

## PRELIMINARY

# Cree® XLamp® XB-G HVW LEDs



### PRODUCT DESCRIPTION

The XLamp XB-G High-Voltage White (HVW) LED brings next-generation performance, price and size to all LED lighting applications. The XB-G HVW LED's footprint enables smaller designs with densely packed arrays for better light mixing and concentration.

XB-G HVW shares common footprint and uniform package design across all white and color configurations, simplifying board and optical designs for many LED systems. XB-G HVW is optimized to dramatically lower system cost in any illumination application, from indoor and outdoor lighting to architectural and transportation lighting.

### FEATURES

- Cree's smallest lighting class LED: 2.45 X 2.45 mm
- XB-G HVW binned @ 85 °C;
- Available in white, 80-minimum CRI white
- 200 mA maximum drive current
- Wide viewing angle: 140°
- Reflow solderable - JEDEC J-STD-020C compatible
- Unlimited floor life at  $\leq 30\text{ }^{\circ}\text{C}/85\%\text{ RH}$
- Electrically neutral thermal path
- RoHS- and REACH-compliant

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## CHARACTERISTICS

Characteristics	Unit	Minimum	Typical	Maximum
Thermal resistance, junction to solder point	°C/W		5.5	
Viewing angle (FWHM)	degrees		140	
Temperature coefficient of voltage	mV/°C		-17	
ESD classification (HBM per Mil-Std-883D)			Class 2	
DC forward current	mA		44	200
Reverse voltage	V			-0.1
Forward voltage (@ 44 mA, 85 °C)	V		22.5	
LED junction temperature	°C			150

## FLUX CHARACTERISTICS (T<sub>j</sub> = 85 °C)

The following table provides several base order codes for XLamp XB-G HVW 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. For more order codes, as well as a complete description of the order-code nomenclature, please consult the XLamp XB Family Binning and Labeling document.

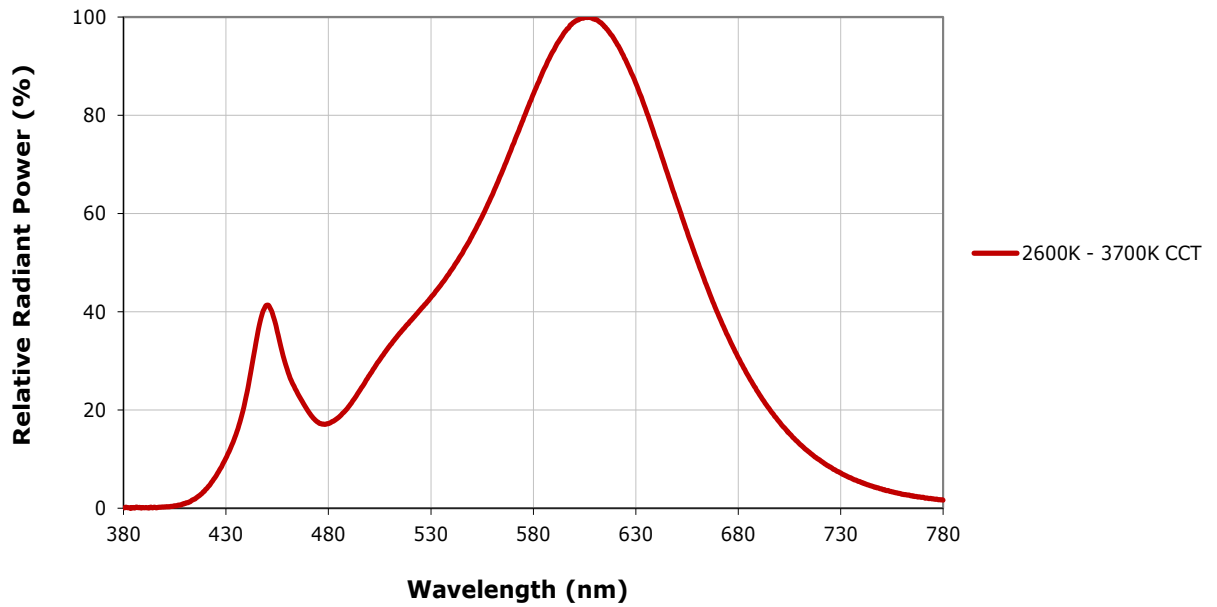
Color	CCT Range		Base Order Codes Min. Luminous Flux @ 44 mA			Calculated Minimum Luminous Flux (lm)**		Order Code
	Min.	Max.	Group	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*	60 mA	100 mA	
80 CRI Minimum White	3200 K	3700 K	Q3	93.9	105.3	123.6	189.9	XBGHVW-H0-0000-00000HBP6
	2000 K	3200 K	Q3	93.9	105.3	123.6	189.9	XBGHVW-H0-0000-00000HBD9
	1900 K	2000 K	Q3	93.9	105.3	123.6	189.9	XBGHVW-H0-0000-00000HBE9
Warm White	2000 K	3200 K	Q3	93.9	105.3	123.6	189.9	XBGHVW-H0-0000-00000LBD9
	1900 K	2000 K	Q3	93.9	105.3	123.6	189.9	XBGHVW-H0-0000-00000LBE9

### Notes:

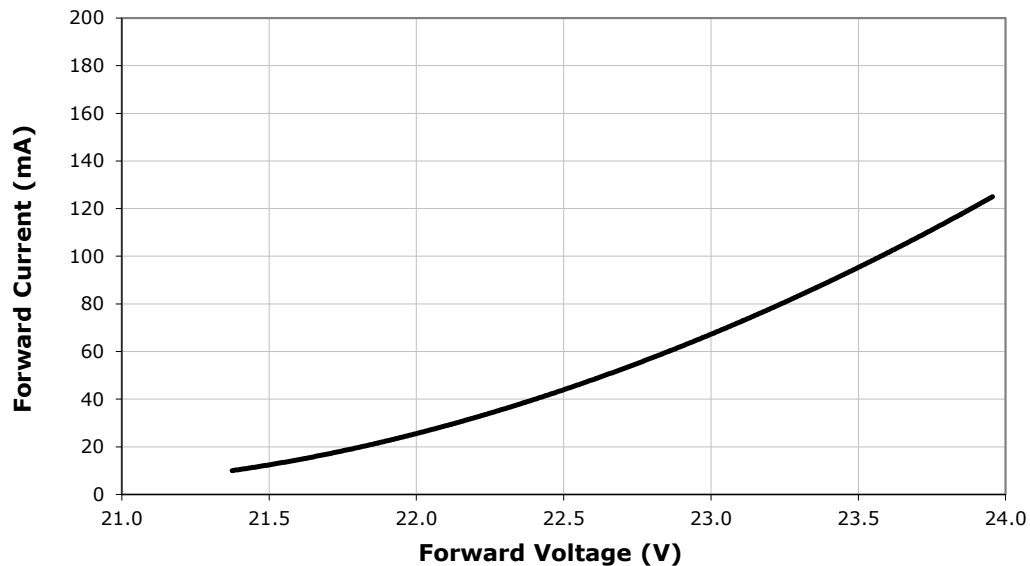
- Cree maintains a tolerance of  $\pm 7\%$  on flux and power measurements,  $\pm 0.005$  on chromaticity (CCx, CCy) measurements and  $\pm 2$  on CRI measurements.
- Typical CRI for Warm White, 1900 K - 3200 K CCT is 80.
- Minimum CRI for 80 CRI Minimum White is 80.
- \* Flux values @ 25 °C are calculated and are for reference only.
- \*\* Calculated flux values at 100 mA and 200 mA are for 85 °C and are for reference only.

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## RELATIVE SPECTRAL POWER DISTRIBUTION



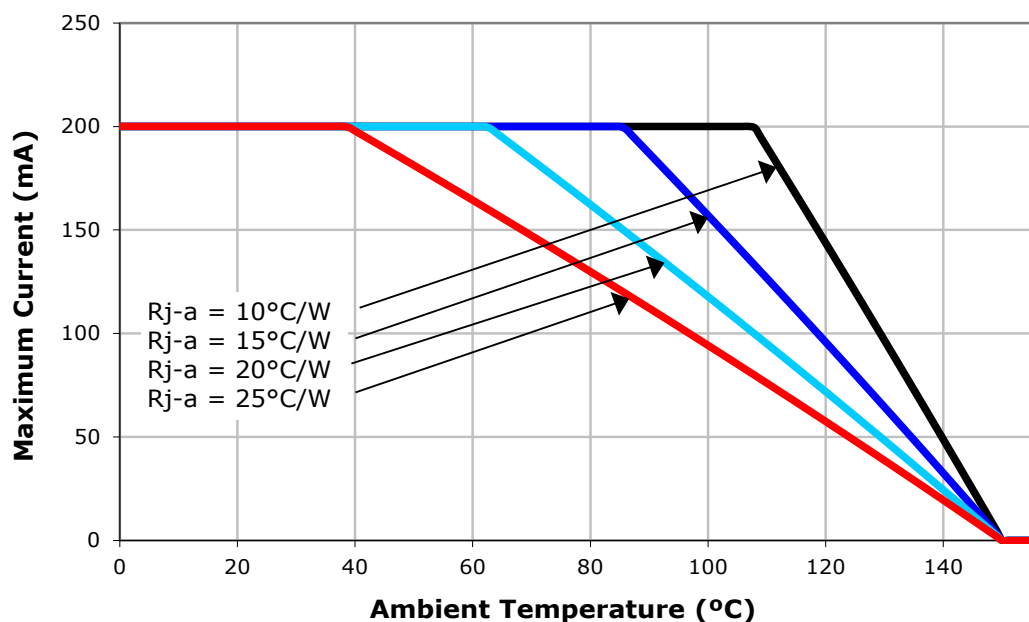
## ELECTRICAL CHARACTERISTICS ( $T_j = 85\text{ }^{\circ}\text{C}$ )



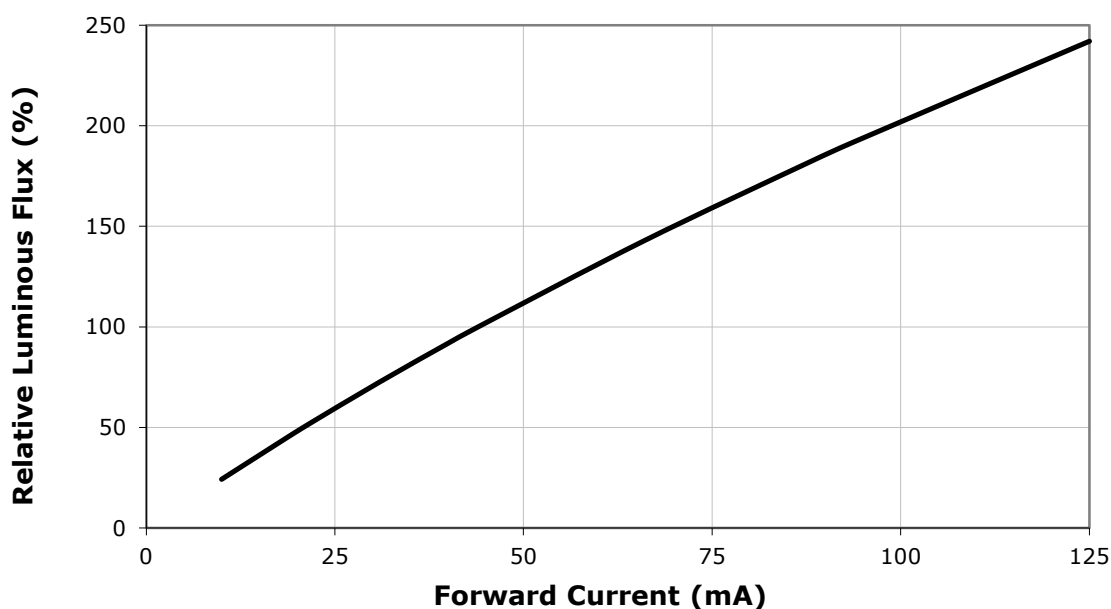
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## THERMAL DESIGN

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.

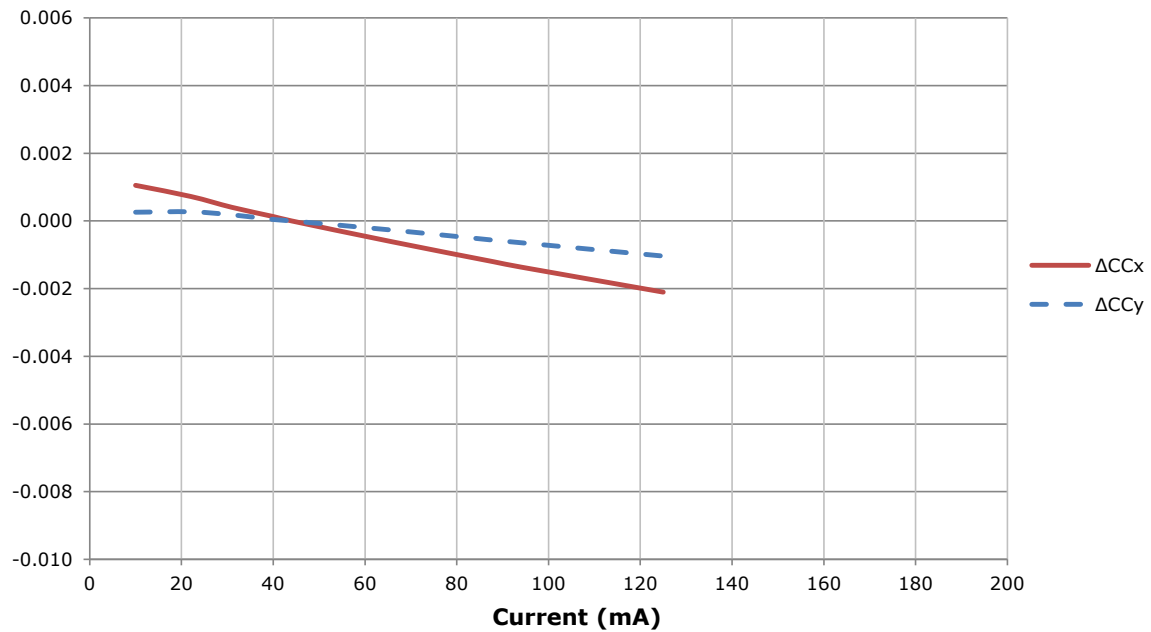


## RELATIVE FLUX VS. CURRENT ( $T_j = 85^{\circ}\text{C}$ )

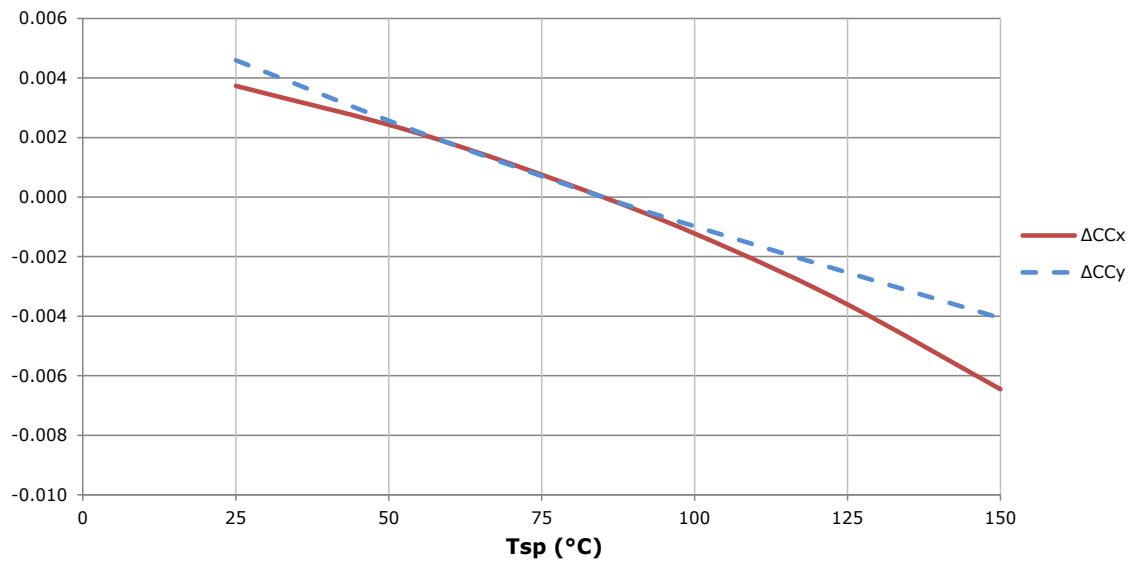


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### RELATIVE CHROMATICITY VS. CURRENT (WARM WHITE)

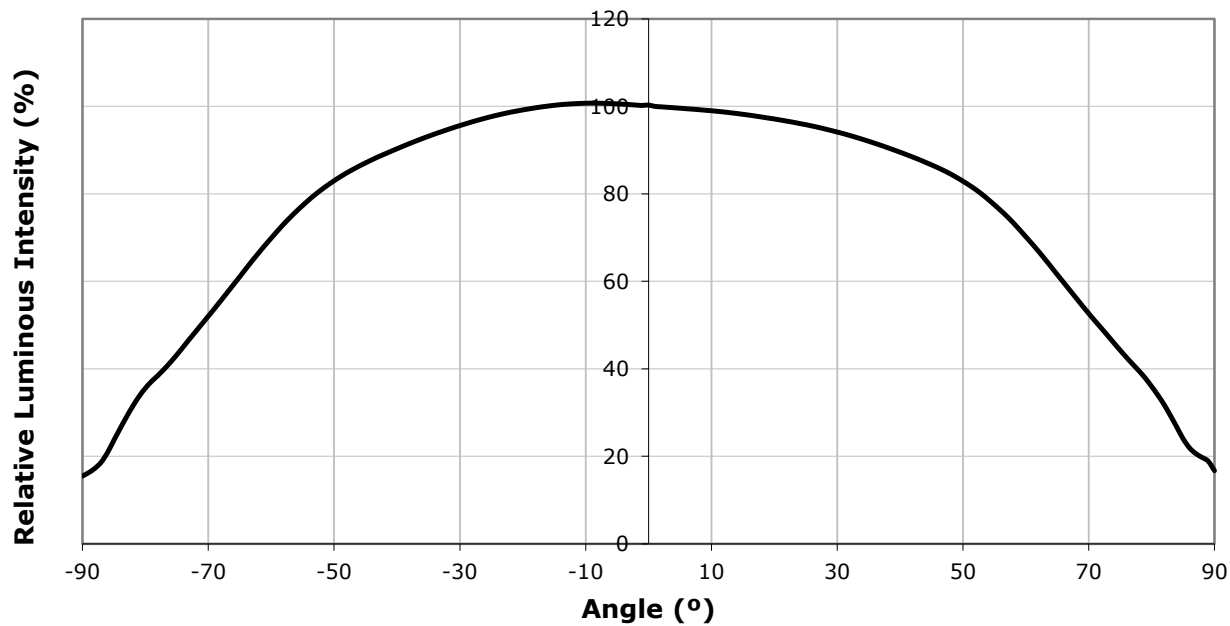


### RELATIVE CHROMATICITY VS. TEMPERATURE (WARM WHITE)



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## TYPICAL SPATIAL DISTRIBUTION

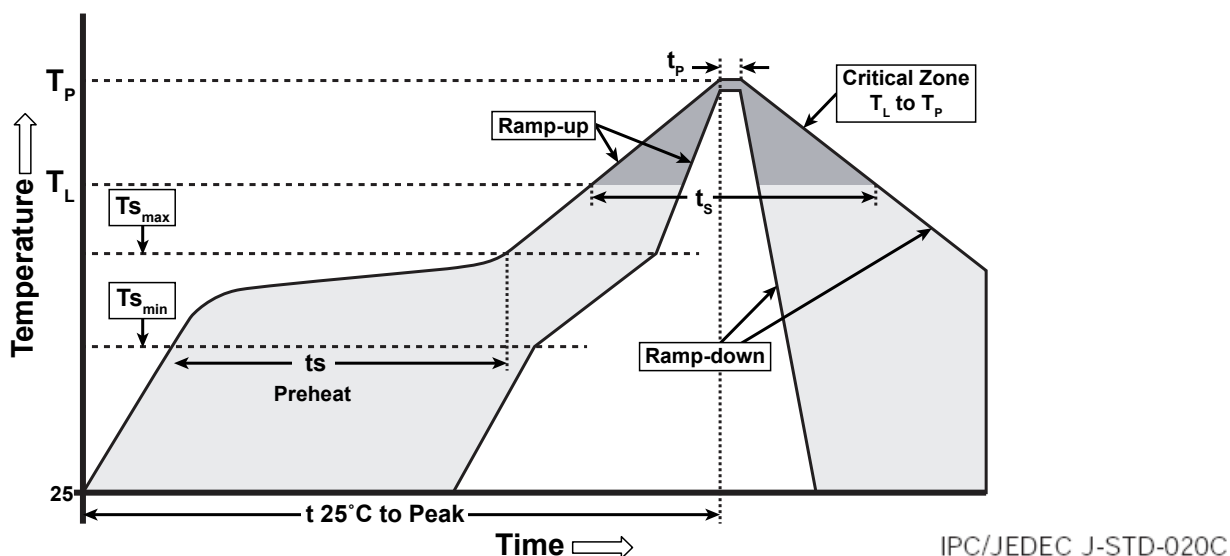


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## REFLOW SOLDERING CHARACTERISTICS

In testing, Cree has found XLamp XB-G HVW 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.



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 topside of the package, measured on the package body surface.

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### NOTES

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#### 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](http://www.cree.com/xlamp_app_notes/LM80_results).

Please read the XLamp Long-Term Lumen Maintenance application note at [www.cree.com/xlamp\\_app\\_notes/lumen\\_maintenance](http://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](http://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 XB-G HVW 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.

#### 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 amended through June 8, 2011. RoHS Declarations for this product can be obtained from your Cree representative or obtained from the Product Ecology section of [www.cree.com](http://www.cree.com).

#### REACH Compliance

REACH substances of high concern (SVHCs) information is available for this product. Since the European Chemical Agency (ECHA) has published notices 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 Declaration. Historical REACH banned substance information (substances restricted or banned in the EU prior to 2010) is also available upon request.

#### Vision Advisory Claim

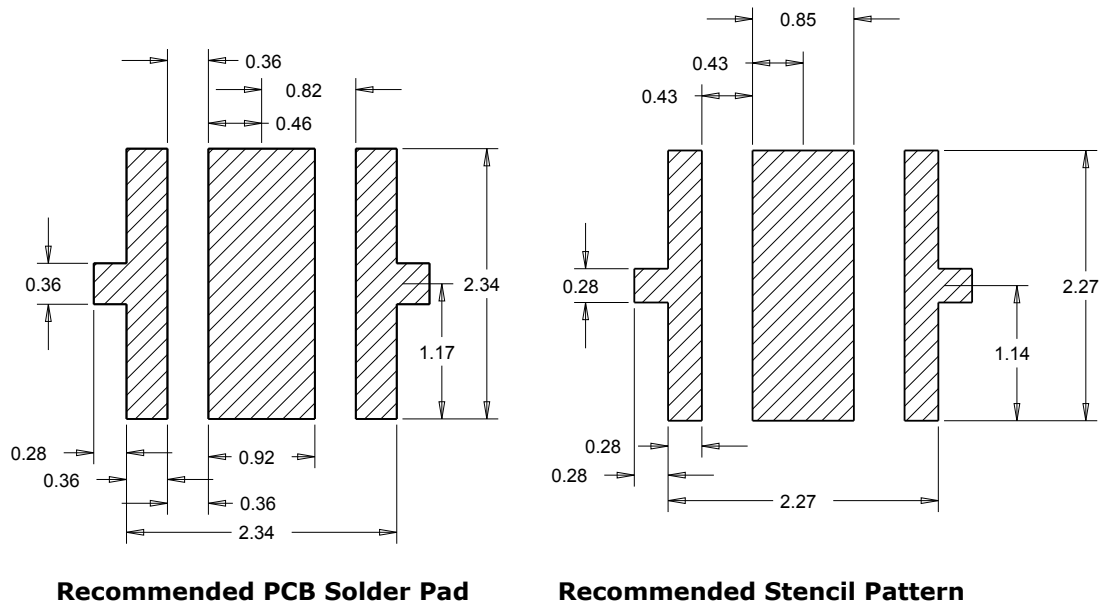
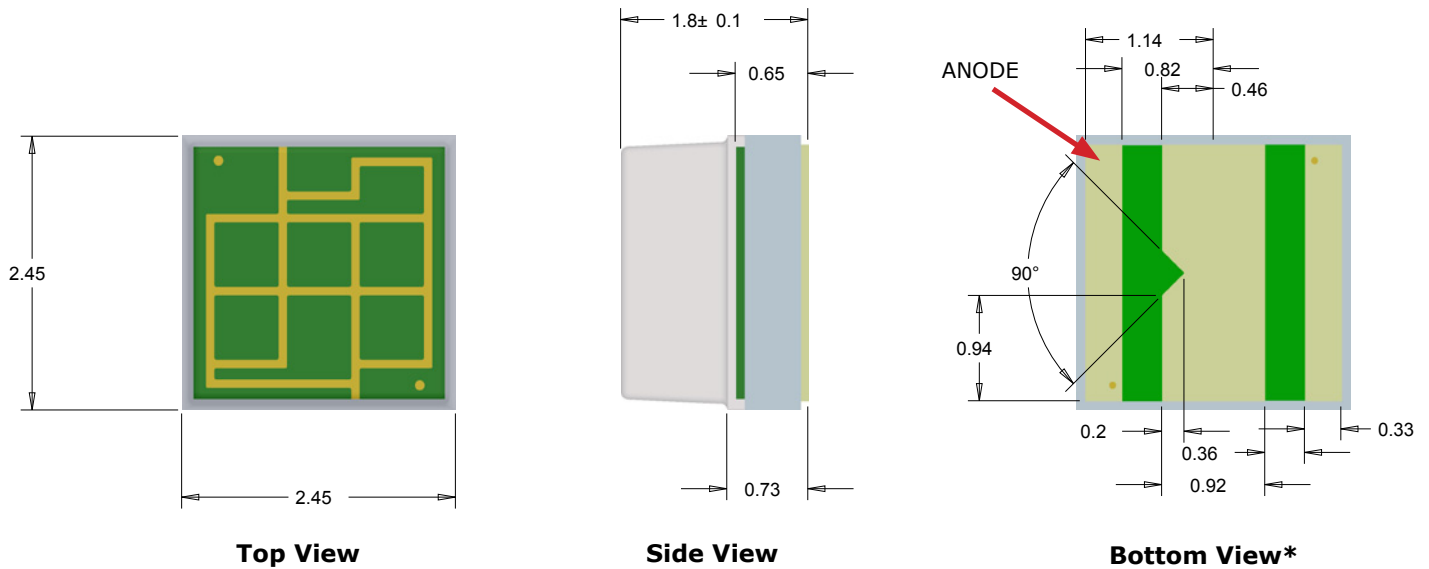
**WARNING:** Do not look at exposed lamp in operation. Eye injury can result. See the LED Eye Safety application note at [www.cree.com/xlamp\\_app\\_notes/led\\_eye\\_safety](http://www.cree.com/xlamp_app_notes/led_eye_safety).



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## MECHANICAL DIMENSIONS

All measurements are  $\pm 0.13$  mm unless otherwise indicated.



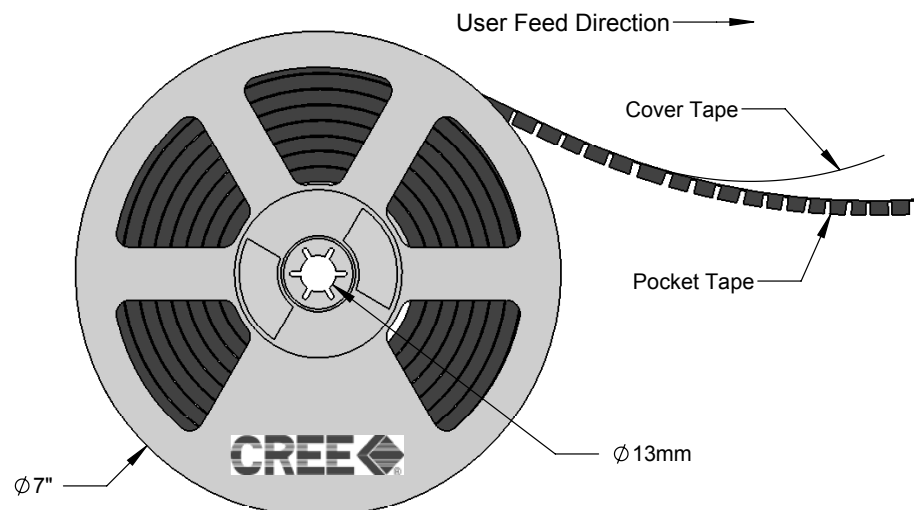
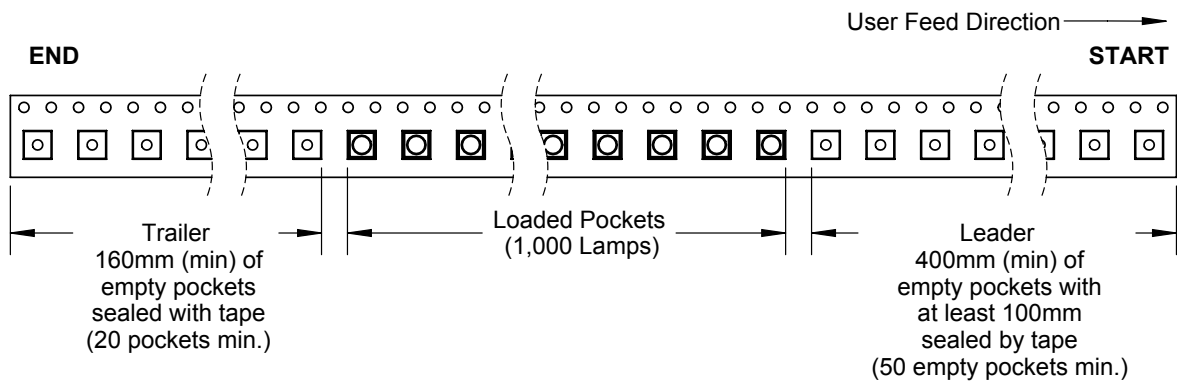
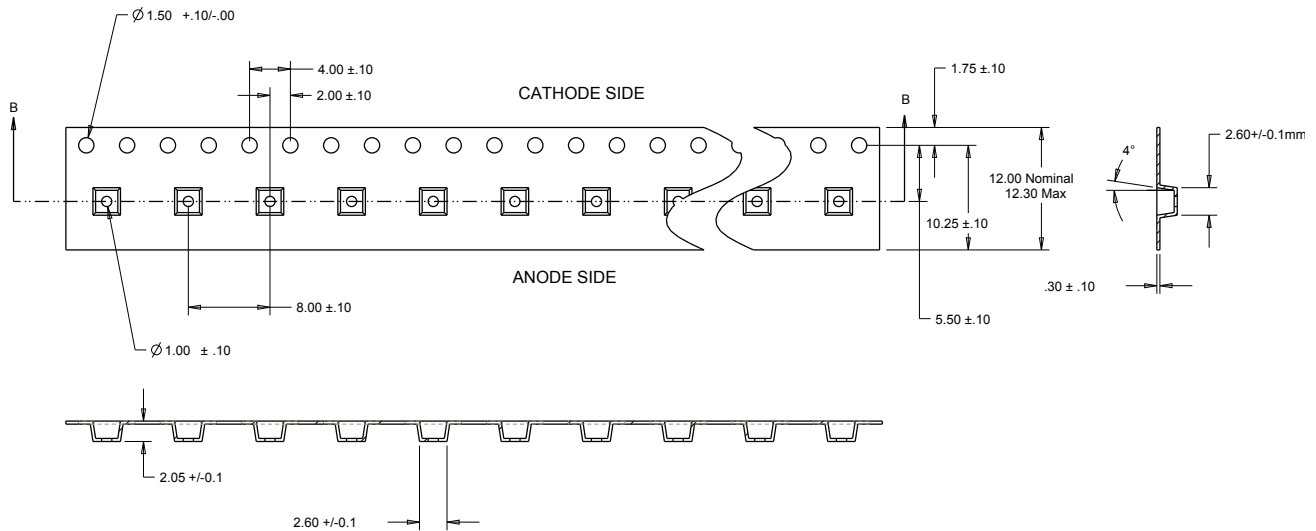
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## TAPE AND REEL

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

All dimensions in mm

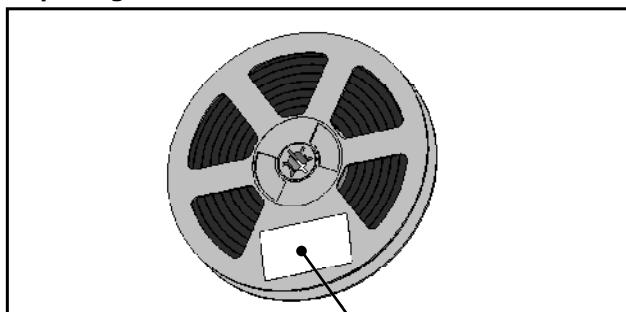
Tolerance unless specified: .XX ± .25, .XXX ± .125, X° ± .5°



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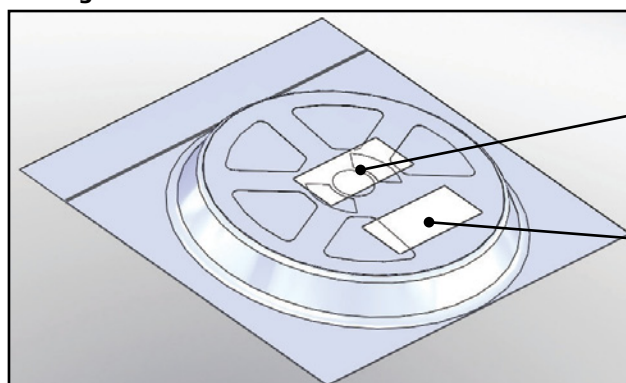
## PACKAGING

**Unpackaged Reel**



Label with Cree Bin  
Code, Qty, Reel ID

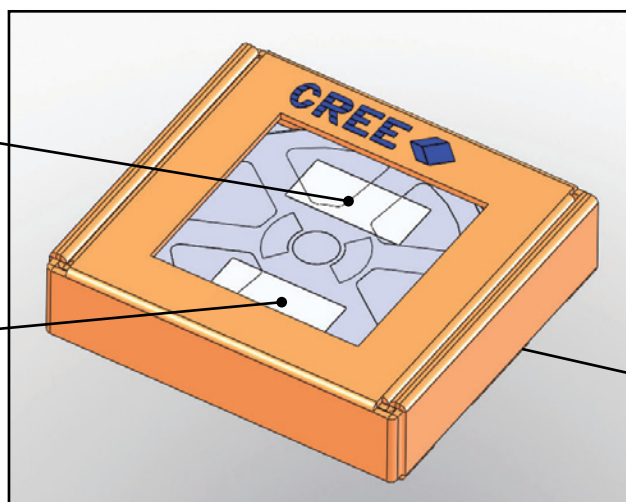
**Packaged Reel**



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  
(on bottom of box)