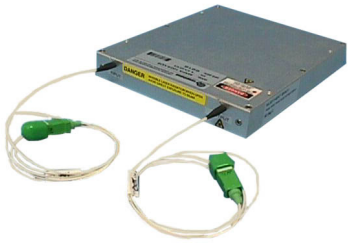
MAFA 2000 Series EDFA

DATASHEET | FEBRUARY 2013 FIBER OPTICS



Applications

- Microwave and RF Optical Fiber Distribution Systems
- EW Systems
- Free Space Optical Communications
- DWDM Networks
- Video and Data Transport Networks
- Laboratory Optical Sources
- High Performance Supertrunking Links
- High Power Distribtuion Networks
- Redundanct Ring Architectures
- FTTx Networks

Features

- Full Function Fiber Optic Amplifier Gain Block Ready for Integration
- Low Noise Figure (Typ < 5 dB)
- Input Power Range io – 10 dBm to +12 dBm and +14 dBm to +27 dBm Output Power
- Standard RS-232 Communication (RS-485 or I^2C is optional)
- Standard and Optional Gain Flatness (1530 nm – 1562 nm)
- Low Electrical Power Consumption

MAFA 2000 Series Erbium Doped Fiber Micro Amplifier

EMCORE's MAFA 2000 Series Erbium Doped Fiber Amplifier (EDFA) Gain Block Module is an ideal building block for OEM system integrators.The family of MAFA 2000 EDFA Gain Blocks is designed to meet the most demanding noise performance requirements of high performance networks, and performs all the functions required of an optical amplifier for system integration.

MAFA 2000 series EDFA Gain Blocks provide optical isolation on the input and output of the gain block for stable, low noise operation. The input and output optical signal power levels are detected for monitoring and control. The input optical signal is amplified with active gain control for a constant output power level or with active output power control for constant gain mode operation.

The MAFA 2000 series EDFA Gain Blocks also provide monitors and associated alarms for all critical operating parameters. The optical output of the MAFA 2000 series EDFA Gain Blocks also provide monitors and associated alarms for all vital characteristics. The optical output of the MAFA 2000 series EDFA Gain Blocks can be split into multiple ports by an optional external splitter.

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Optical/Electrical Characteristics[1]

Property	Unit	Limit	Models						Comments
			2014	2017	2020	2023	2024	2027	
Operating Input Power	Pin (dBm)	Max	12	12	12	12	12	12	
Operating Input Power	Pin (dBm)	Min	-10	-10	-10	-10	-10	-10	Typical (May vary for some models)
Output Power	Po(dBm)	Nominal	14 +/-.20	17 +/-.20	20 +/-.20	23 +/-.25	24 +/-.20	27 +/-.20	Note 2
Noise Figure	NF (dB)	Typ/Max	4.5/5.0	4.5/5.0	4.5/5.0	4.5/5.0	5.0/5.5	5.0/5.5	(Notes 3, 8)
Static Gain Flatness	Gs (dB)	Max	+/-0.5	+/-0.5	+/-0.5	+/-0.5	+/-0.5	+/-0.5	(Notes 4)
Dynamic Gain Flatness	Gd (dB)	Max	+/-1.0	+/-1.25	+/-1.5	+/-2.0	+/-2.0	+/-2.0	(Notes 5, 7)
Output Power Stability	(dB)	Max	+/- 0.2	+/- 0.2	+/- 0.2	+/- 0.2	+/- 0.2	+/-0.2	(Note 6)
Power Consumption (Steady state)	Psys(W)	Max	3	4	8	10	15	25	70°C Case

Notes:

1. Unless stated otherwise, all specifications apply over the full operating temperature and humidity ranges
2. Measurement variations
3. Measured with 8 evenly spread input optical signals @ 25°C, ∑Pin ≈ 0 dBm. Measuring with 1 input optical signal with Pin ≈ 0 dBm and λ ≈ 1550 nm is also available (Low Noise Figure options with NF ≤4.0/4.5 dB are available for some models only)
4. Measured with a swept Probe Signal (Pp), where Pp ≈ 0 dBm @ 25°C
5. Measured with a swept Probe Signal (Pp), and a fixed Tone Signal (Pt) @ ~ 1550 nm; (Pt ≈ Pp+20 dB; Pt + Pp ≈ 0 dBm) @ 25°C; Gain Flattened Options with ΔG ≤ +/-0.75dB or ΔG ≤ +/-1.0dB are available (**for some models only**)
6. Over polarization and temperature
7. Measurement of Static and Dynamic Gain Flatness applicable only for -01 and -03 options. For PONA 2130 can be defined for 1545 nm ≤ λ ≤ 1562 nm and by special request only.
8. Specific NF and ΔG can be guaranteed at a single specified Input Optical Power Level (Pin = Pt + Pp) equal or different from 0 dBm.

General and Mechanical Specifications

Property	Requirement	Comments
Operating Wavelength	1530 nm ~ 1562 nm	Standard
Operating Case Temperature	-20°C to 75°C	
Storage Temperature	-40°C to 85°C	
Operating Humidity	20% to 85%	Non-condensing
Voltage Supply Range	+4.5V to +5.5VDC	All versions
Optical Connectors	SC/APC; SC/UPC; FC/APC; FC/UPC; E2000/APC	User Specified
Dimensions (in)	4.9"W x 5.9"D x 0.8"H 4.9"W x 5.9"D x 1.9"H	MAFA 2014 to MAFA 2023 MAFA 2024 to MAFA 2027

* With a 1" heat sink. (MAFA 2024 and MAFA 2027 require a heat sink to meet operating temperature specifications)

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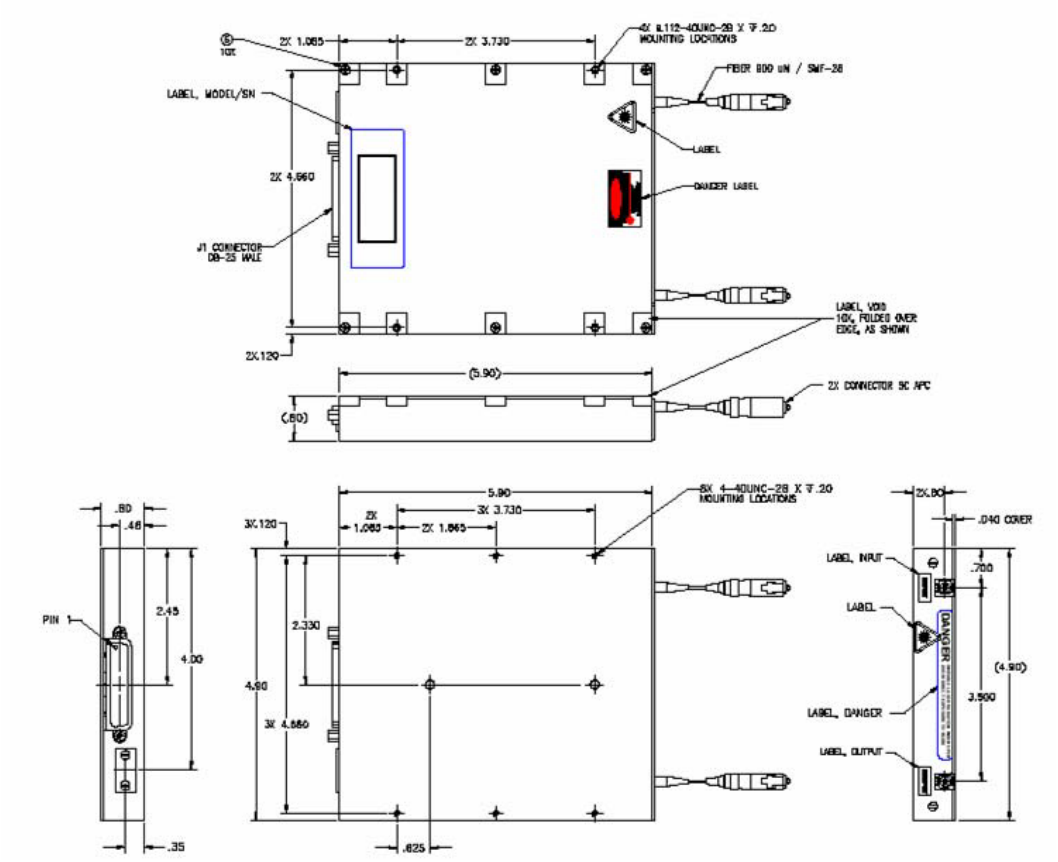
Outline Drawing



Electrical Connector Pinout

PIN #	Designation	PIN #	Designation
1	DC Power Input (+5V)	16	Reserved
2	GND	17	Reserved
3	Reserved	18	RS-232 Rx*
4	Reserved	19	Reserved
5	KEY-SWITCH	20	Reserved
6	RS-232Tx	21	Reserved
7	Reserved	22	Reserved
8	Reserved	23	Reserved B
9	Reserved	24	N/A
10	Reserved	25	Reserved
11	Reserved		
12	Reserved		
13	Reserved		
14	DC Power Input (+5V)		
15	GND		

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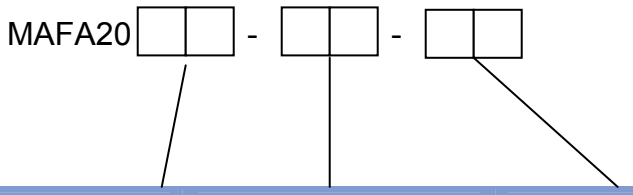
Compliance and Reliability Information

FCC: Subpart B. Part 15 class "A": Unintentional Radiators
EN 55013: Sound and Television Broadcast receivers and associated equipment – Radio disturbance characteristics- limits and methods of measurements – Electric Field Radiation Emissions (2001)
Fit Rate: 60% level of confidence 670 @ 25°C (14-23 dBm EDFA)
Fit Rate: 60% of level of confidence 962 @ 40°C (24-27 dBm EDFA)

Note: It has been determined that recent design changes with the DB25 connector make necessary the re-certification of the MAFA2000 for Electromagnetic Compatibility (EMC) per EN 61000-4-3. Prior to this certification, it is possible that if the MAFA2000 is exposed to electromagnetic interference (EMI) it may cause unintended changes in the behavior of the unit. In addition to possible improper operation, there are safety implications to consider as well. It is recommended that users of this product do so for evaluation purposes only, and exercise caution. At a minimum, it is recommended that a metallic shielded cable be used to connect to the DB25 connector to minimize risk. Other methods of reducing potential EMI such as testing unit far away from electromagnetic radiators, and in a metallic enclosure (such as the PONA2100 series) is highly recommended. Users of this product do so at their own risk.

Ordering Information



Power Level	Connector Option	GF/NF Options
14 – 14 dBm	SC - SC/APC	00 - Standard
17 – 17 dBm	FC - FC/APC	01 – Standard with Gain Flattened Option
20 – 20 dBm	FC – FC/APC	01 – Standard with Gain Flattened Option
23 – 23 dBm	EC – E2000/APC Diamond	02 – Standard with Low NF Option
24 – 24 dBm	TC – SC/UPC	03 – Gain Flattened and Low NF Option
27 – 27 dBm	GC – FC/UPC	

Example:

MAFA2017-SC-00: Standard 17 dBm gain block with SC/APC optical connectors

Note:
Only some models can be order with Gain Flattened options and/or Low NF options (-01, -02, and -03 suffixes).

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