



# LUXEON 3014

Hot-color targeted industry standard package for uniform light

LUXEON 3014 is an industry standard compatible footprint for ease of installation into existing 3014 sockets and stays consistent with a 3.0mm x 1.4mm x 0.75mm package. LUXEON 3014 is hot-color targeted at operating conditions — 65°C. This low power device is an ideal choice when uniformity and reduction in spottiness is necessary for indoor designs.



## FEATURES AND BENEFITS

Industry standard footprint and package offering compatibility with existing designs

1/9<sup>th</sup> ANSI micro-color binning enables tight color control

Hot-color targeted at 65°C which leads to better color accuracy

Rectangular package design allows for increased uniformity

Drive at max current for superior value

## PRIMARY APPLICATIONS

Indoor Area Lighting

Lamps

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# General Product Information

## Product Test Conditions

LUXEON 3014 LEDs are tested and binned with a DC drive current of 60mA at a junction temperature,  $T_j$ , of 25°C.

## Part Number Nomenclature

Part numbers for LUXEON 3014 follow the convention below:

L 1 3 0 – **A A B B** 0 0 1 4 0 0 0 0 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 3014 3000K 80CRI:

L 1 3 0 – **3 0 8 0** 0 0 1 4 0 0 0 0 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 3014 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 3014 at 60mA and 30mA, T<sub>j</sub>=25°C.

NOMINAL CCT	MINIMUM CRI <sup>[1, 2]</sup>	LUMINOUS FLUX <sup>[2]</sup> (lm)		TYPICAL LUMINOUS EFFICACY (lm/W)	TYPICAL LUMINOUS FLUX (lm)	TYPICAL LUMINOUS EFFICACY (lm/W)	PART NUMBER
		MINIMUM	TYPICAL				
		60mA					
2700K	80	20.0	22.0	118.0	12.0	137.0	L130-2780001400001
3000K	80	21.5	23.5	126.0	12.5	145.0	L130-3080001400001
3500K	80	22.5	24.5	132.0	13.0	150.0	L130-3580001400001
4000K	80	23.0	25.0	134.0	13.0	154.0	L130-4080001400001
5000K	80	23.0	25.5	137.0	14.0	157.0	L130-5080001400001
5700K	80	23.0	25.5	137.0	14.0	157.0	L130-5780001400001
6500K	80	23.0	25.0	134.0	13.0	152.0	L130-6580001400001
2700K	90	17.0	19.0	102.0	10.0	116.0	L130-2790001400001
3000K	90	17.0	19.0	102.0	10.0	116.0	L130-3090001400001
3500K	90	19.0	21.0	115.0	11.0	131.0	L130-3590001400001
4000K	90	19.0	21.0	115.0	11.0	131.0	L130-4090001400001
5000K	90	19.0	22.0	118.0	12.0	135.0	L130-5090001400001
5700K	90	19.0	22.0	118.0	12.0	135.0	L130-5790001400001
6500K	90	19.0	21.0	115.0	11.0	131.0	L130-6590001400001

**Notes for Table 1:**

1. Lumileds maintains a tolerance of ±2 on CRI and ±6.5% on luminous flux measurements.
2. Typical CRI is approximately 2 points higher than the minimum CRI specified, but this is not guaranteed.

## Optical Characteristics

Table 2. Optical characteristics for LUXEON 3014 at 60mA, T<sub>j</sub>=25°C.

PART NUMBER	TYPICAL TOTAL INCLUDED ANGLE <sup>[1]</sup>	TYPICAL VIEWING ANGLE <sup>[2]</sup>
L130-xxxx001400001	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 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 3014 at 60mA, T<sub>j</sub>=25°C.

PART NUMBER	FORWARD VOLTAGE (V) <sup>[1]</sup>			TYPICAL TEMPERATURE COEFFICIENT OF FORWARD VOLTAGE (mV/°C) <sup>[2]</sup>	TYPICAL THERMAL RESISTANCE JUNCTION TO SOLDER PAD (°C/W)
	MINIMUM	TYPICAL	MAXIMUM		
L130-xxxx001400001	2.8	3.1	3.3	-2.0 to -4.0	35.0

**Notes for Table 3:**

1. Lumileds maintains a tolerance of ±0.06V on forward voltage measurements.
2. Measured between 25°C and 85°C.

# Absolute Maximum Ratings

Table 4. Absolute maximum ratings for LUXEON 3014.

PARAMETER	MAXIMUM PERFORMANCE
DC Forward Current <sup>[1,2]</sup>	100mA
Peak Pulsed Forward Current <sup>[1,3]</sup>	120mA
LED Junction Temperature <sup>[1]</sup> (DC & Pulse)	100°C
ESD Sensitivity	Class 2 HBM per ANSI/ESDA/JEDEC JS-001-2012
Operating Case Temperature <sup>[1]</sup>	-40°C to 85°C
Storage Temperature	-40°C to 100°C
Soldering Temperature	JEDEC 020D 260°C
Allowable Reflow Cycles	3
Reverse Voltage ( $V_{reverse}$ )	-5V

**Notes for Table 4:**

- Proper current derating must be observed to maintain the junction temperature below the maximum allowable junction temperature.
- 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 15% of the maximum allowable DC forward current
- Pulse operation with the maximum peak pulse forward current is acceptable if the pulse on time is  $\leq 5ms$  per cycle and the duty cycle is  $\leq 50\%$ .

## Characteristic Curves

### Spectral Distribution Characteristics

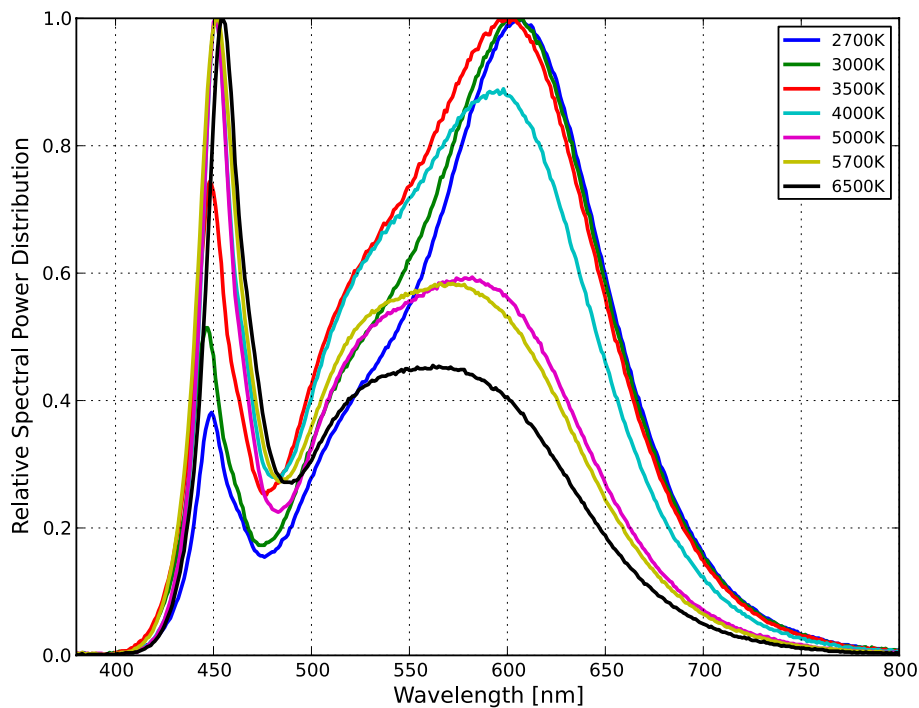


Figure 1a: Typical normalized power vs. wavelength for L130-xx800001400001,  $T_j=25^\circ\text{C}$ .

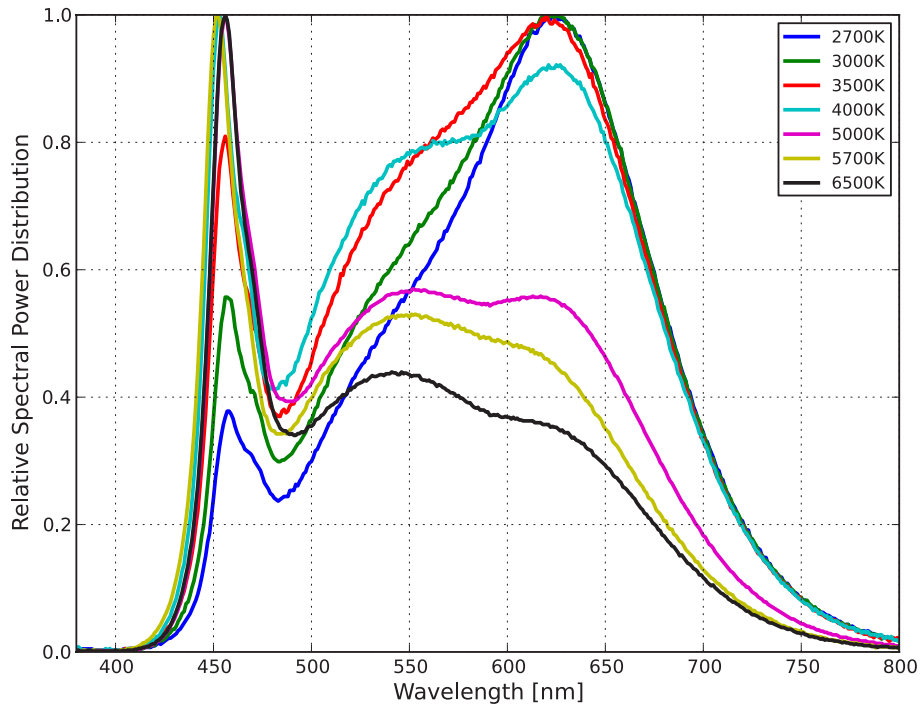


Figure 1b: Typical normalized power vs. wavelength for L130-xx900001400001,  $T_j=25^\circ\text{C}$ .

## Light Output Characteristics

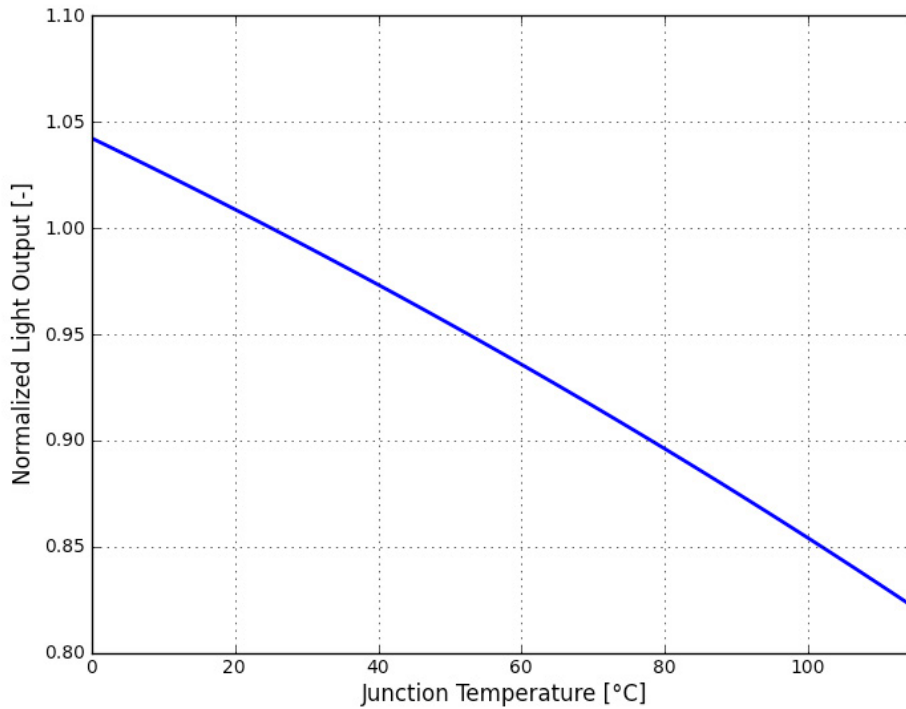


Figure 2a: Typical normalized light output vs. junction temperature for L130-xxxx0001400001 at 60mA.

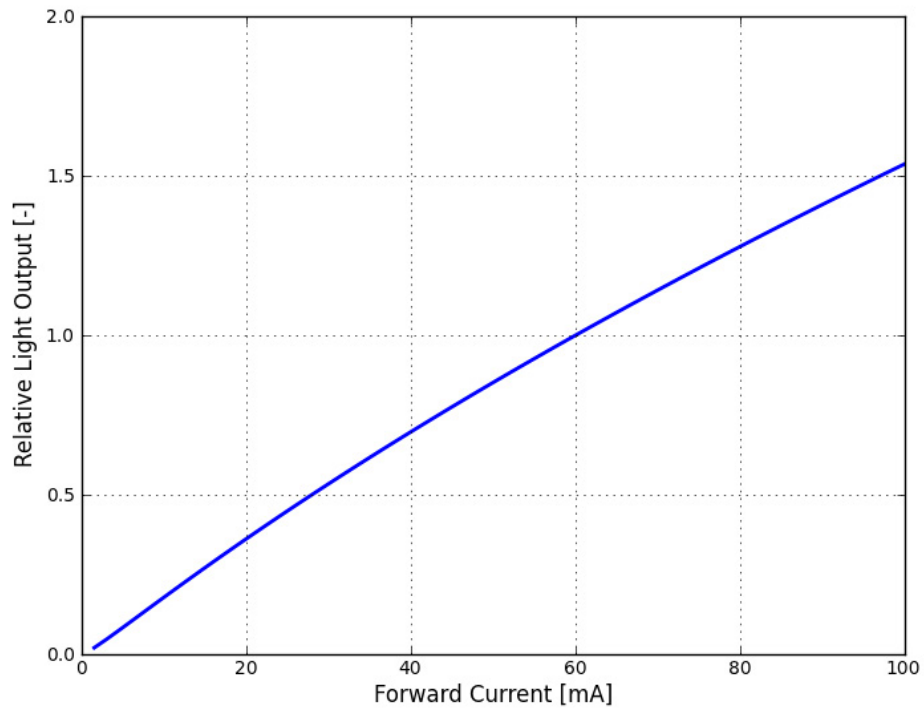


Figure 2b: Typical normalized light output vs. forward current for L130-xxxx0001400001 at  $T_j=25^\circ\text{C}$ .

## Forward Current Characteristics

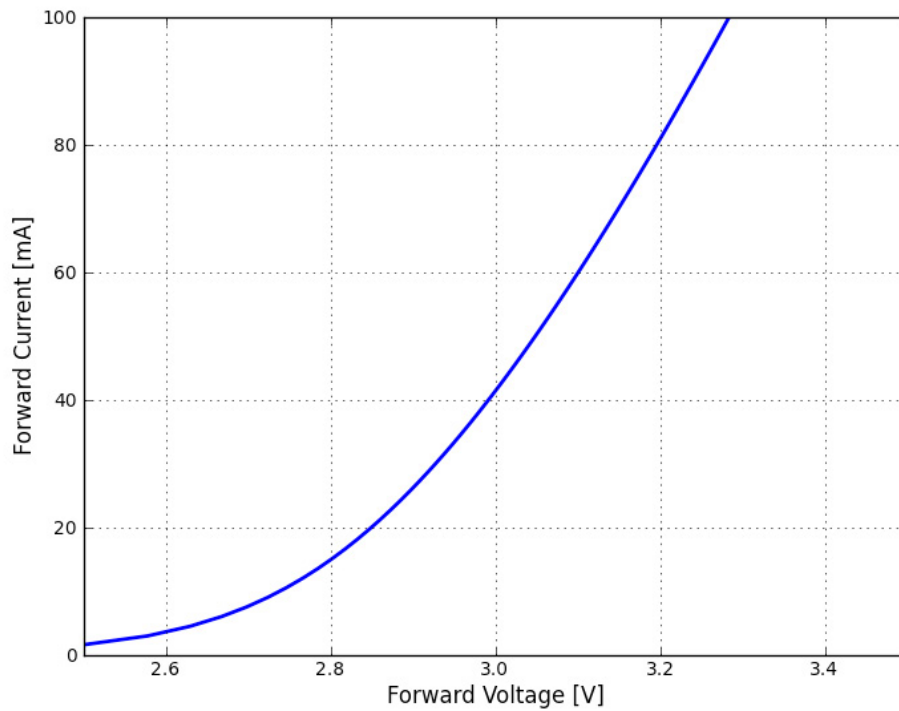


Figure 3: Typical forward current vs. forward voltage for L130-xxxx0001400001 at  $T_j=25^\circ\text{C}$ .

# Radiation Patterns

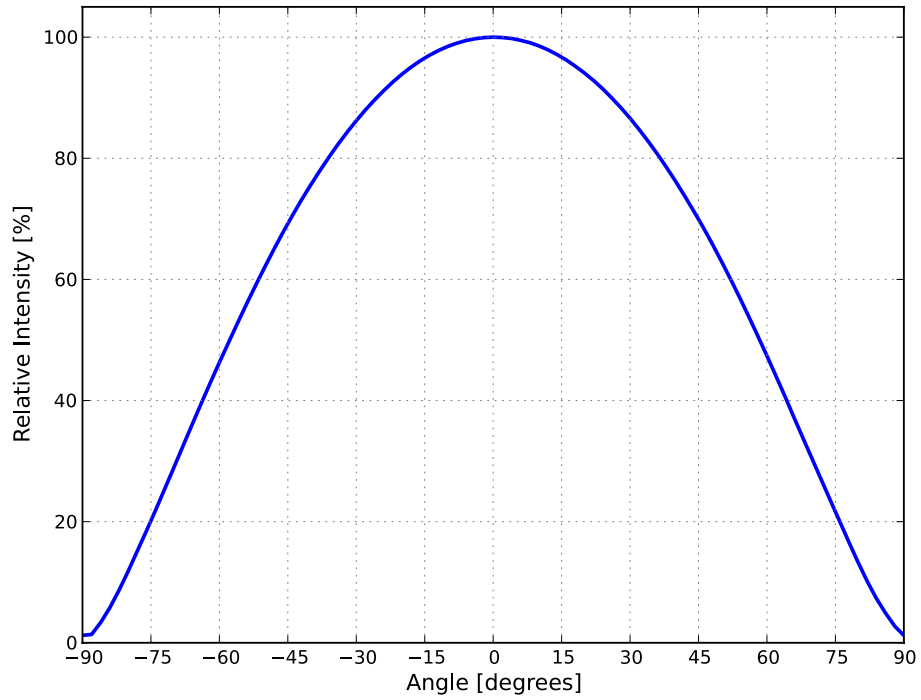


Figure 4: Typical radiation pattern for L130-xxxx0001400001 at 60mA,  $T_j=25^{\circ}\text{C}$ .

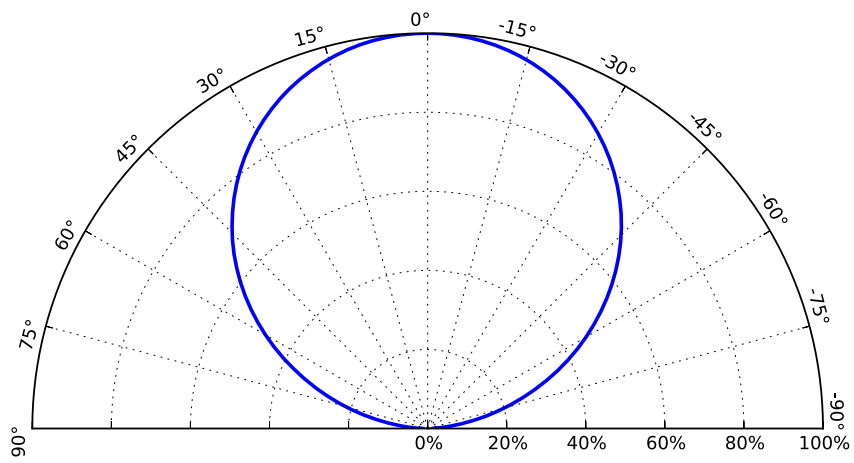


Figure 5: Typical polar radiation pattern for L130-xxxx0001400001 at 60mA,  $T_j=25^{\circ}\text{C}$ .

# 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, forward voltage, and color point, peak wavelength, or dominant wavelength.

LUXEON 3014 LEDs are labeled using a 4-digit alphanumeric CAT code following the format below:

### A B C D

- A** – designates luminous flux bin (example: B=10.0 to 11.5 lumens, F=17.0 to 19.0 lumens)
- B C** – designates color bin (example: 7D, 7E, 7F, 7G, 7H, 7J, 7K, 7L, 7M for 3000K parts)
- D** – designates forward voltage bin (example: T=2.80V to 2.90V, W=3.00V to 3.10V)

Therefore, a LUXEON 3014 with a lumen range of 10.0 to 11.5, color bin of 7D and a forward voltage of 2.80V to 2.90V has the following CAT code:

### B 7 D T

## Luminous Flux Bins

Table 5 lists the standard photometric luminous flux bins for LUXEON 3014 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 3014.

BIN	LUMINOUS FLUX (lm)	
	MINIMUM	MAXIMUM
A	8.5	10.0
B	10.0	11.5
C	11.5	13.0
D	13.0	15.0
E	15.0	17.0
F	17.0	19.0
G	19.0	21.0
H	21.0	24.0
J	24.0	28.0
K	28.0	32.0

**Notes for Table 5:**

1. Lumileds maintains a tolerance of  $\pm 6.5\%$  on luminous flux measurements.

# Color Bin Definition

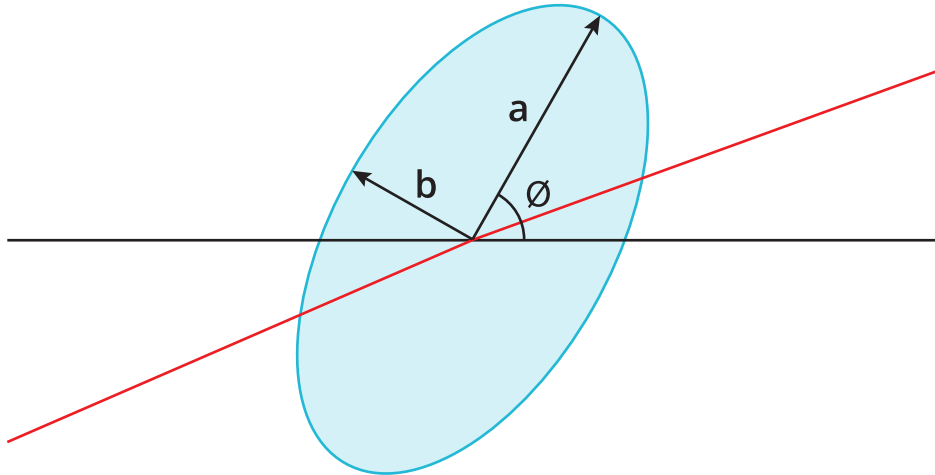


Figure 6: 3- and 5-step MacAdam ellipse illustration for Table 6.

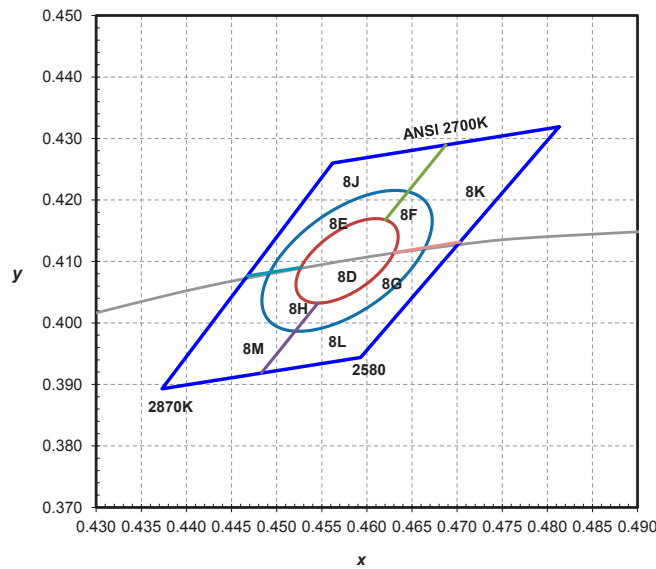


Figure 7: Color bin structure for LUXEON 3014 2700K.

Table 6. 3- and 5-step MacAdam ellipse color bin definitions for L130-2780001400001.

NOMINAL CCT	COLOR SPACE	CENTER POINT (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 6:**

1. Lumileds maintains a tolerance of ±0.005 on x and y coordinates in the CIE 1931 color space.

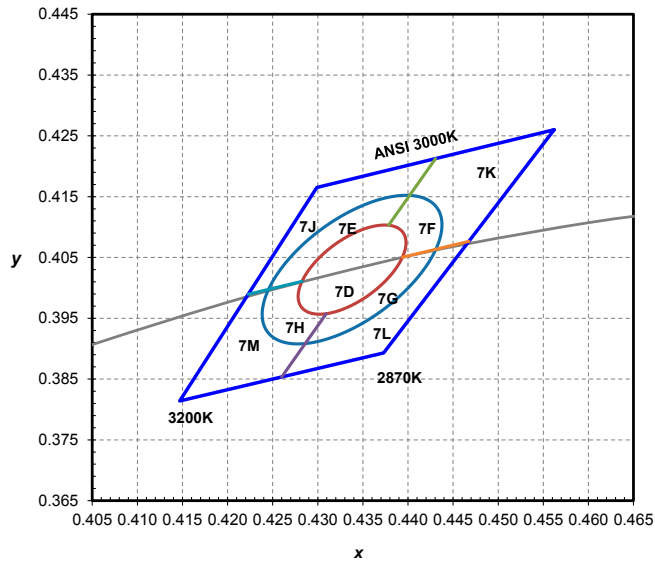


Figure 8: Color bin structure for LUXEON 3014 3000K at 60mA.

Table 7. 3- and 5-step MacAdam ellipse color bin definitions for L130-3080001400001.

NOMINAL CCT	COLOR SPACE	CENTER POINT (cx, cy)	MAJOR AXIS, a	MINOR AXIS, b	ELLIPSE ROTATION ANGLE, $\theta$
3000K	Single 3-step MacAdam ellipse	(0.4338, 0.403)	0.00834	0.00408	53.22°
3000K	Single 5-step MacAdam ellipse	(0.4338, 0.403)	0.01390	0.00680	53.22°

Notes for Table 7:

1. Lumileds maintains a tolerance of  $\pm 0.005$  on x and y coordinates in the CIE 1931 color space.

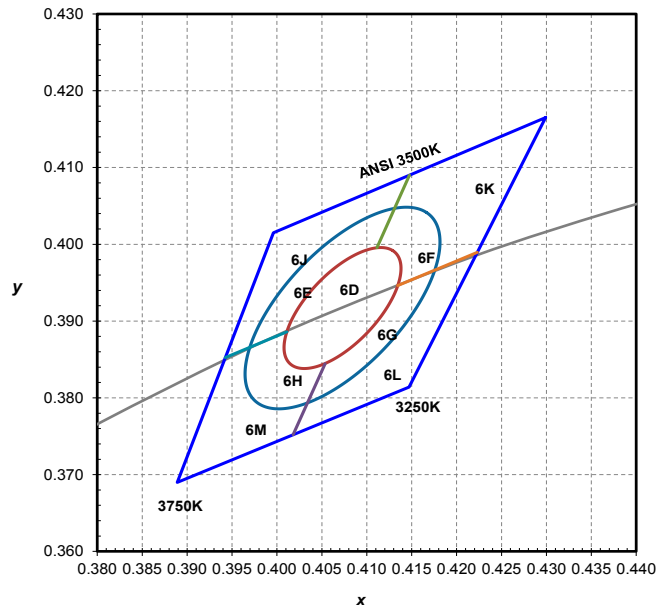


Figure 9: Color bin structure for LUXEON 3014 3500K.

Table 8. 3- and 5-step MacAdam ellipse color bin definitions for L130-3580001400001.

NOMINAL CCT	COLOR SPACE	CENTER POINT (cx, cy)	MAJOR AXIS, a	MINOR AXIS, b	ELLIPSE ROTATION ANGLE, $\theta$
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 8:

1. Lumileds maintains a tolerance of  $\pm 0.005$  on x and y coordinates in the CIE 1931 color space.

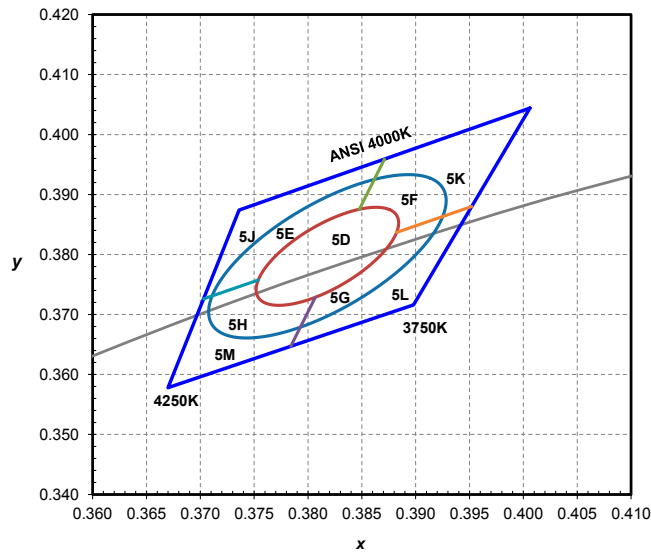


Figure 10: Color bin structure for LUXEON 3014 4000K.

Table 9. 3- and 5-step MacAdam ellipse color bin definitions for L130-4080001400001.

NOMINAL CCT	COLOR SPACE	CENTER POINT (cx, cy)	MAJOR AXIS, a	MINOR AXIS, b	ELLIPSE ROTATION ANGLE, $\theta$
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 9:

1. Lumileds maintains a tolerance of  $\pm 0.005$  on x and y coordinates in the CIE 1931 color space.

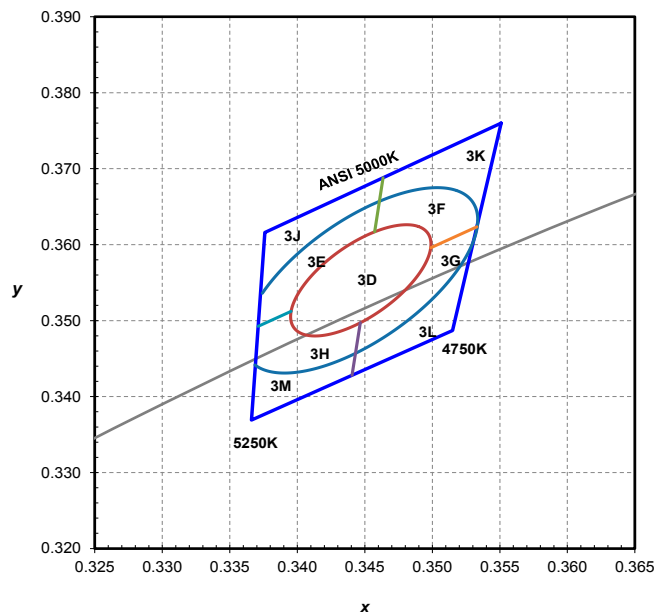


Figure 11: Color bin structure for LUXEON 3014 5000K.

Table 10. 3- and 5-step MacAdam ellipse color bin definitions for L130-5080001400001.

NOMINAL CCT	COLOR SPACE	CENTER POINT (cx, cy)	MAJOR AXIS, a	MINOR AXIS, b	ELLIPSE ROTATION ANGLE, $\theta$
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 10:

1. Lumileds maintains a tolerance of  $\pm 0.005$  on x and y coordinates in the CIE 1931 color space.

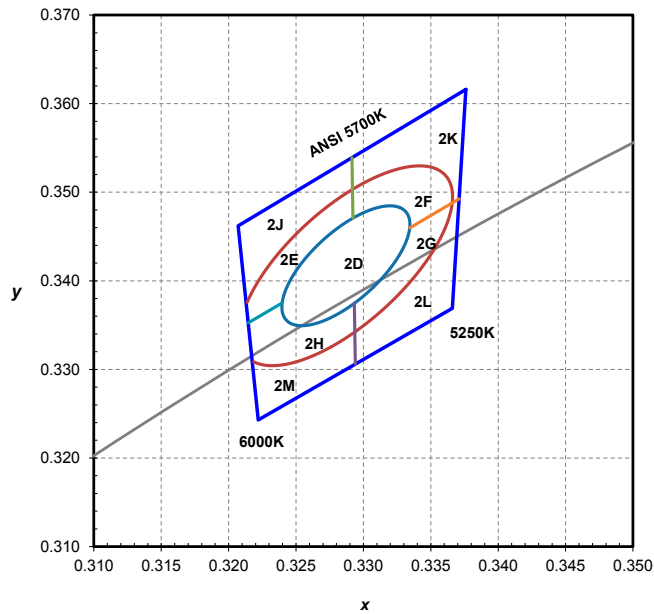


Figure 12: Color bin structure for LUXEON 3014 5700K.

Table 11. 3- and 5-step MacAdam ellipse color bin definitions for L130-5780001400001.

NOMINAL CCT	COLOR SPACE	CENTER POINT (cx, cy)	MAJOR AXIS, a	MINOR AXIS, b	ELLIPSE ROTATION ANGLE, $\theta$
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 11:

1. Lumileds maintains a tolerance of  $\pm 0.005$  on x and y coordinates in the CIE 1931 color space.

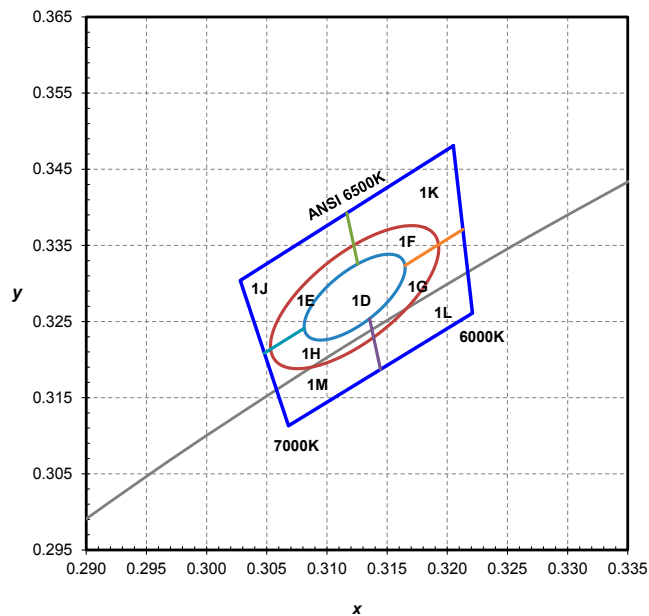


Figure 13: Color bin structure for LUXEON 3014 6500K.

Table 12. 3- and 5-step MacAdam ellipse color bin definitions for L130-6580001400001.

NOMINAL CCT	COLOR SPACE	CENTER POINT (cx, cy)	MAJOR AXIS, a	MINOR AXIS, b	ELLIPSE ROTATION ANGLE, $\theta$
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 12:

1. Lumileds maintains a tolerance of  $\pm 0.005$  on x and y coordinates in the CIE 1931 color space.

# Forward Voltage Bins

Table 13. Forward voltage bin definitions for LUXEON 3014.

BIN	FORWARD VOLTAGE (V) <sup>(1)</sup>	
	MINIMUM	MAXIMUM
T	2.80	2.90
V	2.90	3.00
W	3.00	3.10
X	3.10	3.20
Y	3.20	3.30
Z	3.30	3.40

Notes for Table 13:

1. Lumileds maintains a tolerance of  $\pm 0.1V$  on forward voltage measurements.

# Mechanical Dimensions

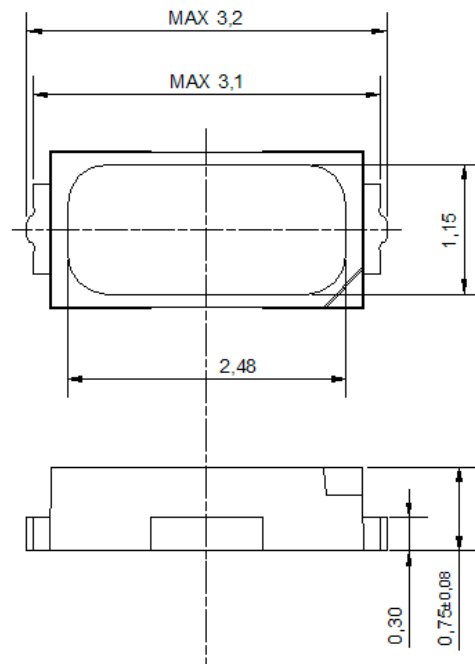


Figure 14: Mechanical dimensions for LUXEON 3014.

Notes for Figure 14:

1. Drawings are not to scale.
2. All dimensions are in millimeters.

# Reflow Soldering Guidelines

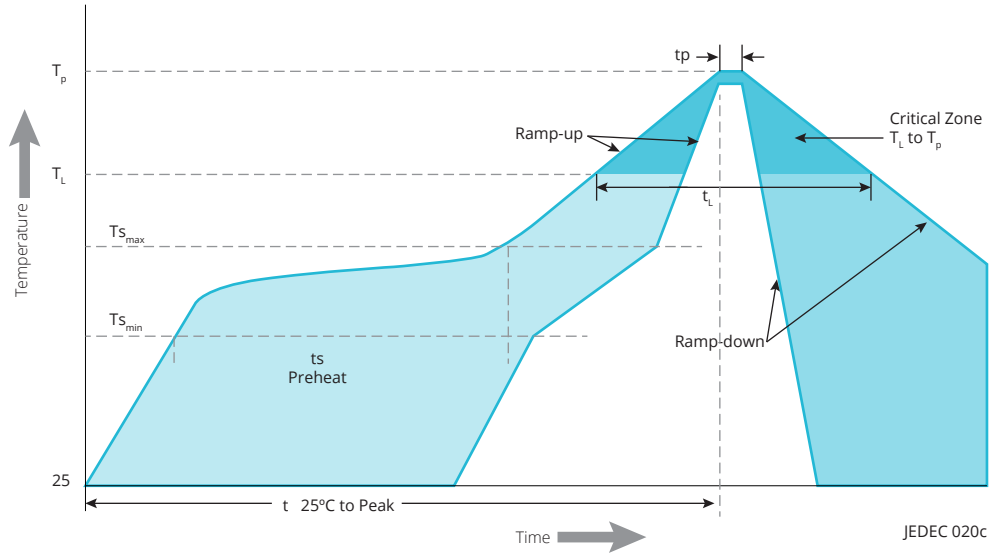


Figure 15: Visualization of the acceptable reflow temperature profile as specified in Table 14.

Table 14. Reflow profile characteristics for LUXEON 3014.

PROFILE FEATURE	LEAD FREE ASSEMBLY
Average Ramp-Up Rate ( $T_{s_{max}}$ to $T_p$ )	3°C / second maximum
Minimum Preheat Temperature ( $T_{s_{min}}$ )	150°C
Maximum Preheat Temperature ( $T_{s_{max}}$ )	200°C
Preheat Time ( $t_{s_{min}}$ to $t_{s_{max}}$ )	60 to 120 seconds
Liquidus Temperature ( $T_L$ )	217°C
Time Maintained Above Temperature $T_L$ ( $t_L$ )	150 seconds
Peak / Classification Temperature ( $T_p$ )	260°C
Time Within 5°C of Actual Temperature ( $t_p$ )	10 to 30 seconds
Ramp-Down Rate	6°C / second maximum
Time 25°C to Peak Temperature	8 minutes maximum

## JEDEC Moisture Sensitivity

Table 15. Moisture sensitivity levels for LUXEON 3014.

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

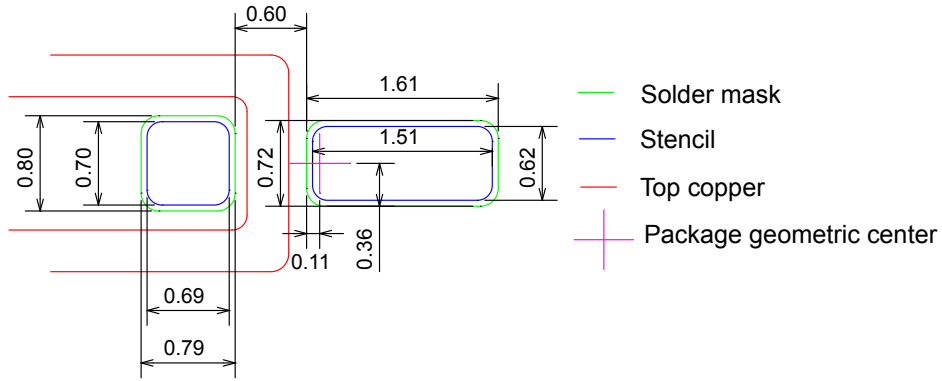


Figure 16: Recommended PCB solder pad layout for LUXEON 3014.

**Notes for Figure 16:**

- 1. Drawings are not to scale.
- 2. All dimensions are in millimeters.

# Packaging Information

## Pocket Tape Dimensions

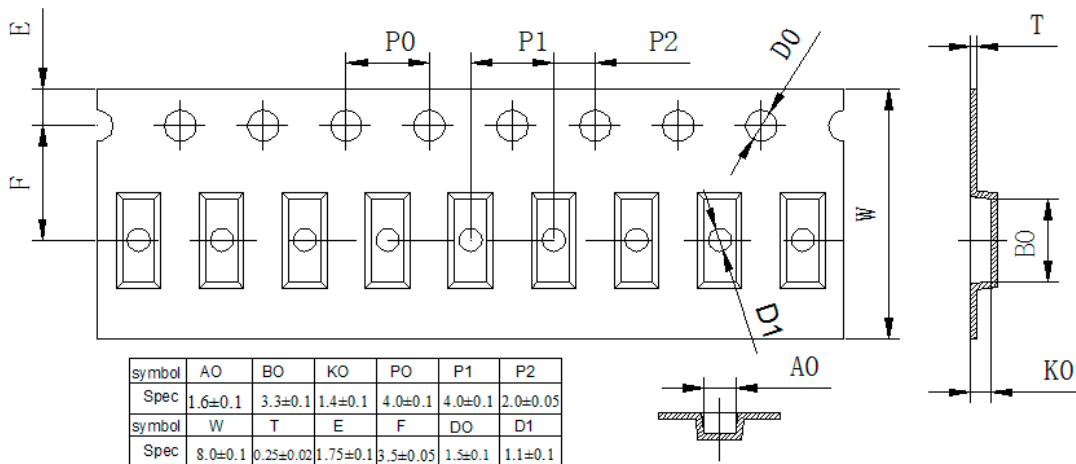


Figure 17: Pocket tape dimensions for LUXEON 3014.

**Notes for Figure 17:**

- 1. Drawings are not to scale.
- 2. All dimensions are in millimeters.

# Reel Dimensions

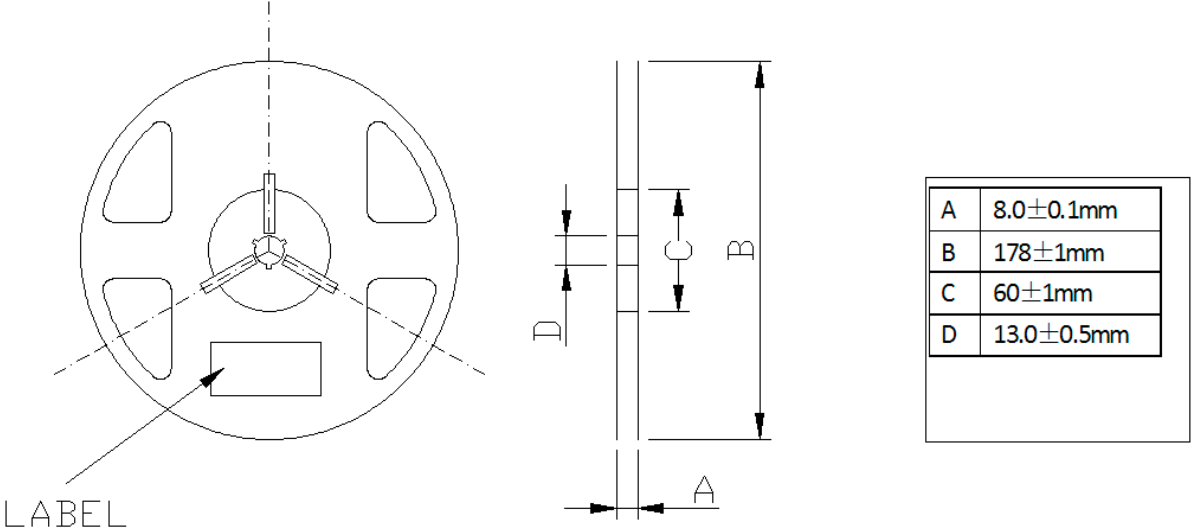


Figure 18: Reel dimensions for LUXEON 3014.

- Notes for Figure 18:
1. Drawings are not to scale.
  2. All dimensions are in millimeters.

# About Lumileds

Lumileds is the light engine leader, delivering innovation, quality and reliability.

For 100 years, Lumileds commitment to innovation has helped customers pioneer breakthrough products in the automotive, consumer and illumination markets.

Lumileds is shaping the future of light with our LEDs and automotive lamps, and helping our customers illuminate how people see the world around them.

To learn more about our portfolio of light engines, visit [lumileds.com](http://lumileds.com).



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