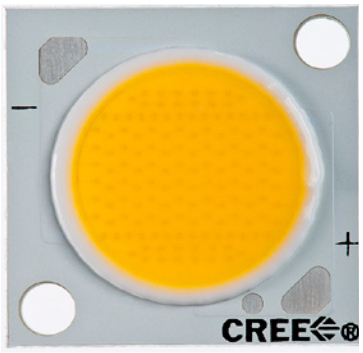
Cree® XLamp® CXA2011 LED



PRODUCT DESCRIPTION

The Cree XLamp CXA2011 LED brings lighting-class reliability and performance to easy-to-use LED arrays. The XLamp CXA2011 expands Cree's lighting-class leadership to multi-die, high-flux arrays. With XLamp 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 2700K, 3000K, 3500K, 4000K and 5000K CCT
- 90 minimum CRI available in 2700K and 3000K 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)

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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 reference Bin and Order Code Formats (page 11).

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

Color	CCT Range	Base Order Codes Min. Luminous Flux @ 270 mA			Chromaticity Regions	Order Code
		Group	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*		
ANSI White	5000K	H0	900	1036	3A0, 3B0, 3C0, 3D0	CXA2011-0000-000P00H00E3
		J0	1040	1197		CXA2011-0000-000P00J00E3
	4000K	G0	780	898	5A0, 5B0, 5C0, 5D0	CXA2011-0000-000P00G00E5
		H0	900	1036		CXA2011-0000-000P00H00E5
	3500K	G0	780	898	6A0, 6B0, 6C0, 6D0	CXA2011-0000-000P00G00E6
		H0	900	1036		CXA2011-0000-000P00H00E6
	3000K	G0	780	898	7A0, 7B0, 7C0, 7D0	CXA2011-0000-000P00G00E7
		H0	900	1036		CXA2011-0000-000P00H00E7
	2700K	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.
- 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 reference Bin and Order Code Formats (page 11).

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

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

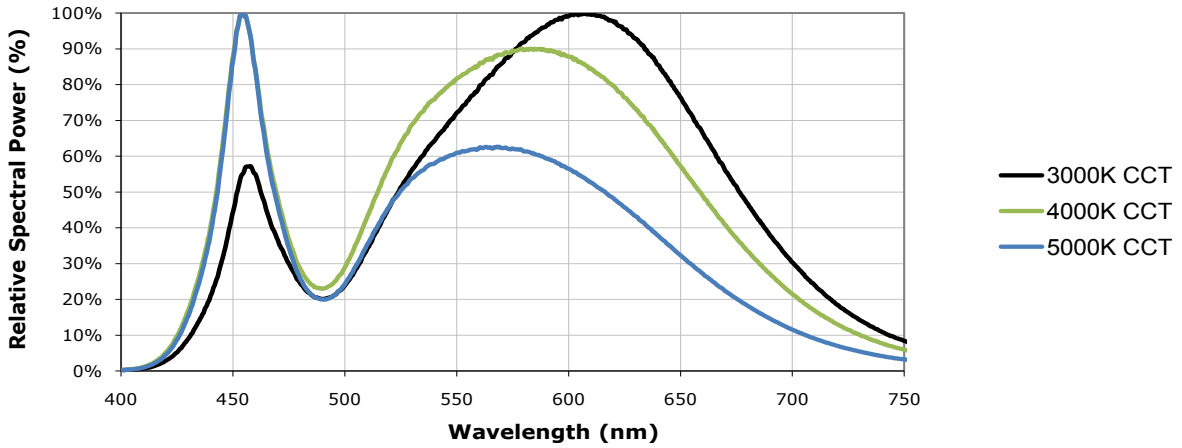
Notes:

- 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.
- Minimum CRI for chromaticity kits 30H, 30F, 27H, 27F, 0E7, 0E8 is 90.

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

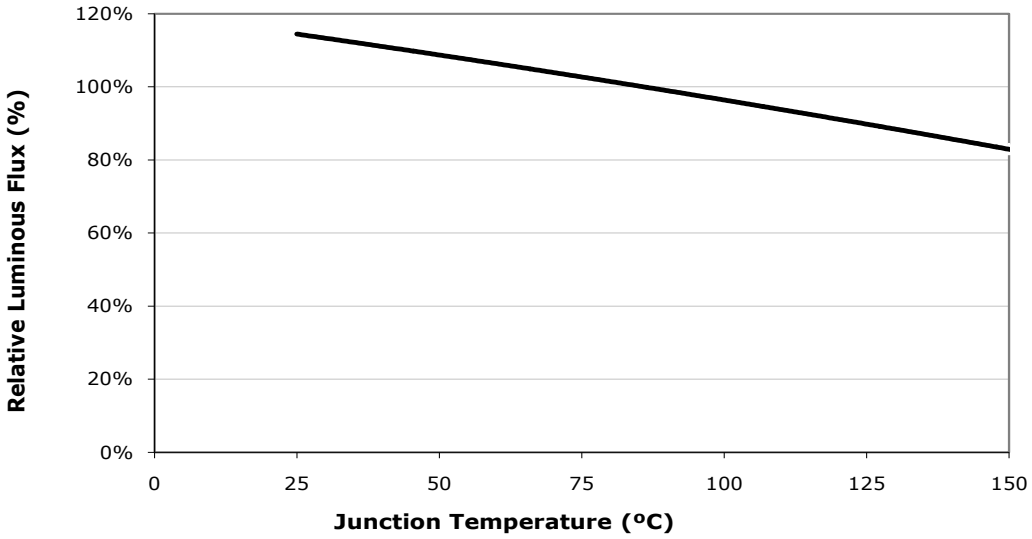
RELATIVE SPECTRAL POWER DISTRIBUTION (I_F = 270 mA, T_J= 85 °C)

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



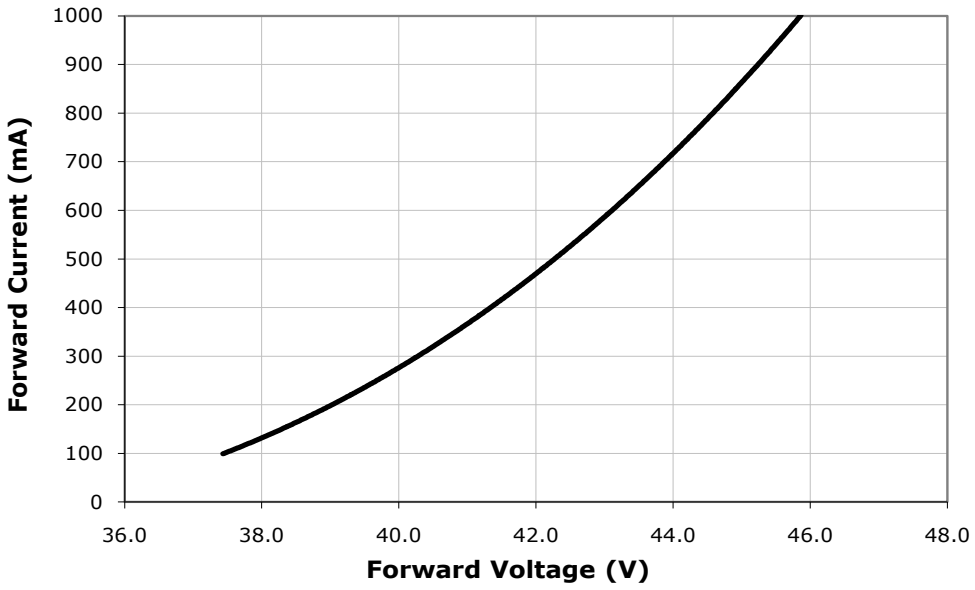
RELATIVE LUMINOUS FLUX VS. JUNCTION TEMPERATURE (I_F = 270 mA)

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



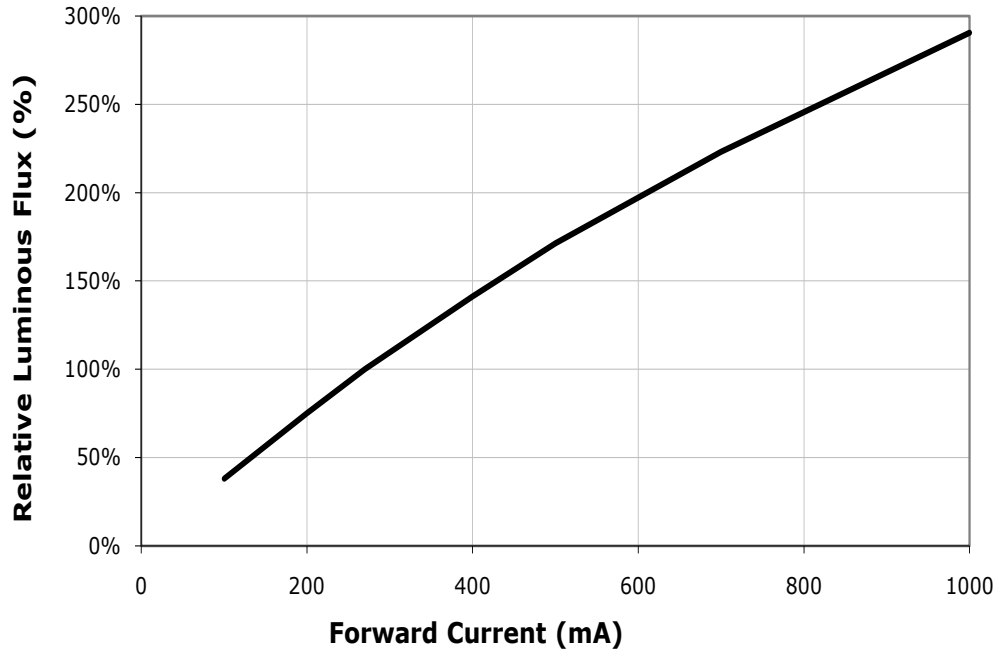
ELECTRICAL CHARACTERISTICS (T_J = 85 °C)

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



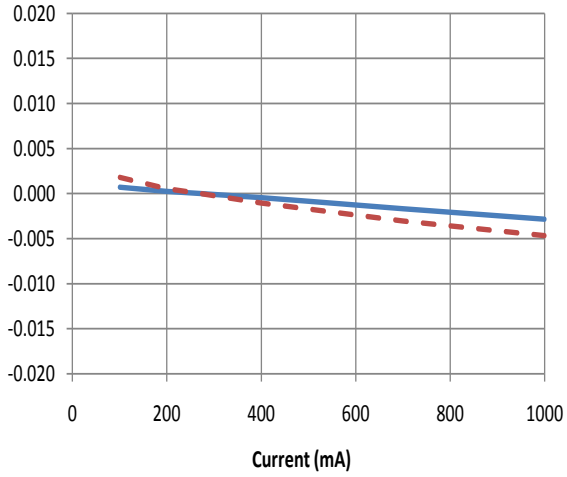
RELATIVE LUMINOUS FLUX VS. CURRENT (T_J = 85 °C)

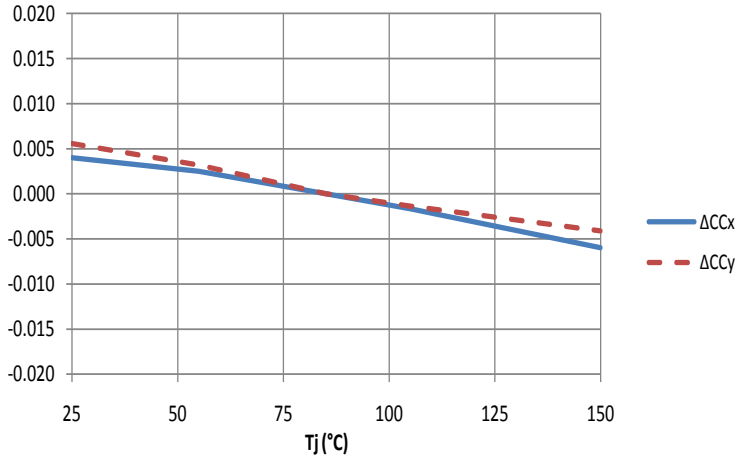
The following graph represents typical performance of the XLamp CXA2011 LED.



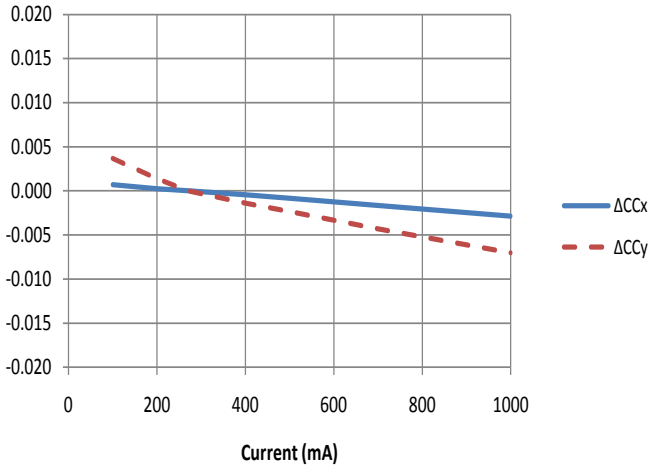
RELATIVE CHROMATICITY VS. CURRENT AND TEMPERATURE

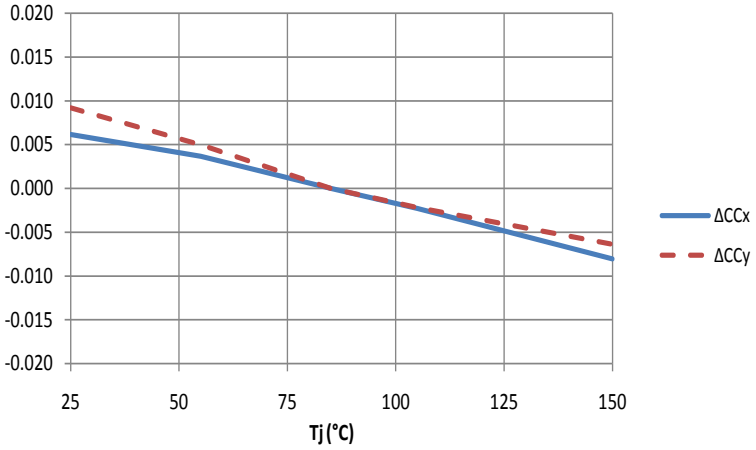
The following graphs represent typical chromaticity vs current and temperature for the standard CRI version of the XLamp CXA2011 at **3000K** CCT.





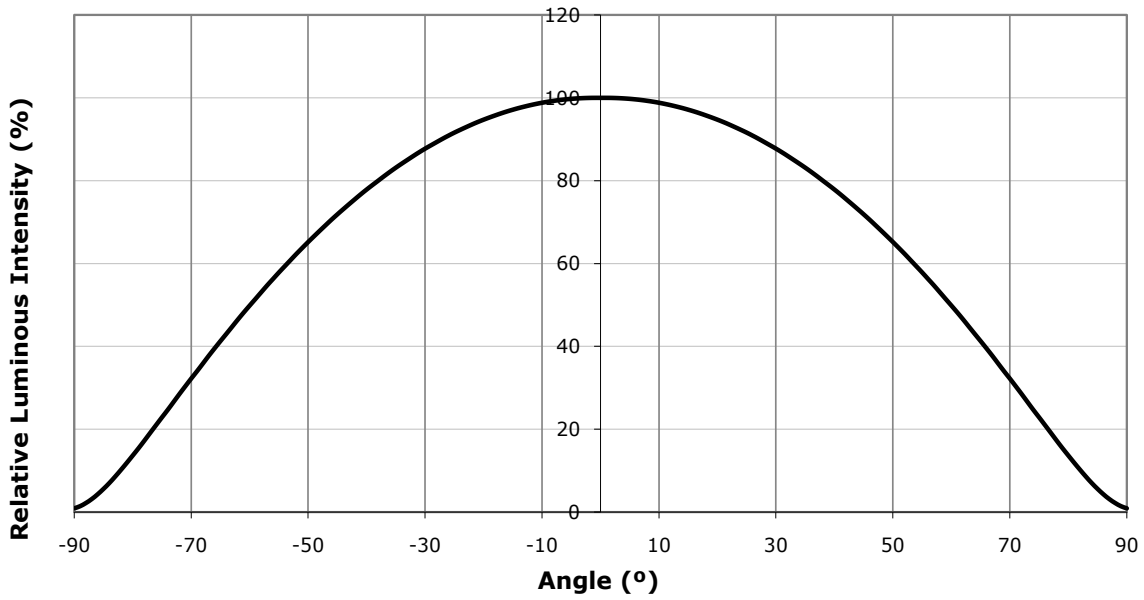
The following graphs represent typical chromaticity vs current and temperature for the XLamp CXA2011 at **5000K** CCT.





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	Min. Luminous Flux @ 270 mA, T_j= 85 °C	Max. Luminous Flux @ 270 mA, T_j= 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	5000K	0.3407	0.3459
		0.3415	0.3586
		0.3499	0.3654
		0.3484	0.3521
40F	4000K	0.3744	0.3685
		0.3782	0.3837
		0.3912	0.3917
		0.3863	0.3758
35F	3500K	0.3981	0.3800
		0.4040	0.3966
		0.4186	0.4037
		0.4116	0.3865
30F	3000K	0.4242	0.3919
		0.4322	0.4096
		0.4449	0.4141
		0.4359	0.3960
27F	2700K	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	5000K	0.3429	0.3507
		0.3434	0.3571
		0.3475	0.3604
		0.3469	0.3539
40H	4000K	0.3784	0.3741
		0.3804	0.3818
		0.3867	0.3857
		0.3844	0.3778
35H	3500K	0.4030	0.3857
		0.4061	0.3941
		0.4132	0.3976
		0.4099	0.3890
30H	3000K	0.4291	0.3973
		0.4333	0.4062
		0.4395	0.4084
		0.4351	0.3994
27H	2700K	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	5000K	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

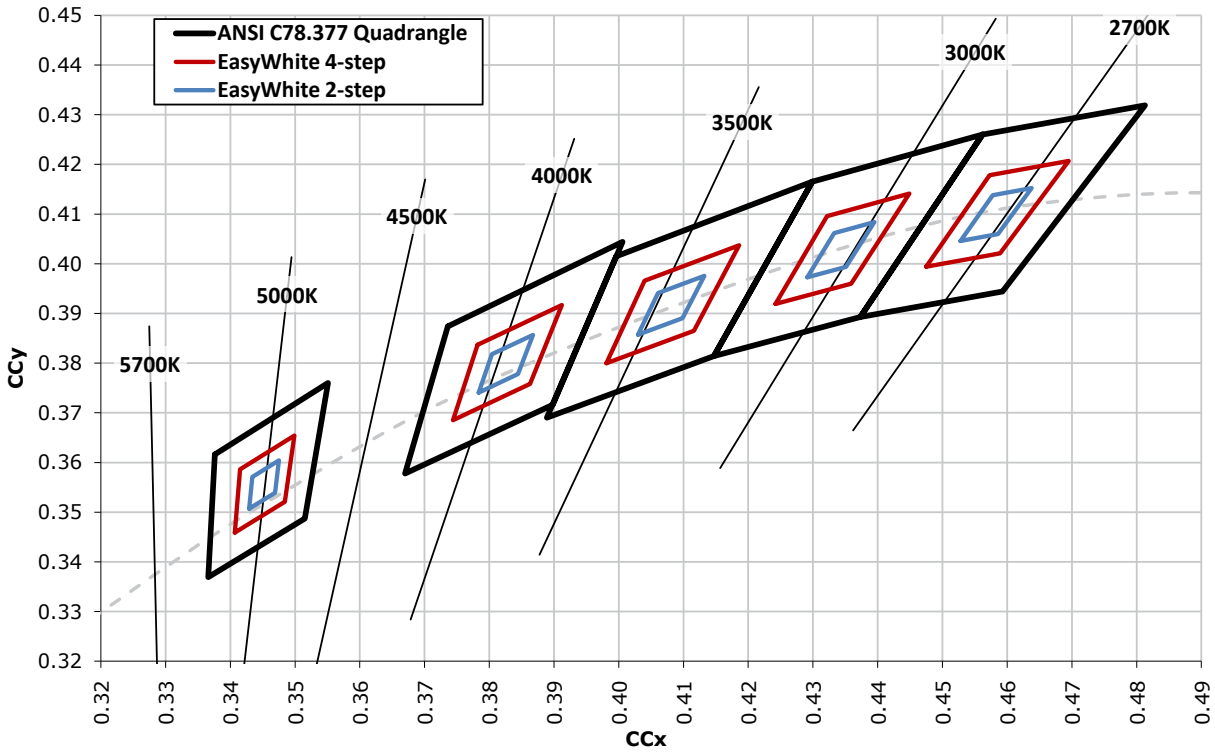
ANSI White Bins				
Code	CCT	Bin Code	x	y
0E5	4000K	5A0	.3670	.3578
			.3702	.3722
			.3825	.3798
			.3783	.3646
		5B0	.3702	.3722
			.3736	.3874
			.3869	.3958
			.3825	.3798
		5C0	.3825	.3798
			.3869	.3958
			.4006	.4044
			.3950	.3875
		5D0	.3783	.3646
			.3825	.3798
			.3950	.3875
			.3898	.3716

ANSI White Bins				
Code	CCT	Bin Code	x	y
0E6	3500K	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

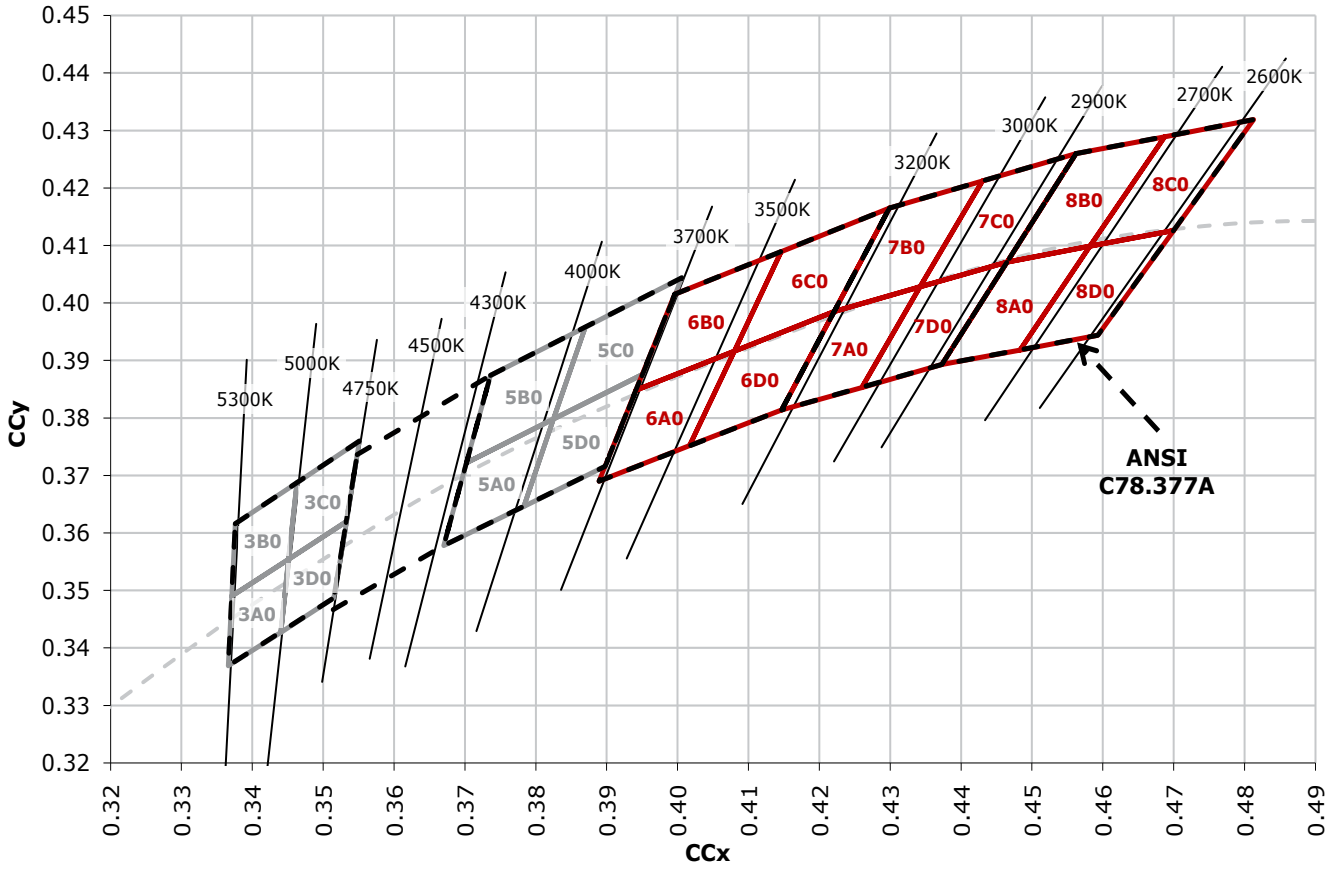
ANSI White Bins				
Code	CCT	Bin Code	x	y
0E7	3000K	7A0	.4147	.3814
			.4221	.3984
			.4342	.4028
			.4259	.3853
		7B0	.4221	.3984
			.4299	.4165
			.4430	.4212
			.4342	.4028
		7C0	.4342	.4028
			.4430	.4212
			.4562	.4260
			.4465	.4071
		7D0	.4259	.3853
			.4342	.4028
			.4465	.4071
			.4373	.3893

ANSI White Bins				
Code	CCT	Bin Code	x	y
0E8	2700K	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:

Order Code

SSSSSCC-HHHH-NNNGGNNNNNN

- Series = CXA20
- Internal code
- CRI Specification
  - U = 90 minimum
  - 0 = standard CRI
- Kit code
- Vf class: P0 = 40-V class
- Performance class

Bin Code

SSSSSCC-WWW-FF-GGA-AAAAA

- Series = CXA20
- Chromaticity bin
- Vf class: P0 = 40-V class
- Internal code
- CRI specification
  - U = 90 CRI minimum
  - H = 80 CRI minimum
  - E = 77 CRI minimum
  - B = 70 CRI minimum
- Flux bin
- Performance class

NOTES

Lumen Maintenance Projections

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 at www.cree.com/xlamp_app_notes/LM80_results.

Please read the XLamp Long-Term Lumen Maintenance application note at www.cree.com/xlamp_app_notes/lumen_maintenance for more details on Cree's lumen maintenance testing and forecasting. Please read the XLamp Thermal Management application note at www.cree.com/xlamp_app_notes/thermal_management 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 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.

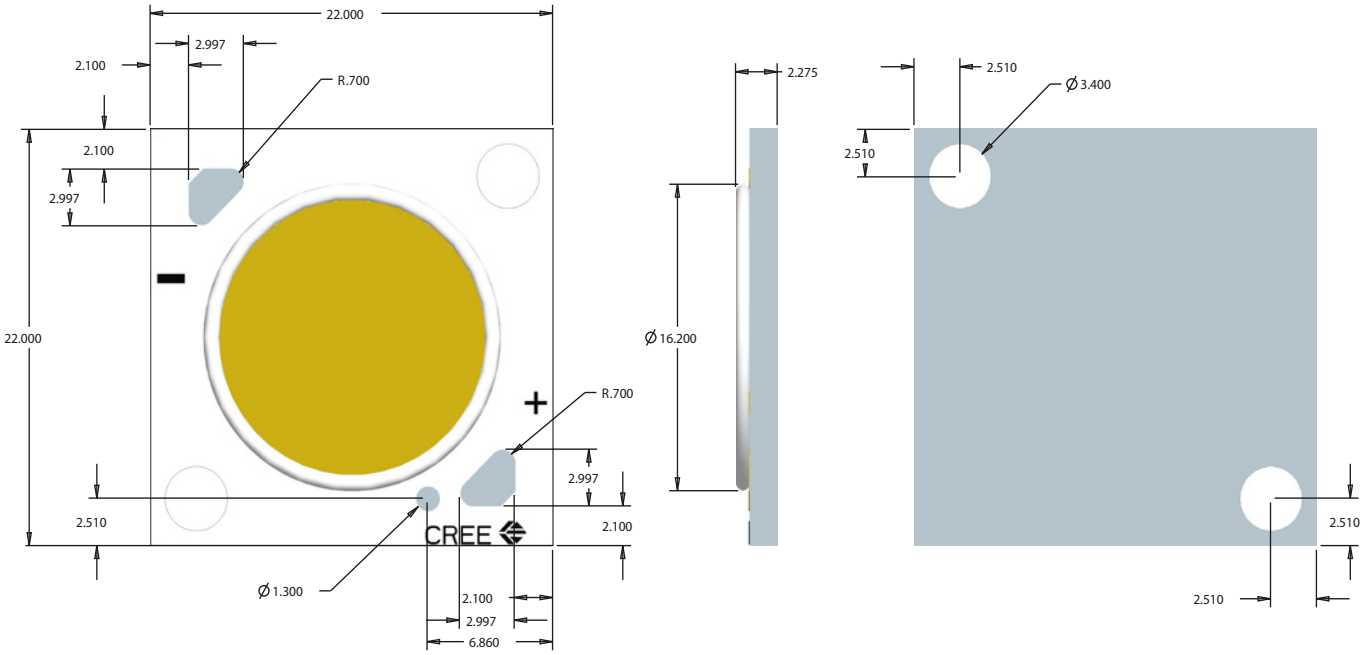
UL Recognized Component

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 Claim

Users should be cautioned not to stare at the light of this LED product. The bright light can damage the eye. See the LED Eye Safety aplication note at www.cree.com/xlamp_app_notes/led_eye_safety.

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.