# Electrically Tunable Optic Filter

## Free Space, Multimode/Single Mode Fiber

DATASHEET

Return to the Webpage


The FOTF-EM series motor-driven optical tunable filters are highly versatile, supporting free-space, multimode, and single-mode operation, unlike traditional etalon- or grating-based tunable filters that typically work only with single-mode fiber. Based on a proprietary edge-filter platform, these filters are available with center wavelengths ranging from 350 nm to 2450 nm. They provide continuous wavelength tuning over ranges up to 100 nm with an approximate 5 nm linewidth. Wavelength tuning is performed by a built-in precision stepper motor, controlled through USB or RS232 interfaces. The design offers high reliability, low insertion loss, and cost-effective performance, making it suitable for a wide range of applications. Standard wavelength configurations are produced in volume to ensure cost efficiency, while custom wavelengths are available at additional cost. The thin-film filter structure also incorporates blocking layers to suppress off-band transmission, ensuring improved spectral performance.

## Features

- 350nm to 2400nm
- 5nm Bandwidth
- 100nm Tuning Range
- SM, MM, Free Space, and PM
- <3dB loss
- Up to 5W Optical Power
- Compact and Low Cost
- Low IL and PDL

## Applications

- Instrument
- Fiber Sensing
- Laboratory
- Test

## Specifications

| Parameter | | Min | Typical | Max | Unit |
|---|---|---|---|---|---|
| Center Wavelength | | 350 | | 2400 | nm |
| Tuning Range | | - | ± 50 | ± 80 | nm |
| Tuning Resolution | | - | 1 | - | nm |
| Tuning Speed | | | 10 | | nm/s |
| Insertion Loss [2] | | 1 | 1.5 | 3.5 | dB |
| Bandwidth @-3dB | | - | 5 | 8 | nm |
| Off-Band Suppression | | - | 30 | - | dB |
| PDL (SM fiber only) | | - | 0.15 | 0.35 | dB |
| PMD (SM fiber only) | | - | - | 0.1 | ps |
| Polarization Extinction Ratio (PM fiber only) | | 18 | 23 | 30 | dB |
| Return Loss | | 40 | - | - | dB |
| Optical Power Handling (CW) | Standard version | - | 0.5 | | W |
| | High power version | | 10 | | W |
| Operating Temperature | | 0 | 20 | 60 | °C |
| Storage Temperature | | -40 | - | 85 | °C |

**Notes**:

[2]. It is defined as the total light coupled out over the filter's spectral passing band. Measured using a broadband light source with integration of the transmission peak. Extra loss can occur if the laser source does not match the filter profile. A special filter can be made to match the application. The smaller the fiber core, the higher the loss. Excluding connector loss

RoHS COMPLIANT



Rev 03/10/26

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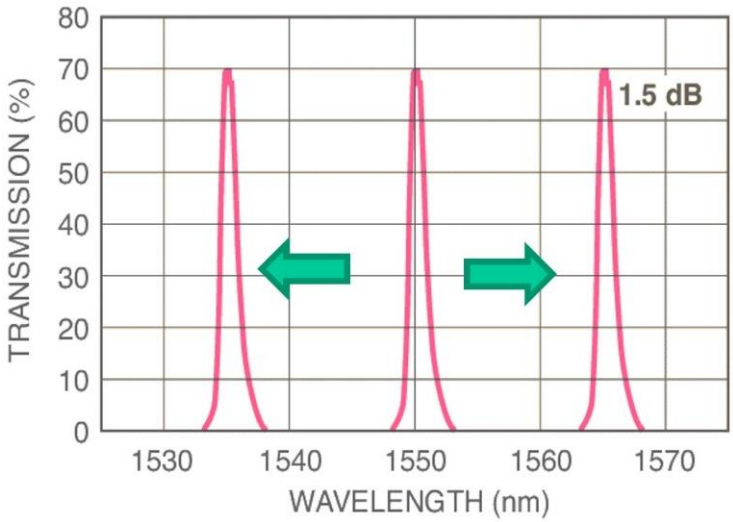
DATASHEET

### Mechanical Dimension (mm)

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

### Typical Transmission Curve

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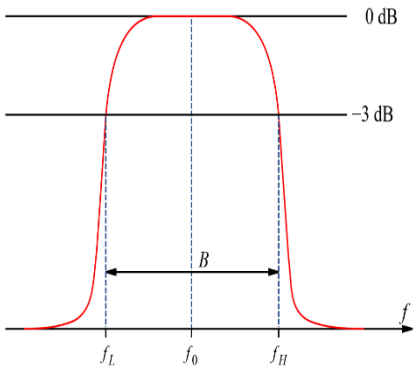
### Bandwidth Definition




### Ordering Information (Part Number)

| | EM | ☐☐☐☐ | ☐ | ☐ | ☐☐ | ☐ | ☐ | ☐ |
|---|---|---|---|---|---|---|---|---|
| **Prefix** | **Type** | **Wavelength** | **Power** | **PER** | **Fiber Type** | **Fiber Cover** | **Fiber Length** | **Connector** |
| **FOTF-** | | 2100± 60nm = 2100<br>2295± 55nm = 2295<br>2195± 55nm = 2195<br>2095± 55nm = 2095<br>2050± 50nm = 2050<br>2000± 50nm = 2000<br>1960± 40nm = 1960<br>1850± 50nm = 1850<br>1800± 50nm = 1800<br>1620± 40nm = 1620<br>1550± 50nm = 1550<br>1550± 40nm = 1551<br>1480± 40nm = 1480<br>1395± 55nm = 1395<br>1310± 40nm = 1310<br>1230± 50nm = 1230<br>1145± 45nm = 1145<br>1130± 40nm = 1130<br>1060± 40nm = 1060<br>1005± 45nm = 1005<br>Special = 0000 | 0.3W = 1<br>5W = 2<br>10W = 3<br>15W = 4<br>20W = 5 | Standard = 2<br>26 = 3<br>28 = 4<br>30 = 5 | SMF-28 = 01<br><br>***Select fiber below*** | Bare fiber = 1<br>900um tube = 3<br>Special = 0 | 0.25m= 1<br>0.5m = 2<br>1.0 m = 3<br>Special = 0 | None = 1<br>FC/PC = 2<br>FC/APC = 3<br>SC/PC = 4<br>SC/APC = 5<br>ST/PC = 6<br>LC/PC = 7<br>Special = 0 |

[1]. Red Items require NRE of $1950 to make the filter

| | | | | | |
|---|---|---|---|---|---|
| 01 | **SMF-28** | 34 | **PM1550** | 71 | **MM 50/125µm** |
| 02 | **SMF-28e** | 35 | **PM1950** | 72 | **MM 62.5µm** |
| 03 | **Corning XB** | 36 | **PM1310** | 73 | **MM 105/125µm** |
| 04 | **SM450** | 37 | **PM400** | 74 | **MM200 µm** |
| 05 | **SM1950** | 38 | **PM480** | 75 | **MM300 µm** |
| 06 | **SM600** | 39 | **PM630** | 76 | **MM400 µm** |
| 07 | **Hi780** | 40 | **PM850** | 77 | **MM600 µm** |
| 08 | **SM800** | 41 | **PM980** | 78 | **IRZS23** |
| 09 | **SM980** | 42 | **PM780** | 79 | **IRFS32** |
| 10 | **Hi1060** | 43 | **PM350** | 80 | **PCF** |
| 11 | **SM400** | 44 | **PM405** | 81 | **UV180nm** |
| 12 | | 45 | **PM460** | 82 | **LMA-PM-10** |
| 13 | | 46 | | | **MM 1mm** |

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### 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.”

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