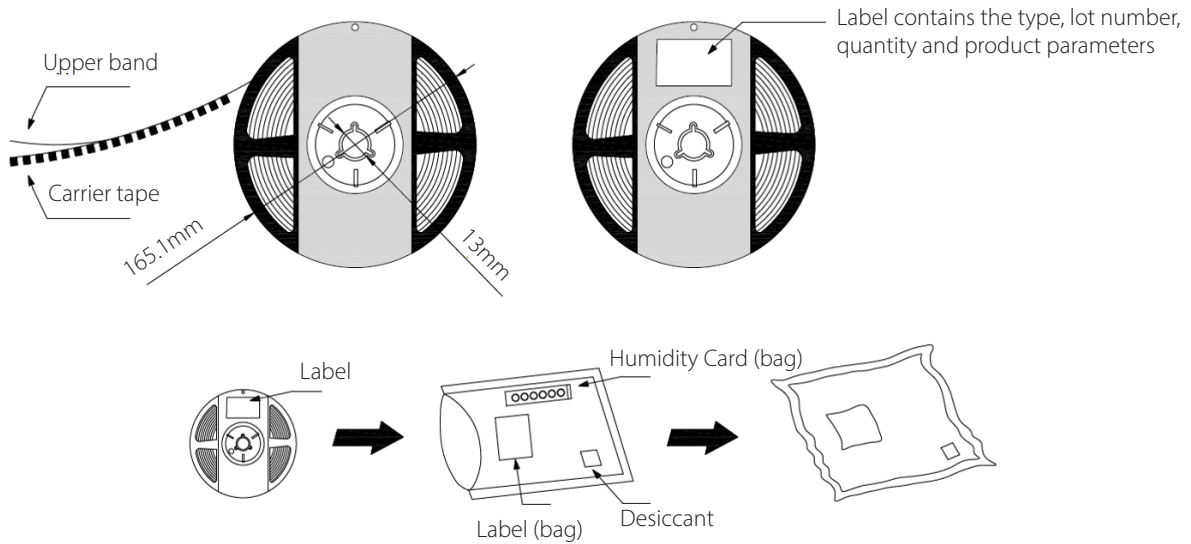


Label Fields:

- 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 5
- Color:** Bin as defined on page 6 - 9
- CRI:** NA
- Lot ID & Reel ID:** For Luminus internal use

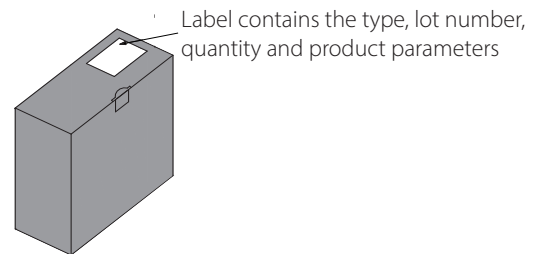
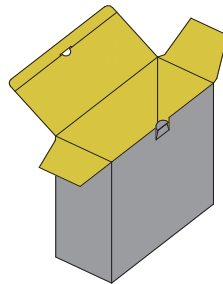
Packaging

Packaged Reel

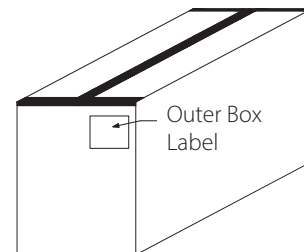
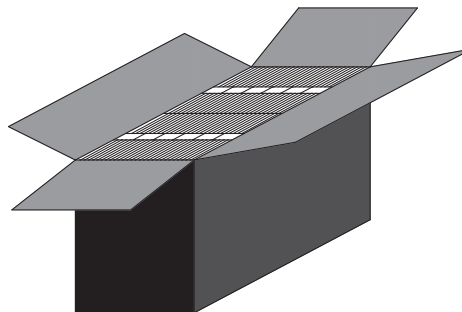


Packaging boxes

Inner Box - Up to 4 reels per box
Size: 22.5 x 13.0 x 24.5 cm



Outer Box - Up to 8 inner boxes per box
Size: 42.0 x 24.0 x 26.5 cm



Packing Configuration:

- 900 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.