

# Cree® PLCC4 1 in 1 SMD LED

## CLM2D-RPC/APC

### (30-degree minimum)



#### PRODUCT DESCRIPTION

SMD LEDs is packaged in the industry standard package. These LEDs have high reliability performance and are designed to work under a wide range of environmental conditions. This high reliability feature makes them ideally suited to be used under Architectural lighting application conditions

These LEDs are suited for channel letter, or Architectural lighting applications. Cree has been certified in accordance with ISO/IATF16949.

#### FEATURES

- Size (mm): 3.2 x 2.8
- Color and Typical Dominant Wavelength:  
Red (619 - 624nm)  
Amber (584 - 596nm)
- Luminous Intensity (mcd)  
CLM2D-RPC: (1800 - 5600)  
CLM2D-APC: (1800 - 5600)
- Viewing angle:  
CLM2D-RPC  
30-degree minimum  
CLM2D-APC  
30-degree minimum
- Moisture Sensitivity Level: 5a
- Lead-Free
- RoHS Compliant
- Untinted Diffused Lens

#### APPLICATIONS

- Channel Letter
- Architectural Lighting

## ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ )

| Items                                                | Symbol     | Absolute Maximum Rating |       | Unit               |
|------------------------------------------------------|------------|-------------------------|-------|--------------------|
|                                                      |            | Red                     | Amber |                    |
| Forward Current                                      | $I_F$      | 70                      |       | mA                 |
| Peak Forward Current <sup>Note</sup>                 | $I_{FP}$   | 200                     |       | mA                 |
| Reverse Voltage                                      | $V_R$      | 5                       |       | V                  |
| Power Dissipation                                    | $P_D$      | 182                     |       | mW                 |
| Operation Temperature                                | $T_{opr}$  | $-40 \sim +100$         |       | $^\circ\text{C}$   |
| Storage Temperature                                  | $T_{stg}$  | $-40 \sim +100$         |       | $^\circ\text{C}$   |
| Junction Temperature                                 | $T_J$      | 110                     |       | $^\circ\text{C}$   |
| Junction/Ambient                                     | $R_{THJA}$ | 250                     |       | $^\circ\text{C/W}$ |
| Junction/Solder Point                                | $R_{THJS}$ | 100                     |       | $^\circ\text{C/W}$ |
| Electrostatic Discharge Classification(MIL-STD-883E) | ESD        | Class 2                 |       |                    |

**Note:** Pulse width  $\leq 0.1$  msec, duty  $\leq 1/10$ .

## TYPICAL ELECTRICAL & OPTICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ )

| Characteristics     | Color     | Symbol          | Condition     | Unit          | Minimum | Typical | Maximum |
|---------------------|-----------|-----------------|---------------|---------------|---------|---------|---------|
| Forward Voltage     | Red       | $V_F$           | $I_F = 20$ mA | V             |         | 2.0     | 2.6     |
|                     | Amber     | $V_F$           | $I_F = 20$ mA | V             |         | 2.1     | 2.6     |
| Reverse Current     | Red/Amber | $I_R$           | $V_R = 5$ V   | $\mu\text{A}$ |         |         | 10      |
| Dominant Wavelength | Red       | $\lambda_D$     | $I_F = 20$ mA | nm            | 619     | 621     | 624     |
|                     | Amber     | $\lambda_D$     | $I_F = 20$ mA | nm            | 584     | 590     | 596     |
| Luminous Intensity  | Red       | $I_V$           | $I_F = 20$ mA | mcd           | 1800    | 3500    |         |
|                     | Amber     | $I_V$           | $I_F = 20$ mA | mcd           | 1800    | 3500    |         |
| 50% Power Angle     | Red/Amber | $2\theta_{1/2}$ | $I_F = 20$ mA | deg           | 30      |         |         |

**Note:** Continuous reverse voltage can cause LED damage.

## INTENSITY BIN LIMIT ( $I_F = 20 \text{ mA}$ )

Red

| Bin Code | Min.<br>(mcd) | Max.<br>(mcd) |
|----------|---------------|---------------|
| Xa       | 1800          | 2240          |
| Xb       | 2240          | 2800          |
| Ya       | 2800          | 3550          |
| Yb       | 3550          | 4500          |
| Z0       | 4500          | 5600          |

Amber

| Bin Code | Min.<br>(mcd) | Max.<br>(mcd) |
|----------|---------------|---------------|
| Xa       | 1800          | 2240          |
| Xb       | 2240          | 2800          |
| Ya       | 2800          | 3550          |
| Yb       | 3550          | 4500          |
| Z0       | 4500          | 5600          |

Tolerance of measurement of luminous intensity is  $\pm 10\%$ .

## COLOR BIN LIMIT ( $I_F = 20 \text{ mA}$ )

Red

| Bin Code | Min.<br>(nm) | Max.<br>(nm) |
|----------|--------------|--------------|
| RB       | 619          | 624          |

Amber

| Bin Code | Min.<br>(nm) | Max.<br>(nm) |
|----------|--------------|--------------|
| A2       | 584          | 587          |
| A3       | 587          | 590          |
| A4       | 590          | 593          |
| A5       | 593          | 596          |

Tolerance of measurement of dominant wavelength is  $\pm 1 \text{ nm}$ .

## ORDER CODE TABLE\*

| Color | Kit Number         | Luminous Intensity (mcd) |      | Dominant Wavelength |          |           |          | Package |
|-------|--------------------|--------------------------|------|---------------------|----------|-----------|----------|---------|
|       |                    | Min.                     | Max. | Color Bin           | Min.(nm) | Color Bin | Max.(nm) |         |
| Red   | CLM2D-RPC-CXaZ0BB3 | 1800                     | 5600 | RB                  | 619      | RB        | 624      | Reel    |
| Red   | CLM2D-RPC-CXbZ0BB3 | 2240                     | 5600 | RB                  | 619      | RB        | 624      | Reel    |

| Color | Kit Number         | Luminous Intensity (mcd) |      | Dominant Wavelength |          |           |          | Package |
|-------|--------------------|--------------------------|------|---------------------|----------|-----------|----------|---------|
|       |                    | Min.                     | Max. | Color Bin           | Min.(nm) | Color Bin | Max.(nm) |         |
| Amber | CLM2D-APC-CXaZ0253 | 1800                     | 5600 | A2                  | 584      | A5        | 596      | Reel    |
| Amber | CLM2D-APC-CXbZ0253 | 2240                     | 5600 | A2                  | 584      | A5        | 596      | Reel    |
| Amber | CLM2D-APC-CXbZ0343 | 2240                     | 5600 | A3                  | 587      | A4        | 593      | Reel    |

### Notes:

1. The above kit numbers represent order codes that include multiple intensity-bin and color-bin codes. Only one intensity-bin code and one color-bin code will be shipped on each bulk. Single intensity-bin code and single color-bin codes will not be orderable.
2. Please refer to the "Cree LED Lamp Reliability Test Standards" document <sup>#1</sup> for reliability test conditions.
3. Please refer to the "Cree LED Lamp Soldering & Handling" document <sup>#2</sup> for information about how to use this LED product safely.

#1: Refer to [http://www.cree.com/led-components/media/documents/LED\\_Lamp\\_Reliability\\_Test\\_Standard.pdf](http://www.cree.com/led-components/media/documents/LED_Lamp_Reliability_Test_Standard.pdf)

#2: Refer to <http://www.cree.com/led-components/media/documents/sh-HB.pdf>

## GRAPHS

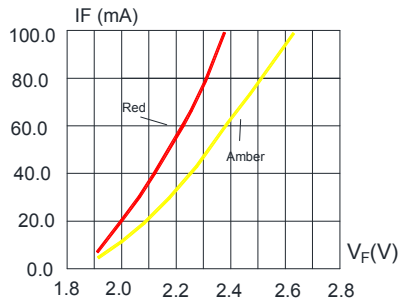


FIG.1 FORWARD CURRENT VS. FORWARD VOLTAGE.

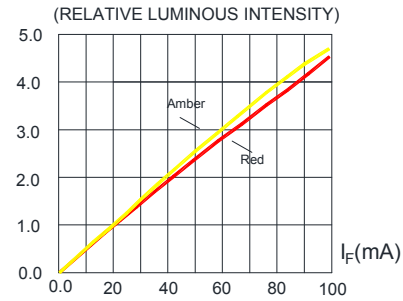


FIG.2 RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT

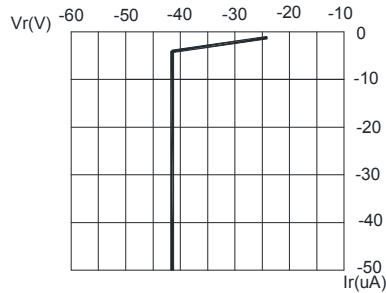


FIG.3 RED&AMBER REVERSE CURRENT VS. REVERSE VOLTAGE.

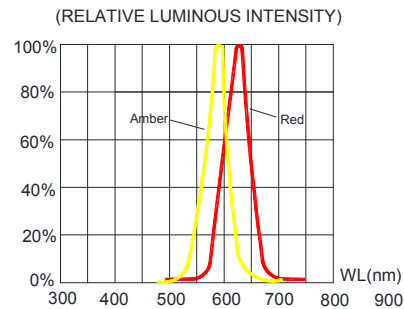


FIG.4 RELATIVE LUMINOUS INTENSITY VS. WAVELENGTH.

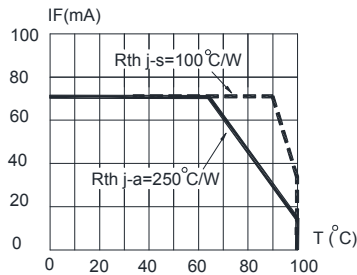


FIG.5 RED&AMBER MAXIMUM FORWARD DC CURRENT VS AMBIENT TEMPERATURE ( $T_{jmax}=110^{\circ}\text{C}$ )

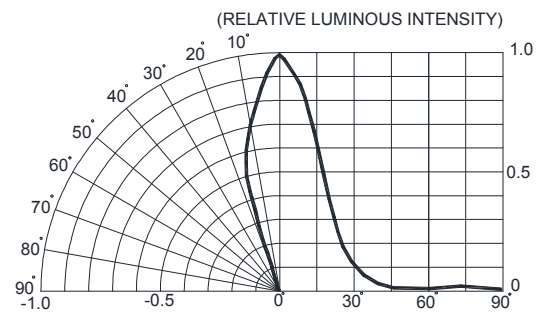
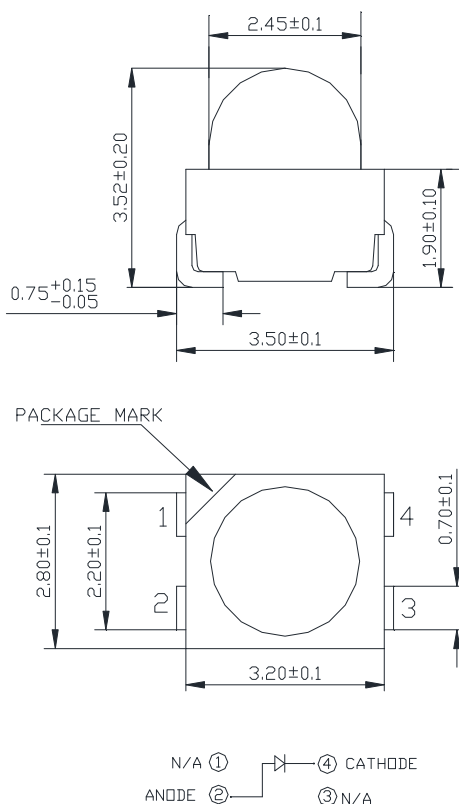


FIG.6 FAR FIELD PATTERN

The above data are collected from statistical figures that do not necessarily correspond to the actual parameters of each single LED. Hence, these data will be changed without further notice.

## MECHANICAL DIMENSIONS

All dimensions are in mm.



## NOTES

### 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 implemented by EU member states on January 2, 2013 and amended on March 31, 2015 by EU Directive 2015/863/EU.

RoHS Declarations for this product can be obtained from your Cree representative or from the Product Ecology section of the Cree website.

### Vision Advisory Claim

Users should be cautioned not to stare at the light of this LED product. The bright light can damage the eye.

## KIT NUMBER SYSTEM

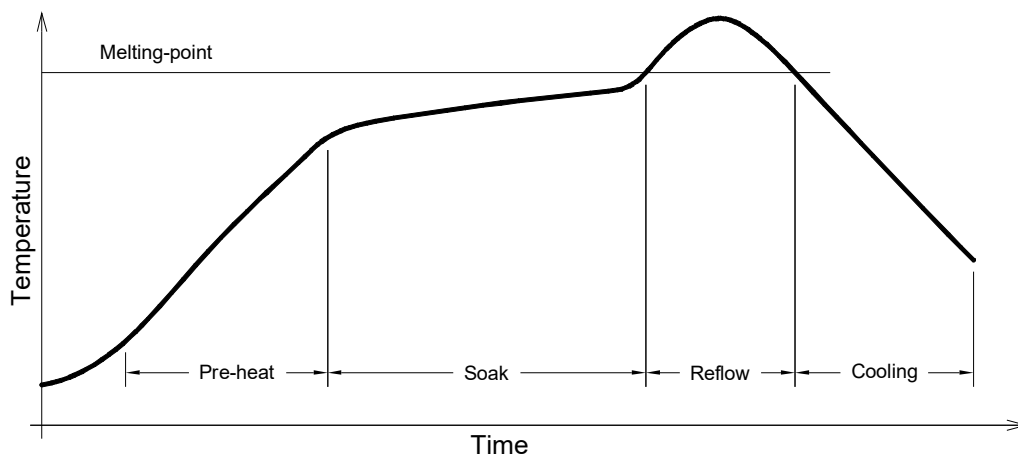
Cree LED lamps are tested and sorted into performance bins. A bin is specified by ranges of color, forward voltage, and brightness. Sorted LEDs are packaged for shipping in various convenient options. Please refer to the "Cree LED Lamp Packaging Standard" document for more information about shipping and packaging options.

Cree LEDs are sold by order codes in combinations of bins called kits. Order codes are configured in the following manner:



## REFLOW SOLDERING

- The CLM2D-RPC/APC is rated as a MSL 5a product.
- The recommended floor life out of bag is 24hrs.
- The temperature profile is as below.



Use only with CLM2D-RPC/APC

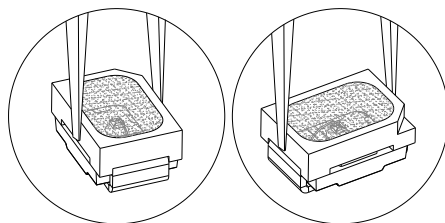
| Solder                                               |
|------------------------------------------------------|
| Average ramp-up rate = 4°C/s max                     |
| Preheat temperature = 150°C ~200°C                   |
| Preheat time = 120s max                              |
| Ramp-down rate = 6°C/s max                           |
| Peak temperature = 235°C max                         |
| Time within 5°C of actual Peak Temperature = 10s max |
| Duration above 217°C is 45s max                      |

Refer to "<http://www.cree.com/led-components/media/documents/sh-HB.pdf>" for soldering & handling details.



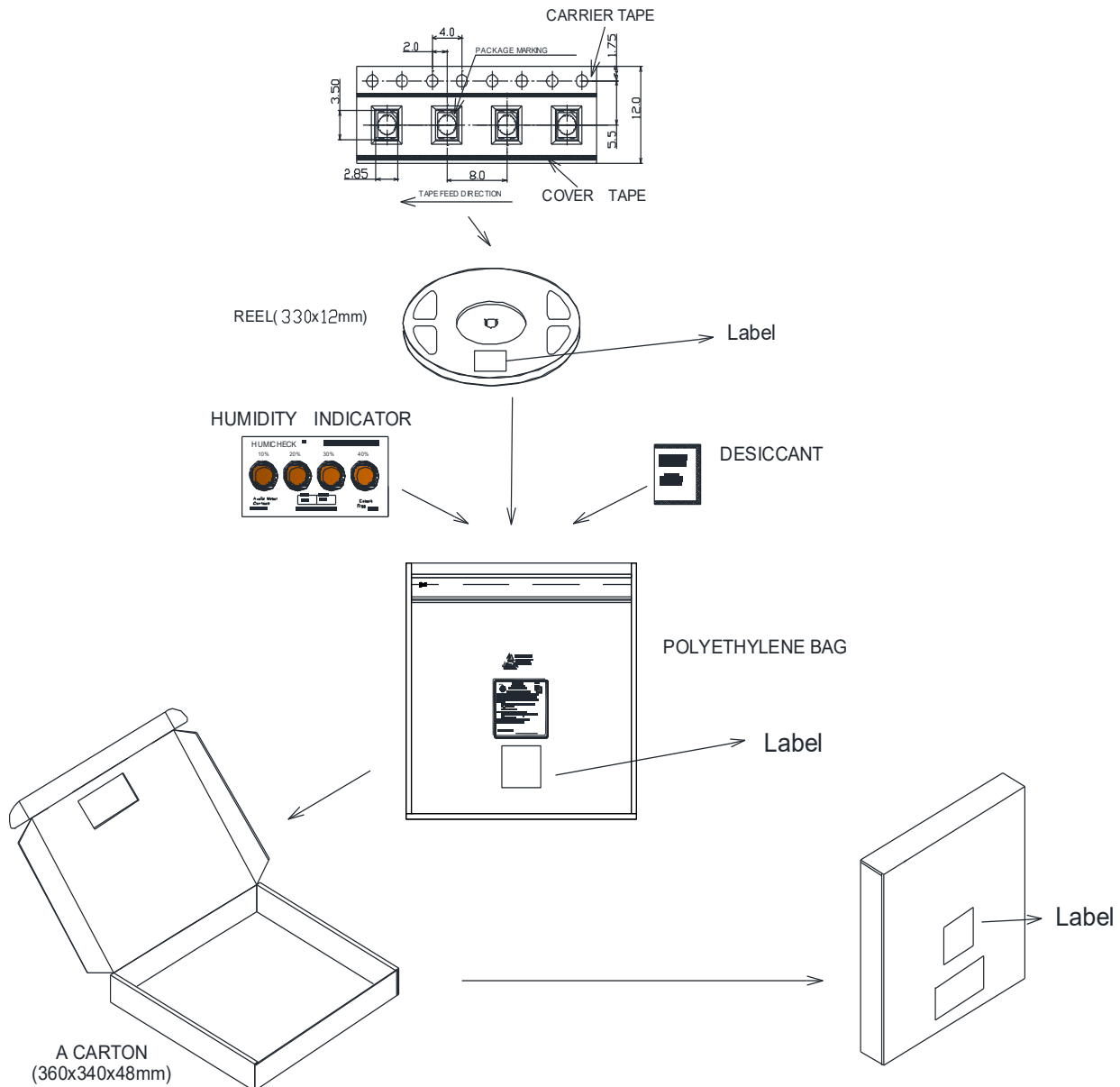
## NOTES

- The packaging sizes of these SMD products are very small and the resin is still soft after solidification. Users are required to handle with care. Never touch the resin surface of SMD products.
- To avoid damaging the product's surface and interior device, it is recommended to choose a special nozzle to pick up the SMD products during the process of SMT production. If handling is necessary, take special care when picking up these products. The following method is necessary:



## PACKAGING

- The boxes are not water resistant and they must be kept away from water and moisture.
- The LEDs are packed in cardboard boxes after packaging in normal or anti-electrostatic bags.
- Cardboard boxes will be used to protect the LEDs from mechanical shocks during transportation.
- The reel pack is applied in SMD LED.
- Max 2300 pcs per reel.



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- Подбор аналогов.
- Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.
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- Работу по проектам и поставку образцов.
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- Защиту от снятия компонента с производства.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.



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