Cree® XLamp® CXA1304 LED

PRODUCT DESCRIPTION

The XLamp® CXA1304 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 CXA1304'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 6-mm optical source, the CXA1304 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 CXA1304 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: 9-V class, 18-V class & 36-V class
- 85 °C binning and characterization
- Maximum drive current: 1000 mA (9 V), 500 mA (18 V), 250 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)

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CHARACTERISTICS

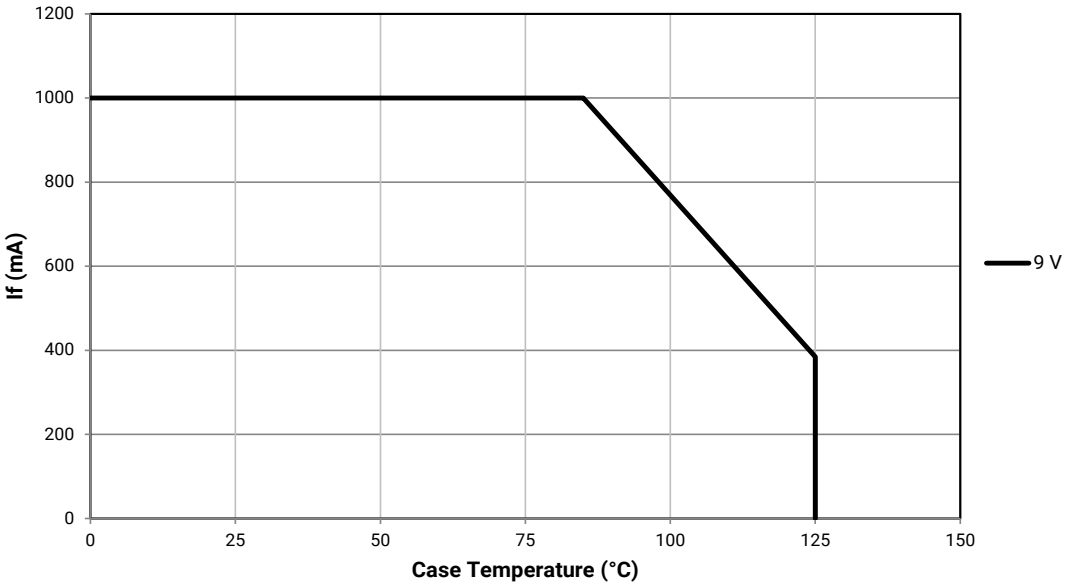
Characteristics	Unit	Minimum	Typical	Maximum
Viewing angle (FWHM)	degrees		115	
ESD withstand voltage (HBM per Mil-Std-883D)	V			8000
DC forward current (9 V)	mA			1000*
DC forward current (18 V)	mA			500*
DC forward current (36 V)	mA			250*
Reverse current (9 V, 18V, 36 V)	mA			0.1
Forward voltage (9 V, 400 mA, 85 °C)	V		9	
Forward voltage (9 V, 400 mA, 25 °C)	V			10.5
Forward voltage (18 V, 200 mA, 85 °C)	V		18	
Forward voltage (18 V, 200 mA, 25 °C)	V			21
Forward voltage (36 V, 100 mA, 85 °C)	V		36	
Forward voltage (36 V, 100 mA, 25 °C)	V			42

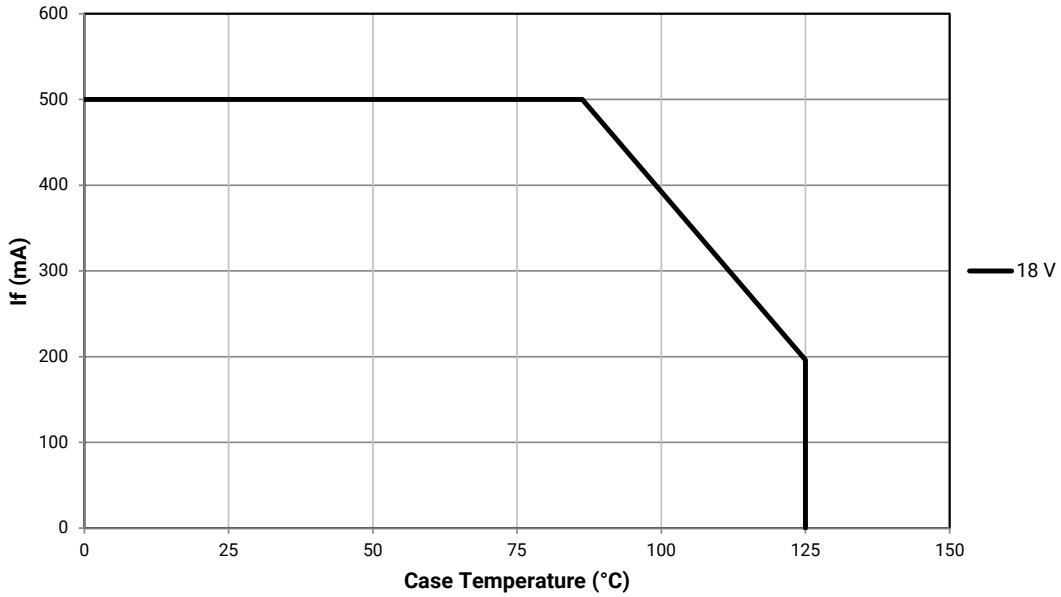
* Refer to the Operating Limits section.

OPERATING LIMITS

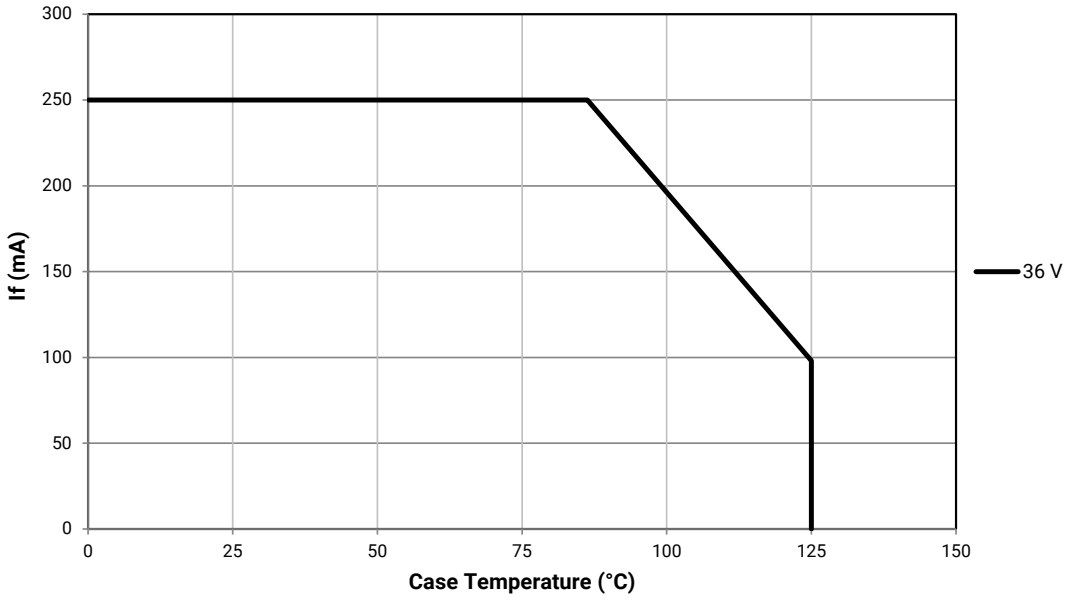
The maximum current rating of the CXA1304 depends on the case temperature (Tc) when the LED has reached thermal equilibrium under steady-state operation. The graphs shown below assume that the system design employs good thermal management (thermal interface material and heat sink) and may vary when poor thermal management is employed. Please refer to the Mechanical Dimensions section on page 27 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 28 for more information on LES temperature measurement.





OPERATING LIMITS - CONTINUED



FLUX CHARACTERISTICS, EASYWHITE® ORDER CODES AND BINS - 9 V (I_F = 400 mA, T_J = 85 °C)

The following table provides order codes for XLamp CXA1304 LEDs. For a complete description of the order code nomenclature, please see the Bin and Order Code Formats section (page 27).

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	B4	410	457					65F	CXA1304-0000-000C00B465F
			C2	440	490						CXA1304-0000-000C00C265F
			C4	475	527						CXA1304-0000-000C00C465F
	80	---	B4	410	457					65F	CXA1304-0000-000C0HB465F
			C2	440	490						CXA1304-0000-000C0HC265F
			C4	475	527						CXA1304-0000-000C0HC465F
5700 K	70	75	C2	440	490					57F	CXA1304-0000-000C00C257F
			C4	475	527						CXA1304-0000-000C00C457F
	80	---	B4	410	457					57F	CXA1304-0000-000C0HB457F
			C2	440	490						CXA1304-0000-000C0HC257F
			C4	475	527						CXA1304-0000-000C0HC457F
5000 K	70	75	C2	440	490	50H	CXA1304-0000-000C00C250H			50F	CXA1304-0000-000C00C250F
			C4	475	527		CXA1304-0000-000C00C450H				CXA1304-0000-000C00C450F
	80	---	B4	410	457	50H	CXA1304-0000-000C0HB450H			50F	CXA1304-0000-000C0HB450F
			C2	440	490		CXA1304-0000-000C0HC250H	50G	CXA1304-0000-000C0HC250G		CXA1304-0000-000C0HC250F
			C4	475	527		CXA1304-0000-000C0HC450H		CXA1304-0000-000C0HC450G		CXA1304-0000-000C0HC450F
	90	95	A2	330	366	50H	CXA1304-0000-000C0UA250H	50G	CXA1304-0000-000C0UA250G	50F	CXA1304-0000-000C0UA250F
			A4	355	396		CXA1304-0000-000C0UA450H		CXA1304-0000-000C0UA450G		CXA1304-0000-000C0UA450F
			B2	380	423		CXA1304-0000-000C0UB250H		CXA1304-0000-000C0UB250G		CXA1304-0000-000C0UB250F

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 30).
- Cree XLamp CXA1304 LED order codes specify only a minimum flux bin and not a maximum. Cree may ship reels in flux bins higher than the minimum specified by the order code without advance notice. Shipments will always adhere to the chromaticity bin restrictions specified by the order code.

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

FLUX CHARACTERISTICS, EASYWHITE® ORDER CODES AND BINS - 9 V (I_F = 400 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
4000 K	70	75	B4	410	457	40H	CXA1304-0000-000C00B440H			40F	CXA1304-0000-000C00B440F
			C2	440	490		CXA1304-0000-000C00C240H				CXA1304-0000-000C00C240F
			C4	475	527		CXA1304-0000-000C00C440H				CXA1304-0000-000C00C440F
	80	---	B4	410	457	40H	CXA1304-0000-000C0HB440H	40G		40F	CXA1304-0000-000C0HB440F
			C2	440	490		CXA1304-0000-000C0HC240H		CXA1304-0000-000C0HC240G		CXA1304-0000-000C0HC240F
			C4	475	527		CXA1304-0000-000C0HC440H		CXA1304-0000-000C0HC440G		CXA1304-0000-000C0HC440F
	90	95	94	290	327	40H	CXA1304-0000-000C0U9440H	40G	CXA1304-0000-000C0U9440G	40F	CXA1304-0000-000C0U9440F
			A2	330	366		CXA1304-0000-000C0UA240H		CXA1304-0000-000C0UA240G		CXA1304-0000-000C0UA240F
			A4	355	396		CXA1304-0000-000C0UA440H		CXA1304-0000-000C0UA440G		CXA1304-0000-000C0UA440F
3500 K	80	---	B2	380	423	35H	CXA1304-0000-000C00B235H	35G		35F	CXA1304-0000-000C00B235F
			B4	410	457		CXA1304-0000-000C00B435H		CXA1304-0000-000C00B435G		CXA1304-0000-000C00B435F
			C2	440	490		CXA1304-0000-000C00C235H		CXA1304-0000-000C00C235G		CXA1304-0000-000C00C235F
	93	95	94	290	327	35H	CXA1304-0000-000C0Y9435H	35G		35F	CXA1304-0000-000C0Y9435F
			A2	330	366		CXA1304-0000-000C0YA235H		CXA1304-0000-000C0YA235G		CXA1304-0000-000C0YA235F
3000 K	80	---	B2	380	423	30H	CXA1304-0000-000C00B230H	30G		30F	CXA1304-0000-000C00B230F
			B4	410	457		CXA1304-0000-000C00B430H		CXA1304-0000-000C00B430G		CXA1304-0000-000C00B430F
			C2	440	490		CXA1304-0000-000C00C230H		CXA1304-0000-000C00C230G		CXA1304-0000-000C00C230F
	93	95	92	250	281	30H	CXA1304-0000-000C0Y9230H	30G		30F	CXA1304-0000-000C0Y9230F
			94	290	327		CXA1304-0000-000C0Y9430H		CXA1304-0000-000C0Y9430G		CXA1304-0000-000C0Y9430F
			A2	330	366		CXA1304-0000-000C0YA230H		CXA1304-0000-000C0YA230G		CXA1304-0000-000C0YA230F

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 30).
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* Flux values @ 25 °C are calculated and for reference only.

FLUX CHARACTERISTICS, EASYWHITE® ORDER CODES AND BINS - 9 V (I_F = 400 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
2700 K	80	---	A4	355	396	27H	CXA1304-0000-000C00A427H	27G		27F	CXA1304-0000-000C00A427F
			B2	380	423		CXA1304-0000-000C00B227H		CXA1304-0000-000C00B227G		CXA1304-0000-000C00B227F
			B4	410	457		CXA1304-0000-000C00B427H		CXA1304-0000-000C00B427G		CXA1304-0000-000C00B427F
	93	95	84	220	248	27H	CXA1304-0000-000C0Y8427H	27G		27F	CXA1304-0000-000C0Y8427F
			92	250	281		CXA1304-0000-000C0Y9227H		CXA1304-0000-000C0Y9227G		CXA1304-0000-000C0Y9227F
			94	290	327		CXA1304-0000-000C0Y9427H		CXA1304-0000-000C0Y9427G		CXA1304-0000-000C0Y9427F

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 30).
- Cree XLamp CXA1304 LED order codes specify only a minimum flux bin and not a maximum. Cree may ship reels in flux bins higher than the minimum specified by the order code without advance notice. Shipments will always adhere to the chromaticity bin restrictions specified by the order code.

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

FLUX CHARACTERISTICS, ANSI WHITE ORDER CODES AND BINS - 9 V (I_F = 400 mA, T_J = 85 °C)

The following table provides order codes for XLamp CXA1304 LEDs. For a complete description of the order code nomenclature, please see the Bin and Order Code Formats section (page 27).

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	B4	410	457	1A0, 1B0, 1C0, 1D0, 65F	CXA1304-0000-000C00B40E1
			C2	440	490		CXA1304-0000-000C00C20E1
			C4	475	527		CXA1304-0000-000C00C40E1
	80	---	B4	410	457	1A0, 1B0, 1C0, 1D0, 65F	CXA1304-0000-000C0HB40E1
			C2	440	490		CXA1304-0000-000C0HC20E1
			C4	475	527		CXA1304-0000-000C0HC40E1
5700 K	70	75	C2	440	490	2A0, 2B0, 2C0, 2D0, 57F	CXA1304-0000-000C00C20E2
			C4	475	527		CXA1304-0000-000C00C40E2
	80	---	B4	410	457	2A0, 2B0, 2C0, 2D0, 57F	CXA1304-0000-000C0HB40E2
			C2	440	490		CXA1304-0000-000C0HC20E2
			C4	475	527		CXA1304-0000-000C0HC40E2
5000 K	70	75	C2	440	490	3A0, 3B0, 3C0, 3D0, 50F	CXA1304-0000-000C00C20E3
			C4	475	527		CXA1304-0000-000C00C40E3
	80	---	B4	410	457	3A0, 3B0, 3C0, 3D0, 50F	CXA1304-0000-000C0HB40E3
			C2	440	490		CXA1304-0000-000C0HC20E3
			C4	475	527		CXA1304-0000-000C0HC40E3
4000 K	70	75	B4	410	457	5A0, 5B0, 5C.0, 5D0, 40F	CXA1304-0000-000C00B40E5
			C2	440	490		CXA1304-0000-000C00C20E5
			C4	475	527		CXA1304-0000-000C00C40E5

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 30).
- Cree XLamp CXA1304 LED order codes specify only a minimum flux bin and not a maximum. Cree may ship reels in flux bins higher than the minimum specified by the order code without advance notice. Shipments will always adhere to the chromaticity bin restrictions specified by the order code.

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

FLUX CHARACTERISTICS, EASYWHITE® ORDER CODES AND BINS - 18 V (I_F = 200 mA, T_J = 85 °C)

The following table provides order codes for XLamp CXA1304 LEDs. For a complete description of the order code nomenclature, please see the Bin and Order Code Formats section (page 27).

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	B4	410	457					65F	CXA1304-0000-000F00B465F
			C2	440	490						CXA1304-0000-000F00C265F
			C4	475	527						CXA1304-0000-000F00C465F
	80	---	B4	410	457					65F	CXA1304-0000-000F0HB465F
			C2	440	490						CXA1304-0000-000F0HC265F
			C4	475	527						CXA1304-0000-000F0HC465F
5700 K	70	75	C2	440	490					57F	CXA1304-0000-000F00C257F
			C4	475	527						CXA1304-0000-000F00C457F
	80	---	B4	410	457					57F	CXA1304-0000-000F0HB457F
			C2	440	490						CXA1304-0000-000F0HC257F
			C4	475	527						CXA1304-0000-000F0HC457F
5000 K	70	75	C2	440	490	50H	CXA1304-0000-000F00C250H			50F	CXA1304-0000-000F00C250F
			C4	475	527		CXA1304-0000-000F00C450H				CXA1304-0000-000F00C450F
	80	---	B4	410	457	50H	CXA1304-0000-000F0HB450H	50G		50F	CXA1304-0000-000F0HB450F
			C2	440	490		CXA1304-0000-000F0HC250H		CXA1304-0000-000F0HC250G		CXA1304-0000-000F0HC250F
			C4	475	527		CXA1304-0000-000F0HC450H		CXA1304-0000-000F0HC450G		CXA1304-0000-000F0HC450F
	90	95	A2	330	366	50H	CXA1304-0000-000F0UA250H	50G	CXA1304-0000-000F0UA250G	50F	CXA1304-0000-000F0UA250F
			A4	355	396		CXA1304-0000-000F0UA450H		CXA1304-0000-000F0UA450G		CXA1304-0000-000F0UA450F
			B2	380	423		CXA1304-0000-000F0UB250H		CXA1304-0000-000F0UB250G		CXA1304-0000-000F0UB250F

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 30).
- Cree XLamp CXA1304 LED order codes specify only a minimum flux bin and not a maximum. Cree may ship reels in flux bins higher than the minimum specified by the order code without advance notice. Shipments will always adhere to the chromaticity bin restrictions specified by the order code.

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

FLUX CHARACTERISTICS, EASYWHITE® ORDER CODES AND BINS - 18 V (I_F = 200 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
4000 K	70	75	B4	410	457	40H	CXA1304-0000-000F00B440H			40F	CXA1304-0000-000F00B440F
			C2	440	490		CXA1304-0000-000F00C240H				CXA1304-0000-000F00C240F
			C4	475	527		CXA1304-0000-000F00C440H				CXA1304-0000-000F00C440F
	80	---	B4	410	457	40H	CXA1304-0000-000F0HB440H	40G		40F	CXA1304-0000-000F0HB440F
			C2	440	490		CXA1304-0000-000F0HC240H		CXA1304-0000-000F0HC240G		CXA1304-0000-000F0HC240F
			C4	475	527		CXA1304-0000-000F0HC440H		CXA1304-0000-000F0HC440G		CXA1304-0000-000F0HC440F
	90	95	94	290	327	40H	CXA1304-0000-000F0U9440H	40G	CXA1304-0000-000F0U9440G	40F	CXA1304-0000-000F0U9440F
			A2	330	366		CXA1304-0000-000F0UA240H		CXA1304-0000-000F0UA240G		CXA1304-0000-000F0UA240F
			A4	355	396		CXA1304-0000-000F0UA440H		CXA1304-0000-000F0UA440G		CXA1304-0000-000F0UA440F
3500 K	80	---	B2	380	423	35H	CXA1304-0000-000F00B235H	35G		35F	CXA1304-0000-000F00B235F
			B4	410	457		CXA1304-0000-000F00B435H		CXA1304-0000-000F00B435G		CXA1304-0000-000F00B435F
			C2	440	490		CXA1304-0000-000F00C235H		CXA1304-0000-000F00C235G		CXA1304-0000-000F00C235F
	93	95	94	290	327	35H	CXA1304-0000-000F0Y9435H	35G		35F	CXA1304-0000-000F0Y9435F
			A2	330	366		CXA1304-0000-000F0YA235H		CXA1304-0000-000F0YA235G		CXA1304-0000-000F0YA235F
3000 K	80	---	B2	380	423	30H	CXA1304-0000-000F00B230H	30G		30F	CXA1304-0000-000F00B230F
			B4	410	457		CXA1304-0000-000F00B430H		CXA1304-0000-000F00B430G		CXA1304-0000-000F00B430F
			C2	440	490		CXA1304-0000-000F00C230H		CXA1304-0000-000F00C230G		CXA1304-0000-000F00C230F
	93	95	92	250	281	30H	CXA1304-0000-000F0Y9230H	30G		30F	CXA1304-0000-000F0Y9230F
			94	290	327		CXA1304-0000-000F0Y9430H		CXA1304-0000-000F0Y9430G		CXA1304-0000-000F0Y9430F
			A2	330	366		CXA1304-0000-000F0YA230H		CXA1304-0000-000F0YA230G		CXA1304-0000-000F0YA230F

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 30).
- Cree XLamp CXA1304 LED order codes specify only a minimum flux bin and not a maximum. Cree may ship reels in flux bins higher than the minimum specified by the order code without advance notice. Shipments will always adhere to the chromaticity bin restrictions specified by the order code.

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

FLUX CHARACTERISTICS, EASYWHITE® ORDER CODES AND BINS - 18 V (I_F = 200 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
2700 K	80	---	A4	355	396	27H	CXA1304-0000-000F00A427H	27G		27F	CXA1304-0000-000F00A427F
			B2	380	423		CXA1304-0000-000F00B227H		CXA1304-0000-000F00B227G		CXA1304-0000-000F00B227F
			B4	410	457		CXA1304-0000-000F00B427H		CXA1304-0000-000F00B427G		CXA1304-0000-000F00B427F
	93	95	84	220	248	27H	CXA1304-0000-000F0Y8427H	27G		27F	CXA1304-0000-000F0Y8427F
			92	250	281		CXA1304-0000-000F0Y9227H		CXA1304-0000-000F0Y9227G		CXA1304-0000-000F0Y9227F
			94	290	327		CXA1304-0000-000F0Y9427H		CXA1304-0000-000F0Y9427G		CXA1304-0000-000F0Y9427F

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 30).
- Cree XLamp CXA1304 LED order codes specify only a minimum flux bin and not a maximum. Cree may ship reels in flux bins higher than the minimum specified by the order code without advance notice. Shipments will always adhere to the chromaticity bin restrictions specified by the order code.

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

FLUX CHARACTERISTICS, ANSI WHITE ORDER CODES AND BINS - 18 V (I_F = 200 mA, T_J = 85 °C)

The following table provides order codes for XLamp CXA1304 LEDs. For a complete description of the order code nomenclature, please see the Bin and Order Code Formats section (page 27).

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	B4	410	457	1A0, 1B0, 1C0, 1D0, 65F	CXA1304-0000-000F00B40E1
			C2	440	490		CXA1304-0000-000F00C20E1
			C4	475	527		CXA1304-0000-000F00C40E1
	80	---	B4	410	457	1A0, 1B0, 1C0, 1D0, 65F	CXA1304-0000-000F0HB40E1
			C2	440	490		CXA1304-0000-000F0HC20E1
			C4	475	527		CXA1304-0000-000F0HC40E1
5700 K	70	75	C2	440	490	2A0, 2B0, 2C0, 2D0, 57F	CXA1304-0000-000F00C20E2
			C4	475	527		CXA1304-0000-000F00C40E2
	80	---	B4	410	457	2A0, 2B0, 2C0, 2D0, 57F	CXA1304-0000-000F0HB40E2
			C2	440	490		CXA1304-0000-000F0HC20E2
			C4	475	527		CXA1304-0000-000F0HC40E2
5000 K	70	75	C2	440	490	3A0, 3B0, 3C0, 3D0, 50F	CXA1304-0000-000F00C20E3
			C4	475	527		CXA1304-0000-000F00C40E3
	80	---	B4	410	457	3A0, 3B0, 3C0, 3D0, 50F	CXA1304-0000-000F0HB40E3
			C2	440	490		CXA1304-0000-000F0HC20E3
			C4	475	527		CXA1304-0000-000F0HC40E3
4000 K	70	75	B4	410	457	5A0, 5B0, 5C.0, 5D0, 40F	CXA1304-0000-000F00B40E5
			C2	440	490		CXA1304-0000-000F00C20E5
			C4	475	527		CXA1304-0000-000F00C40E5

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 30).
- Cree XLamp CXA1304 LED order codes specify only a minimum flux bin and not a maximum. Cree may ship reels in flux bins higher than the minimum specified by the order code without advance notice. Shipments will always adhere to the chromaticity bin restrictions specified by the order code.

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

FLUX CHARACTERISTICS, EASYWHITE® ORDER CODES AND BINS - 36 V (I_F = 100 mA, T_J = 85 °C)

The following table provides order codes for XLamp CXA1304 LEDs. For a complete description of the order code nomenclature, please see the Bin and Order Code Formats section (page 27).

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	B4	410	457					65F	CXA1304-0000-000N00B465F
			C2	440	490						CXA1304-0000-000N00C265F
			C4	475	527						CXA1304-0000-000N00C465F
	80	---	B4	410	457					65F	CXA1304-0000-000N0HB465F
			C2	440	490						CXA1304-0000-000N0HC265F
			C4	475	527						CXA1304-0000-000N0HC465F
5700 K	70	75	C2	440	490					57F	CXA1304-0000-000N00C257F
			C4	475	527						CXA1304-0000-000N00C457F
	80	---	B4	410	457					57F	CXA1304-0000-000N0HB457F
			C2	440	490						CXA1304-0000-000N0HC257F
			C4	475	527						CXA1304-0000-000N0HC457F
5000 K	70	75	C2	440	490	50H	CXA1304-0000-000N00C250H			50F	CXA1304-0000-000N00C250F
			C4	475	527		CXA1304-0000-000N00C450H				CXA1304-0000-000N00C450F
	80	---	B4	410	457	50H	CXA1304-0000-000N0HB450H			50F	CXA1304-0000-000N0HB450F
			C2	440	490		CXA1304-0000-000N0HC250H	50G	CXA1304-0000-000N0HC250G		CXA1304-0000-000N0HC250F
			C4	475	527		CXA1304-0000-000N0HC450H		CXA1304-0000-000N0HC450G		CXA1304-0000-000N0HC450F
	90	95	A2	330	366	50H	CXA1304-0000-000N0UA250H	50G	CXA1304-0000-000N0UA250G	50F	CXA1304-0000-000N0UA250F
			A4	355	396		CXA1304-0000-000N0UA450H		CXA1304-0000-000N0UA450G		CXA1304-0000-000N0UA450F
			B2	380	423		CXA1304-0000-000N0UB250H		CXA1304-0000-000N0UB250G		CXA1304-0000-000N0UB250F

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 30).
- Cree XLamp CXA1304 LED order codes specify only a minimum flux bin and not a maximum. Cree may ship reels in flux bins higher than the minimum specified by the order code without advance notice. Shipments will always adhere to the chromaticity bin restrictions specified by the order code.

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

FLUX CHARACTERISTICS, EASYWHITE® ORDER CODES AND BINS - 36 V (I_F = 100 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
4000 K	70	75	B4	410	457	40H	CXA1304-0000-000N00B440H			40F	CXA1304-0000-000N00B440F
			C2	440	490		CXA1304-0000-000N00C240H				CXA1304-0000-000N00C240F
			C4	475	527		CXA1304-0000-000N00C440H				CXA1304-0000-000N00C440F
	80	---	B4	410	457	40H	CXA1304-0000-000N0HB440H	40G		40F	CXA1304-0000-000N0HB440F
			C2	440	490		CXA1304-0000-000N0HC240H		CXA1304-0000-000N0HC240G		CXA1304-0000-000N0HC240F
			C4	475	527		CXA1304-0000-000N0HC440H		CXA1304-0000-000N0HC440G		CXA1304-0000-000N0HC440F
	90	95	94	290	327	40H	CXA1304-0000-000N0U9440H	40G	CXA1304-0000-000N0U9440G	40F	CXA1304-0000-000N0U9440F
			A2	330	366		CXA1304-0000-000N0UA240H		CXA1304-0000-000N0UA240G		CXA1304-0000-000N0UA240F
			A4	355	396		CXA1304-0000-000N0UA440H		CXA1304-0000-000N0UA440G		CXA1304-0000-000N0UA440F
3500 K	80	---	B2	380	423	35H	CXA1304-0000-000N00B235H	35G		35F	CXA1304-0000-000N00B235F
			B4	410	457		CXA1304-0000-000N00B435H		CXA1304-0000-000N00B435G		CXA1304-0000-000N00B435F
			C2	440	490		CXA1304-0000-000N00C235H		CXA1304-0000-000N00C235G		CXA1304-0000-000N00C235F
	93	95	94	290	327	35H	CXA1304-0000-000N0Y9435H	35G		35F	CXA1304-0000-000N0Y9435F
			A2	330	366		CXA1304-0000-000N0YA235H		CXA1304-0000-000N0YA235G		CXA1304-0000-000N0YA235F
3000 K	80	---	B2	380	423	30H	CXA1304-0000-000N00B230H	30G		30F	CXA1304-0000-000N00B230F
			B4	410	457		CXA1304-0000-000N00B430H		CXA1304-0000-000N00B430G		CXA1304-0000-000N00B430F
			C2	440	490		CXA1304-0000-000N00C230H		CXA1304-0000-000N00C230G		CXA1304-0000-000N00C230F
	93	95	92	250	281	30H	CXA1304-0000-000N0Y9230H	30G		30F	CXA1304-0000-000N0Y9230F
			94	290	327		CXA1304-0000-000N0Y9430H		CXA1304-0000-000N0Y9430G		CXA1304-0000-000N0Y9430F
			A2	330	366		CXA1304-0000-000N0YA230H		CXA1304-0000-000N0YA230G		CXA1304-0000-000N0YA230F

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 30).
- Cree XLamp CXA1304 LED order codes specify only a minimum flux bin and not a maximum. Cree may ship reels in flux bins higher than the minimum specified by the order code without advance notice. Shipments will always adhere to the chromaticity bin restrictions specified by the order code.

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

FLUX CHARACTERISTICS, EASYWHITE® ORDER CODES AND BINS - 36 V (I_F = 100 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
2700 K	80	---	A4	355	396	27H	CXA1304-0000-000N00A427H	27G		27F	CXA1304-0000-000N00A427F
			B2	380	423		CXA1304-0000-000N00B227H		CXA1304-0000-000N00B227G		CXA1304-0000-000N00B227F
			B4	410	457		CXA1304-0000-000N00B427H		CXA1304-0000-000N00B427G		CXA1304-0000-000N00B427F
	93	95	84	220	248	27H	CXA1304-0000-000N0Y8427H	27G		27F	CXA1304-0000-000N0Y8427F
			92	250	281		CXA1304-0000-000N0Y9227H		CXA1304-0000-000N0Y9227G		CXA1304-0000-000N0Y9227F
			94	290	327		CXA1304-0000-000N0Y9427H		CXA1304-0000-000N0Y9427G		CXA1304-0000-000N0Y9427F

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 30).
- Cree XLamp CXA1304 LED order codes specify only a minimum flux bin and not a maximum. Cree may ship reels in flux bins higher than the minimum specified by the order code without advance notice. Shipments will always adhere to the chromaticity bin restrictions specified by the order code.

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

FLUX CHARACTERISTICS, ANSI WHITE ORDER CODES AND BINS - 36 V (I_F = 100 mA, T_J = 85 °C)

The following table provides order codes for XLamp CXA1304 LEDs. For a complete description of the order code nomenclature, please see the Bin and Order Code Formats section (page 27).

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	B4	410	457	1A0, 1B0, 1C0, 1D0, 65F	CXA1304-0000-000N00B40E1
			C2	440	490		CXA1304-0000-000N00C20E1
			C4	475	527		CXA1304-0000-000N00C40E1
	80	---	B4	410	457	1A0, 1B0, 1C0, 1D0, 65F	CXA1304-0000-000N0HB40E1
			C2	440	490		CXA1304-0000-000N0HC20E1
			C4	475	527		CXA1304-0000-000N0HC40E1
5700 K	70	75	C2	440	490	2A0, 2B0, 2C0, 2D0, 57F	CXA1304-0000-000N00C20E2
			C4	475	527		CXA1304-0000-000N00C40E2
	80	---	B4	410	457	2A0, 2B0, 2C0, 2D0, 57F	CXA1304-0000-000N0HB40E2
			C2	440	490		CXA1304-0000-000N0HC20E2
			C4	475	527		CXA1304-0000-000N0HC40E2
5000 K	70	75	C2	440	490	3A0, 3B0, 3C0, 3D0, 50F	CXA1304-0000-000N00C20E3
			C4	475	527		CXA1304-0000-000N00C40E3
	80	---	B4	410	457	3A0, 3B0, 3C0, 3D0, 50F	CXA1304-0000-000N0HB40E3
			C2	440	490		CXA1304-0000-000N0HC20E3
			C4	475	527		CXA1304-0000-000N0HC40E3
4000 K	70	75	B4	410	457	5A0, 5B0, 5C.0, 5D0, 40F	CXA1304-0000-000N00B40E5
			C2	440	490		CXA1304-0000-000N00C20E5
			C4	475	527		CXA1304-0000-000N00C40E5

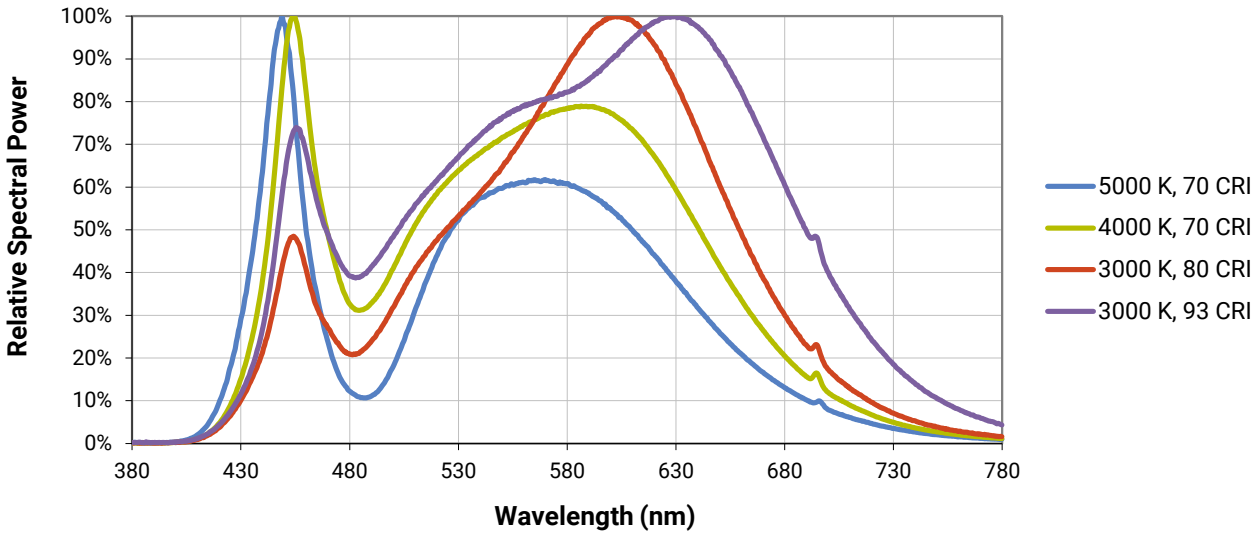
Notes

- 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 30).
- Cree XLamp CXA1304 LED order codes specify only a minimum flux bin and not a maximum. Cree may ship reels in flux bins higher than the minimum specified by the order code without advance notice. Shipments will always adhere to the chromaticity bin restrictions specified by the order code.

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

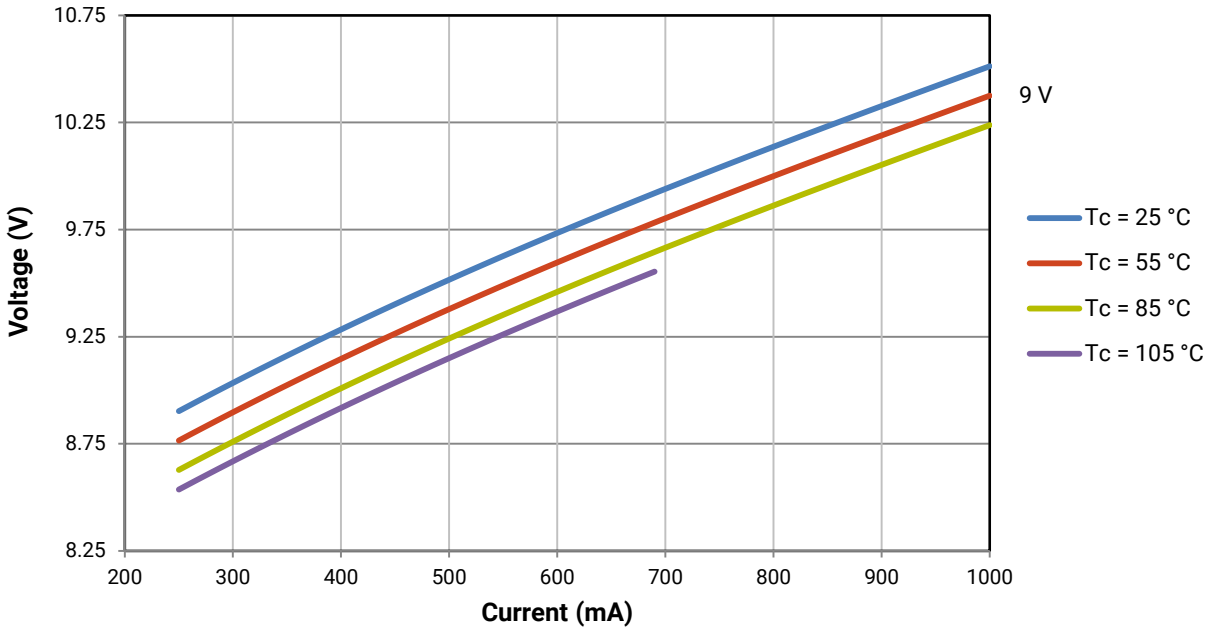
RELATIVE SPECTRAL POWER DISTRIBUTION

The following graph is the result of a series of pulsed measurements at 400 mA for the 9-V CXA1304 LED, 200 mA for the 18-V CXA1304 LED and 100 mA for the 36-V CXA1304 LED and T_J = 85 °C.

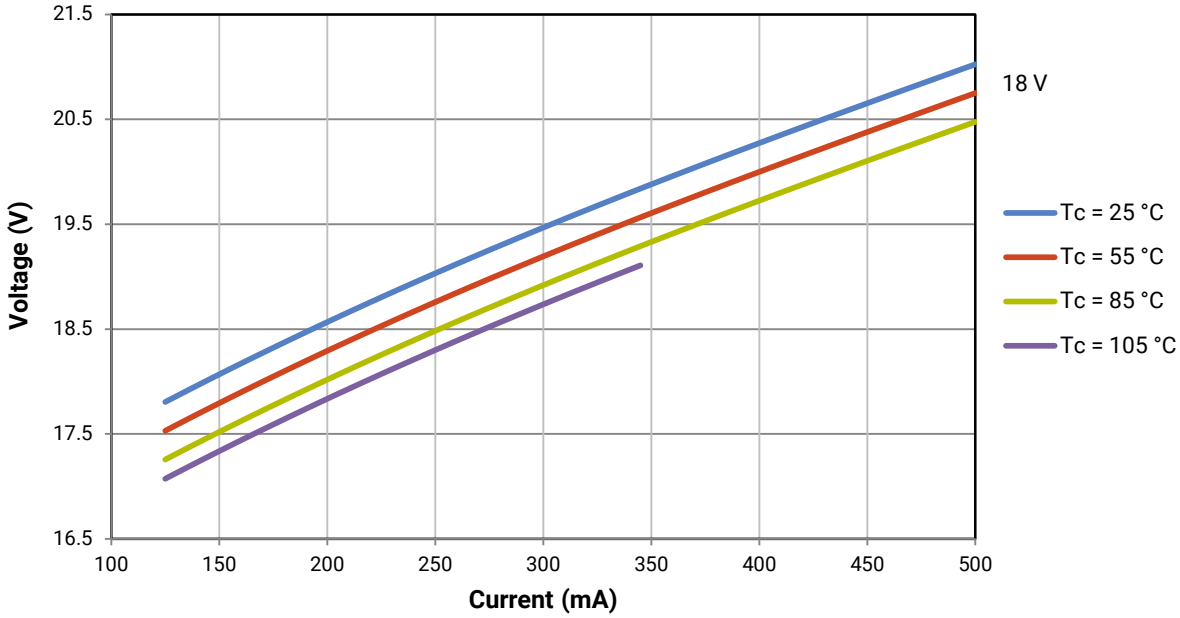


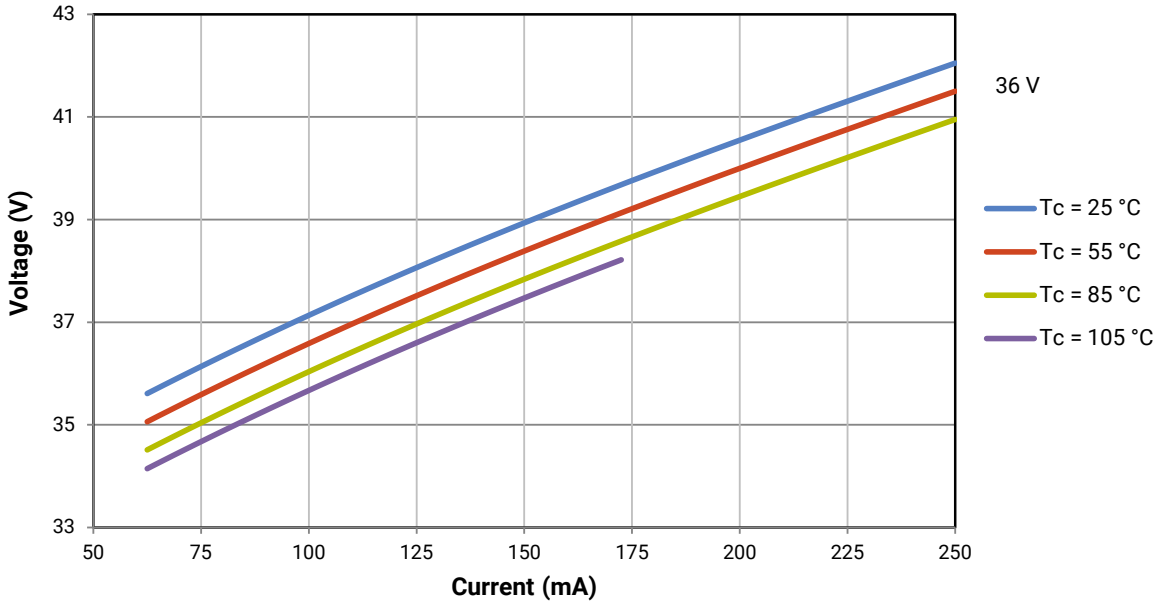
ELECTRICAL CHARACTERISTICS

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



ELECTRICAL CHARACTERISTICS - CONTINUED



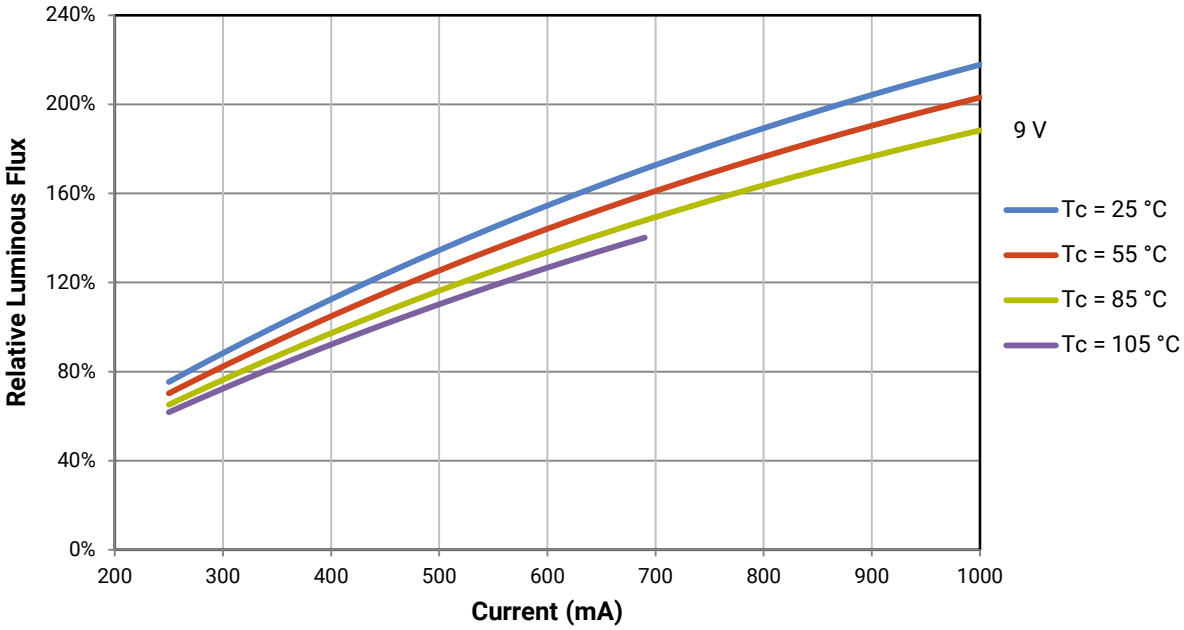


RELATIVE LUMINOUS FLUX

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

- Measurements of CXA1304 at steady-state operation at the given conditions, divided by
- Flux measured during binning, which is a pulsed measurement at 400 mA at T_J = 85 °C for the 9-V CXA1304 LED.

Using the 9-V CXA1304 LED as an example, at steady-state operation of Tc = 55 °C, I_F = 700 mA, the relative luminous flux ratio is 160% in the chart below. A 9-V CXA1304 LED that measures 380 lm during binning will deliver 608 lm (380 * 1.6) at steady-state operation of Tc = 55 °C, I_F = 700 mA.

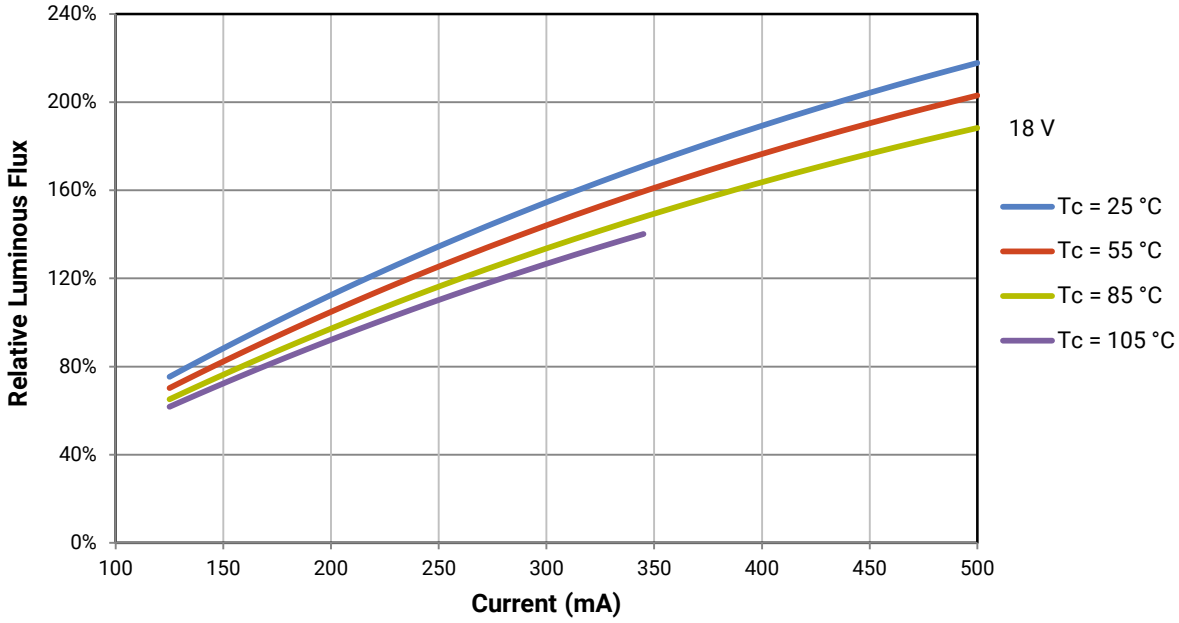


RELATIVE LUMINOUS FLUX - CONTINUED

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

- Measurements of CXA1304 at steady-state operation at the given conditions, divided by
- Flux measured during binning, which is a pulsed measurement at 200 mA at T_J = 85 °C for the 18-V CXA1304 LED.

Using the 18-V CXA1304 LED as an example, at steady-state operation of Tc = 55 °C, I_F = 350 mA, the relative luminous flux ratio is 160% in the chart below. An 18-V CXA1304 LED that measures 380 lm during binning will deliver 608 lm (380 * 1.6) at steady-state operation of Tc = 55 °C, I_F = 350 mA.

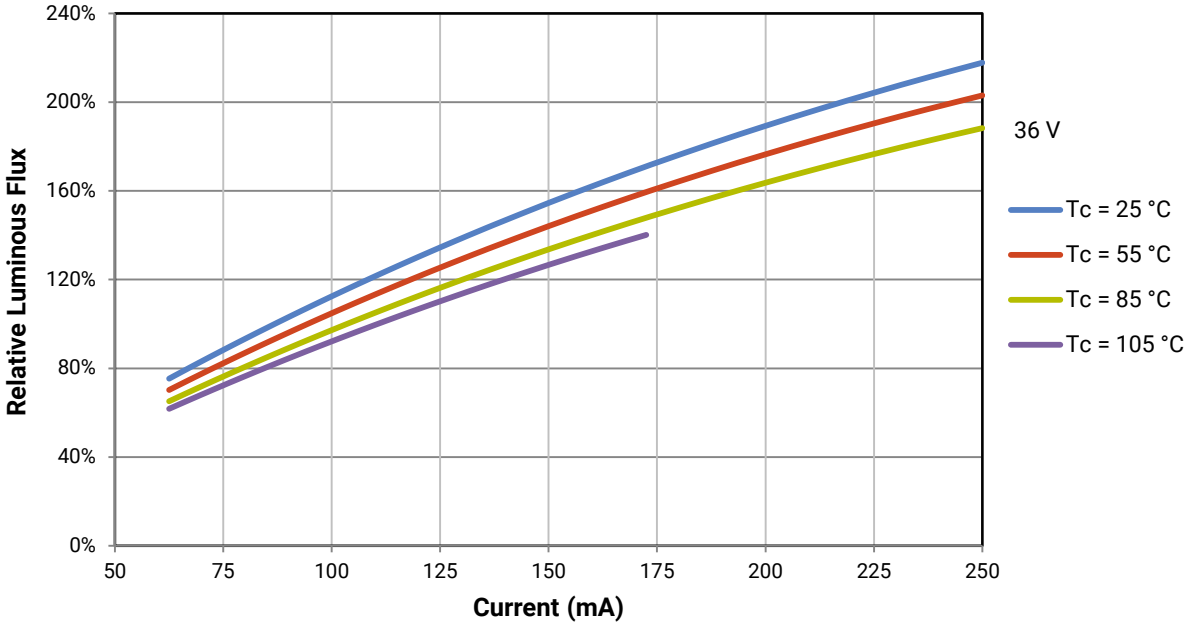


RELATIVE LUMINOUS FLUX - CONTINUED

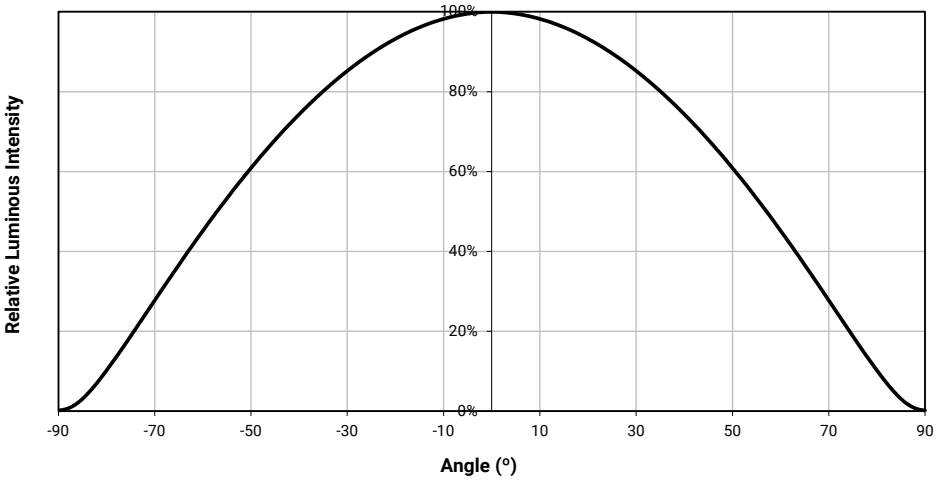
The relative luminous flux values provided below are the ratio of:

- Measurements of CXA1304 at steady-state operation at the given conditions, divided by
- Flux measured during binning, which is a pulsed measurement at 100 mA at T_J = 85 °C for the 36-V CXA1304 LED.

Using the 36-V CXA1304 LED as an example, at steady-state operation of Tc = 55 °C, I_F = 175 mA, the relative luminous flux ratio is 160% in the chart below. A 36-V CXA1304 LED that measures 380 lm during binning will deliver 608 lm (380 * 1.6) at steady-state operation of Tc = 55 °C, I_F = 175 mA.



TYPICAL SPATIAL DISTRIBUTION



PERFORMANCE GROUPS - BRIGHTNESS (9 V, I_F = 400 mA; 18 V, I_F = 200 mA; 36 V, I_F = 100 mA, T_J = 85 °C)

XLamp CXA1304 LEDs are tested for luminous flux and placed into one of the following bins.

Group Code	Minimum Luminous Flux	Maximum Luminous Flux
84	220	250
92	250	290
94	290	330
A2	330	355
A4	355	380
B2	380	410
B4	410	440
C2	440	475
C4	475	510
D2	510	550
D4	550	590

PERFORMANCE GROUPS - CHROMATICITY (T_J = 85 °C)

XLamp CXA1304 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 °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 °C) - CONTINUED

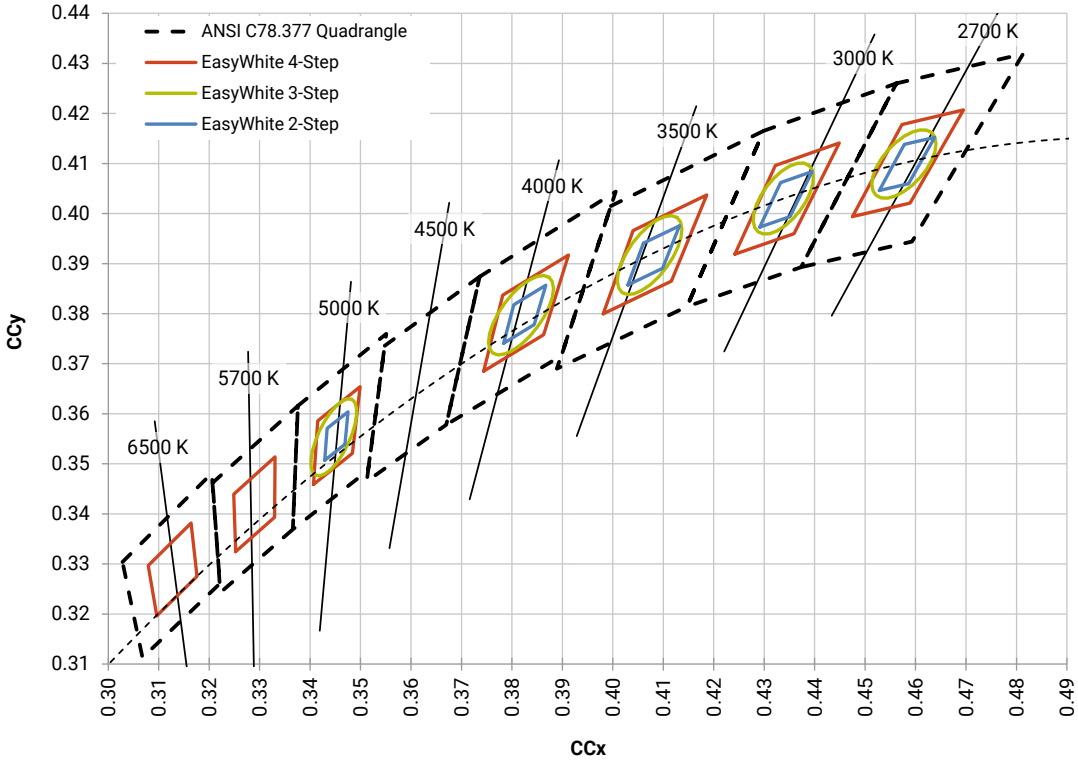
ANSI White Bins				
Code	CCT	Bin Code	x	y
0E1	6500 K	1A0	0.3048	0.3207
			0.3130	0.3290
			0.3144	0.3186
			0.3068	0.3113
		1B0	0.3028	0.3304
			0.3115	0.3391
			0.3130	0.3290
			0.3048	0.3207
		1C0	0.3115	0.3391
			0.3205	0.3481
			0.3213	0.3373
			0.3130	0.3290
		1D0	0.3130	0.3290
			0.3213	0.3373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

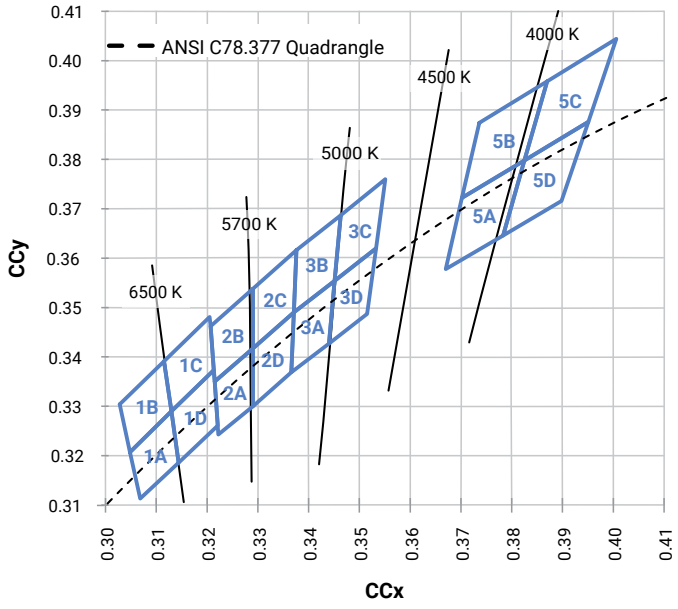
ANSI White Bins				
Code	CCT	Bin Code	x	y
0E3	5000 K	3A0	.3371	.3490
			.3451	.3554
			.3440	.3427
			.3366	.3369
		3B0	.3376	.3616
			.3463	.3687
			.3451	.3554
			.3371	.3490
		3C0	.3463	.3687
			.3551	.3760
			.3533	.3620
			.3451	.3554
		3D0	.3451	.3554
			.3533	.3620
			.3515	.3487
			.3440	.3427

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 °C)



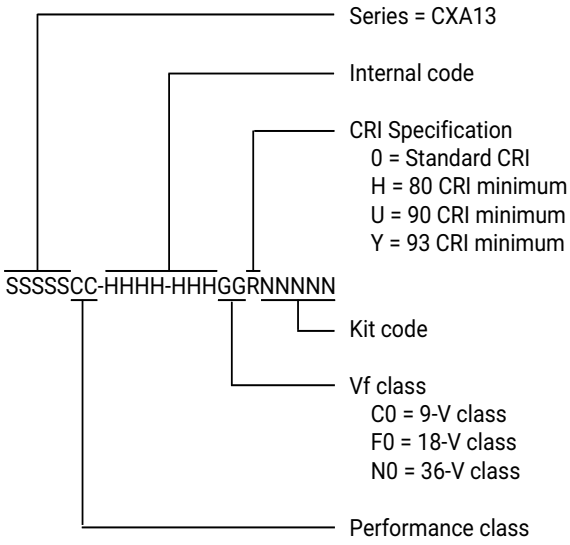
CREE ANSI WHITE BINS PLOTTED ON THE 1931 CIE COLOR SPACE (T_J = 85 °C)



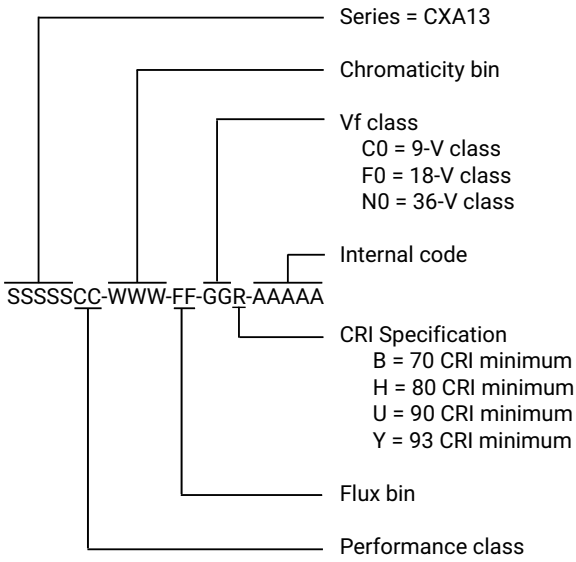
BIN AND ORDER CODE FORMATS

Bin codes and order codes are configured as follows:

Order Code



Bin Code



MECHANICAL DIMENSIONS

Dimensions are in mm.

Tolerances unless otherwise specified: ±.13

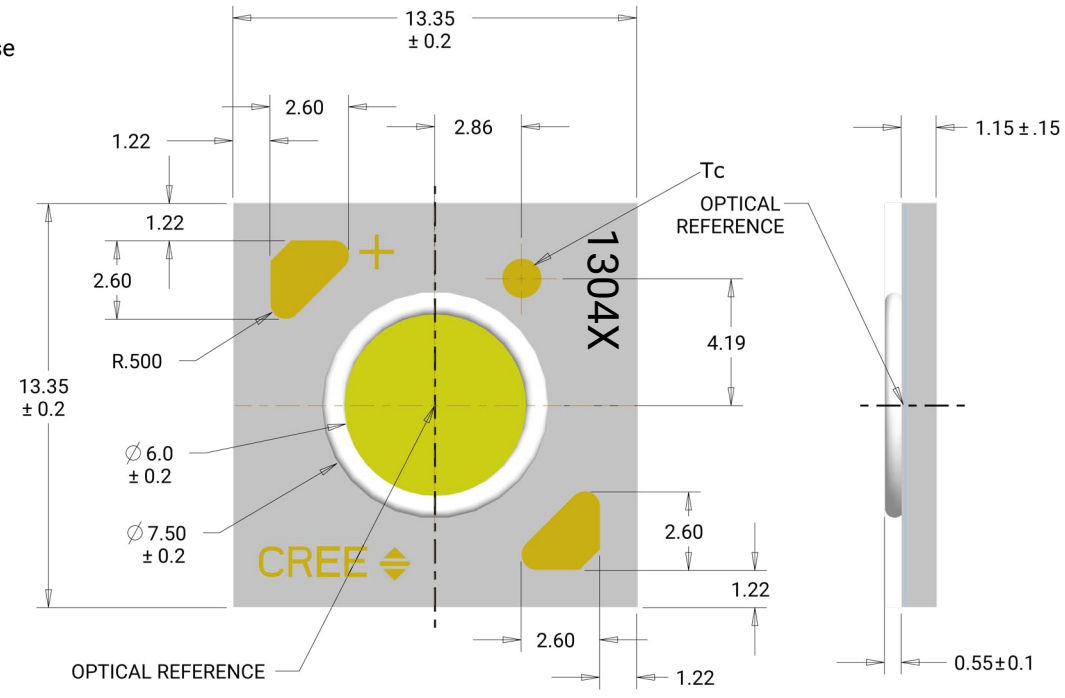
x° ± 1°

Meaning of 1304X

1304C = 9-V CXA1304

1304F = 18-V CXA1304

1304N = 36-V CXA1304



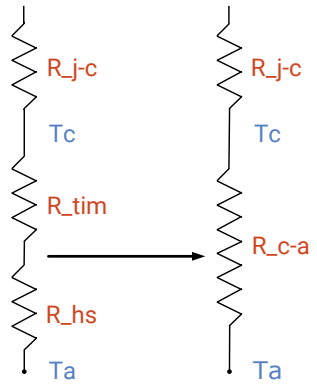
THERMAL DESIGN

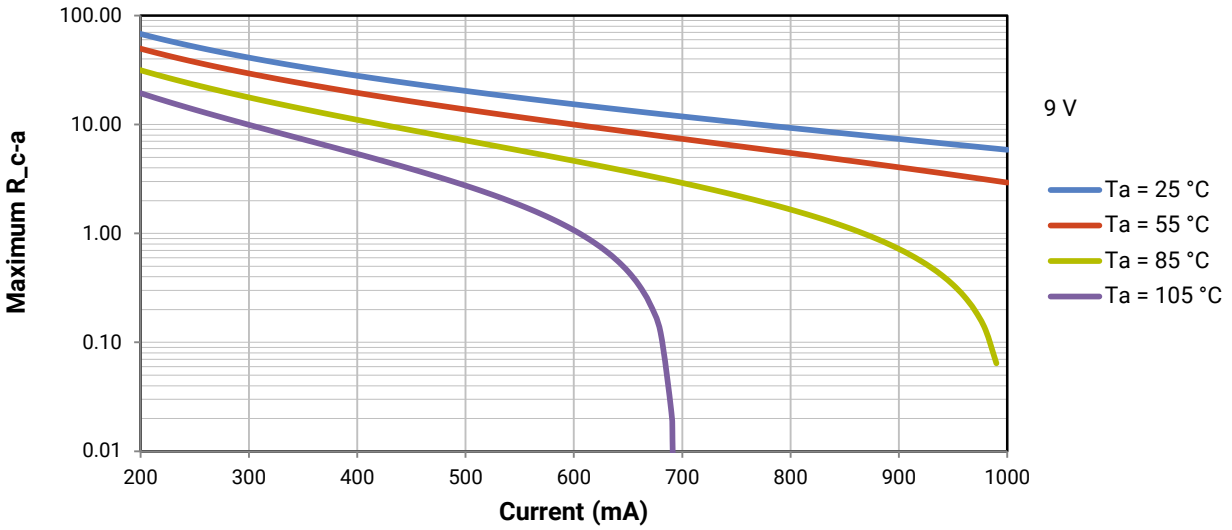
The CXA family of LED arrays can include over a hundred different LED die inside one package, and thus over a hundred different junction temperatures (T_J). Cree has intentionally removed junction-temperature-based operating limits and replaced the commonplace maximum T_J calculations with maximum ratings 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 2 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 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.

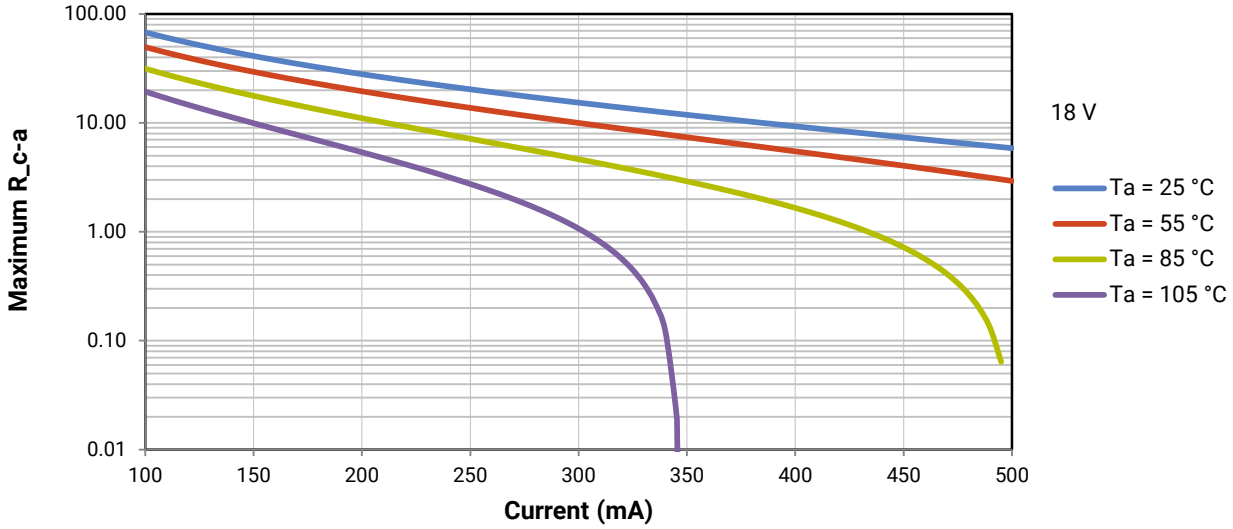
To keep the CXA1304 LED at or below the maximum rated Tc, the case to ambient temperature thermal resistance (R_c-a) must be at or below the maximum R_c-a value shown on the following graphs, depending on the operating environment. The y-axis in each graph is a base 10 logarithmic scale.

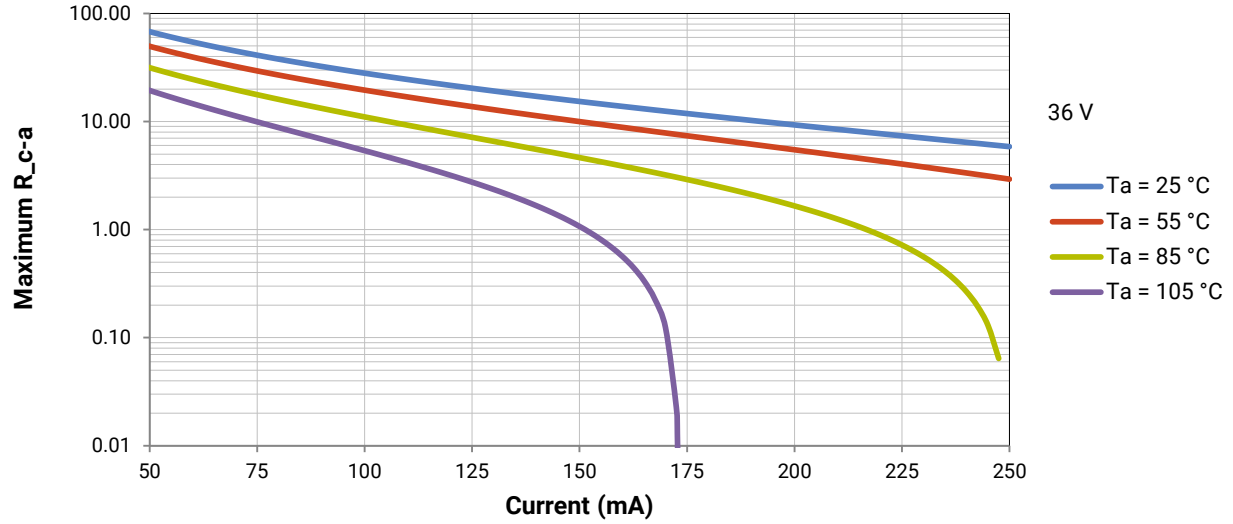
As the figure at right shows, the R_c-a value is the sum of the thermal resistance of the TIM (R_tim) plus the thermal resistance of the heat sink (R_hs).





THERMAL DESIGN - CONTINUED





NOTES

Measurements

The luminous flux, radiant power, chromaticity, 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 SVHC 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

Cree CXA1304 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: ±.13
x° ±1°