# Erbium-Doped Fiber Amplifier (EDFA) - GW Series

Nanovation's GW series of EDFAs is a cost-efficient solution for dense wavelength division multiplexing (DWDM) applications where high performance and reliability are critical. They are available in Booster, Inline and Preamplifier configurations to cover a wide range of applications in the full C-Band. The GW series of products is supplied without internal electronics for those systems that use external electronics to monitor and control the EDFA.

## Features

- Excellent gain flatness over the full C-Band
- High saturated output power
- Low noise figure
- Input and output optical isolation and power monitoring
- TTL compatible alarm and warning capability
- Wide operating temperature and humidity ranges
- Compact packaging
- Bellcore GR-1312-CORE qualified and ISO 9001 certified


## Applications

- High performance Full C-Band DWDM systems
- Booster, inline or preamplifier configurations

## Product Description

### *General*

The GW series of EDFA products has been specially designed to provide flexibility by working with a customer's own drive and control circuitry to provide a specific product for use in DWDM transmission systems as a booster, inline, or preamplifier.

### *Optical*

The amplifiers have been optimized for full C-Band DWDM operations by careful selection of both passive and active components. All amplifiers are pumped with high reliability pumps, and all are provided with optical monitor outputs to allow customer spectral analysis or monitoring of the amplified signal. An optical output monitor port is a customer option that can assist the user in such analysis or monitoring.

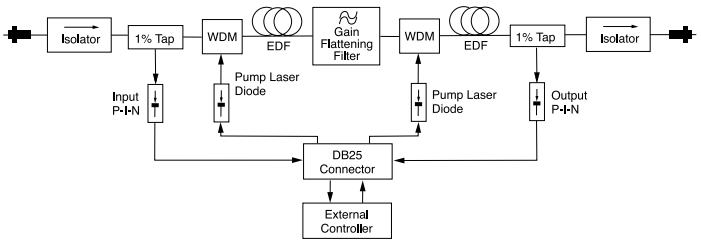
### *Electrical*

Electrical connection is through a standard DB25 male connector.

### *Package*

The units are housed within very small modules with input and output connections through single mode fiber pigtails and are fitted as standard with super-polished FC/UPC or FC/APC connectors. Other types of connectors are available on request.

## Block Diagram



## Absolute Maximum Ratings

(in accordance with Bellcore GR-1312-CORE)

| Parameter | Min. | Typical | Max. | Unit |
|---|---|---|---|---|
| DC Operating Voltage | +4.75 | +5.0 | +5.25 | V |
| Current Consumption | | - | 3.0 | A |
| Operating Temperature Range | 0 | - | 70 | ˚C |
| Storage Temperature Range | -25 | - | 85 | ˚C |
| Operating Humidity Range | 5 | - | 85 | % |

## Optical Parameters

(over the full operating temperature range)

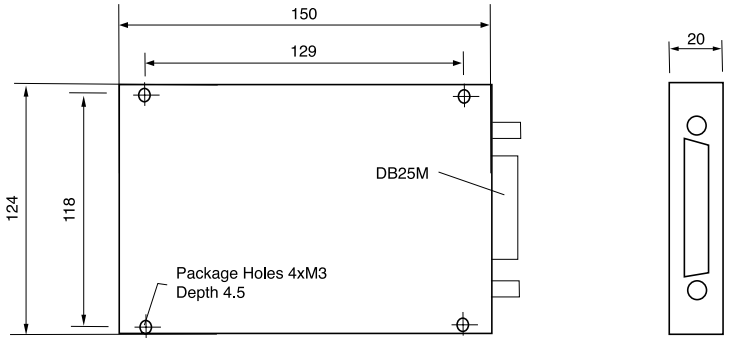
| Parameter | Minimum | Typical | Maximum | Units | Notes |
|---|---|---|---|---|---|
| Wavelength (ITU-T G.692) | 1530 | - | 1562 | nm | Full C-Band |
| Input Power | -20 | - | -7 | dBm | Booster |
| | -28 | - | -16 | dBm | Inline |
| | -28 | - | -16 | dBm | Preamplifier |
| Saturated Output Power | - | 18 | 22 | dBm | Booster |
| | - | 17 | 20 | dBm | Inline |
| | - | 9 | 15 | dBm | Preamplifier |
| Signal Gain | - | 25 | - | dB | Booster |
| | - | 33 | - | dB | Inline |
| | - | 25 | - | dB | Preamplifier |
| Gain Flatness | - | 1.0 | 1.5 | dB | - |
| Dynamic Gain Variation | - | 1.0 | 1.5 | dB | - |
| Optical Isolation | 30 | 35 | - | dB | - |
| Input Return Loss | 50 | - | - | dB | UPC/APC |
| Noise Figure | - | 5.0 | 5.5 | dB | - |
| Polarization Dependent Gain | - | - | 0.5 | dB | - |
| Polarization Mode Dispersion | - | - | 0.2 | ps | - |
| Pump Leakage | - | - | -30 | dBm | - |
| Reverse ASE Power | - | < -20 | - | dBm | - |

## Pigtail Fiber

| | |
|---|---|
| Fiber Type | Standard single-mode fiber |
| Fiber/Buffer Diameter (mm) | 0.9 |
| Pigtail Length (m) | 1.0 (or user defined) |

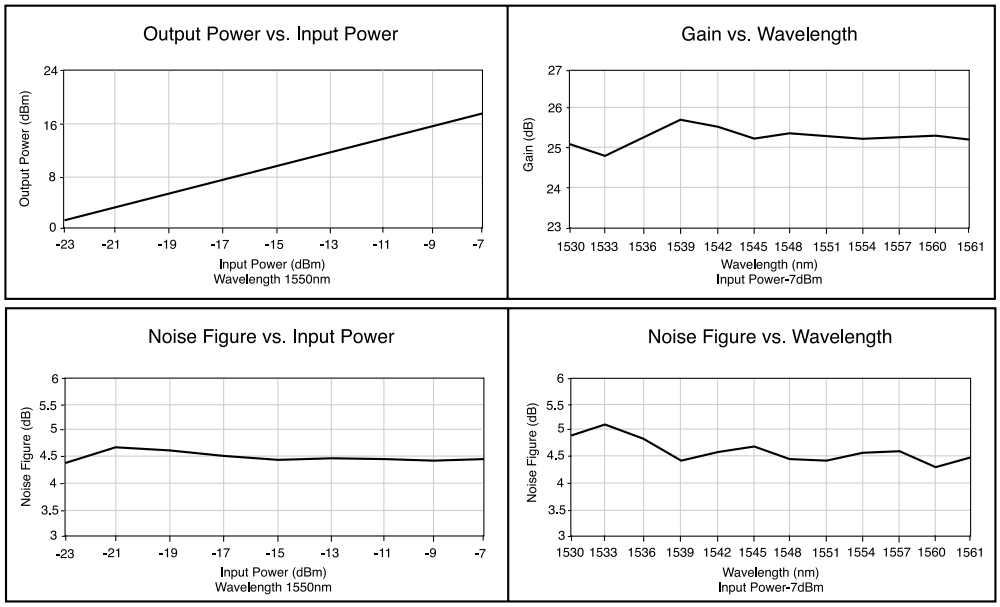
## Outline Drawing

(all units in mm, drawing is not to scale)



## GW EDFA Typical Performance Curves

Boost Configuration




## GW Series EDFA Electrical Interface

The GW series of EDFA products is equipped with a standard DB25 male connector. The functionality of each pin is presented below:

| Pin | Symbol | Description |
|---|---|---|
| 1 | LD1- | Pump Laser 1-Cathode |
| 2 | LD1+ | Pump Laser 1-Anode |
| 3 | MPD1- | Pump Laser 1-Monitor Photo Diode Cathode |
| 4 | MPD1+ | Pump Laser 1-Monitor Photo Diode Anode |
| 5 | RT1 | Pump Laser 1-Thermistor |
| 6 | RT1 | Pump Laser 1-Thermistor |
| 7 | TEC1+ | Pump Laser 1-Thermal Electric Cooler (TEC) Positive Supply |
| 8 | TEC1- | Pump Laser 1-Thermal Electric Cooler (TEC) Negative Supply |
| 9 | PD1- | Input P-I-N Photo Detector-Cathode |
| 10 | PD1+ | Input P-I-N Photo Detector-Anode |
| 11 | N/C | |
| 12 | N/C | |
| 13 | GND | Power supply ground |
| 14 | LD2- | Pump Laser 2-Cathode |
| 15 | LD2+ | Pump Laser 2-Anode |
| 16 | MPD2- | Pump Laser 2-Monitor Photo Diode Cathode |
| 17 | MPD2+ | Pump Laser 2-Monitor Photo Diode Anode |
| 18 | RT2 | Pump Laser 2-Thermistor |
| 19 | RT2 | Pump Laser 2-Thermistor |
| 20 | TEC2+ | Pump Laser 2-Thermal Electric Cooler (TEC) Positive Supply |
| 21 | TEC2- | Pump Laser 2-Thermal Electric Cooler (TEC) Negative Supply |
| 22 | PD2- | Output P-I-N Photo Detector-Cathode |
| 23 | PD2+ | Output P-I-N Photo Detector-Anode |
| 24 | N/C | |
| 25 | N/C | |

## Ordering Information

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Connector Type
- 0: No connector
- 1: FC/UPC (standard)
- 2: FC/APC
- 3: SC/UPC
- 4: SC/APC

Pigtail Fiber Length
- 0: Standard length = 1 m (standard)
- 1: User specify

Fiber Type
- 0: Standard single-mode (standard)
- 1: User specify

Output Power
- 09: 9dBm
- 17: 17dBm
- 18: 18dBm

Operating Wavelength
- 0: Red Band (1545 to 1562 nm)
- 1: Full Band (1530 to 1562 nm)

Product Series
- 5: Booster
- 6: Line
- 7: Preamplifier

Amplifier Type
- B: Booster
- L: Line
- P: Preamplifier

## The following table summarizes the product options and provides examples:

| Part Number | Amplifier Type | Input Power (dBm) | Output Power (dBm) | Gain (dB) | Operation Band (nm) | Dimension (mm x mm x mm) |
|---|---|---|---|---|---|---|
| GWB 510 18 001 | Booster | -20 to -7 | 18 | 25 | Full | 150 x 124 x 20 |
| GWL 610 17 001 | Inline | -28 to -16 | 17 | 33 | Full | 150 x 124 x 20 |
| GWP 710 09 001 | Preamplifier | -28 to -16 | 9 | 25 | Full | 150 x 124 x 20 |

**To order or for additional information, please contact us at:**

Phone: 1-877-919-6266
Fax: 1-734-354-0934
Web: www.nanovation.com



## Safety Information and Handling Precautions

EDFAs are class III laser products. Please read carefully the following safety information prior to handling and installing.

The signal output of the pump laser and EDFA is invisible, yet it can be of high power level and therefore can cause damage to the eyes or skin. Please do not look at the fiber cross section directly without protection devices.

There are precision optical devices inside the EDFA; therefore extreme care should be taken not to impose excess vibration or shaking. Care should also be taken in handling the pigtail fibers since they are easily broken.

There are static sensitive devices inside the EDFA, please make sure proper grounding and electrical power connection.

Do not attempt to open the EDFA by any unauthorized personnel. Please contact Nanovation technical support for assistance.