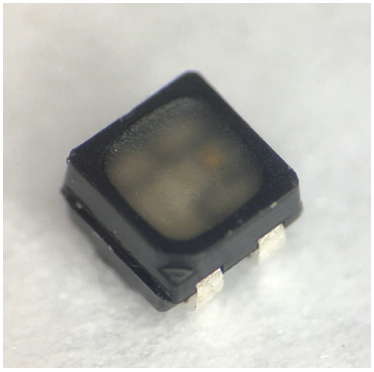
CLD-CT1421.002

Cree® PLCC4 3 in 1 RGB SMD LED CLMUD-FKA



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 PLCC full-color RGB LEDs are suited for indoor video screen, decorative lighting and amusement applications.

FEATURES

- Size (mm):1.5x 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

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ABSOLUTE MAXIMUM RATINGS (T_A = 25°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	60	50	50	mW
Operation Temperature	T_{opr}	-40 ~ +85			°C
Storage Temperature	T_{stg}	-40 ~ +100			°C
Junction Temperature	T_J	110	110	110	°C
Junction/ambient	R_{THJA}	460	430	410	°C/W
Junction/solder point	R_{THJS}	250	270	250	°C/W

Note: 1.Single-color light.
2.Pulse width ≤0.1 msec, duty ≤1/10.

TYPICAL ELECTRICAL & OPTICAL CHARACTERISTICS (T_A = 25°C)

Characteristics	Condition	Symbol	Values			Unit
			R	G	B	
Dominant Wavelength	I_F = 5 mA	λ_{DOM}	619~624	520~535	465~475	nm
Spectral bandwidth at 50% I_{REL} max	I_F = 5 mA	Δ λ	16	28	19	nm
Forward Voltage	I_F = 5 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 mA	$I_{V(min)}$	36	126	22	mcd
		$I_{V(avg)}$	54	180	30	mcd
Luminous Intensity(Reference)	I_F = 20/10/10 mA	$I_{V(avg)}$	215	260	45	mcd
Reverse Current (max)	V_R = 5 V	I_R	10	10	10	μA

Note: Continuous reverse voltage can cause LED damage.

INTENSITY BIN LIMIT (I_F = 5 mA)

Red

Bin Code	Min.(mcd)	Max.(mcd)
L8	36	45
3g3f	41	51
L9	45	56
3e3d	51	64
L	56	71
3c3b	64	81

Green

Bin Code	Min.(mcd)	Max.(mcd)
78	126	160
D	140	180
9a	160	202
E	180	224
bc	202	252

Blue

Bin Code	Min.(mcd)	Max.(mcd)
L6	22	28
3m3k	25	32
L7	28	36
3j3h	32	41
L8	36	45

Tolerance of measurement of luminous intensity is ±10%.

COLOR BIN LIMIT (I_F = 5 mA)

Red

Bin Code	Min.(nm)	Max.(nm)
RB	619	624

Green

Bin Code	Min.(nm)	Max.(nm)
G7	520	525
G23	522.5	527.5
G8	525	530
G45	527.5	532.5
G9	530	535

Blue

Bin Code	Min.(nm)	Max.(nm)
B4	465	470
B45	467.5	472.5
B5	470	475

Tolerance of measurement of dominant wavelength is ±1 nm.

ORDER CODE TABLE*

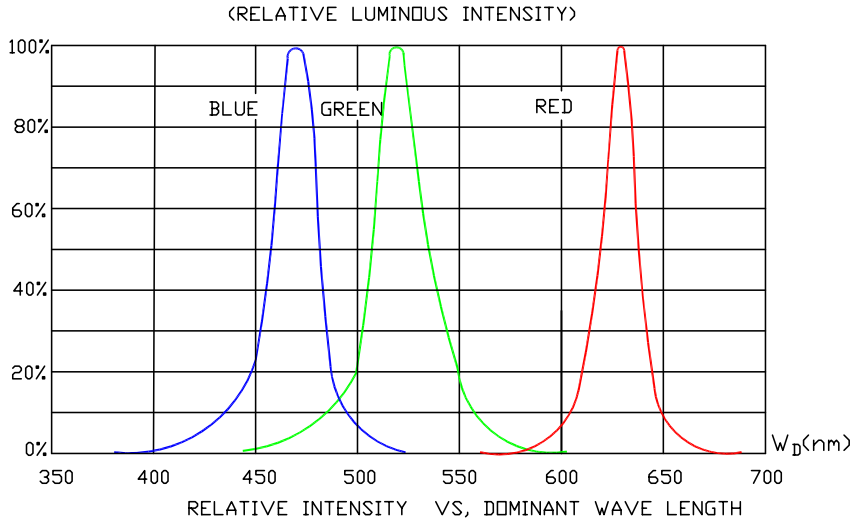
Kit Number	Color	Luminous Intensity (mcd)		Dominant Wavelength (nm)				Package
		Min.	Max.	Color Bin	Min. (nm)	Color Bin	Max. (nm)	
CLMUD-FKA-CL83c3b78bcL6L8BB79453	Red	36	81	RB	619	RB	624	Reel
	Green	126	252	G7	520	G9	535	Reel
	Blue	22	45	B4	465	B5	475	Reel
CLMUD-FKA-CL81781L61BB7C4S3	Red	Any 1 Intensity 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:
1. The above kit numbers represent the order codes which include multiple intensity-bin and color-bin codes. Only one intensity-bin code and one color-bin code will be shipped on each reel. Single intensity-bin code and single color-bin code will be orderable in certain quantities.
2. For example, any 1 intensity-bin from 78 - bc means only 1 intensity-bin (78 or D or 9a or E or bc) will be shipped by Cree.
3. For example, any 1 color-bin from G7 - G9 means only 1 color-bin (G7 or G23 or G8 or G45 or G9) will be shipped by Cree.
4. Please refer to the "Cree LED Lamp Reliability Test Standards" document [#1] for reliability test conditions.
5. Please refer to the "Cree LED Lamp Soldering & Handling" document[#2] for information about how to use this LED product safely.

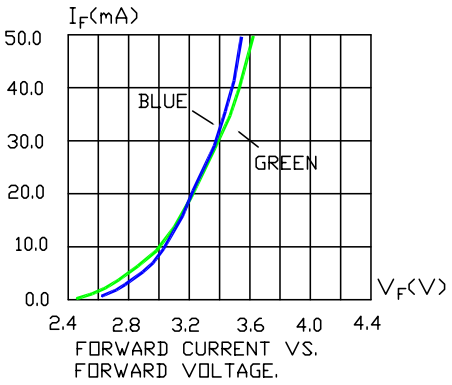
#1: Refer to http://www.cree.com/led-components/media/documents/LED_Lamp_Reliability_Test_Standard.pdf

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

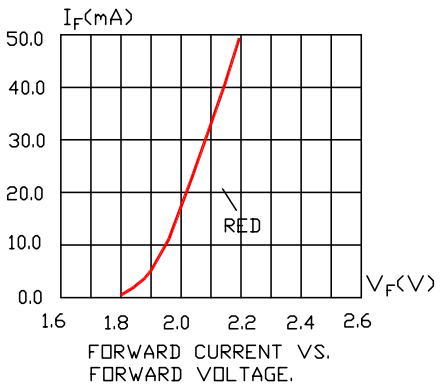
GRAPHS



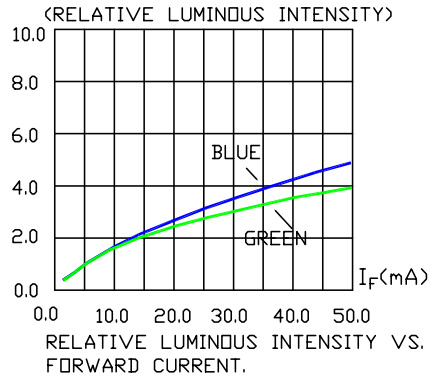
RELATIVE INTENSITY VS, DOMINANT WAVE LENGTH



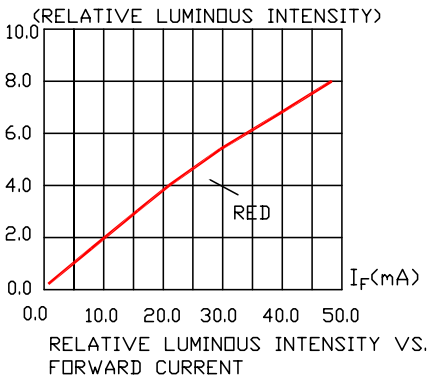
FORWARD CURRENT VS.
FORWARD VOLTAGE.



FORWARD CURRENT VS.
FORWARD VOLTAGE.



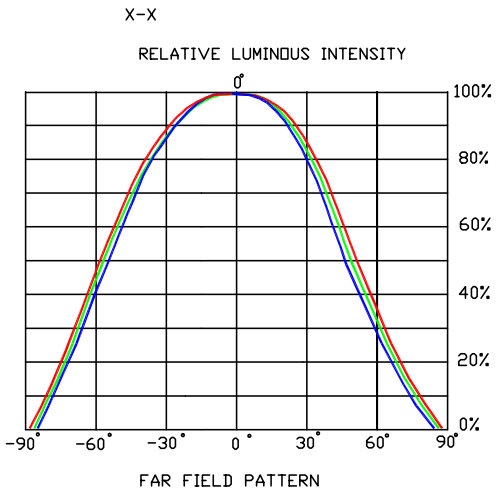
RELATIVE LUMINOUS INTENSITY VS.
FORWARD CURRENT.



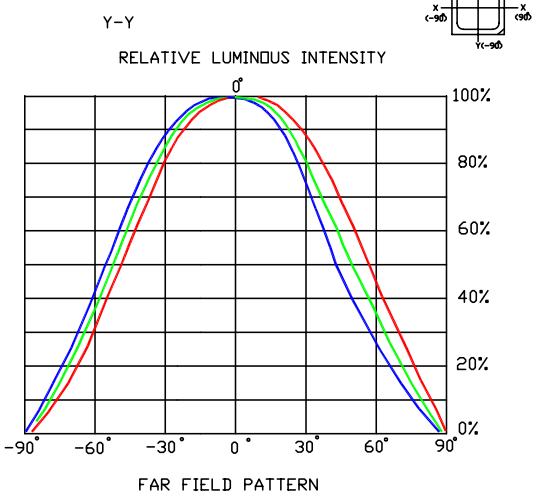
RELATIVE LUMINOUS INTENSITY VS.
FORWARD CURRENT

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.

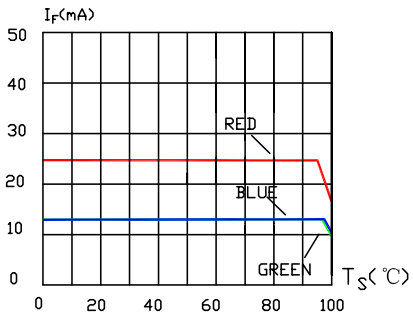
GRAPHS



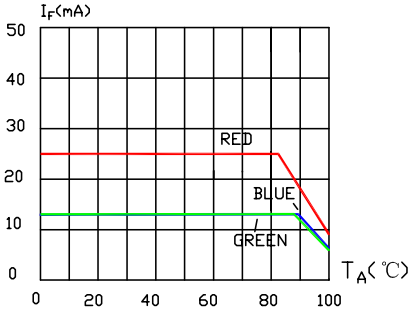
FAR FIELD PATTERN



FAR FIELD PATTERN



MAXIMUM FORWARD DC CURRENT
VS, SOLDER POINT TEMPERATURE.



MAXIMUM FORWARD DC CURRENT
VS, AMBIENT TEMPERATURE.

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

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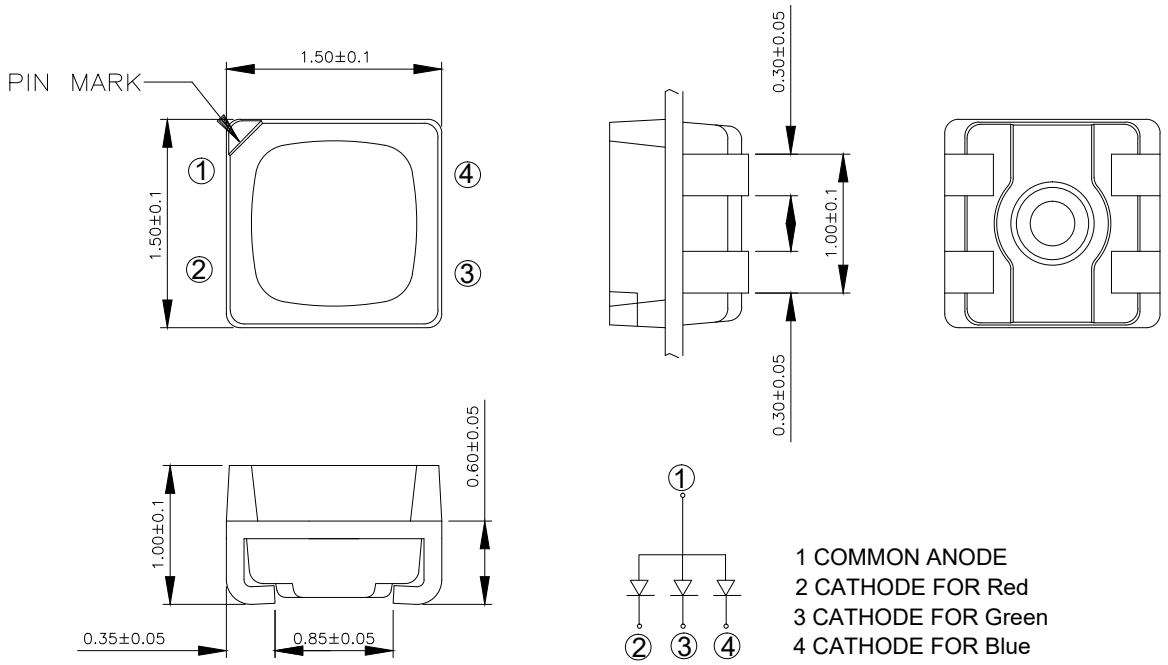
MECHANICAL DIMENSIONS

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.

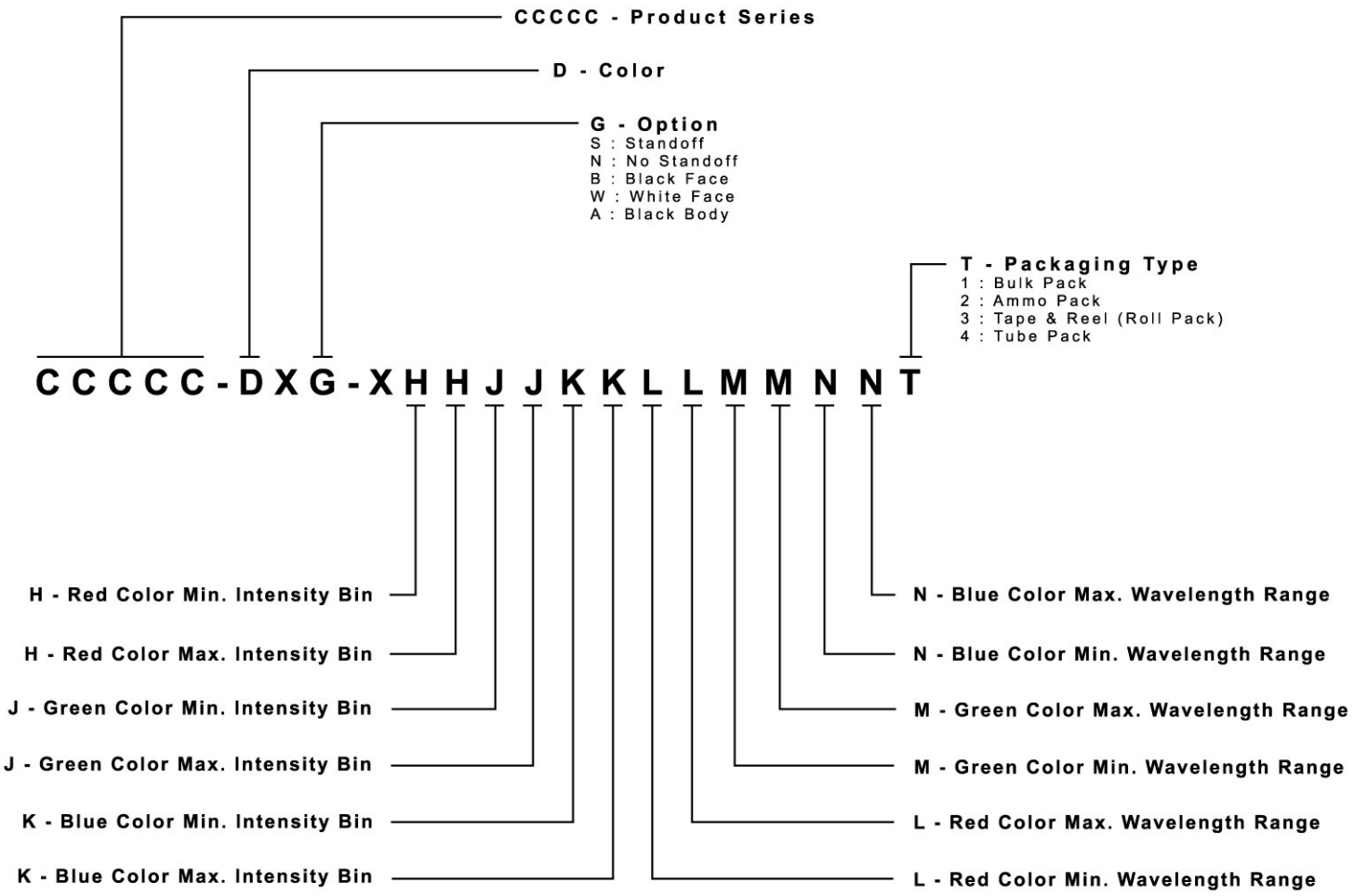
Vision Advisory Claim

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

KIT NUMBER SYSTEM

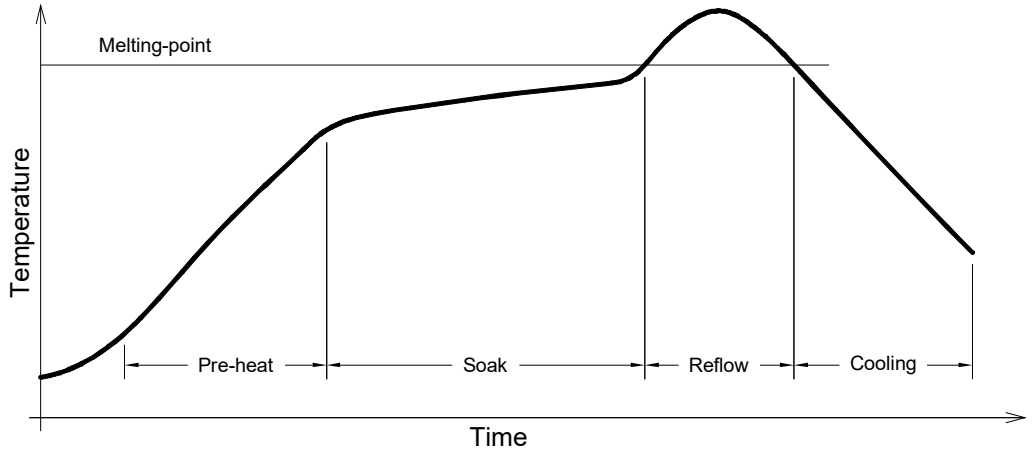
Cree LED lamps are tested and sorted into performance bins. A bin is specified by ranges of color, forward voltage, and brightness. Sorted LEDs are packaged for shipping in various convenient options. Please refer to the "Cree LED Lamp Packaging Standard" document for more information about shipping 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 CLMUD-FKA is rated as a MSL 5a product.
- After opening the sealed bag,the SMD LED must be stored under the condition<30ºC and<60%RH. Under these conditions,the SMD LEDs must be used (subject to reflow) within 24 hours after bag opening, and baking 24-hour/80ºC is required when exceeding 24 hours.
- Note that baking must only be done once.
- The temperature profile is as below.



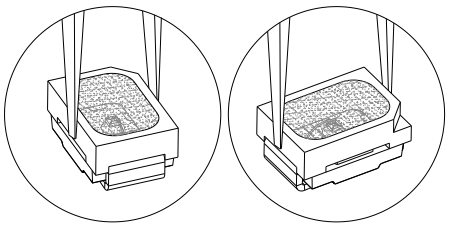
Use only with CLMUD-FKA

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