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SST-40-W

Specialty White LED

Preliminary

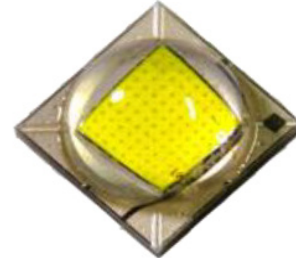


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Features:

- High Brightness Cool white LED with maximum output in excess of 1,650 lm
- Compact monolithic emitter ideal for directional lighting applications with high uniformity
- Binned at 85 °C
- Typical efficacy 170 lm/W at 700 mA
- Maximum drive current: 5 A DC
- High thermal conductivity package - junction thermal resistance of only 2.5° C/W
- Wide viewing angle: 120°
- 8000V HBM ESD rating per MIL STD-883D
- Electrically isolated thermal path
- RoHS and REACH compliant

Applications

- Flashlights
- Automotive accessory spotlights
- Portable lighting accessories
- Spot lights
- Instrumentation
- Work lights
- Battery and solar-powered applications
- Bicycle lights

General Considerations

Environmental Considerations:

As a leading provider of solid-state Lighting solutions, Luminus implements strict substance control policies to ensure all of its products are environmentally friendly. As all Luminus LEDs, the SST-40-W series are compliant with the Restriction of Hazardous Substances Directive (RoHS) and REACH directives from the European Community.

Product Testing:

Every SST-40-W LED is fully production tested to ensure it meets the high quality standards customers have come to expect from Luminus products. Devices are binned to correlated values at 700 mA, 20 msec pulse condition at $T_j = 85^\circ\text{C}$. Current and temperature curves are provided in this document allowing users to predict the LED performance and characteristics under their own driving and thermal conditions.

Reliability:

Luminus SST-40-W LED series are required to pass a rigorous suite of environmental and mechanical stress tests, including mechanical shock, vibration, temperature cycling and humidity. These tests ensure that the devices deliver high performance and achieve reliable long term operation in the automotive and other demanding environments. Please contact Luminus for further information.

Flux Binning Structure

SST-40-W LEDs are binned for luminous flux based on $I_f = 700$ mA and 85 °C junction temperature (T_j) conditions.

Flux Bin (FF) ¹	Min Flux (lm) 700 mA, 85 °C	Min Flux (lm) 700 mA, 25 °C	Calculated Minimum Luminous Flux (lm) @ 85 °C ²		
			2000 mA	3000 mA	5000 mA
N2	260	286	666	933	1394
N3	280	308	717	1005	1501
N4	300	330	768	1077	1608
N5	320	352	819	1149	1715
P2	340	374	870	1221	1822

Note 1: Luminus maintains a +/- 6% tolerance on flux measurement.

Note 2: Calculated flux values at 2000 mA and 3000 mA are for reference only.

Forward Voltage Binning Structure

SST-40-W LEDs are binned for forward voltage based on $I_f = 700$ mA and 85 °C junction temperature (T_j).

Voltage Bin ³	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 3: Individual voltage bins are not orderable.

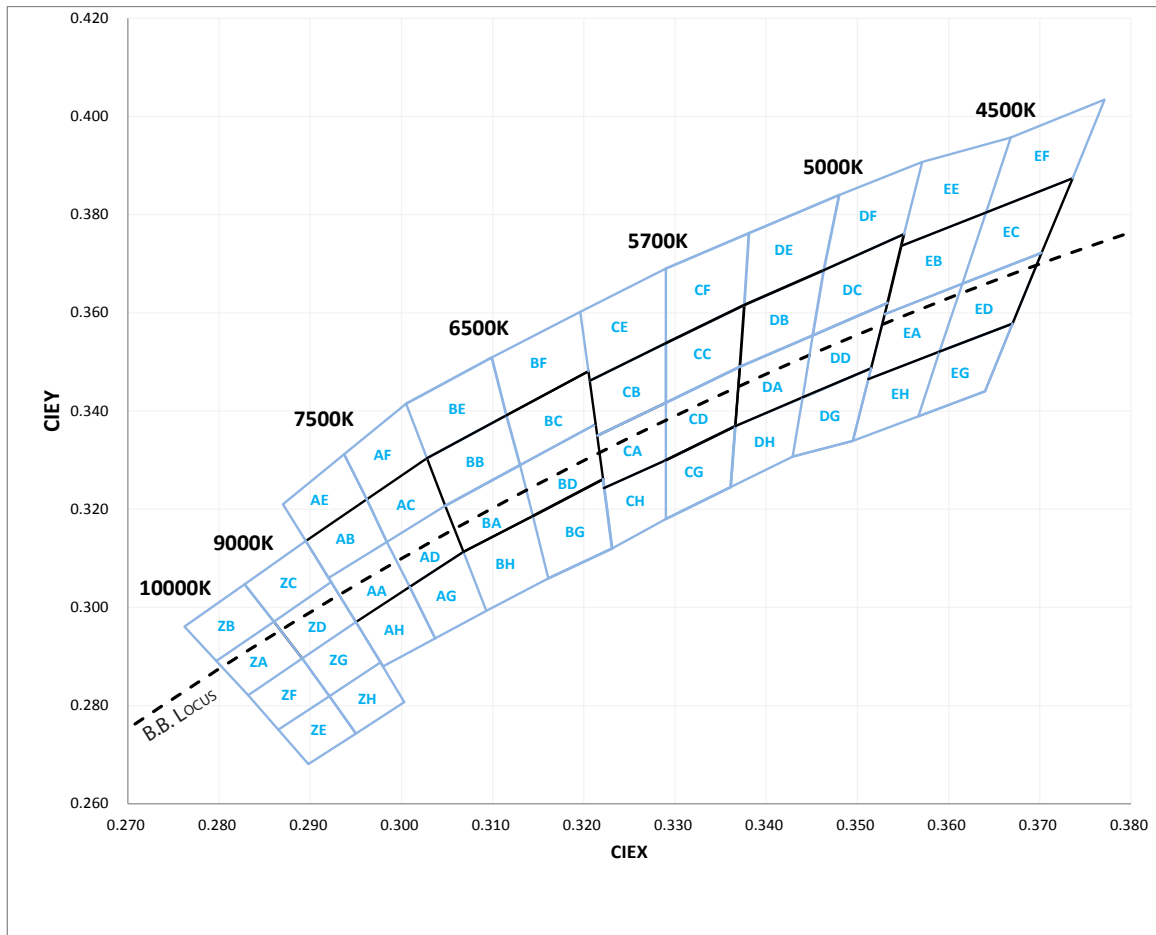
Chromaticity Bin Definitions

CCT	Bin Code	CIE-X	CIE-Y	Bin Code	CIE-X	CIE-Y	Bin Code	CIE-X	CIE-Y	Bin Code	CIE-X	CIE-Y		
10000	ZA	0.2860	0.2971	ZB	0.2828	0.3047	ZC	0.2895	0.3135	ZD	0.2923	0.3052		
		0.2891	0.2896		0.2860	0.2971		0.2923	0.3052		0.2950	0.2970		
		0.2832	0.2821		0.2797	0.2891		0.2860	0.2971		0.2891	0.2896		
		0.2797	0.2891		0.2762	0.2961		0.2828	0.3047		0.2860	0.2971		
	ZE	0.2921	0.2819	ZF	0.2891	0.2896	ZG	0.2950	0.2970	ZH	0.2977	0.2888	0.2977	0.2888
		0.2950	0.2743		0.2921	0.2819		0.2977	0.2888		0.3003	0.2807		
		0.2898	0.2681		0.2865	0.2751		0.2921	0.2819		0.2950	0.2743		
		0.2865	0.2751		0.2832	0.2821		0.2891	0.2896		0.2921	0.2819		
7500	AA	0.2950	0.2970	AB	0.2920	0.3060	AC	0.2984	0.3133	AD	0.2984	0.3133		
		0.2920	0.306		0.2895	0.3135		0.2962	0.3220		0.3048	0.3207		
		0.2984	0.3133		0.2962	0.322		0.3028	0.3304		0.3068	0.3113		
		0.3009	0.3042		0.2984	0.3133		0.3048	0.3207		0.3009	0.3042		
	AH	0.2980	0.2880	AE	0.2895	0.3135	AF	0.2962	0.3220	AG	0.3037	0.2937		
		0.2950	0.2970		0.287	0.3210		0.2937	0.3312		0.3009	0.3042		
		0.3009	0.3042		0.2937	0.3312		0.3005	0.3415		0.3068	0.3113		
		0.3037	0.2937		0.2962	0.3220		0.3028	0.3304		0.3093	0.2993		
6500	BA	0.3048	0.3207	BB	0.3028	0.3304	BC	0.3115	0.3391	BD	0.3130	0.329		
		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		0.313	0.3290		0.3144	0.3186		
	BH	0.3068	0.3113	BE	0.3005	0.3415	BF	0.3099	0.3509	BG	0.3144	0.3186		
		0.3144	0.3186		0.3099	0.3509		0.3196	0.3602		0.3221	0.3261		
		0.3161	0.3059		0.3115	0.3391		0.3205	0.3481		0.3231	0.3120		
		0.3093	0.2993		0.3028	0.3304		0.3115	0.3391		0.3161	0.3059		

Chromaticity Bin Definitions (continued)

CCT	Bin Code	CIE-X	CIE-Y	Bin Code	CIE-X	CIE-Y	Bin Code	CIE-X	CIE-Y	Bin Code	CIE-X	CIE-Y
5700	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	0.330		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
	CH	0.3222	0.3243	CE	0.3196	0.3602	CF	0.3290	0.3690	CG	0.3290	0.3300
		0.3290	0.3300		0.3290	0.3690		0.3381	0.3762		0.3366	0.3369
		0.3290	0.318		0.3290	0.3538		0.3376	0.3616		0.3361	0.3245
		0.3231	0.3120		0.3207	0.3462		0.3290	0.3538		0.3290	0.3180
5000	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
	DH	0.3366	0.3369	DE	0.3381	0.3762	DF	0.348	0.3840	DG	0.3440	0.3428
		0.344	0.3428		0.3480	0.384		0.3571	0.3907		0.3515	0.3487
		0.3429	0.3307		0.3463	0.3687		0.3551	0.3760		0.3495	0.3339
		0.3361	0.3245		0.3376	0.3616		0.3463	0.3687		0.3429	0.3307
4500	EA	0.3530	0.3597	EB	0.3548	0.3736	EC	0.3641	0.3804	ED	0.3615	0.3659
		0.3615	0.3659		0.3641	0.3804		0.3736	0.3874		0.3702	0.3722
		0.3590	0.3521		0.3615	0.3659		0.3702	0.3722		0.3670	0.3578
		0.3512	0.3465		0.3530	0.3597		0.3615	0.3659		0.3590	0.3521
	EH	0.3512	0.3465	EE	0.3571	0.3907	EF	0.3668	0.3957	EG	0.3590	0.3521
		0.3590	0.3521		0.3668	0.3957		0.3771	0.4034		0.3670	0.3578
		0.3567	0.3389		0.3641	0.3804		0.3736	0.3874		0.3640	0.3440
		0.3495	0.3339		0.3548	0.3736		0.3641	0.3804		0.3567	0.3389

SST-40-W Cool White Color Space Plotted on the ANSI 1931 Curve



Chromaticity Bin Kit Codes

CCT	Bin Kit	Chromaticity Bins
7500K	751	AA, AB, AC, AD, AE, AF, AG, AH
	752	AA, AB, AC, AD
7000K	700	AA, AB, AC, AD, AE, AF, AG, AH, BA, BB, BC, BD, BE, BF, BG, BH
	702	AA, AB, AC, AD, BA, BB, BC, BD
6500	650	ZA, ZB, ZC, ZD, ZE, ZF, ZG, ZH, AA, AB, AC, AD, AE, AF, AG, AH, BA, BB, BC, BD, BE, BF, BG, CA, CB, CD, CE, CF, CG, CH
	651	BA, BB, BC, BD, BE, BF, BG, BH
	652	BA, BB, BC, BD

Part Numbering Nomenclature

SST — 40 — <WCS> — <F50> — <FFCCC>

Product Family	LED Emission Area	Color	Package Configuration	Bin Kit
S: Surface mount S: Lensed T: Single monolithic emitter	40=4.0 mm ²	W: White C: Cool White S: standard CRI 70	F50 Package code	See Tables FF = minimum flux bin CCC: Chromaticity bin kit

Ordering Part Numbers

CCT	Min. Flux Bin ¹	Min Flux (lm)	Chromaticity Bin Kit ²	Ordering Part Numbers
7500K	N2	260	751	SST-40-WCS-F50-N2751
			752	SST-40-WCS-F50-N2752
	N3	280	751	SST-40-WCS-F50-N3751
			752	SST-40-WCS-F50-N3752
	N4	300	751	SST-40-WCS-F50-N4751
7000K	N2	260	700	SST-40-WCS-F50-N2700
			702	SST-40-WCS-F50-N2702
	N3	280	700	SST-40-WCS-F50-N3700
			702	SST-40-WCS-F50-N3702
	N4	300	700	SST-40-WCS-F50-N4700
			702	SST-40-WCS-F50-N4702
6500K	N2	260	650	SST-40-WCS-F50-N2650
			651	SST-40-WCS-F50-N2651
			652	SST-40-WCS-F50-N2652
	N3	280	650	SST-40-WCS-F50-N3650
			651	SST-40-WCS-F50-N3651
			652	SST-40-WCS-F50-N3652
	N4	300	650	SST-40-WCS-F50-N4650
			651	SST-40-WCS-F50-N4651
			652	SST-40-WCS-F50-N4652

Note 1: The minimum flux of each bin kit is determined by the minimum flux bin as defined on page 3. Higher flux bins are eligible to ship against shown bin kits and part numbers.

Note 2: See page 6 for chromaticity bin kit definitions.

Example: The part number SST-40-WCS-F50-N2750 refers to a part with flux greater than 260 lm and chromaticity bins AA, AB, AC,AD,AE,AF,AG,AH as defined on page 3.

SST-40-W Product Characteristics

Parameter	Symbol	Minimum	Typical	Maximum	Unit	
Forward Current	I_F		700	5000	mA	
Forward Voltage	700 mA @85°C	V_F	2.5	2.75	3.3	V
	5000 mA @85°C	V_F		3.3		V
Luminus Flux	700 mA @85°C	ϕ_v		310		lm
	5000 mA @85°C	ϕ_v		1662		lm
Viewing Angle	$2 \text{ } \emptyset_{1/2}$		120		Degree	
LED Junction Temperature ¹	T_J			150	°C	
Thermal resistance junction to case	$R_{\theta_{JC}}$		2.5		°C/W	
Operating Temperature	T_{OPR}	- 40		80	°C	
Storage Temperature	T_{STG}	- 40		30	°C	
Reverse voltage ²	V_F			N.A.	V	
ESD withstand Voltage HBM Per Mil STD -883D	V_{ESD}			8,000	V	
Color Rendering Index	CRI		70			

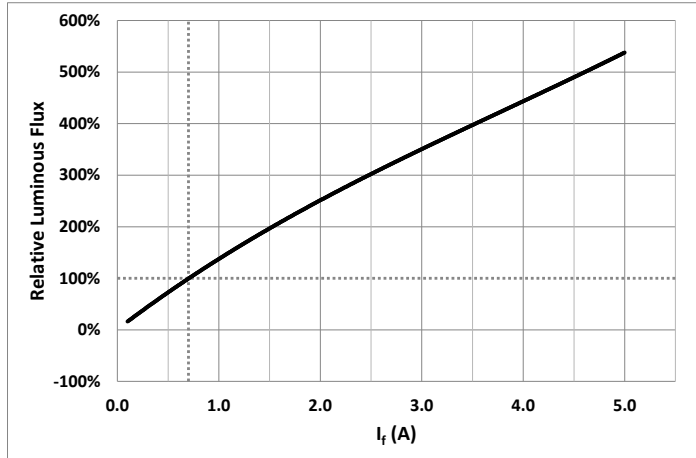
Note 1: Absolute maximum junction temperature not intended for sustained operation. Luminus recommend to keep $T_J < 120^\circ\text{C}$ continuous operation.

Note 2: Not designed for reverse voltage operation

Optical & Electrical Characteristics

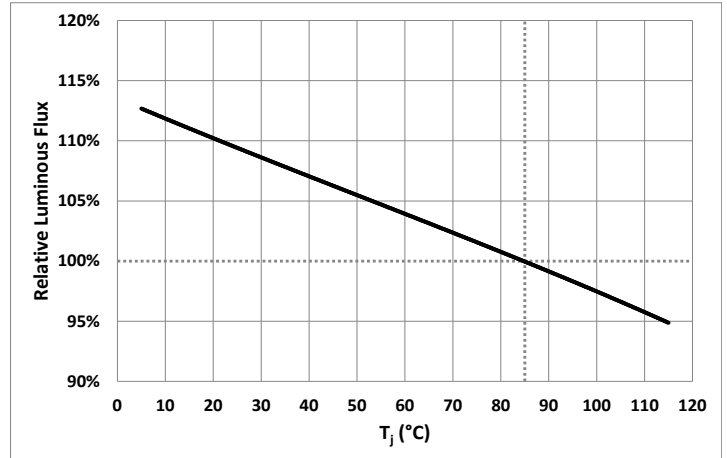
Relative Luminous Flux vs. Forward Current

$$\phi_v(I_f) / \phi_v(0.7A) @ T_j = 85^\circ C$$



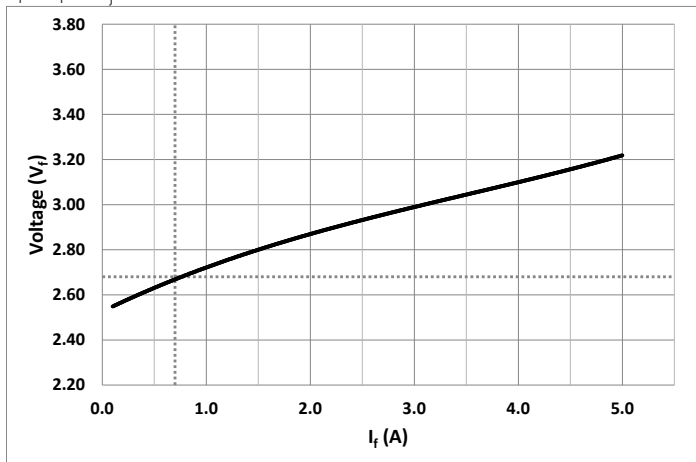
Relative Luminous Flux vs. Temperature(T_j)

$$\phi_v(T_j) / \phi_v(85^\circ C) @ I_f = 0.7A$$



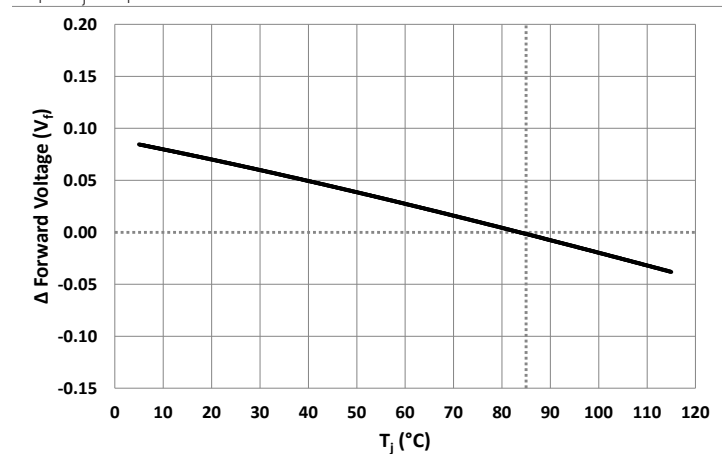
Forward Current vs. Forward Voltage

$$V_f = f(I_f) @ T_j = 85^\circ C$$



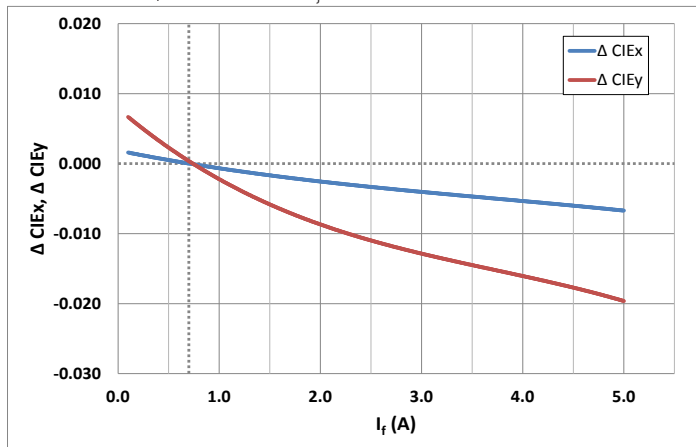
Relative Forward Voltage vs. Temperature(T_j)

$$\Delta V_f = f(T_j) @ I_f = 0.7A$$



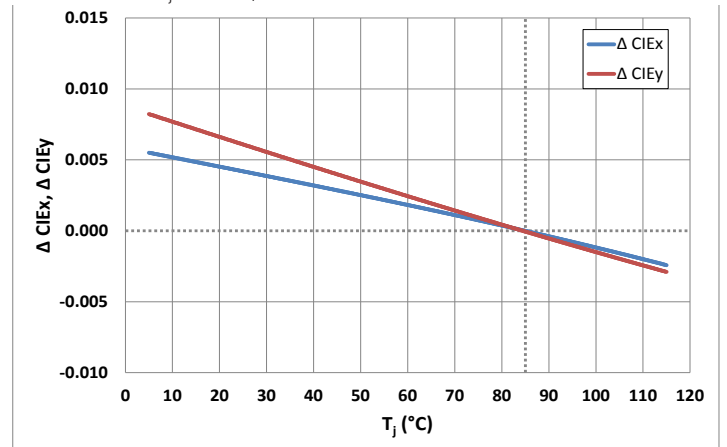
Relative Chromaticity Shift vs. I_f

$$\Delta CIE_{x,y} = CIE_{x,y}(I_f) - CIE_{x,y}(0.7A) @ T_j = 85^\circ C$$



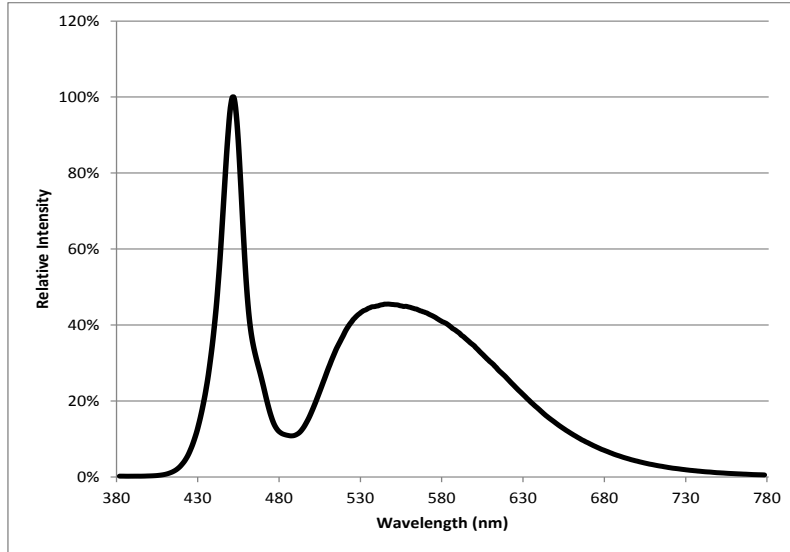
Relative Chromaticity Shift vs. T_j

$$\Delta CIE_{x,y} = CIE_{x,y}(T_j) - CIE_{x,y} @ I_f = 0.7A$$

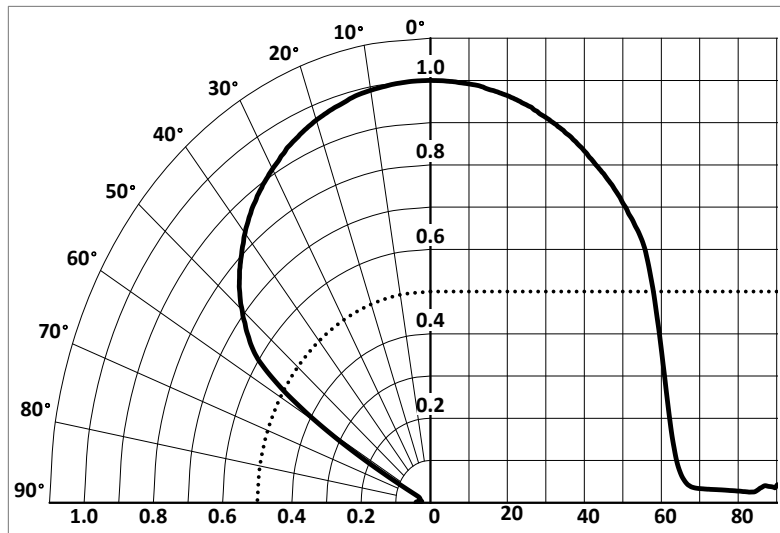


Optical & Electrical Characteristics

Typical Relative Radiant Power (%)



Typical Angular Radiation Pattern

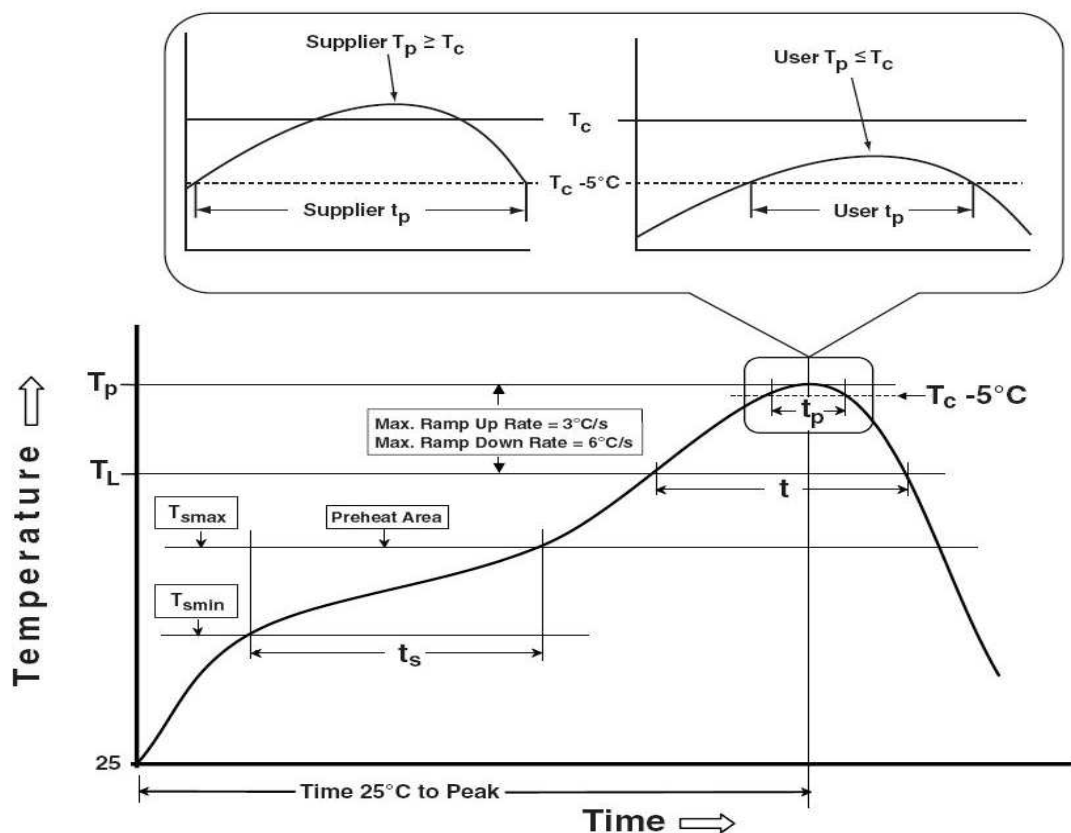


Soldering Profile

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Preheat & Soak	100 °C	150 °C
Temperature min (T _{smin})	150 °C	200 °C
Temperature max (T _{smax})	60-120 seconds	60-120 seconds
Time (T _{smin} to T _{smax}) (t _s)		
Average ramp-up rate (T _{smax} to T _p)	3 °C/second max	3 °C/second max
Liquidous temperature (T _L)	183 °C	217 °C
Time at liquidous (t _L)	60-150 seconds	60-150 seconds
Peak package body temperature (T _p)*	230 °C ~235 °C	255 °C ~260 °C
Classification temperature (T _c)	235 °C	260 °C
Time (t _p) within 5 °C of the specified classification temperature (T _c)	20 seconds	30 seconds
Average ramp-down rate (T _p to T _{smax})	6 °C/second max	6 °C/second max
Time 25 °C to peak temperature	6 minutes max	8 minutes max

* Tolerance for peak profile temperature (T_p) is defined as a supplier minimum and a user maximum.

** Tolerance for time at peak profile temperature (T_p) is defined as a supplier minimum and a user maximum.



Precautions for Use

Storage:

1. The recommended storage condition is 5 °C- 30 °C and relative humidity less than or equal to 60% RH in its original package.
2. After this bag is opened, devices that will be applied to infrared reflow, vapor - phase reflow, or equivalent soldering process must be:
 - a) Completed within 168 hours.
 - b) Stored at less than 60% relative humidity.
 - c) If not completely used within 168 hours, seal the remaining in the moisture barrier bag.
3. Devices require baking before mounting, if 2 a) is not met.
4. If baking is required, devices must be baked under below conditions:
24 hours at 60 C +/-5C

The LED's electrode and leadframe are a silver plated copper alloy. The silver surface may be affected by its environment. Please avoid conditions which may cause the LEDs to corrode or become discolored. The corrosion or discoloration might lower the solderability or affect the optical characteristics of the device.

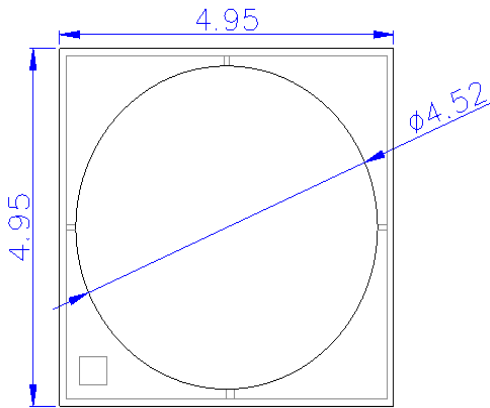
Please avoid rapid transitions in ambient temperature, especially in high humidity environments where condensation can occur.

Static Electricity:

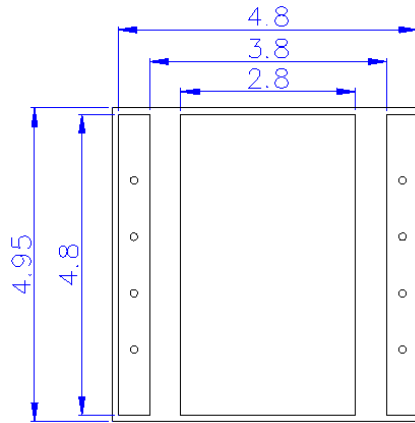
1. The products are sensitive to static electricity and care should be taken when handling them.
2. Static electricity or surge voltage will damage the LEDs. It is recommended to wear an anti-electrostatic wristband or anti-electrostatic gloves when handling the LEDs.
3. All devices, equipment and machinery must be properly grounded. It is recommended that measures be taken against surge voltage to the equipment that mounts the LEDs.

Vision Advisory

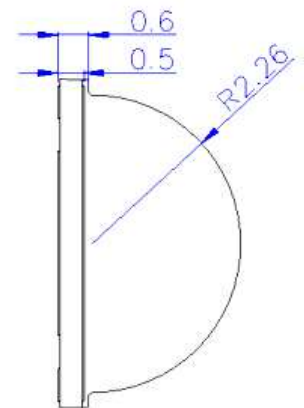
WARNING: Looking at an exposed LED during operation can result in eye injury.

Mechanical Dimensions(mm)


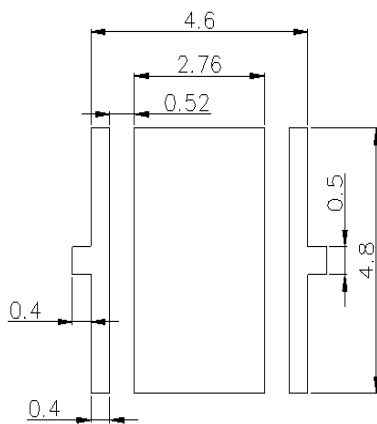
Top View



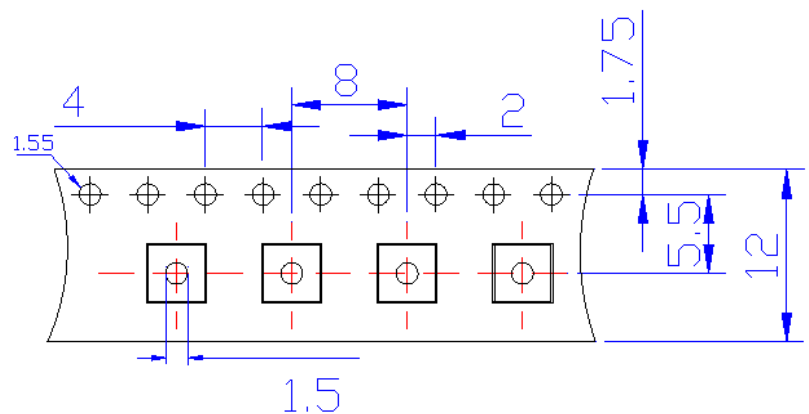
Bottom View



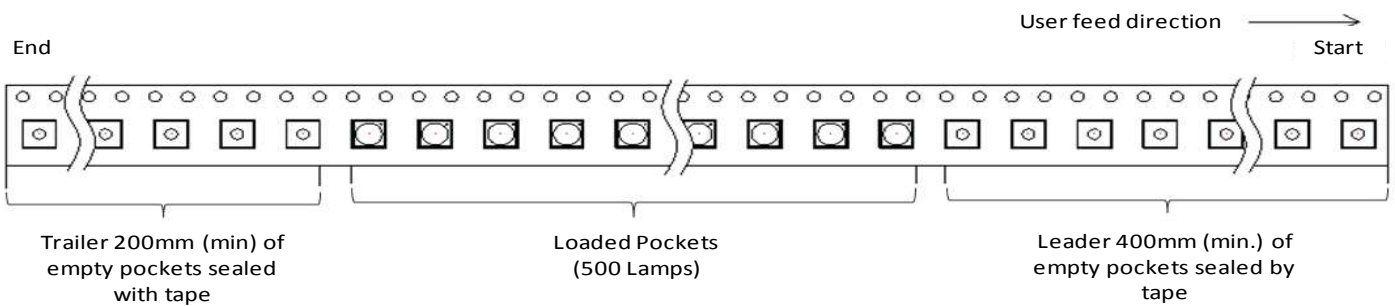
Side View

Tape Information


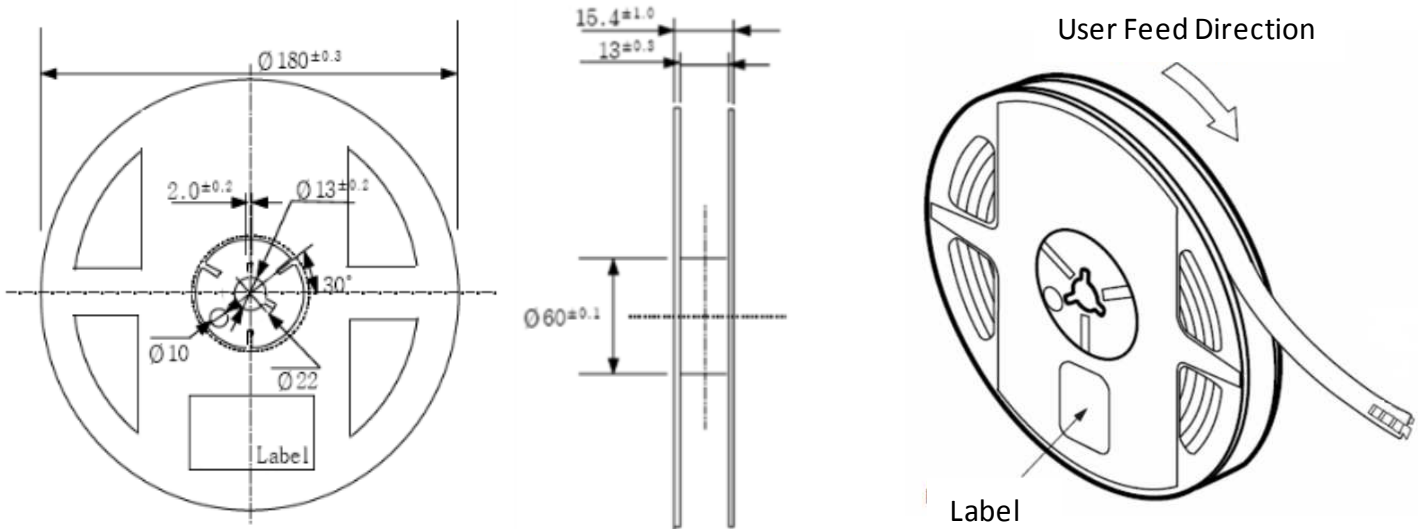
Pad drawing



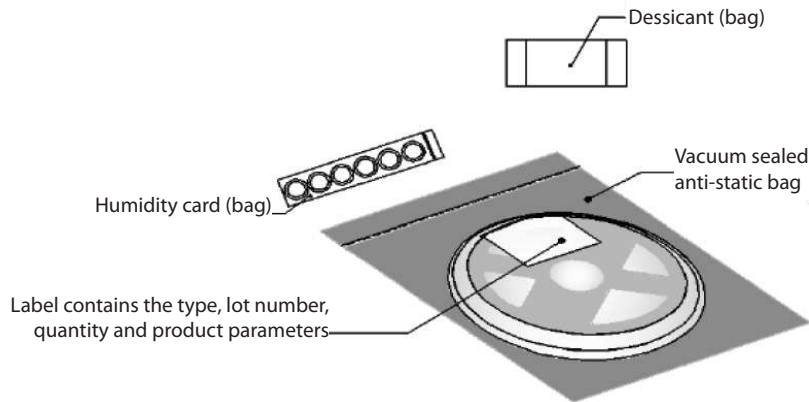
Tape Drawing



Reel Packaging



Reel dimensions are in millimeters.



Label

Label Fields (subject to change):

- CPN: Luminus ordering part number
- MPN: For Luminus internal use
- QTY: Quantity of devices in pack
- 2D Bar code
- Flux: FF as defined on page 3
- Voltage: VV as defined on page 3
- Color: CC as defined on pages 4 and 5
- Mfg Info: For Luminus internal use



CPN: SST-40-WCS-F50-N2751

MPN: 113231

QTY: 500

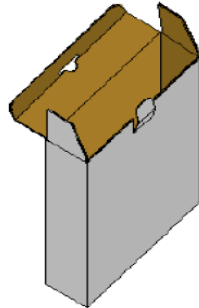


BIN INFO	
Flux:	N2
Voltage:	VJ
Color:	AA

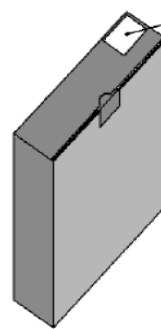
MFG INFO
Rev: 01
Lot#: TOR-1607034

RoHS Compliant

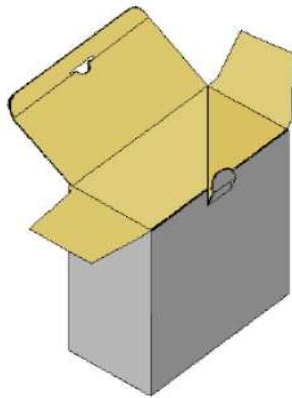
Box Packaging Information



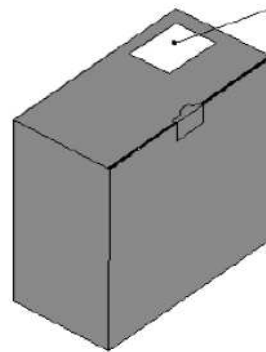
Size: 22.5*24.5*6.5 cm
Capacity: 5 reels per box



Label contains the type, lot number,
quantity and product parameters



Size: 22.5*24.5*13 cm
Capacity: 10 reels per box



Label contains the type, lot number,
quantity and product parameters

History of Changes

Rev	Date	Description of Change
PDS-002938 Rev01	05/15/2017	Initial release.

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