

Data Sheet

QF1400W06B

Quadrifilar Directional Coupler

1165 MHz- 1300 MHz

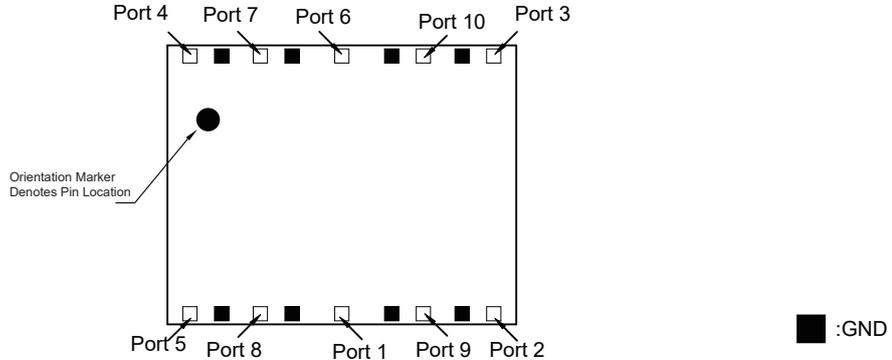
1520 MHz- 1660 MHz



Rev A1.0

Hybrid Coupler Pin Configuration

The QF1400W06B 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:



1520MHz-1660MHz	Port 1	Port 2	Port 3	Port 4	Port 5
	Input1	Output1 -6dB, 0°	Output2 -6dB, -90°	Output3 -6dB, -180°	Output4 -6dB, -270°
1165MHz-1300MHz	Port 6	Port 7	Port 8	Port 9	Port 10
	Input2	Output7 -6dB, 0°	Output8 -6dB, -90°	Output9 -6dB, -180°	Output10 -6dB, -270°

Typical Performance Data (@25°C)

Frequency (MHz)	S21 (dB)	S31 (dB)	S41 (dB)	S51 (dB)	Amplitude Balance	Insertion Loss	Return Loss(dB)				
							S11	S22	S33	S44	S55
1165	-6.56	-7.14	-7.24	-6.76	0.35	-0.89	-29.01	-31.23	-25.15	-21.98	-26.03
1172	-6.55	-7.14	-7.23	-6.77	0.37	-0.90	-29.35	-30.96	-24.93	-22.06	-25.82
1179	-6.54	-7.14	-7.23	-6.79	0.38	-0.90	-29.83	-30.84	-24.75	-22.20	-25.59
1186	-6.53	-7.15	-7.23	-6.81	0.39	-0.90	-30.36	-30.74	-24.59	-22.33	-25.35
1193	-6.52	-7.15	-7.22	-6.82	0.40	-0.90	-31.01	-30.74	-24.56	-22.44	-25.10
1200	-6.51	-7.15	-7.22	-6.84	0.41	-0.90	-31.72	-30.75	-24.52	-22.55	-24.86
1207	-6.50	-7.15	-7.22	-6.85	0.42	-0.90	-32.37	-30.83	-24.64	-22.61	-24.66
1214	-6.49	-7.15	-7.22	-6.87	0.43	-0.90	-33.07	-30.90	-24.76	-22.68	-24.47
1221	-6.48	-7.15	-7.22	-6.89	0.44	-0.90	-33.71	-30.84	-24.88	-22.75	-24.30
1228	-6.48	-7.15	-7.22	-6.91	0.45	-0.91	-34.39	-30.74	-25.01	-22.83	-24.14
1235	-6.47	-7.15	-7.22	-6.93	0.46	-0.91	-34.84	-30.62	-25.08	-22.89	-23.98
1242	-6.46	-7.15	-7.22	-6.94	0.47	-0.91	-35.19	-30.48	-25.14	-22.94	-23.82
1249	-6.46	-7.15	-7.22	-6.96	0.48	-0.92	-35.39	-30.25	-25.08	-23.02	-23.66
1256	-6.46	-7.15	-7.23	-6.98	0.49	-0.92	-35.48	-29.95	-24.93	-23.13	-23.49
1263	-6.45	-7.15	-7.23	-6.99	0.49	-0.92	-35.59	-29.71	-24.76	-23.24	-23.36
1270	-6.45	-7.15	-7.23	-7.00	0.50	-0.93	-35.73	-29.54	-24.55	-23.38	-23.27
1277	-6.45	-7.15	-7.23	-7.02	0.50	-0.93	-35.81	-29.40	-24.37	-23.52	-23.16
1284	-6.44	-7.15	-7.23	-7.03	0.51	-0.93	-35.72	-29.34	-24.21	-23.67	-23.04
1291	-6.44	-7.15	-7.24	-7.04	0.52	-0.94	-35.59	-29.29	-24.08	-23.81	-22.92
1298	-6.44	-7.15	-7.24	-7.05	0.52	-0.94	-35.18	-29.27	-24.05	-23.94	-22.81
1300	-6.44	-7.15	-7.24	-7.05	0.52	-0.94	-35.07	-29.27	-24.04	-23.97	-22.78

Frequency (MHz)	S21 (dB)	S31 (dB)	S41 (dB)	S51 (dB)	Amplitude Balance	Insertion Loss	Return Loss(dB)				
							S11	S22	S33	S44	S55
1520	-6.62	-6.73	-7.17	-6.27	0.49	-0.66	-19.01	-21.15	-26.22	-15.21	-17.66
1527	-6.60	-6.73	-7.17	-6.29	0.49	-0.66	-19.11	-21.09	-26.22	-15.17	-17.63
1534	-6.57	-6.73	-7.17	-6.30	0.49	-0.66	-19.23	-21.04	-26.26	-15.14	-17.62
1541	-6.55	-6.73	-7.17	-6.32	0.49	-0.66	-19.38	-21.01	-26.33	-15.10	-17.61
1548	-6.53	-6.73	-7.16	-6.33	0.48	-0.66	-19.54	-20.98	-26.42	-15.07	-17.60
1555	-6.51	-6.73	-7.16	-6.35	0.48	-0.66	-19.73	-20.94	-26.56	-15.04	-17.58
1562	-6.49	-6.73	-7.16	-6.37	0.48	-0.66	-19.91	-20.91	-26.72	-15.02	-17.55
1569	-6.47	-6.74	-7.16	-6.39	0.48	-0.66	-20.09	-20.88	-26.95	-15.01	-17.51
1576	-6.45	-6.74	-7.15	-6.41	0.48	-0.66	-20.26	-20.85	-27.18	-15.01	-17.47
1583	-6.43	-6.74	-7.15	-6.43	0.47	-0.66	-20.39	-20.80	-27.32	-15.01	-17.43
1590	-6.41	-6.74	-7.15	-6.45	0.47	-0.66	-20.53	-20.75	-27.47	-15.02	-17.40
1597	-6.39	-6.74	-7.15	-6.47	0.47	-0.66	-20.63	-20.66	-27.40	-15.01	-17.38
1604	-6.37	-6.75	-7.14	-6.49	0.47	-0.66	-20.73	-20.57	-27.33	-15.00	-17.35
1611	-6.35	-6.75	-7.14	-6.51	0.46	-0.66	-20.76	-20.51	-27.12	-15.00	-17.35
1618	-6.33	-6.75	-7.14	-6.53	0.46	-0.66	-20.79	-20.45	-26.89	-15.01	-17.35
1625	-6.32	-6.76	-7.14	-6.55	0.46	-0.66	-20.82	-20.42	-26.60	-15.01	-17.36
1632	-6.30	-6.76	-7.14	-6.57	0.46	-0.66	-20.85	-20.40	-26.30	-15.00	-17.38
1639	-6.28	-6.76	-7.15	-6.58	0.47	-0.66	-20.93	-20.40	-26.11	-15.01	-17.39
1646	-6.26	-6.76	-7.15	-6.59	0.47	-0.66	-21.05	-20.42	-26.00	-15.03	-17.39
1653	-6.24	-6.77	-7.15	-6.61	0.47	-0.66	-21.24	-20.43	-25.94	-15.06	-17.40
1660	-6.23	-6.77	-7.15	-6.62	0.47	-0.66	-21.55	-20.43	-25.92	-15.10	-17.41

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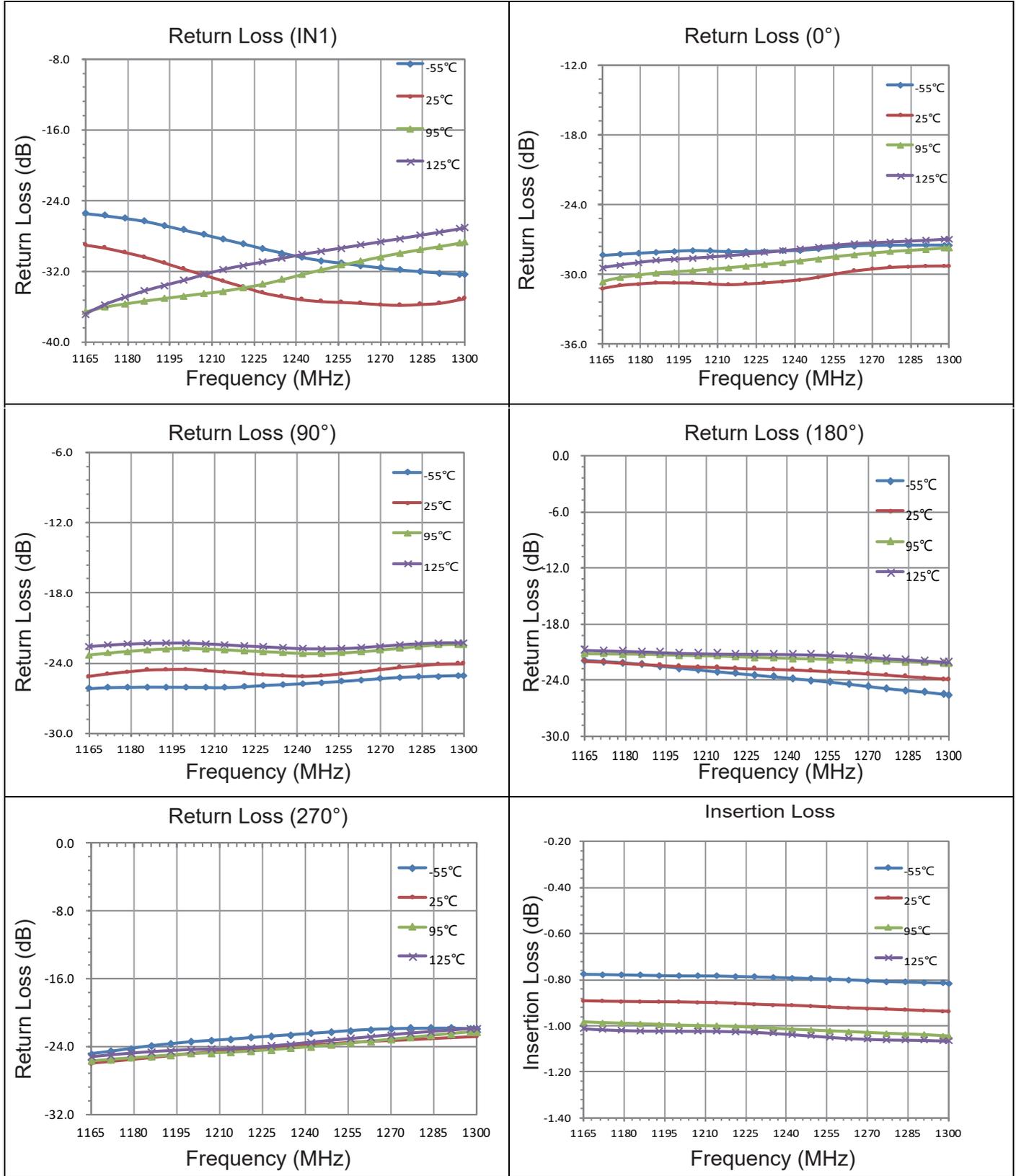
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Rev A1.0

Typical Performance (-55°C,25°C,95°C,125°C: 1165-1300 MHz)



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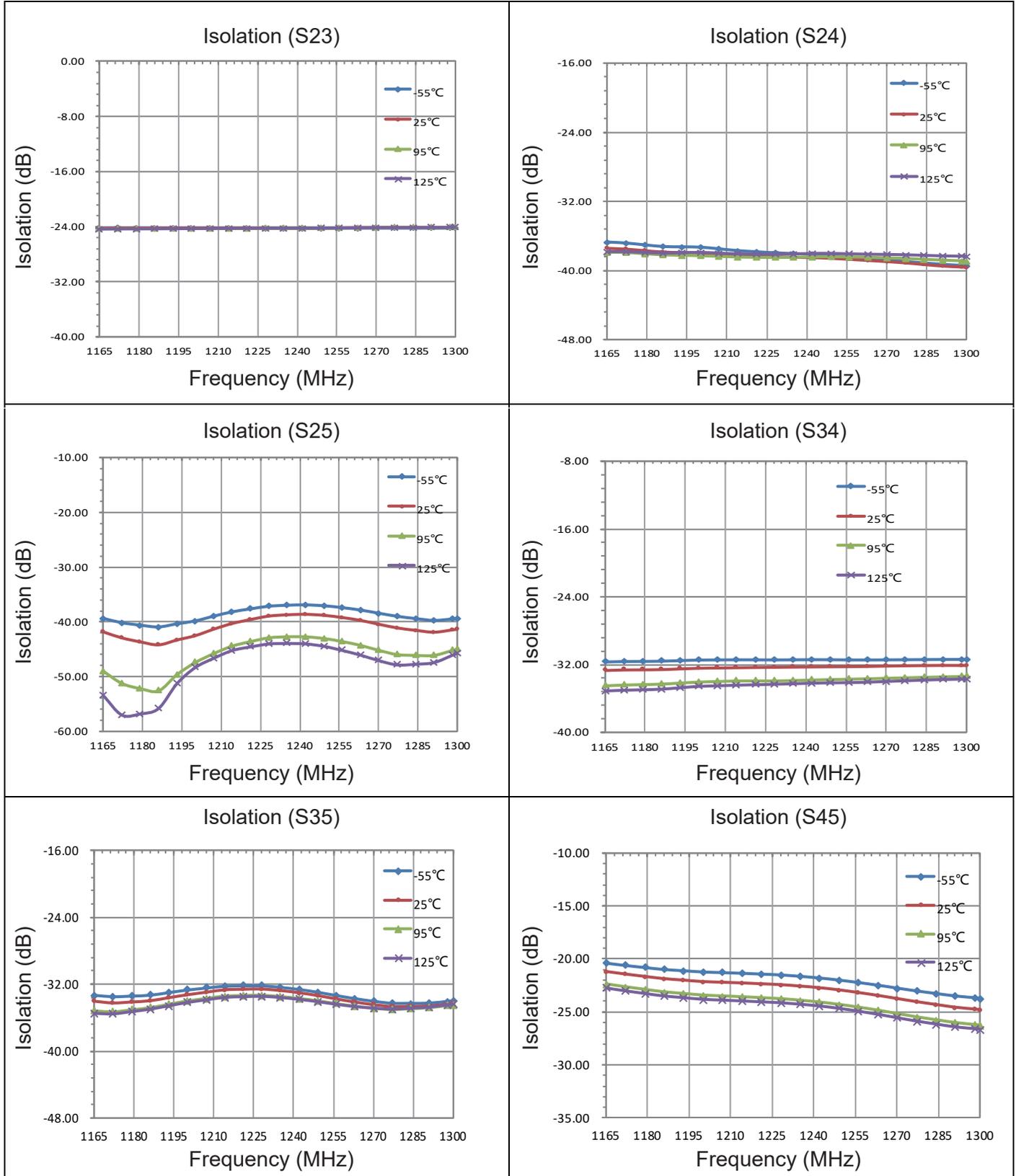
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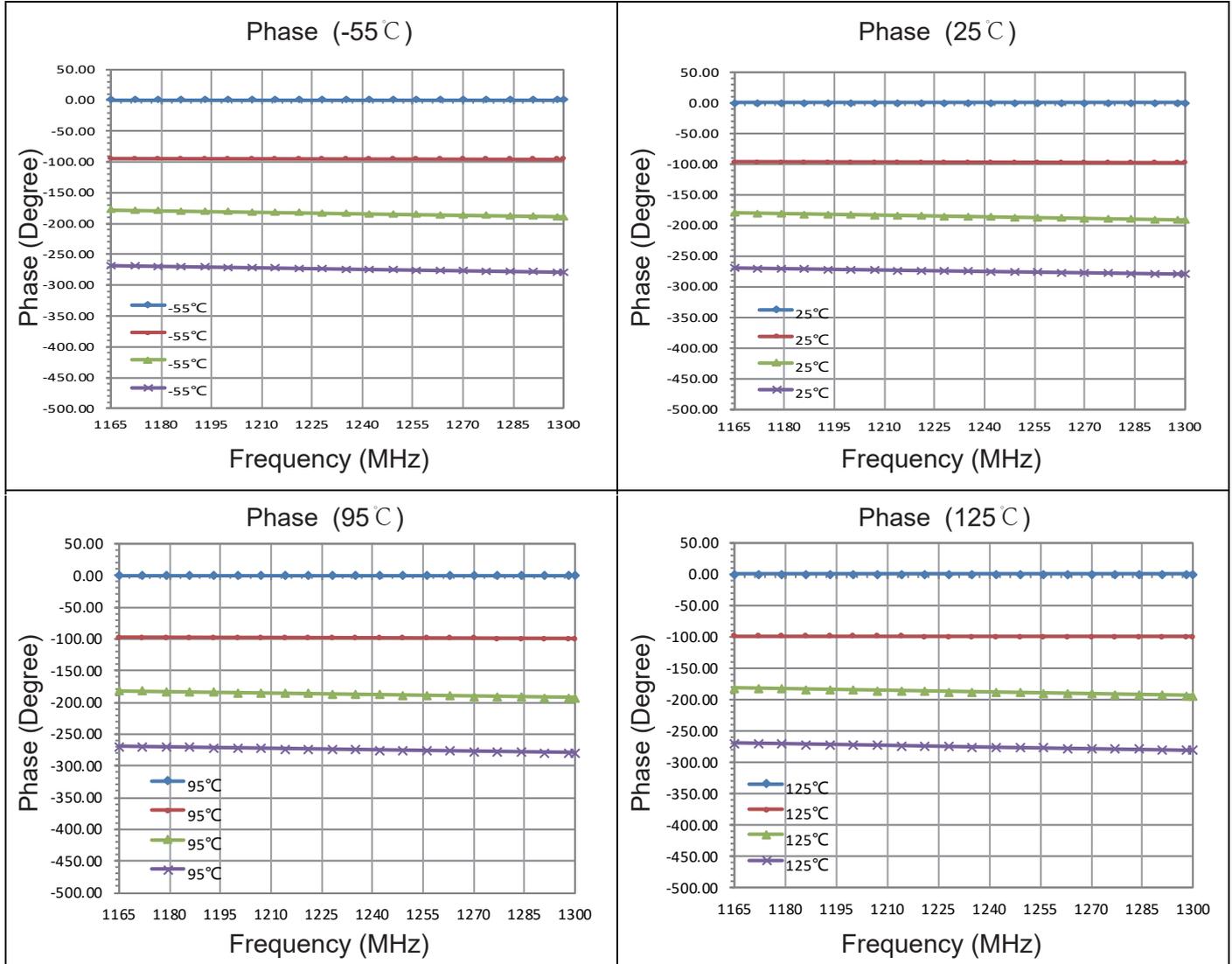
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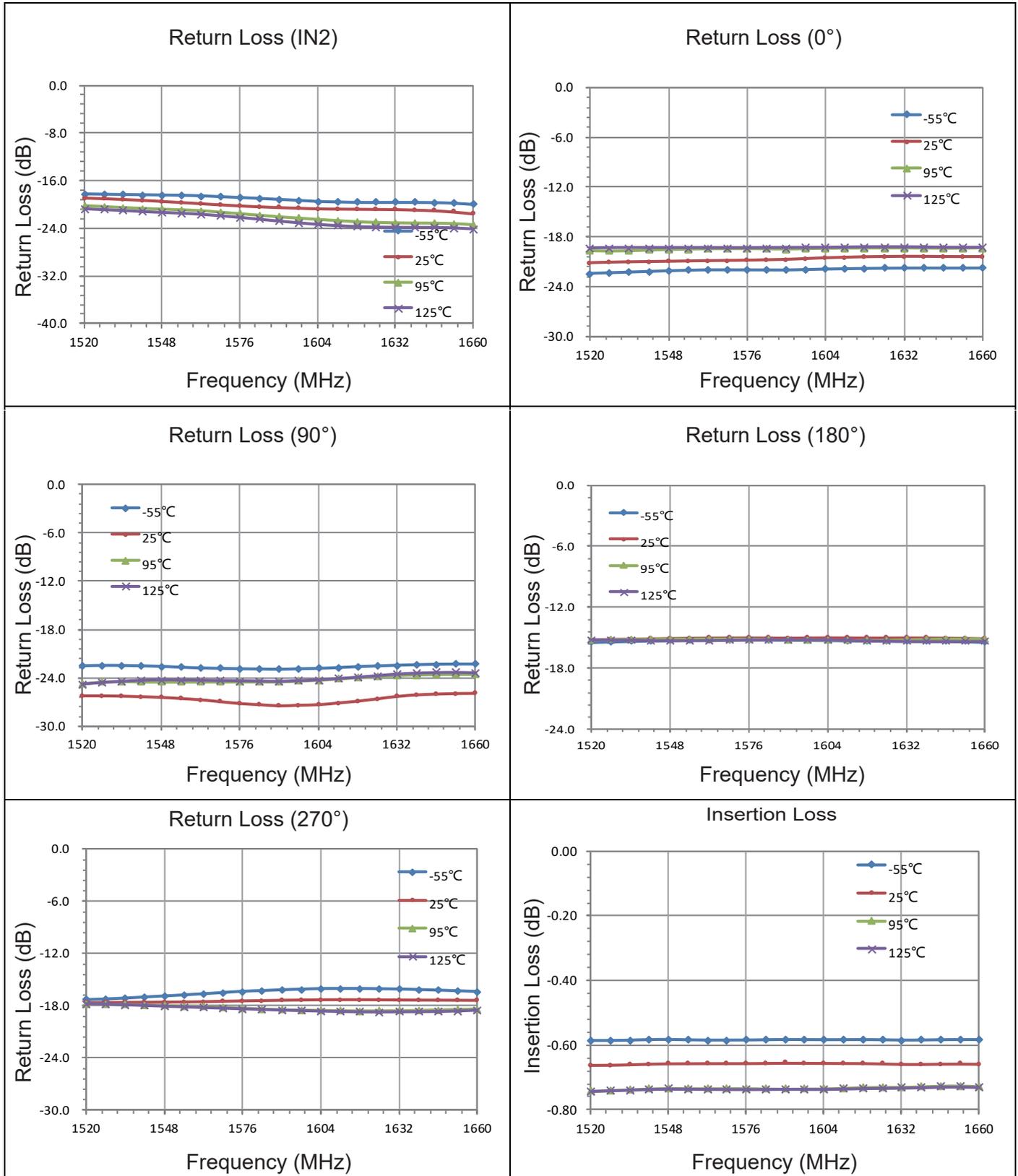
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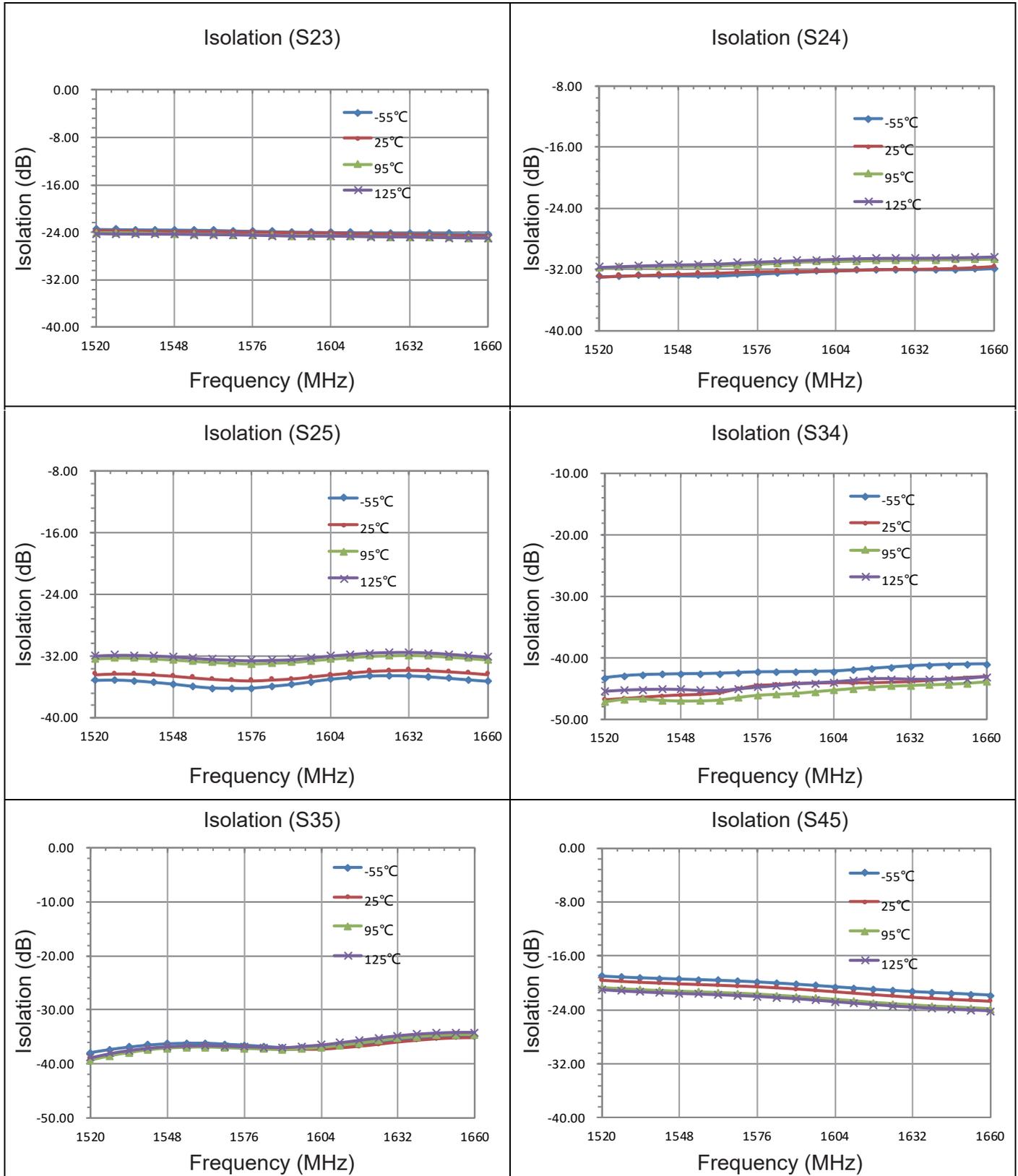
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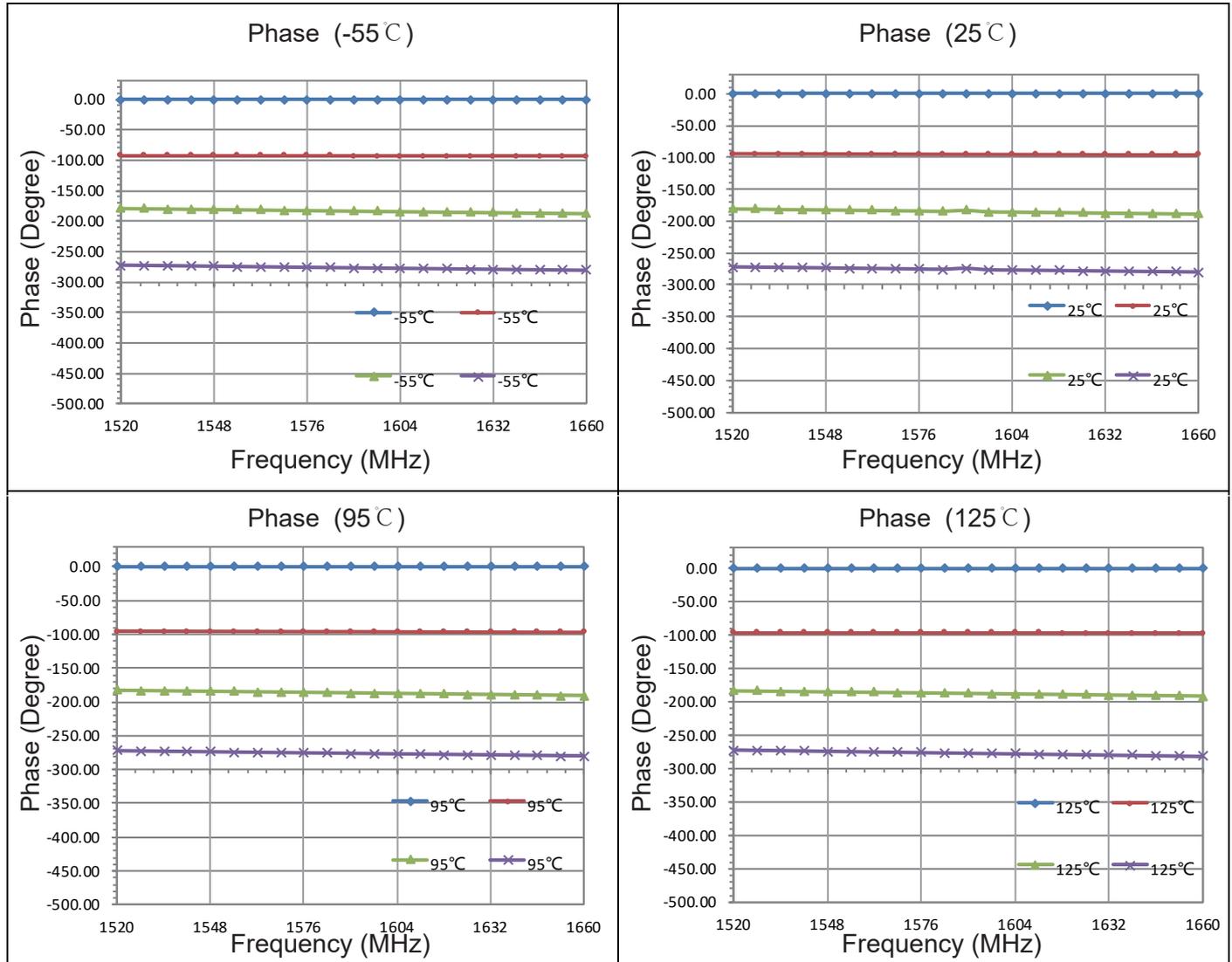
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Definition of Measured Specifications

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

P_{in} : Power of Input Port1
P_{out2}: Power of output Port3
P_{out4}: Power of output Port5

P_{out1}: Power of output Port2
P_{out3}: Power of output Port4

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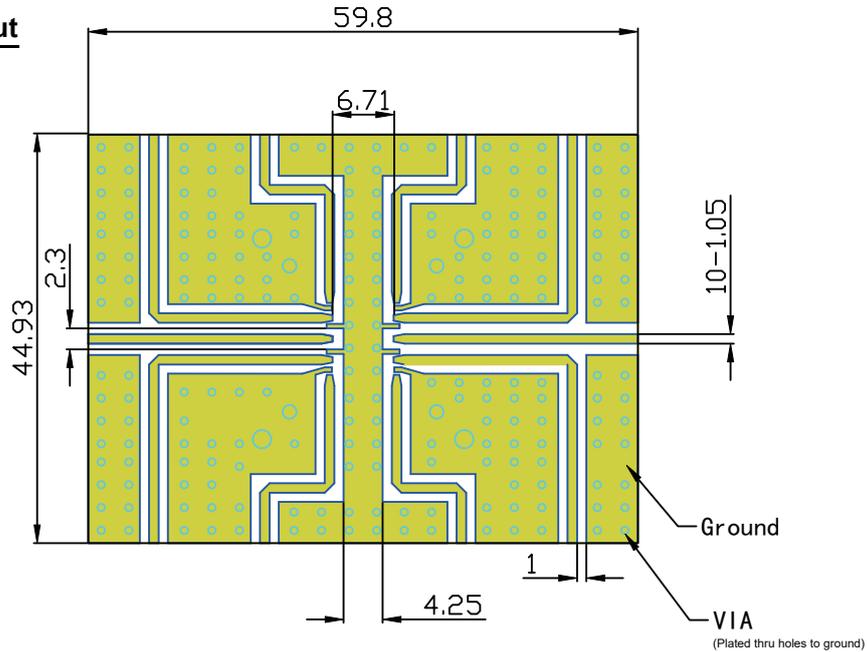
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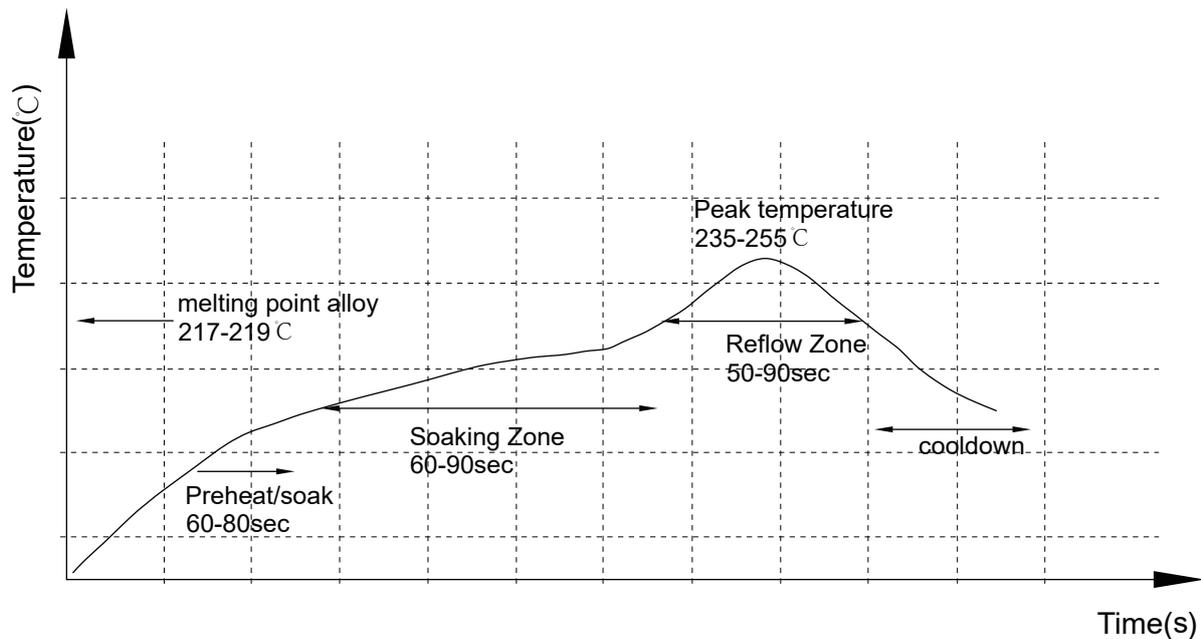
Recommended PCB Layout



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



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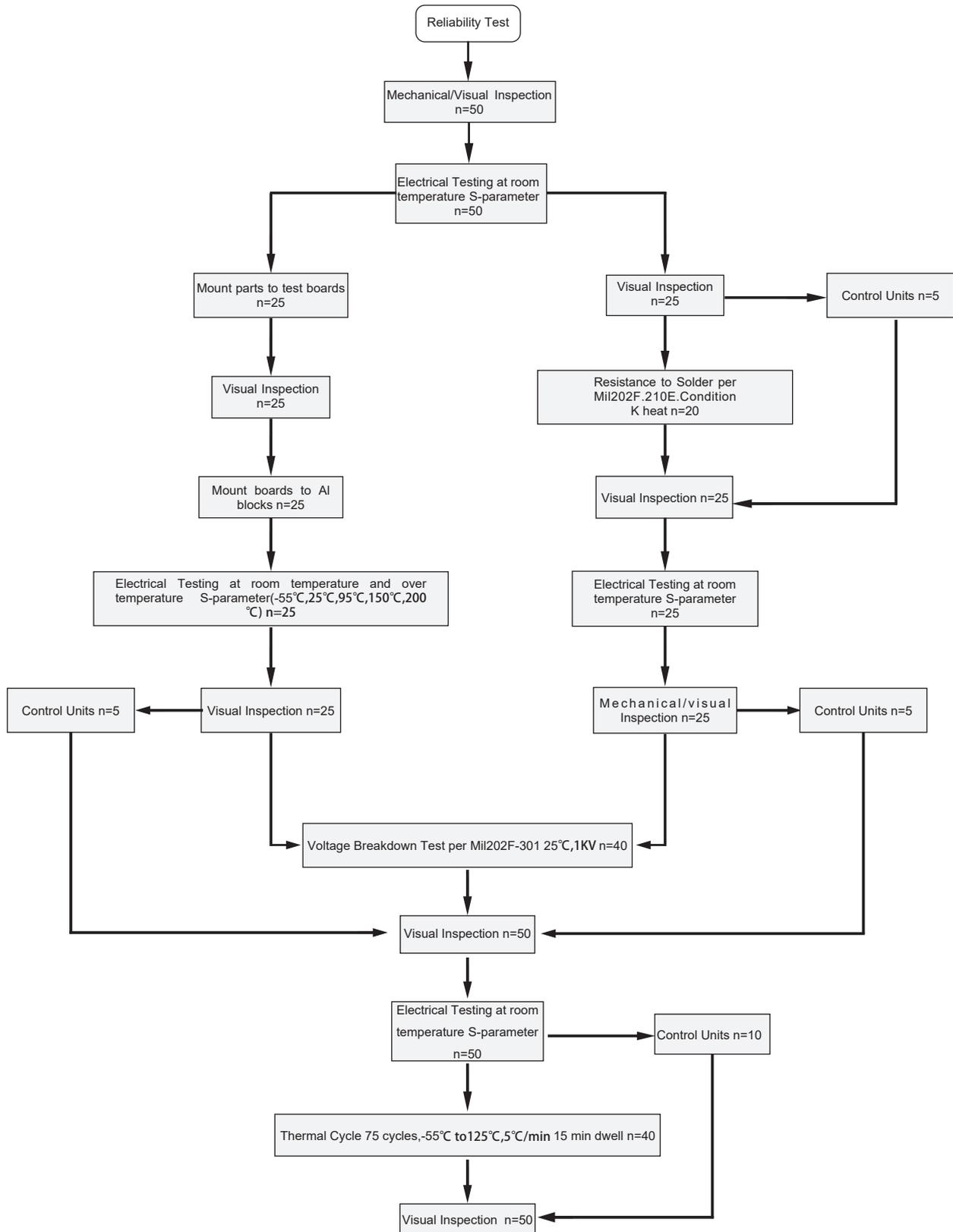
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Rev A1.0

Reliability Test Flow



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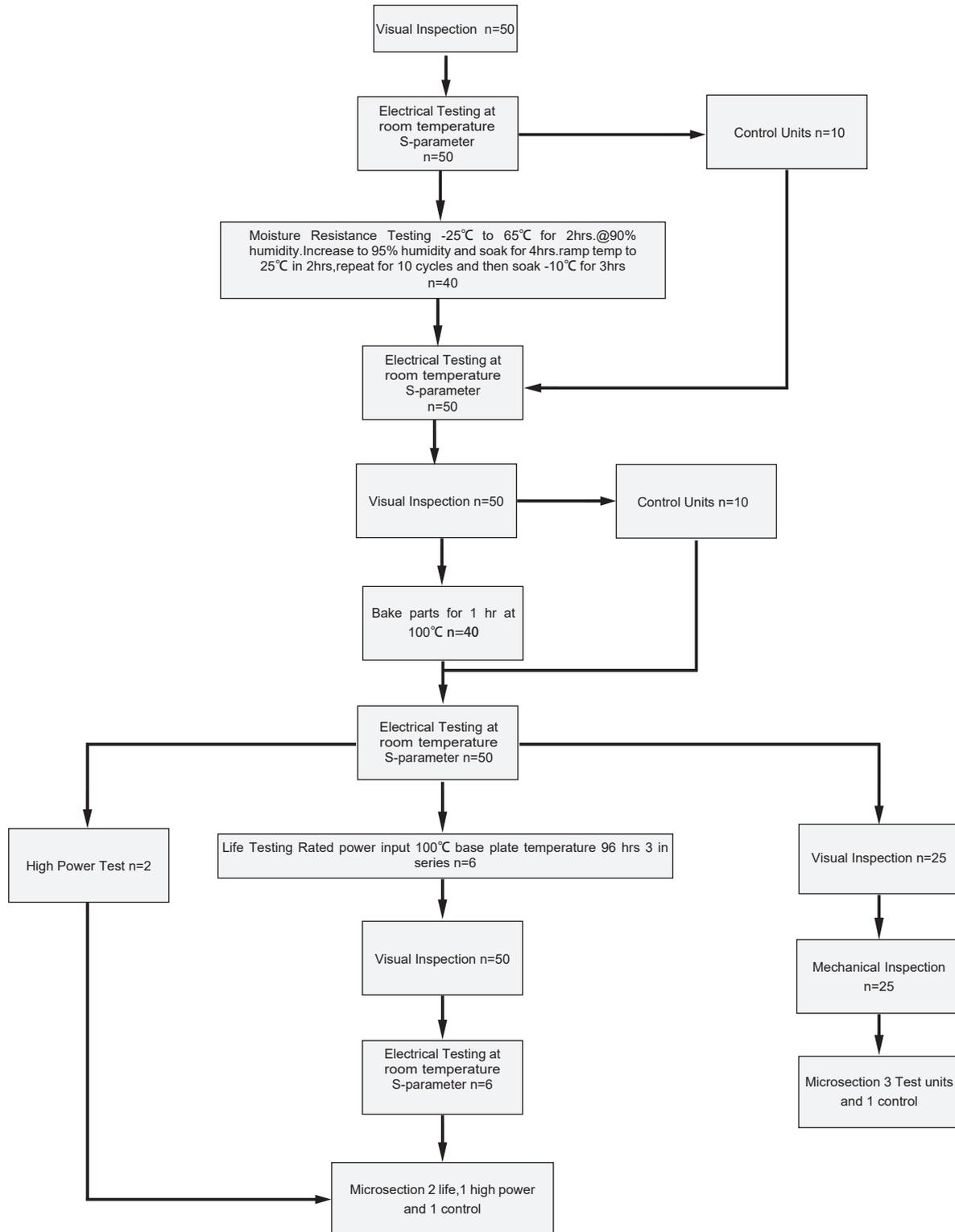
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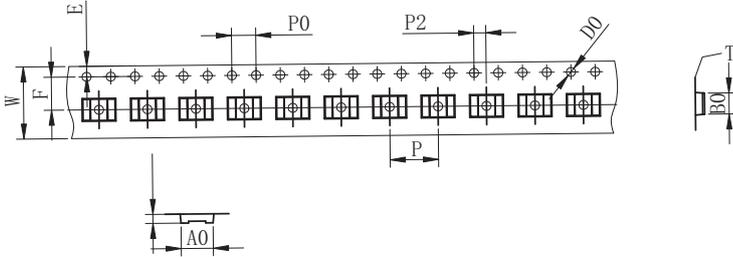
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Tape and Reel Drawing

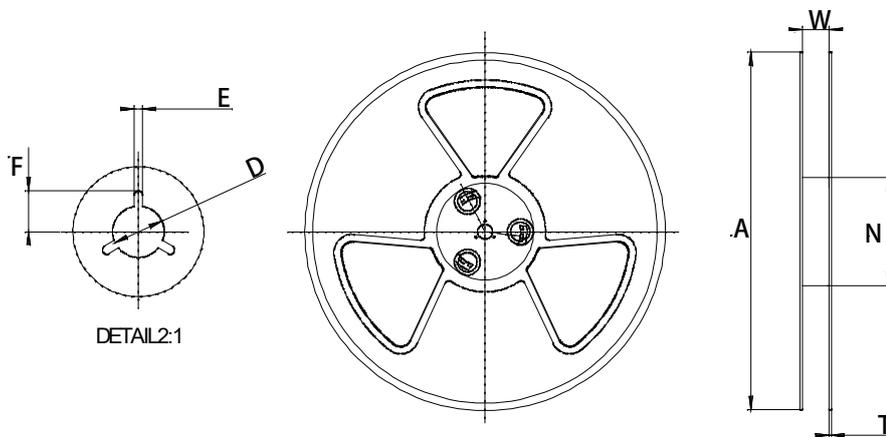
Feeding Direction



ITEM	W	A0	B0	K0	K1	P	F	E	D	P0	P2	t	13"
DIM	12.0	10	8.5	1.0		11	10	1.75	1.50	4.00	2.00	0.3	长/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

