CLMVH-FKA: PLCC4 3 in 1 SMD LED

PRODUCT DESCRIPTION

The CLMVH-FKA 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 (618.5 - 623.5nm)
  Green (519.5 - 532nm)
  Blue (464 - 472nm)
- Luminous Intensity (mcd)
  Red (53.1 - 69)@ 8mA
  Green (150 - 210)@ 5mA
  Blue (18 - 33.3)@ 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

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TYPICAL NIT LEVEL

Typical Nit level in context of pitch and scan rate

Screen Pitch	Scan Rates		
	1/8	1/16	1/32
P2	6200	3100	1550
P2.5	3950	2000	1000
P3	2750	1400	700
P3.5	2000	1000	500
P3.9	1650	800	400

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}	70	50	50	mA
Reverse Voltage	V_R	10	10	10	V
Power Dissipation	P_D	25	15	15	mW
Operation Temperature	T_{opr}	-40 ~ +100			°C
Storage Temperature	T_{stg}	-40 ~ +100			°C
Junction Temperature	T_J	110	110	110	°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}	618.5~623.5	519.5~532	464~472	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
		$V_{F(max)}$	2.3	3.1	3.1	V
Luminous Intensity	I_F = 8mA(R) I_F = 5mA(G) I_F = 3mA(B)	$I_{V(min)}$	53.1	150	20	mcd
		$I_{V(avg)}$	61	180	26	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)
3e2	53.1	69	7c	150	195	3q3	18	23.4
			7d	161.5	210	3n3	22.7	29.5
						3m2	25.6	33.3

* 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)
Rm	618.5	623.5	g6d	519.5	523.5	b4d	464	468
			g5z	524	528	b4c	467	471
			g6e	528	532	b4b	468	472

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

ORDER CODE TABLE

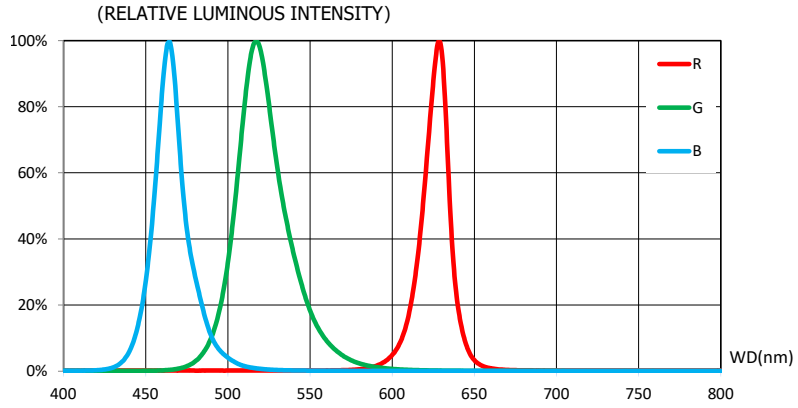
Kit Number	Color	Luminous Intensity (mcd)				Dominant Wavelength (nm)				Package
		Color Bin	Min. (mcd)	Color Bin	Max. (mcd)	Color Bin	Min. (nm)	Color Bin	Max. (nm)	
CLMVH-FKA-V3e27d3n3Rmg6db4c3	Red	3e2	53.1	3e2	69	Rm	618.5	Rm	623.5	Reel
	Green	7d	161.5	7d	210	g6d	519.5	g6d	523.5	
	Blue	3n3	22.7	3n3	29.5	b4c	467	b4c	471	
CLMVH-FKA-V3e27c3q3Rmg5zb4d3	Red	3e2	53.1	3e2	69	Rm	618.5	Rm	623.5	Reel
	Green	7c	150	7c	195	g5z	524	g5z	528	
	Blue	3q3	18	3q3	23.4	b4d	464	b4d	468	
CLMVH-FKA-V3e27c3m2Rmg6eb4b3	Red	3e2	53.1	3e2	69	Rm	618.5	Rm	623.5	Reel
	Green	7c	150	7c	195	g6e	528	g6e	532	
	Blue	3m2	25.6	3m2	33.3	b4b	468	b4b	472	

Notes:

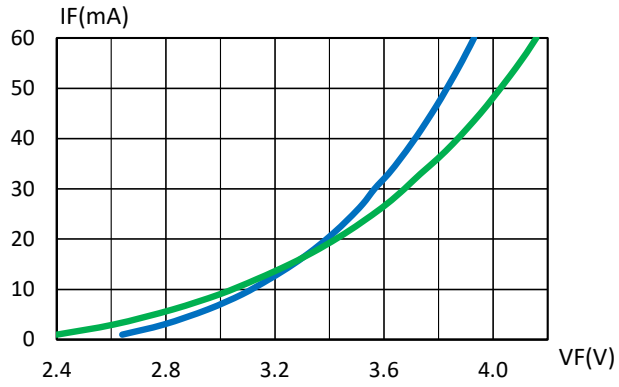
- The above kit numbers represent order codes that include multiple intensity-bin and color-bin codes. Only one intensity-bin code and one color-bin code will be shipped on each bulk. Single intensity-bin code and single color-bin codes will not be orderable.
- Please refer to the HB LED Lamp Reliability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

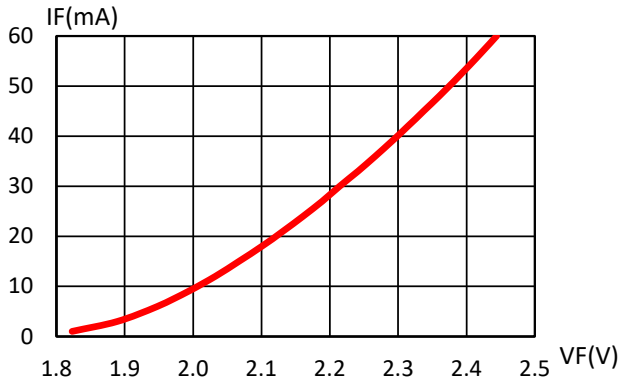
The data below are collected from statistical figures that do not necessarily correspond to the actual parameters of each single LED. Hence, these data will be changed without further notice.



RELATIVE LUMINOUS INTINSITY VS. WAVELENGTH



FORWARD CURRENT VS.
FORWARD VOLTAGE.



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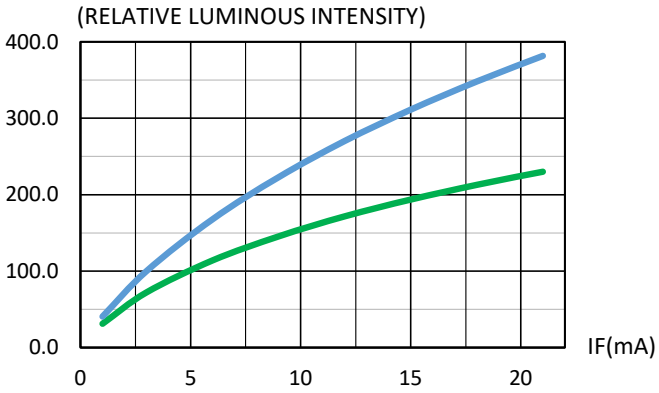
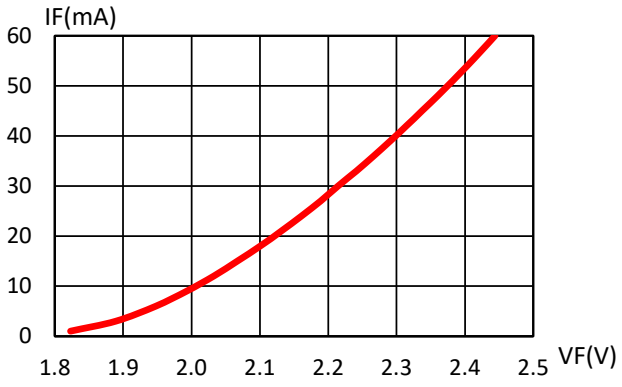
FORWARD VOLTAGE.



FORWARD LUMINOUS INTENSITY VS.
FORWARD CURRENT



FORWARD CURRENT VS.
FORWARD VOLTAGE.

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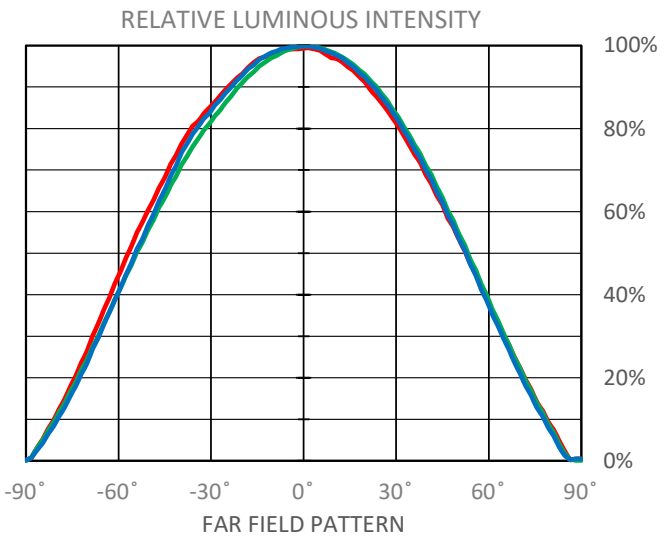
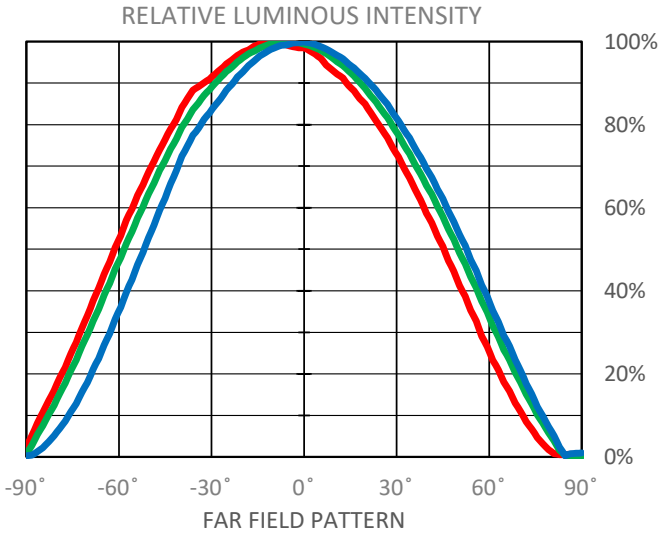
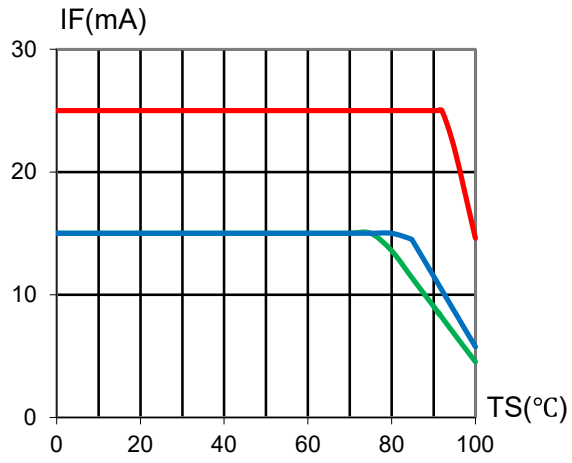
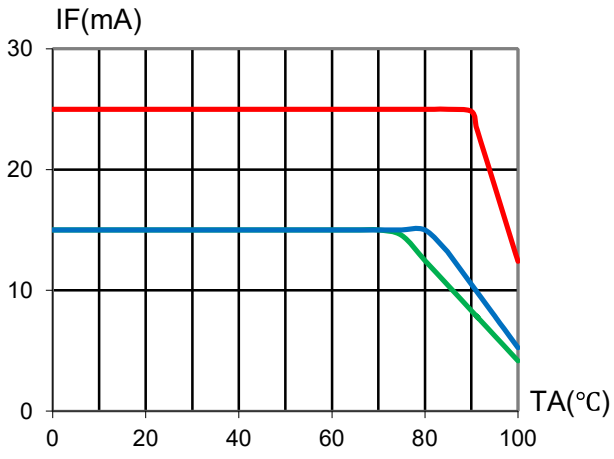






MAXIUN FORWARD DC CURRENT VS, SOLDER POINT TEMPERATURE.



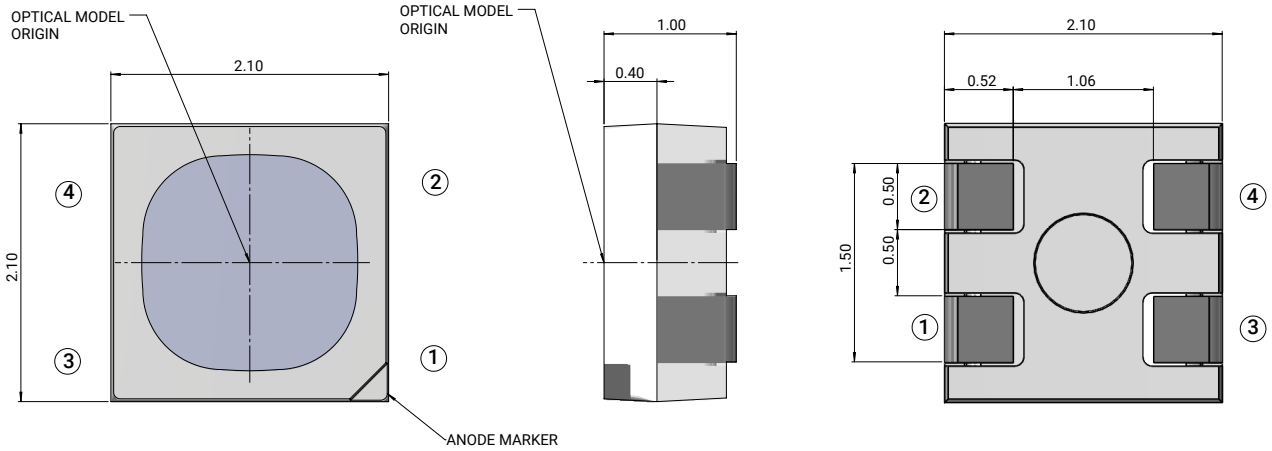
MAXIUN FORWARD DC CURRENT VS, AMBIENT POINT TEMPERATURE.

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

MECHANICAL DIMENSIONS

All dimensions are in mm.

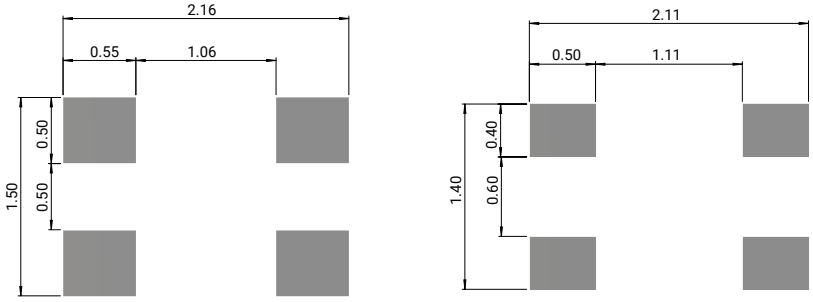
Tolerance of measurement of the dimension is ±0.1.



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.

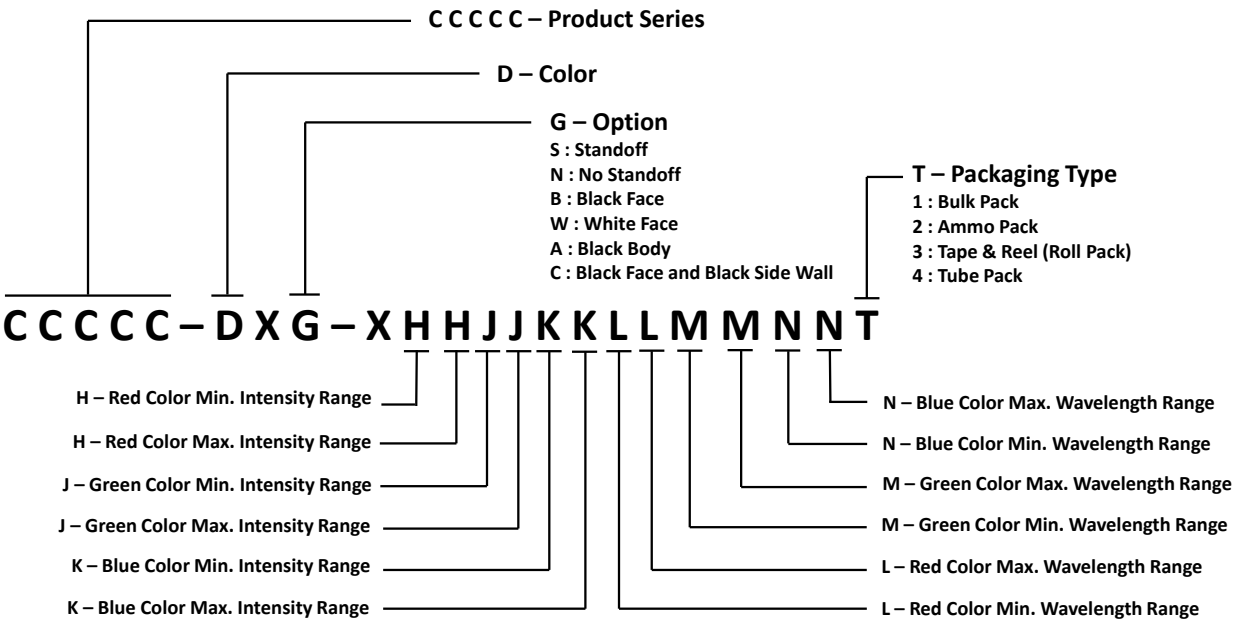
Vision Advisory

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

KIT NUMBER SYSTEM

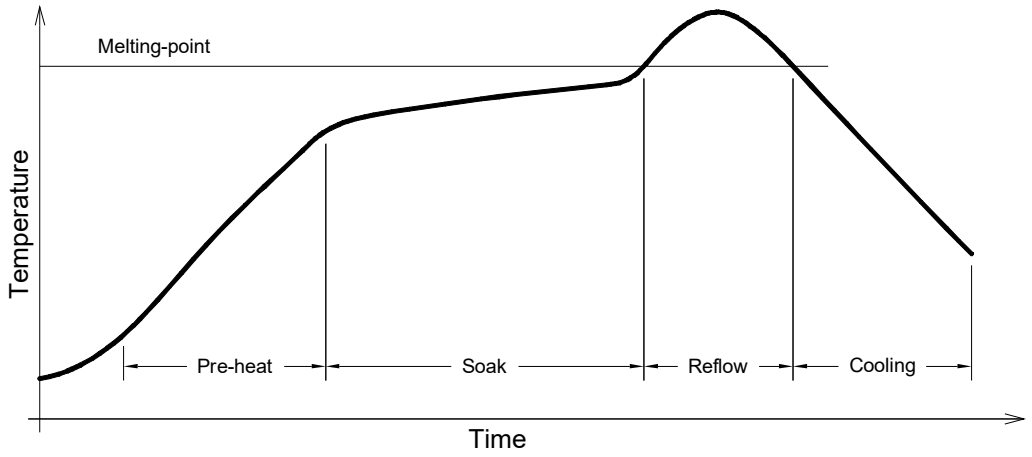
Cree LED lamps are tested and sorted into performance bins. A bin is specified by ranges of color, forward voltage, and brightness.

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-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.

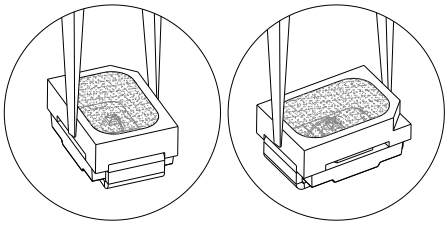


Use only with CLMVH-FKA

Solder
Average ramp-up rate = 4ºC/s max
Preheat temperature = 150ºC ~200ºC
Preheat time = 120s max
Ramp-down rate = 6ºC/s max
Peak temperature = 250ºC max
Time within 5ºC of actual Peak Temperature = 10s max
Duration above 217ºC 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 17000 pcs per reel, 2 reels per bag.