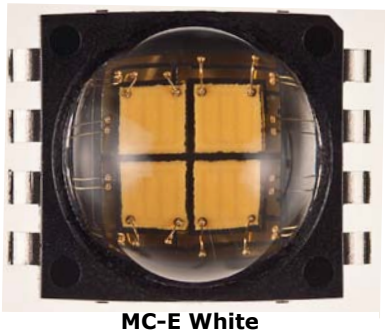
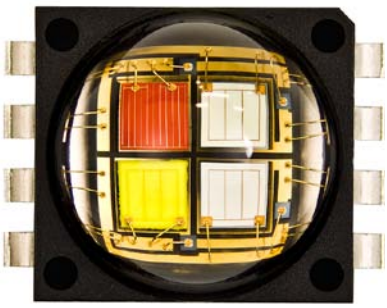
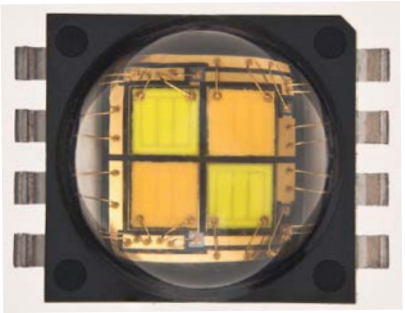
# Cree® XLamp® MC-E LED



MC-E White



MC-E Color



MC-E Dynamic White

## PRODUCT DESCRIPTION

The XLamp MC-E LED is a family of lighting-class, multi-chip LEDs that provides high lumen output in a small package. Compared to discrete LEDs, XLamp MC-E LEDs reduce the distance between LED die, creating a small optical source for excellent optical control and efficient color mixing. XLamp MC-E LEDs can reduce LED system complexity by reducing the number of components required.

Cree XLamp LEDs bring high performance and quality of light to a wide range of lighting applications, including color-changing lighting, portable and personal lighting, outdoor lighting, indoor directional lighting, and entertainment lighting.

## FEATURES

- Available in white (2600 K – 10,000 K CCT), EasyWhite™, Dynamic White, or color (RGBW)
- ANSI-compatible neutral & warm white chromaticity bins
- Individually addressable LEDs
- MC-E Dynamic White LEDs have two cool-white (6500 K) and two warm-white (2700 K) LED die
- MC-E EasyWhite LEDs available in 2 and 4-step bins, up to 85 CRI
- Maximum drive current: 700 mA per LED die
- Reflow solderable – JEDEC J-STD-020
- Electrically neutral thermal path
- RoHS-compliant
- UL-recognized component (E349212)

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## FLUX CHARACTERISTICS, WHITE, DYNAMIC WHITE, COLOR ($T_J$ = 25 °C)

The following tables provide several base order codes for XLamp MC-E. It is important to note that the base order codes listed here are a subset of the total available order codes for the product family. For more order codes, as well as a complete description of the order-code nomenclature, please consult the XLamp MC-E Binning and Labeling document.

| Part | Color | CCT / Dominant Wavelength Range | | Base order codes Min. Luminous Flux @ 350 mA* | | Order Code |
|---|---|---|---|---|---|---|
| | | Min. | Max. | Group | Flux (lm) | |
| White | Cool White | 5000 K | 10,000 K | K | 370 | MCE4WT-A2-0000-000K01 |
| | | | | M | 430 | MCE4WT-A2-0000-000M01 |
| | Neutral White | 3700 K | 5000 K | J | 320 | MCE4WT-A2-0000-000JE4 |
| | | | | K | 370 | MCE4WT-A2-0000-000KE4 |
| | Warm White | 2600 K | 3700 K | G | 240 | MCE4WT-A2-0000-000GE7 |
| | | | | H | 280 | MCE4WT-A2-0000-000HE7 |
| | | | | J | 320 | MCE4WT-A2-0000-000JE7 |
| Dynamic White | 2 cool-white die | 6500 K | | K | 100 | MCEDWT-A1-0000-0000A1001 |
| | 2 warm-white die | 2700 K | | G | 70 | |
| | 2 cool-white die | 6000 K | | K | 100 | MCEDWT-A1-0000-0000A1002 |
| | 2 warm-white die | 2700 K | | G | 70 | |
| Color | Red | 620 nm | 630 nm | A5 | 30.6 | MCE4CT-A2-0000-00A5AAAA1 |
| | Green | 520 nm | 535 nm | | 67.2 | |
| | Blue | 450 nm | 465 nm | | 8.2 | |
| | Cool White | 5700 K | 7000 K | | 100 | |
| | Red | 620 nm | 630 nm | A4 | 30.6 | MCE4CT-A2-0000-00A4AAAB1 |
| | Green | 520 nm | 535 nm | | 67.2 | |
| | Blue | 450 nm | 465 nm | | 8.2 | |
| | Neutral White | 3700 K | 4300 K | | 80 | |

Notes:

- Cree maintains a tolerance of ±7% on flux and power measurements, ±0.005 on chromaticity (CCx, CCy) measurements and ±2 on CRI measurements.
- Typical CRI for cool white and neutral white (3700 K - 10,000 K CCT) is 75.
- Typical CRI for warm white (2600 K - 3700 K CCT) is 80.
- Flux and chromaticity are measured with each LED die connected to independent drive circuits at 350 mA. The flux and chromaticity of XLamp MC-E White are measured with all LEDs lit simultaneously. The flux and color of each LED in XLamp MC-E Dynamic White and MC-E Color are measured individually.

## FLUX CHARACTERISTICS, EASYWHITE MC-E LEDS ($T_J$ = 25 °C)

The following table provides order codes for XLamp MC-E EasyWhite LEDs. For a complete description of the order-code nomenclature, please consult the XLamp MC-E Binning and Labeling document.

| Color | CCT Range | Base Order Codes Min. Luminous Flux @ 350 mA, 25 ° C | | 2-Step Order Code | | 4-Step Order Code | |
|---|---|---|---|---|---|---|---|
| | | Group | Flux (lm) | Chromaticity Region | | Chromaticity Region | |
| Standard CRI EasyWhite | 4000 K | K | 370 | 40H | MCEEZW-A1-0000-0000K040H | 40F | MCEEZW-A1-0000-0000K040F |
| | | J | 320 | | MCEEZW-A1-0000-0000J040H | | MCEEZW-A1-0000-0000J040F |
| | 3500 K | J | 320 | 35H | MCEEZW-A1-0000-0000J035H | 35F | MCEEZW-A1-0000-0000J035F |
| | | H | 280 | | MCEEZW-A1-0000-0000H035H | | MCEEZW-A1-0000-0000H035F |
| | 3000 K | J | 320 | 30H | MCEEZW-A1-0000-0000J030H | 30F | MCEEZW-A1-0000-0000J030F |
| | | H | 280 | | MCEEZW-A1-0000-0000H030H | | MCEEZW-A1-0000-0000H030F |
| | 2700 K | J | 320 | 27H | MCEEZW-A1-0000-0000J027H | 27F | MCEEZW-A1-0000-0000J027F |
| | | H | 280 | | MCEEZW-A1-0000-0000H027H | | MCEEZW-A1-0000-0000H027F |
| 80-CRI Minimum EasyWhite | 4000 K | K | 370 | 40H | MCEEZW-H1-0000-0000K040H | 40F | MCEEZW-H1-0000-0000K040F |
| | | J | 320 | | MCEEZW-H1-0000-0000J040H | | MCEEZW-H1-0000-0000J040F |
| | 3500 K | J | 320 | 35H | MCEEZW-H1-0000-0000J035H | 35F | MCEEZW-H1-0000-0000J035F |
| | | H | 280 | | MCEEZW-H1-0000-0000H035H | | MCEEZW-H1-0000-0000H035F |
| | 3000 K | J | 320 | 30H | MCEEZW-H1-0000-0000J030H | 30F | MCEEZW-H1-0000-0000J030F |
| | | H | 280 | | MCEEZW-H1-0000-0000H030H | | MCEEZW-H1-0000-0000H030F |
| | 2700 K | J | 320 | 27H | MCEEZW-H1-0000-0000J027H | 27F | MCEEZW-H1-0000-0000J027F |
| | | H | 280 | | MCEEZW-H1-0000-0000H027H | | MCEEZW-H1-0000-0000H027F |
| 85-CRI Minimum EasyWhite | 3000 K | H | 280 | 30H | MCEEZW-P1-0000-0000H030H | 30F | MCEEZW-P1-0000-0000H030F |
| | | G | 240 | | MCEEZW-P1-0000-0000G030H | | MCEEZW-P1-0000-0000G030F |
| | 2700 K | H | 280 | 27H | MCEEZW-P1-0000-0000H027H | 27F | MCEEZW-P1-0000-0000H027F |
| | | G | 240 | | MCEEZW-P1-0000-0000G027H | | MCEEZW-P1-0000-0000G027F |

Notes:

- For Standard CRI parts, the typical CRI is 80 for 4000 and 3500 K CCT parts and typical CRI is 82 for 3000 and 2700 K CCT.
- Cree maintains a tolerance of ±7% on flux and power measurements, ±0.005 on chromaticity (CCx, CCy) measurements and ±2 on CRI measurements.
- Flux and chromaticity are measured with each LED die connected to independent drive circuits at 350 mA and with all LEDs lit simultaneously.

## CHARACTERISTICS - COMPLETE PACKAGE

The following table lists the product characteristics for the XLamp MC-E LED package.

| Characteristics | Unit | Minimum | Typical | Maximum |
|---|---|---|---|---|
| Thermal Resistance, junction to solder point - white | °C/W | | 3 | |
| Thermal Resistance, junction to solder point - color | °C/W | | 4 | |
| Viewing Angle (FWHM) - white | degrees | | 110 | |
| Viewing Angle (FWHM) - color | degrees | | 115 | |
| ESD Classification (HBM per Mil-Std-883D) | | | Class 2 | |
| LED Junction Temperature | °C | | | 150 |

## CHARACTERISTICS - PER LED DIE (WHITE, EASYWHITE, DYNAMIC WHITE)

The following table lists the product characteristics of each individual LED die within the XLamp MC-E White LED package.

| Characteristics | Unit | Minimum | Typical | Maximum |
|---|---|---|---|---|
| Temperature Coefficient of Voltage | mV/°C | | -4 | |
| DC Forward Current | mA | | | 700 |
| Reverse Voltage | V | | | 5 |
| Forward Voltage (@ 350 mA) | V | | 3.1 | 3.9 |
| Forward Voltage (@ 700 mA) | V | | 3.4 | |

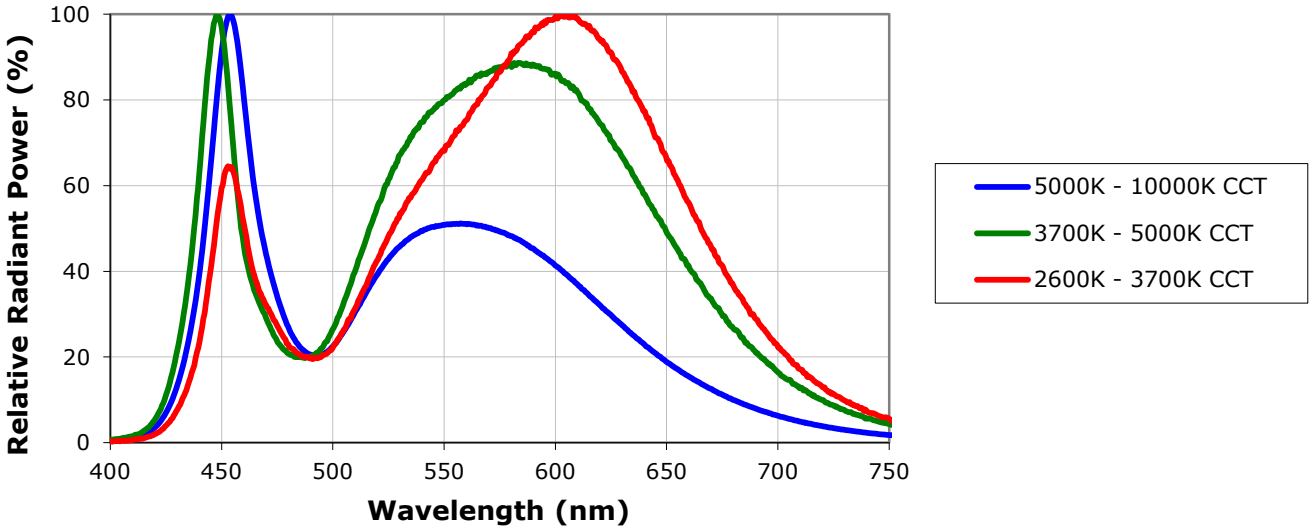
## CHARACTERISTICS - PER LED DIE (COLOR)

The following table lists the product characteristics for each LED die within the XLamp MC-E Color LED package.

| Characteristics | Unit | | Red | Green | Blue | White |
|---|---|---|---|---|---|---|
| Temperature Coefficient of Voltage | mV/°C | Typ. | -2 | -4 | -4 | -4 |
| DC Forward Current | mA | Max. | 700 | 700 | 700 | 700 |
| Reverse Voltage | V | Max. | 5 | 5 | 5 | 5 |
| Forward Voltage (@ 350 mA) | V | Typ. | 2.1 | 3.4 | 3.2 | 3.1 |
| | | Max. | 2.5 | 3.9 | 3.9 | 3.9 |
| Forward Voltage (@ 700 mA) | V | Typ. | 2.3 | 3.7 | 3.5 | 3.5 |

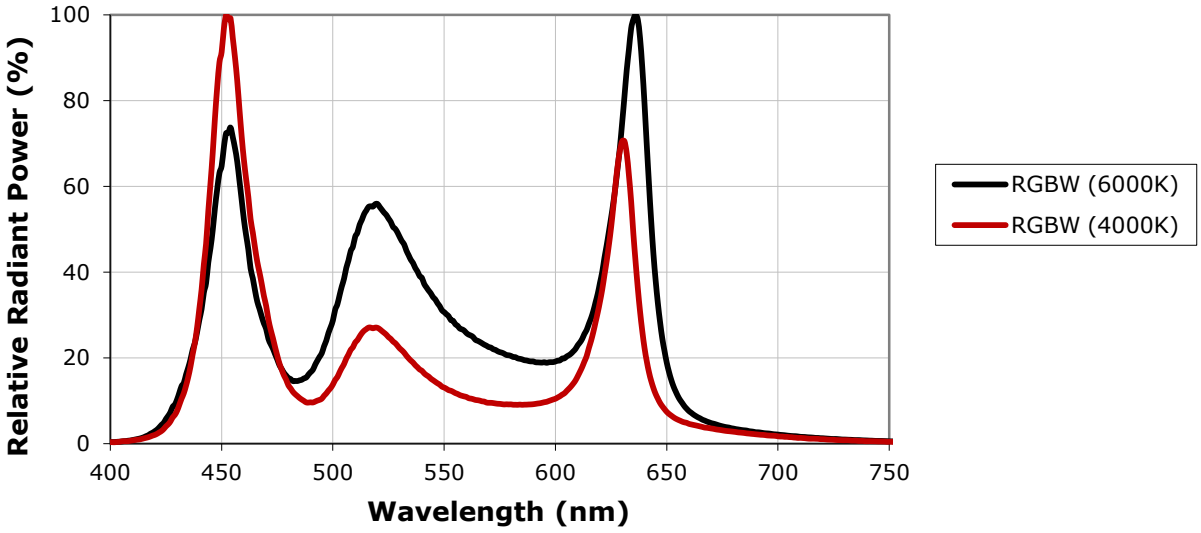
## RELATIVE SPECTRAL POWER DISTRIBUTION ($I_F$ = 350 mA PER LED) - WHITE

The following graph represents typical spectral output of the XLamp MC-E White LED with all four LEDs on simultaneously.



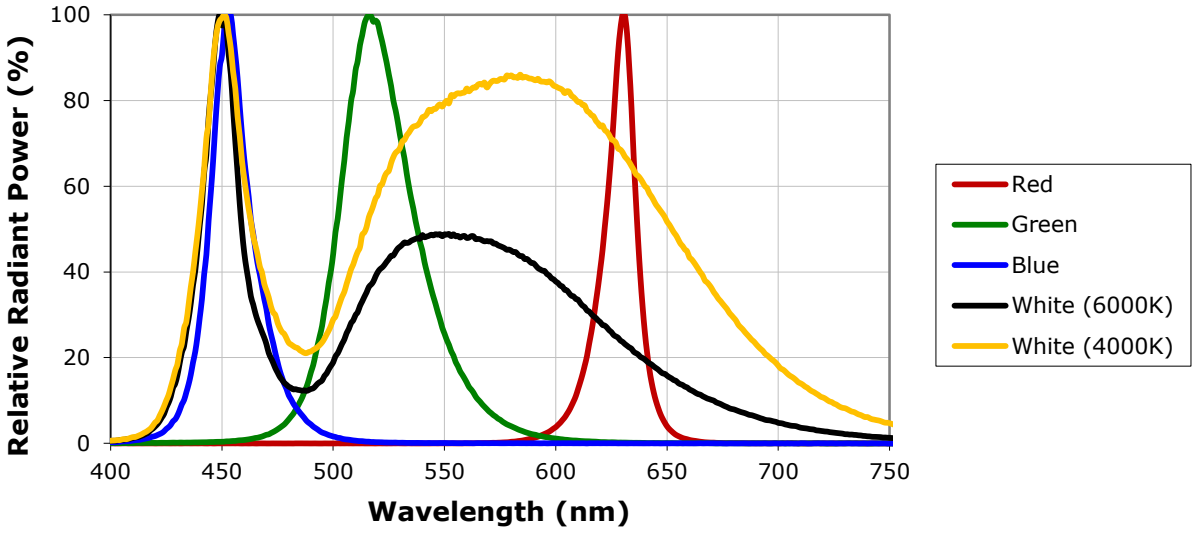

## RELATIVE SPECTRAL POWER DISTRIBUTION ($I_F$ = 350 mA PER LED) - COLOR

The following graph represents typical spectral output of the XLamp MC-E Color LED with all four LEDs on simultaneously.



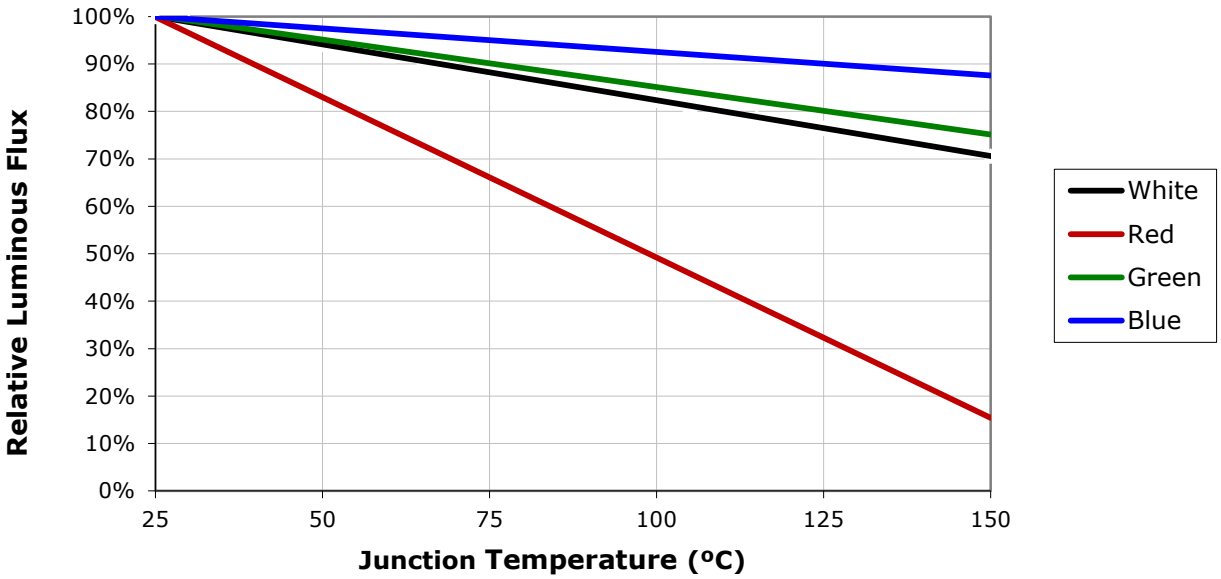
## RELATIVE SPECTRAL POWER DISTRIBUTION ($I_F$ = 350 mA PER LED) - COLOR (CONTINUED)

The following graph represents typical spectral output of the XLamp MC-E Color LED with each LED on independently.



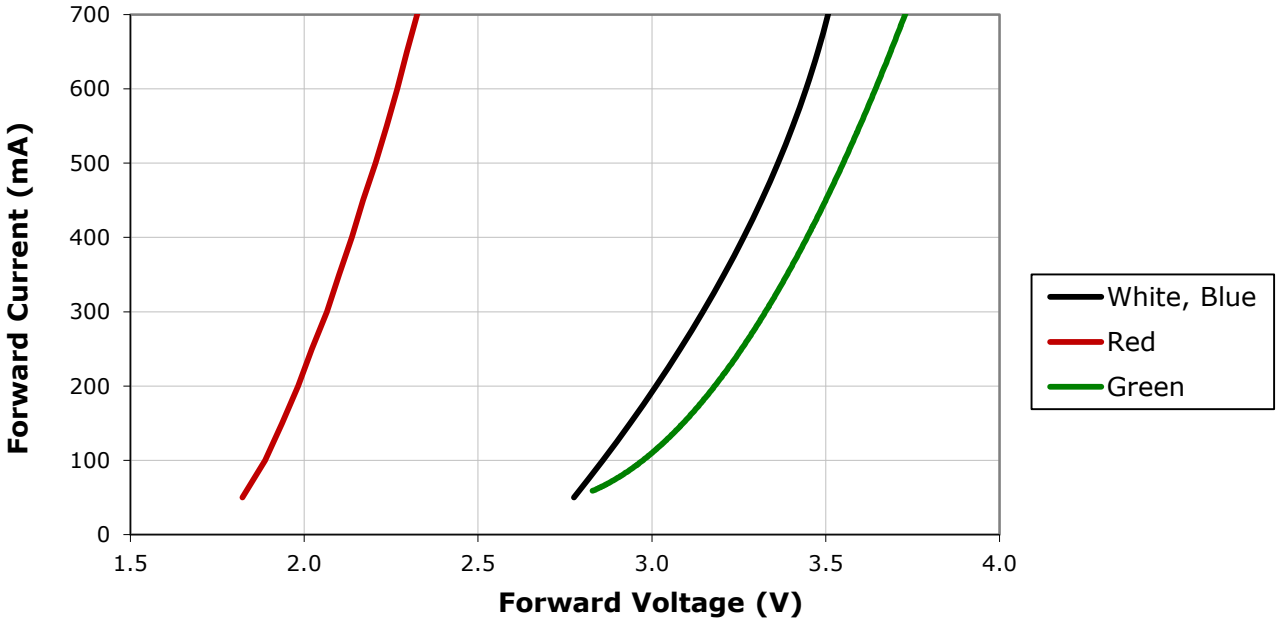

## RELATIVE FLUX OUTPUT VS JUNCTION TEMPERATURE ($I_F$ = 350 mA)

The following graph represents typical performance of each LED die in the XLamp MC-E LED.



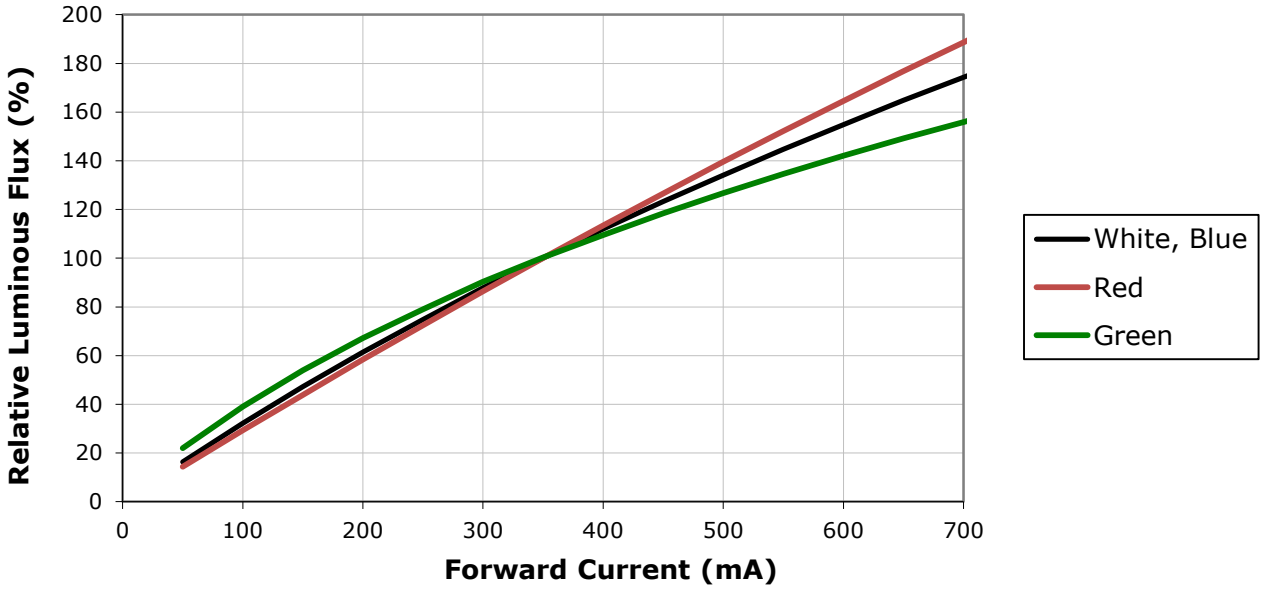
## ELECTRICAL CHARACTERISTICS ($T_J$ = 25 °C)

The following graph represents typical performance of each LED die in the XLamp MC-E LED.



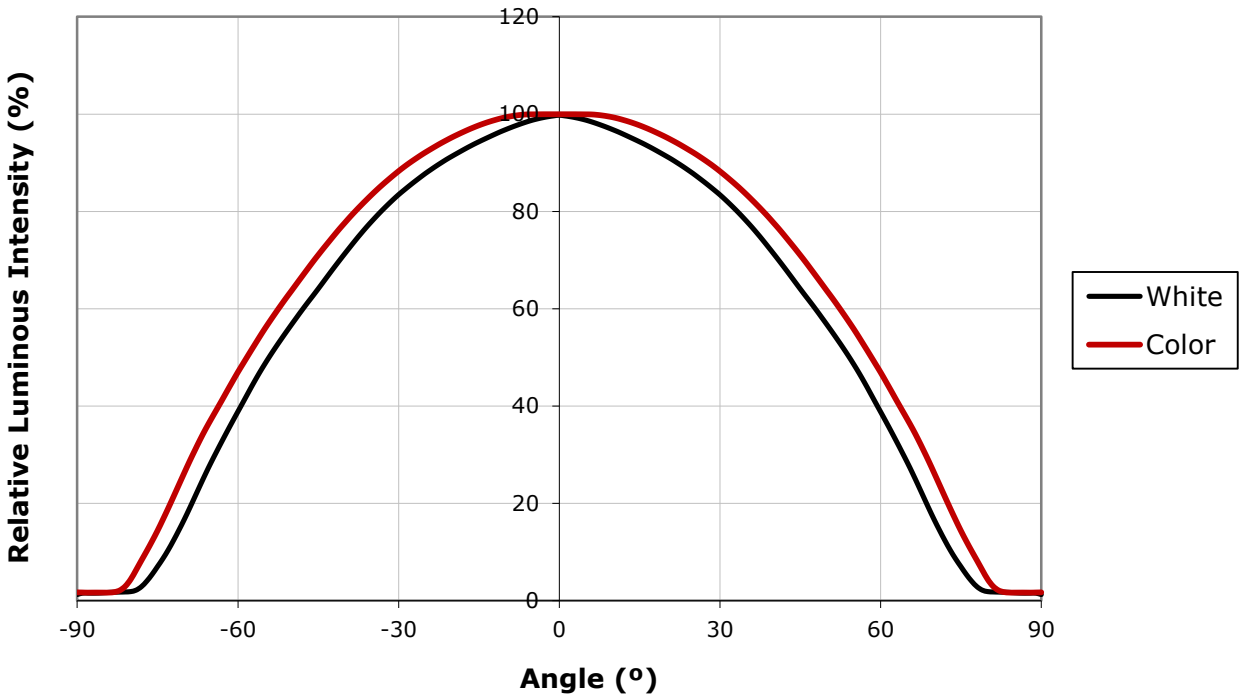

## RELATIVE INTENSITY VS. CURRENT ($T_J$ = 25 °C)

The following graph represents typical performance of each LED die in the XLamp MC-E LED.



## TYPICAL SPATIAL RADIATION PATTERN

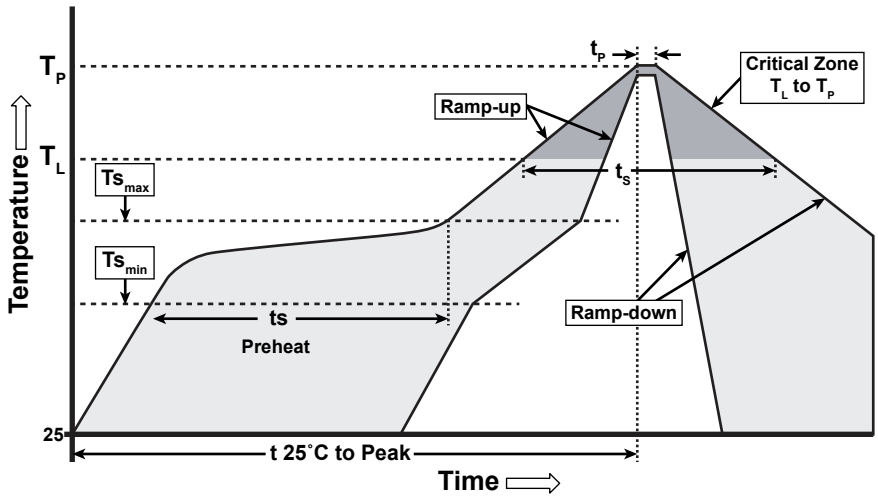
The following graph represents typical output of the XLamp MC-E LED with all four LEDs on simultaneously.



## REFLOW SOLDERING CHARACTERISTICS

In testing, Cree has found XLamp MC-E LEDs to be compatible with JEDEC J-STD-020C, using the parameters listed below. As a general guideline, Cree recommends that users follow the recommended soldering profile provided by the manufacturer of solder paste used.

Note that this general guideline may not apply to all PCB designs and configurations of reflow soldering equipment.




IPC/JEDEC J-STD-020C

| Profile Feature | Lead-Based Solder | Lead-Free Solder |
|---|---|---|
| Average Ramp-Up Rate ($Ts_{max}$ to Tp) | 3 °C/second max. | 3 °C/second max. |
| Preheat: Temperature Min ($Ts_{min}$) | 100 °C | 150 °C |
| Preheat: Temperature Max ($Ts_{max}$) | 150 °C | 200 °C |
| Preheat: Time ($ts_{min}$ to $ts_{max}$) | 60-120 seconds | 60-180 seconds |
| Time Maintained Above: Temperature ($T_L$) | 183 °C | 217°C |
| Time Maintained Above: Time ($t_L$) | 60-150 seconds | 60-150 seconds |
| Peak/Classification Temperature (Tp) | 215 °C | 260 °C |
| Time Within 5 °C of Actual Peak Temperature (tp) | 10-30 seconds | 20-40 seconds |
| Ramp-Down Rate | 6 °C/second max. | 6 °C/second max. |
| Time 25 °C to Peak Temperature | 6 minutes max. | 8 minutes max. |

Note: All temperatures refer to topside of the package, measured on the package body surface.

## NOTES

### Lumen Maintenance Projections

Cree now uses standardized IES LM-80-08 and TM-21-11 methods for collecting long-term data and extrapolating LED lumen maintenance. For information on the specific LM-80 data sets available for this LED, refer to the public LM-80 results document at www.cree.com/xlamp_app_notes/LM80_results.

### Moisture Sensitivity

XLamp MC-E LEDs are shipped in sealed, moisture-barrier bags (MBB) designed for long shelf life. If XLamp MC-E LEDs are exposed to moist environments after opening the MBB packaging but before soldering, damage to the LED may occur during the soldering operation. The derating table at right defines the maximum exposure time (in days) for an XLamp MC-E LED in the listed humidity and temperature conditions. LEDs with exposure time longer than the time specified below must be baked according to the baking conditions listed here.

| Temperature | Maximum Percent Relative Humidity | | | | | | |
|---|---|---|---|---|---|---|---|
| | 30% | 40% | 50% | 60% | 70% | 80% | 90% |
| 30 ºC | 9 | 5 | 4 | 3 | 1 | 1 | 1 |
| 25 ºC | 12 | 7 | 5 | 4 | 2 | 1 | 1 |
| 20 ºC | 17 | 9 | 7 | 6 | 2 | 2 | 1 |

Cree recommends keeping XLamp LEDs in their sealed moisture-barrier packaging until immediately prior to use. Cree also recommends returning any unused LEDS to the resealable moisture-barrier bag and closing the bag immediately after use.

### Baking Conditions

It is not necessary to bake all XLamp MC-E LEDs. Only the LEDs that meet all of the following criteria must be baked:

- LEDs that have been removed from the original MBB packaging.
- LEDs that have been exposed to a humid environment longer than listed in the Moisture Sensitivity section above.
- LEDs that have not been soldered.

LEDs should be baked at 80 ºC for 24 hours. LEDs may be baked on the original reels. Remove LEDs from MBB packaging before baking. Do not bake parts at temperatures higher than 80 ºC. This baking operation resets the exposure time as defined in the Moisture Sensitivity section above.

### Storage Conditions

XLamp MC-E LEDs that have been removed from original MBB packaging but not soldered yet should be stored in a room or cabinet that will maintain an atmosphere of 25 ± 5 ºC and no greater than 10% RH. For LEDs stored in these conditions, storage time does not add to exposure time as defined in the above Moisture Sensitivity section.

### RoHS Compliance

The levels of RoHS restricted materials in this product are below the maximum concentration values (also referred to as the threshold limits) permitted for such substances, or are used in an exempted application, in accordance with EU Directive 2011/65/EC (RoHS2), as amended through June 8, 2011. RoHS Declarations for this product can be obtain from your Cree representative or obtained from the Product Ecology section of www.cree.com.

### UL Recognized Component

Level 1 enclosure consideration. The LED package or a portion thereof has not been investigated as a fire enclosure or a fire and electrical enclosure per ANSI/UL 8750.

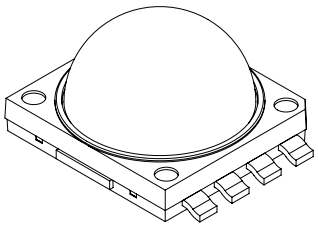
### Vision Advisory Claim

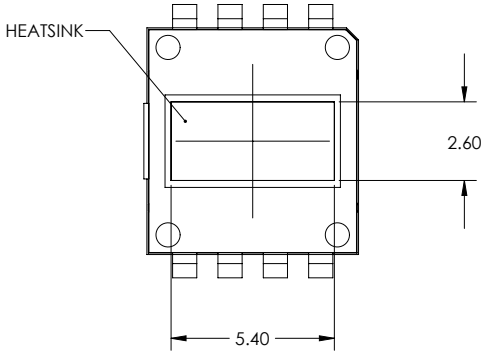
WARNING. Do not look at exposed LED lamps in operation. Eye injury can result. For more information about LEDs and eye safety, please refer to the Cree LED Eye Safety Application Note (www.cree.com/xlamp_app_notes/led_eye_safety).

## MECHANICAL DIMENSIONS

All measurements are ±.1mm unless otherwise indicated.

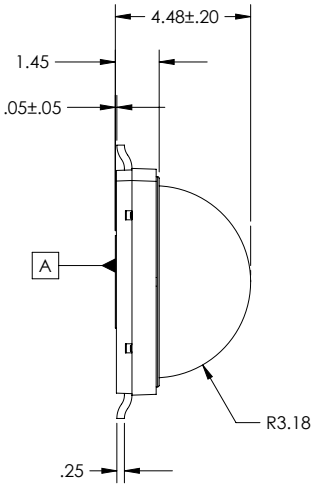
Top View

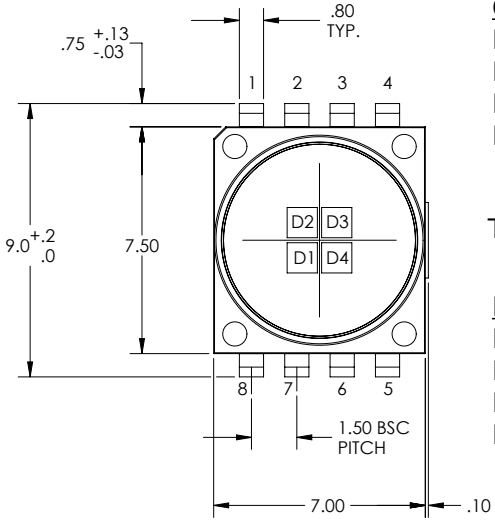





Bottom View

Side View

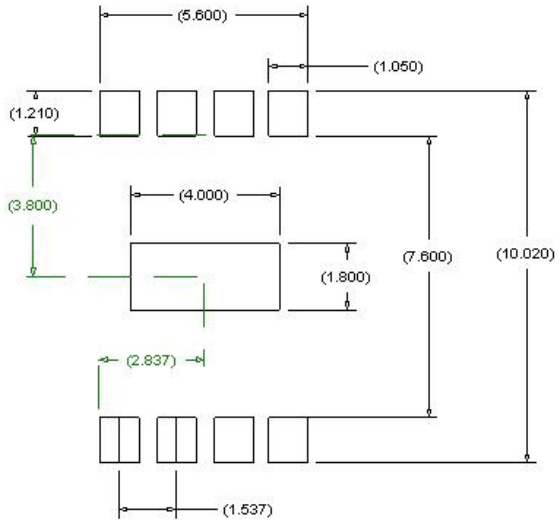


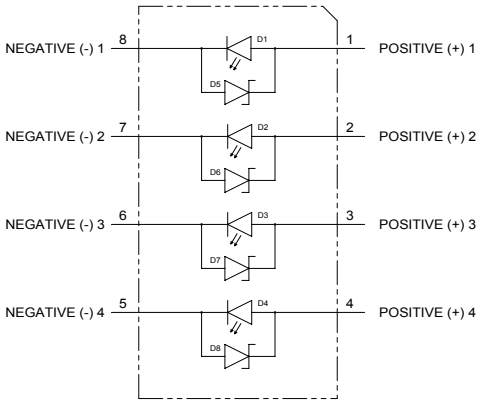

Color
D1: Red
D2: Green
D3: Blue
D4: White

Top View

Dynamic White
D1: Cool White
D2: Warm White
D3: Cool White
D4: Warm White



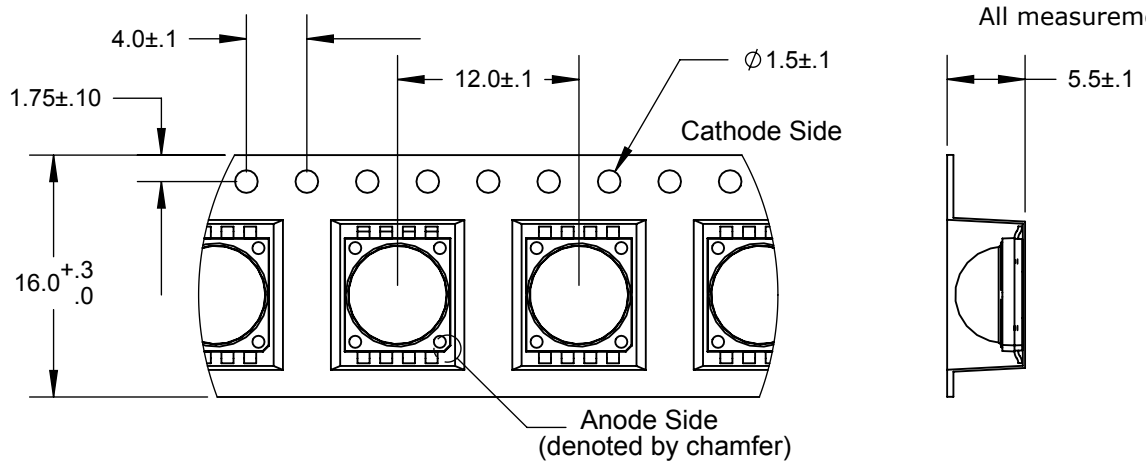

Recommended PCB Solder Pad

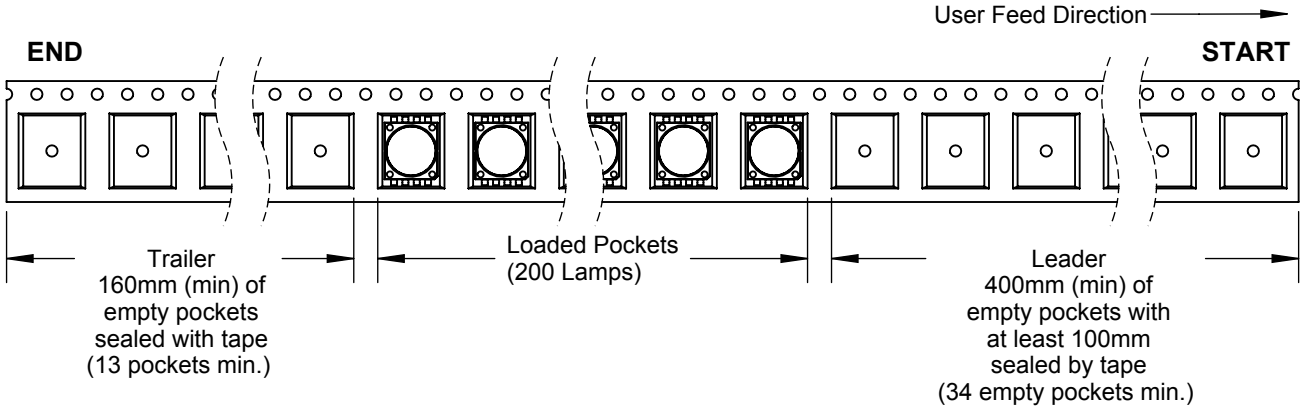


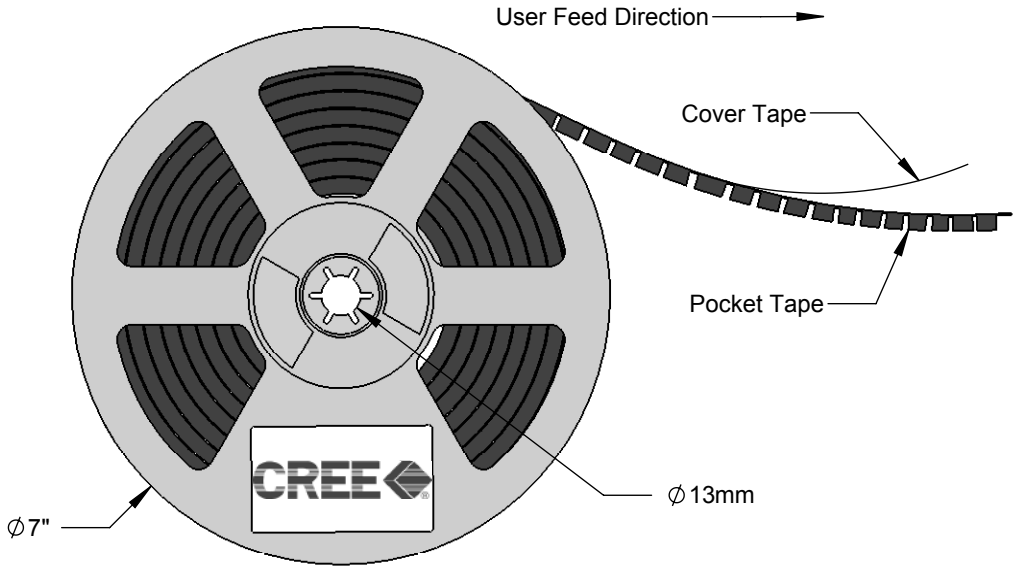
## TAPE AND REEL

All Cree carrier tapes conform to EIA-481D, Automated Component Handling Systems Standard.

All measurements in mm.

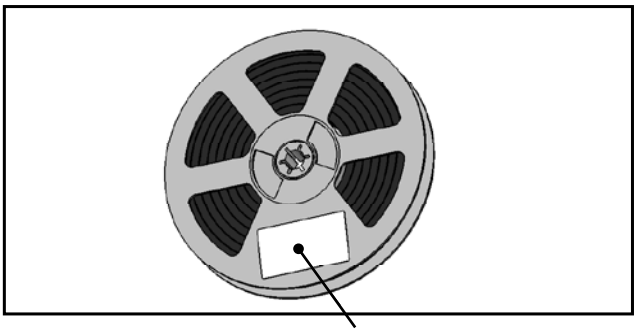


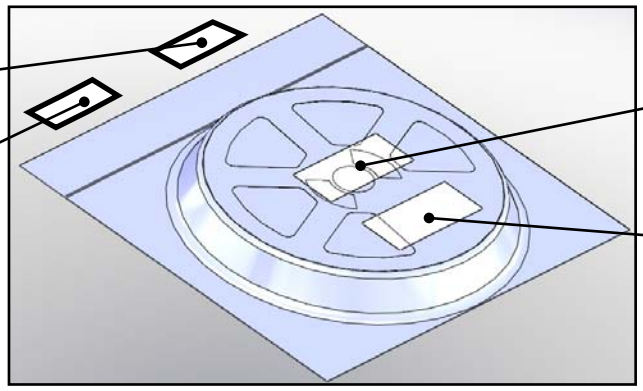



## PACKAGING

**Unpackaged Reel**




**Packaged Reel**




**Boxed Reel**

Стандарт Электрон Связь

Мы молодая и активно развивающаяся компания в области поставок электронных компонентов. Мы поставляем электронные компоненты отечественного и импортного производства напрямую от производителей и с крупнейших складов мира.

Благодаря сотрудничеству с мировыми поставщиками мы осуществляем комплексные и плановые поставки широчайшего спектра электронных компонентов.

Собственная эффективная логистика и склад в обеспечивает надежную поставку продукции в точно указанные сроки по всей России.

Мы осуществляем техническую поддержку нашим клиентам и предпродажную проверку качества продукции. На все поставляемые продукты мы предоставляем гарантию .

Осуществляем поставки продукции под контролем ВП МО РФ на предприятия военно-промышленного комплекса России , а также работаем в рамках 275 ФЗ с открытием отдельных счетов в уполномоченном банке. Система менеджмента качества компании соответствует требованиям ГОСТ ISO 9001.

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