

LUXEON 3030 2D Line

High flux, hot-color targeted 6V package



LUXEON 3030 2D is a high flux, hot-color targeted mid power LED. Hot-color targeting ensures that the LEDs are within color target at application conditions—85°C. Using an industry standard packaging of 3.0mm x 3.0mm and 6V surface-mount emitter solution, LUXEON 3030 2D Line comes in all ANSI CCTs and delivers the efficacy and reliability required for both indoor and outdoor illumination markets.

FEATURES AND BENEFITS

- Industry standard package enables drop-in replacement for existing 3030 packages
- 1/9th micro-color binning enables tight color control
- Superior luminous flux at max current for reduced LED count
- Hot-color targeting ensures that color is within ANSI bin at typical application conditions, 85°C
- Enables 3-, 4-, 5-step MacAdam ellipse custom binning kits

PRIMARY APPLICATIONS

- Troffers
- Downlights
- High Bay
- Low Bay
- Floodlights
- More...

c UL us No. E507562 RoHS COMPLIANT

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General Product Information

Product Test Conditions

LUXEON 3030 2D Line LEDs are tested with a 20ms monopulse of 120mA at a junction temperature, T_j, of 25°C. Forward voltage and luminous flux are binned at a T_j of 25°C, while color is hot targeted at a T_j of 85°C.

Part Number Nomenclature

Part numbers for LUXEON 3030 2D Line follow the convention below:

L 1 3 0 – **A A B B** 0 0 3 0 0 0 **C** 2 **D**

Where:

- **A A** – designates nominal CCT (22=2200K, 27=2700K, 30=3000K, 35=3500K, 40=4000K, 50=5000K, 57=5700K, 65=6500K)
- **B B** – designates minimum CRI (70=70CRI, 80=80CRI and 90=90CRI)
- **C** – designates package type (W=Round LES, X=Square LES)
- **D** – designates Lumileds internal code (1, 2, 3, etc.=shares the same base part)

Therefore, the following part number is used for a LUXEON 3030 2D (Square LES), 3000K 80CRI:

L 1 3 0 – **3 0 8 0** 0 0 3 0 0 0 **X** 2 **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 2D Line 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).

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Performance Characteristics

Product Selection Guide

Table 1. Product performance of LUXEON 3030 2D Line at 120mA and 65mA at specified temperature.

PRODUCT	NOMINAL CCT [1]	MINIMUM CRI [2, 3]	LUMINOUS FLUX [2, 3] (lm)		TYPICAL LUMINOUS EFFICACY (lm/W)	TYPICAL LUMINOUS FLUX (lm)	TYPICAL LUMINOUS EFFICACY (lm/W)	PART NUMBER
			MINIMUM	TYPICAL				
			120mA			65mA		
LUXEON 3030 2D (Round LES)	3000K	70	98	125	174	71	192	L130-3070003000W21
	3500K	70	100	126.5	176	72	195	L130-3570003000W21
	4000K	70	101	129.5	180	74	199	L130-4070003000W21
	5000K	70	101	129.5	180	74	199	L130-5070003000W21
	5700K	70	101	127.5	177	73	196	L130-5770003000W21
	6500K	70	101	126.5	176	72	195	L130-6570003000W21
	2200K	80	80	95	132	54	146	L130-2280003000W21
	2700K	80	80	110	153	63	169	L130-2780003000W21
	3000K	80	85	115	160	66	177	L130-3080003000W21
	3500K	80	85	119	165	68	183	L130-3580003000W21
	4000K	80	90	121.5	169	69	187	L130-4080003000W21
	5000K	80	90	121.5	169	69	187	L130-5080003000W21
	5700K	80	90	121.5	169	69	187	L130-5780003000W21
	6500K	80	90	120.5	167	69	185	L130-6580003000W21
	2700K	90	72	91	126	52	140	L130-2790003000W21
	3000K	90	75	92.5	128	53	142	L130-3090003000W21
	3500K	90	75	96	133	55	148	L130-3590003000W21
	4000K	90	75	100	139	57	154	L130-4090003000W21
	5000K	90	75	100	139	57	154	L130-5090003000W21
LUXEON 3030 2D (Square LES)	3000K	70	110	126.5	176	72	195	L130-3070003000X21
	3500K	70	111	131.5	183	75	202	L130-3570003000X21
	4000K	70	117	133.5	185	76	205	L130-4070003000X21
	5000K	70	117	133.5	185	76	205	L130-5070003000X21
	5700K	70	117	132	183	75	203	L130-5770003000X21
	6500K	70	111	129.5	180	74	199	L130-6570003000X21
	2200K	80	89	98	136	56	151	L130-2280003000X21
	2700K	80	101	113.5	158	65	175	L130-2780003000X21
	3000K	80	102	116.5	162	66	179	L130-3080003000X21
	3500K	80	107	121	168	69	186	L130-3580003000X21
	4000K	80	110	124	172	71	191	L130-4080003000X21
	5000K	80	110	124.5	173	71	192	L130-5080003000X21
	5700K	80	110	125	174	71	192	L130-5780003000X21
	6500K	80	110	123.5	172	70	190	L130-6580003000X21
	2700K	90	86	97	135	55	149	L130-2790003000X21
	3000K	90	88	100	139	57	154	L130-3090003000X21
	3500K	90	91	102	142	58	157	L130-3590003000X21
	4000K	90	94	107	149	61	165	L130-4090003000X21
	5000K	90	94	107	149	61	165	L130-5090003000X21
	5700K	90	94	106	147	60	163	L130-5790003000X21
	6500K	90	94	106	147	60	163	L130-6590003000X21

Notes for Table 1:
1. Correlated color temperature is hot targeted at T_j=85°C.
2. Luminous flux and CRI are specified at T_j=25°. Typical CRI is approximately 2 points higher than the minimum CRI specified, but this is not guaranteed.
3. Lumileds maintains a tolerance of ±2 on CRI and ±7.5% on luminous flux measurements.

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Optical Characteristics

Table 2. Optical characteristics for LUXEON 3030 2D Line at 120mA, T_j=25°C.

PART NUMBER	TYPICAL TOTAL INCLUDED ANGLE [1]	TYPICAL VIEWING ANGLE [2]
L130-xxxx003000x21	140°	116°

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 lamp centerline where the luminous intensity is ½ of the peak value.

Electrical and Thermal Characteristics

Table 3. Electrical and thermal characteristics for LUXEON 3030 2D Line at 120mA, 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-xxxx003000x21	5.8	6.0	6.6	-2.0 to -4.0	12.0

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 2D Line.

PARAMETER	MAXIMUM PERFORMANCE
DC Forward Current [1]	240mA
Peak Pulsed Forward Current [2]	300mA
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.

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Characteristics Curves

Spectral Power Distribution Characteristics

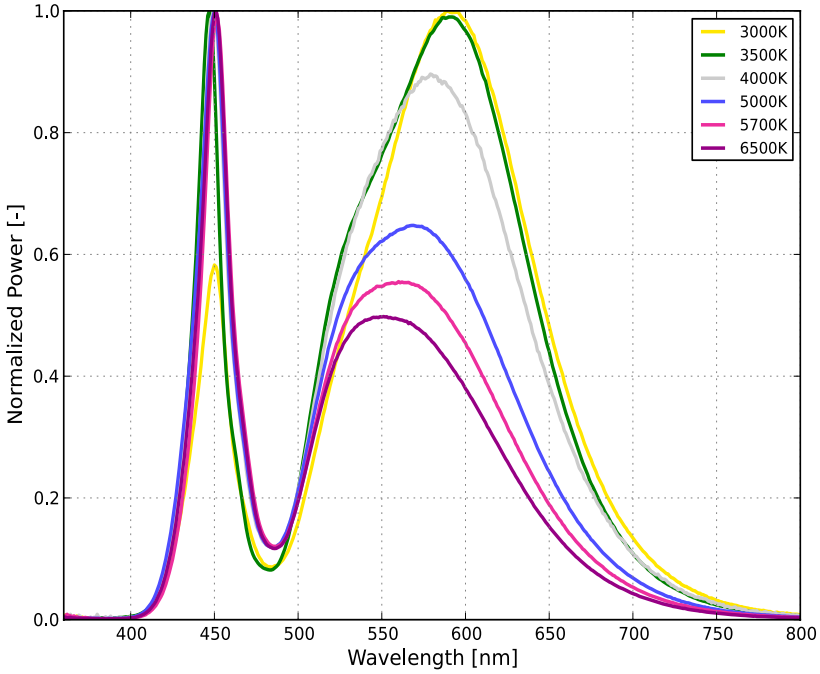


Figure 1a. Typical normalized power vs. wavelength for L130-xx70003000x21 at 120mA, T_j=25°C.

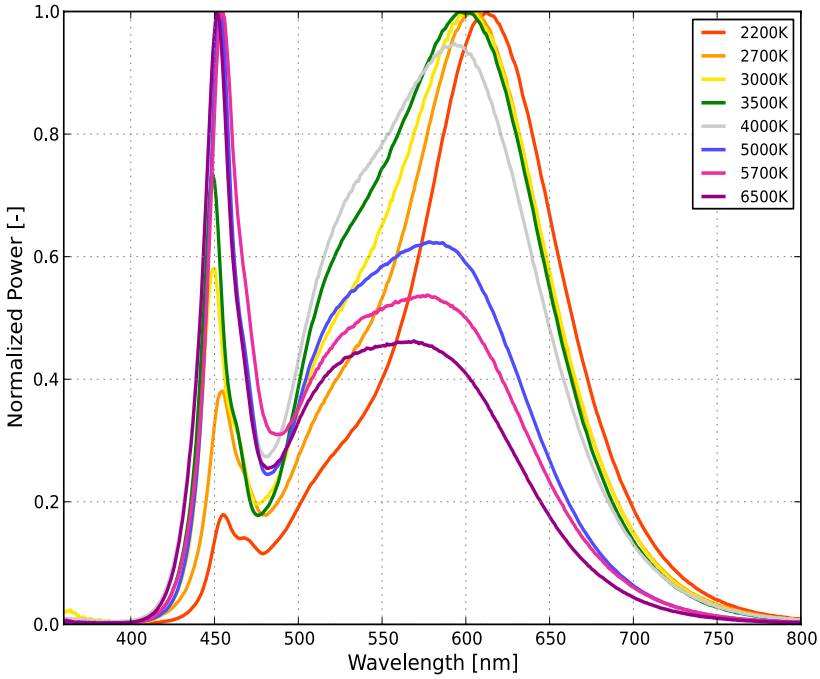


Figure 1b. Typical normalized power vs. wavelength for L130-xx80003000x21 at 120mA, T_j=25°C.

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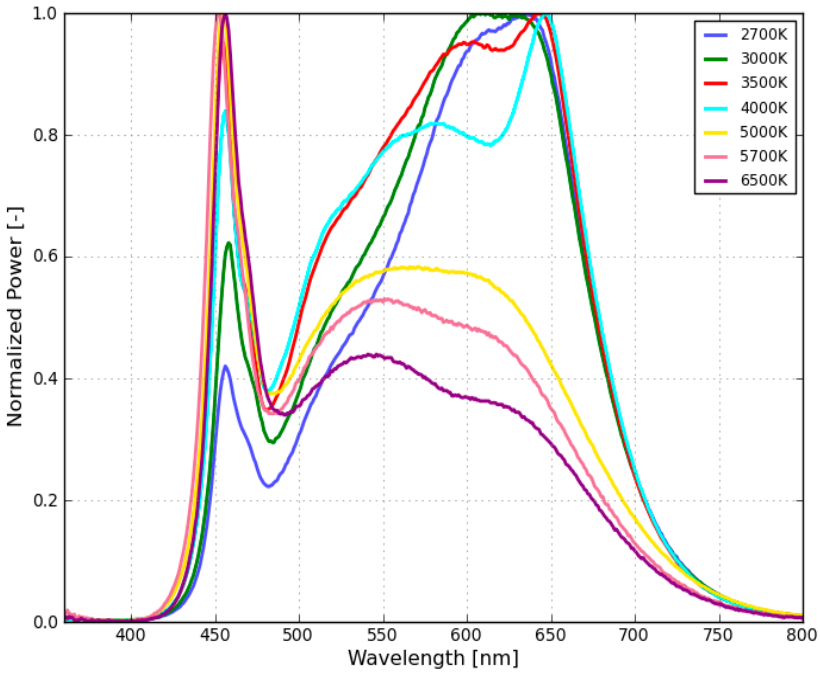


Figure 1c. Typical normalized power vs. wavelength for L130-xx90003000x21 at 120mA, T_j=25°C.

Light Output Characteristics

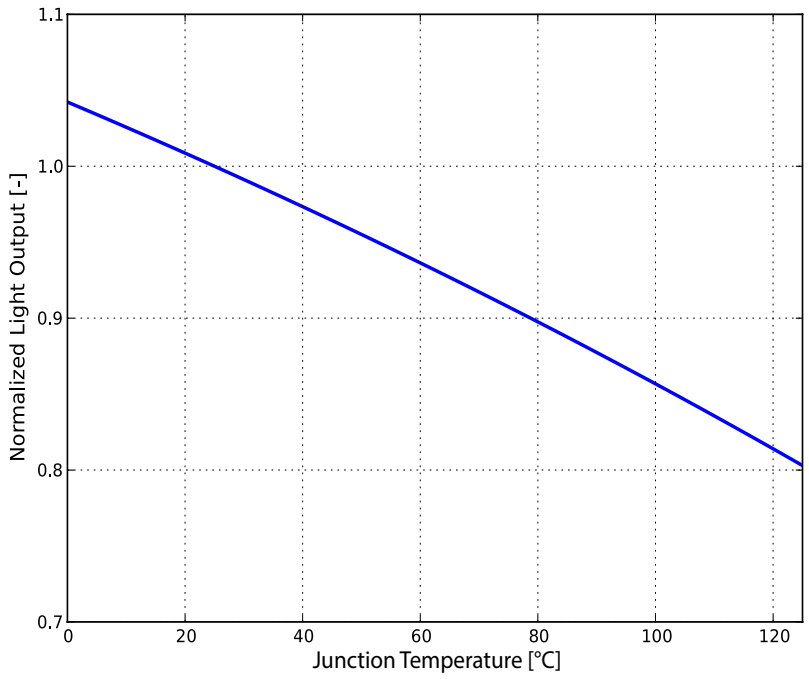
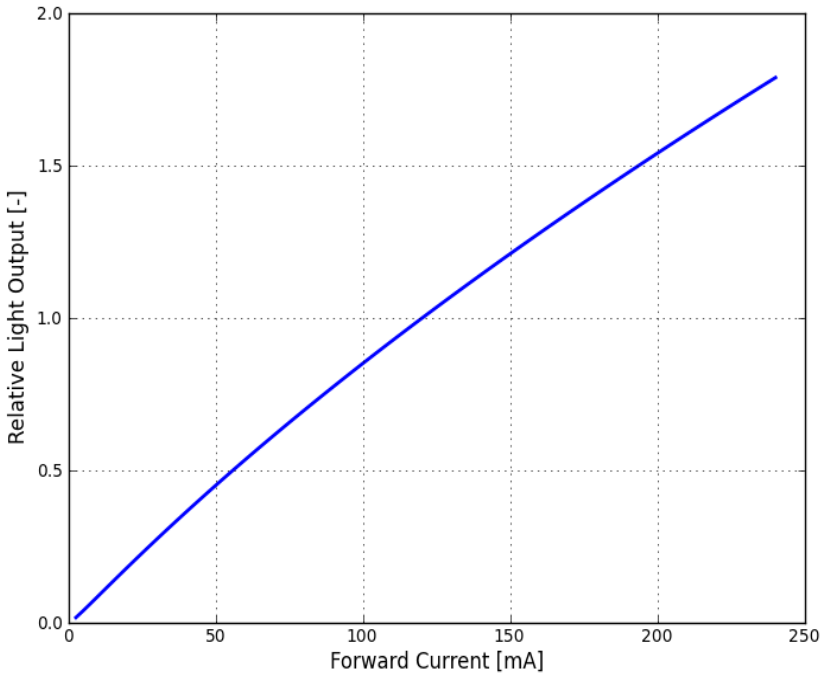


Figure 2. Typical normalized light output vs. junction temperature for L130-xxxx003000x21 at 120mA.

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ESTIMATED TYPICAL RATIO COMPARED TO FLUX AT RATED CONDITION 120mA, T_j=25°C.				
60mA	65mA	100mA	150mA	200mA
53%	57%	85%	121%	154%

Figure 3. Typical normalized light output vs. forward current for L130-xxxx003000x21 at T_j=25°C.

Forward Current Characteristics

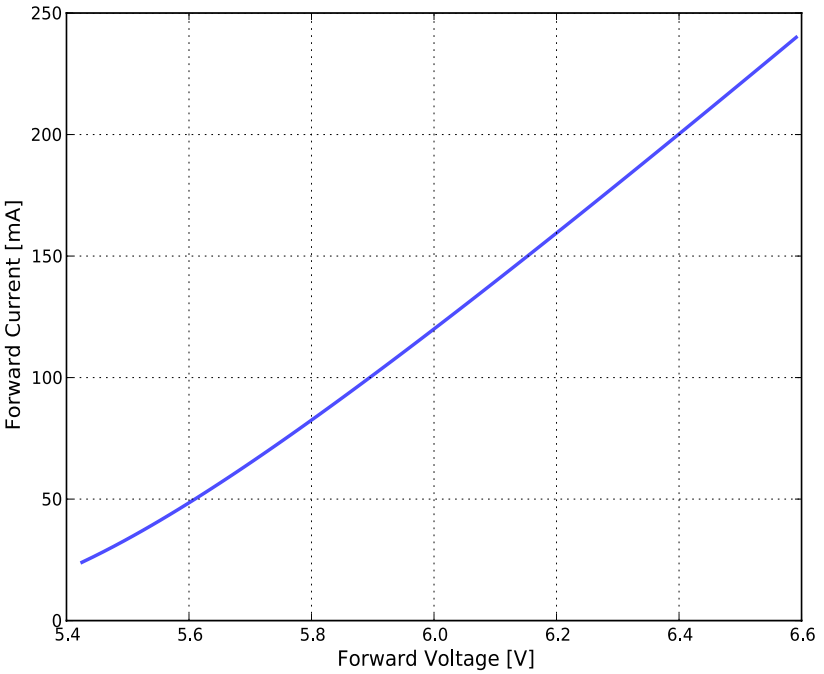


Figure 4. Typical forward current vs. forward voltage for L130-xxxx003000x21 at T_j=25°C.

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Radiation Pattern Characteristics

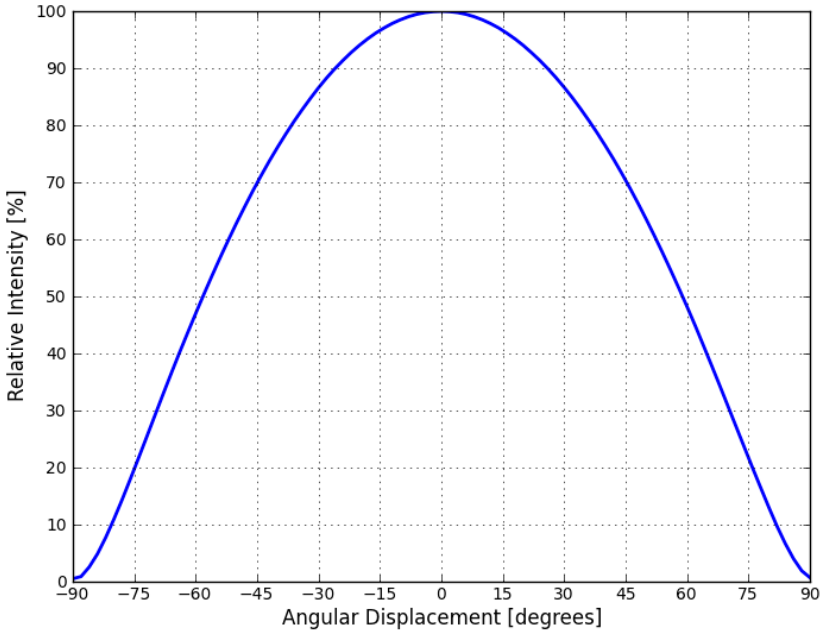


Figure 5. Typical radiation pattern for L130-xxxx003000x21 at 120mA, T_j=25°C.

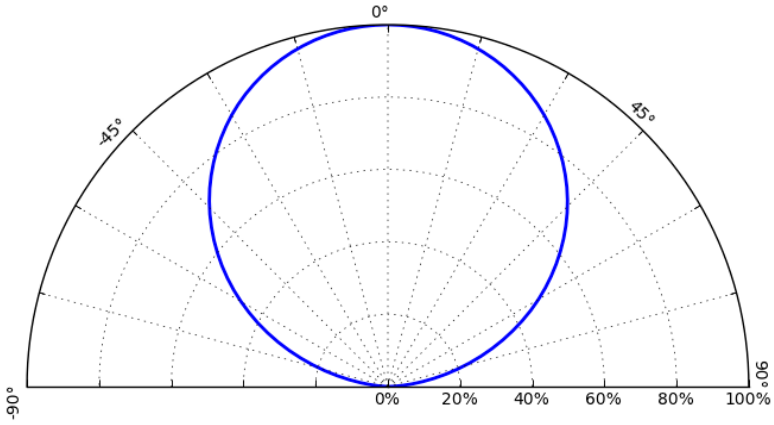


Figure 6. Typical polar radiation pattern for L130-xxxx003000x21 at 120mA, T_j=25°C.

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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 2D Line 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: H=90 to 95 lm, M=110 to 115 lm)

x – designates Lumileds internal code

B C – designates color bin (example: 7D, 7E, 7F, 7G, 7H, 7J, 7K, 7L or 7M for 3000K parts)

D – designates forward voltage bin (example: G=5.8 to 6.0V, J=6.2 to 6.4V)

Therefore, a LUXEON 3030 2D with a lumen range of 90 to 95 lm, color bin of 7J, and a forward voltage range of 5.8 to 6.0V has the following CAT code:

H 7 J G

Luminous Flux Bins

Table 5 lists the standard luminous flux bins for LUXEON 3030 2D Line 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 2D Line at 120mA, T_j=25°C.

BIN	LUMINOUS FLUX [1] (lm)	
	MINIMUM	MAXIMUM
D	70	75
E	75	80
F	80	85
G	85	90
H	90	95
J	95	100
K	100	105
L	105	110
M	110	115
N	115	120
P	120	125
Q	125	130
R	130	135
S	135	140
T	140	145

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

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Color Bin Definitions

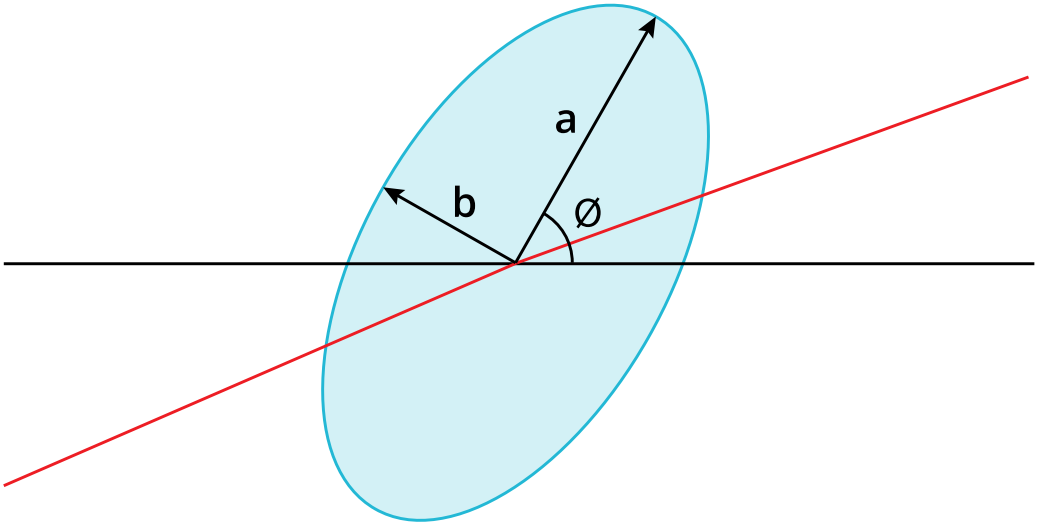


Figure 7. 3- and 5-step MacAdam ellipse illustration for Tables 6a-6h.

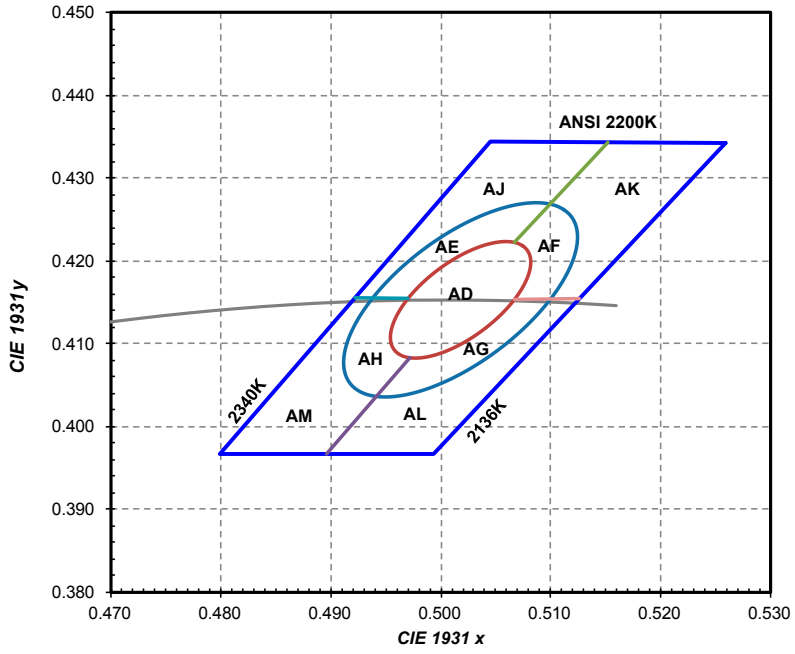


Figure 8a. 1/9th color bin structure for LUXEON 3030 2D Line 2200K, hot-color targeted at 85°C.

Table 6a. 3- and 5-step MacAdam ellipse color bin definitions for L130-22xx003000x21 at test current, hot-color targeted at 85°C.

NOMINAL CCT	COLOR SPACE	CENTER POINT [1] (cx, cy)	MAJOR AXIS, a	MINOR AXIS, b	ELLIPSE ROTATION ANGLE, Θ
2200K	Single 3-step MacAdam ellipse	(0.5018, 0.4153)	0.008625	0.003975	49.27°
2200K	Single 5-step MacAdam ellipse	(0.5018, 0.4153)	0.014375	0.006625	49.27°

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

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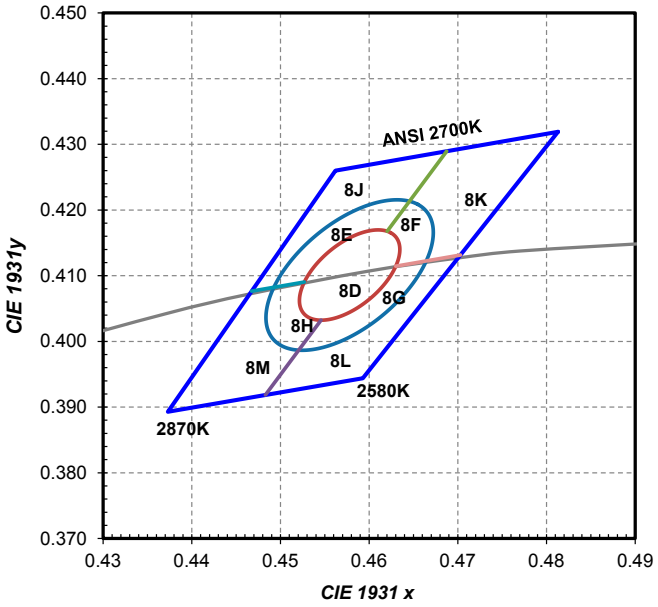


Figure 8b. 1/9th color bin structure for LUXEON 3030 2D Line 2700K, hot-color targeted at 85°C.

Table 6b. 3- and 5-step MacAdam ellipse color bin definitions for L130-27xx003000x21 at test current, hot-color targeted at 85°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 6b:
1. Lumileds maintains a tolerance of ±0.007 on x and y color coordinates in the CIE 1931 color space.

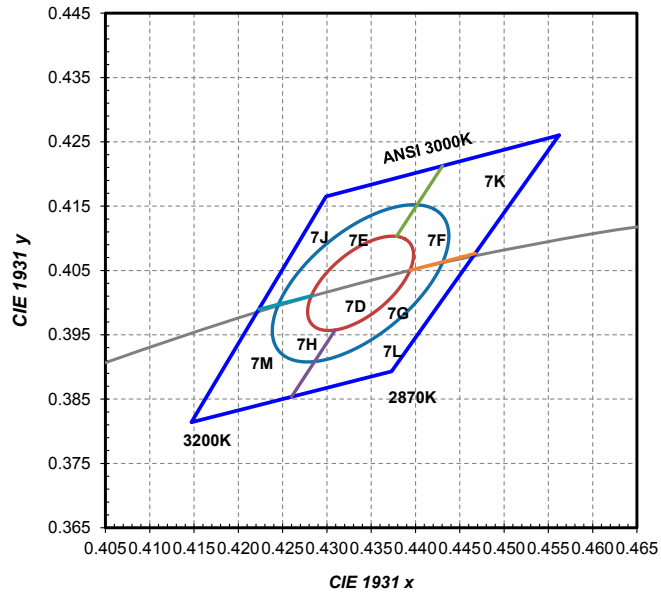


Figure 8c. 1/9th color bin structure for LUXEON 3030 2D Line 3000K, hot-color targeted at 85°C.

Table 6c. 3- and 5-step MacAdam ellipse color bin definitions for L130-30xx003000x21, hot-color targeted at 85°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 6c:
1. Lumileds maintains a tolerance of ±0.007 on x and y color coordinates in the CIE 1931 color space.

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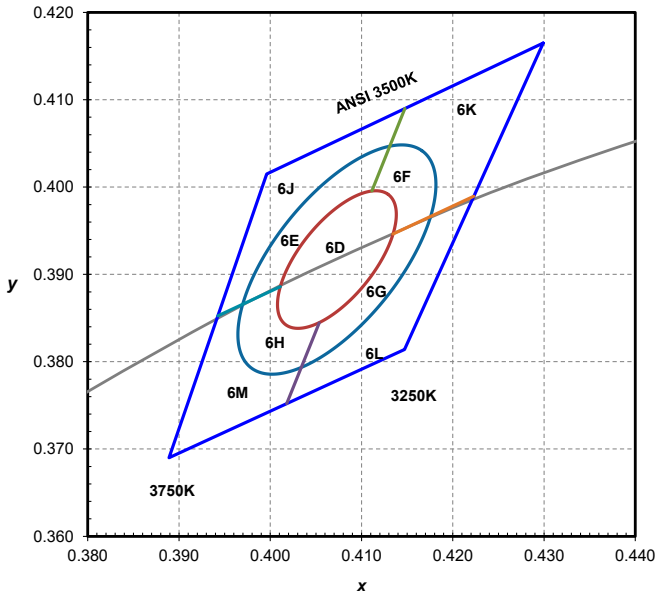


Figure 8d. 1/9th color bin structure for LUXEON 3030 2D Line 3500K, hot-color targeted at 85°C.

Table 6d. 3- and 5-step MacAdam ellipse color bin definitions for L130-35xx003000x21, hot-color targeted at 85°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 6d:
1. Lumileds maintains a tolerance of ±0.007 on x and y color coordinates in the CIE 1931 color space.

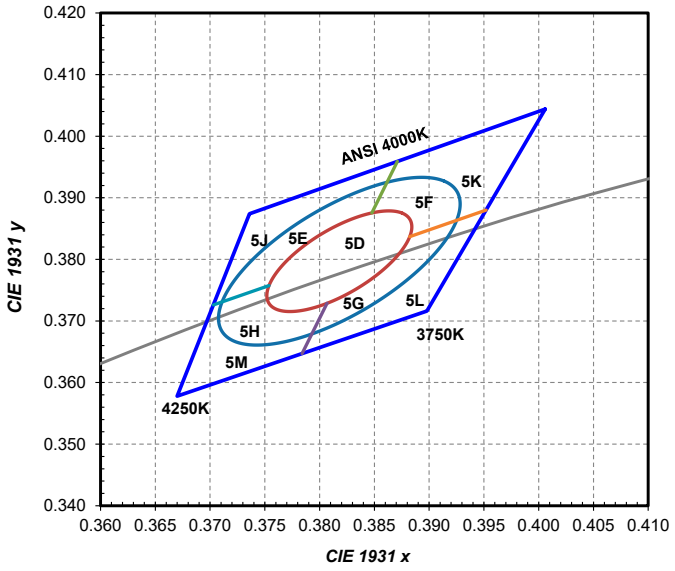


Figure 8e. 1/9th color bin structure for LUXEON 3030 2D Line 4000K, hot-color targeted at 85°C.

Table 6e. 3- and 5-step MacAdam ellipse color bin definitions for L130-40xx003000x21, hot-color targeted at 85°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 6e:
1. Lumileds maintains a tolerance of ±0.007 on x and y color coordinates in the CIE 1931 color space.

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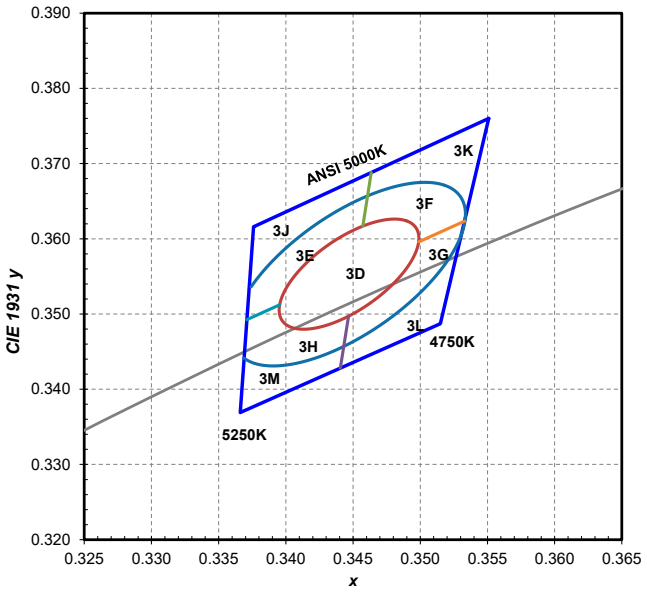


Figure 8f. 1/9th color bin structure for LUXEON 3030 2D Line 5000K, hot-color targeted at 85°C.

Table 6f. 3- and 5-step MacAdam ellipse color bin definitions for L130-50xx003000x21, hot-color targeted at 85°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 6f:
1. Lumileds maintains a tolerance of ±0.007 on x and y color coordinates in the CIE 1931 color space.

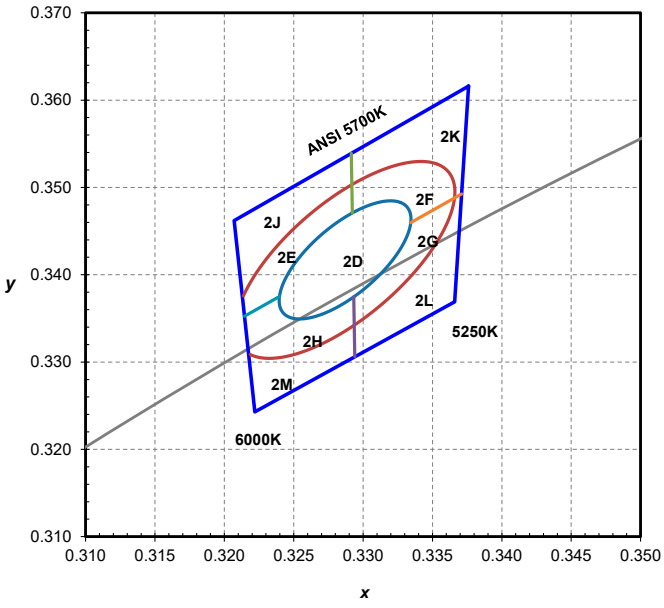


Figure 8g. 1/9th color bin structure for LUXEON 3030 2D Line 5700K, hot-color targeted at 85°C.

Table 6g. 3- and 5-step MacAdam ellipse color bin definitions for L130-57xx003000x21, hot-color targeted at 85°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 6g:
1. Lumileds maintains a tolerance of ±0.007 on x and y color coordinates in the CIE 1931 color space.

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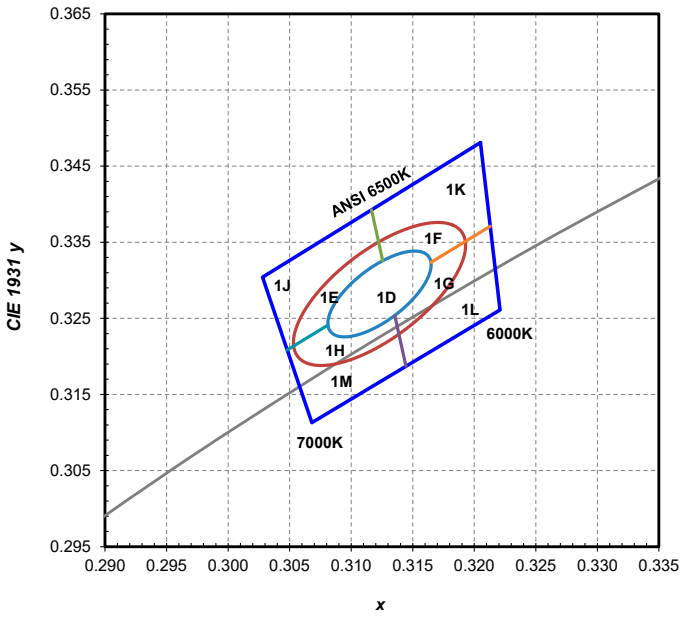


Figure 8h. 1/9th color bin structure for LUXEON 3030 2D Line 6500K, hot-color targeted at 85°C.

Table 6h. 3- and 5-step MacAdam ellipse color bin definitions for L130-65xx003000x21, hot-color targeted at 85°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 6h:
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 LUXEON 3030 2D Line, T_j=25°C.

BIN	FORWARD VOLTAGE [1] (V_f)	
	MINIMUM	MAXIMUM
G	5.8	6.0
H	6.0	6.2
J	6.2	6.4
K	6.4	6.6

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

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Mechanical Dimensions

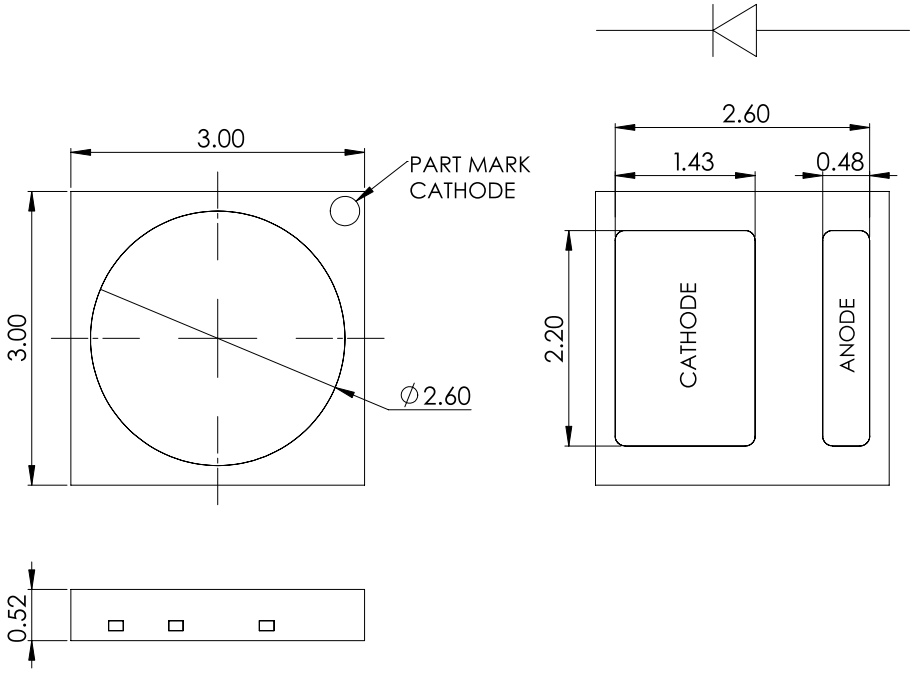


Figure 9a. Mechanical dimensions for LUXEON 3030 2D (Round LES).

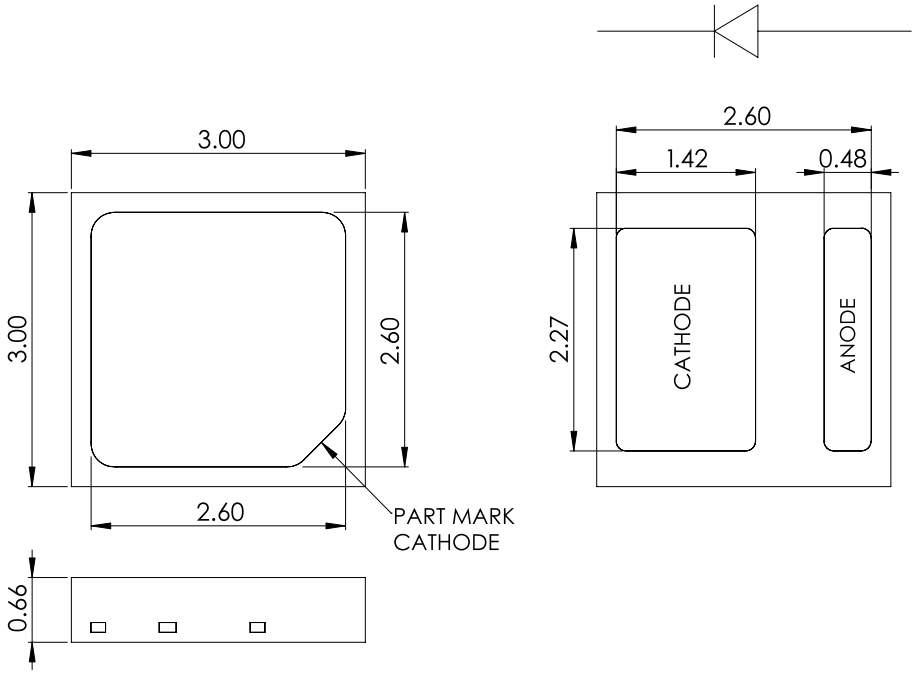


Figure 9b. Mechanical dimensions for LUXEON 3030 2D (Square LES).

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

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Reflow Soldering Guidelines

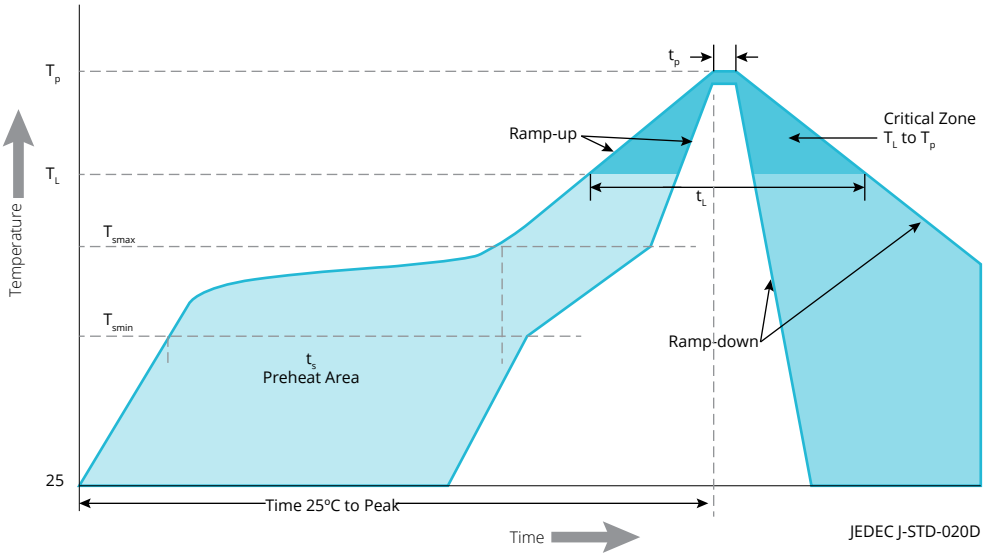


Figure 10. Visualization of the acceptable reflow temperature profile as specified in Table 8.

Table 8. Reflow profile characteristics for LUXEON 3030 2D Line.

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
Liquidus 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 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 2D Line.

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

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Solder Pad Design

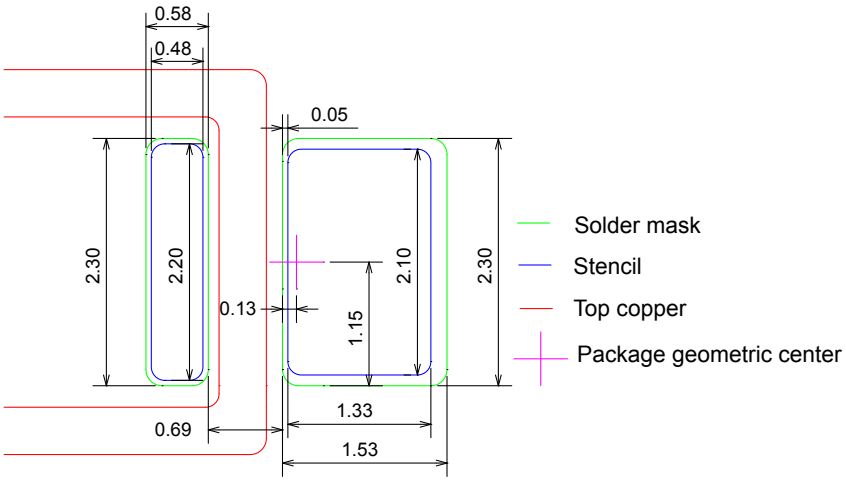


Figure 11. Recommended PCB solder pad layout for LUXEON 3030 2D Line.

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

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Packaging Information

Pocket Tape Dimensions

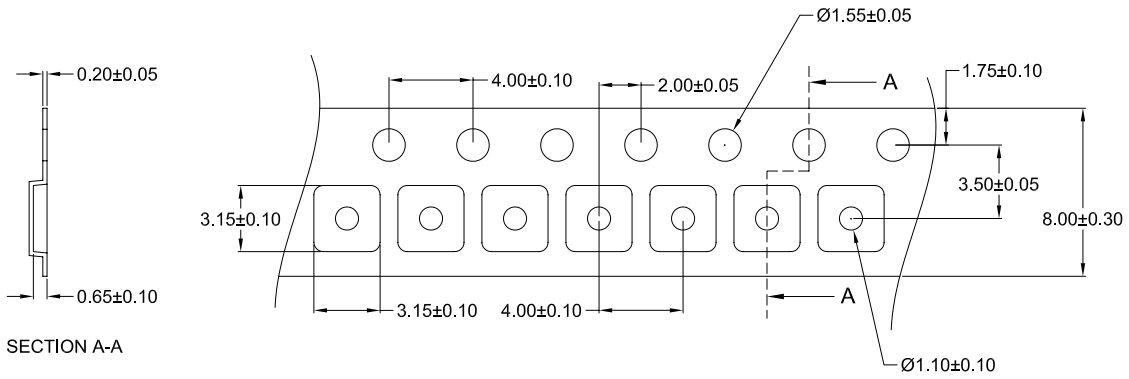


Figure 12a. Pocket tape dimensions for LUXEON 3030 2D (Round LES).

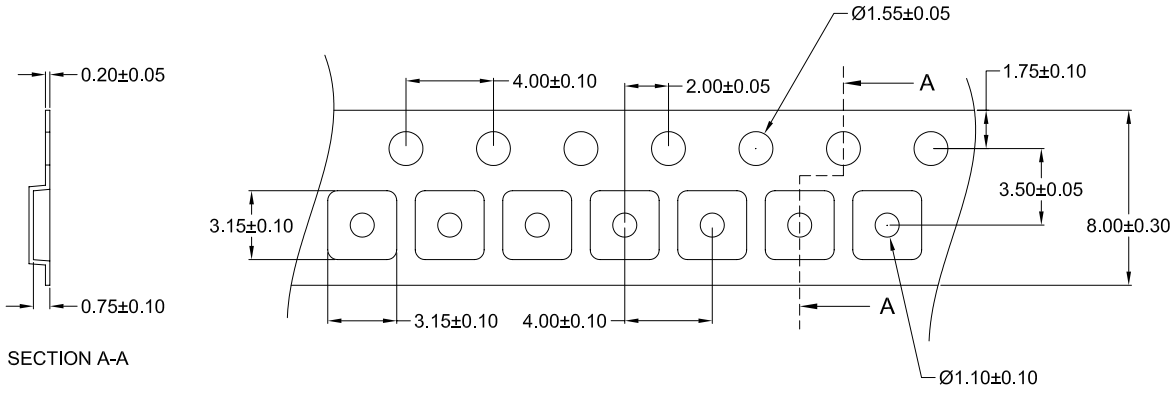


Figure 12b. Pocket tape dimensions for LUXEON 3030 2D (Square LES).

Notes for Figures 12a and 12b:
1. Drawings are not to scale.
2. All dimensions are in millimeters.

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Reel Dimensions

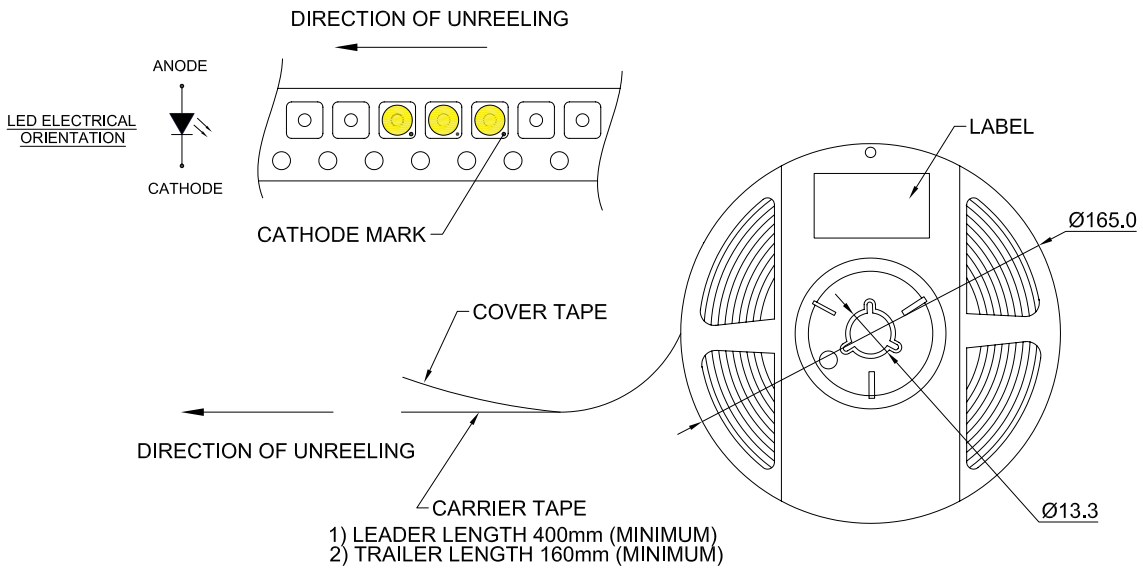


Figure 13a. Reel dimensions for LUXEON 3030 2D (Round LES).

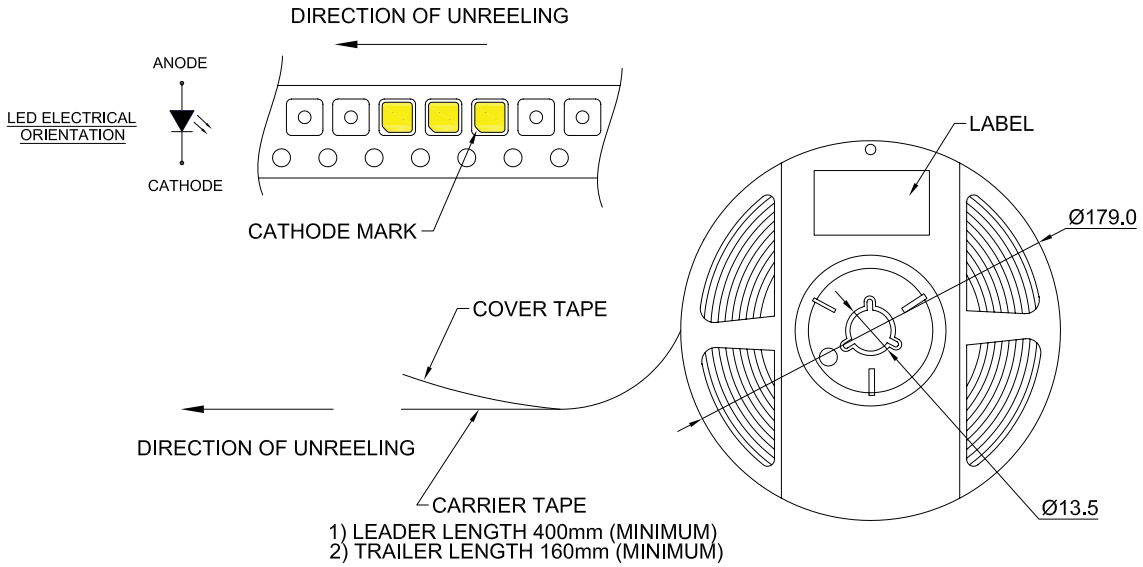


Figure 13b. Reel dimensions for LUXEON 3030 2D (Square LES).

Notes for Figures 13a and 13b:
1. Drawings are not to scale.
2. All dimensions are in millimeters.

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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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