

# RFA7000 C & L-Band Separate Raman Fiber Amplifier

## PRODUCT DESCRIPTION

1. Erbium-doped Fiber Amplifier, due to the multiple cascades and the accumulation of noise caused by spontaneous emission, will reduce the system CNR greatly and thus it will limit the transmission capacity and distance of the system. Raman Amplifier is a newly designed fiber amplifier based on Stimulated Raman Scattering (SRS) effect. Raman amplifier is considered as the core technology of new generation DWDM fiber over-long communication. Compared with Erbium-Doped Fiber Amplifier, Raman amplifier has the advantage of low Noise Figure (NF), wider gain bandwidth, flexible gain spectral region and stable temperature. It is the only device that can operate in 1300~1600 nm.



2. The gain medium of EDFA is Erbium-doped Fiber (EDF) . It is a separated amplifier and its signal light can only be amplified after putting into EDFA. The gain medium of Distributed Raman Amplifier is Single Mode Fiber (SMF) which is for signal light transmission . Raman amplifier gain area is distributed at long transmitting fiber that is 25km from the output end. That is to say, the signal light is amplified 25km before it reaches the output end of the transmitting fiber.

3. Raman amplifier low noise figure marks the super advantages as following:

① During Single Mode Fiber(G.652) transmission, adopting Distributed Raman Amplifier, it can reduce the loss for 5.5dB (Typical value) at effective cross-distance . Compared with EDFA, it equals that the effective distance is reduced for 25km, (fiber loss is calculated as 0.22dB/km). Therefore, the input power to the fiber is reduced and the damage of fiber non-linearity effect (SBS) is weakened.

② In OSNR calculation, the Equivalent Noise Figure of distributed backward pump Raman Amplifier is 0dB, typical value 0~2dB, which has remarkable help for improvement of cross-band length, increase system OSNR and transmission distance.

4. RFA distributed Raman Amplifier is a series of products, with different Raman Gain and Gain bandwidth to meet differential needs. The unit adopts Japanese Fitel Raman pump laser, built-in perfect laser APC, AGC, ATC closed-looped circuit ensuring long life and stable operation of the pump laser.

## PRODUCT FEATURES

- ▶ Perfect laser APC, AGC, ATC closed-looped circuit ensuring long life and stable operation of the pump laser.
- ▶ Low noise figure and flat gain.
- ▶ Adopts famous Fitel Raman pump laser.
- ▶ Gain bandwidth: C & L-Band (1528~1604nm)

## MAIN APPLICATION

- ▶ Fiber CATV system, extra-long trunk that is inconvenient for building relay station.
  - Relay distance > 60Km.
  - Single span distance > 80Km.
- ▶ DWDM, CATV extra-long trunk optical transmission system.
- ▶ Submarine optical transmission system.

## TECHNICAL INDEX

| Performance     |                               |      | Index      |      |      | Supplement            |
|-----------------|-------------------------------|------|------------|------|------|-----------------------|
|                 |                               |      | Min.       | Typ. | Max. |                       |
| Optic feature   | Wavelength                    | (nm) | 1528       |      | 1604 | RFA7000 C & L-Band    |
|                 | Pump optic transmission power | (mW) | 400        |      |      |                       |
|                 | Raman switch gain             | (dB) | 7          | 8    | 9    | RFA7008               |
|                 |                               |      | 9          | 10   | 11   | RFA7010               |
|                 |                               |      | 11         | 12   | 13   | RFA7012               |
|                 |                               |      | 13         | 14   | 15   | RFA7014               |
|                 |                               |      | 15         | 16   | 17   | RFA7016               |
|                 | Gain flatness                 | (dB) |            | 1.0  |      | RFA7000/F (With GFF)  |
|                 |                               |      |            | 2.0  |      | RFA7000 (Without GFF) |
|                 | Noise figure                  | (dB) |            |      | 0    |                       |
|                 | Polarization mode dispersion  | (ps) |            |      | 0.2  |                       |
|                 | Polarization dependence gain  | (dB) |            |      | 0.4  |                       |
|                 | Polarize related loss         | (dB) |            | 0.1  |      |                       |
| General feature | Work voltage                  | (V)  | 90         |      | 265  | -48VDC optional       |
|                 | Power Consume                 | (W)  |            | 30   |      |                       |
|                 | Work temp                     | (°C) | 0          |      | 60   |                       |
|                 | Storage temp                  | (°C) | -40        |      | +85  |                       |
|                 | Relative humidity             | (%)  | 5          |      | 95   |                       |
|                 | Size (W)×(D)×(H)              | (mm) | 483×368×44 |      |      | 1U                    |
|                 |                               |      | 483×368×88 |      |      | 2U                    |

Notes: work wavelength and pumping optical power can be tailored according to the customer's request.

## PRODUCT SEREIS

| Model     | Work wavelength (nm) | Gain flatness (dB) | Raman Switch gain (dB) |
|-----------|----------------------|--------------------|------------------------|
| RFA7008/0 | 1528~1604            | <±2                | 8±1.0                  |
| RFA7010/0 | 1528~1604            | <±2                | 10±1.0                 |
| RFA7012/0 | 1528~1604            | <±2                | 12±1.0                 |
| RFA7014/0 | 1528~1604            | <±2                | 14±1.0                 |
| RFA7016/0 | 1528~1604            | <±2                | 16 (-1 ~ +0.5)         |
| RFA7008/F | 1528~1604            | <±1                | 8±1.0                  |
| RFA7010/F | 1528~1604            | <±1                | 10±1.0                 |
| RFA7012/F | 1528~1604            | <±1                | 12±1.0                 |
| RFA7014/F | 1528~1604            | <±1                | 14±1.0                 |
| RFA7016/F | 1528~1604            | <±1                | 16 (-1 ~ +0.5)         |

Notes: 1. Distributed optical raman amplifier with opposite phase PUMP ( phasing back PUMP).

2. F model, built-in gain flatness filter GFF.

## MODEL EXPLANATION

RFA 70 □□ / □

| Guangtai Raman Optical Amplifier |  | Wavelength |          | Raman Switch Gain |           | Gain flatness |                      |
|----------------------------------|--|------------|----------|-------------------|-----------|---------------|----------------------|
| RFA                              | Separate Raman optical amplifier                         | 40         | CATV     | 08                | 7~8.5dB   | O             | Without GFF<br><±2.0 |
| HFA                              | Hybrid Raman/Er-doped optical amplifier                  | 50         | C-Band   | 10                | 9~10.5dB  |               |                      |
|                                  |  | 60         | L-Band   | 12                | 11~12.5dB | F             | With GFF<br><±1.0    |
| DRA                              | Separate dispersion compensation Raman optical amplifier | 70         | C+L-Band | 14                | 13~14.5dB |               |                      |
|                                  |  |            |          | 16                | 15~16.5dB |               |                      |