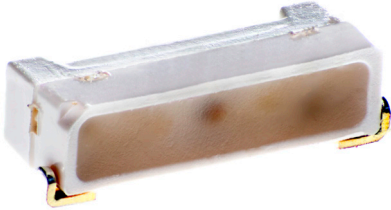


# CLS6C-FKW: PLCC6 3 in 1 SMD LED



## PRODUCT DESCRIPTION

These SMD LEDs are packaged in an industry standard PLCC6 package. These high performance tricolor SMT LEDs are designed to work in a wide range of applications. A wide viewing angle and high brightness make these LEDs suitable for indoor signage applications.

## FEATURES

- Size (mm): 4.7 x 1.5 x 1.3
- Dominant Wavelength
  - Red (619 - 624nm)
  - Green (520 - 540nm)
  - Blue (460 - 475nm)
- Luminous Intensity (mcd)
  - Red (710 - 1120)
  - Green (1800 - 2800)
  - Blue (403 - 635)
- Moisture Sensitivity Level: 3
- Lead-Free
- RoHS Compliant

## APPLICATIONS

- Full-Color Video Screen
- Decorative Lighting
- Amusement

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

Items	Symbol	Absolute Maximum Rating			Unit
		R	G	B	
Forward Current <sup>Note 1</sup>	$I_F$	30	20	20	mA
Peak Forward Current <sup>Note 2</sup>	$I_{FP}$	200	100	100	mA
Reverse Voltage	$V_R$	5	5	5	V
Power Dissipation	$P_D$	78	80	80	mW
Operation Temperature	$T_{opr}$	-40 ~ +85			$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-40 ~ +100			$^\circ\text{C}$
Junction Temperature	$T_J$	110	110	110	$^\circ\text{C}$
Junction/ambient	$R_{THJA}$	360	400	300	$^\circ\text{C/W}$
Junction/solder point	$R_{THJS}$	240	280	200	$^\circ\text{C/W}$

**Note:**

1. Single-color light
2. Pulse width  $\leq 0.1$  msec, duty  $\leq 1/10$ .

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

Characteristics	Condition	Symbol	Values			Unit
			R	G	B	
Dominant Wavelength	$I_F = 20\text{mA}$	$\lambda_{DOM}$	619~624	520~540	460~475	nm
Spectral bandwidth at 50% $I_{REL}$ max	$I_F = 20\text{mA}$	$\Delta \lambda$	24	38	28	nm
Forward Voltage	$I_F = 20\text{ mA}$	$V_{F(avg)}$	2.2	2.7	2.9	V
		$V_{F(max)}$	2.6	3.4	3.4	V
Luminous Intensity	$I_F = 20\text{ mA}$	$I_{V(min)}$	710	1800	403	mcd
		$I_{V(avg)}$	900	2100	460	mcd
Reverse Current (max)	$V_R = 5\text{ V}$	$I_R$	10	10	10	$\mu\text{A}$

\* Continuous reverse voltage can cause LED damage.

### INTENSITY BIN LIMIT

Red (20 mA)			Green (20 mA)			Blue (20 mA)		
Bin Code	Min.(mcd)	Max.(mcd)	Bin Code	Min.(mcd)	Max.(mcd)	Bin Code	Min.(mcd)	Max.(mcd)
M	710	900	R	1800	2240	hj	403	505
qr	805	1010	z1a	2020	2520	J	450	560
N	900	1120	S	2240	2800	km	505	635

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

### COLOR BIN LIMIT

Red (20 mA)			Green (20 mA)			Blue (20 mA)		
Bin Code	Min.(nm)	Max.(nm)	Bin Code	Min.(nm)	Max.(nm)	Bin Code	Min.(nm)	Max.(nm)
RB	619	624	G7	520	525	B3	460	465
			G23	522.5	527.5	B23	462.5	467.5
			G8	525	530	B4	465	470
			G45	527.5	532.5	B45	467.5	472.5
			G9	530	535	B5	470	475
			G67	532.5	537.5			
			Ga	535	540			

\* Tolerance of measurement of dominant wavelength is  $\pm 1$  nm.

**ORDER CODE TABLE**

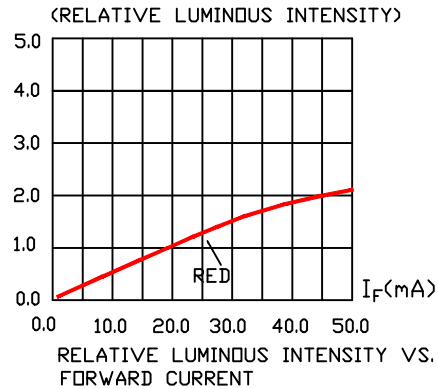
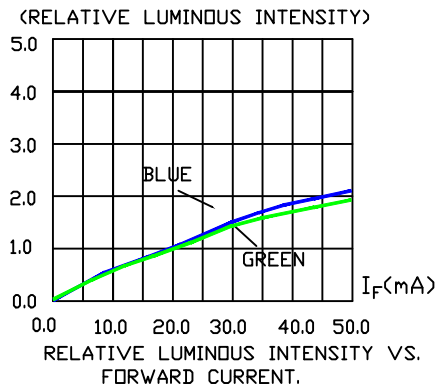
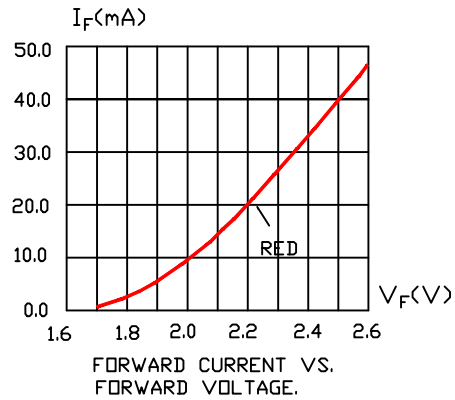
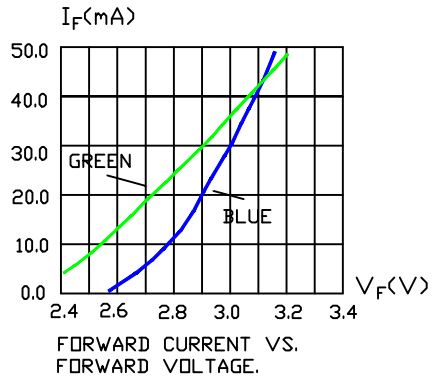
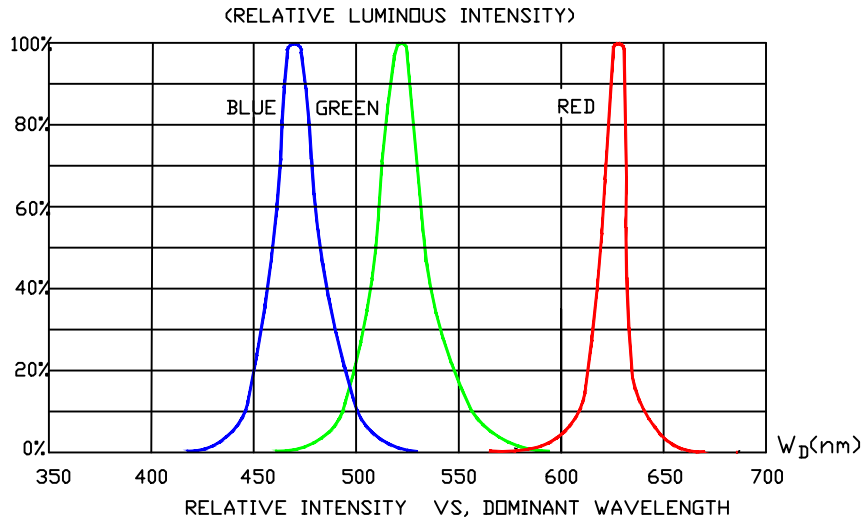
Kit Number	Color	Luminous Intensity (mcd)		Dominant Wavelength (nm)				Package
		Min.	Max.	Color Bin	Min.(nm)	Color Bin	Max.(nm)	
CLS6C-FKW-CMNRShjkmBB7a353	Red	710	1120	RB	619	RB	624	Reel
	Green	1800	2800	G7	520	Ga	540	Reel
	Blue	403	635	B3	465	B5	475	Reel
CLS6C-FKW-CM1R1hj1BB7D3C3	Red	Any 1 Intensity bin from M(710) - N(1120)		RB	619	RB	624	Reel
	Green	Any 1 Intensity bin from R(1800) - S(2800)		Any 1 hue bin from G7(520)-Ga(540)				Reel
	Blue	Any 1 Intensity bin from hj(403) - km(635)		Any 1 hue bin from B3(465)-B5(475)				Reel

**Notes:**

- 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.
- Please refer to the [HB LED Lamp Reliability Test Standards](#) document for reliability test conditions.
- Please refer to the [HB LED Lamp Soldering & Handling](#) document for information about how to use this LED product safely.

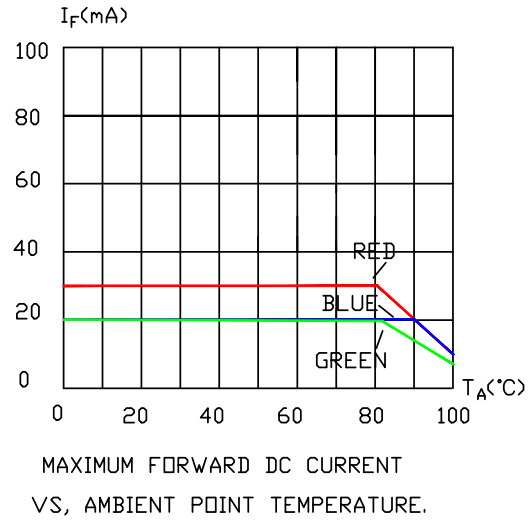
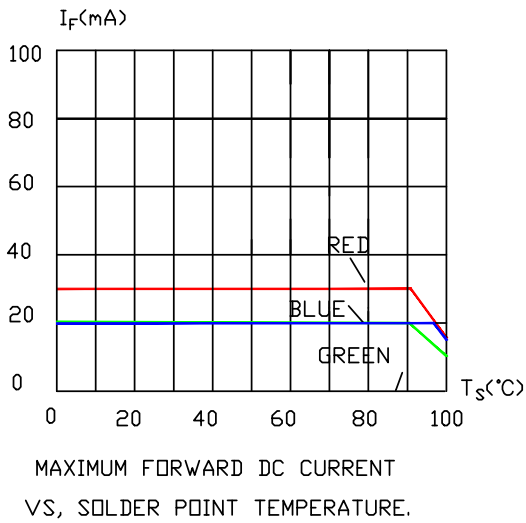
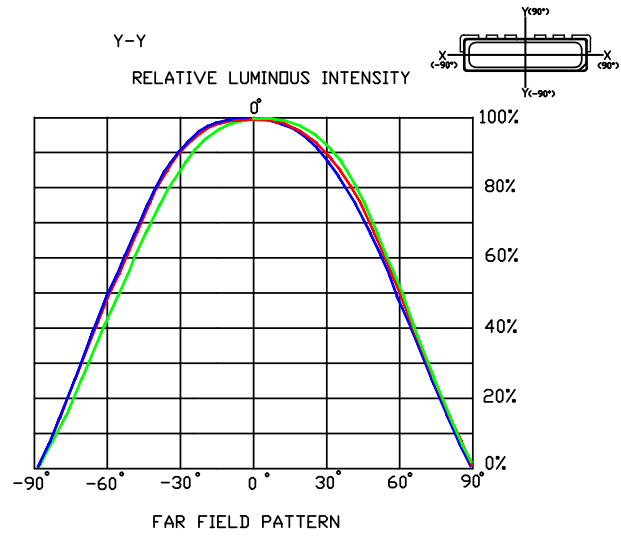
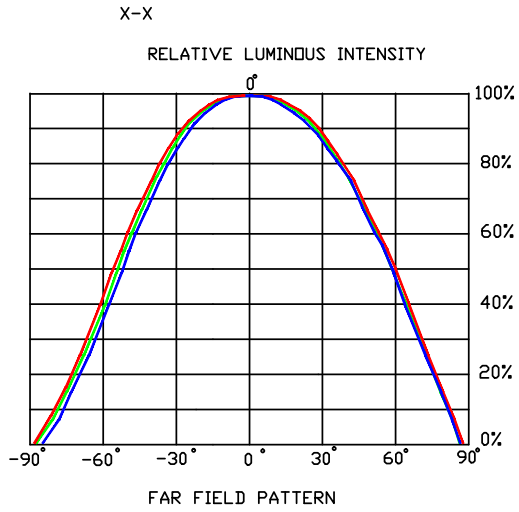
GRAPHS

The data below 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.



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## CAUTIONS

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### 1. Cleaning

- When necessary, cleaning should occur only with isopropyl alcohol (IPA) at room temperature (25°C) for a duration of no more than one minute. Dry at room temperature for 15 minutes before use.
- The influence of ultrasonic cleaning on the SMD LED depends on factors such as ultrasonic power and the way the SMD LEDs are mounted. Ultrasonic cleaning should be pre-qualified to ensure this will not cause damage to the SMD LEDs.

### 2. Moisture-Proof Packing

- To prevent moisture absorption into SMD LEDs during the transportation and storage, the LEDs are packed in a moisture-barrier bag. Desiccants and a humidity indicator are packed together with the LEDs as secondary protection.
- A humidity-indicator card inside the packing indicates the humidity level.

### 3. Storage

- The shelf life of LEDs stored in the original sealed bag at <math> < 40^{\circ}\text{C}</math> and <math> < 90\% \text{RH}</math> is 12 months. Baking is required if the shelf life has expired.
- Before opening the packaging, check for air leaks in the bag.
- After the bag is opened, the SMD LEDs must be stored at <math> < 30^{\circ}\text{C}</math> and <math> < 60\% \text{RH}</math>. Under these conditions, SMD LEDs must be used (subject to reflow) within 168 hours. If the LEDs are not within 168 hours after removal from the bag, baking is required.
- To bake, place the SMD LEDs in an oven at <math> 80^{\circ}\text{C} \pm 5^{\circ}\text{C}</math> and relative humidity <math> \leq 10\% \text{RH}</math> for 24 hours.
- Take the material out of the packaging bag before baking. Do not open the oven door frequently during the baking process.

### 4. Soldering

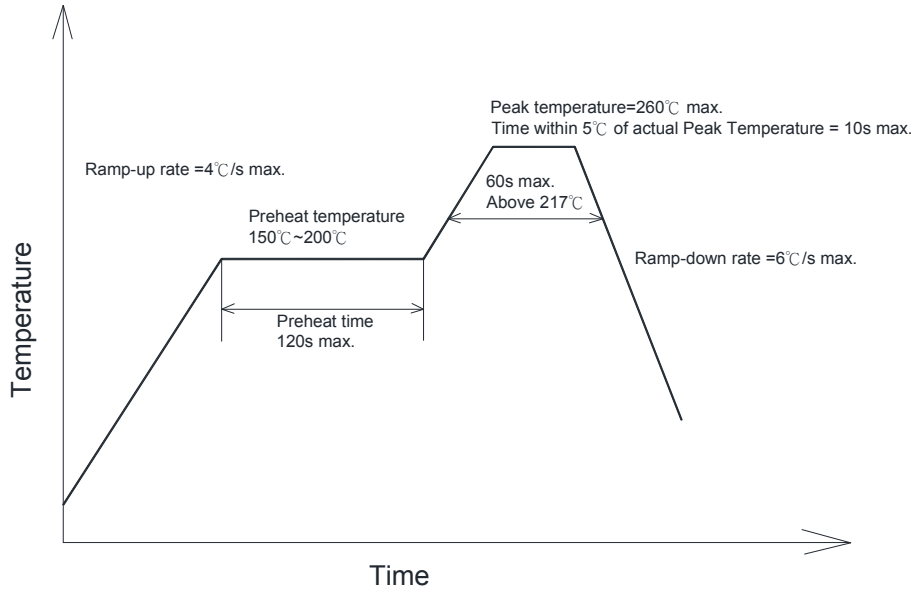
#### a. Manual Soldering with a Soldering Iron

- Use of a soldering iron of less than 25 watts is recommended. The iron temperature must be kept below 315°C and soldering time no more than 2 seconds.
- The epoxy resin of an SMD LED should not contact the tip of the soldering iron.
- No mechanical stress should be exerted on the resin portion of an SMD LED during soldering.
- Handling of an SMD LED should be done only when the package has been cooled down to below 40°C or less. This is to prevent SMD LED failures due to thermal-mechanical stress during handling.

**CAUTIONS**

**b. Reflow Soldering**

Temperature (top surface of the SMD LED) profile:

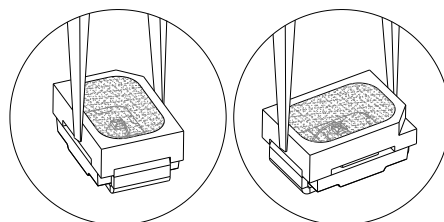


**NOTES**

- SMD LEDs should not be modified after soldering. If modification cannot be avoided, the modifications must be pre-qualified to avoid damaging the SMD LEDs.
- In case of 2 times reflow process, 2nd reflow process must be performed as soon as possible after the 1st reflow.
- No stress should be exerted on the package during soldering.
- The PCB should not be wrapped after soldering; allow the PCB board and SMD LED to cool naturally.

**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:

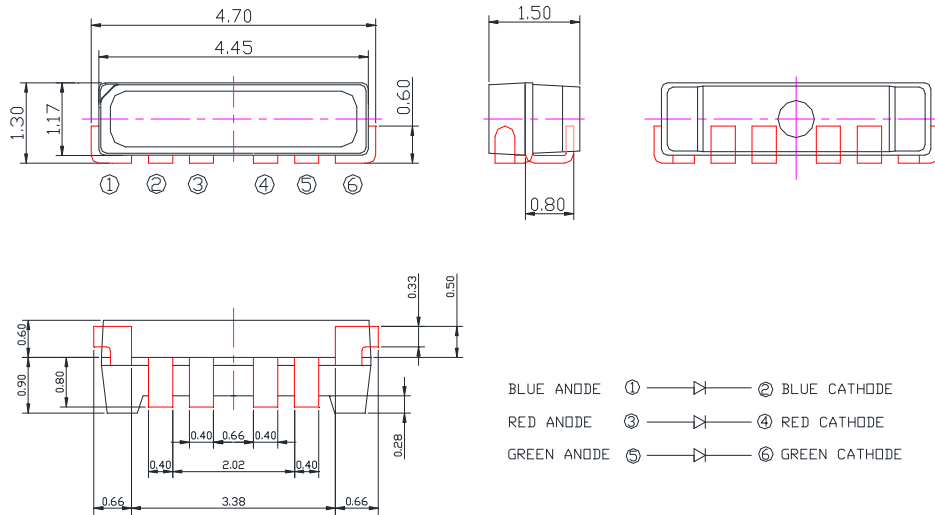




## MECHANICAL DIMENSIONS

All dimensions are in mm.

Tolerance of measurement of the dimension is  $\pm 0.1$ .



## 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 January 2, 2013. RoHS Declarations for this product can be obtained from your Cree LED representative or from the [Product Ecology](#) section of the Cree LED website.

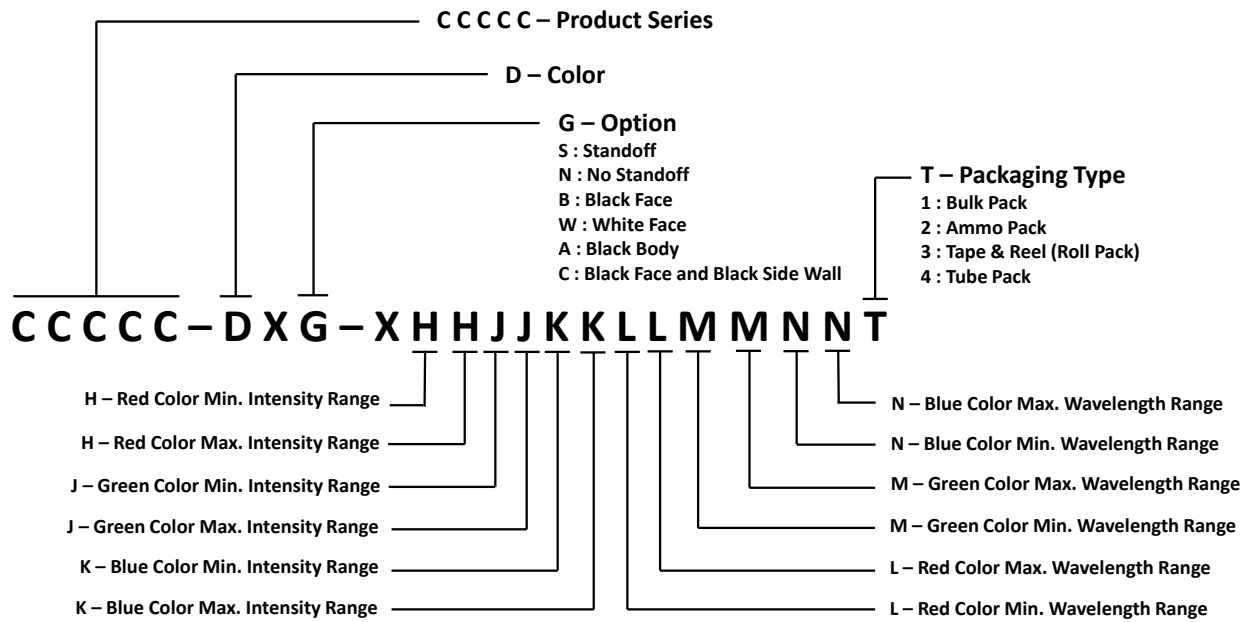
### Vision Advisory

**WARNING:** Do not look at an exposed lamp in operation. Eye injury can result.

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.

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



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 3000 pcs per reel.

