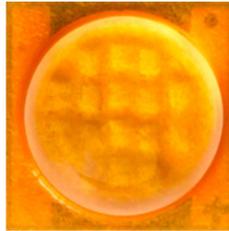
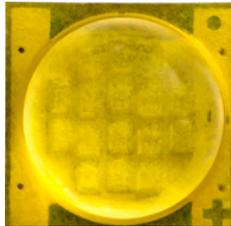


# Cree® XLamp® XM-L HVW LEDs



## PRODUCT DESCRIPTION

The Cree XLamp XM-L High Voltage White LED provides the lighting-class performance and reliability of Cree XLamp LEDs in the standard XM package. The XM-L HVW LED is an order of magnitude smaller than other high-voltage LED arrays, allowing easy implementation of space-constrained lighting applications with smaller, more efficient high-voltage drivers. Among these applications are lamps such as A19, B10, GU10, MR16, PAR30 and E17.

## FEATURES

- Binned at 85 °C
- Typical forward voltage of 46 V @ 44 mA, with Vf binning available
- Cree-standard XM mechanical footprint, with electrically neutral thermal path
- Low thermal resistance: 3.5 °C/W
- Wide viewing angle: 110°
- Maximum drive current: 125 mA
- Maximum junction temperature: 150 °C
- Unlimited floor life at ≤ 30 °C/85% RH
- Reflow solderable
- Available in standard CRI and 80 minimum CRI configurations
- UL-recognized component (E349212)

## TABLE OF CONTENTS

Flux Characteristics.....	2
Characteristics .....	2
Relative Spectral Power Distribution.....	3
Relative Flux vs. Junction Temperature .....	3
Electrical Characteristics.....	4
Thermal Design.....	4
Relative Flux vs. Current .....	5
Typical Spatial Distribution.....	5
Reflow Soldering Characteristics ..	6
Notes.....	7
Mechanical Dimensions.....	8
Tape and Reel .....	9
Packaging.....	10



**FLUX CHARACTERISTICS (T<sub>j</sub> = 85 °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. For more order codes, as well as a complete description of the order-code nomenclature, please consult the XLamp XM-L Binning and Labeling document.

Color	CCT Range		Base Order Codes Min Luminous Flux @ 44 mA			Order Code
	Min.	Max.	Group	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*	
Cool White	5000 K	8300 K	T3	220	255	XMLHVW-Q0-0000-0000LT351
			T4	240	278	XMLHVW-Q0-0000-0000LT451
			T5	260	301	XMLHVW-Q0-0000-0000LT551
Neutral White	3700 K	5000 K	T2	200	231	XMLHVW-Q0-0000-0000LT2E5
			T3	220	255	XMLHVW-Q0-0000-0000LT3E5
			T4	240	278	XMLHVW-Q0-0000-0000LT4E5
Warm White	2600 K	3700 K	S6	182	211	XMLHVW-Q0-0000-0000LS6E7
			T2	200	231	XMLHVW-Q0-0000-0000LT2E7
			T3	220	255	XMLHVW-Q0-0000-0000LT3E7

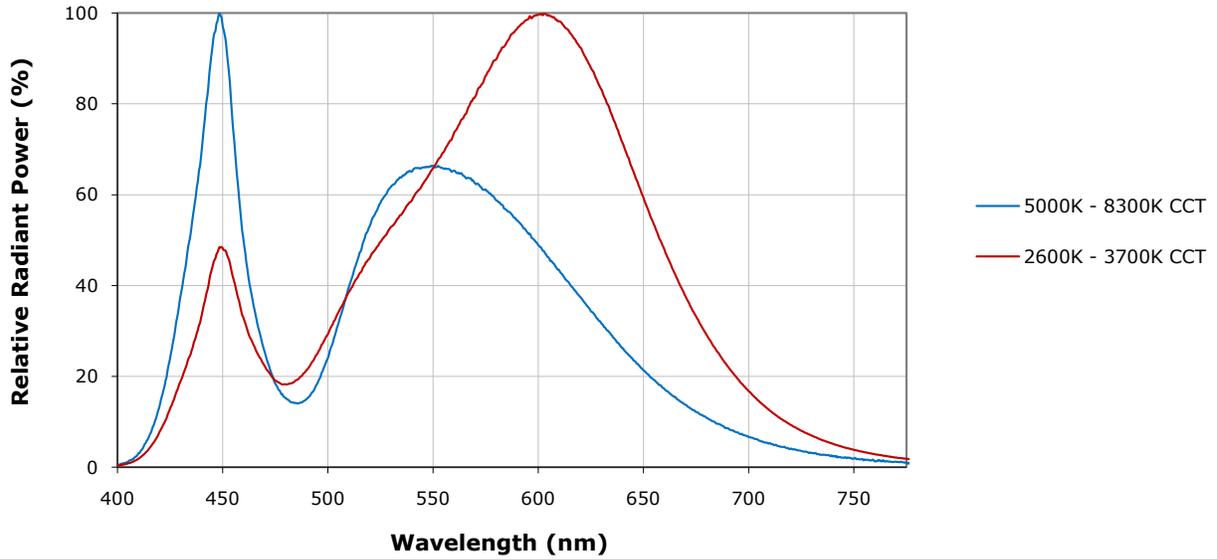
**Notes:**

- Cree maintains a tolerance of  $\pm 7\%$  on flux and power measurements,  $\pm 0.005$  on chromaticity (CC<sub>x</sub>, CC<sub>y</sub>) measurements and  $\pm 2$  on CRI measurements.
- Typical CRI for Cool White (5000 K – 8300 K CCT) is 68.
- Typical CRI for Neutral White (3700 K – 5000 K CCT) is 75.
- Typical CRI for Warm White (2600 K – 3700 K CCT) is 82.
- \* Flux values at 25 °C are calculated and for reference only.

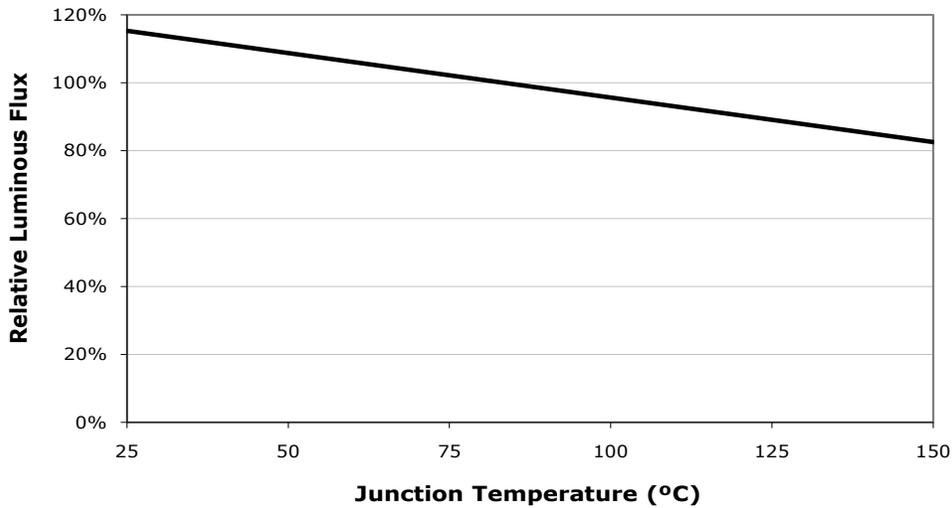
**CHARACTERISTICS**

Characteristics	Unit	Minimum	Typical	Maximum
Thermal Resistance, junction to solder point	°C/W		3.5	
Viewing Angle (FWHM)	degrees		110	
Temperature coefficient of voltage	mV/°C		-35	
ESD Classification (HBM per Mil-Std-883D)			Class 2	
DC Forward Current	mA			125
Reverse Current	mA			0.1
Forward voltage (@ 44 mA, 85 °C)	V		46	55
LED Junction Temperature	°C			150

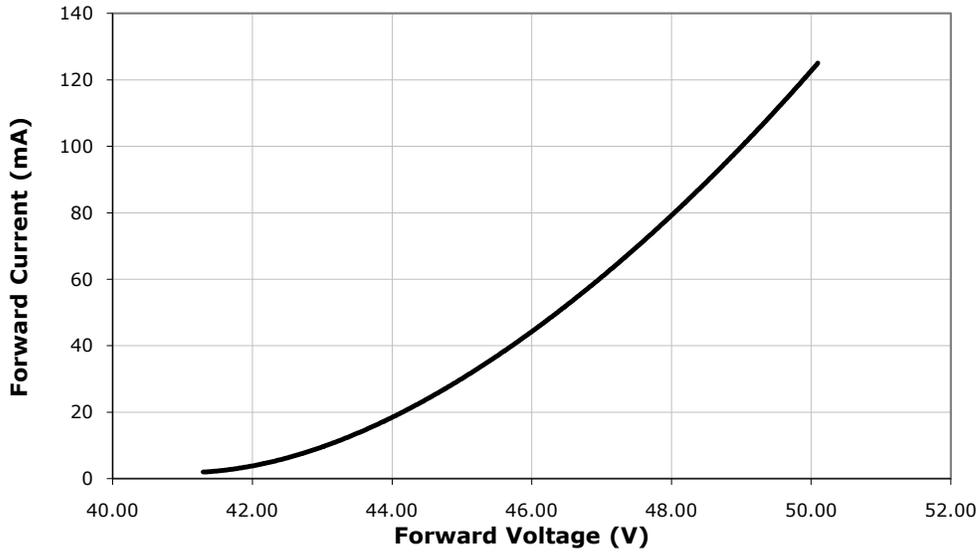
**RELATIVE SPECTRAL POWER DISTRIBUTION**



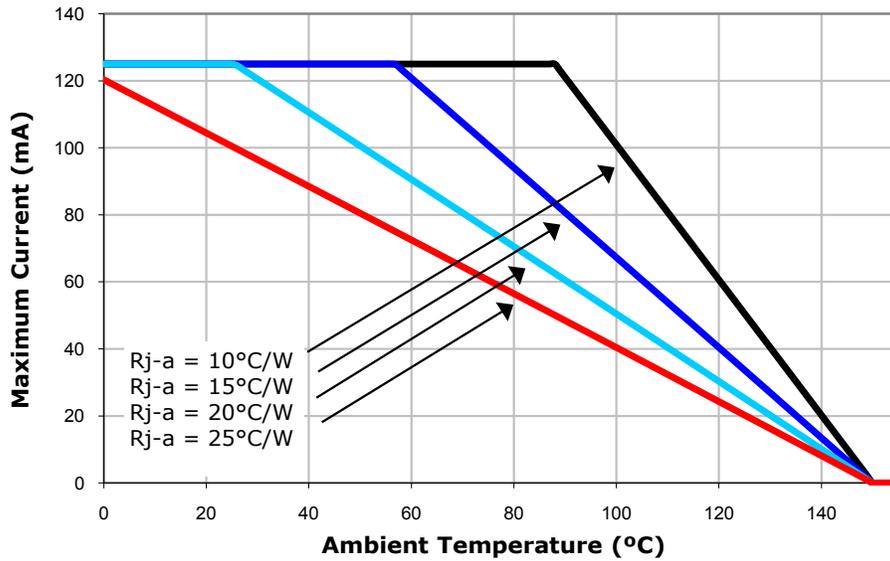
**RELATIVE FLUX VS. JUNCTION TEMPERATURE ( $I_F = 44 \text{ MA}$ )**



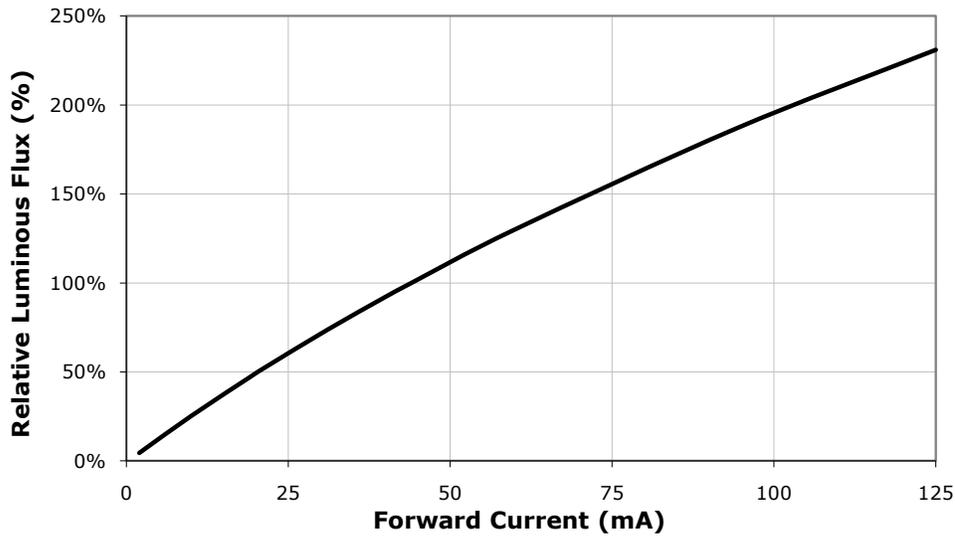
**ELECTRICAL CHARACTERISTICS ( $T_j = 85^\circ\text{C}$ )**



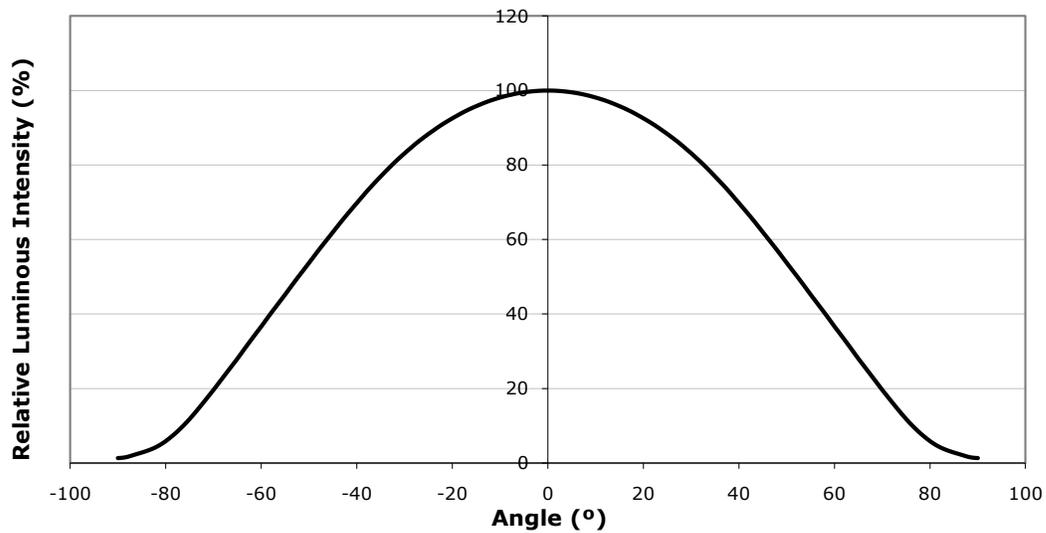
**THERMAL DESIGN**



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



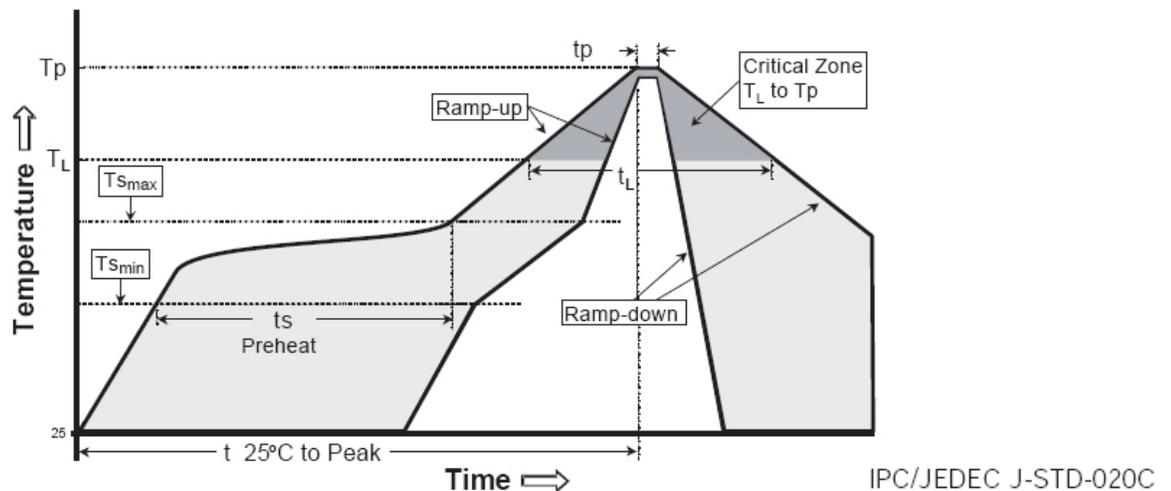
**TYPICAL SPATIAL DISTRIBUTION**



## 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 the 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](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/XRE\\_lumen\\_maintenance](http://www.cree.com/xlamp_app_notes/XRE_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 XM-L LEDs to have unlimited floor life in conditions  $\leq 30$  °C/85% relative humidity (RH). Moisture testing included a 168-hour soak at 85 °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.

### UL Recognized Component

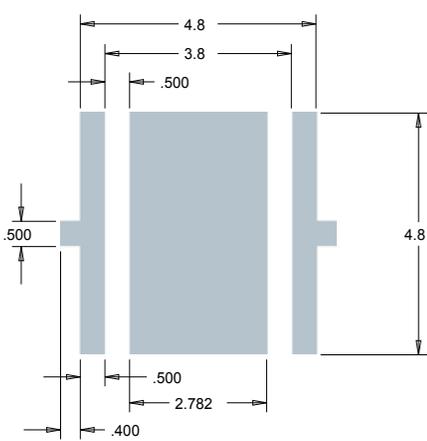
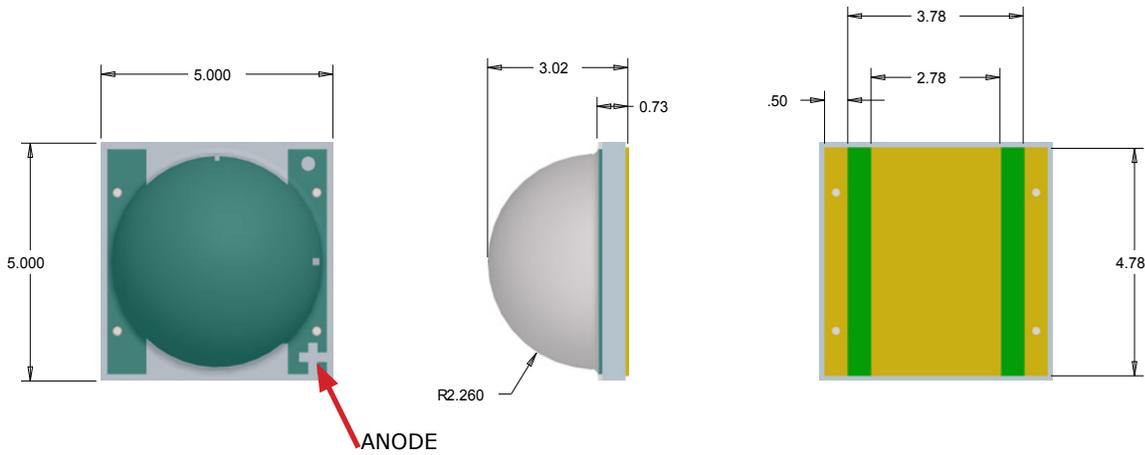
Level 4 enclosure consideration. The LED package or a portion thereof has been investigated as a fire and electrical enclosure per ANSI/UL 8750.

### Vision Advisory Claim

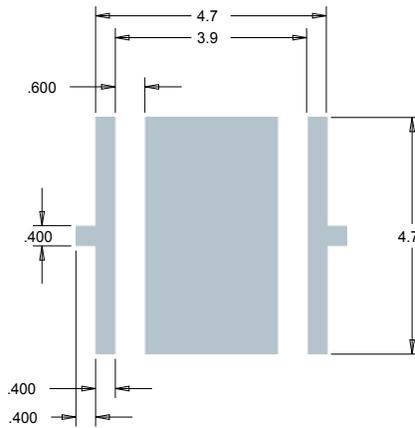
**WARNING:** Do not look at an exposed lamp in operation. Eye injury can result. See LED Eye Safety at [www.cree.com/xlamp\\_app\\_notes/led\\_eye\\_safety](http://www.cree.com/xlamp_app_notes/led_eye_safety).

**MECHANICAL DIMENSIONS**

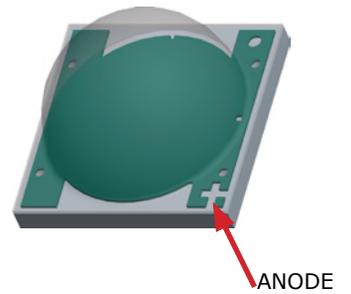
All measurements are  $\pm .13$  mm unless otherwise indicated.



RECOMMENDED PCB SOLDER PAD



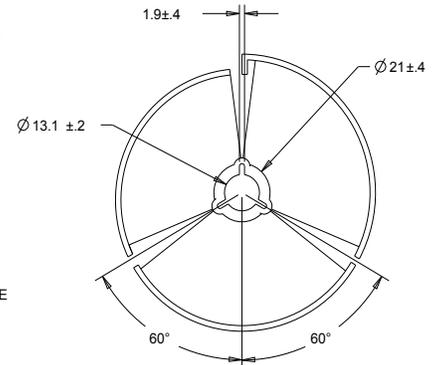
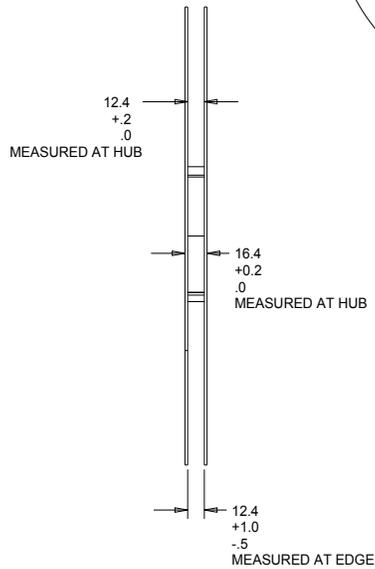
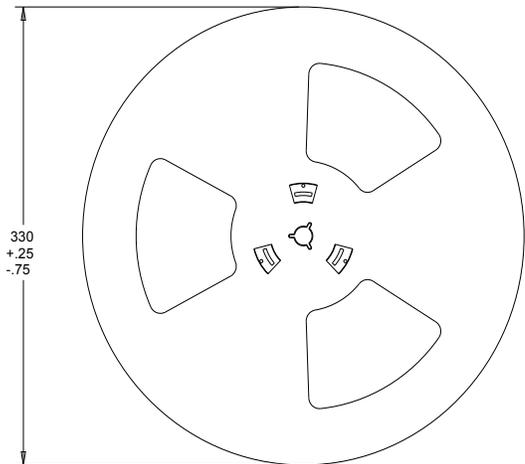
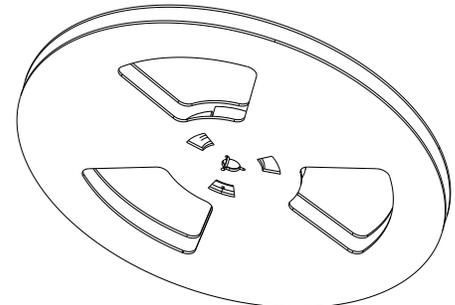
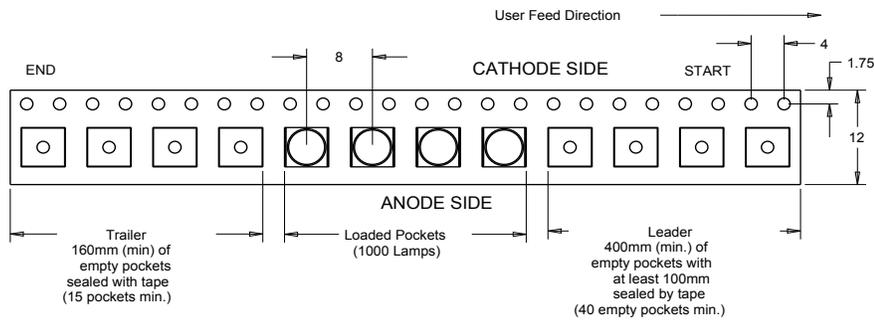
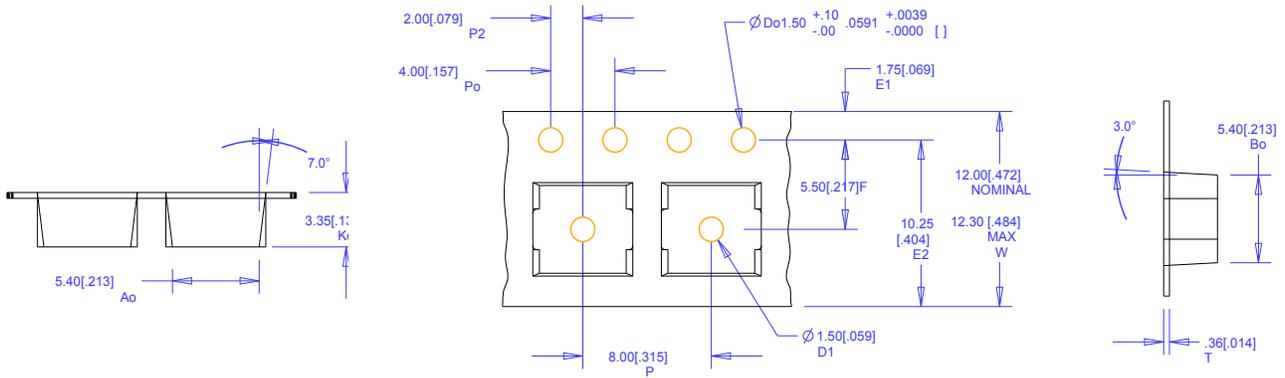
RECOMMENDED STENCIL PATTERN  
SHADED AREA IS OPEN



**TAPE AND REEL**

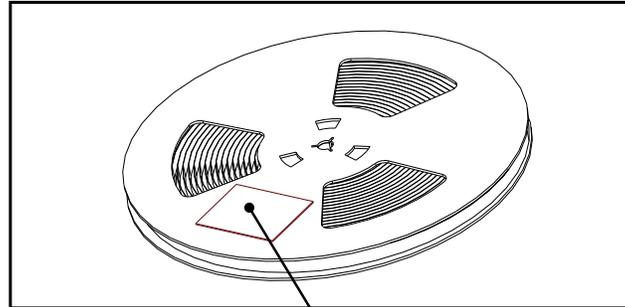
All Cree carrier tapes conform to EIA-481D, Automated Component Handling Systems Standard.

All dimensions in mm.



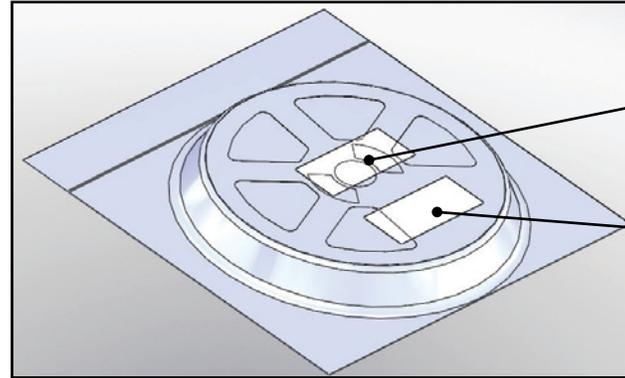
## PACKAGING

### Unpackaged Reel



Label with Cree Bin Code, Qty, Reel ID

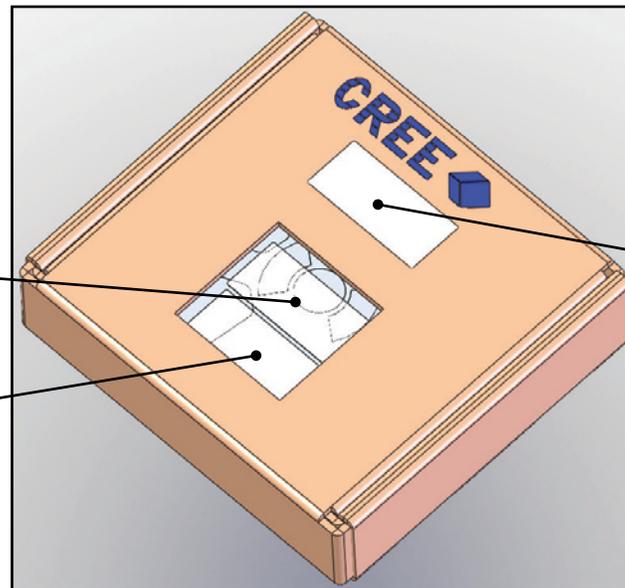
### Packaged Reel



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