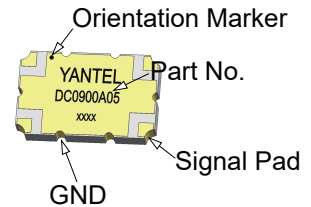


### Description

The products are widely used in China and global 4G/5G base station, 5G network coverage, BeiDou navigation antenna, vehicle-mounted high-precision navigation (unmanned) antenna and other applications. The products have miniaturization, low-loss, wide-bandwidth, high power density, high reliability, high cost-effective and other competitive advantages.



### Features:

- 800-1000 MHz
- AMPS
- 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

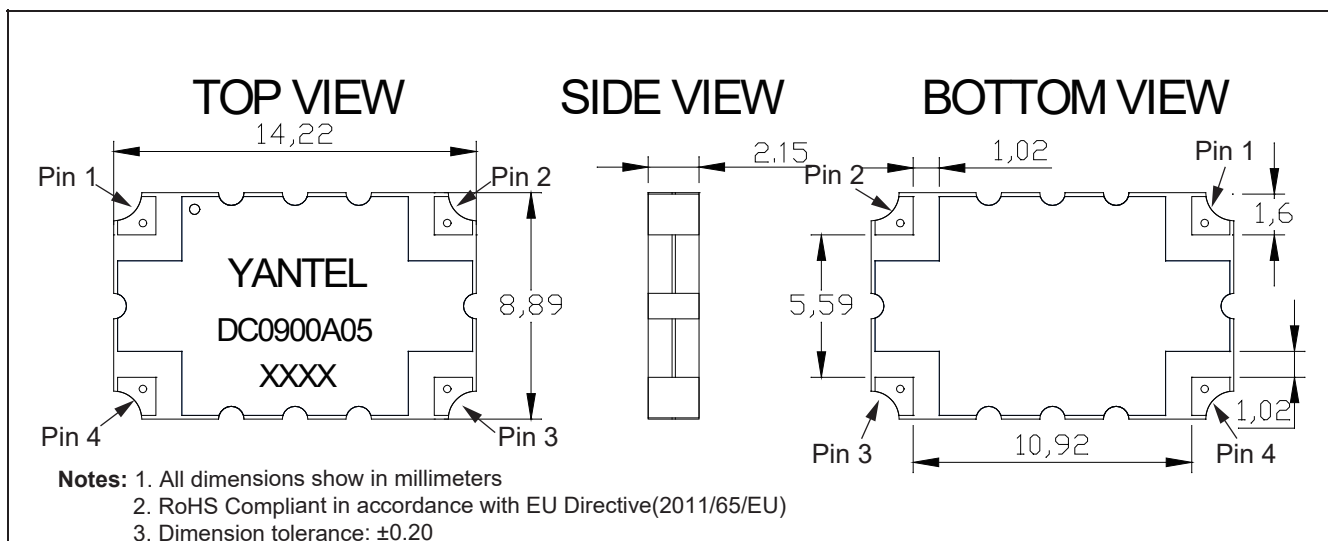
### Electrical Specifications

| Frequency      | Coupling       | Directivity          | VSWR            |
|----------------|----------------|----------------------|-----------------|
| <i>MHz</i>     | <i>dB</i>      | <i>dB Min</i>        | <i>Max : 1</i>  |
| 800 - 1000     | 5±0.35         | 21                   | 1.19            |
| Insertion Loss | Phase Balance  | Power                | Operating Temp. |
| <i>dB Max</i>  | <i>Degrees</i> | <i>Avg. CW Watts</i> | <i>°C</i>       |
| 0.19           | 90±3.5         | 250                  | -55 to +95      |

### Notes:

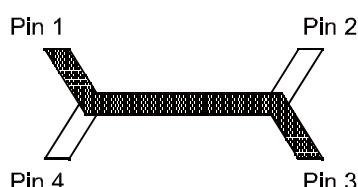
1. All the above data are based on specified demo board.
2. Insertion loss: Thru board loss has been removed.

### Mechanical Outline



### Directional Coupler Pin Configuration

The DC0900A05 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:



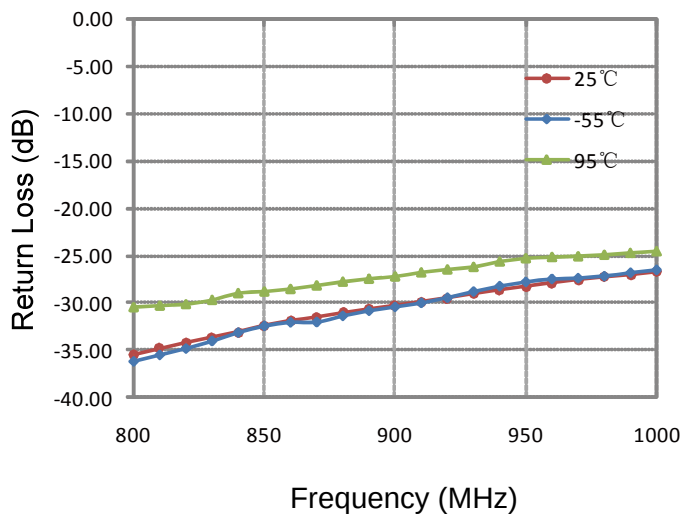
| Pin 1        | Pin 2        | Pin 3        | Pin 4        |
|--------------|--------------|--------------|--------------|
| Input        | Isolate      | Transmission | Coupling     |
| Isolate      | Input        | Coupling     | Transmission |
| Transmission | Coupling     | Input        | Isolate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

### Typical Performance Data (@25°C)

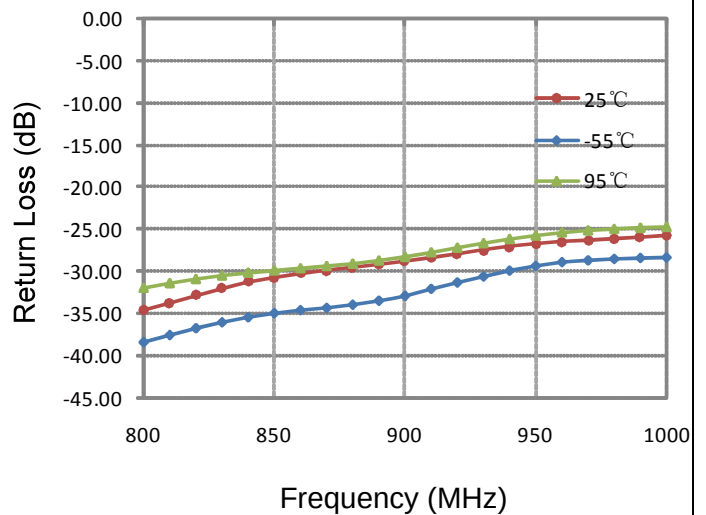
| Frequency<br>(MHz) | Coupling<br>(dB) | Transmission<br>(dB) | Insertion<br>Loss<br>(dB) | Directivity<br>(dB) | Phase<br>(degree) | Return Loss(dB) |        |        |        |
|--------------------|------------------|----------------------|---------------------------|---------------------|-------------------|-----------------|--------|--------|--------|
|                    |                  |                      |                           |                     |                   | S11             | S22    | S33    | S44    |
| 800                | -5.14            | -1.61                | -0.02                     | -41.96              | 87.48             | -35.47          | -34.52 | -37.48 | -35.83 |
| 810                | -5.14            | -1.63                | -0.03                     | -42.17              | 87.42             | -34.81          | -33.72 | -36.26 | -35.73 |
| 820                | -5.13            | -1.66                | -0.05                     | -41.71              | 87.55             | -34.18          | -32.83 | -34.73 | -35.63 |
| 830                | -5.13            | -1.69                | -0.07                     | -41.17              | 87.56             | -33.59          | -32.02 | -33.35 | -35.53 |
| 840                | -5.13            | -1.70                | -0.07                     | -40.59              | 87.44             | -33.04          | -31.25 | -32.08 | -35.43 |
| 850                | -5.13            | -1.72                | -0.09                     | -39.84              | 87.43             | -32.38          | -30.71 | -31.18 | -35.33 |
| 860                | -5.12            | -1.72                | -0.09                     | -39.04              | 87.41             | -31.87          | -30.25 | -30.41 | -35.23 |
| 870                | -5.10            | -1.69                | -0.06                     | -38.22              | 87.39             | -31.50          | -29.86 | -29.74 | -35.13 |
| 880                | -5.09            | -1.69                | -0.06                     | -37.25              | 87.44             | -31.06          | -29.53 | -29.31 | -35.03 |
| 890                | -5.07            | -1.68                | -0.04                     | -36.44              | 87.41             | -30.65          | -29.18 | -28.86 | -34.93 |
| 900                | -5.07            | -1.69                | -0.05                     | -35.74              | 87.31             | -30.27          | -28.82 | -28.37 | -34.83 |
| 910                | -5.09            | -1.71                | -0.07                     | -34.86              | 87.30             | -29.88          | -28.39 | -27.83 | -34.73 |
| 920                | -5.12            | -1.72                | -0.09                     | -34.08              | 87.26             | -29.47          | -27.94 | -27.28 | -34.63 |
| 930                | -5.14            | -1.73                | -0.10                     | -33.43              | 87.23             | -29.04          | -27.46 | -26.73 | -34.53 |
| 940                | -5.13            | -1.71                | -0.08                     | -32.77              | 87.01             | -28.64          | -27.08 | -26.14 | -34.43 |
| 950                | -5.13            | -1.71                | -0.08                     | -32.20              | 86.97             | -28.26          | -26.77 | -25.66 | -34.33 |
| 960                | -5.14            | -1.71                | -0.08                     | -31.71              | 87.12             | -27.87          | -26.51 | -25.27 | -34.23 |
| 970                | -5.16            | -1.68                | -0.07                     | -31.04              | 87.07             | -27.56          | -26.37 | -25.05 | -34.13 |
| 980                | -5.19            | -1.67                | -0.07                     | -30.43              | 87.04             | -27.29          | -26.20 | -24.86 | -34.03 |
| 990                | -5.20            | -1.64                | -0.05                     | -29.86              | 87.08             | -27.04          | -26.02 | -24.71 | -33.93 |
| 1000               | -5.21            | -1.63                | -0.05                     | -29.26              | 87.05             | -26.74          | -25.82 | -24.54 | -33.83 |

### Typical Performance (-55°C, 25°C & 95°C: 800-1000 MHz)

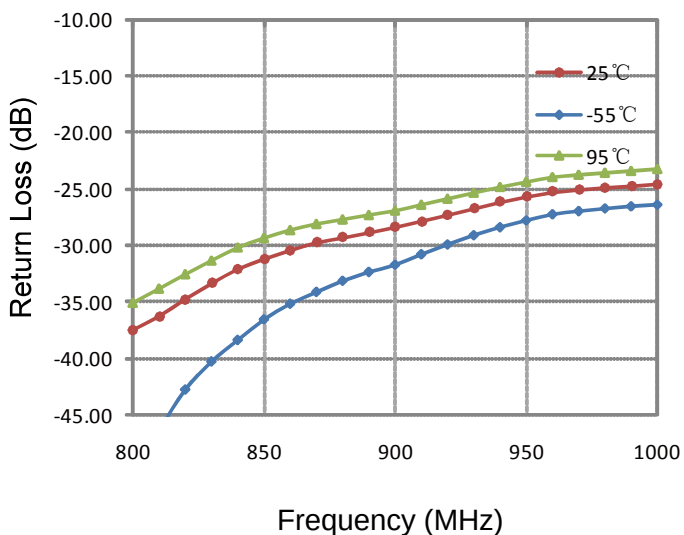
Return Loss (Port 1)



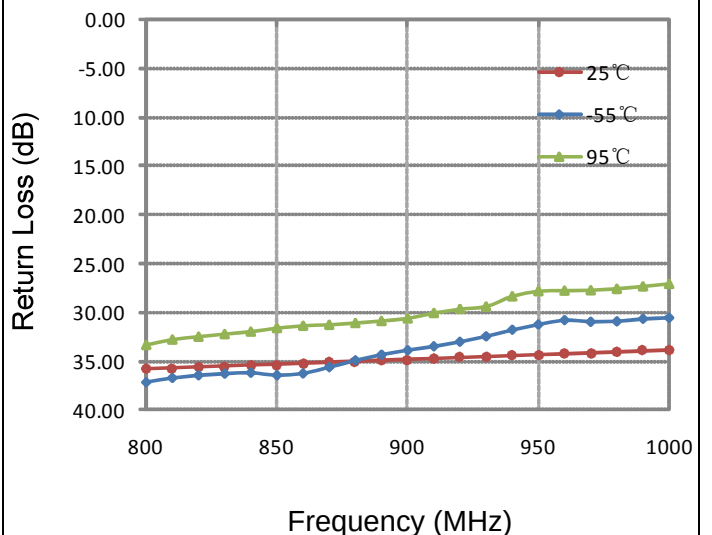
Return Loss (Port 2)



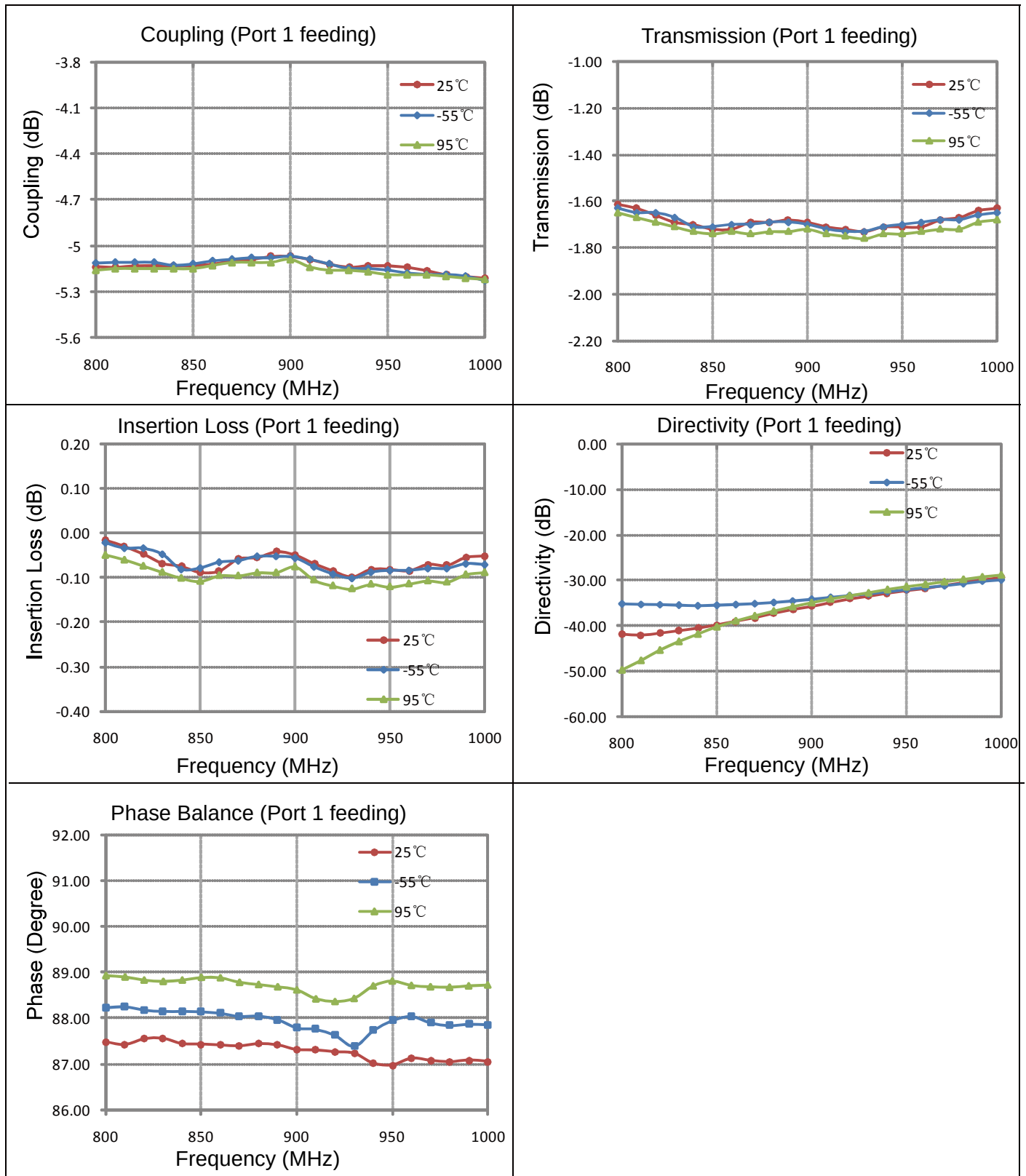
Return Loss (Port 3)



Return Loss (Port 4)



### Typical Performance (-55°C, 25°C & 95°C: 800-1000 MHz)





### Description of Measured Specifications

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

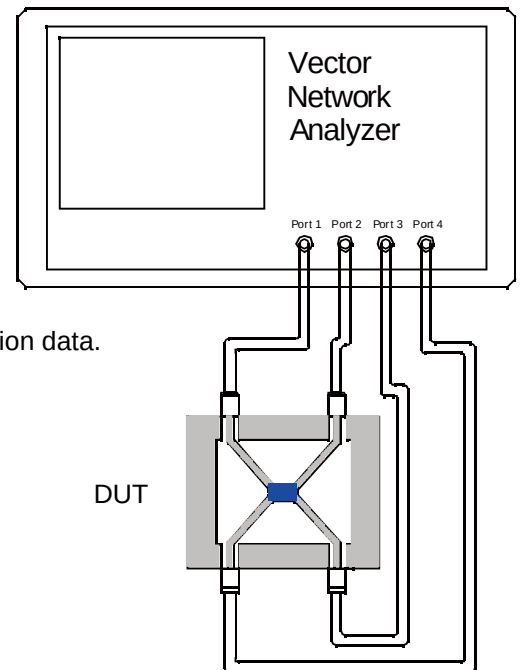
### Test Method

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.

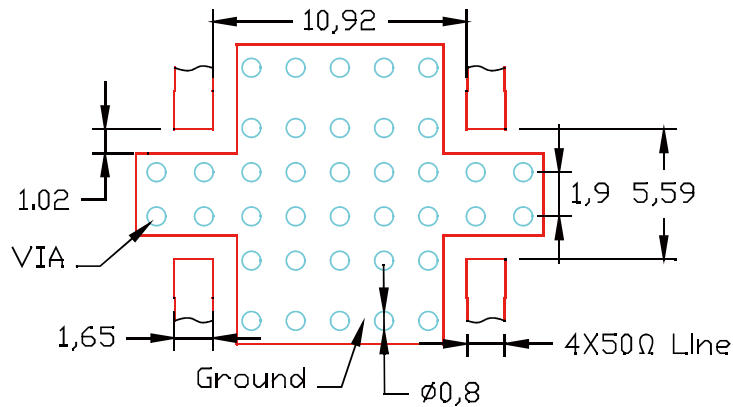
Note:

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℃ |
|----------------------|---------------------------|
| <b>470-860</b>       | 0.07                      |
| <b>800-1000</b>      | 0.10                      |
| <b>1200-1700</b>     | 0.15                      |
| <b>1700-2000</b>     | 0.15                      |
| <b>2000-2300</b>     | 0.20                      |
| <b>2300-2700</b>     | 0.25                      |



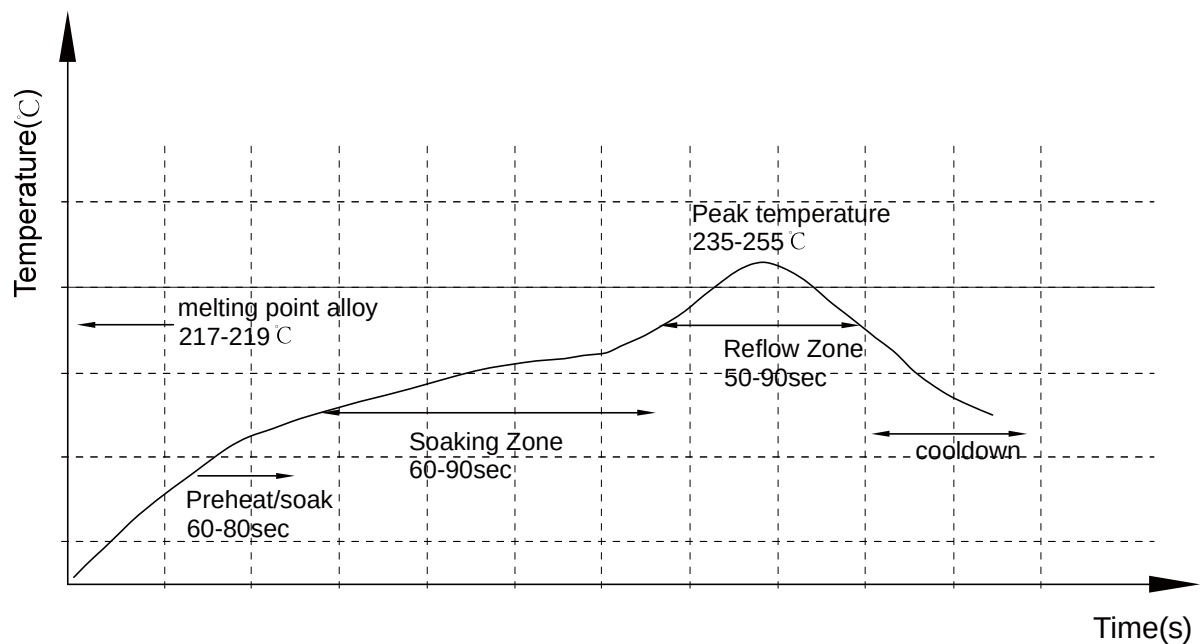
### Recommended PCB Layout



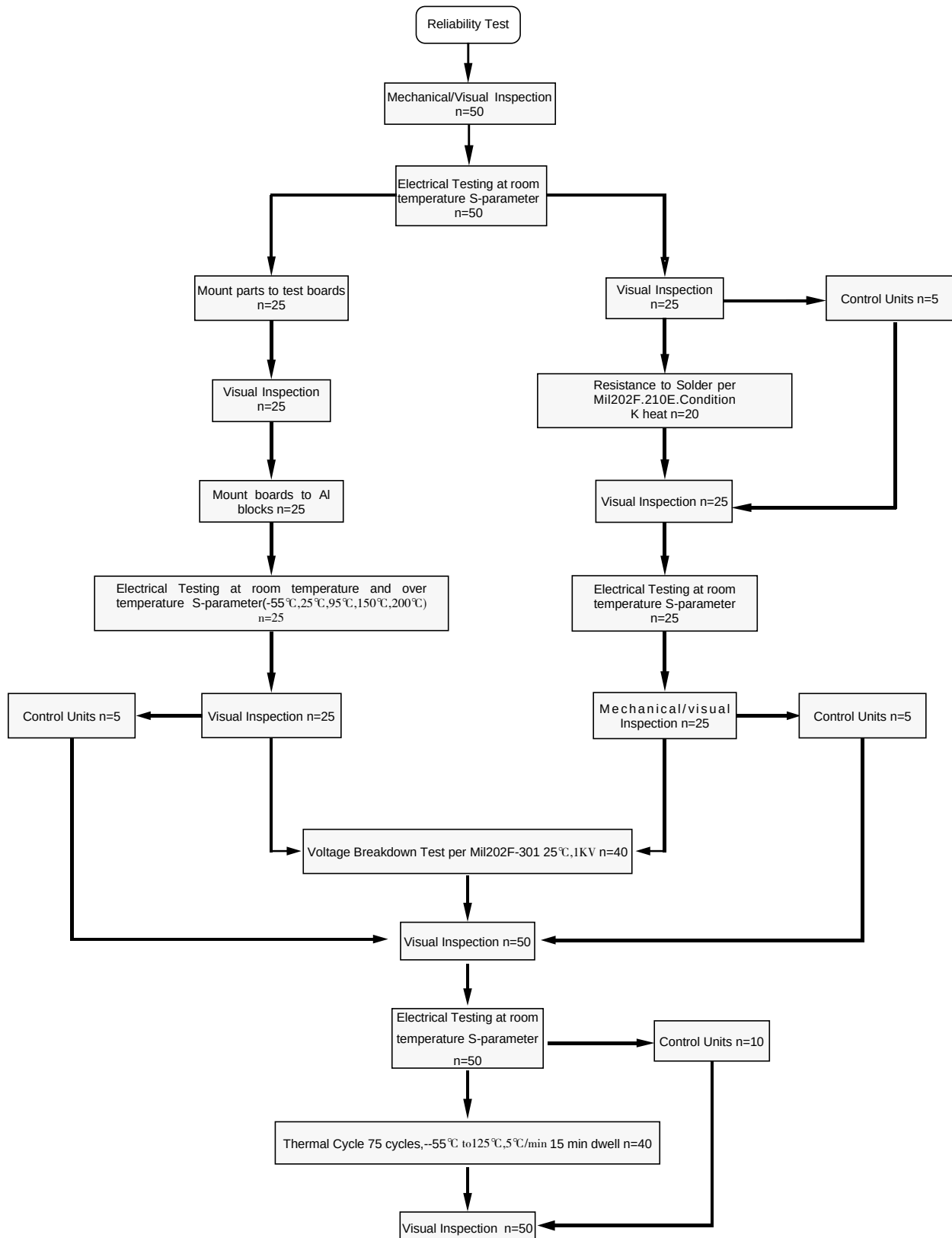
### NOTE:

1. 50 $\Omega$  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.

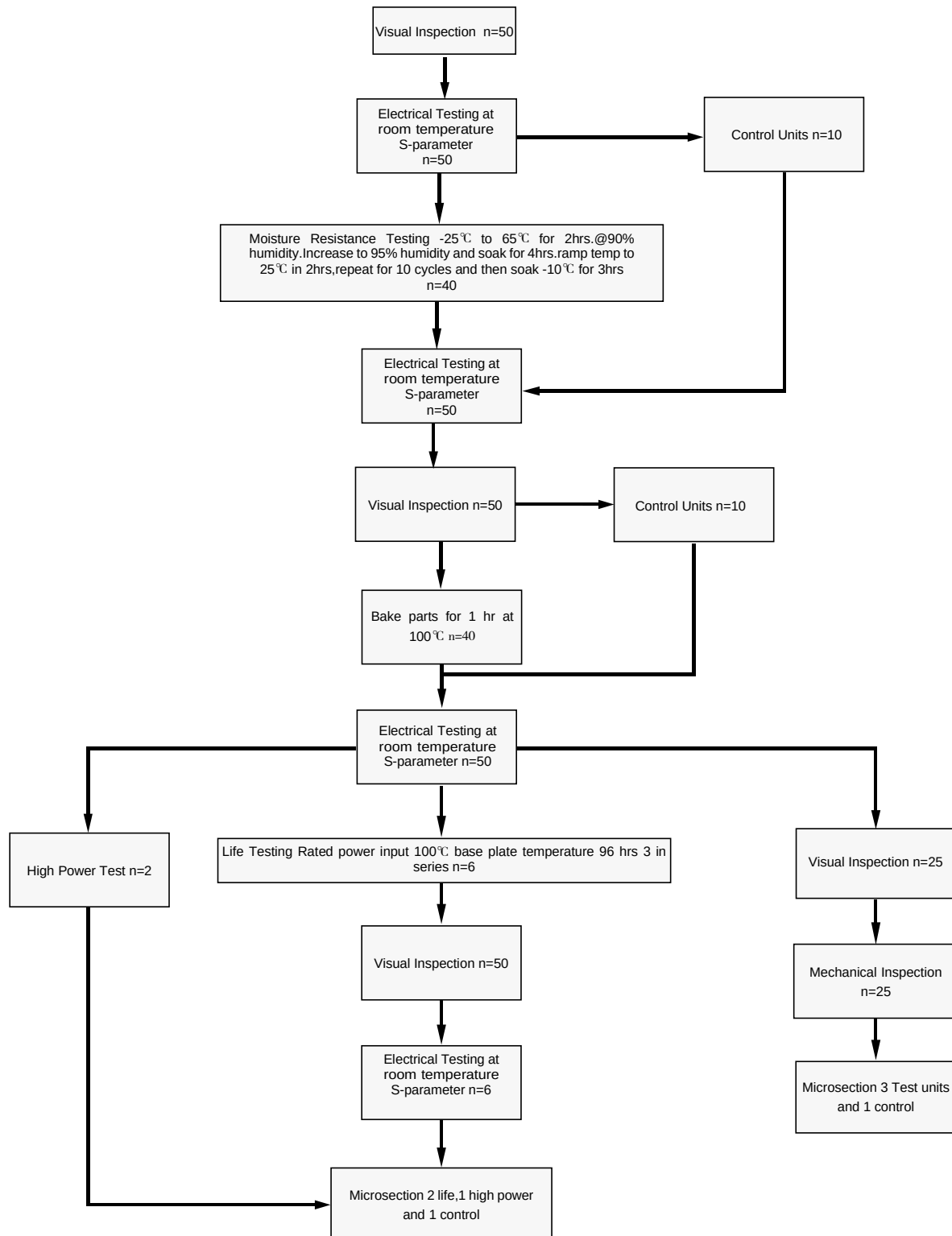
### Reflow Profile



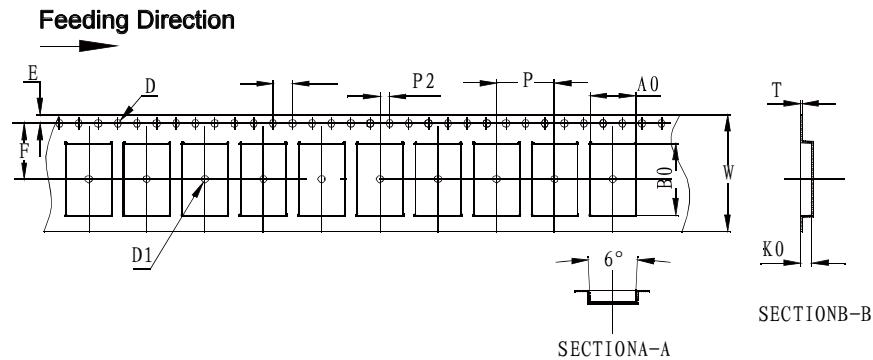
### Reliability Test Flow



### Reliability Test Flow



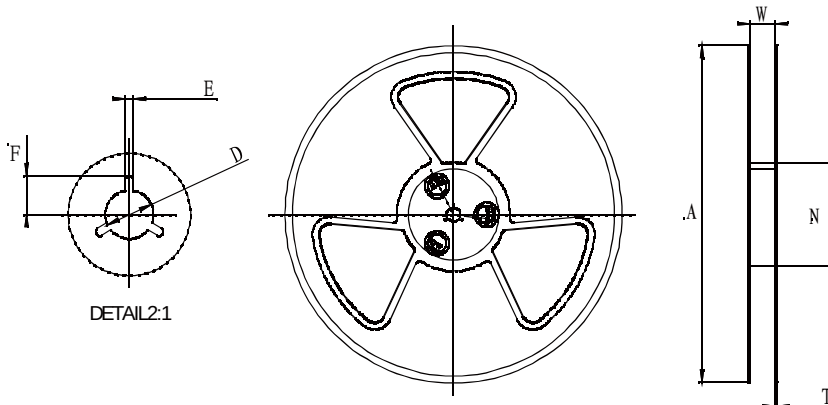
### Tape and Reel Drawing



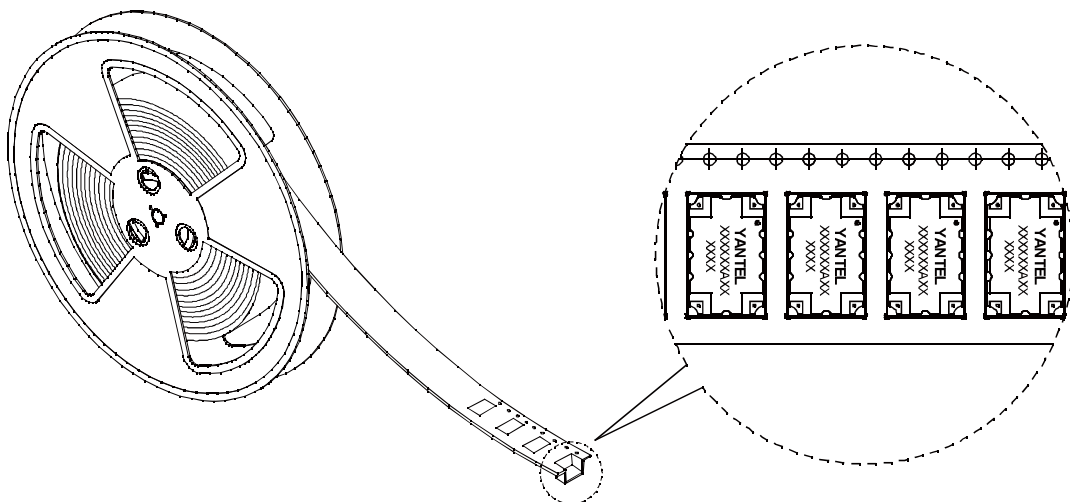
Notice:

- 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:  $0.30 \pm 0.05$ mm
- H. 500 units (maximum) / T&R

| ITEM    | W              | A0             | B0             | K0             | P              | F              | E              | D              | D1             | P0             | P2             | T              | 7"      |
|---------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|---------|
| 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           | P/R     |
| TOLE    | +0.30<br>-0.30 | +0.10<br>-0.10 | +0.10<br>-0.10 | +0.10<br>-0.10 | +0.10<br>-0.10 | +0.10<br>-0.10 | +0.10<br>-0.10 | +0.10<br>-0.00 | +0.10<br>-0.00 | +0.10<br>-0.10 | +0.10<br>-0.10 | +0.05<br>-0.05 | 500 pcs |



| Symbol | Dimensions<br>(mm)   |
|--------|----------------------|
| W      | $24.5 \pm 0.4$       |
| A      | $177 \pm 0.5$        |
| N      | $63 \pm 0.3$         |
| T      | $1.8 \pm 0.2$        |
| E      | $2.1 \pm 0.3$        |
| F      | $10.75 \pm 0.3$      |
| D      | $13.5 + 0.5 / - 0.2$ |



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