LUXEON SunPlus CoB Line

LEDs for ease of design and high PPF density for a deep penetration into the plant canopy

LUXEON SunPlus CoB Line LEDs are purpose-built to enable ease of system design for Horticulture applications. LUXEON SunPlus CoB Line offers the only CoBs available today that are binned and tested based on Photosynthetic Photon Flux (PPF). LUXEON SunPlus CoB Line includes three different sizes: 1208 with an LES of 15mm, 1211 with an LES of 19mm, and 1825 with an LES of 32mm.

**FEATURES AND BENEFITS**

<table>
<thead>
<tr>
<th></th>
<th>PRIMARY APPLICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>115° angle for directional light distribution for greenhouse applications</td>
<td>Horticulture</td>
</tr>
<tr>
<td>Ideal solution for more directional horticulture applications that require a high light output and wattage</td>
<td></td>
</tr>
</tbody>
</table>
# Table of Contents

**General Product Information** ................................................................. 2  
- Product Test Conditions ........................................................................... 2  
- Part Number Nomenclature .................................................................... 2  
- Lumen Maintenance .................................................................................. 2  
- Environmental Compliance ..................................................................... 2  
- Performance Characteristics ................................................................. 3  
- Product Selection Guide ......................................................................... 3  
- Optical Characteristics .......................................................................... 3  
- Electrical and Thermal Characteristics .................................................. 3  

**Absolute Maximum Ratings** .................................................................. 4  

**Characteristic Curves** ......................................................................... 4  
- Spectral Power Distribution Characteristics ........................................ 4  
- Photon Output Characteristics ............................................................... 5  
- Forward Current Characteristics ............................................................ 7  
- Radiation Pattern Characteristics .......................................................... 9  

**Mechanical Dimensions** ...................................................................... 10  

**Packaging and Labeling Information** .................................................... 11  
- Tube ................................................................................................... 12  
- Inner Box .............................................................................................. 13  
- Outer Box .............................................................................................. 14
General Product Information

Product Test Conditions
LUXEON SunPlus CoB Line LEDs are tested and binned with a DC drive current specified below at a junction temperature, $T_J$, of 85°C:

- 900mA – LUXEON CoB 1208
- 1200mA – LUXEON CoB 1211
- 2250mA – LUXEON CoB 1825

Part Number Nomenclature
Part numbers for LUXEON SunPlus CoB Line 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 product type (SP=SunPlus)
- B B – designates color (P1=Purple, R1=Rose)
- C C C C – designates product configuration (example: 1208, 1211, 1825)
- D – designates options for product specification
- E E – designates light emitting surface (LES) size (15=15mm, 19=19mm, 32=32mm)
- F F – designates options for product specification

Therefore, the following part number is used for a LUXEON SunPlus CoB 1211 with a 19mm LES:

L 2 C 5 – S P P 1 1 2 1 1 E 1 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 SunPlus CoB Line 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 SunPlus CoB Line at specified test current, $T_j=85^\circ$C.

<table>
<thead>
<tr>
<th>PRODUCT</th>
<th>COLOR</th>
<th>PPF (µmol/s)(^{(1)}) in PAR (400 TO 700nm)(^{(2)})</th>
<th>TEST CURRENT (mA)</th>
<th>LES (^{(3)}) (mm)</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>LUXEON SunPlus CoB 1208</td>
<td>Purple</td>
<td>47.70</td>
<td>900</td>
<td>15</td>
<td>L2C5-SPP11208E1500</td>
</tr>
<tr>
<td>LUXEON SunPlus CoB 1211</td>
<td>(12.5% Blue)(^{(4)})</td>
<td>63.90</td>
<td>1200</td>
<td>19</td>
<td>L2C5-SPP11211E1900</td>
</tr>
<tr>
<td>LUXEON SunPlus CoB 1825</td>
<td></td>
<td>179.10</td>
<td>2250</td>
<td>32</td>
<td>L2C5-SPP11825G3200</td>
</tr>
<tr>
<td>LUXEON SunPlus CoB 1825</td>
<td>Rose</td>
<td>180.00</td>
<td>2250</td>
<td>32</td>
<td>L2C5-SPR11825G3200</td>
</tr>
</tbody>
</table>

Notes for Table 1:
1. Lumileds maintains a tolerance of ±6.5% on µmol/s for LUXEON SunPlus CoB Line.
2. PAR is the photosynthetic active radiation from 400 to 700nm.
3. Light emitting surface (LES) is the inner diameter (phosphor area) inside the dam.
4. PPF in blue spectrum (420–480nm) ranges from 10–15% of total PPF in PAR (400–700nm). Typical PPF in the blue spectrum is 12.5%.

Optical Characteristics

Table 2. Optical characteristics for LUXEON SunPlus CoB Line at specified test current, $T_j=85^\circ$C.

<table>
<thead>
<tr>
<th>PART NUMBER</th>
<th>TYPICAL TOTAL INCLUDED ANGLE (^{(1)})</th>
<th>TYPICAL VIEWING ANGLE (^{(2)})</th>
</tr>
</thead>
<tbody>
<tr>
<td>L2C5-SPx1xxxxxx00</td>
<td>135°</td>
<td>115°</td>
</tr>
</tbody>
</table>

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 SunPlus CoB Line at specified test current, $T_j=85^\circ$C.

<table>
<thead>
<tr>
<th>PART NUMBER</th>
<th>FORWARD VOLTAGE (^{(1)})(V(_F))</th>
<th>TYPICAL TEMPERATURE COEFFICIENT OF FORWARD VOLTAGE (^{(2)})(mV/°C)</th>
<th>TYPICAL THERMAL RESISTANCE—JUNCTION TO CASE (^{(3)})(°C/W)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MINIMUM</td>
<td>TYPICAL</td>
<td>MAXIMUM</td>
</tr>
<tr>
<td>L2C5-SPx11208E1500</td>
<td>32.5</td>
<td>34.8</td>
<td>37.5</td>
</tr>
<tr>
<td>L2C5-SPx11211E1900</td>
<td>32.5</td>
<td>34.8</td>
<td>37.5</td>
</tr>
<tr>
<td>L2C5-SPx11825G3200</td>
<td>48.8</td>
<td>51.7</td>
<td>56.3</td>
</tr>
</tbody>
</table>

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 SunPlus CoB Line.

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>MAXIMUM PERFORMANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC Forward Current [1,2]</td>
<td>2x test current [1]</td>
</tr>
<tr>
<td>LED Junction Temperature [1](DC &amp; Pulse)</td>
<td>125°C</td>
</tr>
<tr>
<td>ESD Sensitivity (ANSI/ESDA/JEDEC JS-001-2012)</td>
<td>Class 3B</td>
</tr>
<tr>
<td>Operating Case Temperature [1]</td>
<td>-40°C to 105°C</td>
</tr>
<tr>
<td>LED Storage Temperature</td>
<td>-40°C to 120°C</td>
</tr>
<tr>
<td>Allowable Reflow Cycles</td>
<td>3</td>
</tr>
<tr>
<td>Reverse Voltage (VRMS)</td>
<td>LUXEON LEDs are not designed to be driven in reverse bias</td>
</tr>
</tbody>
</table>

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

![Spectral Power Distribution](image)

Figure 1. Typical normalized power vs. wavelength for LUXEON SunPlus CoB Line at specified test current, Tj=85°C.
Photon Output Characteristics

Figure 2a. Typical normalized photon output vs. junction temperature for LUXEON SunPlus CoB Line at specified test current, $T_j=85^\circ$C.

Figure 2b. Typical normalized photon output vs. forward current for L2C5-SPx11208E1500 at specified test current, $T_j=85^\circ$C.
Figure 2c. Typical normalized photon output vs. forward current for L2C5-SPx11211E1900 at specified test current, $T_j=85^\circ C$.

Figure 2d. Typical normalized photon output vs. forward current for L2C5-SPx11825G3200 at specified test current, $T_j=85^\circ C$. 
Forward Current Characteristics

Figure 3a. Typical forward current vs. forward voltage for L2C5-SPx11208E1500 at $T_j=85^\circ$C.

Figure 3b. Typical forward current vs. forward voltage for L2C5-SPx11211E1900 at $T_j=85^\circ$C.
Figure 3c. Typical forward current vs. forward voltage for L2C5-SPx11825G3200 at $T_j=85^\circ C$. 
Radiation Pattern Characteristics

Figure 4. Typical radiation pattern for LUXEON SunPlus CoB Line at specified test current, $T_j=85^\circ C$.

Figure 5. Typical polar radiation pattern for LUXEON SunPlus CoB Line at specified test current, $T_j=85^\circ C$. 
Figure 6a. Mechanical dimensions for L2C5-SPx11208E1500.

Figure 6b. Mechanical dimensions for L2C5-SPx11211E1900.

Notes for Figures 6a and 6b:
1. Drawings not to scale.
2. All dimensions are in millimeters.
Packaging and Labeling Information

LUXEON SunPlus CoB Line 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>
<thead>
<tr>
<th>PART NUMBER</th>
<th>TOTAL UNITS PER TUBE</th>
<th>TOTAL TUBES PER INNER BOX</th>
<th>TOTAL UNITS PER INNER BOX</th>
</tr>
</thead>
<tbody>
<tr>
<td>L2C5-xxxx1208E1500</td>
<td>20</td>
<td>5</td>
<td>100</td>
</tr>
<tr>
<td>L2C5-xxxx1211E1900</td>
<td>10</td>
<td>5</td>
<td>50</td>
</tr>
<tr>
<td>L2C5-xxxx1825G3200</td>
<td>10</td>
<td>5</td>
<td>50</td>
</tr>
</tbody>
</table>
Notes for Figures 7a, 7b and 7c:
1. Drawings not to scale.
2. All dimensions are in millimeters.

Notes for Figure 8 - Tube Label descriptions for customer use:
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 YYYY format.
Inner Box

Table 6. Inner box information for LUXEON SunPlus CoB Line.

<table>
<thead>
<tr>
<th>BOX TYPE</th>
<th>DIMENSIONS (mm)</th>
<th>AVERAGE WEIGHT (100pcs/box)</th>
<th>AVERAGE WEIGHT (100pcs/box)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inner Box</td>
<td>H: 30, L: 490, W: 95</td>
<td>0.340Kg</td>
<td>0.305Kg</td>
</tr>
</tbody>
</table>

Figure 9. Dimensions for inner box packaging for LUXEON SunPlus CoB Line.

Figure 10. Example of inner box label for LUXEON SunPlus CoB Line.

Notes for Figure 10 – 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.
Outer Box

Figure 11. Dimensions for outer box packaging for LUXEON SunPlus CoB Line.

Table 7. Outer box information for LUXEON SunPlus CoB Line.

<table>
<thead>
<tr>
<th>BOX TYPE</th>
<th>DIMENSIONS (mm)</th>
<th>MAXIMUM INNER BOXES PER OUTER BOX</th>
<th>MAXIMUM QUANTITY PER OUTER BOX</th>
<th>AVERAGE WEIGHT (100pcs/box)</th>
<th>AVERAGE WEIGHT (50pcs/box)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outer Box 8</td>
<td>122 510 290</td>
<td>8</td>
<td>800</td>
<td>3.05kg</td>
<td>2.77kg</td>
</tr>
<tr>
<td>Outer Box 20</td>
<td>247 510 310</td>
<td>20</td>
<td>2000</td>
<td>7.55kg</td>
<td>6.85kg</td>
</tr>
<tr>
<td>Outer Box 40</td>
<td>320 510 360</td>
<td>40</td>
<td>4000</td>
<td>15.10kg</td>
<td>13.70kg</td>
</tr>
</tbody>
</table>

Figure 12. Example of outer box label for LUXEON SunPlus CoB Line.

Notes for Figure 12 – 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.