



Basel Precision Instruments

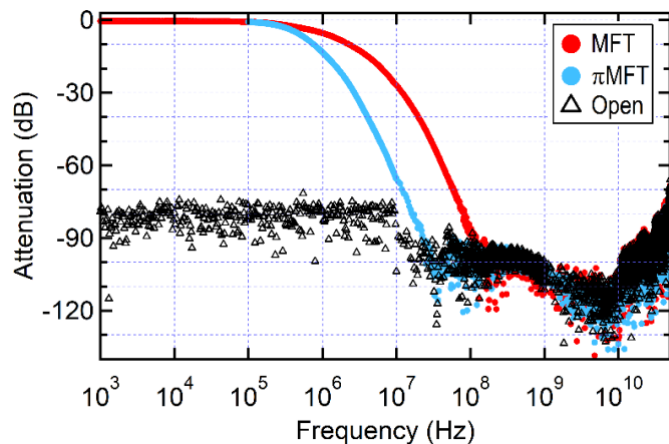


Cryogenic Microwave Filter and Thermalizer (MFT)

high attenuation, low frequency cutoff, strong thermalization

Single MFT filters:

- Strong attenuation of >100dB above 130 MHz
- Strong thermalization
- Low resistance (~150 Ω @ 4K or ~50 m Ω @ 4K) suitable for high-current applications. See models on the next page.
- Low capacitance (2.5 or 5 nF) significantly reducing noise in current measurements using an IV converters
- MCX connectors or customized
- Resonance-free attenuation spectrum



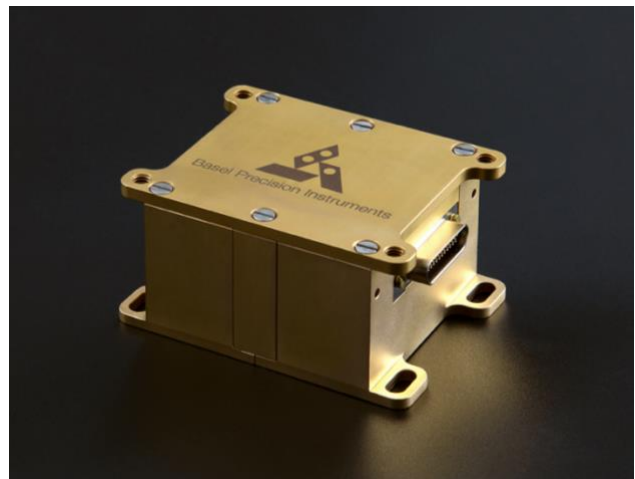
Graph above: attenuation spectrum of an MFT-50m Ω (red) and a π MFT-50m Ω (blue). The π MFT is equipped with an additional pair of discoidal capacitors.

Compact filter box (MFT25):

- 25 filtered lines
- Non-magnetic copper box, gold-plated for optimized thermal contact
- Easy to mount at 10 mK
- Micro-D connectors
- 33.5 x 50 x 68 mm, 350 gr

Customization possibilities:

- Adjust cutoff frequency
- Adding discrete SMD RC filtering
- Customized contacts on single filters (MCX, SMA, SMP, etc.)





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Applications

Microwave filtering and thermalization of signal wires are two critical ingredients in sensitive low-temperature experiments, such as quantum transport measurements. **Our compact MFT filters combine strong thermalization of the signal wires with ultra-strong microwave attenuation.** The MFT consists of a copper or other low-resistivity wire embedded into a highly conductive silver matrix. The latter acts as a heat-exchanger ensuring optimal thermalization.

Examples:

- 1) Filtering out noise at microwave frequencies and thermalizing the electron in milli-Kelvin and sub-milli-Kelvin experiments, e.g., in a cryogenic or cryogen-free dilution refrigerator.
- 2) Low-capacitance filtering in quantum transport experiments to minimize excess noise.
- 3) Experiments aiming to reach ultra-low electron temperatures below 10 mK.

Models

Single Filter Models	MFT-150 Ω	π MFT-150 Ω	MFT-50m Ω	π MFT-50m Ω
Connector type	MCX			
Dimensions	Length 30 mm Diameter 6 mm			
Capacitance (T = 300K / T=4.2K)	$\lesssim 2.5$ nF	$\lesssim 12$ nF	$\lesssim 5$ nF	$\lesssim 15$ nF
Resistance (T = 300K)	$\lesssim 150$ Ω		$\lesssim 5$ Ω	
Resistance (T = 4.2K)	$\lesssim 150$ Ω		$\lesssim 50$ m Ω	
3 dB attenuation	~ 0.5 MHz	~ 0.3 MHz	~ 0.5 MHz	~ 0.3 MHz
25 dB attenuation	~ 8 MHz	~ 1 MHz	~ 8 MHz	~ 1 MHz
100 dB attenuation	~ 130 MHz	~ 30 MHz	~ 130 MHz	~ 30 MHz

Filter Box Models	MFT25-150 Ω	MFT25-50m Ω
Number of filters per box	25	
Filter type	MFT-150 Ω	MFT-50m Ω
Connector type	Micro-D connector	
Dimensions and weight	33.5 x 50 x 68 mm, 350 gr	