# CREE 🚖

## Cree<sup>®</sup> XLamp<sup>®</sup> CXA3590 LED



#### **PRODUCT DESCRIPTION**

The XLamp<sup>®</sup> CXA3590 LED array expands Cree's family of high-flux, multi-die integrated arrays, offering high performance in an easy-to-use platform. With XLamp LED lighting-class reliability, the CXA3590's uniform emittina surface enables both directional and non-directional lighting applications and luminaire and lamp designs. Available in 2-step, 3-step and 4-step color consistency, and featuring a 30-mm optical source, the CXA3590 brings new levels of flux and efficacy to this form factor.

The CX Family LED Design Guide provides basic information on the requirements to use the CXA3590 LED successfully in luminaire designs.

#### **FEATURES**

- Available in 4-step, 3-step and 2-step EasyWhite<sup>®</sup> bins at 2700 K, 3000 K, 3500 K, 4000 K & 5000 K CCT and 4-step EasyWhite bins at 5700 K & 6500 K CCT
- Available in ANSI white bins at 4000 K, 5000 K, 5700 K & 6500 K CCT
- Available in 70-, 80-, 90- and 93-minimum CRI options
- Forward voltage options: 36-V class & 72-V class
- 85 °C binning and characterization
- Maximum drive current: 3600 mA (36 V), 1800 mA (72 V)
- 115° viewing angle, uniform chromaticity profile
- Top-side solder connections
- Thermocouple attach point
- NEMA SSL-3 2011 standard flux bins

- RoHS- and REACh-compliant
- UL<sup>®</sup> recognized component (E349212)

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#### **CHARACTERISTICS**

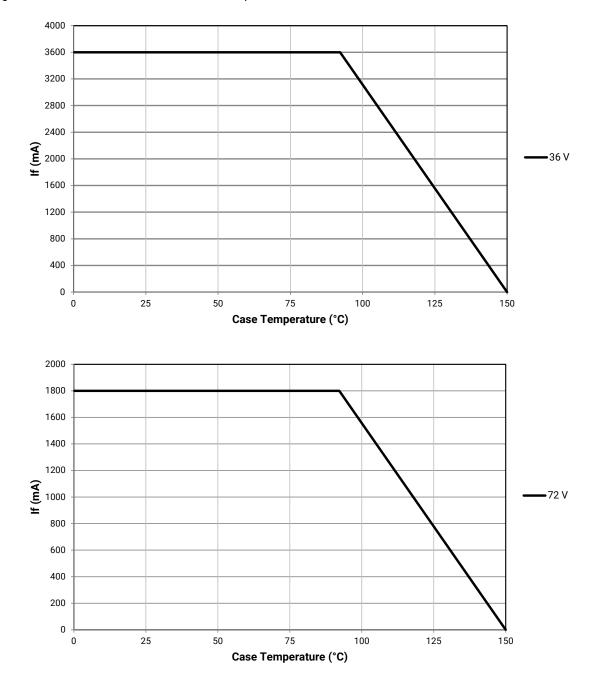
Characteristics	Unit	Minimum	Typical	Maximum
Viewing angle (FWHM)	degrees		115	
ESD withstand voltage (HBM per Mil-Std-883D)	V			8000
DC forward current (36 V)	mA			3600*
DC forward current (72 V)	mA			1800*
Reverse current (36 V, 72 V )	mA			0.1
Forward voltage (36 V, @ 2400 mA, $T_j$ = 85 °C)	V		38.5	
Forward voltage (36 V, @ 2400 mA, $T_j$ = 25 °C)	V			42
Forward voltage (72 V, @ 1200 mA, $T_j$ = 85 °C)	V		77	
Forward voltage (72 V, @ 1200 mA, $T_j$ = 25 °C)	V			84

\* Refer to the Operating Limits section.



#### **OPERATING LIMITS**

The maximum current rating of the CXA3590 is dependent on the case temperature (Tc) when the LED has reached thermal equilibrium under steady-state operation. The graphs shown below assume that the system design employs good thermal management (thermal interface material and heat sink) and may vary when poor thermal management is employed. Please refer to the Mechanical Dimensions section on page 19 for the location of the Tc measurement point.





## FLUX CHARACTERISTICS, EASYWHITE<sup>®</sup> ORDER CODES AND BINS - 36 V ( $I_F$ = 2400 mA, $T_J$ = 85 °C)

The following table provides order codes for XLamp CXA3590 LEDs. For a complete description of the order code nomenclature, please see the Bin and Order Code Formats section (page 19).

Nominal	С	RI	Minin	num Lumino	ous Flux		2-Step		3-Step		4-Step		
CCT	Min	Тур	Group	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*	Group	Order Code	Group	Order Code	Group	Order Code		
			BD	10,000	11,100						CXA3590-0000- 000N00BD65F		
	70	75	СВ	11,000	12,210					65F	CXA3590-0000- 000N00CB65F		
6500 K			CD	12,000	13,320						CXA3590-0000- 000N00CD65F		
0300 K			BB	9,500	10,545						CXA3590-0000- 000N0HBB65F		
	80		BD	10,000	11,100					65F	CXA3590-0000- 000N0HBD65F		
				СВ	11,000	12,210						CXA3590-0000- 000N0HCB65F	
			BD	10,000	11,100						CXA3590-0000- 000N00BD57F		
		70 75	70 75	75	СВ	11,000	12,210					57F	CXA3590-0000- 000N00CB57F
5700 K			CD	12,000	13,320						CXA3590-0000- 000N00CD57F		
5700 K					BB	9,500	10,545						CXA3590-0000- 000N0HBB57F
	80		BD	10,000	11,100					57F	CXA3590-0000- 000N0HBD57F		
			СВ	11,000	12,210						CXA3590-0000- 000N0HCB57F		
			BD	10,000	11,100		CXA3590-0000- 000N00BD50H				CXA3590-0000- 000N00BD50F		
	70	0 75	СВ	11,000	12,210	50H	CXA3590-0000- 000N00CB50H			50F	CXA3590-0000- 000N00CB50F		
			CD	12,000	13,320		CXA3590-0000- 000N00CD50H				CXA3590-0000- 000N00CD50F		
5000 K			BB	9,500	10,545		CXA3590-0000- 000N0HBB50H		CXA3590-0000- 000N0HBB50G		CXA3590-0000- 000N0HBB50F		
5000 K	80		BD	10,000	11,100	50H	CXA3590-0000- 000N0HBD50H	50G	CXA3590-0000- 000N0HBD50G	50F	CXA3590-0000- 000N0HBD50F		
			СВ	11,000	12,210		CXA3590-0000- 000N0HCB50H		CXA3590-0000- 000N0HCB50G		CXA3590-0000- 000N0HCB50F		
	90 95			AB	8,500	9,435	50H	CXA3590-0000- 000N0UAB50H	50G	CXA3590-0000- 000N0UAB50G	50F	CXA3590-0000- 000N0UAB50F	
	90	90	AD	9,000	9,990	5011	CXA3590-0000- 000N0UAD50H	500	CXA3590-0000- 000N0UAD50G	501	CXA3590-0000- 000N0UAD50F		

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 22).
- Cree XLamp CXA3590 LED order codes specify only a minimum flux bin and not a maximum. Cree may ship reels in flux bins higher than the minimum specified by the order code without advance notice. Shipments will always adhere to the chromaticity bin restrictions specified by the order code.
- \* Flux values @ 25 °C are calculated and for reference only.

Nominal	с	RI	Minimum Luminous Flux		ous Flux		2-Step		3-Step	4-Step	
CCT	Min	Тур	Group	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*	Group	Order Code	Group	Order Code	Group	Order Code
			BB	9,500	10,545		CXA3590-0000- 000N00BB40H				CXA3590-0000- 000N00BB40F
	70	75	BD	10,000	11,100	40H	CXA3590-0000- 000N00BD40H			40F	CXA3590-0000- 000N00BD40F
			СВ	11,000	12,210		CXA3590-0000- 000N00CB40H				CXA3590-0000- 000N00CB40F
4000 K			AD	9,000	9,435		CXA3590-0000- 000N0HAD40H		CXA3590-0000- 000N0HAD40G		CXA3590-0000- 000N0HAD40F
4000 10	80		BB	9,500	10,545	40H	CXA3590-0000- 000N0HBB40H	40G	CXA3590-0000- 000N0HBB40G	40H	CXA3590-0000- 000N0HBB40F
			BD	10,000	11,100		CXA3590-0000- 000N0HBD40H		CXA3590-0000- 000N0HBD40G		CXA3590-0000- 000N0HBD40F
	90	95	Z4	7,945	8,819	40H	CXA3590-0000- 000N0UZ440H	40G	CXA3590-0000- 000N0UZ440G	40F	CXA3590-0000- 000N0UZ440F
	90	90	AB	8,500	9,435	4011	CXA3590-0000- 000N0UAB40H	400	CXA3590-0000- 000N0UAB40G		CXA3590-0000- 000N0UAB40F
	80 3500 К 93 95		AD 9,000 9,990 CXA3590-0000- 000N00AD35H	CXA3590-0000- 000N00AD35G		CXA3590-0000- 000N00AD35F					
			BB	9,500	10,545	35H	CXA3590-0000- 000N00BB35H	35G	CXA3590-0000- 000N00BB35G	35F	CXA3590-0000- 000N00BB35F
3500 K			BD	10,000	11,100		CXA3590-0000- 000N00BD35H		CXA3590-0000- 000N00BD35G		CXA3590-0000- 000N00BD35F
		95	Z2	7,390	8,203	2511	CXA3590-0000- 000N0YZ235H	35G	CXA3590-0000- 000N0YZ235G	35F	CXA3590-0000- 000N0YZ235F
	93	90	Z4	7,945	8,819	35H	CXA3590-0000- 000N0YZ435H	300	CXA3590-0000- 000N0YZ435G	50F	CXA3590-0000- 000N0YZ435F
			AD	9,000	9,990		CXA3590-0000- 000N00AD30H		CXA3590-0000- 000N00AD30G		CXA3590-0000- 000N00AD30F
	80		BB	9,500	10,545	30H	CXA3590-0000- 000N00BB30H	30G	CXA3590-0000- 000N00BB30G	30F	CXA3590-0000- 000N00BB30F
3000 K			BD	10,000	11,100		CXA3590-0000- 000N00BD30H		CXA3590-0000- 000N00BD30G		CXA3590-0000- 000N00BD30F
	93	95	Z2	7,390	8,203	30H	CXA3590-0000- 000N0YZ230H	30G	CXA3590-0000- 000N0YZ230G	30F	CXA3590-0000- 000N0YZ230F
	55	90	Z4	7,945	8,819	5011	CXA3590-0000- 000N0YZ430H	500	CXA3590-0000- 000N0YZ430G	501	CXA3590-0000- 000N0YZ430F
			AB	8,500	9,435		CXA3590-0000- 000N00AB27H		CXA3590-0000- 000N00AB27G		CXA3590-0000- 000N00AB27F
	80		AD	9,000	9,990	27H	CXA3590-0000- 000N00AD27H	27G	CXA3590-0000- 000N00AD27G	27F	CXA3590-0000- 000N00AD27F
2700 K			BB	9,500	10,545		CXA3590-0000- 000N00BB27H		CXA3590-0000- 000N00BB27G		CXA3590-0000- 000N00BB27F
	93	3 95 -	Y4	6,910	7,670	27H	CXA3590-0000- 000N0YY427H	27G	CXA3590-0000- 000N0YY427G	27F	CXA3590-0000- 000N0YY427F
	90		Z2	7,390	8,203	2/11	CXA3590-0000- 000N0YZ227H	276	CXA3590-0000- 000N0YZ227G	271	CXA3590-0000- 000N0YZ227F

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 22).

• Cree XLamp CXA3590 LED order codes specify only a minimum flux bin and not a maximum. Cree may ship reels in flux bins higher than the minimum specified by the order code without advance notice. Shipments will always adhere to the chromaticity bin restrictions specified by the order code.

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



## FLUX CHARACTERISTICS, ANSI WHITE ORDER CODES AND BINS - 36 V (I<sub>F</sub> = 2400 mA, T<sub>J</sub> = 85 °C)

The following table provides order codes for XLamp CXA3590 LEDs. For a complete description of the order code nomenclature, please see the Bin and Order Code Formats section (page 19).

сст	С	RI	Min	imum Luminous	Flux			
Range	Min	Тур	Group	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*	Chromaticity Regions	Order Code	
			BD	10,000	11,100		CXA3590-0000-000N00BD0E1	
	70	70 75	СВ	11,000	12,210	1A0, 1B0, 1C0, 1D0, 65F	CXA3590-0000-000N00CB0E1	
6500 K			CD	12,000	13,320		CXA3590-0000-000N00CD0E1	
0000 K			BB	9,500	10,545		CXA3590-0000-000N0HBB0E1	
	80		BD	10,000	11,100	1A0, 1B0, 1C0, 1D0, 65F	CXA3590-0000-000N0HBD0E1	
			СВ	11,000	12,210		CXA3590-0000-000N0HCB0E1	
				BD	10,000	11,100		CXA3590-0000-000N00BD0E2
		75	СВ	11,000	12,210	2A0, 2B0, 2C0, 2D0, 57F	CXA3590-0000-000N00CB0E2	
5700 K			CD	12,000	13,320		CXA3590-0000-000N00CD0E2	
5700 K			BB	9,500	10,545		CXA3590-0000-000N0HBB0E2	
	80		BD	10,000	11,100	2A0, 2B0, 2C0, 2D0, 57F	CXA3590-0000-000N0HBD0E2	
			СВ	11,000	12,210		CXA3590-0000-000N0HCB0E2	
			BD	10,000	11,100		CXA3590-0000-000N00BD0E3	
	70	75	СВ	11,000	12,210	3A0, 3B0, 3C0, 3D0, 50F	CXA3590-0000-000N00CB0E3	
5000 K			CD	12,000	13,320		CXA3590-0000-000N00CD0E3	
5000 K			BB	9,500	10,545		CXA3590-0000-000N0HBB0E3	
	80		BD	10,000	11,100	3A0, 3B0, 3C0, 3D0, 50F	CXA3590-0000-000N0HBD0E3	
			СВ	11,000	12,210		CXA3590-0000-000N0HCB0E3	
4000 K	70	75	BB	9,500	10,545	5A0, 5B0, 5C0, 5D0, 40F	CXA3590-0000-000N00BB0E5	
4000 K	70	75	BD	10,000	11,100	JAU, JBU, JCU, JDU, 4UF	CXA3590-0000-000N00BD0E5	

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 22).
- Cree XLamp CXA3590 LED order codes specify only a minimum flux bin and not a maximum. Cree may ship reels in flux bins higher than the minimum specified by the order code without advance notice. Shipments will always adhere to the chromaticity bin restrictions specified by the order code.
- \* Flux values @ 25 °C are calculated and for reference only.



## FLUX CHARACTERISTICS, EASYWHITE® ORDER CODES AND BINS - 72 V (I<sub>F</sub> = 1200 mA, T<sub>J</sub> = 85 °C)

The following table provides order codes for XLamp CXA3590 LEDs. For a complete description of the order code nomenclature, please see the Bin and Order Code Formats section (page 19).

Nominal	C	RI	Minin	num Lumino	ous Flux		2-Step		3-Step		4-Step					
CCT	Min	Тур	Group	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*	Group	Order Code	Group	Order Code	Group	Order Code					
			BD	10,000	11,100						CXA3590-0000- 000R00BD65F					
	70	70 75	СВ	11,000	12,210					65F	CXA3590-0000- 000R00CB65F					
6500 K			CD	12,000	13,320						CXA3590-0000- 000R00CD65F					
0300 K			BB	9,500	10,545						CXA3590-0000- 000R0HBB65F					
	80		BD	10,000	11,100					65F	CXA3590-0000- 000R0HBD65F					
			СВ	11,000	12,210						CXA3590-0000- 000R0HCB65F					
			BD	10,000	11,100						CXA3590-0000- 000R00BD57F					
	70 700 K	70 75	70	70 75	70 75	70 75	75	СВ	11,000	12,210					57F	CXA3590-0000- 000R00CB57F
5700 K			CD	12,000	13,320						CXA3590-0000- 000R00CD57F					
5700 K		0 BC	BB	9,500	10,545					57F	CXA3590-0000- 000R0HBB57F					
	80		BD	10,000	11,100						CXA3590-0000- 000R0HBD57F					
			СВ	11,000	12,210						CXA3590-0000- 000R0HCB57F					
			BD	10,000	11,100		CXA3590-0000- 000R00BD50H				CXA3590-0000- 000R00BD50F					
	70	75	СВ	11,000	12,210	50H	CXA3590-0000- 000R00CB50H			50F	CXA3590-0000- 000R00CB50F					
			CD	12,000	13,320		CXA3590-0000- 000R00CD50H				CXA3590-0000- 000R00CD50F					
5000 K			BB	9,500	10,545		CXA3590-0000- 000R0HBB50H		CXA3590-0000- 000R0HBB50G		CXA3590-0000- 000R0HBB50F					
5000 K	80		BD	10,000	11,100	50H	CXA3590-0000- 000R0HBD50H	50G	CXA3590-0000- 000R0HBD50G	50F	CXA3590-0000- 000R0HBD50F					
			СВ	11,000	12,210		CXA3590-0000- 000R0HCB50H		CXA3590-0000- 000R0HCB50G		CXA3590-0000- 000R0HCB50F					
	90 95	90	00 05	AB	8,500	9,435	50H	CXA3590-0000- 000R0UAB50H	50G	CXA3590-0000- 000R0UAB50G	50F	CXA3590-0000- 000R0UAB50F				
	50	20	AD	9,000	9,990	0011	CXA3590-0000- 000R0UAD50H	000	CXA3590-0000- 000R0UAD50G	001	CXA3590-0000- 000R0UAD50F					

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 22).
- Cree XLamp CXA3590 LED order codes specify only a minimum flux bin and not a maximum. Cree may ship reels in flux bins higher than the minimum specified by the order code without advance notice. Shipments will always adhere to the chromaticity bin restrictions specified by the order code.
- \* Flux values @ 25 °C are calculated and for reference only.

## FLUX CHARACTERISTICS, EASYWHITE<sup>®</sup> ORDER CODES AND BINS - 72 V (I<sub>F</sub> = 1200 mA, T<sub>J</sub> = 85 °C) - CONTINUED

Nominal	С	RI	Minin	num Lumino	ous Flux		2-Step		3-Step	4-Step	
CCT	Min	Тур	Group	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*	Group	Order Code	Group	Order Code	Group	Order Code
			BB	9,500	10,545		CXA3590-0000- 000R00BB40H				CXA3590-0000- 000R00BB40F
	70	75	BD	10,000	11,100	40H	CXA3590-0000- 000R00BD40H			40F	CXA3590-0000- 000R00BD40F
			СВ	11,000	12,210		CXA3590-0000- 000R00CB40H				CXA3590-0000- 000R00CB40F
4000 K			AD	9,000	9,435		CXA3590-0000- 000R0HAD40H		CXA3590-0000- 000R0HAD40G		CXA3590-0000- 000R0HAD40F
4000 K	80		BB	9,500	10,545	40H	CXA3590-0000- 000R0HBB40H	40G	CXA3590-0000- 000R0HBB40G	40H	CXA3590-0000- 000R0HBB40F
			BD	10,000	11,100		CXA3590-0000- 000R0HBD40H		CXA3590-0000- 000R0HBD40G		CXA3590-0000- 000R0HBD40F
	90	95	Z4	7,945	8,819	40H	CXA3590-0000- 000R0UZ440H	40G	CXA3590-0000- 000R0UZ440G	40F	CXA3590-0000- 000R0UZ440F
	50	50	AB	8,500	9,435	4011	CXA3590-0000- 000R0UAB40H	400	CXA3590-0000- 000R0UAB40G	40F	CXA3590-0000- 000R0UAB40F
			AD	9,000	9,990		CXA3590-0000- 000R00AD35H		CXA3590-0000- 000R00AD35G		CXA3590-0000- 000R00AD35F
	80		BB	9,500	10,545	35H	CXA3590-0000- 000R00BB35H	35G	CXA3590-0000- 000R00BB35G	35F	CXA3590-0000- 000R00BB35F
3500 K	3500 K		BD	10,000	11,100		CXA3590-0000- 000R00BD35H		CXA3590-0000- 000R00BD35G		CXA3590-0000- 000R00BD35F
		95	Z2	7,390	8,203	35H	CXA3590-0000- 000R0YZ235H	35G	CXA3590-0000- 000R0YZ235G	35F	CXA3590-0000- 000R0YZ235F
	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Z4	7,945	8,819	330	CXA3590-0000- 000R0YZ435H		CXA3590-0000- 000R0YZ435G	001	CXA3590-0000- 000R0YZ435F
			AD	9,000	9,990		CXA3590-0000- 000R00AD30H		CXA3590-0000- 000R00AD30G		CXA3590-0000- 000R00AD30F
	80		BB	9,500	10,545	30H	CXA3590-0000- 000R00BB30H	30G	CXA3590-0000- 000R00BB30G	30F	CXA3590-0000- 000R00BB30F
3000 K			BD	10,000	11,100		CXA3590-0000- 000R00BD30H		CXA3590-0000- 000R00BD30G		CXA3590-0000- 000R00BD30F
	93	95	Z2	7,390	8,203	30H	CXA3590-0000- 000R0YZ230H	30G	CXA3590-0000- 000R0YZ230G	30F	CXA3590-0000- 000R0YZ230F
	50	50	Z4	7,945	8,819	5011	CXA3590-0000- 000R0YZ430H	500	CXA3590-0000- 000R0YZ430G	501	CXA3590-0000- 000R0YZ430F
			AB	8,500	9,435		CXA3590-0000- 000R00AB27H		CXA3590-0000- 000R00AB27G		CXA3590-0000- 000R00AB27F
	80		AD	9,000	9,990	27H	CXA3590-0000- 000R00AD27H	27G	CXA3590-0000- 000R00AD27G	27F	CXA3590-0000- 000R00AD27F
2700 K			BB	9,500	10,545		CXA3590-0000- 000R00BB27H		CXA3590-0000- 000R00BB27G		CXA3590-0000- 000R00BB27F
	02	93 95	Y4	6,910	7,670	27H	CXA3590-0000- 000R0YY427H	27G	CXA3590-0000- 000R0YY427G	27F	CXA3590-0000- 000R0YY427F
			Z2	7,390	8,203		CXA3590-0000- 000R0YZ227H	270	CXA3590-0000- 000R0YZ227G	271	CXA3590-0000- 000R0YZ227F

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 22).

• Cree XLamp CXA3590 LED order codes specify only a minimum flux bin and not a maximum. Cree may ship reels in flux bins higher than the minimum specified by the order code without advance notice. Shipments will always adhere to the chromaticity bin restrictions specified by the order code.

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



## FLUX CHARACTERISTICS, ANSI WHITE ORDER CODES AND BINS - 72 V (I<sub>F</sub> = 1200 mA, T<sub>J</sub> = 85 °C)

The following table provides order codes for XLamp CXA3590 LEDs. For a complete description of the order code nomenclature, please see the Bin and Order Code Formats section (page 19).

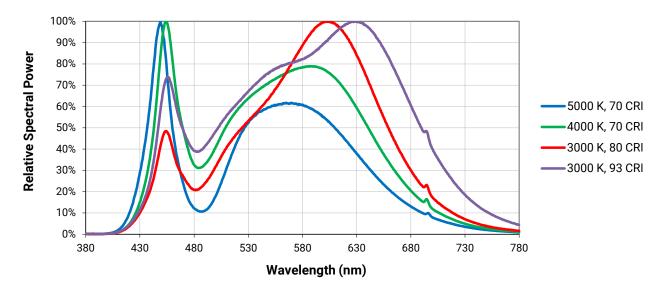
сст	С	RI	Min	imum Luminous	Flux			
Range	Min	Тур	Group	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*	Chromaticity Regions	Order Code	
			BD	10,000	11,100		CXA3590-0000-000R00BD0E1	
	70	0 75	СВ	11,000	12,210	1A0, 1B0, 1C0, 1D0, 65F	CXA3590-0000-000R00CB0E1	
6500 K			CD	12,000	13,320		CXA3590-0000-000R00CD0E1	
0000 K	80		BB	9,500	10,545		CXA3590-0000-000R0HBB0E1	
			BD	10,000	11,100	1A0, 1B0, 1C0, 1D0, 65F	CXA3590-0000-000R0HBD0E1	
			СВ	11,000	12,210		CXA3590-0000-000R0HCB0E1	
	70 75			BD	10,000	11,100		CXA3590-0000-000R00BD0E2
		75	СВ	11,000	12,210	2A0, 2B0, 2C0, 2D0, 57F	CXA3590-0000-000R00CB0E2	
5700 K			CD	12,000	13,320		CXA3590-0000-000R00CD0E2	
5700 K			BB	9,500	10,545		CXA3590-0000-000R0HBB0E2	
	80	80		BD	10,000	11,100	2A0, 2B0, 2C0, 2D0, 57F	CXA3590-0000-000R0HBD0E2
			СВ	11,000	12,210		CXA3590-0000-000R0HCB0E2	
			BD	10,000	11,100		CXA3590-0000-000R00BD0E3	
	70	75	СВ	11,000	12,210	3A0, 3B0, 3C0, 3D0, 50F	CXA3590-0000-000R00CB0E3	
5000 K			CD	12,000	13,320		CXA3590-0000-000R00CD0E3	
5000 K			BB	9,500	10,545		CXA3590-0000-000R0HBB0E3	
	80		BD	10,000	11,100	3A0, 3B0, 3C0, 3D0, 50F	CXA3590-0000-000R0HBD0E3	
			СВ	11,000	12,210		CXA3590-0000-000R0HCB0E3	
4000 K	70	75	BB	9,500	10,545	5A0, 5B0, 5C0, 5D0, 40F	CXA3590-0000-000R00BB0E5	
4000 K	70	75	BD	10,000	11,100	JAU, JEU, JEU, JEU, 40F	CXA3590-0000-000R00BD0E5	

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 22).
- Cree XLamp CXA3590 LED order codes specify only a minimum flux bin and not a maximum. Cree may ship reels in flux bins higher than the minimum specified by the order code without advance notice. Shipments will always adhere to the chromaticity bin restrictions specified by the order code.
- \* Flux values @ 25 °C are calculated and for reference only.

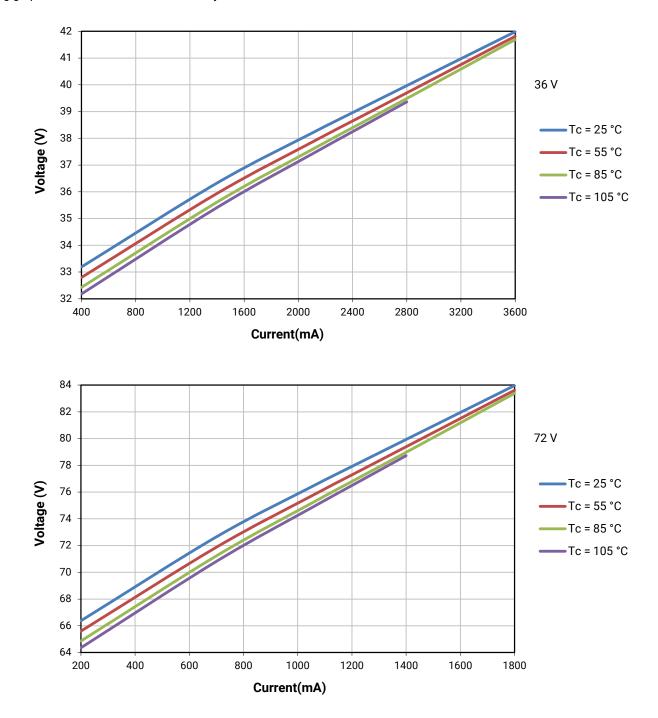
#### **RELATIVE SPECTRAL POWER DISTRIBUTION**

The following graph is the result of a series of pulsed measurements at 2400 mA for the 36-V CXA3590 and 1200 mA for the 72-V CXA3590 and  $T_1 = 85$  °C.



#### **ELECTRICAL CHARACTERISTICS**

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



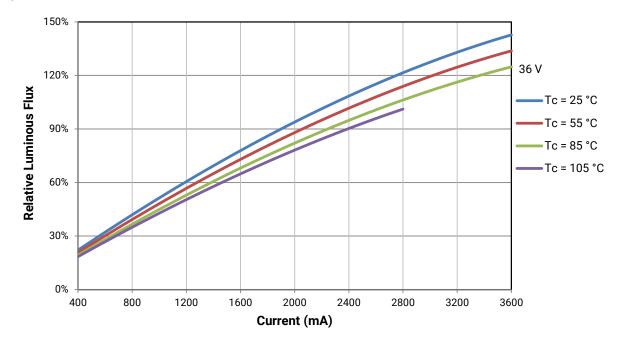


## **RELATIVE LUMINOUS FLUX**

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

- · Measurements of CXA3590 at steady-state operation at the given conditions, divided by
- Flux measured during binning, which is a pulsed measurement at 2400 mA at T<sub>J</sub> = 85 °C for the 36-V CXA3590.

Using the 36-V CXA3590 LED as an example, at steady-state operation of Tc = 25 °C,  $I_F = 1200$  mA, the relative luminous flux ratio is 60% in the chart below. A CXA3590 LED that measures 11,000 Im during binning will deliver 6,600 Im (11,000 \* 0.6) at steady-state operation of Tc = 25 °C,  $I_F = 1200$  mA.

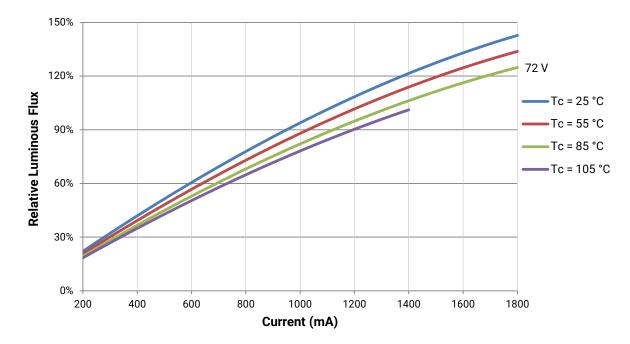


#### **RELATIVE LUMINOUS FLUX - CONTINUED**

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

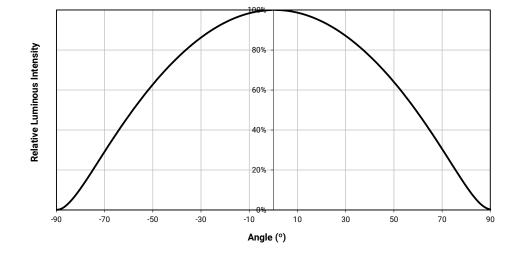
- Measurements of CXA3590 at steady-state operation at the given conditions, divided by
- Flux measured during binning, which is a pulsed measurement at 1200 mA at T<sub>1</sub> = 85 °C for the 72-V CXA3590.

Using the 72-V CXA3590 LED as an example, at steady-state operation of Tc = 105 °C,  $I_F$  = 1200 mA, the relative luminous flux ratio is 90% in the chart below. A CXA3590 LED that measures 11,000 lm during binning will deliver 9,900 lm (11,000 \* 0.9) at steady-state operation of Tc = 105 °C,  $I_F$  = 1200 mA.





## **TYPICAL SPATIAL DISTRIBUTION**



## PERFORMANCE GROUPS - BRIGHTNESS (36 V, $I_F = 2400 \text{ mA}$ ; 72 V $I_F = 1200 \text{ mA}$ , $T_J = 85 \text{ °C}$ )

XLamp CXA3590 LEDs are tested for luminous flux and placed into one of the following bins.

Group Code	Minimum Luminous Flux	Maximum Luminous Flux
Y4	6,910	7,390
Z2	7,390	7,945
Z4	7,945	8,500
AB	8,500	9,000
AD	9,000	9,500
BB	9,500	10,000
BD	10,000	11,000
СВ	11,000	12,000
CD	12,000	13,000
DB	13,000	14,000



## **PERFORMANCE GROUPS - CHROMATICITY (T<sub>J</sub> = 85 °C)**

XLamp CXA3590 LEDs are tested for chromaticity and placed into one of the regions defined by the following bounding coordinates.

EasyV	Vhite Color Ter	nperatures – 2	-Step
Code	ССТ	x	у
		0.3429	0.3507
50H	5000 K	0.3434	0.3571
JUH	2000 K	0.3475	0.3604
		0.3469	0.3539
		0.3784	0.3741
40H	4000 K	0.3804	0.3818
	4000 K	0.3867	0.3857
		0.3844	0.3778
		0.4030	0.3857
35H	3500 K	0.4061	0.3941
320		0.4132	0.3976
		0.4099	0.3890
		0.4291	0.3973
30H	3000 K	0.4333	0.4062
300	3000 K	0.4395	0.4084
		0.4351	0.3994
		0.4528	0.4046
27H	0700 //	0.4578	0.4138
2/11	2700 K	0.4638	0.4152
		0.4586	0.4060

	EasyWhite Color Temperatures - 3-Step Ellipse										
Din Cada	OOT	Center	Point	Major Axis	Minor Axis	Rotation Angle					
Bin Code	ССТ	x	у	а	b	(°)					
50G	5000 K	0.3447	0.3553	0.00840	0.00312	65.0					
40G	4000 K	0.3818	0.3797	0.00939	0.00402	53.7					
35G	3500 K	0.4073	0.3917	0.00927	0.00414	54.0					
30G	3000 K	0.4338	0.4030	0.00834	0.00408	53.2					
27G	2700 K	0.4577	0.4099	0.00834	0.00420	48.5					



## **PERFORMANCE GROUPS - CHROMATICITY (T**<sub>J</sub> = 85 °C) - CONTINUED

EasyHite Color Terrures - 4-StepCodeCCTxy0.30970.319665F6500 K0.30790.329765F6500 K0.31640.33220.31760.32750.31760.327563766301640.32750.3253637763020.33250.33256376633300.33930.351463300633300.33930.351460.34090.36400.36840.3521600 K0.34840.35210.34846034040.36810.36830.3758400 K0.37420.38150.381663610.37820.38160.391235F3500 K0.41860.403735F3500 K0.41860.403730F3000 K0.41410.386530F3000 K0.41420.391027F2700 K0.44750.394127F2700 K0.45730.41783000 K0.44750.3941					
65F0.30970.319665F6500 K0.30790.32970.31640.33820.31760.32750.31760.32750.32530.325357F5700 K0.32490.34390.3300.33930.33930.339350F5000 K0.34150.358650F5000 K0.34990.365450F5000 K0.34990.365460.34990.36540.34990.365460.34840.35210.34910.368560.34840.35210.39120.3917400 K0.37820.38150.3758400 K0.39120.39170.386335F3500 K0.40400.396035F3500 K0.41860.403730F3000 K0.41860.403730F3000 K0.41220.391930F3000 K0.41220.391427F2700 K0.44750.399427F2700 K0.45730.41780.46950.42070.4207	EasyWhite Color Temperatures – 4-Step				
65F6500 K0.30790.32970.31640.33820.31760.32750.31760.32750.3770.32530.332557F6.032490.34390.3300.33930.35140.3300.33930.339350F6.034090.36540.340F0.34490.36540.340F0.34840.352140F0.37440.36850.37820.38010.391235F3500 K0.38630.3758350F0.39120.39173600 K0.41460.40370.41160.38650.403730F3000 K0.41460.403730F3000 K0.44490.41410.43590.39600.44750.394027F2700 K0.45730.41782762700 K0.45730.4178	Code	ССТ	х	у	
65F6500 K0.31640.33820.31760.32750.32530.332557F5700 K0.32490.34390.3300.33930.33930.339360.3300.33930.33930.339350F5000 K0.34070.345950F5000 K0.34150.36540.34070.36540.34990.365460.3490.36540.34990.365460.34840.35210.39120.391740F4000 K0.37820.391260.37620.30170.39120.391735F3500 K0.43630.375830F3500 K0.41860.403730F3000 K0.41410.386530F3000 K0.44490.414130F3000 K0.44750.399427F2700 K0.45730.417830F3090 K0.44750.3994	65F		0.3097	0.3196	
And iteration0.31640.33820.31760.32750.31760.32750.3750.32530.32490.34390.3300.33930.3300.33930.3300.33930.34070.34590.34070.34590.34070.34590.34070.36840.34990.36540.34490.35210.34400.36850.34400.36850.37820.38130.39120.39170.38630.37580.39120.39170.38630.37580.39120.39170.38630.37580.39120.39170.38630.37583500 K0.41860.40400.39600.41160.38650.41160.38650.41160.40373000 K0.42420.43590.39600.44490.41410.43590.396027F2700 K0.45730.41780.46950.4207		6500 K	0.3079	0.3297	
57F0.32530.332557F0.32490.34390.3310.35140.33300.33930.3300.33930.34070.34590.34070.34590.34070.34590.34150.35860.34990.36540.34840.35210.34840.35210.37820.38370.37820.38370.39120.39170.38630.37580.39540.39120.39540.39810.39600.40400.41160.38650.41160.38650.44490.41410.43590.39600.44750.39942762700 K0.45730.41780.46950.4207		0300 K	0.3164	0.3382	
57F5700 K0.32490.34390.3310.35140.33300.33930.33000.33930.33000.33930.33000.339350F5000 K0.34150.34590.34150.35860.34990.36540.34990.36540.34940.35210.34440.35210.37440.36850.37420.39120.39120.39170.38630.37580.38630.37583506 K0.40400.40400.39600.41160.3865306 K0.41260.41210.41410.43590.3940307 K0.4475276 K0.45730.42070.4107			0.3176	0.3275	
57F5700 K0.00000 (0.0000) (0.000) (0.0000) (0.000)			0.3253	0.3325	
And 0.33310.35140.3300.33930.3300.33930.3300.33930.3300.339350F0.34070.345950F5000 K0.34990.36540.34990.36540.34990.36540.3440.35210.34840.352140F4000 K0.37820.383740F0.37440.36850.375835F3500 K0.39810.390035F3500 K0.41860.40370.41160.38650.4178300F0.41260.4096300F0.44490.41410.43590.396027F2700 K0.45730.41783060.45730.4107	67E	5700 K	0.3249	0.3439	
50F0.34070.345950F5000 K0.34150.35860.34990.36540.34990.36540.34840.35210.34840.35214004000 K0.37820.38370.37620.37820.39120.39170.38630.37580.39120.391735F3500 K0.40400.396035F3500 K0.41160.38650.41160.40370.41160.386530F3000 K0.42420.391930F3000 K0.43220.409630F3000 K0.44490.414130F3000 K0.44750.394027F2700 K0.45730.41783060.45730.4207	37F	5700 K	0.3331	0.3514	
50F 5000 K 0.3415 0.3586   0.3499 0.3654   0.3499 0.3654   0.3484 0.3521   0.3484 0.3521   0.3484 0.3521   0.3744 0.3685   0.3782 0.3912   0.3912 0.3917   0.3912 0.3917   0.3863 0.3758   0.3863 0.3758   35F 0.4040   35F 0.4040   35F 0.4116   0.4116 0.3865   0.4116 0.3865   0.4116 0.3919   3000 K 0.4242   0.4141 0.4325   0.4359 0.3960   0.4359 0.3960   0.4445 0.3994   27F 2700 K   0.4573 0.4178   0.4695 0.4207			0.3330	0.3393	
50F5000 K0.34990.36540.34840.35210.34840.352140F4000 K0.37820.3837400 K0.37820.39170.39170.39120.39120.39170.39170.38630.37580.38630.375835F3500 K0.40400.39660.41160.38650.41360.403730F3000 K0.42420.391930F3000 K0.42420.391930F0.4160.43590.396027F2700 K0.45730.41782700 K0.45730.4207			0.3407	0.3459	
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	FOF	5000 K	0.3415	0.3586	
40F 0.3744 0.3685   400 K 0.3782 0.3837   0.3782 0.3917 0.3912   0.3762 0.3917 0.3912   0.3758 0.3912 0.3917   0.3863 0.3758 0.3912   35F 3500 K 0.3981 0.3800   0.4040 0.3966 0.4040 0.3966   0.4116 0.4037 0.4116 0.3865   3000 K 0.4242 0.3919 0.4141   0.4322 0.4096 0.4141 0.4359 0.3960   30F 3000 K 0.4475 0.3960 0.4178   27F 2700 K 0.4573 0.4178	30F	3000 K	0.3499	0.3654	
40F 0.3782 0.3837   400 K 0.3782 0.3817   0.3912 0.3917 0.3917   0.3863 0.3758 0.3758   0.3863 0.3758 0.3863   35F 3500 K 0.3981 0.3800   35F 3500 K 0.4040 0.3966   0.4116 0.3865 0.4116 0.3865   30F 3000 K 0.4242 0.3919   30F 3000 K 0.4242 0.3919   0.4322 0.4096 0.4141 0.4325   0.4359 0.3960 0.4449 0.4141   0.4359 0.3960 0.4475 0.3994   27F 2700 K 0.4573 0.4178			0.3484	0.3521	
40F 4000 K 0.3912 0.3917   0.3912 0.3917 0.3917   0.3863 0.3758 0.3863 0.3758   35F 3500 K 0.3981 0.3800   0.4146 0.4037 0.4103 0.3966   0.4116 0.3865 0.4116 0.3865   30F 3000 K 0.4242 0.4096   0.4322 0.4096 0.4141   0.4359 0.3960 0.4359   27F 2700 K 0.4475 0.3994			0.3744	0.3685	
1 0.3912 0.3917   0.3863 0.3758   0.3964 0.3980   35F 3500 K 0.4040   0.4116 0.3966   0.4116 0.3865   0.4116 0.3865   30F 0.4242   3000 K 0.4322   0.4359 0.4096   0.4449 0.4141   0.4359 0.3960   27F 2700 K   27F 2700 K	405	4000 K	0.3782	0.3837	
35F 0.3981 0.3800   35F 3500 K 0.4040 0.3966   0.4116 0.4037 0.4186 0.4037   0.4116 0.3865 0.4116 0.3865   30F 3000 K 0.4242 0.3919   0.4322 0.4096 0.4141   0.4359 0.3960 0.4359   27F 2700 K 0.4573 0.4178   0.4695 0.4207 0.4207	406	4000 K	0.3912	0.3917	
35F 3500 K 0.40400 0.3966   0.4186 0.4037 0.4137   0.4116 0.3865 0.4116 0.3865   30F 0.4242 0.3919   30F 0.4322 0.4096   0.4141 0.4359 0.4141   0.4359 0.3960 0.4475   27F 2700 K 0.4573 0.4178   0.4695 0.4207 0.4207			0.3863	0.3758	
35F 3500 K 0.4186 0.4037   0.4116 0.3865 0.4116 0.3865   30F 0.4242 0.3919 0.4322 0.4096   30F 0.4322 0.4096 0.4141   0.4359 0.3960 0.4359 0.3960   27F 2700 K 0.4573 0.4178   0.4695 0.4207 0.4207			0.3981	0.3800	
0.4186 0.4037   0.4186 0.4037   0.4116 0.3865   0.4116 0.3919   0.4242 0.3919   0.4322 0.4096   0.4149 0.4141   0.4359 0.3960   27F 2700 K   27F 2700 K	255	2500 K	0.4040	0.3966	
30F 0.4242 0.3919   3000 K 0.4322 0.4096   0.4322 0.4096 0.4141   0.4359 0.3960   27F 2700 K 0.4573 0.4178   0.4573 0.41207	30F	3500 K	0.4186	0.4037	
30F 3000 K 0.4322 0.4096   0.4322 0.4096 0.4141   0.4359 0.3960   27F 2700 K 0.4573 0.4178   0.4573 0.4178 0.4207			0.4116	0.3865	
30F 3000 K 0.4449 0.4141   0.4359 0.3960   27F 2700 K 0.4573 0.4178   0.4695 0.4207			0.4242	0.3919	
0.4449 0.4141   0.4359 0.3960   0.4475 0.3994   0.4573 0.4178   0.4573 0.4178   0.4695 0.4207	30F	2000 K	0.4322	0.4096	
27F 2700 K 0.4475 0.3994 0.4573 0.4178 0.4695 0.4207		3000 K	0.4449	0.4141	
27F 2700 K 0.4573 0.4178 0.4695 0.4207			0.4359	0.3960	
27F 2700 K 0.4695 0.4207			0.4475	0.3994	
0.4695 0.4207	275	2700 K	0.4573	0.4178	
0.4589 0.4021	27F	2700 K	0.4695	0.4207	
			0.4589	0.4021	



## PERFORMANCE GROUPS - CHROMATICITY (T<sub>j</sub> = 85 °C) - CONTINUED

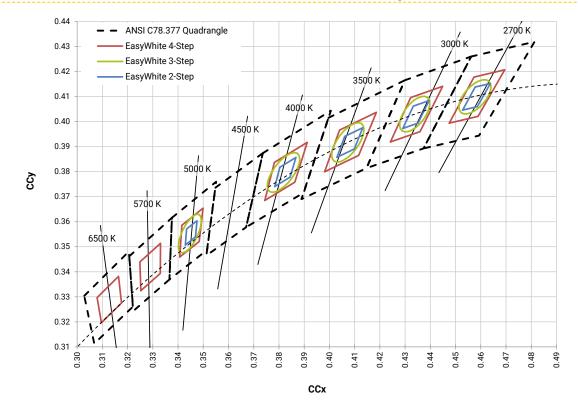
ANSI White Bins				
Code	ССТ	Bin Code	x	у
		1A0	0.3048	0.3207
			0.3130	0.3290
			0.3144	0.3186
			0.3068	0.3113
0E1		1B0	0.3028	0.3304
			0.3115	0.3391
	6500 K		0.3130	0.3290
			0.3048	0.3207
		1C0	0.3115	0.3391
			0.3205	0.3481
			0.3213	0.3373
			0.3130	0.3290
		1D0	0.3130	0.3290
			0.3213	0.3373
			0.3221	0.3261
			0.3144	0.3186

	AN	SI White Bi	ns	
Code	ССТ	Bin Code	x	у
		2A0	0.3215	0.3350
			0.3290	0.3417
			0.3290	0.3300
	5700 K		0.3222	0.3243
		2B0	0.3207	0.3462
			0.3290	0.3538
			0.3290	0.3417
0E2			0.3215	0.3350
UEZ		2C0	0.3290	0.3538
			0.3376	0.3616
			0.3371	0.3490
			0.3290	0.3417
		2D0	0.3290	0.3417
			0.3371	0.3490
			0.3366	0.3369
			0.3290	0.3300

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

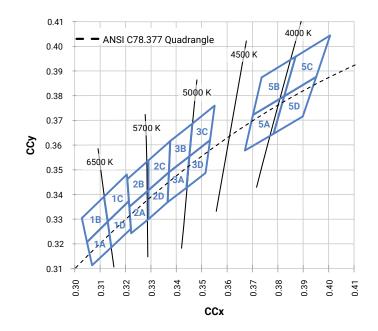
ANSI White Bins				
Code	ССТ	Bin Code	x	у
	5000 K	3A0	.3371	.3490
			.3451	.3554
			.3440	.3427
			.3366	.3369
		3B0	.3376	.3616
			.3463	.3687
			.3451	.3554
0E3			.3371	.3490
UE3		3C0	.3463	.3687
			.3551	.3760
			.3533	.3620
			.3451	.3554
		3D0	.3451	.3554
			.3533	.3620
			.3515	.3487
			.3440	.3427





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

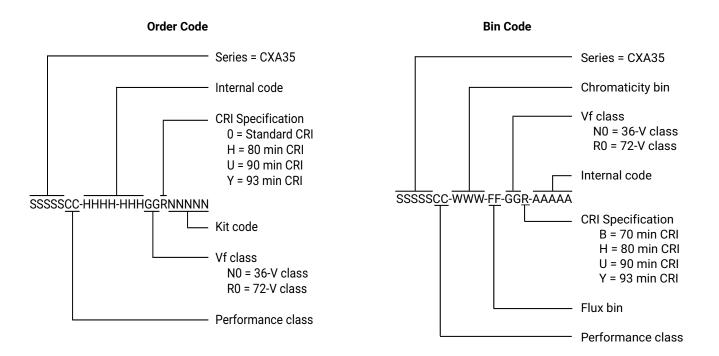
## CREE ANSI WHITE BINS PLOTTED ON THE 1931 CIE COLOR SPACE (T, = 85 °C)



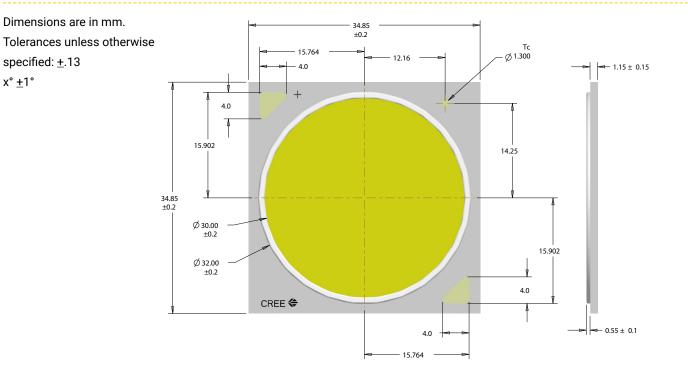
CREE 🚖

#### **BIN AND ORDER CODE FORMATS**

Bin codes and order codes are configured as follows:



#### **MECHANICAL DIMENSIONS**

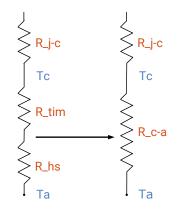


#### THERMAL DESIGN

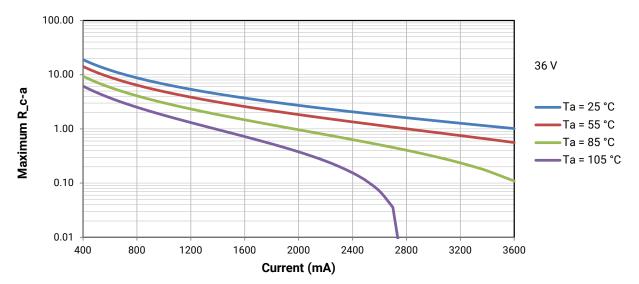
The CXA family of LED arrays can include over a hundred different LED die inside one package, and thus over a hundred different junction temperatures ( $T_j$ ). Cree has intentionally removed junction-temperature-based operating limits and replaced the commonplace maximum  $T_j$  calculations with maximum 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 22 for the Operating Limit specification.

There is no need to calculate for  $T_J$  inside the package, as the thermal management design process, specifically from solder point ( $T_{sp}$ ) 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 Thermal Management application note. For CXA soldering recommendations and more information on thermal interface materials (TIM) and connection methods, please refer to the Cree XLamp CX Family LEDs soldering and handling document. The CX Family LED besign Guide provides basic information on the requirements to use Cree XLamp CXA LEDs successfully in luminaire designs.

To keep the CXA3590 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 each graph is a base 10 logarithmic scale.

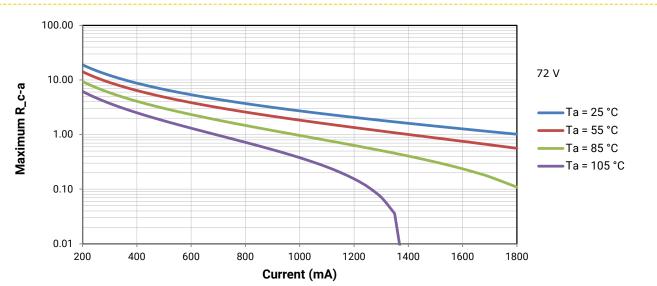


As the figure at right shows, the R\_c-a value is the sum of the thermal resistance of the TIM (R\_tim) plus the thermal resistance of the heat sink (R\_hs).





#### **THERMAL DESIGN - CONTINUED**



#### **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 Documentation sections 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 notice 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. REACh banned substance information (REACh Article 67) 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 an 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.

#### PACKAGING

Cree CXA3590 LEDs are packaged in trays of 10. Five trays are sealed in an anti-static bag and placed inside a carton, for a total of 50 LEDs per carton. Each carton contains 50 LEDs from the same performance bin.

Dimensions are in inches. Tolerances:  $\pm$ .13 x°  $\pm$ 1°

