PRELIMINARY

J Series® 2835SWT 3-V T Class LEDs

PRODUCT DESCRIPTION

J Series® LEDs extend Cree LED's industry-leading portfolio of lighting-class LEDs to a broader set of applications. The J Series 2835 LEDs combine high efficacy and excellent value in a reliable package. The J Series 2835 LEDs are optimized for low density lighting applications where high efficacy and smooth appearance are critical, such as downlights, troffers, and panel lights. The J Series 2835 LEDs offer high CRI and are optimized for lighting applications where good color quality is critical.

FEATURES

- Industry-compatible size : 2.8 x 3.5 x 0.7 mm
- 3-V configuration
- Flux and chromaticity binned at 25 °C
- 6500 K–2700 K ANSI CCTs available
- 80 & 90 CRI minimum available for 6500 K–2700 K CCTs
- RoHS and REACH compliant

PRODUCT SUMMARY

Product	Power Class	Test Temperature	Test Current	Flux Group	5000 K, 80 CRI		Maximum Current
					Minimum Flux	Maximum Flux	
JE2835S 3-V T Class	0.5 W	25 °C	150 mA	TN1	69 lm	73 lm	240 mA

J Series® Products are sold exclusively by Cree Venture LED Company Limited ("Cree Venture"), regardless of geography. Any orders for J Series Products that are submitted to Cree LED or any of its other subsidiaries will be directed to Cree Venture for acknowledgment and order fulfillment.

Cree LED / 4001 E. Hwy. 54, Suite 2000 / Durham, NC 27709 USA / +1.919.313.5330 / www.cree-led.com

PRELIMINARY

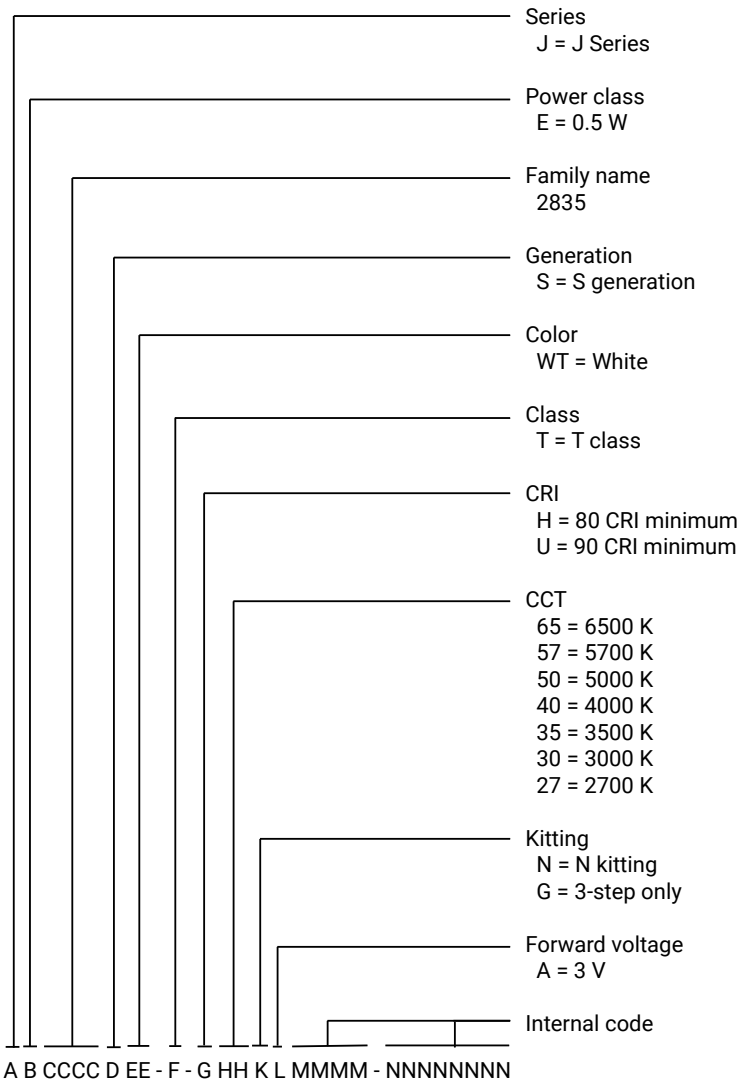
TABLE OF CONTENTS

PRELIMINARY

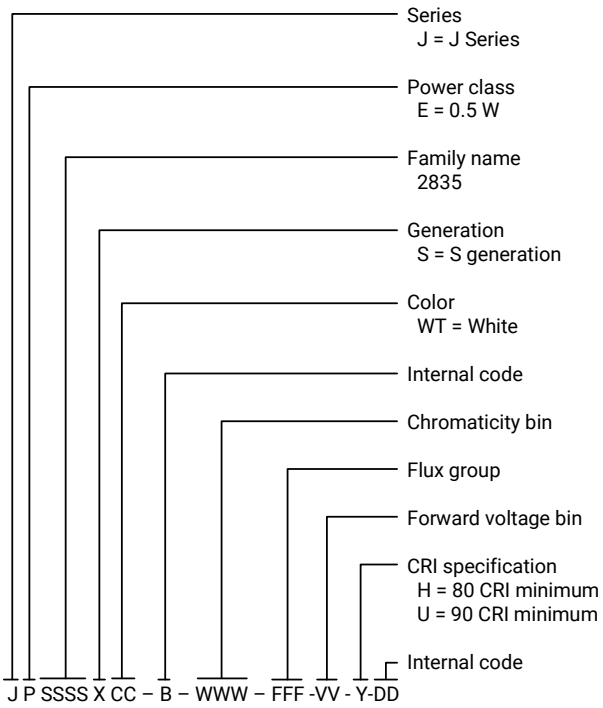
ORDER CODE & BIN CODE FORMATS

Order codes and bin codes for J Series 2835SWT 3-V T Class LEDs are configured in the following manner:

Order Code



Bin Code



PRELIMINARY

CHARACTERISTICS

Characteristics	Unit	Minimum	Typical	Maximum
Thermal resistance, junction to solder point◊	°C/W		11	
Viewing angle (FWHM)	degrees		120	
Temperature coefficient of voltage	mV/°C		-1.1	
ESD withstand voltage (HBM per Mil-Std-883L)			Class 2	
DC forward current	mA			240
Reverse voltage	V			5
Forward voltage (@ 150 mA, 25 °C)	V	2.8	2.97	3.2
LED junction temperature	°C			125
Operating temperature	°C	-40		105

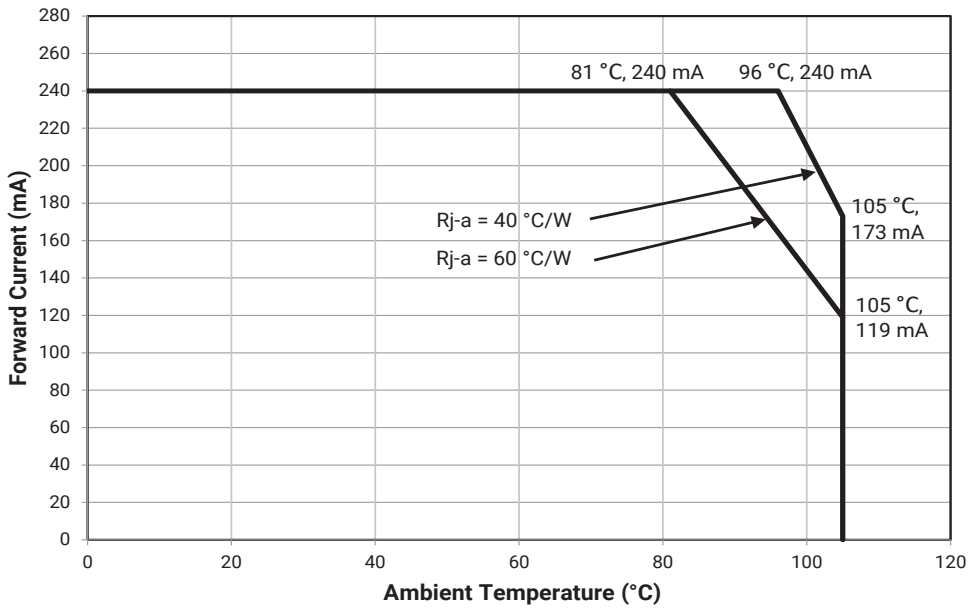
Note:

◊ Thermal resistance measurement was performed per the JEDEC JESD51-14 standard. See the Thermal Resistance Measurement application note for more details.

- Continuous reverse voltage can cause LED damage.

OPERATING LIMITS

The maximum forward current is determined by the thermal resistance between the LED junction and ambient.



PRELIMINARY

FLUX CHARACTERISTICS, ORDER CODES AND BINS (I_F = 150 mA, T_j = 25 °C)

The following table provides order codes for J Series JE2835SWT 3-V T Class LEDs. For a complete description of the order code nomenclature, please see the Order Code and Bin Code Formats section (page 3). For definitions of the chromaticity kits, please see the Performance Groups - Chromaticity section (page 11).

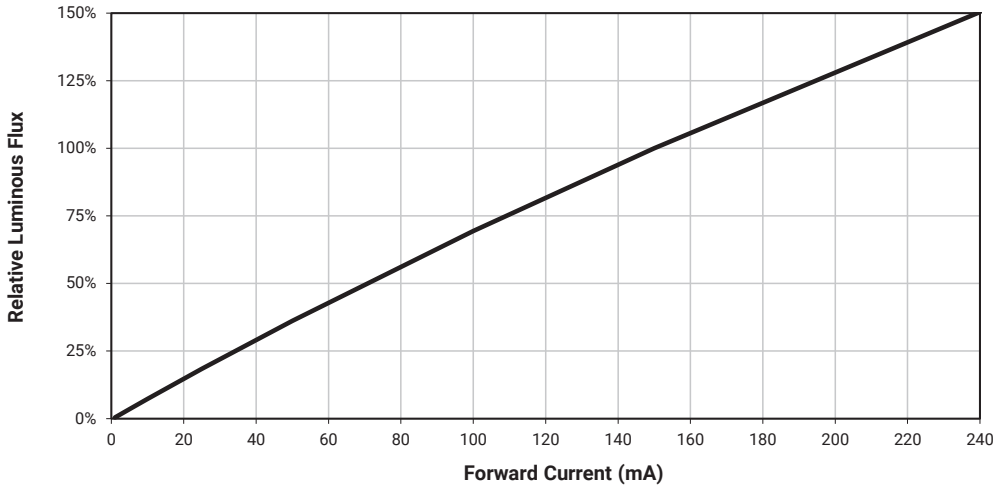
CCT	Minimum CRI	Flux Group	Minimum Flux (lm) @ 25 °C	Maximum Flux (lm) @ 25 °C	N Kitting Order Code	3-Step Order Code
6500 K	80	TN1	68	72	JE2835SWT-T-H65NA0000-N0000001	JE2835SWT-T-H65GA0000-N0000001
	90	TN1	57	61	JE2835SWT-T-U65NA0000-N0000001	JE2835SWT-T-U65GA0000-N0000001
5700 K	80	TN1	68.5	72.5	JE2835SWT-T-H57NA0000-N0000001	JE2835SWT-T-H57GA0000-N0000001
	90	TN1	57.5	61.5	JE2835SWT-T-U57NA0000-N0000001	JE2835SWT-T-U57GA0000-N0000001
5000 K	80	TN1	69	73	JE2835SWT-T-H50NA0000-N0000001	JE2835SWT-T-H50GA0000-N0000001
	90	TN1	58	62	JE2835SWT-T-U50NA0000-N0000001	JE2835SWT-T-U50GA0000-N0000001
4000 K	80	TN1	68	72	JE2835SWT-T-H40NA0000-N0000001	JE2835SWT-T-H40GA0000-N0000001
	90	TN1	57	61	JE2835SWT-T-U40NA0000-N0000001	JE2835SWT-T-U40GA0000-N0000001
3500 K	80	TN1	65.5	69.5	JE2835SWT-T-H35NA0000-N0000001	JE2835SWT-T-H35GA0000-N0000001
	90	TN1	55	59	JE2835SWT-T-U35NA0000-N0000001	JE2835SWT-T-U35GA0000-N0000001
3000 K	80	TN1	64.5	68.5	JE2835SWT-T-H30NA0000-N0000001	JE2835SWT-T-H30GA0000-N0000001
	90	TN1	54	58	JE2835SWT-T-U30NA0000-N0000001	JE2835SWT-T-U30GA0000-N0000001
2700 K	80	TN1	62.5	66.5	JE2835SWT-T-H27NA0000-N0000001	JE2835SWT-T-H27GA0000-N0000001
	90	TN1	52.5	56.5	JE2835SWT-T-U27NA0000-N0000001	JE2835SWT-T-U27GA0000-N0000001

Note:

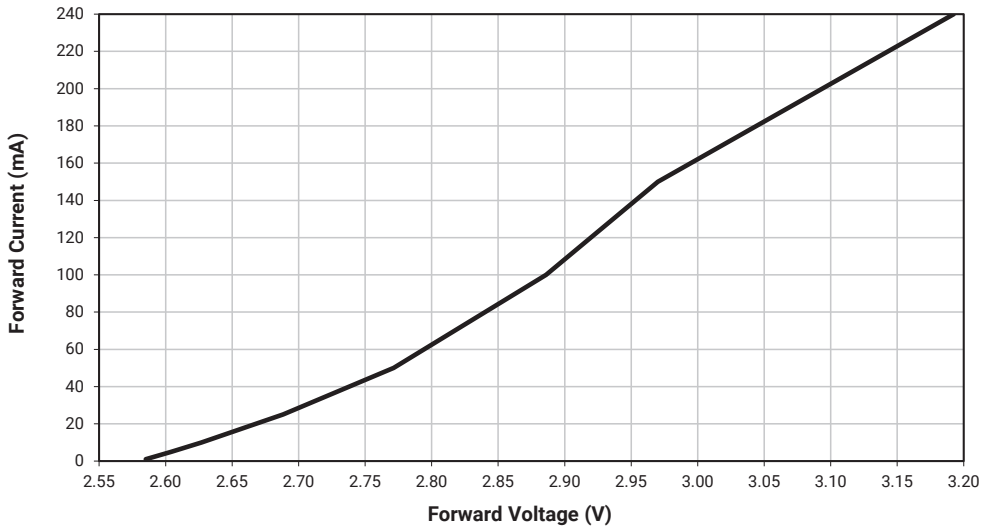
- Cree Venture maintains a tolerance of ±7% on flux and power measurements, ±0.005 on chromaticity (CCx, CCy) measurements and ±2 on CRI measurements. See the Measurements section (page 21).

PRELIMINARY

RELATIVE LUMINOUS FLUX VS. CURRENT

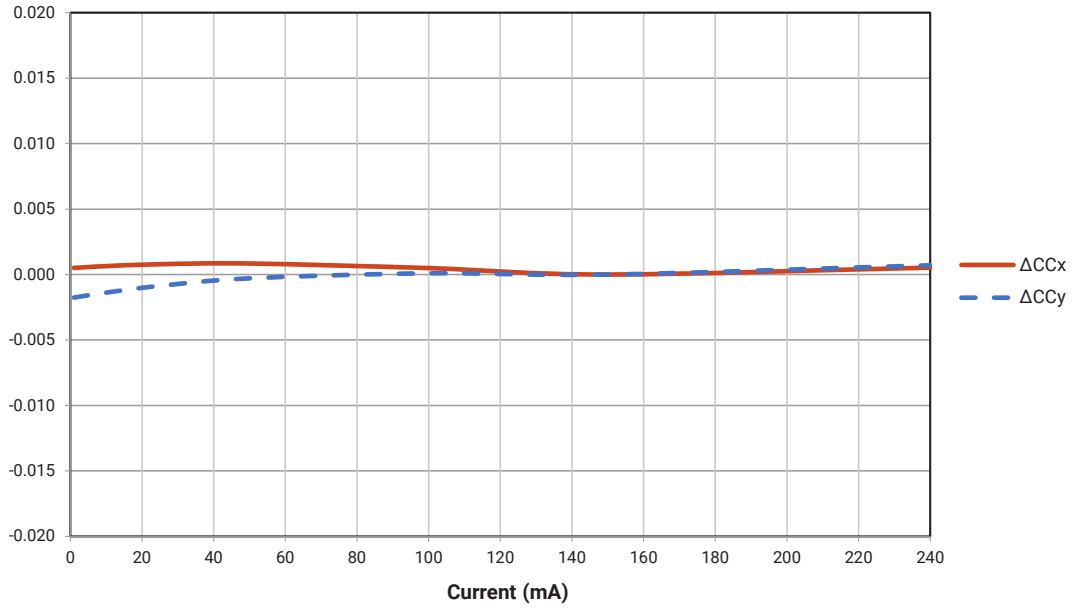


ELECTRICAL CHARACTERISTICS

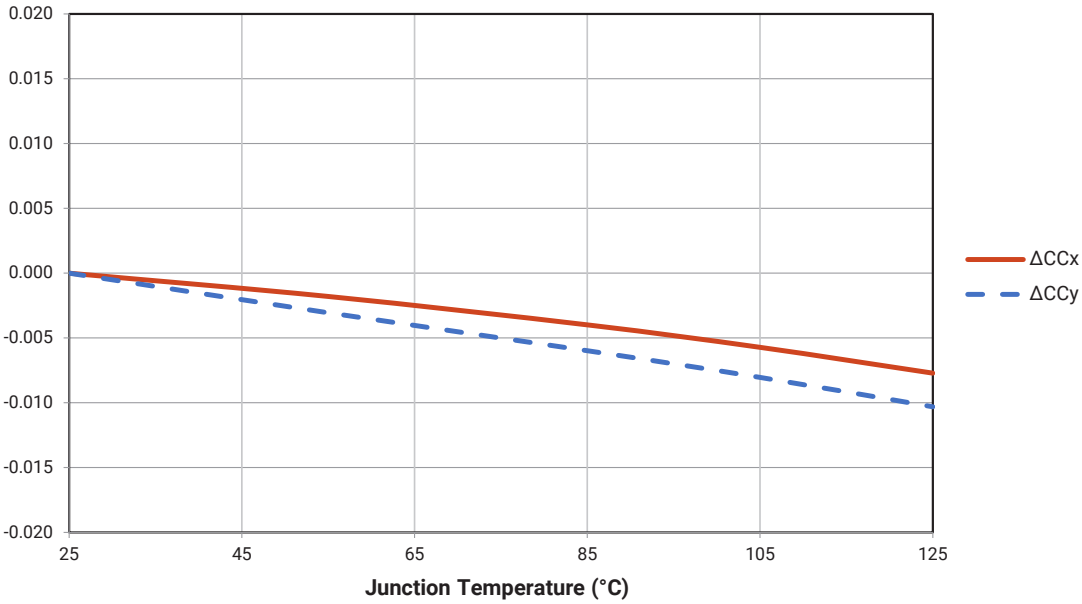


PRELIMINARY

RELATIVE CHROMATICITY VS. CURRENT



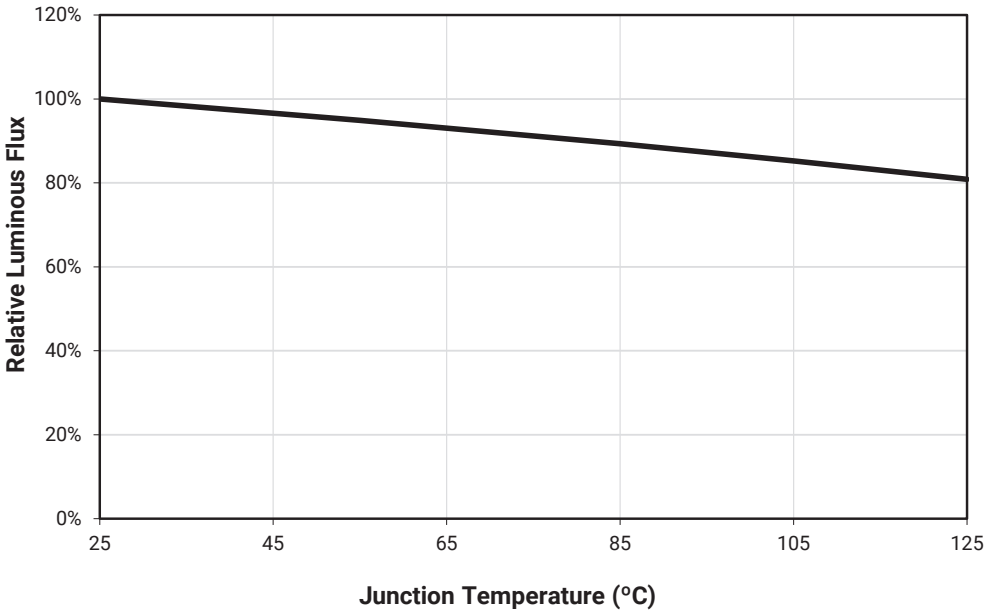
RELATIVE CHROMATICITY VS. TEMPERATURE



- Relative Chromaticity versus Current and Temperature are shown for reference only.

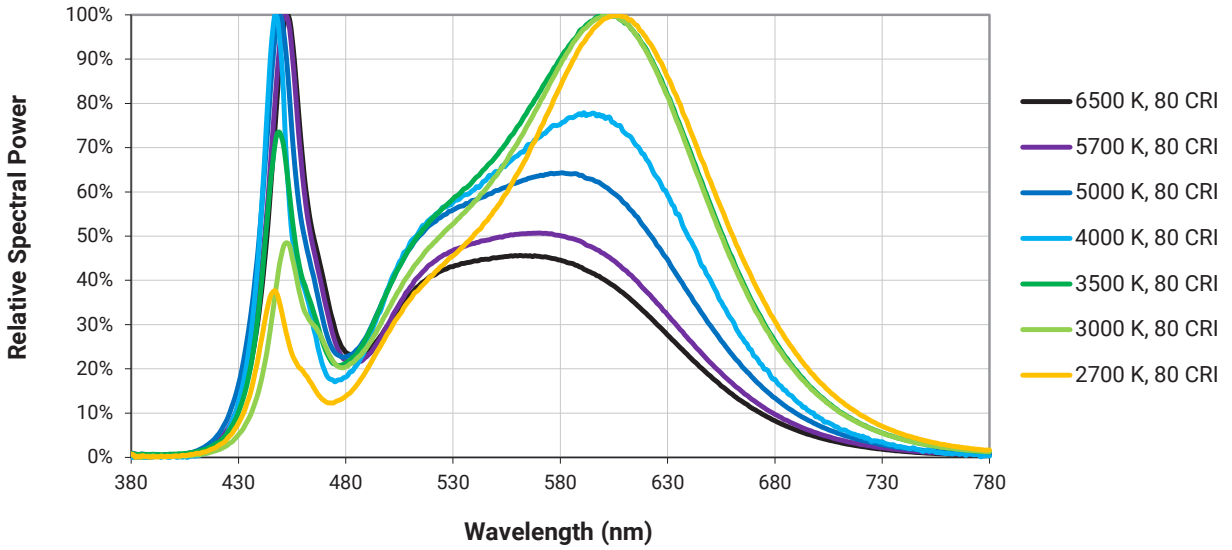
PRELIMINARY

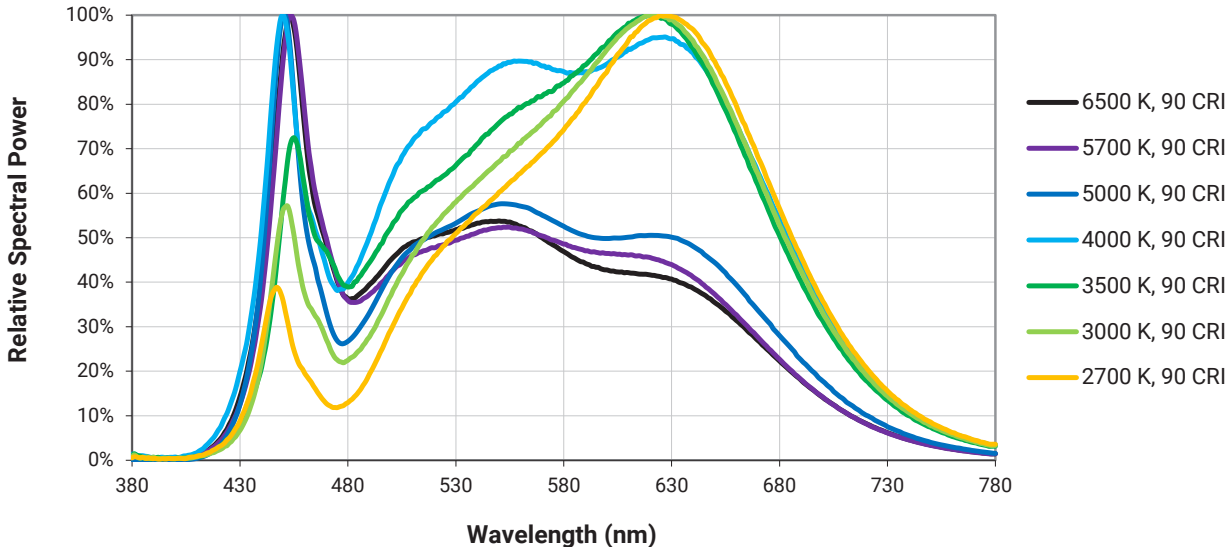
RELATIVE LUMINOUS FLUX VS. JUNCTION TEMPERATURE



PRELIMINARY

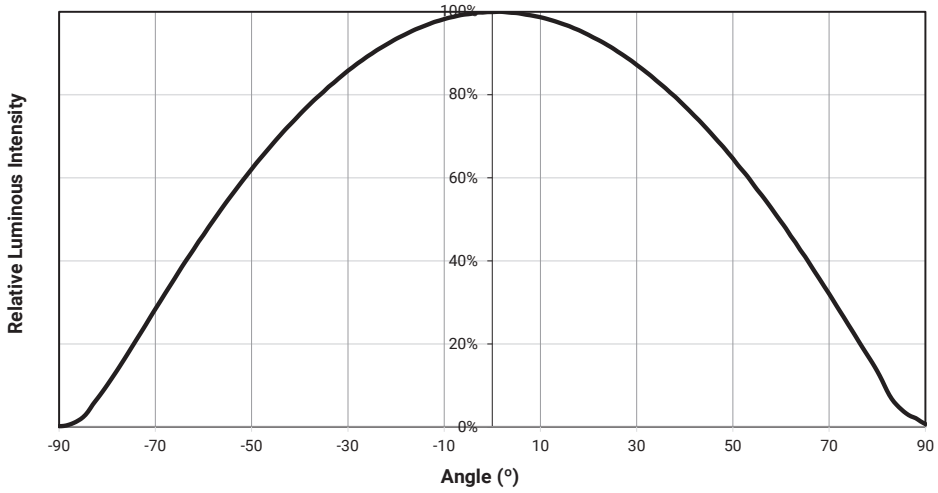
RELATIVE SPECTRAL POWER DISTRIBUTION





PRELIMINARY

TYPICAL SPATIAL DISTRIBUTION



PRELIMINARY

PERFORMANCE GROUPS - FORWARD VOLTAGE (T_j = 25 °C)

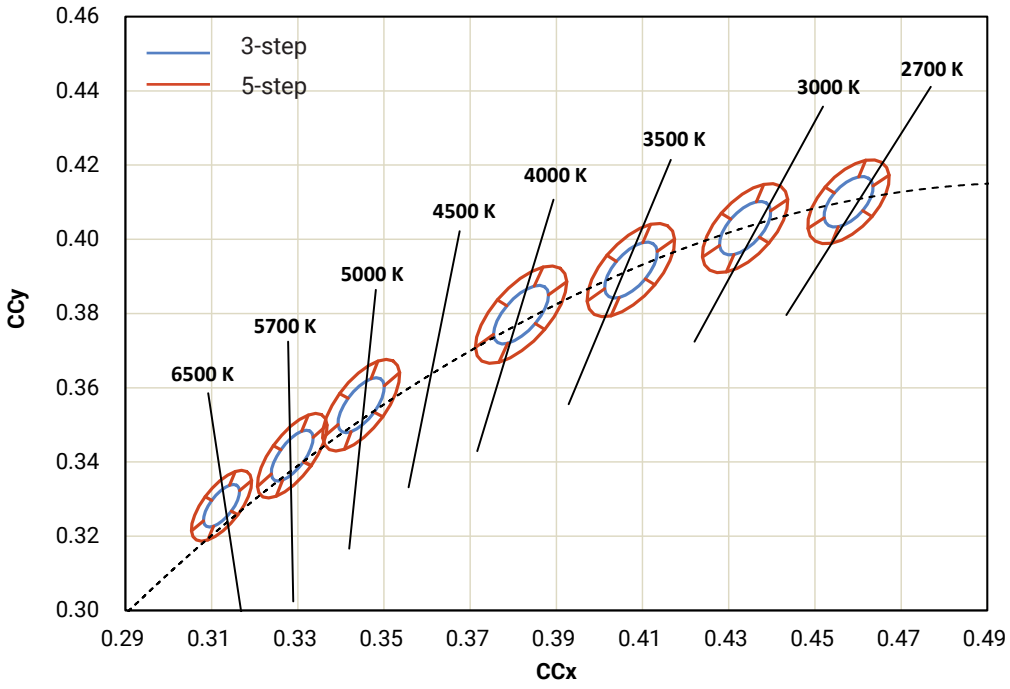
J Series 2835SWT T Class LEDs are tested for forward voltage and placed into one of the following voltage bins.

The following voltage bins are indicated in the Forward Voltage Bin field in the bin code for JE2835S 3-V T Class LEDs.

Voltage Bin	Minimum Forward Voltage (V)	Maximum Forward Voltage (V)
AE	2.80	2.90
AF	2.90	3.00
AG	3.00	3.10
AH	3.10	3.20

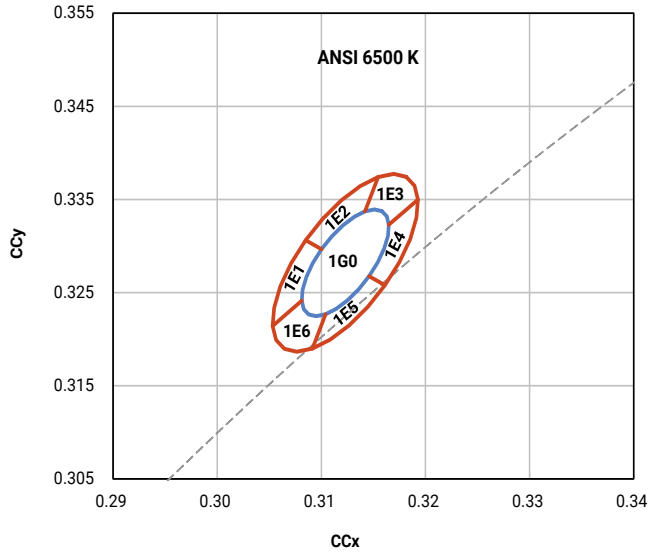
PERFORMANCE GROUPS - CHROMATICITY (T_j = 25 °C)

J Series 2835SWT 3-V T Class LEDs are tested for chromaticity and placed into one of the regions defined by the following bounding coordinates.



PRELIMINARY

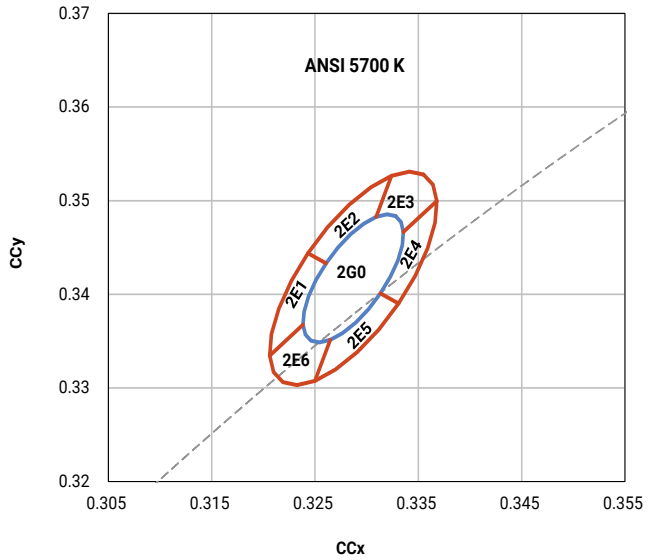
PERFORMANCE GROUPS - CHROMATICITY (T_j = 25 °C) - CONTINUED



CCT	MacAdam Ellipse	Included Bins	Center Point		Major Axis	Minor Axis	Rotation Angle (°)
			x	y	a	b	
6500 K	3-step	1G0	0.3123	0.3282	0.00656	0.00271	57.65
	5-step	1G0, 1E1, 1E2, 1E3, 1E4, 1E5, 1E6	0.3123	0.3282	0.01094	0.00452	57.65

PRELIMINARY

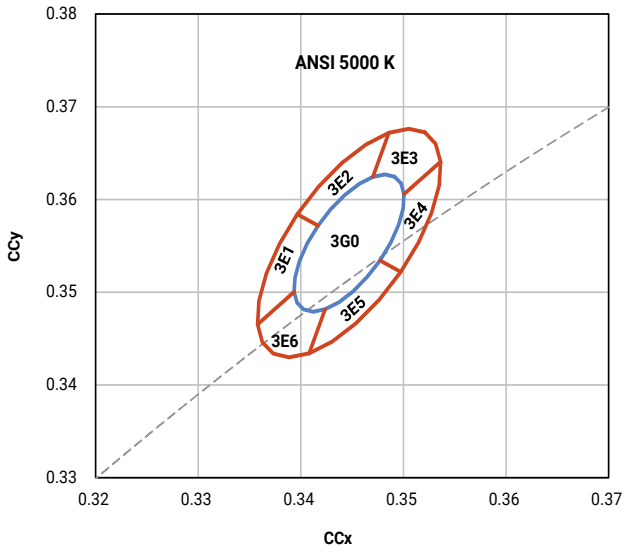
PERFORMANCE GROUPS - CHROMATICITY (T_j = 25 °C) - CONTINUED



CCT	MacAdam Ellipse	Included Bins	Center Point		Major Axis	Minor Axis	Rotation Angle (°)
			x	y	a	b	
5700 K	3-step	2G0	0.3287	0.3417	0.00781	0.00309	58.44
	5-step	2G0, 2E1, 2E2, 2E3, 2E4, 2E5, 2E6	0.3287	0.3417	0.01302	0.00515	58.44

PRELIMINARY

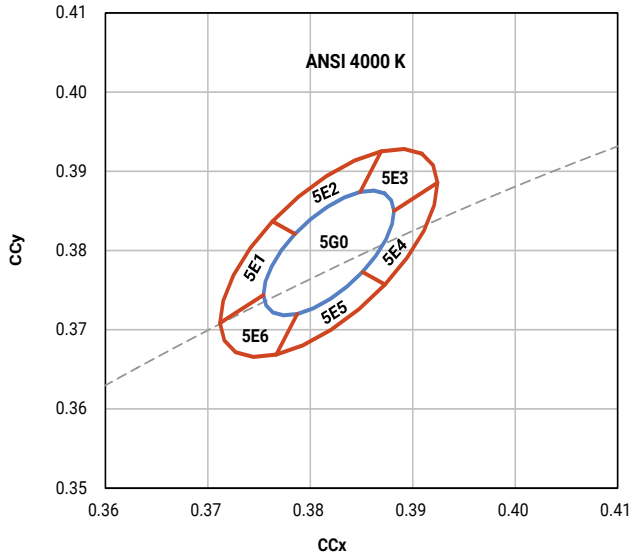
PERFORMANCE GROUPS - CHROMATICITY (T_j = 25 °C) - CONTINUED



CCT	MacAdam Ellipse	Included Bins	Center Point		Major Axis	Minor Axis	Rotation Angle (°)
			x	y	a	b	
5000 K	3-step	3G0	0.3447	0.3553	0.00842	0.00356	58.22
	5-step	3G0, 3E1, 3E2, 3E3, 3E4, 3E5, 3E6	0.3447	0.3553	0.01403	0.00593	58.22

PRELIMINARY

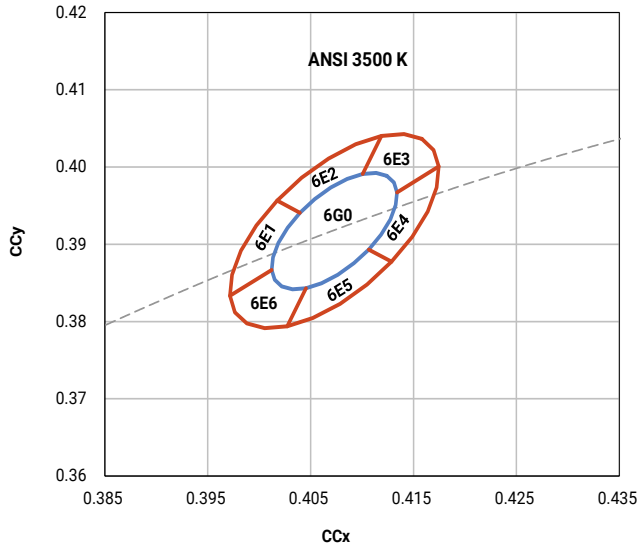
PERFORMANCE GROUPS - CHROMATICITY (T_j = 25 °C) - CONTINUED



CCT	MacAdam Ellipse	Included Bins	Center Point		Major Axis	Minor Axis	Rotation Angle (°)
			x	y	a	b	
4000 K	3-step	5G0	0.3818	0.3797	0.00928	0.00407	54.05
	5-step	5G0, 5E1, 5E2, 5E3, 5E4, 5E5, 5E6	0.3818	0.3797	0.01547	0.00679	54.05

PRELIMINARY

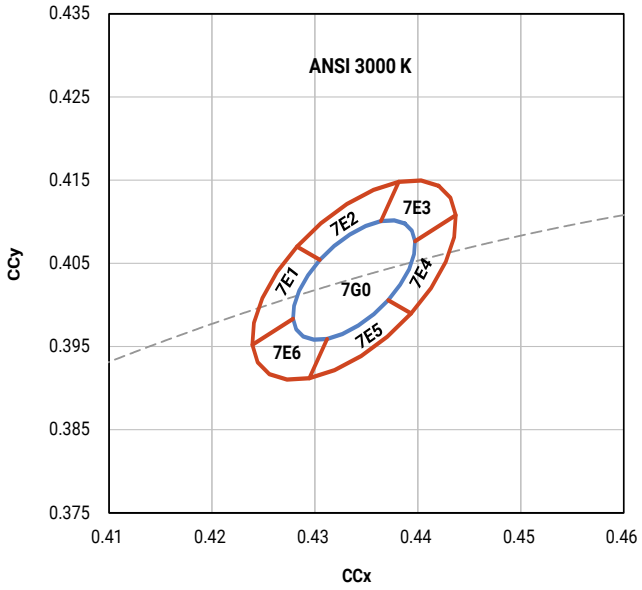
PERFORMANCE GROUPS - CHROMATICITY (T_j = 25 °C) - CONTINUED



CCT	MacAdam Ellipse	Included Bins	Center Point		Major Axis	Minor Axis	Rotation Angle (°)
			x	y	a	b	
3500 K	3-step	6G0	0.4073	0.3917	0.00880	0.00410	54.53
	5-step	6G0, 6E1, 6E2, 6E3, 6E4, 6E5, 6E6	0.4073	0.3917	0.01466	0.00683	54.53

PRELIMINARY

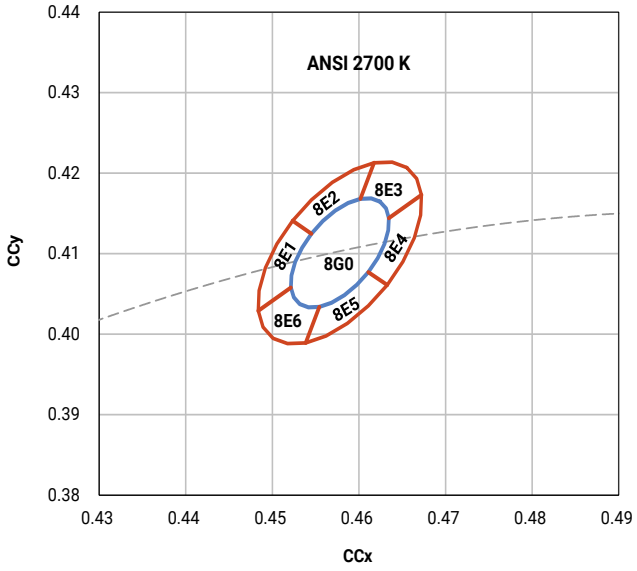
PERFORMANCE GROUPS - CHROMATICITY (T_j = 25 °C) - CONTINUED



CCT	MacAdam Ellipse	Included Bins	Center Point		Major Axis	Minor Axis	Rotation Angle (°)
			x	y	a	b	
3000 K	3-step	7G0	0.4338	0.4030	0.00839	0.00411	54.00
	5-step	7G0, 7E1, 7E2, 7E3, 7E4, 7E5, 7E6	0.4338	0.4030	0.01399	0.00685	54.00

PRELIMINARY

PERFORMANCE GROUPS - CHROMATICITY (T_j = 25 °C) - CONTINUED



CCT	MacAdam Ellipse	Included Bins	Center Point		Major Axis	Minor Axis	Rotation Angle (°)
			x	y	a	b	
2700 K	3-step	8G0	0.4578	0.4101	0.00787	0.00406	53.95
	5-step	8G0, 8E1, 8E2, 8E3, 8E4, 8E5, 8E6	0.4578	0.4101	0.01312	0.00676	53.95

PRELIMINARY

KITTING

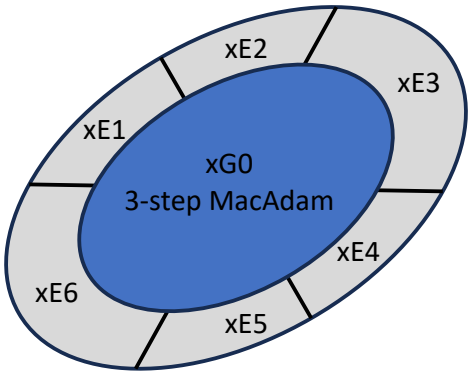
CHROMATICITY

CCT	Kitting	Included Bins
6500 K	3-step only	1G0
	N Kitting	1G0, 1E1, 1E2, 1E3, 1E4, 1E5, 1E6
5700 K	3-step only	2G0
	N Kitting	2G0, 2E1, 2E2, 2E3, 2E4, 2E5, 2E6
5000 K	3-step only	3G0
	N Kitting	3G0, 3E1, 3E2, 3E3, 3E4, 3E5, 3E6
4000 K	3-step only	5G0
	N Kitting	5G0, 5E1, 5E2, 5E3, 5E4, 5E5, 5E6
3500 K	3-step only	6G0
	N Kitting	6G0, 6E1, 6E2, 6E3, 6E4, 6E5, 6E6
3000 K	3-step only	7G0
	N Kitting	7G0, 7E1, 7E2, 7E3, 7E4, 7E5, 7E6
2700 K	3-step only	8G0
	N Kitting	8G0, E1, 8E2, 8E3, 8E4, 8E5, 8E6

N KITTING BIN DETAILS

1. Forward voltage bins are kitted in pairs of the same forward voltage bin.
2. Chromaticity bins are kitted as shown below in the following kitting examples.

Chromaticity Bins



Kitted Bins

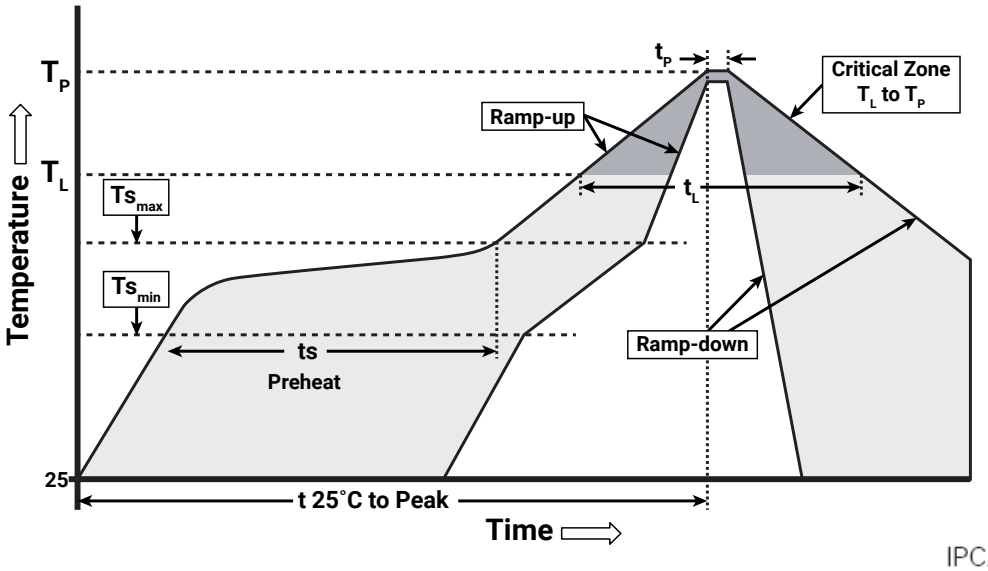
Item	Bin #1	Bin #2
Chromaticity Bin	xG0	xG0
	xE1	xE4
	xE2	xE5
	xE3	xE6

PRELIMINARY

REFLOW SOLDERING CHARACTERISTICS

In testing, Cree Venture has found J Series 2835SWT 3-V T Class LEDs to be compatible with JEDEC J-STD-020C, using the parameters listed below. As a general guideline, Cree Venture recommends that users follow the recommended soldering profile provided by the manufacturer of the solder paste used, and therefore it is the lamp or luminaire manufacturer's responsibility to determine applicable soldering requirements.

Note that this general guideline may not apply to all PCB designs and configurations of reflow soldering equipment.



IPC/JEDEC J-STD-020C

Profile Feature	Lead-Free Solder
Temperature Min. (Ts_{min})	150 °C
Temperature Max. (Ts_{max})	200 °C
Time (ts) from Ts_{min} to Ts_{max}	60-120 seconds
Ramp-Up Rate (T_L to T_p)	3 °C/second
Liquidus Temperature (T_L)	217 °C
Time (t_L) Maintained Above T_L	60-150 seconds
Peak Package Body Temperature (Tp)	260 °C max.
Time (tp) Within 5 °C of the SpecifieD Classification Temperature (Tc)	30 seconds max.
Ramp-Down Rate (T_p to T_L)	6 °C/second max.
Time 25 °C to Peak Temperature	8 minutes max.

Note: All temperatures refer to the topside of the package, measured on the package body surface.

PRELIMINARY

NOTES

Measurements

The luminous flux, radiant power, chromaticity, forward voltage and CRI measurements in this document are binning specifications only and solely represent product measurements as of the date of shipment. These measurements will change over time based on a number of factors that are not within Cree Venture's control and are not intended or provided as operational specifications for the products. Calculated values are provided for informational purposes only and are not intended or provided as specifications.

Pre-Release Qualification Testing

Please read the J Series Reliability Overview for the details of the pre-release qualification testing for J Series LEDs.

Lumen Maintenance

Cree Venture uses standardized IES LM-80-08 and TM-21-11 methods for collecting long-term data and extrapolating LED lumen maintenance. For information on the specific LM-80 data sets available for this LED, refer to the public J Series LM-80 results document.

Please read the Thermal Management application note for details on how thermal design, ambient temperature, and drive current affect the LED junction temperature.

Moisture Sensitivity

Cree Venture recommends keeping J Series 2835SWT 3-V T Class LEDs in the provided, resealable moisture-barrier packaging (MBP) until immediately prior to soldering. Unopened MBP that contains J Series 2835SWT 3-V T Class LEDs does not need special storage for moisture sensitivity.

Once the MBP is opened, J Series 2835SWT 3-V T Class LEDs should be handled and stored as MSL 2A per JEDEC J-STD-033, meaning they have limited exposure time before damage to the LED may occur during the soldering operation. The table on the right specifies the maximum exposure time in days depending on temperature and humidity conditions. LEDs with exposure time longer than the specified maximums must be baked according to the baking conditions listed below.

Moisture Sensitivity Level	Temp.	Maximum Percent Relative Humidity				
		50%	60%	70%	80%	90%
Level 2A	30 °C	∞	28	1	1	1
Level 2A	25 °C	∞	∞	2	1	1
Level 2A	20 °C	∞	∞	2	2	1

Baking Conditions

It is not necessary to bake all J Series 2835SWT 3-V T Class LEDs. Only the LEDs that meet all of the following criteria must be baked:

1. LEDs that have been removed from the original MBP.
2. LEDs that have been exposed to a humid environment longer than listed in the Moisture Sensitivity section above.
3. LEDs that have not been soldered.

LEDs should be baked at 60 °C for 24 hours. LEDs may be baked in the original reels. Remove LEDs from the MBP before baking. Do not bake parts at temperatures higher than 60 °C. This baking operation resets the exposure time as defined in the Moisture Sensitivity section above.

PRELIMINARY

NOTES - CONTINUED

RoHS Compliance

The levels of RoHS restricted materials in this product are below the maximum concentration values (also referred to as the threshold limits) permitted for such substances, or are used in an exempted application, in accordance with EU Directive 2011/65/EC (RoHS2), as implemented January 2, 2013. RoHS Declarations for this product can be obtained from your Cree Venture representative or from the Product Ecology section of the Cree LED website.

REACH Compliance

REACH substances of very high concern (SVHCs) information is available for this product. Since the European Chemical Agency (ECHA) has published notice of their intent to frequently revise the SVHC listing for the foreseeable future, please contact a Cree LED representative to insure you get the most up-to-date REACH SVHC Declaration. REACH banned substance information (REACH Article 67) is also available upon request.

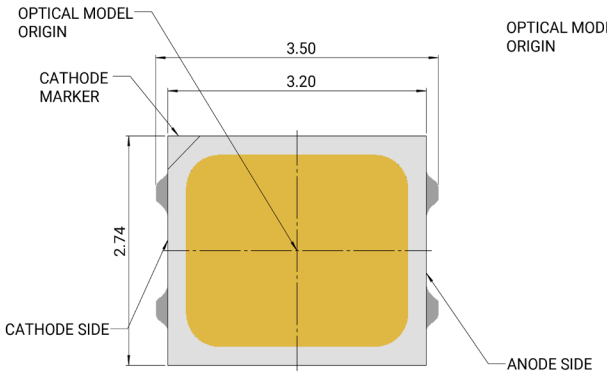
Vision Advisory

WARNING: Do not look at an exposed lamp in operation. Eye injury can result. For more information about LEDs and eye safety, please refer to the J Series LED Eye Safety application note.

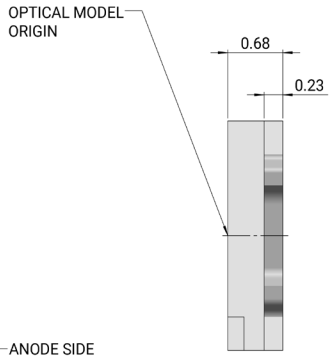
PRELIMINARY

MECHANICAL DIMENSIONS

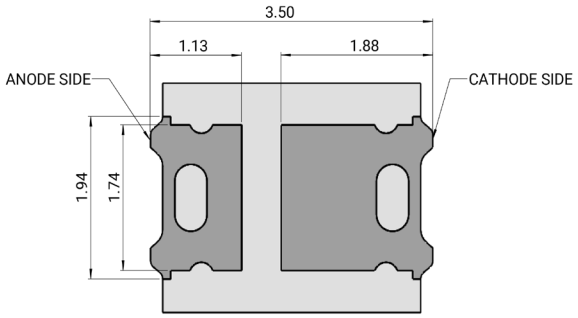
All measurements are ±0.2 mm unless otherwise indicated.



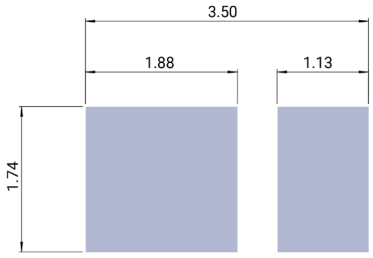
Top View



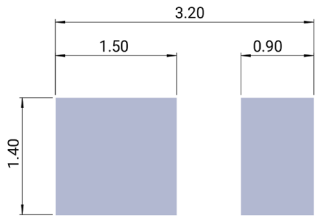
Side View



Bottom View



Recommended PCB Footprint

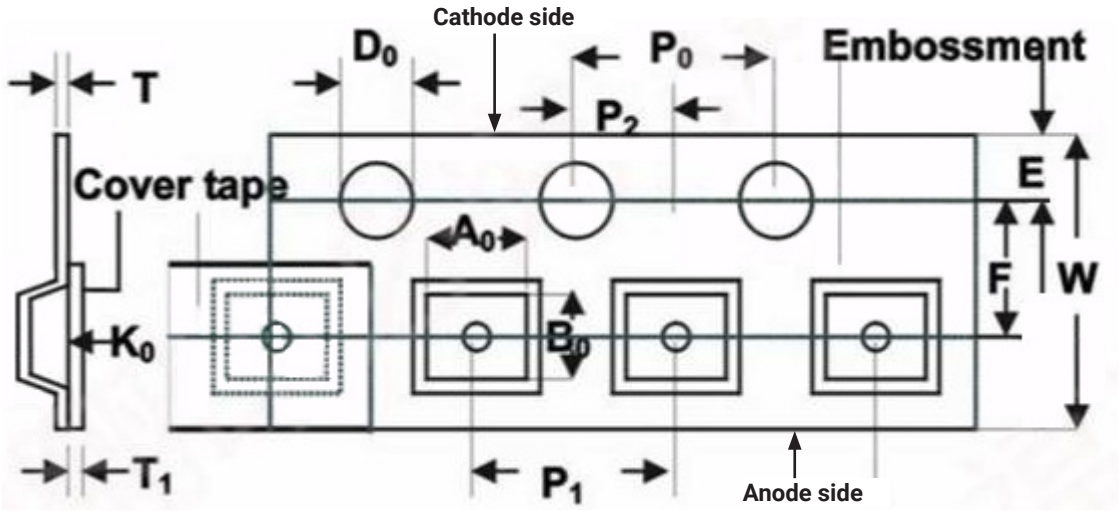


Recommended Stencil Opening

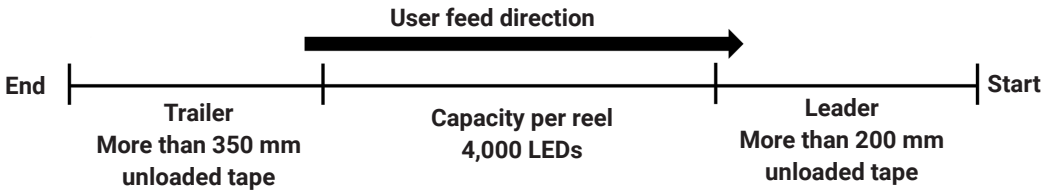
PRELIMINARY

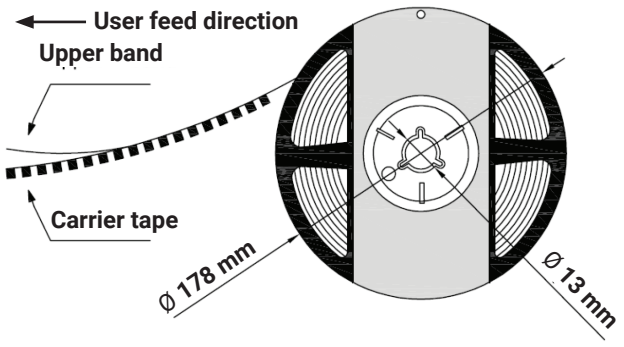
TAPE & REEL

All Cree Venture carrier tapes conform to EIA-481D, Automated Component Handling Systems Standard.
All dimensions in mm.



Symbol	Specification	Symbol	Specification
W	8.00 ± 0.10	A_0	3.00 ± 0.10
E	1.75 ± 0.10	B_0	3.70 ± 0.10
F	3.50 ± 0.05	K_0	1.05 ± 0.10
D_0	1.55 ± 0.10		
P_0	4.00 ± 0.10		
P_1	4.00 ± 0.10		
P_2	2.00 ± 0.05		
T	0.20 ± 0.05		
T1	0.05 ± 0.01		

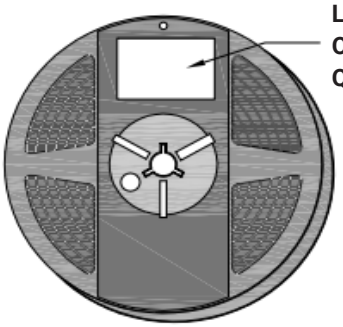




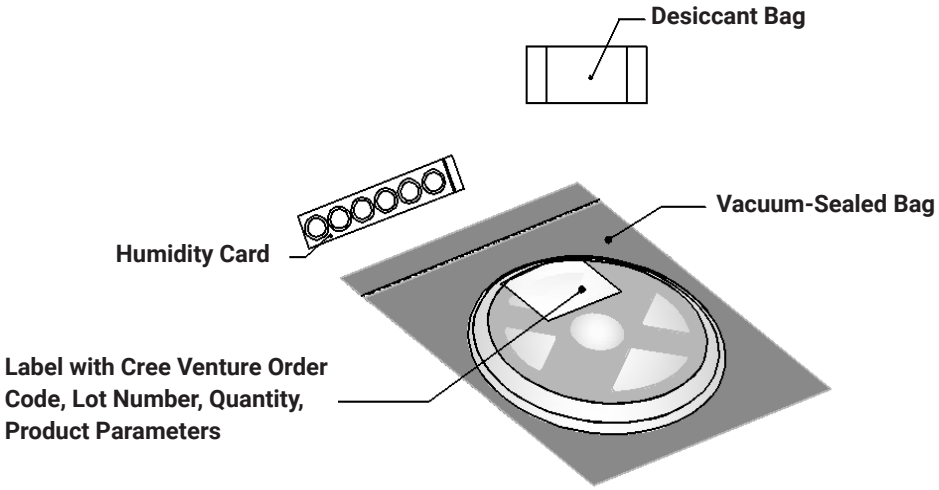
PRELIMINARY

PACKAGING

Unpackaged Reel



Packaged Reel



PRELIMINARY

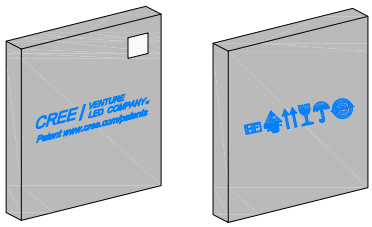
PACKAGING - CONTINUED

J Series 2835SWT 3-V T Class LEDs are packaged in boxes for shipment. Box sizes and the number of reels per box are as follows.

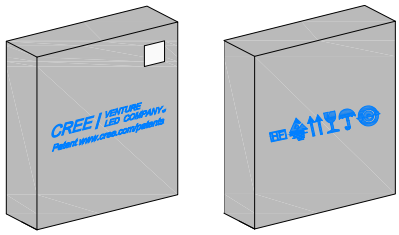
Box	Box Dimensions	Maximum Number of Reels per Box
1	250 x 210 x 30 mm	2
2	250 x 210 x 50 mm	4
3	530 x 230 x 275 mm	44
4	530 x 443 x 275 mm	88

Each box has at least one label (shown as a white square in the diagrams below) showing the order code, lot number, quantity, and product parameters.

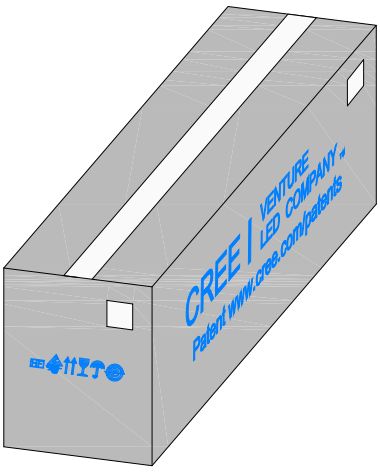
Box 1



Box 2



Box 3



Box 4