

# Cree® 5-mm Red and Amber Round LED

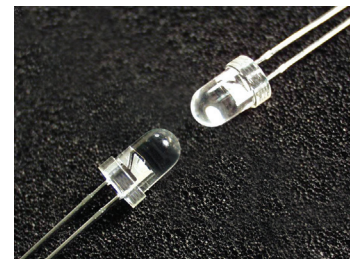
## C503T-RAS/RAN (15 degrees)

## C503T-RCS/RCN/ACS (30 degrees)

### Data Sheet

Round LEDs offer superior light output for excellent readability in sunlight and dependable performance. They provide extremely stable light output over long periods of time.

These lamps are made with an advanced optical-grade epoxy offering superior high-temperature and high-moisture resistance performance in outdoor signal and sign applications.



#### FEATURES

- Size (mm): 5
- Color and Typical Dominant Wavelength (nm):
  - » Red (628)
  - » Amber (591)
- Luminous Intensity (mcd)
  - » C503T-RAS/RAN (4180-16800)
  - » C503T-RCS/RCN (2130-8200)
  - » C503T-ACS (2130-5860)
- Viewing Angle:
  - » C503T-RAS/RAN: 15 degree
  - » C503T-RCS/RCN/ACS: 30 degree
- Lead-Free
- RoHS-Compliant

#### APPLICATIONS

- Electronic Signs & Signals (ESS)
- Motorway Signs
- Variable-Message Sign (VMS)
- Advertising Signs
- Petrol Signs
- Amusement

## Absolute Maximum Ratings ( $T_A = 25^\circ\text{C}$ )

Items	Symbol	Absolute Maximum Rating	Unit
		Red/Amber	
Forward Current	$I_F$	50 <sup>Note1</sup>	mA
Peak Forward Current <sup>Note2</sup>	$I_{FP}$	200	mA
Reverse Voltage	$V_R$	5	V
Power Dissipation	$P_D$	130	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	

### Notes:

- 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.
- 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		2.3	2.6
Reverse Current	Red/Amber		$I_R$	$V_R = 5$ V	$\mu\text{A}$			100
Dominant Wave-length	Red		$\lambda_D$	$I_F = 20$ mA	nm	620	628	635
	Amber		$\lambda_D$	$I_F = 20$ mA	nm	584	591	596
Luminous Intensity	Red	C503T-RAS/RAN (15 degree)	$I_v$	$I_F = 20$ mA	mcd	4180	6500	
		C503T-RCS/RCN (30 degree)	$I_v$	$I_F = 20$ mA	mcd	2130	3300	
	Amber	C503T-ACS (30 degree)	$I_v$	$I_F = 20$ mA	mcd	2130	3300	
50% Power Angle	C503T-RAS/RAN		$2\theta_{1/2}$	$I_F = 20$ mA	deg		15	
	C503T-RCS/RCN/ACS		$2\theta_{1/2}$	$I_F = 20$ mA	deg		30	

## Intensity Bin Limit ( $I_F = 20 \text{ mA}$ )

### Red

#### C503T-RAS/RAN (15 degree)

Bin Code	Min. (mcd)	Max. (mcd)
X0	4180	5860
Y0	5860	8200
Z0	8200	12000
A0	12000	16800

### Amber

#### C503T-ACS (30 degree)

Bin Code	Min. (mcd)	Max. (mcd)
V0	2130	3000
W0	3000	4180
X0	4180	5860

#### C503T-RCS/RCN (30 degree)

Bin Code	Min. (mcd)	Max. (mcd)
V0	2130	3000
W0	3000	4180
X0	4180	5860
Y0	5860	8200

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

## Color Bin Limit ( $I_F = 20 \text{ mA}$ )

### Red

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

### Amber

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

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

## Order Code Table\*

### Red (15 degree)

Color	Kit Number	Viewing Angle	Luminous Intensity (mcd)		Dominant Wavelength				Package	Standoff
			Min.	Max.	Color Bin	Min. (nm)	Color Bin	Max. (nm)		
Red	C503T-RAS-CX0A0CC1	15	4180	16800	RC	620	RC	635	Bulk	Yes
Red	C503T-RAN-CX0A0CC1	15	4180	16800	RC	620	RC	635	Bulk	No
Red	C503T-RAS-CX0A0CC2	15	4180	16800	RC	620	RC	635	Ammo	Yes
Red	C503T-RAN-CX0A0CC2	15	4180	16800	RC	620	RC	635	Ammo	No

### Red (30 degree)

Color	Kit Number	Viewing Angle	Luminous Intensity (mcd)		Dominant Wavelength				Package	Standoff
			Min.	Max.	Color Bin	Min. (nm)	Color Bin	Max. (nm)		
Red	C503T-RCS-CV0Y0CC1	30	2130	8200	RC	620	RC	635	Bulk	Yes
Red	C503T-RCN-CV0Y0CC1	30	2130	8200	RC	620	RC	635	Bulk	No
Red	C503T-RCS-CV0Y0CC2	30	2130	8200	RC	620	RC	635	Ammo	Yes
Red	C503T-RCN-CV0Y0CC2	30	2130	8200	RC	620	RC	635	Ammo	No

### Amber (30 degree)

Color	Kit Number	Viewing Angle	Luminous Intensity (mcd)		Dominant Wavelength				Package	Standoff
			Min.	Max.	Color Bin	Min. (nm)	Color Bin	Max. (nm)		
Amber	C503T-ACS-CV0X0251	30	2130	5860	A2	584	A5	596	Bulk	Yes
Amber	C503T-ACS-CV0X0351	30	2130	5860	A3	587	A5	596	Bulk	Yes
Amber	C503T-ACN-CV0X0251	30	2130	5860	A2	584	A5	596	Bulk	No
Amber	C503T-ACN-CV0X0351	30	2130	5860	A3	587	A5	596	Bulk	No
Amber	C503T-ACS-CV0X0252	30	2130	5860	A2	584	A5	596	Ammo	Yes
Amber	C503T-ACS-CV0X0352	30	2130	5860	A3	587	A5	596	Ammo	Yes
Amber	C503T-ACN-CV0X0252	30	2130	5860	A2	584	A5	596	Ammo	No
Amber	C503T-ACN-CV0X0352	30	2130	5860	A3	587	A5	596	Ammo	No

### 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 or ammo. Single intensity-bin codes and single color-bin codes will not be orderable.
- Please refer to the "Cree LED Lamp Reliability Test Standards" document for reliability test conditions.
- Please refer to the "Cree LED Lamp Soldering & Handling" document for information about how to use this LED product safely.

## Graphs

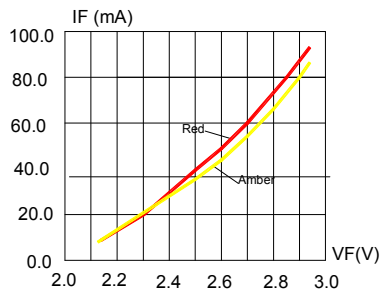


FIG.1 FORWARD CURRENT VS. FORWARD VOLTAGE.

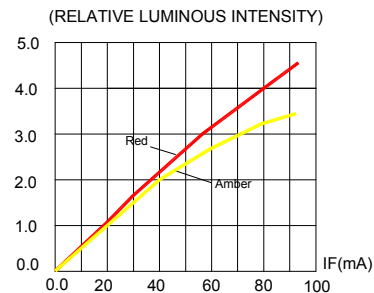


FIG.2 RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT

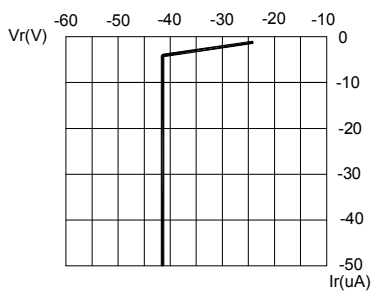


FIG.3 RED & AMBER REVERSE CURRENT VS. REVERSE VOLTAGE.

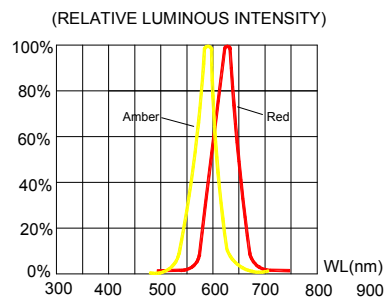


FIG.4 RELATIVE LUMINOUS INTENSITY VS. WAVELENGTH.

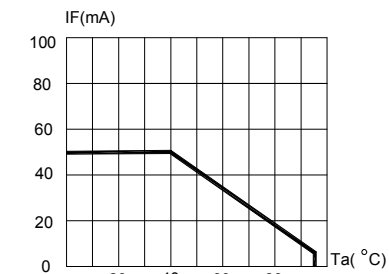


FIG.5 RED & AMBER MAXIMUM FORWARD DC CURRENT VS AMBIENT TEMPERATURE ( $T_{jmax}=105^{\circ}\text{C}$ )

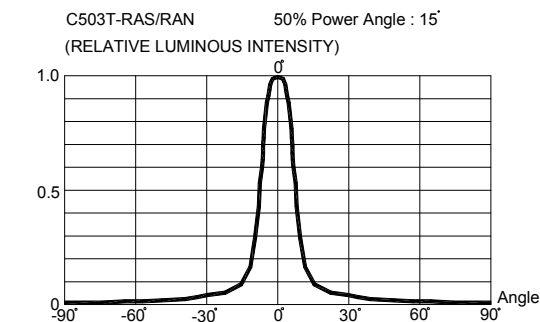


FIG.6 FAR FIELD PATTERN

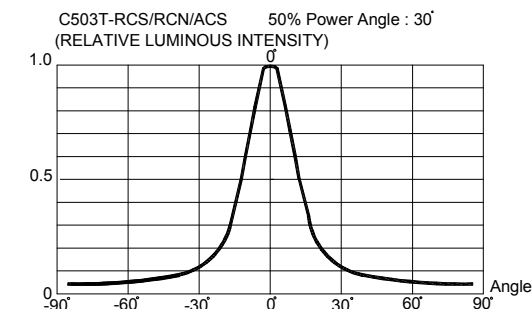


FIG.7 FAR FIELD PATTERN

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.

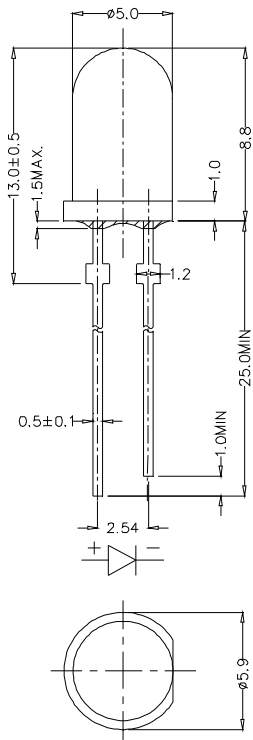
## Mechanical Dimensions

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

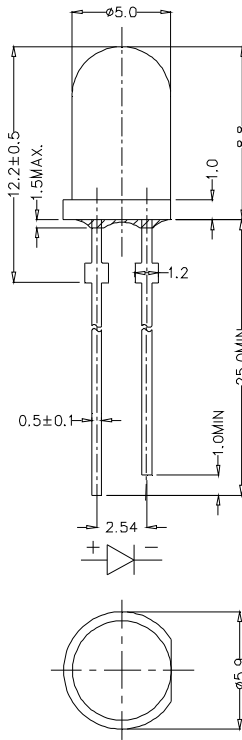
An epoxy meniscus may extend about 1.5 mm down the leads.

Burr around bottom of epoxy may be 0.5 mm max.

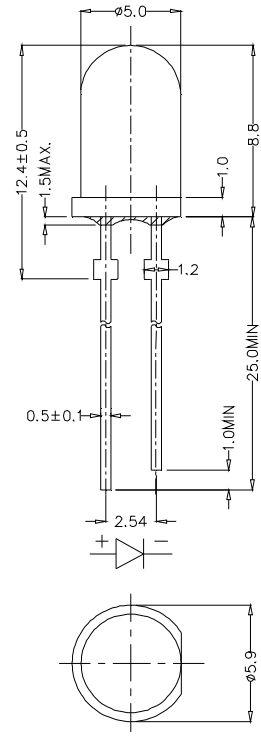
C503T-RAS:



C503T-RCS:



C503T-ACS:



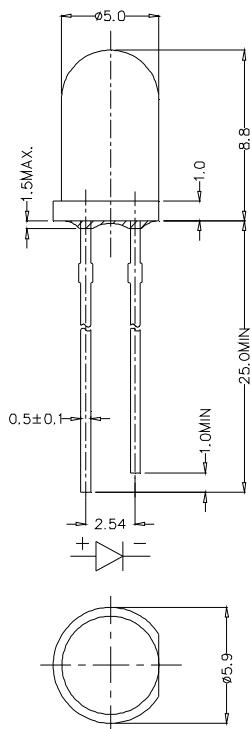
## Mechanical Dimensions

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.

C503T-RAN/RCN:



## 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

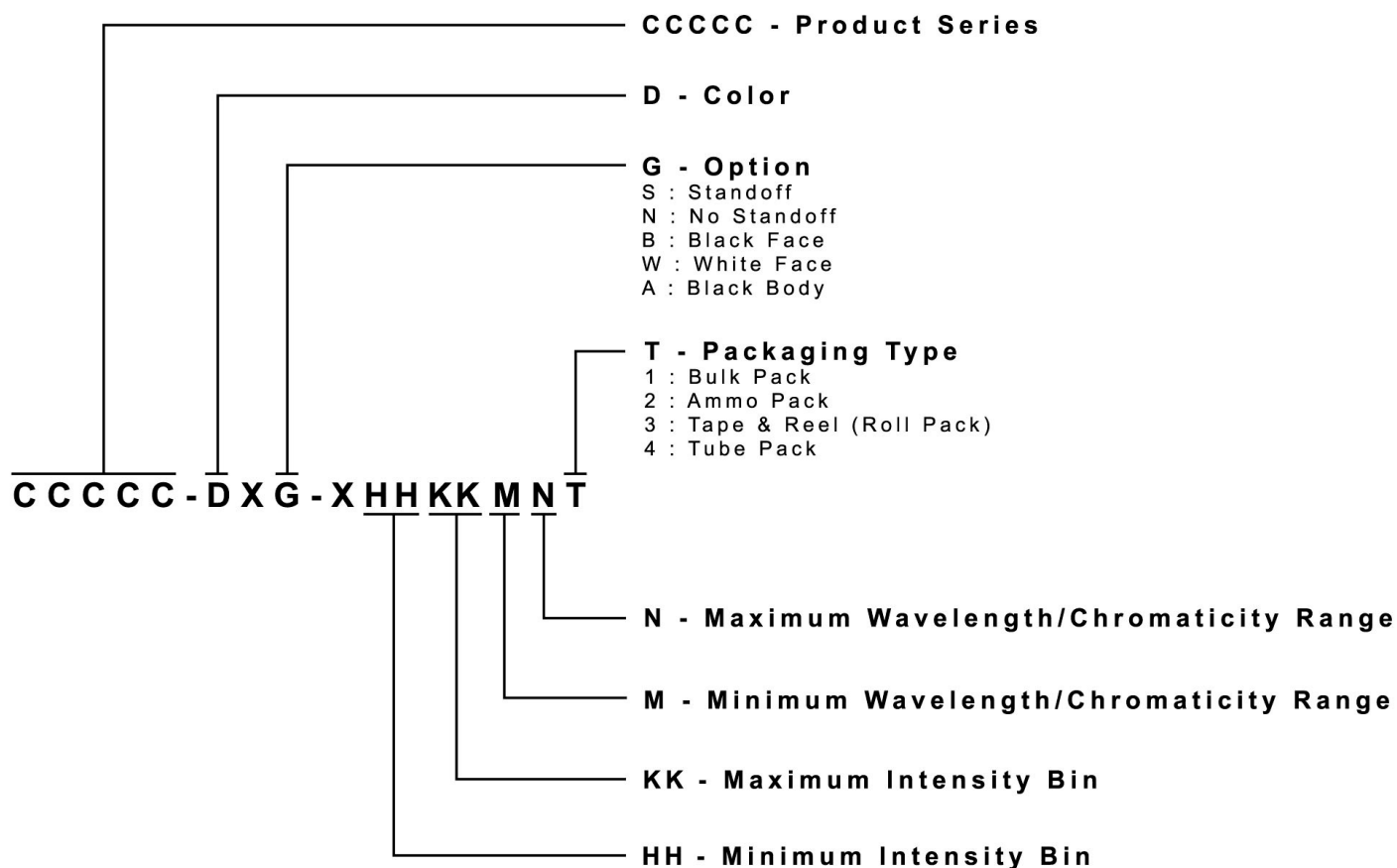
Users should be cautioned not to stare at the light of this LED product. The bright light can damage the eye.



## 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:



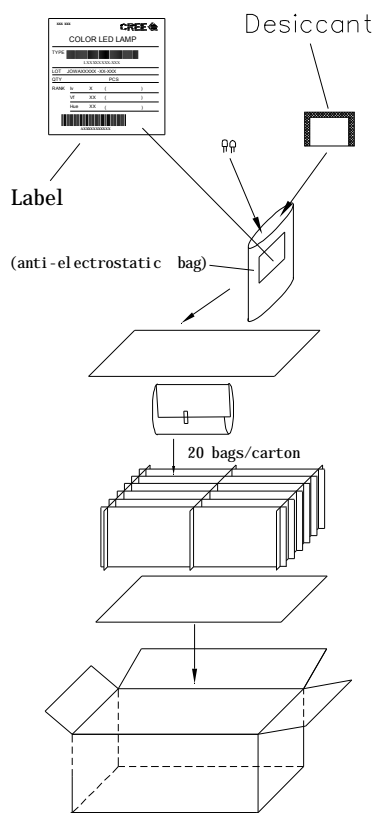


## Package

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

### Bulk Pack Packaging Type:



### Ammo Pack Packaging Type:

