Cree[®] Screen Master[®] 4-mm Oval LED C4SMA-RGF/GGF/BGF

PRODUCT DESCRIPTION

CREE 🔶

These oval LEDs are specifically designed for full-color video screens, digital billboards and passenger-information signs. The oval-shaped radiation pattern and high luminous intensity ensure that these devices are excellent for bright sunlight or low power consumption outdoor applications.

These lamps are made with an advanced optical-grade epoxy that offers superior high-temperature and highmoisture-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): 4
- Color and Typical Dominant Wavelength: Red (621nm) Green(527nm) Blue(472nm)
- Luminous Intensity (mcd) C4SMA-RGF: (1017-2347) C4SMA-GGF: (1672-3885) C4SMA-BGF: (605-1415)
- Lead Free
- RoHS Compliant



APPLICATIONS

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



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ABSOLUTE MAXIMUM RATINGS ($T_A = 25^{\circ}C$)

Items	Symbol	Absolute Max	kimum Rating	Unit	
		Red	Blue and Green		
Forward Current	I _F	50 Note1	35	mA	
Peak Forward Current Note2	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	°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)			
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 ≤ 0.1 msec, duty $\leq 1/10$.

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

Characteristics	Color	Symbol	Condition	Unit	Minimum	Typical	Maximum
	Red	V _F	$I_{F} = 15 \text{ mA}$	V		2.0	2.6
Forward Voltage	Green	V _F	$I_{F} = 10 \text{ mA}$	V		3.0	3.8
	Blue	V _F	$I_F = 10 \text{ mA}$	V		2.9	3.8
Deveree Comment	Red	I _R	$V_{R} = 5 V$	μA			100
Reverse Current	Blue/Green	I _R	$V_{R} = 5 V$	μA			100
	Red	λ_{D}	$I_{F} = 15 \text{ mA}$	nm	619	621	624
Dominant Wavelength	Green	$\lambda_{\rm D}$	$I_{F} = 10 \text{ mA}$	nm	520	527	535
	Blue	λ_{D}	$I_{F} = 10 \text{ mA}$	nm	465	472	475
	Red	I_v	$I_{F} = 15 \text{ mA}$	mcd	1017	1500	
Luminous Intensity	Green	Iv	$I_{F} = 10 \text{ mA}$	mcd	1672	2500	
	Blue	Iv	$I_F = 10 \text{ mA}$	mcd	605	900	

Note: Continuous reverse voltage can cause LED damage.

INTENSITY BIN LIMIT (RED $I_F = 15 \text{ mA}$, GREEN $I_F = 10 \text{ mA}$, BLUE $I_F = 10 \text{ mA}$)

Red: C4SM	C4SMA-RGF			Green: C4SMA-GGF			Blue: C4SM	1A-BGF	
Bin Code	Min.(mcd)	Max.(mcd)		Bin Code	Min.(mcd)	Max.(mcd)	Bin Code	Min.(mcd)	Max.(mcd)
S4	1017	1100		U2	1672	1824	R2	605	660
T1	1100	1205		U3	1824	1976	R3	660	715
T2	1205	1310		U4	1976	2130	R4	715	770
Т3	1310	1415		V1	2130	2347	S1	770	852
T4	1415	1520		V2	2347	2564	S2	852	934
U1	1520	1672		V3	2564	2781	S3	934	1017
U2	1672	1824		V4	2781	3000	S4	1017	1100
U3	1824	1976		W1	3000	3295	T1	1100	1205
U4	1976	2130		W2	3295	3590	T2	1205	1310
V1	2130	2347		W3	3590	3885	Т3	1310	1415

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

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

Bin Code	Min.(nm)	Max.(nm)
B4	465	470
B45	467.5	472.5
B5	470	475

 \bullet Tolerance of measurement of dominant wavelength is $\pm 1 \mbox{ nm}$

ORDER CODE TABLE*

C4SMA-RGF

		Luminous Intensity (mcd)			- Pack-			
Color	Kit Number	Min.	Max.	Color Bin	Min. (nm)	Color Bin	Max. (nm)	age
Red	C4SMA-RGF-CS4V1BB1	1017	2347	RB	619	RB	624	Bulk
Red	C4SMA-RGF-CT24QBB1	Any 4 consecutive sub-bi	ns: T2(1205) - U3(1976)	RB	619	RB	624	Bulk
Red	C4SMA-RGF-CT34QBB1	Any 4 consecutive sub-bi	ns: T3(1310) - U4(2130)	RB	619	RB	624	Bulk
Red	C4SMA-RGF-CS4V1BB2	1017	2347	RB	619	RB	624	Ammo
Red	C4SMA-RGF-CT24QBB2	Any 4 consecutive sub-bi	ns: T2(1205) - U3(1976)	RB	619	RB	624	Ammo
Red	C4SMA-RGF-CT34QBB2	Any 4 consecutive sub-bi	ns: T3(1310) - U4(2130)	RB	619	RB	624	Ammo

C4SMA-GGF

		Luminous Intensity (mcd)			Pack-			
Color	Kit Number	Min.	Max.	Color Bin	Min. (nm)	Color Bin	Max. (nm)	age
Green	C4SMA-GGF-CU2W3791	1672	3885	G7	520	G9	535	Bulk
Green	C4SMA-GGF-CU44Q7C1	Any 4 consecutive sub-bir	ns: U4(1976) - W1(3295)	Any 1 c	olor bin from	G7 (520) to G	69 (535)	Bulk
Green	C4SMA-GGF-CV14Q7C1	Any 4 consecutive sub-bir	ns: V1(2130) - W2(3590)	Any 1 c	69 (535)	Bulk		
Green	C4SMA-GGF-CU2W3792	1672	3885	G7	520	G9	535	Ammo
Green	C4SMA-GGF-CU44Q7C2	Any 4 consecutive sub-bins: U4(1976) - W1(3295)		Any 1 color bin from G7 (520) to G9 (535)			69 (535)	Ammo
Green	C4SMA-GGF-CV14Q7C2	Any 4 consecutive sub-bir	ns: V1(2130) - W2(3590)	Any 1 color bin from G7 (520) to G9 (535)				Ammo

ORDER CODE TABLE*

C4SMA-BGF

01011								
		Luminous Intensity (mcd)		Dominant Wavelength				
Color	Kit Number	Min.	Max.	Color Bin	Min. (nm)	Color Bin	Max. (nm)	- Pack- age
Blue	C4SMA-BGF-CR2T3451	605	1415	B4	465	B5	475	Bulk
Blue	C4SMA-BGF-CR34Q4S1	Any 4 consecutive sub-b	ins: R3(660) - S4(1100)	Any 1 color bin from B4 (465) to B5 (475)				Bulk
Blue	C4SMA-BGF-CR44Q4S1	Any 4 consecutive sub-b	ins: R4(715) - T1(1205)	Any 1 color bin from B4 (465) to B5 (475)				Bulk
Blue	C4SMA-BGF-CR2T3452	605	1415	B4	465	B5	475	Ammo
Blue	C4SMA-BGF-CR34Q4S2	Any 4 consecutive sub-bins: R3(660) - S4(1100)		Any 1 color bin from B4 (465) to B5 (475)			5 (475)	Ammo
Blue	C4SMA-BGF-CR44Q4S2	Any 4 consecutive sub-b	ins: R4(715) - T1(1205)	Any 1 color bin from B4 (465) to B5 (475)				Ammo

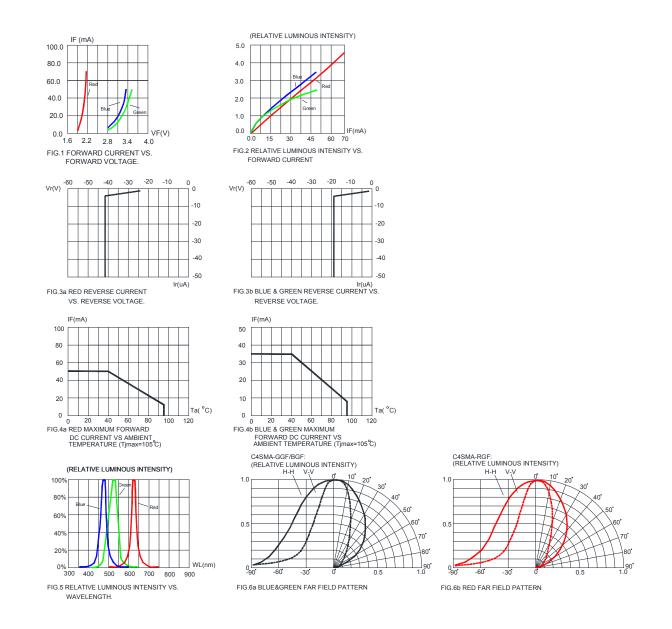
Notes:

- 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 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.

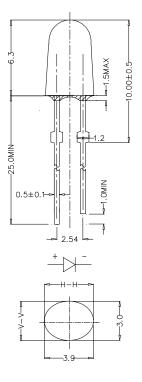


MECHANICAL DIMENSIONS

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.



NOTES

Lead Frame Materials

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

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

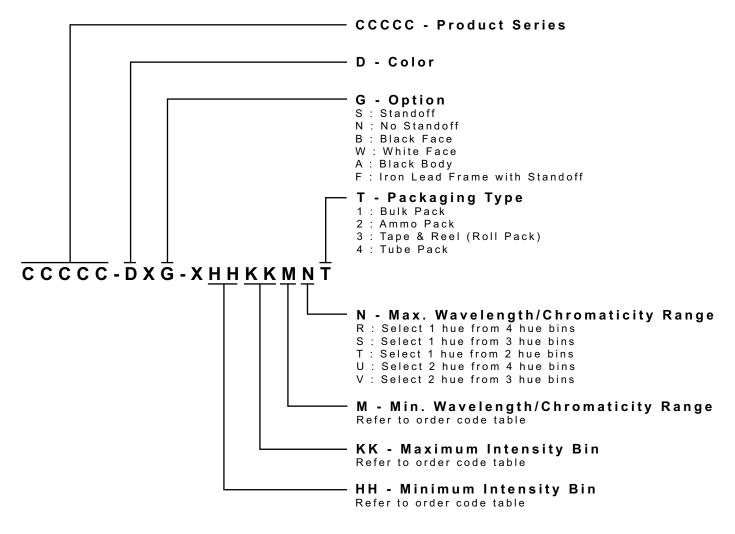
Users should be cautioned not to stare at the light of this LED product. The bright light can damage the eye.



KIT NUMBER SYSTEM

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.



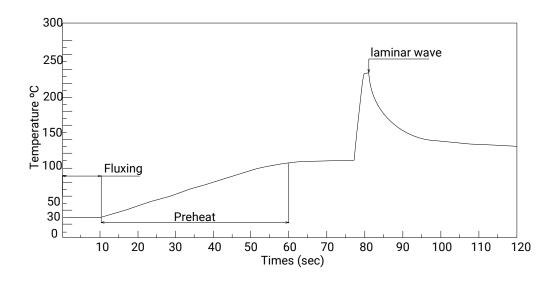
REFLOW SOLDERING

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	
Tomporatura	200.00 may	Preheat time	60 seconds max	
Temperature	300 °C 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 1000 pcs per bulk and Max 3000 pcs per ammo.

Bulk Pack Packaging Type:

Ammo Pack Packaging Type:

