

## XLamp® CXA1510 LED



### PRODUCT DESCRIPTION

The XLamp® CXA1510 LED array expands Cree's family of high-flux, multi-die arrays in a smaller, easy-to-use platform. With XLamp LED lighting-class reliability, the CXA1510's small, uniform emitting surface enables both directional and non-directional lighting applications including lamp retrofit and luminaire designs. Available in 2-step, 3-step and 4-step color consistency, and featuring a 9-mm optical source, the CXA1510 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 CXA1510 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 4000 K, 5000 K, 5700 K & 6500 K CCT
- Available in 70-, 80-, 90- and 93-minimum CRI options
- Forward voltage options: 18-V class & 36-V class
- 85 °C binning and characterization
- Maximum drive current: 900 mA (18 V), 450 mA (36 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)

### TABLE OF CONTENTS

Characteristics .....	2
Operating Limits .....	3
Flux Characteristics, EasyWhite® Order Codes and Bins - 18 V .....	4
Flux Characteristics, ANSI White Order Codes and Bins - 18 V .....	8
Flux Characteristics, EasyWhite® Order Codes and Bins - 36 V .....	9
Flux Characteristics, ANSI White Order Codes and Bins - 36 V .....	13
Relative Spectral Power Distribution .....	14
Electrical Characteristics .....	15
Relative Luminous Flux .....	16
Typical Spatial Distribution .....	18
Performance Groups - Brightness .....	18
Performance Groups - Chromaticity .....	19
EasyWhite® Bins Plotted on the 1931 CIE Color Space .....	22
ANSI White Bins Plotted on the 1931 CIE Color Space .....	22
Bin and Order Code Formats .....	23
Mechanical Dimensions .....	23
Thermal Design .....	24
Notes .....	26
Packaging .....	27



Cree LED / 4001 E. Hwy. 54, Suite 2000 / Durham, NC 27709 USA / +1.919.313.5330 / [www.cree-led.com](http://www.cree-led.com)

## CHARACTERISTICS

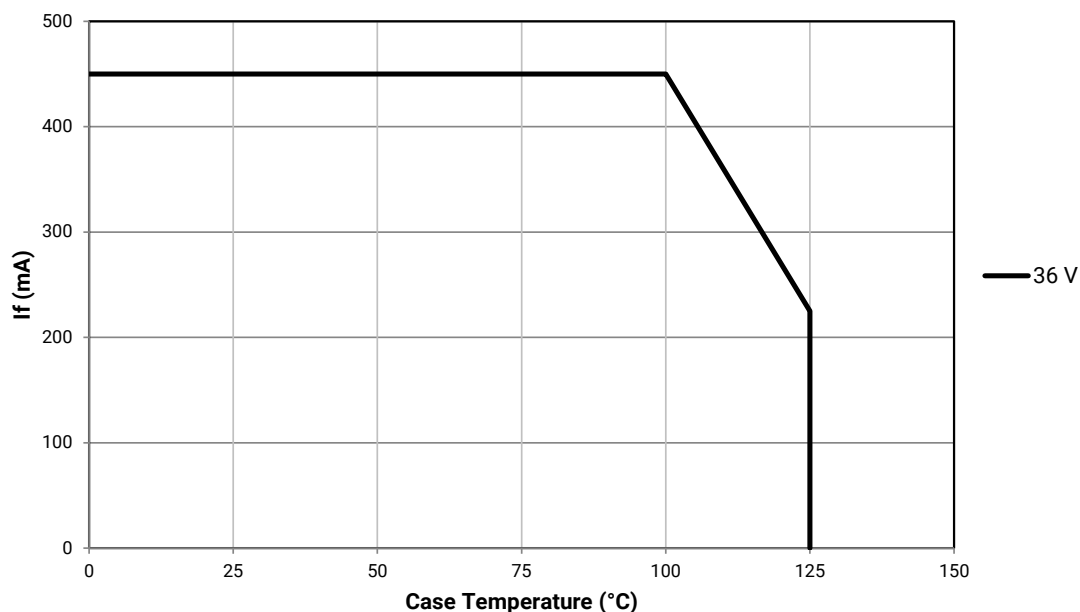
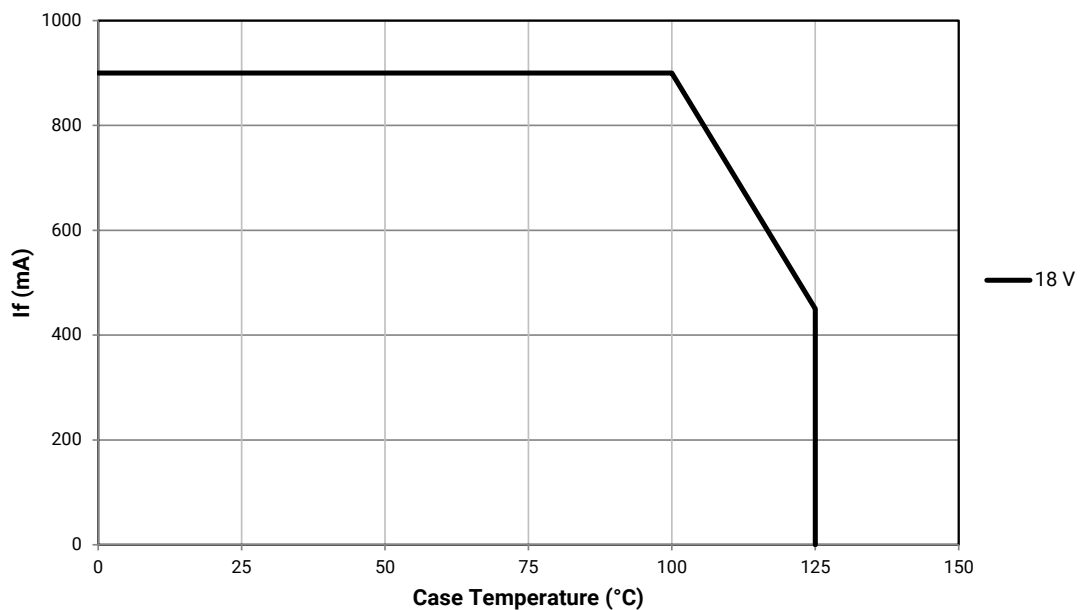
Characteristics	Unit	Minimum	Typical	Maximum
Viewing angle (FWHM)	degrees		115	
ESD withstand voltage (HBM per Mil-Std-883D)	V			8000
DC forward current (18 V)	mA			900*
DC forward current (36 V)	mA			450*
Reverse current (18 V, 36V)	mA			0.1
Forward voltage (18 V, 500 mA, 85 °C)	V		17.5	
Forward voltage (18 V, 500 mA, 25 °C)	V			21
Forward voltage (36 V, 250 mA, 85 °C)	V		35	
Forward voltage (36 V, 250 mA, 25 °C)	V			42

\* Refer to the Operating Limits section.

## OPERATING LIMITS

The maximum current rating of the CXA1510 depends on the case temperature ( $T_c$ ) 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 23 for the location of the  $T_c$  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 24 for more information on LES temperature measurement.



## FLUX CHARACTERISTICS, EASYWHITE® ORDER CODES AND BINS - 18 V ( $I_F = 500 \text{ mA}$ , $T_J = 85^\circ \text{C}$ )

The following table provides order codes for XLamp CXA1510 LEDs. For a complete description of the order code nomenclature, please see the Bin and Order Code Formats section (page 23).

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	H4	970	1076					65F	CXA1510-0000-000F00H465F
			J2	1040	1154						CXA1510-0000-000F00J265F
			J4	1120	1243						CXA1510-0000-000F00J465F
	80	---	H4	970	1076					65F	CXA1510-0000-000F0HH465F
			J2	1040	1154						CXA1510-0000-000F0HJ265F
			J4	1120	1243						CXA1510-0000-000F0HJ465F
5700 K	70	75	H4	970	1076					57F	CXA1510-0000-000F00H457F
			J2	1040	1154						CXA1510-0000-000F00J257F
			J4	1120	1243						CXA1510-0000-000F00J457F
	80	---	H4	970	1076					57F	CXA1510-0000-000F0HH457F
			J2	1040	1154						CXA1510-0000-000F0HJ257F
			J4	1120	1243						CXA1510-0000-000F0HJ457F
	90	95	G2	780	866					57F	CXA1510-0000-000F0UG257F
			G4	840	932						CXA1510-0000-000F0UG457F
			H2	900	999						CXA1510-0000-000F0UH257F

### Notes

- Cree LED maintains a tolerance of  $\pm 7\%$  on flux and power measurements,  $\pm 0.005$  on chromaticity (CCx, CCy) measurements and a tolerance of  $\pm 2$  on CRI measurements. See the Measurements section (page 26).
- CXA1510 LED order codes specify only a minimum flux bin and not a maximum. Cree LED 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 - 18 V ( $I_F = 500 \text{ mA}$ ,  $T_J = 85^\circ \text{C}$ ) - 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	H4	970	1076	50H	CXA1510-0000-000F00H450H			50F	CXA1510-0000-000F00H450F
			J2	1040	1154		CXA1510-0000-000F00J250H				CXA1510-0000-000F00J250F
			J4	1120	1243		CXA1510-0000-000F00J450H				CXA1510-0000-000F00J450F
	80	---	H4	970	1076	50H	CXA1510-0000-000F0HH450H	50G	CXA1510-0000-000F0HH450G	50H	CXA1510-0000-000F0HH450F
			J2	1040	1154		CXA1510-0000-000F0HJ250H		CXA1510-0000-000F0HJ250G		CXA1510-0000-000F0HJ250F
			J4	1120	1243		CXA1510-0000-000F0HJ450H		CXA1510-0000-000F0HJ450G		CXA1510-0000-000F0HJ450F
	90	95	G2	780	866	50H	CXA1510-0000-000F0UG250H	50G	CXA1510-0000-000F0UG250G	50F	CXA1510-0000-000F0UG250F
			G4	840	932		CXA1510-0000-000F0UG450H		CXA1510-0000-000F0UG450G		CXA1510-0000-000F0UG450F
			H2	900	999		CXA1510-0000-000F0UH250H		CXA1510-0000-000F0UH250G		CXA1510-0000-000F0UH250F
4000 K	70	75	H4	970	1076	40H	CXA1510-0000-000F00H440H			40F	CXA1510-0000-000F00H440F
			J2	1040	1154		CXA1510-0000-000F00J240H				CXA1510-0000-000F00J240F
			J4	1120	1243		CXA1510-0000-000F00J440H				CXA1510-0000-000F00J440F
	80	---	H4	970	1076	40H	CXA1510-0000-000F0HH440H	40G	CXA1510-0000-000F0HH440G	40F	CXA1510-0000-000F0HH440F
			J2	1040	1154		CXA1510-0000-000F0HJ240H		CXA1510-0000-000F0HJ240G		CXA1510-0000-000F0HJ240F
			J4	1120	1243		CXA1510-0000-000F0HJ440H		CXA1510-0000-000F0HJ440G		CXA1510-0000-000F0HJ440F
	90	95	G2	780	866	40H	CXA1510-0000-000F0UG240H	40G	CXA1510-0000-000F0UG240G	40F	CXA1510-0000-000F0UG240F
			G4	840	932		CXA1510-0000-000F0UG440H		CXA1510-0000-000F0UG440G		CXA1510-0000-000F0UG440F
			H2	900	999		CXA1510-0000-000F0UH240H		CXA1510-0000-000F0UH240G		CXA1510-0000-000F0UH240F

## Notes

- Cree LED maintains a tolerance of  $\pm 7\%$  on flux and power measurements,  $\pm 0.005$  on chromaticity (CCx, CCy) measurements and a tolerance of  $\pm 2$  on CRI measurements. See the Measurements section (page 26).
- CXA1510 LED order codes specify only a minimum flux bin and not a maximum. Cree LED 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 @  $25^\circ \text{C}$  are calculated and for reference only.

FLUX CHARACTERISTICS, EASYWHITE® ORDER CODES AND BINS - 18 V ( $I_F = 500 \text{ mA}$ ,  $T_J = 85^\circ \text{C}$ ) - 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
3500 K	80	---	H2	900	999	35H	CXA1510-0000-000F00H235H	35G	CXA1510-0000-000F00H235G	35F	CXA1510-0000-000F00H235F
			H4	970	1076		CXA1510-0000-000F00H435H		CXA1510-0000-000F00H435G		CXA1510-0000-000F00H435F
			J2	1040	1154		CXA1510-0000-000F00J235H		CXA1510-0000-000F00J235G		CXA1510-0000-000F00J235F
	90	95	F2	680	755	35H	CXA1510-0000-000F0UF235H	35G	CXA1510-0000-000F0UF235G	35F	CXA1510-0000-000F0UF235F
			F4	730	810		CXA1510-0000-000F0UF435H		CXA1510-0000-000F0UF435G		CXA1510-0000-000F0UF435F
			G2	780	866		CXA1510-0000-000F0UG235H		CXA1510-0000-000F0UG235G		CXA1510-0000-000F0UG235F
	93	95	F2	680	755	35H	CXA1510-0000-000F0YF235H	35G	CXA1510-0000-000F0YF235G	35F	CXA1510-0000-000F0YF235F
			F4	730	810		CXA1510-0000-000F0YF435H		CXA1510-0000-000F0YF435G		CXA1510-0000-000F0YF435F
			G2	780	866		CXA1510-0000-000F0YG235H		CXA1510-0000-000F0YG235G		CXA1510-0000-000F0YG235F
3000 K	80	---	H2	900	999	30H	CXA1510-0000-000F00H230H	30G	CXA1510-0000-000F00H230G	30F	CXA1510-0000-000F00H230F
			H4	970	1076		CXA1510-0000-000F00H430H		CXA1510-0000-000F00H430G		CXA1510-0000-000F00H430F
			J2	1040	1154		CXA1510-0000-000F00J230H		CXA1510-0000-000F00J230G		CXA1510-0000-000F00J230F
	90	95	F2	680	755	30H	CXA1510-0000-000F0UF230H	30G	CXA1510-0000-000F0UF230G	30F	CXA1510-0000-000F0UF230F
			F4	730	810		CXA1510-0000-000F0UF430H		CXA1510-0000-000F0UF430G		CXA1510-0000-000F0UF430F
			G2	780	866		CXA1510-0000-000F0UG230H		CXA1510-0000-000F0UG230G		CXA1510-0000-000F0UG230F
	93	95	F2	680	755	30H	CXA1510-0000-000F0YF230H	30G	CXA1510-0000-000F0YF230G	30F	CXA1510-0000-000F0YF230F
			F4	730	810		CXA1510-0000-000F0YF430H		CXA1510-0000-000F0YF430G		CXA1510-0000-000F0YF430F
			G2	780	866		CXA1510-0000-000F0YG230H		CXA1510-0000-000F0YG230G		CXA1510-0000-000F0YG230F

## Notes

- Cree LED maintains a tolerance of  $\pm 7\%$  on flux and power measurements,  $\pm 0.005$  on chromaticity (CCx, CCy) measurements and a tolerance of  $\pm 2$  on CRI measurements. See the Measurements section (page 26).
- CXA1510 LED order codes specify only a minimum flux bin and not a maximum. Cree LED 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 - 18 V ( $I_F = 500 \text{ mA}$ ,  $T_J = 85^\circ\text{C}$ ) - 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
2700 K	80	---	G4	840	932	27H	CXA1510-0000-000F00G427H	27G	CXA1510-0000-000F00G427G	27F	CXA1510-0000-000F00G427F
			H2	900	999		CXA1510-0000-000F00H227H		CXA1510-0000-000F00H227G		CXA1510-0000-000F00H227F
			H4	970	1076		CXA1510-0000-000F00H427H		CXA1510-0000-000F00H427G		CXA1510-0000-000F00H427F
	90	95	E4	635	707	27H	CXA1510-0000-000F0UE427H	27G	CXA1510-0000-000F0UE427G	27F	CXA1510-0000-000F0UE427F
			F2	680	755		CXA1510-0000-000F0UF227H		CXA1510-0000-000F0UF227G		CXA1510-0000-000F0UF227F
			F4	730	810		CXA1510-0000-000F0UF427H		CXA1510-0000-000F0UF427G		CXA1510-0000-000F0UF427F
	93	95	E4	635	707	27H	CXA1510-0000-000F0YE427H	27G	CXA1510-0000-000F0YE427G	27F	CXA1510-0000-000F0YE427F
			F2	680	755		CXA1510-0000-000F0YF227H		CXA1510-0000-000F0YF227G		CXA1510-0000-000F0YF227F
			F4	730	810		CXA1510-0000-000F0YF427H		CXA1510-0000-000F0YF227G		CXA1510-0000-000F0YF427F

## Notes

- Cree LED maintains a tolerance of  $\pm 7\%$  on flux and power measurements,  $\pm 0.005$  on chromaticity (CCx, CCy) measurements and a tolerance of  $\pm 2$  on CRI measurements. See the Measurements section (page 26).
- CXA1510 LED order codes specify only a minimum flux bin and not a maximum. Cree LED 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 - 18 V ( $I_F = 500 \text{ mA}$ , $T_J = 85^\circ\text{C}$ )

The following table provides order codes for XLamp CXA1510 LEDs. For a complete description of the order code nomenclature, please see the Bin and Order Code Formats section (page 23).

Nominal CCT	CRI		Minimum Luminous Flux			Chromaticity Regions	Order Code
	Min	Typ	Group	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*		
6500 K	70	75	H4	970	1076	1A0, 1B0, 1C0, 1D0, 65F	CXA1510-0000-000F00H40E1
			J2	1040	1154		CXA1510-0000-000F00J20E1
			J4	1120	1243		CXA1510-0000-000F00J40E1
	80	---	H4	970	1076	1A0, 1B0, 1C0, 1D0, 65F	CXA1510-0000-000F0HH40E1
			J2	1040	1154		CXA1510-0000-000F0HJ20E1
			J4	1120	1243		CXA1510-0000-000F0HJ40E1
5700 K	70	75	H4	970	1076	2A0, 2B0, 2C0, 2D0, 57F	CXA1510-0000-000F00H40E2
			J2	1040	1154		CXA1510-0000-000F00J20E2
			J4	1120	1243		CXA1510-0000-000F00J40E2
	80	---	H4	970	1076	2A0, 2B0, 2C0, 2D0, 57F	CXA1510-0000-000F0HH40E2
			J2	1040	1154		CXA1510-0000-000F0HJ20E2
			J4	1120	1243		CXA1510-0000-000F0HJ40E2
	90	95	G2	780	866	2A0, 2B0, 2C0, 1D0, 57F	CXA1510-0000-000F0UG20E2
			G4	840	932		CXA1510-0000-000F0UG40E2
			H2	900	999		CXA1510-0000-000F0UH20E2
5000 K	70	75	H4	970	1076	3A0, 3B0, 3C0, 3D0, 50F	CXA1510-0000-000F00H40E3
			J2	1040	1154		CXA1510-0000-000F00J20E3
			J4	1120	1243		CXA1510-0000-000F00J40E3
	80	---	H4	970	1076	3A0, 3B0, 3C0, 3D0, 50F	CXA1510-0000-000F0HH40E3
			J2	1040	1154		CXA1510-0000-000F0HJ20E3
			J4	1120	1243		CXA1510-0000-000F0HJ40E3
4000 K	70	75	H4	970	1076	5A0, 5B0, 5C0, 5D0, 40F	CXA1510-0000-000F00H40E5
			J2	1040	1154		CXA1510-0000-000F00J20E5
			J4	1120	1243		CXA1510-0000-000F00J40E5

### Notes

- Cree LED maintains a tolerance of  $\pm 7\%$  on flux and power measurements,  $\pm 0.005$  on chromaticity ( $CC_x$ ,  $CC_y$ ) measurements and a tolerance of  $\pm 2$  on CRI measurements. See the Measurements section (page 26).
- CXA1510 LED order codes specify only a minimum flux bin and not a maximum. Cree LED 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 - 36 V ( $I_F = 250 \text{ mA}$ , $T_J = 85^\circ \text{C}$ )

The following table provides order codes for XLamp CXA1510 LEDs. For a complete description of the order code nomenclature, please see the Bin and Order Code Formats section (page 23).

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	H4	970	1076					65F	CXA1510-0000-000N00H465F
			J2	1040	1154						CXA1510-0000-000N00J265F
			J4	1120	1243						CXA1510-0000-000N00J465F
	80	---	H4	970	1076					65F	CXA1510-0000-000N0HH465F
			J2	1040	1154						CXA1510-0000-000N0HJ265F
			J4	1120	1243						CXA1510-0000-000N0HJ465F
5700 K	70	75	H4	970	1076					57F	CXA1510-0000-000N00H457F
			J2	1040	1154						CXA1510-0000-000N00J257F
			J4	1120	1243						CXA1510-0000-000N00J457F
	80	---	H4	970	1076					57F	CXA1510-0000-000N0HH457F
			J2	1040	1154						CXA1510-0000-000N0HJ257F
			J4	1120	1243						CXA1510-0000-000N0HJ457F
	90	95	G2	780	866					57F	CXA1510-0000-000N0UG257F
			G4	840	932						CXA1510-0000-000N0UG457F
			H2	900	999						CXA1510-0000-000N0UH257F

### Notes

- Cree LED maintains a tolerance of  $\pm 7\%$  on flux and power measurements,  $\pm 0.005$  on chromaticity ( $CC_x$ ,  $CC_y$ ) measurements and a tolerance of  $\pm 2$  on CRI measurements. See the Measurements section (page 26).
- CXA1510 LED order codes specify only a minimum flux bin and not a maximum. Cree LED 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 @  $25^\circ \text{C}$  are calculated and for reference only.

FLUX CHARACTERISTICS, EASYWHITE® ORDER CODES AND BINS - 36 V ( $I_F = 250 \text{ mA}$ ,  $T_J = 85^\circ \text{C}$ ) - 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	H4	970	1076	50H	CXA1510-0000-000N00H450H			50F	CXA1510-0000-000N00H450F
			J2	1040	1154		CXA1510-0000-000N00J250H				CXA1510-0000-000N00J250F
			J4	1120	1243		CXA1510-0000-000N00J450H				CXA1510-0000-000N00J450F
	80	---	H4	970	1076	50H	CXA1510-0000-000N0HH450H	50G	CXA1510-0000-000N0HH450G	50H	CXA1510-0000-000N0HH450F
			J2	1040	1154		CXA1510-0000-000N0HJ250H		CXA1510-0000-000N0HJ250G		CXA1510-0000-000N0HJ250F
			J4	1120	1243		CXA1510-0000-000N0HJ450H		CXA1510-0000-000N0HJ450G		CXA1510-0000-000N0HJ450F
	90	95	G2	780	866	50H	CXA1510-0000-000N0UG250H	50G	CXA1510-0000-000N0UG250G	50F	CXA1510-0000-000N0UG250F
			G4	840	932		CXA1510-0000-000N0UG450H		CXA1510-0000-000N0UG450G		CXA1510-0000-000N0UG450F
			H2	900	999		CXA1510-0000-000N0UH250H		CXA1510-0000-000N0UH250G		CXA1510-0000-000N0UH250F
4000 K	70	75	H4	970	1076	40H	CXA1510-0000-000N00H440H			40F	CXA1510-0000-000N00H440F
			J2	1040	1154		CXA1510-0000-000N00J240H				CXA1510-0000-000N00J240F
			J4	1120	1243		CXA1510-0000-000N00J440H				CXA1510-0000-000N00J440F
	80	---	H4	970	1076	40H	CXA1510-0000-000N0HH440H	40G	CXA1510-0000-000N0HH440G	40F	CXA1510-0000-000N0HH440F
			J2	1040	1154		CXA1510-0000-000N0HJ240H		CXA1510-0000-000N0HJ240G		CXA1510-0000-000N0HJ240F
			J4	1120	1243		CXA1510-0000-000N0HJ440H		CXA1510-0000-000N0HJ440G		CXA1510-0000-000N0HJ440F
	90	95	G2	780	866	40H	CXA1510-0000-000N0UG240H	40G	CXA1510-0000-000N0UG240G	40F	CXA1510-0000-000N0UG240F
			G4	840	932		CXA1510-0000-000N0UG440H		CXA1510-0000-000N0UG440G		CXA1510-0000-000N0UG440F
			H2	900	999		CXA1510-0000-000N0UH240H		CXA1510-0000-000N0UH240G		CXA1510-0000-000N0UH240F

## Notes

- Cree LED maintains a tolerance of  $\pm 7\%$  on flux and power measurements,  $\pm 0.005$  on chromaticity (CCx, CCy) measurements and a tolerance of  $\pm 2$  on CRI measurements. See the Measurements section (page 26).
- CXA1510 LED order codes specify only a minimum flux bin and not a maximum. Cree LED 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 - 36 V ( $I_F = 250 \text{ mA}$ ,  $T_J = 85^\circ \text{C}$ ) - 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
3500 K	80	---	H2	900	999	35H	CXA1510-0000-000N00H235H	35G	CXA1510-0000-000N00H235G	35F	CXA1510-0000-000N00H235F
			H4	970	1076		CXA1510-0000-000N00H435H		CXA1510-0000-000N00H435G		CXA1510-0000-000N00H435F
			J2	1040	1154		CXA1510-0000-000N00J235H		CXA1510-0000-000N00J235G		CXA1510-0000-000N00J235F
	90	95	F2	680	755	35H	CXA1510-0000-000N0UF235H	35G	CXA1510-0000-000N0UF235G	35F	CXA1510-0000-000N0UF235F
			F4	730	810		CXA1510-0000-000N0UF435H		CXA1510-0000-000N0UF435G		CXA1510-0000-000N0UF435F
			G2	780	866		CXA1510-0000-000N0UG235H		CXA1510-0000-000N0UG235G		CXA1510-0000-000N0UG235F
	93	95	F2	680	755	35H	CXA1510-0000-000N0YF235H	35G	CXA1510-0000-000N0YF235G	35F	CXA1510-0000-000N0YF235F
			F4	730	810		CXA1510-0000-000N0YF435H		CXA1510-0000-000N0YF435G		CXA1510-0000-000N0YF435F
			G2	780	866		CXA1510-0000-000N0YG235H		CXA1510-0000-000N0YG235G		CXA1510-0000-000N0YG235F
3000 K	80	---	H2	900	999	30H	CXA1510-0000-000N00H230H	30G	CXA1510-0000-000N00H230G	30F	CXA1510-0000-000N00H230F
			H4	970	1076		CXA1510-0000-000N00H430H		CXA1510-0000-000N00H430G		CXA1510-0000-000N00H430F
			J2	1040	1154		CXA1510-0000-000N00J230H		CXA1510-0000-000N00J230G		CXA1510-0000-000N00J230F
	90	95	F2	680	755	30H	CXA1510-0000-000N0UF230H	30G	CXA1510-0000-000N0UF230G	30F	CXA1510-0000-000N0UF230F
			F4	730	810		CXA1510-0000-000N0UF430H		CXA1510-0000-000N0UF430G		CXA1510-0000-000N0UF430F
			G2	780	866		CXA1510-0000-000N0UG230H		CXA1510-0000-000N0UG230G		CXA1510-0000-000N0UG230F
	93	95	F2	680	755	30H	CXA1510-0000-000N0YF230H	30G	CXA1510-0000-000N0YF230G	30F	CXA1510-0000-000N0YF230F
			F4	730	810		CXA1510-0000-000N0YF430H		CXA1510-0000-000N0YF430G		CXA1510-0000-000N0YF430F
			G2	780	866		CXA1510-0000-000N0YG230H		CXA1510-0000-000N0YG230G		CXA1510-0000-000N0YG230F

## Notes

- Cree LED maintains a tolerance of  $\pm 7\%$  on flux and power measurements,  $\pm 0.005$  on chromaticity (CCx, CCy) measurements and a tolerance of  $\pm 2$  on CRI measurements. See the Measurements section (page 26).
- CXA1510 LED order codes specify only a minimum flux bin and not a maximum. Cree LED 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 - 36 V ( $I_F = 250 \text{ mA}$ ,  $T_J = 85^\circ\text{C}$ ) - 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
2700 K	80	---	G4	840	932	27H	CXA1510-0000-000N00G427H	27G	CXA1510-0000-000N00G427G	27F	CXA1510-0000-000N00G427F
			H2	900	999		CXA1510-0000-000N00H227H		CXA1510-0000-000N00H227G		CXA1510-0000-000N00H227F
			H4	970	1076		CXA1510-0000-000N00H427H		CXA1510-0000-000N00H427G		CXA1510-0000-000N00H427F
	90	95	E4	635	707	27H	CXA1510-0000-000N0UE427H	27G	CXA1510-0000-000N0UE427G	27F	CXA1510-0000-000N0UE427F
			F2	680	755		CXA1510-0000-000N0UF227H		CXA1510-0000-000N0UF227G		CXA1510-0000-000N0UF227F
			F4	730	810		CXA1510-0000-000N0UF427H		CXA1510-0000-000N0UF427G		CXA1510-0000-000N0UF427F
	93	95	E4	635	707	27H	CXA1510-0000-000N0YE427H	27G	CXA1510-0000-000N0YE427G	27F	CXA1510-0000-000N0YE427F
			F2	680	755		CXA1510-0000-000N0YF227H		CXA1510-0000-000N0YF227G		CXA1510-0000-000N0YF227F
			F4	730	810		CXA1510-0000-000N0YF427H		CXA1510-0000-000N0YF427G		CXA1510-0000-000N0YF427F

## Notes

- Cree LED maintains a tolerance of  $\pm 7\%$  on flux and power measurements,  $\pm 0.005$  on chromaticity (CCx, CCy) measurements and a tolerance of  $\pm 2$  on CRI measurements. See the Measurements section (page 26).
- CXA1510 LED order codes specify only a minimum flux bin and not a maximum. Cree LED 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 ( $I_F = 250 \text{ mA}$ , $T_J = 85^\circ\text{C}$ )

The following table provides order codes for XLamp CXA1510 LEDs. For a complete description of the order code nomenclature, please see the Bin and Order Code Formats section (page 23).

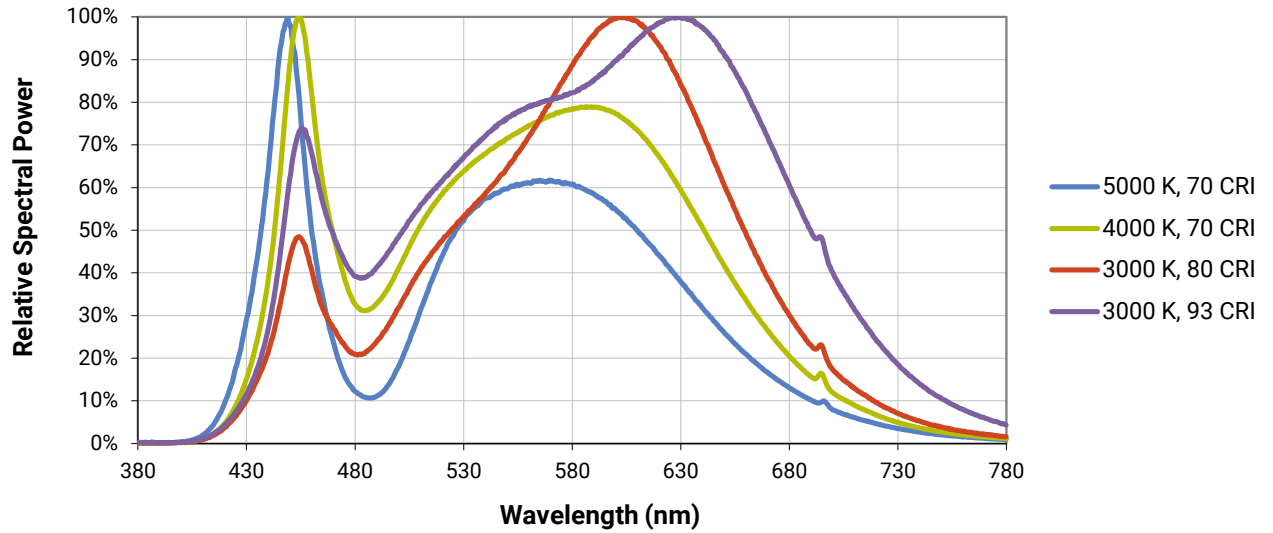
Nominal CCT	CRI		Minimum Luminous Flux			Chromaticity Regions	Order Code
	Min	Typ	Group	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*		
6500 K	70	75	H4	970	1076	1A0, 1B0, 1C0, 1D0, 65F	CXA1510-0000-000N00H40E1
			J2	1040	1154		CXA1510-0000-000N00J20E1
			J4	1120	1243		CXA1510-0000-000N00J40E1
	80	---	H4	970	1076	1A0, 1B0, 1C0, 1D0, 65F	CXA1510-0000-000N0HH40E1
			J2	1040	1154		CXA1510-0000-000N0HJ20E1
			J4	1120	1243		CXA1510-0000-000N0HJ40E1
5700 K	70	75	H4	970	1076	2A0, 2B0, 2C0, 2D0, 57F	CXA1510-0000-000N00H40E2
			J2	1040	1154		CXA1510-0000-000N00J20E2
			J4	1120	1243		CXA1510-0000-000N00J40E2
	80	---	H4	970	1076	2A0, 2B0, 2C0, 2D0, 57F	CXA1510-0000-000N0HH40E2
			J2	1040	1154		CXA1510-0000-000N0HJ20E2
			J4	1120	1243		CXA1510-0000-000N0HJ40E2
	90	95	G2	780	866	2A0, 2B0, 2C0, 1D0, 57F	CXA1510-0000-000N0UG20E2
			G4	840	932		CXA1510-0000-000N0UG40E2
			H2	900	999		CXA1510-0000-000N0UH20E2
5000 K	70	75	H4	970	1076	3A0, 3B0, 3C0, 3D0, 50F	CXA1510-0000-000N00H40E3
			J2	1040	1154		CXA1510-0000-000N00J20E3
			J4	1120	1243		CXA1510-0000-000N00J40E3
	80	---	H4	970	1076	3A0, 3B0, 3C0, 3D0, 50F	CXA1510-0000-000N0HH40E3
			J2	1040	1154		CXA1510-0000-000N0HJ20E3
			J4	1120	1243		CXA1510-0000-000N0HJ40E3
4000 K	70	75	H4	970	1076	5A0, 5B0, 5C0, 5D0, 40F	CXA1510-0000-000N00H40E5
			J2	1040	1154		CXA1510-0000-000N00J20E5
			J4	1120	1243		CXA1510-0000-000N00J40E5

### Notes

- Cree LED maintains a tolerance of  $\pm 7\%$  on flux and power measurements,  $\pm 0.005$  on chromaticity ( $CC_x$ ,  $CC_y$ ) measurements and a tolerance of  $\pm 2$  on CRI measurements. See the Measurements section (page 26).
- CXA1510 LED order codes specify only a minimum flux bin and not a maximum. Cree LED 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.

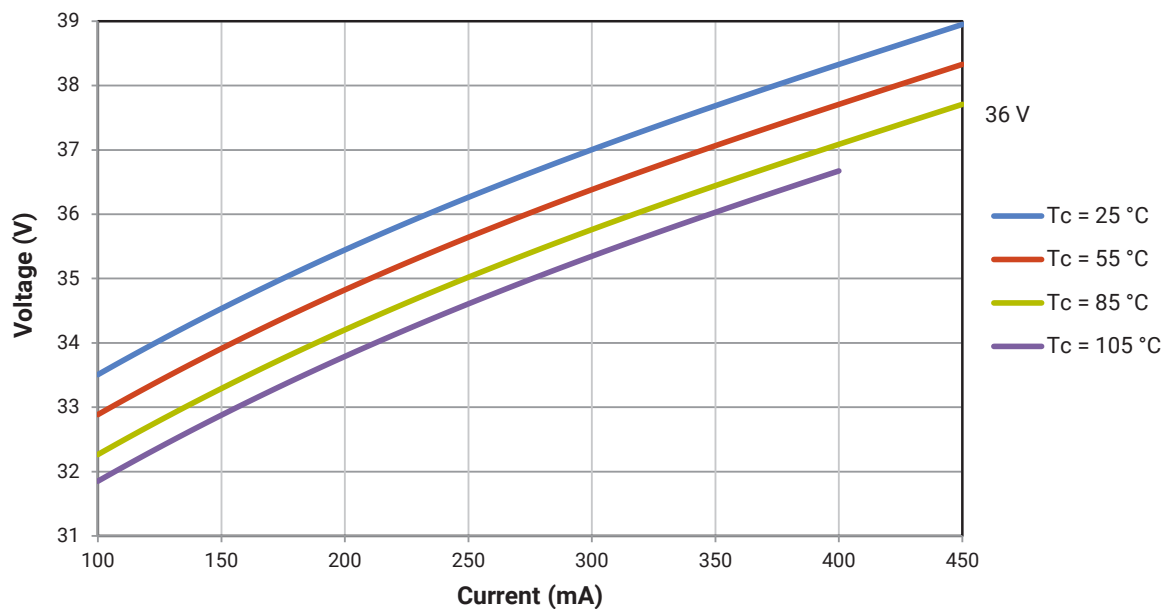
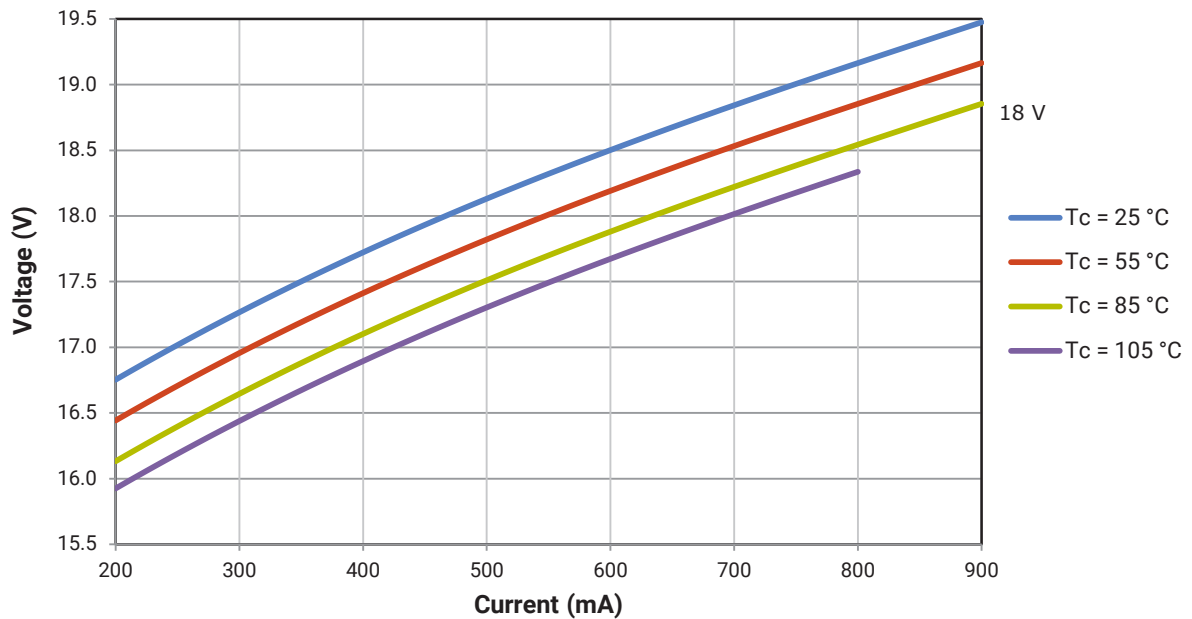
## RELATIVE SPECTRAL POWER DISTRIBUTION

The following graph is the result of a series of pulsed measurements at 500 mA for the 18-V CXA1510 LED and 250 mA for the 36-V CXA1510 LED and  $T_j = 85^\circ\text{C}$ .



## ELECTRICAL CHARACTERISTICS

The following graphs are the result of a series of steady-state measurements.

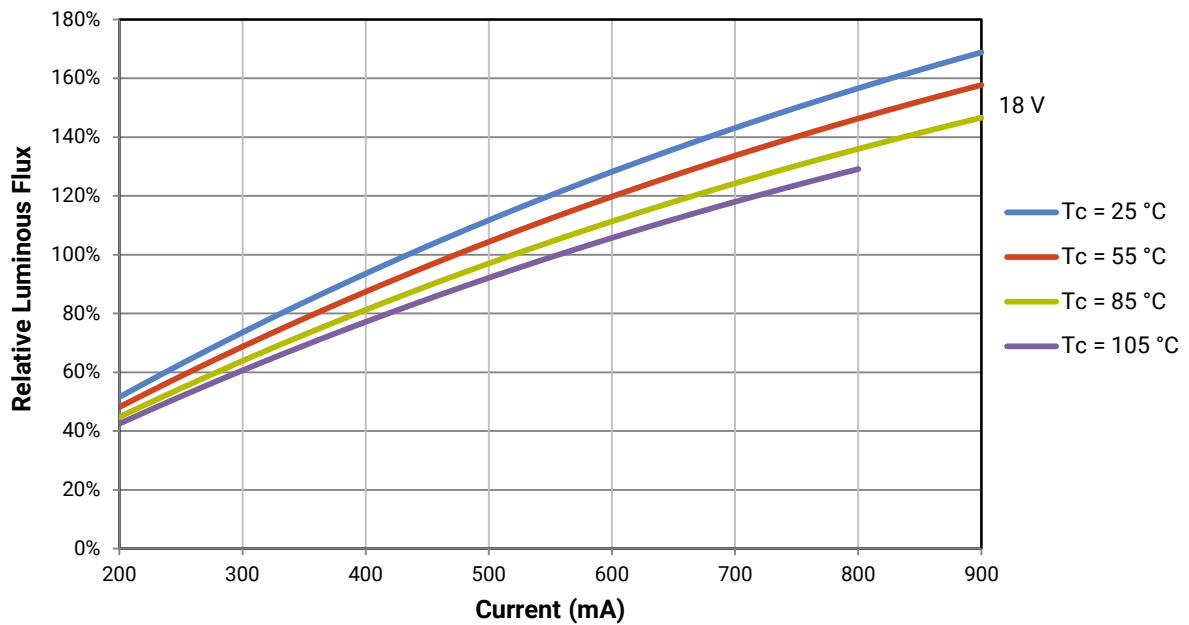


## RELATIVE LUMINOUS FLUX

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

- Measurements of CXA1510 at steady-state operation at the given conditions, divided by
- Flux measured during binning, which is a pulsed measurement at 500 mA at  $T_j = 85^\circ\text{C}$ .

Using the 18-V CXA1510 LED as an example, at steady-state operation of  $T_c = 55^\circ\text{C}$ ,  $I_F = 600\text{ mA}$ , the relative luminous flux ratio is 120% in the chart below. A CXA1510 LED that measures 1120 lm during binning will deliver 1344 lm ( $1120 \times 1.2$ ) at steady-state operation of  $T_c = 55^\circ\text{C}$ ,  $I_F = 600\text{ mA}$ .



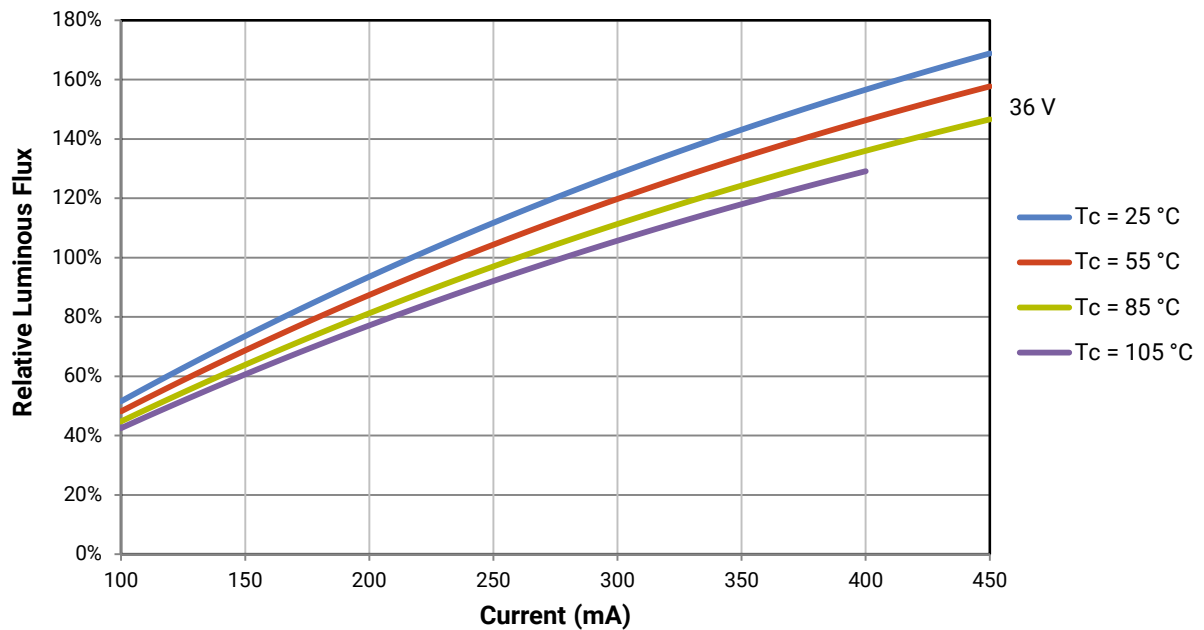


## RELATIVE LUMINOUS FLUX - CONTINUED

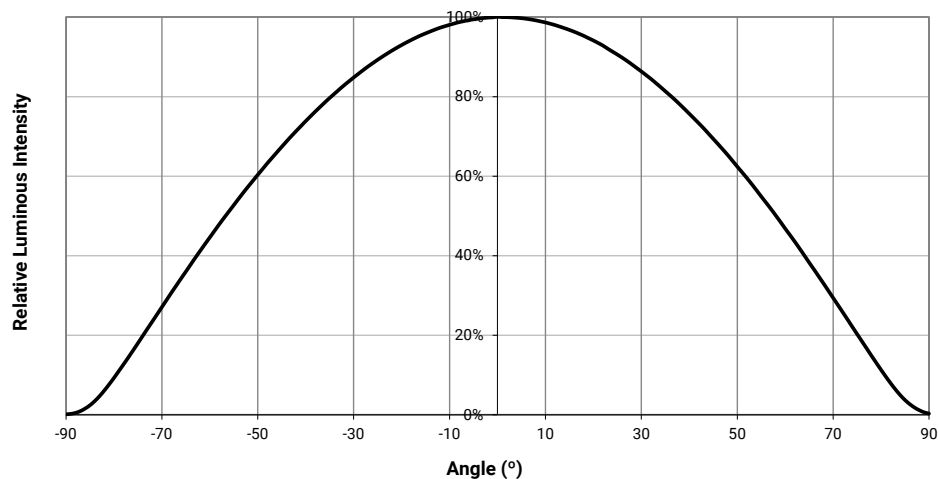
The relative luminous flux values provided below are the ratio of:

- Measurements of CXA1510 at steady-state operation at the given conditions, divided by
- Flux measured during binning, which is a pulsed measurement at 250 mA at  $T_j = 85^\circ\text{C}$ .

Using the 36-V CXA1510 LED as an example, at steady-state operation of  $T_c = 55^\circ\text{C}$ ,  $I_f = 300\text{ mA}$ , the relative luminous flux ratio is 120% in the chart below. A CXA1510 LED that measures 1120 lm during binning will deliver 1344 lm ( $1120 \times 1.2$ ) at steady-state operation of  $T_c = 55^\circ\text{C}$ ,  $I_f = 300\text{ mA}$ .



## TYPICAL SPATIAL DISTRIBUTION

PERFORMANCE GROUPS - BRIGHTNESS (18 V,  $I_F = 500$  mA; 36 V,  $I_F = 250$  mA,  $T_J = 85$  °C)

XLamp CXA1510 LEDs are tested for luminous flux and placed into one of the following bins.

Group Code	Minimum Luminous Flux	Maximum Luminous Flux
E4	635	680
F2	680	730
F4	730	780
G2	780	840
G4	840	900
H2	900	970
H4	970	1040
J2	1040	1120
J4	1120	1200
K2	1200	1290

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

XLamp CXA1510 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

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

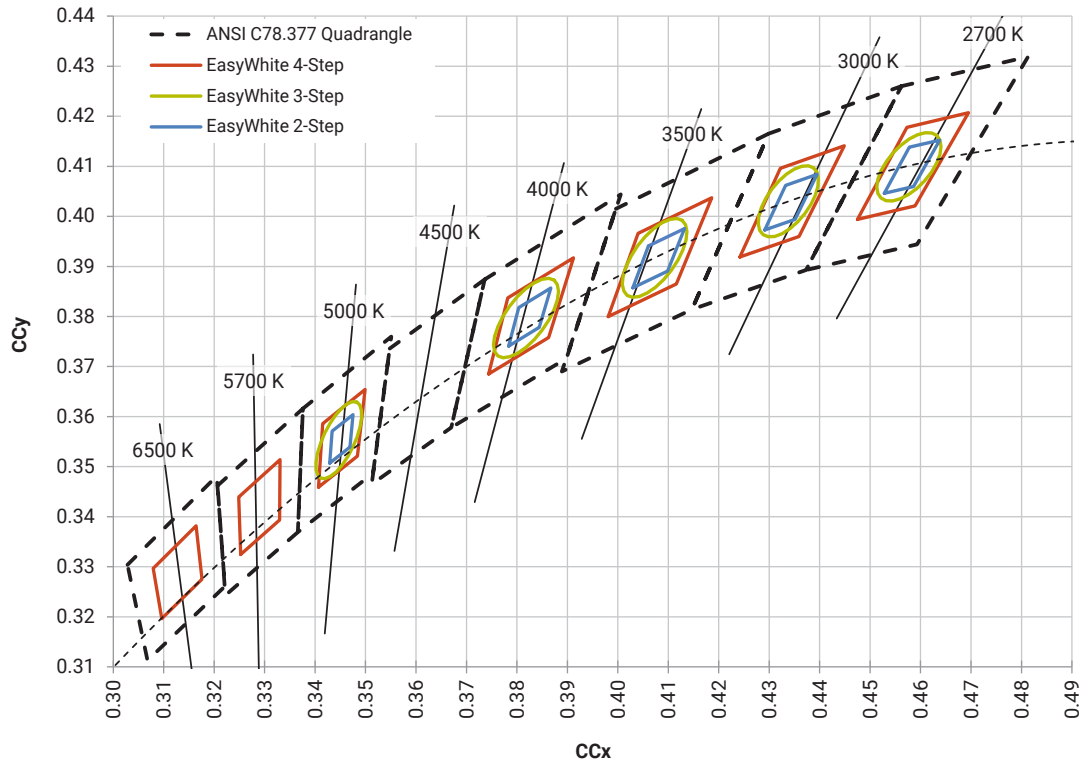
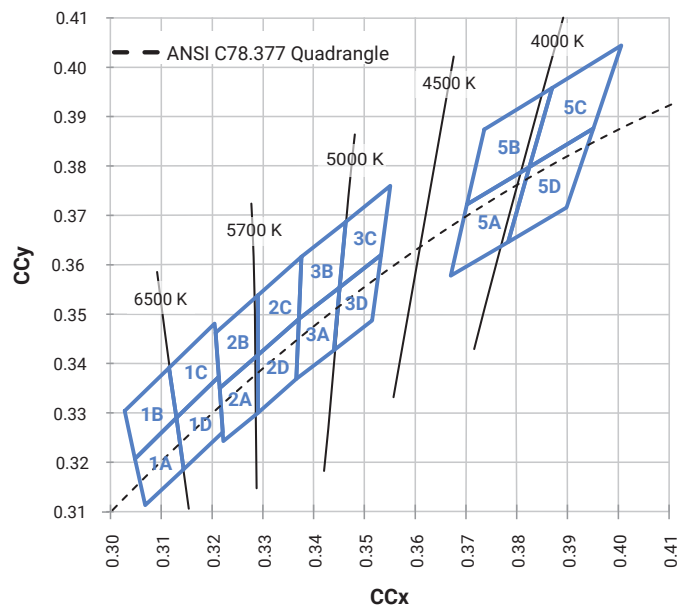
PERFORMANCE GROUPS - CHROMATICITY ( $T_j = 85^\circ\text{C}$ ) - CONTINUED

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

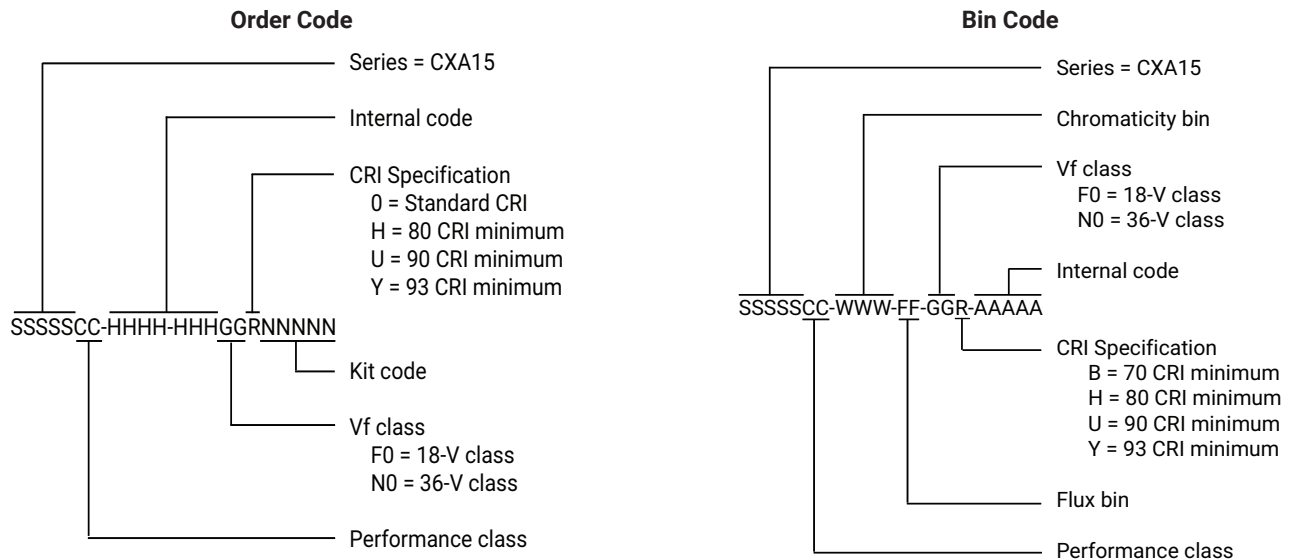
ANSI White Bins				
Code	CCT	Bin Code	x	y
0E3	5000 K	3A0	.3371	.3490
			.3451	.3554
			.3440	.3427
			.3366	.3369
		3B0	.3376	.3616
			.3463	.3687
			.3451	.3554
			.3371	.3490
		3C0	.3463	.3687
			.3551	.3760
			.3533	.3620
			.3451	.3554
		3D0	.3451	.3554
			.3533	.3620
			.3515	.3487
			.3440	.3427

ANSI White Bins				
Code	CCT	Bin Code	x	y
0E5	4000 K	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

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

## BIN AND ORDER CODE FORMATS

Bin codes and order codes are configured as follows:



## MECHANICAL DIMENSIONS

Dimensions are in mm.

Tolerances unless otherwise

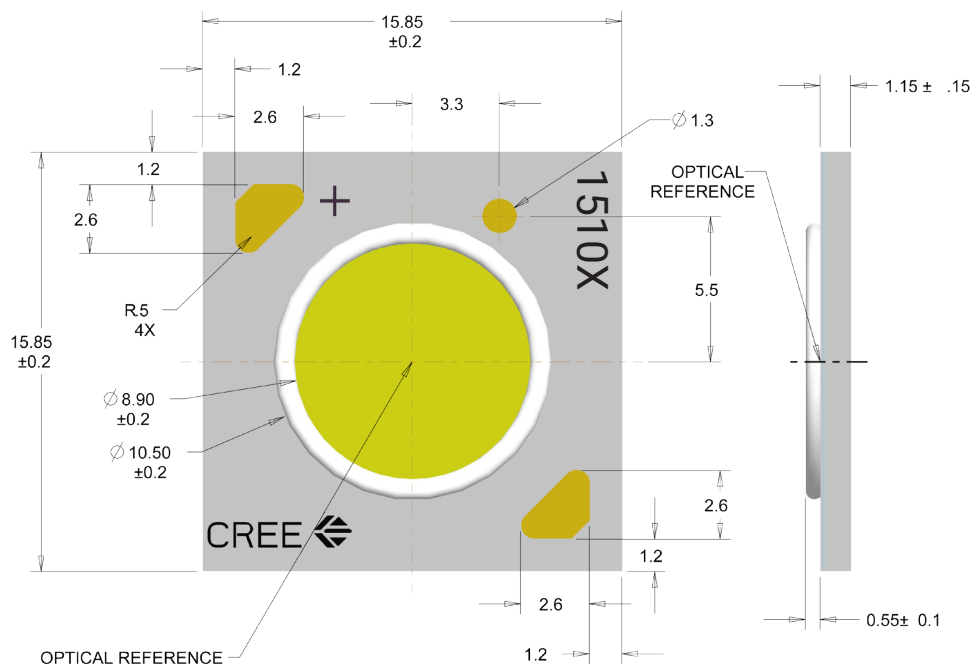
specified:  $\pm 0.13$

$\alpha^\circ \pm 1^\circ$

### Meaning of 1510X

1510F = 18-V CXA1510

1510N = 36-V CXA1510



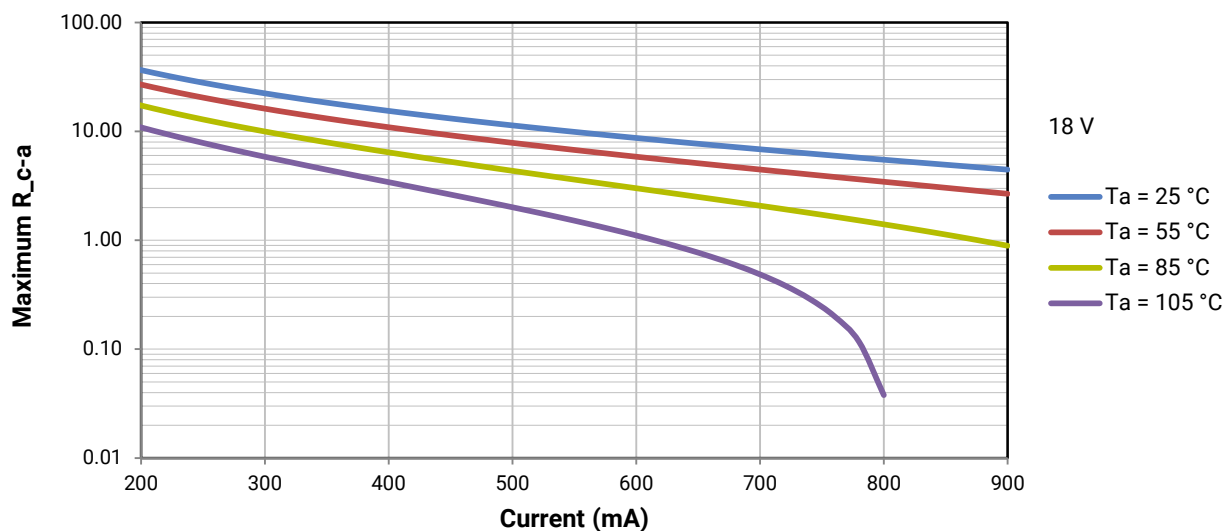
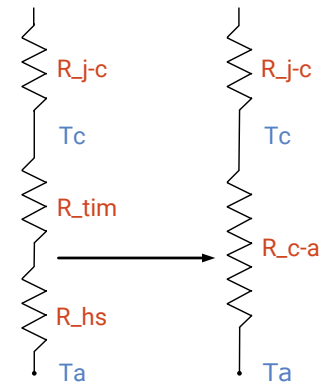
## THERMAL DESIGN

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 ( $T_c$ ). 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 3 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 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 [XLamp CX Family LEDs soldering and handling document](#). The [CX Family LED Design Guide](#) provides basic information on the requirements to use XLamp CXA LEDs successfully in luminaire designs.

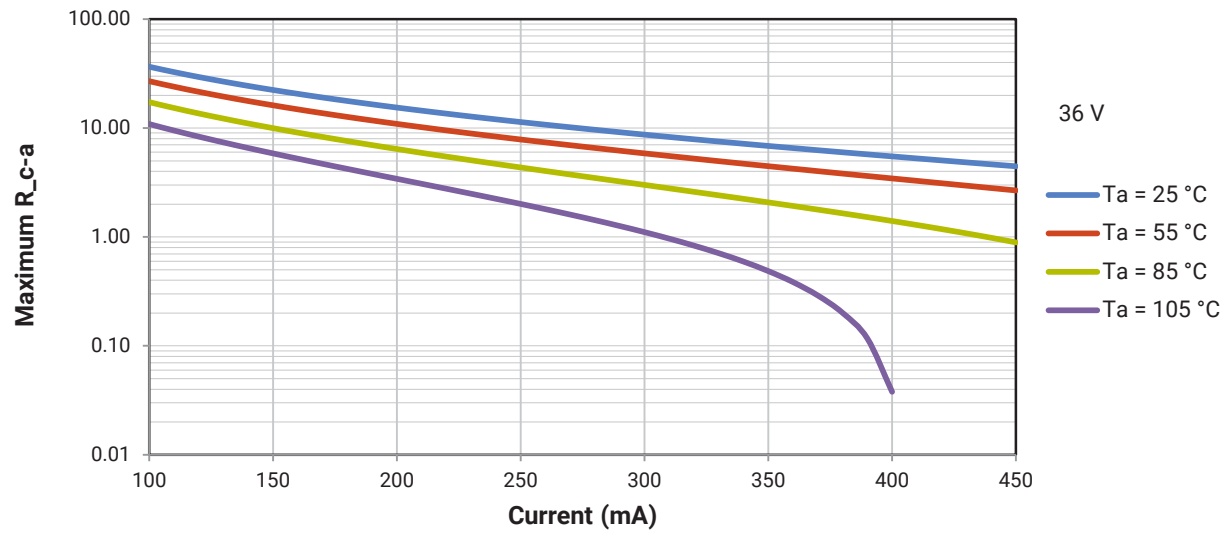
To keep the CXA1510 LED at or below the maximum rated  $T_c$ , the case to ambient temperature thermal resistance ( $R_{c-a}$ ) must be at or below the maximum  $R_{c-a}$  value shown on the following graphs, depending on the operating environment. The y-axis in the graphs is a base 10 logarithmic scale.

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, 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 LED'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 LED applies to ensure long-term reliability for XLamp LEDs and details of Cree LED's pre-release qualification testing for XLamp LEDs.

### Lumen Maintenance

Cree LED 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 LED'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 LED representative or from the [Product Ecology](#) section of the Cree LED 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 LED 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](#).

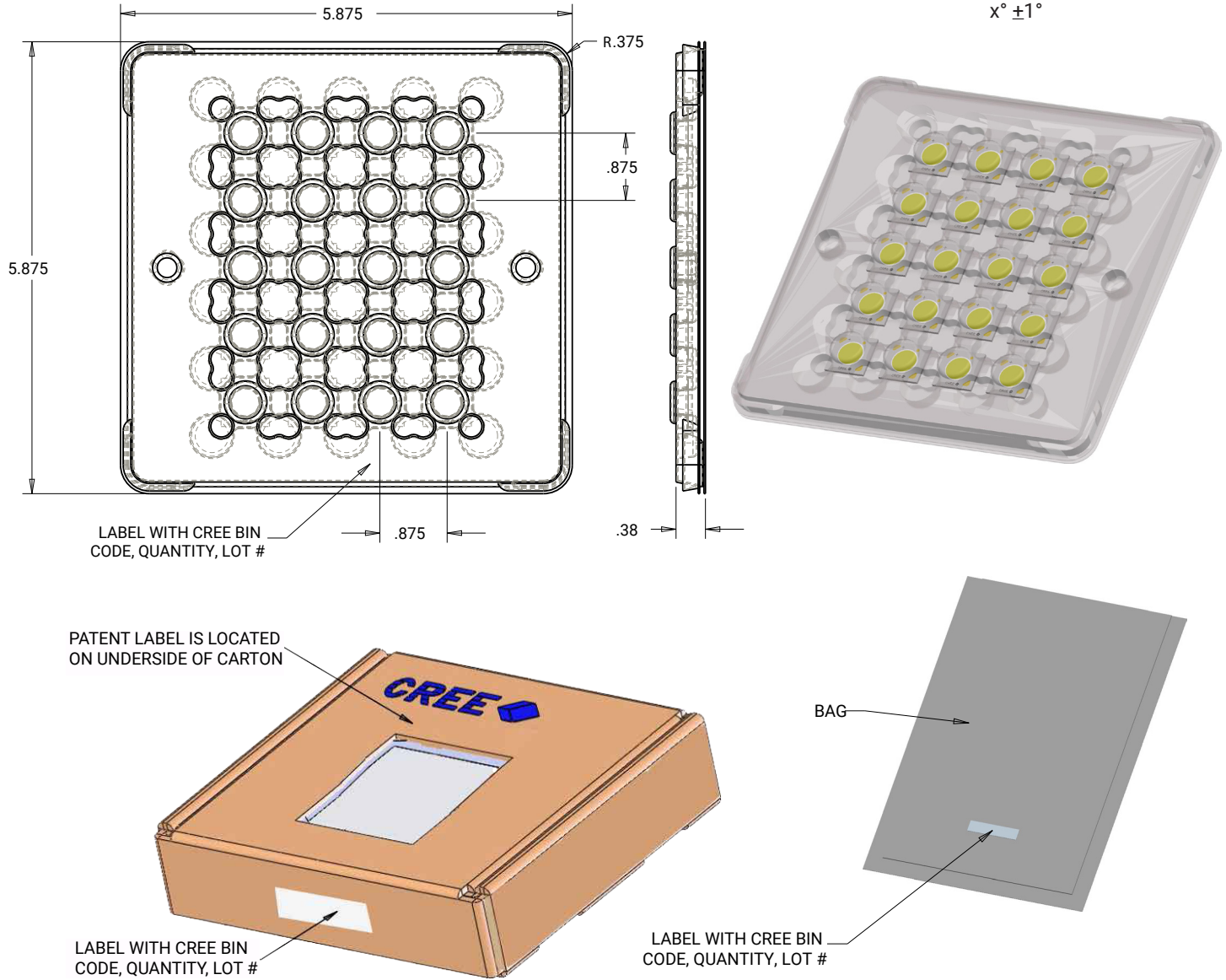
## PACKAGING

CXA1510 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:  $\pm .13$

$x^{\circ} \pm 1^{\circ}$



# Mouser Electronics

Authorized Distributor

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

[Cree LED:](#)

[CXA1510-0000-000N0UF20E7](#) [CXA1510-0000-000F0UH240F](#) [CXA1510-0000-000F0UF20E8](#) [CXA1510-0000-000F0UE427H](#) [CXA1510-0000-000F0UG257F](#) [CXA1510-0000-000N0UG40E5](#) [CXA1510-0000-000F0YF230H](#) [CXA1510-0000-000F0UH20E5](#) [CXA1510-0000-000N0UE427F](#) [CXA1510-0000-000F0UG230F](#) [CXA1510-0000-000N0UG20E5](#) [CXA1510-0000-000N0UF20E6](#) [CXA1510-0000-000N00H230F](#) [CXA1510-0000-000N0HH40E3](#) [CXA1510-0000-000N0YF40E6](#) [CXA1510-0000-000N0YG230F](#) [CXA1510-0000-000F0UF227F](#) [CXA1510-0000-000N00H20E6](#) [CXA1510-0000-000N00H450H](#) [CXA1510-0000-000F0UG20E7](#) [CXA1510-0000-000N00H427F](#) [CXA1510-0000-000F0YG20E6](#) [CXA1510-0000-000N0YE40E8](#) [CXA1510-0000-000N0UG40E2](#) [CXA1510-0000-000N00H40E5](#) [CXA1510-0000-000N00J465F](#) [CXA1510-0000-000N00H427H](#) [CXA1510-0000-000F0YF427F](#) [CXA1510-0000-000N0YG230H](#) [CXA1510-0000-000N0HJ40E3](#) [CXA1510-0000-000F0UF20E7](#) [CXA1510-0000-000N0UG40E1](#) [CXA1510-0000-000N0HJ265F](#) [CXA1510-0000-000N0YF227F](#) [CXA1510-0000-000F0UG20E1](#) [CXA1510-0000-000F0UG20E3](#) [CXA1510-0000-000N0HJ450H](#) [CXA1510-0000-000N0YG20E6](#) [CXA1510-0000-000F0YG235H](#) [CXA1510-0000-000N0HJ440F](#) [CXA1510-0000-000N0HJ20E5](#) [CXA1510-0000-000N0YF20E7](#) [CXA1510-0000-000N0UF427F](#) [CXA1510-0000-000N00H235H](#) [CXA1510-0000-000N00J240H](#) [CXA1510-0000-000F0UG465F](#) [CXA1510-0000-000N00H450F](#) [CXA1510-0000-000F0YG230H](#) [CXA1510-0000-000F0UE40E8](#) [CXA1510-0000-000N00J250H](#) [CXA1510-0000-000F0YF40E6](#) [CXA1510-0000-000F0UG450H](#) [CXA1510-0000-000F0UG240H](#) [CXA1510-0000-000N0UH257F](#) [CXA1510-0000-000F0YF20E7](#) [CXA1510-0000-000F0UG450F](#) [CXA1510-0000-000N00J235F](#) [CXA1510-0000-000N0UG465F](#) [CXA1510-0000-000N0UF227F](#) [CXA1510-0000-000N0YF430H](#) [CXA1510-0000-000N00J40E5](#) [CXA1510-0000-000F0UF427F](#) [CXA1510-0000-000N0UF430F](#) [CXA1510-0000-000F0YF427H](#) [CXA1510-0000-000N0YG235H](#) [CXA1510-0000-000F0UF40E6](#) [CXA1510-0000-000N0HJ250H](#) [CXA1510-0000-000N0HJ250F](#) [CXA1510-0000-000N0YF427F](#) [CXA1510-0000-000F0UH20E3](#) [CXA1510-0000-000N00H440F](#) [CXA1510-0000-000F0UF435H](#) [CXA1510-0000-000N0UF430H](#) [CXA1510-0000-000N00H227F](#) [CXA1510-0000-000N0YE427F](#) [CXA1510-0000-000N0UG450F](#) [CXA1510-0000-000N00J20E7](#) [CXA1510-0000-000N0UH20E3](#) [CXA1510-0000-000N0YF235F](#) [CXA1510-0000-000N0UF435H](#) [CXA1510-0000-000N0UF235F](#) [CXA1510-0000-000N0YF230H](#) [CXA1510-0000-000F0UG440F](#) [CXA1510-0000-000F0UH240H](#) [CXA1510-0000-000N00H430H](#) [CXA1510-0000-000N00J20E3](#) [CXA1510-0000-000N0UF40E6](#) [CXA1510-0000-000F0UF230H](#) [CXA1510-0000-000N0UG440F](#) [CXA1510-0000-000N0YF20E6](#) [CXA1510-0000-000F0UF227H](#)

[CXA1510-0000-000N00G427H](#) [CXA1510-0000-000N0UG20E7](#) [CXA1510-0000-000F0YG20E7](#) [CXA1510-0000-000F0YF227H](#) [CXA1510-0000-000N0YF435H](#) [CXA1510-0000-000F0UG250F](#) [CXA1510-0000-000F0UH250F](#)  
[CXA1510-0000-000N0HH440F](#) [CXA1510-0000-000N0HJ40E1](#)