LTCC SURFACE MOUNT

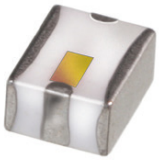
Bandpass Filter

BFCV-2610+

50Ω 2000 to 3220 MHz

THE BIG DEAL

- Low Insertion Loss, 1.9 dB Typ.
- 1210 Surface Mount Footprint
- Power Handling: 4 Watts
- Wide stopband rejection up to 8 GHz

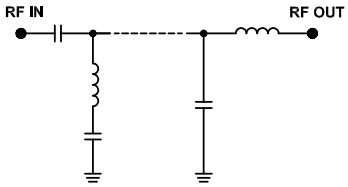


Generic photo used for illustration purposes only

APPLICATIONS

- Software Defined Radio
- WLAN
- Cellular Network

FUNCTIONAL DIAGRAM



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

Features	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.

Bandpass Filter

BFCV-2610+

50Ω 2000 to 3220 MHz

ELECTRICAL SPECIFICATIONS[1,2] AT +25°C

Parameter		F#	Frequency (MHz)	Min.	Typ.	Max.	Units
Passband	Center Frequency	—	—	—	2610	—	MHz
	Insertion Loss	F1-F2	2000 - 3220	—	1.9	3.8	dB
	Return Loss	F1-F2	2000 - 3220	—	9	—	dB
Stop Band, Lower	Rejection	DC-F3	DC - 1550	15	17	—	dB
		F4	1610	—	17	—	
Stop Band, Upper	Rejection	F5	4000	—	16	—	dB
		F6-F7	4500 - 8000	15	20	—	

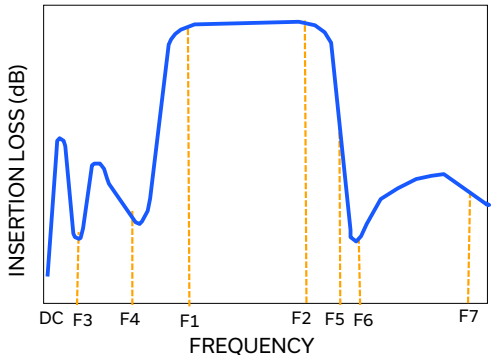
1. Tested in Evaluation Board P/N TB-BFCV-2610+.
2. This component should not be used as a DC-block. In applications where DC voltage and/or current is present at either the input or output ports, external DC blocking capacitors are required.

ABSOLUTE MAXIMUM RATINGS[4]

Parameter	Ratings
Operating Temperature	-55°C to +100°C
Storage Temperature	-55°C to +100°C
Input Power[5]	4 W max @ +25°C

4. Permanent damage may occur if any of these limits are exceeded.
5. Power rating applies only to signals within the passband. Power rating above +25°C operating temperature decreases linearly to 0.25W at +100°C.

TYPICAL FREQUENCY RESPONSE AT +25°C



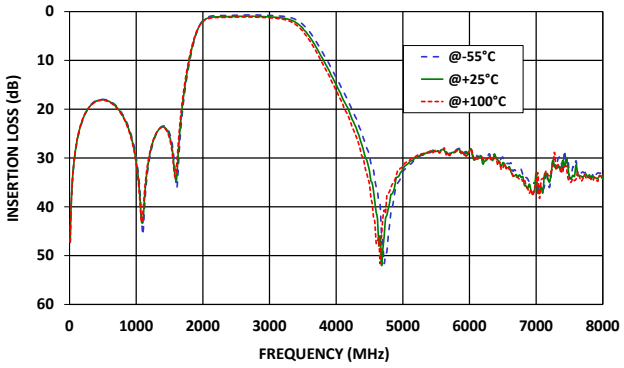
Bandpass Filter

BFCV-2610+

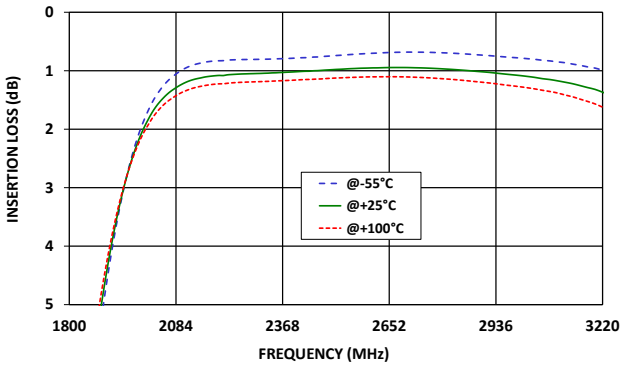
50Ω 2000 to 3220 MHz

TYPICAL PERFORMANCE GRAPHS AT +25°C

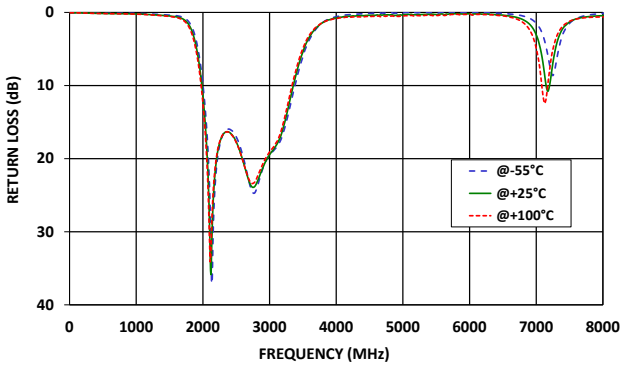
BFCV-2610+
INSERTION LOSS



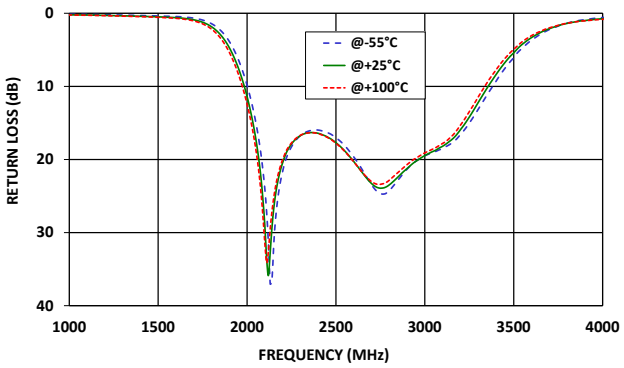
BFCV-2610+
INSERTION LOSS (Zoomed)



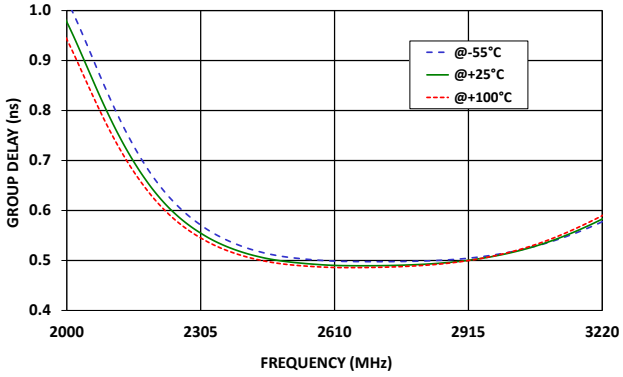
BFCV-2610+
RETURN LOSS



BFCV-2610+
RETURN LOSS (Zoomed)



BFCV-2610+
GROUP DELAY



Bandpass Filter

BFCV-2610+

50Ω 2000 to 3220 MHz

FUNCTIONAL DIAGRAM

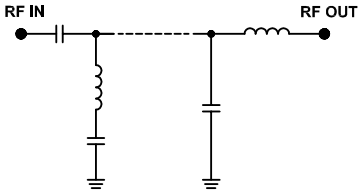
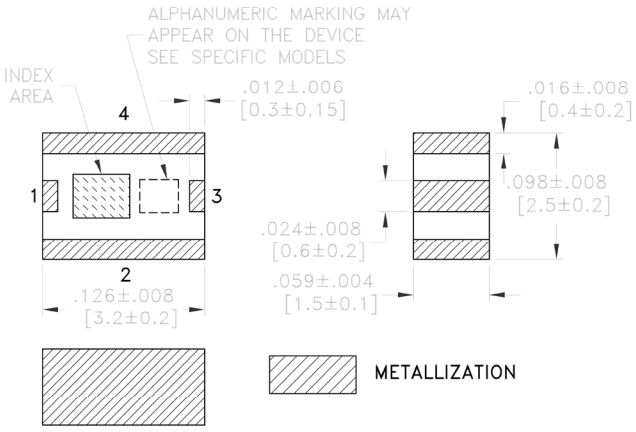


Figure 1. BFCV-2610+ Functional Diagram

PAD DESCRIPTION

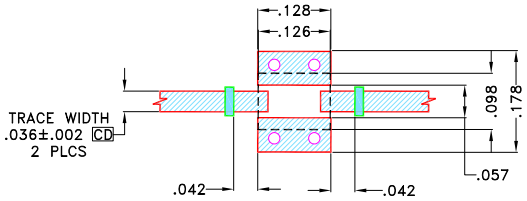
Function	Pad Number	Description
RF1[2]	1	Connects to RF Input Port
RF2[2]	3	Connects to RF Output Port
GROUND	2,4	Connects to Ground on PCB, (See drawing PL-502)

CASE STYLE DRAWING



WEIGHT: .03 grams.
DIMENSIONS ARE IN INCH [MM].

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

Figure 2. Suggested PCB Layout PL-502

PRODUCT MARKING*: L4

*Marking may contain other features or characters for internal lot control.

Bandpass Filter

BFCV-2610+

50Ω 2000 to 3220 MHz

ADDITIONAL DETAILED INFORMATION IS AVAILABLE ON OUR DASH BOARD. CLICK HERE

Performance Data & Graphs	Data Graphs S-Parameter (S2P Files) Data Set (.zip file) De-embedded to device pads
Case Style	JV1210C Lead Finish: Tin over Nickel
RoHS Status	Compliant
Tape and Reel	TR-F74
Suggested Layout for PCB Design	PL-502
Evaluation Board	TB-BFCV-2610+ Gerber File
Environmental Rating	ENV02T1

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-Circuits' 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/terms/viewterm.html

Surface Mount Band Pass Filter BFCV-2610+

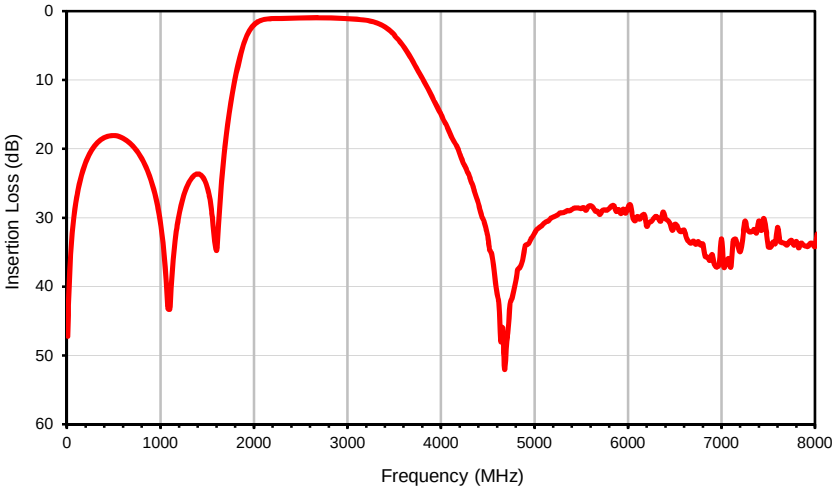
Typical Performance Data

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

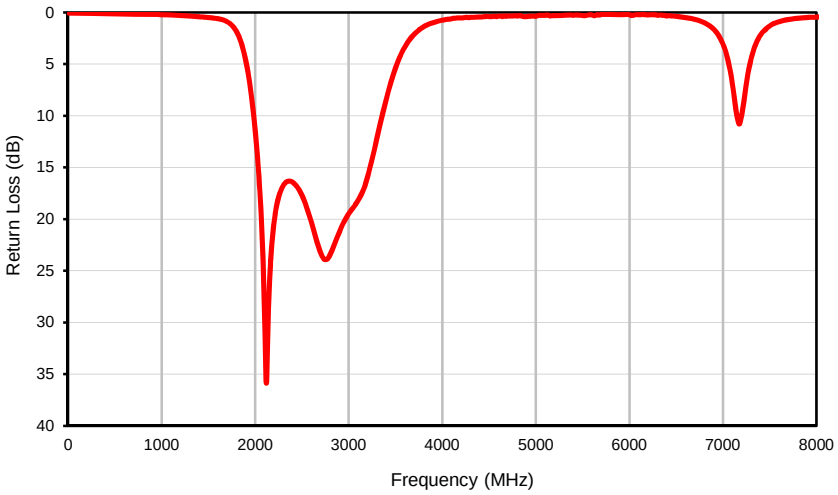
FREQUENCY (MHz)	GROUP DELAY (nsec)
2000	0.98
2020	0.94
2040	0.90
2060	0.86
2080	0.82
2100	0.78
2120	0.75
2140	0.72
2160	0.69
2180	0.66
2200	0.64
2220	0.62
2240	0.60
2260	0.58
2280	0.57
2300	0.56
2320	0.55
2340	0.54
2360	0.53
2380	0.52
2400	0.52
2420	0.51
2440	0.51
2460	0.50
2480	0.50
2500	0.50
2520	0.50
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

Typical Performance Curves

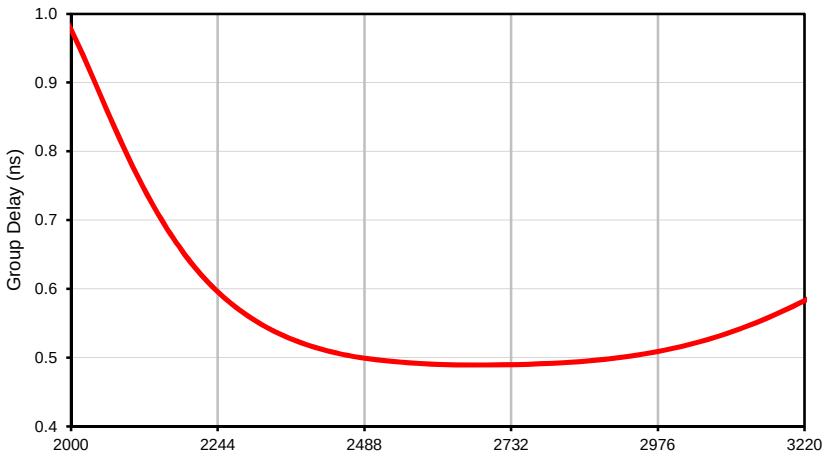
Insertion Loss



Return Loss



Group Delay

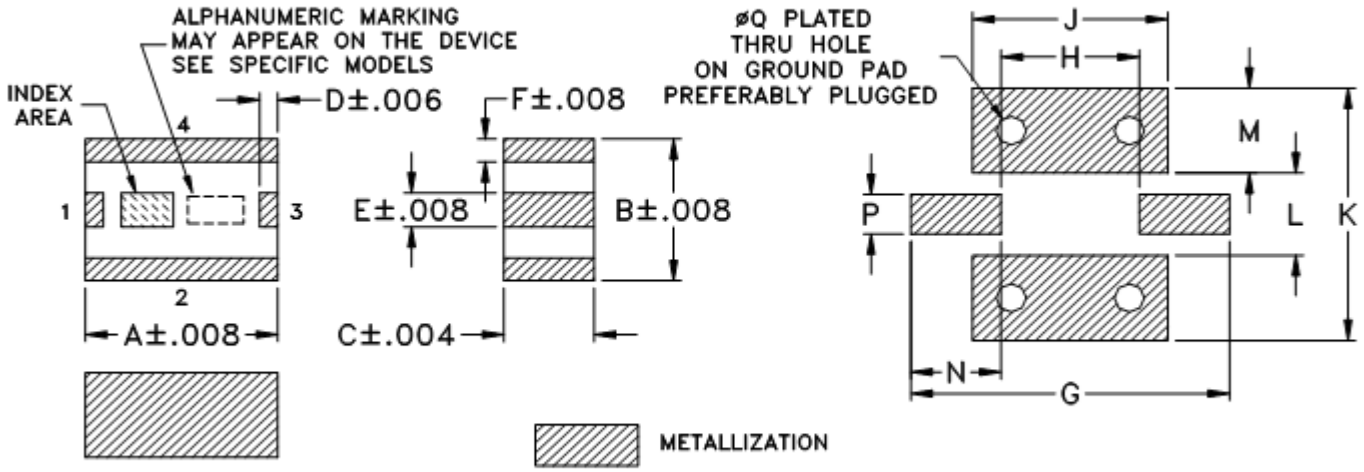


Case Style JV

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.

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Tape & Reel Packaging TR-F74

DEVICE ORIENTATION IN T&R

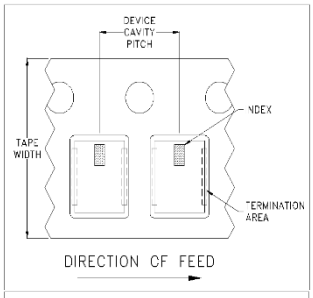

ILLUSTRATION 1

Applicable Case Styles
GE0805C-1
GE0805C-1AP
JV1210C-1
GU2939

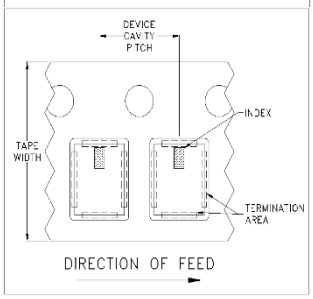

ILLUSTRATION 2

Applicable Case Styles
JV1210C
JV1210C-2
JV1210C-3
JV1210C-4
JV1210C-5
JV1210C-6
JV1210C-11

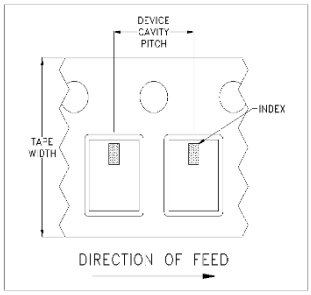

ILLUSTRATION 3

Applicable Case Styles
JC0603C-8
JC0603C-9
JV1210C-7
JV1210C-8
JV1210C-9
JV1210C-10
JV1210C-13
GE0805C-13
GE0805C-19
GE0805C-20

Tape Width, mm	Device Cavity Pitch, mm	Real Size, inches	Devices per Reel	
8	4	7	Small quantity standards **(see note)**	20
				50
				100
				200
				500
				1000
			Standard	2000
				4000

Note: Small reel availability varies by model. Refer to pricing and availability on individual model dashboard.

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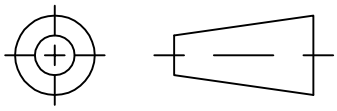
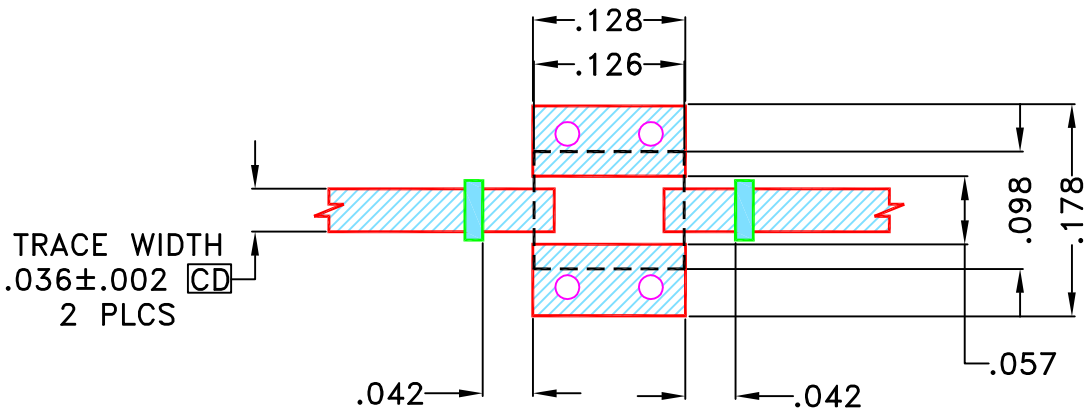
THIRD ANGLE PROJECTION



REVISIONS

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

SUGGESTED MOUNTING CONFIGURATION FOR JV1210C CASE STYLE



NOTES:

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DENOTES PCB COPPER LAYOUT WITH SMOBC
(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 ± 3 PL DECIMALS ± .005"	APPROVED	RV	8 MAR 17
ANGLES ±			
FRACTIONS ±			

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

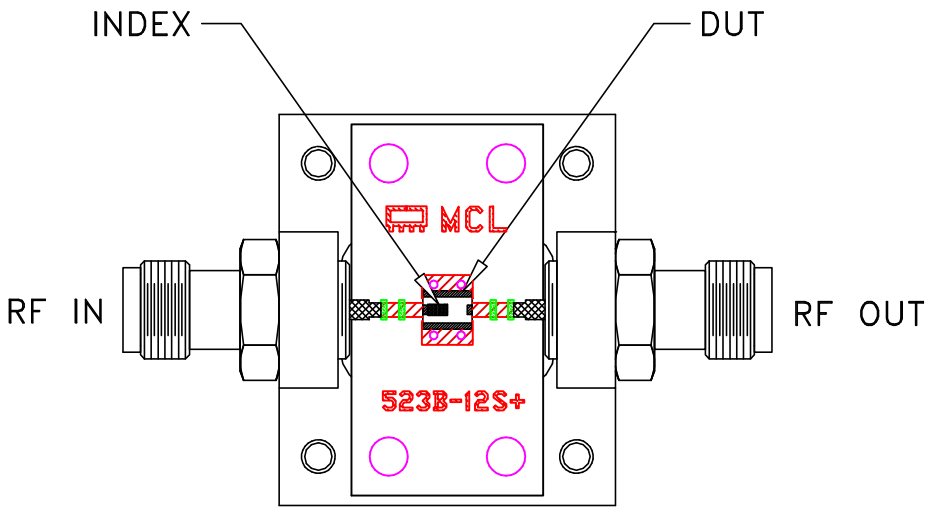
Mini-Circuits®
13 Neptune Avenue
Brooklyn NY 11235

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

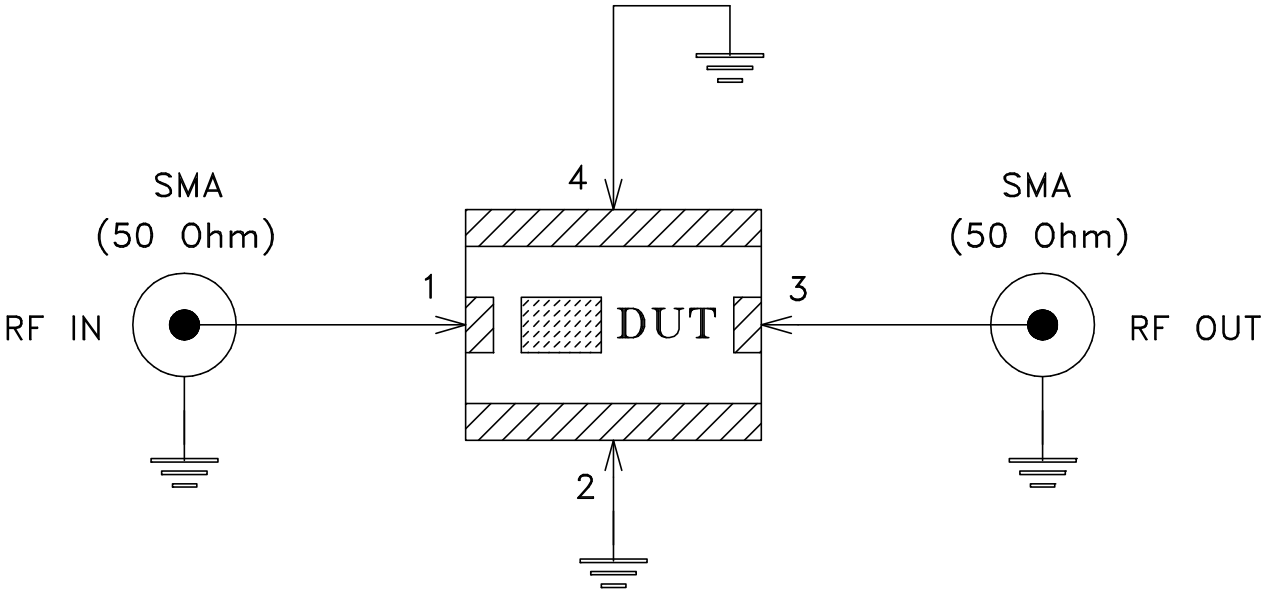
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-502	OR

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.

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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

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