2 µm High Power Fiber Circulator

(up to 50W, SM, PM, LMA, DCM)

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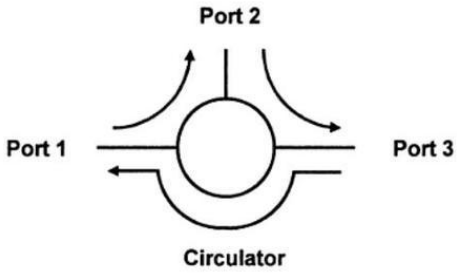
This 2 µm PM fiber optical circulator is a three-port passive device that transmits high-power light in one direction while directing reverse-propagating light to a third port, maintaining functionality for any state of polarization. Leveraging Agiltron's proprietary magneto-optic technology and advanced micro-optic techniques, it offers compact size, high power handling, low loss, and exceptional reliability at a competitive cost. For optical power levels below 20W, heatsink fins are utilized for thermal management, while a proprietary passive liquid cooling system ensures reliable heat dissipation for power levels exceeding 20W. Agiltron provides polarization-independent, polarization-maintaining, and custom-designed versions with integrated filter and power monitor, with support for a broad wavelength range and compatibility with specialized fibers.



Features

- High Power Handling
- Low IL, PDL &TDL
- High Isolation
- High Reliability
- Cost Effective

Applications

- Laser Pump Source
- Optical Fiber Amplifier
- Laser Manufacturing
- Test and Measurement

Specifications

Parameter		Min	Typical	Max	Unit
Operation Wavelength		1950	2000	2040	nm
Insertion Loss [1], [2]			1.5	2 [3]	dB
PDL (Single mode)				0.1	dB
Extinction Ratio (PM fiber)		18	20		dB
Return Loss [1]		50			dB
Isolation	Single State	20 [4]	25	30	dB
	Dual State	40	50	55	
Optical Power Handling CW [5]				5	W
ns Pulse Peak Power Handling				10	kW
Operating Temperature		-5		70	°C
Storage temperature		-40		85	°C

Notes:

[1]. Excluding connectors.

[2]. Using fiber centered at the operation band reduces loss

[3]. Longer wavelength has higher loss due to material absorption

[4]. Measured at the center wavelength

[5]. Back Reflect < 10%. For >10% application, please call us.

Note: For a polarized input light version, the isolation is optimized to block the light reflection of the same polarization. Although lights of other polarizations may also be blocked, the extinction may be poor. PM isolators can be specially made to block backward propagating lights of all polarizations. PM isolators can also be made with a light polarizing function.

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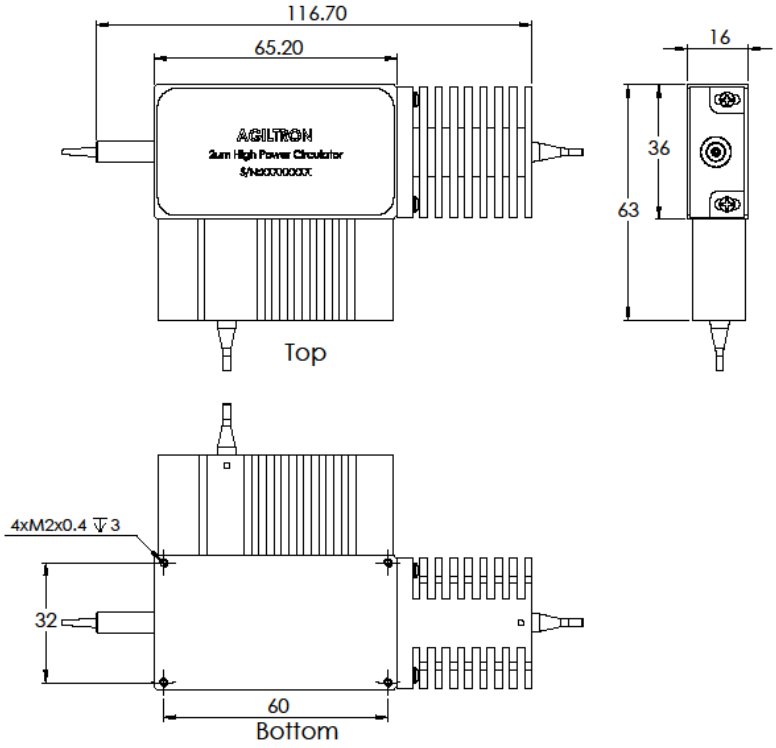
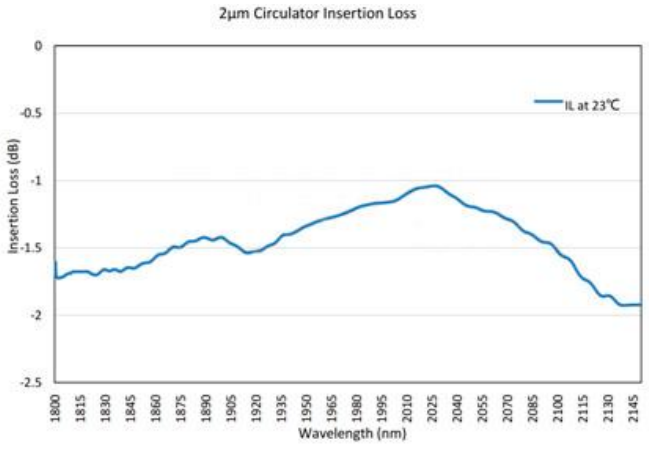
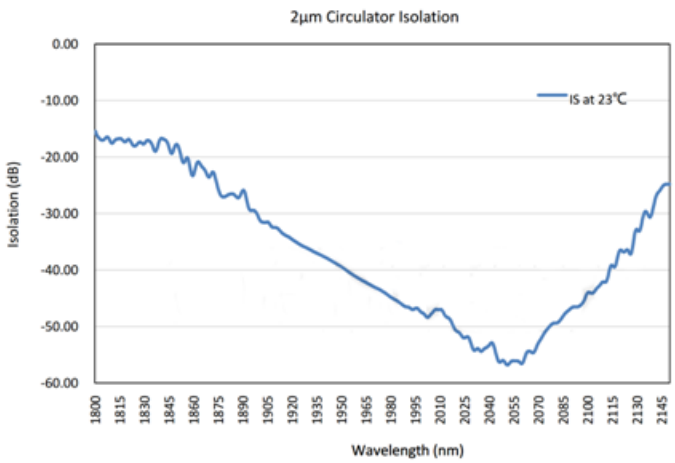
Mechanical Footprint Dimensions (mm) 10-25W



*Product dimensions may change without notice. This is sometimes required for non-standard specifications.

Typical Optical Spectrum Dual Stage





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Ordering Information (Part Number)

	☐	☐	☐	☐	☐	☐	☐	☐	☐
Prefix	**Stage**	**Type**	**Wavelength**	**Power handling**	**Working Axis**	**Fiber Type**	**Fiber Cover**	**Fiber Length**	**Connector [1]**
HPPC-	Single = A Dual = B	Standard = 1 With WDM = 2 With Tap = 3 WDM/Tap = 4 Special = 0	1950nm = 1 2000nm = 2 Special = 0	0.3W = 0 1W = 1 2W = 2 5W = 5	Fast Axis Blocked = F Both Axis working = B	PM1550 = 1 PM1950 = 2 PM2000 = 3	Bare fiber = 1 900um tube = 2 3mm tube = 3 Special = 0	0.25m = 1 0.5m = 2 1.0m = 3 Special = 0	None = 1 FC/PC = 2 FC/APC = 3 SC/PC = 4 SC/APC = 5 ST/PC = 6 LC/PC = 7 LC/APC = A LC/UPC = U Special = 0

[1]. The default connector configuration uses fiber with 0.9 mm buffer protection. The connector cannot be installed directly onto bare fiber because the bare fiber is prone to damage during shipping. However, the connector can be assembled on bare fiber if a 3 cm protective loose tube is added for reinforcement. The customer may remove this protective tube after testing. The optical power handling of a standard connector is less than 0.5 W for SMF-28 fiber and decreases further for smaller-core fibers.

Application Notes

Fiber Core Alignment

Note that the minimum attenuation for these devices depends on excellent core-to-core alignment when the connectors are mated. This is crucial for shorter wavelengths with smaller fiber core diameters that can increase the loss of many decibels above the specification if they are not perfectly aligned. Different vendors' connectors may not mate well with each other, especially for angled APC.

Fiber Cleanliness

Fibers with smaller core diameters (<5 µm) must be kept extremely clean, contamination at fiber-fiber interfaces, combined with the high optical power density, can lead to significant optical damage. This type of damage usually requires re-polishing or replacement of the connector.

Maximum Optical Input Power

Due to their small fiber core diameters for short wavelength and high photon energies, the damage thresholds for device is substantially reduced than the common 1550nm fiber. To avoid damage to the exposed fiber end faces and internal components, the optical input power should never exceed 20 mW for wavelengths shorter 650nm. We produce a special version to increase the how handling by expanding the core side at the fiber ends.

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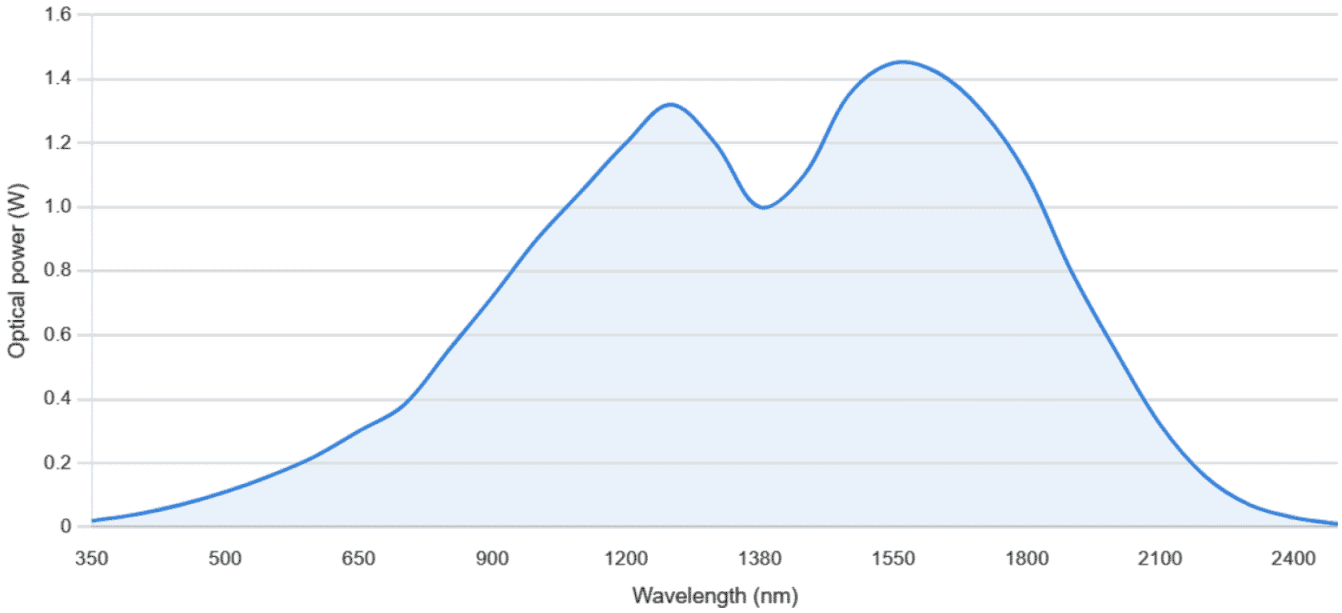
Regular Single Mode / Polarization Maintaining Fiber Optical Power Handing vs Wavelength



Single mode fiber optical power is limited by nonlinear effects in addition to absorption that increase loss and generate heat. The curve shows the approximate safe CW power envelope for standard single-mode fiber. Actual limits depend on fiber design, core size, length, and laser characteristics. Specialty fibers can significantly increase the power limit.

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