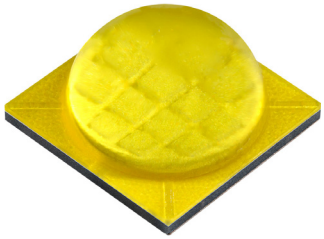
XLamp® MT-G2 EasyWhite® LEDs



PRODUCT DESCRIPTION

The XLamp® MT-G2 EasyWhite® LED builds on the breakthrough performance of the original MT-G by increasing lumen output up to 25%, while providing a small, uniform, single point source for precise optical control. The MT-G2 shares the same mechanical footprint as the original MT-G, providing customers with a seamless upgrade path and shortening the LED luminaire and retrofit lamp design cycle.

MT-G2 LEDs are designed for high-output, directional lighting applications and are the ideal replacement for lighting applications that currently use inefficient halogen lamps. MT-G2 LEDs are optimized for use in track, accent, lamp retrofit, downlighting and other applications where color quality, consistency and optical control are required.

FEATURES

- EasyWhite color temperatures from 2700 K to 5000 K CCT
- 85 °C binning and characterization
- Three voltage options: 6 V, 9 V, 36 V
- 80 and 90 minimum CRI options
- Low thermal resistance: 0.4 °C/W
- High lumen density
- Small, uniform emitting area for excellent optical control
- Electrically neutral thermal path
- RoHS and REACH compliant
- UL® recognized component (E349212)

APPLICATIONS

- MR, PAR, BR, AR and other directional retrofit lamps
- Commercial/residential directional lighting
- General illumination

TABLE OF CONTENTS

Characteristics 2
Flux Characteristics, Standard Order Codes, Bins, 6-Volt MT-G2 3
Flux Characteristics, Standard Order Codes, Bins, 9-Volt MT-G2 4
Flux Characteristics, Standard Order Codes, Bins, 36-Volt MT-G2 5
Relative Spectral Power Distribution 6
Relative Luminous Flux vs. Junction Temperature 6
Electrical Characteristics 7
Relative Luminous Flux vs. Current 8
Typical Spatial Distribution 10
Performance Groups – Brightness 10
Performance Groups – Chromaticity 11
EasyWhite® Color Temperatures Plotted on the 1931 CIE Curve 12
Bin and Order Code Formats 13
Reflow Soldering Characteristics 14
Notes 15
Mechanical Dimensions 17
Tape and Reel 19
Packaging 21

Cree LED / 4001 E. Hwy. 54, Suite 2000 / Durham, NC 27713 USA / +1.919.313.5330 / www.cree-led.com

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CHARACTERISTICS

Characteristics	Unit	Minimum	Typical	Maximum
Viewing angle (FWHM)	degrees		125	
ESD withstand voltage (HBM per Mil-Std-883D)			Class 3B	
Thermal resistance, junction to solder point◊	°C/W		0.4	
LED junction temperature	°C			150
DC forward current (6 V)	mA			3000
DC forward current (9 V)	mA			2000
DC forward current (36 V)	mA			500
Forward voltage (6 V, 1100 mA, 85 °C)	V		5.6	
Forward voltage (6 V, 1100 mA, 25 °C)	V			7
Forward voltage (9 V, 735 mA, 85 °C)	V		8.4	
Forward voltage (9 V, 735 mA, 25 °C)	V			10.5
Forward voltage (36 V, 185 mA, 85 °C)	V		33.6	
Forward voltage (36 V, 185 mA, 25 °C)	V			42
Temperature coefficient of voltage (6 V)	mV/°C		-3	
Temperature coefficient of voltage (9 V)	mV/°C		-4	
Temperature coefficient of voltage (36 V)	mV/°C		-16	
Reverse voltage (6 V)	V			1
Reverse current (6 V, 9 V, 36 V)	A			0.1

Note:

◊ Thermal resistance measurement was performed per the JEDEC JESD51-14 standard. See the Thermal Resistance Measurement application note for more details.

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FLUX CHARACTERISTICS, STANDARD ORDER CODES, BINS, 6-VOLT MT-G2 (1100 mA, T_J = 85 °C)

The following table provides several base order codes for 6-volt XLamp MT-G2 EasyWhite LEDs. For a complete description of the order-code nomenclature, please reference page 13 of this document.

Color	CCT Range	Minimum Luminous Flux (lm) @ 1100 mA			2-Step		4-Step	
		Group	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*	Chromaticity Region	Order Code	Chromaticity Region	Order Code
Standard CRI EasyWhite	5000 K	N0	750	863	50H	MTGBEZ-00-0000-0B00N050H	50F	MTGBEZ-00-0000-0B00N050F
		P0	800	920		MTGBEZ-00-0000-0B00P050H		MTGBEZ-00-0000-0B00P050F
	4000 K	K0	650	748	40H	MTGBEZ-00-0000-0B00K040H	40f	MTGBEZ-00-0000-0B00K040F
		M0	700	805		MTGBEZ-00-0000-0B00M040H		MTGBEZ-00-0000-0B00M040F
		N0	750	863		MTGBEZ-00-0000-0B00N040H		MTGBEZ-00-0000-0B00N040F
	3500 K	K0	650	748	35H	MTGBEZ-00-0000-0B00K035H	35F	MTGBEZ-00-0000-0B00K035F
		M0	700	805		MTGBEZ-00-0000-0B00M035H		MTGBEZ-00-0000-0B00M035F
		N0	750	863		MTGBEZ-00-0000-0B00N035H		MTGBEZ-00-0000-0B00N035F
	3000 K	J0	600	690	30H	MTGBEZ-00-0000-0B00J030H	30F	MTGBEZ-00-0000-0B00J030F
		K0	650	748		MTGBEZ-00-0000-0B00K030H		MTGBEZ-00-0000-0B00K030F
		M0	700	805		MTGBEZ-00-0000-0B00M030H		MTGBEZ-00-0000-0B00M030F
	2700 K	H0	560	644	27H	MTGBEZ-00-0000-0B00H027H	27F	MTGBEZ-00-0000-0B00H027F
		J0	600	690		MTGBEZ-00-0000-0B00J027H		MTGBEZ-00-0000-0B00J027F
		K0	650	748		MTGBEZ-00-0000-0B00K027H		MTGBEZ-00-0000-0B00K027F
80 CRI EasyWhite	5000 K	M0	700	805	50H	MTGBEZ-00-0000-0B0HM050H	50F	MTGBEZ-00-0000-0B0HM050F
		N0	750	863		MTGBEZ-00-0000-0B0HN050H		MTGBEZ-00-0000-0B0HN050F
	4000 K	J0	600	690	40H	MTGBEZ-00-0000-0B0HJ040H	40F	MTGBEZ-00-0000-0B0HJ040F
		K0	650	748		MTGBEZ-00-0000-0B0HK040H		MTGBEZ-00-0000-0B0HK040F
		M0	700	805		MTGBEZ-00-0000-0B0HM040H		MTGBEZ-00-0000-0B0HM040F
90 CRI EasyWhite	3000 K	F0	480	552	30H	MTGBEZ-00-0000-0B0UF030H	30F	MTGBEZ-00-0000-0B0UF030F
		G0	520	598		MTGBEZ-00-0000-0B0UG030H		MTGBEZ-00-0000-0B0UG030F
	2700 K	E0	440	506	27H	MTGBEZ-00-0000-0B0UE027H	27F	MTGBEZ-00-0000-0B0UE027F
		F0	480	552		MTGBEZ-00-0000-0B0UF027H		MTGBEZ-00-0000-0B0UF027F

Notes:

- Cree maintains a tolerance of ±7% on flux and power measurements, ±0.005 on chromaticity (CCx, CCy) measurements and ±2 on CRI measurements. See the Measurements section (page 15).
- XLamp MT-G2 LED order codes specify only a minimum flux bin and not a maximum. Cree may ship reels in flux bins higher than the minimum specified by the order code without advance notice. Shipments will always adhere to the chromaticity bin restrictions specified by the order code.
- Minimum CRI for standard EasyWhite color temperatures 27F, 27H, 30F, 30H, 35F, 35H is 80.
- Minimum CRI for standard EasyWhite color temperatures, 40F, 40H, 50F, 50H is 70.
- Typical CRI for standard EasyWhite color temperatures 40F, 40H, 50F, 50H is 75.

* Flux values @ 25 °C are calculated and for reference only.

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FLUX CHARACTERISTICS, STANDARD ORDER CODES, BINS, 9-VOLT MT-G2 (735 mA, T_J = 85 °C)

The following table provides several base order codes for 9-volt XLamp MT-G2 EasyWhite LEDs. For a complete description of the order-code nomenclature, please reference page 13 of this document.

Color	CCT Range	Minimum Luminous Flux (lm) @ 735 mA			2-Step		4-Step	
		Group	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*	Chromaticity Region	Order Code	Chromaticity Region	Order Code
Standard CRI EasyWhite	5000 K	N0	750	863	50H	MTGBEZ-00-0000-0C00N050H	50F	MTGBEZ-00-0000-0C00N050F
		P0	800	920		MTGBEZ-00-0000-0C00P050H		MTGBEZ-00-0000-0C00P050F
	4000 K	K0	650	748	40H	MTGBEZ-00-0000-0C00K040H	40F	MTGBEZ-00-0000-0C00K040F
		M0	700	805		MTGBEZ-00-0000-0C00M040H		MTGBEZ-00-0000-0C00M040F
		N0	750	863		MTGBEZ-00-0000-0C00N040H		MTGBEZ-00-0000-0C00N040F
	3500 K	K0	650	748	35H	MTGBEZ-00-0000-0C00K035H	35F	MTGBEZ-00-0000-0C00K035F
		M0	700	805		MTGBEZ-00-0000-0C00M035H		MTGBEZ-00-0000-0C00M035F
		N0	750	863		MTGBEZ-00-0000-0C00N035H		MTGBEZ-00-0000-0C00N035F
	3000 K	J0	600	690	30H	MTGBEZ-00-0000-0C00J030H	30F	MTGBEZ-00-0000-0C00J030F
		K0	650	748		MTGBEZ-00-0000-0C00K030H		MTGBEZ-00-0000-0C00K030F
		M0	700	805		MTGBEZ-00-0000-0C00M030H		MTGBEZ-00-0000-0C00M030F
	2700 K	H0	560	644	27H	MTGBEZ-00-0000-0C00H027H	27F	MTGBEZ-00-0000-0C00H027F
		J0	600	690		MTGBEZ-00-0000-0C00J027H		MTGBEZ-00-0000-0C00J027F
		K0	650	748		MTGBEZ-00-0000-0C00K027H		MTGBEZ-00-0000-0C00K027F
80 CRI EasyWhite	5000 K	M0	700	805	50H	MTGBEZ-00-0000-0C0HM050H	50F	MTGBEZ-00-0000-0C0HM050F
		N0	750	863		MTGBEZ-00-0000-0C0HN050H		MTGBEZ-00-0000-0C0HN050F
	4000 K	J0	600	690	40H	MTGBEZ-00-0000-0C0HJ040H	40F	MTGBEZ-00-0000-0C0HJ040F
		K0	650	748		MTGBEZ-00-0000-0C0HK040H		MTGBEZ-00-0000-0C0HK040F
		M0	700	805		MTGBEZ-00-0000-0C0HM040H		MTGBEZ-00-0000-0C0HM040F
90 CRI EasyWhite	3000 K	F0	480	552	30H	MTGBEZ-00-0000-0C0UF030H	30F	MTGBEZ-00-0000-0C0UF030F
		G0	520	598		MTGBEZ-00-0000-0C0UG030H		MTGBEZ-00-0000-0C0UG030F
	2700 K	E0	440	506	27H	MTGBEZ-00-0000-0C0UE027H	27F	MTGBEZ-00-0000-0C0UE027F
		F0	480	552		MTGBEZ-00-0000-0C0UF027H		MTGBEZ-00-0000-0C0UF027F

Notes:

- Cree maintains a tolerance of ±7% on flux and power measurements, ±0.005 on chromaticity (CCx, CCy) measurements and ±2 on CRI measurements. See the Measurements section (page 15).
- XLamp MT-G2 LED order codes specify only a minimum flux bin and not a maximum. Cree may ship reels in flux bins higher than the minimum specified by the order code without advance notice. Shipments will always adhere to the chromaticity bin restrictions specified by the order code.
- Minimum CRI for standard EasyWhite color temperatures 27F, 27H, 30F, 30H, 35F, 35H is 80.
- Minimum CRI for standard EasyWhite color temperatures, 40F, 40H, 50F, 50H is 70.
- Typical CRI for standard EasyWhite color temperatures 40F, 40H, 50F, 50H is 75.

* Flux values @ 25 °C are calculated and for reference only.

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FLUX CHARACTERISTICS, STANDARD ORDER CODES, BINS, 36-VOLT MT-G2 (185 mA, T_J = 85 °C)

The following table provides several base order codes for 36-volt XLamp MT-G2 EasyWhite LEDs. For a complete description of the order-code nomenclature, please reference page 13 of this document.

Color	CCT Range	Minimum Luminous Flux (lm) @ 185 mA			2-Step		4-Step	
		Group	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*	Chromaticity Region	Order Code	Chromaticity Region	Order Code
Standard CRI EasyWhite	5000 K	N0	750	863	50H	MTGBEZ-00-0000-0N00N050H	50F	MTGBEZ-00-0000-0N00N050F
		P0	800	920		MTGBEZ-00-0000-0N00P050H		MTGBEZ-00-0000-0N00P050F
	4000 K	K0	650	748	40H	MTGBEZ-00-0000-0N00K040H	40F	MTGBEZ-00-0000-0N00K040F
		M0	700	805		MTGBEZ-00-0000-0N00M040H		MTGBEZ-00-0000-0N00M040F
		N0	750	863		MTGBEZ-00-0000-0N00N040H		MTGBEZ-00-0000-0N00N040F
	3500 K	K0	650	748	35H	MTGBEZ-00-0000-0N00K035H	35F	MTGBEZ-00-0000-0N00K035F
		M0	700	805		MTGBEZ-00-0000-0N00M035H		MTGBEZ-00-0000-0N00M035F
		N0	750	863		MTGBEZ-00-0000-0N00N035H		MTGBEZ-00-0000-0N00N035F
	3000 K	J0	600	690	30H	MTGBEZ-00-0000-0N00J030H	30F	MTGBEZ-00-0000-0N00J030F
		K0	650	748		MTGBEZ-00-0000-0N00K030H		MTGBEZ-00-0000-0N00K030F
		M0	700	805		MTGBEZ-00-0000-0N00M030H		MTGBEZ-00-0000-0N00M030F
	2700 K	H0	560	644	27H	MTGBEZ-00-0000-0N00H027H	27F	MTGBEZ-00-0000-0N00H027F
		J0	600	690		MTGBEZ-00-0000-0N00J027H		MTGBEZ-00-0000-0N00J027F
		K0	650	748		MTGBEZ-00-0000-0N00K027H		MTGBEZ-00-0000-0N00K027F
80 CRI EasyWhite	5000 K	M0	700	805	50H	MTGBEZ-00-0000-0N0HM050H	50F	MTGBEZ-00-0000-0N0HM050F
		N0	750	863		MTGBEZ-00-0000-0N0HN050H		MTGBEZ-00-0000-0N0HN050F
	4000 K	J0	600	690	40H	MTGBEZ-00-0000-0N0HJ040H	40F	MTGBEZ-00-0000-0N0HJ040F
		K0	650	748		MTGBEZ-00-0000-0N0HK040H		MTGBEZ-00-0000-0N0HK040F
		M0	700	805		MTGBEZ-00-0000-0N0HM040H		MTGBEZ-00-0000-0N0HM040F
90 CRI EasyWhite	3000 K	F0	480	552	30H	MTGBEZ-00-0000-0N0UF030H	30F	MTGBEZ-00-0000-0N0UF030F
		G0	520	598		MTGBEZ-00-0000-0N0UG030H		MTGBEZ-00-0000-0N0UG030F
	2700 K	E0	440	506	27H	MTGBEZ-00-0000-0N0UE027H	27F	MTGBEZ-00-0000-0N0UE027F
		F0	480	552		MTGBEZ-00-0000-0N0UF027H		MTGBEZ-00-0000-0N0UF027F

Notes:

- Cree maintains a tolerance of ±7% on flux and power measurements, ±0.005 on chromaticity (CCx, CCy) measurements and ±2 on CRI measurements. See the Measurements section (page 15).
- XLamp MT-G2 LED order codes specify only a minimum flux bin and not a maximum. Cree may ship reels in flux bins higher than the minimum specified by the order code without advance notice. Shipments will always adhere to the chromaticity bin restrictions specified by the order code.
- Minimum CRI for standard EasyWhite color temperatures 27F, 27H, 30F, 30H, 35F, 35H is 80.
- Minimum CRI for standard EasyWhite color temperatures, 40F, 40H, 50F, 50H is 70.
- Typical CRI for standard EasyWhite color temperatures 40F, 40H, 50F, 50H is 75.

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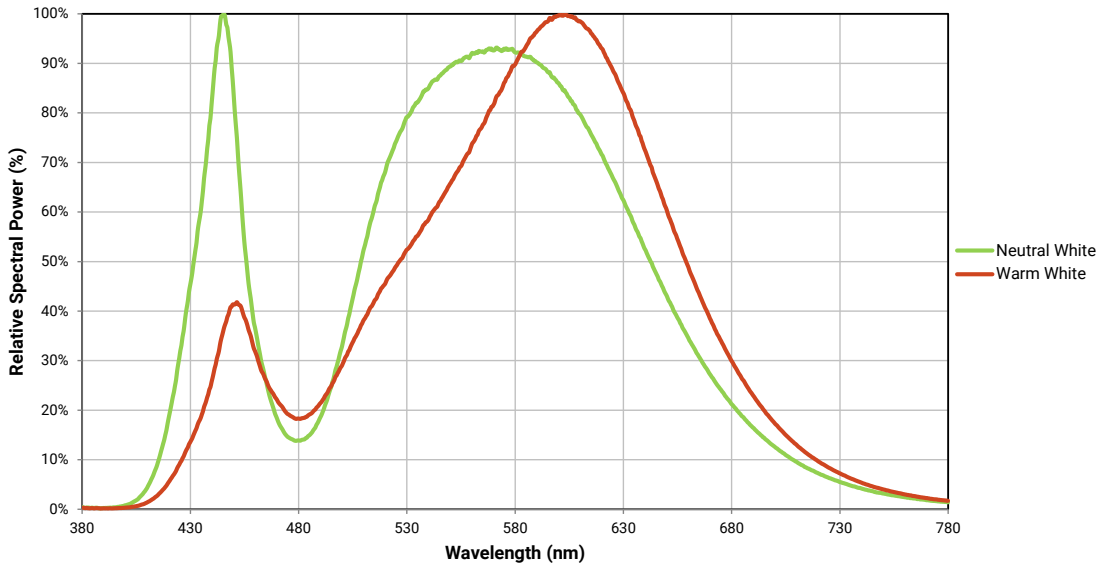
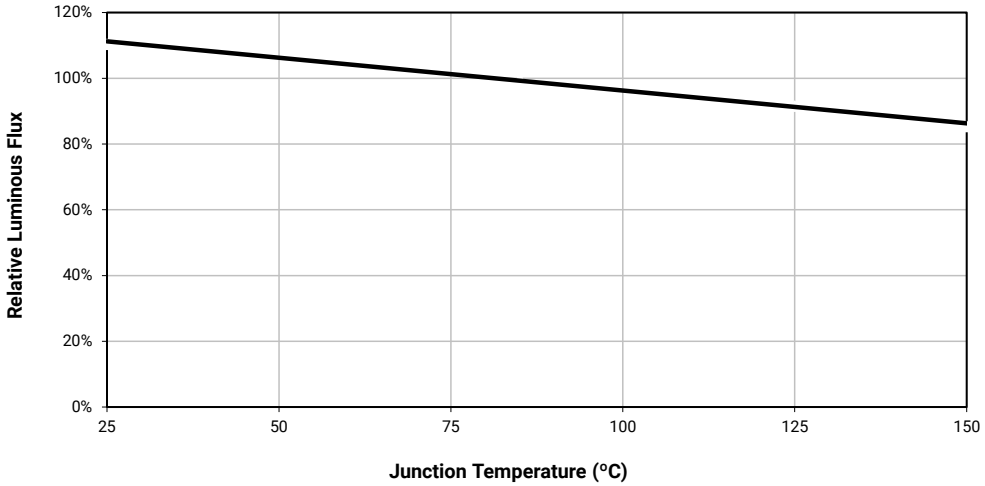
RELATIVE SPECTRAL POWER DISTRIBUTION (6 V, 1100 mA; 9 V, 735 mA; 36 V, 185 mA; T_J = 85 °C)

The following graph represents typical spectral output of the XLamp MT-G2 EasyWhite LED.



RELATIVE LUMINOUS FLUX VS. JUNCTION TEMPERATURE (6 V, 1100 mA; 9 V, 735 mA; 36 V, 185 mA)

The following graph represents typical performance of the XLamp MT-G2 EasyWhite LED.



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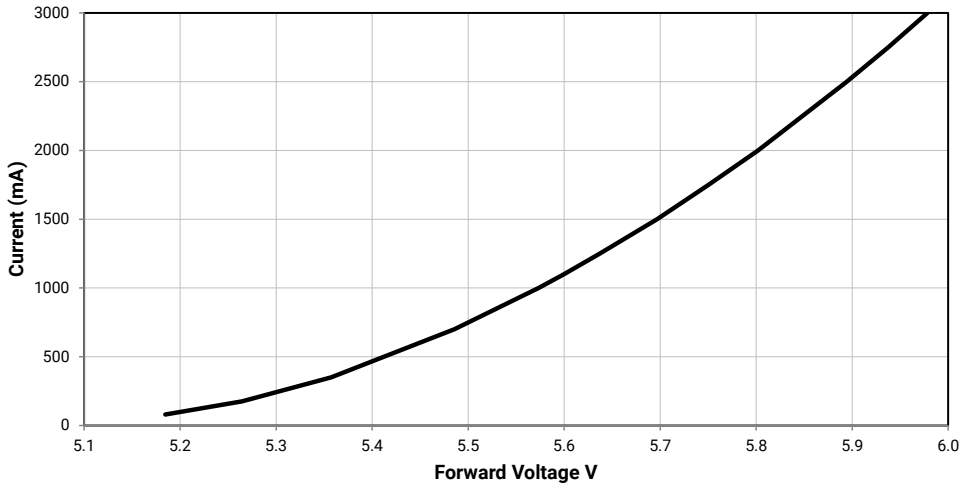
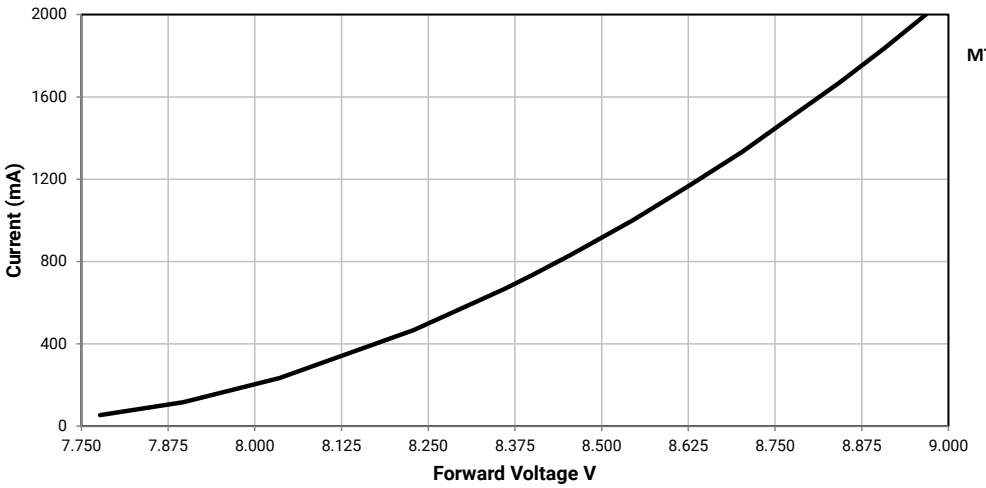
ELECTRICAL CHARACTERISTICS (T_J = 85 °C)



MT-G2 6 V



MT-G2 9 V

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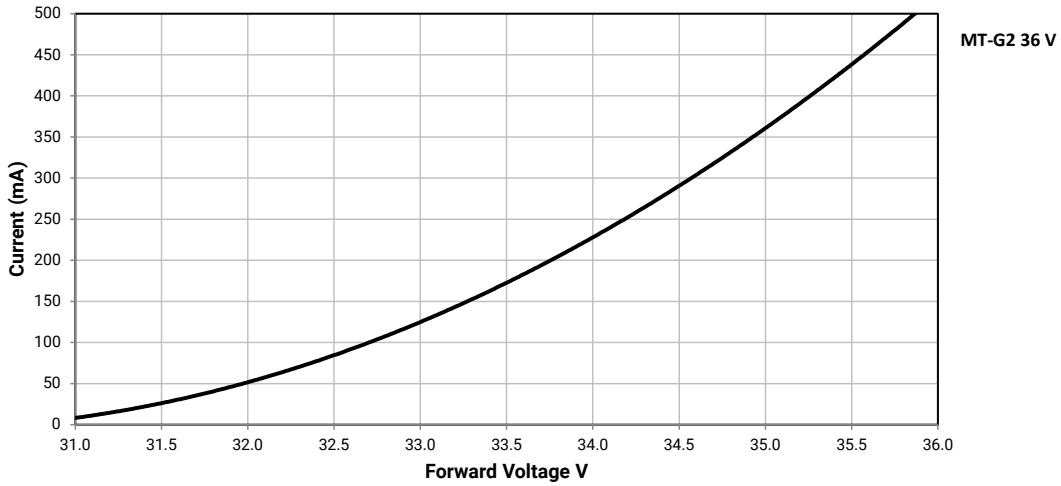
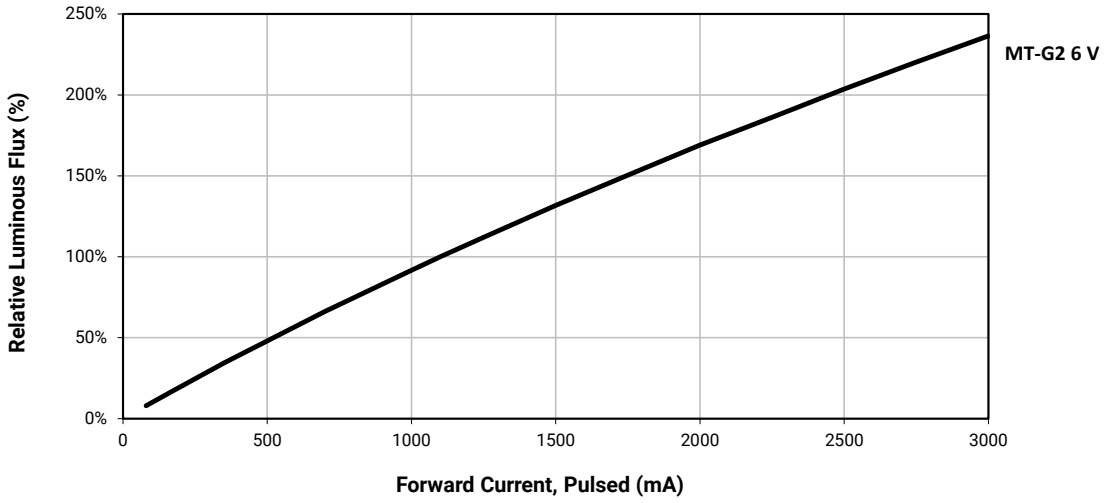
ELECTRICAL CHARACTERISTICS (T_J = 85 °C) - CONTINUED



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



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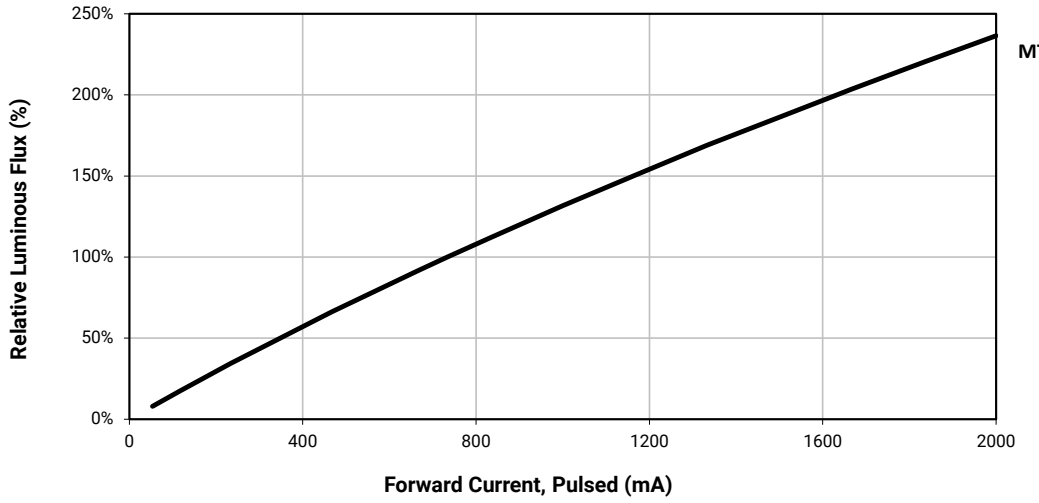
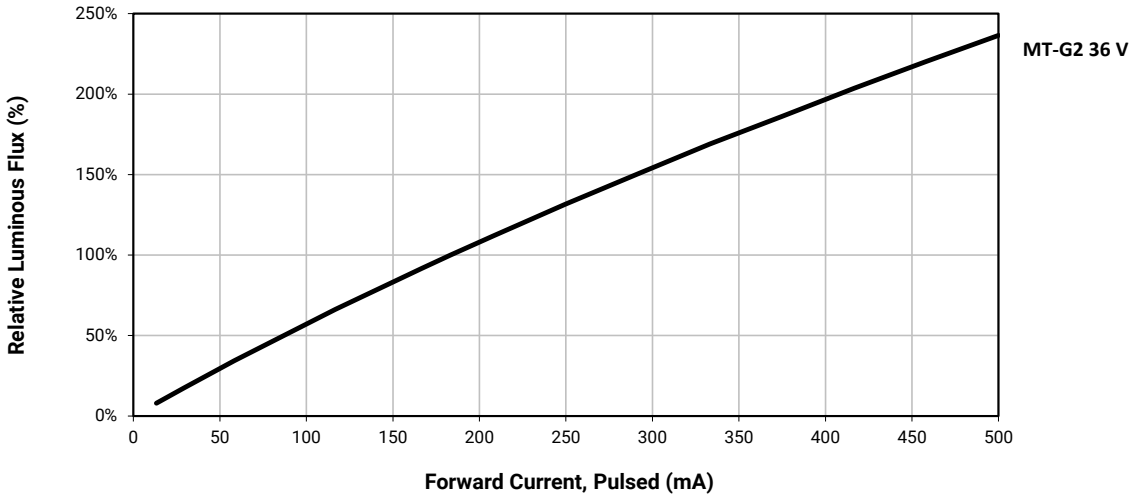
RELATIVE LUMINOUS FLUX VS. CURRENT (T_J = 85 °C) - CONTINUED





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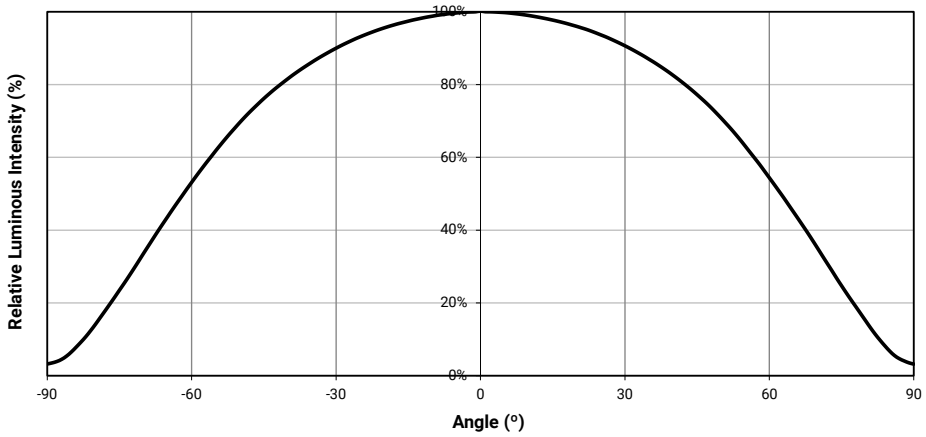
TYPICAL SPATIAL DISTRIBUTION

The following graph represents typical performance of the XLamp MT-G2 EasyWhite LED.



PERFORMANCE GROUPS – BRIGHTNESS (T_J = 85 °C)

XLamp MT-G2 EasyWhite LEDs are tested for luminosity and placed into one of the following bins.

Group Code	Minimum Luminous Flux @ Nominal I_F	Maximum Luminous Flux @ Nominal I_F
D0	400	440
E0	440	480
F0	480	520
G0	520	560
H0	560	600
J0	600	650
K0	650	700
M0	700	750
N0	750	800
P0	800	860

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PERFORMANCE GROUPS – CHROMATICITY (T_J = 85 °C)

XLamp MT-G2 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**
50F	5000 K	0.3407	0.3459
		0.3415	0.3586
		0.3499	0.3654
		0.3484	0.3521
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**
50H	5000 K	0.3429	0.3507
		0.3434	0.3571
		0.3475	0.3604
		0.3469	0.3539
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

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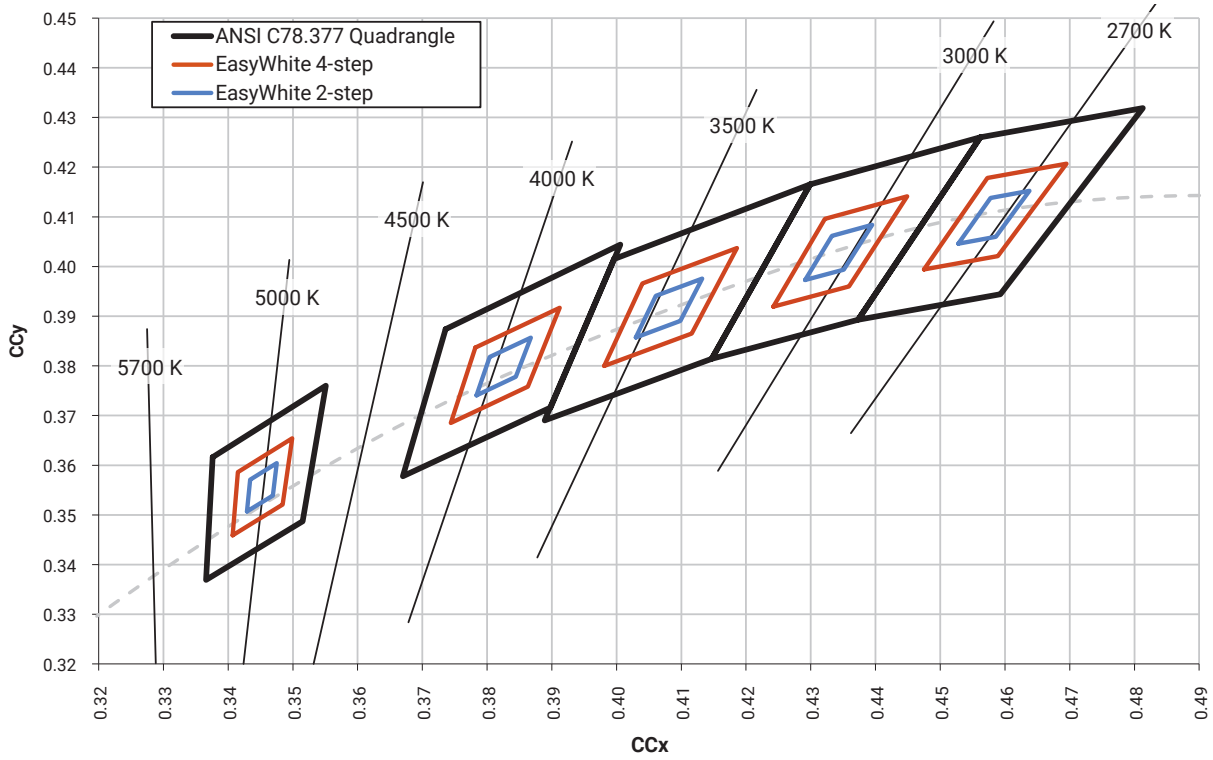
EASYWHITE® COLOR TEMPERATURES PLOTTED ON THE 1931 CIE CURVE (T_J = 85 °C)



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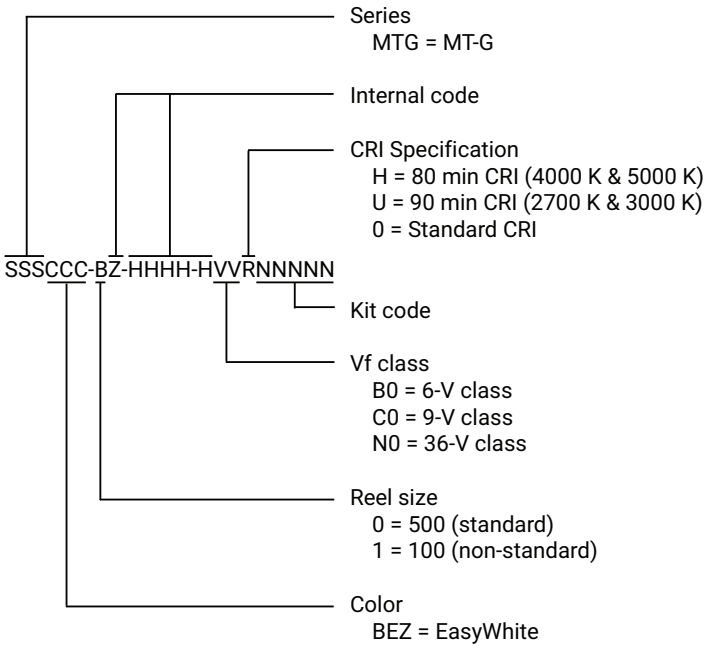
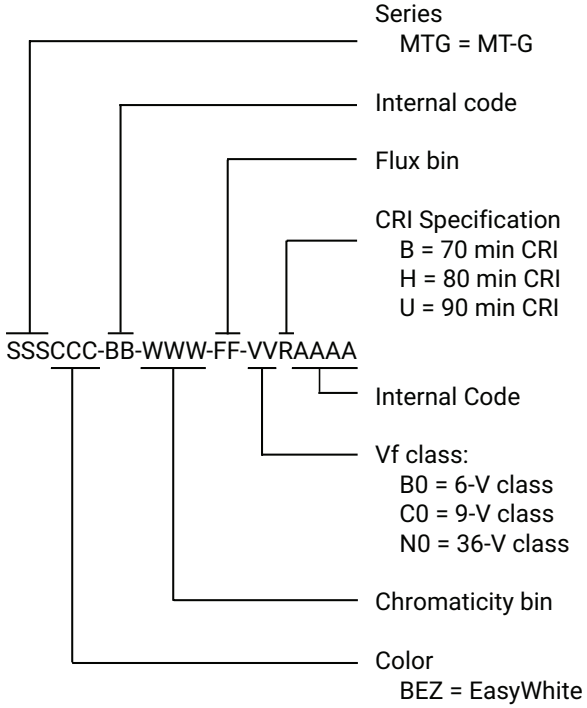
BIN AND ORDER CODE FORMATS

Bin codes and order codes are configured as follows:

Order Code



Bin Code



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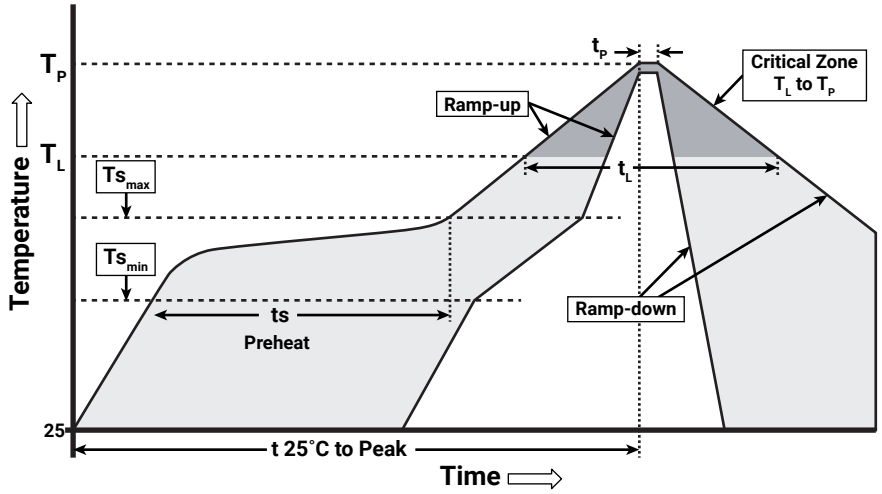
REFLOW SOLDERING CHARACTERISTICS

In testing, Cree LED has found XLamp MT-G2 EasyWhite LEDs to be compatible with JEDEC J-STD-020C, using the parameters listed below. As a general guideline, Cree LED recommends that users follow the recommended soldering profile provided by the manufacturer of the solder paste used, and therefore it is the lamp or luminaire manufacturer's responsibility to determine applicable soldering requirements.

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



IPC/JEDEC J-STD-020C

Profile Feature	Lead-Free Solder
Average Ramp-Up Rate (Ts_{max} to Tp)	1.2 °C/second
Preheat: Temperature Min (Ts_{min})	120 °C
Preheat: Temperature Max (Ts_{max})	170 °C
Preheat: Time (ts_{min} to ts_{max})	65-150 seconds
Time Maintained Above: Temperature (T_L)	217 °C
Time Maintained Above: Time (t_L)	45-90 seconds
Peak/Classification Temperature (Tp)	235 - 245 °C
Time Within 5 °C of Actual Peak Temperature (tp)	20-40 seconds
Ramp-Down Rate	1 - 6 °C/second
Time 25 °C to Peak Temperature	4 minutes max.

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

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NOTES

Measurements

The luminous flux, radiant power, chromaticity, forward voltage and CRI measurements in this document are binning specifications only and solely represent product measurements as of the date of shipment. These measurements will change over time based on a number of factors that are not within Cree LED's control and are not intended or provided as operational specifications for the products. Calculated values are provided for informational purposes only and are not intended or provided as specifications.

Pre-Release Qualification Testing

Please read the LED Reliability Overview for details of the qualification process Cree LED applies to ensure long-term reliability for XLamp LEDs and details of Cree LED's pre-release qualification testing for XLamp LEDs.

Lumen Maintenance

Cree LED now uses standardized IES LM-80-08 and TM-21-11 methods for collecting long-term data and extrapolating LED lumen maintenance. For information on the specific LM-80 data sets available for this LED, refer to the public LM-80 results document.

Moisture Sensitivity

Cree LED recommends keeping XLamp LEDs in the provided, resealable moisture-barrier packaging (MBP) until immediately prior to soldering. Unopened MBPs that contain XLamp LEDs do not need special storage for moisture sensitivity.

Once the MBP is opened, XLamp MT-G2 EasyWhite LEDs may be stored as MSL 1 per JEDEC J-STD-033, meaning they have unlimited floor life in conditions of ≤ 30 °C/85% relative humidity (RH). Regardless of storage condition, Cree LED recommends sealing any unsoldered LEDs in the original MBP.

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 January 2, 2013. RoHS Declarations for this product can be obtained from your Cree LED representative or from the Product Ecology section of the Cree LED website.

REACH Compliance

REACH substances of high concern (SVHCs) information is available for this product. Since the European Chemical Agency (ECHA) has published notice of their intent to frequently revise the SVHC listing for the foreseeable future, please contact a Cree LED representative to insure you get the most up-to-date REACH Declaration. REACH banned substance information (REACH Article 67) is also available upon request.

UL® Recognized Component

This product meets the requirements to be considered a UL Recognized Component with Level 4 enclosure consideration. The LED package or a portion thereof has been investigated as a fire and electrical enclosure per ANSI/UL 8750.

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NOTES - CONTINUED

Vision Advisory

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

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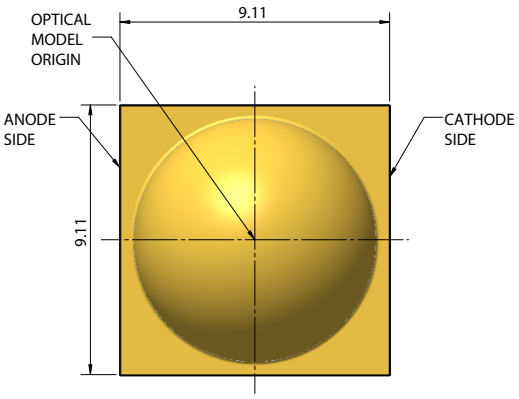
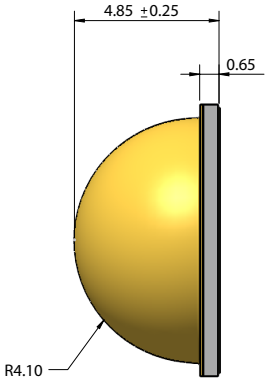
MECHANICAL DIMENSIONS

Thermal vias, if present, are not shown on these drawings.

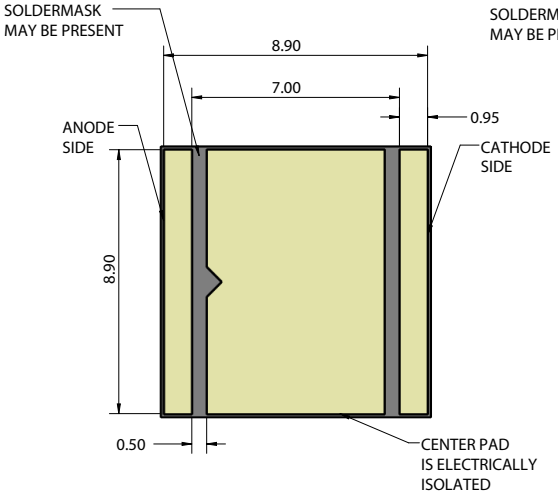
All measurements are ±.13 mm unless otherwise indicated.



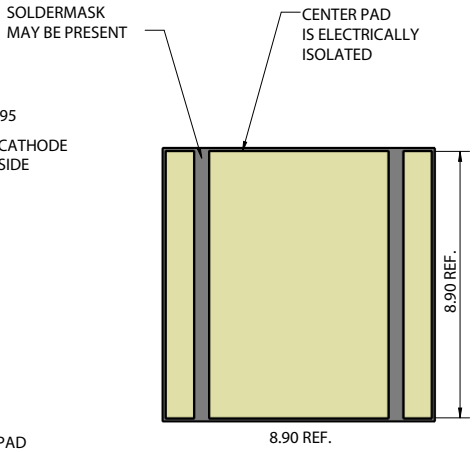
Top View



Side View



Bottom View



Alternate Bottom View

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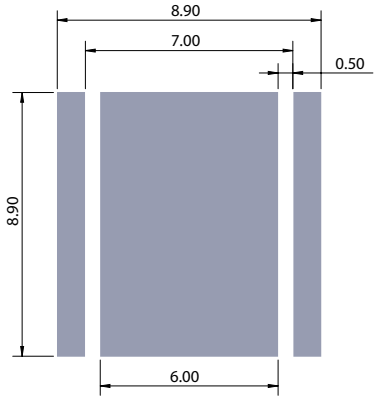
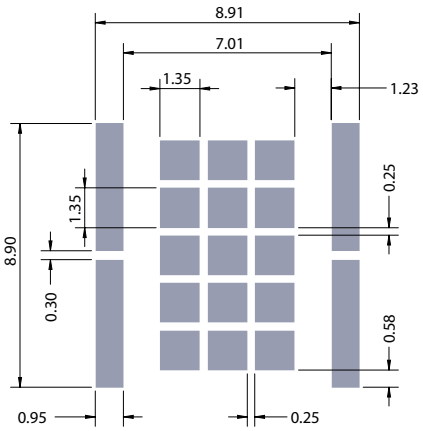
MECHANICAL DIMENSIONS - CONTINUED



Recommended PCB Footprint



Recommended Stencil Opening

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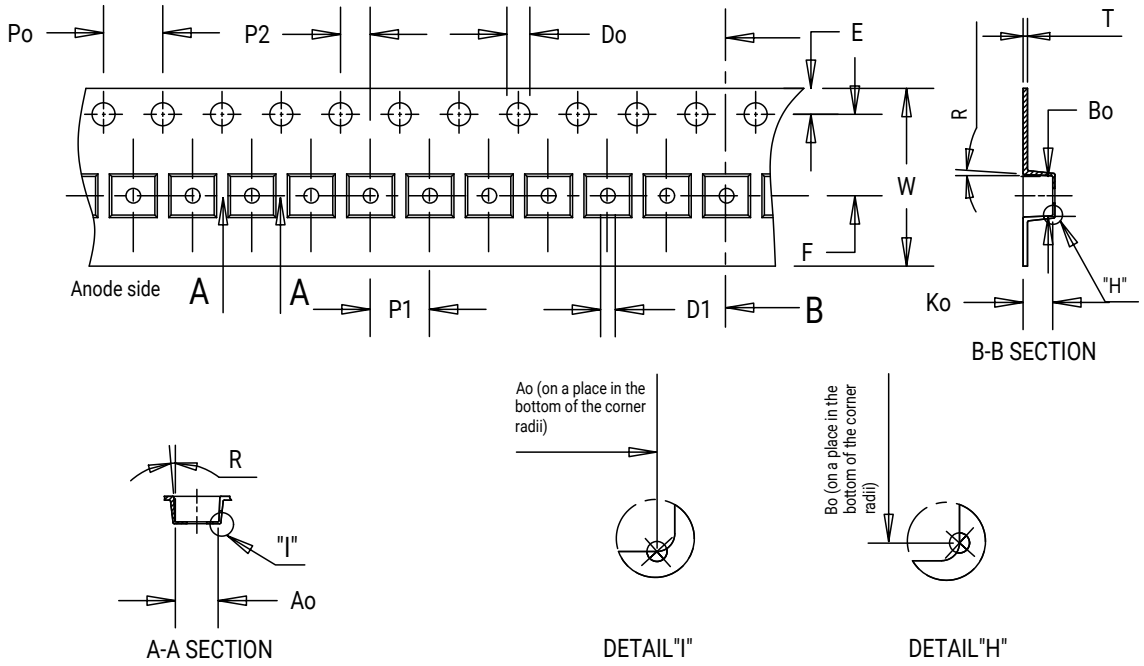
TAPE AND REEL

All Cree LED carrier tapes conform to EIA-481D, Automated Component Handling Systems Standard.

All dimensions in mm

All dimensions are ±.13 mm unless otherwise indicated.



Item	Ao	Bo	Ko	Po	P1	P2	T	E	F	Do	D1	W	R
Dim.	9.40	9.40	5.25	4.00	12.00	2.00	0.36	1.75	7.50	1.50	1.50	16.00	5°

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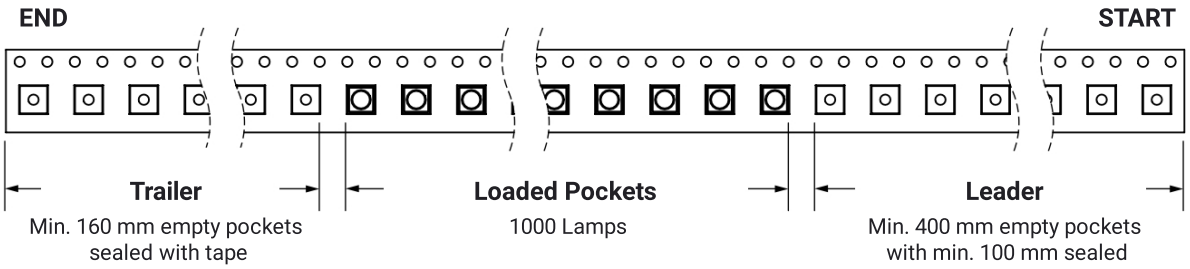
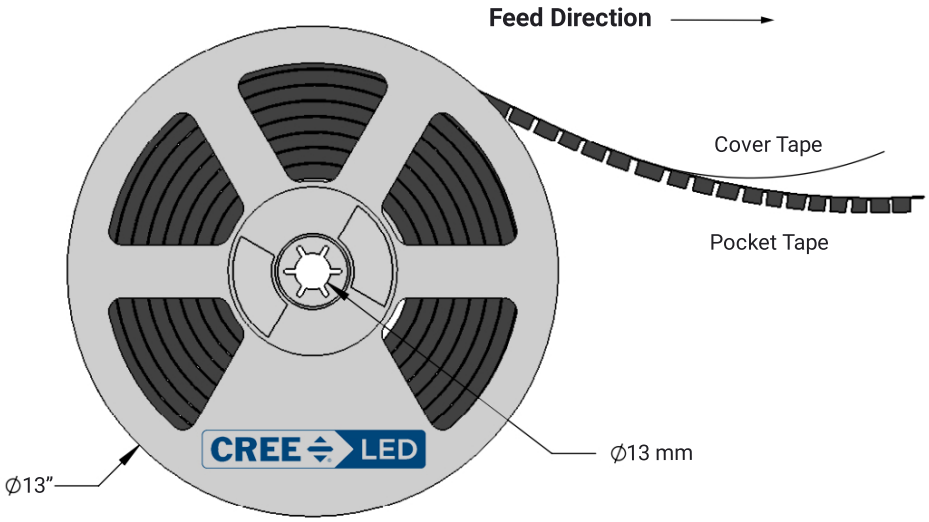
TAPE AND REEL - CONTINUED





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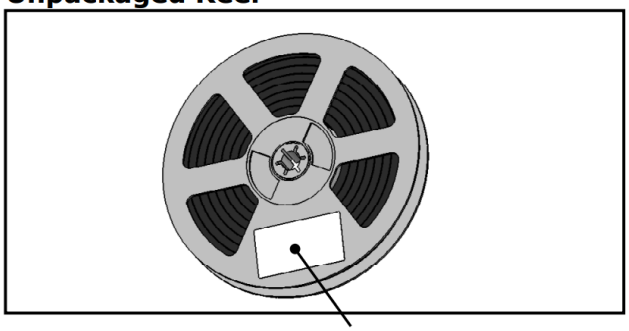
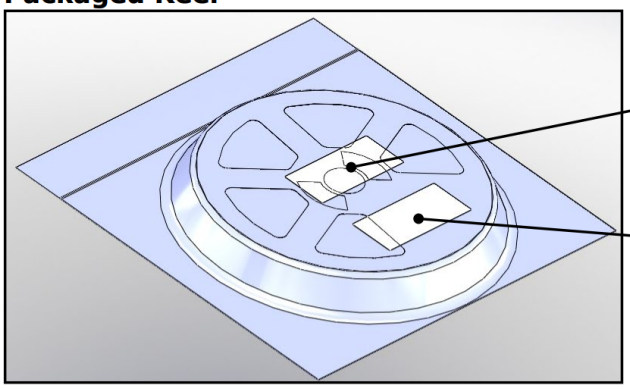
PACKAGING

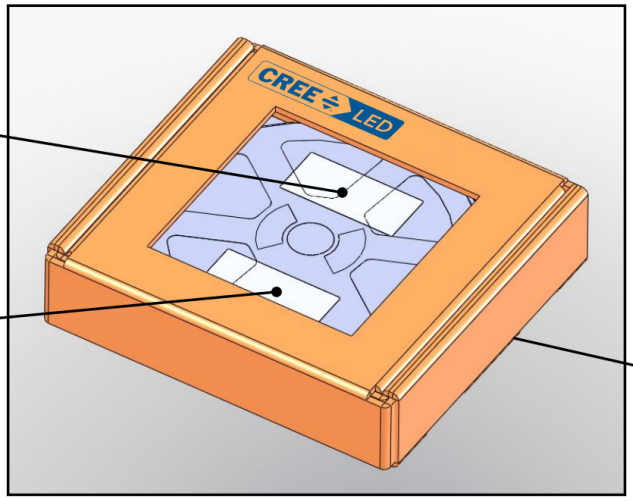
Unpackaged Reel



Packaged Reel



Boxed Reel



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