LUXEON Versat 3030 PCA 150

Industry-leading solutions for exterior automotive lighting

LUXEON Versat is perfect for high-volume assembly where consistency is never compromised. This family of products provides design flexibility, automotive reliability and ease of integration/manufacturing to facilitate simplified system integration for high volume automotive designs. The LUXEON Versat 3030 PCA 150 LED is designed to meet the needs of exterior automotive signal lighting applications. All LUXEON Versat 3030 LEDs are IEC-60810 qualified and cold binned at 25°C.

FEATURES AND BENEFITS

- Industry standard footprint for simple integration
- Optimized package drives efficient light extraction
- Low Z profile simplifies optical design and minimizes design space
- Industry leading efficacy

PRIMARY APPLICATIONS

- Side Marker
- Turn
  - Front Turn
  - Rear Turn
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General Information

Product Test Conditions
LUXEON Versat 3030 PCA 150 is tested and binned using a 20ms monopulse (MP) at 150mA drive current, case temperature, \(T_c\), of 25°C.

Part Number Nomenclature
Part numbers for LUXEON Versat 3030 PCA 150 follow the convention below:

\[ \text{A 1 V A - A B C D E F G H J K M N P} \]

Where:

- A – designates product segment (A=Automotive)
- 1 – designates product level (1=Level 1)
- V – designates product line/family (V=LUXEON Versat)
- A – designates package size (A=3030)
- A B C D – designates dominant wavelength (P591=PC Amber)
- E – designates binning current (A=150mA)
- F – open space
- G – designates generation (1=first generation)
- H – open space
- J K M N – designates minimum luminous flux (0030=30 lumens, 0033=33 lumens etc.)
- P – designates option code for distribution (1=MPP, 0=SSD, default)

Therefore, the following part number is used for a LUXEON Versat 3030 PCA 150 with a minimum luminous flux of 33 lumens:

\[ \text{A 1 V A - P 5 9 1 A 0 1 0 0 3 3 0} \]

Environmental Compliance
Lumileds LLC is committed to providing environmentally friendly products to the solid-state lighting market. LUXEON Versat 3030 PCA 150 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 selection for LUXEON Versat 3030 PCA 150 at 20ms MP, 150mA, T<sub>c</sub>=25°C.

<table>
<thead>
<tr>
<th>COLOR</th>
<th>MINIMUM LUMINOUS FLUX&lt;sup&gt;[1]&lt;/sup&gt; (lm)</th>
<th>TEST CURRENT (mA)</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>PC Amber</td>
<td>1000</td>
<td>150</td>
<td>A1VA-P591A01000300</td>
</tr>
<tr>
<td></td>
<td>1030</td>
<td>150</td>
<td>A1VA-P591A01000330</td>
</tr>
<tr>
<td></td>
<td>1036</td>
<td>150</td>
<td>A1VA-P591A01000360</td>
</tr>
</tbody>
</table>

Notes for Table 1:
1. Luminis maintains a tolerance of ±6.5% on luminous flux measurements.

## Optical Characteristics

Table 2. Typical optical characteristics for LUXEON Versat 3030 PCA 150 at 20ms MP, 150mA, T<sub>c</sub>=25°C.

<table>
<thead>
<tr>
<th>PART NUMBER</th>
<th>DOMINANT WAVELENGTH&lt;sup&gt;[1,2]&lt;/sup&gt; (nm)</th>
<th>SPECTRAL HALF-WIDTH&lt;sup&gt;[3]&lt;/sup&gt; (nm)</th>
<th>TOTAL INCLUDED ANGLE&lt;sup&gt;[4]&lt;/sup&gt; θ&lt;sub&gt;θ,30V&lt;/sub&gt;</th>
<th>TYPICAL VIEWING ANGLE&lt;sup&gt;[5]&lt;/sup&gt; 2θ&lt;sub&gt;1/2&lt;/sub&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1VA-P591A010xxxx0</td>
<td>588.8</td>
<td>592.6</td>
<td>85.0</td>
<td>138°</td>
</tr>
</tbody>
</table>

Notes for Table 2:
1. Dominant wavelength is derived from the CIE Chromaticity diagram and represents perceived color.
2. Luminis maintains a tolerance of ±1nm for dominant wavelength measurements.
3. Spectral width at ½ of the peak intensity.
4. Total angle at which 90% of total luminous flux is captured.
5. 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. Typical electrical and thermal characteristics for LUXEON Versat 3030 PCA 150 at 20ms MP, 150mA, T<sub>c</sub>=25°C.

<table>
<thead>
<tr>
<th>PART NUMBER</th>
<th>FORWARD VOLTAGE&lt;sup&gt;[1]&lt;/sup&gt; (V&lt;sub&gt;f&lt;/sub&gt;)</th>
<th>THERMAL RESISTANCE—JUNCTION TO CASE (°C/W)</th>
<th>R&lt;sub&gt;θj-c&lt;/sub&gt; el&lt;sup&gt;[2]&lt;/sup&gt;</th>
<th>R&lt;sub&gt;θj-c&lt;/sub&gt; real&lt;sup&gt;[3]&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1VA-P591A010xxxx0</td>
<td>2.70</td>
<td>2.00</td>
<td>22.00</td>
<td>27.00</td>
</tr>
</tbody>
</table>

Notes for Table 3:
1. Luminis maintains a tolerance of ±0.06V on forward voltage measurements.
2. R<sub>θj-c</sub> el: Electrical thermal resistance (junction to case).
3. R<sub>θj-c</sub> real: Real thermal resistance (junction to case) with wall plug efficiency included. Reference JESD51-51, JESD51-14, 4.1.3.
**Absolute Ratings**

Table 4. Absolute ratings for LUXEON Versat 3030 PCA 150.

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>PERFORMANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum DC Forward Current</td>
<td>30mA</td>
</tr>
<tr>
<td>Maximum DC Forward Current</td>
<td>250mA</td>
</tr>
<tr>
<td>Maximum Junction Temperature [1]</td>
<td>150°C</td>
</tr>
<tr>
<td>Operating Case Temperature at Test Current [1]</td>
<td>-40°C to 125°C</td>
</tr>
<tr>
<td>Operating Case Temperature at Maximum Current [1]</td>
<td>-40°C to 125°C</td>
</tr>
<tr>
<td>LED Storage Temperature</td>
<td>-40°C to 130°C</td>
</tr>
<tr>
<td>Soldering Temperature</td>
<td>260°C</td>
</tr>
<tr>
<td>Allowable Reflow Cycles</td>
<td>3</td>
</tr>
<tr>
<td>ESD Sensitivity [2]</td>
<td>±8 kV HBM, ±400V MM, ±2kV CDM</td>
</tr>
<tr>
<td>Reverse Voltage (V_{reverse})</td>
<td>LUXEON LEDs are not designed to be driven in reverse bias</td>
</tr>
<tr>
<td>Autoclave Conditions</td>
<td>121°C at 2 ATM 100% Relative Humidity for 96 Hours Maximum</td>
</tr>
</tbody>
</table>

Notes for Table 4:
1. Proper current derating must be used to maintain junction temperature below the maximum. LUXEON Versat LEDs driven at or above maximum LED case temperature may have shorter lifetime.
2. Measured using human body model (per JESD22 A114), machine model (per JESD22 A115) and charged device model (per JESD22 C101).

**JEDEC Moisture Sensitivity**

Table 5. Moisture sensitivity levels for LUXEON Versat PCA 150.

<table>
<thead>
<tr>
<th>LEVEL</th>
<th>FLOOR LIFE</th>
<th>STANDARD SOAK REQUIREMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TIME</td>
<td>CONDITIONS</td>
</tr>
<tr>
<td>1</td>
<td>Unlimited</td>
<td>≤30°C / 25% RH</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Characteristic Curves

Spectral Power Distribution Characteristics

![Spectral Power Distribution Graph]

Figure 1. Typical normalized power vs. wavelength for LUXEON Versat 3030 PCA 150 at 20ms MP, 150mA, $T_c=25^\circ$C.

Light Output Characteristics

![Light Output Graph]

Figure 2. Typical normalized light output vs. case temperature for LUXEON Versat 3030 PCA 150 at 20ms MP, 150mA.
Forward Current and Forward Voltage Characteristics

Figure 3. Typical normalized light output vs. forward current for LUXEON Versat 3030 PCA 150 at $T_c=25^\circ$C.

Figure 4. Typical forward current vs. forward voltage for LUXEON Versat 3030 PCA 150 at $T_c=25^\circ$C.
Color Shift Characteristics

Figure 5. Typical forward voltage shift vs. case temperature for LUXEON Versat 3030 PCA 150.

Figure 6. Typical color shift in CIE 1931 x and y coordinates for LUXEON Versat 3030 PCA 150 at 20ms MP, 150mA.
Radiation Pattern Characteristics

Figure 7. Typical color shift in CIE 1931 x and y coordinates over angle for LUXEON Versat 3030 PCA 150 at 20ms MP, 150mA.

Figure 8. Typical radiation pattern for LUXEON Versat 3030 PCA 150 at 20ms MP, 150mA, T_c=25°C.
Operating Limits Characteristics

Figure 9. Maximum forward current vs. case temperature for LUXEON Versat 3030 PCA 150.

Permissible Pulse Handling Characteristics

Figure 10. Permissible pulse handling capability for LUXEON Versat 3030 PCA 150.
Product Bin and Labeling Definitions

Designing with LUXEON Versat 3030 PCA 150
Flux bins supportable for car programs depend on product color and program start-of-production and end-of-production dates. Flux roadmaps by year and product color are maintained and available from the sales representative. Please contact a local sales representative to request the flux bin range with best supportability for program timing.

Decoding Product Bin Labeling
In the manufacturing of semiconductor products, there are variations in performance around the average values given in the technical datasheets. For this reason, Lumileds bins the LED components for luminous flux or radiometric power, color point, peak or dominant wavelength and forward voltage.

LUXEON Versat 3030 PCA 150 LEDs are labeled using a 3-digit alphanumeric CAT code following the format below:

A  B  C
Where:

A  —  designates luminous flux bin (example: C=36 lumens to 40 lumens)
B  —  designates color code (A, B)
C  —  designates forward voltage bin (example: B=2.94V to 3.20V)

Therefore, a LUXEON Versat 3030 PCA 150 with a lumen range of 36 to 40, color code of A and a forward voltage range of 2.94 to 3.20 has the following CAT code:

C  A  B
Luminous Flux Bins

Table 6 lists the standard luminous flux bins for LUXEON Versat 3030 PCA 150 emitters. Product availability in a particular bin varies by color and platform start of production date. Contact local sales representative for best supportability of programs.

Table 6. Luminous flux bins for LUXEON Versat 3030 PCA 150, T<sub>c</sub>=25°C.

<table>
<thead>
<tr>
<th>BIN</th>
<th>MINIMUM</th>
<th>MAXIMUM</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>30</td>
<td>33</td>
</tr>
<tr>
<td>B</td>
<td>33</td>
<td>36</td>
</tr>
<tr>
<td>C</td>
<td>36</td>
<td>40</td>
</tr>
<tr>
<td>D</td>
<td>40</td>
<td>44</td>
</tr>
<tr>
<td>E</td>
<td>44</td>
<td>48</td>
</tr>
<tr>
<td>F</td>
<td>48</td>
<td>53</td>
</tr>
<tr>
<td>G</td>
<td>53</td>
<td>58</td>
</tr>
<tr>
<td>H</td>
<td>58</td>
<td>64</td>
</tr>
<tr>
<td>J</td>
<td>64</td>
<td>70</td>
</tr>
<tr>
<td>K</td>
<td>70</td>
<td>76</td>
</tr>
<tr>
<td>L</td>
<td>76</td>
<td>82</td>
</tr>
<tr>
<td>M</td>
<td>82</td>
<td>88</td>
</tr>
<tr>
<td>N</td>
<td>88</td>
<td>94</td>
</tr>
<tr>
<td>P</td>
<td>94</td>
<td>100</td>
</tr>
</tbody>
</table>

Notes for Table 6:
1. Lumileds maintains a tolerance of ±6.5% on luminous flux measurements.
## Color Codes

![Graph](image)

**Figure 11.** Color bin structure in CIE 1931 color space for LUXEON Versat 3030 PCA 150.

### Table 7. Color code definitions for LUXEON Versat 3030 PCA 150.

<table>
<thead>
<tr>
<th>CODE</th>
<th>(x)</th>
<th>(y)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0.5680</td>
<td>0.4315</td>
</tr>
<tr>
<td></td>
<td>0.5634</td>
<td>0.4269</td>
</tr>
<tr>
<td></td>
<td>0.5833</td>
<td>0.4075</td>
</tr>
<tr>
<td></td>
<td>0.5901</td>
<td>0.4094</td>
</tr>
<tr>
<td>B</td>
<td>0.5763</td>
<td>0.4054</td>
</tr>
<tr>
<td></td>
<td>0.5833</td>
<td>0.4075</td>
</tr>
<tr>
<td></td>
<td>0.5634</td>
<td>0.4269</td>
</tr>
<tr>
<td></td>
<td>0.5557</td>
<td>0.4192</td>
</tr>
</tbody>
</table>

**Notes for Table 7:**

1. Lumileds maintains a tolerance of ±0.005 on \(x\) and \(y\) coordinates in the CIE 1931 color space.
Forward Voltage Bins

Table 8. Forward voltage bin definitions for LUXEON Versat 3030 PCA 150.

<table>
<thead>
<tr>
<th>BIN</th>
<th>FORWARD VOLTAGE(^{(2)})((V_f))</th>
<th>MINIMUM</th>
<th>MAXIMUM</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2.70</td>
<td>2.94</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>2.94</td>
<td>3.20</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>3.20</td>
<td>3.49</td>
<td></td>
</tr>
</tbody>
</table>

Notes for Table 8:
1. Although several bins are outlined, product availability in a particular bin varies by production run and by product performance.
2. Lumileds maintains a tolerance of ±0.06V on forward voltage measurements.

Mechanical Dimensions

Figure 12. Mechanical dimensions for LUXEON Versat 3030 PCA 150.

Notes for Figure 12:
1. Drawings are not to scale.
2. All dimensions are in millimeters.
Packaging Information

Pocket Tape Dimensions

Figure 13. Pocket tape dimensions for LUXEON Versat 3030 PCA 150.

Notes for Figure 13:
1. Drawings are not to scale.
2. All dimensions are in millimeters.
3. Ao is the width of pocket, Ko is the depth of pocket, and Bo is the height of pocket.

Reel Dimensions

Figure 14. Reel dimensions for LUXEON Versat 3030 PCA 150.

Notes for Figure 14:
1. Drawings are not to scale.
2. All dimensions are in millimeters.
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 safer, better and more beautiful—with light.

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