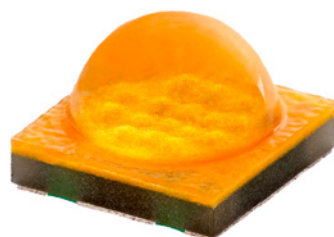
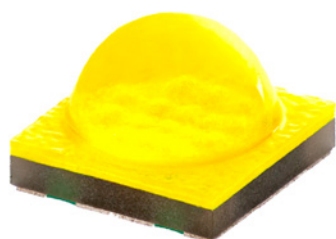


Cree® XLamp® XT-E High-Voltage White LEDs



PRODUCT DESCRIPTION

The Cree XLamp XT-E High Voltage White LED provides the lighting-class performance and reliability of Cree XLamp LEDs in a small-form, high-voltage configuration. The XT-E 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 small lamps such as B10, GU10 and E17.

FEATURES

- Binned at 85 °C
- Available in 12-V, 24-V and 48-V configurations
- Cree-standard mechanical footprint of 3.45 X 3.45 mm with electrically neutral thermal path
- Unlimited floor life at ≤ 30 °C/85% RH
- Reflow solderable
- Available in standard CRI and 80-minimum CRI configurations
- RoHS- and REACH-compliant
- UL-recognized component (E349212)



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CHARACTERISTICS

Characteristics	Unit	Minimum	Typical	Maximum
Thermal resistance, junction to solder point (12 V, 24 V)	°C/W		5	
Thermal resistance, junction to solder point (48 V)	°C/W		6.5	
Viewing angle (FWHM, 12 V)	degrees		130	
Viewing angle (FWHM, 24 V, 48 V)	degrees		115	
Temperature coefficient of voltage (12 V)	mV/°C		-8.5	
Temperature coefficient of voltage (24 V)	mV/°C		-17	
Temperature coefficient of voltage (48 V)	mV/°C		-37	
ESD withstand voltage (HBM per Mil-Std-883D) (12 V)	V			8000
ESD Classification (HBM per Mil-Std-883D) (24 V, 48 V)			Class 2	
DC forward current (12 V)	mA			375
DC forward current (24 V)	mA			125
DC forward current (48 V)	mA			66
Reverse current	mA			-0.1
Forward voltage (12 V @ 88 mA, 85 °C)	V		11.3	13.5
Forward voltage (24 V @ 44 mA, 85 °C)	V		23	27.5
Forward voltage (48 V @ 22 mA, 85 °C)	V		46	55
LED junction temperature	°C			150

FLUX CHARACTERISTICS, 12-VOLT XT-E HVW (88 mA, $T_j = 85\text{ }^{\circ}\text{C}$)

The following table provides several base order codes for 12-V XLamp XT-E 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 XT Family Binning and Labeling document.

Color	CCT Range		Base Order Codes Min. Luminous Flux @ 88 mA			Order Code
	Min.	Max.	Group	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*	
Warm White	2600 K	3700 K	Q4	100	114	XTEHVW-D0-0000-00000LCE7
			Q5	107	122	XTEHVW-D0-0000-00000LDE7

FLUX CHARACTERISTICS, 24-VOLT XT-E HVW (44 mA, $T_j = 85\text{ }^{\circ}\text{C}$)

The following table provides several base order codes for 24-V XLamp XT-E 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 XT Family 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*	
Neutral White	3700 K	5000 K	Q5	107	122	XTEHVW-H0-0000-00000LDE3
			R2	114	130	XTEHVW-H0-0000-00000LEE3
Warm White	2600 K	3700 K	Q3	93.9	107	XTEHVW-H0-0000-00000LBE7
			Q4	100	114	XTEHVW-H0-0000-00000LCE7

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 82.
- * Flux values at 25 °C are calculated and for reference only.

FLUX CHARACTERISTICS, 48-VOLT XT-E HVW (22 mA, $T_j = 85^\circ\text{C}$)

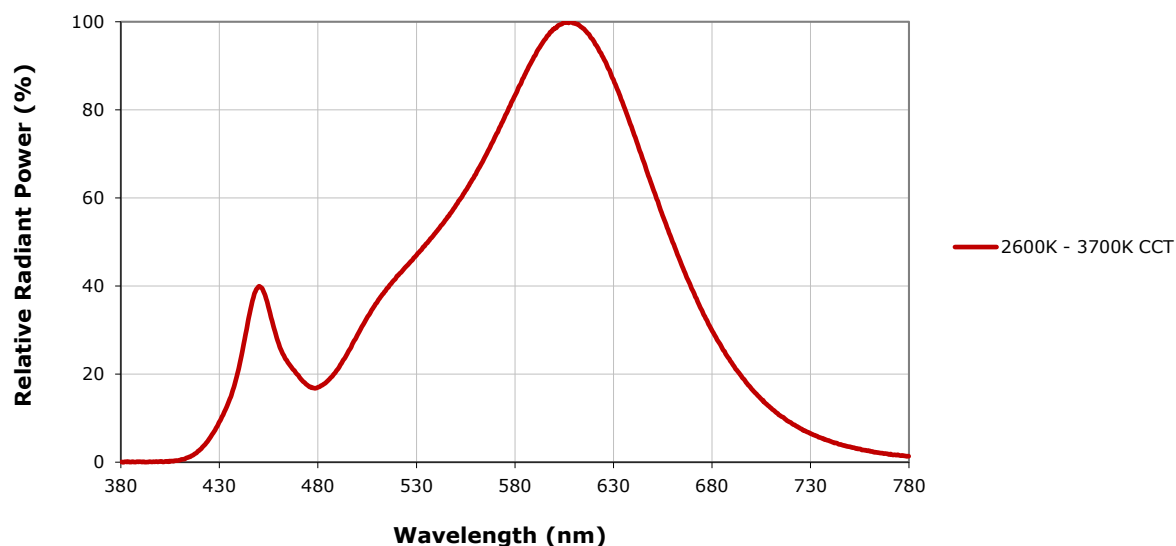
The following table provides several base order codes for 48-V XLamp XT-E HVW LEDs. It is important to note that the base order codes listed here are a subset of the total available order codes for the product family. For more order codes, as well as a complete description of the order-code nomenclature, please consult the XLamp XT Family Binning and Labeling document.

Color	CCT Range		Base Order Codes Min. Luminous Flux @ 22 mA			Order Code
	Min.	Max.	Group	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*	
Cool White	5000 K	8300 K	R4	130	150	XTEHVW-Q0-0000-00000LG51
			R5	139	161	XTEHVW-Q0-0000-00000LH51
Neutral White	3700 K	5000 K	Q5	107	124	XTEHVW-Q0-0000-00000LDE5
			R2	114	132	XTEHVW-Q0-0000-00000LEE5
Warm White	2600 K	3700 K	Q4	100	116	XTEHVW-Q0-0000-00000LCE7
			Q5	107	124	XTEHVW-Q0-0000-00000LDE7

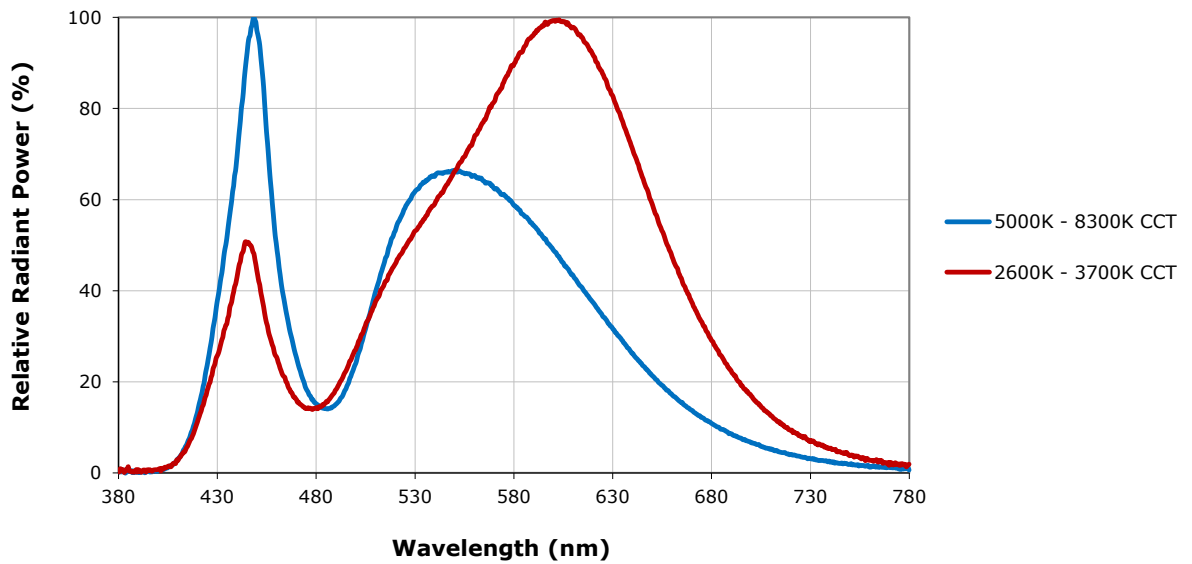
Notes:

- 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 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.

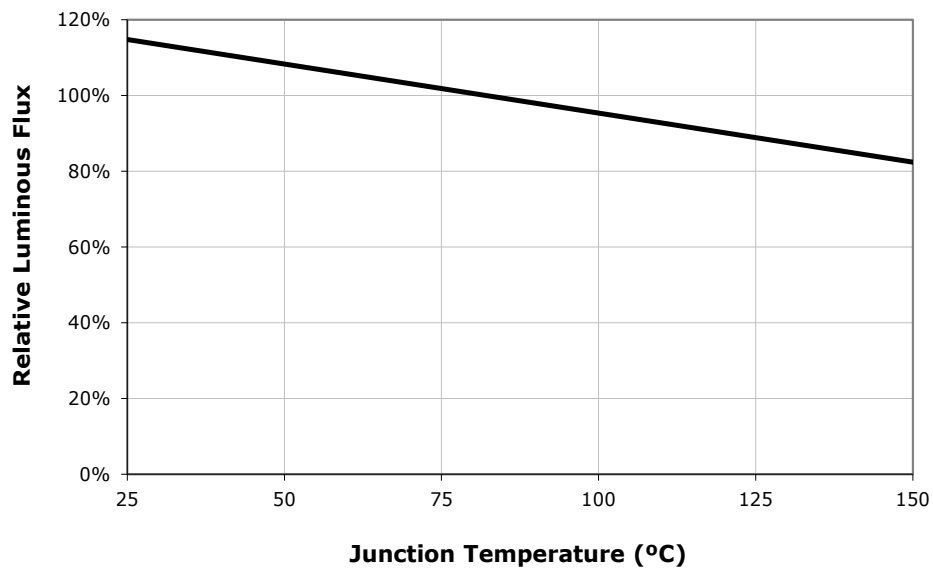
RELATIVE SPECTRAL POWER DISTRIBUTION (12 V, 88 mA; 24 V, 44 mA; $T_j = 85^\circ\text{C}$)



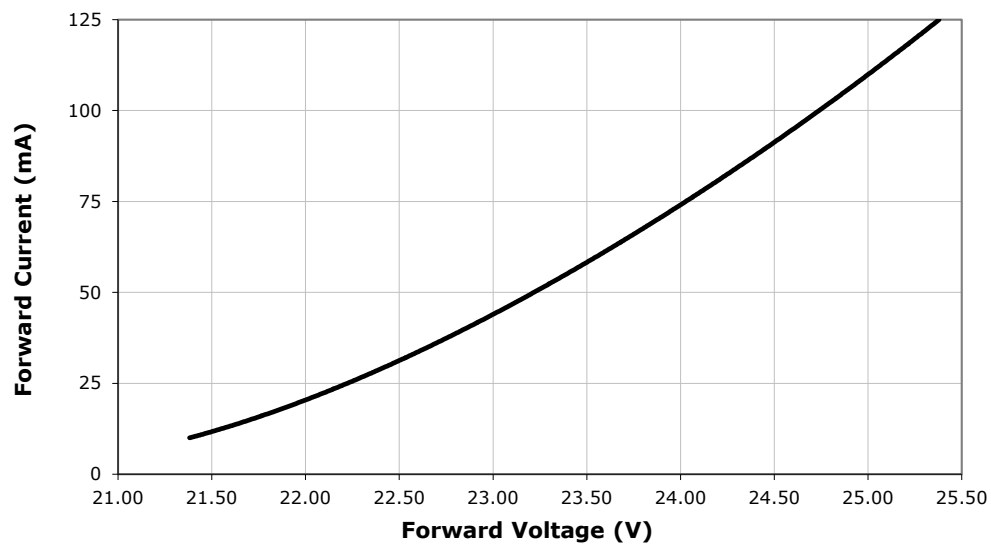
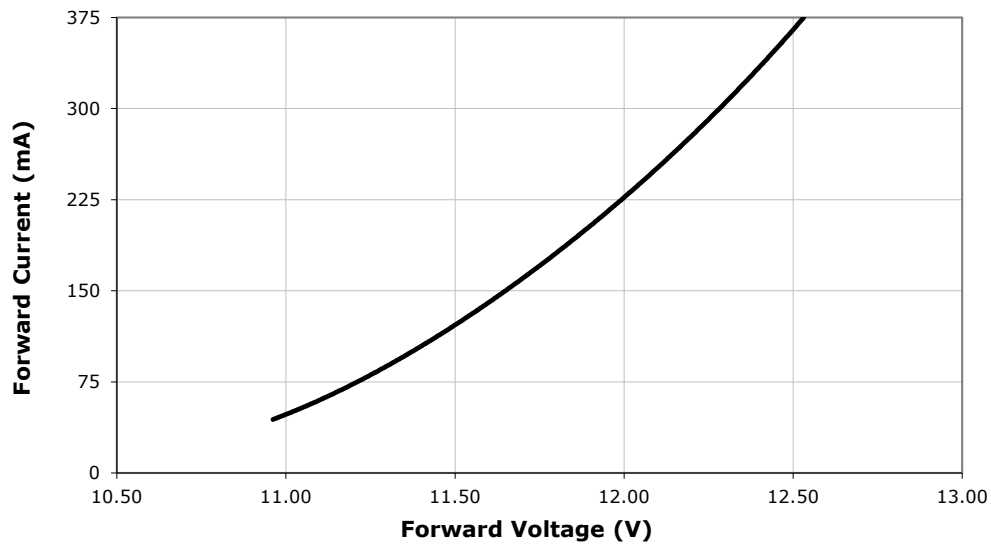
RELATIVE SPECTRAL POWER DISTRIBUTION (48 V, 22 mA; $T_j = 85^\circ\text{C}$)



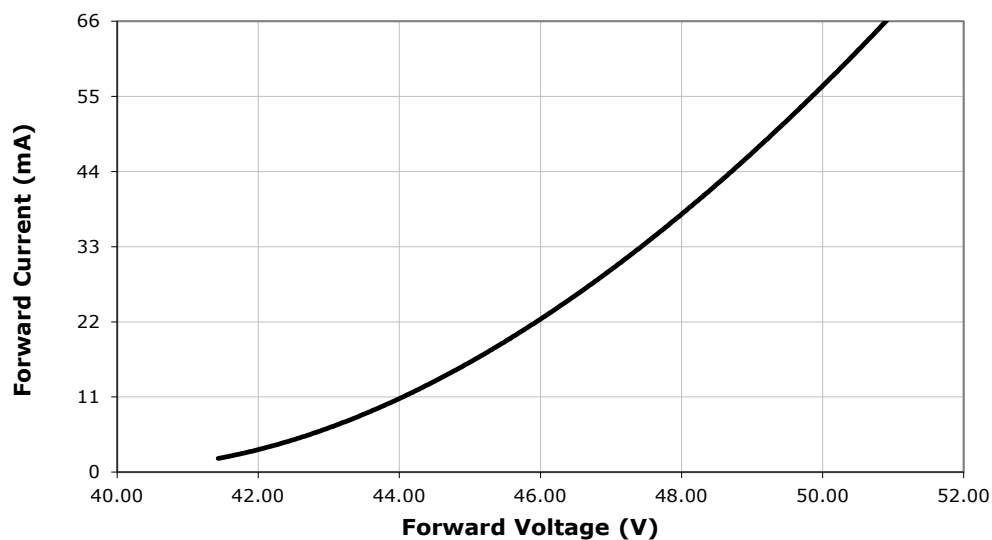
RELATIVE FLUX VS. JUNCTION TEMPERATURE (12 V, 88 mA; 24 V, 44 mA; 48 V, 22 mA)



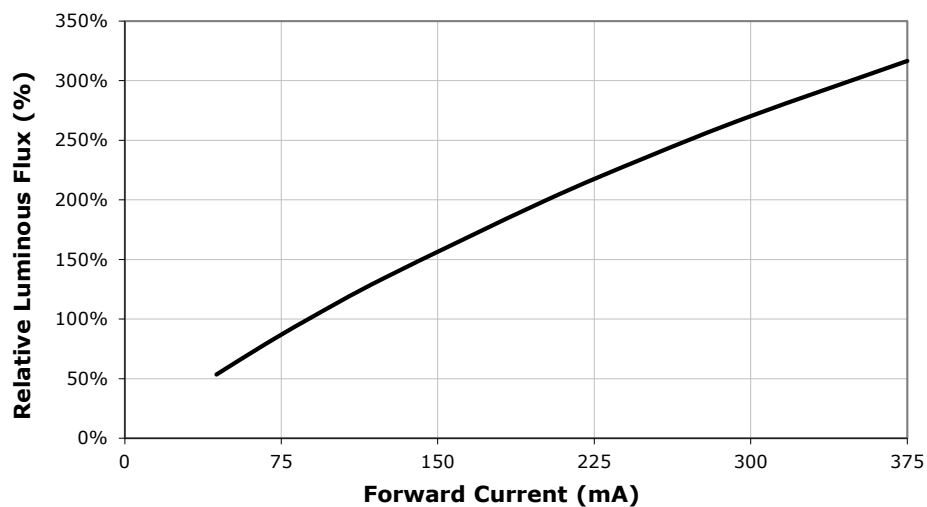
ELECTRICAL CHARACTERISTICS ($T_j = 85\text{ }^{\circ}\text{C}$)



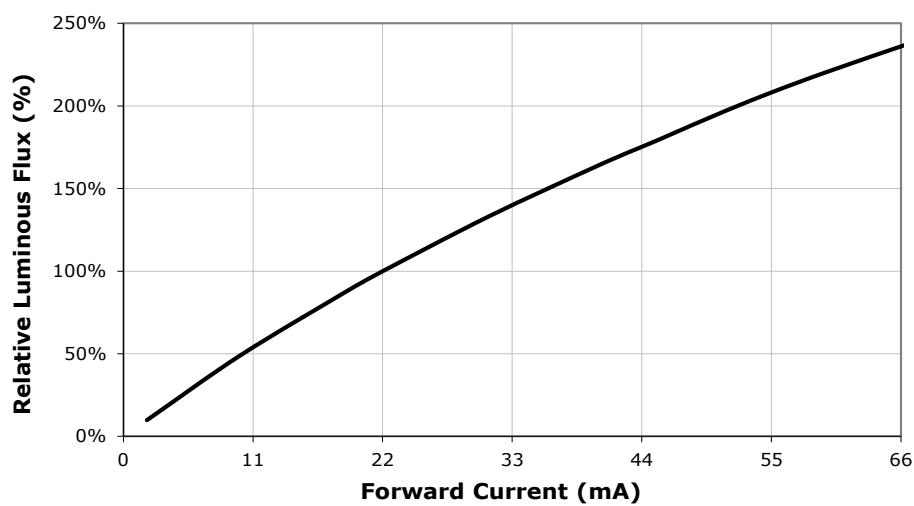
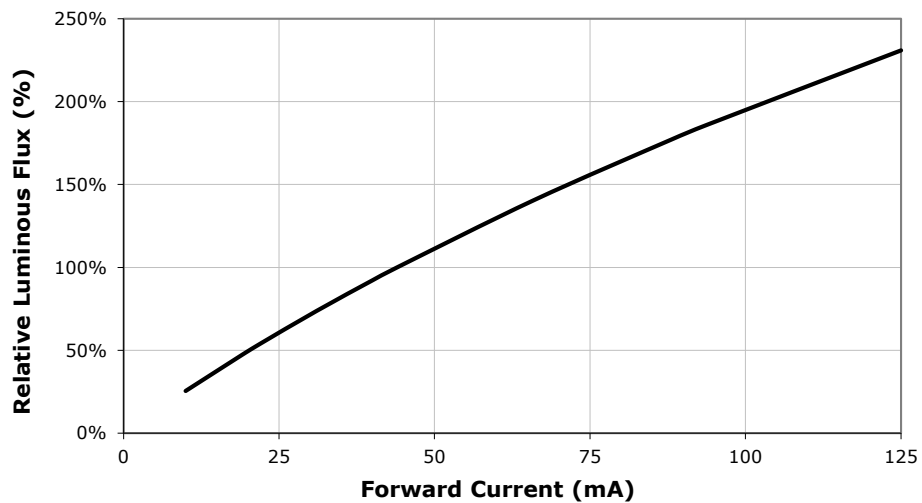
ELECTRICAL CHARACTERISTICS ($T_j = 85\text{ }^{\circ}\text{C}$) - CONTINUED



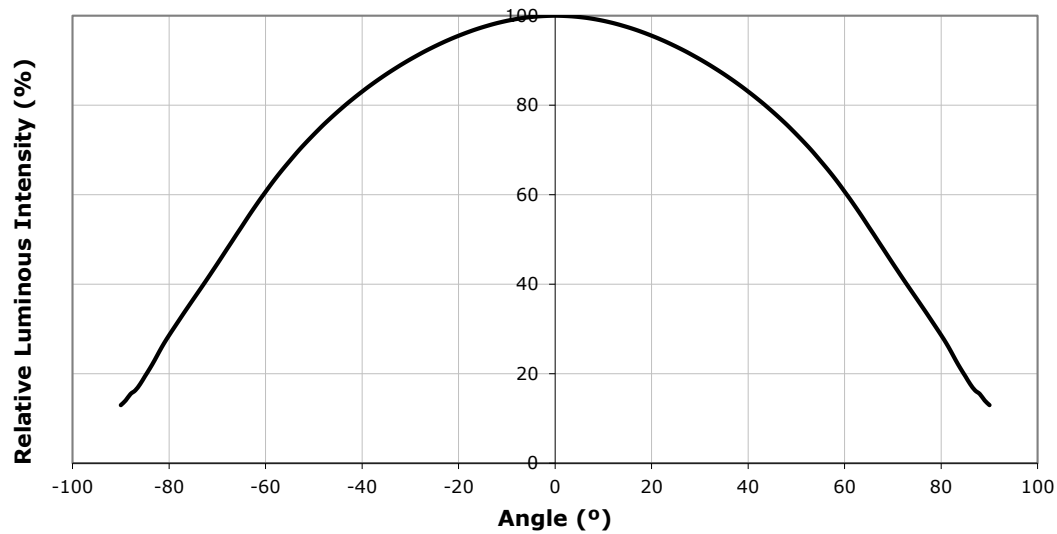
RELATIVE FLUX VS. CURRENT ($T_j = 85\text{ }^{\circ}\text{C}$)



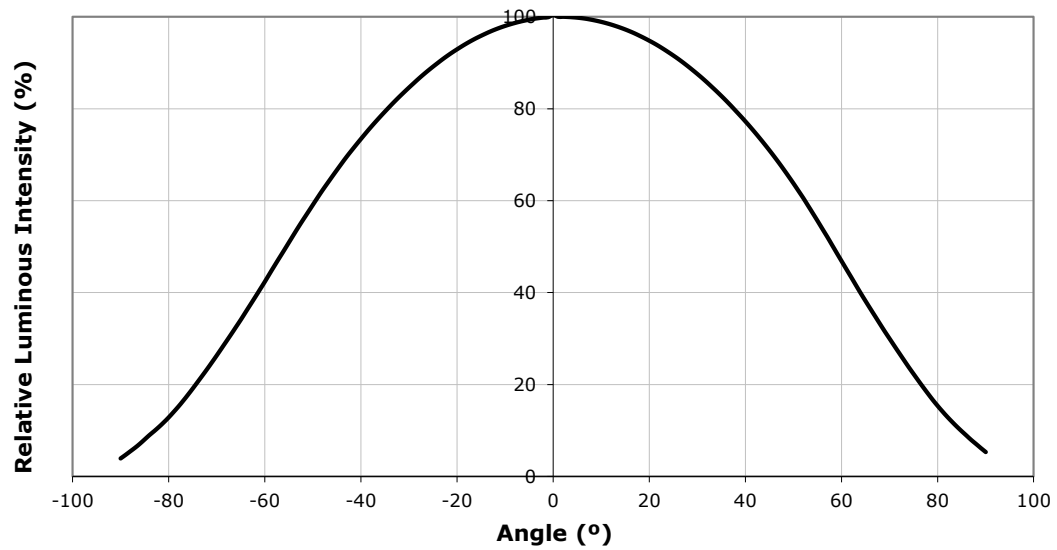
RELATIVE FLUX VS. CURRENT ($T_j = 85^\circ\text{C}$) - CONTINUED



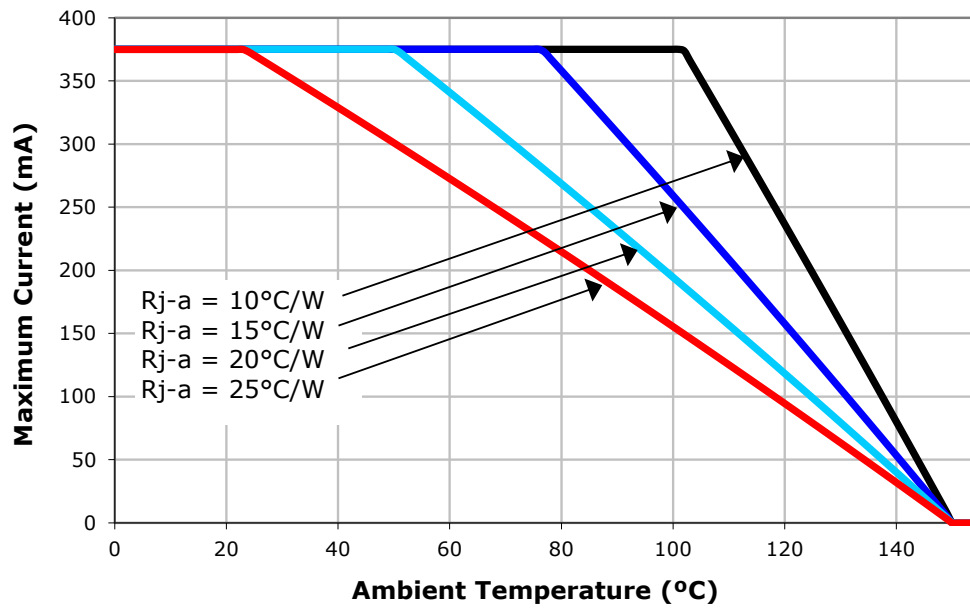
TYPICAL SPATIAL DISTRIBUTION (12-V XT-E HVW)



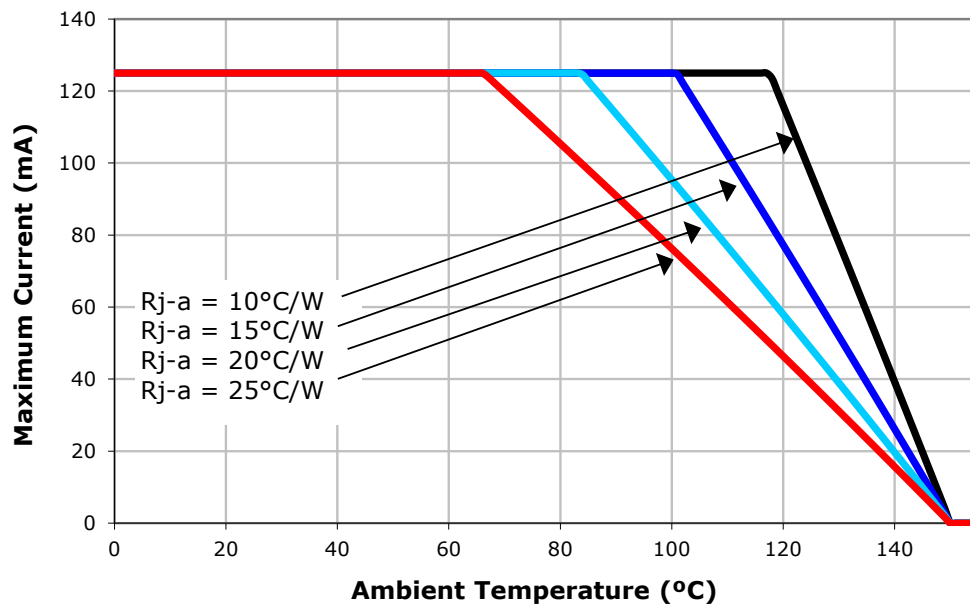
TYPICAL SPATIAL DISTRIBUTION (24-V & 48-V XT-E HVW)



THERMAL DESIGN

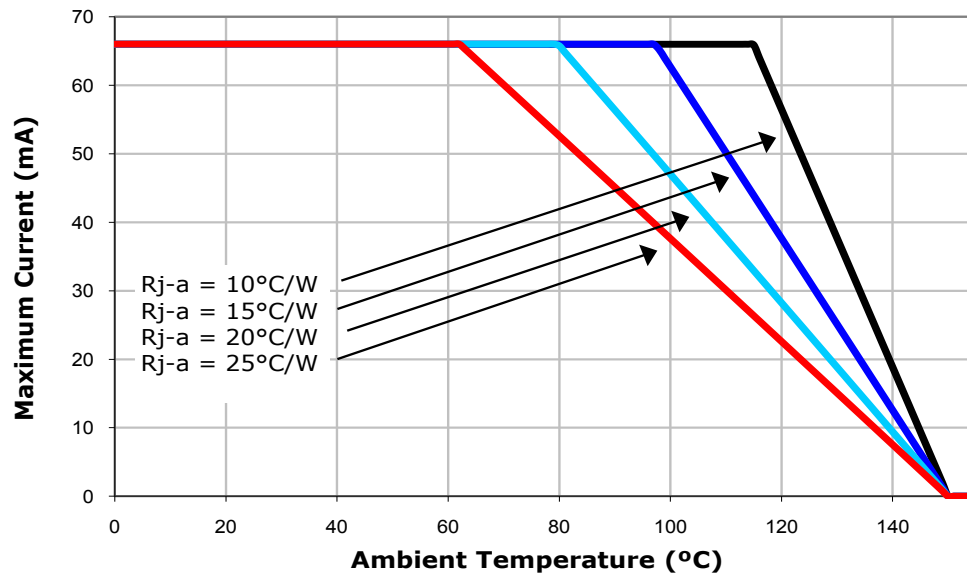


12-V XT-E HVW



24-V XT-E HVW

THERMAL DESIGN - CONTINUED

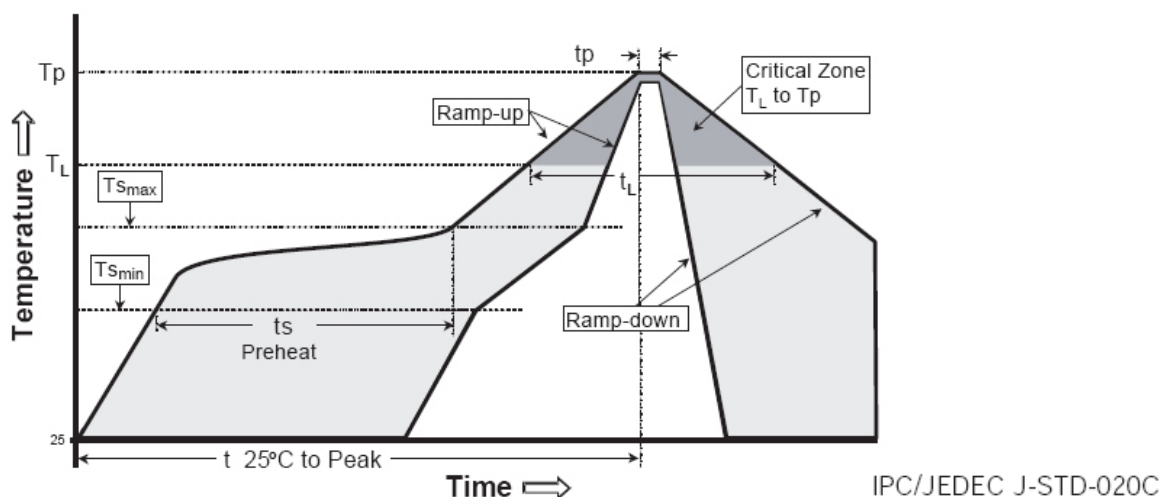


48-V XT-E HVW

REFLOW SOLDERING CHARACTERISTICS

In testing, Cree has found XLamp XT-E 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 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.

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 XT-E 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 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

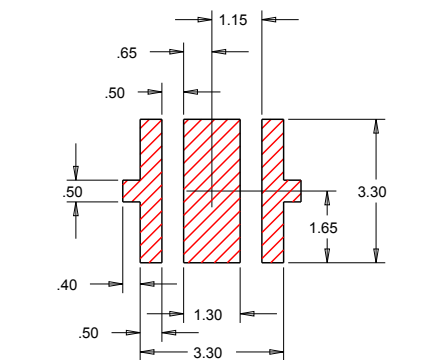
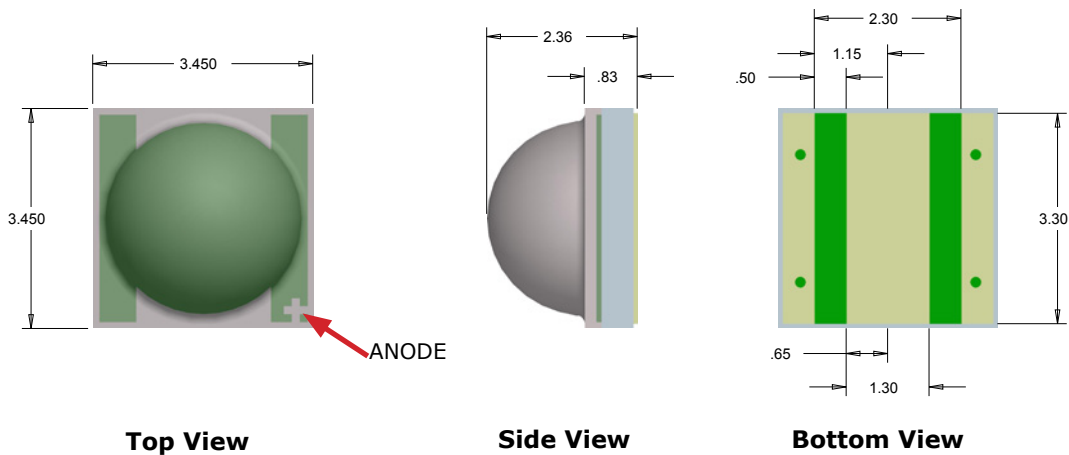
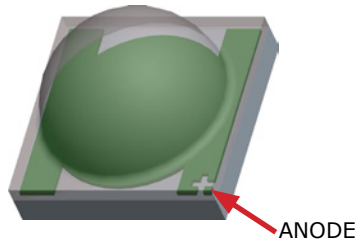
Level 4 enclosure consideration. The LED package or a portion thereof has been investigated as a fire and electrical enclosure per ANSI/UL 8750.

Vision Advisory Claim

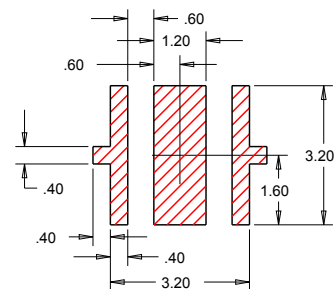
WARNING: Do not look at an exposed lamp in operation. Eye injury can result. See LED Eye Safety at www.cree.com/xlamp_app_notes/led_eye_safety.

MECHANICAL DIMENSIONS

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



Recommended PCB Solder Pad

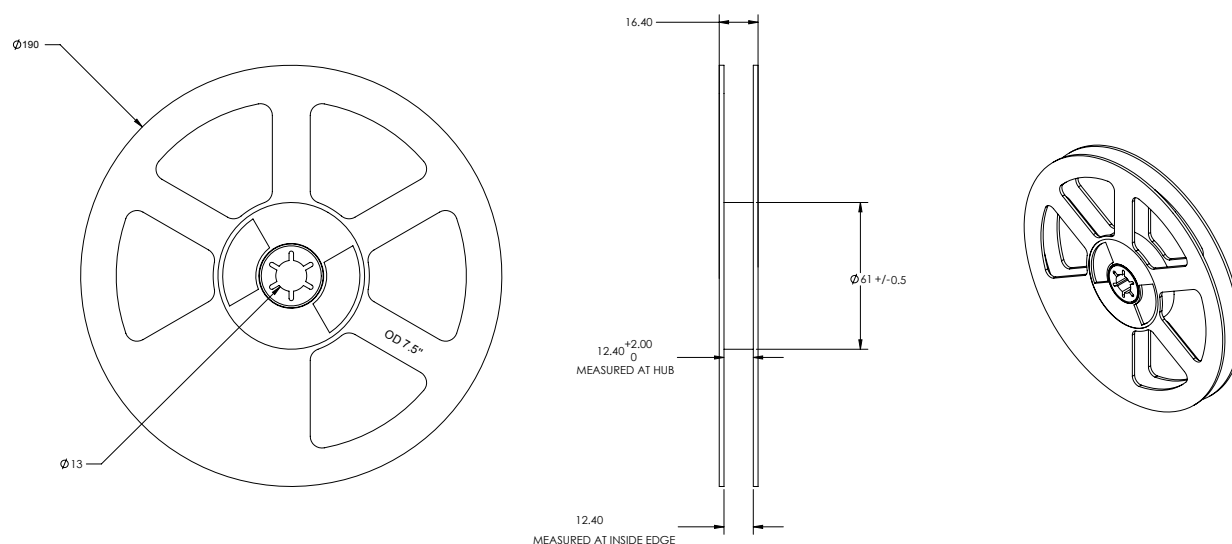
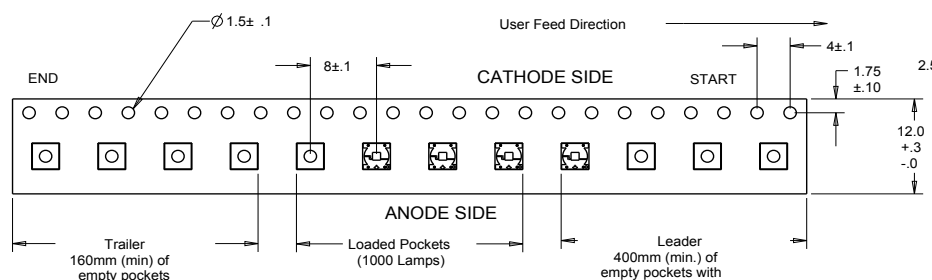


Recommended Stencil Pattern
Hatched Area is Opening

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

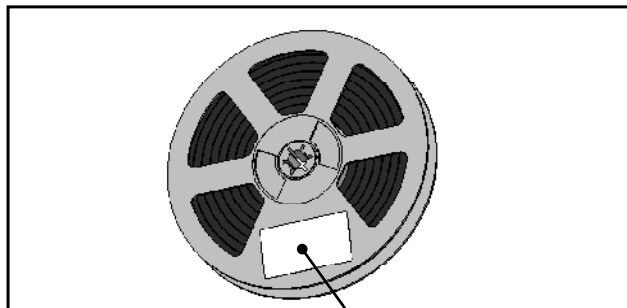
Ao	3.70	+/- 0.1
Bo	3.70	+/- 0.1
Ko	2.40	+0.0/-0.1
F	5.50	+/- 0.05
P ₁	8.00	+/- 0.1
W	12.00	+0.3/-0.1

- (I) Measured from centerline of sprocket hole to centerline of pocket.
- (II) Cumulative tolerance of 10 sprocket holes is ± 0.20 .
- (III) Measured from centerline of sprocket hole to centerline of pocket.
- (IV) Other material available.



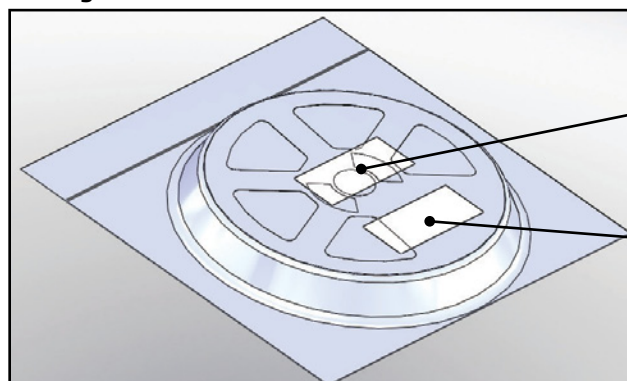
PACKAGING

Unpackaged Reel



Label with Cree Bin Code, Qty, Reel ID

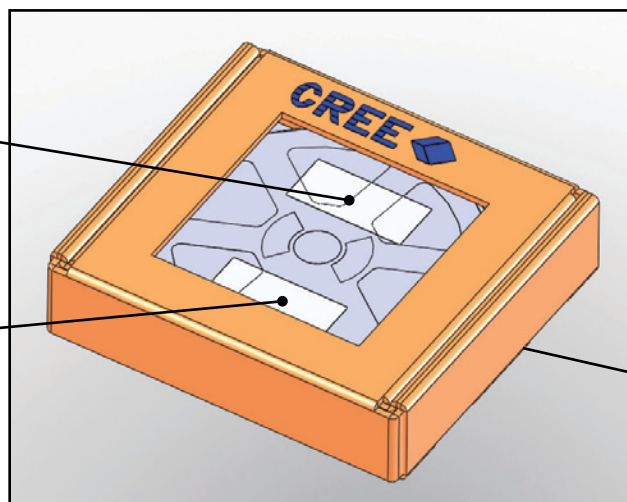
Packaged Reel



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)