

# Optima — Laser Diode Optics

## Cost Effective Lenses for Collimating and Focusing Laser Diodes

Collimating and focusing a laser diode is perhaps the most critical prerequisite in any laser diode application. While the characteristics of a laser diode might be ideal for your application, the laser diode must be matched with the appropriate optics to create a useable beam. Typically, the laser diode is collimated with one lens and a second lens is used to focus the beam. However, many applications exist where a single lens is used to either focus or collimate the beam. In either case, most laser diodes require a collimating lens with a large numerical aperture (NA) to efficiently capture the widely divergent perpendicular axis.



## Multi-Element Lenses for Optimal Performance

For the most demanding applications, a three or four element spherical lens achieves a level of optical performance difficult to obtain with any single element lens. To assure diffraction-limited performance, start by collimating the diode with one of the Optima 336 Series multi-element lenses. The 336 Series lenses are computer optimized to minimize aberrations, maximize coupling efficiency, and function over a broad range of wavelengths and normal manufacturing tolerances. The lenses can be used with most visible and near-infrared laser diodes and are currently used in a wide array of products including the following:

- Alignment and Distance Measuring Systems
- Positioning and Edge Finding Equipment
- Light Scatter and Particle Counters
- Linear and Rotary Encoders
- Free-space Laser Communication Systems
- Bar-code Readers

**336-1027-660 and 336-1027-785** — These are excellent general purpose collimating lenses; the small physical size is compatible with both 5.6mm and 9.0mm diameter laser diodes, making a very compact assembly. A relatively large numerical aperture (NA) of 0.48 captures a large percentage of the beam from most common laser diodes — coupling efficiencies typically range from 91% to 95%.

The 336-1027 is available with two standard MgF2 anti-reflection coatings designated as:

336-1027-660 for visible laser diodes (633nm to 750nm)

336-1027-785 for use with most near-infrared diodes (750nm to 980nm)

## Optima Multiple Element Spherical Lens Specifications:

PART NUMBER	336-1027-660	336-1027-785
UNIT PRICE (Qty 1-49 pcs.)	\$29.20	
DESCRIPTION	Collimating lens	
CONJUGATE DISTANCE	Infinite	
DESIGN WAVELENGTH (note 1)	660nm	785nm
FOCAL LENGTH	4.476mm	4.516mm
WORKING / SOURCE DISTANCE	2.17mm	2.20mm
NUMERICAL APERTURE	0.476	0.476
CLEAR APERTURE	4.30mm	4.30mm
F#	1.04	1.05
FIELD SIZE DIAMETER	0.156mm	0.158mm
AR COATING DESIGN CENTER, MgF2	660nm	785nm
TRANSMISSION	>93%	
COVER GLASS THICKNESS	0.25mm ~ 0.30mm	
COVER GLASS INDEX (n)	1.52023	1.51107
CELL MATERIAL & FINISH	Aluminum, Black Anodized	
CELL DIMENSIONS (diameter x length)	Ø6.4mm x 6.3mm	

Notes: 1) In the specifications listed above, the design wavelength is used to calculate the focal length; however, this does not limit use of the lens to this particular wavelength — these lenses can be used with both near-infrared and visible laser diodes from 635nm through 850nm.

