

# **MEMS TUNABLE OPTICAL FILTER**

*Bare Component*

## **OVERVIEW**

**Sercalo**'s Tunable Optical Filter is based on MEMS technology and is designed for ITU C and L band with 50 GHz or 100 GHz channel spacing.

The highly reliable tuning mechanism uses an integrated micro-mirror with switching time below 50 ms and insertion loss below 3 dB. The miniature package is ideal for applications requiring reduced size and weight.

In the bare Tunable Filter component (BCTF variant) the central wavelength is set using 4 lines of 0-60V analog voltage. The internal MEMS is NOT ESD protected and needs special care during handling.

The component is designed to conform to Telcordia 1221 reliability standards.

## **APPLICATIONS**

- *Reconfigurable Optical Add/Drop Multiplexers*
- *Optical power monitors*
- *Optical sensor interrogators*
- *Low cost spectrometer*
- *Low cost tunable laser*

## **FEATURES**

- *Small 43 x 11 x 9.5 mm<sup>3</sup> body size*
- *UART and I<sup>2</sup>C/SMBus demo-board available on request*

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## DESCRIPTION

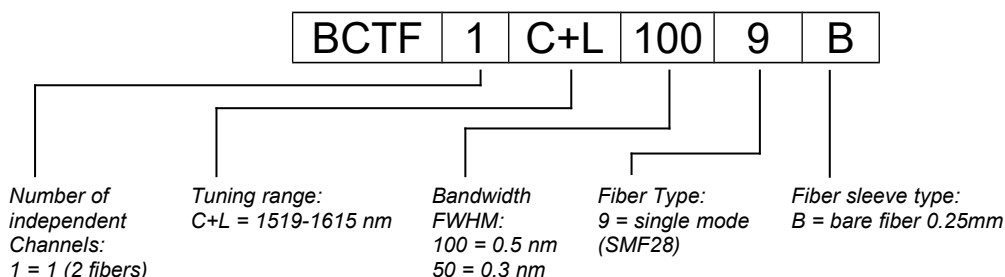
The Tunable Filter is composed of an optical system with a size of only 43 x 11 x 9.5 mm<sup>3</sup>. Light from the input fiber is collimated onto a fused silica grating. The grating diffracts the incoming light into its spectrum with a distinct angle for each wavelength. A MEMS mirror reflects the light onto the output collimator, which only couples a small fraction of the spectrum into the output fiber. By modifying the mirror tilt angle user can chose the wavelength of the filter.

## TECHNICAL SPECIFICATIONS

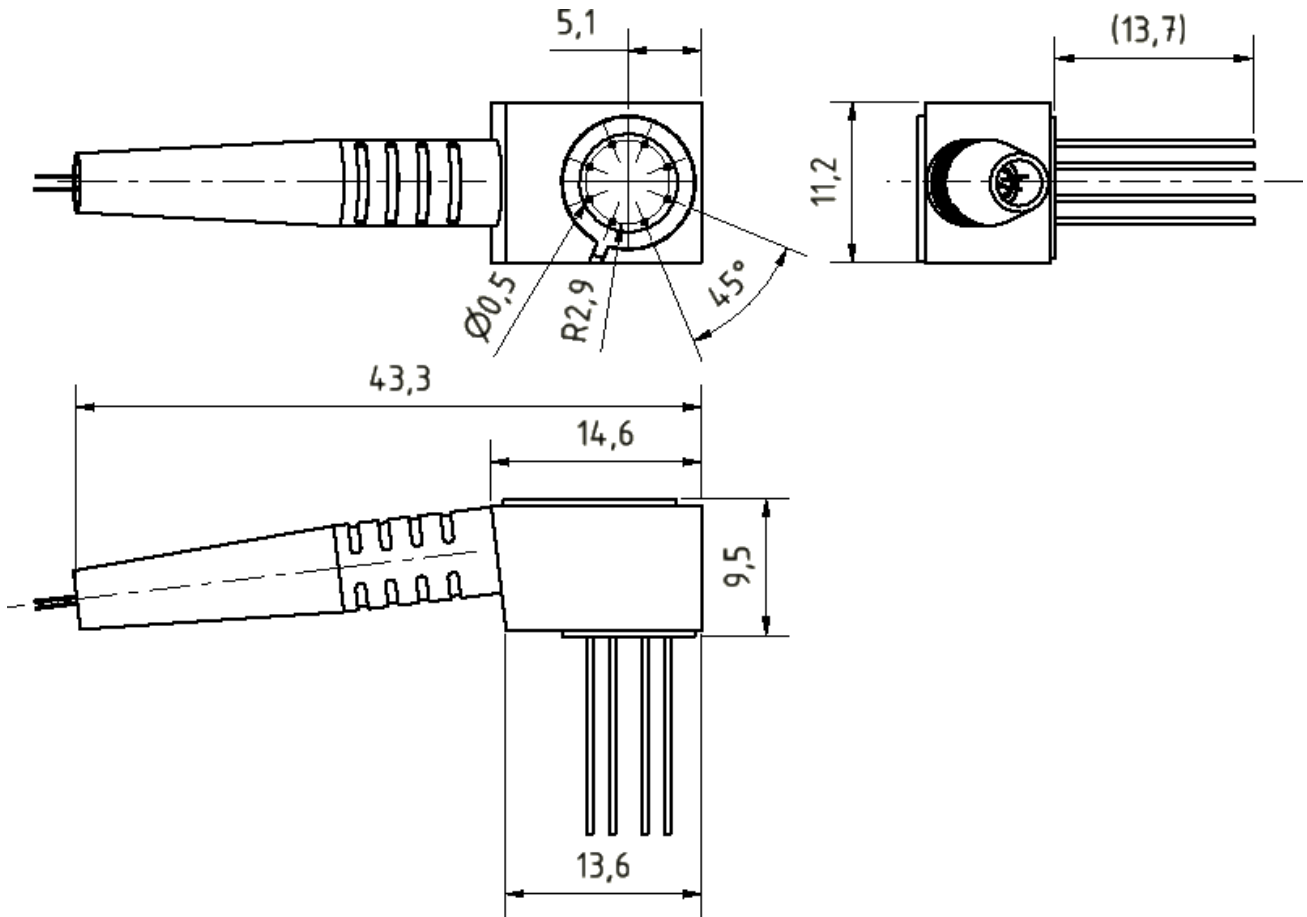
		Unit	Min	Typ	Max
<b>Optical specifications</b>					
Tuning range (span)		nm	1529		1615
Central wavelength				1570	
Insertion loss <sup>1</sup>		dB		1.5	3.0
model BCTF1C50	Bandwidth @ 0.5 dB	nm		0.12	
	Bandwidth @ 3 dB	nm		0.3	
	Bandwidth @ 10 dB	nm		0.6	
	Bandwidth @ 20 dB	nm		0.8	
model BCTF1C100	Bandwidth @ 0.5 dB	nm		0.2	
	Bandwidth @ 3 dB	nm		0.5	
	Bandwidth @ 10 dB	nm		1.0	
	Bandwidth @ 20 dB	nm		1.2	
Return loss		dB	30		
Wavelength repeatability		nm		0.01	
Wavelength temperature dependence		pm/K		1	5
Switching time		ms		10	50
PDL		dB		0.3	
Durability		cycles	No wear		
Side Mode Suppression Ratio (SMSR)		dB	25		
<b>Electrical specifications</b>					
Electrode actuation voltage		V			60
<b>Package</b>					
Operation temperature		°C	0		70
Storage temperature		°C	-40		70
Size		mm	43.3 x 11.2 x 9.5		
Weight		g	75		
ROHS Compliance			2011/65/EU (no exceptions)		

<sup>1</sup>Value @ 25 °C, without connectors.

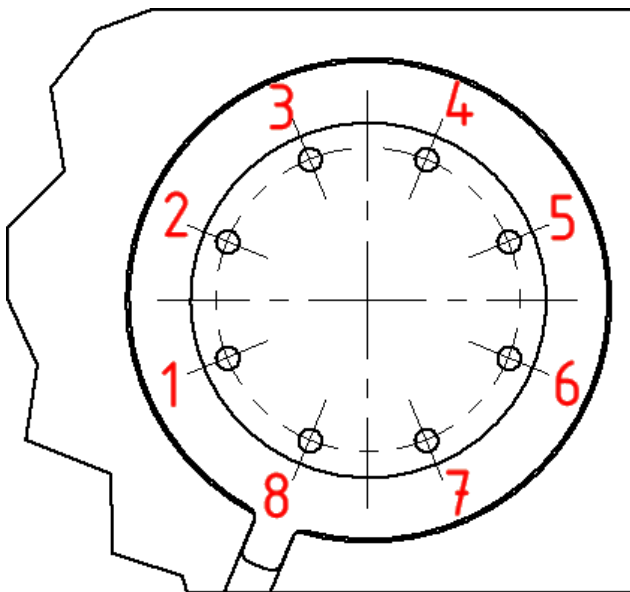
## ORDERING INFORMATION



## DEVICE LAYOUT (DIMENSIONS IN MILLIMETERS)



## CONNECTOR PINOUT



Pin number	Description
1	Not connected
2	Not connected
3	Y+
4	Not connected
5	X-
6	Y-
7	Common reference
8	X+

# TUNABLE FILTER OPERATING PRINCIPLE

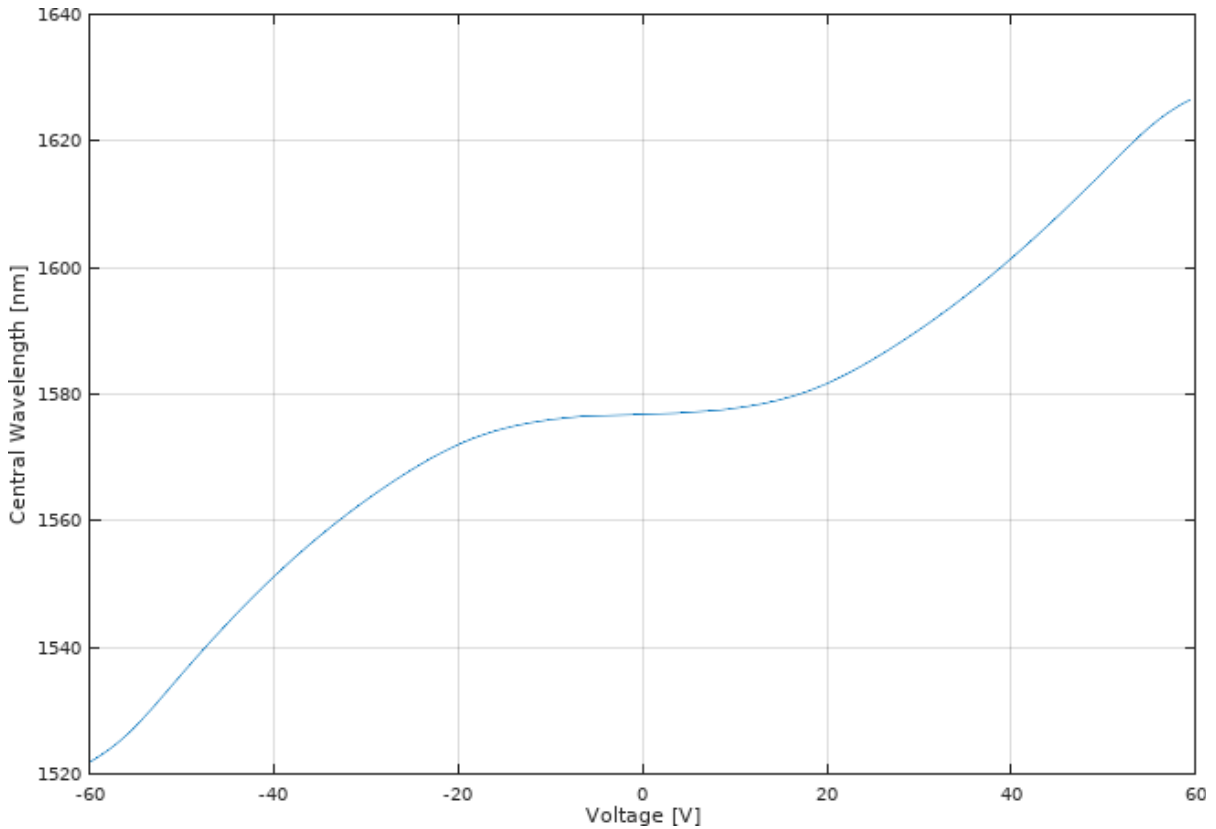
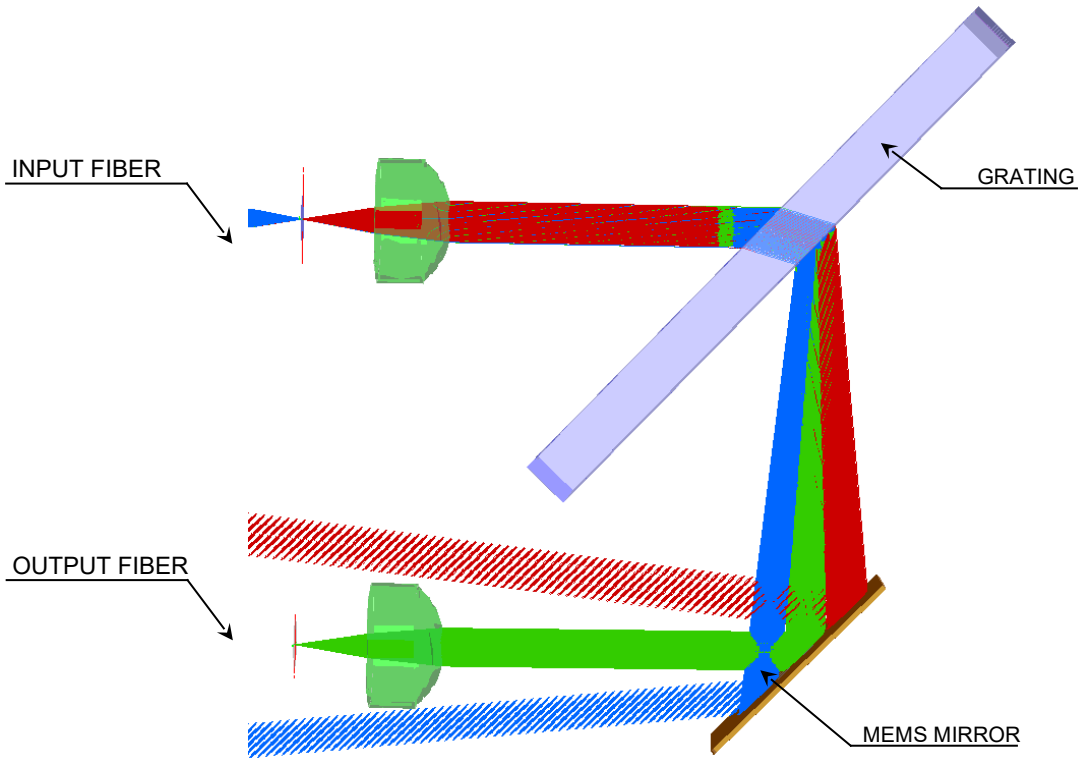


Figure 1 – Typical Central Wavelength vs. Voltage

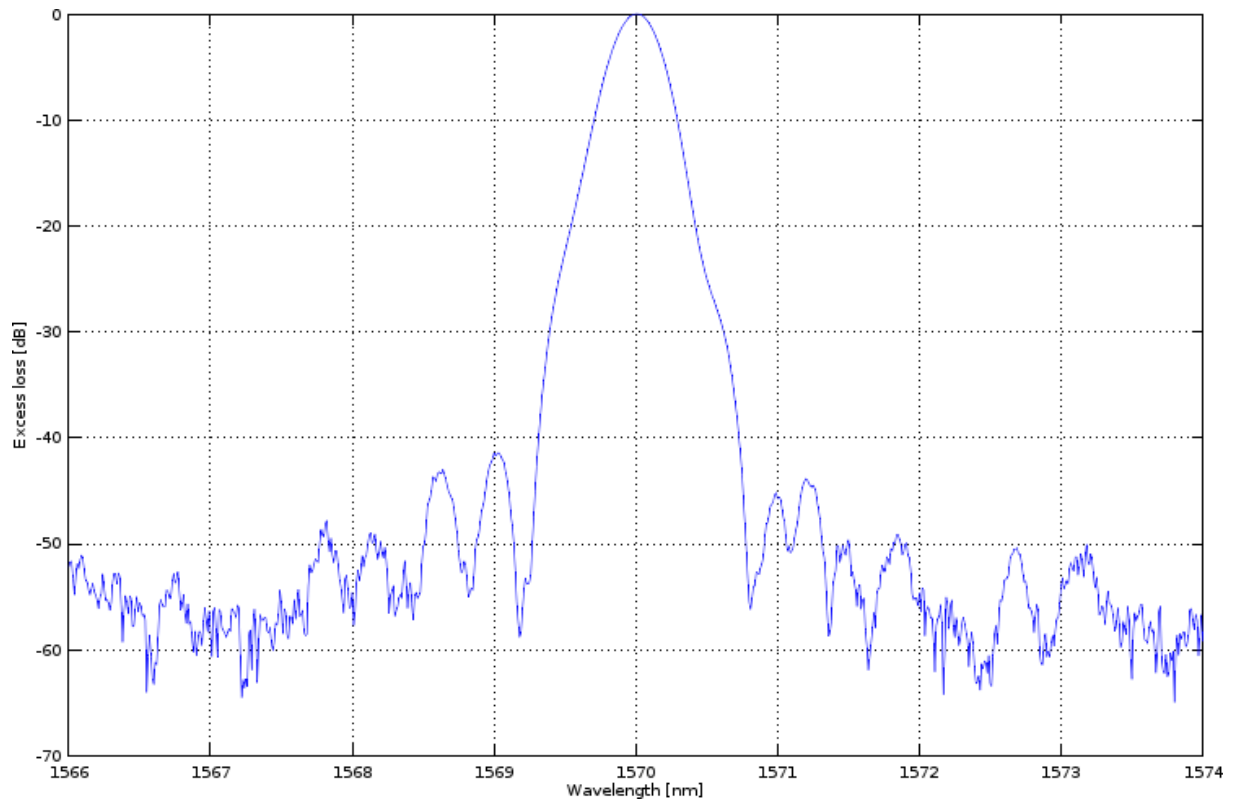
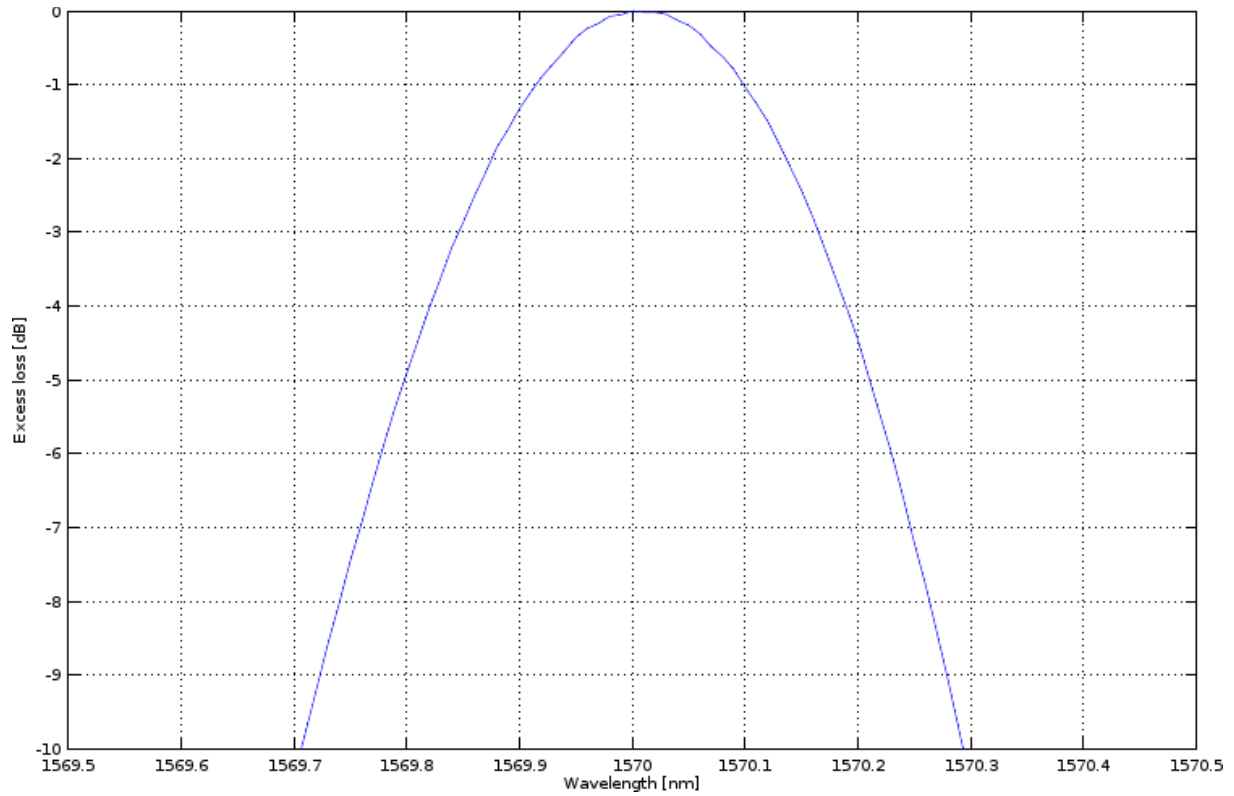
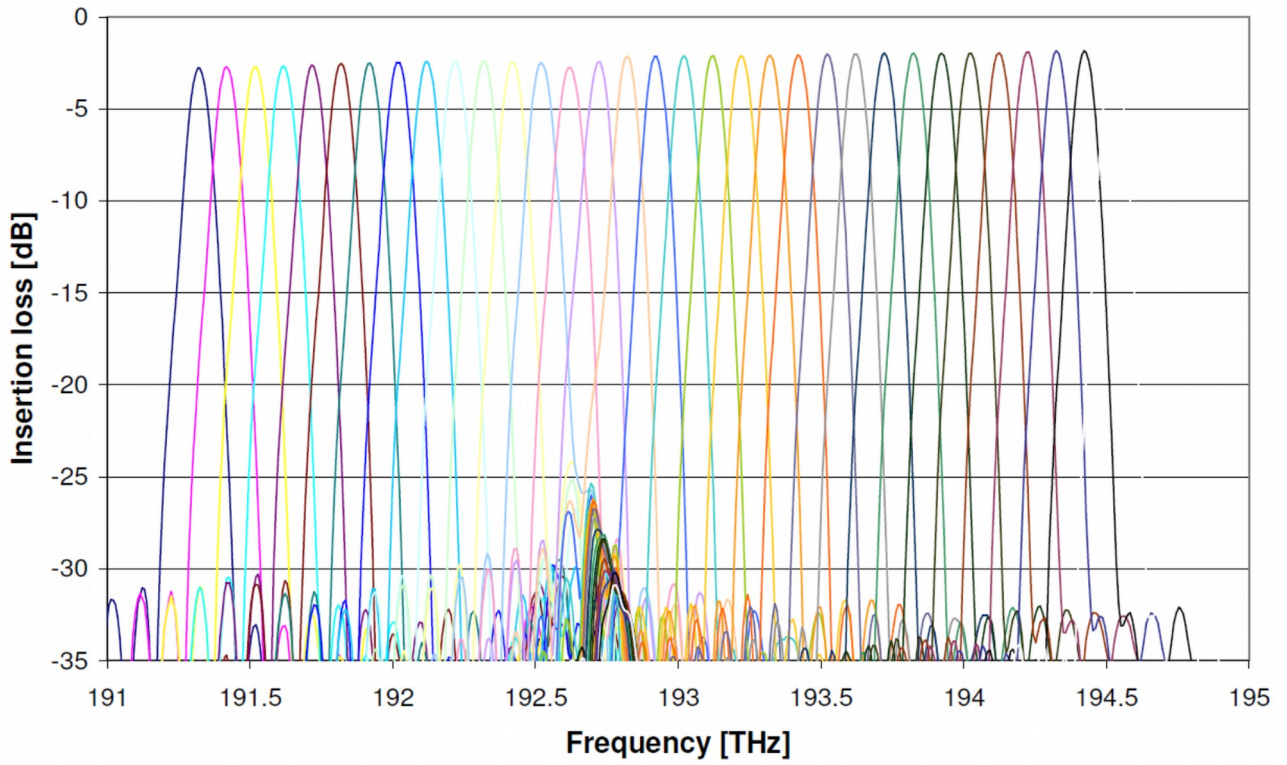


Figure 2 – Typical filter shape (model BCTF1C509B)



**Figure 3 – Example of custom grid: 100GHz spacing, 32 channels**