



Applications

- **Optical Performance Monitoring**
- **Tunable Optical Noise Filtering**
- **Tunable Channel Drop for Ultra DWDM**

Description

The **Micron Optics FFP-TF2** Fiber Fabry-Perot (FFP) tunable filter is a specialized filter based on the all-fiber Fabry-Perot etalon technology. The FFP tunable filter passes wavelengths that are equal to integer fractions of the cavity (etalon) length; all other wavelengths are attenuated according to the Airy function.

The key to the elegant design of the FFP tunable filter is the lensless fiber construction. There are no collimating optics or lenses, thus the FFP tunable filter achieves high finesse and maintains a low loss transmission profile. **Micron Optics** has eliminated the pitfalls of other Fabry-Perot component technologies, including misalignment, environmental sensitivity, and extraneous modes.

The all-fiber FFP tunable filter follows the Airy function so closely that engineers can design it into the opto-electronic systems with a high degree of confidence that it will provide results very close to the theoretical mathematical model. Low loss, high isolation, and accurate power or wavelength measurements are just a few of the characteristics resulting from an ideal Airy function.

The new **FFP-TF2** design provides improved etalon alignment for stable long-term, high reliability, and Telcordia-qualified performance at a more attractive price. Several standard low-cost configurations are readily available for quick delivery. Custom high performance multi-band configurations are also available for special uses including sensing, biotech, and scientific applications. Options available include full-band tuning from 1260nm to 1620nm along with the largest finesse range in the industry (from finesse 10 to 16,000). The new FFP-TF2 is not a direct drop-in replacement for the original FFP-TF (due to drive voltage and packaging differences), but these new filters are now more suitable in many volume applications.

Features

- **Ideal for low cost, high volume applications**
- **High resolution for precise spectrum analysis**
- **Large dynamic range permits accurate measurements**
- **Efficient low loss design**
- **Tunable across O, E, S, C & L bands**
- **Wide ranges of user-specified parameters**
- **Thermally stable**
- **Vibration and shock resistant**
- **Small footprint**
- **Low power requirements**
- **Qualified for Telcordia GR 2883**



Figure 1

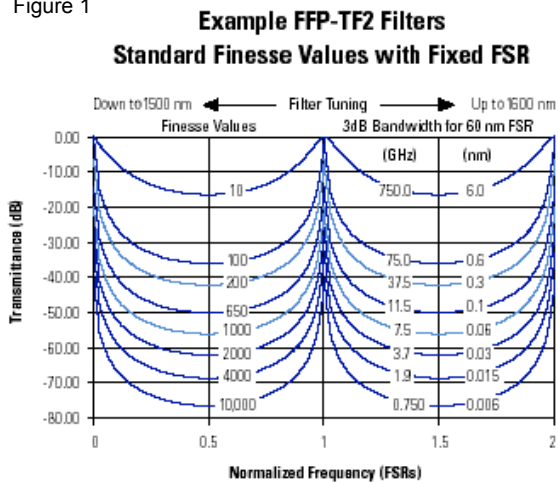
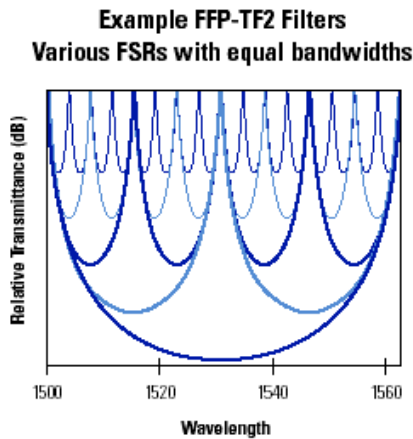


Figure 2



Applications

Optical Performance Monitor

Micron Optics FFP Technology is the base for the highest performing optical performance monitor available today, monitoring up to 400 channels in the C band alone. The high resolution, deep dynamic range and continuous tuning combine to allow accurate dense channel analysis. For example, Micron Optics finesse 10,000 filters have a contrast factor of 76 dB.

Tunable Optical Noise Filtering & Channel Locking

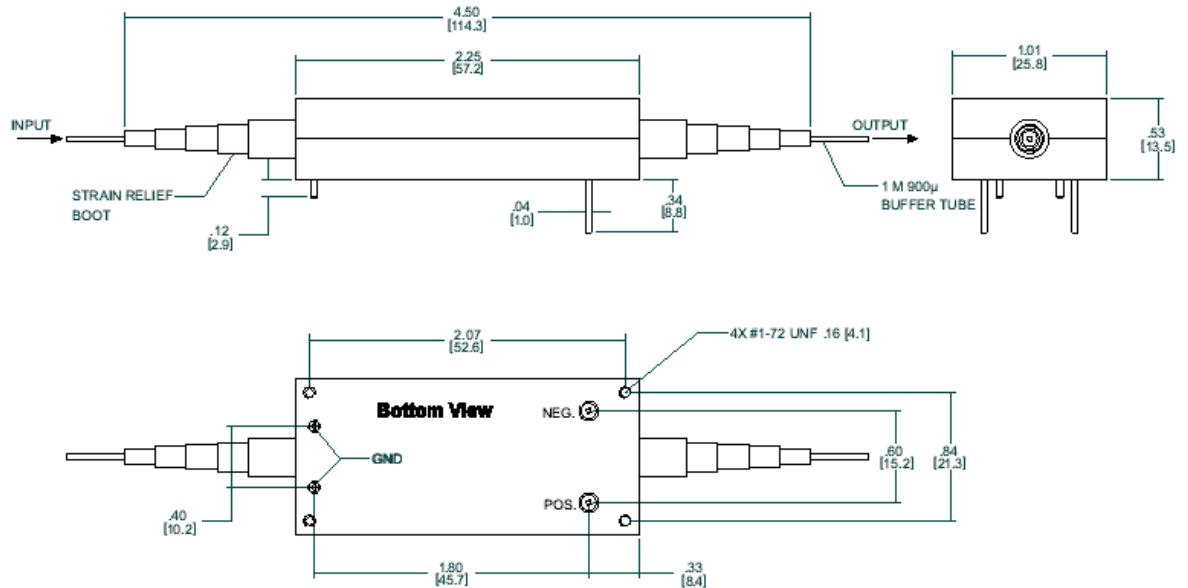
Micron Optics FFP Technology is used in telecom systems around the world for optical noise filtering and dynamic channel locking. A key attribute is the extreme low loss nature (to less than 1.5 dB) of the filter and its reliable locking capability. Data from thousands of filters in the field has shown a projected reliability of less than 80 FITs. The resulting benefit is an extremely low bit error rate and high network receiver sensitivity.

Tunable Channel Drop for Ultra DWDM (< 25 GHz spacing)

The rapid tuning and locking capabilities of the Micron Optics FFP Technology enables reliable channel selection and dropping applications in dynamic optical networks. The high degree to which the FFP filters follow the Airy Function theory allows optical engineers to accurately design system performance parameters, without the overhead of allowing for imprecise measurements.

See the table below for a listing of our standard filters used for the most common applications.

FFP-TF2 Standard Filters (for common applications)				
Parameter (Nominal Values)	Unit	ASE Noise Reducer	Optical Channel Monitor	Optical Channel Analyser
Wavelength Range		C&L Band	C&L Band	C&L Band
Bandwidth	pm	500	133	50
	GHz	62.5	16.67	6.25
Free Spectral Range (FSR)	nm	100	100	100
	GHz	12,500	12,500	12,500
Finesse		200	750	2000
Insertion Loss	dB	< 1.5	< 2.0	< 2.5



Options

- 030 Low Variation Bandwidth*
- 060 FC/SPC Connectors (Fusion Spliced)
- 061 FC/APC Connectors (Fusion Spliced)
- 062 SC/SPC Connectors (Fusion Spliced)
- 063 SC/APC Connectors (Fusion Spliced)
- 065 FC/APC Connectors (Connectorized)
- 069 Other Connectors

* Please verify specifications with Micron Optics.

Part Number

FFP-TF2 λλλλ – bbbuffff – I.I

Wavelength Band

- 1310 – O Band
- 1420 – E Band
- 1500 – S Band
- 1550 – C Band
- 1580 – C&L Band
- 1600 – L Band
- 9000 – Full Band
- 9999 - Other

Bandwidth

- Specify bandwidth
- Example:
040 = 40 GHz Bandwidth

Bandwidth Unit

- G - GHz
- M - MHz

Finesse

- Specify finesse
- Example:
0200 = Finesse of 200

Insertion Loss

- Specify loss
- Example:
2.5 = 2.5 dB loss

Specifications¹

Optical

Operating Wavelength Range²

O-Band	1280 – 1360 nm
E-Band	1360 – 1480 nm
S-Band	1480 – 1520 nm
C-Band	1520 – 1570 nm
L-Band	1570 – 1620 nm
C&L-Band	1520 – 1620 nm
Full Band (O, E, S, C & L Band)	1280 – 1620 nm

Free Spectral Range (fixed FSR but selectable within this range)	480 pm to 360 nm (60 to 54,000 GHz)
3dB Bandwidth	0.3 pm to 25 nm (40 MHz to 3,125 GHz)
Standard Finesse Values	10, 40, 100, 150, 200, 650, 1000, 1500 2000, 4000, 6000, 8000, 16000
Insertion Loss ³	< 1.5 dB
Polarization Dependent Loss ³	< 0.2 dB
Input Power ⁴	< 100 mW (for F < 200)

Electrical

Tuning Voltage	< 18 V
Capacitance	< 3.0 μF
Slew Rate	< 90 V/ms
Cycling Speed Over 1 FSR	< 2500 Hz
Maximum Tuning Voltage	70 V

Environmental³

Operating Temperature	-20° to 80° C
ΔVoltage/Operating Temperature	< 18 V
ΔInsertion Loss/Operating Temperature (dependent on FSR)	< 0.5 dB
ΔInsertion Loss/Vibration	< 0.5 dB

Mechanical

Dimensions	13.5 x 25.8 x 57.2 mm
Weight	53 g
Mounting Holes	(4) #1-72 UNF x 0.16 inch deep
Pigtail Jacket (loose)	900 μm buffer tubing
Pigtail Length	> 1 m
Connector	see options

Notes:

- ¹ Specifications are dependent on filter configuration. Please contact Micron Optics for final specifications.
- ² Other non-telecom wavelengths are available. Please contact Micron Optics for specifications.
- ³ Typical value; final value is dependent on Free Spectral Range and Finesse.
- ⁴ Maximum input power level depends on finesse value.



components