LTCC

Bandpass Filter

BPNK-542R+

50Ω 4900 to 5950 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])
- Low Insertion Loss, 1.3 dB typ.
- 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	—	—	5425	—	MHz
	Insertion Loss	4900 – 5950	—	1.3	1.6	dB
	Return Loss	4900 – 5950	10	14	—	dB
Stop Band, Lower	Rejection	2400 – 2500	—	23	—	dB
Stop Band, Upper	Rejection	9800 - 11900	—	32	—	dB
		14700 - 17850	—	38	—	dB

* Tested on Evaluation Board TB-1039+

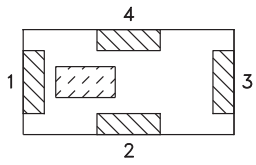
Maximum Ratings

Operating Temperature	-40°C to +85°C
Storage Temperature*	-40°C to +85°C
RF Power Input**	3W 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 1.5W at 85°C.

Block Diagram

Top View

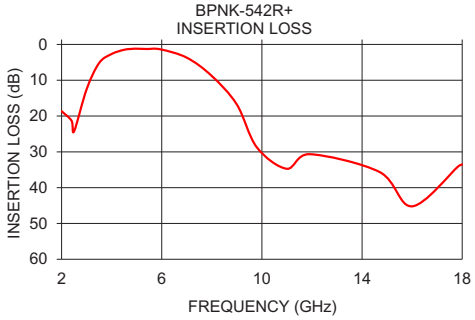


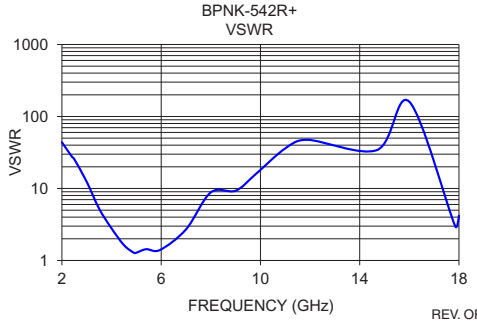
Pad Connections

Input	3
Output	1
Ground	2,4

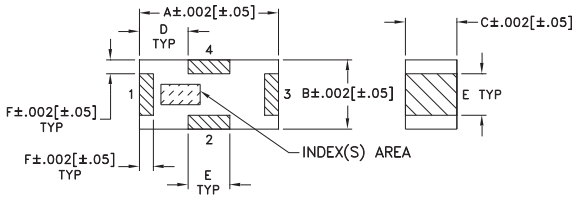
Typical Performance Data at 25°C

Frequency (GHz)	Insertion Loss (dB)	VSWR (:1)
2.00	18.63	43.86
2.40	21.32	27.79
2.50	24.26	25.50
3.00	12.51	12.38
3.50	5.19	5.25
4.00	2.67	2.79
4.90	1.20	1.28
5.00	1.19	1.28
5.95	1.37	1.40
7.00	3.70	2.70
8.00	8.82	8.83
9.00	16.79	9.32
9.80	28.76	15.72
11.00	34.73	36.02
11.90	30.65	47.41
14.70	35.63	34.20
16.00	45.22	160.16
17.85	34.00	2.99
18.00	33.53	4.18

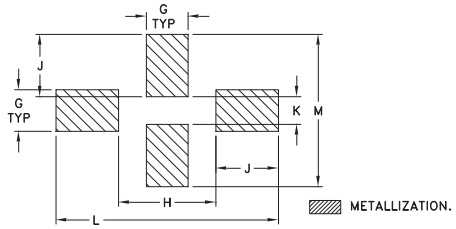




Outline Drawing

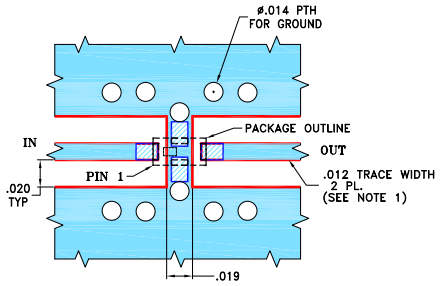


PCB Land Pattern



Suggested Layout,
Tolerance to be within .002

Evaluation Board MCL P/N: TB-1039+
Suggested PCB Layout (PL-569)



NOTES:
1. PCB IS MULTILAYER PCB, SEE STACK-UP DIAGRAM.
2. TRACE WIDTH IS SHOWN FOR FR4 WITH DIELECTRIC THICKNESS .006±.0005. COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH & GAP MAY NEED TO BE MODIFIED.
3. LAYERS 2,3,4 OF THE PCB ARE CONTINUOUS GROUND PLANES.

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-542R+

Typical Performance Data

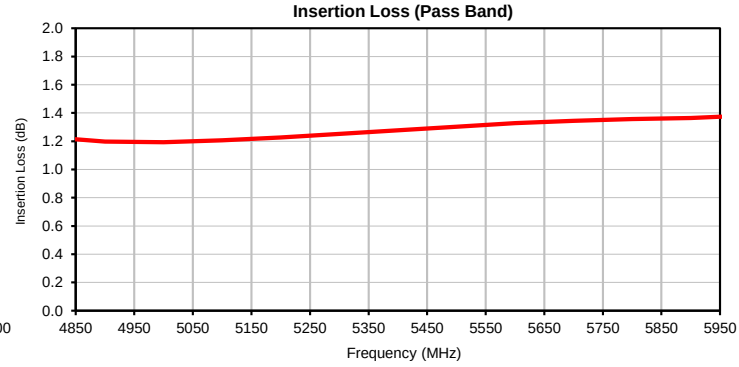
FREQUENCY (MHz)	INSERTION LOSS (dB)	INPUT VSWR (:1)	OUTPUT VSWR (:1)
2000	18.63	43.86	15.55
2400	21.32	27.79	11.73
2420	21.77	27.33	11.52
2440	22.29	26.81	11.29
2460	22.88	26.36	11.11
2480	23.53	25.94	11.01
2500	24.26	25.50	10.91
2600	28.96	22.70	10.17
2800	19.91	17.32	8.67
3000	12.51	12.38	7.62
3200	8.46	8.57	6.50
3400	6.04	6.11	5.34
3600	4.50	4.56	4.33
3800	3.44	3.53	3.49
4000	2.67	2.78	2.79
4200	2.09	2.18	2.24
4400	1.65	1.72	1.81
4600	1.38	1.37	1.49
4800	1.23	1.11	1.31
4900	1.20	1.04	1.28
5000	1.19	1.10	1.28
5100	1.21	1.19	1.32
5200	1.23	1.28	1.36
5300	1.25	1.35	1.40
5400	1.28	1.41	1.43
5500	1.30	1.45	1.45
5600	1.33	1.47	1.46
5700	1.34	1.48	1.45
5800	1.36	1.46	1.42
5900	1.36	1.42	1.37
5950	1.37	1.40	1.33
6000	1.38	1.37	1.29
6200	1.43	1.26	1.13
6400	1.57	1.26	1.14
6600	1.87	1.49	1.42
6800	2.44	1.93	1.81
7000	3.70	2.70	2.02
7200	4.55	3.81	2.84
7400	5.25	4.86	4.13
7600	6.34	6.17	5.26
7800	7.54	7.59	6.31
8000	8.82	8.83	7.07
8200	10.16	9.61	7.59
8400	11.57	9.77	8.01
8600	13.12	9.37	8.34
8800	14.83	8.63	8.70
9000	16.79	7.87	9.32
9200	19.06	7.35	10.17
9400	21.73	7.16	11.48
9600	24.90	7.39	13.30
9800	28.76	8.08	15.72
10000	33.62	9.30	19.03
10400	42.53	13.88	27.28
10800	36.46	22.42	34.69
11200	33.51	36.46	35.31
11600	31.80	49.08	26.06
11900	30.65	47.41	18.35
12000	30.28	44.46	15.86
12500	28.21	24.02	8.01
13000	26.29	10.37	4.75
13500	25.92	4.61	5.24
14000	28.41	3.84	10.06
14500	33.38	7.82	23.33
14700	35.63	11.35	34.20
15000	38.97	20.44	58.93
15500	43.29	59.77	113.04
16000	45.22	160.16	54.11
16500	45.06	89.21	16.99
17000	44.26	23.79	5.15
17500	37.61	6.50	1.93
18000	33.53	1.75	4.18

Ceramic Bandpass Filter BPNK-542R+

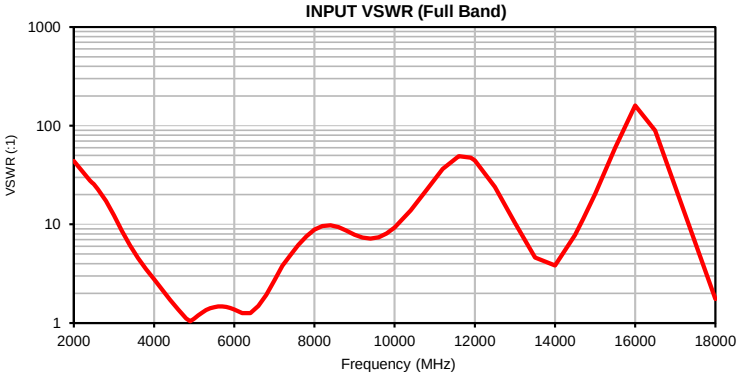
Typical Performance Curves

Insertion Loss (Full Band)

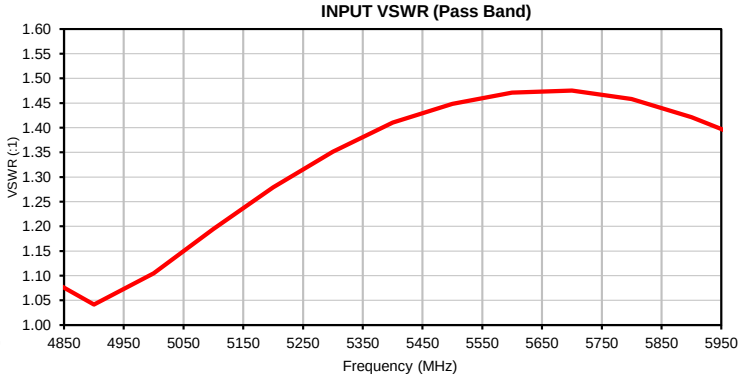
Insertion Loss (Pass Band)



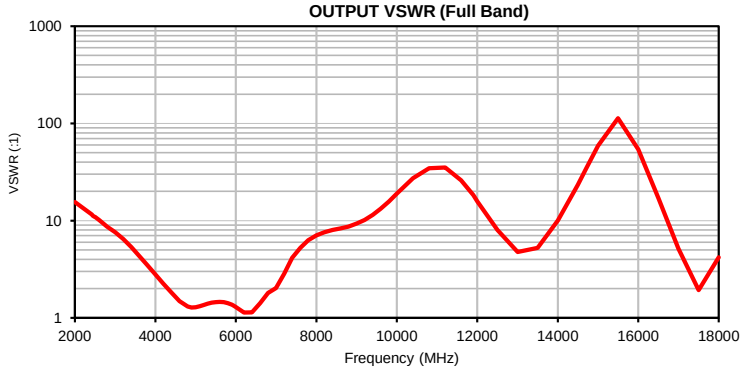
INPUT VSWR (Full Band)



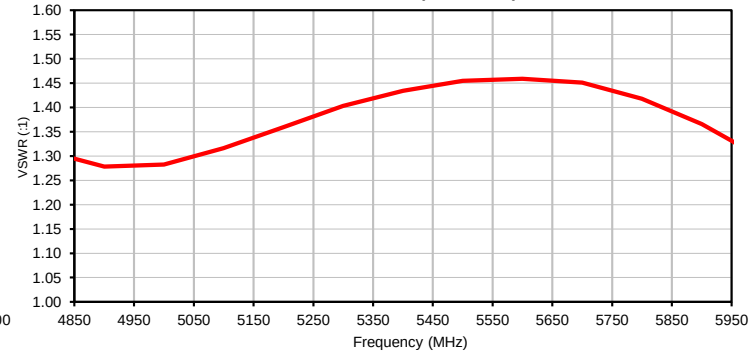
INPUT VSWR (Pass Band)



OUTPUT VSWR (Full Band)



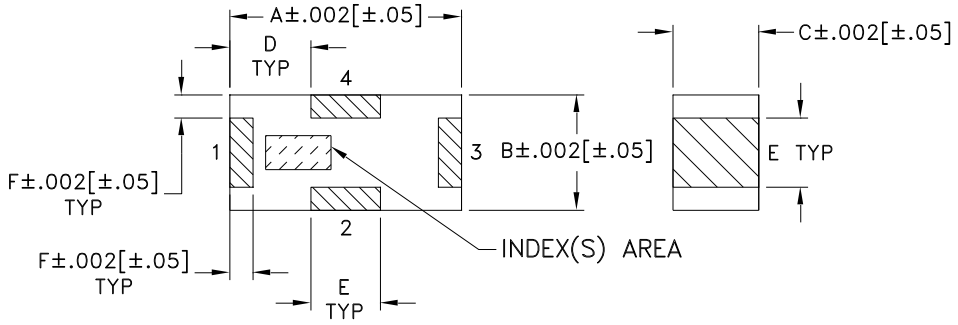
OUTPUT VSWR (Pass Band)



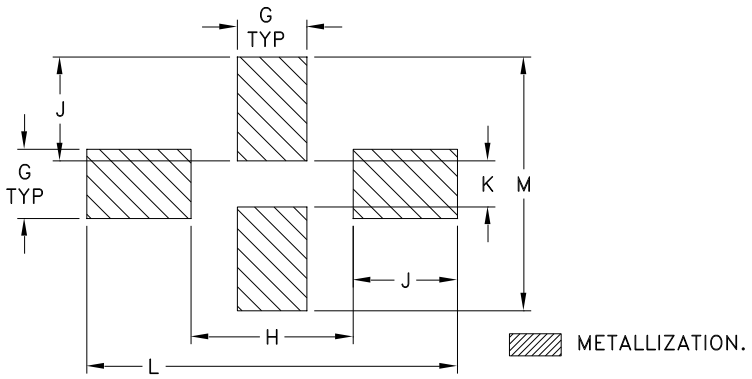
Case Style NK

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

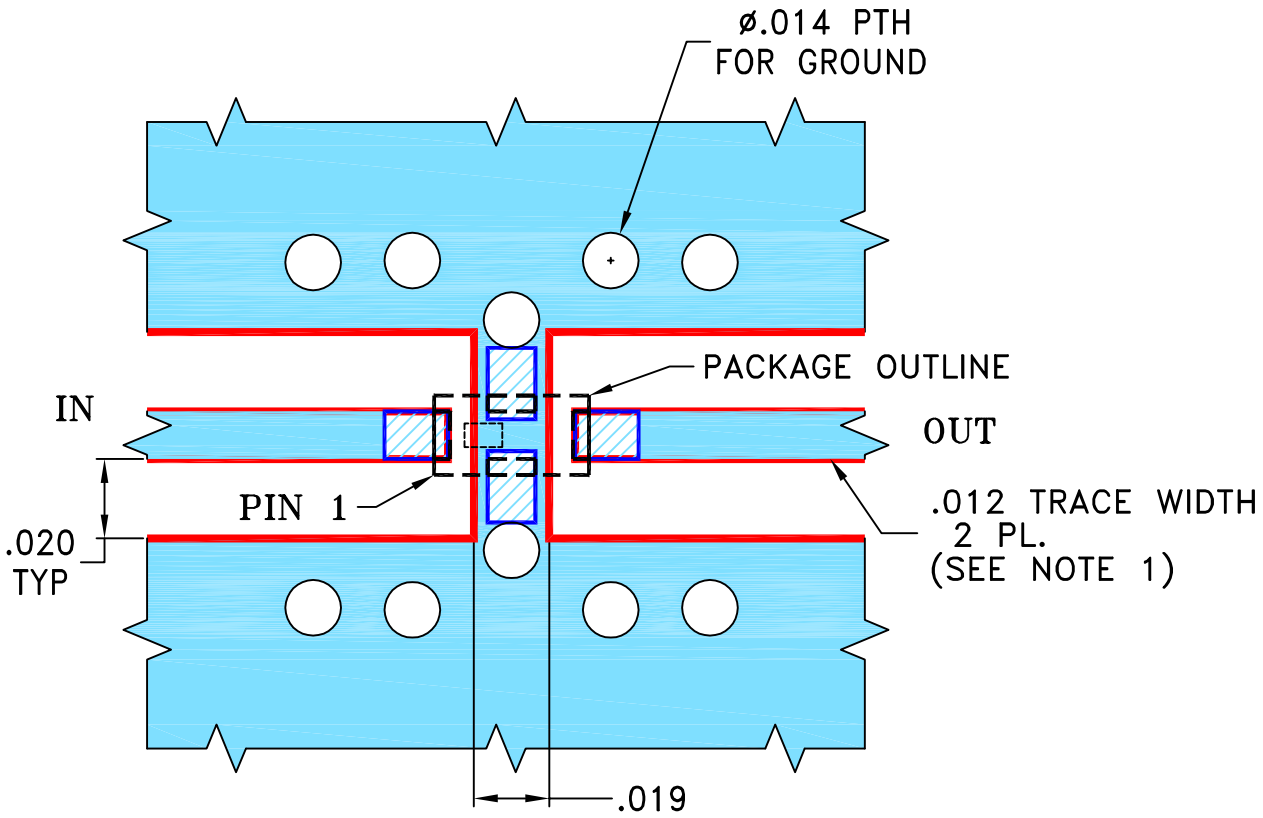
Notes:

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, "04FL04" PIN CODE



NOTES:

1. PCB IS MULTILAYER PCB, SEE STACK-UP DIAGRAM.
2. TRACE WIDTH IS SHOWN FOR FR4
   WITH DIELECTRIC THICKNESS .006±.0005. COPPER: 1/2 OZ. EACH SIDE.
   FOR OTHER MATERIALS TRACE WIDTH & GAP MAY NEED TO BE MODIFIED.
3. LAYERS 2,3,4 OF THE PCB ARE CONTINUOUS GROUND PLANES.

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	05/31/18
2 PL DECIMALS ±	APPROVED	SL	05/31/18
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

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

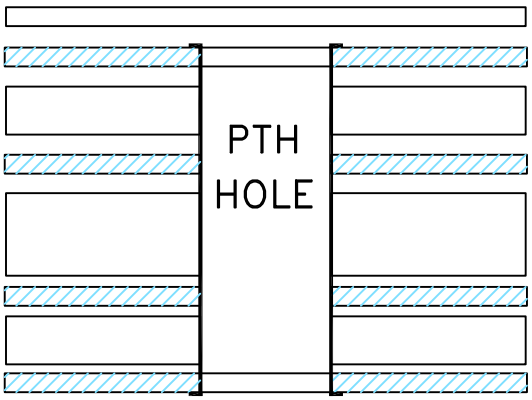
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

PL, 04FL04, NK0402C-1, TB-1039+

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-569	OR

FILE:	SCALE:	SHEET:
98PL569	20:1	1 OF 2

STACK-UP DIAGRAM



-TOP SOLDER MASK
-COPPER LAYER 1, 0.5 OZ.
-CORE, 0.006", FR4
-COPPER LAYER 2, 0.5 OZ.
-PREPREG, FR4
(THICKNESS AS REQUIRED)
-COPPER LAYER 3, 0.5 OZ.
-CORE, 0.006", FR4
-COPPER LAYER 4, 0.5 OZ.

1. TOTAL FINISHED THICKNESS 0.063" ± 10%.
2. PTH HOLES PRESENT FROM COPPER LAYER 1 TO 4.

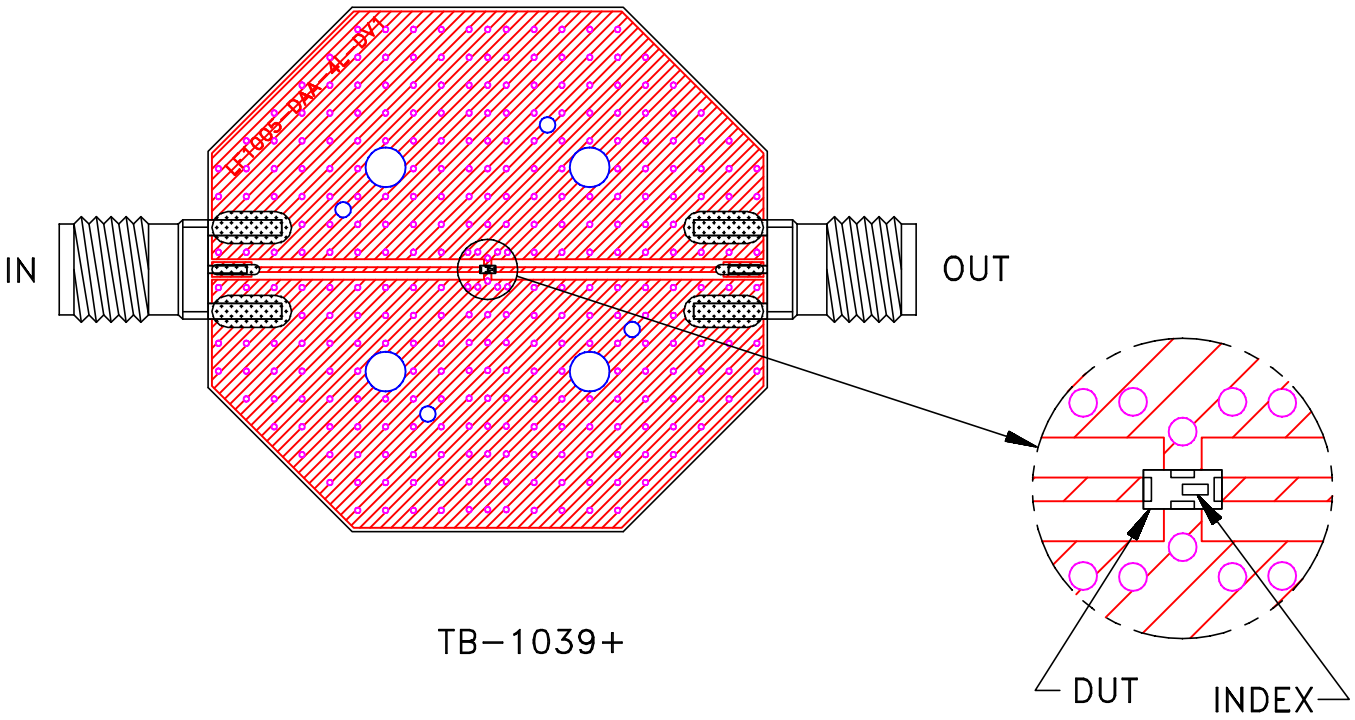
ASHEETA2.DWG REV:A DATE: 01/12/94

ALL DIMENSIONS ARE IN INCHES EXCEPT OTHERWISE SPECIFIED

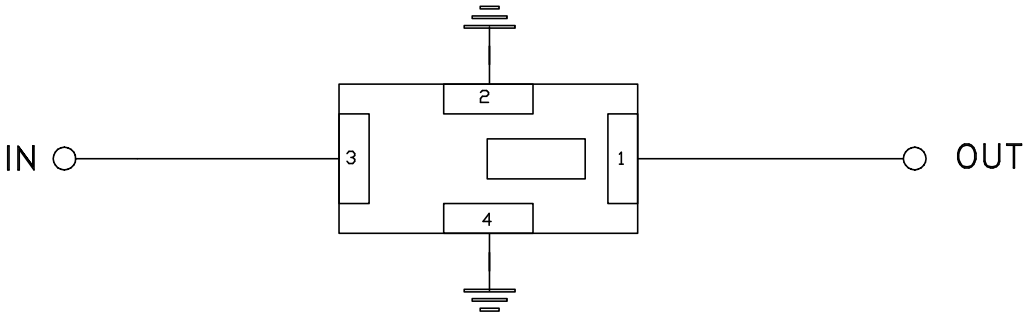
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-569	OR

FILE:	SCALE:	SHEET:
98PL569	20:1	2 OF 2

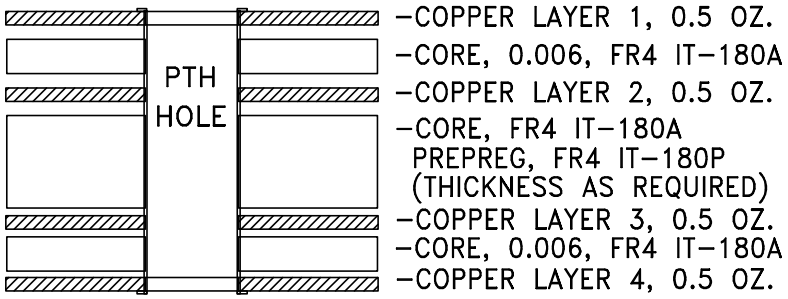
Evaluation Board and Circuit



TB-1039+



Schematic Diagram



Stack-up Diagram

Notes:

1. 50 Ohm SMA Female connectors.
2. PCB Material: FR4 or equivalent,
   Dielectric Constant=4.5,
   Total finished Thickness = .058 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.	