

Cree® XLamp® XH-G LED



PRODUCT DESCRIPTION

Cree XLamp XH-G LEDs redefine mid-power LEDs by delivering lighting-class reliability and a wider spread of light than typical plastic packages. The XH-G's wide light emission enables a smooth look in replacement tubes and panel lights while improving the lifetime and reliability of the system.

The XH-G is designed to improve reliability in the mid-power LED area in non-directional and outdoor area lighting applications.

FEATURES

- Package size: 3.0 X 3.0 mm
- Available in white, 80-minimum CRI white and 70-minimum CRI cool white
- 300 mA maximum drive current
- Low thermal resistance: 20 °C/W
- Viewing angle: 130°
- Reflow solderable - JEDEC J-STD-020C compatible
- Unlimited floor life at ≤ 30 °C/85% RH

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CHARACTERISTICS

Characteristics	Unit	Minimum	Typical	Maximum
Thermal resistance, junction to solder point	°C/W		20	
Viewing angle (FWHM)	degrees		130	
Temperature coefficient of voltage	mV/°C		-1.5	
ESD classification (HBM per Mil-Std-883D)			Class 2	
DC forward current	mA		65	300
Reverse voltage	V			-5
Forward voltage (@ 65 mA, 25 °C)	V		2.9	3.4
LED junction temperature	°C			150

FLUX CHARACTERISTICS (T_j = 25 °C)

The following table provides several base order codes for XLamp XH-G 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 XH Family Binning and Labeling document.

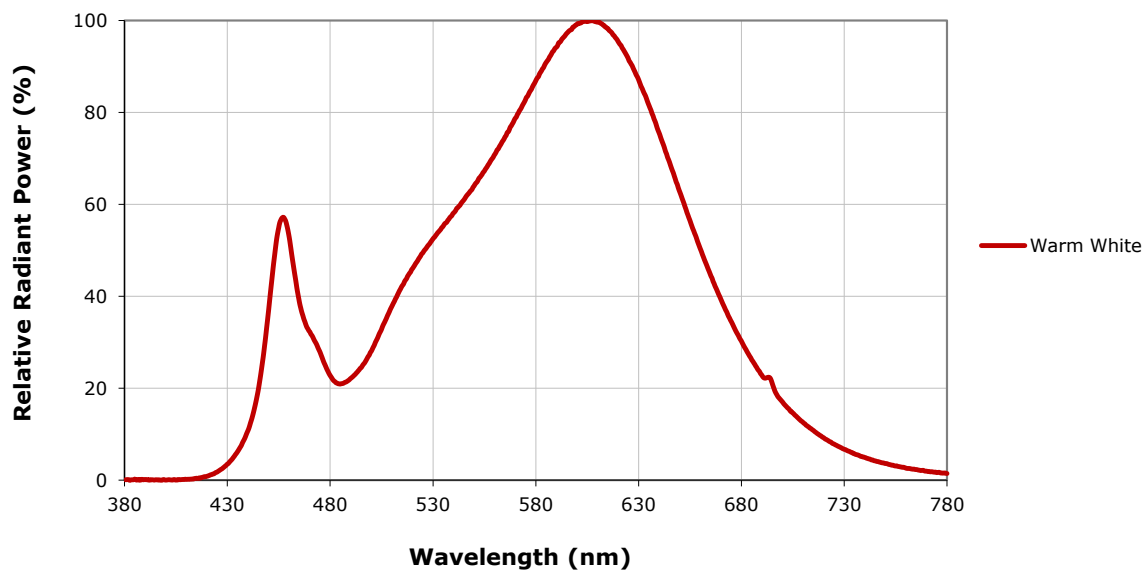
Color	CCT Range		Base Order Codes Minimum Luminous Flux @ 65 mA		Calculated Minimum Luminous Flux (lm)*	Order Code
	Min.	Max.	Group	Flux (lm)	300 mA	
Cool White	5000 K	8300 K	J3	26.8	100.3	XHGAWT-00-0000-00000HX51
Neutral White	3700 K	5000 K	J3	26.8	100.3	XHGAWT-00-0000-00000HXE5
Warm White	2600 K	3700 K	J2	23.5	87.9	XHGAWT-00-0000-00000HWE7

Notes:

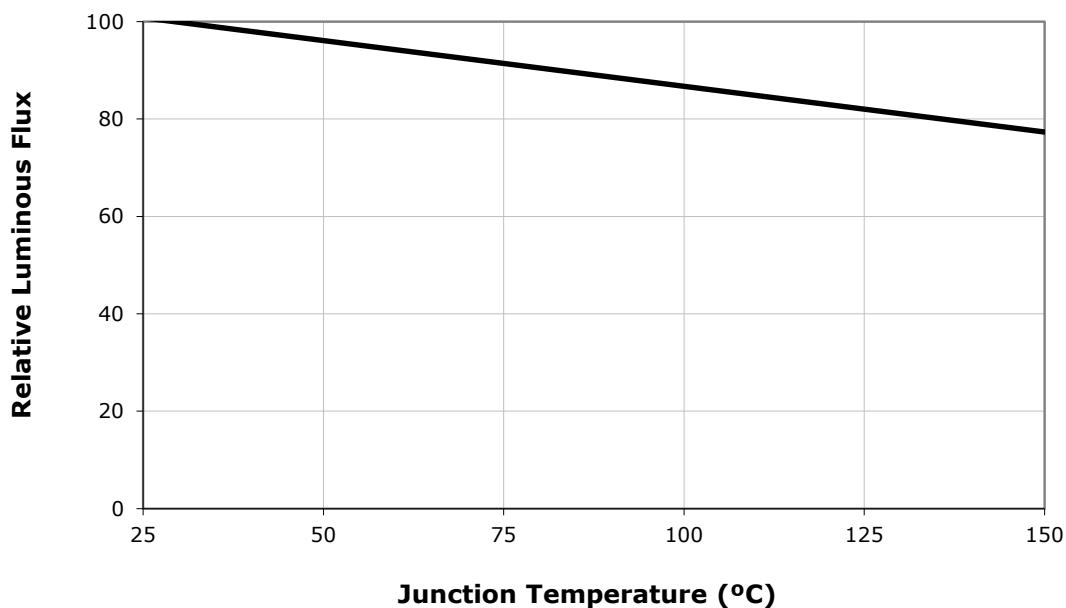
- Cree maintains a tolerance of $\pm 7\%$ on flux and power measurements, ± 0.005 on chromaticity (CCx, CCy) measurements and ± 2 on CRI measurements.
- Typical CRI for Neutral White, 3700 K - 5000 K CCT is 75.
- Typical CRI for Warm White, 2600 K - 3700 K CCT is 80.
- Minimum CRI for 70 CRI Minimum Cool White is 70.
- Minimum CRI for 80 CRI Minimum White is 80.

* Calculated flux values at 300 mA are for reference only.

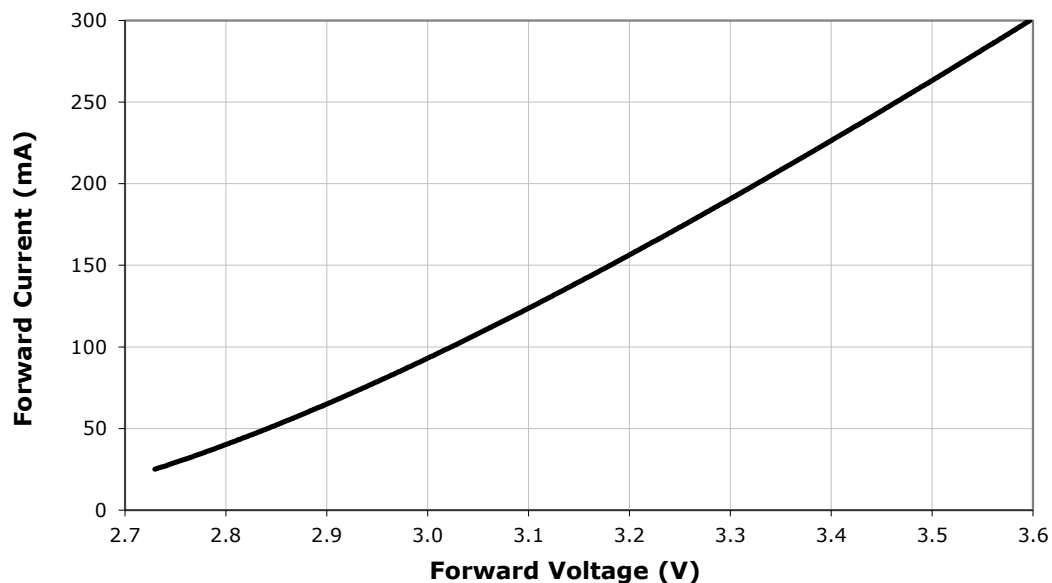
RELATIVE SPECTRAL POWER DISTRIBUTION



RELATIVE FLUX VS. JUNCTION TEMPERATURE ($I_F = 65$ mA)

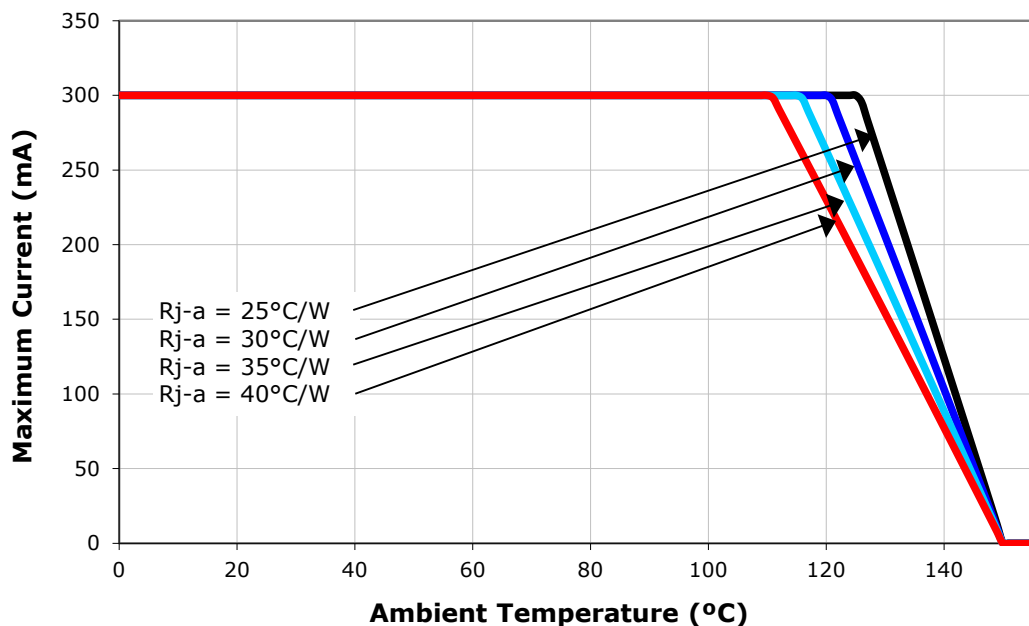


ELECTRICAL CHARACTERISTICS ($T_j = 25^\circ\text{C}$)

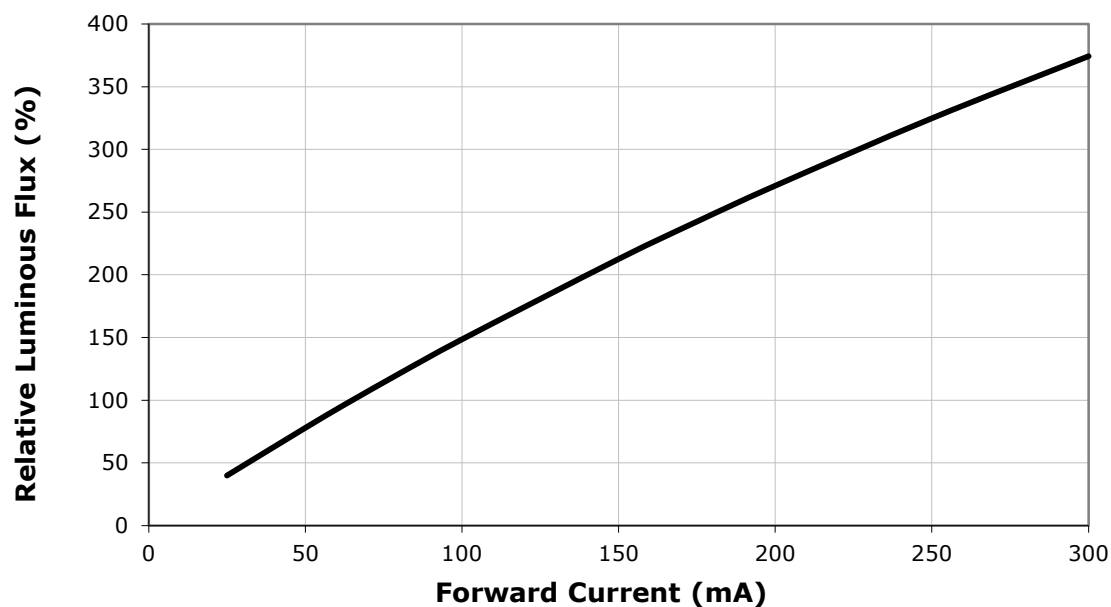


THERMAL DESIGN

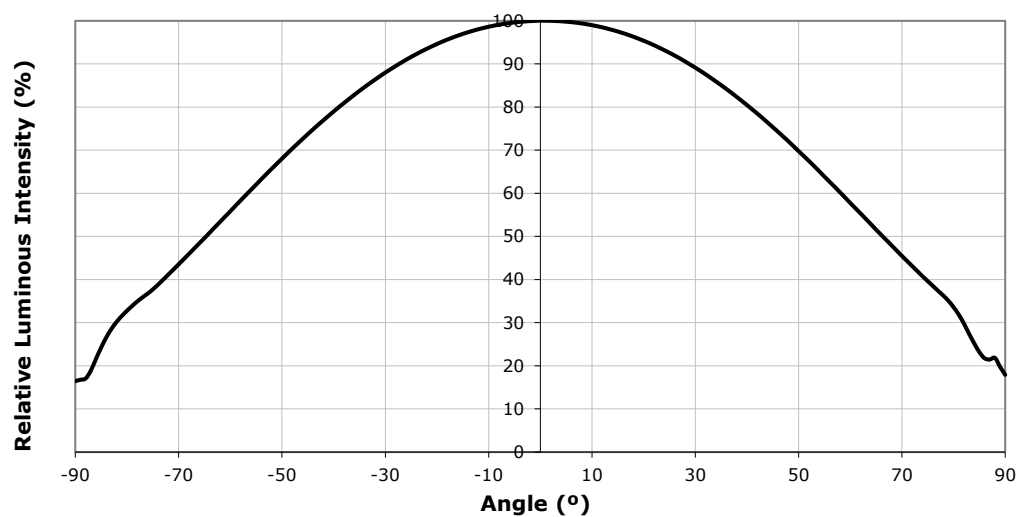
The maximum forward current is determined by the thermal resistance between the LED junction and ambient. It is crucial for the end product to be designed in a manner that minimizes the thermal resistance from the solder point to ambient in order to optimize lamp life and optical characteristics.



RELATIVE FLUX VS. CURRENT ($T_j = 25\text{ }^{\circ}\text{C}$)



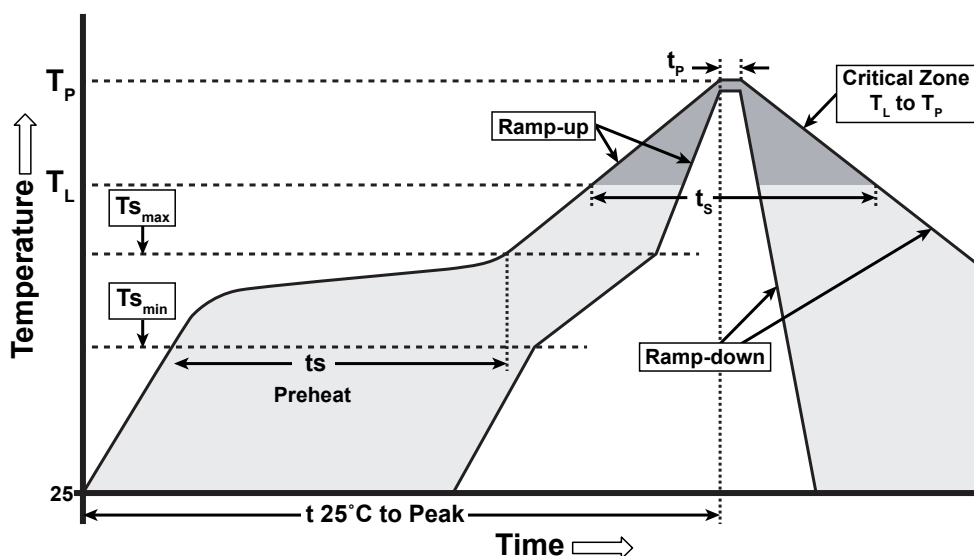
TYPICAL SPATIAL DISTRIBUTION



REFLOW SOLDERING CHARACTERISTICS

In testing, Cree has found XLamp XH-G 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.

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 read 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 XH-G 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.

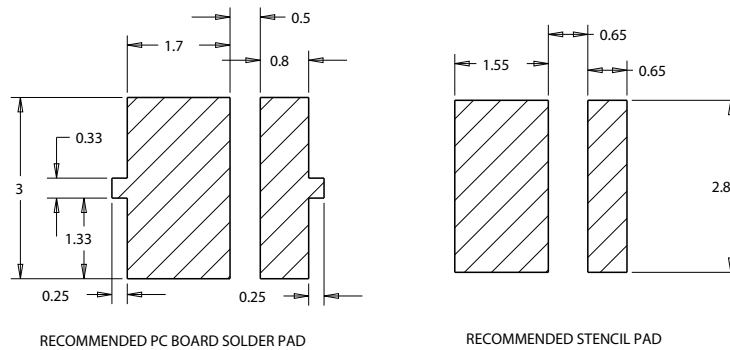
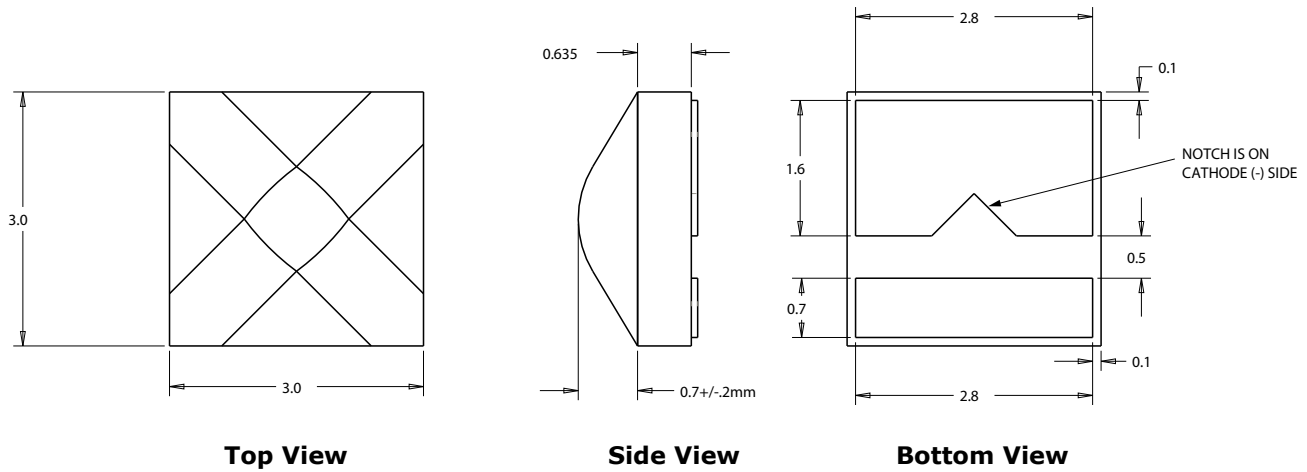
Vision Advisory Claim

WARNING: Do not look at exposed lamp in operation. Eye injury can result. See the LED Eye Safety application note at www.cree.com/xlamp_app_notes/led_eye_safety.

MECHANICAL DIMENSIONS

All dimensions in mm.

Measurement tolerances unless indicated otherwise: .xx = .25 mm, .xxx = .125 mm

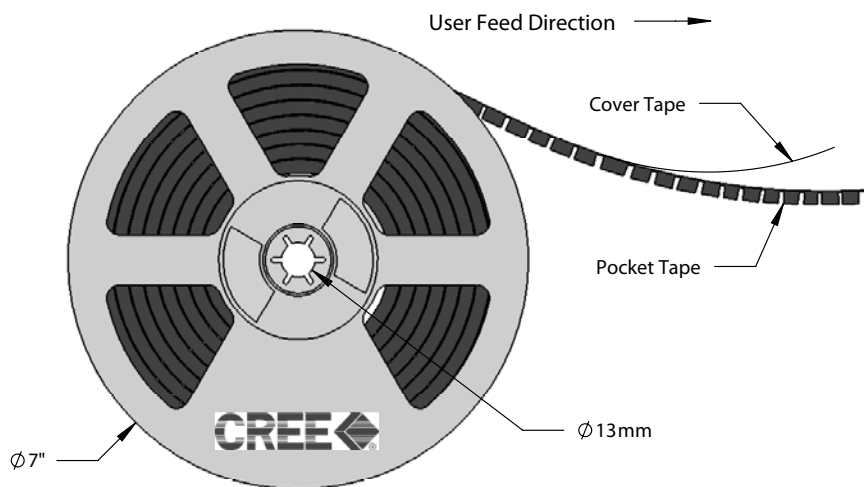
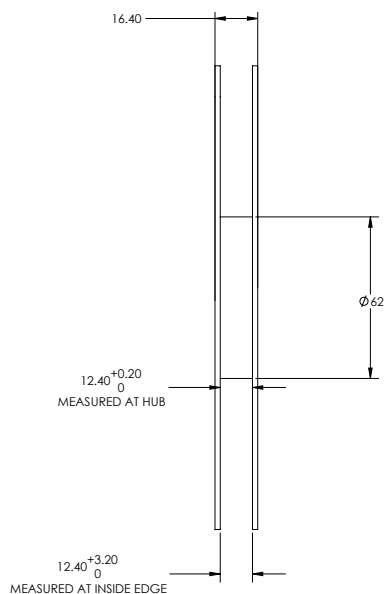
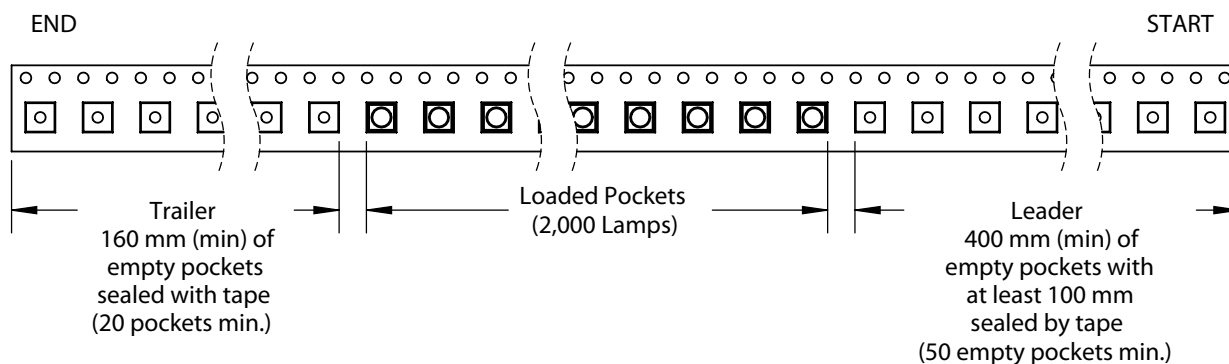
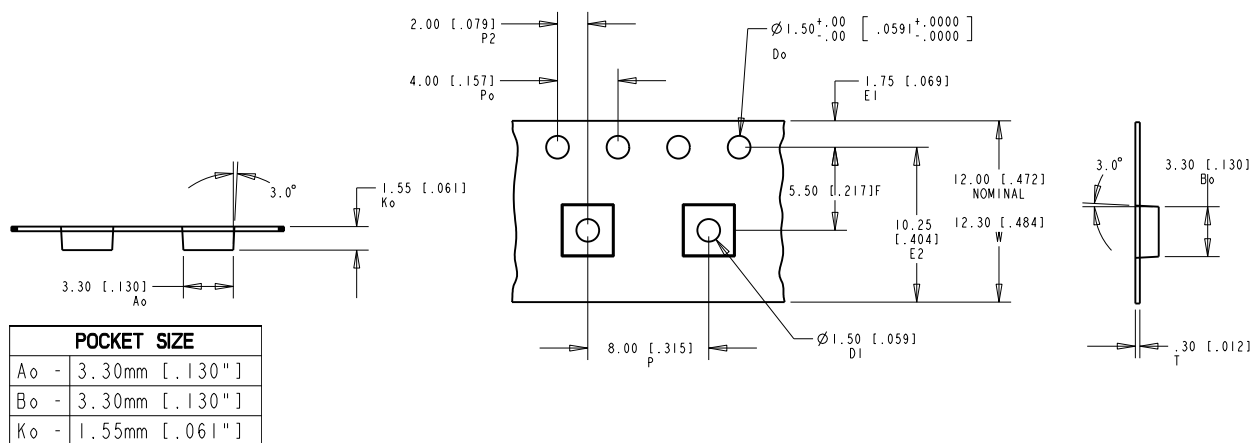


TAPE AND REEL

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

All dimensions in mm.

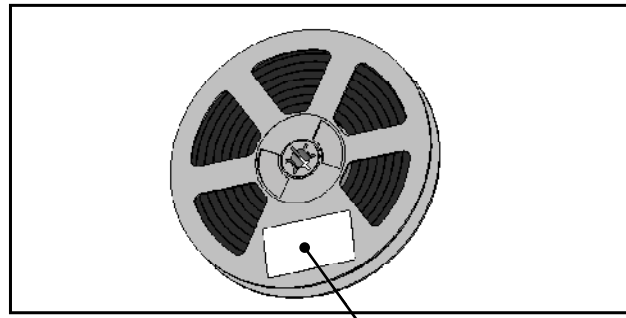
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PACKAGING

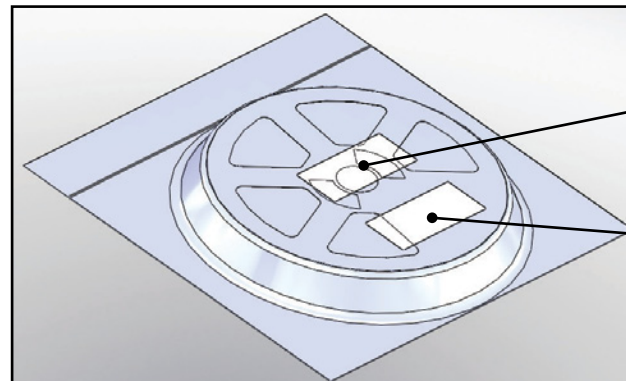
The diagrams below show the packaging and labels Cree uses to ship XLamp XH-G LEDs. XLamp XH-G LEDs are shipped in tape loaded on a reel. Each box contains only one reel in a moisture barrier bag.

Unpackaged Reel



Label with Cree Bin Code, Qty, Reel ID

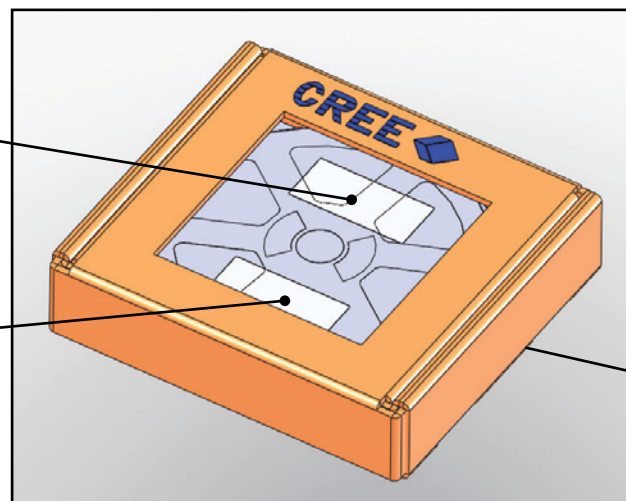
Packaged Reel



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)