



## AUTO GAIN CONTROLLED FIBER AMPLIFIER WITH FAST TRANSIENT SUPPRESSION

**PRELIMINARY**

### Features

- Compact design
- Fixed 25 dB gain independent of wavelength and signal power
- Sub microsecond transient suppression time
- Undershoot/overshoot  $\leq \pm 0.3$  dB
- Auto gain control over wavelength and signal amplitude
- Low noise

### Applications

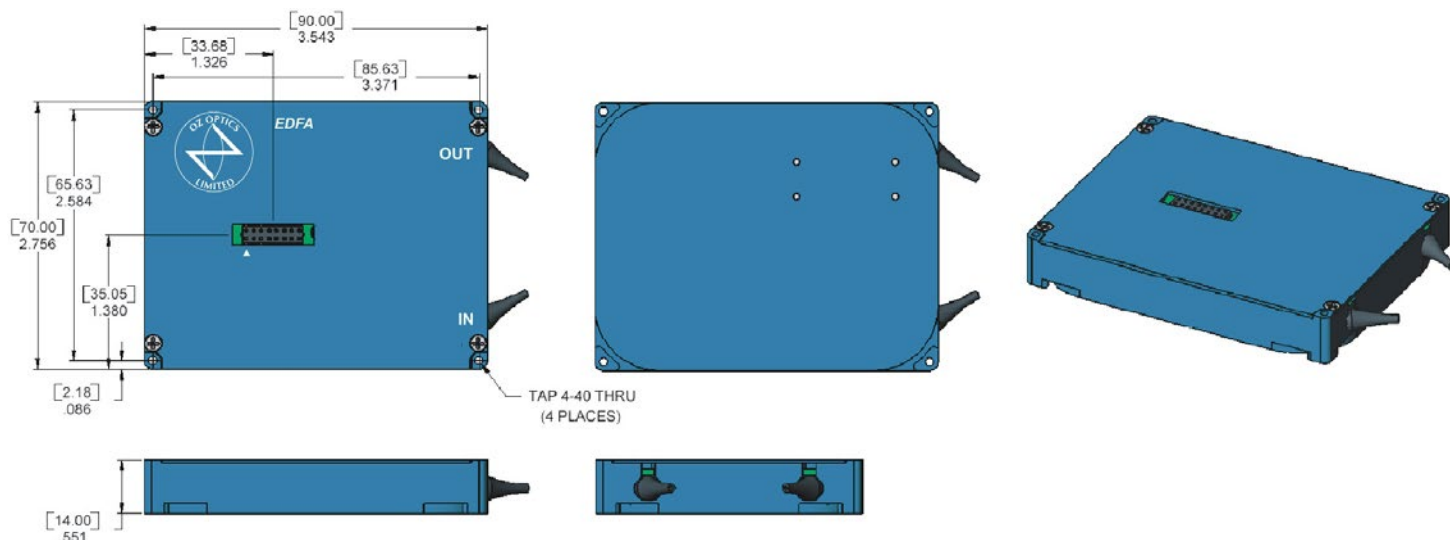
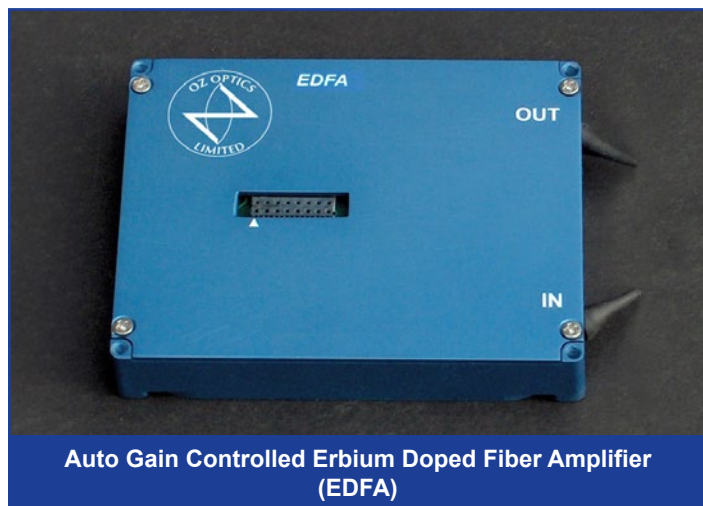
- ROADM network
- CATV/NETWORK access
- C-band channel preamp

### Product Description

In response to a sudden change of input power, an Erbium Doped Fiber Amplifier (EDFA) will exhibit overshoot or undershoot in its output signal. This is called the transient response. With a typical EDFA, this transient response can last on the order of 100  $\mu$ s. In a DWDM transmission system, the addition or removal of channels may cause a transient, to which the EDFA must respond.

This Auto Gain Controlled EDFA is developed to address these fast transient conditions, with sub microsecond suppression time. This device is designed to be used in the traditional C-band. During operation, the signal wavelengths must be confined to a 3.2 nm region for each optical amplifier, although the band may be anywhere within the C-band. The unit can work with up to 4 channels. A constant gain of 25 dB is independent of the wavelength and input power level with sub microsecond transient suppression. As a result, in a DWDM system, when one channel is switched off or turned on, the adjacent channels will not be disturbed.

Due to the nature of the narrow band operation, the transient suppression of the Auto Gain Controlled EDFA is greatly improved compared to a traditional EDFA.



**Figure 1.** Auto Gain Controlled EDFA Mechanical Specification

## Auto Gain Controlled Erbium Doped Fiber Amplifier Specifications

Parameter	Min	Typical	Max
Operation Wavelength <sup>1</sup> (nm)	1529.16		1558.58
Input Power <sup>2</sup> (per channel) (dBm)	-19.00		-11.00
Gain <sup>3</sup> (dB)		24	
Output Power <sup>3</sup> (per channel) (dBm)	5		13
Noise Figure (dB)		5.5	
Gain Flatness (dB) within 3.2 nm band; relative to 24 dB		±0.3	
Polarization Dependent Gain (dB)			0.3
Polarization Mode Dispersion (ps/√km)			0.5
Transient Suppression Time <sup>4</sup> (ns)		50	100
Transient Over/Undershoot (dB)		±0.1 for 3 dB add/drop within 3.2 nm band ±0.3 for 6 dB add/drop within 3.2 nm band	
Input/Output Return Loss (dB)		40	
Residual Pump Power at Output (dBm)		-25	
Dimensions (mm)		90 x 70 x 14	
Fiber Pigtail (μm)		9/125	
Fiber Pigtail Length (m)		1	
Connector Type		FC/APC	
Operating Temperature (°C)		0–70	
Storage Temperature (°C)		-40–85	
Part Number		EDFA-11-9/125-1529.16:1558.58-S-24-5/13-3A-1-1	

- <sup>1</sup> During DWDM operation, the input signals will be confined in a 3.2 nm band. However, the band will be in the traditional C-band region as indicated here.
- <sup>2</sup> -19 dBm is the minimum per channel input power. The maximum number of channels at this power level will be four. There will be only one channel allowed if the single channel input power is at -11 dBm. The unit can also work from dark for single channel application.
- <sup>3</sup> Fixed gain operation. For single channel operation, the AGC cover the whole operating range for multi-channel, the channels are not limited to 3.2 nm apart over 1532-1558 nm
- <sup>4</sup> Measured with total output power.

### Custom Ordering Information:

OZ Optics welcomes the opportunity to provide custom designed products to meet your application needs. As with most manufacturers, customized products do take additional effort so please expect some differences in the pricing compared to our standard parts list. In particular, we will need additional time to prepare a comprehensive quotation, and lead times will be longer than normal. In certain cases non-recurring engineering (NRE) charges, lot charges, and/or a minimum order will be necessary. These points will be carefully explained in your quotation, so your decision will be as well-informed as possible.

### Description: Auto Gain Controlled Erbium Doped Fiber Amplifier

Part Number: **EDFA-11-9/125-1529.16:1558.58-S-24-5/13-X-JD-L**

**X** = Receptacle Style:

X = No connector	SC = SC
3 = Standard flat, Super, or Ultra FC/PC	SCA = Angled SC
3A = Angled FC/PC	LC = LC
8 = AT&T-ST	MU = MU

**JD** = Jacket Diameter

1 = 900 micron OD hytel jacket  
3 = 3 mm OD PVC loose tube with Kevlar

**L** = Fiber length, in meters

## Electrical Specifications

An electrical connector allows the user to apply a voltage to power the unit, as well as monitor the input and output powers and pump performance. The pin-out is shown below:

2	16
1	15



Pin Number	Symbol	Function
1	-5 V	Input supply voltage, -5 V
2	-5 V	Input supply voltage, -5 V
3	GND	Ground
4	GND	Ground
5	+5 V	Input supply voltage, +5 V
6	+5 V	Input supply voltage, +5 V
7	Temp	Temperature
8	V_PDout	Output monitor. This will be around 1 volt when the output power is 13 dBm.
9	GND	Ground
10	V_PDin	Input power monitor. This will be around 1 volt when the input power is -11 dBm.
11	PDC	Pump monitoring photodiode (cathode)
12	PE	Pump enable (high = on, low = off)
13	PDA	Pump monitoring photodiode (anode)
14	PI	Pump current (approximately 10* I <sub>pump</sub> )
15	NC	No connection
16	NC	No connection

See the *Standard Tables* data sheet for other connectors.  
[https://www.ozoptics.com/ALLNEW\\_PDF/DTS0079.pdf](https://www.ozoptics.com/ALLNEW_PDF/DTS0079.pdf)

See table 7 in the *Standard Tables* data sheet for other cable types.  
[https://www.ozoptics.com/ALLNEW\\_PDF/DTS0079.pdf](https://www.ozoptics.com/ALLNEW_PDF/DTS0079.pdf)