LUXEON CoB Core Range (High Density)

High lumen in a small LES

LUXEON CoB Core Range (High Density) focuses on achieving the highest Center Beam Candle Power (CBCP). With a focus on 6, 9 and 11mm Light Emitting Surfaces, we can cover a flux range as high as 8,000 lumens. Using the mechanical dimensions of our LUXEON CoB Core Range, the High Density range will also benefit from the ability to utilize existing an ecosystem of holders, optics and drivers.

FEATURES AND BENEFITS

- Highest flux densities with industry's smallest LES
- 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 heatsinks and higher lumens
- Supported by a comprehensive optical, mechanical and electrical ecosystem

PRIMARY APPLICATIONS

- Spotlights

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General Product Information

Product Test Conditions

LUXEON CoB Core Range (High Density) LEDs are tested and binned with a DC drive current specified below at a junction temperature, T_J, of 85°C:

350mA – LUXEON CoB 1202HD
700mA – LUXEON CoB 1204HD
900mA – LUXEON CoB 1205HD

Part Number Nomenclature

Part numbers for LUXEON CoB Core Range (High Density) follow the convention below:

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

Where:

A A – designates nominal ANSI CCT (27=2700K, 30=3000K, 32=3200K, 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, 1204, 1205)

D D – designates light emitting surface (LES) size (06=6mm, 09=9mm, 11=11mm)

F F – designates options for product specification

Therefore, the following part number is used for a LUXEON CoB 1204, 3000K 80CRI, with a 9mm LES:

L 2 C 5 – **3 0 8 0 1 2 0 4** E **0 9** 0 0

Lumen Maintenance

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

Environmental Compliance

Lumileds LLC is committed to providing environmentally friendly products to the solid-state lighting market. LUXEON CoB Core Range (High Density) 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 (High Density) at specified test current, T_j=85°C.

PRODUCT	NOMINAL CCT	MINIMUM CRI [1, 2, 3]	LUMINOUS FLUX [1] (lm)		TYPICAL LUMINOUS EFFICACY (lm/W)	TEST CURRENT (mA)	LES [4] (mm)	PART NUMBER
			MINIMUM	TYPICAL				
LUXEON CoB 1202HD	4000K	70	1462	1624	125	350	6	L2C5-40701202EH600
	5000K	70	1462	1624	125	350	6	L2C5-50701202EH600
	2700K	80	1240	1378	106	350	6	L2C5-27801202EH600
	3000K	80	1305	1450	112	350	6	L2C5-30801202EH600
	3500K	80	1331	1479	114	350	6	L2C5-35801202EH600
	4000K	80	1357	1508	116	350	6	L2C5-40801202EH600
	5000K	80	1357	1508	116	350	6	L2C5-50801202EH600
	5700K	80	1351	1501	116	350	6	L2C5-57801202EH600
	2700K	90	1044	1160	90	350	6	L2C5-27901202EH600
	3000K	90	1070	1189	92	350	6	L2C5-30901202EH600
	4000K	90	1148	1276	99	350	6	L2C5-40901202EH600
LUXEON CoB 1204HD	4000K	70	2923	3248	125	700	9	L2C5-40701204E0900
	5000K	70	2923	3248	125	700	9	L2C5-50701204E0900
	2700K	80	2480	2755	106	700	9	L2C5-27801204E0900
	3000K	80	2610	2900	112	700	9	L2C5-30801204E0900
	3500K	80	2662	2958	114	700	9	L2C5-35801204E0900
	4000K	80	2714	3016	116	700	9	L2C5-40801204E0900
	5000K	80	2714	3016	116	700	9	L2C5-50801204E0900
	5700K	80	2701	3002	116	700	9	L2C5-57801204E0900
	2700K	90	2088	2320	90	700	9	L2C5-27901204E0900
	3000K	90	2140	2378	92	700	9	L2C5-30901204E0900
	3200K	90	2183	2426	94	700	9	L2C5-32901204E0900
	4000K	90	2297	2552	99	700	9	L2C5-40901204E0900
LUXEON CoB 1205HD	4000K	70	3780	4200	126	900	11	L2C5-40701205E1100
	5000K	70	3780	4200	126	900	11	L2C5-50701205E1100
	2700K	80	3206	3563	107	900	11	L2C5-27801205E1100
	3000K	80	3375	3750	113	900	11	L2C5-30801205E1100
	3500K	80	3443	3825	115	900	11	L2C5-35801205E1100
	4000K	80	3510	3900	117	900	11	L2C5-40801205E1100
	5000K	80	3510	3900	117	900	11	L2C5-50801205E1100
	5700K	80	3493	3881	117	900	11	L2C5-57801205E1100
	2700K	90	2700	3000	90	900	11	L2C5-27901205E1100
	3000K	90	2768	3075	92	900	11	L2C5-30901205E1100
	4000K	90	2970	3300	99	900	11	L2C5-40901205E1100

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.
3. R9 value of 90CRI products are >50.
4. Light Emitting Surface (LES) is the inner diameter (phosphor area) inside the dam.

Optical Characteristics

Table 2. Optical characteristics for LUXEON CoB Core Range (High Density) at specified test current, T_j=85°C.

PART NUMBER	TYPICAL TOTAL INCLUDED ANGLE [1]	TYPICAL VIEWING ANGLE [2]
L2C5-xxxx12xxExx00	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 ½ of the peak value.

Electrical and Thermal Characteristics

Table 3. Electrical and thermal characteristics for LUXEON CoB Core Range (High Density) at specified test current, T_j=85°C.

PART NUMBER	FORWARD VOLTAGE [1] (V_f)			TYPICAL TEMPERATURE COEFFICIENT OF FORWARD VOLTAGE [2] (mV/°C)	TYPICAL THERMAL RESISTANCE—JUNCTION TO CASE [3] (°C/W)
	MINIMUM	TYPICAL	MAXIMUM		
L2C5-xxxx1202EH600	34.5	37.0	39.5	-16	0.98
L2C5-xxxx1204E0900	34.5	37.0	39.5	-16	0.55
L2C5-xxxx1205E1100	34.5	37.0	39.5	-16	0.51

Notes for Table 3:
1. Lumileds maintains a tolerance of ±2% on forward voltage measurements.
2. Measured between 25°C and 85°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 (High Density).

PARAMETER	MAXIMUM PERFORMANCE
DC Forward Current [1, 2]	700mA (1202HD), 1350mA (1204HD), 1650mA (1205HD)
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
LED Storage Temperature	-40°C to 120°C
Allowable Reflow Cycles	3
Reverse Voltage ($V_{reverse}$)	LUXEON LEDs are not designed to be driven in reverse bias

Notes for Table 4:
1. Proper current derating must be observed to maintain the junction temperature below the maximum allowable junction temperature.
2. Residual periodic variations due to power conversion from alternating current (AC) to direct current (DC), also called "ripple," are acceptable if the following conditions are met:
   – The frequency of the ripple current is 100Hz or higher
   – The average current for each cycle does not exceed the maximum allowable DC forward current
   – The maximum amplitude of the ripple does not exceed the maximum peak pulsed forward current

Characteristic Curves

Spectral Power Distribution Characteristics

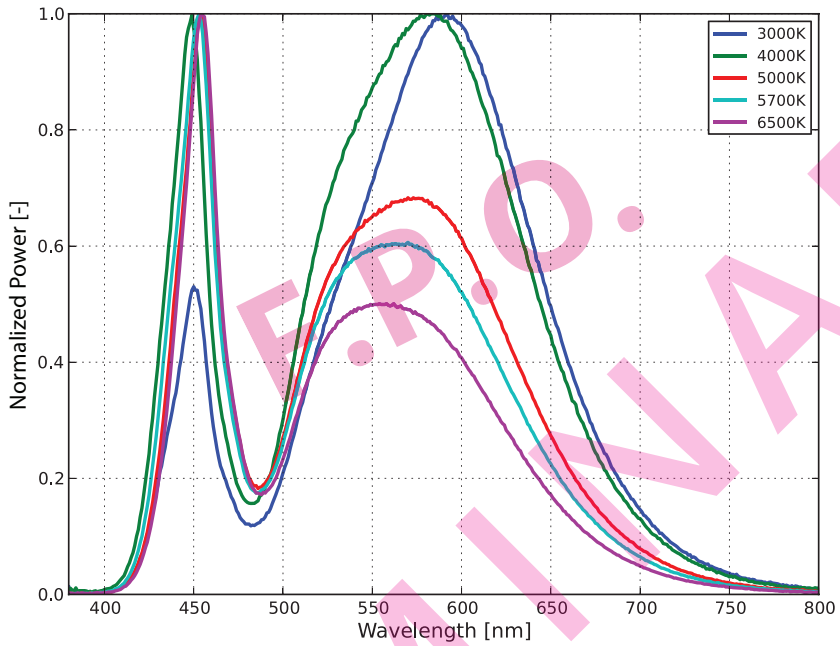

Figure 1a. Typical normalized power vs. wavelength for L2C5-xx7012xxExx00 at specified test current, T_j=85°C.
SOURCE FILE FOR GRAPH NEEDED IN EPS FILE FORMAT

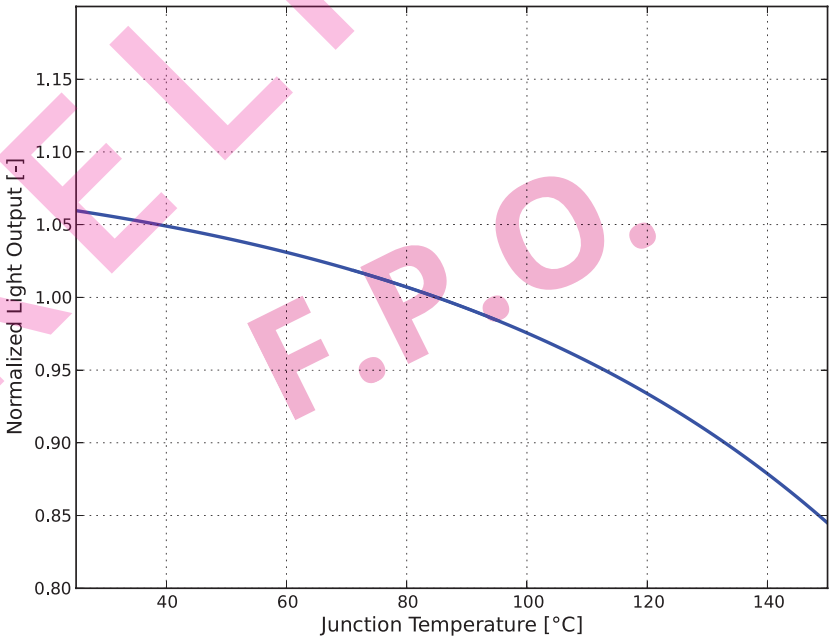

Figure 1b. Typical normalized power vs. wavelength for L2C5-xx8012xxExx00 at specified test current, T_j=85°C.
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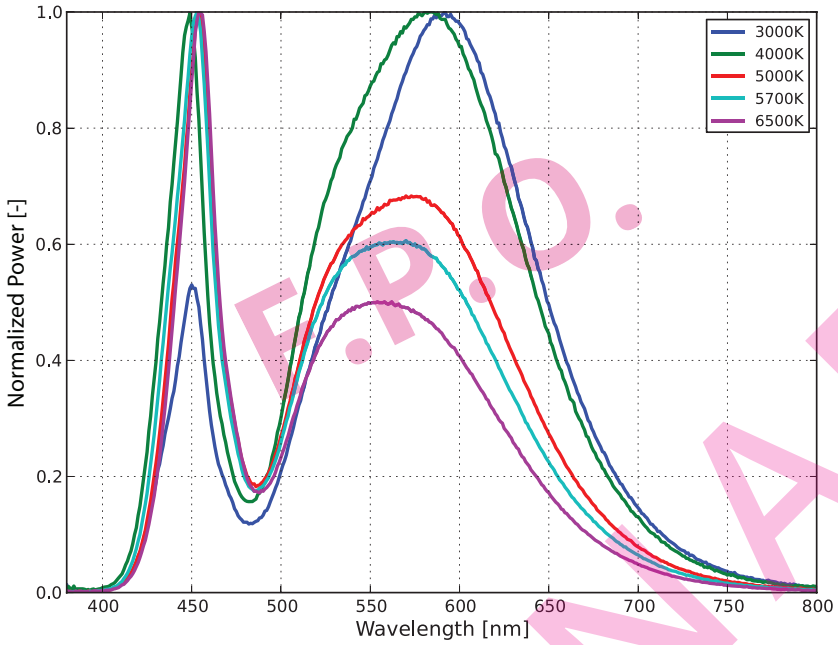


Figure 1c. Typical normalized power vs. wavelength for L2C5-xx9012xxExx00 at specified test current, T_j=85°C.
SOURCE FILE FOR GRAPH NEEDED IN EPS FILE FORMAT

Light Output Characteristics

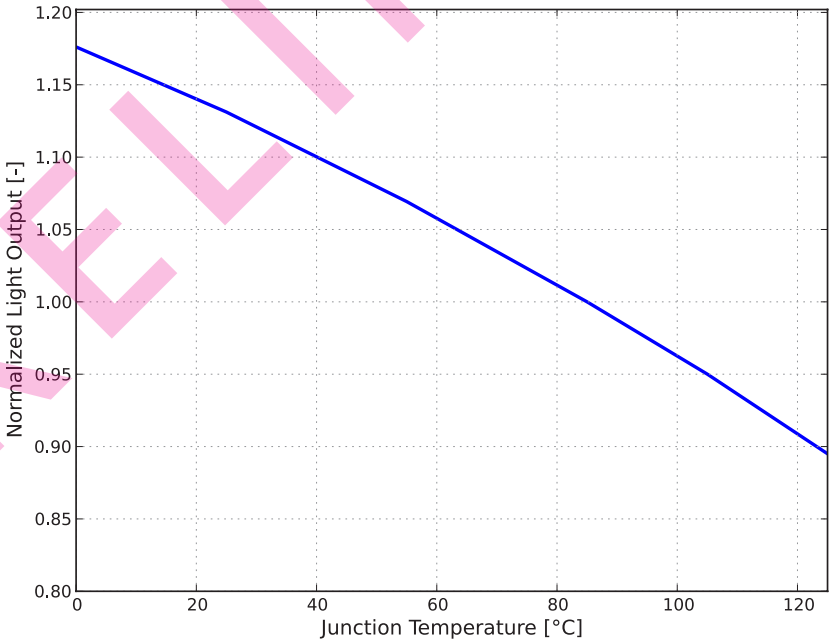
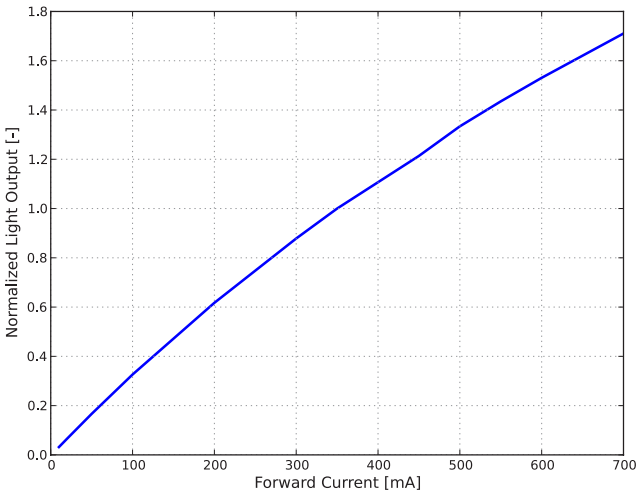
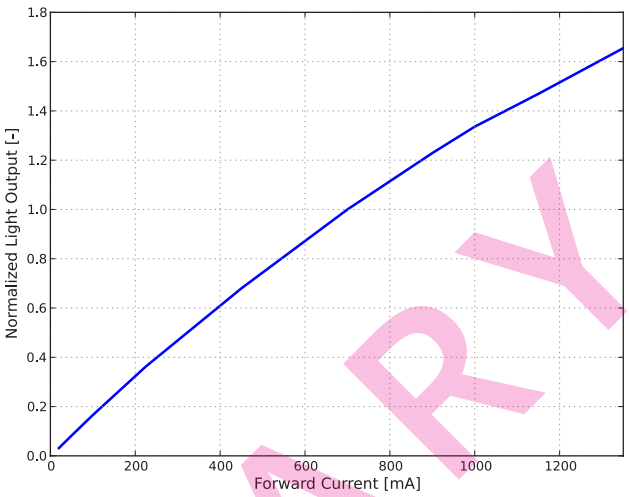


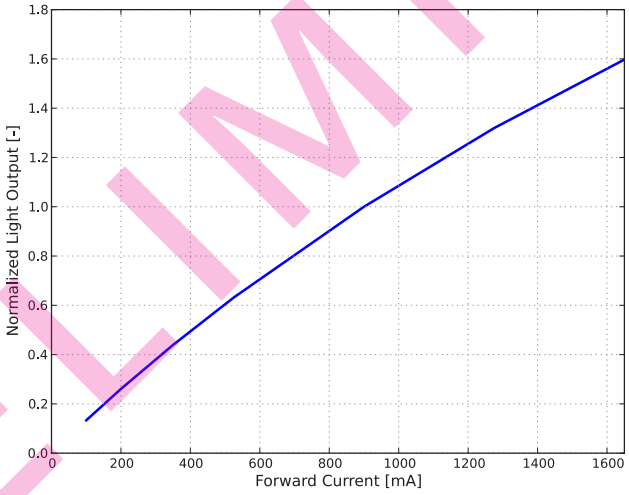
Figure 2. Typical normalized light output vs. junction temperature for L2C5-xxxx12xxExx00 at specified test current.



L2C5-xxxx1202EH600



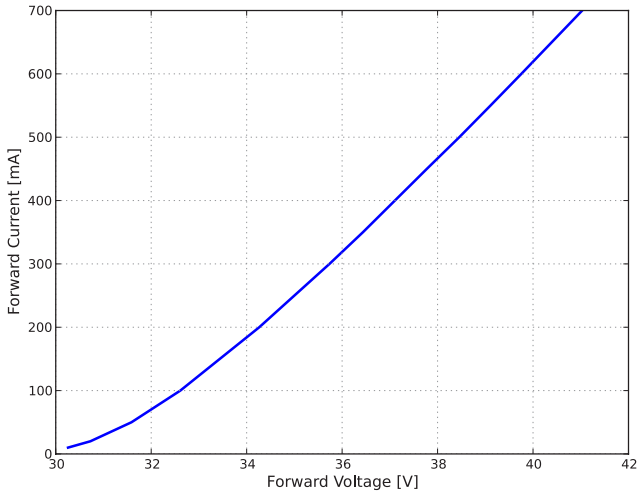
L2C5-xxxx1204E0900



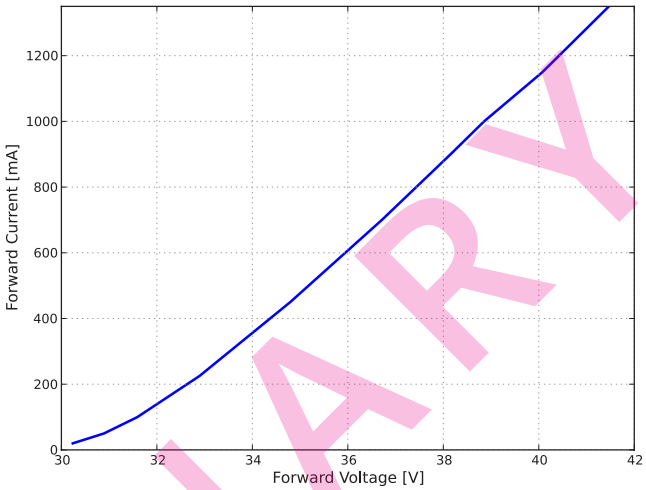
L2C5-xxxx1205E1100

Figure 3. Typical normalized light output vs. forward current for LUXEON CoB Core Range (High Density) at T_j=85°C.

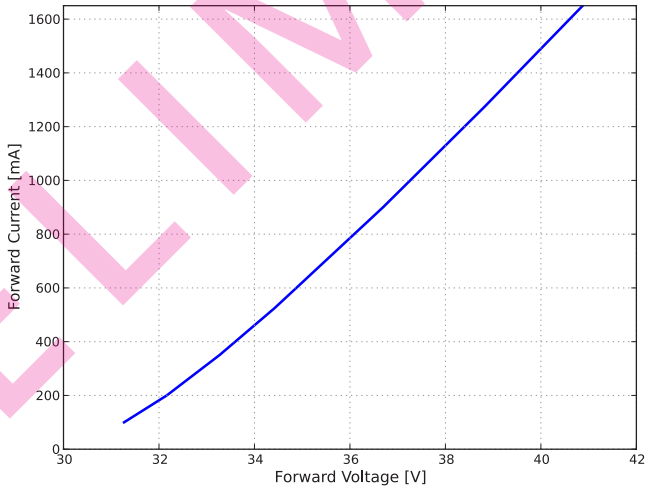
Forward Current Characteristics



L2C5-xxxx1202EH600



L2C5-xxxx1204E0900



L2C5-xxxx1205E1100

Figure 4. Typical forward current vs. forward voltage for LUXEON CoB Core Range (High Density) at T_j=85°C.

Radiation Pattern Characteristics

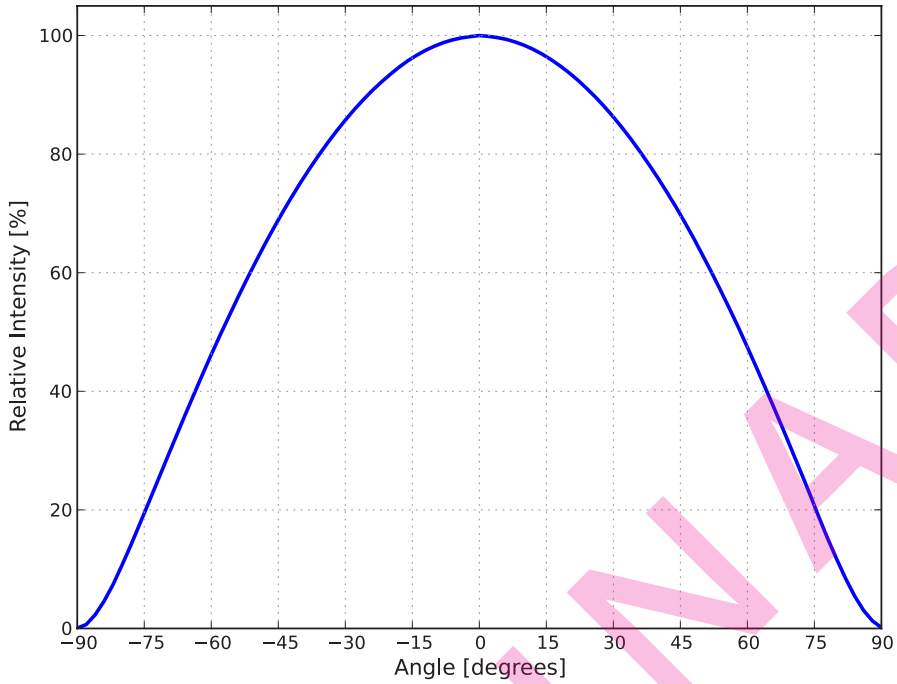


Figure 5. Typical radiation pattern for LUXEON CoB Core Range (High Density) at specified test current, T_j=85ºC.

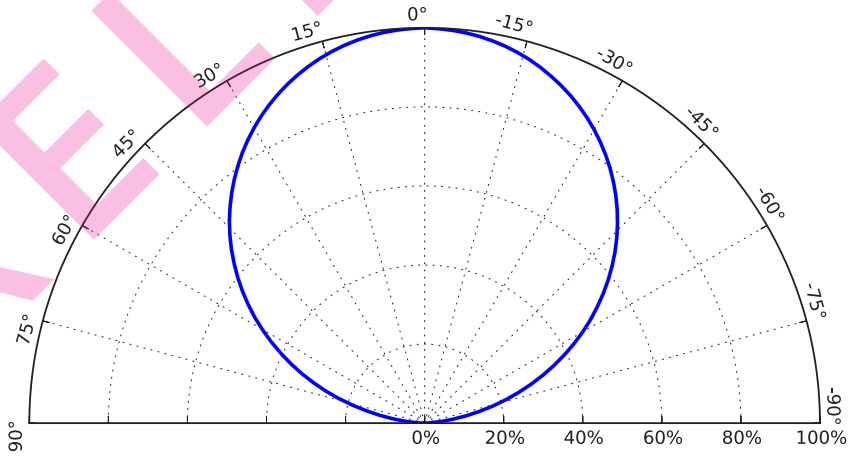


Figure 6. Typical polar radiation pattern for LUXEON CoB Core Range (High Density) at specified test current, T_j=85ºC.

Color Bin Definitions

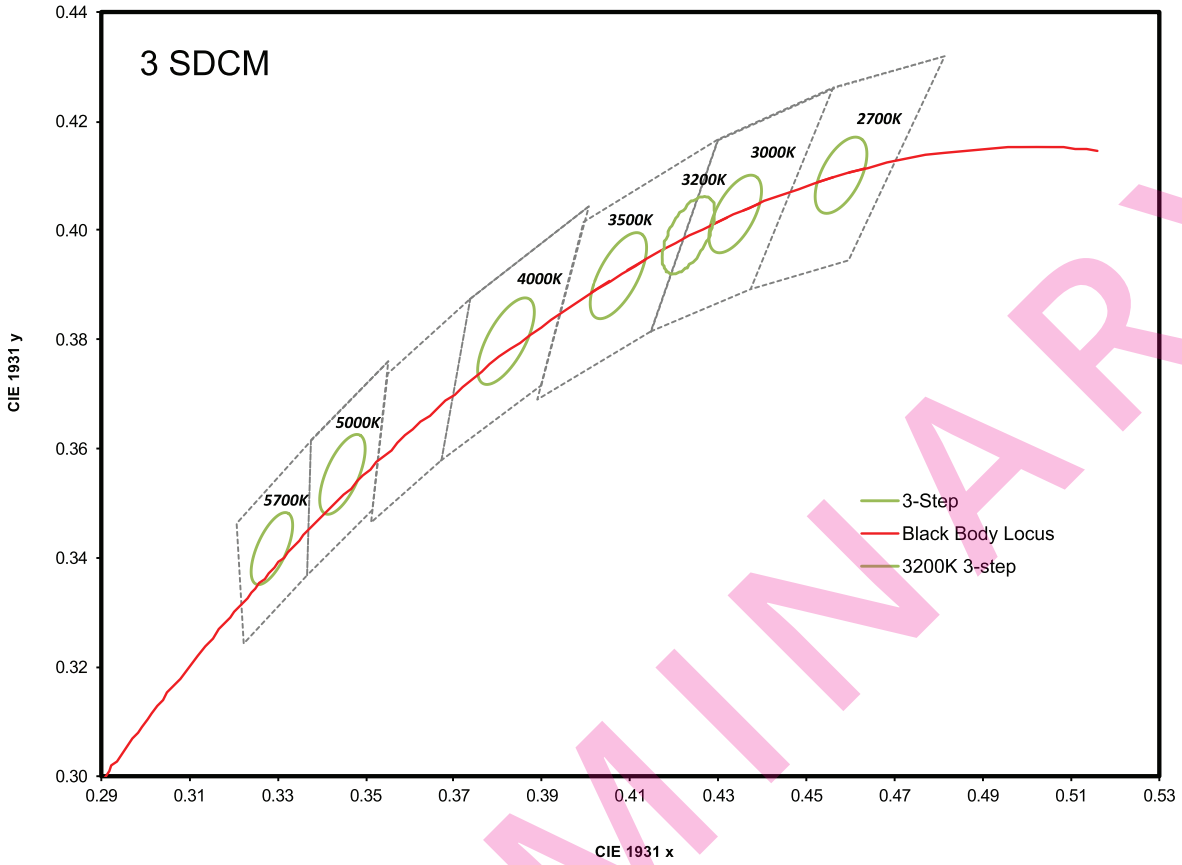


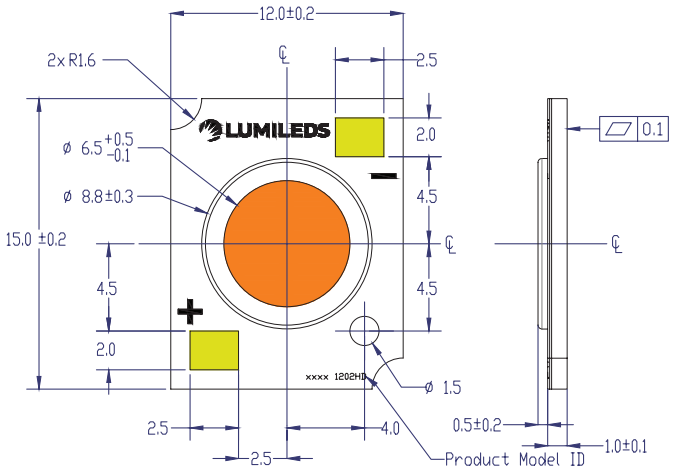
Figure 7. 3-step MacAdam ellipse illustration for Table 5.

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

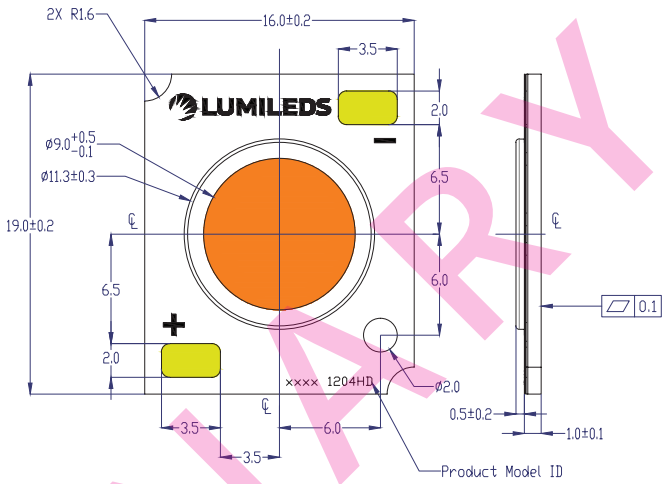
NOMINAL CCT	COLOR SPACE	CENTER POINT [1] (cx, cy)	MAJOR AXIS, a	MINOR AXIS, b	ELLIPSE ROTATION ANGLE, θ
2700K	Single 3-step MacAdam ellipse	(0.4578, 0.4101)	0.00810	0.00420	53.70°
3000K	Single 3-step MacAdam ellipse	(0.4338, 0.4030)	0.00834	0.00408	53.20°
3200K	Single 3-step MacAdam ellipse	(0.4232, 0.3991)	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 ±0.005 on x and y coordinates in the CIE 1931 color space.

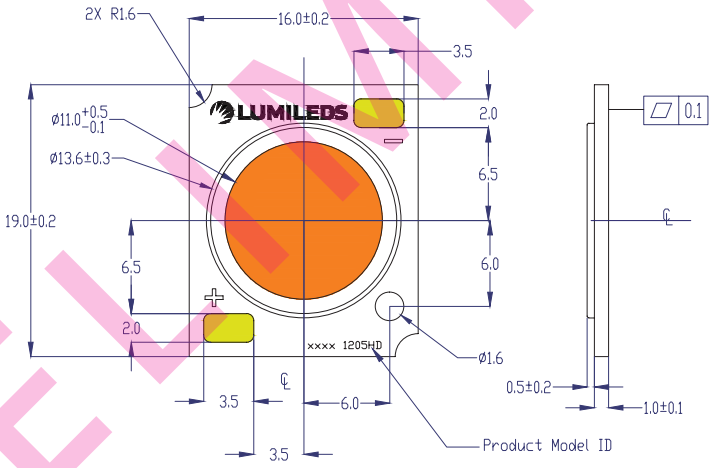
Mechanical Dimensions



L2C5-xxxx1202EH600



L2C5-xxxx1204E0900



L2C5-xxxx1205E1100

Figure 8. Mechanical dimensions for LUXEON CoB Core Range (High Density).

Notes for Figure 8:
1. Drawings are not to scale.
2. All dimensions are in millimeters.

Packaging Information

LUXEON CoB Core Range (High Density) 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 (High Density).

PART NUMBER	TOTAL UNITS PER TUBE	TOTAL TUBES PER INNER BOX	TOTAL UNITS PER INNER BOX
L2C5-xxxx1202EH600	20	5	100
L2C5-xxxx1204E0900	20	5	100
L2C5-xxxx1205E1100	20	5	100

Tube Dimensions

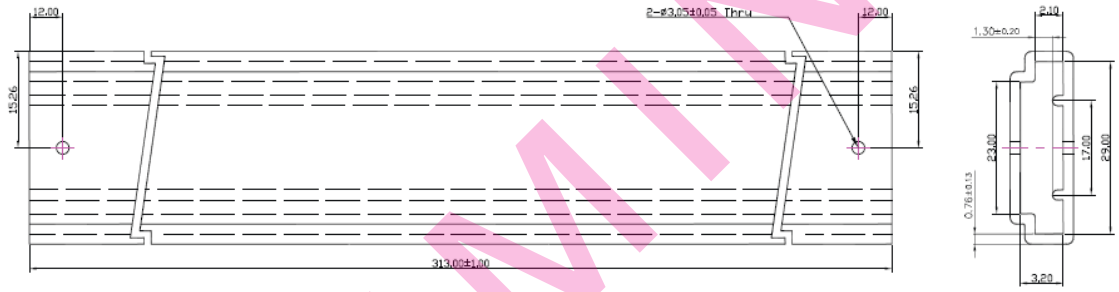


Figure 9a. Tube dimensions for L2C5-xxxx1202EH600.

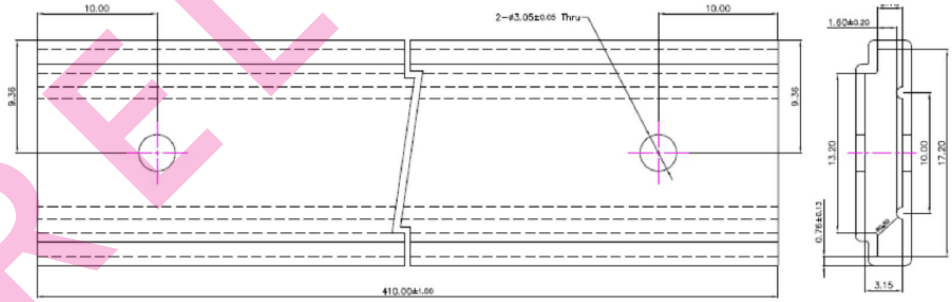


Figure 9b. Tube dimensions for L2C5-xxxx1204E0900 and L2C5-xxxx1205E1100.

Notes for Figures 9a and 9b:
1. Drawings 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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