

# Cree<sup>®</sup> EZ700<sup>™</sup> LED Data Sheet CxxxEZ700-Sxx000

Cree's EZBright<sup>TM</sup> 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  $EZ^{TM}$  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.

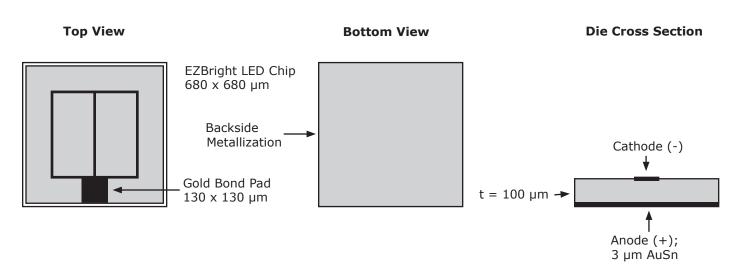
#### **FEATURES**

- 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 <sub>A</sub> = 25°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 $T_A = 25$ °C, If = 350 mA Note 3					
Part Number	Forward Voltage (V <sub>f</sub> , V)		(V <sub>f</sub> , V)	Reverse Current [I(Vr=5 V), μΑ]	Full Width Half Max ( $\lambda_{ m p}$ , nm)
	Min.	Тур.	Max.	Max.	Тур.
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	pecifications 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.



200 mW L

445 nm

447.5 nm

#### 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 If = 350 mA. Radiant flux values are measured using Au-plated TO39 headers without an encapsulant.

m	300 mW		C450EZ70	0-S26000		_
ш	280 mW C450EZ700-0221 C450EZ700-0217 260 mW		C450EZ700-0222	C450EZ700-0223	C450EZ700-0224	
Radiant			C450EZ700-0218	C450EZ700-0219	C450EZ700-0220	
œ	445 nm 447.		5 nm 450	nm 452.	5 nm 455	nm
			Dominant \	<b>Wavelength</b>		
			C450EZ70	0-S20000		
Flux	260 mW	C450EZ700-0213	C450EZ700-0214	C450EZ700-0215	C450EZ700-0216	
nt	240 mW 220 mW	C450EZ700-0209	C450EZ700-0210	C450EZ700-0211	C450EZ700-0212	
Radia	220 IIIW	C450EZ700-0205	C450EZ700-0206	C450EZ700-0207	C450EZ700-0208	

450 nm **Dominant Wavelength** 

455 nm

452.5 nm



# Standard Bins for CxxxEZ700-Sxx000 (continued)

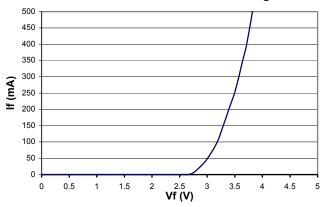
×	280 mW <sub>I</sub>		C460EZ70	0-S24000			
E E	200 11100	C460EZ700-0217	C460EZ700-0218	C460EZ700-0219	C460EZ700-0220		
Radiant Flux	260 mW	C460EZ700-0213	C460EZ700-0214	C460EZ700-0215	C460EZ700-0216		
Rac	240 mW 455				5 nm 465 nm		
	455	437.:		Wavelength	5 11111 405 11111		
			0460===				
Radiant Flux	<b>C460EZ700-S18000</b> 240 mW						
	220 mW	C460EZ700-0209	C460EZ700-0210	C460EZ700-0211	C460EZ700-0212		
	C	C460EZ700-0205	C460EZ700-0206	C460EZ700-0207	C460EZ700-0208		
	200 mW C460EZ700-0201		C460EZ700-0202 C460EZ700-0203		C460EZ700-0204		
	180 mW l 455	nm 457.	5 nm 460	nm 462.	5 nm 465 nm		
			Dominant \	Wavelength			
			C470F770	00-S22000			
×	280 mW						
ΕĤ	260 mW C470EZ700-0217		C470EZ700-0218	C470EZ700-0219	C470EZ700-0220		
Radiant Flux	240 mW	C470EZ700-0213	C470EZ700-0214	C470EZ700-0215	C470EZ700-0216		
Rad		C470EZ700-0209	C470EZ700-0210	C470EZ700-0211	C470EZ700-0212		
	220 mW 467.5 nm 470 nm 472.5 nm 4						
			Dominant \	Wavelength			
J			C470EZ70	0-S16000			
즲	220 mW C470EZ700-0205		C470EZ700-0206	C470EZ700-0207	C470EZ700-0208		
Radiant Flux	200 mW	C470EZ700-0201	C470EZ700-0202	C470EZ700-0203	C470EZ700-0204		
Rad	160 mW						
	465 nm 467.5 nm 470 nm 472.5 nm 475 nn <b>Dominant Wavelength</b>						
20							



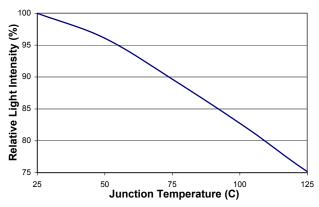
### **Characteristic Curves**

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.

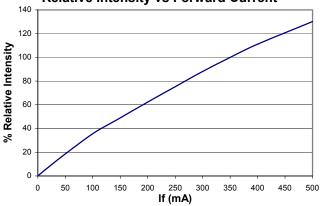
#### **Forward Current vs Forward Voltage**



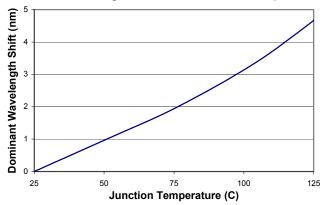
## Relative Light Intensity vs Junction Temperature



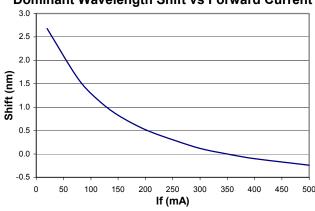
### **Relative Intensity vs Forward Current**



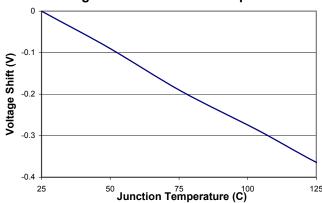
#### **Dominant Wavelength Shift vs Junction Temperature**



# **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.

