

# Cree® XLamp® CXA3050 LED



## PRODUCT DESCRIPTION

The XLamp CXA3050 LED array expands Cree’s family of high-flux, multi-die integrated arrays, offering high performance in an easy-to-use platform. With XLamp lighting-class reliability, the CXA3050’s uniform emitting surface enables both directional and non-directional lighting applications and luminaire and lamp designs. Available in 2-step and 4-step color consistency, and featuring a 23-mm optical source, the CXA3050 brings new levels of flux and efficacy to this form factor.

## 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
- 80-minimum CRI option
- Forward voltage: 37 V
- 85 °C binning and characterization
- Maximum drive current: 2500 mA
- 115° viewing angle, uniform chromaticity profile
- Top-side solder connections
- Thermocouple attach point
- NEMA SSL-3 2011 standard flux bins

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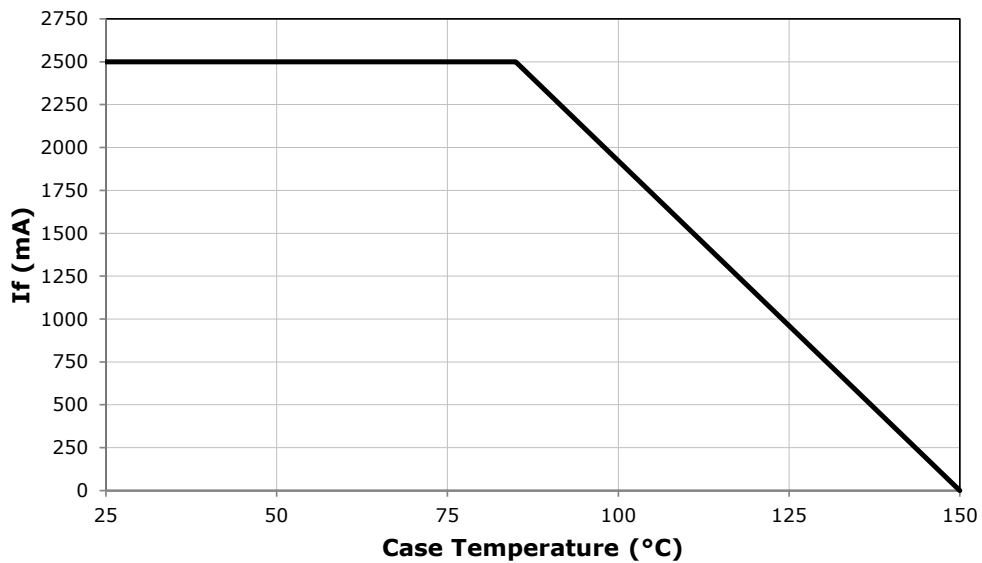
## CHARACTERISTICS

Characteristics	Unit	Minimum	Typical	Maximum
Viewing angle (FWHM)	degrees		115	
ESD classification (HBM per Mil-Std-883D)			Class 2	
DC forward current	mA			2500*
Reverse current	mA			0.1
Forward voltage (@ 1400 mA, $T_j = 85\text{ }^\circ\text{C}$ )	V		37	
Forward voltage (@ 1400 mA, $T_j = 25\text{ }^\circ\text{C}$ )	V			42

\* Refer to the Operating Limits section.

## OPERATING LIMITS

The maximum current rating of the CXA3050 is dependent on the case temperature ( $T_c$ ) when the LED has reached thermal equilibrium under steady-state operation. Please refer to the Mechanical Drawings section on page 13 for the location of the  $T_c$  measurement point.



**FLUX CHARACTERISTICS, STANDARD ORDER CODES AND BINS ( $I_f = 1400 \text{ mA}$ ,  $T_j = 85 \text{ }^\circ\text{C}$ )**

The following tables provide order codes for XLamp CXA3050 LEDs. For a complete description of the order code nomenclature, please reference Bin and Order Code Formats (page 13).

Color	CCT Range	Base Order Codes Min. Luminous Flux @ 1400 mA			2-Step Order Code		4-Step Order Code	
		Group	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*	Chromaticity Region		Chromaticity Region	
EasyWhite	5000K	X2	5590	6299	50H	CXA3050-0000-000N00X250H	50F	CXA3050-0000-000N00X250F
		X4	6010	6773		CXA3050-0000-000N00X450H		CXA3050-0000-000N00X450F
		Y2	6430	7246		CXA3050-0000-000N00Y250H		CXA3050-0000-000N00Y250F
	4000K	W4	5225	5888	40H	CXA3050-0000-000N00W440H	40F	CXA3050-0000-000N00W440F
		X2	5590	6299		CXA3050-0000-000N00X240H		CXA3050-0000-000N00X240F
		X4	6010	6773		CXA3050-0000-000N00X440H		CXA3050-0000-000N00X440F
	3500K	W2	4860	5477	35H	CXA3050-0000-000N00W235H	35F	CXA3050-0000-000N00W235F
		W4	5225	5888		CXA3050-0000-000N00W435H		CXA3050-0000-000N00W435F
		X2	5590	6299		CXA3050-0000-000N00X235H		CXA3050-0000-000N00X235F
	3000K	W2	4860	5477	30H	CXA3050-0000-000N00W230H	30F	CXA3050-0000-000N00W230F
		W4	5225	5888		CXA3050-0000-000N00W430H		CXA3050-0000-000N00W430F
		X2	5590	6299		CXA3050-0000-000N00X230H		CXA3050-0000-000N00X230F
	2700K	V4	4545	5122	27H	CXA3050-0000-000N00V427H	27F	CXA3050-0000-000N00V427F
		W2	4860	5477		CXA3050-0000-000N00W227H		CXA3050-0000-000N00W227F
		W4	5225	5888		CXA3050-0000-000N00W427H		CXA3050-0000-000N00W427F

**Notes:**

- Cree maintains a tolerance of  $\pm 7\%$  on flux and power measurements,  $\pm 0.005$  on chromaticity (CCx, CCy) measurements and a tolerance of  $\pm 2$  on CRI measurements.
- Minimum CRI for standard CRI order codes ending in 0E8, 27F, 27H, 0E7, 30F, 30H, 0E6, 35F, 35H is 80.
- Minimum CRI for standard CRI order codes ending in 0E5, 40F, 40H, 0E3, 50F, 50H is 70.
- \* Flux values @ 25 °C are calculated and for reference only.

**FLUX CHARACTERISTICS, STANDARD ORDER CODES AND BINS ( $I_f = 1400 \text{ mA}$ ,  $T_j = 85 \text{ °C}$ ) - CONTINUED**

Color	CCT Range	Base Order Codes Min Luminous Flux @ 1400 mA			Chromaticity Regions	Order Code
		Group	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*		
ANSI White	5000K	X2	5590	6299	3A0, 3B0, 3C0, 3D0	CXA3050-0000-000N0HX20E3
		X4	6010	6773		CXA3050-0000-000N0HX40E3
		Y2	6430	7246		CXA3050-0000-000N0HY20E3
	4000K	W4	5225	5888	5A0, 5B0, 5C0, 5D0	CXA3050-0000-000N0HW40E5
		X2	5590	6299		CXA3050-0000-000N0HX20E5
		X4	6010	6773		CXA3050-0000-000N0HX40E5
	3500K	W2	4860	5477	6A0, 6B0, 6C0, 6D0	CXA3050-0000-000N0HW20E6
		W4	5225	5888		CXA3050-0000-000N0HW40E6
		X2	5590	6299		CXA3050-0000-000N0HX20E6
	3000K	W2	4860	5477	7A0, 7B0, 7C0, 7D0	CXA3050-0000-000N0HW20E7
		W4	5225	5888		CXA3050-0000-000N0HW40E7
		X2	5590	6299		CXA3050-0000-000N0HX20E7
	2700K	V4	4545	5122	8A0, 8B0, 8C0, 8D0	CXA3050-0000-000N0HV40E8
		W2	4860	5477		CXA3050-0000-000N0HW20E8
		W4	5225	5888		CXA3050-0000-000N0HW40E8

**Notes:**

- Cree maintains a tolerance of  $\pm 7\%$  on flux and power measurements,  $\pm 0.005$  on chromaticity (CCx, CCy) measurements and a tolerance of  $\pm 2$  on CRI measurements.
- Minimum CRI for standard CRI order codes ending in 0E8, 27F, 27H, 0E7, 30F, 30H, 0E6, 35F, 35H is 80.
- Minimum CRI for standard CRI order codes ending in 0E5, 40F, 40H, 0E3, 50F, 50H is 70.
- \* Flux values @ 25 °C are calculated and for reference only.

## FLUX CHARACTERISTICS, STANDARD ORDER CODES AND BINS, 80 CRI ( $I_f = 1400 \text{ mA}$ , $T_j = 85 \text{ }^\circ\text{C}$ )

The following tables provide order codes for XLamp CXA3050 80 CRI minimum LEDs. For a complete description of the order code nomenclature, please reference Bin and Order Code Formats (page 13).

Color	CCT Range	Base Order Codes Min. Luminous Flux @ 1400 mA			2-Step Order Code		4-Step Order Code	
		Group	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*	Chromaticity Region		Chromaticity Region	
EasyWhite	5000K	W4	5225	5888	50H	CXA3050-0000-000N0HW450H	50F	CXA3050-0000-000N0HW450F
		X2	5590	6299		CXA3050-0000-000N0HX250H		CXA3050-0000-000N0HX250F
		X4	6010	6773		CXA3050-0000-000N0HX450H		CXA3050-0000-000N0HX450F
	4000K	W2	4860	5477	40H	CXA3050-0000-000N0HW20H	40F	CXA3050-0000-000N0HW240F
		W4	5225	5888		CXA3050-0000-000N0HW440H		CXA3050-0000-000N0HW440F
		X2	5590	6299		CXA3050-0000-000N0HX240H		CXA3050-0000-000N0HX240F

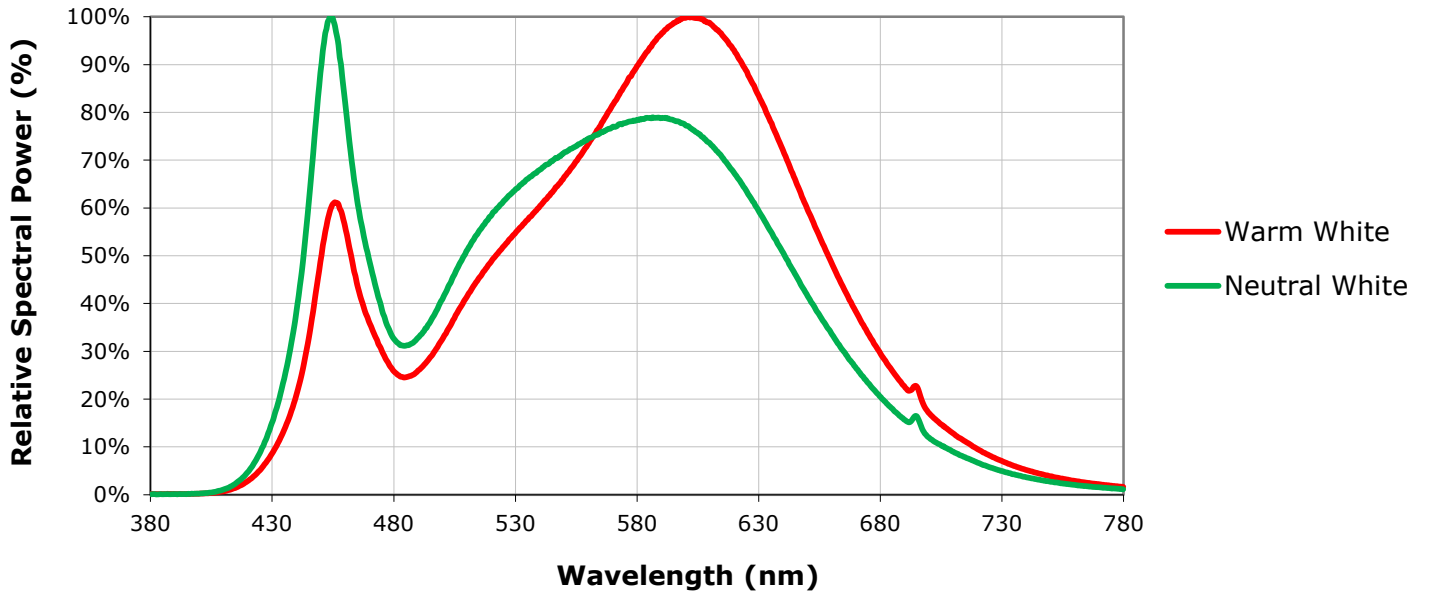
Color	CCT Range	Base Order Codes Min Luminous Flux @ 1400 mA			Chromaticity Regions	Order Code
		Group	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*		
ANSI White	5000K	W4	5225	5888	3A0, 3B0, 3C0, 3D0	CXA3050-0000-000N0HW40E3
		X2	5590	6299		CXA3050-0000-000N0HX20E3
		X4	6010	6773		CXA3050-0000-000N0HX40E3
	4000K	W2	4860	5477	5A0, 5B0, 5C0, 5D0	CXA3050-0000-000N0HW20E5
		W4	5225	5888		CXA3050-0000-000N0HW40E5
		X2	5590	6299		CXA3050-0000-000N0HX20E5

### Notes:

- Cree maintains a tolerance of  $\pm 7\%$  on flux and power measurements,  $\pm 0.005$  on chromaticity (CCx, CCy) measurements and a tolerance of  $\pm 2$  on CRI measurements.
- Minimum CRI for 80 CRI order codes ending in 0E5, 40F, 40H, 0E3, 50F, 50H is 80.
- \* Flux values @ 25 °C are calculated and for reference only.

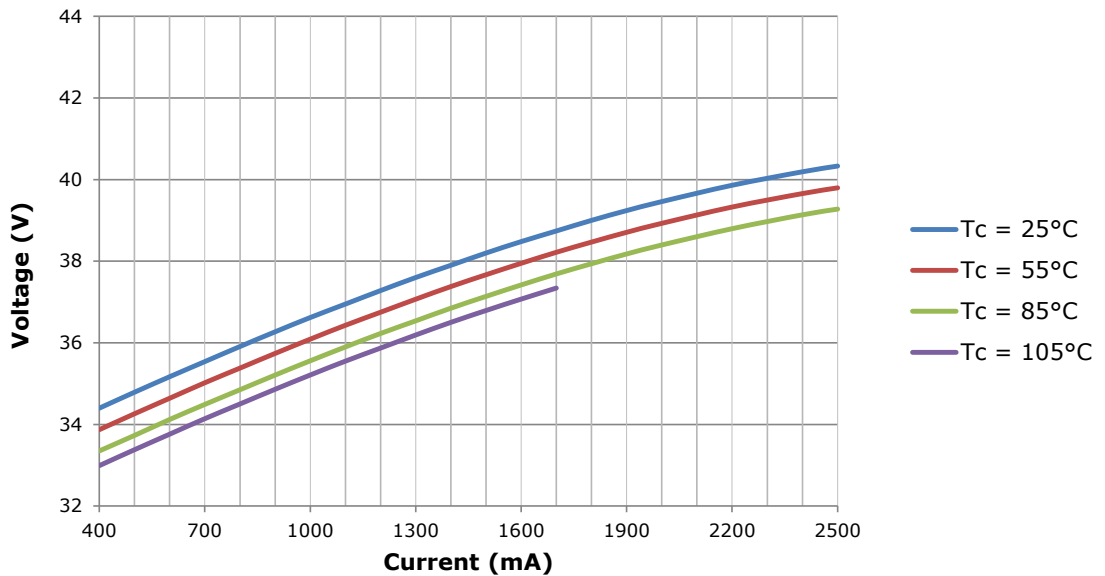
**RELATIVE SPECTRAL POWER DISTRIBUTION ( $I_f = 1400 \text{ mA}$ ,  $T_j = 85 \text{ }^\circ\text{C}$ )**

The following graph is the result of a pulsed measurement at 1400 mA and  $T_j = 85 \text{ }^\circ\text{C}$ .



**ELECTRICAL CHARACTERISTICS**

The following graph is the result of a series of steady-state measurements.

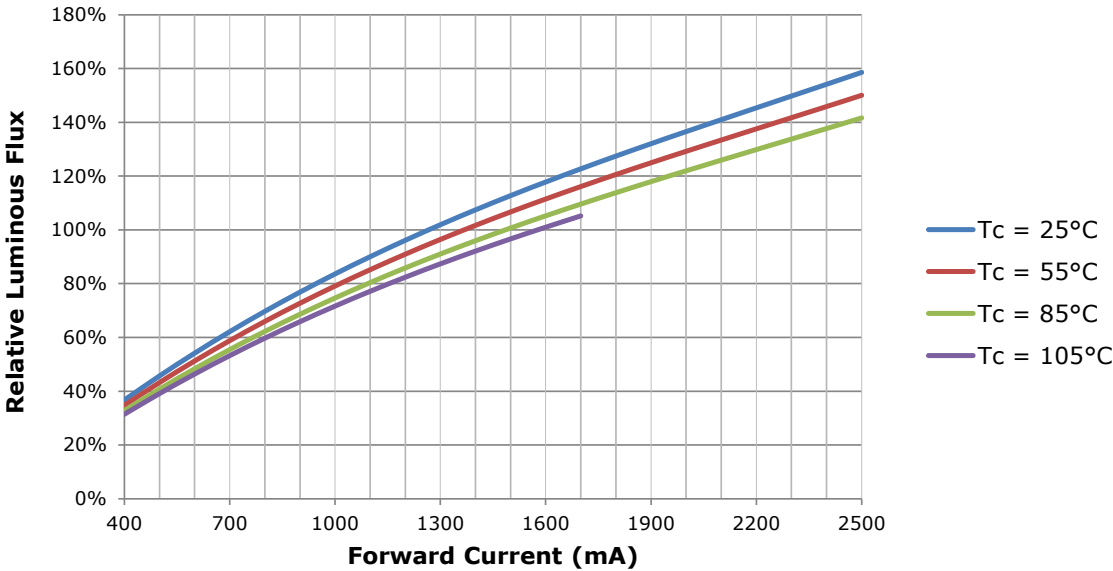


**RELATIVE LUMINOUS FLUX**

The relative luminous flux values provided below are the ratio of:

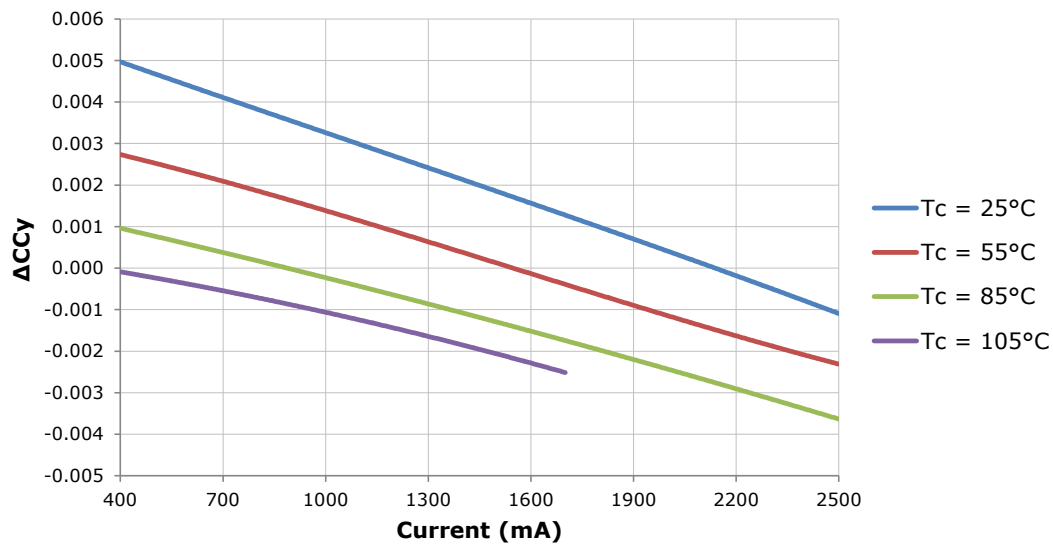
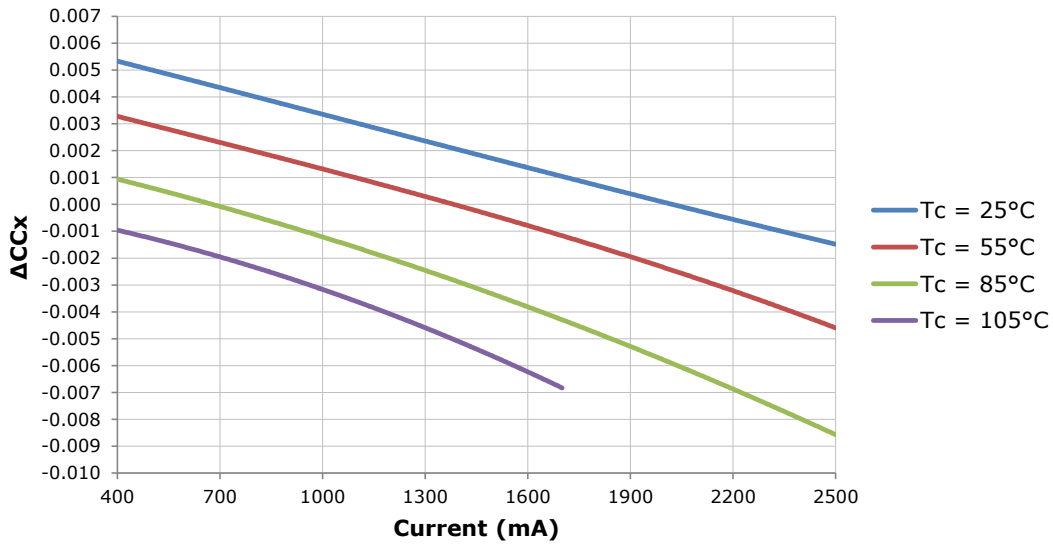
- Measurements of CXA3050 at steady-state operation at the given conditions, divided by
- Flux measured during binning, which is a pulsed measurement at 1400 mA at  $T_j = 85\text{ }^\circ\text{C}$ .

For example, at steady-state operation of  $T_c = 85\text{ }^\circ\text{C}$ ,  $I_f = 1900\text{ mA}$ , the relative luminous flux ratio is 120% in the chart below. A CXA3050 LED that measures 6000 lm during binning will deliver 7200 lm ( $6000 * 1.2$ ) at steady-state operation of  $T_c = 85\text{ }^\circ\text{C}$ ,  $I_f = 1900\text{ mA}$ .



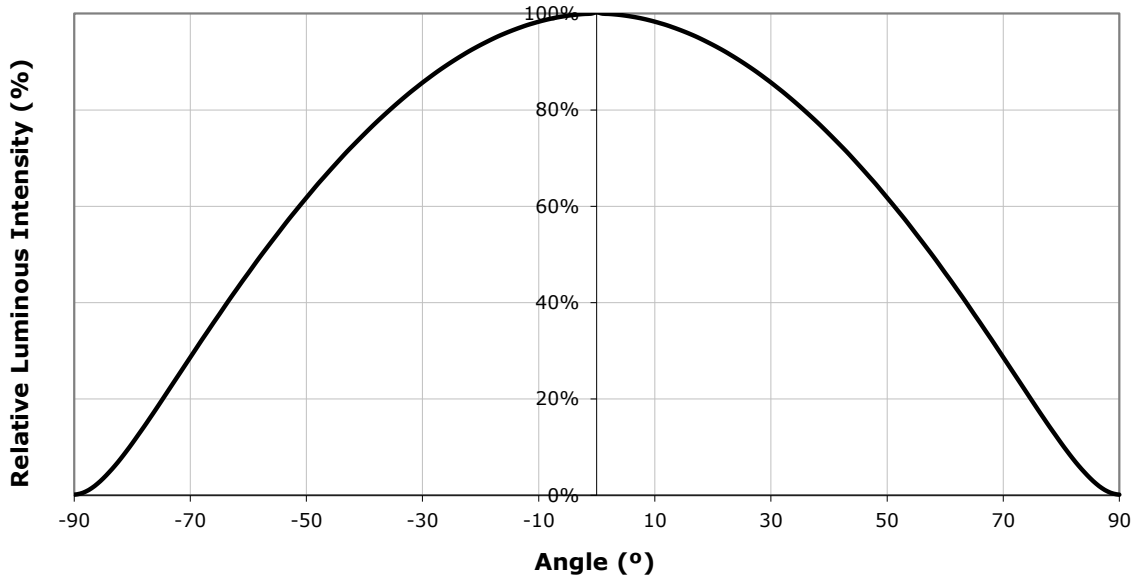
### RELATIVE CHROMATICITY VS. CURRENT AND TEMPERATURE (3000 K, 80 CRI)

The following graphs are the result of a series of steady-state measurements. Relative chromaticity is provided as shift from the chromaticity measured during binning, which is a pulsed measurement at 1400 mA at  $T_j = 85^\circ\text{C}$ .





**TYPICAL SPATIAL DISTRIBUTION**



**PERFORMANCE GROUPS - BRIGHTNESS ( $I_f = 1400 \text{ mA}$ ,  $T_j = 85 \text{ °C}$ )**

XLamp CXA3050 LEDs are tested for luminous flux and placed into one of the following bins.

Group Code	Min. Luminous Flux @ 1400 mA	Max. Luminous Flux @ 1400 mA
V4	4545	4860
W2	4860	5225
W4	5225	5590
X2	5590	6010
X4	6010	6430
Y2	6430	6910

**PERFORMANCE GROUPS - CHROMATICITY ( $T_j = 85\text{ }^\circ\text{C}$ )**

XLamp CXA3050 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

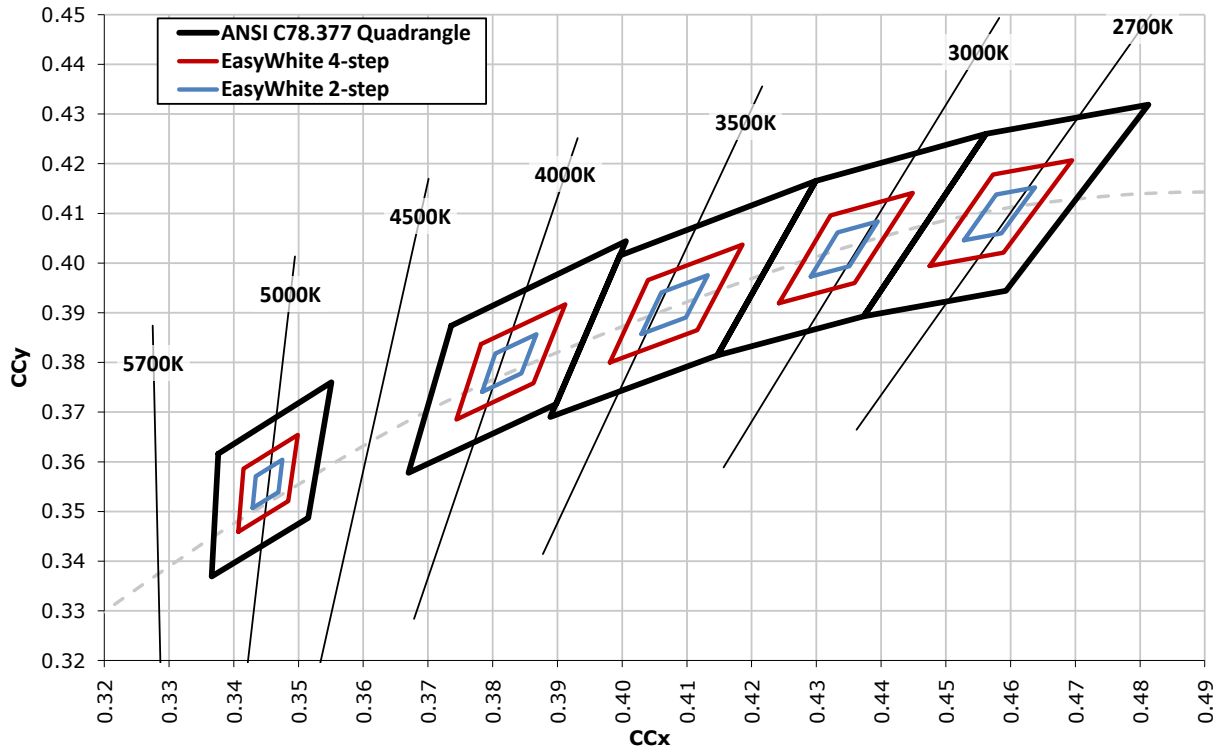
ANSI White Bins				
Code	CCT	Bin Code	x	y
0E3	5000K	3A0	.3371	.3490
			.3451	.3554
			.3440	.3427
			.3366	.3369
		3B0	.3376	.3616
			.3463	.3687
			.3451	.3554
			.3371	.3490
		3C0	.3463	.3687
			.3551	.3760
			.3533	.3620
			.3451	.3554
		3D0	.3451	.3554
			.3533	.3620
			.3515	.3487
			.3440	.3427

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	.3869	.3958
			.4006	.4044
			.3950	.3875
			.3783	.3646
		5D0	.3825	.3798
			.3950	.3875
			.3898	.3716

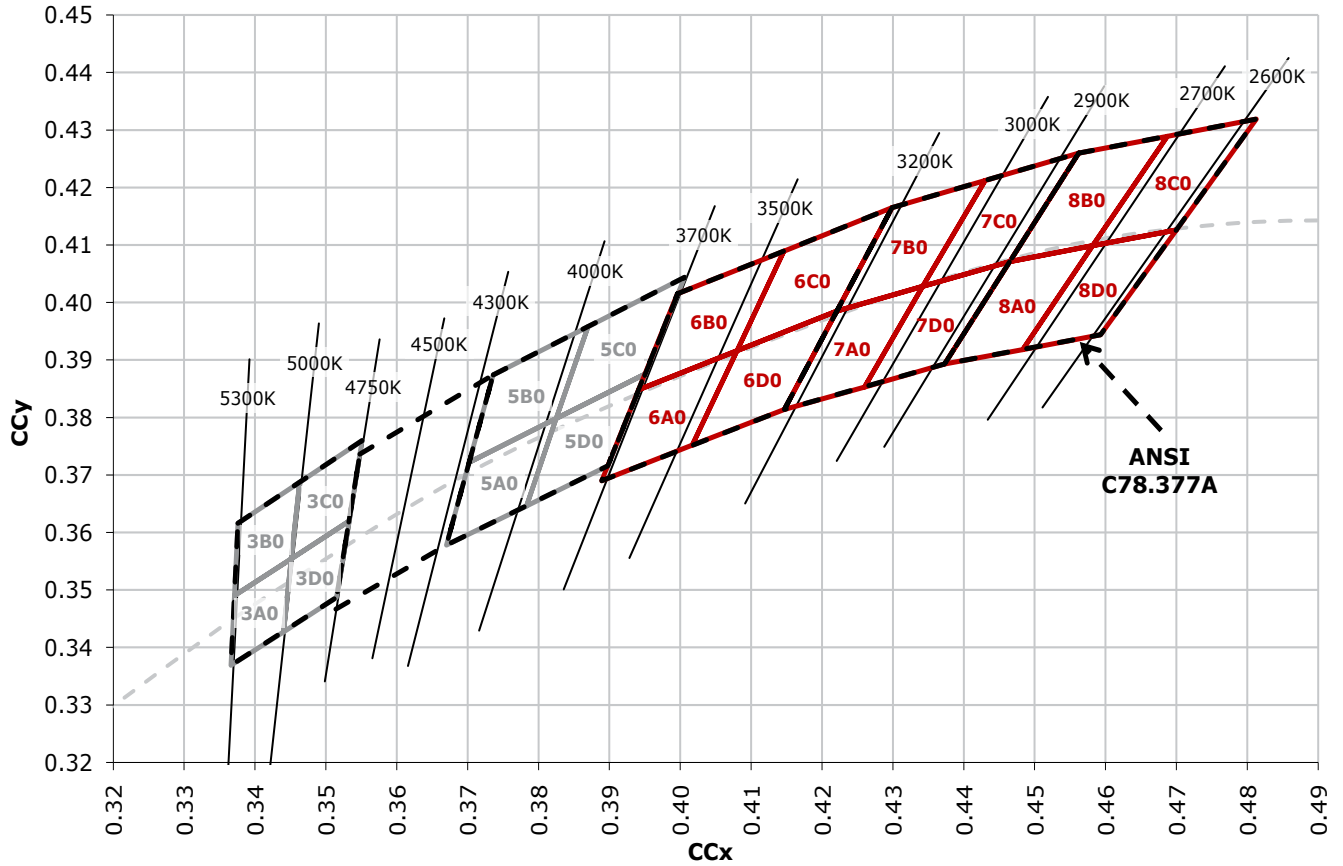
ANSI White Bins				
Code	CCT	Bin Code	x	y
0E6	3500K	6A0	.3889	.3690
			.3941	.3848
			.4080	.3916
			.4017	.3751
		6B0	.3941	.3848
			.3996	.4015
			.4146	.4089
			.4080	.3916
		6C0	.4146	.4089
			.4299	.4165
			.4221	.3984
			.4017	.3751
		6D0	.4080	.3916
			.4221	.3984
			.4147	.3814

ANSI White Bins					ANSI White Bins				
Code	CCT	Bin Code	x	y	Code	CCT	Bin Code	x	y
0E7	3000K	7A0	.4147	.3814	0E8	2700K	8A0	.4373	.3893
			.4221	.3984				.4465	.4071
			.4342	.4028				.4582	.4099
			.4259	.3853				.4483	.3919
		7B0	.4221	.3984			8B0	.4465	.4071
			.4299	.4165				.4562	.4260
			.4430	.4212				.4687	.4289
			.4342	.4028				.4582	.4099
		7C0	.4342	.4028			8C0	.4582	.4099
			.4430	.4212				.4687	.4289
			.4562	.4260				.4813	.4319
			.4465	.4071				.4700	.4126
		7D0	.4259	.3853			8D0	.4483	.3919
			.4342	.4028				.4582	.4099
			.4465	.4071				.4700	.4126
			.4373	.3893				.4593	.3944

**CREE EASYWHITE BINS PLOTTED ON THE CIE 1931 COLOR SPACE ( $T_j = 85^\circ\text{C}$ )**

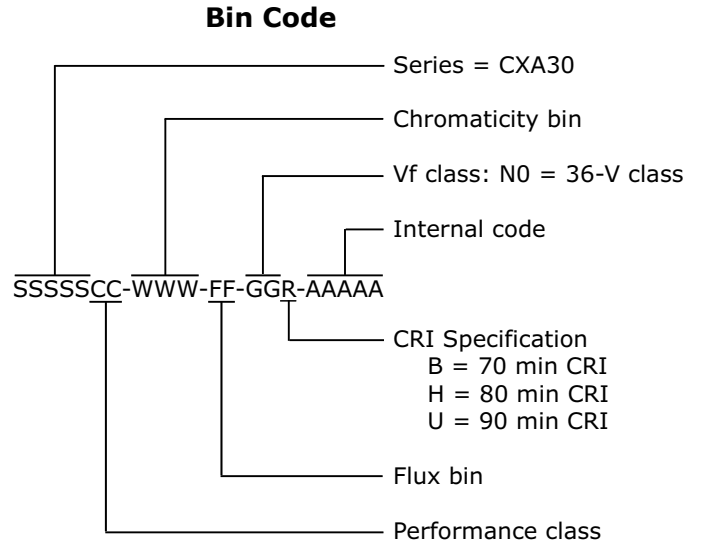
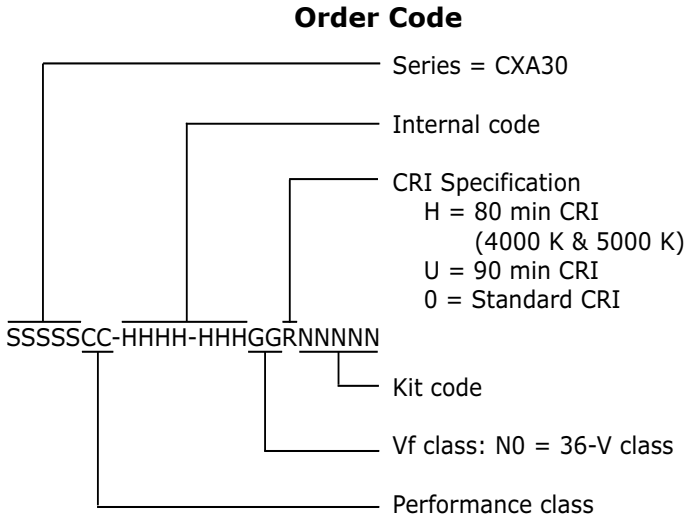


**CREE ANSI WHITE BINS PLOTTED ON THE CIE 1931 COLOR SPACE ( $T_j = 85^\circ\text{C}$ )**



### BIN AND ORDER CODE FORMATS

Bin codes and order codes are configured as follows:

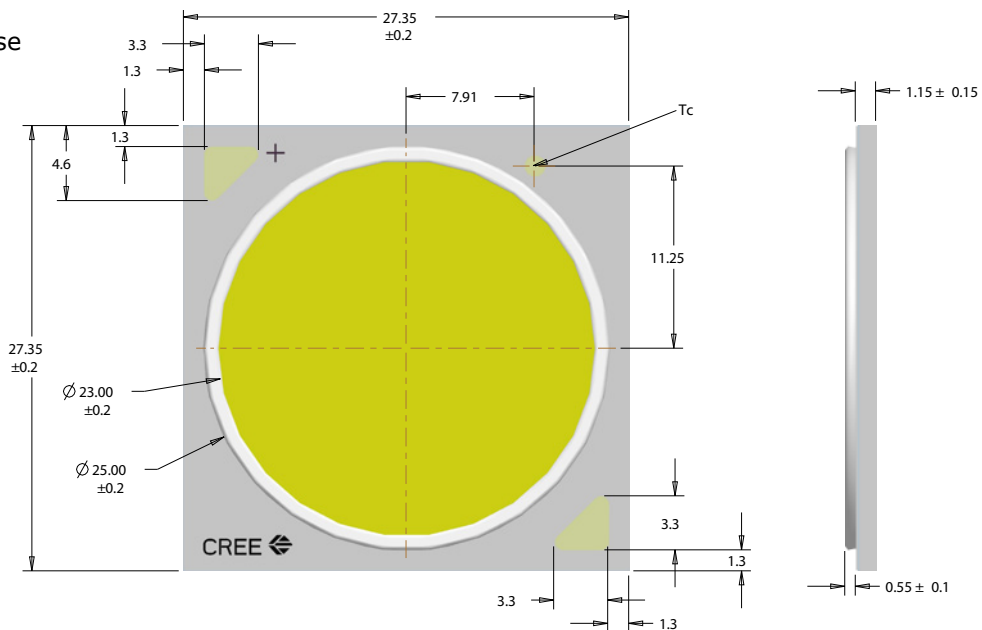


### MECHANICAL DIMENSIONS

Dimensions are in mm.

Tolerances unless otherwise specified:

- .x ± .10
- .xx ± .03
- .xxx ± .010
- x° ± 1°



## THERMAL DESIGN

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The CXA family of LED arrays can include over a hundred different LED die inside one package, and thus over a hundred different junction temperatures ( $T_j$ ). Cree has intentionally removed junction-temperature-based operating limits and replaced the commonplace maximum  $T_j$  calculations with maximum ratings based on forward current ( $I_f$ ) and case temperature ( $T_c$ ). No additional calculations are required to ensure the CXA LED is being operated within its designed limits. Please refer to page 2 for the Operating Limit specification.

For performing thermal simulation, Cree has measured the bottom of the package, commonly referred to as the solder point ( $T_{sp}$ ), and found this value to be equivalent to the  $T_c$  location at the top of the package once the LED has reached thermal equilibrium. There is no need to calculate for  $T_j$  inside the package, as the thermal management design process, specifically from  $T_{sp}$  to ambient, remains identical to any other LED component. For more information on thermal management of Cree XLamp LEDs, please refer to the XLamp Thermal Management application note at [www.cree.com/xlamp\\_app\\_notes/thermal\\_management](http://www.cree.com/xlamp_app_notes/thermal_management).

## NOTES

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### 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](http://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](http://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](http://www.cree.com/xlamp_app_notes/thermal_management) for details on how thermal design, ambient temperature, and drive current affect the LED junction temperature.

### Vision Advisory Claim

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

**PACKAGING**

Cree CXA3050 LEDs are packaged in trays of 20, which are then combined in boxes of 5 trays, or 100 LEDs. Boxes of 100 LEDs are of the same performance bin.

Dimensions are in inches.

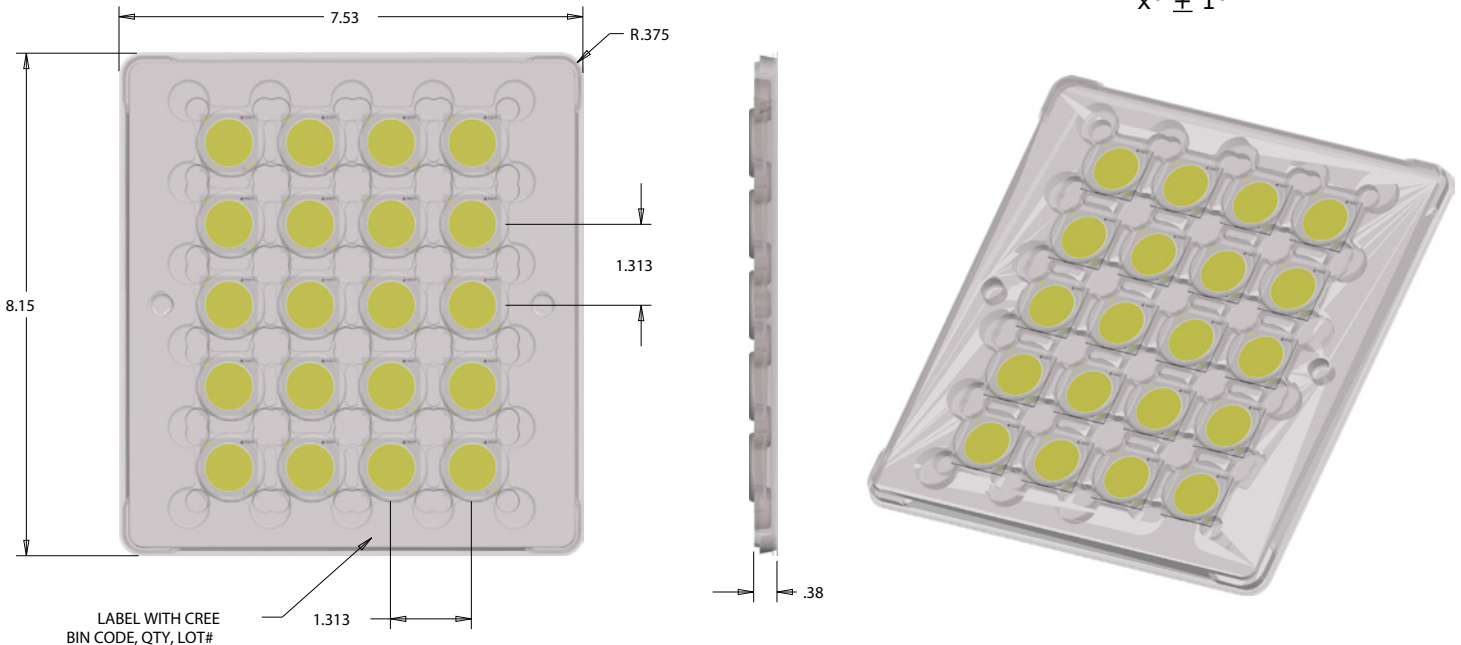
Tolerances:

.x ± .1

.xx ± .05

.xxx ± .005

x° ± 1°



LABEL WITH CREE  
BIN CODE, QTY, LOT#

PATENT LABEL  
IS LOCATED ON UNDERSIDE OF  
CARTON

LABEL WITH CREE  
BIN CODE, QTY, LOT#

LABEL WITH CREE  
BIN CODE, QTY, LOT#

BAG