LumiBright™ LE 2400B-500-W

The Model 2400B-500-W is a light engine providing high luminous flux, white LED illumination into optical fibers, bundles and light guides sized from 3.0 to 5.0 mm in diameter. The product features patented technologies that encompass non-imaging optics with chip-on-board metallic substrates to provide both optimum luminous efficacy as well as ideal thermal management.

The 2400B-500-W is ideally suited for endoscope and microscope illuminator applications. The light engine delivers up to 1500 lumens into a light guide.

Benefits:
- Intense and stable optical power
- Small footprint
- Continuous high current or pulsed operation
- RoHS compliant - Environmentally friendly

Features:
- Supports fiber apertures - 3.0mm - 5.0mm
- White (5300K+/300)
- High thermal conductivity metal core PCB
- COB array technology, 7 Die
- Patented technology

Options:
- Heat sink and thermal pads
- Drivers and controllers

Typical Applications:
- Medical endoscopy
- Microscopes
- Machine vision
- Industrial borescopes

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The LumiBright LE 2400B-500-W is a light engine with a seven white die array.

The data below is provided as a general guideline for a 7 die configuration.

Table 1

<table>
<thead>
<tr>
<th>Assembly</th>
<th>Maximum Number of Die</th>
<th>Numerical Aperture (NA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2400B-500-W</td>
<td>7</td>
<td>0.60</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specifications</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive current</td>
<td>Continuous: 12A Max</td>
<td>Intermittent use up to 15A possible</td>
</tr>
<tr>
<td>Forward voltage</td>
<td>Turn on: 2.5V - Limit: 4.5V</td>
<td>Requires constant current operation</td>
</tr>
<tr>
<td>Numerical aperture (NA&lt;sub&gt;f&lt;/sub&gt;)</td>
<td>0.60</td>
<td></td>
</tr>
<tr>
<td>Clear aperture (CA&lt;sub&gt;f&lt;/sub&gt;)</td>
<td>5.0 mm</td>
<td></td>
</tr>
<tr>
<td>Light guide coupling</td>
<td>Direct butt-coupling method</td>
<td>Distal end to clear aperture</td>
</tr>
<tr>
<td>Electrical connector</td>
<td>1 row, 8 pin</td>
<td>Surface mount, high current</td>
</tr>
<tr>
<td>Overall size (mm)</td>
<td>30 x 36 x 12</td>
<td>W x L x H</td>
</tr>
<tr>
<td>Thermal impedance</td>
<td>&lt;1.0 °C/W</td>
<td>Typical for 1 die</td>
</tr>
<tr>
<td>Thermistor B&lt;sub&gt;125°C&lt;/sub&gt;</td>
<td>3574 to 3646</td>
<td>For 10 kΩ</td>
</tr>
<tr>
<td>Thermistor impedance</td>
<td>10 kΩ</td>
<td>At 25°C</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>-40° C to 85° C</td>
<td>Depending on drive conditions</td>
</tr>
<tr>
<td>Lifetime (Hours)</td>
<td>–</td>
<td>Depends on drive conditions and temperature</td>
</tr>
</tbody>
</table>

**Notes: Light Guide Coupling Efficiency**

The maximum coupling efficiency for the Model 2400B-500-W requires the use of a fiberoptic or liquid light guide with equivalent specifications for both the nominal values of Numerical Aperture (NA<sub>f</sub>) and Clear Aperture (CA<sub>f</sub>). When the light guide design parameters of NA<sub>f</sub> or CA<sub>f</sub> are smaller than the nominal values of the Model 2400B-500-W, the coupling efficiency is reduced by the square of the ratios, (NA<sub>f</sub>/NA<sub>0</sub>)² and/or (CA<sub>f</sub>/CA<sub>0</sub>)². Other factors that contribute to coupling efficiency are the reflectance loss at the face of the fiberoptic or light guide, as well as the packing fraction when using a fiber bundle.

**Thermal Management**

The 2400B-500-W uses a metal core circuit board for high thermal conductivity that allows heat to dissipate in all directions. Reduced overall thermal resistance results in increased LED performance. When thermal energy generated exceeds the thermal energy dissipated, an additional means of cooling may be required to maintain LED performance. Some applications cannot efficiently dissipate enough heat from the circuit board alone and an external heat sink is recommended. The external heat sink is an efficient and inexpensive method of extending the surface area necessary to dissipate heat generated by the LED array. The 2400B-500-W circuit board features an attached thermal pad for heat sink contact, no thermal grease is needed. Adding the feature of forced air convection across the heat sink fins removes heat faster and more efficiently. This feature is often necessary when ambient airflow is limited or non-existent. Every 2400B-500-W circuit board has a built-in thermistor for temperature monitoring. Lifetime of the 2400B-500-W unit operated continuously would be compromised if the temperature of the circuit board exceeds 60°.
Lumen Output vs. Drive Current

Figure 1

Lumen Output vs. Electrical Power

Figure 2

Forward Voltage vs. Drive Current

Figure 3

Luminous Efficacy vs. Drive Current

Figure 4

Correlated Color Temperature vs. Drive Current

Figure 5

Spectral Distribution (CCT = 5400K)

Figure 6
**INSTALLATION CONTROL DRAWING**

**Figure 7**

![Diagram of the Lumibright LE 2400B-500-W installation control drawing.]

**NOTES:**
1. CONTENT FOR REFERENCE ONLY AND SUBJECT TO CHANGE

**ACCESSORIES**

**Figure 8**

- **Cooling Fans**
- **Thermal Pads**
- **Heat Sinks**
- **LumiBright DR Driver/Controller**
- **Heat Pipes**
- **Wire Harness Assemblies**

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