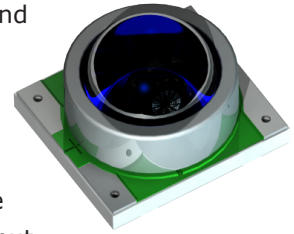


Cree® XLamp® 4550 LEDs

Cree XLamp 4550 LEDs bring the power of brightness to a wide range of lighting and backlighting applications including portable lighting, computer and television screens, signaling, architectural, landscaping and entertainment/advertising. Cree XLamp 4550 LEDs combine the brightness of power LED chips with a rugged package capable of operating in excess of half of a watt. XLamp LEDs lead the solid-state lighting industry in brightness while providing a reflow-solderable design that is optimized for ease-of-use and thermal management. Lighting applications featuring XLamp LEDs maximize light output and increase design flexibility, while minimizing environmental impact.



BENEFITS

- Industry's first 125 mA package
- Surface-mount technology — reflow solderable
- Wide range of colors
 - Royal Blue, Blue, Green, Amber and Red
- Low operating voltage
- Full dimming
- RoHS-compliant — lead-free
- Integrated lens
- Small footprint — 4.5 mm x 5.0 mm
- ESD > 2000 V

Flux Characteristics (T₁ = 25°C)

Color	Dominant wavelength (nm) or CCT (K)		Typical Luminous or Radiant flux @ 125 mA
	Min.	Max.	
Royal Blue	455 nm	465 nm	65 mW
Blue	465 nm	475 nm	4.5 lm
Green	520 nm	535 nm	18 lm
Amber	585 nm	595 nm	8.4 lm
Red	620 nm	635 nm	12 lm

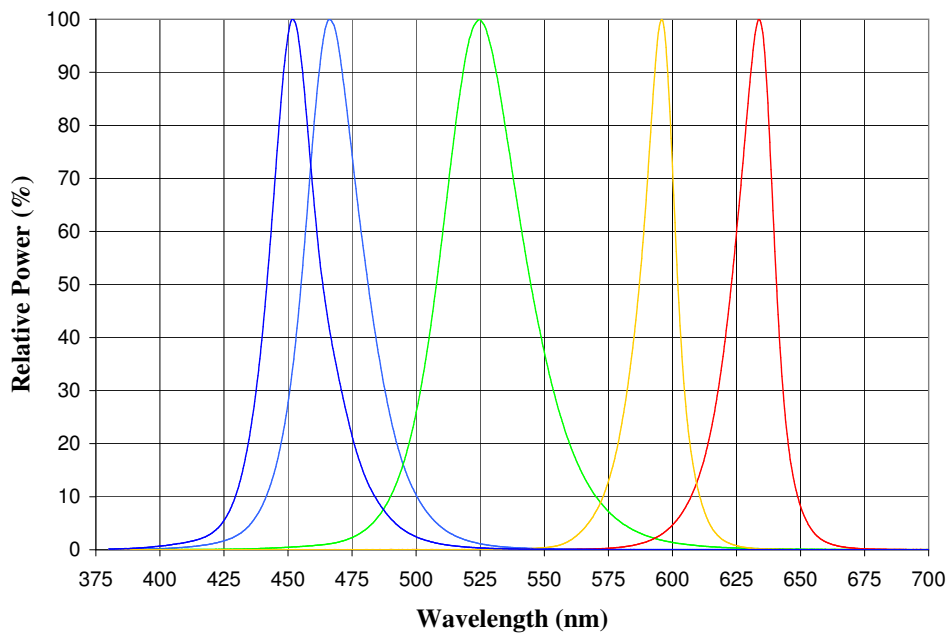
Note: Cree maintains a tolerance of +/-7% on the flux and power measurements.

Characteristics

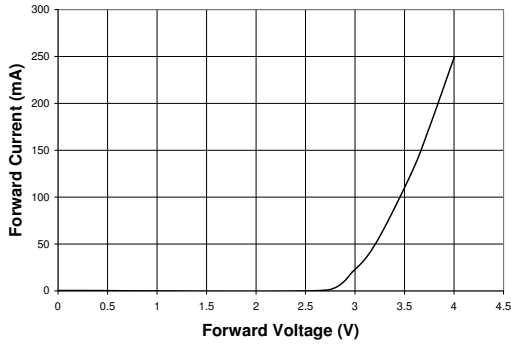
Characteristics	Unit	XLamp 4550
Thermal Resistance, junction to solder point	°C/W	35
Maximum forward voltage @ 125mA (royal blue, blue, green)	V	4
Maximum forward voltage @ 125mA (amber, red)	V	3
Viewing angle (FWHM)	degrees	100
Temperature coefficient of voltage (royal blue, blue, green)	mV/°C	-3.0 to -2.8
Temperature coefficient of voltage (amber, red)	mV/°C	-3.2 to -3.0
ESD Classification (HBM per Mil-Std-883D)		Class 2
Maximum DC Forward Current	mA	125
Maximum Reverse Voltage	V	5
Maximum LED Junction Temperature	°C	125
Minimum Operating Temperature	°C	-40
Maximum Operating Temperature	°C	85
Maximum Solder Point Temperature (measured at LED base)	°C	90

For details on Cree's procedures for sorting, binning and labeling and a list of standard order codes, see application note: *Cree XLamp 4550 LED Binning and Labeling*.

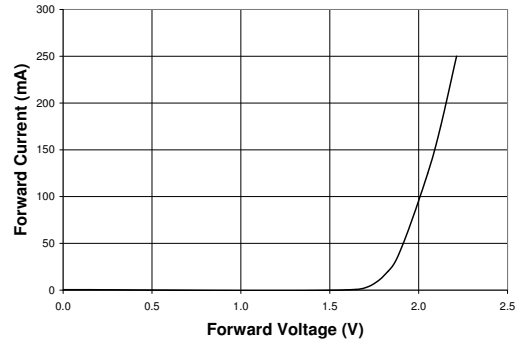
Relative Spectral Power



Electrical Characteristics



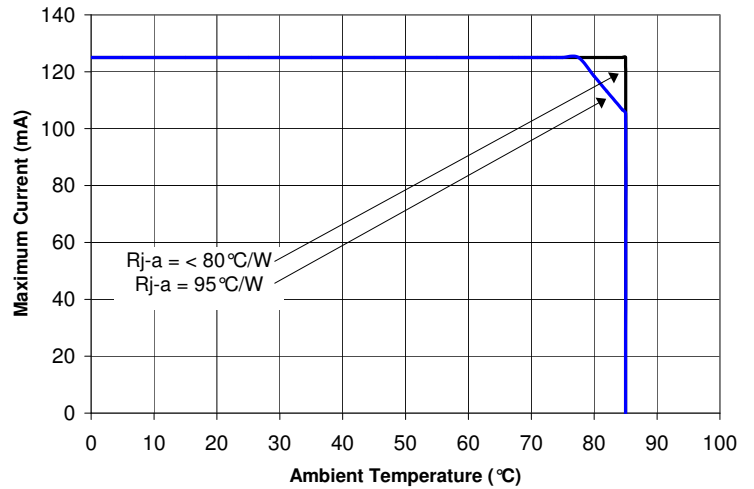
Royal Blue, Blue, Green



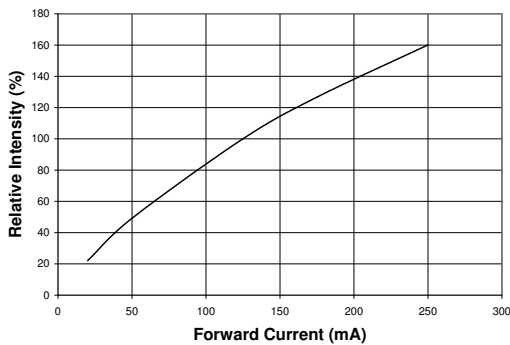
Red, Amber

Thermal Design

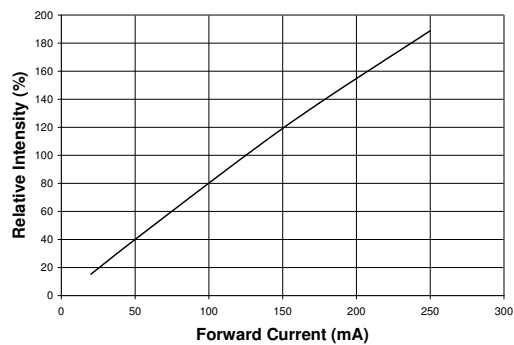
The maximum forward current is determined by the thermal resistance between the LED junction and ambient. Given an existing thermal resistance of 35°C/W between the junction and the solder point, it is crucial for the end product to be designed in a manner that minimizes the thermal resistance from the solder point to ambient in order to optimize lamp life and optical characteristics.



Relative Flux vs. Current ($T_A = 25^\circ\text{C}$)

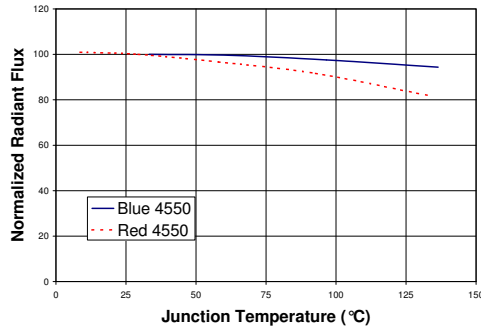


Royal Blue, Blue, Green



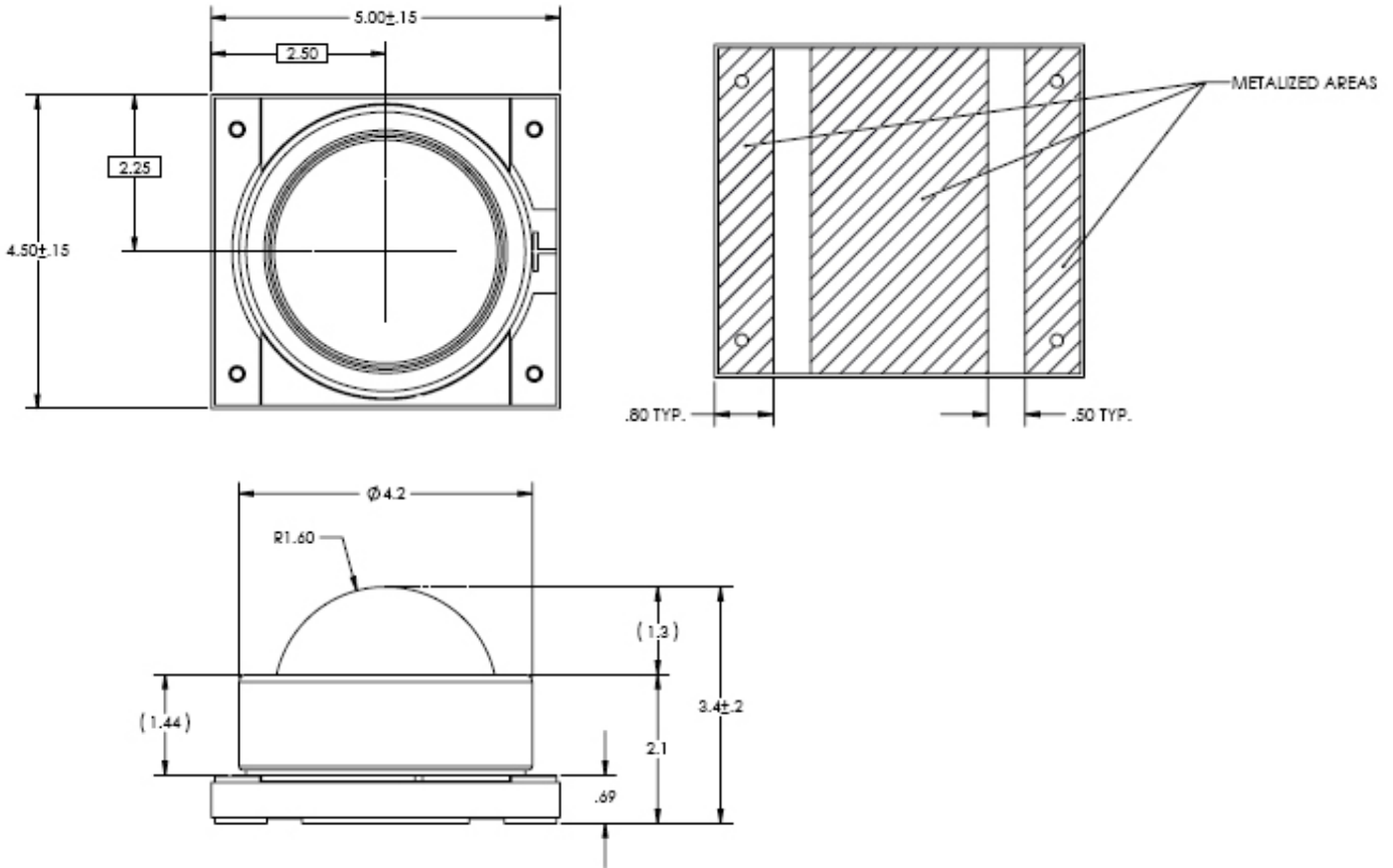
Red, Red-Orange, Amber

Relative Intensity vs. Junction Temperature ($I_f = 125 \text{ mA}$)



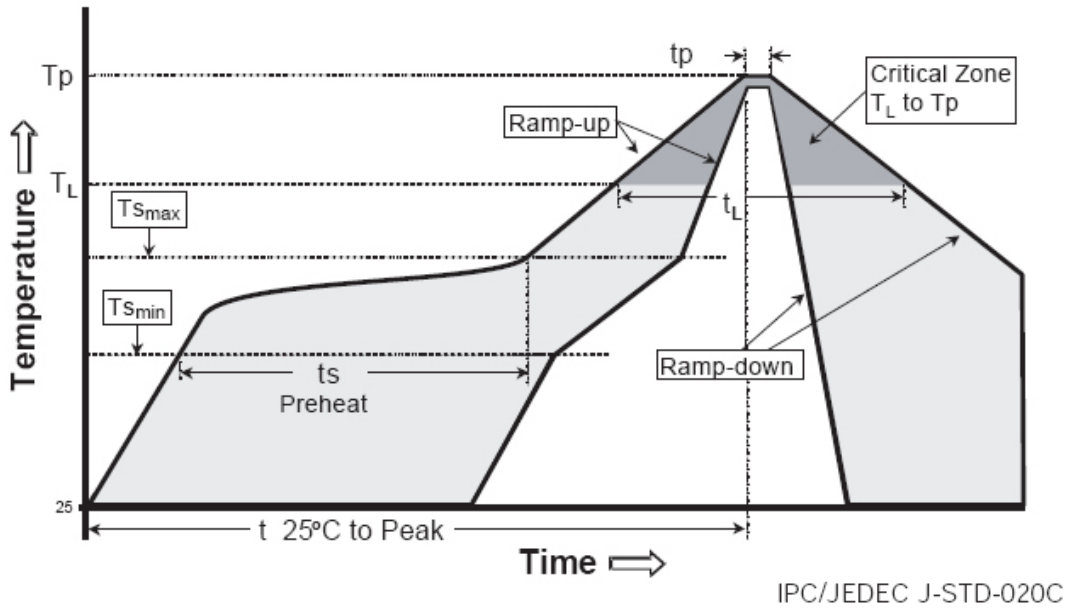
Mechanical Dimensions ($T_A = 25^\circ\text{C}$)

All measurements are $\pm 0.1 \text{ mm}$ unless otherwise indicated.



Reflow Soldering Characteristics

The following reflow soldering profiles are provided for reference. Cree recommends that users follow the recommended soldering profile provided by the manufacturer of the solder paste used. Cree XLamp LEDs are compatible with JEDEC J-STD-020C.



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

Moisture Sensitivity

XLamp LEDs are shipped in sealed, moisture-barrier bags (MBB) designed for long shelf life. If XLamp LEDs are exposed to moist environments after opening the MBB packaging but before soldering, damage to the LED may occur during the soldering operation. The following derating table defines the maximum exposure time (in days) for an XLamp LED in the listed humidity and temperature conditions. LEDs with exposure time longer than the time specified below must be baked according to the baking conditions listed below.

Temperature	Maximum Percent Relative Humidity						
	30%	40%	50%	60%	70%	80%	90%
30°C	9	5	4	3	1	1	1
25°C	12	7	5	4	2	1	1
20°C	17	9	7	6	2	2	1

Baking Conditions

It is not necessary to bake all XLamp LEDs. Only the LEDs that meet all of the following criteria must be baked:

1. LEDs that have been removed from the original MBB packaging
2. LEDs that have been exposed to a humid environment longer than listed in the Moisture Sensitivity section above
3. LED that have not been soldered

LEDs should be baked at 80°C for 24 hours. LEDs may be baked on the original reels. Remove LEDs from MBB packaging before baking. Do not bake parts at temperatures higher than 80°C. This baking operation resets the exposure time as defined in the Moisture Sensitivity section above.

Storage Conditions

XLamp LEDs that have been removed from original MBB packaging but not soldered yet should be stored in a room or cabinet that will maintain an atmosphere of $25 \pm 5^\circ\text{C}$ and no greater than 10% RH (relative humidity). For LEDs stored in these conditions, storage time does not add to exposure time as defined in the moisture sensitivity section above.

RoHS Compliance

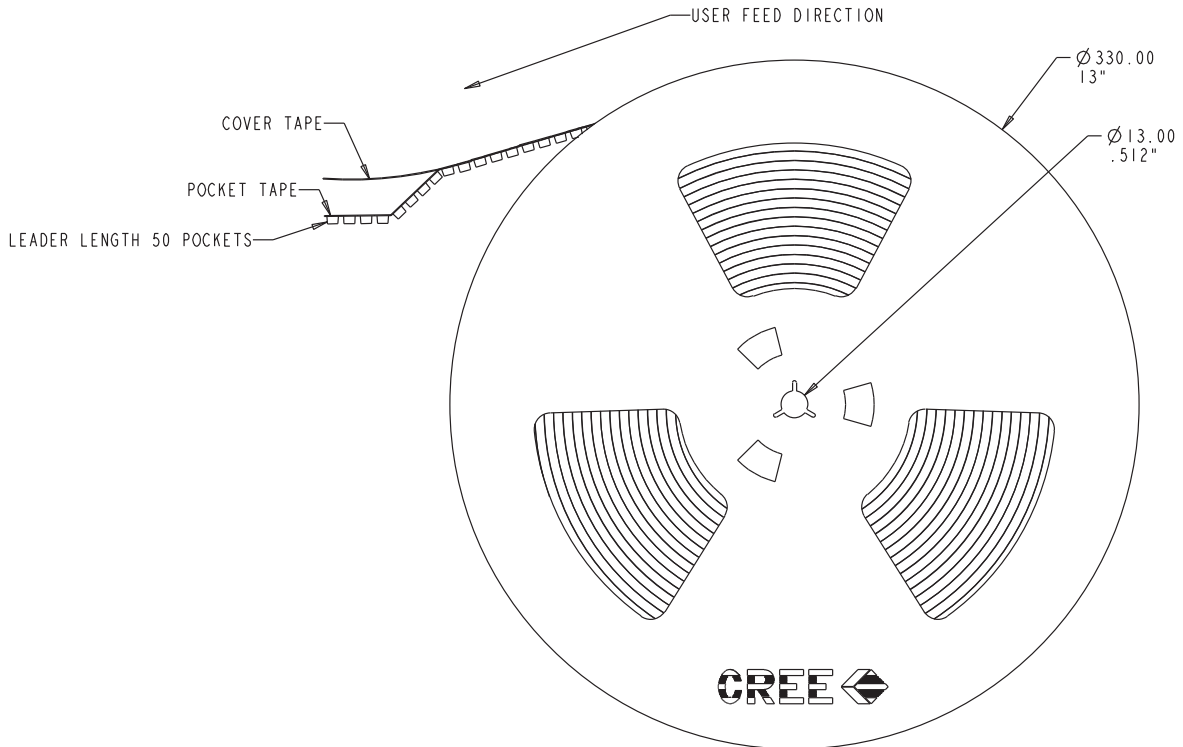
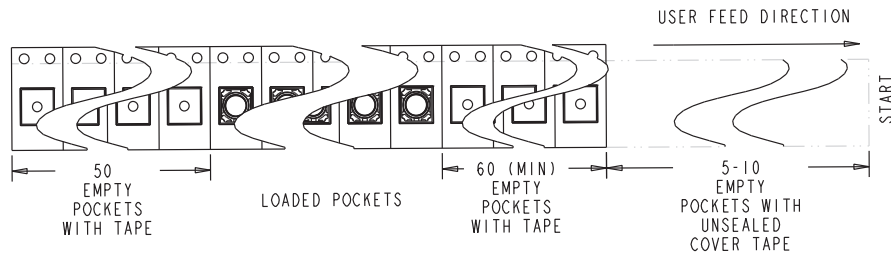
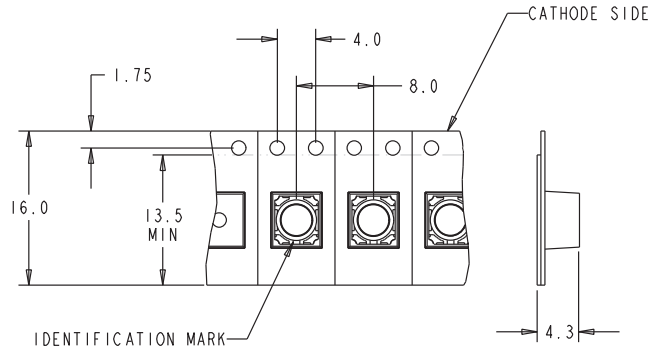
The levels of environmentally sensitive, persistent biologically toxic (PBT), persistent organic pollutants (POP), or otherwise restricted materials in this product are below the maximum concentration values (also referred to as the threshold limits) permitted for such substances, or are used in an exempted application, in accordance with EU Directive 2002/95/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS), as amended through April 21, 2006.

Vision Advisory Claim

Users should be cautioned not to stare at the light of this LED product. The bright light can damage the eye.

Tape and Reel

All dimensions in mm.



Dry Packaging and Packaging

