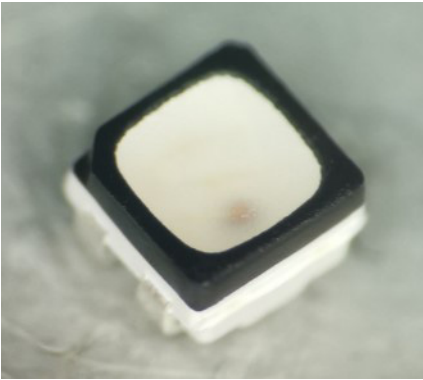


CLMUD-FKC: PLCC4 3 in 1 SMD LED



PRODUCT DESCRIPTION

The CLMUD-FKC full-color RGB LED offers a high-intensity light output and a wide viewing angle. The compact 1.5mm x 1.5mm package allows for a very high resolution screen and it is designed to work in a wide array of environmental conditions. Cree LED PLCC full-color RGB LEDs are suited for indoor video screen, decorative lighting and amusement applications.

FEATURES

- Size (mm): 1.5 x 1.5
- Dominant Wavelength
 - Red (619 - 624nm)
 - Green (525 - 532.5nm)
 - Blue (460 - 470nm)
- Luminous Intensity (mcd)
 - Red (355 - 560)@ 15mA
 - Green (635 - 900)@ 10mA
 - Blue (101 - 202)@ 10mA
- Moisture Sensitivity Level: 5a
- Lead-Free
- RoHS Compliant
- Matte Surface

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 ^{Note 1}	I_F	25	13	13	mA
Peak Forward Current ^{Note 2}	I_{FP}	70	50	50	mA
Reverse Voltage	V_R	5	5	5	V
Power Dissipation	P_D	65	47	47	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 1 chip on	R_{THJA}	390	550	440	$^\circ\text{C/W}$
Junction/solder point 1 chip on	R_{THJS}	290	440	340	$^\circ\text{C/W}$

Note:

1. Single-color light
2. Pulse width ≤ 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	$I_F = 15\text{mA(R)}$ $I_F = 10\text{mA(G)}$ $I_F = 10\text{mA(B)}$	λ_{DOM}	619~624	525~532.5	460~470	nm
Spectral bandwidth at 50% I_{REL} max	$I_F = 15\text{mA(R)}$ $I_F = 10\text{mA(G)}$ $I_F = 10\text{mA(B)}$	$\Delta \lambda$	15	30	21	nm
Forward Voltage	$I_F = 15\text{mA(R)}$ $I_F = 10\text{mA(G)}$ $I_F = 10\text{mA(B)}$	$V_{F(\text{avg})}$	2.1	2.8	2.9	V
		$V_{F(\text{max})}$	2.6	3.6	3.6	V
Luminous Intensity	$I_F = 15\text{mA(R)}$ $I_F = 10\text{mA(G)}$ $I_F = 10\text{mA(B)}$	$I_{V(\text{min})}$	355	635	101	mcd
		$I_{V(\text{avg})}$	450	750	145	mcd
Luminous Intensity(Reference)	$I_F = 5/5/5$ mA	$\Phi_{V(\text{avg})}$	150	500	85	mcd
Reverse Current (max)	$V_R = 5$ V	I_R	10	10	10	μA

* Continuous reverse voltage can cause LED damage.

INTENSITY BIN LIMIT

Red (15 mA)			Green (10 mA)			Blue (10 mA)		
Bin Code	Min.(mcd)	Max.(mcd)	Bin Code	Min.(mcd)	Max.(mcd)	Bin Code	Min.(mcd)	Max.(mcd)
H	355	450	np	635	805	56	101	126
hj	403	505	M	710	900	C	112	140
J	450	560				78	126	160
						D	140	180
						9a	160	202

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

COLOR BIN LIMIT

Red (15 mA)			Green (10 mA)			Blue (10 mA)		
Bin Code	Min.(nm)	Max.(nm)	Bin Code	Min.(nm)	Max.(nm)	Bin Code	Min.(nm)	Max.(nm)
RB	619	624	G8	525	530	B3	460	465
			G45	527.5	532.5	B23	462.5	467.5
						B4	465	470

* Tolerance of measurement of dominant wavelength is ± 1 nm.

ORDER CODE TABLE

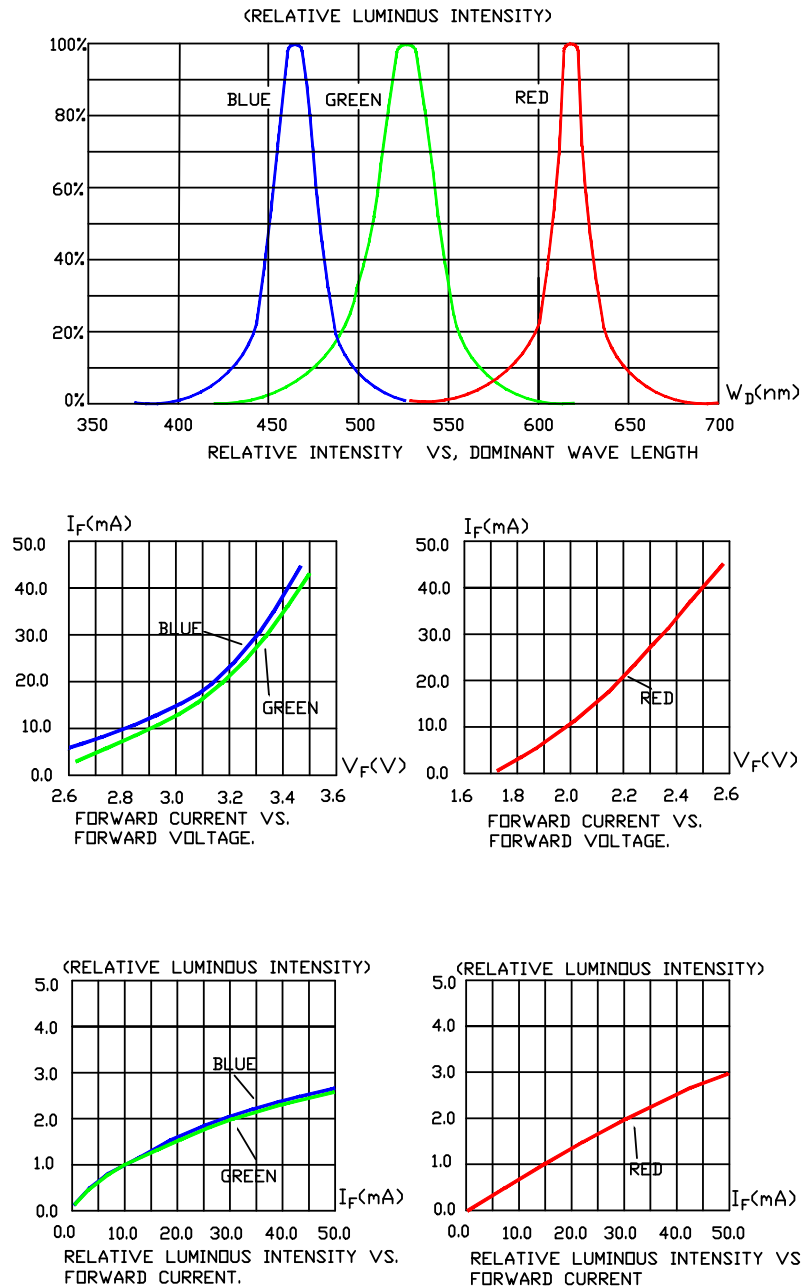
Kit Number	Color	Luminous Intensity (mcd)		Dominant Wavelength (nm)				Package
		Min.	Max.	Color Bin	Min.(nm)	Color Bin	Max.(nm)	
CLMUD-FKC-CHJnpM569aBB845343	Red	355	560	RB	619	RB	624	Reel
	Green	635	900	G8	525	G45	532.5	Reel
	Blue	101	202	B3	460	B4	470	Reel
CLMUD-FKC-CH1np1561BB7T4S3	Red	Any 1 Intensity bin from H(355) - J(560)		RB	619	RB	624	Reel
	Green	Any 1 Intensity bin from np(635) - M(900)		Any 1 hue bin from G8(525)-G45(532.5)				Reel
	Blue	Any 1 Intensity bin from 56(101) - 9a(202)		Any 1 hue bin from B3(460)-B4(470)				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.

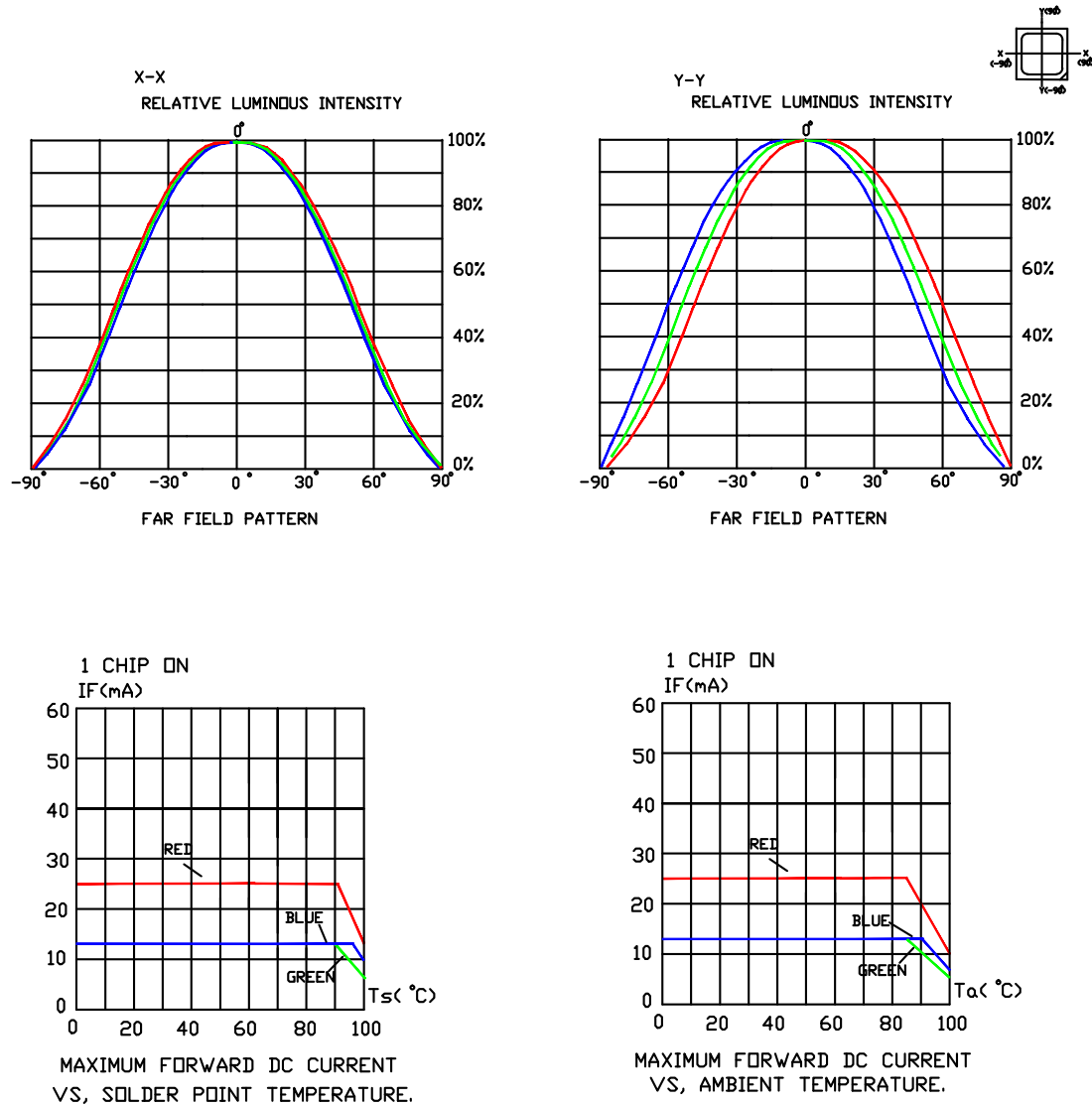
GRAPHS

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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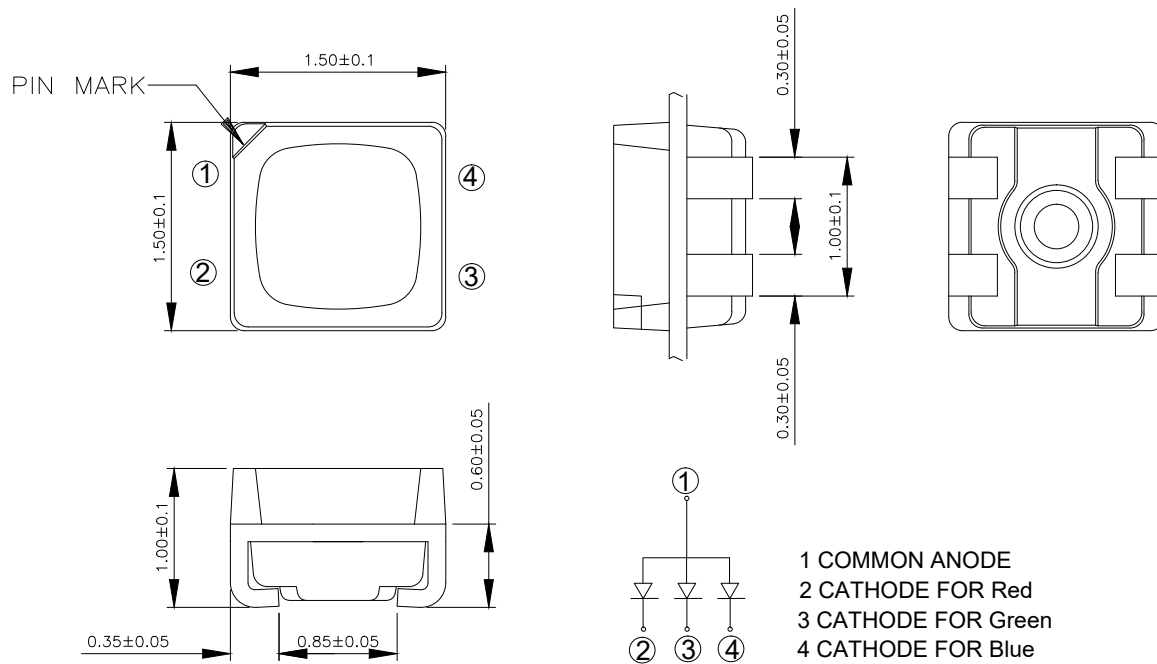


The graph shows the maximum allowable DC current for a LED die of each color.

MECHANICAL DIMENSIONS

All dimensions are in mm.

Tolerance of measurement of the dimension is ± 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.

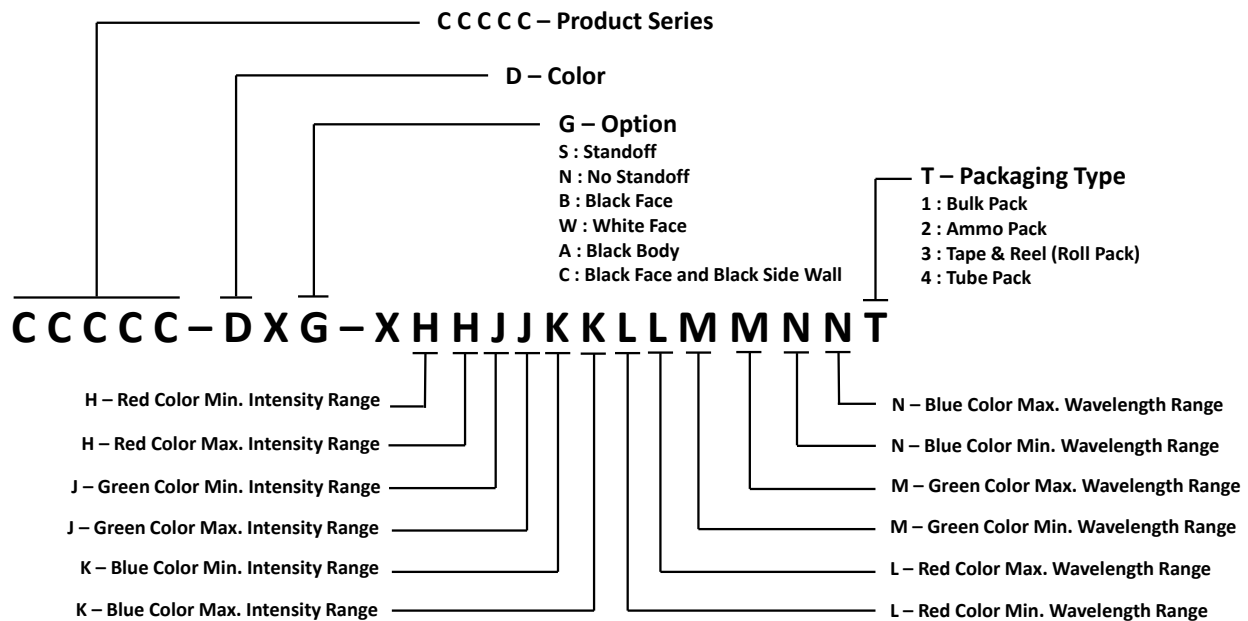
Vision Advisory

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

KIT NUMBER SYSTEM

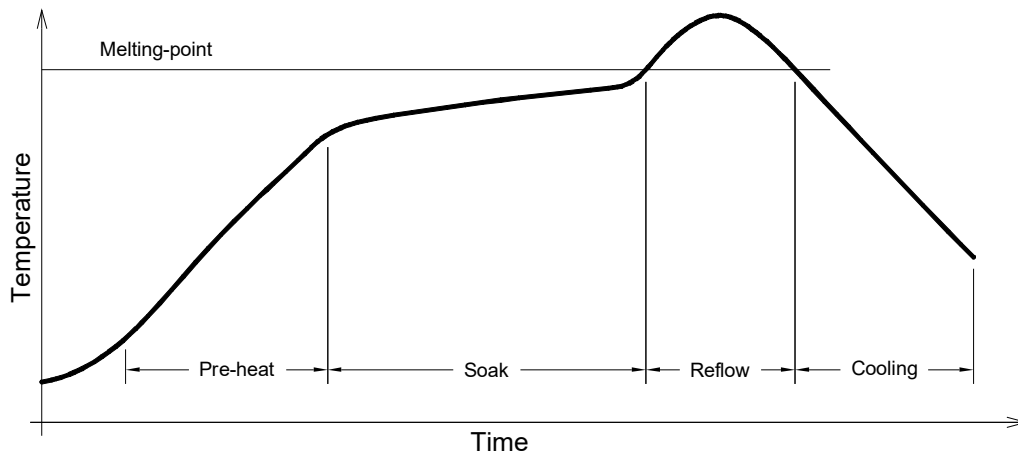
Cree LED lamps are tested and sorted into performance bins. A bin is specified by ranges of color, forward voltage, and brightness.

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



REFLOW SOLDERING

- The CLMUD-FKC is rated as a MSL 5a product.
- After opening the sealed bag, the SMD LED must be stored under the condition $<30^{\circ}\text{C}$ and $<60\%\text{RH}$. Under these conditions, the SMD LEDs must be used (subject to reflow) within 24 hours after bag opening, and baking 24-hour/ 80°C is required when exceeding 24 hours.
- Note that baking must only be done once.
- The temperature profile is as below.

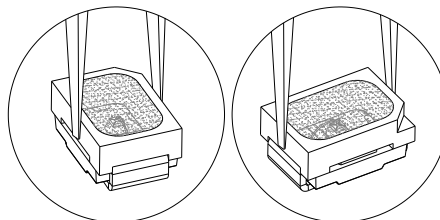


Use only with CLMUD-FKC

Solder
Average ramp-up rate = 4°C/s max
Preheat temperature = $150^{\circ}\text{C} \sim 200^{\circ}\text{C}$
Preheat time = 120s max
Ramp-down rate = 6°C/s max
Peak temperature = 250°C max
Time within 5°C of actual Peak Temperature = 10s max
Duration above 217°C is 60s max

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 12800 pcs per reel.

