CLD-DS81 REV 8A

Cree® XLamp® CXA3590 LED

PRODUCT DESCRIPTION

The XLamp® 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 emitting 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® 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 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® 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		36**	
Forward voltage (36 V, @ 2400 mA, T_j = 25 °C)	V			41**
Forward voltage (72 V, @ 1200 mA, T_j = 85 °C)	V		72**	
Forward voltage (72 V, @ 1200 mA, T_j = 25 °C)	V			81**

* Refer to the Operating Limits section.

** For CXA3590 LEDs having order codes with a CXA3590-xxxx-xxxN0xxxxxx or CXA3590-xxxx-xxxR0xxxxxx format, the forward voltage values are as follows:

Characteristics	Unit	Minimum	Typical	Maximum
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

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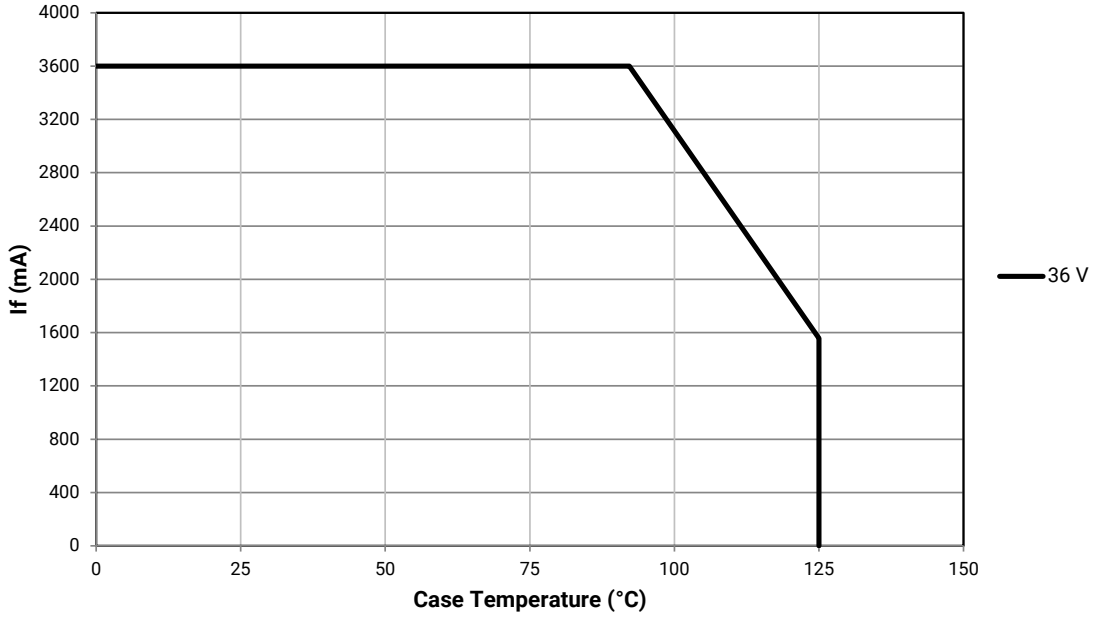
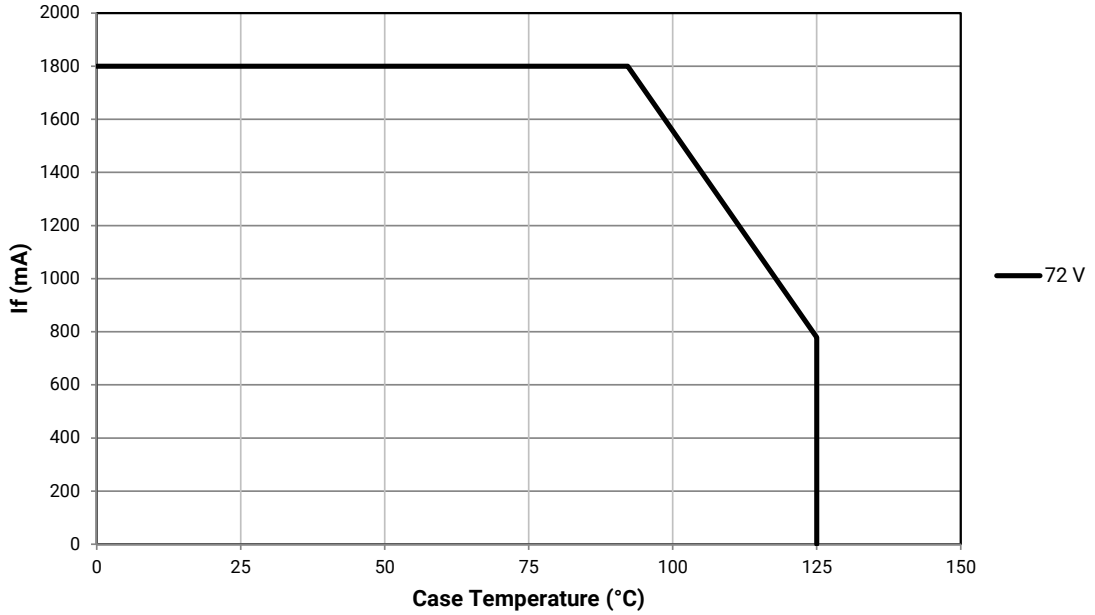
OPERATING LIMITS

The maximum current rating of the CXA3590 depends 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 21 for the location of the Tc measurement point.

Another important factor in good thermal management is the temperature of the Light Emitting Surface (LES). Cree recommends a maximum LES temperature of 135 °C to ensure optimal LED lifetime. Please refer to the Thermal Design section on page 22 for more information on LES temperature measurement.





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FLUX CHARACTERISTICS, EASYWHITE® 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 21).

Nominal CCT	CRI		Minimum Luminous Flux			2-Step		3-Step		4-Step	
	Min	Typ	Group	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*	Group	Order Code	Group	Order Code	Group	Order Code
6500 K	70	75	BD	10,000	11,286					65F	CXA3590-0000-000NT0BD65F
			CB	11,000	12,414						CXA3590-0000-000NT0CB65F
			CD	12,000	13,543						CXA3590-0000-000NT0CD65F
	80	---	BB	9,500	10,721					65F	CXA3590-0000-000NTHBB65F
			BD	10,000	11,286						CXA3590-0000-000NTHBD65F
			CB	11,000	12,414						CXA3590-0000-000NTHCB65F
	90	95	Z4	7,945	8,967					65F	CXA3590-0000-000NTUZ465F
			AB	8,500	9,593						CXA3590-0000-000NTUAB65F
			AD	9,000	10,157						CXA3590-0000-000NTUAD65F
5700 K	70	75	BD	10,000	11,286					57F	CXA3590-0000-000NT0BD57F
			CB	11,000	12,414						CXA3590-0000-000NT0CB57F
			CD	12,000	13,543						CXA3590-0000-000NT0CD57F
	80	---	BB	9,500	10,721					57F	CXA3590-0000-000NTHBB57F
			BD	10,000	11,286						CXA3590-0000-000NTHBD57F
			CB	11,000	12,414						CXA3590-0000-000NTHCB57F

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 24).
- 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.

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FLUX CHARACTERISTICS, EASYWHITE® ORDER CODES AND BINS - 36 V (I_F = 2400 mA, T_J = 85 °C) - CONTINUED

Nominal CCT	CRI		Minimum Luminous Flux			2-Step		3-Step		4-Step	
	Min	Typ	Group	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*	Group	Order Code	Group	Order Code	Group	Order Code
5000 K	70	75	BD	10,000	11,286	50H	CXA3590-0000-000NT0BD50H			50F	CXA3590-0000-000NT0BD50F
			CB	11,000	12,414		CXA3590-0000-000NT0CB50H				CXA3590-0000-000NT0CB50F
			CD	12,000	13,543		CXA3590-0000-000NT0CD50H				CXA3590-0000-000NT0CD50F
	80	---	BB	9,500	10,721	50H	CXA3590-0000-000NTHBB50H	50G	CXA3590-0000-000NTHBB50G	50F	CXA3590-0000-000NTHBB50F
			BD	10,000	11,286		CXA3590-0000-000NTHBD50H		CXA3590-0000-000NTHBD50G		CXA3590-0000-000NTHBD50F
			CB	11,000	12,414		CXA3590-0000-000NTHCB50H		CXA3590-0000-000NTHCB50G		CXA3590-0000-000NTHCB50F
	90	95	AB	8,500	9,593	50H	CXA3590-0000-000NTUAB50H	50G	CXA3590-0000-000NTUAB50G	50F	CXA3590-0000-000NTUAB50F
			AD	9,000	10,157		CXA3590-0000-000NTUAD50H		CXA3590-0000-000NTUAD50G		CXA3590-0000-000NTUAD50F
4000 K	70	75	BB	9,500	10,721	40H	CXA3590-0000-000NT0BB40H			40F	CXA3590-0000-000NT0BB40F
			BD	10,000	11,286		CXA3590-0000-000NT0BD40H				CXA3590-0000-000NT0BD40F
			CB	11,000	12,414		CXA3590-0000-000NT0CB40H				CXA3590-0000-000NT0CB40F
	80	---	AD	9,000	10,157	40H	CXA3590-0000-000NTHAD40H	40G	CXA3590-0000-000NTHAD40G	40F	CXA3590-0000-000NTHAD40F
			BB	9,500	10,721		CXA3590-0000-000NTHBB40H		CXA3590-0000-000NTHBB40G		CXA3590-0000-000NTHBB40F
			BD	10,000	11,286		CXA3590-0000-000NTHBD40H		CXA3590-0000-000NTHBD40G		CXA3590-0000-000NTHBD40F
	90	95	Z4	7,945	8,967	40H	CXA3590-0000-000NTUZ440H	40G	CXA3590-0000-000NTUZ440G	40F	CXA3590-0000-000NTUZ440F
			AB	8,500	9,593		CXA3590-0000-000NTUAB40H		CXA3590-0000-000NTUAB40G		CXA3590-0000-000NTUAB40F
3500 K	80	---	AD	9,000	10,157	35H	CXA3590-0000-000NT0AD35H	35G	CXA3590-0000-000NT0AD35G	35F	CXA3590-0000-000NT0AD35F
			BB	9,500	10,721		CXA3590-0000-000NT0BB35H		CXA3590-0000-000NT0BB35G		CXA3590-0000-000NT0BB35F
			BD	10,000	11,286		CXA3590-0000-000NT0BD35H		CXA3590-0000-000NT0BD35G		CXA3590-0000-000NT0BD35F
	93	95	Z2	7,390	8,340	35H	CXA3590-0000-000NTYZ235H	35G	CXA3590-0000-000NTYZ235G	35F	CXA3590-0000-000NTYZ235F
			Z4	7,945	8,967		CXA3590-0000-000NTYZ435H		CXA3590-0000-000NTYZ435G		CXA3590-0000-000NTYZ435F

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 24).
- 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.

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FLUX CHARACTERISTICS, EASYWHITE® ORDER CODES AND BINS - 36 V (I_F = 2400 mA, T_J = 85 °C) - CONTINUED

Nominal CCT	CRI		Minimum Luminous Flux			2-Step		3-Step		4-Step	
	Min	Typ	Group	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*	Group	Order Code	Group	Order Code	Group	Order Code
3000 K	80	---	AD	9,000	10,157	30H	CXA3590-0000-000NT0AD30H	30G	CXA3590-0000-000NT0AD30G	30F	CXA3590-0000-000NT0AD30F
			BB	9,500	10,721		CXA3590-0000-000NT0BB30H		CXA3590-0000-000NT0BB30G		CXA3590-0000-000NT0BB30F
			BD	10,000	11,286		CXA3590-0000-000NT0BD30H		CXA3590-0000-000NT0BD30G		CXA3590-0000-000NT0BD30F
	93	95	Z2	7,390	8,340	30H	CXA3590-0000-000NTYZ230H	30G	CXA3590-0000-000NTYZ230G	30F	CXA3590-0000-000NTYZ230F
			Z4	7,945	8,967		CXA3590-0000-000NTYZ430H		CXA3590-0000-000NTYZ430G		CXA3590-0000-000NTYZ430F
2700 K	80	---	AB	8,500	9,593	27H	CXA3590-0000-000NT0AB27H	27G	CXA3590-0000-000NT0AB27G	27F	CXA3590-0000-000NT0AB27F
			AD	9,000	10,157		CXA3590-0000-000NT0AD27H		CXA3590-0000-000NT0AD27G		CXA3590-0000-000NT0AD27F
			BB	9,500	10,721		CXA3590-0000-000NT0BB27H		CXA3590-0000-000NT0BB27G		CXA3590-0000-000NT0BB27F
	93	95	Y4	6,910	7,798	27H	CXA3590-0000-000NTYY427H	27G	CXA3590-0000-000NTYY427G	27F	CXA3590-0000-000NTYY427F
			Z2	7,390	8,340		CXA3590-0000-000NTYZ227H		CXA3590-0000-000NTYZ227G		CXA3590-0000-000NTYZ227F

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 24).
- 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.

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FLUX CHARACTERISTICS, ANSI WHITE 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 21).

CCT Range	CRI		Minimum Luminous Flux			Chromaticity Regions	Order Code
	Min	Typ	Group	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*		
6500 K	70	75	BD	10,000	11,286	1A0, 1B0, 1C0, 1D0, 65F	CXA3590-0000-000NT0BD0E1
			CB	11,000	12,414		CXA3590-0000-000NT0CB0E1
			CD	12,000	13,543		CXA3590-0000-000NT0CD0E1
	80	---	BB	9,500	11,286	1A0, 1B0, 1C0, 1D0, 65F	CXA3590-0000-000NTHBB0E1
			BD	10,000	12,414		CXA3590-0000-000NTHBD0E1
			CB	11,000	13,543		CXA3590-0000-000NTHCB0E1
5700 K	70	75	BD	10,000	11,286	2A0, 2B0, 2C0, 2D0, 57F	CXA3590-0000-000NT0BD0E2
			CB	11,000	12,414		CXA3590-0000-000NT0CB0E2
			CD	12,000	13,543		CXA3590-0000-000NT0CD0E2
	80	---	BB	9,500	11,286	2A0, 2B0, 2C0, 2D0, 57F	CXA3590-0000-000NTHBB0E2
			BD	10,000	12,414		CXA3590-0000-000NTHBD0E2
			CB	11,000	13,543		CXA3590-0000-000NTHCB0E2
5000 K	70	75	BD	10,000	11,286	3A0, 3B0, 3C0, 3D0, 50F	CXA3590-0000-000NT0BD0E3
			CB	11,000	12,414		CXA3590-0000-000NT0CB0E3
			CD	12,000	13,543		CXA3590-0000-000NT0CD0E3
	80	---	BB	9,500	11,286	3A0, 3B0, 3C0, 3D0, 50F	CXA3590-0000-000NTHBB0E3
			BD	10,000	12,414		CXA3590-0000-000NTHBD0E3
			CB	11,000	13,543		CXA3590-0000-000NTHCB0E3

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 24).
- 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.

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FLUX CHARACTERISTICS, EASYWHITE® ORDER CODES AND BINS - 72 V (I_F = 1200 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 21).

Nominal CCT	CRI		Minimum Luminous Flux			2-Step		3-Step		4-Step	
	Min	Typ	Group	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*	Group	Order Code	Group	Order Code	Group	Order Code
6500 K	70	75	BD	10,000	11,286					65F	CXA3590-0000-000RT0BD65F
			CB	11,000	12,414						CXA3590-0000-000RT0CB65F
			CD	12,000	13,543						CXA3590-0000-000RT0CD65F
	80	---	BB	9,500	10,721					65F	CXA3590-0000-000RTHBB65F
			BD	10,000	11,286						CXA3590-0000-000RTHBD65F
			CB	11,000	12,414						CXA3590-0000-000RTHCB65F
	90	95	Z4	7,945	8,967					65F	CXA3590-0000-000RTUZ465F
			AB	8,500	9,593						CXA3590-0000-000RTUAB65F
			AD	9,000	10,157						CXA3590-0000-000RTUAD65F
5700 K	70	75	BD	10,000	11,286					57F	CXA3590-0000-000RT0BD57F
			CB	11,000	12,414						CXA3590-0000-000RT0CB57F
			CD	12,000	13,543						CXA3590-0000-000RT0CD57F
	80	---	BB	9,500	10,721					57F	CXA3590-0000-000RTHBB57F
			BD	10,000	11,286						CXA3590-0000-000RTHBD57F
			CB	11,000	12,414						CXA3590-0000-000RTHCB57F

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 24).
- 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.

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FLUX CHARACTERISTICS, EASYWHITE® ORDER CODES AND BINS - 72 V (I_F = 1200 mA, T_J = 85 °C) - CONTINUED

Nominal CCT	CRI		Minimum Luminous Flux			2-Step		3-Step		4-Step	
	Min	Typ	Group	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*	Group	Order Code	Group	Order Code	Group	Order Code
5000 K	70	75	BD	10,000	11,286	50H	CXA3590-0000-000RT0BD50H			50F	CXA3590-0000-000RT0BD50F
			CB	11,000	12,414		CXA3590-0000-000RT0CB50H				CXA3590-0000-000RT0CB50F
			CD	12,000	13,543		CXA3590-0000-000RT0CD50H				CXA3590-0000-000RT0CD50F
	80	---	BB	9,500	10,721	50H	CXA3590-0000-000RTHBB50H	50G	CXA3590-0000-000RTHBB50G	50F	CXA3590-0000-000RTHBB50F
			BD	10,000	11,286		CXA3590-0000-000RTHBD50H		CXA3590-0000-000RTHBD50G		CXA3590-0000-000RTHBD50F
			CB	11,000	12,414		CXA3590-0000-000RTHCB50H		CXA3590-0000-000RTHCB50G		CXA3590-0000-000RTHCB50F
	90	95	AB	8,500	9,593	50H	CXA3590-0000-000RTUAB50H	50G	CXA3590-0000-000RTUAB50G	50F	CXA3590-0000-000RTUAB50F
			AD	9,000	10,157		CXA3590-0000-000RTUAD50H		CXA3590-0000-000RTUAD50G		CXA3590-0000-000RTUAD50F
4000 K	70	75	BB	9,500	10,721	40H	CXA3590-0000-000RT0BB40H			40F	CXA3590-0000-000RT0BB40F
			BD	10,000	11,286		CXA3590-0000-000RT0BD40H				CXA3590-0000-000RT0BD40F
			CB	11,000	12,414		CXA3590-0000-000RT0CB40H				CXA3590-0000-000RT0CB40F
	80	---	AD	9,000	10,157	40H	CXA3590-0000-000RTHAD40H	40G	CXA3590-0000-000RTHAD40G	40F	CXA3590-0000-000RTHAD40F
			BB	9,500	10,721		CXA3590-0000-000RTHBB40H		CXA3590-0000-000RTHBB40G		CXA3590-0000-000RTHBB40F
			BD	10,000	11,286		CXA3590-0000-000RTHBD40H		CXA3590-0000-000RTHBD40G		CXA3590-0000-000RTHBD40F
	90	95	Z4	7,945	8,967	40H	CXA3590-0000-000RTUZ440H	40G	CXA3590-0000-000RTUZ440G	40F	CXA3590-0000-000RTUZ440F
			AB	8,500	9,593		CXA3590-0000-000RTUAB40H		CXA3590-0000-000RTUAB40G		CXA3590-0000-000RTUAB40F
3500 K	80	---	AD	9,000	10,157	35H	CXA3590-0000-000RT0AD35H	35G	CXA3590-0000-000RT0AD35G	35F	CXA3590-0000-000RT0AD35F
			BB	9,500	10,721		CXA3590-0000-000RT0BB35H		CXA3590-0000-000RT0BB35G		CXA3590-0000-000RT0BB35F
			BD	10,000	11,286		CXA3590-0000-000RT0BD35H		CXA3590-0000-000RT0BD35G		CXA3590-0000-000RT0BD35F
	93	95	Z2	7,390	8,340	35H	CXA3590-0000-000RTYZ235H	35G	CXA3590-0000-000RTYZ235G	35F	CXA3590-0000-000RTYZ235F
			Z4	7,945	8,967		CXA3590-0000-000RTYZ435H		CXA3590-0000-000RTYZ435G		CXA3590-0000-000RTYZ435F

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 24).
- 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.

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FLUX CHARACTERISTICS, EASYWHITE® ORDER CODES AND BINS - 72 V (I_F = 1200 mA, T_J = 85 °C) - CONTINUED

Nominal CCT	CRI		Minimum Luminous Flux			2-Step		3-Step		4-Step	
	Min	Typ	Group	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*	Group	Order Code	Group	Order Code	Group	Order Code
3000 K	80	---	AD	9,000	10,157	30H	CXA3590-0000-000RT0AD30H	30G	CXA3590-0000-000RT0AD30G	30F	CXA3590-0000-000RT0AD30F
			BB	9,500	10,721		CXA3590-0000-000RT0BB30H		CXA3590-0000-000RT0BB30G		CXA3590-0000-000RT0BB30F
			BD	10,000	11,286		CXA3590-0000-000RT0BD30H		CXA3590-0000-000RT0BD30G		CXA3590-0000-000RT0BD30F
	93	95	Z2	7,390	8,340	30H	CXA3590-0000-000RTYZ230H	30G	CXA3590-0000-000RTYZ230G	30F	CXA3590-0000-000RTYZ230F
			Z4	7,945	8,967		CXA3590-0000-000RTYZ430H		CXA3590-0000-000RTYZ430G		CXA3590-0000-000RTYZ430F
2700 K	80	---	AB	8,500	9,593	27H	CXA3590-0000-000RT0AB27H	27G	CXA3590-0000-000RT0AB27G	27F	CXA3590-0000-000RT0AB27F
			AD	9,000	10,157		CXA3590-0000-000RT0AD27H		CXA3590-0000-000RT0AD27G		CXA3590-0000-000RT0AD27F
			BB	9,500	10,721		CXA3590-0000-000RT0BB27H		CXA3590-0000-000RT0BB27G		CXA3590-0000-000RT0BB27F
	93	95	Y4	6,910	7,798	27H	CXA3590-0000-000RTYY427H	27G	CXA3590-0000-000RTYY427G	27F	CXA3590-0000-000RTYY427F
			Z2	7,390	8,340		CXA3590-0000-000RTYZ227H		CXA3590-0000-000RTYZ227G		CXA3590-0000-000RTYZ227F

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 24).
- 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.

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FLUX CHARACTERISTICS, ANSI WHITE ORDER CODES AND BINS - 72 V (I_F = 1200 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 21).

CCT Range	CRI		Minimum Luminous Flux			Chromaticity Regions	Order Code
	Min	Typ	Group	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*		
6500 K	70	75	BD	10,000	11,286	1A0, 1B0, 1C0, 1D0, 65F	CXA3590-0000-000RT0BD0E1
			CB	11,000	12,414		CXA3590-0000-000RT0CB0E1
			CD	12,000	13,543		CXA3590-0000-000RT0CD0E1
	80	---	BB	9,500	11,286	1A0, 1B0, 1C0, 1D0, 65F	CXA3590-0000-000RTHBB0E1
			BD	10,000	12,414		CXA3590-0000-000RTHBD0E1
			CB	11,000	13,543		CXA3590-0000-000RTHCB0E1
5700 K	70	75	BD	10,000	11,286	2A0, 2B0, 2C0, 2D0, 57F	CXA3590-0000-000RT0BD0E2
			CB	11,000	12,414		CXA3590-0000-000RT0CB0E2
			CD	12,000	13,543		CXA3590-0000-000RT0CD0E2
	80	---	BB	9,500	11,286	2A0, 2B0, 2C0, 2D0, 57F	CXA3590-0000-000RTHBB0E2
			BD	10,000	12,414		CXA3590-0000-000RTHBD0E2
			CB	11,000	13,543		CXA3590-0000-000RTHCB0E2
5000 K	70	75	BD	10,000	11,286	3A0, 3B0, 3C0, 3D0, 50F	CXA3590-0000-000RT0BD0E3
			CB	11,000	12,414		CXA3590-0000-000RT0CB0E3
			CD	12,000	13,543		CXA3590-0000-000RT0CD0E3
	80	---	BB	9,500	11,286	3A0, 3B0, 3C0, 3D0, 50F	CXA3590-0000-000RTHBB0E3
			BD	10,000	12,414		CXA3590-0000-000RTHBD0E3
			CB	11,000	13,543		CXA3590-0000-000RTHCB0E3

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 24).
- 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.

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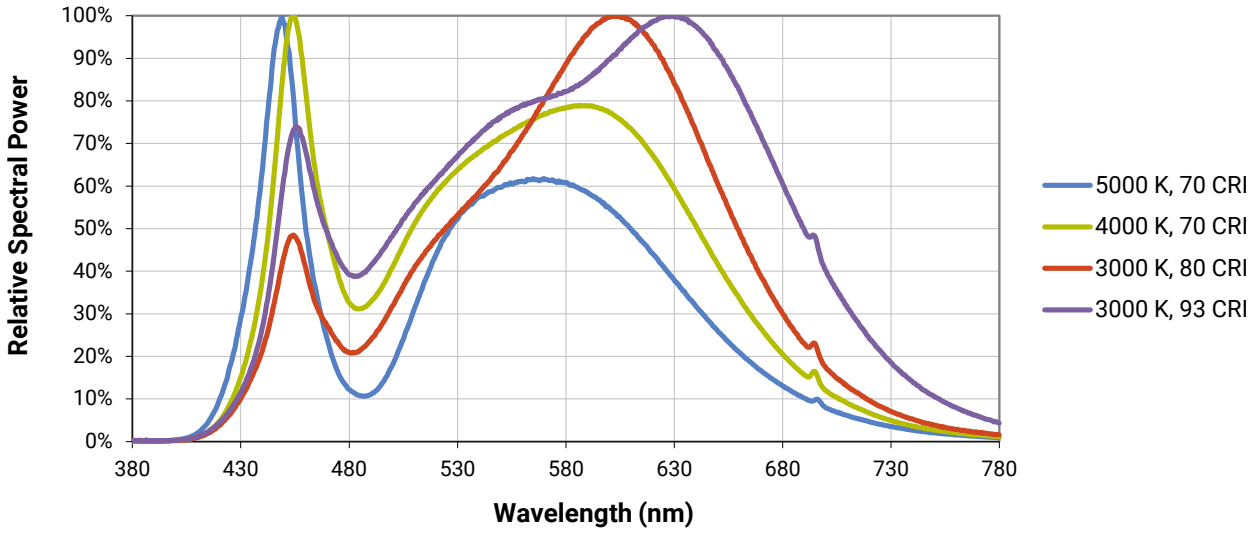
RELATIVE SPECTRAL POWER DISTRIBUTION

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_J = 85 °C.



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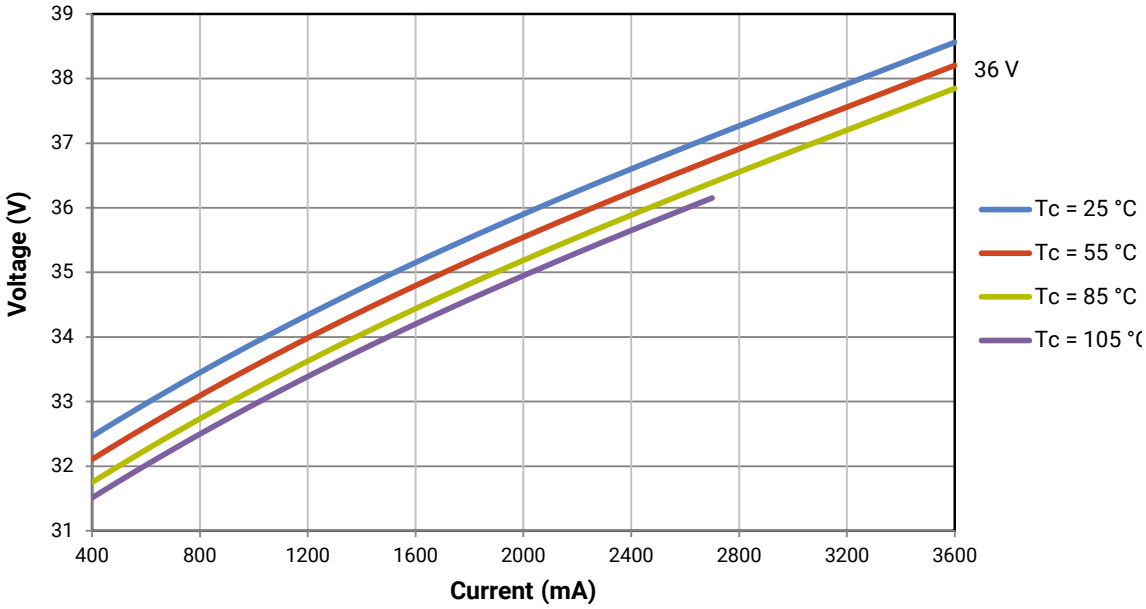
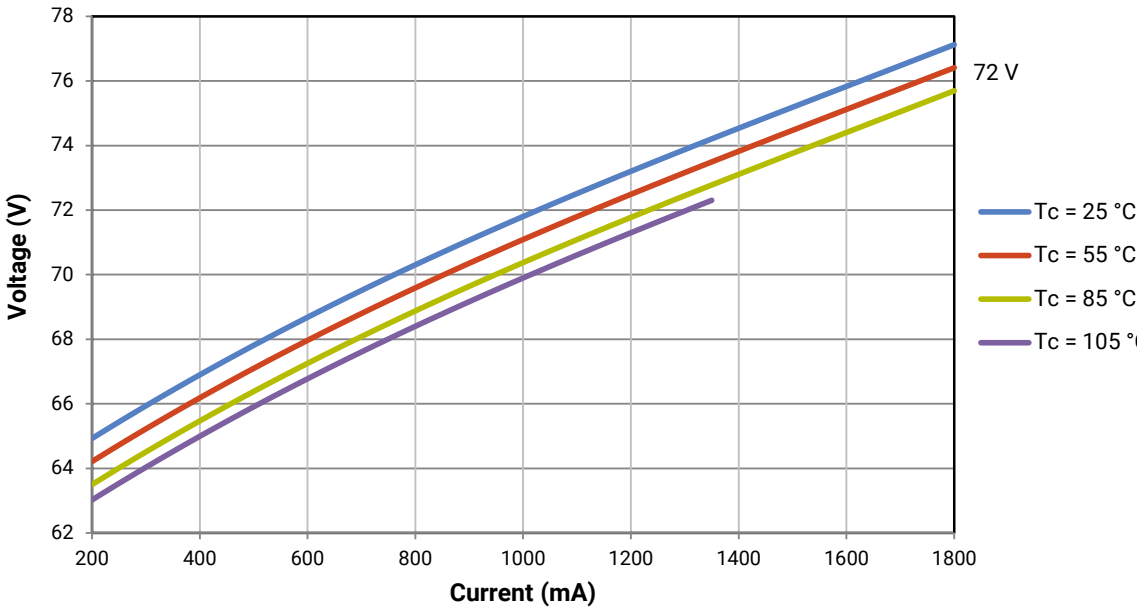
ELECTRICAL CHARACTERISTICS

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





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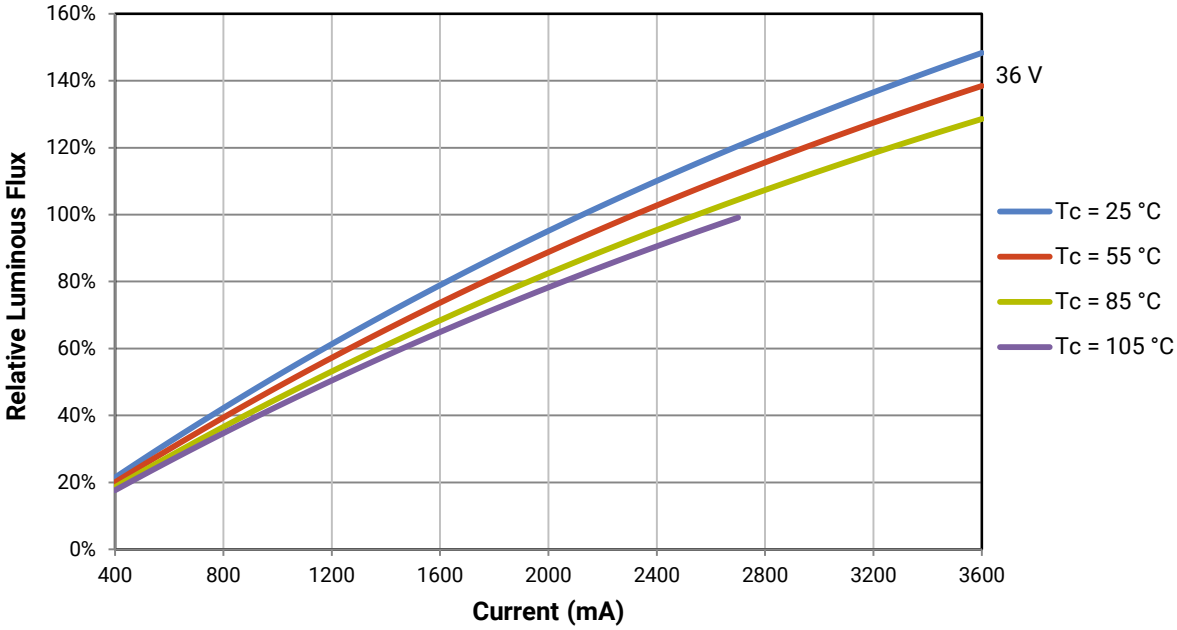
RELATIVE LUMINOUS FLUX

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_J = 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 lm during binning will deliver 6,600 lm (11,000 * 0.6) at steady-state operation of Tc = 25 °C, I_F = 1200 mA.



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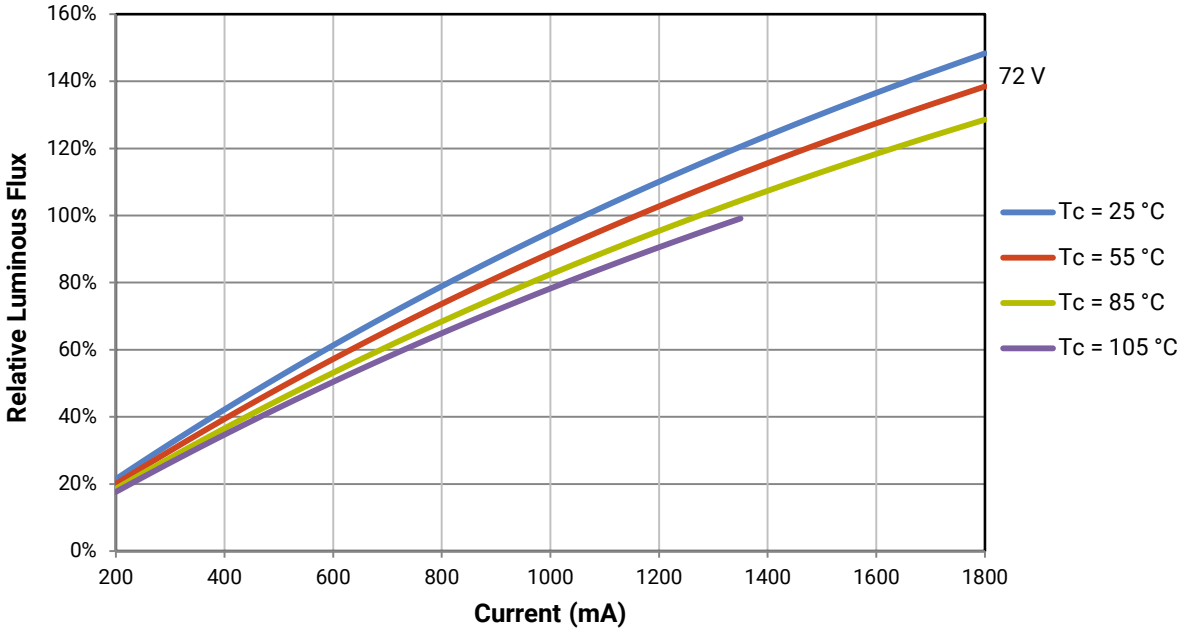
RELATIVE LUMINOUS FLUX - CONTINUED

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_J = 85 °C for the 72-V CXA3590.

Using the 72-V CXA3590 LED as an example, at steady-state operation of Tc = 25 °C, I_F = 800 mA, the relative luminous flux ratio is 80% in the chart below. A CXA3590 LED that measures 11,000 lm during binning will deliver 8,800 lm (11,000 * 0.8) at steady-state operation of Tc = 25 °C, I_F = 800 mA.



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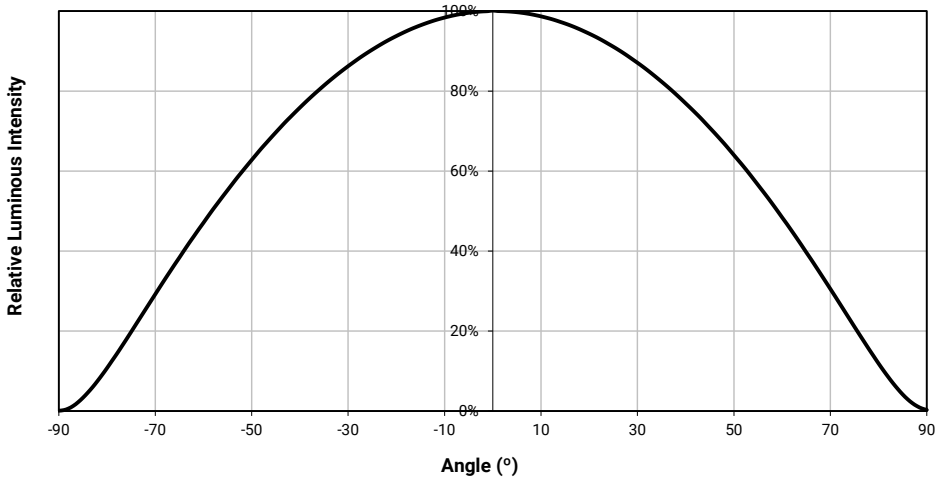
TYPICAL SPATIAL DISTRIBUTION



PERFORMANCE GROUPS - BRIGHTNESS (36 V, I_F = 2400 mA; 72 V I_F = 1200 mA, T_J = 85 °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
CB	11,000	12,000
CD	12,000	13,000
DB	13,000	14,000

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PERFORMANCE GROUPS - CHROMATICITY (T_J = 85 °C)

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

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

EasyWhite Color Temperatures – 3-Step Ellipse						
Bin Code	**CCT**	**Center Point**		**Major Axis**	**Minor Axis**	**Rotation Angle (°)**
		x	**y**	**a**	**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

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PERFORMANCE GROUPS - CHROMATICITY (T_J = 85 °C) - CONTINUED

EasyWhite Color Temperatures – 4-Step			
Code	**CCT**	**x**	**y**
65F	6500 K	0.3097	0.3196
		0.3079	0.3297
		0.3164	0.3382
		0.3176	0.3275
57F	5700 K	0.3253	0.3325
		0.3249	0.3439
		0.3331	0.3514
		0.3330	0.3393
50F	5000 K	0.3407	0.3459
		0.3415	0.3586
		0.3499	0.3654
		0.3484	0.3521
40F	4000 K	0.3744	0.3685
		0.3782	0.3837
		0.3912	0.3917
		0.3863	0.3758
35F	3500 K	0.3981	0.3800
		0.4040	0.3966
		0.4186	0.4037
		0.4116	0.3865
30F	3000 K	0.4242	0.3919
		0.4322	0.4096
		0.4449	0.4141
		0.4359	0.3960
27F	2700 K	0.4475	0.3994
		0.4573	0.4178
		0.4695	0.4207
		0.4589	0.4021

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PERFORMANCE GROUPS - CHROMATICITY (T_J = 85 °C) - CONTINUED

ANSI White Bins				
Code	CCT	Bin Code	x	y
0E1	6500 K	1A0	0.3048	0.3207
			0.3130	0.3290
			0.3144	0.3186
			0.3068	0.3113
		1B0	0.3028	0.3304
			0.3115	0.3391
			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

ANSI White Bins				
Code	CCT	Bin Code	x	y
0E2	5700 K	2A0	0.3215	0.3350
			0.3290	0.3417
			0.3290	0.3300
			0.3222	0.3243
		2B0	0.3207	0.3462
			0.3290	0.3538
			0.3290	0.3417
			0.3215	0.3350
		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	CCT	Bin Code	x	y
0E3	5000 K	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

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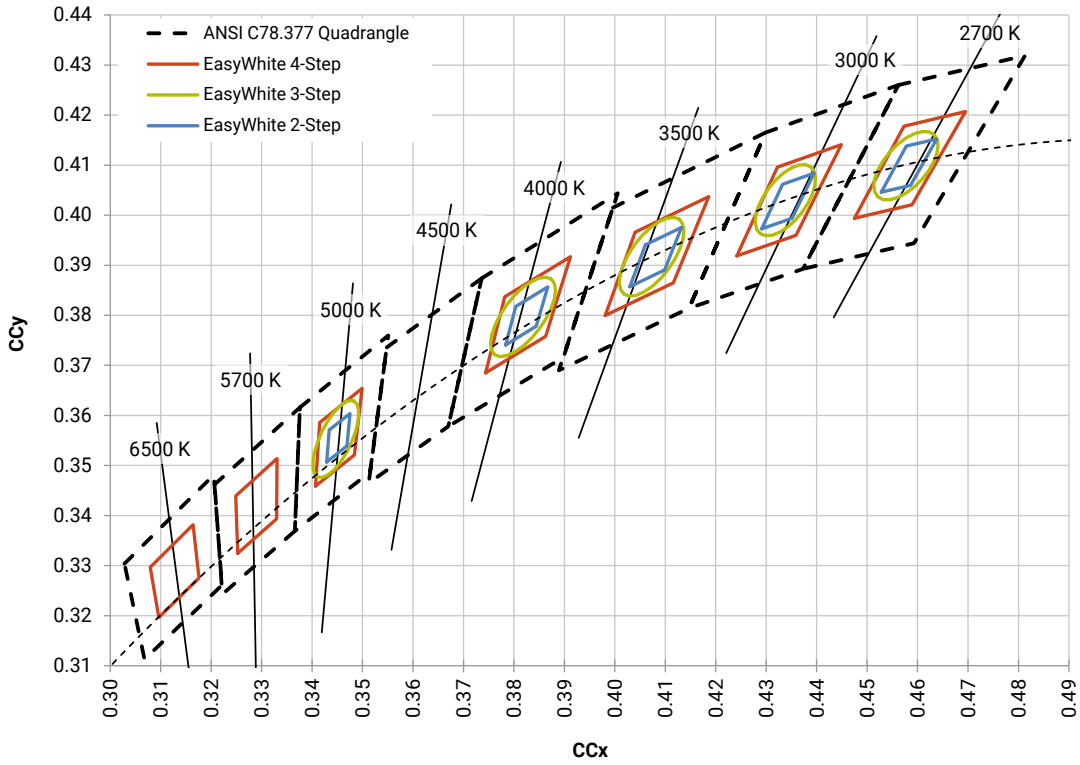
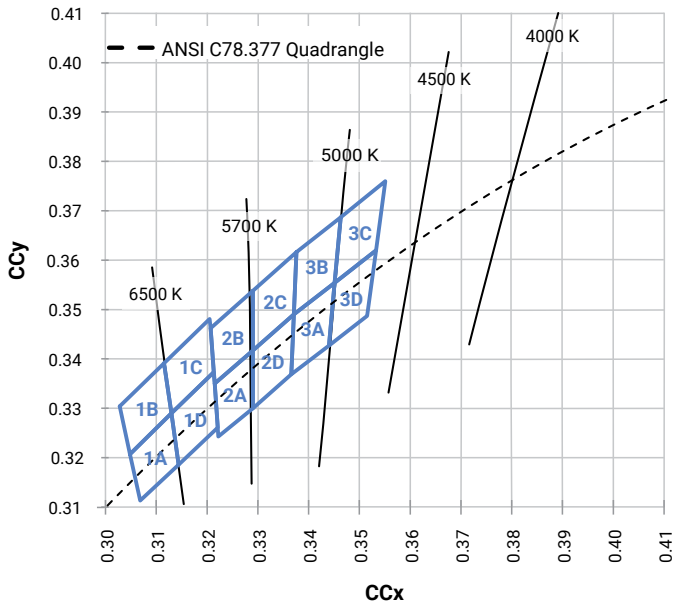
CREE EASYWHITE® BINS PLOTTED ON THE 1931 CIE COLOR SPACE (T_J = 85 °C)



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



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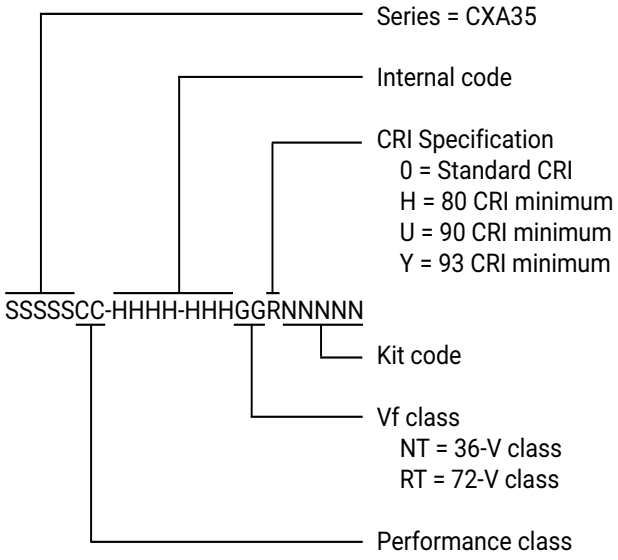
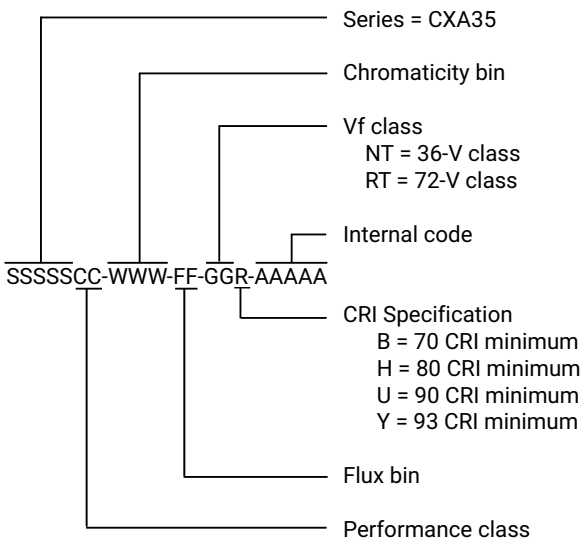
BIN AND ORDER CODE FORMATS

Bin codes and order codes are configured as follows:

Order Code



Bin Code



MECHANICAL DIMENSIONS

Dimensions are in mm.

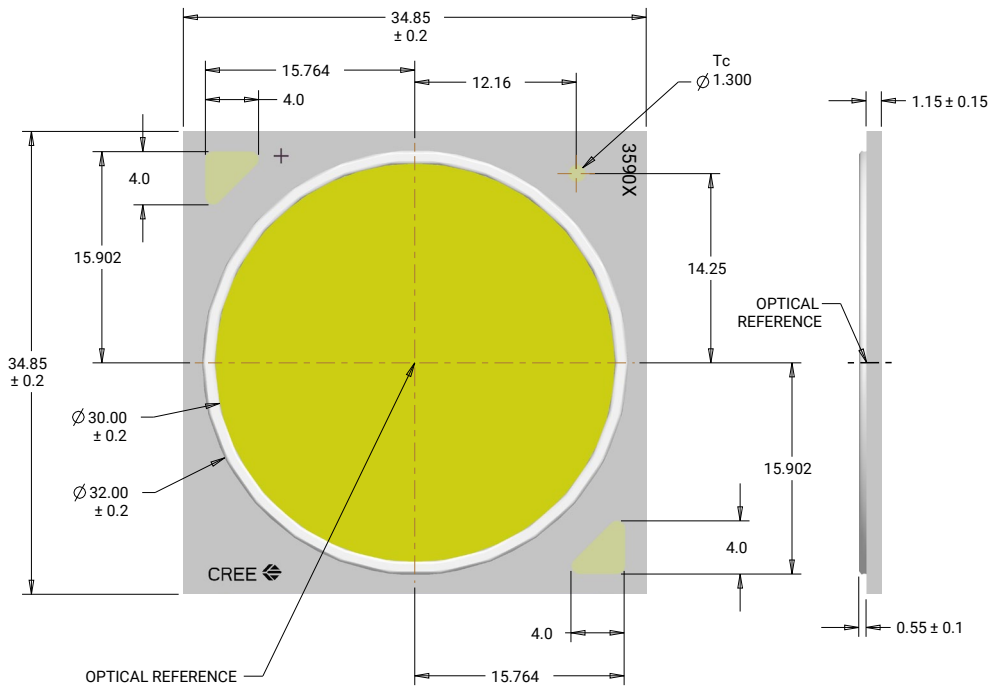
Tolerances unless otherwise specified: ±.13

x° ±1°

Meaning of 3590X

3590N = 36-V CXA3590

3590R = 72-V CXA3590



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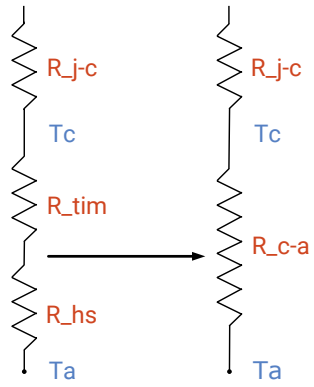
THERMAL DESIGN

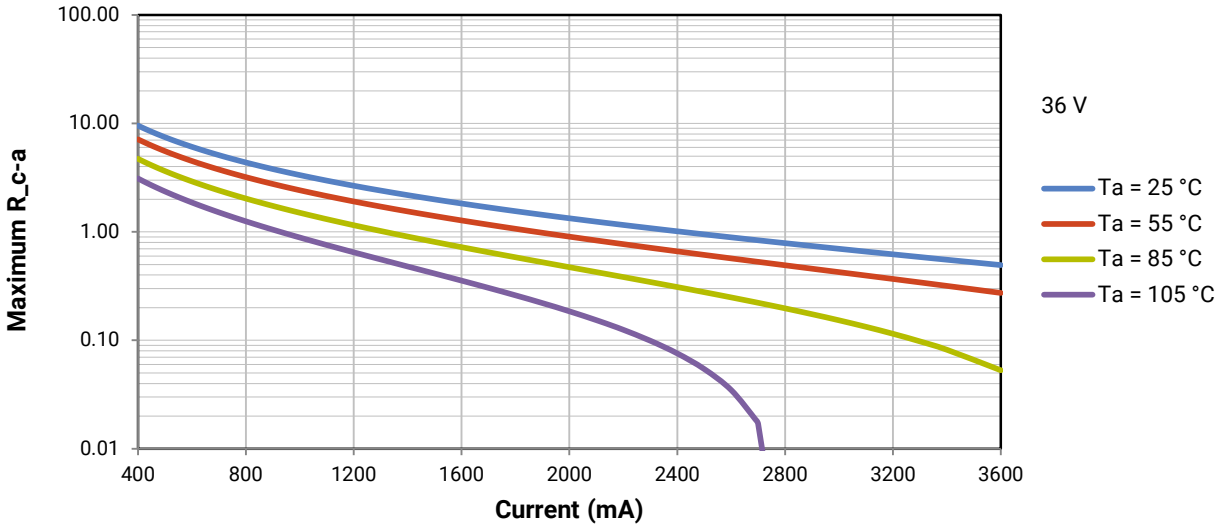
The CXA family of LED arrays can include over a hundred different LED die inside one package, and thus over a hundred different junction temperatures (T_J). Cree has intentionally removed junction-temperature-based operating limits and replaced the commonplace maximum T_J calculations with maximum ratings based on forward current (I_F) and case temperature (Tc). No additional calculations are required to ensure that the CXA LED is being operated within its designed limits. LES temperature measurement provides additional verification of good thermal design. Please refer to page 22 for the Operating Limit specifications.

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 Thermal Management application note. For CXA soldering recommendations and more information on thermal interface materials (TIM), LES temperature measurement, and connection methods, please refer to the Cree XLamp CX Family LEDs soldering and handling document. The CX Family LED Design 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).





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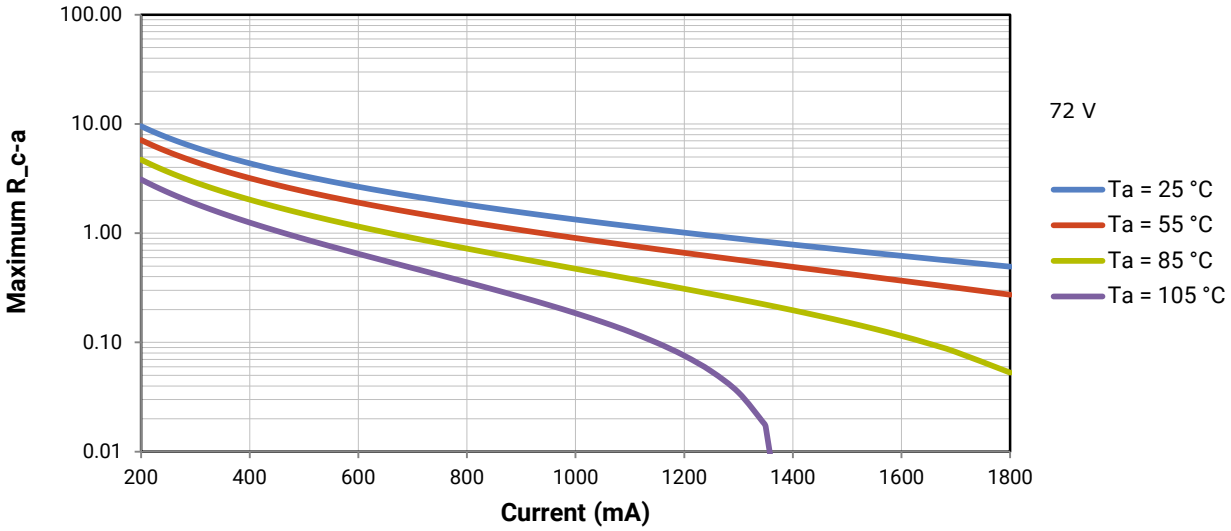
THERMAL DESIGN - CONTINUED



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NOTES

Measurements

The luminous flux, radiant power, chromaticity, forward voltage 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 or provided 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 Ecology section of the Cree website.

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

This product meets the requirements to be considered a UL Recognized Component with 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.

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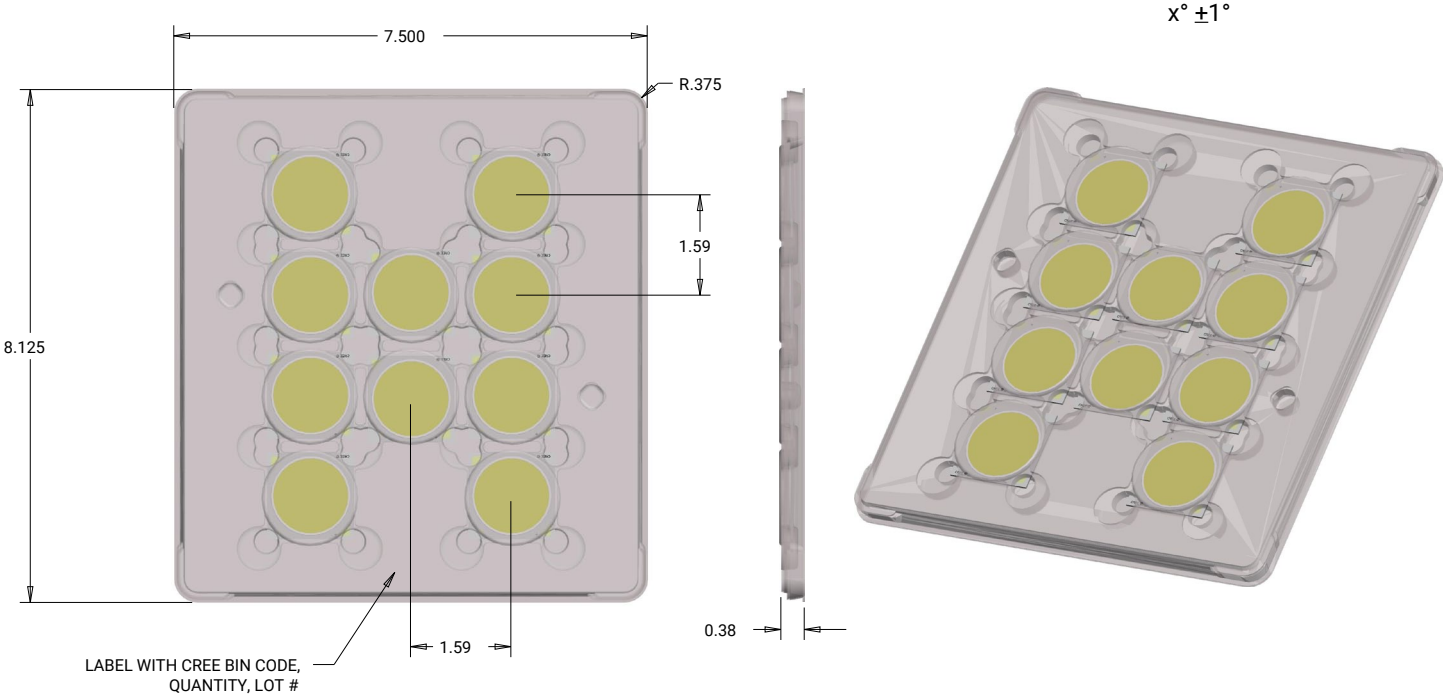
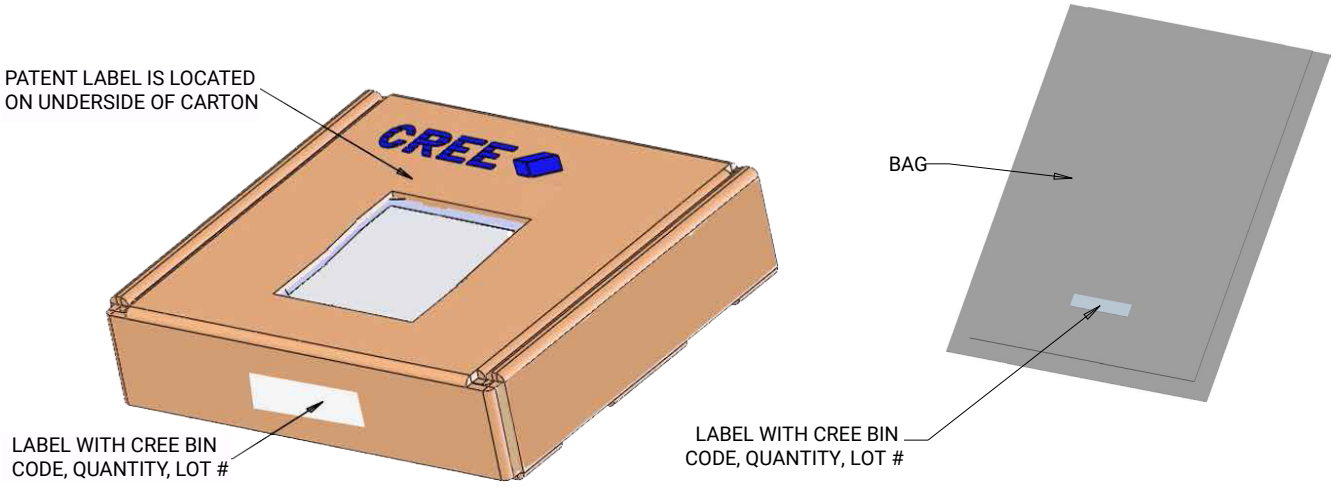
PACKAGING

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: ±.13
x° ±1°





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Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

Cree, Inc.:

CXA3590-0000-000R0HCB0E5 CXA3590-0000-000R00BD0E7 CXA3590-0000-000R0HBD50F CXA3590-0000-000R0YZ230F CXA3590-0000-000R00AD0E6 CXA3590-0000-000R0YZ235H CXA3590-0000-000R0UZ440H CXA3590-0000-000R00BB40F CXA3590-0000-000R00AD30H CXA3590-0000-000R00BB35H CXA3590-0000-000R0UAB50F CXA3590-0000-000R0UAD0E3 CXA3590-0000-000R0YY40E8 CXA3590-0000-000R0HBB40F CXA3590-0000-000R00AD0E7 CXA3590-0000-000R00AB27F CXA3590-0000-000R0YZ435H CXA3590-0000-000R00BD35H CXA3590-0000-000R00BB0E5 CXA3590-0000-000R00CB0E5 CXA3590-0000-000R00BB0E6 CXA3590-0000-000R00AD27H CXA3590-0000-000R00BD30H CXA3590-0000-000R00BD0E3 CXA3590-0000-000R0YZ435F CXA3590-0000-000R0HBD50H CXA3590-0000-000R0UAB50H CXA3590-0000-000R0HCB0E3 CXA3590-0000-000R0YZ20E6 CXA3590-0000-000R0UAD50F CXA3590-0000-000R00BB35F CXA3590-0000-000R0UAB40H CXA3590-0000-000R00CD0E3 CXA3590-0000-000R0YY427F CXA3590-0000-000R0YZ227F CXA3590-0000-000R00AD30F CXA3590-0000-000R0HAD40H CXA3590-0000-000R00AD27F CXA3590-0000-000R0HBB50H CXA3590-0000-000R0YZ40E7 CXA3590-0000-000R0UAD50H CXA3590-0000-000R0YZ430H CXA3590-0000-000R00BB27F CXA3590-0000-000R00BD50F CXA3590-0000-000R00BD40H CXA3590-0000-000R0HBD0E3 CXA3590-0000-000R00BB0E8 CXA3590-0000-000R0HBD40H CXA3590-0000-000R00CB40H CXA3590-0000-000R0UAB0E5 CXA3590-0000-000R0YZ230H CXA3590-0000-000R0HBD40F CXA3590-0000-000R00CB0E3 CXA3590-0000-000R00AD35F CXA3590-0000-000R0UZ40E5 CXA3590-0000-000R00CB50H CXA3590-0000-000R0YY427H CXA3590-0000-000R00BD35F CXA3590-0000-000R0HBB0E3 CXA3590-0000-000R0HCB50H CXA3590-0000-000R00AB0E8 CXA3590-0000-000R0YZ40E6 CXA3590-0000-000R00BD50H CXA3590-0000-000R0HAD40F CXA3590-0000-000R00AD0E8 CXA3590-0000-000R0HBD0E5 CXA3590-0000-000R00CD50H CXA3590-0000-000R0HBB50F CXA3590-0000-000R0UAB0E3 CXA3590-0000-000R0HCB50F CXA3590-0000-000R00BB0E7 CXA3590-0000-000R00AB27H CXA3590-0000-000R00CB50F CXA3590-0000-000R00BB30H CXA3590-0000-000R00BB30F CXA3590-0000-000R0YZ227H CXA3590-0000-000R00BD40F CXA3590-0000-000R0YZ20E7 CXA3590-0000-000R00BB27H CXA3590-0000-000R00BD30F CXA3590-0000-000R0HBB0E5 CXA3590-0000-000R00AD35H CXA3590-0000-000R0UZ440F CXA3590-0000-000R0YZ20E8 CXA3590-0000-000R0UAB40F CXA3590-0000-000R00CD50F CXA3590-0000-000R00BD0E6 CXA3590-0000-000R0YZ235F CXA3590-0000-000R00CB40F CXA3590-0000-000R00BB40H CXA3590-0000-000R0YZ430F CXA3590-0000-000R00BD0E5 CXA3590-0000-000R0HBB40H CXA3590-0000-000N00CD57F CXA3590-0000-000R0HBD0E1 CXA3590-0000-000N00AD30H CXA3590-0000-000R0UAB57F CXA3590-0000-000N00CB40H CXA3590-0000-000N0UZ457F CXA3590-0000-000N00BD40F