

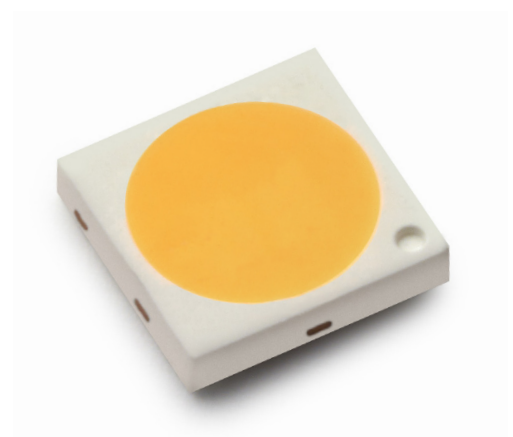


# LUXEON 3030 2D

## High flux, hot-color targeted 6V package

LUXEON 3030 2D is the first hot-color targeted mid power LED.

Hot-color targeting ensures that the LEDs are within color target at application conditions — 85°C. Using an industry standard packaging of 3.0mm x 3.0mm x 0.5mm and 6V surface-mount emitter solution, LUXEON 3030 2D comes in all ANSI CCTs and delivers the efficacy and reliability required for indoor illumination markets.



### FEATURES AND BENEFITS

Industry standard package enables drop-in replacement for existing 3030 packages

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

Superior luminous flux at max current for reduced LED count

Hot-color targeting ensures that color is within ANSI bin at typical application conditions, 85°C

Enables 3-, 4-, 5-step MacAdam ellipse kits

### PRIMARY APPLICATIONS

Downlights

High Bay & Low Bay

Lamps

Outdoor

Spotlights

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# General Product Information

## Product Test Conditions

LUXEON 3030 2D LEDs are tested and binned with a DC drive current of 120mA at a junction temperature,  $T_j$ , of 25°C.

## Part Number Nomenclature

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

L 1 3 0 – **A A B B** 0 0 3 0 0 0 W 2 1

Where:

**A A** – designates nominal CCT (27=2700K)

**B B** – designates minimum CRI (70=70CRI, 80=80CRI and 90=90CRI)

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

L 1 3 0 – **3 0 8 0** 0 0 3 0 0 0 W 2 1

## Lumen Maintenance

Please contact your local Sales Representative or Lumileds Technical Solutions Manager for more information about the long-term performance of this product.

## Environmental Compliance

Lumileds LLC is committed to providing environmentally friendly products to the solid-state lighting market. LUXEON 3030 2D 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 2D at 120mA and 100mA,  $T_j=25^{\circ}\text{C}$ .

| NOMINAL CCT <sup>[1]</sup> | MINIMUM CRI <sup>[2]</sup> | LUMINOUS FLUX <sup>[3]</sup> (lm) |         | TYPICAL LUMINOUS EFFICACY (lm/W) | TYPICAL LUMINOUS FLUX (lm) | TYPICAL LUMINOUS EFFICACY (lm/W) | PART NUMBER        |
|----------------------------|----------------------------|-----------------------------------|---------|----------------------------------|----------------------------|----------------------------------|--------------------|
|                            |                            | MINIMUM                           | TYPICAL |                                  |                            |                                  |                    |
|                            |                            | 120mA                             |         |                                  |                            |                                  |                    |
| 3000K                      | 70                         | 98                                | 108     | 148                              | 92                         | 153                              | L130-3070003000W21 |
| 3500K                      | 70                         | 100                               | 111     | 152                              | 95                         | 158                              | L130-3570003000W21 |
| 4000K                      | 70                         | 101                               | 116     | 158                              | 99                         | 165                              | L130-4070003000W21 |
| 5000K                      | 70                         | 101                               | 116     | 158                              | 99                         | 165                              | L130-5070003000W21 |
| 5700K                      | 70                         | 101                               | 115     | 157                              | 98                         | 164                              | L130-5770003000W21 |
| 6500K                      | 70                         | 101                               | 115     | 157                              | 98                         | 164                              | L130-6570003000W21 |
| 2700K                      | 80                         | 80                                | 100     | 137                              | 84                         | 140                              | L130-2780003000W21 |
| 3000K                      | 80                         | 85                                | 102     | 139                              | 85                         | 142                              | L130-3080003000W21 |
| 3500K                      | 80                         | 85                                | 105     | 143                              | 89                         | 148                              | L130-3580003000W21 |
| 4000K                      | 80                         | 90                                | 109     | 149                              | 93                         | 155                              | L130-4080003000W21 |
| 5000K                      | 80                         | 90                                | 109     | 149                              | 93                         | 155                              | L130-5080003000W21 |
| 5700K                      | 80                         | 90                                | 109     | 149                              | 93                         | 155                              | L130-5780003000W21 |
| 6500K                      | 80                         | 90                                | 109     | 149                              | 93                         | 155                              | L130-6580003000W21 |
| 2700K                      | 90                         | 72                                | 84      | 115                              | 72                         | 119                              | L130-2790003000W21 |
| 3000K                      | 90                         | 75                                | 86      | 117                              | 73                         | 122                              | L130-3090003000W21 |
| 3500K                      | 90                         | 75                                | 88      | 120                              | 75                         | 125                              | L130-3590003000W21 |
| 4000K                      | 90                         | 75                                | 92      | 126                              | 78                         | 131                              | L130-4090003000W21 |

**Notes for Table 1:**

1. Correlated color temperature is based upon mounted die on highly reflective surface at  $T_j=25^{\circ}\text{C}$ .
2. Typical CRI is approximately 2 points higher than the minimum CRI, 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 2D at 120mA,  $T_j=25^{\circ}\text{C}$ .

| PART NUMBER        | TYPICAL TOTAL INCLUDED ANGLE <sup>[1]</sup> | TYPICAL VIEWING ANGLE <sup>[2]</sup> |
|--------------------|---------------------------------------------|--------------------------------------|
| L130-xxxx003000W21 | 140°                                        | 116°                                 |

**Notes for Table 2:**

1. Total angle at which 90% of total luminous flux is captured.
2. Viewing angle is the off axis angle from lamp centerline where the luminous intensity is  $\frac{1}{2}$  of the peak value.

## Electrical and Thermal Characteristics

Table 3. Electrical and thermal characteristics for LUXEON 3030 2D at 120mA,  $T_j=25^\circ\text{C}$ .

| PART NUMBER        | FORWARD VOLTAGE (V) <sup>[1]</sup> |         |         | TYPICAL TEMPERATURE<br>COEFFICIENT OF FORWARD<br>VOLTAGE (mV/°C) <sup>[2]</sup> | TYPICAL THERMAL<br>RESISTANCE JUNCTION TO<br>SOLDER PAD (°C/W) |
|--------------------|------------------------------------|---------|---------|---------------------------------------------------------------------------------|----------------------------------------------------------------|
|                    | MINIMUM                            | TYPICAL | MAXIMUM |                                                                                 |                                                                |
| L130-xxxx003000W21 | 5.8                                | 6.1     | 6.6     | -2.0 to -4.0                                                                    | 12.0                                                           |

**Notes for Table 3:**

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

## Absolute Maximum Ratings

Table 4. Absolute maximum ratings for LUXEON 3030 2D.

| PARAMETER                                               | MAXIMUM PERFORMANCE |
|---------------------------------------------------------|---------------------|
| DC Forward Current <sup>[1]</sup>                       | 240mA               |
| Peak Pulsed Forward Current <sup>[2]</sup>              | 300mA               |
| ESD Sensitivity (ANSI/ESDA/JEDEC JS-001-2012)           | Class 2             |
| LED Junction Temperature (DC & Pulse)                   | 125°C               |
| Operating Case Temperature                              | 105°C               |
| Storage Temperature                                     | -40°C to 105°C      |
| Soldering Temperature                                   | JEDEC 020D 260°C    |
| Allowable Reflow Cycles                                 | 3                   |
| Reverse Voltage ( $V_{\text{reverse}}$ ) <sup>[3]</sup> | -10V                |

**Notes for Table 4:**

1. Residual periodic variations due to power conversion from alternating current (AC) to direct current (DC), also called "ripple", are acceptable if the following conditions are met:
  - The frequency of the ripple current is 100Hz or higher
  - The average current for each cycle does not exceed the maximum allowable DC forward current
  - The maximum amplitude of the ripple does not exceed 25% of the maximum allowable DC forward current.
2. Pulse operation with the maximum peak pulse forward current is acceptable if the pulse on time is  $\leq 5\text{ms}$  per cycle and the duty cycle is  $\leq 50\%$
3. At a maximum reverse current of  $10\mu\text{A}$ , LUXEON 3030 LEDs are not designed to be driven in reverse bias.

# Characteristics Curves

## Spectral Power Distribution Characteristics

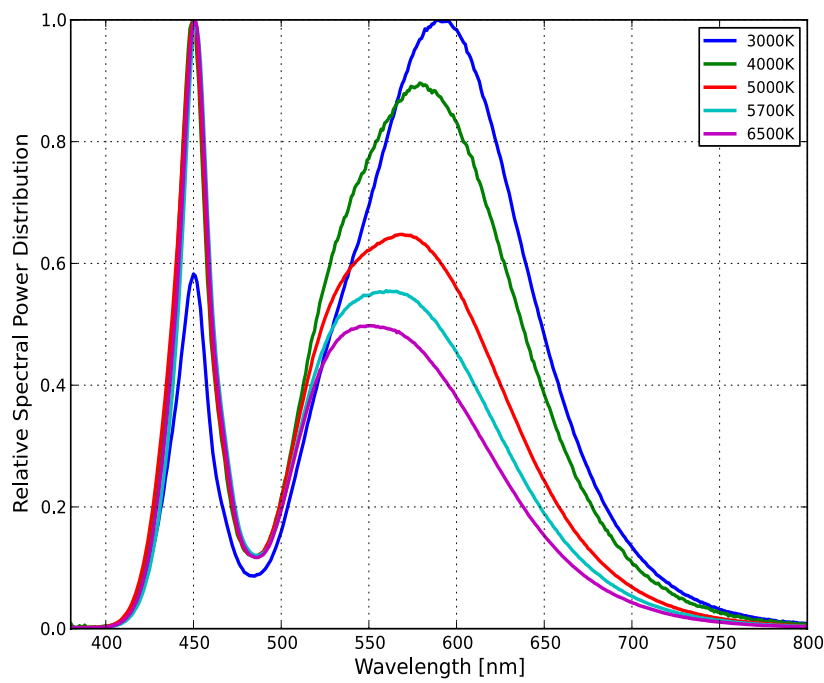


Figure 1a: Typical normalized power vs. wavelength for L130-xx70003000W21 at 120mA,  $T_j=25^{\circ}\text{C}$ .

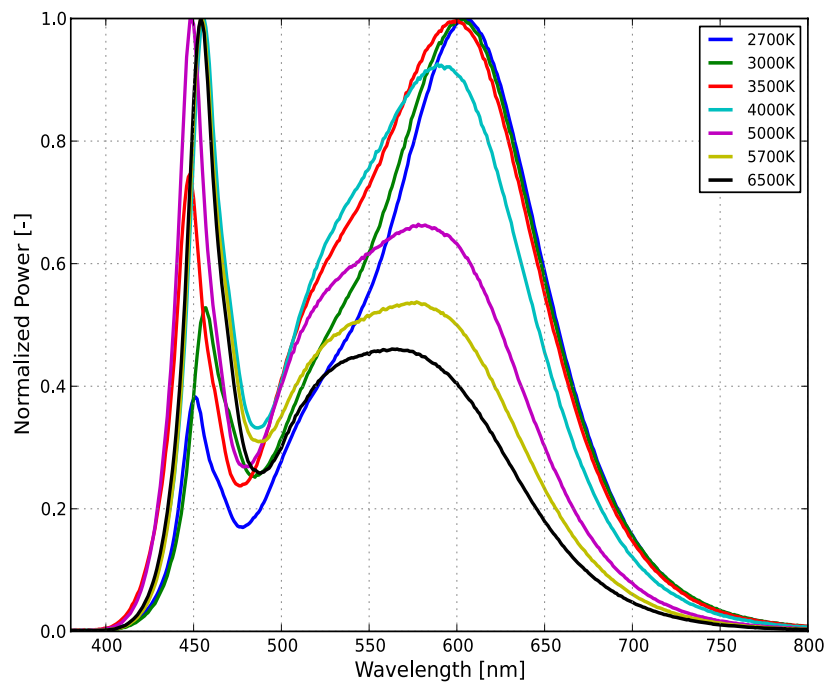


Figure 1b: Typical normalized power vs. wavelength for L130-xx80003000W21 120mA,  $T_j=25^{\circ}\text{C}$ .

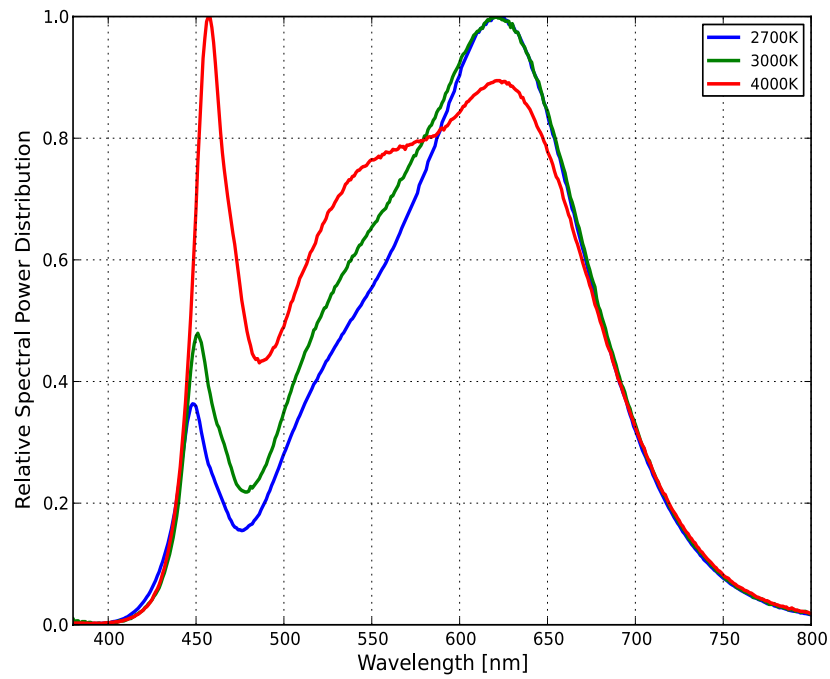


Figure 1c: Typical normalized power vs. wavelength for L130-xx90003000W21 120mA,  $T_j=25^{\circ}\text{C}$ .

## Light Output Characteristics

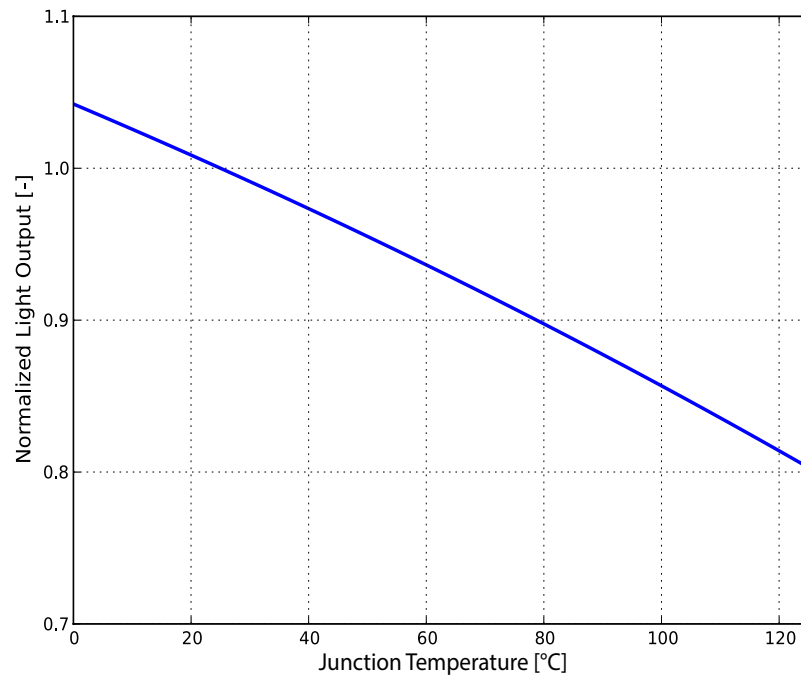


Figure 2a: Typical normalized light output vs. junction temperature for L130-xxxx003000W21 at 120mA.

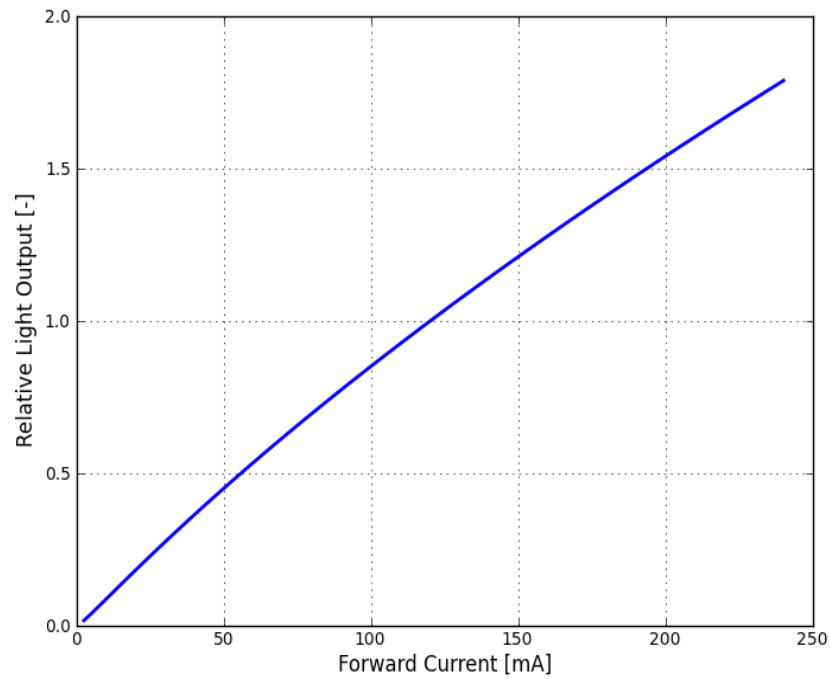


Figure 2b: Typical normalized light output vs. forward current for L130-xxxx003000W21 at  $T_j=25^{\circ}\text{C}$ .

## Forward Current Characteristics

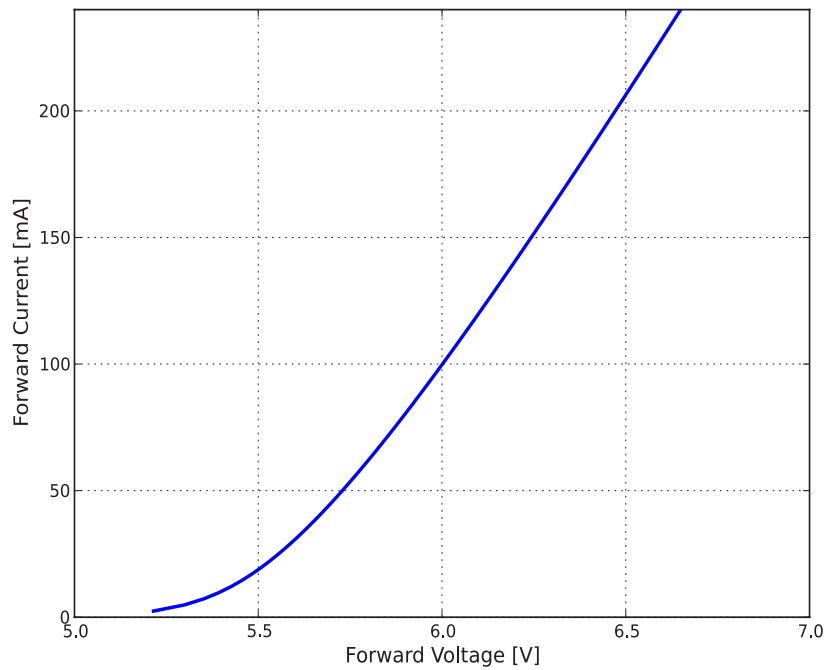


Figure 3: Typical forward current vs. forward voltage for L130-xxxx003000W21 at  $T_j=25^{\circ}\text{C}$ .

# Radiation Pattern Characteristics

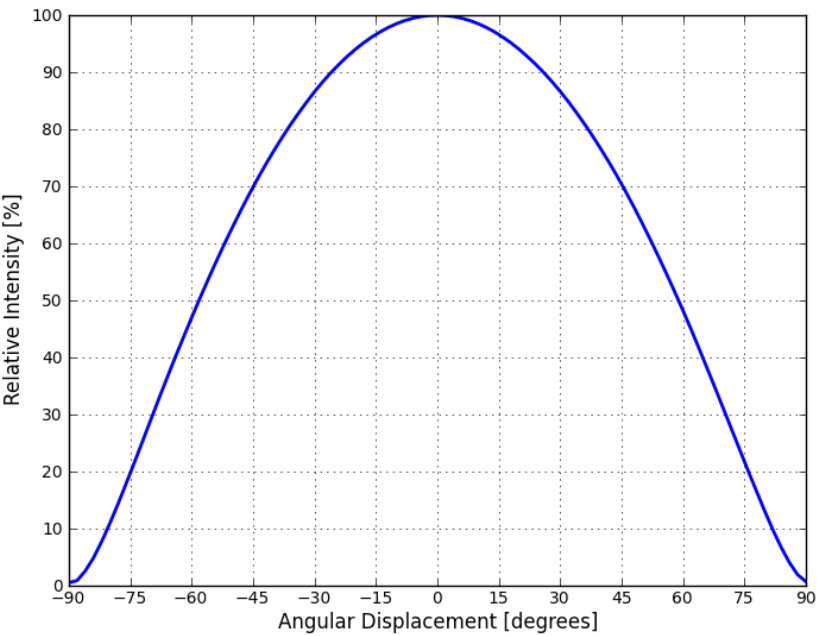


Figure 4a: Typical radiation pattern for L130-xxxx003000W21 at 120mA,  $T_j=25^{\circ}\text{C}$ .

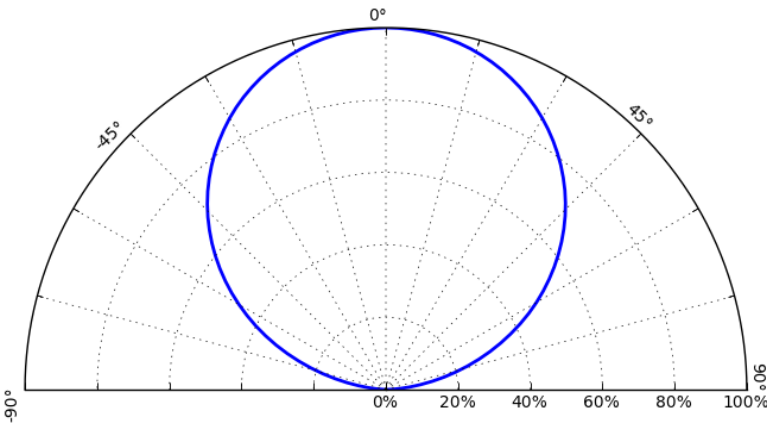


Figure 4b: Typical polar radiation pattern for L130-xxxx003000W21 at 120mA,  $T_j=25^{\circ}\text{C}$ .

# 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 2D LEDs are labeled using a 4-digit alphanumeric CAT code following the format below.

### A B C D

- A** – designates luminous flux bin (ex. H=90 to 95 lumens, M=110 to 115 lumens)
- B C** – designates color bin (ex. 7D, 7E, 7F, 7G, 7H, 7J, 7K, 7L or 7M for 3000K parts)
- D** – designates forward voltage bin (ex. G=5.8 to 6.0V, J=6.2 to 6.4V)

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

### H 7 J G

## Luminous Flux Bins

Table 5 lists the standard photometric luminous flux bins for LUXEON 3030 2D emitters. Although several bins are outlined, product availability in a particular bin varies by production run and by product performance. Not all bins are available in all CCTs.

Table 5. Luminous flux bin definitions for LUXEON 3030 2D.

| BIN | LUMINOUS FLUX (lm) |         |
|-----|--------------------|---------|
|     | MINIMUM            | MAXIMUM |
| Z   | 50                 | 55      |
| A   | 55                 | 60      |
| B   | 60                 | 65      |
| C   | 65                 | 70      |
| D   | 70                 | 75      |
| E   | 75                 | 80      |
| F   | 80                 | 85      |
| G   | 85                 | 90      |
| H   | 90                 | 95      |
| J   | 95                 | 100     |
| K   | 100                | 105     |
| L   | 105                | 110     |
| M   | 110                | 115     |
| N   | 115                | 120     |
| P   | 120                | 125     |
| Q   | 125                | 130     |

**Notes for Table 5:**

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

# Color Bin Definition

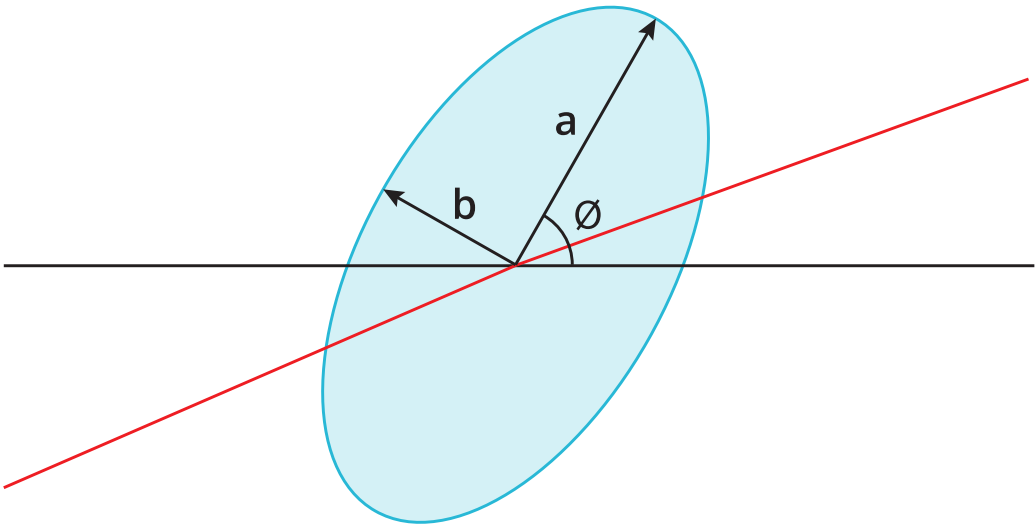


Figure 5: 3- and 5-step MacAdam ellipse illustration for Tables 6–12.

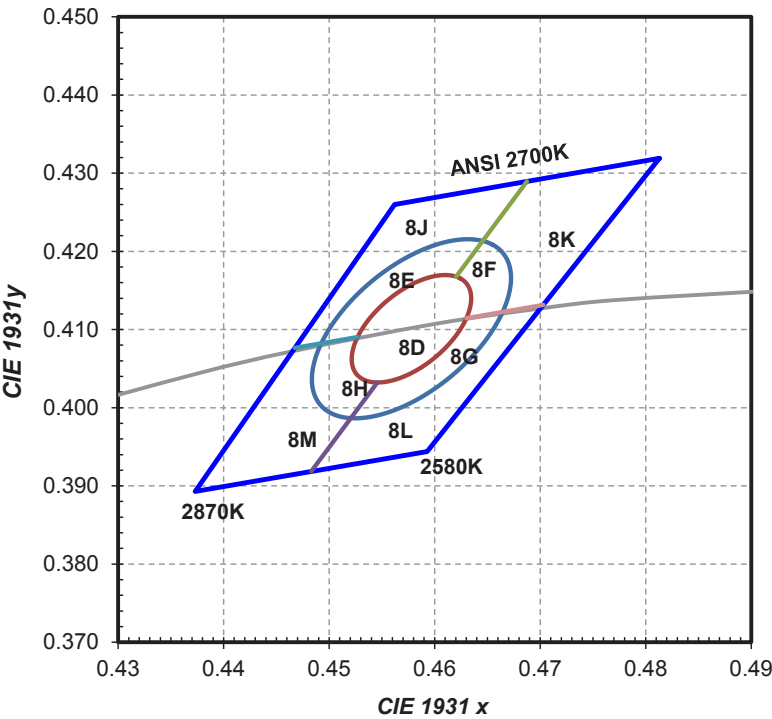


Figure 6: Color bin structure for LUXEON 3030 2D 2700K.

Table 6. 3- and 5-step MacAdam ellipse color bin definitions for L130-27xx003000W21.

| NOMINAL CCT | COLOR SPACE                   | CENTER POINT (cx, cy) | MAJOR AXIS, a | MINOR AXIS, b | ELLIPSE ROTATION ANGLE, θ |
|-------------|-------------------------------|-----------------------|---------------|---------------|---------------------------|
| 2700K       | Single 3-step MacAdam ellipse | (0.4578, 0.4101)      | 0.00810       | 0.00420       | 53.70°                    |
| 2700K       | Single 5-step MacAdam ellipse | (0.4578, 0.4101)      | 0.01350       | 0.00700       | 53.70°                    |

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

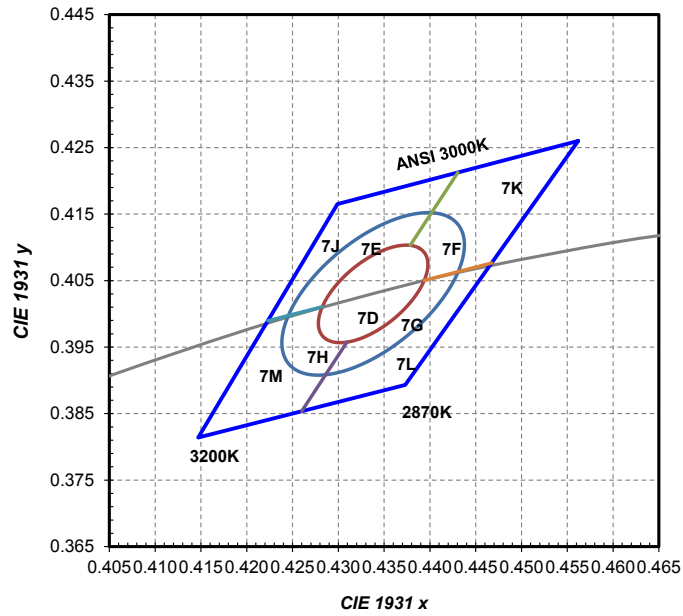


Figure 7: Color bin structure for LUXEON 3030 2D 3000K.

Table 7. 3- and 5-step MacAdam ellipse color bin definitions for L130-30xx003000W21.

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

Notes for Table 7:

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

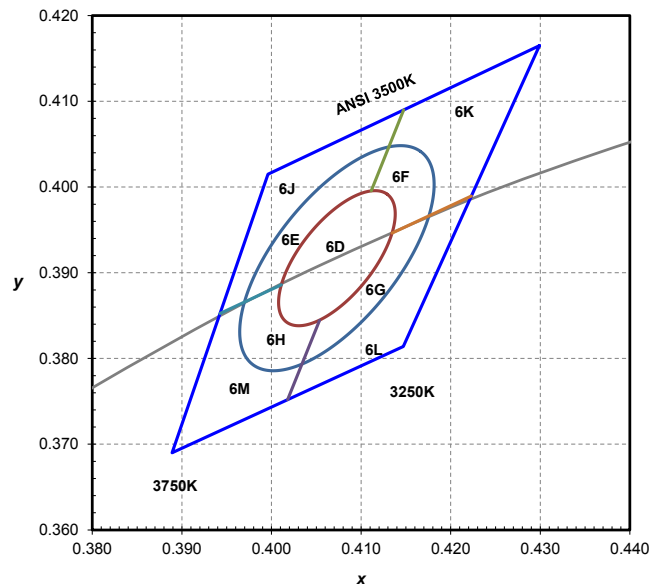


Figure 8: Color bin structure for LUXEON 3030 2D 3500K.

Table 8. 3- and 5-step MacAdam ellipse color bin definitions for L130-35xx003000W21.

| NOMINAL CCT | COLOR SPACE                   | CENTER POINT (cx, cy) | MAJOR AXIS, a | MINOR AXIS, b | ELLIPSE ROTATION ANGLE, $\theta$ |
|-------------|-------------------------------|-----------------------|---------------|---------------|----------------------------------|
| 3500K       | Single 3-step MacAdam ellipse | (0.4073, 0.3917)      | 0.00927       | 0.00414       | 53.22°                           |
| 3500K       | Single 5-step MacAdam ellipse | (0.4073, 0.3917)      | 0.01545       | 0.00690       | 53.22°                           |

Notes for Table 8:

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

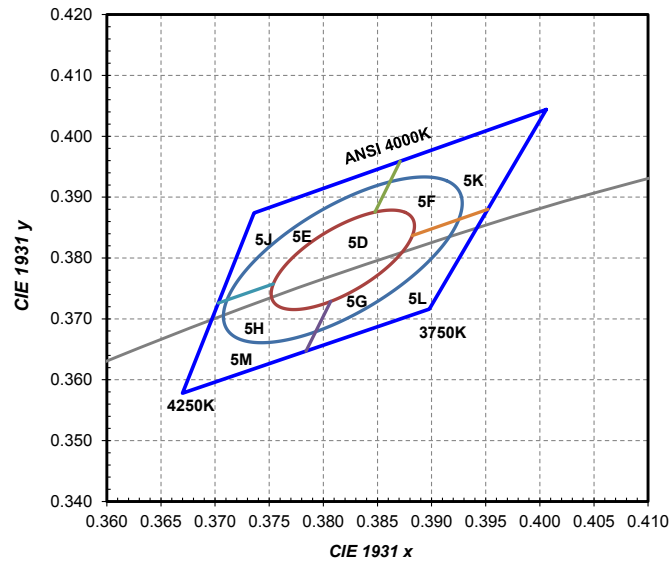


Figure 9: Color bin structure for LUXEON 3030 2D 4000K.

Table 9. 3- and 5-step MacAdam ellipse color bin definitions for L130-40xx003000W21.

| NOMINAL CCT | COLOR SPACE                   | CENTER POINT (cx, cy) | MAJOR AXIS, a | MINOR AXIS, b | ELLIPSE ROTATION ANGLE, $\theta$ |
|-------------|-------------------------------|-----------------------|---------------|---------------|----------------------------------|
| 4000K       | Single 3-step MacAdam ellipse | (0.3818, 0.3797)      | 0.00939       | 0.00402       | 53.72°                           |
| 4000K       | Single 5-step MacAdam ellipse | (0.3818, 0.3797)      | 0.01565       | 0.00670       | 53.72°                           |

Notes for Table 9:

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

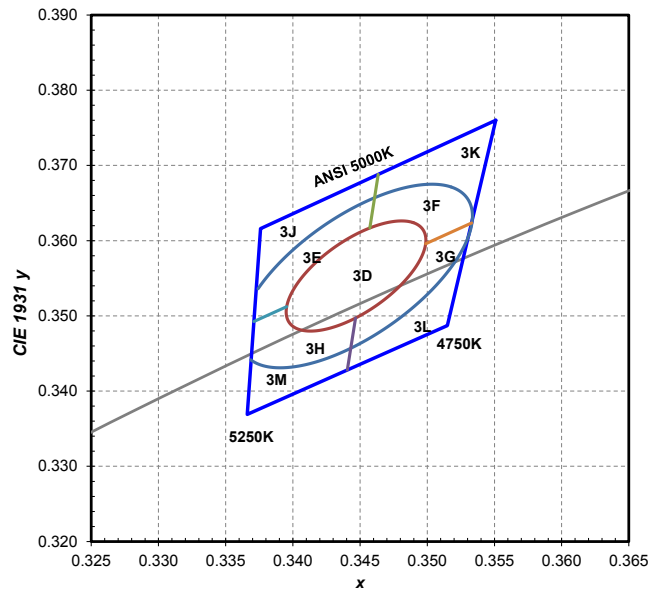


Figure 10: Color bin structure for LUXEON 3030 2D 5000K.

Table 10. 3- and 5-step MacAdam ellipse color bin definitions for L130-50xx003000W21.

| NOMINAL CCT | COLOR SPACE                   | CENTER POINT (cx, cy) | MAJOR AXIS, a | MINOR AXIS, b | ELLIPSE ROTATION ANGLE, $\theta$ |
|-------------|-------------------------------|-----------------------|---------------|---------------|----------------------------------|
| 5000K       | Single 3-step MacAdam ellipse | (0.3447, 0.3553)      | 0.00822       | 0.00354       | 59.62°                           |
| 5000K       | Single 5-step MacAdam ellipse | (0.3447, 0.3553)      | 0.01370       | 0.00590       | 59.62°                           |

Notes for Table 10:

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

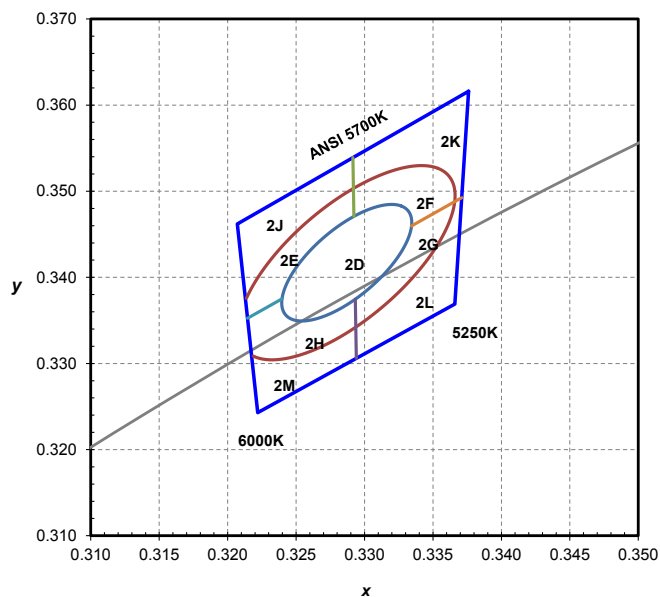


Figure 11: Color bin structure for LUXEON 3030 2D 5700K.

Table 11. 3- and 5-step MacAdam ellipse color bin definitions for L130-57xx003000W21.

| NOMINAL CCT | COLOR SPACE                   | CENTER POINT (cx, cy) | MAJOR AXIS, a | MINOR AXIS, b | ELLIPSE ROTATION ANGLE, $\theta$ |
|-------------|-------------------------------|-----------------------|---------------|---------------|----------------------------------|
| 5700K       | Single 3-step MacAdam ellipse | (0.3287, 0.3417)      | 0.00746       | 0.00320       | 59.09°                           |
| 5700K       | Single 5-step MacAdam ellipse | (0.3287, 0.3417)      | 0.01243       | 0.00533       | 59.09°                           |

Notes for Table 11:

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

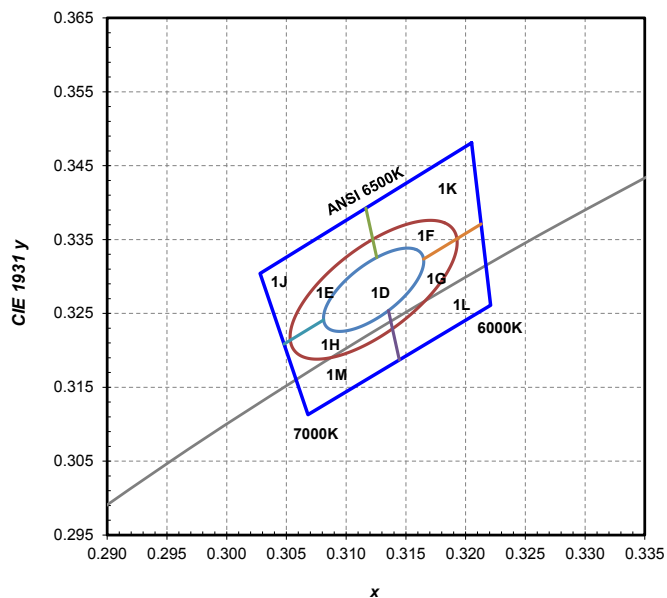


Figure 12: Color bin structure for LUXEON 3030 2D 6500K.

Table 12. 3- and 5-step MacAdam ellipse color bin definitions for L130-65xx003000W21.

| NOMINAL CCT | COLOR SPACE                   | CENTER POINT (cx, cy) | MAJOR AXIS, a | MINOR AXIS, b | ELLIPSE ROTATION ANGLE, $\theta$ |
|-------------|-------------------------------|-----------------------|---------------|---------------|----------------------------------|
| 6500K       | Single 3-step MacAdam ellipse | (0.3123, 0.3282)      | 0.00669       | 0.00285       | 58.57°                           |
| 6500K       | Single 5-step MacAdam ellipse | (0.3123, 0.3282)      | 0.01115       | 0.00475       | 58.57°                           |

Notes for Table 12:

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

# Forward Voltage Bins

Table 13. Forward voltage bin definitions for LUXEON 3030 2D.

| BIN | FORWARD VOLTAGE (V) |         |
|-----|---------------------|---------|
|     | MINIMUM             | MAXIMUM |
| F   | 5.6                 | 5.8     |
| G   | 5.8                 | 6.0     |
| H   | 6.0                 | 6.2     |
| J   | 6.2                 | 6.4     |
| K   | 6.4                 | 6.6     |

Notes for Table 13:  
1. Lumileds maintains a tolerance of  $\pm 0.1V$  on forward voltage measurements.

# Mechanical Dimensions

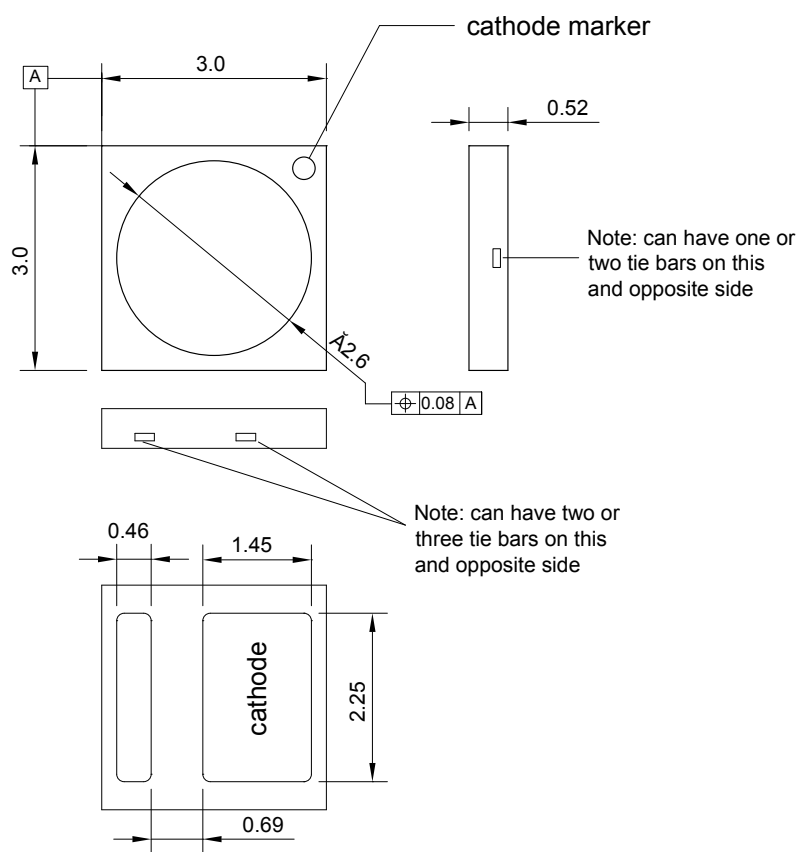


Figure 13: Mechanical dimensions for LUXEON 3030 2D.

Notes for Figure 13:  
1. Drawings are not to scale.  
2. All dimensions are in millimeters.  
3. Tolerance:  $\pm 0.10mm$ .

# Reflow Soldering Guidelines

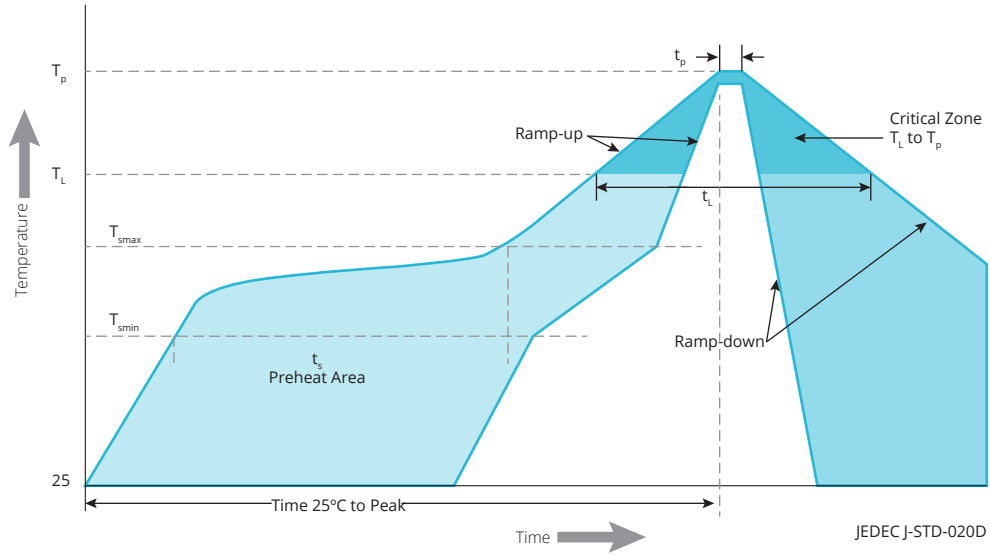


Figure 14: Visualization of the acceptable reflow temperature profile as specified in Table 14.

Table 14. Reflow profile characteristics for LUXEON 3030 2D.

| PROFILE FEATURE                                   | LEAD FREE ASSEMBLY   |
|---------------------------------------------------|----------------------|
| Preheat Minimum Temperature ( $T_{min}$ )         | 150°C                |
| Preheat Maximum Temperature ( $T_{max}$ )         | 200°C                |
| Preheat Time ( $t_{min}$ to $t_{max}$ )           | 60 to 120 seconds    |
| Ramp-Up Rate ( $T_{max}$ 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                                    | 6°C / second maximum |
| Time 25°C to Peak Temperature                     | 8 minutes maximum    |

**Notes for Table 14:**

1. All temperatures refer to the application Printed Circuit Board (PCB), measured on the surface adjacent to the package body.

## JEDEC Moisture Sensitivity

Table 15. Moisture sensitivity levels for LUXEON 3030 2D.

| 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

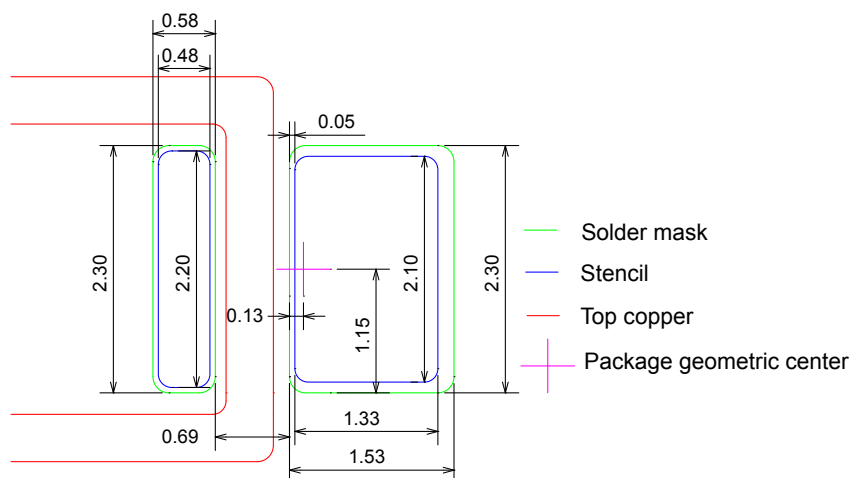


Figure 15: Recommended PCB solder pad layout for LUXEON 3030 2D.

## Packaging Information

## Pocket Tape Dimensions

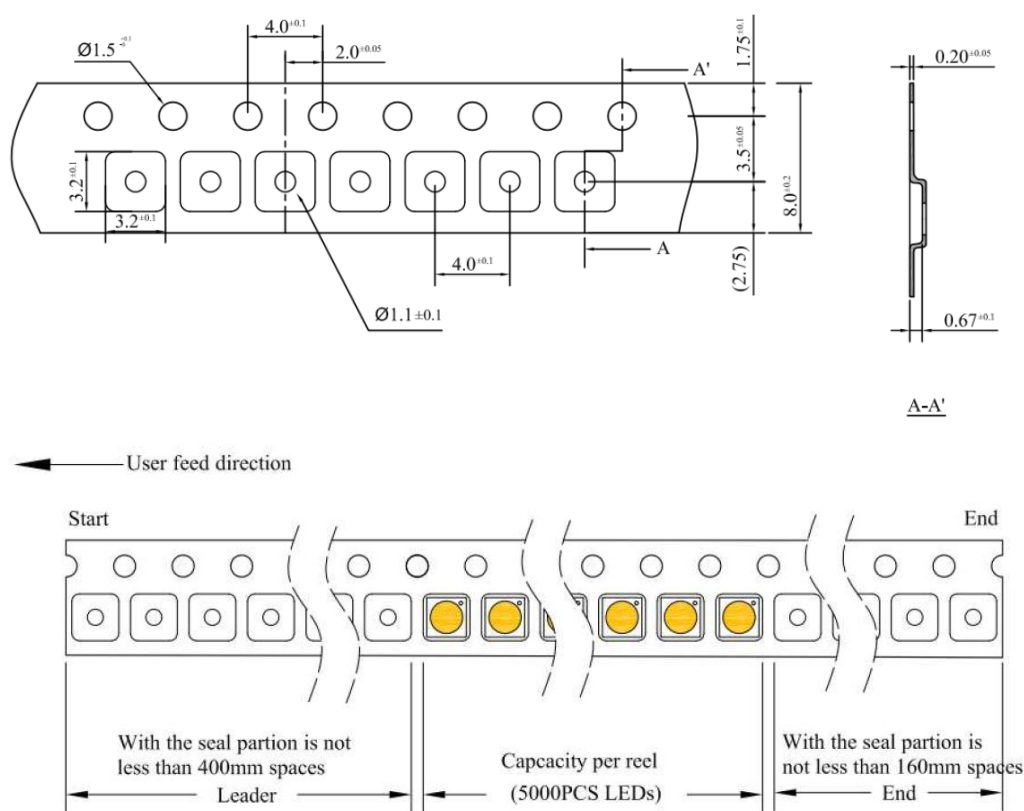


Figure 16: Tape dimensions for LUXEON 3030 2D.

Notes for Figures 15 and 16:  
1. Drawings are not to scale.  
2. All dimensions are in millimeters.

## Reel Dimensions

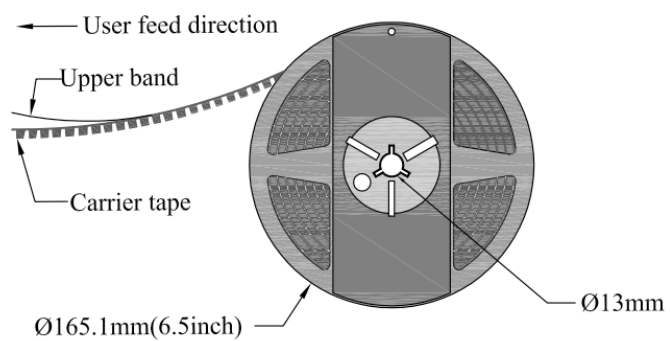


Figure 17: Reel dimensions for LUXEON 3030 2D.

Notes for Figure 17:

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

# About Lumileds

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

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

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

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



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