Laser Diode Array
Lensing Capabilities

Northrop Grumman – Cutting Edge Optronics
### Laser Diode Packaging

<table>
<thead>
<tr>
<th>Parameter</th>
<th>80x nm</th>
<th>87x-88x nm</th>
<th>94x nm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max QCW Power (W)*</td>
<td>300</td>
<td>300</td>
<td>300+</td>
</tr>
<tr>
<td>Max CW Power (W)*</td>
<td>100</td>
<td>120</td>
<td>120</td>
</tr>
<tr>
<td>Efficiency @ 25° C</td>
<td>58%</td>
<td>60%</td>
<td>58%</td>
</tr>
</tbody>
</table>

*Standard Products – higher powers available

CEO has experience with additional wavelengths (available upon request)
- 630nm, 915nm, 940nm-980nm, 1120nm, 1470nm, 1530nm, etc.

Many of these wavelengths, powers and package types are available with FAC and SAC lenses

**CEO has >20 years experience manufacturing laser diode array packages**
Microlensing Laser Diode Packages

CEO can collimate laser diode output for a given set of application requirements to achieve high levels of collimation and pointing.

Fast-axis divergence values of \(\sim 0.1^\circ\) are available. Divergence values are dependent on package type, operational mode and size. Collimation is available on 800 \(\mu\text{m}\) minimum pitch.

Many of CEO’s laser diode packages can be collimated.
Laser Bar Selection

Cutting Edge Optronics is able to reliably produce industry leading fast-axis collimation values through careful selection of the laser diode bar before the laser diode package is assembled.

Depending on the required output parameters, we know the exact flatness requirements and the interaction with mechanical structures during the bonding process to produce a given collimation value.

CEO has significant experience manufacturing a variety of laser diode array packages with extremely low divergence requirements.

![Laser bar with high smile ~4μm](image1.png)

![Optimized low smile ~0.65μm](image2.png)

Flatter bars produce narrower divergence values on lensed packages.
Active Lens Alignment

Cutting Edge Optronics actively aligns each individual laser diode bar in the packaged stack to ensure optimal focus across the entire bar to achieve the tightest far field possible.

CEO achieves optimal focus across the entire bar
Wavelength Stabilization with VBG Reflectors

CEO has extensive experience utilizing external gratings, in addition to FAC lenses, to narrow output spectra of diode arrays.

This is extremely beneficial for laser gain media with narrow absorption spectra:

- Nd:YAG ~885nm
- Yb:YAG ~975nm

Before and after spectral locking data with the addition of VBGs on a 36-bar stack operating at 100A CW.

Representation of VBG attachment to lensed diode package.

See Also: kW-Class, Wavelength-Stabilized Laser Diode Arrays
CEO’s Laser Diode Manufacturing Process

ISO 9001:2008 Certified
Summary

• Cutting Edge Optronics has >20 years experience manufacturing laser diode arrays for the commercial, industrial, medical, and military/aerospace markets.

• Through extensive laser diode packaging experience, CEO has developed significant microlensing capabilities and is able to lens multi-stack laser diode packages with high levels of pointing and collimation.

• Cutting Edge Optronics has the ability to produce wavelength stabilized laser diode array packages utilizing external gratings.
THE VALUE OF PERFORMANCE.

NORTHROP GRUMMAN