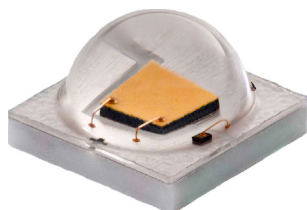


# Cree® XLamp® XP-E2 Torch LEDs



## PRODUCT DESCRIPTION

The XLamp® XP-E2 Torch LED provides lumen output similar to the XLamp XP-G LED but in the smaller optical source of the XP-E2 LED. Together with a higher maximum current rating than XP-E2 and simplified color binning, the XLamp XP-E2 Torch LED is fully optimized for a wide range of mainstream portable lighting applications.

## FEATURES

- Available in cool white
- Binned at 25 °C
- Maximum drive current: 1.5 A
- Low thermal resistance: 9°C/W
- Wide viewing angle: 125°
- Unlimited floor life at  $\leq 30$  °C/85% RH
- Reflow solderable - JEDEC J-STD-020C compatible
- Electrically neutral thermal path
- RoHS compliant

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## CHARACTERISTICS

| Characteristics                              | Unit    | Minimum | Typical | Maximum |
|----------------------------------------------|---------|---------|---------|---------|
| Thermal resistance, junction to solder point | °C/W    |         | 9       |         |
| Viewing angle (FWHM)                         | degrees |         | 125     |         |
| Temperature coefficient of voltage           | mV/°C   |         | -3.9    |         |
| ESD withstand voltage (HBM per Mil-Std-883D) | V       |         |         | 8000    |
| DC forward current                           | mA      |         |         | 1500    |
| Reverse voltage                              | V       |         |         | 5       |
| Forward voltage (@ 1050 mA, 25 °C)           | V       |         | 3.5     | 3.9     |
| LED junction temperature                     | °C      |         |         | 150     |

## FLUX CHARACTERISTICS (T<sub>j</sub> = 25 °C)

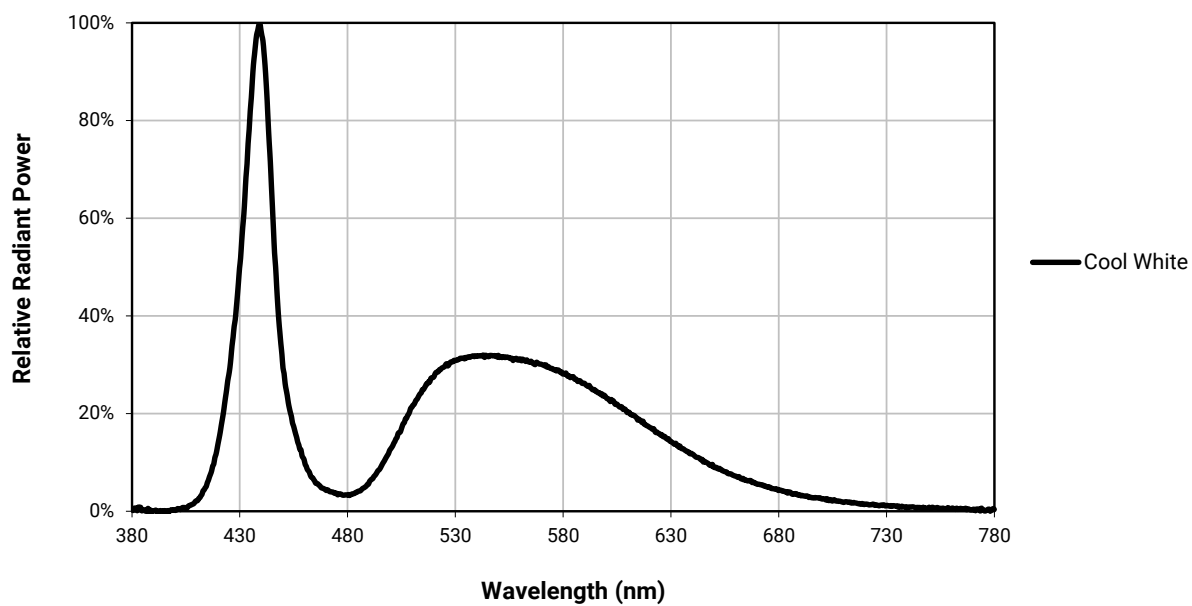
The following table provides order codes for XLamp XP-E2 Torch LEDs.

| Color      | CCT Range |          | Minimum Luminous Flux (lm) @ 1050 mA |           | Calculated Minimum Luminous Flux (lm) * | Order Code           |
|------------|-----------|----------|--------------------------------------|-----------|-----------------------------------------|----------------------|
|            | Min.      | Max.     | Group                                | Flux (lm) | 1.5 A                                   |                      |
| Cool White | 6000 K    | 10,500 K | T6                                   | 280       | 355                                     | XPEBTT-01-0000-00T80 |
|            |           |          | U2                                   | 300       | 380                                     | XPEBTT-01-0000-00U80 |
|            |           |          | U3                                   | 320       | 405                                     | XPEBTT-01-0000-00V80 |
|            |           |          | U4                                   | 340       | 431                                     | XPEBTT-01-0000-00W80 |
|            |           |          | U5                                   | 360       | 456                                     | XPEBTT-01-0000-00Y80 |

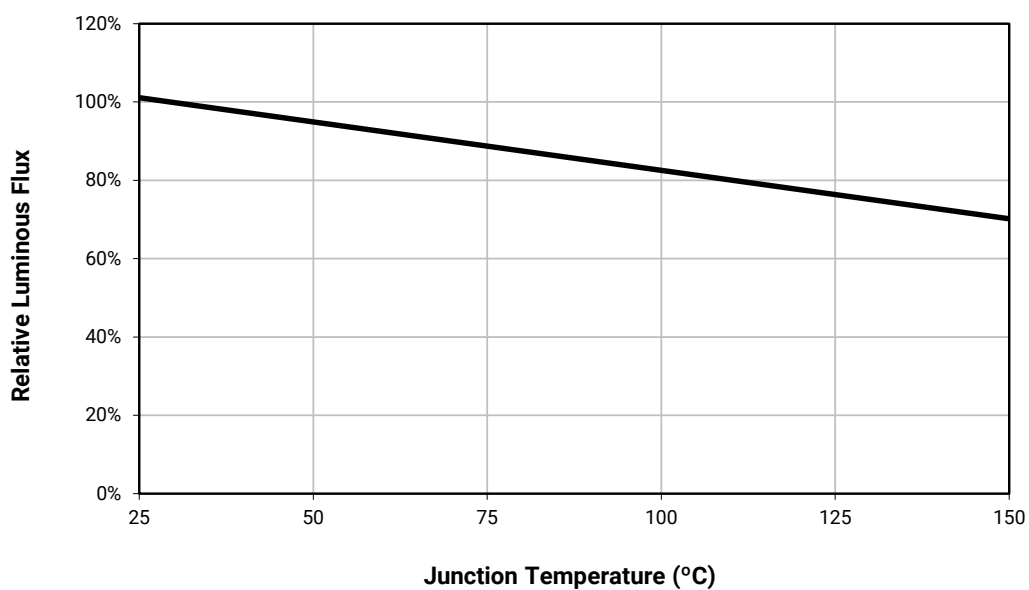
### Notes:

- Cree maintains a tolerance of ±7% on flux and power measurements, ±0.015 on chromaticity (CCx, CCy) measurements and ±2 on CRI measurements. See the Measurements section (page 9).
- Typical CRI for Cool White (6000 K – 10,500 K CCT) is 65.
- \* Calculated flux values at 1.5 A are for reference only.

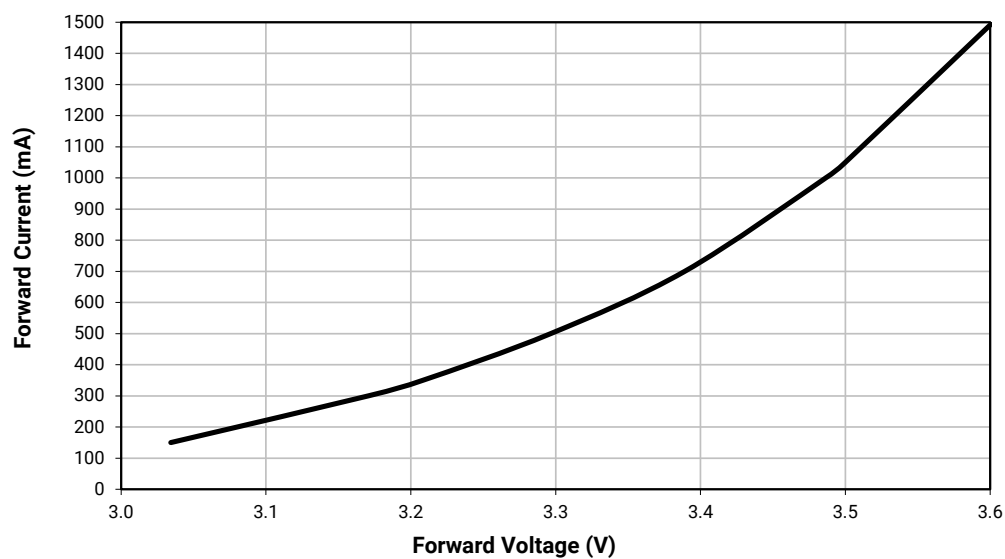
## RELATIVE SPECTRAL POWER DISTRIBUTION



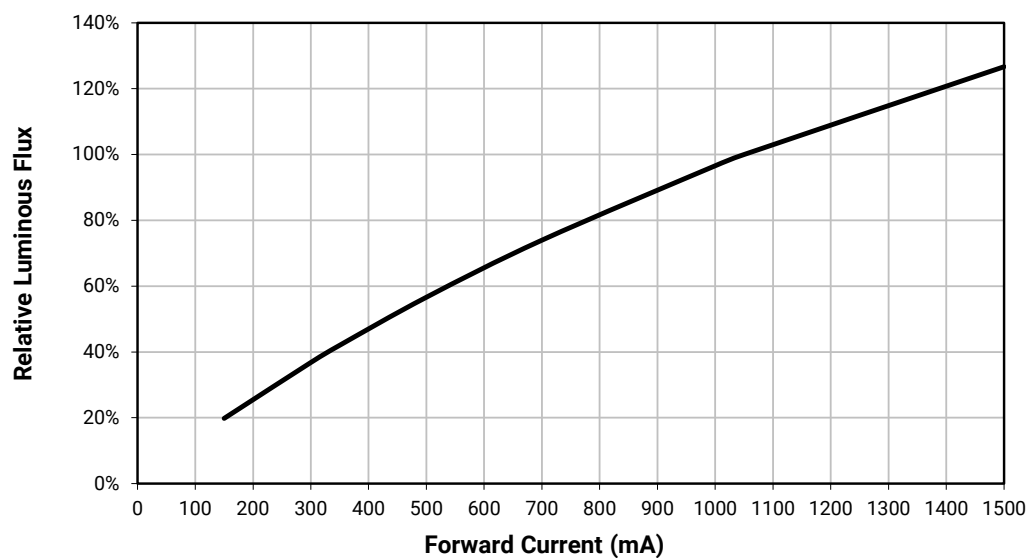
## RELATIVE FLUX VS. JUNCTION TEMPERATURE ( $I_F = 1050$ mA)



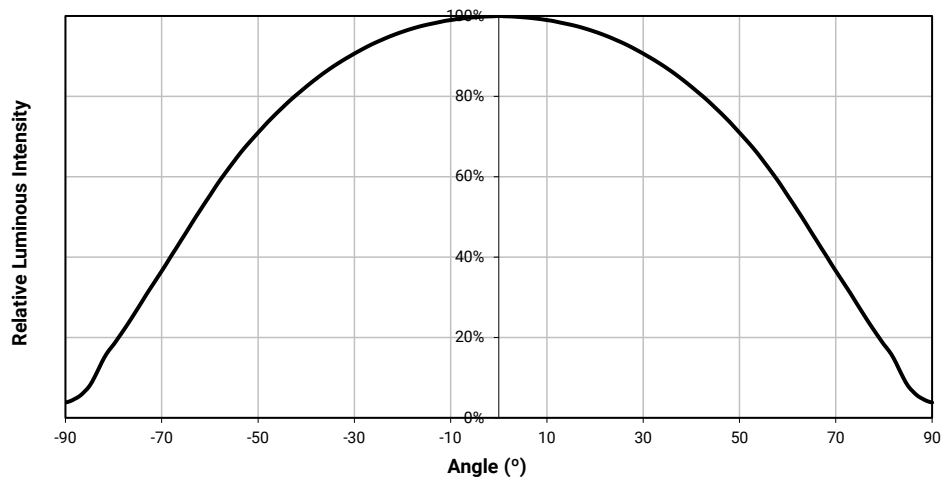
## ELECTRICAL CHARACTERISTICS ( $T_j = 25\text{ }^{\circ}\text{C}$ )



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

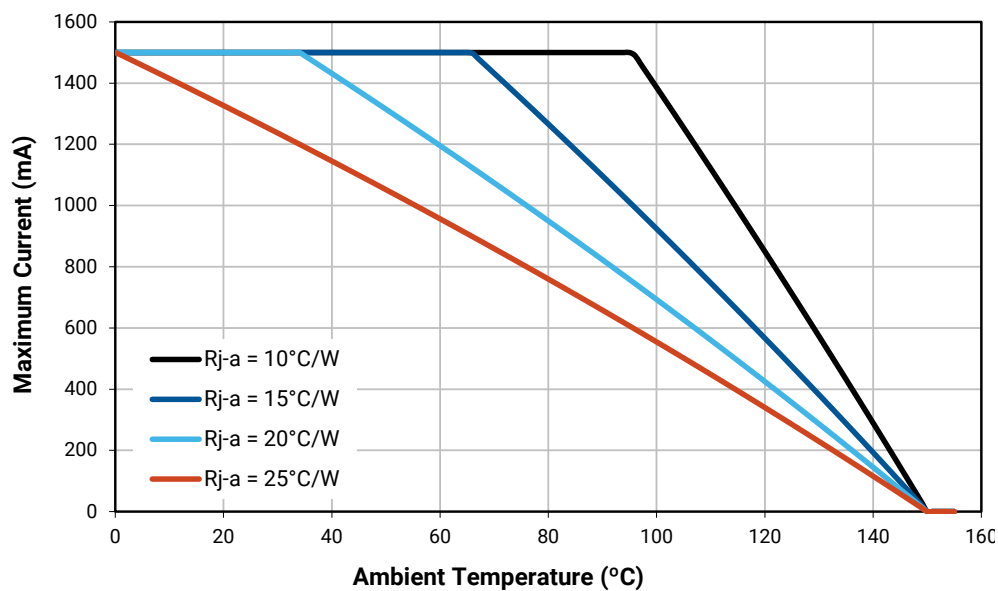


## TYPICAL SPATIAL DISTRIBUTION



## 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.



## PERFORMANCE GROUPS - BRIGHTNESS ( $T_j = 25^\circ\text{C}$ )

XLamp XP-E2 Torch LEDs are tested for luminous flux and placed into one of the following bins.

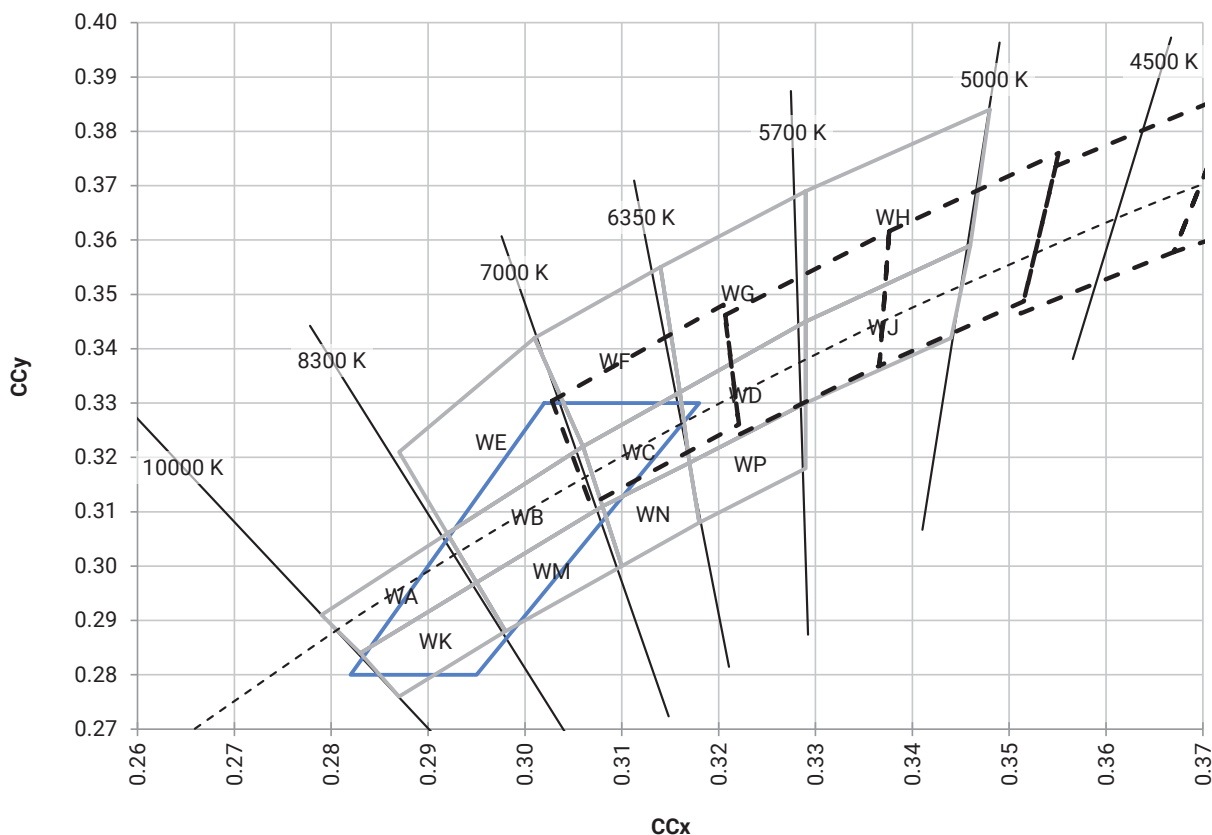
| Group Code | Minimum Luminous Flux | Maximum Luminous Flux |
|------------|-----------------------|-----------------------|
| T6         | 280                   | 300                   |
| U2         | 300                   | 320                   |
| U3         | 320                   | 340                   |
| U4         | 340                   | 360                   |
| U5         | 360                   | 380                   |

## PERFORMANCE GROUPS - CHROMATICITY ( $T_j = 25^\circ\text{C}$ )

XLamp XP-E2 Torch LEDs are tested for chromaticity and placed into the bin defined by the following bounding coordinates.

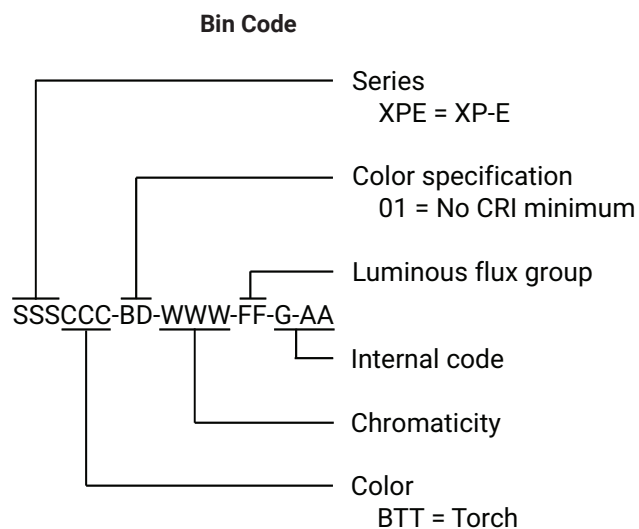
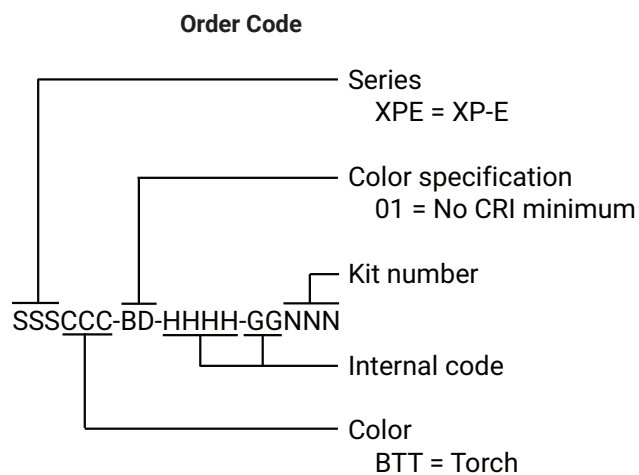
| Bin | x     | y    |
|-----|-------|------|
| T1  | 0.302 | 0.33 |
|     | 0.318 | 0.33 |
|     | 0.295 | 0.28 |
|     | 0.282 | 0.28 |

## CREE ANSI WHITE BIN PLOTTED ON THE 1931 CIE COLOR SPACE ( $T_j = 25^\circ\text{C}$ )



## BIN AND ORDER CODE FORMATS

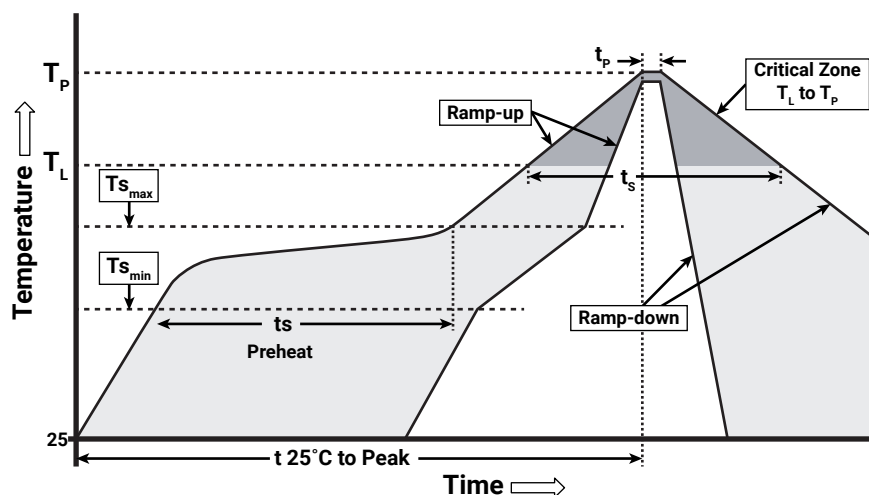
Bin codes and order codes are configured as follows.



## REFLOW SOLDERING CHARACTERISTICS

In testing, Cree has found XLamp XP-E2 Torch 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, and therefore it is the lamp or luminaire manufacturer's responsibility to determine applicable soldering requirements.

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-Free Solder |
|-------------------------------------------------------|------------------|
| Average Ramp-Up Rate ( $T_{s_{max}}$ to $T_p$ )       | 1.2 °C/second    |
| Preheat: Temperature Min ( $T_{s_{min}}$ )            | 120 °C           |
| Preheat: Temperature Max ( $T_{s_{max}}$ )            | 170 °C           |
| Preheat: Time ( $t_{s_{min}}$ to $t_{s_{max}}$ )      | 65-150 seconds   |
| Time Maintained Above: Temperature ( $T_L$ )          | 217 °C           |
| Time Maintained Above: Time ( $t_L$ )                 | 45-90 seconds    |
| Peak/Classification Temperature ( $T_p$ )             | 235 - 245 °C     |
| Time Within 5 °C of Actual Peak Temperature ( $t_p$ ) | 20-40 seconds    |
| Ramp-Down Rate                                        | 1 - 6 °C/second  |
| Time 25 °C to Peak Temperature                        | 4 minutes max.   |

Note: All temperatures refer to topside of the package, measured on the package body surface.

## NOTES

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### Measurements

The luminous flux, radiant power, chromaticity, forward voltage and CRI measurements in this document are binning specifications only and solely represent product measurements as of the date of shipment. These measurements will change over time based on a number of factors that are not within Cree's control and are not intended or provided as operational specifications for the products. Calculated values are provided for informational purposes only and are not intended or provided as specifications.

### Pre-Release Qualification Testing

Please read the [LED Reliability Overview](#) for details of the qualification process Cree applies to ensure long-term reliability for XLamp LEDs and details of Cree's pre-release qualification testing for XLamp LEDs.

### Moisture Sensitivity

Cree recommends keeping XLamp LEDs in the provided, resealable moisture-barrier packaging (MBP) until immediately prior to soldering. Unopened MBPs that contain XLamp LEDs do not need special storage for moisture sensitivity.

Once the MBP is opened, XLamp XP-E2 Torch LEDs may be stored as MSL 1 per JEDEC J-STD-033, meaning they have unlimited floor life in conditions of  $\leq 30^{\circ}\text{C}/85\%$  relative humidity (RH). Regardless of the storage condition, Cree recommends sealing any unsoldered LEDs in the original MBP.

### 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 Ecology](#) section of the Cree website.

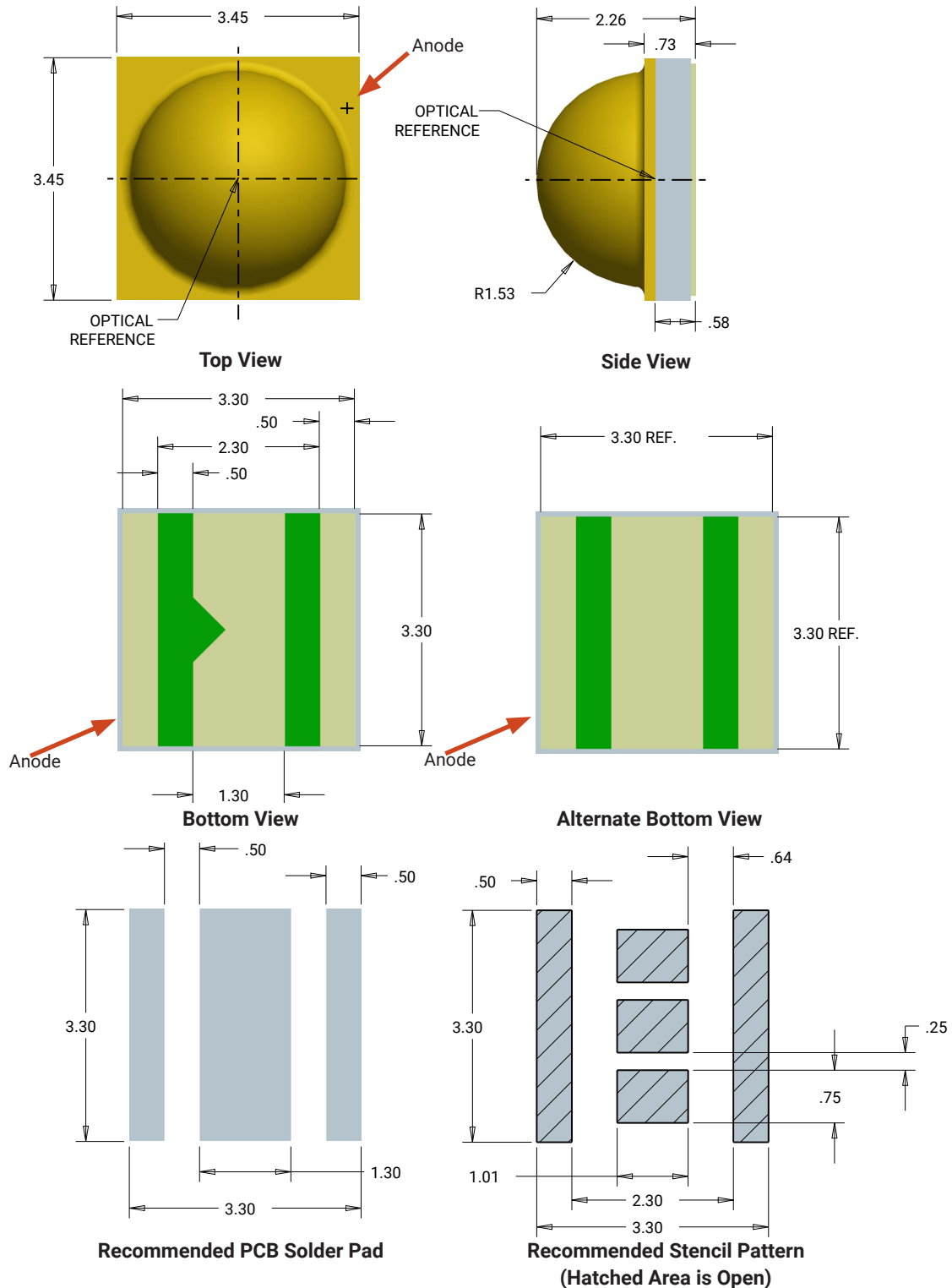
### Vision Advisory

WARNING: Do not look at an exposed lamp in operation. Eye injury can result. For more information about LEDs and eye safety, please refer to the [LED Eye Safety application note](#).

## MECHANICAL DIMENSIONS

Thermal vias, if present, are not shown on these drawings.

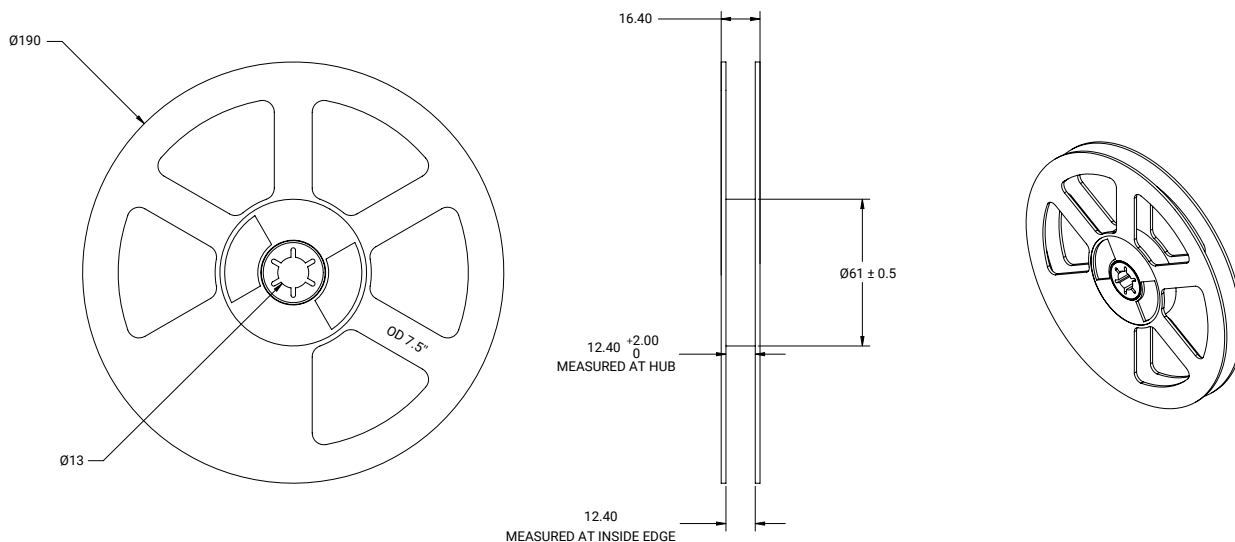
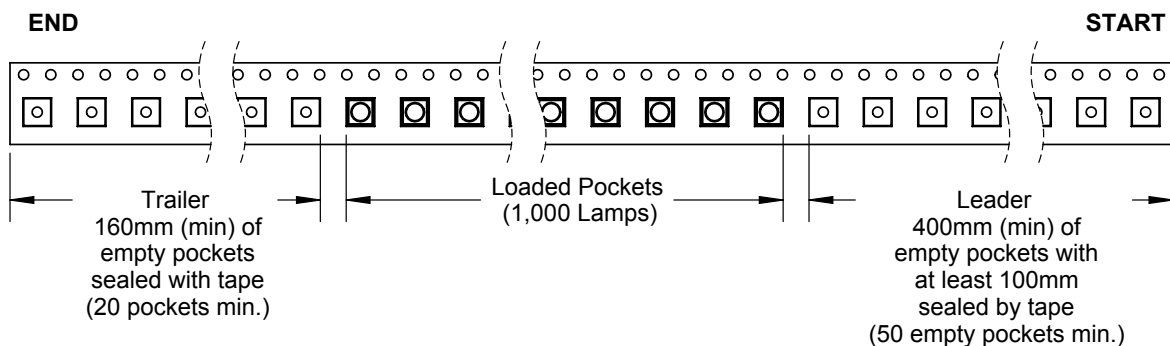
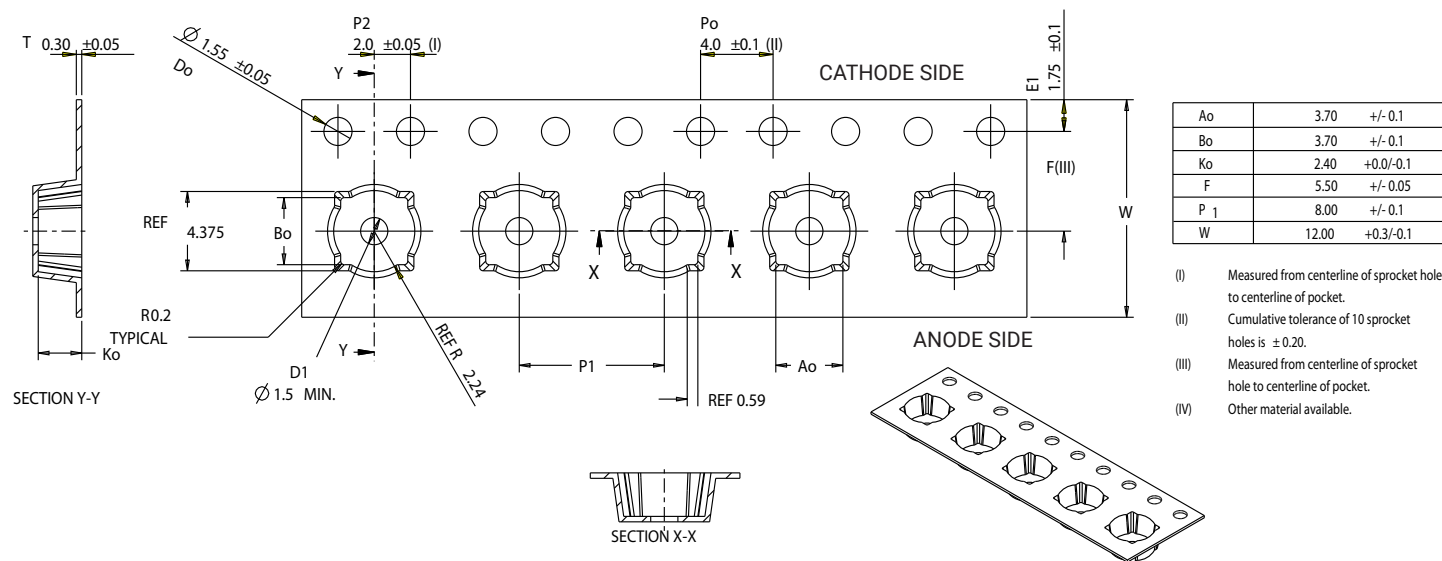
All measurements are  $\pm 0.13$  mm unless otherwise indicated..



## TAPE AND REEL

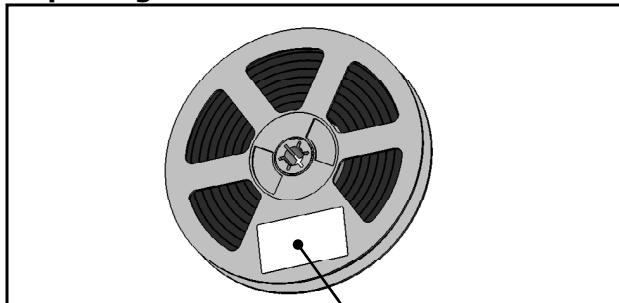
All Cree carrier tapes conform to EIA-481D, Automated Component Handling Systems Standard.

All dimensions in mm.



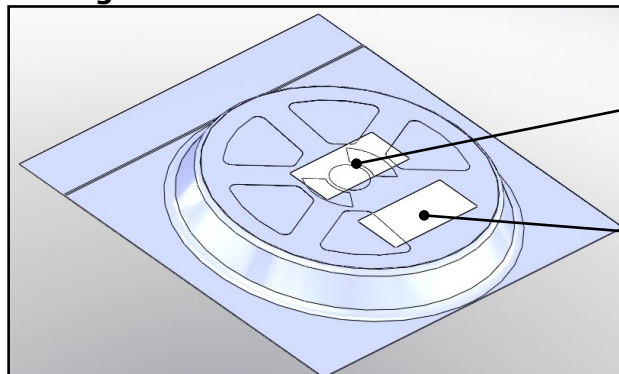
## PACKAGING

### Unpackaged Reel



Label with Cree Bin Code,  
Quantity, Reel ID

### Packaged Reel



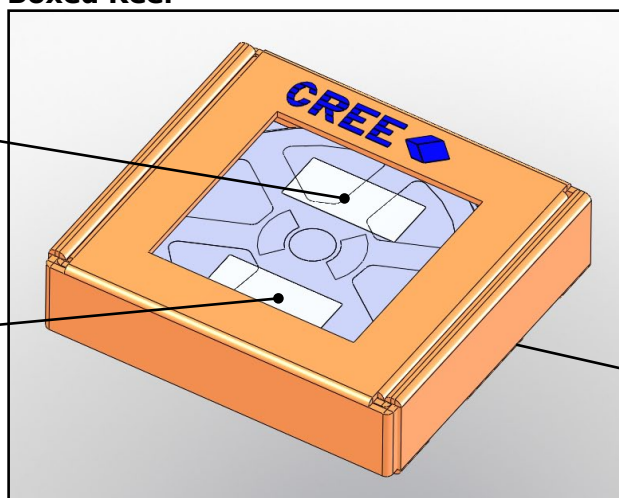
Label with Cree Order Code,  
Quantity, Reel ID, PO #

Label with Cree Bin Code,  
Quantity, Reel ID

### Boxed Reel

Label with Cree Order Code,  
Quantity, Reel ID, PO #

Label with Cree Bin Code,  
Quantity, Reel ID



Patent Label  
(on bottom of box)

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