



# LUXEON HR30

Superior lumen maintenance and corrosion resistance in punishing conditions

LUXEON HR30 is specifically designed and tested for use in the most demanding environments and conditions. With upgraded packaging using industry-best materials, LUXEON HR30 is the only product in its class that provides robustness and long lifetime in high temperature and chemical vapor environments. The exceptional reliability and leading performance makes LUXEON HR30 an efficient solution for a wide variety of extreme harsh applications, such as natatoriums and industrial plants.



## FEATURES AND BENEFITS

Gold plated lead frame package with high reflectance SMC housing for exceptional reliability and lifetime in the most extreme conditions

Proven resistant to chemical environments with IEC68-2-43 (15ppm), DLOP <10%, Du'v' <0.006 after 21 days

Resistant to common chemical environments, such as high chlorine sulfur areas

1/5<sup>th</sup> micro-color binning enables tight color control

Targeted lifetime in excess of 100K hours at 150mA, T<sub>s</sub>=105°C

## PRIMARY APPLICATIONS

High Bay & Low Bay

Indoor Area Lighting

- Natatoriums

Outdoor

- Chemical Environments

- Industrial Lamps and Fixtures

Specialty Lighting

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# General Product Information

## Product Test Conditions

LUXEON HR30 LEDs are tested and binned with a 20ms monopulse of 150mA, at a junction temperature,  $T_j$ , of 25°C.

## Part Number Nomenclature

Part numbers for LUXEON HR30 follow the convention below:

L 1 3 0 – **A A B B C C** H R 0 0 0 0 0

Where:

- A A** – designates nominal ANSI CCT (27=2700K, 30=3000K, 40=4000K, 50=5000K, 57=5700K)
- B B** – designates minimum CRI (70=70CRI and 80=80CRI)
- C C** – designates ESD protection level (00=2kV and 0T=8kV)

Therefore, the following part number is used for a LUXEON HR30 3000K 80CRI with an ESD protection level of 2kV:

L 1 3 0 – **3 0 8 0 0 0** H R 0 0 0 0 0

## 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 HR30 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 HR30 at 150mA, T<sub>j</sub>=25°C.

ESD PROTECTION LEVEL <sup>[1]</sup>	NOMINAL CCT	MINIMUM CRI <sup>[2, 3]</sup>	LUMINOUS FLUX <sup>[3]</sup> (lm)		TYPICAL LUMINOUS EFFICACY (lm/W)	PART NUMBER
			MINIMUM	TYPICAL		
2kV	4000K	70	105	125	134	L130-407000HR00000
	5000K	70	105	125	134	L130-507000HR00000
	5700K	70	105	125	134	L130-577000HR00000
	2700K	80	95	110	118	L130-278000HR00000
	3000K	80	100	115	124	L130-308000HR00000
	4000K	80	100	119	128	L130-408000HR00000
	5700K	80	100	115	124	L130-578000HR00000
8kV	4000K	70	105	115	124	L130-40700THR00000
	5000K	70	105	115	124	L130-50700THR00000
	5700K	70	105	115	124	L130-57700THR00000
	2700K	80	95	102	110	L130-27800THR00000
	3000K	80	100	107	115	L130-30800THR00000
	4000K	80	100	110	119	L130-40800THR00000
	5700K	80	100	107	115	L130-57800THR00000

**Notes for Table 1:**

1. Per JEDEC JS-001-2012.
2. 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.

## Optical Characteristics

Table 2. Optical characteristics for LUXEON HR30 at 150mA, T<sub>j</sub>=25°C.

PART NUMBER	TYPICAL TOTAL INCLUDED ANGLE <sup>[1]</sup>	TYPICAL VIEWING ANGLE <sup>[2]</sup>
L130-xxxxxxHR00000	140°	120°

**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 HR30 at 150mA, T<sub>j</sub>=25°C.

PART NUMBER	FORWARD VOLTAGE <sup>[1]</sup> (V <sub>f</sub> )			TYPICAL TEMPERATURE COEFFICIENT OF FORWARD VOLTAGE <sup>[2]</sup> (mV/°C)	TYPICAL THERMAL RESISTANCE—JUNCTION TO SOLDER PAD (°C/W)
	MINIMUM	TYPICAL	MAXIMUM		
L130-xxxxxHR00000	5.8	6.2	6.8	-3.0	14.0

**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 HR30.

PARAMETER	MAXIMUM PERFORMANCE
DC Forward Current <sup>[1,2]</sup>	240mA
Peak Pulsed Forward Current <sup>[1,3]</sup>	350mA
LED Junction Temperature <sup>[1]</sup> (DC & Pulse)	150°C
ESD Sensitivity (ANSI/ESDA/JEDEC JS-001-2012)	Class 2 for L130-xxxx00HR00000 Class 3B for L130-xxxx0THR00000
Operating Case Temperature <sup>[1]</sup>	-40°C to 125°C
LED Storage Temperature	-40°C to 125°C
Soldering Temperature	JEDEC 020c 260°C
Allowable Reflow Cycles	3
Reverse Voltage (V <sub>reverse</sub> )	LUXEON LEDs are not designed to be driven in reverse bias

**Notes for Table 4:**

1. Proper current derating must be observed to maintain the junction temperature below the maximum allowable junction temperature.
2. 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 the maximum peak pulsed forward current
3. At 10% duty cycle with pulse width of 10ms.

# Characteristic Curves

## Spectral Power Distribution Characteristics

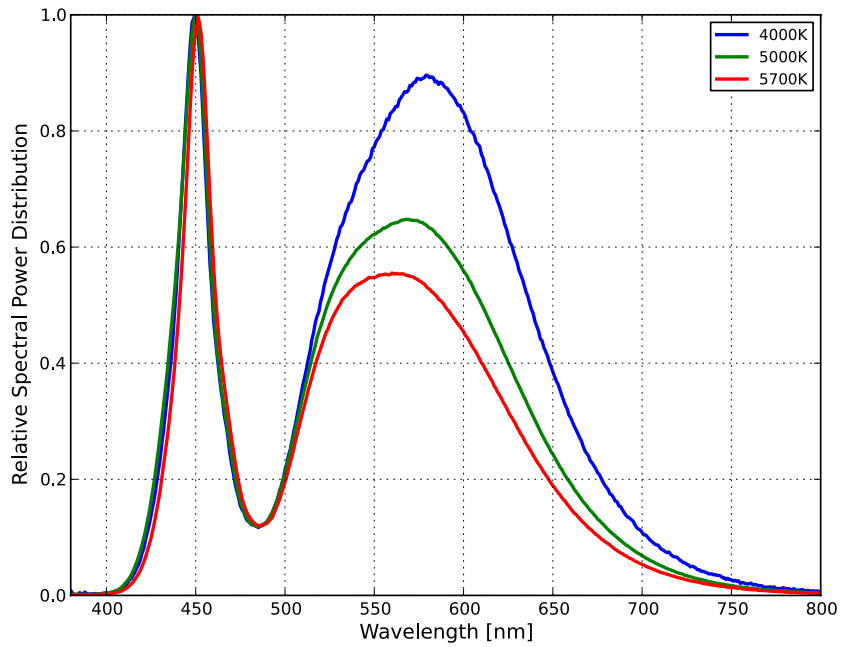


Figure 1a. Typical normalized power vs. wavelength for 70CRI LUXEON HR30 at 150mA,  $T_j=25^\circ\text{C}$ .

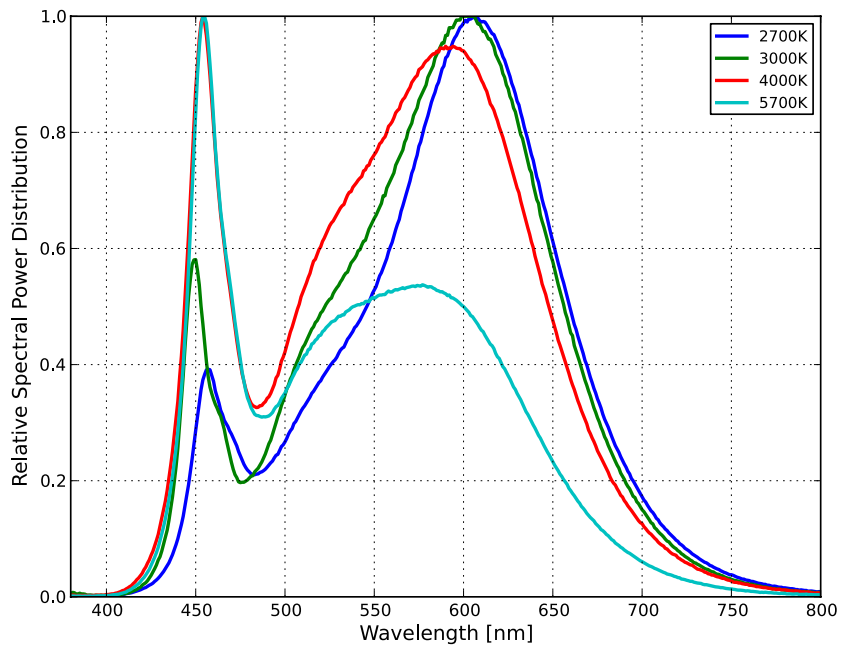


Figure 1b. Typical normalized power vs. wavelength for 80CRI LUXEON HR30 at 150mA,  $T_j=25^\circ\text{C}$ .

# Light Output Characteristics

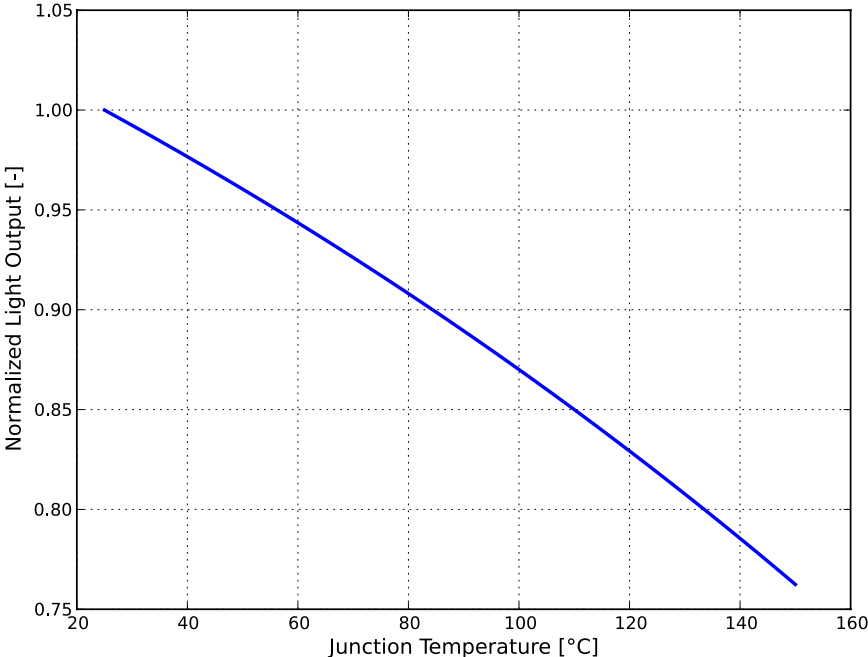


Figure 2. Typical normalized light output vs. junction temperature for LUXEON HR30 at 150mA.

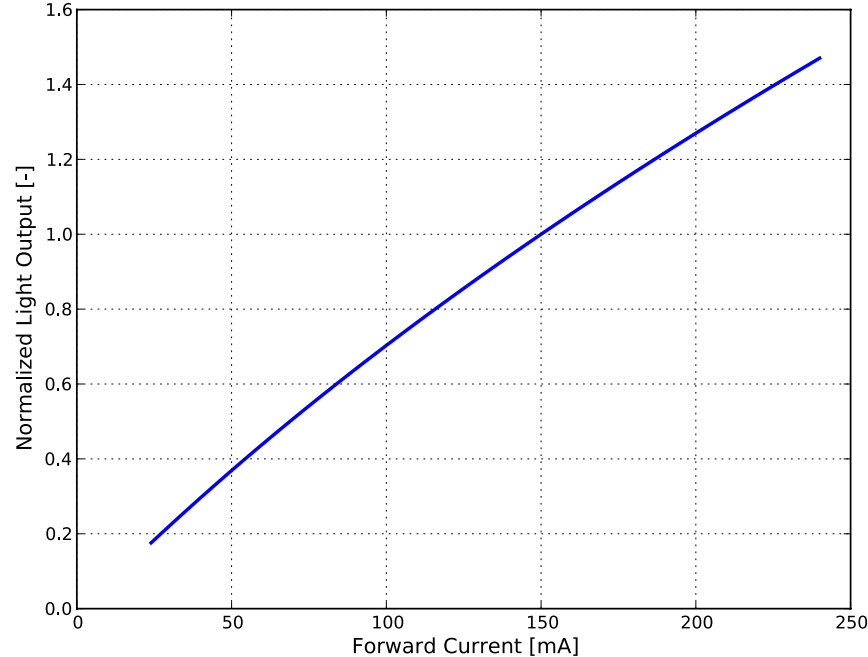


Figure 3. Typical normalized light output vs. forward current for LUXEON HR30 at  $T_j=25^{\circ}\text{C}$ .

## Forward Current Characteristics

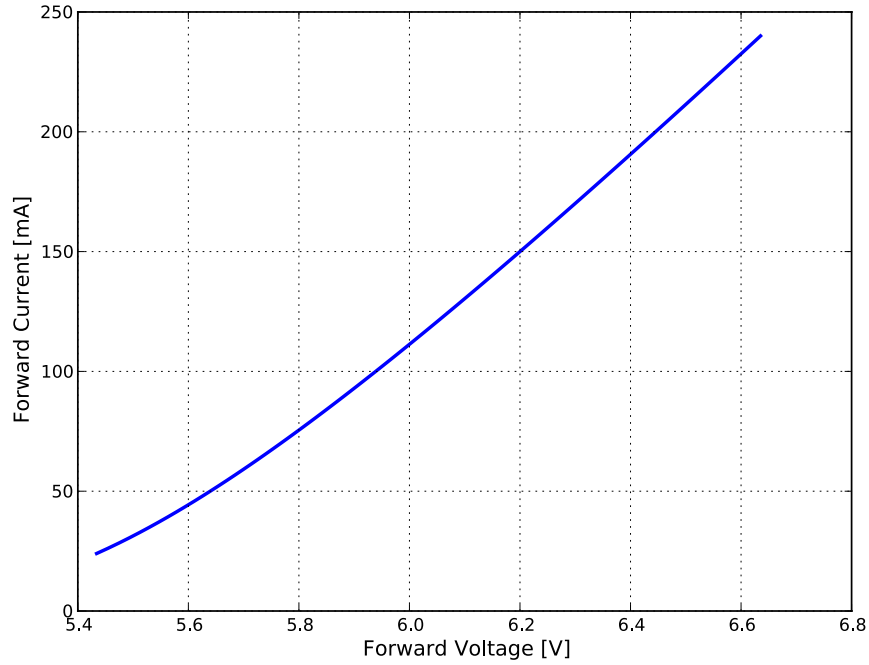


Figure 4. Typical forward current vs. forward voltage for LUXEON HR30 at  $T_j=25^\circ\text{C}$ .

## Radiation Pattern Characteristics

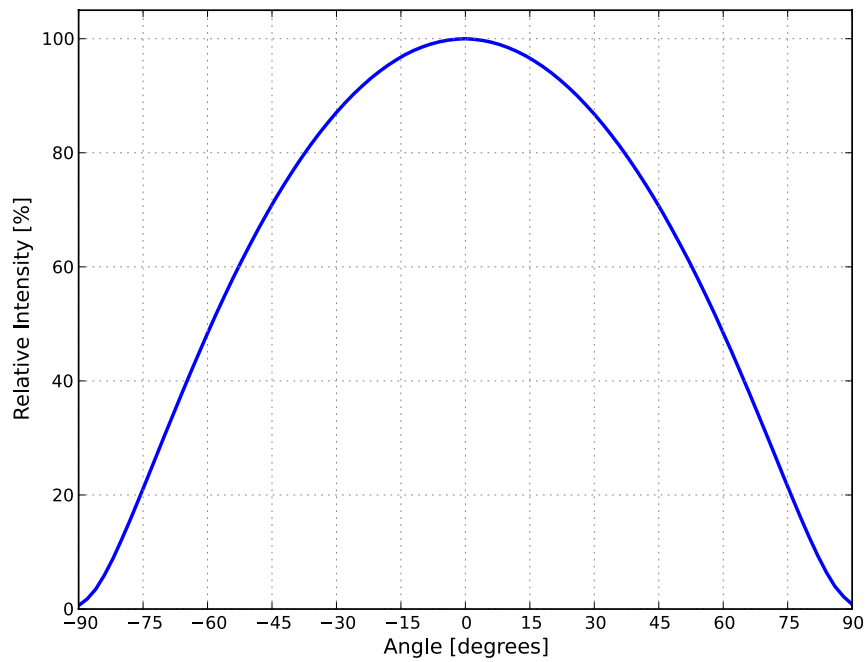


Figure 5. Typical radiation pattern for LUXEON HR30 at 150mA,  $T_j=25^\circ\text{C}$ .



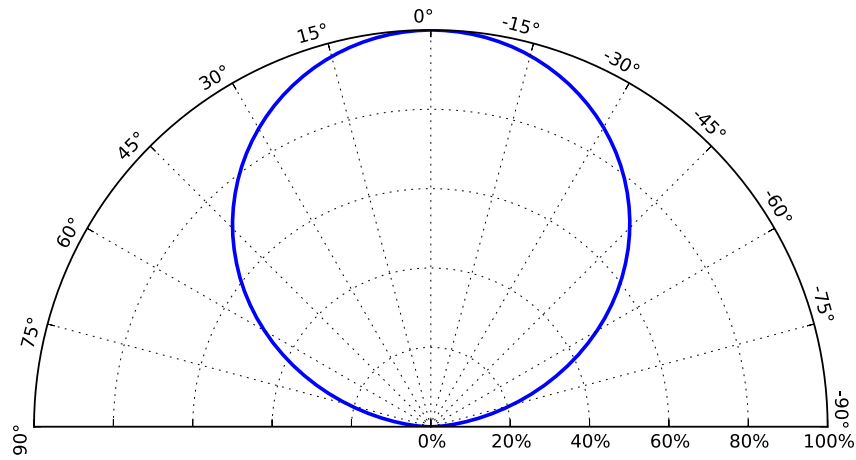


Figure 6. Typical polar radiation pattern for LUXEON HR30 at 150mA,  $T_j=25^\circ\text{C}$ .

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

LUXEON HR30 LEDs are labeled using a 4-digit alphanumeric CAT code following the format below:

**A B C D**

Where:

- A** – designates luminous flux bin (example: K=100 to 105 lumens, M=110 to 115 lumens)
- B C** – designates correlated color temperature bin (example: 7D, 7E, 7F, 7G, 7H for 3000K products)
- D** – designates forward voltage bin (example: G=5.8 to 6.0V, J=6.2 to 6.4V)

Therefore, a LUXEON HR30 with a lumen range of 100 to 105, color bin of 7H and a forward voltage range of 5.8 to 6.0V has the following CAT code:

**K 7 H G**

## Luminous Flux Bins

Table 5 lists the standard luminous flux bins for LUXEON HR30 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 HR30.**

BIN	LUMINOUS FLUX <sup>[1]</sup> (lm)	
	MINIMUM	MAXIMUM
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

**Notes for Table 5:**

1. Lumileds maintains a tolerance of  $\pm 7.5\%$  on luminous flux measurements.

# Color Bin Definitions

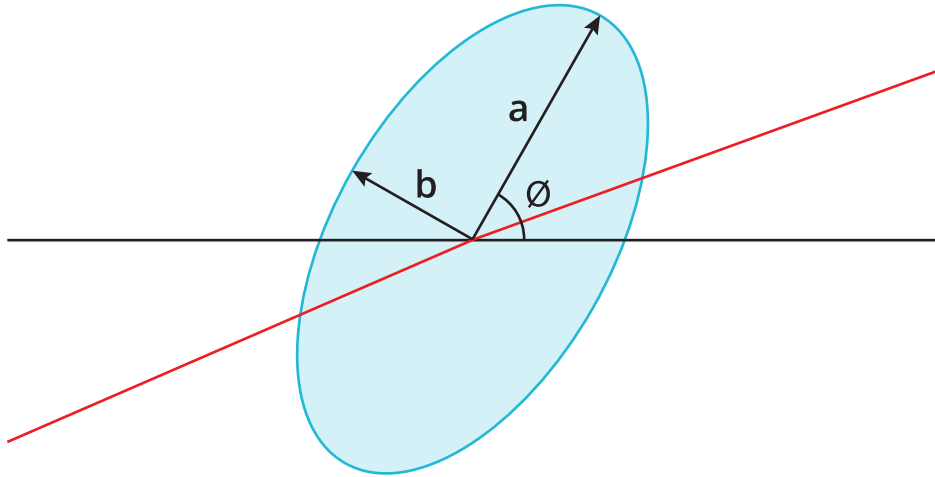


Figure 7. 3-step MacAdam ellipse illustration for Tables 6a-6e.

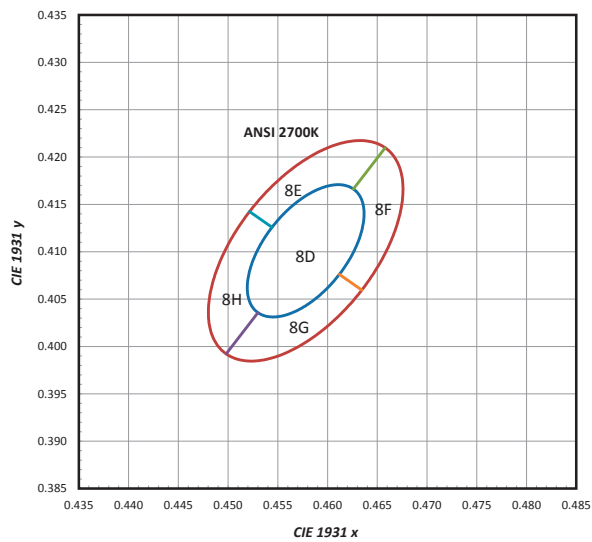


Figure 8a. 1/5<sup>th</sup> color bin structure for LUXEON HR30 2700K.

Table 6a. 3-step MacAdam ellipse color bin definitions for L130-27xxxHR00000.

NOMINAL CCT	COLOR SPACE	CENTER POINT <sup>[1]</sup> (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 ±0.005 on x and y coordinates in the CIE 1931 color space.

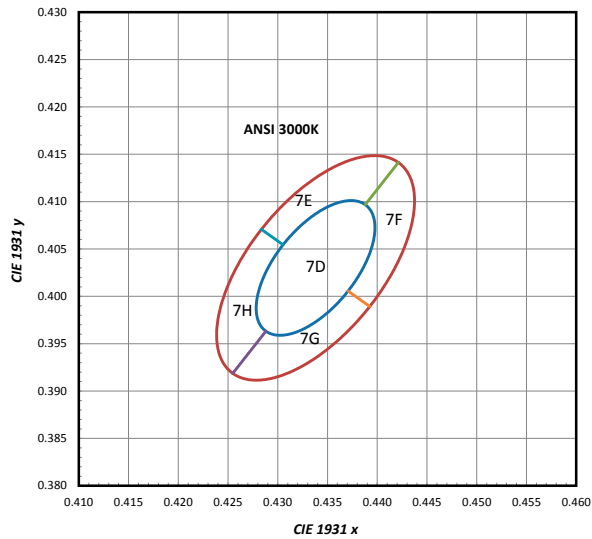


Figure 8b. 1/5<sup>th</sup> color bin structure for LUXEON HR30 3000K.

Table 6b. 3-step MacAdam ellipse color bin definitions for L130-30xxxxHR00000.

NOMINAL CCT	COLOR SPACE	CENTER POINT <sup>[1]</sup> (cx, cy)	MAJOR AXIS, a	MINOR AXIS, b	ELLIPSE ROTATION ANGLE, $\theta$
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  $\pm 0.005$  on x and y coordinates in the CIE 1931 color space.

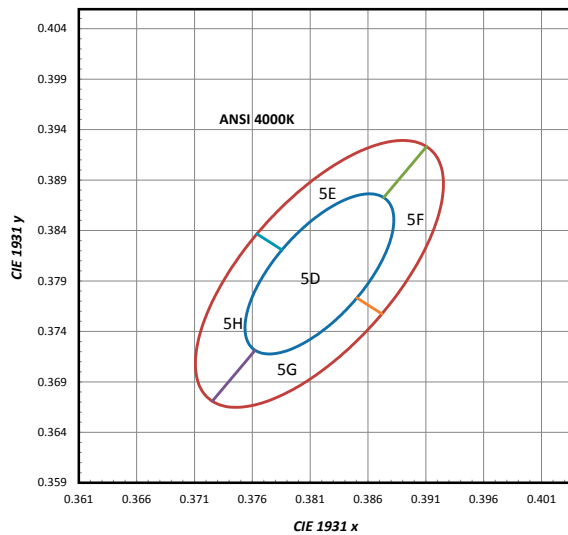


Figure 8c. 1/5<sup>th</sup> color bin structure for LUXEON HR30 4000K.

Table 6c. 3-step MacAdam ellipse color bin definitions for L130-40xxxxHR00000.

NOMINAL CCT	COLOR SPACE	CENTER POINT <sup>[1]</sup> (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°

Notes for Table 6c:

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

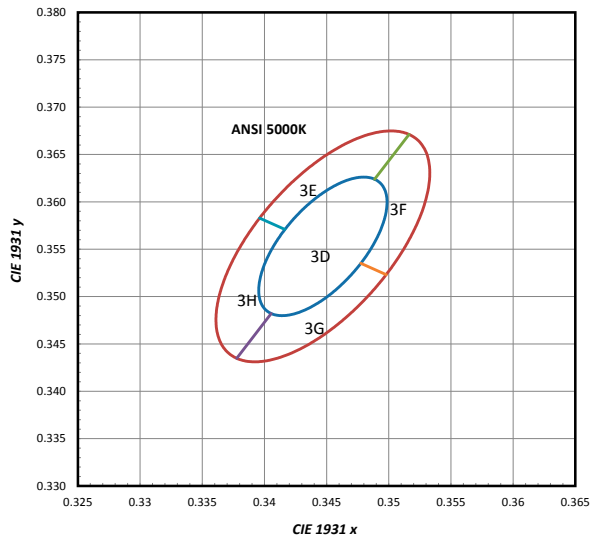


Figure 8d. 1/5<sup>th</sup> color bin structure for LUXEON HR30 5000K.

Table 6d. 3-step MacAdam ellipse color bin definitions for L130-50xxxxHR00000.

NOMINAL CCT	COLOR SPACE	CENTER POINT <sup>[1]</sup> (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°

Notes for Table 6d:

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

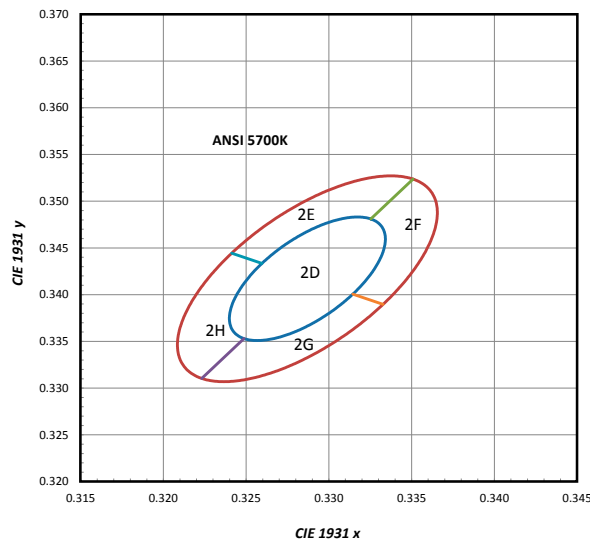


Figure 8e. 1/5<sup>th</sup> color bin structure for LUXEON HR30 5700K.

Table 6e. 3-step MacAdam ellipse color bin definitions for L130-57xxxxHR00000.

NOMINAL CCT	COLOR SPACE	CENTER POINT <sup>[1]</sup> (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°

Notes for Table 6e:

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

# Forward Voltage Bins

Table 7. Forward voltage bin definitions for LUXEON HR30.

BIN	FORWARD VOLTAGE <sup>[1]</sup> (V <sub>f</sub> )	
	MINIMUM	MAXIMUM
G	5.8	6.0
H	6.0	6.2
J	6.2	6.4
K	6.4	6.6
L	6.6	6.8

Notes for Table 7:

1. Lumileds maintains a tolerance of ±0.1V on forward voltage measurements.

# Mechanical Dimensions

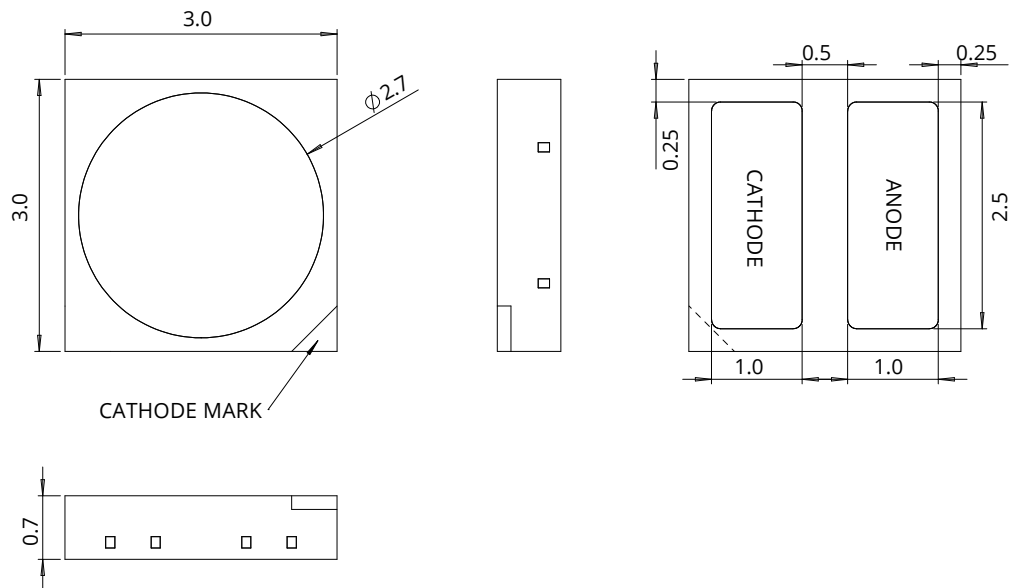


Figure 9. Mechanical dimensions for LUXEON HR30.

Notes for Figure 9:

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

# Reflow Soldering Guidelines

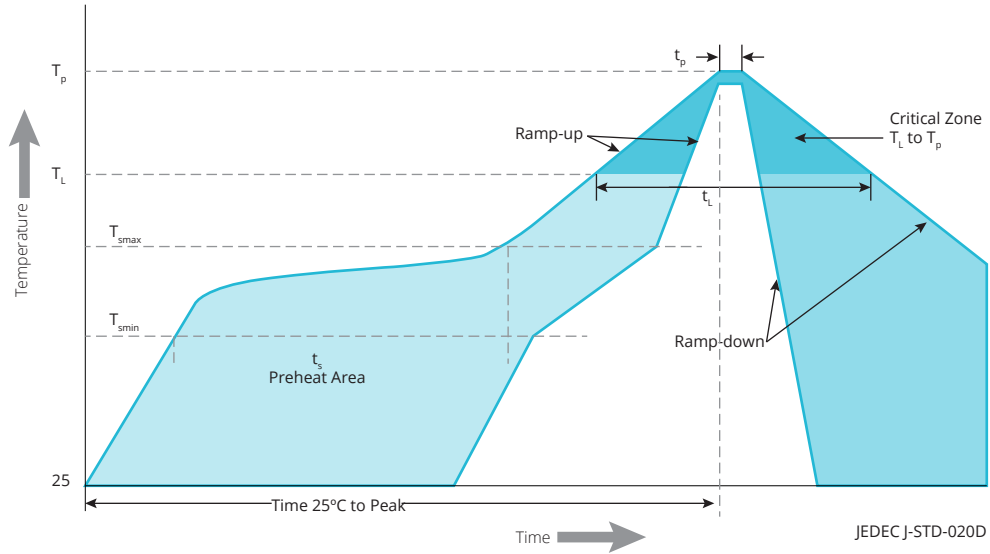


Figure 10. Visualization of the acceptable reflow temperature profile as specified in Table 8.

Table 8. Reflow profile characteristics for LUXEON HR30.

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

## JEDEC Moisture Sensitivity

Table 9. Moisture sensitivity levels for LUXEON HR30.

LEVEL	FLOOR LIFE		SOAK REQUIREMENTS STANDARD	
	TIME	CONDITIONS	TIME	CONDITIONS
1	Unlimited	≤30°C / 85% RH	168 Hours +5 / -0	85°C / 85% RH

# Solder Pad Design

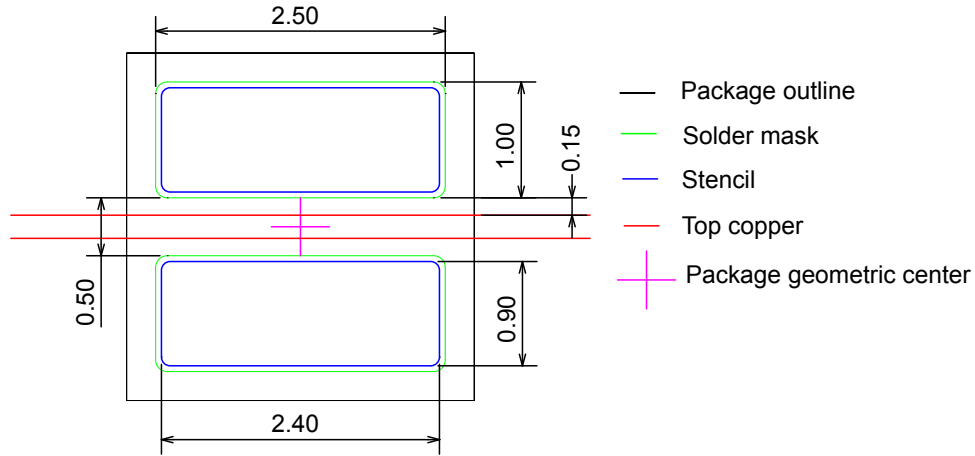


Figure 11. Recommended PCB solder pad layout for LUXEON HR30.

**Notes for Figure 11:**

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

# Packaging Information

## Pocket Tape Dimensions

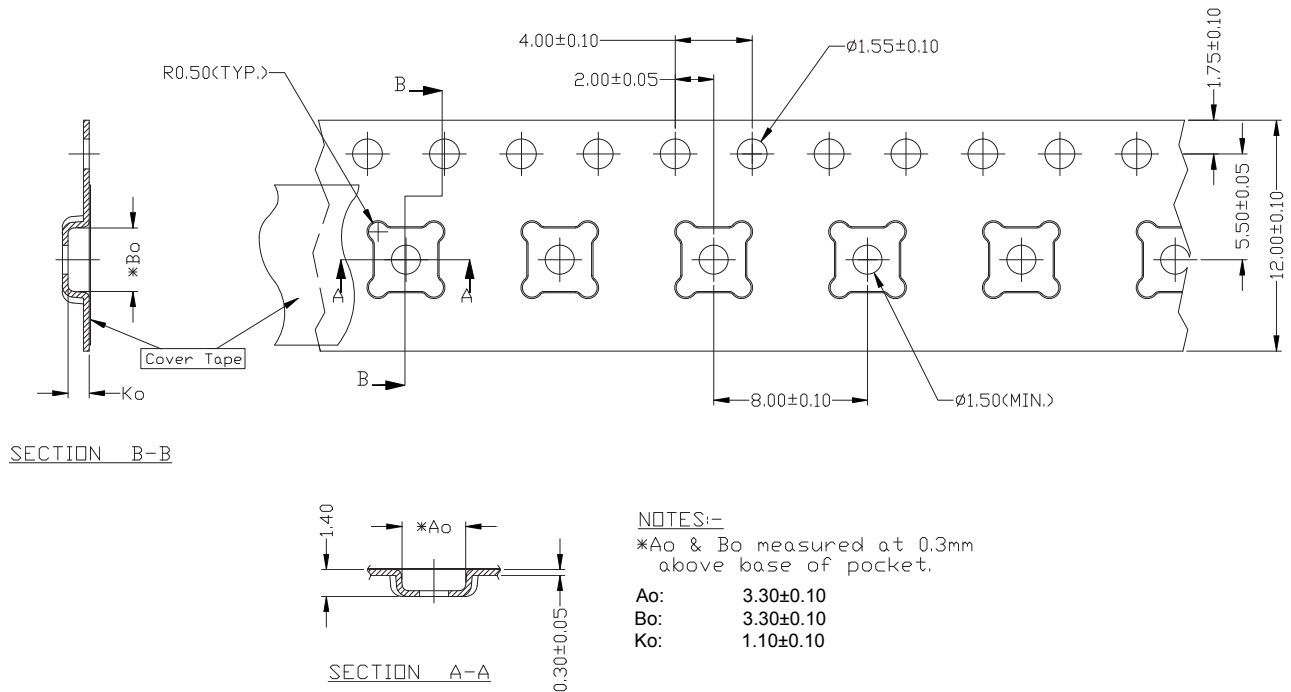


Figure 12. Pocket tape dimensions for LUXEON HR30.

**Notes for Figure 12:**

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



# Reel Dimensions

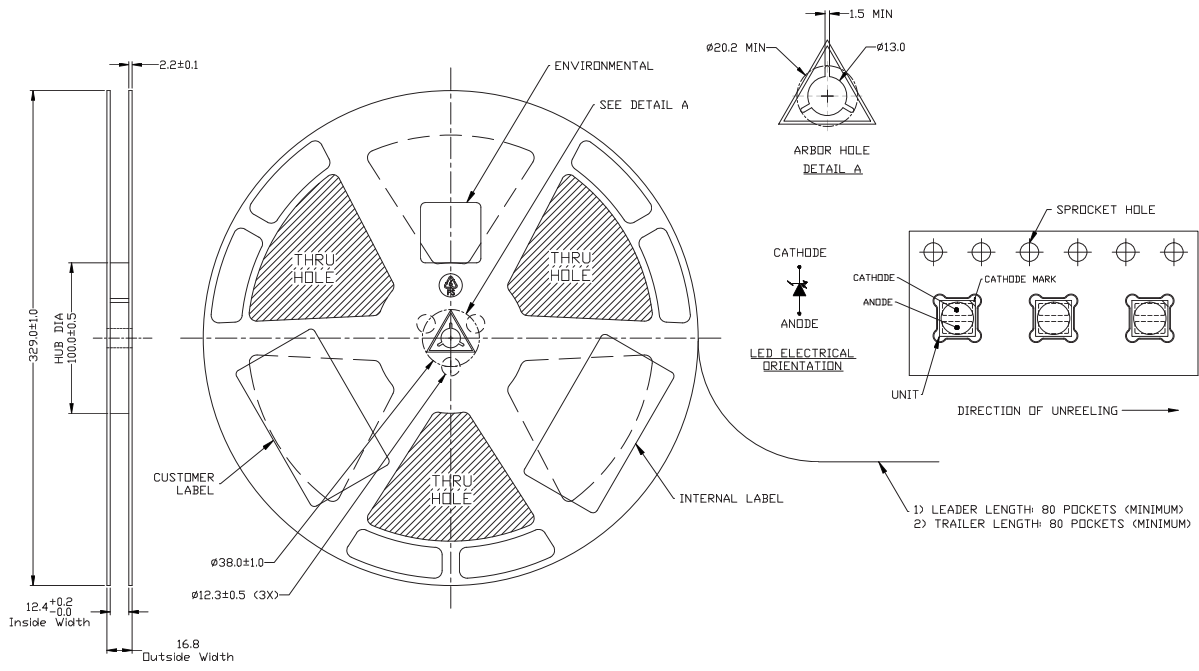


Figure 13. Reel dimensions for LUXEON HR30.

**Notes for Figure 13:**

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

## About Lumileds

Lumileds is the global leader in light engine technology. The company develops, manufactures and distributes groundbreaking LEDs and automotive lighting products that shatter the status quo and help customers gain and maintain a competitive edge.

With a rich history of industry “firsts,” Lumileds is uniquely positioned to deliver lighting advancements well into the future by maintaining an unwavering focus on quality, innovation and reliability.

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



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