C-band Wideband Gain Flattened 18dBm AGC EDFA

Top view

The optical amplifier is a gain-flattened, transient-proof, constant-gain EDFA designed for DWDM transmission systems. Typically, it will operate in Automatic Gain Control (AGC) mode with a nominal gain of 26dB. The amplifier will provide input and output power monitor, as well as automatically shutdown features. The amplifier is controlled via a RS232 port.
The amplifier uses a standard DB25 connector for all electrical signals.

Features / Benefits

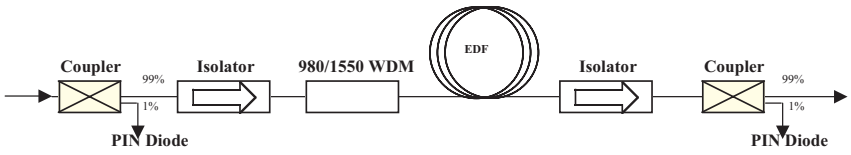
- Single/dual stage 980nm and 1480nm pump laser
- Low noise figure
- Wide wavelength range
- Good heat spreading
- Smooth gain flatness

Applications

- Long haul metropolitan and access networks
- Optical add/drop module
- Power equalization and pre-emphasis
- Digital CATV

Optical Functional Diagram

The MSA gain module includes an un-cooled 980nm pump laser, input/output monitor & isolator, and a reel of optimized erbium-doped fiber.



Performance Specifications

Parameter	Units	Min.	Typ.	Max.
Wavelength	nm	1529.55	-	1561.42
Optical gain (AGC mode)	dB	26	-	28
Optical input power	dBm	-24	-	-8
Saturated output power	dBm	18	-	-
Gain flatness	dB	0	1	1.5
Noise figure	dB	-	5	5.5
PDG	dB	-	-	0.2
Monitor port coupling ratio (IN)		-	1 %	-
Monitor port coupling ratio (OUT)		-	1 %	-
Input port return loss	dB	-	45	-
Output port return loss	dB	-	45	-
Transient time		-	-	-

Electronic Specificatoions

Parameter	Units	Min.	Typ.	Max.
DC power supply voltage	V	4.75	5	5.25
Current consumption	A	-	-	3
Power consumption	W	-	-	15@25°C
Digital input/output pin	V	0	-	5
Analog out pin (optional)	V	-	-	5
Operation temperature range	°C	0	-	50
Storage temperature range	°C	-40	-	70

Mechanical Characteristic

Fiber Type	SMF-28
Core-Cladding/Buffer	9 / 125 / 900um
Fiber Length	1.0 ± 0.1m
Device Package Dimensions	150(W) x 125(D) x 25(H)mm (heat sink included)
Connector Type	LC/UPC
Device Marking	UOI Standard

Pin No	Assignment
1	+5V
2	+5V
3	+5V
4	+5V
5	Output Optical Power Monitor
6	Input Optical Power Monitor
7	EDFA Temperature Alarm
8	Loss of Output Optical Power Alarm
9	Pump Bias Alarm
10	Pump Temperature Alarm
11	Back Reflection Power Alarm
12	+5V
13	GND
14	GND
15	GND
16	GND
17	GND
18	RS-232 out (TTL Levels)
19	Loss of Input Power Alarm
20	N/C
21	Amplifier Disable Input
22	RS-232 In (TTL Levels)
23	N/C
24	+5V
25	GND

Pin Description

- **Pin 1, 2, 3, 4, 12, 24: +5V Supply**
  DC voltage between 4.75 and 5.25 V should be made to all pins. Current requirement is dependent on amplifier type - see the power supply section for details.
- **Pin 5: Output Optical Power Monitor**
  A DC voltage that is proportional to the amplifier output power. For a preamp, this voltage is approximately 30 mV/mW.
- **Pin 6: Input Optical Power Monitor**
  A DC voltage that is proportional to the amplifier input power. For this amplifier, this voltage is approximately 1.6 V/mW.
- **Pin 7: EDFA Temperature Alarm**
  This is a TTL logic level alarm which is normally at logic "0". When the EDFA internal temperature exceeds 60 ºC, the alarm is activated (logic "1"). The temperature sensor is located on the pcb.
- **Pin 8: Loss of Output Power Alarm**
  This is a TTL logic level alarm, normally it's at logic "0". The alarm is raised to logic level "1" if the output power of amplifier exceeds the set value. This function is active in Output power.
- **Pin 9: Pump Bias Alarm**
  This is a TTL logic level alarm, normally it's at logic "0". The alarm is raised to logic "1" if any of the pump drive currents exceed 90 % of the pre-set end-of-life value.
- **Pin 10: Pump Temperature Alarm**
  This is a TTL logic level alarm, normally it's at logic "0". The alarm is raised to logic "1" if any of the pump submount temperature are more than 10 degrees away from the set point (factory default setting). The threshold levels can be modified by using the SPT command.
- **Pin 11: Back Reflection Power Alarm**
  This is a TTL logic level alarm, normally it's at logic "0". The alarm is raised to logic "1" if any of the EDFA back reflection power exceed the set value.
- **Pin 13,14,15,16,17,25: Ground**
  Ground Connection should be made to all pins.
- **Pin 18: RS-232 OUT**
  Serial data output at TTL levels.
- **Pin 19: Loss of Input Power Alarm**
  This is a TTL logic level alarm, normally it's at logic "0". The alarm is raised to logic "1" if the input power of amplifier is below a user-specified value. The alarm threshold is set via the SIT command.
- **Pin 21: Amplifier Disable**
  This is a TTL input signal (normally at logic "0") to turn off the pump lasers. The temperature control electronics and all other functions are unaffected. Note that under high input power conditions, considerable output power can still exist even when the amplifier is disabled. This input must not be regarded as an interlock and the amplifier must still be considered as class 3B, IEC.
- **Pin 22: RS-232 IN**
  Serial data input at TTL levels.
- **Pin 20, 23: N/C**
  No connection.

Rx Command Summary

COMMAND	ARG1	ARG2	ARG3	ARG4	Description	Comment
DSP					Show EDFA's values	
SIT	[MIN] -25 ~ [MAX]dBm	[MAX] [MIN] ~ +5dBm			Read/set input power alarm threshold	eg, SI SIT-10
SOT	[MIN] 10 ~ [MAX]dBm	[MAX] [MIN] ~ 20dBm			Read/set output power alarm threshold	eg, SOT SOT -20
SST	[D,<X>] -25 ~ +5dBm				<X>: set up auto shutdown threshold power D: disable auto shutdown	eg, SST SST D SST-25
SPB	[1,2]	<X> 0 ~ max current unit: 0.1mA			Read/set up LD current (ACC)	eg, LD current= 125mA SPB 1 SPB 1 1250
SPT	[1,2]	[MIN] < [SET] 10 ~ 5 unit: °C	[SET] > [MIN] 10 ~ 50 unit: °C	[MAX] > [SET] 10 ~ 50 unit: °C	Read/set up LD temperature and max/min threshold Operation <X> Then Shutdown Operation <X> Then Shutdown	eg, min: 10 degree max: 30 degree SPT 1 SPT 1 10 25 30
ADN	<X> 0~FFFF				Connect with communication address (no reply command mode)	
VER					Show version number	
RST					Reset EDFA	

Tx Command Summary

COMMAND	REPLY
DSP	LD1 Current, LD2 Current, LD1 MONIT, LD2 MONIT, LD1 TEMP, LD2 TEMP, TEC1 Current, TEC2 Current, ENV. TEMP, Input MONIT, Output MONIT (the above is floating point number) CTA, LOPA, PBA, PTA, LIPA, BRA, PSA, (1/0 respectively represent alarm/no alarm) LD1 ON, LD2 ON, TEC1 ON, TEC2 ON, (1/0 respectively represent operation/no operation)
SIT	- 10dBm (Input Power Alarm Threshold Power) / Disable
SIT <X>	OK
SOT	10dBm (Output Power Alarm Threshold)
SOT <X>	OK
SST	- 20dBm (Auto Shutdown Threshold Power) / Disable
SST [D,<X>]	OK
SPB [1,2]	If LD[1,2] isn't present, show -> Not fitted, If LD[1,2] is controlled by ACC, show ->XXX mA
SPT [1,2]	20.0, 25.0, 30.0 ([MIN], [SET], [MAX] UNIT: °C)
SPT [1,2] [MIN] [SET] [MAX]	OK
RST	

1. AQll replies are ASCII characters.
2. In case of null command or wrong parameter, the reply will be “???”.
3. In case of no connection, the reply will be “No Communication”.
4. Bold represents reply characters.

Warning Label

Because the EDFA gain module contains electrostatic sensitive devices, glass fibers, and lasers, the gain module bears a warning label on the upper front side to keep the user careful about handling and operation