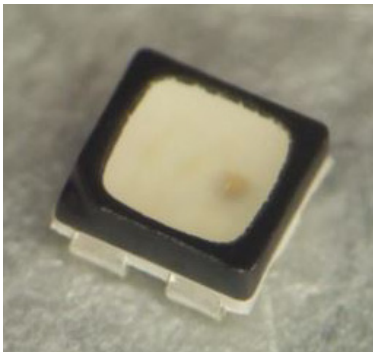
CLD-CT1402.002

Cree® PLCC4 3 in 1 RGB SMD LED CLMVC-FKC



PRODUCT DESCRIPTION

The CLMVC-FKC full-color RGB LED offers a high-intensity light output and a wide viewing angle. The compact 2mm x 2mm 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):2.0x 2.0
- Dominant Wavelength:
  Red (619 - 624nm)
  Green (520 - 540nm)
  Blue (460 - 470nm)
- Luminous Intensity (mcd)
  Red (280 - 560)@ 15mA
  Green (450 - 900)@ 10mA
  Blue (101 - 202)@ 10mA
- 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	65	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 1 chip on	R_{THJA}	350	490	430	°C/W
Junction/solder point 1 chip on	R_{THJS}	240	480	380	°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 = 15mA(R) I_F = 10mA(G) I_F = 10mA(B)	λ_{DOM}	619~624	520~540	460~470	nm
Spectral bandwidth at 50% I_{REL} max	I_F = 15mA(R) I_F = 10mA(G) I_F = 10mA(B)	Δ λ	24	38	28	nm
Forward Voltage	I_F = 15mA(R) I_F = 10mA(G) I_F = 10mA(B)	$V_{F(avg)}$	2.1	3.1	3.1	V
		$V_{F(max)}$	2.6	3.8	3.8	V
Luminous Intensity	I_F = 15mA(R) I_F = 10mA(G) I_F = 10mA(B)	$I_{V(min)}$	280	450	101	mcd
		$I_{V(avg)}$	420	650	145	mcd
Luminous Intensity(Reference)	I_F = 5/5/5mA	$I_{V(avg)}$	135	403	85	mcd
Reverse Current (max)	V_R = 5 V	I_R	10	10	10	μA

Note: Continuous reverse voltage can cause LED damage.

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INTENSITY BIN LIMIT (RED I_F = 15 mA, GREEN I_F = 10 mA, BLUE I_F = 10 mA)

Red

Bin Code	Min.(mcd)	Max.(mcd)
G	280	355
fg	318	403
H	355	450
hj	403	505
J	450	560

Green

Bin Code	Min.(mcd)	Max.(mcd)
J	450	560
km	505	635
K	560	710
np	635	805
M	710	900

Blue

Bin Code	Min.(mcd)	Max.(mcd)
56	101	126
C	112	140
78	126	160
D	140	180
9a	160	202

Tolerance of measurement of luminous intensity is ±10%.

COLOR BIN LIMIT (RED I_F = 15 mA, GREEN I_F = 10 mA, BLUE I_F = 10 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
G67	532.5	537.5
Ga	535	540

Blue

Bin Code	Min.(nm)	Max.(nm)
B3	460	465
B23	462.5	467.5
B4	465	470

Tolerance of measurement of dominant wavelength is ±1 nm.

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ORDER CODE TABLE*

Kit Number	Color	Luminous Intensity (mcd)		Dominant Wavelength (nm)				Package
		Min.	Max.	Color Bin	Min. (nm)	Color Bin	Max. (nm)	
CLMVC-FKC-CGJJM569aBB7a343	Red	280	560	RB	619	RB	624	Reel
	Green	450	900	G7	520	Ga	540	Reel
	Blue	101	202	B3	460	B4	470	Reel
CLMVC-FKC-CG1J1561BB7D3S3	Red	Any 1 Intensity bin from G(280) - J(560)		RB	619	RB	624	Reel
	Green	Any 1 Intensity bin from J(450) - M(900)		Any 1 hue bin from G7(520) - Ga(540)				Reel
	Blue	Any 1 Intensity bin from 56(101) - 9a(202)		Any 1 hue bin from B3(460) - B4(470)				Reel
CLMVC-FKC-CH1K1781BB7D3S3	Red	Any 1 Intensity bin from H(355) - J(560)		RB	619	RB	624	Reel
	Green	Any 1 Intensity bin from K(560) - M(900)		Any 1 hue bin from G7(520) - Ga(540)				Reel
	Blue	Any 1 Intensity bin from 78(126) - 9a(202)		Any 1 hue bin from B3(460) - B4(470)				Reel

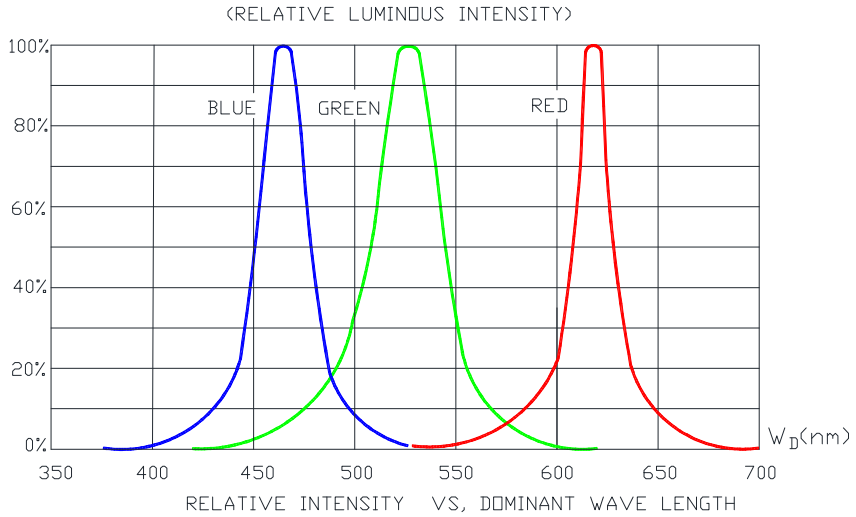
Notes:
1. The above kit numbers represent the order codes which include multiple intensity-bin and color-bin codes. Only one intensity-bin code and one color-bin code will be shipped on each reel. Single intensity-bin code and single color-bin code will be orderable in certain quantities.
2. For example, any 1 intensity-bin from J - M means only 1 intensity-bin (J or km or K or np or M) will be shipped by Cree.
3. For example, any 1 color-bin from G7 - Ga means only 1 color-bin (G7 or G23 or G8 or G45 or G9 or G67 or Ga) 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

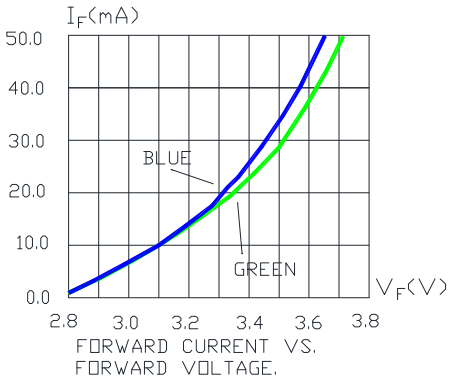
#2: Refer to http://www.cree.com/led-components/media/documents/sh-HB.pdf

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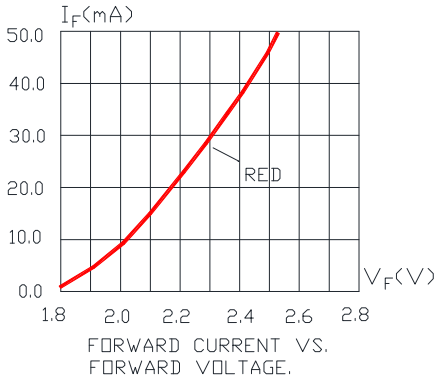
GRAPHS



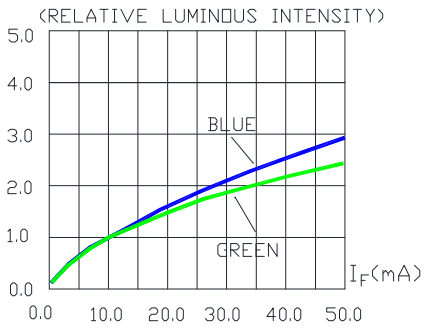
RELATIVE INTENSITY VS, DOMINANT WAVE LENGTH



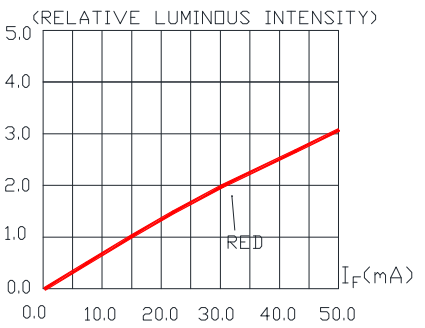
FORWARD CURRENT VS.
FORWARD VOLTAGE.



FORWARD CURRENT VS.
FORWARD VOLTAGE.



RELATIVE LUMINOUS INTENSITY VS.
FORWARD CURRENT.

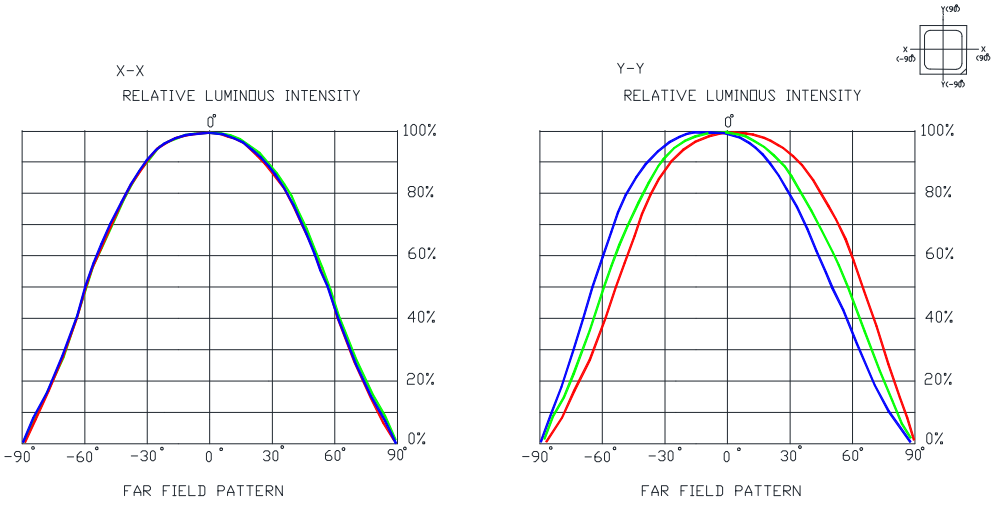


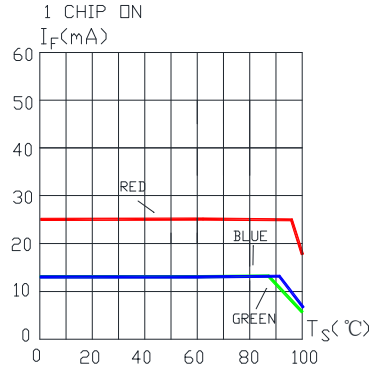
RELATIVE LUMINOUS INTENSITY VS.
FORWARD CURRENT

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.

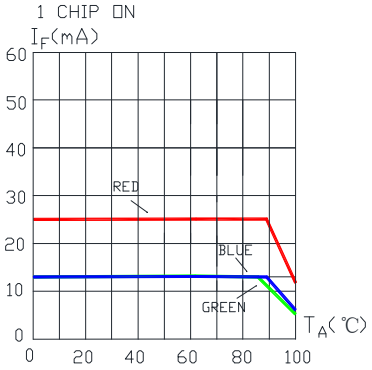
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GRAPHS





MAXIMUM FORWARD DC CURRENT
VS, SOLDER POINT TEMPERATURE.



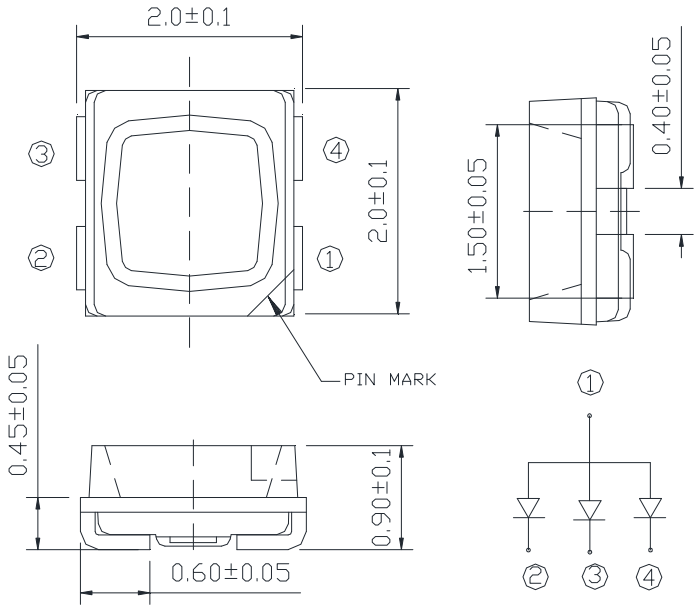
MAXIMUM FORWARD DC CURRENT
VS, AMBIENT TEMPERATURE.

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.

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MECHANICAL DIMENSIONS

All dimensions are in mm.



NOTES

RoHS Compliance

The levels of environmentally sensitive, persistent biologically toxic (PBT), persistent organic pollutants (POP), or otherwise 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 2002/95/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS), as amended through April 21, 2006.

Vision Advisory Claim

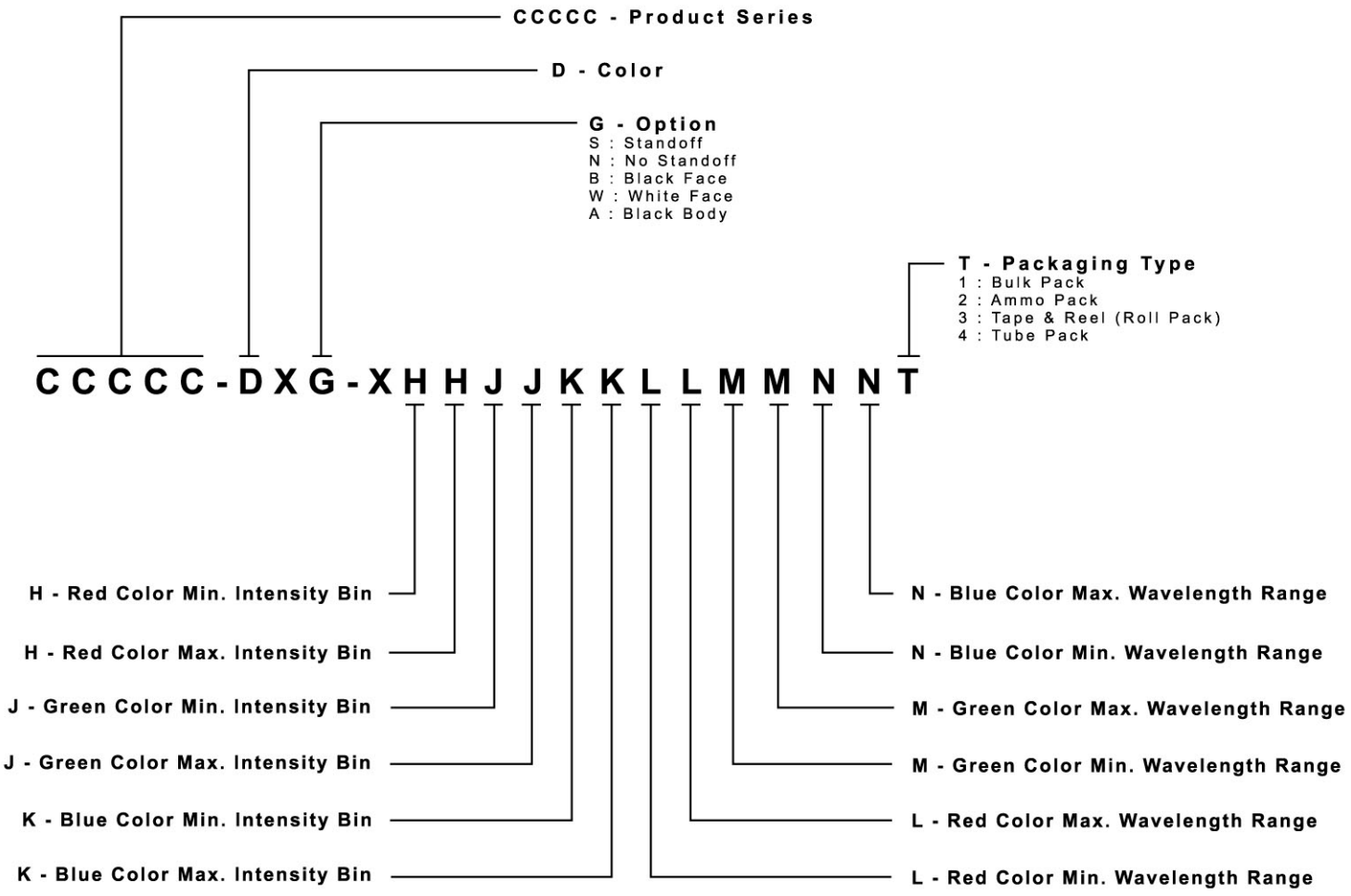
Users should be cautioned not to stare at the light of this LED product. The bright light can damage the eye.

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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.

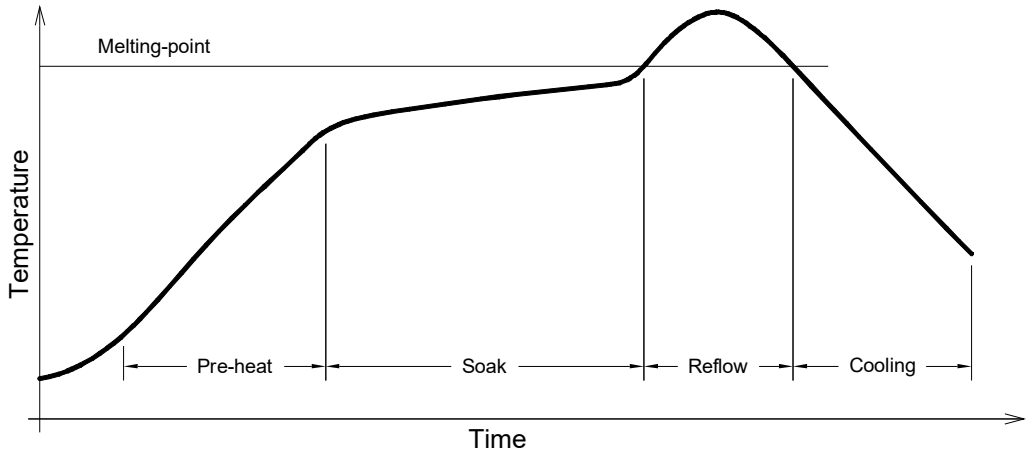
Cree LEDs are sold by order codes in combinations of bins called kits. Order codes are configured in the following manner:



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REFLOW SOLDERING

- The CLMVC-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 CLMVC-FKC

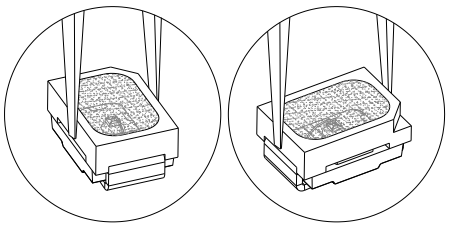
Solder
Average ramp-up rate = 4ºC/s max
Preheat temperature = 150ºC ~200ºC
Preheat time = 120s max
Ramp-down rate = 6ºC/s max
Peak temperature = 235ºC max
Time within 5ºC of actual Peak Temperature = 10s max
Duration above 217ºC is 45s max

Refer to "http://www.cree.com/led-components/media/documents/sh-HB.pdf" for soldering & handling details.

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NOTES

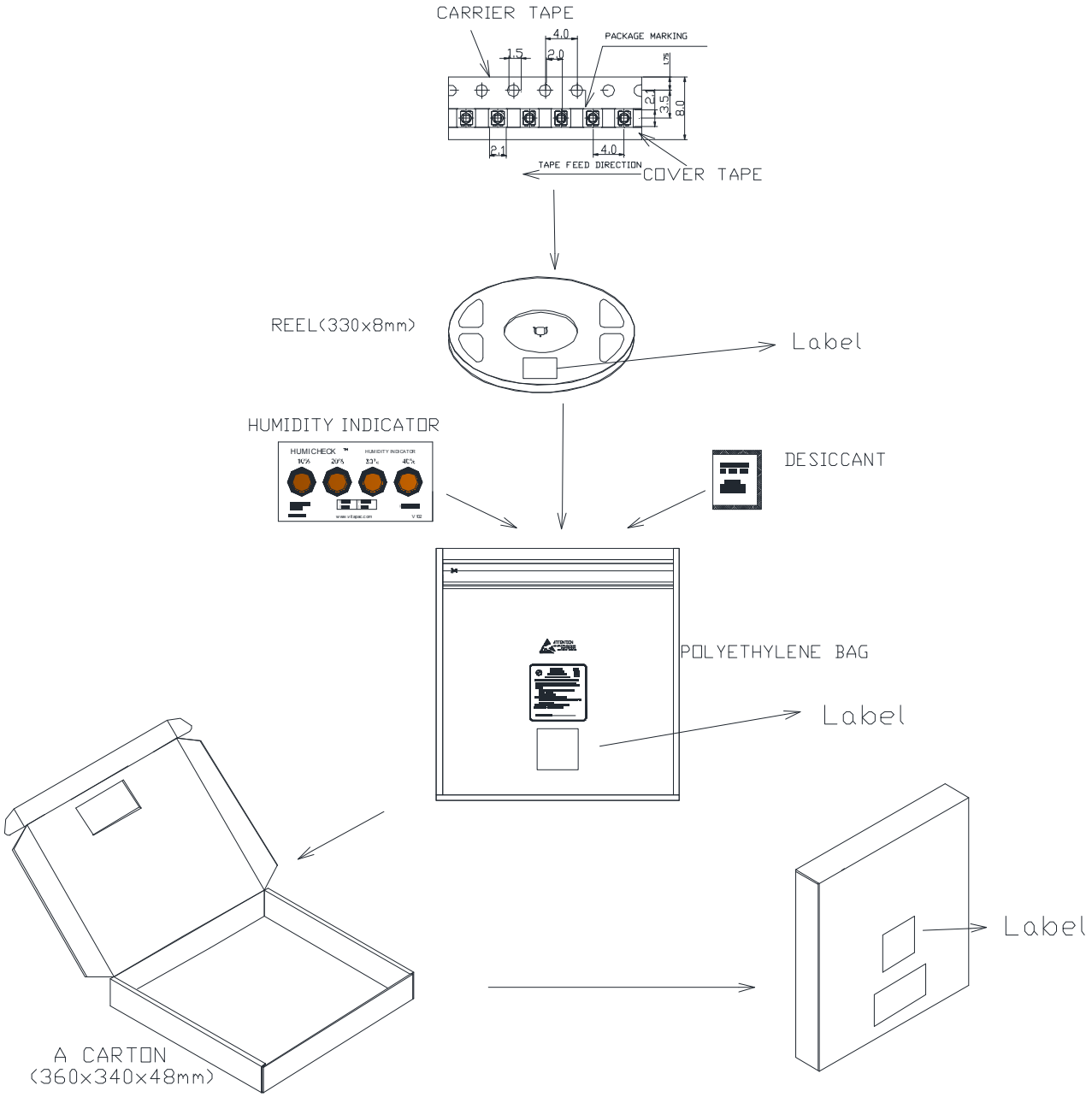
- The packaging sizes of these SMD products are very small and the resin is still soft after solidification. Users are required to handle with care. Never touch the resin surface of SMD products.
- To avoid damaging the product's surface and interior device, it is recommended to choose a special nozzle 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:



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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.



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