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Cree Inc.
XQBAWT-00-0000-00000HXE5

For any questions, you can email us directly:
sales@integrated-circuit.com
Cree® XLamp® XQ-B LED

**PRODUCT DESCRIPTION**

Cree XLamp® XQ-B LEDs revolutionize mid-power LEDs by delivering lighting-class reliability and a wider spread of light than typical plastic packages. The XQ-B’s innovative wide light emission enables a smooth look in replacement tubes and panel lights while reducing system cost by using fewer LEDs.

Using Cree’s newest generation of silicon carbide-based LED chips, XQ-B is optimized to dramatically lower system cost in non-directional and outdoor area lighting applications.

**FEATURES**

- Cree’s smallest lighting class LED: 1.6 X 1.6 X 1.6 mm
- Available in white, 80-minimum CRI white and 70-minimum CRI cool white
- 300 mA maximum drive current
- Low thermal resistance: 17 °C/W
- Wide viewing angle: 140°
- Reflow solderable - JEDEC J-STD-020C compatible
- Unlimited floor life at ≤ 30 °C/85% RH
- RoHS- and REACh-compliant
- UL® recognized component (E349212)

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**CHARACTERISTICS**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Unit</th>
<th>Minimum</th>
<th>Typical</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermal resistance, junction to solder point</td>
<td>°C/W</td>
<td>17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Viewing angle (FWHM)</td>
<td>degrees.</td>
<td>140</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature coefficient of voltage</td>
<td>mV/°C</td>
<td>-2.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ESD classification (HBM per MIL-Std-883D)</td>
<td>Class 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DC forward current</td>
<td>mA</td>
<td>80</td>
<td>300</td>
<td></td>
</tr>
<tr>
<td>Reverse voltage</td>
<td>V</td>
<td></td>
<td>-5</td>
<td></td>
</tr>
<tr>
<td>Forward voltage (@ 80 mA, 25 °C)</td>
<td>V</td>
<td>3.0</td>
<td>3.4</td>
<td></td>
</tr>
<tr>
<td>LED junction temperature</td>
<td>°C</td>
<td></td>
<td>150</td>
<td></td>
</tr>
</tbody>
</table>

**FLUX CHARACTERISTICS (T_j = 25 °C)**

The following table provides several base order codes for XLamp XQ-B LEDs. It is important to note that the base order codes listed here are a subset of the total available order codes for the product family. For more order codes, as well as a complete description of the order-code nomenclature, please consult the XLamp XQ LED Family Binning and Labeling document.

<table>
<thead>
<tr>
<th>Color</th>
<th>CCT Range</th>
<th>Minimum Luminous Flux @ 80 mA</th>
<th>Calculated Minimum Luminous Flux (lm)*</th>
<th>Order Code</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min.</td>
<td>Max.</td>
<td>Group</td>
<td>Flux (lm)</td>
</tr>
<tr>
<td>Cool White</td>
<td>5000 K</td>
<td>8300 K</td>
<td>K2</td>
<td>30.6</td>
</tr>
<tr>
<td>Neutral White</td>
<td>3700 K</td>
<td>5000 K</td>
<td>K2</td>
<td>30.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>26.8</td>
</tr>
<tr>
<td>Warm White</td>
<td>2600 K</td>
<td>3700 K</td>
<td>J3</td>
<td>26.8</td>
</tr>
</tbody>
</table>

Notes:

- Cree maintains a tolerance of ±7% on flux and power measurements, ±0.005 on chromaticity (CCx, CCy) measurements and ±2 on CRI measurements. See the Measurements section (page 7).
- Typical CRI for Neutral White, 3700 K - 5000 K CCT is 75.
- Typical CRI for Warm White, 2600 K - 3700 K CCT is 80.
- Minimum CRI for 70 CRI Minimum Cool White is 70.
- Minimum CRI for 80 CRI Minimum White is 80.
  
* Calculated flux values at 150 mA are for reference only.
XLamp® XQ-B LED

RELATIVE SPECTRAL POWER DISTRIBUTION

![Relative Spectral Power Distribution Graph](image)

RELATIVE FLUX VS. JUNCTION TEMPERATURE ($I_c = 80$ mA)

![Relative Flux vs. Junction Temperature Graph](image)
ELECTRICAL CHARACTERISTICS ($T_J = 25 \, ^\circ\text{C}$)

![Forward Current vs. Forward Voltage graph]

RELATIVE FLUX VS. CURRENT ($T_J = 25 \, ^\circ\text{C}$)

![Relative Luminous Flux vs. Forward Current graph]
TYPICAL SPATIAL DISTRIBUTION

The maximum forward current is determined by the thermal resistance between the LED junction and ambient. It is crucial for the end product to be designed in a manner that minimizes the thermal resistance from the solder point to ambient in order to optimize lamp life and optical characteristics.
REFLOW SOLDERING CHARACTERISTICS

In testing, Cree has found XLamp XQ-B LEDs to be compatible with JEDEC J-STD-020C, using the parameters listed below. As a general guideline, Cree recommends that users follow the recommended soldering profile provided by the manufacturer of the solder paste used.

Note that this general guideline may not apply to all PCB designs and configurations of reflow soldering equipment.

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**Profile Feature** | **Lead-Free Solder**
---|---
Average Ramp-Up Rate \( (T_{s_{\text{max}}} \text{ to } T_p) \) | 1.2 °C/second
Preheat: Temperature Min \( (T_{s_{\text{min}}}) \) | 120 °C
Preheat: Temperature Max \( (T_{s_{\text{max}}}) \) | 170 °C
Preheat: Time \( (t_{s_{\text{min}}} \text{ to } t_{s_{\text{max}}}) \) | 65-150 seconds
Time Maintained Above: Temperature \( (T_L) \) | 217 °C
Time Maintained Above: Time \( (t_L) \) | 45-90 seconds
Peak/Classification Temperature \( (T_p) \) | 235 - 245 °C
Time Within 5 °C of Actual Peak Temperature \( (t_p) \) | 20-40 seconds
Ramp-Down Rate | 1 - 6 °C/second
Time 25 °C to Peak Temperature | 4 minutes max.

Note: All temperatures refer to topside of the package, measured on the package body surface.
NOTES

Measurements
The luminous flux, radiant power, chromaticity and CRI measurements in this document are binning specifications only and solely represent product measurements as of the date of shipment. These measurements will change over time based on a number of factors that are not within Cree's control and are not intended or provided as operational specifications for the products. Calculated values are provided for informational purposes only and are not intended as specifications.

Pre-Release Qualification Testing
Please read the LED Reliability Overview for details of the qualification process Cree applies to ensure long-term reliability for XLamp LEDs and details of Cree's pre-release qualification testing for XLamp LEDs.

Lumen Maintenance
Cree now uses standardized IES LM-80-08 and TM-21-11 methods for collecting long-term data and extrapolating LED lumen maintenance. For information on the specific LM-80 data sets available for this LED, refer to the public LM-80 results document.

Please read the Long-Term Lumen Maintenance application note for more details on Cree's lumen maintenance testing and forecasting. Please read the Thermal Management application note for details on how thermal design, ambient temperature, and drive current affect the LED junction temperature.

Moisture Sensitivity
Cree recommends keeping XLamp LEDs in the provided, resealable moisture-barrier packaging (MBP) until immediately prior to soldering. Unopened MBPs that contain XLamp LEDs do not need special storage for moisture sensitivity.

Once the MBP is opened, XLamp XQ-B LEDs may be stored as MSL 1 per JEDEC J-STD-033, meaning they have unlimited floor life in conditions of ≤ 30 °C/85% relative humidity (RH). Regardless of storage condition, Cree recommends sealing any unsoldered LEDs in the original MBP.

RoHS Compliance
The levels of RoHS restricted materials in this product are below the maximum concentration values (also referred to as the threshold limits) permitted for such substances, or are used in an exempted application, in accordance with EU Directive 2011/65/EC (RoHS2), as implemented January 2, 2013. RoHS Declarations for this product can be obtained from your Cree representative or from the Product Documentation sections of www.cree.com.

REACH Compliance
REACH substances of very high concern (SVHCs) information is available for this product. Since the European Chemical Agency (ECHA) has published notice of their intent to frequently revise the SVHC listing for the foreseeable future, please contact a Cree representative to insure you get the most up-to-date REACch SVHC Declaration. REACch banned substance information (REACch Article 67) is also available upon request.
NOTES - CONTINUED

UL® Recognized Component
Level 1 enclosure consideration. The LED package or a portion thereof has not been investigated as a fire enclosure or a fire and electrical enclosure per ANSI/UL 8750.

Vision Advisory
WARNING: Do not look at exposed lamp in operation. Eye injury can result. For more information about LEDs and eye safety, please refer to the LED Eye Safety application note.
MECHANICAL DIMENSIONS

All dimensions in mm.
Measurement tolerances unless indicated otherwise: ±13 mm

Recommended PCB solder pad

Recommended trace layout
TAPE AND REEL

All Cree carrier tapes conform to EIA-481D, Automated Component Handling Systems Standard.

Unless otherwise indicated, all dimensions in mm.

Measurement tolerances unless indicated otherwise: .xx = ±.25 mm, .xxx = ±125 mm.

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PACKAGING

The diagrams below show the packaging and labels Cree uses to ship XLamp XQ-B LEDs. XLamp XQ-B LEDs are shipped in tape loaded on a reel. Each box contains only one reel in a moisture barrier bag.

Unpackaged Reel

Packaged Reel

Boxed Reel