Ceramic

LTCC Bandpass Filter

BFCV-2610+

50Ω 2000 to 3220 MHz

Generic photo used for illustration purposes only

CASE STYLE: JV1210C

The Big Deal

- Small size 3.2mm x 2.5mm
- Wide passband (2000-3220 MHz)
- Low Insertion Loss (1.9 dB typical)
- Wide stopband rejection up to 8 GHz

Product Overview

The BFCV-2610+ LTCC Band Pass Filter is constructed with multiple layers in order to achieve a miniature size and high repeatability of performance. Wrap-around terminations minimize variations in performance due to parasitics. These units offer low insertion loss and very good wide band rejection.

Key Features

Feature	Advantages
Small Size (3.20mm x2.5 mm)	Allows for high layout density of circuit boards, while minimizing effects of parasitics.
Wrap around termination	Provides excellent solderability and easy visual inspection capability.
Wide bandwidth	Enables high data rate in communication systems.
LTCC construction	Provides a rugged package that is well suited for tough environments including high humidity and high temperature extremes.

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Bandpass Filter

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BFCV-2610+

Generic photo used for illustration purposes only

CASE STYLE: JV1210C

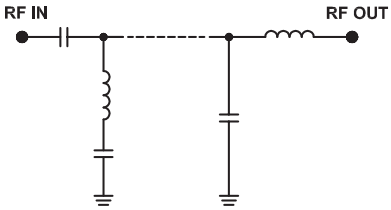
Features

- Small size
- Temperature stable
- Hermetically sealed
- LTCC construction

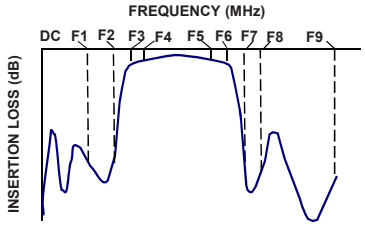
Applications

- Software defined radio
- WLAN
- Cellular network

Functional Schematic



Typical Frequency Response



Electrical Specifications[1,2] at 25°C

Parameter		F#	Frequency (MHz)	Min.	Typ.	Max.	Unit
Pass Band	Center Frequency	—	—	—	2610	—	MHz
	Insertion Loss	F3-F6	2000-3220	—	1.9	—	dB
		F4-F5	2100-3120	—	1.9	3.8	dB
	VSWR	F3-F6	2000-3220	—	2.1	—	:1
Stop Band, Lower	Insertion Loss	DC-F1	DC-1550	15	17	—	dB
		F2	1610	—	17	—	dB
	VSWR	DC-F1	DC-1550	—	20	—	:1
Stop Band, Upper	Insertion Loss	F7	4000	—	16	—	dB
		F8-F9	4500-8000	15	20	—	dB
	VSWR	F8-F9	4500-8000	—	20	—	:1

1. Measured on Mini-Circuits Characterization Test Board TB-946+

2. This filter is not intended for use as a DC Blocking circuit element. In Application where DC voltage is present at either input or output ports, blocking capacitors are required at the corresponding RF port.

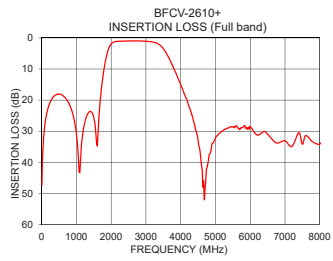
Maximum Ratings	
Operating Temperature	-55°C to 100°C
Storage Temperature	-55°C to 100°C
RF Power Input*	4 W max @ +25°C

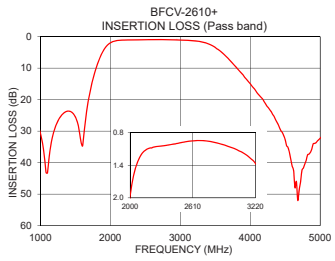
*Passband rating, derate linearly to 0.25W at 100°C ambient

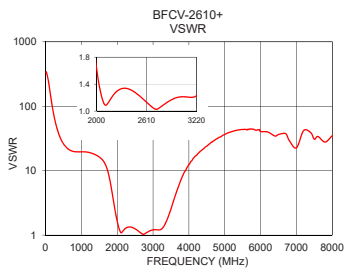
Permanent damage may occur if any of these limits are exceeded.

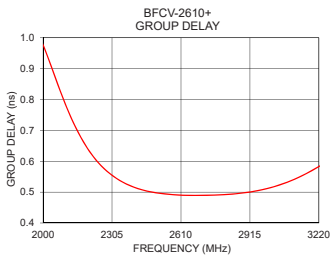
Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)	Frequency (MHz)	Group Delay (nsec)
10	47.22	329.19	2000	0.98
1550	29.40	15.41	2060	0.86
1610	33.47	14.22	2100	0.78
1640	27.21	13.42	2200	0.64
1680	20.88	12.11	2300	0.56
1800	9.71	6.86	2400	0.52
1940	3.13	2.41	2500	0.50
2000	1.96	1.63	2600	0.49
2100	1.23	1.09	2610	0.49
2610	0.95	1.13	2660	0.49
3120	1.20	1.21	2700	0.49
3220	1.37	1.23	2760	0.49
3480	3.14	2.37	2800	0.49
3800	9.73	7.71	2820	0.49
4000	14.94	12.55	2900	0.50
4200	20.69	17.14	2960	0.51
4460	30.48	23.32	3000	0.51
4500	32.69	24.09	3100	0.54
7000	33.07	22.59	3120	0.54
8000	34.17	34.86	3220	0.58









+RoHS Compliant

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

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.

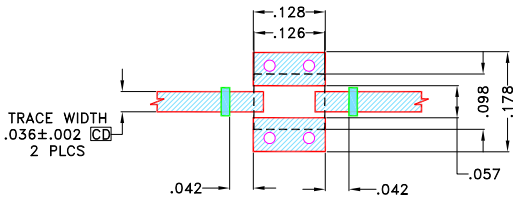
C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/MCLStore/terms.jsp

Pad Connections

RF IN	1
RF OUT	3
GROUND	2,4

Product Marking: JG

Demo Board MCL P/N: TB-946+
Suggested PCB Layout (PL-502)



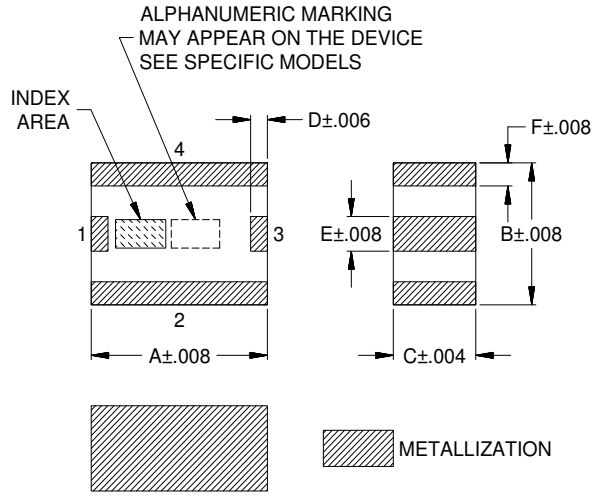
NOTES:

1. TRACE WIDTH & SPACE WIDTH IS SHOWN FOR ROGERS (RO4350B) WITH DIELECTRIC THICKNESS .0166"±.0015". COPPER 1/2 Oz. EACH SIDE
   FOR OTHER MATERIALS TRACE WIDTH & SPACE WIDTH 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 SOLDERMASK

Outline Drawing



Outline Dimensions (inch / mm)

A	B	C	D	E	F	Wt.
.126	**.098**	**.059**	**.012**	**.024**	**.016**	grams
3.2	2.5	1.5	.3	.6	.4	.03

Note: Please refer to case style drawing for details

Surface Mount Band Pass Filter BFCV-2610+

Typical Performance Data

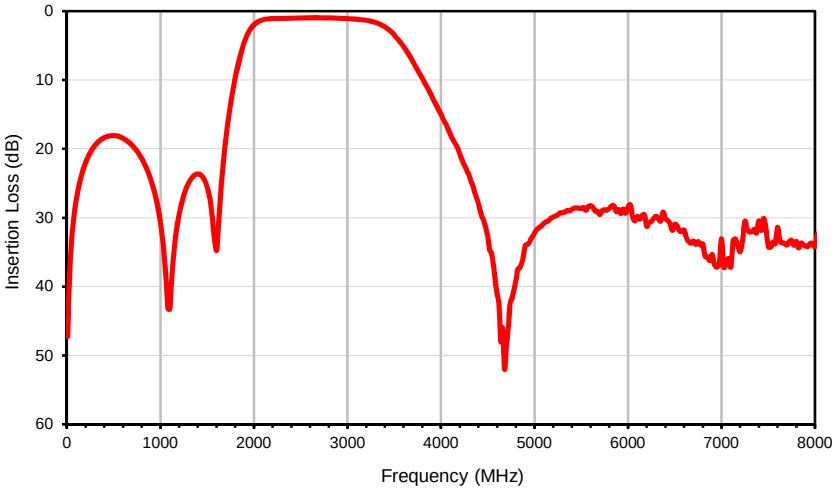
FREQUENCY (MHz)	INSERTION LOSS (dB)	RETURN LOSS (dB)
10	47.22	0.05
20	41.19	0.05
40	35.18	0.05
60	31.71	0.05
100	27.40	0.05
200	22.01	0.08
400	18.35	0.13
600	18.45	0.16
800	21.38	0.18
1000	30.67	0.21
1200	29.51	0.29
1500	25.53	0.49
1550	29.40	0.54
1600	34.77	0.60
1610	33.47	0.62
1620	31.40	0.64
1630	29.23	0.66
1650	25.39	0.71
1680	20.88	0.81
1690	19.62	0.85
1700	18.45	0.89
1750	13.53	1.23
1800	9.71	1.85
1820	8.41	2.21
1840	7.23	2.66
1850	6.69	2.92
1900	4.42	4.70
1920	3.72	5.67
1940	3.13	6.80
1950	2.88	7.43
2000	1.96	11.38
2100	1.23	29.07
2610	0.95	20.59
3120	1.20	17.87
3220	1.37	15.29
3400	2.28	8.41
3500	3.43	5.42
3700	7.31	2.11
3900	12.24	1.00
4000	14.94	0.74
4200	20.69	0.52
4260	22.58	0.48
4400	27.92	0.45
4480	31.51	0.39
4500	32.69	0.40
4600	41.14	0.36
4700	48.64	0.35
5000	32.27	0.38
5500	28.66	0.29
5800	28.65	0.19
6000	28.49	0.21
6200	31.23	0.24
6400	30.10	0.34
6500	30.97	0.37
6600	31.80	0.49
6800	33.81	0.98
7000	33.07	3.06
7400	30.45	2.19
7500	34.19	1.31
8000	34.17	0.45

FREQUENCY (MHz)	GROUP DELAY (nsec)
2000	0.98
2020	0.94
2040	0.90
2060	0.86
2080	0.82
2100	0.78
2120	0.75
2140	0.72
2160	0.69
2180	0.66
2200	0.64
2220	0.62
2240	0.60
2260	0.58
2280	0.57
2300	0.56
2320	0.55
2340	0.54
2360	0.53
2380	0.52
2400	0.52
2420	0.51
2440	0.51
2460	0.50
2480	0.50
2500	0.50
2520	0.50
2540	0.49
2560	0.49
2580	0.49
2600	0.49
2620	0.49
2640	0.49
2660	0.49
2680	0.49
2700	0.49
2720	0.49
2740	0.49
2760	0.49
2780	0.49
2800	0.49
2820	0.49
2840	0.49
2860	0.50
2880	0.50
2900	0.50
2920	0.50
2940	0.50
2960	0.51
2980	0.51
3000	0.51
3020	0.52
3040	0.52
3060	0.53
3080	0.53
3100	0.54
3120	0.54
3140	0.55
3160	0.56
3200	0.57

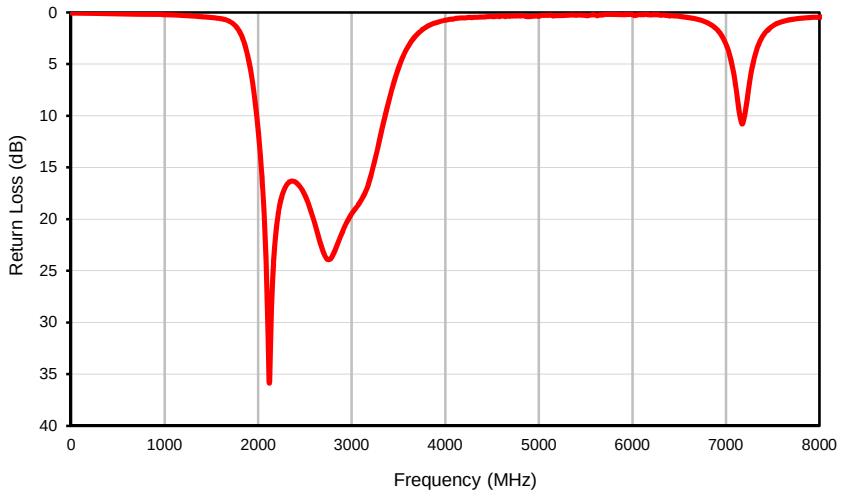
Surface Mount Band Pass Filter BFCV-2610+

Typical Performance Curves

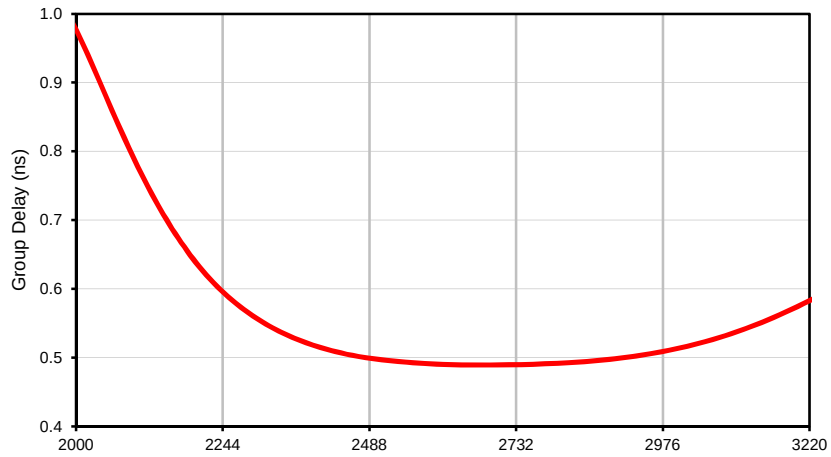
Insertion Loss



Return Loss



Group Delay

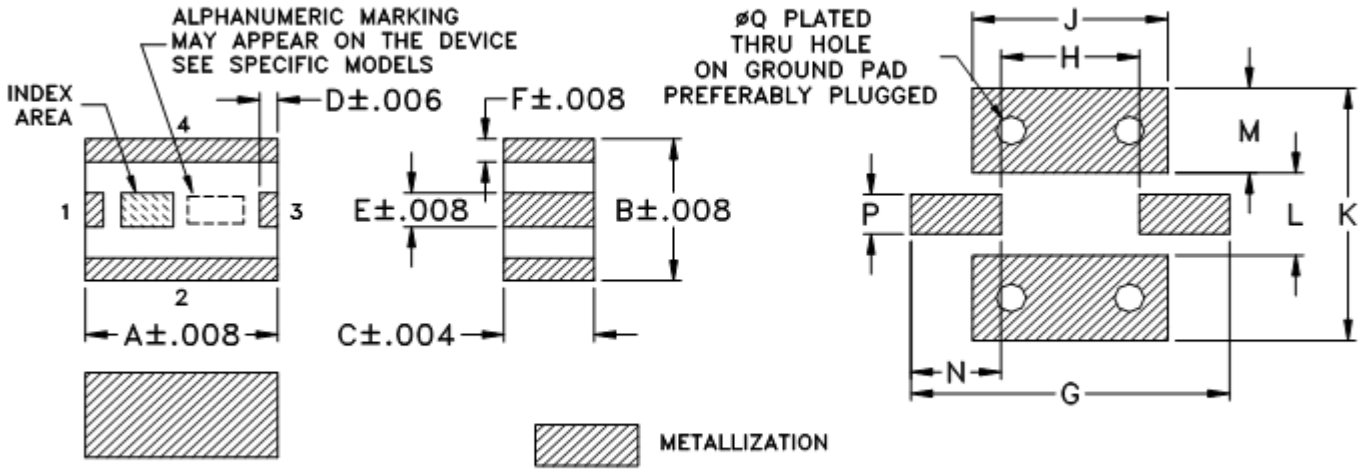


Case Style JV

Outline Dimensions

JV1210C

PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.002

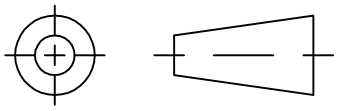
CASE #	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	WT. GRAM
JV1210C	.126 (3.2)	.098 (2.5)	.059 (1.5)	.012 (.3)	.024 (.6)	.016 (.4)	.209 (5.3)	.091 (2.3)	.128 (3.25)	.175 (4.45)	.057 (1.45)	.059 (1.5)	.059 (1.5)	.028 (.7)	.020 (.5)	.03

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

Notes:

1. Open style, ceramic base.
2. Termination finish: **as shown below or indicated on Data Sheet.**
   For RoHS Case Styles: Tin plate over Nickel plate. All models, (+) suffix.
   For RoHS-5 Case Styles: Tin-Lead plate. All models, no (+) suffix.
3. Pad tolerance is non-cumulative. Minimum spacing between each pad is .004.

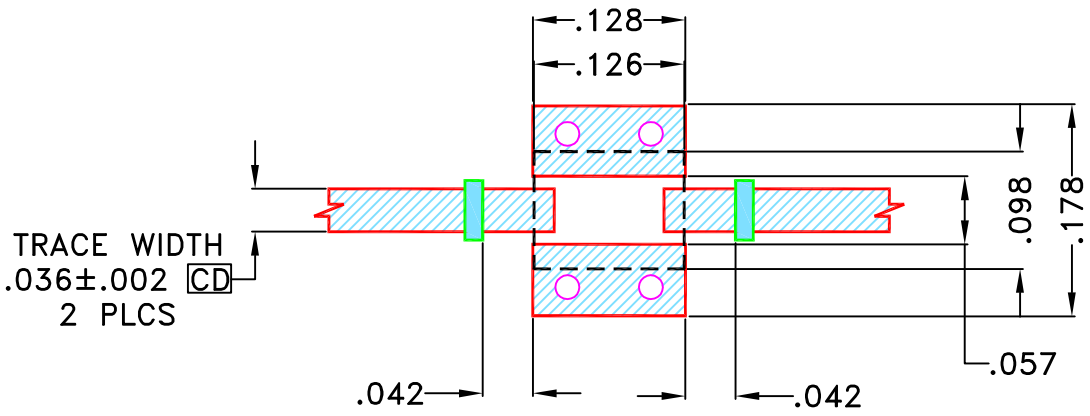
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M160679	NEW RELEASE	MAR 17	TM	MD

SUGGESTED MOUNTING CONFIGURATION FOR JV1210C CASE STYLE



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(SOLDER MASK OVER BARE COPPER)

DENOTES COPPER LAND PATTERN FREE OF SOLDERMASK

UNLESS OTHERWISE SPECIFIED		INITIALS	DATE
DIMENSIONS ARE IN INCHES	DRAWN	TM	8 MAR 17
TOLERANCES ON:	CHECKED	MD	8 MAR 17
2 PL DECIMALS ±	APPROVED	RV	8 MAR 17
3 PL DECIMALS ± .005"			
ANGLES ±			
FRACTIONS ±			

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

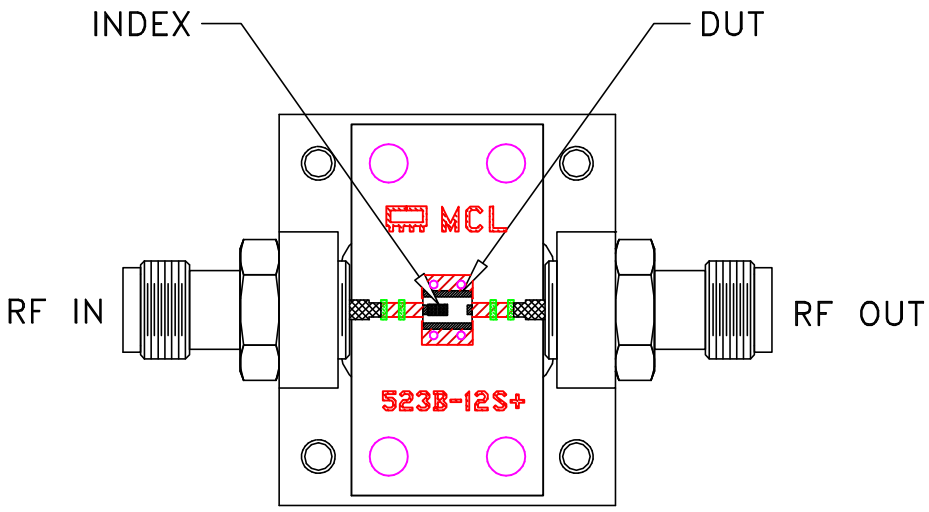
Mini-Circuits®
13 Neptune Avenue
Brooklyn NY 11235

PL, JV1210C, BFCV-4085+, BFCV-2895+, BFCV-3350+, BFCV-2610+, TB-946+
50 OHM

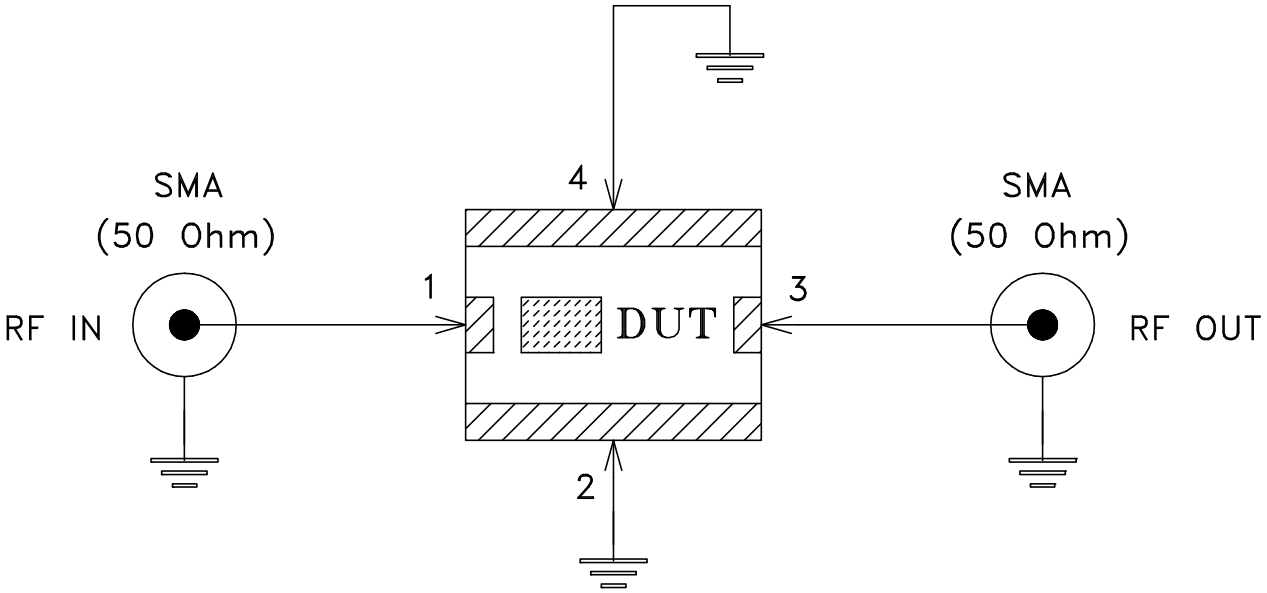
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-502	OR

FILE:	SCALE:	SHEET:
98PL502	6:1	1 OF 1

Evaluation Board and Circuit



TB-946+



Schematic Diagram

Notes:

1. 50 Ohm SMA Female connectors.
2. PCB Material: RO4350 or equivalent,
   Dielectric Constant=3.48, Thickness=.0166 inch.

Mini-Circuits®

Mini-Circuits

Environmental Specifications ENV02T1

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	-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
Thermal Shock	-55° to 100°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°C
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, 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
Marking Resistance to Solvents	Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C; distilled water + proylene glycol monomethyl ether + monoethanolamine at 63°C to 70°C	MIL-STD-202, Method 215