



# LUXEON CoB with CrispWhite Technology Line

## Retail lighting that makes an impact

The LUXEON CoB with CrispWhite Technology Line creates the most impactful retail lighting ever available, by revealing the richest whites, vibrant reds and colors that pop. LUXEON CoB with CrispWhite Technology delivers the warm saturated colors of high 90CRI solutions while creating a natural crisp whiteness by activating fluorescent whitening agents in paints and fabrics to properly display merchandise in retail shops; ideal for CDM/CMH replacements.



### FEATURES AND BENEFITS

- Lumen packages from 500 to 5,000 lumens for a range of options
- Industry's smallest light emitting surface (LES) for highest flux densities
- Up to 4x lower thermal resistance than competitors enabling smaller heat sinks and higher lumens
- Contains violet LEDs and does NOT contain UV LEDs for minimal amount of damage, much lower than that from traditional CDM shop lighting
- Mouse bites for M2 and M3 make it easy to work with

### PRIMARY APPLICATIONS

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

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# General Product Information

## Product Test Conditions

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

|        |   |                           |
|--------|---|---------------------------|
| 200mA  | - | LUXEON CoB 1202s and 1202 |
| 250mA  | - | LUXEON CoB 109            |
| 300mA  | - | LUXEON CoB 1203           |
| 450mA  | - | LUXEON CoB 1204           |
| 600mA  | - | LUXEON CoB 1205           |
| 900mA  | - | LUXEON CoB 1208           |
| 1200mA | - | LUXEON CoB 1211           |

## Part Number Nomenclature

Part numbers for LUXEON CoB with CrispWhite Technology follow the convention below:

L H C 1 – **A A B B** – **D D D D** C R S P (Traditional Part Number Scheme)

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

L 2 C 3 – **A A B B** 1 0 9 E 0 6 C 0 0

Where:

- A A** – designates nominal CCT (30=3000K)
- B B** – designates minimum CRI (90=90CRI)
- D D D D** – 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 1203 with CrispWhite Technology 3000K CCT 90CRI:

L H C 1 – **3 0 9 0** – **1 2 0 3** C R S P

## 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 with CrispWhite Technology 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 with CrispWhite Technology at test current,  $T_j=85^\circ\text{C}$ .

| NOMINAL CCT | MINIMUM CRI <sup>[1]</sup> | LUMINOUS FLUX <sup>[2, 3]</sup> (lm) |         | TYPICAL LUMINOUS EFFICACY (lm/W) | TEST CURRENT (mA) | LES <sup>[4]</sup> (mm) | PART NUMBER        |
|-------------|----------------------------|--------------------------------------|---------|----------------------------------|-------------------|-------------------------|--------------------|
|             |                            | MINIMUM                              | TYPICAL |                                  |                   |                         |                    |
| 3000K       | 90                         | 585                                  | 650     | 75                               | 250               | 6.5                     | L2C3-3090109E06C00 |
| 3000K       | 90                         | 550                                  | 600     | 85                               | 200               | 6.5                     | L2C1-3090120206ACO |
| 3000K       | 90                         | 550                                  | 625     | 90                               | 200               | 9.0                     | LHC1-3090-1202CRSP |
| 3000K       | 90                         | 850                                  | 950     | 90                               | 300               | 9.0                     | LHC1-3090-1203CRSP |
| 3000K       | 90                         | 1250                                 | 1400    | 90                               | 450               | 13.0                    | LHC1-3090-1204CRSP |
| 3000K       | 90                         | 1700                                 | 1900    | 90                               | 600               | 13.0                    | LHC1-3090-1205CRSP |
| 3000K       | 90                         | 2500                                 | 2800    | 90                               | 900               | 15.0                    | LHC1-3090-1208CRSP |
| 3000K       | 90                         | 3400                                 | 3750    | 90                               | 1200              | 19.0                    | LHC1-3090-1211CRSP |

**Notes for Table 1:**

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.
3. Maximum luminous flux is 10% above typical luminous flux.
4. Light emitting surface (LES) is the inner diameter (phosphor area) inside the dam.

## Optical Characteristics

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

| PART NUMBER        | TYPICAL TOTAL INCLUDED ANGLE <sup>[1]</sup> | TYPICAL VIEWING ANGLE <sup>[2]</sup> |
|--------------------|---|--------------------------------------|
| L2C3-3090109E06C00 | 135°  | 115°                                 |
| L2C1-3090120206ACO | 135°  | 115°                                 |
| LHC1-3090-xxxxCRSP | 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 the LED centerline where the luminous intensity is  $\frac{1}{2}$  of the peak value.

## Electrical and Thermal Characteristics

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

| PART NUMBER        | FORWARD VOLTAGE <sup>[1]</sup> (V) |         |         | TYPICAL TEMPERATURE COEFFICIENT OF FORWARD VOLTAGE <sup>[2]</sup> (mV/°C) | TYPICAL THERMAL RESISTANCE JUNCTION TO CASE <sup>[3]</sup> (°C/W) |
|--------------------|------------------------------------|---------|---------|---|---|
|                    | MINIMUM                            | TYPICAL | MAXIMUM |   |   |
| L2C3-3090109E06C00 | 33                                 | 35      | 38      | -16   | 1.5   |
| L2C1-3090120206AC0 | 33                                 | 35.5    | 38      | -16   | 0.98  |
| LHC1-3090-1202CRSP | 33                                 | 35.5    | 38      | -16   | 0.91  |
| LHC1-3090-1203CRSP | 33                                 | 35.5    | 38      | -16   | 0.70  |
| LHC1-3090-1204CRSP | 33                                 | 35.5    | 38      | -16   | 0.53  |
| LHC1-3090-1205CRSP | 33                                 | 35.5    | 38      | -16   | 0.45  |
| LHC1-3090-1208CRSP | 33                                 | 35.5    | 38      | -16   | 0.29  |
| LHC1-3090-1211CRSP | 33                                 | 35.5    | 38      | -16   | 0.23  |

**Notes for Table 3:**

1. Lumileds maintains a tolerance of  $\pm 2\%$  on forward voltage measurements.
2. Measured between  $25^\circ\text{C}$  and  $85^\circ\text{C}$ .
3. Junction temperature to back of the PCB and measurement tolerance of  $\sim 10\%$ .

## Absolute Maximum Ratings

Table 4. Absolute maximum ratings for LUXEON CoB with CrispWhite Technology.

| PARAMETER  | MAXIMUM PERFORMANCE   |
|--|---|
| DC Forward Current <sup>[1,2]</sup>                  | 400mA for L2C3-3090109E06C00<br>2x test current for LHC1-xxxx-xxxxCRSP and L2C1-xxxx120206AC0 |
| LED Junction Temperature <sup>[1]</sup> (DC & Pulse) | 125°C   |
| 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 ( $V_{\text{reverse}}$ )             | 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 20% of the maximum allowable DC forward current

# Characteristic Curves

## Spectral Power Distribution Characteristics

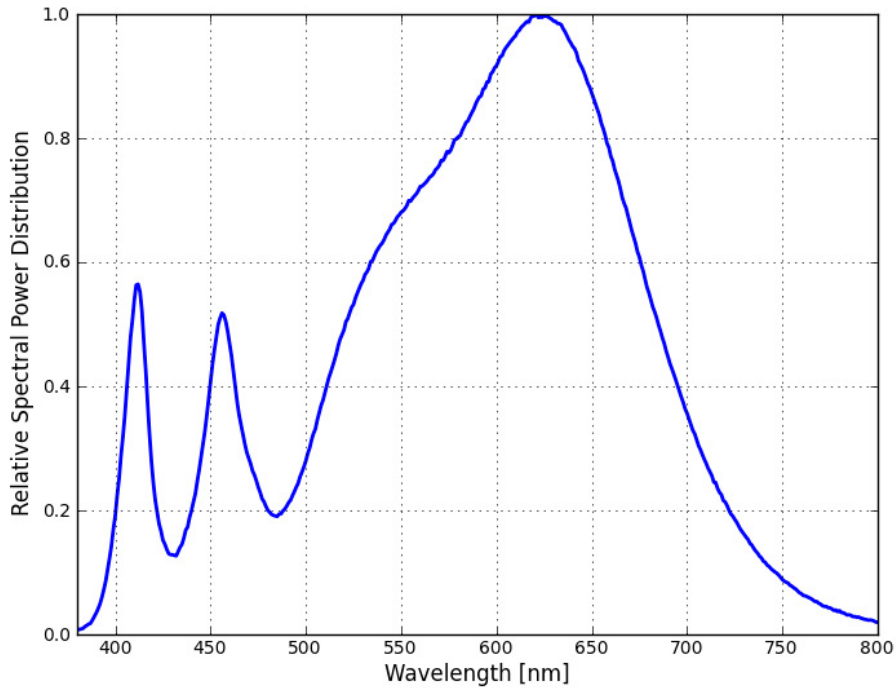


Figure 1: Typical normalized power vs. wavelength for L2C3-3090109E06C00, L2C1-3090120206AC0 and LH1C1-3090-xxxxCRSP at test current,  $T_j=85^{\circ}\text{C}$ .

## Light Output Characteristics

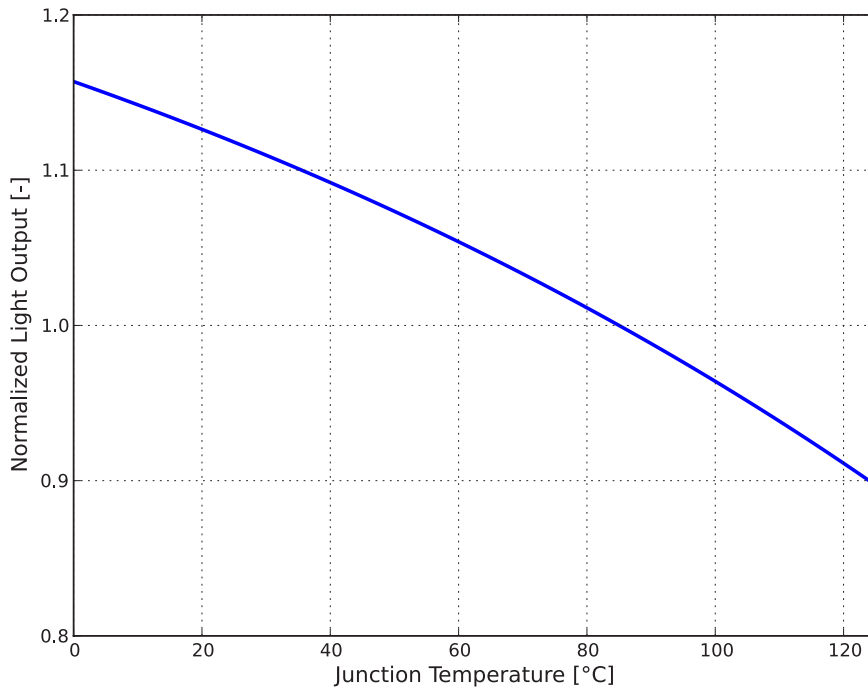


Figure 2: Typical normalized light output vs. junction temperature for L2C3-3090109E06C00, L2C1-3090120206AC0 and LH1C1-3090-xxxxCRSP at test current.

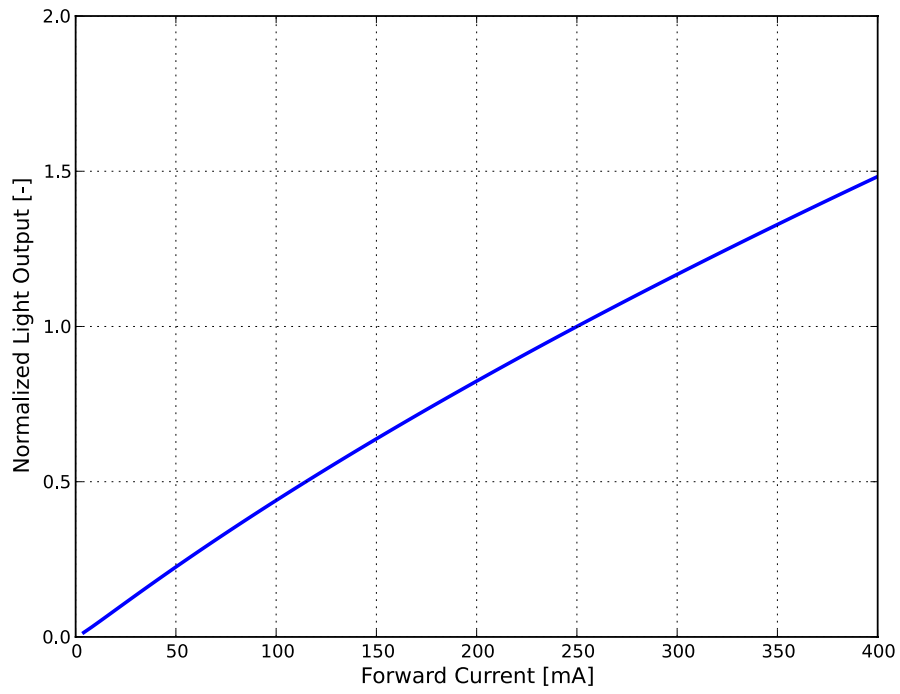
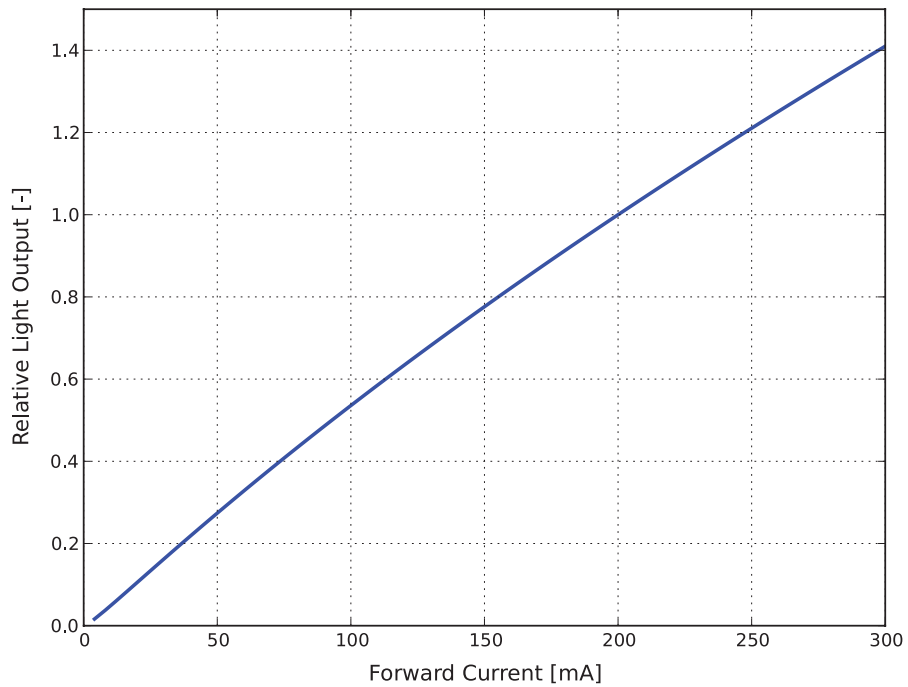


Figure 3a: Typical normalized light output vs. forward current for L2C3-3090109E06C00 at  $T_j=85^\circ\text{C}$ .



3b: Typical normalized light output vs. forward current for L2C1-3090120206AC0 and LHC1-3090-1202CRSP at  $T_j=85^\circ\text{C}$ .

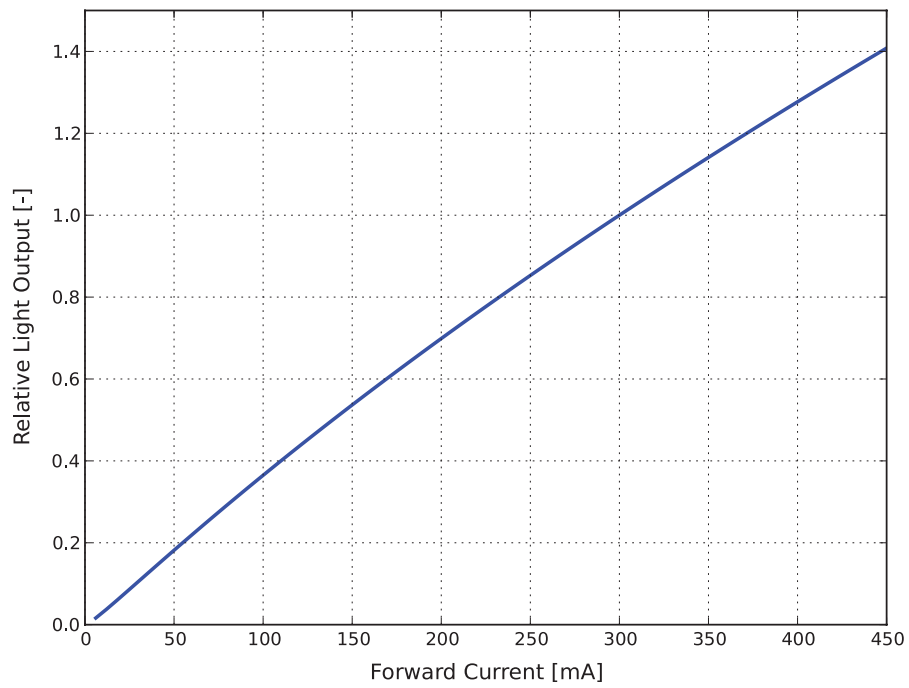
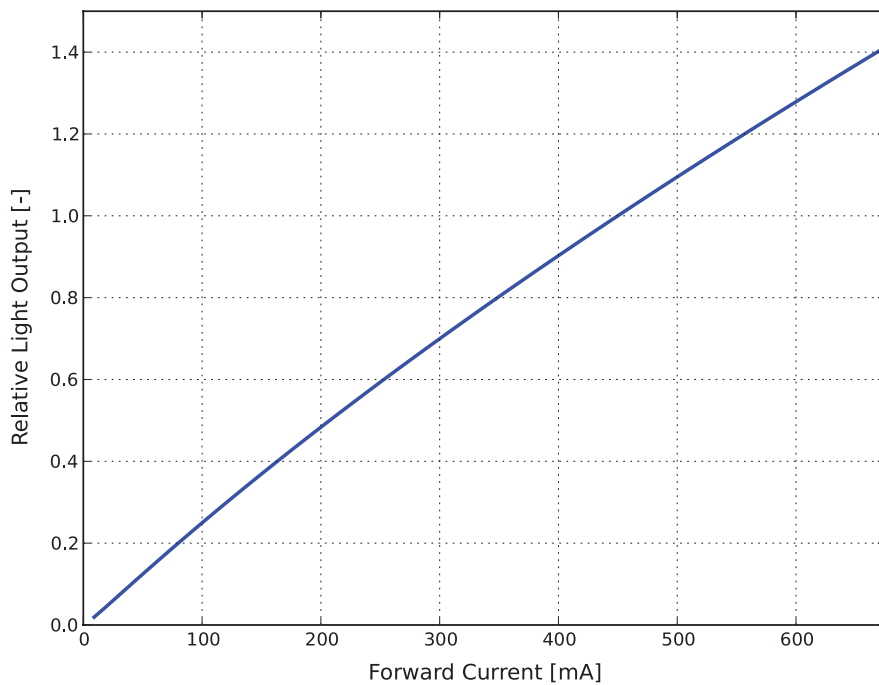


Figure 3c: Typical normalized light output vs. forward current for LHC1-3090-1203CRSP at  $T_j=85^\circ\text{C}$ .



3d: Typical normalized light output vs. forward current for LHC1-3090-1204CRSP at  $T_j=85^\circ\text{C}$ .



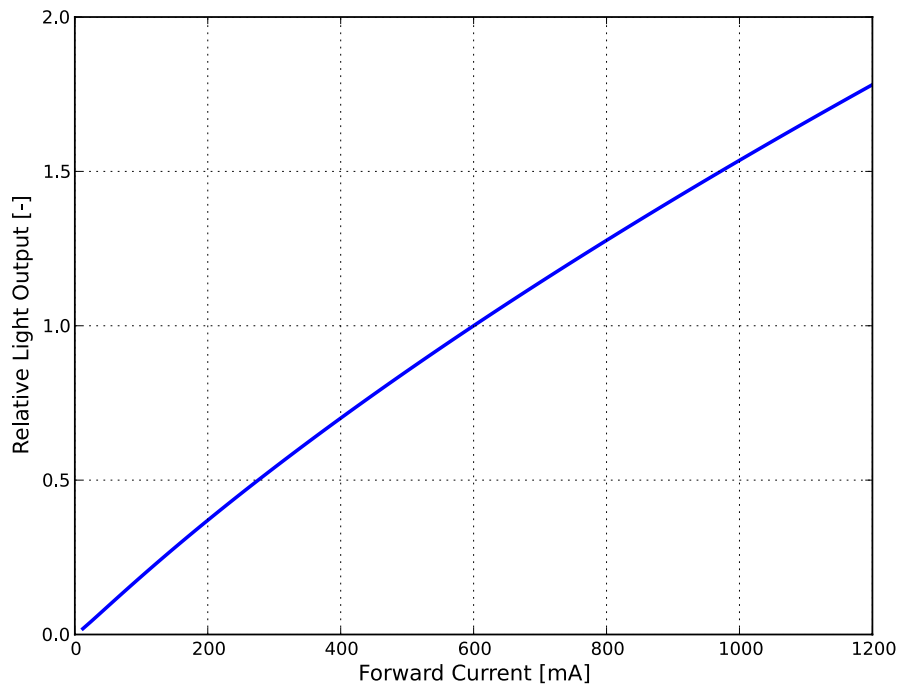
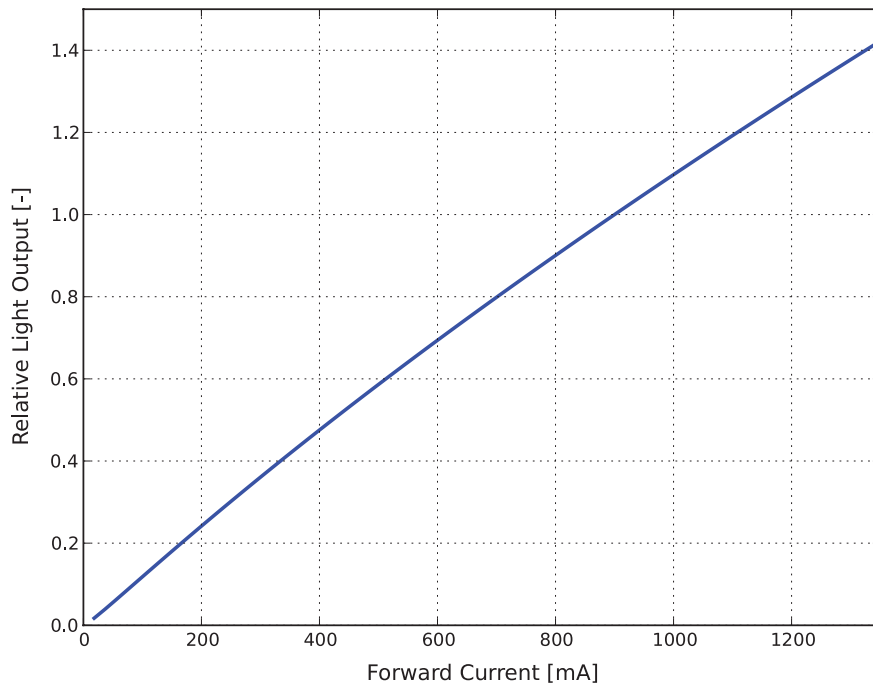
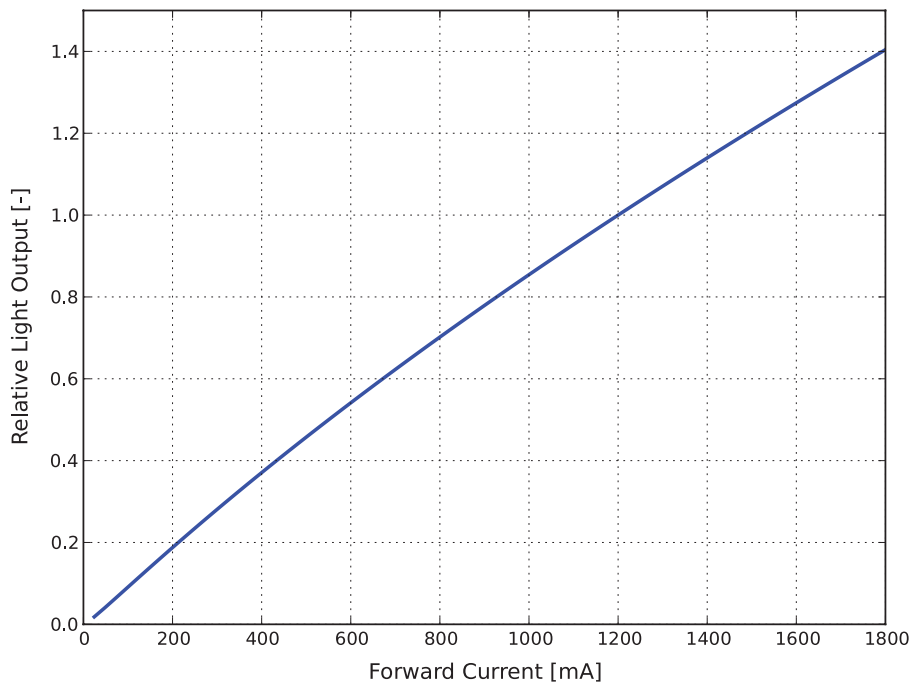


Figure 3e: Typical normalized light output vs. forward current for LHC1-3090-1205CRSP at  $T_j=85^\circ\text{C}$ .

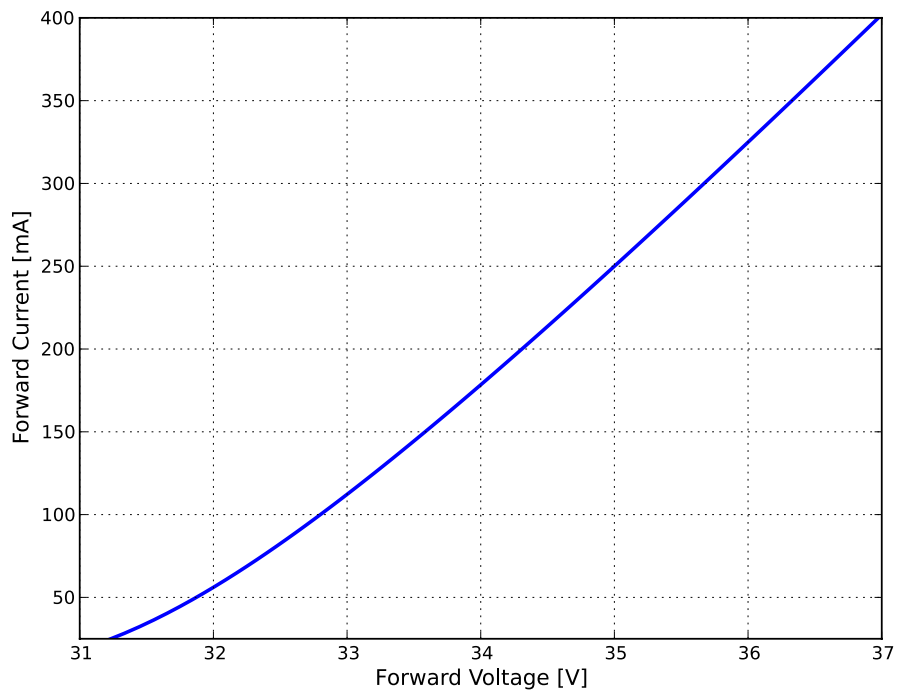


3f: Typical normalized light output vs. forward current for LHC1-3090-1208CRSP at  $T_j=85^\circ\text{C}$ .

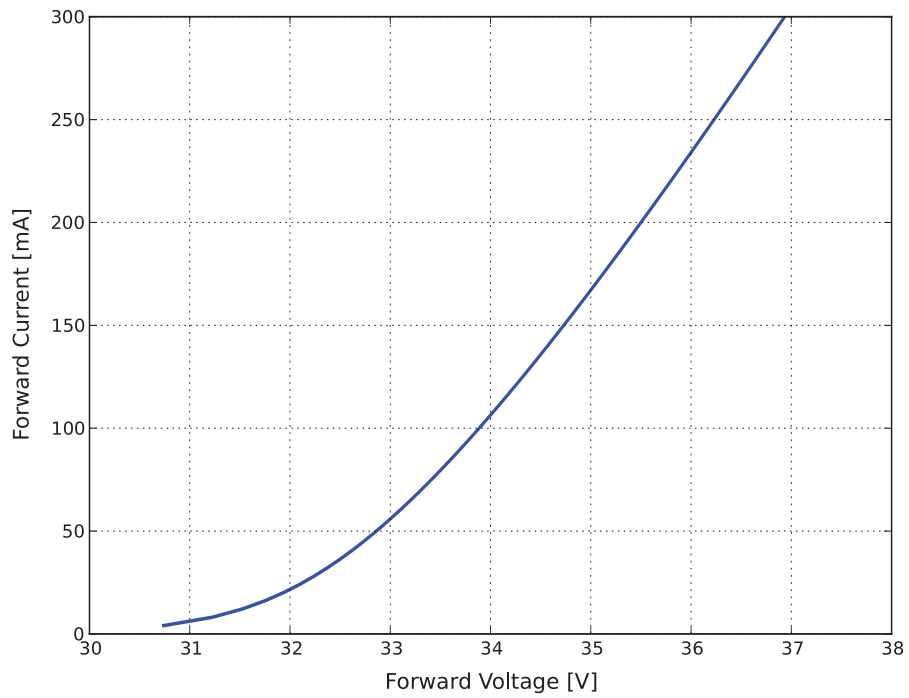


3g: Typical normalized light output vs. forward current for LHC1-3090-1211CRSP at  $T_j=85^\circ\text{C}$ .

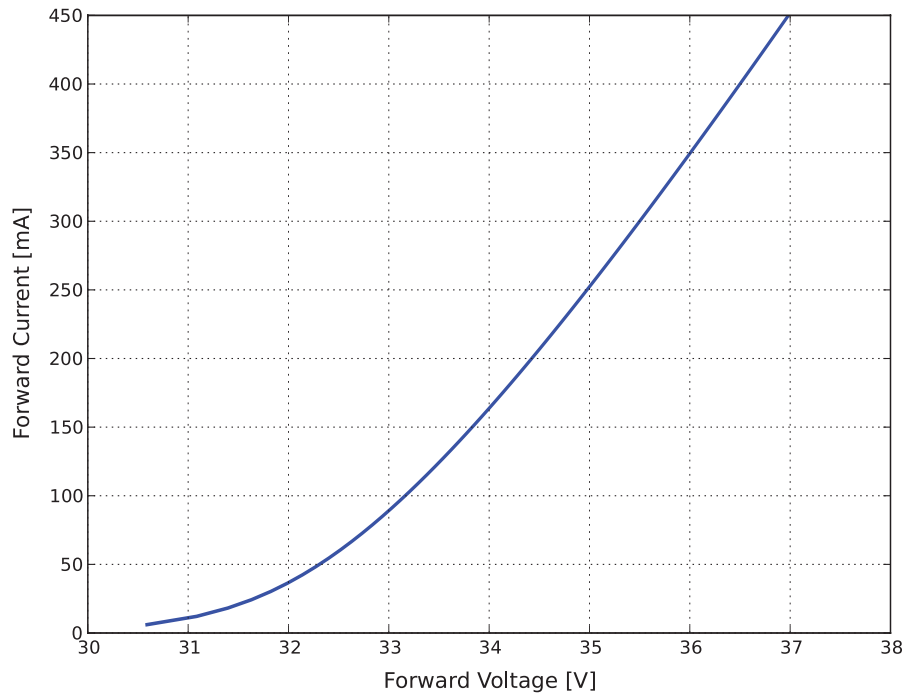
## Forward Current Characteristics



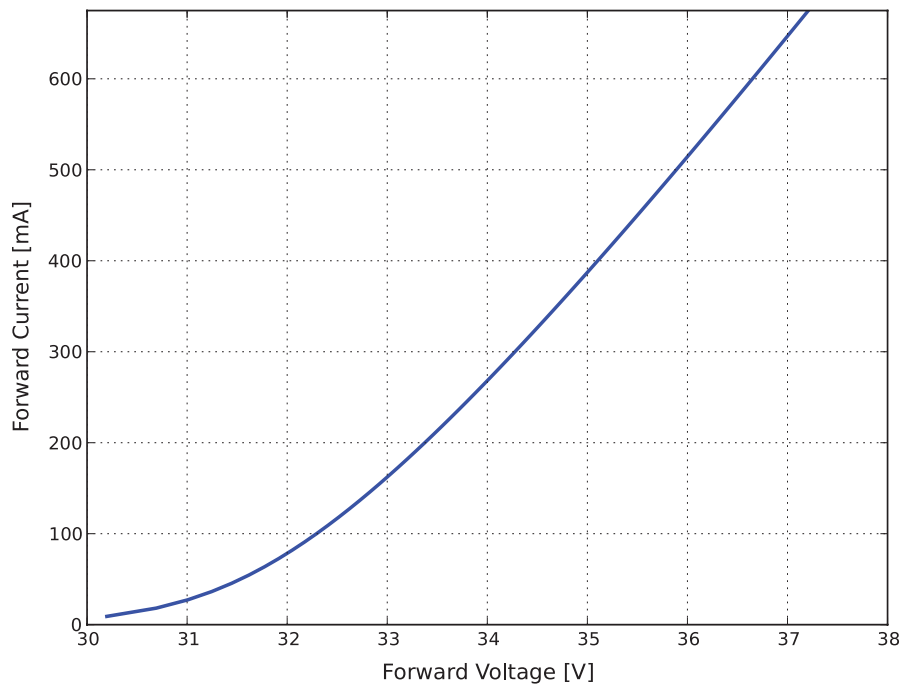
4a: Typical forward current vs. forward voltage for L2C3-3090109E06C00 at  $T_j=85^\circ\text{C}$ .



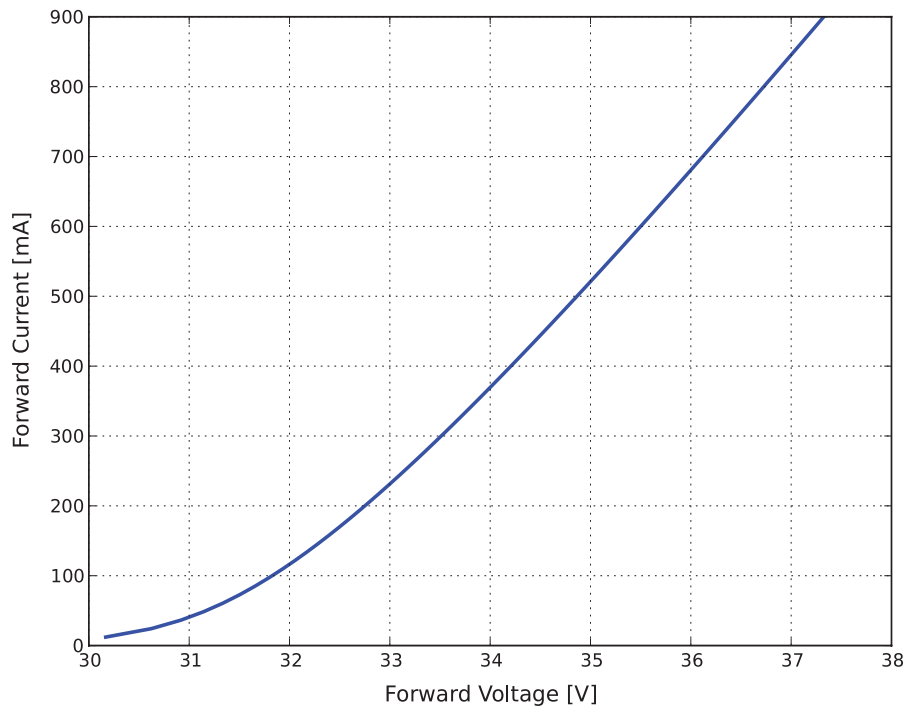
4b. Typical forward current vs. forward voltage for L2C1-3090120206AC0 and LHC1-3090-1202CRSP at  $T_j=85^\circ\text{C}$ .



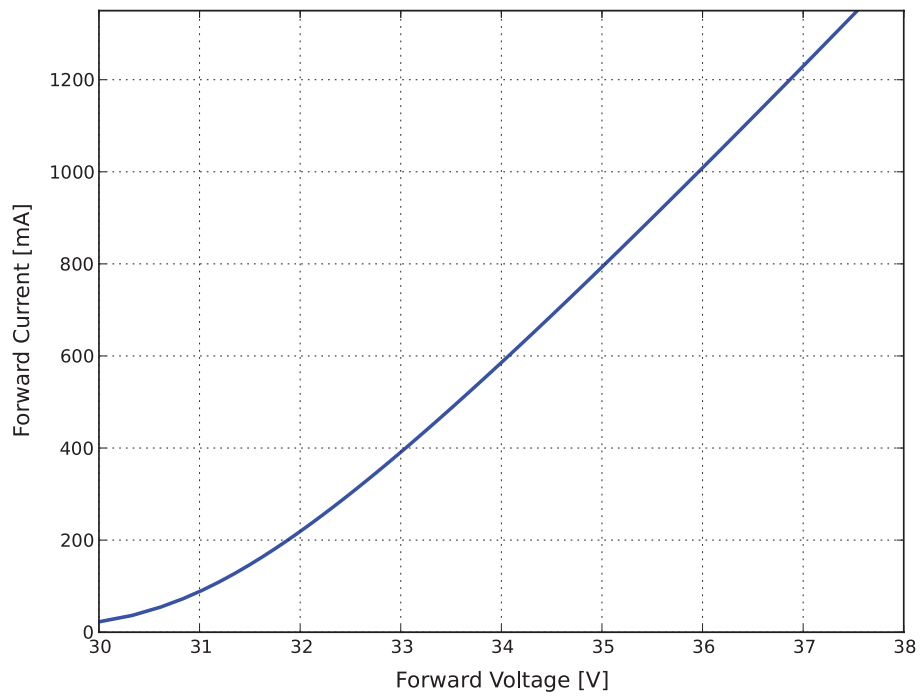
4c. Typical forward current vs. forward voltage for LHC1-3090-1203CRSP at  $T_j=85^\circ\text{C}$ .



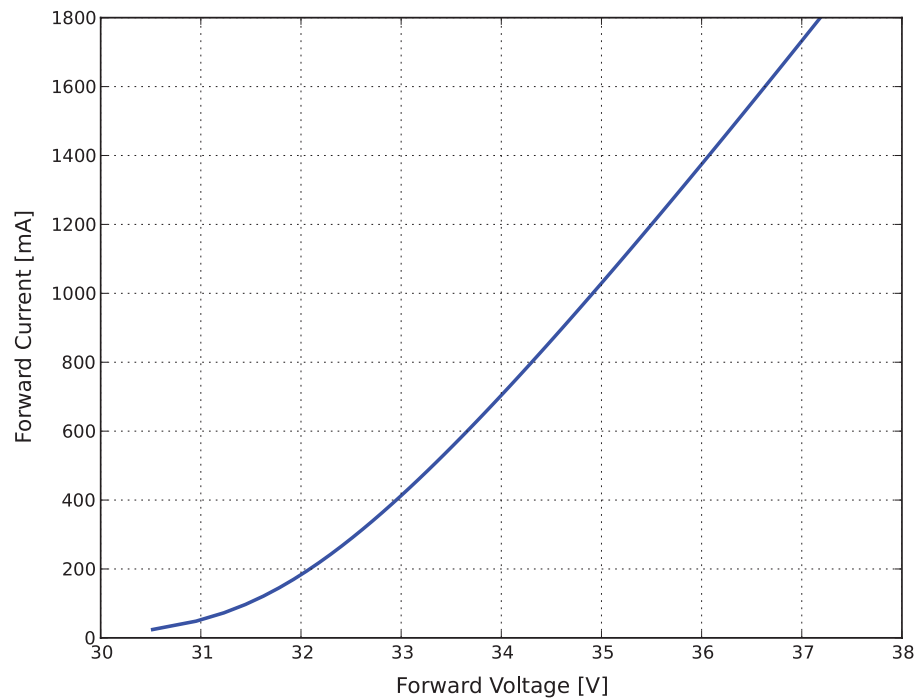
4d. Typical forward current vs. forward voltage for LHC1-3090-1204CRSP at  $T_j=85^\circ\text{C}$ .



4e. Typical forward current vs. forward voltage for LHC1-3090-1205CRSP at  $T_j=85^\circ\text{C}$ .



4f. Typical forward current vs. forward voltage for LHC1-3090-1208CRSP at  $T_j=85^\circ\text{C}$ .



4g. Typical forward current vs. forward voltage for LHC1-3090-1211CRSP at  $T_j=85^\circ\text{C}$ .

## Radiation Pattern Characteristics

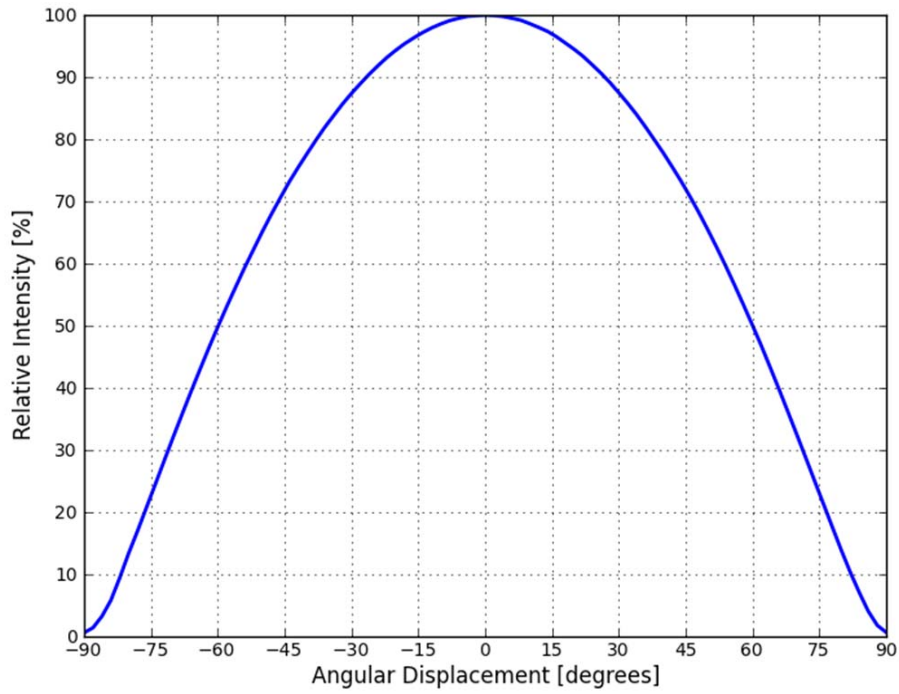


Figure 5: Typical radiation pattern for L2C3-3090109E06C00, L2C1-3090120206AC0 and LH1C1-3090-xxxxCRSP at test current,  $T_j=85^{\circ}\text{C}$ .

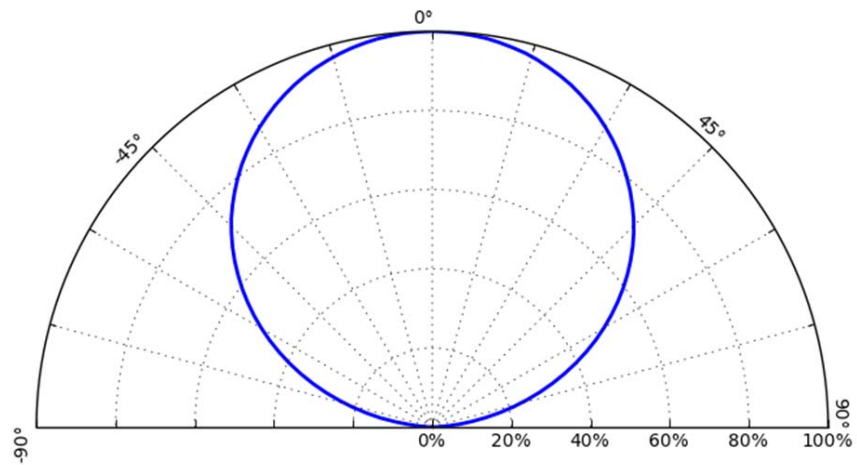


Figure 6: Typical polar radiation pattern for L2C3-3090109E06C00, L2C1-3090120206AC0 and LH1C1-3090-xxxxCRSP at test current,  $T_j=85^{\circ}\text{C}$ .

## Color Bin Definition

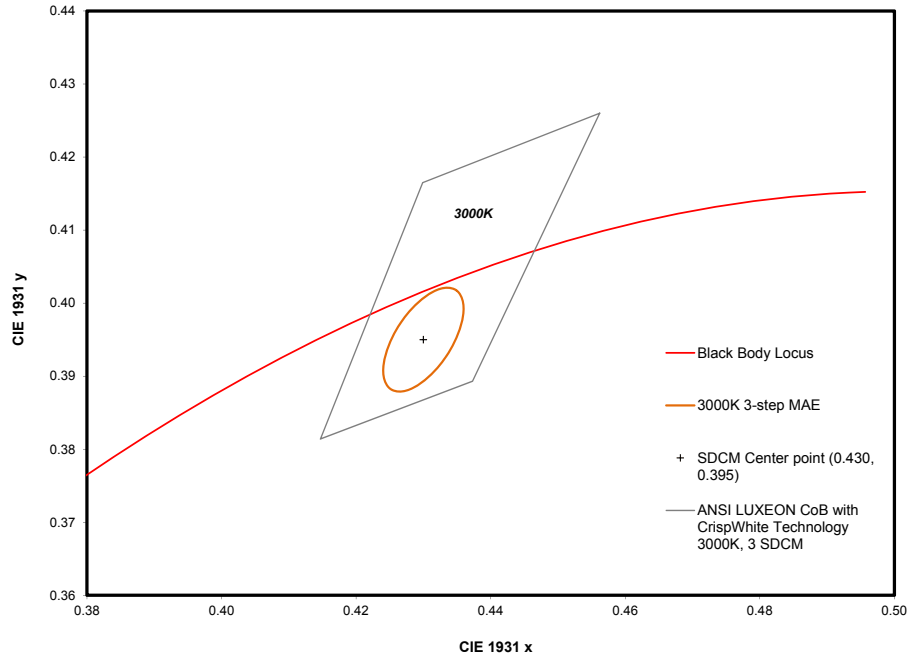


Figure 7: 3000K 3-step MacAdam ellipse color bin.

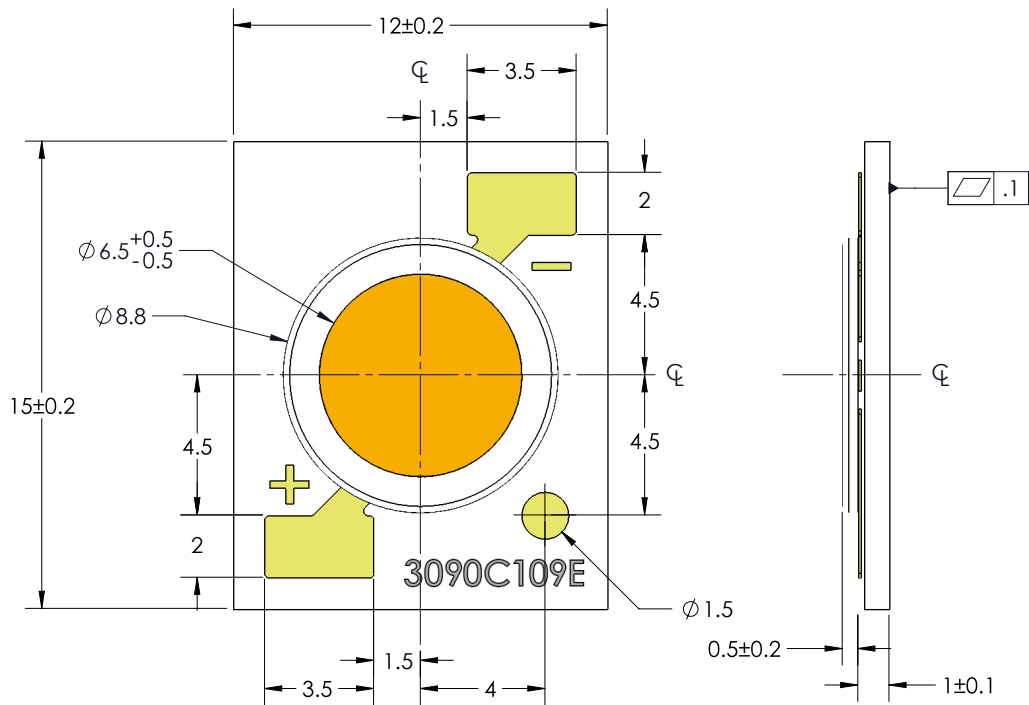
Table 5. 3-step MacAdam ellipse color bin definitions for LUXEON CoB with CrispWhite Technology.

| NOMINAL CCT | COLOR SPACE                   | CENTER POINT (cx, cy) | MAJOR AXIS, a | MINOR AXIS, b | ELLIPSE ROTATION ANGLE, $\theta$ |
|-------------|-------------------------------|-----------------------|---------------|---------------|----------------------------------|
| 3000K       | Single 3-Step MacAdam ellipse | (0.430, 0.395)        | 0.00834       | 0.00408       | 53.2°                            |

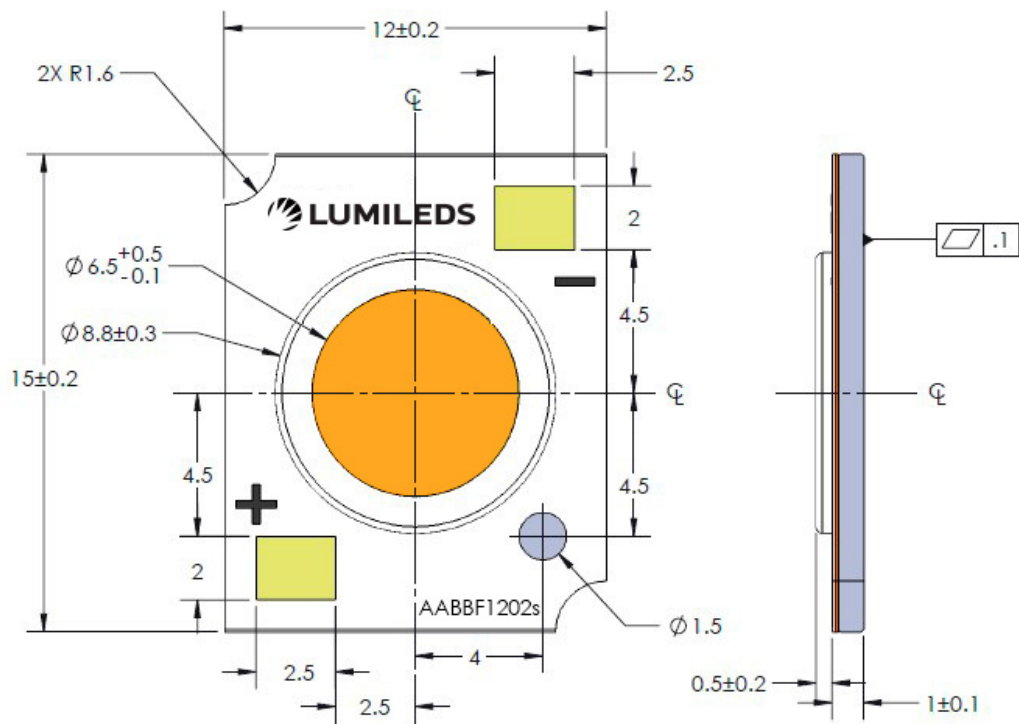
**Notes for Table 5:**

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

# Mechanical Dimensions



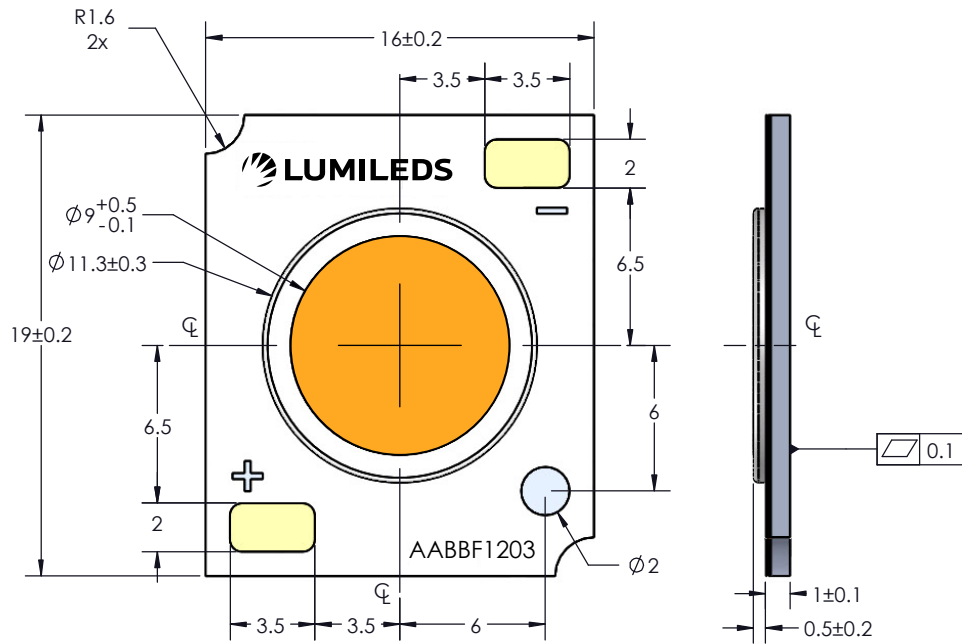
8a. Mechanical dimensions for L2C3-3090109E06C00.



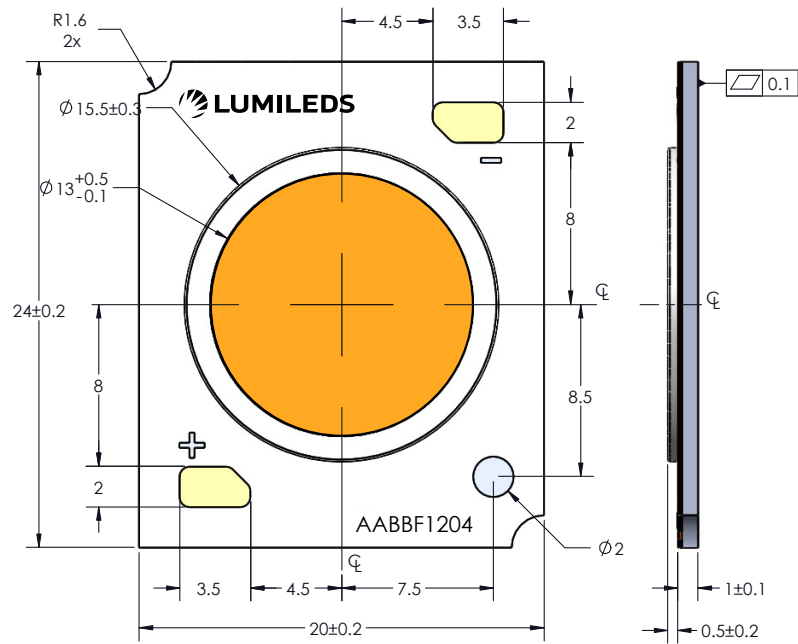
8b. Mechanical dimensions for L2C1-3090120206AC0.

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



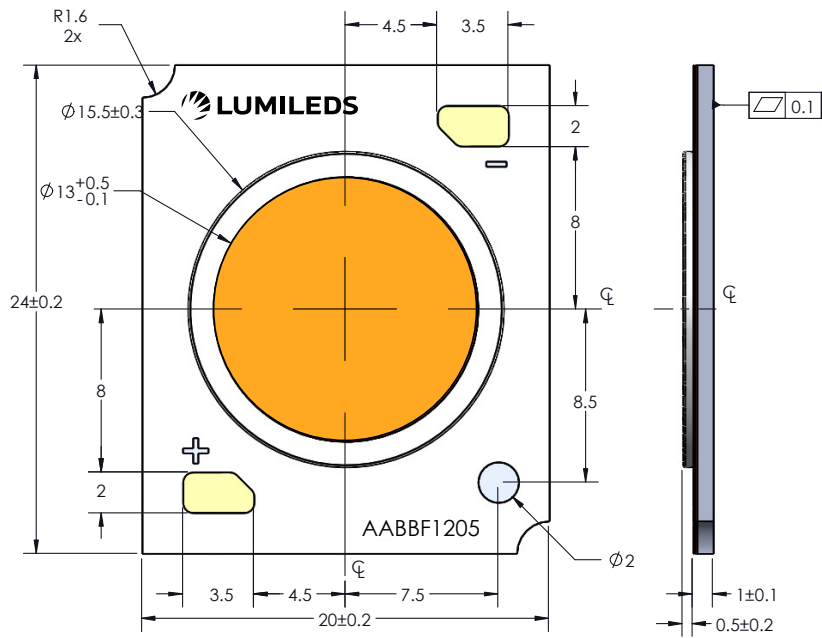


8c. Mechanical dimensions for LHC1-3090-1202CRSP and LHC1-3090-1203CRS.

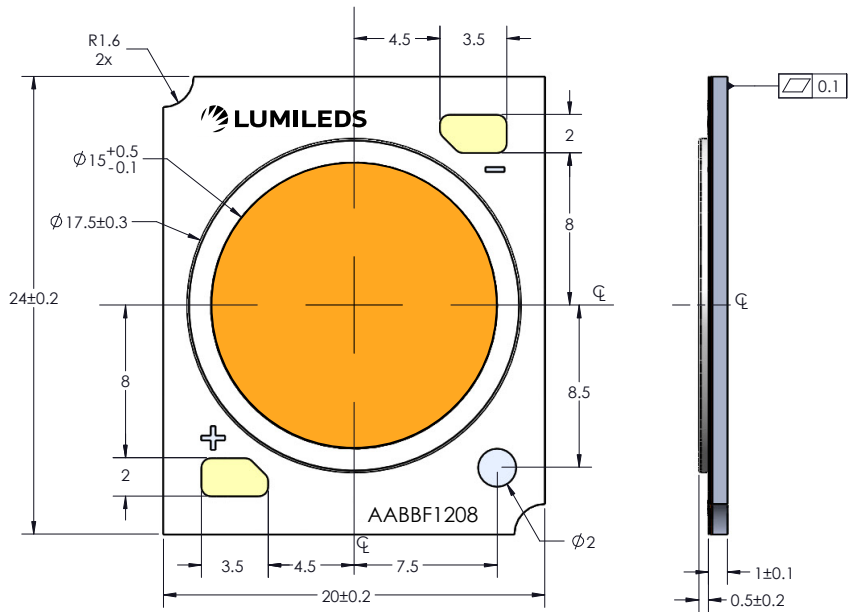


8d. Mechanical dimensions for LHC1-3090-1204CRSP.

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

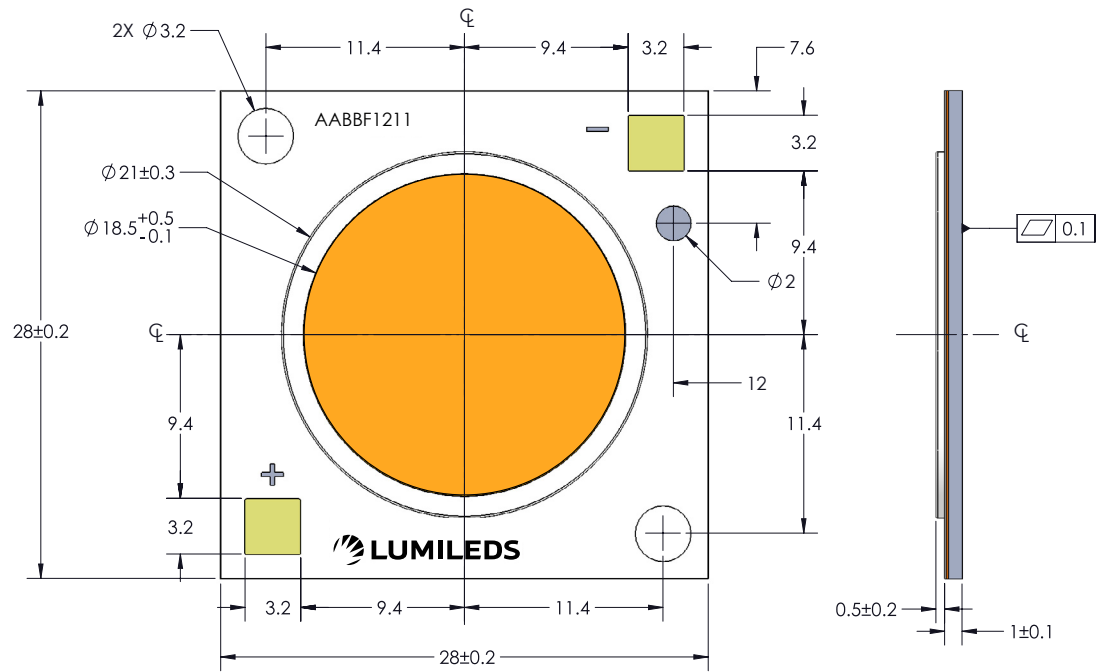


8e. Mechanical dimensions for LHC1-3090-1205CRSP.



8f. Mechanical dimensions for LHC1-3090-1208CRSP.

Notes for Figures 8e and 8f:  
 1. Drawings are not to scale.  
 2. All dimensions are in millimeters.



8g. Mechanical dimensions for LHC1-3090-1211CRSP.

Notes for Figure 8g:

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

# Packaging Information

LUXEON CoB LEDs are packaged in tubes. Each tube contains a specified number of LEDs. The LEDs in each tube come from a single category code, ensuring they are all well-matched for light output, color, and forward voltage. Each tube contains a rubber stopper at one end. The tube label has both alphanumeric and bar code information.

## Total Units per Box

Table 6. Number of LEDs per box for LUXEON CoB with CrispWhite Technology.

| TOTAL          | L2C3-3090109E06C00 and L2C1-3090120206AC0 | LH1C1-3090-1202CRSP | LH1C1-3090-1203CRSP | LH1C1-3090-1204CRSP | LH1C1-3090-1205CRSP | LH1C1-3090-1208CRSP | LH1C1-3090-1211CRSP |
|----------------|---|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| 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

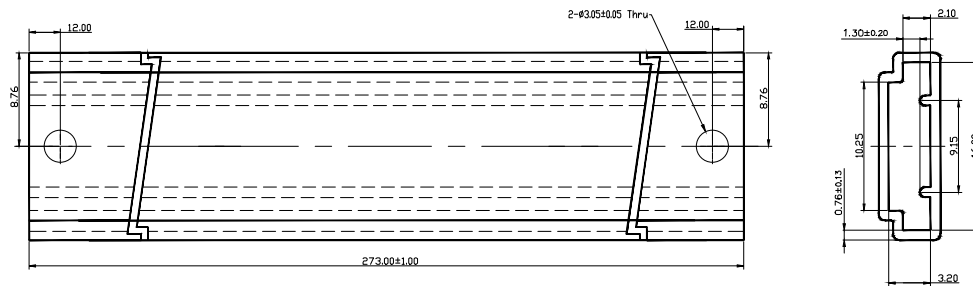


Figure 9a: Tube dimensions for LUXEON CoB with CrispWhite Technology L2C3-3090109E06C00 and L2C1-3090120206AC0.

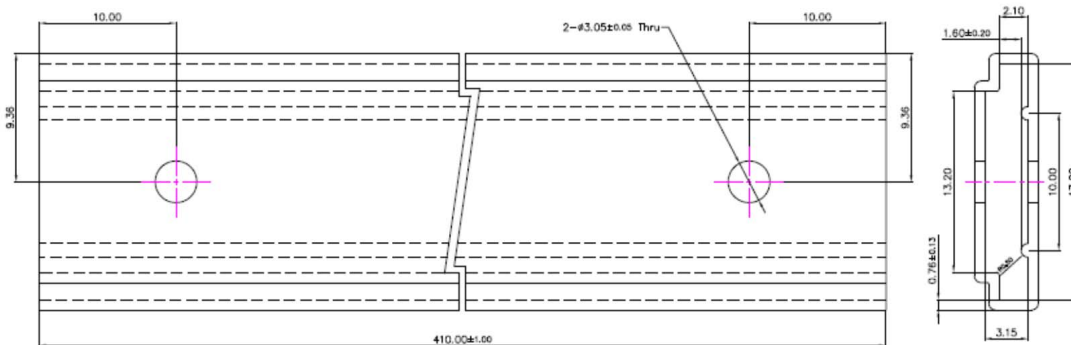


Figure 9b: Tube dimensions for LUXEON CoB with CrispWhite Technology LHC1-xxxx-1202CRSP and LHC1-xxxx-1203CRSP.

### Notes for Figures 9a and 9b:

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

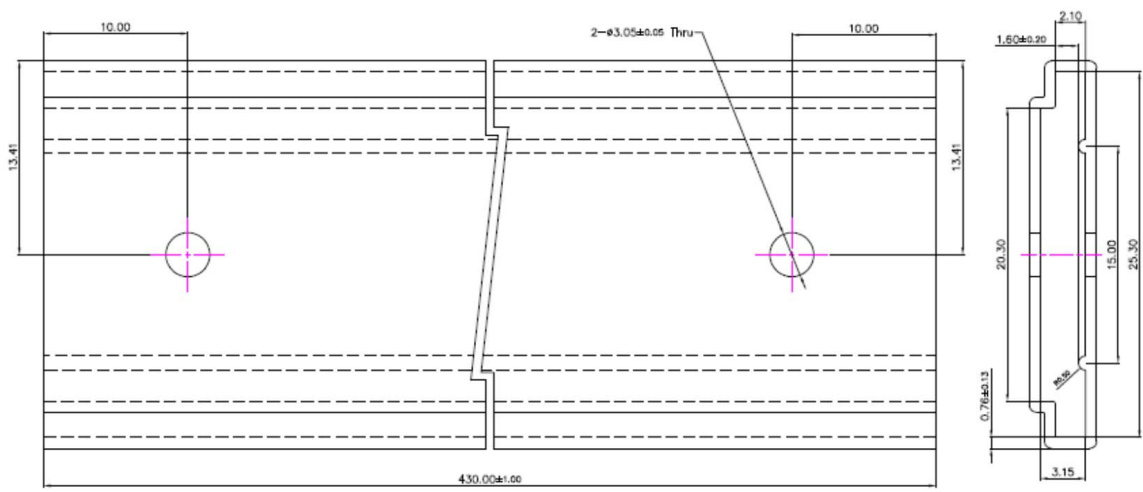


Figure 9c: Tube dimensions for LUXEON CoB with CrispWhite Technology LHC1-xxxx-1204CRSP, LHC1-xxxx-1205CRSP and LHC1-xxxx-1208CRSP.

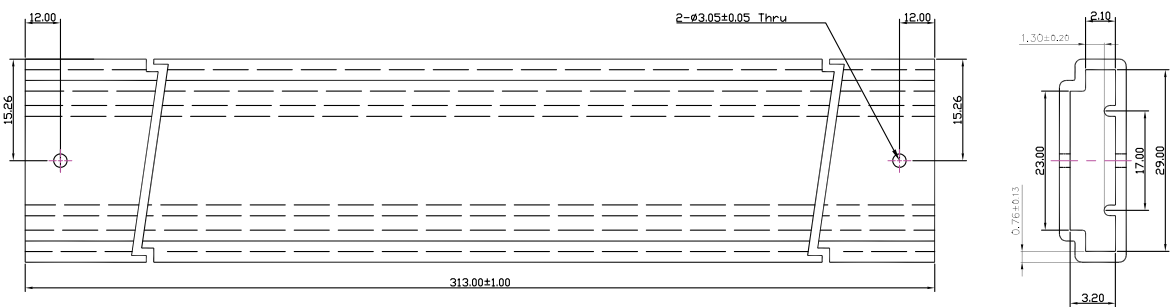


Figure 9d: Tube dimensions for LUXEON CoB with CrispWhite Technology LHC1-xxxx-1211CRSP.

- Notes for Figures 9c and 9d:
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](http://lumileds.com).



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