Preliminary
October 22, 2010

Cree® XLamp® XM-L LEDs
Data Sheet

FEATURES

- Maximum drive current: 3000 mA
- Low thermal resistance: 2.5°C/W
- Maximum junction temperature: 150°C
- Viewing angle: 125°
- Available in cool white
- ANSI-compatible chromaticity bins
- Unlimited floor life at ≤ 30ºC/85% RH
- Reflow solderable - JEDEC J-STD-020C
- Electrically neutral thermal path

Table of Contents

Flux Characteristics (T_J = 25°C)

The following table provides several base order codes for XLamp XM-L LEDs. It is important to note that the base order codes listed here are a subset of the total available order codes for the product family.

Color	CCT Range		Base Order Codes Min Luminous Flux @ 700 mA (lm)		Order Code
	Min.	Max.	Group	Flux (lm)	
Cool White	5,000 K	8,300 K	T5	260	XMLAWT-00-0000-0000T5051
			T6	280	XMLAWT-00-0000-0000T6051

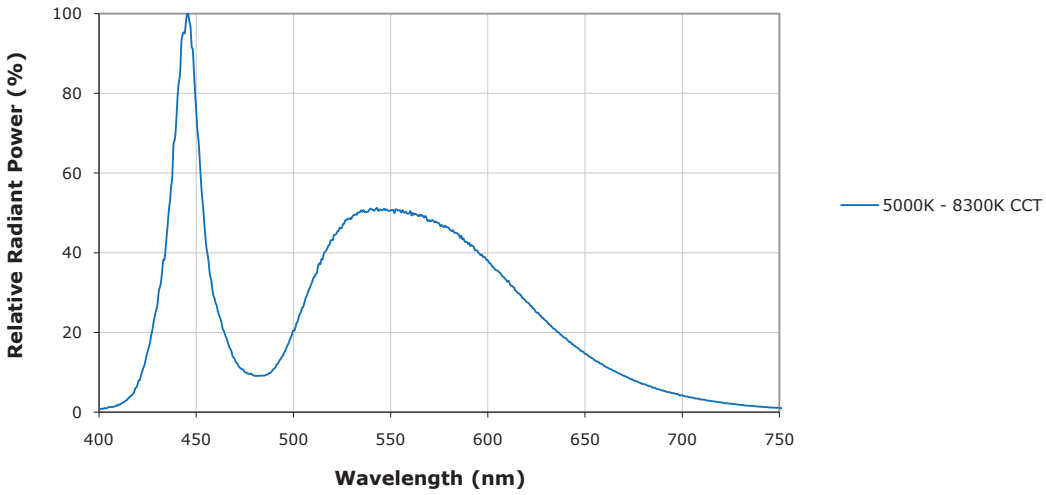
Notes:
- Cree maintains a tolerance of +/- 7% on flux and power measurements and +/- 2% on CRI measurements.
- Typical CRI for Cool White (5,000 K - 8,300 K CCT) is 75.

Characteristics

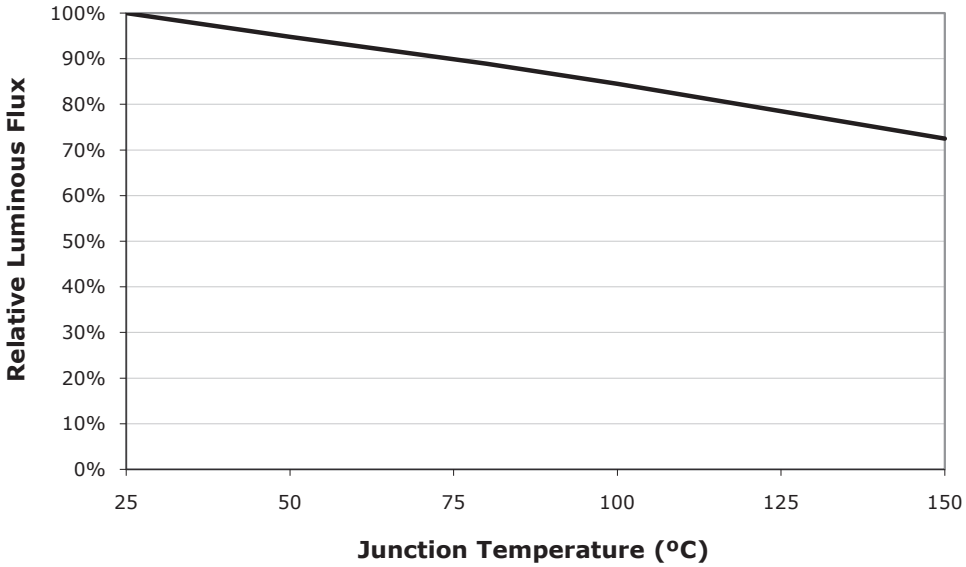
Characteristics	Unit	Minimum	Typical	Maximum
Thermal Resistance, junction to solder point	°C/W		2.5	
Viewing Angle (FWHM)	degrees		125	
Temperature coefficient of voltage	mV/°C		-3.0	
ESD Classification (HBM per Mil-Std-883D)			Class 2	
DC Forward Current	mA			3000
Reverse Voltage	V			5
Forward voltage (@ 700 mA)	V		2.9	3.5
Forward voltage (@ 1500 mA)	V		3.1	
Forward voltage (@ 3000 mA)	V		3.35	
LED Junction Temperature	°C			150

Cree, Inc.
4600 Silicon Drive
Durham, NC 27703
USA Tel: +1.919.313.5300
www.cree.com/xlamp

Relative Spectral Power Distribution

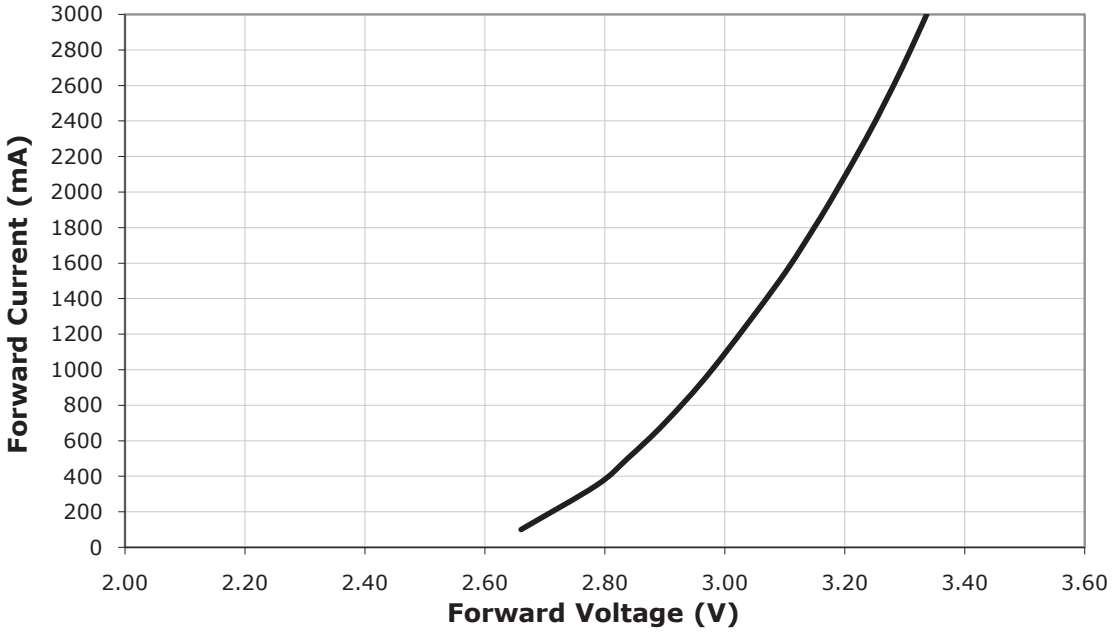


Relative Flux vs. Junction Temperature (I_F = 700 mA)



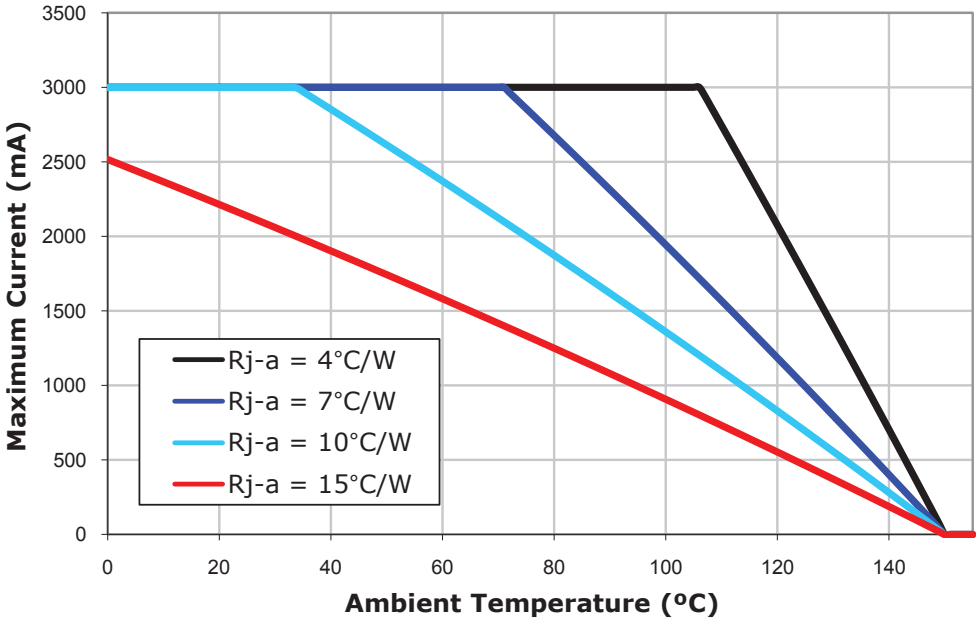
Cree, Inc.
4600 Silicon Drive
Durham, NC 27703
USA Tel: +1.919.313.5300
www.cree.com/xlamp

Electrical Characteristics (T_J = 25°C)



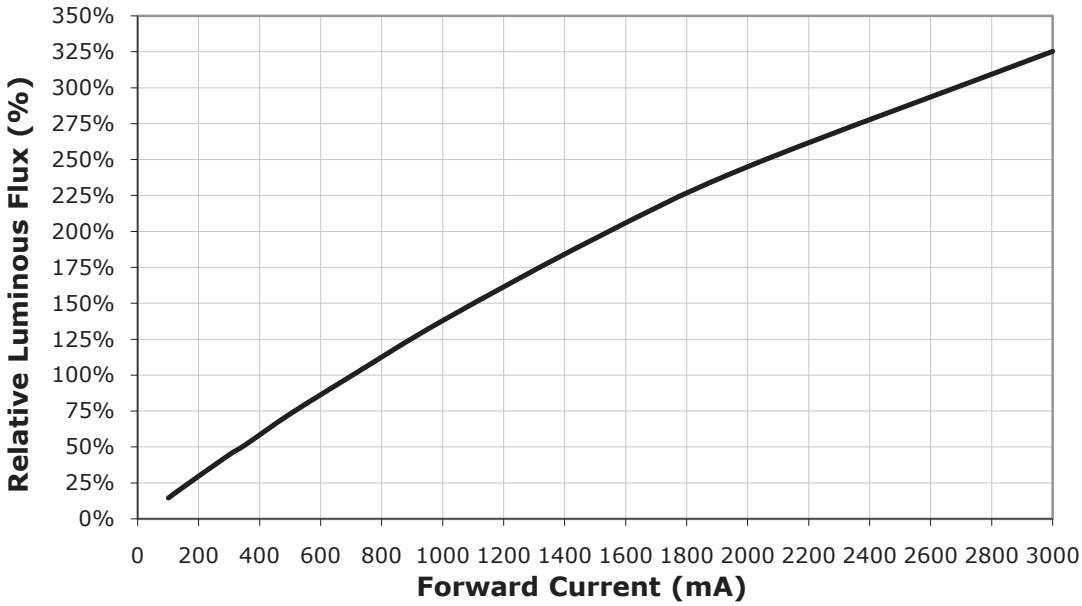
Thermal Design

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.

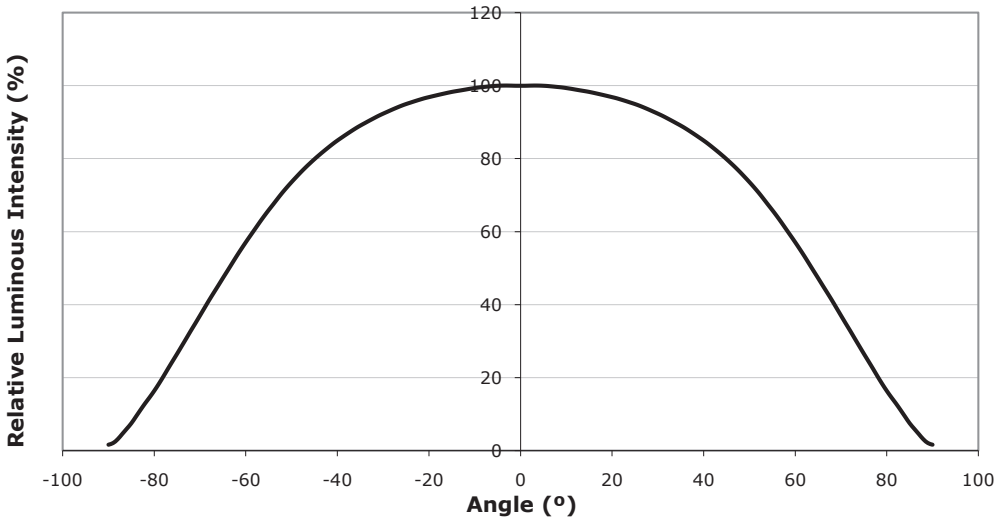


Cree, Inc.
4600 Silicon Drive
Durham, NC 27703
USA Tel: +1.919.313.5300
www.cree.com/xlamp

Relative Flux vs. Current (T_j = 25°C)



Typical Spatial Distribution

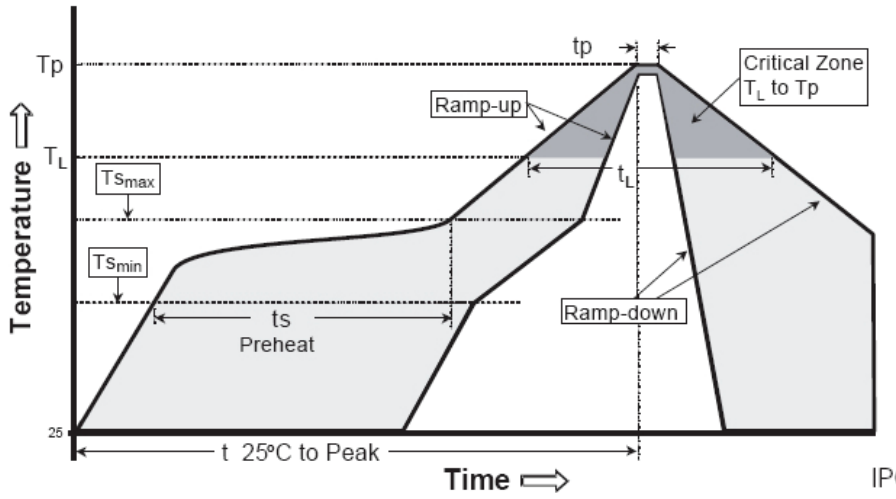


Cree, Inc.
4600 Silicon Drive
Durham, NC 27703
USA Tel: +1.919.313.5300
www.cree.com/xlamp

Reflow Soldering Characteristics

In testing, Cree has found XLamp XM-L 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 (Ts_{max} to Tp)	3°C/second max.	3°C/second max.
Preheat: Temperature Min (Ts_{min})	100°C	150°C
Preheat: Temperature Max (Ts_{max})	150°C	200°C
Preheat: Time (ts_{min} to ts_{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 (Tp)	215°C	260°C
Time Within 5°C of Actual Peak Temperature (tp)	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 topside of the package, measured on the package body surface.

Cree, Inc.
4600 Silicon Drive
Durham, NC 27703
USA Tel: +1.919.313.5300
www.cree.com/xlamp

Notes

Lumen Maintenance Projections

Cree currently recommends a maximum drive current of 1500 mA for XLamp XM-L white in designs seeking the ENERGY STAR* 35,000 hour lifetime rating (≥ 94.1% luminous flux @ 6000 hours) or 25,000-hour lifetime rating (≥ 91.8% luminous flux @ 6000 hours).

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

* These lifetime ratings are based on the current ENERGY STAR Solid State Lighting Luminaires V1.1 (December 12, 2008) and ENERGY STAR Integral LED Lamps V1.0 (December 3, 2009) lumen maintenance criteria.

Moisture Sensitivity

In testing, Cree has found XLamp XM-L LEDs to have unlimited floor life in conditions ≤30ºC / 85% relative humidity (RH). Moisture testing included a 168 hour soak at 85ºC / 85% RH followed by 3 reflow cycles, with visual and electrical inspections at each stage.

Vision Advisory Claim

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

Cree, Inc.
4600 Silicon Drive
Durham, NC 27703
USA Tel: +1.919.313.5300
www.cree.com/xlamp

Performance Groups – Brightness

XLamp XM-L LEDs are tested for luminous flux and placed into one of the following luminous-flux groups:

Group Code	Min. Luminous Flux @ 700 mA (lm)	Max. Luminous Flux @ 700 mA (lm)
T5	260	280
T6	280	300
U2	300	320

Cree, Inc.
4600 Silicon Drive
Durham, NC 27703
USA Tel: +1.919.313.5300
www.cree.com/xlamp

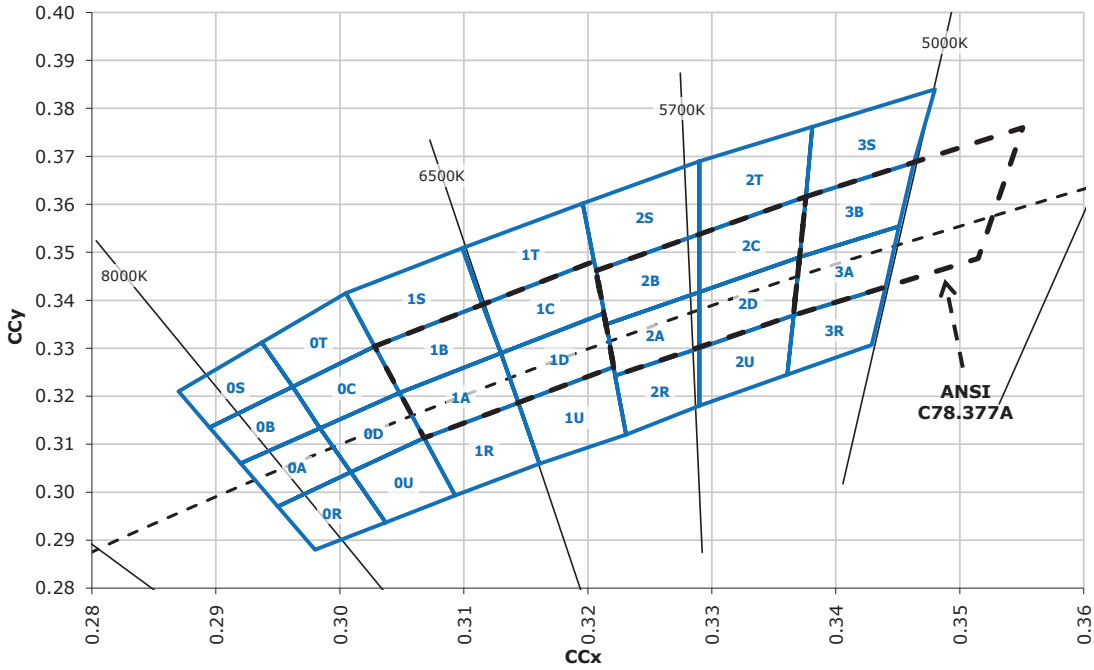
Performance Groups – Chromaticity

Region	x	y	Region	x	y	Region	x	y	Region	x	y
0A	0.2950	0.2970	0B	0.2920	0.3060	0C	0.2984	0.3133	0D	0.2984	0.3133
	0.2920	0.3060		0.2895	0.3135		0.2962	0.3220		0.3048	0.3207
	0.2984	0.3133		0.2962	0.3220		0.3028	0.3304		0.3068	0.3113
	0.3009	0.3042		0.2984	0.3133		0.3048	0.3207		0.3009	0.3042
0R	0.2980	0.2880	0S	0.2895	0.3135	0T	0.2962	0.3220	0U	0.3037	0.2937
	0.2950	0.2970		0.2870	0.3210		0.2937	0.3312		0.3009	0.3042
	0.3009	0.3042		0.2937	0.3312		0.3005	0.3415		0.3068	0.3113
	0.3037	0.2937		0.2962	0.3220		0.3028	0.3304		0.3093	0.2993
1A	0.3048	0.3207	1B	0.3028	0.3304	1C	0.3115	0.3391	1D	0.3130	0.3290
	0.3130	0.3290		0.3115	0.3391		0.3205	0.3481		0.3213	0.3373
	0.3144	0.3186		0.3130	0.3290		0.3213	0.3373		0.3221	0.3261
	0.3068	0.3113		0.3048	0.3207		0.3130	0.3290		0.3144	0.3186
1R	0.3068	0.3113	1S	0.3005	0.3415	1T	0.3099	0.3509	1U	0.3144	0.3186
	0.3144	0.3186		0.3099	0.3509		0.3196	0.3602		0.3221	0.3261
	0.3161	0.3059		0.3115	0.3391		0.3205	0.3481		0.3231	0.3120
	0.3093	0.2993		0.3028	0.3304		0.3115	0.3391		0.3161	0.3059
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						
	0.3451	0.3554		0.3463	0.3687						
	0.3440	0.3427		0.3451	0.3554						
	0.3366	0.3369		0.3371	0.3490						
3R	0.3366	0.3369	3S	0.3381	0.3762						
	0.3440	0.3428		0.3480	0.3840						
	0.3429	0.3307		0.3463	0.3687						
	0.3361	0.3245		0.3376	0.3616						

Cree, Inc.
4600 Silicon Drive
Durham, NC 27703
USA Tel: +1.919.313.5300
www.cree.com/xlamp

Cree's Standard Chromaticity Regions Plotted on the 1931 CIE Curve

ANSI Cool White



Cree, Inc.
4600 Silicon Drive
Durham, NC 27703
USA Tel: +1.919.313.5300
www.cree.com/xlamp

Standard Order Codes and Bins (XM-L ANSI Cool White)

XLamp XM-L LED Standard Order Codes - White			
Min. Luminous Flux (lm) @ 700 mA*		Chromaticity Regions	Kit Number
Group	Flux (lm)		
ANSI Cool White (5000 K – 8300 K)			
T5	260	0A, 0B, 0C, 0D, 0R, 0S, 0T, 0U, 1A, 1B, 1C, 1D, 1R, 1S, 1T, 1U, 2A, 2B, 2C, 2D, 2R, 2S, 2T, 2U, 3A, 3B, 3R, 3S	0000T5051
T6	280	0A, 0B, 0C, 0D, 0R, 0S, 0T, 0U, 1A, 1B, 1C, 1D, 1R, 1S, 1T, 1U, 2A, 2B, 2C, 2D, 2R, 2S, 2T, 2U, 3A, 3B, 3R, 3S	0000T6051

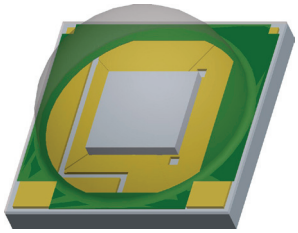
For other flux and chromaticity combinations, contact Cree or an authorized distributor.

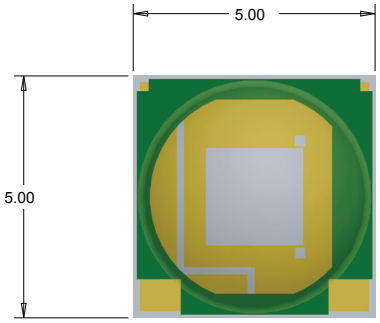
* Cree XLamp XM-L order codes specify only a minimum flux bin and not a maximum. Cree may ship reels in flux bins higher than the minimum specified by the order code without advance notice. Shipments will always adhere to the chromaticity restrictions specified by the order code.

Cree, Inc.
4600 Silicon Drive
Durham, NC 27703
USA Tel: +1.919.313.5300
www.cree.com/xlamp

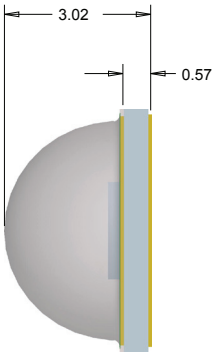
Mechanical Dimensions

All measurements are ±.13 mm unless otherwise indicated.

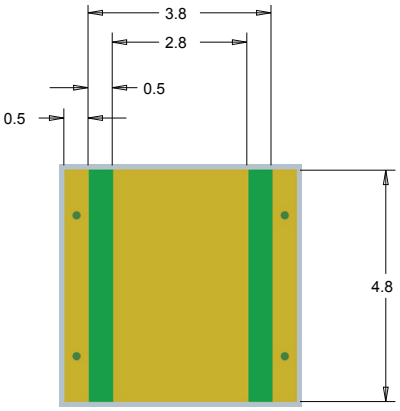




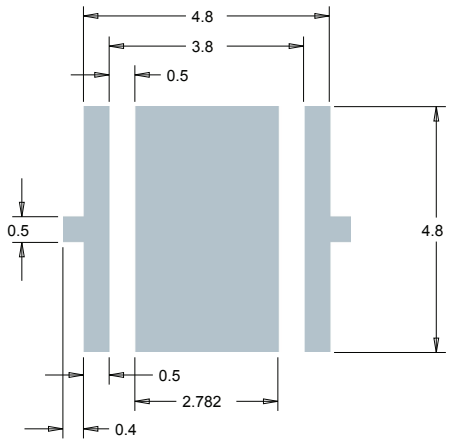
Top View



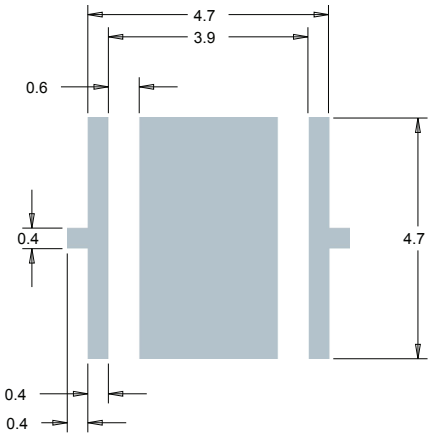
Side View



Bottom View



Recommended PCB Solder Pad



Recommended Stencil Pattern
(Shaded Area Is Open)

Cree, Inc.
4600 Silicon Drive
Durham, NC 27703
USA Tel: +1.919.313.5300
www.cree.com/xlamp