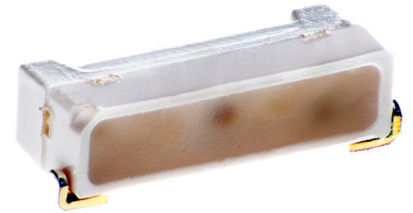


Cree® PLCC6 3 in 1 SMD LED

CLS6B-FKW



PRODUCT DESCRIPTION

These SMD LEDs are packaged in an industry standard PLCC6 package. These high performance tricolor SMT LEDs are designed to work in a wide range of applications. A wide viewing angle and high brightness make these LEDs suitable for indoor signage applications.

FEATURES

- Size (mm): 4.7 x 1.5 X1.3
- Dominant Wavelength (nm):
Red:(619-624)
Green:(520-535)
Blue:(462.5-475)
- Luminous Intensity (mcd)
Red (560 - 1120)
Green (1120 - 2240)
Blue (252 - 505)
- Moisture Sensitivity Level: 3
- Lead-Free
- RoHS Compliant

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 ^{Note 1}	I_F	30	20	20	mA
Peak Forward Current ^{Note 2}	I_{FP}	200	100	100	mA
Reverse Voltage	V_R	5	5	5	V
Power Dissipation	P_D	78	76	76	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 1 chip on	R_{THJA}	360	475	450	$^\circ\text{C}/\text{W}$
Junction/solder point 1 chip on	R_{THJS}	200	330	300	$^\circ\text{C}/\text{W}$
Junction/ambient 3 chip on	R_{THJA}	510	675	690	$^\circ\text{C}/\text{W}$
Junction/solder point 3 chip on	R_{THJS}	280	470	420	$^\circ\text{C}/\text{W}$

Note: 1.Single-color light.
2.Pulse width ≤ 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	$I_F = 20$ mA	λ_{DOM}	619~624	520~535	462.5~475	nm
Spectral bandwidth at 50% I_{REL} max	$I_F = 20$ mA	$\Delta \lambda$	16	30	22	nm
Forward Voltage	$I_F = 20$ mA	$V_{F(avg)}$	2.1	3.1	3.1	V
		$V_{F(max)}$	2.6	3.8	3.8	V
Luminous Intensity	$I_F = 20$ mA	$I_{V(min)}$	560	1120	252	mcd
		$I_{V(avg)}$	770	1500	350	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 ($I_f = 20\text{mA}$)

Red

Bin Code	Min.(mcd)	Max.(mcd)
K	560	710
np	635	805
M	710	900
qr	805	1010
N	900	1120

Green

Bin Code	Min.(mcd)	Max.(mcd)
P	1120	1400
vw	1260	1600
Q	1400	1800
xy	1600	2020
R	1800	2240

Blue

Bin Code	Min.(mcd)	Max.(mcd)
de	252	318
G	280	355
fg	318	403
H	355	450
hj	403	505

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

COLOR BIN LIMIT ($I_f = 20\text{mA}$)

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)
B23	462.5	467.5
B4	465	470
B45	467.5	472.5
B5	470	475

Tolerance of measurement of dominant wavelength is $\pm 1 \text{ nm}$.

ORDER CODE TABLE*

Kit Number	Color	Luminous Intensity (mcd)		Dominant Wavelength (nm)				Pack- age
		Min.	Max.	Color Bin	Min. (nm)	Color Bin	Max. (nm)	
CLS6B-FKW-CKNPRdehjBB792353	Red	560	1120	RB	619	RB	624	Reel
	Green	1120	2240	G7	520	G9	535	Reel
	Blue	252	505	B23	462.5	B5	475	Reel
CLS6B-FKW-CK1P1de1BB7C23R3	Red	Any 1 intensity bin from K(560)-N(1120)		RB	619	RB	624	Reel
	Green	Any 1 intensity bin from P(1120)-R(2240)		Any 1 hue bin from G7(520)-G9(535)			Reel	
	Blue	Any 1 intensity bin from de(252)-hj(505)		Any 1 hue bin from B23(462.5)-B5(475)			Reel	

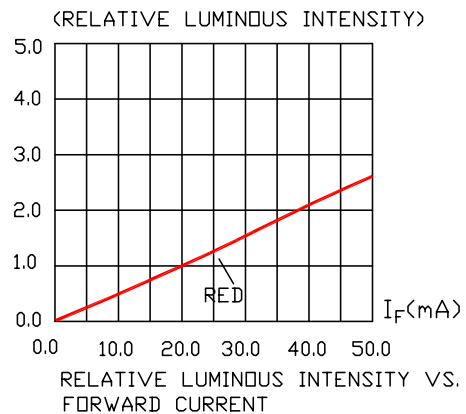
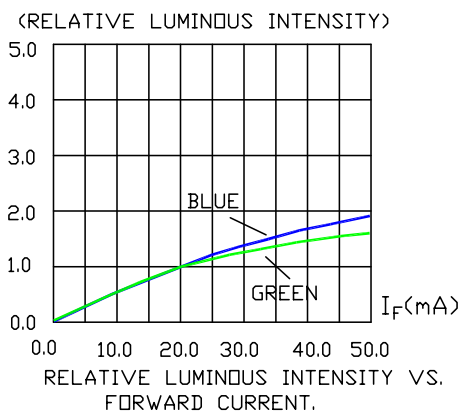
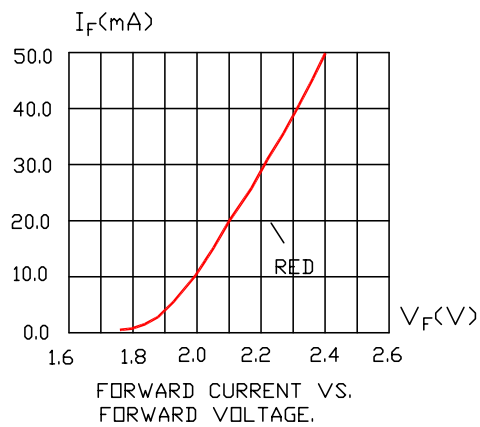
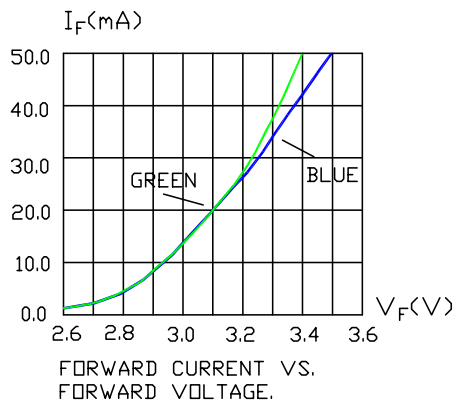
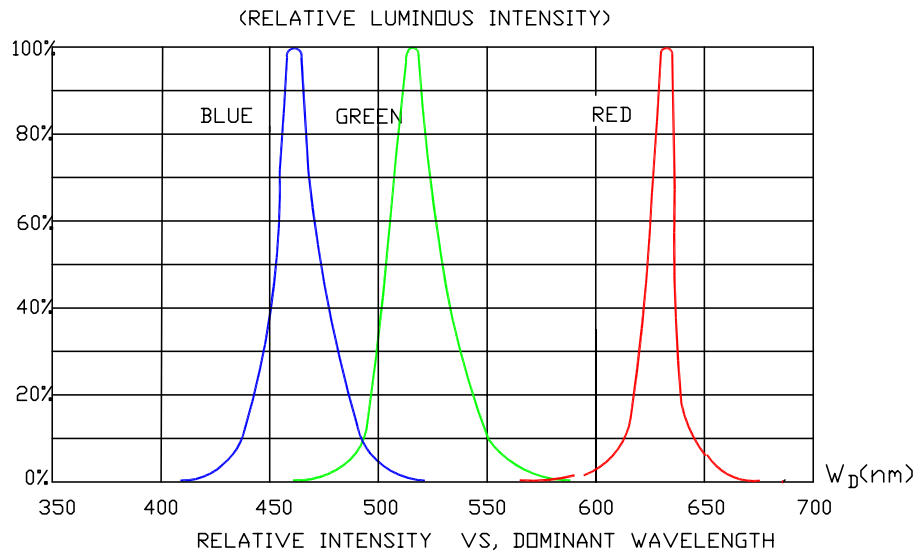
Notes:

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. For example, any 1 intensity bin from P - R means only 1 intensity bin (P or vw or Q or xy or R) will be shipped by Cree. 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.
2. Please refer to the "Cree LED Lamp Reliability Test Standards" document #1 for reliability test conditions.
3. 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

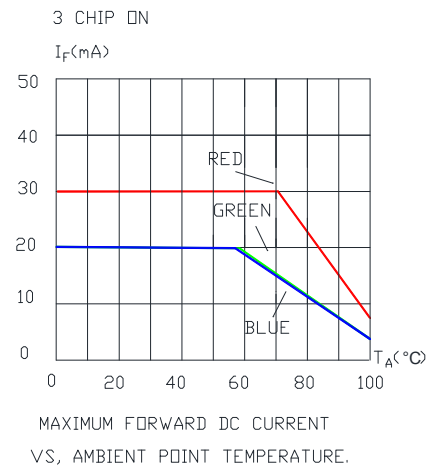
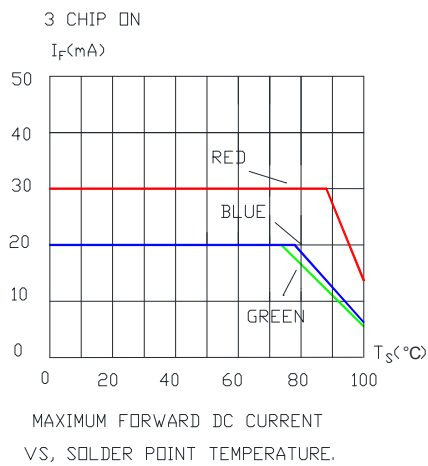
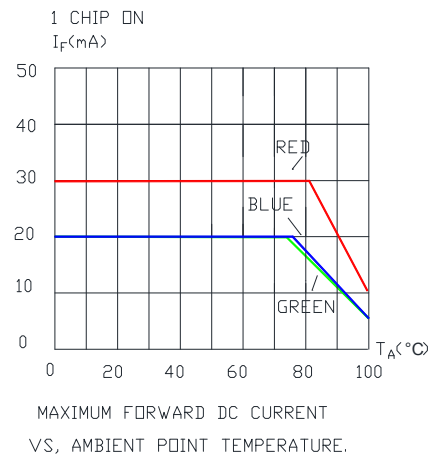
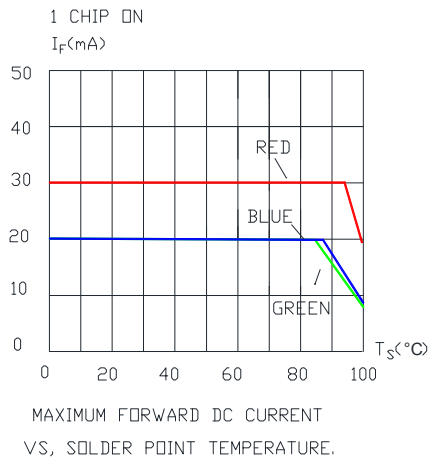
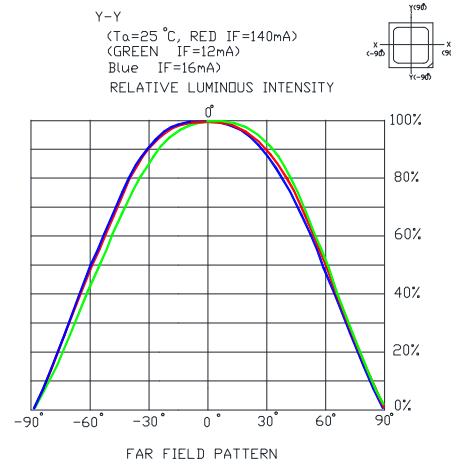
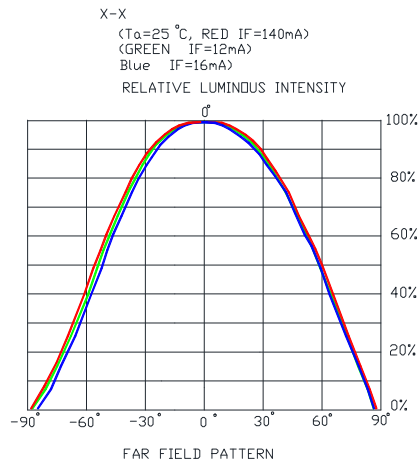
#2: Refer to <http://www.cree.com/led-components/media/documents/sh-HB.pdf>

GRAPHS



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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CAUTIONS

1. Cleaning

- When necessary, cleaning should occur only with isopropyl alcohol (IPA) at room temperature (25°C) for a duration of no more than one minute. Dry at room temperature for 15 minutes before use.
- The influence of ultrasonic cleaning on the SMD LED depends on factors such as ultrasonic power and the way the SMD LEDs are mounted. Ultrasonic cleaning should be pre-qualified to ensure this will not cause damage to the SMD LEDs.

2. Moisture-Proof Packing

- To prevent moisture absorption into SMD LEDs during the transportation and storage, the LEDs are packed in a moisture-barrier bag. Desiccants and a humidity indicator are packed together with the LEDs as secondary protection.
- A humidity-indicator card inside the packing indicates the humidity level.

3. Storage

- The shelf life of LEDs stored in the original sealed bag at <40°C and <90%RH is 12 months. Baking is required if the shelf life has expired.
- Before opening the packaging, check for air leaks in the bag.
- After the bag is opened, the SMD LEDs must be stored at < 30°C and < 60% RH. Under these conditions, SMD LEDs must be used (subject to reflow) within 168 hours. If the LEDs are not within 168 hours after removal from the bag, baking is required.
- To bake, place the SMD LEDs in an oven at 80°C ±5°C and relative humidity ≤10% RH for 24 hours.
- Take the material out of the packaging bag before baking. Do not open the oven door frequently during the baking process.

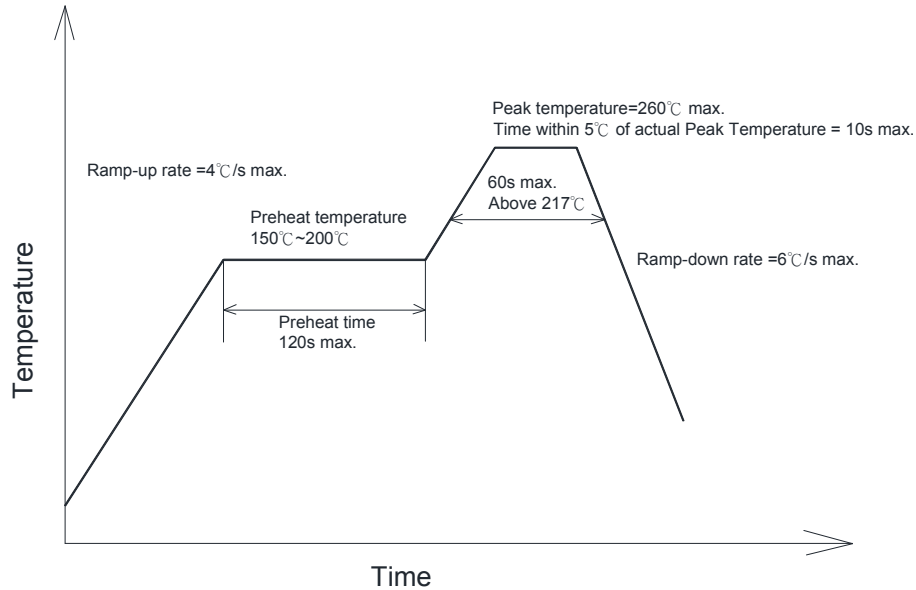
4. Soldering

a. Manual Soldering with a Soldering Iron

- Use of a soldering iron of less than 25 watts is recommended. The iron temperature must be kept below 315°C and soldering time no more than 2 seconds.
- The epoxy resin of an SMD LED should not contact the tip of the soldering iron.
- No mechanical stress should be exerted on the resin portion of an SMD LED during soldering.
- Handling of an SMD LED should be done only when the package has been cooled down to below 40°C or less. This is to prevent SMD LED failures due to thermal-mechanical stress during handling.

b. Reflow Soldering

Temperature (top surface of the SMD LED) profile:



Notes:

- SMD LEDs should not be modified after soldering. If modification cannot be avoided, the modifications must be pre-qualified to avoid damaging the SMD LEDs.
- In case of 2 times reflow process, 2nd reflow process must be performed as soon as possible after the 1st reflow.
- No stress should be exerted on the package during soldering.
- The PCB should not be wrapped after soldering; allow the PCB board and SMD LED to cool naturally.

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

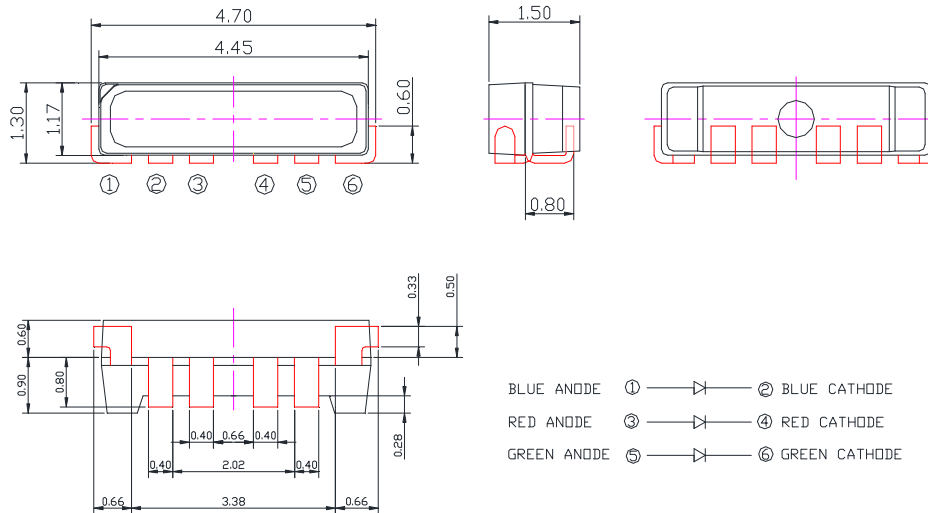
NOTES

- 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:



MECHANICAL DIMENSIONS

All dimensions are in mm.



Tolerance of measurement of the dimension is ± 0.1

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.

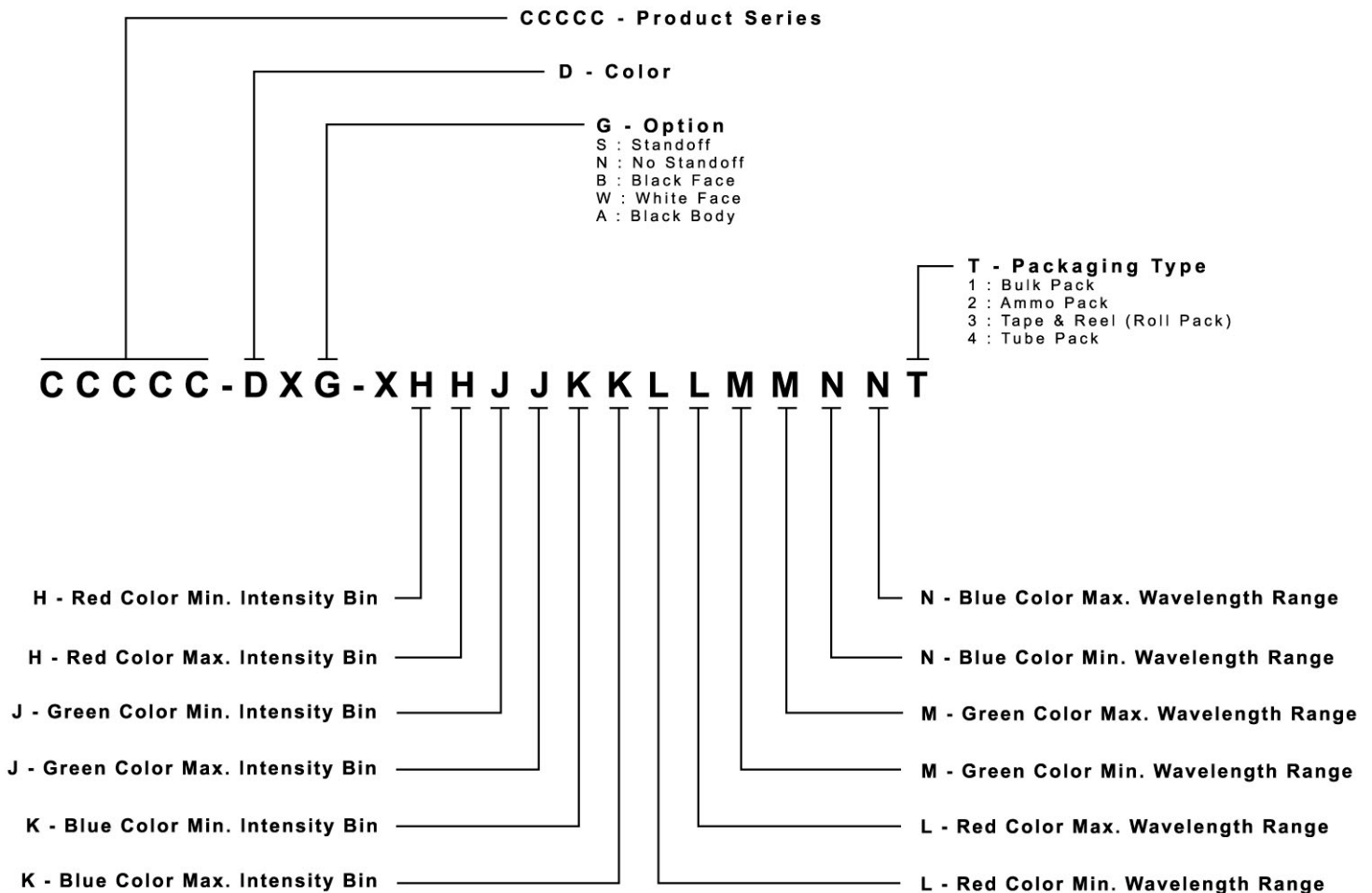
Vision Advisory Claim

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

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:



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 3000 pcs per reel.

