

TFN

Narrowband Tunable Optical Filter



The TFN Narrowband Tunable Optical Filter combines TeraXion's fiber Bragg grating (FBG) technology and a thermally-tunable platform to create a tunable filter with unprecedented stability and resolution. The compact and reliable TFN is available in two models: reflection (R) and transmission-reflection (T+R). The narrowband option enables bandwidths from 2 GHz to 100 GHz, and the ultra-narrowband option enables bandwidths from 35 MHz to 500 MHz.

Both models feature wavelength tuning resolution of 2 pm (250 MHz at 1550 nm) over a range of ± 30 GHz around the center wavelength.

The TFN tunable optical filter has been specifically designed for high-precision applications that require a high-optical isolation coupled with precise and accurate narrowband filtering. It provides excellent sideband filtering and carrier suppression, making this tunable filter ideal for RF over fiber, advanced fiber-optic sensing systems and quantum applications.

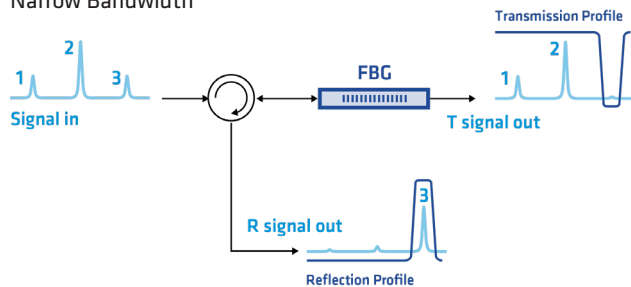
Top 6 Features

- **Ultra-Narrow Bandwidth:** Supports bandwidths as narrow as 35 MHz.
- **Precision Tuning:** Tunable over a range of ± 30 GHz around the center frequency with a resolution of 2 pm.
- **High Optical Isolation:** Narrowband models can reach optical isolation higher than 25 dB.
- **Sharp-Edged:** Both the narrowband flat-top filter and ultra-narrowband notch filter have sharp-edged spectra for precision wavelength filtering.
- **Flexible:** Can be cascaded to separate, redirect, and combine different wavelength peaks.
- **Easy Integration:** Comes equipped with control software that makes this tunable filter ready-made for advanced fiber-optic systems requiring precise tuning and excellent sideband suppression.

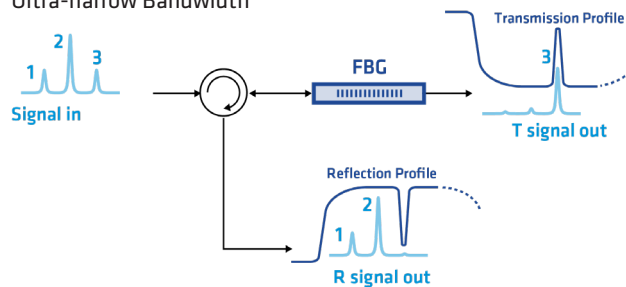


Filter Profile Examples, Usage and Applications

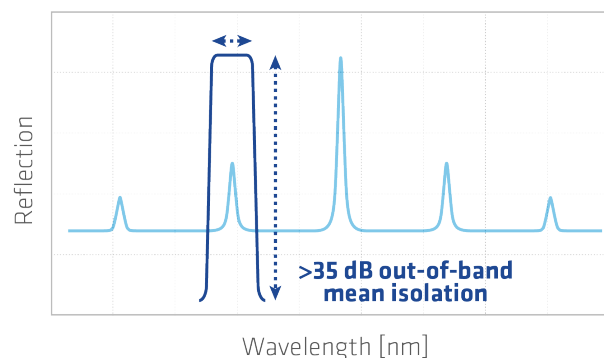
Narrow Bandwidth



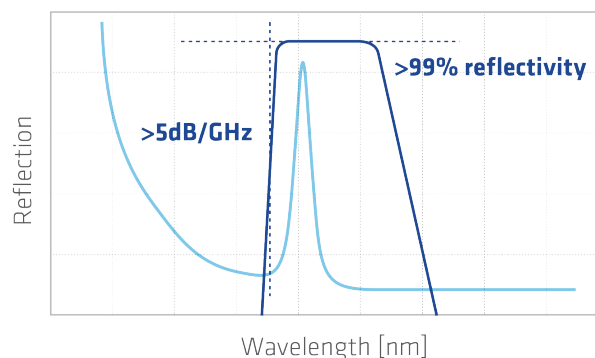
Ultra-narrow Bandwidth



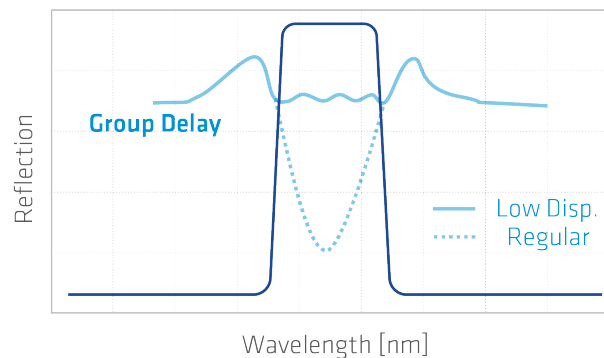
High Isolation & Narrow



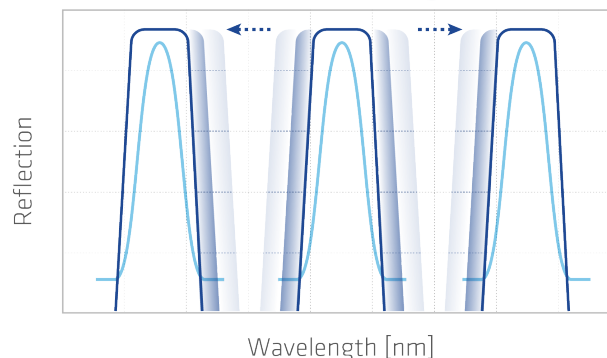
Flat-top Steep-edge



Low Dispersion



Precision Tuning



Usage	Key Features	Application Examples
<ul style="list-style-type: none"> Optical communication carrier and side-band suppression 	<ul style="list-style-type: none"> Flat-top steep-edge High optical isolation <p>BW: 2 – 12 GHz typical</p>	<ul style="list-style-type: none"> RF over Fiber DWDM Access & DCI Quantum Computing
<ul style="list-style-type: none"> Brillouin or Rayleigh signal isolation Probe or pump wavelength isolation ASE suppression 	<ul style="list-style-type: none"> High reflectivity High optical isolation Minimal thermal drift <p>BW: 5 – 25 GHz typical</p>	<ul style="list-style-type: none"> Distributed Fiber Sensing Quantum Sensing
<ul style="list-style-type: none"> Picosecond lasers spectral filtering Cyberattacks prevention 	<ul style="list-style-type: none"> Low dispersion High isolation <p>BW: 0.1 – 0.8 nm typical</p>	<ul style="list-style-type: none"> Quantum Key Distribution Ultrafast lasers

Optical Specifications	Narrowband Configuration	Ultra-narrowband Configuration	Units
Single center wavelength λ @25°C (referenced to vacuum) ⁽¹⁾	700 – 2100	1525 – 1570	nm
Bandwidth	2 – 100	0.035 – 0.5	GHz
Reflectivity	50 – 99.9+	N/A ⁽²⁾	%
Side Mode Suppression Ratio (SMSR)	> 20	N/A	dB
Power handling	500 ⁽³⁾	10 – 40	mW
Typical insertion loss	< 3.5 ⁽³⁾	< 2	dB
Fiber type	PM or non-PM	PM	
Tuning range	± 30		GHz
Tuning resolution	2		pm
Isolation	20 – 70 ⁽⁴⁾		dB
Polarization extinction ratio	> 20		dB

(1) Other center wavelengths available on request

(2) Notch optimized for transmission

(3) Including circulator

(4) Per FBG; BW/2 + 10GHz (~10 GHz from edge)

Other Specifications	Values	Units
Operating temperature	-5 to 65	°C
Storage temperature	-40 to 85	°C
Control interface	I ² C	
Voltage	5	V
Typical power consumption	3	W
R module dimensions	130 x 22 x 14	mm
T+R module dimensions	150 x 54 x 19.5	mm
RoHS compliance	Yes	



Reflection (R) module



Transmission + Reflection (T+R) module

Ordering information

For orders, questions, specific requirements or to learn more about TeraXion's products, contact us at info@teraxion.com

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