

Cree® XLamp® CXA1830 LED



PRODUCT DESCRIPTION

The XLamp® CXA1830 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 CXA1830's small, uniform emitting surface enables both directional and non-directional lighting applications including lamp retrofit and luminaire designs. Available in 2-step and 4-step color consistency, and featuring a 14-mm optical source, the CXA1830 brings new levels of flux and efficacy to this form factor.

The [CXA LED Design Guide](#) provides basic information on the requirements to use the CXA1830 LED successfully in luminaire designs.

FEATURES

- Available in 4-step and 2-step EasyWhite® bins at 2700 K, 3000 K, 3500 K, 4000 K and 5000 K CCT
- Available in ANSI white bins as well as 4-step EasyWhite bins at 4000 K, 5000 K, 5700 K and 6500 K CCT
- Available in 70-, 80-, 90- and 93-minimum CRI options
- Forward voltage: 37 V
- 85 °C binning and characterization
- Maximum drive current: 1400 mA
- 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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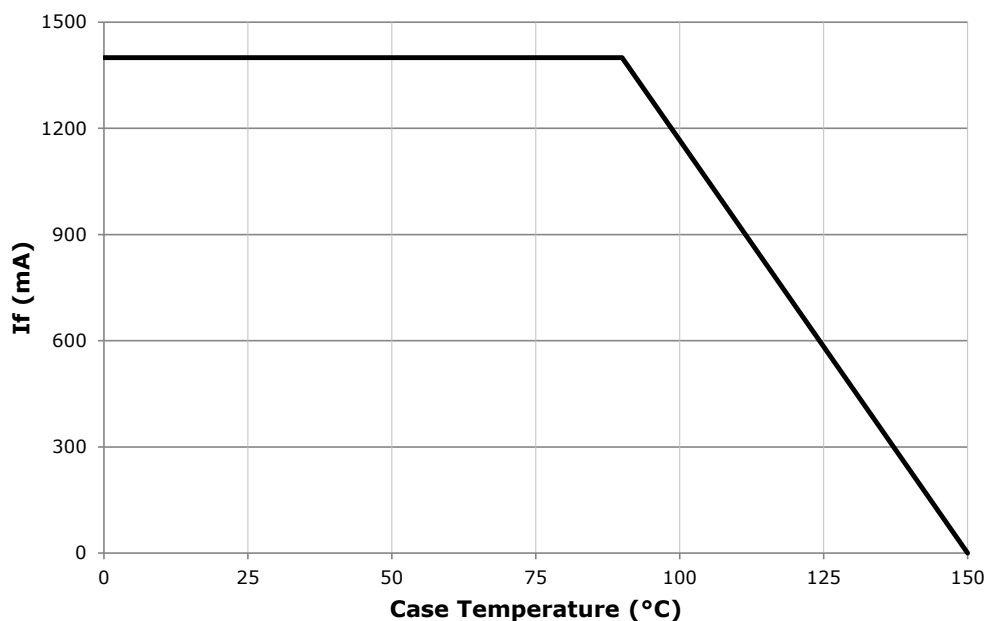
CHARACTERISTICS

Characteristics	Unit	Minimum	Typical	Maximum
Viewing angle (FWHM)	degrees		115	
ESD withstand voltage (HBM per Mil-Std-883D)	V			8000
DC forward current	mA			1400*
Reverse current	mA			0.1
Forward voltage (800 mA, 85 °C)	V		37	
Forward voltage (800 mA, 25 °C)	V			42

* Refer to the Operating Limits section.

OPERATING LIMITS

The maximum current rating of the CXA1830 is dependent on the case temperature (T_c) when the LED has reached thermal equilibrium under steady-state operation. Please refer to the Mechanical Dimensions section on page 15 for the location of the T_c measurement point.



FLUX CHARACTERISTICS, EASYWHITE ORDER CODES AND BINS ($I_f = 800 \text{ mA}$, $T_j = 85 \text{ °C}$)

The following tables provide order codes for XLamp CXA1830 LEDs. For a complete description of the order code nomenclature, please reference Bin and Order Code Formats (page 15).

CCT Range	CRI		Base Order Codes Min. Luminous Flux @ 800 mA			2-Step Order Code		4-Step Order Code	
	Min	Typ	Group	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*	Chromaticity Region		Chromaticity Region	
6500 K	70	75	T4	3440	3887			65F	CXA1830-0000-000N00T465F
			U2	3680	4158				CXA1830-0000-000N00U265F
			U4	3955	4424				CXA1830-0000-000N00U465F
	80	---	T4	3440	3887			65F	CXA1830-0000-000N0HT465F
			U2	3680	4158				CXA1830-0000-000N0HU265F
5700 K	70	75	T4	3440	3887			57F	CXA1830-0000-000N00T457F
			U2	3680	4158				CXA1830-0000-000N00U257F
			U4	3955	4424				CXA1830-0000-000N00U457F
	80	---	T4	3440	3887			57F	CXA1830-0000-000N0HT457F
			U2	3680	4158				CXA1830-0000-000N0HU257F
5000 K	70	75	T4	3440	3887	50H	CXA1830-0000-000N00T450H	50F	CXA1830-0000-000N00T450F
			U2	3680	4158		CXA1830-0000-000N00U250H		CXA1830-0000-000N00U250F
			U4	3955	4424		CXA1830-0000-000N00U450H		CXA1830-0000-000N00U450F
	80	---	S4	2990	3379	50H	CXA1830-0000-000N0HS450H	50F	CXA1830-0000-000N0HS450F
			T2	3200	3616		CXA1830-0000-000N0HT250H		CXA1830-0000-000N0HT250F
			T4	3440	3887		CXA1830-0000-000N0HT450H		CXA1830-0000-000N0HT450F
			U2	3680	4158		CXA1830-0000-000N0HU250H		CXA1830-0000-000N0HU250F
	90	95	R4	2600	2938	50H	CXA1830-0000-000N0UR450H	50F	CXA1830-0000-000N0UR450F
			S2	2780	3141		CXA1830-0000-000N0US250H		CXA1830-0000-000N0US250F
			S4	2990	3379		CXA1830-0000-000N0US450H		CXA1830-0000-000N0US450F

Notes

- Cree maintains a tolerance of $\pm 7\%$ on flux and power measurements, ± 0.005 on chromaticity (CCx, CCy) measurements and a tolerance of ± 2 on CRI measurements.
- * Flux values @ 25 °C are calculated and for reference only.

FLUX CHARACTERISTICS, EASYWHITE ORDER CODES AND BINS ($I_f = 800 \text{ mA}$, $T_j = 85 \text{ °C}$) - CONTINUED

CCT Range	CRI		Base Order Codes Min. Luminous Flux @ 800 mA			2-Step Order Code		4-Step Order Code	
	Min	Typ	Group	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*	Chromaticity Region		Chromaticity Region	
4000 K	70	75	T2	3200	3616	40H	CXA1830-0000-000N00T240H	40F	CXA1830-0000-000N00T240F
			T4	3440	3887		CXA1830-0000-000N00T440H		CXA1830-0000-000N00T440F
			U2	3680	4158		CXA1830-0000-000N00U240H		CXA1830-0000-000N00U240F
			U4	3955	4424		CXA1830-0000-000N00U440H		CXA1830-0000-000N00U440F
	80	---	S4	2990	3379	40H	CXA1830-0000-000N0HS440H	40F	CXA1830-0000-000N0HS440F
			T2	3200	3616		CXA1830-0000-000N0HT240H		CXA1830-0000-000N0HT240F
			T4	3440	3887		CXA1830-0000-000N0HT440H		CXA1830-0000-000N0HT440F
			U2	3680	4158		CXA1830-0000-000N0HU240H		CXA1830-0000-000N0HU240F
	90	95	R2	2420	2735	40H	CXA1830-0000-000N0UR240H	40F	CXA1830-0000-000N0UR240F
			R4	2600	2938		CXA1830-0000-000N0UR440H		CXA1830-0000-000N0UR440F
			S2	2780	3141		CXA1830-0000-000N0US240H		CXA1830-0000-000N0US240F
			S4	2990	3379		CXA1830-0000-000N0US440H		CXA1830-0000-000N0US440F
3500 K	80	---	S4	2990	3379	35H	CXA1830-0000-000N00S435H	35F	CXA1830-0000-000N00S435F
			T2	3200	3616		CXA1830-0000-000N00T235H		CXA1830-0000-000N00T235F
			T4	3440	3887		CXA1830-0000-000N00T435H		CXA1830-0000-000N00T435F
	93	95	Q4	2260	2554	35H	CXA1830-0000-000N0YQ435H	35F	CXA1830-0000-000N0YQ435F
			R2	2420	2735		CXA1830-0000-000N0YR235H		CXA1830-0000-000N0YR235F
			R4	2600	2938		CXA1830-0000-000N0YR435H		CXA1830-0000-000N0YR435F
			S2	2780	3141		CXA1830-0000-000N0YS235H		CXA1830-0000-000N0YS235F
3000 K	80	---	S4	2990	3379	30H	CXA1830-0000-000N00S430H	30F	CXA1830-0000-000N00S430F
			T2	3200	3616		CXA1830-0000-000N00T230H		CXA1830-0000-000N00T230F
			T4	3440	3887		CXA1830-0000-000N00T430H		CXA1830-0000-000N00T430F
			U2	3680	4158		CXA1830-0000-000N00U230H		CXA1830-0000-000N00U230F
	93	95	Q2	2100	2373	30H	CXA1830-0000-000N0YQ230H	30F	CXA1830-0000-000N0YQ230F
			Q4	2260	2554		CXA1830-0000-000N0YQ430H		CXA1830-0000-000N0YQ430F
			R2	2420	2735		CXA1830-0000-000N0YR230H		CXA1830-0000-000N0YR230F
			R4	2600	2938		CXA1830-0000-000N0YR430H		CXA1830-0000-000N0YR430F

Notes

- Cree maintains a tolerance of $\pm 7\%$ on flux and power measurements, ± 0.005 on chromaticity (CCx, CCy) measurements and a tolerance of ± 2 on CRI measurements.
- * Flux values @ 25 °C are calculated and for reference only.

FLUX CHARACTERISTICS, EASYWHITE ORDER CODES AND BINS ($I_F = 800 \text{ mA}$, $T_J = 85 \text{ °C}$) - CONTINUED

CCT Range	CRI		Base Order Codes Min. Luminous Flux @ 800 mA			2-Step Order Code		4-Step Order Code	
	Min	Typ	Group	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*	Chromaticity Region		Chromaticity Region	
2700 K	80	---	S2	2780	3141	27H	CXA1830-0000-000N00S227H	27F	CXA1830-0000-000N00S227F
			S4	2990	3379		CXA1830-0000-000N00S427H		CXA1830-0000-000N00S427F
			T2	3200	3616		CXA1830-0000-000N00T227H		CXA1830-0000-000N00T227F
	93	95	P4	1965	2221	27H	CXA1830-0000-000N0YP427H	27F	CXA1830-0000-000N0YP427F
			Q2	2100	2373		CXA1830-0000-000N0YQ227H		CXA1830-0000-000N0YQ227F
			Q4	2260	2554		CXA1830-0000-000N0YQ427		CXA1830-0000-000N0YQ427F
			R2	2420	2735		CXA1830-0000-000N0YR227H		CXA1830-0000-000N0YR227F

Notes

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

FLUX CHARACTERISTICS, ANSI WHITE ORDER CODES AND BINS ($I_f = 800 \text{ mA}$, $T_j = 85 \text{ °C}$)

The following tables provide order codes for XLamp CXA1830 LEDs. For a complete description of the order code nomenclature, please reference Bin and Order Code Formats (page 15).

CCT Range	CRI		Base Order Codes Min. Luminous Flux @ 800 mA			Chromaticity Regions	Order Code
	Min	Typ	Group	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*		
6500 K	70	75	T4	3440	3887	1A0, 1B0, 1C0, 1D0	CXA1830-0000-000N00T40E1
			U2	3680	4158		CXA1830-0000-000N00U20E1
			U4	3955	4424		CXA1830-0000-000N00U40E1
	80	---	T4	3440	3887	1A0, 1B0, 1C0, 1D0	CXA1830-0000-000N0HT40E1
			U2	3680	4158		CXA1830-0000-000N0HU20E1
5700 K	70	75	T4	3440	3887	2A0, 2B0, 2C0, 2D0	CXA1830-0000-000N00T40E2
			U2	3680	4158		CXA1830-0000-000N00U20E2
			U4	3955	4424		CXA1830-0000-000N00U40E2
	80	---	T4	3440	3887	2A0, 2B0, 2C0, 2D0	CXA1830-0000-000N0HT40E2
			U2	3680	4158		CXA1830-0000-000N0HU20E2
5000 K	70	75	T4	3440	3887	3A0, 3B0, 3C0, 3D0	CXA1830-0000-000N00T40E3
			U2	3680	4158		CXA1830-0000-000N00U20E3
			U4	3955	4424		CXA1830-0000-000N00U40E3
	80	---	S4	2990	3379	3A0, 3B0, 3C0, 3D0	CXA1830-0000-000N0HS40E3
			T2	3200	3616		CXA1830-0000-000N0HT20E3
			T4	3440	3887		CXA1830-0000-000N0HT40E3
			U2	3680	4158		CXA1830-0000-000N0HU20E3
	90	95	R4	2600	2938	3A0, 3B0, 3C0, 3D0	CXA1830-0000-000N0UR40E3
			S2	2780	3141		CXA1830-0000-000N0US20E3
			S4	2990	3379		CXA1830-0000-000N0US40E3

Notes

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

FLUX CHARACTERISTICS, ANSI WHITE ORDER CODES AND BINS ($I_F = 800 \text{ mA}$, $T_J = 85 \text{ °C}$) - CONTINUED

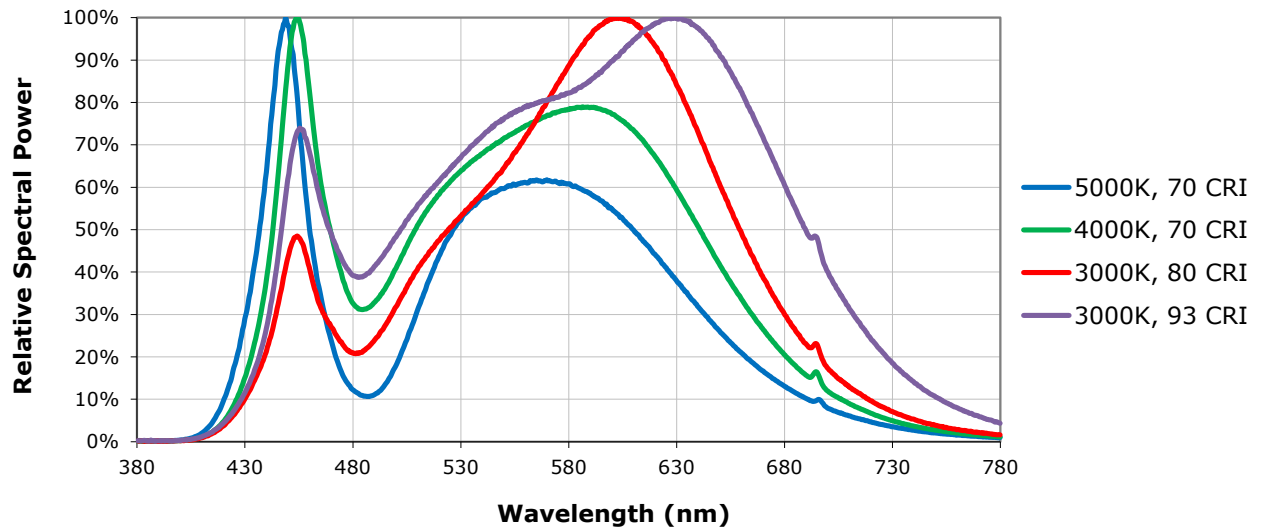
CCT Range	CRI		Base Order Codes Min. Luminous Flux @ 800 mA			Chromaticity Regions	Order Code
	Min	Typ	Group	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*		
4000 K	70	75	T2	3200	3616	5A0, 5B0, 5C0, 5D0	CXA1830-0000-000N00T20E5
			T4	3440	3887		CXA1830-0000-000N00T40E5
			U2	3680	4158		CXA1830-0000-000N00U20E5
			U4	3955	4424		CXA1830-0000-000N00U40E5
	80	---	S4	2990	3379	5A0, 5B0, 5C0, 5D0	CXA1830-0000-000N0HS40E5
			T2	3200	3616		CXA1830-0000-000N0HT20E5
			T4	3440	3887		CXA1830-0000-000N0HT40E5
			U2	3680	4158		CXA1830-0000-000N0HU20E5
	90	95	R2	2420	2735	5A0, 5B0, 5C0, 5D0	CXA1830-0000-000N0UR20E5
			R4	2600	2938		CXA1830-0000-000N0UR40E5
			S2	2780	3141		CXA1830-0000-000N0US20E5
			S4	2990	3379		CXA1830-0000-000N0US40E5

Notes

- Cree maintains a tolerance of $\pm 7\%$ on flux and power measurements, ± 0.005 on chromaticity (CCx, CCy) measurements and a tolerance of ± 2 on CRI measurements.
- * Flux values @ 25 °C are calculated and for reference only.

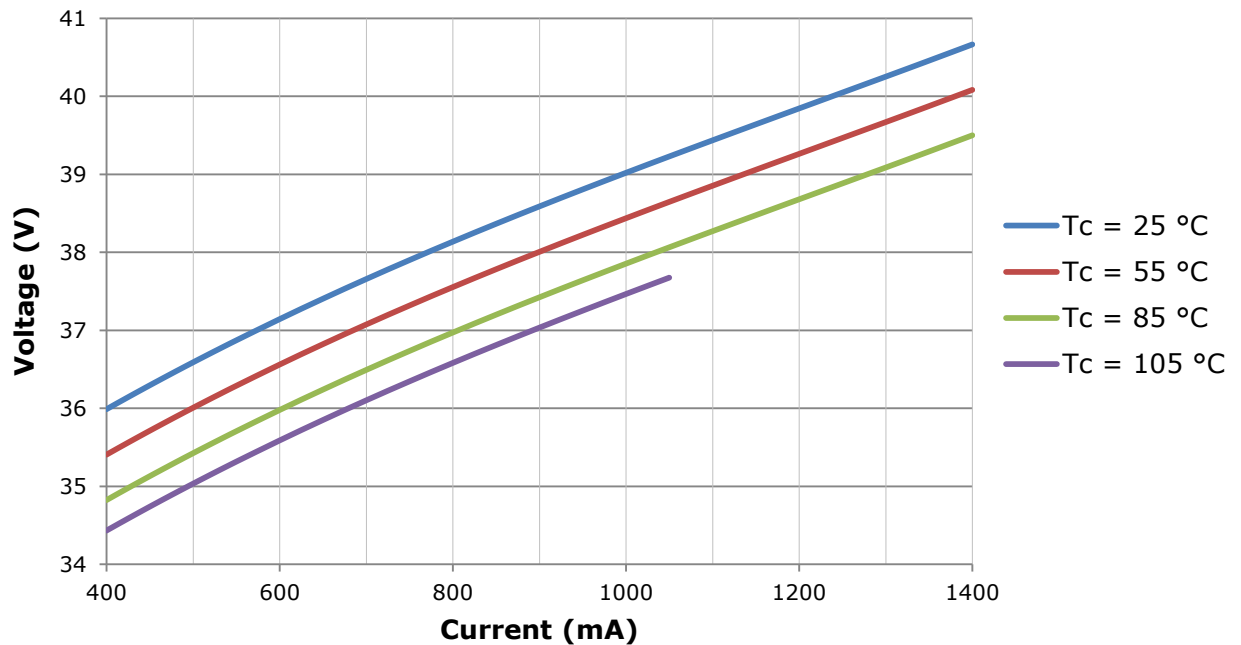
RELATIVE SPECTRAL POWER DISTRIBUTION ($I_F = 800 \text{ mA}$, $T_J = 85^\circ\text{C}$)

The following graph is the result of a series of pulsed measurements at 800 mA and $T_J = 85^\circ\text{C}$.



ELECTRICAL CHARACTERISTICS

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

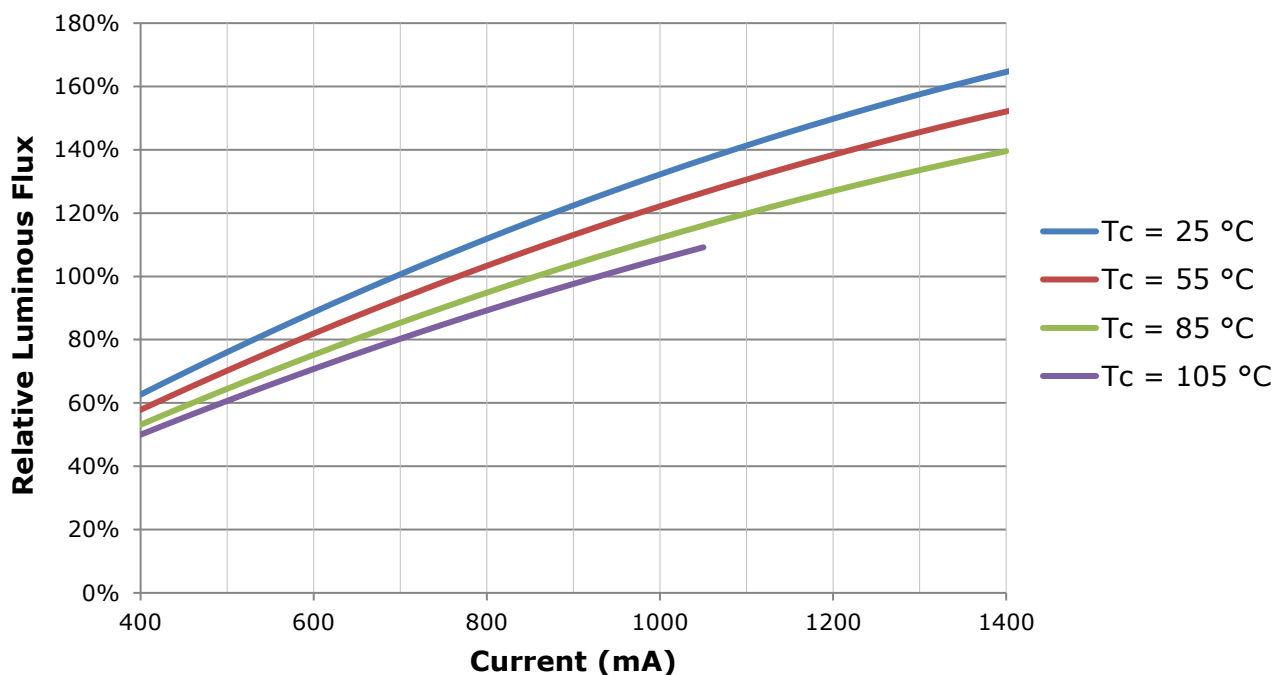


RELATIVE LUMINOUS FLUX

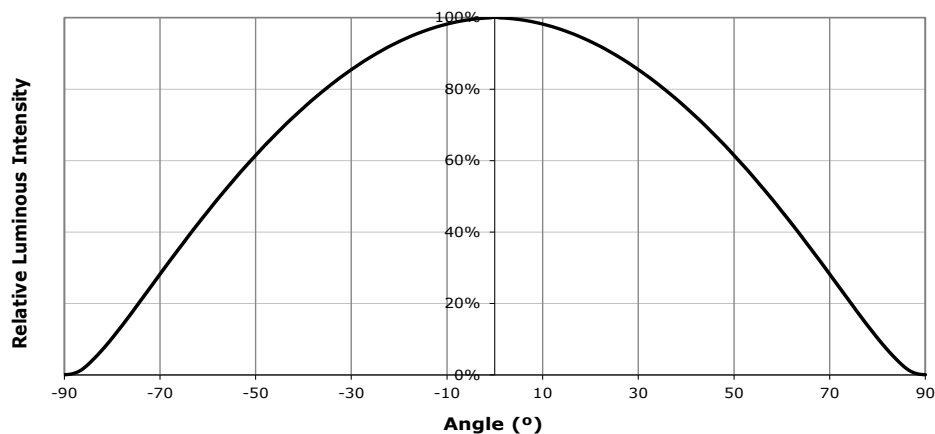
The relative luminous flux values provided below are the ratio of:

- Measurements of CXA1830 at steady-state operation at the given conditions, divided by
- Flux measured during binning, which is a pulsed measurement at 800 mA at $T_j = 85\text{ °C}$.

For example, at steady-state operation of $T_c = 55\text{ °C}$, $I_f = 1000\text{ mA}$, the relative luminous flux ratio is 120% in the chart below. A CXA1830 LED that measures 2100 lm during binning will deliver 2340 lm (2100×1.2) at steady-state operation of $T_c = 55\text{ °C}$, $I_f = 1000\text{ mA}$.



TYPICAL SPATIAL DISTRIBUTION



PERFORMANCE GROUPS - BRIGHTNESS ($I_F = 800\text{ mA}$, $T_J = 85\text{ °C}$)

XLamp CXA1830 LEDs are tested for luminous flux and placed into one of the following bins.

Group Code	Min. Luminous Flux @ 800 mA	Max. Luminous Flux @ 800 mA
P4	1965	2100
Q2	2100	2260
Q4	2260	2420
R2	2420	2600
R4	2600	2780
S2	2780	2990
S4	2990	3200
T2	3200	3440
T4	3440	3680
U2	3680	3955
U4	3955	4230
V2	4230	4545

PERFORMANCE GROUPS - CHROMATICITY ($T_j = 85\text{ °C}$)

XLamp CXA1830 LEDs are tested for chromaticity and placed into one of the regions defined by the following bounding coordinates.

EasyWhite Color Temperatures – 4-Step			
Code	CCT	x	y
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

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

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

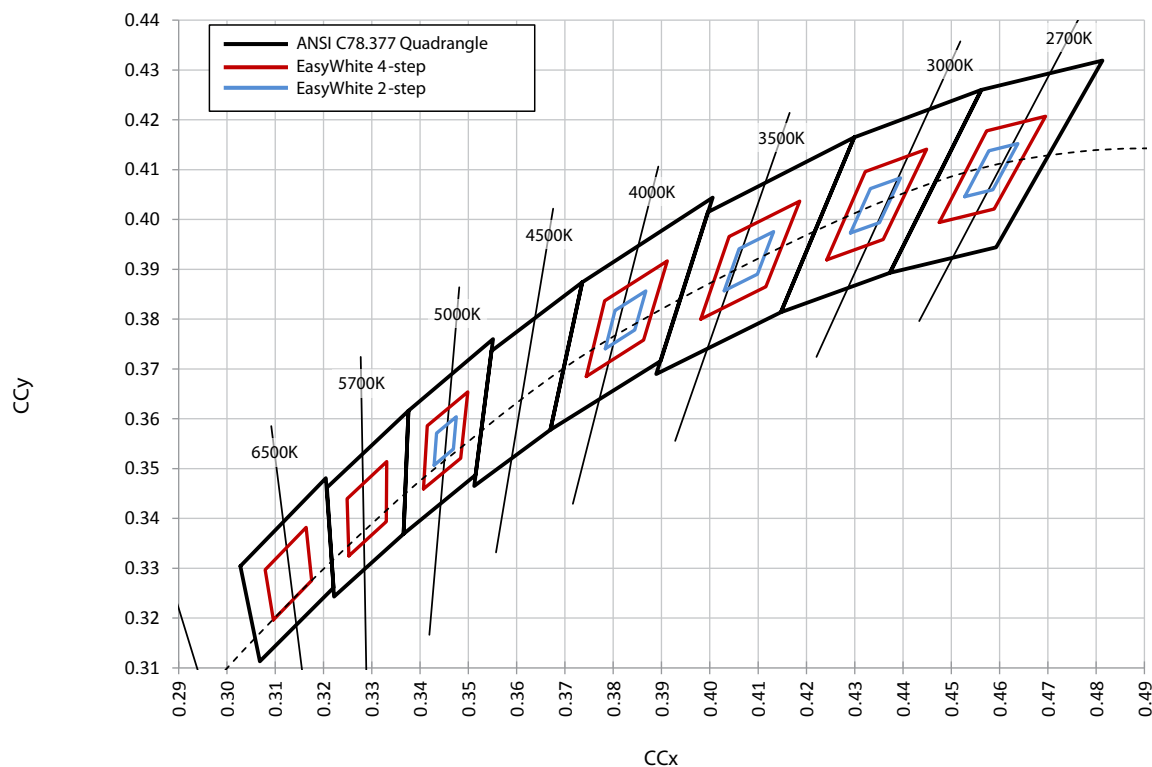
ANSI White Bins				
Code	CCT	Bin Code	x	y
0E1	6500 K	1A0	0.3048	0.3207
			0.3130	0.3290
			0.3144	0.3186
			0.3068	0.3113
		1B0	0.3028	0.3304
			0.3115	0.3391
			0.3130	0.3290
			0.3048	0.3207
		1C0	0.3115	0.3391
			0.3205	0.3481
			0.3213	0.3373
			0.3130	0.3290
		1D0	0.3130	0.3290
			0.3213	0.3373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

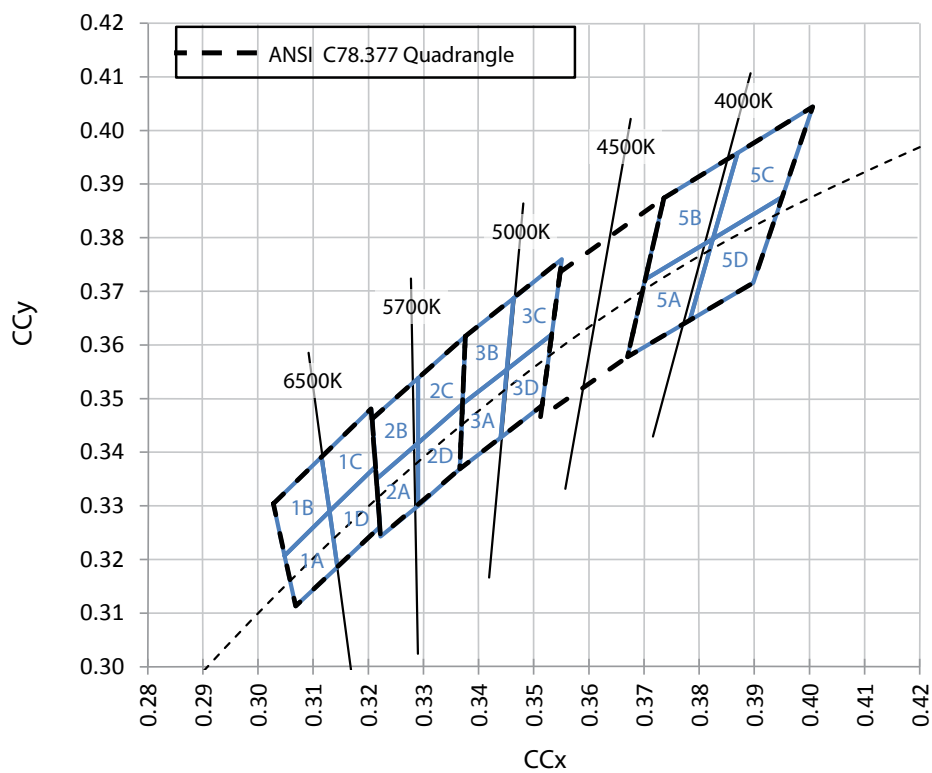
ANSI White Bins				
Code	CCT	Bin Code	x	y
0E3	5000 K	3A0	.3371	.3490
			.3451	.3554
			.3440	.3427
			.3366	.3369
		3B0	.3376	.3616
			.3463	.3687
			.3451	.3554
			.3371	.3490
		3C0	.3463	.3687
			.3551	.3760
			.3533	.3620
			.3451	.3554
		3D0	.3451	.3554
			.3533	.3620
			.3515	.3487
			.3440	.3427

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

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



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



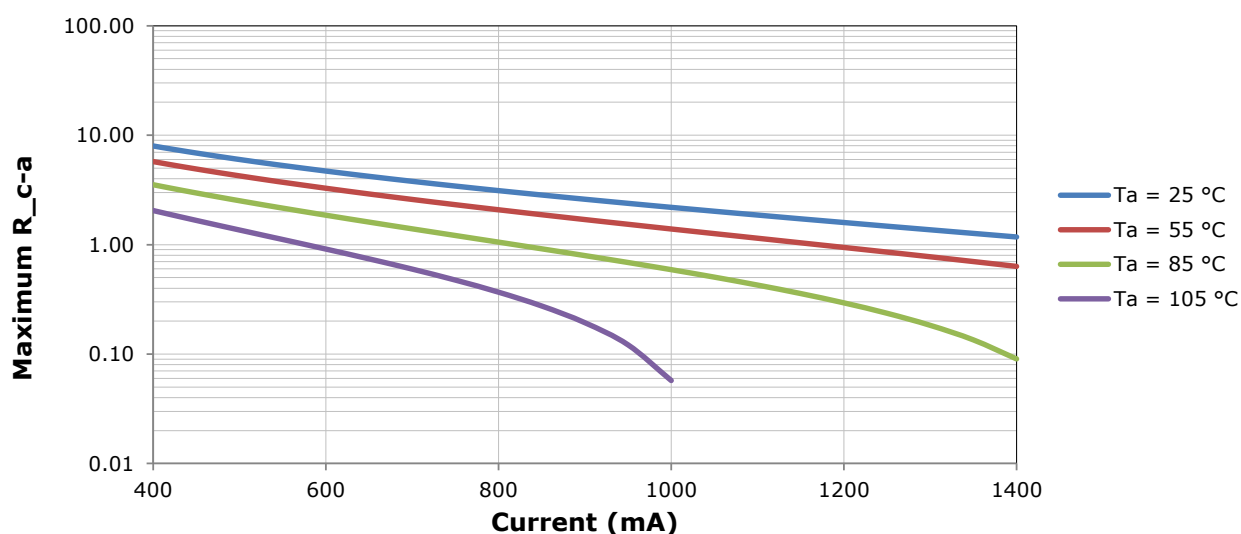
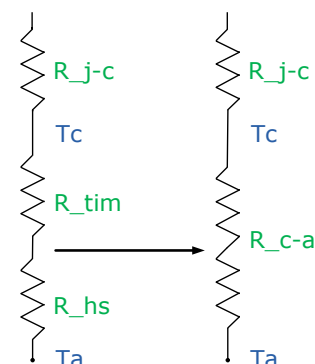
THERMAL DESIGN

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 the CXA LED is being operated within its designed limits. Please refer to page 2 for the Operating Limit specification.

Cree has measured the temperature at the bottom of the package, commonly referred to as the solder point (T_{sp}), and found this value to be equivalent to the temperature at the T_c location at the top of the package once the LED has reached thermal equilibrium. There is no need to calculate for T_j inside the package, as the thermal management design process, specifically from T_{sp} to ambient (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 CXA Family LEDs soldering and handling document](#). The [CXA LED Design Guide](#) provides basic information on the requirements to use Cree XLamp CXA LEDs successfully in luminaire designs.

To keep the CXA1830 LED at or below the maximum rated T_c , the case to ambient thermal resistance (R_{c-a}) must be at or below the maximum R_{c-a} value shown on the following graph, depending on the operating environment. The y-axis in the graph is a base 10 logarithmic scale.

As the figure at right shows, the R_{c-a} value is the sum of the thermal resistance of the TIM (R_{tim}) plus the thermal resistance of the heat sink (R_{hs}).



NOTES

Lumen Maintenance Projections

Cree now uses standardized IES LM-80-08 and TM-21-11 methods for collecting long-term data and extrapolating LED lumen maintenance. For information on the specific LM-80 data sets available for this LED, refer to the public [LM-80 results document](#).

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 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 SVHC 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 Claim

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

PACKAGING

Cree CXA1830 LEDs are packaged in trays of 20. Five trays are sealed in an anti-static bag and placed inside a carton, for a total of 100 LEDs per carton. Each carton contains 100 LEDs from the same performance bin.

Dimensions are in inches.

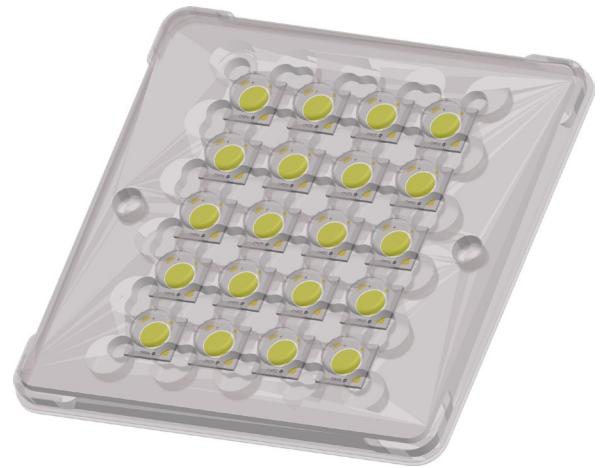
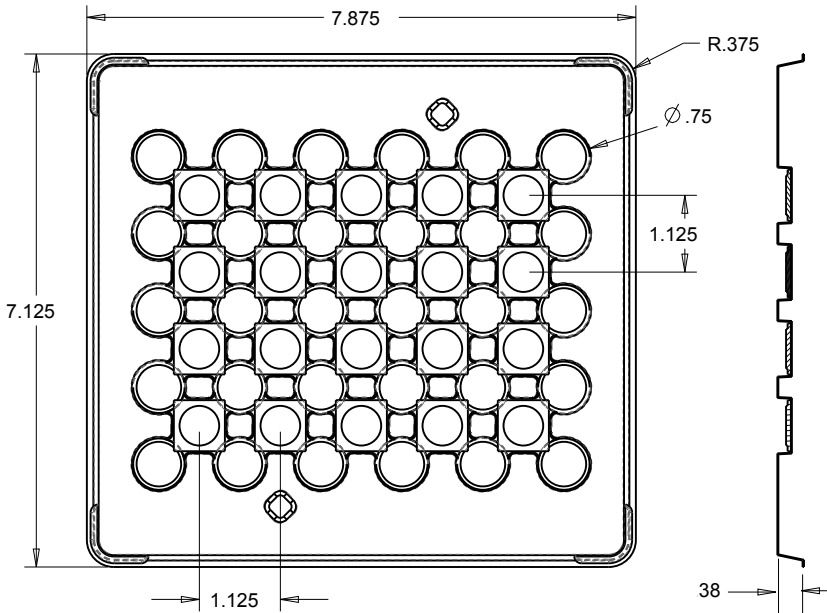
Tolerances:

.x ± .1

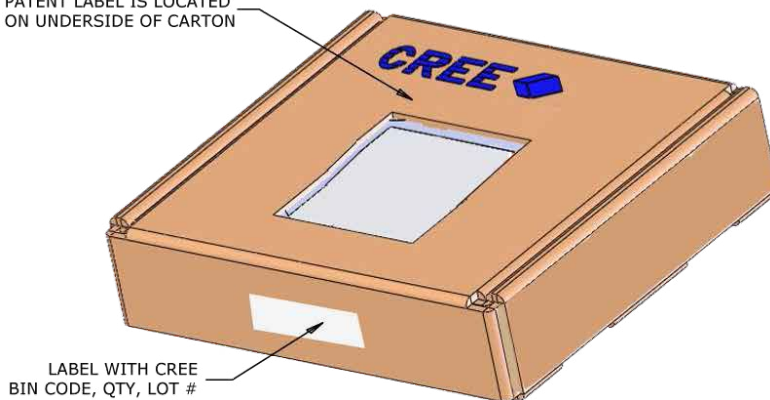
.xx ± .05

.xxx ± .005

x° ± 1°



PATENT LABEL IS LOCATED ON UNDERSIDE OF CARTON



LABEL WITH CREE BIN CODE, QTY, LOT #

BAG

LABEL WITH CREE BIN CODE, QTY, LOT#

