

Tunable Fiber Grating Filter

center wavelength 350-2400nm, 0.7nm linewidth, 2nm tuning range



DATASHEET

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The TTFG series tunable optical filter integrates a fiber Bragg grating (FBG) with a thermally tunable platform, offering a filter with narrow linewidth and wide center wavelength selection. It is available in two configurations: two-port reflection, functioning as a tunable notch filter, and three-port transmission-reflection, which acts as a tunable bandpass filter with an integrated circulator. Standard FBG linewidths range from 0.07 nm to 2 nm, with custom narrower options available. We provide tailored FBG production from 350 to 2500nm, with a one-time setup fee of approximately \$1800. Additionally, our circulators cover a wide wavelength range from 350 nm to 2200 nm, supporting the three port TTFG configuration for diverse optical system requirements.

Features

- Low insertion loss
- Narrow linewidth
- High off-band suppression
- Uniform bandwidth
- High tuning resolution
- Compact and cost-effective

Applications

- DWDM networks
- Fiber Sensing
- Quantum Computing
- Tunable Fiber Lasers

Specifications

| Parameter | Min | Typical | Max | Unit |
|----------------------------------|-------------|--------------------|------|------|
| Center Wavelength | 350 | | 2400 | nm |
| Wavelength Tuning Range | | 1 | 2.5 | nm |
| Reflectivity | 30 | | 99.9 | % |
| Tuning Resolution | - | 0.1 | - | nm |
| Insertion Loss ^[1] | two ports | 0.6 | 1.6 | dB |
| | three ports | 1.5 ^[2] | 4 | |
| Tuning Speed | | 0.02 | | nm/s |
| Bandwidth @-3dB | 0.05 | 0.1 | 2 | nm |
| Off Band Rejection @-20dB | 18 | 20 | 45 | dB |
| Polarization Dependent Loss | - | 0.25 | - | dB |
| Extinction Ratio (PM fiber only) | - | 20 | - | dB |
| Polarization Mode Dispersion | - | - | 0.5 | ps |
| Return Loss | 50 | - | - | dB |
| Optical Power Handling (CW) | - | 0.5 | 5 | W |
| Electrical Power Consumption | | 1 | 3 | W |
| Operating Temperature | -20 | 20 | 50 | °C |
| Storage Temperature | -40 | | 85 | °C |

Notes:

[1] This refers to the total light transmitted through a filter's spectral passing band. It is measured using a broadband light source by integrating the transmission peak. Extra loss may occur if the laser source does not align with the filter's spectral profile. Special filters can be custom-designed to match specific application needs. Note that smaller fiber cores result in higher loss (excluding connector losses).

[2] This three-port filter contains a circulator, which has lowest loss in the 1310/1550 nm bands . Circulator has higher loss outside these wavelength bands. For additional details, visit Agiltron's Isolators and Circulators. <https://agiltron.com/category/optical-isolators/isolators-circulators/>

Note: The specifications provided are for general applications with a cost-effective approach. If you need to narrow or expand the tolerance, coverage, limit, or qualifications, please [\[click this link\]](#):

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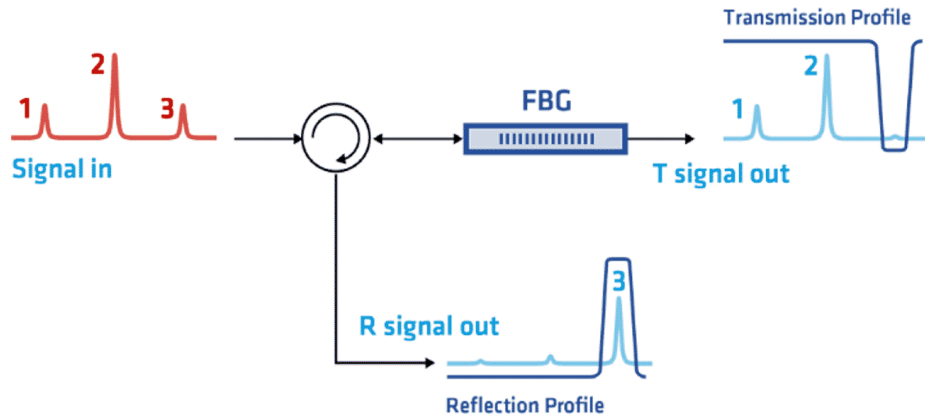
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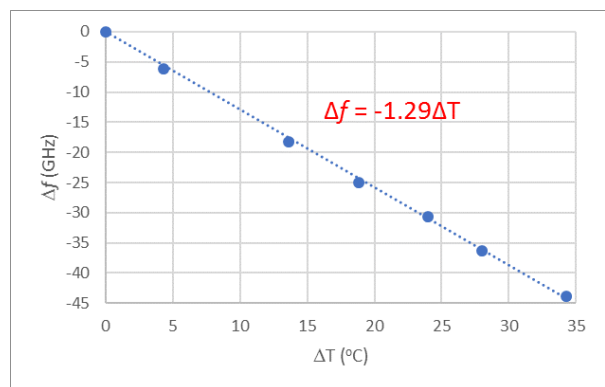
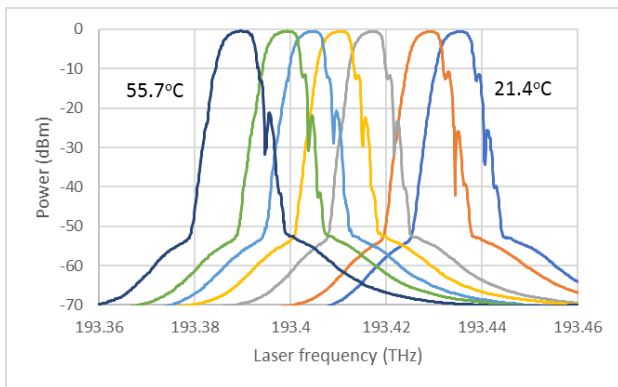
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Three Port Configuration



*Product dimensions may change without notice. This is sometimes required for non-standard specifications.

Spectrum



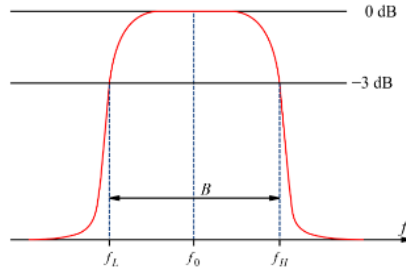
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Bandwidth Definition



Ordering Information

| Prefix | Wavelength | Linewidth | Port | Fiber Type | Fiber Cover | Fiber Length | Connector |
|--------------|--|--|----------------|--|-------------------------------|---|---|
| TTFG- | 1550.5nm = 15505 950.8nm = 09508 1061.5nm = 10615 Special = 00000 | 0.7nm = 1 1.5nm = 2 2.0nm = 3 Special = 0 | 2 = 2 3 = 3 | SMF-28 = 01 PM1550 = 34 PM1310 = 36 Select from below table Special = 00 | 900um tube = 3 Special = 0 | 0.25m = 1 0.5m = 2 1.0 m = 3 Special = 0 | None = 1 FC/APC = 3 FC/PC = 2 None = 3 LC/PC = 7 LC/APC = A LC/UPC = U Special = 0 |

Red is non-standard specially made at a higher cost. Red wavelength requires \$1650 to set up

Fiber Type Selection Table:

| | | | | | |
|----|------------|----|--------|----|-------------|
| 01 | SMF-28 | 34 | PM1550 | 71 | MM 50/125µm |
| 02 | SMF-28e | 35 | PM1950 | 72 | MM 62.5µm |
| 03 | Corning XB | 36 | PM1310 | 73 | 105/125µm |
| 04 | SM450 | 37 | PM400 | 74 | FG105LCA |
| 05 | SM1950 | 38 | PM480 | 75 | FG50LGA |
| 06 | SM600 | 39 | PM630 | 76 | STP 50/125 |
| 07 | 780HP | 40 | PM850 | 77 | IRZS23 |
| 08 | SM800 | 41 | PM980 | 78 | IRZS32 |
| 09 | SM980 | 42 | PM780 | 79 | 135 µm |
| 10 | Hi1060 | 43 | | 80 | 400 µm |
| 11 | SM400 | 44 | PM405 | 81 | 600 µm |
| 12 | | 45 | PM460 | | |

How to test the insertion loss of a tunable optical filter

The filter only works in a specific range. Beyond this range, extra peaks may show. These peaks can be blocked with special order. Please follow these instructions to do an optical insertion loss test:

1. Connect a broadband fiber-coupled laser source to OSA, sweep one time over the specified range of the tunable filter, and then fix the curve in Trace A as a reference.
2. Connect the broadband laser source to the fiberoptic tunable filter fiber as input, then connect the other fiber port of the tunable filter as the output to the OSA.
3. Set OSA Trace B as 'write,' Trace C as 'Calculate: B-A.' Auto sweep Trace C from the specific range. Tune the micrometer to shift the peak at a different wavelength. Use 'Peak search' to record IL at a different wavelength."