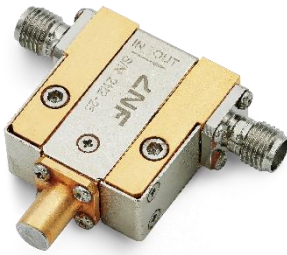


Datasheet

LNF-ISC4_12A and LNF-CIC4_12A

4-12 GHz Cryogenic Isolator or Circulator



LNF-ISC4_12A



LNF-CIC4_12A

Product Features

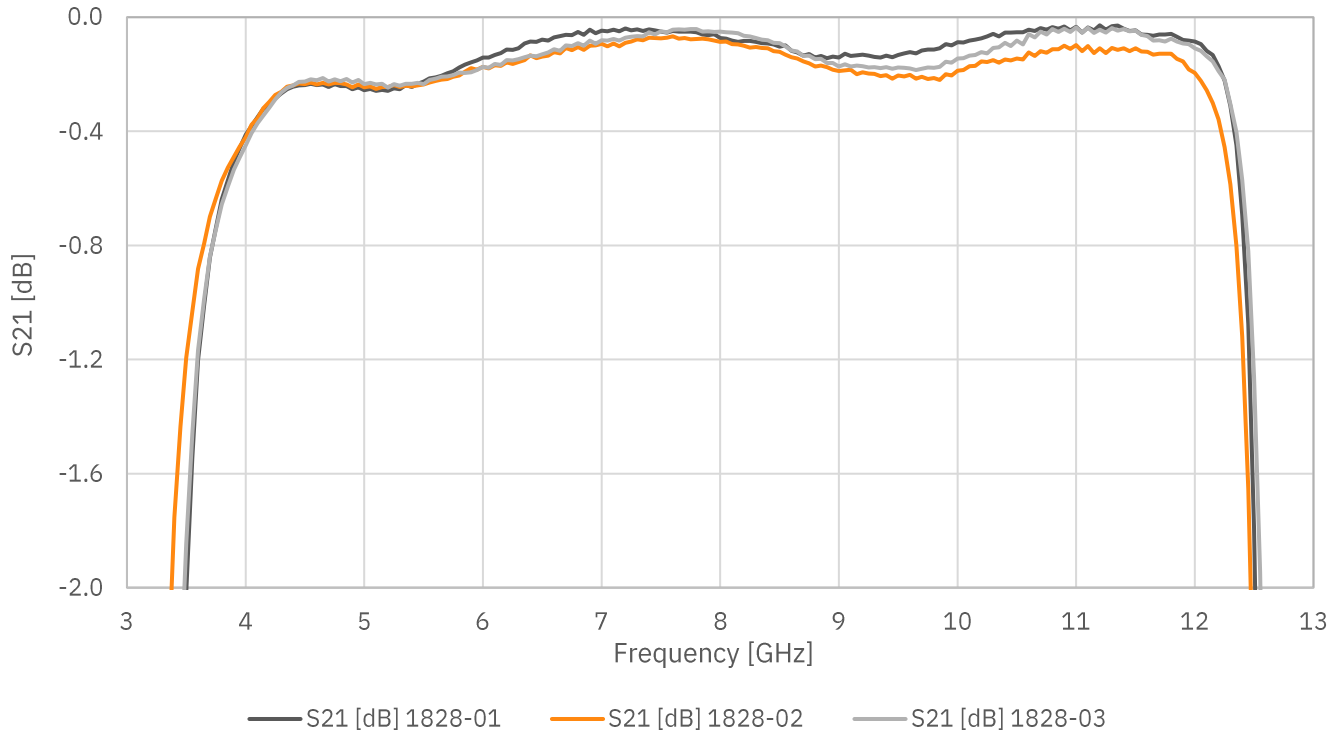
RF Bandwidth	4-12 GHz
Insertion Loss	0.2 dB typical
Isolation	20 dB typical
Port Match	20 dB typical
RF Connectors	Female SMA

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	4-12 GHz	0.2	dB
RF Drive Level		30 dBm	Isolation	4-12 GHz	20	dB
DC Voltage on RF Input and Output	-50 V	50 V	Port Match	4-12 GHz	20	dB

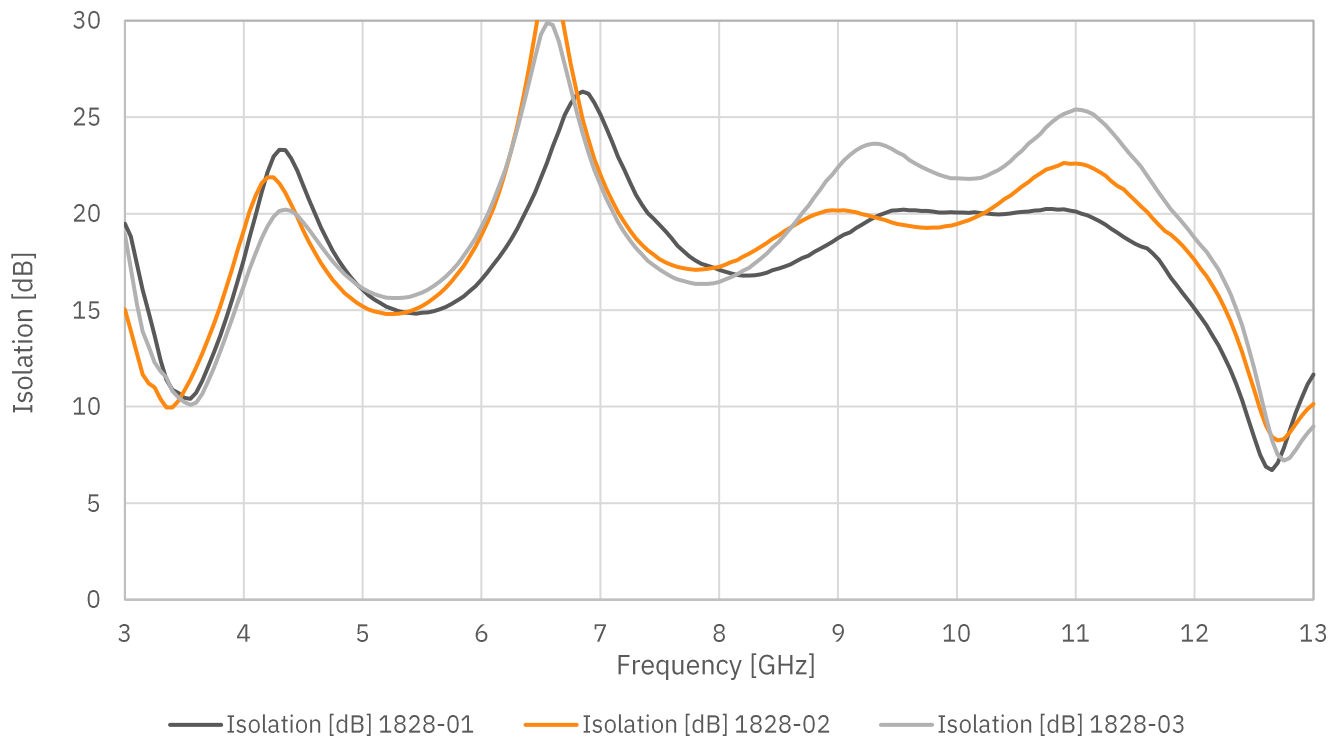
LNF-ISC4_12A and LNF-CIC4_12A are ultra-low insertion loss cryogenic isolators and circulators operating in the 4-12 GHz frequency range. They have been designed from ground up to meet the strict requirements of ultra-low temperature physics research. The gold plated OFHC copper body ensures minimum 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 22.35x24.64x10.16 mm excluding the connectors.

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

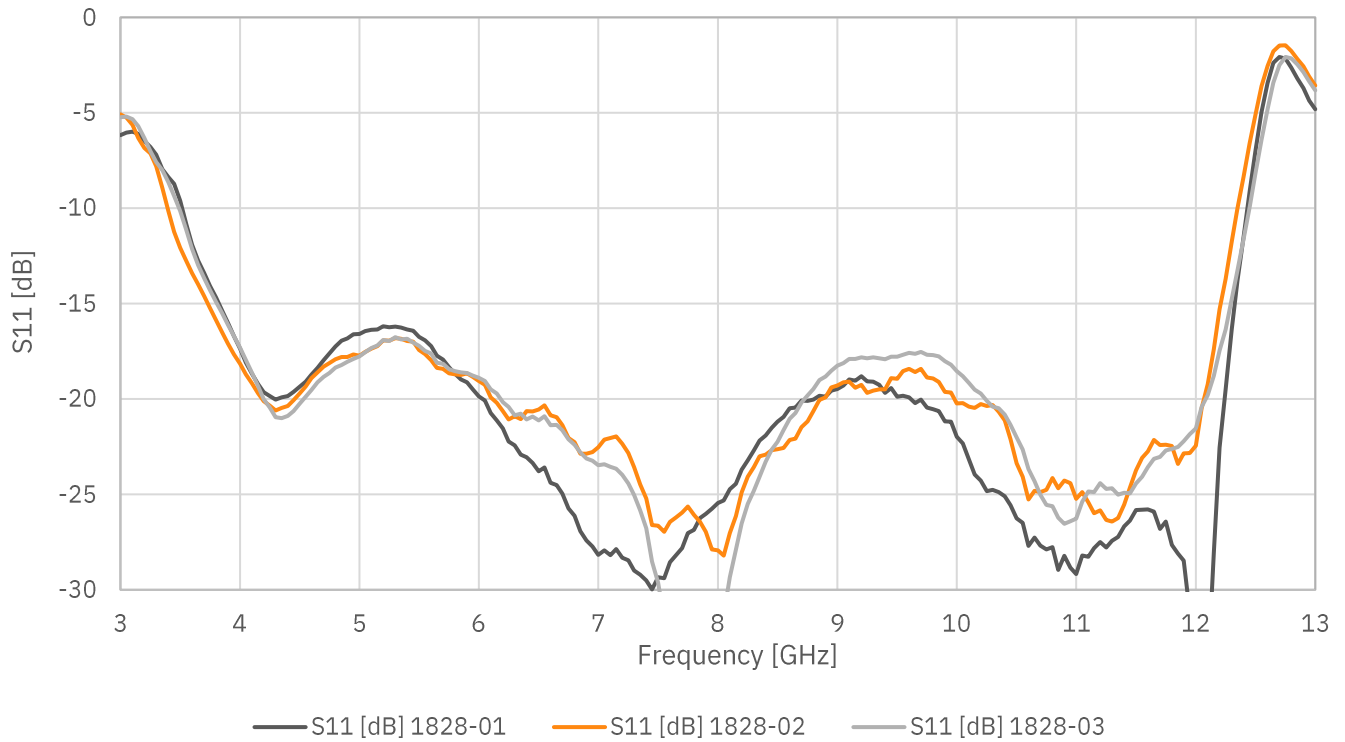
Insertion Loss of 3 Units at 77 K



Isolation of 3 Units at 77 K



Port Match of 3 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

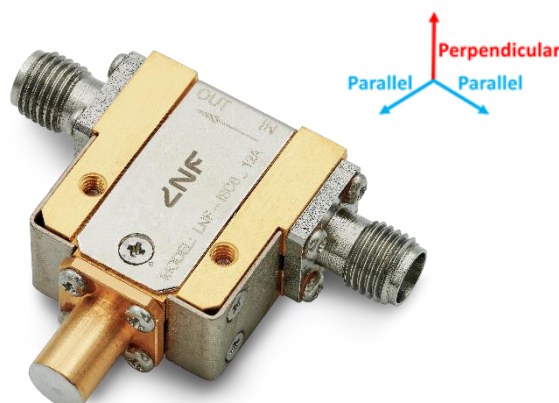
Parameter	Condition	Value	Unit
Magnetic flux density with standard shielding*	6 mm from chassis	< 4	Gauss
Magnetic flux density with optional shielding	6 mm from chassis	< 0.1	Gauss

- 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

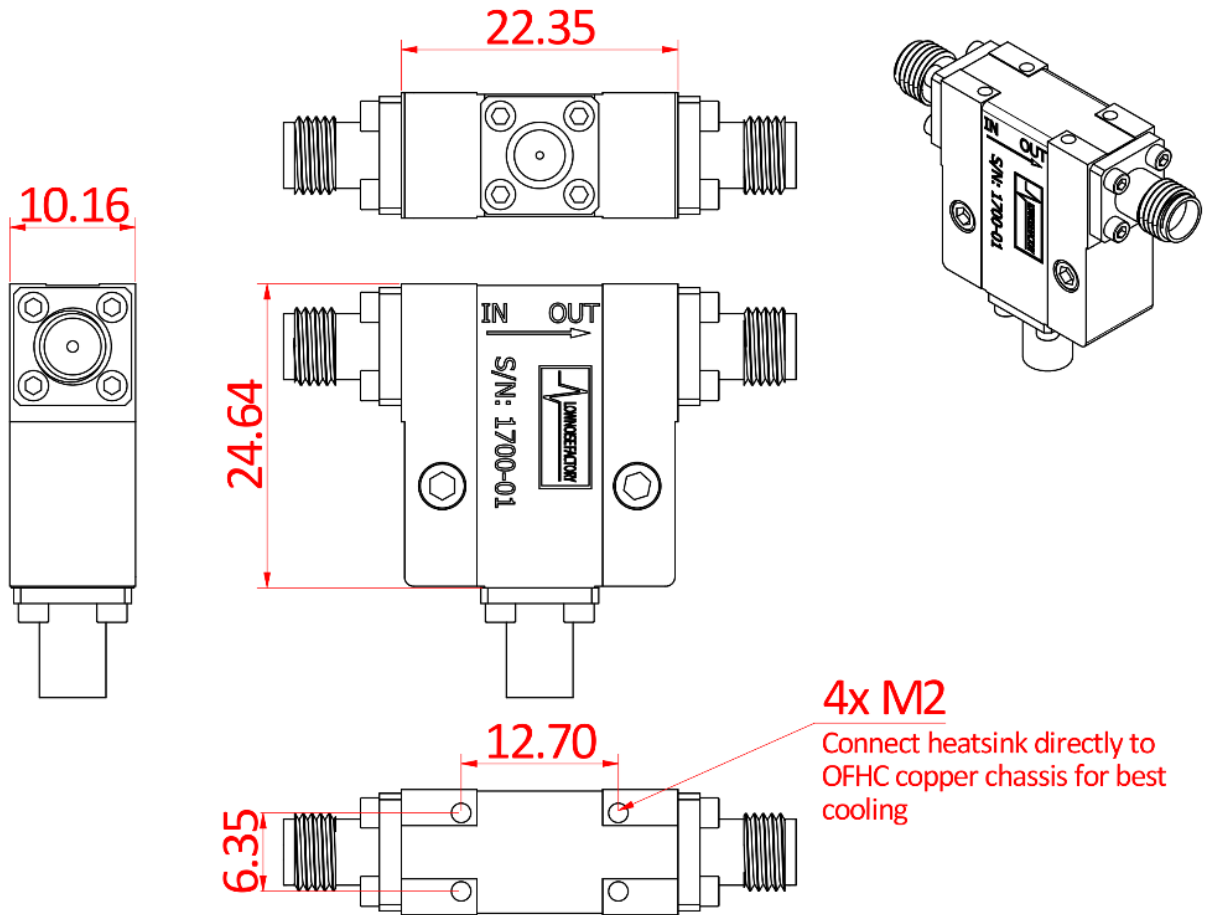
Parameter	Condition	Value	Unit
Maximum perpendicular external magnetic field	At chassis	650	Gauss
Maximum parallel external magnetic field	At chassis	1500	Gauss

- “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.



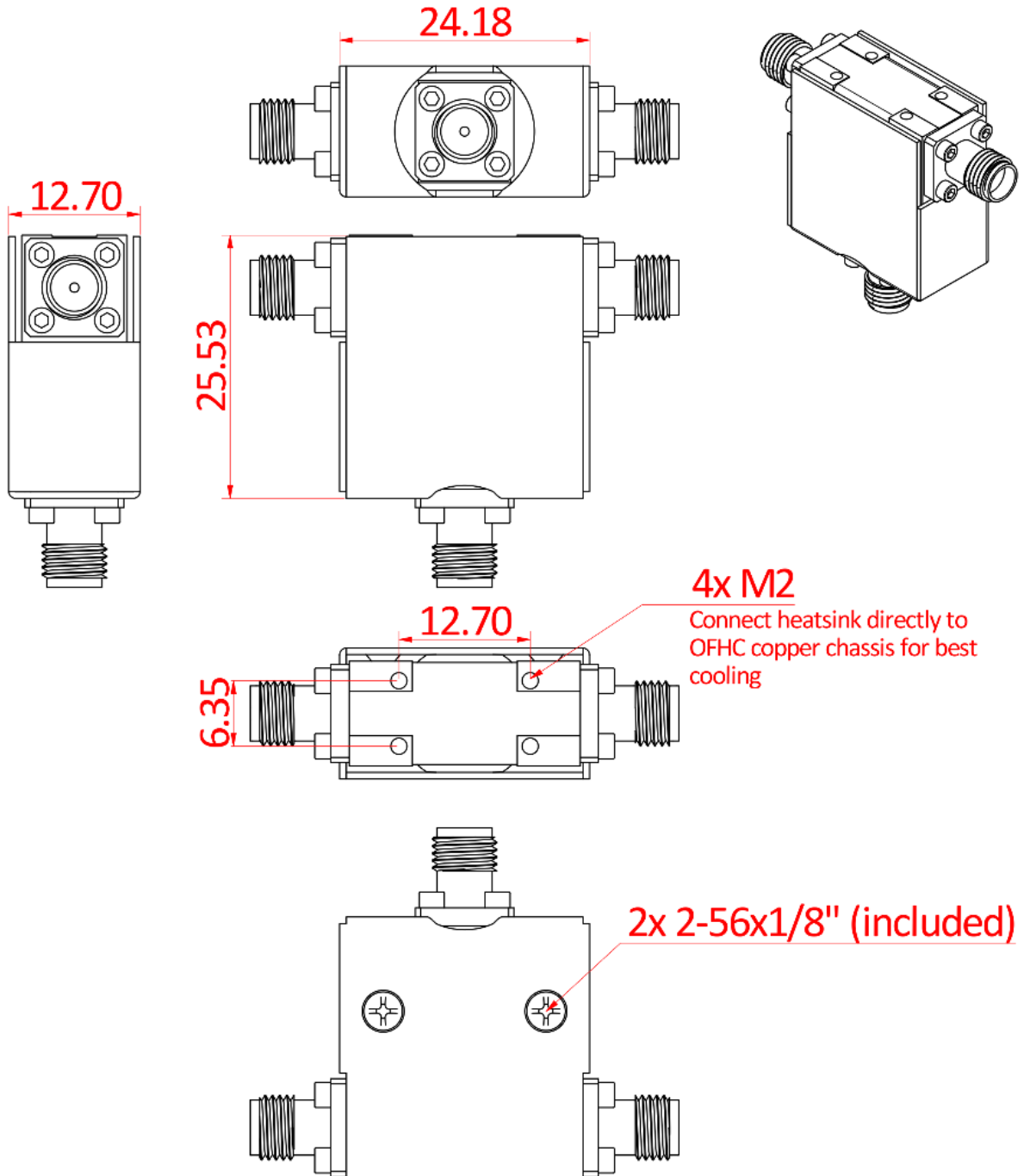
Dimensions without additional shielding

Units: mm

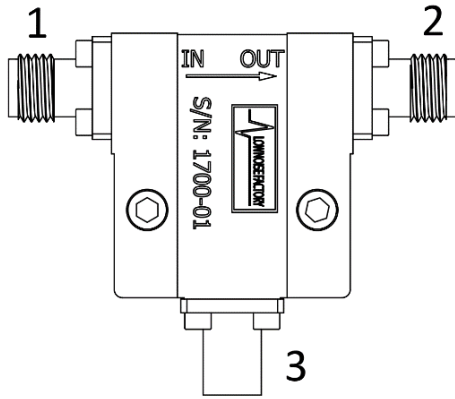


Dimensions with additional shielding

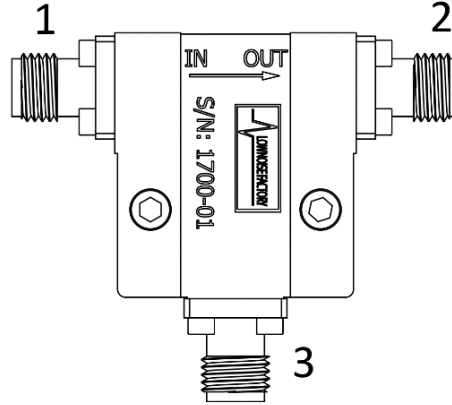
Units: mm



Model numbering



LNF-ISC4_12A
Single Junction Isolator
Port 1: Female SMA
Port 2: Female SMA
Port 3: Termination

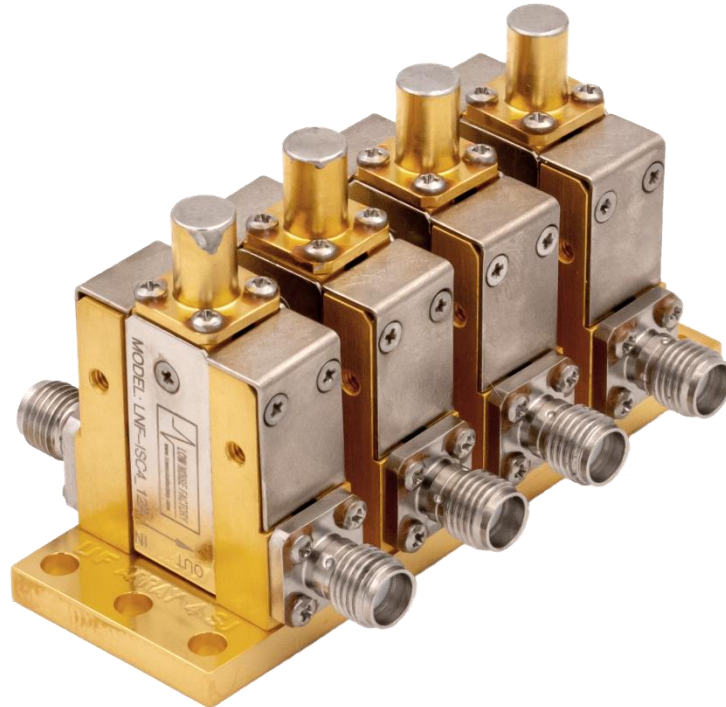


LNF-CIC4_12A
Single Junction Circulator
Port 1: Female SMA
Port 2: Female SMA
Port 3: Female SMA

Version	Model number
Isolator	LNF-ISC4_12A
Circulator	LNF-CIC4_12A
Extra shield	LNF-SHIELD4_8_SJ *

* LNF-ISC4_8A and LNF-ISC4_12A share the same chassis dimensions and hence also the same extra shield.

Array



* Consult with factory for array options.