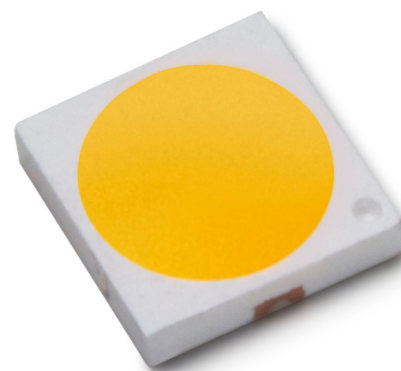


# LUXEON 3030 2D

## 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

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# General Information

## Part Number Nomenclature

LUXEON 3030 2D is tested and binned at  $T_j = 25^\circ\text{C}$  with a drive current of 120mA DC.

The part number designation is explained as follows:

L 1 3 0 - A A B B 0 0 C C 0 0 W 2 1

Where:

AA — designates CCT (for example, 2700K = 27)

BB — designates CRI (70, 80 and 90)

CC — designates last 2 digits of 3030 package

For example, a LUXEON 3030 2D 2700K 80CRI emitter has the following part number.

L 1 3 0 - 2 7 8 0 0 0 3 0 0 0 W 2 1

## Average Lumen Maintenance Characteristics

The LUXEON 3030 2D is being tested in accordance with LM-80 standards. Please contact your Lumileds TSM or Sales person for more detailed information.

## Environmental Compliance

Lumileds 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 and REACH directives. Lumileds will not intentionally add the following restricted material to the LUXEON 3030 2D L130-\*\*\*\*003000W21: lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE).

# Product Selection

## Product Selection Guide for LUXEON 3030 2D

Junction Temperature = 25°C

Table 1.

| Nominal CCT | Part Number        | Minimum CRI <sup>[1]</sup> | Luminous Flux (lm) <sup>[1]</sup> @ 120mA |         | Luminous Flux (lm) <sup>[2]</sup> @ 100mA | R <sub>th_J-c</sub> (°C/W) <sup>[3]</sup> |
|-------------|--------------------|----------------------------|-------------------------------------------|---------|-------------------------------------------|-------------------------------------------|
|             |                    |                            | Minimum                                   | Typical | Typical                                   | Typical                                   |
| 2700K       | L130-2780003000W21 | 80                         | 80                                        | 96      | 82                                        | 12                                        |
| 2700K       | L130-2790003000W21 | 90                         | 72                                        | 80      | 68                                        |                                           |
| 3000K       | L130-3080003000W21 | 80                         | 85                                        | 98      | 83                                        |                                           |
| 3000K       | L130-3090003000W21 | 90                         | 75                                        | 82      | 70                                        |                                           |
| 3500K       | L130-3580003000W21 | 80                         | 85                                        | 101     | 85                                        |                                           |
| 4000K       | L130-4070003000W21 | 70                         | 101                                       | 111     | 95                                        |                                           |
| 4000K       | L130-4080003000W21 | 80                         | 90                                        | 105     | 89                                        |                                           |
| 5000K       | L130-5070003000W21 | 70                         | 101                                       | 111     | 95                                        |                                           |
| 5000K       | L130-5080003000W21 | 80                         | 90                                        | 105     | 89                                        |                                           |
| 5700K       | L130-5770003000W21 | 70                         | 101                                       | 111     | 95                                        |                                           |
| 5700K       | L130-5780003000W21 | 80                         | 90                                        | 105     | 89                                        |                                           |
| 6500K       | L130-6570003000W21 | 70                         | 101                                       | 111     | 95                                        |                                           |
| 6500K       | L130-6580003000W21 | 80                         | 90                                        | 105     | 89                                        |                                           |

Notes for Table 1:

1. Lumileds maintains a tolerance of ±7.5% on luminous flux, ±2 on CRI.
2. Interpolated value.
3. Thermal resistance is measured junction to case.

# Electrical Characteristics

Junction Temperature = 25°C, Test Current @ 120mA

Table 2.

| Part Number        | Forward Voltage V <sub>f</sub> <sup>[1] [3]</sup><br>(V) |         |         | Typical Temperature Coefficient of Forward Voltage Between 25°C and 85°C <sup>[2]</sup><br>$\Delta V_f / \Delta T_j$ |
|--------------------|----------------------------------------------------------|---------|---------|----------------------------------------------------------------------------------------------------------------------|
|                    | Minimum                                                  | Typical | Maximum |                                                                                                                      |
| L130-2780003000W21 | 5.8                                                      | 6.1     | 6.6     | -2.0 to -4.0                                                                                                         |
| L130-2790003000W21 |                                                          |         |         |                                                                                                                      |
| L130-3080003000W21 |                                                          |         |         |                                                                                                                      |
| L130-3090003000W21 |                                                          |         |         |                                                                                                                      |
| L130-3580003000W21 |                                                          |         |         |                                                                                                                      |
| L130-4070003000W21 |                                                          |         |         |                                                                                                                      |
| L130-4080003000W21 |                                                          |         |         |                                                                                                                      |
| L130-5070003000W21 |                                                          |         |         |                                                                                                                      |
| L130-5080003000W21 |                                                          |         |         |                                                                                                                      |
| L130-5770003000W21 |                                                          |         |         |                                                                                                                      |
| L130-5780003000W21 |                                                          |         |         |                                                                                                                      |
| L130-6570003000W21 |                                                          |         |         |                                                                                                                      |
| L130-6580003000W21 |                                                          |         |         |                                                                                                                      |

Notes for Table 2:

- 1. Lumileds maintains a tolerance of ±0.1V on forward voltage measurements.
- 2. Measured between T<sub>j</sub> = 25°C and T<sub>j</sub> = 85°C.
- 3. Forward voltage test tolerance: ±0.1 volts.

# Absolute Maximum Ratings

No parameter can surpass its maximum rating under any condition. Care must be maintained to insure junction and case temperatures are properly derated with current.

Table 3.

| Parameter                        | Maximum Performance                         |
|----------------------------------|---------------------------------------------|
| DC Forward Current               | 240mA                                       |
| Peak Pulsed Forward Current      | 300mA <sup>[1]</sup>                        |
| ESD Sensitivity                  | Class 2 HBM per ANSI/ESDA/JEDEC JS-001-2012 |
| Maximum Case Temperature         | 100°C                                       |
| Soldering Temperature            | JEDEC 020D 260°C                            |
| Storage Temperature              | -40°C - 100°C                               |
| LED Junction Temperature         | 125°C                                       |
| Allowable Reflow Cycles          | 3                                           |
| Reverse Voltage <sup>[2,3]</sup> | -10V                                        |

Notes for Table 3:

1. At 10% duty cycle and pulse width 10ms.
2. LUXEON 3030 2D are not designed to be driven in reverse bias.
3. At a maximum reverse current of 10µA.

# JEDEC Moisture Sensitivity

Table 4.

| Level | Floor Life |                                      | Soak Requirements      |               |
|-------|------------|--------------------------------------|------------------------|---------------|
|       |            |                                      | Standard               |               |
|       | Time       | Conditions                           | Time                   | Conditions    |
| 3     | 168 hours  | 30°C / 60% RH<br>(Relative Humidity) | 192 Hrs. + 5 / -0 Hrs. | 30°C / 60% RH |

# Reflow Soldering Characteristics

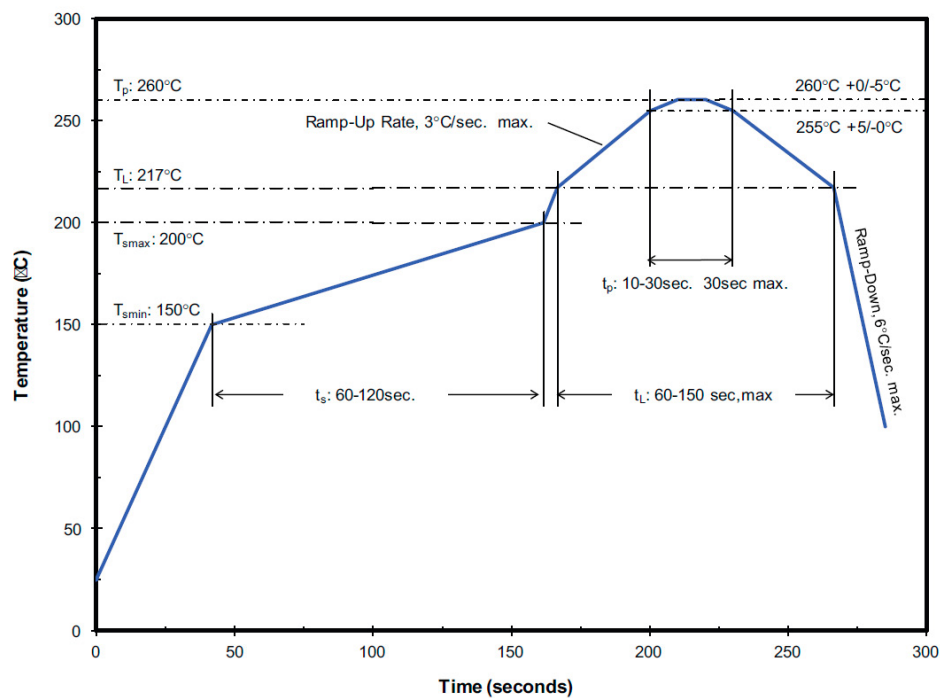


Figure 1. Temperature Profile for Table 5.

Table 5.

| Profile Feature                                                  | Lead Free Assembly |
|------------------------------------------------------------------|--------------------|
| Preheat/Soak:                                                    |                    |
| Temperature Min ( $T_{smin}$ )                                   | 150°C              |
| Temperature Max ( $T_{smax}$ )                                   | 200°C              |
| Maximum Time ( $t_s$ ) from $T_{smin}$ to $T_{smax}$             | 120 seconds        |
| Ramp-Up Rate ( $T_L$ to $T_p$ )                                  | 3°C / second       |
| Liquidous Temperature ( $T_L$ )                                  | 217°C              |
| Maximum Time ( $t_L$ ) Maintained $T_L$                          | 150 seconds        |
| Maximum Peak Package Body Temperature ( $T_p$ )                  | 260°C              |
| Time ( $t_p$ ) Within 5°C of the Specified Temperature ( $T_C$ ) | 10 - 30 seconds    |
| Maximum Ramp-Down Rate ( $T_p$ to $T_L$ )                        | 6°C / second       |
| Maximum Time 25°C to Peak Temperature                            | 8 minutes          |

Note for Table 5:

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

# Mechanical Dimensions and Package Information

## Mechanical Dimensions

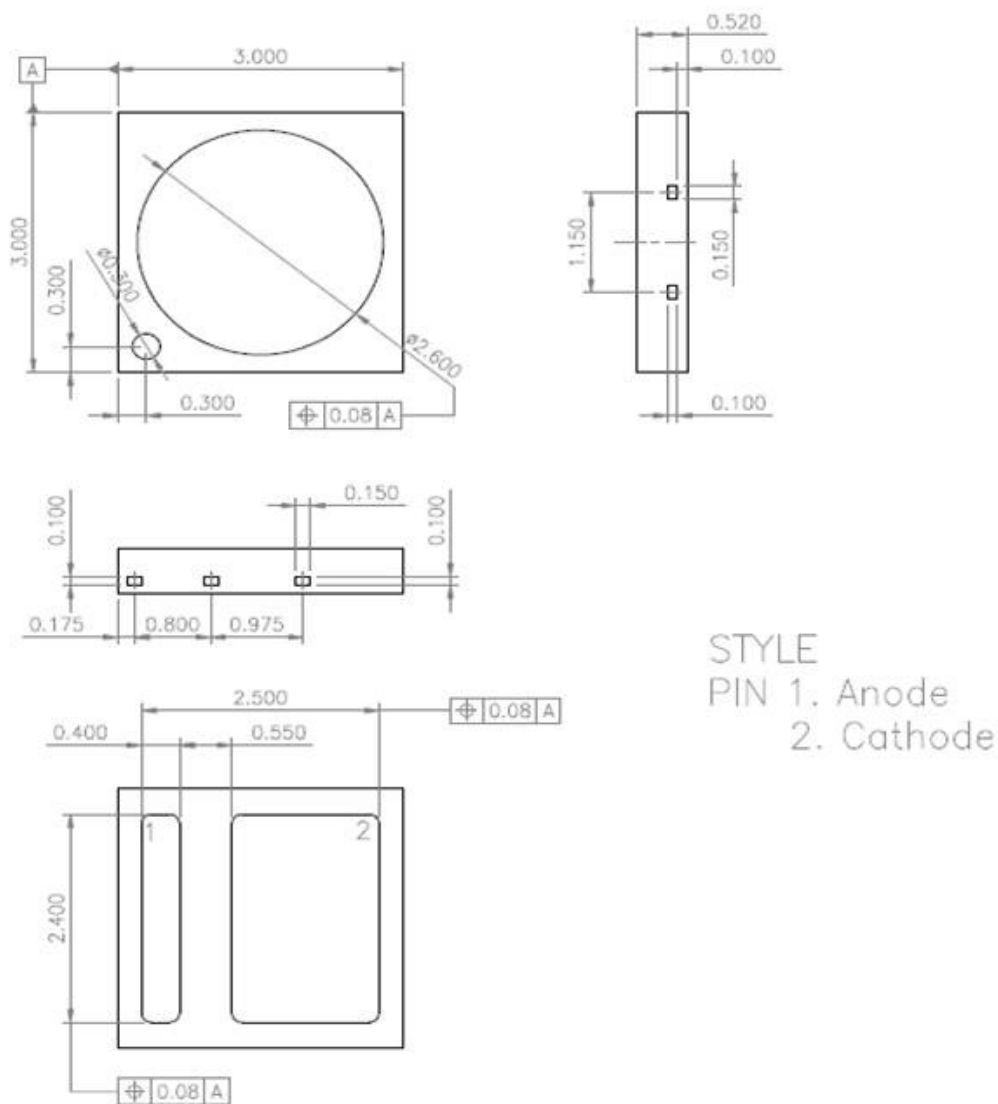


Figure 2.

Notes for Figure 2:

1. All dimensions are in millimeters.
2. Tolerance: X.X:  $\pm 0.1$ mm.



## Recommended Soldering Pad Pattern and Metal Solder Stencil Aperture

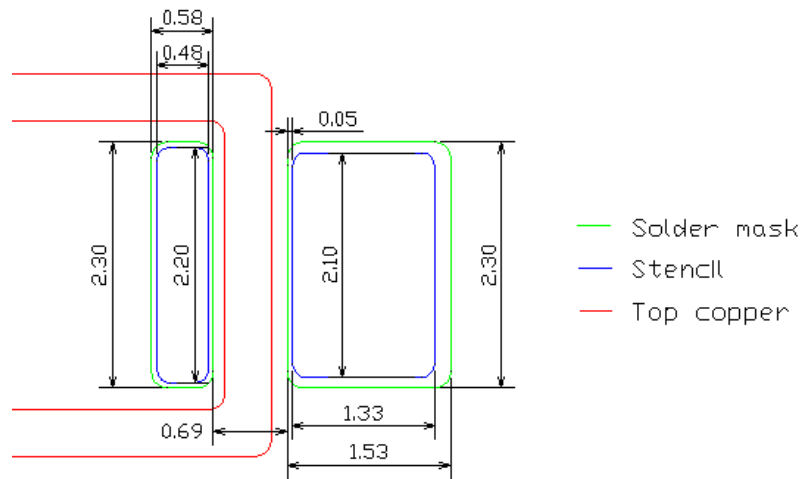


Figure 3.

## Package Dimensions of Tape (Unit: mm)

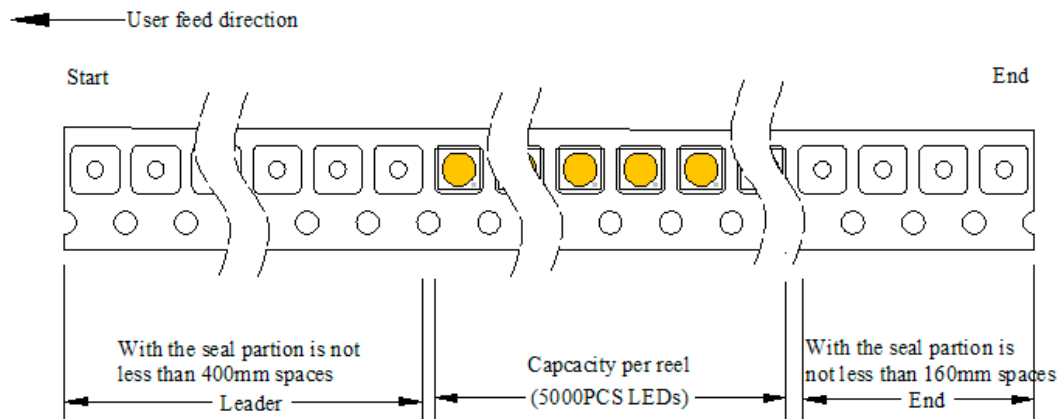
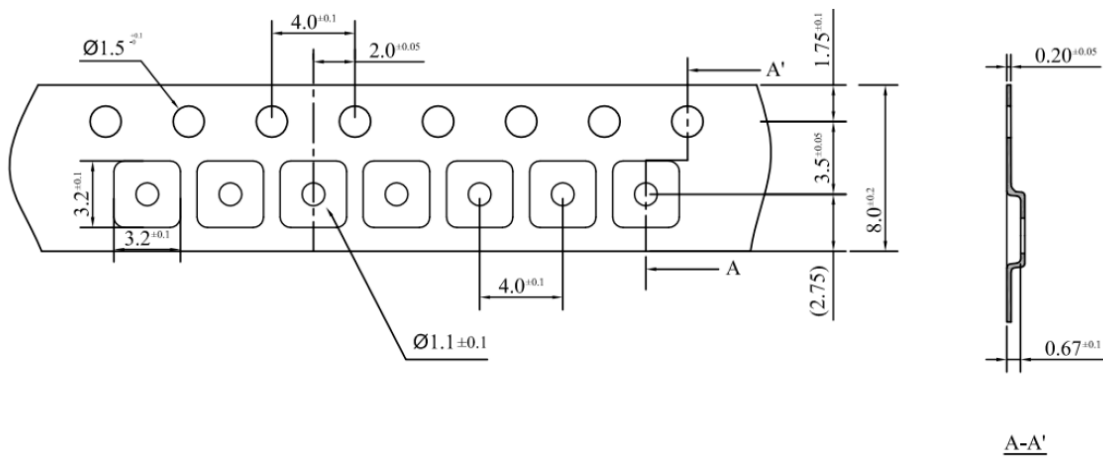


Figure 4.

## Package Dimensions of Reel

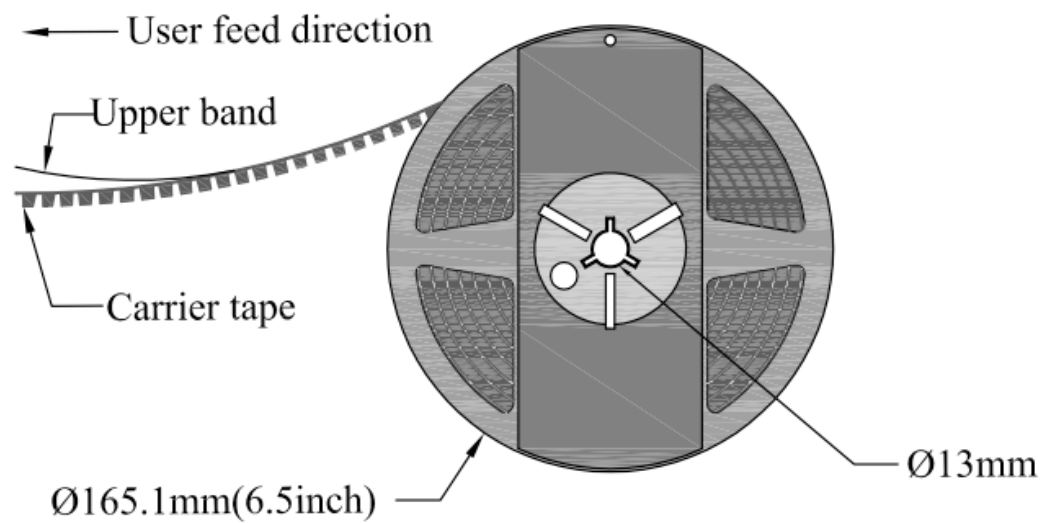


Figure 5. Reel dimensions.

## Package Labeling

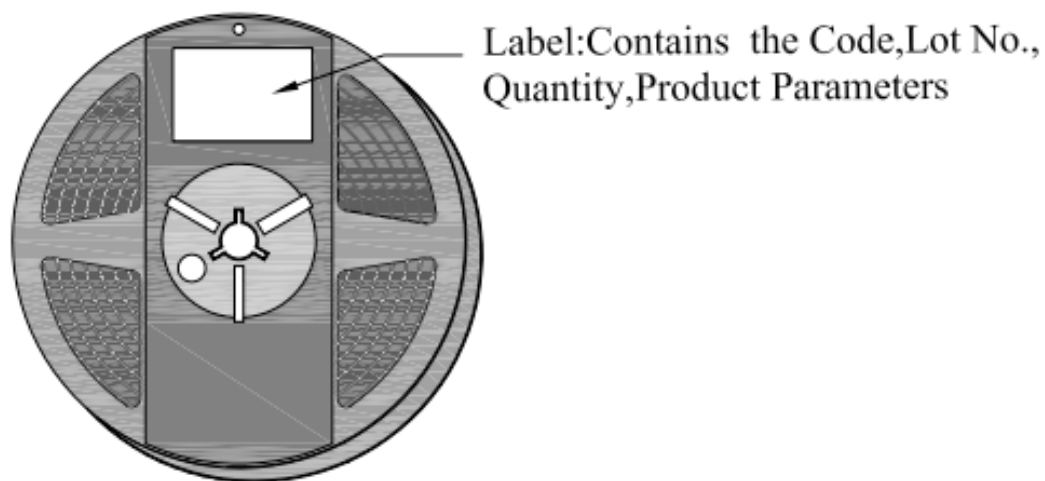


Figure 6. Label information.

## Moisture Proof Package

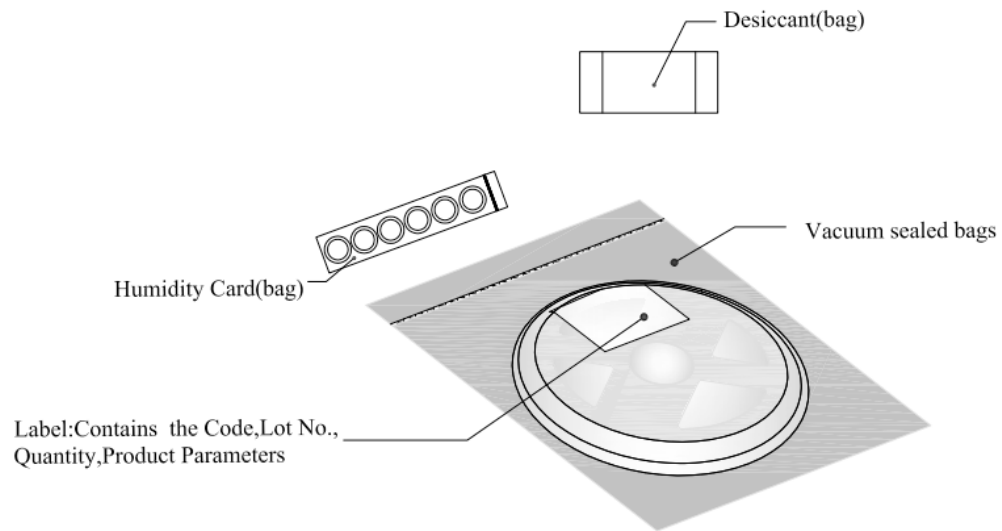


Figure 7. Vacuum sealed and moisture proof.

# Relative Spectral Distribution

## L130-xx80003000W21 80CRI Relative Intensity vs. Wavelength

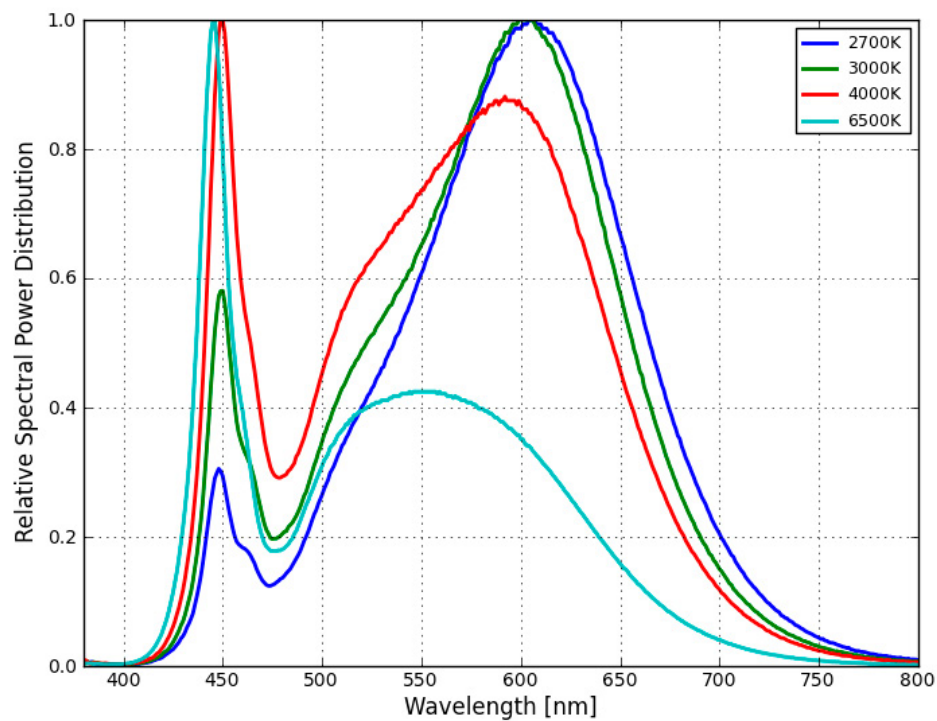


Figure 8. L130-xx80003000W21 80CRI typical color spectrum at solder pad temperature = 25°C, forward current = 120mA.

## L130-xx70003000W21 70CRI Relative Intensity vs. Wavelength

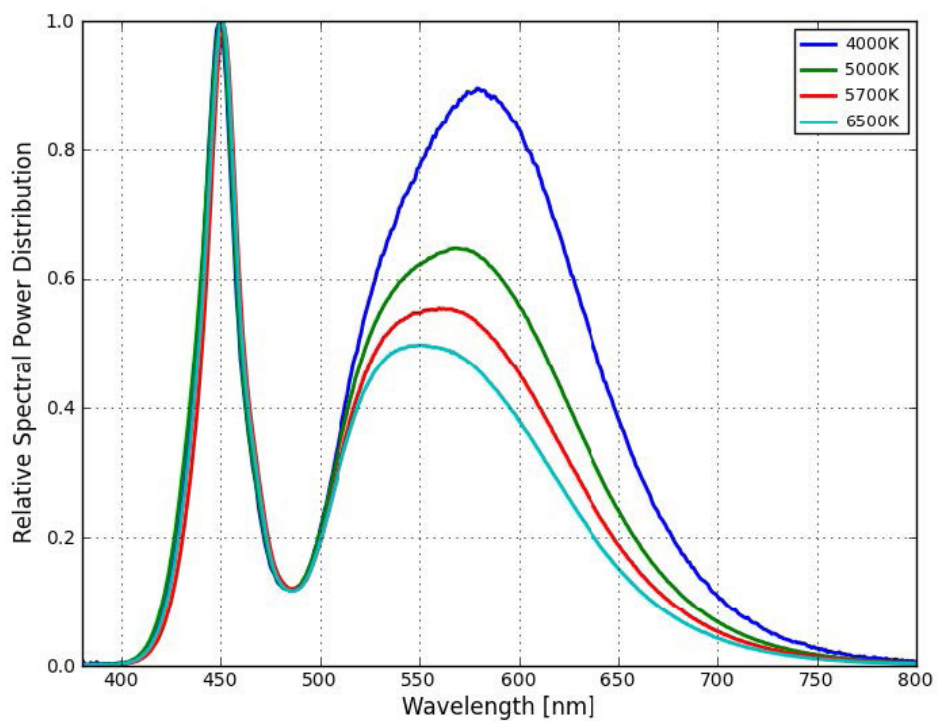


Figure 9. L130-xx70003000W21 70CRI typical color spectrum at solder pad temperature = 25°C, forward current = 120mA.

## Relative Flux vs. Temperature

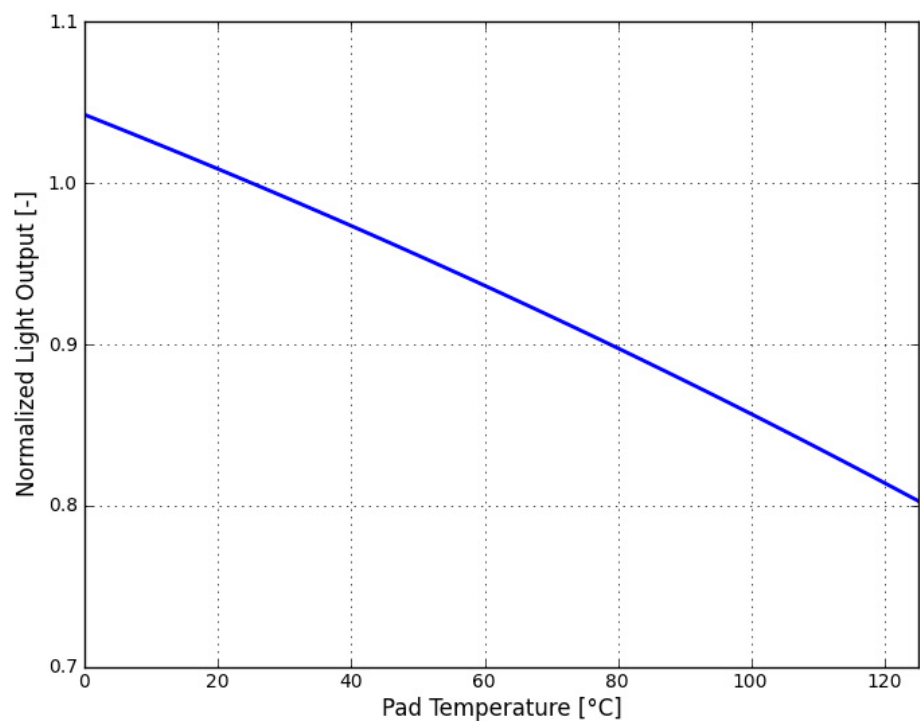


Figure 10. Typical relative light output vs. solder pad temperature, forward current = 120mA.

## Relative Flux vs. Forward Current

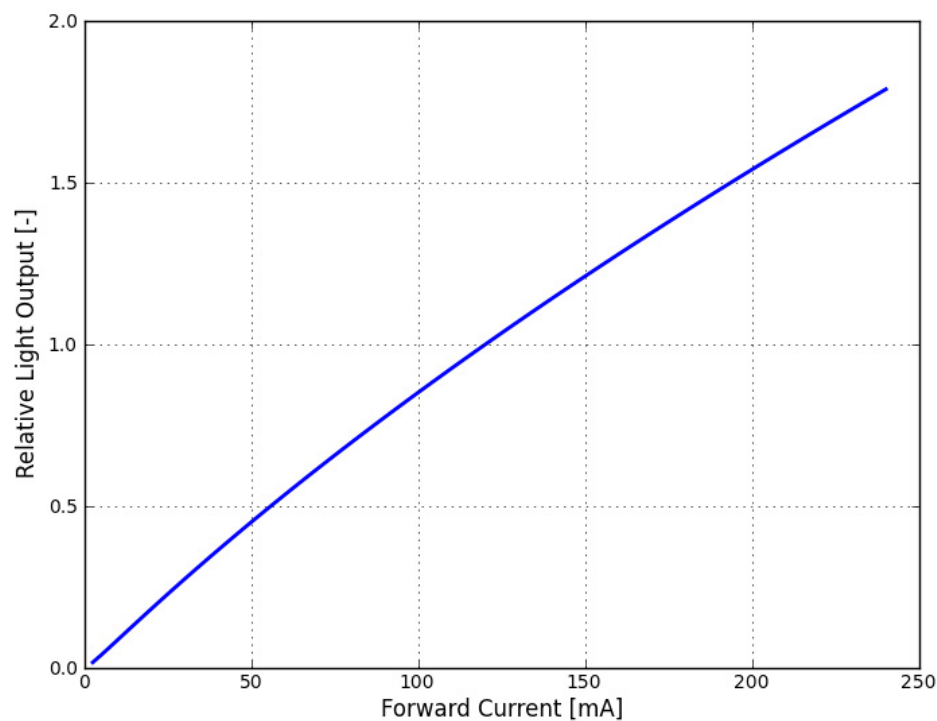


Figure 11. Typical relative light output vs. forward current = 120mA, solder pad temperature = 25°C.

# Forward Current vs. Forward Voltage

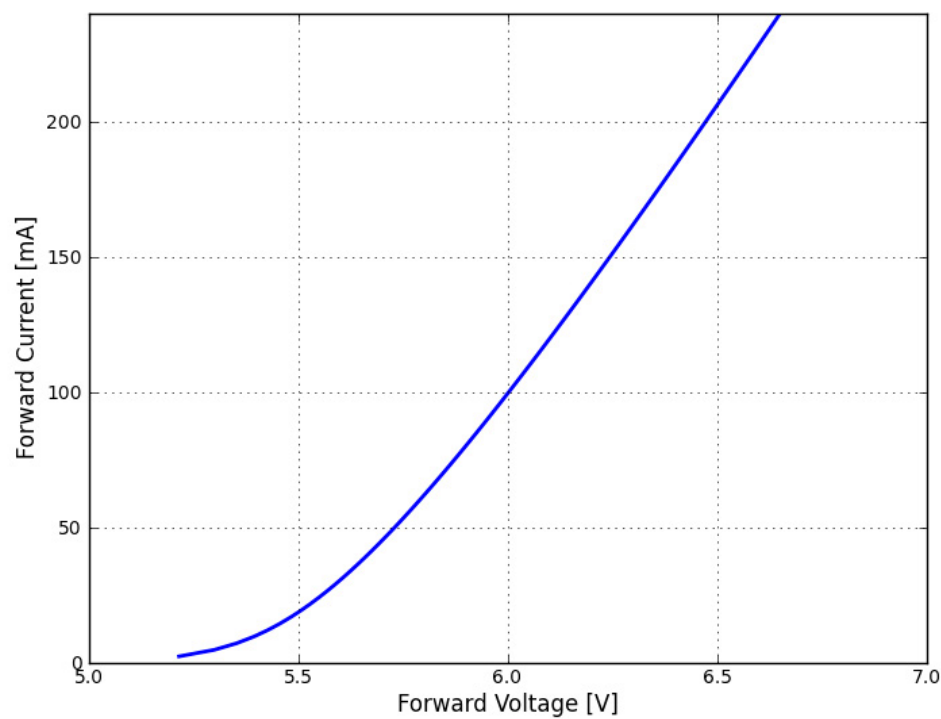


Figure 12. Typical forward current vs. forward voltage, solder pad temperature = 25°C.

# Typical Radiation Patterns

## Radiation in Cartesian coordinate system

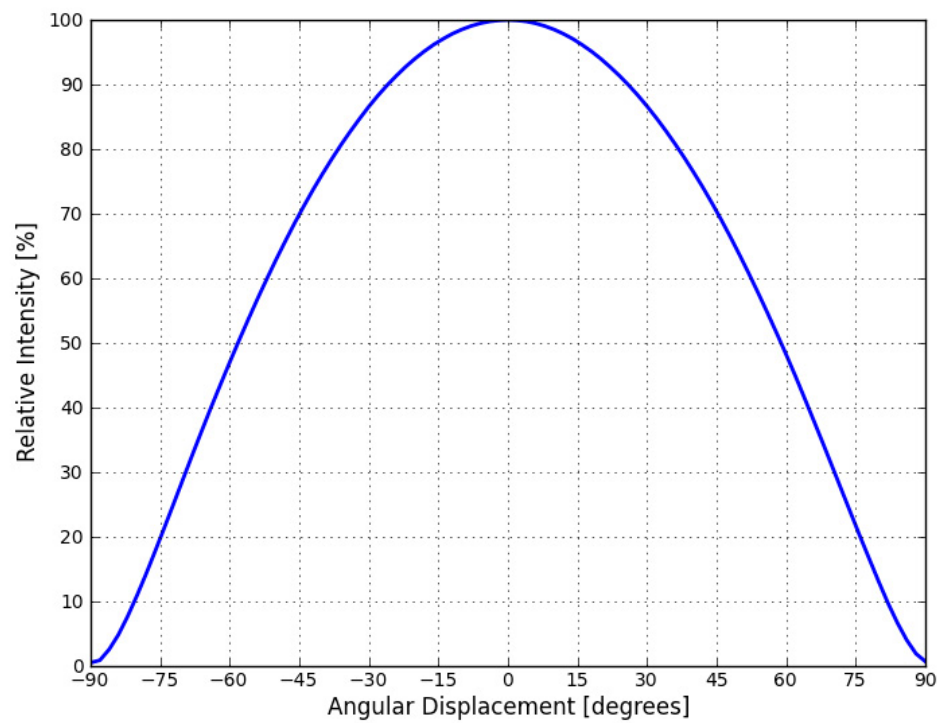


Figure 13. Typical radiation pattern in Cartesian coordinate system.

## Radiation Pattern in Polar Coordinate System

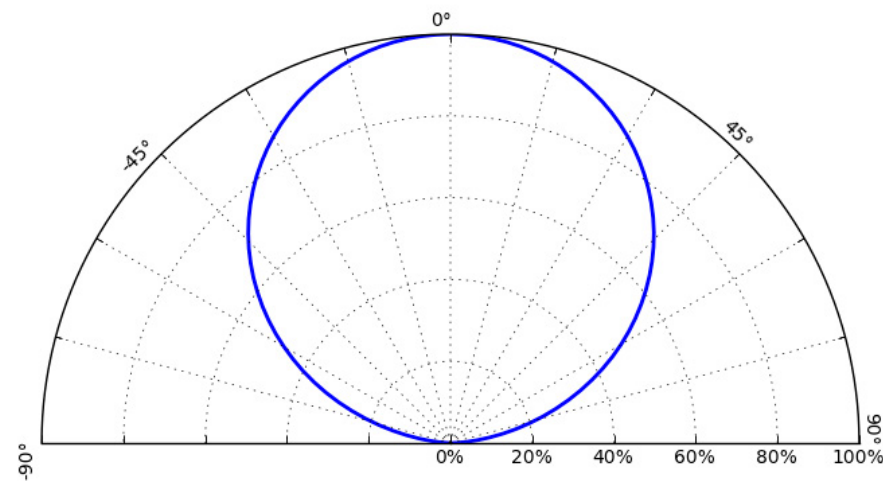


Figure 14. Typical radiation pattern in Polar coordinate system.

# Product Binning and Labeling

## Purpose of Product Binning

In the manufacturing of semiconductor products, there is a variation of performance around the average values given in the technical data sheets. For this reason, Lumileds bins the LED components for luminous flux, color and forward voltage ( $V_f$ ).

## Decoding Product Bin Labeling

LUXEON mid-power emitters are labeled using a four digit alphanumeric code (CAT code) depicting the bin values for emitters packaged on a single reel. All emitters packaged within a reel are of the same 3-variable bin combination. Using these codes, it is possible to determine optimum mixing and matching of products for consistency in a given application.

Reels for all emitters are labeled with the CAT code following the format below.

ABCD

Where:

A = Flux bin (H etc.)

B & C = Color bin (For example 8D, 8E, 8F, etc.)

D =  $V_f$  bin

## Luminous Flux Bins

Table 6 and Table 7 list the standard photometric luminous flux bins for LUXEON 3030 2D mid-power emitters (tested and binned at 120mA and a junction temperature of 25°C). 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 colors. Please contact your Lumileds representative for the supportable flux bins.

Table 6.

| Bin Code | Minimum Photometric Flux (lm) | Maximum Photometric Flux (lm) |
|----------|-------------------------------|-------------------------------|
| 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                           |

Note for Table 6:

1. Tested and binned at 25°C,  $I_f=120\text{mA}$ . Tester tolerance:  $\pm 7.5\%$ .



# Forward Voltage Bins

Table 7.

| Bin Code | Minimum Forward Voltage (V) | Maximum Forward Voltage (V) |
|----------|-----------------------------|-----------------------------|
| 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                         |

Note for Table 7:

- 1. Tested and binned at 25°C, I<sub>f</sub>=120mA.

# Color Bin Structure

The LUXEON 3030 2D is hot color targeted so that at 85°C, the color is within ANSI.

Typical bin structure at 85°C

In application conditions, the LED temperature rises and at 85°C the typical color bins will be as shown.

Note: Bin \*N will represent the entire ANSI bin for that corresponding CCT. For example, bin 7N will represent the entire bin for 3000K ANSI.

## L130-27xx003000W21 Color Bin Structure

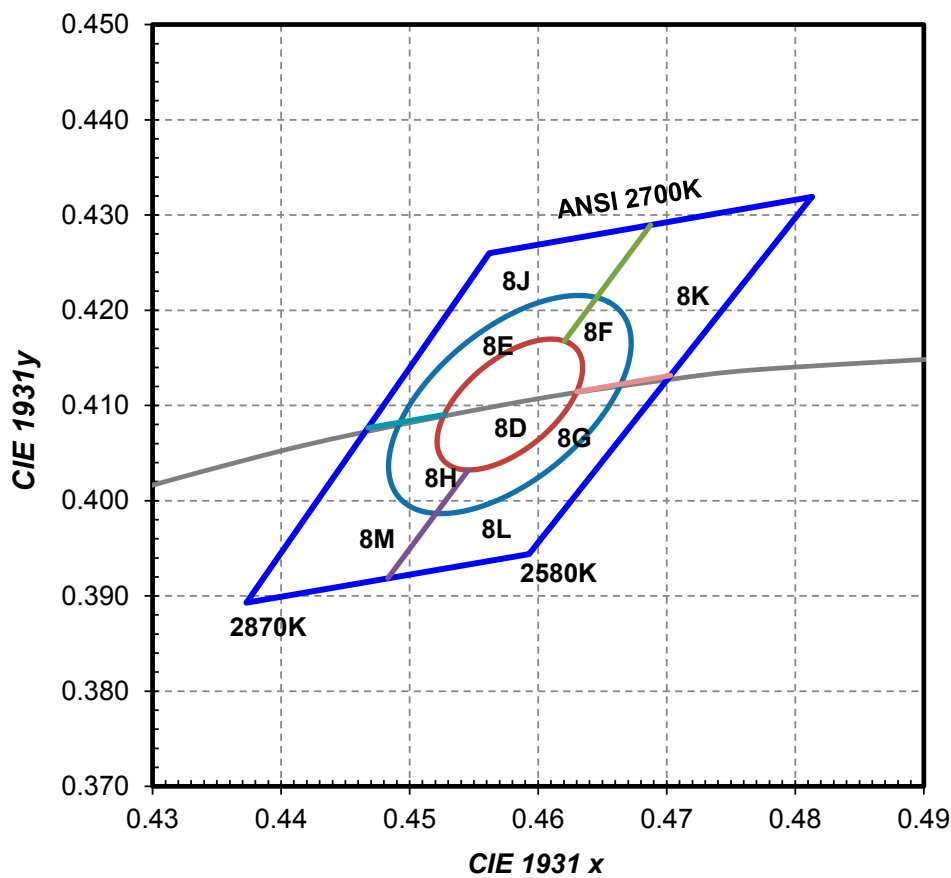


Figure 15. 2700K 1/9<sup>th</sup> color bin structure.

Table 8.

| Nominal ANSI CCT | Color Space                   | Target Center Point (cx, cy) | Major Axis, a | Minor Axis, b | Ellipse Rotation Angle |
|------------------|-------------------------------|------------------------------|---------------|---------------|------------------------|
| 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°                 |

Note for Table 8:

1. Tester tolerance: ±0.007 in x and y coordinates.

L130-30xx003000W21 Color Bin Structure

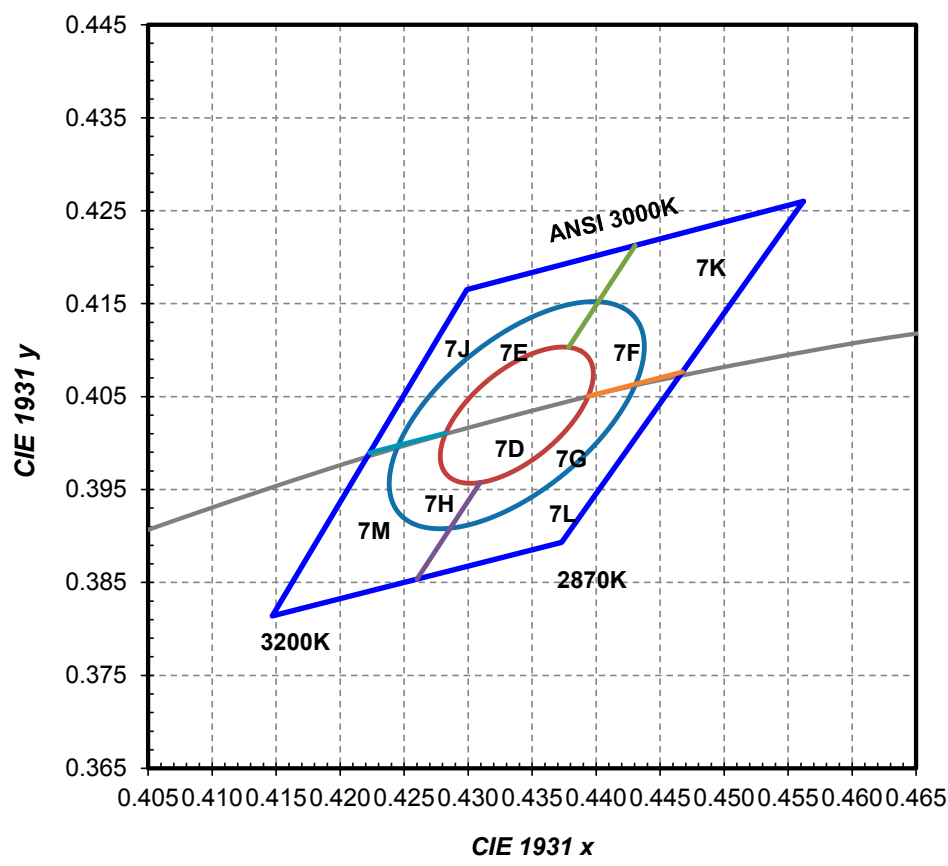


Figure 16. 3000K 1/9<sup>th</sup> color bin structure.

Table 9.

| Nominal ANSI CCT | Color Space                   | Target Center Point (cx, cy) | Major Axis, a | Minor Axis, b | Ellipse Rotation Angle |
|------------------|-------------------------------|------------------------------|---------------|---------------|------------------------|
| 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°                 |

Note for Table 9:  
1. Tester tolerance: ±0.007 in x and y coordinates.

L130-35xx003000W21 Color Bin Structure

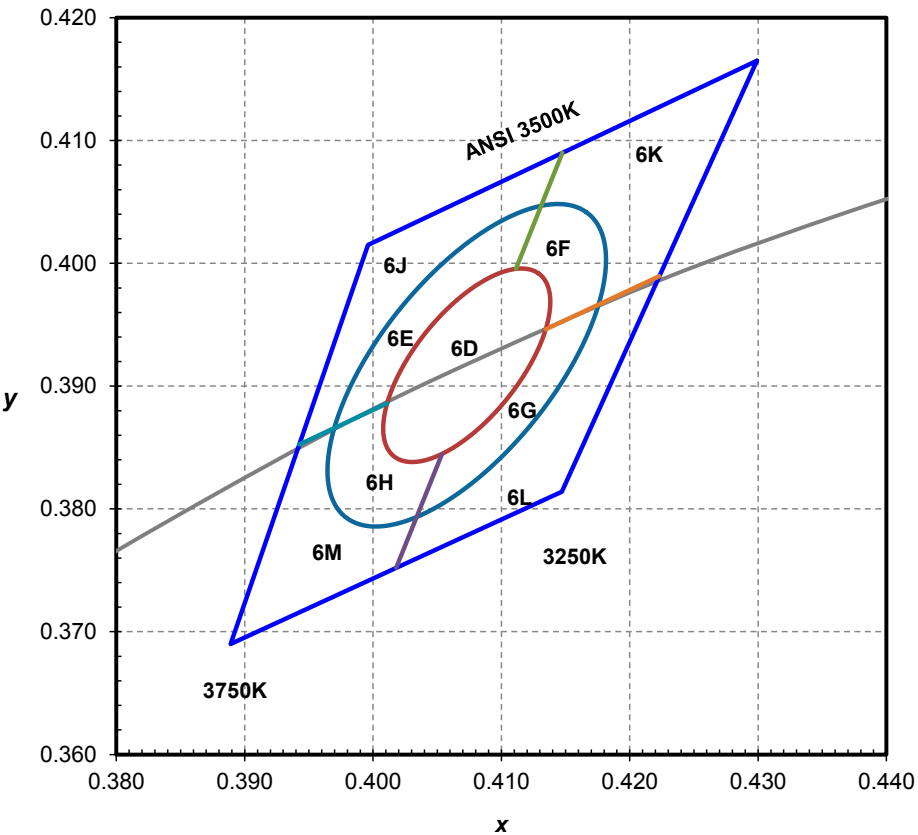


Figure 17. 3500K 1/9<sup>th</sup> color bin structure.

Table 10.

| Nominal ANSI CCT | Color Space                   | Target Center Point (cx, cy) | Major Axis, a | Minor Axis, b | Ellipse Rotation Angle |
|------------------|-------------------------------|------------------------------|---------------|---------------|------------------------|
| 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°                 |

Note for Table 10:  
1. Tester tolerance: ±0.007 in x and y coordinates.

L130-40xx003000W21 Color Bin Structure

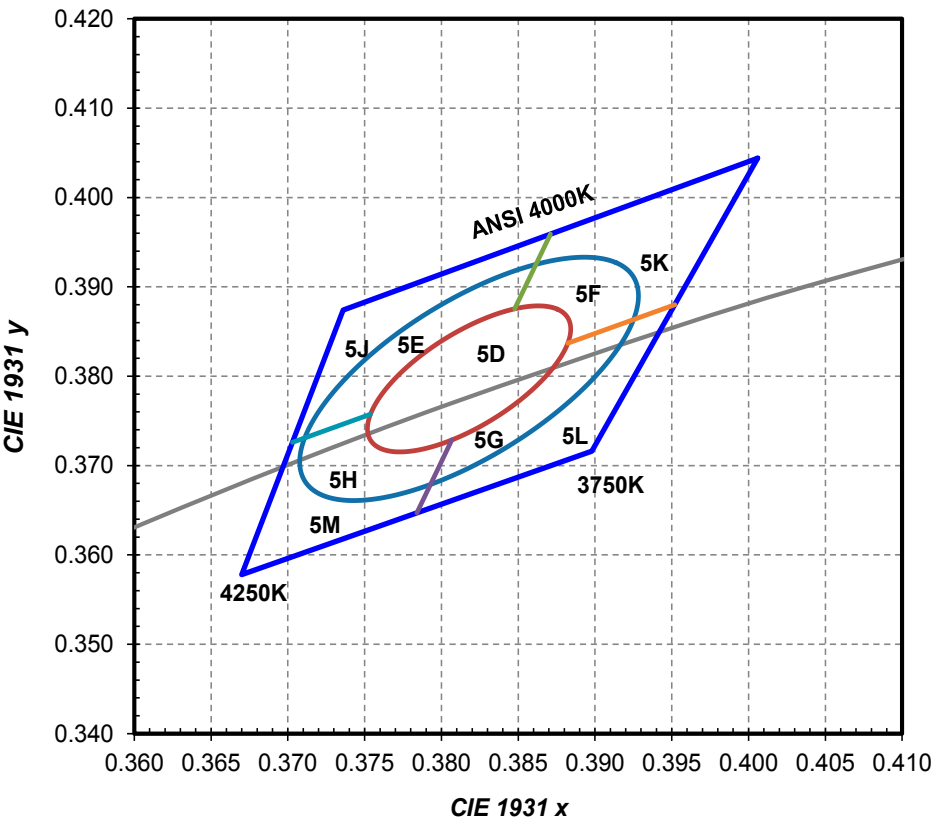


Figure 18. 4000K 1/9<sup>th</sup> color bin structure.

Table 11.

| Nominal ANSI CCT | Color Space                   | Target Center Point (cx, cy) | Major Axis, a | Minor Axis, b | Ellipse Rotation Angle |
|------------------|-------------------------------|------------------------------|---------------|---------------|------------------------|
| 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°                 |

Note for Table 11:  
1. Tester tolerance: ±0.007 in x and y coordinates.

L130-50xx003000W21 Color Bin Structure

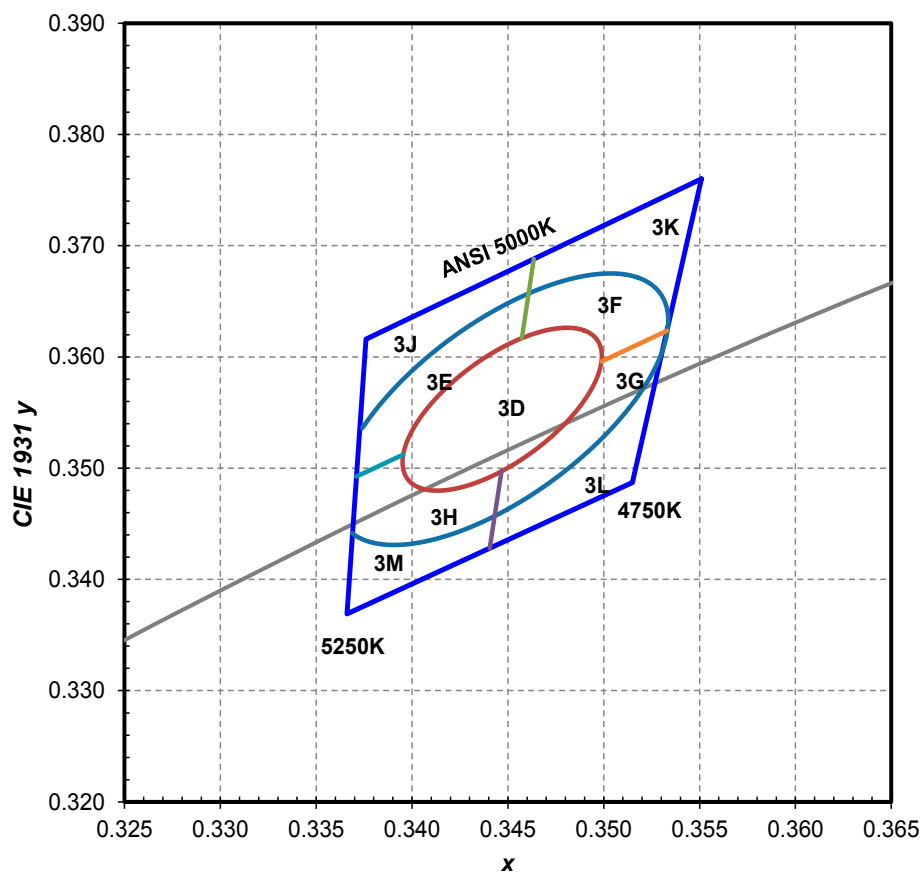


Figure 19. 5000K 1/9<sup>th</sup> color bin structure.

Table 12.

| Nominal ANSI CCT | Color Space                   | Target Center Point (cx, cy) | Major Axis, a | Minor Axis, b | Ellipse Rotation Angle |
|------------------|-------------------------------|------------------------------|---------------|---------------|------------------------|
| 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°                 |

Note for Table 12:  
1. Tester tolerance: ±0.007 in x and y coordinates.

L130-57xx003000W21 Color Bin Structure

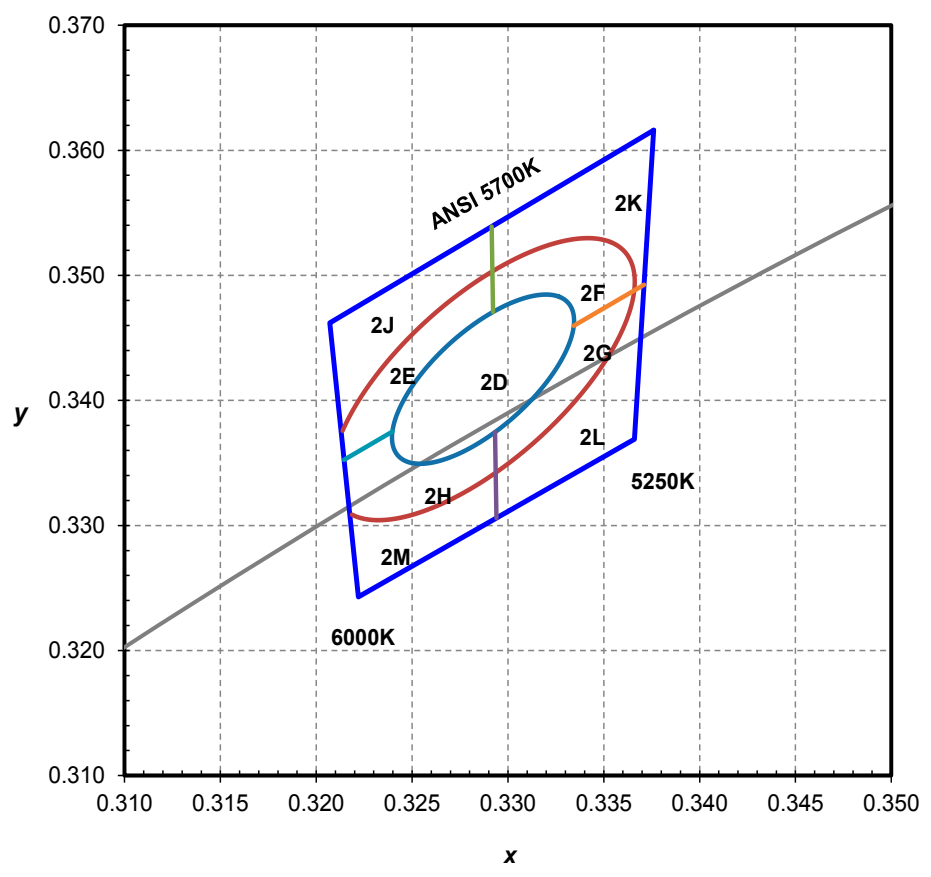


Figure 20. 5700K 1/9<sup>th</sup> color bin structure.

Table 13.

| Nominal ANSI CCT | Color Space                   | Target Center Point (cx, cy) | Major Axis, a | Minor Axis, b | Ellipse Rotation Angle |
|------------------|-------------------------------|------------------------------|---------------|---------------|------------------------|
| 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°                 |

Note for Table 13:  
1. Tester tolerance: ±0.007 in x and y coordinates.

L130-65xx003000W21 Color Bin Structure

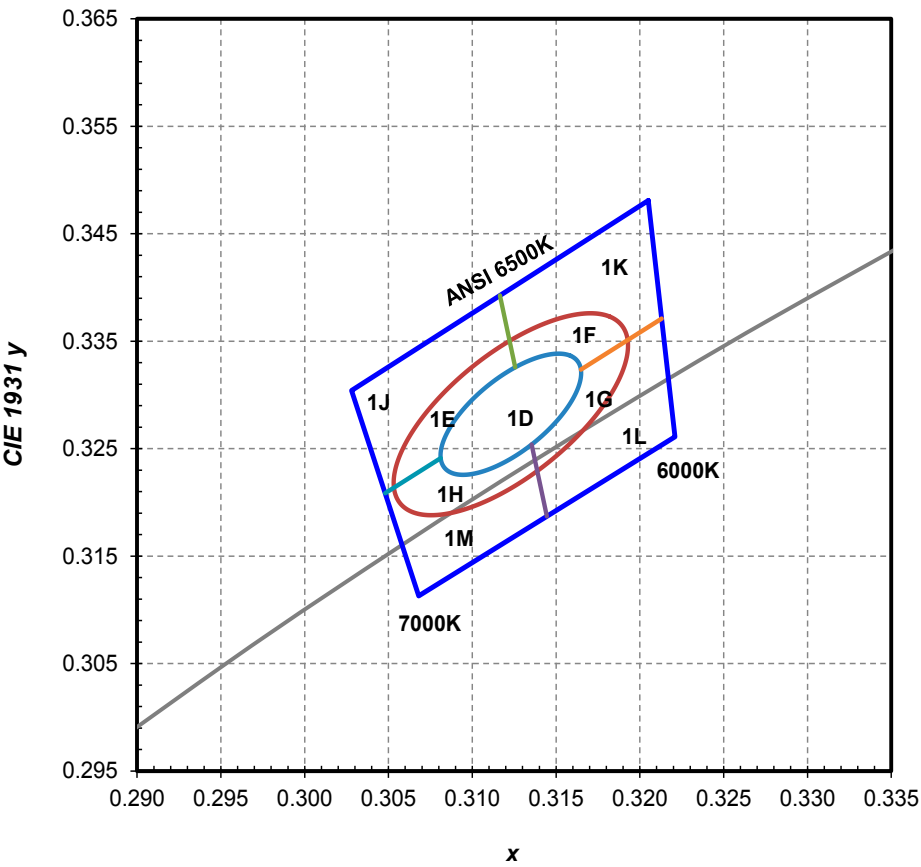


Figure 21. 6500K 1/9<sup>th</sup> color bin structure.

Table 14.

| Nominal ANSI CCT | Color Space                   | Target Center Point (cx, cy) | Major Axis, a | Minor Axis, b | Ellipse Rotation Angle |
|------------------|-------------------------------|------------------------------|---------------|---------------|------------------------|
| 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°                 |

Note for Table 14:  
1. Tester tolerance: ±0.007 in x and y coordinates.



# 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 [www.lumileds.com](http://www.lumileds.com).



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