aeroGAIN-BASE-1.2

High power ytterbium fiber gain module

- Truly single mode polarization maintaining system
- Excellent pointing stability
- Robust industrial construction
- 10 µm or 15 µm step-index fiber input
- Easy thermal management
- Long lifetime

Applications

- Ultrafast fiber lasers

The aeroGAIN-BASE-1.2 is a high performance ytterbium fiber gain module designed for industrial manufacturers of pulsed fiber lasers, providing laser beams with high spectral and spatial brightness. It is also suited as an easy entry into ultrafast scientific setups. This model has a reduced size compared to other members in the aeroGAIN-BASE family. The module is equipped with either a 10 or 15 µm step-index single-mode fiber input that can easily be spliced to a seed source. The gain medium is our industry leading DC-200/40-PZ-Yb fiber providing the largest single mode MFD in the industry. The gain fiber is heatsunk to the aluminum base-plate which can be clamped to e.g. a water chilled plate or an air-cooled heat sink. The output end of the module is equipped with a large AR coated endcap that provides mode expansion and reduces reflections. Excess pump light is removed by the integrated residual pump dump.

For optimal performance, the aeroGAIN-BASE-1.2 is designed for counter propagating pumping through the output end-cap. The end-cap and the last part of the gain fiber is mounted in a water cooled housing to ensure maximum performance and lifetime.

Seed →   ← Pump

125/10 step-index input seed fiber   Residual pump dump   40 µm core single-mode gain fiber   Water cooled section   Mode stripper   End-cap
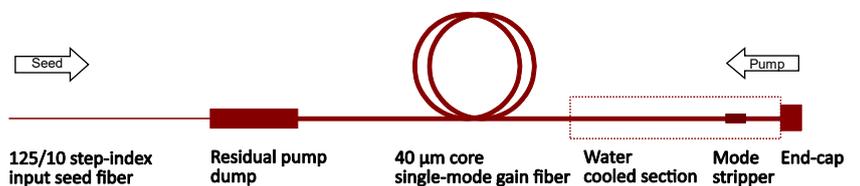
Model	Yb Fiber Length	Recommended signal wavelength
aeroGAIN-BASE-1.2	1.8 m	1030 - 1040 nm

The aeroGAIN-BASE design has proven its industrial 24/7 reliability through a significant number of long term tests including continuous 25,000 hours operation at 55 W output power. The design has been subjected to extensive HASS testing. Lifetime in specific OEM systems depends on pump power, pump wavelength, cooling efficiency etc. and NKT Photonics is available for supporting system design.
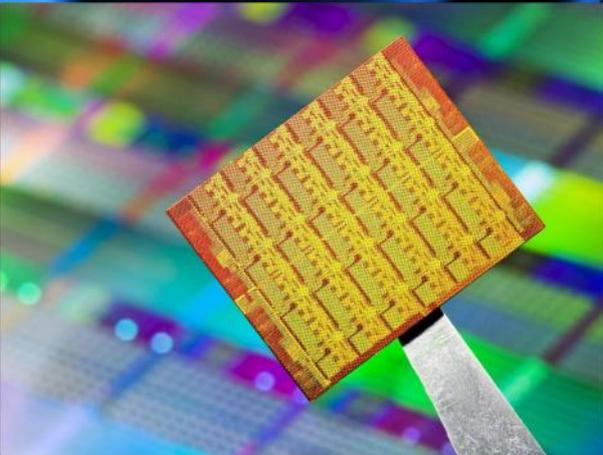
Specifications

Optical

Seed input

Signal wavelength	1030 – 1040 nm
Recommended signal input power	> 500 mW
Recommended pulse duration	fs, ps or ns pulses
Signal input fiber	- 10 μm core PM 125 μm / 250 μm or - 15 μm core PM 250 μm / 350 μm

Signal Output

Max signal gain	< 20 dB
Rated output power	75 W
M^2	≤ 1.3
Mode field diameter	31 ± 2 μm
PER	≥ 15 dB
Typical optical efficiency*	> 70 %
Typical core to clad power ratio**	> 96 %

Pump Input

Pump center wavelength	976 ± 2 nm
Maximum pump power P_p	100 W @ fiber facet
Recommended pump type	Fiber delivered 200/0.22 (max NA<0.55)
Pump cladding diameter	200 ± 2 μm

* At max power   ** Amplified signal

Mechanical

Base plate dimensions (HxBxW)*	See drawing
Weight	1.8 kg (without tooling plate)
Length of input pigtail	1 m
Output end facet angle	0 degree
End-cap length / diameter	6 mm / 7 mm** - AR coated

* The system is shipped on a larger tooling plate that can also be used for mounting the module during test
** Open aperture

Water cooling

Cooling flow for base	4 ± 2 liter/minute
Cooling flow in the tube	0.2—0.5 liter/minute
Cooling water temperature	25 ± 5°C
Max temperature of base-plate	35 °C
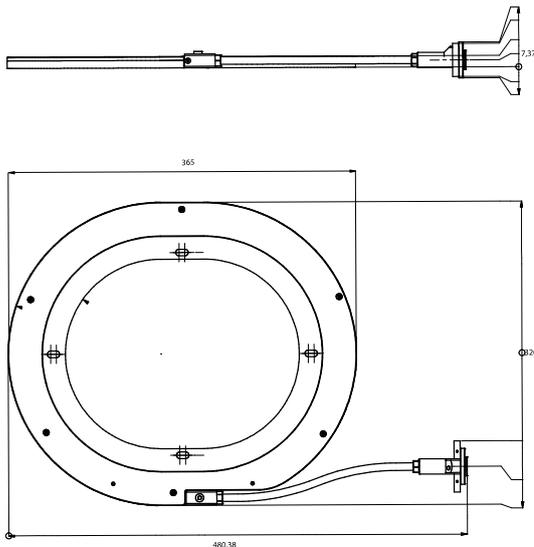
Other aeroGAIN products

aeroGAIN-ROD

Whenever a 40 μm core is not large enough our aeroGAIN-ROD modules deliver the ultimate gain solution. With MFDs in excess of 65 μm, ROD systems sits at the very top of the amplifier chain reaching power levels normally only found in DPSS systems but with the benefits of a fiber waveguide and the efficient ytterbium material system.

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