

## Wavelength-locked FBG (Fiber Bragg Grating)



### ● Product Description

Fiber Bragg Gratings have many applications in optical communications, laser technology and sensing systems. FBGs are widely used as fiber reflectors or optical filters with narrowband spectra. FBGs can be used as sensitive elements for strain and temperature measurements. Wavelength Locked FBGs are used as external reflectors for laser diodes. The wavelength generation of pump semiconductor lasers and single frequency



lasers is easily stabilized using such fiber gratings. Low reflection gratings with FWHM 0.3 nm – 0.8 nm and reflectivity 2% – 5 % are ideal for pump power laser stabilization. FBGs close to semiconductor laser crystals with FWHM of about 0.1 nm and reflectivity of 10% - 20% are used to create single frequency sources. We present a family of WL FBGs with different accurate wavelength positions up to  $\pm 0.02$  nm. The transmission spectrum of the wavelength locked FBGs for laser diode power and wavelength stabilization is shown in the figure.

- **Product features**

Improve laser performance; Flexible design and high reliability

- **Part Number**

MP-GTL-FBG-WL-810

- **Application area**

Pump laser of fiber amplifier (EDFA) | Single frequency fiber laser | Tunable laser module



## ● Core parameters

Wavelength Range	Bandwidth	Reflectivity
633-2300nm	0.3 ~ 0.8 nm / 0.1~ 0.15 nm	2 ~5 / 10 ~20%

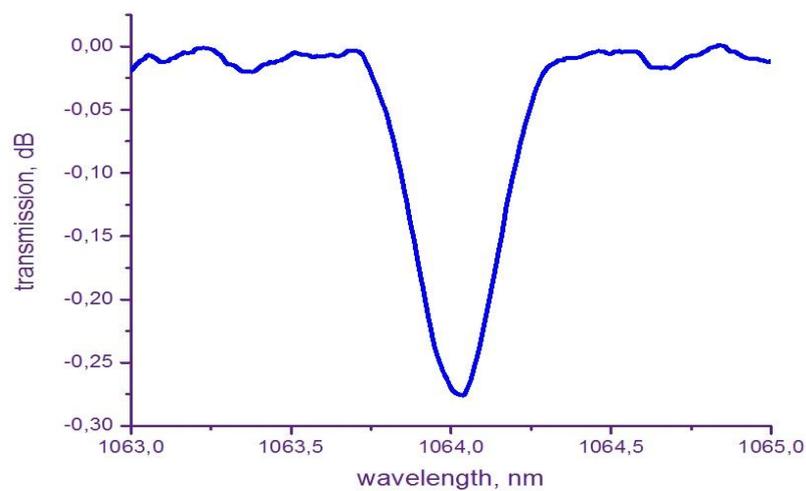
## ● General Parameters

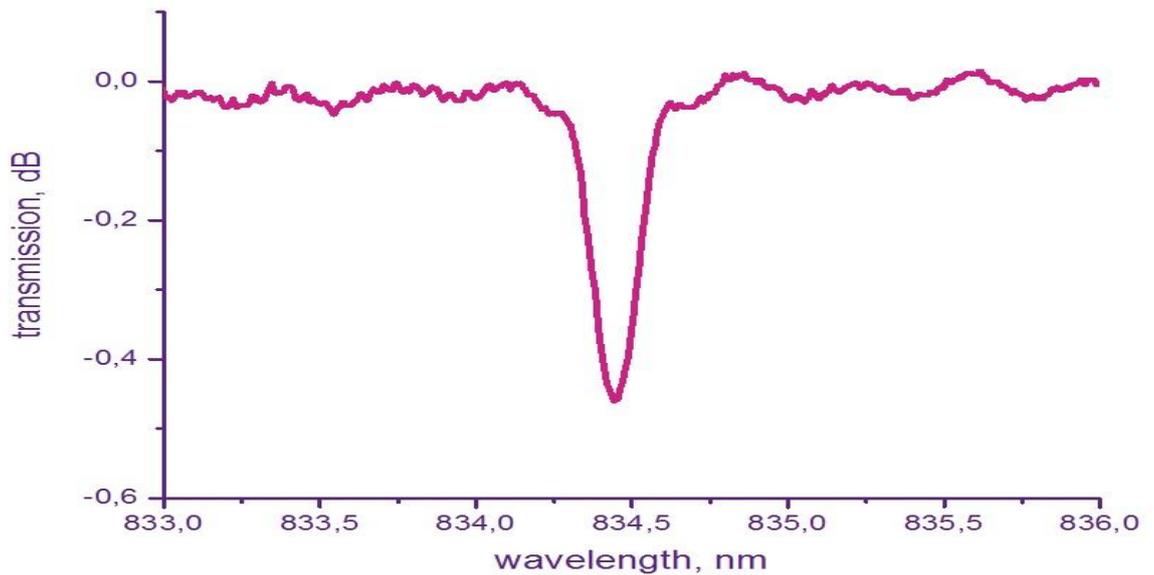
Type

Grating characteristics	MP-GTL-FBG-WL-810	Tolerance/Precautions
Wavelength range, nm	633, 780, 794, 797, 799, 801, 809, 830, 852, 895, 940, 976, 1030, 1057, 1060, 1064, 1080, 1125, 1150, 1178, 1240, 1270, 1310, 1484, 1510 ~ 1580, 1650, 1900, 1908, 1952, 2300	± 0.1~± 1 customization requirements
Fiber type	Single mode, polarization maintaining	Or customize
Reflectance,%	2 ~5 / 10 ~20	0.5 ~ 1 / 1 ~ 3



<b>Bandwidth (FWHM), nm</b>	<b>0.3 ~ 0.8 nm / 0.1~ 0.15 nm</b>	<b>Customization requirements</b>
<b>SLSR, dB</b>	<b>~ 10</b>	<b>Or customize</b>
<b>FBG tail fiber length, meters</b>	<b>≥ 0.5</b>	<b>Or customize</b>
<b>FBG Recoating</b>	<b>None, acrylic ester, polyimide, aluminum, copper</b>	<b>Or customize</b>
<b>Tensile strength, kpsi</b>	<b>&gt; 100</b>	
<b>Optical connector</b>	<b>bare fiber, FC/APC, LC/APC</b>	<b>Or customize</b>





## Special application fiber Bragg gratings (FBG) include

Wavelength locker FBG

WDM ITU filter 100/200 GHz FBG

Raman laser FBG

Fabry-Perot interferometer FBG

High-temperature resistant fiber Bragg grating

Radiation-resistant FBG



## The application range of the special FBG series:

External reflector for laser diodes

Filtering optical signals

Optical add/drop multiplexers in WDM systems

Measuring minute temperature or strain changes

Evaluating small vibrations or sound signals

Multi-stage Raman lasers

High-temperature applications

Nuclear industry

Aerospace

### MP-GTL-FBG-WL-810 Wavelength-Locking Fiber Bragg Grating

Used as an external reflector for laser diodes. With the help of these FBGs, it is easy to stabilize the wavelength generation of pump semiconductor lasers and single-frequency lasers. Low-reflection gratings with a Full Width at Half

Maximum (FWHM) bandwidth of 0.3 nm to 0.8 nm and a reflectivity of 2% to 5%

are ideal for stabilizing pump power in lasers. FBGs with a FWHM bandwidth of

around 0.1 nm and a reflectivity of 10% to 20% are placed near the semiconductor laser crystal to create single-frequency sources. FORC Photonics offers wavelength-locking FBGs with highly precise wavelength positions (up to

$\pm 0.02$  nm).

#### **MP-GTL-FBG-WDM-810 Series WDM ITU Filter 100/200 GHz Fiber Bragg Grating**

With narrow spectral bandwidth, this FBG is a good element for filtering optical signals. It is widely used as an optical add/drop multiplexer in WDM systems, allowing for high levels of Side-Lobe Suppression Ratio (SLSR) to prevent adjacent channel crosstalk in the system. These FBGs have a flat-top reflection spectrum and steep spectral drop-offs. The non-thermal encapsulation of these FBGs ensures wavelength stability of  $<0.16$  nm in the temperature range from  $0^{\circ}$  C to  $+70^{\circ}$  C, which is essential for stable operation.

#### **MP-GTL-FBG-RL-880 Raman Laser Fiber Bragg Grating**

Can be used to create highly efficient multi-stage Raman lasers based on phosphate-silicate fibers at different wavelengths. Compared to germanium-doped fibers, it allows for about three times the Raman shift. For many applications that require very precise measurements of small temperature or strain variations using acoustic waves, paired FBGs can enhance sensitivity.

#### **MP-GTL-FBG-FPI-810 Fabry-Pérot Interferometer Fiber Bragg Grating**

This is a pair of FBGs that can detect very small phase shifts. By applying electrically, magnetically, or acoustically enhanced coatings on the fiber between the gratings, extremely small changes in these fields can be measured. For sensing purposes and to assess small vibrations or acoustic signals through interference measurement methods, a low-finesse Fabry-Pérot cavity is typically sufficient.

#### **MP-GTL-FBG-HE-810 High-Environment Fiber Bragg Grating**

These FBGs can be provided as separate or different wavelength FBG chains, enabling multi-point temperature monitoring. Various types of single-mode (SM) fibers and fiber coatings can be used to write these gratings. High-temperature acrylate-coated fibers are suitable for temperatures up to +150°C. Polyimide or metal (copper, aluminum) coated fibers are used for high-temperature applications up to +300°C and +500°C, respectively. With steel tube protection, our high-environment FBGs can be used at temperatures up to +700°C.

#### **MP-GTL-FBG-RH-880 Radiation-Hard Fiber Bragg Grating**

Written with radiation-hard pure quartz core fibers, this FBG is well-suited for applications in the nuclear industry, aerospace, and other radiation-intensive environments.



The following configurations can be modified according to customer requirements to customize the fiber Bragg grating solution:

Parameter/ P N#	MP-G					
	TL-F					
Wave length	BG-W		MP-GTL	MP-GTL-F		
	L-810	MP-GTL-FBG-	-FBG-R	BG-FPI-8	MP-GTL-FB	MP-GTL-FB
N#	WDM-810	WDM	L-880	10Fabry-	G-HE-810	G-RH-880
	ITU Filter	100/2	Raman	Perot	HardEnvir	RadiationH
Locker	h	00GHzFBGs	LaserF	Interfero	onment	ardFBGs
	FBGs		BGs	meter	FBGs	
Wavelength Range [nm]	630-2 300	1530-1565 (C-band) or Customized 1510-1580	124,012 ,701,48 4	600-2300		1000-2300

Quick Order Wavelength [nm]]	30 values from 633 to 2300	-	-	-	30 values from 633 to 2300	-
Fiber Type	SM, PM, Customized	SM, Corning SMF-28	SM, PM, Dual-core, LMA, Customized	SM, PM, Dual-core, Radiation-resistant, Customized	SM, PM, Dual-core, LMA, Customized	SM, PM, Dual-core, Radiation-resistant, Customized
Reflectivity [%]	2-5, 10-20	10-99, Flat-top typical >99.5	5-99.9	0.5-99		
Bandwidth	0.3-0.8, 0.1-	100/200GHz on ITU	0.15-1.2	0.3-0.8	0.15-0.8	0.3-0.5



(FWHM) [nm]	0.15	For 100GHz: @-0.5dB>0.3nm, @-20dB0.65nm				
Distance Between FBGs [mm]	-	-	-	1-200, Customized	-	-
Channel Isolation [dB]	-	-20	-	-	-	-
Insertion Loss [dB]	-	<0.15	-	-	-	-



Cladding Mode Loss [dB]	-	<0.5 (only for cladding mode suppression fiber)	-	-	-	-
Return Loss [dB]	~10	-	~8	-	~8	~8
FBG pigtail length [m]	$\geq 0.5$ , Customized					



<b>FBG Coating</b>	None , Acrylic, Polyimide, Aluminum, , Copper, Customized	None, Acrylic, Polyimide, Customized	None, Acrylic, Polyimide, Aluminum, Copper, Customized.
<b>Tensile Strength [kpsi]</b>	>100	-	>100



Thermal Wavelength Stability(0°C-+70°C)[nm]	-	<0.16	-	-	-	-
Optical Connector	Bare Fiber, FC/APC, LC/APC, Customized					
DimensionsLxWxH[mm]	-	66×18×12	-	-	-	-