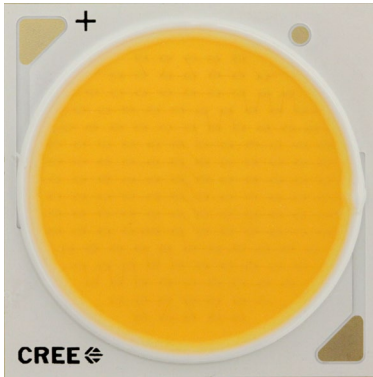**PRODUCT FAMILY DATA SHEET**

Cree® XLamp® CXA3070 LED

PRODUCT DESCRIPTION

The XLamp CXA3070 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 CXA3070'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 CXA3070 brings new levels of flux and efficacy to this form factor.

The CXA LED Design Guide provides basic information on the requirements to use the CXA3070 LED successfully in luminaire designs.[1]

FEATURES

- Available in 4-step and 2-step EasyWhite® bins at 2700 K, 3000 K, 3500 K, 4000 K and 5000 K CCT
- Available in ANSI white bins at 4000 K and 5000 K CCT
- Available in 70- and 80-minimum CRI options
- Forward voltage: 38.5 V
- 85 °C binning and characterization
- Maximum drive current: 2800 mA
- 115° viewing angle, uniform chromaticity profile
- Top-side solder connections
- Thermocouple attach point
- NEMA SSL-3 2011 standard flux bins
- RoHS-compliant
- UL-recognized component (E349212)

TABLE OF CONTENTS

---

1 Cree XLamp CXA LED Design Guide, Design Guide DG02, www.cree.com/xlamp_app_notes/cxa_design_guide

WWW.CREE.COM/XLAMP

CHARACTERISTICS

Characteristics	Unit	Minimum	Typical	Maximum
Viewing angle (FWHM)	degrees		115	
ESD withstand voltage (HBM per Mil-Std-883D)	V			8000
DC forward current	mA			2800*
Reverse current	mA			0.1
Forward voltage (@ 1925 mA, T_j = 85 °C)	V		38.5	
Forward voltage (@ 1925 mA, T_j = 25 °C)	V			42

*   Refer to the Operating Limits section.

OPERATING LIMITS

The maximum current rating of the CXA3070 is dependent on the case temperature (Tc) when the LED has reached thermal equilibrium under steady-state operation. Please refer to the Mechanical Drawings section on page 11 for the location of the Tc measurement point.
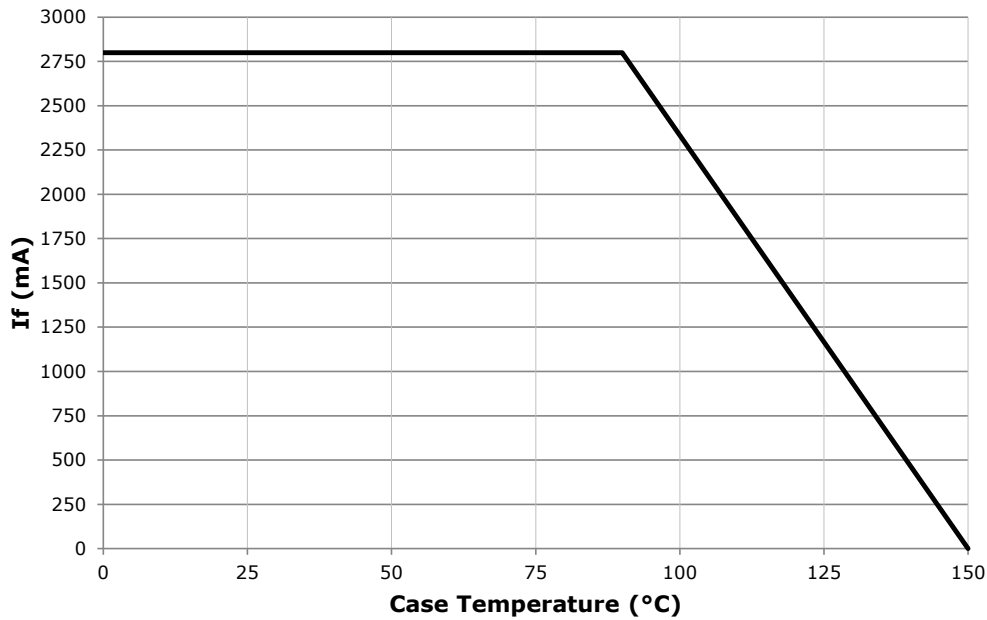
FLUX CHARACTERISTICS, EASYWHITE ORDER CODES AND BINS (I_F = 1925 mA, T_J = 85 °C)

The following tables provide order codes for XLamp CXA3070 LEDs. For a complete description of the order code nomenclature, please reference Bin and Order Code Formats (page 11).

CCT Range	CRI		Base Order Codes Min. Luminous Flux @ 1925 mA			2-Step Order Code		4-Step Order Code	
	Min	Typ	Group	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*	Chromaticity Region		Chromaticity Region	
5000 K	70	75	Z4	7945	9296	50H	CXA3070-0000-000N00Z450H	50F	CXA3070-0000-000N00Z450F
			AB	8500	9945		CXA3070-0000-000N00AB50H		CXA3070-0000-000N00AB50F
			AD	9000	10,530		CXA3070-0000-000N00AD50H		CXA3070-0000-000N00AD50F
	80	---	Z2	7390	8646	50H	CXA3070-0000-000N0HZ250H	50F	CXA3070-0000-000N0HZ250F
			Z4	7945	9296		CXA3070-0000-000N0HZ450H		CXA3070-0000-000N0HZ450F
			AB	8500	9945		CXA3070-0000-000N0HAB50H		CXA3070-0000-000N0HAB50F
4000 K	70	75	Z2	7390	8646	40H	CXA3070-0000-000N00Z240H	40F	CXA3070-0000-000N00Z240F
			Z4	7945	9296		CXA3070-0000-000N00Z440H		CXA3070-0000-000N00Z440F
			AB	8500	9945		CXA3070-0000-000N00AB40H		CXA3070-0000-000N00AB40F
	80	---	Z2	7390	8646	40H	CXA3070-0000-000N0HZ240H	40F	CXA3070-0000-000N0HZ240F
			Z4	7945	9296		CXA3070-0000-000N0HZ440H		CXA3070-0000-000N0HZ440F
3500 K	80	---	Y4	6910	8085	35H	CXA3070-0000-000N00Y435H	35F	CXA3070-0000-000N00Y435F
			Z2	7390	8646		CXA3070-0000-000N00Z235H		CXA3070-0000-000N00Z235F
			Z4	7945	9296		CXA3070-0000-000N00Z435H		CXA3070-0000-000N00Z435F
3000 K	80	---	Y4	6910	8085	30H	CXA3070-0000-000N00Y430H	30F	CXA3070-0000-000N00Y430F
			Z2	7390	8646		CXA3070-0000-000N00Z230H		CXA3070-0000-000N00Z230F
			Z4	7945	9296		CXA3070-0000-000N00Z430H		CXA3070-0000-000N00Z430F
2700 K	80	---	Y2	6430	7523	27H	CXA3070-0000-000N00Y227H	27F	CXA3070-0000-000N00Y227F
			Y4	6910	8085		CXA3070-0000-000N00Y427H		CXA3070-0000-000N00Y427F
			Z2	7390	8646		CXA3070-0000-000N00Z227H		CXA3070-0000-000N00Z227F

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

FLUX CHARACTERISTICS, ANSI WHITE ORDER CODES AND BINS (I$_F$ = 1925 mA, T$_J$ = 85 °C)

The following tables provide order codes for XLamp CXA3070 LEDs. For a complete description of the order code nomenclature, please reference Bin and Order Code Formats (page 11).

CCT Range	CRI		Base Order Codes Min Luminous Flux @ 1925 mA			Chromaticity Regions	Order Code
	Min	Typ	Group	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*		
5000 K	70	75	Z4	7945	9296	3A0, 3B0, 3C0, 3D0	CXA3070-0000-000N00Z40E3
			AB	8500	9945		CXA3070-0000-000N00AB0E3
			AD	9000	10,530		CXA3070-0000-000N00AD0E3
	80	---	Z2	7390	8646	3A0, 3B0, 3C0, 3D0	CXA3070-0000-000N0HZ20E3
			Z4	7945	9296		CXA3070-0000-000N0HZ40E3
			AB	8500	9945		CXA3070-0000-000N0HAB0E3
4000 K	70	75	Z2	7390	8646	5A0, 5B0, 5C0, 5D0	CXA3070-0000-000N00Z20E5
			Z4	7945	9296		CXA3070-0000-000N00Z40E5
			AB	8500	9945		CXA3070-0000-000N00AB0E5
	80	---	Z2	7390	8646	5A0, 5B0, 5C0, 5D0	CXA3070-0000-000N0HZ20E5
			Z4	7945	9296		CXA3070-0000-000N0HZ40E5

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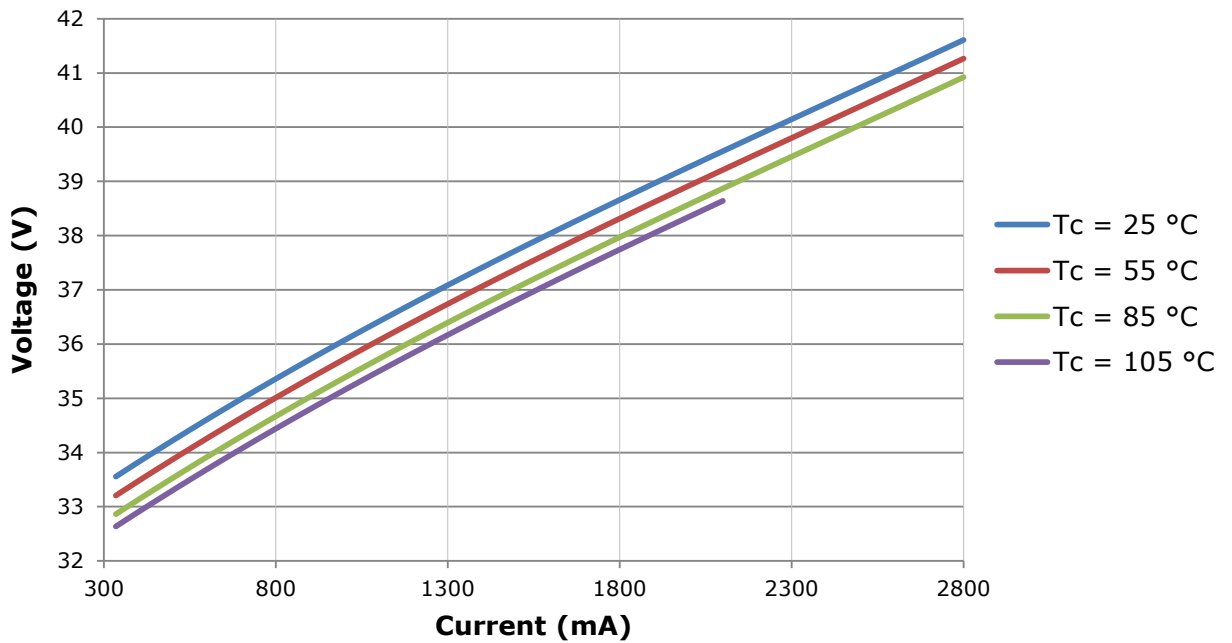- * Flux values @ 25 °C are calculated and for reference only.

RELATIVE SPECTRAL POWER DISTRIBUTION (I_F = 1925 mA, T_J = 85 °C)

The following graph is the result of a series of pulsed measurements at 1925 mA and T_J = 85 °C.
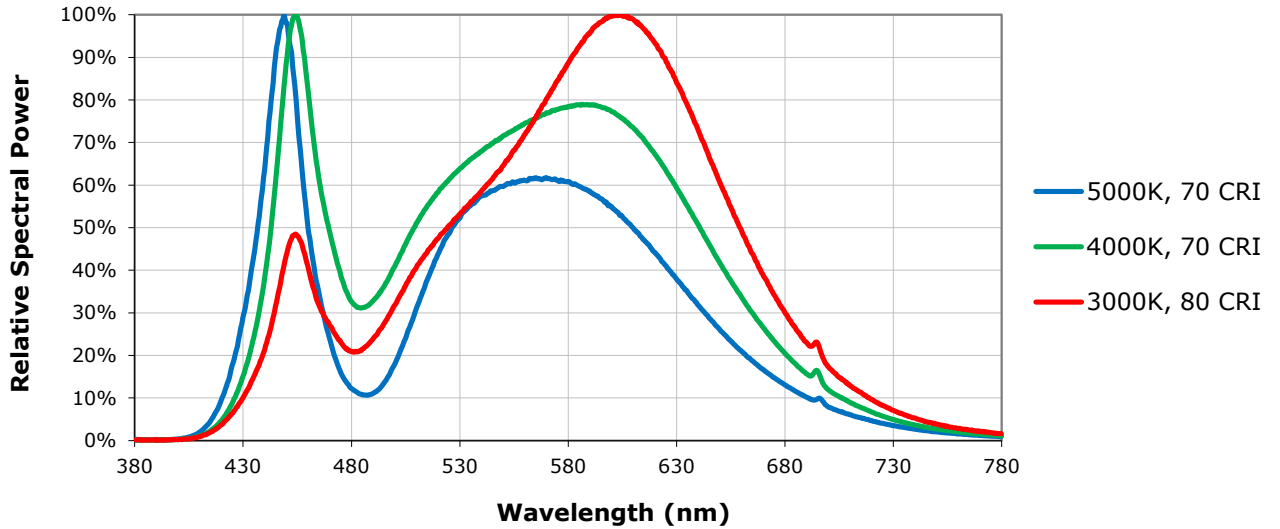
ELECTRICAL CHARACTERISTICS

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 CXA3070 at steady-state operation at the given conditions, divided by
- Flux measured during binning, which is a pulsed measurement at 1925 mA at T_J = 85 °C.

For example, at steady-state operation of Tc = 25 °C, I_F = 1300 mA, the relative luminous flux ratio is 80% in the chart below. A CXA3070 LED that measures 8500 lm during binning will deliver 6800 lm (8500 * 0.8) at steady-state operation of Tc = 25 °C, I_F = 1300 mA.
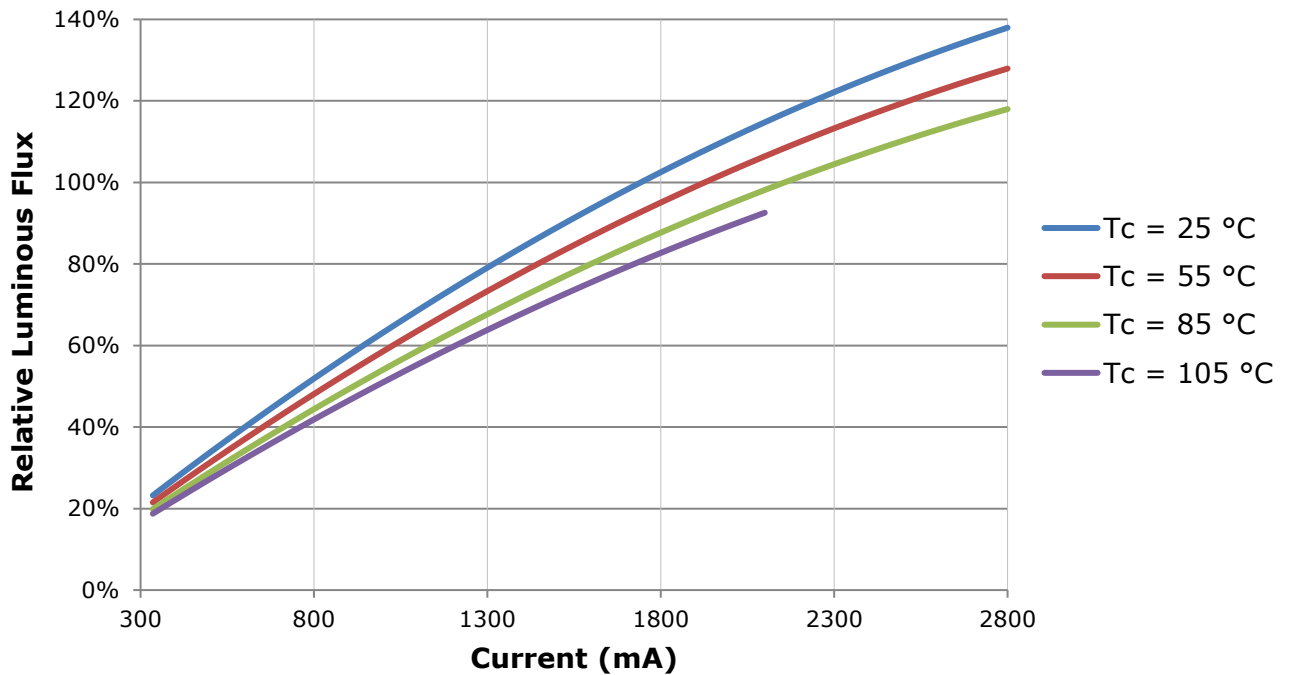
TYPICAL SPATIAL DISTRIBUTION
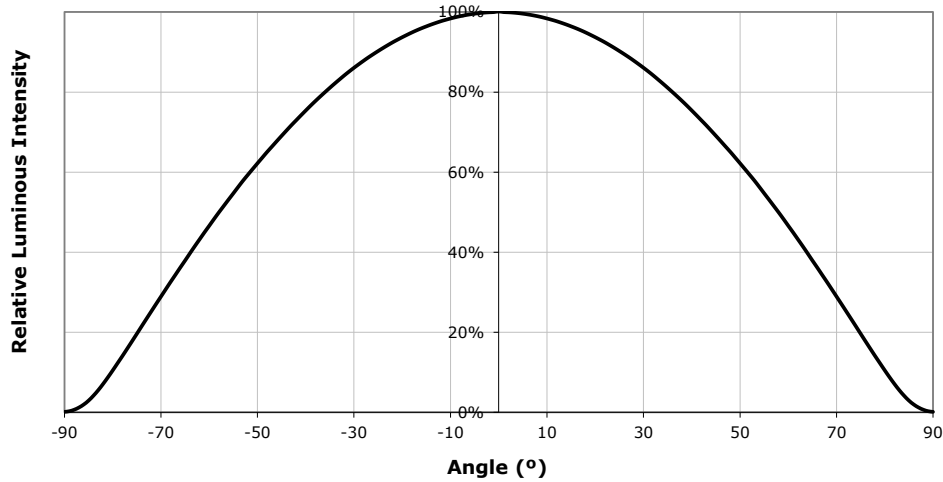
PERFORMANCE GROUPS - BRIGHTNESS (I_F = 1925 mA, T_J = 85 °C)

XLamp CXA3070 LEDs are tested for luminous flux and placed into one of the following bins.

Group Code	Min. Luminous Flux @ 1925 mA	Max. Luminous Flux @ 1925 mA
W2	4860	5225
W4	5225	5590
X2	5590	6010
X4	6010	6430
Y2	6430	6910
Y4	6910	7390
Z2	7390	7945
Z4	7945	8500
AB	8500	9000
AD	9000	9500
BB	9500	10,000
BD	10,000	11,000
CB	11,000	12,000

PERFORMANCE GROUPS - CHROMATICITY (T$_J$ = 85 °C)

XLamp CXA3070 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

CREE EASYWHITE BINS PLOTTED ON THE CIE 1931 COLOR SPACE (T$_J$ = 85 °C)
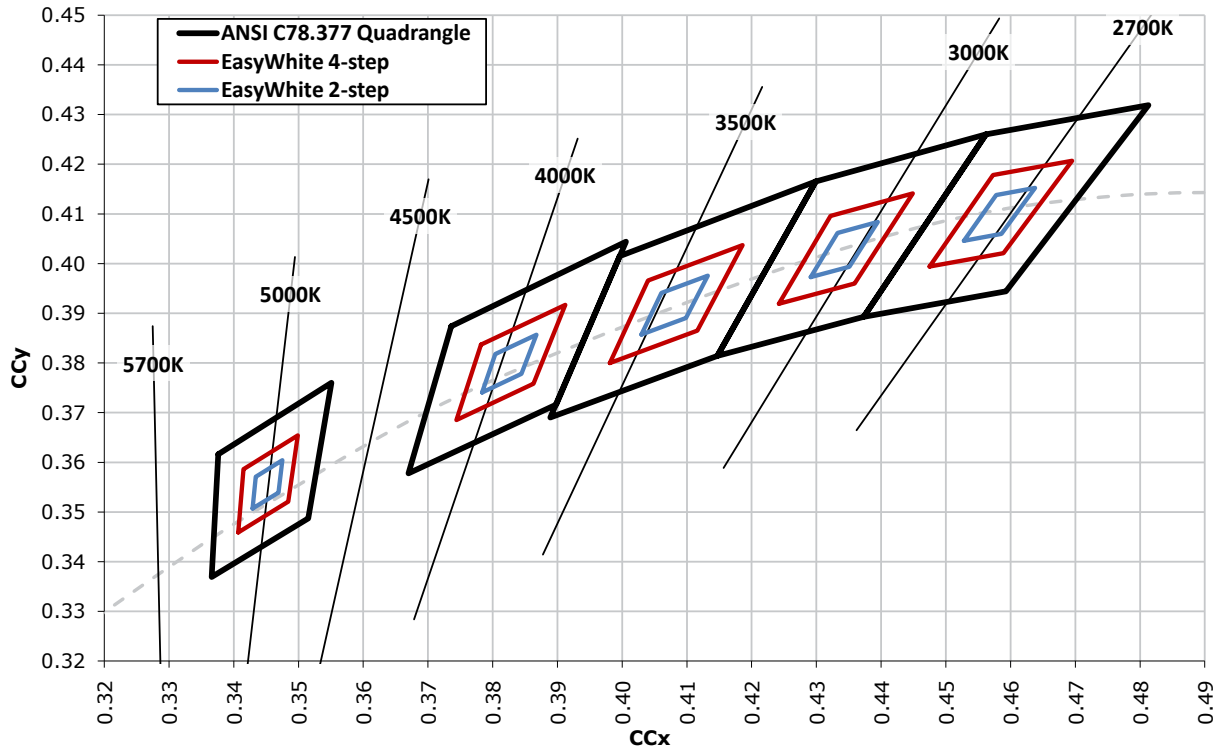
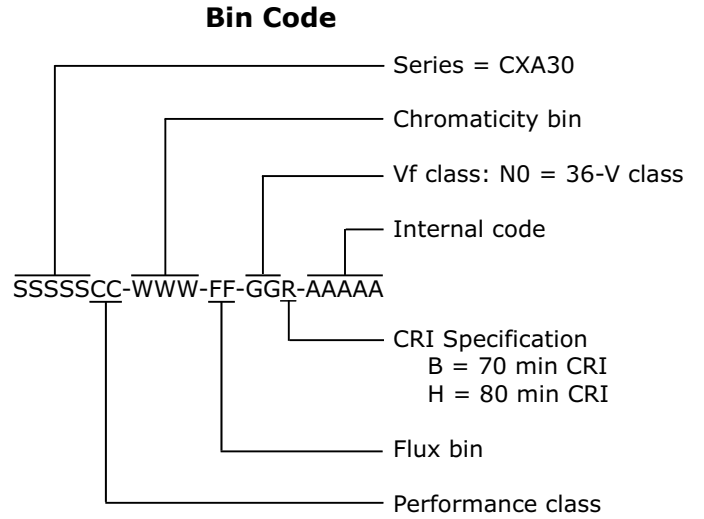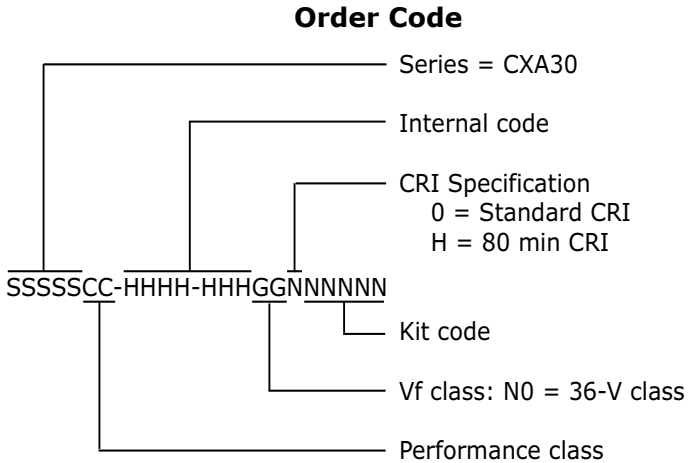## CREE ANSI WHITE BINS PLOTTED ON THE CIE 1931 COLOR SPACE (T$_J$ = 85 °C)
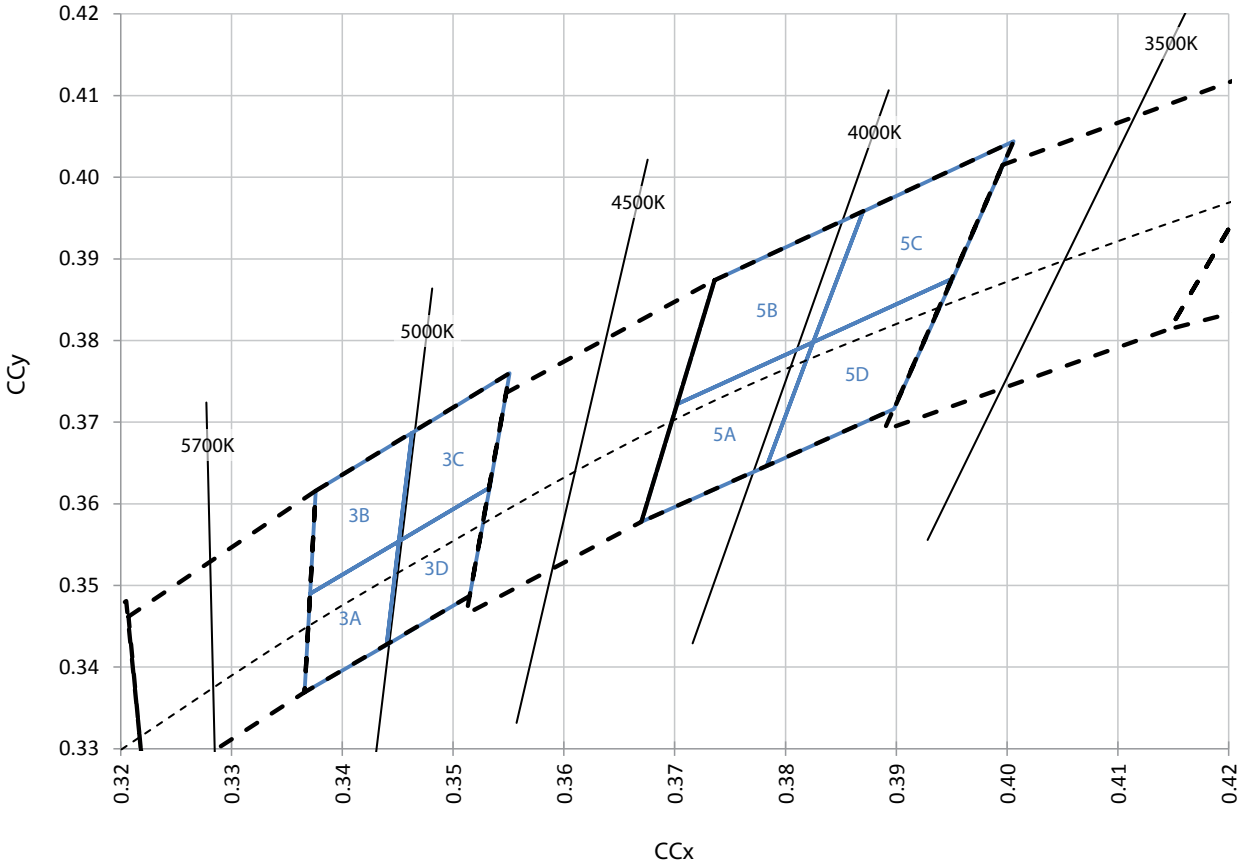
BIN AND ORDER CODE FORMATS
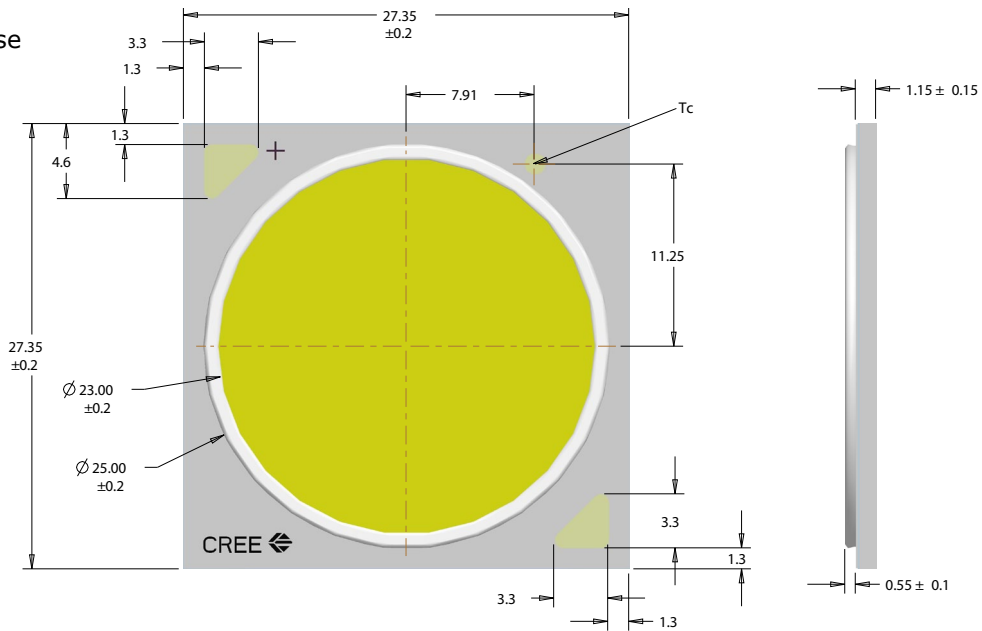
Bin codes and order codes are configured as follows:

Order Code

SSSSSCC-HHHH-HHHGGNNNNNN

- Series = CXA30
- Internal code
- CRI Specification
  - 0 = Standard CRI
  - H = 80 min CRI
- Kit code
- Vf class: N0 = 36-V class
- Performance class

Bin Code

SSSSSCC-WWW-FF-GGR-AAAAA

- Series = CXA30
- Chromaticity bin
- Vf class: N0 = 36-V class
- Internal code
- CRI Specification
  - B = 70 min CRI
  - H = 80 min CRI
- Flux bin
- Performance class

MECHANICAL DIMENSIONS

Dimensions are in mm.

Tolerances unless otherwise specified:

.x $\pm$ .10

.xx $\pm$ .03

.xxx $\pm$ .010

x° $\pm$ 1°

27.35 ±0.2

3.3

1.3

1.3

4.6

7.91

Tc

11.25

27.35 ±0.2

Ø 23.00 ±0.2

Ø 25.00 ±0.2

CREE

3.3

1.3

3.3

1.3

1.15 ± 0.15

0.55 ± 0.1

THERMAL DESIGN

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 (Tc). 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.

Cree has measured the temperature at the bottom of the package, commonly referred to as the solder point (T_{SP}), and found this value to be equivalent to the temperature at the Tc 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 (T_a), 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. For CXA soldering recommendations and more information on thermal interface materials (TIM) and connection methods, please refer to the Cree XLamp CXA Family LEDs soldering and handling document at www.cree.com/xlamp_app_notes/CXA_SH.

To keep the CXA3070 LED at or below the maximum rated Tc, the case to ambient temperature thermal resistance (R_c-a) must be at or below the maximum R_c-a value shown on the following graph, depending on the operating environment. The y-axis in the graph is a base 10 logarithmic scale.

As the figure at right shows, the R_c-a value is the sum of the thermal resistance of the TIM (R_tim) plus the thermal resistance of the heat sink (R_hs).
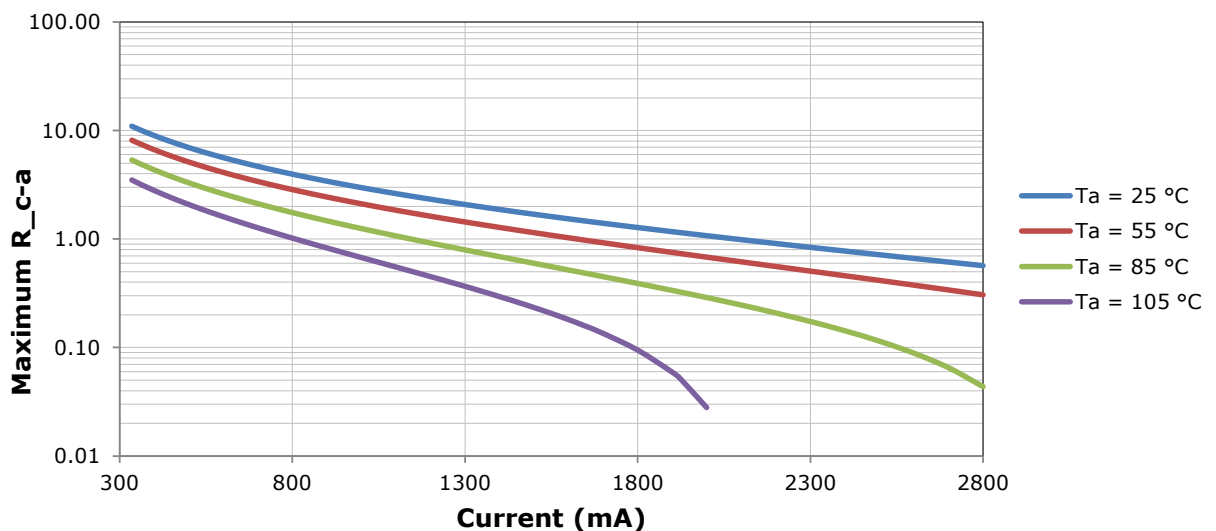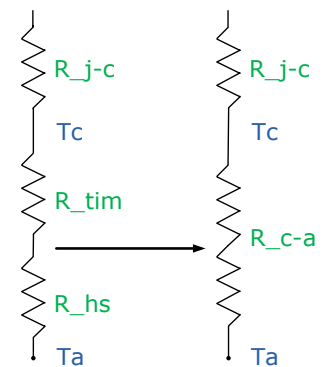
NOTES

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 Documentation sections of www.cree.com.

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.

PACKAGING

Cree CXA3070 LEDs are packaged in trays of 20. Five trays are sealed in an anti-static bag and placed inside a carton, for a total of 100 LEDs per carton. Each carton contains 100 LEDs from the same performance bin.

Dimensions are in inches.

Tolerances:

.x $\pm$ .1

.xx $\pm$ .05

.xxx $\pm$ .005

x° $\pm$ 1°

7.53

R.375

1.313

8.15

1.313

.38

LABEL WITH CREE
BIN CODE, QTY, LOT#

PATENT LABEL IS LOCATED
ON UNDERSIDE OF CARTON

BAG

LABEL WITH CREE
BIN CODE, QTY, LOT#

LABEL WITH CREE
BIN CODE, QTY, LOT #