

Optical Isolator Capabilities

- Low cost **RoHS** ✓ Compliant Isolators
- Epoxy free optical path available
- Flexible optical and physical design
- Design variations without major process or tooling changes

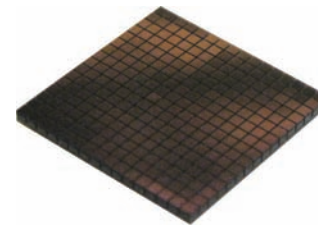
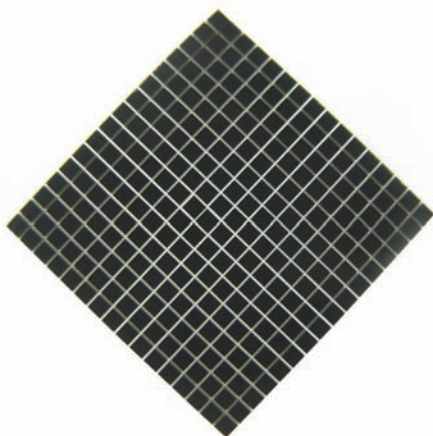
Optical Isolators provide lasers with immunity from back-reflection, thereby improving the signal to noise ratio for laser diode based transmitters. This is especially important for high data rate transceivers and transponders, or those devices requiring long span lengths between transceiver pairs. All of our isolators are based on dichroic polarizing glass and Faraday rotating crystals for highest performance. These devices are available in a single stage, 1.5 stages, or double stages, with multiple stages providing progressively higher isolation.

LightPath has extensive capability to design and build custom products where the flexibility of our platform-based processes provides a responsive and competitive advantage. We offer isolators in the Surface-Mount and Sub-Mount form factors. In addition, we manufacture isolators with either an epoxy-free optical path or with a laminated core. LightPath works with customers on the front-end to tailor isolators for the manufacture of next generation products.

The primary benefits of our approach to manufacturing include reduced costs as a result of higher yields, throughput and product consistency as a result of automation. LightPath is capable of delivering a total solution to its OEM customers, from prototype and development contracting through high-volume production.

Typical Isolator Performance Parameters		
Isolator Type	Minimum Isolation	Max. Insertion Loss
Single Stage	25 dB	0.3 dB
1.5 State	42 dB	0.5 dB
Double Stage	47 dB	0.5 dB

This table shows typical specifications for single, 1.5, and double stage isolators (Temperature 0°C to 85°C λ (center) \pm 20 nm).



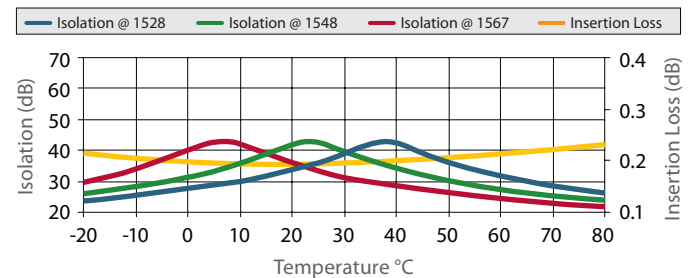
Typical Temperature and λ Dependence

The following graphs show how isolation performance changes as a function of temperature and wavelength for single stage, 1.5 stage, and double stage isolators. Isolation performance increases as stages are added to the isolator. Additional stages also reduce the sensitivity of the isolator to changes in temperature and wavelength.

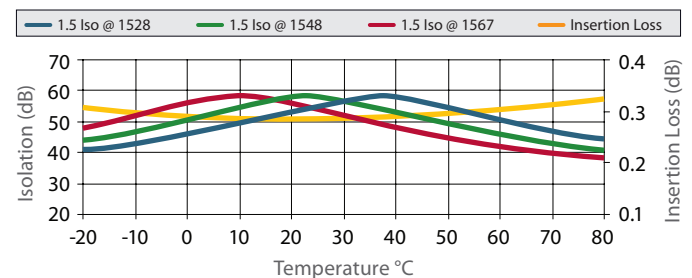
LightPath will customize isolators to be optimized for isolation performance over a specific temperature range and wavelength. These optimized isolators can be mass produced very quickly at prices comparable to the standard isolators listed in this catalog.

Isolation & Insertion Loss as a Function of Temp. and λ

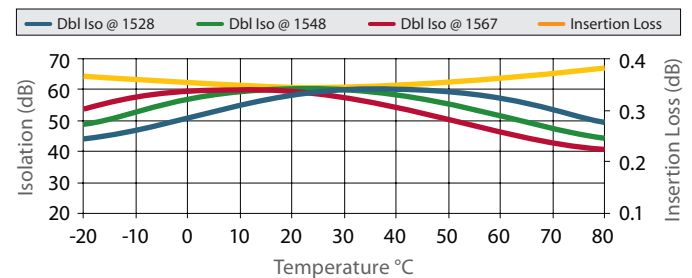
Single Stage (non-latching garnet)



1.5 Stage (non-latching garnet)



Double Stage (non-latching garnet)



Optical Isolator Capabilities

- Metro, access, long haul and hybrid fiber coax
- High volume wafer-scale manufacturing
- High isolation, low insertion loss
- Square form factor for ease of mounting
- One stage, 1.5 stage, and double stage isolation

Many of today's transmitters require optical isolators to eliminate back reflections and feedback in the laser diode. This feedback and noise creates jitters in the system. LightPath's Tx™ Isolators are manufactured in a very economical and scalable process.

By utilizing a wafer based platform, you can be assured of premium performance at an outstanding value. LightPath's processes allow manufacturing, test, and inspection on hundreds of isolators in wafer format.

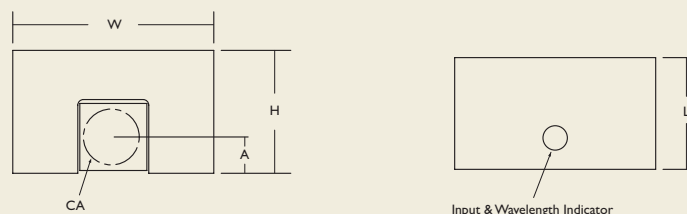
Tx™ Isolators

The Tx™ Isolators are manufactured with a latched garnet, which eliminates the need and extra cost associated with traditional magnet. Latched garnet has the orientation of its magnetic dipoles frozen by poling in an external magnetic field at an elevated temperature.

Tx™ isolators require lower post processing temperatures. If temperatures in your process are higher than 150 degrees centigrade, please contact LightPath to discuss your requirements with our product engineers.

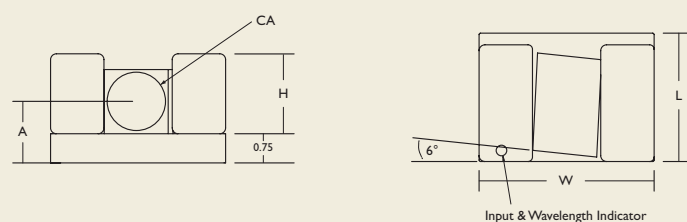
Surface Mount Isolators

- Small form factor
- Laminate core
- Solder or epoxy attach
- Suitable for pick-and-place assembly



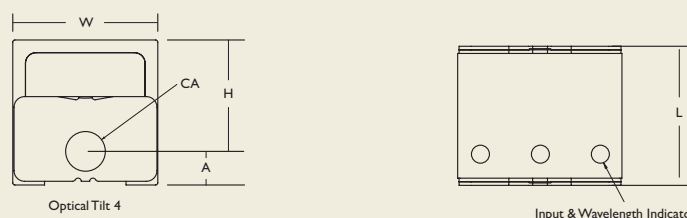
Sub Mount Isolators

- Small form factor
- Laminate core
- Solder or epoxy attach
- Sub-mount thickness determines optical axis height



Micro Fixture Isolators

- Epoxy free core optical path
- Laser welded construction



Oasis™ Monolithic Isolator & Aspheric Lens

Oasis™ provides a compact solution by combining both an aspheric lens and an isolator. Built as a monolithic design, it offers diffraction limited performance optics along with outstanding isolation. The designs are ideal for small form factor laser diodes in both single and multi-channel configurations.

The Surface Mount configuration offers smaller form factors and exceptional value. The typical Surface Mount Oasis™ contains a 0.55 NA Finite Conjugate lens that couples a laser directly into a single mode fiber. As with all of our products, LightPath offers extensive support to our customers in designing and manufacturing custom configurations. These would include a wide selection of aspheric lenses and single, 1.5, and double stage isolation.

Oasis™ Surface Mount		
Drawing	Lens Parameter	Sample Value
	Design Wavelength	1550/1480 nm
	Numerical Aperture (NA)	0.55
	Clear Aperture (CA)	0.53 mm
	Effective Focal Length (EFL)	0.382 mm
	Magnification	4.02
	RMS WFE	Diffraction Limited
	Outer Diameter (OD)	1.20 mm
	Working Distance (WD)	0.290/1.91 mm
	Distance Lens to Laser	0.290 mm