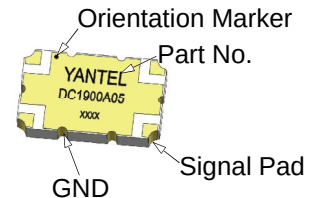


Description

The DC1900A05 is a low profile, high performance 5dB directional coupler. It is designed for DCS & PCS applications. This component is suitable for 3 way power divide & combine circuits where low insertion loss, high directivity is required. It can be used in power applications up to 200 Watts.

Parts have been subjected to rigorous qualification testing and they are using materials with coefficients of thermal expansion (CTE) compatible with common substrates such as FR4, G-10, RF-35, RO4350B and polyimide.



Features:

- 1700-2000 MHz
- DCS & PCS
- Low Insertion Loss
- High Directivity
- Low VSWR
- Good Repeatability
- CTE compatible with FR4, G-10, RF-35, RO4350B and polyimide
- Immersion gold, prevent surface oxidation & scratch
- RoHS Compliant
- Tape & Reel Package available

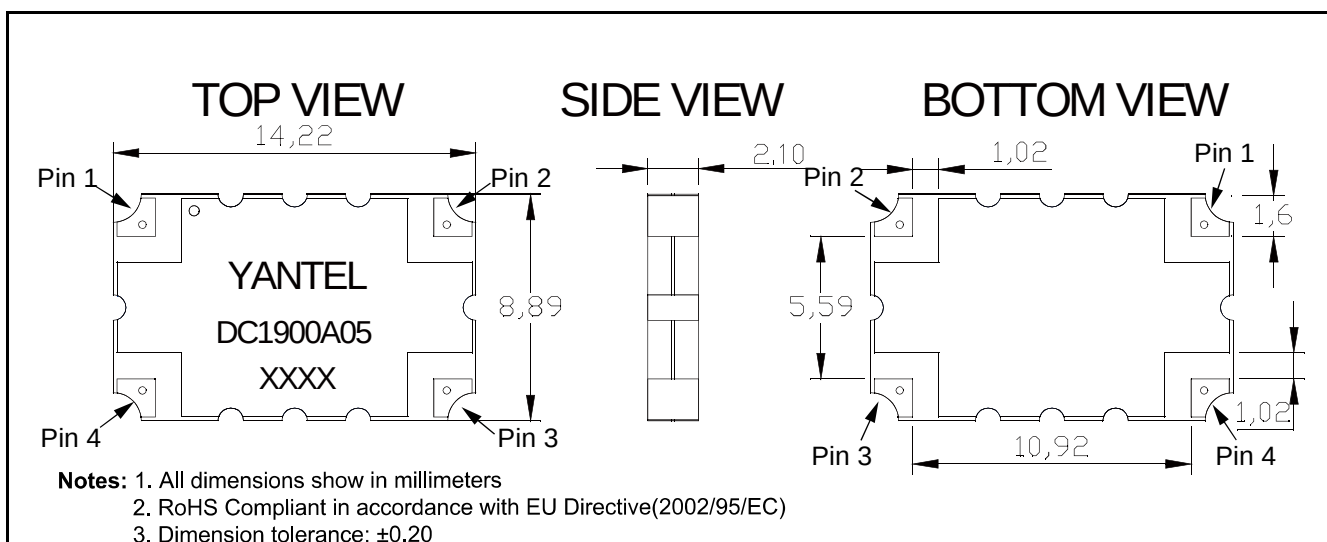
Electrical Specifications

Frequency	Coupling	Directivity	VSWR
MHz	dB	dB Min	Max : 1
1700 - 2000	5±0.25	22	1.15
Insertion Loss	Phase Balance	Power	Operating Temp.
dB Max	Degrees	Avg. CW Watts	°C
0.19	90±3.5	200	-55 to +95

Notes:

1. All the above data are based on specified demo board.
2. Insertion loss: Thru board loss has been removed.

Mechanical Outline

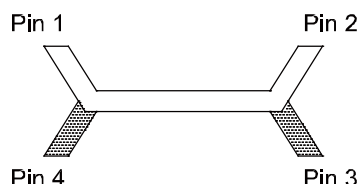


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Directional Coupler Pin Configuration

The DC1900A05 has an orientation marker to denote Pin 1. Once port one has been identified the other ports are known automatically. Please see the chart below for clarification:



Pin 1	Pin 2	Pin 3	Pin 4
Input	Transmission	Isolate	Coupling
Transmission	Input	Coupling	Isolate

Typical Performance Data (@25°C)

Frequency (MHz)	Coupling (dB)	Transmission (dB)	Insertion Loss (dB)	Directivity (dB)	Phase (degree)	Return Loss(dB)			
						S11	S22	S33	S44
1700	-5.14	-1.74	-0.11	-30.50	88.28	-33.62	-32.38	-33.53	-31.83
1715	-5.11	-1.73	-0.09	-30.65	88.20	-33.21	-33.38	-34.06	-31.41
1730	-5.12	-1.74	-0.10	-30.65	88.13	-33.07	-34.58	-34.72	-31.02
1745	-5.13	-1.77	-0.12	-30.61	88.03	-33.04	-35.84	-35.46	-30.95
1760	-5.14	-1.77	-0.13	-30.62	88.05	-33.17	-36.90	-36.06	-31.17
1775	-5.13	-1.76	-0.12	-30.57	88.06	-33.33	-37.24	-37.04	-31.63
1790	-5.12	-1.76	-0.11	-30.52	88.14	-33.26	-37.20	-38.01	-31.97
1805	-5.10	-1.77	-0.11	-30.44	88.22	-32.79	-37.01	-39.24	-31.87
1820	-5.08	-1.76	-0.10	-30.32	88.17	-32.15	-37.11	-40.70	-31.41
1835	-5.08	-1.76	-0.10	-30.05	88.07	-31.54	-37.80	-42.26	-30.95
1850	-5.11	-1.76	-0.11	-29.81	87.96	-31.25	-38.81	-43.97	-30.84
1865	-5.10	-1.76	-0.11	-29.70	87.94	-31.40	-39.05	-46.69	-31.27
1880	-5.11	-1.76	-0.11	-29.83	88.05	-31.54	-37.69	-49.63	-32.08
1895	-5.11	-1.77	-0.12	-30.11	88.07	-31.16	-35.61	-50.87	-32.74
1910	-5.11	-1.77	-0.12	-30.05	88.06	-30.68	-34.47	-49.92	-33.25
1925	-5.11	-1.77	-0.12	-30.02	88.02	-30.27	-33.61	-48.86	-33.31
1940	-5.12	-1.77	-0.12	-30.04	87.92	-29.97	-32.69	-46.42	-33.25
1955	-5.14	-1.77	-0.13	-30.05	87.93	-29.96	-31.89	-44.39	-33.50
1970	-5.14	-1.76	-0.12	-29.86	87.95	-30.30	-31.57	-42.55	-34.07
1985	-5.12	-1.75	-0.11	-29.58	88.01	-30.40	-31.25	-40.63	-34.94
2000	-5.11	-1.74	-0.10	-29.53	88.00	-30.13	-30.51	-38.75	-35.92

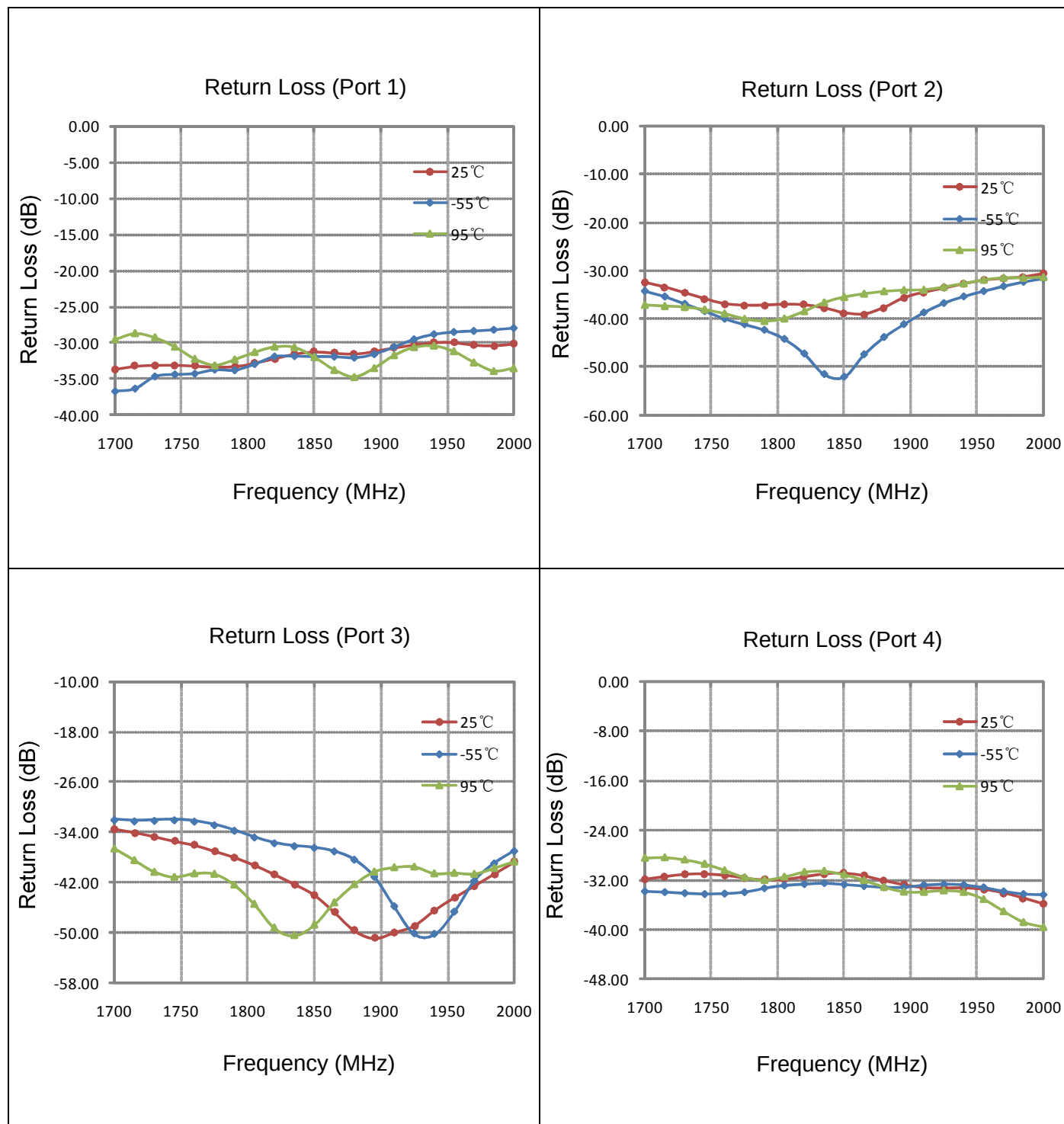
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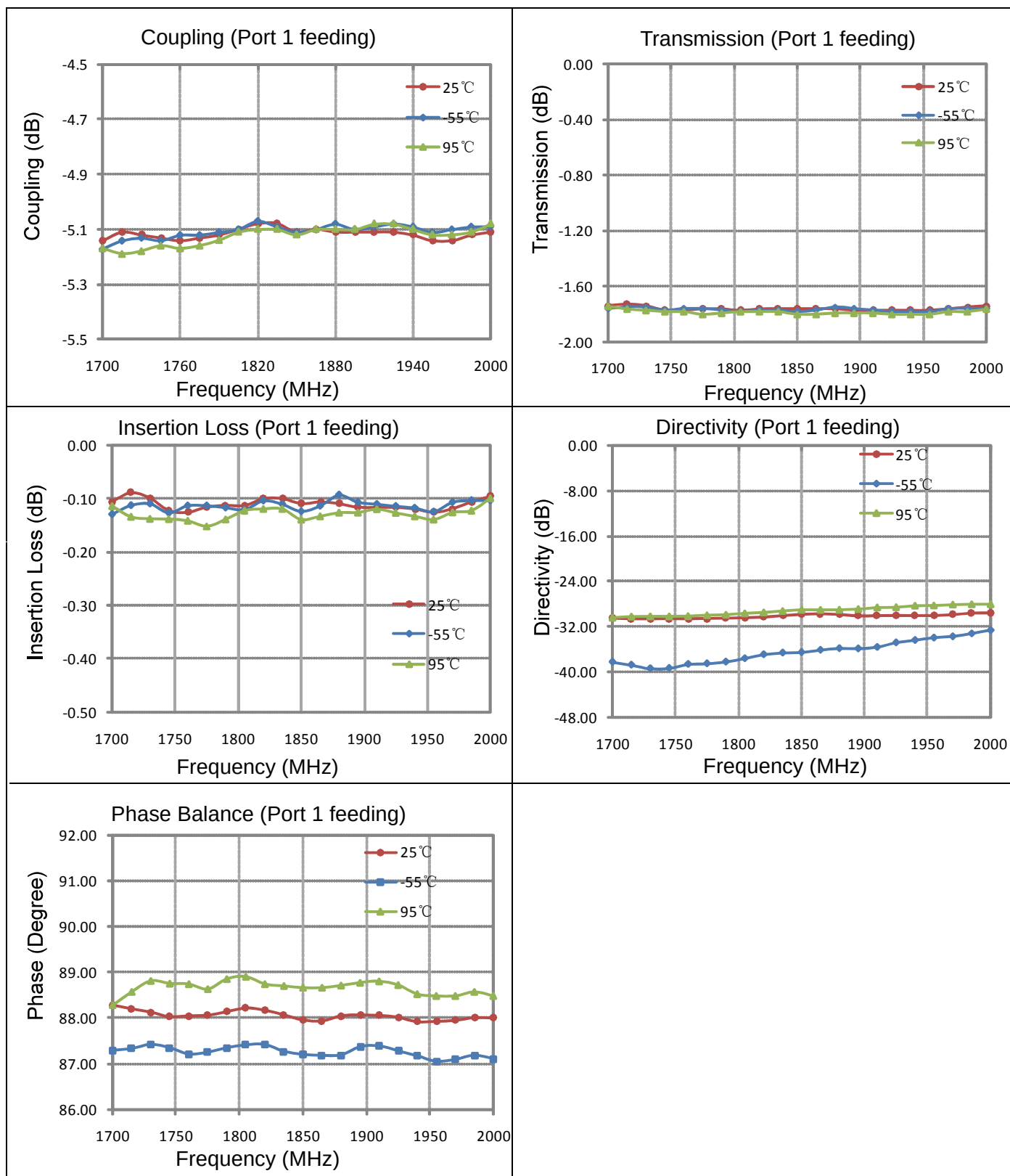
Typical Performance (-55°C, 25°C & 95°C: 1700-2000 MHz)



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Description of Measured Specifications

Parameter	Description
VSWR	Voltage standing wave ratio, the impedance match to $50\ \Omega$, the ideal value is 1:1.
Return Loss	Loss of signal power resulting from the reflection caused by discontinuity of transmission line.
Insertion Loss	The input power divided by sum of power at the coupling port & transmission port.
Coupling	The input power divided by the power at coupling port.
Transmission	The input power divided by the power at transmission port.
Directivity	The power at the coupling port divided by the power at the isolated.
Phase Balance	The difference between coupling port and transmission port.

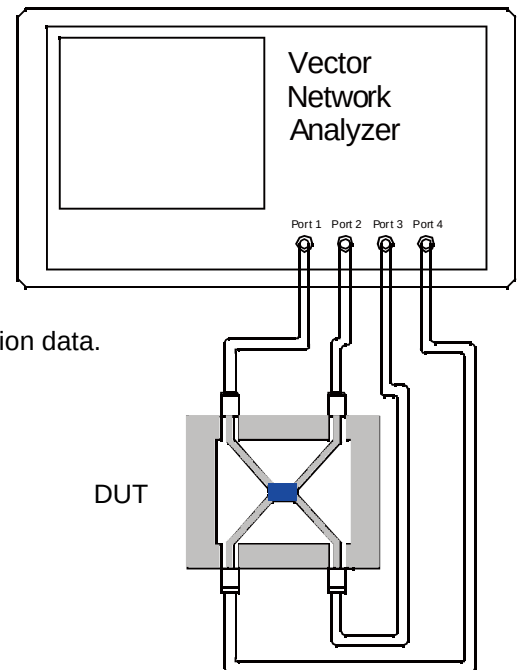
Test Method

1. Calibrating your vector network analyzer.
2. Connect the VNA 4 Port to DUT respectively.
3. Measure the data of coupling through port 1 to port 4(S41).
4. Measure the data of transmission through port 1 to port 3(S31).
5. Measure the data of isolation through port 1 to port 2(S21).
6. Measure the data of return loss port 1, port 2, port 3 & port 4.
7. According to the above data to calculate insertion loss, directivity and phase balance.

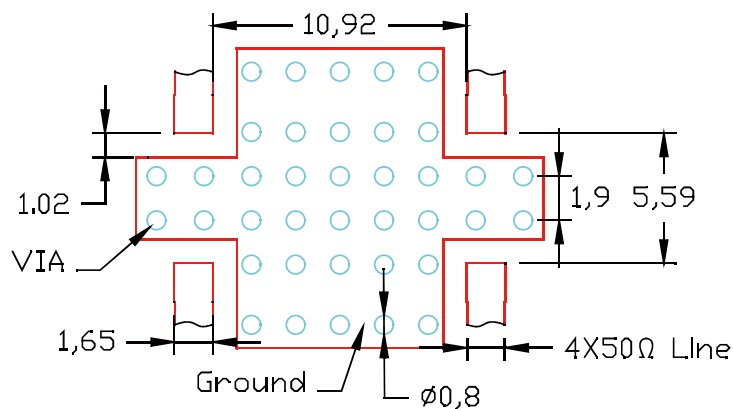
Note:

1. When calculating insertion loss at room temperature, demo board loss should be removed from both coupling & transmission data. Please refer to the below table for demo board loss :

Frequency Range(MHz)	Demo Board Loss (dB) @25℃
470-860	0.07
800-1000	0.10
1200-1700	0.15
1700-2000	0.15
2000-2300	0.20
2300-2700	0.25



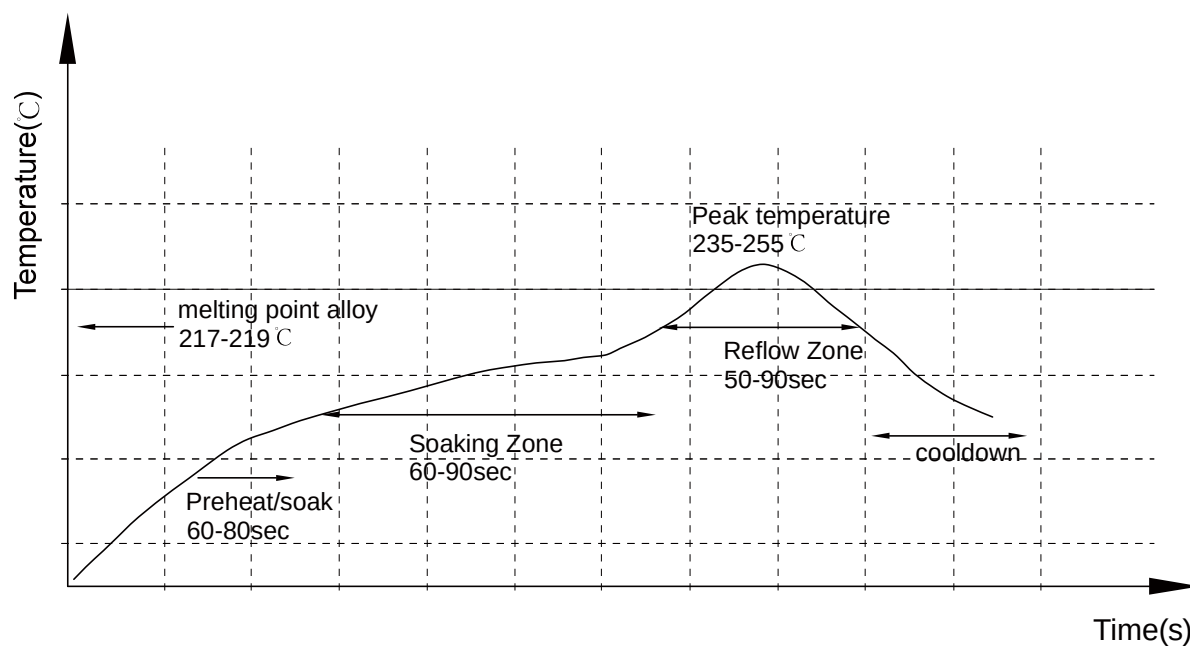
Recommended PCB Layout



NOTE:

1. 50 Ω line width is shown above designing from RO4350B dielectric thickness 0.762mm; copper 1 OZ
2. Bottom side of the PCB is continuous ground plane.
3. All dimensions shown in mm.

Reflow Profile



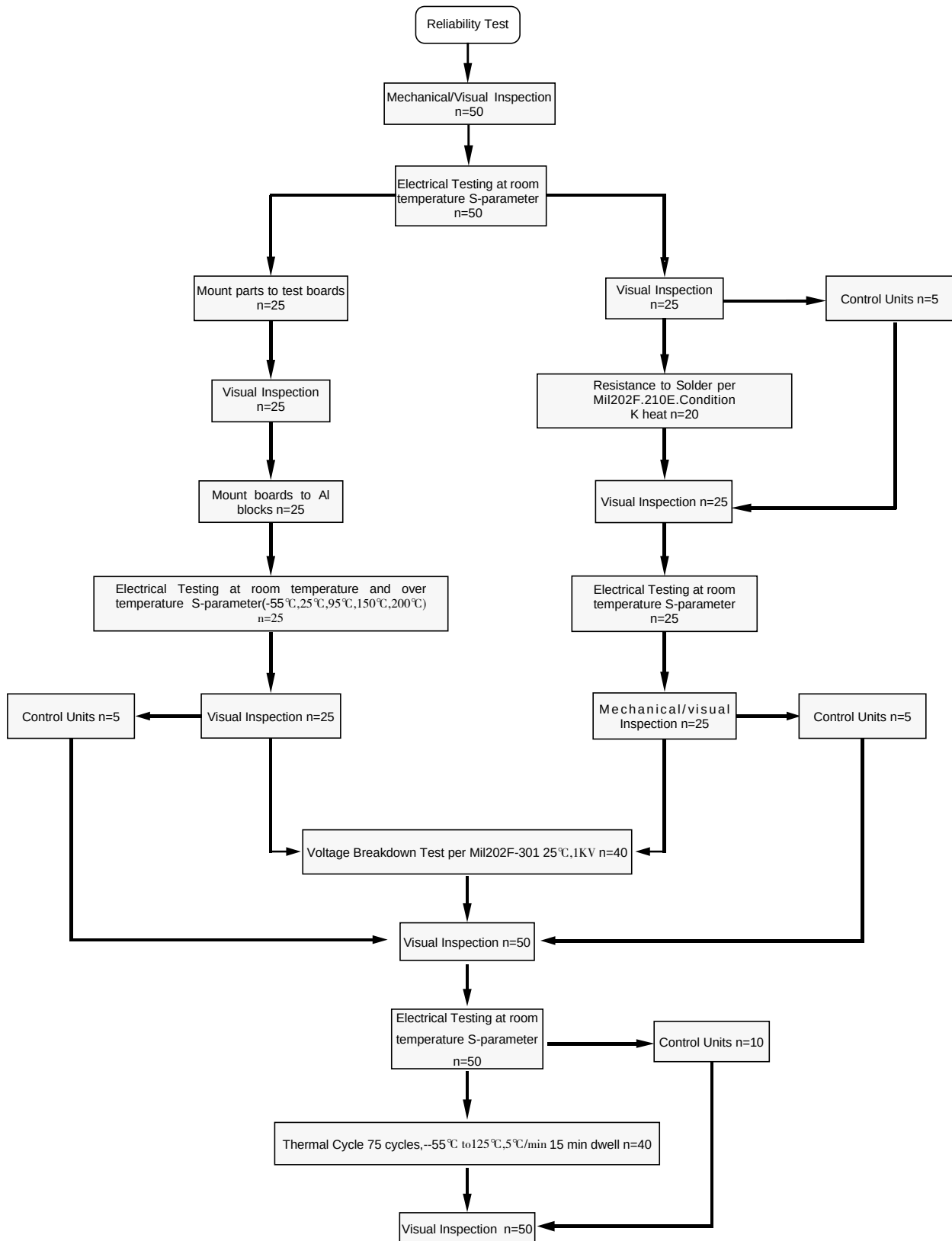
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Reliability Test Flow



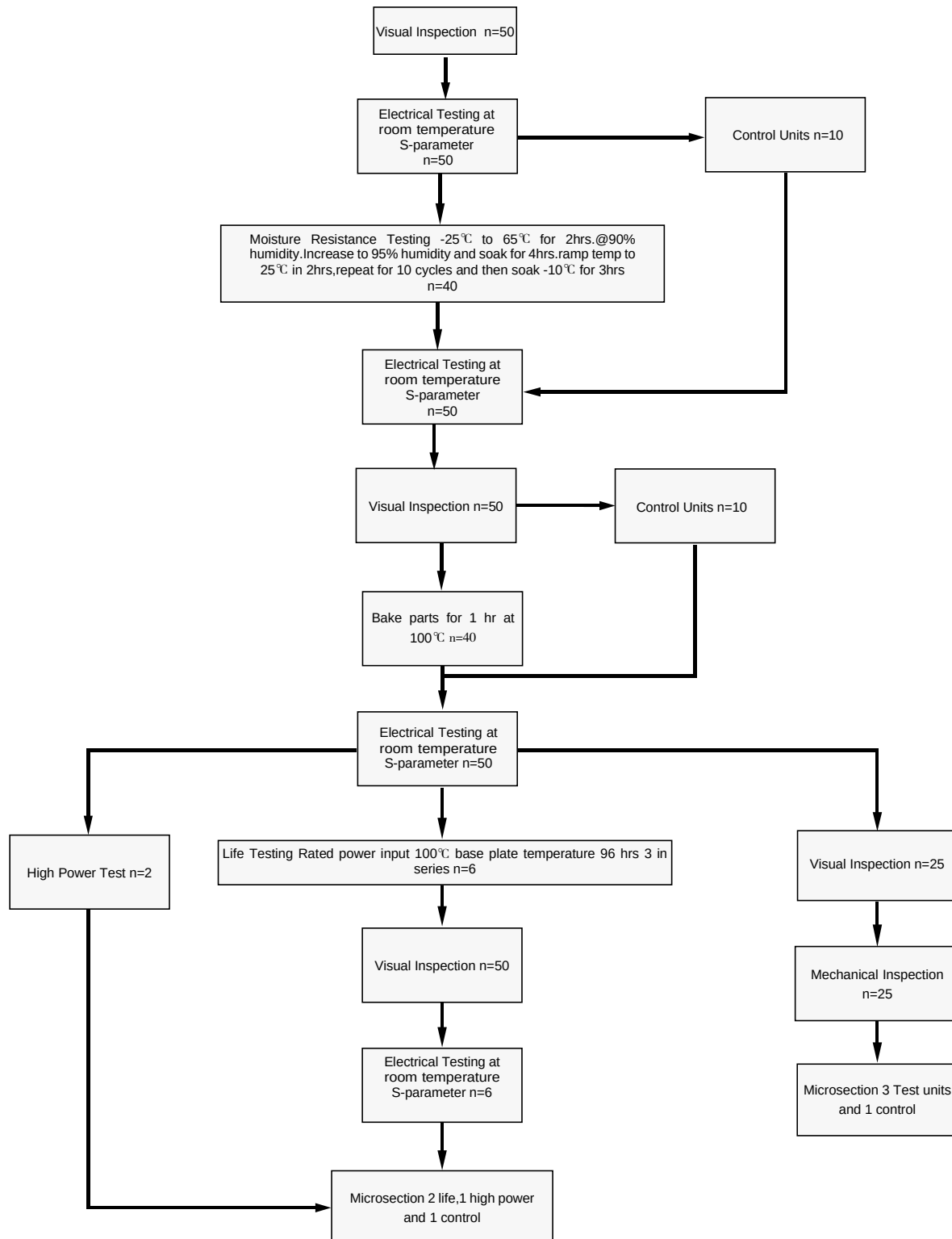
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Reliability Test Flow



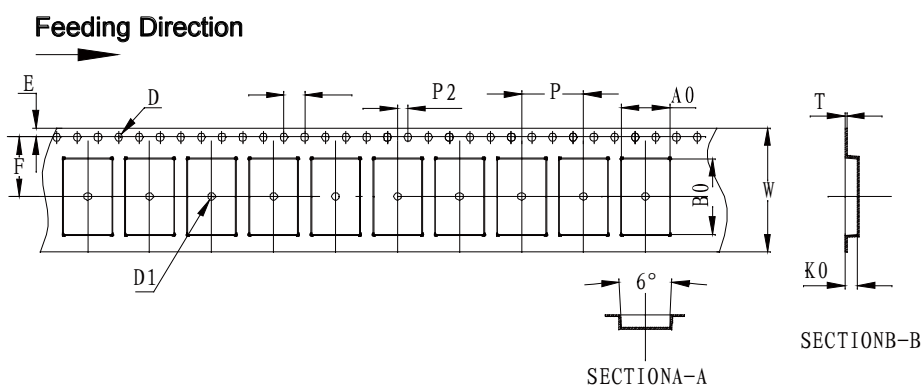
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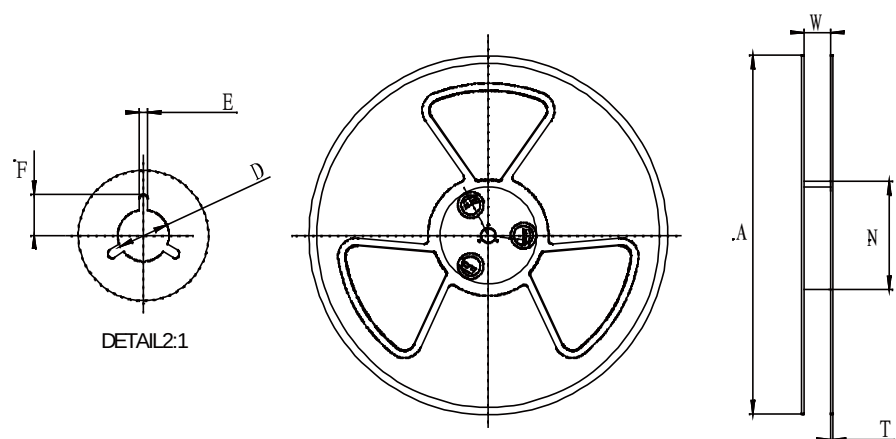
Tape and Reel Drawing



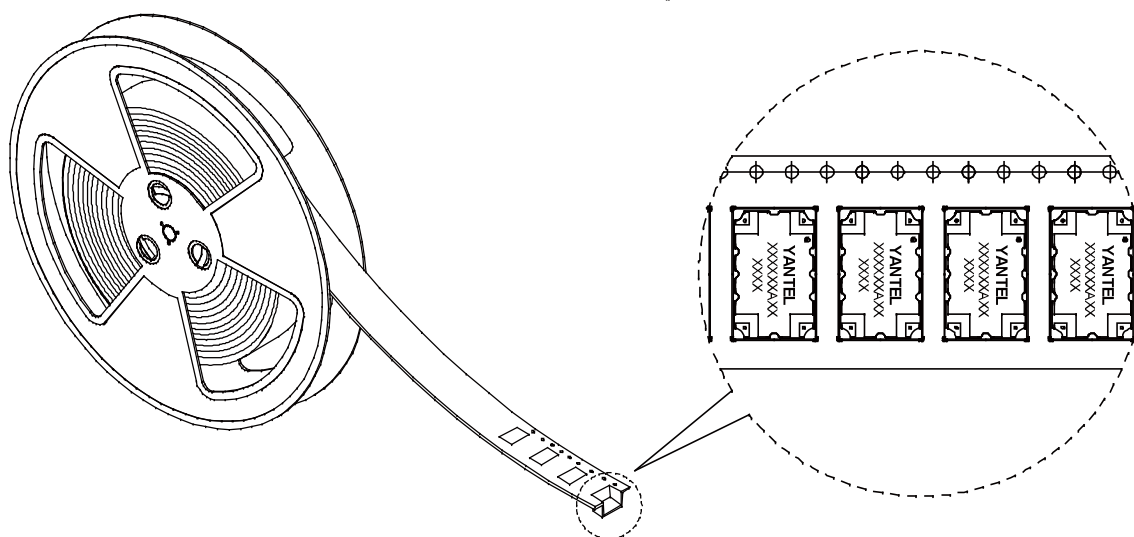
ITEM	W	A0	B0	K0	P	F	E	D	D1	P0	P2	T	13"	
DIM(mm)	24.00	9.30	14.70	2.40	12.00	11.50	1.75	1.50	1.50	4.00	2.00	0.30	M/R	P/R
TOLE	+0.30 -0.30	+0.10 -0.10	+0.10 -0.10	+0.10 -0.10	+0.10 -0.10	+0.10 -0.10	+0.10 -0.10	+0.10 -0.00	+0.10 -0.00	+0.10 -0.10	+0.10 -0.10	+0.05 -0.05	25.2M/R	2000pcs

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. 2000 units (maximum) / T&R



Symbol	Dimensions(mm)
W	24.5±0.4
A	330±0.5
N	100±0.3
T	1.8±0.2
E	2.1±0.3
F	10.75±0.3
D	13.5+0.5/-0.2



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