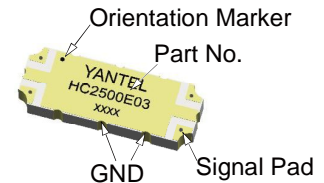


Description

The HC2100E03 is a low profile, high performance 3dB hybrid coupler in a new easy to use, manufacturing friendly surface mount package. It is designed for UMTS & other 3G applications. The HC2100E03 is particularly for balanced power and low noise amplifiers, plus signal designed distribution and other applications where low insertion loss and tight amplitude and phase balance is required. It can be used in high power applications up to 100 Watts.

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, RO4350 and polyimide.



Features:

- 2300-2700 MHz
- UMT & 3G
- High Power
- Very Low Loss
- Tight Amplitude Balance
- High Isolation
- 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

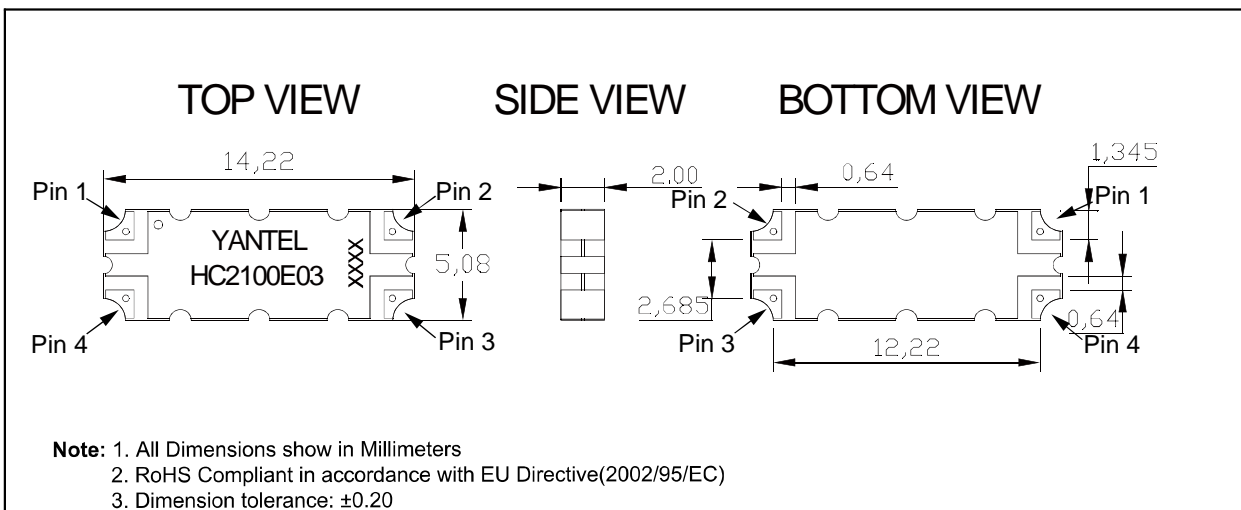
Electrical Specifications

Frequency	Isolation	Insertion Loss	VSWR	Amplitude Balance
<i>MHz</i>	<i>dB Min</i>	<i>dB Max</i>	<i>Max : 1</i>	<i>dB Max</i>
2300 - 2700	26	0.20	1.12	± 0.15
Phase Balance	Power	Operating Temp.		
<i>Degrees</i>	<i>Avg. CW Watts</i>	<i>°C</i>		
90 ± 2.0	100	-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

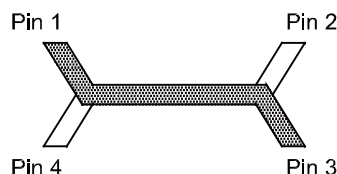


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Hybrid Coupler Pin Configuration

The HC2100E03 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:



Configuration	Pin 1	Pin 2	Pin 3	Pin 4
Splitter	Input	Isolated	-3dB $\angle \theta - 90$	-3dB $\angle \theta$
Splitter	Isolated	Input	-3dB $\angle \theta$	-3dB $\angle \theta - 90$
Splitter	-3dB $\angle \theta - 90$	-3dB $\angle \theta$	Input	Isolated
Splitter	-3dB $\angle \theta$	-3dB $\angle \theta - 90$	Isolated	Input
*Combiner	A $\angle \theta - 90$	A $\angle \theta$	Isolated	Output
*Combiner	A $\angle \theta$	A $\angle \theta - 90$	Output	Isolated
*Combiner	Isolated	Output	A $\angle \theta - 90$	A $\angle \theta$
*Combiner	Output	Isolated	A $\angle \theta$	A $\angle \theta - 90$

*Note: "A" is the amplitude of the applied signals. When two quadrature signals with equal amplitudes are applied to the coupler as described in the table, they will combine at the output port. If the amplitudes are not equal, some of the applied energy will be directed to the isolated port.

Typical Performance Data (@25°C)

Frequency (MHz)	Coupling (dB)	Transmission (dB)	Insertion Loss (dB)	Isolation (dB)	Amplitude Balance (dB)	Phase (degree)	Return Loss(dB)			
							S11	S22	S33	S44
2300	-3.03	-3.03	-0.02	-28.72	0.00	90.19	-28.70	-29.19	-29.10	-32.55
2320	-3.03	-3.05	-0.03	-28.61	0.02	90.07	-28.69	-29.07	-29.12	-32.15
2340	-3.10	-3.11	-0.09	-28.49	0.02	90.13	-28.79	-29.01	-29.31	-31.81
2360	-3.16	-3.16	-0.15	-28.37	0.00	90.06	-28.67	-28.95	-29.35	-31.33
2380	-3.12	-3.13	-0.12	-28.25	0.01	90.23	-28.60	-28.86	-29.47	-30.98
2400	-3.01	-3.05	-0.02	-28.11	0.04	90.49	-28.46	-28.76	-29.51	-30.55
2420	-2.96	-3.02	0.02	-28.02	0.06	90.49	-28.30	-28.66	-29.51	-30.16
2440	-3.06	-3.13	-0.08	-27.95	0.08	90.45	-28.19	-28.53	-29.55	-29.69
2460	-3.13	-3.22	-0.16	-27.87	0.10	90.28	-28.06	-28.37	-29.58	-29.32
2480	-3.10	-3.17	-0.12	-27.75	0.07	90.24	-28.11	-28.21	-29.58	-28.93
2500	-2.97	-3.03	0.01	-27.66	0.05	90.24	-28.13	-28.05	-29.70	-28.48
2520	-3.03	-3.06	-0.03	-27.55	0.02	90.31	-28.16	-27.91	-29.99	-28.08
2540	-3.10	-3.13	-0.11	-27.41	0.04	90.53	-28.11	-27.82	-30.22	-27.71
2560	-3.13	-3.18	-0.14	-27.26	0.05	90.60	-28.17	-27.72	-30.52	-27.37
2580	-3.06	-3.14	-0.09	-27.18	0.07	90.62	-28.16	-27.68	-30.94	-27.04
2600	-2.98	-3.07	-0.02	-27.08	0.08	90.42	-28.12	-27.70	-30.99	-26.71
2620	-3.03	-3.09	-0.05	-26.97	0.06	90.45	-28.01	-27.66	-31.13	-26.41
2640	-3.14	-3.17	-0.15	-26.85	0.03	90.35	-27.86	-27.61	-31.26	-26.06
2660	-3.19	-3.20	-0.18	-26.76	0.01	90.43	-27.79	-27.51	-31.33	-25.84
2680	-3.17	-3.15	-0.15	-26.64	-0.02	90.57	-27.74	-27.39	-31.40	-25.59
2700	-3.12	-3.12	-0.11	-26.55	0.01	91.00	-27.56	-27.35	-31.68	-25.33

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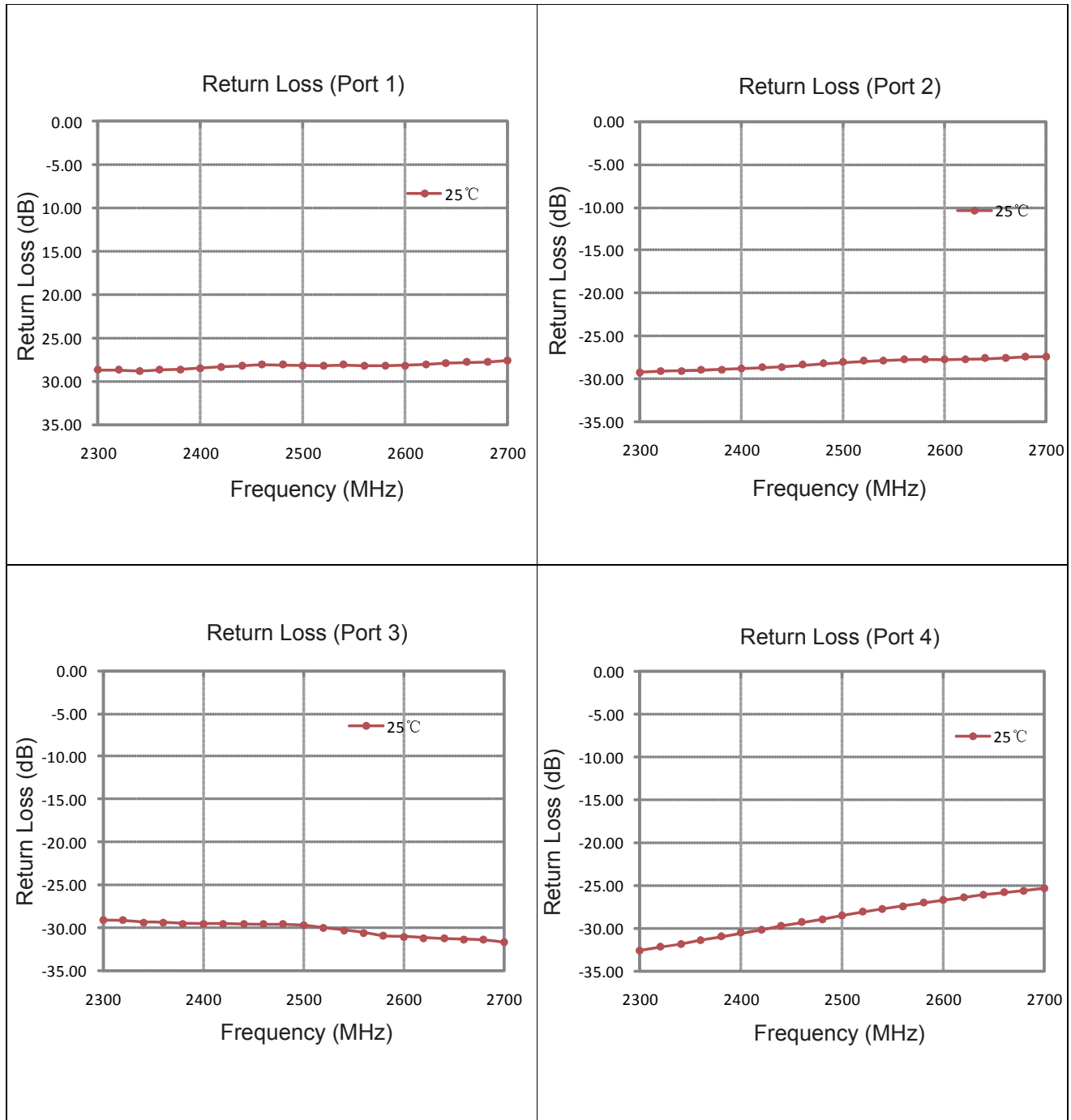
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HC2500E03

Hybrid Coupler 3 dB, 90°

Typical Performance (25°C, 2300-2700 MHz)



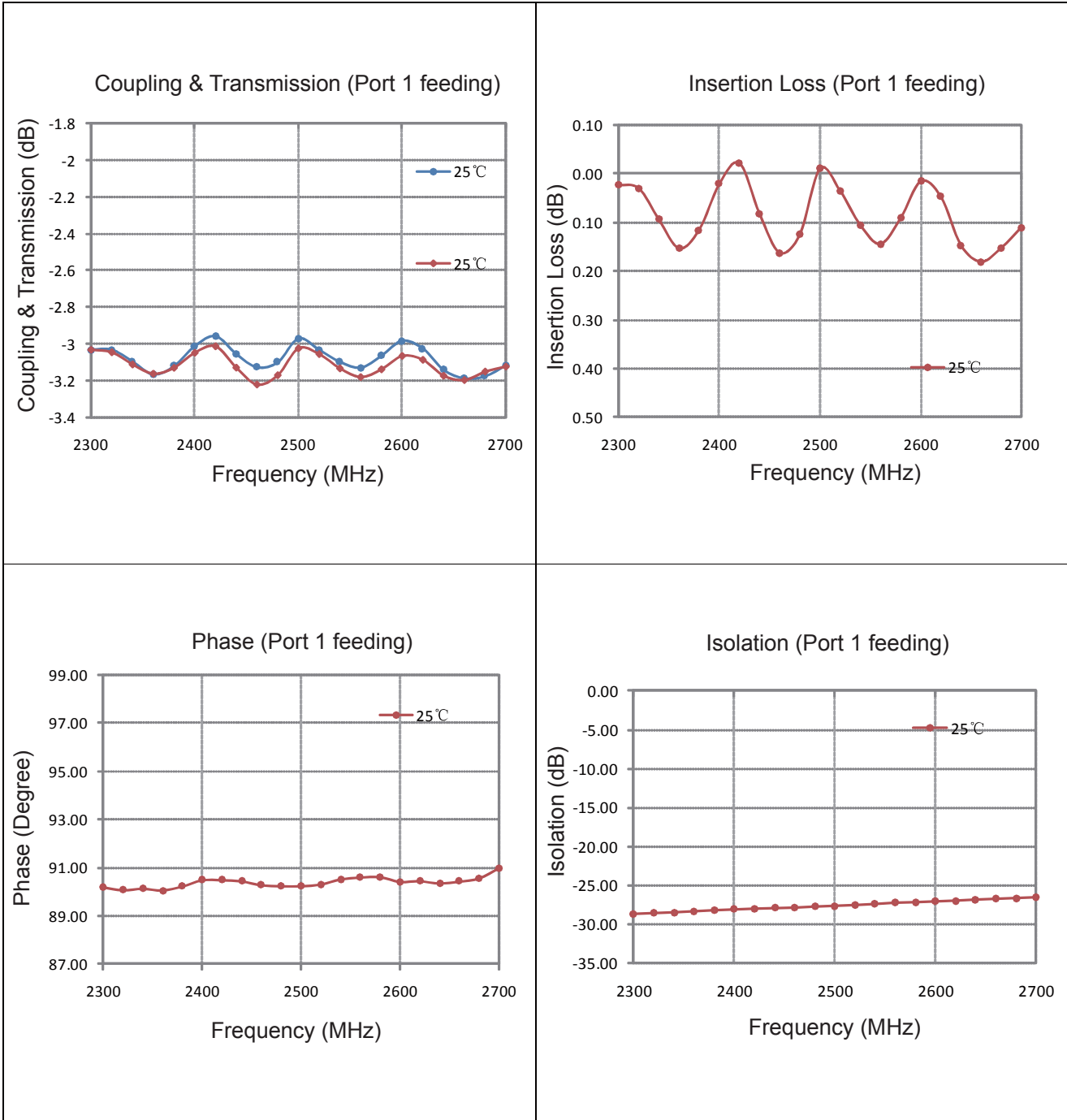
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Typical Performance (25°C: 2300-2700 MHz)



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Description of Measured Specifications

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

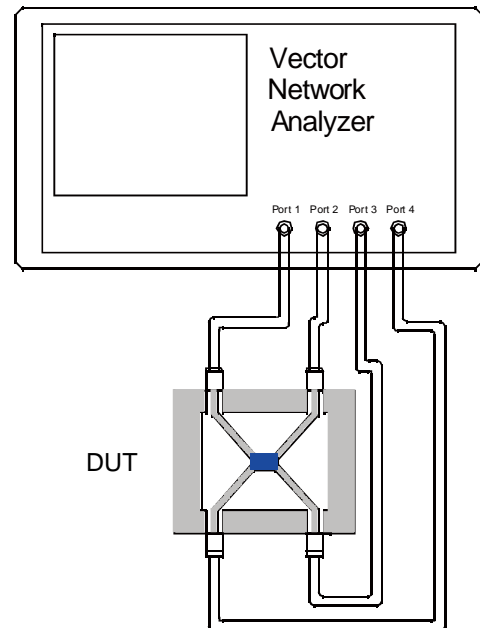
Test Method

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



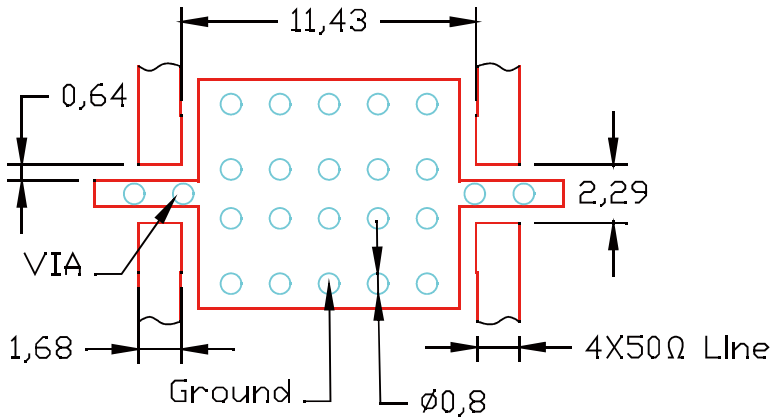
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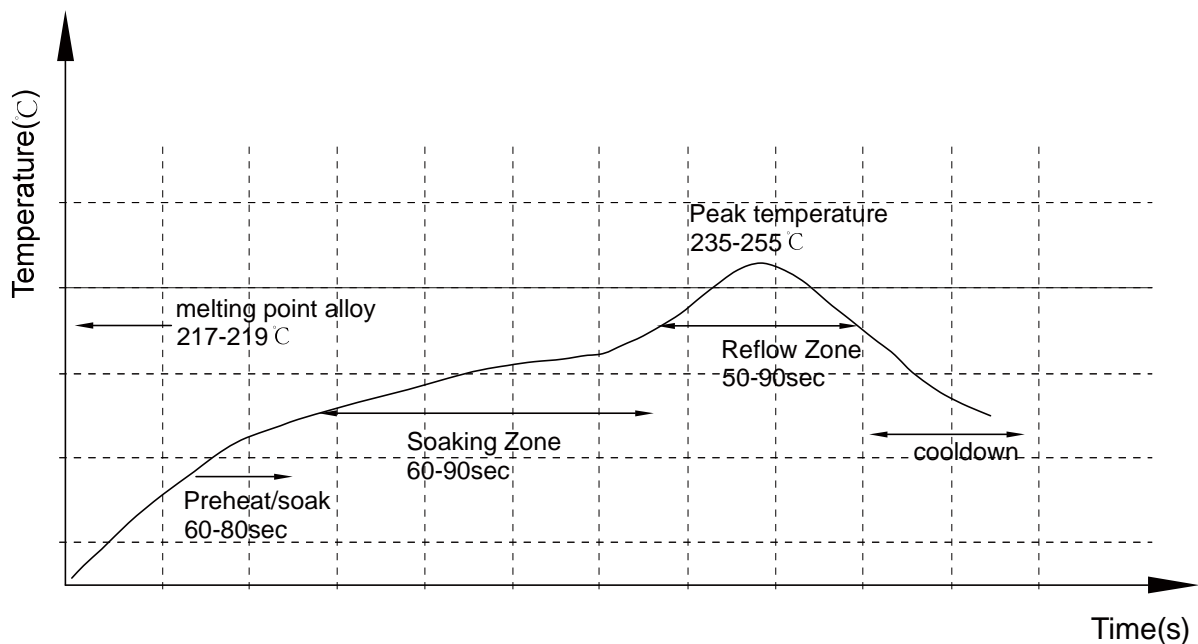
Recommended PCB Layout



NOTE:

1. 50Ω 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.

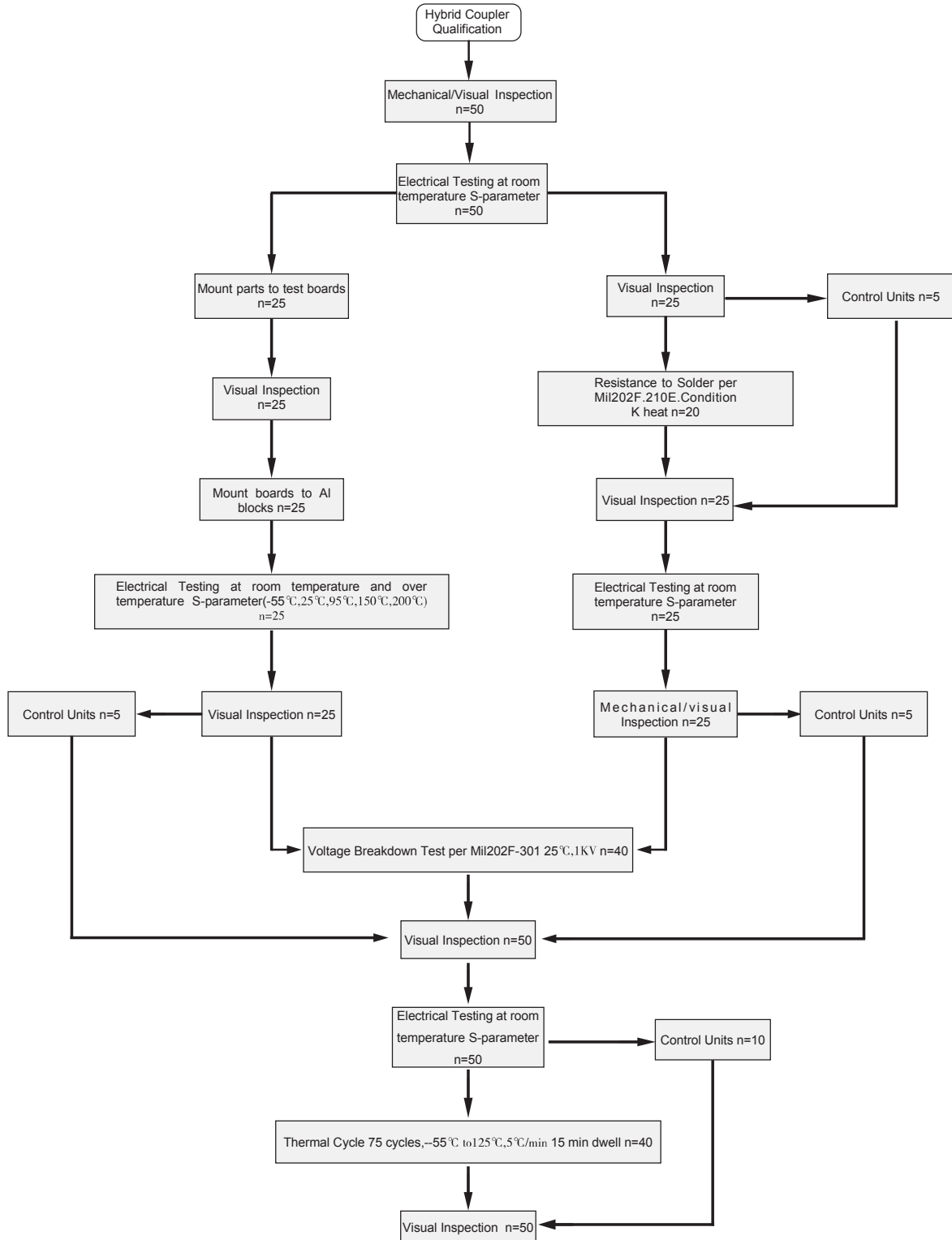
Reflow Profile



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Reliability Test Flow



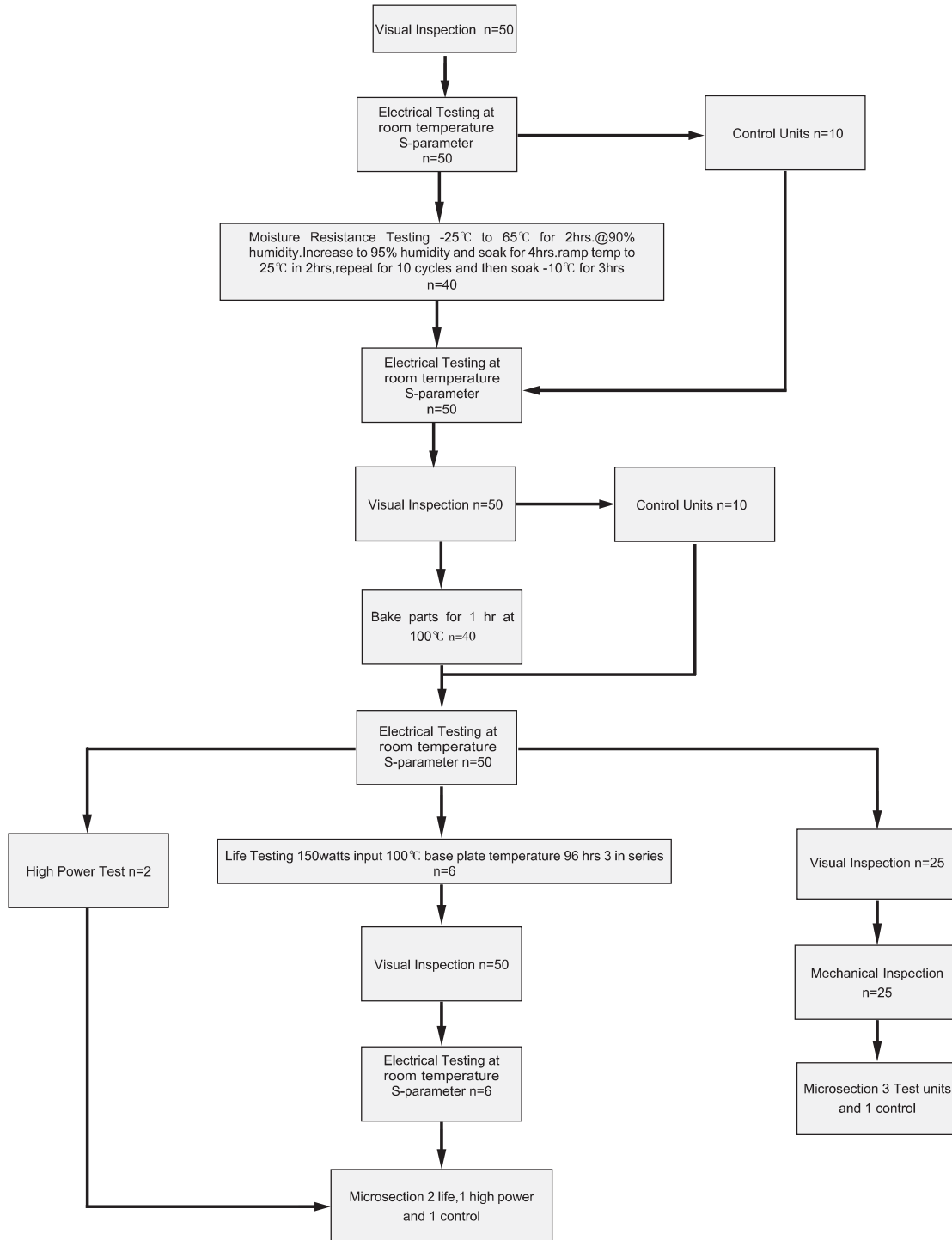
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Reliability Test Flow



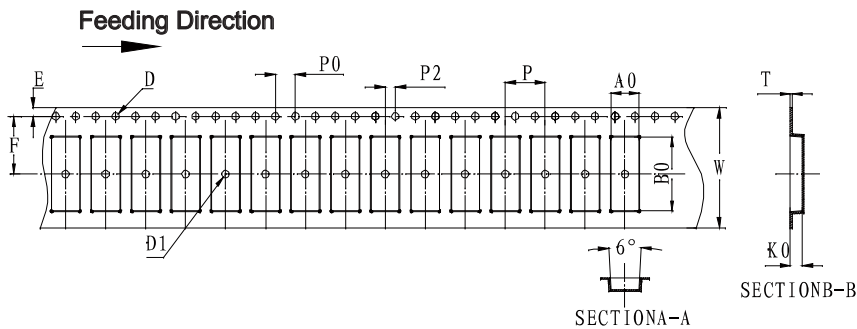
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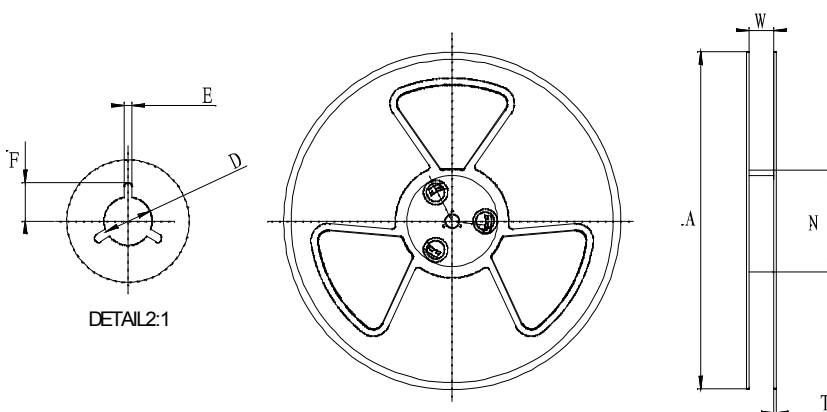
Tape and Reel Drawing



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. 3000 units (maximum) / T&R

ITEM	W	A0	B0	K0	P	F	E	D	D1	P0	P2	T	13"	
DIM(mm)	24.0	5.60	14.80	2.40	8.00	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	24.8WR	3000pcs



Symbol	Dimensions(mm)
W	24.5±0.4
A	330±0.5
T	100±0.3
N	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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HC2500E03

Hybrid Coupler 3 dB, 90°

RoHS Test Report

SGS Job No. :SZ12995579
 SGS Internal Reference No. :2.1
 Tested sample information :HC1900A03
 Client Reference Information :HC1900A03,:HC2100A03,:HC2500A03,HC0900E03,HC1900E03,
 HC2100E03,HC2500E03
 Date of Sample Received :MAR 09,2011
 Testing Period :MAR 09,2011 TO MAR 14,2011
 Test Requested :Selected test (s) with reference to EU COM(2008) 809/final as requested by client.
 Test Method :Please refer to next page(s).
 Test Result(s) :Please refer to next page(s).

A:RoHS Directive 2002/95/EC

Test Item(s)	Unit	Test Method (Reference)	Result	MDL	Limit
Cadmium (Cd)	mg/kg	IEC 62321 : 2008, ICP-OES	N.D.	2	100
Lead(Pb)	mg/kg	IEC 62321 : 2008, ICP-OES	7	2	1000
Mercury(Hg)	mg/kg	IEC 62321 : 2008, ICP-OES	N.D.	2	1000
Hexavalent Chromium (CrVI) by	mg/kg			2	1000
Sum OF PBBs	mg/kg	-	N.D.	-	1000
Sum OF PBDEs	mg/kg	-	N.D.	-	1000

B:HBCDD & Phthalate(s)

Test Item(s)	Unit	Test Method (Reference)	Result	MDL
Hexabromocyclododecane (HBCDD)	mg/kg	EPA 3550C:2007, GC-MS	N.D.	10
Dibutyl Phthalate (DBP)	%(W/W)	EN14372:2004, GC-MS	N.D.	0.003
Benzylbutyl Phthalate (BBP)	%(W/W)	EN14372:2004, GC-MS	N.D.	0.003
Di-(2-ethylhexyl) Phthalate (DEHP)	%(W/W)	EN14372:2004, GC-MS	N.D.	0.003

Note:

- 1.mg/kg=ppm,01%=1000ppm
- 2.N.D.=Not detected(<MDL)
- 3.MDL=Method Detection Limit
- 4."-"=Not regulated

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