LUMILEDS

ILLUMINATION

LUXEON CoB Core Range High Density Gen 3

Double the flux in the same form factor

LUXEON CoB Core Range High Density focuses on achieving the highest Center Beam Candle Power (CBCP). 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 smallest LES
- 2-step and 3-step MacAdam ellipse color definition: Freedom from Binning for color consistency from luminaire to luminaire
- Superior thermal resistance, enabling smaller heatsinks and higher lumens
- Supported by a comprehensive optical, mechanical and electrical ecosystem

PRIMARY APPLICATIONS

- Spotlights
- Track Lights
- Downlights

ATG D ATG E ATG F cULus No. E352519 RoHS COMPLIANT

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General Product Information

Product Test Conditions

LUXEON CoB Core Range High Density Gen 3 LEDs are tested and binned with a DC drive current specified below at a junction temperature, T_j, of 85°C:

350mA – L2C5-AABBCL02FH600
700mA – L2C5-AABBCL04FH900
900mA – L2C5-AABBCL05FHB00

Part Number Nomenclature

Part numbers for LUXEON CoB Core Range High Density Gen 3 follow the convention below:

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

Where:

A A – designates nominal CCT (24=2400K, 27=2700K, 30=3000K, 35=3500K, 40=4000K, 50=5000K)

B B – designates minimum CRI (80=80CRI, 90=90CRI)

C – designates SDCM (2=2-step MacAdam, 3=3-step MacAdam)

D D D – designates product configuration (example: L02=1202, L04=1204, L05=1205)

E – designates options for product specification

F F – designates light emitting surface (LES) size (6=6.5mm, 9=9mm, A=11mm)

G G – designates options for product specification

Therefore, the following part number is used for a LUXEON CoB Core Range High Density Gen 3, 1202, 3000K 90CRI, 3 SDCM with a 6mm LES:

L 2 C 5 – **3 0 9 0 3 L 0 2 F H 6 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 Holding B.V. is committed to providing environmentally friendly products to the solid-state lighting market. LUXEON CoB Core Range High Density Gen 2 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 Holding B.V. 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 Gen 3 at specified test current, T_j=85°C

LES [1] (mm)	NOMINAL CCT	MINIMUM CRI [2, 3, 4]	LUMINOUS FLUX [2] (lm)		TYPICAL LUMINOUS EFFICACY (lm/W)	TEST CURRENT (mA)	ENERGY EFFICIENCY CLASS [5]	PART NUMBER
			MINIMUM	TYPICAL				
6.5	2400K	80	1409	1565	124	350	E	L2C5-2480xL02FH600
6.5	2700K	80	1493	1659	132	350	E	L2C5-2780xL02FH600
6.5	3000K	80	1571	1746	139	350	E	L2C5-3080xL02FH600
6.5	3500K	80	1593	1770	140	350	E	L2C5-3580xL02FH600
6.5	4000K	80	1661	1845	146	350	D	L2C5-4080xL02FH600
6.5	5000K	80	1661	1845	146	350	D	L2C5-5080xL02FH600
6.5	2400K	90	1213	1348	107	350	F	L2C5-2490xL02FH600
6.5	2700K	90	1287	1430	113	350	F	L2C5-2790xL02FH600
6.5	3000K	90	1350	1500	119	350	E	L2C5-3090xL02FH600
6.5	3500K	90	1363	1514	120	350	E	L2C5-3590xL02FH600
6.5	4000K	90	1386	1540	122	350	E	L2C5-4090xL02FH600
6.5	5000K	90	1386	1540	122	350	E	L2C5-5090xL02FH600
9	2400K	80	2817	3130	124	700	E	L2C5-2480xL04FH900
9	2700K	80	2986	3318	132	700	E	L2C5-2780xL04FH900
9	3000K	80	3105	3450	137	700	E	L2C5-3080xL04FH900
9	3500K	80	3186	3540	140	700	E	L2C5-3580xL04FH900
9	4000K	80	3321	3690	146	700	D	L2C5-4080xL04FH900
9	5000K	80	3321	3690	146	700	D	L2C5-5080xL04FH900
9	2400K	90	2444	2715	108	700	F	L2C5-2490xL04FH900
9	2700K	90	2592	2880	114	700	F	L2C5-2790xL04FH900
9	3000K	90	2714	3015	120	700	E	L2C5-3090xL04FH900
9	3500K	90	2784	3093	123	700	E	L2C5-3590xL04FH900
9	4000K	90	2834	3149	125	700	E	L2C5-4090xL04FH900
9	5000K	90	2834	3149	125	700	E	L2C5-5090xL04FH900
11	2400K	80	3612	4013	124	900	E	L2C5-2480xL05FHA00
11	2700K	80	3829	4254	131	900	E	L2C5-2780xL05FHA00
11	3000K	80	3979	4421	136	900	E	L2C5-3080xL05FHA00
11	3500K	80	4138	4598	142	900	E	L2C5-3580xL05FHA00
11	4000K	80	4152	4613	142	900	E	L2C5-4080xL05FHA00
11	5000K	80	4152	4613	142	900	E	L2C5-5080xL05FHA00
11	2400K	90	3186	3540	109	900	F	L2C5-2490xL05FHA00
11	2700K	90	3337	3708	114	900	F	L2C5-2790xL05FHA00
11	3000K	90	3555	3950	122	900	E	L2C5-3090xL05FHA00
11	3500K	90	3601	4001	123	900	E	L2C5-3590xL05FHA00
11	4000K	90	3706	4118	127	900	E	L2C5-4090xL05FHA00
11	5000K	90	3706	4118	127	900	E	L2C5-5090xL05FHA00

Notes for Table 1:
1. Light Emitting Surface (LES) is the inner diameter (phosphor area) inside the dam.
2. Lumileds maintains a tolerance of ±2 on CRI and ±6.5% on luminous flux measurements.
3. Typical CRI is approximately 2 points higher than the minimum CRI specified, but this is not guaranteed.
4. R9 value of 90CRI products are >50.
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 High Density Gen 3 at specified test current, T_j=85°C

PART NUMBER	TYPICAL TOTAL INCLUDED ANGLE [1]	TYPICAL VIEWING ANGLE [2]
L2C5-xxxxxLxxFHx00	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 Gen 3 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-xxxxxL02FH600	34.2	36.0	37.8	-16	0.75
L2C5-xxxxxL04FH900	34.2	36.0	37.8	-16	0.37
L2C5-xxxxxL05FHA00	34.2	36.0	37.8	-16	0.28

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 Gen 3

PARAMETER	PERFORMANCE
DC Forward Current [1, 2]	1202 HD: 675mA 1204 HD: 1350mA 1205 HD: 1650mA
LED Junction Temperature [1] (DC & Pulse)	150°C
ESD Sensitivity (ANSI/ESDA/JEDEC JS-001-2012)	8 kV
Operating Case Temperature [1]	-40°C to 105°C
LED Storage Temperature	-40°C to 120°C
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 20% of the maximum allowable DC forward current

Characteristic Curves

Spectral Power Distribution Characteristics

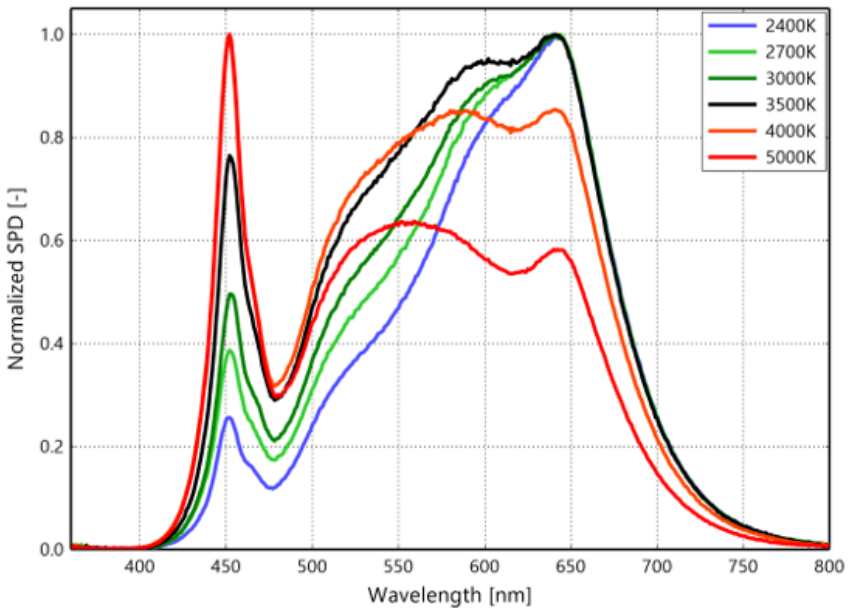

Figure 1a. Typical normalized power vs. wavelength for L2C5-xx80xLxxFHx00 at specified test current, T_j=85°C

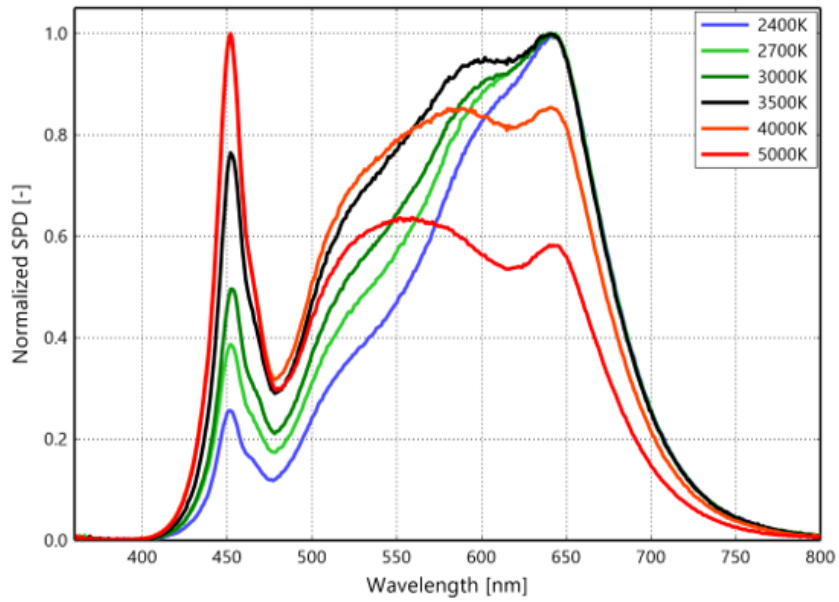

Figure 1b. Typical normalized power vs. wavelength for L2C5-xx90xLxxFHx00 at specified test current, T_j=85°C

Light Output Characteristics

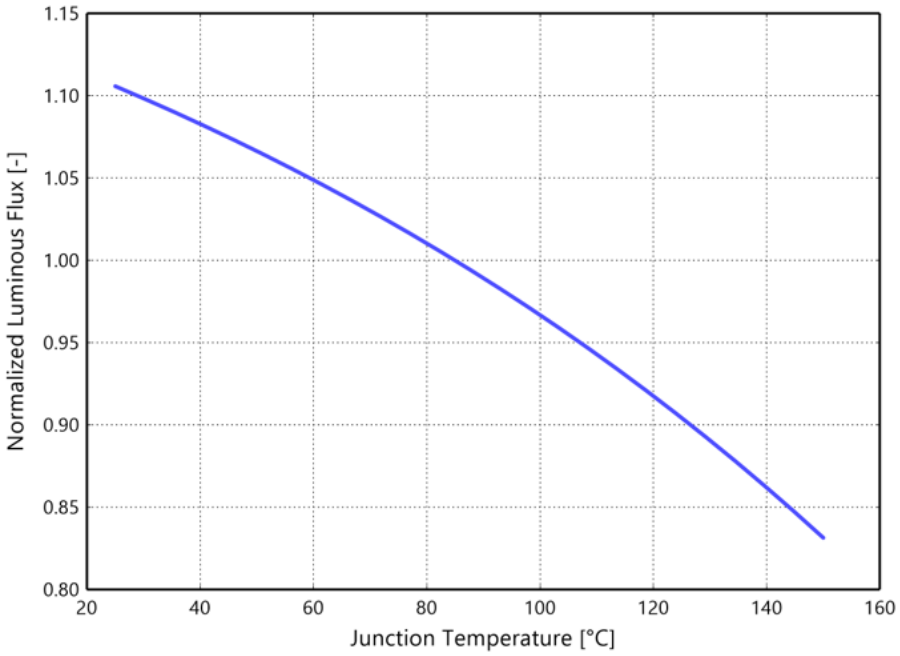

Figure 2. Typical normalized light output vs. junction temperature for L2C5-xxxxxLxxFHx00 at specified test current

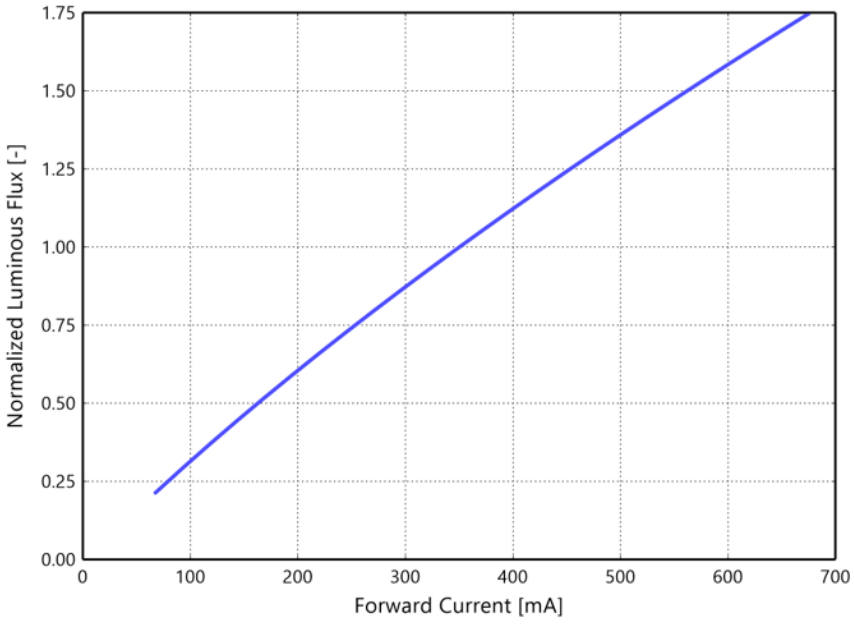

Figure 3a. Typical normalized light output vs. forward current for L2C5-xxxxxL02FH600 at T_j =85°C

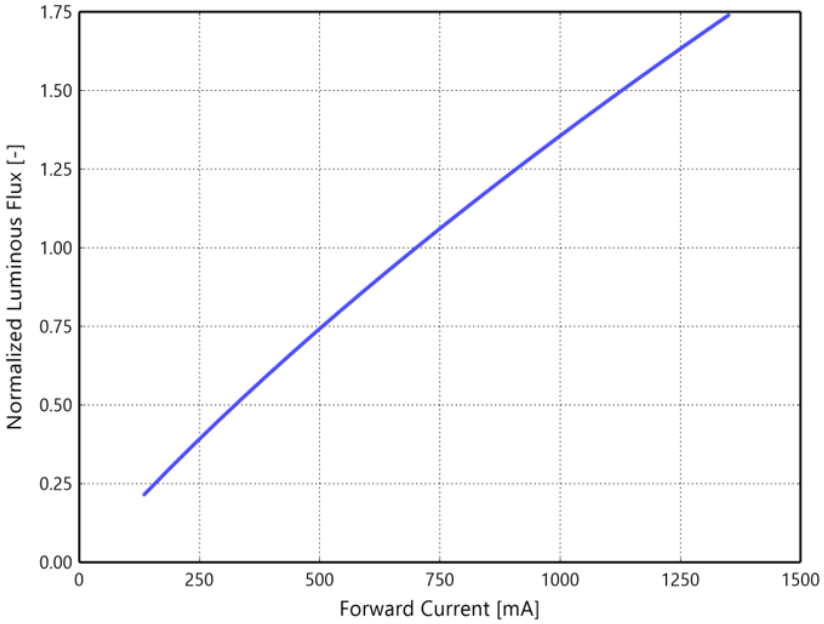

Figure 3b. Typical normalized light output vs. forward current for L2C5-xxxxxL04FH900 at T_j =85°C

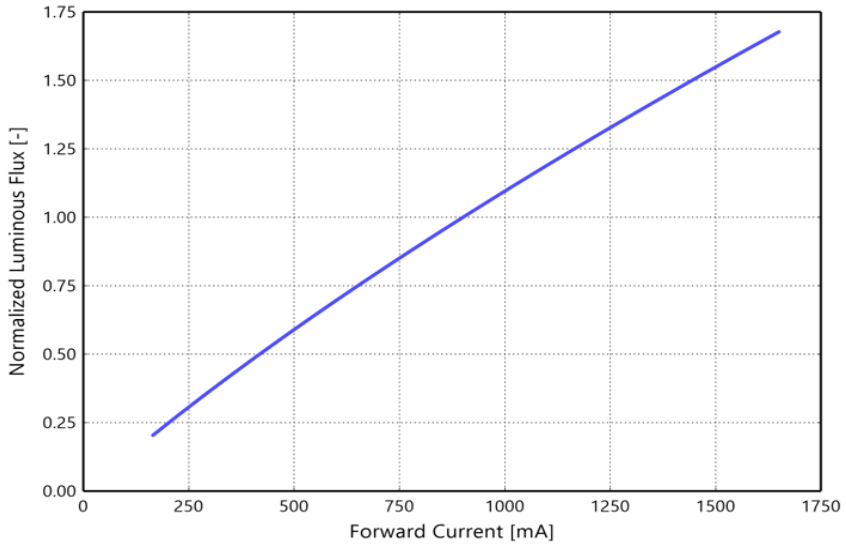

Figure 3c. Typical normalized light output vs. forward current for L2C5-xxxxxL05FHA00 at T_j =85°C

Forward Current Characteristics

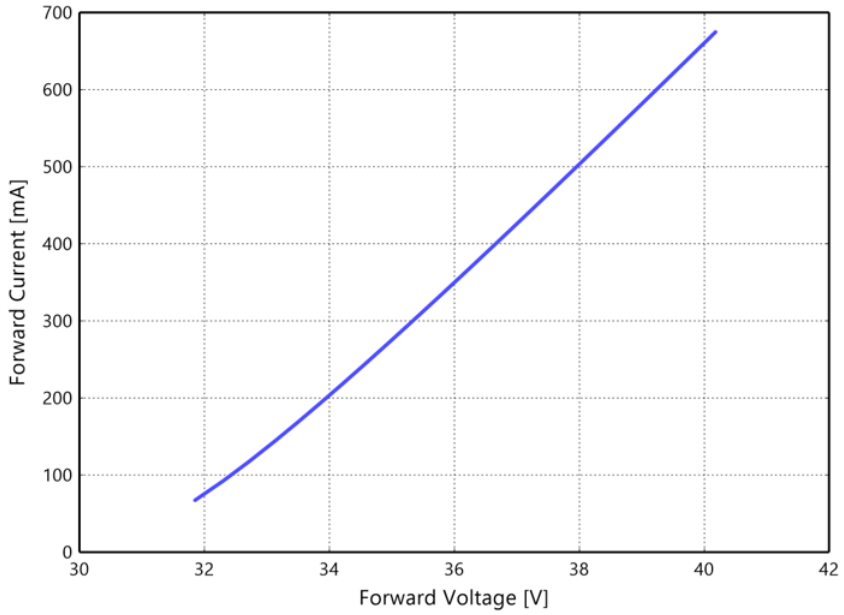

Figure 4a. Typical forward current vs. forward voltage for L2C5-xxxxxL02FH600 at T_j=85°C

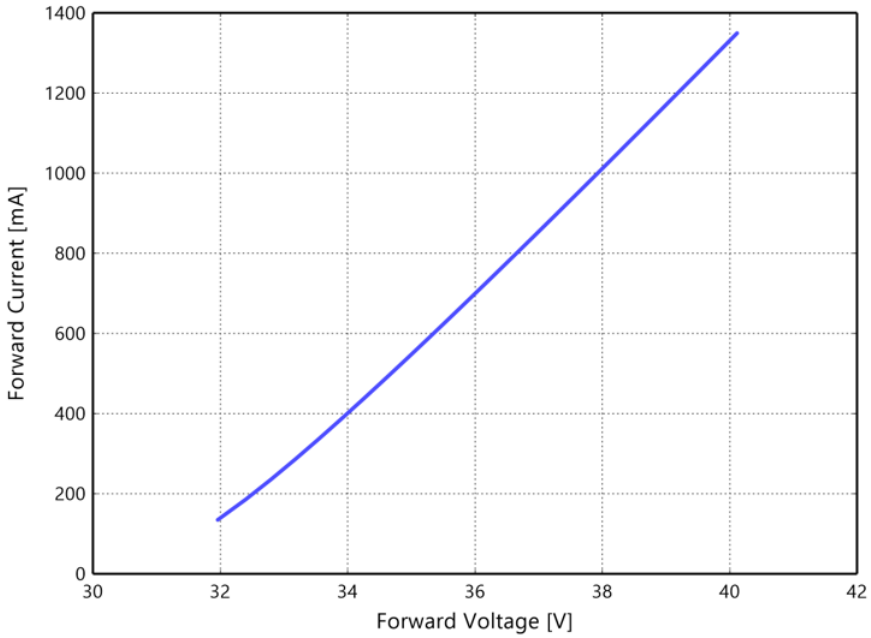

Figure 4b. Typical forward current vs. forward voltage for L2C5-xxxxxL04FH900 at T_j=85°C

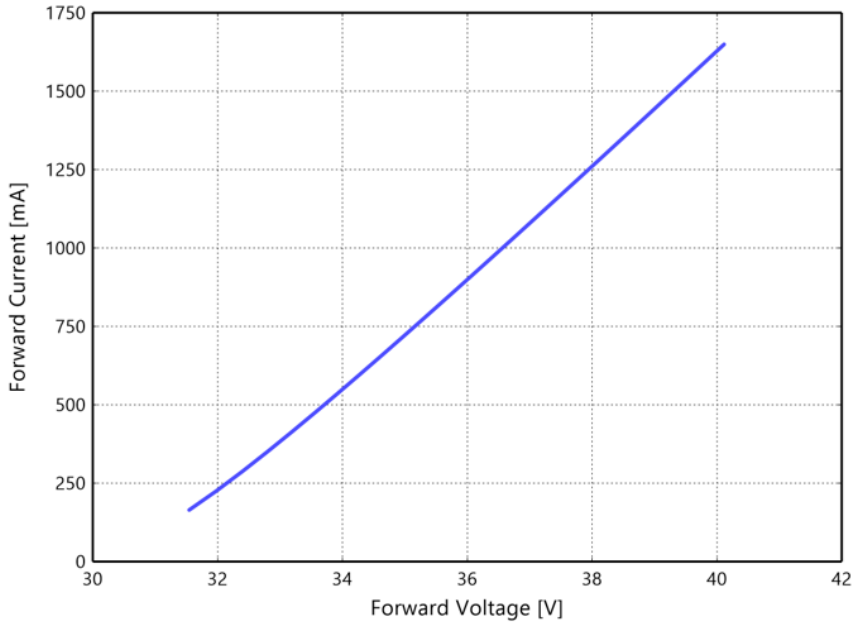

Figure 4c. Typical forward current vs. forward voltage for L2C5-xxxxxL05FHA00 at T_j=85°C

Radiation Pattern Characteristics

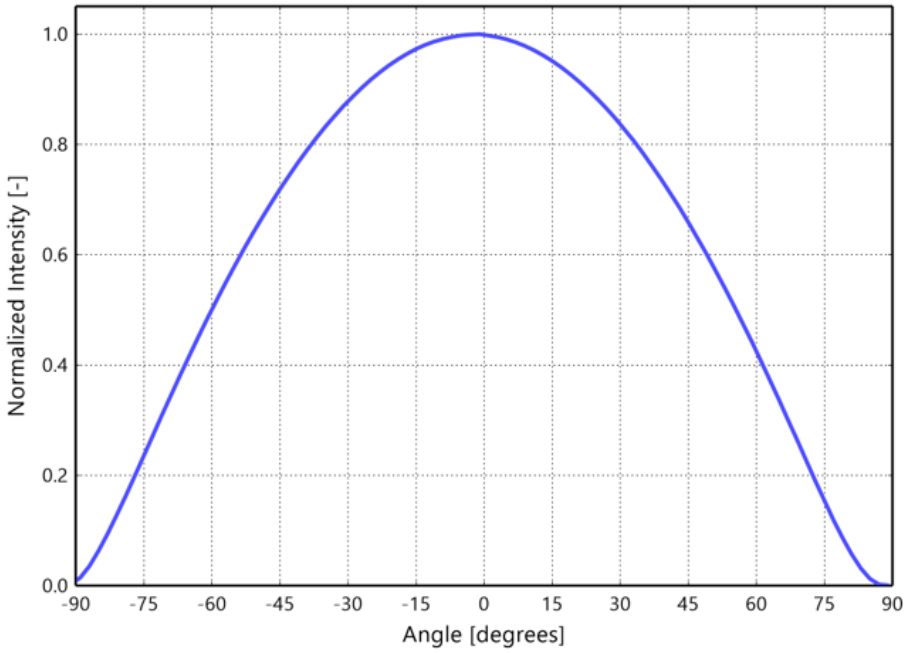

Figure 5. Typical radiation pattern for LUXEON CoB Core Range High Density Gen 3 at specified test current, T_j=85°C

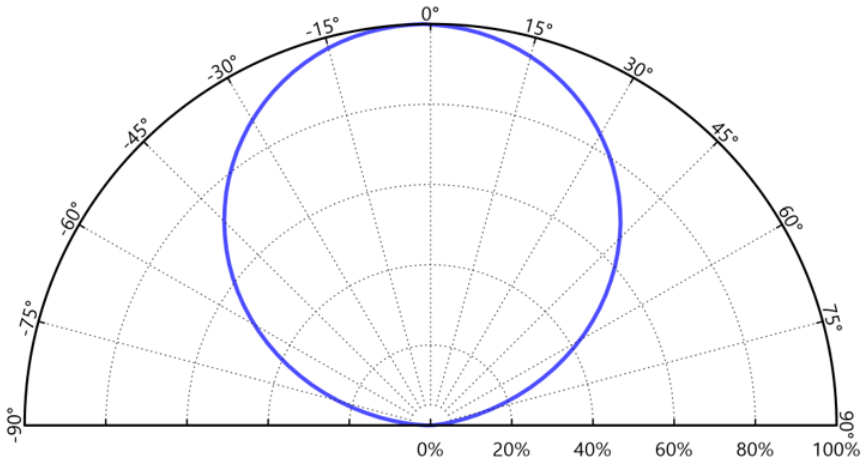

Figure 6. Typical polar radiation pattern for LUXEON CoB Core Range High Density Gen 3 at specified test current, T_j=85°C

Color Bin Definitions

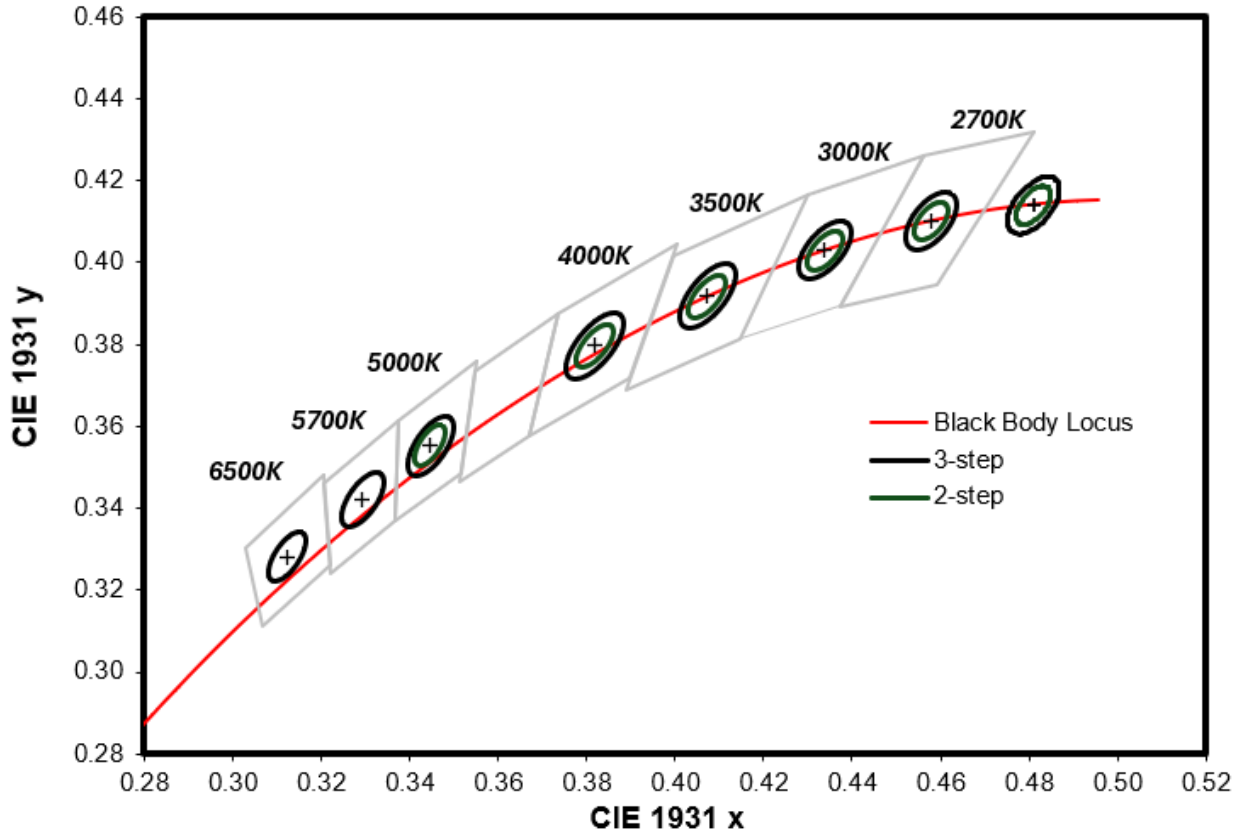

Figure 7. 3-step MacAdam ellipse illustration for Table 5

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

NOMINAL CCT	COLOR SPACE	CENTER POINT [1] (cx, cy)	MAJOR AXIS, a		MINOR AXIS, b		ELLIPSE ROTATION ANGLE, θ
			2-step	3-step	2-step	3-step	
2400K	2-step, 3-step MacAdam ellipse	(0.4810, 0.4140)	0.00540	0.00810	0.00280	0.00420	53.70°
2700K	2-step, 3-step MacAdam ellipse	(0.4578, 0.4101)	0.00540	0.00810	0.00280	0.00420	53.70°
3000K	2-step, 3-step MacAdam ellipse	(0.4338, 0.4030)	0.00556	0.00834	0.00272	0.00408	53.22°
3500K	2-step, 3-step MacAdam ellipse	(0.4073, 0.3917)	0.00618	0.00927	0.00276	0.00414	54.00°
4000K	2-step, 3-step MacAdam ellipse	(0.3818, 0.3797)	0.00626	0.00939	0.00268	0.00402	53.72°
5000K	2-step, 3-step MacAdam ellipse	(0.3447, 0.3553)	0.00548	0.00822	0.00236	0.00354	59.62°

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

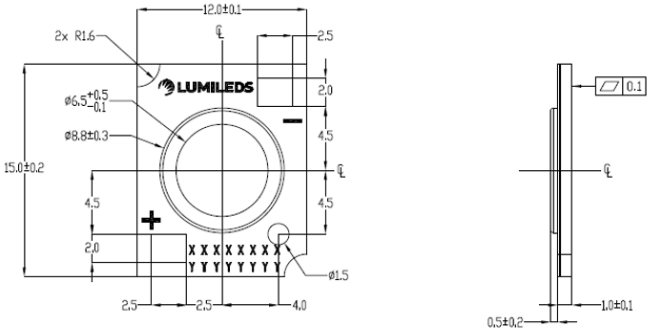

Figure 8a. Mechanical dimensions for L2C5-xxxxxL02FH600 (LES 6.5 mm)

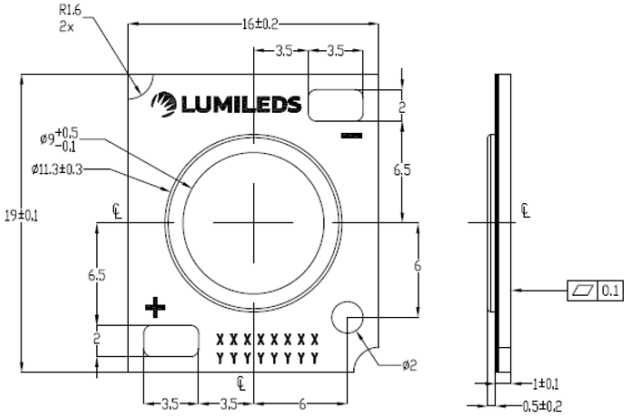

Figure 8b. Mechanical dimensions for L2C5-xxxxxL04F0900 (LES 9 mm)

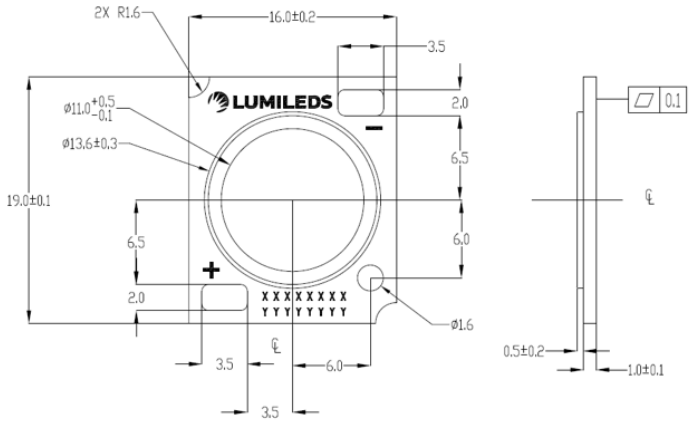

Figure 8c. Mechanical dimensions for L2C5-xxxxxL05FHA00 (LES 11 mm)

Packaging Information

LUXEON CoB Core Range High Density Gen 3 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 Gen 3

PART NUMBER	TOTAL UNITS PER TUBE	TOTAL TUBES PER INNER BOX	TOTAL UNITS PER INNER BOX
L2C5-xxxxxL02FH600	20	5	100
L2C5-xxxxxL04FH900	20	5	100
L2C5-xxxxxL05FHA00	20	5	100

Tube Dimensions

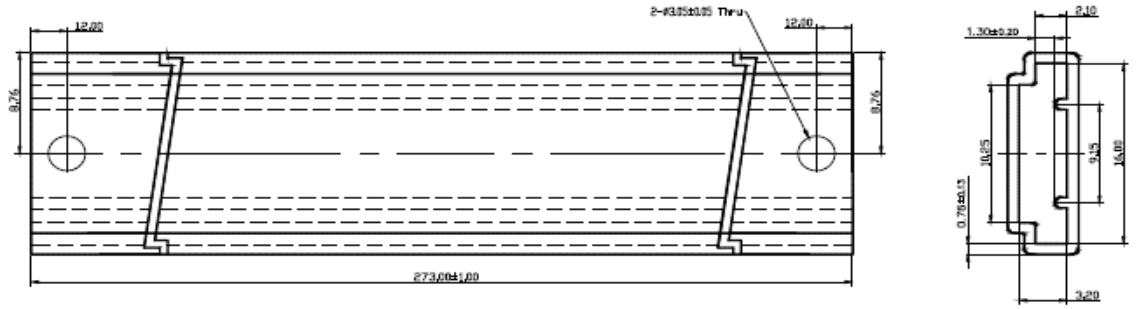

Figure 9a. Tube dimensions for L2C5-xxxxxL02FH6xx

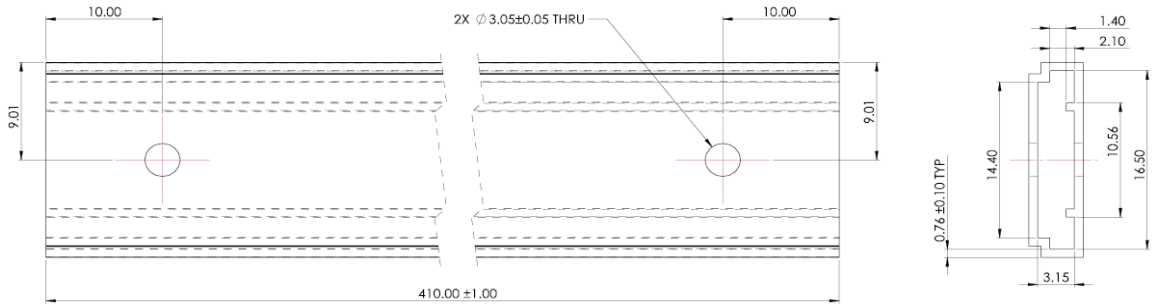

Figure 9b. Tube dimensions for L2C5-xxxxxL04H09xx and L2C5-xxxxxL05FHBxx

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

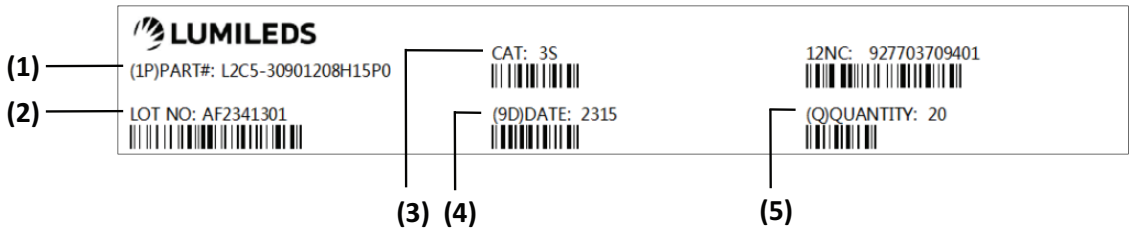

Figure 10. Example of a tube label

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. LED test date in YYWW format
5. Number of LED emitters in a tube.

Inner Box

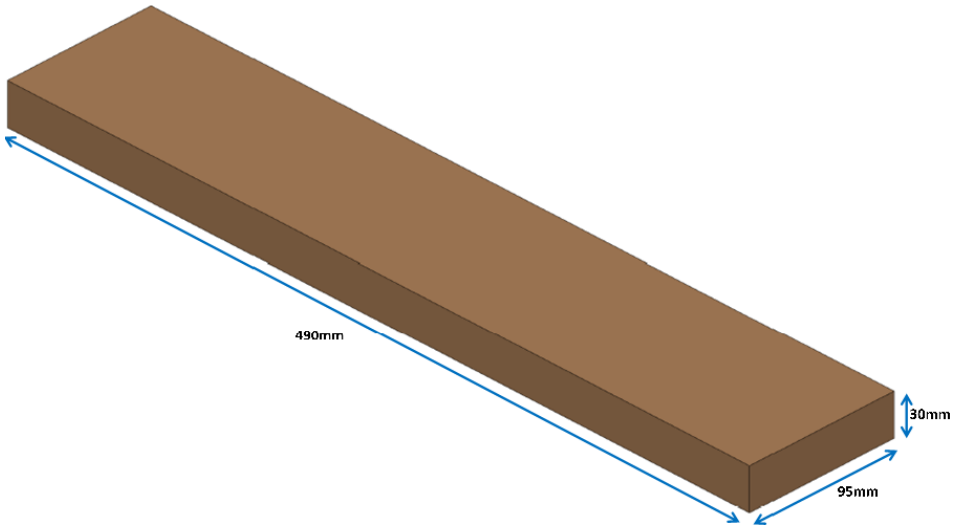

Figure 11. Dimensions for inner box packaging

Table 7. Inner box information

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 High Density Gen 2

Notes for Figure 12 – Inner Box Label descriptions for customer use:
Field labels not described are for Lumileds internal use only.

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

Outer Box

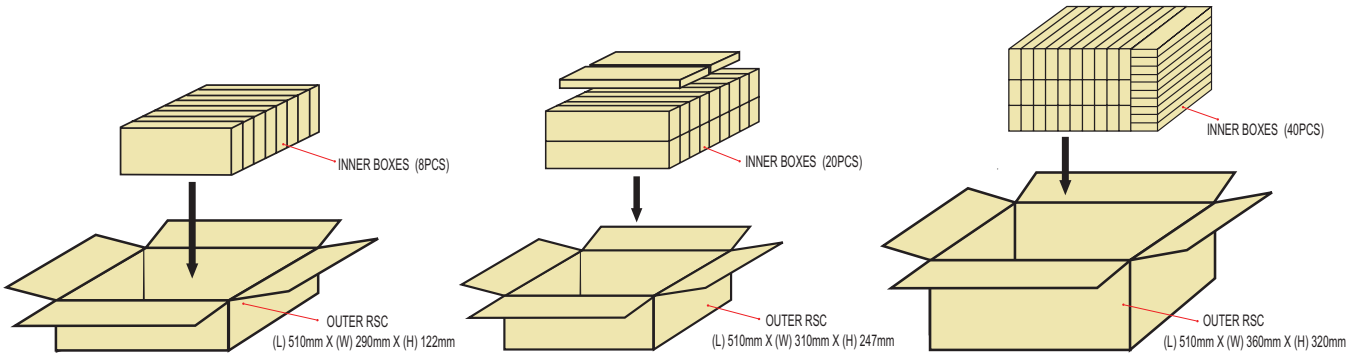

Figure 13. Dimensions for outer box packaging

Table 8. Outer box information

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

Notes for Figure 14 – Outer Box Label descriptions for customer use:
Field labels not described are for Lumileds internal use only.
1. Lumileds part number.
2. Customer part number for custom requests only.
3. Unique production lot identification number. This number is required for traceability purpose.
4. Total number of LED emitters in a shipment box.

About Lumileds

Lumileds is a global leader in LED and microLED technology, innovation, and solutions for the automotive, display, illumination, mobile, and other markets where light sources are essential. Our approximately 3,500 employees operate in over 15 countries and partner with our customers to deliver never before possible solutions for lighting, safety, and well-being.

To learn more about our lighting solutions, visit lumileds.com.