

**For NEW designs consider this replacement product:**

• LUXEON CoB Core Range



# LUXEON CoB Core Range

High-efficacy LED with a small light emitting surface and greater uniformity of light

LUXEON CoB Core Range consists of high uniformity LEDs that represent a new breakthrough in efficacy for chip-on-board. Due to its industry-leading small Light Emitting Surfaces (LES), LUXEON CoB arrays are easy to work with, enabling less expensive designs. All emitters within the LUXEON CoB Core Range are available in 3-step MacAdam ellipse, ensuring uniform optical performance in general lighting applications. In addition, LUXEON CoB Core Range LEDs are hot-tested at 85°C—real world operating conditions—which means luminaire design is simplified and testing can be minimized.



## FEATURES AND BENEFITS

- Highest flux densities with industry's smallest LES
- R9 between 80 and 90 for vibrant reds
- 3-step MacAdam ellipse color definition: *Freedom from Binning* for color consistency from luminaire to luminaire
- Up to 4x lower thermal resistance than competition, enabling smaller heat sinks and higher lumens
- Supported by a comprehensive optical, mechanical and electrical ecosystem

## PRIMARY APPLICATIONS

- Architectural
- Downlights
- High Bay & Low Bay
- Lamps
- Outdoor
- Specialty Lighting
- Spotlights

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NO LONGER ORDERABLE

# General Product Information

## Product Test Conditions

LUXEON CoB Core Range LEDs are tested and binned with a drive current of 200mA for LUXEON CoB 1202s and LUXEON CoB 1202, 300mA for LUXEON CoB 1203, 450mA for LUXEON CoB 1204, 600mA for LUXEON CoB 1205, 900mA for LUXEON CoB 1208 and 1200mA for LUXEON 1211 at a junction temperature,  $T_j$ , of 85°C.

## Part Number Nomenclature

Part numbers for LUXEON CoB Core Range follow the convention below:

L H C 1 – **A A B B** – **C C C C** (Traditional Part Number Scheme)

L 2 C 1 – **A A B B** 1 2 0 2 0 6 A 0 0 (New Part Number Scheme)

Where:

- A A** – designates nominal CCT (22=2200K, 27=2700K, 30=3000K, 35=3500K, 40=4000K, 50=5000K, 57=5700K)
- B B** – designates minimum CRI (70=70CRI, 80=80CRI, 90=90CRI)
- C C C C** – designates product configuration (1202=1202, 1203=1203, 1204=1204, 1205=1205, 1208=1208, 1211=1211)

Therefore, the following part numbers are used for LUXEON CoB Core Range 1203 3000K CCT 80CRI:

L H C 1 – **3 0 8 0** – **1 2 0 3**

## 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 CoB Core Range 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 CoB Core Range at test current,  $T_j=85^\circ\text{C}$ .

| PRODUCT          | NOMINAL CCT | MINIMUM CRI <sup>[1, 2]</sup> | LUMINOUS FLUX <sup>[1]</sup> (lm) |         | TYPICAL LUMINOUS EFFICACY (lm/W) | TEST CURRENT (mA) | PART NUMBER        |
|------------------|-------------|-------------------------------|-----------------------------------|---------|----------------------------------|-------------------|--------------------|
|                  |             |                               | MINIMUM                           | TYPICAL |                                  |                   |                    |
| LUXEON CoB 1202s | 2200K       | 80                            | 550                               | 625     | 88                               | 200               | L2C1-2280120206A00 |
|                  | 2700K       | 80                            | 645                               | 725     | 101                              | 200               | L2C1-2780120206A00 |
|                  | 3000K       | 80                            | 700                               | 775     | 109                              | 200               | L2C1-3080120206A00 |
|                  | 3500K       | 80                            | 700                               | 775     | 109                              | 200               | L2C1-3580120206A00 |
|                  | 4000K       | 80                            | 700                               | 800     | 113                              | 200               | L2C1-4080120206A00 |
|                  | 5000K       | 80                            | 725                               | 825     | 116                              | 200               | L2C1-5080120206A00 |
|                  | 2200K       | 90                            | 450                               | 525     | 75                               | 200               | L2C1-2290120206A00 |
|                  | 2700K       | 90                            | 525                               | 600     | 85                               | 200               | L2C1-2790120206A00 |
|                  | 3000K       | 90                            | 550                               | 625     | 88                               | 200               | L2C1-3090120206A00 |
|                  | 3500K       | 90                            | 575                               | 650     | 92                               | 200               | L2C1-3590120206A00 |
| LUXEON CoB 1202  | 4000K       | 90                            | 600                               | 700     | 100                              | 200               | L2C1-4090120206A00 |
|                  | 2200K       | 80                            | 575                               | 650     | 92                               | 200               | LHC1-2280-1202     |
|                  | 2700K       | 80                            | 675                               | 750     | 106                              | 200               | LHC1-2780-1202     |
|                  | 3000K       | 80                            | 725                               | 800     | 115                              | 200               | LHC1-3080-1202     |
|                  | 3500K       | 80                            | 750                               | 825     | 119                              | 200               | LHC1-3580-1202     |
|                  | 4000K       | 80                            | 750                               | 850     | 122                              | 200               | LHC1-4080-1202     |
|                  | 5000K       | 80                            | 775                               | 875     | 124                              | 200               | LHC1-5080-1202     |
|                  | 2200K       | 90                            | 475                               | 550     | 44                               | 200               | LHC1-2290-1202     |
|                  | 2700K       | 90                            | 550                               | 625     | 90                               | 200               | LHC1-2790-1202     |
|                  | 3000K       | 90                            | 575                               | 650     | 93                               | 200               | LHC1-3090-1202     |
| LUXEON CoB 1203  | 3500K       | 90                            | 600                               | 675     | 96                               | 200               | LHC1-3590-1202     |
|                  | 4000K       | 90                            | 650                               | 725     | 100                              | 200               | LHC1-4090-1202     |
|                  | 3000K       | 70                            | 1172                              | 1300    | 122                              | 300               | LHC1-3070-1203     |
|                  | 3500K       | 70                            | 1172                              | 1300    | 122                              | 300               | LHC1-3570-1203     |
|                  | 4000K       | 70                            | 1225                              | 1375    | 130                              | 300               | LHC1-4070-1203     |
|                  | 5000K       | 70                            | 1225                              | 1375    | 130                              | 300               | LHC1-5070-1203     |
|                  | 5700K       | 70                            | 1225                              | 1375    | 130                              | 300               | LHC1-5770-1203     |
|                  | 2200K       | 80                            | 825                               | 950     | 92                               | 300               | LHC1-2280-1203     |
|                  | 2700K       | 80                            | 1025                              | 1125    | 106                              | 300               | LHC1-2780-1203     |
|                  | 3000K       | 80                            | 1100                              | 1225    | 115                              | 300               | LHC1-3080-1203     |
| LUXEON CoB 1203  | 3500K       | 80                            | 1150                              | 1275    | 119                              | 300               | LHC1-3580-1203     |
|                  | 4000K       | 80                            | 1175                              | 1300    | 122                              | 300               | LHC1-4080-1203     |
|                  | 5000K       | 80                            | 1175                              | 1325    | 124                              | 300               | LHC1-5080-1203     |
|                  | 2200K       | 90                            | 700                               | 825     | 80                               | 300               | LHC1-2290-1203     |
|                  | 2700K       | 90                            | 850                               | 950     | 90                               | 300               | LHC1-2790-1203     |
|                  | 3000K       | 90                            | 900                               | 1000    | 93                               | 300               | LHC1-3090-1203     |
|                  | 3500K       | 90                            | 925                               | 1025    | 96                               | 300               | LHC1-3590-1203     |
|                  | 4000K       | 90                            | 1000                              | 1100    | 100                              | 300               | LHC1-4090-1203     |

Notes for Table 1 (continued on next page):

1. Lumileds maintains a tolerance of  $\pm 2$  on CRI and  $\pm 6.5\%$  on luminous flux measurements.
2. Typical CRI is approximately 2 points higher than the minimum CRI specified, but this is not guaranteed.

Table 1 Continued. Product performance of LUXEON CoB Core Range at test current, T<sub>j</sub>=85°C.

| PRODUCT            | NOMINAL CCT        | MINIMUM CRI <sup>[1, 2]</sup> | LUMINOUS FLUX <sup>[1]</sup> (lm) |         | TYPICAL LUMINOUS EFFICACY (lm/W) | TEST CURRENT (mA) | PART NUMBER    |                |
|--------------------|--------------------|-------------------------------|-----------------------------------|---------|----------------------------------|-------------------|----------------|----------------|
|                    |                    |                               | MINIMUM                           | TYPICAL |                                  |                   |                |                |
| LUXEON CoB<br>1204 | 3000K              | 70                            | 1725                              | 1950    | 122                              | 450               | LHC1-3070-1204 |                |
|                    | 3500K              | 70                            | 1725                              | 1950    | 122                              | 450               | LHC1-3570-1204 |                |
|                    | 4000K              | 70                            | 1825                              | 2050    | 130                              | 450               | LHC1-4070-1204 |                |
|                    | 5000K              | 70                            | 1825                              | 2050    | 130                              | 450               | LHC1-5070-1204 |                |
|                    | 5700K              | 70                            | 1825                              | 2050    | 130                              | 450               | LHC1-5770-1204 |                |
|                    | 2200K              | 80                            | 1325                              | 1475    | 92                               | 450               | LHC1-2280-1204 |                |
|                    | 2700K              | 80                            | 1550                              | 1700    | 106                              | 450               | LHC1-2780-1204 |                |
|                    | 3000K              | 80                            | 1625                              | 1825    | 115                              | 450               | LHC1-3080-1204 |                |
|                    | 3500K              | 80                            | 1725                              | 1900    | 119                              | 450               | LHC1-3580-1204 |                |
|                    | 4000K              | 80                            | 1725                              | 1950    | 122                              | 450               | LHC1-4080-1204 |                |
|                    | 5000K              | 80                            | 1750                              | 1975    | 124                              | 450               | LHC1-5080-1204 |                |
|                    | 2200K              | 90                            | 1075                              | 1250    | 78                               | 450               | LHC1-2290-1204 |                |
|                    | 2700K              | 90                            | 1275                              | 1425    | 90                               | 450               | LHC1-2790-1204 |                |
|                    | 3000K              | 90                            | 1325                              | 1475    | 93                               | 450               | LHC1-3090-1204 |                |
|                    | 3500K              | 90                            | 1400                              | 1525    | 96                               | 450               | LHC1-3590-1204 |                |
|                    | 4000K              | 90                            | 1450                              | 1600    | 100                              | 450               | LHC1-4090-1204 |                |
|                    | LUXEON CoB<br>1205 | 3000K                         | 70                                | 2325    | 2600                             | 122               | 600            | LHC1-3070-1205 |
|                    |                    | 3500K                         | 70                                | 2325    | 2600                             | 122               | 600            | LHC1-3570-1205 |
|                    |                    | 4000K                         | 70                                | 2450    | 2750                             | 130               | 600            | LHC1-4070-1205 |
|                    |                    | 5000K                         | 70                                | 2450    | 2750                             | 130               | 600            | LHC1-5070-1205 |
| 5700K              |                    | 70                            | 2450                              | 2750    | 130                              | 600               | LHC1-5770-1205 |                |
| 2200K              |                    | 80                            | 1700                              | 1950    | 92                               | 600               | LHC1-2280-1205 |                |
| 2700K              |                    | 80                            | 2000                              | 2250    | 106                              | 600               | LHC1-2780-1205 |                |
| 3000K              |                    | 80                            | 2200                              | 2450    | 115                              | 600               | LHC1-3080-1205 |                |
| 3500K              |                    | 80                            | 2250                              | 2550    | 119                              | 600               | LHC1-3580-1205 |                |
| 4000K              |                    | 80                            | 2325                              | 2600    | 122                              | 600               | LHC1-4080-1205 |                |
| 5000K              |                    | 80                            | 2350                              | 2650    | 124                              | 600               | LHC1-5080-1205 |                |
| 2200K              |                    | 90                            | 1400                              | 1600    | 79                               | 600               | LHC1-2290-1205 |                |
| 2700K              |                    | 90                            | 1700                              | 1900    | 90                               | 600               | LHC1-2790-1205 |                |
| 3000K              |                    | 90                            | 1800                              | 2000    | 93                               | 600               | LHC1-3090-1205 |                |
| 3500K              |                    | 90                            | 1850                              | 2075    | 96                               | 600               | LHC1-3590-1205 |                |
| 4000K              | 90                 | 1925                          | 2150                              | 100     | 600                              | LHC1-4090-1205    |                |                |

Notes for Table 1 (continued on next page):

1. Lumileds maintains a tolerance of ±2 on CRI and ±6.5% on luminous flux measurements.
2. Typical CRI is approximately 2 points higher than the minimum CRI specified, but this is not guaranteed.

Table 1 Continued. Product performance of LUXEON CoB Core Range at test current, T<sub>j</sub>=85°C.

| PRODUCT            | NOMINAL CCT        | MINIMUM CRI <sup>[1, 2]</sup> | LUMINOUS FLUX <sup>[1]</sup> (lm) |         | TYPICAL LUMINOUS EFFICACY (lm/W) | TEST CURRENT (mA) | PART NUMBER    |                |
|--------------------|--------------------|-------------------------------|-----------------------------------|---------|----------------------------------|-------------------|----------------|----------------|
|                    |                    |                               | MINIMUM                           | TYPICAL |                                  |                   |                |                |
| LUXEON CoB<br>1208 | 3000K              | 70                            | 3500                              | 3900    | 122                              | 900               | LHC1-3070-1208 |                |
|                    | 3500K              | 70                            | 3500                              | 3900    | 122                              | 900               | LHC1-3570-1208 |                |
|                    | 4000K              | 70                            | 3650                              | 4100    | 130                              | 900               | LHC1-4070-1208 |                |
|                    | 5000K              | 70                            | 3700                              | 4100    | 130                              | 900               | LHC1-5070-1208 |                |
|                    | 5700K              | 70                            | 3700                              | 4100    | 130                              | 900               | LHC1-5770-1208 |                |
|                    | 2200K              | 80                            | 2600                              | 2925    | 92                               | 900               | LHC1-2280-1208 |                |
|                    | 2700K              | 80                            | 3050                              | 3400    | 106                              | 900               | LHC1-2780-1208 |                |
|                    | 3000K              | 80                            | 3275                              | 3650    | 115                              | 900               | LHC1-3080-1208 |                |
|                    | 3500K              | 80                            | 3400                              | 3800    | 119                              | 900               | LHC1-3580-1208 |                |
|                    | 4000K              | 80                            | 3500                              | 3900    | 122                              | 900               | LHC1-4080-1208 |                |
|                    | 5000K              | 80                            | 3500                              | 3950    | 124                              | 900               | LHC1-5080-1208 |                |
|                    | 2200K              | 90                            | 2125                              | 2450    | 79                               | 900               | LHC1-2290-1208 |                |
|                    | 2700K              | 90                            | 2550                              | 2850    | 90                               | 900               | LHC1-2790-1208 |                |
|                    | 3000K              | 90                            | 2650                              | 2950    | 93                               | 900               | LHC1-3090-1208 |                |
|                    | 3500K              | 90                            | 2775                              | 3075    | 96                               | 900               | LHC1-3590-1208 |                |
|                    | 4000K              | 90                            | 2900                              | 3200    | 100                              | 900               | LHC1-4090-1208 |                |
|                    | LUXEON CoB<br>1211 | 3000K                         | 70                                | 4775    | 5200                             | 122               | 1200           | LHC1-3070-1211 |
|                    |                    | 3500K                         | 70                                | 4775    | 5200                             | 122               | 1200           | LHC1-3570-1211 |
|                    |                    | 4000K                         | 70                                | 5050    | 5600                             | 130               | 1200           | LHC1-4070-1211 |
|                    |                    | 5000K                         | 70                                | 5050    | 5600                             | 130               | 1200           | LHC1-5070-1211 |
| 5700K              |                    | 70                            | 5050                              | 5600    | 130                              | 1200              | LHC1-5770-1211 |                |
| 2200K              |                    | 80                            | 3550                              | 3975    | 92                               | 1200              | LHC1-2280-1211 |                |
| 2700K              |                    | 80                            | 4150                              | 4600    | 106                              | 1200              | LHC1-2780-1211 |                |
| 3000K              |                    | 80                            | 4500                              | 5000    | 115                              | 1200              | LHC1-3080-1211 |                |
| 3500K              |                    | 80                            | 4675                              | 5200    | 119                              | 1200              | LHC1-3580-1211 |                |
| 4000K              |                    | 80                            | 4775                              | 5200    | 122                              | 1200              | LHC1-4080-1211 |                |
| 5000K              |                    | 80                            | 4850                              | 5300    | 124                              | 1200              | LHC1-5080-1211 |                |
| 2200K              |                    | 90                            | 2925                              | 3425    | 80                               | 1200              | LHC1-2290-1211 |                |
| 2700K              |                    | 90                            | 3500                              | 3875    | 90                               | 1200              | LHC1-2790-1211 |                |
| 3000K              |                    | 90                            | 3650                              | 4000    | 93                               | 1200              | LHC1-3090-1211 |                |
| 3500K              |                    | 90                            | 3775                              | 4200    | 96                               | 1200              | LHC1-3590-1211 |                |
| 4000K              |                    | 90                            | 4050                              | 4400    | 100                              | 1200              | LHC1-4090-1211 |                |

Notes for Table 1:

1. Lumileds maintains a tolerance of ±2 on CRI and ±6.5% on luminous flux measurements.
2. Typical CRI is approximately 2 points higher than the minimum CRI specified, but this is not guaranteed.

## Optical Characteristics

Table 2. Optical characteristics for LUXEON CoB Core Range at test current,  $T_j=85^\circ\text{C}$ .

| PART NUMBER        | TYPICAL TOTAL INCLUDED ANGLE <sup>[1]</sup> | TYPICAL VIEWING ANGLE <sup>[2]</sup> |
|--------------------|---|--------------------------------------|
| L2C1-xxxx120206xxx | 135°  | 115°                                 |
| LHC1-xxxx-xxxx     | 135°  | 115°                                 |

**Notes for Table 2:**

- Total angle at which 90% of total luminous flux is captured.
- Viewing angle is the off axis angle from the LED centerline where the luminous intensity is ½ of the peak value.

## Electrical and Thermal Characteristics

Table 3. Electrical and thermal characteristics for LUXEON CoB Core Range at test current,  $T_j=85^\circ\text{C}$ .

| PART NUMBER        | FORWARD VOLTAGE (V <sub>f</sub> ) <sup>[1]</sup> |         |         | TYPICAL TEMPERATURE COEFFICIENT OF FORWARD VOLTAGE <sup>[2]</sup> (mV/°C) | TYPICAL THERMAL RESISTANCE—JUNCTION TO SOLDER PAD (°C/W) |
|--------------------|--|---------|---------|---|--|
|                    | MINIMUM  | TYPICAL | MAXIMUM |   |  |
| L2C1-xxxx120206xxx | 33   | 35.5    | 38      | -16   | 0.98   |
| LHC1-xxxx-1202     | 33   | 35.5    | 38      | -16   | 0.98   |
| LHC1-xxxx-1203     | 33   | 35.5    | 38      | -16   | 0.70   |
| LHC1-xxxx-1204     | 33   | 35.5    | 38      | -16   | 0.55   |
| LHC1-xxxx-1205     | 33   | 35.5    | 38      | -16   | 0.51   |
| LHC1-xxxx-1208     | 33   | 35.5    | 38      | -16   | 0.29   |
| LHC1-xxxx-1211     | 33   | 35.5    | 38      | -16   | 0.23   |

**Notes for Table 3:**

- Lumileds maintains a tolerance of  $\pm 2\%$  on forward voltage measurements.
- Measured between 25°C and 85°C.

## Absolute Maximum Ratings

Table 4. Absolute maximum ratings for LUXEON CoB Core Range.

| PARAMETER  | MAXIMUM PERFORMANCE                                       |
|--|---|
| DC Forward Current <sup>[1,2]</sup>                  | 2x test current <sup>[2]</sup>                            |
| LED Junction Temperature <sup>[1]</sup> (DC & Pulse) | 125°C <sup>[3]</sup>                                      |
| ESD Sensitivity (ANSI/ESDA/JEDEC JS-001-2012)        | Class 3B  |
| Operating Case Temperature <sup>[1]</sup>            | -40°C to 105°C  |
| LED Storage Temperature                              | -40°C to 120°C  |
| Allowable Reflow Cycles                              | 3   |
| Reverse Voltage (V <sub>reverse</sub> )              | LUXEON LEDs are not designed to be driven in reverse bias |

**Notes for Table 4:**

- Proper current derating must be observed to maintain the junction temperature below the maximum allowable junction temperature.
- 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 15% of the maximum allowable DC forward current

# Characteristic Curves

## Spectral Power Distribution Characteristics

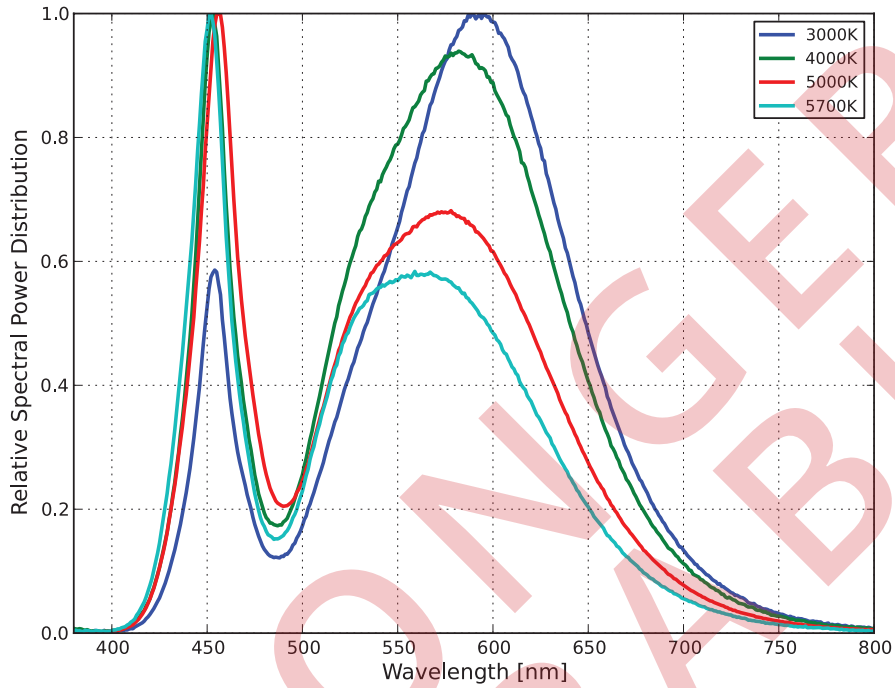


Figure 1a. Typical normalized power vs. wavelength for LHC1-xx70-1203 at test current,  $T_j=85^{\circ}\text{C}$ .

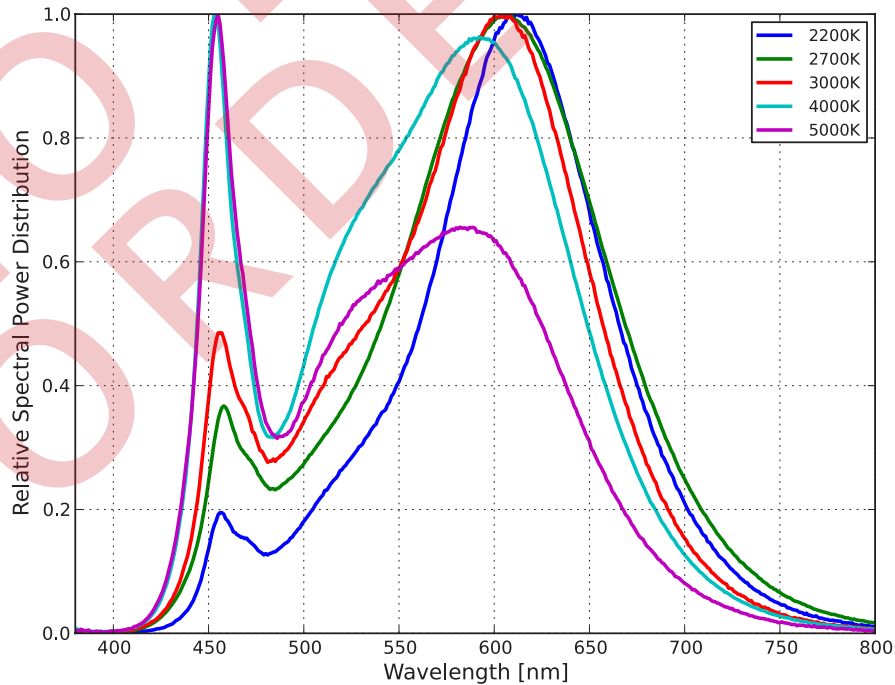


Figure 1b. Typical normalized power vs. wavelength for L2C1-xx80120206xxx and LHC1-xx80-1202at test current,  $T_j=85^{\circ}\text{C}$ .



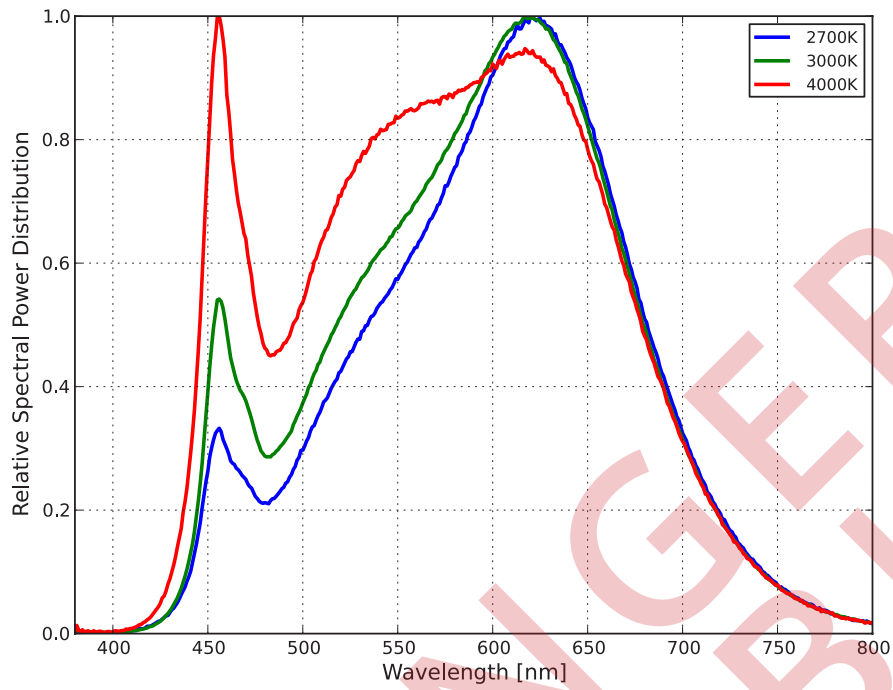


Figure 1c. Typical normalized power vs. wavelength for L2C1-xx90120206xxx and LHC1-xx90-1202 at test current,  $T_j=85^\circ\text{C}$ .

## Light Output Characteristics

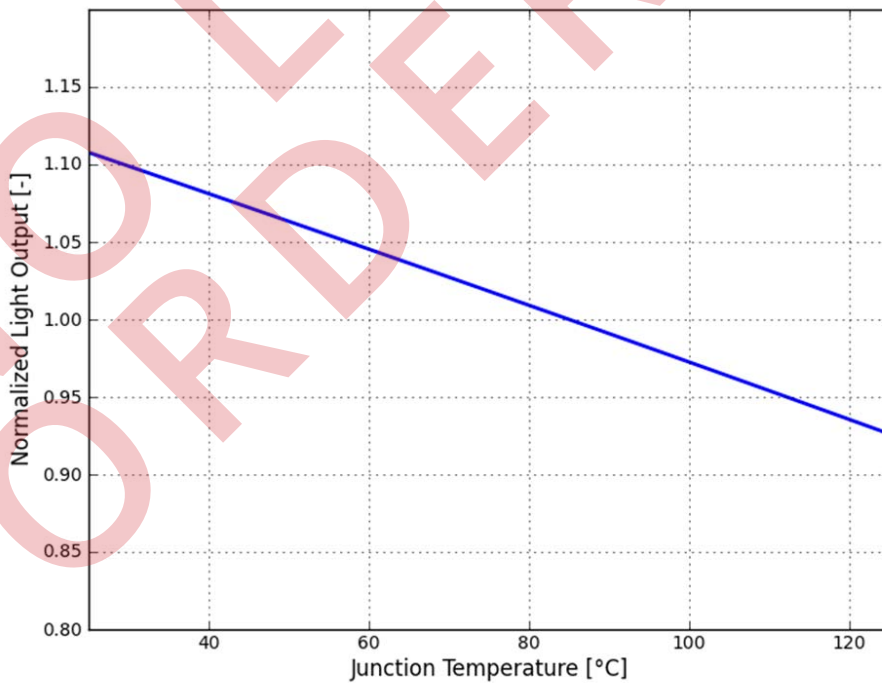


Figure 2. Typical normalized light output vs. junction temperature for L2C1-xxxx120206xxx and LHC1-xxxx-xxxx at test current.

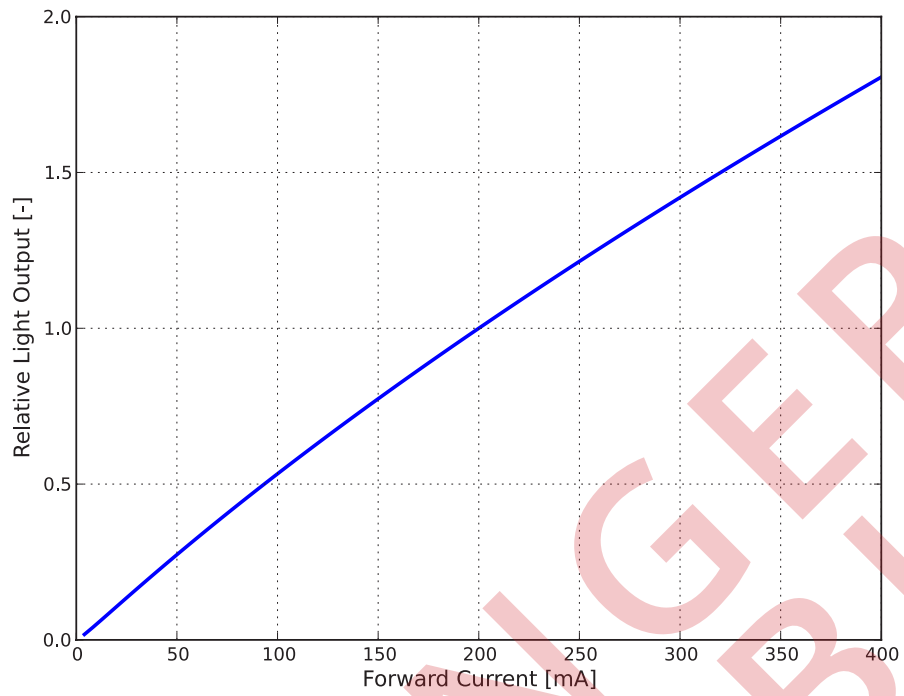


Figure 3a. Typical normalized light output vs. forward current for L2C1-xxxx120206xxx and LHC1-XXXX-1202,  $T_j=85^\circ\text{C}$

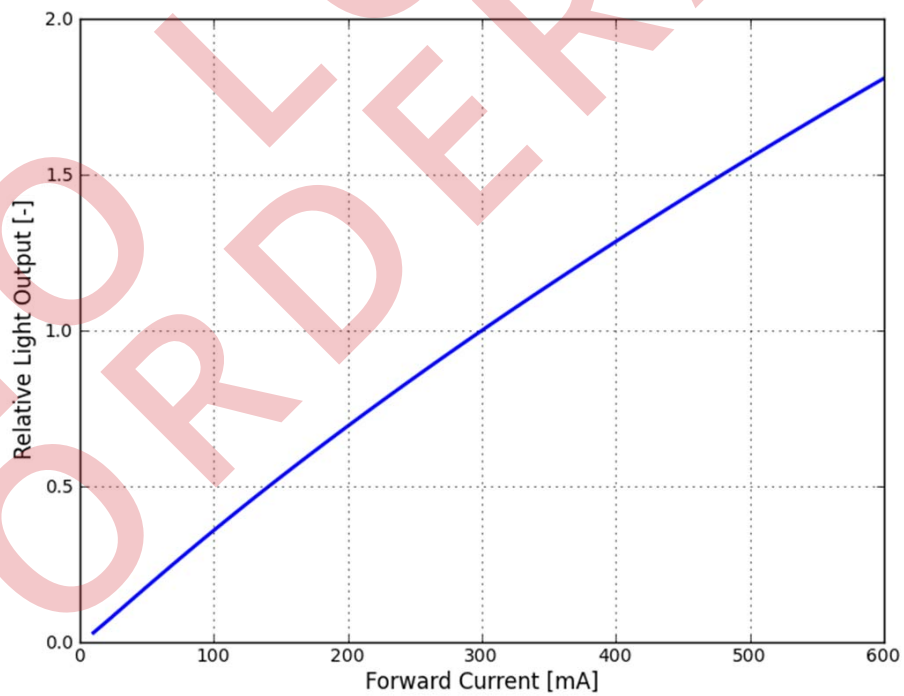


Figure 3b. Typical normalized light output vs. forward current for LHC1-xxxx-1203,  $T_j=85^\circ\text{C}$ .

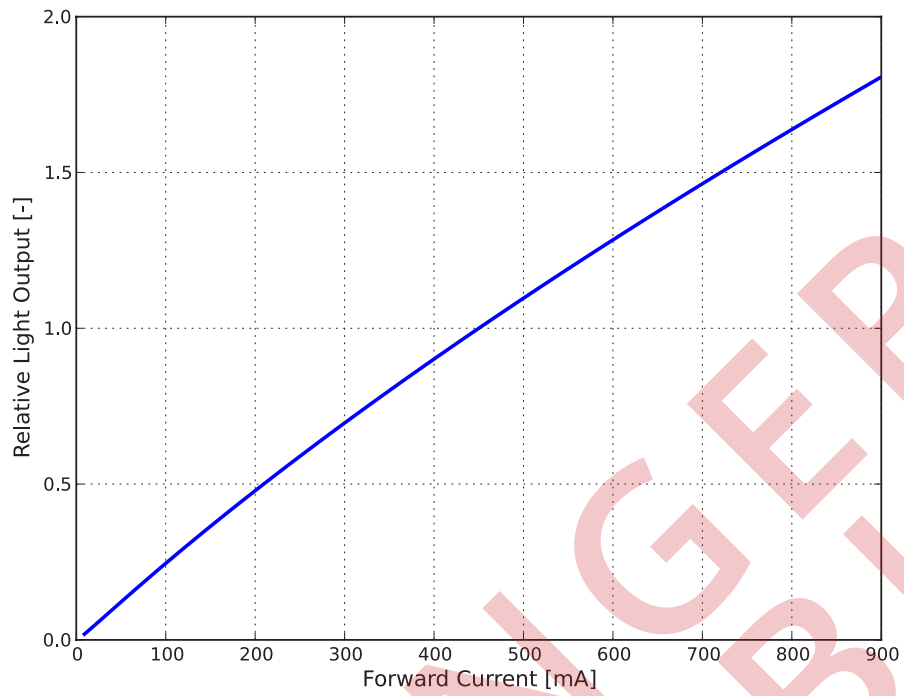


Figure 3c. Typical normalized light output vs. forward current for LHC1-xxxx-1204,  $T_j=85^\circ\text{C}$ .

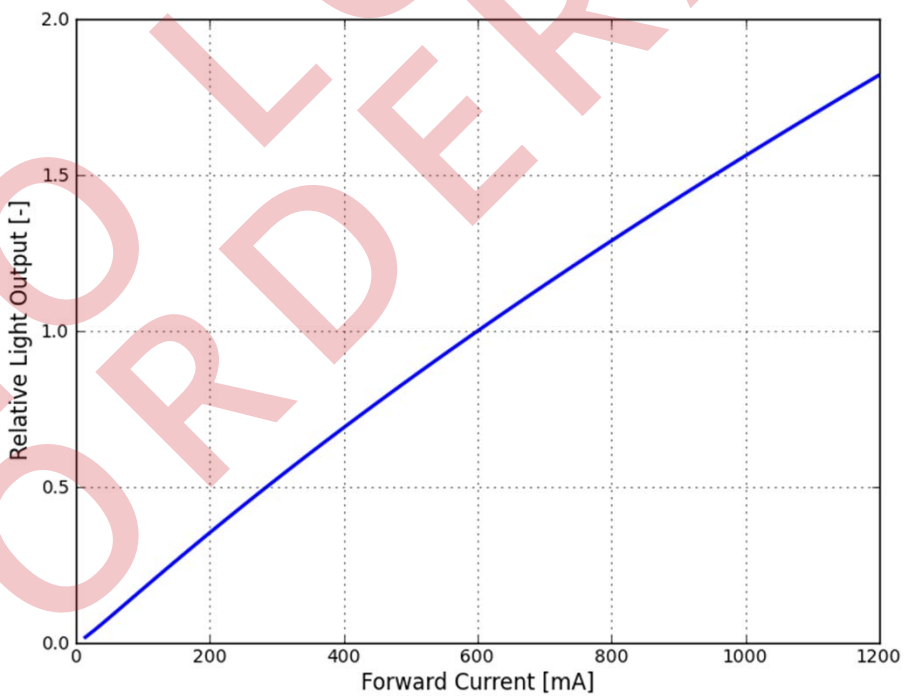


Figure 3d. Typical normalized light output vs. forward current for LHC1-xxxx-1205,  $T_j=85^\circ\text{C}$ .

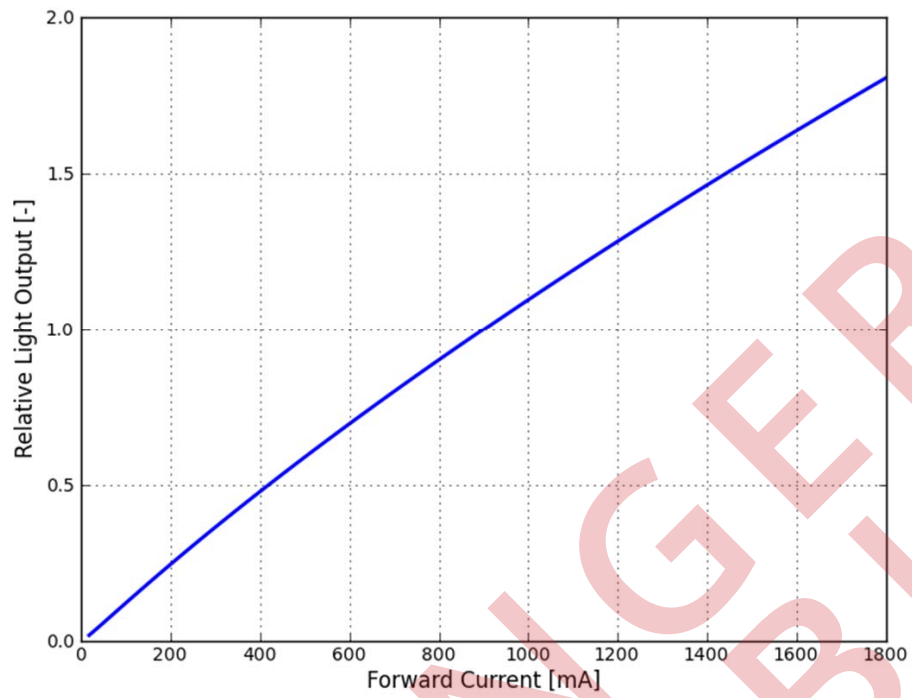


Figure 3e. Typical normalized light output vs. forward current for LHC1-xxxx-1208,  $T_j=85^\circ\text{C}$ .

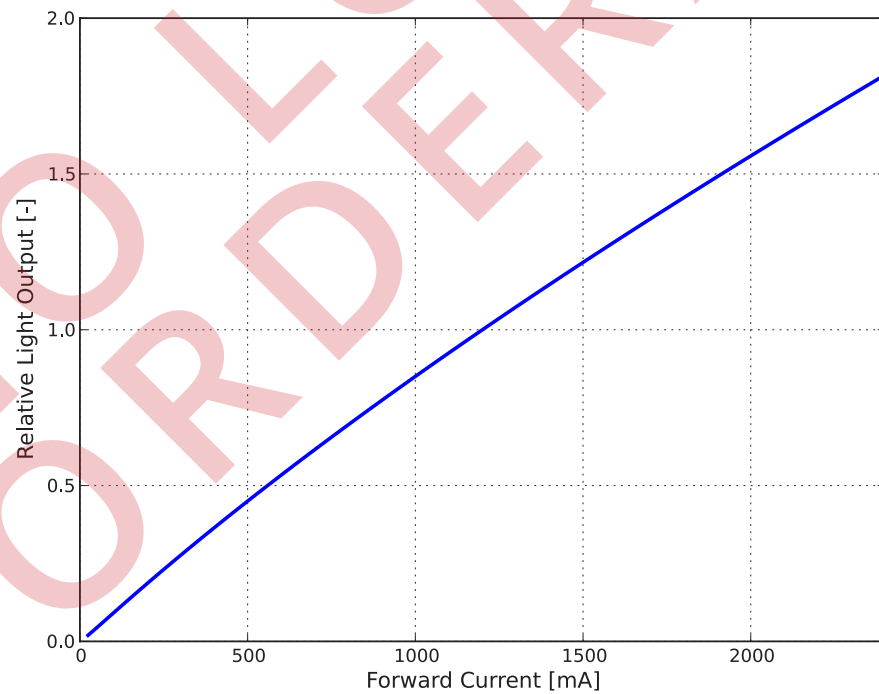


Figure 3f. Typical normalized light output vs. forward current for LHC1-xxxx-1211,  $T_j=85^\circ\text{C}$ .

## Forward Current Characteristics

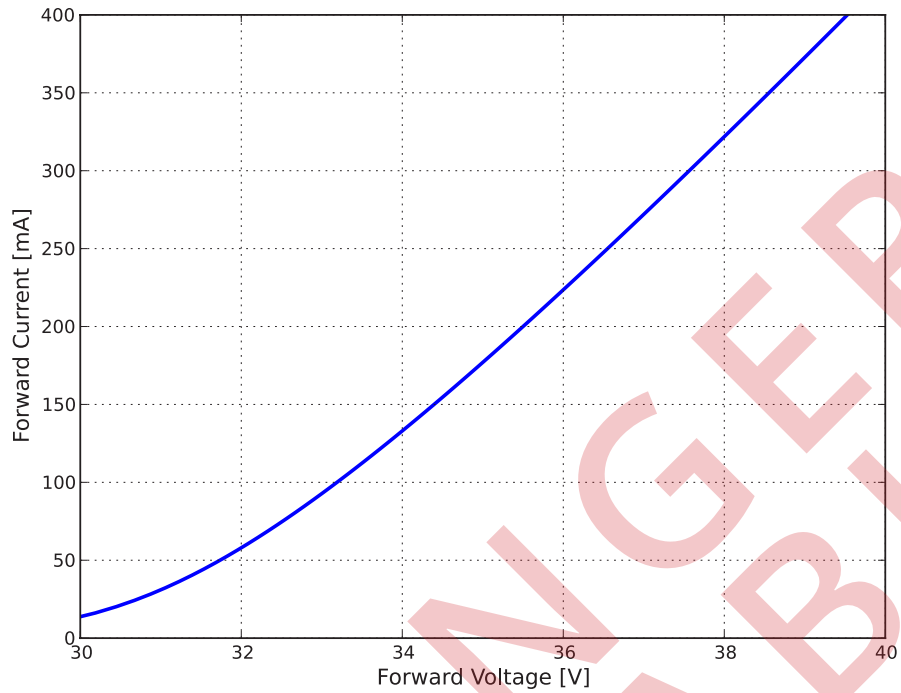


Figure 4a. Typical forward current vs. forward voltage for L2C1-xxxx120206xxx and LHC1-xxxx-1202,  $T_j=85^\circ\text{C}$ .

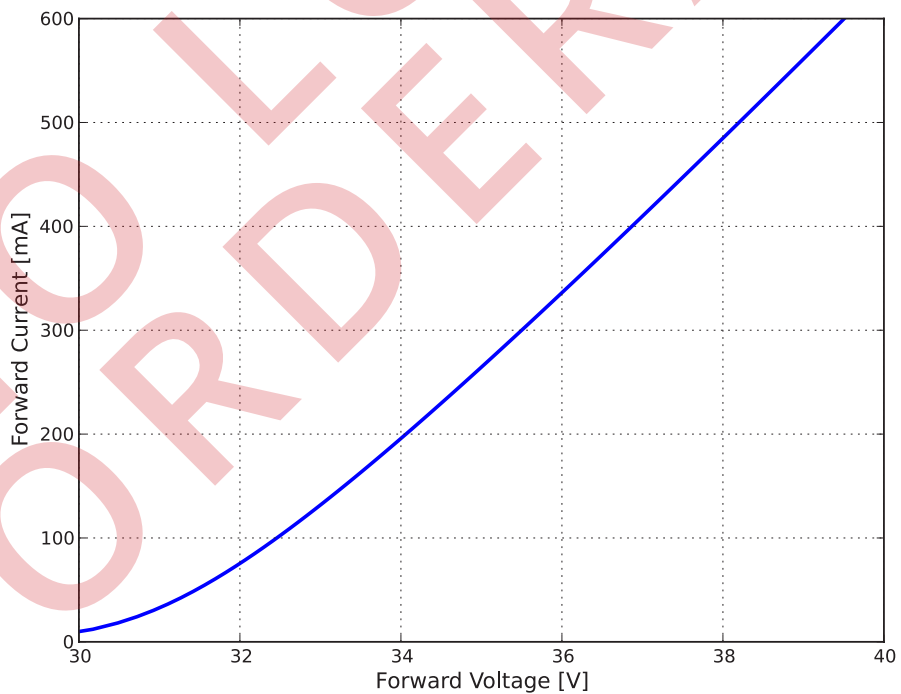


Figure 4b. Typical forward current vs. forward voltage for LHC1-xxxx-1203,  $T_j=85^\circ\text{C}$ .

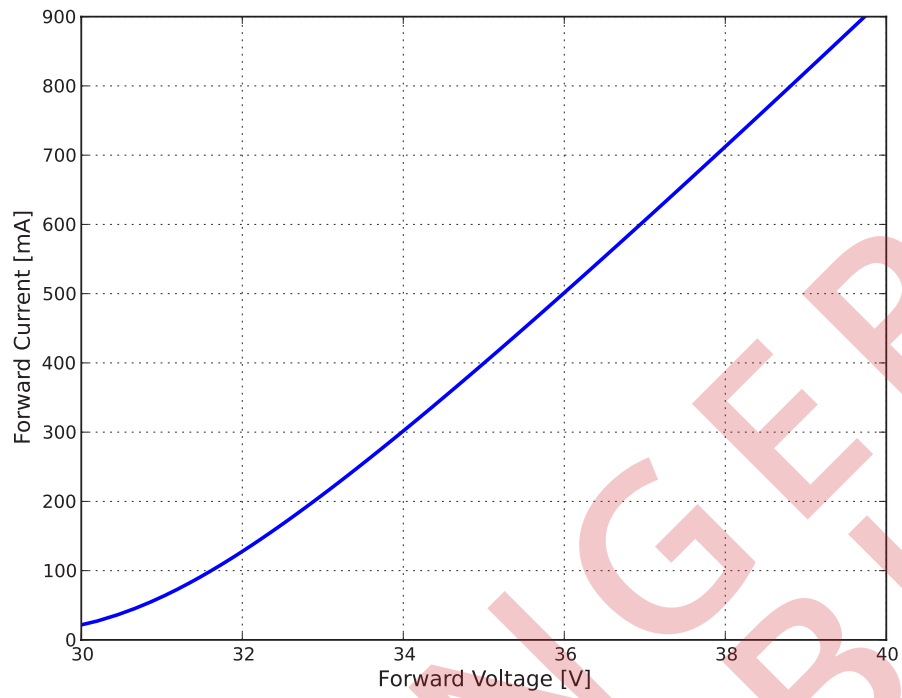


Figure 4c. Typical forward current vs. forward voltage for LHC1-xxxx-1204,  $T_j=85^\circ\text{C}$ .

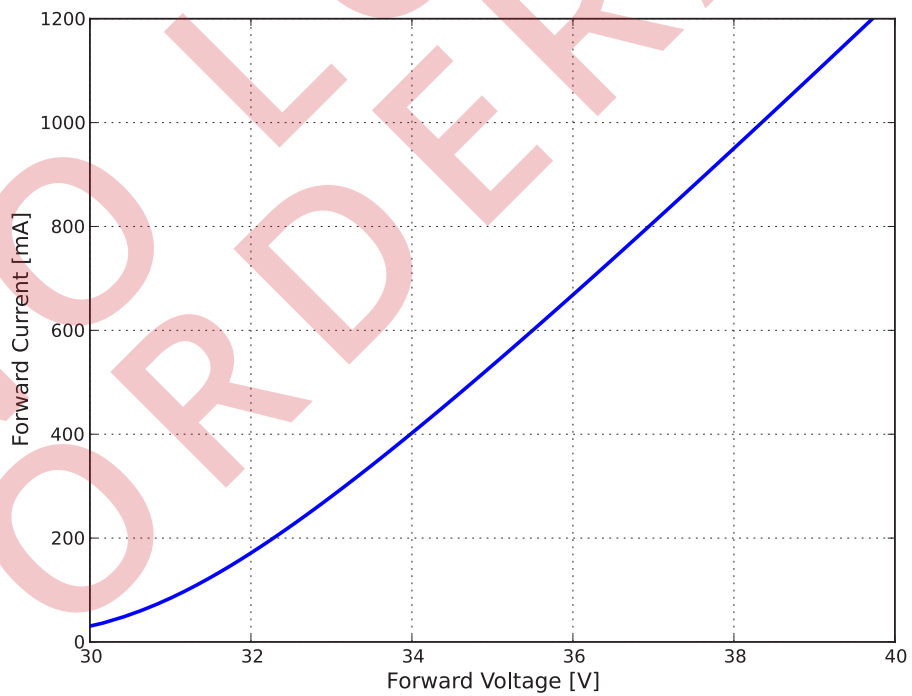


Figure 4d. Typical forward current vs. forward voltage for LHC1-xxxx-1205,  $T_j=85^\circ\text{C}$ .

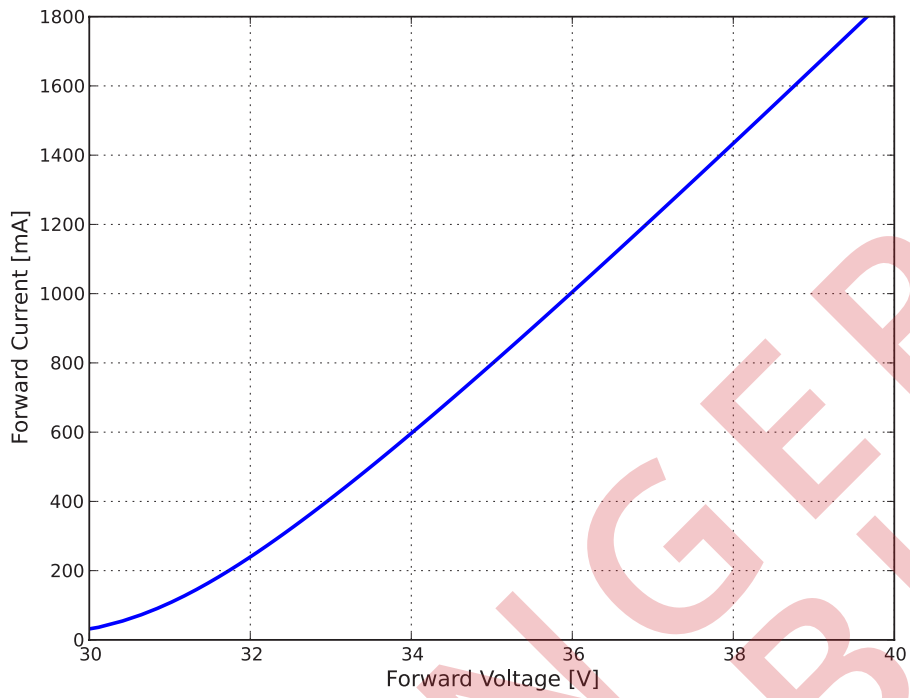


Figure 4e. Typical forward current vs. forward voltage for LHC1-xxxx-1208,  $T_j=85^\circ\text{C}$ .

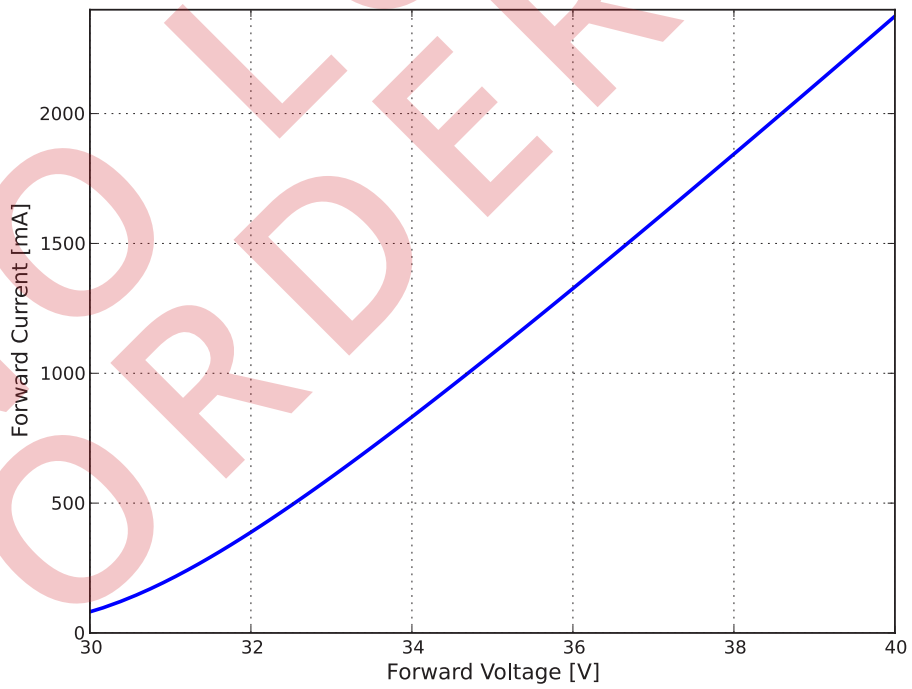


Figure 4f. Typical forward current vs. forward voltage for LHC1-xxxx-1211,  $T_j=85^\circ\text{C}$ .

## Radiation Pattern Characteristics



Figure 5. Typical radiation pattern for L2C1-xxxx120206xxx and LHC1-xxxx-xxxx at test current,  $T_j=85^\circ\text{C}$ .

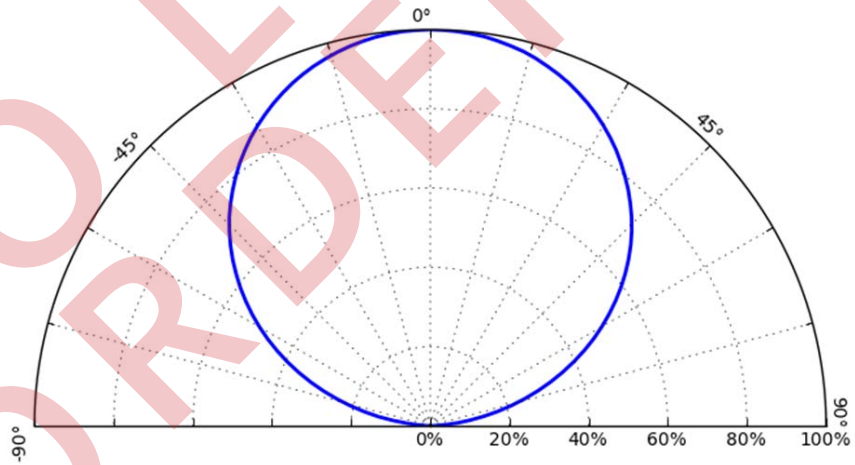


Figure 6. Typical polar radiation pattern for L2C1-xxxx120206xxx and LHC1-xxxx-xxxx at test current,  $T_j=85^\circ\text{C}$ .



## Color Bin Definition

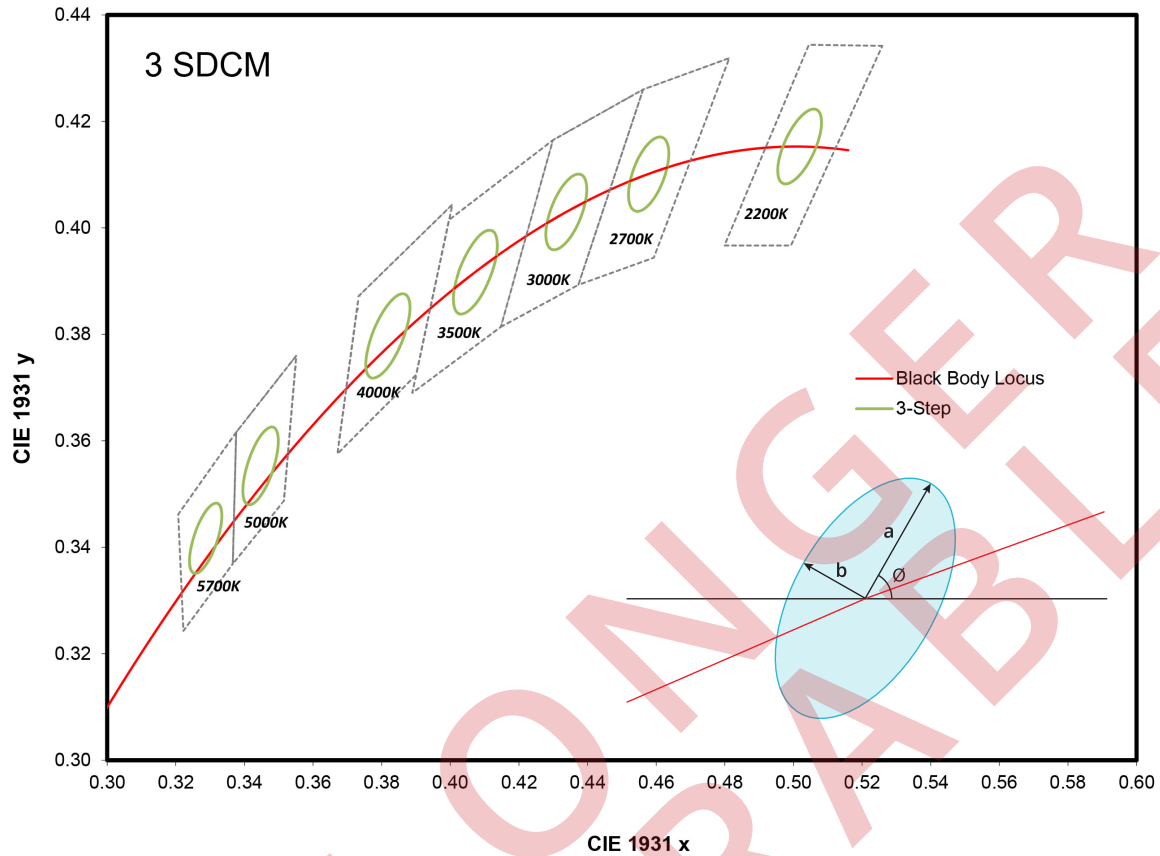


Figure 7. 3-step MacAdam ellipse illustration for Table 5.

Table 5. 3-step MacAdam ellipse color bin definitions for LUXEON CoB Core Range.

| NOMINAL CCT | COLOR SPACE                   | CENTER POINT <sup>(1)</sup><br>(cx, cy) | MAJOR AXIS,<br>a | MINOR AXIS,<br>b | ELLIPSE ROTATION<br>ANGLE, θ |
|-------------|-------------------------------|---|------------------|------------------|------------------------------|
| 2200K       | Single 3-step MacAdam ellipse | (0.5020, 0.4155)                        | 0.00862          | 0.00397          | 49.30°                       |
| 2700K       | Single 3-step MacAdam ellipse | (0.4578, 0.4101)                        | 0.00810          | 0.00420          | 53.70°                       |
| 3000K       | Single 3-step MacAdam ellipse | (0.4338, 0.4030)                        | 0.00834          | 0.00408          | 53.20°                       |
| 3500K       | Single 3-step MacAdam ellipse | (0.4073, 0.3917)                        | 0.00927          | 0.00414          | 54.00°                       |
| 4000K       | Single 3-step MacAdam ellipse | (0.3818, 0.3797)                        | 0.00939          | 0.00402          | 53.70°                       |
| 5000K       | Single 3-step MacAdam ellipse | (0.3447, 0.3553)                        | 0.00822          | 0.00354          | 59.60°                       |
| 5700K       | Single 3-step MacAdam ellipse | (0.3287, 0.3417)                        | 0.00745          | 0.00320          | 59.09°                       |

**Notes for Table 5:**

1. Lumileds maintains a tolerance of  $\pm 0.005$  on x and y coordinates in the CIE 1931 color space.

# Mechanical Dimensions

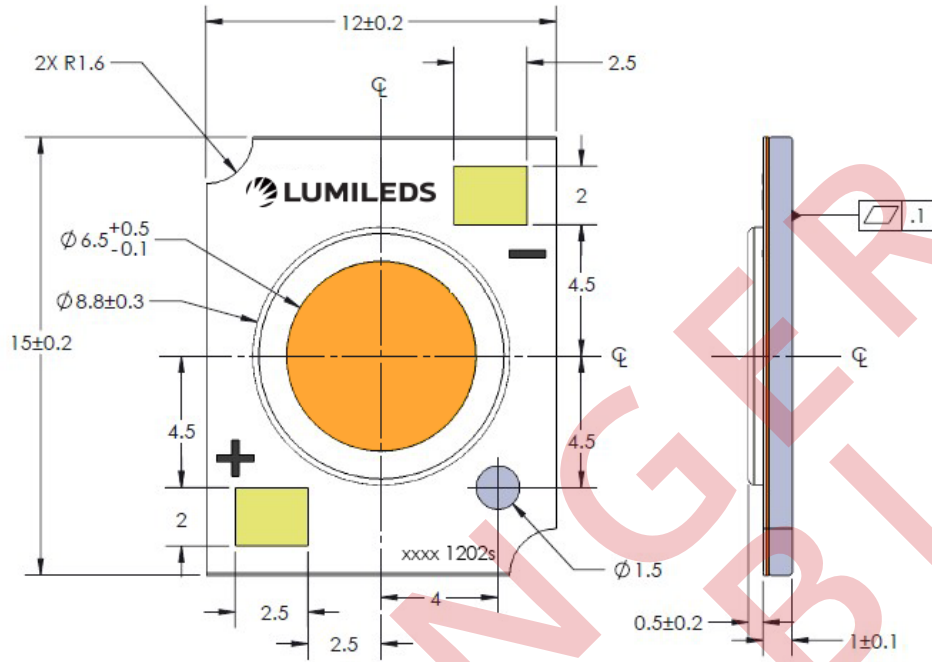


Figure 8a. Mechanical dimensions for L2C1-xxxx120206xxx.

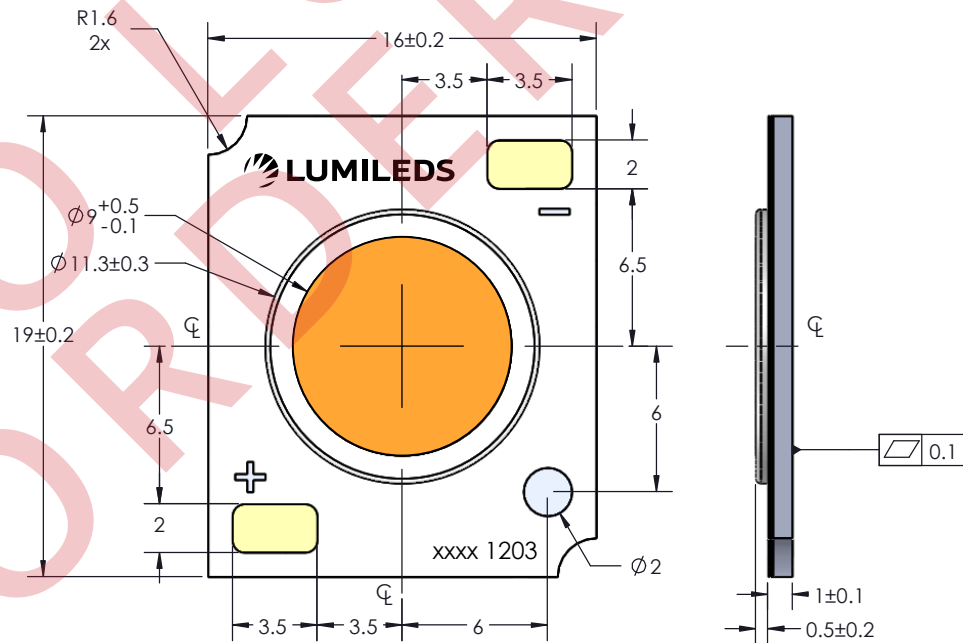


Figure 8b. Mechanical dimensions for LHC1-xxxx-1202 and LHC1-xxxx-1203.

- Notes for Figures 8a and 8b:
1. Drawings not to scale.
  2. All dimensions are in millimeters.

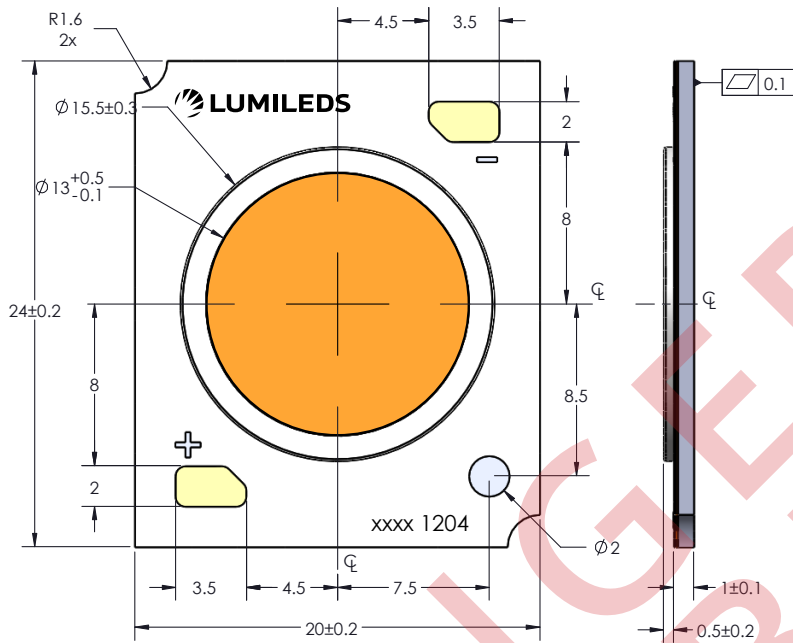


Figure 8c. Mechanical dimensions for LHC1-xxxx-1204.

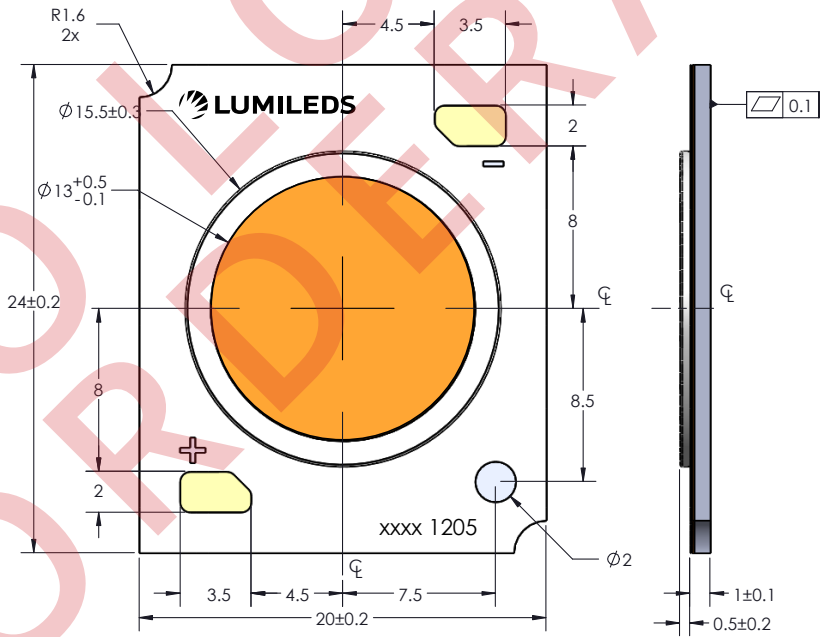


Figure 8d. Mechanical dimensions for LHC1-xxxx-1205.

- Notes for Figures 8c and 8d:
1. Drawings not to scale.
  2. All dimensions are in millimeters.

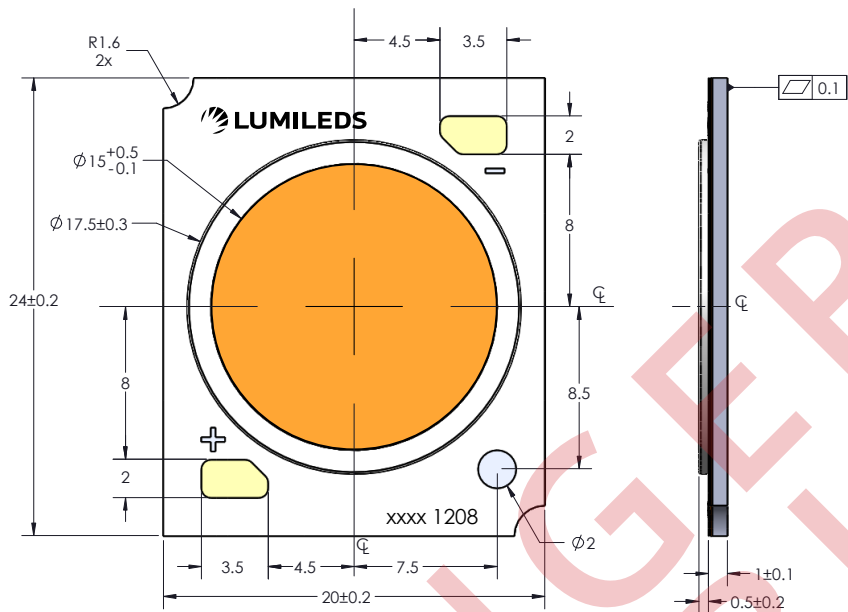


Figure 8e. Mechanical dimensions for LHC1-xxxx-1208.

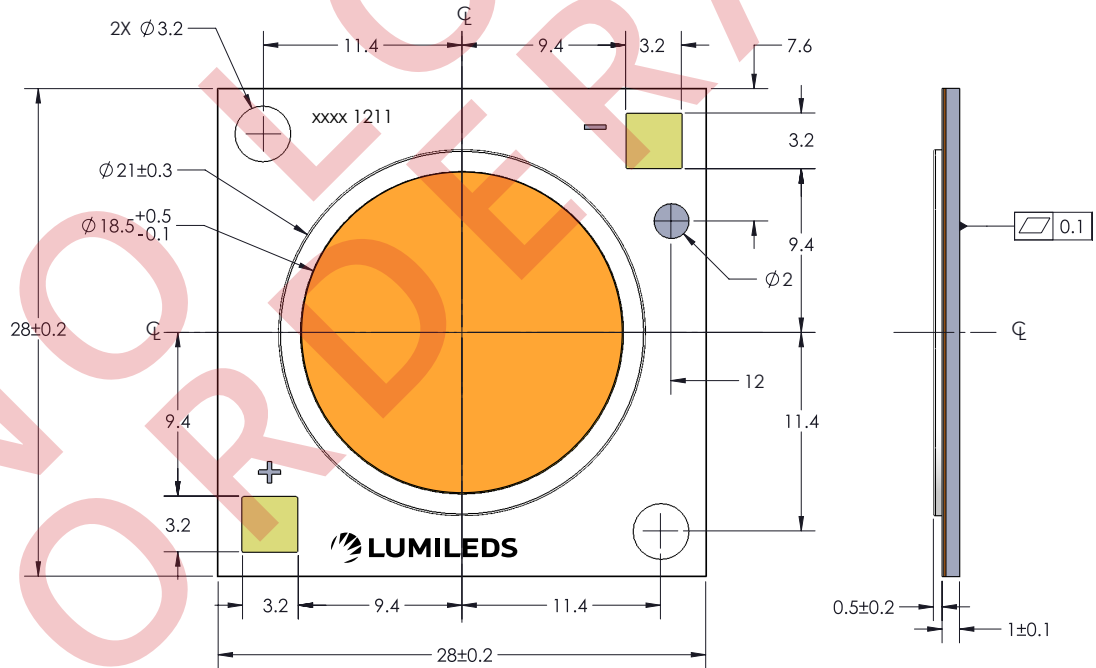


Figure 8f. Mechanical dimensions for LHC1-xxxx-1211.

Notes for Figures 8e and 8f:

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

# Packaging Information

## Unit Totals per Box

Table 6. Unit totals per box for LUXEON CoB with CrispWhite Technology.

| TOTAL          | L2C1-<br>xxxx120206xxx | LHC1-<br>xxxx-1202 | LHC1-<br>xxxx-1203 | LHC1-<br>xxxx-1204 | LHC1-<br>xxxx-1205 | LHC1-<br>xxxx-1208 | LHC1-<br>xxxx-1211 |
|----------------|------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| Units per Tube | 20                     | 20                 | 20                 | 20                 | 20                 | 20                 | 10                 |
| Tubes per Box  | 5                      | 5                  | 5                  | 5                  | 5                  | 5                  | 5                  |
| Units per Box  | 100                    | 100                | 100                | 100                | 100                | 100                | 50                 |

## Tube Dimensions

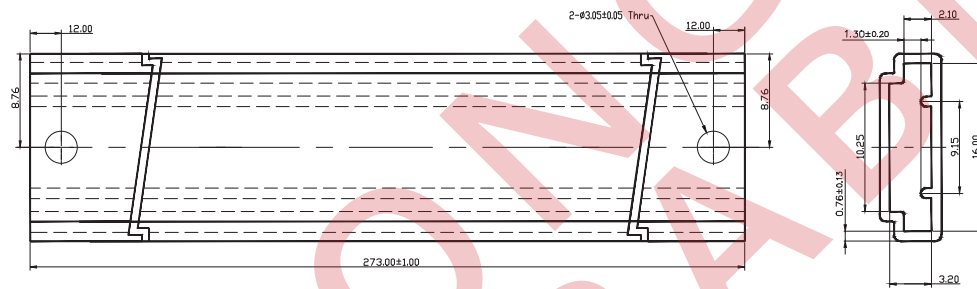


Figure 9a. Tube dimensions for LUXEON CoB Core Range L2C1-xxxx120206xxx.

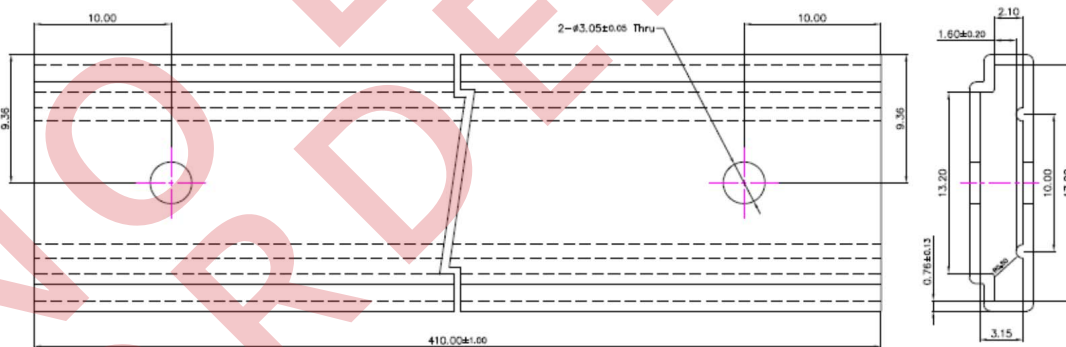


Figure 9b. Tube dimensions for LUXEON CoB LHC1-xxxx-1202 and LHC1-xxxx-1203.

- Notes for Figure 9a and 9b:
1. Drawings are not to scale.
  2. All dimensions are in millimeters.

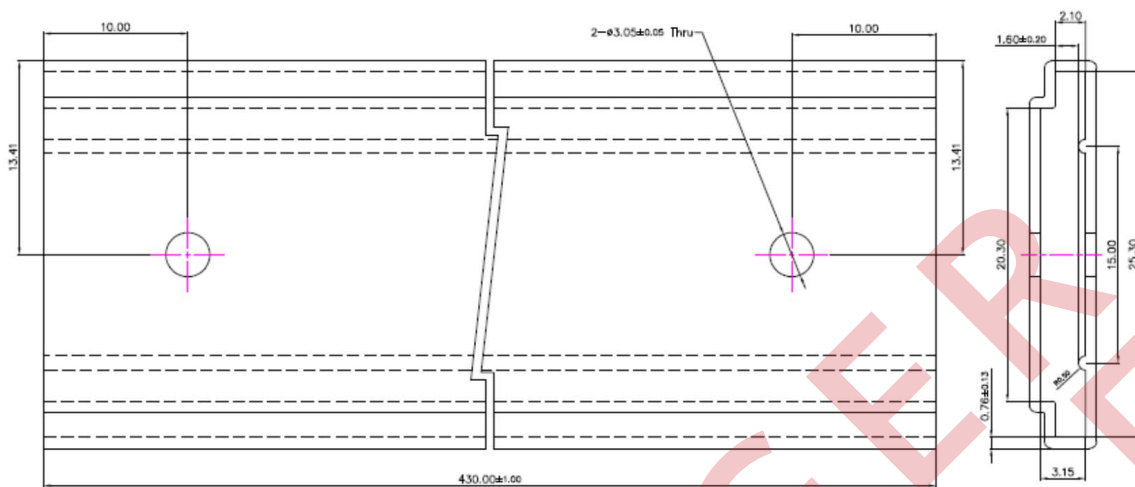


Figure 9c. Tube dimensions for LUXEON CoB LHC1-xxxx-1204, LHC1-xxxx-1205 and LHC1-xxxx-1208.

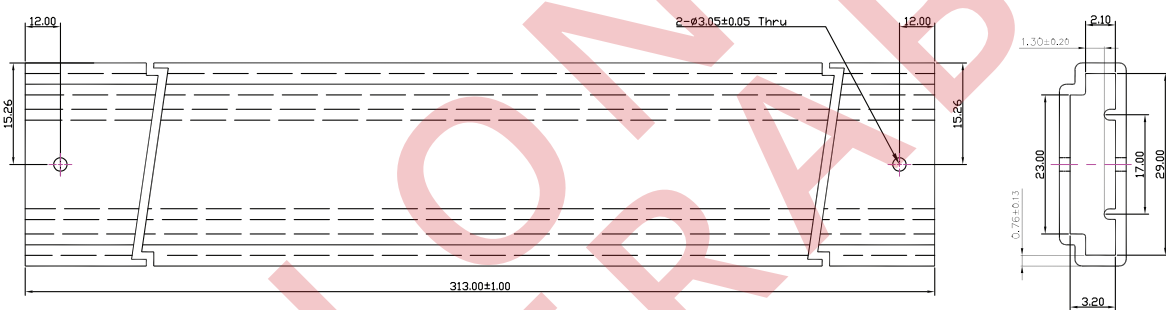


Figure 9d. Tube dimensions for LUXEON CoB LHC1-xxxx-1211.

- Notes for Figures 9c and 9d:
1. Drawings are not to scale.
  2. All dimensions are in millimeters.

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Companies developing automotive, mobile, IoT and illumination lighting applications need a partner who can collaborate with them to push the boundaries of light. With over 100 years of inventions and industry firsts, Lumileds is a global lighting solutions company that helps customers around the world deliver differentiated solutions to gain and maintain a competitive edge. As the inventor of Xenon technology, a pioneer in halogen lighting and the leader in high performance LEDs, Lumileds builds innovation, quality and reliability into its technology, products and every customer engagement. Together with its customers, Lumileds is making the world safer, better and more beautiful—with light.

To learn more about our lighting solutions, visit [lumileds.com](http://lumileds.com).

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