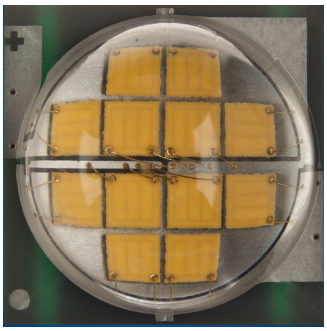
Cree® XLamp® MT-G EasyWhite™ LEDs



PRODUCT DESCRIPTION

The XLamp MT-G EasyWhite LED maximizes lumen density, eliminates chromaticity binning, and enables luminaire and bulb manufacturers to deliver consistent color and high efficacy light output in a new, compact, multi-die package. XLamp MT-G EasyWhite LEDs can reduce LED-to-LED color variation to within a 2-step MacAdam ellipse, 94% smaller than the total area of the corresponding ANSI C78.377 color region.

The XLamp MT-G EasyWhite LED is the perfect choice for lighting applications where high luminous flux output is required from a single, small point source. Example applications include: LED retrofit bulbs, commercial/retail display spotlights, and other indoor general illumination applications.

FEATURES

- Cree EasyWhite color temperatures
- Wide Range of operating current - up to 4 A
- 85° C binning and characterization
- Low effective thermal resistance 1.5° C/W
- High lumen density
- Wide viewing angle: 120°
- Minimum 80 CRI at 2700 K and 3000 K CCT
- Electrically neutral thermal path

APPLICATIONS

- MR, PAR and other directional retrofit bulbs
- Commercial/residential directional lighting
- General indoor/outdoor illumination

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PRODUCT CHARACTERISTICS

Characteristics	Unit	Minimum	Typical	Maximum
Viewing Angle (FWHM)	degrees		120	
ESD Classification (HBM per Mil-Std-883D)			Class 2	
Effective Thermal Resistance, Junction to Solder-point	°C/W		1.5	
LED Junction Temperatures	°C			150
DC Forward Current	mA			4000
Forward Voltage (at 1100 mA, 85° C)	V		5.6	
Temperature Coefficient of Voltage	mV/°C		-4.5	
Reverse Voltage	V			-5
Moisture Sensitivity Level Rating (MSL)			MSL 1	

FLUX CHARACTERISTICS @ 1100 MA (T_J =85° C)

The following table provides several base order codes for XLamp MT-G EasyWhite LEDs. For additional order codes, as well as a complete description of the order-code nomenclature, please reference pages 6 through 8 of this document.

Color	CCT Range	Base Order Codes Min Luminous Flux (lm) (Tj =85° C)		Order Code
		Group	Flux (lm)	
EasyWhite 4-Step	4,000 K	F0	480	MTGEZW-00-0000-0B00F040F
		G0	520	MTGEZW-00-0000-0B00G040F
		H0	560	MTGEZW-00-0000-0B00H040F
	3,500 K	E0	440	MTGEZW-00-0000-0B00E035F
		F0	480	MTGEZW-00-0000-0B00F035F
		G0	520	MTGEZW-00-0000-0B00G035F
	3,000 K	E0	440	MTGEZW-00-0000-0B00E030F
		F0	480	MTGEZW-00-0000-0B00F030F
		G0	520	MTGEZW-00-0000-0B00G030F
	2,700 K	D0	400	MTGEZW-00-0000-0B00D027F
		E0	440	MTGEZW-00-0000-0B00E027F
		F0	480	MTGEZW-00-0000-0B00F027F

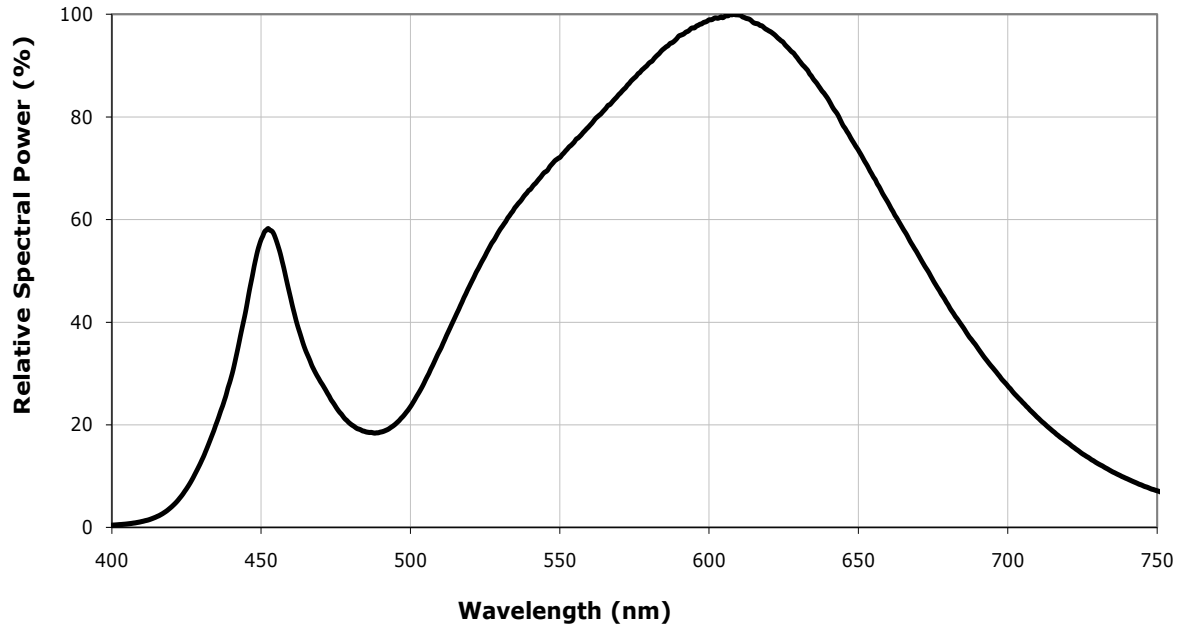
Notes:

- Cree maintains a tolerance of ±7% on flux and power measurements
- Minimum CRI for EasyWhite color temperatures 27F, 27H, 30F, 30H is 80
- Minimum CRI for EasyWhite color temperatures 35F, 35H, 40F, 40H is 77
- Typical CRI for EasyWhite color temperatures 35F, 35H, 40F, 40H is 80
- Cree maintains a tolerance of ±2 on CRI measurements

Color	CCT Range	Base Order Codes Min Luminous Flux (lm) (Tj =85° C)		Order Code
		Group	Flux (lm)	
EasyWhite 2-Step	4,000 K	F0	480	MTGEZW-00-0000-0B00F040H
		G0	520	MTGEZW-00-0000-0B00G040H
		H0	560	MTGEZW-00-0000-0B00H040H
	3,500 K	E0	440	MTGEZW-00-0000-0B00E035H
		F0	480	MTGEZW-00-0000-0B00F035H
		G0	520	MTGEZW-00-0000-0B00G035H
	3,000 K	E0	440	MTGEZW-00-0000-0B00E030H
		F0	480	MTGEZW-00-0000-0B00F030H
		G0	520	MTGEZW-00-0000-0B00G030H
	2,700 K	D0	400	MTGEZW-00-0000-0B00D027H
		E0	440	MTGEZW-00-0000-0B00E027H
		F0	480	MTGEZW-00-0000-0B00F027H

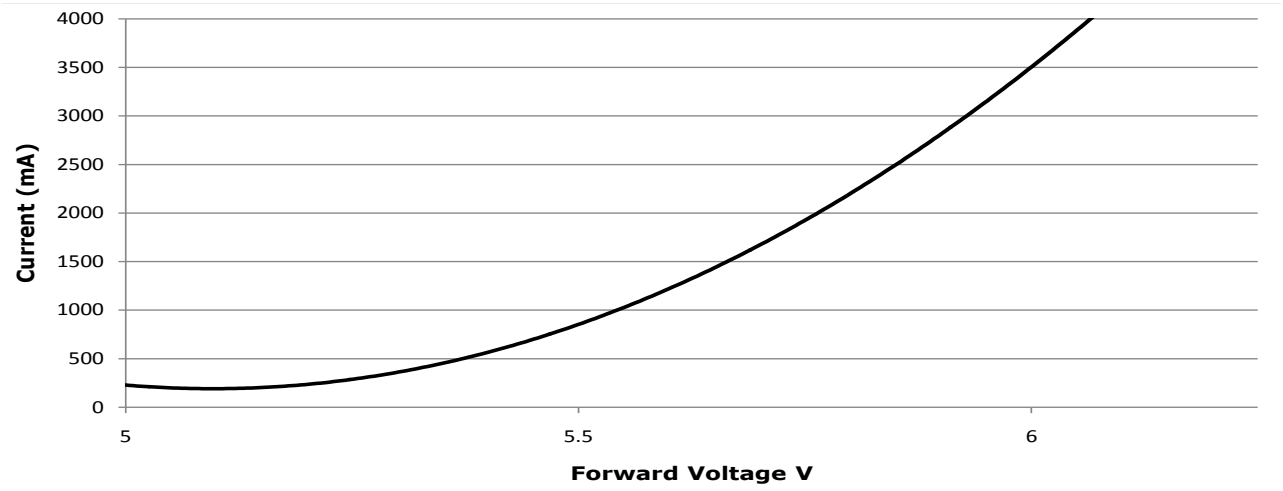
RELATIVE SPECTRAL POWER DISTRIBUTION (I_F = 1100 MA, T_J = 85°C, 3000K CCT)

The following graph represents typical spectral output of the XLamp MT-G EasyWhite LED.



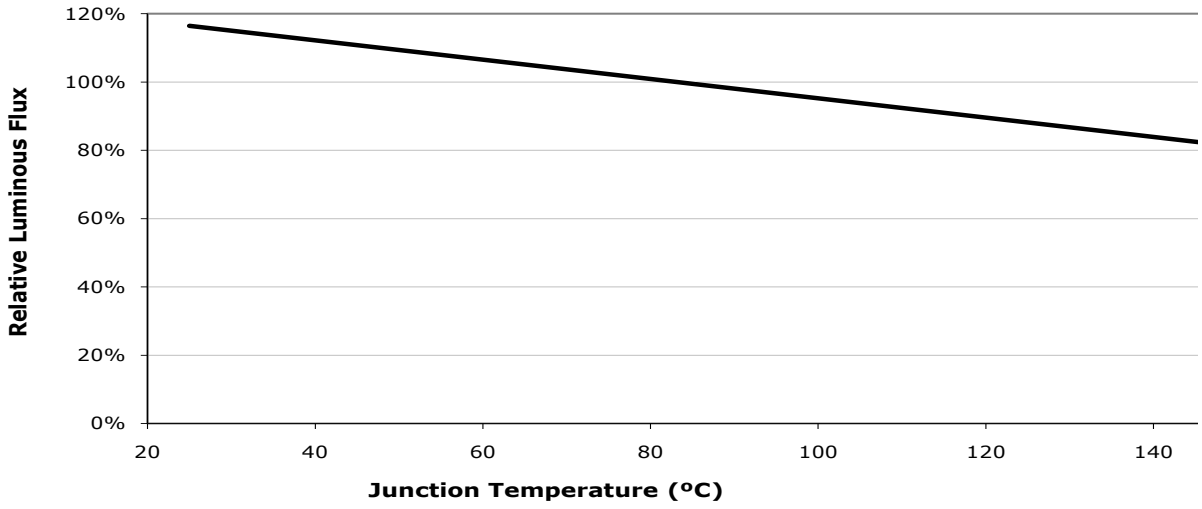
ELECTRICAL CHARACTERISTICS (T_J = 85°C)

The following graph represents typical electrical characteristics of the XLamp MT-G EasyWhite LED.



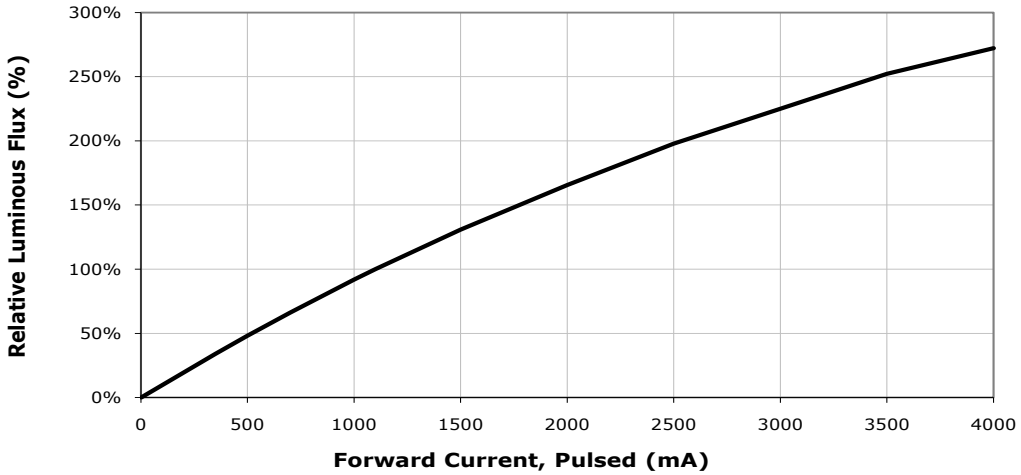
RELATIVE LUMINOUS FLUX VS JUNCTION TEMPERATURE (I_F = 1100 MA)

The following graph represents typical performance of the XLamp MT-G EasyWhite LED.



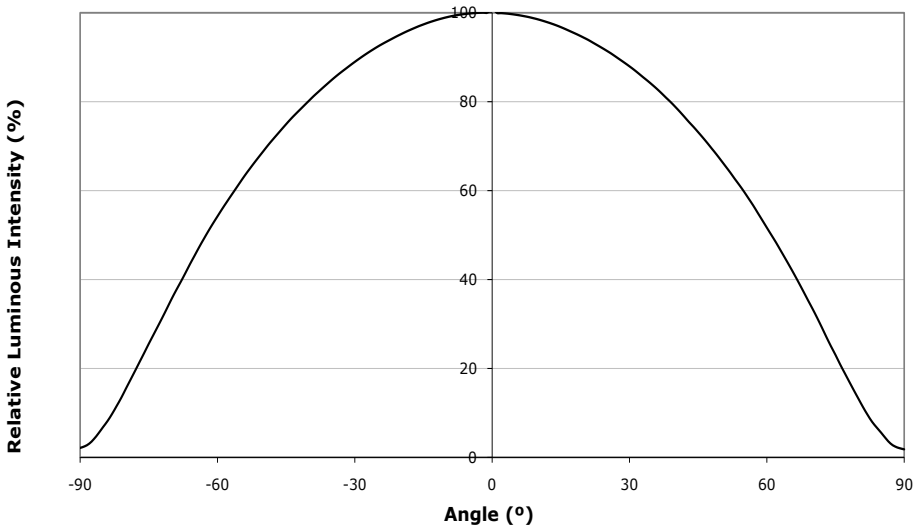
RELATIVE LUMINOUS FLUX VS CURRENT (T_J = 85°C)

The following graph represents typical performance of the XLamp MT-G EasyWhite LED.



TYPICAL SPATIAL DISTRIBUTION

The following graph represents typical performance of the XLamp MT-G EasyWhite LED.



PERFORMANCE GROUPS – BRIGHTNESS (I_F = 1100 MA, T_J = 85°C)

XLamp MT-G EasyWhite LEDs are tested for luminosity and placed into one the following bins.

Group Code	Min. Luminous Flux @ 1100 mA, Tj=85°C	Max. Luminous Flux @ 1100 mA, Tj=85°C
D0	400	440
E0	440	480
F0	480	520
G0	520	560
H0	560	600

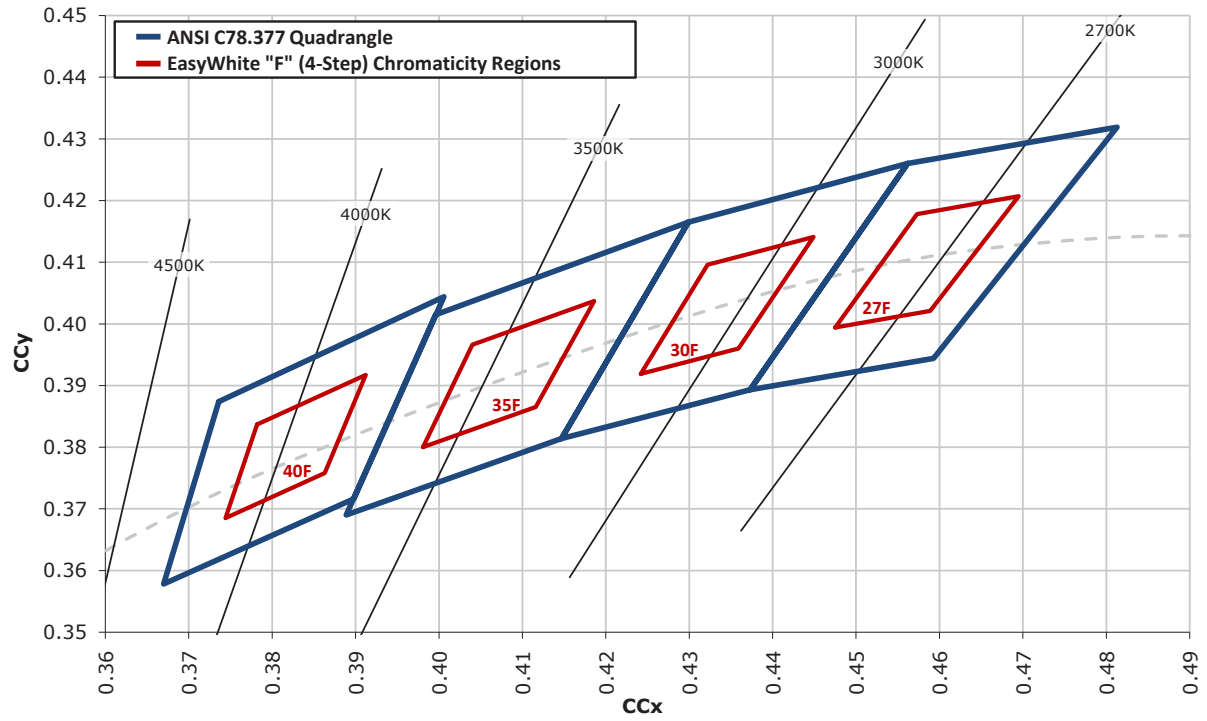
PERFORMANCE GROUPS – CHROMATICITY (T_J = 85°C)

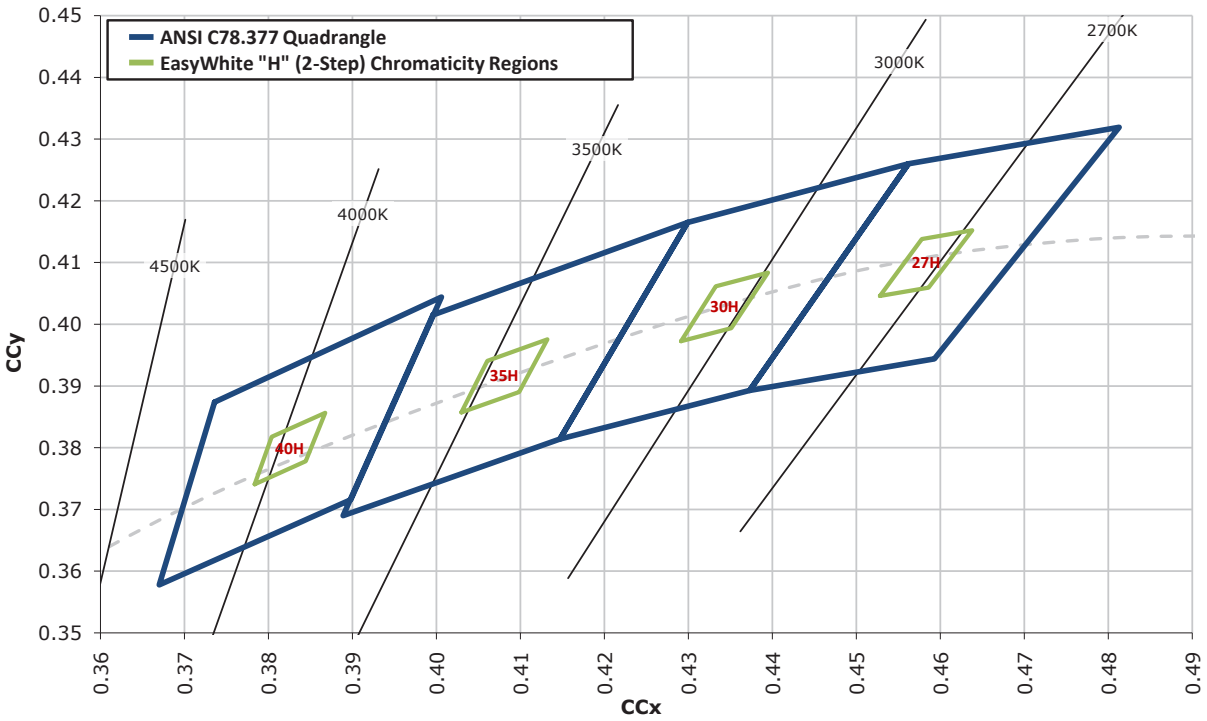
XLamp MT-G EasyWhite LEDs are tested for chromaticity and placed into one of the regions defined by the following bounding coordinates.

EasyWhite Color Temperatures – 4-Step			
Code	CCT	x	y
40F	4000 K	0.3744	0.3685
		0.3782	0.3837
		0.3912	0.3917
		0.3863	0.3758
35F	3500 K	0.3981	0.3800
		0.4040	0.3966
		0.4186	0.4037
		0.4116	0.3865
30F	3000 K	0.4242	0.3919
		0.4322	0.4096
		0.4449	0.4141
		0.4359	0.3960
27F	2700 K	0.4475	0.3994
		0.4573	0.4178
		0.4695	0.4207
		0.4589	0.4021

EasyWhite Color Temperatures – 2-Step			
Code	CCT	x	y
40H	4000 K	0.3784	0.3741
		0.3804	0.3818
		0.3867	0.3857
		0.3844	0.3778
35H	3500 K	0.4030	0.3857
		0.4061	0.3941
		0.4132	0.3976
		0.4099	0.3890
30H	3000 K	0.4291	0.3973
		0.4333	0.4062
		0.4395	0.4084
		0.4351	0.3994
27H	2700 K	0.4528	0.4046
		0.4578	0.4138
		0.4638	0.4152
		0.4586	0.4060

CREE EASYWHITE COLOR TEMPERATURES PLOTTED ON THE 1931 CIE CURVE (T_J = 85°C)

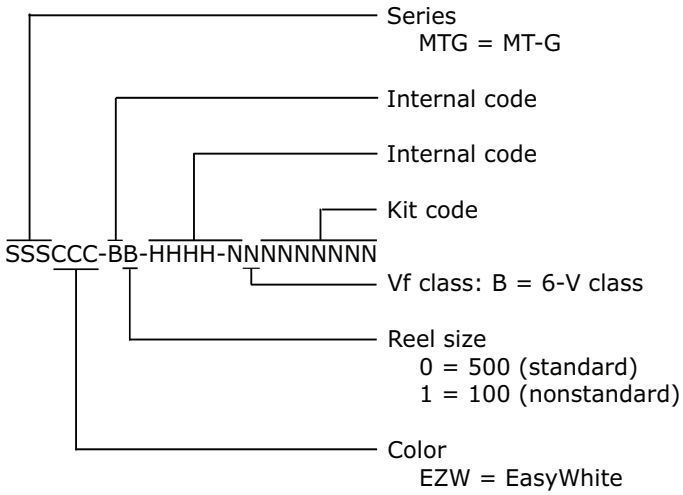




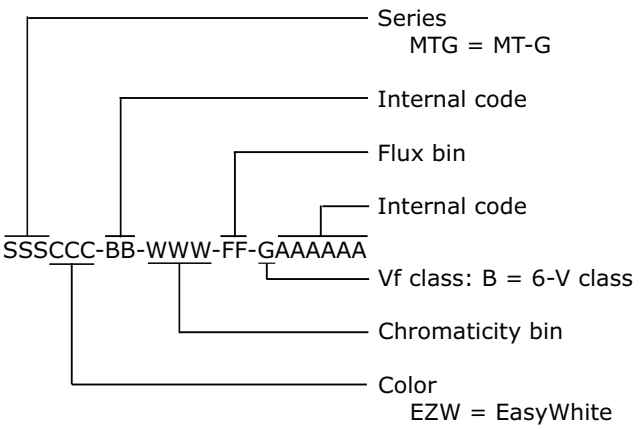
BIN AND ORDER CODE FORMAT

Bin codes and order codes are configured as follows:

Order Code



Bin Code



STANDARD ORDER CODES AND BINS (XLAMP MT-G EASYWHITE)

XLamp MT-G EasyWhite LED Standard Order Codes			
Min. Luminous Flux (lm) @ 1100 mA, Tj=85°C		Chromaticity Regions	Order Code
Group	Flux (lm)		
EasyWhite			
D0	400	27F	MTGEZW-00-0000-0B00D027F
		27H	MTGEZW-00-0000-0B00D027H
E0	440	27F	MTGEZW-00-0000-0B00E027F
		27H	MTGEZW-00-0000-0B00E027H
		30F	MTGEZW-00-0000-0B00E030F
		30H	MTGEZW-00-0000-0B00E030H
		35F	MTGEZW-00-0000-0B00E035F
		35H	MTGEZW-00-0000-0B00E035H
F0	480	27F	MTGEZW-00-0000-0B00F027F
		27H	MTGEZW-00-0000-0B00F027H
		30F	MTGEZW-00-0000-0B00F030F
		30H	MTGEZW-00-0000-0B00F030H
		35F	MTGEZW-00-0000-0B00F035F
		35H	MTGEZW-00-0000-0B00F035H
		40F	MTGEZW-00-0000-0B00F040F
		40H	MTGEZW-00-0000-0B00F040H
G0	520	30F	MTGEZW-00-0000-0B00G030F
		30H	MTGEZW-00-0000-0B00G030H
		35F	MTGEZW-00-0000-0B00G035F
		35H	MTGEZW-00-0000-0B00G035H
		40F	MTGEZW-00-0000-0B00G040F
		40H	MTGEZW-00-0000-0B00G040H
H0	560	40F	MTGEZW-00-0000-0B00H040F
		40H	MTGEZW-00-0000-0B00H040H

NOTES

Moisture Sensitivity

In testing, Cree has found XLamp MT-G EasyWhite LEDs to have unlimited floor life in conditions ≤30ºC / 85% relative humidity (RH). Moisture testing included a 168 hour soak at 85ºC / 85% RH followed by 3 reflow cycles, with visual and electrical inspections at each stage.

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.

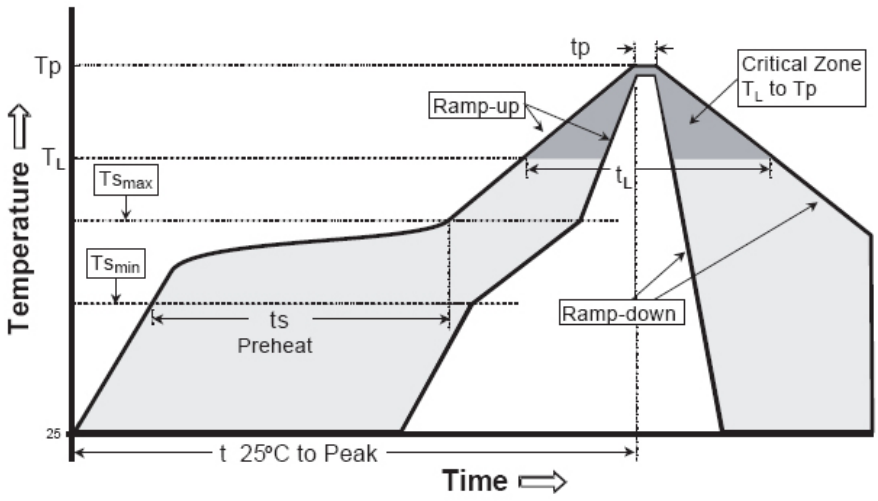
Vision Advisory Claim

WARNING. Do not look at exposed lamp in operation. Eye injury can result. For more information about LEDs and eye safety, please refer to the Cree LED Eye Safety application note.

REFLOW SOLDERING CHARACTERISTICS

In testing, Cree has found XLamp MT-G EasyWhite LEDs to be compatible with JEDEC J-STD-020C, using the parameters listed below. As a general guideline, Cree recommends that users follow the recommended soldering profile provided by the manufacturer of solder paste used.

Note that this general guideline may not apply to all PCB designs and configurations of reflow soldering equipment.

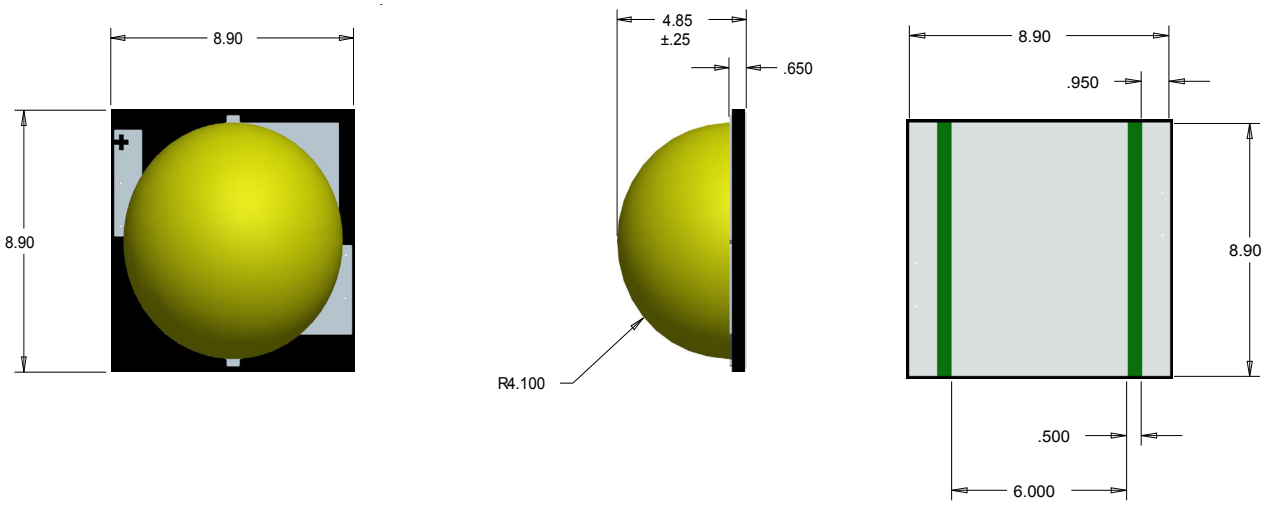


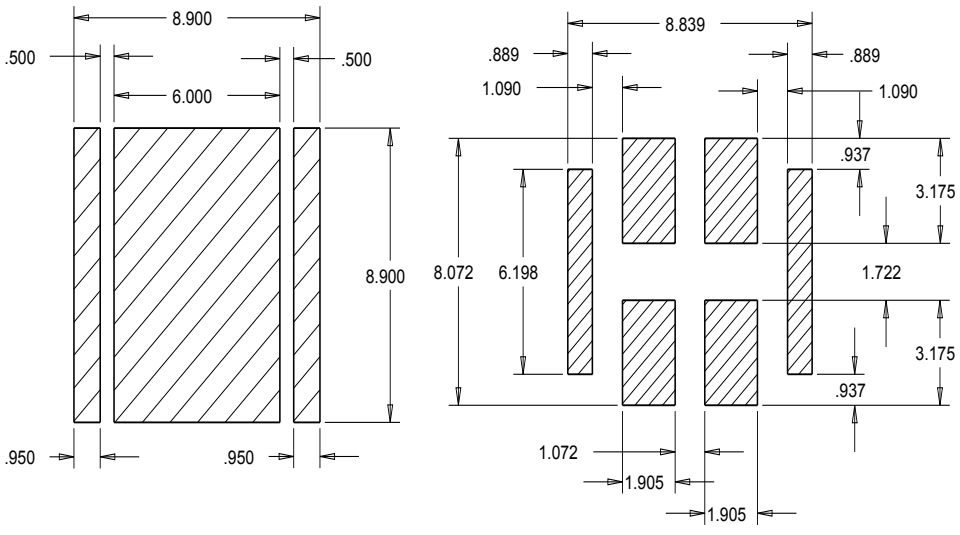
Profile Feature	Lead-Based Solder	Lead-Free Solder
Average Ramp-Up Rate (Ts_{max} to Tp)	3°C/second max.	3°C/second max.
Preheat: Temperature Min (Ts_{min})	100°C	150°C
Preheat: Temperature Max (Ts_{max})	150°C	200°C
Preheat: Time (ts_{min} to ts_{max})	60-120 seconds	60-180 seconds
Time Maintained Above: Temperature (T_L)	183°C	217°C
Time Maintained Above: Time (t_L)	60-150 seconds	60-150 seconds
Peak/Classification Temperature (Tp)	215°C	260°C
Time Within 5°C of Actual Peak Temperature (tp)	10-30 seconds	20-40 seconds
Ramp-Down Rate	6°C/second max.	6°C/second max
Time 25°C to Peak Temperature	6 minutes max.	8 minutes max.

Note: All temperatures refer to the topside of the package, measured on the package body surface.

MECHANICAL DIMENSIONS

All measurements are ±.13 mm unless otherwise indicated.

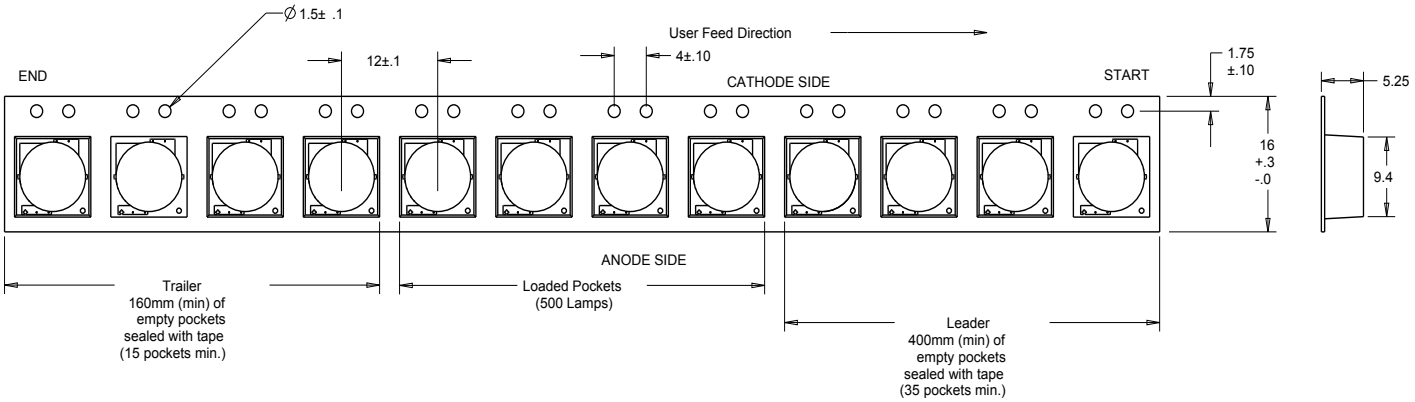


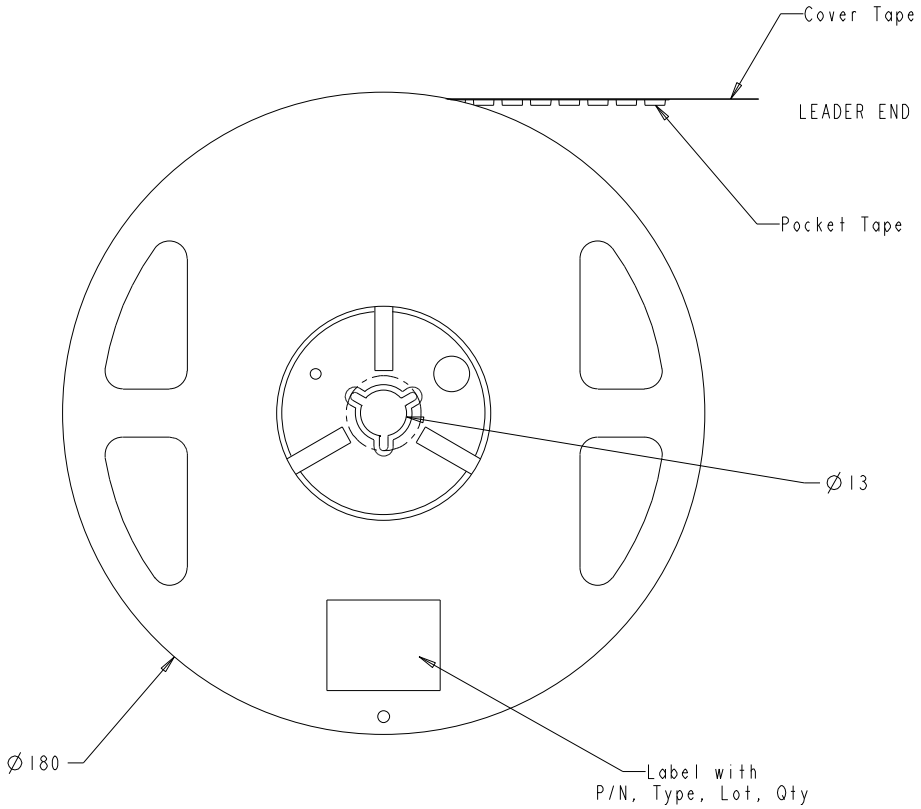


RECOMMENDED PC BOARD SOLDER PAD

RECOMMENDED STENCIL PATTERN

TAPE AND REEL





PACKAGING