LUXEON 3030 HE

Industry leading efficacy, 3V 3030 package

LUXEON 3030 HE and LUXEON 3030 HE Plus are superior high efficacy, mid power package built on the legacy of the LUXEON 3030 product line. It serves as a go-to solution for various indoor and outdoor fixture applications that require top notch lm/W performance and long lifetime. LUXEON 3030 HE and LUXEON 3030 HE Plus adopt quadrant bin structure within 3 SDCM, which enables 2 SDCM by kitting.

FEATURES AND BENEFITS

- Superior high efficacy at rated current enables outstanding lm/W at system level
- Reliable package design from a proven product line affirms application long lifetime
- Quadrant bin structure within 3 SDCM enables 2 SDCM by kitting
- Industry standard package allows drop-in replacement for existing 3030 packages

PRIMARY APPLICATIONS

- Panel / Soft Lights
- Spotlights
- Linear
- Troffers
- Downlights
- Wall Pack

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General Product Information

Product Test Conditions

LUXEON 3030 HE 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 LEDs follow the convention below:

L 1 3 0 – **A A B B C C** 3 0 0 0 0 **D E**

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 (70=70CRI, 80=80CRI, 90=90CRI)
- **C C** – designates product code (HA= LUXEON 3030 HE Plus, HB = LUXEON 3030 HE)
- **D** – designates product code (0=0.08V V_f bin, B=0.1V V_f bin)
- **E** – designates Lumileds internal code (i.e. 1, 2, 3, etc., share the same base part)

Therefore, the following part number is used for a LUXEON 3030 HE Plus, 3000K 80CRI LED with a 0.1V V_f bin:

L 1 3 0 – **3 0 8 0** H A 3 0 0 0 0 **B 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 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 and LUXEON 3030 HE Plus 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	2700K	80	29.0	32.0	176	L130-2780HB30000B1
	3000K	80	29.5	32.5	179	L130-3080HB30000B1
	3500K	80	30.0	33.5	184	L130-3580HB30000B1
	4000K	80	32.0	35.5	195	L130-4080HB30000B1
	5000K	80	32.0	35.5	195	L130-5080HB30000B1
	5700K	80	32.0	35.0	192	L130-5780HB30000B1
	6500K	80	31.0	35.0	192	L130-6580HB30000B1
	2700K	90	24.5	27.4	151	L130-2790HB30000B1
	3000K	90	25.0	27.5	151	L130-3090HB30000B1
	3500K	90	26.0	28.5	157	L130-3590HB30000B1
	4000K	90	27.5	30.2	166	L130-4090HB30000B1
	5000K	90	27.0	29.5	162	L130-5090HB30000B1
	5700K	90	27.0	29.5	162	L130-5790HB30000B1
	6500K	90	27.0	29.5	162	L130-6590HB30000B1
LUXEON 3030 HE Plus	2700K	80	30.0	33.5	190	L130-2780HA3000001
	3000K	80	32.0	35.0	199	L130-3080HA3000001
	3500K	80	33.0	36.0	204	L130-3580HA3000001
	4000K	80	34.0	37.0	210	L130-4080HA3000001
	5000K	80	34.0	37.0	210	L130-5080HA3000001
	5700K	80	33.5	36.5	207	L130-5780HA3000001
	6500K	80	33.0	36.0	204	L130-6580HA3000001
	3000K	70	34.0	37.0	210	L130-3070HA30000B1
	3500K	70	35.0	38.0	216	L130-3570HA30000B1
	4000K	70	36.0	39.0	221	L130-4070HA30000B1
	5000K	70	36.0	39.0	221	L130-5070HA30000B1
	5700K	70	35.0	38.0	216	L130-5770HA30000B1
	6500K	70	34.5	37.5	213	L130-6570HA30000B1
	2700K	80	30.0	33.5	190	L130-2780HA30000B1
	3000K	80	32.0	35.0	199	L130-3080HA30000B1
	3500K	80	33.0	36.0	204	L130-3580HA30000B1
	4000K	80	34.0	37.0	210	L130-4080HA30000B1
	5000K	80	34.0	37.0	210	L130-5080HA30000B1
	5700K	80	33.5	36.5	207	L130-5780HA30000B1
	6500K	80	33.0	36.0	204	L130-6580HA30000B1
	2700K	90	26.0	28.5	162	L130-2790HA30000B1
	3000K	90	27.0	29.5	167	L130-3090HA30000B1
	3500K	90	27.5	30.5	173	L130-3590HA30000B1
	4000K	90	28.5	31.5	179	L130-4090HA30000B1
	5000K	90	28.5	31.5	179	L130-5090HA30000B1
	5700K	90	28.5	31.5	179	L130-5790HA30000B1
	6500K	90	28.0	31.0	176	L130-6590HA30000B1

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 and LUXEON 3030 HE Plus at 65mA, T_j= 25°C.

PART NUMBER	TYPICAL TOTAL INCLUDED ANGLE [1]	TYPICAL VIEWING ANGLE [2]
L130-xxxxHx30000x1	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 and LUXEON 3030 HE Plus 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-xxxxHA3000001	2.62	2.71	2.86	-1.0 to -2.0	10.0
L130-xxxxHA30000B1	2.66	2.71	2.76	-1.0 to -2.0	10.0
L130-xxxxHB30000B1	2.75	2.80	2.85	-1.0 to -2.0	23.0

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 and LUXEON 3030 HE Plus.

PARAMETER	MAXIMUM PERFORMANCE
DC Forward Current [1]	240mA/480mA
Peak Pulsed Forward Current [2]	350mA/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 2D LEDs are not designed to be driven in reverse bias.

Characteristics Curves

Spectral Power Distribution Characteristics

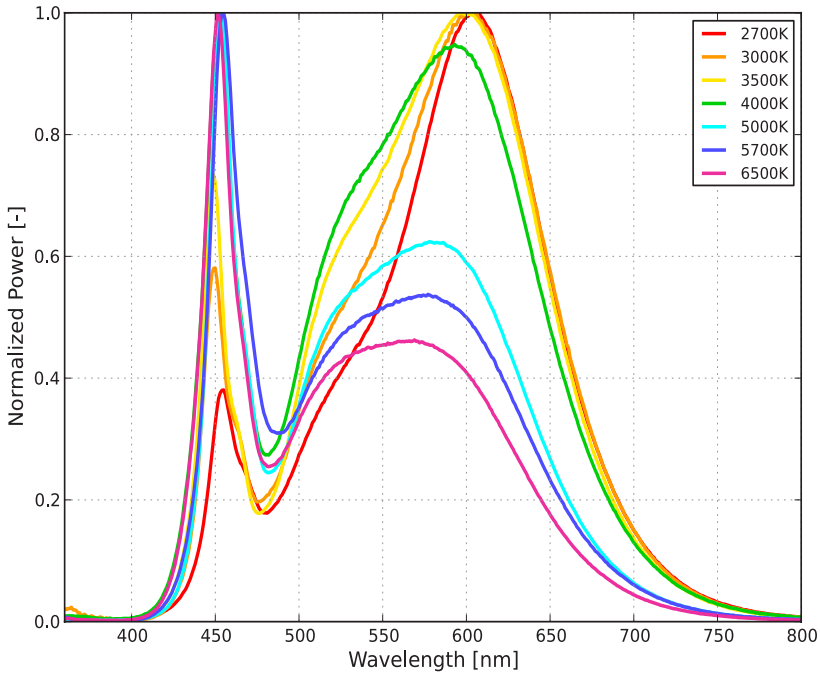


Figure 1a. Typical normalized power vs. wavelength for L130-xx80Hx30000x1 at 65mA, T_j=25°C.

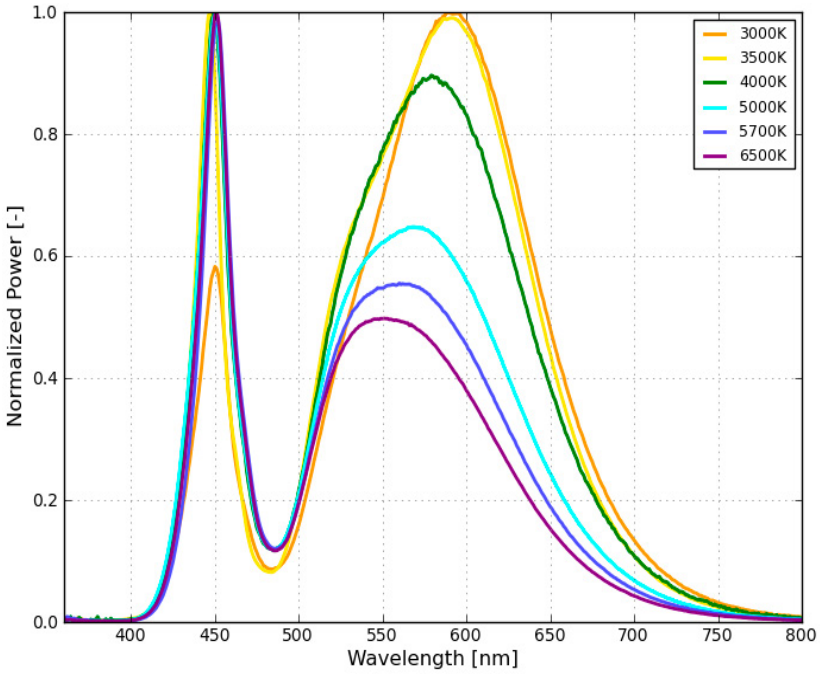


Figure 1b. Typical normalized power vs. wavelength for L130-xx70Hx30000x1 at 65mA, T_j=25°C.

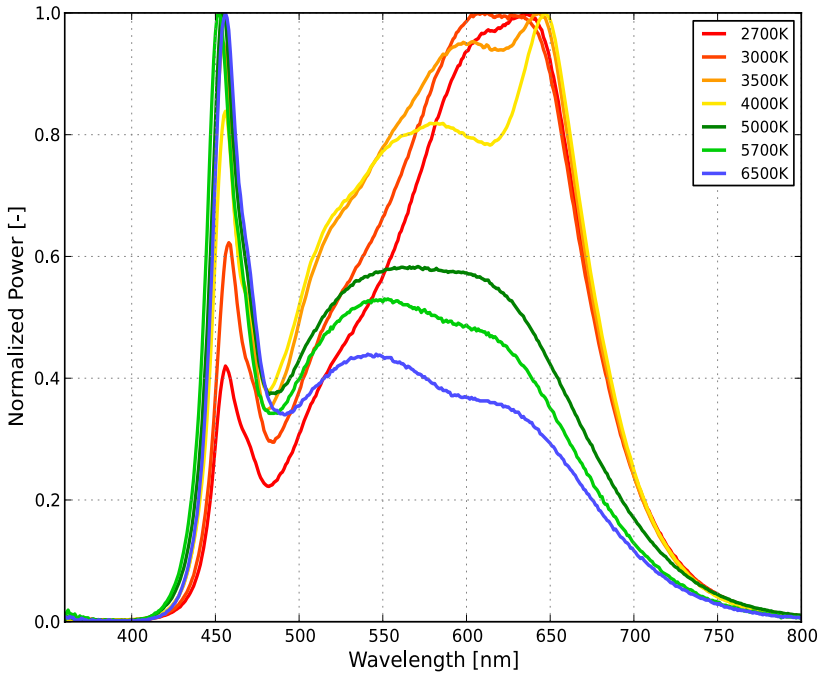


Figure 1c. Typical normalized power vs. wavelength for L130-xx90Hx30000x1 at 65mA, T_j=25°C.

Light Output Characteristics

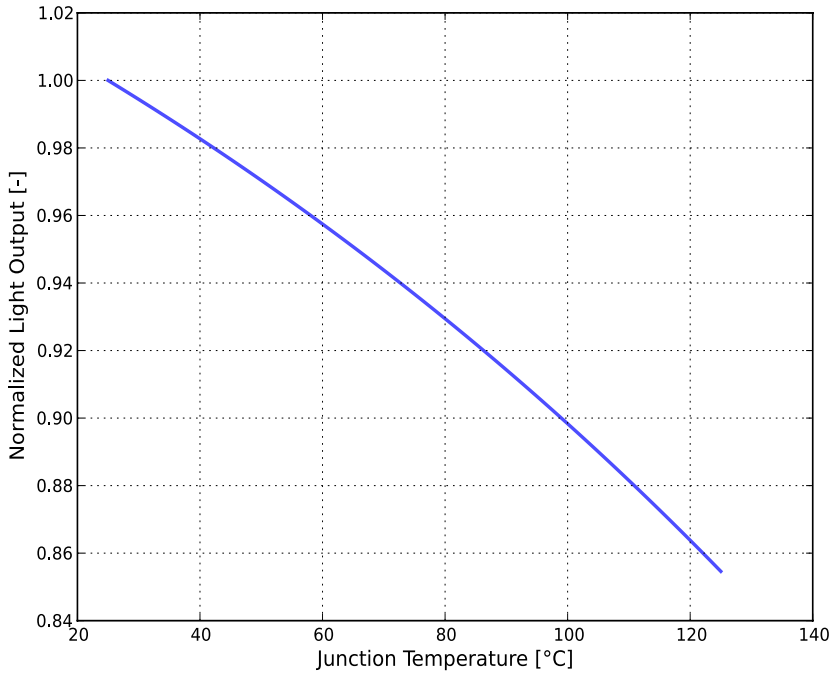
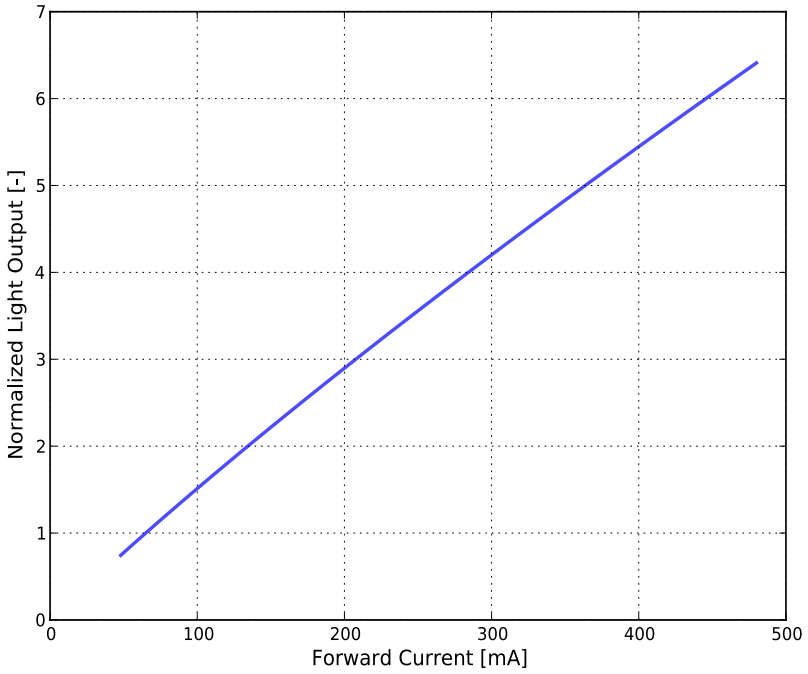
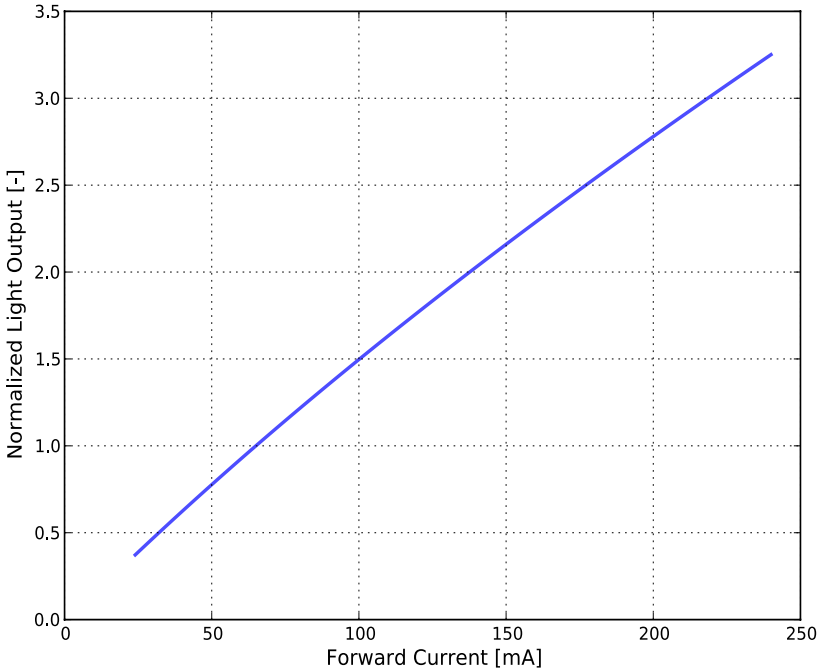


Figure 2. Typical normalized light output vs. junction temperature for L130-xxxxHx30000x1 at 65mA.



ESTIMATED TYPICAL RATIO COMPARED TO FLUX AT RATED CONDITION 65mA, T_j=25°C.				
60mA	65mA	120mA	150mA	480mA
93%	100%	180%	222%	641%

Figure 3. Typical normalized light output vs. forward current for L130-xxxxHA30000x1 at T_j=25°C.



ESTIMATED TYPICAL RATIO COMPARED TO FLUX AT RATED CONDITION 65mA, T_j=25°C.				
60mA	65mA	120mA	150mA	480mA
93%	100%	177%	216%	325%

Figure 4. Typical normalized light output vs. forward current for L130-xxxxHB30000x1 at T_j=25°C.

Forward Current Characteristics

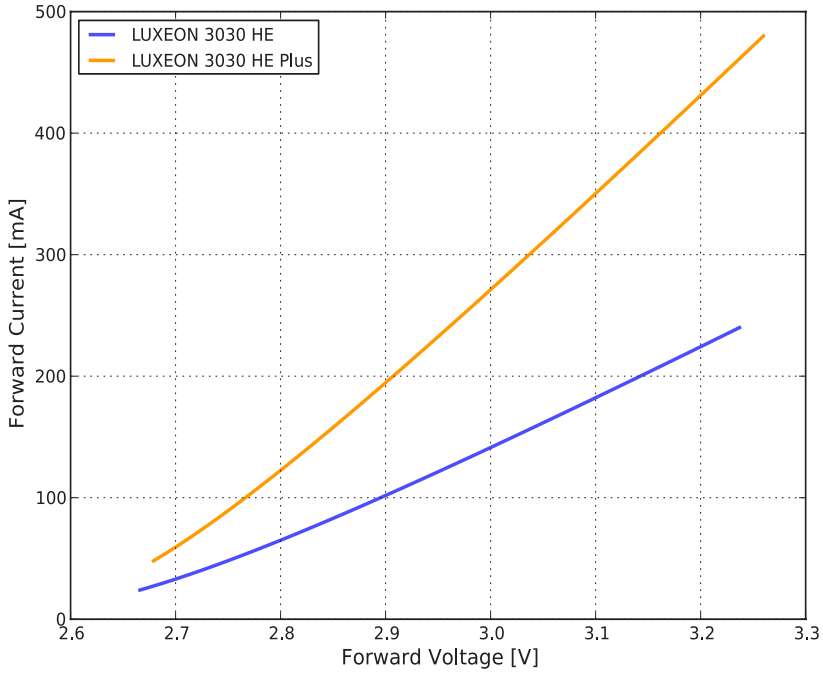


Figure 5. Typical forward current vs. forward voltage for L130-xxxxHx30000x1 at T_j=25°C.

Radiation Pattern Characteristics

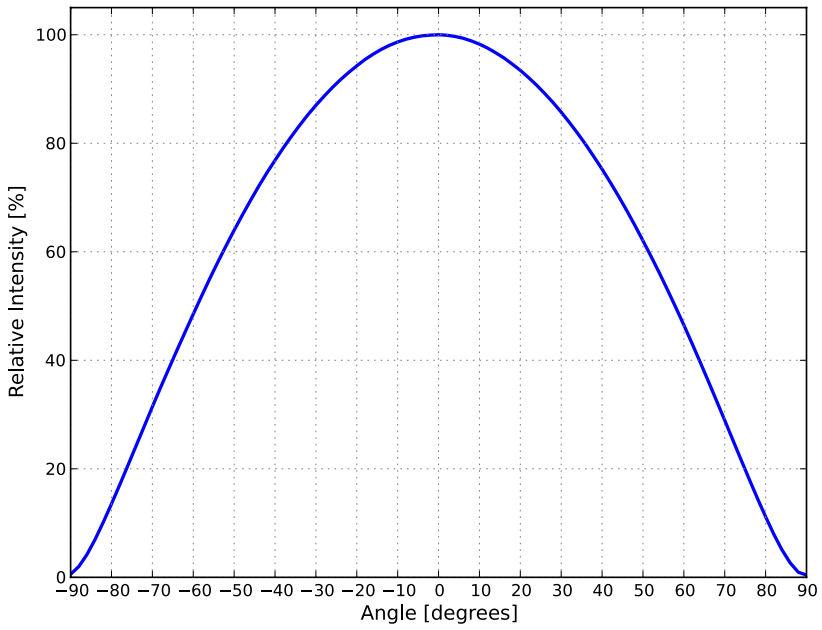


Figure 6. Typical radiation pattern for L130-xxxxHx30000x1 at 65mA, T_j=25°C.

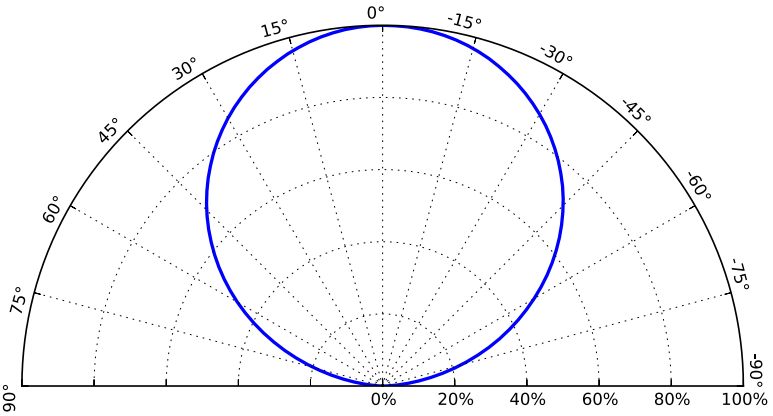


Figure 7. Typical polar radiation pattern for L130-xxxxHx30000x1 at 65mA, T_j=25°C.

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 LEDs are labeled using a 4- or 5-digit alphanumeric CAT code following the format below.

A B C D or **A x B C D**

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

x – designates Lumileds internal code

B C – designates color bin (example: 5E, 5H, 5F, 5G for 4000K parts)

D – designates forward voltage bin (example: B=2.62 to 2.70V, C=2.70 to 2.78V, K = 2.66 to 2.76V)

Therefore, a LUXEON 3030 HE Plus with a lumen range of 35.5 to 37.0 lm, color bin of 5E, and a forward voltage range of 2.70 to 2.78V has the following CAT code:

F 5 E C

Luminous Flux Bins

Table 5 lists the standard luminous flux bins for LUXEON 3030 HE 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 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

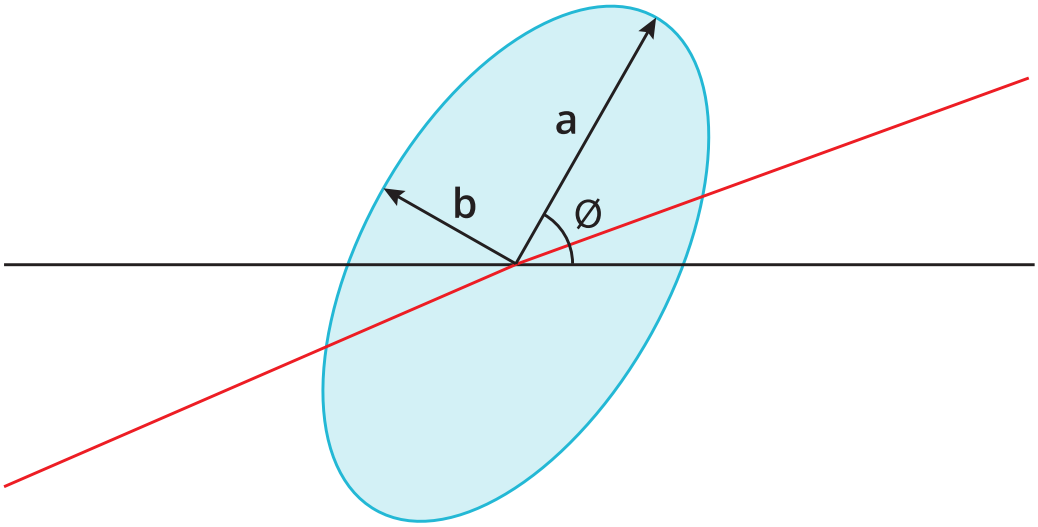


Figure 8. 3- and 5-step MacAdam ellipse illustration for Tables 6a-6g.

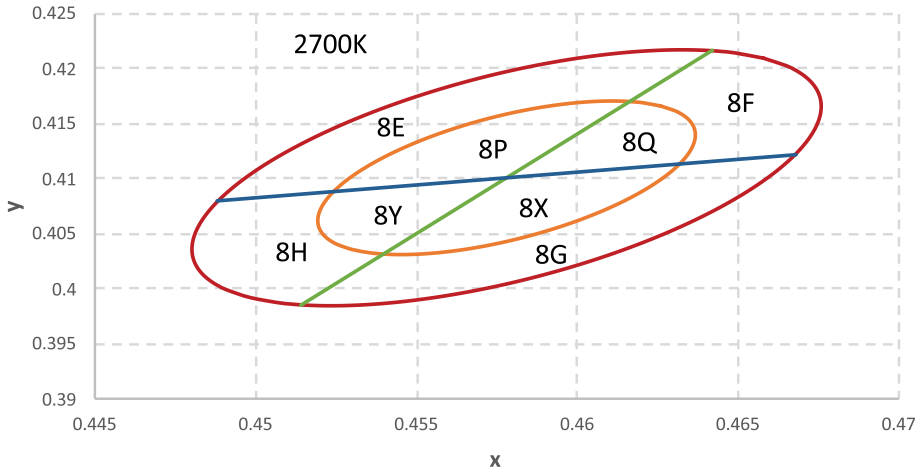


Figure 9a. 1/8th color bin structure for LUXEON 3030 HE and LUXEON 3030 HE Plus 2700K, at 65mA, T_j=25°C.

Table 6a. 3- and 5-step MacAdam ellipse color bin definitions for LUXEON 3030 HE and LUXEON 3030 HE Plus 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°
2700K	Single 5-Step MacAdam ellipse	(0.4578, 0.4101)	0.01350	0.00700	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.

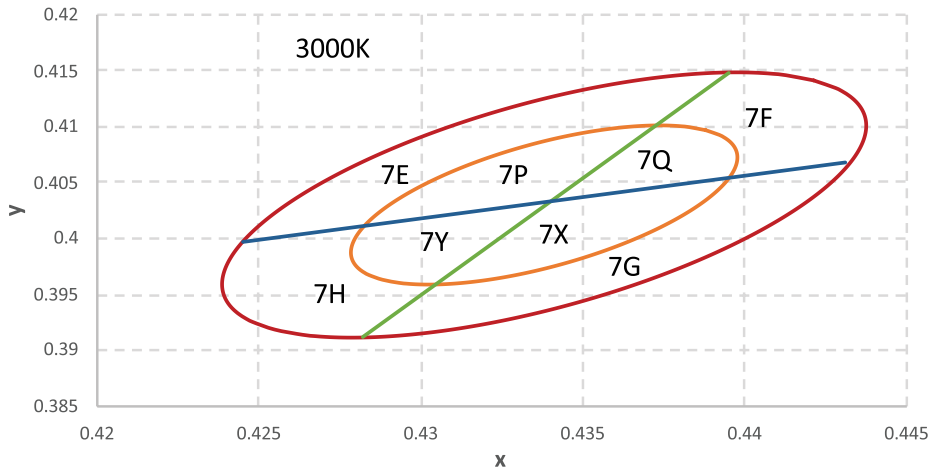


Figure 9b. 1/8th color bin structure for LUXEON 3030 HE and LUXEON 3030 HE Plus 3000K, at 65mA, T_j=25°C.

Table 6b. 3- and 5-step MacAdam ellipse color bin definitions for LUXEON 3030 HE and LUXEON 3030 HE Plus 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°
3000K	Single 5-Step MacAdam ellipse	(0.4338, 0.4030)	0.01390	0.00680	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.

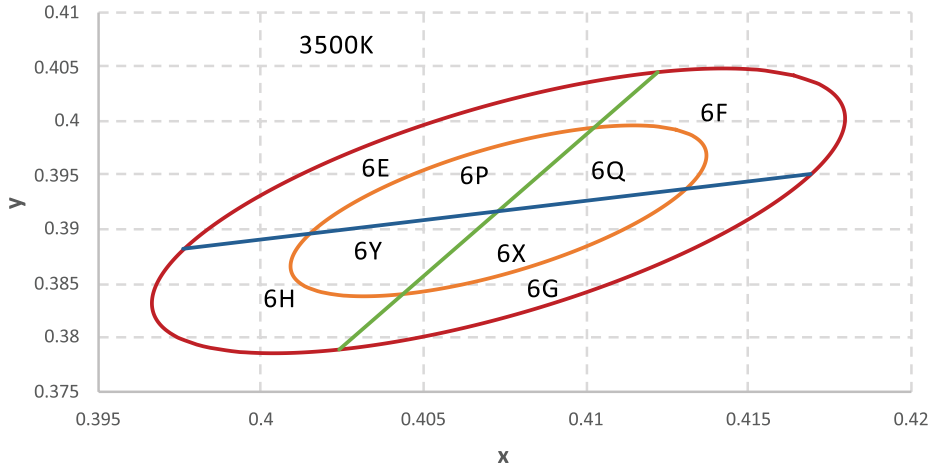


Figure 9c. 1/8th color bin structure for LUXEON 3030 HE and LUXEON 3030 HE Plus 3500K, at 65mA, T_j=25°C.

Table 6c. 3- and 5-step MacAdam ellipse color bin definitions for LUXEON 3030 HE and LUXEON 3030 HE Plus 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°
3500K	Single 5-Step MacAdam ellipse	(0.4073, 0.3917)	0.01545	0.00690	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.

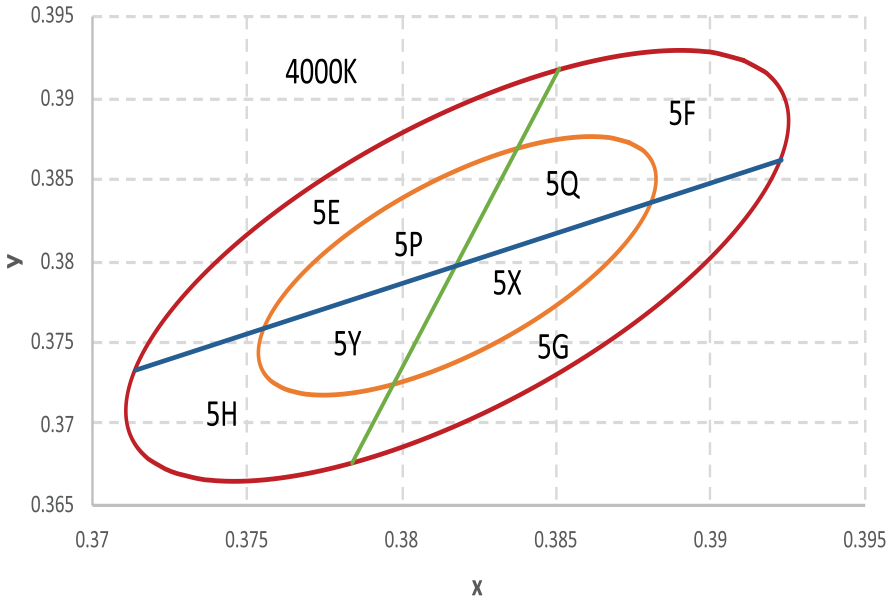


Figure 9d. 1/8th color bin structure for LUXEON 3030 HE and LUXEON 3030 HE Plus 4000K, at 65mA, T_j=25°C.

Table 6d. 3- and 5-step MacAdam ellipse color bin definitions for LUXEON 3030 HE and LUXEON 3030 HE Plus 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°
4000K	Single 5-Step MacAdam ellipse	(0.3818, 0.3797)	0.01565	0.00670	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.

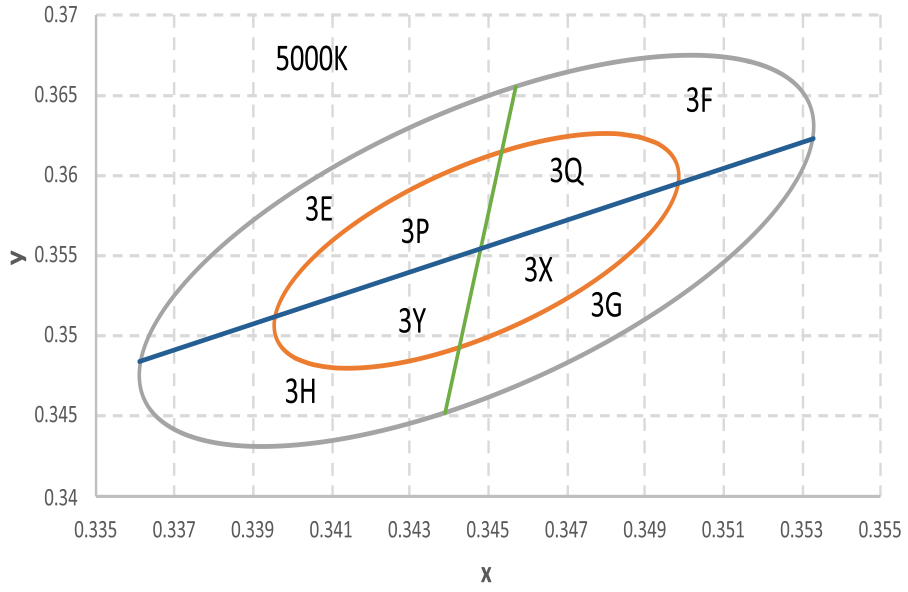


Figure 9e. 1/8th color bin structure for LUXEON 3030 HE and LUXEON 3030 HE Plus 5000K, at 65mA, T_j=25°C.

Table 6e. 3- and 5-step MacAdam ellipse color bin definitions for LUXEON 3030 HE and LUXEON 3030 HE Plus 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°
5000K	Single 5-Step MacAdam ellipse	(0.3447, 0.3553)	0.01370	0.00590	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.

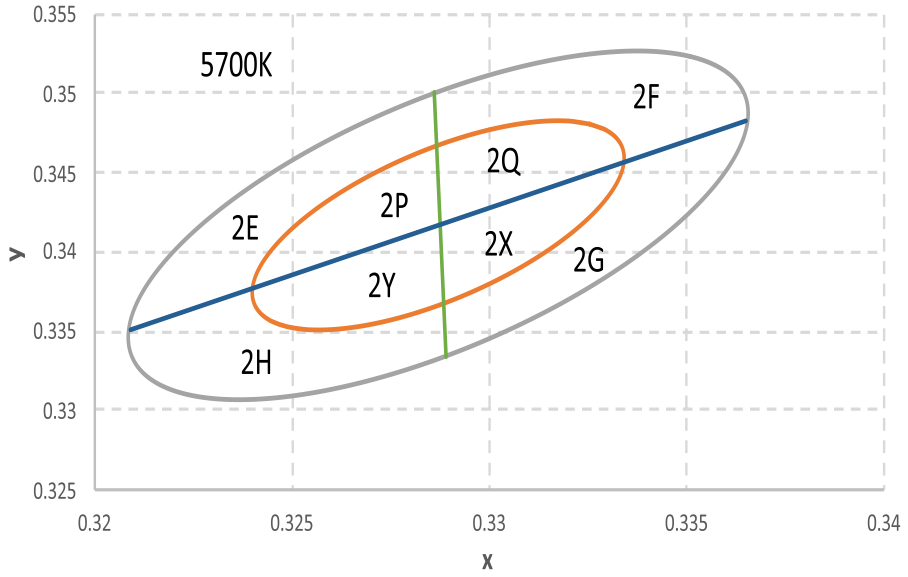


Figure 9f. 1/8th color bin structure for LUXEON 3030 HE and LUXEON 3030 HE Plus 5700K, at 65mA, T_j=25°C.

Table 6f. 3- and 5-step MacAdam ellipse color bin definitions for LUXEON 3030 HE and LUXEON 3030 HE Plus 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°
5700K	Single 5-Step MacAdam ellipse	(0.3287, 0.3417)	0.01243	0.00533	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.

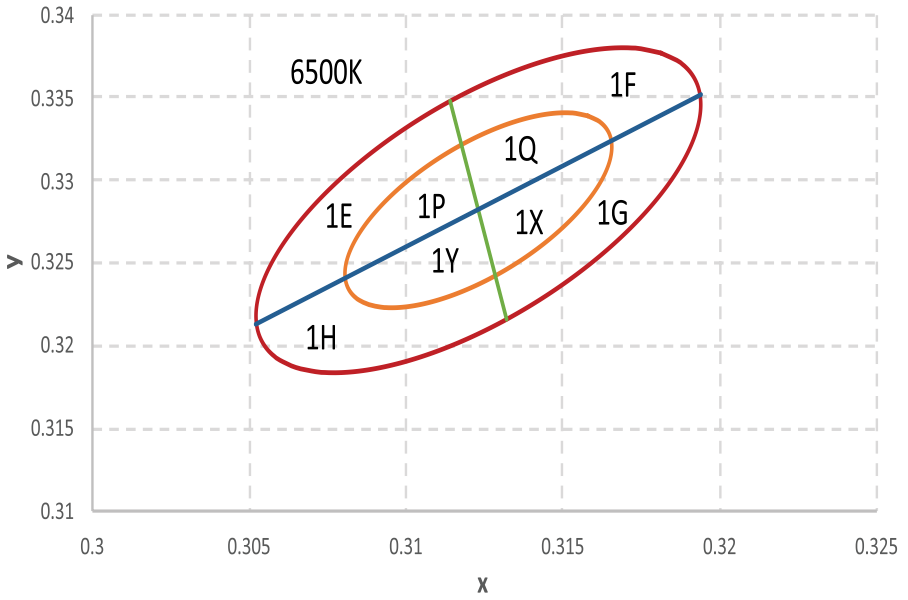


Figure 9g. 1/8th color bin structure for LUXEON 3030 HE and LUXEON 3030 HE Plus 6500K, at 65mA, T_j=25°C.

Table 6g. 3- and 5-step MacAdam ellipse color bin definitions for LUXEON 3030 HE and LUXEON 3030 HE Plus 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°
6500K	Single 5-Step MacAdam ellipse	(0.3123, 0.3282)	0.01115	0.00475	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 7a. Forward voltage bin definitions for L130-xxxxHA3000001, T_j=25°C.

BIN	FORWARD VOLTAGE [1] (V_f)	
	MINIMUM	MAXIMUM
B	2.62	2.70
C	2.70	2.78
D	2.78	2.86

Notes for Table 7a:
1. Lumileds maintains a tolerance of ±0.1V on forward voltage measurements.

Table 7b. Forward voltage bin definitions for L130-xxxxHA30000B1, T_j=25°C.

BIN	FORWARD VOLTAGE [1] (V_f)	
	MINIMUM	MAXIMUM
K	2.66	2.76

Notes for Table 7b:
1. Lumileds maintains a tolerance of ±0.1V on forward voltage measurements.

Table 7c. Forward voltage bin definitions for L130-xxxxHB30000B1, T_j=25°C.

BIN	FORWARD VOLTAGE [1] (V_f)	
	MINIMUM	MAXIMUM
L	2.75	2.85

Notes for Table 7c:
1. Lumileds maintains a tolerance of ±0.1V on forward voltage measurements.

Mechanical Dimensions

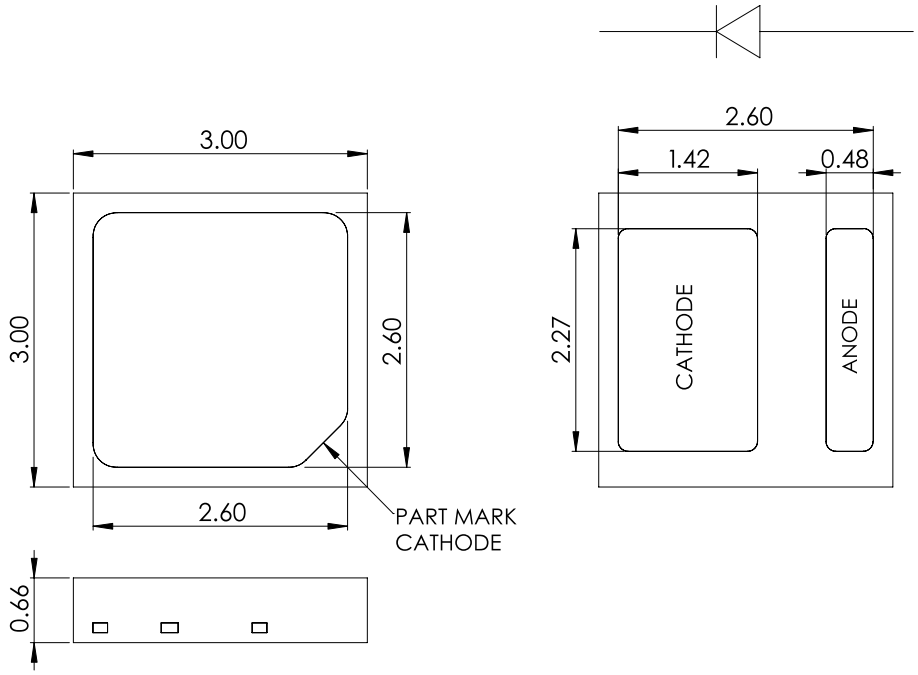


Figure 10. Mechanical dimensions for LUXEON 3030 HE.

Notes for Figure 10:
1. Drawings are not to scale.
2. All dimensions are in millimeters.
3. Tolerance: ±0.10mm.

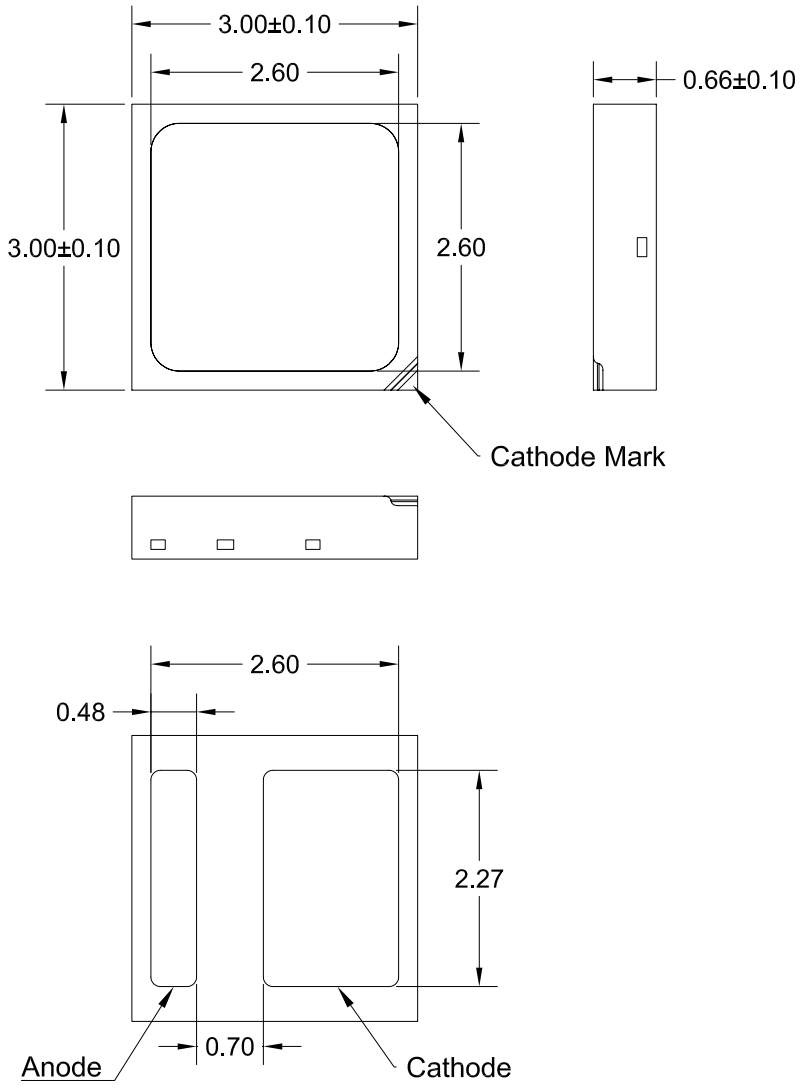


Figure 11. Mechanical dimensions for LUXEON 3030 HE Plus.

Notes for Figure 11:
1. Drawings are not to scale.
2. All dimensions are in millimeters.
3. Tolerance: ±0.10mm.

Reflow Soldering Guidelines

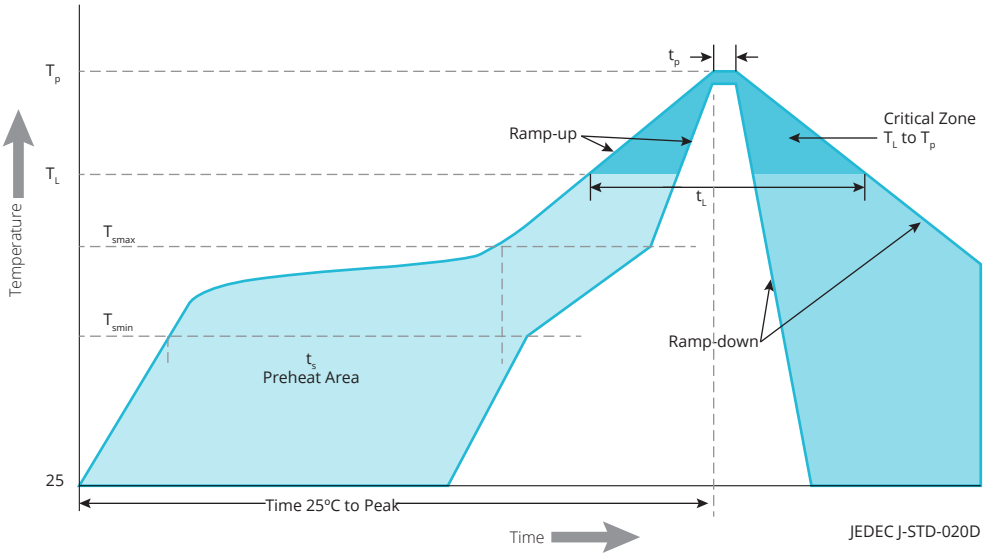


Figure 12. Visualization of the acceptable reflow temperature profile as specified in Table 8.

Table 8. Reflow profile characteristics for LUXEON 3030 HE and LUXEON 3030 HE Plus.

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 and LUXEON 3030 HE Plus.

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

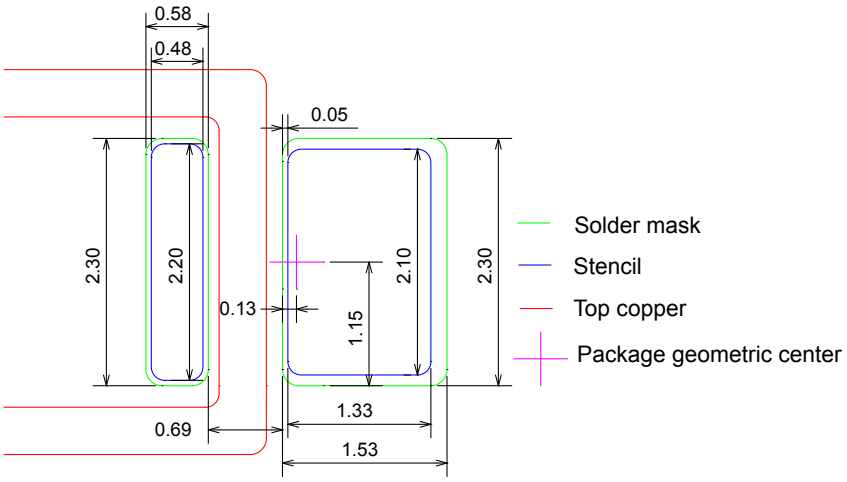


Figure 13. Recommended PCB solder pad layout for LUXEON 3030 HE and LUXEON 3030 HE Plus.

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

Packaging Information

Pocket Tape Dimensions

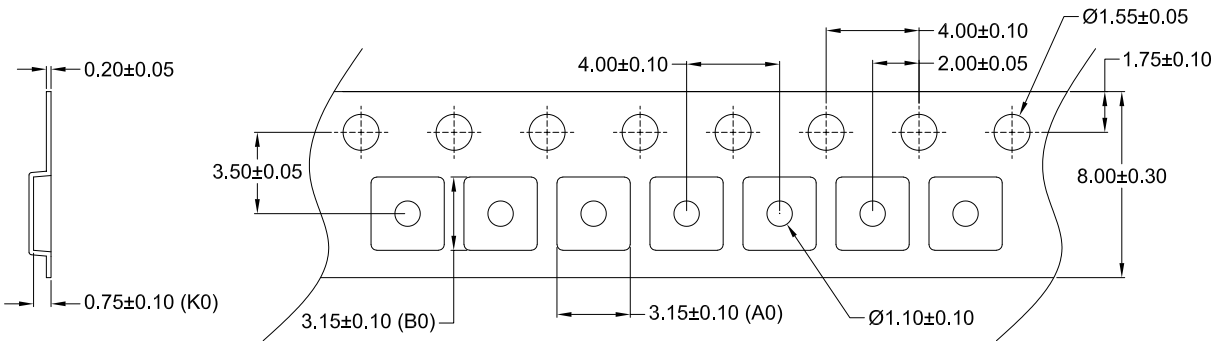


Figure 14. Pocket tape dimensions for LUXEON 3030 HE and LUXEON 3030 HE Plus.

Notes for Figure 14:
1. Drawings are not to scale.
2. All dimensions are in millimeters.

Reel Dimensions

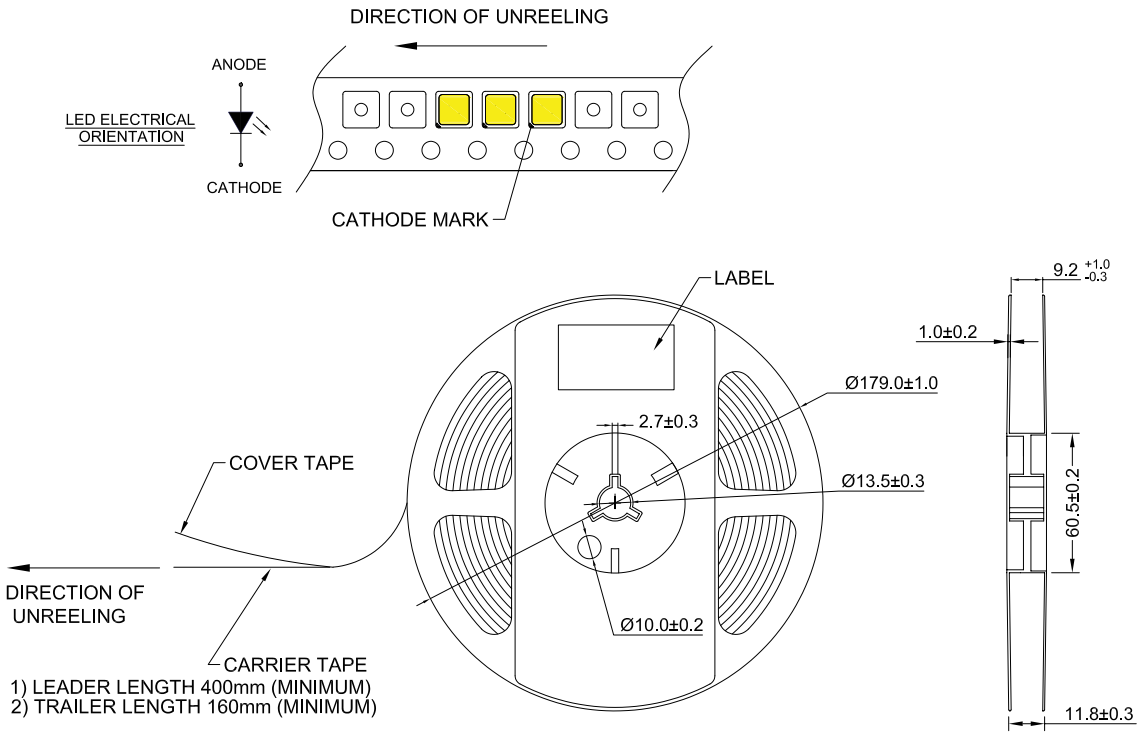


Figure 15. Reel dimensions for LUXEON 3030 HE and LUXEON 3030 HE Plus.

Notes for Figure 15:
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.

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