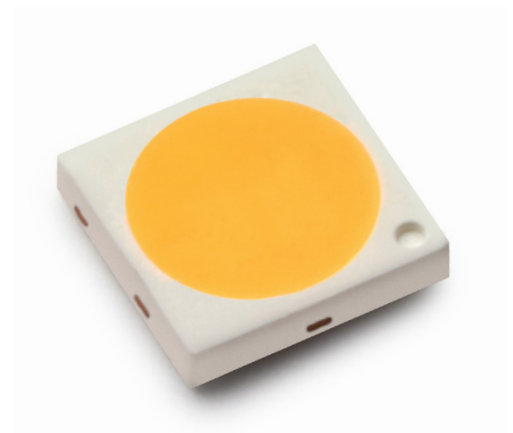




# LUXEON 3030 HV

High flux, hot-color targeted,  
24V and 48V mid power packages

LUXEON 3030 HV is an industry standard package to optimize total voltage output, available in 24V and 48V. This high voltage at low current architecture allows system design freedom and is compatible with more efficient and cost effective drivers. This mid power LED is 1/9<sup>th</sup> micro-color binned for tight color control and hot-color targeted to ensure that the LEDs are within color target at application conditions—85°C. LUXEON 3030 HV delivers efficacy and reliability for a variety of applications such as downlights, lamps and spotlights.



## FEATURES AND BENEFITS

High voltage at low current, compatible with more efficient and cost effective drivers

24V and 48V options available to optimize total voltage output

1/9<sup>th</sup> micro color binning and 85°C hot-color targeting enables tight color control

EMC based package affirms lumen maintenance and long lifetime

## PRIMARY APPLICATIONS

Downlights

Lamps

Spotlights

# 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 .....                     | 3         |
| Electrical and Thermal Characteristics .....      | 4         |
| <b>Absolute Maximum Ratings</b> .....             | <b>4</b>  |
| <b>Characteristic Curves</b> .....                | <b>5</b>  |
| Spectral Power Distribution Characteristics ..... | 5         |
| Light Output Characteristics .....                | 6         |
| Forward Current Characteristics .....             | 8         |
| Radiation Pattern Characteristics .....           | 9         |
| <b>Product Bin and Labeling Definitions</b> ..... | <b>10</b> |
| Decoding Product Bin Labeling .....               | 10        |
| Luminous Flux Bins .....                          | 10        |
| Color Bin Definitions .....                       | 11        |
| Forward Voltage Bins .....                        | 15        |
| <b>Mechanical Dimensions</b> .....                | <b>15</b> |
| <b>Reflow Soldering Guidelines</b> .....          | <b>16</b> |
| JEDEC Moisture Sensitivity .....                  | 16        |
| Solder Pad Design .....                           | 17        |
| <b>Packaging Information</b> .....                | <b>17</b> |
| Pocket Tape Dimensions .....                      | 17        |
| Reel Dimensions .....                             | 18        |

# General Product Information

## Product Test Conditions

LUXEON 3030 HV LEDs are tested with a 20ms monopulse of 34mA for LUXEON 3030 HV 24V and 17mA for LUXEON 3030 HV 48V parts 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 HV follow the convention below:

L 1 3 0 – **A A B B C C** H V 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)
- C C** – designates voltage (0B=24V and 0C=48V)

Therefore, the following part number is used for a LUXEON 3030 HV 3000K 80CRI 24V:

L 1 3 0 – **3 0 8 0 0 B** H V 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 3030 HV is compliant to the European Union directives on the restriction of hazardous substances in electronic equipment, namely the RoHS Directive 2011/65/EU and REACH Regulation (EC) 1907/2006. Lumileds LLC will not intentionally add the following restricted materials to its products: lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE).

# Performance Characteristics

## Product Selection Guide

Table 1. Product performance of LUXEON 3030 HV at specified test current and temperature.

| VOLTAGE | NOMINAL CCT <sup>[1]</sup> | MINIMUM CRI <sup>[2, 3]</sup> | LUMINOUS FLUX <sup>[2, 3]</sup> (lm) |         | TYPICAL LUMINOUS EFFICACY (lm/W) | TEST CURRENT (mA) | PART NUMBER        |
|---------|----------------------------|-------------------------------|--------------------------------------|---------|----------------------------------|-------------------|--------------------|
|         |                            |                               | MINIMUM                              | TYPICAL |                                  |                   |                    |
| 24V     | 2700K                      | 80                            | 97                                   | 107     | 132                              | 34                | L130-27800BHV00001 |
|         | 3000K                      | 80                            | 99                                   | 109     | 135                              | 34                | L130-30800BHV00001 |
|         | 3500K                      | 80                            | 102                                  | 112     | 139                              | 34                | L130-35800BHV00001 |
|         | 4000K                      | 80                            | 107                                  | 117     | 145                              | 34                | L130-40800BHV00001 |
|         | 5000K                      | 80                            | 107                                  | 117     | 145                              | 34                | L130-50800BHV00001 |
|         | 5700K                      | 80                            | 107                                  | 117     | 145                              | 34                | L130-57800BHV00001 |
|         | 6500K                      | 80                            | 107                                  | 117     | 145                              | 34                | L130-65800BHV00001 |
|         | 2700K                      | 90                            | 87                                   | 92      | 114                              | 34                | L130-27900BHV00001 |
| 48V     | 3000K                      | 90                            | 90                                   | 95      | 116                              | 34                | L130-30900BHV00001 |
|         | 2700K                      | 80                            | 97                                   | 107     | 132                              | 17                | L130-27800CHV00001 |
|         | 3000K                      | 80                            | 99                                   | 109     | 135                              | 17                | L130-30800CHV00001 |
|         | 3500K                      | 80                            | 102                                  | 112     | 139                              | 17                | L130-35800CHV00001 |
|         | 4000K                      | 80                            | 107                                  | 117     | 145                              | 17                | L130-40800CHV00001 |
|         | 5000K                      | 80                            | 107                                  | 117     | 145                              | 17                | L130-50800CHV00001 |
|         | 5700K                      | 80                            | 107                                  | 117     | 145                              | 17                | L130-57800CHV00001 |
|         | 6500K                      | 80                            | 107                                  | 117     | 145                              | 17                | L130-65800CHV00001 |
|         | 2700K                      | 90                            | 87                                   | 92      | 114                              | 17                | L130-27900CHV00001 |

**Notes for Table 1:**

1. Correlated color temperature is not targeted at  $T_j=85^\circ\text{C}$ .
2. Luminous flux and CRI specs are based upon mounted package on highly reflective surface at  $T_j=25^\circ\text{C}$ . Typical CRI is approximately 2 points higher than the minimum CRI specified, but this is not guaranteed.
3. Lumileds maintains a tolerance of  $\pm 2$  on CRI and  $\pm 7.5\%$  on luminous flux measurements.

## Optical Characteristics

Table 2. Optical characteristics for LUXEON 3030 HV at test current,  $T_j=25^\circ\text{C}$ .

| PART NUMBER        | TYPICAL TOTAL INCLUDED ANGLE <sup>[1]</sup> | TYPICAL VIEWING ANGLE <sup>[2]</sup> |
|--------------------|---|--------------------------------------|
| L130-XXXXXXHV00001 | 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  $\frac{1}{2}$  of the peak value.

## Electrical and Thermal Characteristics

Table 3. Electrical and thermal characteristics for LUXEON 3030 HV at test current,  $T_j=25^\circ\text{C}$ .

| PART NUMBER        | FORWARD VOLTAGE <sup>[1]</sup> ( $V_f$ ) |         |         | TYPICAL TEMPERATURE COEFFICIENT OF FORWARD VOLTAGE <sup>[2]</sup> (mV/ $^\circ\text{C}$ ) | TYPICAL THERMAL RESISTANCE — JUNCTION TO SOLDER PAD ( $^\circ\text{C}/\text{W}$ ) |
|--------------------|--|---------|---------|---|---|
|                    | MINIMUM                                  | TYPICAL | MAXIMUM |   |   |
| L130-XXXXXBHV00001 | 22.5                                     | 24.0    | 25.0    | -13   | 12  |
| L130-XXXXXCHV00001 | 45.0                                     | 48.0    | 50.0    | -26   | 12  |

**Notes for Table 3:**

1. Lumileds maintains a tolerance of  $\pm 0.1\text{V}$  on forward voltage measurements.
2. Measured between  $25^\circ\text{C}$  and  $85^\circ\text{C}$ .

## Absolute Maximum Ratings

Table 4. Absolute maximum ratings for LUXEON 3030 HV.

| PARAMETER  | MAXIMUM PERFORMANCE  |
|--|--|
| DC Forward Current <sup>[1,2]</sup>                  | 60mA for L130-xxxx0BHV00001<br>30mA for L130-xxxx0CHV00001 |
| Peak Pulsed Forward Current <sup>[1,3]</sup>         | 80mA for L130-xxxx0BHV00001<br>40mA for L130-xxxx0CHV00001 |
| LED Junction Temperature <sup>[1]</sup> (DC & Pulse) | 125 $^\circ\text{C}$                                       |
| ESD Sensitivity (ANSI/ESDA/JEDEC JS-001-2012)        | Class 2  |
| Operating Case Temperature <sup>[1]</sup>            | -40 $^\circ\text{C}$ to 105 $^\circ\text{C}$               |
| LED Storage Temperature                              | -40 $^\circ\text{C}$ to 105 $^\circ\text{C}$               |
| Soldering Temperature                                | JEDEC 020D 260 $^\circ\text{C}$                            |
| Allowable Reflow Cycles                              | 3  |
| Reverse Voltage ( $V_{\text{reverse}}$ )             | 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 25% of the maximum allowable DC forward current
3. Pulsed operation with the maximum peak pulsed forward current is acceptable if the pulse duty cycle is  $\leq 10\%$ .

# Characteristic Curves

## Spectral Power Distribution Characteristics

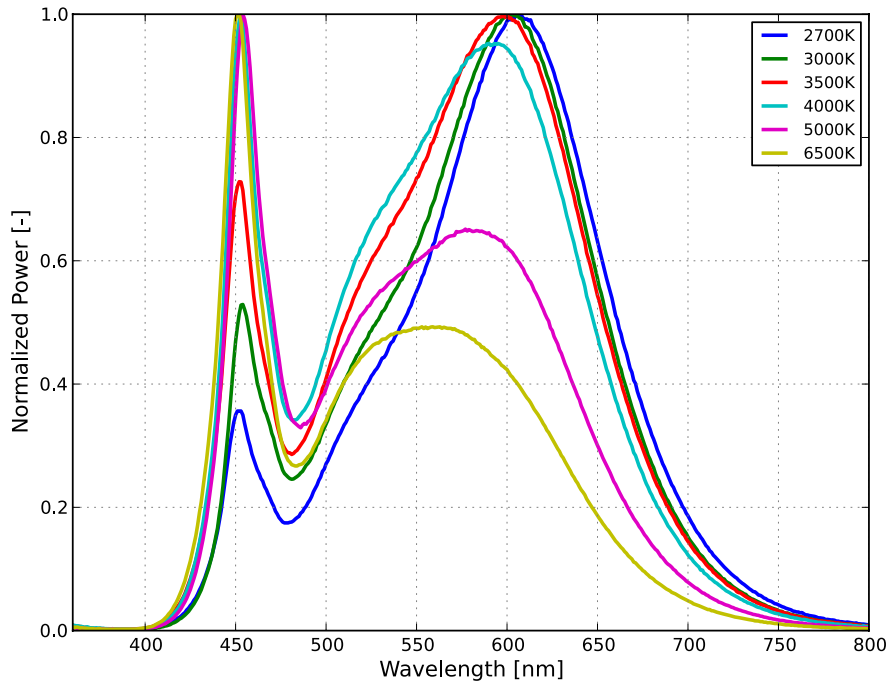


Figure 1a. Typical normalized power vs. wavelength for L130-XX80XXHV00001 at test current,  $T_j=25^{\circ}\text{C}$ .

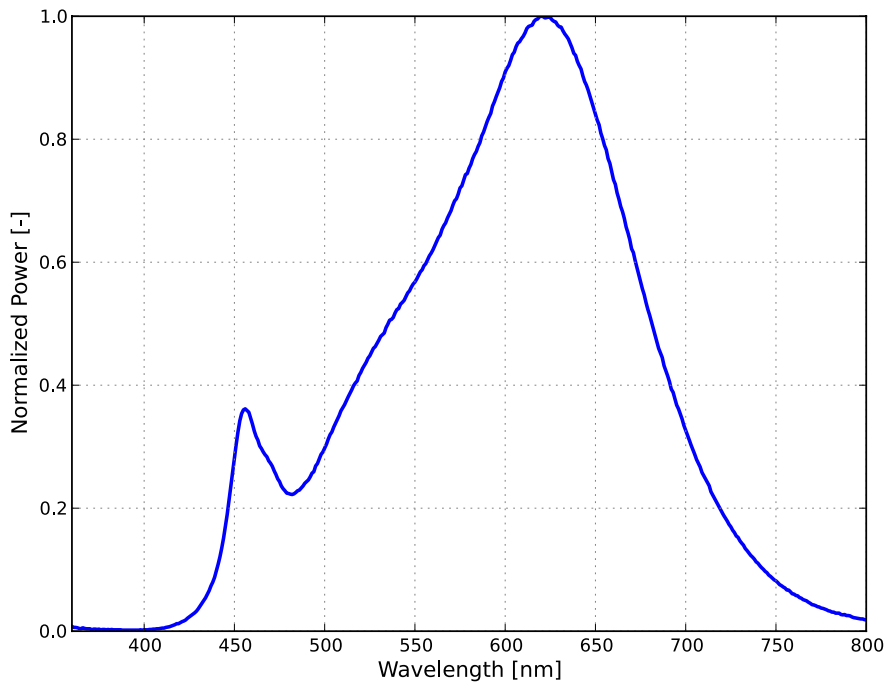


Figure 1b. Typical normalized power vs. wavelength for L130-XX90XXHV00001 at test current,  $T_j=25^{\circ}\text{C}$ .

# Light Output Characteristics

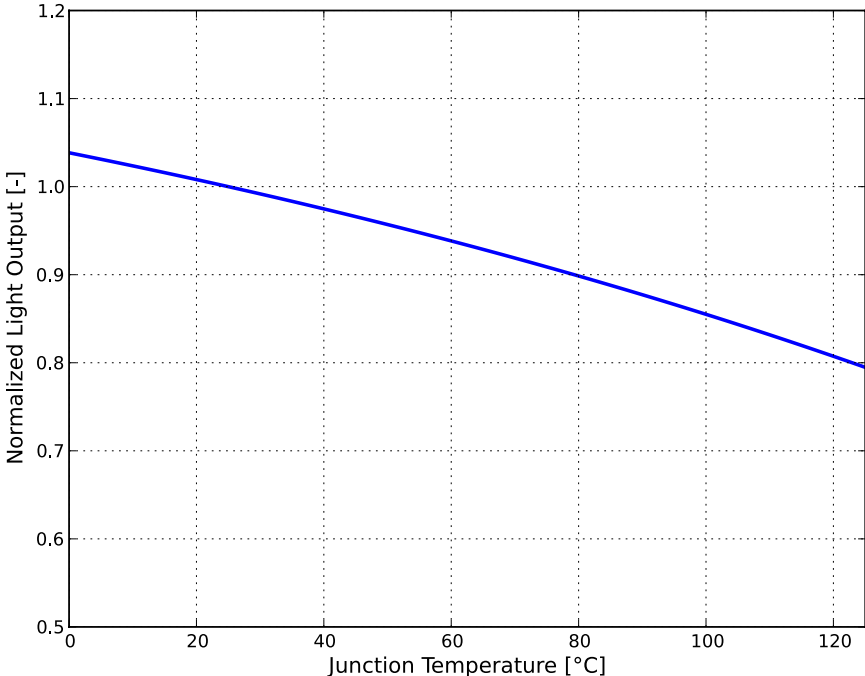


Figure 2. Typical normalized light output vs. junction temperature for L130-XXXXXXHV00001 at test current.

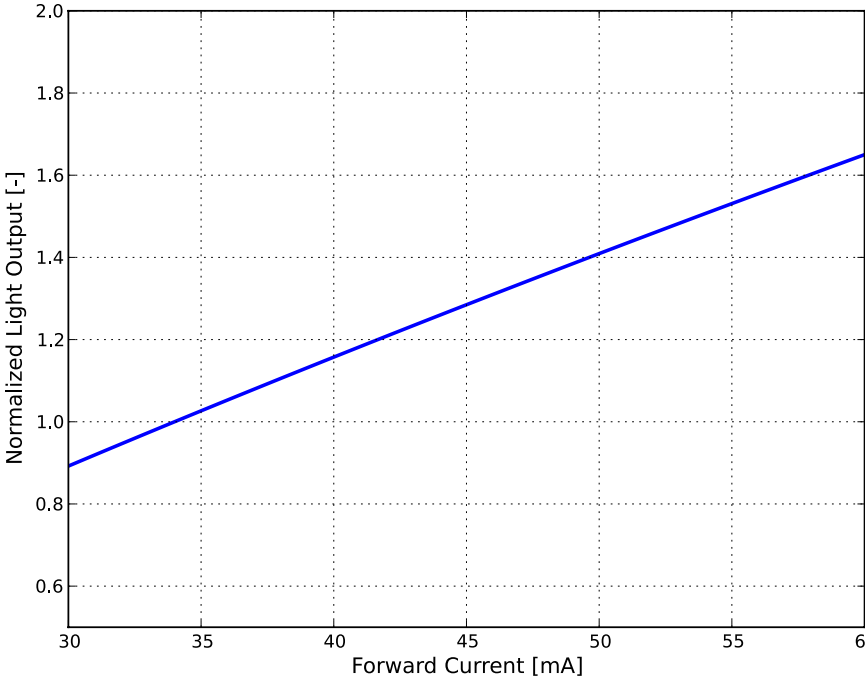


Figure 3a. Typical normalized light output vs. forward current for L130-XXXX0BHV00001 at  $T_j=25^{\circ}\text{C}$ .

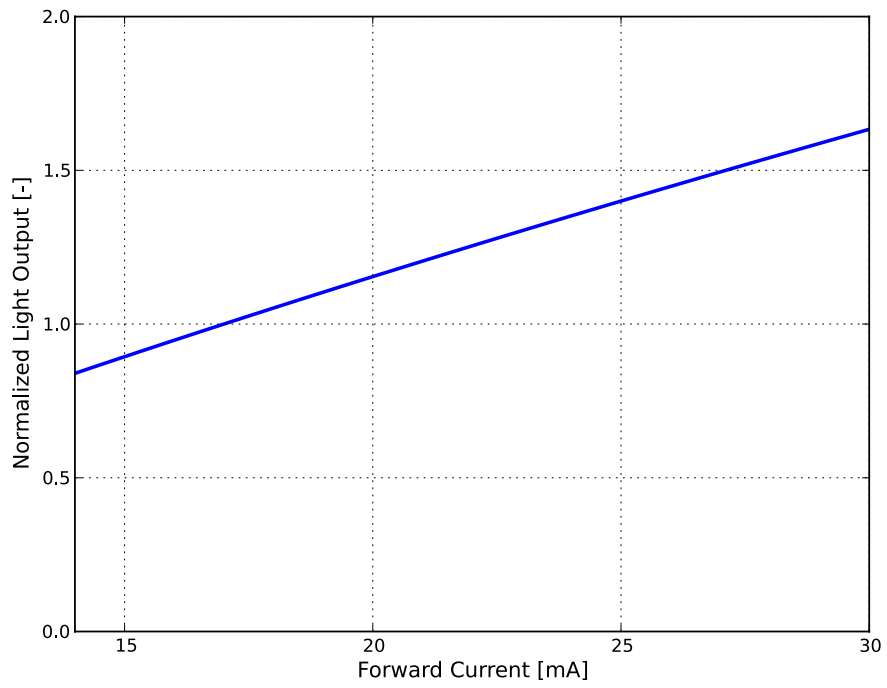


Figure 3b. Typical normalized light output vs. forward current for L130-XXXX0CHV00001 at  $T_j=25^\circ\text{C}$ .



# Forward Current Characteristics

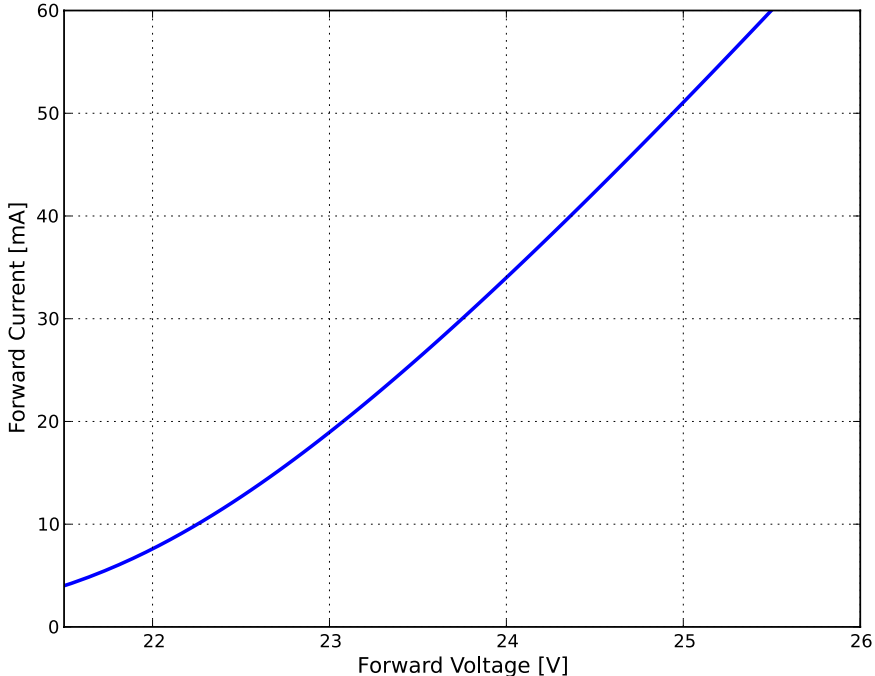


Figure 4a. Typical forward current vs. forward voltage for L130-XXXX0BHV00001 at  $T_j=25^\circ\text{C}$ .

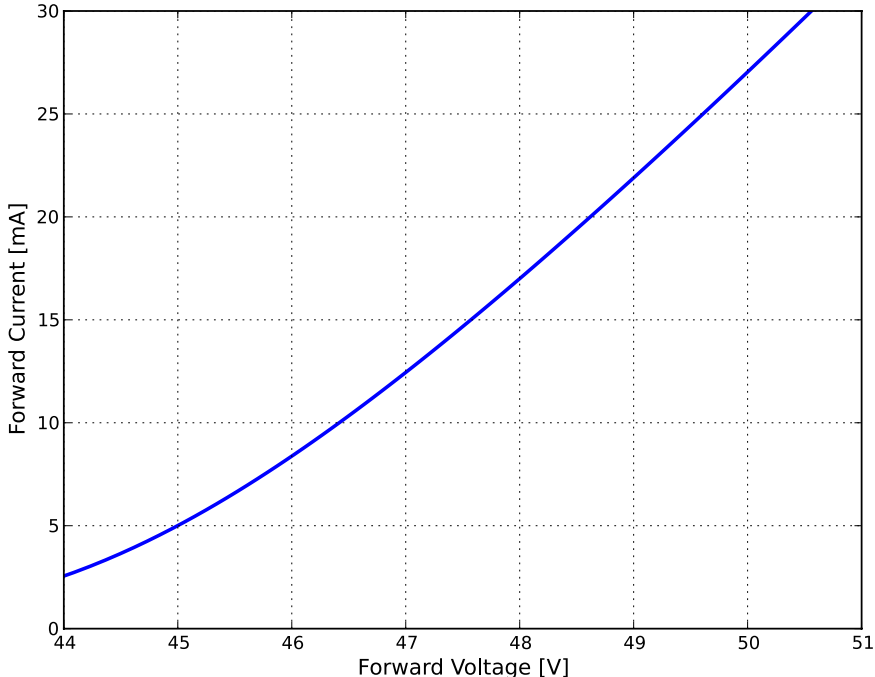


Figure 4b. Typical forward current vs. forward voltage for L130-XXXX0CHV000001 at  $T_j=25^\circ\text{C}$ .

# Radiation Pattern Characteristics

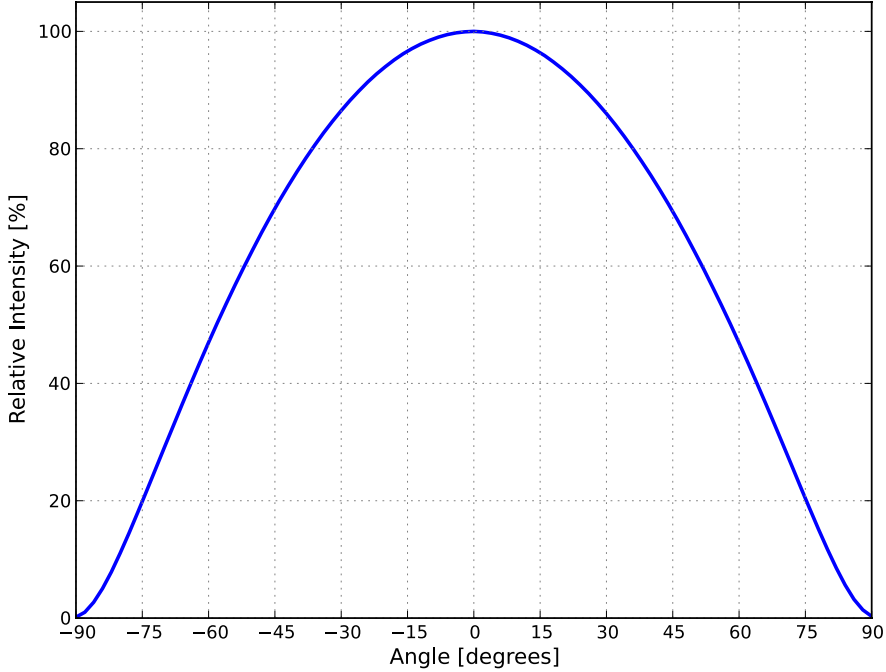


Figure 5. Typical radiation pattern for L130-XXXXXXHV00001 at test current,  $T_j=25^{\circ}\text{C}$ .

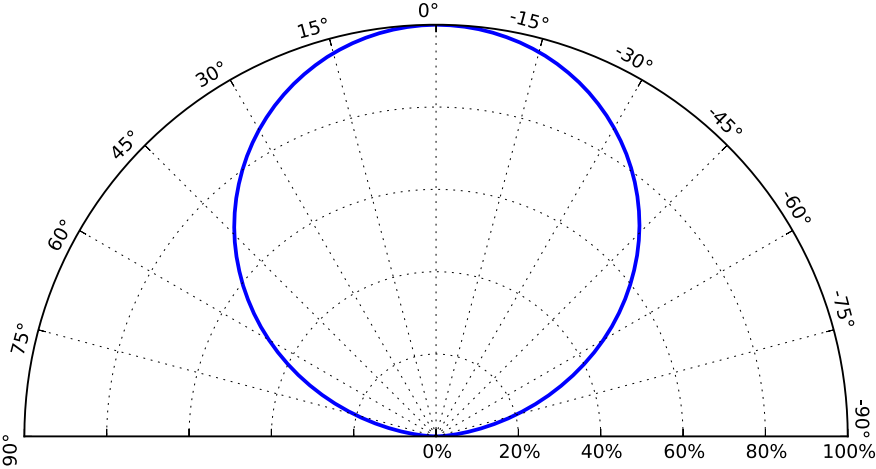


Figure 6. Typical polar radiation pattern for L130-XXXXXXHV00001 at test current,  $T_j=25^{\circ}\text{C}$ .

# 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 HV 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 color bin (example: 7D, 7E, 7F, 7G, 7H, 7J, 7K, 7G or 7M)
- D** – designates forward voltage bin (example: G=23 to 24V, Q=48 to 49V)

Therefore, a LUXEON 3030 HV with a lumen range of 100 to 105, color bin of 7H and forward voltage range of 23 to 24V has the following CAT code:

### K 7 H G

## Luminous Flux Bins

Table 5 lists the standard luminous flux bins for LUXEON 3030 HV 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 HV at test current,  $T_j=25^\circ\text{C}$ .

| BIN | LUMINOUS FLUX <sup>(1)</sup> (lm) |         |
|-----|-----------------------------------|---------|
|     | MINIMUM                           | MAXIMUM |
| 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     |

Notes for Table 5:

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

# Color Bin Definitions

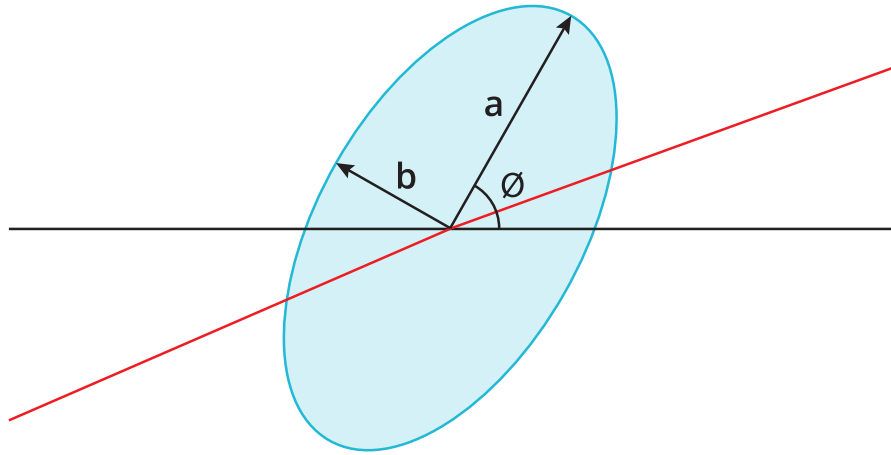


Figure 7. 3- and 5-step MacAdam ellipse illustration for tables 6a-6g.

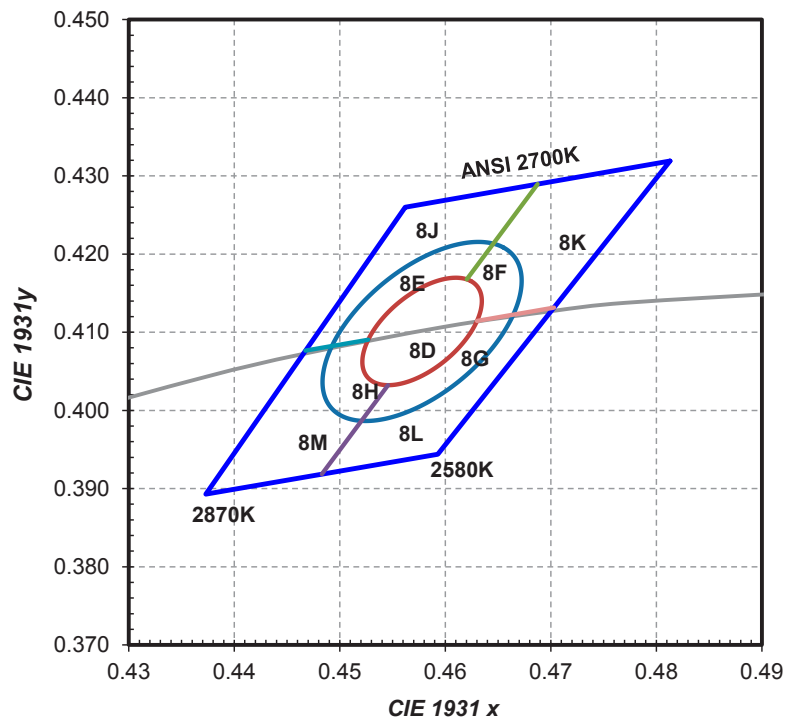


Figure 8a. 1/9<sup>th</sup> color bin structure for LUXEON 3030 HV 2700K, hot-color targeted at 85°C.

Table 6a. 3- and 5-step MacAdam ellipse color bin definitions for L130-27xxxxHV00001 at test current, hot-color targeted at 85°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       | 3-step MacAdam ellipse | (0.4578, 0.4101)                        | 0.00810          | 0.00420          | 53.70°                       |
| 2700K       | 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 coordinates in the CIE 1931 color space.

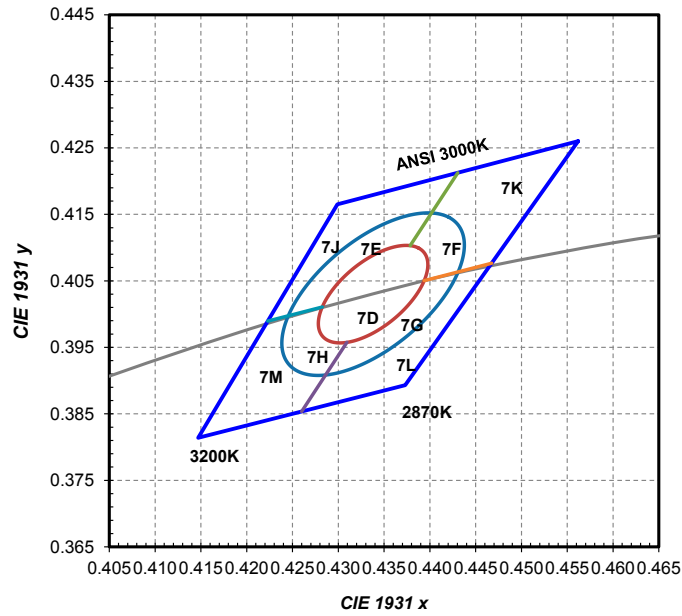


Figure 8b. 1/9<sup>th</sup> color bin structure for LUXEON 3030 HV 3000K, hot-color targeted at 85°C.

Table 6b. 3- and 5-step MacAdam ellipse color bin definitions for L130-30xxxxHV00001 at test current, hot-color targeted at 85°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, $\theta$ |
|-------------|------------------------|---|------------------|------------------|-------------------------------------|
| 3000K       | 3-step MacAdam ellipse | (0.4338, 0.4030)                        | 0.00834          | 0.00408          | 53.22°                              |
| 3000K       | 5-step MacAdam ellipse | (0.4338, 0.4030)                        | 0.01390          | 0.00680          | 53.22°                              |

Notes for Table 6b:

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

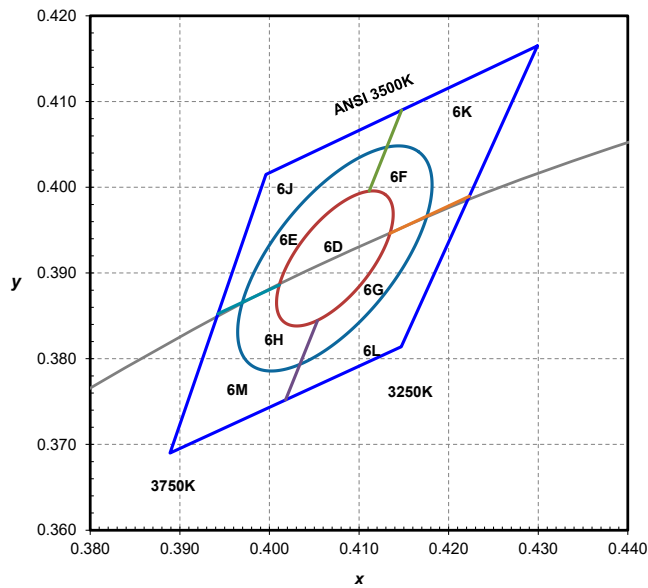


Figure 8c. 1/9<sup>th</sup> color bin structure for LUXEON 3030 HV 3500K, hot-color targeted at 85°C.

Table 6c. 3- and 5-step MacAdam ellipse color bin definitions for L130-35xx003000W21 at test current, hot-color targeted at 85°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, $\theta$ |
|-------------|-------------------------------|---|------------------|------------------|-------------------------------------|
| 3500K       | Single 3-step MacAdam ellipse | (0.4073, 0.3917)                        | 0.00927          | 0.00414          | 54.00°                              |
| 3500K       | Single 5-step MacAdam ellipse | (0.4578, 0.3917)                        | 0.01545          | 0.00690          | 54.00°                              |

Notes for Table 6c:

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

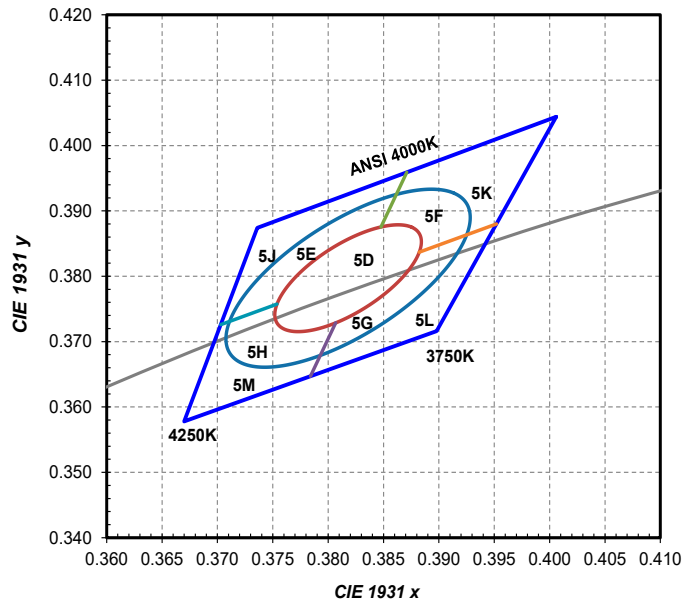


Figure 8d. 1/9<sup>th</sup> color bin structure for LUXEON 3030 HV 4000K, hot-color targeted at 85°C.

Table 6d. 3- and 5-step MacAdam ellipse color bin definitions for L130-40xxxxHV00001 at test current, hot-color targeted at 85°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       | 3-step MacAdam ellipse | (0.3866, 0.3882)                        | 0.00939          | 0.00402          | 53.72°                              |
| 4000K       | 5-step MacAdam ellipse | (0.3866, 0.3882)                        | 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.

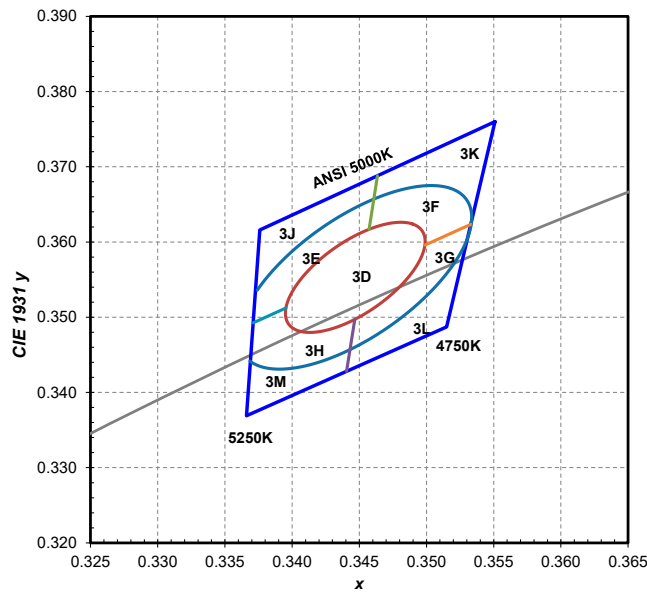


Figure 8e. 1/9<sup>th</sup> color bin structure for LUXEON 3030 HV 5000K, hot-color targeted at 85°C.

Table 6e. 3- and 5-step MacAdam ellipse color bin definitions for L130-50xxxxHV00001 at test current, hot-color targeted at 85°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       | 3-step MacAdam ellipse | (0.3447, 0.3558)                        | 0.00822          | 0.00354          | 59.62°                              |
| 5000K       | 5-step MacAdam ellipse | (0.3447, 0.3558)                        | 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.

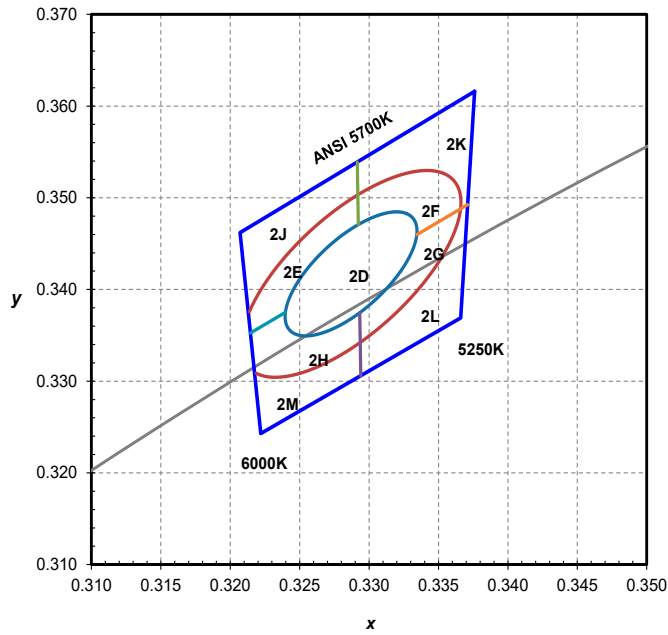


Figure 8f. 1/9<sup>th</sup> color bin structure for LUXEON 3030 HV 5700K, hot-color targeted at 85°C.

Table 6f. 3- and 5-step MacAdam ellipse color bin definitions for L130-57xxxHV00001 at test current, hot-color targeted at 85°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       | 3-step MacAdam ellipse | (0.3287, 0.3417)                        | 0.00746          | 0.00320          | 59.09°                              |
| 5700K       | 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.

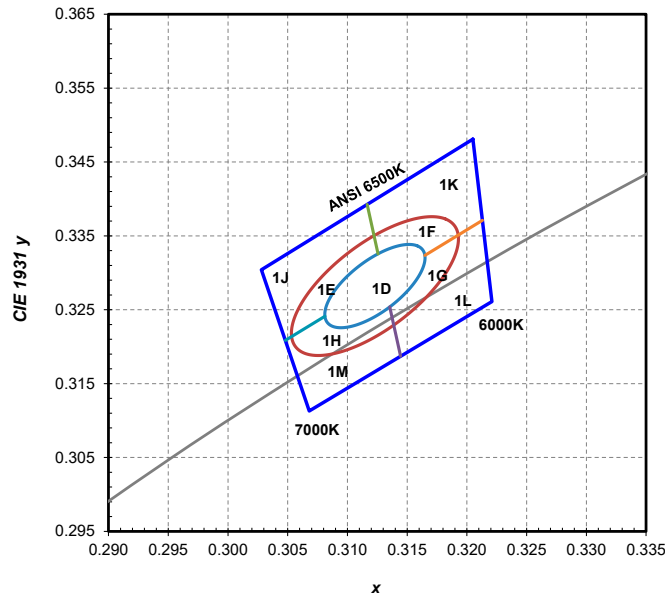


Figure 8g. 1/9<sup>th</sup> color bin structure for LUXEON 3030 HV 6500K, hot-color targeted at 85°C.

Table 6g. 3- and 5-step MacAdam ellipse color bin definitions for L130-65xxxHV00001 at test current, hot-color targeted at 85°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       | 3-step MacAdam ellipse | (0.3123, 0.3282)                        | 0.00669          | 0.00285          | 58.57°                              |
| 6500K       | 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.

# Forward Voltage Bins

Table 7. Forward voltage bin definitions for LUXEON 3030 HV at test current,  $T_j=25^\circ\text{C}$ .

| VOLTAGE | BIN | FORWARD VOLTAGE <sup>[1]</sup> (V <sub>f</sub> ) |         |
|---------|-----|--|---------|
|         |     | MINIMUM  | MAXIMUM |
| 24      | F   | 22   | 23      |
|         | G   | 23   | 24      |
|         | H   | 24   | 25      |
| 48      | L   | 45   | 46      |
|         | M   | 46   | 47      |
|         | P   | 47   | 48      |
|         | Q   | 48   | 49      |
|         | R   | 49   | 50      |

**Notes for Table 7:**

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

# Mechanical Dimensions

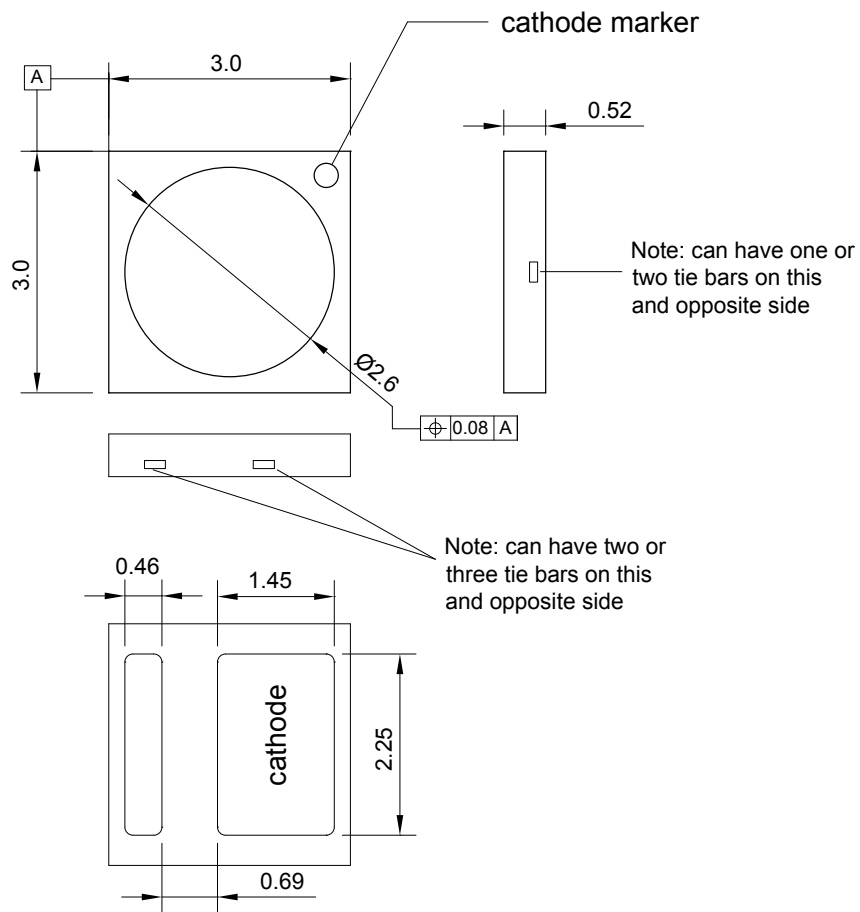


Figure 9. Mechanical dimensions for LUXEON 3030 HV.

**Notes for Figure 9:**

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



# Reflow Soldering Guidelines

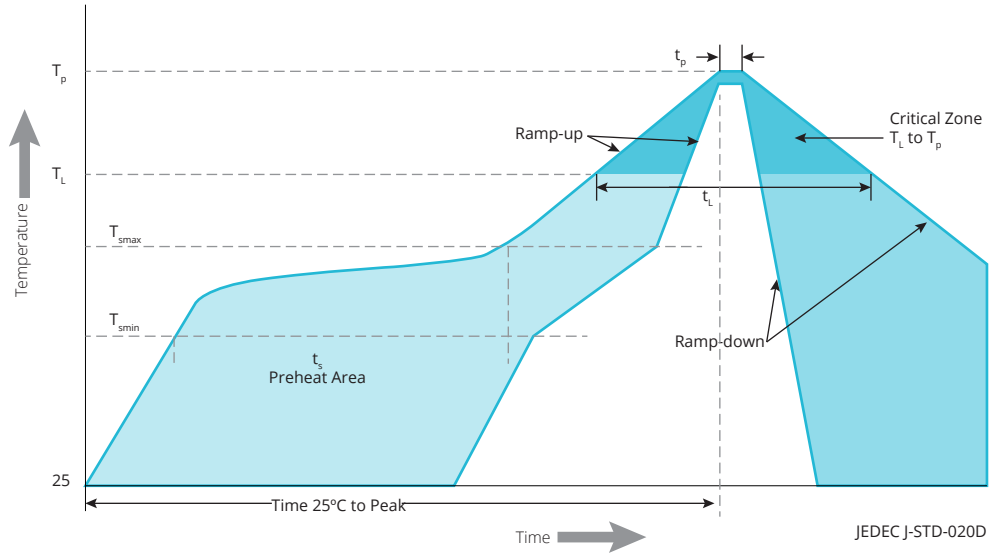


Figure 10. Visualization of the acceptable reflow temperature profile as specified in Table 8.

Table 8. Reflow profile characteristics for LUXEON 3030 HV.

| 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 ( $T_{smax}$ to $T_p$ )              | 3°C / second maximum |
| Liquidus Temperature ( $T_L$ )                    | 217°C                |
| Time Maintained Above Temperature $T_L$ ( $t_t$ ) | 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                                    | 6°C / second maximum |
| Time 25°C to Peak Temperature                     | 8 minutes maximum    |

## JEDEC Moisture Sensitivity

Table 9. Moisture sensitivity levels for LUXEON 3030 HV.

| 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

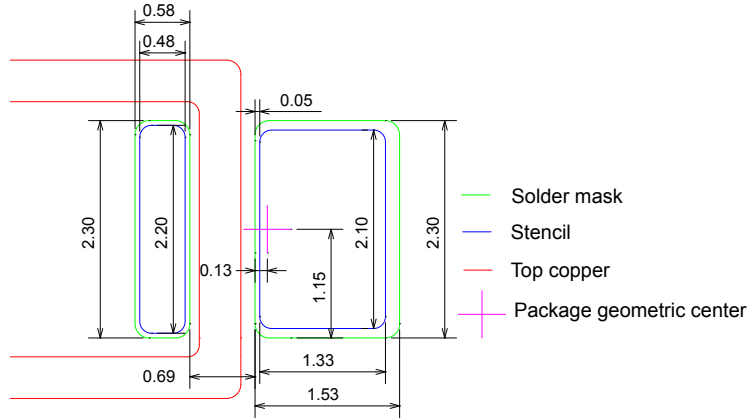


Figure 11. Recommended PCB solder pad layout for LUXEON 3030 HV.

# Packaging Information

## Pocket Tape Dimensions

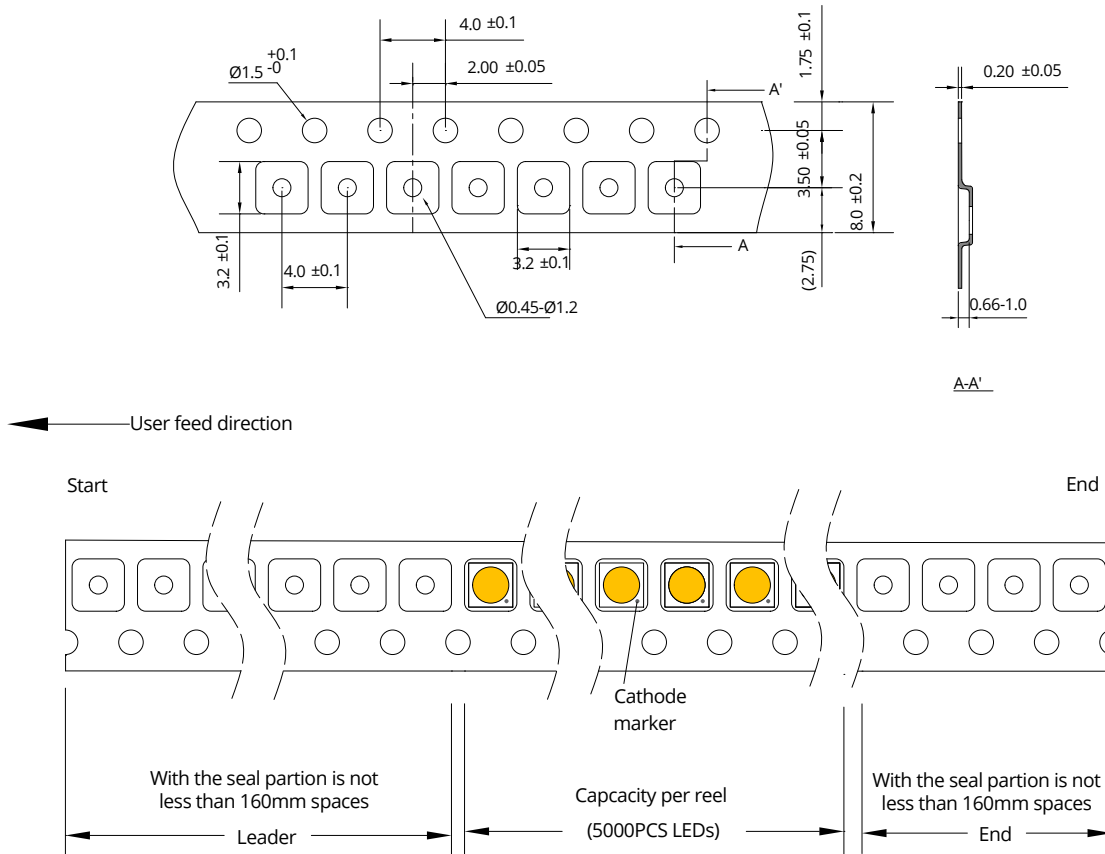


Figure 12. Pocket tape dimensions for LUXEON 3030 HV.

Notes for Figures 11 and 12:  
 1. Drawings are not to scale.  
 2. All dimensions are in millimeters.

# Reel Dimensions

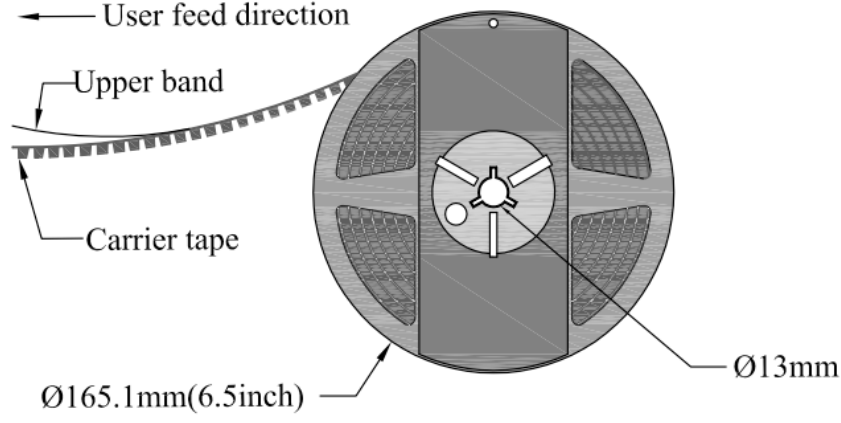


Figure 13. Reel dimensions for LUXEON 3030 HV.

- 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.

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