PRODUCT FAMILY DATA SHEET

Cree® XLamp® XH-G LED

PRODUCT DESCRIPTION

Unlike common plastic packages, XLamp XH LEDs use a ceramic package to deliver the unique combination of high performance and reliability not available elsewhere in mid-power LEDs. The ceramic-based XH LEDs are designed to deliver the long L70 lifetimes of Cree's other high-power LEDs, such as XP or XT LEDs, as well as industry-leading LED efficacy levels.

Optimized for fluorescent replacement lighting applications, such as troffers and panel lights, where high efficacy, long lifetime and smooth appearance are critical, the XH LEDs allow lighting manufacturers to offer products that meet the lifetime expectations of LED technology.

FEATURES

- Package size: 3.0 X 3.0 mm
- Available in white, 70-minimum CRI cool white, 80-minimum CRI white and 85- and 90-minimum CRI warm white
- 350 mA maximum drive current
- Viewing angle: 130°
- Reflow solderable - JEDEC J-STD-020C compatible
- Unlimited floor life at ≤ 30 °C/85% RH
- RoHS- and REACh-compliant
- UL-recognized component (E349212)

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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		-1.2	
ESD withstand voltage (HBM per Mil-Std-883D)	V			8000
DC forward current	mA			350
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	113	XHGAWT-00-0000-00000LX51
Neutral White	3700 K	5000 K	J3	26.8	113	XHGAWT-00-0000-00000LXE5
Warm White	2600 K	3700 K	J3	26.8	113	XHGAWT-00-0000-00000LXE7
70-CRI White	5000 K	8300 K	J3	26.8	113	XHGAWT-00-0000-00000BX51
	3700 K	5000 K	J3	26.8	113	XHGAWT-00-0000-00000BXE5
	2600 K	3700 K	J3	26.8	113	XHGAWT-00-0000-00000BXE7
80-CRI White	5000 K	8300 K	J3	26.8	113	XHGAWT-00-0000-00000HX51
	3700 K	5000 K	J3	26.8	113	XHGAWT-00-0000-00000HXE5
	2600 K	3700 K	J3	26.8	113	XHGAWT-00-0000-00000HXE7
85-CRI White	2600 K	3200 K	H0	18.1	76	XHGAWT-00-0000-00000PVE7
90-CRI White	2600 K	3200 K	H0	18.1	76	XHGAWT-00-0000-00000UVE7

Notes:
- Cree maintains a tolerance of ±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.
- Minimum CRI for 85-CRI Minimum White is 85.
- Minimum CRI for 90-CRI Minimum White is 90.
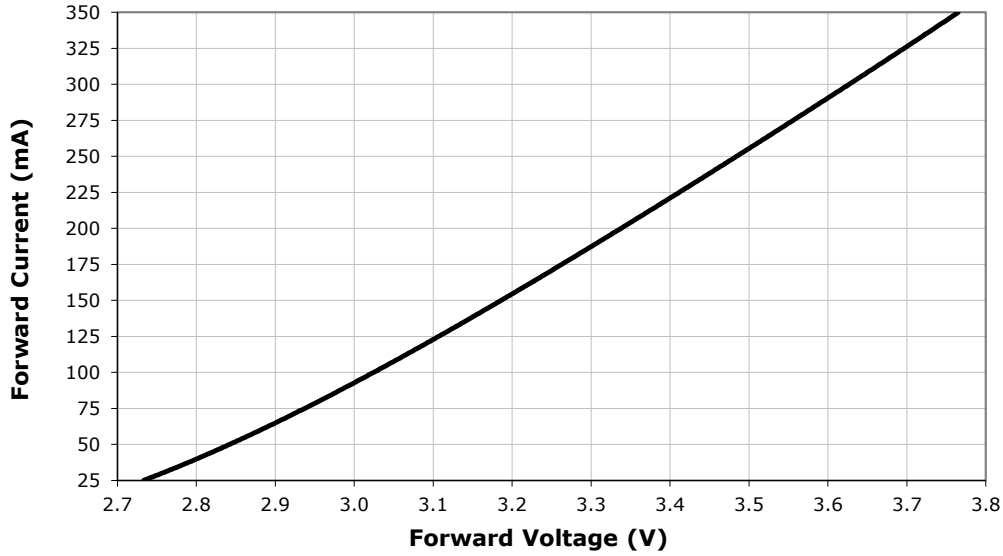* Calculated flux values at 300 mA are for reference only.
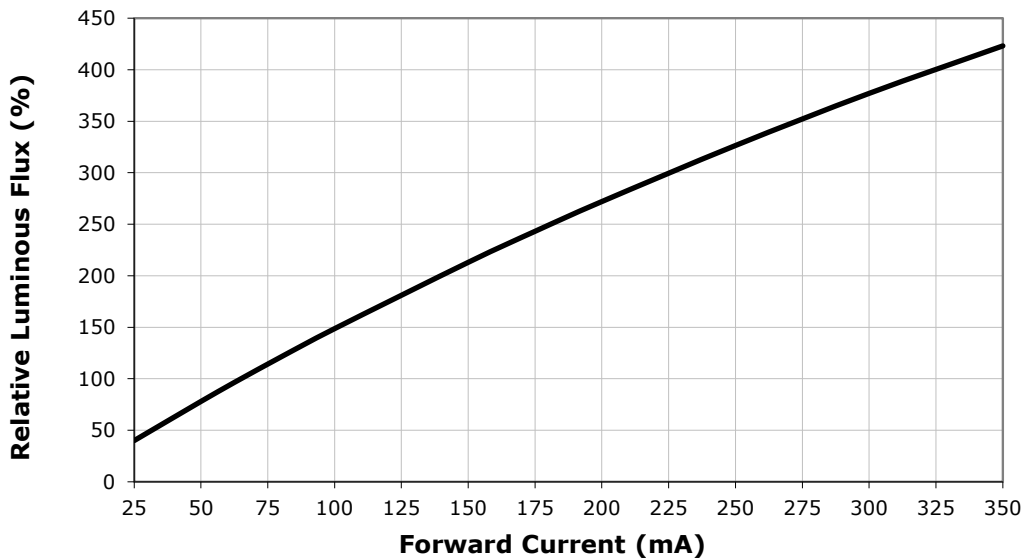
RELATIVE SPECTRAL POWER DISTRIBUTION
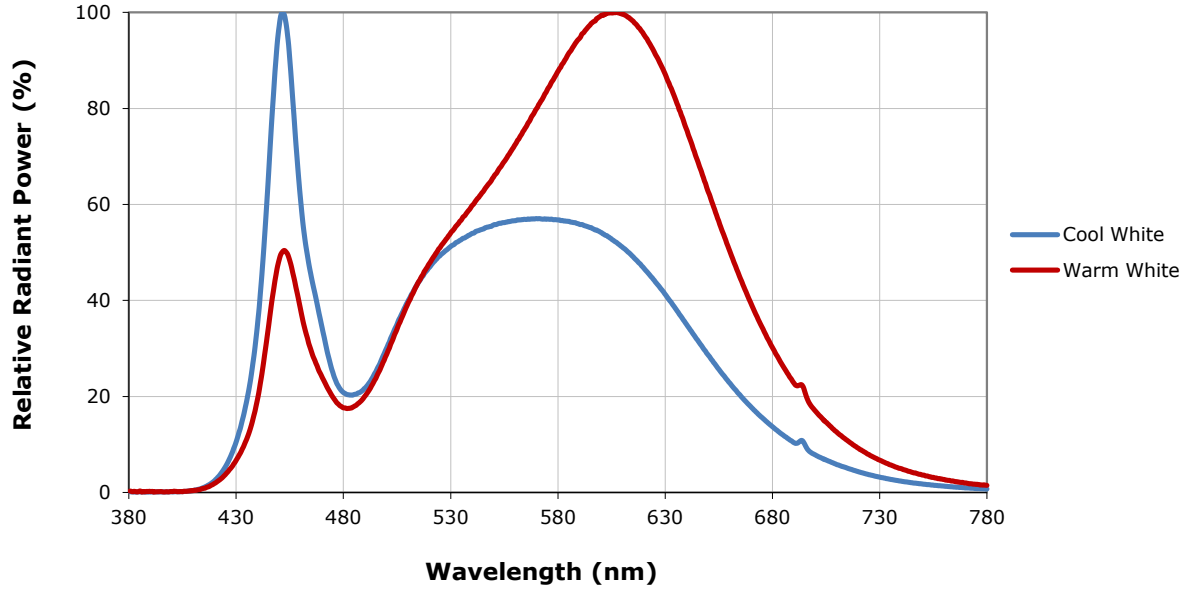
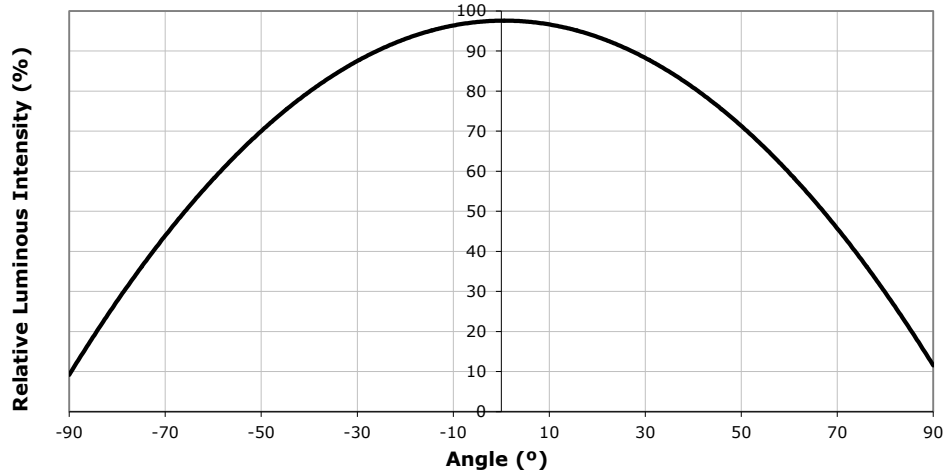

RELATIVE FLUX VS. JUNCTION TEMPERATURE (I_F = 65 mA)
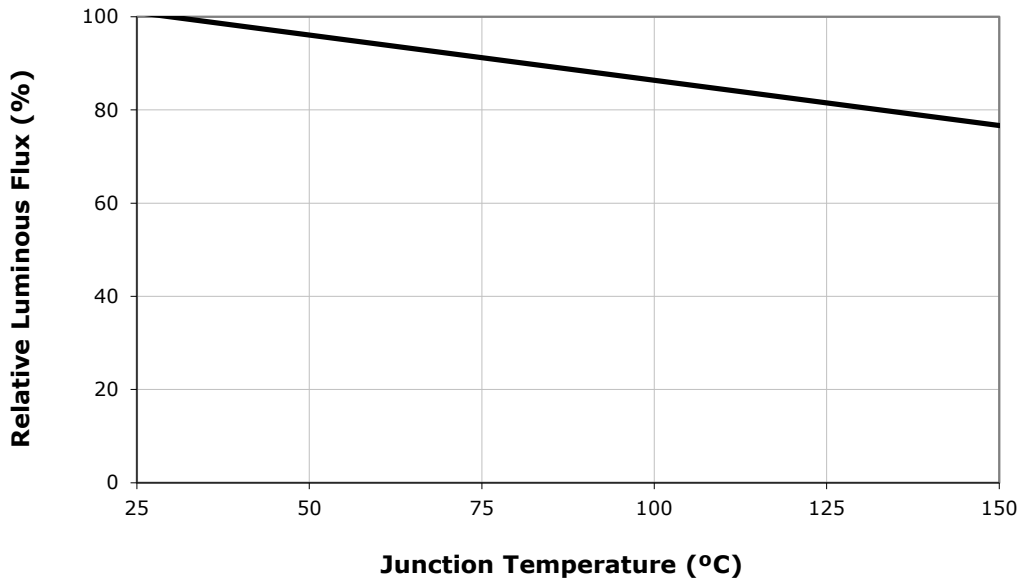
ELECTRICAL CHARACTERISTICS (T$_J$ = 25 °C)

## RELATIVE FLUX VS. CURRENT (T$_J$ = 25 °C)

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.
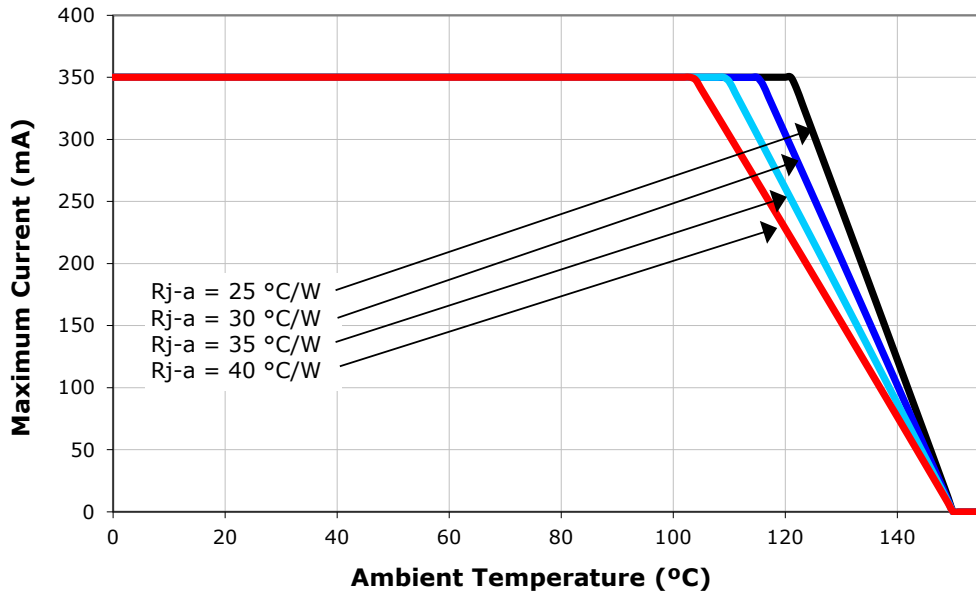
REFLOW SOLDERING CHARACTERISTICS

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.
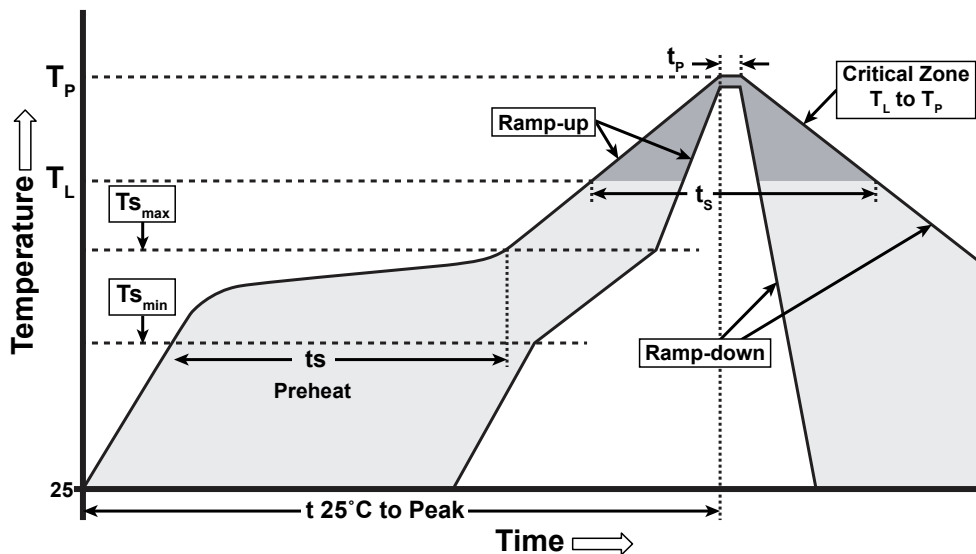
Profile Feature	Lead-Based Solder	Lead-Free Solder
Average Ramp-Up Rate (Ts_{max} to Tp)	3 °C/second max.	3 °C/second max.
Preheat: Temperature Min (Ts_{min})	100 °C	150 °C
Preheat: Temperature Max (Ts_{max})	150 °C	200 °C
Preheat: Time (ts_{min} to ts_{max})	60-120 seconds	60-180 seconds
Time Maintained 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.

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 ≤30 ºC/85% relative humidity (RH). Moisture testing included a 168-hour soak at 85 ºC/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 implemented January 2, 2013. RoHS Declarations for this product can be obtained from your Cree representative or from the Product Documentation sections of 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 notice 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 SVHC Declaration. REACh banned substance information (REACh Article 67) is also available upon request.

UL Recognized Component

Level 4 enclosure consideration. The LED package or a portion thereof has been investigated as a fire and electrical enclosure per ANSI/UL 8750.
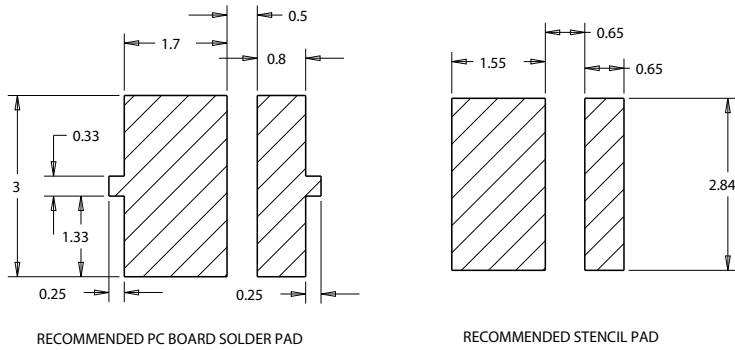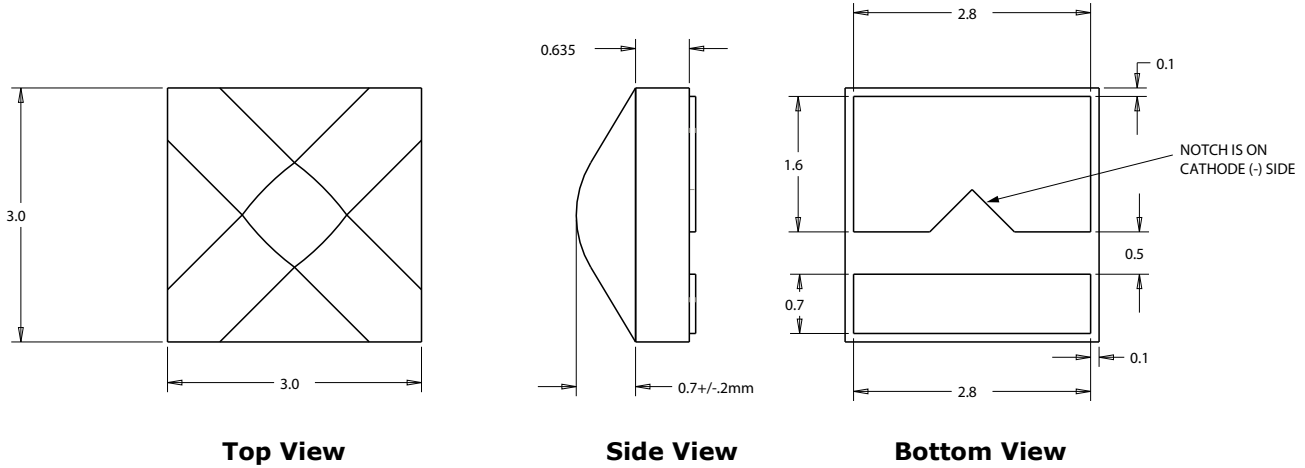
Vision Advisory Claim

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

Top View   **Side View**   **Bottom View**

NOTCH IS ON CATHODE (-) SIDE

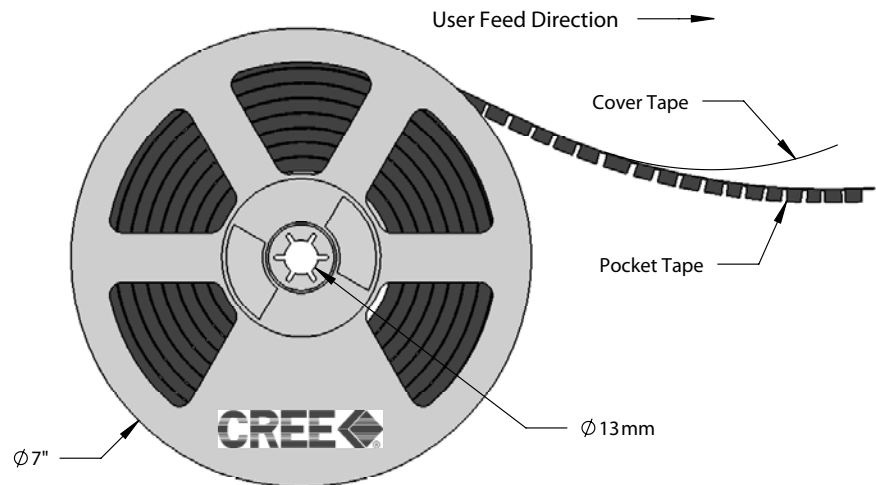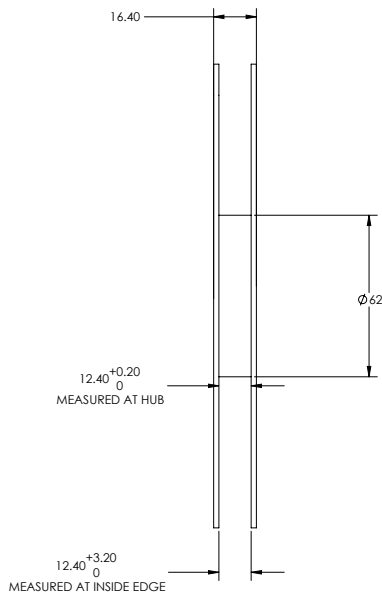RECOMMENDED PC BOARD SOLDER PAD
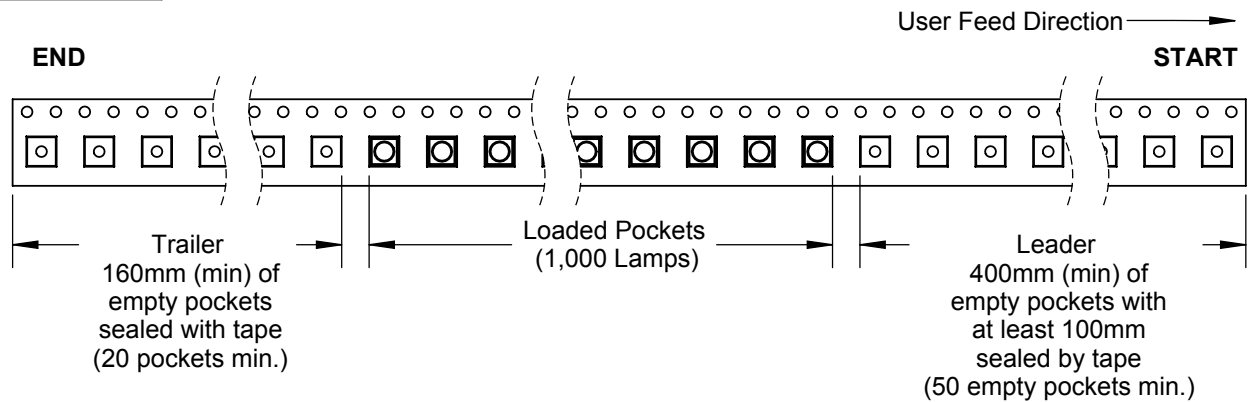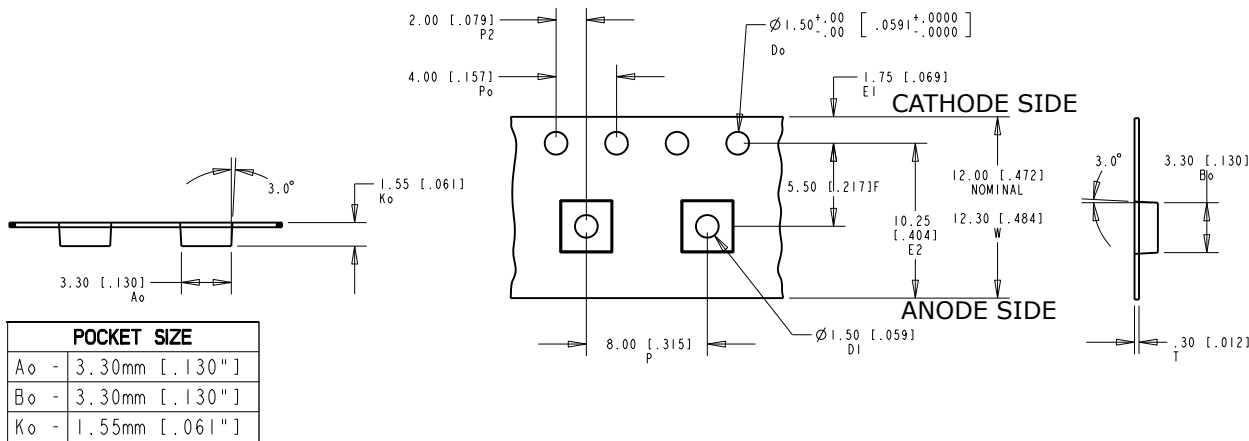
RECOMMENDED STENCIL PAD

TAPE AND REEL

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

All dimensions in mm.

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

POCKET SIZE	
Ao -	3.30mm [.130"]
Bo -	3.30mm [.130"]
Ko -	1.55mm [.061"]

CATHODE SIDE

ANODE SIDE

User Feed Direction →

END   **START**

Trailer
160mm (min) of
empty pockets
sealed with tape
(20 pockets min.)

Loaded Pockets
(1,000 Lamps)

Leader
400mm (min) of
empty pockets with
at least 100mm
sealed by tape
(50 empty pockets min.)

User Feed Direction →

Cover Tape

Pocket Tape

Ø13mm

Ø7"

16.40

Ø62

12.40 +0.20 / 0
MEASURED AT HUB

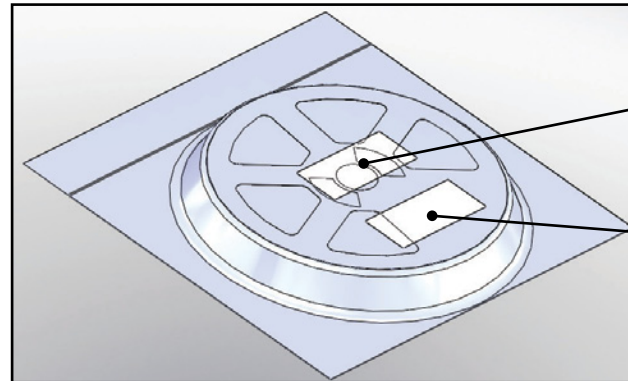12.40 +3.20 / 0
MEASURED AT INSIDE EDGE

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
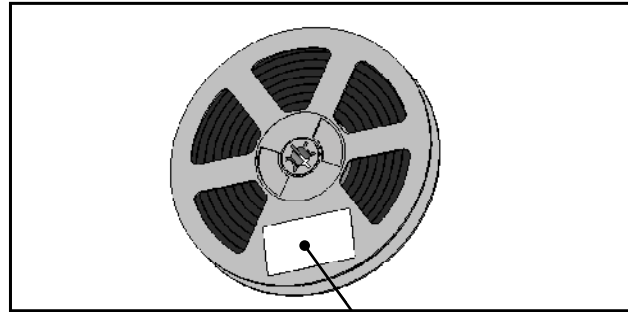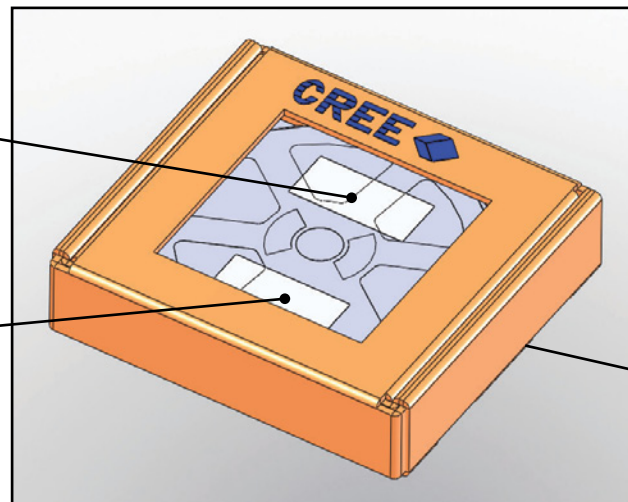
Label with Cree Bin
Code, Qty, Reel ID

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)

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[Cree, Inc.](#):

XHGAWT-00-0000-00000HXE5   XHGAWT-00-0000-00000HXE1   XHGAWT-00-0000-00000HXE3   XHGAWT-02-0000-00000HXE1   XHGAWT-02-0000-00000HWE7   XHGAWT-02-0000-00000HXE3   XHGAWT-02-0000-00000HXE5   XHGAWT-00-0000-00000HWE7   XHGAWT-00-0000-00000L0E1   XHGAWT-00-0000-00000L050   XHGAWT-00-0000-00000B050   XHGAWT-00-0000-00000B0E1   XHGAWT-00-0000-00000L053   XHGAWT-00-0000-00000B053   XHGAWT-00-0000-00000L0E2   XHGAWT-00-0000-00000L051   XHGAWT-00-0000-00000B051   XHGAWT-00-0000-00000B0E2   XHGAWT-00-0000-00000B0F5   XHGAWT-00-0000-00000LXE6   XHGAWT-00-0000-00000B0F6   XHGAWT-00-0000-00000UVE8   XHGAWT-00-0000-00000PVF8   XHGAWT-00-0000-00000UVF7   XHGAWT-00-0000-00000PVE7   XHGAWT-00-0000-00000HX51   XHGAWT-00-0000-00000LXF5   XHGAWT-00-0000-00000BXE1   XHGAWT-00-0000-00000LXF8   XHGAWT-00-0000-00000LXE8   XHGAWT-00-0000-00000LXE1   XHGAWT-00-0000-00000LWF8   XHGAWT-00-0000-00000LXE5   XHGAWT-00-0000-00000LXE7   XHGAWT-00-0000-00000B0E5   XHGAWT-00-0000-00000BXE8   XHGAWT-00-0000-00000PVF7   XHGAWT-00-0000-00000UVE7   XHGAWT-00-0000-00000LXE4   XHGAWT-00-0000-00000HX53   XHGAWT-00-0000-00000HXF4   XHGAWT-00-0000-00000LXE2   XHGAWT-00-0000-00000BXE6   XHGAWT-00-0000-00000LWE8   XHGAWT-00-0000-00000HXE6   XHGAWT-00-0000-00000LX51   XHGAWT-00-0000-00000HWF7   XHGAWT-00-0000-00000B0F4   XHGAWT-00-0000-00000BXF8   XHGAWT-00-0000-00000BXE5   XHGAWT-00-0000-00000LXF6   XHGAWT-00-0000-00000LXF7   XHGAWT-00-0000-00000BXE4   XHGAWT-00-0000-00000HXF5   XHGAWT-00-0000-00000LXF4   XHGAWT-00-0000-00000LX50   XHGAWT-00-0000-00000HXF7   XHGAWT-00-0000-00000HWE8   XHGAWT-00-0000-00000UVF8   XHGAWT-00-0000-00000B0E3   XHGAWT-00-0000-00000B0E4   XHGAWT-00-0000-00000HXF8   XHGAWT-00-0000-00000BX51   XHGAWT-00-0000-00000LXE3   XHGAWT-00-0000-00000BXF5   XHGAWT-00-0000-00000BXE7   XHGAWT-00-0000-00000LX53   XHGAWT-00-0000-00000HX50   XHGAWT-00-0000-00000BXF6   XHGAWT-00-0000-00000BXF4   XHGAWT-00-0000-00000HXE8   XHGAWT-00-0000-00000BXE3   XHGAWT-00-0000-00000BX50   XHGAWT-00-0000-00000BXF7   XHGAWT-00-0000-00000HWF8   XHGAWT-00-0000-00000L0E3   XHGAWT-00-0000-00000BX53   XHGAWT-00-0000-00000HXF6   XHGAWT-00-0000-00000HXE7   XHGAWT-00-0000-00000HXE4   XHGAWT-00-0000-00000HXE2   XHGAWT-00-0000-00000PVE8   XHGAWT-00-0000-00000BXE2   XHP35A-00-0000-0D00D20E5