

# Data Sheet

## QF1600Q06A

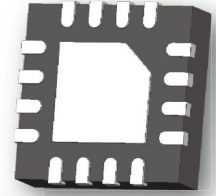
### Quadrifilar Directional Coupler

### 1520 MHz-1660 MHz



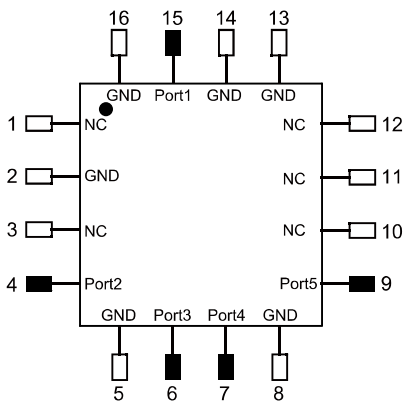
## Features

- Ultra Small Size (3×3mm)
- Excellent phase & amplitude balance
- Excellent repeatability
- Passive RF IC, no need external DC power supply
- With internal 50 ohm termination ( no need external termination )
- Built with leading edge RFIC design technology
- Have one Input port and four Output ports that have -6dB -(0°, 90°, 180°, 270°) of phase difference
- Quadrifilar Coupler, 4-Phased Antenna Feeder, Helicaled Antenna Feeder
- Operating Temperature: -40°C to +85°C
- Tape & Reel



## Applications

- Realizing the World's Most Compact High Precision GNSS Antenna (GPS, Beidou, Galileo, Glonass)



TOP VIEW

### Notes:

- 1.Require to add Capacitors of DC Blocker between Pins (with black color) and external circuit to prevent DC signal entry to guranteeparts normal work.
- 2.This part has passed through 100% RF test.

Port 1	Port 2	Port 3	Port4	Port 5
Input	Output1 -6dB, 0°	Output2 -6dB, -90°	Output3 -6dB, -180°	Output4 -6dB, -270°

## Electrical Specifications at +25° C

Part No.	Freq. Range (MHz) FL~FU	Power (W)	Size LxW (mm)	Typical Return Loss (dB)	Typical Insertion Loss (dB)	Typical Isolation (dB)	Typical Phase Balance (deg)	Typical Amplitude Balance (dB)
QF1600Q06A	1520-1660	5	3X3	11-27	1.02	9-18	90±5	±0.9
	1560-1620	5	3X3	12-26	0.94	9-17	90±5	±0.75

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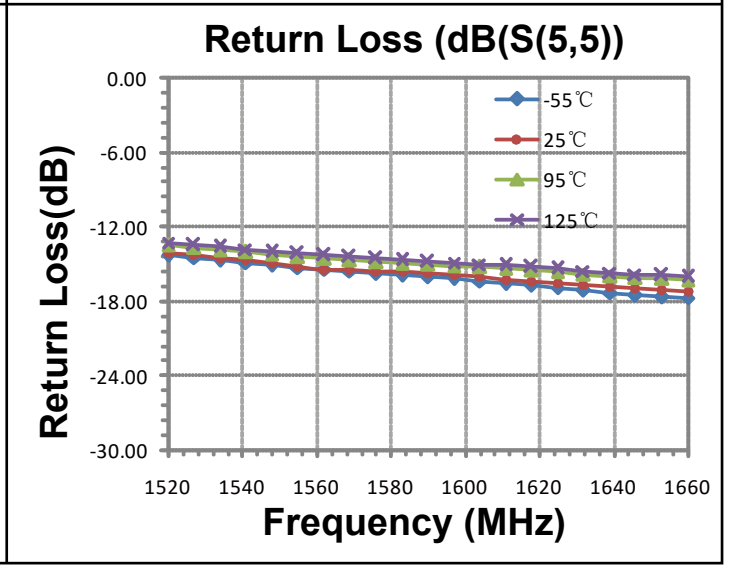
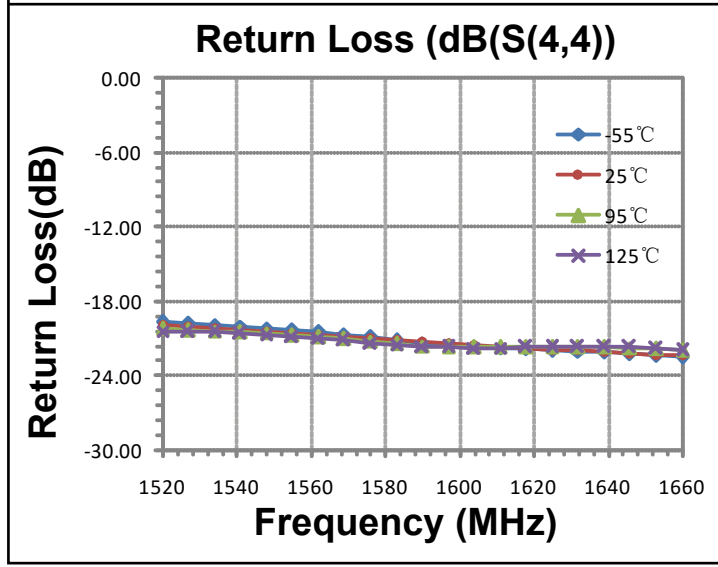
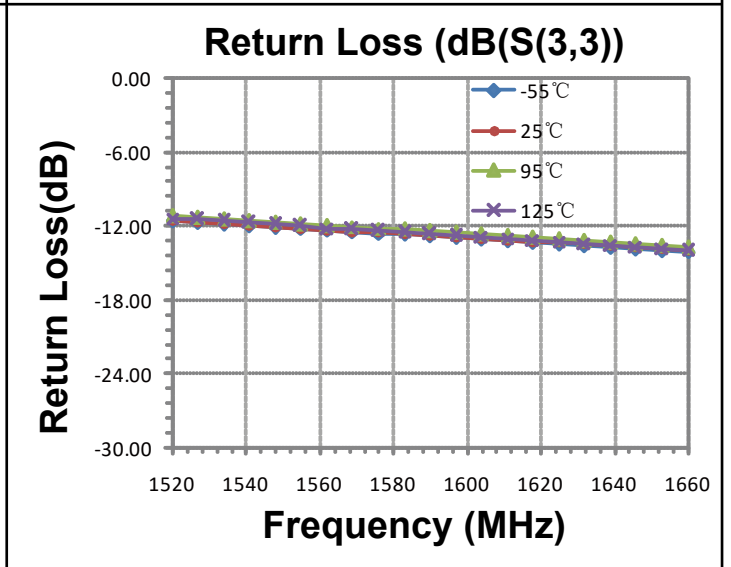
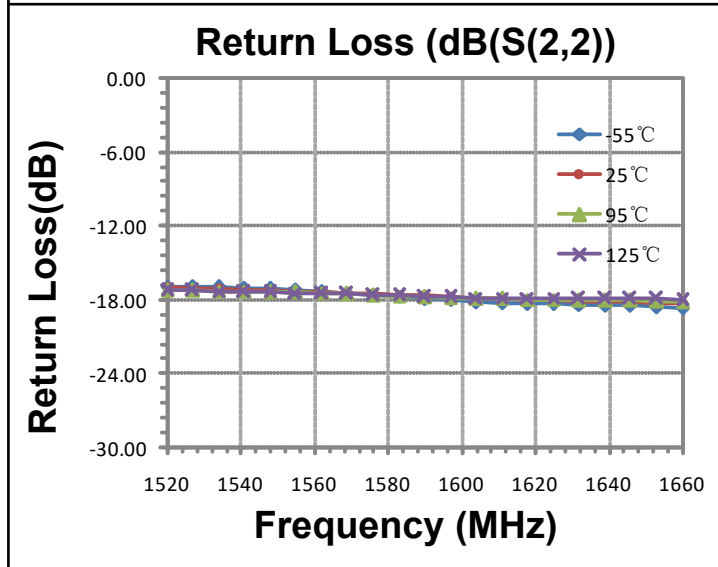
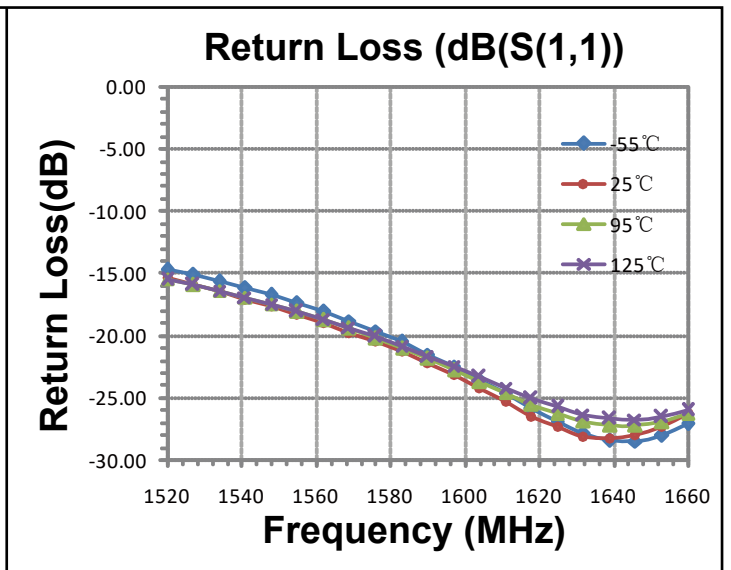
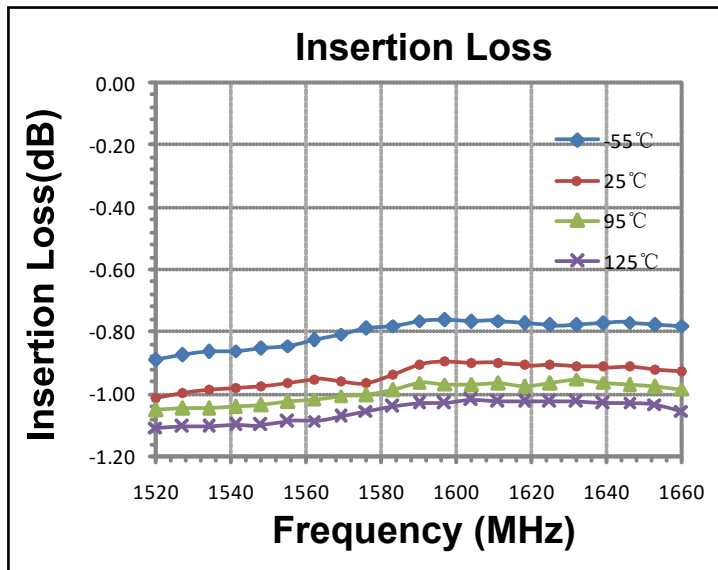
A3.0

For detailed performance specs & shopping online see Yantel web site : [www.yantel-corp.com](http://www.yantel-corp.com)

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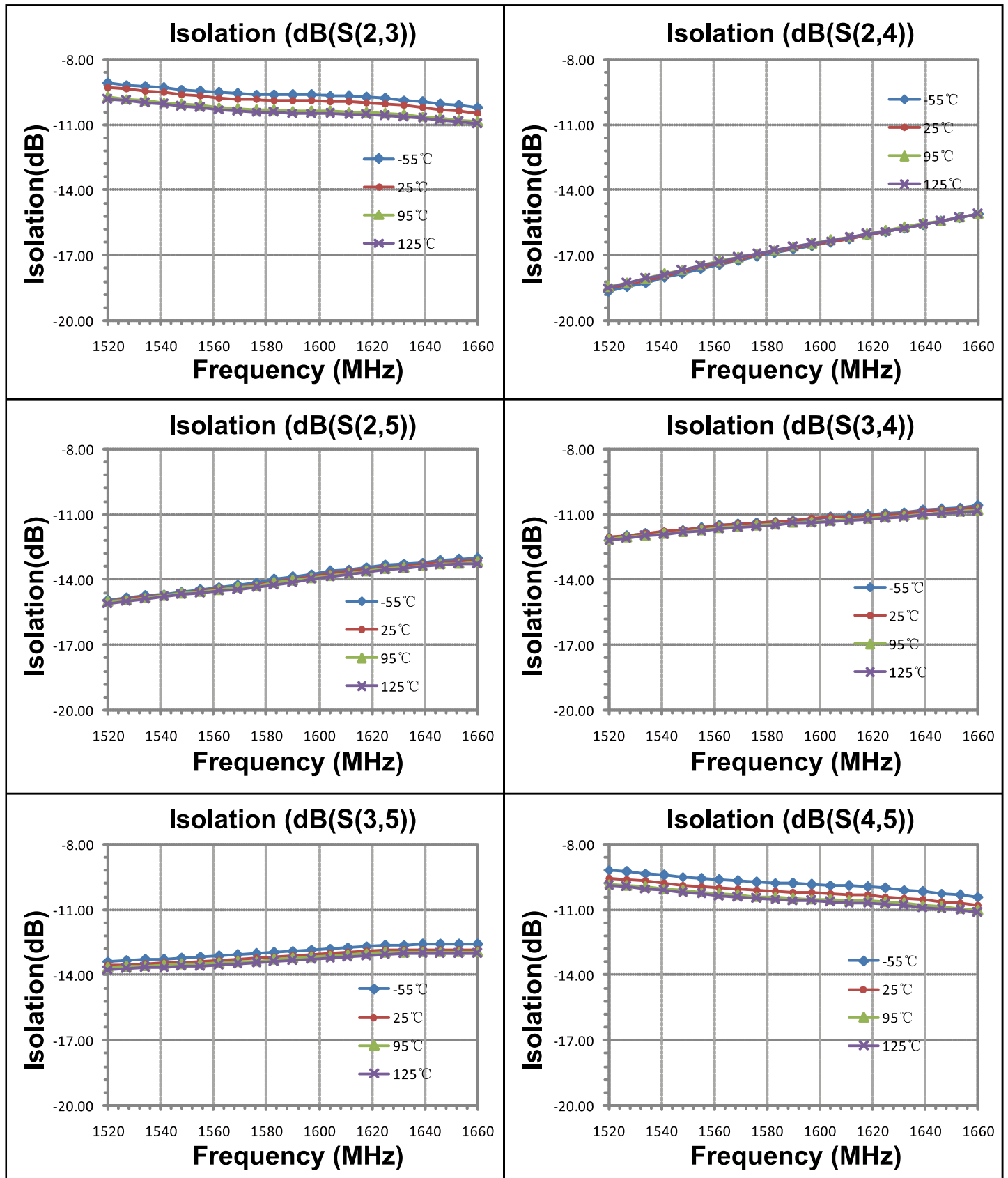
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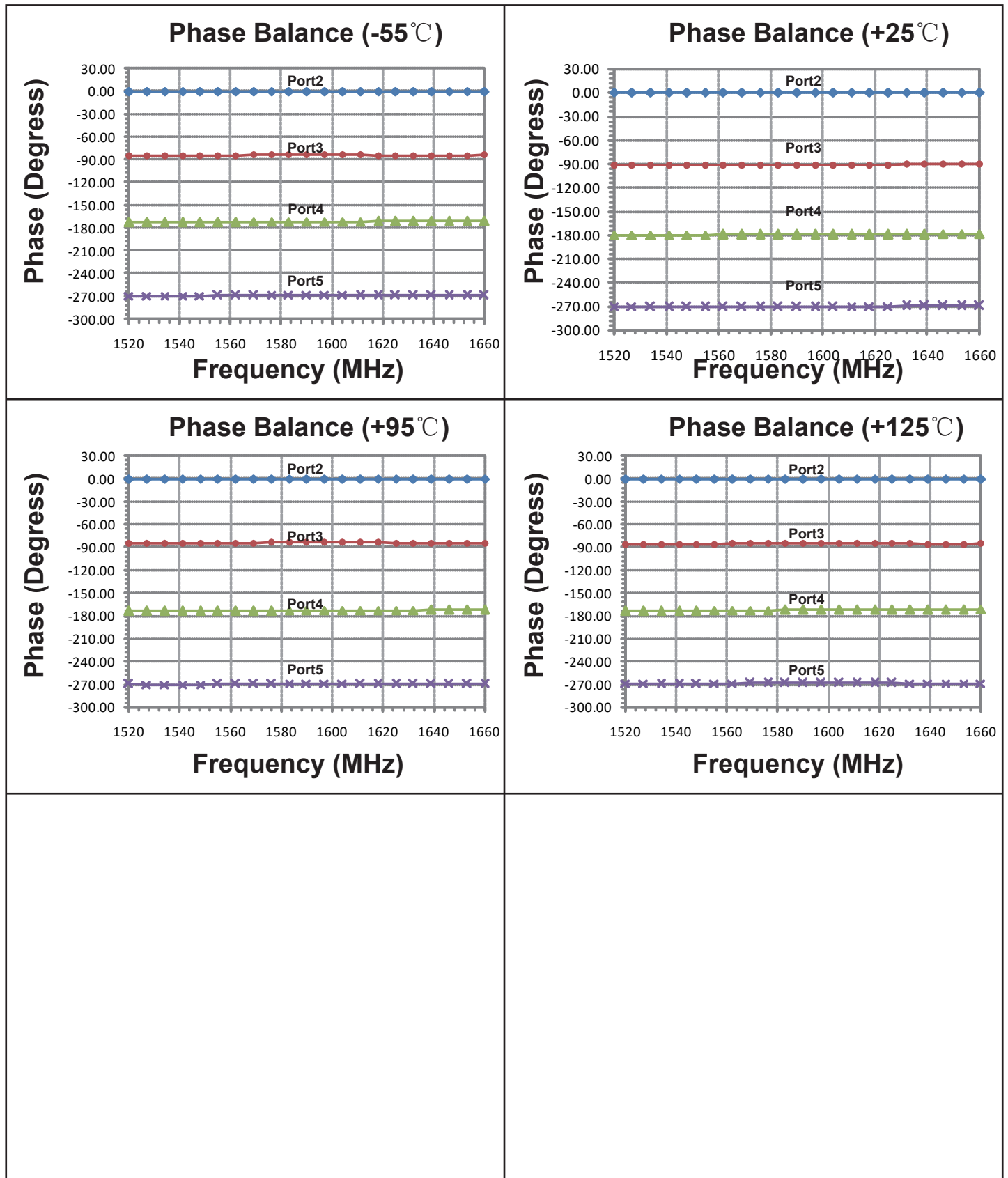
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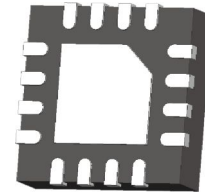
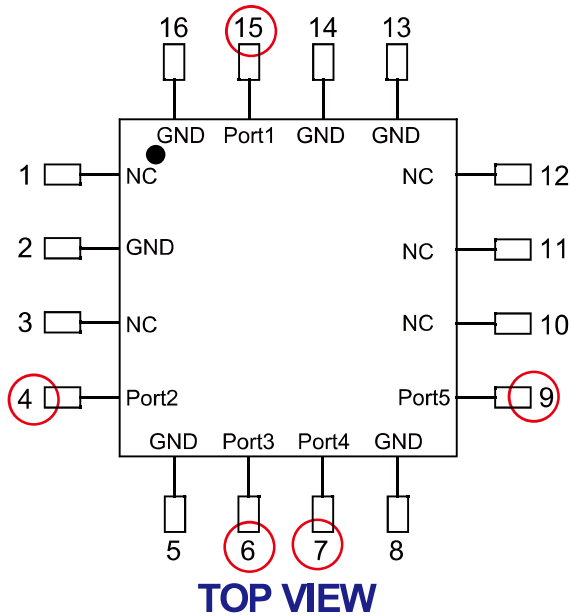
### 1520 MHz-1660 MHz



## Special Attenuation before Quadrifilar IC Soldering

### 1. A Package

Applicable P/N: QF0900Q06A, QF1200Q06A, QF1600Q06A, QF2100Q06A, QF2500Q06A

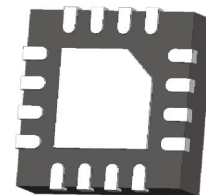
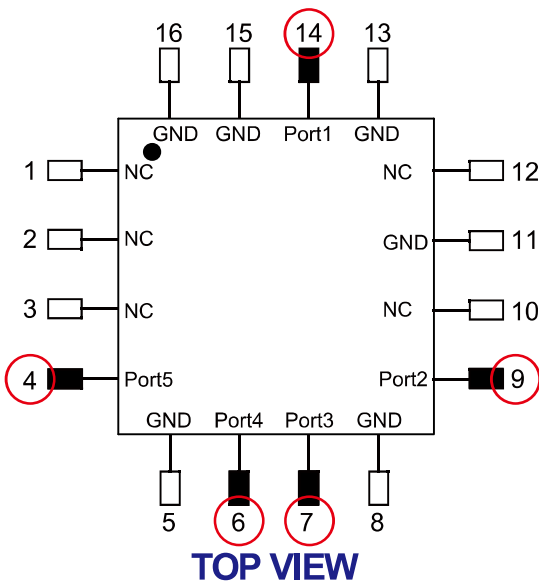


**Attention: The 5 ports circled out should be soldered right to footprint pads accordingly to ensure accurate RF performance test.**

Port 1	Port 2	Port 3	Port 4	Port 5
Input	Output1 -6dB, 0°	Output2 -6dB, -90°	Output3 -6dB, -180°	Output4 -6dB, -270°

### 2. B Package

Applicable P/N: QF2100Q06B



**Attention: The 5 ports circled out should be soldered right to footprint pads accordingly to ensure accurate RF performance test.**

Port 1	Port 2	Port 3	Port 4	Port 5
Input	Output1 -6dB, 0°	Output2 -6dB, -90°	Output3 -6dB, -180°	Output4 -6dB, -270°

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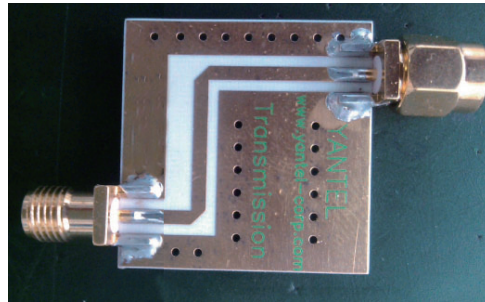
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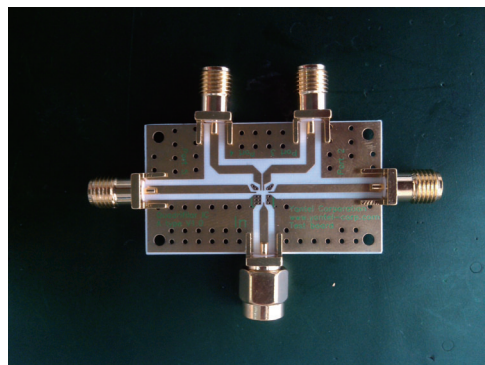
### Quadrifilar IC Soldering, Testing and Calculation Instructions

First, transmission board is used to connect to VNA and calculate its IL.

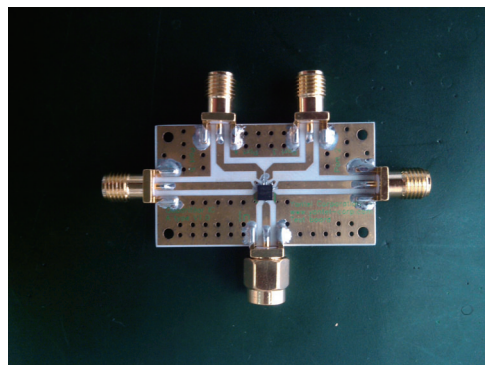


Transmission Board

Second, use Yantel EVB or customers' designed PCB and follow soldering instructions by soldering ports to right footprint pads.



EVB



EVB with part mounted on

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### Quadrifilar Directional Coupler

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#### Test Method

	S-Parameter[dB]	Power Method[dB]
Output1	S21	$10 \cdot \log \left( \frac{P_{Out1}}{P_{in}} \right)$
Output2	S31	$10 \cdot \log \left( \frac{P_{Out2}}{P_{in}} \right)$
Output3	S41	$10 \cdot \log \left( \frac{P_{Out3}}{P_{in}} \right)$
Output4	S51	$10 \cdot \log \left( \frac{P_{Out4}}{P_{in}} \right)$
Insertion Loss		$10 \cdot \log \left( \frac{P_{in}}{P_{Out1} P_{Out2} P_{Out3} P_{Out4}} \right)$
Amplitude Balance		$10 \cdot \log \left( \frac{P_{Out1} \sim P_{Out4}}{\frac{P_{Out1} P_{Out2} P_{Out3} P_{Out4}}{4}} \right)$
Isolation1	S23	$10 \cdot \log \left( \frac{P_{Out3}}{P_{Out2}} \right)$
Isolation2	S24	$10 \cdot \log \left( \frac{P_{Out4}}{P_{Out2}} \right)$
Isolation3	S25	$10 \cdot \log \left( \frac{P_{Out5}}{P_{Out2}} \right)$
Isolation4	S34	$10 \cdot \log \left( \frac{P_{Out4}}{P_{Out3}} \right)$
Isolation5	S35	$10 \cdot \log \left( \frac{P_{Out5}}{P_{Out3}} \right)$
Isolation6	S45	$10 \cdot \log \left( \frac{P_{Out5}}{P_{Out4}} \right)$
Phase Balance1(0°)	Phase <sub>(S21)</sub>	
Phase Balance2(-90°)	Phase <sub>(S31)</sub> -Phase <sub>(S21)</sub>	
Phase Balance3(-180°)	Phase <sub>(S41)</sub> -Phase <sub>(S21)</sub>	
Phase Balance4(-270°)	Phase <sub>(S51)</sub> -Phase <sub>(S21)</sub>	

$P_{in}$  : Power of Input Port1       $P_{Out1}$  : Power of Output Port2  
 $P_{Out2}$  : Power of Output Port3       $P_{Out3}$  : Power of Output Port4  
 $P_{Out4}$  : Power of Output Port5

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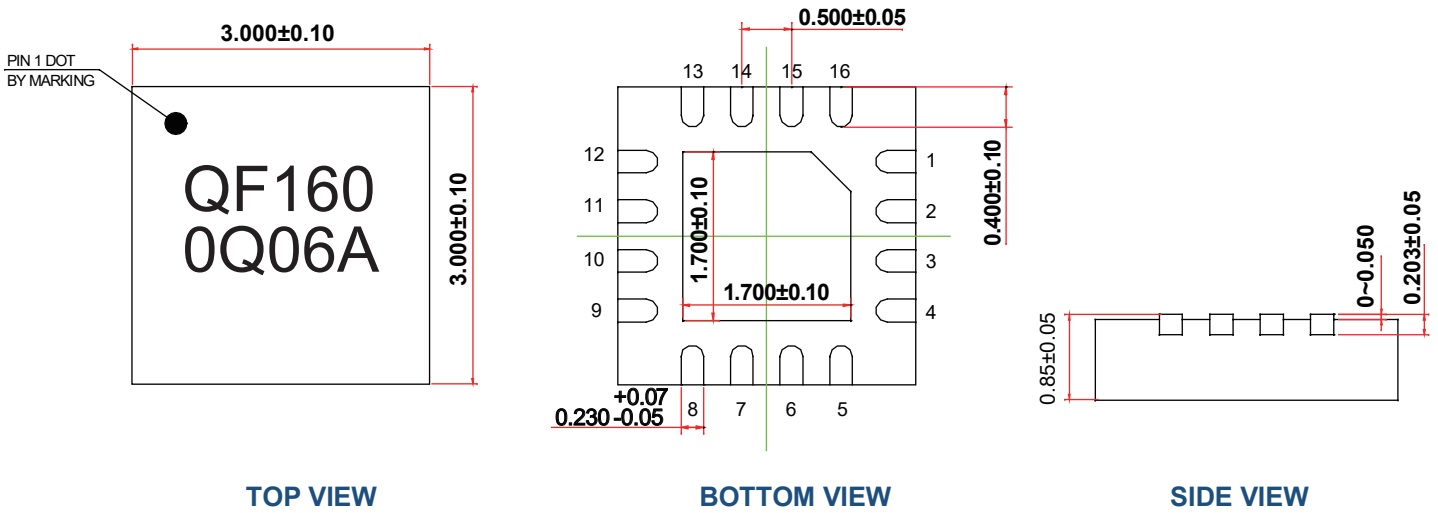
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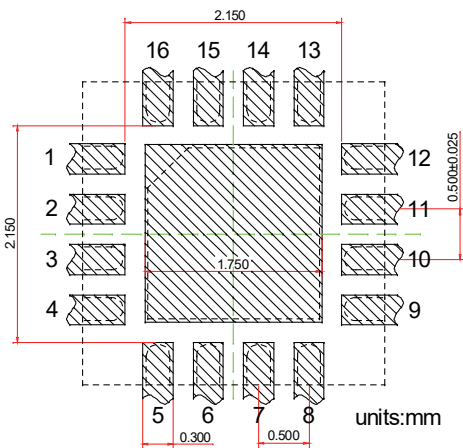
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## Outline Drawing



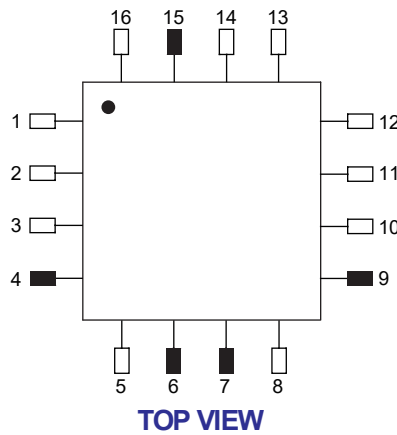
## Land Pattern



Recommended Land Pattern  
Top View

**Notes:** All dimensions show in millimeters

## Pin Out



**Notes:**

1. Require to add Capacitors of DC Blocker between Pins (with black color) and external circuit to prevent DC signal entry to guarantee normal work.
2. This part has passed through 100% RF test.

Pin #	Connection
1	NC
2	GND
3	NC
4	PORT 2(-6dB, 0°)
5	GND
6	PORT 3(-6dB, -90°)
7	PORT 4(-6dB, -180°)
8	GND
9	PORT 5(-6dB, -270°)
10	NC
11	NC
12	NC
13	GND
14	GND
15	PORT 1(Input)
16	GND
Center Pad	GND

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