

Cree® EZ700™ LED

Data Sheet

CxxxEZ700-Sxx000

Cree's EZBright™ LEDs are the next 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. Additionally, these LEDs are die attachable with conductive epoxy, solder paste or solder preforms, in addition to using the flux eutectic method. These vertically structured, low forward voltage LED chips are approximately 100 microns in height. Cree's EZ™ chips are tested for conformity to optical and electrical specifications and the ability to withstand 1000 V ESD. These LEDs are useful in a broad range of applications, such as general illumination, automotive lighting and LCD backlighting.

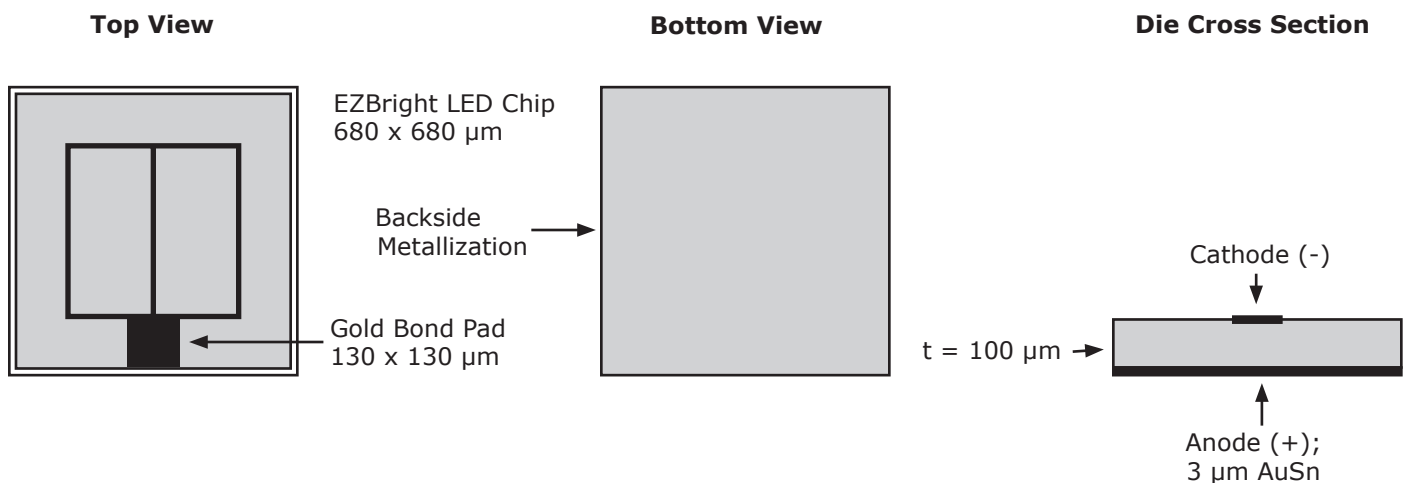
FEATURES

- EZBright Power Chip LED Rf Performance
 - 200 mW min. & 260 mW min. – 450 nm
 - 180 mW min. & 240 mW min. – 460 nm
 - 160 mW min. & 220 mW min. – 470 nm
- Lambertian Radiation
- Conductive Epoxy, Solder Paste or Preforms, or Flux Eutectic Attach
- Thin 100 µm Chip
- Low Forward Voltage – 3.6 V Typical at 350 mA
- Single Wire Bond Structure
- 1000 V ESD Threshold Rating

APPLICATIONS

- General Illumination
 - Aircraft
 - Decorative Lighting
 - Task Lighting
 - Outdoor Illumination
- White LEDs
- Crosswalk Signals
- Backlighting
- Automotive

CxxxEZ700-Sxx000 Chip Diagram



Maximum Ratings at $T_A = 25^\circ\text{C}$ ^{Note 1}		CxxxEZ700-Sxx000
DC Forward Current		500 mA
Peak Forward Current		1000 mA ^{Note 4}
LED Junction Temperature		125°C
Reverse Voltage		5 V
Operating Temperature Range		-40°C to +100°C
Storage Temperature Range		-40°C to +120°C
Electrostatic Discharge Threshold Rating (HBM) ^{Note 2}		1000 V

Typical Electrical/Optical Characteristics at $T_A = 25^\circ\text{C}$, $I_f = 350\text{ mA}$ ^{Note 3}					
Part Number	Forward Voltage (V_f , V)			Reverse Current [$I(V_r=5\text{ V})$, μA]	Full Width Half Max (λ_{DF} , nm)
	Min.	Typ.	Max.	Max.	Typ.
C450EZ700-Sxx000	3.0	3.6	3.9	2	21
C460EZ700-Sxx000	3.0	3.6	3.9	2	21
C470EZ700-Sxx000	3.0	3.6	3.9	2	22

Mechanical Specifications		CxxxEZ700-Sxx000
Description	Dimension	Tolerance
P-N Junction Area (μm)	650 x 650	± 25
Chip Area (μm)	680 x 680	± 25
Chip Thickness (μm)	100	± 25
Top Au Bond Pad (μm)	130 x 130	± 15
Au Bond Pad Thickness (μm)	3.0	± 1.0
Back Contact Metal Area (μm)	680 x 680	± 25
Back Contact Metal Thickness (μm)	3.0	± 1.0

Notes:

1. Maximum ratings are package-dependent. The above ratings were determined using a Au-plated TO39 header without an encapsulant 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 Cree EZBright Applications Note for assembly-process information.
2. Product resistance to electrostatic discharge (ESD) according to the HBM is measured by simulating ESD using a rapid avalanche energy test (RAET). The RAET procedures are designed to approximate the minimum ESD ratings shown.
3. 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 expected by the manufacturer in large quantities and are provided for information only. All measurements were made using a Au-plated TO39 header without an encapsulant. Optical characteristics measured in an integrating sphere using Illuminance E.
4. This peak forward current specification is based on a 400 ms pulse width at a 1/5-duty cycle with a junction temperature of 65°C.

Standard Bins for CxxxEZ700-Sxx000

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 (CxxxEZ700-Sxx000) orders may be filled with any or all bins (CxxxEZ700-0xxx) contained in the kit. All radiant flux and all dominant wavelength values shown and specified are at $I_f = 350$ mA. Radiant flux values are measured using Au-plated TO39 headers without an encapsulant.

C450EZ700-S26000

Radiant Flux	300 mW	C450EZ700-0221	C450EZ700-0222	C450EZ700-0223	C450EZ700-0224	
	280 mW	C450EZ700-0217	C450EZ700-0218	C450EZ700-0219	C450EZ700-0220	
		445 nm	447.5 nm	450 nm	452.5 nm	455 nm

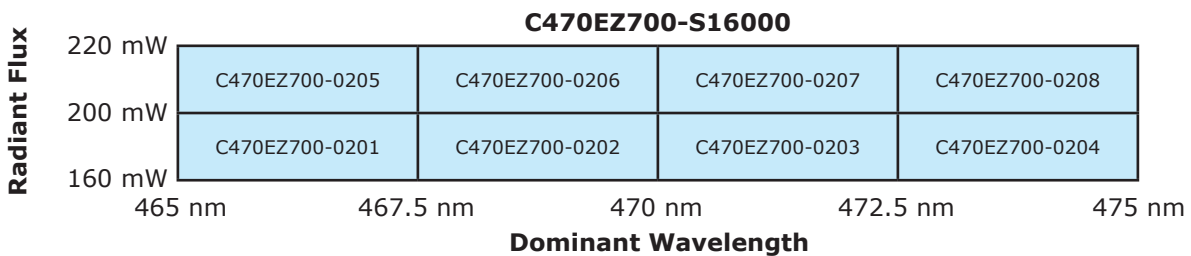
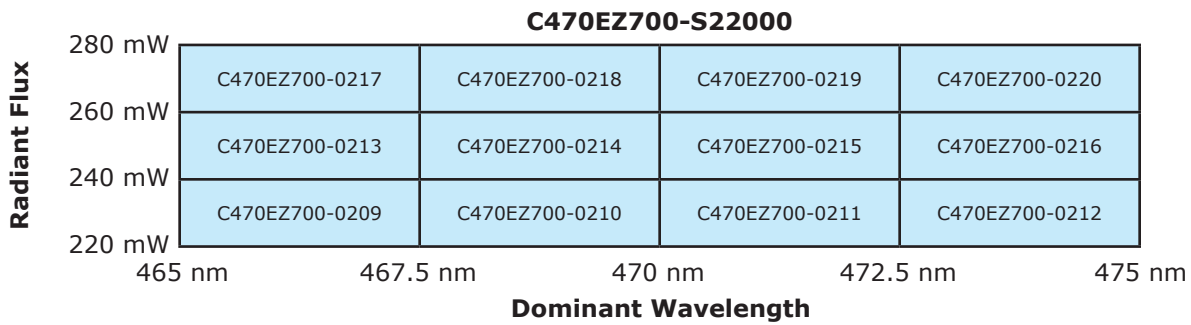
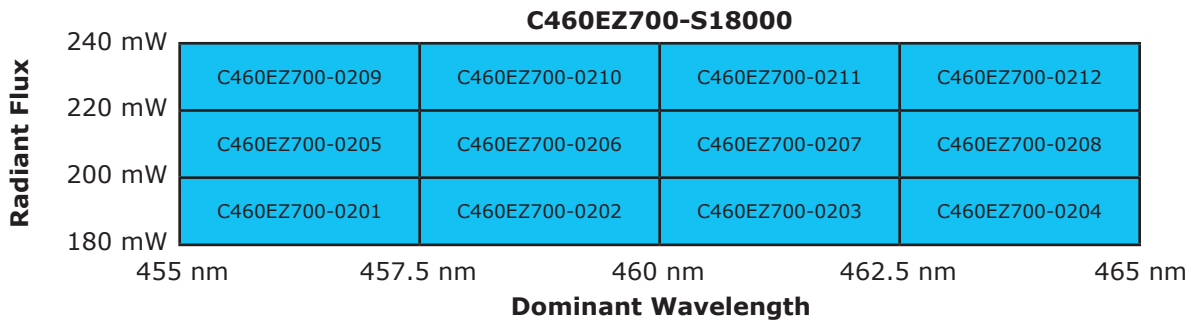
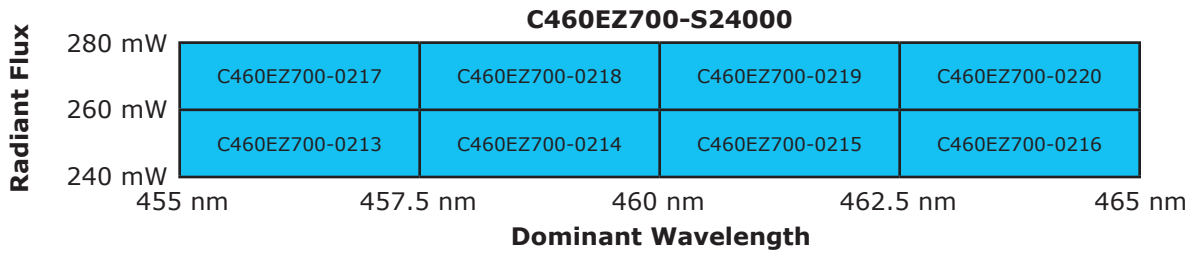
Dominant Wavelength

C450EZ700-S20000

Radiant Flux	260 mW	C450EZ700-0213	C450EZ700-0214	C450EZ700-0215	C450EZ700-0216	
	240 mW	C450EZ700-0209	C450EZ700-0210	C450EZ700-0211	C450EZ700-0212	
	220 mW	C450EZ700-0205	C450EZ700-0206	C450EZ700-0207	C450EZ700-0208	
	200 mW	445 nm	447.5 nm	450 nm	452.5 nm	455 nm

Dominant Wavelength

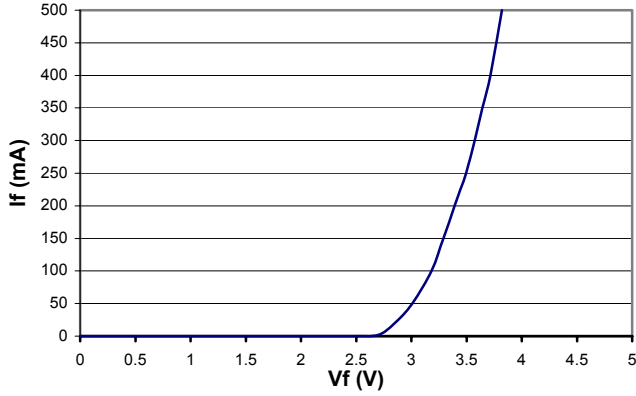
Standard Bins for CxxxEZ700-Sxx000 (continued)



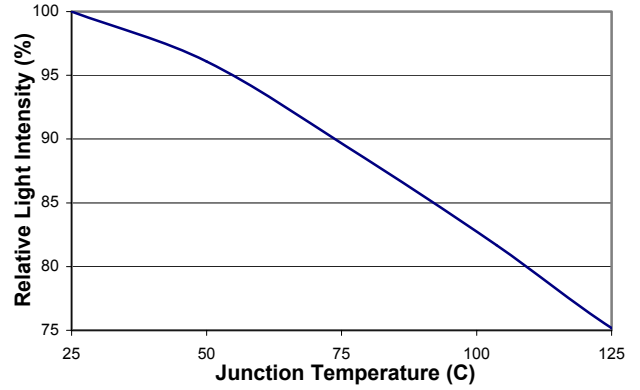
Characteristic Curves

These are representative measurements for the EZBright Power Chip LED product. Actual curves will vary slightly for the various radiant flux and dominant wavelength bins.

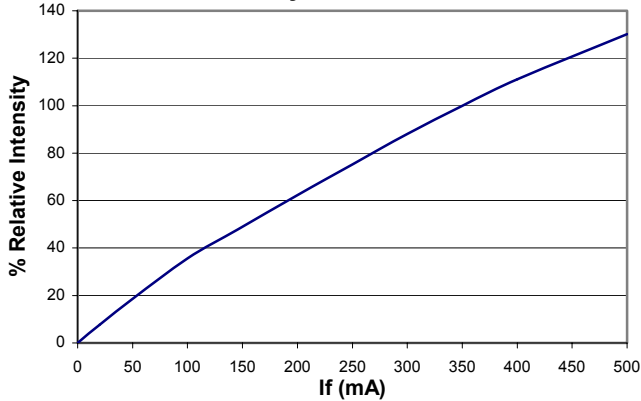
Forward Current vs Forward Voltage



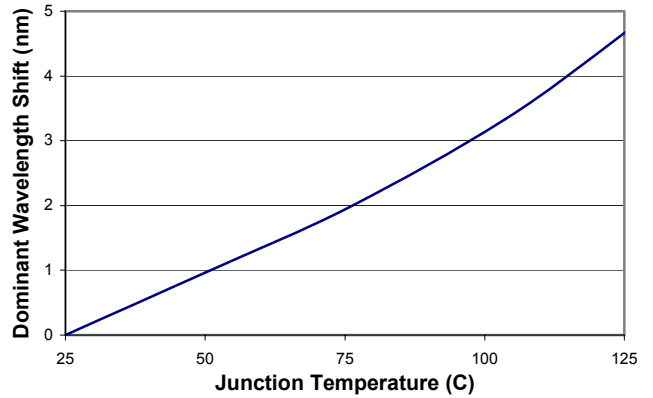
Relative Light Intensity vs Junction Temperature



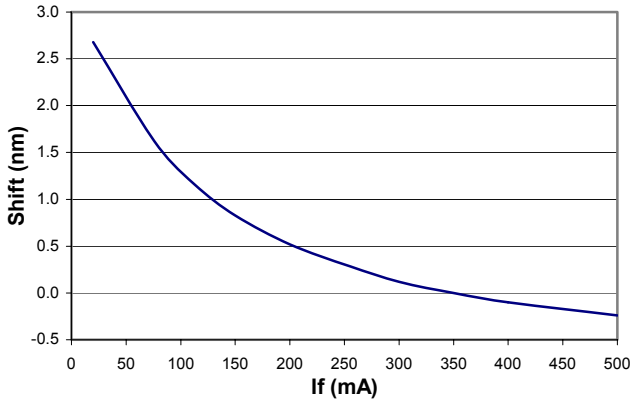
Relative Intensity vs Forward Current



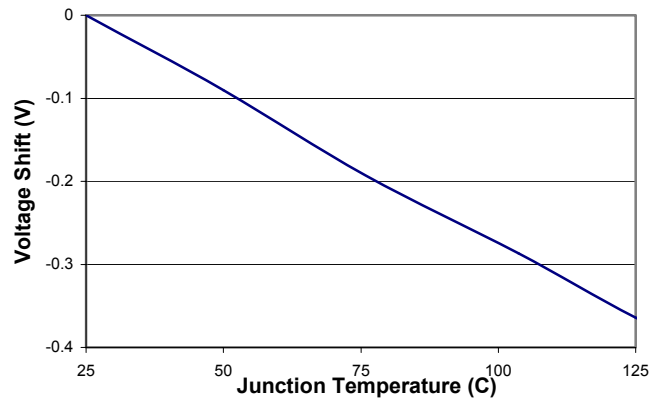
Dominant Wavelength Shift vs Junction Temperature



Dominant Wavelength Shift vs Forward Current



Voltage Shift vs Junction Temperature



Radiation Pattern

This is a representative radiation pattern for the EZBright Power Chip LED product. Actual patterns will vary slightly for each chip.

