

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 2,700K, 3,000K, 3,500K, 4,000K 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
- RoHS and REACH-compliant
- Unlimited shelf life at ≤ 30°C/85% RH

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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 classification (HBM per Mil-Std-883D)			Class 2	
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 ($I_F = 270 \text{ MA}, T_J = 85 \degree \text{C}$)

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 (p. 10).

Color	сст	Min Lumin	ler Codes ous Flux @ A, 85° C	2.	-Step Order Code	4-Step Order Code			
	Range	Group	Flux (lm)	Chromaticity Region		Chromaticity Region			
	5000K	H0	900	50H	CXA2011-0000-000P00H050H	505	CXA2011-0000-000P00H050F		
	JUUUK	30	1040	JUH	CXA2011-0000-000P00J050H	50F	CXA2011-0000-000P00J050F		
	4000K	G0	780	40H	CXA2011-0000-000P00G040H	40F	CXA2011-0000-000P00G040F		
		H0	900	4011	CXA2011-0000-000P00H040H	401	CXA2011-0000-000P00H040F		
EasyWhite	3500K	G0	780	35H	CXA2011-0000-000P00G035H	35F	CXA2011-0000-000P00G035F		
Lasywhite	22004	H0	900	2211	CXA2011-0000-000P00H035H	221	CXA2011-0000-000P00H035F		
	3000K	G0	780	30H	CXA2011-0000-000P00G030H	30F	CXA2011-0000-000P00G030F		
	2000K	H0	900	5011	CXA2011-0000-000P00H030H	50F	CXA2011-0000-000P00H030F		
	27004	F0	680	27H	CXA2011-0000-000P00F027H	27F	CXA2011-0000-000P00F027F		
	2700K	G0	780	2/П	CXA2011-0000-000P00G027H	275	CXA2011-0000-000P00G027F		

Notes:

- Cree maintains a tolerance of $\pm 7\%$ on flux and power 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



Color	CCT Range	(0) 2/0 mA 85 °C		Chromaticity Regions	Order Code
		Group	Flux (lm)		
	5000K	H0	900	240 280 200 200	CXA2011-0000-000P00H00E3
	JUUUK	JO	1040	3A0, 3B0, 3C0, 3D0	CXA2011-0000-000P00J00E3
	4000K	G0	780	5A0, 5B0, 5C0, 5D0	CXA2011-0000-000P00G00E5
		H0	900	JAU, JBU, JCU, JDU	CXA2011-0000-000P00H00E5
ANSI White	3500K	G0	780	6A0, 6B0, 6C0, 6D0	CXA2011-0000-000P00G00E6
ANSI WIILE	3300K	H0	900	040, 080, 000, 000	CXA2011-0000-000P00H00E6
	3000K	G0	780	7A0, 7B0, 7C0, 7D0	CXA2011-0000-000P00G00E7
	JUUK	H0	900	7A0, 7B0, 7C0, 7D0	CXA2011-0000-000P00H00E7
	2700K	F0	680		CXA2011-0000-000P00F00E8
	2700K	G0	780	8A0, 8B0, 8C0, 8D0	CXA2011-0000-000P00G00E8

Notes:

- Cree maintains a tolerance of $\pm 7\%$ on flux and power 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 CHARACTERISTICS, STANDARD ORDER CODES AND BINS, 90 CRI (I_{z} =270 MA, T_{1} =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 (p. 10).

Color	CCT Range	Min Lumi	ler Codes nous Flux 1 A, 85° C	2	-Step Order Code	4-Step Order Code		
Kang	Kange	Group	Flux (lm)	Chromaticity Region		Chromaticity Region		
	3000K	F0	680	30H	CXA2011-0000-000P0UF030H	30F	CXA2011-0000-000P0UF030F	
EasyWhite	3000K	G0	780		CXA2011-0000-000P0UG030H	306	CXA2011-0000-000P0UG030F	
	2700K	F0	680	27H	CXA2011-0000-000P0UF027H	27F	CXA2011-0000-000P0U0F027F	

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

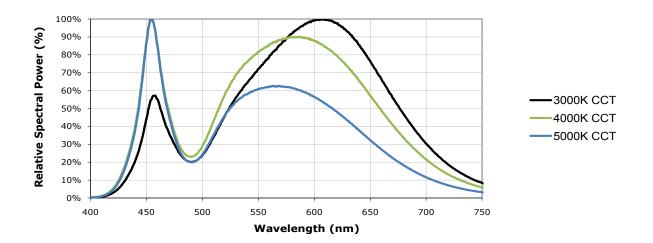
Notes:

- Cree maintains a tolerance of $\pm 7\%$ on flux and power measurements and a tolerance of ± 2 on CRI measurements.
- Minimum CRI for chromaticity kits 30H, 30F, 27H, 27F, 0E7, 0E8 is 90.



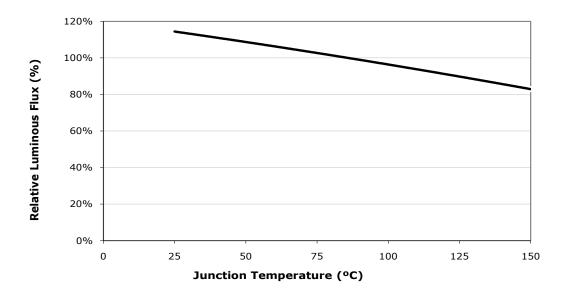
RELATIVE SPECTRAL POWER DISTRIBUTION (I_F=270 MA, T₁=85°C)

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



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

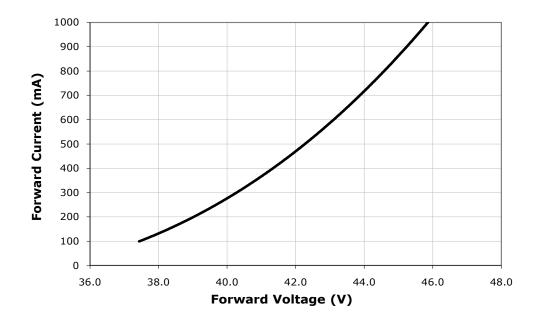
The following graph represents typical performance of the XLamp CXA2011 LED.





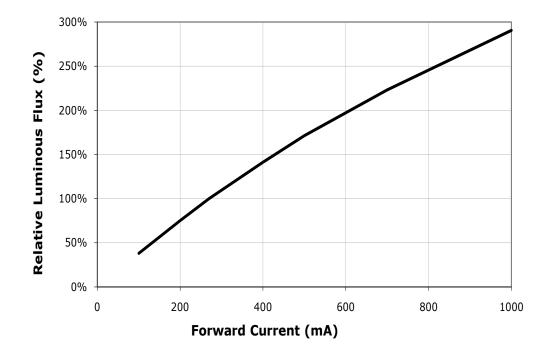
ELECTRICAL CHARACTERISTICS (T, =85°C)

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



RELATIVE LUMINOUS FLUX VS. CURRENT (T₁=85°C)

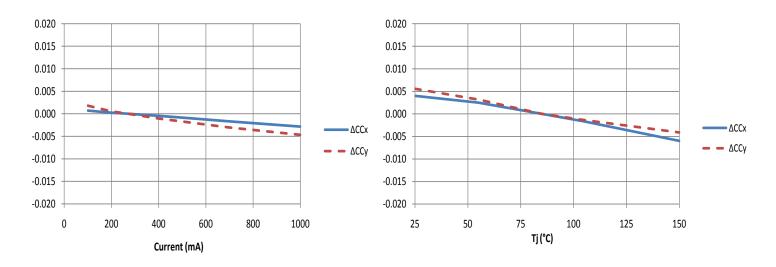
The following graph represents typical performance of the XLamp CXA2011 LED.



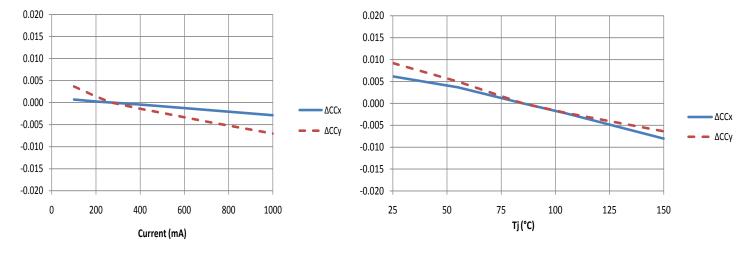


RELATIVE CHROMATICITY VS. CURRENT AND TEMPERATURE

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



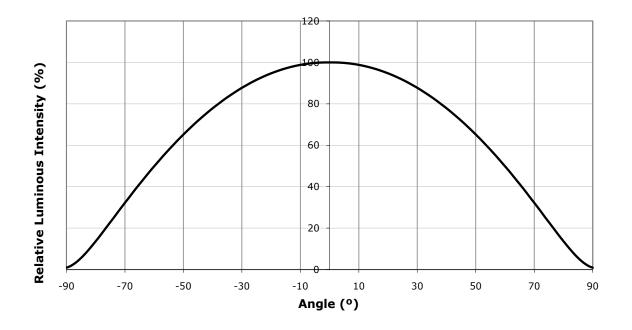
The following graphs represent typical chromaticity vs current and temperature for the XLamp CXA2011 at 5000K CCT





TYPICAL SPATIAL DISTRIBUTION

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



PERFORMANCE GROUPS - BRIGHTNESS ($I_F = 270 \text{ MA}, T_J = 85^{\circ}\text{C}$)

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

Group Code	Min. Luminous Flux ($@ 270 \text{ mA}, \text{ T}_{j}=85^{\circ}\text{C}$	Max. Luminous Flux @ 270 mA, T _j =85°C
EO	590	680
FO	680	780
G0	780	900
HO	900	1040
JO	1040	1200
К0	1200	1380



PERFORMANCE GROUPS - CHROMATICITY (T,=85°C)

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

EasyWhi	te Color Ter	mperatures	– 4-Step
Code	ССТ	x	у
		0.3407	0.3459
FOF	50001/	0.3415	0.3586
50F	5000K	0.3499	0.3654
		0.3484	0.3521
		0.3744	0.3685
40F	4000K	0.3782	0.3837
406	4000K	0.3912	0.3917
		0.3863	0.3758
	3500K	0.3981	0.3800
35F		0.4040	0.3966
225		0.4186	0.4037
		0.4116	0.3865
		0.4242	0.3919
30F	3000K	0.4322	0.4096
306	3000K	0.4449	0.4141
		0.4359	0.3960
		0.4475	0.3994
27F	2700K	0.4573	0.4178
275	2700K	0.4695	0.4207
		0.4586	0.4060

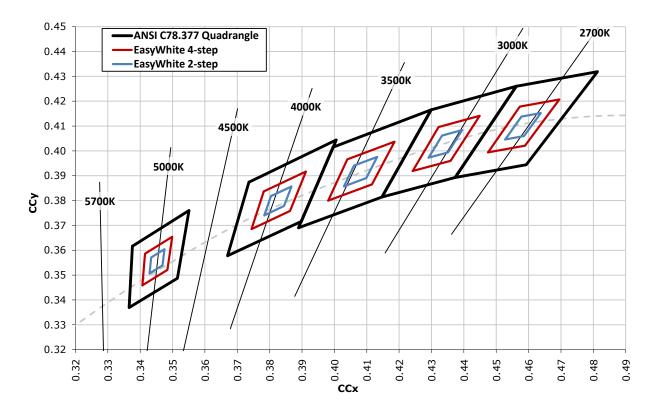
EasyWhite Color Temperatures – 2-Step									
Code	ССТ	x	у						
		0.3429	0.3507						
50H	5000K	0.3434	0.3571						
501	5000K	0.3475	0.3604						
		0.3469	0.3539						
		0.3784	0.3741						
40H	4000K	0.3804	0.3818						
400	4000K	0.3867	0.3857						
		0.3844	0.3778						
		0.4030	0.3857						
35H	3500K	0.4061	0.3941						
5511	22004	0.4132	0.3976						
		0.4099	0.3890						
		0.4291	0.3973						
30H	3000K	0.4333	0.4062						
5011	2000K	0.4395	0.4084						
		0.4351	0.3994						
		0.4528	0.4046						
27H	2700K	0.4578	0.4138						
2/П	2700K	0.4638	0.4152						
		0.4586	0.4060						

ANSI White Bins					ANSI White Bins				ANSI White Bins												
Code	ССТ	Bin Code	x	У	Code	ССТ	Bin Code	x	У	Code	ССТ	Bin Code	x	У							
			.3371	.3490				.3670	.3578			640	.3889	.3690							
		3A0	.3451	.3554			5A0	.3702	.3722				.3941	.3848							
		SAU	.3440	.3427			JAU	.3825	.3798			6A0	.4080	.3916							
			.3366	.3369				.3783	.3646				.4017	.3751							
			.3376	.3616		4000K		.3702	.3722			6B0	.3941	.3848							
		3B0	.3463	.3687			5B0	.3736	.3874				.3996	.4015							
			.3451	.3554			200	.3869	.3958				.4146	.4089							
0E3	5000K		.3371	.3490	055		400.01/	40001/	40001	4000K	E 4000K	000 K	40001/	40001/		.3825	.3798	0E6	3500K		.4080
0E3	JUUUK		.3463	.3687	0E5			.3825	.3798	ULO	_0 _3300K	(6)	.4080	.3916							
		3C0	.3551	.3760			500	.3869	.3958				.4146	.4089							
		300	.3533	.3620									5C0	.4006	.4044			6C0	.4299	.4165	
			.3451	.3554				.3950	.3875				.4221	.3984							
			.3451	.3554				.3783	.3646				.4017	.3751							
		25.0	.3533	.3620			EDO	.3825	.3798			600	.4080	.3916							
		3D0	.3515	.3487			5D0	.3950	.3875			6D0	.4221	.3984							
			.3440	.3427				.3898	.3716				.4147	.3814							



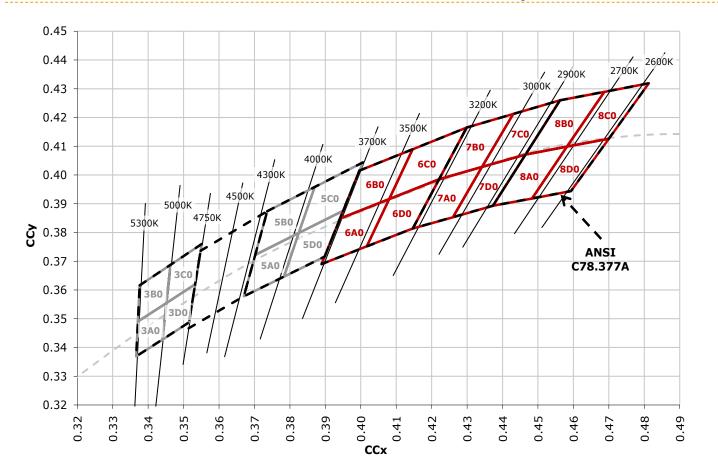
	ANS	I White B	ins				ANS	I White I	Bins	
Code	сст	Bin Code	x	у		Code	ССТ	Bin Code	x	У
			.4147	.3814					.4373	.3893
		7A0	.4221	.3984				8A0	.4465	.4071
		740	.4342	.4028				0AU	.4582	.4099
			.4259	.3853					.4483	.3919
			.4221	.3984					.4465	.4071
		7B0	.4299	.4165			2700K	8B0	.4562	.4260
			.4430	.4212		0E8			.4687	.4289
057	20001/		.4342	.4028					.4582	.4099
0E7	3000K		.4342	.4028				0.00	.4582	.4099
		700	.4430	.4212					.4687	.4289
		7C0	.4562	.4260				8C0	.4813	.4319
			.4465	.4071					.4700	.4126
			.4259	.3853					.4483	.3919
		75.0	.4342	.4028				0.00	.4582	.4099
		7D0	.4465	.4071				8D0	.4700	.4126
			.4373	.3893					.4593	.3944

CREE EASYWHITE BINS PLOTTED ON THE 1931 CIE COLOR SPACE (T_1 =85°C)



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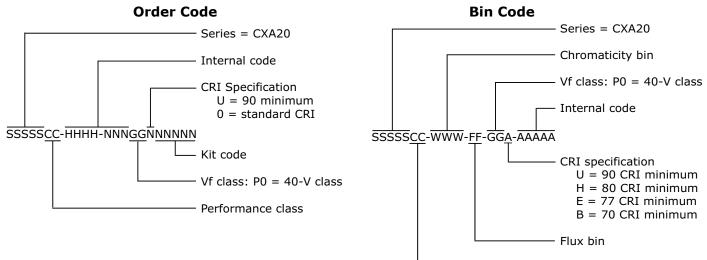




CREE ANSI WHITE BINS PLOTTED ON THE 1931 CIE COLOR SPACE (T₁=85°C)

BIN AND ORDER CODE FORMATS

Bin codes and order codes are configured as follows:



- Performance class

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NOTES

Lumen Maintenance Projections

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

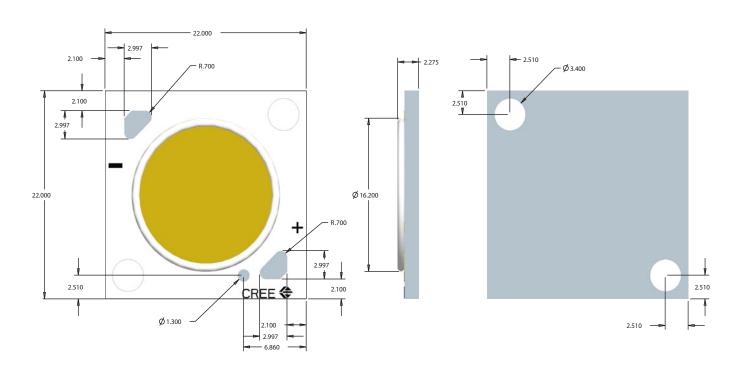
RoHS Compliance

The levels of environmentally sensitive, persistent biologically toxic (PBT), persistent organic pollutants (POP), or otherwise 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 2002/95/ EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS), as amended through April 21, 2006.

Vision Advisory Claim

Users should be cautioned not to stare at the light of this LED product. The bright light can damage the eye.





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.

