

# **MEMS TUNABLE OPTICAL FILTER**

*Miniature Version*

## **OVERVIEW**

**Sercalo**'s Tunable Optical Filter is based on MEMS technology and is designed for ITU C band with 100 GHz channel spacing. It continuously tunes from 1530 to 1570 nm with a voltage from 0 to 40 V.

The 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.

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

## **FEATURES**

- *Ultra small 19 x 7.6 x 5.9 mm<sup>3</sup> body size*
- *UART and I<sup>2</sup>C/SMBus demo-board available on request*

## **APPLICATIONS**

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

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**sercalo**

## DESCRIPTION

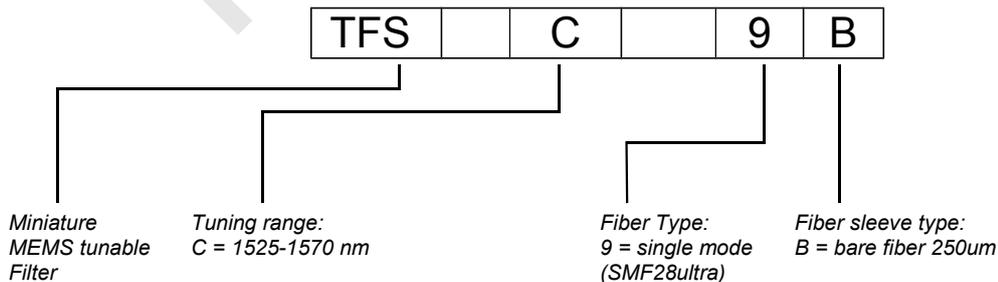
The MEMS Tunable Filter is composed of an optical system with a size of only 19 x 7.6 x 5.9 mm<sup>3</sup>. Light from the input fiber is collimated onto a fused silica grating. The grating diffracts the incoming light into its spectrum with a distinct angle for each wavelength. A MEMS mirror reflects the light onto the output collimator, which only couples the filtered spectrum into the output fiber. By modifying the mirror tilt angle user can chose the wavelength of the filter.

## TECHNICAL SPECIFICATIONS

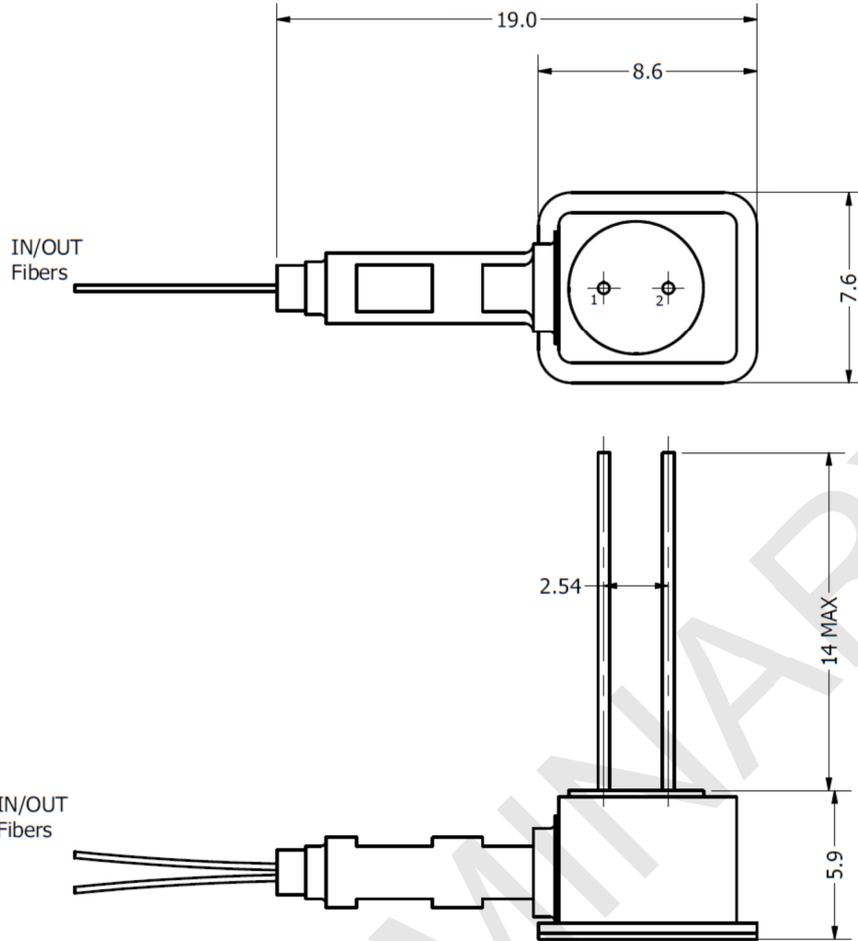
|                                    | Unit               | Min            | Typ     | Max  |
|------------------------------------|--------------------|----------------|---------|------|
| <b>Optical parameters</b>          |                    |                |         |      |
| Tuning range (span)                | nm                 | 1525           |         | 1570 |
| Wavelength at power off            |                    |                | tbd     |      |
| Insertion loss <sup>1</sup>        | dB                 |                | 1.5     | 3.0  |
| model TFS-C                        | Bandwidth @ 0.5 dB | nm             | 0.2     |      |
|                                    | Bandwidth @ 3 dB   | nm             | 0.6     |      |
|                                    | Bandwidth @ 10 dB  | nm             | 1.0     |      |
|                                    | Bandwidth @ 20 dB  | nm             | 1.2     |      |
| Return loss                        | dB                 | 30             |         |      |
| 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 parameters</b>       |                    |                |         |      |
| Electrode actuation voltage        | V                  |                |         | 42   |
| <b>Package</b>                     |                    |                |         |      |
| Operation temperature              | °C                 | 0              |         | 70   |
| Storage temperature                | °C                 | -40            |         | 70   |
| Size (optical engine)              | mm                 | 19 x 7.6 x 5.9 |         |      |
| Weight                             | g                  | TBD            |         |      |

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

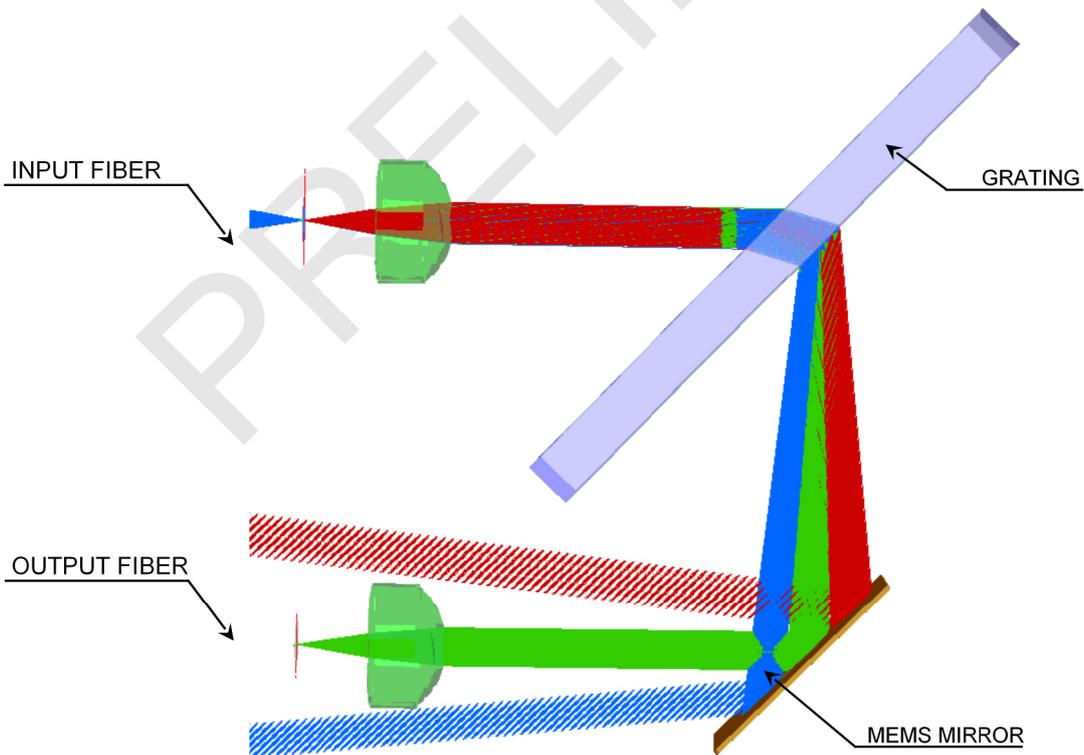
## ORDERING INFORMATION



## DEVICE LAYOUT (DIMENSIONS IN MILLIMETERS)



## TUNABLE FILTER OPERATING PRINCIPLE



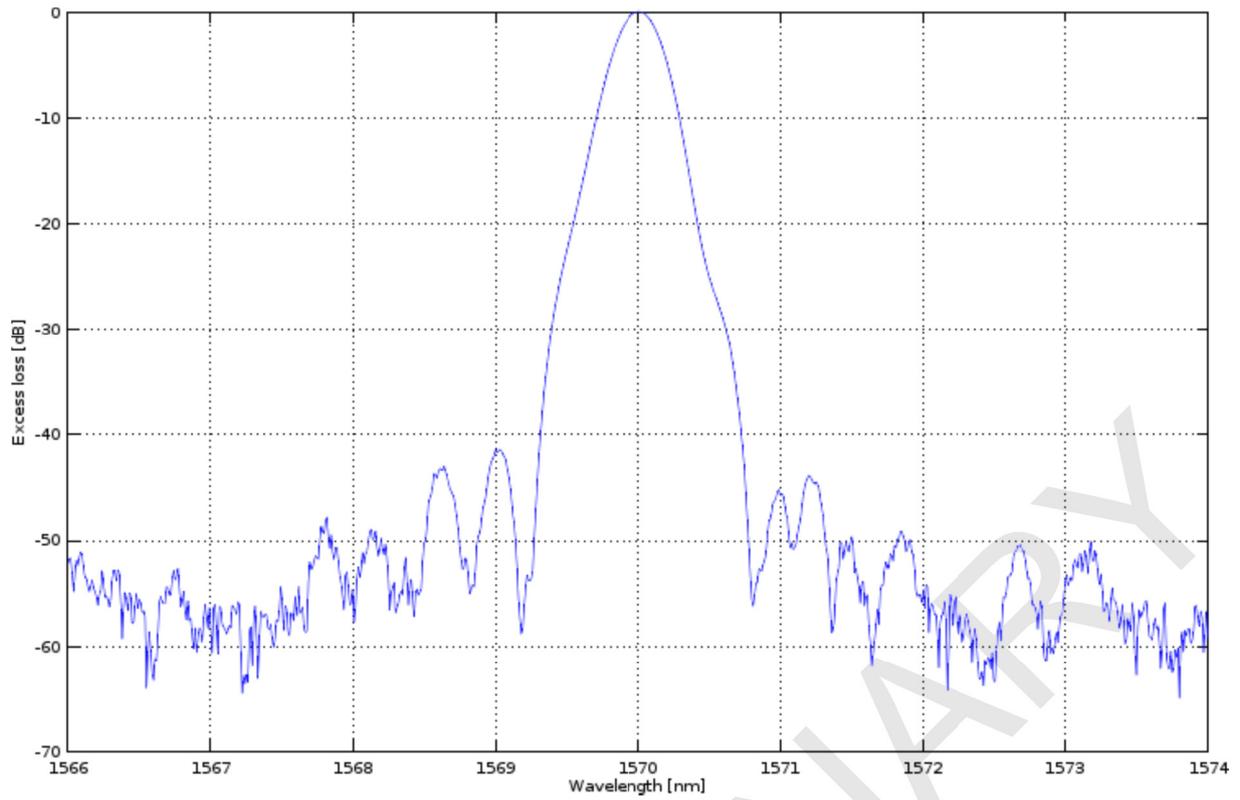


Figure 1 – Typical filter shape (model TFS1C509B)

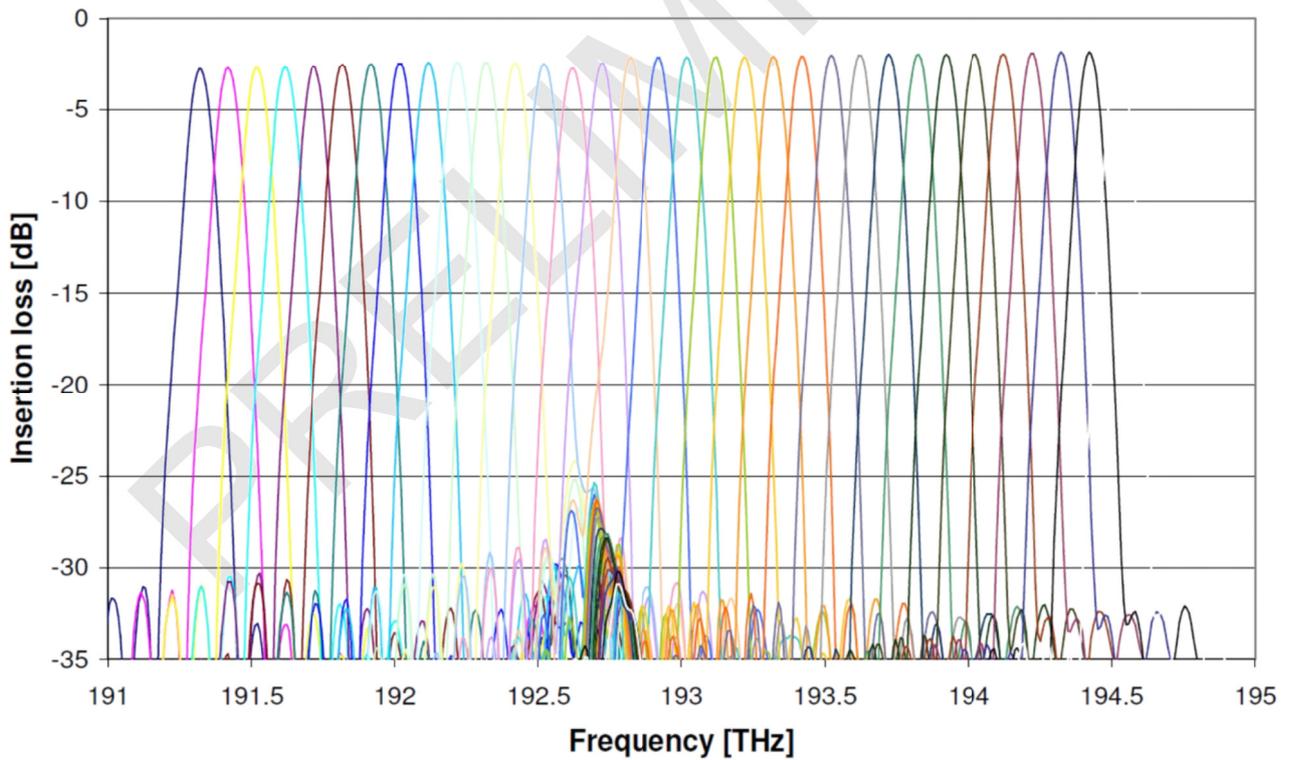


Figure 2 – Example of custom grid: 100GHz spacing, 32 channels