CREE OPTOELECTRONICS

**G·SiC® Technology**
**MegaBright® LEDs**
**C*xxx*MB290-S0100**

## Features

- MegaBright® LED Performance
  - 8.0mW min (460nm) Deep Blue
  - 7.5mW min (470nm) Blue
  - 6.0mW min (505nm) Traffic Green
  - 5.0mW min (527nm) Green
- Single Wire Bond Structure
- Class II ESD Rating

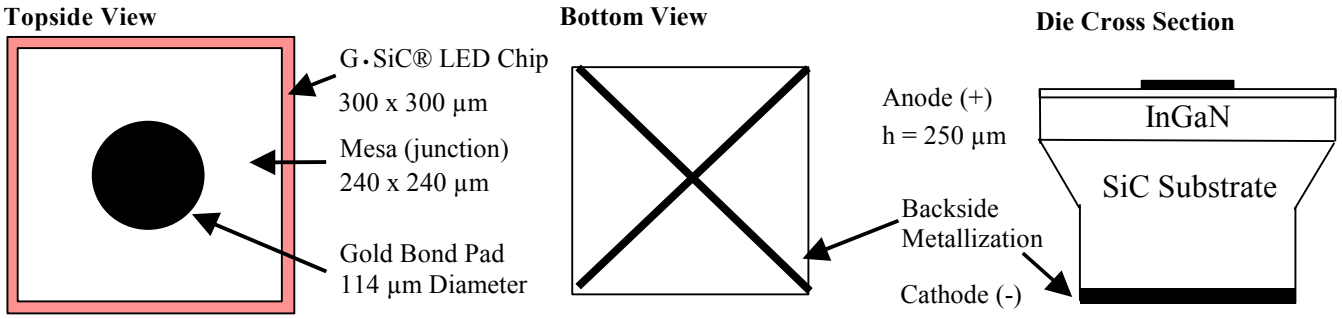
## Applications

- Outdoor LED Video Displays
- Automotive Dashboard Lighting
- White LEDs
- Backlighting
- Traffic Signals

## Description

Cree's MB™ series of MegaBright® LEDs combine highly efficient InGaN materials with Cree's proprietary G·SiC® substrate to deliver superior price/performance for high intensity blue and green LEDs. These LED chips have a geometrically enhanced vertical chip structure to maximize light extraction efficiency, and require only a single wire bond connection. Sorted Die Kits provide die sheets conveniently sorted into wavelength and radiant flux bins. Cree's MB series chips are tested for conformity to optical and electrical specifications and the ability to withstand 1000V ESD. These LEDs are useful in a broad range of applications such as outdoor full motion LED video signs, automotive lighting and white LEDs, yet can also be used in high volume applications such as LCD backlighting. Cree's MB series chips are compatible with most radial and SMT LED assembly processes.

## C*xxx*MB290-S0100 Chip Diagram




CPR3AP Rev. F

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| ***Maximum Ratings at $T_A$ = 25°C*** Notes 1&3 | **C*xxx*MB290-S0100** |
|---|---|
| DC Forward Current | 30mA |
| Peak Forward Current (1/10 duty cycle @ 1kHz) | 100mA |
| 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 | 1000 V |
| Electrostatic Discharge Classification (MIL-STD-883E) Note 2 | Class 2 |

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

| Part Number | Forward Voltage ($V_f$, V) | | | Reverse Current [I(Vr=5V), µA] | Peak Wavelength ($\lambda_p$, nm) | Full Width Half Max ($\lambda_D$, nm) | Optical Rise Time ($\tau$, ns) |
|---|---|---|---|---|---|---|---|
| | Min | Typ | Max | Max | Typ | Typ | Typ |
| C460MB290-S0100 | 3.0 | 3.5 | 3.8 | 10 | 458 | 26 | 30 |
| C470 MB290-S0100 | 3.0 | 3.5 | 3.8 | 10 | 468 | 26 | 30 |
| C505 MB290-S0100 | 3.0 | 3.8 | 4.0 | 10 | 502 | 30 | 30 |
| C527 MB290-S0100 | 3.0 | 3.8 | 4.0 | 10 | 518 | 35 | 30 |

| ***Mechanical Specifications*** | **C*xxx*MB290-S0100** | |
|---|---|---|
| **Description** | **Dimension** | **Tolerance** |
| P-N Junction Area (µm) | 240 x 240 | ± 25 |
| Top Area (µm) | 300 x 300 | ± 25 |
| Bottom Area (µm) | 200 x 200 | ± 25 |
| Chip Thickness (µm) | 250 | ± 25 |
| Au Bond Pad Diameter (µm) | 114 | ± 20 |
| Au Bond Pad Thickness (µm) | 1.2 | ± 0.5 |
| Back Contact Metal Width (µm) | 20 | -5, +10 |

**Notes:**

1) 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 325°C (< 5 seconds).

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 II 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 the 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). Dominant wavelength measurements taken using Illuminance E.

**4) Caution: To obtain optimum output efficiency, the maximum height of die attach epoxy on the side of the chip should not exceed 80µm.**

5) Specifications are subject to change without notice.

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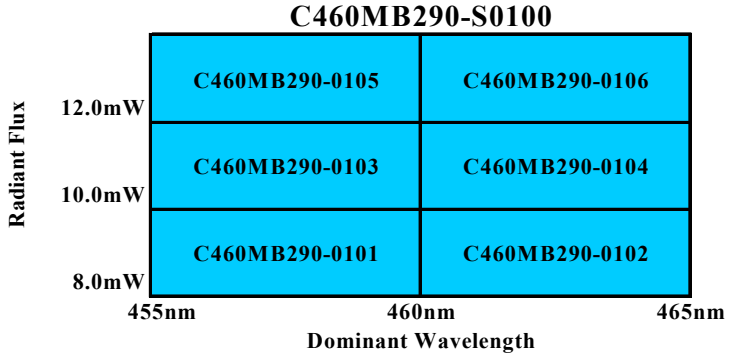
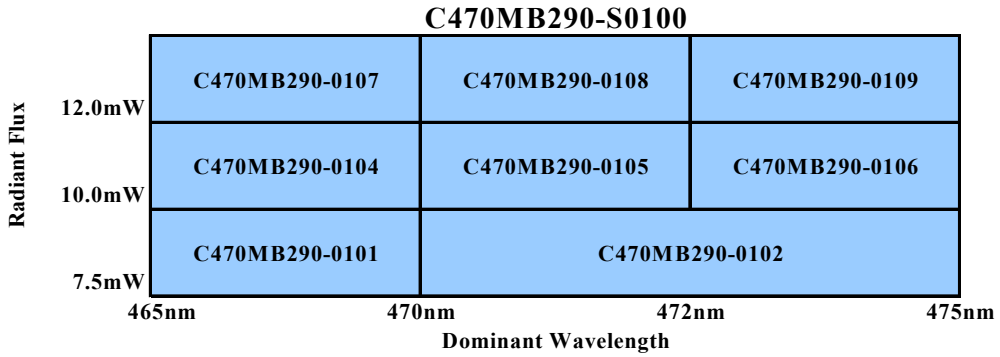
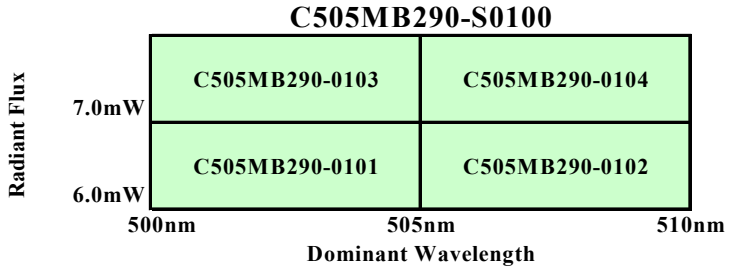
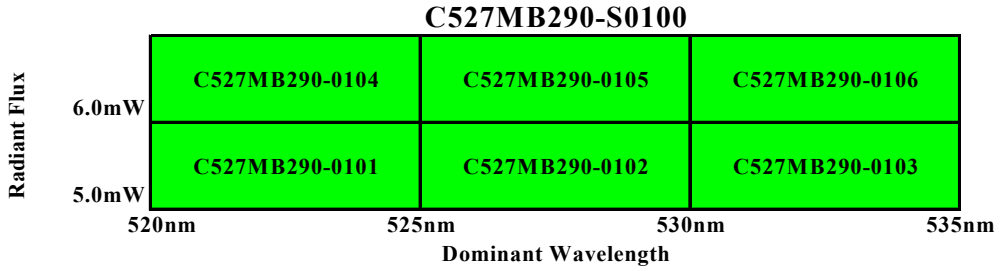
# Standard Bins for C*xxx*MB290-S0100:

LED chips are sorted to the **radiant flux** and **dominant wavelength** bins shown. Sorted die sheets contain die from only one bin. Sorted die kit (C*xxx*MB290-S0100) orders may be filled with any or all bins (C*xxx*MB290-010*x*) contained in the kit.



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# Characteristic Curves