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FIBERAMP



Fiber Amplifiers

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An Extended Series of Fiber Amplifiers

FEATURES

C-BAND FIBER AMPLIFIERS

C-band FIBERAMP technology is based on field-proven 980 nm co-propagating pumping of erbium-doped fiber that provides a low 4.5 dB (typ.) noise figure and a high saturated output power.

The benchtop version, FIBERAMP-BT 17 with 17 dBm saturated output power, is the ideal high-performance amplifier for plug-and-play use around the lab and modular versions are also available for platform or OEM applications.

HIGH OUTPUT POWER

FIBERAMP-BT 20 is a double-pump benchtop version with +20 dBm output power for those power-hungry applications where 100 mW at 1550 nm makes a difference.

L-BAND FIBER AMPLIFIERS

FIBERAMP-BT L is an erbium-doped fiber amplifier dedicated to the 1570-1610 nm window that offers +17 dBm of saturated output power.

Ideally suited for applications that require amplification and high output power in the L-band.

FLAT & FIXED-GAIN

FIBERAMP-BT F is a flat gain EDFA providing 1 dB (typ.) flatness over 30 nm in the C-band window. The proprietary optical gain-control scheme provides 22 dB fixed gain and input-signal level independence over a remarkable 15 dB dynamic range. An all-optical solution for unpredictable add-and-drop situations in WDM systems.

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FIBERAMPs are an extended series of high-quality optical amplifiers with state-of-the-art design. They offer outstanding performance, notably high gain, unsurpassed noise figure, flat spectral response, low-polarization dependence, and high output power. Two formats are available: convenient stand-alone bench-top instruments with the full suite of parameter controls and compact modules for platform or OEM applications. The FIBERAMP family covers all needs in fiberoptic amplification, from generic erbium-doped models operating in both the C- and L-band to a unique flat & fixed-gain version.

MODELS

BENCHTOP UNITS



Benchtop units

FIBERAMP-BT models are full-featured benchtop units packaged with complete control electronics and power supplies. Their flexible, user-friendly front-panel controls, rear-panel monitoring analog outputs, and IEEE-488 computer interface make them ubiquitous instruments for optical communication laboratories. 19" rack-mount versions are also available and can be easily inserted into test systems.

OSICS MODULES



OSICS module

When many EDFAs are necessary, GN Nettest also offers the OSICS modular platform for hosting up to 8 amplifier modules (OSICS-EDFA). These modules can be also mixed and matched with tunable external cavity lasers (OSICS-ECL), distributed feed back laser diodes (OSICS-DFB), and amplified spontaneous emission sources (OSICS-ASE). OSICS-EDFA features a high-performance C-band erbium-doped fiber amplifier module which offers a remarkable +17 dBm of saturated output power and a low 4.5 dB (typ.) noise figure.

OEM MODULES



OEM module

FIBERAMP-SM 17 is a compact, single-pump gain module for OEM applications. It includes complete and sophisticated pump diode electronics and features full user control via an RS-232 serial interface. Rugged and tightly packaged, it is designed for low power consumption and operates over a wide range of temperature.
The FIBERAMP-SM 17 model offers +17 dBm saturated output power, making it a universal OEM gain amplifier module for system designs.

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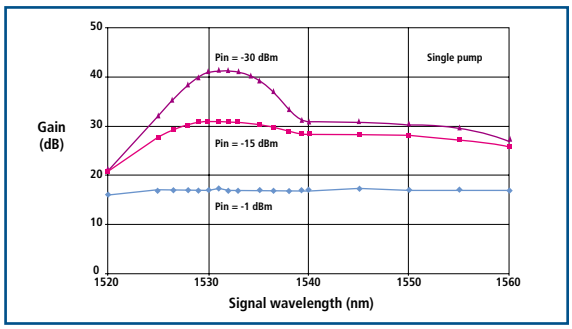
C- and L-band Erbium-Doped-Fiber Amplifiers

> Single-pump and double-pump configurations
> Over 35 dB small-signal net gain at 1530 nm
> Outstanding 4.5 dB (typ.) noise figure
> +17 dBm or +20 dBm saturated output power in the C-band
> +17 dBm saturated output power in the L-band
> Benchtop and modular models.

FIBERAMP-BT 17 AND -BT 20

FIBERAMP-BT 17 and -BT 20 Erbium-Doped Fiber Amplifiers operate in the C-band. They feature advanced, and now field-proven, 980 nm pump-diodes and a co-propagating pumping configuration for a low 4.5 dB (typ.) noise figure irrespective of signal and pump power levels.

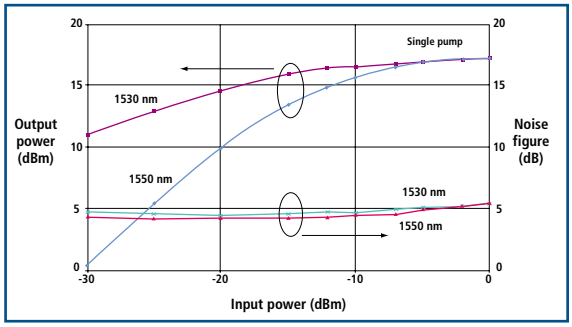
The erbium-doped fiber is optimized in concentration and length for a small-signal gain in excess of 35 dB at the peak wavelength of 1530 nm and 25 dB at 1550 nm (for FIBERAMP-BT 17), and a maximum saturated output power. It is co-doped with aluminum for a flat spectral response around 1550 nm, even under low-signal conditions. With its double-pump configuration, FIBERAMP-BT 20 provides up to +20 dBm of saturated output power.



Gain vs wavelength (typical) for FIBERAMP-BT 17

OSICS-EDFA

All the features of FIBERAMP-BT 17 can also be found in the OSICS-EDFA modules.
Up to 8 modules can be controlled with the versatile OSICS platform.



Output power and noise figure @ 1530 nm and 1550 nm (typical) for FIBERAMP-BT 17

FIBERAMP-SM

For OEM applications FIBERAMP-SM 17 offers all the features of FIBERAMP-BT 17 in a compact, fully-controllable package.

FIBERAMP-BT L

Completing these general-purpose amplifiers, the FIBERAMP-BT L is designed to operate in the long wavelength band (L-band) between 1570 and 1610 nm. It provides high gain, high output power (+17 dBm) and low noise figure.

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Flat & Fixed-Gain Erbium-Doped Fiber Amplifier

The optical gain of conventional Erbium-Doped Fiber Amplifiers (EDFAs) varies a great deal with channel count, wavelength and total optical input power.

When EDFAs are deployed in a network, adding or dropping channels at random is likely to defeat the equalization and upset the network gain budget.

FIBERAMP-BT F

> Input power independent over 15 dB

FIBERAMP-BT F maintains gain flatness over a remarkable 15 dB dynamic range, a 32-fold variation in optical power or active-channel number.

> 1 dB (typ.) flat over 30 nm

It offers an unsurpassed 1 dB (typ.) flatness over the entire 1530-1560 nm range.

> Fixed 22 dB-gain design

FIBERAMP-BT F is a novel EDFA that provides the network designer with a 22 dB fixed-gain block, independent of both wavelength and total input power.

> Two proprietary concepts

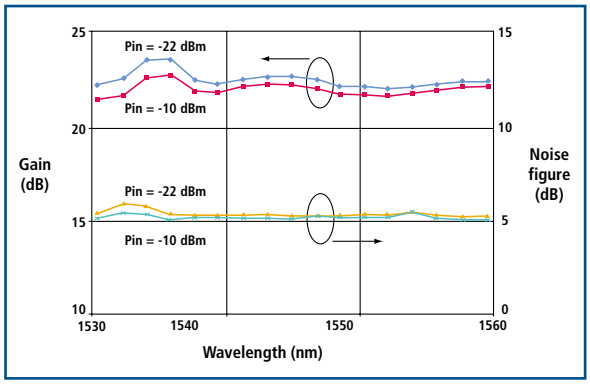
This is achieved by combining two proprietary concepts: an all-fiber equalization filter and an all-optical gain-lock mechanism, in a coordinated layout.

> Noise figure below 6 dB

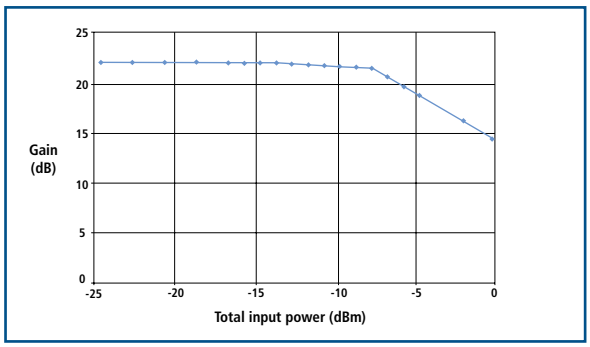
The FIBERAMP-BT F design does not sacrifice in any way the noise figure, which remains below 6 dB under all operating conditions, nor the output power capability, with a potential of over +2 dBm per channel in a 16-channel system.

> Ideally suited for DWDM networks

FIBERAMP-BT F is the perfect building block for ring and mesh all-optical networks where flexibility in amplifier spacing and in active-channel number is necessary. It opens a realm of possibilities in the design of new DWDM-network architectures.



Gain and noise figure vs wavelength



Gain vs input power

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SPECIFICATIONS

Benchtop unit Platform module OEM module	BT 17 OSICS-EDFA SM 17	BT 20	BT L	BT F
Wavelength range	1525-1560 nm	1525-1560 nm	1570-1610 nm	1530-1560 nm
Output power[1]	>+17 dBm	>+20 dBm	>+17 dBm	>+14 dBm[2]
Small signal gain[3]	>25 dB	>35 dB	>35 dB	
Fixed small signal gain[4]				22 ±2 dB
Noise figure	<6 dB (4.5 dB typ.)	<6 dB (4.5 dB typ.)	<6 dB	<6 dB
Polarization sensitivity of gain[5]	<0.5 dB	<0.5 dB	<0.5 dB	<0.5 dB
Spectral gain flatness[6]	3 dB typ.	2 dB typ.		
Power Independent spectral gain flatness[7]				2 dB (1 dB typ.)
Input and output isolation	35 dB	35 dB	35 dB	35 dB

Controls, Interface, Environment	BT models	SM 17 model	OSICS-EDFA
Displays and settings	Pump current Pump power	Pump current Pump power	Pump power
Power supply	100 to 240 V, 50 to 60 Hz	5 V, 1 A	100 to 240 V, 50 to 60 Hz
Operating temperature range	0 to +50 °C (+30 to +125 °F)	0 to +65 °C (+30 to +150 °F)	+15 to +35 °C (+55 to +95 °F)
Dimensions (W x H x D)	235 x 180 x 325 mm[3][8]	160 x 76 x 26 mm[3]	35 x 130 x 250 mm[3][9]
Alarms	Current limit Temperature control error		Pump power limit Temperature control error
Electrical outputs	Pump power and pump current analog output		Pump power and pump current analog output
Electrical interface	IEEE-488.1	RS-232 C	IEEE-488.2 and RS-232 C
Optical interface	FC-APC on Corguide™ SMF-28 fiber	FC-APC on Corguide™ SMF-28 fiber	FC-APC on Corguide™ SMF-28 fiber

NOTES

(1) With 0 dBm input signal power at 1550 nm (1590 nm for FIBERAMP-BT L).
(2) With the total input power that yields a 1 dB decrease of the fixed gain. FIBERAMP-BT F also offers more than +17 dBm saturated output power.
(3) With -40 dBm input signal power at 1550 nm (1590 nm for FIBERAMP-BT L).
(4) Locked gain for a total input power from -25 to -10 dBm over 1530 to 1560 nm.
(5) Polarization sensitivity of gain can be optionally specified at 0.25 dB (see options).
(6) For a single channel at -30 dBm input power from 1540 to 1560 nm (BT 17, OSICS-EDFA, SM 17 and BT 20).
(7) For -25 to -10 dBm total input power variation from 1530 to 1560 nm (BT F).
(8) 345 x 180 x 325 mm³ for FIBERAMP-BT 20 and FIBERAMP-BT F.
448 x 133 x 370 mm³ for 19" rack-mount version. (see options)
(9) 448 x 133 x 370 mm³ for OSICS platform.

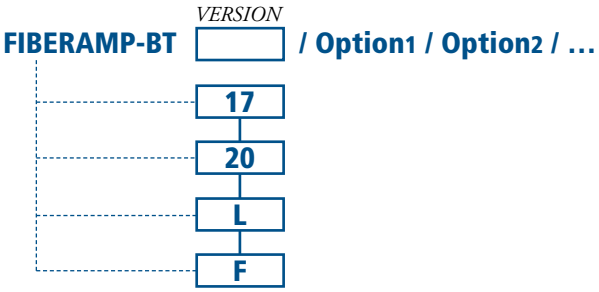
OPTIONS

R *. . . . . 19" rack-mount version (3U) (FIBERAMP-BT)*
LP *. . . . . Polarization sensitivity of gain <0.25 dB (FIBERAMP-BT, OSICS-EDFA, SM 17)*
J-APC *. . . . . Fiber-optic jumper FC-APC/FC-APC (FIBERAMP-BT, OSICS-EDFA)*
J-PC *. . . . . Fiber-optic jumper FC-APC/FC-PC (FIBERAMP-BT, OSICS-EDFA)*

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Ordering Information

For the benchtop instrument, please specify the model name followed by the options:



> Use the following code references that correspond to the available FIBERAMP-BT options:

R	19" rack-mount version (3U)
LP	Polarization sensitivy of gain <0.25 dB
J-APC	Fiber-optic jumper FC-APC/FC-APC
J-PC	Fiber-optic jumper FC-APC/FC-PC (included when delivered)

Each benchtop instrument is delivered as standard with a fiber-optic jumper.

> For the modules, please specify:

FIBERAMP-SM 17/Option1	for the OEM SM 17 module
OSICS-mainframe	for the OSICS mainframe without module
OSICS-EDFA module/Option1/Option2/...	for the EDFA module

> Use the following code references that correspond to the available module options:

LP	Polarization sensitivy of gain <0.25 dB (OSICS-EDFA, SM 17)
J-APC	Fiber-optic jumper FC-APC/FC-APC (OSICS-EDFA)
J-PC	Fiber-optic jumper FC-APC/FC-PC (OSICS-EDFA, included when delivered)

Each OSICS-EDFA module is delivered as standard with a fiber-optic jumper.

For additional information regarding other OSICS modules, please see OSICS datasheet.

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GN Nettest develops, manufactures and markets advanced equipment and systems for the test and measurement of telecommunication, data communication and optical networks. We provide carriers, vendors, enterprises and research laboratories with the network testing solutions they need to troubleshoot and optimise performance in today's complex, hybrid networks and in those planned for tomorrow.

GN Nettest undertakes a continuous and intensive product development program to ensure that its instruments and systems perform to the highest technical standards. As a result, the specifications in this document are subject to change without notice.





All FIBERAMP modules comply with IEC 60825-1 and FDA (21CFR Subchapter J) laser safety standards.

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