

Datasheet

LNF-xxxxC4_12A

4-12 GHz Cryogenic Dual Junction Isolator or Circulator



LNF-ISISC4_12A



LNF-CIISC4_12A

LNF-ISCIC4_12A



LNF-CICIC4_12A

Product Features

RF Bandwidth	4-12 GHz
Insertion Loss	0.4 dB typical
Isolation	30 dB typical
Port Match	16 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

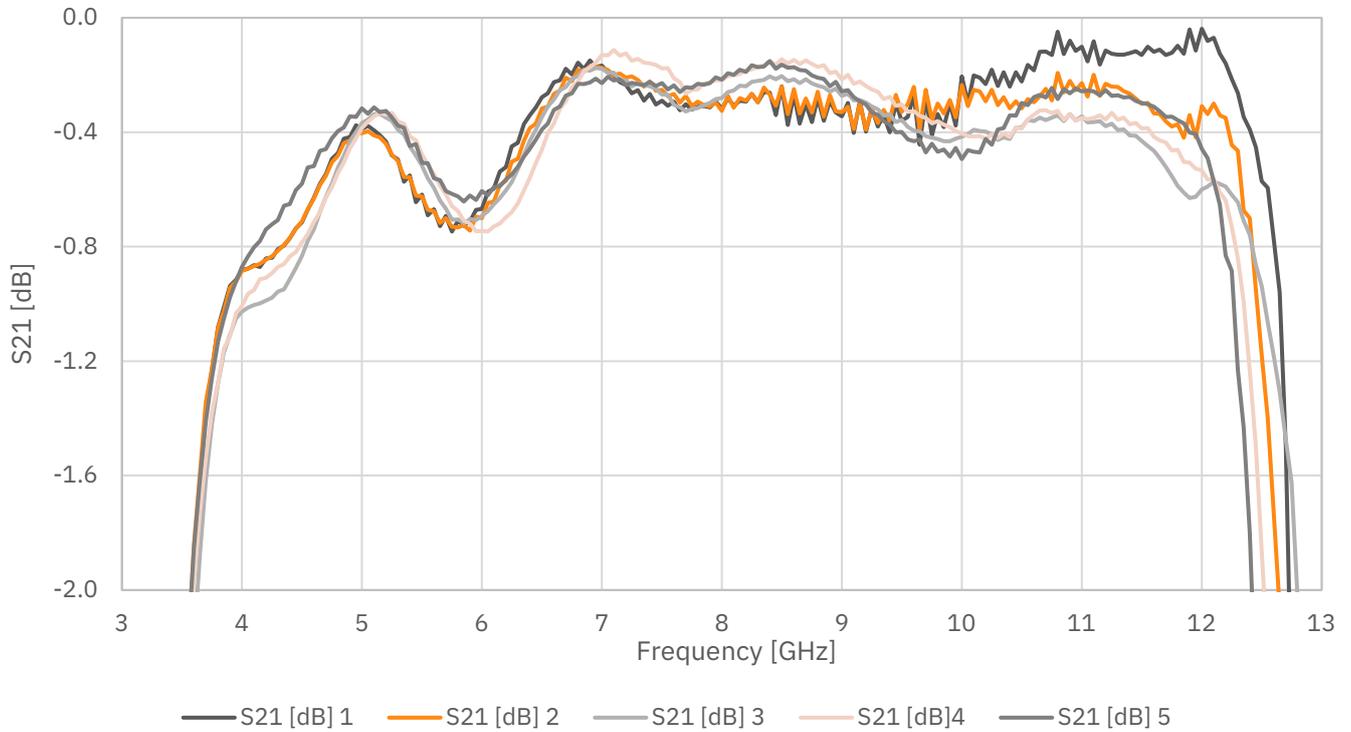
Typical RF Characteristics at 77 K

Parameter	Condition	Value	Unit
Insertion Loss	4-12 GHz	0.4	dB
Isolation	4-12 GHz	30	dB
Port Match	4-12 GHz	16	dB

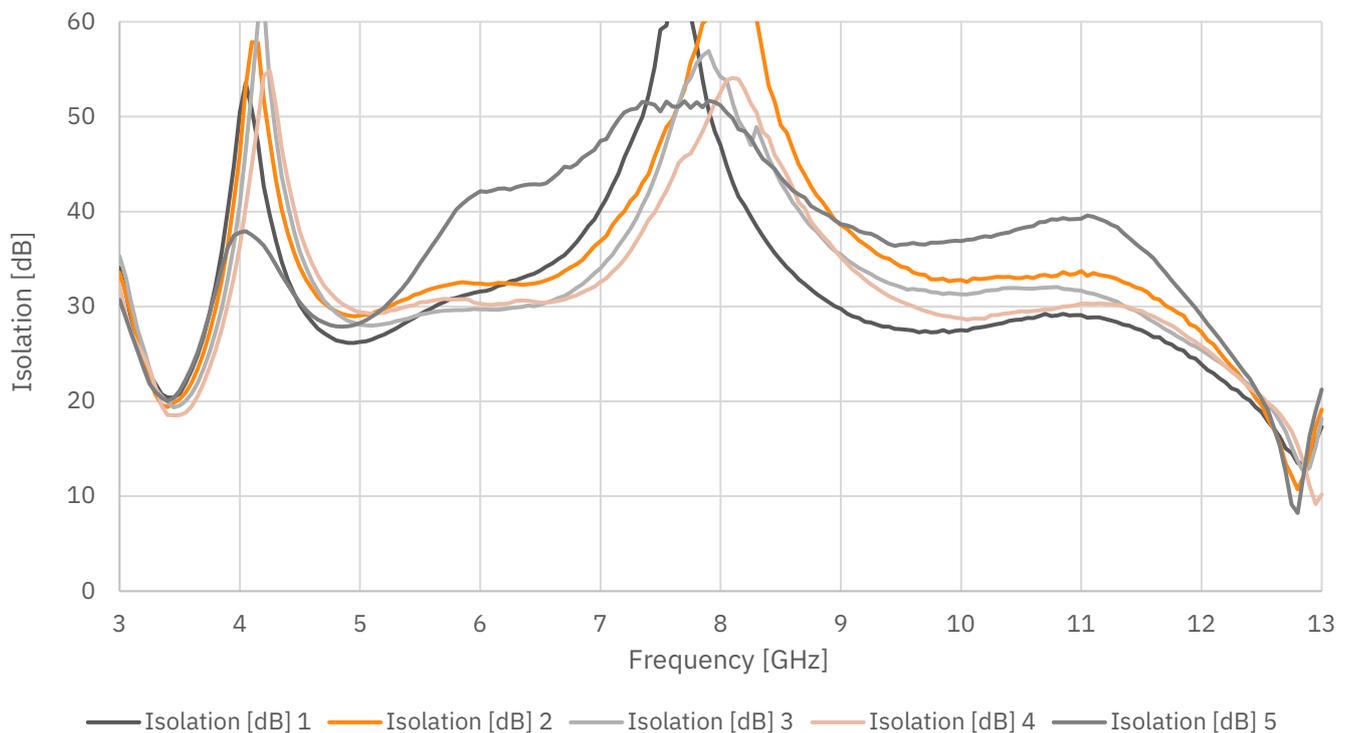
LNF-xxxxC4_12A is an ultra-low insertion loss cryogenic dual junction isolator/circulator operating in the 4-12 GHz frequency range. It has been designed from ground up to meet the strict requirements of ultra-low temperature physics research. The gold plated OFHC copper body ensures minimum loss and 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 44.70x24.64x10.16 mm excluding the connectors.

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

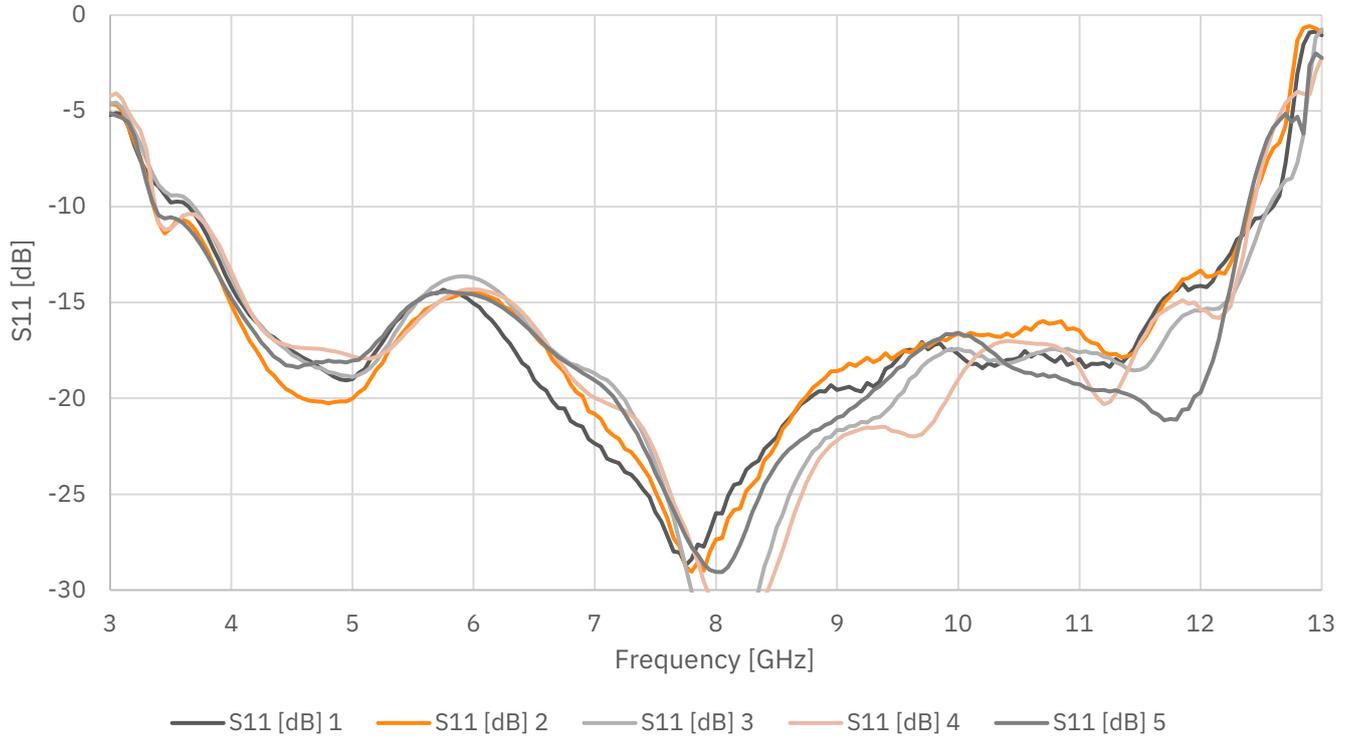
Insertion Loss of 5 Units at 77 K



Isolation of 5 Units at 77 K



Port Match of 5 Units at 77 K



Insertion loss improves slightly when cooled to 5 K and 10 mK, port match and isolation remain the same.

Magnetic flux density generated by internal magnet

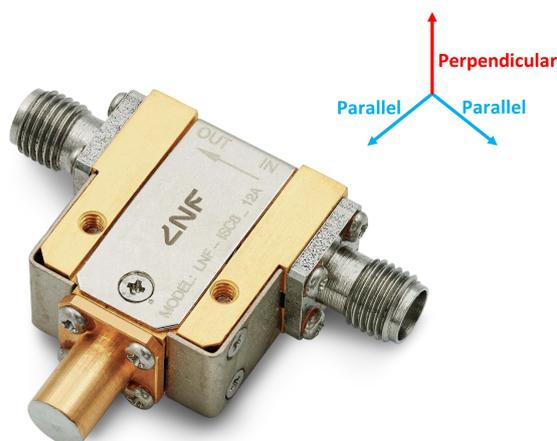
Parameter	Condition	Value	Unit
Magnetic flux density with standard shielding*	6 mm from chassis	<4	Gauss
Magnetic flux density with optional shielding	6 mm from chassis	<0.1	Gauss

- 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

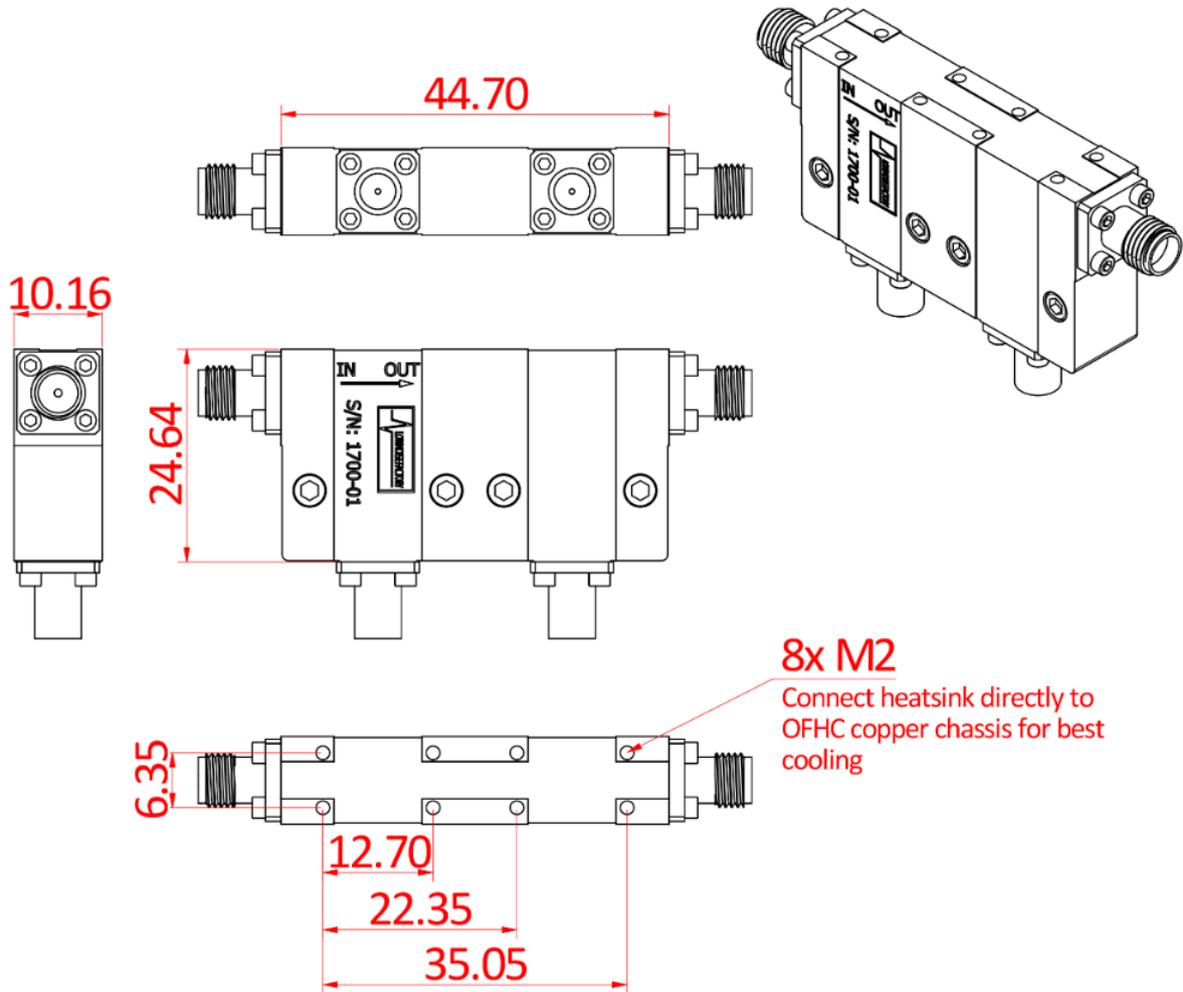
Parameter	Condition	Value	Unit
Maximum perpendicular external magnetic field	At chassis	650	Gauss
Maximum parallel external magnetic field	At chassis	1500	Gauss

- “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.



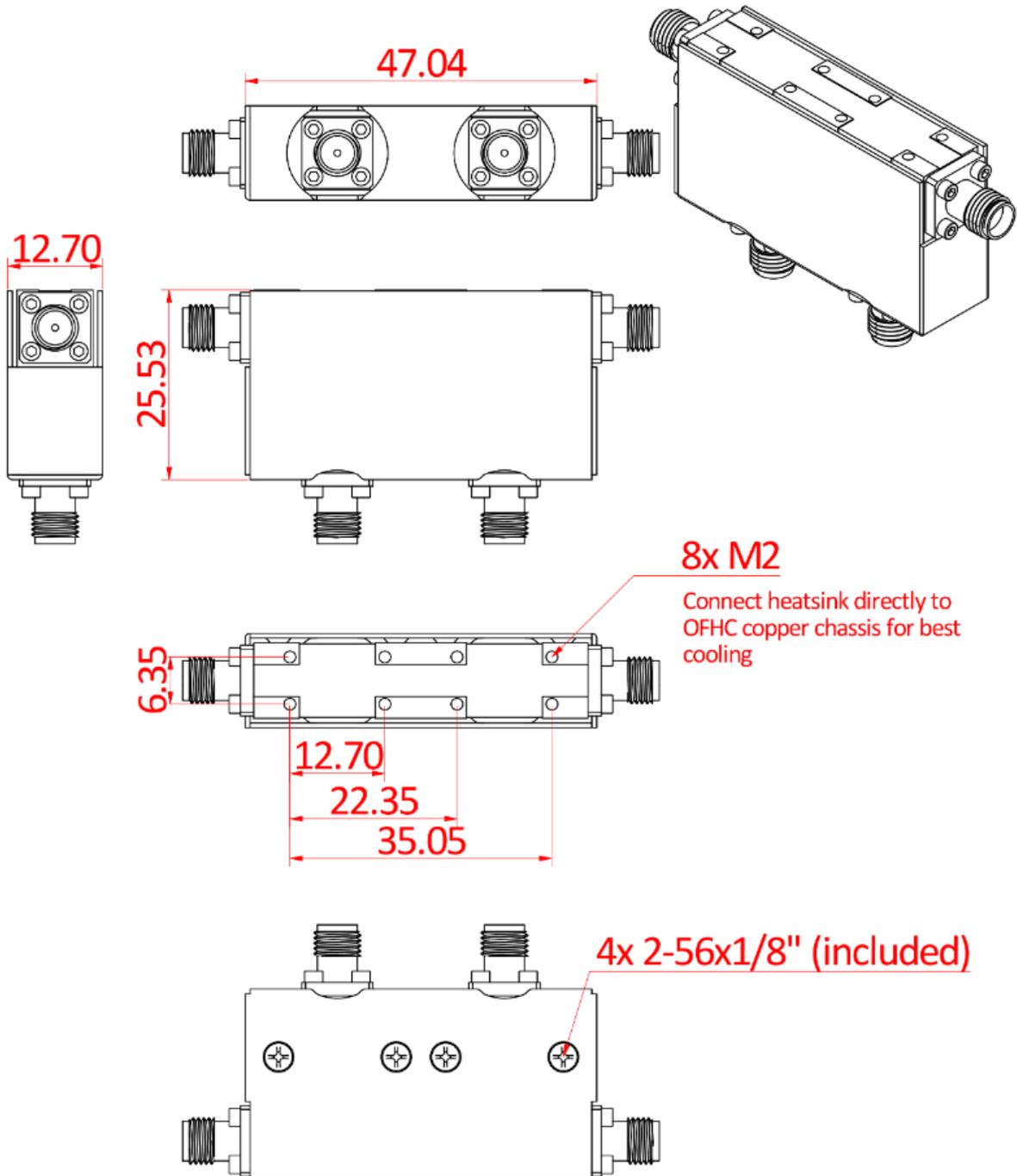
Dimensions without additional shielding

Units: mm

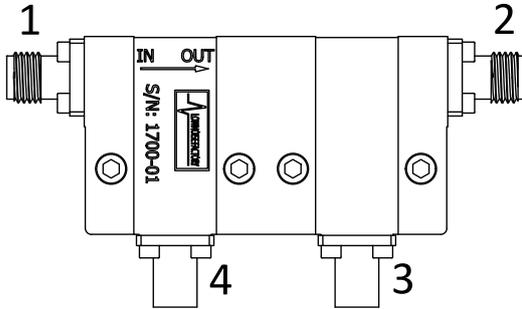


Dimensions with additional shielding

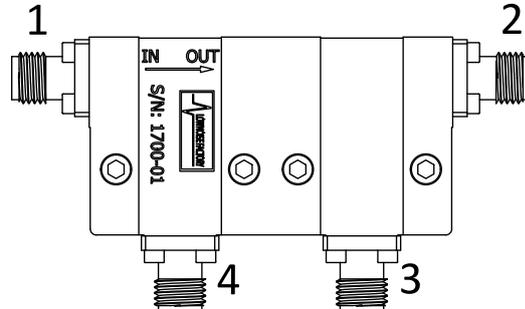
Units: mm



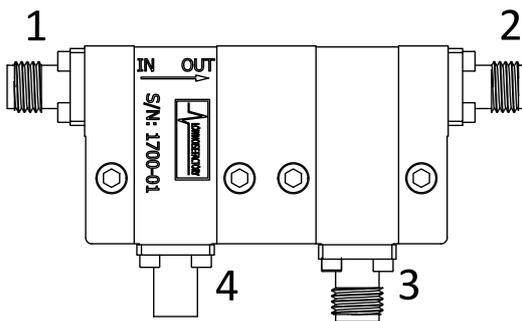
Model numbering



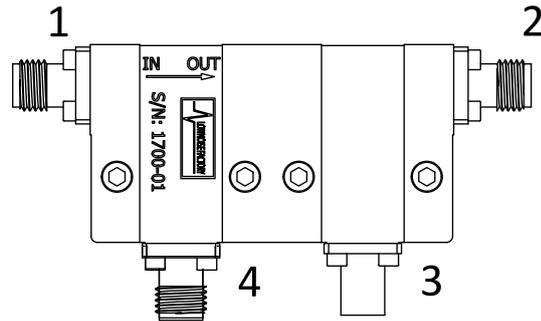
LNF-ISISC4_12A
Dual Junction Isolator
Port 1: Female SMA
Port 2: Female SMA
Port 3: Termination
Port 4: Termination



LNF-CICIC4_12A
Dual Junction Circulator
Port 1: Female SMA
Port 2: Female SMA
Port 3: Female SMA
Port 4: Female SMA



LNF-ISCIC4_12A
Dual Junction Isolator-Circulator
Port 1: Female SMA
Port 2: Female SMA
Port 3: Female SMA
Port 4: Termination

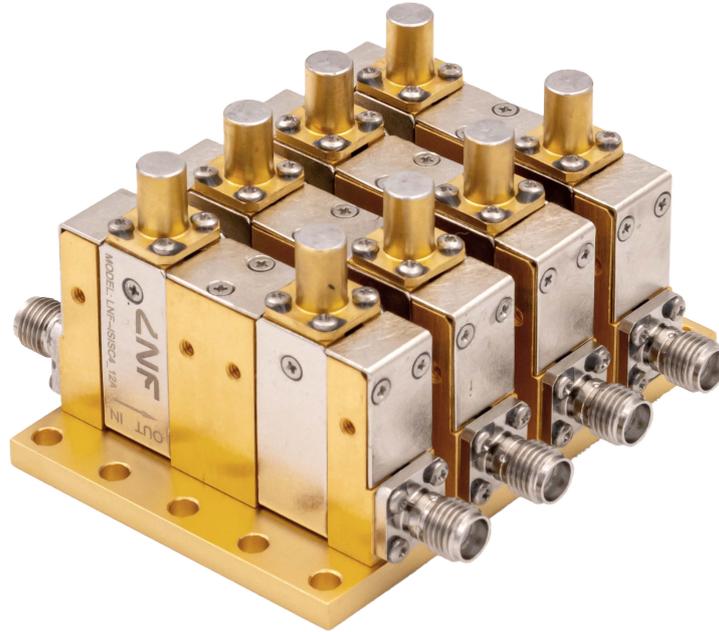


LNF-CIISC4_12A
Dual Junction Circulator-Isolator
Port 1: Female SMA
Port 2: Female SMA
Port 3: Termination
Port 4: Female SMA

Version	Model number
Dual Isolator	LNF-ISISC4_12A
Dual Circulator	LNF-CICIC4_12A
Isolator-Circulator	LNF-ISCIC4_12A
Circulator-Isolator	LNF-CIISC4_12A
Extra shield	LNF-SHIELD4_8_DJ *

* LNF-xxxxC4_8A and LNF-xxxxC4_12A share the same chassis dimensions and hence also the same extra shield.

Array



* Consult with factory for array options.