

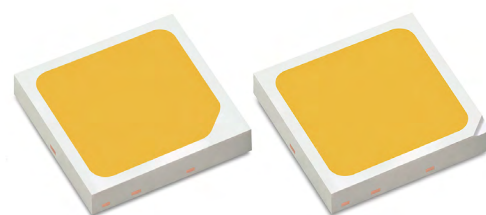
# LUXEON 3030 HE

# LUXEON 3030 HE Plus

Industry leading efficacy, 3V 3030 package

LUXEON 3030 HE and LUXEON 3030 HE Plus are superior high efficacy, mid power packages built on the legacy of the LUXEON 3030 product line. They serve as go-to solutions for various indoor and outdoor fixture applications that require top notch lm/W and  $\mu\text{mol/J}$  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. Furthermore, with the latest NightScape Technology, LUXEON 3030 HE Plus enabled revolutionary environmental friendly outdoor solutions with blue content below 2%.



## Now With NightScape Technology

NightScape Technology enables white light with blue light content that is less than 2%.

### 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

Robust coating design for enhanced sulfurprotection capability (LUXEON 3030 HE Plus)<sup>[1]</sup>

[1] Refer to reliability datasheet for more details.

### PRIMARY APPLICATIONS

Panel / Soft Lights

Spotlights

Linear

Troffers

Downlights

Wall Pack

Horticulture

# Table of Contents

|   |           |
|---|-----------|
| <b>General Product Information</b>          | <b>2</b>  |
| Product Test Conditions                     | 2         |
| Part Number Nomenclature                    | 2         |
| Lumen Maintenance                           | 2         |
| Environmental Compliance                    | 2         |
| <b>Performance Characteristics</b>          | <b>3</b>  |
| Product Selection Guide                     | 3         |
| Optical Characteristics                     | 4         |
| Electrical and Thermal Characteristics      | 4         |
| <b>Absolute Maximum Ratings</b>             | <b>5</b>  |
| <b>Characteristics Curves</b>               | <b>5</b>  |
| Spectral Power Distribution Characteristics | 5         |
| Light Output Characteristics                | 7         |
| Forward Current Characteristics             | 9         |
| Radiation Pattern Characteristics           | 10        |
| <b>Product Bin and Labeling Definitions</b> | <b>11</b> |
| Decoding Product Bin Labeling               | 11        |
| Luminous Flux Bins                          | 11        |
| Color Bin Definitions                       | 12        |
| Forward Voltage Bins                        | 16        |
| <b>Mechanical Dimensions</b>                | <b>17</b> |
| <b>Reflow Soldering Guidelines</b>          | <b>18</b> |
| JEDEC Moisture Sensitivity                  | 18        |
| Solder Pad Design                           | 19        |
| <b>Packaging Information</b>                | <b>19</b> |
| Pocket Tape Dimensions                      | 19        |
| Reel Dimensions                             | 20        |

# General Product Information

## Product Test Conditions

LUXEON 3030 HE and LUXEON 3030 HE Plus 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 and LUXEON 3030 HE Plus follow the convention below:

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

Where:

- A A A** – designates nominal CCT and CRI (2780=2700K, 80CRI; 3090=3000K, 90CRI, etc., and NSC1=Nightscape)
- B B** – designates product code (HA=LUXEON 3030 HE Plus, HB=LUXEON 3030 HE)
- C** – designates product code (B=generic version, C=high flux version)
- 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 HE Plus, 3000K 80CRI LED with generic version performance:

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 including amendments 2015/863/EU & 2017/2102/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<sub>j</sub> = 25°C.

| PRODUCT<br>TYPE        | NOMINAL<br>CCT <sup>[1]</sup> | MINIMUM<br>CRI <sup>[2, 3]</sup> | LUMINOUS FLUX <sup>[2, 3]</sup> (lm) |         | TYPICAL<br>LUMINOUS<br>EFFICACY (lm/W) | PART NUMBER        |
|------------------------|-------------------------------|----------------------------------|--------------------------------------|---------|--|--------------------|
|                        |                               |                                  | MINIMUM                              | TYPICAL |  |                    |
|                        |                               |                                  | 65mA                                 |         |  |                    |
| LUXEON 3030 HE         | 3000K                         | 70                               | 32.7                                 | 35.5    | 195                                    | L130-3070HB30000B1 |
|                        | 3500K                         | 70                               | 34.0                                 | 37.0    | 203                                    | L130-3570HB30000B1 |
|                        | 4000K                         | 70                               | 34.5                                 | 37.5    | 206                                    | L130-4070HB30000B1 |
|                        | 5000K                         | 70                               | 34.5                                 | 37.5    | 206                                    | L130-5070HB30000B1 |
|                        | 5700K                         | 70                               | 34.0                                 | 37.0    | 203                                    | L130-5770HB30000B1 |
|                        | 6500K                         | 70                               | 33.5                                 | 36.4    | 200                                    | L130-6570HB30000B1 |
|                        | 2700K                         | 80                               | 29.0                                 | 33.5    | 184                                    | L130-2780HB30000B1 |
|                        | 3000K                         | 80                               | 29.5                                 | 34.0    | 187                                    | L130-3080HB30000B1 |
|                        | 3500K                         | 80                               | 30.0                                 | 35.0    | 192                                    | L130-3580HB30000B1 |
|                        | 4000K                         | 80                               | 32.0                                 | 36.5    | 201                                    | L130-4080HB30000B1 |
|                        | 5000K                         | 80                               | 31.5                                 | 36.0    | 198                                    | L130-5080HB30000B1 |
|                        | 5700K                         | 80                               | 31.5                                 | 36.0    | 198                                    | L130-5780HB30000B1 |
|                        | 6500K                         | 80                               | 31.0                                 | 35.5    | 195                                    | L130-6580HB30000B1 |
|                        | 2700K                         | 90                               | 24.5                                 | 28.0    | 154                                    | L130-2790HB30000B1 |
|                        | 3000K                         | 90                               | 25.0                                 | 28.5    | 157                                    | L130-3090HB30000B1 |
|                        | 3500K                         | 90                               | 26.0                                 | 29.5    | 162                                    | L130-3590HB30000B1 |
|                        | 4000K                         | 90                               | 27.5                                 | 30.5    | 168                                    | L130-4090HB30000B1 |
|                        | 5000K                         | 90                               | 27.0                                 | 30.0    | 165                                    | L130-5090HB30000B1 |
|                        | 5700K                         | 90                               | 27.0                                 | 30.0    | 165                                    | L130-5790HB30000B1 |
|                        | 6500K                         | 90                               | 27.0                                 | 30.0    | 165                                    | L130-6590HB30000B1 |
| LUXEON 3030<br>HE Plus | 2200K                         | 70                               | 29.5                                 | 32.0    | 182                                    | L130-2270HA30000B1 |
|                        | 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                     |                    |

Table 1 continued on next page:  
1. Correlated color temperature is not targeted at T<sub>j</sub>=85°C.  
2. Luminous flux and CRI are specified at T<sub>j</sub>=25°C. 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.

Table 1. Product performance of LUXEON 3030 HE and LUXEON 3030 HE Plus at 65mA, T<sub>j</sub> = 25°C, Continued.

| PRODUCT TYPE        | NOMINAL CCT <sup>[1]</sup> | MINIMUM CRI <sup>[2, 3]</sup> | LUMINOUS FLUX <sup>[2, 3]</sup> (lm) |         | TYPICAL LUMINOUS EFFICACY (lm/W) | PART NUMBER        |
|---------------------|----------------------------|-------------------------------|--------------------------------------|---------|----------------------------------|--------------------|
|                     |                            |                               | MINIMUM                              | TYPICAL |                                  |                    |
|                     |                            |                               | 65mA                                 |         |                                  |                    |
| LUXEON 3030 HE Plus | 1850K <sup>[4]</sup>       | 50                            | 29.5                                 | 32.2    | 183                              | L130-NSC1HA30000C1 |
|                     | 2200K                      | 70                            | 29.5                                 | 33.1    | 188                              | L130-2270HA30000C1 |
|                     | 3000K                      | 70                            | 34.0                                 | 37.7    | 215                              | L130-3070HA30000C1 |
|                     | 3500K                      | 70                            | 35.0                                 | 38.7    | 221                              | L130-3570HA30000C1 |
|                     | 4000K                      | 70                            | 36.0                                 | 39.4    | 224                              | L130-4070HA30000C1 |
|                     | 5000K                      | 70                            | 36.0                                 | 39.4    | 224                              | L130-5070HA30000C1 |
|                     | 5700K                      | 70                            | 35.0                                 | 38.5    | 219                              | L130-5770HA30000C1 |
|                     | 6500K                      | 70                            | 34.5                                 | 38.0    | 216                              | L130-6570HA30000C1 |
|                     | 2700K                      | 80                            | 30.0                                 | 33.8    | 193                              | L130-2780HA30000C1 |
|                     | 3000K                      | 80                            | 32.0                                 | 35.2    | 201                              | L130-3080HA30000C1 |
|                     | 3500K                      | 80                            | 33.0                                 | 36.6    | 209                              | L130-3580HA30000C1 |
|                     | 4000K                      | 80                            | 34.0                                 | 37.6    | 214                              | L130-4080HA30000C1 |
|                     | 5000K                      | 80                            | 34.0                                 | 37.6    | 214                              | L130-5080HA30000C1 |
|                     | 5700K                      | 80                            | 33.5                                 | 37.0    | 211                              | L130-5780HA30000C1 |
|                     | 6500K                      | 80                            | 33.0                                 | 36.6    | 209                              | L130-6580HA30000C1 |
|                     | 2700K                      | 90                            | 26.0                                 | 28.8    | 164                              | L130-2790HA30000C1 |
|                     | 3000K                      | 90                            | 27.0                                 | 30.0    | 171                              | L130-3090HA30000C1 |
|                     | 3500K                      | 90                            | 27.5                                 | 30.5    | 174                              | L130-3590HA30000C1 |
|                     | 4000K                      | 90                            | 28.5                                 | 32.1    | 183                              | L130-4090HA30000C1 |
|                     | 5000K                      | 90                            | 28.5                                 | 32.1    | 183                              | L130-5090HA30000C1 |
|                     | 5700K                      | 90                            | 28.5                                 | 32.1    | 183                              | L130-5790HA30000C1 |
|                     | 6500K                      | 90                            | 28.0                                 | 31.3    | 178                              | L130-6590HA30000C1 |

Notes for Table 1:

1. Correlated color temperature is not targeted at T<sub>j</sub>=85°C.
2. Luminous flux and CRI are specified at T<sub>j</sub>=25°C. 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.
4. Referred to as LUXEON 3030 HE Plus - Nightscape; which constrains the typical output of blue light from 400nm to 500nm to be within 2% at rated condition.

## Optical Characteristics

Table 2. Optical characteristics for LUXEON 3030 HE and LUXEON 3030 HE Plus at 65mA, T<sub>j</sub> = 25°C.

| PART NUMBER        | TYPICAL TOTAL INCLUDED ANGLE <sup>[1]</sup> | TYPICAL VIEWING ANGLE <sup>[2]</sup> |
|--------------------|---|--------------------------------------|
| 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<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-xxxxHA30000x1 | 2.66   | 2.70    | 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 <sup>[1]</sup>                | 240mA/480mA         |
| Peak Pulsed Forward Current <sup>[2]</sup>       | 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 ( $V_{reverse}$ ) <sup>[3]</sup> | -5V                 |

**Notes for Table 4:**

- 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
- Pulse operation with the maximum peak pulse forward current is acceptable if the pulse on time is  $\leq 5\text{ms}$  per cycle and the duty cycle is  $\leq 50\%$
- At a maximum reverse current of 10 $\mu\text{A}$ , LUXEON 3030 HE and LUXEON 3030 HE Plus LEDs are not designed to be driven in reverse bias.

## Characteristics Curves

### Spectral Power Distribution Characteristics

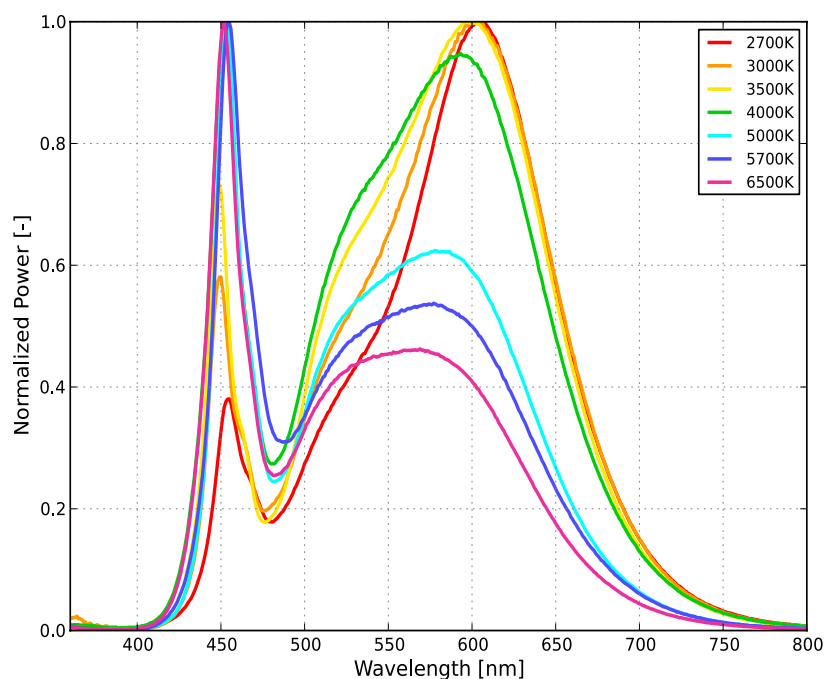


Figure 1a. Typical normalized power vs. wavelength for L130-xx80Hx30000x1 at 65mA,  $T_j=25^\circ\text{C}$ .

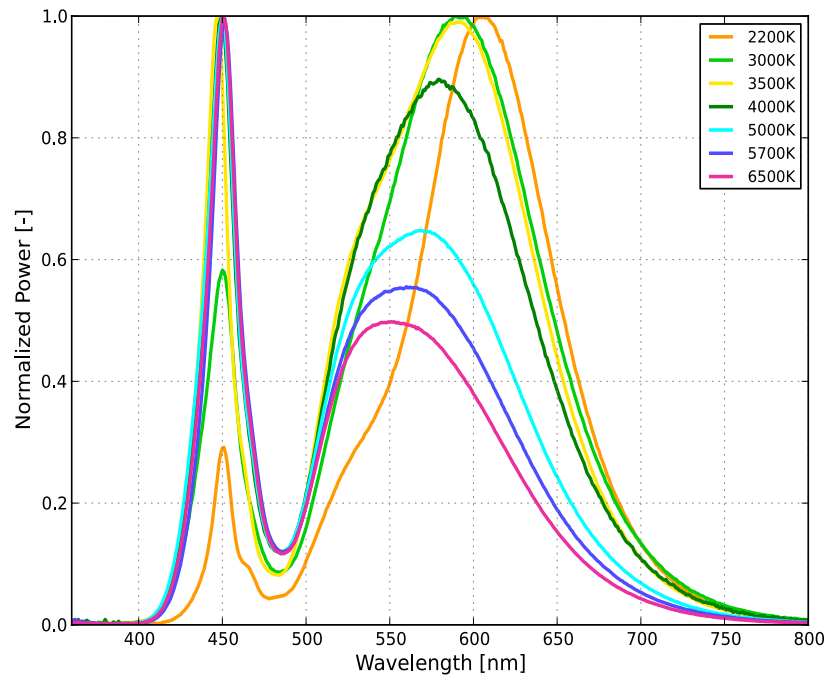


Figure 1b. Typical normalized power vs. wavelength for L130-xx70Hx30000x1 at 65mA,  $T_j=25^{\circ}\text{C}$ .

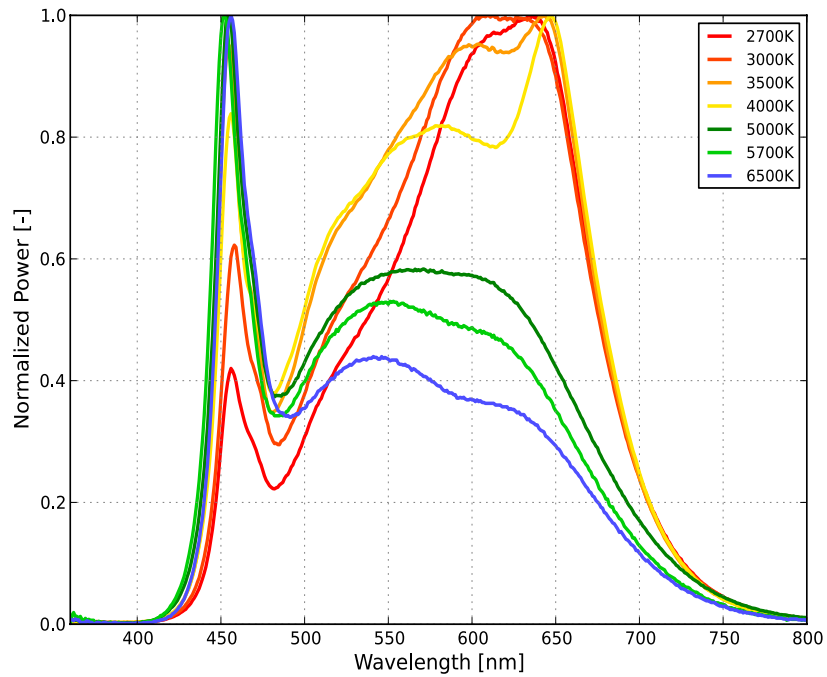


Figure 1c. Typical normalized power vs. wavelength for L130-xx90Hx30000x1 at 65mA,  $T_j=25^{\circ}\text{C}$ .

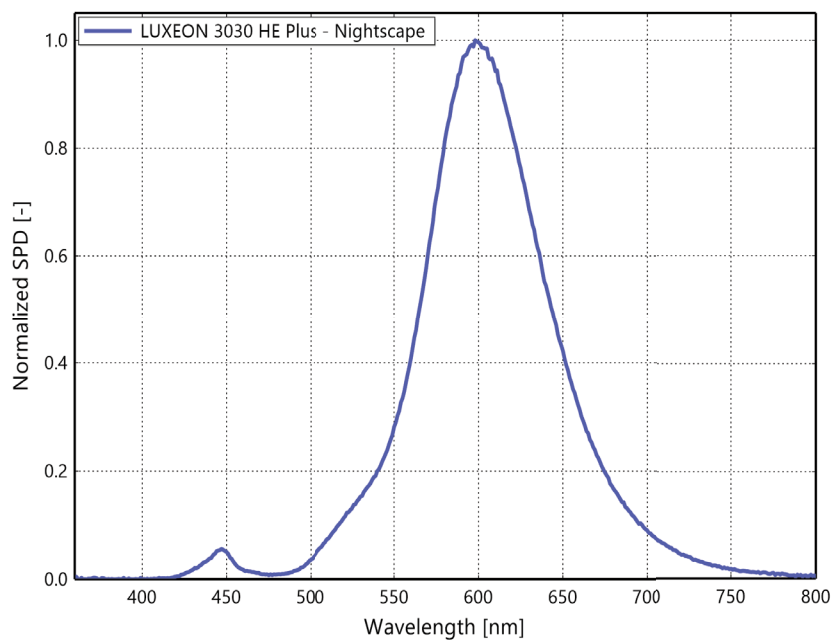


Figure 1d. Typical normalized power vs. wavelength for L130-NSC1HA30000C1 at 65mA,  $T_j=25^{\circ}\text{C}$ .

## Light Output Characteristics

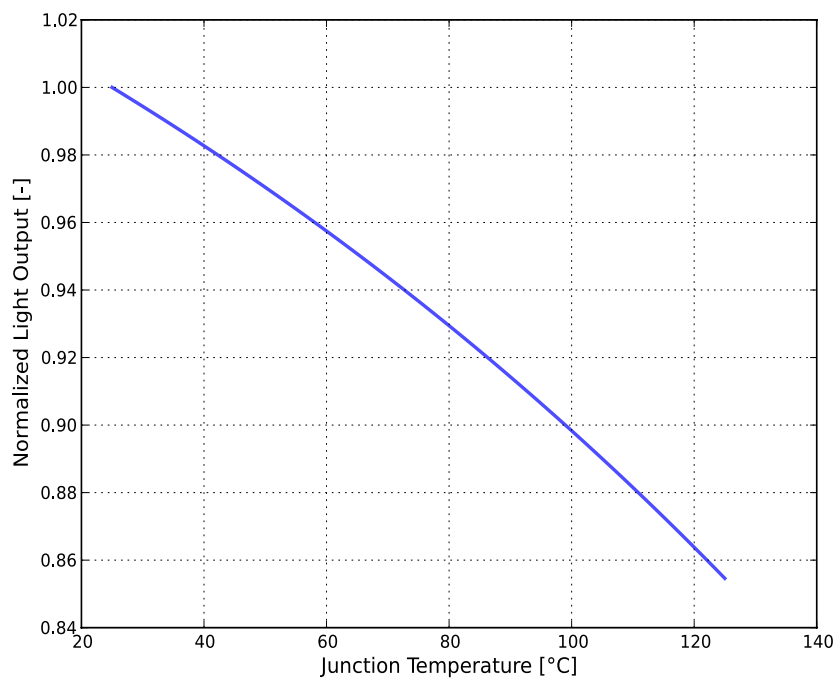
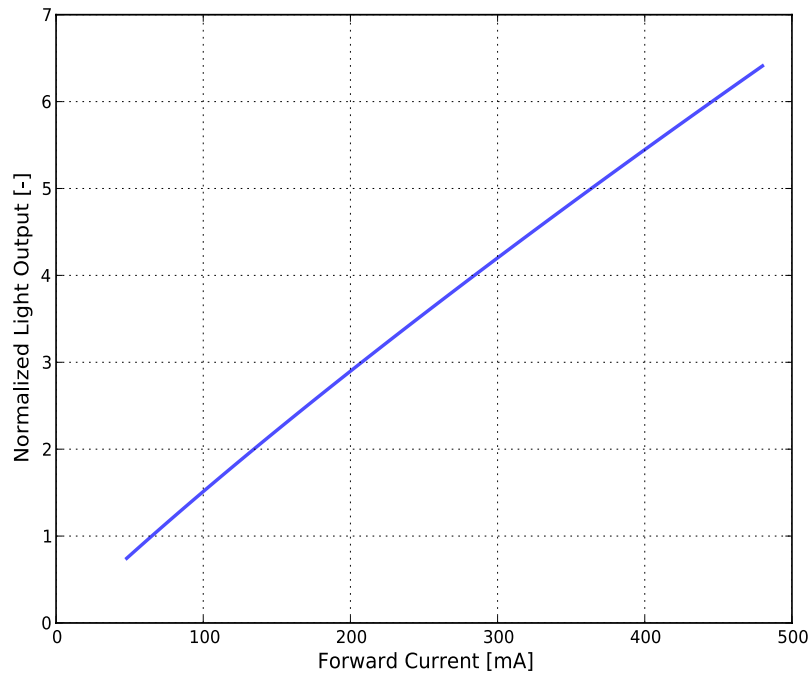


Figure 2. Typical normalized light output vs. junction temperature for L130-xxxxHx30000x1 at 65mA.

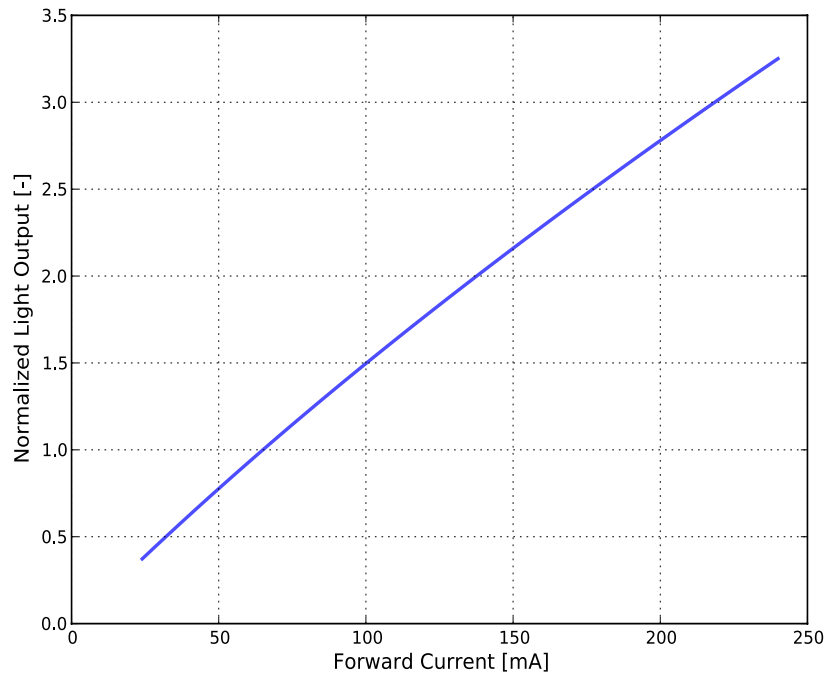




ESTIMATED TYPICAL RATIO COMPARED TO FLUX AT RATED CONDITION 65mA,  $T_j=25^{\circ}\text{C}$ .

|      |      |       |       |       |
|------|------|-------|-------|-------|
| 60mA | 65mA | 120mA | 150mA | 480mA |
| 93%  | 100% | 180%  | 222%  | 641%  |

Figure 3. Typical normalized light output vs. forward current for L130-xxxxHA30000x1 at  $T_j=25^{\circ}\text{C}$ .



ESTIMATED TYPICAL RATIO COMPARED TO FLUX AT RATED CONDITION 65mA,  $T_j=25^{\circ}\text{C}$ .

|      |      |       |       |       |
|------|------|-------|-------|-------|
| 60mA | 65mA | 120mA | 150mA | 480mA |
| 93%  | 100% | 177%  | 216%  | 325%  |

Figure 4. Typical normalized light output vs. forward current for L130-xxxxHB30000x1 at  $T_j=25^{\circ}\text{C}$ .

# Forward Current Characteristics

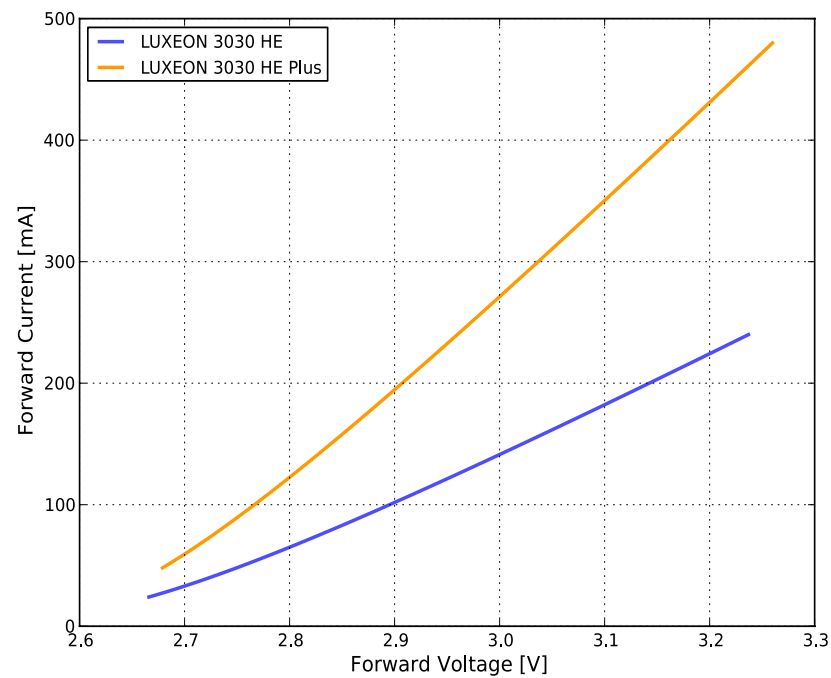


Figure 5. Typical forward current vs. forward voltage for L130-xxxxHx30000x1 at  $T_j=25^{\circ}\text{C}$ .

# Radiation Pattern Characteristics

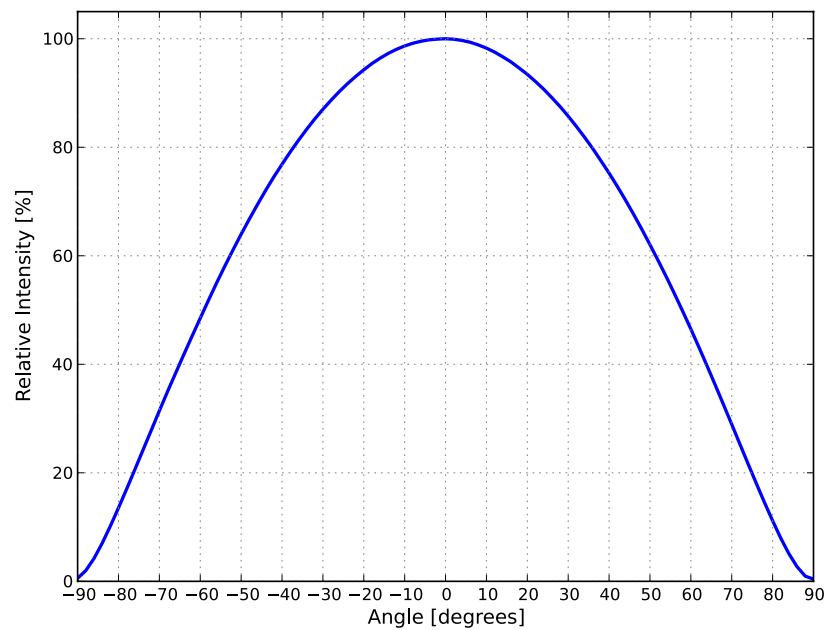


Figure 6. Typical radiation pattern for L130-xxxxHx30000x1 at 65mA,  $T_j=25^{\circ}\text{C}$ .

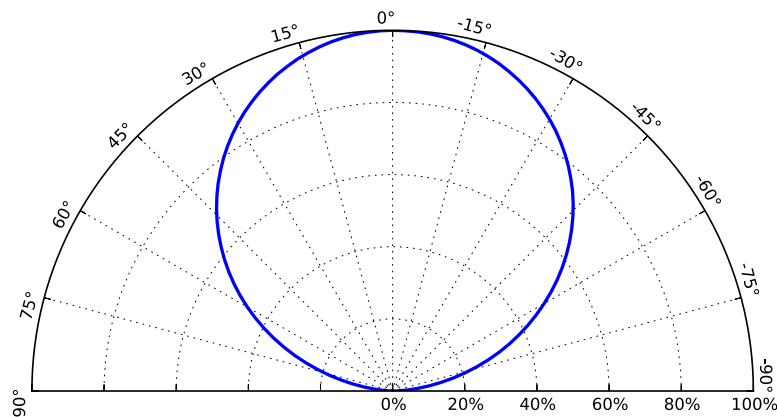


Figure 7. Typical polar radiation pattern for L130-xxxxHx30000x1 at 65mA,  $T_j=25^{\circ}\text{C}$ .

# 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 3030 HE and LUXEON 3030 HE Plus 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 (K=2.66 to 2.76V)

Therefore, a LUXEON 3030 HE and 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 2.66 to 2.76V has the following CAT code:

**F 5 E K**

## 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 and LUXEON 3030 HE Plus at 65mA, T<sub>j</sub>=25°C.

| BIN | LUMINOUS FLUX <sup>(1)</sup> (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

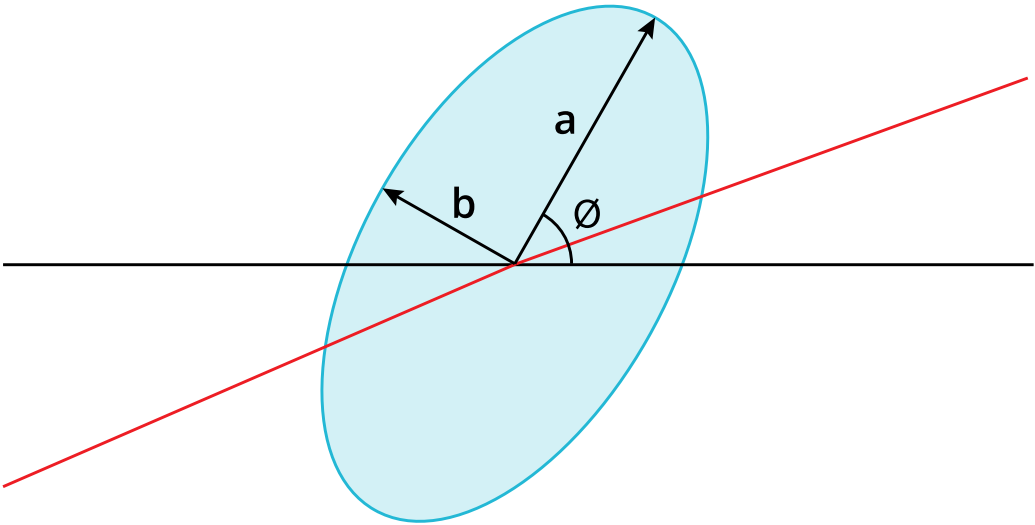


Figure 8. 3- and 5-step MacAdam ellipse illustration for Tables 6a-6g.

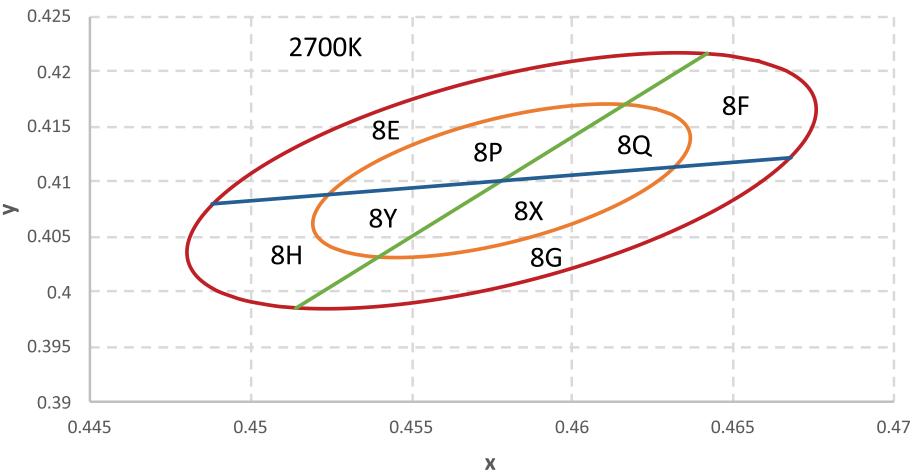


Figure 9a. 1/8<sup>th</sup> color bin structure for LUXEON 3030 HE and LUXEON 3030 HE Plus 2700K, at 65mA, T<sub>j</sub>=25°C.

Table 6a. 3- and 5-step MacAdam ellipse color bin definitions for LUXEON 3030 HE and LUXEON 3030 HE Plus 2700K, at 65mA, T<sub>j</sub>=25°C.

| NOMINAL CCT | COLOR SPACE                   | CENTER POINT <sup>(1)</sup><br>(cx, cy) | MAJOR AXIS,<br>a | MINOR AXIS,<br>b | ELLIPSE ROTATION<br>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.

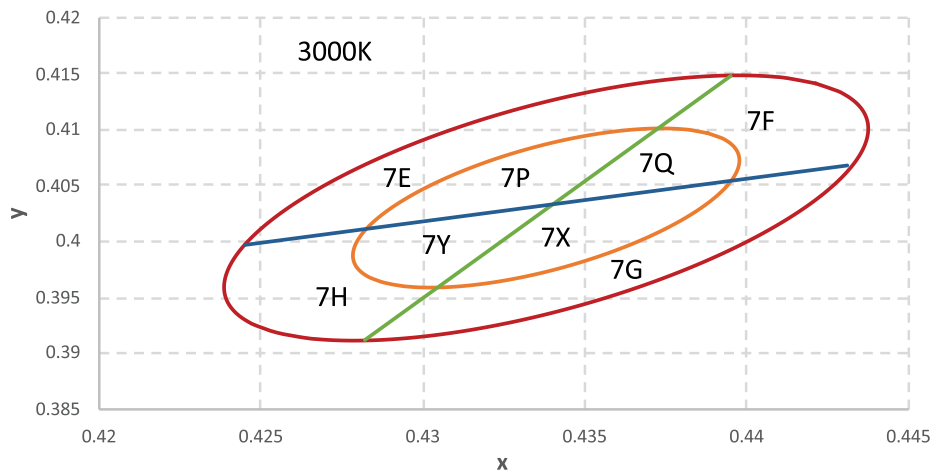


Figure 9b. 1/8<sup>th</sup> color bin structure for LUXEON 3030 HE and LUXEON 3030 HE Plus 3000K, at 65mA, T<sub>j</sub>=25°C.

Table 6b. 3- and 5-step MacAdam ellipse color bin definitions for LUXEON 3030 HE and LUXEON 3030 HE Plus 3000K, at 65mA, T<sub>j</sub>=25°C.

| NOMINAL CCT | COLOR SPACE                   | CENTER POINT <sup>[1]</sup><br>(cx, cy) | MAJOR AXIS,<br>a | MINOR AXIS,<br>b | ELLIPSE ROTATION<br>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.

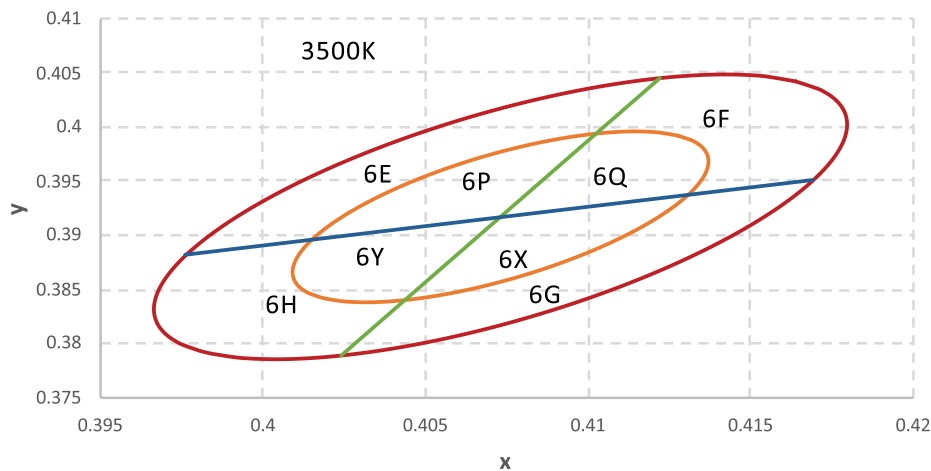


Figure 9c. 1/8<sup>th</sup> color bin structure for LUXEON 3030 HE and LUXEON 3030 HE Plus 3500K, at 65mA, T<sub>j</sub>=25°C.

Table 6c. 3- and 5-step MacAdam ellipse color bin definitions for LUXEON 3030 HE and LUXEON 3030 HE Plus 3500K, at 65mA, T<sub>j</sub>=25°C.

| NOMINAL CCT | COLOR SPACE                   | CENTER POINT <sup>[1]</sup><br>(cx, cy) | MAJOR AXIS,<br>a | MINOR AXIS,<br>b | ELLIPSE ROTATION<br>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.

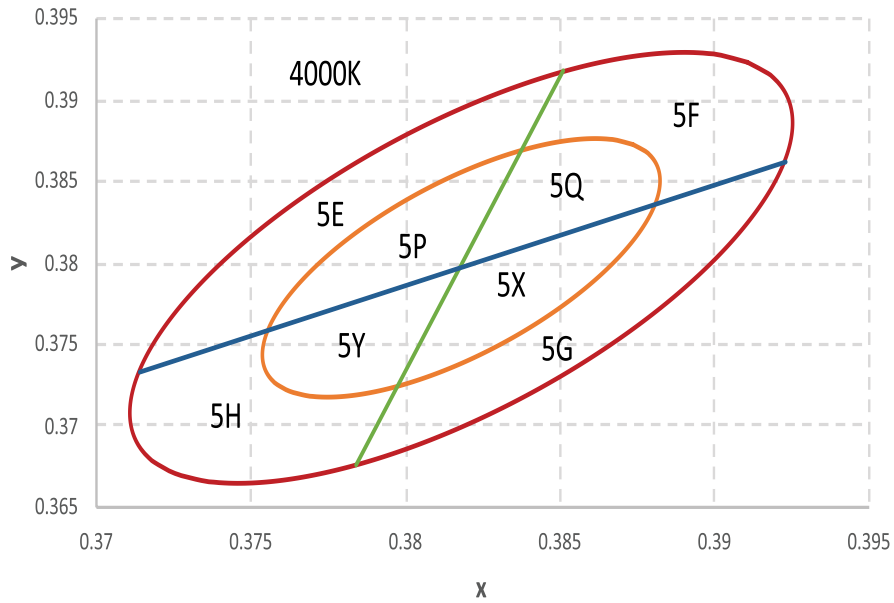


Figure 9d. 1/8<sup>th</sup> color bin structure for LUXEON 3030 HE and LUXEON 3030 HE Plus 4000K, at 65mA, T<sub>j</sub>=25°C.

Table 6d. 3- and 5-step MacAdam ellipse color bin definitions for LUXEON 3030 HE and LUXEON 3030 HE Plus 4000K, at 65mA, T<sub>j</sub>=25°C.

| NOMINAL CCT | COLOR SPACE                   | CENTER POINT <sup>[1]</sup><br>(cx, cy) | MAJOR AXIS,<br>a | MINOR AXIS,<br>b | ELLIPSE ROTATION<br>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 6d:

1. Lumileds maintains a tolerance of  $\pm 0.007$  on x and y color coordinates in the CIE 1931 color space.

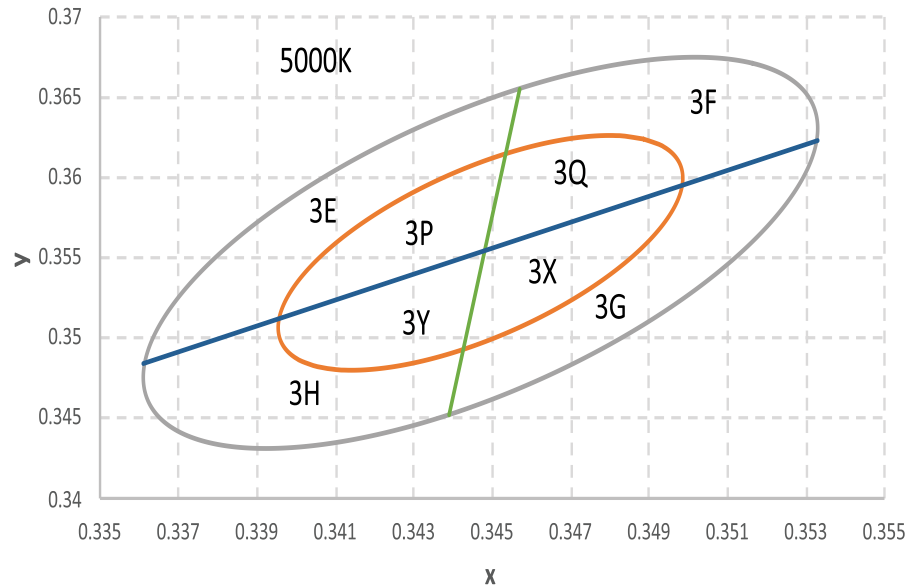


Figure 9e. 1/8<sup>th</sup> color bin structure for LUXEON 3030 HE and LUXEON 3030 HE Plus 5000K, at 65mA, T<sub>j</sub>=25°C.

Table 6e. 3- and 5-step MacAdam ellipse color bin definitions for LUXEON 3030 HE and LUXEON 3030 HE Plus 5000K, at 65mA, T<sub>j</sub>=25°C.

| NOMINAL CCT | COLOR SPACE                   | CENTER POINT <sup>[1]</sup><br>(cx, cy) | MAJOR AXIS,<br>a | MINOR AXIS,<br>b | ELLIPSE ROTATION<br>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 6e:

1. Lumileds maintains a tolerance of  $\pm 0.007$  on x and y color coordinates in the CIE 1931 color space.

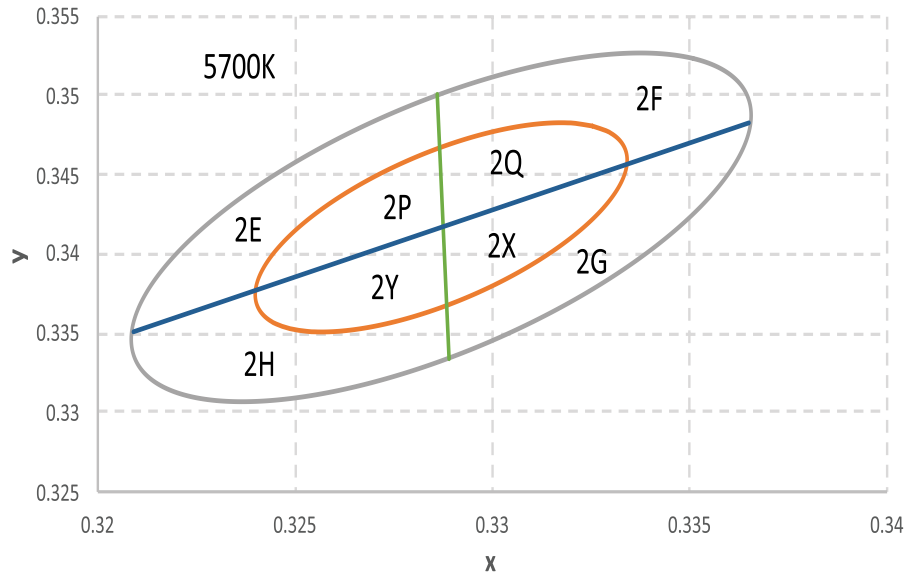


Figure 9f. 1/8<sup>th</sup> color bin structure for LUXEON 3030 HE and LUXEON 3030 HE Plus 5700K, at 65mA,  $T_j=25^{\circ}\text{C}$ .

Table 6f. 3- and 5-step MacAdam ellipse color bin definitions for LUXEON 3030 HE and LUXEON 3030 HE Plus 5700K, at 65mA,  $T_j=25^{\circ}\text{C}$ .

| NOMINAL CCT | COLOR SPACE                   | CENTER POINT <sup>(1)</sup><br>(cx, cy) | MAJOR AXIS,<br>a | MINOR AXIS,<br>b | ELLIPSE ROTATION<br>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 6f:

1. Lumileds maintains a tolerance of  $\pm 0.007$  on x and y color coordinates in the CIE 1931 color space.

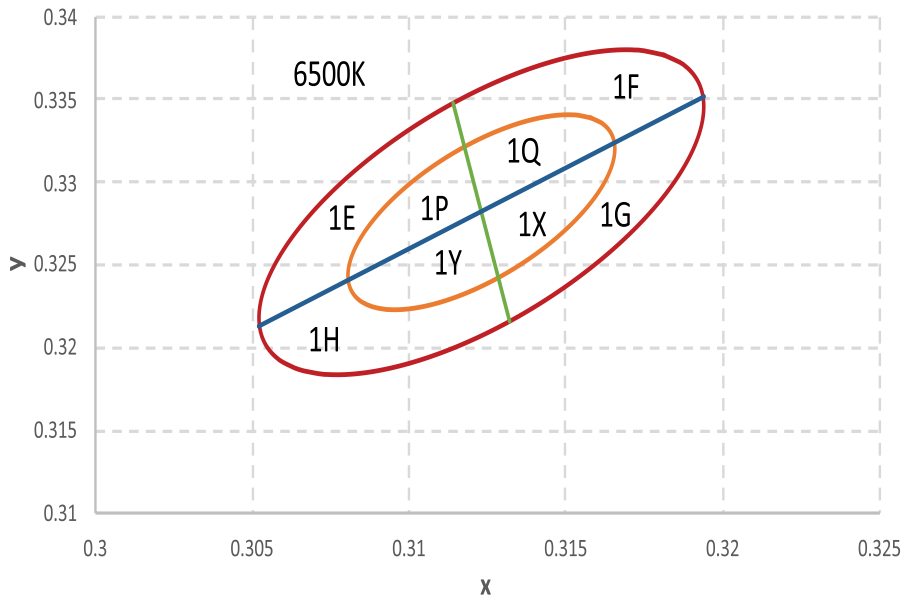


Figure 9g. 1/8<sup>th</sup> color bin structure for LUXEON 3030 HE and LUXEON 3030 HE Plus 6500K, at 65mA,  $T_j=25^{\circ}\text{C}$ .

Table 6g. 3- and 5-step MacAdam ellipse color bin definitions for LUXEON 3030 HE and LUXEON 3030 HE Plus 6500K, at 65mA,  $T_j=25^{\circ}\text{C}$ .

| NOMINAL CCT | COLOR SPACE                   | CENTER POINT <sup>(1)</sup><br>(cx, cy) | MAJOR AXIS,<br>a | MINOR AXIS,<br>b | ELLIPSE ROTATION<br>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 6g:

1. Lumileds maintains a tolerance of  $\pm 0.007$  on x and y color coordinates in the CIE 1931 color space.



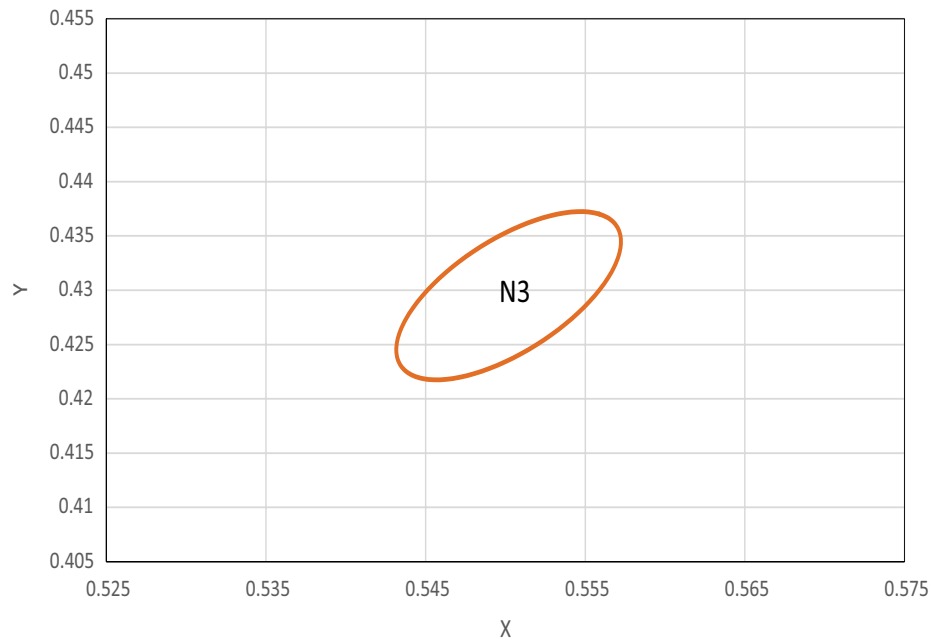


Figure 9h. color bin structure for LUXEON 3030 HE Plus - NightScape, at 65mA,  $T_j=25^{\circ}\text{C}$ .

Table 6h. 3-step MacAdam ellipse color bin definitions for LUXEON 3030 HE Plus - NightScape, at 65mA,  $T_j=25^{\circ}\text{C}$ .

| NOMINAL CCT | COLOR SPACE                   | CENTER POINT <sup>[1]</sup><br>(cx, cy) | MAJOR AXIS,<br>a | MINOR AXIS,<br>b | ELLIPSE ROTATION<br>ANGLE, $\theta$ |
|-------------|-------------------------------|---|------------------|------------------|-------------------------------------|
| 1850        | Single 3-Step MacAdam ellipse | (0.5510, 0.4300)                        | 0.0096           | 0.0046           | 49.27°                              |

Notes for Table 6h:

1. Lumileds maintains a tolerance of  $\pm 0.007$  on x and y color coordinates in the CIE 1931 color space.

## Forward Voltage Bins

Table 7a. Forward voltage bin definitions for L130-xxxxHA30000x1,  $T_j=25^{\circ}\text{C}$ .

| BIN | FORWARD VOLTAGE <sup>[1]</sup> ( $V_f$ ) |         |
|-----|--|---------|
|     | MINIMUM                                  | MAXIMUM |
| K   | 2.66                                     | 2.76    |

Notes for Table 7a:

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

Table 7b. Forward voltage bin definitions for L130-xxxxHB30000B1,  $T_j=25^{\circ}\text{C}$ .

| BIN | FORWARD VOLTAGE <sup>[1]</sup> ( $V_f$ ) |         |
|-----|--|---------|
|     | MINIMUM                                  | MAXIMUM |
| L   | 2.75                                     | 2.85    |

Notes for Table 7b:

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

## Mechanical Dimensions

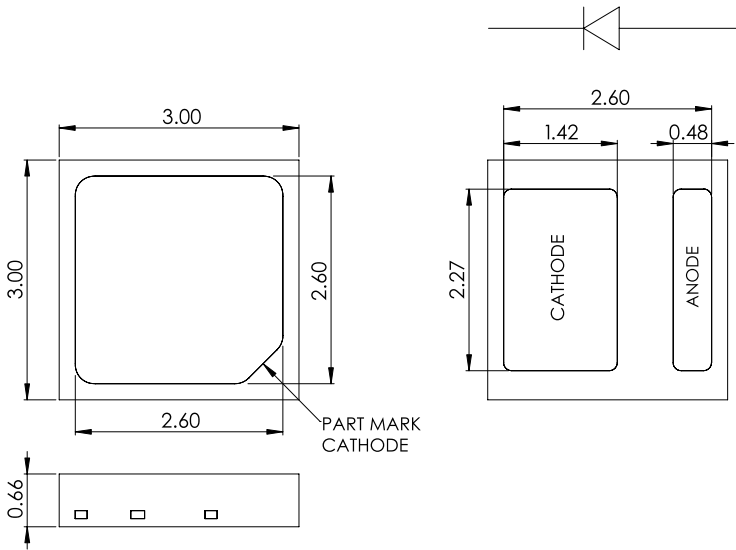


Figure 10. Mechanical dimensions for LUXEON 3030 HE.

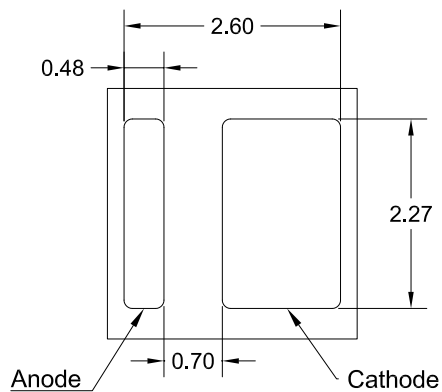
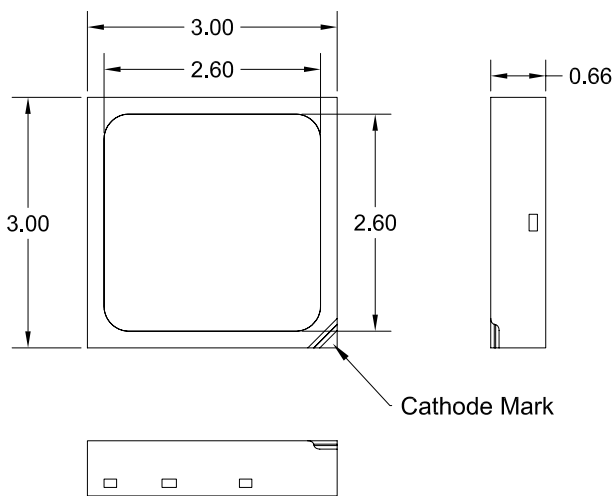


Figure 11. Mechanical dimensions for LUXEON 3030 HE Plus.

Notes for Figures 10 and 11:

1. Drawings are not to scale.
2. All dimensions are in millimeters.
3. Tolerance:  $\pm 0.10\text{mm}$ .

# Reflow Soldering Guidelines

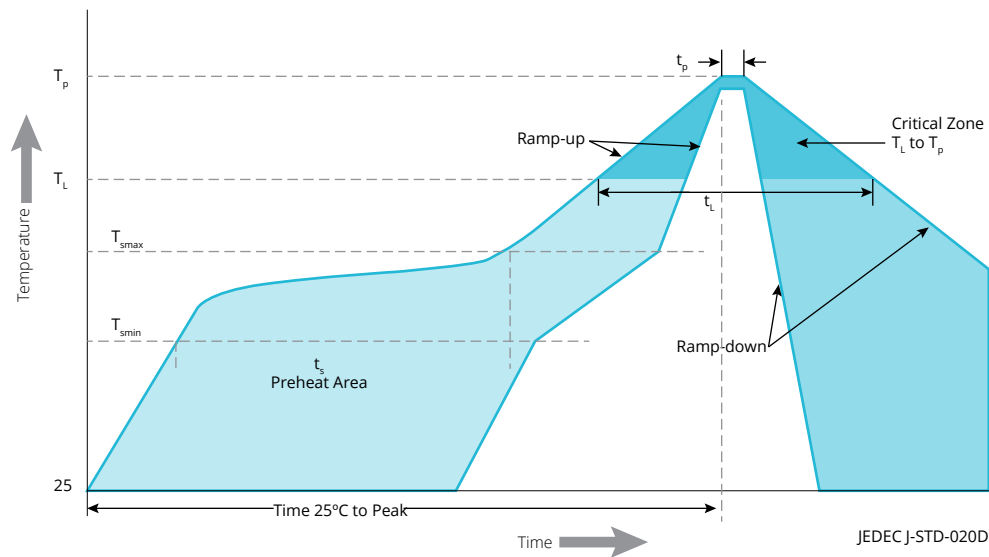


Figure 12. Visualization of the acceptable reflow temperature profile as specified in Table 8.

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

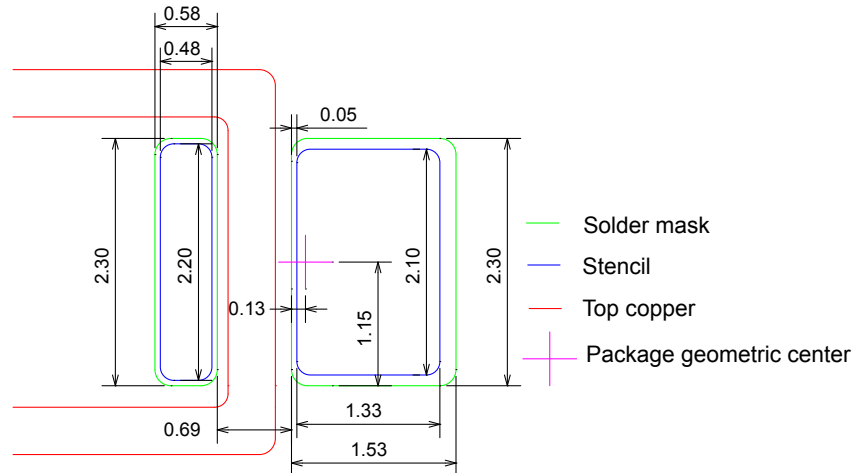


Figure 13. Recommended PCB solder pad layout for LUXEON 3030 HE and LUXEON 3030 HE Plus.

### Notes for Figure 13:

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

## Packaging Information

### Pocket Tape Dimensions

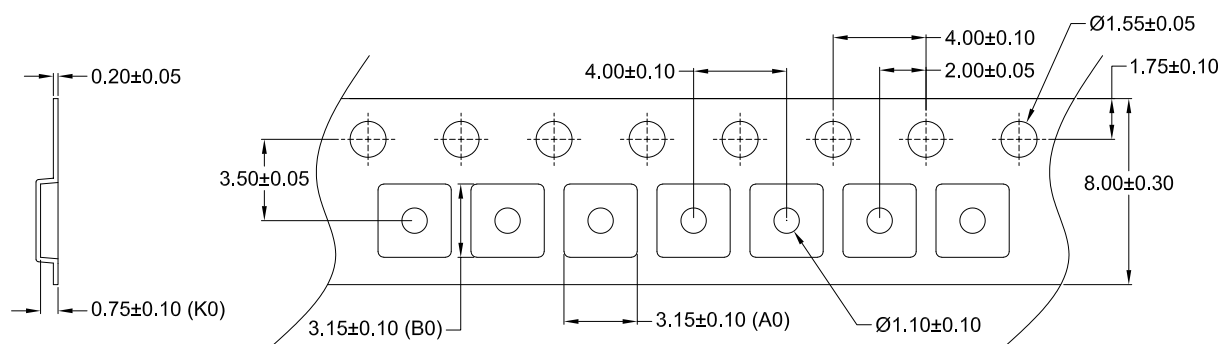


Figure 14. Pocket tape dimensions for LUXEON 3030 HE and LUXEON 3030 HE Plus.

### Notes for Figure 14:

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

# Reel Dimensions

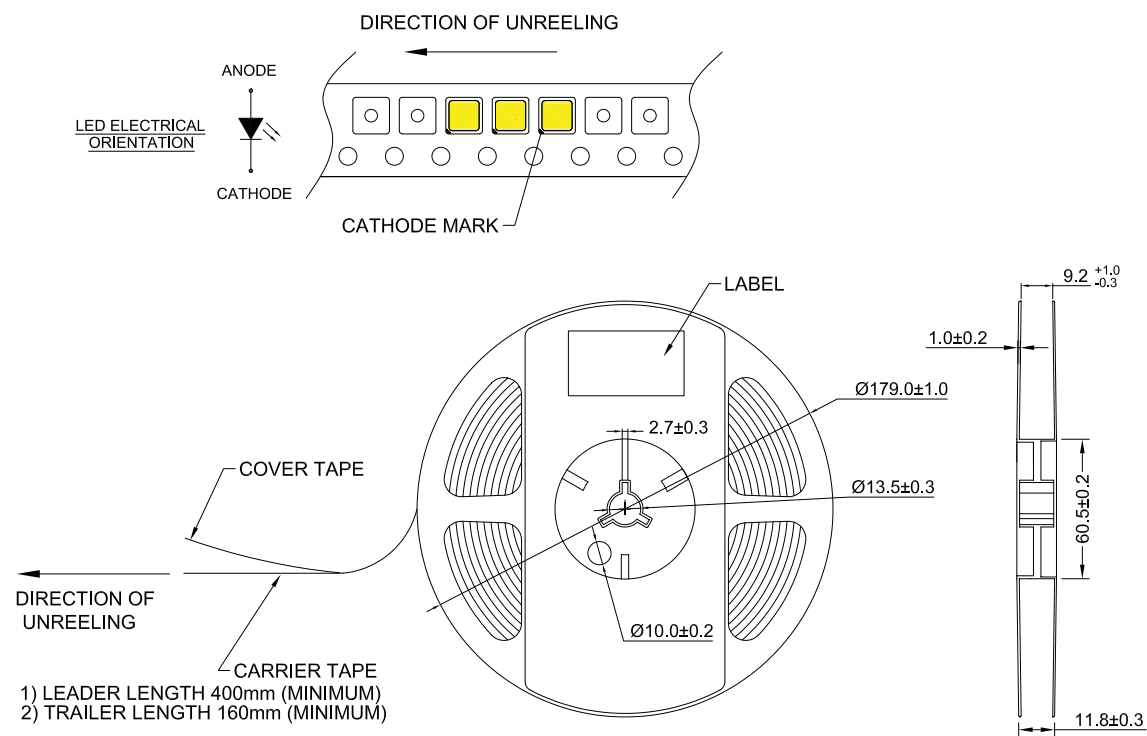


Figure 15. Reel dimensions for LUXEON 3030 HE and LUXEON 3030 HE Plus.

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](https://lumileds.com).



©2023 Lumileds Holding B.V. All rights reserved.  
LUXEON is a registered trademark of the Lumileds Holding B.V. in the United States and other countries.  
[lumileds.com](https://lumileds.com)

Neither Lumileds Holding B.V. nor its affiliates shall be liable for any kind of loss of data or any other damages, direct, indirect or consequential, resulting from the use of the provided information and data. Although Lumileds Holding B.V. and/or its affiliates have attempted to provide the most accurate information and data, the materials and services information and data are provided “as is,” and neither Lumileds Holding B.V. nor its affiliates warrants or guarantees the contents and correctness of the provided information and data. Lumileds Holding B.V. and its affiliates reserve the right to make changes without notice. You as user agree to this disclaimer and user agreement with the download or use of the provided materials, information and data. A listing of Lumileds product/patent coverage may be accessed at [lumileds.com/patents](https://lumileds.com/patents).