

MegaBright® Generation II LEDs

CxxxMB290-Sxx00

Cree's MB™ Generation II series of MegaBright LEDs combine highly efficient InGaN materials with Cree's proprietary G•SiC® substrate to deliver superior price/performance for high-intensity 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.

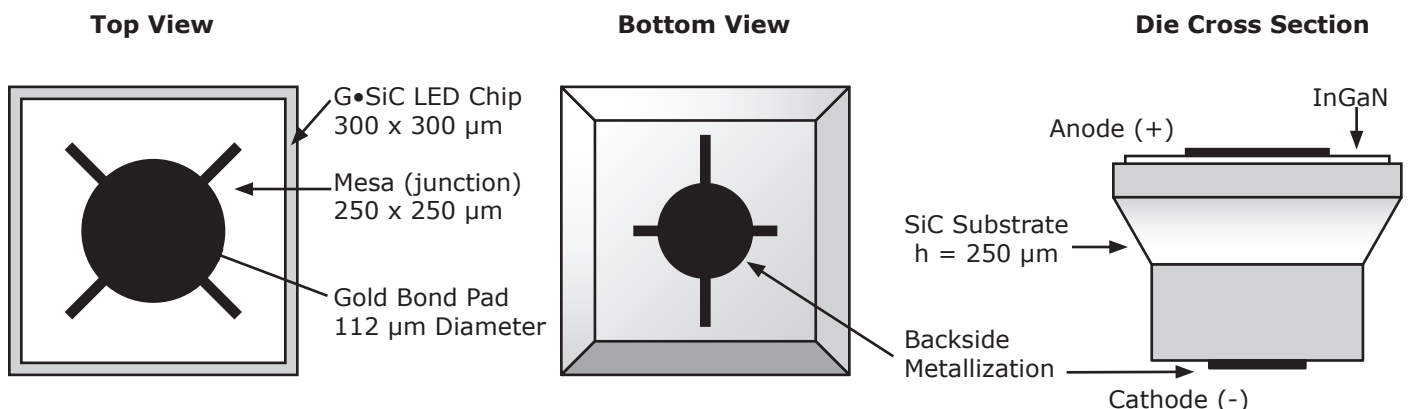
FEATURES

- MegaBright LED Performance
 - 460 & 470nm
 - MB-8 - 8.0 mW min.
 - MB-10 - 10.0 mW min.
 - MB-12 - 12.0 mW min.
 - MB-14 - 14.0 mW min.
 - MB-16 - 16.0 mW min (460 nm)
 - 505 nm - 6.0 mW min.
 - 527 nm - 5.0 mW min.
- Single Wire Bond Structure
- Class 2 ESD Rating

APPLICATIONS

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

CxxxMB290-Sxx00 Chip Diagram



Maximum Ratings at $T_A = 25^\circ\text{C}$ <small>Notes 1&3</small>		CxxxMB290-Sxx00
DC Forward Current		30 mA
Peak Forward Current (1/10 duty cycle @ 1kHz)		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}		1000 V
Electrostatic Discharge Classification (MIL-STD-883E) ^{Note 2}		Class 2

Typical Electrical/Optical Characteristics at $T_A = 25^\circ\text{C}$, $I_f = 20\text{ mA}$ <small>Note 3</small>					
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.
C460MB290-Sxx00	2.9	3.3	3.7	2	21
C470MB290-Sxx00	2.9	3.3	3.7	2	22
C505MB290-S0600	2.9	3.3	3.9	2	30
C527MB290-S0500	2.9	3.3	3.9	2	35

Mechanical Specifications		CxxxMB290-Sxx00	
Description	Dimension	Tolerance	
P-N Junction Area (μm)	250 x 250	± 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)	112	± 20	
Au Bond Pad Thickness (μm)	1.2	± 0.5	
Backside Metal Diameter (μm)	104	± 20	

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 325°C (< 5 seconds).
- 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.
- 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.
- Caution: To obtain optimum output efficiency, the maximum height of die attach epoxy on the side of the chip should not exceed 80 μm .
- Specifications are subject to change without notice.

Standard Bins for CxxxMB290-Sxx00

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 (CxxxMB290-Sxx00) orders may be filled with any or all bins (CxxxMB290-02xx) contained in the kit.

MB-16

C460MB290-S1600

Radiant Flux	18.0 mW	C460MB290-0221	C460MB290-0222	C460MB290-0223	C460MB290-0224	
	16.0 mW	C460MB290-0217	C460MB290-0218	C460MB290-0219	C460MB290-0220	
		455 nm	457.5 nm	460 nm	462.5 nm	465 nm

Dominant Wavelength

MB-14

C460MB290-S1400

Radiant Flux	18.0 mW	C460MB290-0221	C460MB290-0222	C460MB290-0223	C460MB290-0224	
	16.0 mW	C460MB290-0217	C460MB290-0218	C460MB290-0219	C460MB290-0220	
	14.0 mW	C460MB290-0213	C460MB290-0214	C460MB290-0215	C460MB290-0216	
		455 nm	457.5 nm	460 nm	462.5 nm	465 nm

Dominant Wavelength

MB-12

C460MB290-S1200

Radiant Flux	18.0 mW	C460MB290-0221	C460MB290-0222	C460MB290-0223	C460MB290-0224	
	16.0 mW	C460MB290-0217	C460MB290-0218	C460MB290-0219	C460MB290-0220	
	14.0 mW	C460MB290-0213	C460MB290-0214	C460MB290-0215	C460MB290-0216	
	12.0 mW	C460MB290-0209	C460MB290-0210	C460MB290-0211	C460MB290-0212	
		455 nm	457.5 nm	460 nm	462.5 nm	465 nm

Dominant Wavelength

Standard Bins for CxxxMB290-Sxx00 (continued)

MB-10

C460MB290-S1000

Radiant Flux	18.0 mW	C460MB290-0221	C460MB290-0222	C460MB290-0223	C460MB290-0224	
	16.0 mW	C460MB290-0217	C460MB290-0218	C460MB290-0219	C460MB290-0220	
	14.0 mW	C460MB290-0213	C460MB290-0214	C460MB290-0215	C460MB290-0216	
	12.0 mW	C460MB290-0209	C460MB290-0210	C460MB290-0211	C460MB290-0212	
	10.0 mW	C460MB290-0205	C460MB290-0206	C460MB290-0207	C460MB290-0208	
		455 nm	457.5 nm	460 nm	462.5 nm	465 nm
		Dominant Wavelength				

MB-8

C460MB290-S0800

Radiant Flux	18.0 mW	C460MB290-0221	C460MB290-0222	C460MB290-0223	C460MB290-0224	
	16.0 mW	C460MB290-0217	C460MB290-0218	C460MB290-0219	C460MB290-0220	
	14.0 mW	C460MB290-0213	C460MB290-0214	C460MB290-0215	C460MB290-0216	
	12.0 mW	C460MB290-0209	C460MB290-0210	C460MB290-0211	C460MB290-0212	
	10.0 mW	C460MB290-0205	C460MB290-0206	C460MB290-0207	C460MB290-0208	
	8.0 mW	C460MB290-0201	C460MB290-0202	C460MB290-0203	C460MB290-0204	
		455 nm	457.5 nm	460 nm	462.5 nm	465 nm
		Dominant Wavelength				

Standard Bins for CxxxMB290-Sxx00 (continued)

MB-14

C470MB290-S1400

Radiant Flux	16.0 mW	C470MB290-0217	C470MB290-0218	C470MB290-0219	C470MB290-0220	
	14.0 mW	C470MB290-0213	C470MB290-0214	C470MB290-0215	C470MB290-0216	
		465 nm	467.5 nm	470 nm	472.5 nm	475 nm

Dominant Wavelength

MB-12

C470MB290-S1200

Radiant Flux	16.0 mW	C470MB290-0217	C470MB290-0218	C470MB290-0219	C470MB290-0220	
	14.0 mW	C470MB290-0213	C470MB290-0214	C470MB290-0215	C470MB290-0216	
	12.0 mW	C470MB290-0209	C470MB290-0210	C470MB290-0211	C470MB290-0212	
		465 nm	467.5 nm	470 nm	472.5 nm	475 nm

Dominant Wavelength

MB-10

C470MB290-S1000

Radiant Flux	16.0 mW	C470MB290-0217	C470MB290-0218	C470MB290-0219	C470MB290-0220	
	14.0 mW	C470MB290-0213	C470MB290-0214	C470MB290-0215	C470MB290-0216	
	12.0 mW	C470MB290-0209	C470MB290-0210	C470MB290-0211	C470MB290-0212	
	10.0 mW	C470MB290-0205	C470MB290-0206	C470MB290-0207	C470MB290-0208	
		465 nm	467.5 nm	470 nm	472.5 nm	475 nm

Dominant Wavelength

MB-8

C470MB290-S0800

Radiant Flux	16.0 mW	C470MB290-0217	C470MB290-0218	C470MB290-0219	C470MB290-0220	
	14.0 mW	C470MB290-0213	C470MB290-0214	C470MB290-0215	C470MB290-0216	
	12.0 mW	C470MB290-0209	C470MB290-0210	C470MB290-0211	C470MB290-0212	
	10.0 mW	C470MB290-0205	C470MB290-0206	C470MB290-0207	C470MB290-0208	
	8.0 mW	C470MB290-0201	C470MB290-0202	C470MB290-0203	C470MB290-0204	
		465 nm	467.5 nm	470 nm	472.5 nm	475 nm

Dominant Wavelength

Standard Bins for CxxxMB290-Sxx00 (continued)

505MB

C505MB290-S0600

Radiant Flux	9.0 mW	C505MB290-0205	C505MB290-0206	
	7.5 mW	C505MB290-0203	C505MB290-0204	
	6.0 mW	C505MB290-0201	C505MB290-0202	
		500nm	505nm	510nm
		Dominant Wavelength		

527MB

C527MB290-S0500

Radiant Flux	7.0 mW	C527MB290-0207	C527MB290-0208	C527MB290-0209	
	6.0 mW	C527MB290-0204	C527MB290-0205	C527MB290-0206	
	5.0 mW	C527MB290-0201	C527MB290-0202	C527MB290-0203	
		520 nm	525 nm	530 nm	535 nm
		Dominant Wavelength			

Characteristic Curves

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

