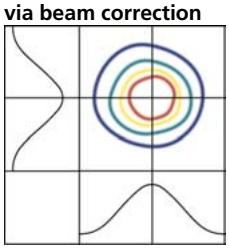
Optical correction methods

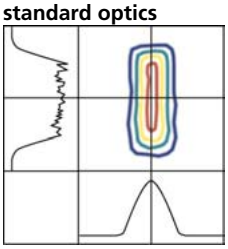
Methods of improving beam quality in laser diode modules

A laser diode naturally produces a beam that is divergent, elliptical, and astigmatic. A variety of optical procedures are available to correct for these deficiencies, procedures that enable a laser diode module to produce a circular, diffraction-limited beam with very low divergence.

Round output achieved via beam correction



Output resulting from standard optics



Laser diode optical correction

We at Power Technology, Inc. employ three methods of beam correction.

- We can integrate a highly advanced microlens into a variety of our packages. Microlensing circularizes the naturally elliptical light output of a laser diode. The microlensed diode emits a circular, diffraction-limited beam without the inclusion of correcting prisms and lenses. In addition, the extremely high entrance NA (numerical aperture) of the microlens captures virtually all of the optical energy available from the laser diode.
- Another method of beam circularization employs a pair of anamorphic correcting prisms. By adjusting the angles of the prisms and incorporating a circular aperture, we can circularize an elliptical beam. For astigmatic correction, we use a weak cylindrical lens after the collimating lens. Employing both of these methods results in a cost-effective means of correcting a beam.
- A method of both circularizing an elliptical beam and correcting astigmatism involves coupling a laser beam into a fiber optic. This method yields a superior, circular beam with low light scattering and no residual astigmatism.

Power Technology Incorporated

Mailing: P. O. Box 191117, Little Rock, AR 72219-1117 • Shipping: 16302 Alexander Road, Alexander, AR 72002
Tel: 501.407.0712 • Fax: 501.407.0036 • Email: sales@powertechnology.com • Web: www.powertechnology.com