LTCC

Bandpass Filter

BPNK-252R+

50Ω 2400 to 2500 MHz

Generic photo used for illustration purposes only

CASE STYLE: NK0402C-1

+RoHS Compliant

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

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

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	2400-2500	—	3.3	3.8	dB
	VSWR	2400-2500	—	1.6	2	:1
Stop Band, Lower	Rejection	695 – 800	25	40	—	dB
		1910	22	25	—	dB
Stop Band, Upper	Rejection	3200	30	36	—	dB
		4800 - 5000	17.5	23	—	dB
		7200 - 7500	15.5	22	—	dB

* Tested on Evaluation Board TB-1024+

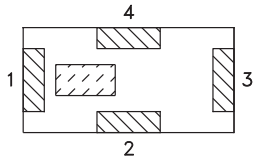
Maximum Ratings

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

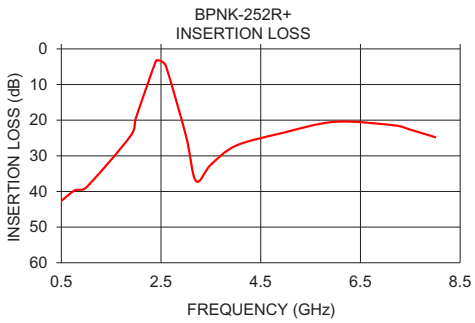


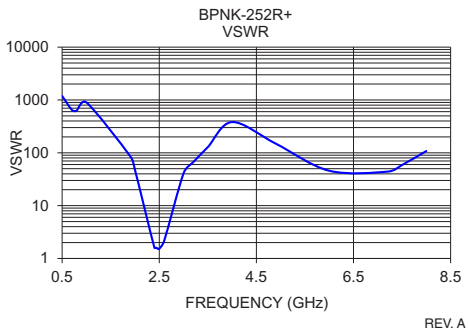
Pad Connections

Input	3
Output	1
Ground	2,4

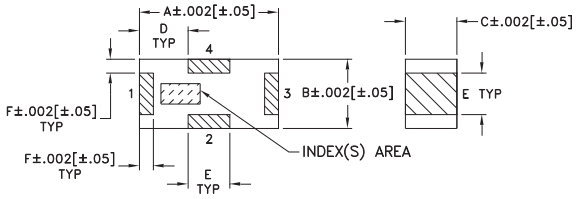
Typical Performance Data at 25°C

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

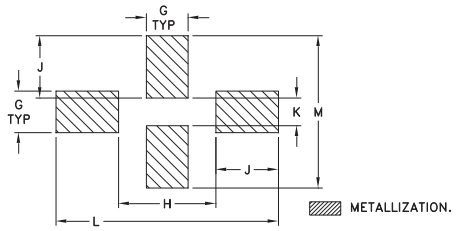




Outline Drawing

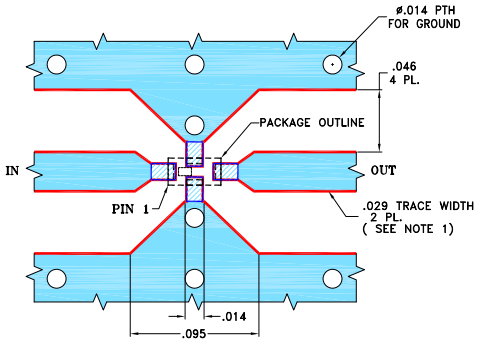


PCB Land Pattern



Suggested Layout,
Tolerance to be within .002

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±.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.

Pad Connections

Input	3
Output	1
Ground	2,4

Outline Dimensions (inch / 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

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

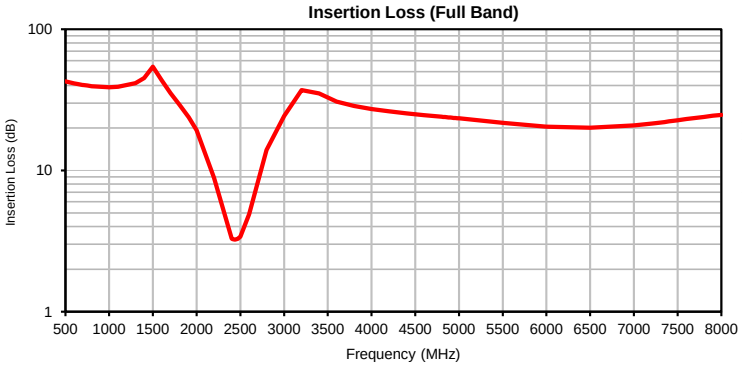
Ceramic Bandpass Filter BPNK-252R+

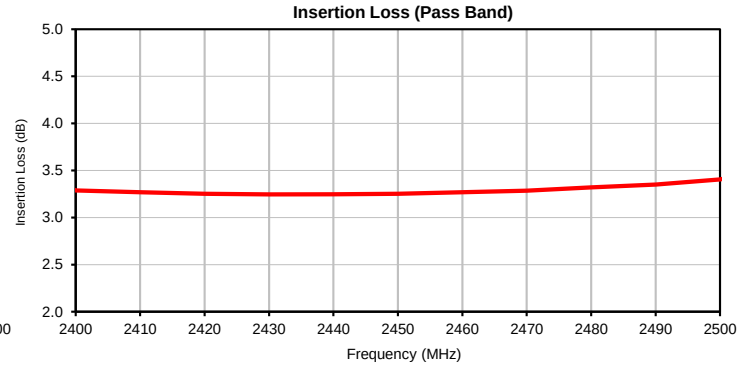
Typical Performance Data

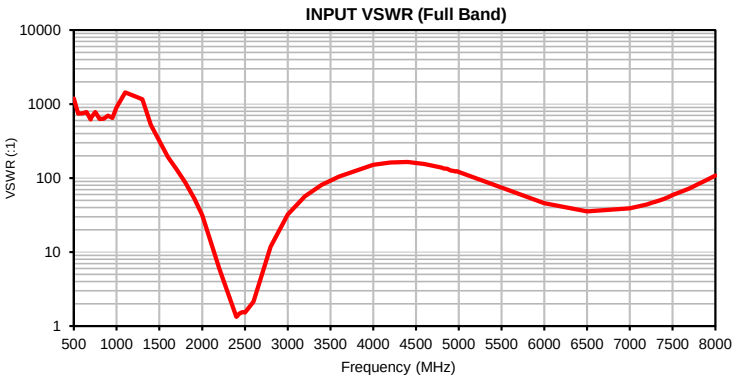
FREQUENCY (MHz)	INSERTION LOSS (dB)	INPUT VSWR (:1)	OUTPUT VSWR (:1)
500	42.66	1191.08	224.71
550	41.97	745.57	221.30
600	41.34	750.55	191.01
650	40.80	779.72	261.72
695	40.37	619.61	170.03
700	40.32	651.00	160.47
750	39.92	779.60	181.91
800	39.54	629.67	143.67
850	39.26	633.01	114.99
900	39.10	698.21	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

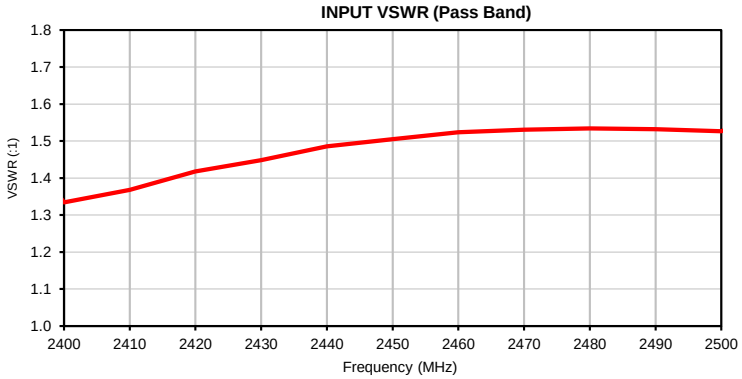
Ceramic Bandpass Filter BPNK-252R+

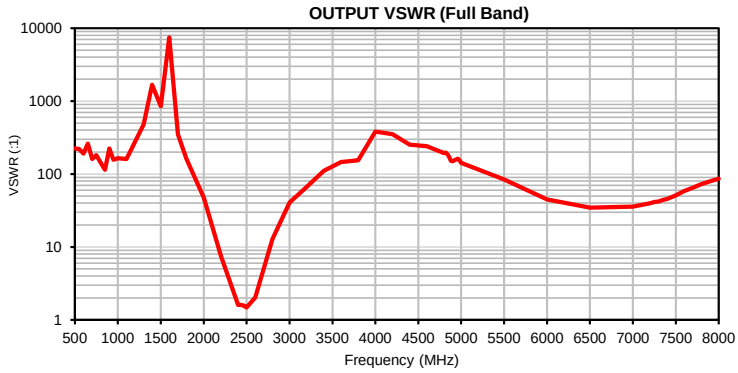
Typical Performance Curves

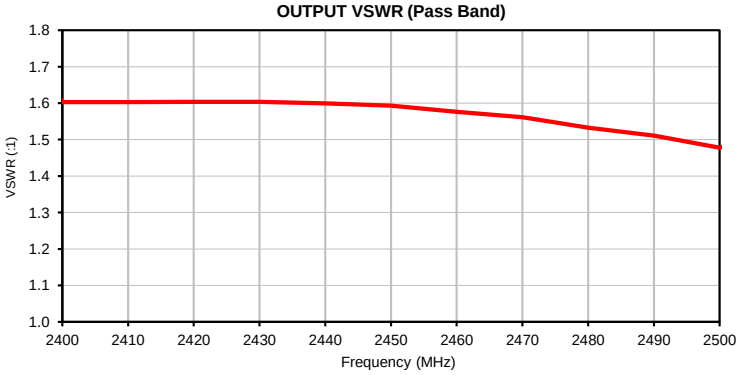








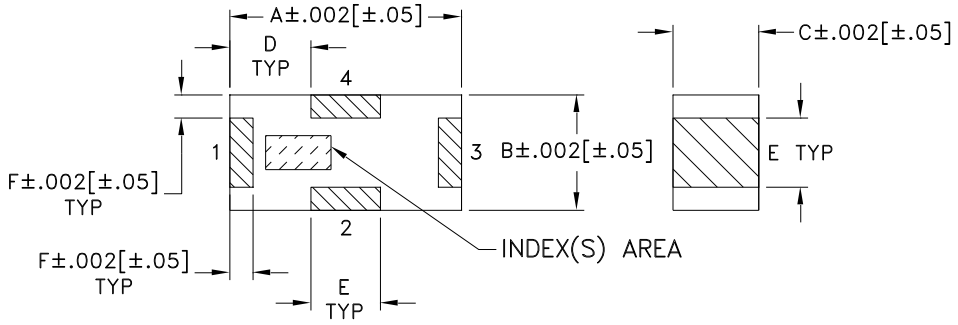




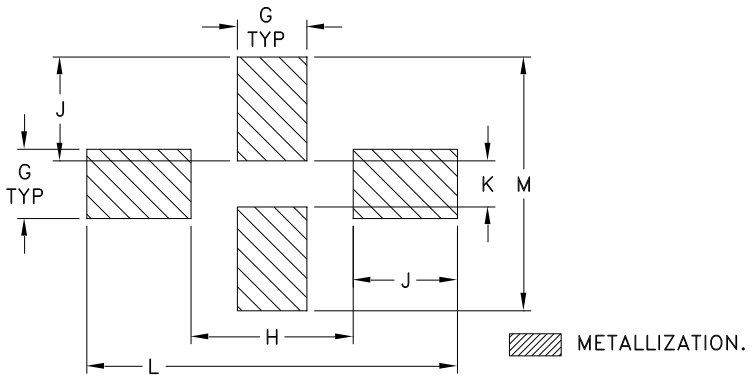
Case Style NK

NK0402C-1

Outline Dimensions



PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.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. ± .01; 3 Pl. ± .005

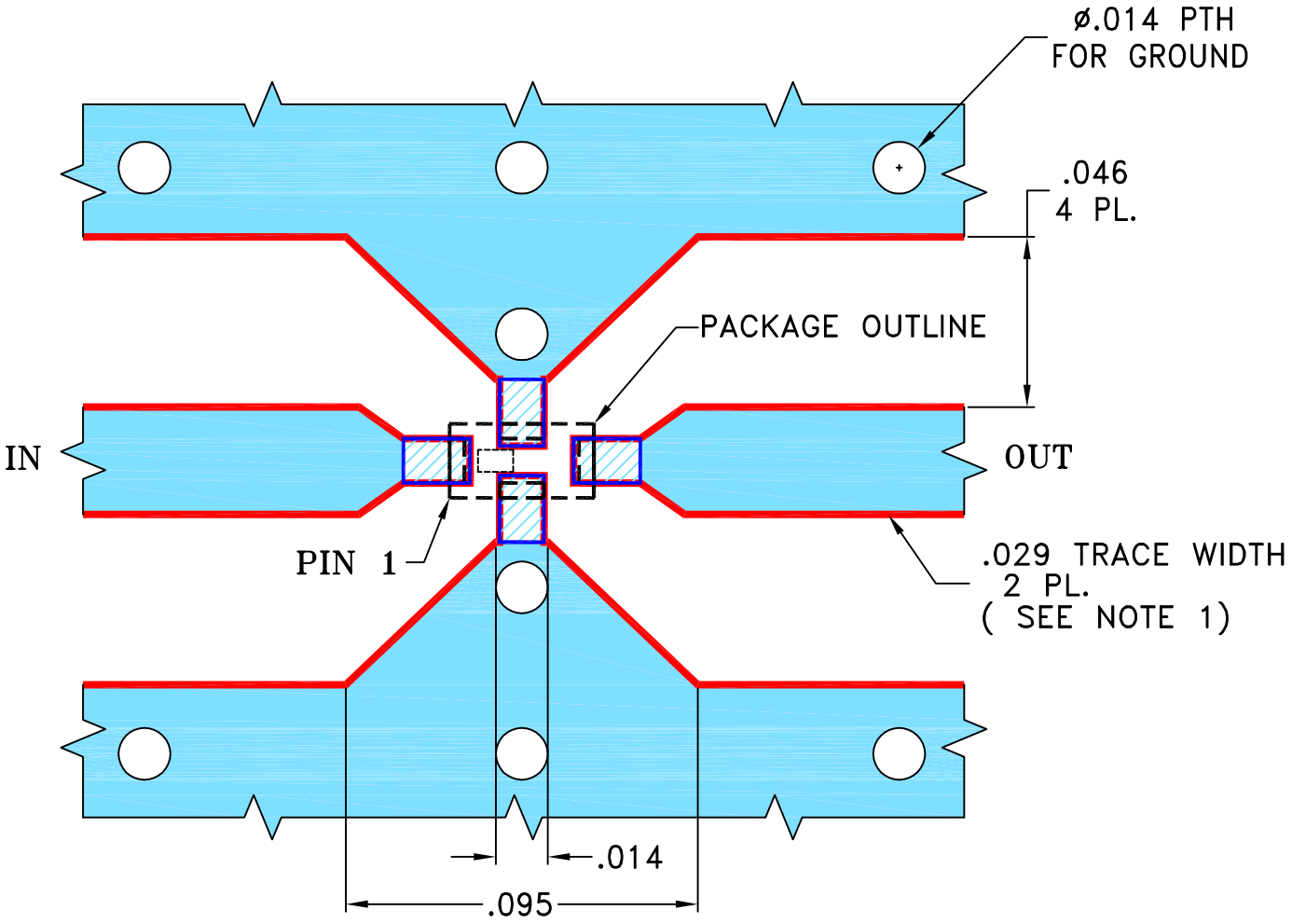
Notes:

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

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:

1. TRACE WIDTH IS SHOWN FOR FR4, GRADE IT-180TC (ITEQ CORP.) WITH DIELECTRIC THICKNESS .016±.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.

UNLESS OTHERWISE SPECIFIED		INITIALS	DATE
DIMENSIONS ARE IN INCHES	DRAWN	NP	05/30/18
TOLERANCES ON:	CHECKED	GF	05/30/18
2 PL DECIMALS ±	APPROVED	SL	05/31/18
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

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

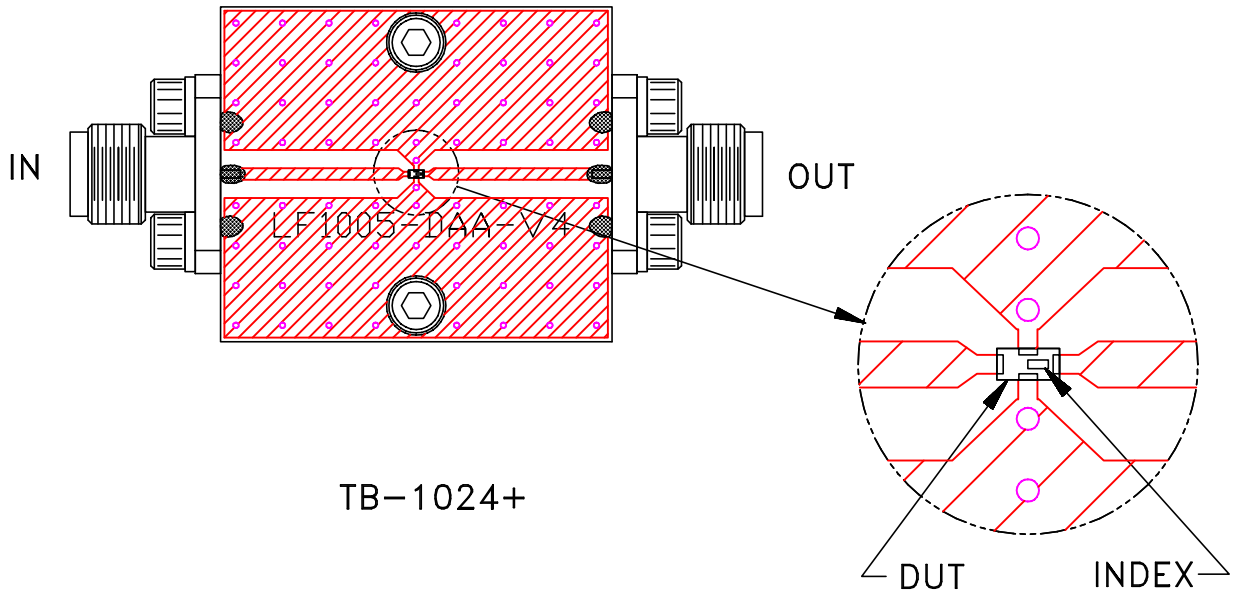
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

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

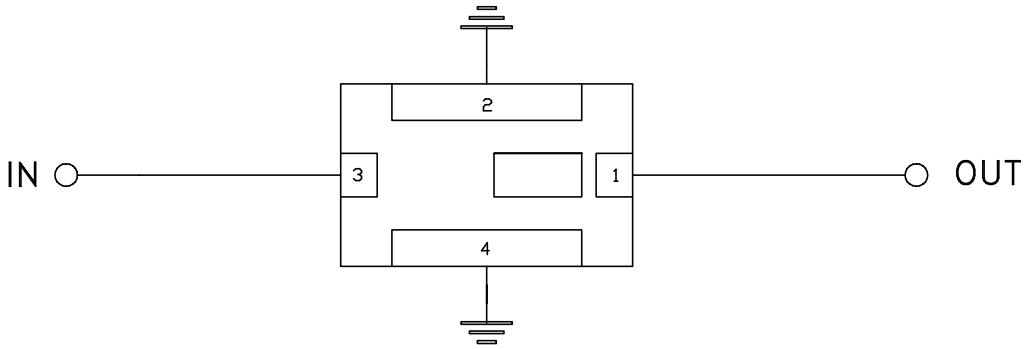
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-552	OR

FILE:	SCALE:	SHEET:
98PL552	20:1	1 OF 1

Evaluation Board and Circuit



TB-1024+



Schematic Diagram

Notes:

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

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Environmental Specifications ENV107

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 preseve shelf life for proper solderability.	