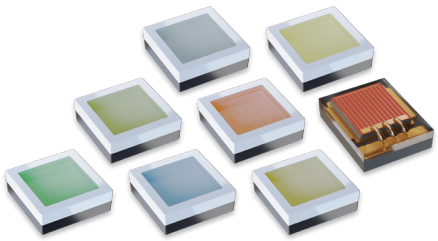


# LUXEON Rubix

## High drive, tiny LED, max performance



LUXEON Rubix is a breakthrough design for the LED industry. Designed with high driving current capability and small form factor, it provides maximum flux in a minimal amount of space making it ideal for entertainment, architecture and emergency vehicle lighting application. This LED provides double the flux at much higher driving current compared to previous generations. It is the smallest form factor in the Lumileds Colors portfolio enabling it to be packaged even closer to achieve higher lumen output at higher lumen densities. The individual emitters and color gamut allow customers to have much better flexibility in their product design.

### FEATURES AND BENEFITS

- Tiny footprint 1414 package
- High Drive current up to 1.6A DC
- Maximized punch (cd/lm)

### PRIMARY APPLICATIONS

- Moving Head
- Spotlights
- Wall Wash
- Floodlights
- Landscape Lighting

cULus No. E352519 RoHS COMPLIANT

DS309 LUXEON Rubix Product Datasheet ©2026 Lumileds Holding B.V. All rights reserved.

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# General Product Information

## Product Test Conditions

LUXEON Rubix Color Line LEDs are tested and binned with a DC drive current and junction temperature specified below:

LUXEON Rubix Color - 1500mA, $T_j$=85ºC
LUXEON Rubix Red Option 2 (L1RX-RED2000000000) - 1000mA, $T_j$=85ºC
LUXEON Rubix White 5700K 60CRI - 1500mA, $T_j$=85ºC
LUXEON Rubix White for 80CRI and 90CRI - 1000mA, $T_j$=85ºC

## Part Number Nomenclature

Part numbers for LUXEON Rubix Colors follow the convention below:

L 1 R X – **A A A B** 0 0 0 0 0 0 0 0 0

Where:

**A A A** – designates color (RED=Red, PCA=PC Amber, LME=Lime, GRN=Green, CYN=Cyan, BLU=Blue, RYL=Royal Blue)
**B** – designates product option (example 1, 2...etc)

Therefore, the following part number is used for a LUXEON Rubix Red LED:

L 1 R X – **R E D** 2 0 0 0 0 0 0 0 0 0

Part numbers for LUXEON Rubix White follow the convention below:

L 1 R X – **A A B B** 0 0 0 0 0 0 0 0 0

Where:

**A A** – designates nominal CCT (22=2200K, 27=2700K, 30=3000K, 35=3500K, 40=4000K, 45=4500K, 57=5700K, 65=6500K)
**B B** – designates minimum CRI (60=60CRI, 80=80CRI, 90=90CRI)

Therefore, the following part number is used for a LUXEON Rubix White 5700K 60CRI LED:

L 1 R X – **5 7 6 0** 0 0 0 0 0 0 0 0 0

## Lumen Maintenance

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

## Environmental Compliance

Lumileds LLC is committed to providing environmentally friendly products to the solid-state lighting market. LUXEON Rubix 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 1a. Product performance of LUXEON Rubix Colors at 1500mA, $T_j$=85°C**

| COLOR | DOMINANT OR PEAK WAVELENGTH [1] (nm) | | LUMINOUS FLUX (lm) OR RADIOMETRIC POWER [2] (mW) | | PART NUMBER |
|---|---|---|---|---|---|
| | MINIMUM | MAXIMUM | MINIMUM | TYPICAL | |
| PC Amber | - | - | 240 | 308 | L1RX-PCA1000000000 |
| Lime | - | - | 502 | 670 | L1RX-LME1000000000 |
| Green | 520 | 535 | 280 | 360 | L1RX-GRN1000000000 |
| Cyan | 490 | 510 | 180 | 279 | L1RX-CYN1000000000 |
| Blue | 465 | 485 | 80 | 130 | L1RX-BLU1000000000 |
| Royal Blue | 440 | 455 | 1700 | 1970 | L1RX-RYL1000000000 |

Notes for Table 1a:
1. Lumileds maintains a tolerance of ±6.5% on luminous flux measurements.
2. Royal Blue is binned by peak wavelength. All other colors are binned by dominant wavelength.
3. Royal Blue is binned by radiometric power. All other colors are binned by luminous flux.

**Table 1b. Product performance of LUXEON Rubix L1RX-RED2000000000 at 1000mA, $T_j$=85°C**

| COLOR | DOMINANT WAVELENGTH [1] (nm) | | LUMINOUS FLUX [1] (lm) | | PART NUMBER |
|---|---|---|---|---|---|
| | MINIMUM | MAXIMUM | MINIMUM | TYPICAL | |
| Red | 620 | 630 | 65 | 78 | L1RX-RED2000000000 |

Notes for Table 1b:
1. Lumileds maintains a tolerance of ±6.5% on luminous flux measurements.

**Table 1c. Product performance of LUXEON Rubix White 60CRI at 1500mA, $T_j$=85°C**

| COLOR | NOMINAL CCT | MINIMUM CRI [1] | LUMINOUS FLUX [1] (lm) | | TYPICAL LUMINOUS EFFICACY (lm/W) | PART NUMBER |
|---|---|---|---|---|---|---|
| | | | MINIMUM | TYPICAL | | |
| White 60CRI | 5700K | 60 | 440 | 510 | 108 | L1RX-5760000000000 |

Notes for Table 1c:
1. Lumileds maintains a tolerance of ±6.5% on luminous flux and ±2 on CRI measurements for these products.

**Table 1d. Product performance of LUXEON Rubix White at 1000mA, $T_j$=85°C**

| COLOR | NOMINAL CCT | MINIMUM CRI [1] | LUMINOUS FLUX [1] (lm) | | TYPICAL LUMINOUS EFFICACY (lm/W) | PART NUMBER |
|---|---|---|---|---|---|---|
| | | | MINIMUM | TYPICAL | | |
| White 80CRI and 90CRI | 2200K | 80 | 200 | 242 | 80 | L1RX-2280000000000 |
| | 2700K | 80 | 240 | 282 | 93 | L1RX-2780000000000 |
| | 3000K | 80 | 260 | 295 | 98 | L1RX-3080000000000 |
| | 3500K | 80 | 260 | 317 | 105 | L1RX-3580000000000 |
| | 4000K | 80 | 280 | 320 | 106 | L1RX-4080000000000 |
| | 4500K | 80 | 280 | 323 | 107 | L1RX-4580000000000 |
| | 6500K | 80 | 280 | 325 | 108 | L1RX-6580000000000 |
| | 2700K | 90 | 200 | 230 | 76 | L1RX-2790000000000 |

Notes for Table 1d:
1. Lumileds maintains a tolerance of ±6.5% on luminous flux and ±2 on CRI measurements for these products.

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# Optical Characteristics

**Table 2a. Optical characteristics for LUXEON Rubix Colors at 1500mA, $T_j$=85°C**

| COLOR | PART NUMBER | TYPICAL SPECTRAL HALF-WIDTH [1] (nm) | TYPICAL TEMPERATURE COEFFICIENT OF DOMINANT OR PEAK WAVELENGTH (nm/°C) | TYPICAL TOTAL INCLUDED ANGLE [2] | TYPICAL VIEWING ANGLE [3] |
|---|---|---|---|---|---|
| PC Amber | L1RX-PCA1000000000 | 78 | -0.01 | 140 | 125 |
| Lime | L1RX-LME1000000000 | 101 | 0.02 | 140 | 125 |
| Green | L1RX-GRN1000000000 | 36 | 0.05 | 140 | 125 |
| Cyan | L1RX-CYN1000000000 | 29 | 0.03 | 140 | 125 |
| Blue | L1RX-BLU1000000000 | 28 | 0.04 | 140 | 125 |
| Royal Blue | L1RX-RYL1000000000 | 22 | 0.05 | 140 | 125 |

Notes for Table 2a:
1. Spectral half-width is the spectral bandwidth at 50% of the peak intensity.
2. Total angle at which 90% of total luminous flux is captured.
3. Viewing angle is the off axis angle from the LED centerline where the luminous intensity is ½ of the peak value.

**Table 2b. Optical characteristics for LUXEON Rubix L1RX-RED2000000000 at 1000mA, $T_j$=85°C**

| COLOR | PART NUMBER | TYPICAL SPECTRAL HALF-WIDTH [1] (nm) | TYPICAL TEMPERATURE COEFFICIENT OF DOMINANT WAVELENGTH (nm/°C) | TYPICAL TOTAL INCLUDED ANGLE [2] | TYPICAL VIEWING ANGLE [3] |
|---|---|---|---|---|---|
| Red | L1RX-RED2000000000 | 20 | 0.05 | 140 | 124 |

Notes for Table 2b:
1. Spectral half-width is the spectral bandwidth at 50% of the peak intensity.
2. Total angle at which 90% of total luminous flux is captured.
3. Viewing angle is the off axis angle from the LED centerline where the luminous intensity is ½ of the peak value.

**Table 2c. Optical characteristics for LUXEON Rubix White 60CRI at 1500mA, $T_j$=85°C**

| COLOR | PART NUMBER | TYPICAL TOTAL INCLUDED ANGLE [1] | TYPICAL VIEWING ANGLE [2] |
|---|---|---|---|
| White 60CRI | L1RX-5760000000000 | 140 | 125 |

Notes for Table 2c:
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.

**Table 2d. Optical characteristics for LUXEON Rubix White at 1000mA, $T_j$=85°C**

| COLOR | PART NUMBER | TYPICAL TOTAL INCLUDED ANGLE [1] | TYPICAL VIEWING ANGLE [2] |
|---|---|---|---|
| White 80CRI and 90CRI | L1RX-2280000000000 | 137 | 118 |
| | L1RX-2780000000000 | | |
| | L1RX-3080000000000 | | |
| | L1RX-3580000000000 | | |
| | L1RX-4080000000000 | | |
| | L1RX-4580000000000 | | |
| | L1RX-6580000000000 | | |
| | L1RX-2790000000000 | | |

Notes for Table 2d:
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.

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# Electrical and Thermal Characteristics

**Table 3a. Electrical and thermal characteristics for LUXEON Rubix at 1500mA, $T_j$=85°C**

| COLOR | PART NUMBER | FORWARD VOLTAGE [1] ($V_f$) | | | TYPICAL TEMPERATURE COEFFICIENT OF FORWARD VOLTAGE [2] (mV/°C) | TYPICAL THERMAL RESISTANCE—JUNCTION TO SOLDER PAD (°C/W) |
|---|---|---|---|---|---|---|
| | | MINIMUM | TYPICAL | MAXIMUM | | |
| PC Amber | L1RX-PCA1000000000 | 2.85 | 3.15 | 3.50 | -1.8 | 2.3 |
| Lime | L1RX-LME1000000000 | 2.85 | 3.15 | 3.50 | -1.8 | 2.1 |
| Green | L1RX-GRN1000000000 | 2.55 | 2.89 | 4.50 | -3.3 | 2.4 |
| Cyan | L1RX-CYN1000000000 | 2.65 | 2.96 | 4.00 | -3.3 | 2.2 |
| Blue | L1RX-BLU1000000000 | 2.65 | 3.08 | 4.00 | -1.9 | 1.8 |
| Royal Blue | L1RX-RYL1000000000 | 2.85 | 3.15 | 3.50 | -1.8 | 1.7 |
| White | L1RX-5760000000000 | 2.85 | 3.15 | 3.50 | -1.9 | 1.9 |

Notes for Table 3a:
1. Lumileds maintains a tolerance of ±0.06V on forward voltage measurements.
2. Measured between 25°C and 85°C.

**Table 3b. Electrical and thermal characteristics for LUXEON Rubix at 1000mA, $T_j$=85°C**

| COLOR | PART NUMBER | FORWARD VOLTAGE [1] ($V_f$) | | | TYPICAL TEMPERATURE COEFFICIENT OF FORWARD VOLTAGE [2] (mV/°C) | TYPICAL THERMAL RESISTANCE — JUNCTION TO SOLDER PAD (°C/W) |
|---|---|---|---|---|---|---|
| | | MINIMUM | TYPICAL | MAXIMUM | | |
| Red | L1RX-RED2000000000 | 2.00 | 2.30 | 2.80 | -1.3 | 2.8 |
| | L1RX-2280000000000 | 2.65 | 3.02 | 3.50 | -1.6 | 2.0 |
| | L1RX-2780000000000 | | | | | |
| | L1RX-3080000000000 | | | | | |
| | L1RX-3580000000000 | | | | | |
| | L1RX-4080000000000 | | | | | |
| | L1RX-4580000000000 | | | | | |
| | L1RX-6580000000000 | | | | | |
| | L1RX-2790000000000 | | | | | |

Notes for Table 3b:
1. Lumileds maintains a tolerance of ±0.06V on forward voltage measurements.
2. Measured between 25°C and 85°C.

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# Absolute Maximum Ratings

**Table 4. Absolute maximum ratings for LUXEON Rubix Color Line**

| PARAMETER | RED | | GREEN AND BLUE | CYAN AND ROYAL BLUE | WHITE 60CRI, PC AMBER AND LIME | WHITE 80CRI AND 90CRI |
|---|---|---|---|---|---|---|
| DC Forward Current [1, 2] | 1600mA | 1400mA | 1600mA | 1600mA | 1600mA | 1600mA |
| Peak Pulsed Forward Current [1, 3] | 1600mA | 1400mA | 3000mA | 3000mA | 3000mA | 2600mA |
| LED Junction Temperature [1] (DC & Pulse) | 120°C | 135°C | 150°C | 150°C | 150°C | 150°C |
| ESD Sensitivity (ANSI/ESDA/JEDEC JS-001-2012) | Class 1A | | | | | |
| Operating Case Temperature [1, 4] | -40°C to 110°C | | -40°C to 125°C | -40°C to 125°C | -40°C to 125°C | -40°C to 125°C |
| LED Storage Temperature | -40°C to 135°C | | | | | |
| Soldering Temperature | JEDEC 020c 260°C | | | | | |
| Allowable Reflow Cycles | 3 | | | | | |
| Reverse Voltage ($V_{reverse}$) | 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 the maximum peak pulsed forward current
3. At 10% duty cycle with pulse width of 10ms.
4. The maximum operating case temperature is based on respective typical current (binning current) of each color being used. At higher than typical currents, the user would have to use the thermal resistance of the device to calculate an appropriate maximum operating case temperature.

# Characteristic Curves

## Spectral Power Distribution Characteristics

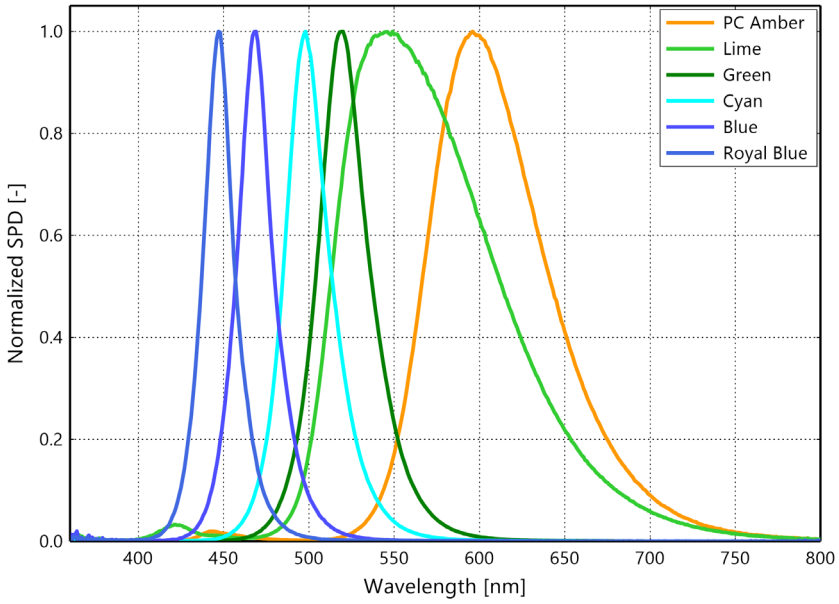



**Figure 1a. Typical normalized power vs. wavelength for LUXEON Rubix Colors at 1500mA, $T_j$=85°C**

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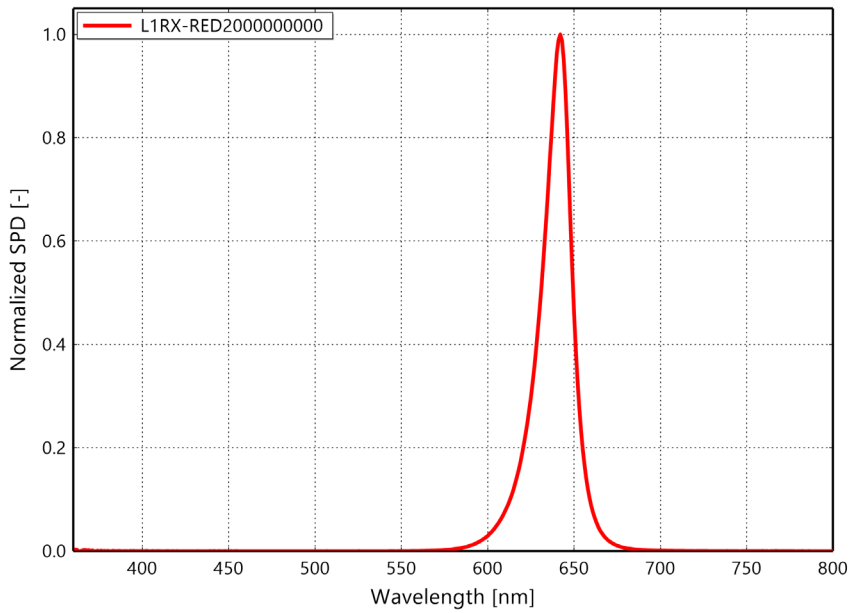



Figure 1b. Typical normalized SPD vs. wavelength for LUXEON Rubix L1RX-RED2000000000 at 1000mA, $T_j$=85°C

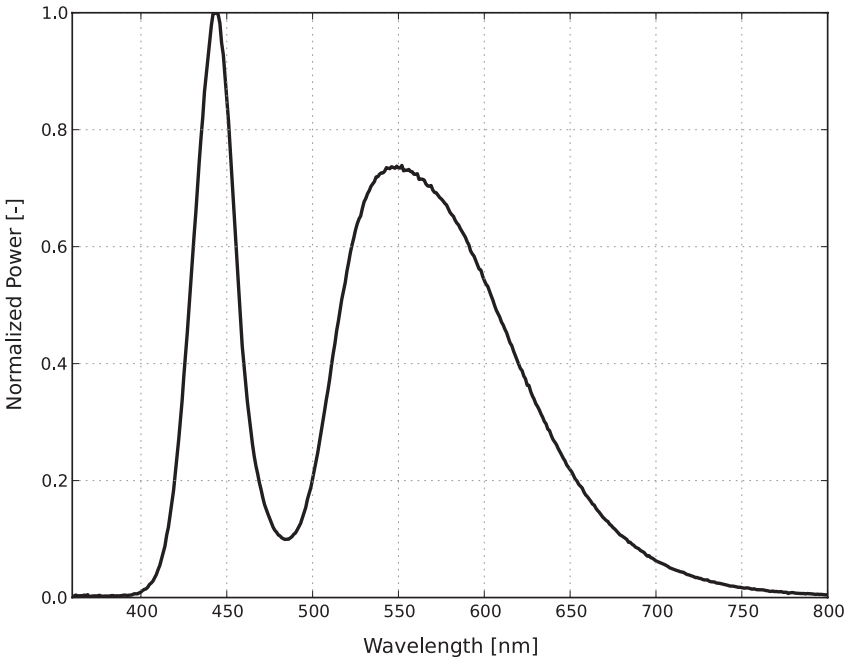



Figure 1c. Typical normalized power vs. wavelength for LUXEON Rubix White 5700K 60CRI at 1500mA, $T_j$=85°C

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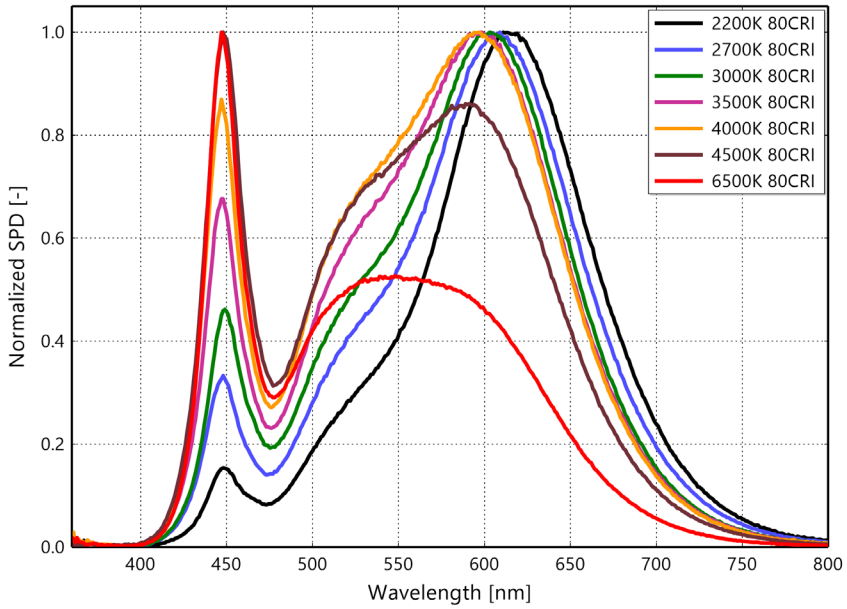



Figure 1d. Typical normalized power vs. wavelength for LUXEON Rubix White 80CRI at 1000mA, $T_j$=85ºC

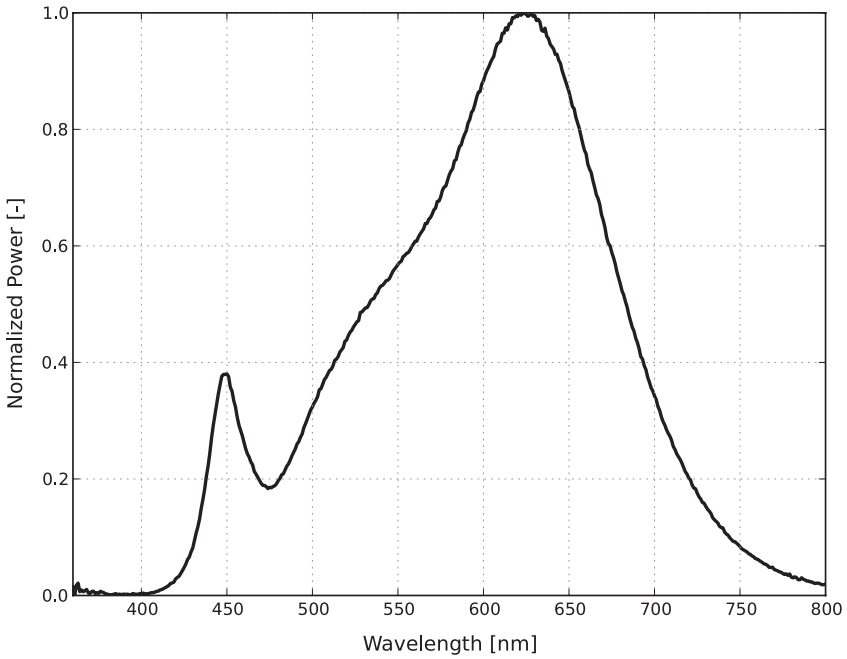



Figure 1e. Typical normalized power vs. wavelength for LUXEON Rubix White 2700K 90CRI at 1000mA, $T_j$=85ºC

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# Light Output Characteristics

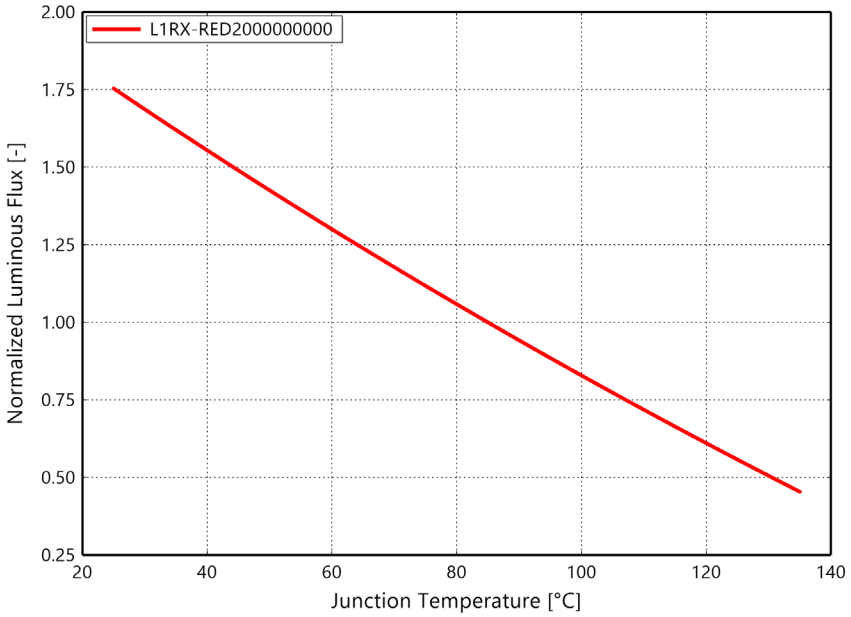



**Figure 2a. Typical normalized luminous flux vs. junction temperature for LUXEON Rubix L1RX-RED2000000000 at 1000mA**

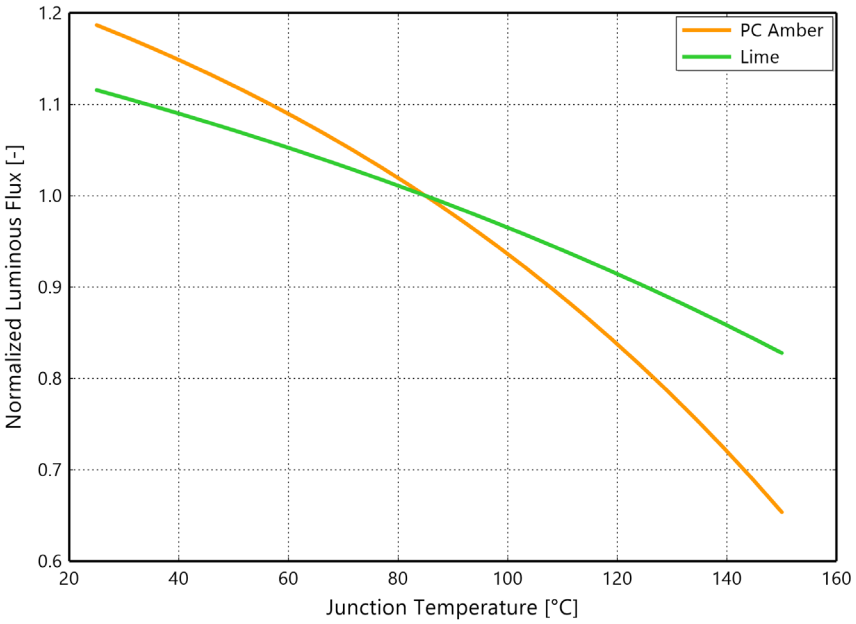



**Figure 2b. Typical normalized luminous flux vs. junction temperature for LUXEON Rubix PC Amber and Lime at 1500mA**

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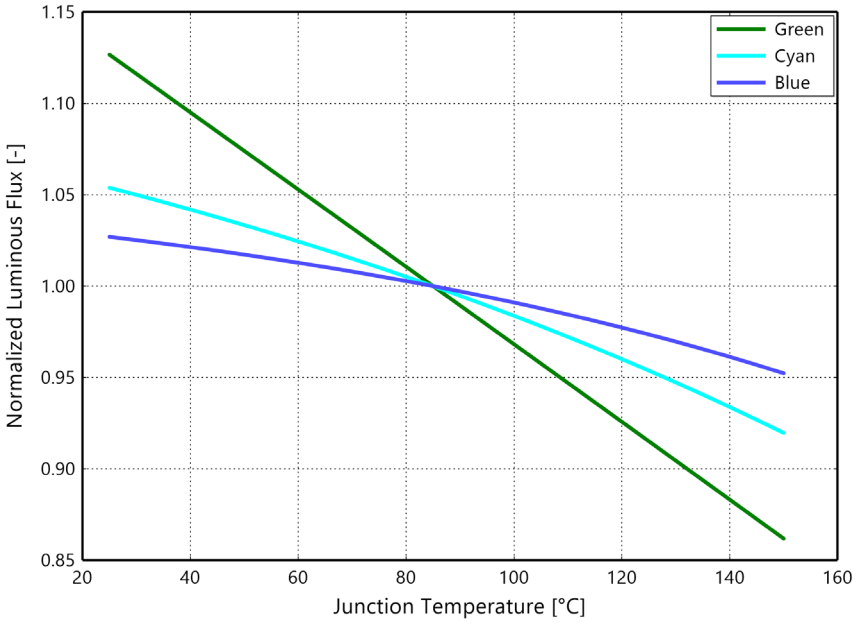



Figure 2c. Typical normalized luminous flux vs. junction temperature for LUXEON Rubix Green, Cyan aand Blue at 1500mA

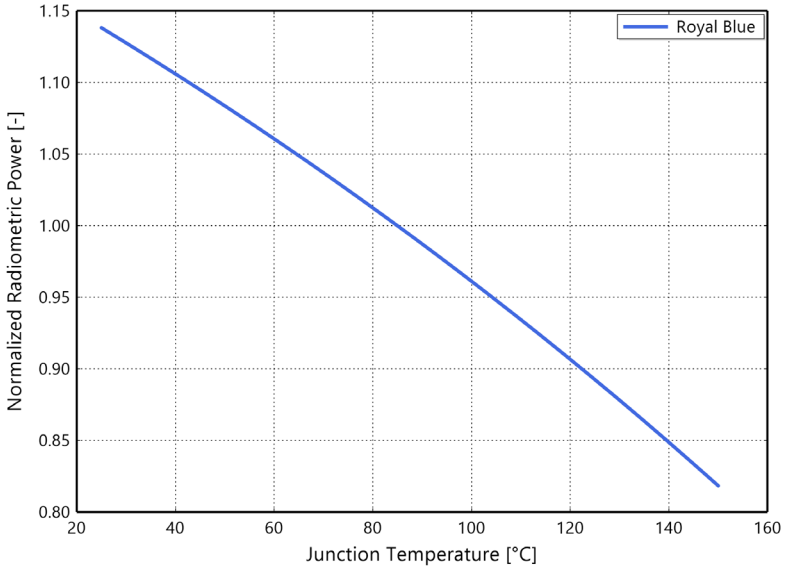



Figure 2d. Typical normalized radiometric power vs. junction temperature for LUXEON Rubix Royal Blue at 1500mA

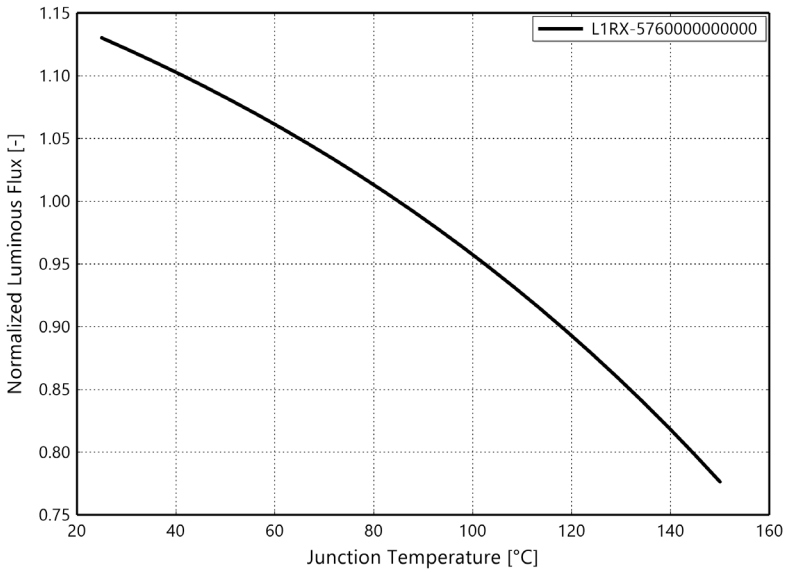



Figure 2e. Typical normalized luminous flux vs. junction temperature for LUXEON Rubix White 60CRI at 1500mA

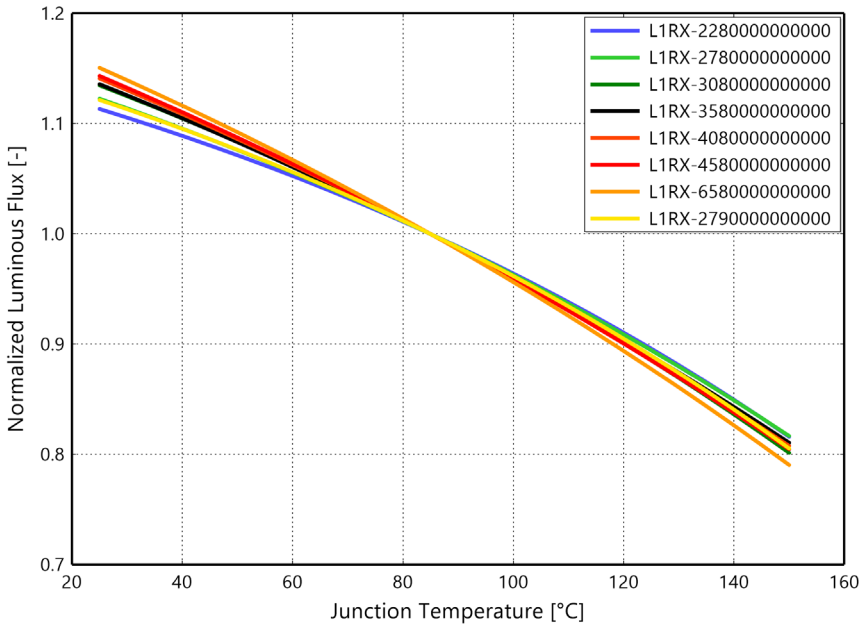



Figure 2f. Typical normalized luminous flux vs. junction temperature for LUXEON Rubix White 80CRI and 90CRI at 1000mA

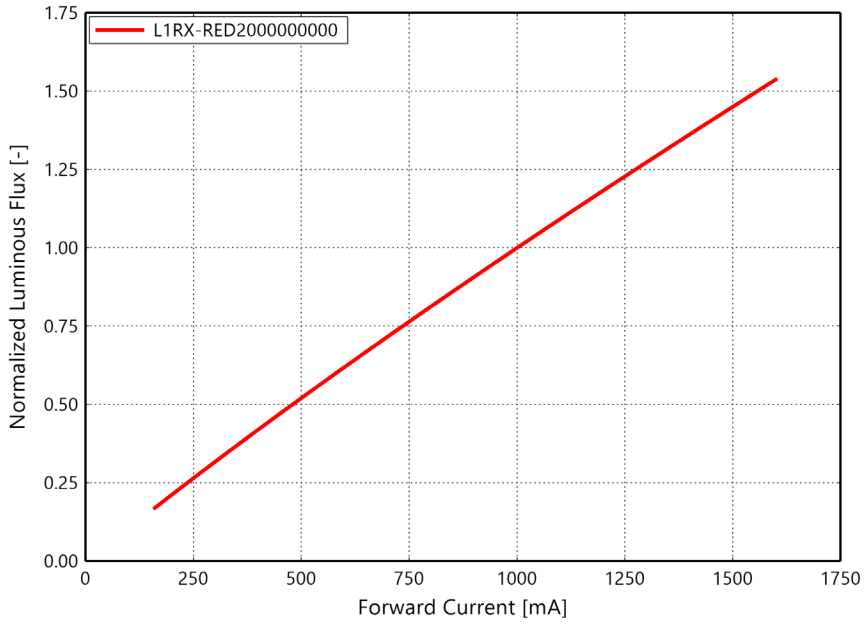



Figure 3a. Typical normalized luminous flux vs. forward current for LUXEON Rubix L1RX-RED2000000000 at $T_j$=85°C

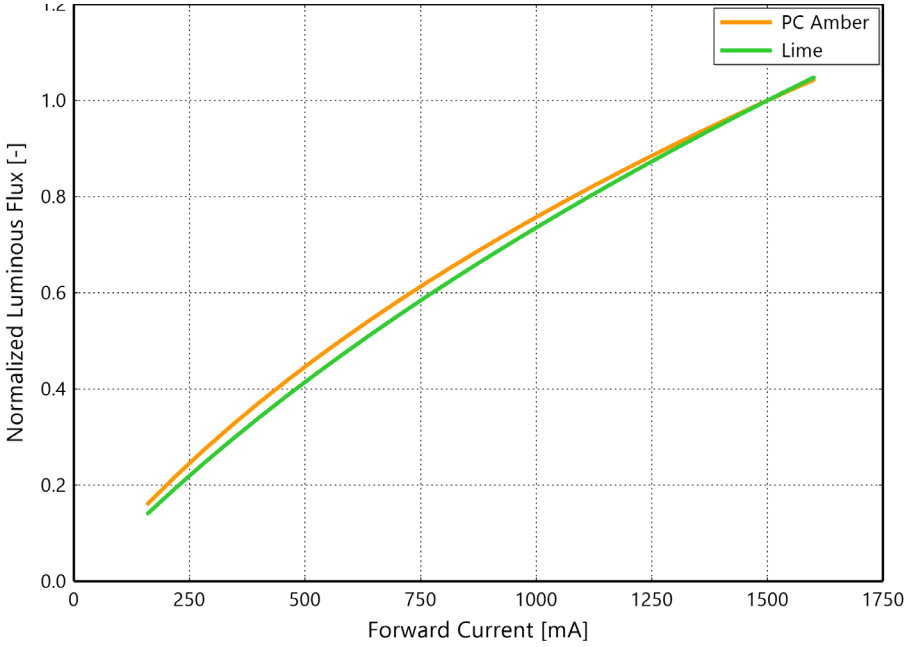



Figure 3b. Typical normalized luminous flux vs. forward current for LUXEON Rubix PC Amber and Lime at $T_j$=85°C

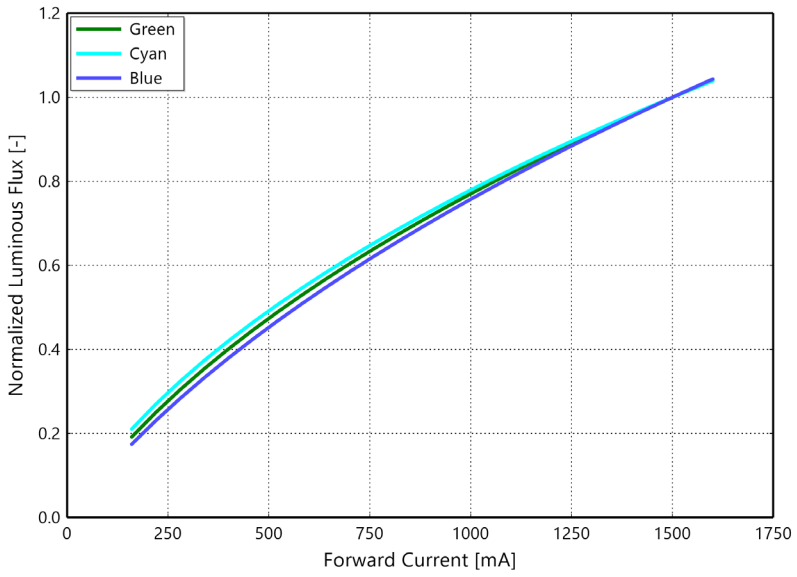



Figure 3c. Typical normalized luminous flux bin vs. forward current for LUXEON Rubix Green, Cyan and Blue at $T_j$=85°C

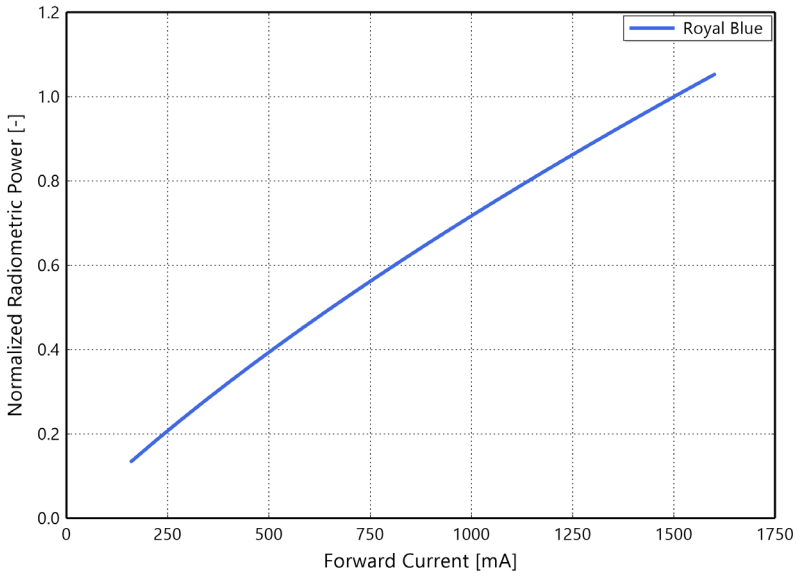



Figure 3d. Typical normalized radiometric power vs. forward current for LUXEON Rubix Royal Blue at $T_j$=85°C

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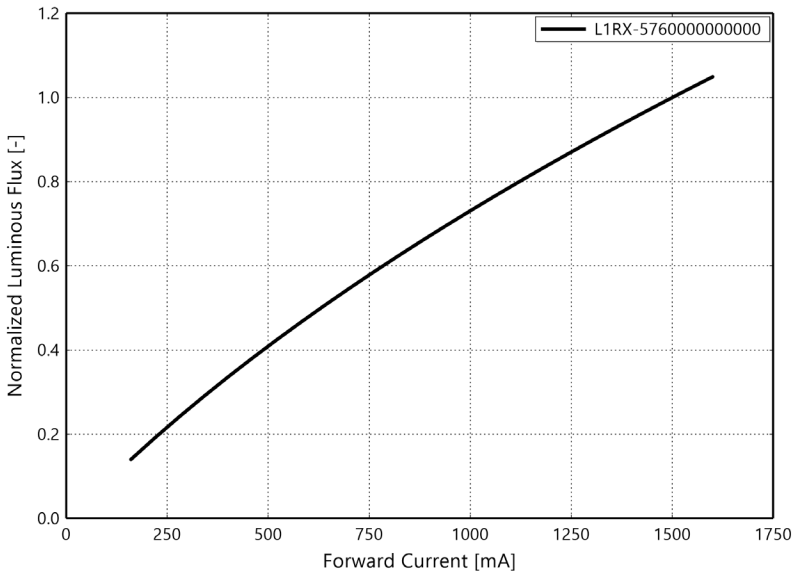



Figure 3e. Typical normalized luminous flux vs. forward current for LUXEON Rubix White 60CRI at $T_j$=85°C

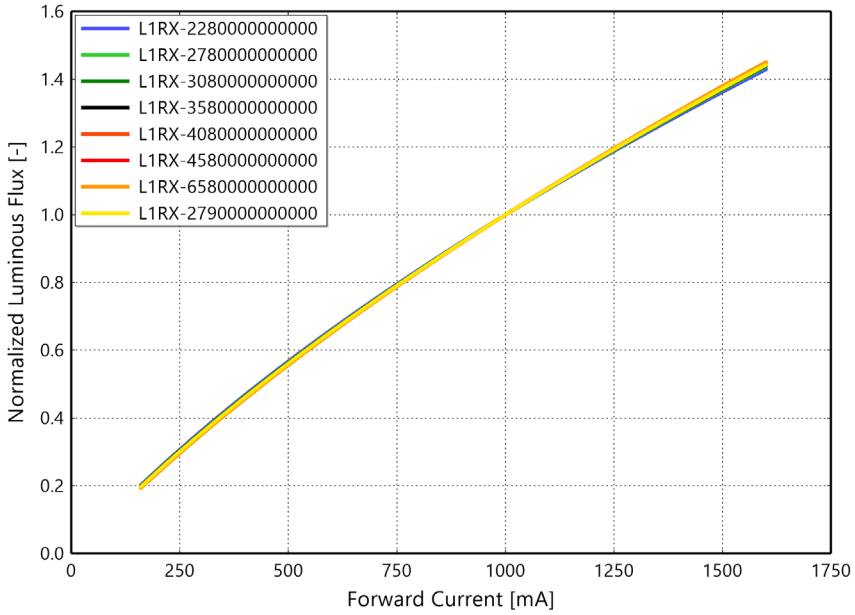



Figure 3f. Typical normalized luminous flux vs. forward current for LUXEON Rubix White 80CRI and 90CRI at $T_j$=85°C

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# Forward Current Characteristics

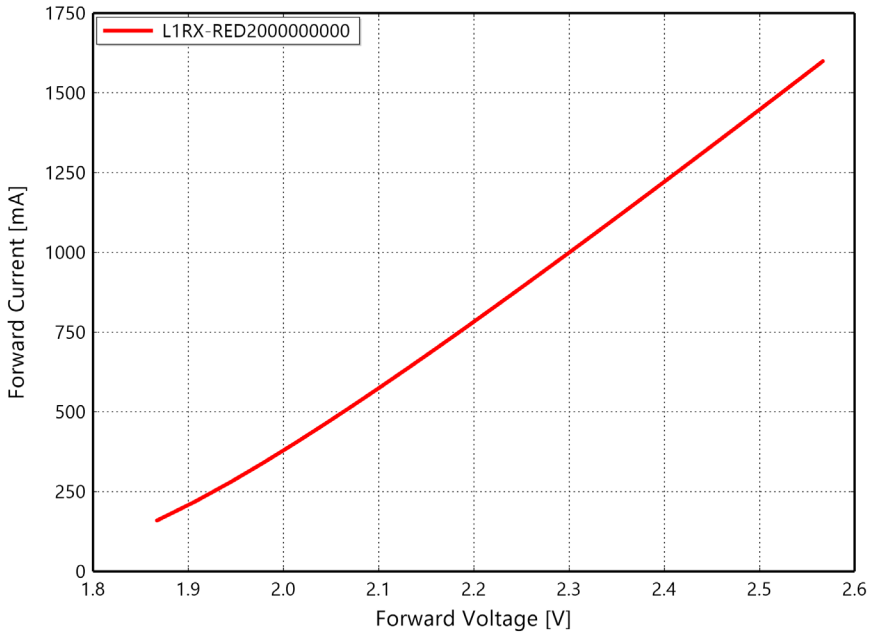



Figure 4a. Typical forward current vs. forward voltage for LUXEON Rubix L1RX-RED2000000000 at $T_j$=85°C

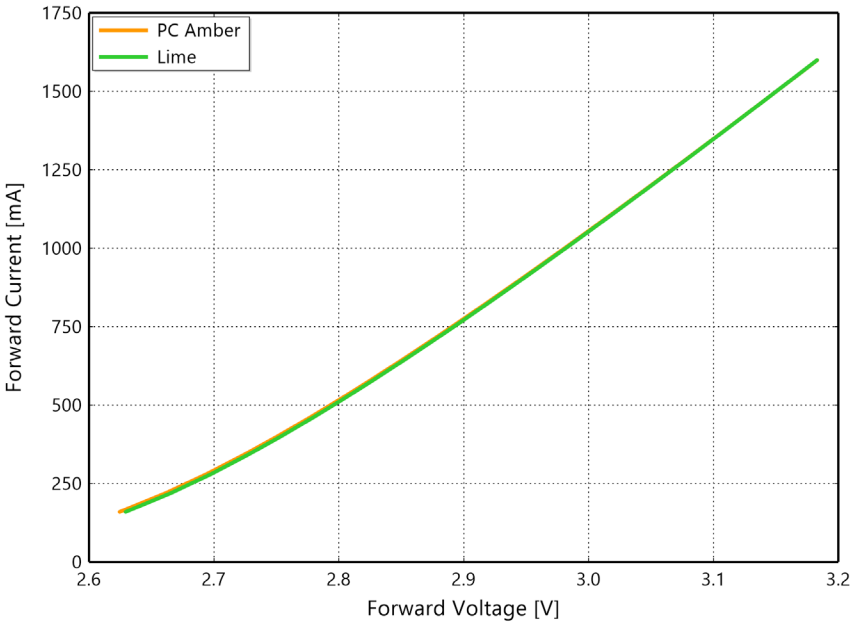



Figure 4b. Typical forward current vs. forward voltage for LUXEON Rubix PC Amber and Lime at $T_j$=85°C

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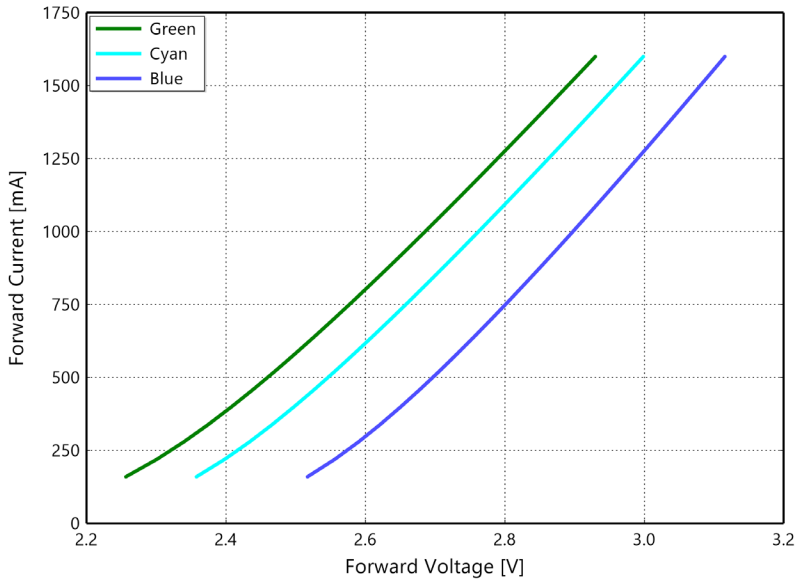



Figure 4c. Typical forward current vs. forward voltage for LUXEON Rubix Green, Cyan and Blue at $T_j$=85°C

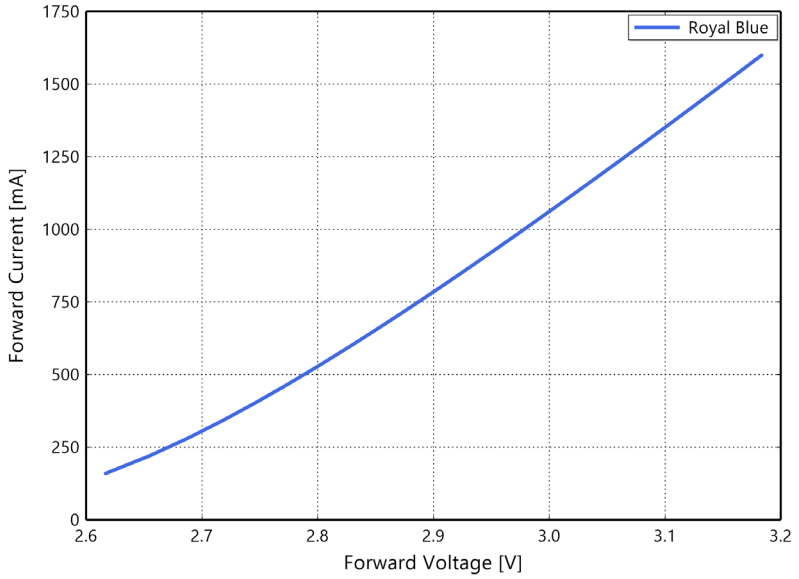



Figure 4d. Typical forward current vs. forward voltage for LUXEON Rubix Royal Blue at $T_j$=85°C

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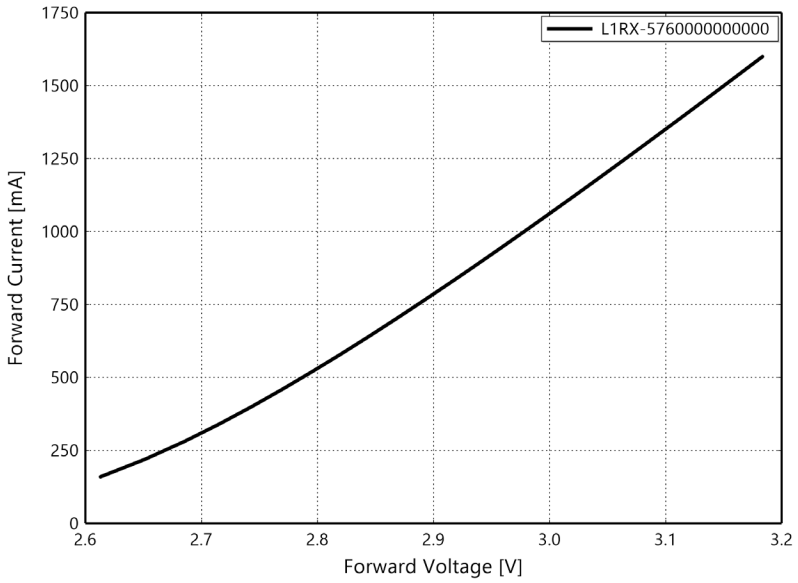



Figure 4e. Typical forward current vs. forward voltage for LUXEON Rubix White 60CRI at $T_j$=85°C

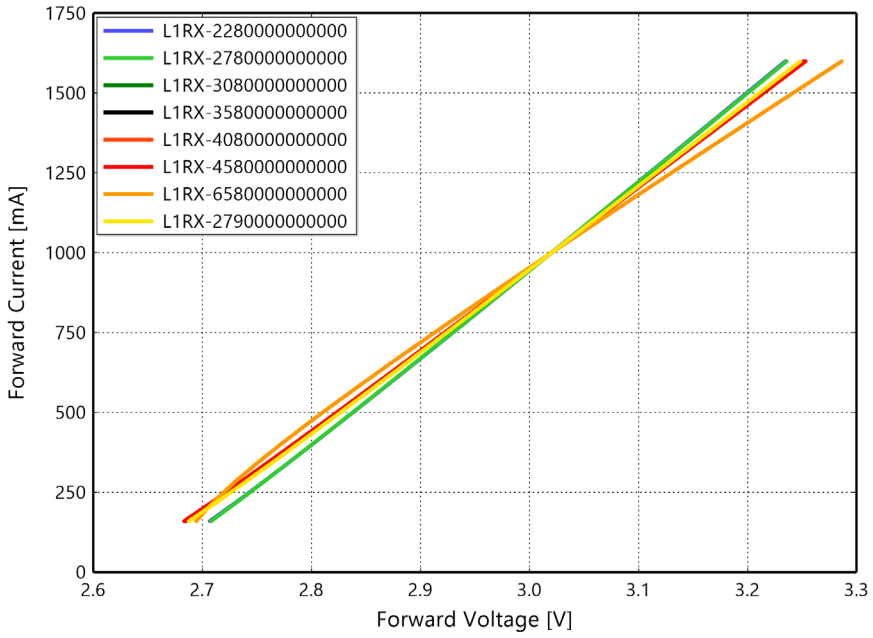



Figure 4f. Typical forward current vs. forward voltage for LUXEON Rubix White 80CRI and 90CRI at $T_j$=85°C

# Radiation Pattern Characteristics

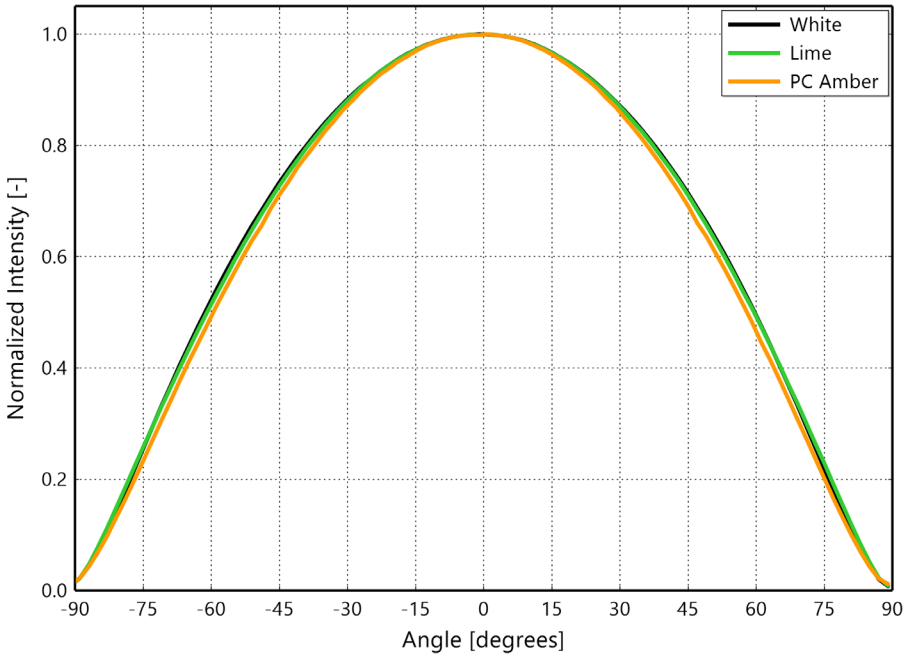



Figure 5a. Typical radiation pattern for LUXEON Rubix PC Amber, Lime and White 60CRI at 1500mA, $T_j$=85°C

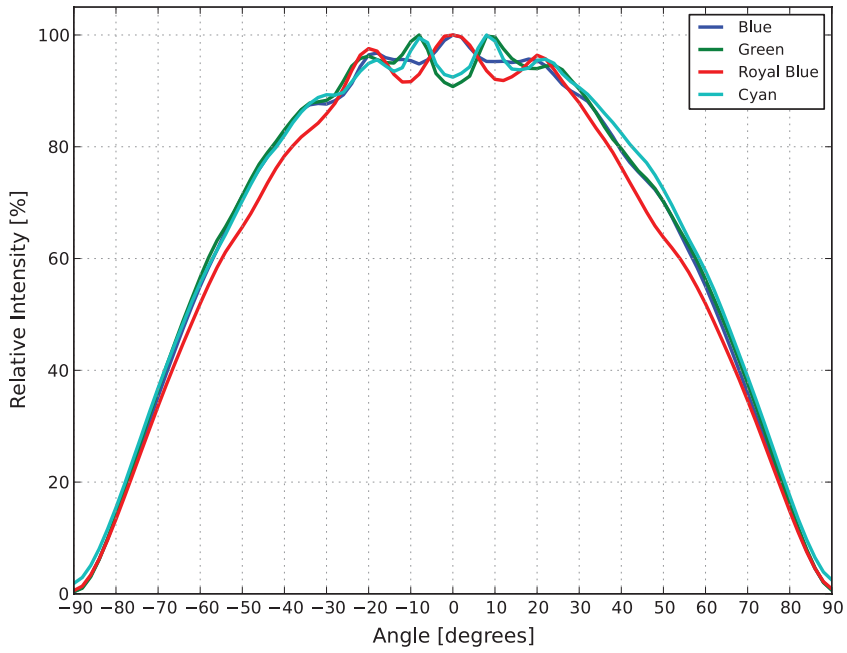



Figure 5b. Typical radiation pattern for LUXEON Rubix Green, Cyan, Blue and Royal Blue at 1500mA, $T_j$=85°C

Notes for Figure 5a and 5b:
1. The normalized intensity around 0° to ±30° may fluctuate between the upper and lower bound limits.

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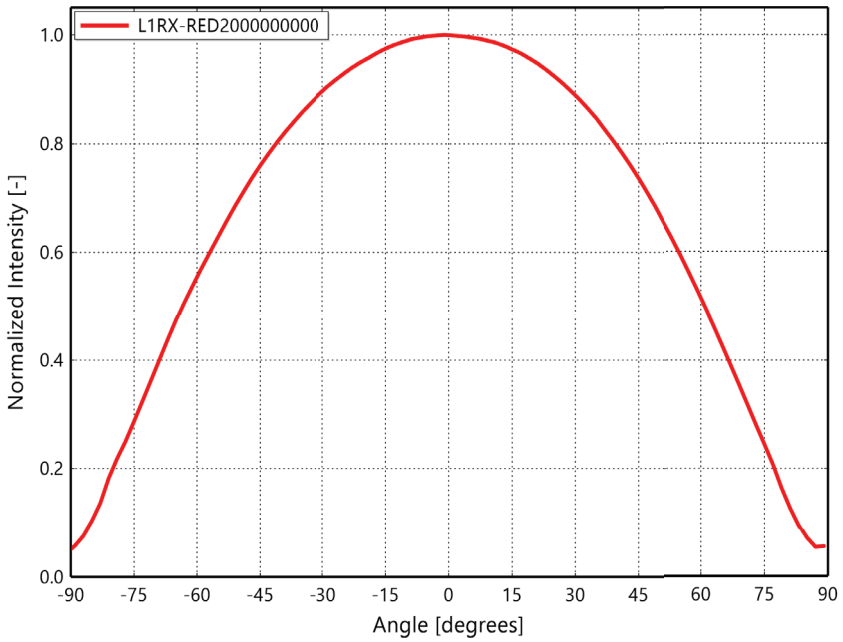



Figure 5c. Typical radiation pattern for LUXEON Rubix L1RX-RED2000000000 at 1000mA, $T_j$=85°C

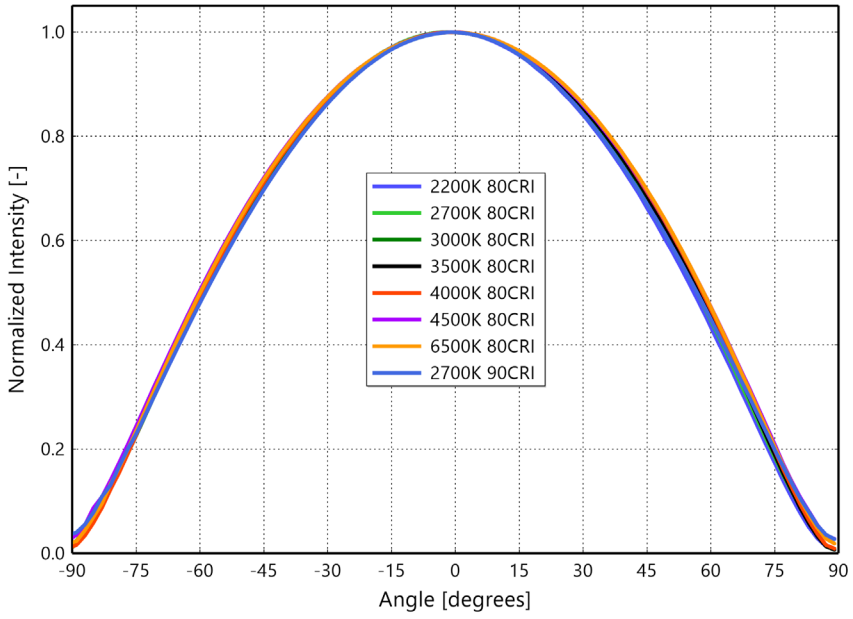



Figure 5d. Typical radiation pattern for LUXEON Rubix White 80CRI and 90CRI at 1000mA, $T_j$=85°C

Notes for Figures 5c and 5d:
1. The normalized intensity around 0° to ±30° may fluctuate between the upper and lower bound limits.

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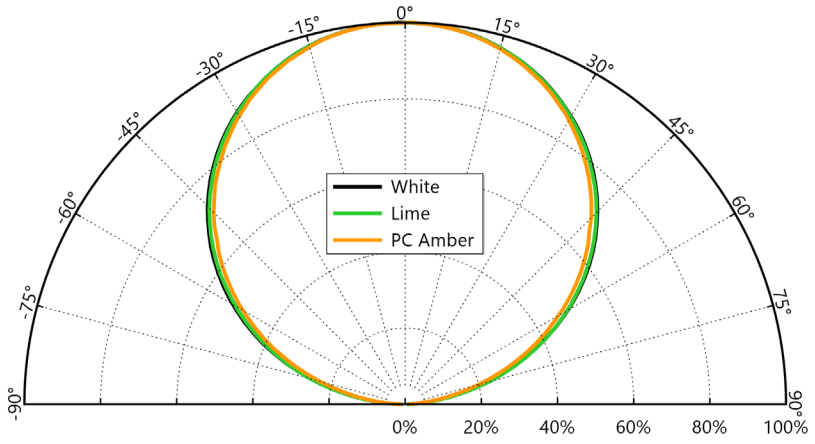



**Figure 5e. Typical polar radiation pattern for LUXEON Rubix PC Amber, Lime and White 60CRI at 1500mA, $T_j$=85°C**

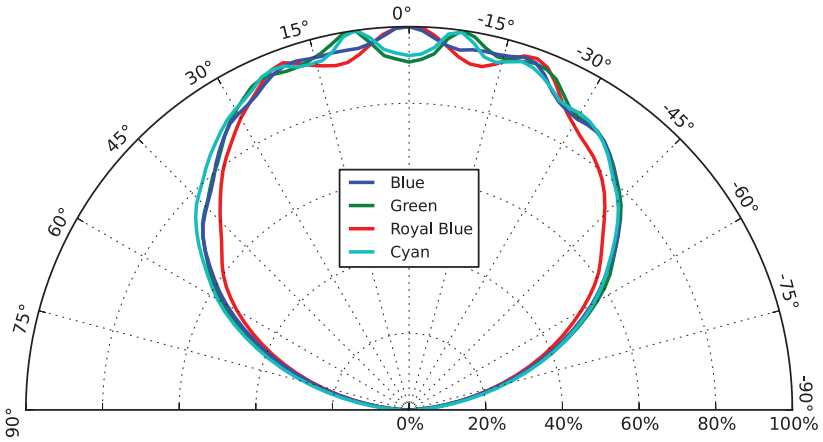



**Figure 5f. Typical polar radiation pattern for LUXEON Rubix Green, Cyan, Blue and Royal Blue at 1500mA, $T_j$=85°C**

Notes for Figures 5e and 5f:
1. The normalized intensity around 0° to ±30° may fluctuate between the upper and lower bound limits.

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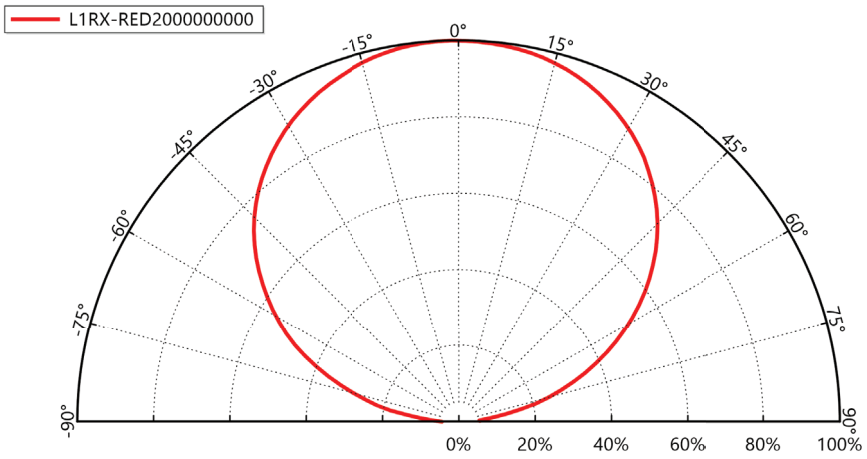



Figure 5g. Typical polar radiation pattern for LUXEON Rubix L1RX-RED2000000000 at 1000mA, $T_j$=85°C

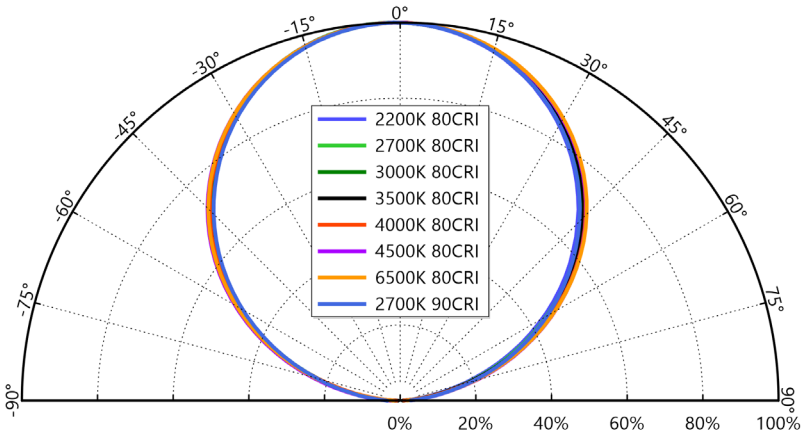



Figure 5h. Typical polar radiation pattern for LUXEON Rubix White 80CRI and 90CRI at 1000mA, $T_j$=85°C

Notes for Figures 5g and 5h:
1. The normalized intensity around 0° to ±30° may fluctuate between the upper and lower bound limits.

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# 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, radiometric power, color point, peak wavelength, dominant wavelength and forward voltage.

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

**A B C D**

Where:

- **A** – designates luminous flux bin or radiometric power bin (luminous flux bin example: A=60 to 70 lm, B= 70 to 80 lm; radiometric power bin example: Royal Blue C=1500 to 1600mW)
- **B C** – designates color bin, peak wavelength bin or dominant wavelength bin (peak wavelength bin example: Royal Blue 30=440 to 445nm; dominant wavelength bin example: Red 40=620 to 630nm)
- **D** – designates forward voltage bin (example: A=1.80 to 2.00V, B=2.00 to 2.20V)

Therefore, a LUXEON Rubix Red LED with a lumen range of 80 to 90 lm, a dominant wavelength of 620 to 630nm and a forward voltage range of 3.00 to 3.20V has the following CAT code:

**C 4 0 G**

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# Luminous Flux Bins

Table 5 lists the standard photometric luminous flux bins for LUXEON Rubix 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 Rubix**

| BIN | LUMINOUS FLUX [1] (lm) | |
|---|---|---|
| | MINIMUM | MAXIMUM |
| 9 | 50 | 60 |
| A | 60 | 70 |
| B | 70 | 80 |
| C | 80 | 90 |
| D | 90 | 100 |
| E | 100 | 110 |
| F | 110 | 120 |
| G | 120 | 140 |
| H | 140 | 160 |
| J | 160 | 180 |
| K | 180 | 200 |
| L | 200 | 220 |
| M | 220 | 240 |
| N | 240 | 260 |
| P | 260 | 280 |
| Q | 280 | 300 |
| R | 300 | 320 |
| S | 320 | 340 |
| T | 340 | 360 |
| U | 360 | 380 |
| V | 380 | 400 |
| W | 400 | 420 |
| X | 420 | 440 |
| Y | 440 | 460 |
| Z | 460 | 480 |
| 1 | 480 | 500 |
| 2 | 500 | 520 |
| 3 | 520 | 540 |
| 4 | 540 | 570 |
| 5 | 570 | 600 |
| 6 | 600 | 640 |
| 7 | 640 | 680 |
| 8 | 680 | 720 |
| 0 | 720 | 760 |

Notes for Table 5:
1. Lumileds maintains a tolerance of ±6.5% on luminous flux measurements.

# Radiometric Power Bins

**Table 6. Radiometric power bin definitions for LUXEON Rubix Royal Blue**

| COLOR | BIN | RADIOMETRIC POWER [1] (mW) | |
|---|---|---|---|
| | | MINIMUM | MAXIMUM |
| Royal Blue | A | 1300 | 1400 |
| | B | 1400 | 1500 |
| | C | 1500 | 1600 |
| | D | 1600 | 1700 |
| | E | 1700 | 1800 |
| | F | 1800 | 1900 |
| | G | 1900 | 2000 |
| | H | 2000 | 2150 |
| | J | 2150 | 2300 |

Notes for Table 6:
1. Lumileds maintains a tolerance of ±6.5% on radiometric power measurements.

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# Color Bin Definitions

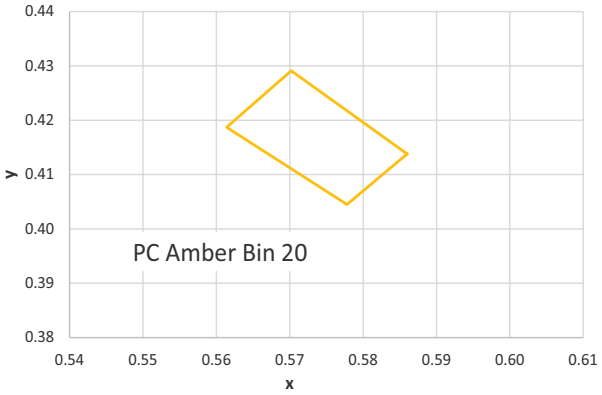



Figure 6. Color bin structure for LUXEON Rubix PC Amber for Table 7

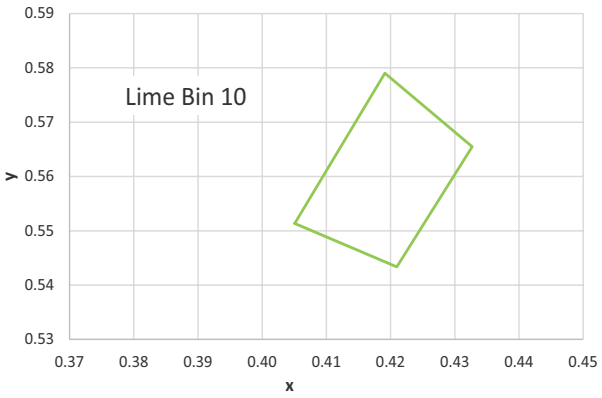



Figure 7. Color bin structure for LUXEON Rubix Lime for Table 7

Table 7. Color bin definitions for LUXEON Rubix PC Amber and Lime at 1500mA, $T_j$ = 85°C

| COLOR | PART NUMBER | BIN | x | y |
|---|---|---|---|---|
| PC Amber | L1RX-PCA1000000000 | 20 | 0.5860 | 0.4138 |
| | | | 0.5778 | 0.4045 |
| | | | 0.5614 | 0.4187 |
| | | | 0.5702 | 0.4291 |
| Lime | L1RX-LME1000000000 | 10 | 0.4051 | 0.5514 |
| | | | 0.4191 | 0.5790 |
| | | | 0.4327 | 0.5655 |
| | | | 0.4210 | 0.5434 |

Notes for Table 7:
1. Lumileds maintains a tolerance of ±0.005 on x and y color coordinates measurements.

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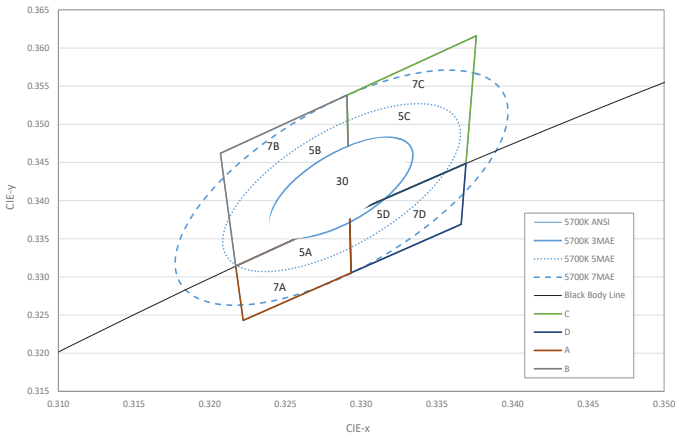



Figure 8a. Color bin structure for LUXEON Rubix White 5700K 60CRI

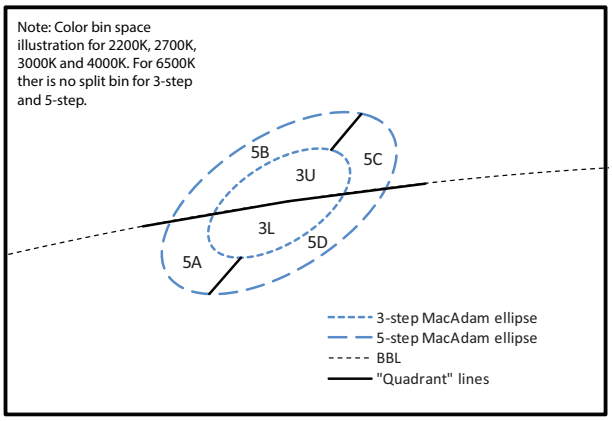



Figure 8b. Color bin structure for LUXEON Rubix White 70CRI, 80CRI and 90CRI

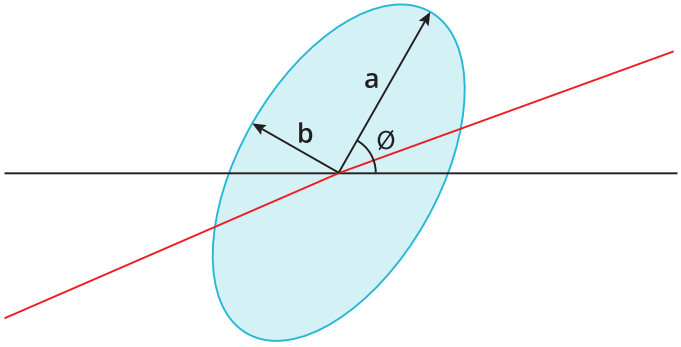



Figure 9. 3- and 5-step MacAdam ellipse illustration for Tables 8a and 8b

Table 8a. 3-, 5- and 7-step MacAdam ellipse color bin definitions for LUXEON Rubix White at 1500mA, $T_j$ = 85°C

| NOMINAL CCT | COLOR SPACE | CENTER POINT [1] (cx, cy) | MAJOR AXIS, a | MINOR AXIS, b | ELLIPSE ROTATION ANGLE, θ |
|---|---|---|---|---|---|
| 5700K | Single 3-step MacAdam ellipse | (0.3287, 0.3417) | 0.00746 | 0.00320 | 59.1° |
| 5700K | Single 5-step MacAdam ellipse | (0.3287, 0.3417) | 0.01243 | 0.00533 | 59.1° |
| 5700K | Single 7-step MacAdam ellipse | (0.3287, 0.3417) | 0.01740 | 0.00746 | 59.1° |

Notes for Table 8a:
1. Lumileds maintains a tolerance of ±0.005 on x and y coordinates in the CIE 1931 color space.

Table 8b. 3- and 5-step MacAdam ellipse color bin definitions for LUXEON Rubix White at 1000mA, $T_j$ = 85°C

| NOMINAL CCT | COLOR SPACE | CENTER POINT [1] (cx, cy) | MAJOR AXIS, a | MINOR AXIS, b | ELLIPSE ROTATION ANGLE, θ |
|---|---|---|---|---|---|
| 2200K | Single 3-step MacAdam ellipse | (0.5020, 0.4156) | 0.00863 | 0.00398 | 49.3° |
| 2700K | Single 3-step MacAdam ellipse | (0.4578, 0.4101) | 0.00810 | 0.00420 | 53.7° |
| 3000K | Single 3-step MacAdam ellipse | (0.4338, 0.4030) | 0.00834 | 0.00408 | 53.2° |
| 3500K | Single 3-step MacAdam ellipse | (0.4073, 0.3917) | 0.00927 | 0.00414 | 54.0° |
| 4000K | Single 3-step MacAdam ellipse | (0.3818, 0.3797) | 0.00939 | 0.00402 | 53.7° |
| 4500K | Single 3-step MacAdam ellipse | (0.3611, 0.3658) | 0.00881 | 0.00378 | 56.7° |
| 6500K | Single 3-step MacAdam ellipse | (0.3123, 0.3282) | 0.00669 | 0.00285 | 58.6° |
| 2200K | Single 5-step MacAdam ellipse | (0.5020, 0.4156) | 0.01438 | 0.00663 | 49.3° |
| 2700K | Single 5-step MacAdam ellipse | (0.4578, 0.4101) | 0.01350 | 0.00700 | 53.7° |
| 3000K | Single 5-step MacAdam ellipse | (0.4338, 0.4030) | 0.01390 | 0.00680 | 53.2° |
| 3500K | Single 5-step MacAdam ellipse | (0.4073, 0.3917) | 0.01545 | 0.00690 | 54.0° |
| 4000K | Single 5-step MacAdam ellipse | (0.3818, 0.3797) | 0.01565 | 0.00670 | 53.7° |
| 4500K | Single 5-step MacAdam ellipse | (0.3611, 0.3658) | 0.01468 | 0.00630 | 56.7° |
| 6500K | Single 5-step MacAdam ellipse | (0.3123, 0.3282) | 0.01115 | 0.00475 | 58.6° |

Notes for Table 8b:
1. Lumileds maintains a tolerance of ±0.005 on x and y coordinates in the CIE 1931 color space.

Table 8c. MacAdam ellipse color bin definitions for LUXEON Rubix White

| BIN | SDCM |
|---|---|
| 30 | Single 3-step MacAdam ellipse (For 5700K and 6500K) |
| 3U | Single 3-step MacAdam ellipse (For 2200K, 2700K, 3000K, 3500K, 4000K, 4500K) |
| 3L | Single 3-step MacAdam ellipse (For 2200K, 2700K, 3000K, 3500K, 4000K, 4500K) |
| 50 | Single 5-step MacAdam ellipse (For 6500K) |
| 5A | Single 5-step MacAdam ellipse (For 2200K, 2700K, 3000K, 3500K, 4000K, 4500K, 5700K) |
| 5B | Single 5-step MacAdam ellipse (For 2200K, 2700K, 3000K, 3500K, 4000K, 4500K, 5700K) |
| 5C | Single 5-step MacAdam ellipse (For 2200K, 2700K, 3000K, 3500K, 4000K, 4500K, 5700K) |
| 5D | Single 5-step MacAdam ellipse (For 2200K, 2700K, 3000K, 3500K, 4000K, 4500K, 5700K) |
| 7A | Single 7-step MacAdam ellipse (For 5700K 60CRI) |
| 7B | Single 7-step MacAdam ellipse (For 5700K 60CRI) |
| 7C | Single 7-step MacAdam ellipse (For 5700K 60CRI) |
| 7D | Single 7-step MacAdam ellipse (For 5700K 60CRI) |

# Peak Wavelength Bins

Table 9. Peak wavelength bin definitions for LUXEON Rubix Royal Blue

| COLOR | PART NUMBER | BIN | PEAK WAVELENGTH [1] (nm) | |
|---|---|---|---|---|
| | | | MINIMUM | MAXIMUM |
| Royal Blue | L1RX-RYL1000000000 | 30 | 440 | 445 |
| | | 40 | 445 | 450 |
| | | 50 | 450 | 455 |

Notes for Table 9:
1. Lumileds maintains a tolerance of ±2.0nm on peak wavelength measurements.

# Dominant Wavelength Bins

**Table 10a. Dominant wavelength bin definitions for LUXEON Rubix Green, Cyan and Blue at 1500mA, $T_j$=85°C**

| COLOR | PART NUMBER | BIN | DOMINANT WAVELENGTH [1] (nm) | |
|---|---|---|---|---|
| | | | MINIMUM | MAXIMUM |
| Green | L1RX-GRN1000000000 | 10 | 520 | 525 |
| | | 20 | 525 | 530 |
| | | 30 | 530 | 535 |
| Cyan | L1RX-CYN1000000000 | 10 | 490 | 495 |
| | | 20 | 495 | 500 |
| | | 30 | 500 | 505 |
| | | 40 | 505 | 510 |
| Blue | L1RX-BLU1000000000 | 20 | 465 | 470 |
| | | 30 | 470 | 475 |
| | | 40 | 475 | 480 |
| | | 50 | 480 | 485 |

Notes for Table 10a:
1. Lumileds maintains a tolerance of ±0.5nm on dominant wavelength measurements.

**Table 10b. Dominant wavelength bin definitions for LUXEON Rubix L1RX-RED2000000000 at 1000mA, $T_j$=85°C**

| COLOR | PART NUMBER | BIN | DOMINANT WAVELENGTH [1](nm) | |
|---|---|---|---|---|
| | | | MINIMUM | MAXIMUM |
| Red | L1RX-RED2000000000 | 40 | 620 | 630 |

Notes for Table 10b:
1. Lumileds maintains a tolerance of ±0.5nm on dominant wavelength measurements.

# Forward Voltage Bins

**Table 11. Forward voltage bin definitions for LUXEON Rubix**

| BIN | FORWARD VOLTAGE [1] ($V_f$) | |
|---|---|---|
| | MINIMUM | MAXIMUM |
| A | 1.80 | 2.00 |
| B | 2.00 | 2.20 |
| C | 2.20 | 2.40 |
| D | 2.40 | 2.60 |
| E | 2.60 | 2.80 |
| F | 2.80 | 3.00 |
| G | 3.00 | 3.20 |
| H | 3.20 | 3.40 |
| J | 3.40 | 3.60 |
| K | 3.60 | 3.80 |
| L | 3.80 | 4.00 |
| M | 4.00 | 4.20 |
| N | 4.20 | 4.40 |
| P | 4.40 | 4.50 |

Notes for Table 11:
1. Lumileds maintains a tolerance of ±0.06V on forward voltage measurements.

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# Mechanical Dimensions

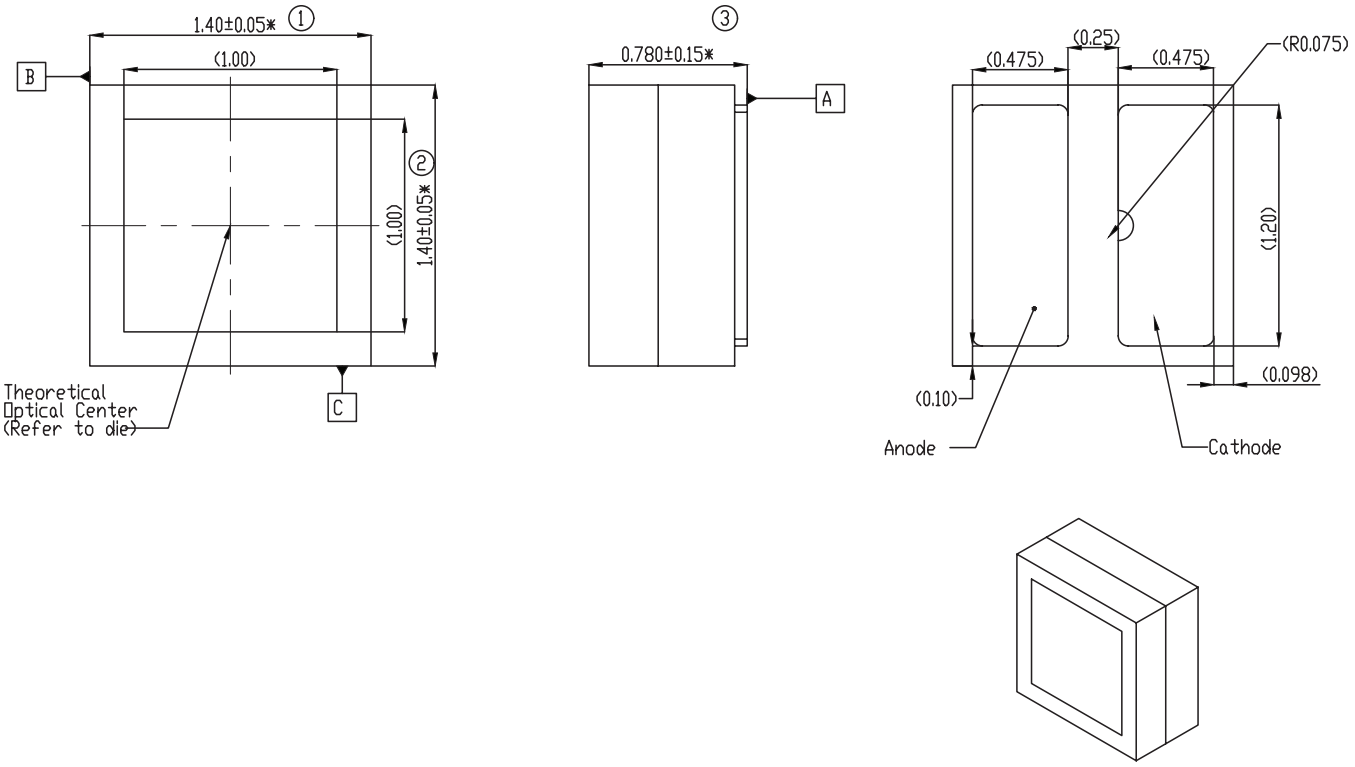



Figure 10a. Mechanical dimensions for LUXEON Rubix PC Amber, Lime, Green, Cyan, Blue, Royal Blue and White Colors

Notes for Figure 10a:
1. Drawings are not to scale.
2. All dimensions are in millimeters.

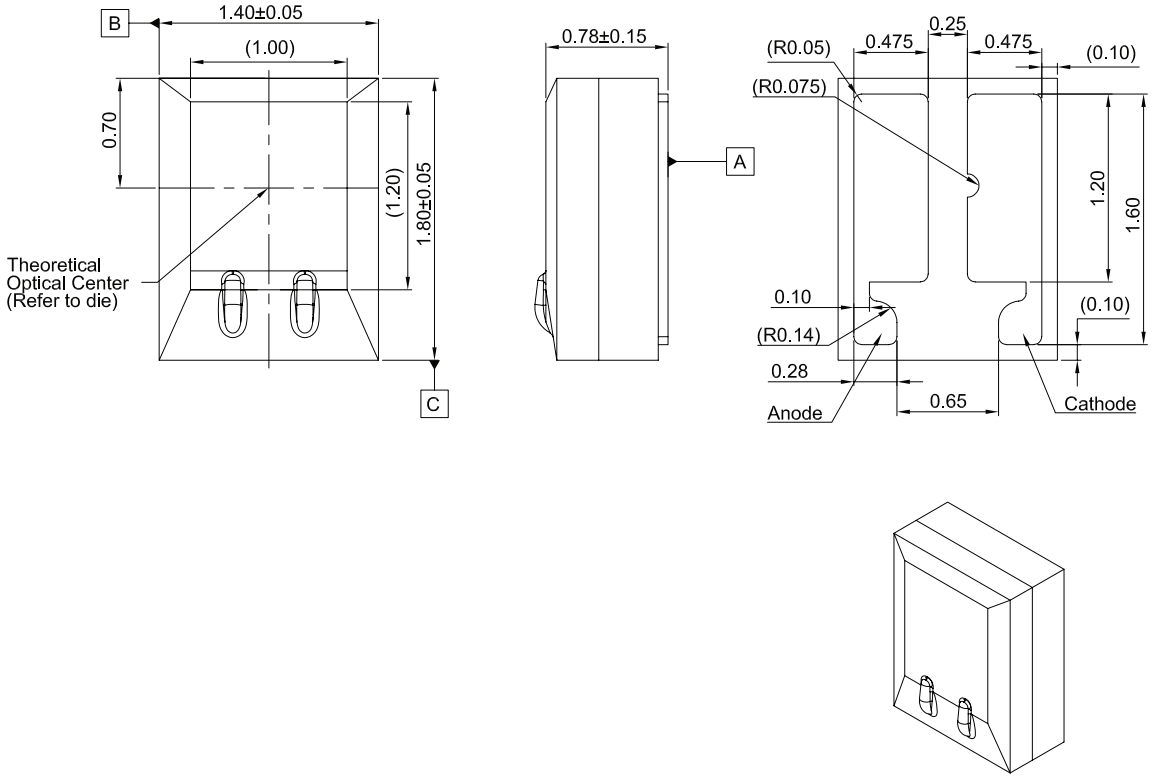



**Figure 10b. Mechanical dimensions for LUXEON Rubix L1RX-RED2000000000 Color**

Notes for Figures 10b:
1. Drawings are not to scale.
2. All dimensions are in millimeters.

# Reflow Soldering Guidelines

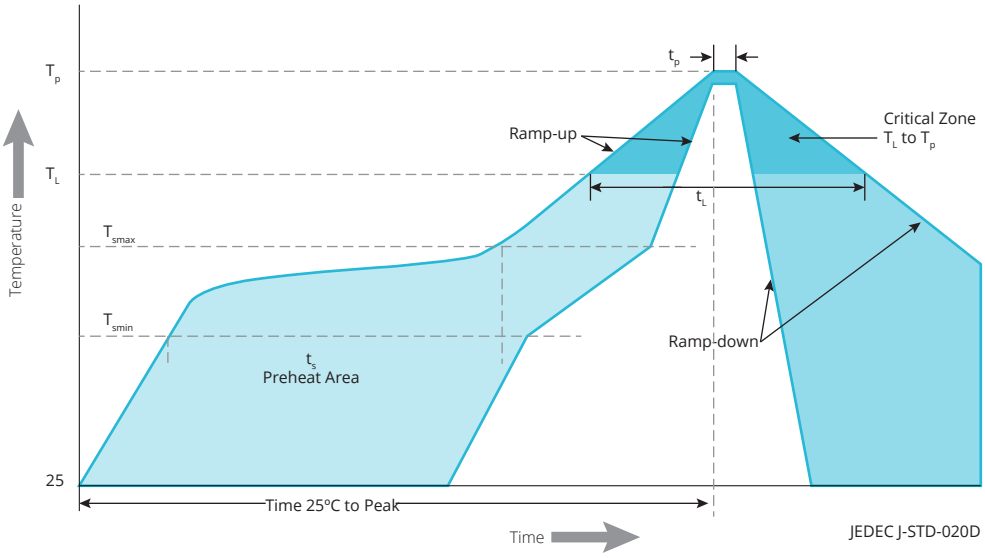



**Figure 11. Visualization of the acceptable reflow temperature profile as specified in Table 12**

**Table 12. Reflow profile characteristics for LUXEON Rubix**

| PROFILE FEATURE | LEAD-FREE ASSEMBLY |
|---|---|
| Preheat Minimum Temperature ($T_{smin}$) | 150°C |
| Preheat Maximum Temperature ($T_{smax}$) | 200°C |
| Preheat Time ($t_{smin}$ to $t_{smax}$) | 60 to 120 seconds |
| Ramp-Up Rate ($T_L$ to $T_p$) | 3°C / second maximum |
| Liquidus Temperature ($T_L$) | 217°C |
| Time Maintained Above Temperature $T_L$ ($t_L$) | 60 to 150 seconds |
| Peak / Classification Temperature ($T_p$) | 260°C |
| Time Within 5°C of Actual Temperature ($t_p$) | 20 to 40 seconds |
| Ramp-Down Rate ($T_p$ to $T_L$) | 6°C / second maximum |
| Time 25°C to Peak Temperature | 8 minutes maximum |

# JEDEC Moisture Sensitivity

**Table 13. Moisture sensitivity levels for LUXEON Rubix**

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

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## Solder Pad Design

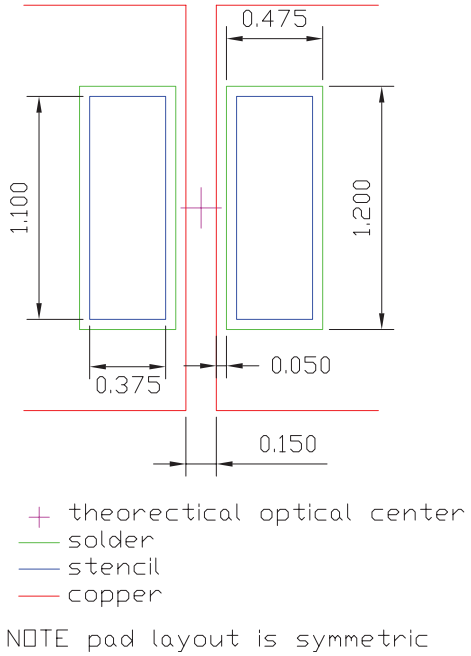



**Figure 12. Recommended PCB solder pad layout for all LUXEON Rubix**

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

# Packaging Information

## Pocket Tape Dimensions

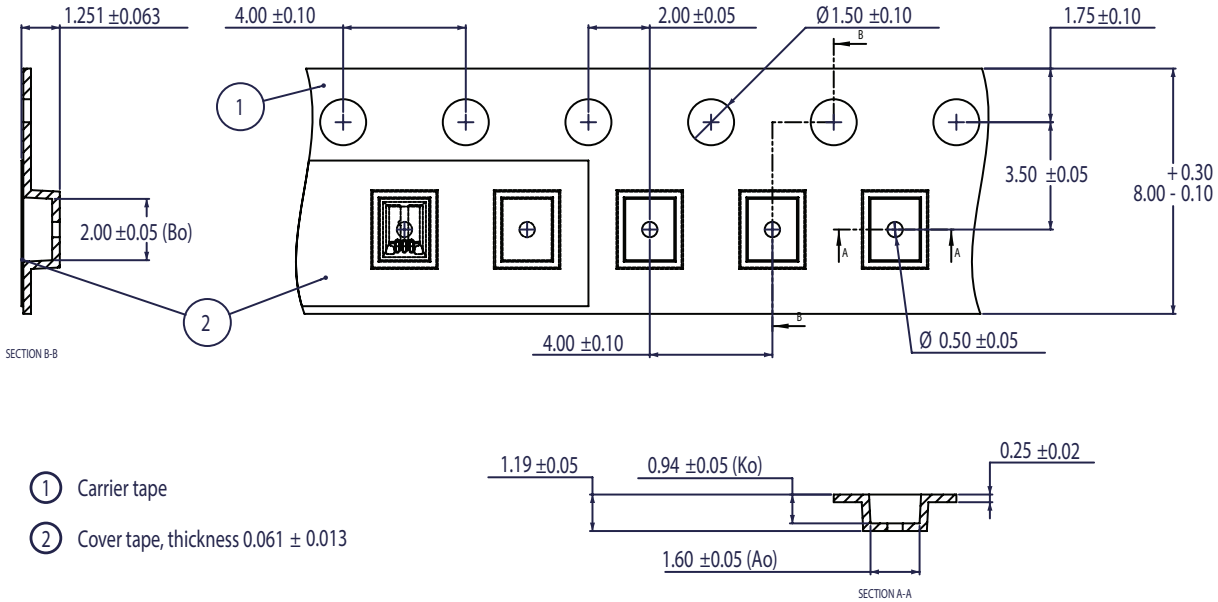



**Figure 13a. Pocket Tape dimensions for LUXEON Rubix Red**

Notes for Figure 13a:
1. Drawings are not to scale.
2. All dimensions are in millimeters.

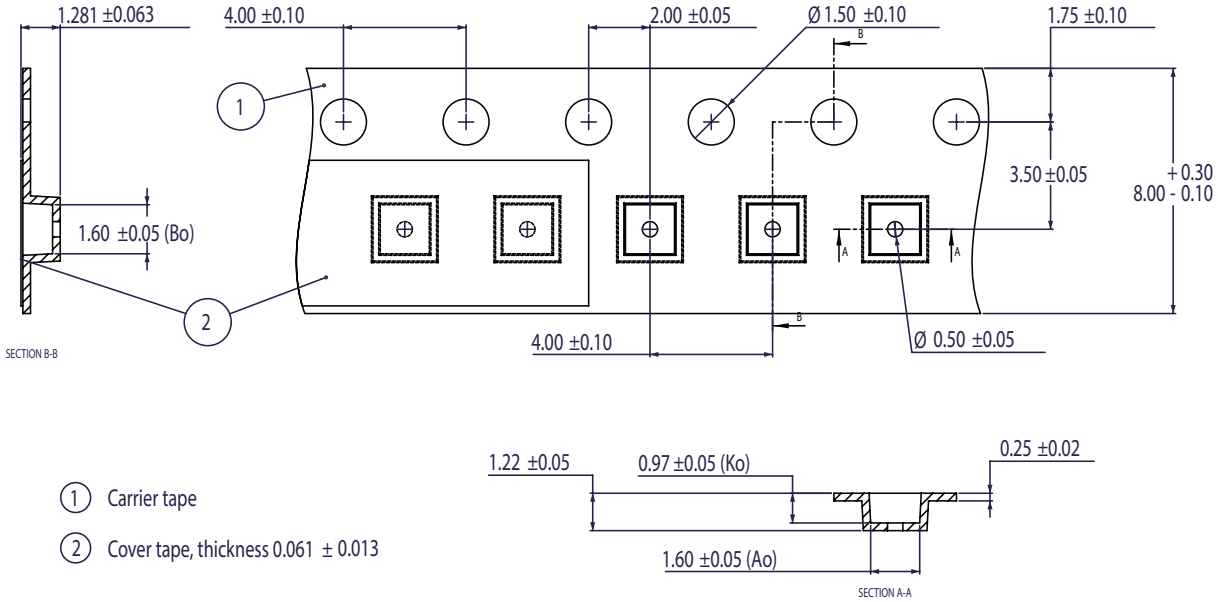



**Figure 13b. Pocket Tape dimensions for LUXEON Rubix PC Amber, Lime, Green, Cyan, Blue, Royal Blue and White**

Notes for Figure 13b:
1. Drawings are not to scale.
2. All dimensions are in millimeters.

# Reel Dimensions

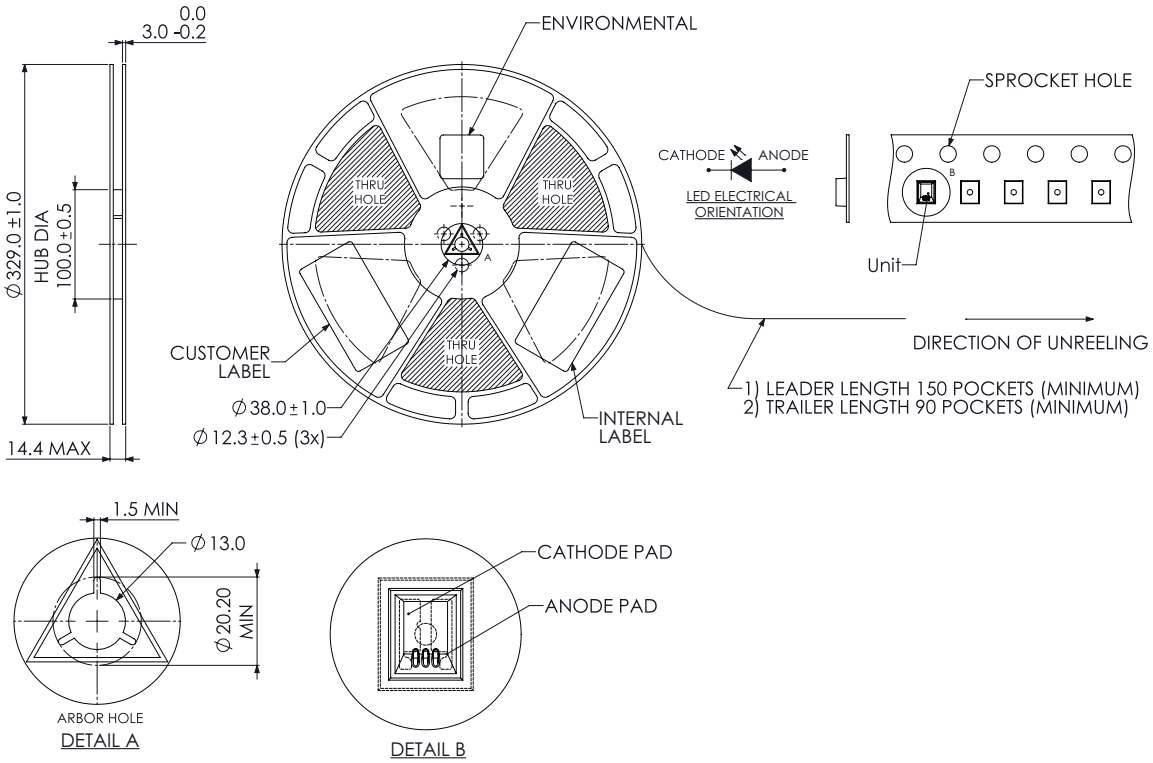



**Figure 14a. Reel dimensions for LUXEON Rubix Red**

Notes for Figure 14a:
1. Drawings are not to scale.
2. All dimensions are in millimeters.
3. Maximum 1,000 pieces per reel.

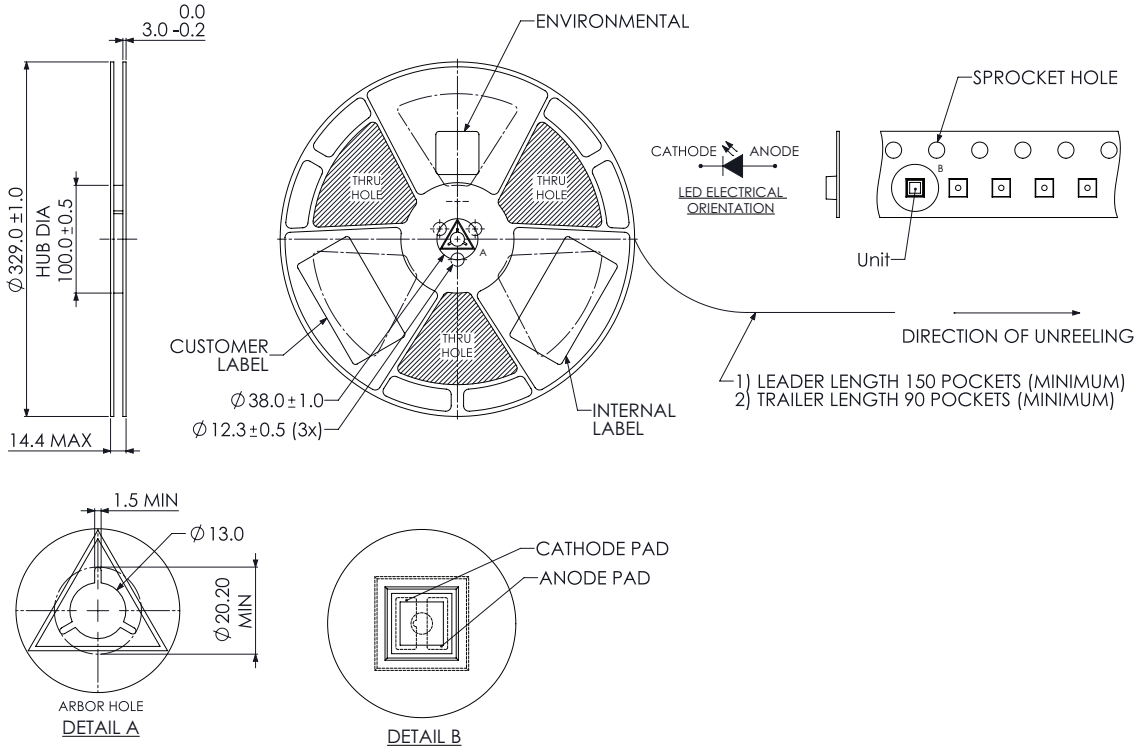






**Figure 14b. Reel dimensions for LUXEON Rubix PC Amber, Lime, Green, Cyan, Blue, Royal Blue and White**

Notes for Figure 14b:
1. Drawings are not to scale.
2. All dimensions are in millimeters.
3. Maximum 1,000 pieces per reel.

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