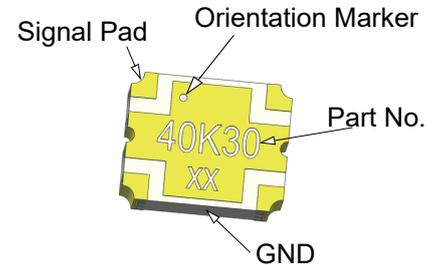


Description

The DC40K30 is a low profile, high performance 30dB directional coupler in a new easy to use, manufacturing friendly surface mount package. It is designed for LTE and 5G wireless communications frequency bands. The DC40K30 is designed particularly for power and frequency detection, as well as for VSWR monitoring, where tightly controlled coupling and low insertion loss is required.

Parts have been subjected to rigorous qualification testing and they are manufactured using materials with coefficients of thermal expansion (CTE) compatible with common substrates such as FR4, G-10, RF-35, RO4003 and polyimide. Produced with 6 of 6 RoHS compliant tin immersion finish.



Features:

- 3200-4200MHz
- Very Low Loss
- Production Friendly
- Tight Coupling
- High Directivity
- Tape and Reel
- Lead Free

Electrical Specifications

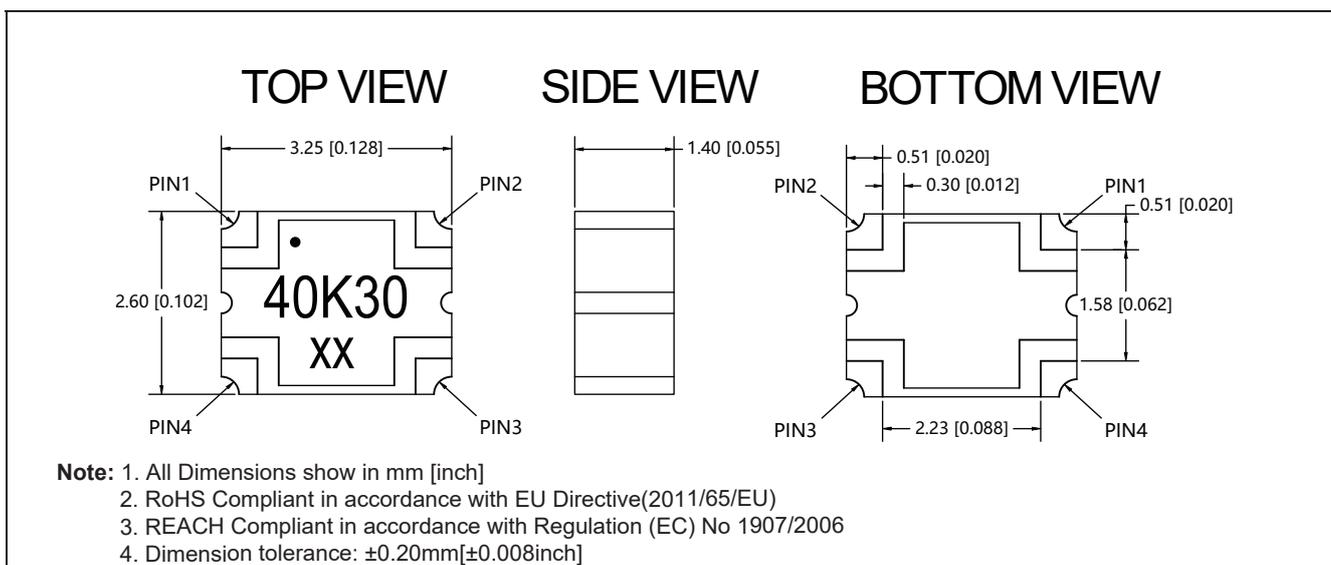
Frequency MHz	Coupling dB	Directivity dB Min	VSWR Max : 1
3200-4200	30.0±1.5	18	1.25
3400-3600	30.0±1.5	20	1.25
3600-3800	30.0±1.5	20	1.25

Insertion Loss dB Max	Power Avg. CW Watts at 105°C	Operating Temp. °C
0.25	25	-55 to +150
0.20	25	-55 to +150
0.20	25	-55 to +150

Notes:

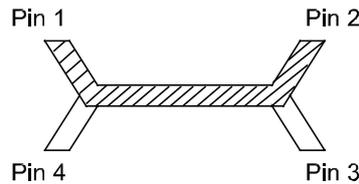
1. All the above data are based on specified demo board.
2. Insertion loss: Thru board loss has been removed.

Mechanical Outline



Directional Coupler Pin Configuration

The DC40K30 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:

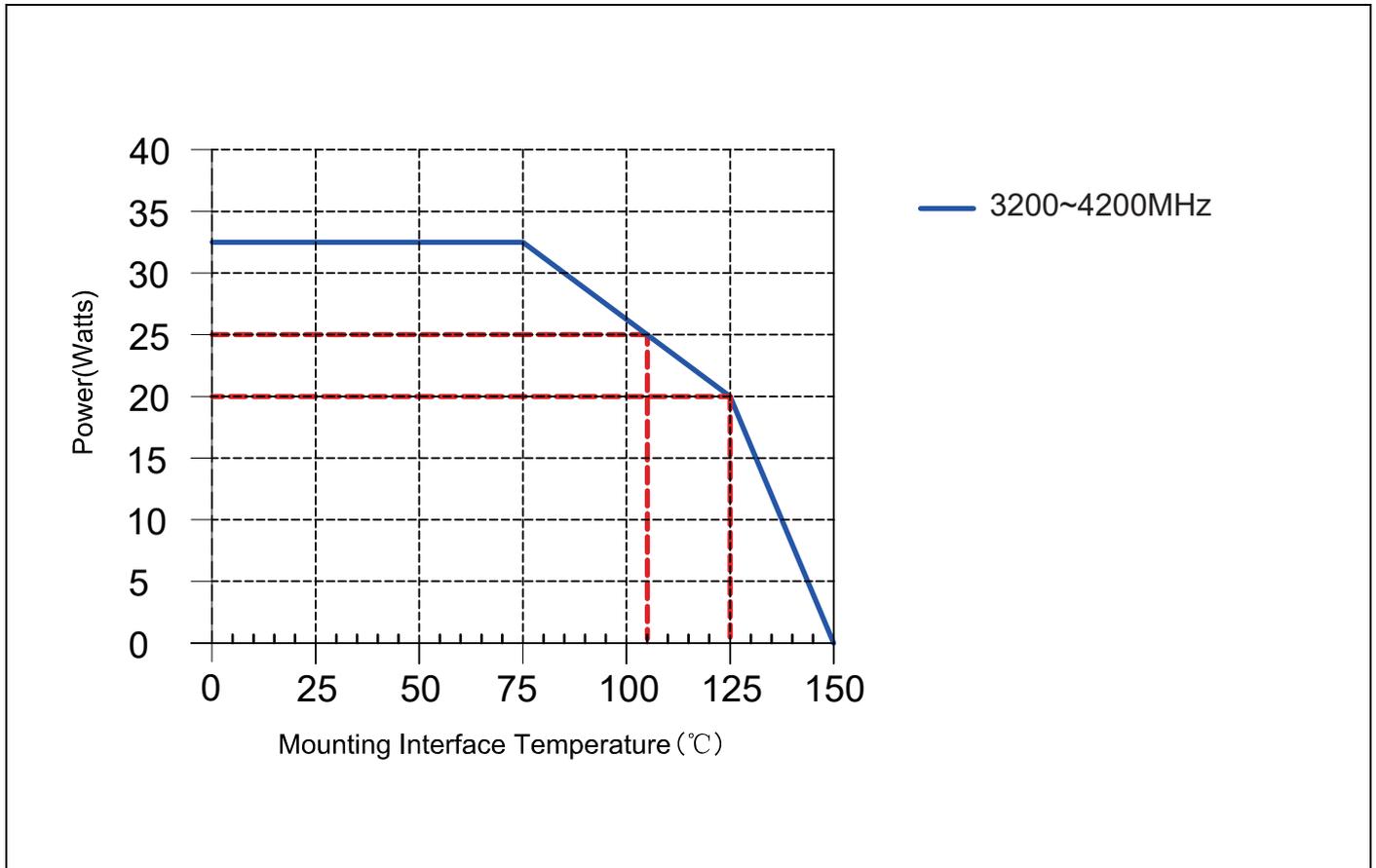


Pin 1	Pin 2	Pin 3	Pin 4
Input	Transmission	Isolate	Coupling
Transmission	Input	Coupling	Isolate

Typical Performance Data (@25 °C)

Frequency (MHz)	Coupling (dB)	Transmission (dB)	Insertion Loss (dB)	Directivity (dB)	Return Loss(dB)			
					S11	S22	S33	S44
3200	-30.64	-0.18	-0.18	-31.98	-21.59	-29.12	-30.67	-21.71
3250	-30.56	-0.18	-0.18	-29.62	-21.78	-30.57	-34.74	-22.62
3300	-30.49	-0.17	-0.17	-28.38	-22.43	-31.12	-34.31	-23.39
3350	-30.46	-0.17	-0.17	-26.83	-22.91	-32.89	-41.74	-24.16
3400	-30.41	-0.17	-0.17	-25.63	-23.52	-35.65	-45.69	-24.75
3450	-30.36	-0.17	-0.16	-26.29	-24.19	-35.06	-39.57	-25.82
3500	-30.35	-0.17	-0.17	-25.60	-24.88	-35.65	-38.07	-27.17
3550	-30.31	-0.16	-0.16	-25.36	-25.82	-30.81	-30.85	-28.57
3600	-30.28	-0.17	-0.16	-24.44	-26.59	-30.12	-29.92	-29.35
3650	-30.27	-0.17	-0.17	-25.27	-27.24	-27.15	-26.75	-30.60
3700	-30.26	-0.17	-0.17	-24.32	-27.96	-26.47	-26.05	-31.88
3750	-30.20	-0.17	-0.16	-24.35	-29.13	-24.14	-23.61	-34.11
3800	-30.17	-0.17	-0.16	-24.11	-29.48	-23.58	-23.08	-34.21
3850	-30.17	-0.16	-0.16	-24.17	-30.37	-22.00	-21.62	-36.21
3900	-30.16	-0.17	-0.17	-24.42	-30.57	-21.90	-21.73	-34.36
3950	-30.16	-0.17	-0.16	-23.84	-30.43	-20.98	-20.69	-34.90
4000	-30.19	-0.17	-0.17	-23.70	-31.24	-20.81	-20.69	-35.37
4050	-30.14	-0.18	-0.17	-24.46	-31.53	-20.19	-19.81	-34.91
4100	-30.15	-0.18	-0.18	-23.67	-31.37	-20.22	-20.14	-35.30
4150	-30.17	-0.18	-0.18	-24.66	-31.85	-19.97	-19.62	-36.93
4200	-30.21	-0.18	-0.18	-23.92	-31.81	-20.43	-20.38	-34.73

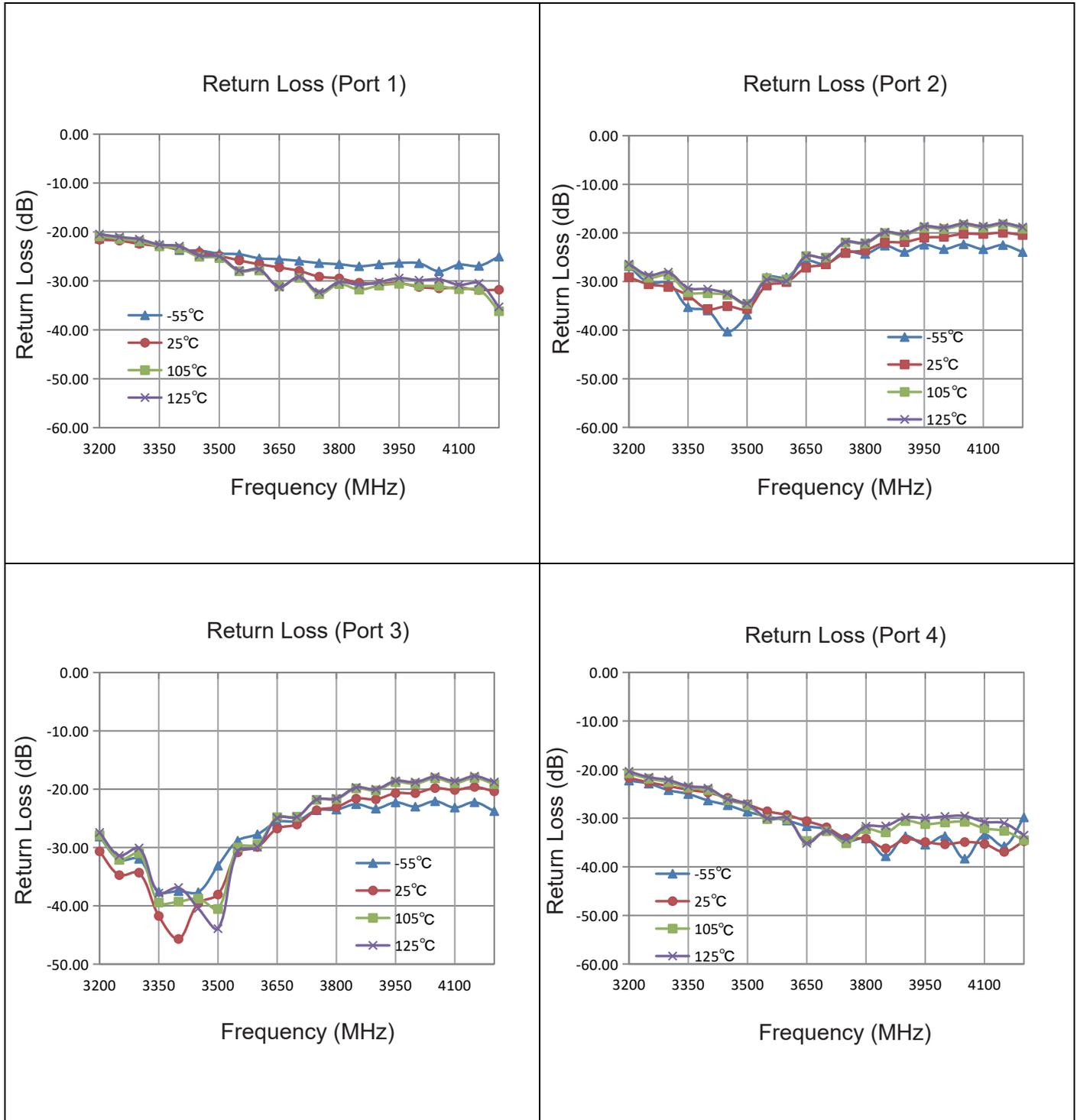
Power Derating Curves

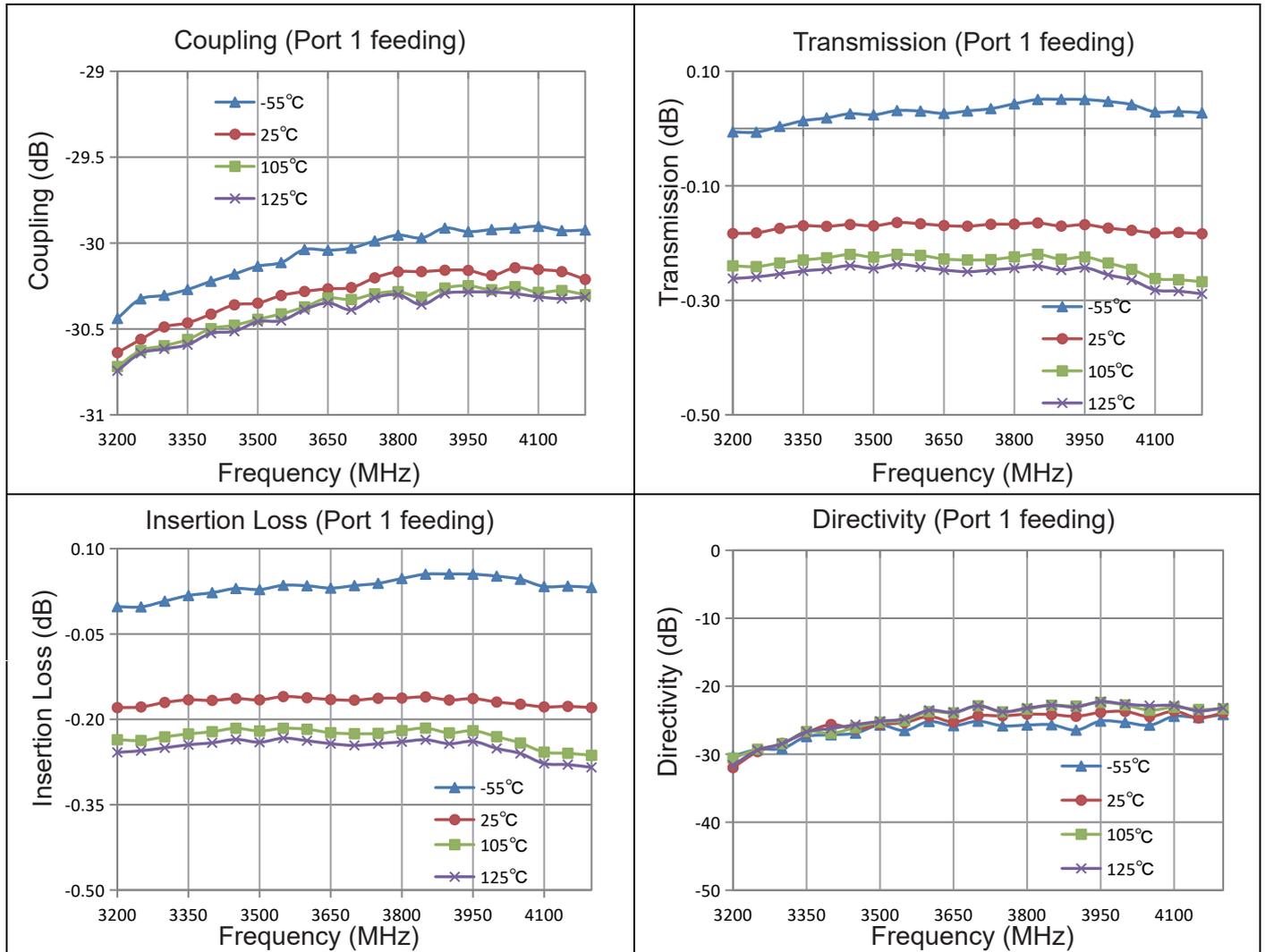


Power Derating:

As the mounting interface temperature approaches the maximum continuous operating temperature, the power handling decreases to zero.

Typical Performance (-55°C, 25°C, 105°C, 125°C:3200-4200 MHz)



Typical Performance (-55°C, 25°C, 105°C & 125°C: 3200-4200 MHz)


Description of Measured Specifications

Parameter	Description
VSWR	Voltage standing wave ratio, the impedance match to 50Ω , 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.

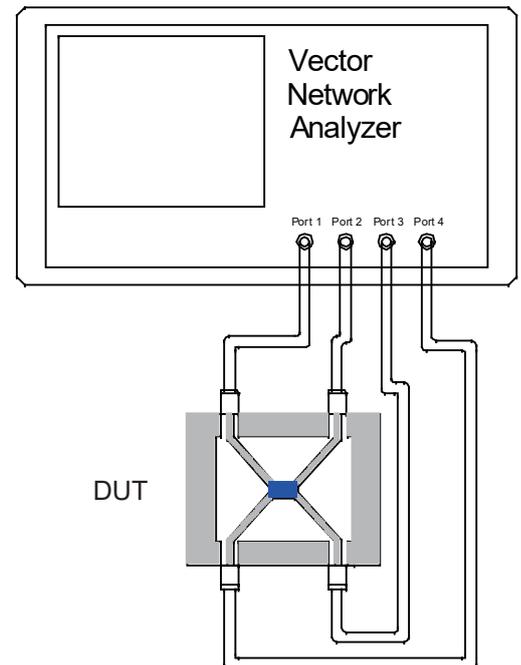
Test Method

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 2(S21).
5. Measure the data of isolation through port 1 to port 3(S31).
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.

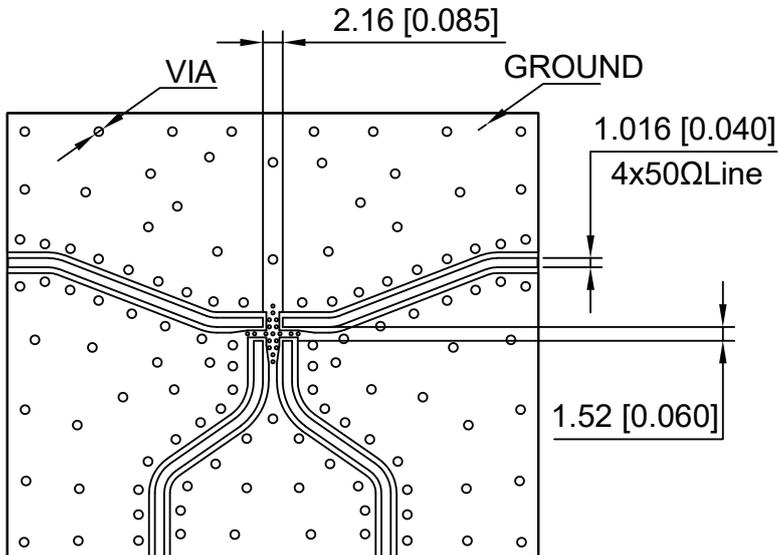
Note:

1. When calculating insertion loss at room temperature, coupling & transmission data both need remove demo board loss. Please see demo board loss data below the table :

Frequency Range(MHz)	Demo Board Loss (dB) @25°C
470-860	0.06~0.10
800-1000	0.10~0.15
1200-1700	0.15~0.20
1700-2000	0.20~0.25
2000-2300	0.20~0.25
2300-2700	0.25~0.30



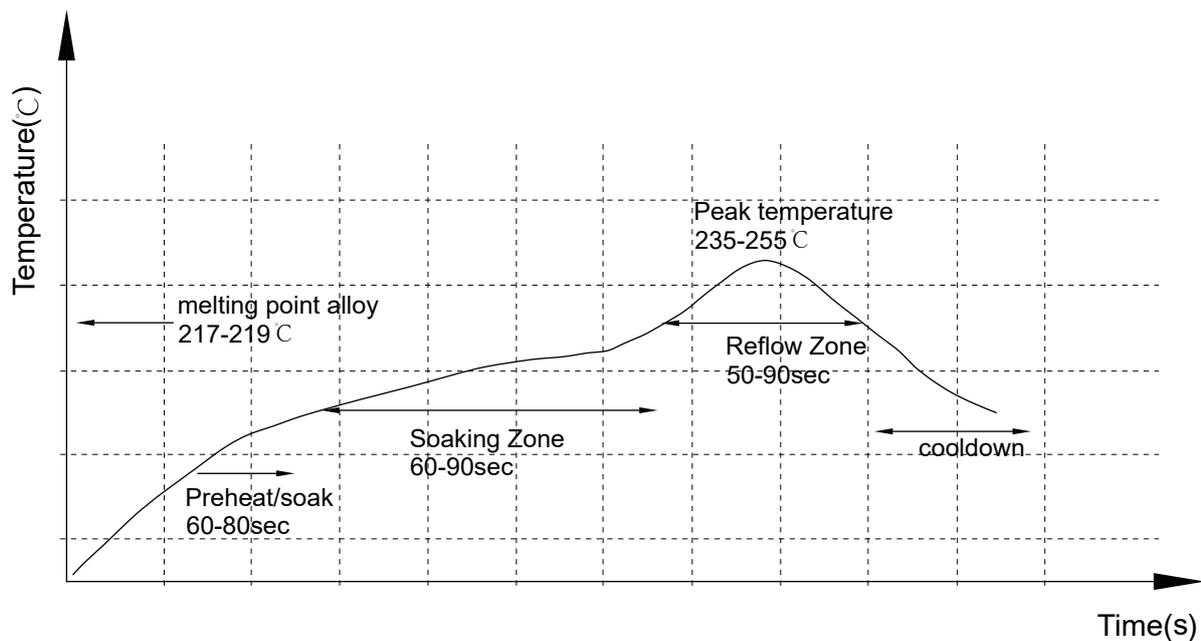
Recommended PCB Layout



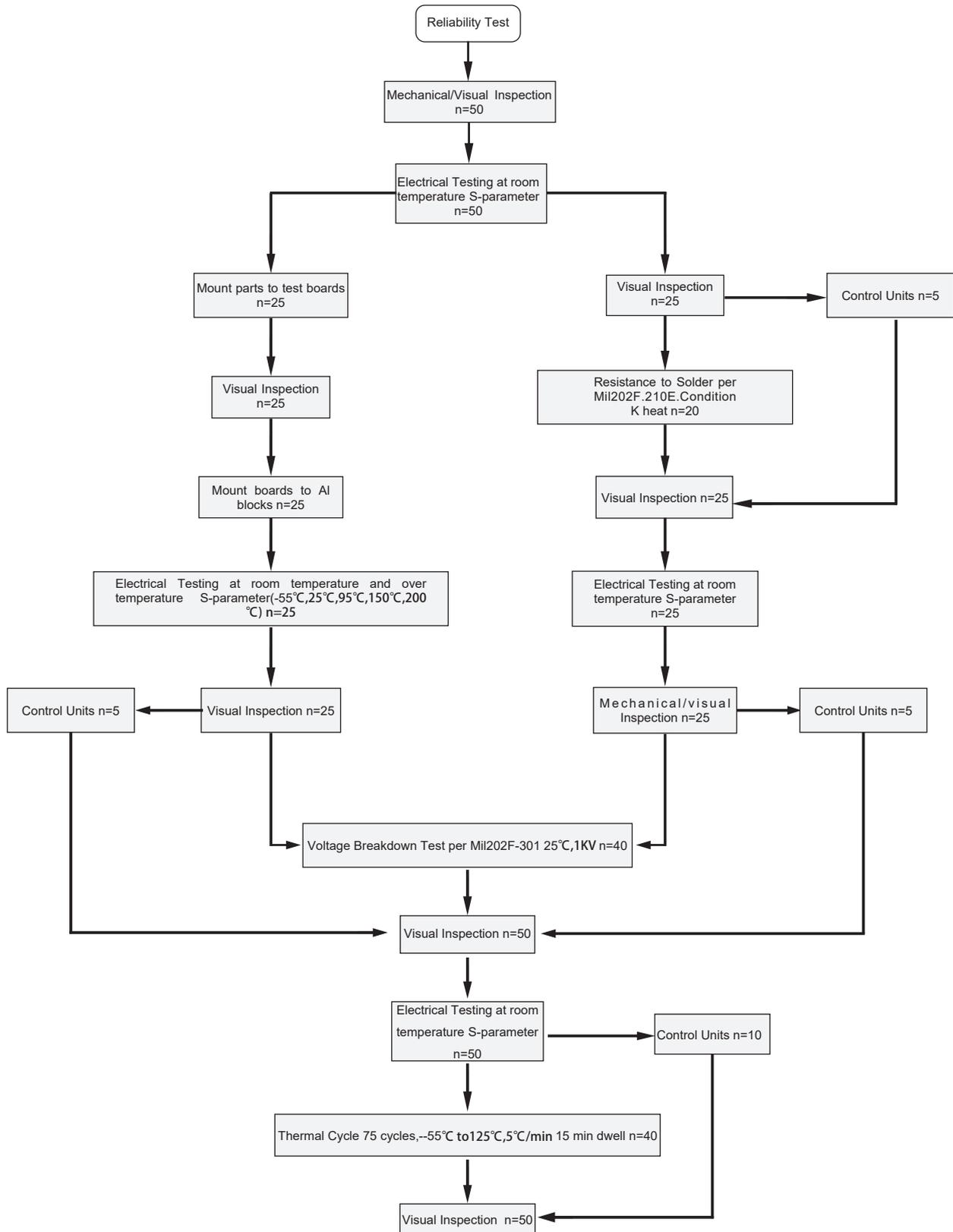
NOTE:

1. 50Ω line width is shown above designing from $\epsilon_r=3.66$ THK=20mil copper 1 OZ
2. Bottom side of the PCB is continuous ground plane.
3. All dimensions shown in mm [inch].

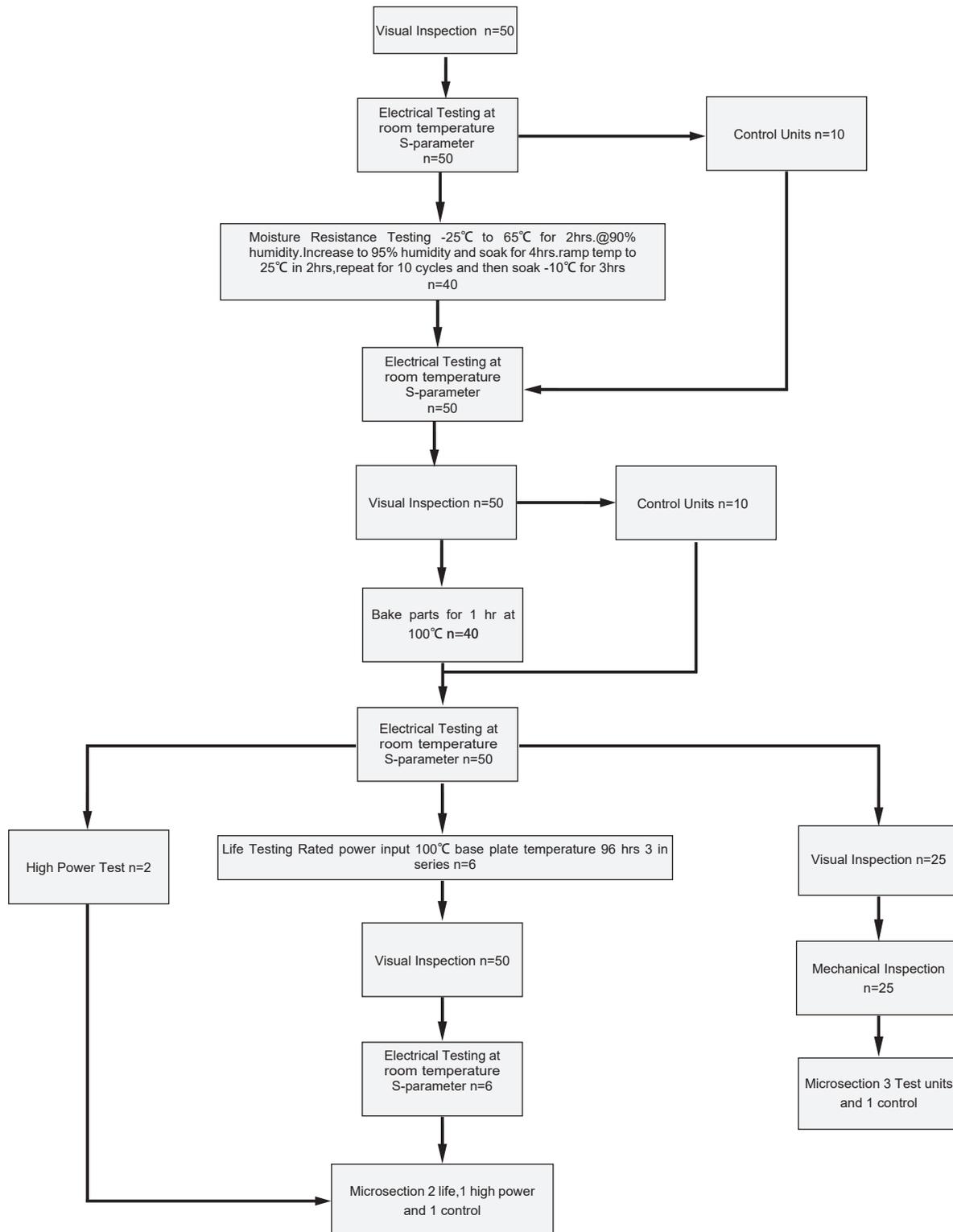
Reflow Profile



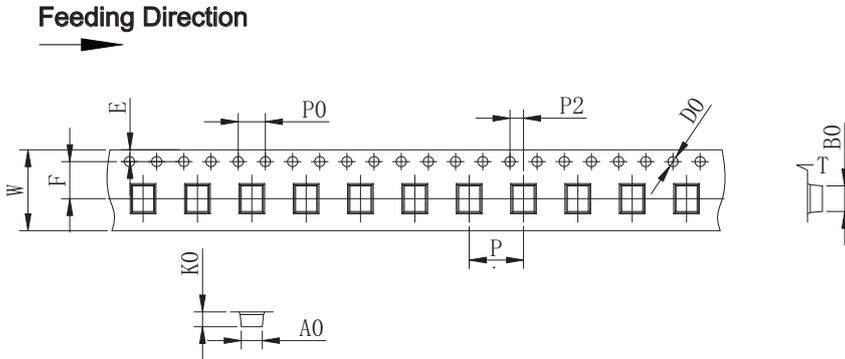
Reliability Test Flow



Reliability Test Flow



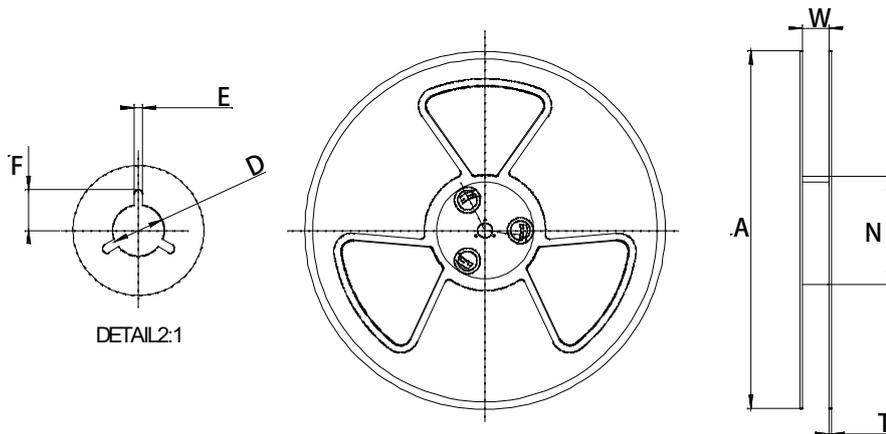
Tape and Reel Drawing



ITEM	W	A0	B0	K0	K1	P	F	E	D	P0	P2	t	γ°
DIM(mm)	16.0	2.80	3.40	1.5		8	7.5	1.75	1.50	4.0	2.0	0.3	P/R
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	1000pcs						

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	16.5±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

