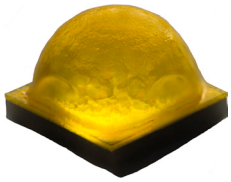
Cree® XLamp® XHP35.2 LEDs



PRODUCT DESCRIPTION

The XLamp® XHP35.2 LED is the next generation of Extreme High Power LEDs available in the XP footprint. Built on Cree's latest high-power LED technology, the XHP35.2 LED improves the voltage characteristics, efficacy and reliability of the XHP35 LED in the same 3.45 mm x 3.45 mm footprint. The new XHP35.2 LED provides an easy drop-in upgrade so that lighting manufacturers can achieve higher system LPW on existing XHP35 designs with minimal system redesign cost.

FEATURES

- Available in 5-step EasyWhite® bins at 2700 K—5700 K CCT and 3-step & 2-step EasyWhite bins at 2700 K—4000 K CCT
- Available in ANSI white bins at 2700 K—7000 K CCT
- Available in standard, 70-, 80- and 90-CRI minimum options
- Binned at 85 °C
- Maximum drive current: 1050 mA
- Low thermal resistance: 1.8 °C/W
- Wide viewing angle: 135°
- Unlimited floor life at ≤ 30 ºC/85% RH
- Reflow solderable - JEDEC J-STD-020C
- RoHS and REACh compliant
- UL® recognized component (E349212)

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Cree, Inc.
4600 Silicon Drive
Durham, NC 27703
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CHARACTERISTICS

Characteristics	Unit	Minimum	Typical	Maximum
Thermal resistance, junction to solder point	°C/W		1.8	
Viewing angle (FWHM)	degrees		135	
Temperature coefficient of voltage	mV/°C		-5.6	
ESD withstand voltage (HBM per Mil-Std-883D)	V			8000
DC forward current	mA			1050
Reverse voltage	V			-5
Forward voltage (@ 350 mA, 85 °C)	V		11.2	11.9
LED junction temperature	°C			150

FLUX CHARACTERISTICS, EASYWHITE® ORDER CODES AND BINS (T_J = 85 °C)

The following table provides order codes for XLamp XHP35.2 LEDs. For a complete description of how the flux and chromaticity groups are reflected in the bin code and order code nomenclature, please see the Bin and Order Code Formats section (page 21).

Nominal CCT	CRI		Minimum Luminous Flux @350 mA		2-Step		3-Step		5-Step	
	Min	Typ	Group	Flux (lm) @ 85 °C	Group	Order Code	Group	Order Code	Group	Order Code
5700 K	70		E2	590					57E	XHP35B-00-0000-0D0BE257E
			D4	550						XHP35B-00-0000-0D0BD457E
	80		D4	550					57E	XHP35B-00-0000-0D0HD457E
			D2	510						XHP35B-00-0000-0D0HD257E
	90		C4	475					57E	XHP35B-00-0000-0D0UC457E
			C2	440						XHP35B-00-0000-0D0UC257E
			B4	410						XHP35B-00-0000-0D0UB457E
5000 K	70		E2	590					50E	XHP35B-00-0000-0D0BE250E
			D4	550						XHP35B-00-0000-0D0BD450E
	80		D4	550					50E	XHP35B-00-0000-0D0HD450E
			D2	510						XHP35B-00-0000-0D0HD250E
	90		C4	475					50E	XHP35B-00-0000-0D0UC450E
			C2	440						XHP35B-00-0000-0D0UC250E
			B4	410						XHP35B-00-0000-0D0UB450E
4500 K	70		E2	590					45E	XHP35B-00-0000-0D0BE245E
			D4	550						XHP35B-00-0000-0D0BD445E
	80		D4	550					45E	XHP35B-00-0000-0D0HD445E
			D2	510						XHP35B-00-0000-0D0HD245E
	90		C4	475					45E	XHP35B-00-0000-0D0UC445E
			C2	440						XHP35B-00-0000-0D0UC245E
			B4	410						XHP35B-00-0000-0D0UB445E

Notes:

- Cree maintains a tolerance of ±7% on flux and power measurements, ±0.005 on chromaticity (CCx, CCy) measurements and ±2 on CRI measurements. See the Measurements section (page 23).
- Cree XLamp XHP35.2 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 CHARACTERISTICS, EASYWHITE® ORDER CODES AND BINS (T_J = 85 °C) - CONTINUED

Nominal CCT	CRI		Minimum Luminous Flux @350 mA		2-Step		3-Step		5-Step	
	Min	Typ	Group	Flux (lm) @ 85 °C	Group	Order Code	Group	Order Code	Group	Order Code
4000 K	70		E2	590					40E	XHP35B-00-0000-0D0BE240E
			D4	550						XHP35B-00-0000-0D0BD440E
			D2	510						XHP35B-00-0000-0D0BD240E
	80		D4	550					40E	XHP35B-00-0000-0D0HD440E
			D2	510						XHP35B-00-0000-0D0HD240E
	90		C2	440	40H	XHP35B-00-0000-0D0UC240H	40G	XHP35B-00-0000-0D0UC240G	40E	XHP35B-00-0000-0D0UC240E
			B4	410		XHP35B-00-0000-0D0UB440H		XHP35B-00-0000-0D0UB440G		XHP35B-00-0000-0D0UB440E
3500 K	70		E2	590					35E	XHP35B-00-0000-0D0BE235E
			D4	550						XHP35B-00-0000-0D0BD435E
			D2	510						XHP35B-00-0000-0D0BD235E
	80		D4	550					35E	XHP35B-00-0000-0D0HD435E
			D2	510						XHP35B-00-0000-0D0HD235E
			C4	475						XHP35B-00-0000-0D0HC435E
	90		C2	440	35H	XHP35B-00-0000-0D0UC235H	35G	XHP35B-00-0000-0D0UC235G	35E	XHP35B-00-0000-0D0UC235E
			B4	410		XHP35B-00-0000-0D0UB435H		XHP35B-00-0000-0D0UB435G		XHP35B-00-0000-0D0UB435E
3000 K	70		D4	550					30E	XHP35B-00-0000-0D0BD430E
			D2	510						XHP35B-00-0000-0D0BD230E
	80		D2	510					30E	XHP35B-00-0000-0D0HD230E
			C4	475						XHP35B-00-0000-0D0HC430E
	90		C2	440	30H	XHP35B-00-0000-0D0UC230H	30G	XHP35B-00-0000-0D0UC230G	30E	XHP35B-00-0000-0D0UC230E
			B4	410		XHP35B-00-0000-0D0UB430H		XHP35B-00-0000-0D0UB430G		XHP35B-00-0000-0D0UB430E
			B2	380		XHP35B-00-0000-0D0UB230H		XHP35B-00-0000-0D0UB230G		XHP35B-00-0000-0D0UB230E

Notes:

- Cree maintains a tolerance of ±7% on flux and power measurements, ±0.005 on chromaticity (CCx, CCy) measurements and ±2 on CRI measurements. See the Measurements section (page 23).
- Cree XLamp XHP35.2 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 CHARACTERISTICS, EASYWHITE® ORDER CODES AND BINS (T_J = 85 °C) - CONTINUED

Nominal CCT	CRI		Minimum Luminous Flux @350 mA		2-Step		3-Step		5-Step	
	Min	Typ	Group	Flux (lm) @ 85 °C	Group	Order Code	Group	Order Code	Group	Order Code
2700 K	80		C4	475					27E	XHP35B-00-0000-0D0HC427E
			C2	440						XHP35B-00-0000-0D0HC227E
	90		B4	410	27H	XHP35B-00-0000-0D0UB427H	27G	XHP35B-00-0000-0D0UB427G	27E	XHP35B-00-0000-0D0UB427E
			B2	380		XHP35B-00-0000-0D0UB227H		XHP35B-00-0000-0D0UB227G		XHP35B-00-0000-0D0UB227E

FLUX CHARACTERISTICS, ANSI WHITE ORDER CODES AND BINS (T_J = 85 °C)

The following table provides order codes for XLamp XHP35.2 LEDs. For a complete description of how the flux and chromaticity groups are reflected in the bin code and order code nomenclature, please see the Bin and Order Code Formats section (page 21).

Nomimal CCT	Chromaticity Regions	CRI		Minimum Luminous Flux @ 350 mA		Order Code
		Min	Typ	Group	Flux (lm) @ 85 °C	
7000 K	0A, 0B, 0C, 0D, 0R, 0S, 0T, 0U, 1A, 1B, 1C, 1D, 1R, 1S, 1T, 1U	0	68	E2	590	XHP35B-00-0000-0D00E20DT
				D4	550	XHP35B-00-0000-0D00D40DT
		70		E2	590	XHP35B-00-0000-0D0BE20DT
				D4	550	XHP35B-00-0000-0D0BD40DT
		80		D4	550	XHP35B-00-0000-0D0HD40DT
				D2	510	XHP35B-00-0000-0D0HD20DT
		90		C4	475	XHP35B-00-0000-0D0UC40DT
				C2	440	XHP35B-00-0000-0D0UC20DT
				B4	410	XHP35B-00-0000-0D0UB40DT
6500 K	1A, 1B, 1C, 1D	0	68	E2	590	XHP35B-00-0000-0D00E20E1
				D4	550	XHP35B-00-0000-0D00D40E1
		70		E2	590	XHP35B-00-0000-0D0BE20E1
				D4	550	XHP35B-00-0000-0D0BD40E1
		80		D4	550	XHP35B-00-0000-0D0HD40E1
				D2	510	XHP35B-00-0000-0D0HD20E1
		90		C4	475	XHP35B-00-0000-0D0UC40E1
				C2	440	XHP35B-00-0000-0D0UC20E1
				B4	410	XHP35B-00-0000-0D0UB40E1

Notes:

- Cree maintains a tolerance of ±7% on flux and power measurements, ±0.005 on chromaticity (CCx, CCy) measurements and ±2 on CRI measurements. See the Measurements section (page 23).
- Cree XLamp XHP35.2 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 CHARACTERISTICS, ANSI ORDER CODES AND BINS (T_J = 85 °C) - CONTINUED

Nomimal CCT	Chromaticity Regions	CRI		Minimum Luminous Flux @ 350 mA		Order Code
		Min	Typ	Group	Flux (lm) @ 85 °C	
6000 K	1A, 1B, 1C, 1D, 1R, 1S, 1T, 1U, 2A, 2B, 2C, 2D, 2R, 2S, 2T, 2U	0	68	E2	590	XHP35B-00-0000-0D00E20DV
				D4	550	XHP35B-00-0000-0D00D40DV
		70		E2	590	XHP35B-00-0000-0D0BE20DV
				D4	550	XHP35B-00-0000-0D0BD40DV
		80		D4	550	XHP35B-00-0000-0D0HD40DV
				D2	510	XHP35B-00-0000-0D0HD20DV
		90		C4	475	XHP35B-00-0000-0D0UC40DV
				C2	440	XHP35B-00-0000-0D0UC20DV
				B4	410	XHP35B-00-0000-0D0UB40DV
5700 K	2A, 2B, 2C, 2D	0	68	E2	590	XHP35B-00-0000-0D00E20E2
				D4	550	XHP35B-00-0000-0D00D40E2
		70		E2	590	XHP35B-00-0000-0D0BE20E2
				D4	550	XHP35B-00-0000-0D0BD40E2
		80		D4	550	XHP35B-00-0000-0D0HD40E2
				D2	510	XHP35B-00-0000-0D0HD20E2
		90		C4	475	XHP35B-00-0000-0D0UC40E2
				C2	440	XHP35B-00-0000-0D0UC20E2
				B4	410	XHP35B-00-0000-0D0UB40E2
5000 K	3A, 3B, 3C, 3D	0	68	E2	590	XHP35B-00-0000-0D00E20E3
				D4	550	XHP35B-00-0000-0D00D40E3
		70		E2	590	XHP35B-00-0000-0D0BE20E3
				D4	550	XHP35B-00-0000-0D0BD40E3
		80		D4	550	XHP35B-00-0000-0D0HD40E3
				D2	510	XHP35B-00-0000-0D0HD20E3
		90		C4	475	XHP35B-00-0000-0D0UC40E3
				C2	440	XHP35B-00-0000-0D0UC20E3
				B4	410	XHP35B-00-0000-0D0UB40E3
4500 K	4A, 4B, 4C, 4D	0	68	E2	590	XHP35B-00-0000-0D00E20E4
				D4	550	XHP35B-00-0000-0D00D40E4
		70		E2	590	XHP35B-00-0000-0D0BE20E4
				D4	550	XHP35B-00-0000-0D0BD40E4
		80		D4	550	XHP35B-00-0000-0D0HD40E4
				D2	510	XHP35B-00-0000-0D0HD20E4
		90		C4	475	XHP35B-00-0000-0D0UC40E4
				C2	440	XHP35B-00-0000-0D0UC20E4
				B4	410	XHP35B-00-0000-0D0UB40E4

Notes:

- Cree maintains a tolerance of ±7% on flux and power measurements, ±0.005 on chromaticity (CCx, CCy) measurements and ±2 on CRI measurements. See the Measurements section (page 23).
- Cree XLamp XHP35.2 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.

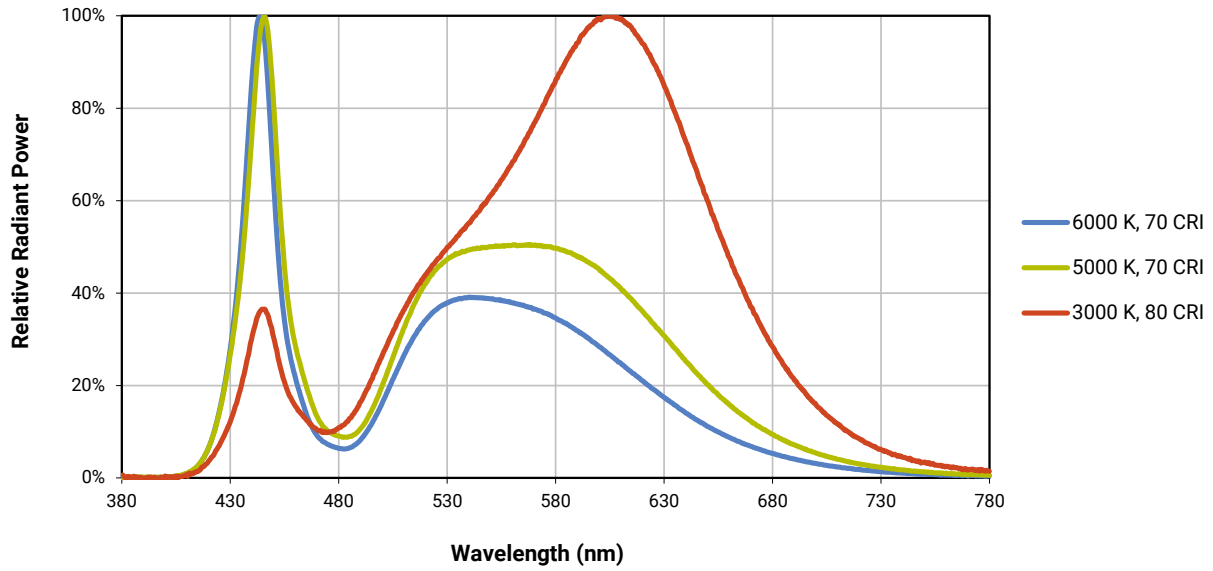
FLUX CHARACTERISTICS, ANSI ORDER CODES AND BINS (T_J = 85 °C) - CONTINUED

Nomimal CCT	Chromaticity Regions	CRI		Minimum Luminous Flux @ 350 mA		Order Code
		Min	Typ	Group	Flux (lm) @ 85 °C	
4000 K	5A, 5B, 5C, 5D	0	68	E2	590	XHP35B-00-0000-0D00E20E5
				D4	550	XHP35B-00-0000-0D00D40E5
				D2	510	XHP35B-00-0000-0D00D20E5
		70		E2	590	XHP35B-00-0000-0D0BE20E5
				D4	550	XHP35B-00-0000-0D0BD40E5
				D2	510	XHP35B-00-0000-0D0BD20E5
		80		D4	550	XHP35B-00-0000-0D0HD40E5
				D2	510	XHP35B-00-0000-0D0HD20E5
		90		C2	440	XHP35B-00-0000-0D0UC20E5
				B4	410	XHP35B-00-0000-0D0UB40E5
3500 K	6A, 6B, 6C, 6D	70		E2	590	XHP35B-00-0000-0D0BE20E6
				D4	550	XHP35B-00-0000-0D0BD40E6
				D2	510	XHP35B-00-0000-0D0BD20E6
		80		D4	550	XHP35B-00-0000-0D0HD40E6
				D2	510	XHP35B-00-0000-0D0HD20E6
				C4	475	XHP35B-00-0000-0D0HC40E6
		90		C2	440	XHP35B-00-0000-0D0UC20E6
				B4	410	XHP35B-00-0000-0D0UB40E6
3000 K	7A, 7B, 7C, 7D	70		D4	550	XHP35B-00-0000-0D0BD40E7
				D2	510	XHP35B-00-0000-0D0BD20E7
		80		D2	510	XHP35B-00-0000-0D0HD20E7
				C4	475	XHP35B-00-0000-0D0HC40E7
		90		C2	440	XHP35B-00-0000-0D0UC20E7
				B4	410	XHP35B-00-0000-0D0UB40E7
				B2	380	XHP35B-00-0000-0D0UB20E7
2700 K	8A, 8B, 8C, 8D	80		C4	475	XHP35B-00-0000-0D0HC40E8
				C2	440	XHP35B-00-0000-0D0HC20E8
		90		B4	410	XHP35B-00-0000-0D0UB40E8
				B2	380	XHP35B-00-0000-0D0UB20E8

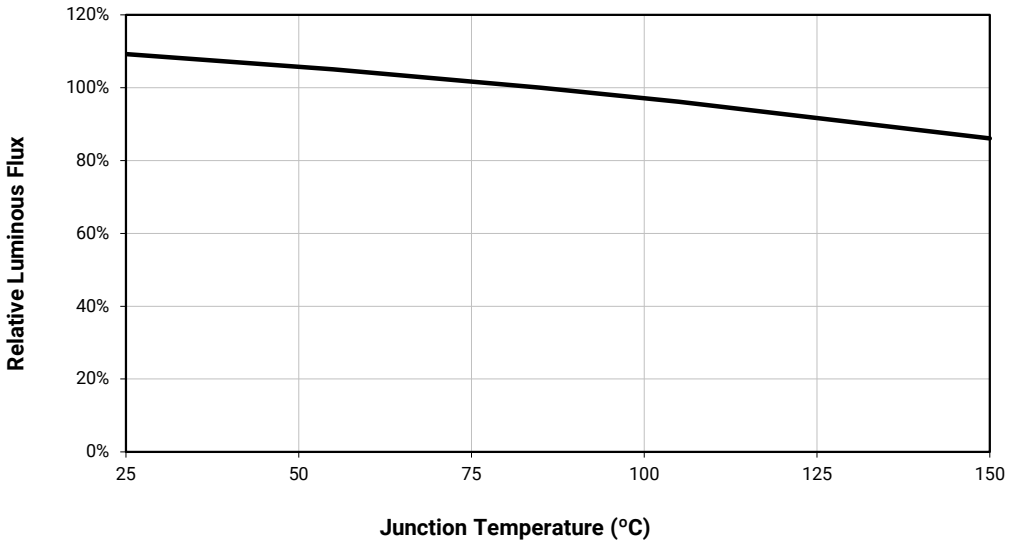
Notes:

- Cree maintains a tolerance of ±7% on flux and power measurements, ±0.005 on chromaticity (CCx, CCy) measurements and ±2 on CRI measurements. See the Measurements section (page 23).
- Cree XLamp XHP35.2 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.

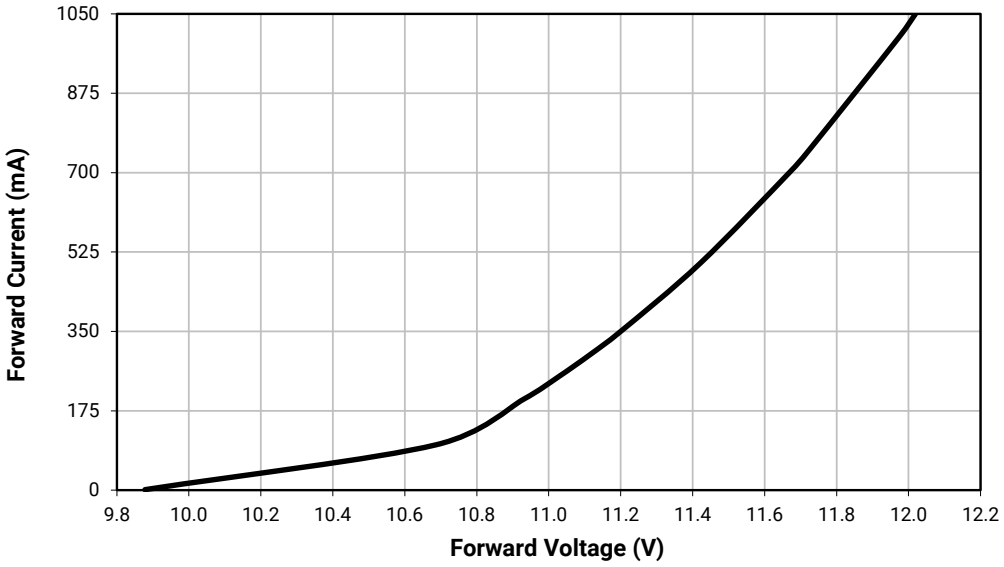
RELATIVE SPECTRAL POWER DISTRIBUTION



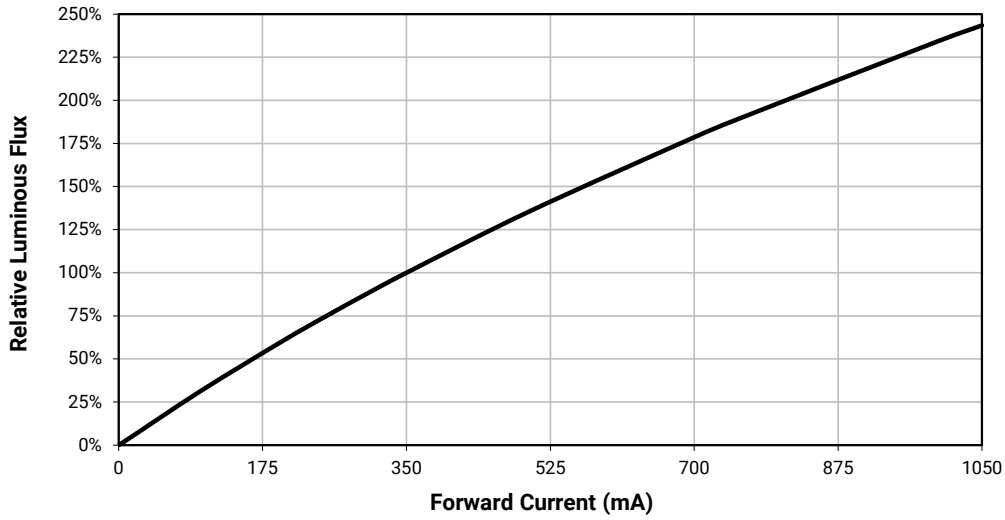
RELATIVE FLUX VS. JUNCTION TEMPERATURE (I_F = 350 mA)



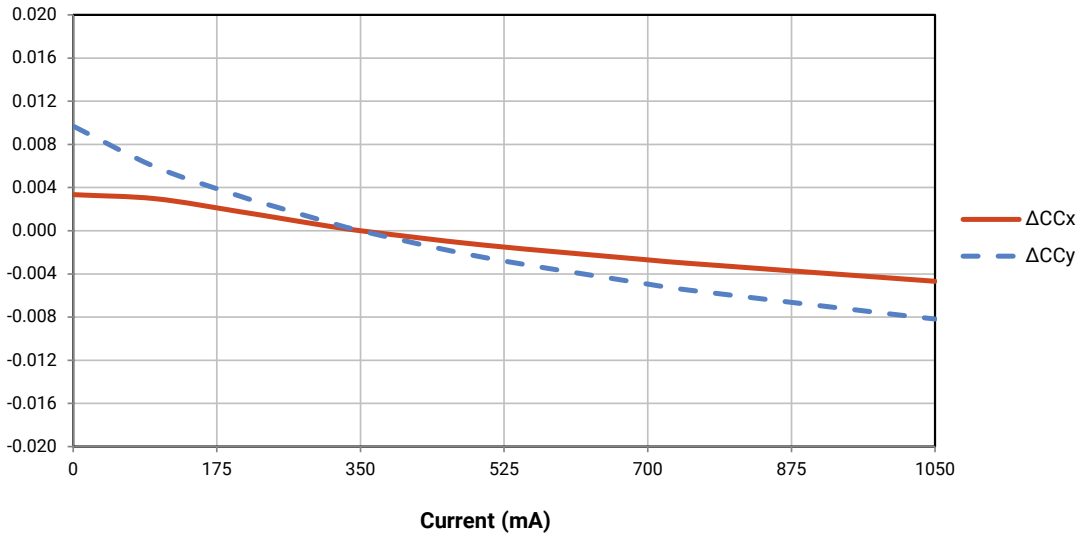
ELECTRICAL CHARACTERISTICS (T_J = 85 °C)



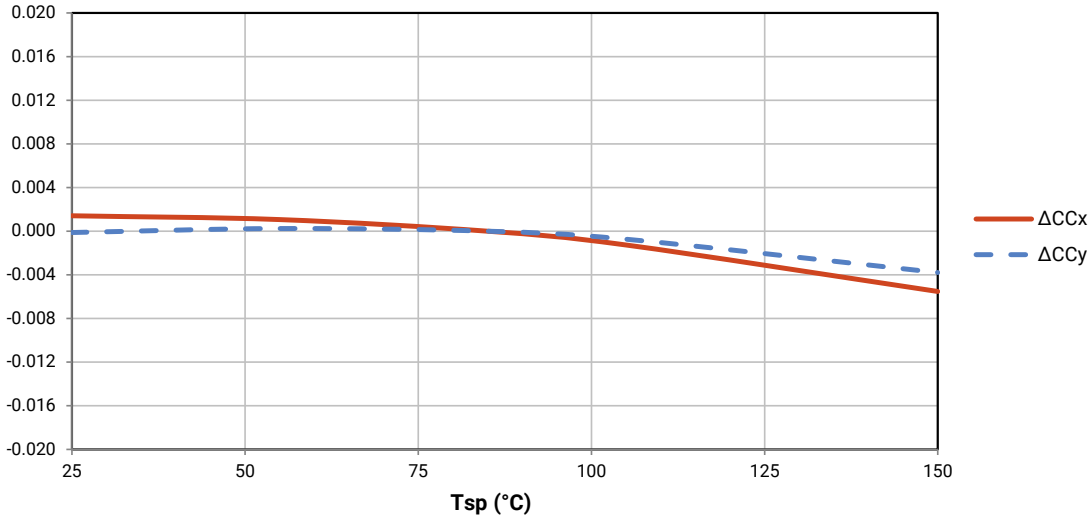
RELATIVE FLUX VS. CURRENT (T_J = 85 °C)



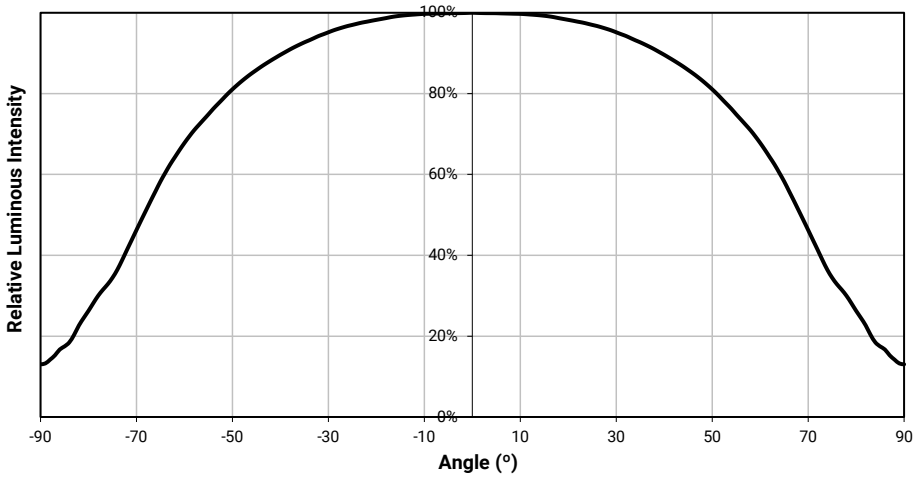
RELATIVE CHROMATICITY VS. CURRENT (WARM WHITE)



RELATIVE CHROMATICITY VS. TEMPERATURE (WARM WHITE)

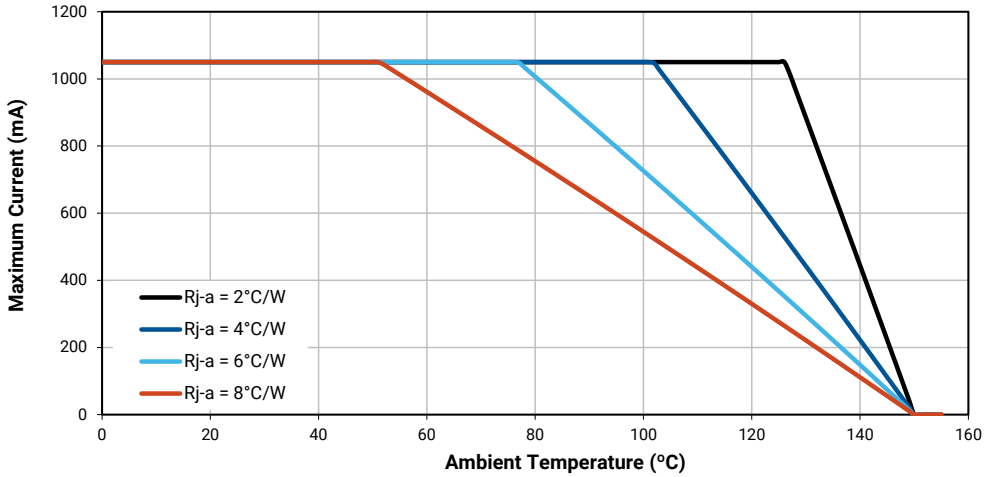


TYPICAL SPATIAL DISTRIBUTION



THERMAL DESIGN

The maximum forward current is determined by the thermal resistance between the LED junction and ambient. It is crucial for the end product to be designed in a manner that minimizes the thermal resistance from the solder point to ambient in order to optimize lamp life and optical characteristics.



PERFORMANCE GROUPS – LUMINOUS FLUX (T_J = 85 °C)

XLamp XHP35.2 LEDs are tested for luminous flux and placed into one of the following luminous-flux groups.

Group Code	Minimum Luminous Flux	Maximum Luminous Flux
A2	330	355
A4	355	380
B2	380	410
B4	410	440
C2	440	475
C4	475	510
D2	510	550
D4	550	590
E2	590	635
E4	635	680

PERFORMANCE GROUPS – CHROMATICITY

XLamp XHP35.2 LEDs are tested for chromaticity and placed into one of the regions defined by the following bounding coordinates.

EasyWhite Color Temperatures – 2-Step			
Bin Code	CCT	x	y
40H	4000 K	0.3777	0.3739
		0.3797	0.3816
		0.3861	0.3855
		0.3838	0.3777
35H	3500 K	0.4022	0.3858
		0.4053	0.3942
		0.4125	0.3977
		0.4091	0.3891
30H	3000 K	0.4287	0.3975
		0.4328	0.4064
		0.4390	0.4086
		0.4347	0.3996
27H	2700 K	0.4524	0.4048
		0.4574	0.4140
		0.4633	0.4154
		0.4581	0.4062

PERFORMANCE GROUPS – CHROMATICITY (CONTINUED)

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

EasyWhite Color Temperatures – 5-Step Ellipse						
Bin Code	CCT	Center Point		Major Axis	Minor Axis	Rotation Angle (°)
		x	y	a	b	
57E	5700 K	0.3287	0.3417	0.01230	0.00600	72.0
50E	5000 K	0.3447	0.3553	0.01400	0.00520	65.0
45E	4500 K	0.3611	0.3658	0.01420	0.00550	61.5
40E	4000 K	0.3818	0.3797	0.01565	0.00670	53.7
35E	3500 K	0.4073	0.3917	0.01545	0.00690	54.0
30E	3000 K	0.4338	0.4030	0.01390	0.00680	53.2
27E	2700 K	0.4577	0.4099	0.01350	0.00700	48.5

ANSI White Bins			
CCT	Bin Code	x	y
7000 K	0A0	0.2950	0.2970
		0.2920	0.3060
		0.2984	0.3133
		0.3009	0.3042
	0B0	0.2920	0.3060
		0.2895	0.3135
		0.2962	0.3220
		0.2984	0.3133
	0C0	0.2984	0.3133
		0.2962	0.3220
		0.3028	0.3304
		0.3048	0.3207
	0D0	0.2984	0.3133
		0.3048	0.3207
		0.3068	0.3113
		0.3009	0.3042

ANSI White Bins			
CCT	Bin Code	x	y
7000 K	0R0	0.2980	0.2880
		0.2950	0.2970
		0.3009	0.3042
		0.3037	0.2937
	0S0	0.2895	0.3135
		0.2870	0.3210
		0.2937	0.3312
		0.2962	0.3220
	0T0	0.2962	0.3220
		0.2937	0.3312
		0.3005	0.3415
		0.3028	0.3304
	0U0	0.3037	0.2937
		0.3009	0.3042
		0.3068	0.3113
		0.3093	0.2993

PERFORMANCE GROUPS – CHROMATICITY (CONTINUED)

ANSI White Bins			
CCT	Bin Code	x	y
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			
CCT	Bin Code	x	y
6500 K	1R0	0.3068	0.3113
		0.3144	0.3186
		0.3161	0.3059
		0.3093	0.2993
	1S0	0.3005	0.3415
		0.3099	0.3509
		0.3115	0.3391
		0.3028	0.3304
	1T0	0.3099	0.3509
		0.3196	0.3602
		0.3205	0.3481
		0.3115	0.3391
	1U0	0.3144	0.3186
		0.3221	0.3261
		0.3231	0.3120
		0.3161	0.3059

ANSI White Bins			
CCT	Bin Code	x	y
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			
CCT	Bin Code	x	y
5700 K	2R0	0.3222	0.3243
		0.3290	0.3300
		0.3290	0.3180
		0.3231	0.3120
	2S0	0.3196	0.3602
		0.3290	0.3690
		0.3290	0.3538
		0.3207	0.3462
	2T0	0.3290	0.3690
		0.3381	0.3762
		0.3376	0.3616
		0.3290	0.3538
	2U0	0.3290	0.3300
		0.3366	0.3369
		0.3361	0.3245
		0.3290	0.3180

PERFORMANCE GROUPS – CHROMATICITY (CONTINUED)

ANSI White Bins			
CCT	Bin Code	x	y
5000 K	3A0	0.3371	0.3490
		0.3451	0.3554
		0.3440	0.3427
		0.3366	0.3369
	3B0	0.3376	0.3616
		0.3463	0.3687
		0.3451	0.3554
		0.3371	0.3490
	3C0	0.3463	0.3687
		0.3551	0.3760
		0.3533	0.3620
		0.3451	0.3554
	3D0	0.3451	0.3554
		0.3533	0.3620
		0.3515	0.3487
		0.3440	0.3427

ANSI White Bins			
CCT	Bin Code	x	y
4500 K	4A0	0.3530	0.3597
		0.3615	0.3659
		0.3512	0.3465
		0.3515	0.3487
	4B0	0.3548	0.3736
		0.3641	0.3804
		0.3530	0.3597
		0.3533	0.3620
	4C0	0.3641	0.3804
		0.3736	0.3874
		0.3702	0.3722
		0.3615	0.3659
	4D0	0.3615	0.3659
		0.3702	0.3722
		0.3670	0.3578
		0.3590	0.3521

ANSI White Bins			
CCT	Bin Code	x	y
4000 K	5A0	0.3670	0.3578
		0.3702	0.3722
		0.3825	0.3798
		0.3783	.3646
	5B0	0.3702	0.3722
		0.3736	0.3874
		0.3869	0.3958
		0.3825	0.3798
	5C0	0.3825	0.3798
		0.3869	0.3958
		.04006	0.4044
		0.3950	0.3875
	5D0	0.3783	0.3646
		0.3825	0.3798
		0.3950	0.3875
		0.3898	0.3716

ANSI White Bins			
CCT	Bin Code	x	y
3500 K	6A0	0.3889	0.3690
		0.3941	0.3848
		0.4080	0.3916
		0.4017	0.3751
	6B0	0.3941	0.3848
		0.3996	0.4015
		.04146	0.4089
		.04080	0.3916
	6C0	0.4080	0.3916
		0.4146	0.4089
		0.4299	0.4165
		0.4221	0.3984
	6D0	0.4017	0.3751
		0.4080	0.3916
		0.4221	0.3984
		0.4147	0.3814

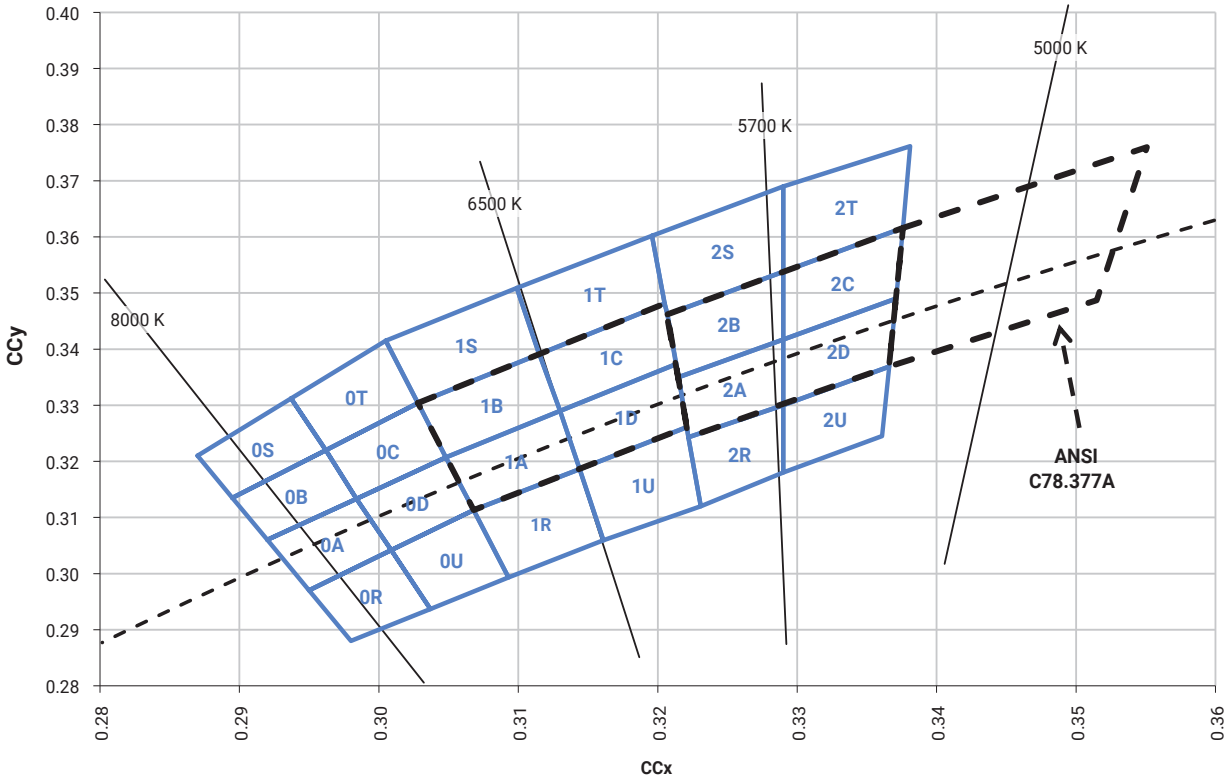
PERFORMANCE GROUPS – CHROMATICITY (CONTINUED)

ANSI White Bins			
CCT	Bin Code	x	y
3000 K	7A0	0.4147	0.3814
		0.4221	0.3984
		0.4342	0.4028
		0.4259	0.3853
	7B0	0.4221	0.3984
		0.4299	0.4165
		0.4430	0.4212
		0.4342	.04028
	7C0	0.4342	0.4028
		0.4430	0.4212
		0.4562	0.4260
		0.4465	0.4071
	7D0	0.4259	0.3853
		0.4342	0.4028
		0.4465	0.4071
		0.4373	0.3893

ANSI White Bins			
CCT	Bin Code	x	y
2700 K	8A0	0.4373	0.3893
		0.4465	0.4071
		0.4582	0.4099
		0.4483	0.3919
	8B0	0.4465	.04071
		0.4562	0.4260
		0.4687	0.4289
		.04582	0.4099
	8C0	0.4582	0.4099
		0.4687	0.4289
		0.4813	0.4319
		0.4700	0.4126
	8D0	0.4483	0.3919
		0.4582	0.4099
		0.4700	0.4126
		0.4593	0.3944

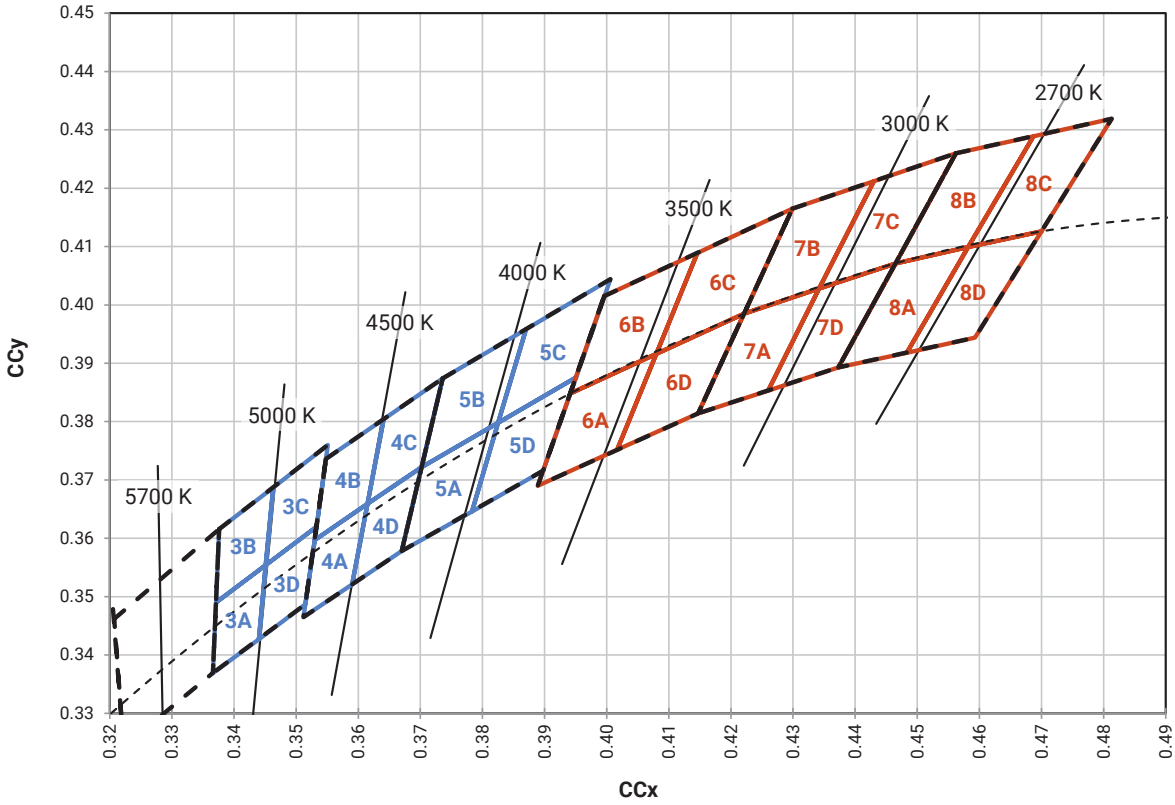
CREE'S EASYWHITE® CHROMATICITY REGIONS PLOTTED ON THE 1931 CIE CURVE

ANSI Cool White

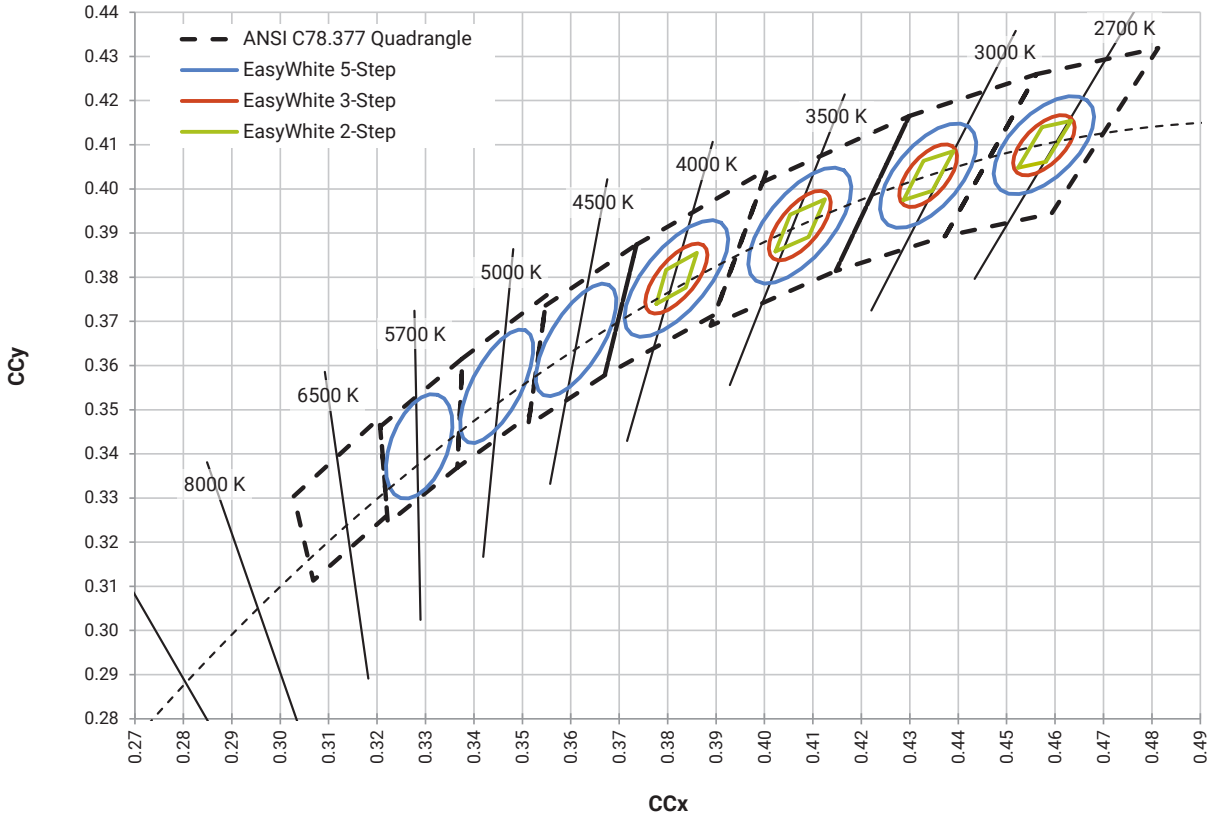


CREE'S EASYWHITE® CHROMATICITY REGIONS PLOTTED ON THE 1931 CIE CURVE - CONTINUED

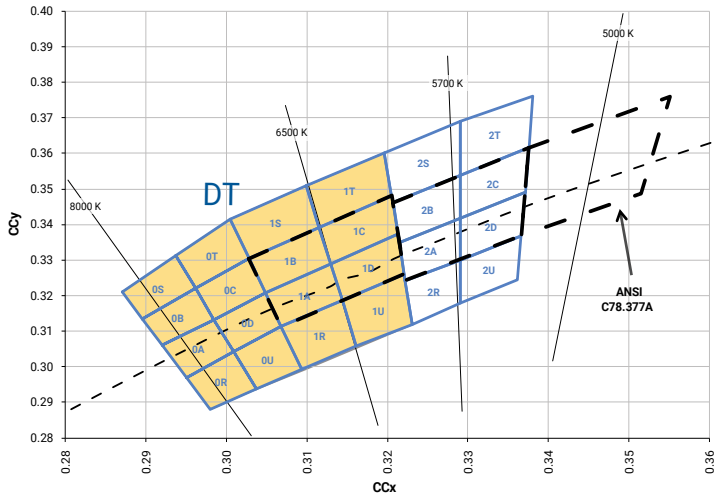
ANSI Neutral White and ANSI Warm White

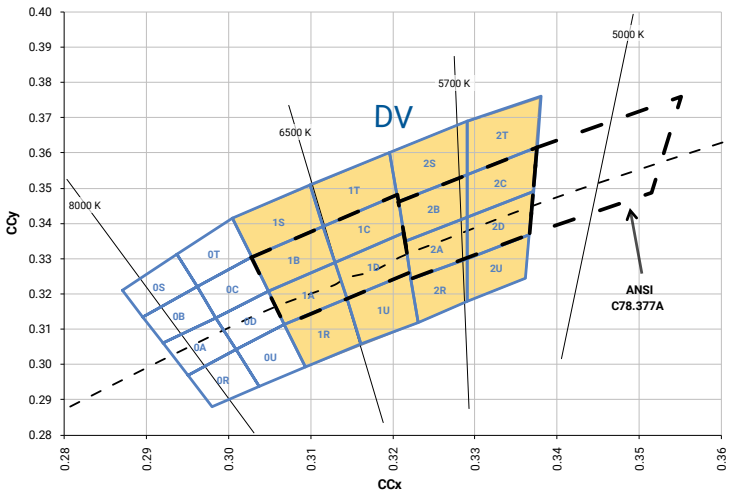


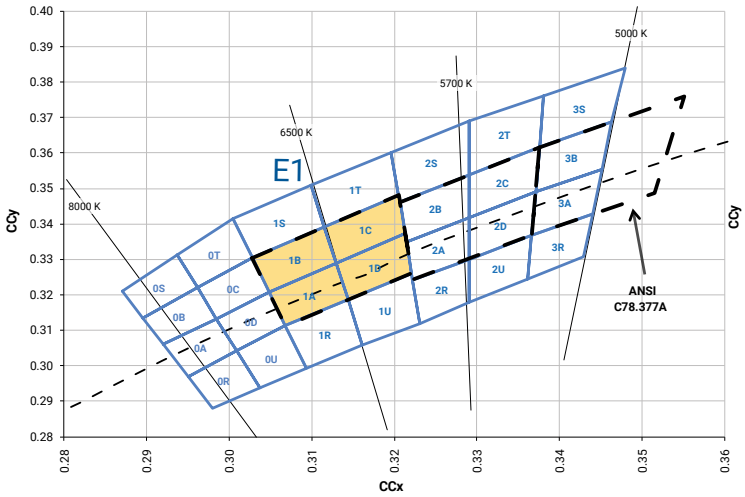
CREE'S EASYWHITE® CHROMATICITY REGIONS PLOTTED ON THE 1931 CIE CURVE - CONTINUED

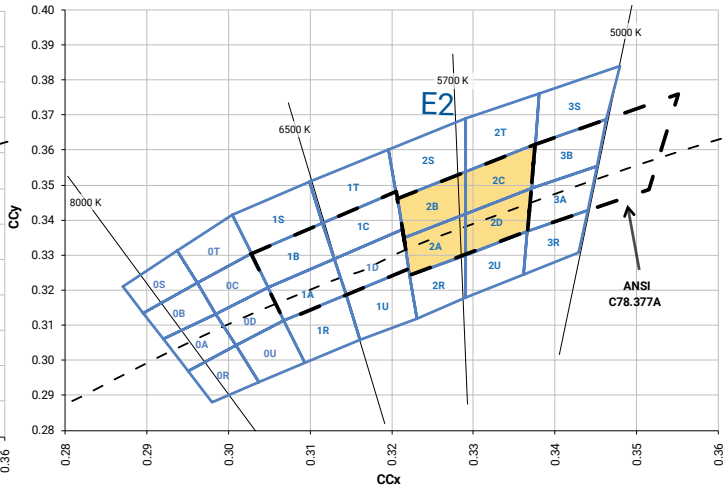


CREE'S STANDARD COOL WHITE KITS PLOTTED ON ANSI STANDARD CHROMATICITY REGIONS

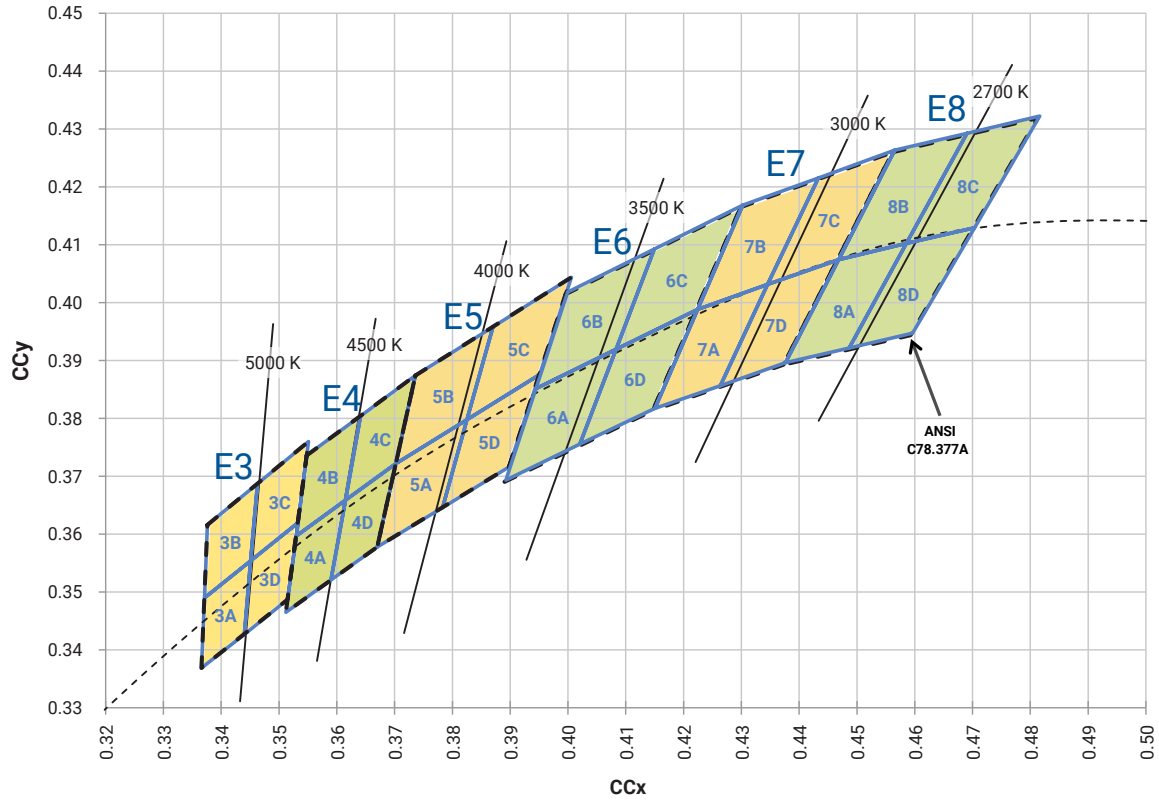








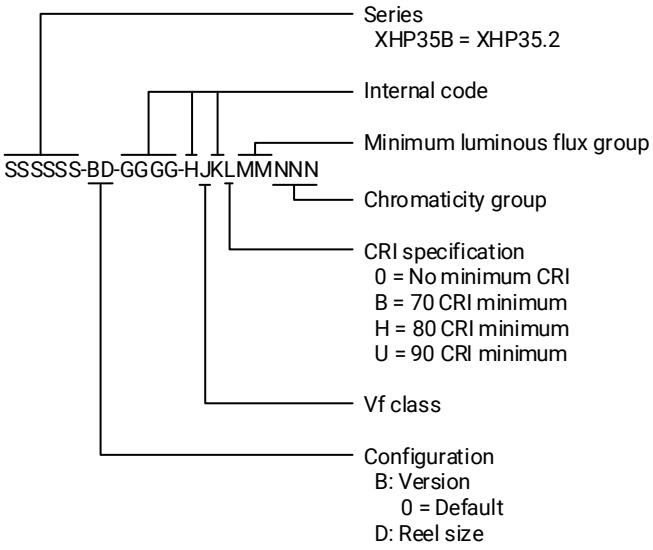
CREE'S STANDARD WARM AND NEUTRAL WHITE KITS PLOTTED ON ANSI STANDARD CHROMATICITY REGIONS



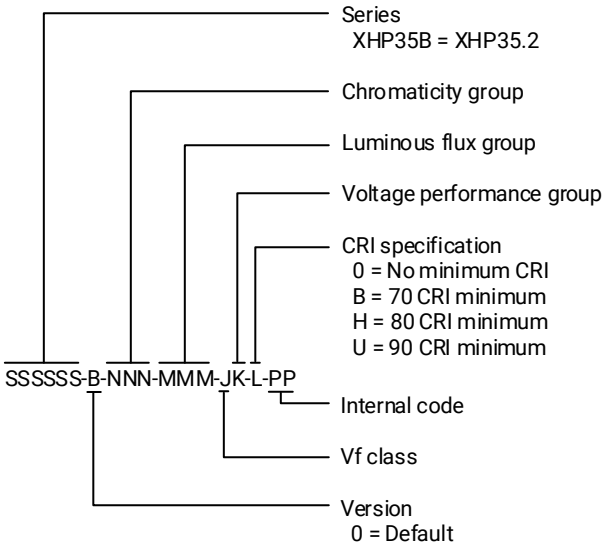
BIN AND ORDER CODE FORMATS

Bin codes and order codes for XHP35.2 LEDs are configured in the following manner:

Order Code



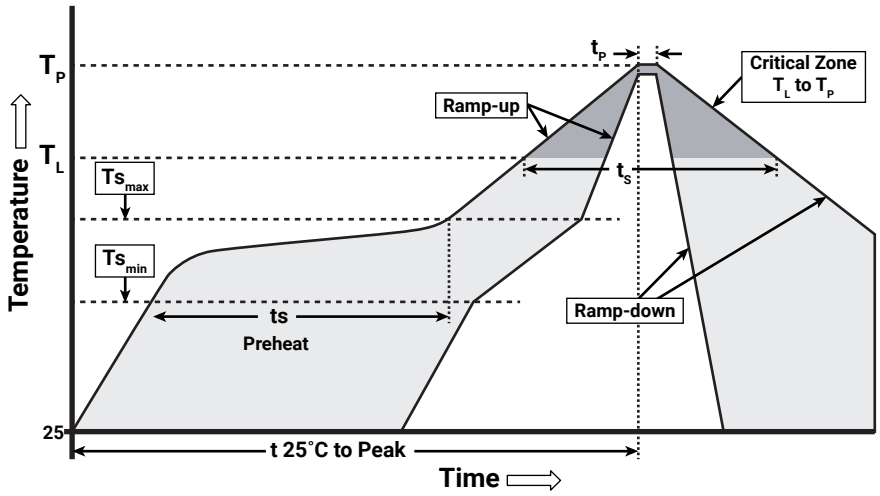
Bin Code



REFLOW SOLDERING CHARACTERISTICS

In testing, Cree has found XLamp XHP35.2 LEDs to be compatible with JEDEC J-STD-020C, using the parameters listed below. As a general guideline, Cree recommends that users follow the recommended soldering profile provided by the manufacturer of the solder paste used, and therefore it is the lamp or luminaire manufacturer's responsibility to determine applicable soldering requirements.

Note that this general guideline may not apply to all PCB designs and configurations of reflow soldering equipment.



IPC/JEDEC J-STD-020C

Profile Feature	Lead-Free Solder
Average Ramp-Up Rate (Ts_{max} to T_p)	1.2 °C/second
Preheat: Temperature Min (Ts_{min})	120 °C
Preheat: Temperature Max (Ts_{max})	170 °C
Preheat: Time (ts_{min} to ts_{max})	65-150 seconds
Time Maintained Above: Temperature (T_L)	217 °C
Time Maintained Above: Time (t_L)	45-90 seconds
Peak/Classification Temperature (Tp)	235 - 245 °C
Time Within 5 °C of Actual Peak Temperature (tp)	20-40 seconds
Ramp-Down Rate	1 - 6 °C/second
Time 25 °C to Peak Temperature	4 minutes max.

Note: All temperatures refer to the topside of the package, measured on the package body surface.

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.

Moisture Sensitivity

Cree recommends keeping XLamp LEDs in the provided, resealable moisture-barrier packaging (MBP) until immediately prior to soldering. Unopened MBPs that contain XLamp LEDs do not need special storage for moisture sensitivity.

Once the MBP is opened, XLamp XHP35.2 LEDs may be stored as MSL 1 per JEDEC J-STD-033, meaning they have unlimited floor life in conditions of ≤ 30 ºC/85% relative humidity (RH). Regardless of the storage condition, Cree recommends sealing any unsoldered LEDs in the original MBP.

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.

NOTES - CONTINUED

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.

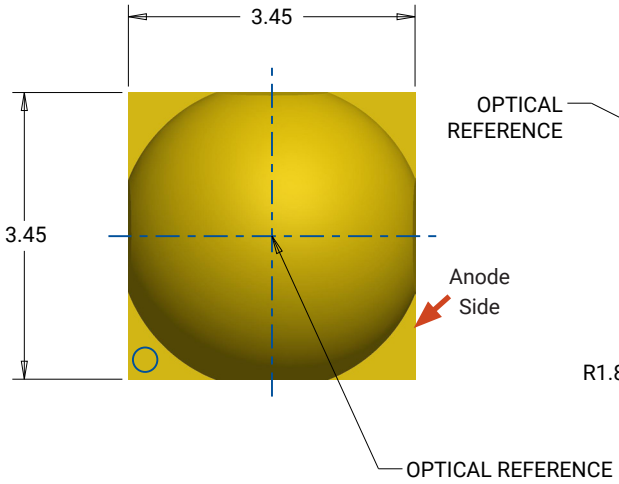
Vision Advisory

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.

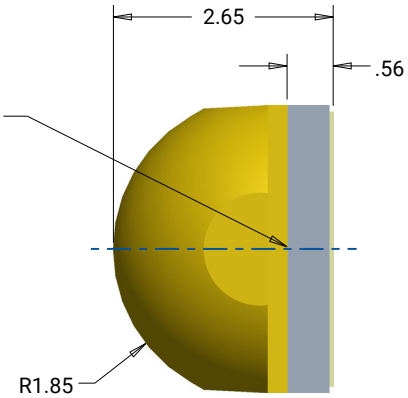
MECHANICAL DIMENSIONS

Thermal vias, if present, are not shown on these drawings.

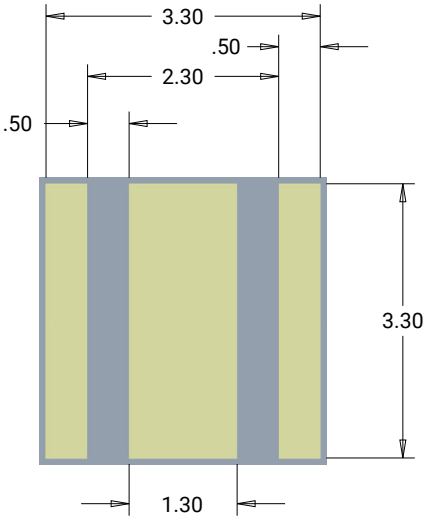
All dimensions are ±.13 mm unless otherwise indicated.



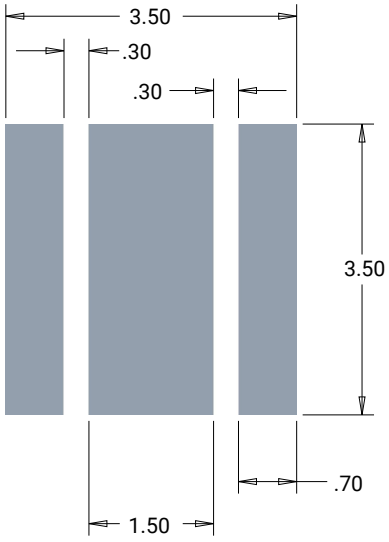
Top View



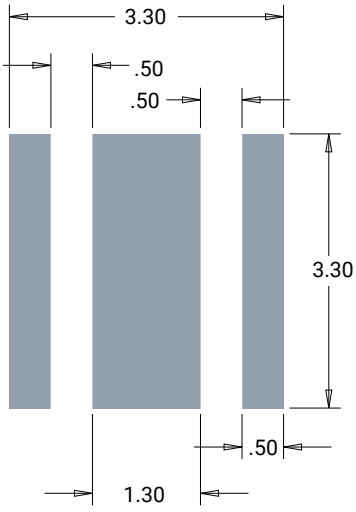
Side View



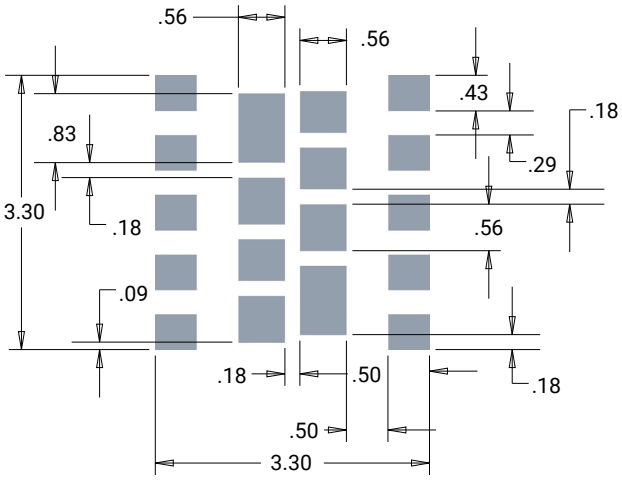
Bottom View



Recommended Copper Layout



Recommended Solder Pad (Solder Resist Pattern)



Recommended Stencil Openings*

Notes:

- Cree recommends using thermal pad kickouts to maximize component thermal performance.
- Cree recommends using white solder mask material to minimize system optical loss.

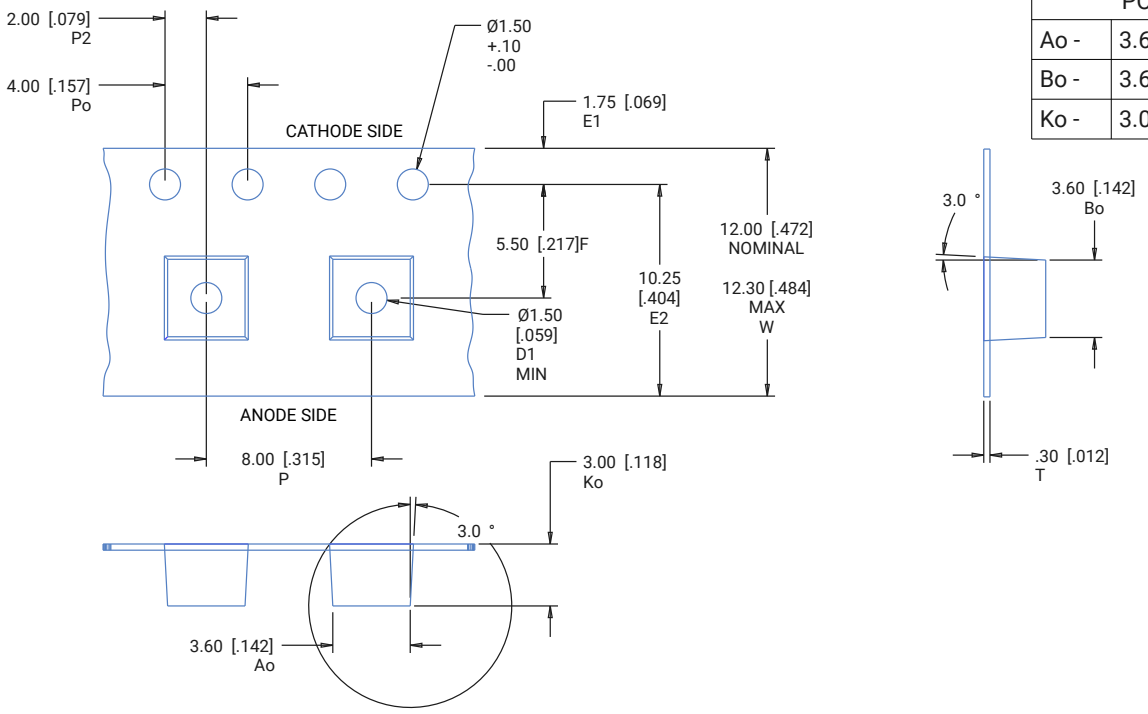
* This stencil has been tested and optimized for the avoidance of voiding when using ALPHA® LUMET® P30 Maxrel solder paste. For other solder pastes, a “window pane” design for the thermal pad stencil may result in a lower voiding percentage. Contact your local Cree Field Applications Engineer for consultation regarding your specific application.

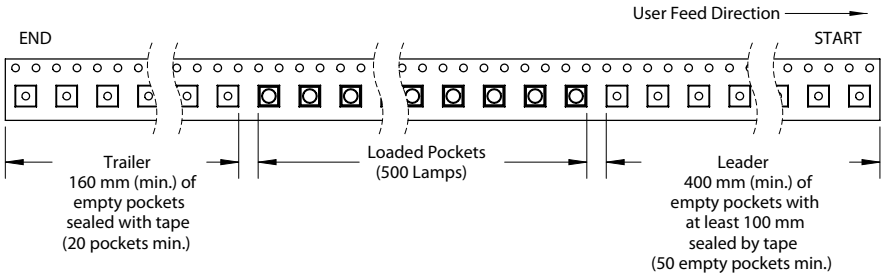
TAPE AND REEL

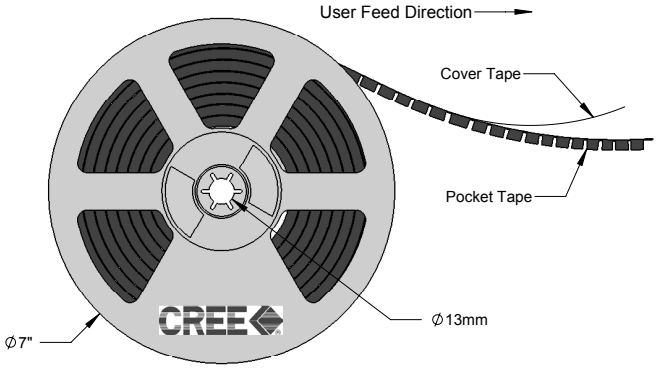
All Cree carrier tapes conform to EIA-481D, Automated Component Handling Systems Standard.

Except as noted, all dimensions in mm [inches]

POCKET SIZE	
Ao -	3.60 mm [.142"]
Bo -	3.60 mm [.142"]
Ko -	3.00 mm [.118"]

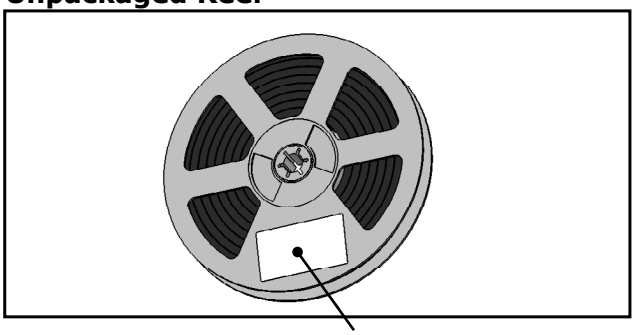




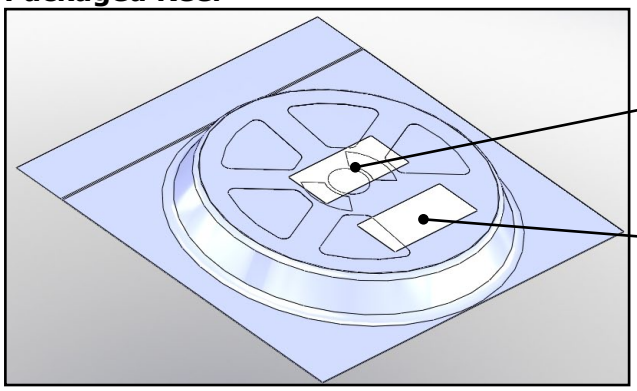


PACKAGING

Unpackaged Reel



Packaged Reel



Boxed Reel