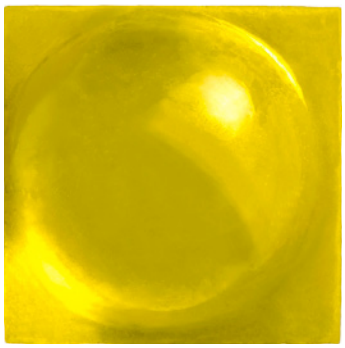
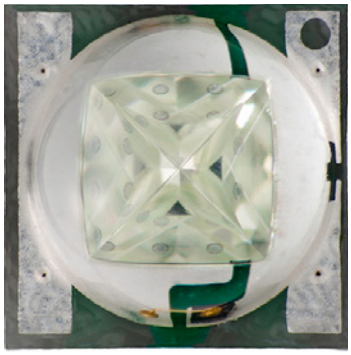
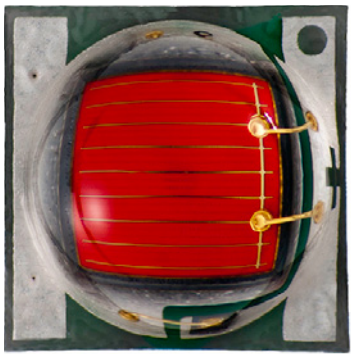
Cree® XLamp® XB-D LEDs







PRODUCT DESCRIPTION

The XLamp XB-D LED brings next-generation performance, price and size to all LED lighting applications. The XB-D's footprint enables smaller designs with densely packed arrays for better light mixing and concentration.

XB-D shares common footprint and uniform package design across all white and color configurations, simplifying board and optical designs for many LED systems. XB-D is optimized to dramatically lower system cost in any illumination application, from indoor and outdoor lighting to architectural and transportation lighting.

FEATURES

- Cree's smallest lighting class LED: 2.45 X 2.45 mm
- XB-D white binned @ 85 °C; XB-D color binned @ 25 °C
- Up to 136 lm/W in cool white (@ 85 °C, 350 mA)
- Available in white, 80-minimum CRI white, and 70-minimum CRI cool white, royal blue, blue, green, amber, red-orange & red
- 1 A maximum drive current
- Wide viewing angle: from 115° (white) to 140° (red)
- Reflow solderable - JEDEC J-STD-020C compatible
- Unlimited floor life at ≤ 30 °C/85% RH
- Electrically neutral thermal path
- RoHS- and REACh-compliant
- UL-recognized component (E349212)

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CHARACTERISTICS

Characteristics	Unit	Minimum	Typical	Maximum
Thermal resistance, junction to solder point - white, royal blue, blue	°C/W		6.5	
Thermal resistance, junction to solder point - green	°C/W		11	
Thermal resistance, junction to solder point - amber	°C/W		7	
Thermal resistance, junction to solder point - red-orange, red	°C/W		5	
Viewing angle (FWHM) - white	degrees		115	
Viewing angle (FWHM) - royal blue, blue, green	degrees		135	
Viewing angle (FWHM) - amber, red-orange, red	degrees		140	
Temperature coefficient of voltage - white	mV/°C		-2.5	
Temperature coefficient of voltage - royal blue, blue, green	mV/°C		-3.3	
Temperature coefficient of voltage - amber, red-orange, red	mV/°C		-2	
ESD classification (HBM per Mil-Std-883D)			Class 2	
DC forward current	mA			1000
Reverse voltage	V			-5
Forward voltage (@ 350 mA, 85 °C) - white	V		2.9	3.5
Forward voltage (@ 350 mA, 25 °C) - royal blue, blue	V		3.1	3.7
Forward voltage (@ 350 mA, 25 °C) - green	V		3.3	3.9
Forward voltage (@ 350 mA, 25 °C) - amber, red-orange, red	V		2.25	2.6
LED junction temperature	°C			150

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FLUX CHARACTERISTICS - WHITE (T_J = 85 °C)

The following table provides several base order codes for XLamp XB-D 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 XB-D Binning and Labeling document.

Color	CCT Range		Base Order Codes Min. Luminous Flux @ 350 mA			Calculated Minimum Luminous Flux (lm)**		Order Code
	Min.	Max.	Group	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*	700 mA	1000 mA	
Cool White	5000 K	8300 K	R3	122	139	210	271	XBDAWT-00-0000-000000F51
			R2	114	130	196	253	XBDAWT-00-0000-000000E51
70 CRI Minimum Cool White	5000 K	8300 K	R3	122	139	210	271	XBDAWT-00-0000-00000BF51
			R2	114	130	196	253	XBDAWT-00-0000-00000BE51
Neutral White	3700 K	5000 K	R2	114	130	196	253	XBDAWT-00-0000-00000LEE4
			Q5	107	122	184	237	XBDAWT-00-0000-00000LDE4
			Q4	100	114	172	222	XBDAWT-00-0000-00000LCE4
80 CRI Minimum White	2600 K	6200 K	Q4	100	114	172	222	XBDAWT-00-0000-00000HCE7
			Q3	93.9	107	162	208	XBDAWT-00-0000-00000HBE7
			Q2	87.4	100	150	194	XBDAWT-00-0000-00000HAE7
Warm White	2600 K	3700 K	Q4	100	114	172	222	XBDAWT-00-0000-00000LCE7
			Q3	93.9	107	162	208	XBDAWT-00-0000-00000LBE7
			Q2	87.4	100	150	194	XBDAWT-00-0000-00000LAE7

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 - 5000K 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.

* Flux values @ 25 °C are calculated and are for reference only.

** Calculated flux values at 700 mA and 1000 mA are for 85 °C and are for reference only.

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FLUX CHARACTERISTICS - COLOR (T_J = 25 °C)

The following table provides several base order codes for XLamp XB-D 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 XB-D Binning and Labeling document.

Color	Dominant Wavelength Range				Base Order Codes Min. Radiant Flux (mW) @ 350 mA		Order Code
	Min.		Max.				
	Group	DWL (nm)	Group	DWL (nm)	Group	Flux (mW)	
Royal Blue	D36	450	D57	465	34 (N)	550	XBDROY-00-0000-000000N01
					33 (M)	525	XBDROY-00-0000-000000M01
					32 (L)	500	XBDROY-00-0000-000000L01
					31 (K)	475	XBDROY-00-0000-000000K01
					30 (J)	450	XBDROY-00-0000-000000J01

Color	Dominant Wavelength Range				Base Order Codes Min. Luminous Flux (lm) @ 350 mA		Order Code
	Min.		Max.				
	Group	DWL (nm)	Group	DWL (nm)	Group	Flux (lm)	
Blue	B3	465	B6	485	M2	39.8	XBDBLU-00-0000-000000201
					K3	35.2	XBDBLU-00-0000-000000Z01
					K2	30.6	XBDBLU-00-0000-000000Y01

Color	Dominant Wavelength Range				Base Order Codes Min. Luminous Flux (lm) @ 350 mA		Order Code
	Min.		Max.				
	Group	DWL (nm)	Group	DWL (nm)	Group	Flux (lm)	
Green	G2	520	G4	535	Q5	107	XBDGRN-00-0000-000000D01
					Q4	100	XBDGRN-00-0000-000000C01
					Q3	93.9	XBDGRN-00-0000-000000B01
					Q2	87.4	XBDGRN-00-0000-000000A01

Color	Dominant Wavelength Range				Base Order Codes Min. Luminous Flux (lm) @ 350 mA		Order Code
	Min.		Max.				
	Group	DWL (nm)	Group	DWL (nm)	Group	Flux (lm)	
Amber	A2	585	A3	595	P3	73.9	XBDAMB-00-0000-000000801
					P2	67.2	XBDAMB-00-0000-000000701
					N4	62	XBDAMB-00-0000-000000601
					N3	56.8	XBDAMB-00-0000-000000501

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FLUX CHARACTERISTICS - COLOR (T_J = 25 °C) - CONTINUED

Color	Dominant Wavelength Range				Base Order Codes Min. Luminous Flux (lm) @ 350 mA		Order Code
	Min.		Max.				
	Group	DWL (nm)	Group	DWL (nm)	Group	Flux (lm)	
Red-Orange	O3	610	O4	620	Q4	100	XBDRDO-00-0000-000000C01
					Q3	93.9	XBDRDO-00-0000-000000B01
					Q2	87.4	XBDRDO-00-0000-000000A01
					P4	80.6	XBDRDO-00-0000-000000901
					P3	73.9	XBDRDO-00-0000-000000801

Color	Dominant Wavelength Range				Base Order Codes Min. Luminous Flux (lm) @ 350 mA		Order Code
	Min.		Max.				
	Group	DWL (nm)	Group	DWL (nm)	Group	Flux (lm)	
Red	R2	620	R3	630	P2	67.2	XBDRED-00-0000-000000701
					N4	62	XBDRED-00-0000-000000601
					N3	56.8	XBDRED-00-0000-000000501

Note: Cree maintains a tolerance of +/- 7% on flux and power measurements.

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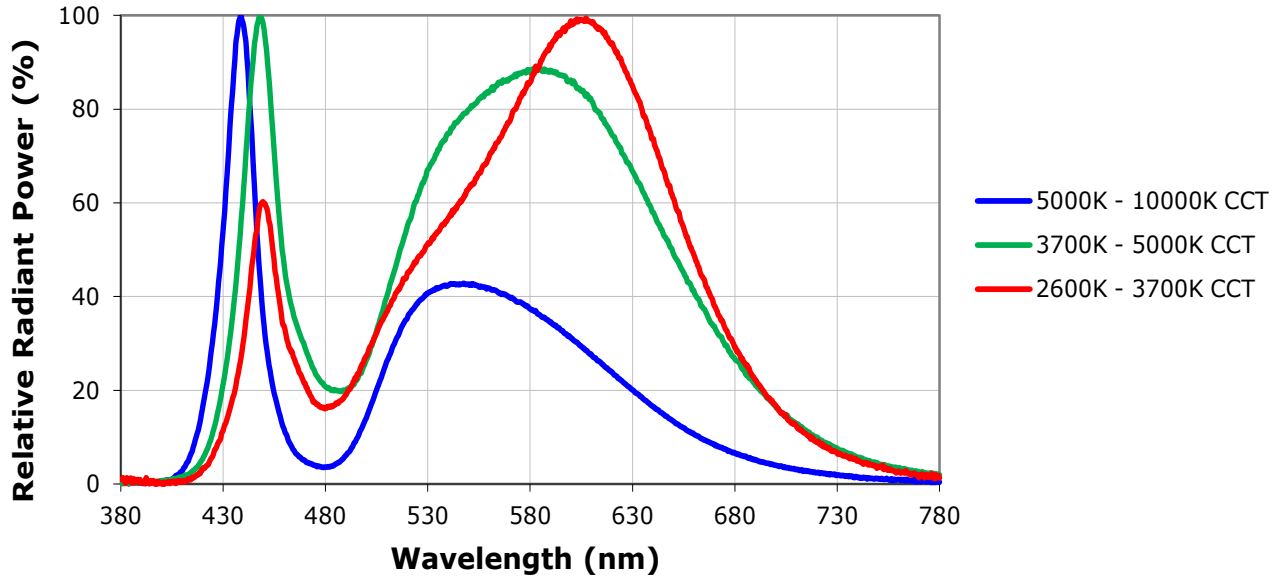
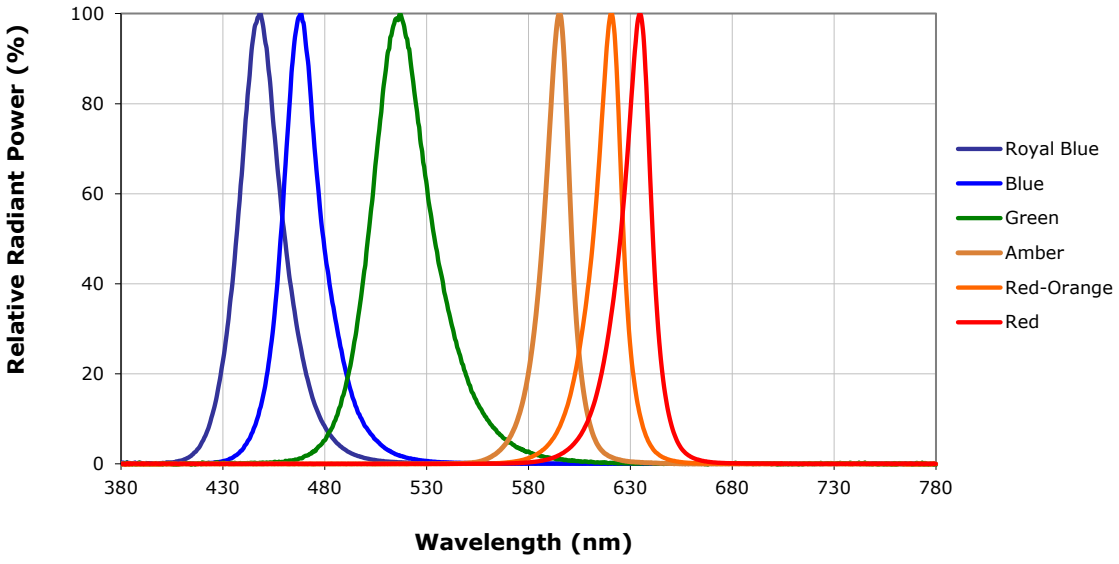
RELATIVE SPECTRAL POWER DISTRIBUTION





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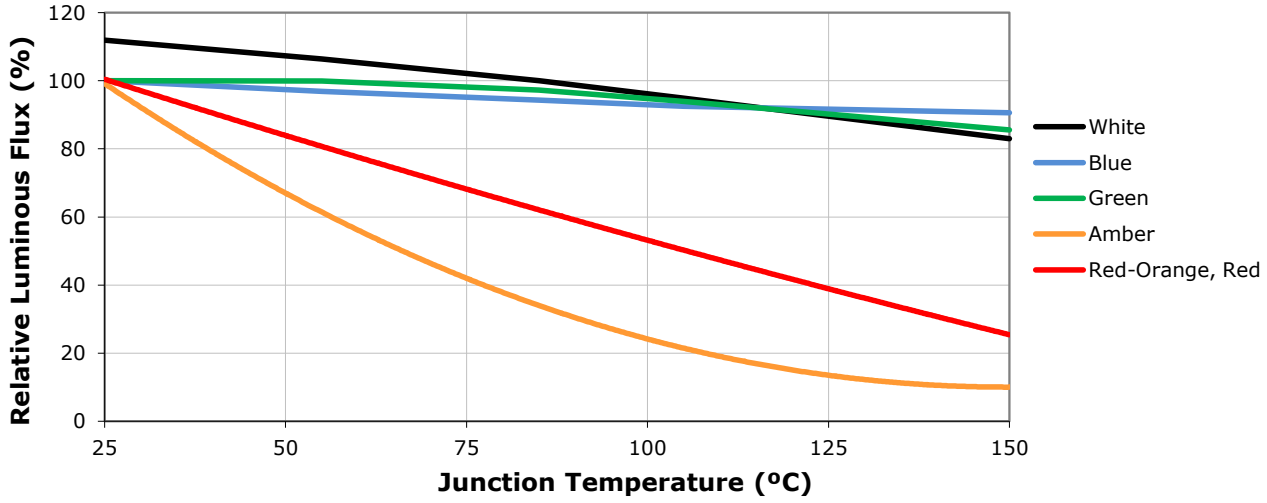
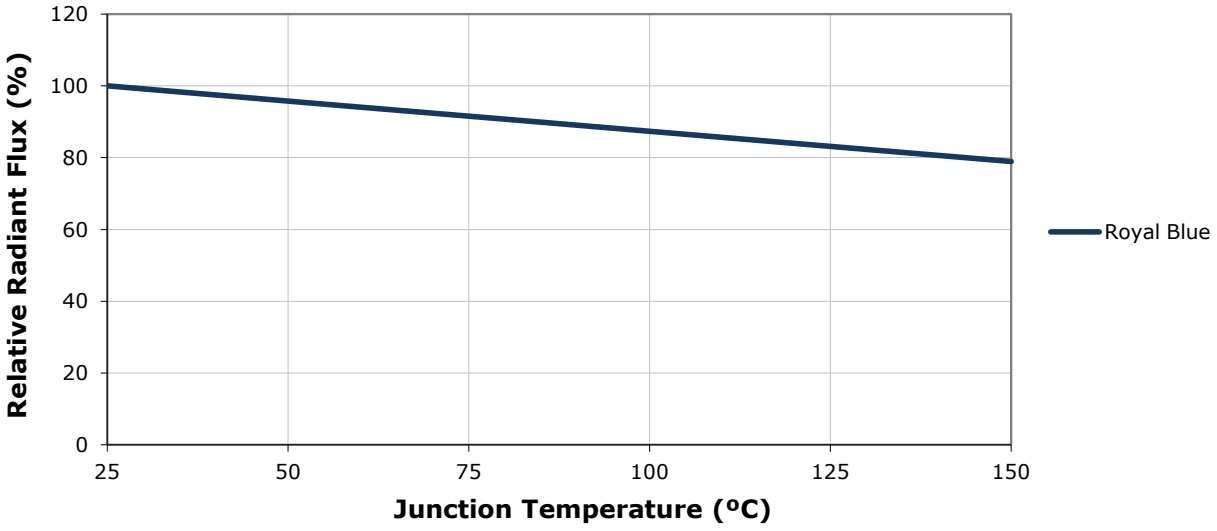
RELATIVE FLUX VS. JUNCTION TEMPERATURE (I_F = 350 mA)





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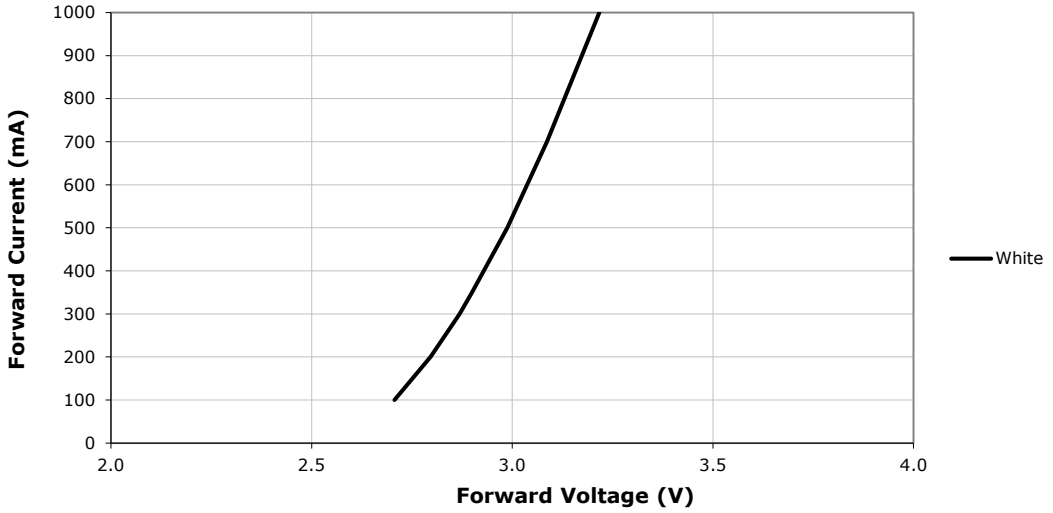
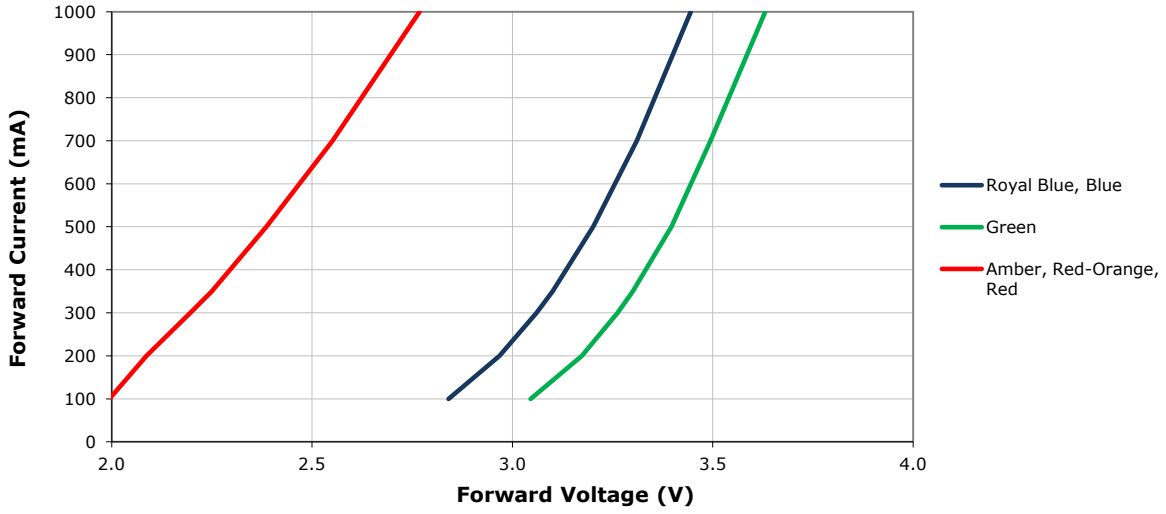
ELECTRICAL CHARACTERISTICS (T_J = 85 °C)



ELECTRICAL CHARACTERISTICS (T_J = 25 °C)



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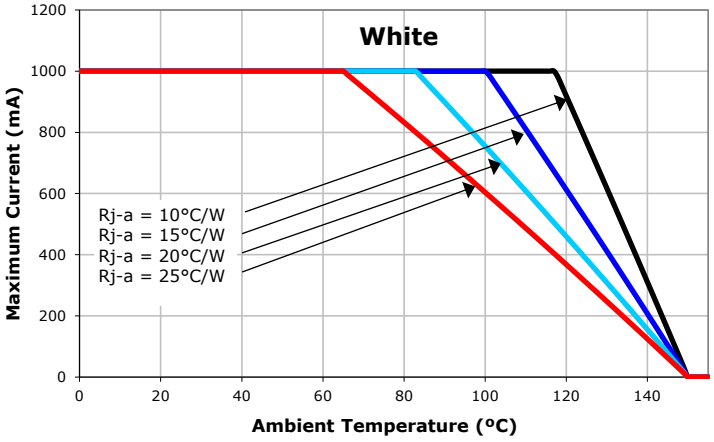
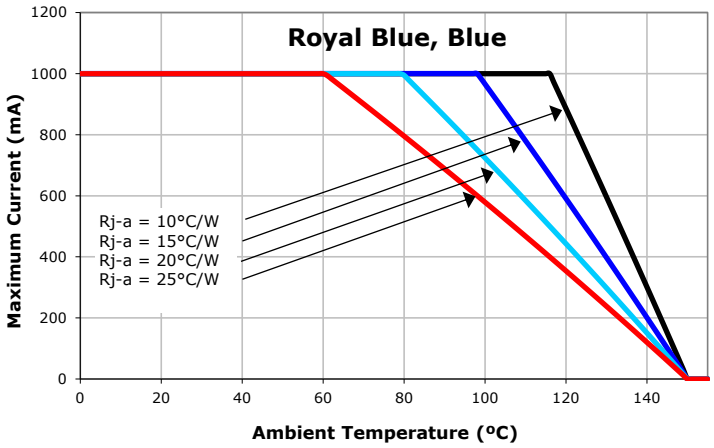
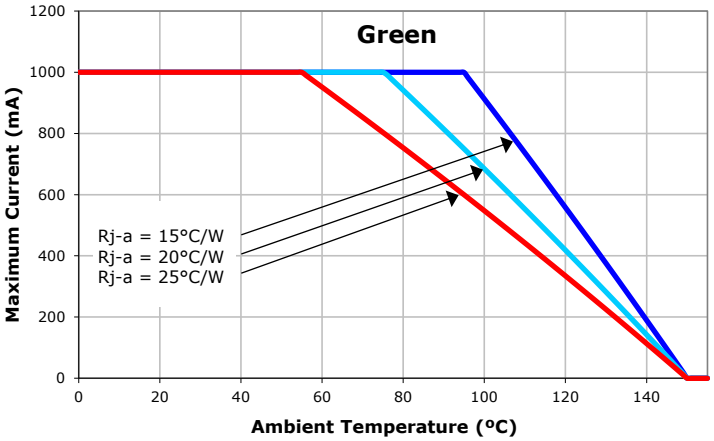
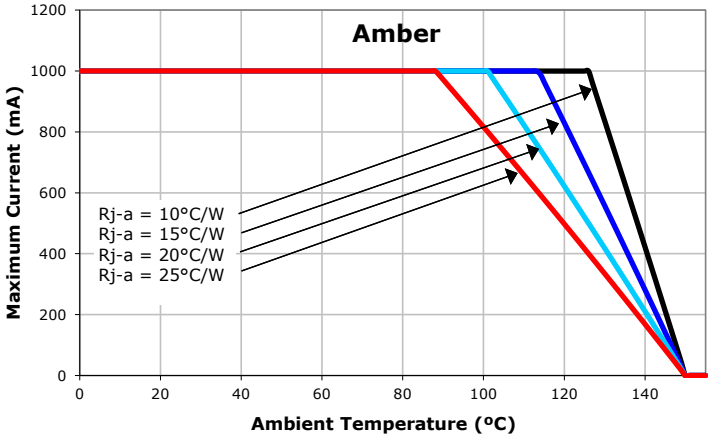
THERMAL DESIGN

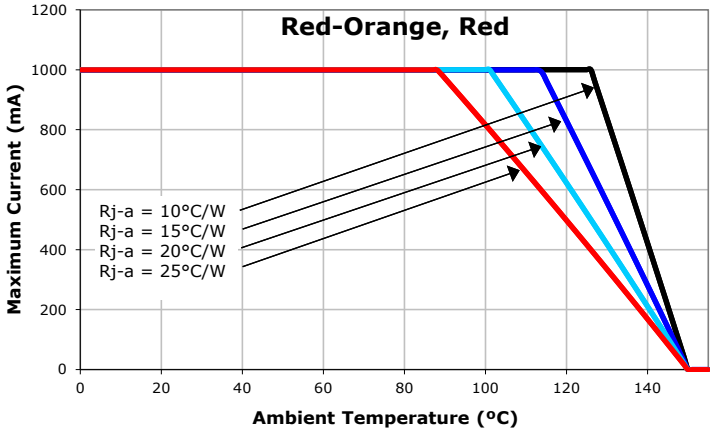
The maximum forward current is determined by the thermal resistance between the LED junction and ambient. It is crucial for the end product to be designed in a manner that minimizes the thermal resistance from the solder point to ambient in order to optimize lamp life and optical characteristics.











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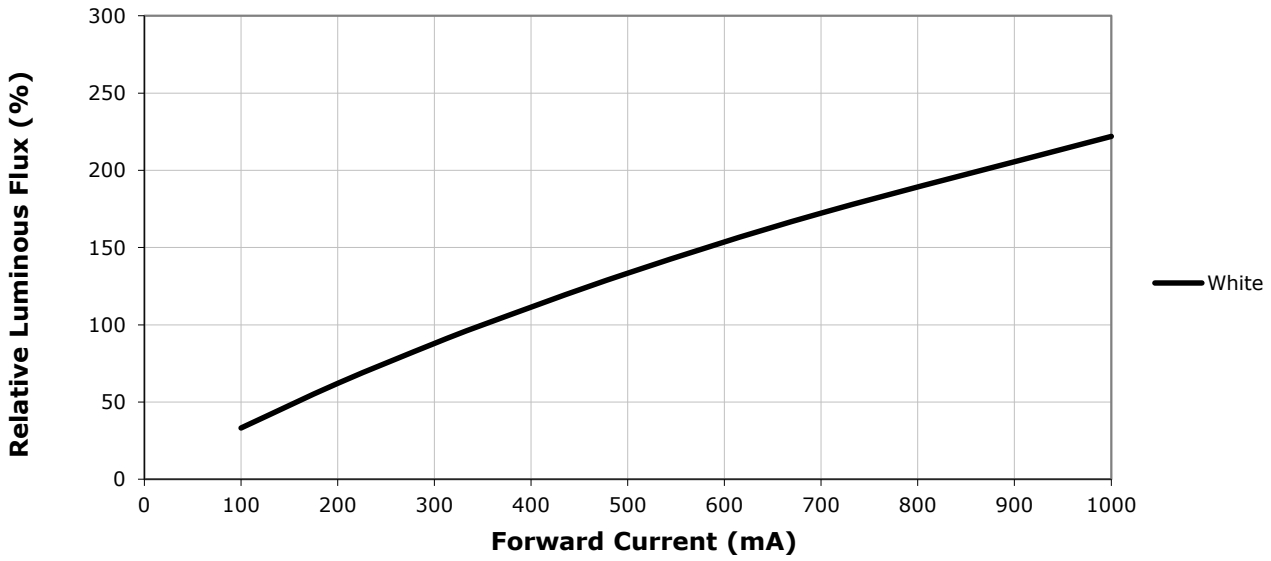
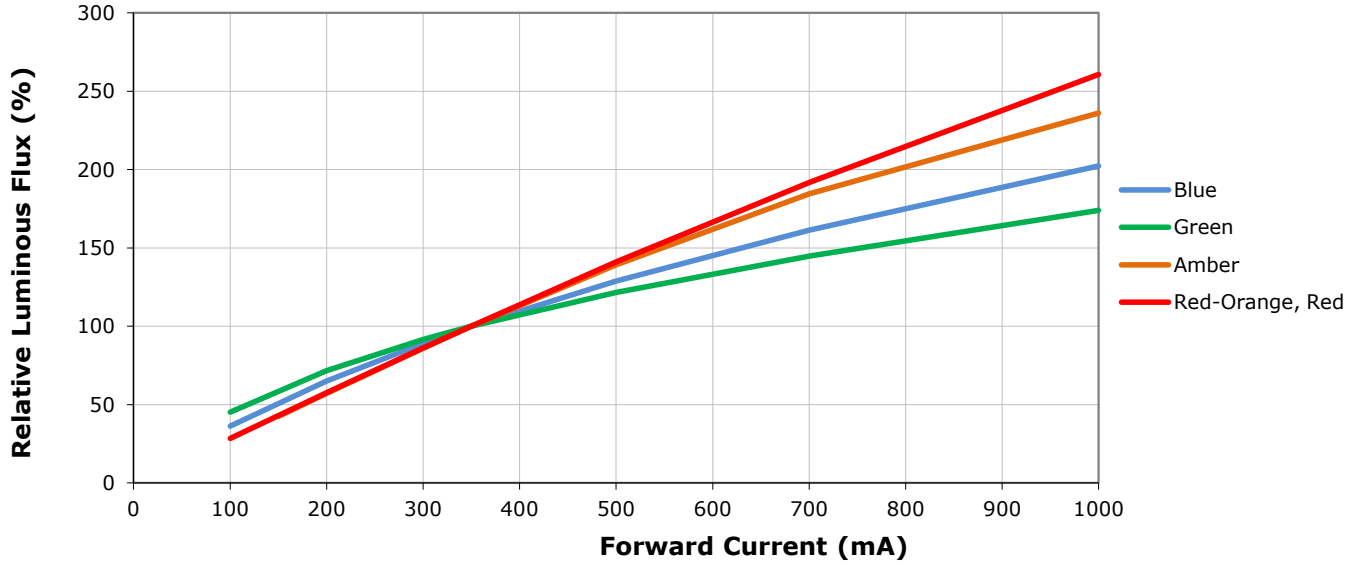
RELATIVE FLUX VS. CURRENT (T_J = 85 °C)



RELATIVE FLUX VS. CURRENT (T_J = 25 °C)



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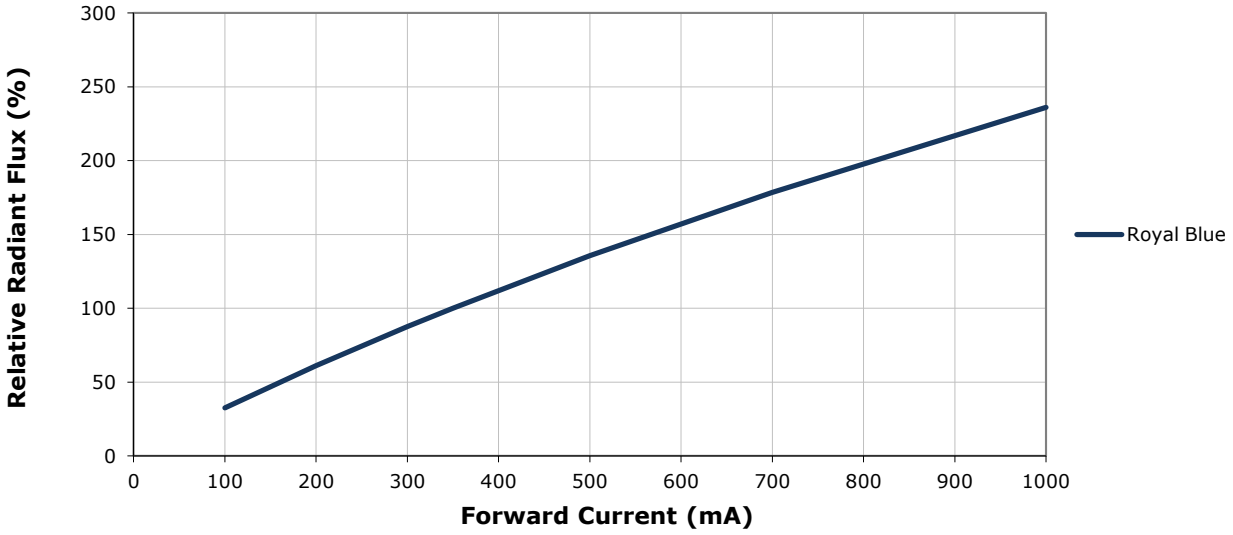
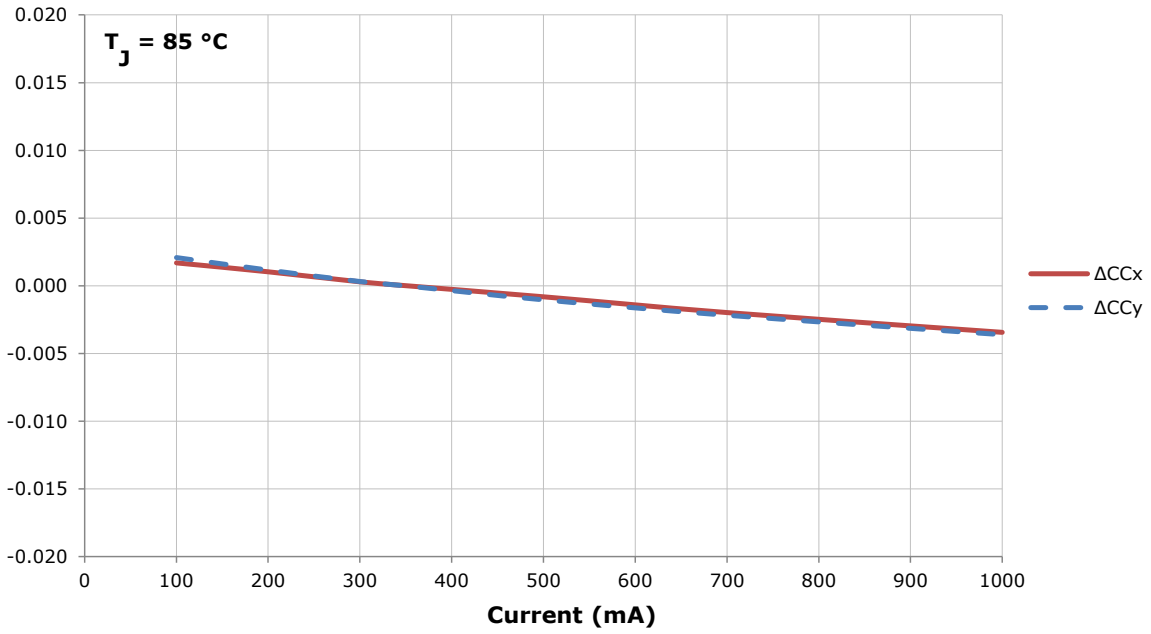
RELATIVE FLUX VS. CURRENT (T_J = 25 °C) - CONTINUED



RELATIVE CHROMATICITY VS. CURRENT (WARM WHITE)



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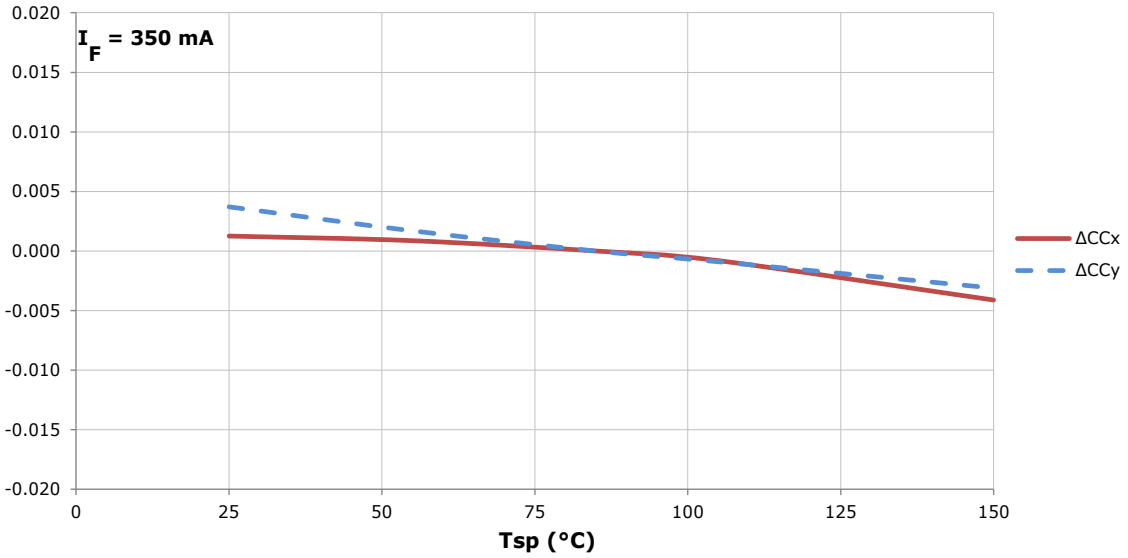
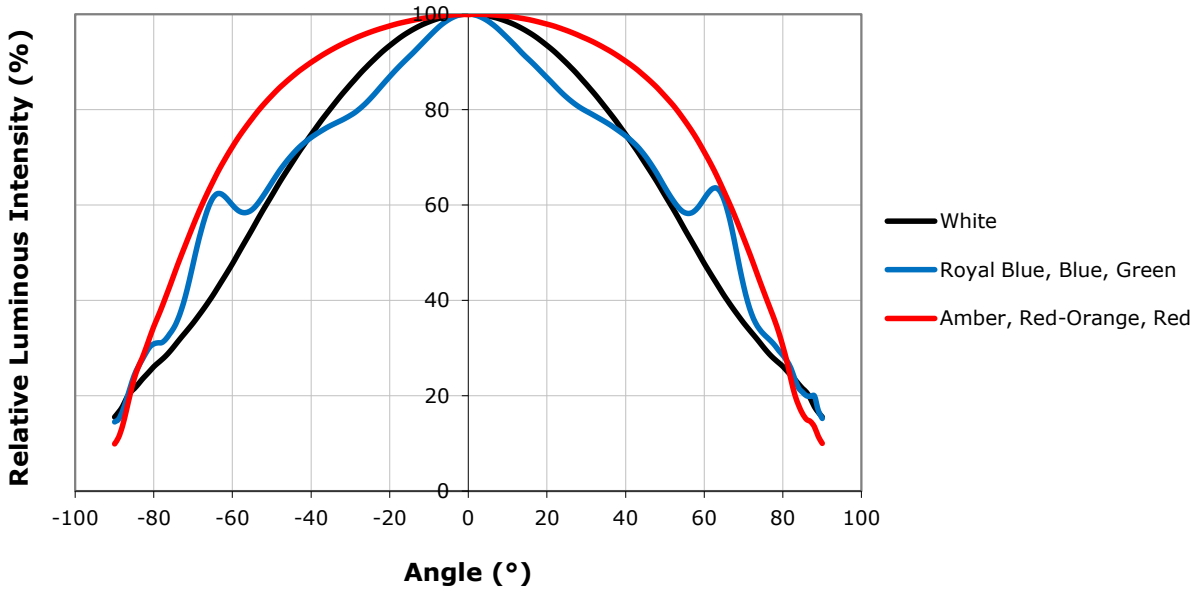
RELATIVE CHROMATICITY VS. TEMPERATURE (WARM WHITE)



TYPICAL SPATIAL DISTRIBUTION



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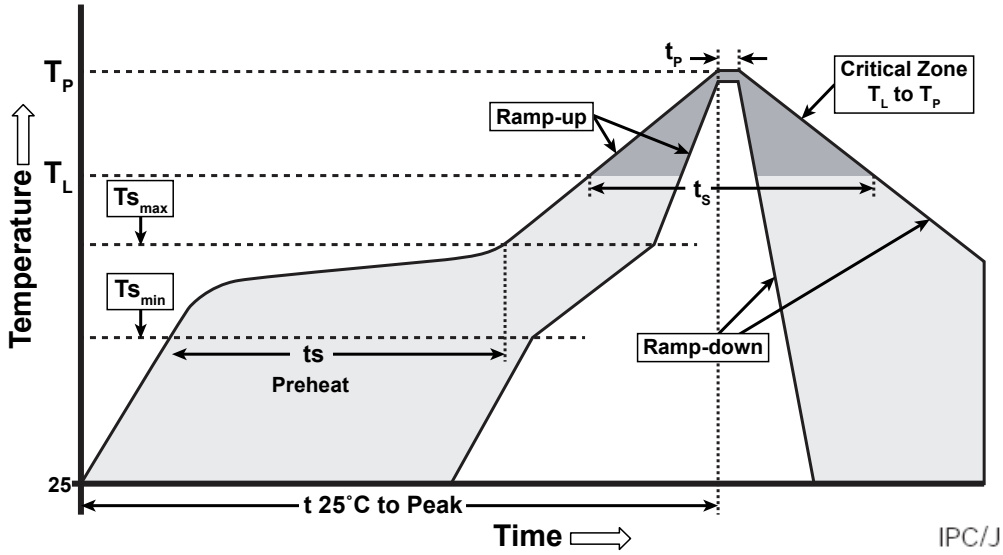
REFLOW SOLDERING CHARACTERISTICS

In testing, Cree has found XLamp XB-D 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.



IPC/JEDEC J-STD-020C

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.

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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 XB-D 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 amended through June 8, 2011. RoHS Declarations for this product can be obtain from your Cree representative or obtained from the Product Ecology section 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 notices 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 Declaration. Historical REACh banned substance information (substances restricted or banned in the EU prior to 2010) 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.

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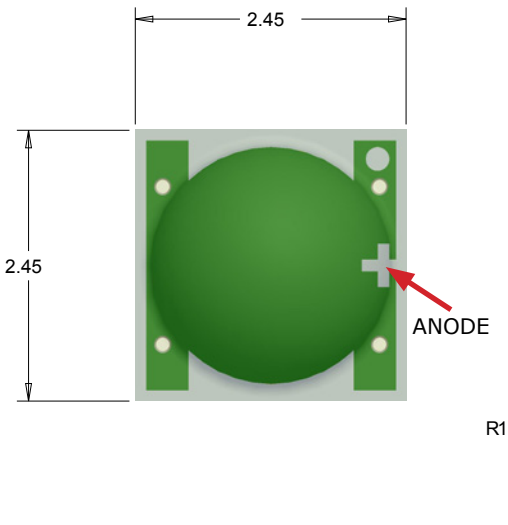
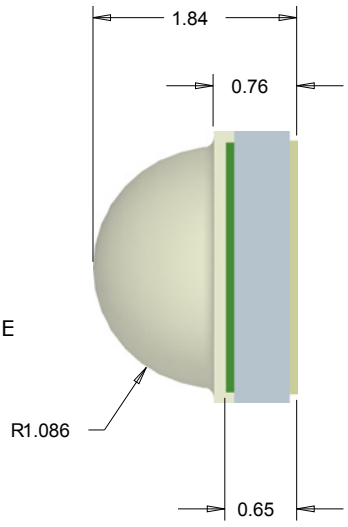
MECHANICAL DIMENSIONS

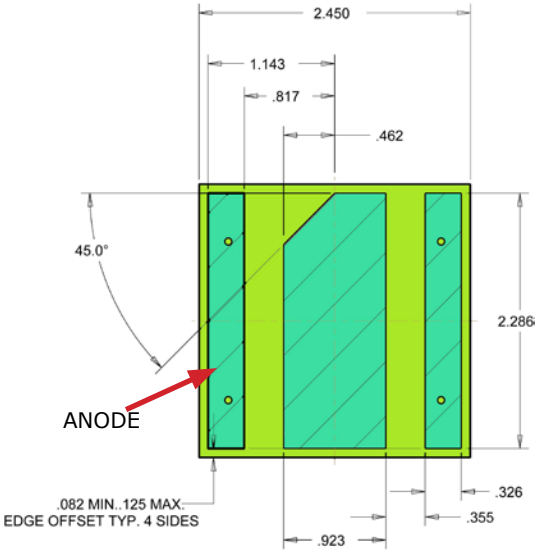
All measurements are ±.13 mm unless otherwise indicated.



Top View

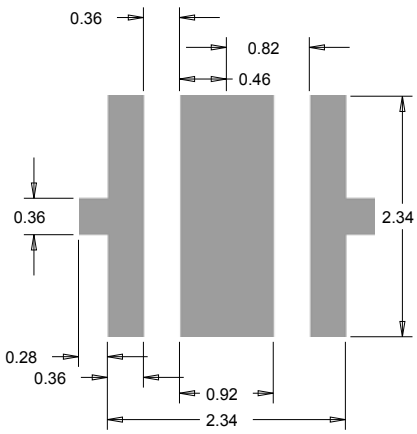


Side View

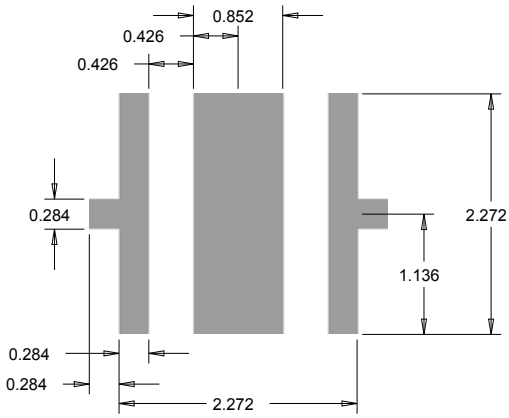


Bottom View*

* Note: In December, 2012, Cree changed the thermal pad of the XB-D package to include the anode notch illustrated above. XB-D LEDs produced prior to implementation of this change may have a different visual appearance.



Recommended PCB Solder Pad



Recommended Stencil Pattern

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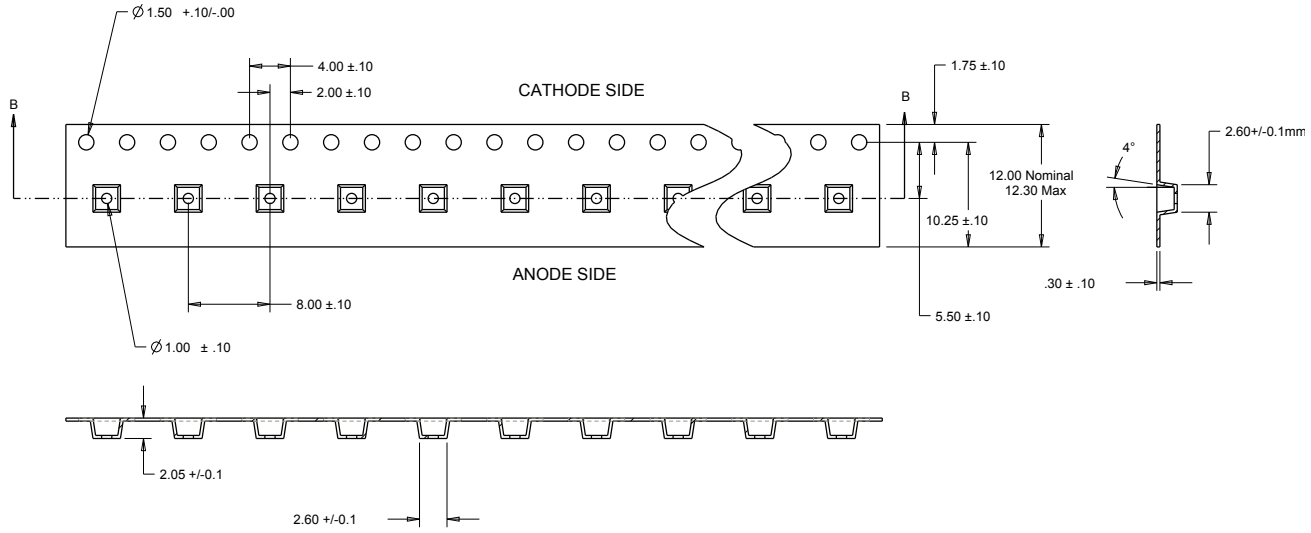
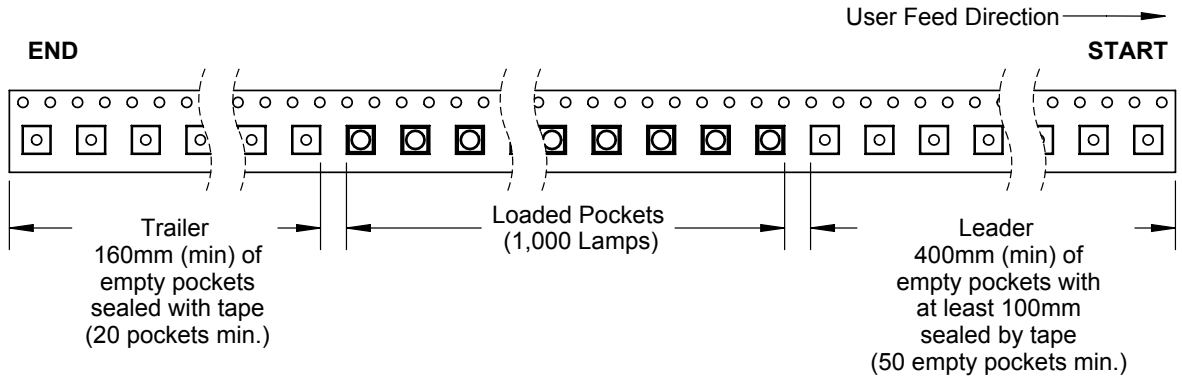
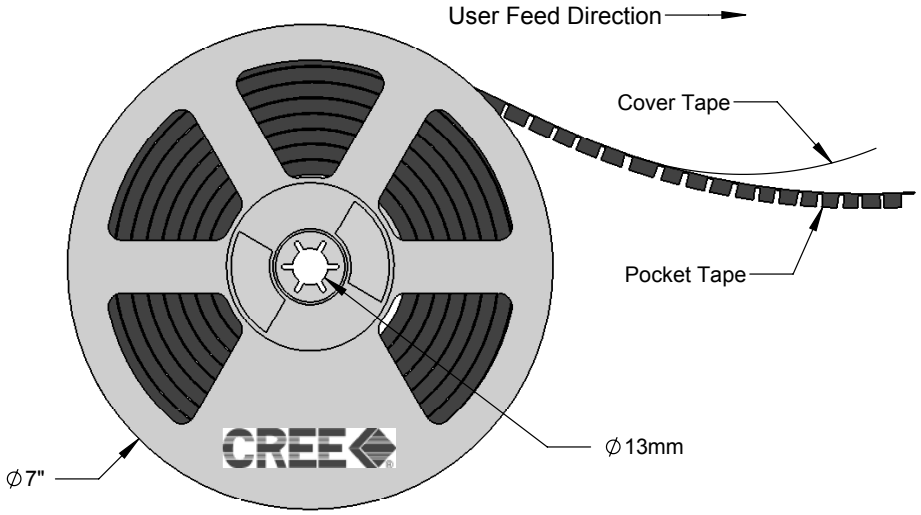
TAPE AND REEL

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

All dimensions in mm
Tolerance unless specified: .XX ± .25, .XXX ± .125, X° ± .5°







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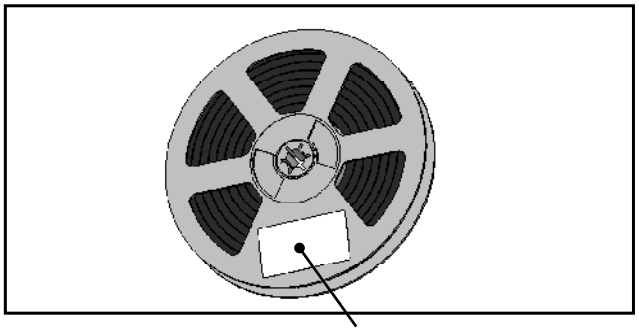
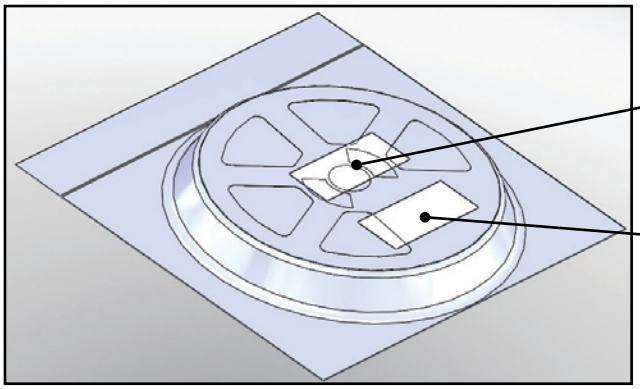
PACKAGING

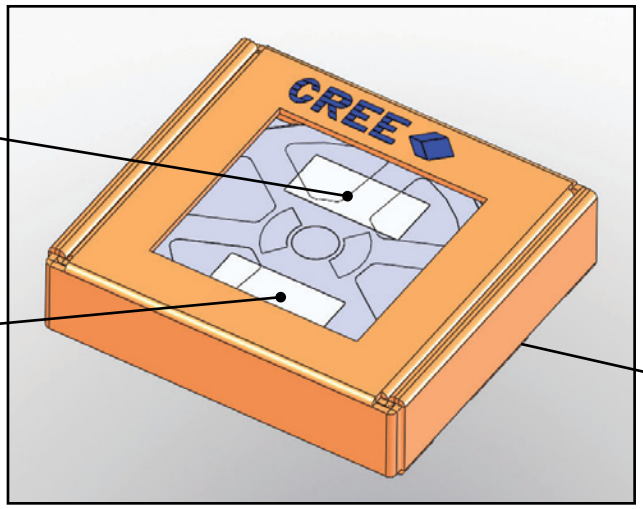
Unpackaged Reel



Packaged Reel



Boxed Reel



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LifeElectronics
Живое партнерство

ООО «ЛайфЭлектроникс» **“LifeElectronics” LLC**

ИНН 7805602321 КПП 780501001 Р/С 40702810122510004610 ФАКБ "АБСОЛЮТ БАНК" (ЗАО) в г.Санкт-Петербурге К/С 30101810900000000703 БИК 044030703

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С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров

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- *Специальные условия для постоянных клиентов.*
- *Подбор аналогов.*
- *Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.*

- *Приемлемые сроки поставки, возможна ускоренная поставка.*
- *Доставку товара в любую точку России и стран СНГ.*
- *Комплексную поставку.*
- *Работу по проектам и поставку образцов.*
- *Формирование склада под заказчика.*

- *Сертификаты соответствия на поставляемую продукцию (по желанию клиента).*
- *Тестирование поставляемой продукции.*
- *Поставку компонентов, требующих военную и космическую приемку.*
- *Входной контроль качества.*
- *Наличие сертификата ISO.*

В составе нашей компании организован Конструкторский отдел, призванный помогать разработчикам, и инженерам.

Конструкторский отдел помогает осуществить:

- *Регистрацию проекта у производителя компонентов.*
- *Техническую поддержку проекта.*
- *Защиту от снятия компонента с производства.*
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