



Applications

- CATV Systems
- Long Distance RF/Microwave Fiber Optic Communication Links
- Sensing and Control Systems
- High Performance Supertrunking Links
- High Power Distribution Networks
- Redundant Ring Architectures
- FTTx Networks

Features

- Full Function Fiber Optic Amplifier Ready for Integration
- Low Noise Figure (Typ < 4.5 dB)
- Pin: -6 dBm to +12 dBm
- Pout: +14 dBm to +23 dBm
- RS-232 Monitor and Control Interface
- Standard and Optional Gain Flatness
- Low Electrical Power Consumption
- Input/Output Isolation >40/40 dB
- Polarization Dependant Gain < 0.1 dB
- Polarization Mode Dispersion < 0.2 ps
- Input & Output Return Losses < -40 dB
- Output Residual Pump Power < -30 dBm
- Back Reflection Monitoring

MAFA 1000 Series Erbium Doped Fiber Micro Amplifier

EMCORE's MAFA 1000 Series Erbium Doped Fiber micro Amplifier (μ EDFA) Gain Block Module is an ideal building block for OEM system integrators. The family of MAFA 1000 EDFA Gain Blocks is designed to meet the most demanding noise performance requirements of fiber optic communications and control systems, and performs all the functions required of an optical amplifier for system integration.

MAFA 1000 series EDFA Gain Blocks provide input and output optical isolation 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 1000 series EDFA Gain Blocks also provide monitors and associated alarms for all critical operating parameters. The optical output of the MAFA 1000 series EDFA Gain Blocks can be split into multiple ports by optional external splitter. Optional back reflection monitoring feature enables safe output optical power managing.

The compact mechanical footprint of the MAFA 1000 allows using this unit to be installed in small space environments.

Optical/Electrical Characteristics¹

| Property | Unit | Limit | Models | | | | | Comments ^(Note 1) |
|-------------------------------------|-----------|---------|---------------|---------------|---------------|---------------|---------------|---|
| | | | 1014 | 1017 | 1020 | 1022 | 1023 | |
| Operating Input Power | Pin (dBm) | Max | 12 | 12 | 12 | 12 | 12 | |
| Operating Input Power | Pin (dBm) | Min | -6 | -6 | -6 | -6 | -6 | Typical (May vary for some models) |
| Output Power | Po(dBm) | Nominal | 14 +/- .25 | 17 +/- .25 | 20 +/- .25 | 22 +/- .25 | 23 +/- .25 | Note 2 |
| Noise Figure | NF (dB) | Typ | ≤ 4.0 dB | ≤ 4.0 dB | ≤ 4.0 dB | ≤ 4.0 dB | ≤ 4.0 dB | @ Pin = 0 dBm, no Pin monitoring (Notes 3, 7, 8) |
| Static Gain Flatness | ΔGs (dB) | Max | +/-0.5 | +/-0.5 | +/-0.5 | +/-0.5 | +/-0.5 | (Notes 4) |
| Dynamic Gain Flatness | ΔGd (dB) | Max | +/-1.0 | +/-1.25 | +/-1.5 | +/-2.0 | +/-2.0 | (Notes 5, 7) |
| Output Power Stability | (dB) | Max | +/- 0.1 | +/- 0.1 | +/- 0.1 | +/- 0.1 | +/- 0.1 | (Note 6) |
| Power Consumption (Steady state) | Psys(W) | Max | 2 | 3 | 5 | 6 | 8 | 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, $\Sigma Pin \approx 0$ dBm. Measuring with 1 input optical signal with Pin ≈ 0 dBm and $\lambda \approx 1550$ nm is also possible.
4. Measured with a swept Probe Signal (Pp), where Pp ≈ 0 dBm @ 25°C
5. Applicable for option 01 only. Measured with a swept Probe Signal (Pp), and a fixed Tone Signal (Pt) @ ~ 1550 nm; (Pt \approx Pp+20 dB; Pt + Pp ≈ 0 dBm) @ 25°C; Gain Flattened Options with $\Delta G \leq +/-1.0$ dB are available (**for some models and for defined input optical power only**)
6. Over polarization and temperature
7. Specific ΔG can be guaranteed at a single specified Input Optical Power Level (Pin = Pt + Pp) equal or different from 0 dBm
8. If input power monitoring and input isolation are required then typical NF (for all units @ Pin = 0 dBm) ≤ 4.5 dB

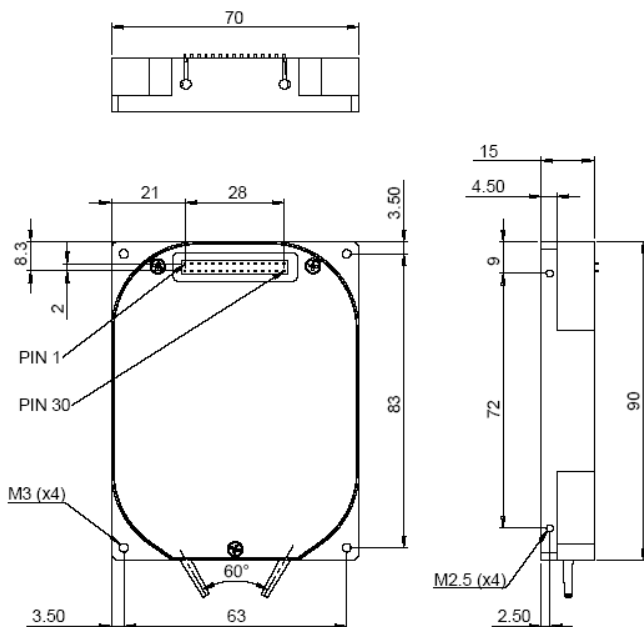
General and Mechanical Specifications

| Property | Requirement | Comments |
|----------------------------|-------------------------|----------------|
| Operating Wavelength | 1532 nm ~ 1565 nm | Standard |
| Operating Case Temperature | 0°C to 50°C | Standard* |
| Storage Temperature | -40°C to 85°C | Standard |
| Operating Humidity | 20% to 85% | Non-condensing |
| Voltage Supply Range | +12 VDC/+5 VDC/+3.3 VDC | All versions** |
| Optical Connectors | SC; FC; E2000 | User Specified |
| Dimensions (mm) | 70 x 90 x 15 | All versions |

* - Extended temperature range of -40°C to +75°C is also possible

** Transient Pulse to +X.X VDC + 5% for < 100 msec

Outline Drawing (dimensions in mm)



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: 90% level of confidence - 290 @ 25°C

Electrical Connector Pinout

| PIN # | Designation | PIN # | Designation |
|-------|-------------------------|-------|-------------------------|
| 1 | +12 VDC/+5 VDC/+3.3 VDC | 16 | LED_Laser_ON |
| 2 | +12 VDC/+5 VDC/+3.3 VDC | 17 | N/A |
| 3 | +12 VDC/+5 VDC/+3.3 VDC | 18 | Pump_Bias_Alarm * |
| 4 | +12 VDC/+5 VDC/+3.3 VDC | 19 | Loss_Input_Power * |
| 5 | GND | 20 | Loss_Output_Power * |
| 6 | GND | 21 | N/A |
| 7 | RS232_Rx | 22 | N/A |
| 8 | RS232_Tx | 23 | Back_Reflection_Alarm * |
| 9 | GND | 24 | N/A |
| 10 | GND | 25 | N/A |
| 11 | LED_Comm | 26 | N/A |
| 12 | EDFA_Reset | 27 | N/A |
| 13 | EDFA_Disable | 28 | N/A |
| 14 | Pout_Mute | 29 | N/A |
| 15 | EDFA_Temp_Alarm * | 30 | N/A |

* - software adjustable parameters; logic levels (low / high) TBD

Ordering Information



| Power Level | Connector Option | GF/NF Options | Temp Options | Voltage Options |
|---------------|------------------|---|--------------|-----------------|
| 1014 – 14 dBm | SC1 - SC/APC | 00 - Standard | S- Standard | 1 – “+12 VDC” |
| 1017 – 17 dBm | S21 - SC/PC | 01 – Gain Flattened option | | 2 – “+5 VDC” |
| 1020 – 20 dBm | FC1- FC/APC | 02 – No Pin monitoring, low NF option | E – Extended | 3 – “+3.3 VDC” |
| 1020 – 22 dBm | FC2- FC/PC | 03 – Standard with back reflection monitoring | | |
| 1023 – 23 dBm | EC1-E2000/APC | | | |
| | EC2-E2000/PC | | | |

Example:

MAFA1014-SC-00-S-2: 14 dBm gain block with SC/APC optical connectors, standard NG/GF, standard temperature range, +5 VDC power supply

Note:

Only some models can be order with Gain Flattened options. (-01 suffixes). **Please contact your Sales Representative for details**

Laser Safety Information

This component product does not meet the applicable requirements of 21 CFR 1010 & 1040 and is classified as a Class IIIb laser product based on the maximum optical output power defined below. During use as intended, the laser energy is fully contained within the fiber network such that there is no accessible laser radiation and would meet the requirements for a Class I laser product.

Wavelength = 1532 ~ 1565 nm (dependent on input source)

Maximum Output Power = 200 mW

