

Ceramic Balun RF Transformer

50Ω 3500 to 11000 MHz

NCR2-113-2+



CASE STYLE: NF1846-1

Maximum Ratings

Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
Input RF Power	3W
Permanent damage may occur if any of these limits are exceeded.	

Pad Connections

PRIMARY DOT (Unbalanced Port)	2
SECONDARY DOT (Balanced)	6
SECONDARY (Balanced)	4
GND Externally	1,3,5

Features

- wideband, 3500 to 11000 MHz
- miniature size, 0.079"x0.098"x0.035"
- LTCC construction
- low cost
- aqueous washable

Applications

- Point to Point
- ISM
- Radio navigation
- SATCOM

+RoHS Compliant

The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

Electrical Specifications at 25°C

Parameter	Frequency (MHz)	Min.	Typ.	Max.	Unit
Impedance Ratio (secondary/primary)			2		
Frequency Range		3500	—	11000	MHz
Insertion Loss*	3500 - 11000	—	0.5	2.7	dB
Amplitude Unbalance	3500 - 11000	—	1.0	3.5	dB
Phase Unbalance†	3500 - 11000	—	9	19	Degree

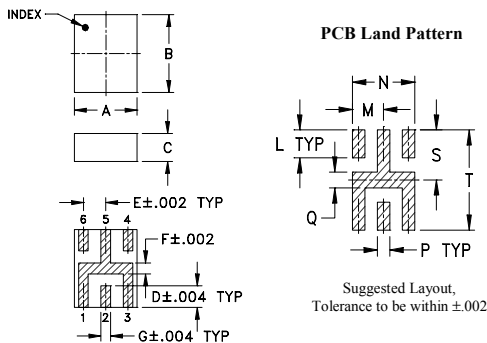
* Insertion Loss is referenced to mid-band loss, 0.60 dB. Reference Demo Board TB-745+.

† Relative to 180°

Typical Performance Data at 25°C

FREQUENCY (MHz)	INSERTION LOSS (dB)	INPUT R. LOSS (dB)	AMPLITUDE UNBALANCE (dB)	PHASE UNBALANCE (Deg.)
3500.0	0.40	9.66	1.48	8.68
4260.0	0.03	13.51	0.90	11.83
5000.0	0.06	12.80	0.63	11.92
5760.0	0.13	12.06	0.35	8.73
6500.0	0.21	11.60	0.12	4.61
7260.0	0.30	11.13	0.53	1.54
8000.0	0.39	10.68	0.55	0.46
8760.0	0.43	10.82	0.08	3.02
9500.0	0.41	11.69	0.55	6.73
11000.0	0.70	12.34	1.68	6.60

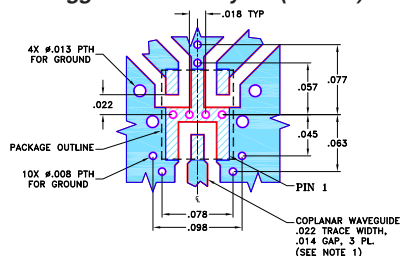
Outline Drawing



Outline Dimensions (inch/mm)

A	B	C	D	E	F	G	L
.079	.098	.035	.027	.028	.014	.014	.028
2.01	2.49	0.89	0.69	0.71	0.36	0.36	0.71
M	N	P	Q	R	S	T	wt
.035	.07	.014	.016	--	.050	.100	grams
0.89	1.78	0.36	0.41	--	1.27	0.03	0.020

Demo Board MCL P/N: TB-745+ Suggested PCB Layout (PL-425)



NOTES:

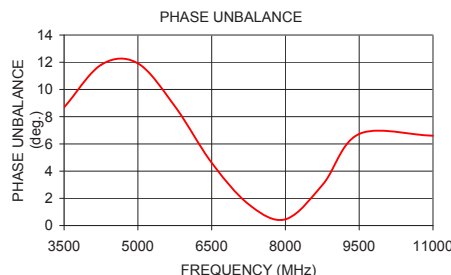
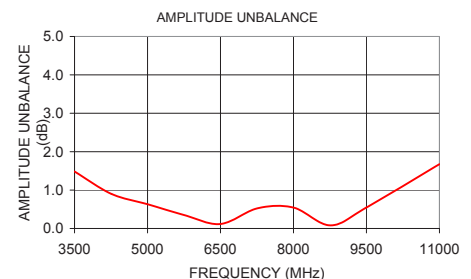
1. COPLANAR WAVEGUIDE PARAMETERS ARE SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .010"±.001". COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH AND GAP MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.
3. DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER).
4. DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

Notes

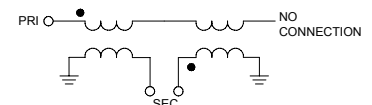
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configuration J



REV. OR
M153360
NCR2-113-2+
ED-16126
AV/EC/CP
151013
Page 1 of 1

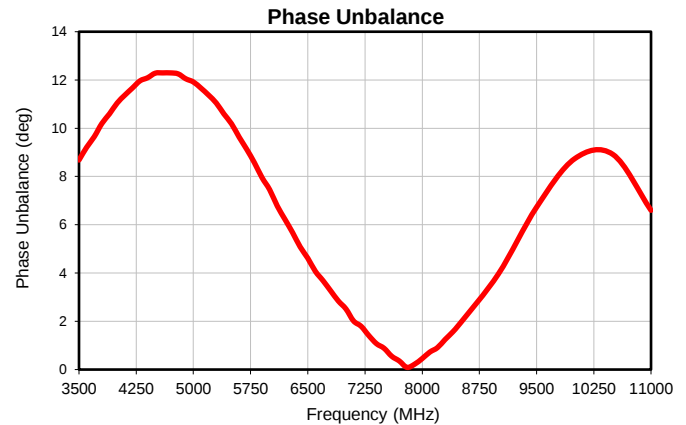
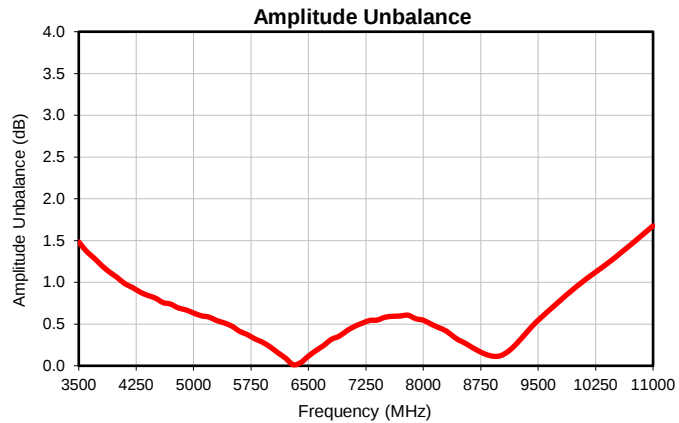
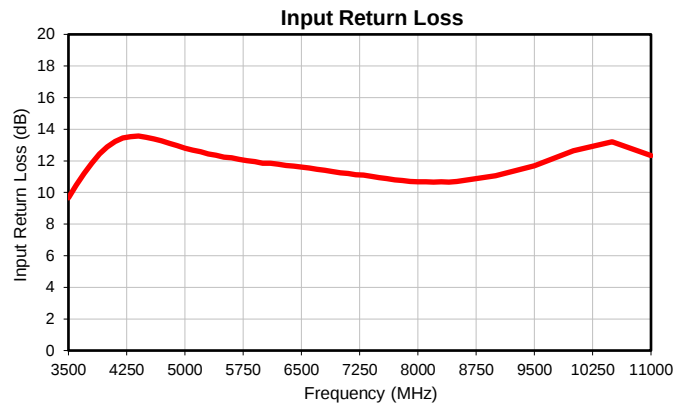
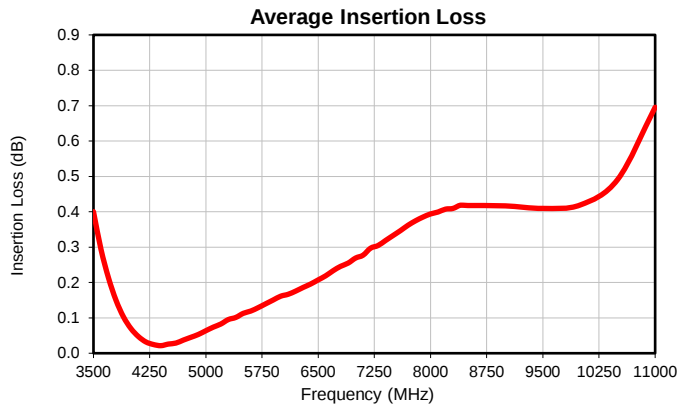
Typical Performance Data

FREQUENCY (MHz)	AVERAGE INSERTION LOSS* (dB)	INPUT RETURN LOSS (dB)	AMPLITUDE UNBALANCE (dB)	PHASE UNBALANCE** (deg.)
3500	0.40	9.66	1.48	8.68
3600	0.29	10.46	1.37	9.21
3700	0.21	11.20	1.29	9.65
3800	0.15	11.86	1.20	10.20
3900	0.10	12.44	1.12	10.60
4000	0.07	12.89	1.06	11.04
4100	0.05	13.23	0.98	11.37
4200	0.03	13.44	0.94	11.67
4300	0.02	13.53	0.88	11.96
4400	0.02	13.57	0.84	12.09
4500	0.03	13.48	0.81	12.28
4600	0.03	13.40	0.76	12.29
4700	0.04	13.26	0.74	12.29
4800	0.04	13.11	0.69	12.25
4900	0.05	12.97	0.67	12.05
5000	0.06	12.80	0.63	11.92
5100	0.07	12.69	0.60	11.66
5200	0.08	12.57	0.58	11.37
5300	0.10	12.43	0.54	11.05
5400	0.10	12.36	0.51	10.59
5500	0.11	12.23	0.47	10.18
5600	0.12	12.20	0.41	9.63
5700	0.13	12.10	0.37	9.12
5800	0.14	12.02	0.32	8.57
5900	0.15	11.94	0.28	7.95
6000	0.16	11.86	0.23	7.45
6100	0.17	11.84	0.16	6.78
6200	0.18	11.79	0.09	6.23
6300	0.19	11.71	0.01	5.68
6400	0.20	11.66	0.04	5.08
6500	0.21	11.60	0.12	4.61
6600	0.22	11.54	0.18	4.07
6700	0.23	11.47	0.24	3.68
6800	0.25	11.40	0.32	3.26
6900	0.25	11.33	0.35	2.84
7000	0.27	11.25	0.42	2.51
7100	0.28	11.21	0.47	2.01
7200	0.30	11.12	0.51	1.79
7300	0.30	11.10	0.54	1.41
7400	0.32	11.02	0.55	1.07
7500	0.33	10.94	0.58	0.88
7600	0.35	10.87	0.59	0.55
7700	0.36	10.80	0.60	0.35
7800	0.37	10.75	0.61	0.09
7900	0.39	10.70	0.56	0.22
8000	0.39	10.68	0.55	0.46
8100	0.40	10.67	0.50	0.72
8200	0.41	10.66	0.46	0.91
8300	0.41	10.67	0.42	1.24
8400	0.42	10.65	0.35	1.56
8500	0.42	10.69	0.29	1.93
9000	0.42	11.05	0.12	3.97
9500	0.41	11.69	0.55	6.73
10000	0.42	12.65	0.95	8.74
10500	0.49	13.20	1.29	8.92
11000	0.70	12.34	1.68	6.60

*Insertion Loss is referenced to mid-band loss, 0.60dB

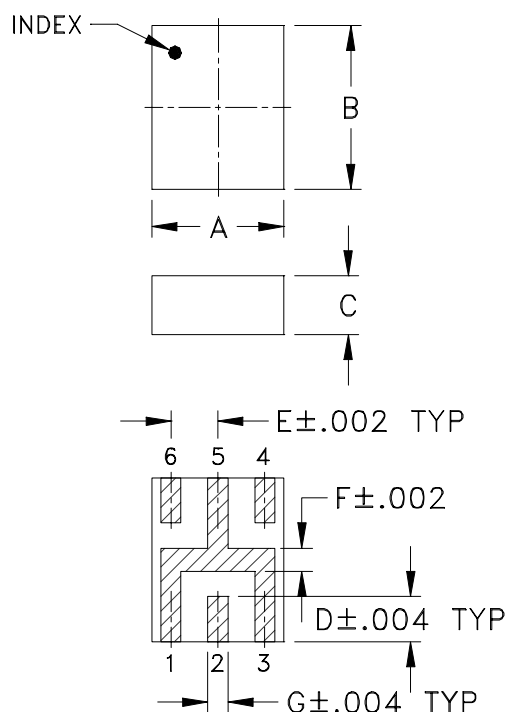
**Relative to 180°

Typical Performance Data

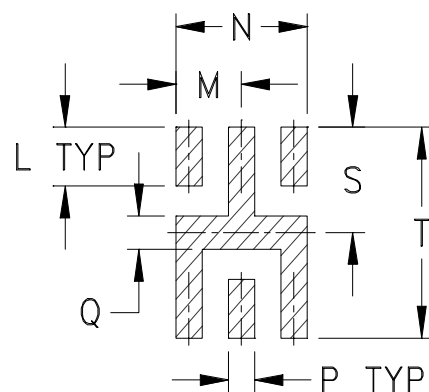


Outline Dimensions

NF1846-1



PCB Land Pattern



Suggested Layout,
Tolerance to be within $\pm.002$

CASE #.	A	B	C	D	E	F	G	H	J	K	L	M	N	P
NF1846-1	.079 (2.00)	.098 (2.50)	.035 (0.89)	.027 (0.69)	.028 (0.71)	.014 (0.36)	.012 (0.30)	- -	- -	- -	.028 (0.71)	.035 (0.89)	.07 (1.78)	.014 (0.36)

CASE #.	Q	R	S	T	WT GRAMS
NF1846-1	.016 (0.41)	- -	.050 (1.27)	.100 (2.54)	.020

Dimensions are in inches (mm). Tolerances $\pm .005$ unless specified.

Notes:

1. Open style, ceramic base.
2. Termination Finish:

For RoHS case style: Tin plate over Nickel plate.

All models, (+) suffix.



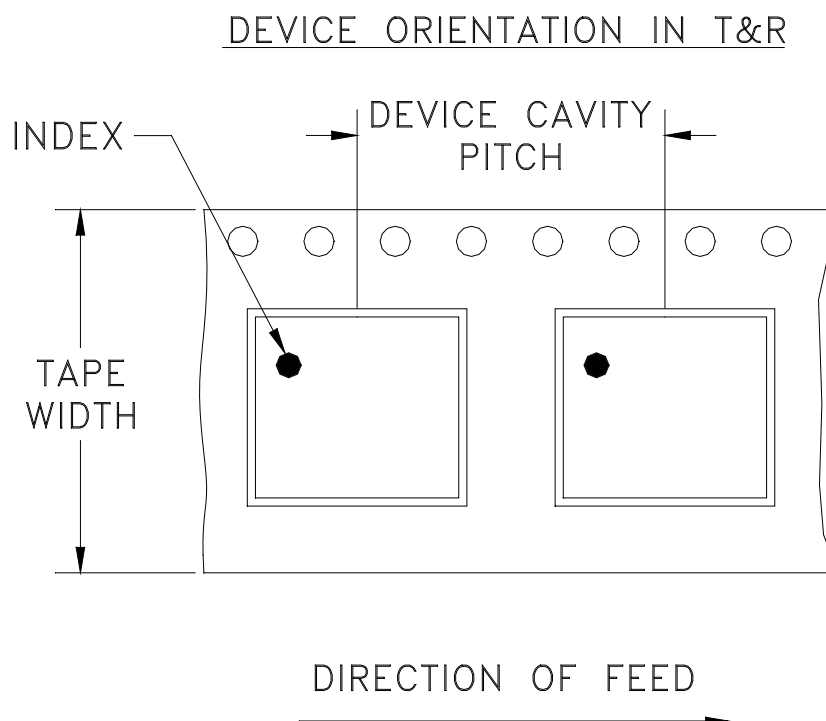
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Tape & Reel Packaging TR-F66



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel see note	
8	4	7	Small quantity standard	20
				50
				100
				200
				500
		7	Standard	1000, 2000, 3000

Note: Please consult individual model data sheet to determine device per reel availability.

Mini-Circuits carrier tape materials provide protection from ESD (Electro-Static Discharge) during handling and transportation. Tapes are static dissipative and comply with industry standards EIA-481/EIA-541.

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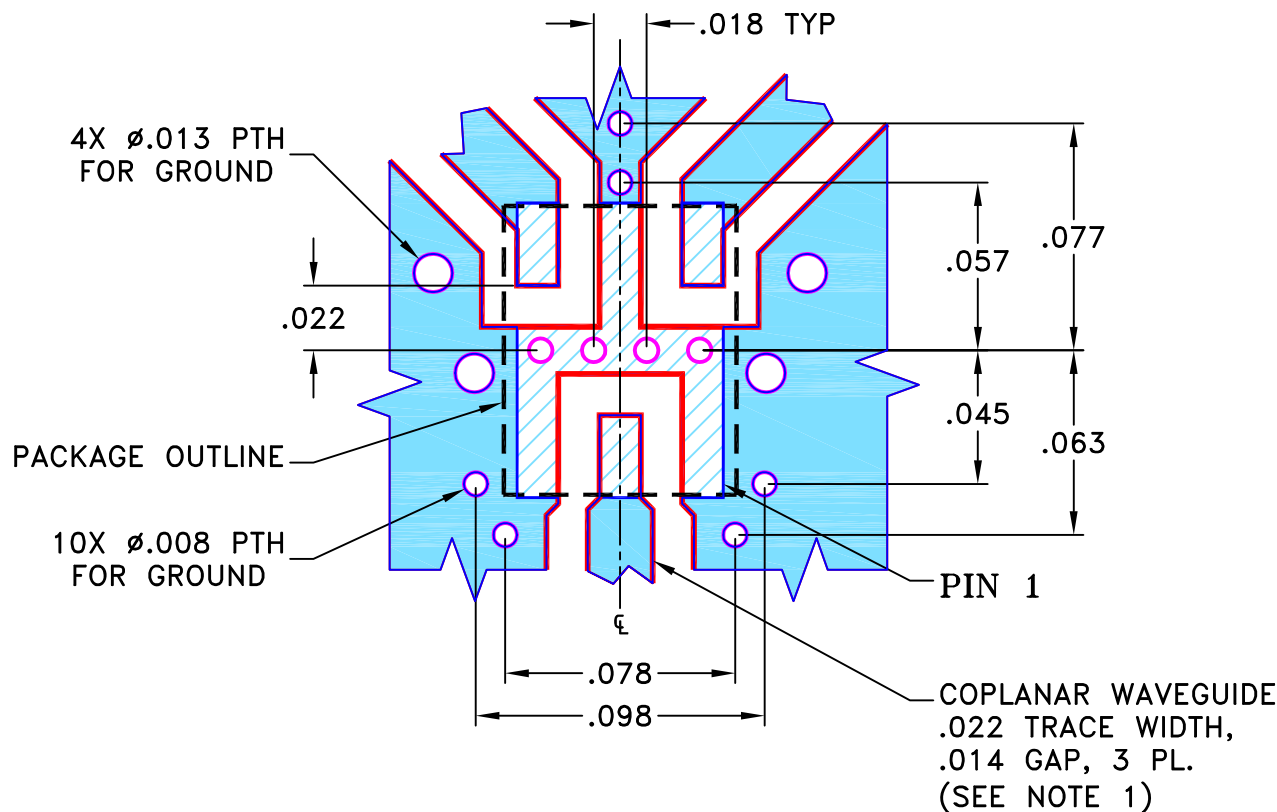
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THIRD ANGLE PROJECTION		REVISIONS				
		REV	ECN No.	DESCRIPTION	DATE	DR
		OR	M147198	NEW RELEASE	07/14/14	ITG

SUGGESTED MOUNTING CONFIGURATION
FOR NF1846-1 CASE STYLE, "06TE01" PIN CONNECTION.

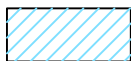


NOTES:

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2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.



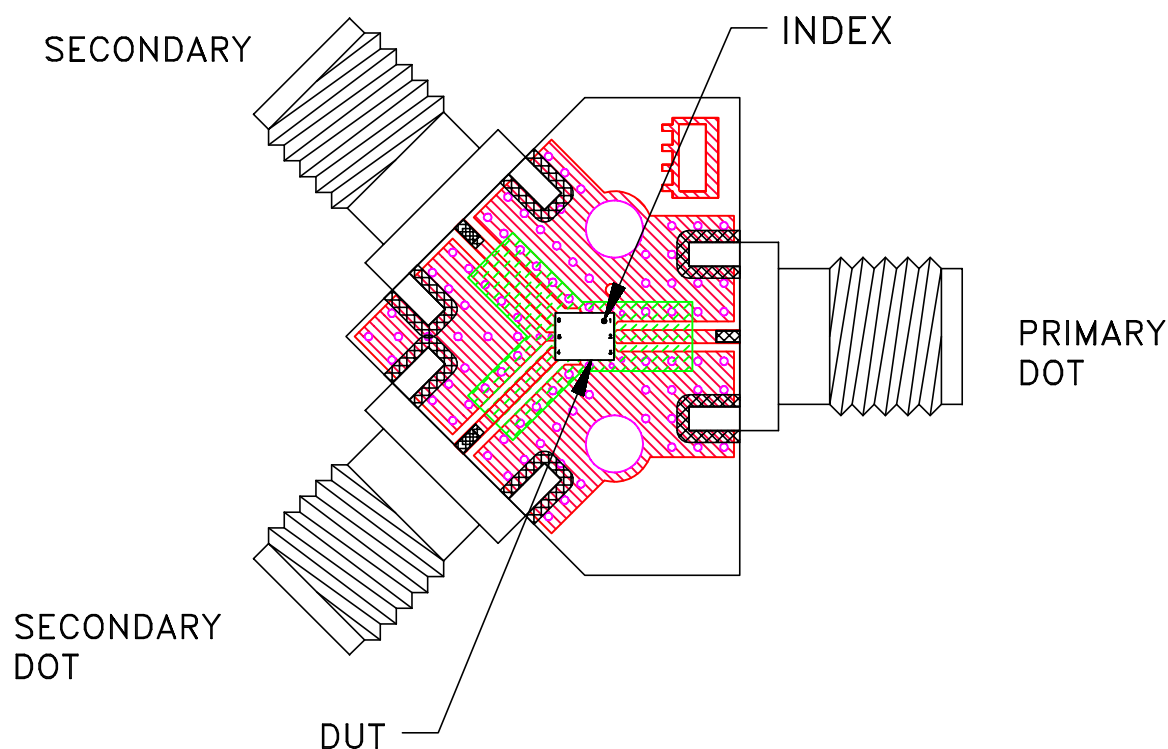
DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER).



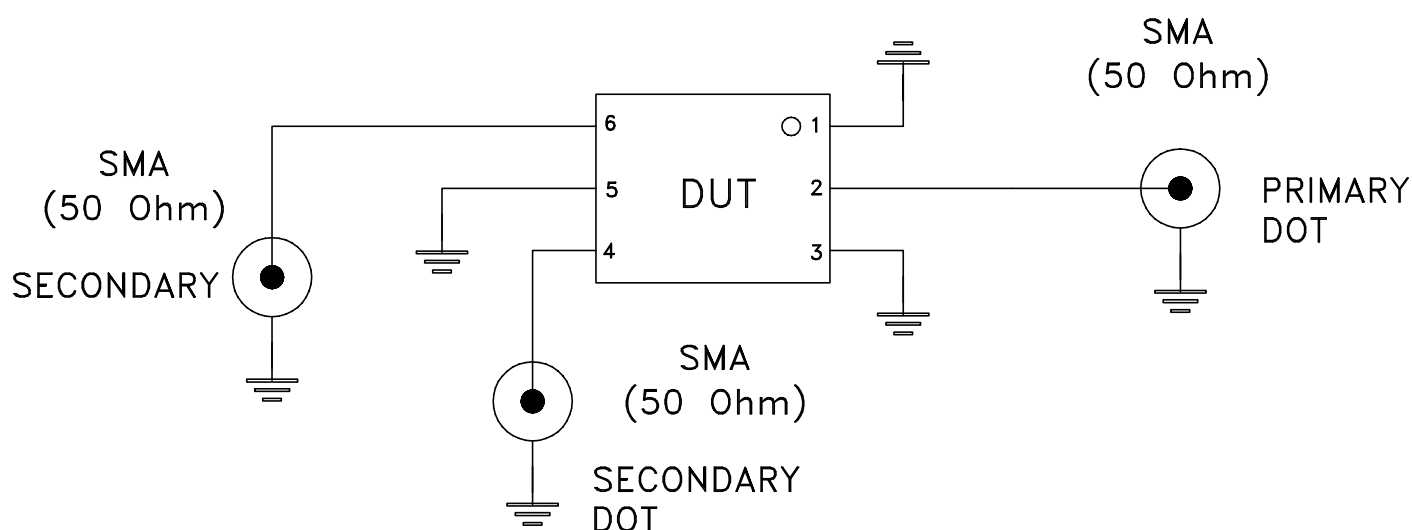
DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

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TOLERANCES ON:		CHECKED	GF	07/14/14							
2 PL DECIMALS ±		APPROVED	AVB	07/14/14							
3 PL DECIMALS ± .005											
ANGLES ±						SIZE CODE IDENT DRAWING NO: REV: A 15542 98-PL-425 OR					
FRACTIONS ±											
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Evaluation Board and Circuit



TB-745+



Schematic Diagram

Notes:

1. 50 Ohm SMA Female connectors.
2. PCB Material: R04350 or equivalent,
Dielectric Constant=3.5, Thickness=.010 inch.

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Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	-55° to 100°C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
Barometric Pressure	100,000 Feet	MIL-STD-202, Method 105, Condition D
Humidity	90% RH, 65°C Units may require bake-out after humidity to restore full performance.	MIL-STD-202, Method 103
Thermal Shock	-65° to 125°C, 5 cycles	MIL-STD-202, Method 107, Condition B
Vibration (High Frequency)	20g peak, 10-2000 Hz, 12 times in each of three perpendicular directions (total 36)	MIL-STD-202, Method 204, Condition D
Mechanical Shock	100g, 6ms sawtooth, 3 shocks each direction 3 axes (total 18)	MIL-STD-202, Method 213, Condition I