CERAMIC BALUN

RF Transformer

NCS1.5-232+

50Ω 400 to 2300 MHz 1:1.5 Ratio

FEATURES

- Wideband, 400 to 2300 MHz
- Low phase unbalance, 5 deg. and amplitude unbalance, 0.9 dB typ.
- Miniature size 0805 (2.0x1.23mm)
- LTCC construction
- Low cost
- Aqueous washable



Generic photo used for illustration purposes only

CASE STYLE: GE0805C-9

+RoHS Compliant

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

APPLICATIONS

- WCDMA
- PCS
- GPS
- ISM
- WLAN
- UHF
- LTE
- Cellular

ELECTRICAL SPECIFICATIONS AT 25°C

Parameter	Frequency (MHz)	Min.	Typ.	Max.	Units
Impedance Ratio (Secondary/Primary)			1.5		
Frequency Range		400		2300	MHz
Insertion Loss[1]	400 - 2300	—	1.2	1.6	dB
Amplitude Unbalance	400 - 2300	—	0.8	1.5	dB
	1650 - 1950	—	0.5	1.0	
Phase Unbalance[2]	400 - 2300	—	8	12	Degree
	1650 - 1950	—	3	9	

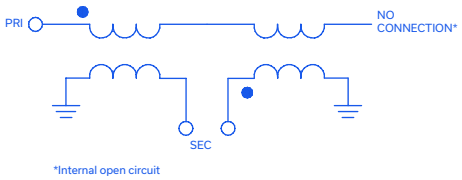
1. Reference Demo Board TB-626+
2. Relative to 180°

MAXIMUM RATINGS

Parameter	Ratings
Operating Temperature	-55°C to 100°C
Storage Temperature	-55°C to 100°C
RF Power[3]	2W at 25°C

3. Passband rating, derate linearly to 1W at 100°C ambient
Permanent damage may occur if any of these limits are exceeded.

CONFIGURATION J



*Internal open circuit

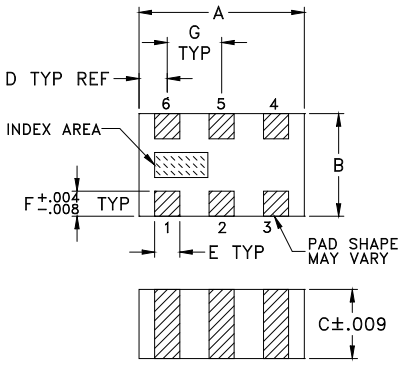
RF Transformer

NCS1.5-232+

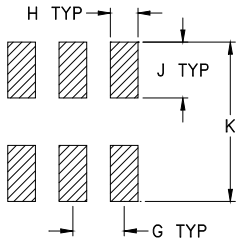
PAD CONNECTIONS

PRIMARY DOT (Unbalanced Port)	2
PRIMARY (GND)	1,3
SECONDARY DOT (Balanced)	4
SECONDARY (Balanced)	6
NO CONNECTION	5

OUTLINE DRAWING



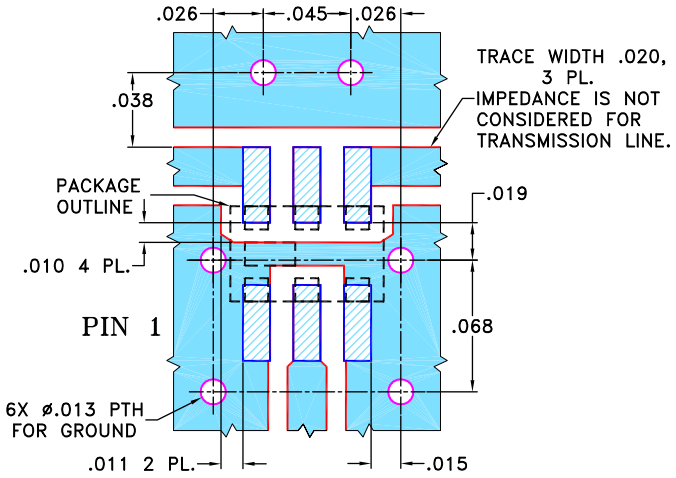
PCB Land Pattern



Suggested Layout,
Tolerance to be within±.002

PRODUCT MARKING: N/A

DEMO BOARD MCL P/N: TB-626+
SUGGESTED PCB LAYOUT (PL-348)



NOTES:
1. TRACE WIDTH IS SHOWN FOR REFERENCE ONLY.
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

OUTLINE DIMENSIONS (Inches / mm)

A	B	C	D	E	F
.079	.049	.033	.014	.012	.012
2.0	1.24	0.84	0.36	0.30	0.30

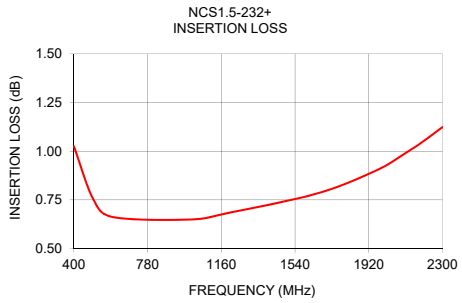
G	H	J	K		wt
.026	.014	.039	.110		grams
0.66	0.36	1.00	2.80		.008

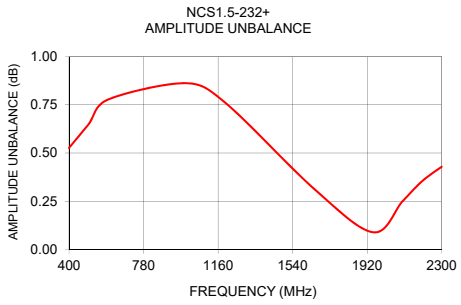
TAPE & REEL INFORMATION: F74

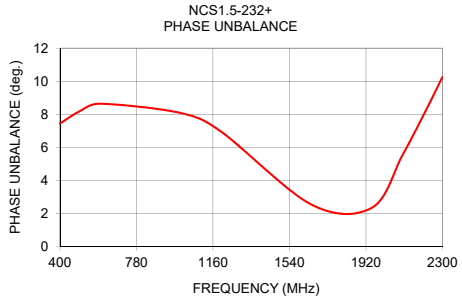
TYPICAL PERFORMANCE DATA[3]

Frequency (MHz)	Insertion Loss (dB)	Input Return Loss (dB)	Amplitude Unbalance (dB)	Phase Unbalance (deg)
400	1.03	11.76	0.53	7.45
500	0.75	15.77	0.65	8.20
600	0.66	18.11	0.78	8.64
1000	0.65	18.24	0.86	8.08
1200	0.68	18.23	0.76	6.96
1650	0.78	18.84	0.31	2.53
1950	0.90	17.26	0.09	2.35
2100	0.98	15.94	0.25	5.50
2200	1.05	15.14	0.35	7.81
2300	1.12	14.44	0.43	10.26

3. Measured with Agilent E5071B network analyzer using impedance conversion and port extension.







NOTES

A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the standard. Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/MCLStore/terms.jsp

RF Transformer NCS1.5-232+

Typical Performance Data

FREQUENCY (MHz)	INSERTION LOSS* (dB)	INPUT RETURN LOSS (dB)	AMPLITUDE UNBALANCE (dB)	PHASE UNBALANCE** (deg)
250	2.95	4.61	0.22	4.90
300	1.89	6.97	0.33	5.86
350	1.34	9.41	0.45	6.68
400	1.03	11.76	0.53	7.45
450	0.85	13.95	0.58	7.91
500	0.75	15.77	0.65	8.20
550	0.69	17.22	0.73	8.41
600	0.66	18.11	0.78	8.64
650	0.64	18.76	0.81	8.82
700	0.63	18.94	0.82	8.81
750	0.62	18.85	0.84	8.74
800	0.63	18.81	0.87	8.69
850	0.63	18.68	0.87	8.70
900	0.63	18.58	0.86	8.56
950	0.64	18.40	0.86	8.34
1000	0.65	18.24	0.86	8.08
1050	0.66	18.21	0.84	7.89
1100	0.67	18.21	0.81	7.64
1150	0.67	18.21	0.78	7.33
1200	0.68	18.23	0.76	6.96
1250	0.69	18.25	0.72	6.67
1300	0.70	18.40	0.68	6.35
1350	0.71	18.52	0.64	5.91
1400	0.72	18.63	0.59	5.43
1450	0.73	18.65	0.55	4.97
1500	0.74	18.75	0.49	4.47
1550	0.75	18.84	0.44	3.85
1600	0.77	18.83	0.38	3.20
1650	0.78	18.84	0.31	2.53
1700	0.80	18.69	0.24	1.84
1750	0.81	18.57	0.17	1.13
1800	0.83	18.33	0.10	0.32
1850	0.85	18.01	0.04	0.54
1900	0.87	17.68	0.02	1.46
1950	0.90	17.26	0.09	2.35
2000	0.92	16.88	0.14	3.36
2050	0.95	16.42	0.19	4.47
2100	0.98	15.94	0.25	5.50
2150	1.01	15.61	0.30	6.66
2200	1.05	15.14	0.35	7.81
2250	1.09	14.80	0.39	9.05
2300	1.12	14.44	0.43	10.26
2350	1.17	14.06	0.47	11.47
2400	1.21	13.78	0.50	12.81
2450	1.25	13.50	0.52	14.15
2500	1.30	13.22	0.53	15.46

* Reference Demo Board TB-626+

**Phase Unbalance is relative to 180˚

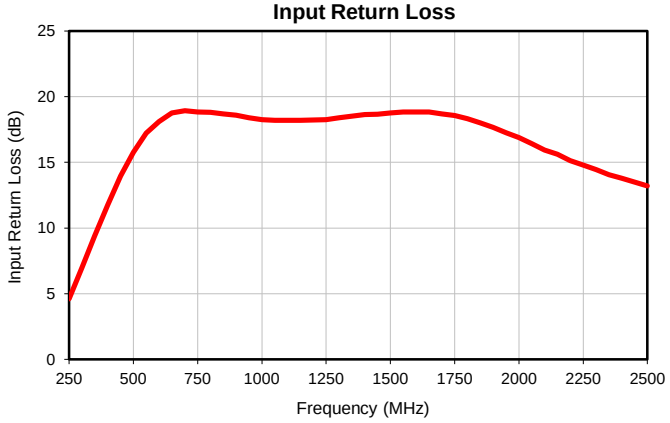
RF Transformer NCS1.5-232+

Typical Performance Data

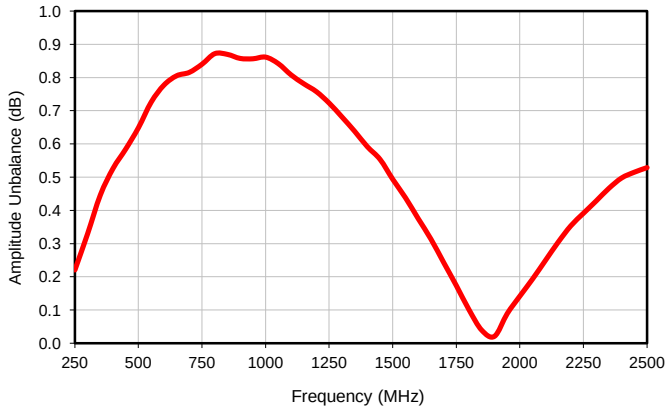
Insertion Loss



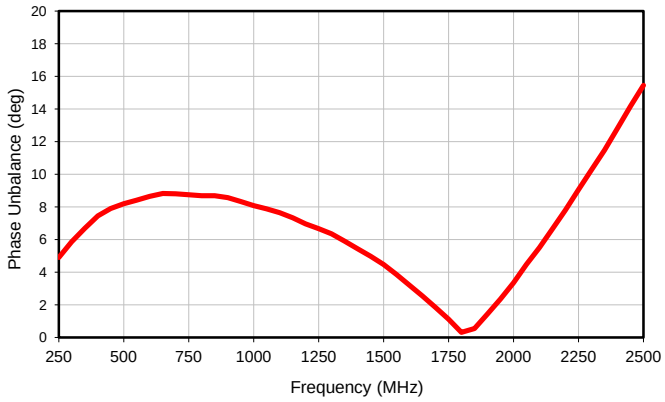
Input Return Loss



Amplitude Unbalance

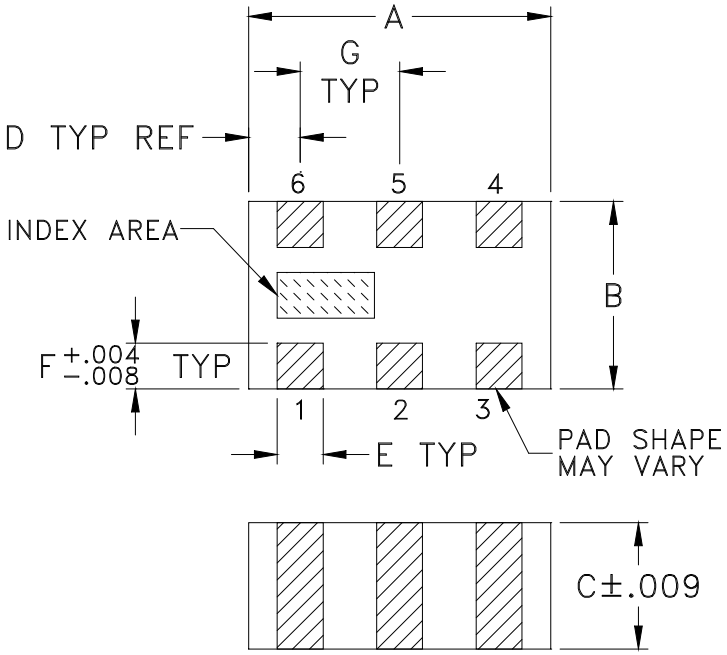


Phase Unbalance

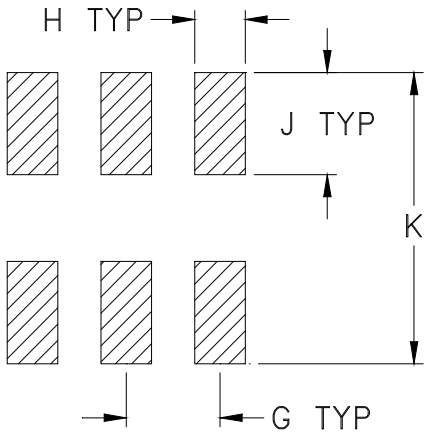


GE0805C-9

Outline Dimensions



PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.002

CASE #	A	B	C	D	E	F	G	H	J	K	WT.GRAM
GE0805C-9	.079 (2.00)	.049 (1.25)	.037 (0.95)	.014 (0.35)	.012 (0.30)	.012 (0.30)	.026 (0.65)	.014 (0.35)	.039 (1.00)	.110 (2.80)	.008

Dimensions are in inches (mm). Tolerances: 2Pl. ± .01; 3 Pl. ± .005

Notes:

1. Open style, ceramic base.
2. Termination finish: For RoHS Case Styles: Tin plate over Nickel plate. All models, (+) suffix.
   For RoHS-5 Case Styles: Tin-Lead plate over Nickel plate. All models, no (+) suffix.

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Tape & Reel Packaging TR-F114

DEVICE ORIENTATION IN T&R

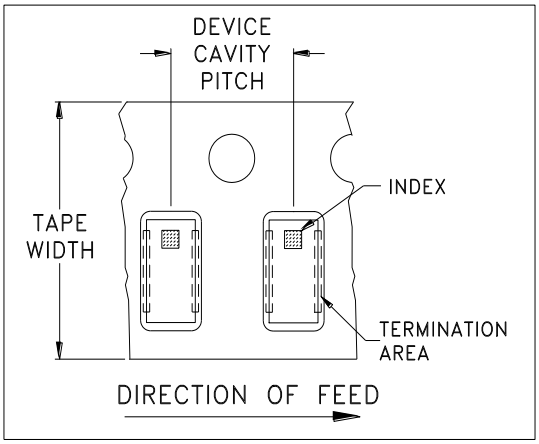


ILLUSTRATION 1

Applicable Case Styles	
GE0805C	JC0603C
GE0805C-1	JC0603C-4
GE0805C-1AP	JC0603C-6
GE0805C-7	
GE0805C-9	
GE0805C-10	
GE0805C-11	
GE0805C-12	

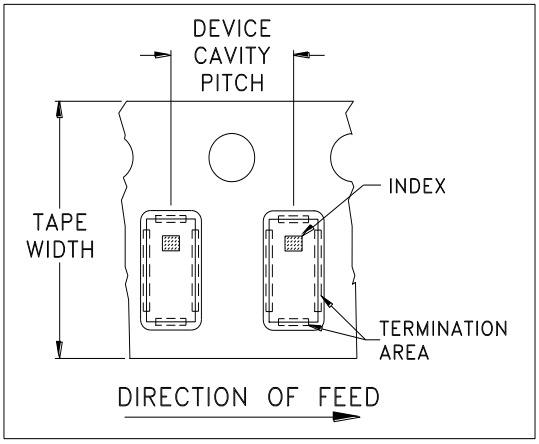


ILLUSTRATION 2

Applicable Case Styles	
GE0805C-2	JC0603C-1
GE0805C-3	JC0603C-2
GE0805C-4	JC0603C-3
GE0805C-5	JC0603C-5
GE0805C-6	JC0603C-7
GE0805C-8	
GE0805C-15	

Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel	
8	4	7	Small quantity standards (see note)	20
				50
				100
				200
				500
				1000
			Standard	4000

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.

Go to: www.minicircuits.com/pages/pdfs/tape.pdf

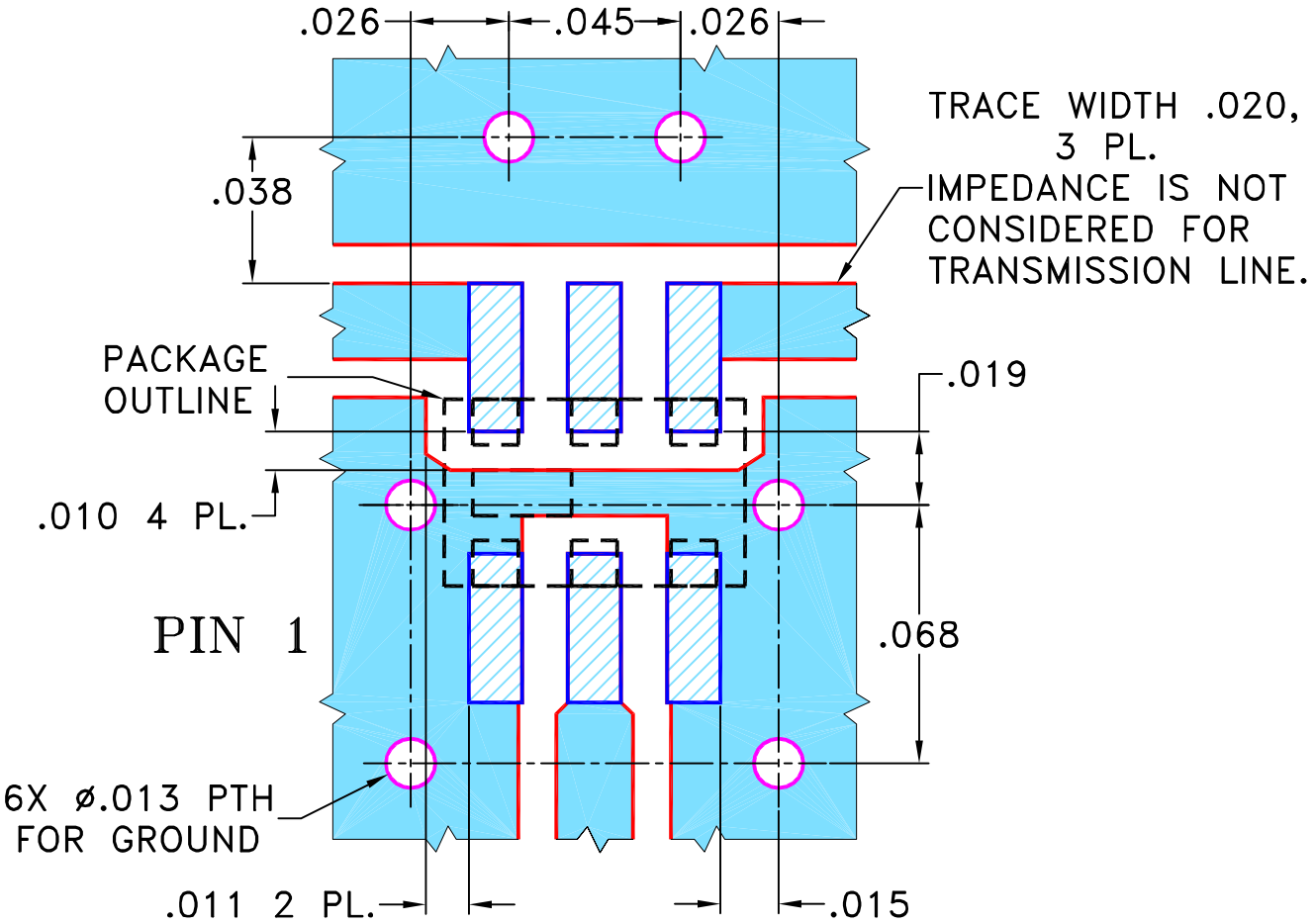
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THIRD ANGLE PROJECTION

REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M132367	NEW RELEASE	07/20/11	GF	ABD
A	M151441	UPDATED TRACE WIDTH INFO	06/05/15	GF	WP

SUGGESTED MOUNTING CONFIGURATION FOR GE0805C-1 CASE STYLE, "06TJ01" PIN CODE



NOTES:

1. TRACE WIDTH IS SHOWN FOR REFERENCE ONLY.
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

UNLESS OTHERWISE SPECIFIED		INITIALS	DATE
DIMENSIONS ARE IN INCHES	DRAWN	GF	06/20/11
TOLERANCES ON:	CHECKED	IL	07/20/11
2 PL DECIMALS ±	APPROVED	ABD	07/20/11
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

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ASHEETA1.DWG REV:A DATE:01/12/95

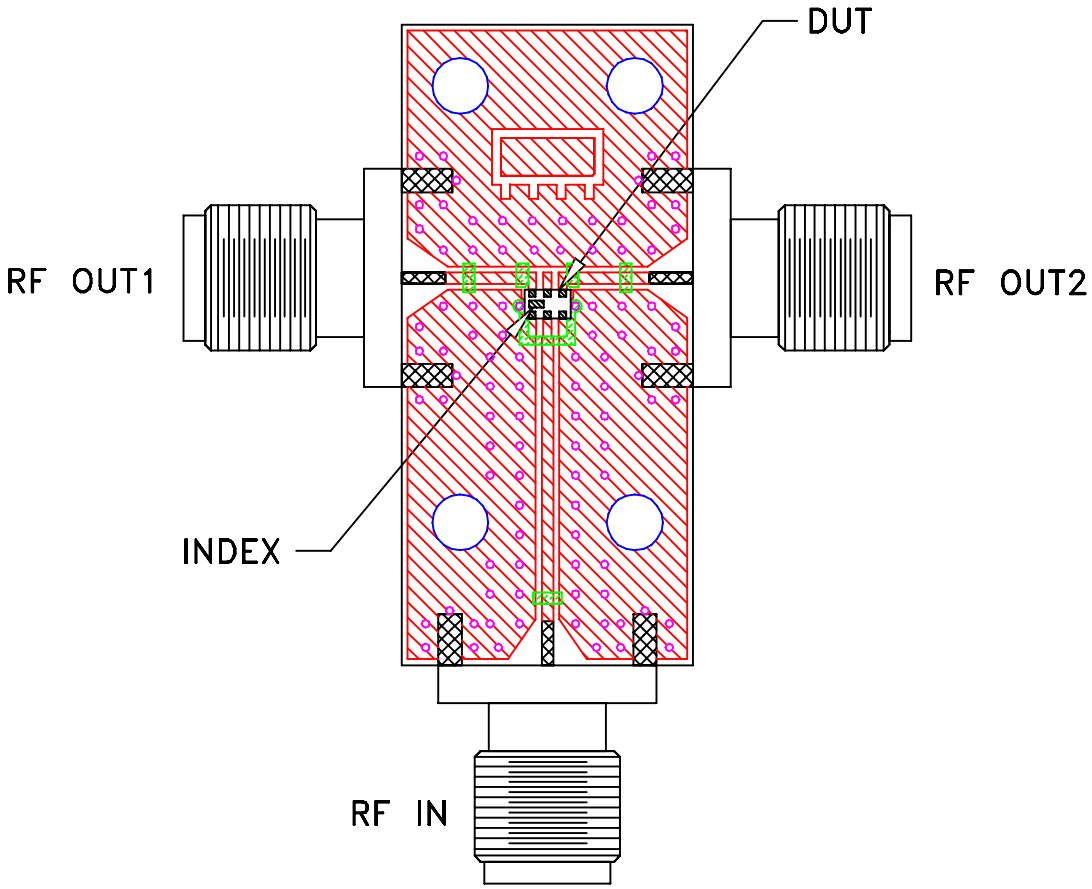
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PL, 06TJ01, GE0805C-1, TB-626+

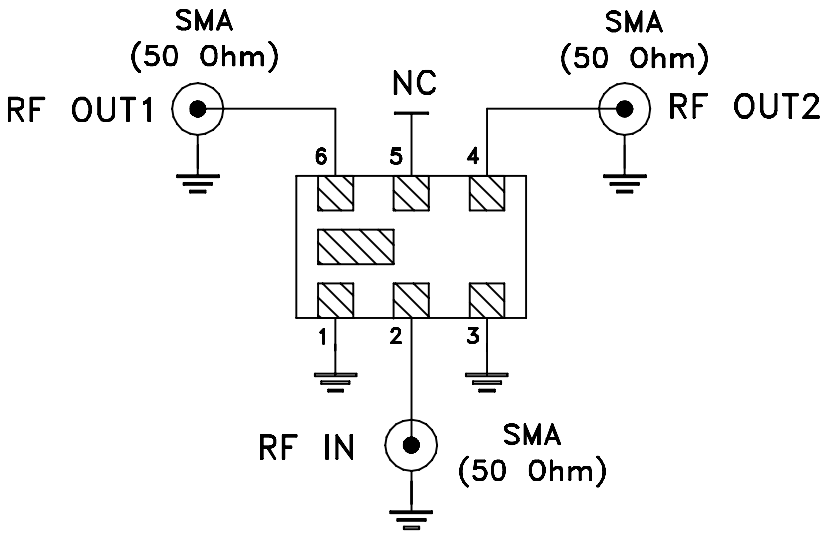
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-348	A

FILE:	SCALE:	SHEET:
98PL348	20:1	1 OF 1

Evaluation Board and Circuit



TB-626+



Schematic Diagram

Notes:

1. 50 Ohm SMA Female connectors.
2. PCB Material: RO4350 or equivalent,
   Dielectric Constant=3.5, Thickness=.010 inch.

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Environmental Specifications ENV06

All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

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
Humidity	90 to 95% RH, 240 hours, 50°C	MIL-STD-202, Method 103, Condition A, Except 50°C and end-point electrical test done within 12 hours
Solder Reflow Heat	Sn-Pb Eutetic Process: 225°C peak Pb-Free Process 245° - 250°C peak	J-STD-020, Table 4-1, 4-2 and 5-2, Figure 5-1
Solderability	10X Magnification	J-STD-002, Para 4.2.5, Test S, 95% Coverage
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	50g, 11 ms, 1/2-sine, 18 shocks: 3 each direction, each of 3 axes	MIL-STD-202, Method 213, Condition A

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