

# Preliminary Data Sheet

## QF2100F06B

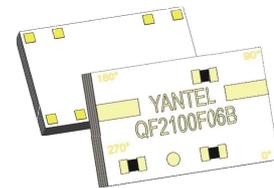
Quadrifilar Directional Coupler

1980 MHz-2200 MHz



### Features

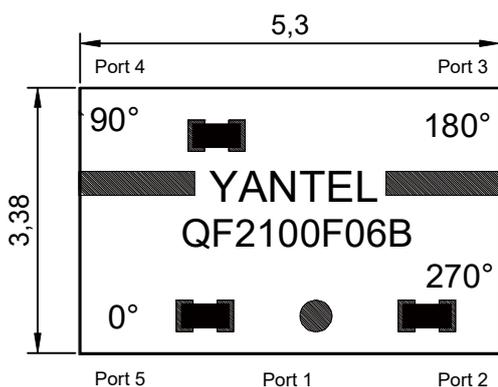
- Ultra Small Size (5.28×3.38mm)
- Excellent phase & amplitude balance
- Excellent repeatability
- Passive RF Component, no need external DC power supply
- Have one Input port and four Output ports that have -6dB -(0°, 90°, 180°, 270°) of phase difference
- Quadrifilar Coupler, 4-Phased Antenna Feeder, Helicaled Antenna Feeder
- Operating Temperature: -40°C to +105°C
- Tape & Reel



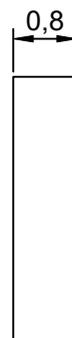
### Applications

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

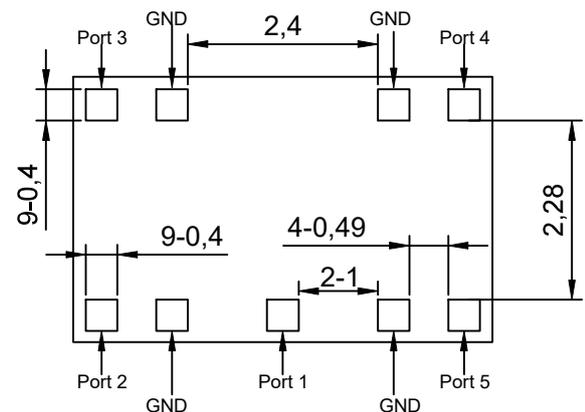
### Mechanical Outline



TOP VIEW



SIDE VIEW



BOTTOM VIEW

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

#### Mechanical Outline

- Dimensions are in Millimeters
- Tolerances are Non-Cumulative
- Dimension tolerance: ±0.20mm[±0.008inch]

### 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)
QF2100F06	1980-2200	5	5.28X3.38	15.0	0.70	22	90±9	±0.60

# Data Sheet

## QF2100F06B

### Quadrifilar Directional Coupler

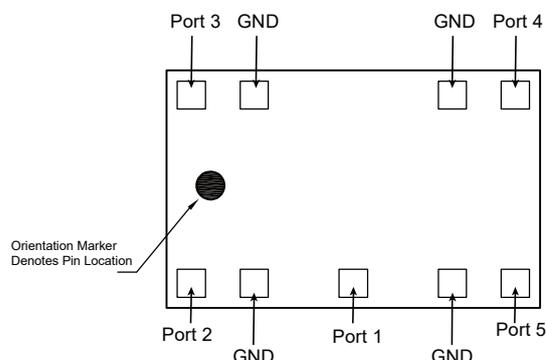
### 1980 MHz-2200 MHz



Rev A1.0

#### Hybrid Coupler Pin Configuration

The QF2100F06B has an orientation marker to denote Pin1. Once port one has been identified the other ports are known automatically. Please see the chart below for clarification:



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

#### Typical Performance Data (@25°C)

Frequency (MHz)	S21 (dB)	S31 (dB)	S41 (dB)	S51 (dB)	Amplitude Balance	Insertion Loss	Return Loss(dB)					VSWR				
							S11	S22	S33	S44	S55	S11	S22	S33	S44	S55
1980	-6.50	-6.86	-7.22	-6.21	0.54	-0.66	-21.56	-18.62	-20.97	-15.89	-17.91	1.18	1.27	1.20	1.38	1.29
1991	-6.48	-6.87	-7.22	-6.21	0.54	-0.66	-22.16	-18.61	-20.88	-15.92	-17.90	1.17	1.27	1.20	1.38	1.29
2002	-6.46	-6.87	-7.22	-6.21	0.55	-0.65	-22.78	-18.62	-20.78	-15.96	-17.87	1.16	1.27	1.20	1.38	1.29
2013	-6.45	-6.88	-7.21	-6.21	0.54	-0.65	-23.28	-18.66	-20.63	-16.02	-17.80	1.15	1.26	1.21	1.38	1.30
2024	-6.43	-6.89	-7.20	-6.23	0.53	-0.65	-23.46	-18.74	-20.41	-16.10	-17.68	1.14	1.26	1.21	1.37	1.30
2035	-6.42	-6.89	-7.20	-6.25	0.52	-0.65	-23.20	-18.81	-20.25	-16.24	-17.61	1.15	1.26	1.22	1.36	1.30
2046	-6.41	-6.89	-7.19	-6.28	0.51	-0.65	-22.75	-18.89	-20.12	-16.36	-17.57	1.16	1.26	1.22	1.36	1.31
2057	-6.39	-6.89	-7.18	-6.30	0.51	-0.65	-22.23	-18.98	-20.05	-16.46	-17.55	1.17	1.25	1.22	1.35	1.31
2068	-6.37	-6.89	-7.18	-6.32	0.51	-0.65	-21.96	-19.09	-20.09	-16.51	-17.55	1.17	1.25	1.22	1.35	1.31
2079	-6.34	-6.89	-7.18	-6.34	0.51	-0.65	-21.88	-19.16	-20.06	-16.55	-17.52	1.18	1.25	1.22	1.35	1.31
2090	-6.32	-6.89	-7.18	-6.36	0.51	-0.65	-22.01	-19.25	-20.04	-16.59	-17.46	1.17	1.24	1.22	1.35	1.31
2101	-6.30	-6.90	-7.19	-6.38	0.52	-0.65	-22.35	-19.39	-20.01	-16.64	-17.37	1.17	1.24	1.22	1.35	1.31
2112	-6.28	-6.90	-7.19	-6.40	0.51	-0.66	-22.80	-19.48	-19.87	-16.74	-17.24	1.16	1.24	1.23	1.34	1.32
2123	-6.27	-6.91	-7.19	-6.42	0.51	-0.66	-23.21	-19.60	-19.75	-16.88	-17.14	1.15	1.23	1.23	1.33	1.32
2134	-6.26	-6.91	-7.19	-6.43	0.51	-0.66	-23.55	-19.72	-19.64	-17.03	-17.06	1.14	1.23	1.23	1.33	1.33
2145	-6.24	-6.91	-7.18	-6.45	0.50	-0.66	-23.75	-19.79	-19.51	-17.16	-16.98	1.14	1.23	1.24	1.32	1.33
2156	-6.22	-6.92	-7.18	-6.47	0.50	-0.66	-23.70	-19.81	-19.51	-17.28	-16.98	1.14	1.23	1.24	1.32	1.33
2167	-6.21	-6.92	-7.18	-6.49	0.50	-0.66	-23.84	-19.78	-19.55	-17.37	-16.98	1.14	1.23	1.24	1.31	1.33
2178	-6.20	-6.92	-7.18	-6.51	0.49	-0.66	-24.13	-19.76	-19.60	-17.45	-16.98	1.13	1.23	1.23	1.31	1.33
2189	-6.18	-6.92	-7.17	-6.53	0.50	-0.66	-24.53	-19.78	-19.65	-17.51	-16.99	1.13	1.23	1.23	1.31	1.33
2200	-6.17	-6.93	-7.17	-6.55	0.52	-0.67	-25.34	-19.83	-19.59	-17.60	-17.00	1.11	1.23	1.23	1.30	1.33

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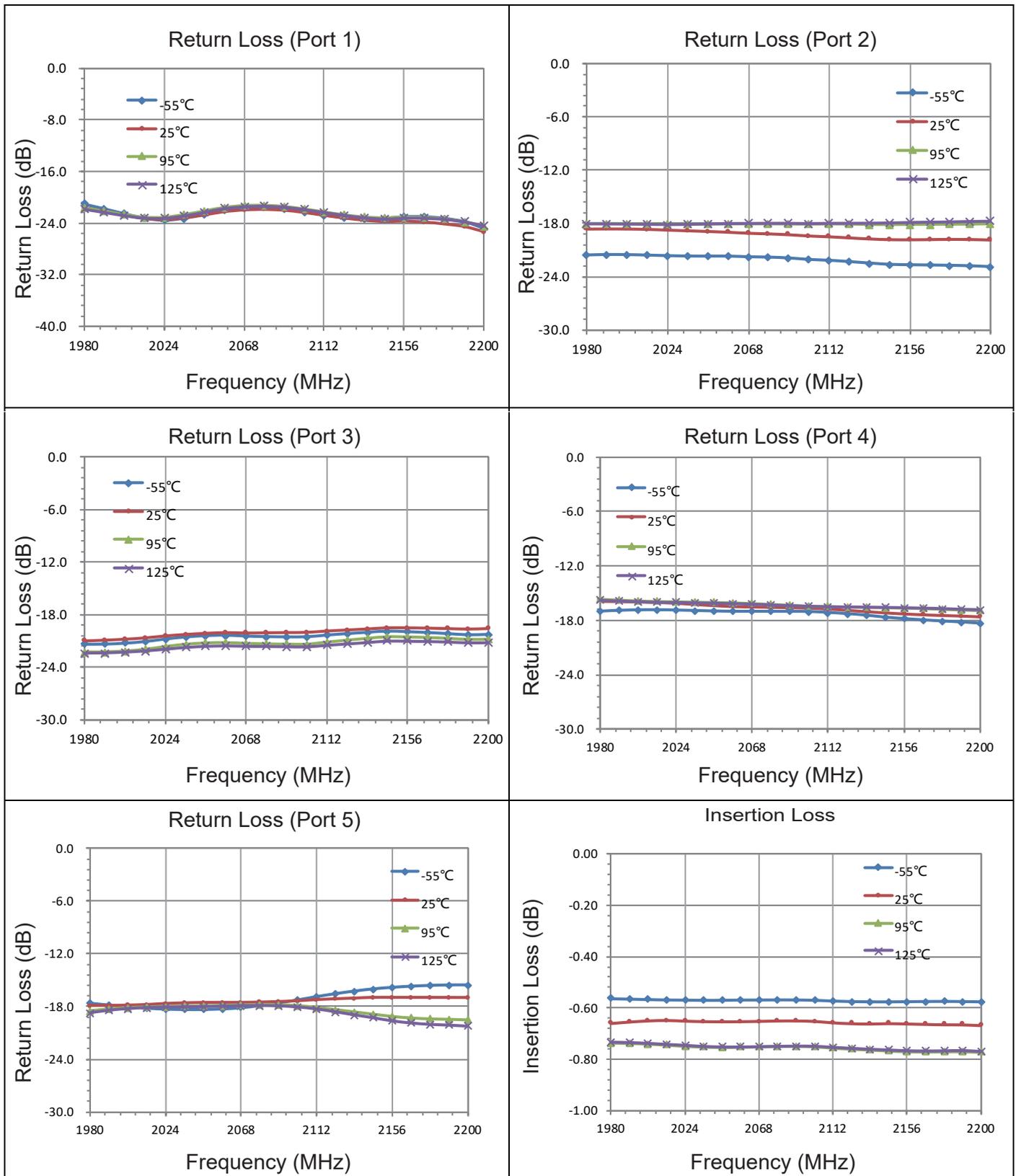
## QF2100F06B

Quadrifilar Directional Coupler  
1980 MHz-2200 MHz



Rev A1.0

### Typical Performance (-55°C,25°C,95°C,125°C: 1980-2200 MHz)



# Data Sheet

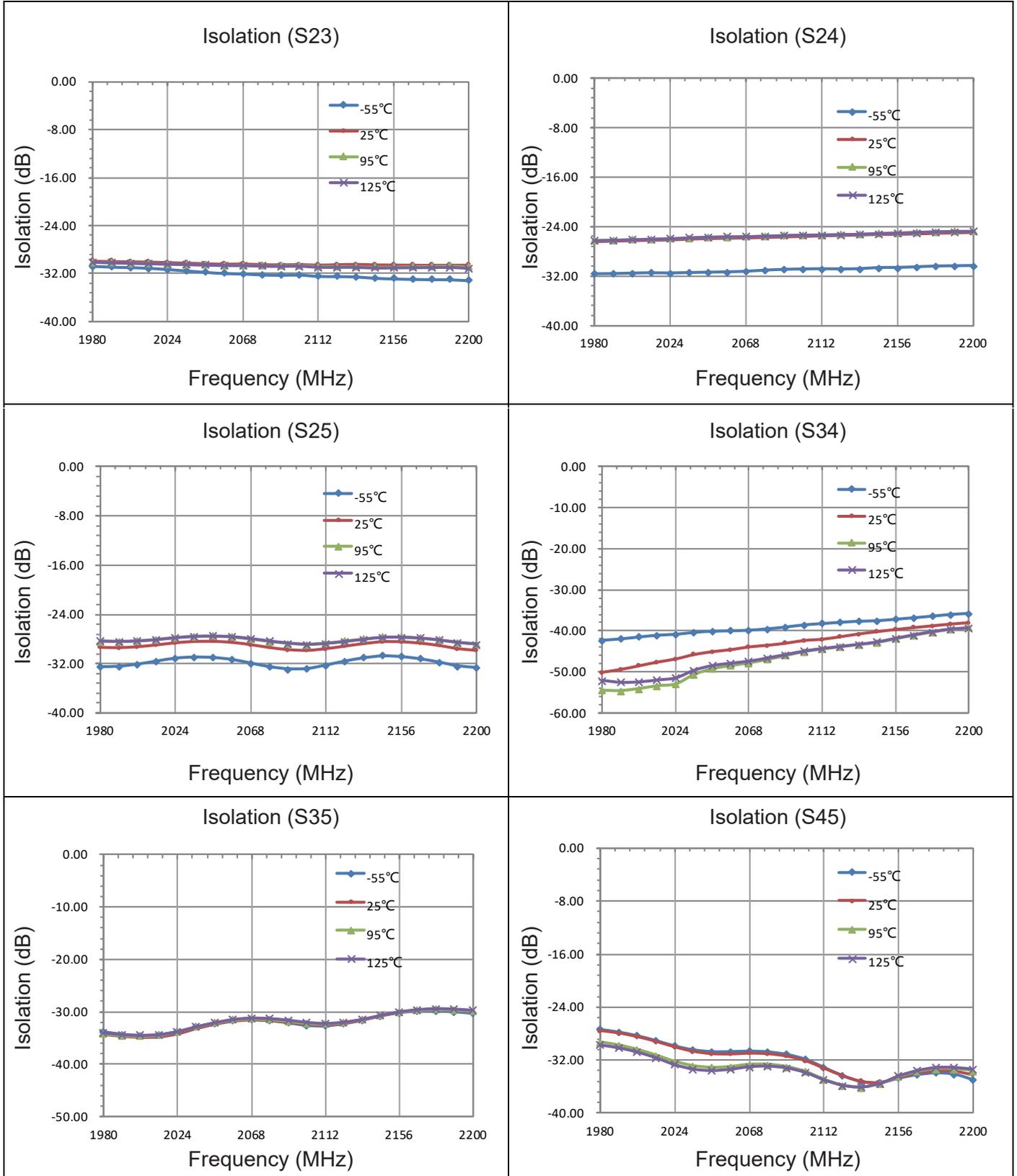
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### Typical Performance (-55°C,25°C,95°C,125°C: 1980-2200 MHz)



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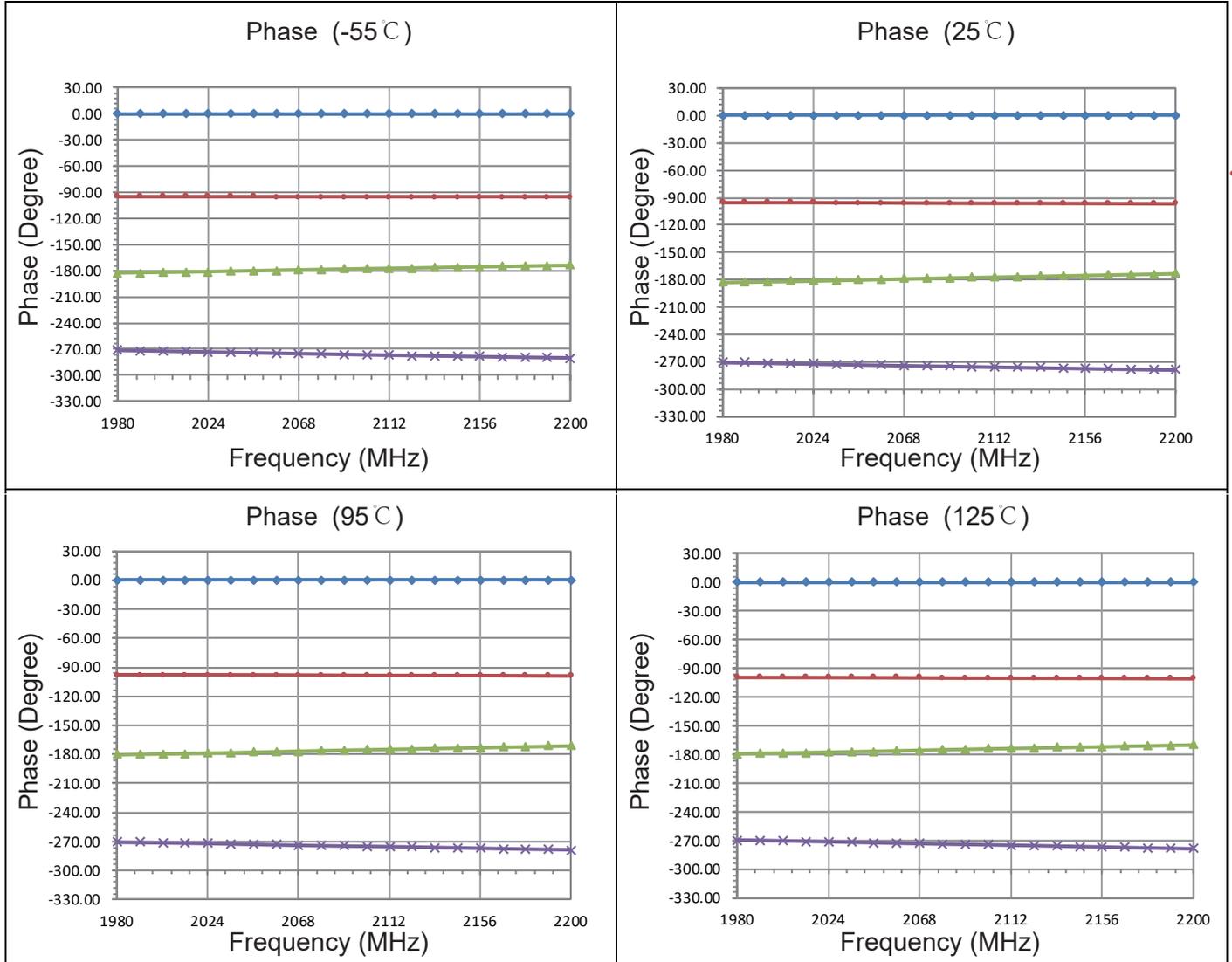
## QF2100F06B

Quadrifilar Directional Coupler  
1980 MHz-2200 MHz



Rev A1.0

### Typical Performance (-55°C, 25°C, 95°C, 125°C: 1980-2200 MHz)



# Data Sheet

## QF1600F06

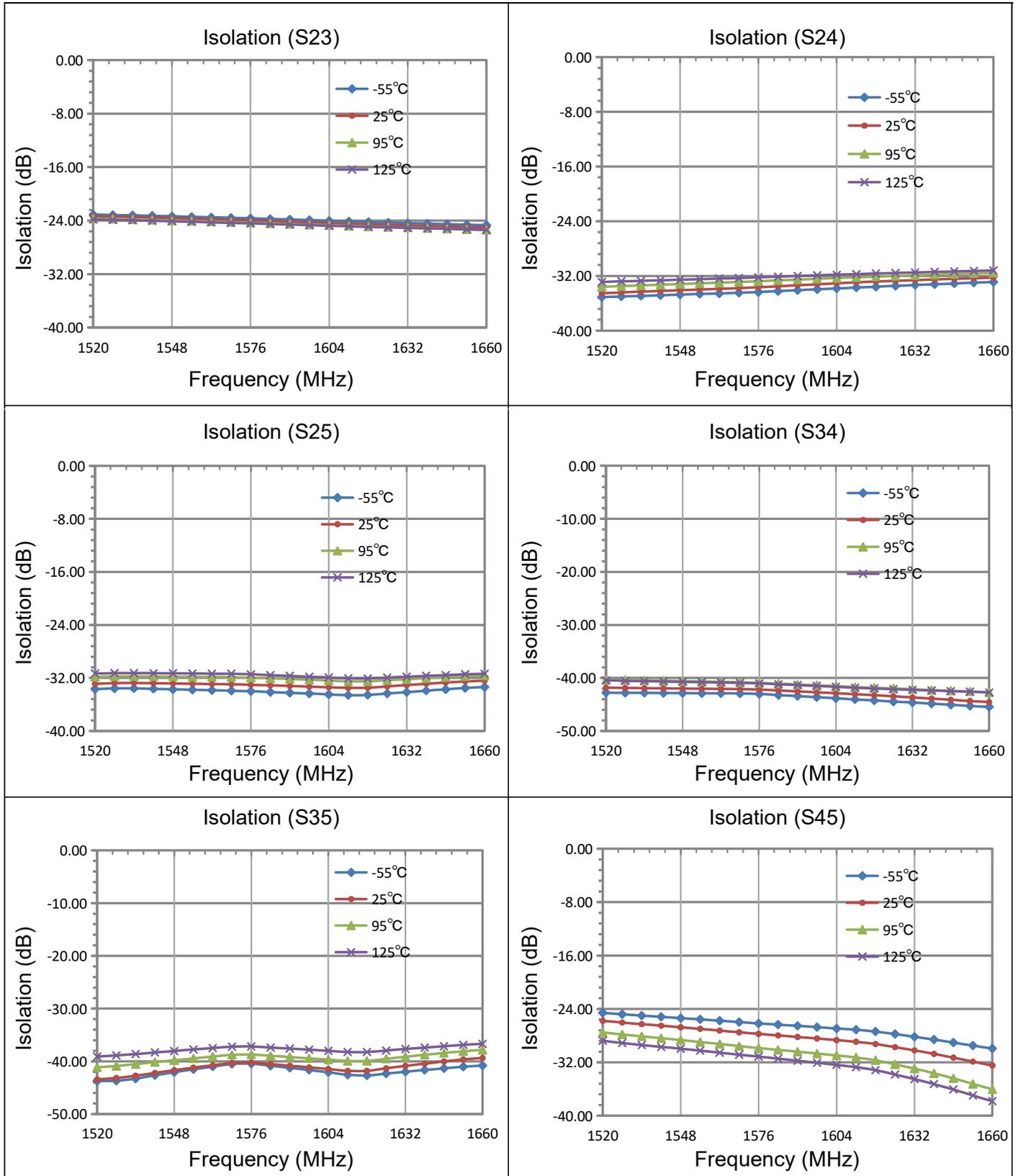
### Quadrifilar Directional Coupler

### 1520 MHz-1660 MHz



Rev A1.0

#### Typical Performance (-55°C,25°C,95°C,125°C: 1520-1660 MHz)



# Data Sheet

## QF1600F06

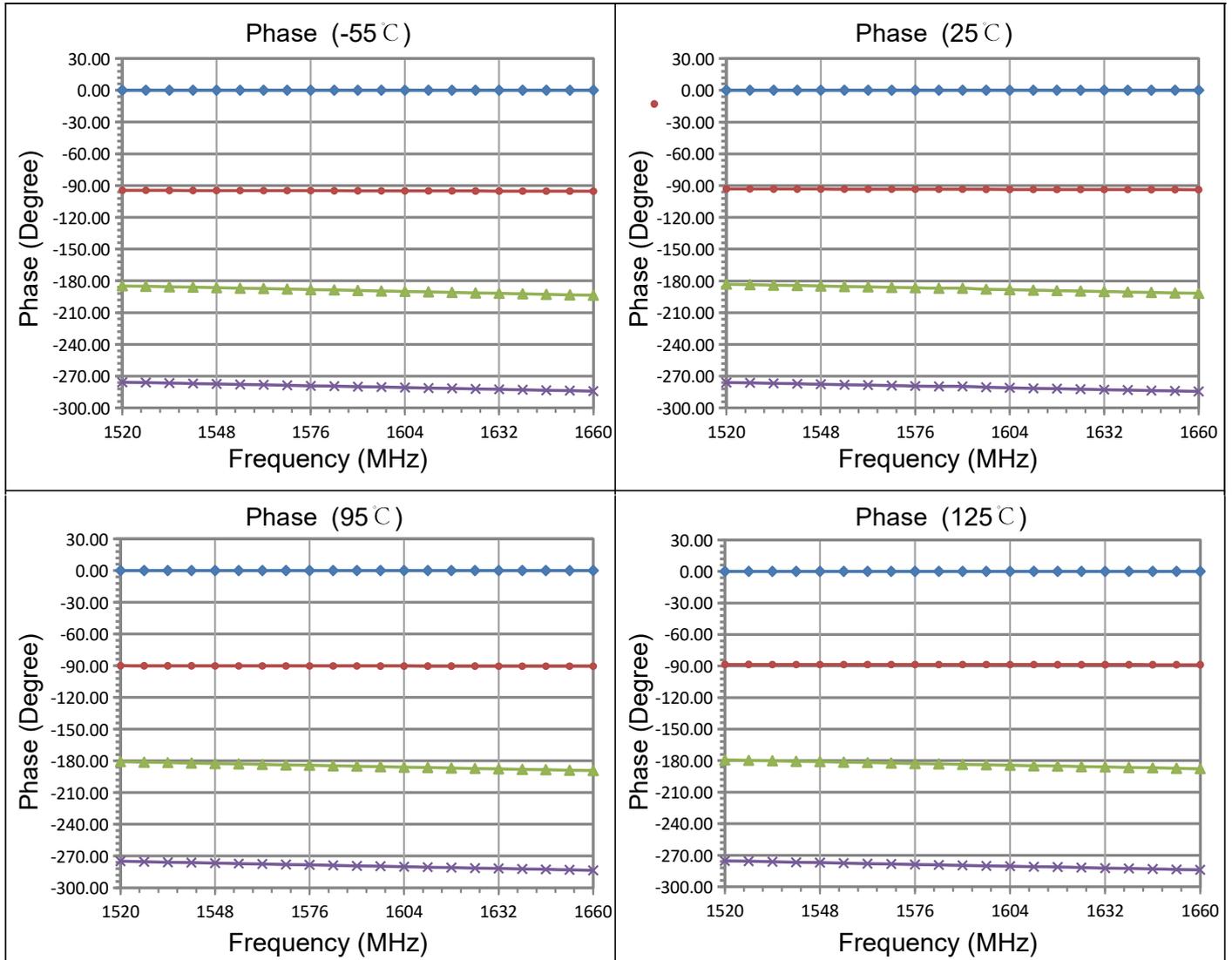
### Quadrifilar Directional Coupler

### 1520 MHz-1660 MHz



Rev A1.0

#### Typical Performance (-55°C, 25°C, 95°C, 125°C: 1520-1660 MHz)



# Data Sheet

## QF2100F06B

Quadrifilar Directional Coupler  
1980 MHz-2200 MHz



Rev A1.0

### Definition of Measured Specifications

	S-Parameter(dB)	Power Method[dB]
Output 1	S <sub>21</sub>	$10 \cdot \log \left( \frac{P_{out1}}{P_{in}} \right)$
Output 2	S <sub>31</sub>	$10 \cdot \log \left( \frac{P_{out2}}{P_{in}} \right)$
Output 3	S <sub>41</sub>	$10 \cdot \log \left( \frac{P_{out3}}{P_{in}} \right)$
Output 4	S <sub>51</sub>	$10 \cdot \log \left( \frac{P_{out4}}{P_{in}} \right)$
Insertion Loss		$10 \cdot \log \left( \frac{P_{in}}{P_{out1+out2+out3+out4}} \right)$
Amplitude Balance		$10 \cdot \log \left( \frac{P_{out1-out4}}{P_{out1+out2+out3+out4} / 2} \right)$
Isolation 1	S <sub>23</sub>	$10 \cdot \log \left( \frac{P_{out3}}{P_{out2}} \right)$
Isolation 2	S <sub>24</sub>	$10 \cdot \log \left( \frac{P_{out4}}{P_{out2}} \right)$
Isolation 3	S <sub>25</sub>	$10 \cdot \log \left( \frac{P_{out5}}{P_{out2}} \right)$
Isolation 4	S <sub>34</sub>	$10 \cdot \log \left( \frac{P_{out4}}{P_{out3}} \right)$
Isolation 5	S <sub>35</sub>	$10 \cdot \log \left( \frac{P_{out5}}{P_{out3}} \right)$
Isolation 6	S <sub>45</sub>	$10 \cdot \log \left( \frac{P_{out5}}{P_{out4}} \right)$
Phase Balance 1(0°)	Phase (S <sub>21</sub> )	
Phase Balance 2(-90°)	Phase (S <sub>31</sub> ) -Phase (S <sub>21</sub> )	
Phase Balance 2(-180°)	Phase (S <sub>41</sub> ) -Phase (S <sub>21</sub> )	
Phase Balance 2(-270°)	Phase (S <sub>51</sub> ) -Phase (S <sub>21</sub> )	

P<sub>in</sub> : Power of Input Port1

P<sub>out1</sub>: Power of output Port2

P<sub>out2</sub>: Power of output Port3

P<sub>out3</sub>: Power of output Port4

P<sub>out4</sub>: Power of output Port5

# Data Sheet

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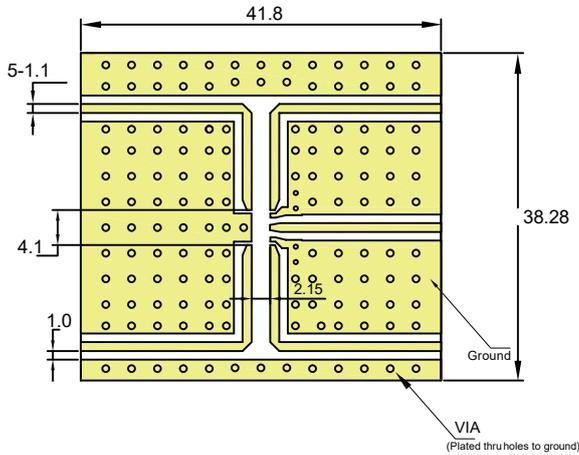
### Quadrifilar Directional Coupler

### 1980 MHz-2200 MHz



Rev A1.0

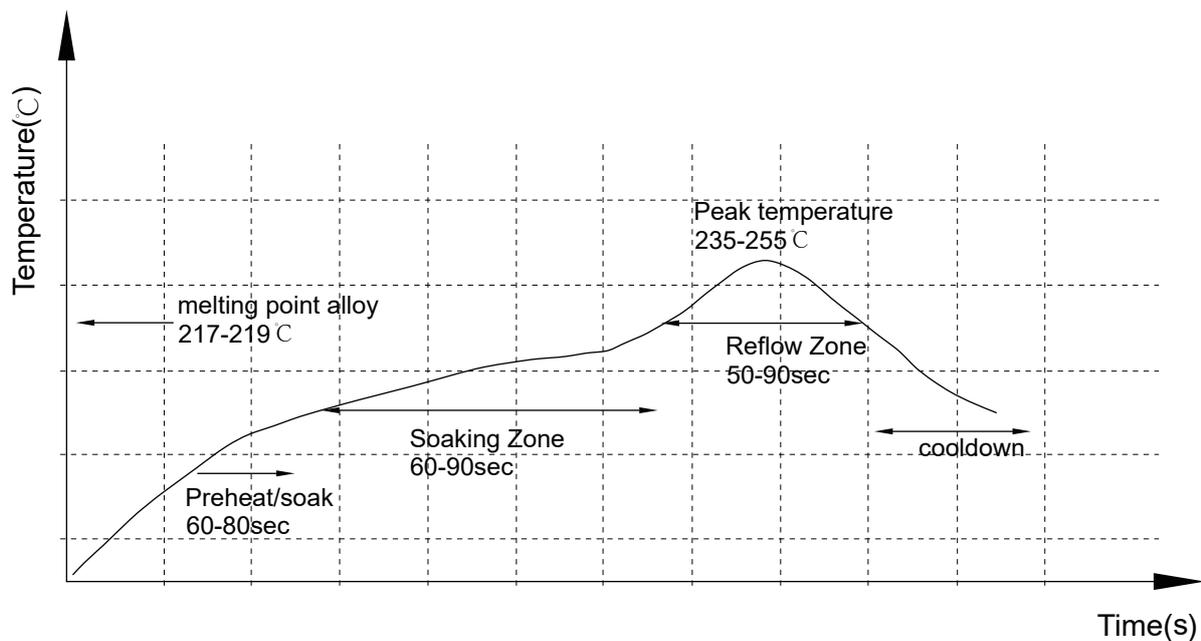
#### Recommended PCB Layout



#### NOTE:

1. 50Ω line width is shown above designing from  $\epsilon_r=3.66$  THK=0.508mm copper 0.5 OZ
2. Bottom side of the PCB is continuous ground plane.
3. All dimensions shown in mm [inch].

#### Reflow Profile



# Data Sheet

## QF2100F06B

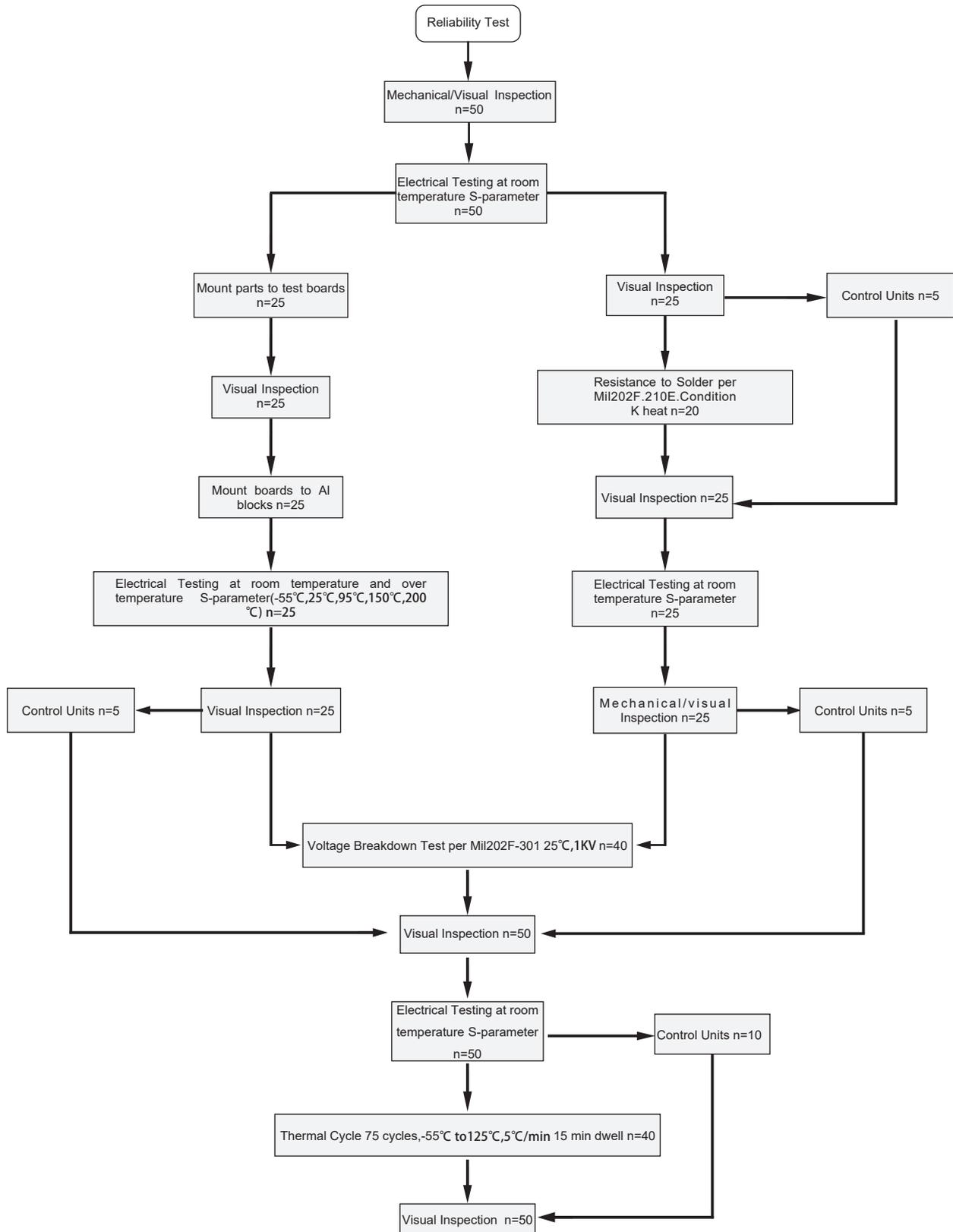
### Quadrifilar Directional Coupler

### 1980 MHz-2200 MHz



Rev A1.0

#### Reliability Test Flow



# Data Sheet

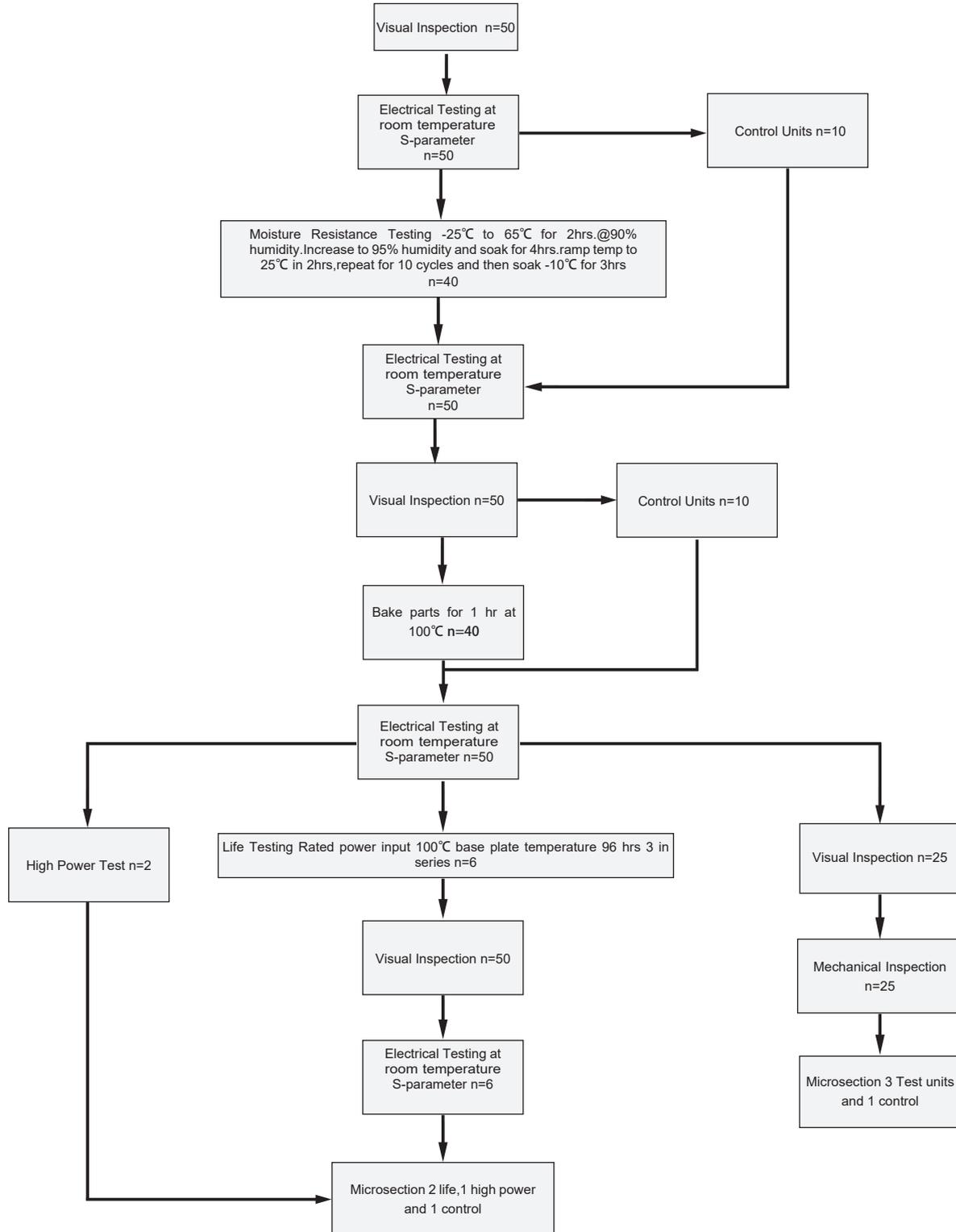
## QF2100F06B

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Rev A1.0

### Reliability Test Flow



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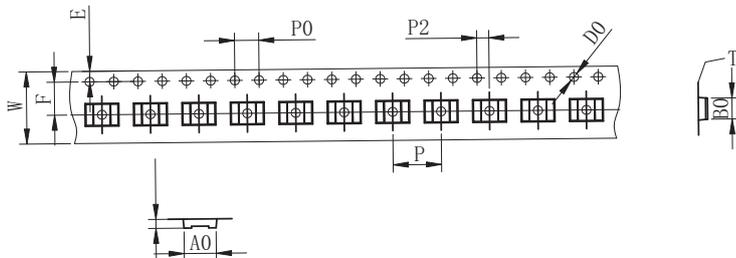
Quadrifilar Directional Coupler  
1980 MHz-2200 MHz



Rev A1.0

### Tape and Reel Drawing

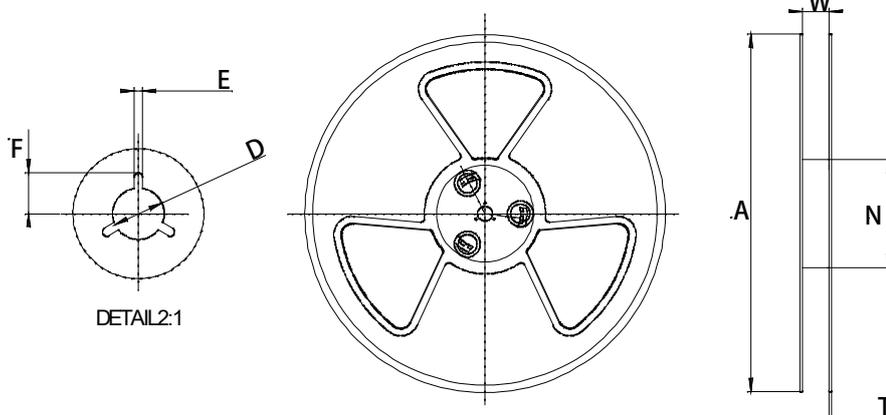
Feeding Direction



ITEM	W	A0	B0	K0	K1	P	F	E	D	P0	P2	t	13°
DIM	12.0	5.6	3.7	1.00		8	5.5	1.75	1.50	4.00	2.00	0.3	长度/盘 元件/盘
TOLE	+0.30 -0.30	+0.10 -0.10	+0.10 -0.00	+0.10 -0.10	+0.10 -0.10	+0.05 -0.05	55M 6000 PCS						

Notice:

- A. 10 Sprocket hole pitch cumulative tolerance is 0.2mm.
- B. Carrier camber shall be not more than 1mm per 100mm through a length of 250mm.
- C. All dimensions meet EIA-418-B requirements.
- D. A0 & B0 measured as indicated.
- E. K0 measured from a place on the inside bottom of the pocket to top surface of carrier.
- F. Material: PE 100
- G. Thickness: 0.30±0.05mm
- H. 1000 units (maximum) / T&R



Symbol	Dimensions(mm)
W	12.5±0.4
A	177±0.5
N	63±0.3
T	1.8±0.2
E	2.1±0.3
F	10.75±0.3
D	13.5+0.5/-0.2

