Description
The VPSL-640-040-x-5-A/B is an 640nm laser diode, it is suitable as a visible light source for laser levelers, scanners, displays, and optical equipment for measurement. A diffraction- limited and circular wavefront is accomplished through the integration of our beam correcting optic that creates a Virtual Point Source. Hermetic sealing of the package assures high reliability.

Features
- Built-in monitor photodiode.
- Single Transverse mode
- 40mW optical power
- Standard 5.6mm form factor

Absolute Maximum Ratings \((T_C=\text{case temperature}=25^\circ\text{C})\) *

<table>
<thead>
<tr>
<th>Item</th>
<th>Symbol</th>
<th>Rated Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optical output power</td>
<td>(P_O)</td>
<td>45</td>
<td>mW</td>
</tr>
<tr>
<td>LD reverse voltage</td>
<td>(V_R) (LD)</td>
<td>2</td>
<td>V</td>
</tr>
<tr>
<td>PD reverse voltage</td>
<td>(V_R) (PD)</td>
<td>30</td>
<td>V</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>(Topr)</td>
<td>-10 - +50</td>
<td>(^\circ\text{C})</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>(Tstg)</td>
<td>-40 - +85</td>
<td>(^\circ\text{C})</td>
</tr>
</tbody>
</table>

Optical and Electrical Characteristics \((T_C=\text{case temperature}=25^\circ\text{C})\) *

<table>
<thead>
<tr>
<th>Item</th>
<th>Symbol</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
<th>Test Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optical output power</td>
<td>(P_O)</td>
<td>-</td>
<td>40</td>
<td>45</td>
<td>mW</td>
<td>(P_O=40\text{mW})</td>
</tr>
<tr>
<td>Threshold current</td>
<td>(I_{th})</td>
<td>-</td>
<td>45</td>
<td>60</td>
<td>mA</td>
<td></td>
</tr>
<tr>
<td>Operating current</td>
<td>(I_{op})</td>
<td>-</td>
<td>90</td>
<td>110</td>
<td>mA</td>
<td>(P_O=40\text{mW})</td>
</tr>
<tr>
<td>Operating voltage</td>
<td>(V_{op})</td>
<td>-</td>
<td>2.4</td>
<td>2.6</td>
<td>V</td>
<td>(P_O=40\text{mW})</td>
</tr>
<tr>
<td>Lasing wavelength</td>
<td>(\lambda_p)</td>
<td>-</td>
<td>640</td>
<td>643</td>
<td>nm</td>
<td>(P_O=40\text{mW})</td>
</tr>
<tr>
<td>Circularity</td>
<td>(\phi)</td>
<td>-</td>
<td>0.8:1.25</td>
<td>ratio</td>
<td>(P_O=40\text{mW} \ @e^2)</td>
<td></td>
</tr>
<tr>
<td>Beam divergence</td>
<td>(\theta)</td>
<td>7</td>
<td>10</td>
<td>13</td>
<td>deg</td>
<td>(P_O=40\text{mW}, \text{FWHM})</td>
</tr>
<tr>
<td>Off axis angle</td>
<td>(\Delta \theta)</td>
<td>-</td>
<td>-</td>
<td>\pm 3</td>
<td>deg</td>
<td></td>
</tr>
<tr>
<td>Monitor current</td>
<td>(I_S)</td>
<td>0.15</td>
<td>0.3</td>
<td>0.6</td>
<td>mA</td>
<td>(P_O=40\text{mW}, V_R) (PD) = 5V</td>
</tr>
</tbody>
</table>

Specifications are subject to change without notice. Each purchased VPSL is provided with test data.
Handling Care and Precautions for Use of VPSL Diodes

1. Absolute Maximum Ratings
   Do not exceed, _even momentarily_, the maximum ratings (see page 1, table). When a CircuLaser diode is driven in excess of it's maximum ratings, it can cause at minimum a considerable reduction in reliability, and potentially instantaneous failure.
   a. CircuLaser diodes may be damaged by surge currents generated at power on-off operation. Check on the transient characteristics of the power supply to make sure that such surges do not exceed the maximum ratings.
   b. The maximum ratings are specified for a case temperature of 25°C. Designs should be made to work well within this temperature range. As the case temperature goes up, power dissipation as well as maximum light output power is reduced.

2. Soldering Conditions
   Maximum solder-tip temperature is 260°C and soldering time must be within 3.0 seconds. A minimum solder clearance of 1.6mm should be maintained from the root of the lead.

3. Prevention of Breakdown due to Static Electricity
   CircuLaser diodes may be adversely affected by static electricity and surge currents and, consequently, cause breakdown of the diode and reduction of reliability unless the following precautions are taken:
   a. Power supplies, installation and measuring equipment should be grounded. A noise filter or noise-cut transformer should be provided on any power supply inputs.
   b. Anyone working with a CircuLaser diode should be grounded through high resistance (500 K Ohm - 1M Ohm) by means of a ground strap.
and wrist band (for example).

c. Soldering irons should be grounded to protect laser diodes from voltage leaks.
d. During operation of the CircuLaser diode, working clothes, hats, and shoes should be static-protected. Cotton-based clothing is preferred.
e. Any container for carriage and storage should be static-protected.
f. Avoid using laser diodes in an environment where high frequency surge currents may be generated by an inductive electric field (such as a fluorescent lamp). These fields can also cause breakdown or deterioration of the laser diode.

4. **Package Handling**

a. The laser diode package should not be cut off, reworked, or deformed. Do not hold the cap of the CircuLaser diode tightly, otherwise it may induce cracks or damage to the window glass.
b. Do not touch the surface of the window glass. Any scratch or contamination may result in reduction of optical characteristics.
c. Remove small contaminates on the surface softly using a cotton tip stick with a small amount of methyl alcohol.

5. **Safety**

The output light from laser diodes is harmful to a human body even if it is invisible. Avoid looking at the output light of a CircuLaser diode directly, or even indirectly through a lens during operation. Observance of operation should be through an infrared TV camera or related equipment. Refer to IEC 825-1 and 21 CFR 1040.10-1040.11 as a radiation safety standard for laser products.

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Blue Sky Research is an ISO 9001:2008 certified company

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**LASER DIODE**

AVOID EXPOSURE

visible Laser Radiation is emitted from this aperture

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**DANGER**

INVISIBLE/VISIBLE LASER RADIATION-
AVOID DIRECT EXPOSURE TO BEAM

PEAK POWER 214mW/5mW
WAVELENGTH 400-1650 nm
CAUTION - Hazardous radiation. Use with eyes protected by infrared protective goggles. Eye damage is permanent.

This product does NOT comply with 21 CFR 1040.11