

# Datasheet

## LNF-ISC2\_2.8A and LNF-CIC2\_2.8A

2-2.8 GHz Cryogenic Isolator or Circulator



**LNF-CIC2\_2.8A**



**LNF-ISC2\_2.8A**

### Product Features

RF Bandwidth	2-2.8 GHz
Insertion Loss at 5 K	0.3 dB typical
Insertion Loss at 77 K	0.2 dB typical
Isolation at 5 K	18 dB typical
Port Match at 5 K	20 dB typical
RF Connectors	Female SMA

### Absolute Maximum Ratings

Parameter	Min	Max
Operating Temperature	0.01 K	100 K
RF Drive Level		30 dBm
DC Voltage on RF Input and Output	-50 V	50 V

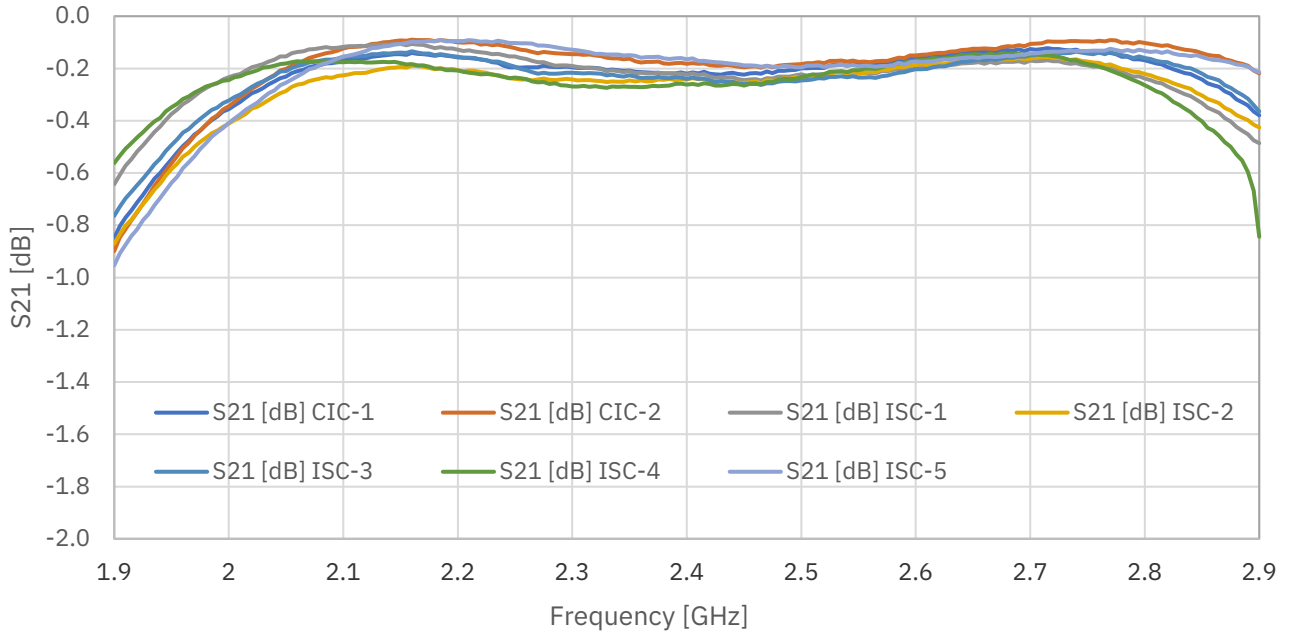
### Typical RF Characteristics at 77 K

Parameter	Condition	Value	Unit
Insertion Loss	2-2.8 GHz	0.2	dB
Isolation	2-2.8 GHz	20	dB
Port Match	2-2.8 GHz	20	dB

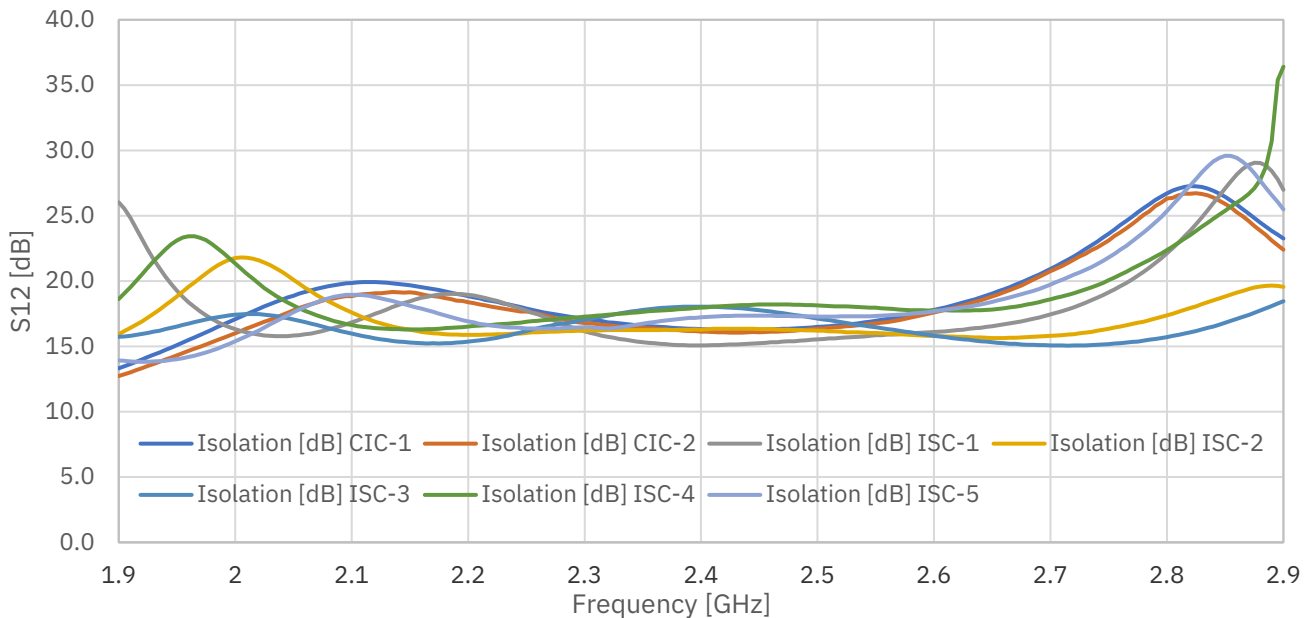
LNF-ISC2\_2.8A and LNF-CIC2\_2.8A are ultra-low insertion loss cryogenic isolators and circulators operating in the 2 – 2.8 GHz frequency range. They have been designed from ground up to meet the strict requirements of ultra-low temperature physics research. The gold plated OFHC copper body ensures minimum 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 22.86x22.56x12.7 mm for the circulator and 22.86x35.56x12.7 mm for the isolator excluding the connectors.

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

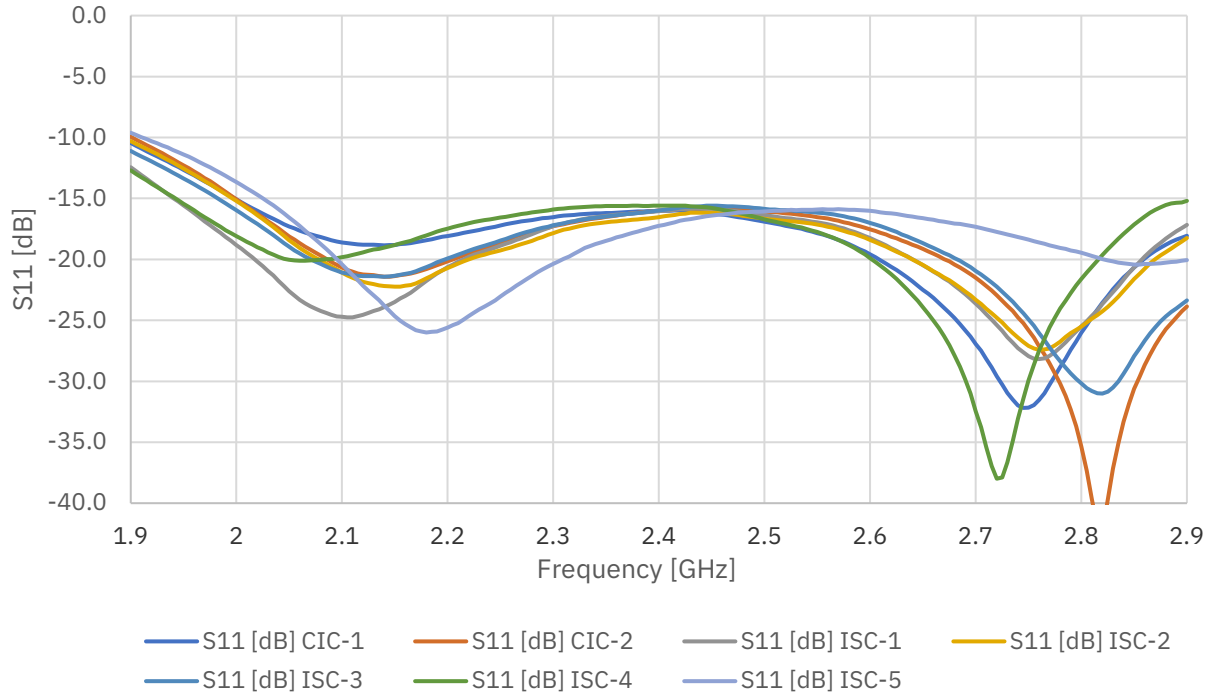
Insertion loss of 2 circulators and 5 isolators at 77 K



Isolation of 2 circulators and 5 isolators at 77 K

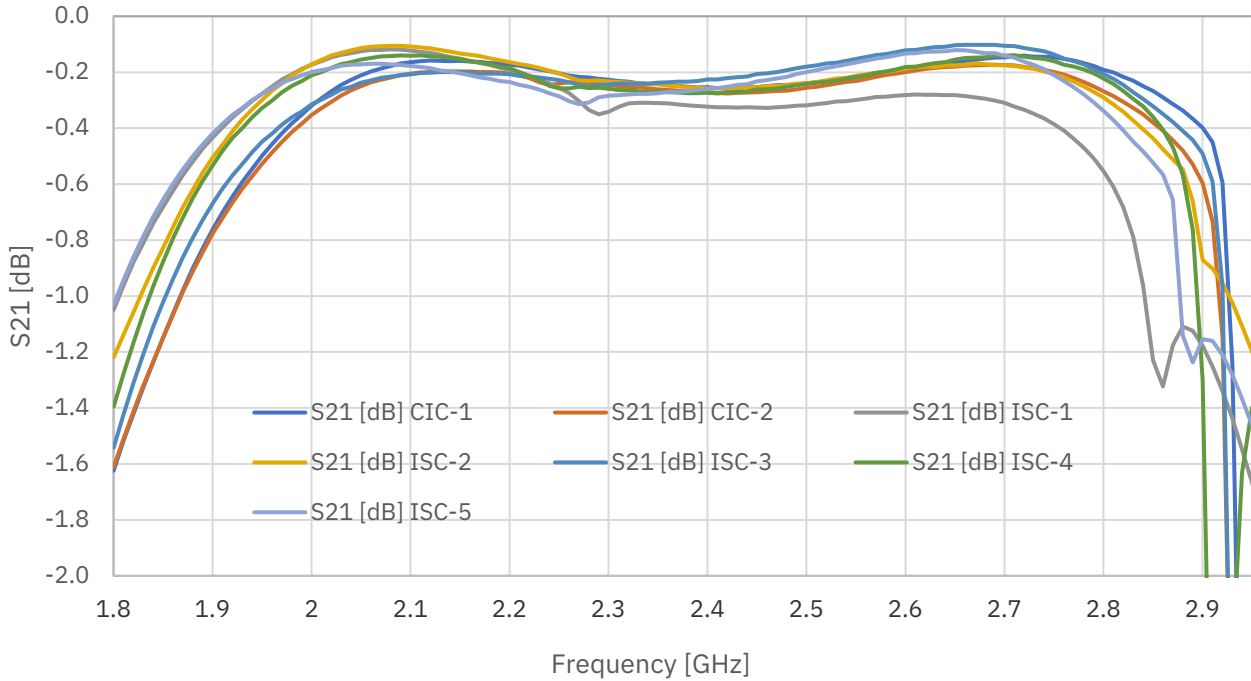


### Port match of 2 circulators and 5 isolators at 77 K

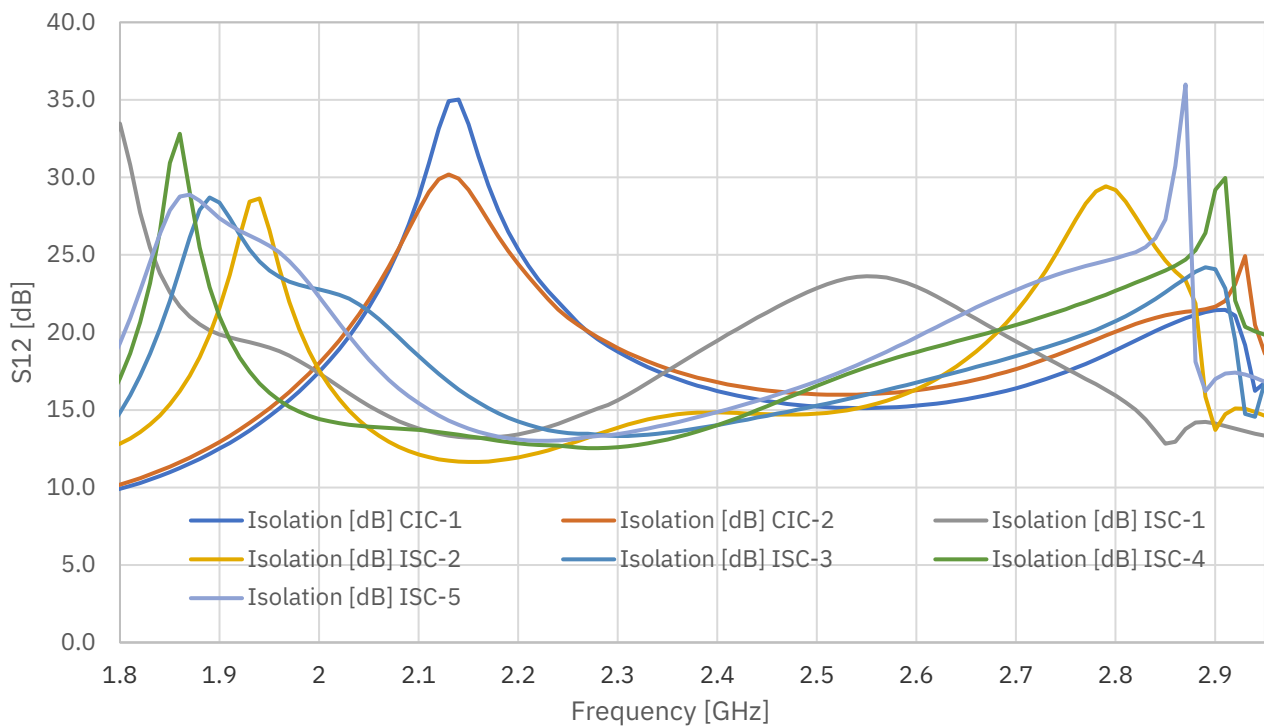


Measured data,  $T_{amb} = 5\text{ K}$

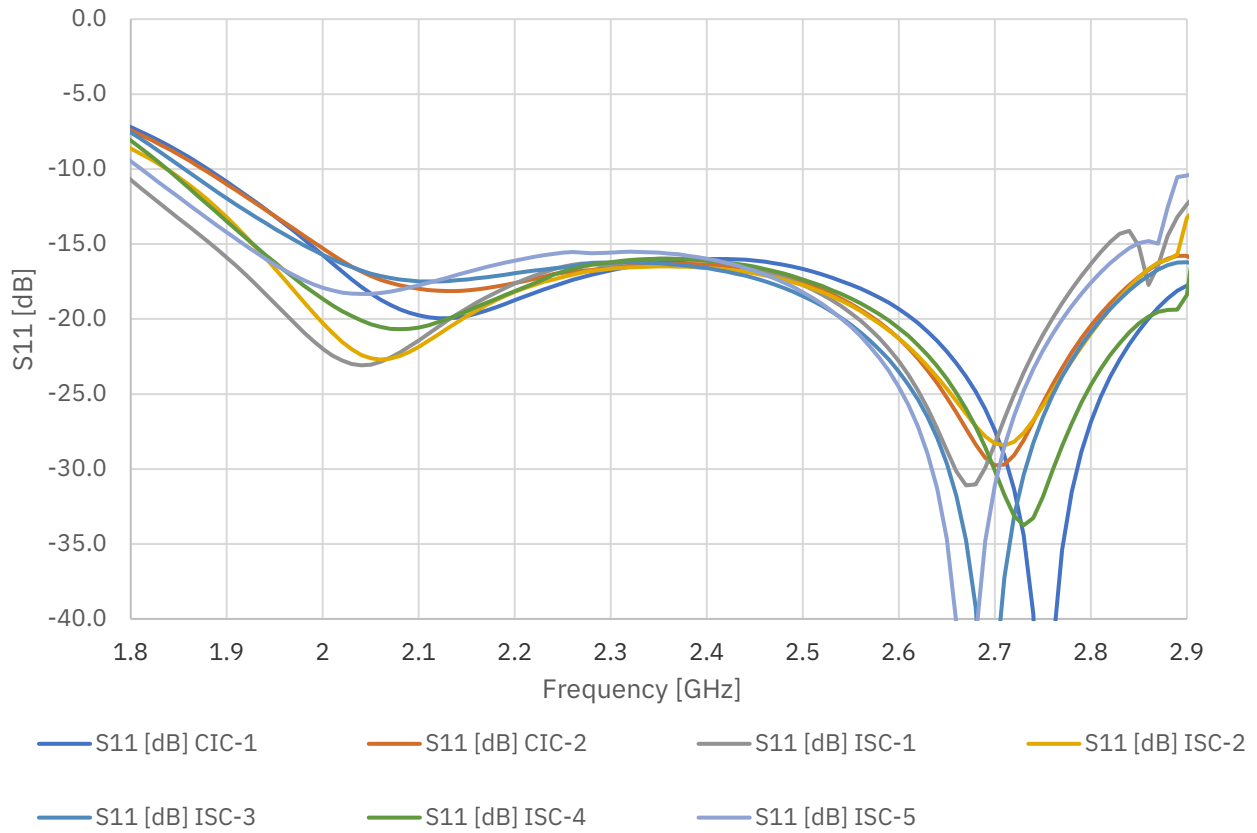
Insertion loss of 2 circulators and 5 isolators at 5 K



Isolation of 2 circulators and 5 isolators at 5 K



### Port match of 2 circulators and 5 isolators at 5 K



## Magnetic flux density generated by internal magnet

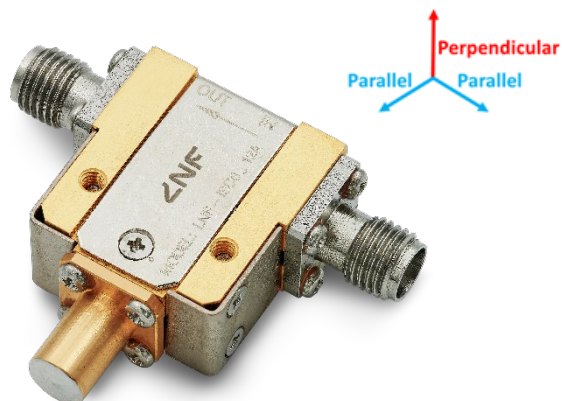
Parameter	Condition	Value	Unit
Magnetic flux density with standard shielding*	6 mm from chassis	< 4	Gauss
Magnetic flux density with optional shielding	6 mm from chassis	< 0.1	Gauss

- 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

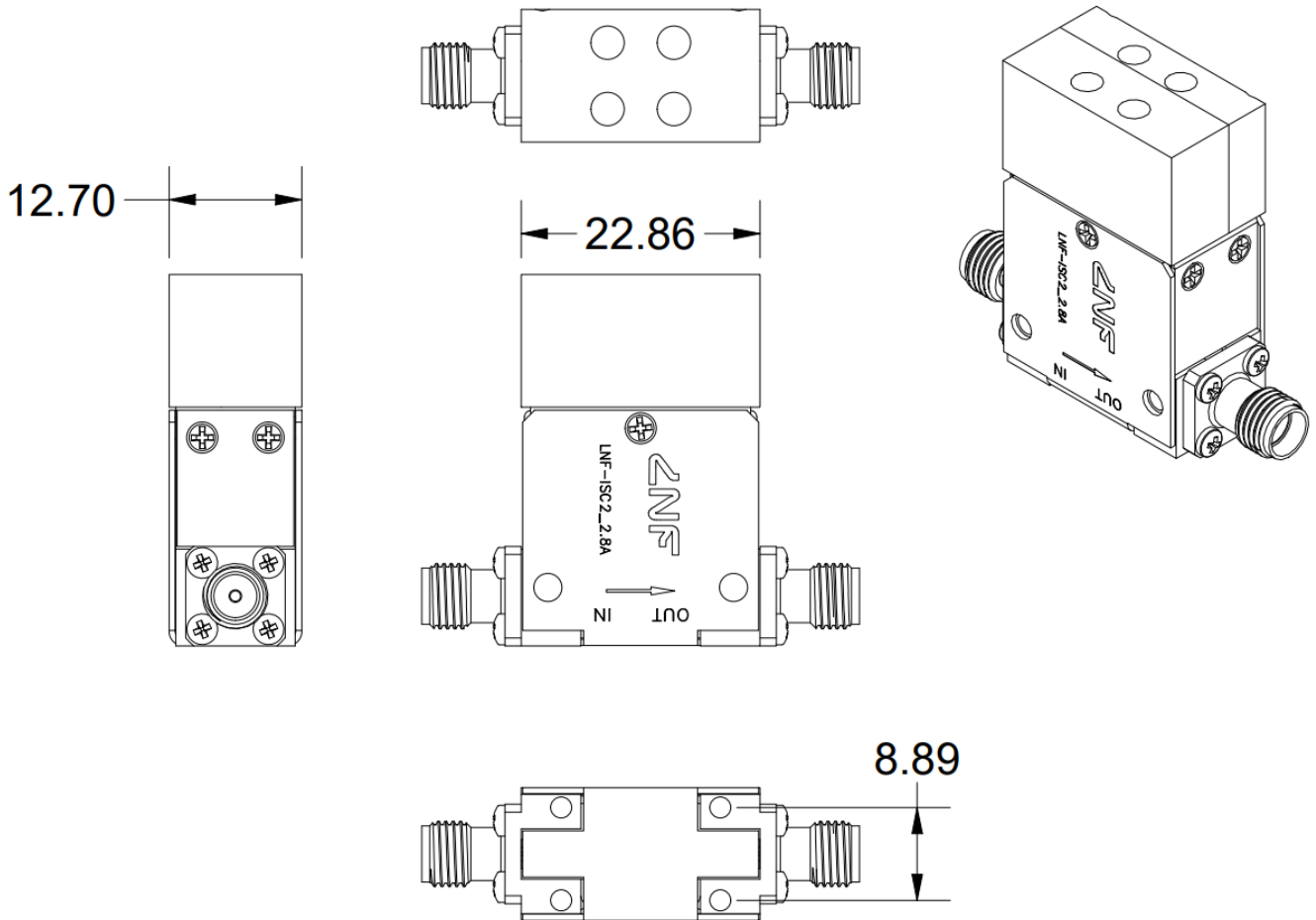
Parameter	Condition	Value	Unit
Maximum perpendicular external magnetic field	At chassis	650	Gauss
Maximum parallel external magnetic field	At chassis	1500	Gauss

- “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.



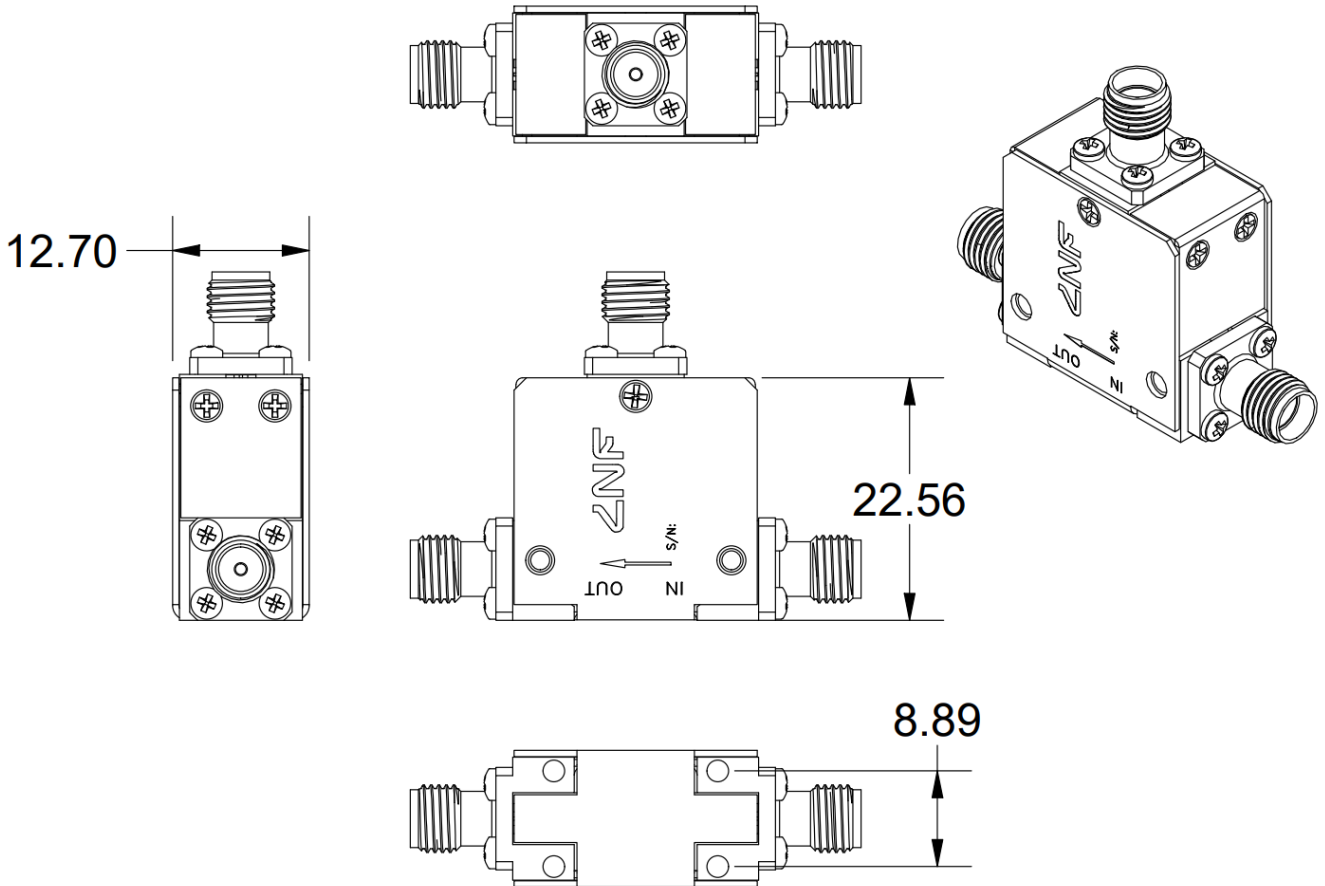
## Dimensions without additional shielding for LNF-ISC2\_2.8A

Units: mm



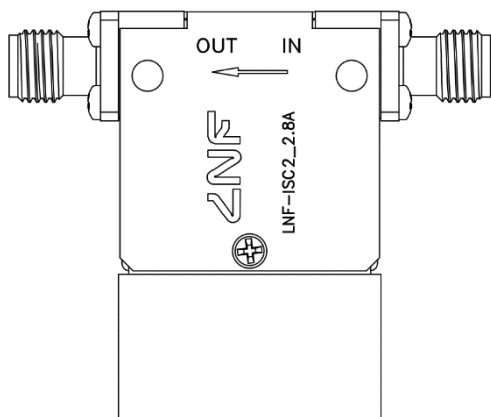
## Dimensions without additional shielding for LNF-CIC2\_2.8A

Units: mm

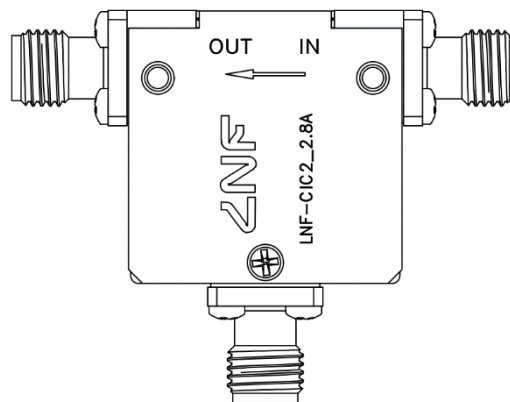




## Model numbering



LNF-ISC2\_2.8A



LNF-CIC2\_2.8A

Version	Model number
Isolator	LNF-ISC2_2.8A
Circulator	LNF-CIC2_2.8A