DC1500W33

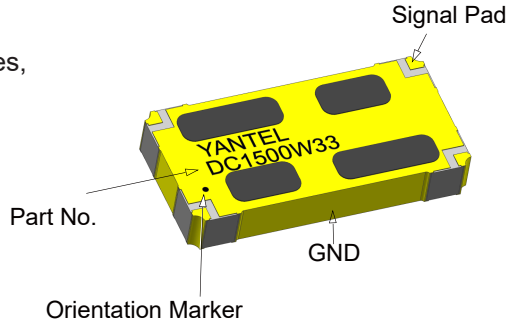
Directional Coupler

Rev A0

Description

High-power broadband surface-mounted and embedded coupler series, realizing the power synthesis and distribution of microwave high-power amplifier system, signal acquisition and other functions. Used in active phased array radar, microwave transceiver components, microwave amplifiers, radio stations, satellite communications and other projects, to provide standardized and customized high-quality and reliable products.

The performance and reliability indexes are in line with international products,and the pin definition and package size are compatible with international products, realizing 100% in-situ replacement.



Features:

- **500-2500 MHz**
- **DCS & PCS**
- **Low Insetion 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**

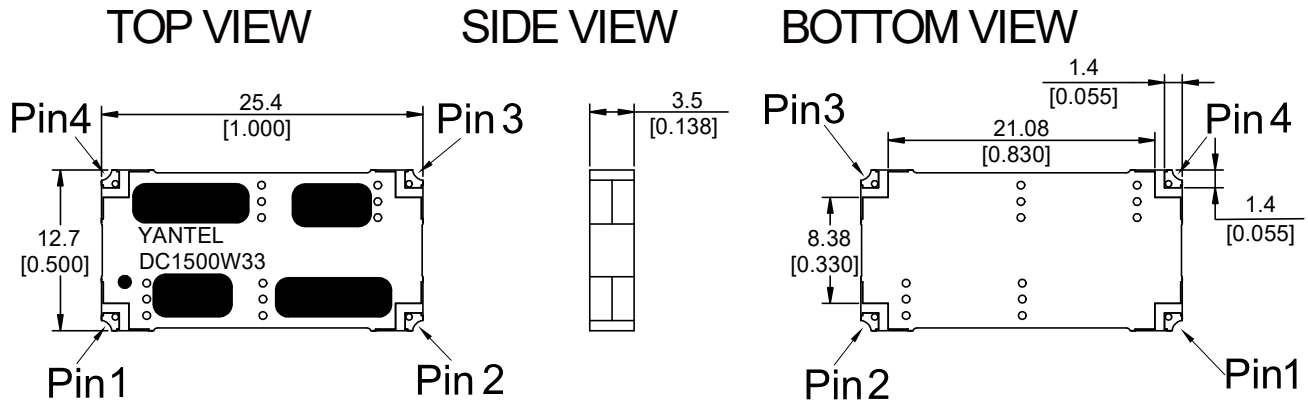
Electrical Specifications (typical)

Frequency *MHz*	Forward Coupled *dB*	Directivity *dB Min*	Return Loss *dB Min*
500-2500	33±2.0dB	18.5dB	15dB

Insertion Loss *dB Max*	Power *Avg. CW Watts*	Operating Temp. *°C*
0.3	150	-55 to +85

Note:
1. All above test data resulting from specify demo board.
2. Insertion loss has removed the thru board loss.

Mechanical Outline



Note: 1. All Dimensions show in mm [inch]
2. RoHS Compliant in accordance with EU Directive(2011/65/EU)
3. REACH Compliant in accordance with Regulation (EC) No 1907/2006
4. Dimension tolerance: ±0.20mm[±0.008inch]

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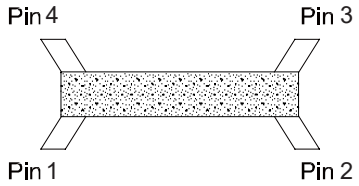
Directional Coupler Pin Configuration

The DC1500W33 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	Reflected Coupled	Transmission	Forward Coupled
Transmission	Forward Coupled	Input	Reflected Coupled

Typical Performance Data (@25℃)

Frequency (MHz)	Forward Coupled (dB)	Transmission (dB)	Insertion Loss (dB)	Reflected Coupled (dB)	Return Loss(dB)	
					S11	S33
500	-33.83	0.00	-0.01	-54.66	-27.27	-28.19
600	-33.18	0.00	0.01	-53.65	-27.15	-28.03
700	-32.84	0.00	0.00	-53.98	-27.74	-28.22
800	-32.76	-0.01	0.00	-54.26	-26.96	-27.89
900	-32.79	0.00	0.00	-54.39	-27.65	-28.23
1000	-32.90	-0.01	-0.01	-55.10	-28.55	-29.09
1100	-33.06	-0.01	-0.01	-55.97	-30.45	-30.67
1200	-33.18	-0.02	-0.01	-57.20	-31.44	-31.19
1300	-33.36	-0.01	-0.01	-57.84	-32.73	-31.53
1400	-33.45	-0.02	-0.02	-58.86	-33.24	-31.44
1500	-33.41	-0.01	-0.01	-60.61	-33.78	-32.27
1600	-33.37	-0.04	-0.04	-60.35	-32.56	-30.28
1700	-33.37	-0.05	-0.05	-59.92	-30.20	-28.58
1800	-33.45	-0.06	-0.06	-58.11	-27.85	-26.90
1900	-33.49	-0.07	-0.04	-73.93	-25.97	-25.07
2000	-32.93	-0.11	-0.03	-66.40	-23.30	-22.91
2100	-33.17	-0.13	-0.04	-65.78	-21.28	-20.96
2200	-32.87	-0.15	-0.06	-64.31	-19.81	-19.41
2300	-32.88	-0.18	-0.18	-70.07	-18.32	-18.14
2400	-32.39	-0.22	-0.22	-64.06	-17.20	-17.06
2500	-31.94	-0.24	-0.23	-61.54	-16.07	-16.08

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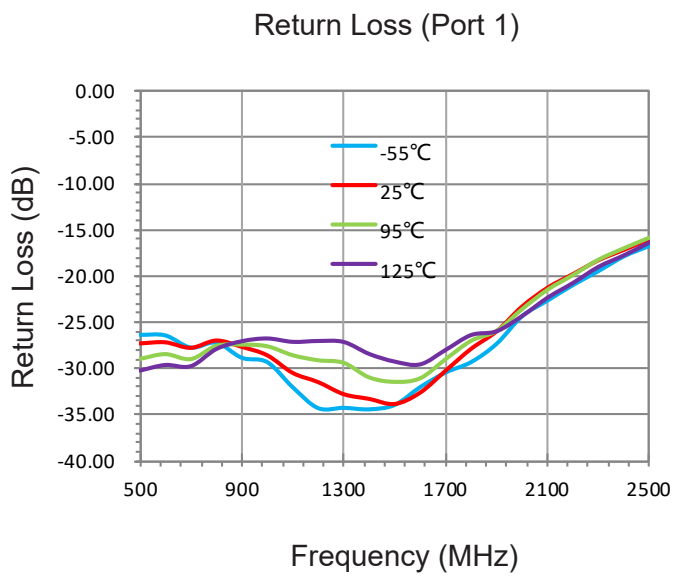
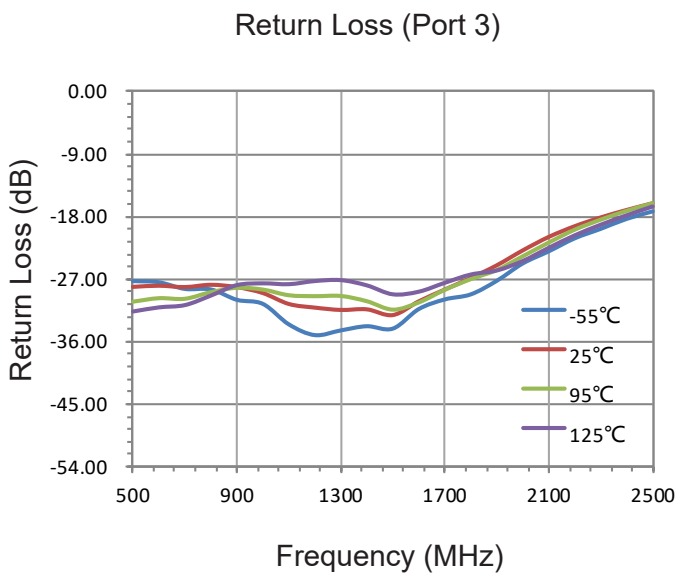
Typical Performance (-55°C, 25°C, 95°C, 125°C : 500-2500 MHz)





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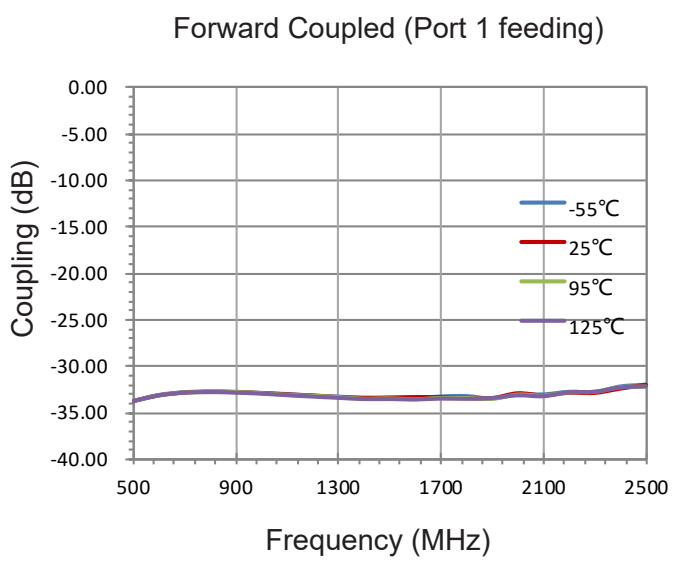

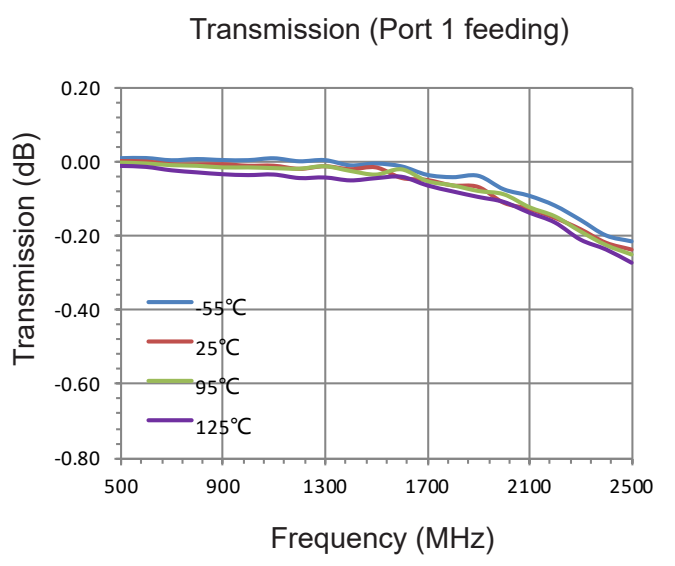

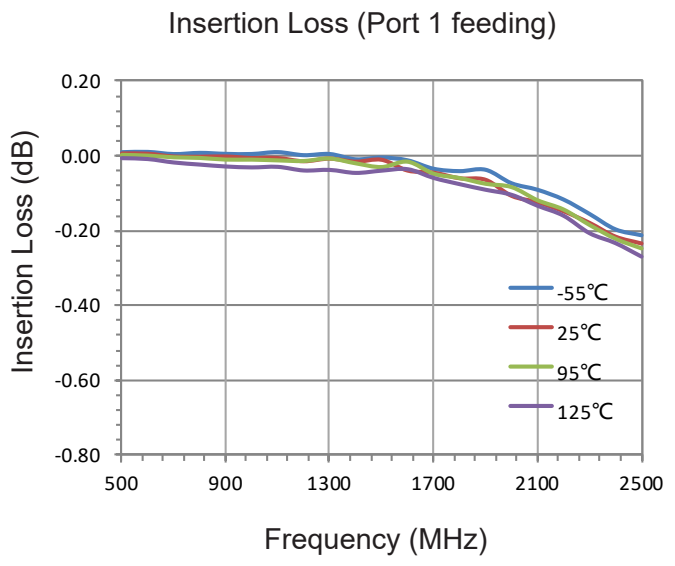

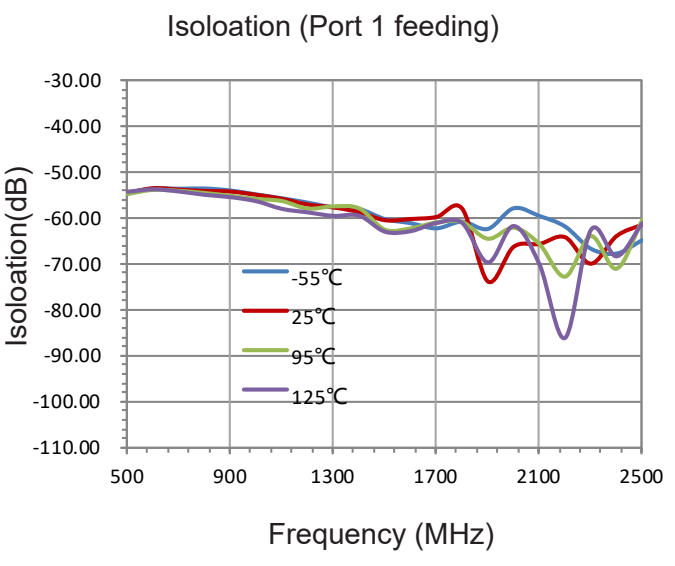

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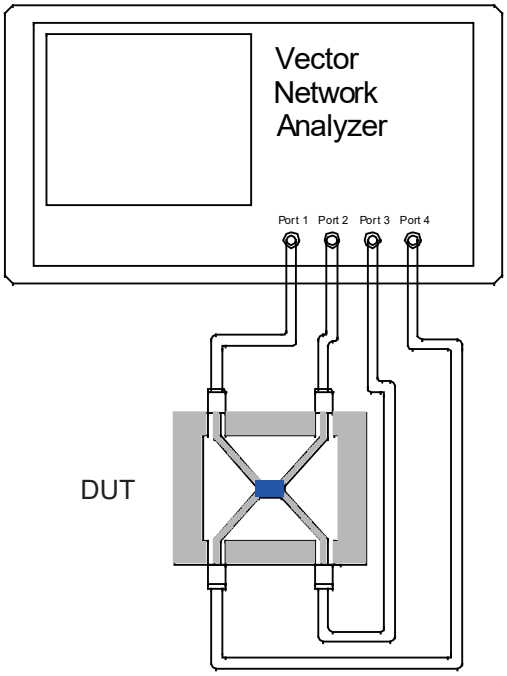
Description of Measured Specifications

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 Forward Coupled port & transmission port
Forward Coupled	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 Forward Coupled port divided by the power at the Reflected Coupled port

Test Method

1. Calibrating your vector network analyzer.
2. Connect the VNA 4 Port to DUT respectively.
3. Measure the data of Forward coupled 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 Reflected Coupled through port 1 to port 2(S21).
6. Measure the data of return loss port 1, port 3.
7. According to the above data to calculate insertion loss, directivity.



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

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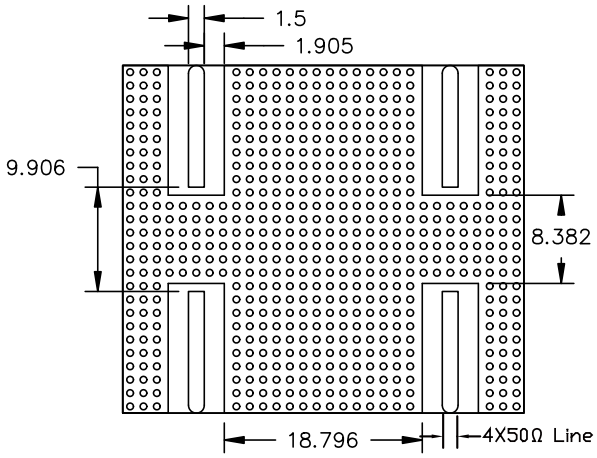
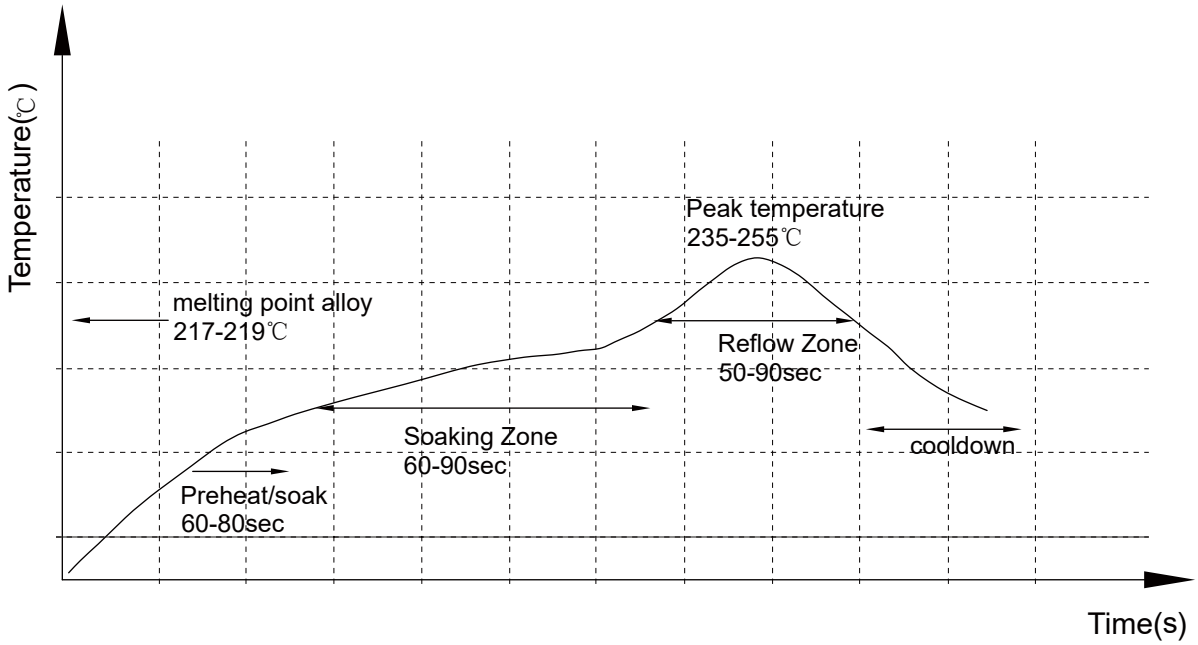
Recommended PCB Layout



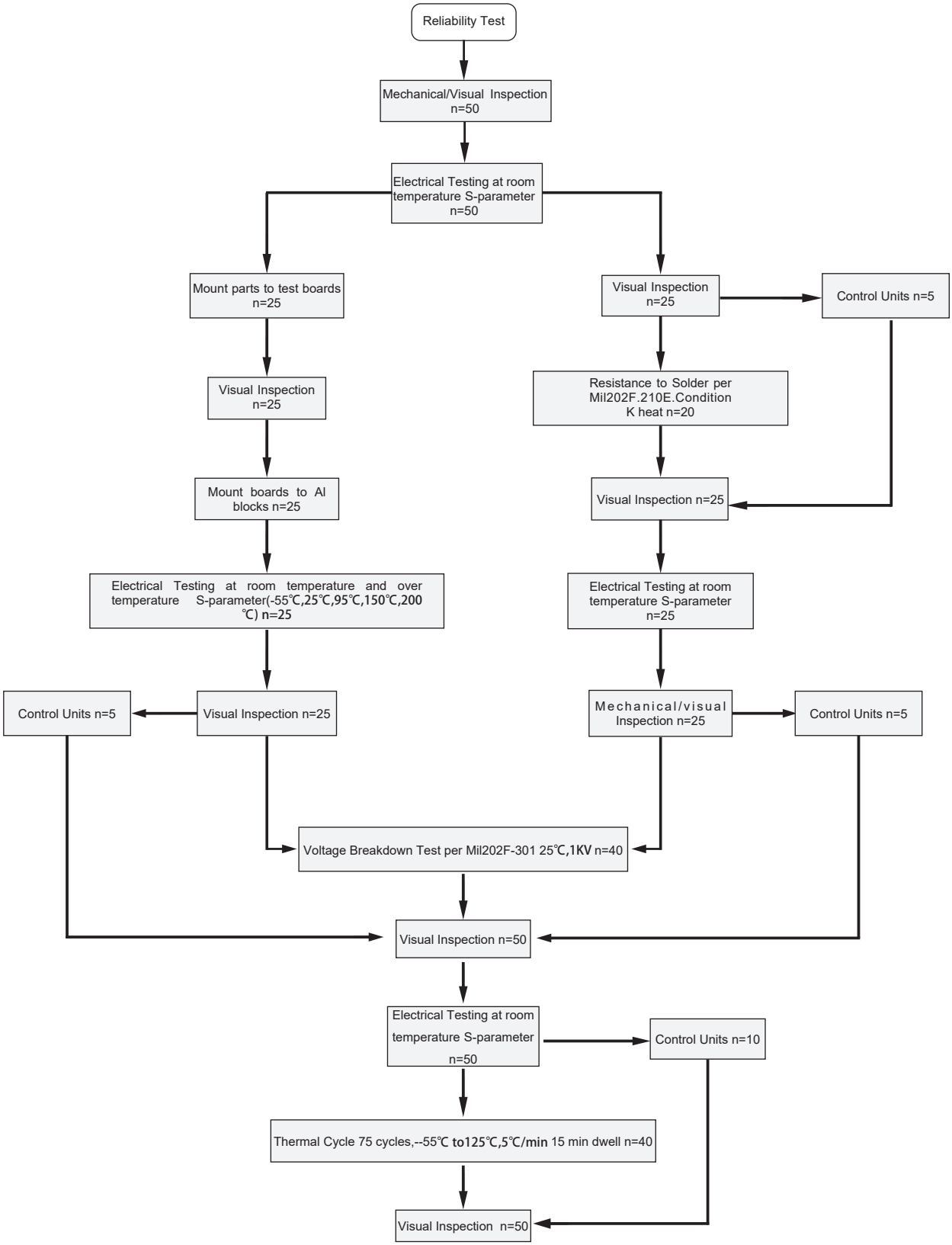
NOTE:

1. 50Ω line width is shown above designing from RO5880 dieletric thickness 0.508mm; 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



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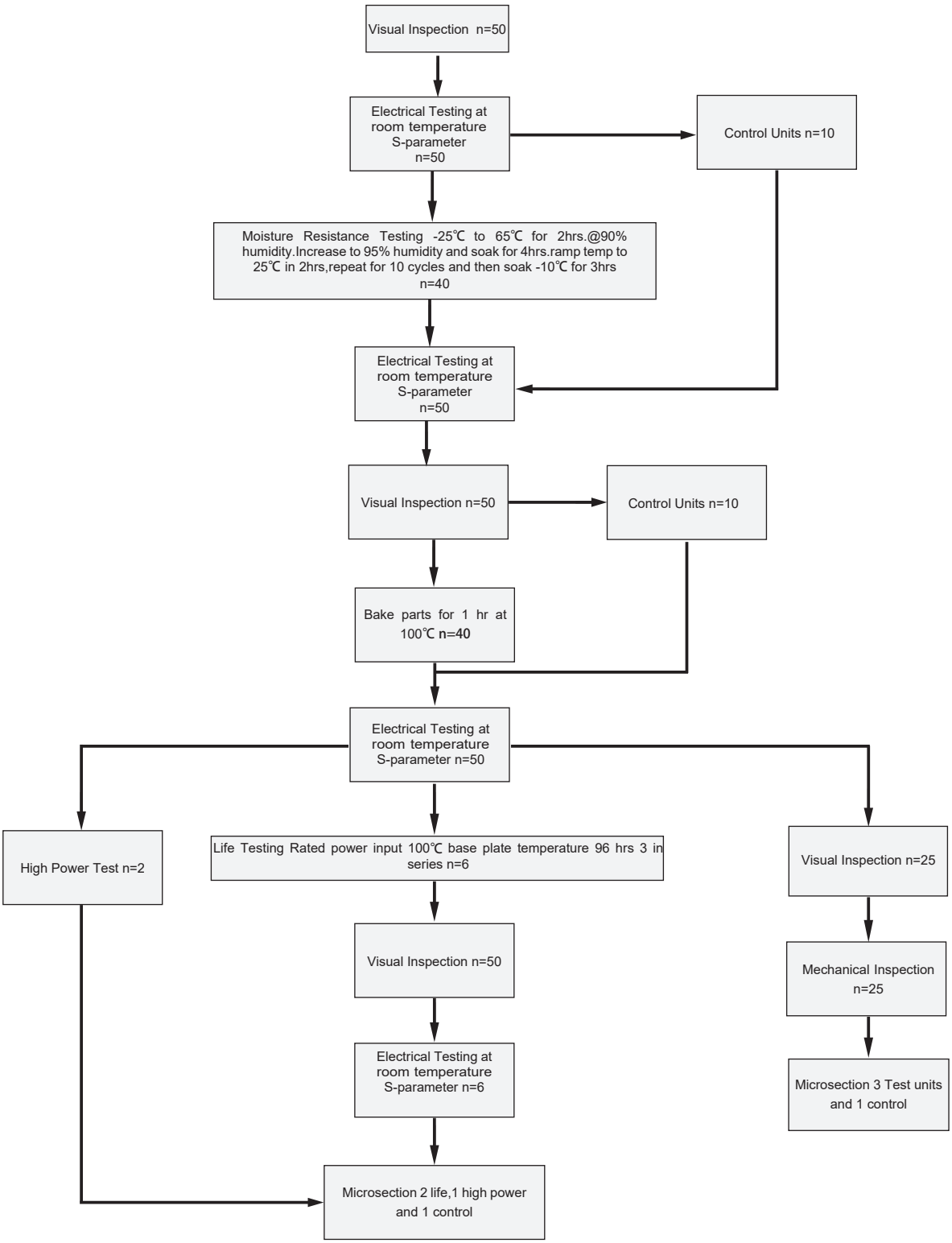

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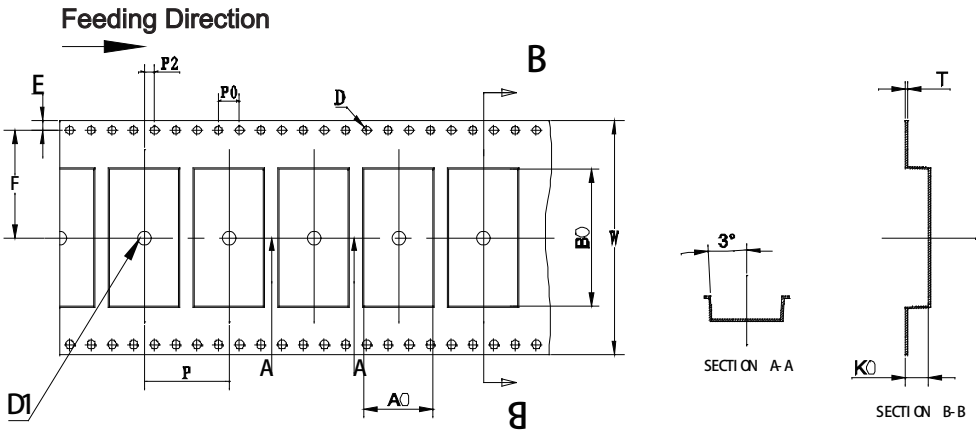
Tape and Reel Drawing



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.

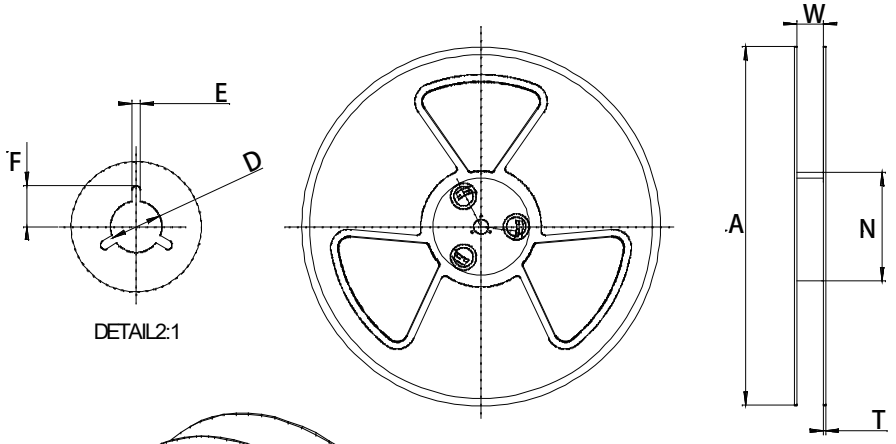
E. K0 measured from a place on the inside bottom of the pocket to top surface of carrier.

F. Material: PE 100

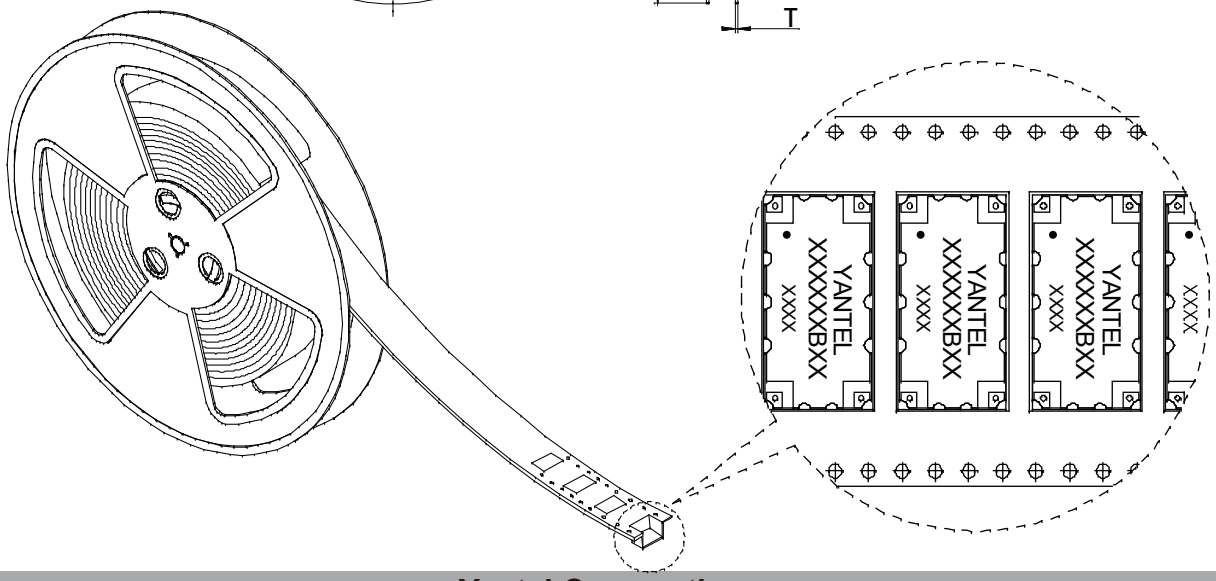
G. Thickness: 0.40±0.05mm

H. 400 units (maximum) / T&R

ITEM	W	A0	B0	K0	P	F	E	D	D1	P0	P2	T	13″
DIM(mm)	44.00	13.2	25.90	3.60	16.00	20.20	1.75	1.50	1.50	4.00	2.00	0.40	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	+0.15 -0.15	+0.05 -0.05	400 pcs



Symbol	Dimensions(mm)
W	44.5±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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