



Basel Precision Instruments



Cryogenic Microwave Filter & Thermalizer (MFT)

high attenuation, low cutoff frequency, strong thermalization

- 25 filtered lines in a compact non-magnetic box
- Easy to mount at 10 mK
- **Exponentially strong attenuation**, free of resonances (plot on next page)
- More than 100 dB attenuation above ~100 MHz
- **Strong thermalization** (filter wire embedded in silver epoxy)
- Ultra-low resistance for high current applications: **~25 mΩ @ 4K**
- Ultra-low capacitance, reduced noise in current measurements: **2.5 nF**
- Resistance to ground > 1 TΩ; **negligible leakage current**
- **NEW: 2-pole RCRC stage option with 3dB cutoff down to kHz, integrated into the same compact box**

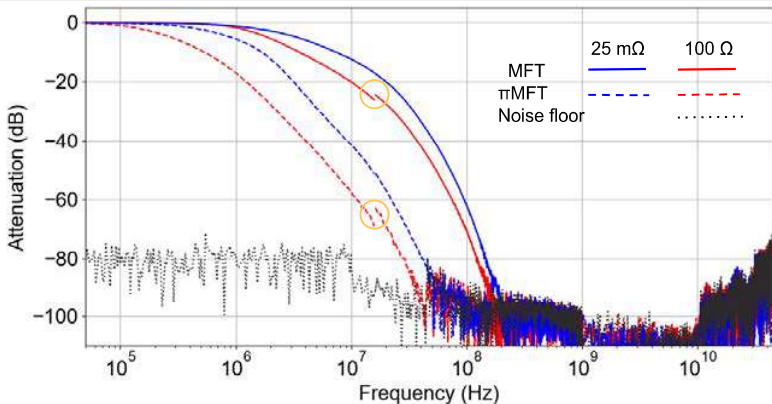


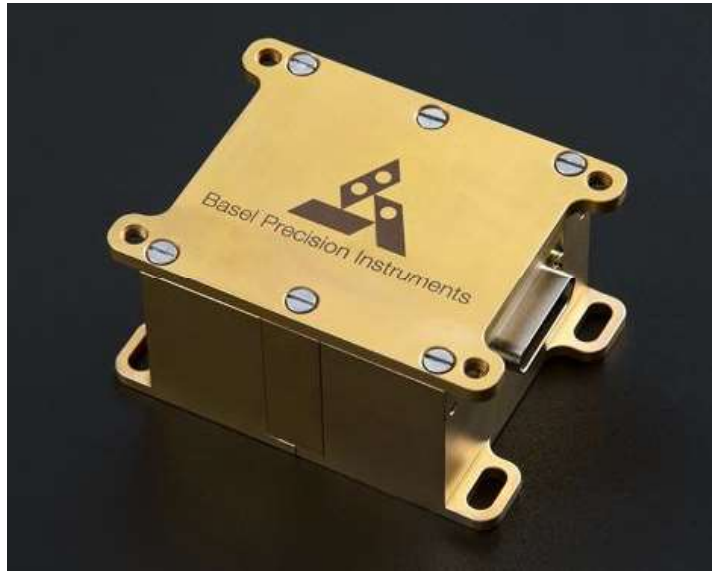
Single Filter Models		MFT-100Ω	πMFT-100Ω	MFT-25mΩ	πMFT-25mΩ
		Resistive for optimum thermalization		Ultra-low (mΩ) resistance for high-currents	
Connector type		SMA, MCX, or customized			
Dimensions (not including connector)		Length ~ 25 mm, Diameter ~ 6 mm			
Capacitance	300 K / 4.2 K	≲ 2.5 nF	≲ 12 nF	≲ 2.5 nF	≲ 12 nF
In-line resistance	T = 300 K	≲ 100 Ω		≲ 2.5 Ω	
	T = 4.2 K	≲ 100 Ω		≲ 25 mΩ	
Attenuation	3 dB cutoff *	~ 1.3 MHz **	~ 0.2 MHz **	~ 2 MHz	~ 0.5 MHz
	20 dB cutoff *	~ 10 MHz **	~ 1.2 MHz **	~ 20 MHz	~ 3 MHz
	100 dB cutoff *	~ 180 MHz	~ 45 MHz	~ 200 MHz	~ 70 MHz
Maximum applied voltage		100 V			
Maximum applied current	300 K	10 mA		30 mA	
	10 mK	0.2 mA***		10 mA***	
Resistance to ground		> 1 TΩ			

Table shows typical specs; * Variations of up to ±20% in cutoff frequencies can be expected; ** Extracted from measurements with 1 MΩ input impedance; all other cutoff frequencies are extracted with 50 Ω input impedance (typical spectra plotted below); *** Maximum current at 10 mK is calculated to keep dissipation below 10 μW.

25-line Filter Box Models	MFT25-100Ω	MFT25-25mΩ
Number of filtered lines	25	
Filter type	MFT-100Ω	MFT-25mΩ
Connector type	Micro-D connector	
Weight and dimensions	400 gr, 30 x 56 x 68 mm (without Micro-D) for mounting: 4 x M4 with 39.5 to 44 mm flexible & 60 mm fixed spacing	

Figure shows typical room-temperature attenuation characteristics of individual MFT filters. A vector network analyzer with 50 Ω input was used. For 100 Ω filters (red curves), a spectrum analyzer with 1 MΩ input impedance was used below 20 MHz. Disclaimer: measurement results depend on the total setup and load impedance (real and imaginary). The jump observed (yellow circles) is caused by switching the input impedance from 1 MΩ to 50 Ω.



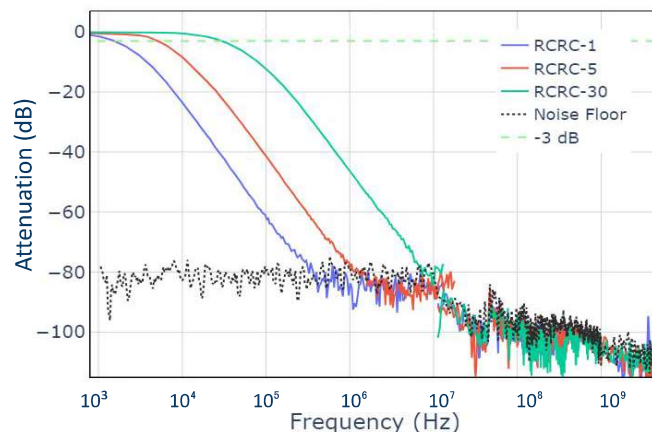


kHz Cutoff with 2-pole RCRC stage

Integrated into the Compact MFT25 Box

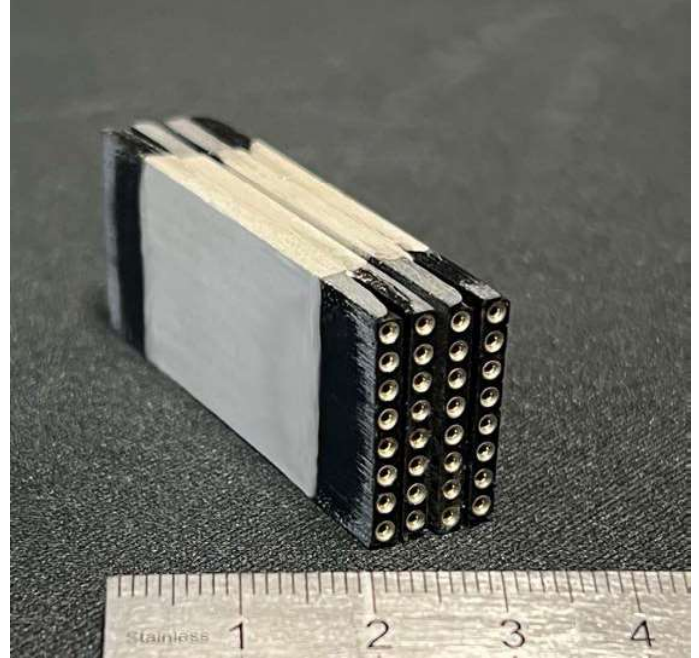
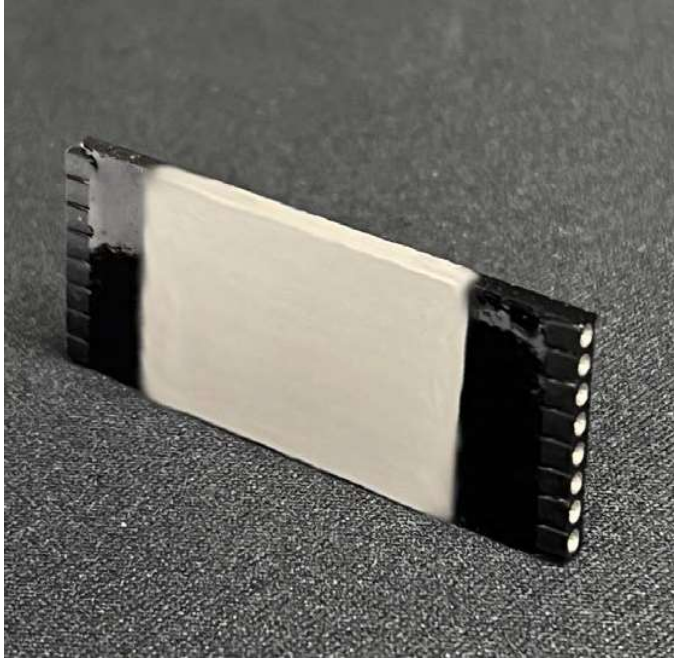
2-pole RCRC options	3 dB Cutoff	Maximum R	Maximum C
RCRC-1	1 - 2 kHz	15 - 25 k Ω	17 - 14 nF
RCRC-5	5 - 7 kHz	4.5 - 12 k Ω	14 - 6.5 nF
RCRC-10	10 - 15 kHz	2 - 5 k Ω	12 - 4 nF
RCRC-30	30 - 35 kHz	2 - 5 k Ω	7 - 2.5 nF
RCRC-C	customized cutoff with R and C values based on application requirements		

Figure shows typical room-temperature attenuation characteristics of individual MFT filters with an RCRC-1, RCRC-5 and an RCRC-30 stage. A spectrum analyzer with 1 M Ω input impedance was used for the measurements.





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Slim Cryogenic Microwave Filter & Thermalizer (SlimMFT)

Stackable slim MFT package for small dilution fridge inserts

- Slim ultra-compact MFT package for small (50 mm) dilution fridge inserts
- Ultra-low resistance ultra-low capacitance silver epoxy based microwave filter and thermalizer (MFT)
- One SlimMFT8 package includes 8 filtered lines (photo on the top left)
- Several packages can be stacked on top of each other (photo top right)
- Up to 6 packages (48 filtered lines) fit in a 50 mm insert
- Dimensions of one SlimMFT8 package: ~ 52 x 21 x 3.2 mm
- SIP-socket connectors for easy plugging/unplugging
- Easy mounting on cold finger



		SlimMFT8-30mΩ	SlimMFT8-100Ω
Number of filtered lines per SlimMFT8 unit		8	
Connector Type		SIP-Socket connectors	
Dimensions		~ 52 x 21 x 3.2 mm	
Capacitance	300 K / 4.2 K	1.9 nF	2.8 nF
Resistance	T = 300 K	~ 3 Ω	~ 100 Ω
	T = 4.2 K	~ 30 mΩ	~ 100 Ω
Attenuations	3 dB cutoff *	~ 2.3 MHz	~ 0.8 MHz**
	20 dB cutoff *	~ 35 MHz	~ 8 MHz**
	100 dB cutoff *	~ 330 MHz	~ 200 MHz
Maximum applied voltage		100 V	
Maximum applied current	300 K	30 mA	10 mA
	10 mK	10 mA***	0.2 mA***
Resistance to ground		> 1 TΩ	

Table shows typical specs; * Variations of up to ±20% in cutoff frequencies can be expected; ** Extracted from measurements with 1 MΩ input impedance; all other cutoff frequencies are extracted with 50 Ω input impedance (typical spectra plotted below); *** Maximum current at 10 mK is calculated to keep dissipation below 10 μW.

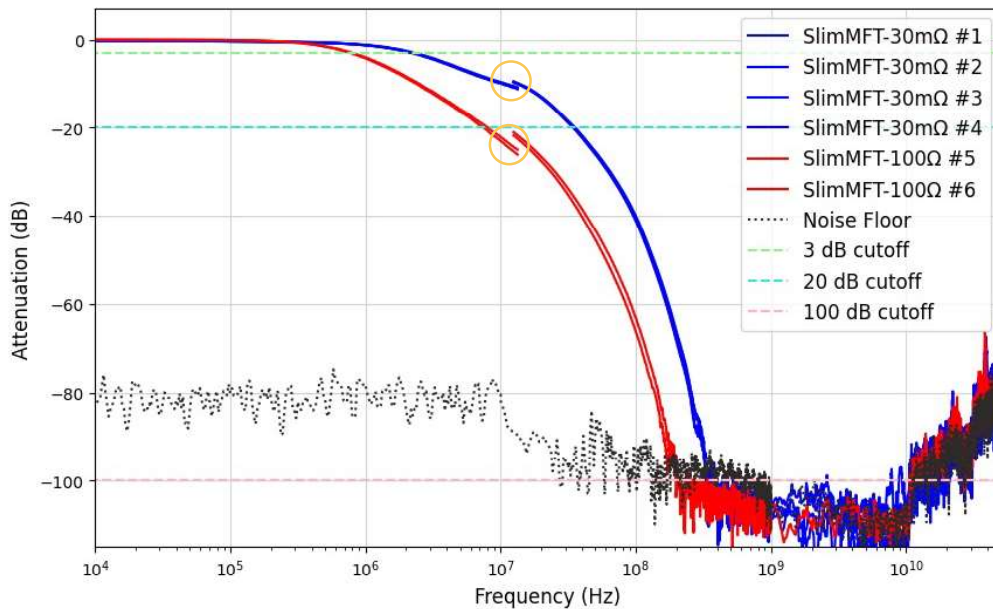


Figure shows typical room-temperature attenuation characteristics of individual MFT filters. A vector network analyzer with 50 Ω input was used. For 100 Ω filters (red curves), a spectrum analyzer with 1 MΩ input impedance was used below 20 MHz. Disclaimer: measurement results depend on the total setup and load impedance (real and imaginary). The jump observed (yellow circles) is caused by switching the input impedance from 1 MΩ to 50 Ω.

