QMC-CRYOIRF-002

Cryogenic High Cut-Off Frequency Infrared Filter

Key Features

- Cryogenic High Cut-Off Frequency Infrared Filter
- IR filter to enhance Qubit Performance
- Based on Magnetically loaded dielectric absorber
- Eccosorb CR 110
- Length of absorber region 10 mm
- Impedance 50 Ω
- Housing gold plated OFHC Copper
- Various connector configurations

QMC-CRYOIRF-002-S

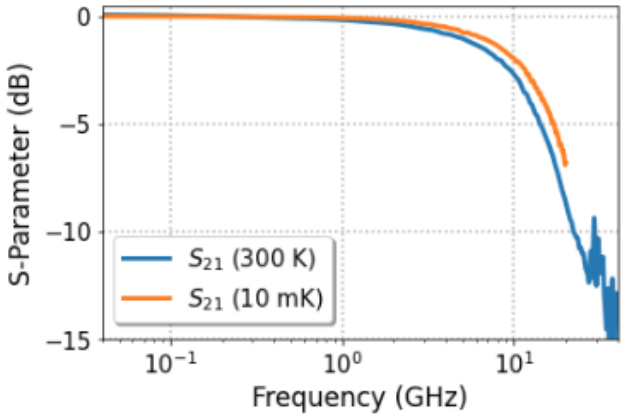
QMC-CRYOIRF-002MF-S

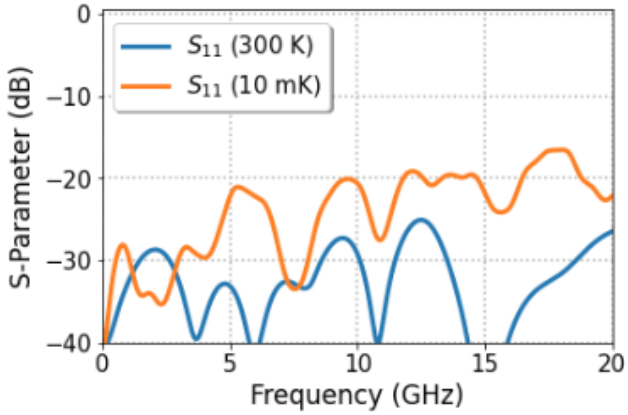
QMC-CRYOIRF-002

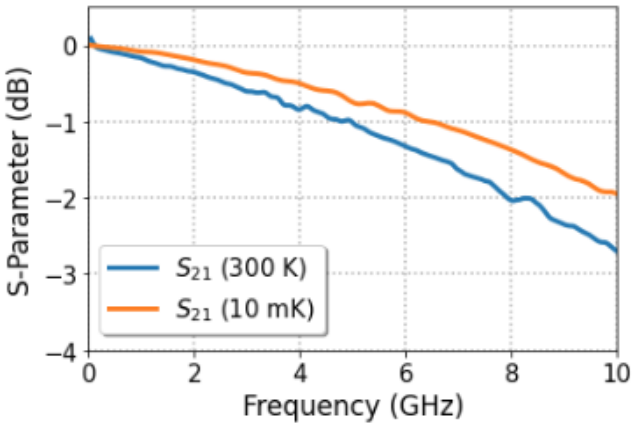
Performance

Frequency	DC – 10 GHz
Insertion loss (10 mK)	2 dB @ 10 GHz
Return loss (10 mK)	20 dB

Scattering Parameters







IR filters were characterized cryogenically in a dilution refrigerator utilizing the Quantum Microwave testing services. For more information on testing services offered contact sales@QuantumMicrowave.com

QMC-CRYOIRF-002

Cryogenic High Cut-Off Frequency Infrared Filter

Connector Configurations

QMC-CRYOIRF-002 series is available in the following connector configurations (order number)

SMA male-female (QMC-CRYOIRF-002MF-S)

SMA female-female (QMC-CRYOIRF-002-S)

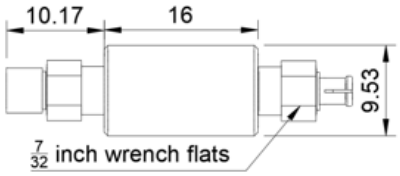
SMA Bulkhead female-female (QMC-CRYOIRF-002)

SMA Bulkhead male-female (QMC-CRYOIRF-002MF)

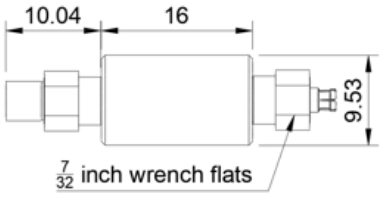
SMP male-female (QMC-CRYOIRF-002MF-SMP)

SMPM male-female (QMC-CRYOIRF-002MF-MSMP)

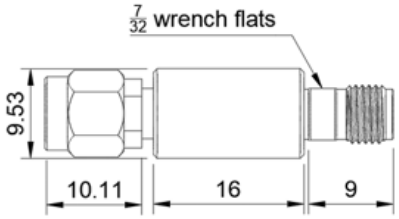
Drawings



QMC-CRYOIRF-002MF-SMP



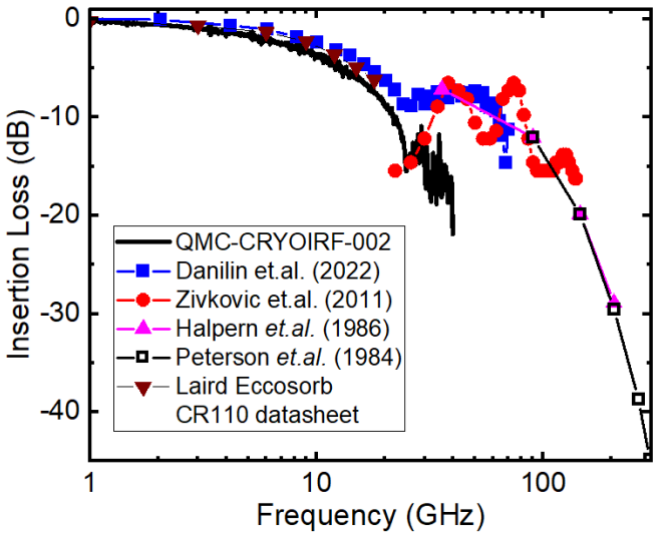
QMC-CRYOIRF-002MF-MSMP



QMC-CRYOIRF-002MF-S

Expected High Frequency Dependence

Insertion loss of QMC-CRYOIRF-002 filter (solid black line) plotted with insertion loss data derived from measured absorption of Eccosorb CR110 from literature [1-4] scaled to the dimensions of the QMC-CRYOIRF-002 filter. Above 300 GHz the absorption coefficient is expected to continue to vary with frequency as a power law [3].



1. *Danilin, S., Barbosa, J., Farage, M. et al. Engineering the microwave to infrared noise photon flux for superconducting quantum systems. EPJ Quantum Technol.* ***9,*** *1 (2022).*
2. *Zivkovic I. and Murk A., Characterization of Magnetically Loaded Microwave Absorbers, Progress in Electromagnetics Research B, Vol. 33, 277-289 (2011).*
3. *Halpern M., Gush H.P., Wishnow E., and De Cosmo V., Far Infrared transmission of dielectrics at cryogenic and room temperatures: glass, Fluorogold, Eccosorb, Stycast, and various plastics, Applied Optics 25, 565 (1986).*
4. *Peterson J.B. and Richards P.L., A Cryogenic Blackbody for Millimeter Wavelengths, Int. J. Infrared Millimeter Waves 5, 1507 (1984).*