

### Cree® Screen Master® 5-mm Oval LED C566C-RFF/GFF/BFF/AFF C566C-RFE/GFE/BFE/AFE



#### PRODUCT DESCRIPTION

The 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 tinted and diffused. 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:  
Red (621nm)  
Green (527nm)  
Blue (470nm)  
Amber (591nm)
- Luminous Intensity (mcd)  
C566C-RFF/RFE: (1520-4180)  
C566C-GFF/GFE: (4180-12000)  
C566C-BFF/BFE: (1100-3000)  
C566C-AFF/AFE: (1520-4180)
- Viewing angle:  
70 X 35 degree
- 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 ( $T_A = 25^\circ\text{C}$ )

Items	Symbol	Absolute Maximum Rating		Unit
		Red and Amber	Blue and Green	
Forward Current	$I_F$	50 <sup>Note1</sup>	35	mA
Peak Forward Current <sup>Note2</sup>	$I_{FP}$	200	100	mA
Reverse Voltage	$V_R$	5	5	V
Power Dissipation	$P_D$	130	140	mW
Operation Temperature	$T_{opr}$	-40 ~ +95		$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-40 ~ +100		$^\circ\text{C}$
Lead Soldering Temperature	$T_{sol}$	Max. 260 $^\circ\text{C}$ for 3 sec. max. (3 mm from the base of the epoxy bulb)		
Electrostatic Discharge Classification (MIL-STD-883E)	ESD	Class 2		

### Note:

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

## TYPICAL ELECTRICAL & OPTICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ )

Characteristics	Color	Symbol	Condition	Unit	Minimum	Typical	Maximum
Forward Voltage	Red/Amber	$V_F$	$I_F = 20$ mA	V		2.1	2.6
	Blue/Green	$V_F$	$I_F = 20$ mA	V		3.4	4.0
Reverse Current	Red/Amber	$I_R$	$V_R = 5$ V	$\mu\text{A}$			100
	Blue/Green	$I_R$	$V_R = 5$ V	$\mu\text{A}$			100
Dominant Wavelength	Red	$\lambda_D$	$I_F = 20$ mA	nm	619	621	624
	Green	$\lambda_D$	$I_F = 20$ mA	nm	520	527	535
	Blue	$\lambda_D$	$I_F = 20$ mA	nm	460	470	475
	Amber	$\lambda_D$	$I_F = 20$ mA	nm	584	591	596
Luminous Intensity	Red	$I_V$	$I_F = 20$ mA	mcd	1520	2200	
	Green	$I_V$	$I_F = 20$ mA	mcd	4180	5200	
	Blue	$I_V$	$I_F = 20$ mA	mcd	1100	1500	
	Amber	$I_V$	$I_F = 20$ mA	mcd	1520	2200	

**Note:** Continuous reverse voltage can cause LED damage.

## INTENSITY BIN LIMIT ( $I_F = 20 \text{ mA}$ )

### Red

Bin Code	Min.(mcd)	Max.(mcd)
U0	1520	2130
V0	2130	3000
W0	3000	4180

### Amber

Bin Code	Min.(mcd)	Max.(mcd)
U0	1520	2130
V0	2130	3000
W0	3000	4180

### Green

Bin Code	Min.(mcd)	Max.(mcd)
X0	4180	5860
Y0	5860	8200
Z0	8200	12000

### Blue

Bin Code	Min.(mcd)	Max.(mcd)
T0	1100	1520
U0	1520	2130
V0	2130	3000

- Tolerance of measurement of luminous intensity is  $\pm 15\%$

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

### Red

Bin Code	Min.(nm)	Max.(nm)
RB	619	624

### Amber

Bin Code	Min.(nm)	Max.(nm)
A2	584	587
A3	587	590
A4	590	593
A5	593	596

### Green

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

### Blue

Bin Code	Min.(nm)	Max.(nm)
B3	460	465
B4	465	470
B5	470	475

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

## ORDER CODE TABLE\*

Color	Kit Number	Luminous Intensity (mcd)		Dominant Wavelength				Package	Standoff
		Min.	Max.	Color Bin	Min. (nm)	Color Bin	Max. (nm)		
Red	C566C-RFF-CU0W0BB1	1520	4180	RB	619	RB	624	Bulk	Yes
Red	C566C-RFF-CU0V0BB1	1520	3000	RB	619	RB	624	Bulk	Yes
Red	C566C-RFF-CV0W0BB1	2130	4180	RB	619	RB	624	Bulk	Yes
Red	C566C-RFE-CU0W0BB1	1520	4180	RB	619	RB	624	Bulk	No
Red	C566C-RFE-CU0V0BB1	1520	3000	RB	619	RB	624	Bulk	No
Red	C566C-RFE-CV0W0BB1	2130	4180	RB	619	RB	624	Bulk	No
Red	C566C-RFF-CU0W0BB2	1520	4180	RB	619	RB	624	Ammo	Yes
Red	C566C-RFF-CU0V0BB2	1520	3000	RB	619	RB	624	Ammo	Yes
Red	C566C-RFF-CV0W0BB2	2130	4180	RB	619	RB	624	Ammo	Yes
Red	C566C-RFE-CU0W0BB2	1520	4180	RB	619	RB	624	Ammo	No
Red	C566C-RFE-CU0V0BB2	1520	3000	RB	619	RB	624	Ammo	No
Red	C566C-RFE-CV0W0BB2	2130	4180	RB	619	RB	624	Ammo	No

Color	Kit Number	Luminous Intensity (mcd)		Dominant Wavelength				Package	Standoff
		Min.	Max.	Color Bin	Min. (nm)	Color Bin	Max. (nm)		
Green	C566C-GFF-CX0Z0791	4180	12000	G7	520	G9	535	Bulk	Yes
Green	C566C-GFF-CX0Y0781	4180	8200	G7	520	G8	530	Bulk	Yes
Green	C566C-GFF-CX0Y0891	4180	8200	G8	525	G9	535	Bulk	Yes
Green	C566C-GFF-CY0Z0781	5860	12000	G7	520	G8	530	Bulk	Yes
Green	C566C-GFF-CY0Z0891	5860	12000	G8	525	G9	535	Bulk	Yes
Green	C566C-GFE-CX0Z0791	4180	12000	G7	520	G9	535	Bulk	No
Green	C566C-GFE-CX0Y0781	4180	8200	G7	520	G8	530	Bulk	No
Green	C566C-GFE-CX0Y0891	4180	8200	G8	525	G9	535	Bulk	No
Green	C566C-GFE-CY0Z0781	5860	12000	G7	520	G8	530	Bulk	No
Green	C566C-GFE-CY0Z0891	5860	12000	G8	525	G9	535	Bulk	No
Green	C566C-GFF-CX0Z0792	4180	12000	G7	520	G9	535	Ammo	Yes
Green	C566C-GFF-CX0Y0782	4180	8200	G7	520	G8	530	Ammo	Yes
Green	C566C-GFF-CX0Y0892	4180	8200	G8	525	G9	535	Ammo	Yes
Green	C566C-GFF-CY0Z0782	5860	12000	G7	520	G8	530	Ammo	Yes
Green	C566C-GFF-CY0Z0892	5860	12000	G8	525	G9	535	Ammo	Yes
Green	C566C-GFE-CX0Z0792	4180	12000	G7	520	G9	535	Ammo	No
Green	C566C-GFE-CX0Y0782	4180	8200	G7	520	G8	530	Ammo	No
Green	C566C-GFE-CX0Y0892	4180	8200	G8	525	G9	535	Ammo	No
Green	C566C-GFE-CY0Z0782	5860	12000	G7	520	G8	530	Ammo	No
Green	C566C-GFE-CY0Z0892	5860	12000	G8	525	G9	535	Ammo	No

## ORDER CODE TABLE\*

Color	Kit Number	Luminous Intensity (mcd)		Dominant Wavelength				Package	Standoff
		Min.	Max.	Color Bin	Min. (nm)	Color Bin	Max. (nm)		
Blue	C566C-BFF-CT0V0351	1100	3000	B3	460	B5	475	Bulk	Yes
Blue	C566C-BFF-CT0U0341	1100	2130	B3	460	B4	470	Bulk	Yes
Blue	C566C-BFF-CT0U0451	1100	2130	B4	465	B5	475	Bulk	Yes
Blue	C566C-BFF-CU0V0341	1520	3000	B3	460	B4	470	Bulk	Yes
Blue	C566C-BFF-CU0V0451	1520	3000	B4	465	B5	475	Bulk	Yes
Blue	C566C-BFE-CT0V0351	1100	3000	B3	460	B5	475	Bulk	No
Blue	C566C-BFE-CT0U0341	1100	2130	B3	460	B4	470	Bulk	No
Blue	C566C-BFE-CT0U0451	1100	2130	B4	465	B5	475	Bulk	No
Blue	C566C-BFE-CU0V0341	1520	3000	B3	460	B4	470	Bulk	No
Blue	C566C-BFE-CU0V0451	1520	3000	B4	465	B5	475	Bulk	No
Blue	C566C-BFF-CT0V0352	1100	3000	B3	460	B5	475	Ammo	Yes
Blue	C566C-BFF-CT0U0342	1100	2130	B3	460	B4	470	Ammo	Yes
Blue	C566C-BFF-CT0U0452	1100	2130	B4	465	B5	475	Ammo	Yes
Blue	C566C-BFF-CU0V0342	1520	3000	B3	460	B4	470	Ammo	Yes
Blue	C566C-BFF-CU0V0452	1520	3000	B4	465	B5	475	Ammo	Yes
Blue	C566C-BFE-CT0V0352	1100	3000	B3	460	B5	475	Ammo	No
Blue	C566C-BFE-CT0U0342	1100	2130	B3	460	B4	470	Ammo	No
Blue	C566C-BFE-CT0U0452	1100	2130	B4	465	B5	475	Ammo	No
Blue	C566C-BFE-CU0V0342	1520	3000	B3	460	B4	470	Ammo	No
Blue	C566C-BFE-CU0V0452	1520	3000	B4	465	B5	475	Ammo	No

## ORDER CODE TABLE\*

Color	Kit Number	Luminous Intensity (mcd)		Dominant Wavelength				Package	Standoff
		Min.	Max.	Color Bin	Min. (nm)	Color Bin	Max. (nm)		
Amber	C566C-AFF-CU0W0251	1520	4180	A2	584	A5	596	Bulk	Yes
Amber	C566C-AFF-CU0V0341	1520	3000	A3	587	A4	593	Bulk	Yes
Amber	C566C-AFF-CV0W0341	2130	4180	A3	587	A4	593	Bulk	Yes
Amber	C566C-AFE-CU0W0251	1520	4180	A2	584	A5	596	Bulk	No
Amber	C566C-AFE-CU0V0341	1520	3000	A3	587	A4	593	Bulk	No
Amber	C566C-AFE-CV0W0341	2130	4180	A3	587	A4	593	Bulk	No
Amber	C566C-AFF-CU0W0252	1520	4180	A2	584	A5	596	Ammo	Yes
Amber	C566C-AFF-CU0V0342	1520	3000	A3	587	A4	593	Ammo	Yes
Amber	C566C-AFF-CV0W0342	2130	4180	A3	587	A4	593	Ammo	Yes
Amber	C566C-AFE-CU0W0252	1520	4180	A2	584	A5	596	Ammo	No
Amber	C566C-AFE-CU0V0342	1520	3000	A3	587	A4	593	Ammo	No
Amber	C566C-AFE-CV0W0342	2130	4180	A3	587	A4	593	Ammo	No

### Notes:

1. 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 reel. Single intensity-bin, single color-bin codes will not be orderable.
2. Please refer to the "Cree LED Lamp Reliability Test Standards" document <sup>#1</sup> for reliability test conditions.
3. Please refer to the "Cree LED Lamp Soldering & Handling" document <sup>#2</sup> 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](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

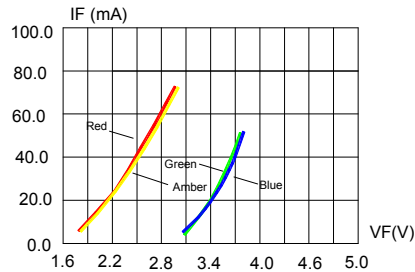


FIG.1 FORWARD CURRENT VS. FORWARD VOLTAGE.

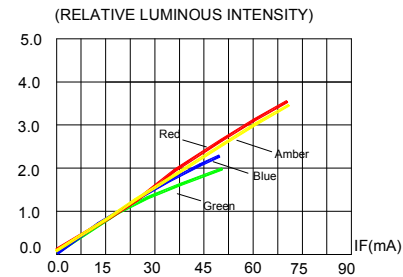


FIG.2 RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT

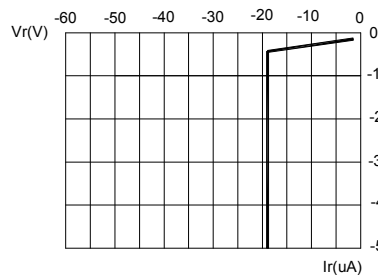


FIG.3a BLUE & GREEN REVERSE CURRENT VS. REVERSE VOLTAGE.

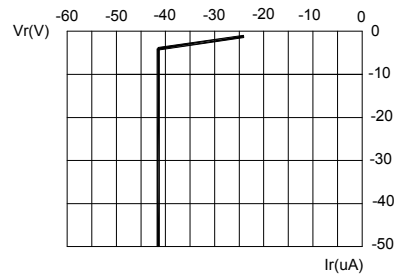


FIG.3b RED & AMBER REVERSE CURRENT VS. REVERSE VOLTAGE.

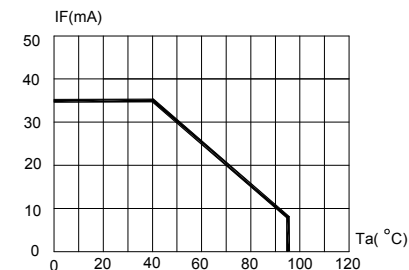


FIG.4a BLUE & GREEN MAXIMUM FORWARD DC CURRENT VS. AMBIENT TEMPERATURE ( $T_{jmax}=105^{\circ}\text{C}$ )

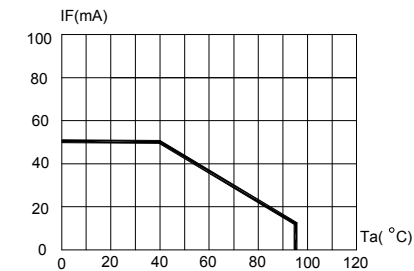


FIG.4b RED & AMBER MAXIMUM FORWARD DC CURRENT VS. AMBIENT TEMPERATURE ( $T_{jmax}=105^{\circ}\text{C}$ )

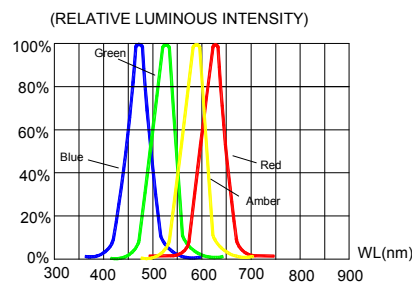


FIG.5 RELATIVE LUMINOUS INTENSITY VS. WAVELENGTH.

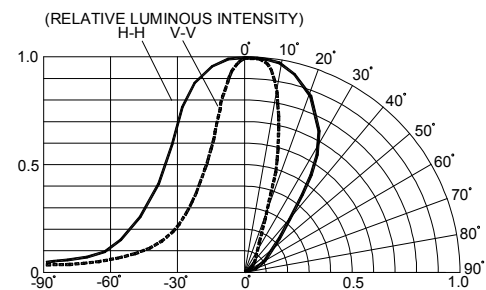


FIG.6 FAR FIELD PATTERN

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.

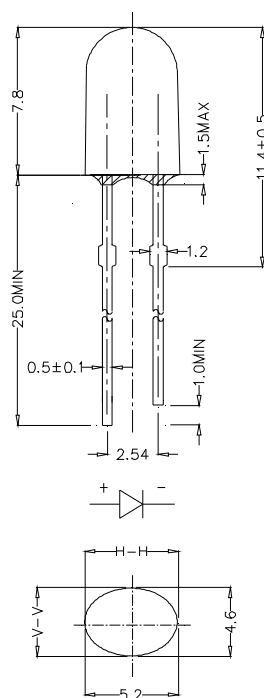
## MECHANICAL DIMENSIONS

All dimensions are in mm. Tolerance is  $\pm 0.25$  mm unless otherwise noted.

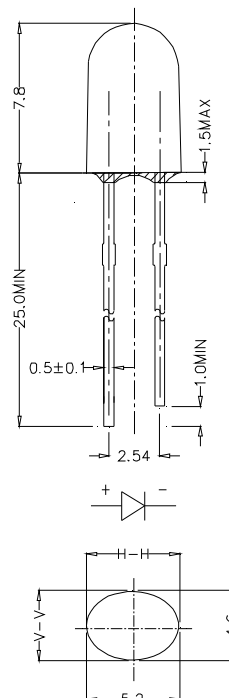
An epoxy meniscus may extend about 1.5 mm down the leads.

Burr around bottom of epoxy may be 0.5 mm max.

C566C-RFF/GFF/BFF/AFF:



C566C-RFE/GFE/BFE/AFE:



## NOTES

### Lead Frame Materials

Ag-plated and Lead-free Solder-plated iron.

### 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 by EU member states on January 2, 2013 and amended on March 31, 2015 by EU Directive 2015/863/EU.

RoHS Declarations for this product can be obtained from your Cree representative or from the Product Ecology section of the Cree website.

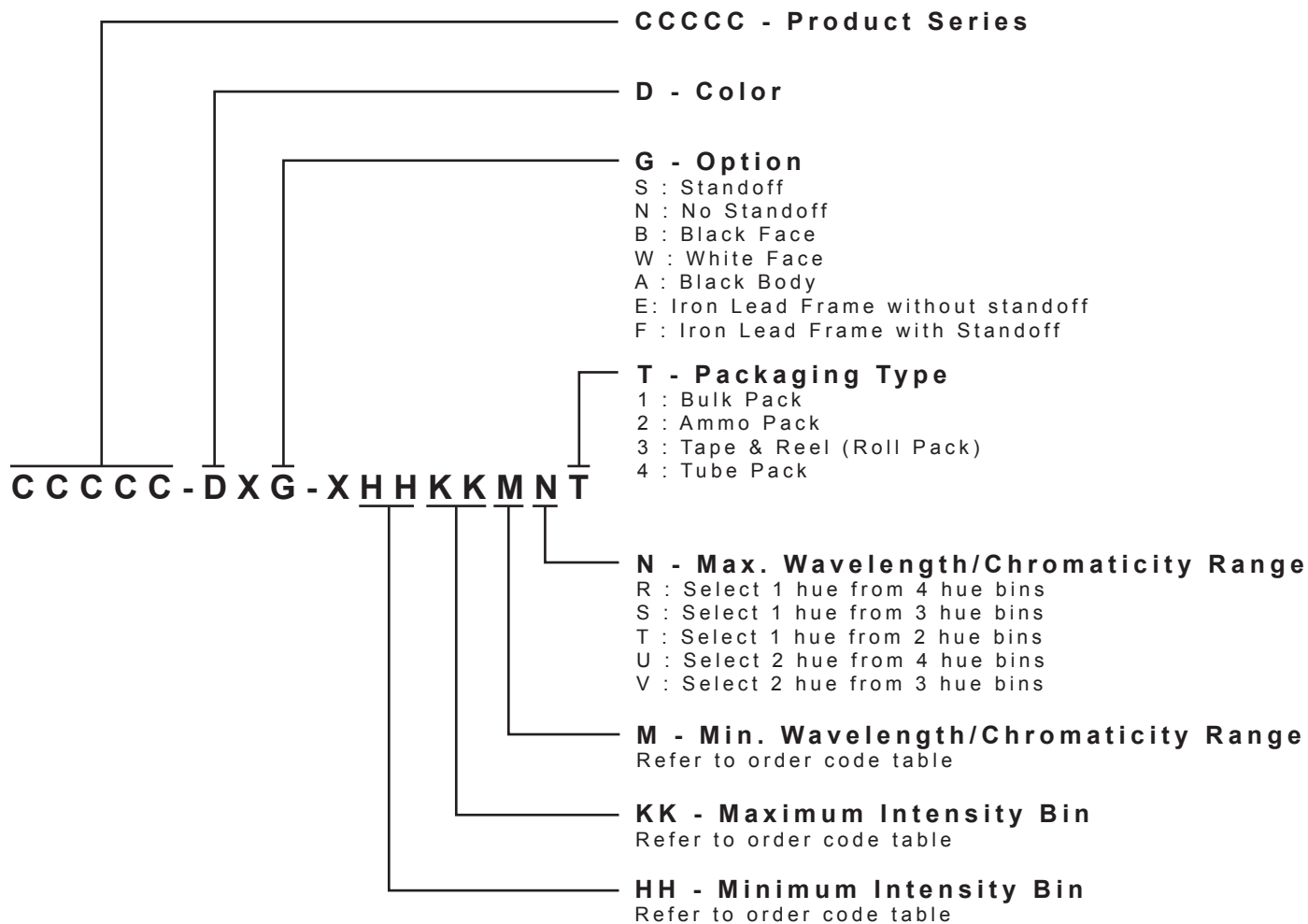
### Vision Advisory Claim

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

## KIT NUMBER SYSTEM

All dimensions in mm. 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:



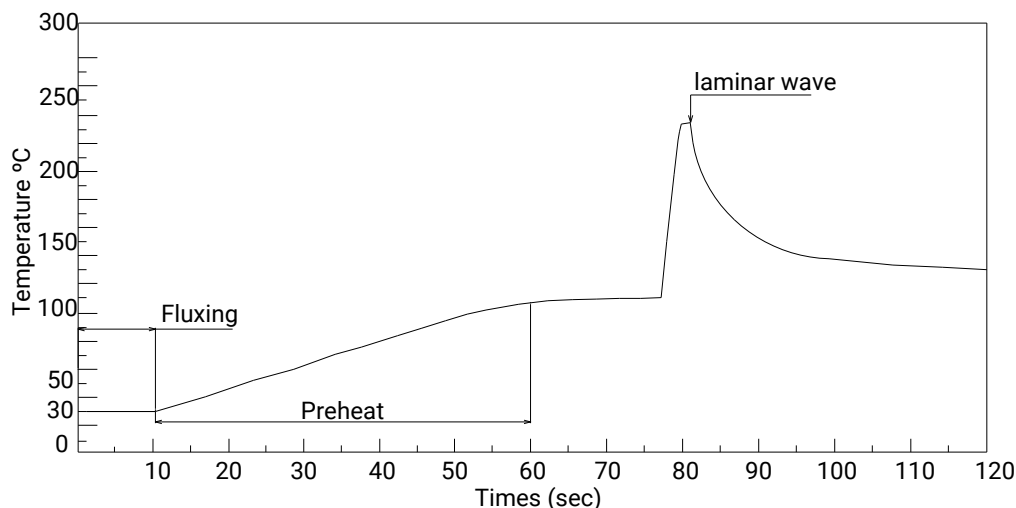
\* Please contact our sales representative for ordering information.

## REFLOW SOLDERING

The LED soldering specification is shown below (suitable for both leaded solder & lead-free solder):

Manual Soldering		Solder Dipping	
Soldering iron	35 W max	Preheat	110 °C max
Temperature	300 °C max	Preheat time	60 seconds max
		Solder-bath temperature	260 °C Max
Soldering time	3 seconds max	Dipping time	5 seconds max
Position	Not less than 3 mm from the base of the package.	Position	Not less than 3 mm from the base of the package.

- Manual soldering onto the PCB is not recommended because soldering time is uncontrollable.
- The recommended wave soldering is as below:



- Do not apply any stress to the LED package, particularly when heated.
- Only bottom preheat is suggested & should not preheat on top in order to reduce thermal stress experienced by the LEDs.
- The LEDs must not be re used once they have been extracted from PCB.
- After soldering the LEDs, the package should be protected from mechanical shock or vibration until the LEDs have reached 40 °C or below.
- Precautions must be taken as mechanical stress on the LEDs may be caused by PCB warpage or from the clinching and cutting of the LED leads.
- When it is necessary to clam the LEDs during soldering, it is important to ensure no mechanical stress is exerted on the LEDs.
- Cut the LED lead at normal room temperature. Lead cutting at high temperature may cause failure of the LEDs.

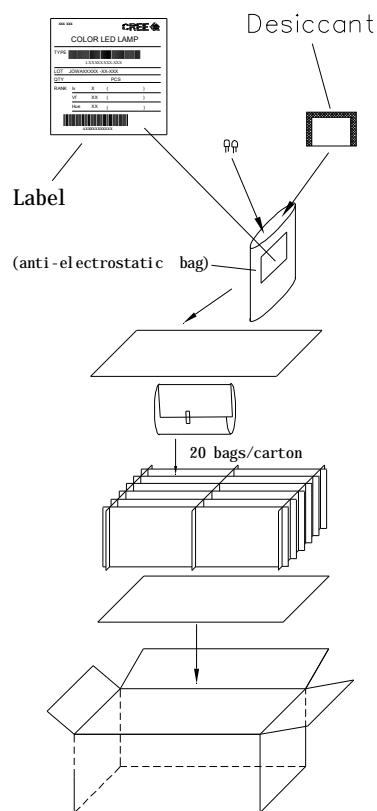
Refer to "<http://www.cree.com/led-components/media/documents/sh-HB.pdf>" for soldering & handling details.

## **PACKAGING**

### **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.
- The Bulk Pack types of packaging.
- Max 500 pcs per bulk and Max 2500 pcs per ammo.

### **Bulk Pack Packaging Type:**



### **Ammo Pack Packaging Type:**

