

For NEW designs consider these replacement products:

LUXEON CoB Compact Range (Gen 2)
 • LUXEON CoB 205 and LUXEON CoB 209



LUXEON CoB Compact Range

Unsurpassed light quality and CBCP due to small LES

LUXEON CoB Compact Range offers the industry's smallest Light Emitting Surface (LES) that enables more cost effective designs and provides good Center Beam Candle Power (CBCP) for crisp light beams with the best luminance and color uniformity. LUXEON CoB Compact parts are available in 3-step (80CRI and 90CRI) MacAdam ellipse, ensuring uniform optical performance in retrofit lamps and spotlight applications. LUXEON CoB Compact LEDs are all hot-tested at 85°C—real world operating conditions—which means that luminaire design is simplified and testing can be minimized.



FEATURES AND BENEFITS

- Highest flux densities with industry's smallest LES, 6.5mm
- Industry leading thermal resistance allows for smaller heat sinks
- Ceramic substrate that offers better protection in Hi Pot testing
- Supported by a comprehensive optical, mechanical and electrical ecosystem
- 3-step MacAdam ellipse color definition: *Freedom from Binning* for color consistency from luminaire to luminaire
- Tested at $T_j=85^\circ\text{C}$ for accurate color in application

PRIMARY APPLICATIONS

- Downlights
- High Bay & Low Bay
- Lamps
 - Directional
- Spotlights

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General Product Information

Nomenclature Test Conditions

LUXEON CoB Compact LEDs are tested and binned with a DC drive current specified below at a junction temperature, T_j , of 85°C.

| | | |
|-------|---|--------------------|
| 150mA | - | LUXEON CoB 105 36V |
| 200mA | - | LUXEON CoB 107 36V |
| 250mA | - | LUXEON CoB 109 36V |
| 350mA | - | LUXEON CoB 105 12V |
| 350mA | - | LUXEON CoB 109 12V |

Part Number Nomenclature

The part number designation for LUXEON CoB Compact LEDs is explained as follows:

L 2 C 3 - **A A B B D D D E** 0 6 0 0 0

Where:

- A A** - designates nominal ANSI CCT (22=2200K, 27=2700K, 30=3000K, 35=3500K, 40=4000K, 50=5000K, 57=5700K)
- B B** - designates minimum CRI (80=80CRI, 90=90CRI)
- D D D** - designates LUXEON CoB product number (105, 107, 109)
- E** - designates forward voltage (B=12V, D=24V, E=36V)

Therefore, a LUXEON CoB 105 3000K, 80CRI 12V will have the following part number:

L 2 C 3 - **3 0 8 0 1 0 5 B** 0 6 0 0 0

Lumen Maintenance

Lumen maintenance for solid-state lighting devices (LEDs) is typically defined in terms of the percentage of initial light output remaining after a specified period of time. Based on historical data Lumileds projects that LUXEON CoB Compact will deliver—on average—70% lumen maintenance (L70) at 50,000 hours of operation at its nominal, tested conditions. Observation of design limits included in this data sheet is required in order to achieve this projected lumen maintenance.

Environmental Compliance

Lumileds LLC is committed to providing environmentally friendly products to the solid-state lighting market. LUXEON LEDs are 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 material 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 Compact at test current, $T_j=85^{\circ}\text{C}$.

| PRODUCT | FORWARD VOLTAGE (V_f) | NOMINAL CCT | MINIMUM CRI ^(1, 2) | LUMINOUS FLUX ⁽¹⁾ (lm) | | TYPICAL LUMINOUS EFFICACY (lm/W) | TEST CURRENT (mA) | LES (mm) | PART NUMBER |
|----------------|---------------------------|-------------|-------------------------------|-----------------------------------|---------|----------------------------------|-------------------|----------|--------------------|
| | | | | MINIMUM | TYPICAL | | | | |
| LUXEON CoB 105 | 12V | 2700K | 80 | 405 | 450 | 112 | 350 | 6.5 | L2C3-2780105B06000 |
| | | 3000K | 80 | 425 | 472 | 117 | 350 | 6.5 | L2C3-3080105B06000 |
| | | 3500K | 80 | 435 | 493 | 122 | 350 | 6.5 | L2C3-3580105B06000 |
| | | 4000K | 80 | 457 | 507 | 126 | 350 | 6.5 | L2C3-4080105B06000 |
| | | 2700K | 90 | 347 | 385 | 96 | 350 | 6.5 | L2C3-2790105B06000 |
| | | 3000K | 90 | 369 | 410 | 102 | 350 | 6.5 | L2C3-3090105B06000 |
| | | 3500K | 90 | 378 | 419 | 104 | 350 | 6.5 | L2C3-3590105B06000 |
| | | 4000K | 90 | 395 | 439 | 109 | 350 | 6.5 | L2C3-4090105B06000 |
| | 36V | 2200K | 80 | 375 | 425 | 79 | 150 | 6.5 | L2C3-2280105E06000 |
| | | 2700K | 80 | 525 | 575 | 106 | 150 | 6.5 | L2C3-2780105E06000 |
| | | 3000K | 80 | 525 | 600 | 111 | 150 | 6.5 | L2C3-3080105E06000 |
| | | 3500K | 80 | 525 | 600 | 111 | 150 | 6.5 | L2C3-3580105E06000 |
| | | 4000K | 80 | 550 | 625 | 116 | 150 | 6.5 | L2C3-4080105E06000 |
| | | 5000K | 80 | 600 | 650 | 120 | 150 | 6.5 | L2C3-5080105E06000 |
| | | 5700K | 80 | 600 | 650 | 120 | 150 | 6.5 | L2C3-5780105E06000 |
| | | 2200K | 90 | 350 | 400 | 74 | 150 | 6.5 | L2C3-2290105E06000 |
| LUXEON CoB 107 | 36V | 2700K | 90 | 450 | 500 | 93 | 150 | 6.5 | L2C3-2790105E06000 |
| | | 3000K | 90 | 475 | 500 | 93 | 150 | 6.5 | L2C3-3090105E06000 |
| | | 3500K | 90 | 475 | 525 | 97 | 150 | 6.5 | L2C3-3590105E06000 |
| | | 4000K | 90 | 525 | 575 | 106 | 150 | 6.5 | L2C3-4090105E06000 |
| | | 2200K | 80 | 500 | 550 | 77 | 200 | 6.5 | L2C3-2280107E06000 |
| | | 2700K | 80 | 625 | 725 | 102 | 200 | 6.5 | L2C3-2780107E06000 |
| | | 3000K | 80 | 650 | 750 | 106 | 200 | 6.5 | L2C3-3080107E06000 |
| | | 3500K | 80 | 675 | 750 | 106 | 200 | 6.5 | L2C3-3580107E06000 |
| | 36V | 4000K | 80 | 700 | 775 | 109 | 200 | 6.5 | L2C3-4080107E06000 |
| | | 5000K | 80 | 700 | 800 | 113 | 200 | 6.5 | L2C3-5080107E06000 |
| | | 5700K | 80 | 700 | 800 | 113 | 200 | 6.5 | L2C3-5780107E06000 |
| | | 2200K | 90 | 450 | 500 | 70 | 200 | 6.5 | L2C3-2290107E06000 |
| | | 2700K | 90 | 550 | 625 | 88 | 200 | 6.5 | L2C3-2790107E06000 |
| | | 3000K | 90 | 550 | 650 | 92 | 200 | 6.5 | L2C3-3090107E06000 |
| | | 3500K | 90 | 575 | 675 | 95 | 200 | 6.5 | L2C3-3590107E06000 |
| | | 4000K | 90 | 600 | 675 | 95 | 200 | 6.5 | L2C3-4090107E06000 |

Notes for Table 1 continued on next page:

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

Table 1. Product performance of LUXEON CoB Compact at test current, $T_j=85^\circ\text{C}$ (continued).

| PRODUCT | FORWARD VOLTAGE (V_f) | NOMINAL CCT | MINIMUM CRI ^[1,2] | LUMINOUS FLUX ^[1] (lm) | | TYPICAL LUMINOUS EFFICACY (lm/W) | TEST CURRENT (mA) | LES (mm) | PART NUMBER |
|----------------|---------------------------|-------------|------------------------------|-----------------------------------|---------|----------------------------------|-------------------|--------------------|--------------------|
| | | | | MINIMUM | TYPICAL | | | | |
| LUXEON CoB 109 | 24V | 2700K | 80 | 792 | 880 | 109 | 350 | 6.5 | L2C3-2780109D06000 |
| | | 3000K | 80 | 810 | 900 | 112 | 350 | 6.5 | L2C3-3080109D06000 |
| | | 3500K | 80 | 842 | 936 | 117 | 350 | 6.5 | L2C3-3580109D06000 |
| | | 4000K | 80 | 871 | 968 | 120 | 350 | 6.5 | L2C3-4080109D06000 |
| | | 2700K | 90 | 680 | 755 | 94 | 350 | 6.5 | L2C3-2790109D06000 |
| | | 3000K | 90 | 710 | 789 | 98 | 350 | 6.5 | L2C3-3090109D06000 |
| | | 3500K | 90 | 720 | 800 | 99 | 350 | 6.5 | L2C3-3590109D06000 |
| | | 4000K | 90 | 753 | 837 | 104 | 350 | 6.5 | L2C3-4090109D06000 |
| | | 2200K | 80 | 700 | 775 | 87 | 250 | 6.5 | L2C3-2280109E06000 |
| | | 2700K | 80 | 875 | 975 | 110 | 250 | 6.5 | L2C3-2780109E06000 |
| | 3000K | 80 | 900 | 1025 | 115 | 250 | 6.5 | L2C3-3080109E06000 | |
| | 3500K | 80 | 950 | 1075 | 121 | 250 | 6.5 | L2C3-3580109E06000 | |
| | 4000K | 80 | 950 | 1075 | 121 | 250 | 6.5 | L2C3-4080109E06000 | |
| | 5000K | 80 | 1000 | 1100 | 124 | 250 | 6.5 | L2C3-5080109E06000 | |
| | 5700K | 80 | 1000 | 1100 | 124 | 250 | 6.5 | L2C3-5780109E06000 | |
| | 2200K | 90 | 625 | 700 | 79 | 250 | 6.5 | L2C3-2290109E06000 | |
| | 2700K | 90 | 775 | 850 | 96 | 250 | 6.5 | L2C3-2790109E06000 | |
| | 3000K | 90 | 775 | 875 | 99 | 250 | 6.5 | L2C3-3090109E06000 | |
| | 3500K | 90 | 800 | 875 | 99 | 250 | 6.5 | L2C3-3590109E06000 | |
| | 4000K | 90 | 825 | 925 | 104 | 250 | 6.5 | L2C3-4090109E06000 | |

Notes for Table 1:

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

Optical Characteristics

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

| PART NUMBER | TYPICAL TOTAL INCLUDED ANGLE | TYPICAL VIEWING ANGLE |
|-------------------|------------------------------|-----------------------|
| L2C3-xxx10xx06000 | 135° | 115° |

Notes for Table 2:

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

Electrical Characteristics

Table 3. Forward voltage and typical thermal resistance for LUXEON CoB Compact at test current, $T_j=85^\circ\text{C}$.

| PART NUMBER | TEST CURRENT (mA) | FORWARD VOLTAGE (V_f) | | | TYPICAL TEMPERATURE COEFFICIENT OF FORWARD VOLTAGE (mV/°C) | TYPICAL THERMAL RESISTANCE JUNCTION TO CASE (°C/W) |
|--------------------|-------------------|---------------------------|---------|---------|--|--|
| | | MINIMUM | TYPICAL | MAXIMUM | | |
| L2C3-xxxx105B06000 | 350 | 10.5 | 11.5 | 12.5 | -16 | 2.7 |
| L2C3-xxxx105E06000 | 150 | 33.0 | 36.0 | 39.0 | -16 | 2.7 |
| L2C3-xxxx107E06000 | 200 | 33.0 | 35.5 | 39.0 | -16 | 1.5 |
| L2C3-xxxx109D06000 | 350 | 21.0 | 23.0 | 25.0 | -16 | 1.5 |
| L2C3-xxxx109E06000 | 250 | 33.0 | 35.5 | 39.0 | -16 | 1.5 |

Notes for Table 3:

1. Lumileds maintains a voltage tolerance of $\pm 10\%$.
2. Measured between 25°C and 85°C for coefficient of forward current.
3. Thermal resistance is measured between junction and the bottom of the LUXEON CoB Compact substrate.

Absolute Maximum Ratings

Table 4. Absolute maximum ratings for LUXEON CoB Compact.

| PARAMETER | MAXIMUM PERFORMANCE |
|--|---|
| DC Forward Current ^[1,2] | LUXEON CoB 105 B: 600mA , LUXEON CoB 105 E: 200mA LUXEON CoB 107 E: 300mA LUXEON CoB 109 D: 600mA , LUXEON CoB 109 E: 400mA |
| LED Junction Temperature ^[1] (DC & Pulse) | 125°C |
| ESD Sensitivity (ANSI/ESDA/JEDEC JS-001-2012) | Class 3B |
| Operating Case Temperature ^[1] | -40°C to 105°C |
| Storage Temperature | -40°C to 105°C |
| Reverse Voltage ($V_{reverse}$) | LUXEON LEDs are not designed to be driven in reverse bias |

Notes for 4:

1. Proper current derating must be observed to maintain junction temperature below the maximum.
2. Residual periodic variations due to power conversion from alternating current (AC) to direct current (DC), also called "ripple," with frequencies $\geq 100\text{Hz}$ and amplitude $\leq 15\%$ of the maximum allowable DC forward current are acceptable, assuming the average current throughout each cycle does not exceed the maximum allowable DC forward current at the corresponding maximum junction temperature.
3. Pulsed operation with a peak drive current equal to the stated peak pulsed forward current is acceptable if the pulse on-time is $\leq 5\text{ms}$ per cycle and the duty cycle is $\leq 50\%$.

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Characteristics Curves

Spectral Distribution Characteristics

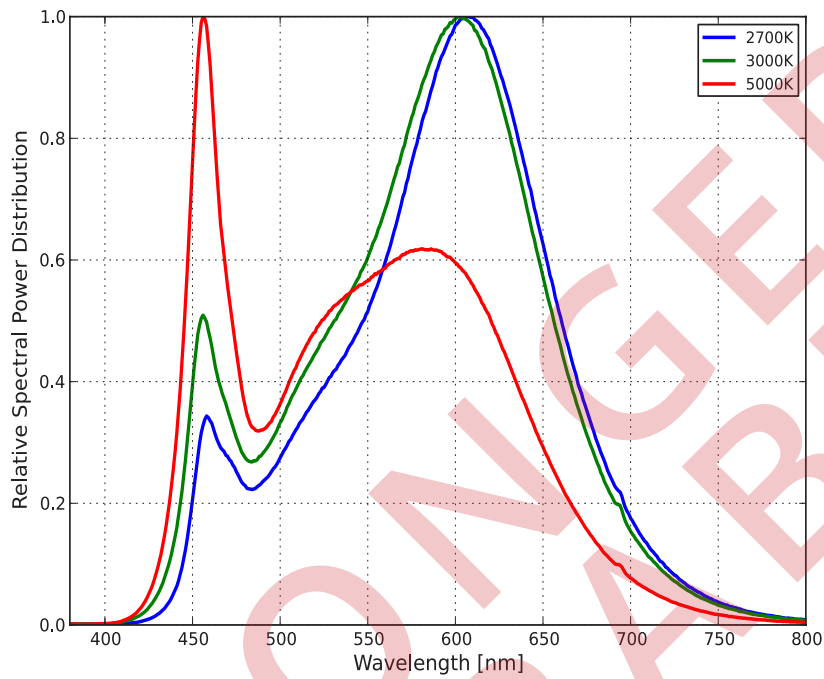


Figure 1a: Typical normalized power vs. wavelength for L2C3-xx8010xx06000 at test current, $T_j=85^\circ\text{C}$.

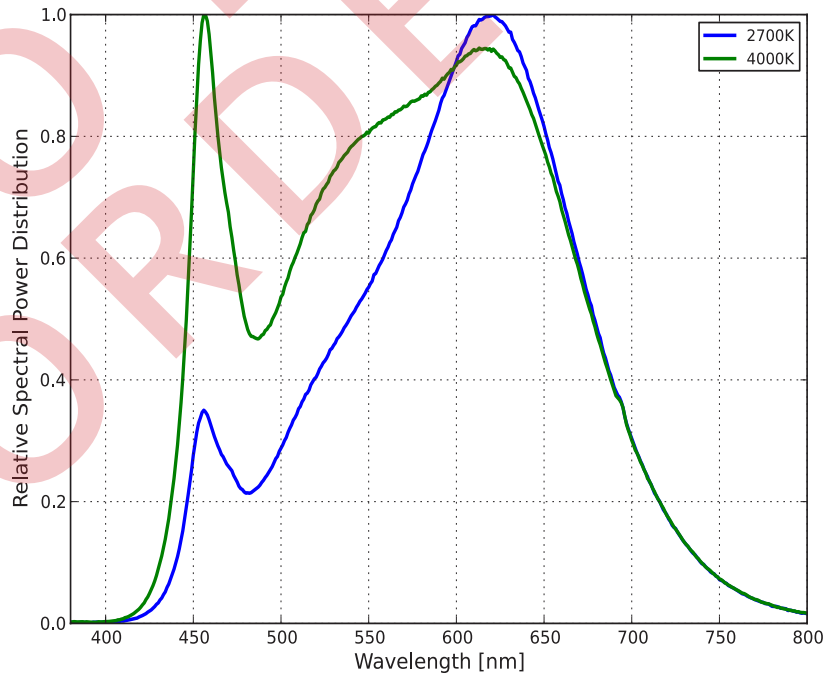


Figure 1b: Typical normalized power vs. wavelength for L2C3-xx9010xx06000 at test current, $T_j=85^\circ\text{C}$.

Light Output Characteristics

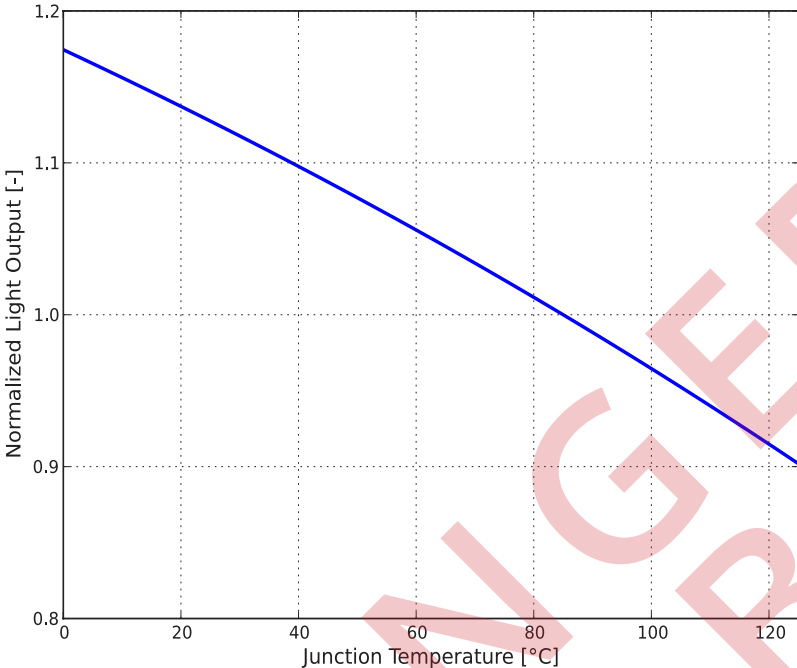


Figure 2: Typical normalized light output vs. junction temperature for L2C3-xxxx10xx06000 at test current.

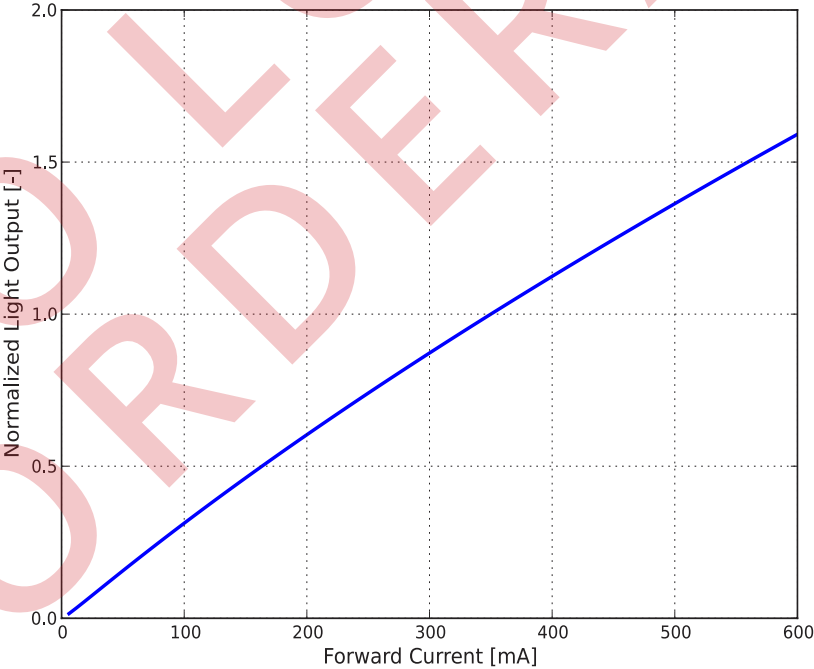


Figure 3a: Typical normalized light output vs. forward current for L2C3-xxxx105B06000 at $T_j=85^\circ\text{C}$.

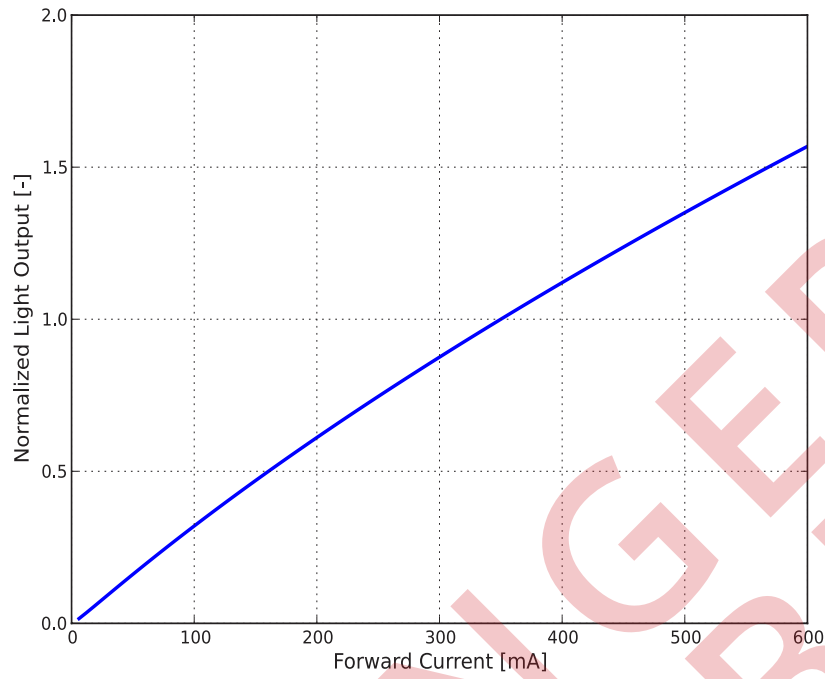


Figure 3b: Typical normalized light output vs. forward current for L2C3-xxxx109D06000 at $T_j=85^\circ\text{C}$.

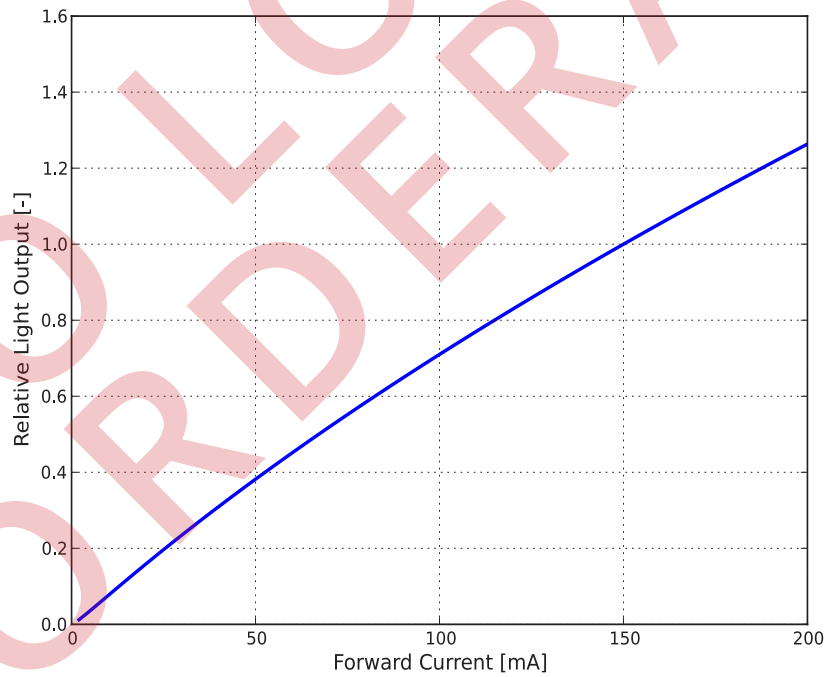


Figure 3c: Typical normalized light output vs. forward current for L2C3-xxxx105E06000 at $T_j=85^\circ\text{C}$.

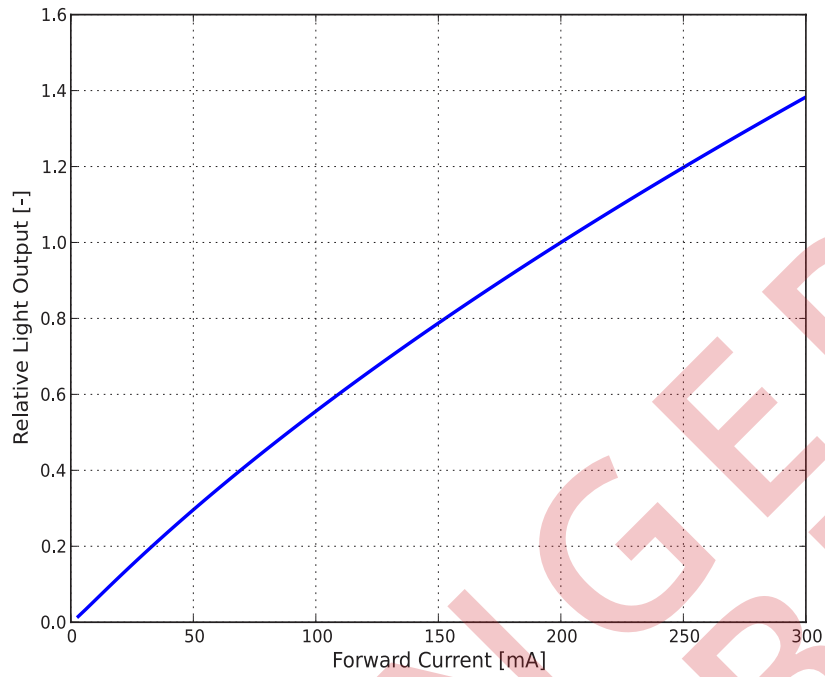


Figure 3d: Typical normalized light output vs. forward current for L2C3-xxxx107E06000 at $T_j=85^\circ\text{C}$.

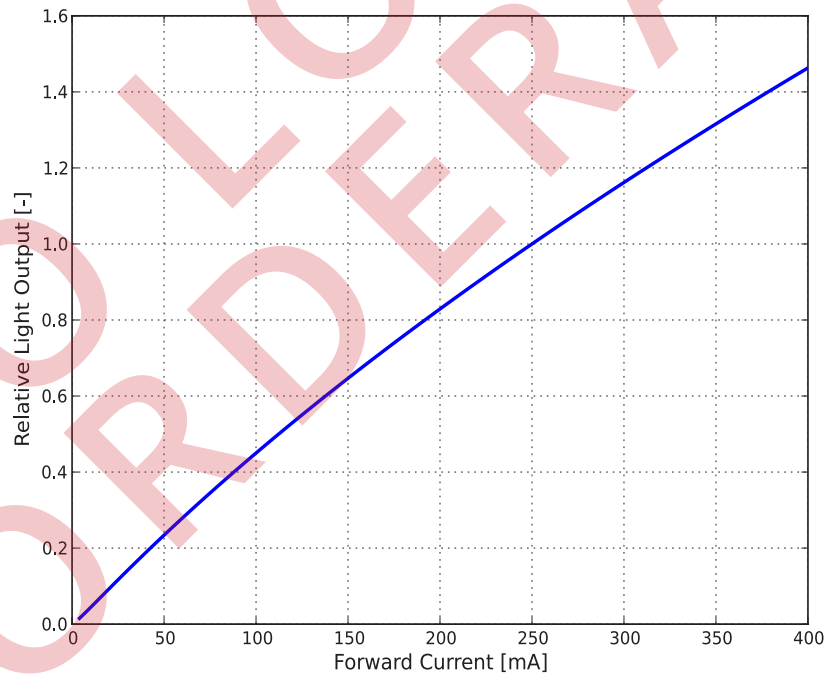


Figure 3e: Typical normalized light output vs. forward current for L2C3-xxxx109E06000 at $T_j=85^\circ\text{C}$.

Forward Current Characteristics

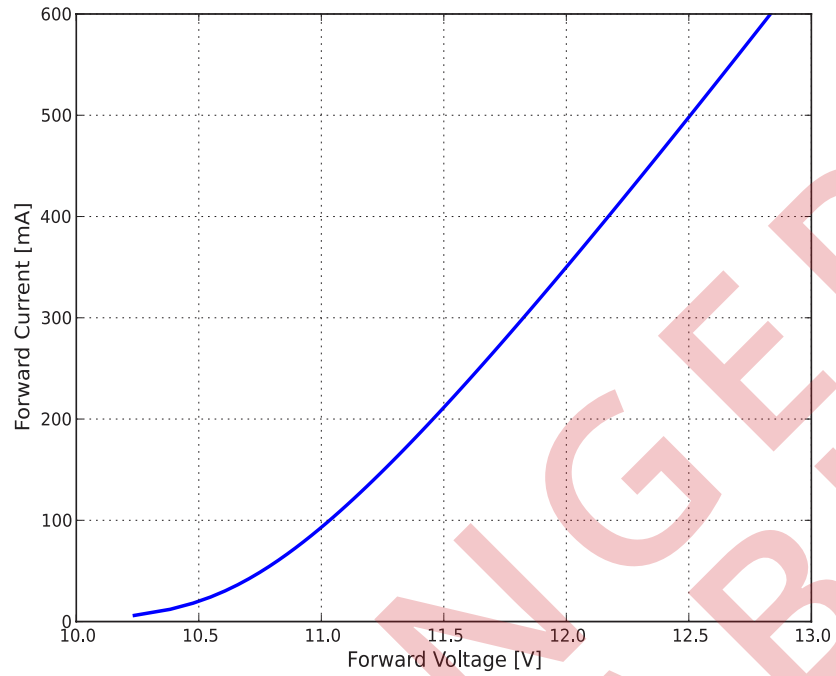


Figure 4a: Typical forward current vs. forward voltage for L2C3-xxx105B06000 at $T_j=85^\circ\text{C}$.

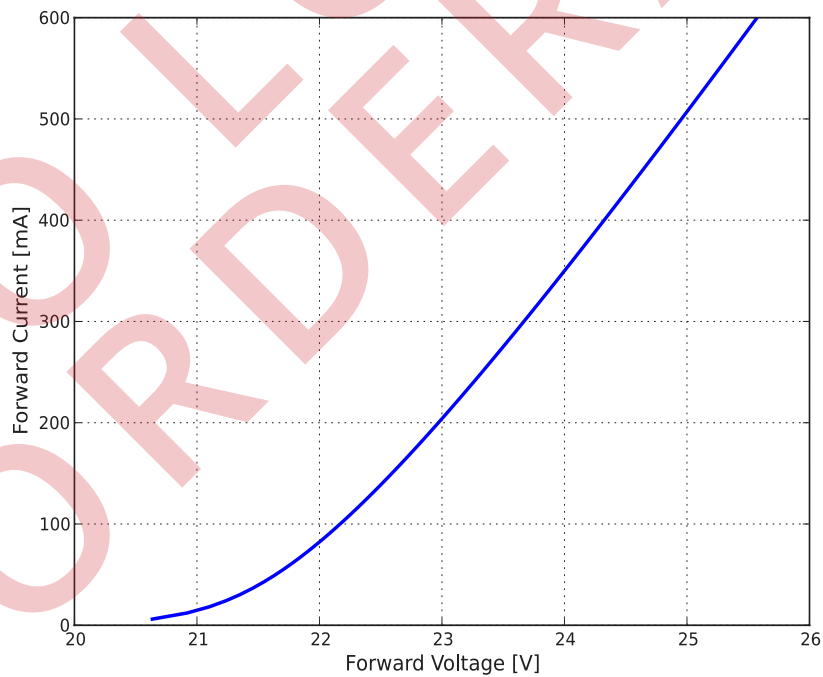


Figure 4b: Typical forward current vs. forward voltage for L2C3-xxx109D06000 at $T_j=85^\circ\text{C}$.

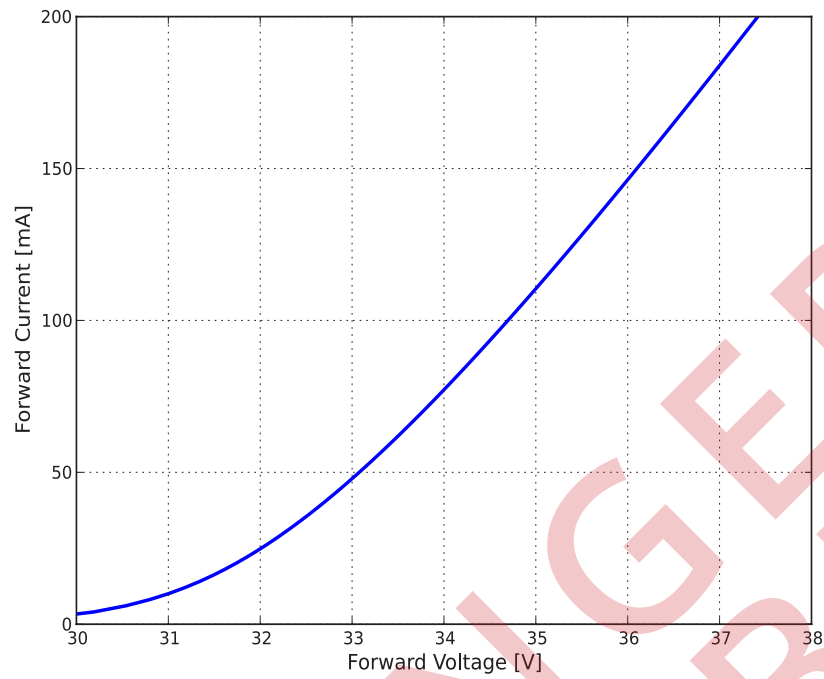


Figure 4c: Typical forward current vs. forward voltage for L2C3-xxx105E06000 at $T_j=85^\circ\text{C}$.

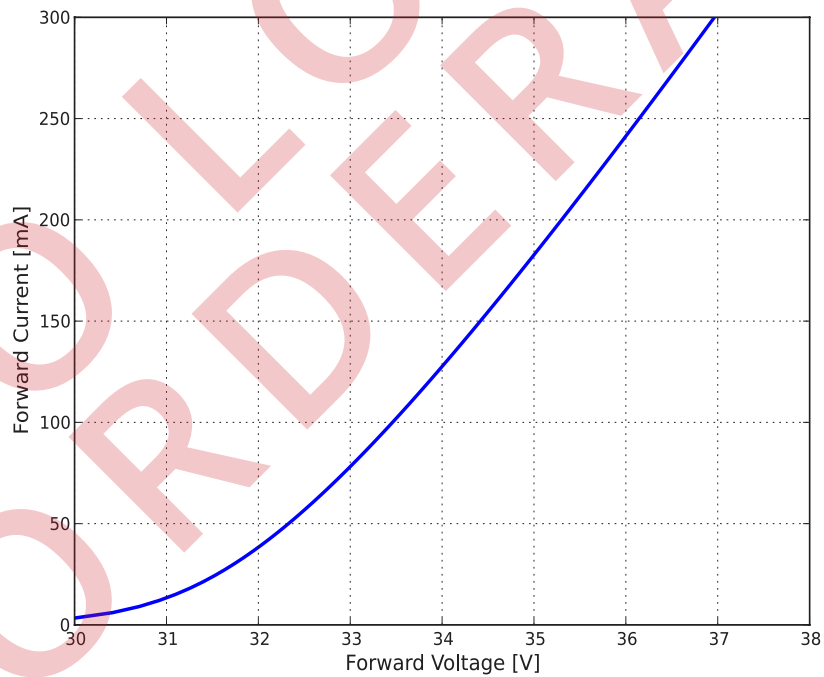


Figure 4d: Typical forward current vs. forward voltage for L2C3-xxx107E06000 at $T_j=85^\circ\text{C}$.

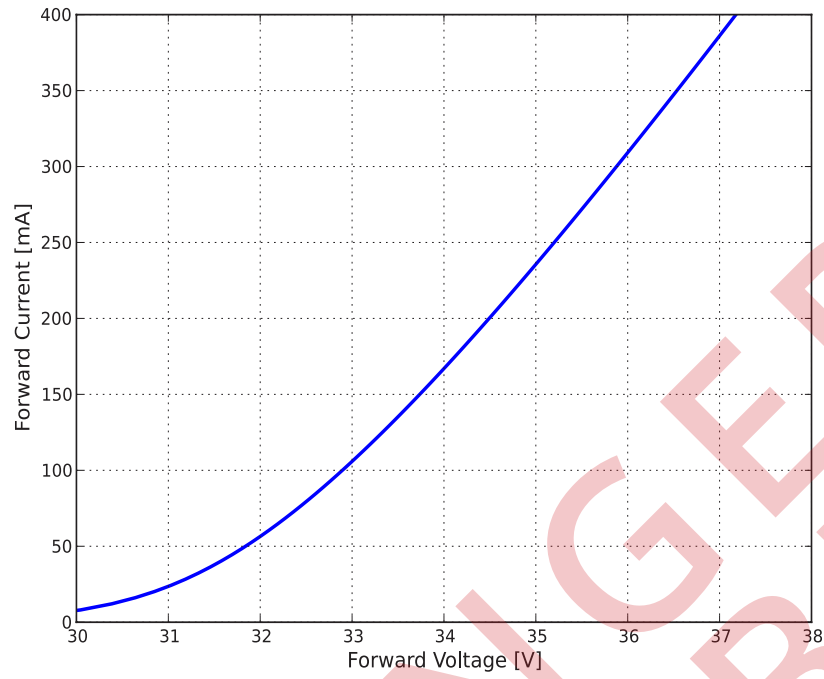


Figure 4e: Typical forward current vs. forward voltage for L2C3-xxxx109E06000 at $T_j=85^\circ\text{C}$.

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Radiation Patterns

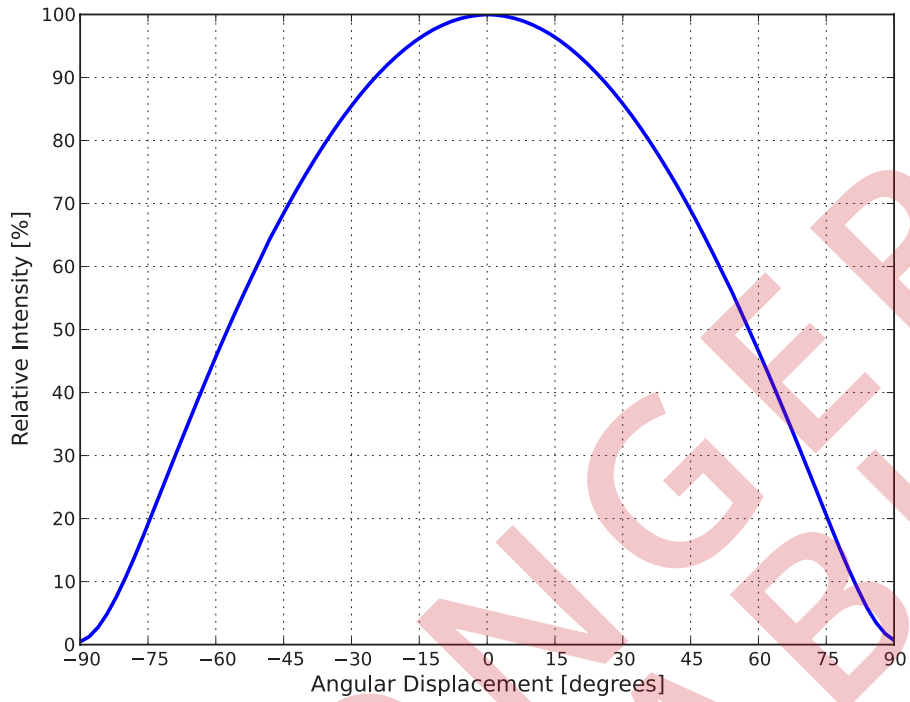


Figure 5a: Typical radiation pattern for L2C3-xxxx10xE06000 at test current, $T_j=85^\circ\text{C}$.

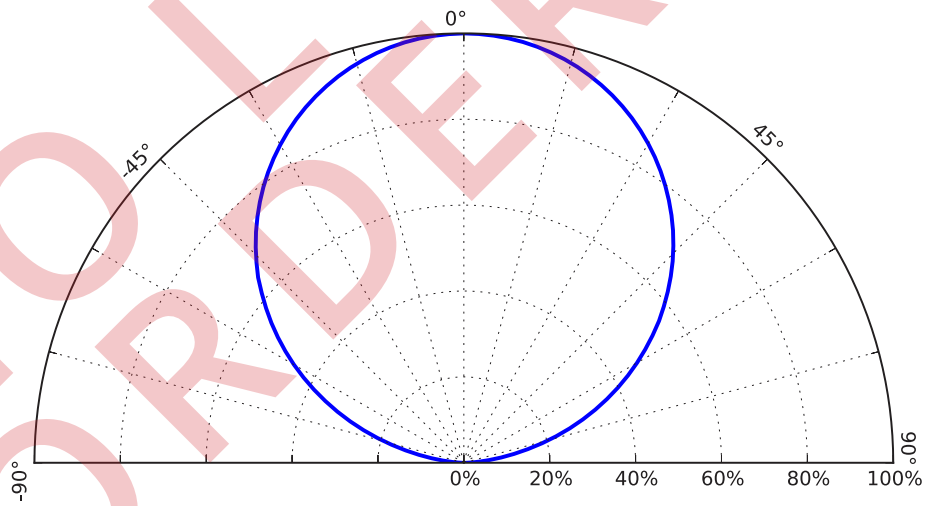


Figure 5b: Typical polar radiation pattern for L2C3-xxxx10xE06000 at test current, $T_j=85^\circ\text{C}$.

Color Bin Definition

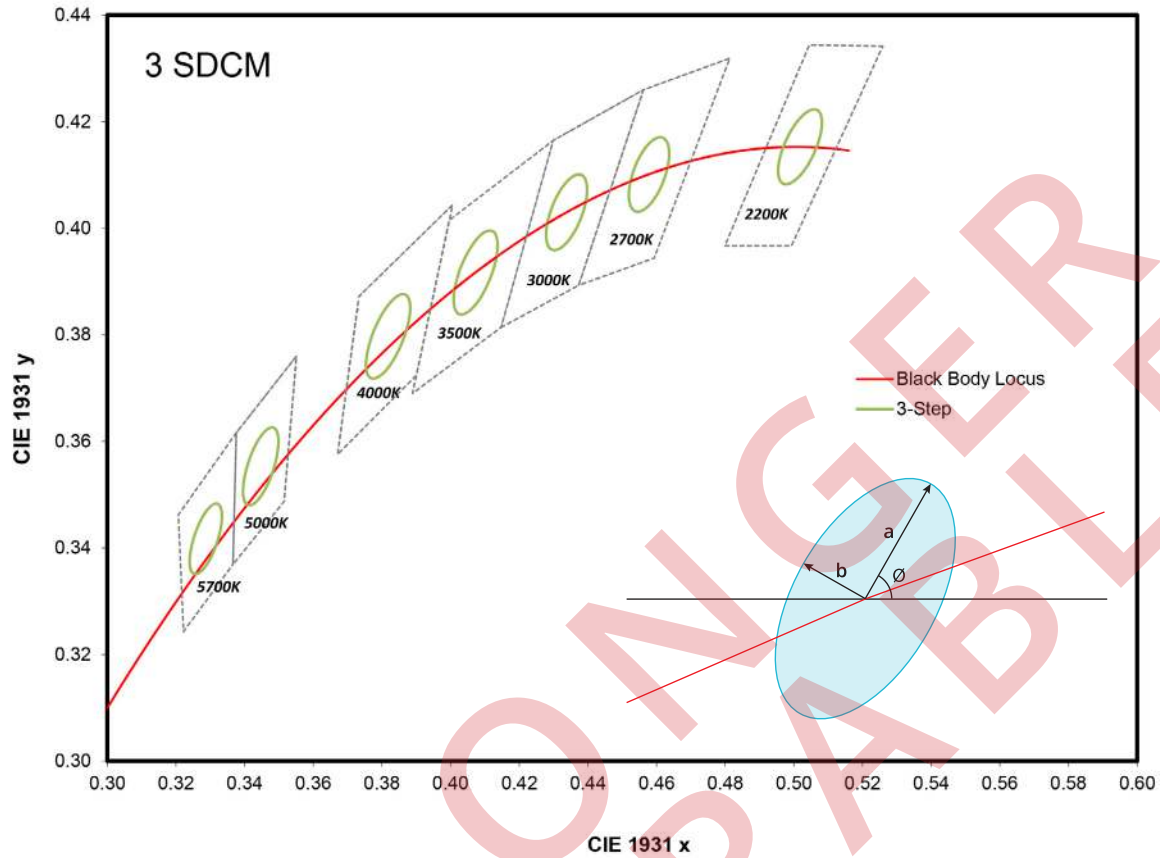


Figure 6: 3-step MacAdam ellipse illustration for Table 5.

Table 5. 3-step MacAdam ellipse color bin definitions for LUXEON CoB Compact at test current, $T_j=85^\circ\text{C}$.

| NOMINAL CCT | COLOR SPACE | CENTER POINT (cx, cy) | MAJOR AXIS, a | MINOR AXIS, b | ELLIPSE ROTATION ANGLE, θ |
|-------------|-------------------------------|-----------------------|---------------|---------------|----------------------------------|
| 2200K | Single 3-step MacAdam ellipse | (0.5020, 0.4155) | 0.00862 | 0.00397 | 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° |
| 5000K | Single 3-step MacAdam ellipse | (0.3447, 0.3553) | 0.00822 | 0.00354 | 59.6° |
| 5700K | Single 3-step MacAdam ellipse | (0.3287, 0.3417) | 0.00745 | 0.00320 | 59.1° |

Notes for Table 5:

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

Packaging Information

Table 6. Package information for LUXEON CoB Compact.

| PACKAGING | L2C3-XXXX10XX06000 |
|----------------------|--------------------|
| Total Units per Tube | 20 |
| Total Tubes per Box | 5 |
| Total Units per Box | 100 |

Tube Dimensions



Figure 8: Tape dimensions for LUXEON CoB Compact.

Notes for Figure 8:

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

About Lumileds

Lumileds is the global leader in light engine technology. The company develops, manufactures and distributes groundbreaking LEDs and automotive lighting products that shatter the status quo and help customers gain and maintain a competitive edge.

With a rich history of industry “firsts,” Lumileds is uniquely positioned to deliver lighting advancements well into the future by maintaining an unwavering focus on quality, innovation and reliability.

To learn more about our portfolio of light engines, visit lumileds.com.

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