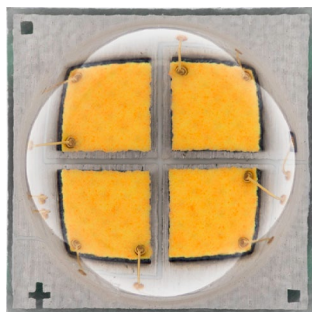


Cree® XLamp® XM-L2 EasyWhite® LEDs



PRODUCT DESCRIPTION

The XLamp XM-L2 EasyWhite LED eliminates chromaticity binning and enables luminaire and bulb manufacturers to deliver the consistent color and high efficacy light output of a multi-die LED in the compact XM-L footprint. XLamp XM-L2 EasyWhite LEDs can reduce LED-to-LED color variation to within a 2-step MacAdam ellipse, 94% smaller than the total area of the corresponding ANSI C78.377 color region.

The XLamp XM-L2 EasyWhite LED is the perfect choice for lighting applications where high luminous flux output is required from a single, small point source. Example applications include LED retrofit bulbs, commercial/retail display spotlights, and other indoor general-illumination applications.

FEATURES

- Available in 4-step and 2-step EasyWhite bins at 2700 K, 3000 K, 3500 K, 4000 K, 5000 K CCT, ANSI white bins at 5700 K, 6500 K
- Wide range of operating current – up to 2 A @ 6 V or 1 A @ 12 V
- 85 °C binning and characterization
- Available in 6-V and 12-V versions
- Low thermal resistance: 2.5 °C/W
- Wide viewing angle: 115°
- Wide variety of CRI choices: standard CRI as well as 80- & 90-minimum CRI
- Electrically neutral thermal path
- Unlimited floor life at ≤ 30 °C/85% RH
- Reflow solderable - JEDEC J-STD-020C

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CHARACTERISTICS

Characteristics	Unit	Minimum	Typical	Maximum
Thermal resistance, junction to solder point	°C/W		2.5	
Viewing angle (FWHM)	degrees		115	
Temperature coefficient of voltage (6 V)	mV/°C		-5	
Temperature coefficient of voltage (12 V)	mV/°C		-10	
ESD withstand voltage (HBM per Mil-Std-883D)	V			8000
DC forward current (6 V)	mA			2000
DC forward current (12 V)	mA			1000
Reverse current (6 V, 12 V)	mA			0.1
Forward voltage (@ 700 mA, 85 °C, 6 V)	V		5.8	6.5
Forward voltage (@ 350 mA, 85 °C, 12 V)	V		11.6	13.0
LED junction temperature	°C			150

FLUX CHARACTERISTICS, STANDARD ORDER CODES AND BINS, 6-V XM-L2 EZW (700 mA, $T_j = 85^\circ\text{C}$)

The following table provides the order codes for 6-volt XLamp XM-L2 EZW LEDs.

Color	CCT Range	Base Order Codes Min. Luminous Flux @ 700 mA			2-Step Order Code		4-Step Order Code	
		Group	Flux (lm) @ 85°C	Flux (lm) @ 25°C^*	Chromaticity Region		Chromaticity Region	
Standard CRI EasyWhite	5000 K	U6	380	443	50H	XMLBEZ-00-0000-0B00U650H	50F	XMLBEZ-00-0000-0B00U650F
		V2	400	466		XMLBEZ-00-0000-0B00V250H		XMLBEZ-00-0000-0B00V250F
		V3	420	486		XMLBEZ-00-0000-0B00V350H		XMLBEZ-00-0000-0B00V350F
	4000 K	U6	380	443	40H	XMLBEZ-00-0000-0B00U640H	40F	XMLBEZ-00-0000-0B00U640F
		V2	400	466		XMLBEZ-00-0000-0B00V240H		XMLBEZ-00-0000-0B00V240F
		V3	420	486		XMLBEZ-00-0000-0B00V340H		XMLBEZ-00-0000-0B00V340F
	3500 K	U6	380	443	35H	XMLBEZ-00-0000-0B00U635H	35F	XMLBEZ-00-0000-0B00U635F
		V2	400	466		XMLBEZ-00-0000-0B00V235H		XMLBEZ-00-0000-0B00V235F
		V3	420	486		XMLBEZ-00-0000-0B00V335H		XMLBEZ-00-0000-0B00V335F
	3000 K	U6	380	443	30H	XMLBEZ-00-0000-0B00U630H	30F	XMLBEZ-00-0000-0B00U630F
		V2	400	466		XMLBEZ-00-0000-0B00V230H		XMLBEZ-00-0000-0B00V230F
	2700 K	U5	360	420	27H	XMLBEZ-00-0000-0B00U527H	27F	XMLBEZ-00-0000-0B00U527F
		U6	380	443		XMLBEZ-00-0000-0B00U627H		XMLBEZ-00-0000-0B00U627F
		V2	400	466		XMLBEZ-00-0000-0B00V227H		XMLBEZ-00-0000-0B00V227F

Notes:

- For Standard CRI parts, typical CRI is 75 for 5000-4000-K CCT parts, 80 for 4000-3500-K CCT parts and 82 for 3000-2700-K CCT parts.
- Cree maintains a tolerance of $\pm 7\%$ on flux and power measurements, ± 0.005 on chromaticity (CCx, CCy) measurements and ± 2 on CRI measurements.
- * Flux values @ 25°C are calculated and for reference only.

FLUX CHARACTERISTICS, STANDARD ORDER CODES AND BINS, 6-V XM-L2 EZW (700 mA, T_j = 85 °C) - CONTINUED

Color	CCT Range	Base Order Codes Min. Luminous Flux @ 700 mA			2-Step Order Code		4-Step Order Code	
		Group	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*	Chromaticity Region		Chromaticity Region	
80-CRI Minimum EasyWhite	5000 K	U6	380	443	50H	XMLBEZ-00-0000-0B0HU650H	50F	XMLBEZ-00-0000-0B0HU650F
		V2	400	466		XMLBEZ-00-0000-0B0HV250H		XMLBEZ-00-0000-0B0HV250F
		V3	420	486		XMLBEZ-00-0000-0B0HV350H		XMLBEZ-00-0000-0B0HV350F
	4000 K	U6	380	443	40H	XMLBEZ-00-0000-0B0HU640H	40F	XMLBEZ-00-0000-0B0HU640F
		V2	400	466		XMLBEZ-00-0000-0B0HV240H		XMLBEZ-00-0000-0B0HV240F
		V3	420	486		XMLBEZ-00-0000-0B0HV340H		XMLBEZ-00-0000-0B0HV340F
	3500 K	U6	380	443	35H	XMLBEZ-00-0000-0B0HU635H	35F	XMLBEZ-00-0000-0B0HU635F
		V2	400	466		XMLBEZ-00-0000-0B0HV235H		XMLBEZ-00-0000-0B0HV235F
		V3	420	486		XMLBEZ-00-0000-0B0HV335H		XMLBEZ-00-0000-0B0HV335F
	3000 K	U5	360	420	30H	XMLBEZ-00-0000-0B0HU530H	30F	XMLBEZ-00-0000-0B0HU530F
		U6	380	443		XMLBEZ-00-0000-0B0HU630H		XMLBEZ-00-0000-0B0HU630F
		V2	400	466		XMLBEZ-00-0000-0B0HV230H		XMLBEZ-00-0000-0B0HV230F
	2700 K	U4	340	396	27H	XMLBEZ-00-0000-0B0HU427H	27F	XMLBEZ-00-0000-0B0HU427F
		U5	360	420		XMLBEZ-00-0000-0B0HU527H		XMLBEZ-00-0000-0B0HU527F
		U6	380	443		XMLBEZ-00-0000-0B0HU627H		XMLBEZ-00-0000-0B0HU627F
90-CRI Minimum EasyWhite	3000 K	U2	300	350	30H	XMLBEZ-00-0000-0B0UU230H	30F	XMLBEZ-00-0000-0B0UU230F
		U3	320	373		XMLBEZ-00-0000-0B0UU330H		XMLBEZ-00-0000-0B0UU330F
		U4	340	396		XMLBEZ-00-0000-0B0UU430H		XMLBEZ-00-0000-0B0UU430F
	2700 K	T6	280	326	27H	XMLBEZ-00-0000-0B0UT627H	27F	XMLBEZ-00-0000-0B0UT627F
		U2	300	350		XMLBEZ-00-0000-0B0UU227H		XMLBEZ-00-0000-0B0UU227F
		U3	320	373		XMLBEZ-00-0000-0B0UU327H		XMLBEZ-00-0000-0B0UU327F

Notes:

- For Standard CRI parts, typical CRI is 75 for 5000-4000-K CCT parts, 80 for 4000–3500-K CCT parts and 82 for 3000–2700-K CCT parts.
- Cree maintains a tolerance of ±7% on flux and power measurements, ±0.005 on chromaticity (CCx, CCy) measurements and ±2 on CRI measurements.
- * Flux values @ 25 °C are calculated and for reference only.

FLUX CHARACTERISTICS, STANDARD ORDER CODES AND BINS, 6-V XM-L2 EZW (700 mA, T_j = 85 °C) - CONTINUED

Color	CCT Range	Base Order Codes Min Luminous Flux @ 700 mA			Chromaticity Regions	Order Code
		Group	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*		
Standard CRI ANSI White	6500 K	U6	380	443	0E1	XMLBEZ-00-0000-0B00U60E1
		V2	400	466		XMLBEZ-00-0000-0B00V20E1
		V3	420	486		XMLBEZ-00-0000-0B00V30E1
	5700 K	U6	380	443	0E2	XMLBEZ-00-0000-0B00U60E2
		V2	400	466		XMLBEZ-00-0000-0B00V20E2
		V3	420	486		XMLBEZ-00-0000-0B00V30E2

FLUX CHARACTERISTICS, STANDARD ORDER CODES AND BINS, 12-V XM-L2 EZW (350 mA, T_j = 85 °C)

The following table provides the order codes for 12-volt XLamp XM-L2 EZW LEDs.

Color	CCT Range	Base Order Codes Min. Luminous Flux @ 350 mA			2-Step Order Code		4-Step Order Code	
		Group	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*	Chromaticity Region		Chromaticity Region	
Standard CRI EasyWhite	5000 K	U6	380	443	50H	XMLBEZ-00-0000-0D00U650H	50F	XMLBEZ-00-0000-0D00U650F
		V2	400	466		XMLBEZ-00-0000-0D00V250H		XMLBEZ-00-0000-0D00V250F
		V3	420	486		XMLBEZ-00-0000-0D00V350H		XMLBEZ-00-0000-0D00V350F
	4000 K	U6	380	443	40H	XMLBEZ-00-0000-0D00U640H	40F	XMLBEZ-00-0000-0D00U640F
		V2	400	466		XMLBEZ-00-0000-0D00V240H		XMLBEZ-00-0000-0D00V240F
		V3	420	486		XMLBEZ-00-0000-0D00V340H		XMLBEZ-00-0000-0D00V340F
	3500 K	U6	380	443	35H	XMLBEZ-00-0000-0D00U635H	35F	XMLBEZ-00-0000-0D00U635F
		V2	400	466		XMLBEZ-00-0000-0D00V235H		XMLBEZ-00-0000-0D00V235F
		V3	420	486		XMLBEZ-00-0000-0D00V335H		XMLBEZ-00-0000-0D00V335F
	3000 K	U6	380	443	30H	XMLBEZ-00-0000-0D00U630H	30F	XMLBEZ-00-0000-0D00U630F
		V2	400	466		XMLBEZ-00-0000-0D00V230H		XMLBEZ-00-0000-0D00V230F
	2700 K	U5	360	420	27H	XMLBEZ-00-0000-0D00U527H	27F	XMLBEZ-00-0000-0D00U527F
		V2	400	466		XMLBEZ-00-0000-0D00V227H		XMLBEZ-00-0000-0D00V227F

Notes:

- For Standard CRI parts, typical CRI is 75 for 5000-4000-K CCT parts, 80 for 4000-3500-K CCT parts and 82 for 3000-2700-K CCT parts.
- Cree maintains a tolerance of ±7% on flux and power measurements, ±0.005 on chromaticity (CCx, CCy) measurements and ±2 on CRI measurements.
- * Flux values @ 25 °C are calculated and for reference only.

FLUX CHARACTERISTICS, STANDARD ORDER CODES AND BINS, 12-V XM-L2 EZW (350 mA, T_j = 85 °C) - CONTINUED

Color	CCT Range	Base Order Codes Min. Luminous Flux @ 350 mA			2-Step Order Code		4-Step Order Code	
		Group	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*	Chromaticity Region		Chromaticity Region	
80-CRI Minimum EasyWhite	5000 K	U6	380	443	50H	XMLBEZ-00-0000-0D0HU650H	50F	XMLBEZ-00-0000-0D0HU650F
		V2	400	466		XMLBEZ-00-0000-0D0HV250H		XMLBEZ-00-0000-0D0HV250F
		V3	420	486		XMLBEZ-00-0000-0D0HV350H		XMLBEZ-00-0000-0D0HV350F
	4000 K	U6	380	443	40H	XMLBEZ-00-0000-0D0HU640H	40F	XMLBEZ-00-0000-0D0HU640F
		V2	400	466		XMLBEZ-00-0000-0D0HV240H		XMLBEZ-00-0000-0D0HV240F
		V3	420	486		XMLBEZ-00-0000-0D0HV340H		XMLBEZ-00-0000-0D0HV340F
	3500 K	U6	380	443	35H	XMLBEZ-00-0000-0D0HU635H	35F	XMLBEZ-00-0000-0D0HU635F
		V2	400	466		XMLBEZ-00-0000-0D0HV235H		XMLBEZ-00-0000-0D0HV235F
		V3	420	486		XMLBEZ-00-0000-0D0HV335H		XMLBEZ-00-0000-0D0HV335F
	3000 K	U5	360	420	30H	XMLBEZ-00-0000-0D0HU530H	30F	XMLBEZ-00-0000-0D0HU530F
		U6	380	443		XMLBEZ-00-0000-0D0HU630H		XMLBEZ-00-0000-0D0HU630F
		V2	400	466		XMLBEZ-00-0000-0D0HV230H		XMLBEZ-00-0000-0D0HV230F
	2700 K	U4	340	396	27H	XMLBEZ-00-0000-0D0HU427H	27F	XMLBEZ-00-0000-0D0HU427F
		U5	360	420		XMLBEZ-00-0000-0D0HU527H		XMLBEZ-00-0000-0D0HU527F
		U6	380	443		XMLBEZ-00-0000-0D0HU627H		XMLBEZ-00-0000-0D0HU627F
90-CRI Minimum EasyWhite	3000 K	U2	300	350	30H	XMLBEZ-00-0000-0D0UU230H	30F	XMLBEZ-00-0000-0D0UU230F
		U3	320	373		XMLBEZ-00-0000-0D0UU330H		XMLBEZ-00-0000-0D0UU330F
		U4	340	396		XMLBEZ-00-0000-0D0UU430H		XMLBEZ-00-0000-0D0UU430F
	2700 K	T6	280	326	27H	XMLBEZ-00-0000-0D0UT627H	27F	XMLBEZ-00-0000-0D0UT627F
		U2	300	350		XMLBEZ-00-0000-0D0UU227H		XMLBEZ-00-0000-0D0UU227F
		U3	320	373		XMLBEZ-00-0000-0D0UU327H		XMLBEZ-00-0000-0D0UU327F

Notes:

- For Standard CRI parts, typical CRI is 75 for 5000-4000-K CCT parts, 80 for 4000–3500-K CCT parts and 82 for 3000–2700-K CCT parts.
- Cree maintains a tolerance of ±7% on flux and power measurements, ±0.005 on chromaticity (CCx, CCy) measurements and ±2 on CRI measurements.
- * Flux values @ 25 °C are calculated and for reference only.

FLUX CHARACTERISTICS, STANDARD ORDER CODES AND BINS, 12-V XM-L2 EZW (350 mA, $T_j = 85\text{ }^{\circ}\text{C}$) - CONTINUED

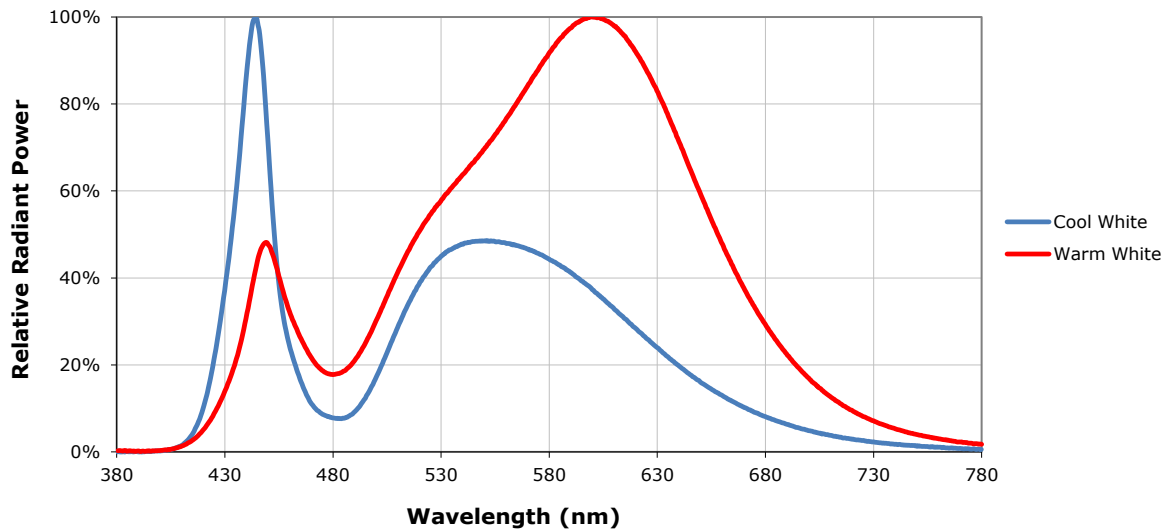
Color	CCT Range	Base Order Codes Min Luminous Flux @ 700 mA			Chromaticity Regions	Order Code
		Group	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*		
Standard CRI ANSI White	6500 K	U6	380	443	0E1	XMLBEZ-00-0000-0D00U60E1
		V2	400	466		XMLBEZ-00-0000-0D00V20E1
		V3	420	486		XMLBEZ-00-0000-0D00V30E1
	5700 K	U6	380	443	0E2	XMLBEZ-00-0000-0D00U60E2
		V2	400	466		XMLBEZ-00-0000-0D00V20E2
		V3	420	486		XMLBEZ-00-0000-0D00V30E2

Notes:

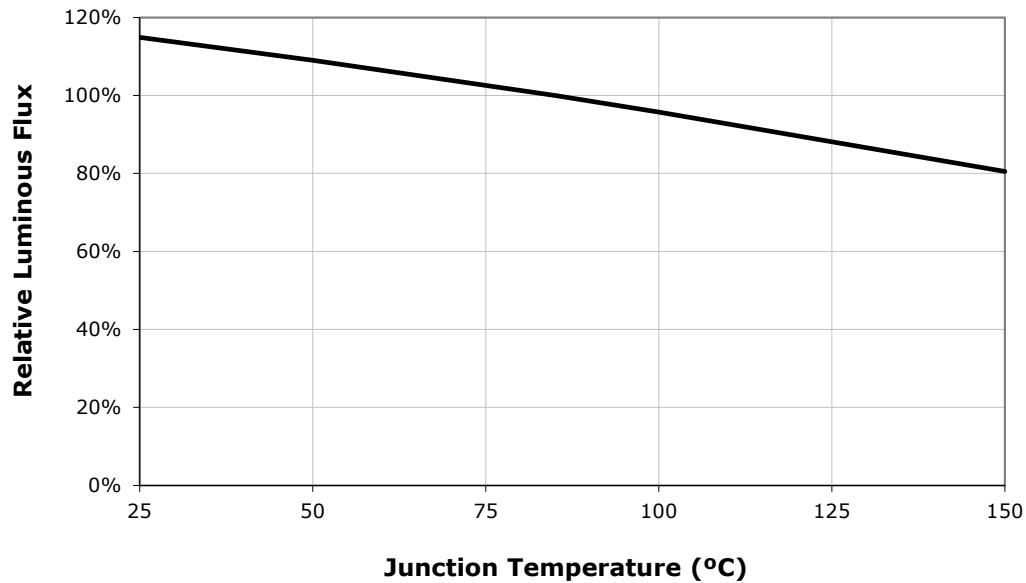
- For Standard CRI parts, typical CRI is 75 for 5000-4000-K CCT parts, 80 for 4000–3500-K CCT parts and 82 for 3000–2700-K CCT parts.
- Cree maintains a tolerance of $\pm 7\%$ on flux and power measurements, ± 0.005 on chromaticity (CCx, CCy) measurements and ± 2 on CRI measurements.

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

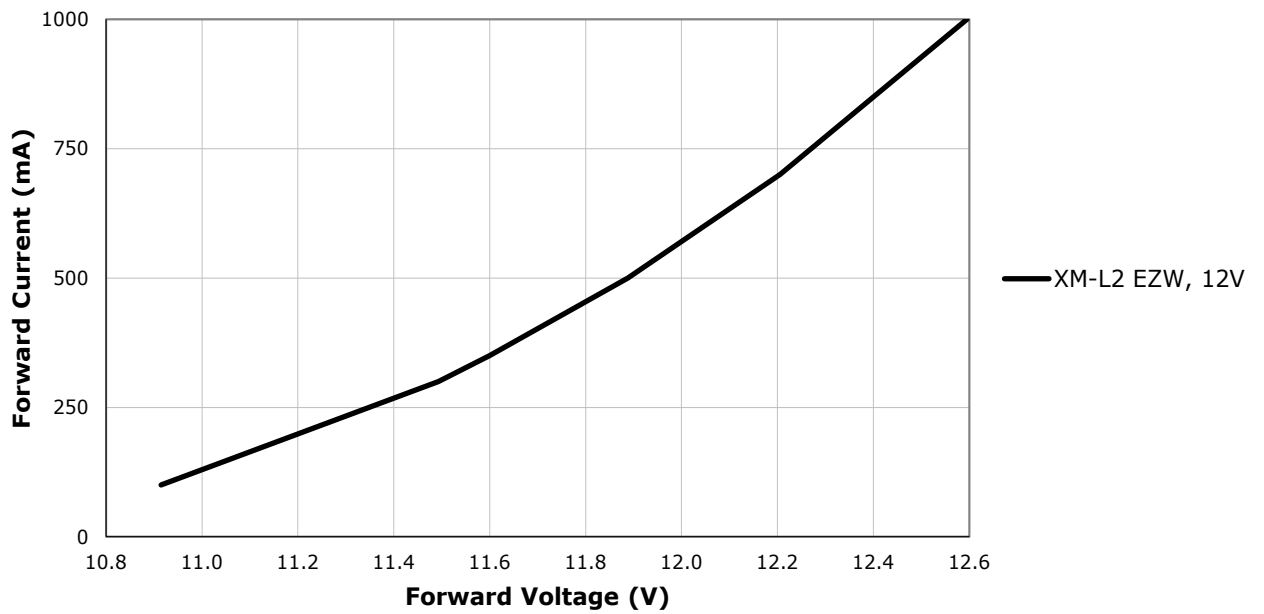
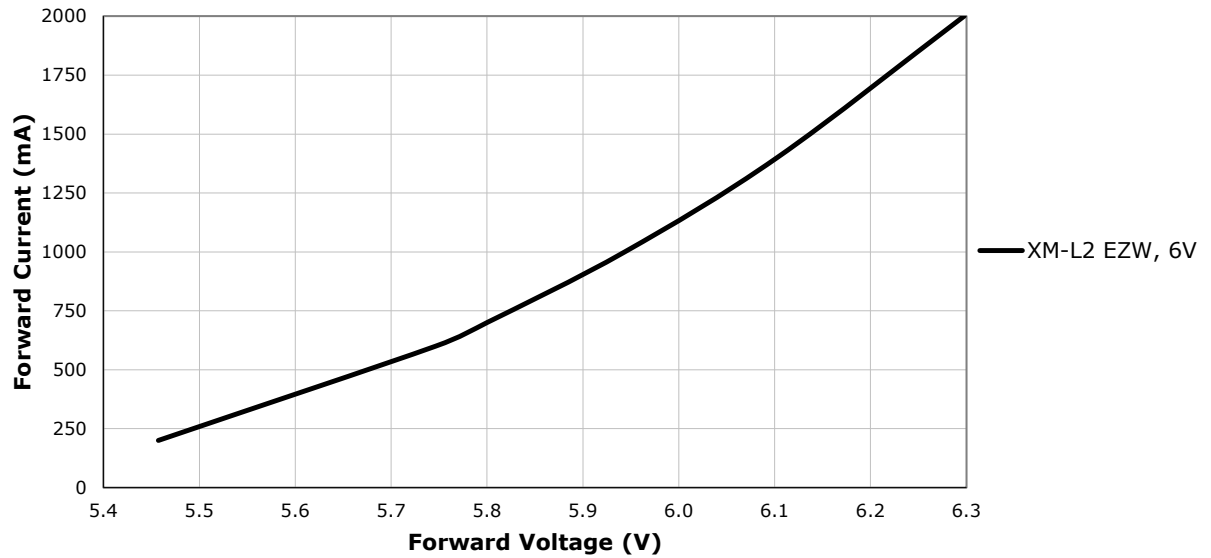
RELATIVE SPECTRAL POWER DISTRIBUTION



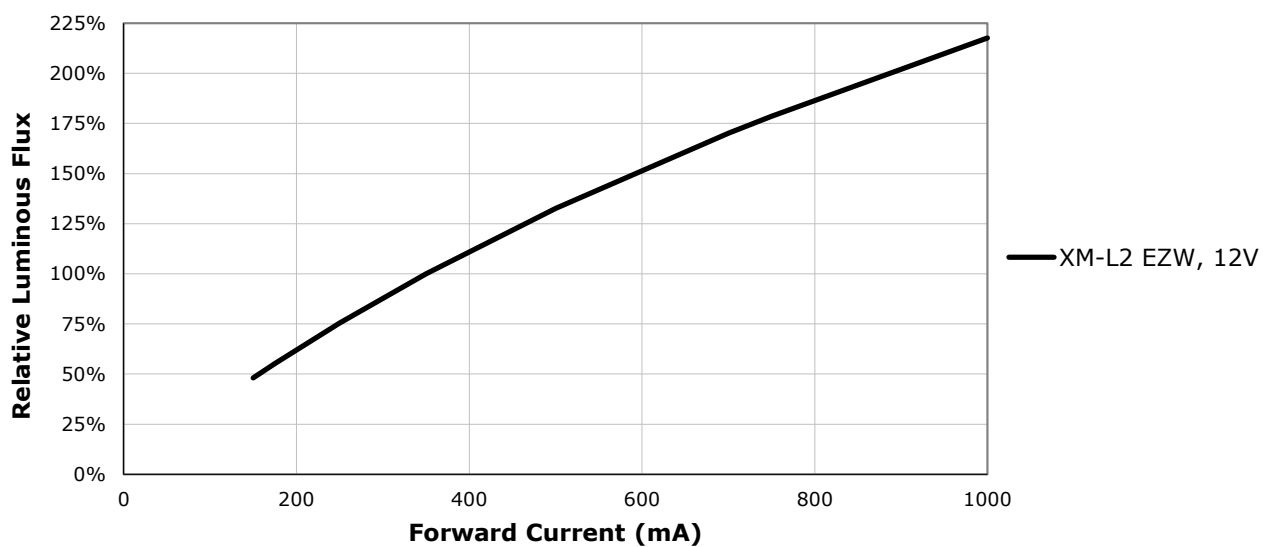
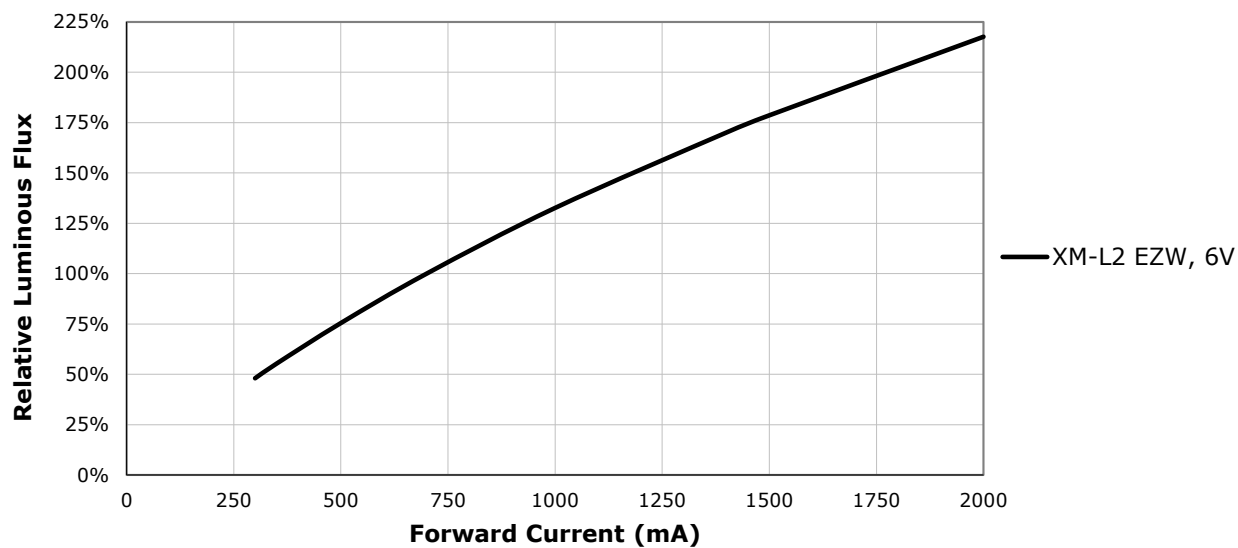
RELATIVE FLUX VS. JUNCTION TEMPERATURE (6-V - $I_F = 700$ mA; 12-V - $I_F = 350$ mA)

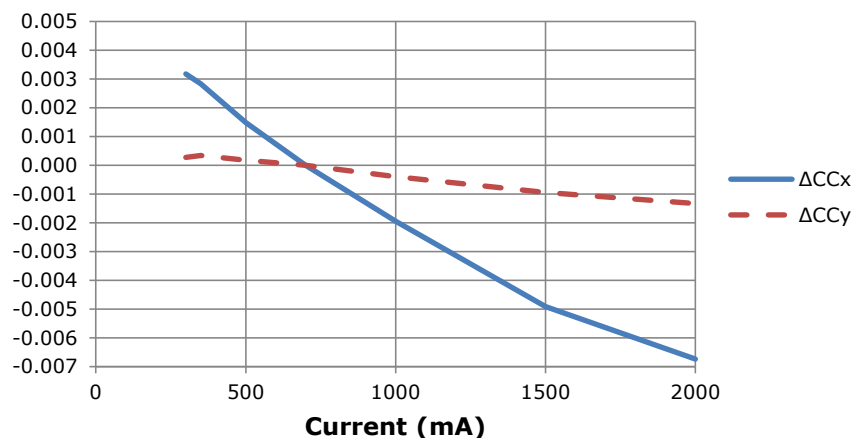
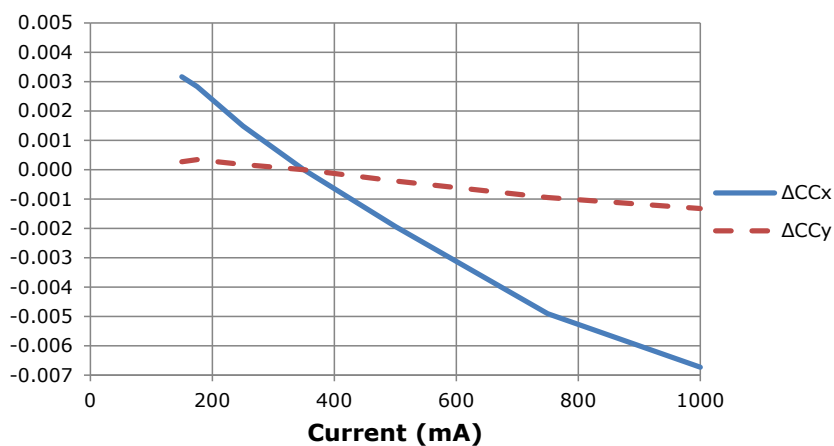
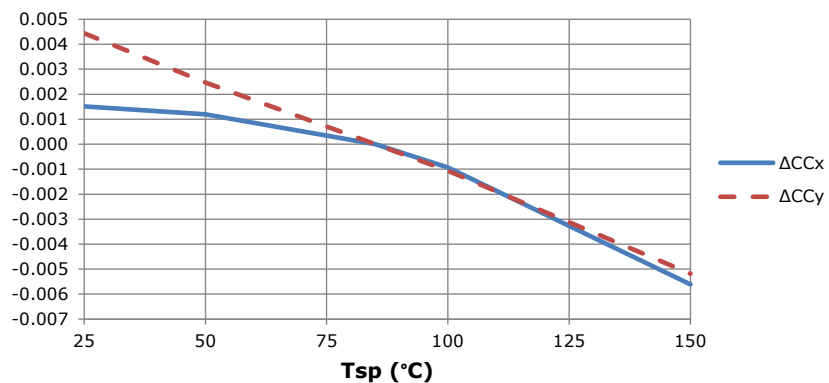


ELECTRICAL CHARACTERISTICS ($T_j = 85\text{ }^{\circ}\text{C}$)

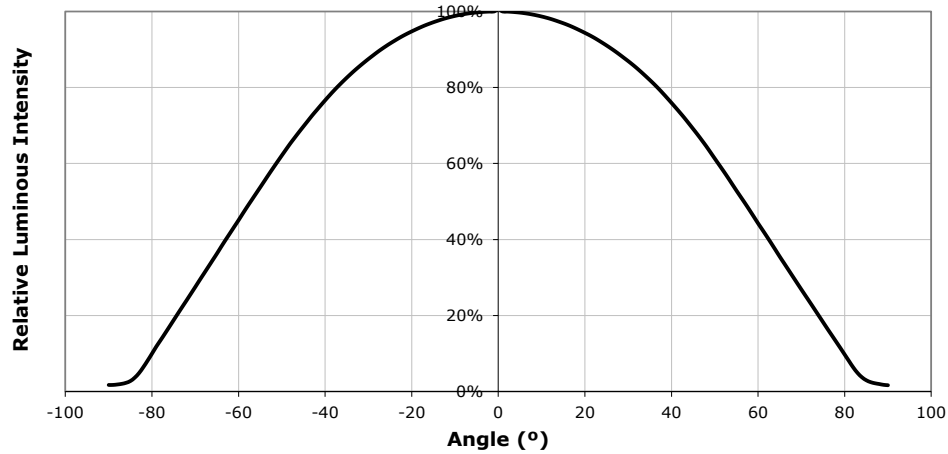


RELATIVE FLUX VS. CURRENT ($T_j = 85^{\circ}\text{C}$)



RELATIVE CHROMATICITY VS. CURRENT AND TEMPERATURE
XM-L2 EZW, 6 V

XM-L2 EZW, 12 V

XM-L2 EZW, 6 V & 12 V


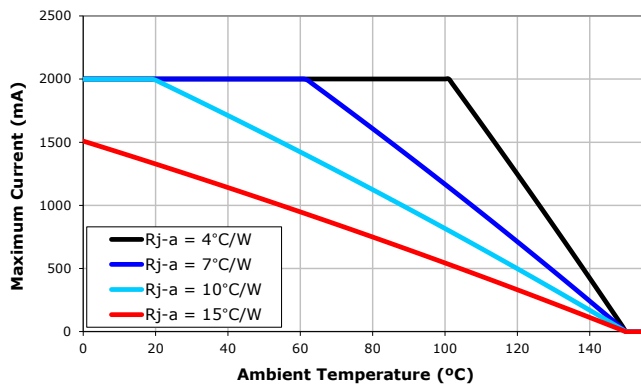
TYPICAL SPATIAL DISTRIBUTION



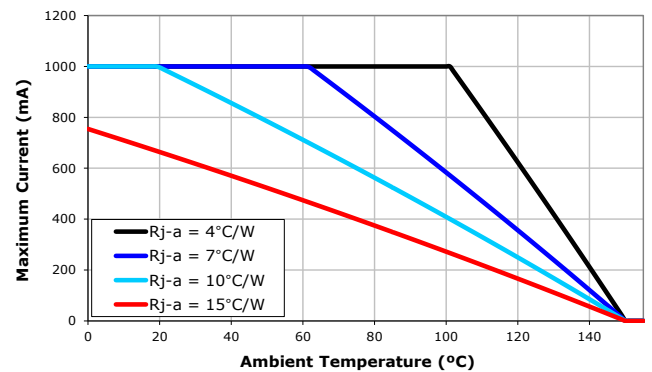
THERMAL DESIGN

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.

XM-L2 EZW, 6-V



XM-L2 EZW, 12-V



PERFORMANCE GROUPS – BRIGHTNESS ($T_j = 85^\circ\text{C}$)

XLamp XM-L2 EasyWhite LEDs are tested for luminous flux and placed into one of the following bins.

Group Code	Min. Luminous Flux @ 700 mA, 6 V, @ 350 mA, 12 V	Max. Luminous Flux @ 700 mA, 6 V, @ 350 mA, 12 V
T5	260	280
T6	280	300
U2	300	320
U3	320	340
U4	340	360
U5	360	380
U6	380	400
V2	400	420
V3	420	440
V4	440	460

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

XLamp XM-L2 EasyWhite LEDs are tested for chromaticity and placed into one of the regions defined by the following bounding coordinates.

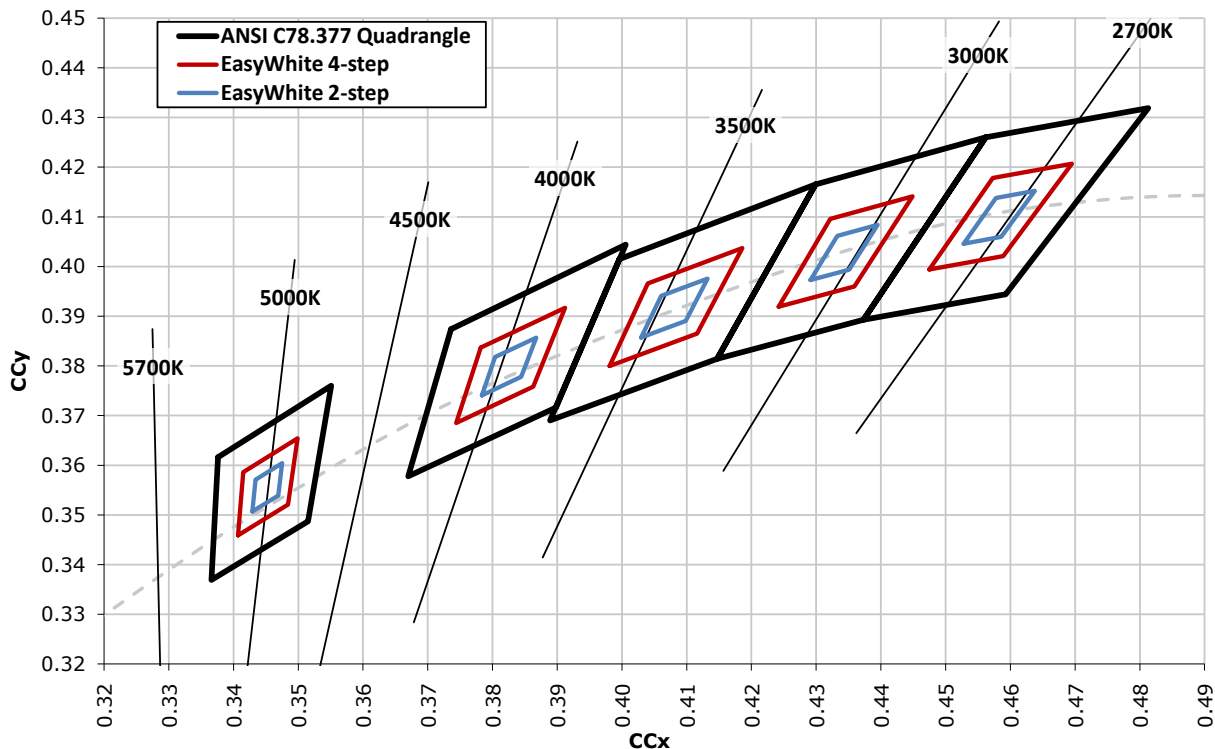
EasyWhite Color Temperatures – 4-Step			
Code	CCT	x	y
50F	5000 K	0.3407	0.3459
		0.3415	0.3586
		0.3499	0.3654
		0.3484	0.3521
40F	4000 K	0.3744	0.3685
		0.3782	0.3837
		0.3912	0.3917
		0.3863	0.3758
35F	3500 K	0.3981	0.3800
		0.4040	0.3966
		0.4186	0.4037
		0.4116	0.3865
30F	3000 K	0.4242	0.3919
		0.4322	0.4096
		0.4449	0.4141
		0.4359	0.3960
27F	2700 K	0.4475	0.3994
		0.4573	0.4178
		0.4695	0.4207
		0.4589	0.4021

EasyWhite Color Temperatures – 2-Step			
Code	CCT	x	y
50H	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

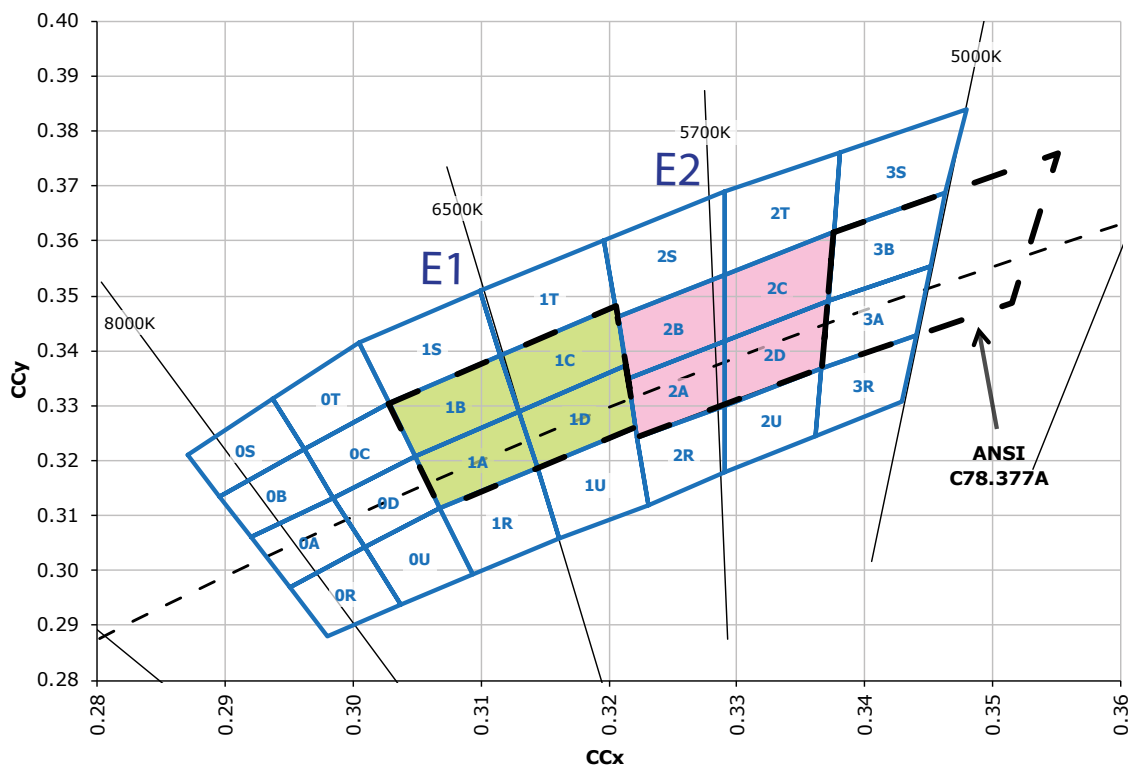
PERFORMANCE GROUPS - CHROMATICITY ($T_j = 85\text{ }^{\circ}\text{C}$) - CONTINUED

ANSI White Bins					ANSI White Bins				
Code	CCT	Bin Code	x	y	Code	CCT	Bin Code	x	y
0E1	6500 K	1A0	0.3048	0.3207	0E2	5700 K	2A0	0.3215	0.3350
			0.3130	0.3290				0.3290	0.3417
			0.3144	0.3186				0.3290	0.3300
			0.3068	0.3113				0.3222	0.3243
		1B0	0.3028	0.3304			2B0	0.3207	0.3462
			0.3115	0.3391				0.3290	0.3538
			0.3130	0.3290				0.3290	0.3417
			0.3048	0.3207				0.3215	0.3350
		1C0	0.3115	0.3391			2C0	0.3290	0.3538
			0.3205	0.3481				0.3376	0.3616
			0.3213	0.3373				0.3371	0.3490
			0.3130	0.3290				0.3290	0.3417
		1D0	0.3130	0.3290			2D0	0.3290	0.3417
			0.3213	0.3373				0.3371	0.3490
			0.3221	0.3261				0.3366	0.3369
			0.3144	0.3186				0.3290	0.3300

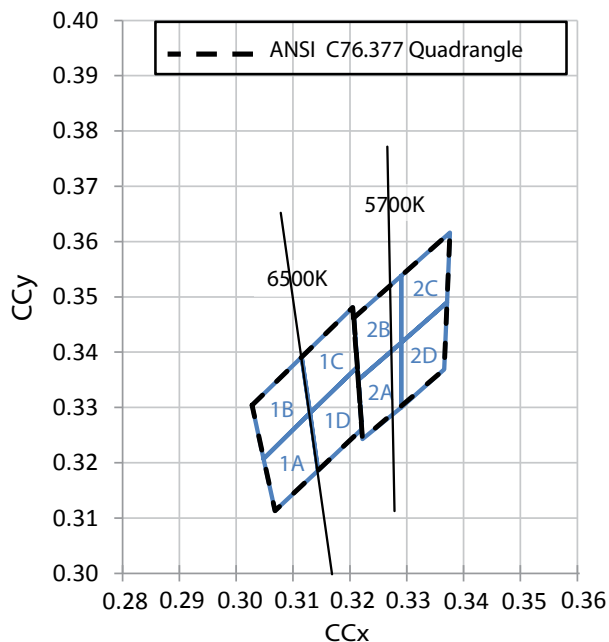
CREE EASYWHITE BINS PLOTTED ON THE 1931 CIE COLOR SPACE ($T_j = 85\text{ }^{\circ}\text{C}$)



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



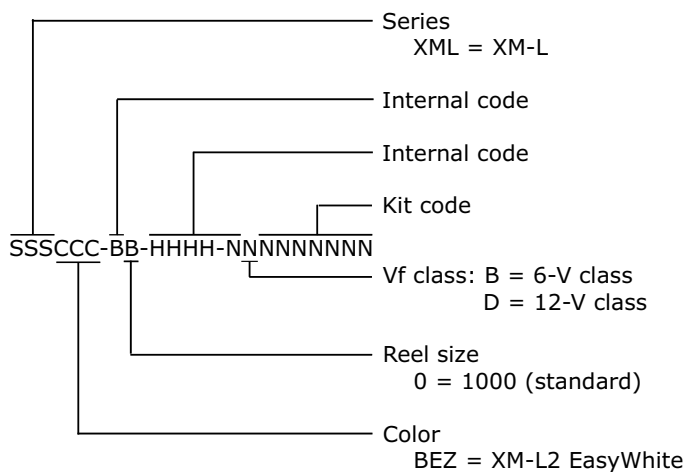
CREE ANSI WHITE BINS PLOTTED ON THE 1931 CIE COLOR SPACE ($T_j = 85^\circ\text{C}$)



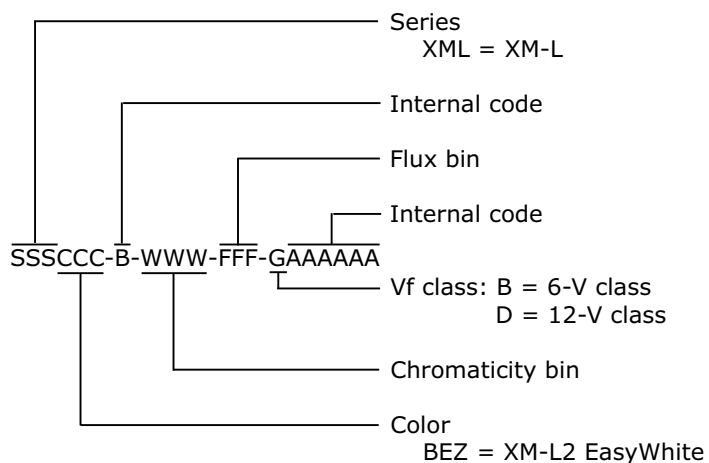
BIN AND ORDER CODE FORMAT

Bin codes and order codes are configured as follows:

Order Code



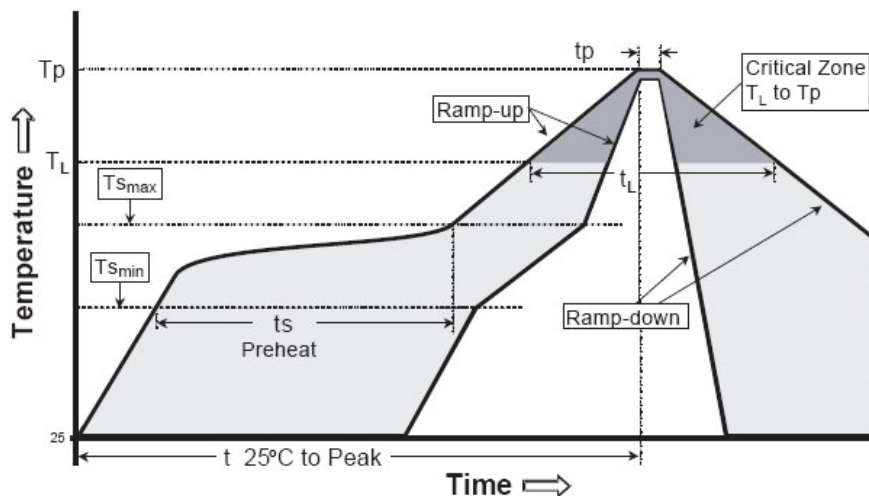
Bin Code



REFLOW SOLDERING CHARACTERISTICS

In testing, Cree has found XLamp XM-L2 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 solder paste used.

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-Based Solder	Lead-Free Solder
Average Ramp-Up Rate ($T_{s_{max}}$ to T_p)	3 °C/second max.	3 °C/second max.
Preheat: Temperature Min ($T_{s_{min}}$)	100 °C	150 °C
Preheat: Temperature Max ($T_{s_{max}}$)	150 °C	200 °C
Preheat: Time ($t_{s_{min}}$ to $t_{s_{max}}$)	60-120 seconds	60-180 seconds
Time Maintained Above: Temperature (T_l)	183 °C	217 °C
Time Maintained Above: Time (t_l)	60-150 seconds	60-150 seconds
Peak/Classification Temperature (T_p)	215 °C	260 °C
Time Within 5 °C of Actual Peak Temperature (t_p)	10-30 seconds	20-40 seconds
Ramp-Down Rate	6 °C/second max.	6 °C/second max.
Time 25 °C to Peak Temperature	6 minutes max.	8 minutes max.

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

NOTES

Lumen Maintenance Projections

Cree now uses standardized IES LM-80-08 and TM-21-11 methods for collecting long-term data and extrapolating LED lumen maintenance. For information on the specific LM-80 data sets available for this LED, refer to the public LM-80 results document at www.cree.com/xlamp_app_notes/LM80_results.

Please consult the XLamp Long-Term Lumen Maintenance application note at www.cree.com/xlamp_app_notes/lumen_maintenance for more details on Cree's lumen maintenance testing and forecasting. Please read the XLamp Thermal Management application note at www.cree.com/xlamp_app_notes/thermal_management for details on how thermal design, ambient temperature, and drive current affect the LED junction temperature.

Moisture Sensitivity

In testing, Cree has found XLamp XM-L2 LEDs to have unlimited floor life in conditions $\leq 30^{\circ}\text{C}/85\%$ relative humidity (RH). Moisture testing included a 168-hour soak at $85^{\circ}\text{C}/85\%$ RH followed by 3 reflow cycles, with visual and electrical inspections at each stage.

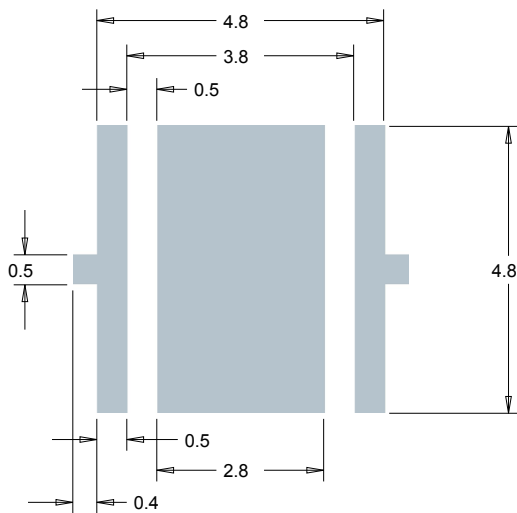
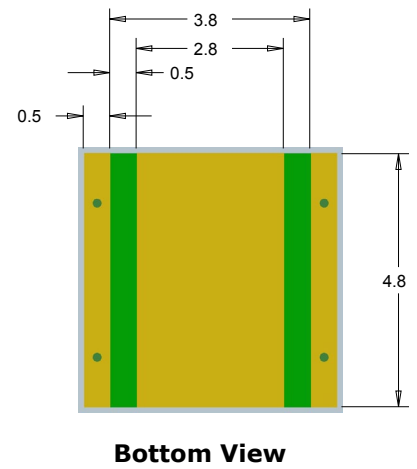
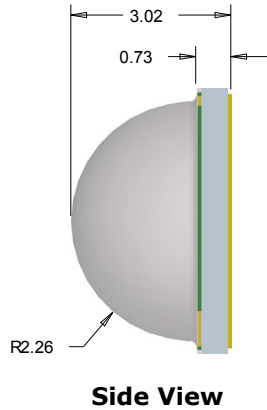
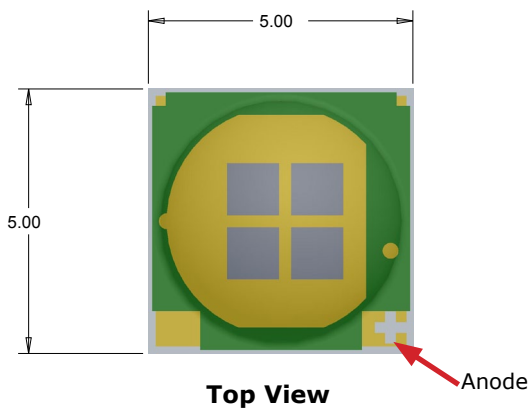
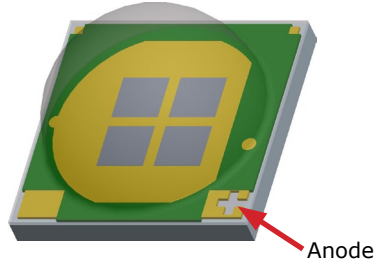
Cree recommends keeping XLamp LEDs in their sealed moisture-barrier packaging until immediately prior to use. Cree also recommends returning any unused LEDs to the resealable moisture-barrier bag and closing the bag immediately after use.

Vision Advisory Claim

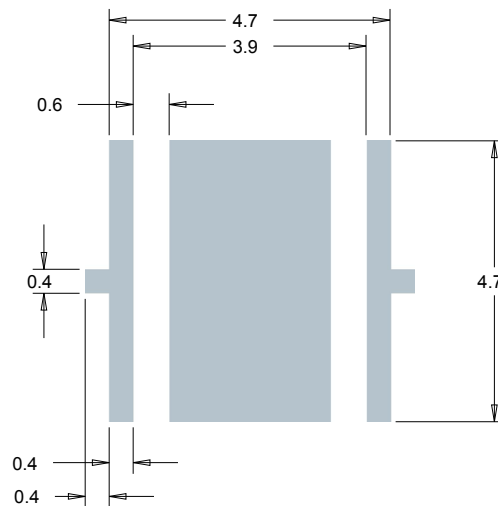
WARNING. Do not look at exposed lamp in operation. Eye injury can result. For more information about LEDs and eye safety, please refer to the Cree LED Eye Safety application note at www.cree.com/xlamp_app_notes/led_eye_safety.

MECHANICAL DIMENSIONS

All measurements are ± 0.13 mm unless otherwise indicated.



Recommended PCB Solder Pad

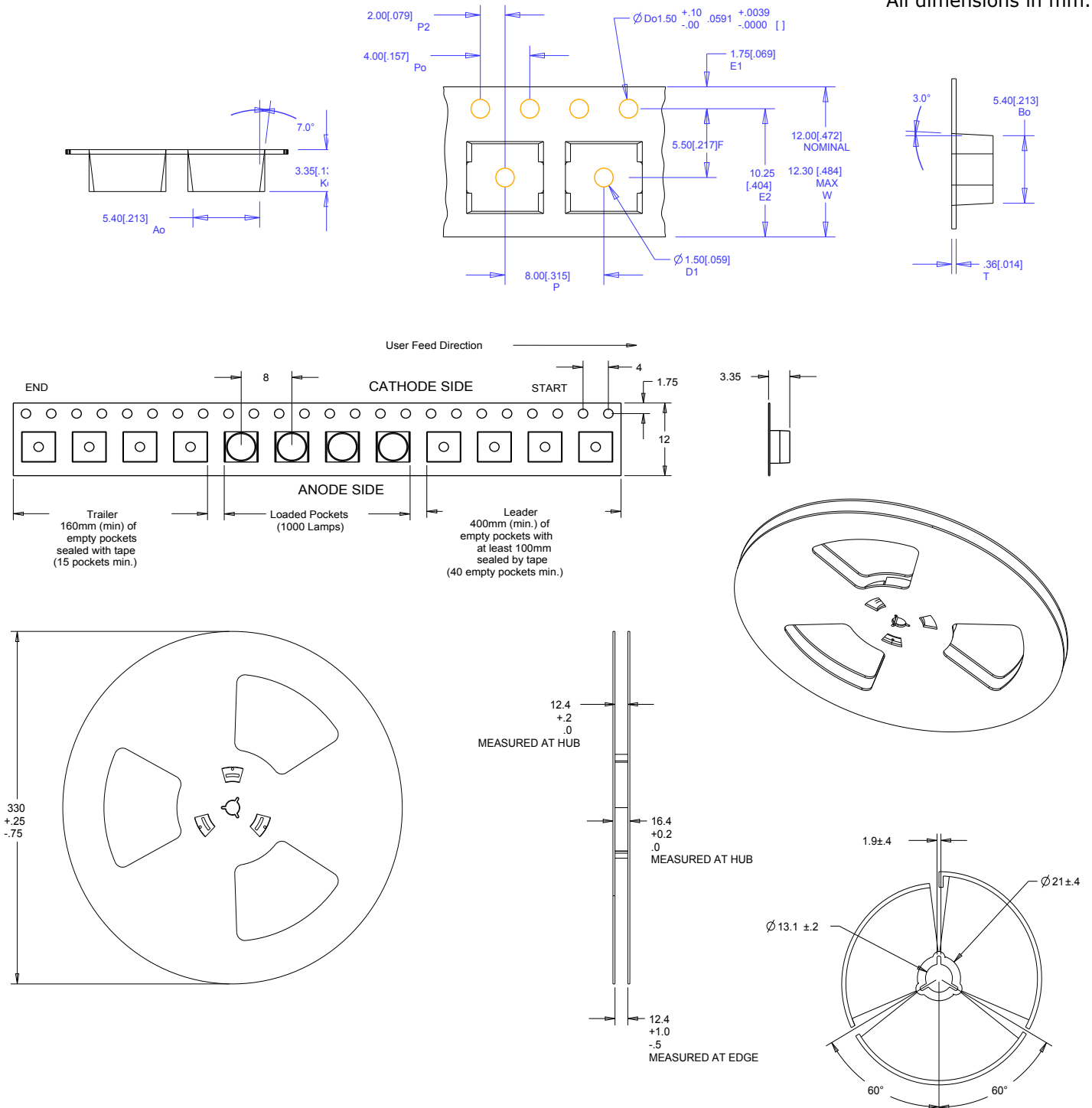


**Recommended Stencil Pattern
(Shaded Area Is Open)**

TAPE AND REEL

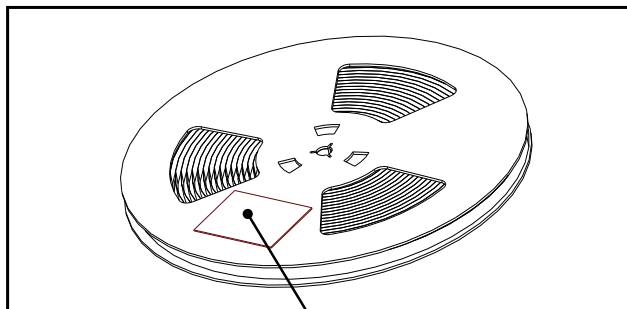
All Cree carrier tapes conform to EIA-481D, Automated Component Handling Systems Standard.

All dimensions in mm.



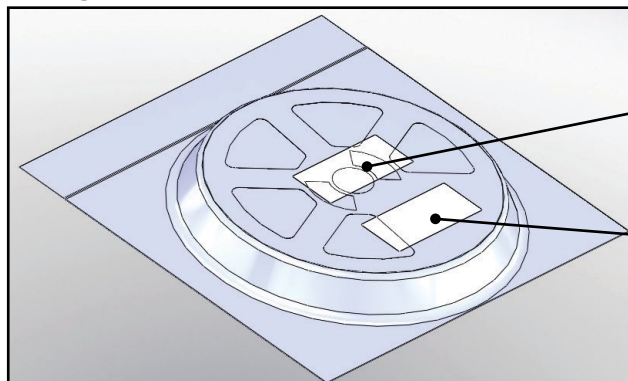
PACKAGING

Unpackaged Reel



Label with Cree Bin Code, Qty, Reel ID

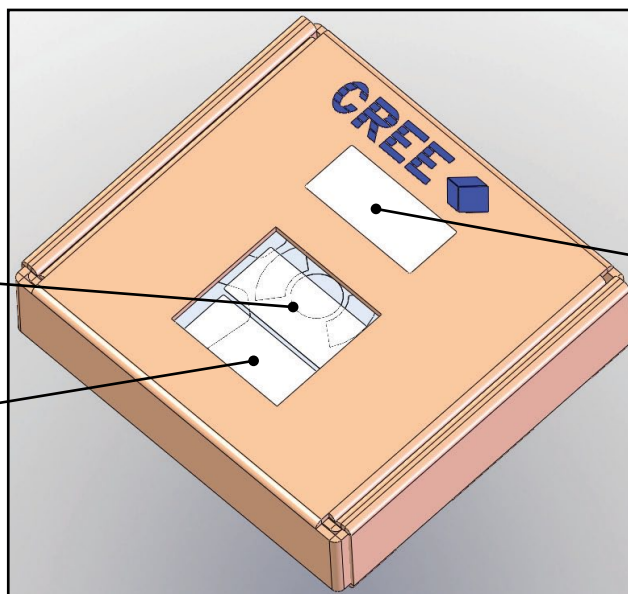
Packaged Reel



Label with Cree Order Code, Qty, Reel ID, PO #

Label with Cree Bin Code, Qty, Reel ID

Boxed Reel



Label with Cree Order Code, Qty, Reel ID, PO #

Label with Cree Bin Code, Qty, Reel ID

Patent Label