

LTCC

Bandpass Filter

50Ω 2400 to 2500 MHz

BPNK-252R+



Generic photo used for illustration purposes only
CASE STYLE: NK0402C-1

Features

- Miniature size 0402 (0.039" [1.0mm] x 0.020" [0.5mm] x 0.015" [0.37mm])
- High rejection up to 8.5GHz.
- Low cost
- Aqueous washable

+RoHS Compliant

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

Applications

- ISM Band
- WLAN
- Bluetooth
- Zigbee

Electrical Specifications at 25°C

Parameter	Frequency (MHz)	Min.	Typ.	Max.	Unit
Pass Band	Center Frequency	—	2450	—	MHz
	Insertion Loss	—	3.3	3.8	dB
	VSWR	—	1.6	2	:1
Stop Band, Lower	Rejection	695 – 800	25	40	dB
		1910	22	25	dB
		3200	30	36	dB
Stop Band, Upper	Rejection	4800 - 5000	17.5	23	dB
		7200 - 7500	15.5	22	dB
					dB

* Tested on Evaluation Board TB-1024+

Maximum Ratings

Operating Temperature	-40°C to +85°C
Storage Temperature*	-40°C to +85°C
RF Power Input**	2W at 25°C

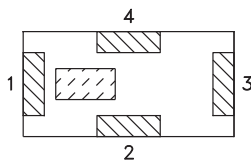
*Refer to product storage temperature after installation
Suggestion for T&R unused product storage condition:
+5 ~ +35 °C, Humidity 45~75%RH, 12 month Max

** Derate linearly to 1W at 85°C

Block Diagram



Top View

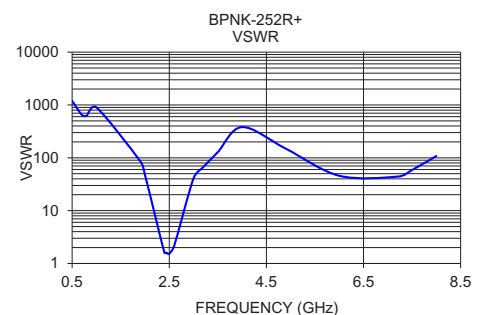
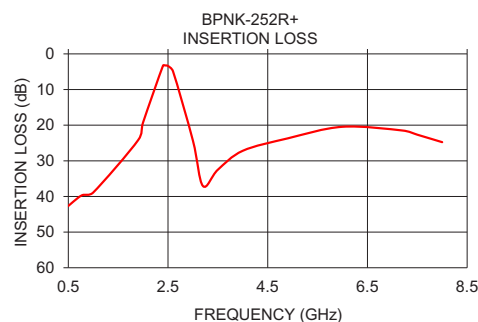


Pad Connections

Input	3
Output	1
Ground	2,4

Typical Performance Data at 25°C

Frequency (GHz)	Insertion Loss (dB)	VSWR (:1)
0.50	42.66	1191.08
0.70	40.32	651.00
0.80	39.54	629.67
1.00	38.89	899.24
1.90	24.20	86.63
2.00	19.22	47.47
2.40	3.29	1.60
2.44	3.25	1.60
2.50	3.40	1.53
2.60	4.89	2.13
3.00	24.36	40.79
3.20	37.06	66.49
3.50	32.49	128.11
4.00	27.18	381.82
4.80	24.02	193.10
4.90	23.71	148.98
5.00	23.38	142.17
6.00	20.45	45.73
7.20	21.49	44.04
7.50	22.67	58.78
8.00	24.77	107.96



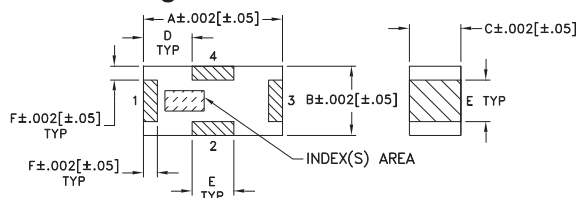
www.minicircuits.com P.O. Box 350166, Brooklyn, NY 11235-0003 (718) 934-4500 sales@minicircuits.com

REV. A
M175960
BPNK-252R+
SL/CP/AM
200924
Page 1 of 2

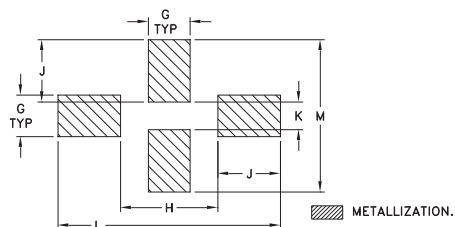
Bandpass Filter

BPNK-252R+

Outline Drawing



PCB Land Pattern



Suggested Layout,
Tolerance to be within .002

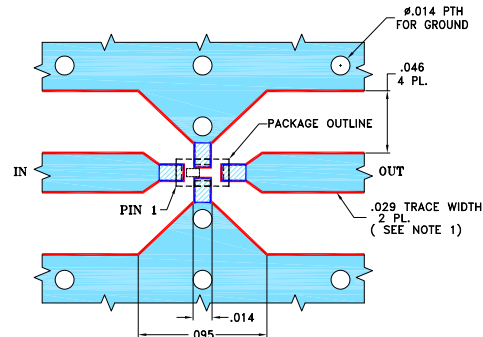
Pad Connections

Input	3
Output	1
Ground	2,4

Outline Dimensions ($\frac{\text{inch}}{\text{mm}}$)

A	B	C	D	E	F	G
.039	.020	.015	.014	.012	.004	.012
0.99	0.51	0.38	0.36	0.30	0.10	0.30
H	J	K	L	M	wt	
.028	.018	.008	.063	.043	grams	
0.71	0.46	0.20	1.60	1.09	.0007	

Evaluation Board MCL P/N: TB-1024+ Suggested PCB Layout (PL-552)



- NOTES:
1. TRACE WIDTH IS SHOWN FOR FR4, GRADE IT-180TC (ITEQ CORP.) WITH DIELECTRIC THICKNESS .016 $\pm$.0015. COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH & GAP MAY NEED TO BE MODIFIED.
 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.

Additional Notes

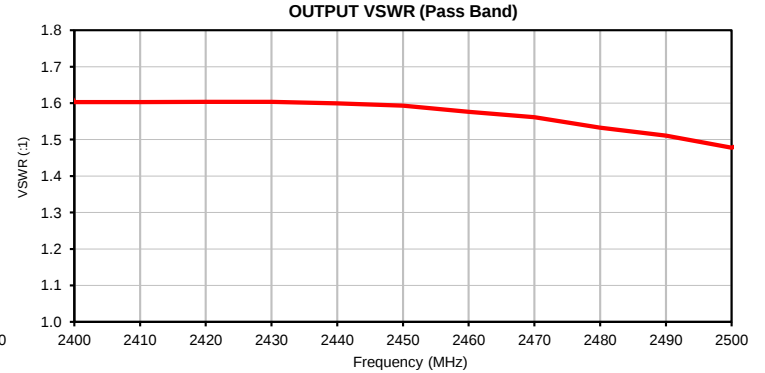
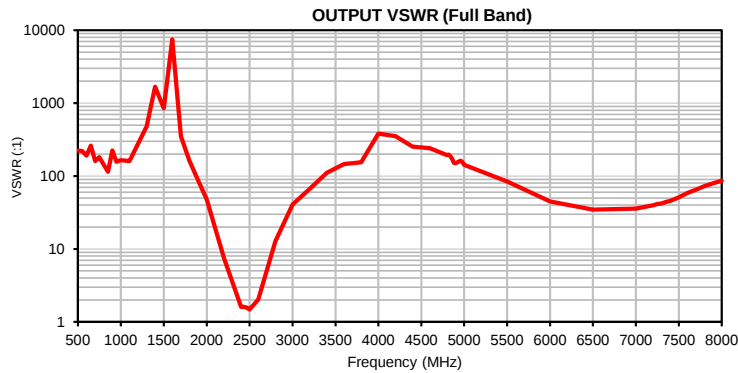
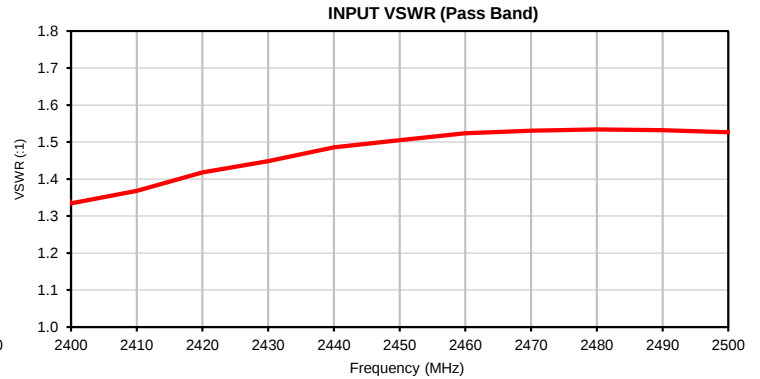
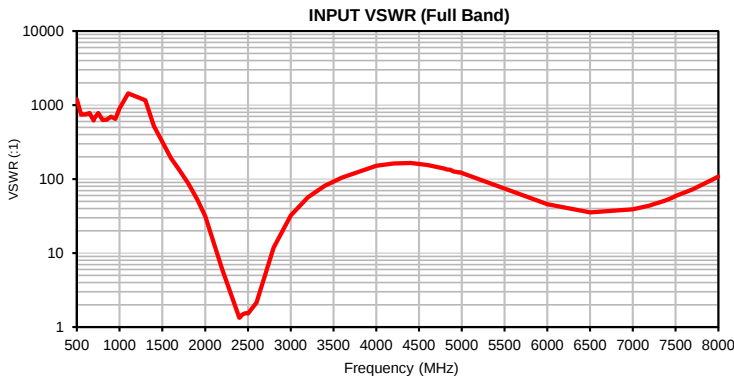
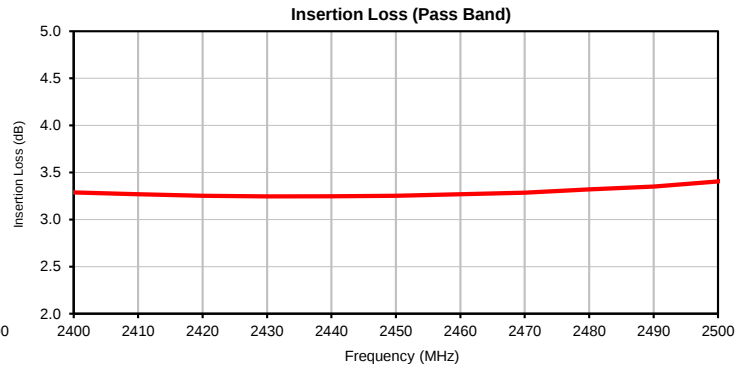
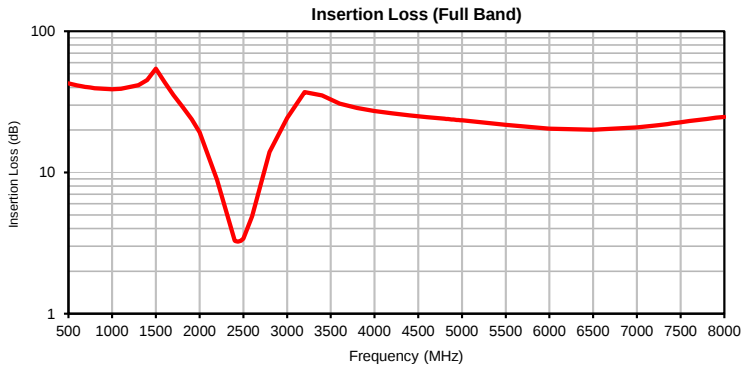
- A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
- B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's 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



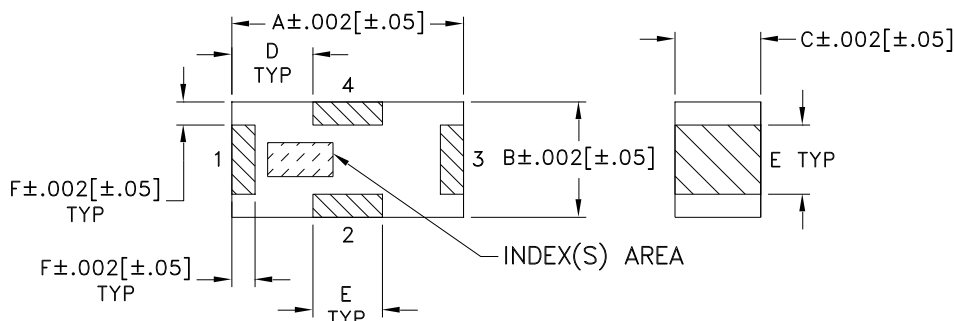
Typical Performance Data

FREQUENCY (MHz)	INSERTION LOSS (dB)	INPUT VSWR (:1)	OUTPUT VSWR (:1)
500	42.66	1191.08	224.71
550	41.97	745.57	221.30
600	41.34	750.55	191.01
650	40.80	779.72	261.72
695	40.37	619.61	170.03
700	40.32	651.00	160.47
750	39.92	779.60	181.91
800	39.54	629.67	143.67
850	39.26	633.01	114.99
900	39.10	698.21	223.39
950	38.94	650.87	157.08
1000	38.89	899.24	165.35
1100	39.09	1437.07	160.43
1300	41.48	1162.63	479.49
1400	45.03	521.66	1673.10
1500	54.31	320.55	853.42
1600	43.63	192.32	7469.57
1700	35.27	131.41	350.24
1800	29.34	87.63	161.96
1910	23.80	52.95	82.74
2000	19.22	31.39	47.47
2200	8.86	6.04	7.51
2400	3.29	1.33	1.60
2410	3.27	1.37	1.60
2420	3.25	1.42	1.60
2430	3.25	1.45	1.60
2440	3.25	1.49	1.60
2450	3.25	1.50	1.59
2460	3.27	1.52	1.58
2470	3.29	1.53	1.56
2480	3.32	1.53	1.53
2490	3.35	1.53	1.51
2500	3.40	1.53	1.48
2600	4.89	2.13	2.03
2800	13.99	11.80	12.84
3000	24.36	32.26	40.79
3200	37.06	56.69	66.49
3400	35.15	80.85	110.93
3600	30.74	104.48	145.73
3800	28.58	126.13	154.17
4000	27.18	150.74	381.82
4200	26.19	162.80	350.91
4400	25.38	164.66	252.02
4600	24.67	154.86	241.41
4800	24.02	138.29	193.10
4820	23.95	134.74	196.35
4840	23.89	134.03	185.48
4860	23.82	133.60	169.67
4880	23.76	130.70	152.38
4900	23.71	126.40	148.98
4920	23.65	125.53	153.98
4940	23.57	124.94	158.78
4960	23.50	122.85	161.77
4980	23.43	123.67	154.37
5000	23.38	120.74	142.17
5500	21.73	74.03	84.56
6000	20.45	45.73	44.94
6500	20.06	35.31	34.54
7000	20.87	39.02	35.67
7200	21.49	44.04	39.86
7250	21.66	45.97	41.46
7300	21.86	47.80	42.17
7350	22.04	49.93	44.26
7400	22.25	52.46	45.48
7450	22.45	55.16	48.08
7500	22.67	58.78	50.95
7600	23.10	65.17	58.49
7700	23.54	72.76	64.99
7800	23.97	83.38	72.66
7900	24.39	94.57	79.52
8000	24.77	107.96	86.59

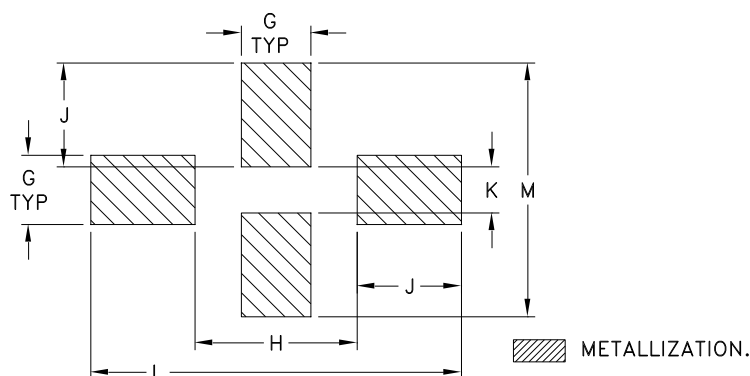
Typical Performance Curves



Outline Dimensions



PCB Land Pattern



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

CASE#	A	B	C	D	E	F	G	H	J	K	L	M	WT.GRAMS
NK0402C-1	.039 (1.00)	.020 (.50)	.015 (.37)	.014 (.35)	.012 (.30)	.004 (.10)	.012 (.30)	.028 (.70)	.018 (.45)	.008 (.20)	.063 (1.60)	.043 (1.10)	.0007

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

Notes:

- Open style, ceramic base.
- Termination finish:
For RoHS Case Styles: Matte Tin over Nickel plating. Models with (+) suffix.
- *Line width should be designed to match 50 Ω characteristic impedance, depending on PCB material and thickness.



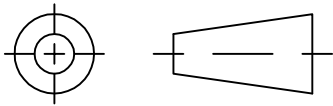
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com

RF/IF MICROWAVE COMPONENTS

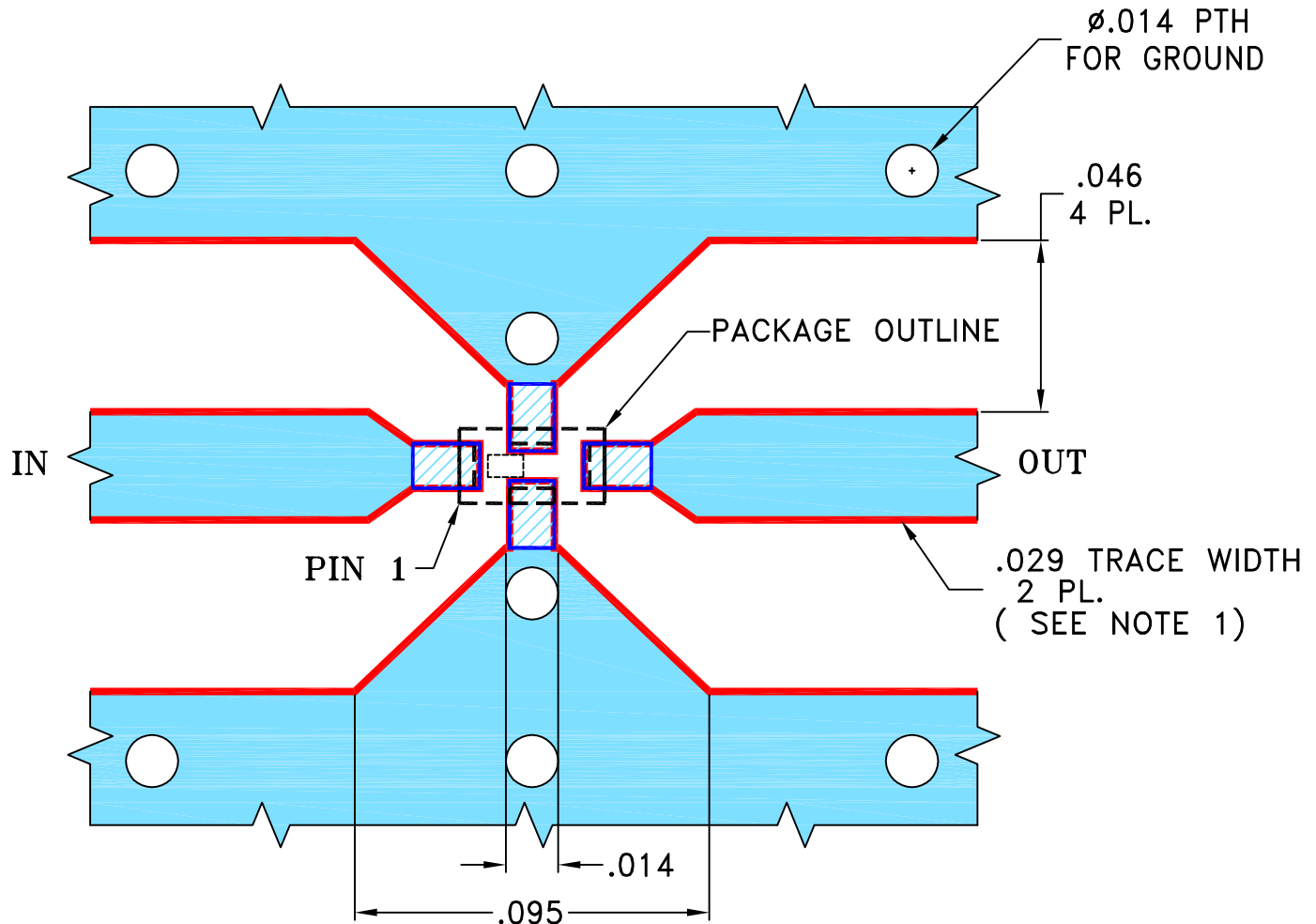
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M168200	NEW RELEASE	05/31/18	NP	SL

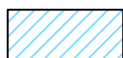
SUGGESTED MOUNTING CONFIGURATION
FOR NK0402C-1 CASE STYLE, "04FL01" PIN CODE

**NOTES:**

- TRACE WIDTH IS SHOWN FOR FR4, GRADE IT-180TC (ITEQ CORP.) WITH DIELECTRIC THICKNESS $.016 \pm .0015$. COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH & GAP MAY NEED TO BE MODIFIED.
- 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

DIMENSIONS ARE IN INCHES

TOLERANCES ON:
 2 PL DECIMALS $\pm$
 3 PL DECIMALS $\pm$.005
 ANGLES $\pm$
 FRACTIONS $\pm$



Mini-Circuits®

	INITIALS	DATE
DRAWN	NP	05/30/18
CHECKED	GF	05/30/18
APPROVED	SL	05/31/18



Mini-Circuits®

13 Neptune Avenue
 Brooklyn NY 11235

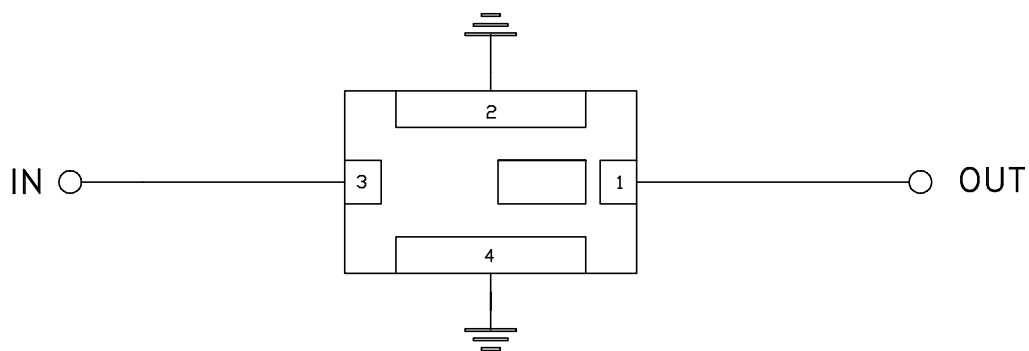
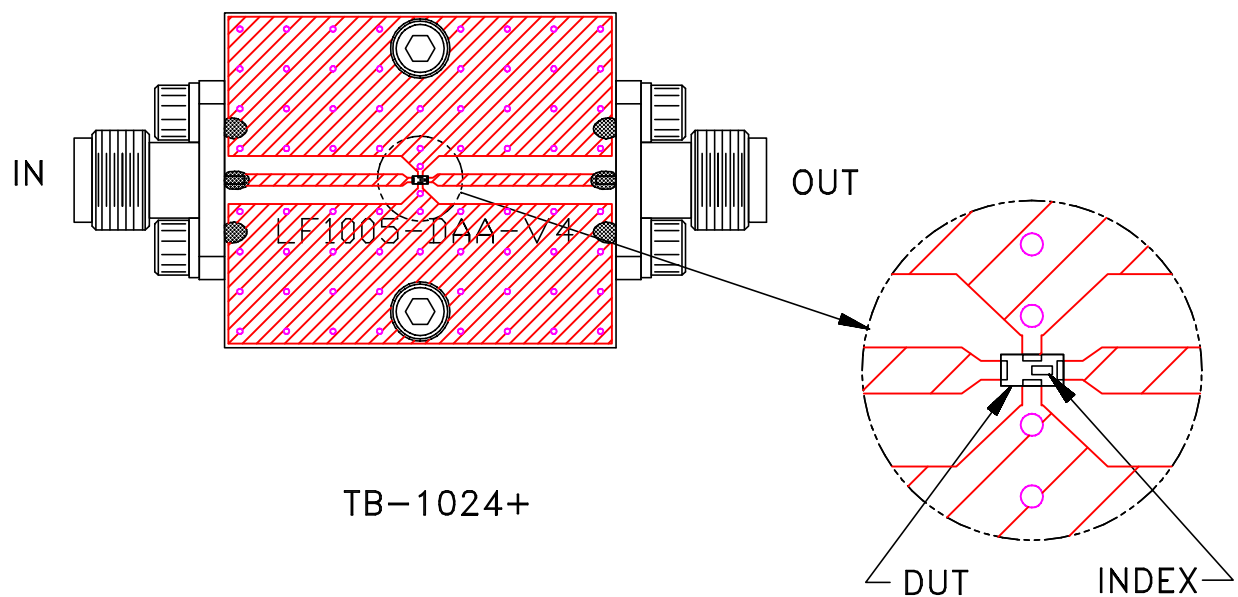
PL, 04FL01, NK0402C-1, TB-1024+

SIZE A	CODE IDENT 15542	DRAWING NO: 98-PL-552	REV: OR
FILE:	98PL552	SCALE: 20:1	SHEET: 1 OF 1

THIS DOCUMENT AND ITS CONTENTS ARE THE PROPERTY OF MINI-CIRCUITS. EXCEPT FOR USE EXPRESSLY GRANTED, IN WRITING, TO ITS VENDORS, VENDEE AND THE UNITED STATES GOVERNMENT, MINI-CIRCUITS RESERVES ALL PROPRIETARY DESIGN, USE, MANUFACTURING AND REPRODUCTION RIGHTS THERETO. THESE CONTENTS SHALL NOT BE USED, DUPLICATED OR DISCLOSED TO ANY OUTSIDE PARTY, IN WHOLE OR IN PART, WITHOUT WRITTEN PERMISSION OF MINI-CIRCUITS.

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

Evaluation Board and Circuit



Schematic Diagram

Notes:

1. 50 Ohm SMA Female connectors.
2. PCB Material: FR4 or equivalent,
Dielectric Constant=4.5, Thickness=.016 inch.

 **Mini-Circuits®**



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	-40° to 85° C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-40° to 85° C Ambient Environment	Individual Model Data Sheet
Thermal Shock	-40° to 125°C, 100 cycles	MIL-STD-202 Method 107, Condition A-3 except -40°C instead of -55° C and +125° C instead of -85° C
Solder Reflow Heat	Pb-Free Process 245° -250°C peak,	J-STD-020, 4-2 and 5-2, Figure 5-1
Solderability	10X Magnification	J-STD-002, Para 4.2.5, Test S, 95% Coverage
Shelf Life	Shelf life is 12 months when kept in sealed bags. Unused parts are to be resealed to preserve shelf life for proper solderability.	