LUMILEDS

ILLUMINATION

LUXEON 3030 HE Plus – Deep Dimming

High efficacy 3V 3030 package tailor-made excellent dimming application

LUXEON 3030 HE Plus – Deep Dimming is superior high efficacy, mid power package built on the legacy of the LUXEON 3030 product line. It is specially designed for dimming applications which require extremely uniform light output throughout rated and deep dimming operating conditions. This innovative product enables not only top notch lm/W performance and long lifetime, but also pure 3 SDCM color bin and 0.1 V_f width by default for end applications.

FEATURES AND BENEFITS

- Dedicated Deep Dimming bin achieves best-of-class dimming effects
- 3 SDCM color bin by default, eliminate customer concern on color consistency
- 0.1 V_f width by default, free customer from complex driver compatibility design
- Superior high efficacy at rated current enables outstanding lm/W at system level
- Reliable package design from a proven product line affirms long lifetime for end application
- Industry standard package allows drop-in replacement for existing 3030 packages

PRIMARY APPLICATIONS

- Panel Lights
- Linear
- Troffers

c UL us No. E507562 RoHS COMPLIANT

Table of Contents

General Product Information

Product Test Conditions

LUXEON 3030 HE Plus – Deep Dimming LEDs are tested and binned with a 20ms monopulse of 65mA at a junction temperature, T_j, of 25°C.

Part Number Nomenclature

Part numbers for LUXEON 3030 HE Plus – Deep Dimming LEDs follow the convention below:

L 1 3 0 – **A A B B** H A 3 0 0 0 D D 1

Where:

A A – designates nominal CCT (27=2700K, 30=3000K, 35=3500K, 40=4000K, 50=5000K, 57=5700K, 65=6500K)

B B – designates minimum CRI (80=80CRI, 90=90CRI)

Therefore, the following part number is used for a LUXEON 3030 HE Plus – Deep Dimming, 3500K 80CRI LED:

L 1 3 0 – **3 5 8 0** H A 3 0 0 0 D D 1

Lumen Maintenance

Please contact your local Sales Representative or Lumileds Technical Solutions Manager for more information about the long-term performance of this product.

Environmental Compliance

Lumileds LLC is committed to providing environmentally friendly products to the solid-state lighting market. LUXEON 3030 HE Plus is compliant to the European Union directives on the restriction of hazardous substances in electronic equipment, namely the RoHS Directive 2011/65/EU and REACH Regulation (EC) 1907/2006. Lumileds LLC will not intentionally add the following restricted materials to its products: lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE).

Performance Characteristics

Product Selection Guide

Table 1. Product performance of LUXEON 3030 HE Plus – Deep Dimming at 65mA, T_j= 25°C.

PRODUCT TYPE	NOMINAL CCT [1]	MINIMUM CRI [1, 2]	LUMINOUS FLUX [1, 2] (lm)		TYPICAL LUMINOUS EFFICACY (lm/W)	PART NUMBER
			MINIMUM	TYPICAL		
			65mA			
LUXEON 3030 HE Plus – Deep Dimming	2700K	80	30.0	33.5	190	L130-2780HA3000DD1
	3000K	80	32.0	35.0	199	L130-3080HA3000DD1
	3500K	80	33.0	36.0	204	L130-3580HA3000DD1
	4000K	80	34.0	37.0	210	L130-4080HA3000DD1
	5000K	80	34.0	37.0	210	L130-5080HA3000DD1
	5700K	80	33.5	36.5	207	L130-5780HA3000DD1
	6500K	80	33.0	36.0	204	L130-6580HA3000DD1
	2700K	90	26.0	28.5	162	L130-2790HA3000DD1
	3000K	90	27.0	29.5	167	L130-3090HA3000DD1
	3500K	90	27.5	30.5	173	L130-3590HA3000DD1
	4000K	90	28.5	31.5	179	L130-4090HA3000DD1
	5000K	90	28.5	31.5	179	L130-5090HA3000DD1
	5700K	90	28.5	31.5	179	L130-5790HA3000DD1
	6500K	90	28.0	31.0	176	L130-6590HA3000DD1

Notes for Table 1:
1. Luminous flux, CCT, and CRI are specified at T_j=25°C. Typical CRI is approximately 2 points higher than the minimum CRI specified, but this is not guaranteed.
2. Lumileds maintains a tolerance of ±2 on CRI and ±7.5% on luminous flux measurements.

Optical Characteristics

Table 2. Optical characteristics for LUXEON 3030 HE Plus – Deep Dimming at 65mA, T_j= 25°C.

PART NUMBER	TYPICAL TOTAL INCLUDED ANGLE [1]	TYPICAL VIEWING ANGLE [2]
L130-xxxxHA3000DD1	160°	110°

Notes for Table 2:
1. Total angle at which 90% of total luminous flux is captured.
2. Viewing angle is the off axis angle from the LED centerline where the luminous intensity is ½ of the peak value.

Electrical and Thermal Characteristics

Table 3. Electrical and thermal characteristics for LUXEON 3030 HE Plus – Deep Dimming at 65mA, T_j= 25°C.

PART NUMBER	FORWARD VOLTAGE [1] (V_f)			TYPICAL TEMPERATURE COEFFICIENT OF FORWARD VOLTAGE [2] (mV/°C)	TYPICAL THERMAL RESISTANCE—JUNCTION TO SOLDER PAD (°C/W)
	MINIMUM	TYPICAL	MAXIMUM		
L130-xxxxHA3000DD1	2.66	2.71	2.76	-1.0 to -2.0	10.0

Notes for Table 3:
1. Lumileds maintains a tolerance of ±0.1V on forward voltage measurements.
2. Measured between 25°C and 85°C.

Absolute Maximum Ratings

Table 4. Absolute maximum ratings for LUXEON 3030 HE Plus – Deep Dimming.

PARAMETER	MAXIMUM PERFORMANCE
DC Forward Current [1]	480mA
Peak Pulsed Forward Current [2]	700mA
ESD Sensitivity (ANSI/ESDA/JEDEC JS-001-2012)	Class 2
LED Junction Temperature (DC & Pulse)	125°C
Operating Case Temperature	-40°C to 105°C
LED Storage Temperature	-40°C to 105°C
Soldering Temperature	JEDEC 020D 260°C
Allowable Reflow Cycles	3
Reverse Voltage ($V_{reverse}$) [3]	-5V

Notes for Table 4:
1. Residual periodic variations due to power conversion from alternating current (AC) to direct current (DC), also called "ripple", are acceptable if the following conditions are met:
   – The frequency of the ripple current is 100Hz or higher
   – The average current for each cycle does not exceed the maximum allowable DC forward current
   – The maximum amplitude of the ripple does not exceed 25% of the maximum allowable DC forward current
2. Pulse operation with the maximum peak pulse forward current is acceptable if the pulse on time is ≤5ms per cycle and the duty cycle is ≤50%
3. At a maximum reverse current of 10µA. LUXEON 3030 Plus LEDs are not designed to be driven in reverse bias.

Characteristics Curves

Spectral Power Distribution Characteristics

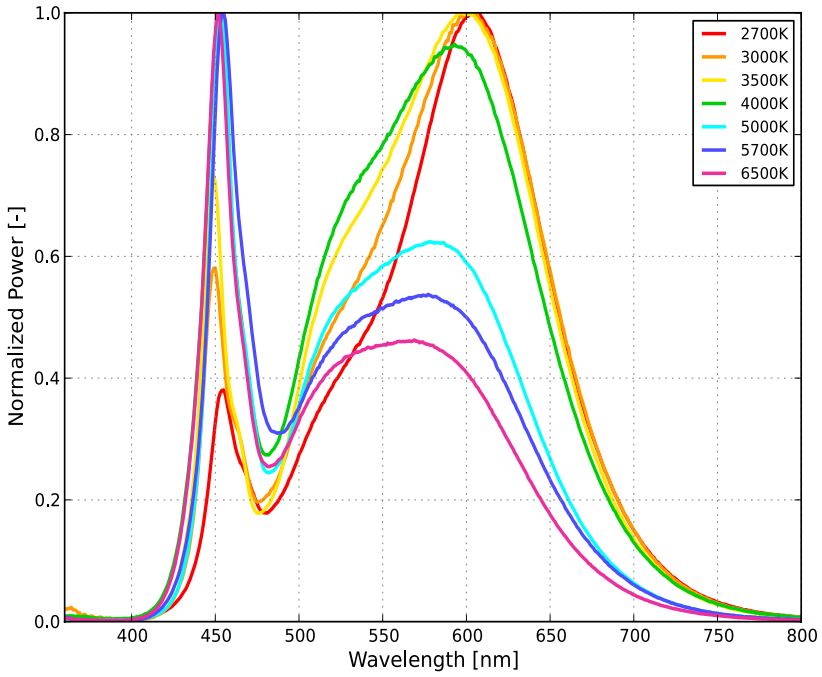


Figure 1a. Typical normalized power vs. wavelength for L130-xx80HA3000DD1 at 65mA, T_j=25°C.

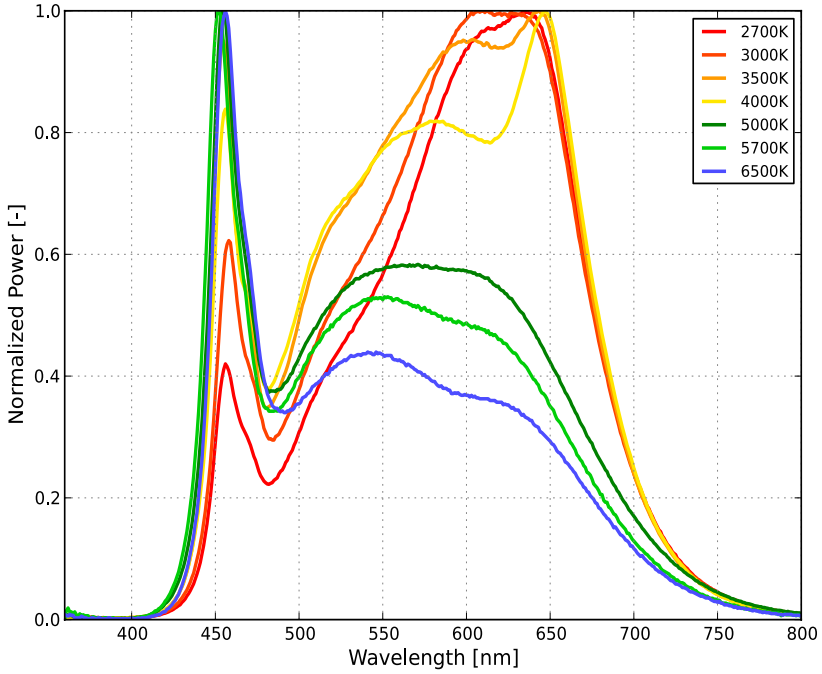


Figure 1b. Typical normalized power vs. wavelength for L130-xx90HA3000DD1 at 65mA, T_j=25°C.

Light Output Characteristics

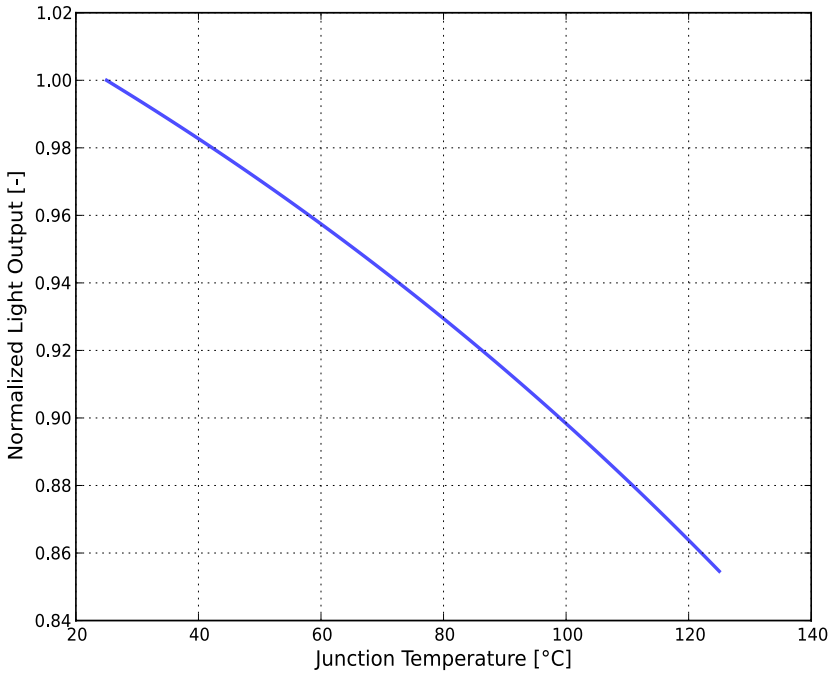
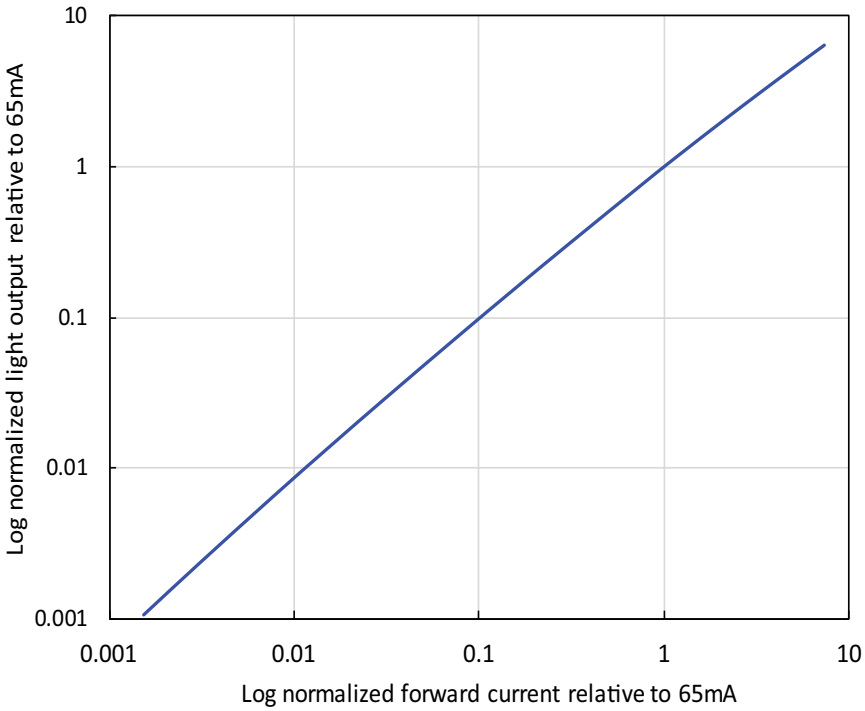


Figure 2. Typical normalized light output vs. junction temperature for L130-xxxxHA3000DD1 at 65mA.



ESTIMATED TYPICAL RATIO COMPARED TO FLUX AT RATED CONDITION 65mA, T_j=25°C.				
0.65mA	1mA	5mA	20mA	50mA
0.9%	1.4%	7.5%	31%	77%

Figure 3. Typical normalized light output vs. forward current for L130-xxxxHA3000DD1 at T_j=25°C.

Forward Current Characteristics

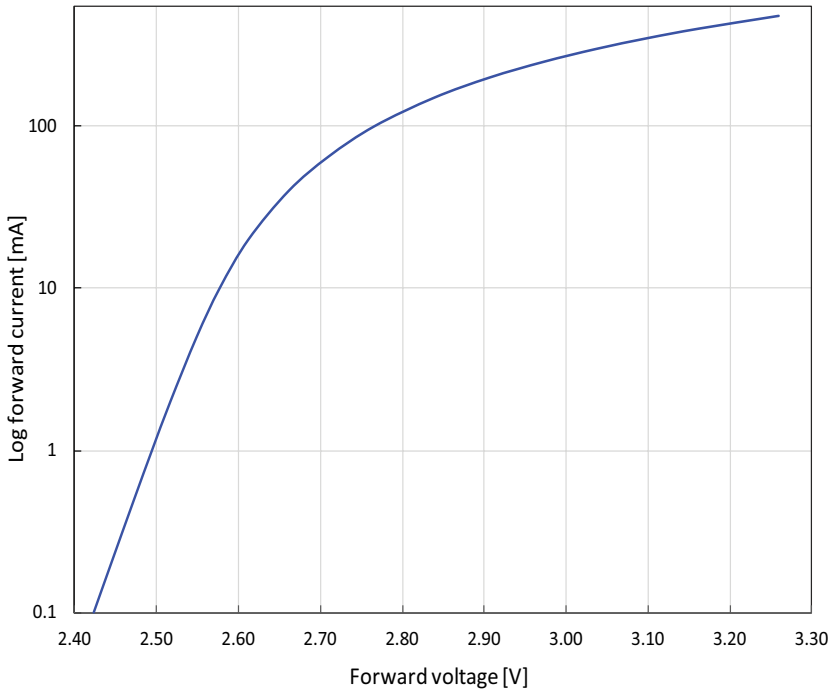


Figure 4. Typical forward current vs. forward voltage for L130-xxxxHA3000DD1 at T_j=25°C.

Radiation Pattern Characteristics

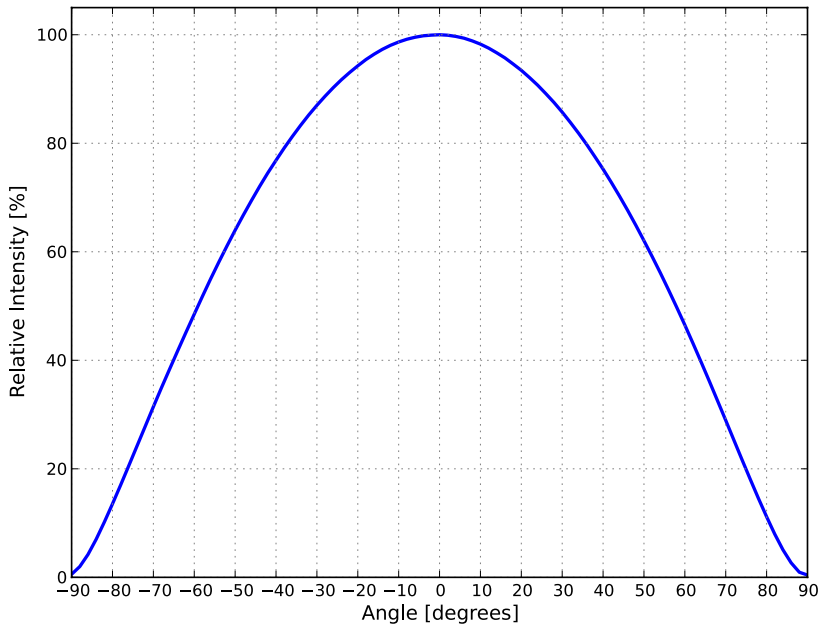


Figure 5. Typical radiation pattern for L130-xxxxHA3000DD1 at 65mA, T_j=25°C.

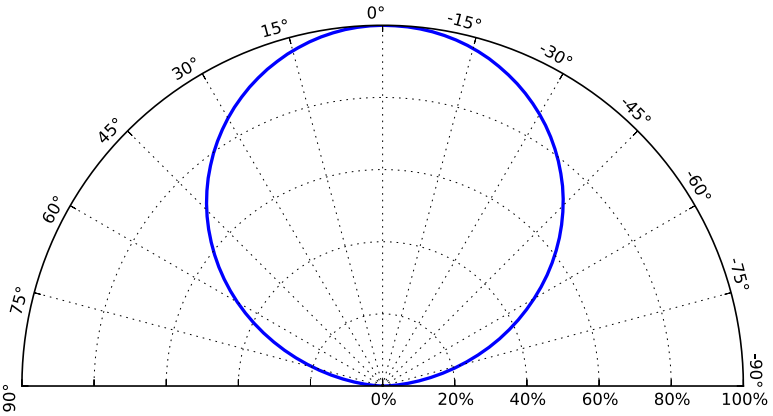


Figure 6. Typical polar radiation pattern for L130-xxxxHA3000DD1 at 65mA, T_j=25°C.

Product Bin and Labeling Definitions

Decoding Product Bin Labeling

In the manufacturing of semiconductor products, there are variations in performance around the average values given in the technical datasheet. For this reason, Lumileds bins LED components for luminous flux or radiometric power, color point, peak or dominant wavelength and forward voltage.

LUXEON 3030 HE Plus – Deep Dimming LEDs are labeled using a 4-digit alphanumeric CAT code following the format below.

A B C D

A – designates luminous flux bin (example: F=35.5 to 37.0 lm, G=37.0 to 38.5 lm)

B C – designates color bin (example: 5P, 5Q, 5X, 5Y for 4000K parts)

D – designates Deep Dimming bin (example: 1=deep dimming group 1, 2=deep dimming group 2, details can refer to application notes)

Therefore, a LUXEON 3030 HE Plus with a lumen range of 35.5 to 37.0 lm, color bin of 5X, and deep dimming bin group2 has the following CAT code:

F 5 X 2

Luminous Flux Bins

Table 5 lists the standard luminous flux bins for LUXEON 3030 HE Plus – Deep Dimming emitters. Although several bins are outlined, product availability in a particular bin varies by production run and by product performance. Not all bins are available in all CCTs.

Table 5. Luminous flux bin definitions for LUXEON 3030 HE Plus – Deep Dimming at 65mA, T_j=25°C.

BIN	LUMINOUS FLUX[1] (lm)	
	MINIMUM	MAXIMUM
Y	25.0	26.5
Z	26.5	28.0
A	28.0	29.5
B	29.5	31.0
C	31.0	32.5
D	32.5	34.0
E	34.0	35.5
F	35.5	37.0
G	37.0	38.5
H	38.5	40.0
J	40.0	41.5

Notes for Table 5:
1. Lumileds maintains a tolerance of ±7.5% on luminous flux measurements.

Color Bin Definitions

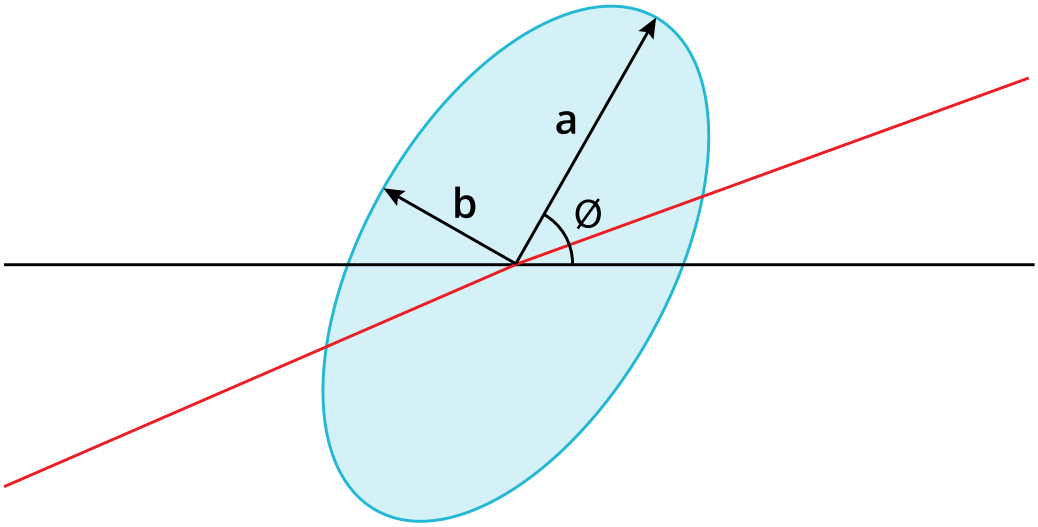


Figure 7. 3- and 5-step MacAdam ellipse illustration for Tables 6a-6g.

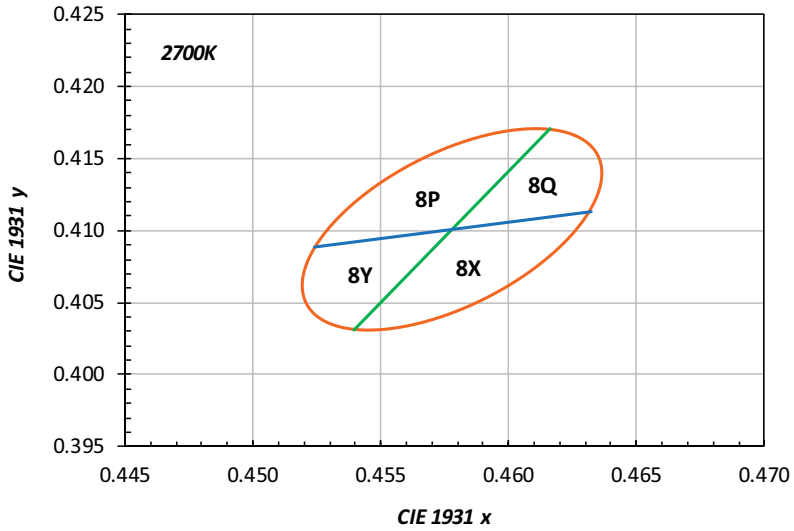


Figure 8a. 1/8th color bin structure for LUXEON 3030 HE Plus – Deep Dimming 2700K, at 65mA, T_j=25°C.

Table 6a. 3-step MacAdam ellipse color bin definitions for LUXEON 3030 HE Plus – Deep Dimming 2700K, at 65mA, T_j=25°C.

NOMINAL CCT	COLOR SPACE	CENTER POINT [1] (cx, cy)	MAJOR AXIS, a	MINOR AXIS, b	ELLIPSE ROTATION ANGLE, Θ
2700K	Single 3-Step MacAdam ellipse	(0.4578, 0.4101)	0.00810	0.00420	53.70°

Notes for Table 6a:
1. Lumileds maintains a tolerance of ±0.007 on x and y color coordinates in the CIE 1931 color space.

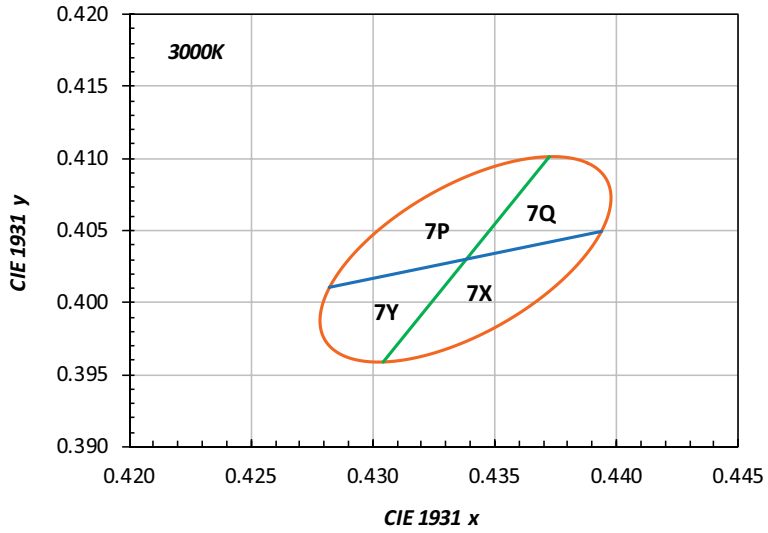


Figure 8b. 1/8th color bin structure for LUXEON 3030 HE Plus – Deep Dimming 3000K, at 65mA, T_j=25°C.

Table 6b. 3-step MacAdam ellipse color bin definitions for LUXEON 3030 HE Plus – Deep Dimming 3000K, at 65mA, T_j=25°C.

NOMINAL CCT	COLOR SPACE	CENTER POINT [1] (cx, cy)	MAJOR AXIS, a	MINOR AXIS, b	ELLIPSE ROTATION ANGLE, Θ
3000K	Single 3-Step MacAdam ellipse	(0.4338, 0.4030)	0.00834	0.00408	53.22°

Notes for Table 6b:
1. Lumileds maintains a tolerance of ±0.007 on x and y color coordinates in the CIE 1931 color space.

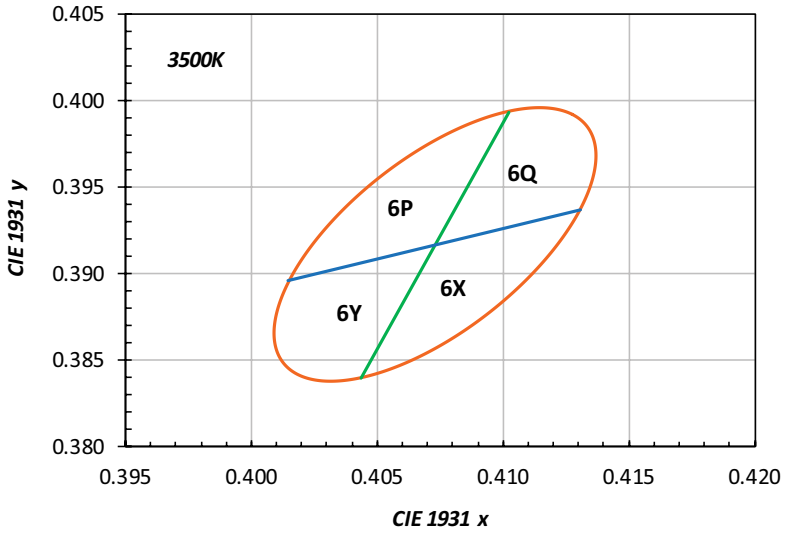


Figure 8c. 1/8th color bin structure for LUXEON 3030 HE Plus – Deep Dimming 3500K, at 65mA, T_j=25°C.

Table 6c. 3-step MacAdam ellipse color bin definitions for LUXEON 3030 HE Plus – Deep Dimming 3500K, at 65mA, T_j=25°C.

NOMINAL CCT	COLOR SPACE	CENTER POINT [1] (cx, cy)	MAJOR AXIS, a	MINOR AXIS, b	ELLIPSE ROTATION ANGLE, Θ
3500K	Single 3-Step MacAdam ellipse	(0.4073, 0.3917)	0.00927	0.00414	54.00°

Notes for Table 6c:
1. Lumileds maintains a tolerance of ±0.007 on x and y color coordinates in the CIE 1931 color space.

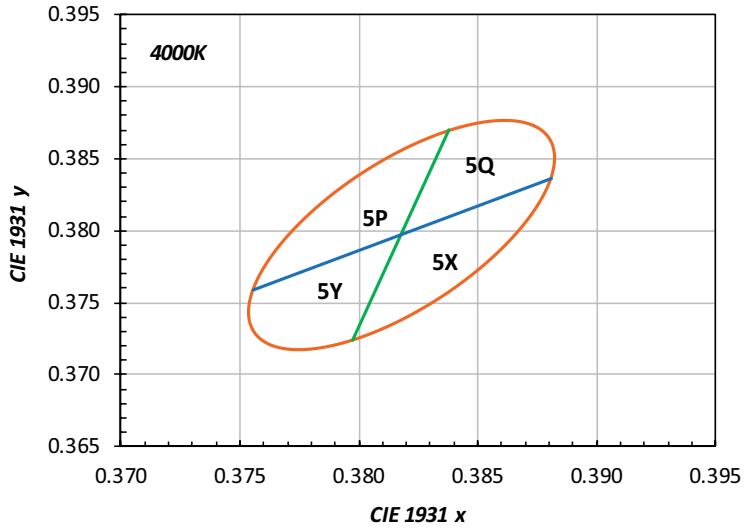


Figure 8d. 1/8th color bin structure for LUXEON 3030 HE Plus – Deep Dimming 4000K, at 65mA, T_j=25°C.

Table 6d. 3-step MacAdam ellipse color bin definitions for LUXEON 3030 HE Plus – Deep Dimming 4000K, at 65mA, T_j=25°C.

NOMINAL CCT	COLOR SPACE	CENTER POINT [1] (cx, cy)	MAJOR AXIS, a	MINOR AXIS, b	ELLIPSE ROTATION ANGLE, Θ
4000K	Single 3-Step MacAdam ellipse	(0.3818, 0.3797)	0.00939	0.00402	53.72°

Notes for Table 6d:
1. Lumileds maintains a tolerance of ±0.007 on x and y color coordinates in the CIE 1931 color space.

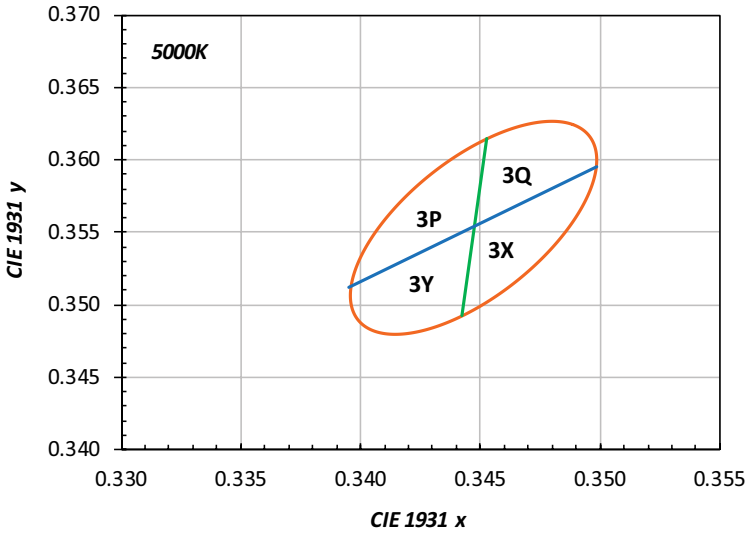


Figure 8e. 1/8th color bin structure for LUXEON 3030 HE Plus – Deep Dimming 5000K, at 65mA, T_j=25°C.

Table 6e. 3-step MacAdam ellipse color bin definitions for LUXEON 3030 HE Plus – Deep Dimming 5000K, at 65mA, T_j=25°C.

NOMINAL CCT	COLOR SPACE	CENTER POINT [1] (cx, cy)	MAJOR AXIS, a	MINOR AXIS, b	ELLIPSE ROTATION ANGLE, Θ
5000K	Single 3-Step MacAdam ellipse	(0.3447, 0.3553)	0.00822	0.00354	59.62°

Notes for Table 6e:
1. Lumileds maintains a tolerance of ±0.007 on x and y color coordinates in the CIE 1931 color space.

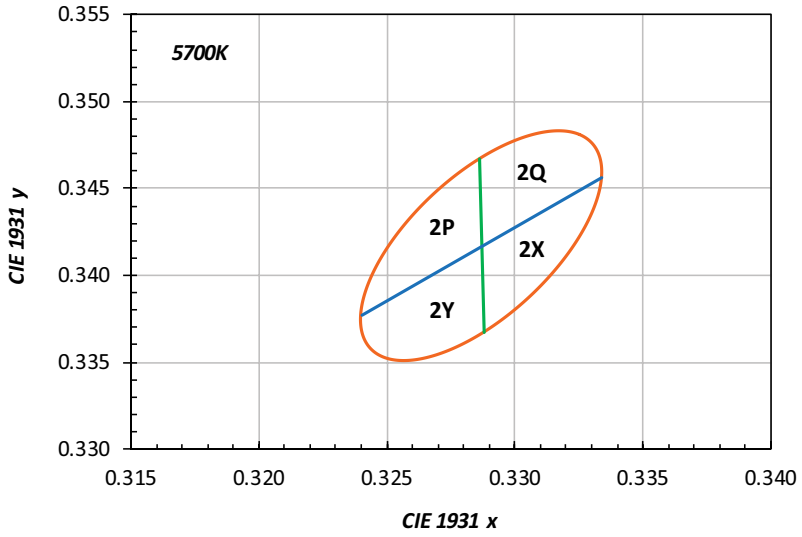


Figure 8f. 1/8th color bin structure for LUXEON 3030 HE Plus – Deep Dimming 5700K, at 65mA, T_j=25°C.

Table 6f. 3-step MacAdam ellipse color bin definitions for LUXEON 3030 HE Plus – Deep Dimming 5700K, at 65mA, T_j=25°C.

NOMINAL CCT	COLOR SPACE	CENTER POINT [1] (cx, cy)	MAJOR AXIS, a	MINOR AXIS, b	ELLIPSE ROTATION ANGLE, Θ
5700K	Single 3-Step MacAdam ellipse	(0.3287, 0.3417)	0.00746	0.00320	59.09°

Notes for Table 6f:
1. Lumileds maintains a tolerance of ±0.007 on x and y color coordinates in the CIE 1931 color space.

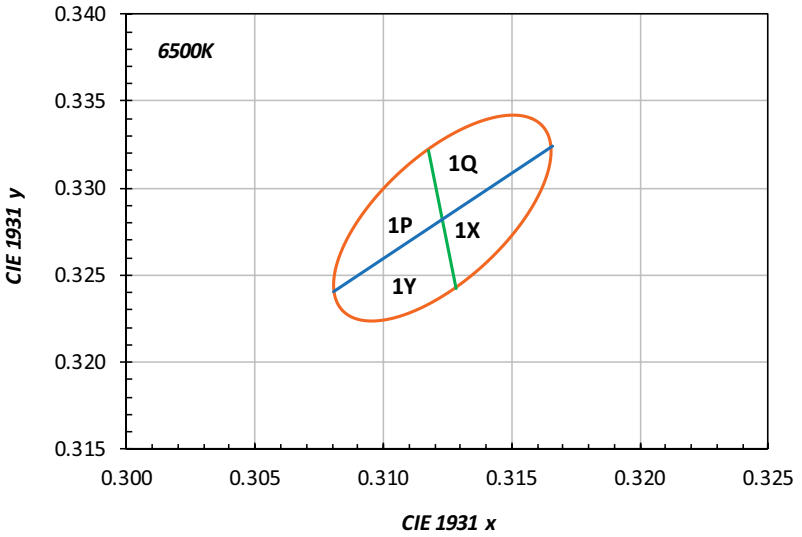


Figure 8g. 1/8th color bin structure for LUXEON 3030 HE Plus – Deep Dimming 6500K, at 65mA, T_j=25°C.

Table 6g. 3-step MacAdam ellipse color bin definitions for LUXEON 3030 HE Plus – Deep Dimming 6500K, at 65mA, T_j=25°C.

NOMINAL CCT	COLOR SPACE	CENTER POINT [1] (cx, cy)	MAJOR AXIS, a	MINOR AXIS, b	ELLIPSE ROTATION ANGLE, Θ
6500K	Single 3-Step MacAdam ellipse	(0.3123, 0.3282)	0.00669	0.00285	58.57°

Notes for Table 6g:
1. Lumileds maintains a tolerance of ±0.007 on x and y color coordinates in the CIE 1931 color space.

Forward Voltage Bins

Table 7. Forward voltage bin definitions for L130-xxxxHA3000DD1, T_j=25°C.

BIN	DEEP DIMING GROUP [1]
1	Deep Diming group 1
2	Deep Diming group 2
3	Deep Diming group 3

Notes for Table 7:
1. Deep Diming group is specifically designed for deep dimming applications. Please refer to respective Lumileds Sales person or info@lumileds.com for more details.

Mechanical Dimensions

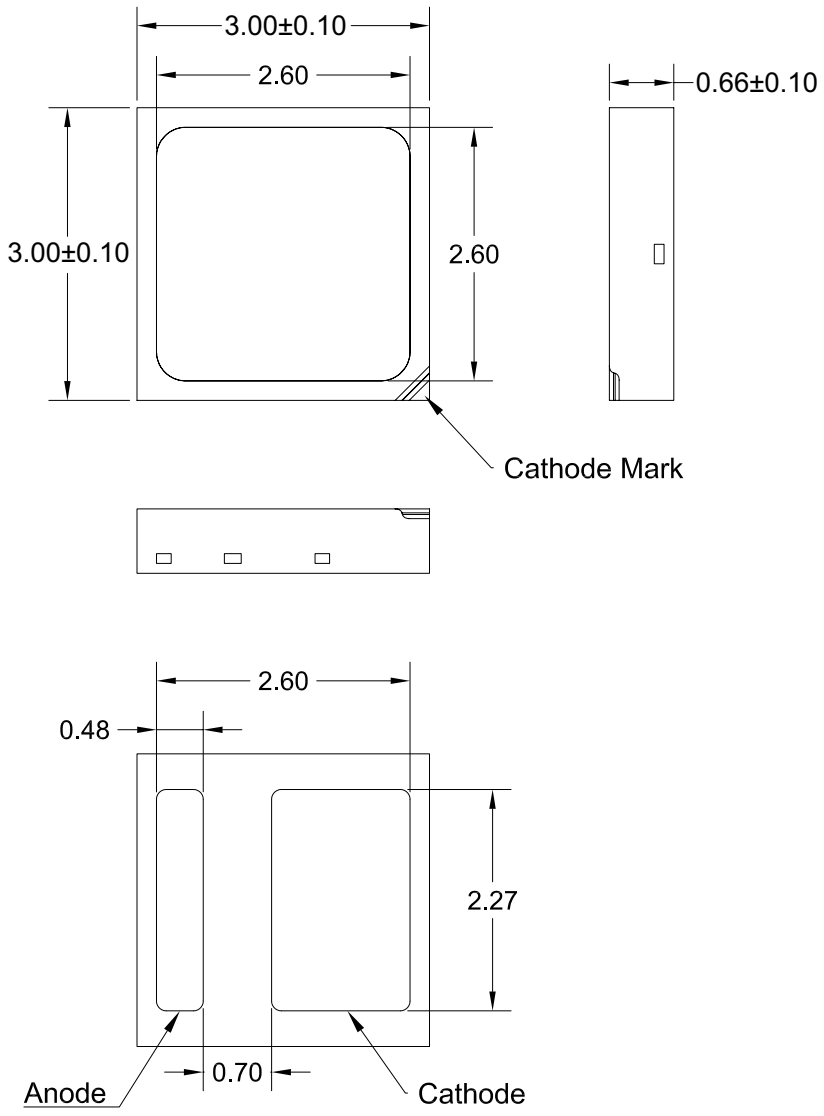


Figure 9. Mechanical dimensions for LUXEON 3030 HE Plus – Deep Dimming.

Notes for Figure 9:
1. Drawings are not to scale.
2. All dimensions are in millimeters.
3. Tolerance: ±0.10mm.

Reflow Soldering Guidelines

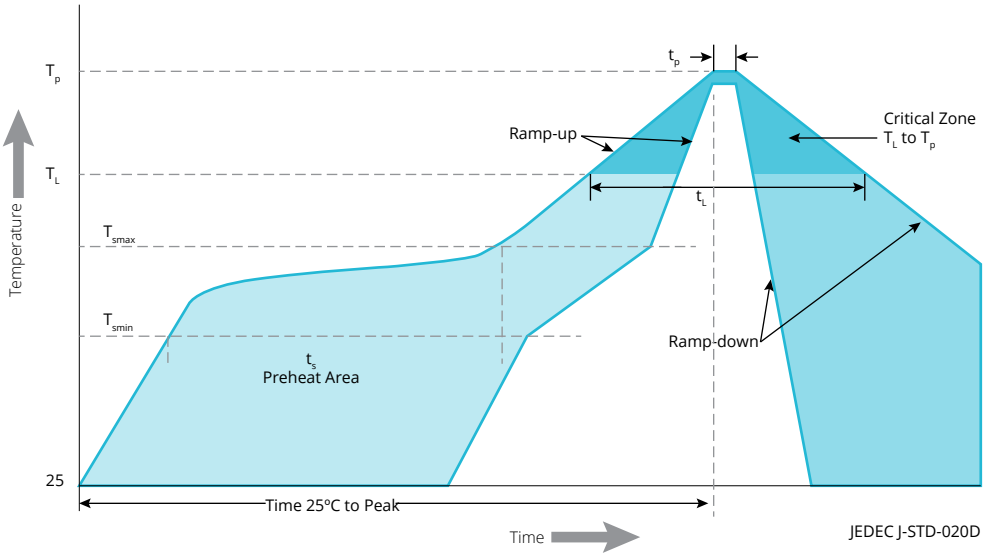


Figure 10. Visualization of the acceptable reflow temperature profile as specified in Table 8.

Table 8. Reflow profile characteristics for LUXEON 3030 HE Plus – Deep Dimming.

PROFILE FEATURE	LEAD FREE ASSEMBLY
Preheat Minimum Temperature (T_{smin})	150°C
Preheat Maximum Temperature (T_{smax})	200°C
Preheat Time (t_{smin} to t_{smax})	60 to 120 seconds
Ramp-Up Rate (T_L to T_p)	3°C / second maximum
Liquidous Temperature (T_L)	217°C
Time Maintained Above Temperature T_L (t_L)	60 to 150 seconds
Peak / Classification Temperature (T_p)	260°C
Time Within 5°C of Actual Peak Temperature (t_p)	20 to 40 seconds
Ramp-Down Rate (T_p to T_L)	6°C / second maximum
Time 25°C to Peak Temperature	8 minutes maximum

Notes for Table 8:
1. All temperatures refer to the application Printed Circuit Board (PCB), measured on the surface adjacent to the package body.

JEDEC Moisture Sensitivity

Table 9. Moisture sensitivity levels for LUXEON 3030 HE Plus – Deep Dimming.

LEVEL	FLOOR LIFE		SOAK REQUIREMENTS STANDARD	
	TIME	CONDITIONS	TIME	CONDITIONS
3	168 Hours	30°C / 60% RH	192 Hours +5 / -0	30°C / 60% RH

Solder Pad Design

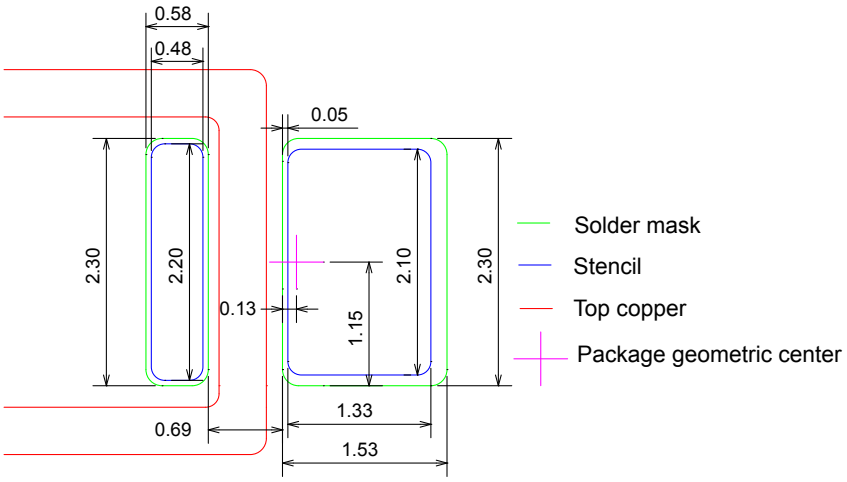


Figure 11. Recommended PCB solder pad layout for LUXEON 3030 HE Plus – Deep Dimming.

Notes for Figure 11 :
1. Drawings are not to scale.
2. All dimensions are in millimeters.

Packaging Information

Pocket Tape Dimensions

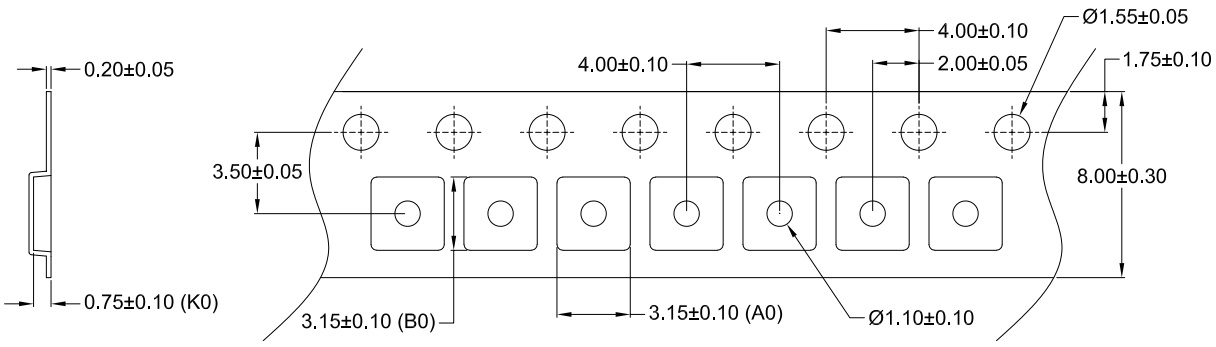


Figure 12. Pocket tape dimensions for LUXEON 3030 HE Plus – Deep Dimming.

Notes for Figure 12:
1. Drawings are not to scale.
2. All dimensions are in millimeters.

Reel Dimensions

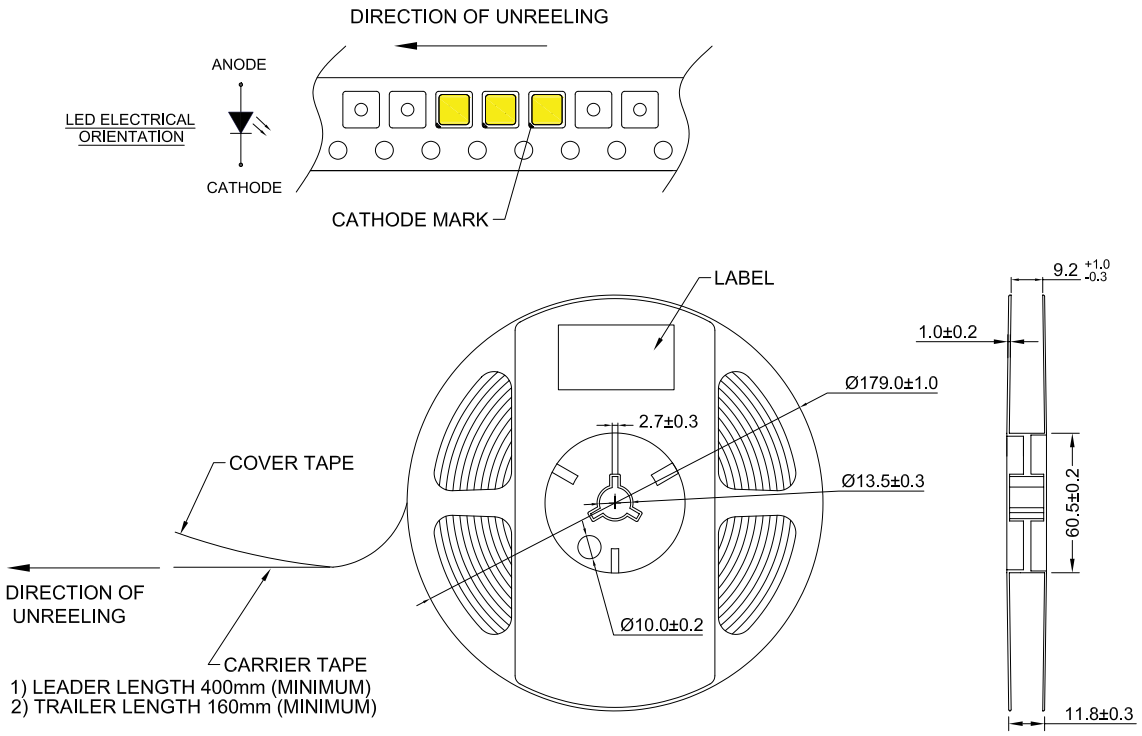


Figure 13. Reel dimensions for LUXEON 3030 HE Plus – Deep Dimming.

Notes for Figure 13:
1. Drawings are not to scale.
2. All dimensions are in millimeters.

About Lumileds

Companies developing automotive, mobile, IoT and illumination lighting applications need a partner who can collaborate with them to push the boundaries of light. With over 100 years of inventions and industry firsts, Lumileds is a global lighting solutions company that helps customers around the world deliver differentiated solutions to gain and maintain a competitive edge. As the inventor of Xenon technology, a pioneer in halogen lighting and the leader in high performance LEDs, Lumileds builds innovation, quality and reliability into its technology, products and every customer engagement. Together with its customers, Lumileds is making the world better, safer, more beautiful—with light.

To learn more about our lighting solutions, visit lumileds.com.

LUMILEDS