

# LUXEON CoB Core Range PW

Engineered for vibrant colors

LUXEON CoB Core Range PW was built for applications that need the highest quality of light combined with market leading performances. Its beautiful color transforms areas into vibrant spaces. Above all, LUXEON CoB Core Range PW has a robust, long life span and fits easily into luminaire designs.



## FEATURES AND BENEFITS

- High efficacy and superior color quality at lower energy consumption
- Various LES sizes and flux output that fit different applications and requirements
- Best in class thermal resistance enabling the use of smaller heatsinks and prolonged product life span
- Supported by a comprehensive optical, mechanical, and electrical ecosystem

## PRIMARY APPLICATIONS

- Spotlights
- Track Lights
- Downlights
- Low Bay

# Table of Contents

<b>General Product Information</b> .....	<b>2</b>
Product Test Conditions .....	2
Part Number Nomenclature .....	2
Lumen Maintenance .....	2
Environmental Compliance .....	2
<b>Performance Characteristics</b> .....	<b>3</b>
Product Selection Guide .....	3
Optical Characteristics .....	3
Electrical and Thermal Characteristics .....	4
<b>Absolute Maximum Ratings</b> .....	<b>4</b>
<b>Characteristic Curves</b> .....	<b>5</b>
Spectral Power Distribution Characteristics .....	5
Light Output Characteristics .....	6
Forward Current Characteristics .....	9
Radiation Pattern Characteristics .....	12
<b>Color Bin Definitions</b> .....	<b>13</b>
<b>Mechanical Dimensions</b> .....	<b>14</b>
<b>Packaging and Labeling Information</b> .....	<b>15</b>
Tube .....	15
Inner Box .....	17
Outer Box .....	18

# General Product Information

## Product Test Conditions

LUXEON CoB Core Range PW LEDs are tested and binned with a DC drive current specified below at a junction temperature,  $T_j$ , of 85°C:

300mA	-	LUXEON CoB PW 1203
600mA	-	LUXEON CoB PW 1205
900mA	-	LUXEON CoB PW 1208
900mA	-	LUXEON CoB PW 1210
1200mA	-	LUXEON CoB PW 1211

## Part Number Nomenclature

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

**L 2 C 5 - A A B B C C C C D E E F F**

Where:

- A A** - designates nominal CCT (30=3000K, 35=3500K, 40=4000K)
- B B** - designates minimum CRI (80=80CRI, 90=90CRI)
- C C C C** - designates product configuration (example: 1203, 1205, 1208, 1210, 1211)
- D** - designates options for product specification
- E E** - designates light emitting surface (LES) size (09=9mm, 13=13mm, 15=15mm, 19=19mm)
- F F** - designates options for product specification

Therefore, the following part number is used for a LUXEON CoB Core Range PW 3000K, 90CRI, 1208, Gen 4, 15mm LES:

**L 2 C 5 - 3 0 9 0 1 2 0 8 F 1 5 P 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 CoB Core Range PW 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 PW at specified test current,  $T_j=85^\circ\text{C}$ .

PRODUCT	NOMINAL CCT	MINIMUM CRI <sup>[1, 2, 3]</sup>	LUMINOUS FLUX <sup>[1]</sup> (lm)		TYPICAL LUMINOUS EFFICACY (lm/W)	TEST CURRENT (mA)	LES <sup>[4]</sup> (mm)	ENERGY EFFICIENCY CLASS <sup>[5]</sup>	PART NUMBER
			MINIMUM	TYPICAL					
LUXEON CoB PW 1203	3000K	80	1351	1501	145	300	9	E	L2C5-30801203F09P0
	3000K	90	1191	1324	128	300	9	E	L2C5-30901203F09P0
	3500K	90	1246	1384	134	300	9	E	L2C5-35901203F09P0
	4000K	90	1250	1389	134	300	9	E	L2C5-40901203F09P0
LUXEON CoB PW 1205	3000K	80	2739	3043	145	600	13	E	L2C5-30801205F13P0
	3000K	90	2413	2681	128	600	13	E	L2C5-30901205F13P0
	3500K	90	2509	2788	133	600	13	E	L2C5-35901205F13P0
	4000K	90	2595	2884	137	600	13	E	L2C5-40901205F13P0
LUXEON CoB PW 1208	3000K	80	4159	4621	148	900	15	D	L2C5-30801208F15P0
	3000K	90	3566	3962	127	900	15	E	L2C5-30901208F15P0
	3500K	90	3747	4163	133	900	15	E	L2C5-35901208F15P0
	4000K	90	3854	4283	137	900	15	E	L2C5-40901208F15P0
LUXEON CoB PW 1210	3000K	80	4230	4700	154	900	15	D	L2C5-30801210F15P0
	3000K	90	3601	4002	131	900	15	E	L2C5-30901210F15P0
	3500K	90	3784	4205	137	900	15	E	L2C5-35901210F15P0
	4000K	90	3915	4350	142	900	15	E	L2C5-40901210F15P0
LUXEON CoB PW 1211	3000K	80	5559	6177	148	1200	19	D	L2C5-30801211F19P0
	3000K	90	4836	5373	129	1200	19	E	L2C5-30901211F19P0
	3500K	90	5068	5631	135	1200	19	E	L2C5-35901211F19P0
	4000K	90	5203	5782	138	1200	19	E	L2C5-40901211F19P0

**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. R9 value of 90CRI products is  $>50$ .
4. Light Emitting Surface (LES) is the inner diameter (phosphor area) inside the dam.
5. Energy efficiency class as specified in Commission Delegated Regulation (EU) 2019/2015. The available range of energy efficiency classes is A-G.

## Optical Characteristics

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

PART NUMBER	TYPICAL TOTAL INCLUDED ANGLE <sup>[1]</sup>	TYPICAL VIEWING ANGLE <sup>[2]</sup>
L2C5-xxxx12xxxxP0	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 Core Range PW at specified test current,  $T_j=85^\circ\text{C}$ .

PART NUMBER	FORWARD VOLTAGE <sup>[1]</sup> ( $V_f$ )			TYPICAL TEMPERATURE COEFFICIENT OF FORWARD VOLTAGE <sup>[2]</sup> (mV/ $^\circ\text{C}$ )	TYPICAL THERMAL RESISTANCE—JUNCTION TO CASE <sup>[3]</sup> ( $^\circ\text{C}/\text{W}$ )
	MINIMUM	TYPICAL	MAXIMUM		
L2C5-xxxx1203F09P0	32.5	34.5	37.5	-16	0.62
L2C5-xxxx1205F13P0	32.5	35.0	37.5	-16	0.37
L2C5-xxxx1208F15P0	32.5	34.8	37.5	-16	0.25
L2C5-xxxx1210F15P0	32.5	34.0	37.5	-16	0.20
L2C5-xxxx1211F19P0	32.5	34.8	37.5	-16	0.18

**Notes for Table 3:**

1. Lumileds maintains a tolerance of  $\pm 0.06\text{V}$  on forward voltage measurements.
2. Measured between  $25^\circ\text{C}$  and  $85^\circ\text{C}$ .
3. Thermal resistance is measured between junction and the bottom of the LUXEON CoB substrate.

## Absolute Maximum Ratings

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

PARAMETER	MAXIMUM PERFORMANCE
DC Forward Current <sup>[1,2]</sup>	2x test current <sup>[3]</sup>
LED Junction Temperature <sup>[1]</sup> (DC & Pulse)	$125^\circ\text{C}$
ESD Sensitivity (ANSI/ESDA/JEDEC JS-001-2012)	Class 3B
Operating Case Temperature <sup>[1]</sup>	$-40^\circ\text{C}$ to $105^\circ\text{C}$
LED Storage Temperature	$-40^\circ\text{C}$ to $120^\circ\text{C}$
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.
- 3.

# Characteristic Curves

## Spectral Power Distribution Characteristics

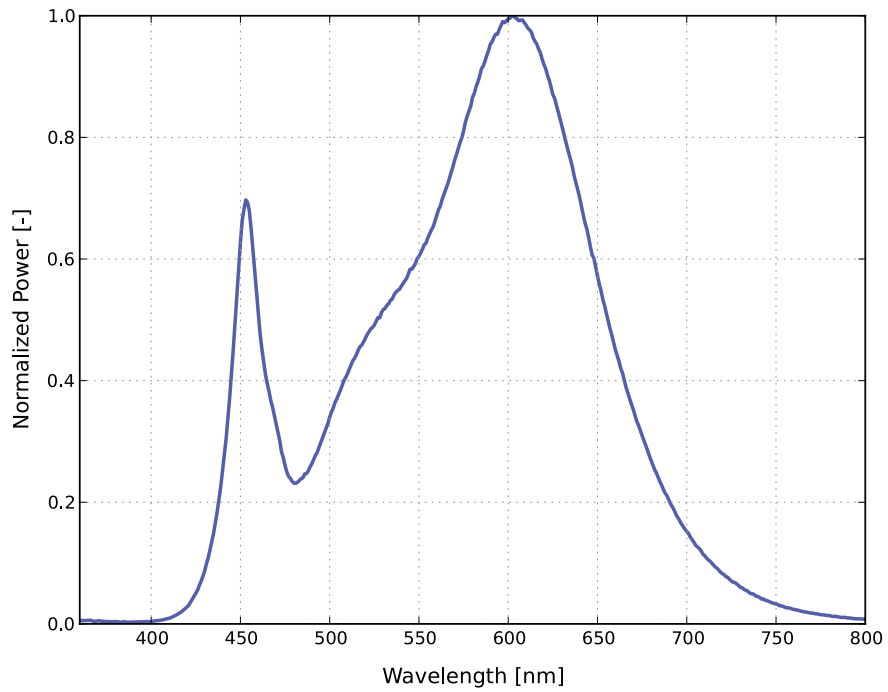


Figure 1a. Typical normalized power vs. wavelength for L2C5-xx80xxxxFxxP0 at specified test current,  $T_j=85^{\circ}\text{C}$ .

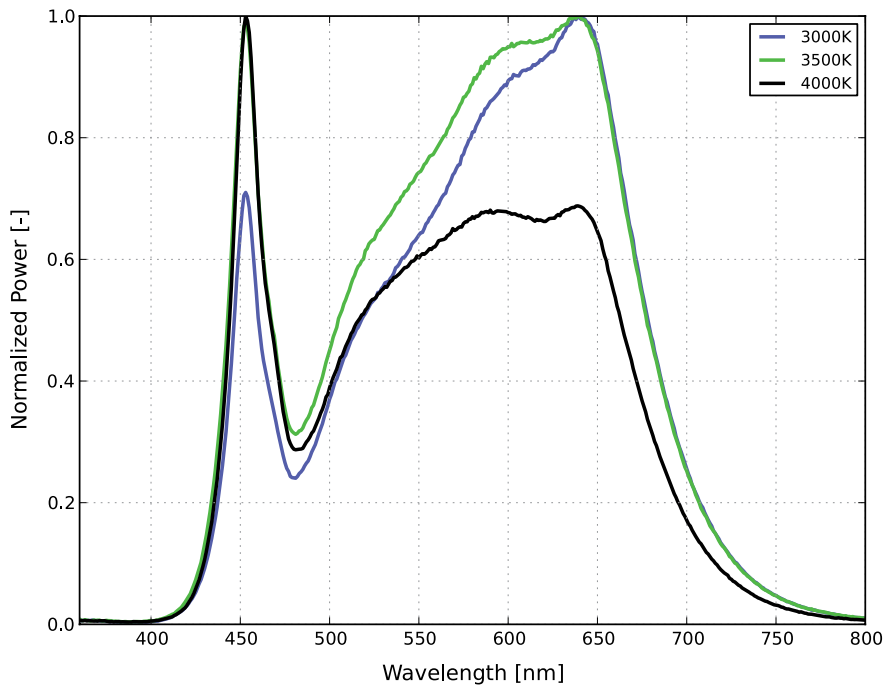


Figure 1b. Typical normalized power vs. wavelength for L2C5-xx90xxxxFxxP0 at specified test current,  $T_j=85^{\circ}\text{C}$ .

# Light Output Characteristics

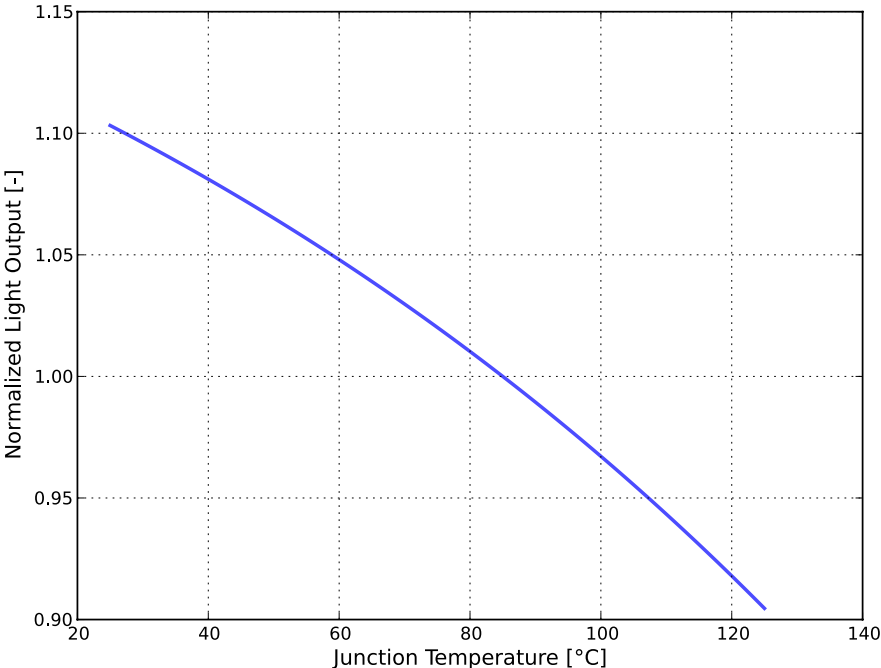


Figure 2. Typical normalized light output vs. junction temperature for L2C5-xxxx12xxxxP0 at specified test current.

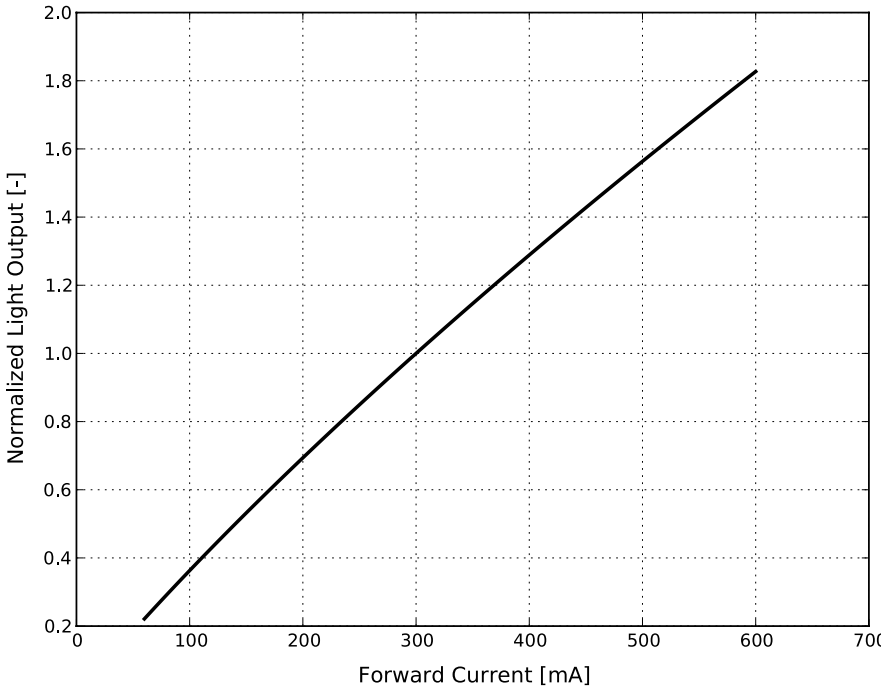


Figure 3a. Typical normalized light output vs. forward current for L2C5-xxxx1203F09P0 at  $T_j=85^\circ\text{C}$ .

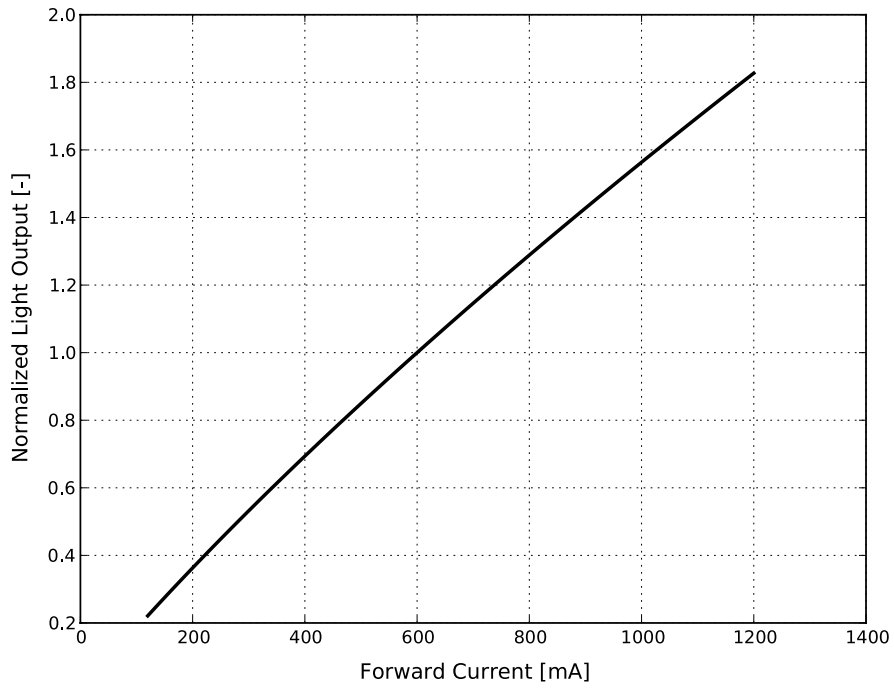


Figure 3b. Typical normalized light output vs. forward current for L2C5-xxxx1205F13P0 at  $T_j=85^\circ\text{C}$ .

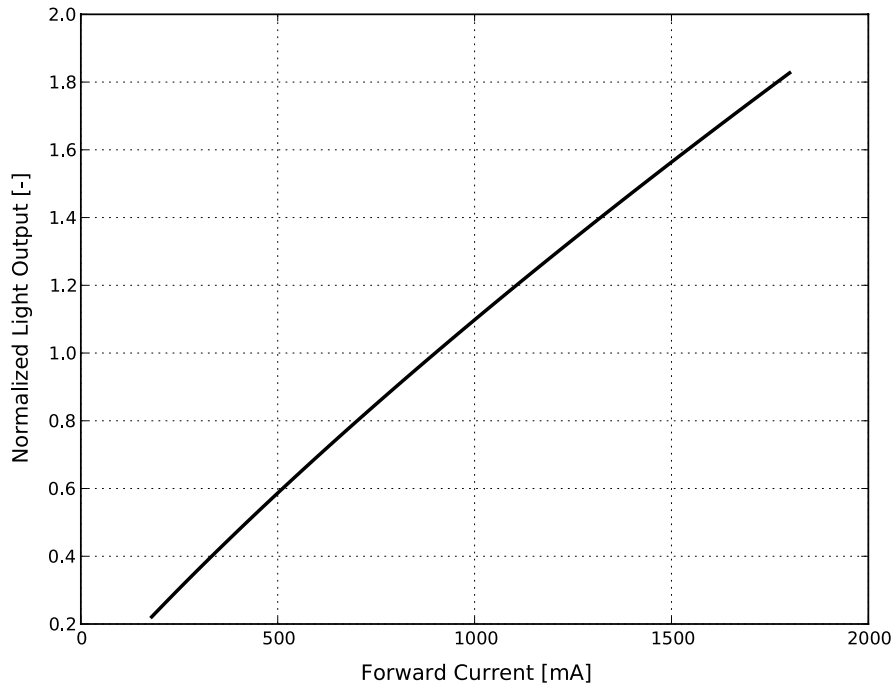


Figure 3c. Typical normalized light output vs. forward current for L2C5-xxxx1208F15P0 at  $T_j=85^\circ\text{C}$ .



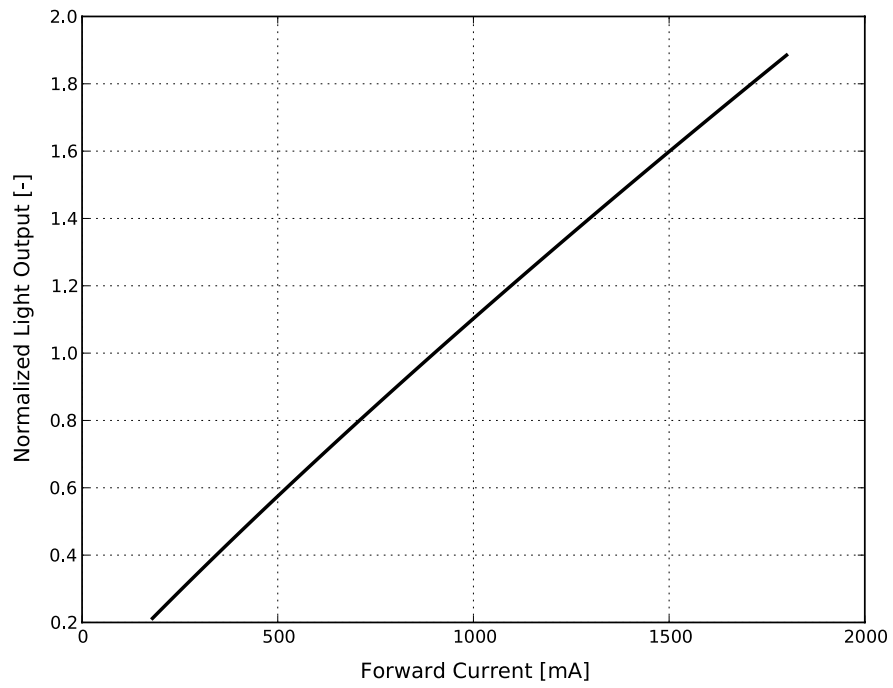


Figure 3d. Typical normalized light output vs. forward current for L2C5-xxxx1210F15P0 at  $T_j=85^\circ\text{C}$ .

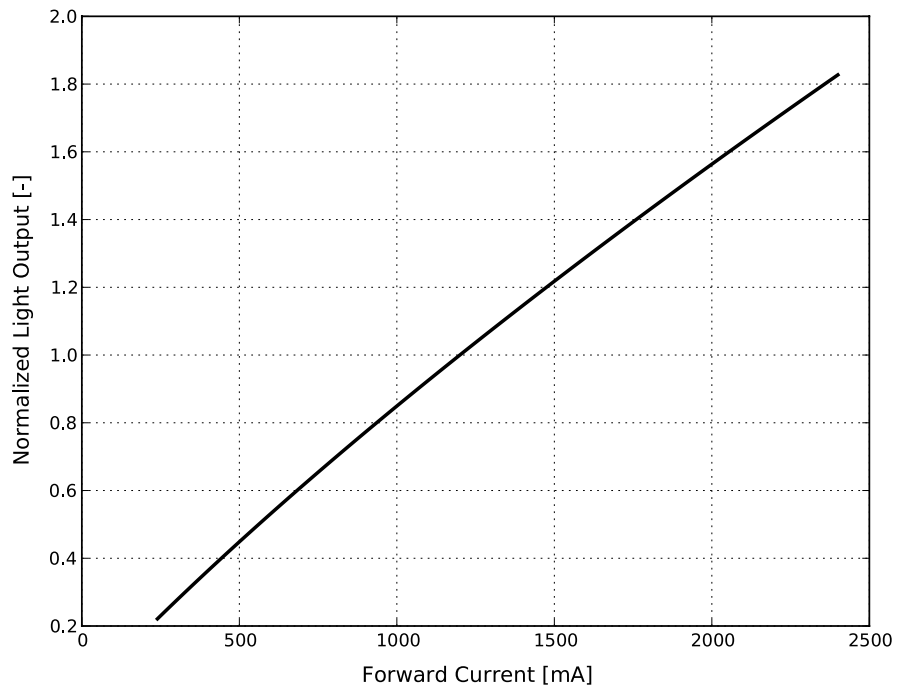


Figure 3e. Typical normalized light output vs. forward current for L2C5-xxxx1211F19P0 at  $T_j=85^\circ\text{C}$ .

# Forward Current Characteristics

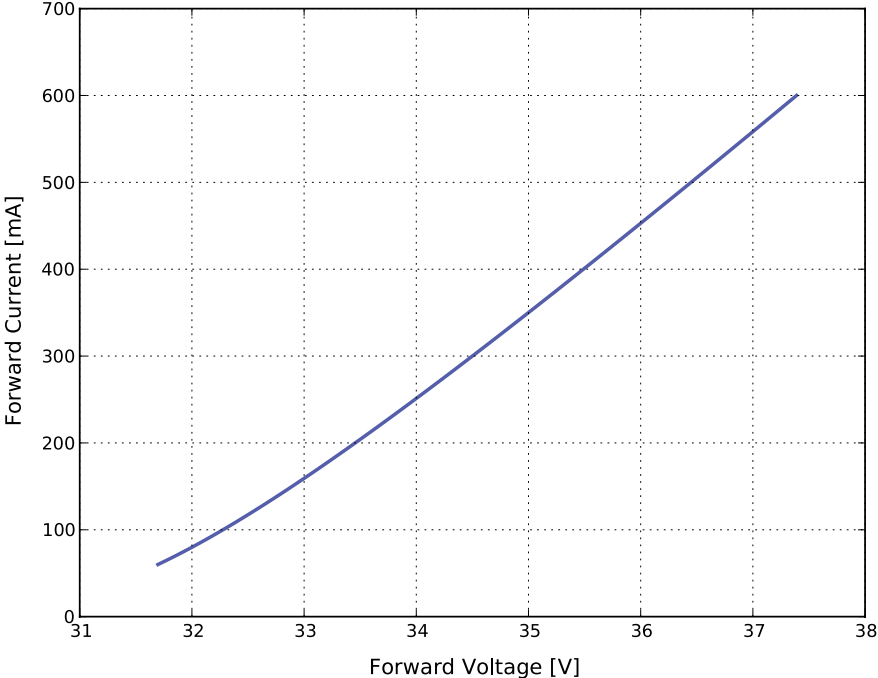


Figure 4a. Typical forward current vs. forward voltage for L2C5-xxxx1203FxxP0 at  $T_j=85^\circ\text{C}$ .

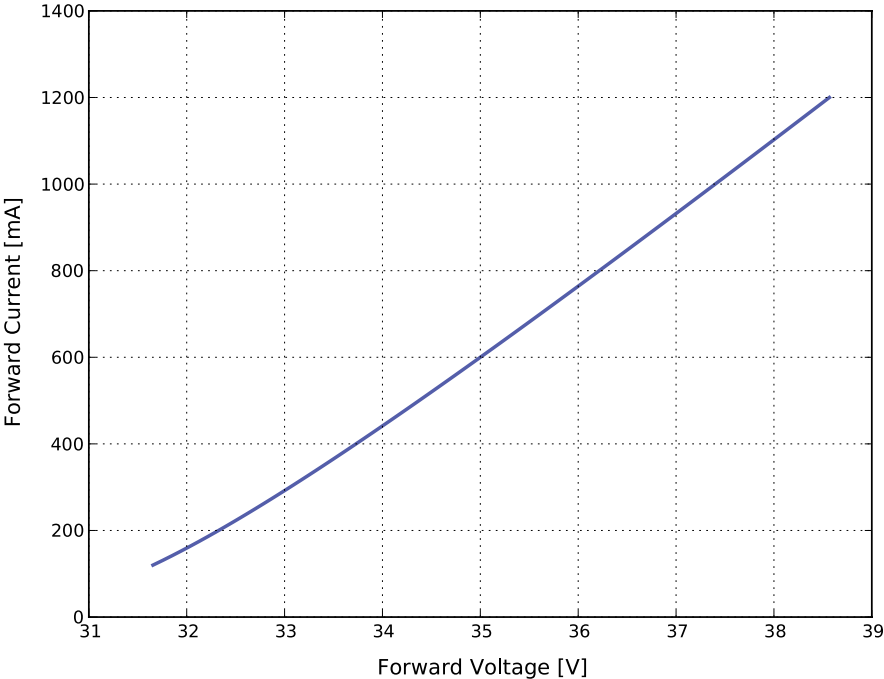


Figure 4b. Typical forward current vs. forward voltage for L2C5-xxxx1205FxxP0 at  $T_j=85^\circ\text{C}$ .

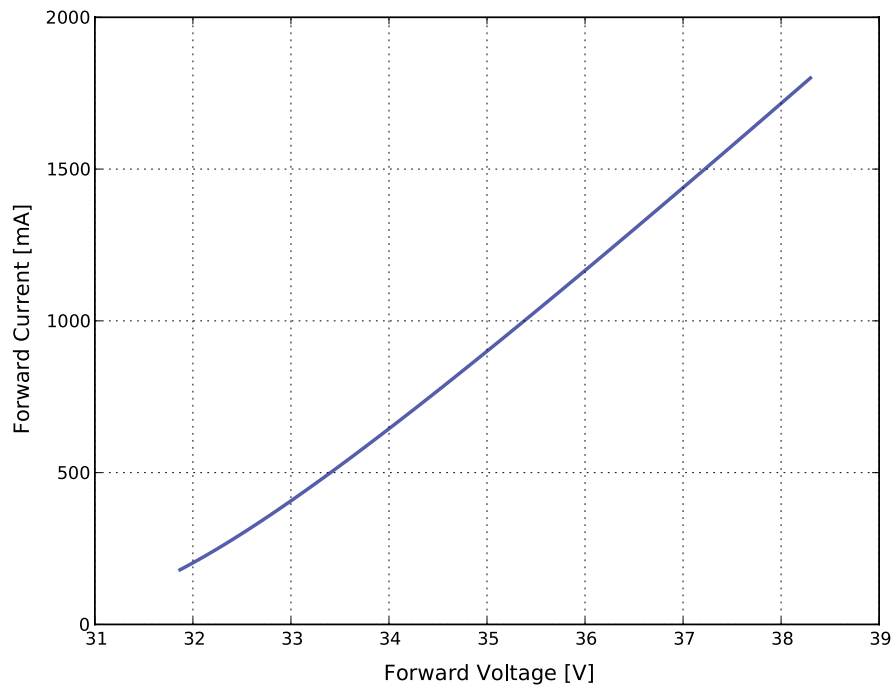


Figure 4c. Typical forward current vs. forward voltage for L2C5-xxxx1208FxxP0 at  $T_j=85^\circ\text{C}$ .

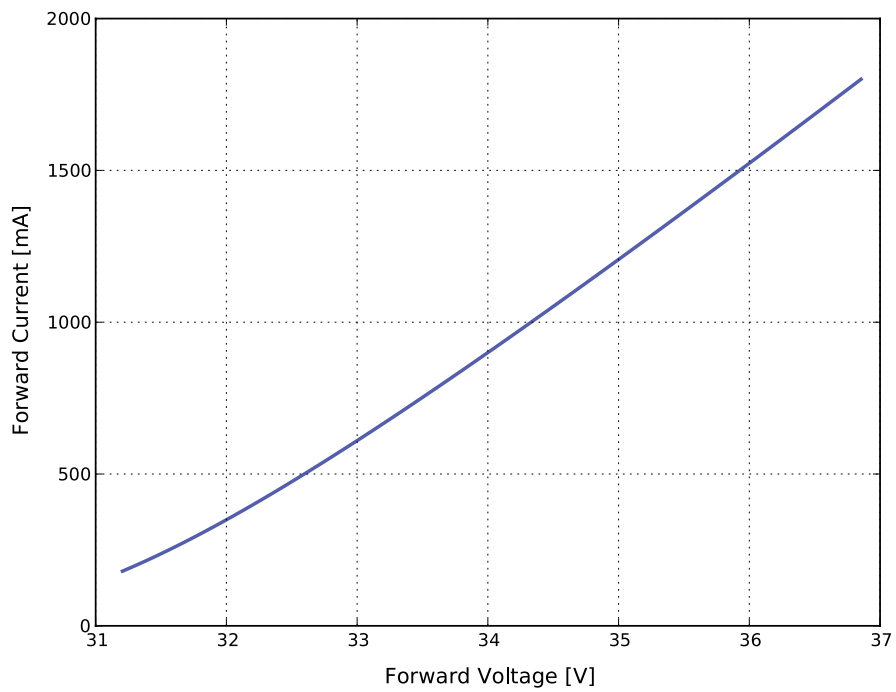


Figure 4d. Typical forward current vs. forward voltage for L2C5-xxxx1210FxxP0 at  $T_j=85^\circ\text{C}$ .

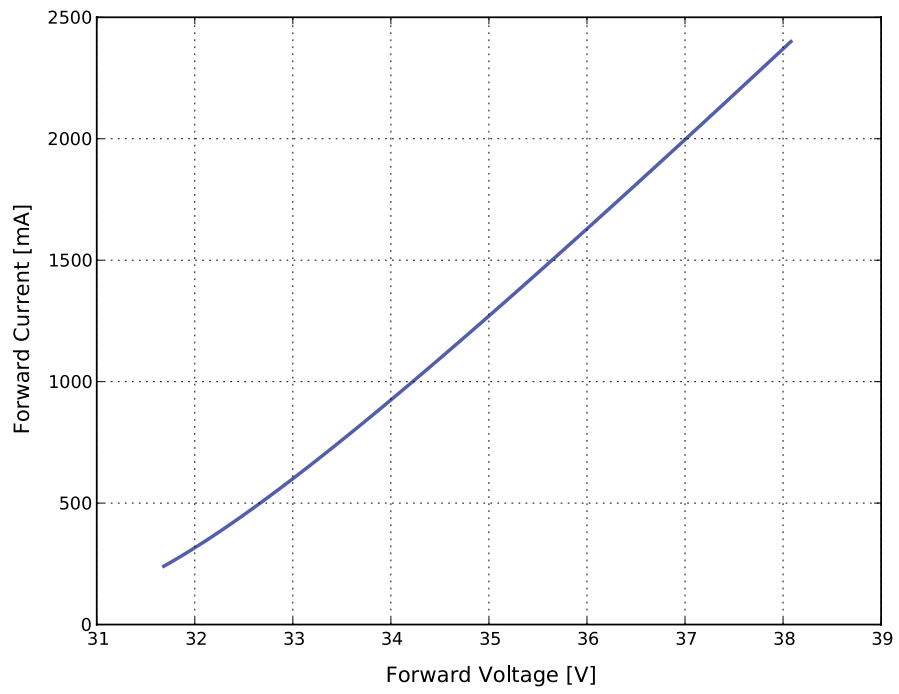


Figure 4e. Typical forward current vs. forward voltage for L2C5-xxxx1211FxxP0 at T<sub>j</sub>=85°C.

# Radiation Pattern Characteristics

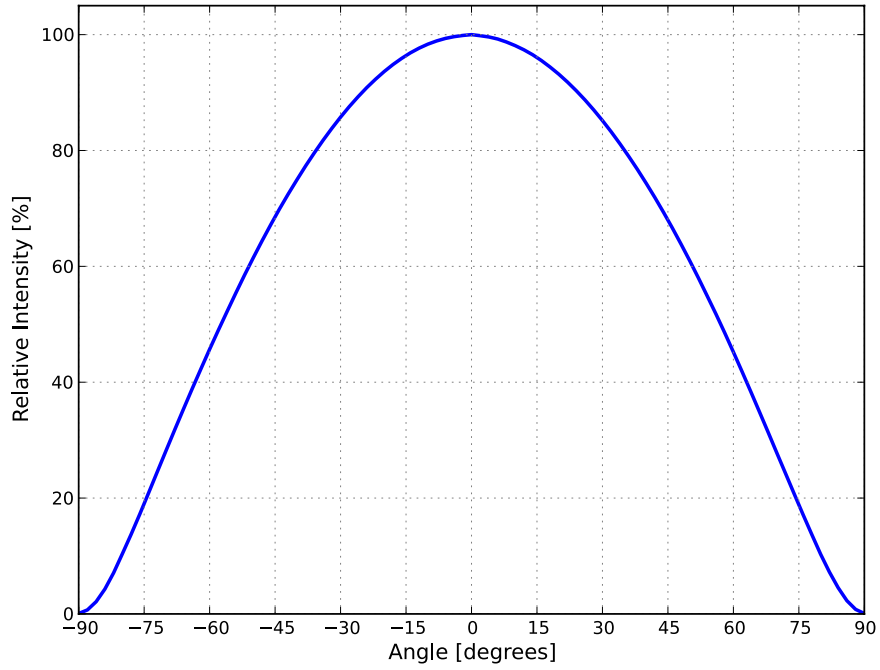


Figure 5. Typical radiation pattern for LUXEON CoB Core Range PW at specified test current,  $T_j=85^{\circ}\text{C}$ .

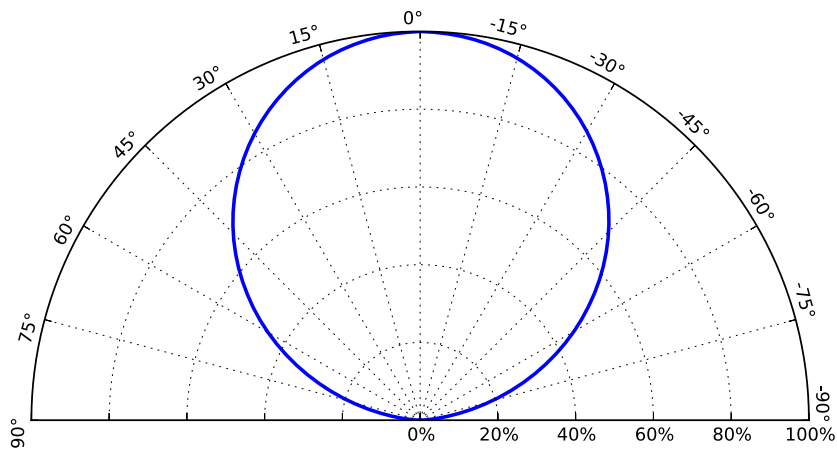


Figure 6. Typical polar radiation pattern for LUXEON CoB Core Range PW at specified test current,  $T_j=85^{\circ}\text{C}$ .

# Color Bin Definitions

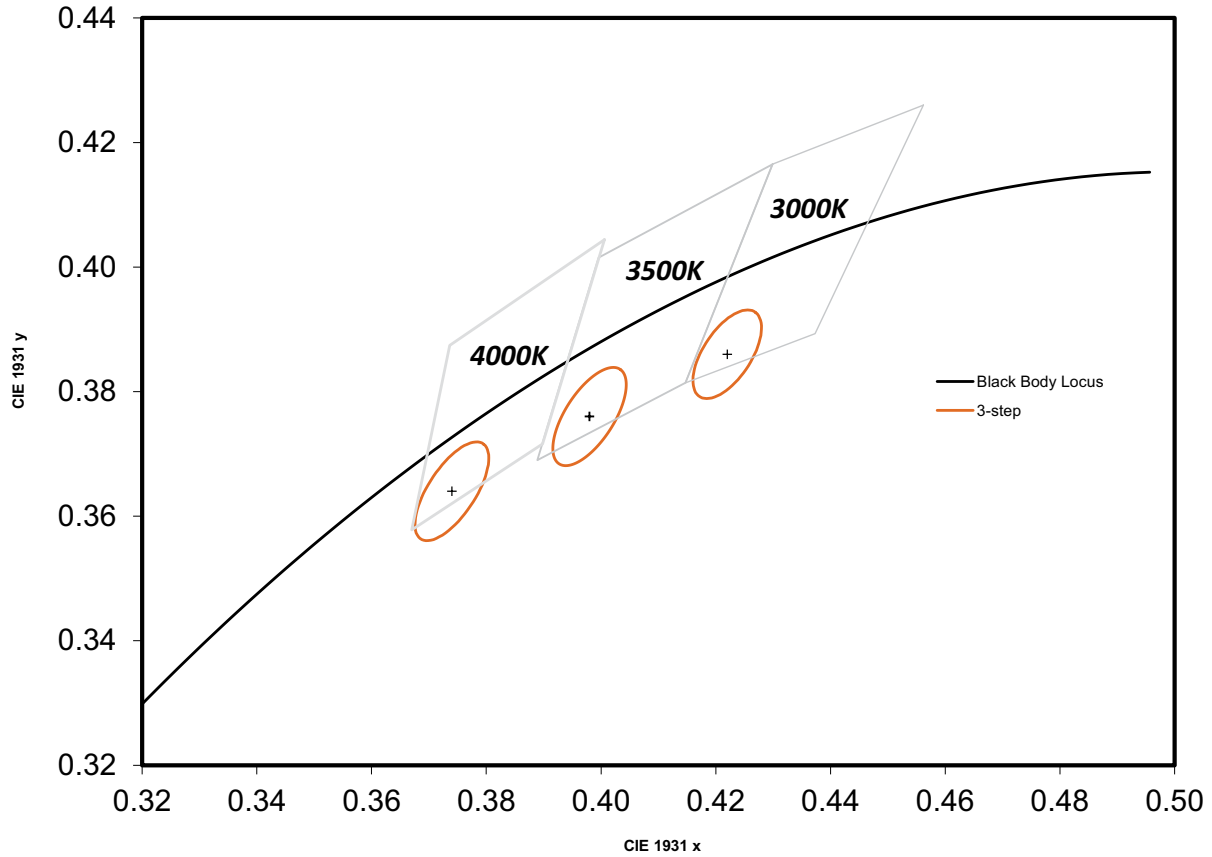


Figure 7. 3-step MacAdam ellipse illustration for Table 5.

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

NOMINAL CCT	COLOR SPACE	CENTER POINT <sup>[1]</sup> (cx, cy)	MAJOR AXIS, a	MINOR AXIS, b	ELLIPSE ROTATION ANGLE, $\theta$
3000K	Single 3-step MacAdam ellipse	(0.422, 0.386)	0.00834	0.00408	53.20°
3500K	Single 3-step MacAdam ellipse	(0.398, 0.376)	0.00927	0.00414	54.00°
4000K	Single 3-step MacAdam ellipse	(0.374, 0.364)	0.00939	0.00402	53.70°

**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

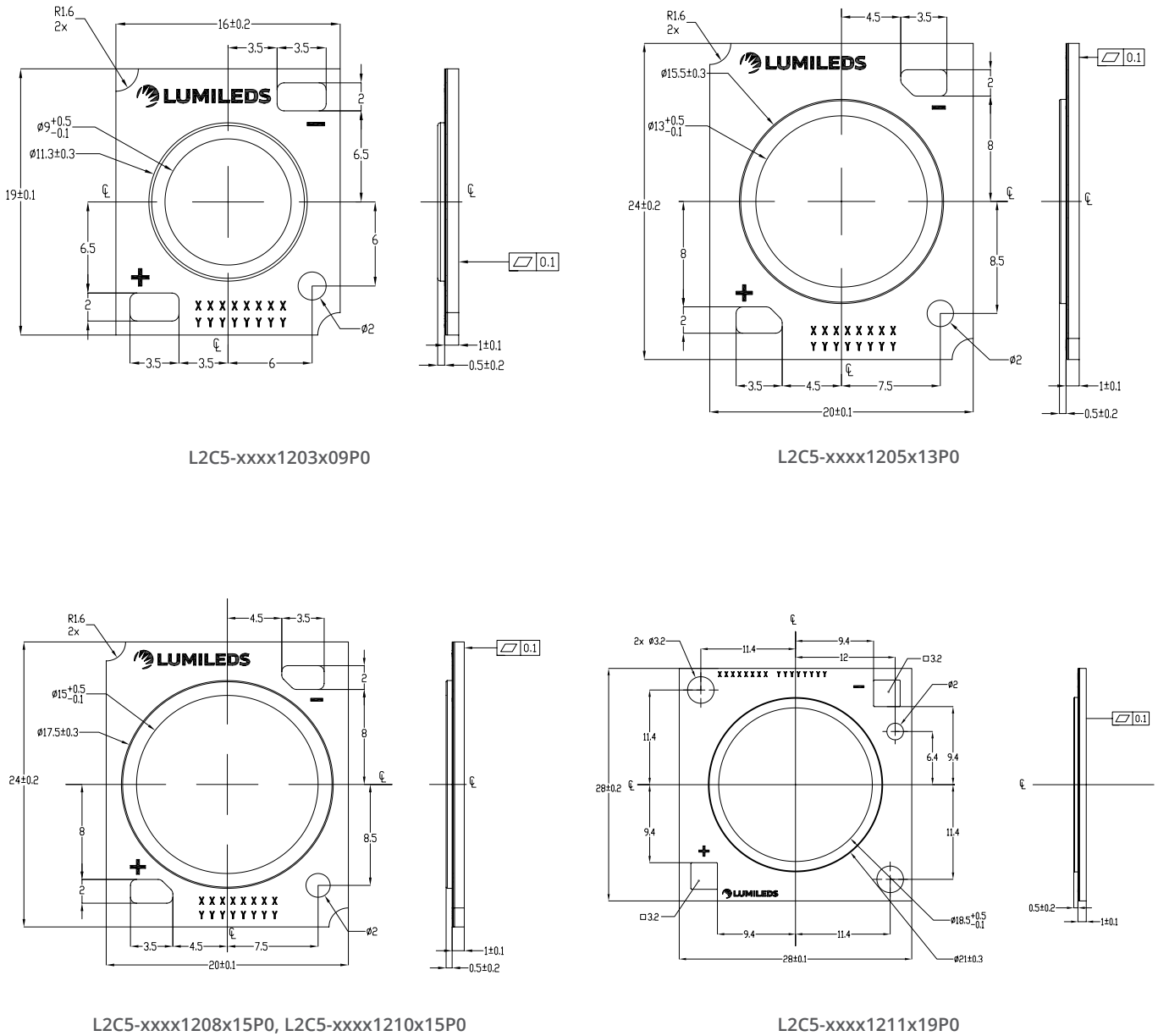


Figure 8. Mechanical dimensions for LUXEON CoB Core Range PW.

**Notes for Figure 8:**

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

# Packaging and Labeling Information

LUXEON CoB Core Range PW LEDs are packaged in tubes then in a carton box. 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. The carton boxes have printed information providing part numbers with CAT codes that indicate luminous flux, color and forward voltage bins.

Table 6. Number of LEDs per tube for LUXEON CoB Core Range PW.

PART NUMBER	TOTAL UNITS PER TUBE	TOTAL TUBES PER INNER BOX	TOTAL UNITS PER INNER BOX
L2C5-xxxx1203F09P0	20	5	100
L2C5-xxxx1205F13P0	20	5	100
L2C5-xxxx1208F15P0	20	5	100
L2C5-xxxx1210F15P0	20	5	100
L2C5-xxxx1211F19P0	10	5	50

## Tube

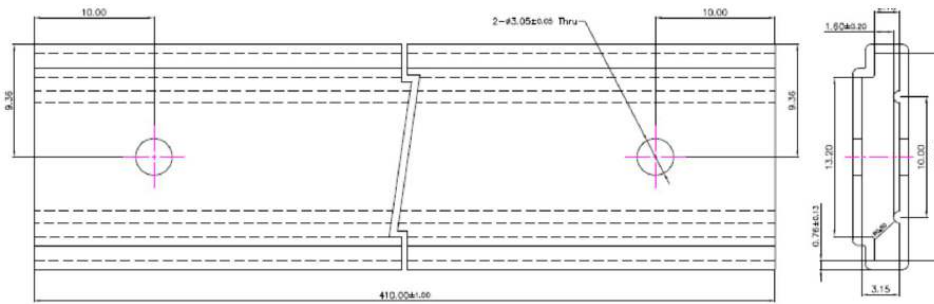


Figure 9a. Tube dimensions for L2C5-xxxx1203F09P0.

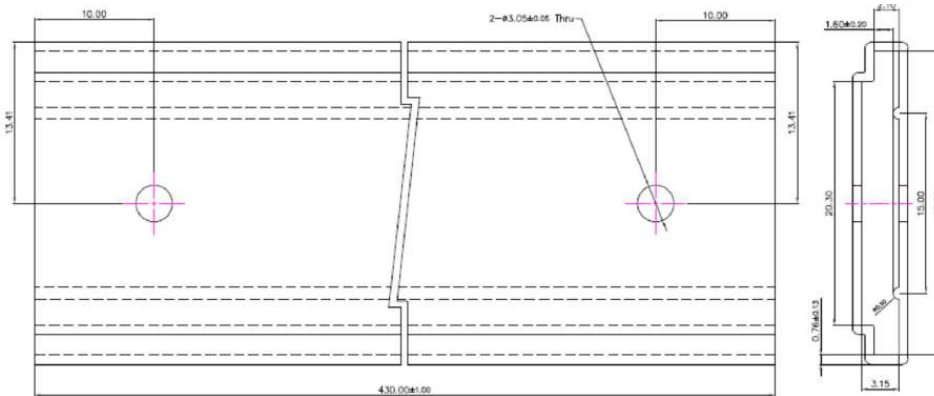


Figure 9b. Tube dimensions for L2C5-xxxx1205F13P0 and L2C5-xxxx1208F15P0 and L2C5-xxxx1210F15P0.

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

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



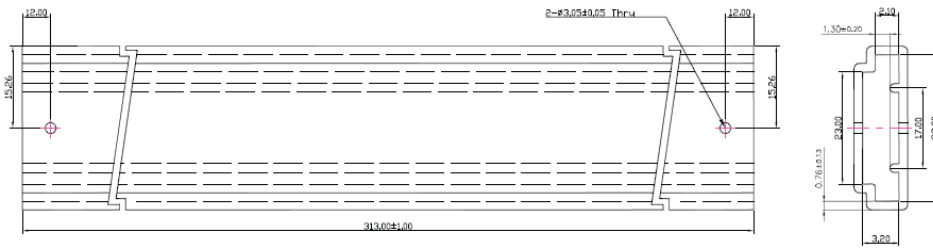


Figure 9c. Tube dimensions for L2C5-xxxx1211F19P0.

Notes for Figure 9c:

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

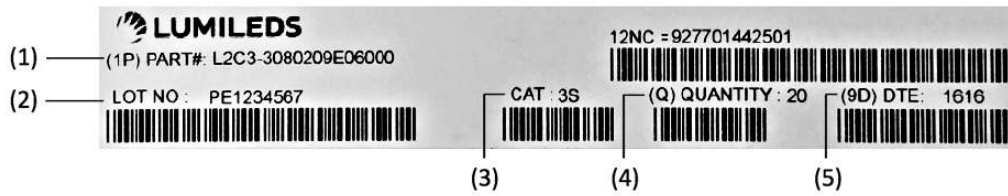


Figure 10. Example of a tube label for LUXEON CoB Core Range PW.

Notes for Figure 10 - Tube Label descriptions for customer use:

Field labels not described are for Lumileds internal use only.

1. Lumileds part number.
2. Unique production lot identification number. This number is required for traceability purpose.
3. Product category code.
4. Number of LED emitters in a tube.
5. LED test date in YYWW format.

## Inner Box

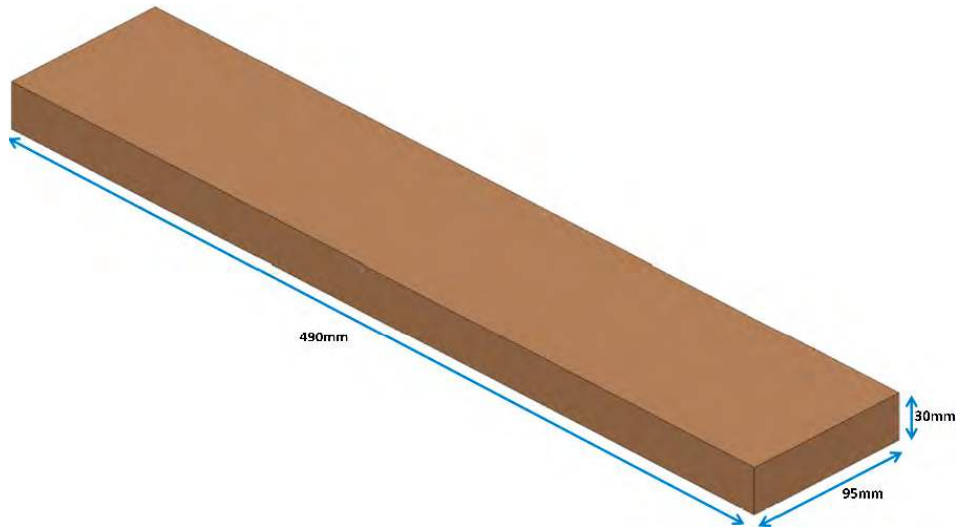


Figure 11. Dimensions for inner box packaging for LUXEON CoB Core Range PW.

Table 7. Inner box information for LUXEON CoB Core Range PW.

BOX TYPE	DIMENSIONS (mm)			AVERAGE WEIGHT (100pcs/box)	AVERAGE WEIGHT (50pcs/box)
	H	L	W		
Inner Box	30	490	95	0.340Kg	0.305Kg

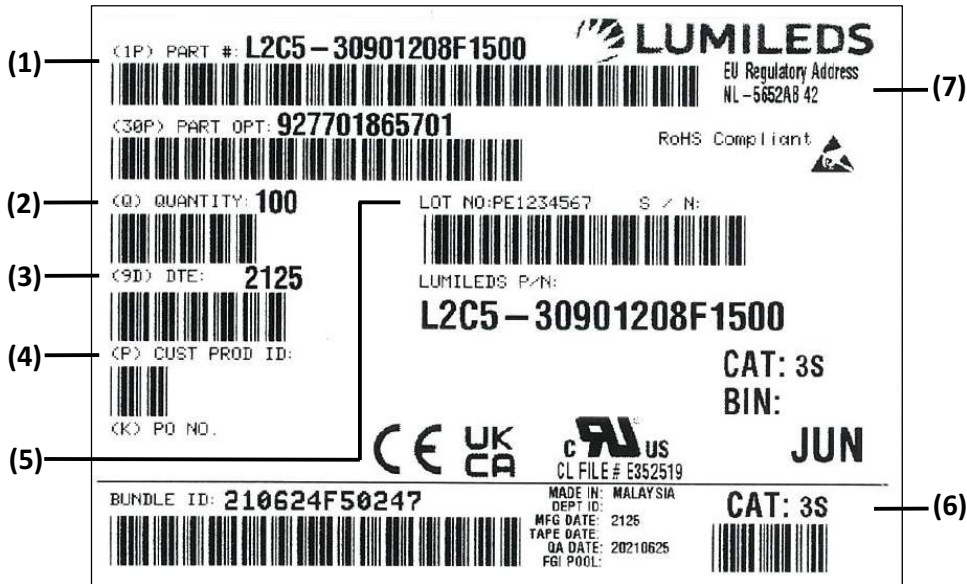


Figure 12. Example of inner box label for LUXEON CoB Core Range PW.

Notes for Figure 12 – Inner Box Label descriptions for customer use:

Field labels not described are for Lumileds internal use only.

1. Lumileds part number.
2. Number of LED emitters in a box.
3. LED test date in YYWW format.
4. Customer part number for custom requests only.
5. Unique production lot identification number. This number is required for traceability purpose.
6. Product category code.
7. EU regulatory address.

# Outer Box

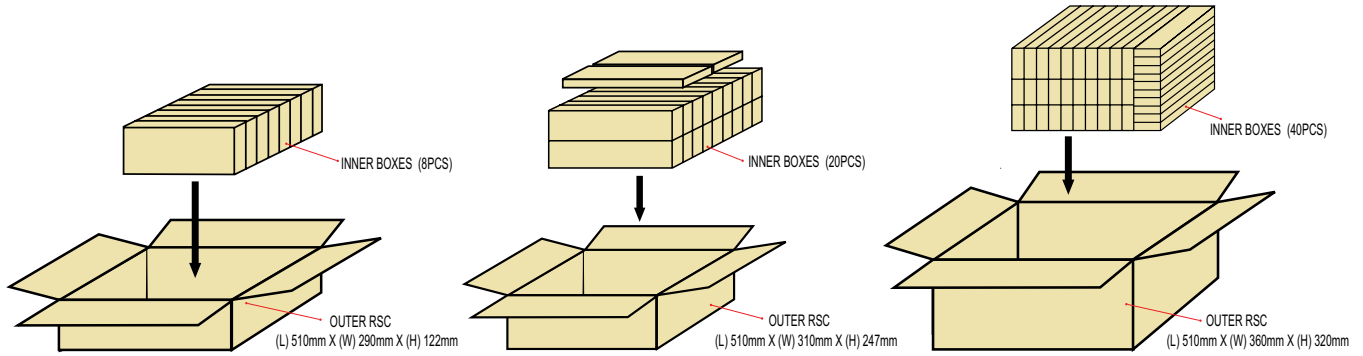


Figure 13. Dimensions for outer box packaging for LUXEON CoB Core Range PW.

Table 8. Outer box information for LUXEON CoB Core Range PW.

BOX TYPE	DIMENSIONS (mm)			MAXIMUM INNER BOXES PER OUTER BOX	MAXIMUM QUANTITY PER OUTER BOX	AVERAGE WEIGHT (100pcs/box)	AVERAGE WEIGHT (50pcs/box)
	H	L	W				
Outer Box 8	122	510	290	8	800	3.05kg	2.77kg
Outer Box 20	247	510	310	20	2000	7.55kg	6.85kg
Outer Box 40	320	510	360	40	4000	15.10kg	13.70kg

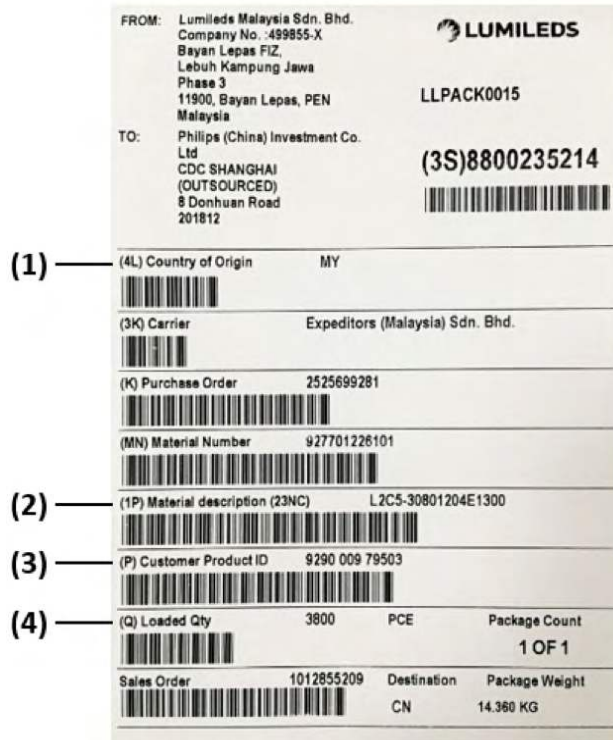


Figure 14. Example of outer box label for LUXEON CoB Core Range PW.

Notes for Figure 14 – Outer Box Label descriptions for customer use:  
Field labels not described are for Lumileds internal use only.

1. Country code of origin of manufacturing of parts (e.g. MY for Malaysia, CN for China) according to ISO 3166-1 alpha-2 document.
2. Lumileds part number.
3. Customer part number for custom requests only.
4. Total number of LED emitters in a shipment box.

## About Lumileds

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 better, safer, more beautiful—with light.

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



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