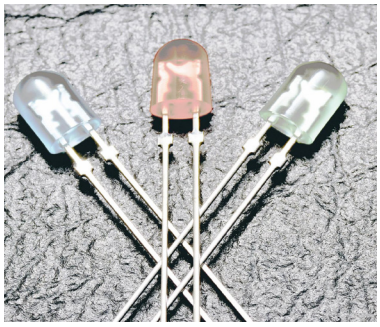
Cree® Screen Master® 5-mm Oval LED
C5SMB-RJS/GJS/BJS
C5SMA-RJS
Data Sheet



This oval LED is specifically designed for variable-message signs and passenger-information signs. The oval-shaped radiation pattern and high luminous intensity ensure that these devices are excellent for wide-field-of-view outdoor applications where a wide viewing angle and readability in sunlight are essential.

These lamps are made with an advanced optical-grade epoxy that offers superior high-temperature and high-moisture-resistance performance in outdoor signal and sign applications. The encapsulation resin contains anti-UV material in order to reduce the effects of long-term exposure to direct sunlight.

FEATURES

- Size (mm): 5
- Color and Typical Dominant Wavelength (nm):
  - C5SMB - Red (628)
  - C5SMA - Red (624)
    Green (527)
    Blue (470)
- Luminous Intensity (mcd)
  - C5SMB - Red (390-1520)
    Green (1100-4180)
    Blue (200-770)
  - C5SMA - Red (280-770)
- Lead-Free
- RoHS-Compliant

APPLICATIONS

- Electronic Signs & Signals (ESS)
- Full-Color Video Screen
- Motorway Signs
- Variable-Message Sign (VMS)
- Advertising Signs
- Petrol Signs

Absolute Maximum Ratings (T_A = 25°C)

Items	Symbol	Absolute Maximum Rating		Unit
		Red	Blue and Green	
Forward Current	I_F	50 Note1	25	mA
Peak Forward Current Note2	I_{FP}	200	100	mA
Reverse Voltage	V_R	5	5	V
Power Dissipation	P_D	130	100	mW
Operation Temperature	T_{opr}	-40 ~ +95		°C
Storage Temperature	T_{stg}	-40 ~ +100		°C
Lead Soldering Temperature	T_{sol}	Max. 260°C for 3 sec. max. (3 mm from the base of the epoxy bulb)		

Note:

1. For long-term performance, the drive currents between 10 mA and 30 mA are recommended. Please contact a Cree sales representative for more information on recommended drive conditions.
2. Pulse width ≤0.1 msec, duty ≤1/10.

Typical Electrical & Optical Characteristics (T_A = 25°C)

Characteristics	Color	Symbol	Condition	Unit	Minimum	Typical	Maximum
Forward Voltage	C5SMB - Red	V_F	I_F = 20 mA	V		2.3	2.6
	C5SMA - Red	V_F	I_F = 20 mA	V		2.0	2.5
	Blue/Green	V_F	I_F = 20 mA	V		3.4	4.0
Reverse Current	Red	I_R	V_R = 5 V	μA			100
	Blue/Green	I_R	V_R = 5 V	μA			100
Dominant Wavelength	C5SMB - Red	λ_D	I_F = 20 mA	nm	620	628	635
	C5SMA - Red	λ_D	I_F = 20 mA	nm	620	624	628
	Green	λ_D	I_F = 20 mA	nm	520	527	535
	Blue	λ_D	I_F = 20 mA	nm	465	470	475
Luminous Intensity	C5SMB - Red	I_V	I_F = 20 mA	mcd	390	750	
	C5SMA - Red	I_V	I_F = 20 mA	mcd	280	450	
	Green	I_V	I_F = 20 mA	mcd	1100	1750	
	Blue	I_V	I_F = 20 mA	mcd	200	350	

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Intensity Bin Limit (I_F = 20 mA)

Red: C5SMB

Bin Code	Sub-bin	Min. (mcd)	Max. (mcd)
Q0	Q1	390	430
	Q2	430	470
	Q3	470	510
	Q4	510	550
R0	R1	550	605
	R2	605	660
	R3	660	715
	R4	715	770
S0	S1	770	852
	S2	852	934
	S3	934	1017
	S4	1017	1100
T0	T1	1100	1205
	T2	1205	1310
	T3	1310	1415
	T4	1415	1520

Green:C5SMB

Bin Code	Sub-bin	Min. (mcd)	Max. (mcd)
T0	T1	1100	1205
	T2	1205	1310
	T3	1310	1415
	T4	1415	1520
U0	U1	1520	1672
	U2	1672	1824
	U3	1824	1976
	U4	1976	2130
V0	V1	2130	2347
	V2	2347	2564
	V3	2564	2781
	V4	2781	3000
W0	W1	3000	3295
	W2	3295	3590
	W3	3590	3885
	W4	3885	4180

Blue:C5SMB

Bin Code	Sub-bin	Min. (mcd)	Max. (mcd)
N0	N1	200	220
	N2	220	240
	N3	240	260
	N4	260	280
P0	P1	280	308
	P2	308	336
	P3	336	364
	P4	364	390
Q0	Q1	390	430
	Q2	430	470
	Q3	470	510
	Q4	510	550
R0	R1	550	605
	R2	605	660
	R3	660	715
	R4	715	770

Red: C5SMA

Bin Code	Sub-bin	Min. (mcd)	Max. (mcd)
P0	P1	280	308
	P2	308	336
	P3	336	364
	P4	364	390
Q0	Q1	390	430
	Q2	430	470
	Q3	470	510
	Q4	510	550
R0	R1	550	605
	R2	605	660
	R3	660	715
	R4	715	770

Tolerance of measurement of luminous intensity is ±15%.

Color Bin Limit (I_F = 20 mA)

C5SMB - Red

Bin Code	Min. (nm)	Max. (nm)
RC	620	635

C5SMA - Red

Bin Code	Min. (nm)	Max. (nm)
RD	620	628

Green

Bin Code	Min. (nm)	Max. (nm)
G7	520	525
G8	525	530
G9	530	535

Blue

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

Tolerance of measurement of dominant wavelength is ±1 nm.

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Order Code Table*

C5SMB

Color	Kit Number	Luminous Intensity (mcd)		Dominant Wavelength				Package
		Min.	Max.	Color Bin	Min. (nm)	Color Bin	Max. (nm)	
Red	C5SMB-RJS-CQ0T0CC1	390	1520	RC	620	RC	635	Bulk
Red	C5SMB-RJS-CR14QCC1	Any 4 consecutive sub-bins: R1 (550) - S2 (934)		RC	620	RC	635	Bulk
Red	C5SMB-RJS-CR34QCC1	Any 4 consecutive sub-bins: R3 (660) - S4 (1100)		RC	620	RC	635	Bulk
Red	C5SMB-RJS-CS14QCC1	Any 4 consecutive sub-bins: S1 (770) - T2 (1310)		RC	620	RC	635	Bulk
Red	C5SMB-RJS-CQ0T0CC2	390	1520	RC	620	RC	635	Ammo
Red	C5SMB-RJS-CR14QCC2	Any 4 consecutive sub-bins: R1 (550) - S2 (934)		RC	620	RC	635	Ammo
Red	C5SMB-RJS-CR34QCC2	Any 4 consecutive sub-bins: R3 (660) - S4 (1100)		RC	620	RC	635	Ammo
Red	C5SMB-RJS-CS14QCC2	Any 4 consecutive sub-bins: S1 (770) - T2 (1310)		RC	620	RC	635	Ammo

Color	Kit Number	Luminous Intensity (mcd)		Dominant Wavelength				Package
		Min.	Max.	Color Bin	Min. (nm)	Color Bin	Max. (nm)	
Green	C5SMB-GJS-CT0W0791	1100	4180	G7	520	G9	535	Bulk
Green	C5SMB-GJS-CU14Q7T1	Any 4 consecutive sub-bins: U1 (1520) - V2 (2564)		Any 1 color bin from G7 (520) to G8 (530)				Bulk
Green	C5SMB-GJS-CU14Q8T1	Any 4 consecutive sub-bins: U1 (1520) - V2 (2564)		Any 1 color bin from G8 (525) to G9 (535)				Bulk
Green	C5SMB-GJS-CU34Q7T1	Any 4 consecutive sub-bins: U3 (1824) - V4 (3000)		Any 1 color bin from G7 (520) to G8 (530)				Bulk
Green	C5SMB-GJS-CU34Q8T1	Any 4 consecutive sub-bins: U3 (1824) - V4 (3000)		Any 1 color bin from G8 (525) to G9 (535)				Bulk
Green	C5SMB-GJS-CV14Q7T1	Any 4 consecutive sub-bins: V1 (2130) - W2 (3590)		Any 1 color bin from G7 (520) to G8 (530)				Bulk
Green	C5SMB-GJS-CV14Q8T1	Any 4 consecutive sub-bins: V1 (2130) - W2 (3590)		Any 1 color bin from G8 (525) to G9 (535)				Bulk
Green	C5SMB-GJS-CT0W0792	1100	4180	G7	520	G9	535	Ammo
Green	C5SMB-GJS-CU14Q7T2	Any 4 consecutive sub-bins: U1 (1520) - V2 (2564)		Any 1 color bin from G7 (520) to G8 (530)				Ammo
Green	C5SMB-GJS-CU14Q8T2	Any 4 consecutive sub-bins: U1 (1520) - V2 (2564)		Any 1 color bin from G8 (525) to G9 (535)				Ammo
Green	C5SMB-GJS-CU34Q7T2	Any 4 consecutive sub-bins: U3 (1824) - V4 (3000)		Any 1 color bin from G7 (520) to G8 (530)				Ammo
Green	C5SMB-GJS-CU34Q8T2	Any 4 consecutive sub-bins: U3 (1824) - V4 (3000)		Any 1 color bin from G8 (525) to G9 (535)				Ammo
Green	C5SMB-GJS-CV14Q7T2	Any 4 consecutive sub-bins: V1 (2130) - W2 (3590)		Any 1 color bin from G7 (520) to G8 (530)				Ammo
Green	C5SMB-GJS-CV14Q8T2	Any 4 consecutive sub-bins: V1 (2130) - W2 (3590)		Any 1 color bin from G8 (525) to G9 (535)				Ammo

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Order Code Table*

C5SMB

Color	Kit Number	Luminous Intensity (mcd)		Dominant Wavelength				Package
		Min.	Max.	Color Bin	Min. (nm)	Color Bin	Max. (nm)	
Blue	C5SMB-BJS-CN0R0451	200	770	B4	465	B5	475	Bulk
Blue	C5SMB-BJS-CP14Q4T1	Any 4 consecutive sub-bins: P1 (280) - Q2 (470)		Any 1 color bin from B4 (465) to B5 (475)				Bulk
Blue	C5SMB-BJS-CP34Q4T1	Any 4 consecutive sub-bins: P3 (336) - Q4 (550)		Any 1 color bin from B4 (465) to B5 (475)				Bulk
Blue	C5SMB-BJS-CQ14Q4T1	Any 4 consecutive sub-bins: Q1 (390) - R2 (660)		Any 1 color bin from B4 (465) to B5 (475)				Bulk
Blue	C5SMB-BJS-CN0R0452	200	770	B4	465	B5	475	Ammo
Blue	C5SMB-BJS-CP14Q4T2	Any 4 consecutive sub-bins: P1 (280) - Q2 (470)		Any 1 color bin from B4 (465) to B5 (475)				Ammo
Blue	C5SMB-BJS-CP34Q4T2	Any 4 consecutive sub-bins: P3 (336) - Q4 (550)		Any 1 color bin from B4 (465) to B5 (475)				Ammo
Blue	C5SMB-BJS-CQ14Q4T2	Any 4 consecutive sub-bins: Q1 (390) - R2 (660)		Any 1 color bin from B4 (465) to B5 (475)				Ammo

C5SMA

Color	Kit Number	Luminous Intensity (mcd)		Dominant Wavelength				Package
		Min.	Max.	Color Bin	Min.(nm)	Color Bin	Max.(nm)	
Red	C5SMA-RJS-CP0R0DD1	280	770	RD	620	RD	628	Bulk
Red	C5SMA-RJS-CP14QDD1	Any 4 consecutive sub-bins: P1 (280) - Q2 (470)		RD	620	RD	628	Bulk
Red	C5SMA-RJS-CQ14QDD1	Any 4 consecutive sub-bins: Q1 (390) - R2 (660)		RD	620	RD	628	Bulk
Red	C5SMA-RJS-CQ34QDD1	Any 4 consecutive sub-bins: Q3 (470) - R4 (770)		RD	620	RD	628	Bulk
Red	C5SMA-RJS-CP0R0DD2	280	770	RD	620	RD	628	Ammo
Red	C5SMA-RJS-CP14QDD1	Any 4 consecutive sub-bins: P1 (280) - Q2 (470)		RD	620	RD	628	Ammo
Red	C5SMA-RJS-CQ14QDD1	Any 4 consecutive sub-bins: Q1 (390) - R2 (660)		RD	620	RD	628	Ammo
Red	C5SMA-RJS-CQ34QDD1	Any 4 consecutive sub-bins: Q3 (470) - R4 (770)		RD	620	RD	628	Ammo

Notes:

1. The above kit numbers represent order codes that include multiple intensity-bin and color-bin codes. Only one intensity-sub-bin code and one color-bin code will be shipped on each reel. Selected single intensity-bin, single color-bin codes will be orderable in certain quantities. For example, any four consecutive sub-bins from V1 to W2 mean only one intensity bin with four sub-bins of the following brightness ranges (V1-V4, V2-W1, V3-W2) will be shipped by Cree. For example, any one-color bin from G7 to G9 means only one color bin (G7 or G8 or G9) will be shipped by Cree.
2. Please refer to the "Cree LED Lamp Reliability Test Standards" document for reliability test conditions.
3. Please refer to the "Cree LED Lamp Soldering & Handling" document for information about how to use this LED product safely.

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Graphs

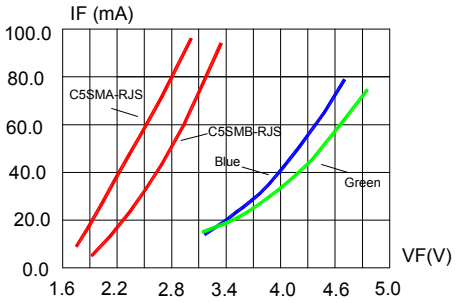

FIG.1 FORWARD CURRENT VS. FORWARD VOLTAGE.

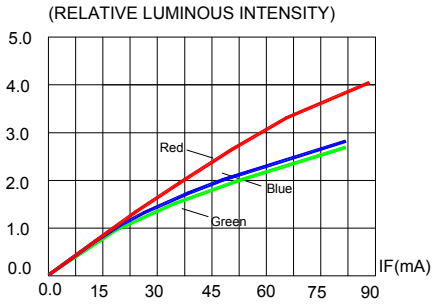

FIG.2 RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT

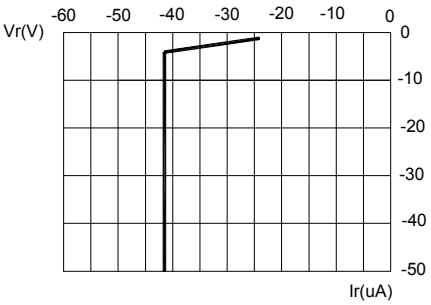

FIG.3a RED REVERSE CURRENT VS. REVERSE VOLTAGE.

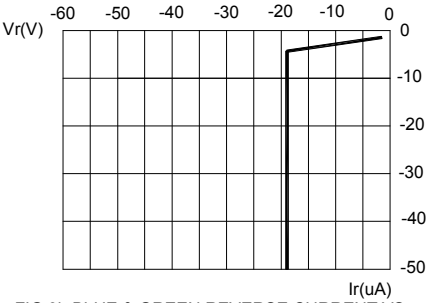

FIG.3b BLUE & GREEN REVERSE CURRENT VS. REVERSE VOLTAGE.

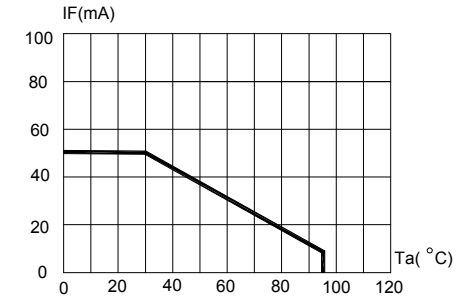

FIG.4a RED MAXIMUM FORWARD DCCURRENT VS AMBIENT TEMPERATURE (Tjmax=105℃)

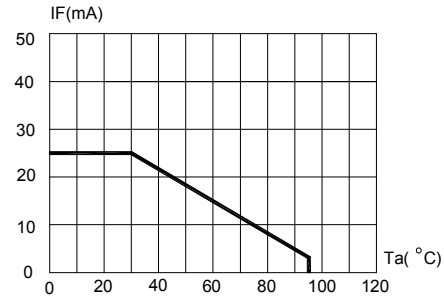

FIG.4b BLUE & GREEN MAXIMUM FORWARD DCCURRENT VS AMBIENT TEMPERATURE (Tjmax=105℃)

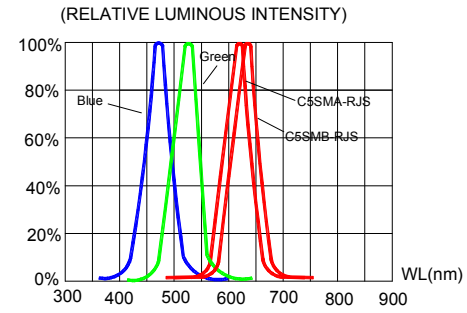

FIG.5 RELATIVE LUMINOUS INTENSITY VS. WAVELENGTH.

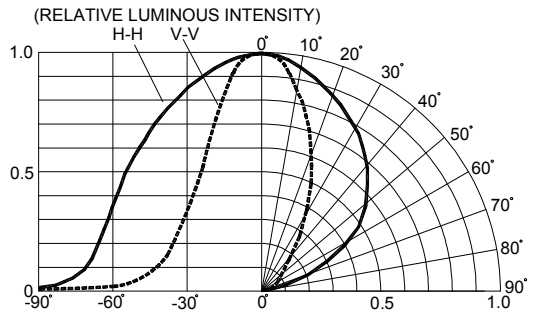

FIG.6 FAR FIELD PATTERN

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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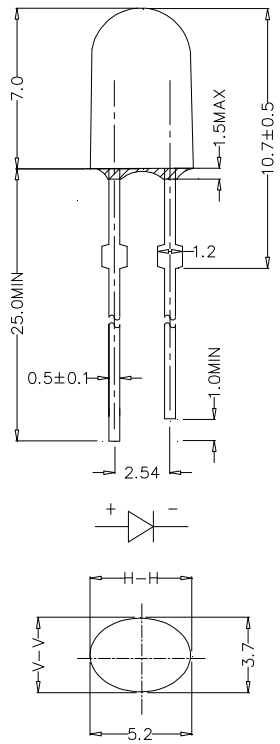
Mechanical Dimensions

All dimensions are in mm. Tolerance is ±0.25 mm unless otherwise noted.

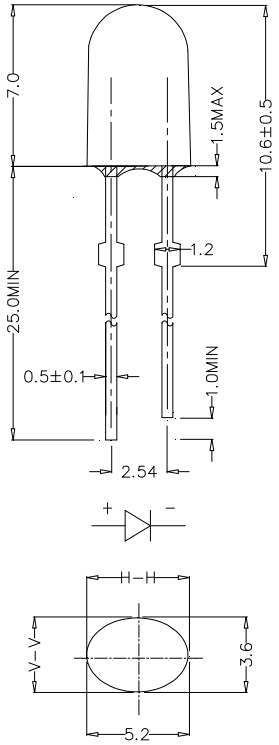
An epoxy meniscus may extend about 1.5 mm down the leads.

Burr around bottom of epoxy may be 0.5 mm max.

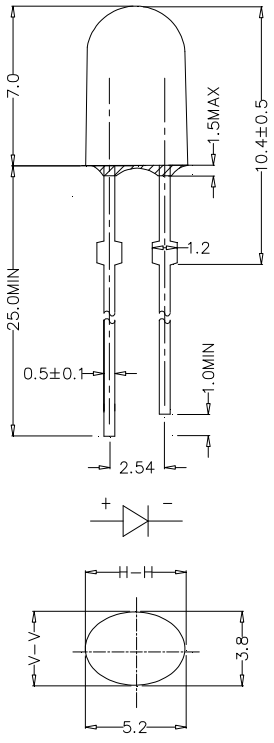
C5SMB-RJS:



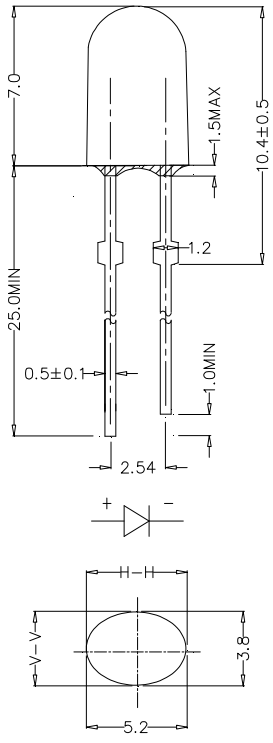
C5SMB-BJS:



C5SMB-GJS:



C5SMA-RJS:



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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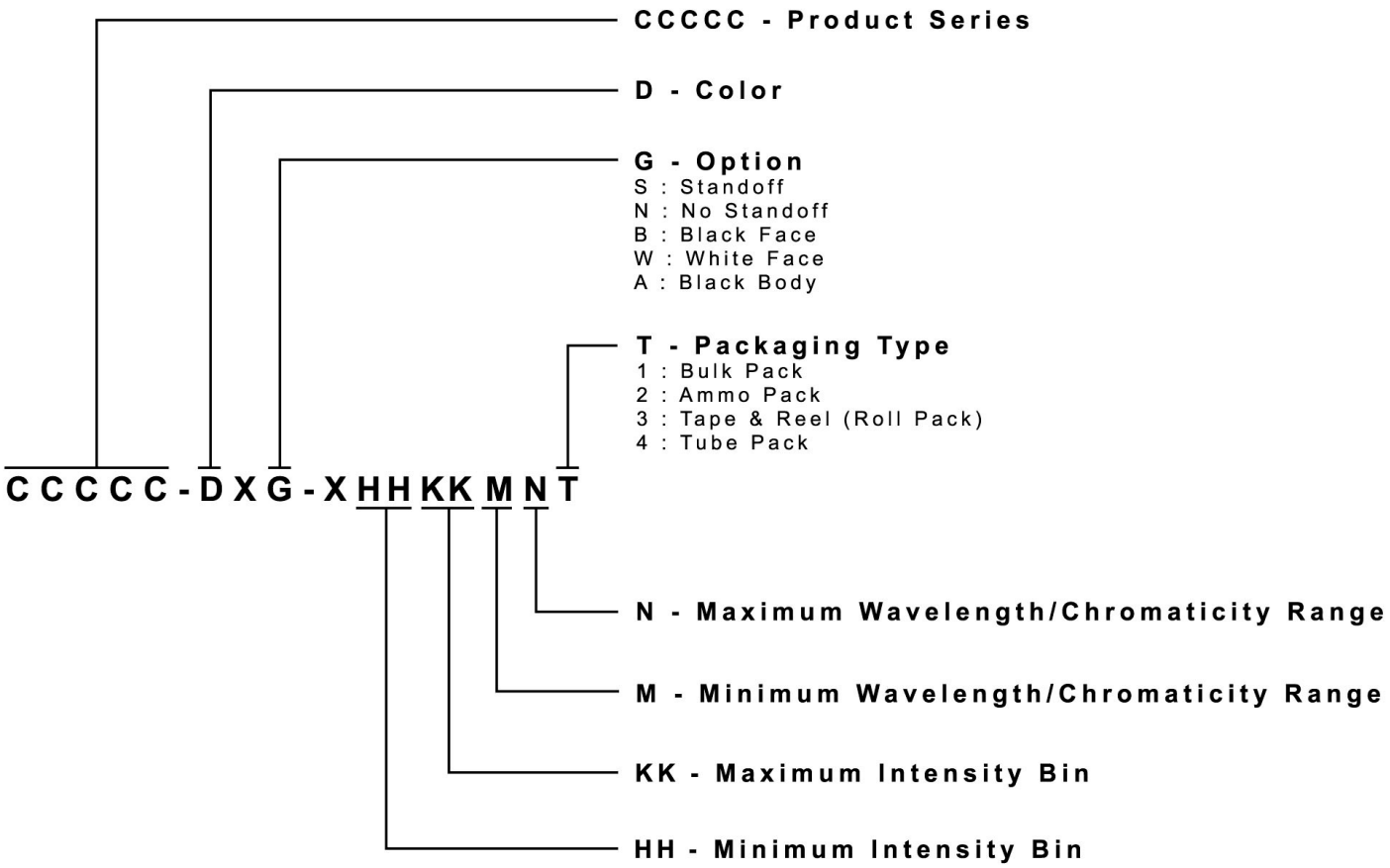
Kit Number System

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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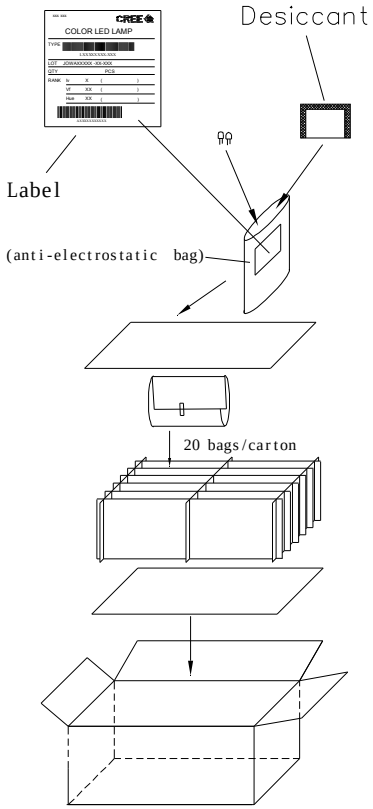
Package

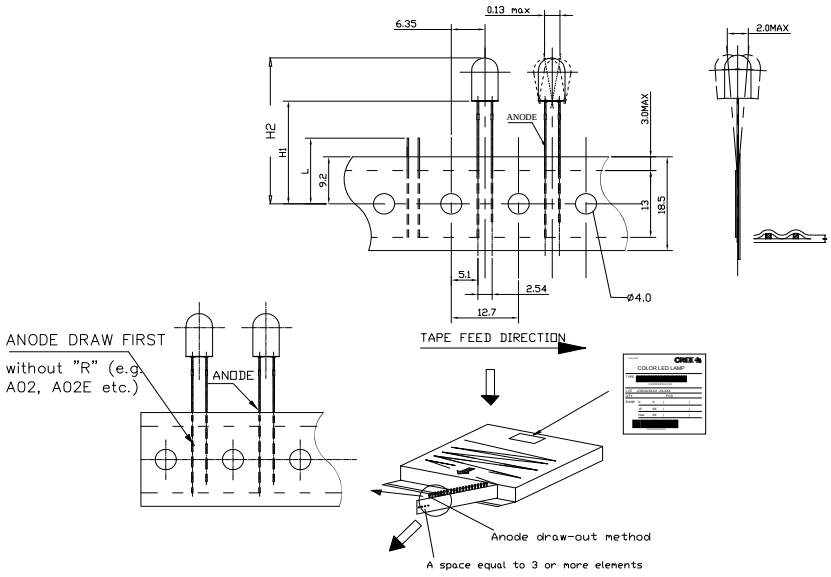
Features:

- 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 shock during transportation.
- The boxes are not water-resistant, and they must be kept away from water and moisture.
- There are two types of packaging: bulk pack and ammo pack.
- Max 500 pcs per bulk and max 2500 pcs per ammo.

Bulk Pack Packaging Type:



Ammo Pack Packaging Type:



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