Ultrabright White LED, Ø 5 mm Untinted Non-Diffused Package

DESCRIPTION
The VLHW5100 is a clear, non-diffused 5 mm LED for high end applications where supreme luminous intensity required. These lamps with clear untinted plastic case utilize the highly developed ultrabright InGaN technologies. The lens and the viewing angle is optimized to achieve best performance of light output and visibility.

PRODUCT GROUP AND PACKAGE DATA
- Product group: LED
- Package: 5 mm
- Product series: standard
- Angle of half intensity: ±10°

FEATURES
- Untinted non-diffused lens
- Utilizing ultrabright InGaN technology
- High luminous intensity
- Luminous intensity and color categorized for each packing unit
- ESD-withstand voltage: up to 4 kV according to JESD22-A114-B
- Circuit protection by Zener diode
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

APPLICATIONS
- Interior and exterior lighting
- Outdoor LED panels
- Instrumentation and front panel indicators
- Replaces incandescent lamps
- Light guide compatible

PARTS TABLE

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<th>LUMINOUS INTENSITY (mcd)</th>
<th>COORDINATE (x, y)</th>
<th>FORWARD VOLTAGE (V)</th>
<th>TECHNOLOGY</th>
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<tr>
<td></td>
<td></td>
<td>AT IF (mA)</td>
<td>MIN.  TYP.  MAX.</td>
<td>MIN.  TYP.  MAX.</td>
<td>MIN.  TYP.  MAX.</td>
</tr>
<tr>
<td>VLHW5100</td>
<td>White</td>
<td>5600</td>
<td>11 200</td>
<td>0.33, 0.33</td>
<td>2.8</td>
</tr>
</tbody>
</table>

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>TEST CONDITION</th>
<th>SYMBOL</th>
<th>VALUE</th>
<th>UNIT</th>
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<tr>
<td>Reverse voltage</td>
<td></td>
<td>VR</td>
<td>5</td>
<td>V</td>
</tr>
<tr>
<td>DC forward current</td>
<td></td>
<td>IF</td>
<td>30</td>
<td>mA</td>
</tr>
<tr>
<td>Peak forward current</td>
<td>at 1 kHz, tf/T = 0.1</td>
<td>I_{FSM}</td>
<td>0.1</td>
<td>A</td>
</tr>
<tr>
<td>Power dissipation</td>
<td></td>
<td>PV</td>
<td>100</td>
<td>mW</td>
</tr>
<tr>
<td>Zener reverse current</td>
<td></td>
<td>I_{Z}</td>
<td>100</td>
<td>mA</td>
</tr>
<tr>
<td>Junction temperature</td>
<td></td>
<td>T_{j}</td>
<td>100</td>
<td>°C</td>
</tr>
<tr>
<td>Operating temperature range</td>
<td></td>
<td>T_{amb}</td>
<td>-40 to +100</td>
<td>°C</td>
</tr>
<tr>
<td>Storage temperature range</td>
<td></td>
<td>T_{stg}</td>
<td>-40 to +100</td>
<td>°C</td>
</tr>
<tr>
<td>Soldering temperature</td>
<td>t ≤ 5 s</td>
<td>T_{sd}</td>
<td>260</td>
<td>°C</td>
</tr>
<tr>
<td>Thermal resistance junction-to-ambient</td>
<td></td>
<td>R_{thJA}</td>
<td>400</td>
<td>K/W</td>
</tr>
</tbody>
</table>

For technical questions, contact: LED@vishay.com
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OPTICAL AND ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

### WHITE VLHW5100

**PARAMETER** | **TEST CONDITION** | **PART** | **SYMBOL** | **MIN.** | **TYP.** | **MAX.** | **UNIT**  
--- | --- | --- | --- | --- | --- | --- | ---  
Luminous intensity | I_{F} = 20 mA | VLHW5100 | I_{V} | 5600 | - | 11 200 | mcd  
Chromaticity coordinate x acc. to CIE 1931 | I_{F} = 20 mA | x | - | 0.33 | - | - |  
Chromaticity coordinate y acc. to CIE 1931 | I_{F} = 20 mA | y | - | 0.33 | - | - |  
Angle of half intensity | I_{F} = 20 mA | \( \varphi \) | - | \( \pm 10 \) | - | - | °  
Forward voltage | I_{F} = 20 mA | V_{F} | 2.8 | - | 3.6 | - | V  
Reverse current | V_{R} = 5 V | I_{R} | - | - | 50 | - | \( \mu A \)  
Temperature coefficient of V_{F} | I_{F} = 20 mA | TC_{V_{F}} | - | -4 | - | - | m\( V/K \)  
Temperature coefficient of I_{V} | I_{F} = 20 mA | TC_{I_{V}} | - | -0.5 | - | - | % / K

### CHROMATICITY COORDINATED CLASSIFICATION

| GROUP | MIN. \( X \) | MAX. \( X \) | MIN. \( Y \) | MAX. \( Y \)  
--- | --- | --- | --- | ---  
3A | 0.2900 | 0.3025 | \( y = 1.4x - 0.121 \) | \( y = 1.4x - 0.071 \)  
3B | 0.3025 | 0.3150 | \( y = 1.4x - 0.121 \) | \( y = 1.4x - 0.071 \)  
3C | 0.2900 | 0.3025 | \( y = 1.4x - 0.171 \) | \( y = 1.4x - 0.121 \)  
3D | 0.3025 | 0.3150 | \( y = 1.4x - 0.171 \) | \( y = 1.4x - 0.121 \)  
4A | 0.3150 | 0.3275 | \( y = 1.4x - 0.121 \) | \( y = 1.4x - 0.071 \)  
4B | 0.3275 | 0.3400 | \( y = 1.4x - 0.121 \) | \( y = 1.4x - 0.071 \)  
4C | 0.3150 | 0.3275 | \( y = 1.4x - 0.171 \) | \( y = 1.4x - 0.121 \)  
4D | 0.3275 | 0.3400 | \( y = 1.4x - 0.171 \) | \( y = 1.4x - 0.121 \)  
5A | 0.3400 | 0.3525 | \( y = 1.4x - 0.121 \) | \( y = 1.4x - 0.071 \)  
5B | 0.3525 | 0.3650 | \( y = 1.4x - 0.121 \) | \( y = 1.4x - 0.071 \)  
5C | 0.3400 | 0.3525 | \( y = 1.4x - 0.171 \) | \( y = 1.4x - 0.121 \)  
5D | 0.3525 | 0.3650 | \( y = 1.4x - 0.171 \) | \( y = 1.4x - 0.121 \)  

Note
- Chromaticity coordinate groups are tested with a tolerance of \( \pm 0.01 \)

### LUMINOUS INTENSITY CLASSIFICATION

| GROUP | LIGHT INTENSITY (mcd) | STANDARD | MIN. | MAX.  
--- | --- | --- | --- | ---  
DB | 5600 | 7100  
EA | 7100 | 9000  
EB | 9000 | 11 200  

Note
- Luminous intensity is tested with an accuracy of \( \pm 11 \% \).

### FORWARD VOLTAGE CLASSIFICATION

| GROUP | FORWARD VOLTAGE (V) | FORWARD | MIN. | MAX.  
--- | --- | --- | --- | ---  
0 | 2.8 | 2.8 | 3.0  
1 | 3.0 | 3.0 | 3.2  
2 | 3.2 | 3.2 | 3.4  
3 | 3.4 | 3.4 | 3.6  

Note
- Forward voltage is tested with an accuracy of \( \pm 0.1 \) V
**TYPICAL CHARACTERISTICS** (\(T_{\text{amb}} = 25 \degree \text{C}, \) unless otherwise specified)

### Fig. 1 - Forward Current vs. Ambient Temperature

![Graph showing Forward Current vs. Ambient Temperature](image1)

### Fig. 2 - Relative Luminous Intensity vs. Angular Displacement

![Graph showing Relative Luminous Intensity vs. Angular Displacement](image2)

### Fig. 3 - Relative Intensity vs. Wavelength

![Graph showing Relative Intensity vs. Wavelength](image3)

### Fig. 4 - Forward Current vs. Forward Voltage

![Graph showing Forward Current vs. Forward Voltage](image4)

### Fig. 5 - Relative Luminous Flux vs. Forward Current

![Graph showing Relative Luminous Flux vs. Forward Current](image5)

### Fig. 6 - Relative Luminous Intensity vs. Ambient Temperature

![Graph showing Relative Luminous Intensity vs. Ambient Temperature](image6)
Fig. 7 - Change of Forward Voltage vs. Ambient Temperature

Fig. 8 - Coordinates of Colorgroups

Fig. 9 - Chromaticity Coordinate Shift vs. Forward Current
 PACKAGE DIMENSIONS in millimeters

BAR CODE PRODUCT LABEL

A) Type of component
B) Manufacturing plant
C) SEL - selection code (bin):
   e.g.: EA = code for luminous intensity group
         4C = code for chromaticity coordinate
         1 = code for forward voltage
D) Date code year / week
E) Day code (e.g. 1: Monday)
F) Batch no.
G) Total quantity
H) Company code
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