

Cree[®] EZ700[™] LED Data Sheet CxxxEZ700-Sxx000

Cree's EZBrightTM 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.

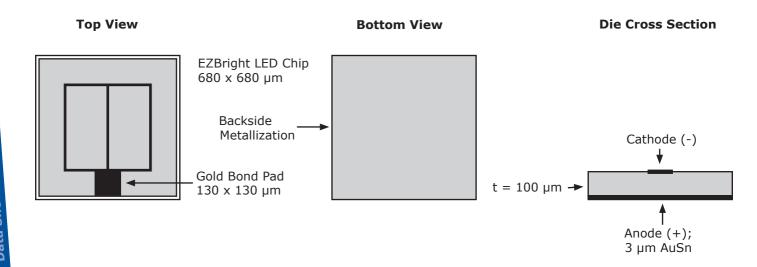
FEATURES

- 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 _A = 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 _r , V)		(V _f , V)	Reverse Current [I(Vr=5 V), μΑ]	Full Width Half Max ($\lambda_{ t D}$, 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	CxxxEZ70	0-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

C450EZ700-0205

447.5 nm

200 mW

445 nm

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 (CxxxEZ700-0xx) 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.

×	300 mW		C450EZ70	0-S26000			
ш	C450EZ700-0221		C450EZ700-0222	C450EZ700-0223	C450EZ700-0224		
Radiant	260 mW	C450EZ700-0217	C450EZ700-0218	C450EZ700-0219	C450EZ700-0220		
~		nm 447.	5 nm 450	nm 452.	5 nm 455	nm	
			Dominant \	Wavelength			
	260 mW		C450EZ70	0-S20000			
Flux	240 mW	C450EZ700-0213	C450EZ700-0214	C450EZ700-0215	C450EZ700-0216		
iant I	220 mW	C450EZ700-0209	C450EZ700-0210	C450EZ700-0211	C450EZ700-0212		

450 nm

Dominant Wavelength

C450EZ700-0207

452.5 nm

C450EZ700-0208

455 nm

C450EZ700-0206

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Standard Bins for CxxxEZ700-Sxx000 (continued)

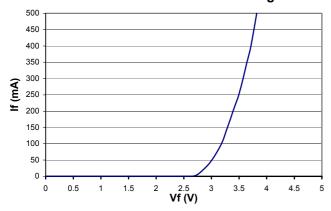
×	280 mW		C460EZ70	0-S24000	
Radiant Flux		C460EZ700-0217	C460EZ700-0218	C460EZ700-0219	C460EZ700-0220
	260 mW	C460EZ700-0213	C460EZ700-0214	C460EZ700-0215	C460EZ700-0216
Rad	240 mW				
	455	nm 457.		nm 462. Navelength	5 nm 465 nm
				_	
	240 mW		C460EZ70	0-S18000	
Radiant Flux	220 mW	C460EZ700-0209	C460EZ700-0210	C460EZ700-0211	C460EZ700-0212
		C460EZ700-0205	C460EZ700-0206	C460EZ700-0207	C460EZ700-0208
	200 mW -	C460EZ700-0201	C460EZ700-0202	C460EZ700-0203	C460EZ700-0204
	180 mW 455	nm 457.	I5 nm 460	nm 462.	 5 nm 465 nm
				Navelength	
			C470E770	0-S22000	
J	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 ^L 465	nm 467.			5 nm 475 nm
			Dominant \	Wavelength	
×	220		C470EZ70	0-S16000	
E.	220 mW	C470EZ700-0205	C470EZ700-0206	C470EZ700-0207	C470EZ700-0208
Radiant Flux	200 mW	C470EZ700-0201	C470EZ700-0202	C470EZ700-0203	C470EZ700-0204
Rac	160 mW				
465 nm 467.5 nm 470 nm 472.5 nm					5 nm 475 nm



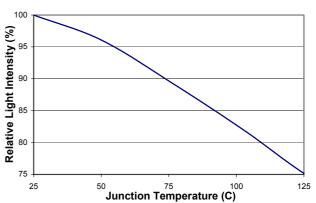
Characteristic Curves

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.

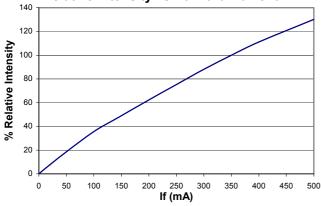
Forward Current vs Forward Voltage



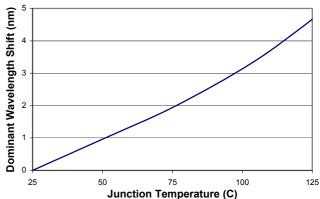
Relative Light Intensity vs Junction Temperature



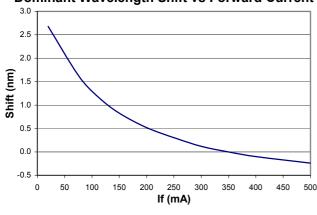
Relative Intensity vs Forward Current



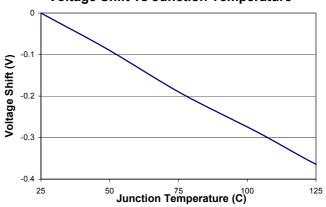
Dominant Wavelength Shift vs Junction Temperature



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.

