Ver. 2.4en

# VGA4700-FM06

# Variable Gain EDFA Module (with MSA)

# C-Band DWDM VGA Module with MSA

# Technical Specification

# CONTENT

## 1.0 PRODUCT DESCRIPTION

Huatai VGA4700-FM06 series is a next generation variable gain optical amplifier module, which with the most excellent performance and most completes functions in the market. It adopts nowadays most excellent optical performance, most advanced electronic technology and most complete software functions. Remarkable transient suppression control technology and heat management control technology let many complicated optical functions achieved. It is the most versatile multifunction optical amplifier in the market.

This next generation variable gain amplifier module is composed with two stages amplifier: variable gain pre-amplifier (PA) and variable gain booster amplifier (BA). The gain of these two stages amplifier can be independently set in a certain range. There is a connector between the two stages amplifier, which used for mid-stage access, such as optical Add-Drop module (OADM), dispersion compensation module (DCM) and others optical modules.

VGA4700-FM06 adopts 130×212×19.5mm (including heat sinks) ultra-thin appearance; signal unit +5VDC power supply, low consumption.

VGA4700-FM06 is a device with Mid-stage Access, which according with various communication technology requirements of C-Band 44 or 88 channels DWDM system, widely used in long distance and ultra-long distance transmission network. Since its complete functions, it can be used as line amplifier, pre-amplifier, booster amplifier.

## 2.0 PRODUCT FEATURE

- Nest-generation Variable Gain Amplifies Module
- With Mid-stage Access Version
- Accord with the various communication technology requirements of C-Band 44 or 88 channels DWDM system
- Adopt latest total integration electronic transient control technology
- Adopt digital control technology which can adapt to heat management.
- Mid-stage versions can be set as independent pre-amplifier and booster amplifier
- Saturation large output power optional: 18dBm, 20dBm, 23dBm,24dBm
- AGC, APC, ACC working mode
- Optical monitoring channels optional: OSC Add/Drop
- Carrier-class security and reliability
- Ultra-thin appearance 130×212×19.5mm(including heat sinks)
- Low power consumption
- Excellent cost performance in area

## 3.0 MAIN APPLICATION

- OADM optical Add-Drop multiplexing
- DCM ultra-long trunk dispersion compensation
- ASON intelligent optical network
- ROADM reconfigurable optical Add-Drop multiplexing
- Long distance and Ultra-long distance network among the cities
- Line amplifier, pre-amplifier, booster amplifier or Add-Drop multiplexing amplifier

## 4.0 Related product

- VGA4500-FM06 (Without MSA Variable Gain EDFA Module)
- HWA4500 (Without MSA Variable Gain EDFA)
- HWA4700（(Without MSA Variable Gain EDFA)
- HWA4400(Fixed Gain Amplifier)

## 5.0 Technique index

| Performance | | | Index | | | Supplement |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| Optic feature | Wavelength work range(λ) | (nm) | 1529.16 | | 1563.86 | ITU 88CH |
| | Input power range[1)] | (dBm) | -35 | | +3 | VGA4718-FM06 Typ. |
| | | | -35 | | +3 | VGA4720-FM06 Typ. |
| | | | -40 | | 0 | VGA4723-FM06 Typ. |
| | | | -40 | | 0 | VGA4724-FM06 Typ. |
| | Gain range [2)] | (dB) | 18 | | 30 | G30 Typ. |
| | | | 23 | | 35 | G35 Typ. |
| | | | 29 | | 41 | G40 Typ. |
| | | | 12 | | 24 | G25 Typ. |
| | Mid-stage loss range[3)] | (dB) | 0 | | 8 | |
| | | | 0 | | 10 | |
| | | | 0 | | 12 | |
| | Max. output power[4)] | (dBm) | | | 18 | VGA4718-FM06 |
| | | | | | 20 | VGA4720-FM06 |
| | | | | | 23 | VGA4723-FM06 |
| | | | | | 24 | VGA4724-FM06 |
| | Gain flatness | (dB) | | 0.7 | 1.0 | Peak-to-peak |
| | Noise figure | (dB) | | 5.0 | 5.9 | Max gain |
| | Polarization dependence loss | (dB) | | | 0.3 | |
| | Polarization dependence gain | (dB) | | | 0.3 | |
| | Polarization mode dispersion | (ps) | | | 0.3 | |
| | Pump leakage power | (dBm) | | | -30 | |
| | Return loss[5)] | (dB) | 40 | | | UPC |
| | Optical supervisory channel wavelength ranges | (nm) | 1500 | 1510 | 1520 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Transient feature | Transient setting time | (μs) | | | 500 | 16dB Add/Drop |
| | Transient overshoot | (dB) | 1.5 | | 1.0 | 16dB Add/Drop |
| | Transient gain changes | (dB) | | | 0.5 | |
| General feature | Communication interface | | RS232 | | | |
| | Fiber type | | Coming SMF-28™ or equivalent | | | |
| | Pigtail buffer diameter | (μm) | | 900 | | |
| | Pigtail length | (mm) | | 1000 | | |
| | Power supply | (VDC) | +4.75 | +5 | +5.25 | |
| | Power consumption | (W) | 14 | | 20 | |
| | Work temp. | (°C) | 0 | | +70 | |
| | Storage temp. | (°C) | -40 | | +85 | |
| | Working relative humidity | (%) | 5 | | 95 | |
| | Size(W)×(D)×(H) | (mm) | 130×212×19.5 | | | |

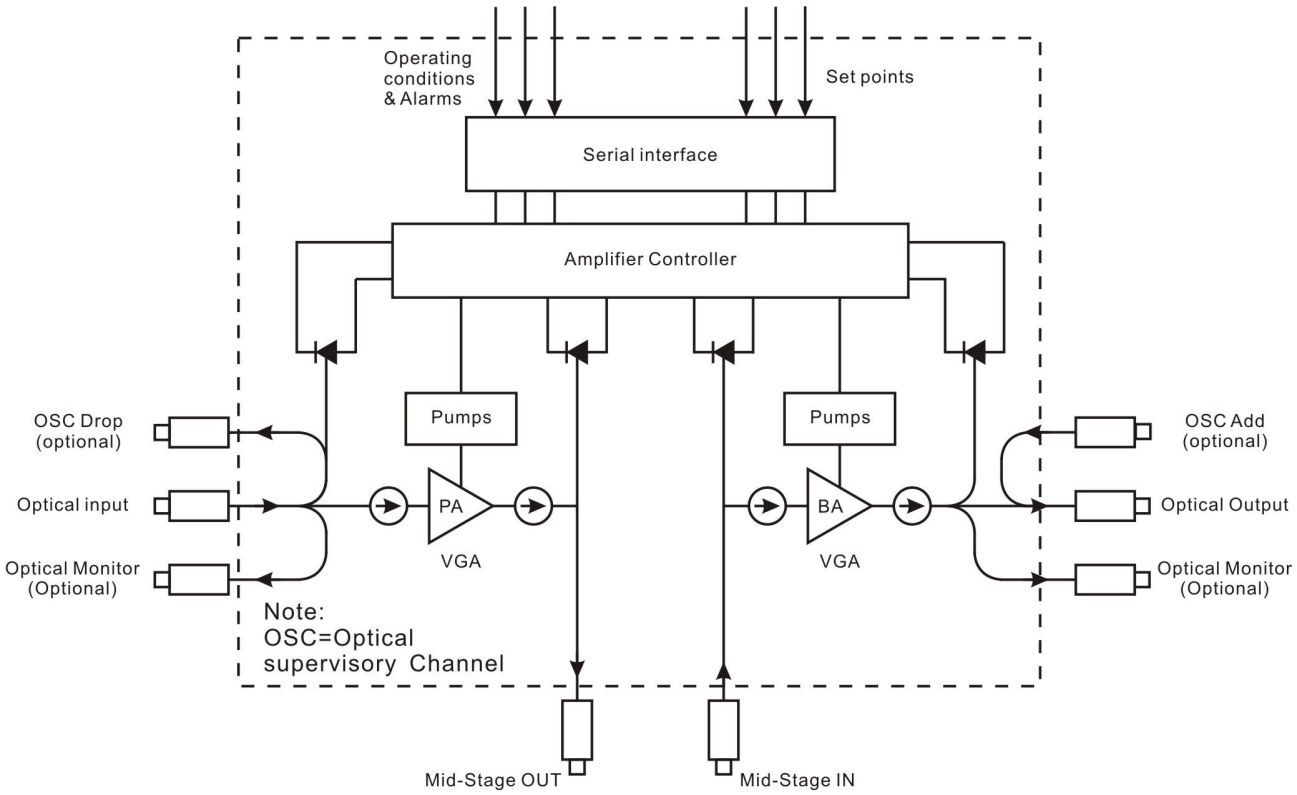
Note: 1, 2, 3, 4: these optic performance are typical application, can be customized according to customers' requirements.

5: APC optional, return loss>50dB

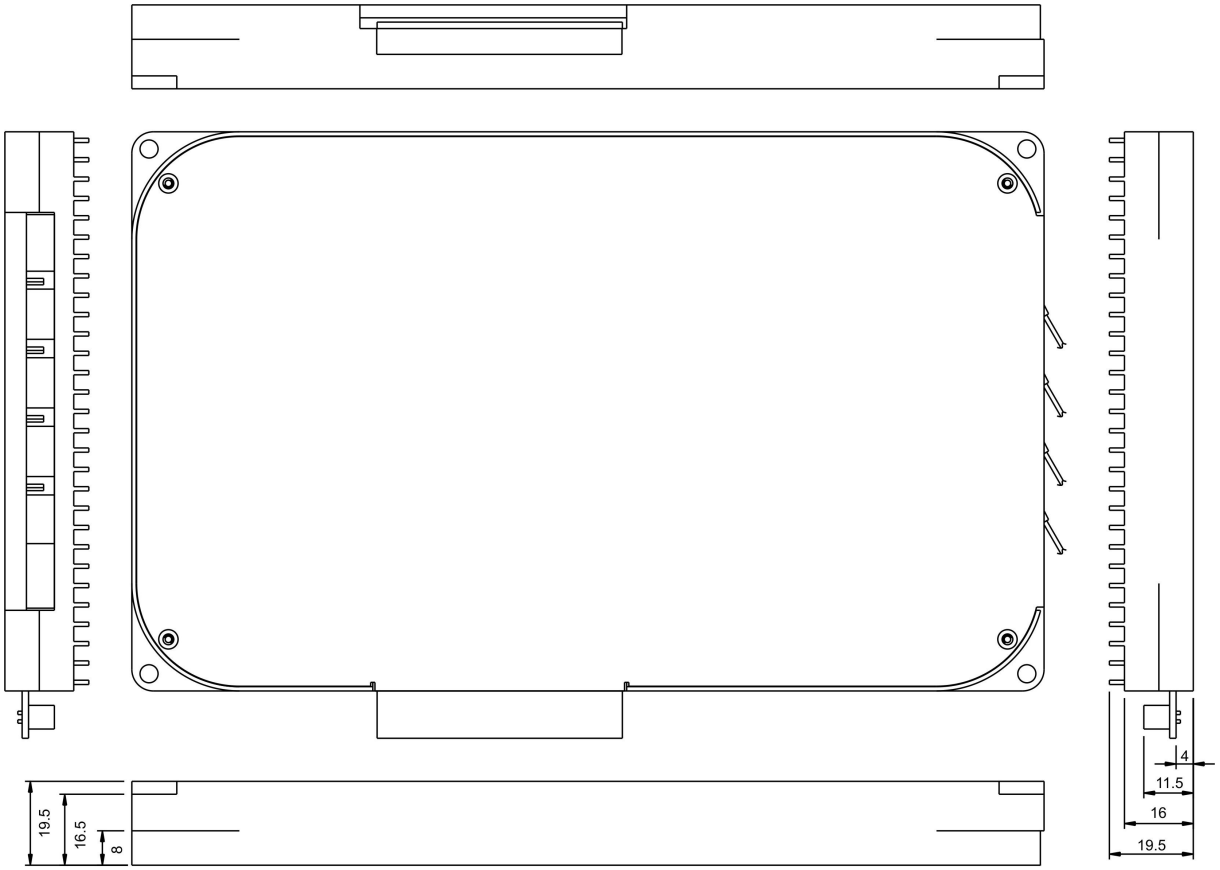
## 6.0 SOFTWARE FUNCTION MONITORING AND ALARM

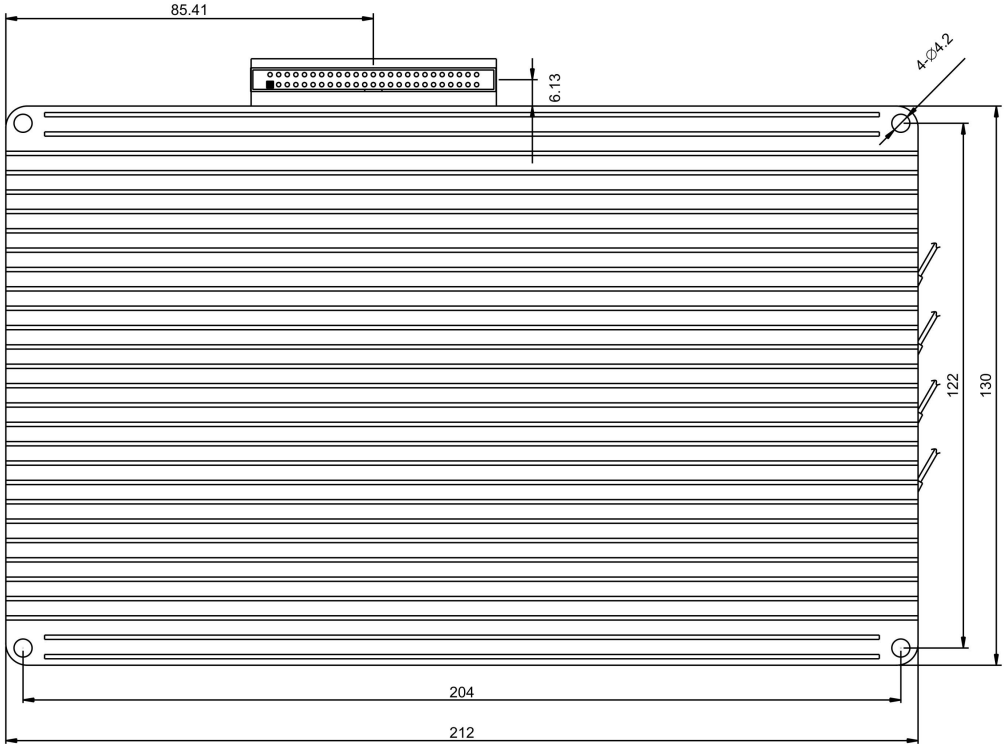
| | |
|---|---|
| Functions | In-service firmware upgrades |
| | Auto shut down |
| | Gain control mode with automatic power limiting (VGA) |
| | Independent stage mode ( on variants with Mid-stage access ) |
| | Output power control mode |
| | Pump current control mode |
| | Eye-safe power mode |
| | Non-volatile event log |
| Monitors | Total input power |
| | Total output power |
| | Optical backreflection |
| | Pump status |
| | Module temperature |
| Alarms | Loss-of-signal alarm |
| | Low output power alarm |
| | Module temperature alarm |
| | Pump temperature alarm |
| | Pump bias alarm |
| | Excess backreflection alarm (Optional) |

## 7.0 OPTICAL/ELECTRICAL SCHEMATIC



## 8.0 MODULE CHASSIS SIZE



## 9.0 50 PIN INTERFACE DEFINATION

| Pins | Description | Pins | Description |
|---|---|---|---|
| 1 | Power supply | 2 | Power supply |
| 3 | Power supply | 4 | Power supply |
| 5 | Power supply | 6 | Power supply |
| 7 | Ground | 8 | Ground |
| 9 | Ground | 10 | Ground |
| 11 | Reserved ( do not connect ) | 12 | Output Reflection Alarm |
| 13 | Ground | 14 | Resent input |
| 15 | Serial input | 16 | Serial output |
| 17 | Pump Current Alarm | 18 | Stage 1 input LOS alarm |
| 19 | Ground | 20 | Ground |
| 21 | Reserved ( do not connect ) | 22 | Reserved ( do not connect ) |
| 23 | Reserved ( do not connect ) | 24 | Reserved ( do not connect ) |
| 25 | Ground | 26 | Reserved ( do not connect ) |
| 27 | Stage 2 input LOS alarm | 28 | Ground |
| 29 | Stage 2 output/Gain alarm | 30 | Ground |
| 31 | Ground | 32 | Ground |
| 33 | Case temperature alarm | 34 | Stage 1 output / Gain alarm |
| 35 | Pump temperature alarm | 36 | Pin is absent ( Polarization key ) |
| 37 | Amplifier disable input | 38 | Output Power mute input |
| 39 | I2C SCL ( Optional ) | 40 | I2C SDA ( Optional ) |
| 41 | Ground | 42 | Ground |
| 43 | Ground | 44 | Ground |
| 45 | Power supply | 46 | Power supply |
| 47 | Power supply | 48 | Power supply |
| 49 | Power supply | 50 | Power supply |

## 10.0 PRODUCT SERIES

| Model | Max.output optical power (dBm ) | Gain range (dB) | Input power range Typ.(dBm) | Mid-stage insertion loss (dB) | Monitor optical port mode | OSC optical port mode |
|---|---|---|---|---|---|---|
| VGA4718-G30-FM06-M00-S00 | 18 | 16~28 | +3~-35 | 0~10 | Without | Without |
| VGA4718-G35-FM06-M00-S00 | | 23~35 | 0~-35 | 0~12 | | |
| VGA4718-G40-FM06-M00-S00 | | 28.5~40.5 | +3~-30 | | | |
| VGA4720-G30-FM06-M00-S00 | 20 | 18.5~30.5 | +3~-35 | 0~12 | | |
| VGA4720-G35-FM06-M00-S00 | | 23~35 | 0~-35 | | | |
| VGA4720-G40-FM06-M00-S00 | | 29~41 | +3~-35 | | | |
| VGA4723-G30-FM06-M00-S00 | 23 | 19~31 | 0~-35 | 0~12 | | |
| VGA4723-G35-FM06-M00-S00 | | 25~37 | 0~-37 | | | |
| VGA4723-G40-FM06-M00-S00 | | 29~41 | 0~-40 | | | |
| VGA4724-G35-FM06-M00-S00 | 24 | 25~37 | 0~-37 | 0~12 | | |
| VGA4724-G40-FM06-M00-S00 | | 30.5~42.5 | 0~-40 | | | |

Note: 1), Optical port monitoring mode options:

1, MO (With output monitoring optical port)

2, MI (With input monitoring optical port)

3, MIO (With input and output monitoring optical port)

2), OSC optical port mode of optical management channel:

1, OD (OSC/Drop)

2, OA (OSC/Add)

3, ODA (OSC/Drop & Add)

## 11.0 Model explanation

VGA 4 7 □□ – G□□ – FM 06 – □□ – M□□ – O□□

| NGB Variable Gain EDFA Module | Wavelength | | Product type | | Max.Output power(dBm) | | Gain Range Typ(dB) | | Module type | | Module size No. | | Connector | | Optical port Monitoring optional | | OSC Optical port optional | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 4 | C-Band (1528~1564) | 7 | VGA withMSA | 18 | 18 | 30 | 18~30 | FM | Full function module | 06 | 130×212 ×19.5mm | LP | LC/UPC | M00 | Without optical port monitoring | O00 | WithoutOSC |
| | | | | | 20 | 20 | 35 | 23~35 | | | | | SP | SC/UPC | | | OD | OSC/Drop |
| | | | 5 | VGA without MSA | 23 | 23 | 40 | 29~41 | | | | | LA | LC/APC | MO | With output optical port monitoring | OA | OSC/Add |
| | | | | | 24 | 24 | 25 | 12~24 | | | | | SA | SC/APC | | | ODA | OSC/Drop & Add |
| | | | | | | | | | | | | | | | MI | With input optical port monitoring | | |
| | | | | | | | | | | | | | | | MIO | With input, output optical port monitoring | | |