

High Precision Optical Filters

OF

Applications

- DAS Signal Isolation
- DTS/DTSS Brillouin/Raman Isolation
- Wideband FBG Filtering
- Multi-Peak Laser Monitoring
- DV-QKD Pulse Filtering
- Pump Laser Suppression

Features

- Outstanding central wavelength accuracy
- High stability
- Flat top & steep edge shapes Standardized
- High reflectivity & high optical isolation
- Narrow to wide bandwidth (BW)



The OF High Precision Optical Filters are based on TeraXion fiber Bragg grating (FBG) technology and can be integrated in athermal packages to create filters with very high stability. The design of the Optical Filters can be tailored to meet the challenging requirements of next-generation optical systems.

indie optical filters can be centered from 700 nm up to 2100 nm. They can also be shaped with a bandwidth (BW) as low as 2 GHz (0.016 nm) up to thousands of GHz.

Thanks to its proven simulation modelling, manufacturing processes, and athermal packaging expertise backed by 20 years delivering high-precision FBG components, indie provides optical filters that can meet a wide set of demanding requirements.

Features Details

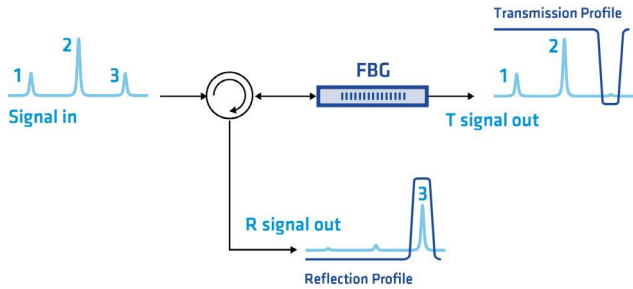
- **Outstanding central wavelength accuracy:** < 50 pm absolute accuracy.
- **High stability:** < 0.5 pm / °C drift when integrated within TeraXion best-in-class athermal package.
- **Flat top & steep edge shapes:** > 20 dB drop over 4 GHz for steep edge models, tailored for challenging signal isolation needs.
- **Low dispersion models:** < 5 ps peak-to-peak group delay, ideal for picosecond laser spectral filtering.
- **High reflectivity & high optical isolation:** > 99.9% reflectivity combined with typical > 35 dB mean out-of-band isolation, provides remarkable signal-to-noise ratio (SNR) enhancement.
- **Narrow to wide bandwidth (BW):** As low as 2 GHz (0.016 nm) up to thousands of GHz.

High Precision Optical Filters

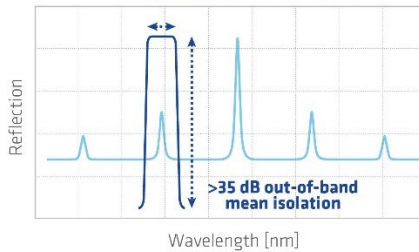
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Filter Profile Examples, Usage and Applications

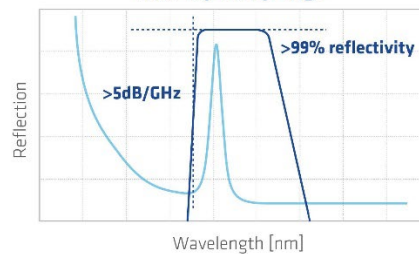
Narrow Bandwidth



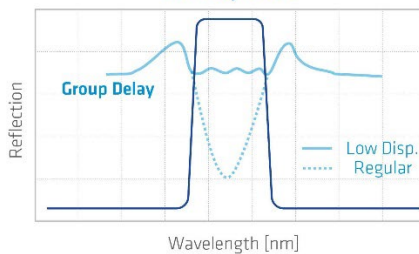
High Isolation & Narrow



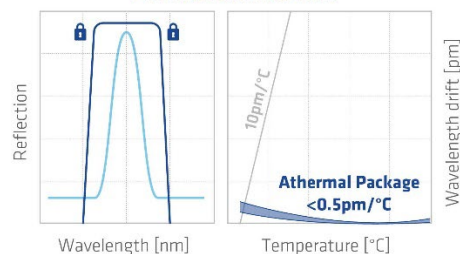
Flat-top Steep-edge



Low Dispersion



Minimal Thermal Drift



Usage	Key Features	Application Examples
<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 – 20 GHz typical</p>	<ul style="list-style-type: none"> Distributed Fiber Sensing Quantum Sensing
<ul style="list-style-type: none"> Picosecond lasers and modulated signals spectral filtering Entangled photons isolation Cyberattacks prevention 	<ul style="list-style-type: none"> High isolation Flat-top steep-edge Low dispersion <p>BW: 0.1 – 0.8 nm typical</p>	<ul style="list-style-type: none"> Quantum Key Distribution Quantum Computing Ultrafast lasers

Contact us at info@teraxion.com or visit our website www.indie.inc/photonics.

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Optical Specifications	Values	Units
Single center wavelength λ @25°C (referenced to vacuum)	700 — 2100	nm
Center wavelength accuracy ^{1,2}	< 50	pm
Center wavelength stability (athermal package)	< 0.5	pm/°C
Reflection Bandwidth	2 – thousands	GHz
	0.016 – tens	nm
Reflectivity ³	50 – 99.9%	%
Mean out-of-band isolation ⁴	Typ. > 35	dB
Power handling	Up to 1	W
Fiber type	PM or non-PM	
Polarization extinction ratio ⁵	> 20	dB
Optical Feature		
Step edge design: Transition slope	> 20	dB over 4 GHz
Low dispersion design: Peak-to-peak group delay (GD)	< 5	ps

(1) < 150 pm when using PM fiber in athermal package

(2) Maximum wavelength accuracy between 700 – 930, 1020 – 1070 nm, and 1520 – 1620 nm.

(3) Maximum measurable reflectivity may be limited by BW and fiber type

(4) Equivalent to the metrology and test noise floor, higher isolation by design

(5) Lower PER for athermal packages

Mechanical Specifications	Values	Units
Package options	Bare - Recoat – Loose Tube - Athermal Tube - Module	-
Athermal tube dimensions (L x \emptyset): Short tube ¹	75 x 4.8	mm
Athermal tube dimensions (L x \emptyset): Long tube ¹	195 x 6.3	mm
Module dimensions (L x W x H): FBG filter ¹	60 x 10 x 6.0	mm
Module dimensions (L x W x H): FBG filter + circulator ¹	162 x 20 x 9.0	mm
Module dimensions (L x W x H): double FBG filter + circulator ¹	207 x 65 x 8.6	mm
Pigtail length options	0.5 – 1 – 1.5	m
Connectors	Various options	-
RoHS, REACH, Telcordia GR-1221/GR-1209	Yes ²	-

(1) Package availability to be confirmed by TeraXion based on filter specification requirements

(2) Select packages



Athermal Tubes:
Long & Short



Modules:
Single & Dual FBG



Contact us at info@teraxion.com or visit our website www.indie.inc/photonics.