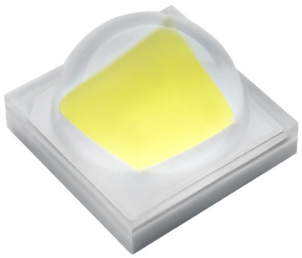
SST-20F-W-AL

The F-Line High Power White LEDs



Features

- The flip chip in an optimized ceramic package has 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℃ (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.

Table of Contents

Applications

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

Ordering Information

Ordering Part Numbers[1]

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	N/A	
	6500K	D6	340 lm	652	SST-20F-WS65-AL-D6652		
Min. 70	3000K	D5	325 lm	302	SST-20F-WE30-AL-D5302		
	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
	5000K	D4	310 lm	502	SST-20F-WF50-AL-D4502	N/A	
	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	N/A	
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 Binning' 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.

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 Binning' table for details <**cccc**> Chromaticity Bin Kit, see 'Chromaticity Bin Kit Codes' table for details

Binning Structure

Luminous Flux Binning[1,2]

Flux Bin Code	Binning @ 700 mA			Correlated Minimum Flux (lm) @ T_j=85°C[2]		
	T_j= 85°C[1]		T_j= 25°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 ±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 Binning[1]

Voltage Bin Code[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

Note:

1. Individual voltage bins are not orderable. Luminus maintains a ±0.1V tolerance on forward voltage measurement.

Binning Structure

Chromaticity Binning Coordinates

CCT	Bin Code	CIEx	CIEy	Bin Code	CIEx	CIEy	Bin Code	CIEx	CIEy	Bin Code	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	0.43	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
		0.43	0.3939		0.4342	0.4028		0.4403	0.4049		0.4359	0.396
3500K	GA3	0.3981	0.38	GB4	0.401	0.3882	GC1	0.408	0.3916	GD4	0.4082	0.3782
		0.401	0.3882		0.404	0.3966		0.4113	0.4001		0.4116	0.3865
		0.408	0.3916		0.4113	0.4001		0.4186	0.4037		0.4183	0.3898
		0.4048	0.3832		0.408	0.3916		0.415	0.395		0.4147	0.3814
4000K	FA3	0.3744	0.3685	FB4	0.3763	0.376	FC1	0.3825	0.3798	FD2	0.3804	0.3721
		0.3763	0.376		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

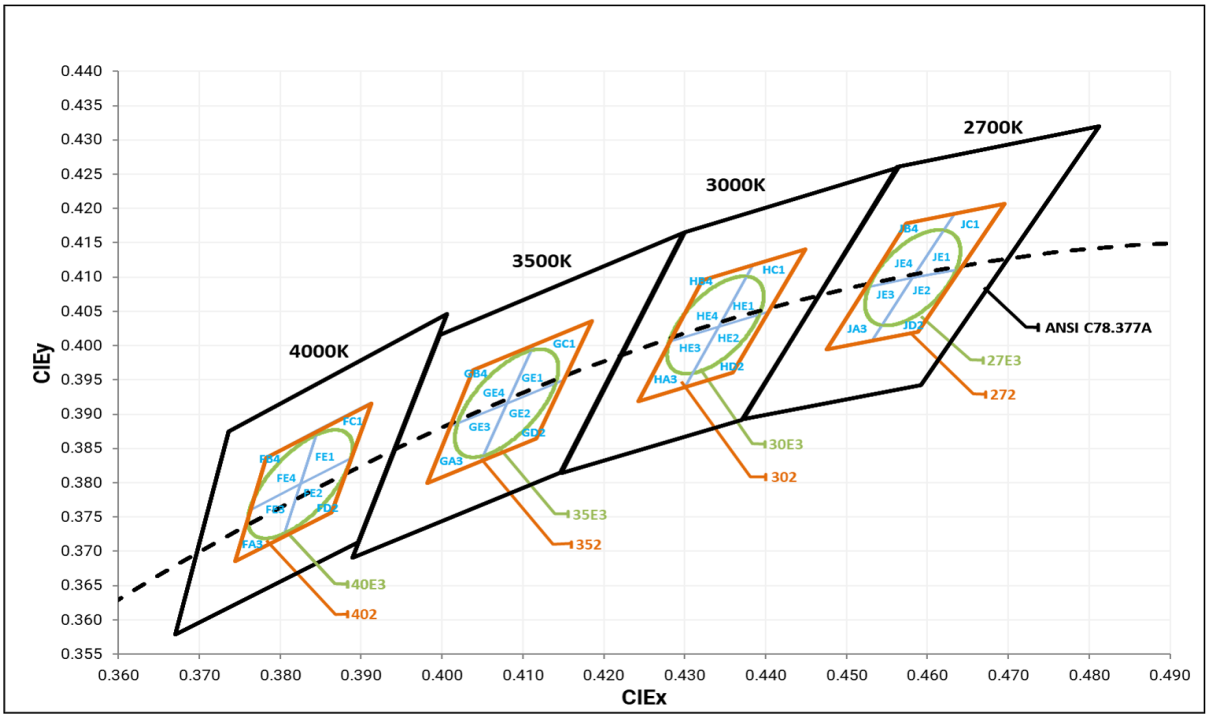
Binning Structure

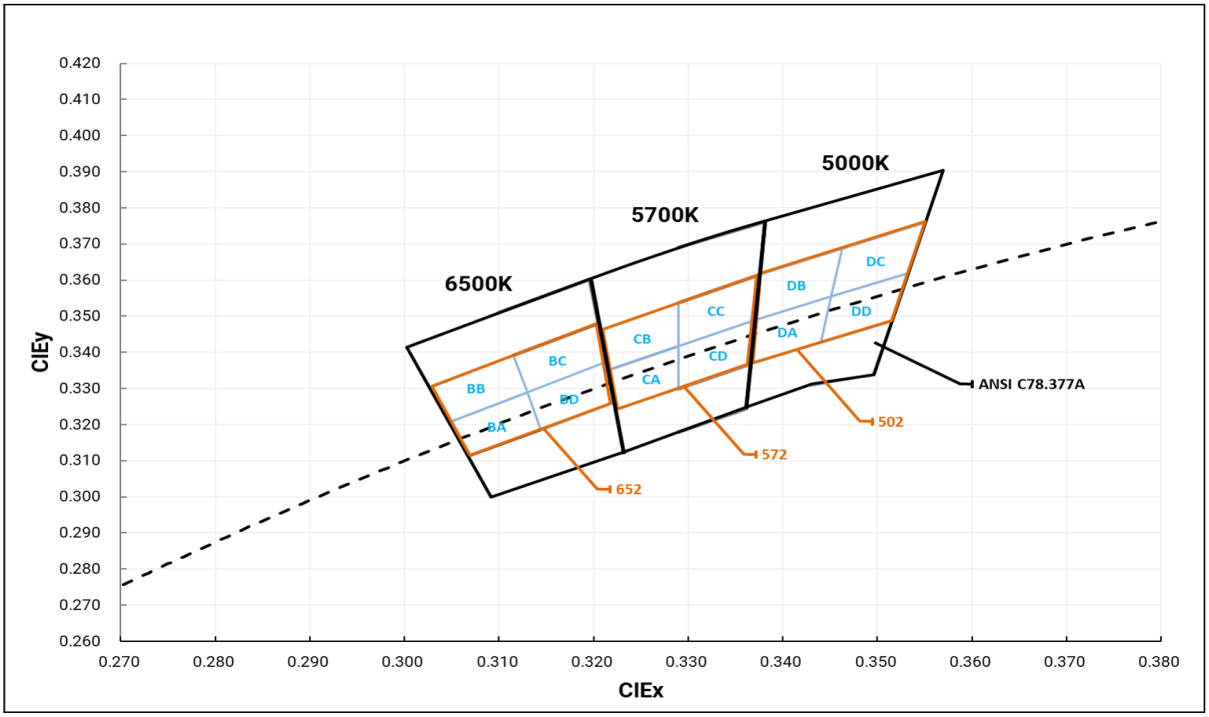
Chromaticity Binning Coordinates (3-Step Ellipse)

CCT	Bin Code	Center Point		3-Step Ellipse		
		CIEx	CIEy	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°

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 (CIEx, CIEy) 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

		Symbol	Values	Unit
DC Forward Current	Minimum	$I_{f\,min}$	0.2	A
	Maximum	$I_{f\,max}$	1.5	
Surge Current (t<10 ms, Duty Cycle < 10%)		$I_{s\,max}$	2.0	A
Reverse Voltage (I_r= 10 mA)		V_r	5.0	V
Power Dissipation		P_D	4.8	W
Junction Temperature		$T_{j\,max}$	150	°C
Operating Temperature		T_{opr}	-40 to 105	°C
Storage Temperature		T_{stg}	-40 to 105	°C
ESD withstand Voltage HBM Per ANSI/ESDA/JEDEC JS-001		V_{HBM}	8	kV
ESD withstand Voltage CDM Per ANSI/ESDA/JEDEC JS-002		V_{CDM}	1	kV

Characteristics

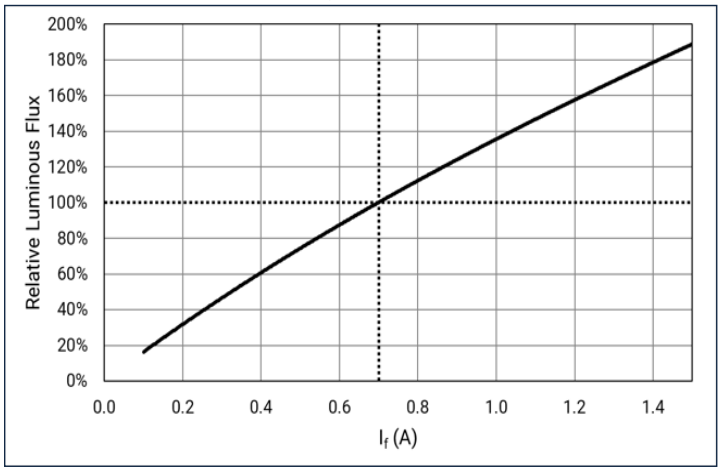
Parameter		Symbol	Value					Unit
			WS	WE	WF	WG	WH	
Color Rendering Index[1] (T_j=85°C)	Minimum	CRI	65	70	80	90	95	
	Typical	CRI	70	-	-	-	-	
Viewing Angle (FWHM)		$2\theta_{1/2}$	2700K to 4000K			5000K to 6500K		
			112			120		°
Forward Voltage (I_f =700 mA, T_j = 85°C)	Minimum	$V_{f\,min}$	2.50					V
	Typical	$V_{f\,typ}$	2.85					
	Maximum	$V_{f\,max}$	3.30					
Temperature Coefficient of Voltage		∂_{Vf}/∂_T	-1.4					mV/°C
Thermal Resistance (Electrical) Junction/Solder Point		$R_{thjs\text{-}EL}$	5.9					°C/W

Note:

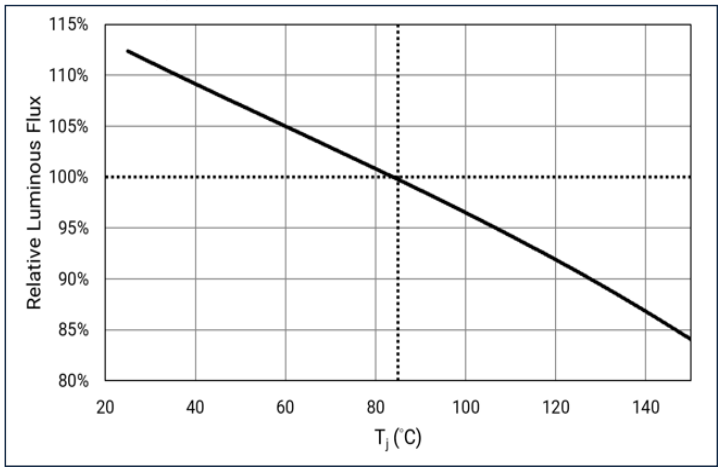
1. Luminus maintains a tolerance of ±2 on Color Rendering Index (CRI) measurement.

Relative Luminous Flux (2700K - 4000K)

Forward Current: Φ_v/Φ_v(0.7 A), T_j = 85°C

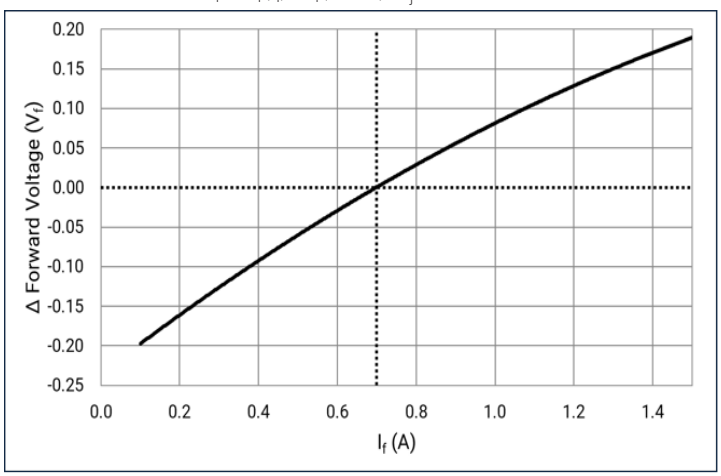


Temperature (T_j): Φ_v/Φ_v(85°C), I_f = 0.7 A

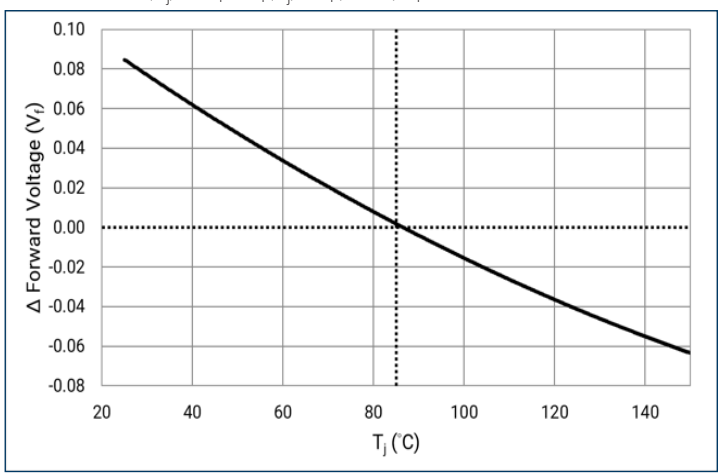


Forward Voltage (2700K - 4000K)

Forward Current: $\Delta V_f = V_f(I_f) - V_f$(0.7 A), T_j = 85°C

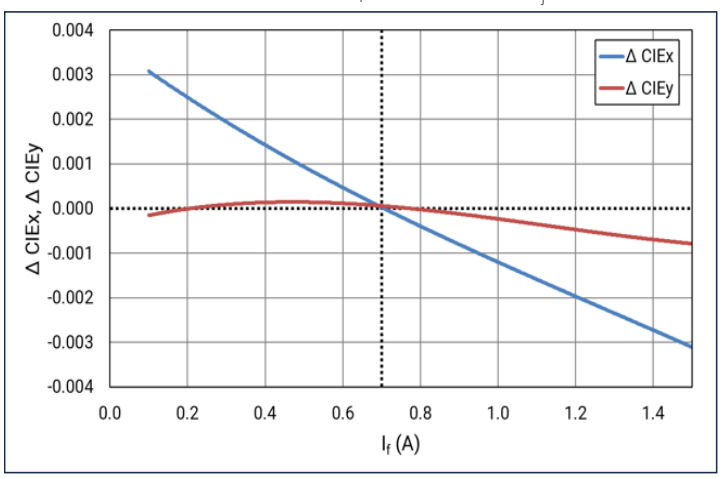


Temperature (T_j): $\Delta V_f = V_f(T_j) - V_f$(85°C), I_f = 0.7 A

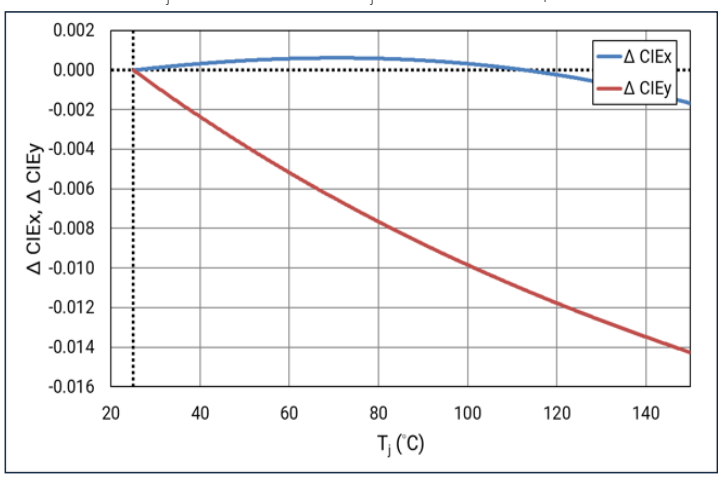


Relative Chromaticity (2700K - 4000K)

Forward Current: ΔCIEx,y= CIEx,y(I_f) - CIEx,y(0.7 A), T_j = 85°C

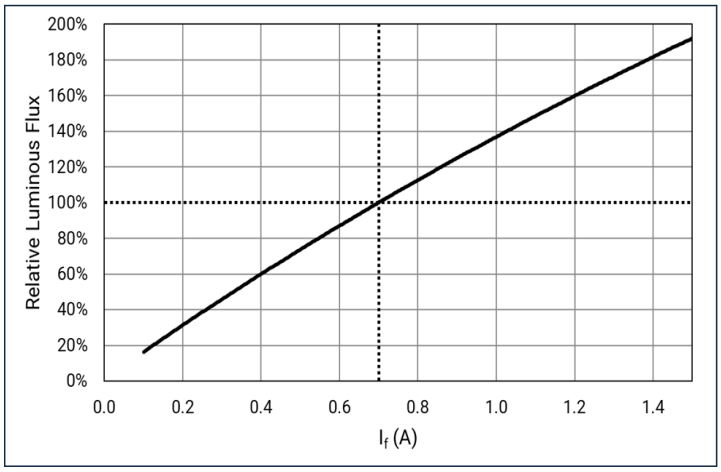


Temperature (T_j): ΔCIEx,y= CIEx,y(T_j) - CIEx,y(25°C), I_f = 0.7 A

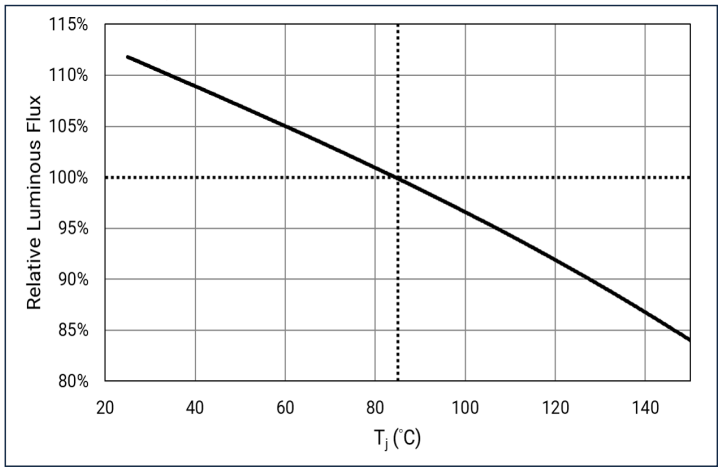


Relative Luminous Flux (5000K - 6500K)

Forward Current: Φ_v/Φ_v(0.7 A), T_j= 85°C

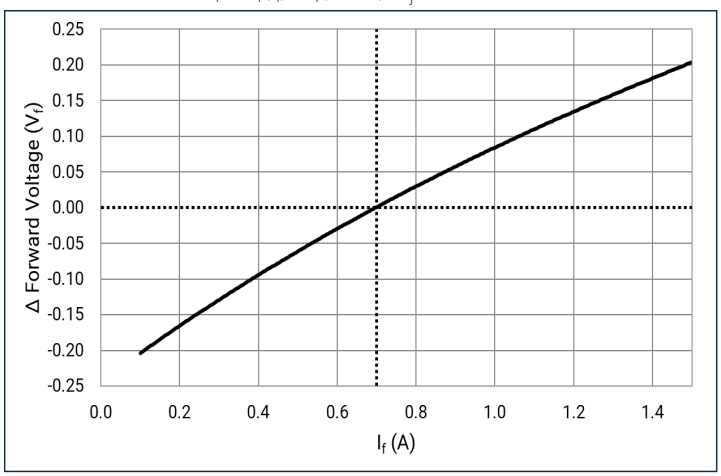


Temperature (T_j): Φ_v/Φ_v(85°C), I_f = 0.7 A

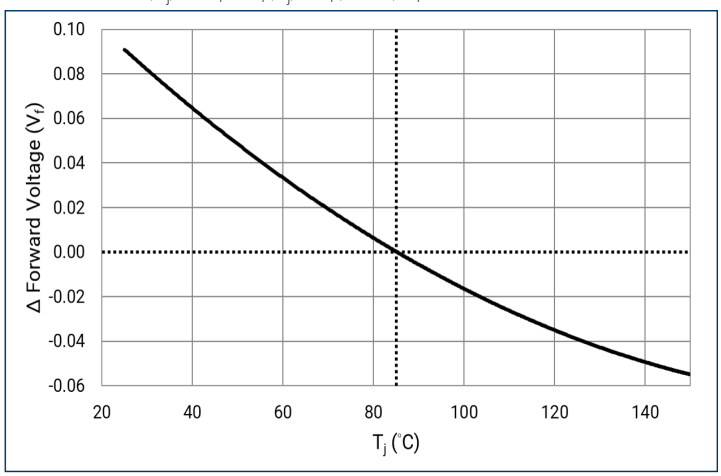


Forward Voltage (5000K - 6500K)

Forward Current: $\Delta V_f = V_f(I_f) - V_f$(0.7 A), T_j = 85°C

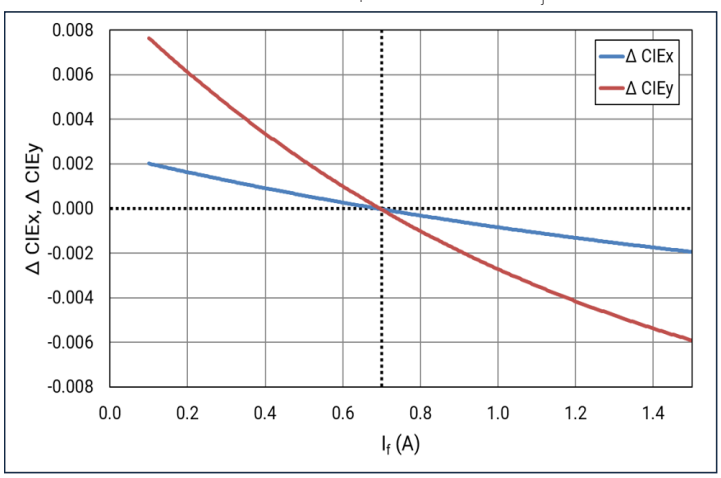


Temperature (T_j): $\Delta V_f = V_f(T_j) - V_f$(85°C), I_f = 0.7 A

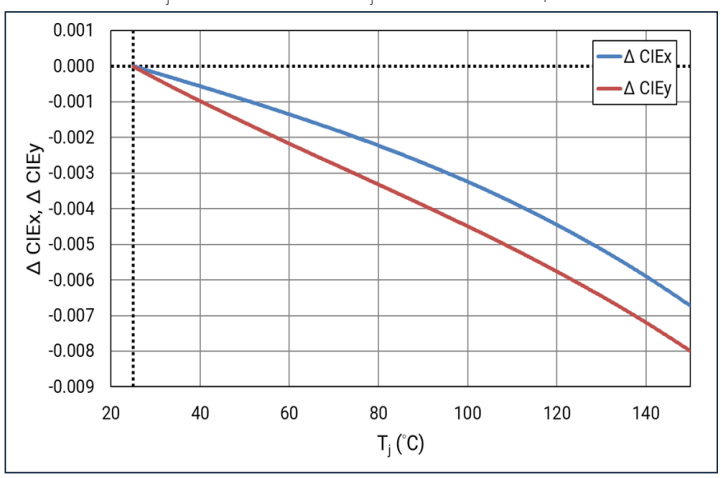


Relative Chromaticity (5000K - 6500K)

Forward Current: ΔCIEx,y= CIEx,y(I_f) - CIEx,y(0.7 A), T_j = 85°C

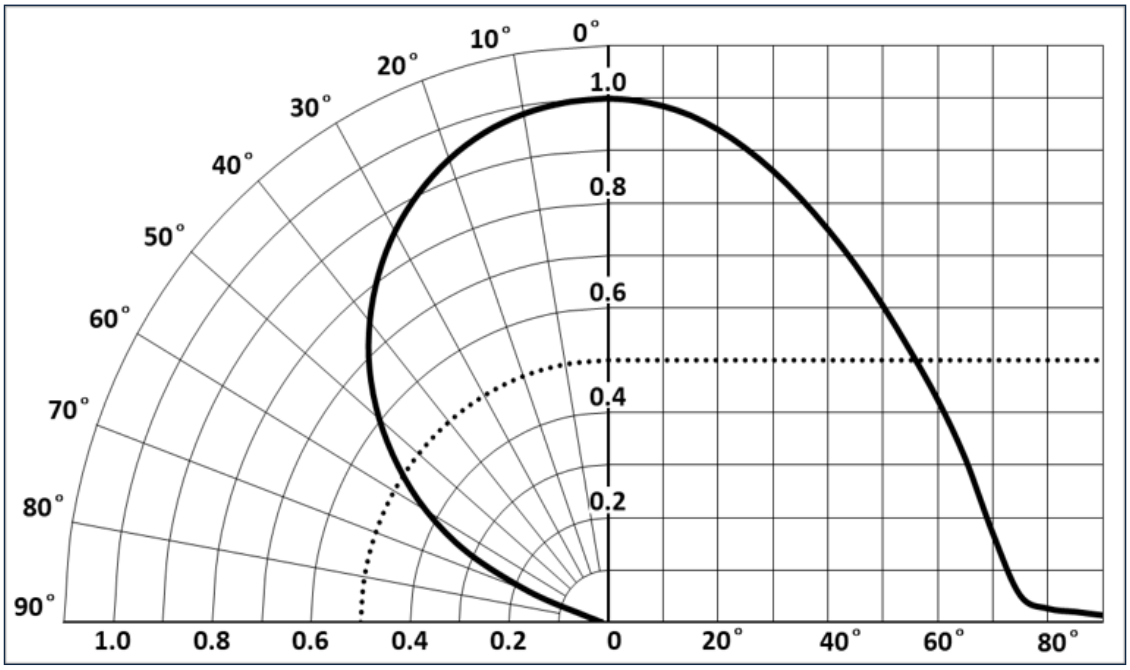


Temperature (T_j): ΔCIEx,y= CIEx,y(T_j) - CIEx,y(25°C), I_f = 0.7 A



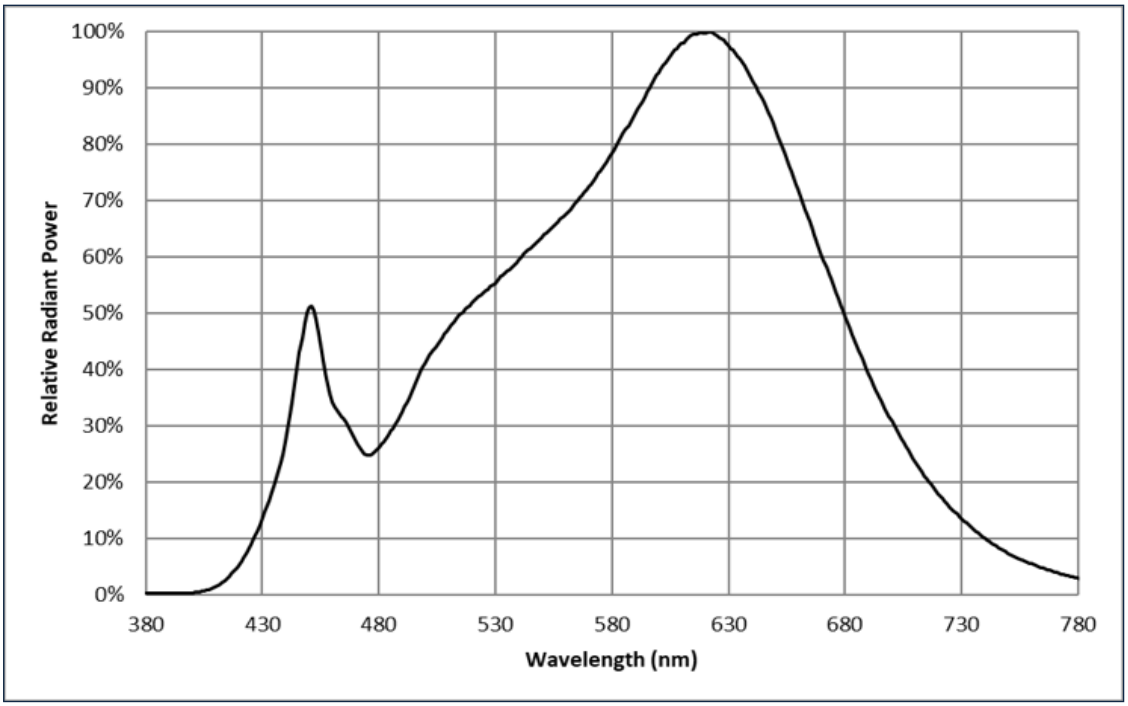
Angular Distribution (2700K - 4000K)

I_f = 0.7 A; T_j = 25°C



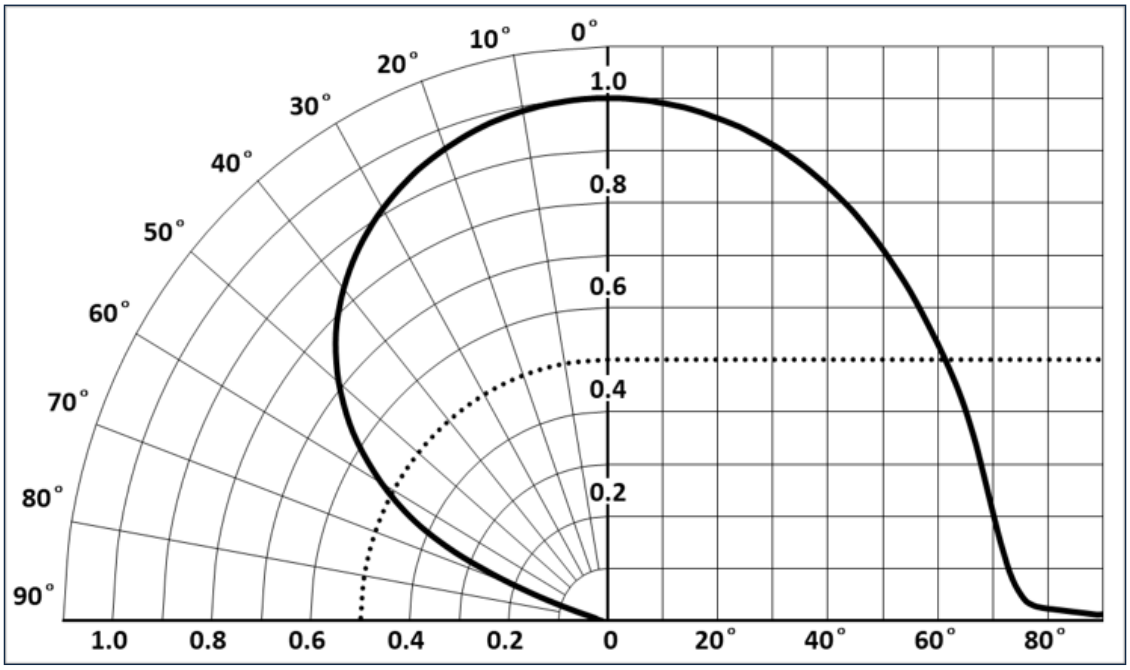
Relative Spectral Power Distribution (2700K - 4000K)

I_f = 0.7 A; T_j = 25°C



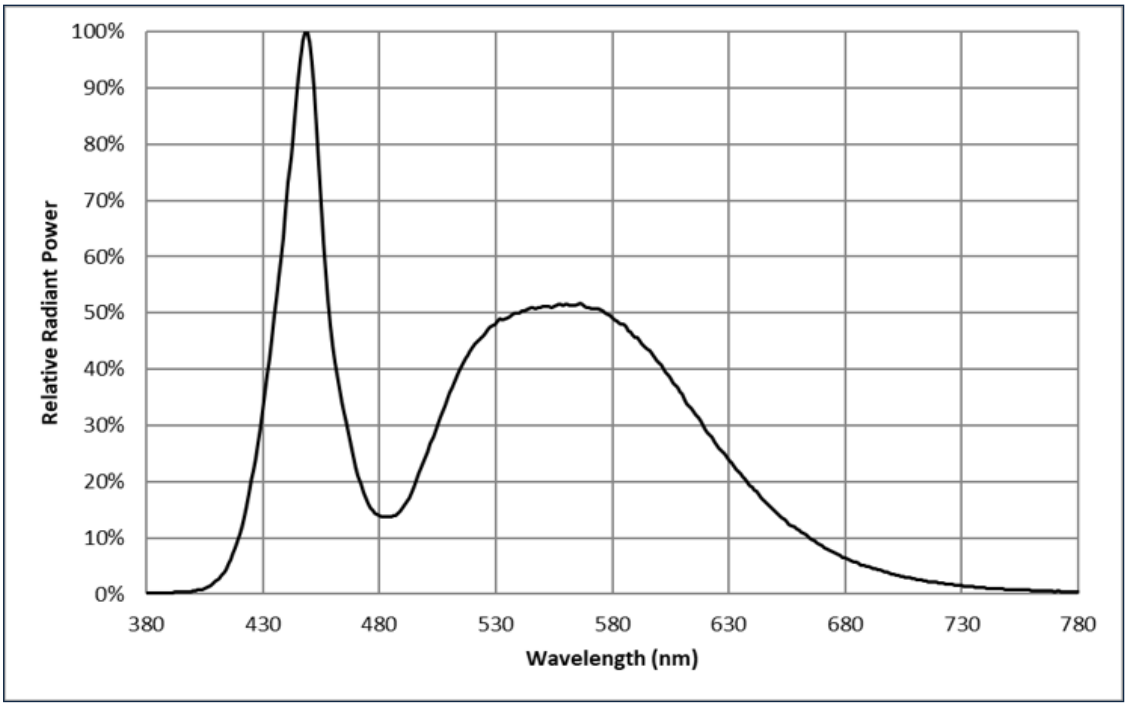
Angular Distribution (5000K - 6500K)

I_f = 0.7 A; T_j = 25°C

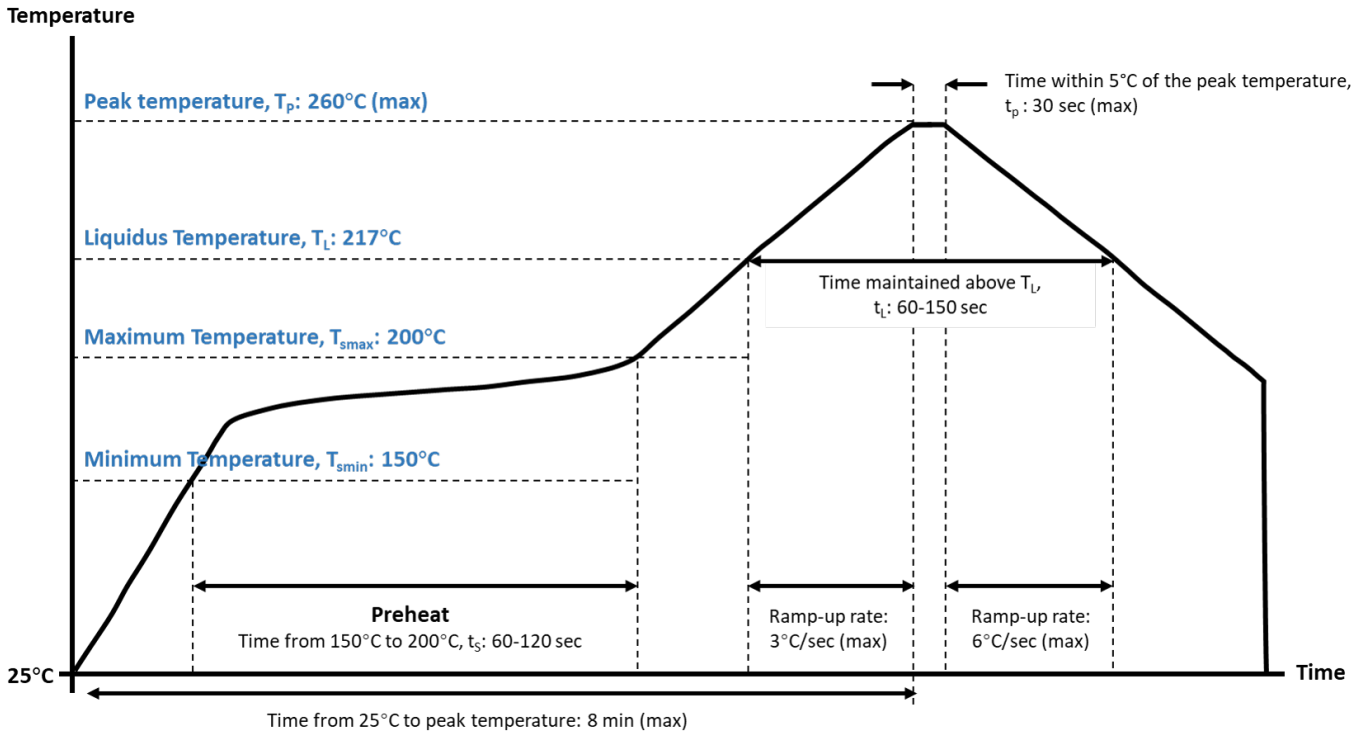


Relative Spectral Power Distribution (5000K - 6500K)

I_f = 0.7 A; T_j = 25°C



Soldering Profile



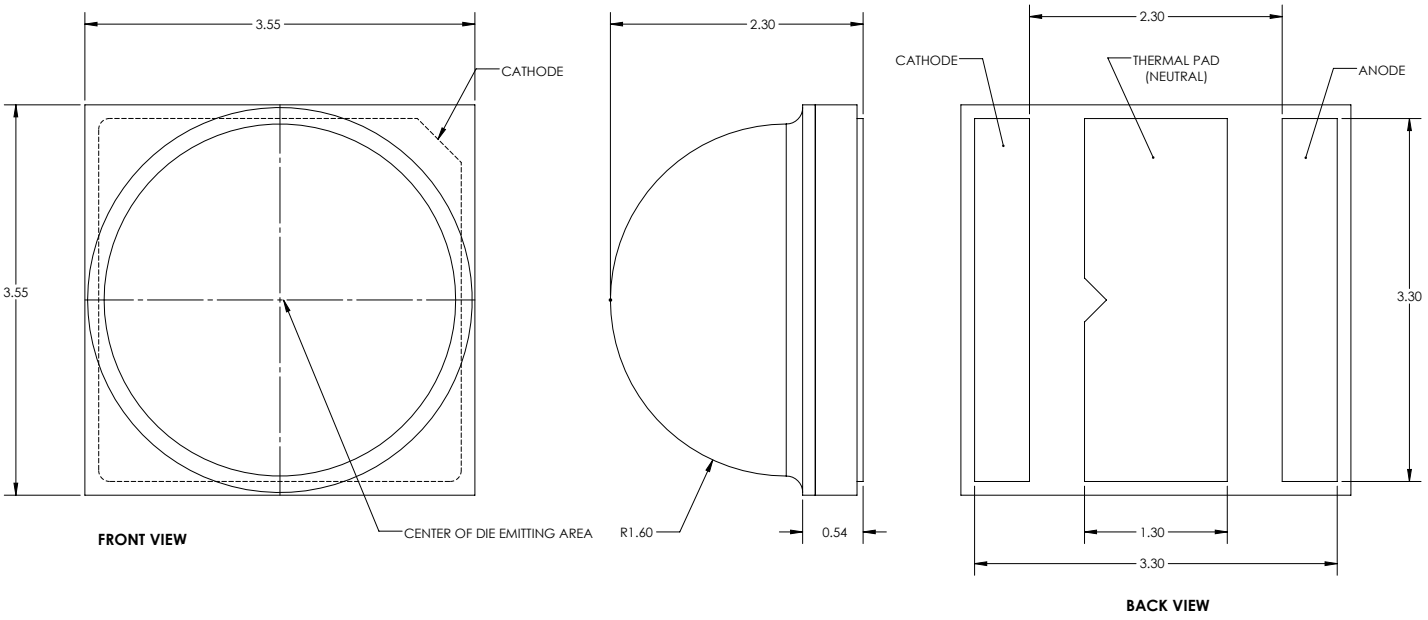
SMT Rework Guideline	Manual Hotplate Reflow	Hot Air Gun Reflow
Heating Time	< 60 sec	
Hotplate Temperature	< 245°C	< 150°C

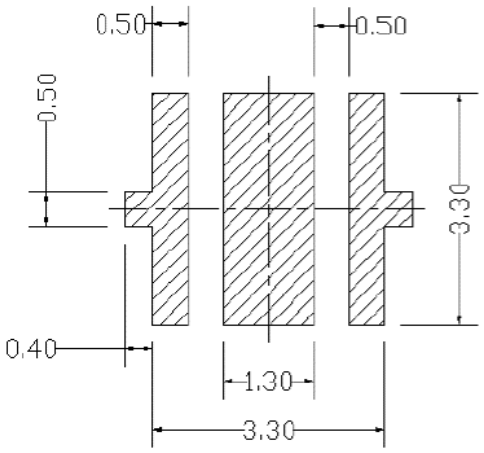
Notes:

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 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:

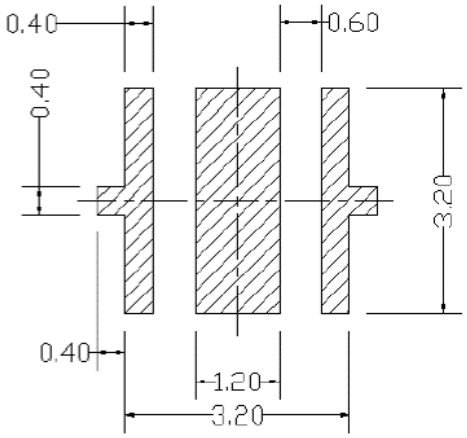
   https://luminusdevices.zendesk.com/hc/en-us/articles/360060306692-How-do-I-Reflow-Solder-Luminus-SMD-Components-
8. For any technical questions about soldering process, please contact Luminus at techsupport@luminus.com.

Mechanical Dimensions





Recommended PCB Solder Pad

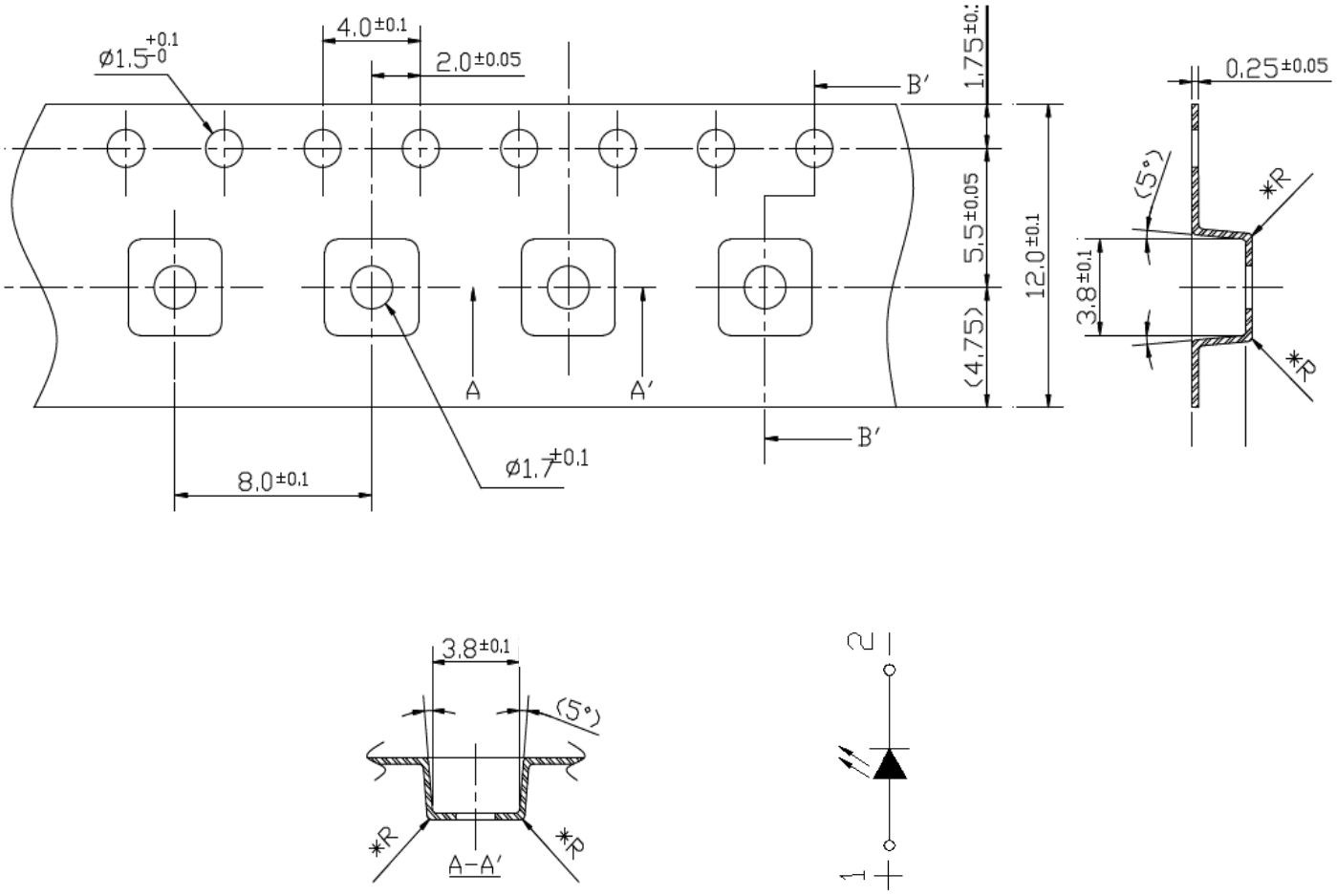


Recommended Stencil Pattern

Note:

1. All dimensions are in millimeter ± 0.1 mm.

Tape and Reel Outline

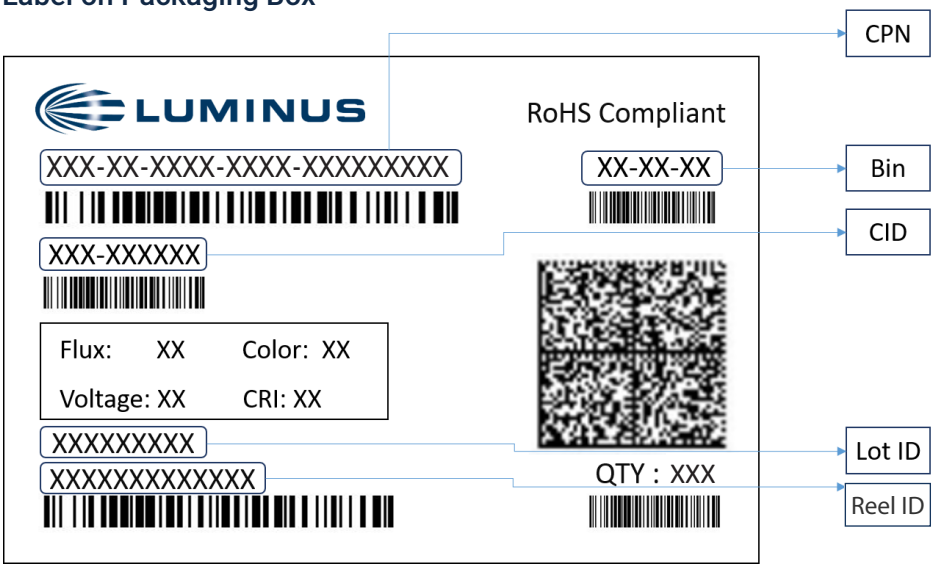


Notes:

1. Each reel contains 900 units.
2. Luminus maintains a cumulative tolerance of ±0.25mm for every 10 pitches.
3. All dimensions are in millimeter.

Shipping Label

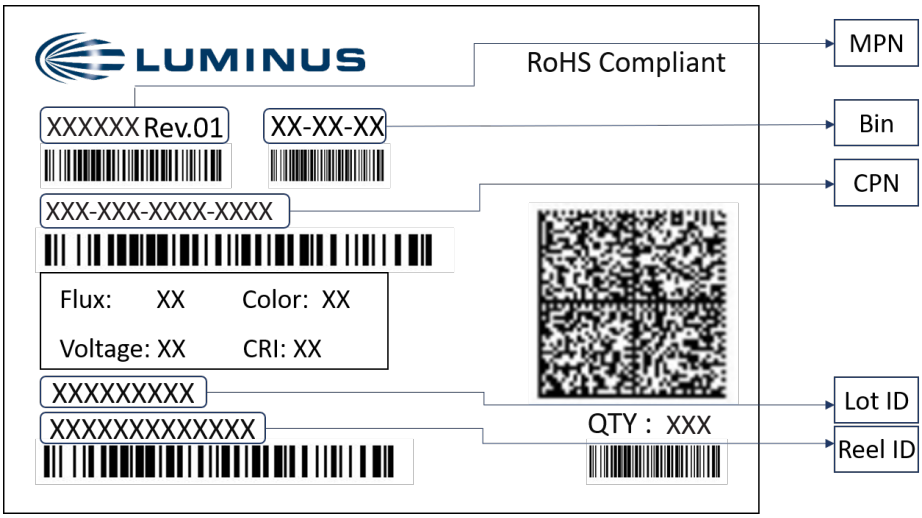
Label on Packaging Box



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

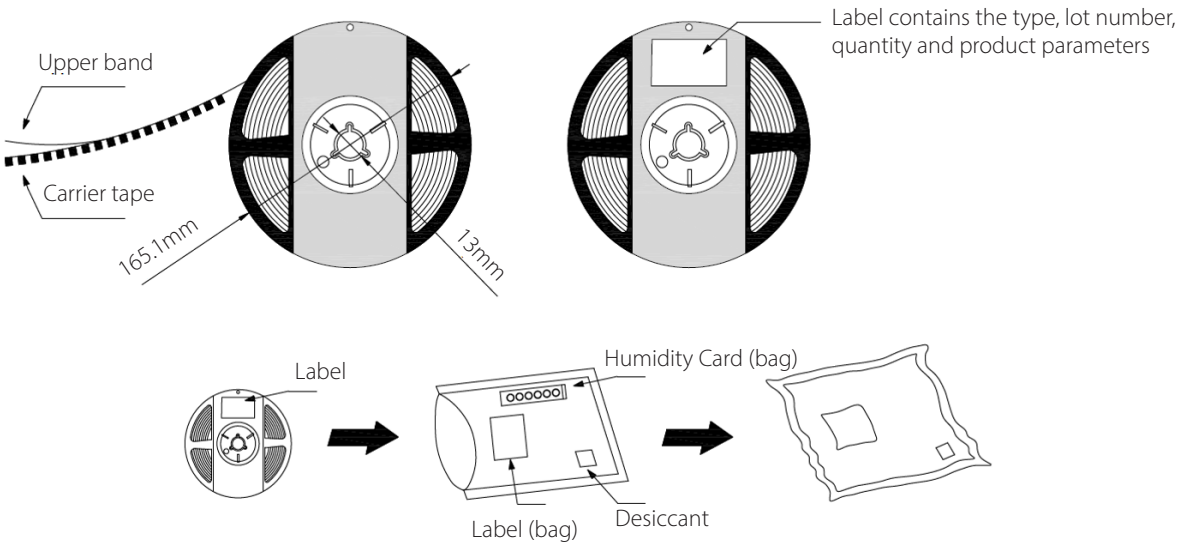


Label Fields:

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

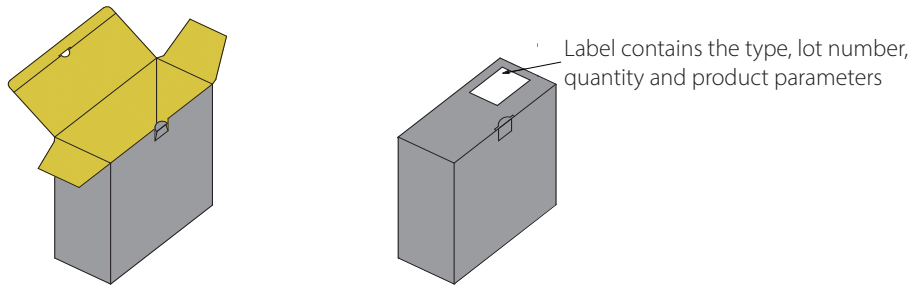
Packaging

Packaged Reel

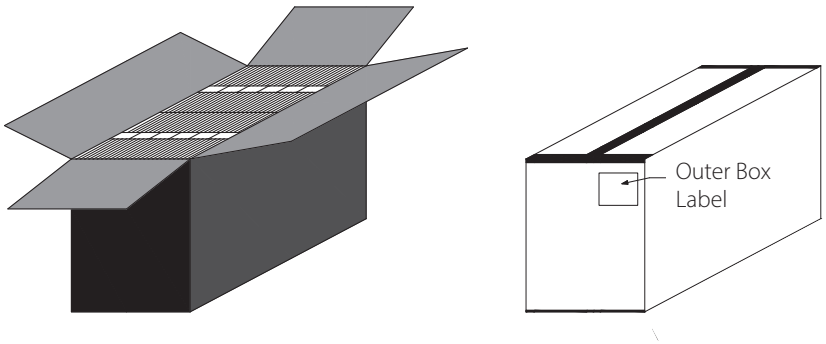


Packaging boxes

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

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

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 according to J-STD-033D.

   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.