

Product Specification

R7100DA High Power Variable Gain EDFA, 23 dBm, 17-32 dB, with Mid-stage Access

PN: FOA-R7100DA-EVG2C-AA015

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Customer: General

Product Features

- Variable Gain EDFA with control electronics
- APC or AGC control modes
- Flat spectrum over gain range of 17-32 dB
- Output power up to 23 dBm
- Automatic power reduction mechanism
- Low noise figure
- Mid-stage access 4-9 dB
- 100x150x18 package (without heatsink)
- Standard command protocol according to IEC 61291-6-1
- Low power dissipation
- RoHS compliant and lead free
- Class 1M* laser safety classification



Applications

- Regional, metro and access DWDM networks
- ROADM line cards
- Booster or inline

The R7100DA VG (Variable Gain) EDFA is a micro processor-controlled module for C-Band amplification. The module contains two amplification stages and has mid-stage access. The amplifier quickly reacts to network conditions as they unfold, seamlessly adjusting to variances in the system conditions of Metro and Long Haul environments in real-time. It can accommodate a wide variety of network topologies, fiber spans and fiber losses, thereby reducing the number of amplifier types needed for deployment in any given network environment.

The amplifier provides gain flattening and low noise figure in all its operational regimes. Its fast AGC allows the amplifier to keep the gain constant also in cases when there is a fast and large changes in the input power.

Optical Specifications

Parameters	Min	Typ.	Max	Unit	Notes
Number of Pump Lasers	2				
Minimum Wavelength range in vacuum (C-Band)	1529.5		1564	nm	
Total Input Power (with fast transient suppression)	-30.0		+6	dBm	
Total Input Power (without fast transient suppression)	-38.0		-30.0	dBm	
Total SIGNAL Output Power (does not include ASE power)	-2		23.0	dBm	Max output power for single channel operation is +20dBm; max output power for high gain zone is +21dBm.
Mid Stage Input Power (does not include ASE power)	-21		13.0	dBm	
Mid-stage Loss, including connectors	4.0		9.5	dB	
Gain, 4-9.5 dB Mid-stage loss	17		32	dB	
Gain, High gain Zone.	32		40	dB	
Gain Setting Accuracy		±0.25	± 0.4	dB	
Gain Flatness over entire gain bandwidth (Pk-Pk)		0.7	1.2	dB	Gain flatness is defined at powers < 14dBm. At higher output powers linear negative tilt is created, so gain flattening is kept at < 1.2dB relative to the linear tilt.
Steady State Gain, Power Stability		± 0.1	±0.2	dB	
Noise Figure 4-9.5 dB mid-stage loss, including connector loss	G≥17dB, TILT=0		16.3	dB	All operating conditions
	G≥19dB, TILT=0		12.9		
	G≥22dB, TILT=0		9.5		
	G≥26dB, TILT=0		7.5		
	G≥30dB, TILT=0		6.6		
Adjustable Gain Tilt over G=17–32dB	-2		0	dB	
Overshoot/Undershoot for 16dB Add/Drop transient			±1.5	dB	
Stabilization Time after transient			500	μsec	

Parameters	Min	Typ.	Max	Unit	Notes
Residual Pump Power out of Input port			-30	dBm	
Residual Pump Power out of Output port			-20	dBm	
Optical Return Loss (at any port, pump off)	45			dB	
Polarization Dependence Loss			0.3	dB	
Polarization Mode Dispersion			0.2	ps	
Input Output Isolation	30			dB	
Output Monitor Ratio		1% (-20)		% (dB)	

Optical Ports

The VG EDFA module is equipped with five optical ports as described in the following drawing and table:

Port	Description	Adaptor Type	Pigtail Length cm	Shrink Color
Input	Input into first stage	LC	100+/-10	Black
Mid stage IN	Output of first Stage	LC	100+/-10	Red
Mid stage OUT	Input into second stage	LC	100+/-10	Yellow
Output	Output of second Stage	LC	100+/-10	White
Output Monitor	1% Output tap at second stage	LC	100+/-10	Blue

Automatic Power Reduction Eye Safety Mechanism

In order to achieve class 1M classification, the amplifier incorporates an Automatic Power Reduction (APR) eye safety mechanism. This mechanism automatically reduces output power to below 20 dBm within 200ms if the transmission line connected to the output port of the EDFA is opened at a location up to 2Km from EDFA output port. This ensures that if a break (open connector or broken fiber) occurs in the transmission line, then the maximum power emitted from the fiber at the point of the break will always be below 20.5dBm. This is well below the level required for class 1M classification (21.2 dBm assuming transmission in the C-Band, 1525-1565nm). Thus, even though the output power of the amplifier is 23dBm, the APR mechanism enables class 1M classification.

The amplifier APR mechanism is based on two detection methods

- Back reflected power in the C band: If back reflected power in the C band fulfills the following condition:

$$[\text{Back reflected power in the C Band in dBm}] > [\{\text{Output power from EDFA}\} - 26\text{dB}]$$

Then the APR mechanism is activated

- Back reflected power of Amplified Spontaneous Emission (ASE) created by Raman scattering in the 1600-1650nm band: If the ASE power decreases in period of period (T2-T1) such that:

$$[\text{Power at 1600-1650nm @ T2}] - [\text{Power at 1600-1650nm @ T1}] > 1\text{dB}, \text{ where } T2-T1 = 100\text{msec},$$

Then the APR mechanism is activated

Electrical Parameters and Maximum Ratings

The following table summarizes the maximum electrical ratings of the amplifier

Parameter	Units	Specification			Notes
		Min.	Typ.	Max.	
Supply voltage	V	4.75	5.0	5.25	Power supply is fully isolated and no surges or spikes are allowed at input voltage.
Steady State Current	A			5.2	
Startup Current	A			9	
Power consumption	W			26	

Electrical Pin Out

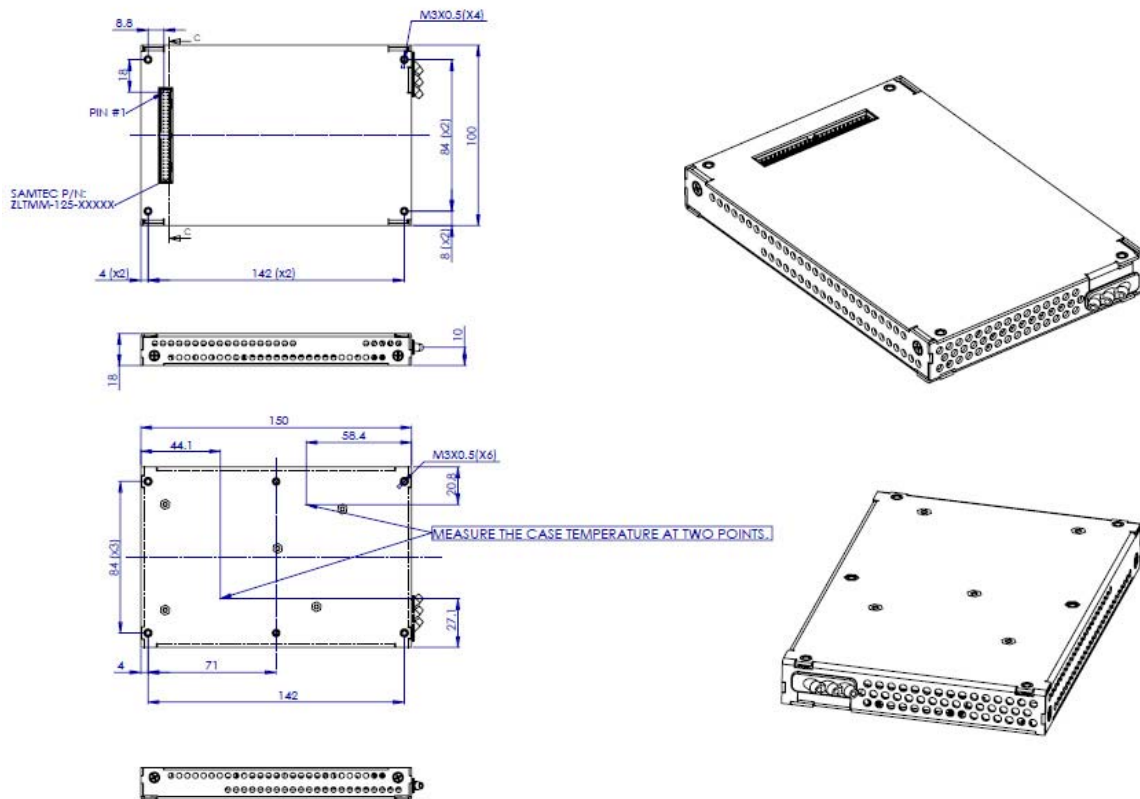
Connector type: SAMTEC: ZLTMM- 125-XX-L- D – XXX

Pin no.	Function	Description	Pin no.	Function	Description
1	+ 5.0 V	Power Supply	2	+ 5.0 V	Power Supply
3	+ 5.0 V	Power Supply	4	+ 5.0 V	Power Supply
5	+ 5.0 V	Power Supply	6	+ 5.0 V	Power Supply
7	Ground		8	Ground	
9	Ground		10	Ground	
11	N/C		12	N/C	
13	Ground		14	RESET Input	LVTTL Input, Idle High, P.U 10K (1)
15	1 RS-232 Input, Rx	LVTTL Level 4.75K P.U	16	1 RS-232 Output, Tx	LVTTL Level Output, 4.75K P.U
17	Pumps Current Alarm	LVTTL Output, Active High	18	Loss of Input Alarm (1 st stage)	LVTTL Output, Active High
19	Ground		20	Ground	
21	N/C		22	N/C	
23	N/C		24	N/C	
25	Ground		26	N/C	
27	Loss of Input Alarm (2 nd stage)	LVTTL Output, Active High	28	Eye-safety Alarm	LVTTL Output, Active High
29	Loss of Output/Gain Alarm (2 nd stage)	LVTTL Output, Active High	30	Output Back-Reflection	LVTTL Output, Active High
31	Ground		32	Ground	
33	Case Temperature Alarm	LVTTL Output, Active High	34	Loss of Output/Gain Alarm (1 st stage)	LVTTL Output, Active High

Pin no.	Function	Description	Pin no.	Function	Description
35	Pumps Temperature Alarm	LVTTL Output, Active High	36	Valid/ Absent module alarm	LVTTL Output, Active High, Pull Up 5K
37	Shutdown Input	LVTTL Input, Active High 10K P.U	38	N/C	
39	N/C		40	N/C	
41	Ground		42	Ground	
43	Ground		44	Ground	
45	+ 5.0 V		46	+ 5.0 V	
47	+ 5.0 V		48	+ 5.0 V	
49	+ 5.0 V		50	+ 5.0 V	

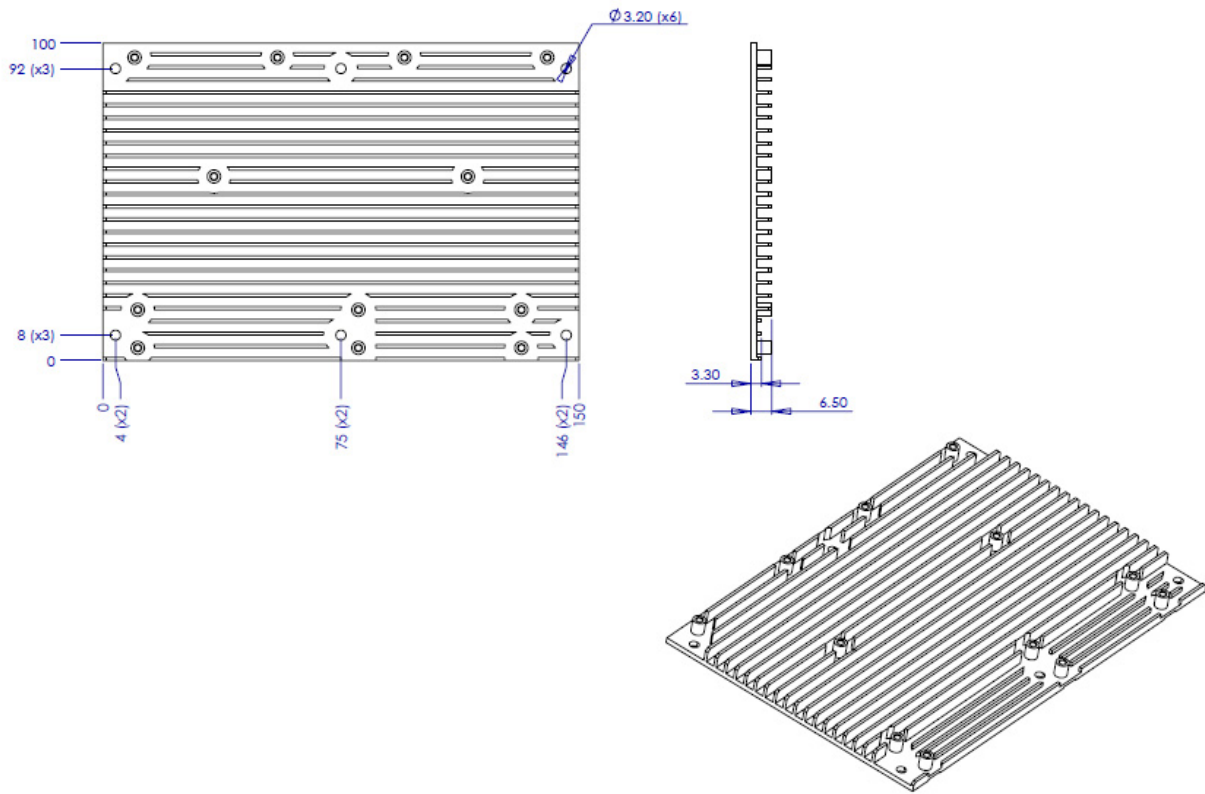
Mechanical Diagram

EDFA is packaged in an aluminum box. EDFA drawings:



To the EDFA box a Heat-sink will be connected. Thermal paste will be added between amplifier and Heat-sink to assure good thermal connectivity.

Heat-sink drawing:



Environmental and Qualification

Parameter	Value/Range
Operating Case Temperature	0°C to +70 °C
Operating Humidity	5 to 85%
Storage Temperature	-40°C to +85°C
Storage Humidity	5 to 95%
Qualification	Telcordia GR1312
Laser Safety	Class 1M*

* Class 1M products are not hazardous under normal circumstances, but may pose an eye hazard when the laser output is viewed with certain optical instruments (for example eye loupes, magnifiers and microscopes) within a distance of 100 mm

Ordering Information:



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Email orders to: sales@xsoptix.com
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