Cree® EZ950-p™ LEDs
Data Sheet (Anode-up)
C*xxx*EZ950-S*xxx*00-*x*

Cree's EZBright® LEDs are the latest generation of solid-state LED emitters that combine highly efficient InGaN materials with Cree's proprietary optical design and device technology to deliver superior value for high-intensity LEDs. The optical design maximizes light extraction efficiency and enables a Lambertian radiation pattern. EZ™ LEDs are attachable with the flux eutectic method, as well as conductive epoxy, solder paste or solder preforms. These vertically structured, low forward voltage LED chips are approximately 170 µm in height. Cree's EZ chips are tested for conformity to optical and electrical specifications. These LEDs are useful in a broad range of applications, including automotive lighting, general illumination and mobile flash.

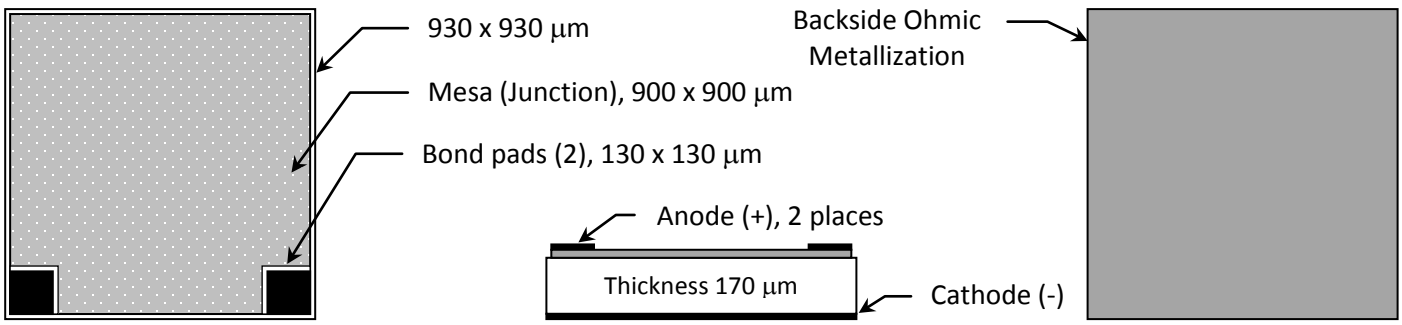
FEATURES

- Lambertian Radiation Pattern
- Anode-up design (p-pad up)
- EZBright LED Technology, binned @ 350 mA
  - 450 nm – 540+ mW
  - 460 nm – 520+ mW
  - 470 nm – 480+ mW
  - 527 nm – 170+ mW
- Low Forward Voltage (Vf) – 3.1 V Typical at 350 mA
- Maximum DC Forward Current – 1500 mA
- Backside Metal versions for various attach methods:
  -A (AuSn) for use with Conductive Adhesives, Flux Eutectic Attach, Solder Paste & Solder Preforms
  -G (LTDA) for Low Temperature Flux Eutectic Attach

APPLICATIONS

- General Illumination
  - Aircraft
  - Decorative Lighting
  - Task Lighting
  - Outdoor Illumination
- White LEDs
- Projection Displays
- Automotive Exterior
- Mobile Flash

C*xxx*EZ950-S*xxx*00-*x* Chip Diagram



Maximum Ratings at T_A = 25°C Note 1, 2 & 3	CxxxEZ950-Sxxx00-x
DC Forward Current	1500 mA
Peak Forward Current (1/10 duty cycle @ 1 kHz)	2500 mA
LED Junction Temperature	150°C
Reverse Voltage	5 V
Operating Temperature Range	-40°C to +100°C
LED Chip Storage Temperature Range	-40°C to +120°C
Recommended Die Sheet Storage Conditions	≤30°C / ≤85% RH

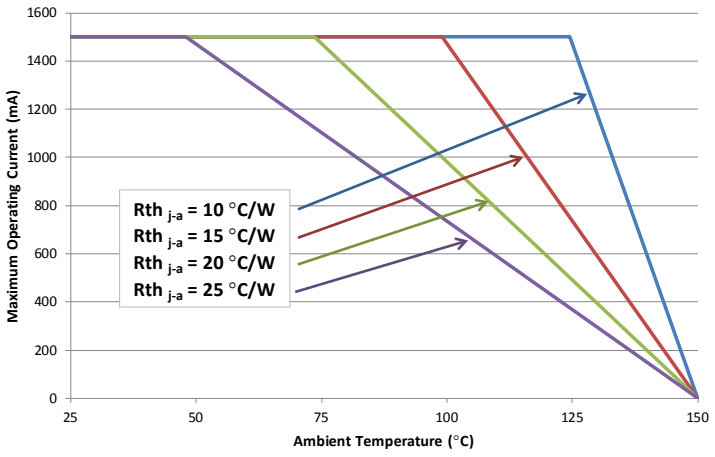
Typical Electrical/Optical Characteristics at T_A = 25°C, If = 350 mA Note 2

Part Number	Forward Voltage (V_f, V)			Reverse Current [I(Vr=5V), µA]	Full Width Half Max (λ_D, nm)
	Min.	Typ.	Max.	Max.	Typ.
C450EZ950-Sxxx00-x	2.7	3.1	3.4	2	20
C460EZ950-Sxxx00-x	2.7	3.1	3.4	2	21
C470EZ950-Sxxx00-x	2.7	3.1	3.4	2	22
C527EZ950-Sxxx00-x	2.8	3.25	3.8	2	35

Mechanical Specifications	CxxxEZ950-Sxxx00-x	
Description	**Dimensions**	**Tolerance**
P-N Junction Area (µm)	900 x 900	± 35
Chip Area (µm)	930 x 930	± 35
Chip Thickness (µm)	170	± 25
Top Au Bond Pad (µm) - Qty. 2	130 x 130	± 25
Au Bond Pad Thickness (µm)	1.0	± 0.5
Backside Ohmic Metal Area (µm)	930 x 930	± 35
Backside Ohmic Metal Thickness (µm) – "-A" (AuSn)	3.0	± 1.5
Backside Ohmic Metal Thickness (µm) – "-G" (LTDA)	3.3	± 1.5

Notes:

1. Maximum ratings are package-dependent. The above ratings were determined using a silicone encapsulated chip on MCPCB for characterization. Ratings for other packages may differ. The junction temperature should be characterized in a specific package to determine limitations. Assembly processing temperature must not exceed 325°C (< 5 seconds). See the Cree EZBright Applications Note for assembly-process information.
2. All products conform to the listed minimum and maximum specifications for electrical and optical characteristics when assembled and operated at 350 mA within the maximum ratings shown above. Efficiency decreases at higher currents. Typical values given are within the range of average values expected by the manufacturer in large quantities and are provided for information only. All measurements were made using a Au-plated TO header without an encapsulant. Optical characteristics were measured in an integrating sphere using Illuminance E.
3. 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 LED junction to ambient in order to optimize product performance.

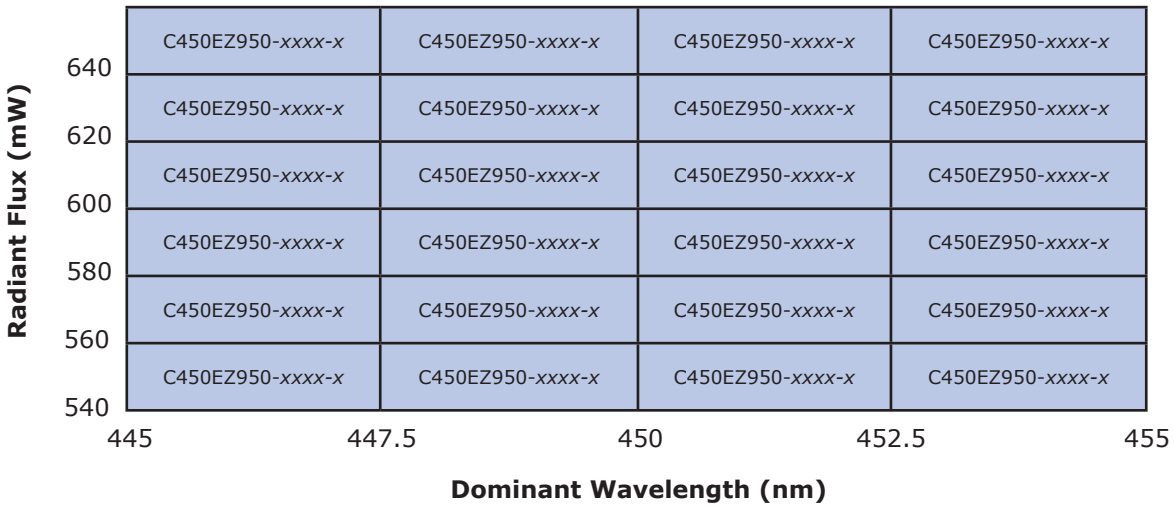


Cree, Inc.
4600 Silicon Drive
Durham, NC 27703-8475 USA
Tel: +1.919.313.5300
Fax: +1.919.313.5778
www.cree.com/chips

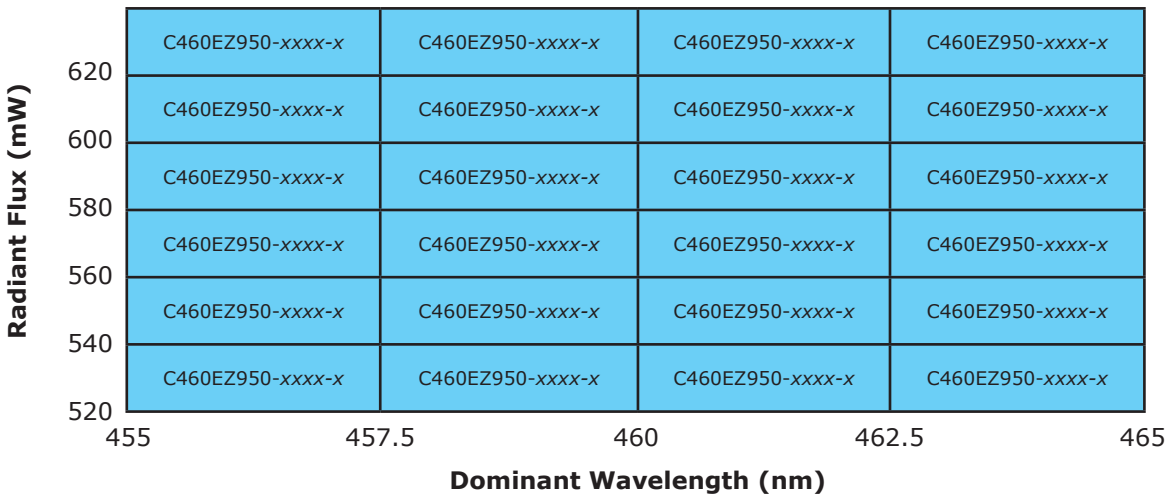
Standard Bins for C*xxx*EZ950-S*xxx*00-*x*

LED chips are sorted to the **radiant flux** and **dominant wavelength** bins shown. A sorted die sheet contains die from only one bin. Sorted die kit (C*xxx*EZ950-S*xxx00-x*) orders may be filled with any or all bins (C*xxx*EZ950-*xxxx-x*) contained in the kit. All radiant flux and dominant wavelength values shown and specified are at If = 350 mA. Radiant flux values are measured using Au-plated headers without an encapsulant.

C450EZ950-S54000-*x*



C460EZ950-S52000-*x*



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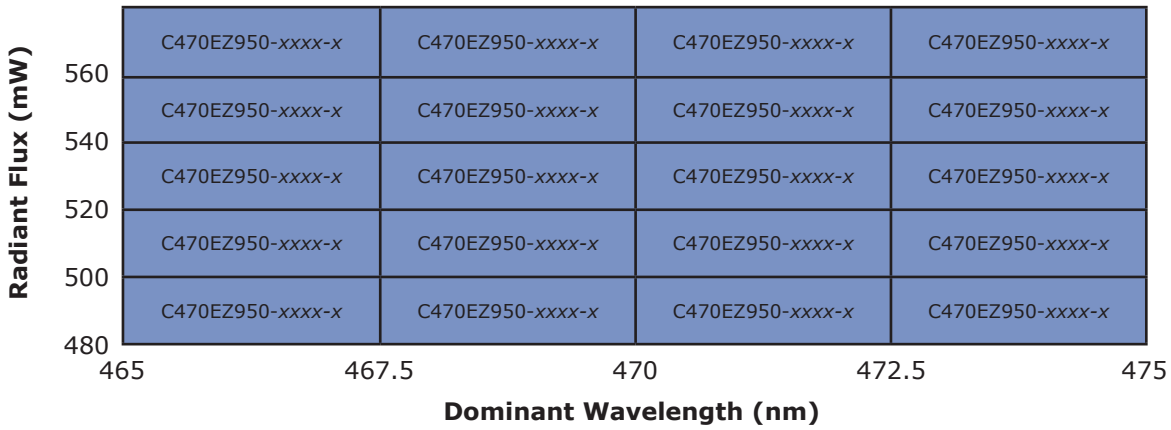
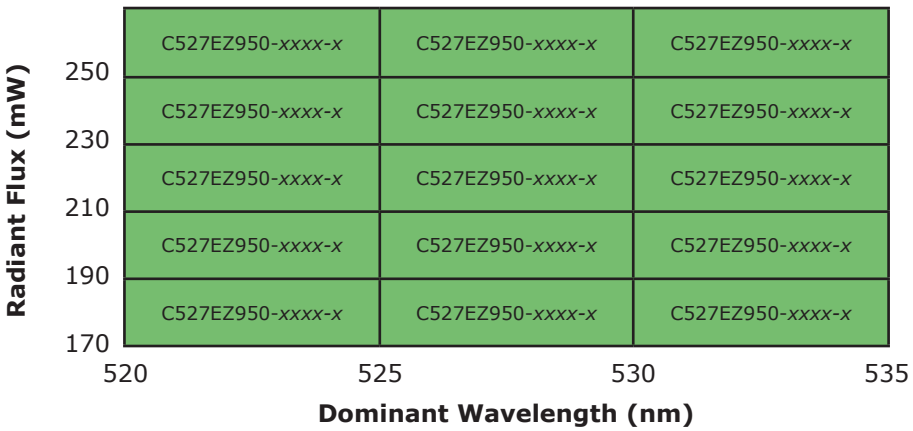
C470EZ950-S48000-*x*



C527EZ950-S17000-*x*



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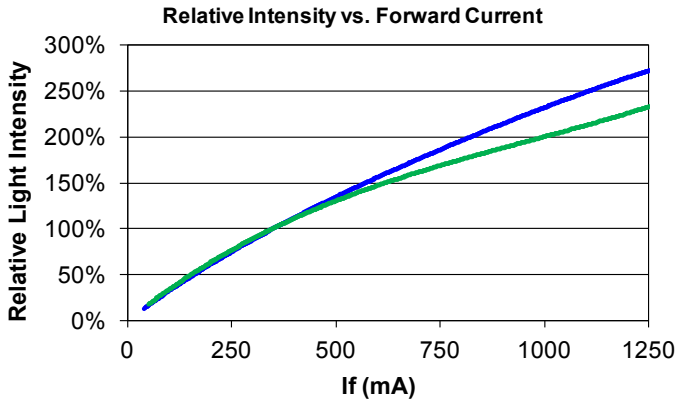
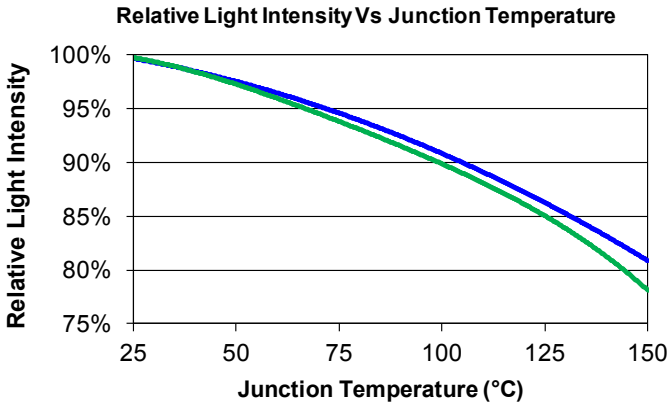
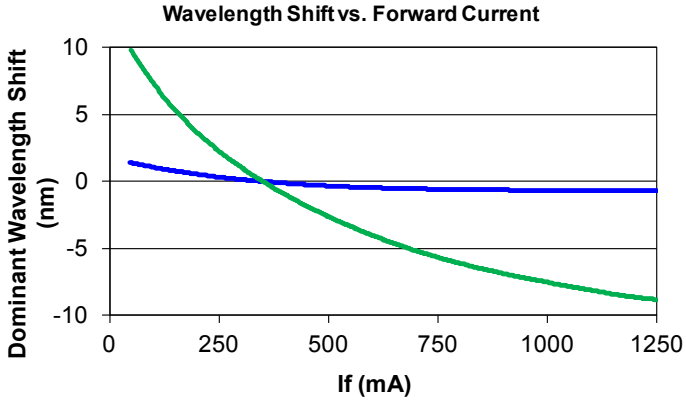
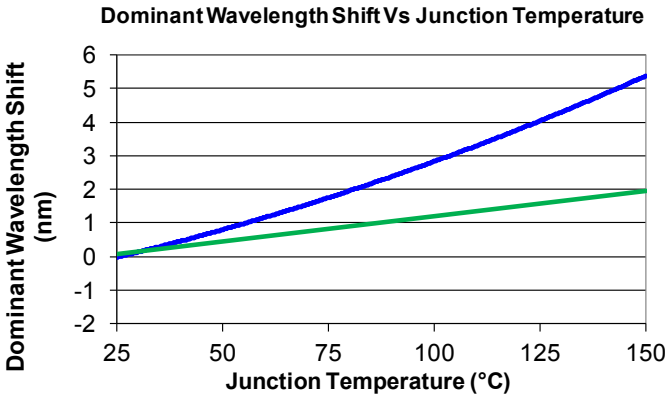
Characteristic Curves, T_A = 25°C

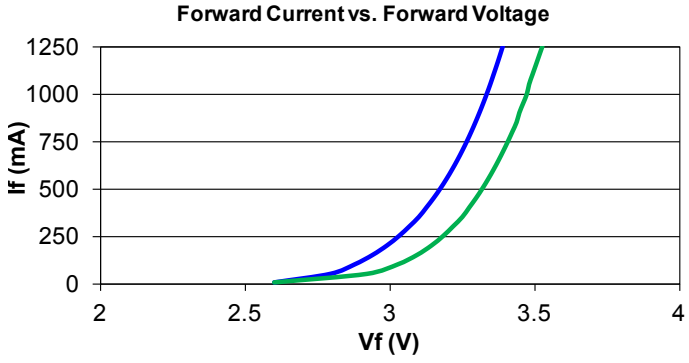
This is a representative measurement for the EZ950™ LED product. Actual curves will vary slightly for the various radiant flux and dominant wavelength bins.

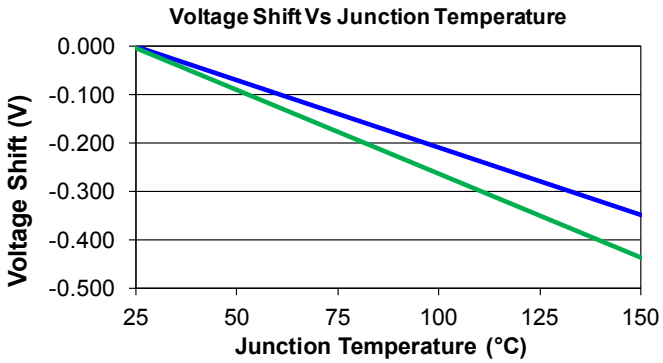












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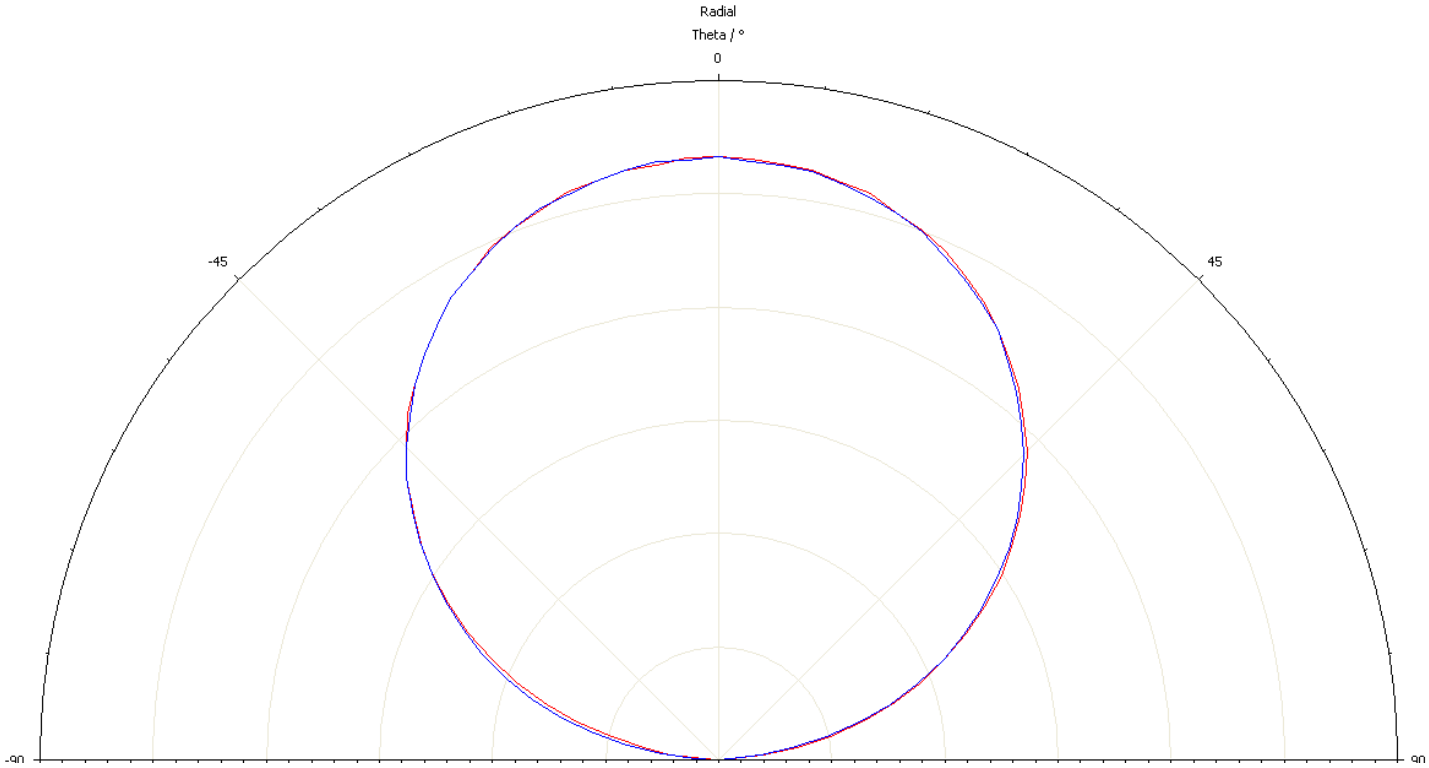
Radiation Pattern

This is a representative radiation pattern for the EZ LED products. Actual patterns will vary slightly for each chip.



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