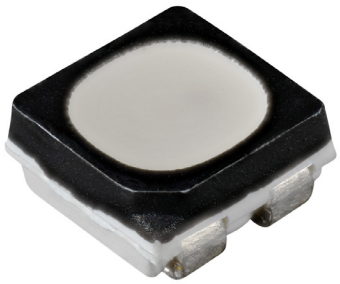
CLMVH-FKC: PLCC4 3 in 1 SMD LED



PRODUCT DESCRIPTION

The CLMVH-FKC full-color RGB LED delivers reliable high-intensity light output and a wide viewing angle, making it a solid choice for a broad range of applications. Its compact 2.1mm x 2.1mm package enables high-resolution screens and is built to perform across a variety of pitches. This LED provides dependable performance and versatility for indoor video screens, decorative lighting, and amusement applications—delivering strong value for cost-conscious projects without major compromises on quality.

FEATURES

- Size (mm): 2.1 x 2.1
- Typical pitch range: 2 mm - 4 mm
- NIT level: see Page 3
- Dominant Wavelength
  Red (619 - 624nm)
  Green (524 - 528nm)
  Blue (468 - 472nm)
- Luminous Intensity (mcd)
  Red (104 - 132.2)@ 8mA
  Green (355 - 435.5)@ 5mA
  Blue (60 - 78)@ 3mA
- Lead-Free
- RoHS Compliant
- Matte Surface

APPLICATIONS

- Full-Color Video Screen
- Decorative Lighting
- Amusement

Cree LED / 4001 E. Hwy. 54, Suite 2000 / Durham, NC 27713 USA / +1.919.313.5330 / www.cree-led.com

TABLE OF CONTENTS

TYPICAL NIT LEVEL

Typical Nit level in context of pitch and scan rate

Screen Pitch	Scan Rates		
	1/8	1/16	1/32
P2	11700	5850	2900
P2.5	7450	3750	1850
P3	5200	2600	1300
P3.5	3800	1900	950
P3.9	3050	1550	750

Notes

- Estimated Nits
- 8/5/3 mA current

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Items	Symbol	Absolute Maximum Rating			Unit
		R	G	B	
Forward Current Note 1	I_F	8	5	5	mA
Peak Forward Current Note 2	I_{FP}	25	15	15	mA
Reverse Voltage	V_R	10	10	10	V
Power Dissipation	P_D	40	15	15	mW
Operation Temperature	T_{opr}	-40 ~ +85			°C
Storage Temperature	T_{stg}	-40 ~ +100			°C
Junction Temperature	T_J	115	115	115	°C
Junction/ambient 1 chip on	R_{THJA}	380	770	620	°C/W
Junction/solder point 1 chip on	R_{THJS}	330	710	560	°C/W
Electrostatic Discharge Classification (MIL-STD-883E)	ESD	2000	1000	1000	V

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 = 8mA(R) I_F = 5mA(G) I_F = 3mA(B)	λ_{DOM}	617~625	515~535	460~475	nm
Spectral bandwidth at 50% I_{REL} max	I_F = 8mA(R) I_F = 5mA(G) I_F = 3mA(B)	$\Delta\lambda$	18	30	20	nm
Forward Voltage	I_F = 8mA(R) I_F = 5mA(G) I_F = 3mA(B)	$V_{F(min)}$	1.7	2.5	2.5	V
		$V_{F(max)}$	2.5	3.1	3.1	V
Luminous Intensity	I_F = 8mA(R) I_F = 5mA(G) I_F = 3mA(B)	$I_{V(min)}$	104	355	60	mcd
		$I_{V(avg)}$	115	400	70	mcd
Luminous Intensity(Reference)	I_F = 15/10/10mA(R/G/B)	$I_{V(avg)}$	230	715	240	mcd
Reverse Current (max)	V_R = 10 V	I_R	0.5	0.5	0.5	μA

* Continuous reverse voltage can cause LED damage.

INTENSITY BIN LIMIT

Red (8 mA)			Green (5 mA)			Blue (3 mA)		
Bin Code	Min.(mcd)	Max.(mcd)	Bin Code	Min.(mcd)	Max.(mcd)	Bin Code	Min.(mcd)	Max.(mcd)
5b	104	132.2	e5	335	435.5	3d1	60	78

* Tolerance of measurement of luminous intensity is ±10%.

COLOR BIN LIMIT

Red (8 mA)			Green (5 mA)			Blue (3 mA)		
Bin Code	Min.(nm)	Max.(nm)	Bin Code	Min.(nm)	Max.(nm)	Bin Code	Min.(nm)	Max.(nm)
RB	619	624	g5z	524	528	b4b	468	472

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

ORDER CODE TABLE

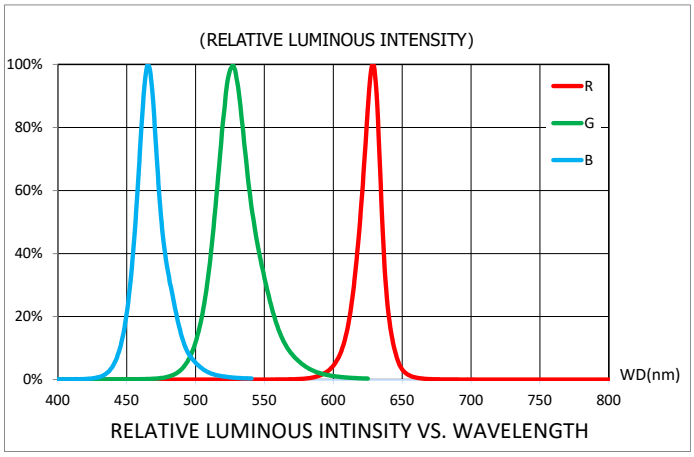
Kit Number	Color	Luminous Intensity (mcd)				Dominant Wavelength (nm)				Package
		Color Bin	Min. (mcd)	Color Bin	Max. (mcd)	Color Bin	Min. (nm)	Color Bin	Max. (nm)	
CLMVH-FKC-C5be53d1RBg5zb4b3	Red	5b	104	5b	132.2	RB	619	RB	624	Reel
	Green	e5	355	e5	435.5	g5z	524	g5z	528	Reel
	Blue	3d1	60	3d1	78	b4b	46	b4b	472	Reel

Notes:

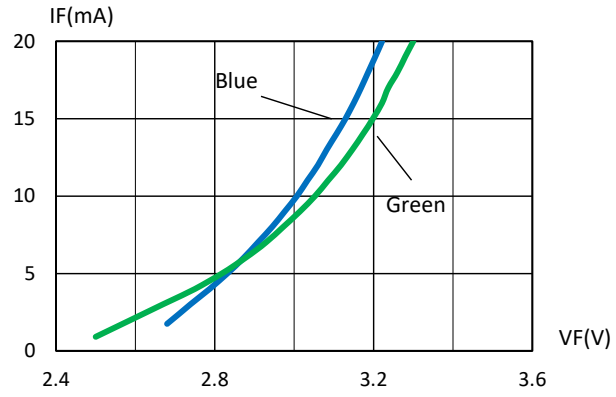
- The above kit numbers represent order codes that include multiple intensity-bin and color-bin codes. Only one intensity-bin code and one color-bin code will be shipped on each bulk. Single intensity-bin code and single color-bin codes will not be orderable.
- Please refer to the HB LED Lamp Reliability 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

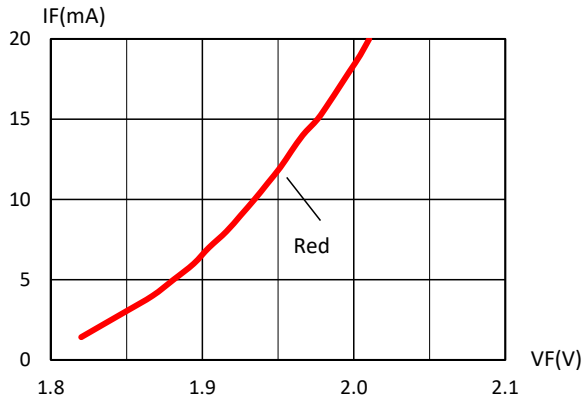
The data below are collected from statistical figures that do not necessarily correspond to the actual parameters of each single LED. Hence, these data will be changed without further notice.



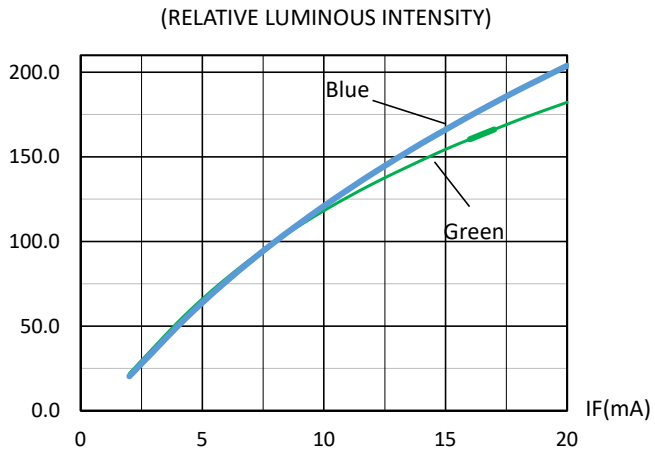
RELATIVE LUMINOUS INTINSITY VS. WAVELENGTH



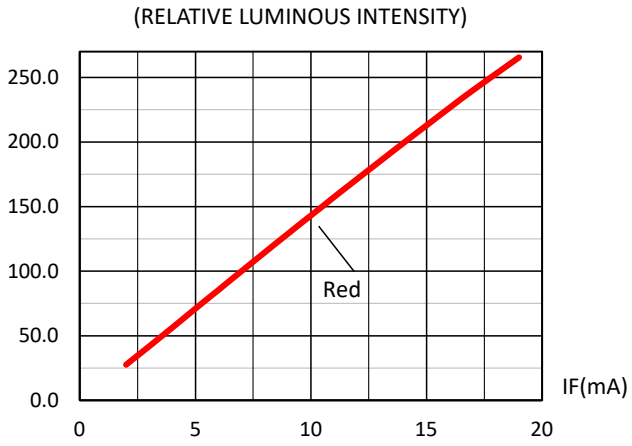
FORWARD CURRENT VS.
FORWARD VOLTAGE.



FORWARD CURRENT VS.
FORWARD VOLTAGE.



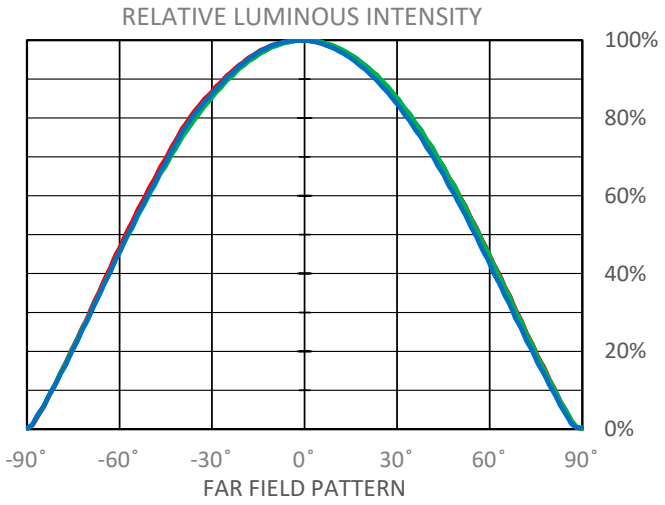
FORWARD LUMINOUS INTENSITY VS.
FORWARD CURRENT

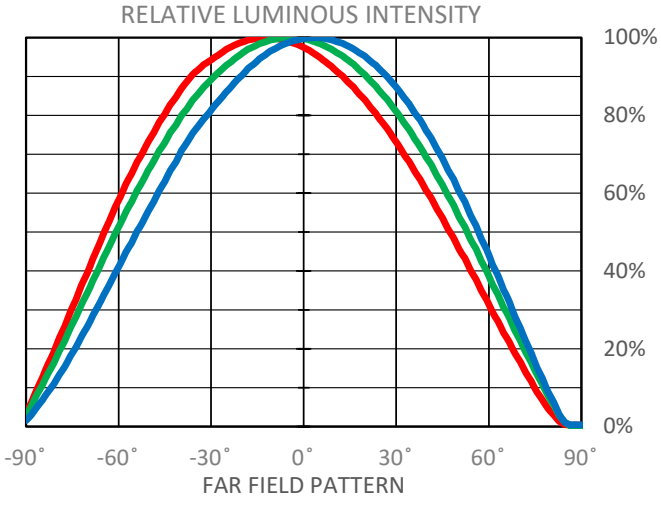


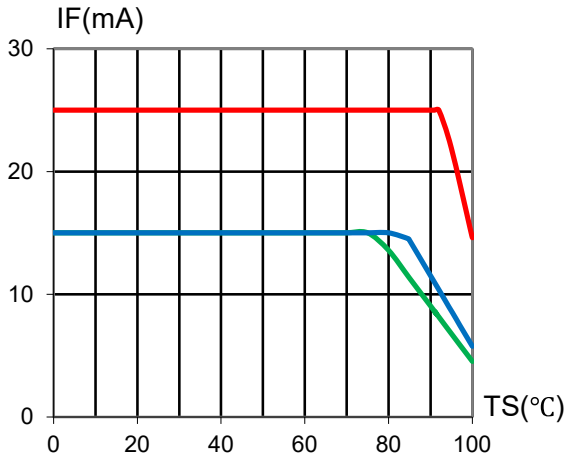
FORWARD LUMINOUS INTENSITY VS.
FORWARD CURRENT

GRAPHS

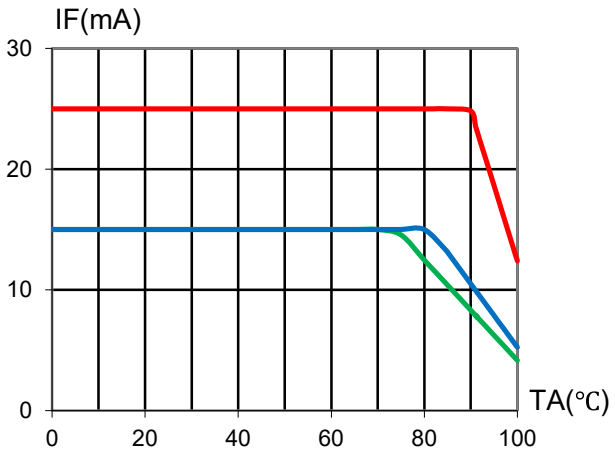
The data below are collected from statistical figures that do not necessarily correspond to the actual parameters of each single LED. Hence, these data will be changed without further notice.







MAXIUN FORWARD DC CURRENT VS,
SOLDER POINT TEMPERATURE.

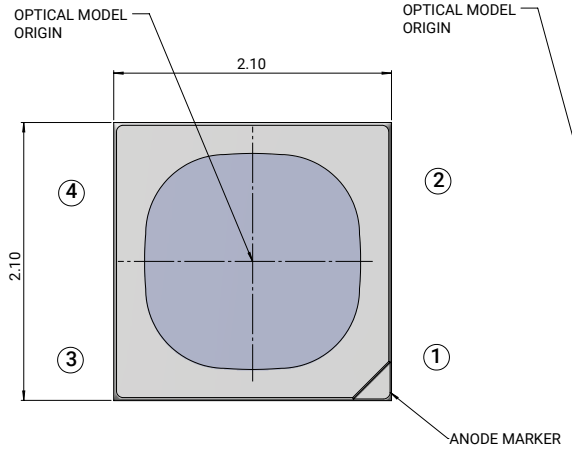


MAXIUN FORWARD DC CURRENT VS,
AMBIENT POINT TEMPERATURE.

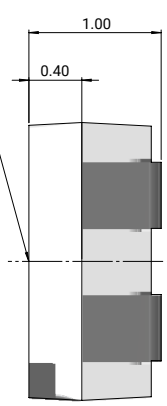
MECHANICAL DIMENSIONS

All dimensions are in mm.

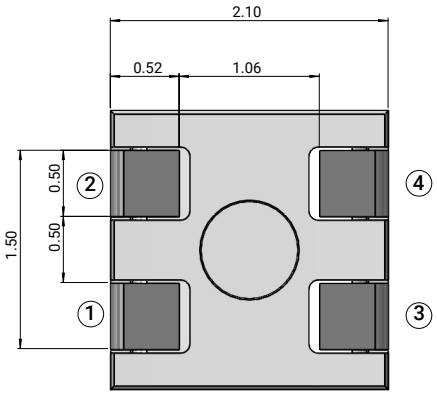
Tolerance of measurement of the dimension is ±0.1.



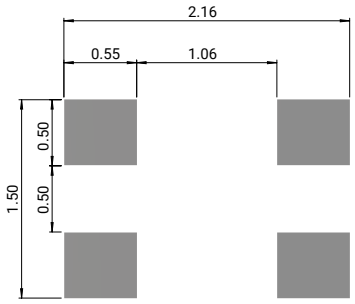
TOP VIEW



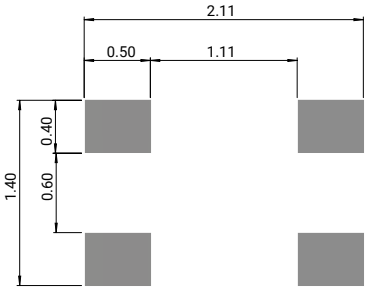
SIDE VIEW



BOTTOM VIEW



RECOMMENDED PCB FOOTPRINT



RECOMMENDED STENCIL OPENING

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.

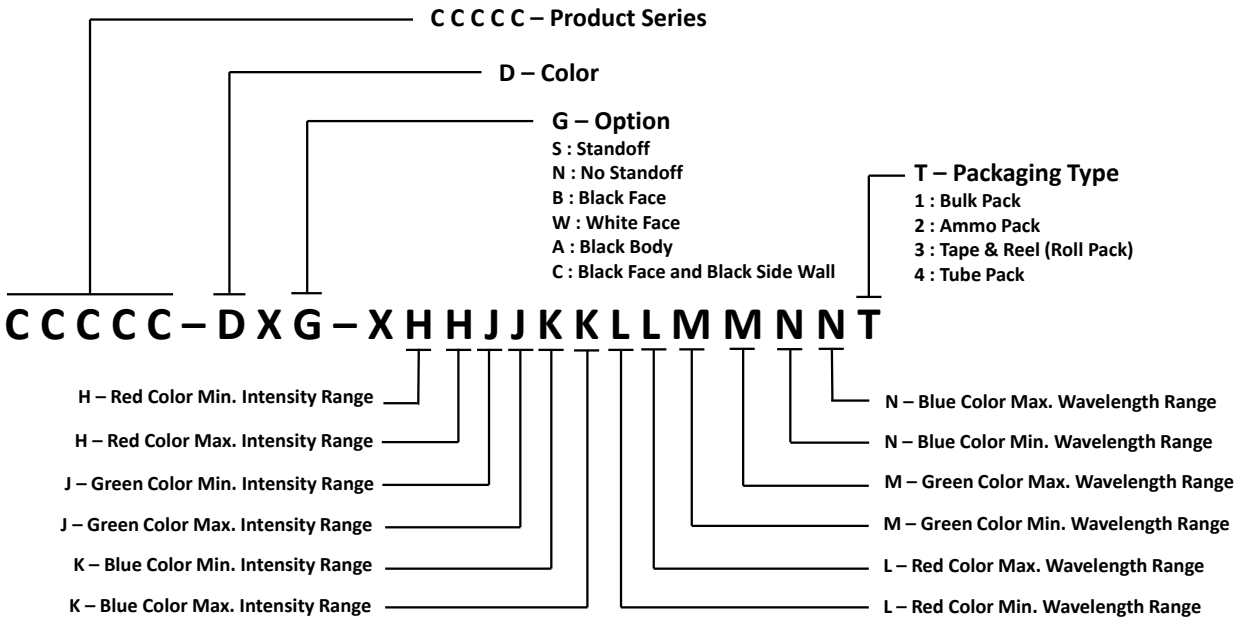
Vision Advisory

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

KIT NUMBER SYSTEM

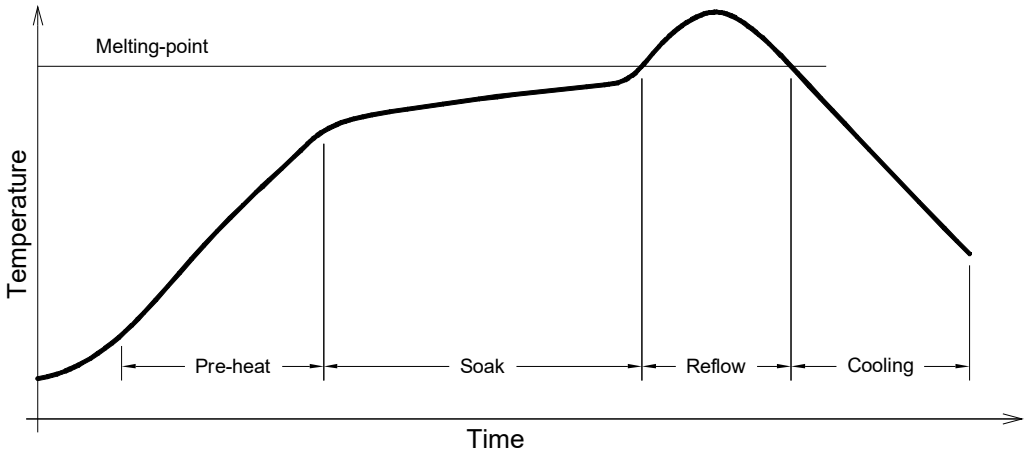
Cree LED lamps are tested and sorted into performance bins. A bin is specified by ranges of color, forward voltage, and brightness.

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



REFLOW SOLDERING

- The CLMVH-FKC 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.

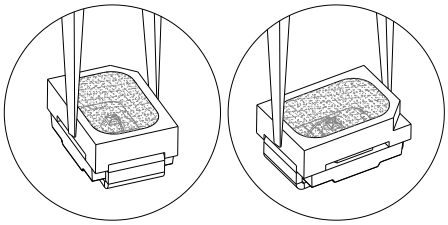


Use only with CLMVH-FKC

Solder
Average ramp-up rate = 4 ºC/second max.
Soak temperature = 183-217ºC
Soak time = 120 seconds max.
Duration above 217 ºC = 60 seconds max.
Peak temperature = 230-240ºC max
Time within 5 ºC of peak temperature = 10 seconds max.
Ramp-down rate = 6 ºC/second 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 17000 pcs per reel and 2 reels per bag.