Cree® EZ290-n™ Gen 2 LEDs
Data Sheet (Cathode-up)
C*xxx*EZ290-S*xx*00-2

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, as well as the eutectic method. These vertically structured, low forward voltage LED chips are approximately 170 microns 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, such as wearable devices, video displays and LCD backlighting.

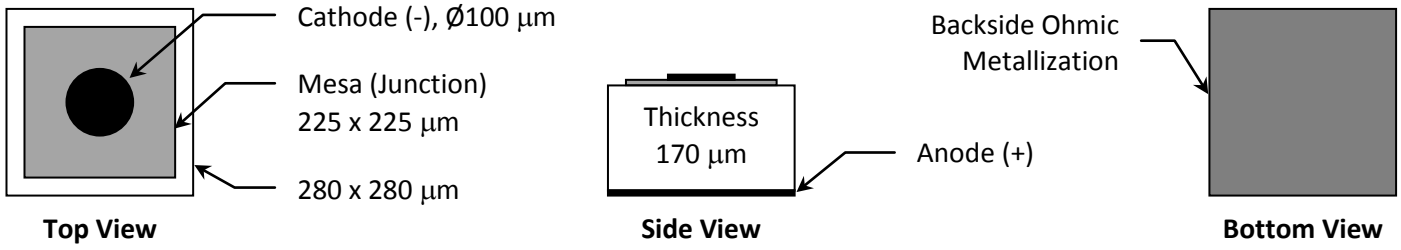
FEATURES

- Lambertian Radiation Pattern
- Cathode-up design (n-pad up)
- EZBright LED Technology, binned @ 20 mA
  - 450 nm – 24+ mW
  - 460 nm – 24+ mW
  - 470 nm – 21+ mW
  - 527 nm – 8+ mW
- Low Forward Voltage (Vf) – 3.0 V Typical at 20 mA
- Maximum DC Forward Current – 50 mA
- AuSn Backside Metal for use with Conductive Adhesives, Flux Eutectic Attach, Solder Paste & Solder Preforms

APPLICATIONS

- LCD Backlighting
  - Mobile Devices
  - Monitors
- Video Displays
- Wearable Devices
- Automotive Interior

C*xxx*EZ290-S*xx*00-2 Chip Diagram



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Maximum Ratings at T_A = 25°C Notes 1&3	C*xxx*EZ290-S*xx*00-2
DC Forward Current	50 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
LED Chip Storage Temperature Range	-40°C to +120°C
Recommended Die Sheet Storage Conditions	≤30°C / ≤85% RH
Electrostatic Discharge Threshold (HBM) Note 2	1000 V
Electrostatic Discharge Classification (MIL-STD-883E) Note 2	Class 2

Typical Electrical/Optical Characteristics at T_A = 25°C, If = 20 mA Note 3

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.
C450EZ290-S*xx*00-2	2.7	3.0	3.5	2	20
C460EZ290-S*xx*00-2	2.7	3.0	3.5	2	21
C470EZ290-S*xx*00-2	2.7	3.0	3.5	2	22
C527EZ290-S*xx*00-2	2.9	3.2	3.7	2	35

Mechanical Specifications	C*xxx*EZ290-S*xx*00-2	
Description	**Dimension**	**Tolerance**
P-N Junction Area (µm)	225 x 225	± 25
Top Area (µm)	280 x 280	± 25
Bottom Area (µm)	280 x 280	± 25
Chip Thickness (µm)	170	± 25
Au Bond Pad Diameter (µm)	100	-15, +5
Au Bond Pad Thickness (µm)	3.0	± 1.0
Back Ohmic Metal Area (µm)	280 x 280	± 25
Back Ohmic Metal Thickness (µm)	3.0	± 0.3

Notes:

1. Maximum ratings are package-dependent. The above ratings were determined using a thru-hole package (with Hysol® OS4000 epoxy encapsulation) 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 thru-hole package; 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 EZ 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 maximum ESD ratings shown. The RAET procedure is performed on each die. The ESD classification of Class 2 is based on sample testing according to MIL-STD-883E.
3. 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 thru-hole packages (with Hysol OS4000 epoxy encapsulation). Optical characteristics measured in an integrating sphere using Illuminance E.
4. Specifications are subject to change without notice.

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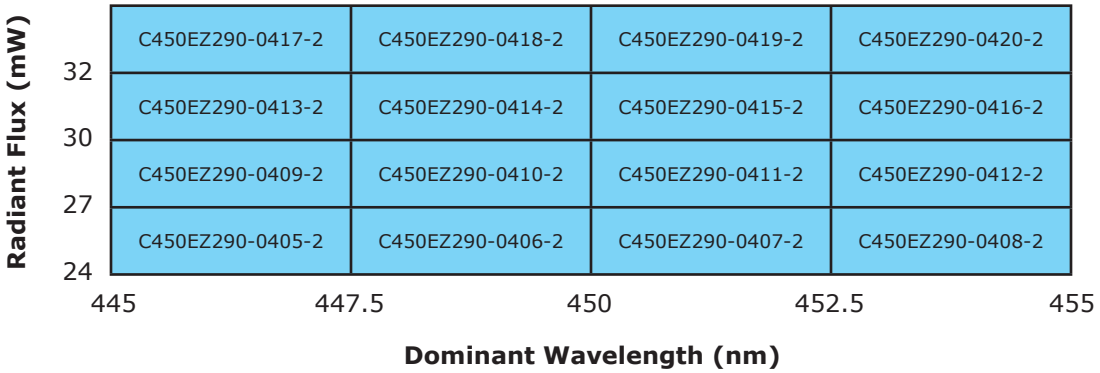
Standard Bins for C*xxx*EZ290-S*xx*00-2

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*EZ290-S*xxxx*-2) orders may be filled with any or all bins (C*xxx*EZ290-*xxxx*-2) contained in the kit. All radiant flux and dominant wavelength values shown are specified at If = 20 mA.

C450EZ290-S2400-2



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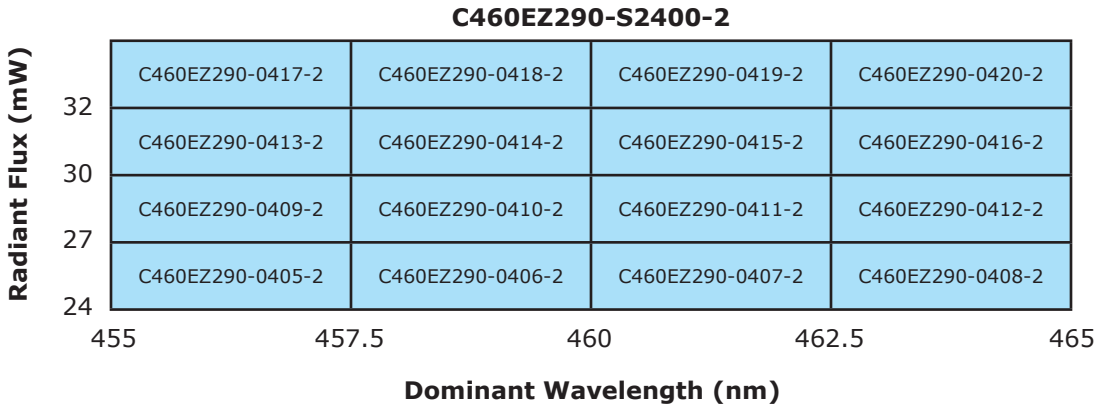

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Standard Bins for C*xxx*EZ290-S*xx*00-2

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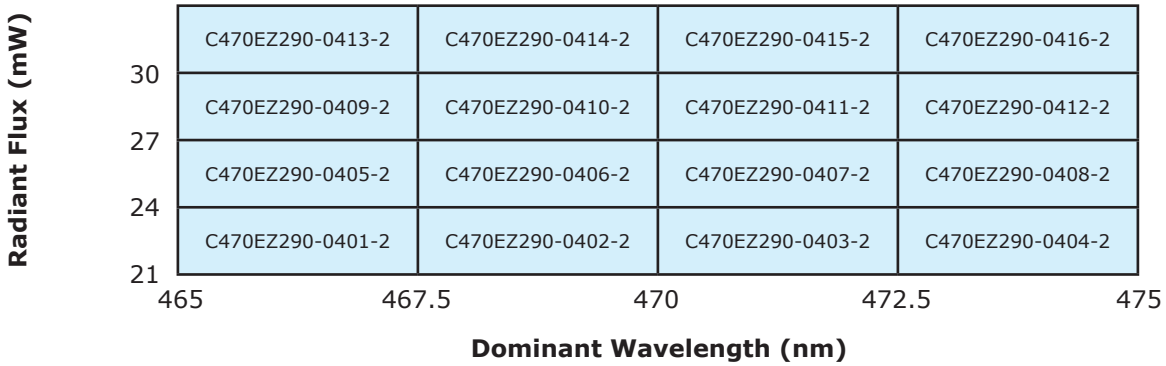
C470EZ290-S2100-2



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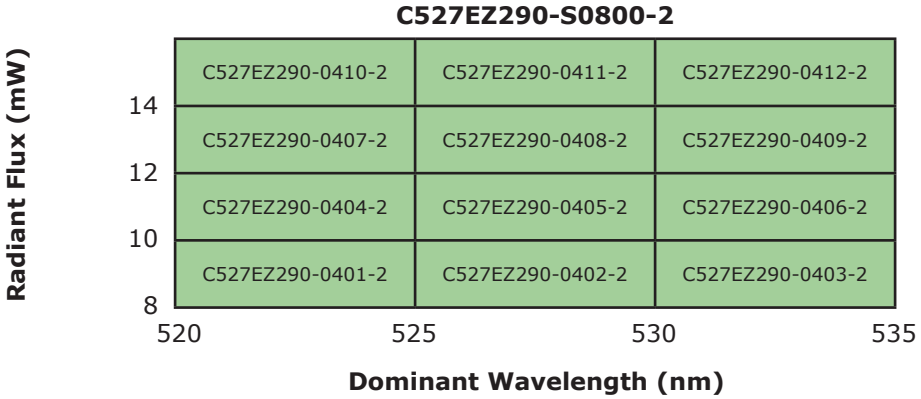

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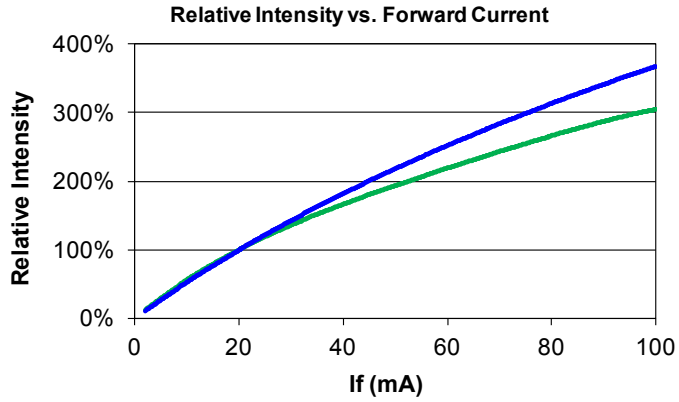
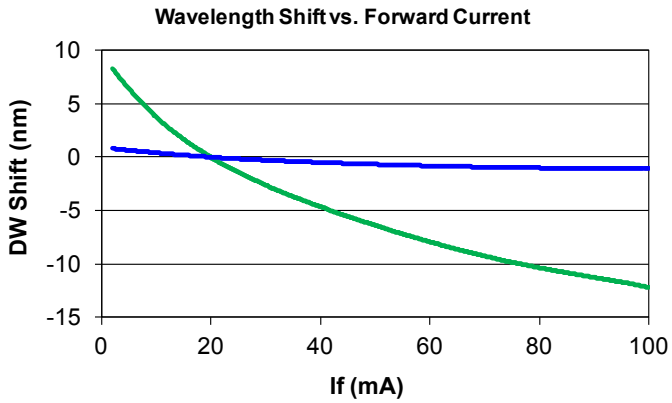
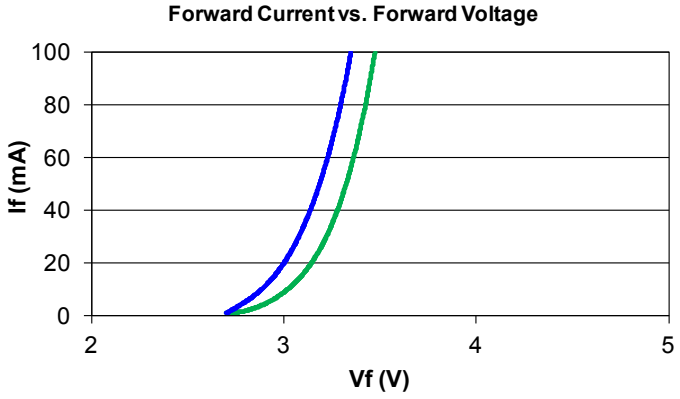
Characteristic Curves

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







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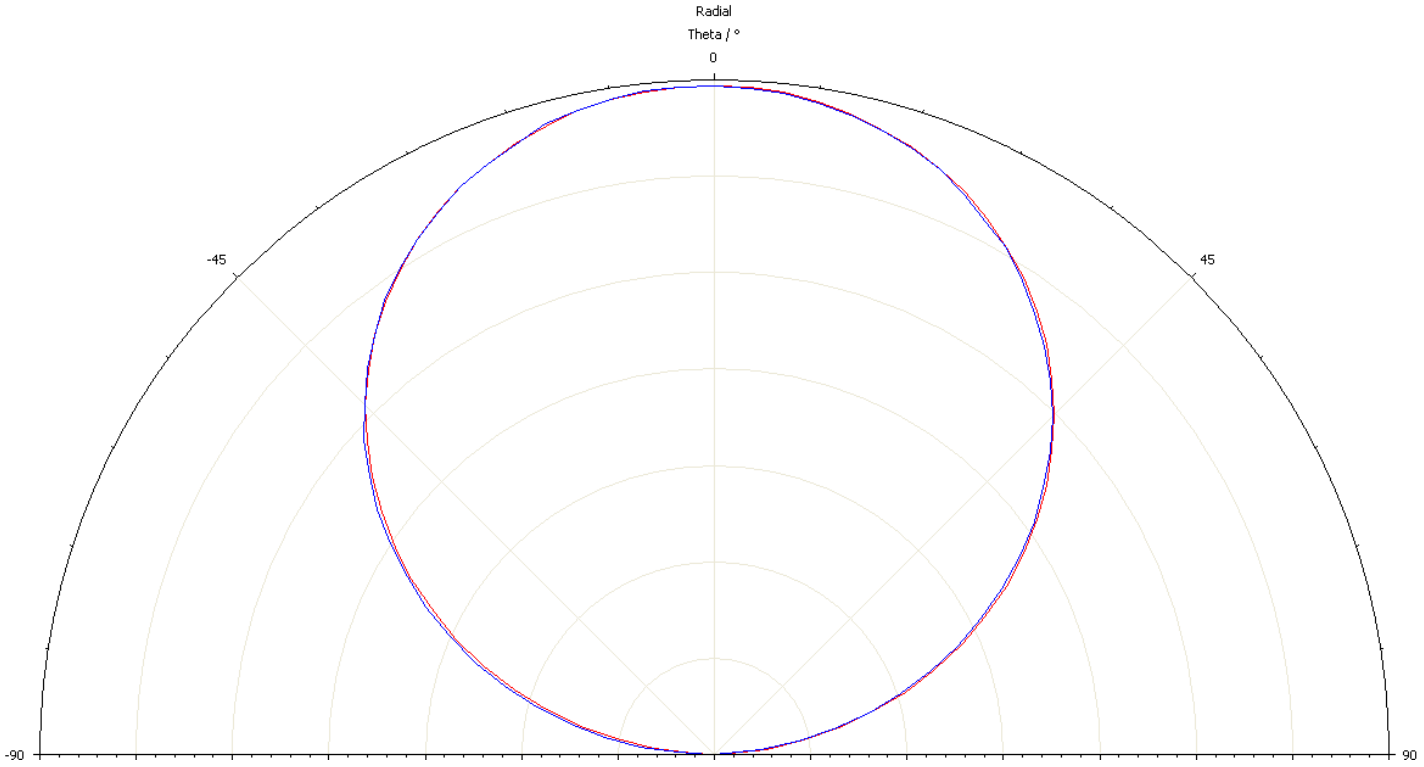
Radiation Pattern

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



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