SST-40-W
Specialty White LED

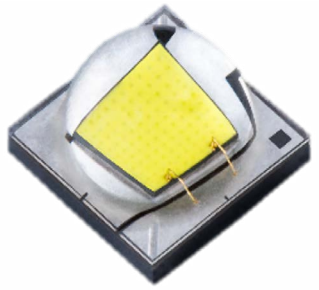


Table of Contents

General Considerations 2
Binning Structure 3
Chromaticity Bin Kit Codes .7
Ordering Information 8
Optical and Electrical Characteristics 10
Soldering Profile 12
Precautions for Use. 13
Mechanical Dimensions . . 14
Reel & Box Packaging 15
Change History 17

Features:

- High Brightness Cool white LED with maximum output in excess of 1,800 lm
- Available in 5000K, 5700K and 6500K, 70 CRI (typical) color points
- 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: 6 A DC
- High thermal conductivity package - junction thermal resistance of only 1.2° C/W
- Wide viewing angle: 120°
- 8000V HBM ESD rating per MIL STD-883D
- Electrically isolated thermal path
- RoHS and REACH compliant

Applications

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

PDS-002938 Rev 02
© 2018 Luminus Devices, Inc. - All Rights Reserved
Luminus Devices, Inc. • T 408.708.7000 • www.luminus.com
1145 Sonora Ct., Sunnyvale, CA 94086 USA

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 1500 mA, 20 msec pulse condition at Tj = 85°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.

© 2018 Luminus Devices, Inc. - All Rights Reserved
Luminus Devices, Inc. • T 408.708.7000 • www.luminus.com
1145 Sonora Ct., Sunnyvale, CA 94086 USA

Flux Binning Structure

SST-40-W LEDs are binned for luminous flux based on I_f = 1500 mA and 85 °C junction temperature (Tj) conditions.

Flux Bin(FF)	Min flux (lm) 1500 mA,85 °C	Max flux (lm) 1500 mA,85 °C	Calculated Min flux (lm) 700mA, 25°C	Calculated Minimum Luminous Flux (lm)@ 85 °C				
				700 mA	2000 mA	3000 mA	5000 mA	6000 mA
P2	673	720	381	340	862	1185	1703	1919
N5	634	673	358	320	811	1115	1603	1806
N4	594	634	336	300	760	1045	1503	1693
N3	554	594	314	280	710	976	1403	1580
N2	515	554	291	260	659	906	1302	1467

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

Note 2: Correlated flux values at 700mA, 2000 mA, 3000 mA, 5000 mA and 6000 mA are for reference only.

Forward Voltage Binning Structure

SST-40-W LEDs are binned for forward voltage based on I_f = 1500 mA and 85 °C junction temperature (Tj) .conditions.

Voltage Bin[3]	Minimum Voltage (V)	Maximim 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.

© 2018 Luminus Devices, Inc. - All Rights Reserved
Luminus Devices, Inc. • T 408.708.7000 • www.luminus.com
1145 Sonora Ct., Sunnyvale, CA 94086 USA

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	0.286	0.2971	ZB	0.2828	0.3047	ZC	0.2895	0.3135	ZD	0.2923	0.3052
		0.2891	0.2896		0.286	0.2971		0.2923	0.3052		0.295	0.297
		0.2832	0.2821		0.2797	0.2891		0.286	0.2971		0.2891	0.2896
		0.2797	0.2891		0.2762	0.2961		0.2828	0.3047		0.286	0.2971
	ZE	0.2921	0.2819	ZF	0.2891	0.2896	ZG	0.2950	0.2970	ZH	0.2977	0.2888
		0.295	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		0.295	0.2743
		0.2865	0.2751		0.2832	0.2821		0.2891	0.2896		0.2921	0.2819
7500	AA	0.295	0.297	AB	0.292	0.306	AC	0.2984	0.3133	AD	0.2984	0.3133
		0.292	0.306		0.2895	0.3135		0.2962	0.322		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	0.298	0.288	AE	0.2895	0.3135	AF	0.2962	0.322	AG	0.3037	0.2937
		0.295	0.297		0.287	0.321		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	0.322		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	0.313	0.329
		0.313	0.329		0.3115	0.3391		0.3205	0.3481		0.3213	0.3373
		0.3144	0.3186		0.313	0.329		0.3213	0.3373		0.3221	0.3261
		0.3068	0.3113		0.3048	0.3207		0.313	0.329		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	0.312
		0.3093	0.2993		0.3028	0.3304		0.3115	0.3391		0.3161	0.3059

© 2018 Luminus Devices, Inc. - All Rights Reserved
Luminus Devices, Inc. • T 408.708.7000 • www.luminus.com
1145 Sonora Ct., Sunnyvale, CA 94086 USA

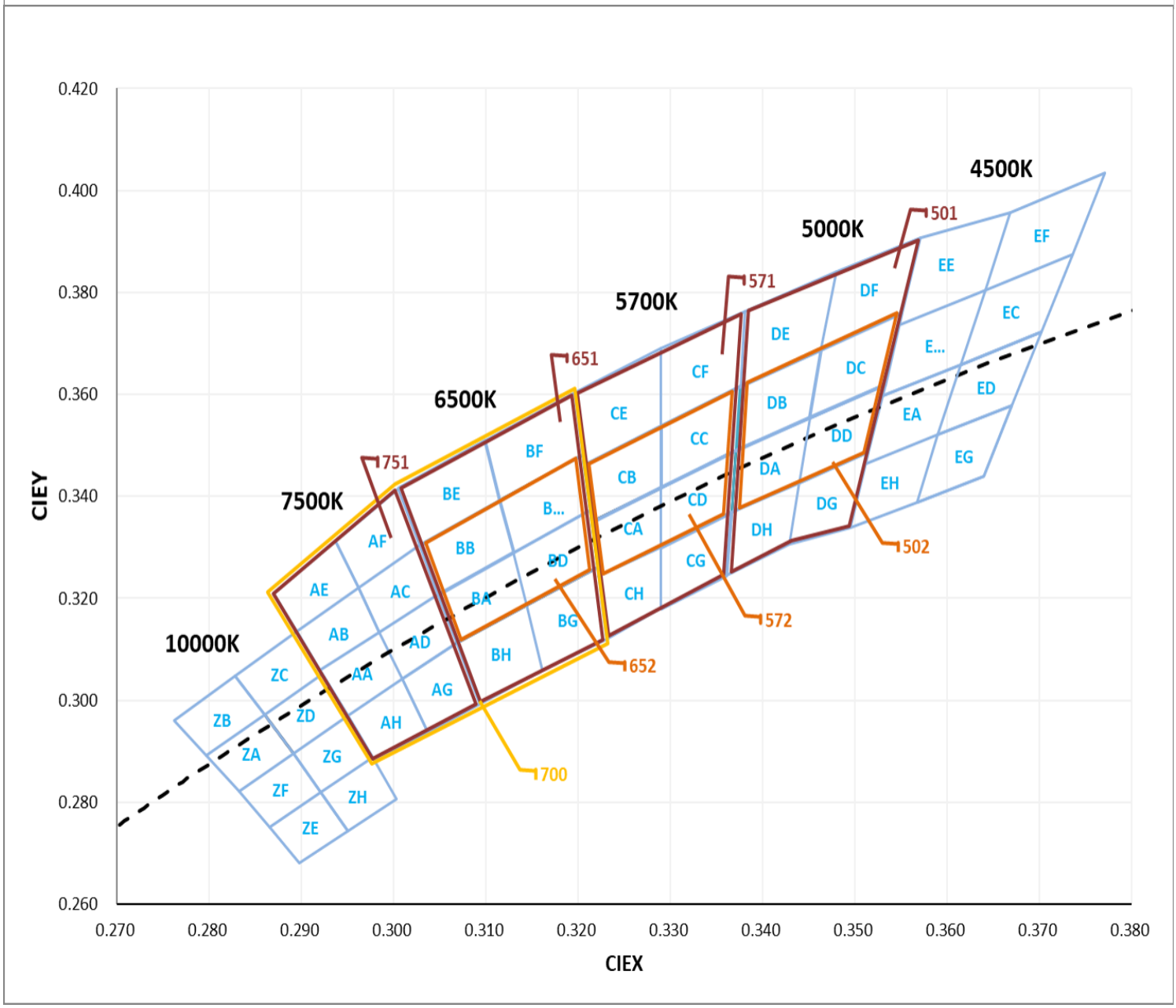
Chromaticity Bin Definitions (continued)

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	0.335	CB	0.3207	0.3462	CC	0.329	0.3538	CD	0.329	0.3417
		0.329	0.3417		0.329	0.3538		0.3376	0.3616		0.3371	0.349
		0.329	0.33		0.329	0.3417		0.3371	0.349		0.3366	0.3369
		0.3222	0.3243		0.3215	0.335		0.329	0.3417		0.3290	0.3300
	CH	0.3222	0.3243	CE	0.3196	0.3602	CF	0.329	0.369	CG	0.329	0.33
		0.329	0.33		0.329	0.369		0.3381	0.3762		0.3366	0.3369
		0.329	0.318		0.329	0.3538		0.3376	0.3616		0.3361	0.3245
		0.3231	0.312		0.3207	0.3462		0.329	0.3538		0.3290	0.3180
5000	DA	0.3371	0.349	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	0.376		0.3533	0.362
		0.344	0.3427		0.3451	0.3554		0.3533	0.362		0.3515	0.3487
		0.3366	0.3369		0.3371	0.349		0.3451	0.3554		0.3440	0.3427
	DH	0.3366	0.3369	DE	0.3381	0.3762	DF	0.348	0.384	DG	0.344	0.3428
		0.3366	0.3428		0.348	0.384		0.3571	0.3907		0.3515	0.3487
		0.3366	0.3307		0.3463	0.3687		0.3551	0.376		0.3495	0.3339
		0.3366	0.3245		0.3376	0.3616		0.3463	0.3687		0.3429	0.3307
4500	EA	0.353	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
		0.359	0.3521		0.3615	0.3659		0.3702	0.3722		0.367	0.3578
		0.3512	0.3465		0.353	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	0.359	0.3521
		0.359	0.3521		0.3668	0.3957		0.3771	0.4034		0.367	0.3578
		0.3567	0.3389		0.3641	0.3804		0.3736	0.3874		0.364	0.344
		0.3495	0.3339		0.3548	0.3736		0.3641	0.3804		0.3567	0.3389

© 2018 Luminus Devices, Inc. - All Rights Reserved
Luminus Devices, Inc. • T 408.708.7000 • www.luminus.com
1145 Sonora Ct., Sunnyvale, CA 94086 USA

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

SST40 Cool White Color Space



PDS-002938 Rev 02 © 2018 Luminus Devices, Inc. - All Rights Reserved

Luminus Devices, Inc. • T 408.708.7000 • www.luminus.com
1145 Sonora Ct., Sunnyvale, CA 94086 USA

Chromaticity Bin Kit Codes

CCT	Bin Kit	Chromaticity Bins
7500K	751	AA, AB, AC, AD, AE, AF, AG, AH
7000K	700	AA, AB, AC, AD, AE, AF, AG, AH, BA, BB, BC, BD, BE, BF, BG, BH
6500K	651	BA, BB, BC, BD, BE, BF, BG, BH
	652	BA, BB, BC, BD
5700K	571	CA, CB, CC, CD, CE, CF, CG, CH
	572	CA, CB, CC, CD
5000K	501	DA, DB, DC, DD, DE, DF, DG, DH
	502	DA, DB, DC, DD

Part Numbering Nomenclature

SST — 40 — <WXS> — <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 X: Temperature C: Cool White D: Daylight White S: standard CRI 70	F50 package code	See Tables FF = minimum flux bin CCC: Chromaticity bin kit

© 2018 Luminus Devices, Inc. - All Rights Reserved
Luminus Devices, Inc. • T 408.708.7000 • www.luminus.com
1145 Sonora Ct., Sunnyvale, CA 94086 USA

Ordering Part Numbers

CCT	Min. Flux Bin[1]	Min. Flux (lm)	Chromaticity Bin Kit Code[2]	Ordering Part Numbers
7500K	N3	554	751	SST-40-WCS-F50-N3751
	N4	594	751	SST-40-WCS-F50-N4751
7000K	N3	554	700	SST-40-WCS-F50-N3700
	N4	594	700	SST-40-WCS-F50-N4700
6500K	N3	554	651	SST-40-WCS-F50-N3651
	N4	594	651	SST-40-WCS-F50-N4651
	N3	554	652	SST-40-WCS-F50-N3652
	N4	594	652	SST-40-WCS-F50-N4652
5700K	N3	554	571	SST-40-WDS-F50-N3571
	N4	594	571	SST-40-WDS-F50-N4571
	N3	554	572	SST-40-WDS-F50-N3572
	N4	594	572	SST-40-WDS-F50-N4572
5000K	N3	554	501	SST-40-WDS-F50-N3501
	N4	594	501	SST-40-WDS-F50-N4501
	N3	554	502	SST-40-WDS-F50-N3502
	N4	594	502	SST-40-WDS-F50-N4502

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 7 for chromaticity bin kit definitions.

Example: The part number SST-40-WCS-F50-N3751 refers to a part with flux greater than 554 lm and chromaticity bins AA, AB, AC,AD,AE,AF,AG,AH as defined on page 3.

© 2018 Luminus Devices, Inc. - All Rights Reserved
Luminus Devices, Inc. • T 408.708.7000 • www.luminus.com
1145 Sonora Ct., Sunnyvale, CA 94086 USA

SST-40-W Product Characteristics[1]

Parameter		Symbol	Minimum	Typical	Maximum	Unit
Forward Current at test		I_F		1500		mA
Forward Voltage		V_F	2.6	2.8	3.1	V
Luminous Flux	5000K	φ_v		608		lm
	5700K			619		
	6500K			658		
Viewing Angle	A120	$2\,Ø_{1/2}$		120		Degrees
Color Rendering Index		CRI	65	70		
Forward Current (CW)[2]		I_{fmin}, I_{fmax}	0.2		6	A
Maximum Surge Current		$I_{f\text{-}smax}$			8	A
Maximum Reverse Current[3]		I_{rev}			N.A.	
LED Junction Temperature		T_J			150	^{0}C
ESD withstand Voltage HBM Per JEDEC/ESDA STANDARD JS-001		V_{HBM}	8000			V
ESD withstand Voltage CDM Per JEDEC/ESDA STANDARD JS-002		V_{CDM}	1000			V
Operating Temperature		T_{OPR}	- 40		100	^{0}C
Thermal resistance junction to case (electrical)		$R_{\Theta JC\text{-}EL}$		1.2		^{0}C/W

Note 1: Values are at 85°C unless otherwise noted

Note 2: Sustained operation at maximum current will result in shortened lifetime.

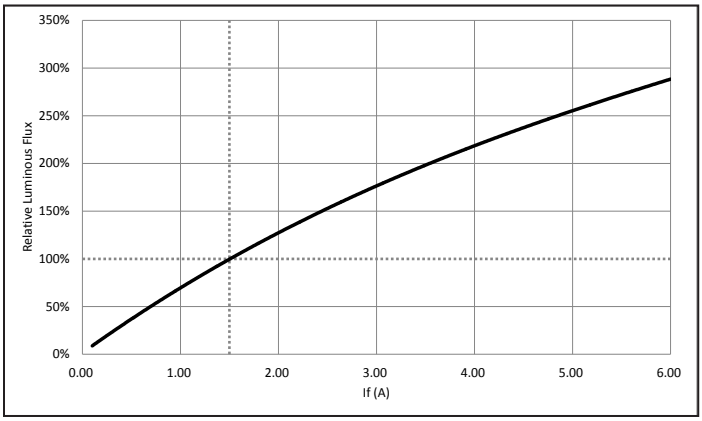
Note 3: Not designed for reverse voltage operation.

© 2018 Luminus Devices, Inc. - All Rights Reserved
Luminus Devices, Inc. • T 408.708.7000 • www.luminus.com
1145 Sonora Ct., Sunnyvale, CA 94086 USA

Optical & Electrical Characteristics

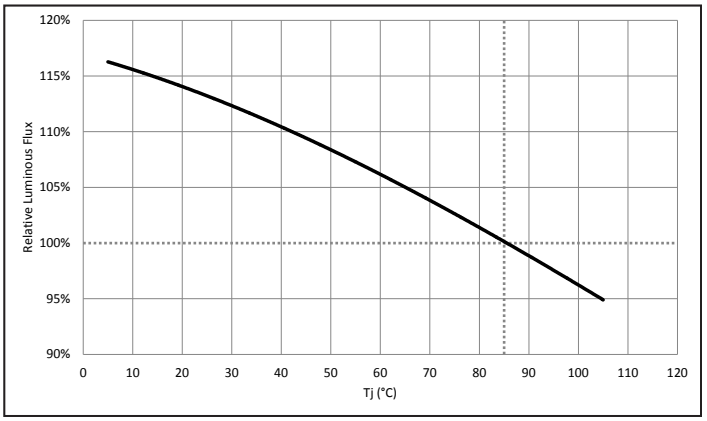
Relative Luminous Flux vs. Forward Curent

φv/φv(1.5A) Single Pulse 20ms Tj = 85 °C



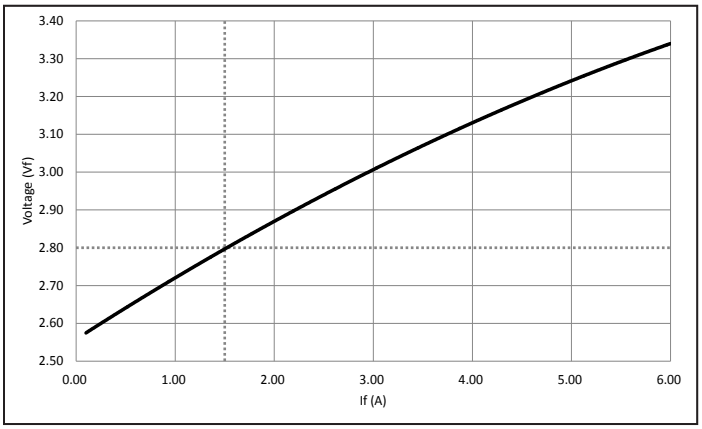
Relative Luminous Flux vs. Temperature(Tj)

φv/φv(85 °C) Single Pulse 20ms If = 1.5A



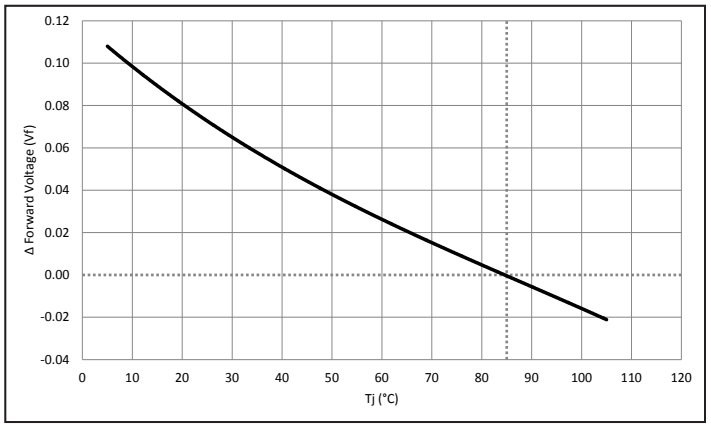
Forward Voltage vs. Forward Current

Vf(If) Single Pulse 20ms Tj = 85 °C



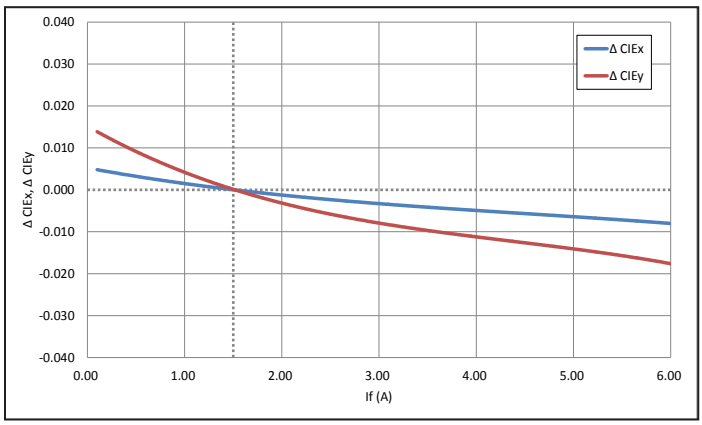
Relative Forward Voltage vs. Temperature(Tj)

ΔVf = V(Tj) - V(85 °C) Single Pulse 20ms If =1.5A



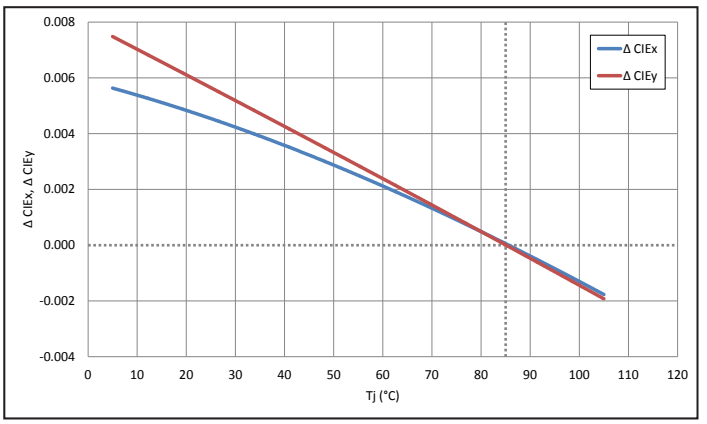
Relative Chromaticity vs. Forward Current

ΔCIEx,y = CIEx,y(If) - CIEx,y (1.5A), Single Pulse 20ms Tj = 85 °C



Relative Chromaticity vs. Temperature(Tj)

ΔCIEx,y = CIEx,y(Tj) - CIEx,y(85 °C) Single Pulse 20ms If = 1.5A

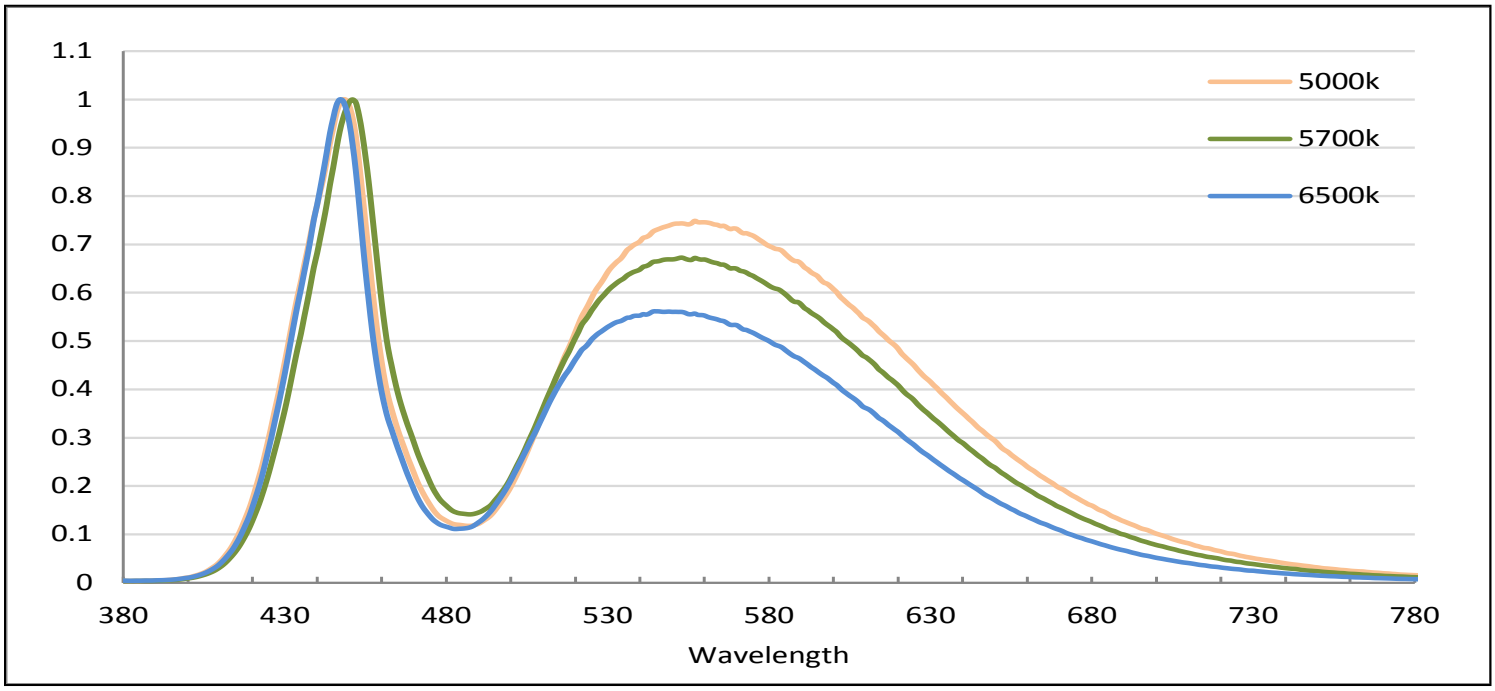


© 2018 Luminus Devices, Inc. - All Rights Reserved

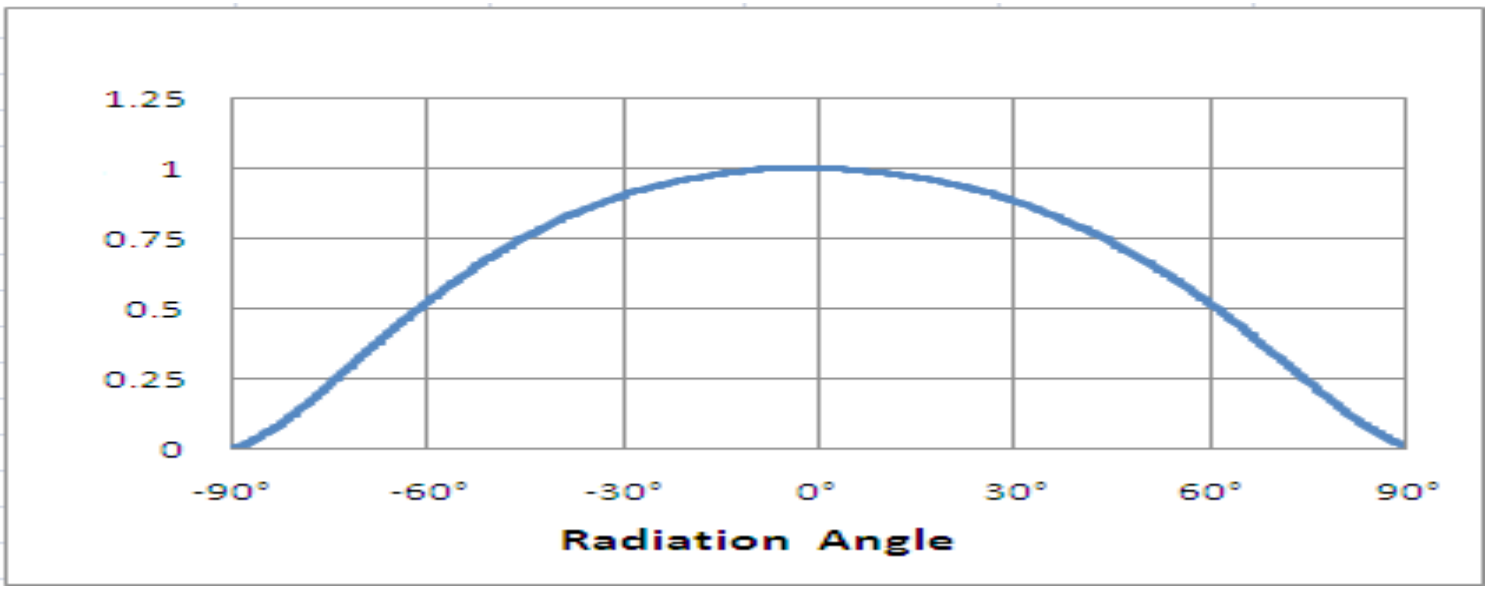
Luminus Devices, Inc. • T 408.708.7000 • www.luminus.com
1145 Sonora Ct., Sunnyvale, CA 94086 USA

Optical & Electrical Characteristics

Typical Relative Radiant Power [1]



Typical Angular Pattern of Radiant Power[2]



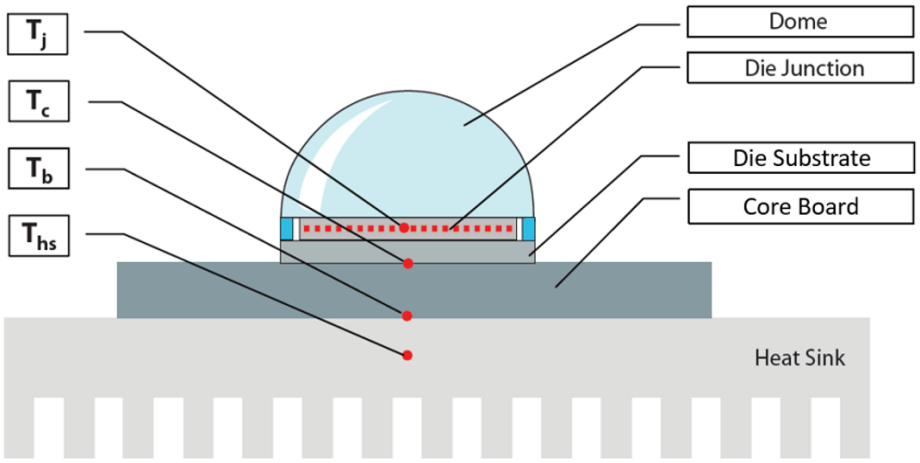
Note 1: Relative radiant power measurements were made at 1.5 A, 85 °C.

Note 2: Angular pattern measurements were made at 1.5 A, 25 °C.

PDS-002938 Rev 02 © 2018 Luminus Devices, Inc. - All Rights Reserved

Luminus Devices, Inc. • T 408.708.7000 • www.luminus.com
1145 Sonora Ct., Sunnyvale, CA 94086 USA

Thermal Resistance



Typical Thermal Resistance

R_{j-c} [1]	1.20 °C/W
R_{j-b} [1]	2.54 °C/W

Note 1: Thermal resistance values are based on rapid thermal transient testing results.

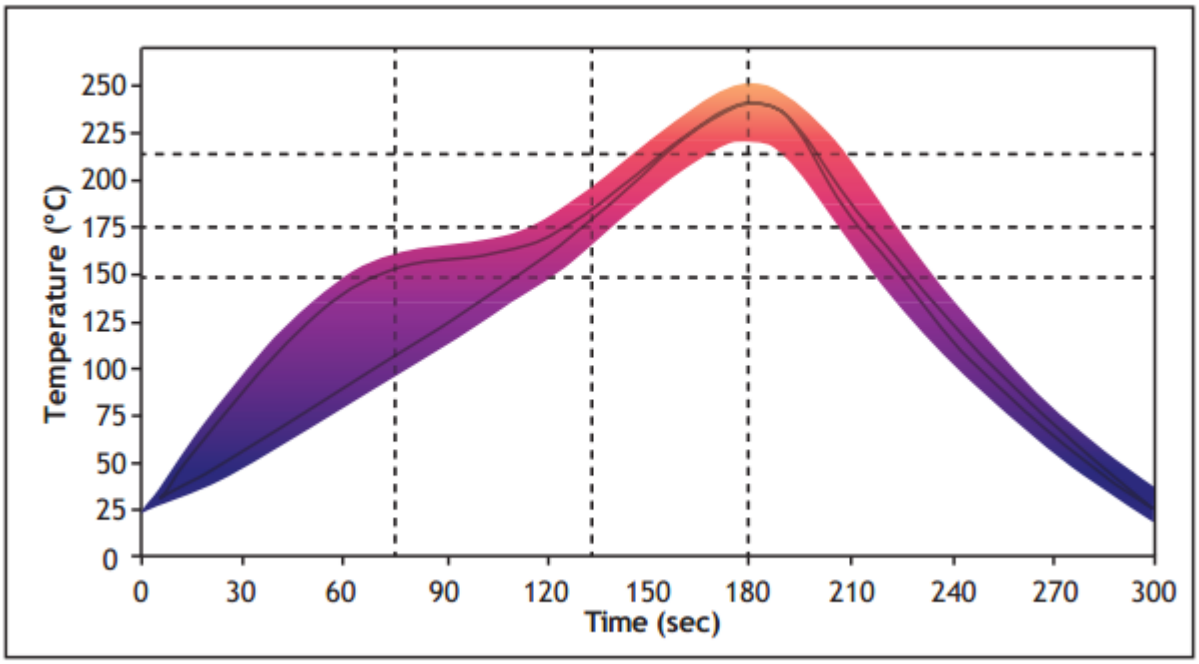
Note 2: Thermal resistance is measured using a SAC305 solder and a Cu-pedestal MCPCB.

Note 3: The values represent the electrical thermal resistance @2A operation @25deg.

© 2018 Luminus Devices, Inc. - All Rights Reserved
Luminus Devices, Inc. • T 408.708.7000 • www.luminus.com
1145 Sonora Ct., Sunnyvale, CA 94086 USA

Soldering Profile

SAC 305 Reflow Profile Window For Low Density Boards



Lead free solder guideline for low density boards

Solder Profile Stage	Lead-Free Solder	Lead-based Solder
Profile length, Ambient to Peak	2.75 - 3.5 minutes	2.75 - 3.5 minutes
Time Maintained Above: Temperature	217 °C	183 °C
Time Maintained Above: Time	30 - 60 seconds	30 - 60 seconds
Cooldown Rate	≤4° C/sec	≤4° C/sec
Cooldown Duration	45 ± 15 sec	45 ± 15 sec

Note 1: Temperatures are taken and monitored at the component copper layer.

Note 2: Optimum profile may differ due to oven type, circuit board or assembly layout.

Note 3: Recommended lead free, no-clean solder: AIM NC254-SAC305.

Note 4: Refer to APN-001473 soldering and handling application note for additional solder profiles and details.

Note 5: MSL- Level 2A (Glass Lens); MSL Level 1 (Over Molded Design)

© 2018 Luminus Devices, Inc. - All Rights Reserved
Luminus Devices, Inc. • T 408.708.7000 • www.luminus.com
1145 Sonora Ct., Sunnyvale, CA 94086 USA

Precautions for Use

Storage:
1. The recommended storage condition is between 5 °C and 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 +/-5 °C

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.

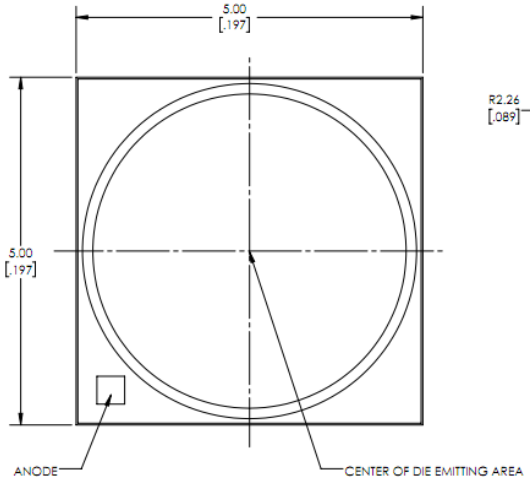
2. Static electricity or surge voltage will damage the LEDs. It is recommended to wear an anti-electrostatic wristband or anti-electrostatic gloves when handling the LEDs.

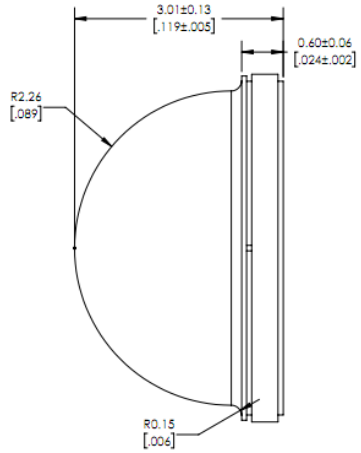
3. All devices, equipment and machinery must be properly grounded. It is recommended that measures be taken against surge voltage to the equipment that mounts the LEDs.

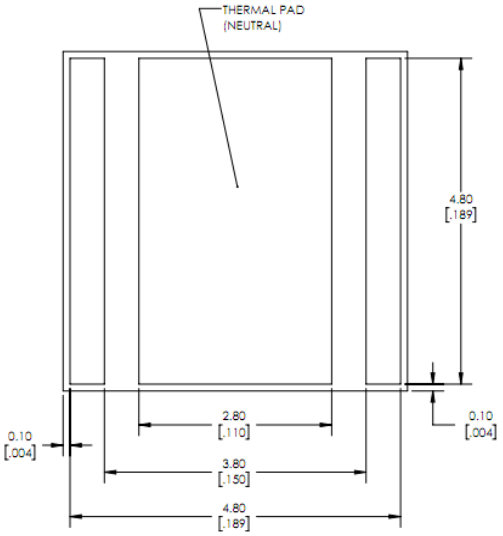
Vision Advisory
WARNING: Looking at an exposed LED during operation can result in eye injury. This LED products has been classified as Risk Group 2 for blue light hazard according to the IEC 62471.

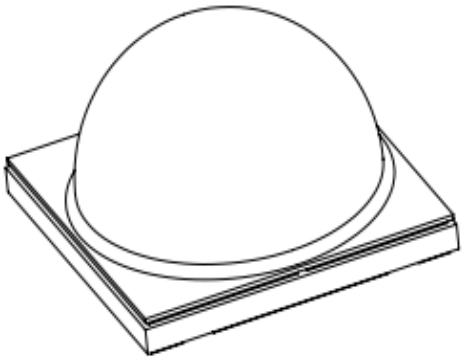
© 2018 Luminus Devices, Inc. - All Rights Reserved
Luminus Devices, Inc. • T 408.708.7000 • www.luminus.com
1145 Sonora Ct., Sunnyvale, CA 94086 USA

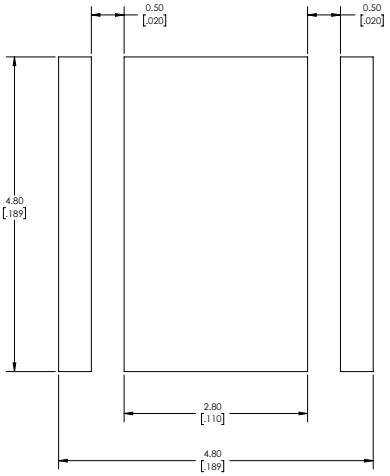
Mechanical Dimensions



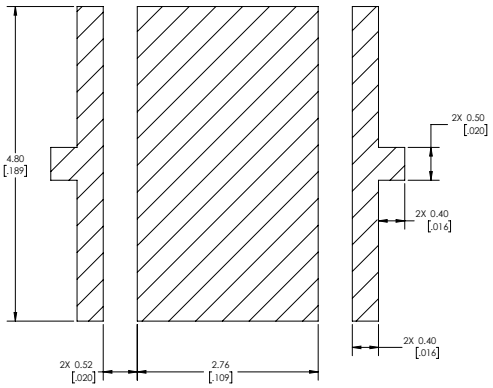






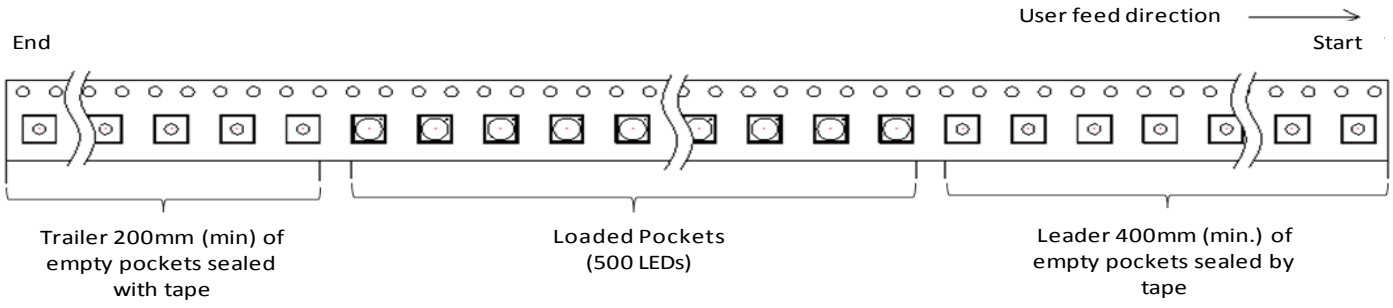


RECOMMENDED PCB SOLDER PAD



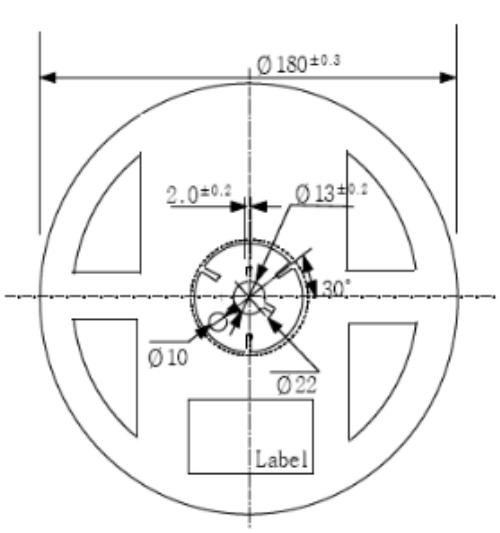
RECOMMENDED STENCIL PATTERN

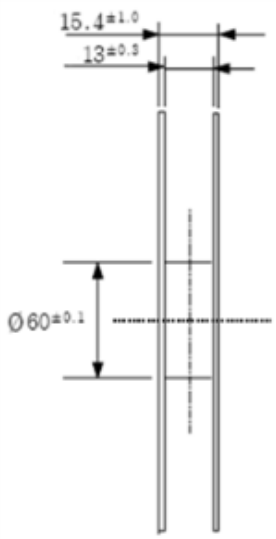
Tape Drawing

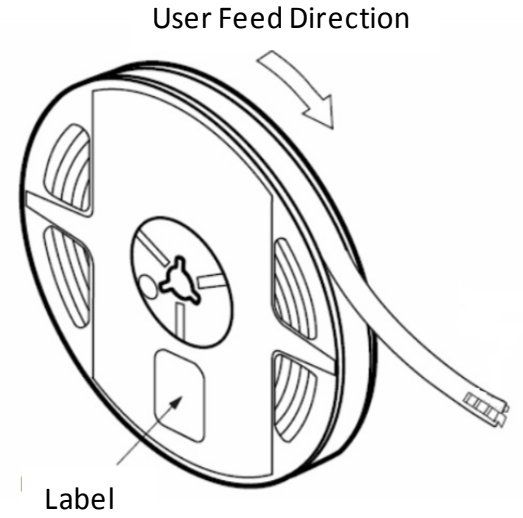


© 2018 Luminus Devices, Inc. - All Rights Reserved
Luminus Devices, Inc. • T 408.708.7000 • www.luminus.com
1145 Sonora Ct., Sunnyvale, CA 94086 USA

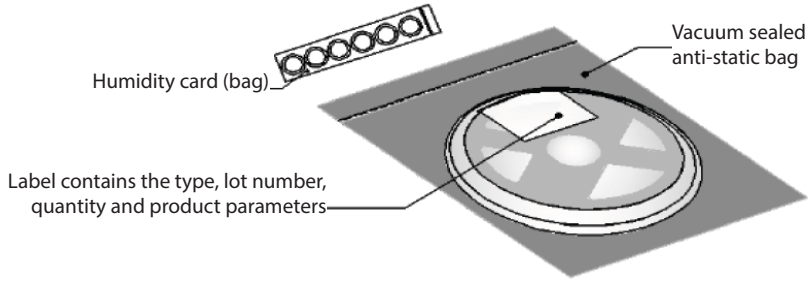
Reel Package



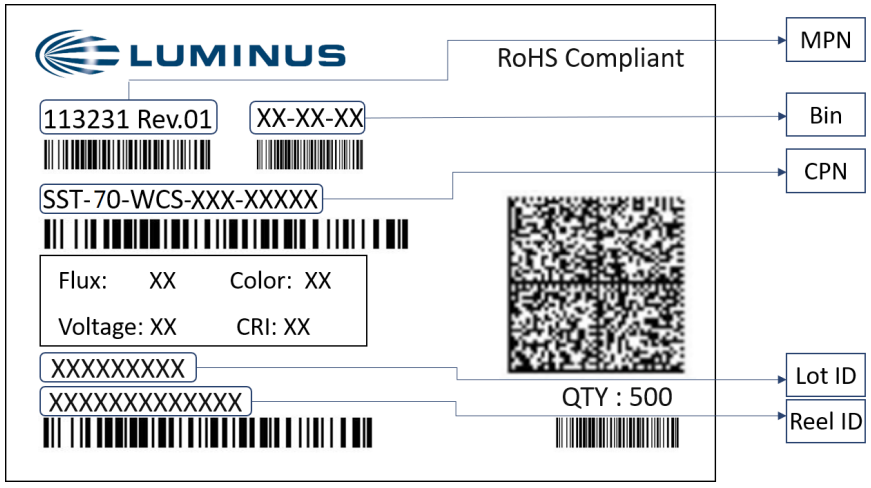




Reel dimensions are in millimeters.



Reel Label

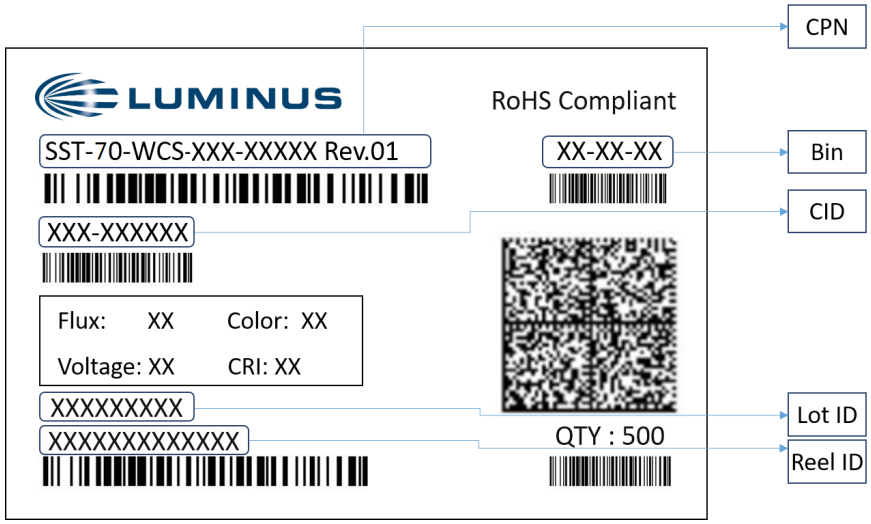


Label Fields:

- CPN: Luminus ordering part number
- MPN: For Luminus internal use
- Qty: On reel
- Flux: Bin as defned on page 3
- Voltage: Bin as defined on page 3
- Color: Bin as defined on page 4
- Mfg Info: For Luminus internal use

© 2018 Luminus Devices, Inc. - All Rights Reserved
Luminus Devices, Inc. • T 408.708.7000 • www.luminus.com
1145 Sonora Ct., Sunnyvale, CA 94086 USA

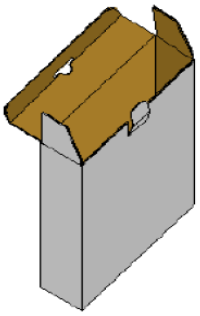
Shipping Label



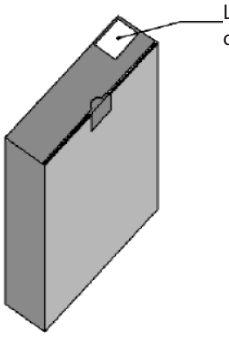
Label Fields:

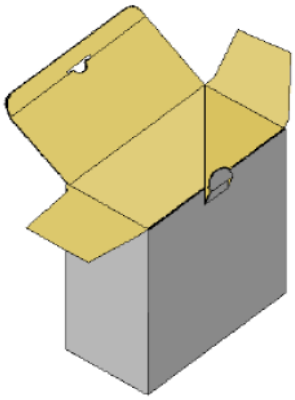
- CPN: Luminus ordering part number
- CID: Customer ID (Optional)
- Qty: On reel
- Flux: Bin as defned on page 3
- Voltage: Bin as defined on page 3
- Color: Bin as defined on page 4

Box Packaging Information

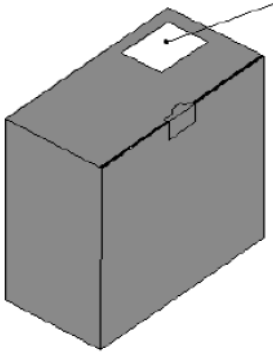


Size: 22.5*24.5*6.5 cm
Capacity: 5 reels per box





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



© 2018 Luminus Devices, Inc. - All Rights Reserved
Luminus Devices, Inc. • T 408.708.7000 • www.luminus.com
1145 Sonora Ct., Sunnyvale, CA 94086 USA

History of Changes

Revision	Date	Description of Change
01	05/15/2017	Initial data sheet.
02	8/8/2018	- Change binning current to 1.5 A. Updated calculated values and characterization plots accordingly. - Added 5000K, 5700K. - Remove chromaticity bin codes "650" and flux bin "N2". - Editorial fixes across the document

The products, their specifications and other information appearing in this document are subject to change by Luminus Devices without notice. Luminus Devices assumes no liability for errors that may appear in this document, and no liability otherwise arising from the application or use of the product or information contained herein. None of the information provided herein should be considered to be a representation of the fitness or suitability of the product for any particular application or as any other form of warranty. Luminus Devices' product warranties are limited to only such warranties as accompany a purchase contract or purchase order for such products. Nothing herein is to be construed as constituting an additional warranty. No information contained in this publication may be considered as a waiver by Luminus Devices of any intellectual property rights that Luminus Devices may have in such information.

This product is protected by U.S. Patents 6,831,302; 7,074,631; 7,083,993; 7,084,434; 7,098,589; 7,105,861; 7,138,666; 7,166,870; 7,166,871; 7,170,100; 7,196,354; 7,211,831; 7,262,550; 7,274,043; 7,301,271; 7,341,880; 7,344,903; 7,345,416; 7,348,603; 7,388,233; 7,391,059 Patents Pending in the U.S. and other countries.

© 2018 Luminus Devices, Inc. - All Rights Reserved

Luminus Devices, Inc. • T 408.708.7000 • www.luminus.com
1145 Sonora Ct., Sunnyvale, CA 94086 USA