Polarization Maintaining Fiber Amplifier 1550nm

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Features

- Low Noise
- High Output Up to 40dBm
- High Stability
- High Reliability
- Customizable

Applications

- BOTDR
- OTDR
- LiDAR
- Fiber sensing

Agiltron Erbium-doped fiber amplifier (EDFA) provides cost-effective solutions for high-power optical amplification. It is built using semiconductor lasers, WDM, isolator, and erbium-doped fiber. The product has the advantages of high reliability, high power output, high gain, and low noise. Two configurations are available: A pre-Amplifier for small optical signal amplification and a Booster amplifier for maximum output power. We make both random polarization and polarization maintain versions. It has several package configuration choices. A Benchtop unit that is preset at the highest gain is suited for laboratory use. The Benchtop has a computer control interface and GUI. The compact module is suited for system integration with the universal control interface. The pluggable and the associated host net-control rack are standardized for local network build-out. Customer configurations are available with an NRE fee.

The EDFA has isolators on both input and output.

These Erbium-Doped Fiber Amplifiers (EDFAs) are engineered for a long operational lifespan, typically designed to function reliably for over 10 years. This durability is achieved through high-quality components and robust manufacturing processes. The design considerations include thermal management, component selection, and rigorous testing to maximize the amplifier's longevity and efficiency.

Specifications

Parameter		Min	Typical	Max	Unit
Wavelength		1543	1550	1605	nm
Input Power	Booster Amplifier	-6	0	7	dBm
	Pre-Amplifier	-30	-20	-10	dBm
Saturated Output Power [1]		15		40	dBm
Power Conversion Efficiency [2]		8		11	
Gain Range [3]		13		40	dB
Noise Index			5.5		dB
Gain Flatness			3		dB
Polarization Dependent Gain [4]				0.3	dB
Polarization Mode Dispersion [4]			0.5		
Polarization Extinction Ratio [5]		20		27	dB
Input/output Isolation		35			dB
Output Stability (8hrs RMS)			0.05	0.5	%
Adjustable Output Power			Yes		
Fiber Type		SMF-28e 9/125um NA = 0.13			
Working Temperature [6]		-30		70	°C
Storage Temperature		-40		85	°C
Power Supply		DC +5V/GND			
Communication		>20dBm	RS232		
		<20dBm	USB		

Notes:

[1] Maximum optical output power. For Booster type only

[2] Define as the ratio of Electrical Input Power/Optical Output Power

[3] Amplification. Output power = Gain X Input power. For weak signals, buy a preamplifier

[4] Random polarization version only

[5] Polarization Maintaining only

[6] The regular range is -5 to 40°C, for extended range requires additional cost

* Preamplifier output power is limited to 25dBm

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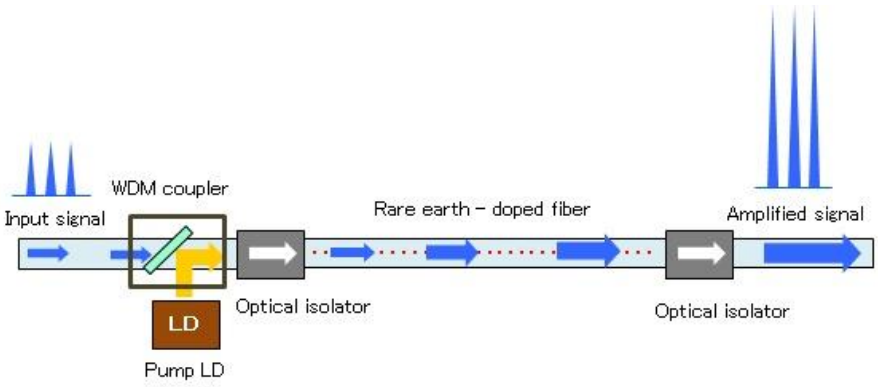
Function Diagram



Package Choices

Component

Benchtop .

Net-Control Rack

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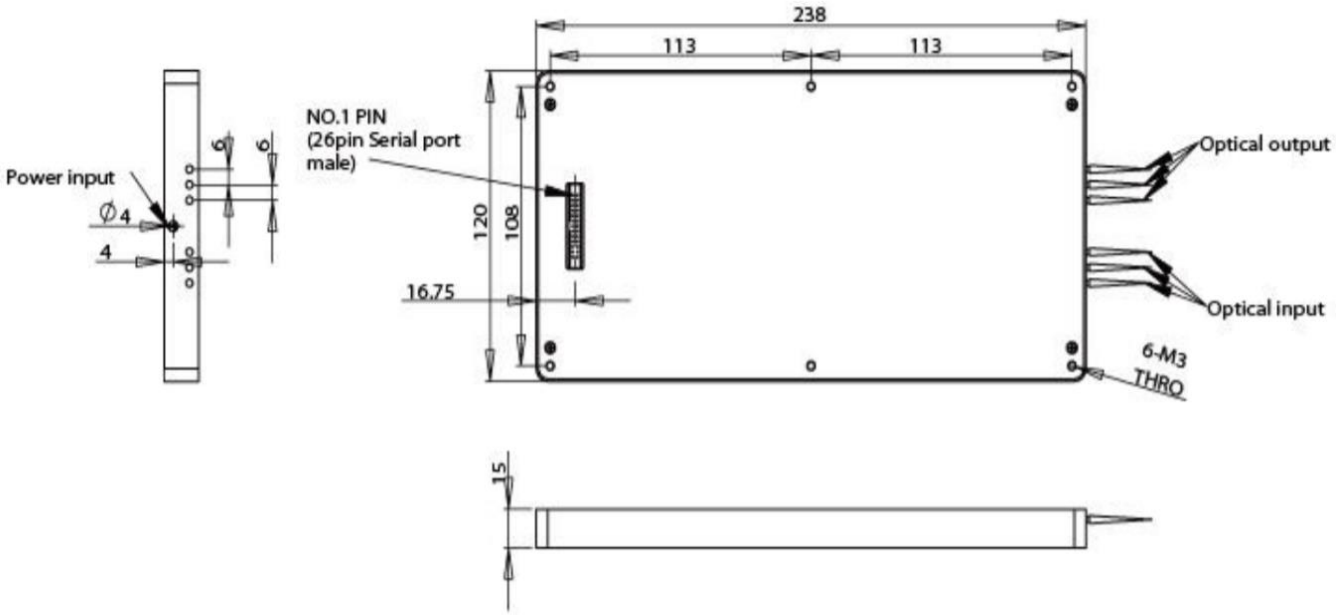
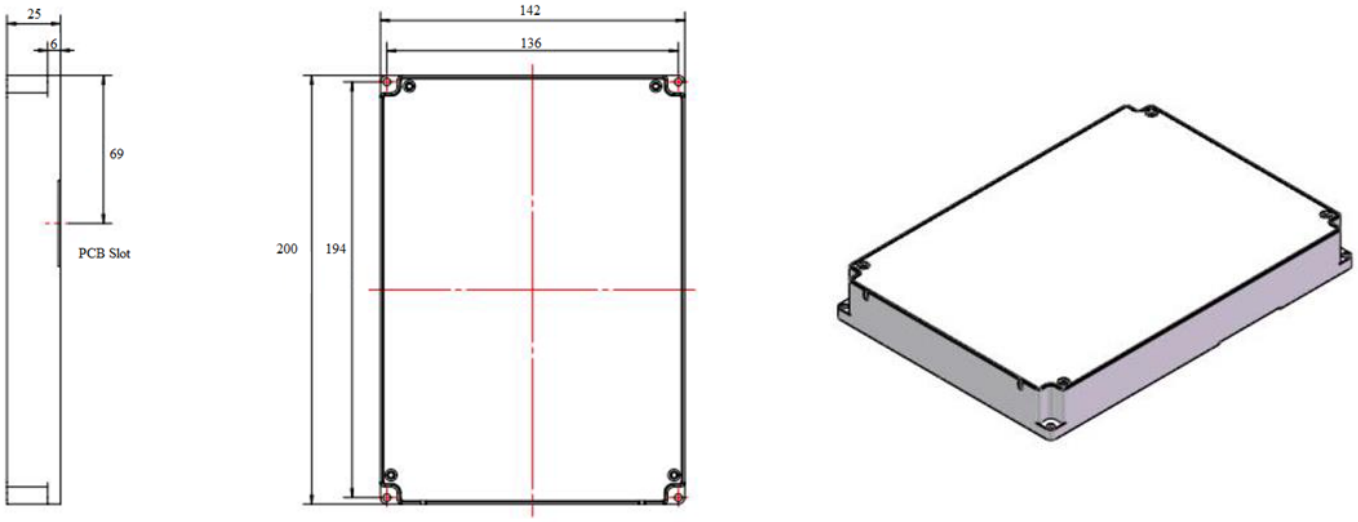
Mechanical Dimension (33dBm)



Mechanical Dimension (30dBm/1W)



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

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Ordering Information

	☐	☐	☐	1	2	☐	☐	☐	☐	☐	☐
Prefix	**Type**	**Wavelength**	**Power [1]**		**Polarization**	**Package**	**Cable Type**	**Fiber Length [3]**	**Connector [4]**	**Low Temperature**	**High Temperature**
EDFA-	Booster = 1 Preamp = 2	C Band = C L Band = L Red Band = R Blue Band = B Special = 0	10dBm/10mW = A 15dBm/30mW = B 17dBm/50mW = 2 20dBm/100mW = 3 22dBm/160mW = C 23dBm/200mW = D 24dBm/250mW = E 25dBm/320mW = F 26dBm/400mW = G 27dBm/500mW = H 30dBm/1W = 1 33dBm/2W = 5 35dBm/3W = 6 37dBm/5W = 7 40dBm/10W = 8 41dBm/12W = 9 Special = 0		Maintain = 2	Component = 1 Benchtop = 2 Pluggable = 3 Plug/Rack = 4 Special = 0	0.9mm 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 LC/PC = 7 Duplex LC/PC = 8 LC/APC = A LC/UPC = U Special = 0	-5°C = 1 -30°C = 2 Special = 0	40°C = 1 70°C = 2 Special = 0

[1]. For Booster, Power means maximum output power. For Preamp, Power means maximum amplification gain.
[2]. This has a small package without power adjustment capability for lower cost
[3]. For >1W modules, the fiber cables extrude out of the front.
[4]. Regular connector only rated to 0.5W and will burn at higher power. We make a special beam expanded connector to handle up to 5W. PM connector is aligned to the slow axis

Note:

- Preamplifier output power is limited to 25dBm

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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Q&A About Fiber Optical Amplifier

Q: Can this amplifier pulsed signals?
A: It has been tested to amplify up to 100GHz digital data.

Q: Can this amplifier WDM signals?
A: It has been tested to amplify signals with DWDM wavelength spacing.

Q: Can this amplifier has a flat wavelength response?
A: Yes, by put flattering gain filters, that is an extra cost.

Q: If one puts a small signal into it, can it be amplified to the maximum output power indicated on the spec?
A: The amplifier is set as an analog mode whose output signal strength is approximately proportional to the input strength. It has a certain gain of about 40dB. There are two types: one is a preamplifier and a booster. One can use a preamplifier before the booster for weak signals, as done in electronic amplifiers.

Q: We have an existing amplifier. Can you duplicate it?
A: Yes, we can produce it with a seamless software interface.

Modes Description

The EDFAs have both ACC mode - automatic current control or constant current control and APC mode - automatic power control settable via GUI. In the ACC mode, the pump laser's current is set by the user and automatically locked by the EDFA to achieve a constant pumping current. The EDFA's output power is proportional to the input power and has output even though the input signal is weak. In the APC mode, the user sets the output power, and the EDFA automatically maintains the output constant in a feedback laser pump control way. When the input optical power fluctuates, the APC mode minimizes the fluctuation of the output power and is suitable for power type and line type EDFA.

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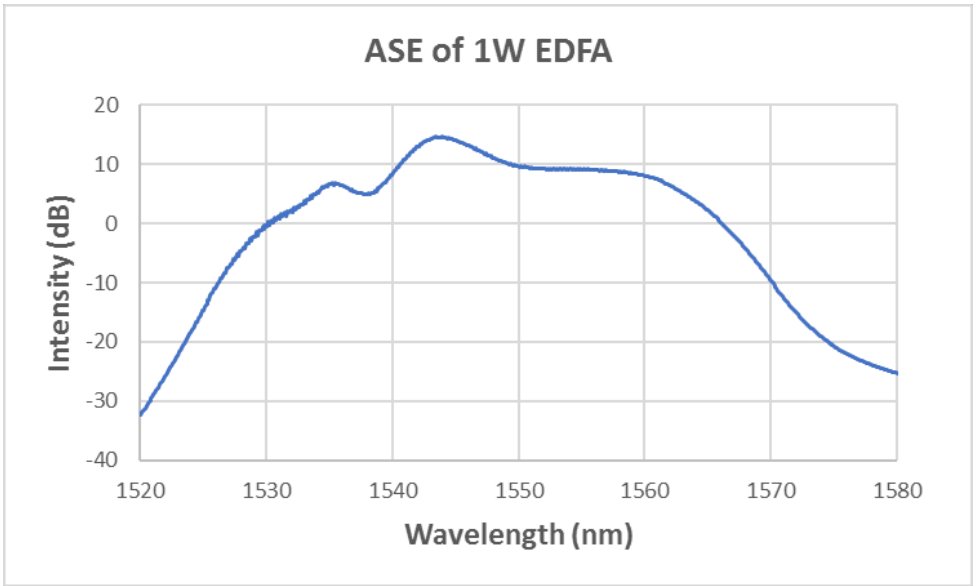
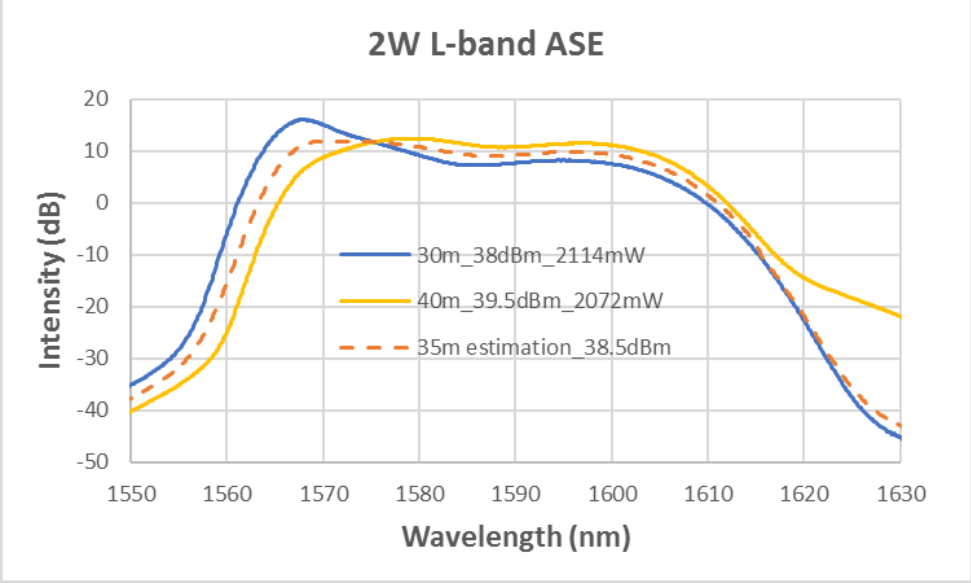
Typical Spectrums





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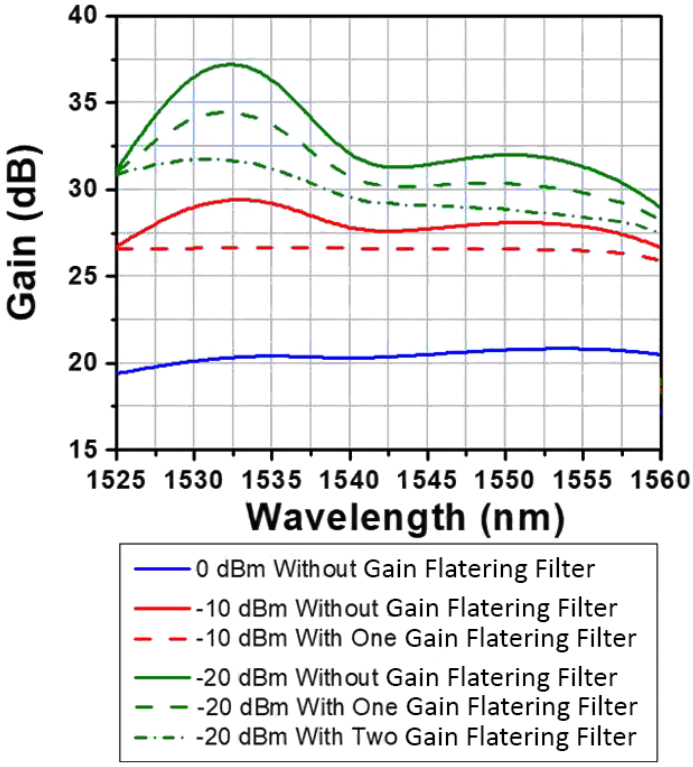
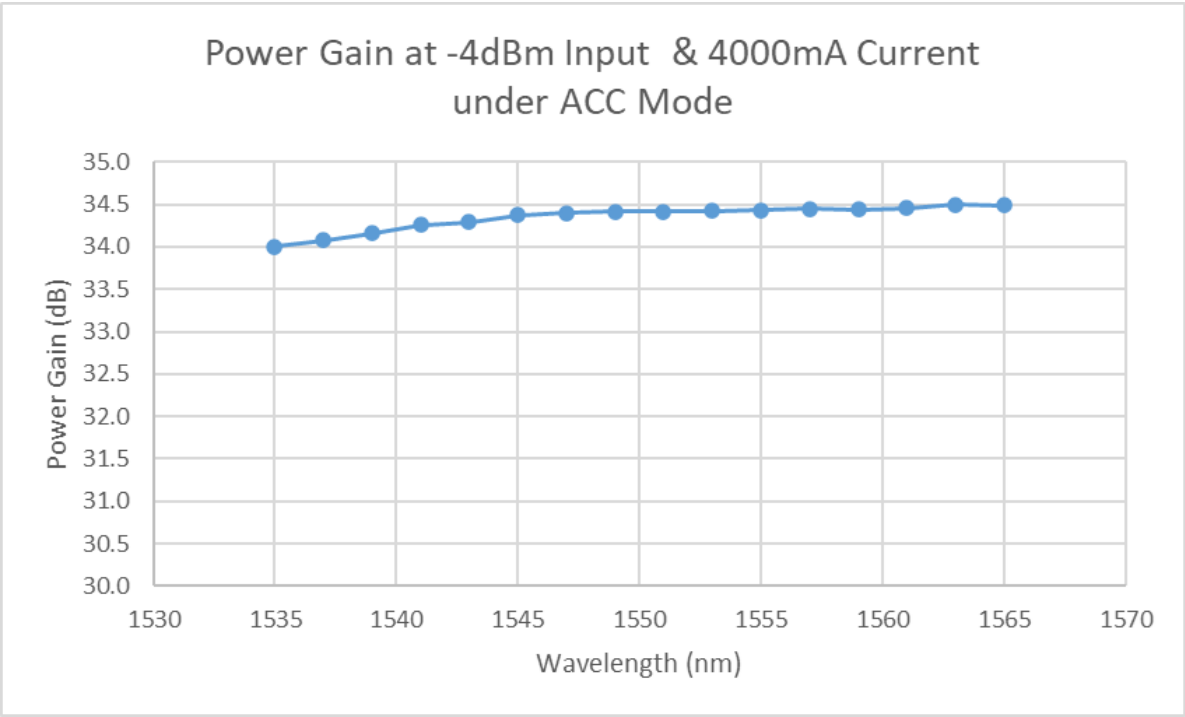
Gain Flattering Filter Effect



Power Gain



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Control GUI