

EZBright290™ LEDs

CxxxEZ290-Sxx00

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 wafer-level submount 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. These vertically structured, low forward voltage LED chips are approximately 100 microns in height and require only a single wire bond connection. Cree's EZ™ LED chips are tested for conformity to optical and electrical specifications. Applications for EZ LEDs include next-generation mobile appliances for use in their LCD backlights and digital camera flash where brightness, subminiaturization, and low power consumption are required. Additional applications include indoor and outdoor displays.

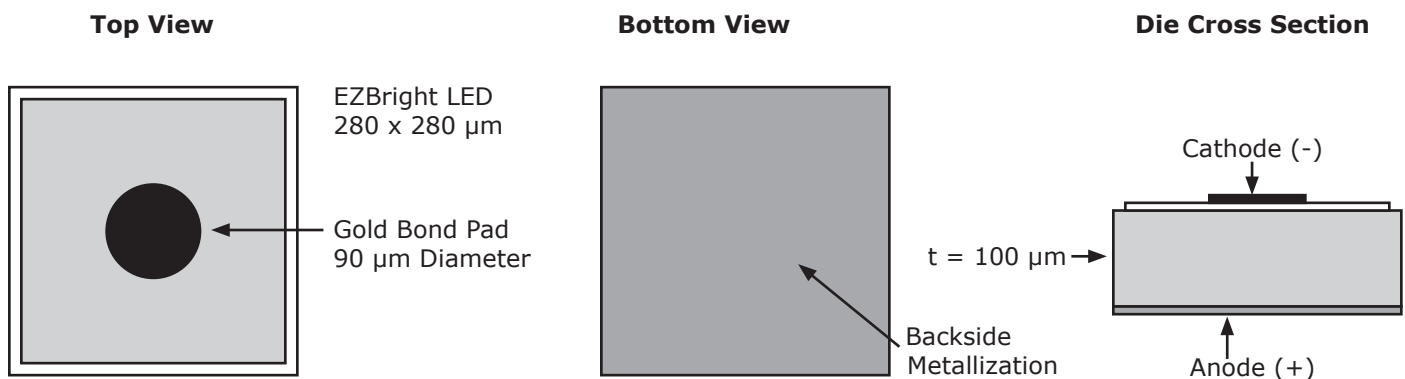
FEATURES

- EZBright LED Rf Performance
 - 460 & 470 nm
 - ♦ EZ-12™ - 12 mW min. (470 nm only)
 - ♦ EZ-16™ - 16 mW min.
 - ♦ EZ-18™ - 18 mW min.
 - ♦ EZ-21™ - 21 mW min.
 - ♦ EZ-24™ - 24 mW min. (460 nm only)
 - 505 nm - EZ-8.5™ - 8.5 mW min.
 - 527 nm - EZ-7™ - 7 mW min.
- Lambertian Radiation
- Conductive-Epoxy Die Attach
- Low Forward Voltage - 3.2 V Typical at 20 mA

APPLICATIONS

- LCD Backlighting
 - Mobile Appliances
 - Digital Still Cameras
 - Monitors
- Digital Camera Flash
- LED Video Displays
- Audio Product Display Lighting

CxxxEZ290-S0200 Chip Diagram



Maximum Ratings at $T_A = 25^{\circ}\text{C}$ Notes 1&3		CxxxEZ290-Sxx00
DC Forward Current		30 mA
Peak Forward Current (1/10 duty cycle @ 1 kHz)		100 mA
LED Junction Temperature		125°C
Reverse Voltage		5 V
Operating Temperature Range		-40°C to +100°C
Storage Temperature Range		-40°C to +100°C
Electrostatic Discharge Threshold (HBM) Note 2		400 V
Electrostatic Discharge Classification (MIL-STD-883E) Note 2		Class 1

Typical Electrical/Optical Characteristics at $T_A = 25^{\circ}\text{C}$, $I_f = 20\text{ mA}$ Note 3					
Part Number	Forward Voltage (V_f , V)			Reverse Current [$I(V_r=5V)$, μA]	Full Width Half Max (λ_{DF} , nm)
	Min.	Typ.	Max.	Max.	Typ.
C460EZ290-Sxx00	2.7	3.2	3.7	2	21
C470EZ290-Sxx00	2.7	3.2	3.7	2	22
C505EZ290-S8500	2.7	3.2	3.7	2	30
C527EZ290-S7000	2.7	3.2	3.7	2	35

Mechanical Specifications		CxxxEZ290-Sxx00	
Description	Dimension	Tolerance	
P-N Junction Area (μm)	250 x 250	± 25	
Top Area (μm)	280 x 280	± 25	
Bottom Area (μm)	280 x 280	± 25	
Chip Thickness (μm)	100	± 15	
Au Bond Pad Diameter (μm)	90	-5, +15	
Au Bond Pad Thickness (μm)	2.0	± 0.5	
Back Contact Metal Area (μm)	280 x 280	± 25	

Notes:

- Maximum ratings are package dependent. The above ratings were determined using a T-1 3/4 package (with Hysol OS4000 epoxy) for characterization. Ratings for other packages may differ. The forward currents (DC and Peak) are not limited by the die but by the effect of the LED junction temperature on the package. The junction temperature limit of 125°C is a limit of the T-1 3/4 package; junction temperature should be characterized in a specific package to determine limitations. Assembly processing temperature must not exceed 305°C (< 10 seconds). See Cree EZBright Applications Note for assembly process information.
- 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 maximum ESD ratings shown. The RAET procedure is performed on each die. The ESD classification of Class 1 is based on sample testing according to MIL-STD-883E.
- All products conform to the listed minimum and maximum specifications for electrical and optical characteristics when assembled and operated at 20 mA within the maximum ratings shown above. Efficiency decreases at higher currents. Typical values given are within the range of average values expected by manufacturer in large quantities and are provided for information only. All measurements were made using lamps in T-1 3/4 packages (with Hysol OS4000 epoxy). Optical characteristics measured in an integrating sphere using Illuminance E.
- Specifications are subject to change without notice.

Standard Bins for CxxxEZ290-Sxx00

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 (CxxxEZ290-Sxxxx) orders may be filled with any or all bins (CxxxEZ290-xxxx) contained in the kit. All radiant flux and dominant wavelength values shown and specified are at $I_f = 20$ mA.

EZ-24

C460EZ290-S2400

Radiant Flux	24.0 mW	C460EZ290-0117	C460EZ290-0118	C460EZ290-0119	C460EZ290-0120
		455 nm	457.5 nm	460 nm	462.5 nm
Dominant Wavelength					

EZ-21

C460EZ290-S2100

Radiant Flux	24.0 mW	C460EZ290-0117	C460EZ290-0118	C460EZ290-0119	C460EZ290-0120
	21.0 mW	C460EZ290-0113	C460EZ290-0114	C460EZ290-0115	C460EZ290-0116
Dominant Wavelength					

EZ-18

C460EZ290-S1800

Radiant Flux	24.0 mW	C460EZ290-0117	C460EZ290-0118	C460EZ290-0119	C460EZ290-0120
	21.0 mW	C460EZ290-0113	C460EZ290-0114	C460EZ290-0115	C460EZ290-0116
	18.0 mW	C460EZ290-0109	C460EZ290-0110	C460EZ290-0111	C460EZ290-0112
Dominant Wavelength					

EZ-16

C460EZ290-S1600

Radiant Flux	24.0 mW	C460EZ290-0117	C460EZ290-0118	C460EZ290-0119	C460EZ290-0120
	21.0 mW	C460EZ290-0113	C460EZ290-0114	C460EZ290-0115	C460EZ290-0116
	18.0 mW	C460EZ290-0109	C460EZ290-0110	C460EZ290-0111	C460EZ290-0112
	16.0 mW	C460EZ290-0105	C460EZ290-0106	C460EZ290-0107	C460EZ290-0108
Dominant Wavelength					

Standard Bins for CxxxEZ290-Sxx00 (continued)

EZ-21

C470EZ290-S2100

Radiant Flux	21.0 mW	C470EZ290-0113	C470EZ290-0114	C470EZ290-0115	C470EZ290-0116
		465 nm	467.5 nm	470 nm	472.5 nm
Dominant Wavelength					

EZ-18

C470EZ290-S1800

Radiant Flux	21.0 mW	C470EZ290-0113	C470EZ290-0114	C470EZ290-0115	C470EZ290-0116
	18.0 mW	C470EZ290-0109	C470EZ290-0110	C470EZ290-0111	C470EZ290-0112
Dominant Wavelength					

EZ-16

C470EZ290-S1600

Radiant Flux	21.0 mW	C470EZ290-0113	C470EZ290-0114	C470EZ290-0115	C470EZ290-0116
	18.0 mW	C470EZ290-0109	C470EZ290-0110	C470EZ290-0111	C470EZ290-0112
	16.0 mW	C470EZ290-0105	C470EZ290-0106	C470EZ290-0107	C470EZ290-0108
Dominant Wavelength					

EZ-12

C470EZ290-S1200

Radiant Flux	21.0 mW	C470EZ290-0113	C470EZ290-0114	C470EZ290-0115	C470EZ290-0116
	18.0 mW	C470EZ290-0109	C470EZ290-0110	C470EZ290-0111	C470EZ290-0112
	16.0 mW	C470EZ290-0105	C470EZ290-0106	C470EZ290-0107	C470EZ290-0108
	12.0 mW	C470EZ290-0101	C470EZ290-0102	C470EZ290-0103	C470EZ290-0104
Dominant Wavelength					

Standard Bins for CxxxEZ290-Sxx00 (continued)

EZ-8.5

C505EZ290-S0850

Radiant Flux	10.0 mW	C505EZ290-0103	C505EZ290-0104
	8.5 mW	C505EZ290-0101	C505EZ290-0102
		500 nm	510 nm

Dominant Wavelength

EZ-7

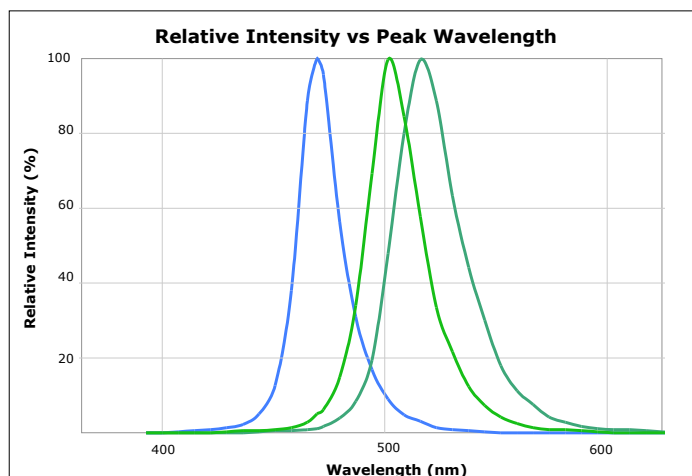
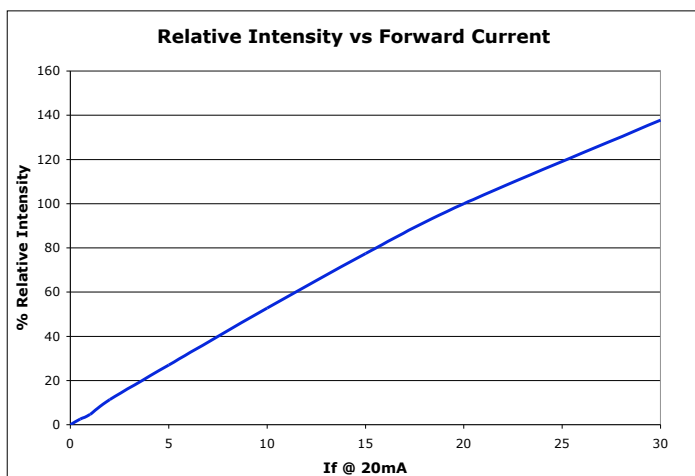
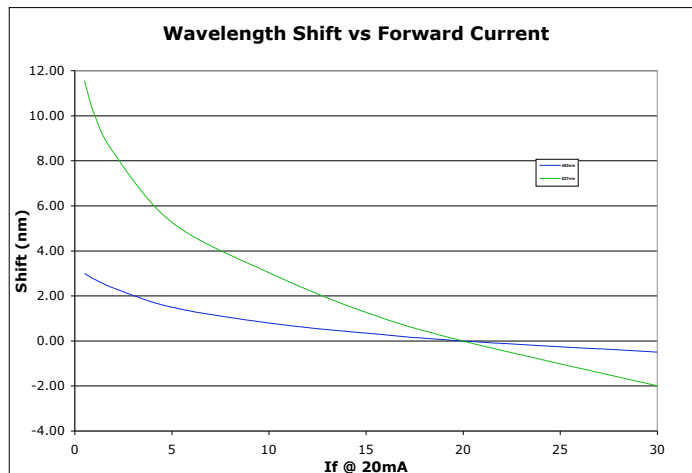
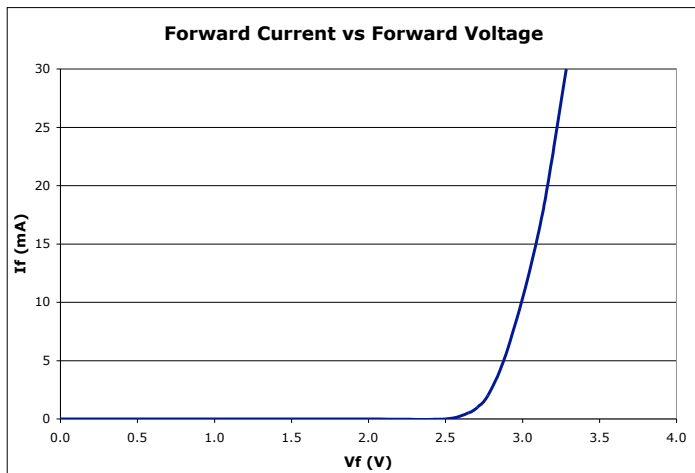
C527EZ290-S0700

Radiant Flux	10.0 mW	C527EZ290-0110	C527EZ290-0111	C527EZ290-0112
	9.0 mW	C527EZ290-0107	C527EZ290-0108	C527EZ290-0109
	8.0 mW	C527EZ290-0104	C527EZ290-0105	C527EZ290-0106
	7.0 mW	C527EZ290-0101	C527EZ290-0102	C527EZ290-0103
		520 nm	525 nm	535 nm

Dominant Wavelength

Characteristic Curves

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



Radiation Pattern

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

