High Power Laser Diode
For Range Finding

Product Description
Pulsed semiconductor lasers in the near IR are commonly used for long-distance time-of-flight or phase-shift range-finder or LIDAR systems. Excelitas offers a broad range of ideally-suited pulsed 905 nm laser designs including multi-cavity monolithic structures with up to 4 active areas per chip resulting in up to 100 W of peak optical output power. Physical stacking of laser chips is also possible, resulting in up to 300 W of peak optical output power.

Chip-on-board assemblies are available for hybrid integration. A selection of 6 metal, hermetically-sealed package types are available for harsh environment applications. A molded epoxy resin TO-18 type package and a surface-mount overmoulded chip-on-ceramic package are available for high-volume applications.

Critical parameters are pulse-width and rise/fall times. The pulse width may be reduced allowing for increased current drive and resulting in higher peak optical power. Quantum-well laser design offers rise and fall times of <1ns but the drive circuit lay-out and package inductance play the greater role in determining rise/fall times, and should be designed accordingly. Excelitas offers a variety of package types with different inductance values to assist to this end.

Our core competencies include: MOVPE wafer growth; wafer processing of the grown GaAs wafers; assembly using either epoxy or solder die attach; epoxy encapsulation of lasers mounted on lead frame; hermetically-sealed product qualification to MIL STD and custom requirements.

<table>
<thead>
<tr>
<th>Device</th>
<th>Description</th>
<th>Emitting Area</th>
<th>Typical Peak Power at 10A, 100ns</th>
<th>Typical Peak Power at 30A, 100ns</th>
<th>Beam Spread Parallel to Junction (FWHM)</th>
<th>Beam Spread Perpendicular to Junction (FWHM)</th>
<th>Typical Temperature Coefficient (°C/W)</th>
<th>Preferred Packages</th>
</tr>
</thead>
<tbody>
<tr>
<td>X1503H</td>
<td>1 chip</td>
<td>75 x 1</td>
<td>8W</td>
<td>25W</td>
<td>10</td>
<td>25</td>
<td>0.25</td>
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<tr>
<td>X1509H</td>
<td>1 chip</td>
<td>225 x 1</td>
<td>8W</td>
<td>25W</td>
<td>10</td>
<td>25</td>
<td>0.25</td>
<td>✓</td>
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<tr>
<td>X2S03H</td>
<td>1 chip</td>
<td>75 x 5</td>
<td>16W</td>
<td>50W</td>
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<tr>
<td>X2S09H</td>
<td>1 chip</td>
<td>225 x 5</td>
<td>16W</td>
<td>50W</td>
<td>10</td>
<td>25</td>
<td>0.25</td>
<td>✓</td>
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<tr>
<td>X2S03H</td>
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<td>75 x 10</td>
<td>23W</td>
<td>75W</td>
<td>10</td>
<td>25</td>
<td>0.25</td>
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<tr>
<td>X2S09H</td>
<td>1 chip</td>
<td>225 x 10</td>
<td>23W</td>
<td>75W</td>
<td>10</td>
<td>25</td>
<td>0.25</td>
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<td>90W</td>
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<td>25</td>
<td>0.25</td>
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<tr>
<td>X2S09H</td>
<td>1 chip</td>
<td>225 x 15</td>
<td>30W</td>
<td>90W</td>
<td>10</td>
<td>25</td>
<td>0.25</td>
<td>✓</td>
</tr>
<tr>
<td>X2S03H</td>
<td>2 chips</td>
<td>75 x 175</td>
<td>45W</td>
<td>150W</td>
<td>10</td>
<td>25</td>
<td>0.25</td>
<td>✓</td>
</tr>
<tr>
<td>X2S09H</td>
<td>2 chips</td>
<td>225 x 175</td>
<td>45W</td>
<td>150W</td>
<td>10</td>
<td>25</td>
<td>0.25</td>
<td>✓</td>
</tr>
<tr>
<td>X2S03H</td>
<td>3 chips</td>
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<td>85W</td>
<td>255W</td>
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<tr>
<td>X2S09H</td>
<td>3 chips</td>
<td>225 x 450</td>
<td>85W</td>
<td>255W</td>
<td>10</td>
<td>25</td>
<td>0.25</td>
<td>✓</td>
</tr>
</tbody>
</table>

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PULSED LASER DIODES

### Graph 1
**Peak Radiant Intensity vs. Temperature**

![Graph 1](image)

### Graph 2
**Radiant Intensity vs. Pulse Width for Safe Operation**

![Graph 2](image)

### Graph 3
**Spectral Plot Distribution**

![Graph 3](image)

### Graph 4
**Center Wavelength vs. Temperature**

![Graph 4](image)

### Package S (TO-18)
Pin out:
1. LD Anode (+),
2. LD Cathode (-) Case,
Inductance 5.2 nH

![Package S](image)

### Package D (Surface Mount)
Inductance 1.6 nH

![Package D](image)

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Note: The diagrams and graphs are not described in detail due to the nature of the content.
Figure 2
Package Drawing

Figure 3
Housing / Package Drawing • Laser Chip on Board

Figure 4
Package Drawing

Figure 5
Package Drawing

Figure 6
Housing / Package Drawing • TO-18-”W” Plastic Package (15 Devices Only)

Package U (5 mm CD)
Pin out
1. LD Anode (+),
2. NC,
3. LD Cathode (-) Case,
Inductance 5.0 nH

Package Y (Chip on Carrier)
Pin out
1. LD Cathode (-) chip bottom,
2. LD Anode (+) chip top,
Inductance 1.6 nH

Package C (8–32 Coax)
Pin out
1. LD Anode (+),
2. NC,
3. LD Cathode (-) Case,
Inductance 12 nH

Package R (9 mm CD)
Pin out
1. LD Anode (+),
2. NC,
3. LD Cathode (-) Case,
Inductance 6.8 nH

Package W (TO-18 Plastic)
Pin out
1. (Pkg Flat)
LD Anode (+),
2. LD Cathode (-),
Inductance 5.0 nH