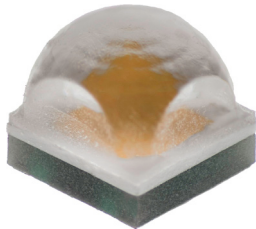


XLamp® XB-H LEDs



PRODUCT DESCRIPTION

The XLamp® XB-H LED delivers a breakthrough combination of lumen output and efficacy in a small package. Delivering more than 500 lumens at 1.5 A, 25 °C in a 2.45 mm² package, the XB-H LED offers triple the lumen density of competing high-power LEDs to significantly increase the performance of today’s lighting designs. The XB-H LED joins a new generation of directionally optimized LEDs that offers the industry’s highest optical control factor (OCF), a measurement of how LED size and performance benefit directional lighting applications. High-OCF LEDs enable lighting manufacturers to improve the performance of any lighting design, create smaller and less expensive systems, and develop new lighting solutions that were previously not possible.

FEATURES

- Available in white, outdoor white and 80-, 85- and 90-CRI white
- ANSI-compatible chromaticity bins
- Binned at 85 °C
- Maximum drive current: 1500 mA
- Low thermal resistance: 3.5 °C/W
- Wide viewing angle: 110°
- Unlimited floor life at ≤ 30 °C/85% RH
- Reflow solderable - JEDEC J-STD-020C
- Electrically neutral thermal path
- RoHS and REACH compliant
- UL® recognized component (E349212)

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Cree LED / 4001 E. Hwy. 54, Suite 2000 / Durham, NC 27713 USA / +1.919.313.5330 / www.cree-led.com

CHARACTERISTICS

Characteristics	Unit	Minimum	Typical	Maximum
Thermal resistance, junction to solder point ^o	°C/W		3.5	
Viewing angle (FWHM)	degrees		110	
Temperature coefficient of voltage	mV/°C		-1.3	
ESD withstand voltage (HBM per Mil-Std-883D)			Class 3B	
DC forward current	mA			1500
Reverse voltage	V			1
Forward voltage (@ 700 mA, 85 °C)	V		2.86	3.3
Forward voltage (@ 1000 mA, 85 °C)	V		2.95	
Forward voltage (@ 1500 mA, 85 °C)	V		3.08	
LED junction temperature	°C			150

Note:

- ◊ Thermal resistance measurement was performed per the JEDEC JESD51-14 standard. See the [Thermal Resistance Measurement application note](#) for more details.

FLUX CHARACTERISTICS (T_J = 85 °C)

The following tables provide order codes for XLamp XB-H LEDs. For a complete description of the order-code nomenclature, please consult the Bin and Order Code Formats section (page 17).

Chromaticity		Minimum Luminous Flux (lm) @ 700 mA			Calculated Minimum Luminous Flux (lm)** @ 85 °C		Order Codes				
Kit	CCT	Code	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*	1.0 A	1.5 A	No CRI Minimum	Standard CRI	80 CRI Minimum	85 CRI Minimum	90 CRI Minimum
E2	5700 K	T6	280	322	372	499		XBHAWT-00-0000-000LT60E2			
		T5	260	299	345	463		XBHAWT-00-0000-000LT50E2			
		T4	240	276	318	428		XBHAWT-00-0000-000LT40E2			
		T3	220	253	292	392		XBHAWT-00-0000-000LT30E2			
E3	5000 K	T6	280	322	372	499	XBHAWT-00-0000-0000T60E3	XBHAWT-00-0000-000LT60E3			
		T5	260	299	345	463	XBHAWT-00-0000-0000T50E3	XBHAWT-00-0000-000LT50E3			
		T4	240	276	318	428	XBHAWT-00-0000-0000T40E3	XBHAWT-00-0000-000LT40E3			
		T3	220	253	292	392	XBHAWT-00-0000-0000T30E3	XBHAWT-00-0000-000LT30E3			
F4	4750 K	T6	280	322	372	499	XBHAWT-00-0000-0000T60F4				
		T5	260	299	345	463	XBHAWT-00-0000-0000T50F4				
		T4	240	276	318	428	XBHAWT-00-0000-0000T40F4				
		T3	220	253	292	392	XBHAWT-00-0000-0000T30F4				
E4	4500 K	T6	280	322	372	499	XBHAWT-00-0000-0000T60E4	XBHAWT-00-0000-000LT60E4			
		T5	260	299	345	463	XBHAWT-00-0000-0000T50E4	XBHAWT-00-0000-000LT50E4			
		T4	240	276	318	428	XBHAWT-00-0000-0000T40E4	XBHAWT-00-0000-000LT40E4			
		T3	220	253	292	392	XBHAWT-00-0000-0000T30E4	XBHAWT-00-0000-000LT30E4			

Notes:

- Cree LED 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 19).
- XLamp XB-H LED order codes specify only a minimum flux bin and not a maximum. Cree LED may ship reels in flux bins higher than the minimum specified by the order code without advance notice. Shipments will always adhere to the chromaticity or bin restrictions specified by the order code.
- Typical CRI for Cool White (5000 K - 5700 K CCT) is 70.
- Typical CRI for Neutral White (3700 K - 5300 K CCT) is 75.
- Typical CRI for Warm White (2600 K - 3700 K CCT) is 80.
- * Flux values @ 25 °C are calculated and for reference only.
- ** Calculated flux values at 1 A and 1.5 A are for reference only.

FLUX CHARACTERISTICS (T_J = 85 °C) - CONTINUED

Chromaticity		Minimum Luminous Flux (lm) @ 700 mA			Calculated Minimum Luminous Flux (lm)** @ 85 °C		Order Codes					
Kit	CCT	Code	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*	1.0 A	1.5 A	No CRI Minimum	Standard CRI	80 CRI Minimum	85 CRI Minimum	90 CRI Minimum	
F5	4300 K	T6	280	322	372	499	XBHAWT-00-0000-0000T60F5					
		T5	260	299	345	463	XBHAWT-00-0000-0000T50F5	XBHAWT-00-0000-000LT50F5				
		T4	240	276	318	428	XBHAWT-00-0000-0000T40F5	XBHAWT-00-0000-000LT40F5				
		T3	220	253	292	392	XBHAWT-00-0000-0000T30F5	XBHAWT-00-0000-000LT30F5				
E5	4000 K	T6	280	322	372	499	XBHAWT-00-0000-0000T60E5					
		T5	260	299	345	463	XBHAWT-00-0000-0000T50E5	XBHAWT-00-0000-000LT50E5				
		T4	240	276	318	428	XBHAWT-00-0000-0000T40E5	XBHAWT-00-0000-000LT40E5	XBHAWT-00-0000-000HT40E5			
		T3	220	253	292	392	XBHAWT-00-0000-0000T30E5	XBHAWT-00-0000-000LT30E5	XBHAWT-00-0000-000HT30E5			
Z5	4000 K	T4	240	276	318	428		XBHAWT-00-0000-000LT40Z5	XBHAWT-00-0000-000HT40Z5			
		T3	220	253	292	392		XBHAWT-00-0000-000LT30Z5	XBHAWT-00-0000-000HT30Z5			
F6	3700 K	T5	260	299	345	463	XBHAWT-00-0000-0000T50F6					
		T4	240	276	318	428	XBHAWT-00-0000-0000T40F6		XBHAWT-00-0000-000HT40F6			
		T3	220	253	292	392	XBHAWT-00-0000-0000T30F6		XBHAWT-00-0000-000HT30F6			
		T2	200	230	265	356	XBHAWT-00-0000-0000T20F6		XBHAWT-00-0000-000HT20F6			
E6	3500 K	T5	260	299	345	463	XBHAWT-00-0000-0000T50E6					
		T4	240	276	318	428	XBHAWT-00-0000-0000T40E6		XBHAWT-00-0000-000HT40E6			
		T3	220	253	292	392	XBHAWT-00-0000-0000T30E6		XBHAWT-00-0000-000HT30E6			
		T2	200	230	265	356	XBHAWT-00-0000-0000T20E6		XBHAWT-00-0000-000HT20E6			

Notes:

- Cree LED 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 19).
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FLUX CHARACTERISTICS (T_j = 85 °C) - CONTINUED

Chromaticity		Minimum Luminous Flux (lm) @ 700 mA			Calculated Minimum Luminous Flux (lm)** @ 85 °C		Order Codes				
Kit	CCT	Code	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*	1.0 A	1.5 A	No CRI Minimum	Standard CRI	80 CRI Minimum	85 CRI Minimum	90 CRI Minimum
Z6	3500 K	T3	220	253	292	392			XBHAWT-00-0000-000HT30Z6		
		T2	200	230	265	356			XBHAWT-00-0000-000HT20Z6		
F7	3200 K	T5	260	299	345	463	XBHAWT-00-0000-0000T50F7				
		T4	240	276	318	428	XBHAWT-00-0000-0000T40F7				
		T3	220	253	292	392	XBHAWT-00-0000-0000T30F7		XBHAWT-00-0000-000HT30F7		
		T2	200	230	265	356	XBHAWT-00-0000-0000T20F7		XBHAWT-00-0000-000HT20F7		
E7	3000 K	T5	260	299	345	463	XBHAWT-00-0000-0000T50E7				
		T4	240	276	318	428	XBHAWT-00-0000-0000T40E7				
		T3	220	253	292	392	XBHAWT-00-0000-0000T30E7		XBHAWT-00-0000-000HT30E7		
		T2	200	230	265	356	XBHAWT-00-0000-0000T20E7		XBHAWT-00-0000-000HT20E7	XBHAWT-00-0000-000PT20E7	
		S6	182	209	242	324				XBHAWT-00-0000-000PS60E7	XBHAWT-00-0000-000US60E7
		S5	172	198	228	306				XBHAWT-00-0000-000PS50E7	XBHAWT-00-0000-000US50E7
Z7	3000 K	S4	164	186	218	292					XBHAWT-00-0000-000US40E7
		T3	220	253	292	392			XBHAWT-00-0000-000HT30Z7		
		T2	200	230	265	356			XBHAWT-00-0000-000HT20Z7		
		S6	182	209	242	324				XBHAWT-00-0000-000PS60Z7	XBHAWT-00-0000-000US60Z7
		S5	172	198	228	306				XBHAWT-00-0000-000PS50Z7	XBHAWT-00-0000-000US50Z7
		S4	164	186	218	292				XBHAWT-00-0000-000US40Z7	

Notes:

- Cree LED 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 19).
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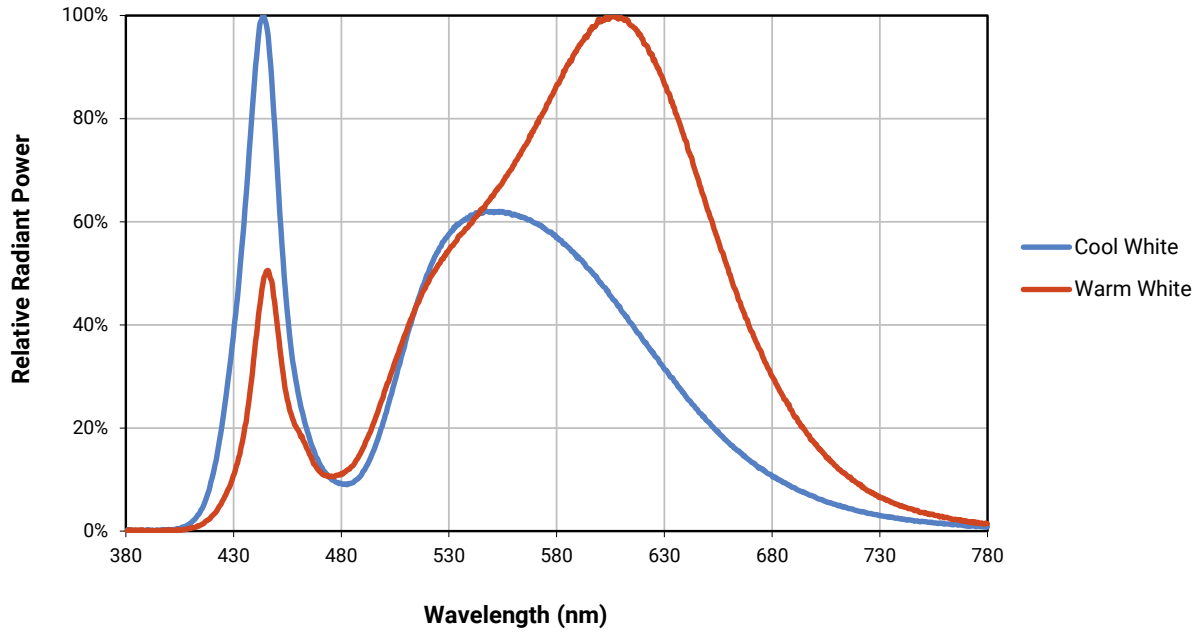
FLUX CHARACTERISTICS (T_j = 85 °C) - CONTINUED

Chromaticity		Minimum Luminous Flux (lm) @ 700 mA			Calculated Minimum Luminous Flux (lm)** @ 85 °C		Order Codes				
Kit	CCT	Code	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*	1.0 A	1.5 A	No CRI Minimum	Standard CRI	80 CRI Minimum	85 CRI Minimum	90 CRI Minimum
F8	2850 K	T3	220	253	292	392			XBHAWT-00-0000-000HT30F8		
		T2	200	230	265	356			XBHAWT-00-0000-000HT20F8		
		S6	182	209	242	324			XBHAWT-00-0000-000HS60F8	XBHAWT-00-0000-000PS60F8	XBHAWT-00-0000-000US60F8
		S5	172	198	228	306				XBHAWT-00-0000-000PS50F8	XBHAWT-00-0000-000US50F8
		S4	164	186	218	292				XBHAWT-00-0000-000PS40F8	XBHAWT-00-0000-000US40F8
E8	2700 K	T3	220	253	292	392			XBHAWT-00-0000-000HT30E8		
		T2	200	230	265	356			XBHAWT-00-0000-000HT20E8		
		S6	182	209	242	324			XBHAWT-00-0000-000HS60E8	XBHAWT-00-0000-000PS60E8	XBHAWT-00-0000-000US60E8
		S5	172	198	228	306				XBHAWT-00-0000-000PS50E8	XBHAWT-00-0000-000US50E8
		S4	164	186	218	292				XBHAWT-00-0000-000PS40E8	XBHAWT-00-0000-000US40E8
Z8	2700 K	T3	220	253	292	392			XBHAWT-00-0000-000HT30Z8		
		T2	200	230	265	356			XBHAWT-00-0000-000HT20Z8		
		S6	182	209	242	324			XBHAWT-00-0000-000HS60Z8	XBHAWT-00-0000-000PS60Z8	
		S5	172	198	228	306				XBHAWT-00-0000-000PS50Z8	XBHAWT-00-0000-000US50Z8
		S4	164	186	218	292				XBHAWT-00-0000-000PS40Z8	XBHAWT-00-0000-000US40Z8

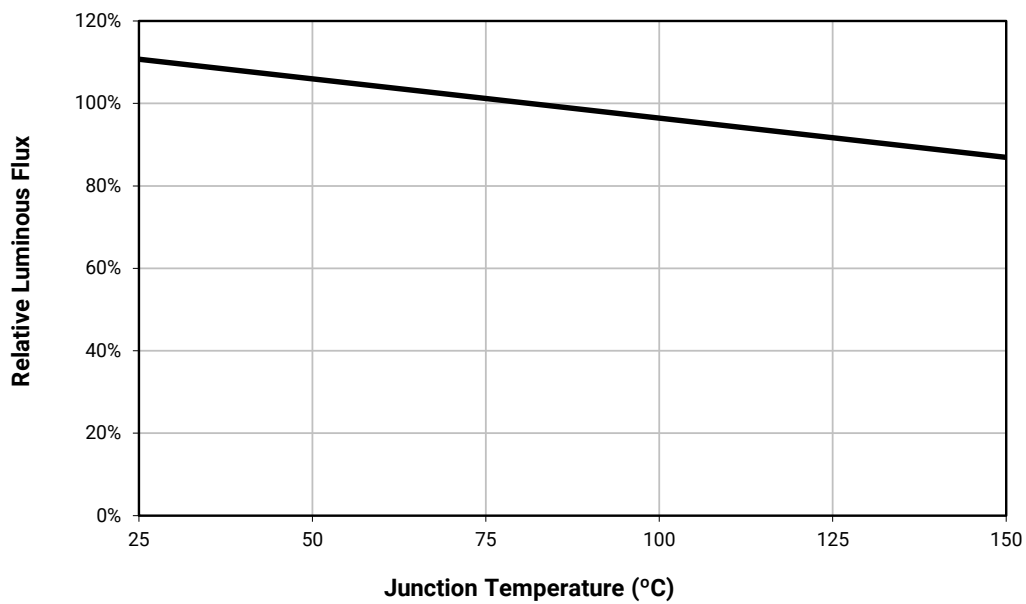
Notes:

- Cree LED 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 19).
- XLamp XB-H LED order codes specify only a minimum flux bin and not a maximum. Cree LED may ship reels in flux bins higher than the minimum specified by the order code without advance notice. Shipments will always adhere to the chromaticity or bin restrictions specified by the order code.
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- * Flux values @ 25 °C are calculated and for reference only.
- ** Calculated flux values at 1 A and 1.5 A are for reference only.

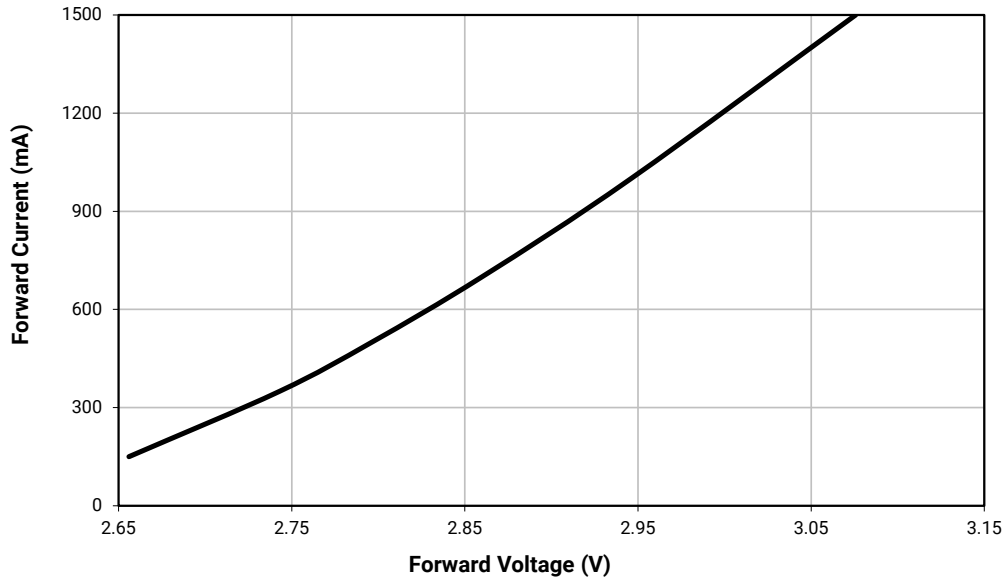
RELATIVE SPECTRAL POWER DISTRIBUTION



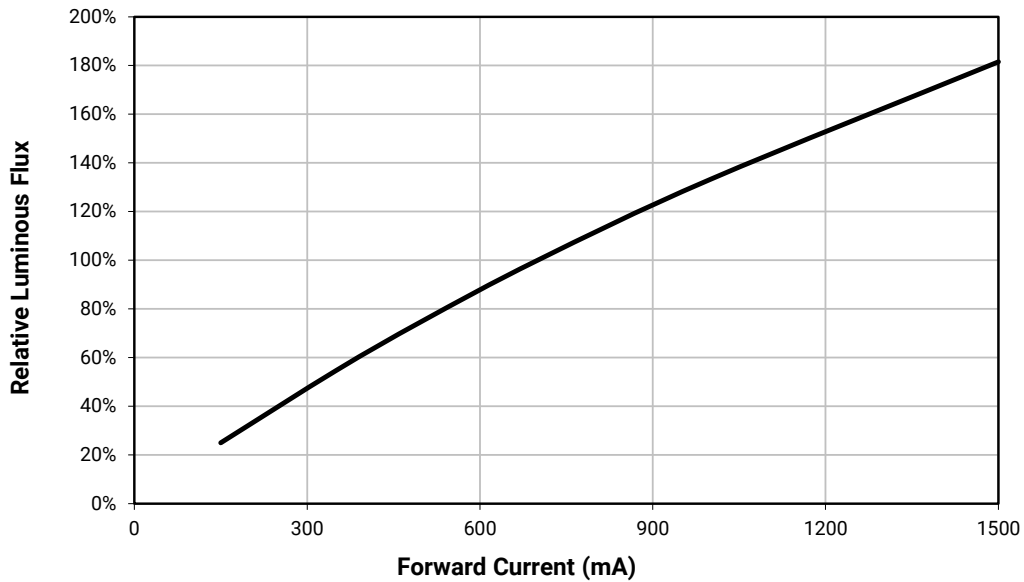
RELATIVE FLUX VS. JUNCTION TEMPERATURE ($I_f = 700$ mA)



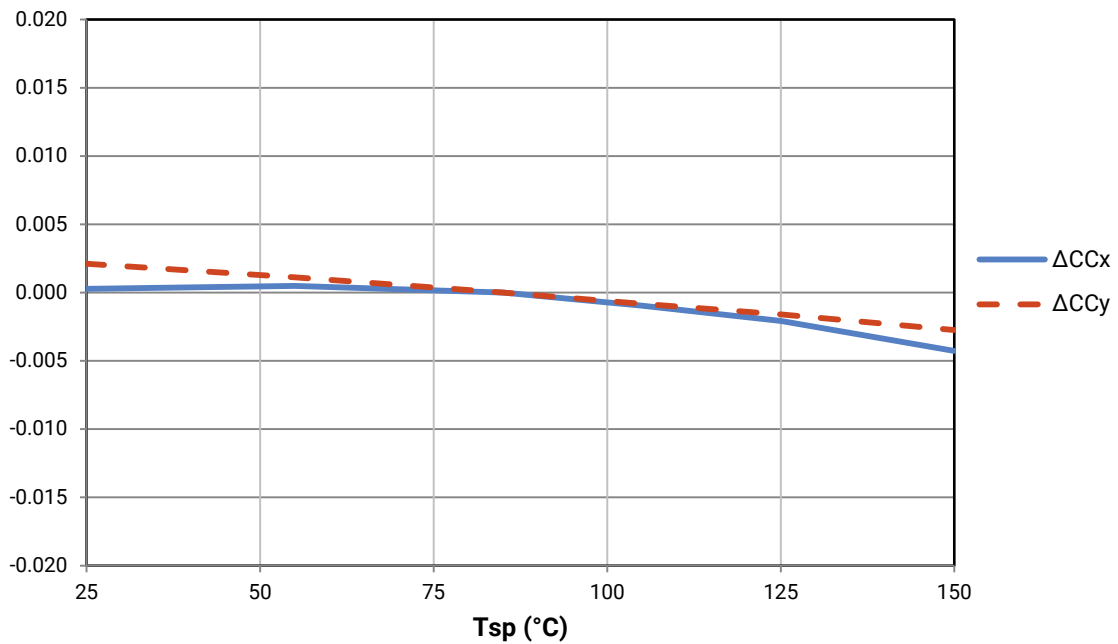
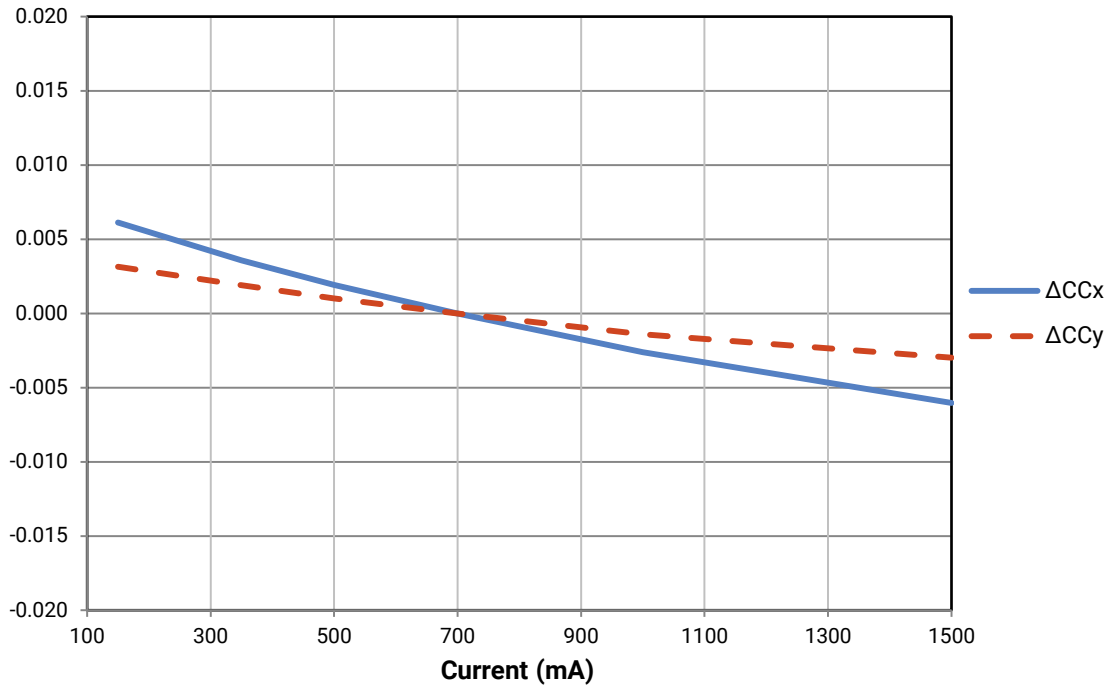
ELECTRICAL CHARACTERISTICS ($T_j = 85\text{ }^\circ\text{C}$)



RELATIVE FLUX VS. CURRENT ($T_j = 85\text{ }^\circ\text{C}$)

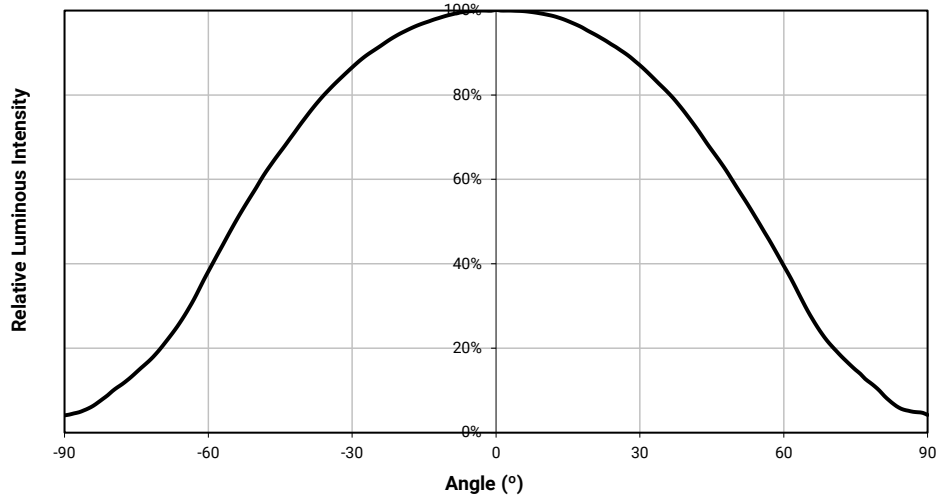


RELATIVE CHROMATICITY VS CURRENT AND TEMPERATURE (WARM WHITE*)



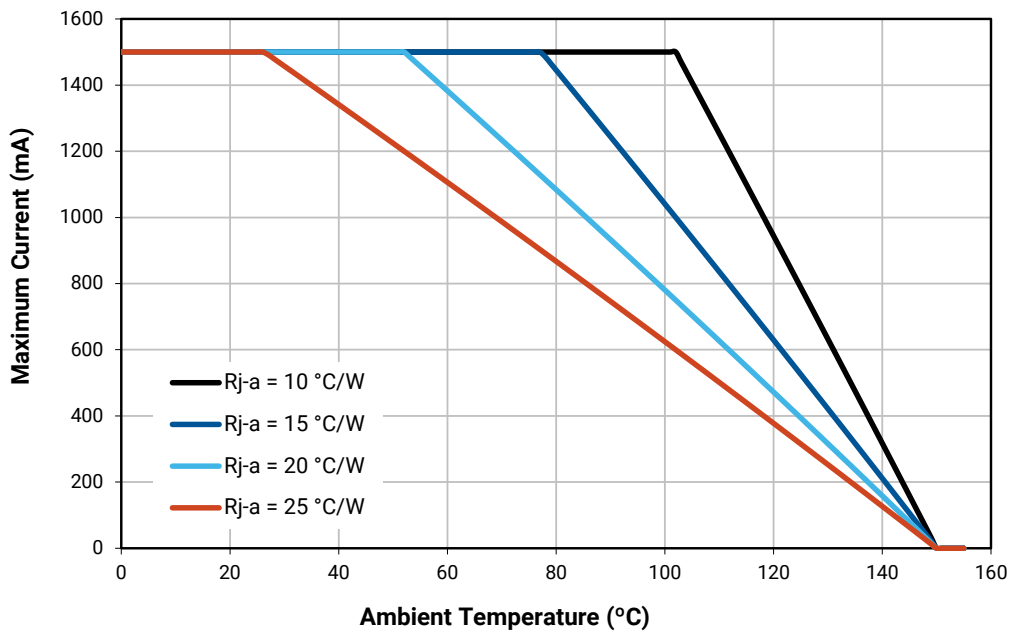
* Warm White XLamp XB-H LEDs have a typical CRI of 80.

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

XLamp XB-H LEDs are tested for luminous flux and placed into one of the following luminous-flux groups. These groups, appended with a 0, are used in the Bin Code “Luminous or radiant flux group.”

Group Code	Minimum Luminous Flux (lm) @ 700 mA	Maximum Luminous Flux (lm) @ 700 mA
S4	164	172
S5	172	182
S6	182	200
T2	200	220
T3	220	240
T4	240	260
T5	260	280
T6	280	300
U2	300	320

PERFORMANCE GROUPS – CHROMATICITY

Region	x	y	Region	x	y	Region	x	y	Region	x	y
2A	0.3215	0.3350	2B	0.3207	0.3462	2C	0.3290	0.3538	2D	0.3290	0.3417
	0.3290	0.3417		0.3290	0.3538		0.3376	0.3616		0.3371	0.3490
	0.3290	0.3300		0.3290	0.3417		0.3371	0.3490		0.3366	0.3369
	0.3222	0.3243		0.3215	0.3350		0.3290	0.3417		0.3290	0.3300
2R	0.3222	0.3243	2S	0.3196	0.3602	2T	0.3290	0.3690	2U	0.3290	0.3300
	0.3290	0.3300		0.3290	0.3690		0.3381	0.3762		0.3366	0.3369
	0.3290	0.3180		0.3290	0.3538		0.3376	0.3616		0.3361	0.3245
	0.3231	0.3120		0.3207	0.3462		0.3290	0.3538		0.3290	0.3180
3A	0.3371	0.3490	3B	0.3376	0.3616	3C	0.3463	0.3687	3D	0.3451	0.3554
	0.3451	0.3554		0.3463	0.3687		0.3551	0.3760		0.3533	0.3620
	0.3440	0.3427		0.3451	0.3554		0.3533	0.3620		0.3515	0.3487
	0.3366	0.3369		0.3371	0.3490		0.3451	0.3554		0.3440	0.3427
3R	0.3366	0.3369	3S	0.3381	0.3762	3T	0.3480	0.3840	3U	0.3440	0.3428
	0.3440	0.3428		0.3480	0.3840		0.3571	0.3907		0.3515	0.3487
	0.3429	0.3307		0.3463	0.3687		0.3551	0.3760		0.3495	0.3339
	0.3361	0.3245		0.3376	0.3616		0.3463	0.3687		0.3429	0.3307
4A	0.3530	0.3597	4B	0.3548	0.3736	4C	0.3641	0.3804	4D	0.3615	0.3659
	0.3615	0.3659		0.3641	0.3804		0.3736	0.3874		0.3702	0.3722
	0.3590	0.3521		0.3615	0.3659		0.3702	0.3722		0.3670	0.3578
	0.3512	0.3465		0.3530	0.3597		0.3615	0.3659		0.3590	0.3521

PERFORMANCE GROUPS – CHROMATICITY (CONTINUED)

Region	x	y	Region	x	y	Region	x	y	Region	x	y
4R	0.3512	0.3465	4S	0.3571	0.3907	4T	0.3668	0.3957	4U	0.3590	0.3521
	0.3590	0.3521		0.3668	0.3957		0.3771	0.4034		0.3670	0.3578
	0.3567	0.3389		0.3641	0.3804		0.3736	0.3874		0.3640	0.3440
	0.3495	0.3339		0.3548	0.3736		0.3641	0.3804		0.3567	0.3389
5A1	0.3670	0.3578	5A2	0.3686	0.3649	5A3	0.3744	0.3685	5A4	0.3726	0.3612
	0.3686	0.3649		0.3702	0.3722		0.3763	0.3760		0.3744	0.3685
	0.3744	0.3685		0.3763	0.3760		0.3825	0.3798		0.3804	0.3721
	0.3726	0.3612		0.3744	0.3685		0.3804	0.3721		0.3783	0.3646
5B1	0.3702	0.3722	5B2	0.3719	0.3797	5B3	0.3782	0.3837	5B4	0.3763	0.3760
	0.3719	0.3797		0.3736	0.3874		0.3802	0.3916		0.3782	0.3837
	0.3782	0.3837		0.3802	0.3916		0.3869	0.3958		0.3847	0.3877
	0.3763	0.3760		0.3782	0.3837		0.3847	0.3877		0.3825	0.3798
5C1	0.3825	0.3798	5C2	0.3847	0.3877	5C3	0.3912	0.3917	5C4	0.3887	0.3836
	0.3847	0.3877		0.3869	0.3958		0.3937	0.4001		0.3912	0.3917
	0.3912	0.3917		0.3937	0.4001		0.4006	0.4044		0.3978	0.3958
	0.3887	0.3836		0.3912	0.3917		0.3978	0.3958		0.3950	0.3875
5D1	0.3783	0.3646	5D2	0.3804	0.3721	5D3	0.3863	0.3758	5D4	0.3840	0.3681
	0.3804	0.3721		0.3825	0.3798		0.3887	0.3836		0.3863	0.3758
	0.3863	0.3758		0.3887	0.3836		0.3950	0.3875		0.3924	0.3794
	0.3840	0.3681		0.3863	0.3758		0.3924	0.3794		0.3898	0.3716
5R	0.3670	0.3578	5S	0.3771	0.4034	5T	0.3916	0.4127	5U	0.3783	0.3646
	0.3783	0.3646		0.3916	0.4127		0.4064	0.4221		0.3898	0.3716
	0.3743	0.3502		0.3869	0.3958		0.4006	0.4044		0.3848	0.3565
	0.3640	0.3440		0.3736	0.3874		0.3869	0.3958		0.3743	0.3502
6A1	0.3889	0.3690	6A2	0.3915	0.3768	6A3	0.3981	0.3800	6A4	0.3953	0.3720
	0.3915	0.3768		0.3941	0.3848		0.4010	0.3882		0.3981	0.3800
	0.3981	0.3800		0.4010	0.3882		0.4080	0.3916		0.4048	0.3832
	0.3953	0.3720		0.3981	0.3800		0.4048	0.3832		0.4017	0.3751
6B1	0.3941	0.3848	6B2	0.3968	0.3930	6B3	0.4040	0.3966	6B4	0.4010	0.3882
	0.3968	0.3930		0.3996	0.4015		0.4071	0.4052		0.4040	0.3966
	0.4040	0.3966		0.4071	0.4052		0.4146	0.4089		0.4113	0.4001
	0.4010	0.3882		0.4040	0.3966		0.4113	0.4001		0.4080	0.3916
6C1	0.4080	0.3916	6C2	0.4113	0.4001	6C3	0.4186	0.4037	6C4	0.4150	0.3950
	0.4113	0.4001		0.4146	0.4089		0.4222	0.4127		0.4186	0.4037
	0.4186	0.4037		0.4222	0.4127		0.4299	0.4165		0.4259	0.4073
	0.4150	0.3950		0.4186	0.4037		0.4259	0.4073		0.4221	0.3984
6D1	0.4017	0.3751	6D2	0.4048	0.3832	6D3	0.4116	0.3865	6D4	0.4082	0.3782
	0.4048	0.3832		0.4080	0.3916		0.4150	0.3950		0.4116	0.3865
	0.4116	0.3865		0.4150	0.3950		0.4221	0.3984		0.4183	0.3898
	0.4082	0.3782		0.4116	0.3865		0.4183	0.3898		0.4147	0.3814

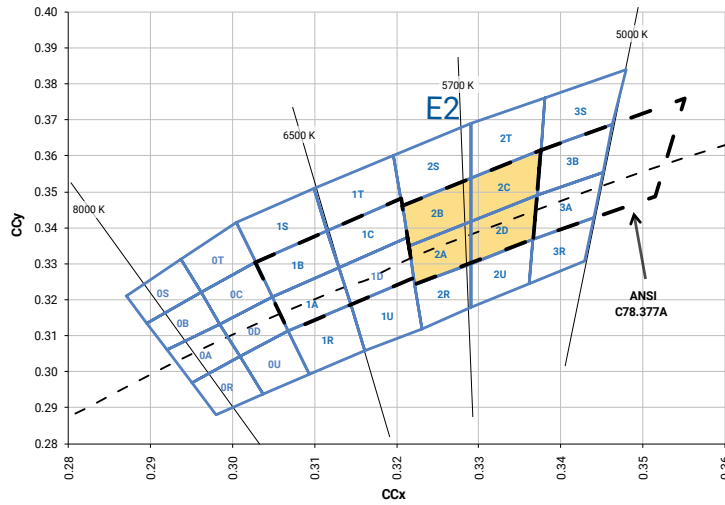
PERFORMANCE GROUPS – CHROMATICITY (CONTINUED)

Region	x	y	Region	x	y	Region	x	y	Region	x	y
6R	0.3889	0.3690	6S	0.4054	0.4191	6T	0.4217	0.4273	6U	0.4017	0.3751
	0.4017	0.3751		0.4217	0.4273		0.4382	0.4356		0.4147	0.3814
	0.3957	0.3596		0.4146	0.4089		0.4299	0.4165		0.4077	0.3652
	0.3840	0.3540		0.3996	0.4015		0.4146	0.4089		0.3957	0.3596
7A	0.4221	0.3985	7B	0.4299	0.4165	7C	0.4430	0.4212	7D	0.4342	0.4028
	0.4342	0.4028		0.4430	0.4212		0.4562	0.426		0.4465	0.4071
	0.4260	0.3853		0.4342	0.4028		0.4465	0.4071		0.4373	0.3893
	0.4147	0.3814		0.4221	0.3985		0.4342	0.4028		0.4260	0.3853
7A1	0.4147	0.3814	7A2	0.4183	0.3898	7A3	0.4242	0.3919	7A4	0.4203	0.3833
	0.4183	0.3898		0.4221	0.3984		0.4281	0.4006		0.4242	0.3919
	0.4242	0.3919		0.4281	0.4006		0.4342	0.4028		0.4300	0.3939
	0.4203	0.3833		0.4242	0.3919		0.4300	0.3939		0.4259	0.3853
7B1	0.4221	0.3984	7B2	0.4259	0.4073	7B3	0.4322	0.4096	7B4	0.4281	0.4006
	0.4259	0.4073		0.4299	0.4165		0.4364	0.4188		0.4322	0.4096
	0.4322	0.4096		0.4364	0.4188		0.4430	0.4212		0.4385	0.4119
	0.4281	0.4006		0.4322	0.4096		0.4385	0.4119		0.4342	0.4028
7C1	0.4342	0.4028	7C2	0.4385	0.4119	7C3	0.4449	0.4141	7C4	0.4403	0.4049
	0.4385	0.4119		0.4430	0.4212		0.4496	0.4236		0.4449	0.4141
	0.4449	0.4141		0.4496	0.4236		0.4562	0.4260		0.4513	0.4164
	0.4403	0.4049		0.4449	0.4141		0.4513	0.4164		0.4465	0.4071
7D1	0.4259	0.3853	7D2	0.4300	0.3939	7D3	0.4359	0.3960	7D4	0.4316	0.3873
	0.4300	0.3939		0.4342	0.4028		0.4403	0.4049		0.4359	0.3960
	0.4359	0.3960		0.4403	0.4049		0.4465	0.4071		0.4418	0.3981
	0.4316	0.3873		0.4359	0.3960		0.4418	0.3981		0.4373	0.3893
8A	0.4465	0.4071	8B	0.4562	0.4260	8C	0.4687	0.4289	8D	0.4582	0.4099
	0.4582	0.4099		0.4687	0.4289		0.4813	0.4319		0.4700	0.4126
	0.4483	0.3918		0.4582	0.4099		0.4700	0.4126		0.4593	0.3944
	0.4373	0.3893		0.4465	0.4071		0.4582	0.4099		0.4483	0.3918
8A1	0.4373	0.3893	8A2	0.4418	0.3981	8A3	0.4475	0.3994	8A4	0.4428	0.3906
	0.4418	0.3981		0.4465	0.4071		0.4523	0.4085		0.4475	0.3994
	0.4475	0.3994		0.4523	0.4085		0.4582	0.4099		0.4532	0.4008
	0.4428	0.3906		0.4475	0.3994		0.4532	0.4008		0.4483	0.3919
8B1	0.4465	0.4071	8B2	0.4513	0.4164	8B3	0.4573	0.4178	8B4	0.4523	0.4085
	0.4513	0.4164		0.4562	0.4260		0.4624	0.4274		0.4573	0.4178
	0.4573	0.4178		0.4624	0.4274		0.4687	0.4289		0.4634	0.4193
	0.4523	0.4085		0.4573	0.4178		0.4634	0.4193		0.4582	0.4099
8C1	0.4582	0.4099	8C2	0.4634	0.4193	8C3	0.4695	0.4207	8C4	0.4641	0.4112
	0.4634	0.4193		0.4687	0.4289		0.4750	0.4304		0.4695	0.4207
	0.4695	0.4207		0.4750	0.4304		0.4813	0.4319		0.4756	0.4221
	0.4641	0.4112		0.4695	0.4207		0.4756	0.4221		0.4700	0.4126

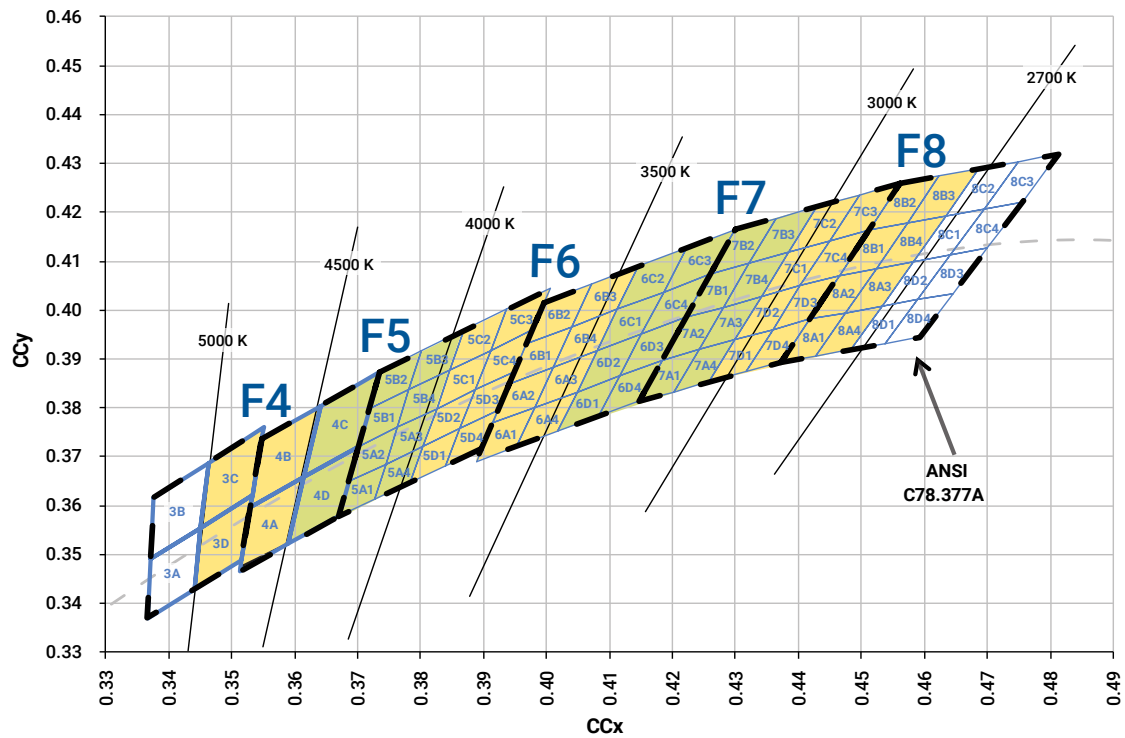
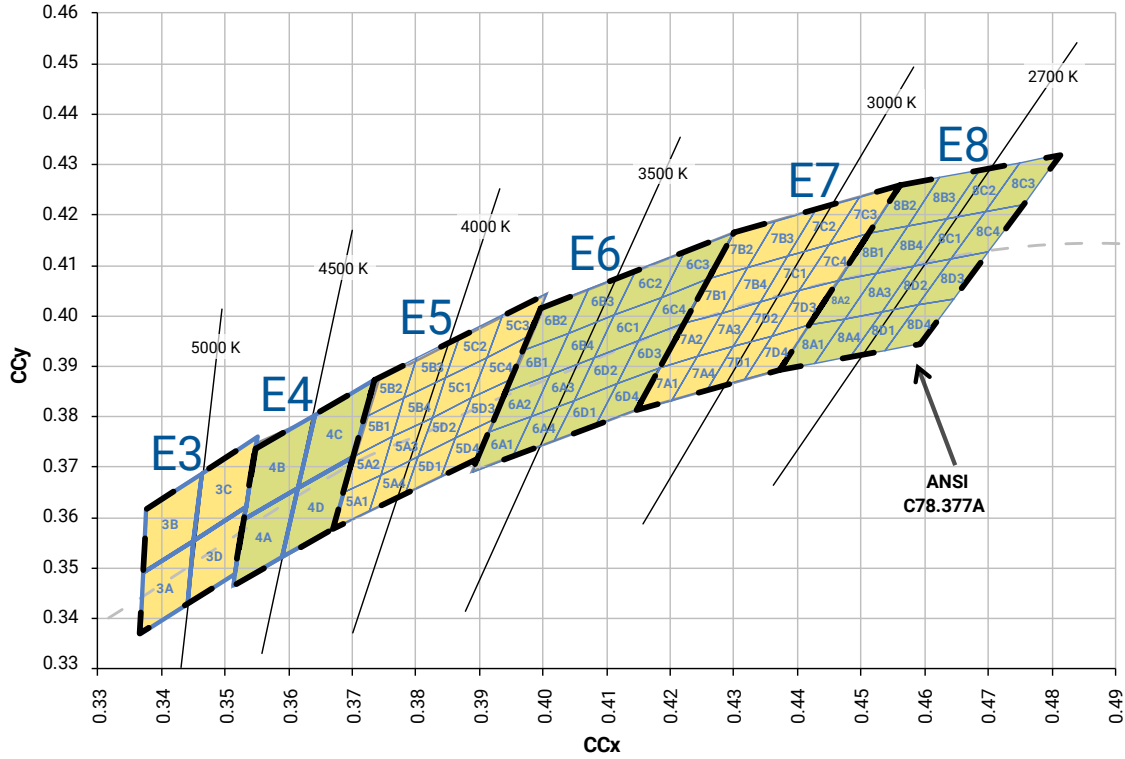
PERFORMANCE GROUPS – CHROMATICITY (CONTINUED)

Region	x	y	Region	x	y	Region	x	y	Region	x	y
8D1	0.4483	0.3919	8D2	0.4532	0.4008	8D3	0.4589	0.4021	8D4	0.4538	0.3931
	0.4532	0.4008		0.4582	0.4099		0.4641	0.4112		0.4589	0.4021
	0.4589	0.4021		0.4641	0.4112		0.4700	0.4126		0.4646	0.4034
	0.4538	0.3931		0.4589	0.4021		0.4646	0.4034		0.4593	0.3944

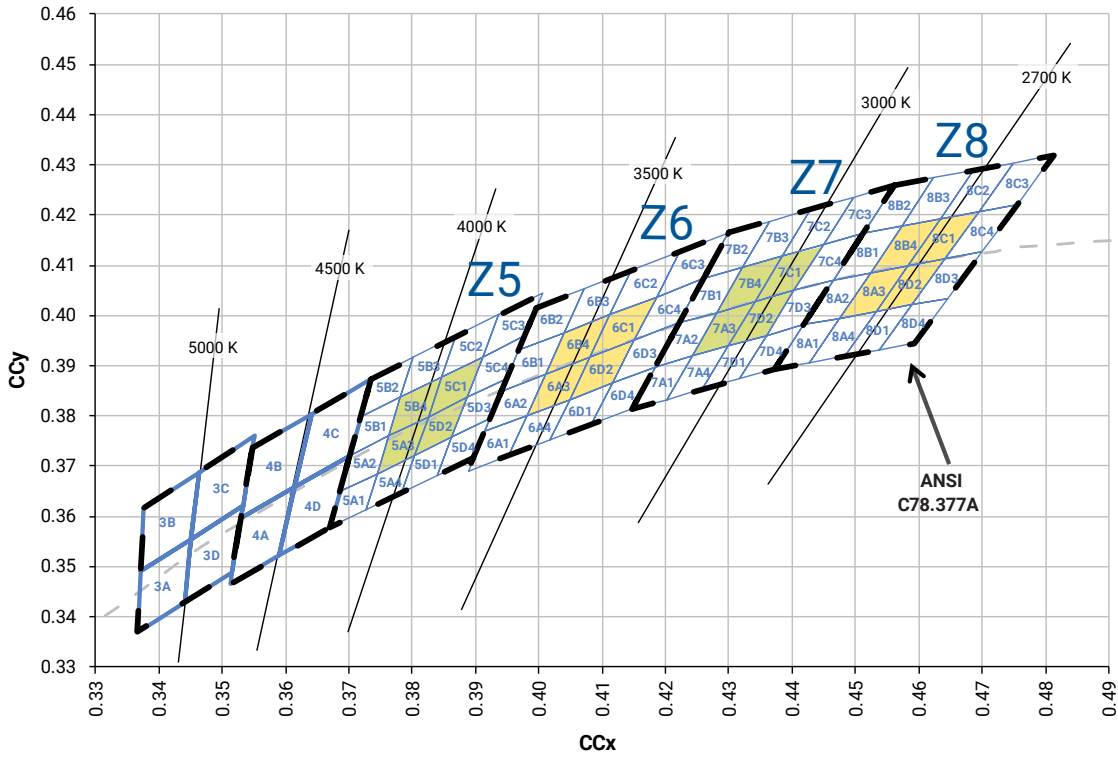
STANDARD COOL WHITE KITS PLOTTED ON ANSI STANDARD CHROMATICITY REGIONS



STANDARD WARM AND NEUTRAL WHITE KITS PLOTTED ON ANSI STANDARD CHROMATICITY REGIONS



STANDARD WARM AND NEUTRAL WHITE KITS PLOTTED ON ANSI STANDARD CHROMATICITY REGIONS - CONTINUED



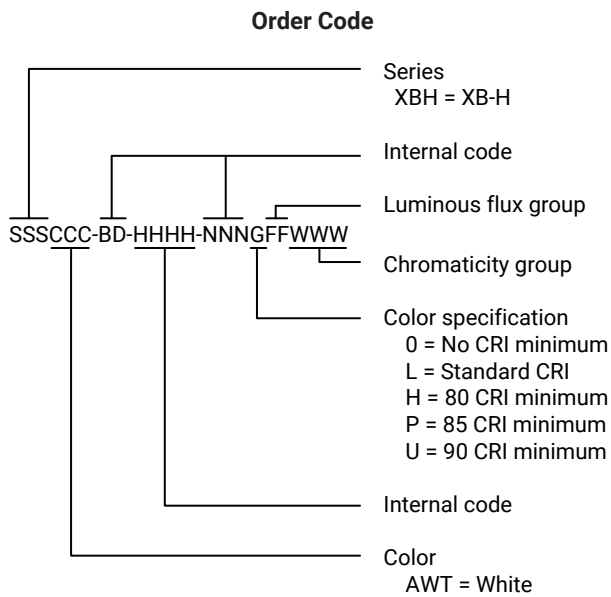
STANDARD CHROMATICITY KITS

The following table provides the chromaticity bins associated with chromaticity kits, which are specified as part of the order code.

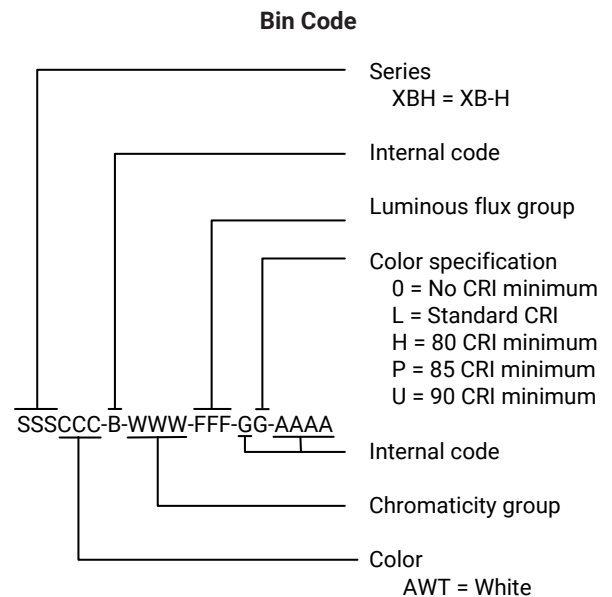
Color	Kit	Chromaticity Bins
Cool White	E2	2A, 2B, 2C, 2D
	E3	3A, 3B, 3C, 3D
Neutral White	F4	3C, 3D, 4A, 4B
	E4	4A, 4B, 4C, 4D
	F5	4C, 4D, 5A1, 5A2, 5A3, 5A4, 5B1, 5B2, 5B3, 5B4
	E5	5A1, 5A2, 5A3, 5A4, 5B1, 5B2, 5B3, 5B4, 5C1, 5C2, 5C3, 5C4, 5D1, 5D2, 5D3, 5D4
	Z5	5A3, 5B4, 5C1, 5D2
Warm White	F6	5C1, 5C2, 5C3, 5C4, 5D1, 5D2, 5D3, 5D4, 6A1, 6A2, 6A3, 6A4, 6B1, 6B2, 6B3, 6B4
	E6	6A1, 6A2, 6A3, 6A4, 6B1, 6B2, 6B3, 6B4, 6C1, 6C2, 6C3, 6C4, 6D1, 6D2, 6D3, 6D4
	Z6	6A3, 6B4, 6C1, 6D2
	F7	6C1, 6C2, 6C3, 6C4, 6D1, 6D2, 6D3, 6D4, 7A1, 7A2, 7A3, 7A4, 7B1, 7B2, 7B3, 7B4
	E7	7A1, 7A2, 7A3, 7A4, 7B1, 7B2, 7B3, 7B4, 7C1, 7C2, 7C3, 7C4, 7D1, 7D2, 7D3, 7D4
	Z7	7A3, 7B4, 7C1, 7D2
	F8	7C1, 7C2, 7C3, 7C4, 7D1, 7D2, 7D3, 7D4, 8A1, 8A2, 8A3, 8A4, 8B1, 8B2, 8B3, 8B4
	E8	8A1, 8A2, 8A3, 8A4, 8B1, 8B2, 8B3, 8B4, 8C1, 8C2, 8C3, 8C4, 8D1, 8D2, 8D3, 8D4
	Z8	8A3, 8B4, 8C1, 8D2

BIN AND ORDER CODE FORMATS

Bin codes and order codes for XB-H LEDs are configured in the following manner:



Example Order Code: XBHAWT-00-0000-000HT20E7

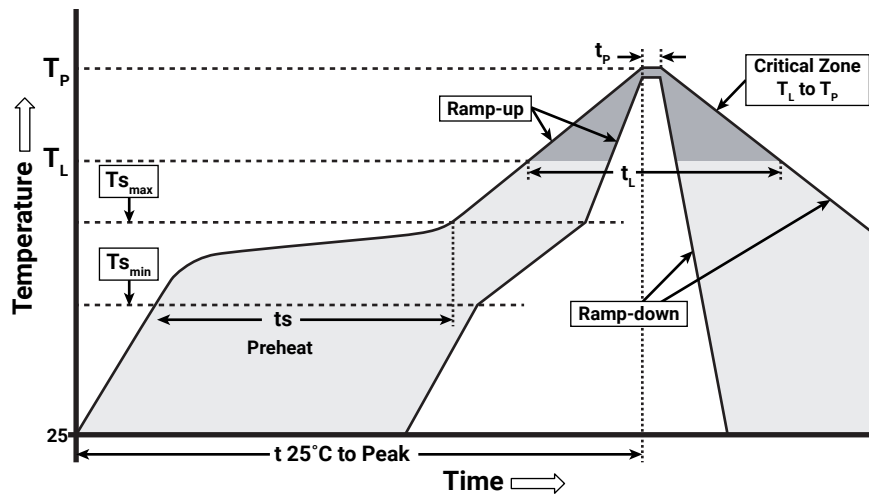


Example Bin Code: XBHAWT-0-7A3-T20-0H-0001

REFLOW SOLDERING CHARACTERISTICS

In testing, Cree LED has found XLamp XB-H LEDs to be compatible with JEDEC J-STD-020C, using the parameters listed below. As a general guideline, Cree LED 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 ($T_{s_{max}}$ to T_p)	1.2 °C/second
Preheat: Temperature Min ($T_{s_{min}}$)	120 °C
Preheat: Temperature Max ($T_{s_{max}}$)	170 °C
Preheat: Time ($t_{s_{min}}$ to $t_{s_{max}}$)	65-150 seconds
Time Maintained Above: Temperature (T_L)	217 °C
Time Maintained Above: Time (t_L)	45-90 seconds
Peak/Classification Temperature (T_p)	235 - 245 °C
Time Within 5 °C of Actual Peak Temperature (t_p)	20-40 seconds
Ramp-Down Rate	1 - 6 °C/second
Time 25 °C to Peak Temperature	4 minutes max.

Note: All temperatures refer to 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 LED's control and are not intended or provided as operational specifications for the products. Calculated values are provided for informational purposes only and are not intended or provided as specifications.

Pre-Release Qualification Testing

Please read the [LED Reliability Overview](#) for details of the qualification process Cree LED applies to ensure long-term reliability for XLamp LEDs and details of Cree LED's pre-release qualification testing for XLamp LEDs.

Lumen Maintenance

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

Please read the [Long-Term Lumen Maintenance application note](#) for more details on Cree LED's lumen maintenance testing and forecasting. Please read the [Thermal Management application note](#) for details on how thermal design, ambient temperature, and drive current affect the LED junction temperature.

Moisture Sensitivity

Cree LED 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 XB-H LEDs may be stored as MSL 1 per JEDEC J-STD-033, meaning they have unlimited floor life in conditions of ≤ 30 °C/85% relative humidity (RH). Regardless of storage condition, Cree LED 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 LED representative or from the [Product Ecology](#) section of the Cree LED website.

REACH Compliance

REACH substances of very high concern (SVHCs) information is available for this product. Since the European Chemical Agency (ECHA) has published notice of their intent to frequently revise the SVHC listing for the foreseeable future, please contact a Cree LED representative to insure you get the most up-to-date REACH 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.

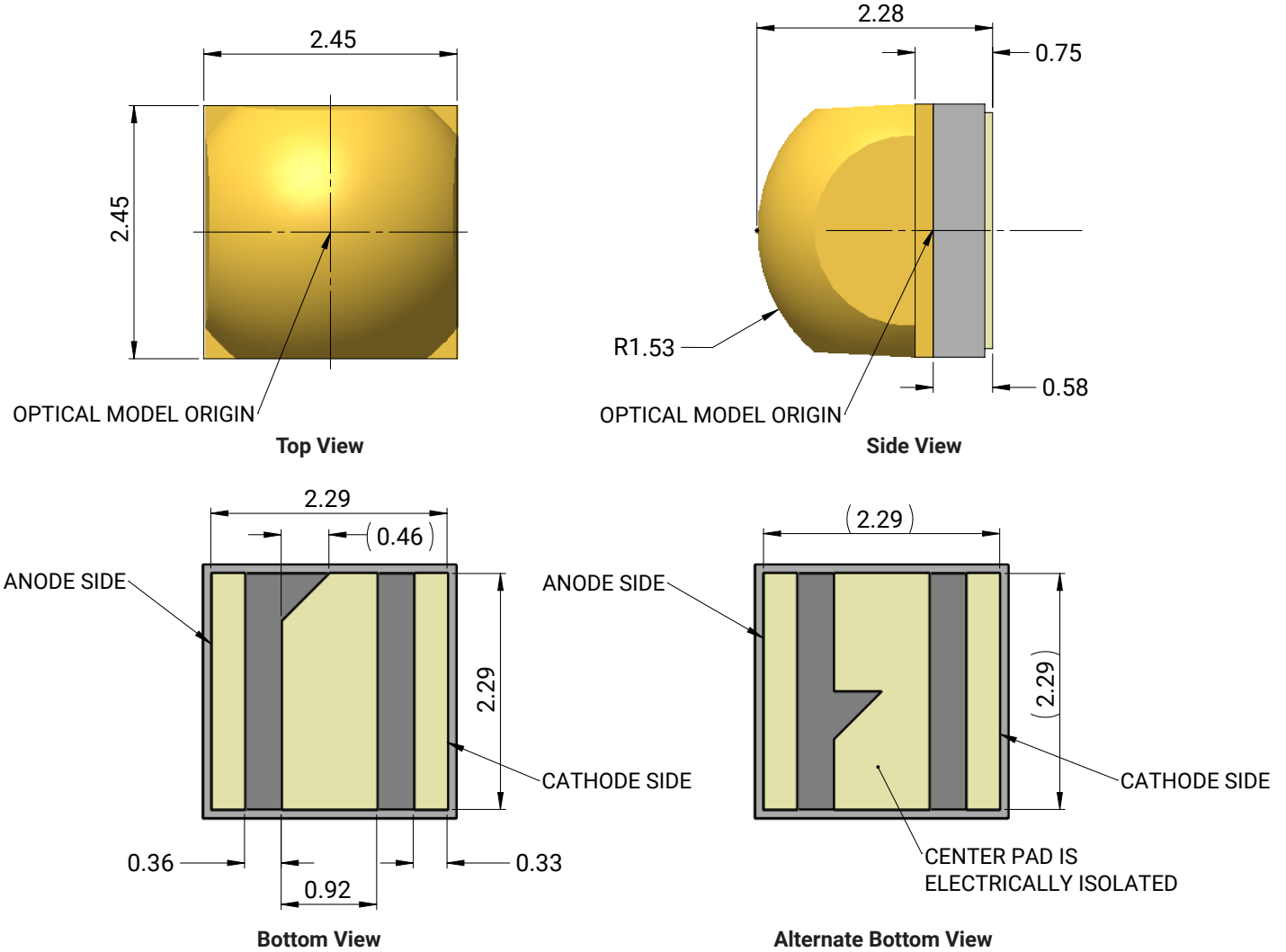
Vision Advisory

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](#).

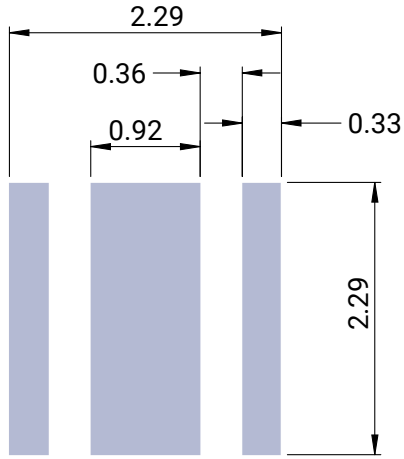
MECHANICAL DIMENSIONS

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

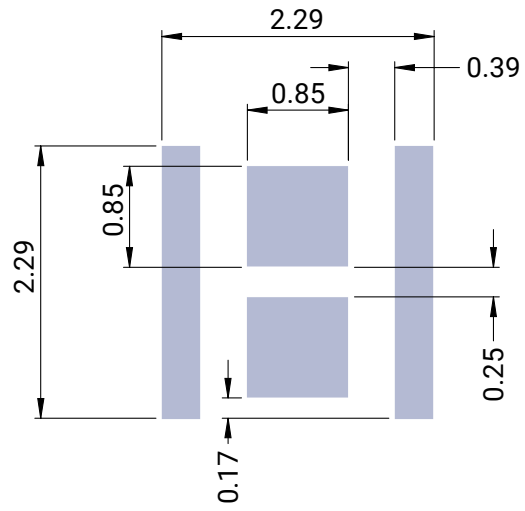
All measurements are ± 0.13 mm, unless otherwise indicated.



MECHANICAL DIMENSIONS - CONTINUED



Recommended PCB Footprint

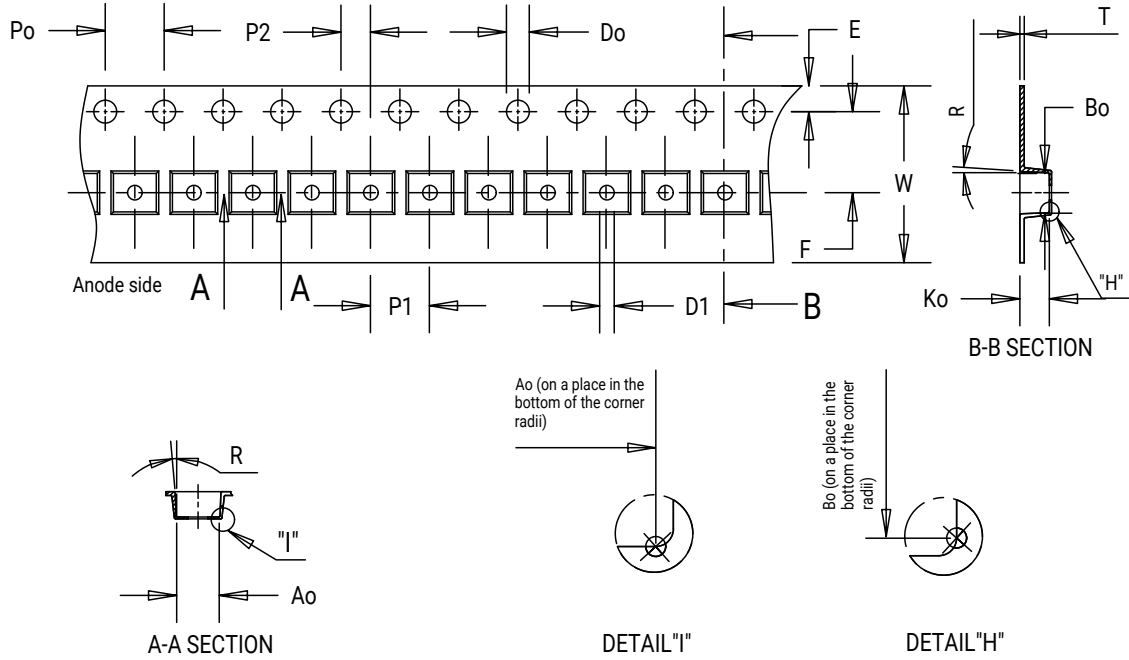


Recommended Solder Stencil

TAPE AND REEL

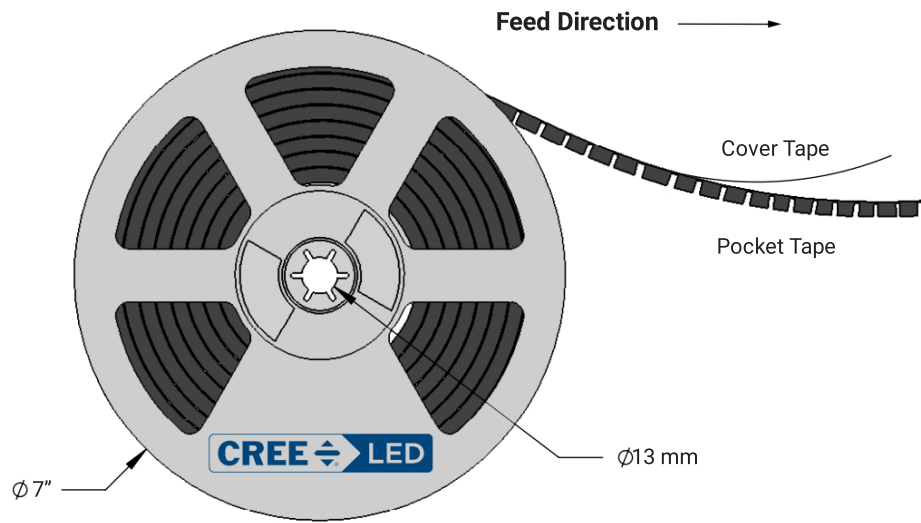
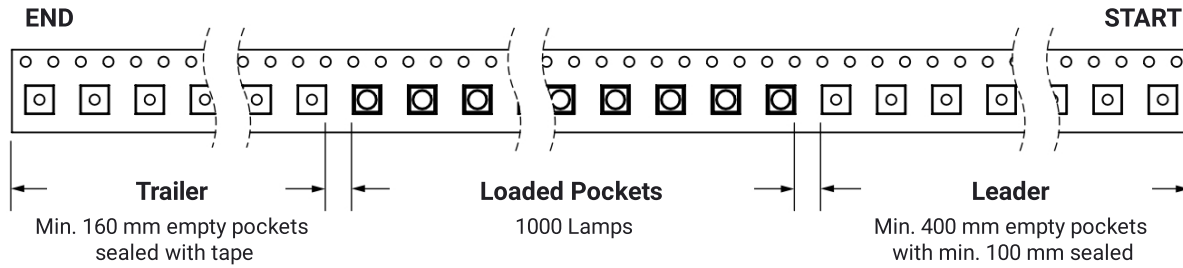
All Cree LED carrier tapes conform to EIA-481D, Automated Component Handling Systems Standard.

All dimensions are ±.15 mm unless otherwise indicated.



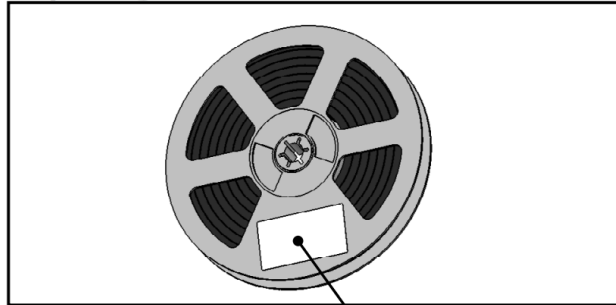
Item	Ao	Bo	Ko	Po	P1	P2	T	E	F	Do	D1	W	R
Dim.	2.60	2.60	2.05	4.00	8.00	2.00	0.30	1.75	5.50	1.50	1.50	12.00	4°

TAPE AND REEL - CONTINUED



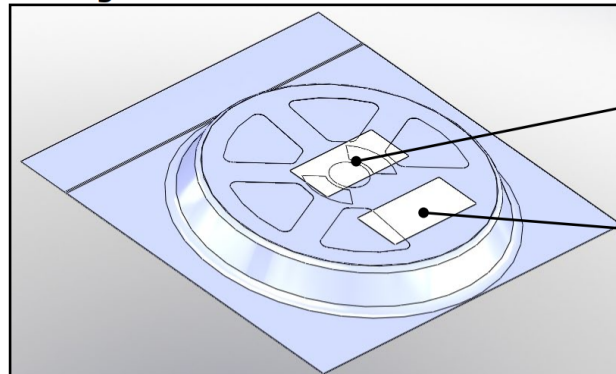
PACKAGING

Unpackaged Reel



Label with Cree LED Bin Code, Quantity, Reel ID

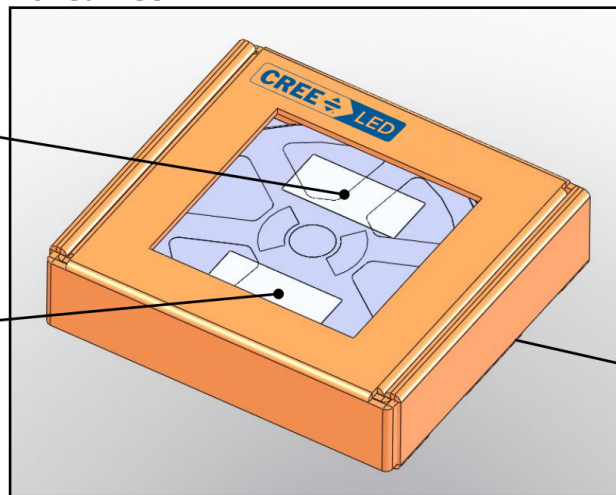
Packaged Reel



Label with Cree LED Order Code, Quantity, Reel ID, PO#

Label with Cree LED Bin Code, Quantity, Reel ID

Boxed Reel



Label with Cree LED Order Code, Quantity, Reel ID, PO#

Label with Cree LED Bin Code, Quantity, Reel ID

Patent Label (on bottom of box)