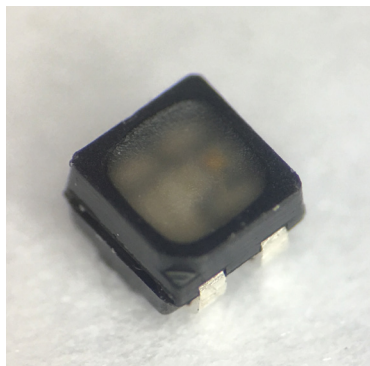


## CLMUD-FKA: PLCC4 3 in 1 SMD LED



### PRODUCT DESCRIPTION

The CLMUD-FKA 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 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 (520 - 535nm)  
Blue (465 - 475nm)
- Luminous Intensity (mcd)  
Red (36 - 81)@ 5mA  
Green (126 - 252)@ 5mA  
Blue (22 - 45)@ 5mA
- 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 <sup>Note 1</sup>	$I_F$	25	13	13	mA
Peak Forward Current <sup>Note 2</sup>	$I_{FP}$	70	50	50	mA
Reverse Voltage	$V_R$	5	5	5	V
Power Dissipation	$P_D$	60	50	50	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	$R_{THJA}$	460	430	410	$^\circ\text{C/W}$
Junction/solder point	$R_{THJS}$	250	270	250	$^\circ\text{C/W}$

## 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	$I_F = 5\text{mA}$	$\lambda_{DOM}$	619~624	520~535	465~475	nm
Spectral bandwidth at 50% $I_{REL}$ max	$I_F = 5\text{mA}$	$\Delta\lambda$	16	28	19	nm
Forward Voltage	$I_F = 5\text{mA}$	$V_{F(avg)}$	1.9	2.8	2.9	V
		$V_{F(max)}$	2.4	3.8	3.8	V
Luminous Intensity	$I_F = 5\text{mA}$	$I_{V(min)}$	36	126	22	mcd
		$I_{V(avg)}$	54	180	30	mcd
Luminous Intensity(Reference)	$I_F = 20/10/10\text{mA}$	$\Phi_{V(avg)}$	215	260	45	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 (5 mA)			Green (5 mA)			Blue (5 mA)		
Bin Code	Min.(mcd)	Max.(mcd)	Bin Code	Min.(mcd)	Max.(mcd)	Bin Code	Min.(mcd)	Max.(mcd)
L8	36	45	78	126	160	L6	22	28
3g3f	41	51	D	140	180	3m3k	25	32
L9	45	56	9a	160	202	L7	28	36
3e3d	51	64	E	180	224	3j3h	32	41
L	56	71	bc	202	252	L8	36	45
3c3b	64	81						

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

## COLOR BIN LIMIT

Red (5 mA)			Green (5 mA)			Blue (5 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	B4	465	470
			G23	522.5	527.5	B45	467.5	472.5
			G8	525	530	B5	470	475
			G45	527.5	532.5			
			G9	530	535			

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

## ORDER CODE TABLE

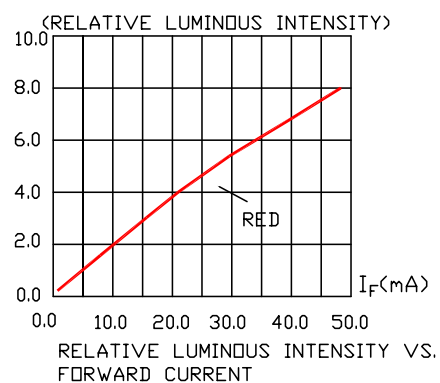
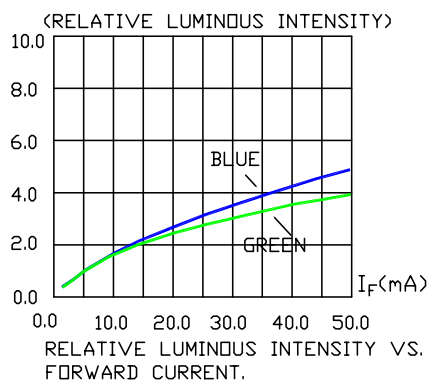
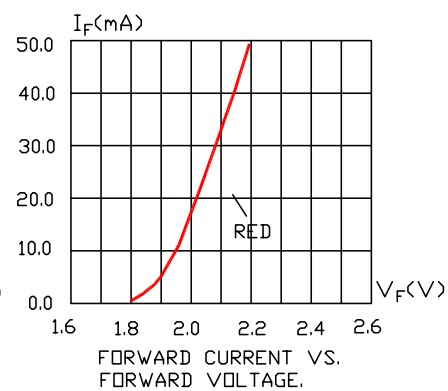
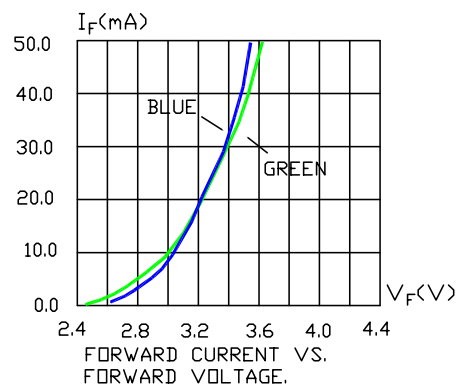
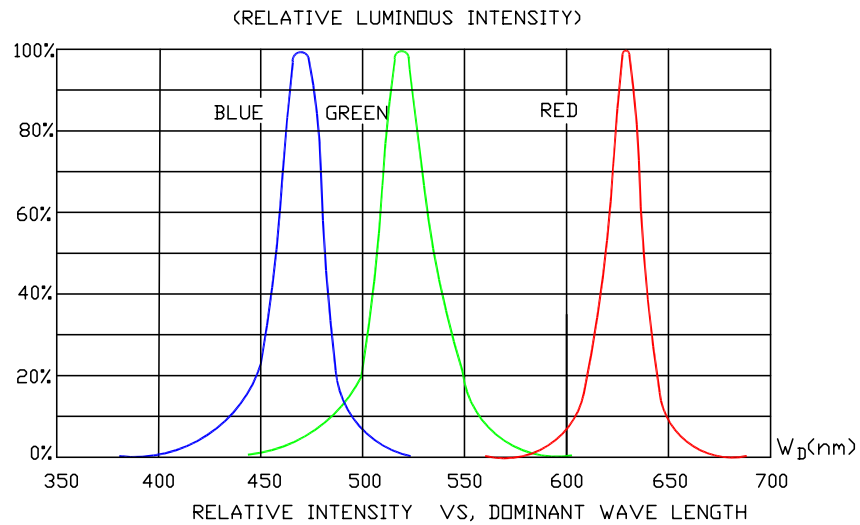
Kit Number	Color	Luminous Intensity (mcd)		Dominant Wavelength (nm)				Package
		Min.	Max.	Color Bin	Min.(nm)	Color Bin	Max. (nm)	
CLMUD-FKA-CL83c3b78bcL6L8BB79453	Red	36	81	RB	619	RB	624	Reel
	Green	126	252	G7	520	G9	535	Reel
	Blue	22	45	B4	465	B5	475	Reel
CLMUD-FKA-CL81781L61BB7C4S3	Red	Any 1 Intensity bin from L8(36) - 3c3b(81)		RB	619	RB	624	Reel
	Green	Any 1 Intensity bin from 78(126) - bc(252)		Any 1 hue bin from G7(520)-G9(535)				Reel
	Blue	Any 1 Intensity bin from L6(22) - L8(45)		Any 1 hue bin from B4(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.

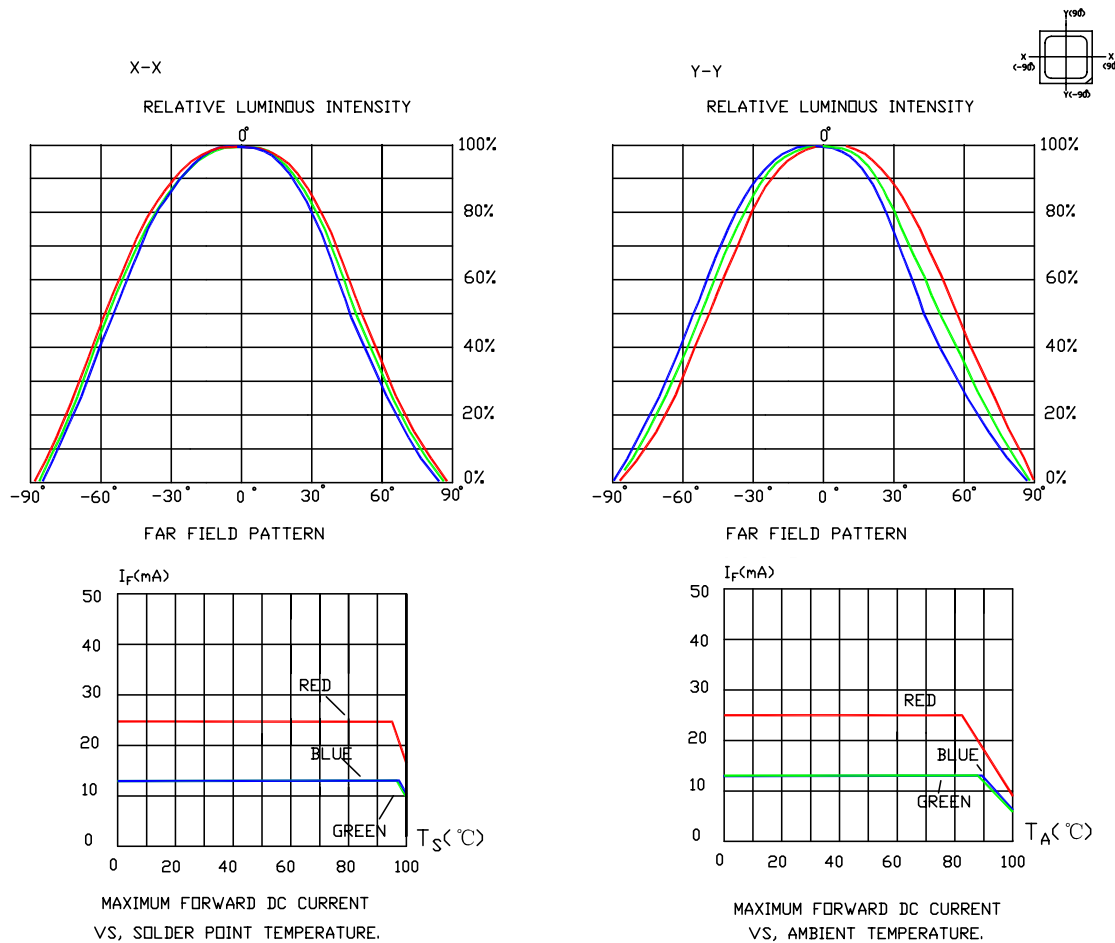
## GRAPHS

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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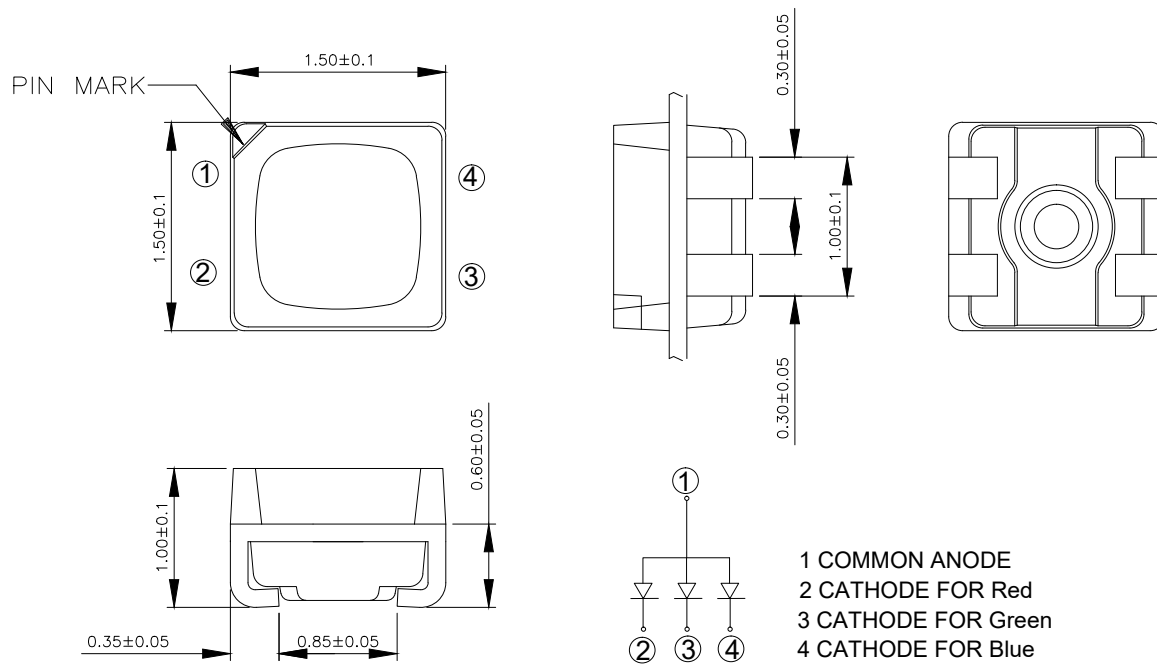


The graph shows the maximum allowable DC current for a LED die of each color.

## MECHANICAL DIMENSIONS

All dimensions are in mm.

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



## 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.

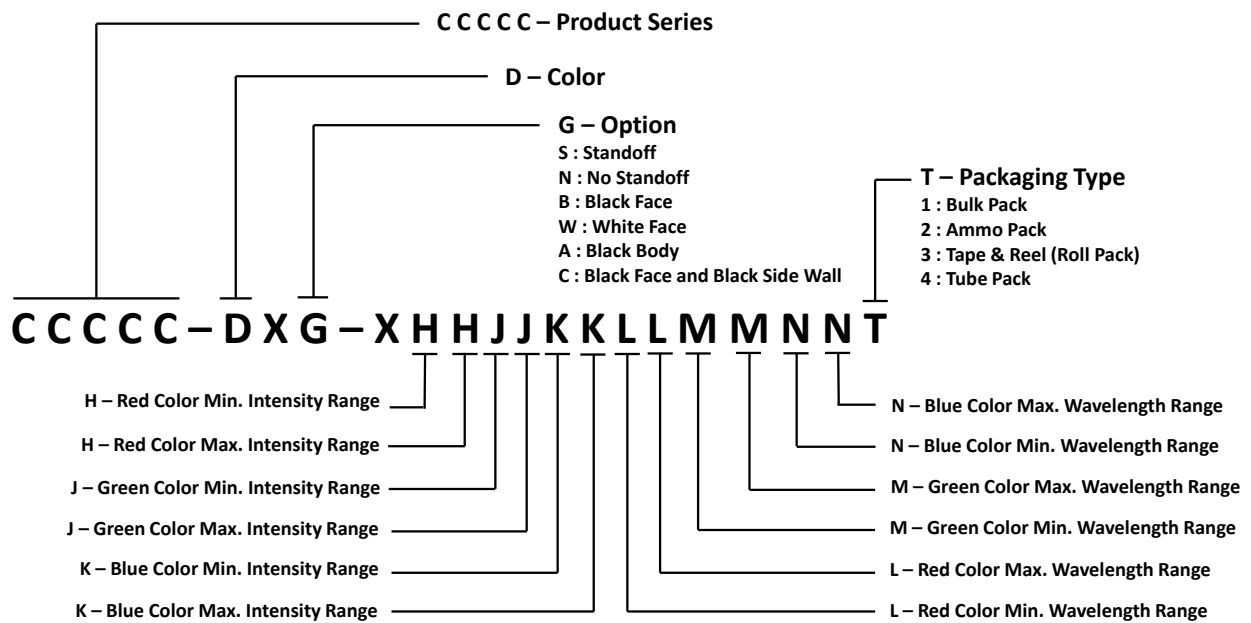
### Vision Advisory

**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.

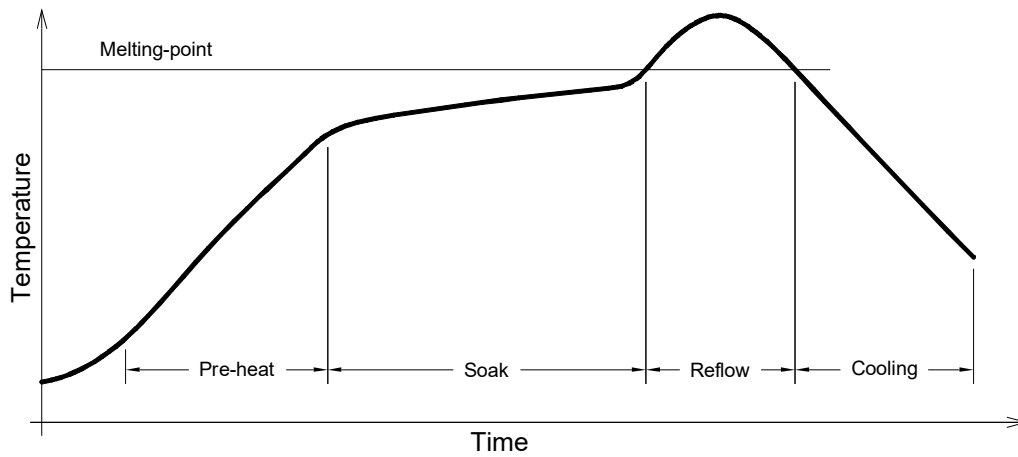
Cree LEDs are sold by order codes in combinations of bins called kits. Order codes are configured in the following manner:





## REFLOW SOLDERING

- The CLMUD-FKA 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/ $80^{\circ}\text{C}$  is required when exceeding 24 hours.
- Note that baking must only be done once.
- The temperature profile is as below.

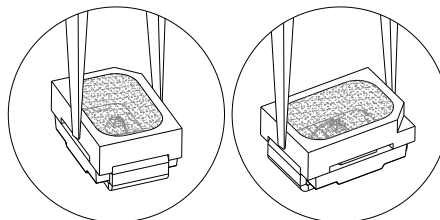


Use only with CLMUD-FKA

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

