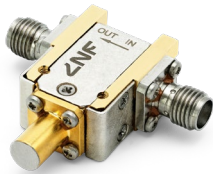


Datasheet

LNF-ISC10_18A and LNF-CIC10_18A

10-18 GHz Cryogenic Isolator or Circulator



LNF-ISC10_18A

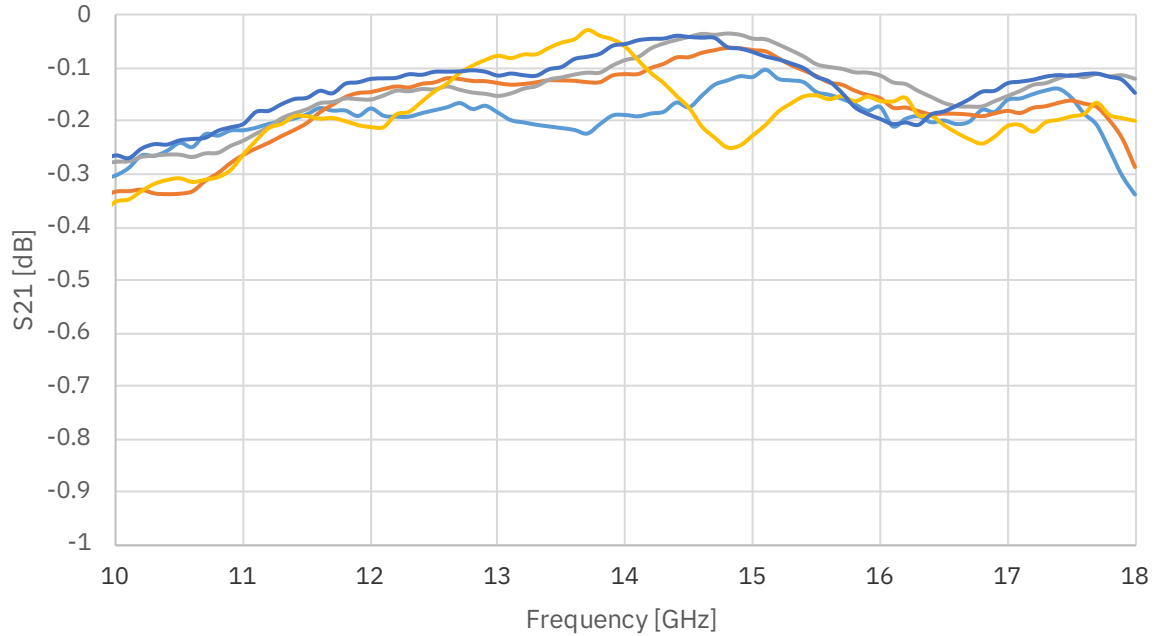
Product Features	
RF Bandwidth	10-18 GHz
Insertion Loss at 5 K	0.3 dB typical
Insertion Loss at 77 K	0.3 dB typical
Isolation	18 dB typical
Port Match	19 dB typical
RF Connectors	Female SMA

Absolute Maximum Ratings			Typical RF Characteristics at 77 K			
Parameter	Min	Max	Parameter	Condition	Value	Unit
Operating Temperature	0.01 K	100 K	Insertion Loss	10-18 GHz	0.3	dB
RF Drive Level		30 dBm	Isolation	10-18 GHz	18	dB
DC Voltage on RF Input and Output	-50 V	50 V	Port Match	10-18 GHz	19	dB

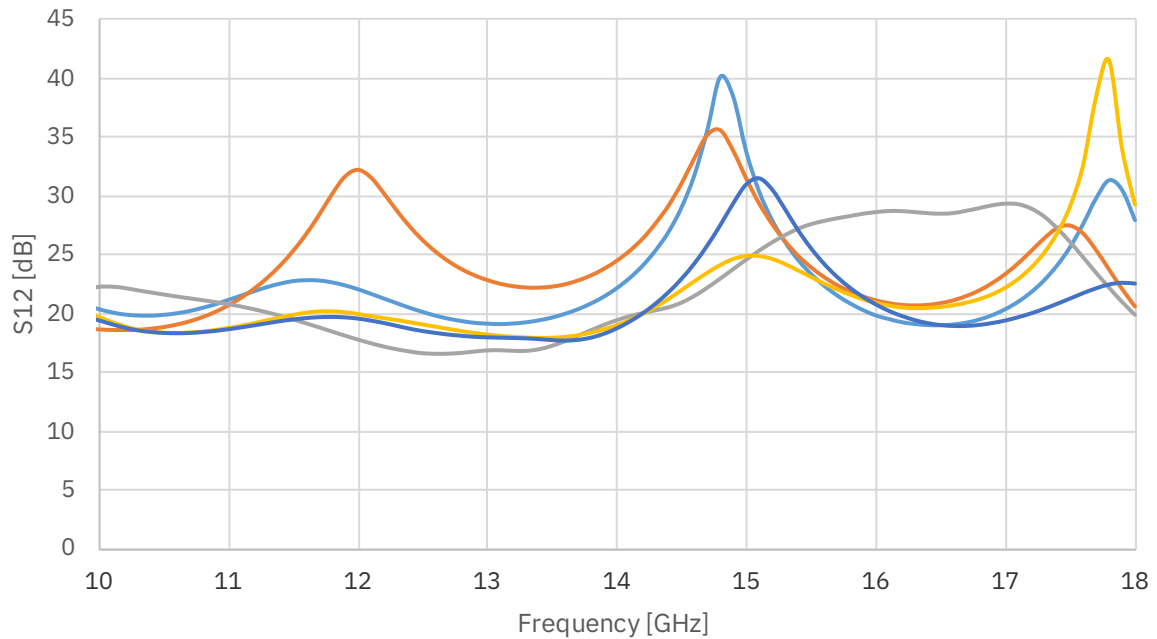
LNF-ISC10_18A and LNF-CIC10_18A are ultra-low insertion loss cryogenic isolators and circulators operating in the 10-18 GHz frequency range. They have been designed from ground up to meet the strict requirements of ultra-low temperature physics research. The gold plated OFHC copper body ensures minimum loss and that this loss reaches the lowest possible temperature to minimize thermal noise. The isolator/circulator is packaged in a slim coaxial module using industry standard SMA connectors. The module measures 16x20.5x9.9 mm excluding the connectors.

Measured data, $T_{amb} = 77\text{ K}$

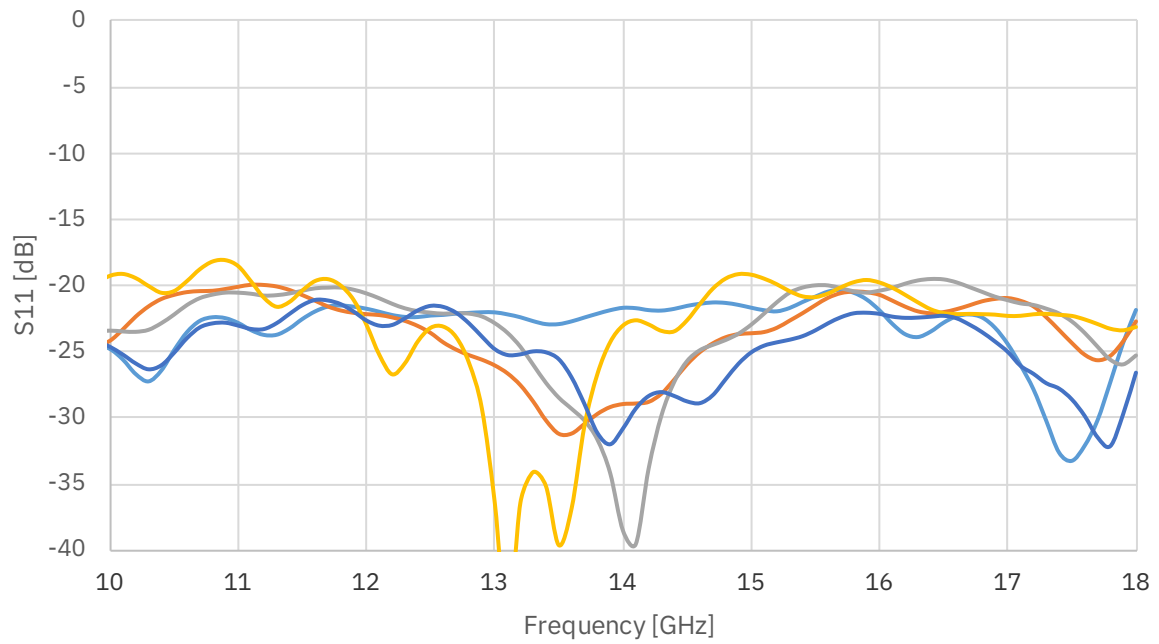
S21 of 5 Circulators at 77K



S12 of 5 Circulators at 77K

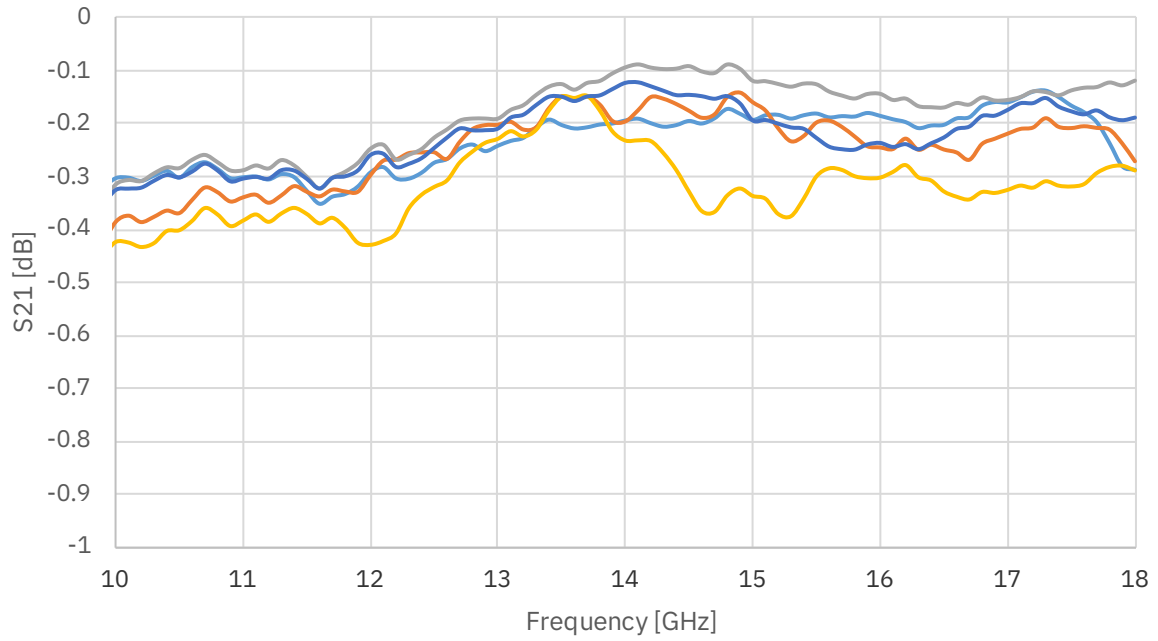


S11 [dB] of 5 Circulators at 77K

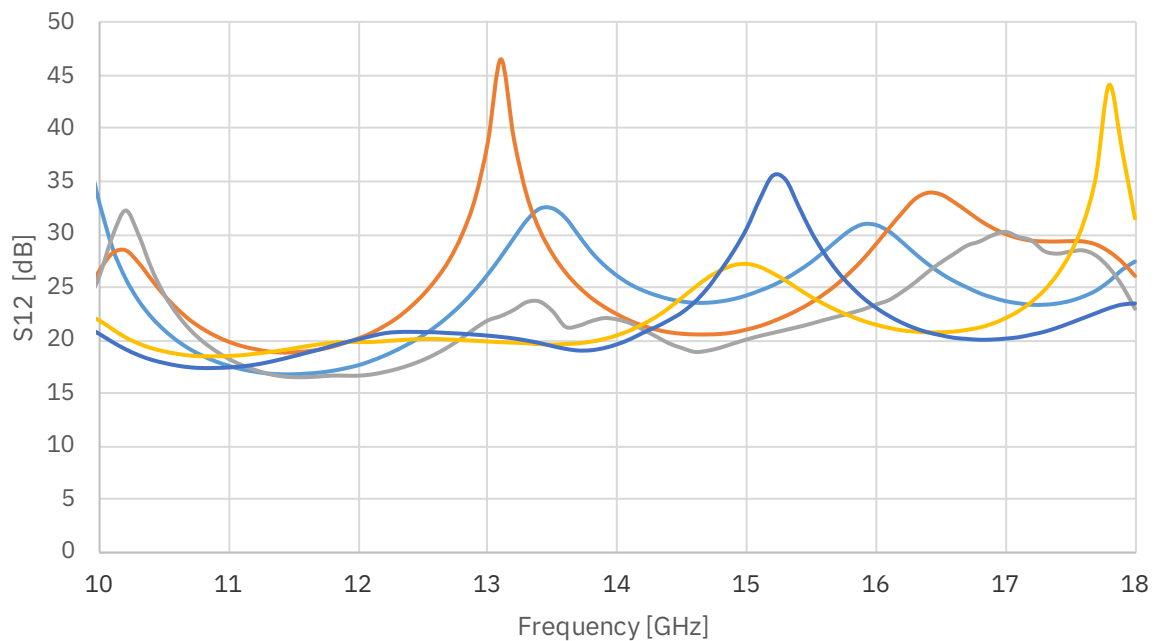


Measured data, $T_{amb} = 5\text{ K}$

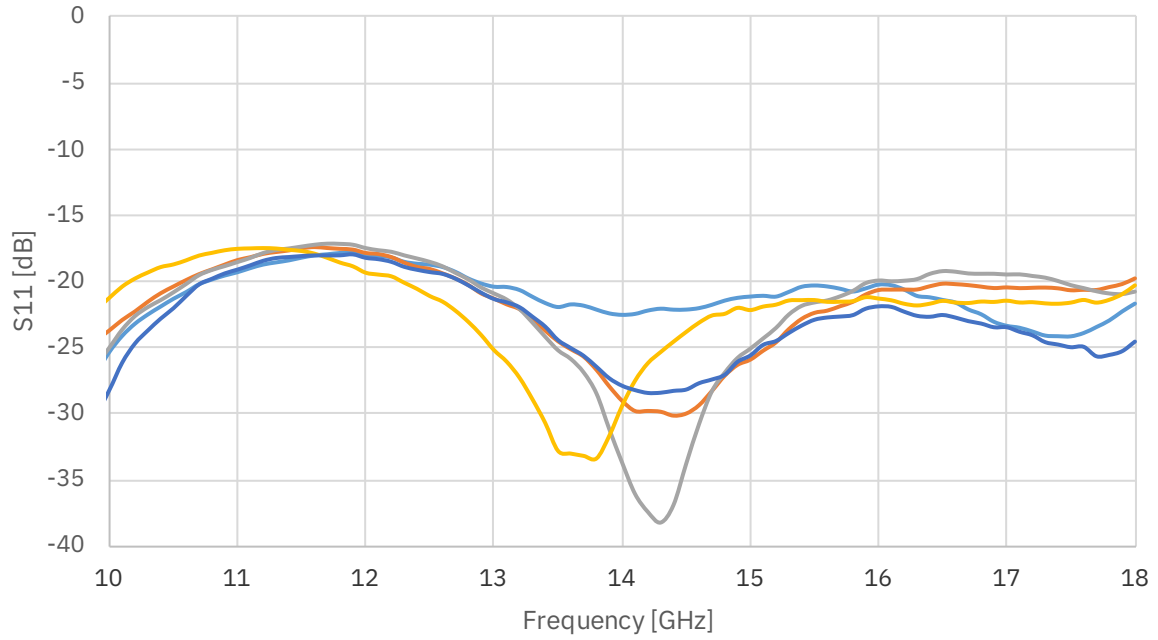
S21 of 5 Circulators and isolators at 5K



S12 of 5 Circulators at 5K



S11 of 5 Circulators at 5K



Magnetic flux density generated by internal magnet

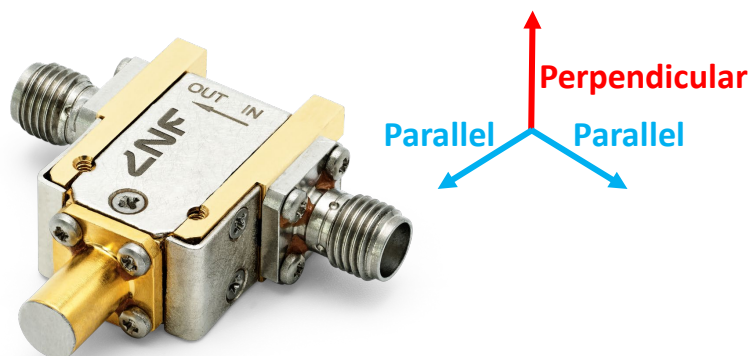
Parameter	Condition	Value	Unit
Magnetic flux density with standard shielding*	6 mm from chassis	< 4	Gauss
Magnetic flux density with optional shielding	6 mm from chassis	< 0.1	Gauss

- This is the magnetic field generated by the internal magnet inside the isolator/circulator chassis, which potentially may influence nearby components.
- Two isolators/circulators can be placed 3.3 mm apart without interfering with each other.

Maximum external magnetic field imposed on the isolator

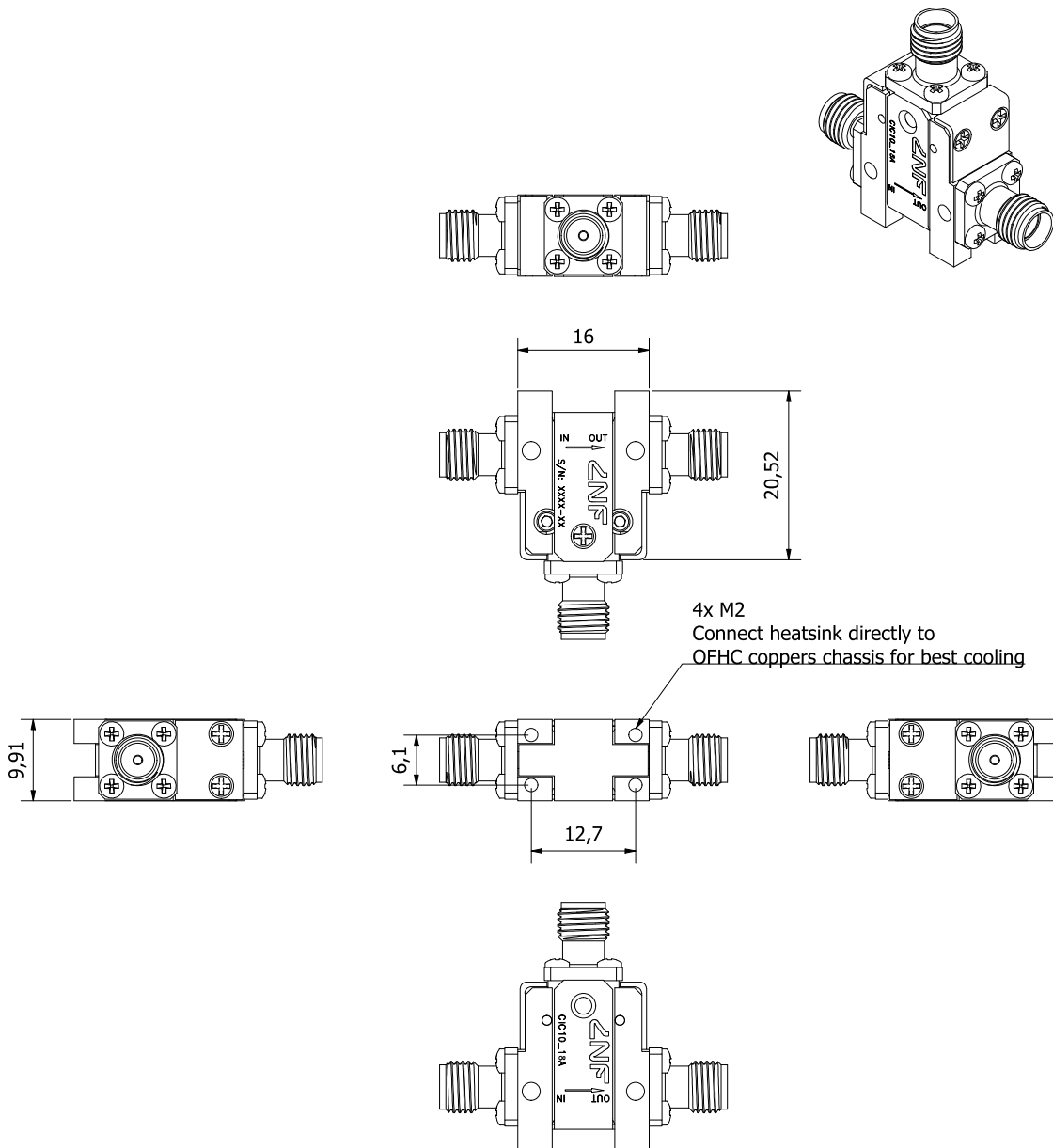
Parameter	Condition	Value	Unit
Maximum perpendicular external magnetic field	At chassis	650	Gauss
Maximum parallel external magnetic field	At chassis	1500	Gauss

- “Maximum field” means the field when the passband frequency edge has shifted 150 MHz, and insertion loss degradation becomes noticeable.
- The optional MuMetal shield improves the maximum external magnetic field very little. MuMetal alloys are good at shielding very low level “stray” magnetic fields, however the material saturates quickly and doesn’t shield well against high field external sources.

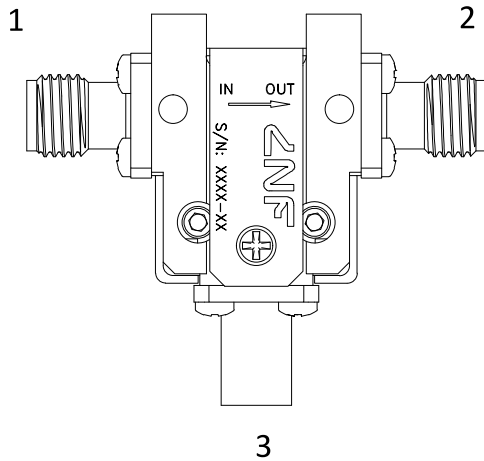


Dimensions without additional shielding

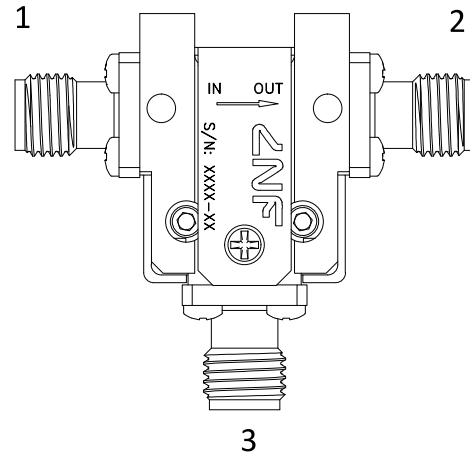
Units: mm



Model numbering



LNF-ISC10_18A
Single Junction Isolator
Port 1: Female SMA
Port 2: Female SMA
Port 3: Termination



LNF-CIC10_18A
Single Junction Circulator
Port 1: Female SMA
Port 2: Female SMA
Port 3: Female SMA

Version	Model number
Isolator	LNF-ISC10_18A
Circulator	LNF-CIC10_18A