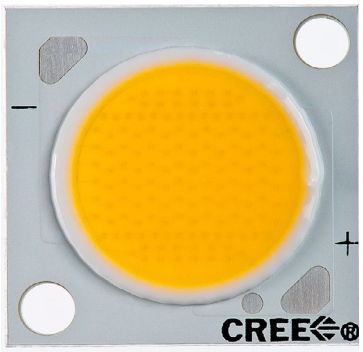
Cree® XLamp® CXA2011 LED



PRODUCT DESCRIPTION

The Cree XLamp® CXA2011 LED brings lighting-class reliability and performance to easy-to-use LED arrays. The XLamp CXA2011 LED expands Cree's lighting-class leadership to multi-die, high-flux arrays. With XLamp LED lighting-class reliability, a wide viewing angle, uniform light output, and industry-leading chromaticity binning in a 16-mm diameter optical source, the XLamp CXA2011 LED continues Cree's history of segment-focused product innovation in LEDs for lighting applications.

The XLamp CXA2011 LED brings high performance and a smooth look to a wide range of lighting applications, including downlighting, recessed fixtures, can lights and retrofit bulbs.

FEATURES

- Available in ANSI white bins as well as 4-step and 2-step EasyWhite® bins at 2700 K, 3000 K, 3500 K, 4000 K and 5000 K CCT
- 90 minimum CRI available in 2700 K and 3000 K CCT
- Forward Voltage: 40 V
- 85 °C binning and characterization
- NEMA SSL-3 2011 standard flux bins
- Max drive current: 1000 mA
- 120° viewing angle, uniform chromaticity profile
- Top-side solder connections
- Thermocouple attach point
- Screw-down attachment
- Unlimited shelf life at ≤ 30°C/85% RH
- RoHS- and REACh-compliant
- UL® recognized component (E349212)

TABLE OF CONTENTS

Cree, Inc.
4600 Silicon Drive
Durham, NC 27703
USA Tel: +1.919.313.5300

CHARACTERISTICS

Characteristics	Unit	Minimum	Typical	Maximum
Effective thermal resistance, junction to case	°C/W		0.4	
Viewing angle (FWHM)	degrees		120	
ESD withstand voltage (HBM per Mil-Std-883D)	V			8000
DC forward current	mA			1,000
Reverse current	mA			0.1
Forward voltage (@ 270 mA, 85 °C)	V		40	48
LED junction temperature	°C			150
Temperature coefficient of voltage	mV/°C		-35	

FLUX CHARACTERISTICS, STANDARD ORDER CODES AND BINS (I_F = 270 mA, T_J = 85 °C)

The following tables provide order codes for XLamp CXA2011 LEDs. For a complete description of the order code nomenclature, please see the Bin and Order Code Formats section (page 11).

Color	CCT Range	Minimum Luminous Flux @ 270 mA			2-Step		4-Step	
		Group	Flux (lm) @ 85 ° C	Flux (lm) @ 25 ° C*	Chromaticity Region	Order Code	Chromaticity Region	Order Code
EasyWhite	5000 K	H0	900	1036	50H	CXA2011-0000-000P00H050H	50F	CXA2011-0000-000P00H050F
		J0	1040	1197		CXA2011-0000-000P00J050H		CXA2011-0000-000P00J050F
	4000 K	G0	780	898	40H	CXA2011-0000-000P00G040H	40F	CXA2011-0000-000P00G040F
		H0	900	1036		CXA2011-0000-000P00H040H		CXA2011-0000-000P00H040F
	3500 K	G0	780	898	35H	CXA2011-0000-000P00G035H	35F	CXA2011-0000-000P00G035F
		H0	900	1036		CXA2011-0000-000P00H035H		CXA2011-0000-000P00H035F
	3000 K	G0	780	898	30H	CXA2011-0000-000P00G030H	30F	CXA2011-0000-000P00G030F
		H0	900	1036		CXA2011-0000-000P00H030H		CXA2011-0000-000P00H030F
	2700 K	F0	680	783	27H	CXA2011-0000-000P00F027H	27F	CXA2011-0000-000P00F027F
		G0	780	898		CXA2011-0000-000P00G027H		CXA2011-0000-000P00G027F

Color	CCT Range	Minimum Luminous Flux @ 270 mA			Chromaticity Regions	Order Code
		Group	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*		
ANSI White	5000 K	H0	900	1036	3A0, 3B0, 3C0, 3D0	CXA2011-0000-000P00H00E3
		J0	1040	1197		CXA2011-0000-000P00J00E3
	4000 K	G0	780	898	5A0, 5B0, 5C0, 5D0	CXA2011-0000-000P00G00E5
		H0	900	1036		CXA2011-0000-000P00H00E5
	3500 K	G0	780	898	6A0, 6B0, 6C0, 6D0	CXA2011-0000-000P00G00E6
		H0	900	1036		CXA2011-0000-000P00H00E6
	3000 K	G0	780	898	7A0, 7B0, 7C0, 7D0	CXA2011-0000-000P00G00E7
		H0	900	1036		CXA2011-0000-000P00H00E7
	2700 K	F0	680	783	8A0, 8B0, 8C0, 8D0	CXA2011-0000-000P00F00E8
		G0	780	898		CXA2011-0000-000P00G00E8

Notes:

- Cree maintains a tolerance of ±7% on flux and power measurements, ±0.005 on chromaticity (CCx, CCy) measurements and a tolerance of ±2 on CRI measurements. See the Measurements section (page 12).
- Minimum CRI for chromaticity kits 27F, 27H, 30F, 30H, 0E8, 0E7 is 80.
- Minimum CRI for chromaticity kit 35F, 35H, 0E6 is 77 and typical CRI is 80.
- Minimum CRI for chromaticity kits 40F, 40H, 50F, 50H, 0E5, 0E3 is 70 and typical CRI is 75.

* Flux values @ 25 °C are calculated and for reference only.

FLUX CHARACTERISTICS, STANDARD ORDER CODES AND BINS, 90 CRI (I_F= 270 mA, T_J= 85 °C)

The following tables provide order codes for XLamp CXA2011 90 CRI minimum LEDs. For a complete description of the order code nomenclature, please see the Bin and Order Code Formats section (page 11).

Color	CCT Range	Minimum Luminous Flux @ 270 mA			2-Step		4-Step	
		Group	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*	Chromaticity Region	Order Code	Chromaticity Region	Order Code
EasyWhite	3000 K	F0	680	783	30H	CXA2011-0000-000P0UF030H	30F	CXA2011-0000-000P0UF030F
		G0	780	898		CXA2011-0000-000P0UG030H		CXA2011-0000-000P0UG030F
	2700 K	F0	680	783	27H	CXA2011-0000-000P0UF027H	27F	CXA2011-0000-000P0U0F027F

Color	CCT Range	Minimum Luminous Flux @ 270 mA, 85 °C			Chromaticity Regions	Order Code
		Group	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*		
ANSI White	3000 K	F0	680	783	7A0, 7B0, 7C0, 7D0	CXA2011-0000-000P0UF00E7
		G0	780	898		CXA2011-0000-000P0UG00E7
	2700 K	F0	680	783	8A0, 8B0, 8C0, 8D0	CXA2011-0000-000P0UF00E8

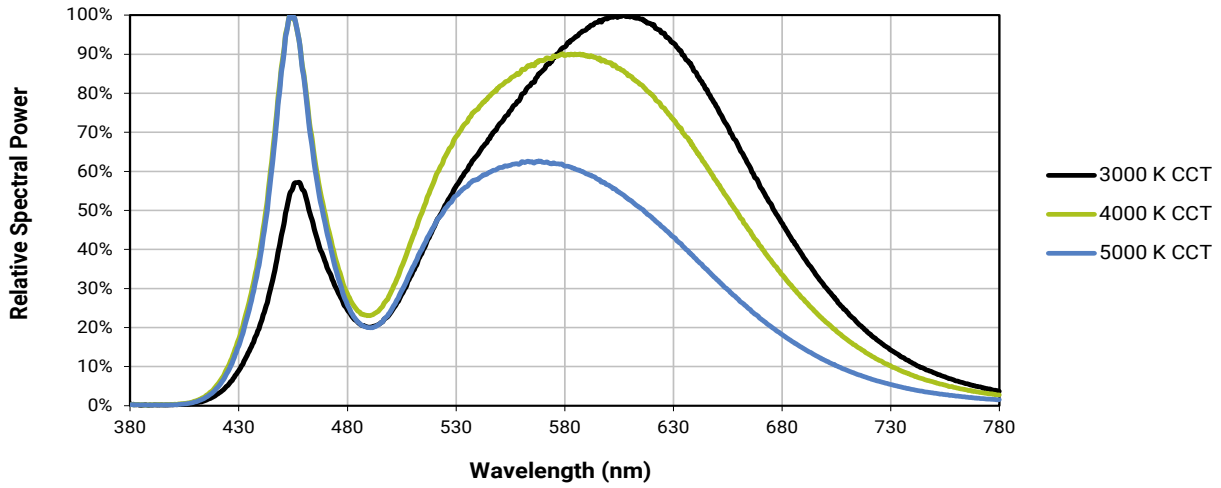
Notes:

- Cree maintains a tolerance of ±7% on flux and power measurements, ±0.005 on chromaticity (CCx, CCy) measurements and a tolerance of ±2 on CRI measurements. See the Measurements section (page 12).
- Minimum CRI for chromaticity kits 30H, 30F, 27H, 27F, 0E7, 0E8 is 90.

* Flux values @ 25 °C are calculated and for reference only.

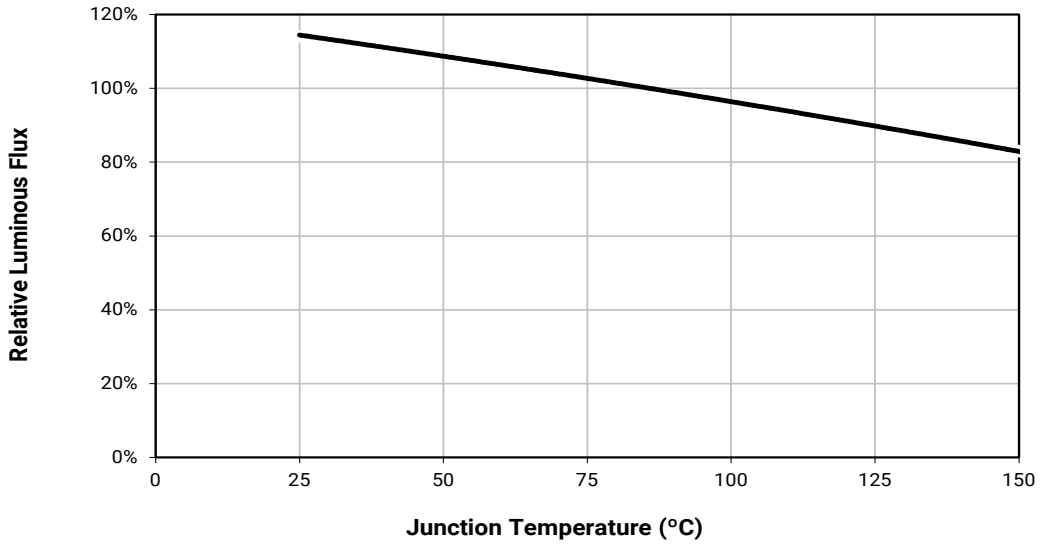
RELATIVE SPECTRAL POWER DISTRIBUTION (I_F = 270 mA, T_J= 85 °C)

The following graph represents typical spectral emission of standard CRI XLamp CXA2011 LEDs.



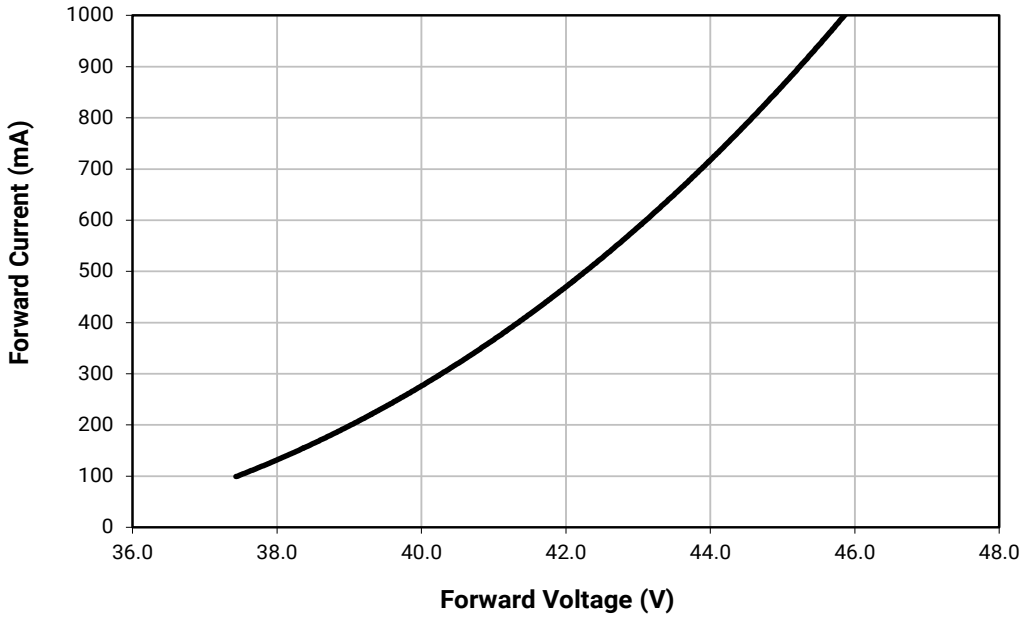
RELATIVE LUMINOUS FLUX VS. JUNCTION TEMPERATURE (I_F = 270 mA)

The following graph represents typical performance of the XLamp CXA2011 LED.



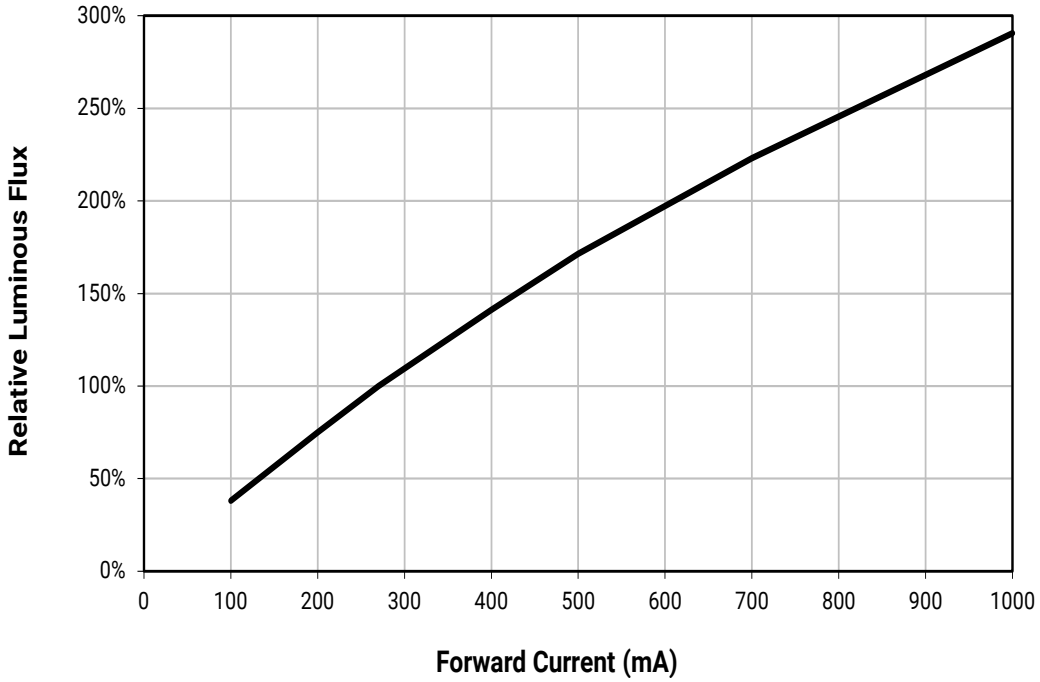
ELECTRICAL CHARACTERISTICS (T_J = 85 °C)

The following graph represents typical electrical characteristics of the XLamp CXA2011 LED.



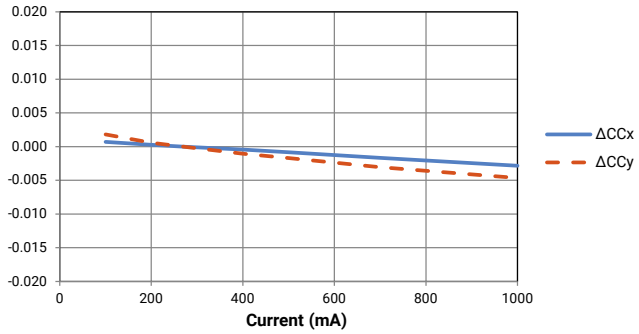
RELATIVE LUMINOUS FLUX VS. CURRENT (T_J = 85 °C)

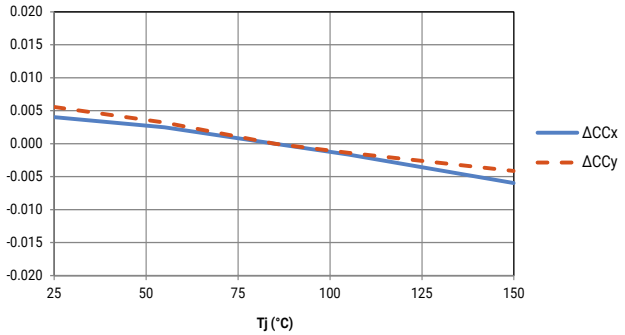
The following graph represents typical performance of the XLamp CXA2011 LED.



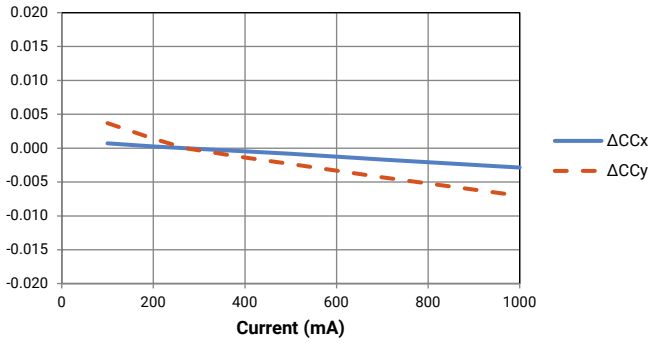
RELATIVE CHROMATICITY VS. CURRENT AND TEMPERATURE

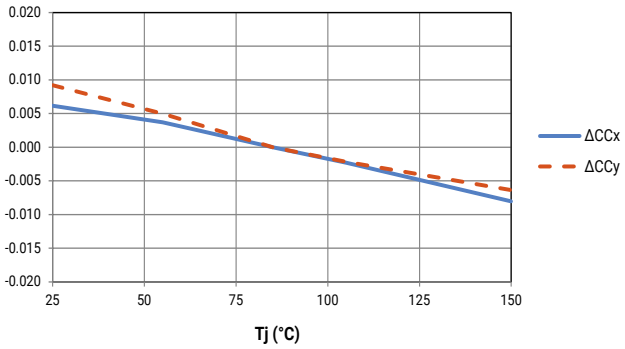
The following graphs represent typical chromaticity vs. current and temperature for the standard CRI version of the XLamp CXA2011 LED at 3000 K CCT.





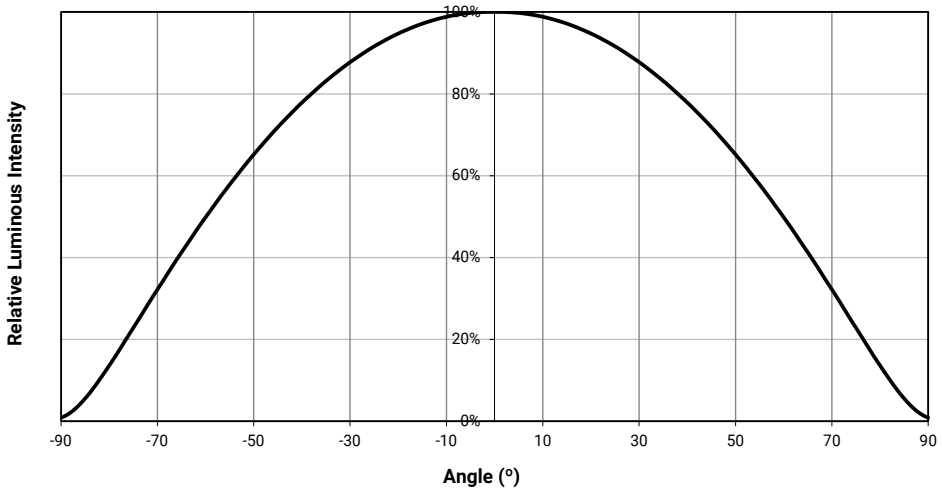
The following graphs represent typical chromaticity vs. current and temperature for the XLamp CXA2011 LED at 5000 K CCT.





TYPICAL SPATIAL DISTRIBUTION

The following graph represents the typical spatial distribution of the XLamp CXA2011 LED.



PERFORMANCE GROUPS - BRIGHTNESS (I_F = 270 mA, T_J = 85 °C)

XLamp CXA2011 LEDs are tested for luminous flux and placed into one of the following bins.

Group Code	Minimum Luminous Flux @ 270 mA, Tj= 85 °C	Maximum Luminous Flux @ 270 mA, Tj= 85 °C
E0	590	680
F0	680	780
G0	780	900
H0	900	1040
J0	1040	1200
K0	1200	1380

PERFORMANCE GROUPS - CHROMATICITY (T_J = 85 °C)

XLamp CXA2011 LEDs are tested for chromaticity and placed into one of the regions defined by the following bounding coordinates.

EasyWhite Color Temperatures – 4-Step			
Code	CCT	x	y
50F	5000 K	0.3407	0.3459
		0.3415	0.3586
		0.3499	0.3654
		0.3484	0.3521
40F	4000 K	0.3744	0.3685
		0.3782	0.3837
		0.3912	0.3917
		0.3863	0.3758
35F	3500 K	0.3981	0.3800
		0.4040	0.3966
		0.4186	0.4037
		0.4116	0.3865
30F	3000 K	0.4242	0.3919
		0.4322	0.4096
		0.4449	0.4141
		0.4359	0.3960
27F	2700 K	0.4475	0.3994
		0.4573	0.4178
		0.4695	0.4207
		0.4589	0.4021

EasyWhite Color Temperatures – 2-Step			
Code	CCT	x	y
50H	5000 K	0.3429	0.3507
		0.3434	0.3571
		0.3475	0.3604
		0.3469	0.3539
40H	4000 K	0.3784	0.3741
		0.3804	0.3818
		0.3867	0.3857
		0.3844	0.3778
35H	3500 K	0.4030	0.3857
		0.4061	0.3941
		0.4132	0.3976
		0.4099	0.3890
30H	3000 K	0.4291	0.3973
		0.4333	0.4062
		0.4395	0.4084
		0.4351	0.3994
27H	2700 K	0.4528	0.4046
		0.4578	0.4138
		0.4638	0.4152
		0.4586	0.4060

ANSI White Bins				
Code	CCT	Bin Code	x	y
0E3	5000 K	3A0	.3371	.3490
			.3451	.3554
			.3440	.3427
			.3366	.3369
		3B0	.3376	.3616
			.3463	.3687
			.3451	.3554
			.3371	.3490
		3C0	.3463	.3687
			.3551	.3760
			.3533	.3620
			.3451	.3554
		3D0	.3451	.3554
			.3533	.3620
			.3515	.3487
			.3440	.3427

ANSI White Bins				
Code	CCT	Bin Code	x	y
0E5	4000 K	5A0	.3670	.3578
			.3702	.3722
			.3825	.3798
			.3783	.3646
		5B0	.3702	.3722
			.3736	.3874
			.3869	.3958
			.3825	.3798
		5C0	.3825	.3798
			.3869	.3958
			.4006	.4044
			.3950	.3875
		5D0	.3783	.3646
			.3825	.3798
			.3950	.3875
			.3898	.3716

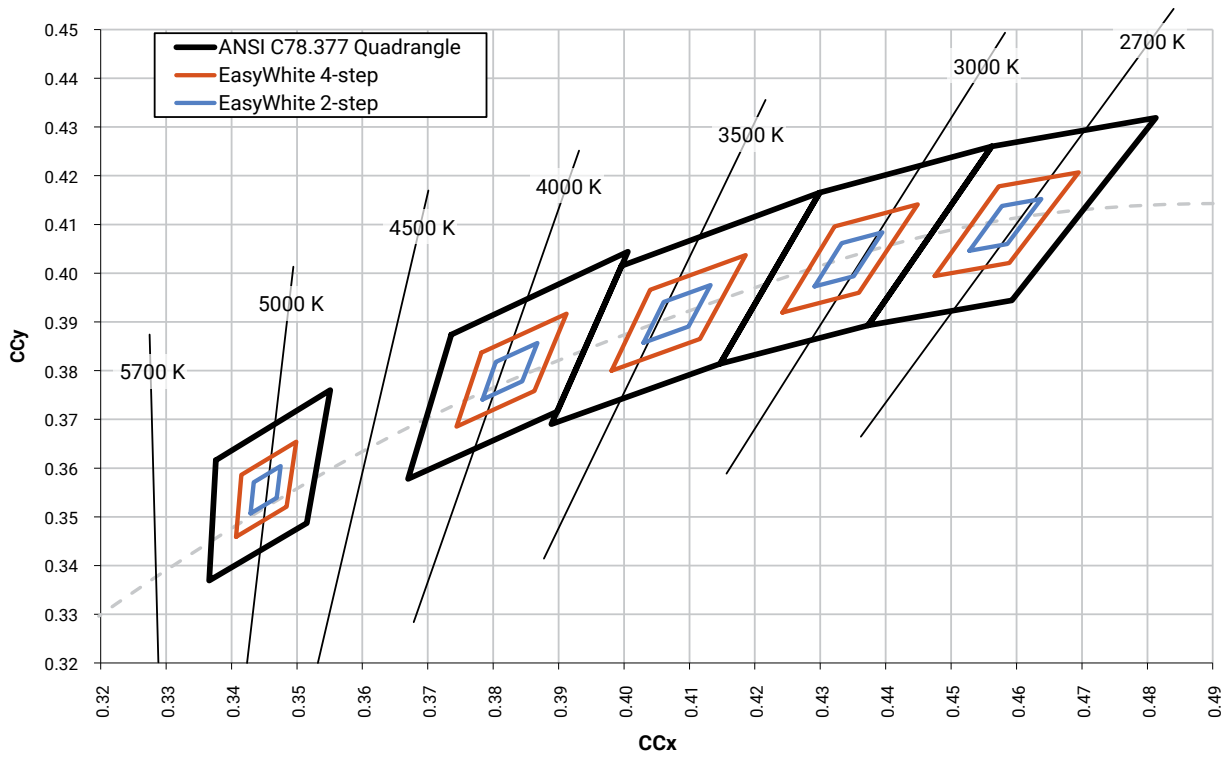
ANSI White Bins				
Code	CCT	Bin Code	x	y
0E6	3500 K	6A0	.3889	.3690
			.3941	.3848
			.4080	.3916
			.4017	.3751
		6B0	.3941	.3848
			.3996	.4015
			.4146	.4089
			.4080	.3916
		6C0	.4080	.3916
			.4146	.4089
			.4299	.4165
			.4221	.3984
		6D0	.4017	.3751
			.4080	.3916
			.4221	.3984
			.4147	.3814

PERFORMANCE GROUPS - CHROMATICITY (TJ = 85 °C) - CONTNUED

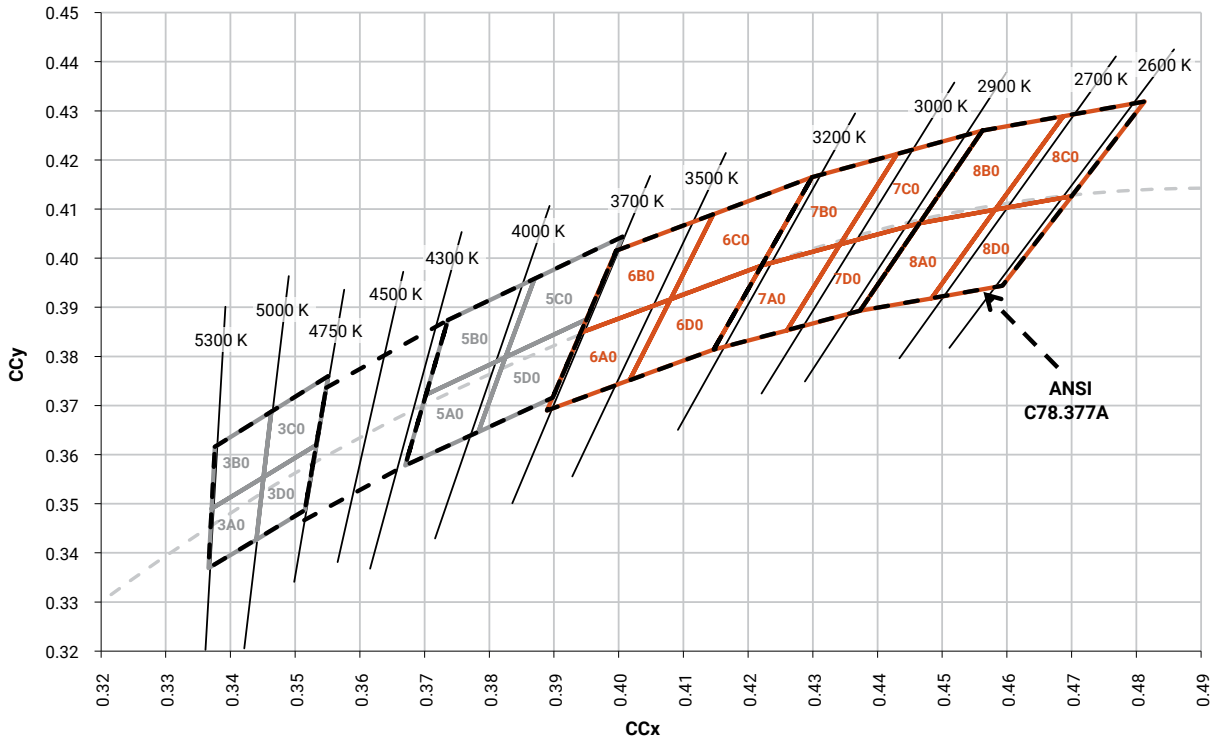
ANSI White Bins				
Code	CCT	Bin Code	x	y
0E7	3000 K	7A0	.4147	.3814
			.4221	.3984
			.4342	.4028
			.4259	.3853
		7B0	.4221	.3984
			.4299	.4165
			.4430	.4212
			.4342	.4028
		7C0	.4342	.4028
			.4430	.4212
			.4562	.4260
			.4465	.4071
		7D0	.4259	.3853
			.4342	.4028
			.4465	.4071
			.4373	.3893

ANSI White Bins				
Code	CCT	Bin Code	x	y
0E8	2700 K	8A0	.4373	.3893
			.4465	.4071
			.4582	.4099
			.4483	.3919
		8B0	.4465	.4071
			.4562	.4260
			.4687	.4289
			.4582	.4099
		8C0	.4582	.4099
			.4687	.4289
			.4813	.4319
			.4700	.4126
		8D0	.4483	.3919
			.4582	.4099
			.4700	.4126
			.4593	.3944

CREE EASYWHITE® BINS PLOTTED ON THE 1931 CIE COLOR SPACE (T_J = 85 °C)

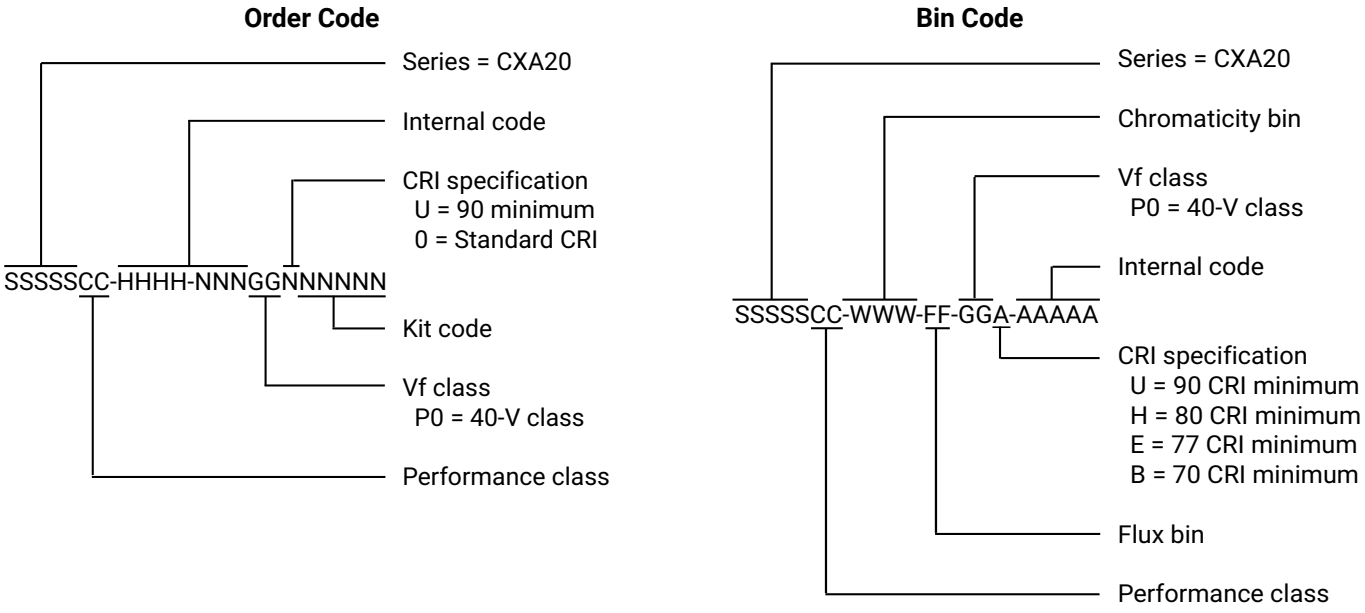


CREE ANSI WHITE BINS PLOTTED ON THE 1931 CIE COLOR SPACE (T_J = 85 °C)



BIN AND ORDER CODE FORMATS

Bin codes and order codes are configured as follows:



NOTES

Measurements

The luminous flux, radiant power, chromaticity 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'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 as specifications.

Pre-Release Qualification Testing

Please read the LED Reliability Overview for details of the qualification process Cree applies to ensure long-term reliability for XLamp LEDs and details of Cree's pre-release qualification testing for XLamp LEDs.

Lumen Maintenance

Cree now 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 LM-80 results document.

Please read the Long-Term Lumen Maintenance application note for more details on Cree's lumen maintenance testing and forecasting. Please read the Thermal Management application note for details on how thermal design, ambient temperature, and drive current affect the LED junction temperature.

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 representative or from the Product Ecology section of www.cree.com.

REACh Compliance

REACh substances of very high concern (SVHCs) information is available for this product. Since the European Chemical Agency (ECHA) has published notices of their intent to frequently revise the SVHC listing for the foreseeable future, please contact a Cree representative to insure you get the most up-to-date REACh Declaration. Historical REACh banned substance information (substances restricted or banned in the EU prior to 2010) is also available upon request.

UL® Recognized Component

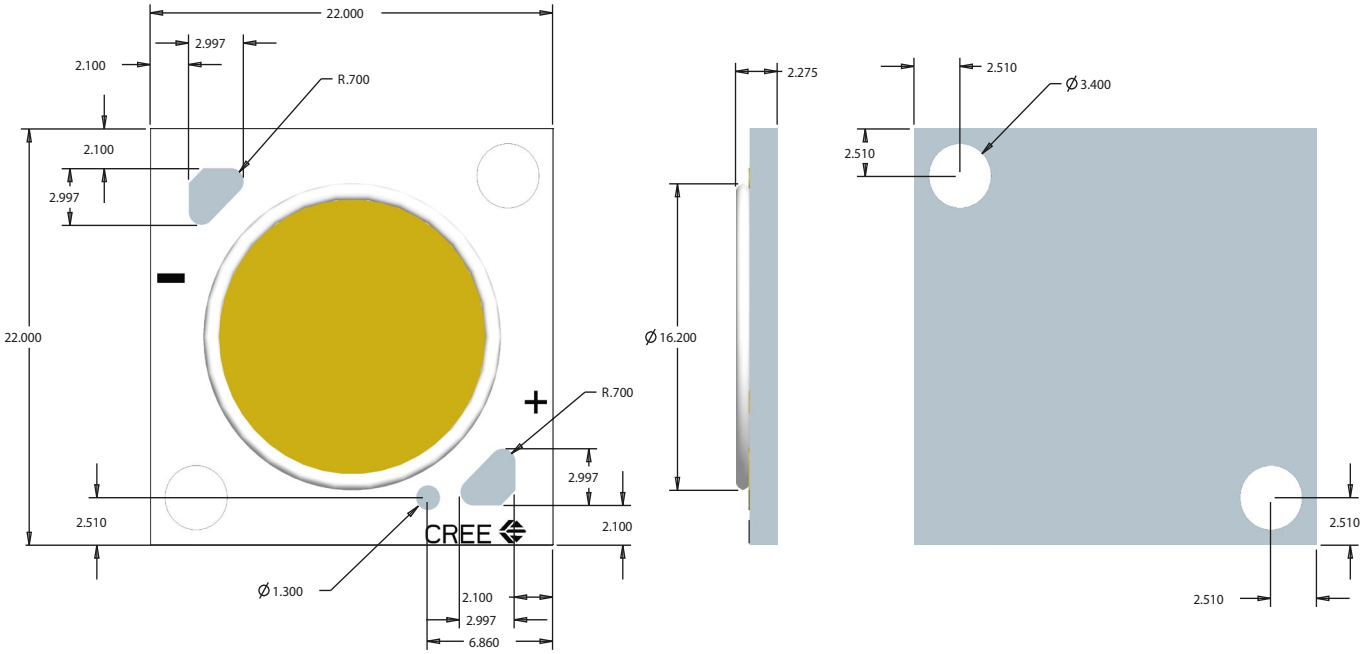
Level 4 enclosure consideration. The LED package or a portion thereof has been investigated as a fire and electrical enclosure per ANSI/UL 8750.

Vision Advisory

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

MECHANICAL DIMENSIONS

All measurements are ±.13 mm unless otherwise indicated.



PACKAGING

Cree CXA2011 LEDs are packaged in tubes of 20, which are then combined in boxes of 5 tubes, or 100 LEDs. Boxes of 100 LEDs are of the same performance bin.