



THE BIG DEAL

- Low Insertion Loss, 1.6 dB Typ.
- Good Return Loss, 12 dB Typ.
- Stop Band Rejection, 35 dB Typ.
- Small size, 1210



Generic photo used for illustration purposes only

CASE STYLE: JV1210C-13

+RoHS Compliant

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

APPLICATIONS

- Test & Measurement Equipment
- Communications, Radar, EW and ECM Defense Systems

PRODUCT OVERVIEW

LFCV-2002+ is a miniature low temperature co-fired ceramic (LTCC) low pass filter with a DC to 20 GHz passband supporting a variety of applications. This model provides 1.6 dB typical insertion loss over a wide band due to its rugged monolithic construction. Housed in a small 1210 ceramic form factor, the filter is ideal for dense signal chain PCB layouts where it complements MMIC size and performance. The LTCC fabrication process assures minimal RF performance variation while delivering a product that is well suited for environmental extremes of high humidity and temperature.

KEY FEATURES

Feature	Advantages
Ultra-wide Stopband	The LTCC lowpass filter provides a very good stopband rejection to 50 GHz suitable for high end applications.
LTCC Construction	Provides repeatable performance in a rugged, ceramic package well suited for tough environments such as high humidity and temperature extremes.
Small footprint (1210)	Allows for high layout density of circuit boards, while minimizing effects of parasitics.
Good power handling, 1W	Supports a wide range of system power requirements.



Mini-Circuits®

LTCC SMT

Low Pass Filter

LFCV-2002+

50Ω

DC to 20 GHz

ELECTRICAL SPECIFICATIONS^{1,2} AT 25°C

Parameter		F#	Frequency (GHz)	Min.	Typ.	Max.	Units
Passband	Insertion Loss	F1 - F2	DC-20	—	1.6	2.0	dB
	Return Loss	F1 - F2	DC-20	—	12.0	—	dB
Stop Band	Insertion Loss	F3 - F4	25.8-40	—	36	—	dB
		F4 - F5	40-50	—	25	—	

1. Measured on Mini-Circuits Test Board TB-LFCV-2002C+ with the connector and feedline effects de-embedded using the 2XThru IEEE P370 method

2. DC blocking capacitors are required in Applications where DC voltage and/or current is present at either RF1 or RF2 ports. Please contact Mini-Circuits for alternatives if DC pass from RF1-RF2 is required.

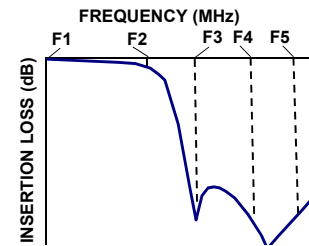
ABSOLUTE MAXIMUM RATINGS¹

Parameter	Ratings
Operating Temperature	-55°C to +125°C
Storage Temperature	-55°C to +125°C
RF Power Input ²	1W max.

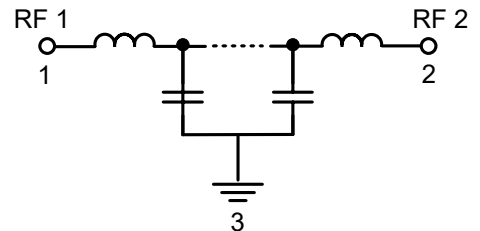
1. Permanent damage may occur if any of these limits are exceeded.

2. Derate linearly to 0.5 W at 125°C.

TYPICAL FREQUENCY RESPONSE



FUNCTIONAL SCHEMATIC





Mini-Circuits®

LTCC SMT

Low Pass Filter

50Ω

DC to 20 GHz

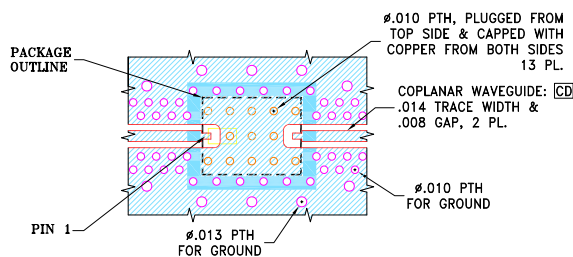
LFCV-2002+

PAD CONNECTIONS

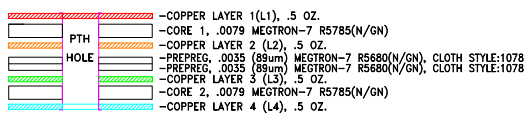
RF 1	1
RF 2	2
GROUND	3

PRODUCT MARKING: VF

SUGGESTED PCB LAYOUT (PL-743)



STACK-UP DIAGRAM



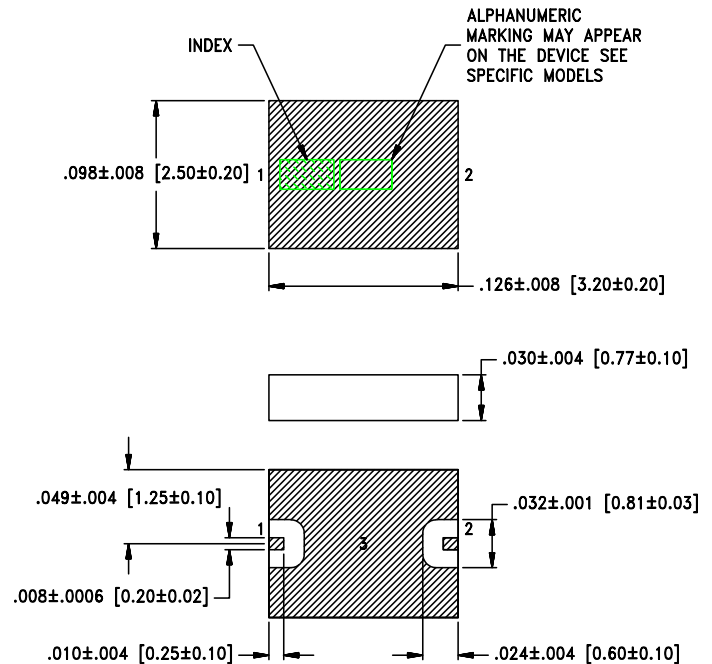
1. TOTAL FINISHED THICKNESS $0.026 \pm 10\%$.
2. PTH PRESENT FROM COPPER LAYER 1 TO COPPER LAYER 4.
3. INDICATED ON TOP VIEW PTH'S ARE PLUGGED WITH EPOXY AND CAPPED WITH COPPER FROM TOP SIDE.
4. L2, L3 AND L4 ARE CONTINUOUS GROUND PLANES.

NOTES:

1. PCB IS MULTILAYER PCB, SEE STACK-UP DIAGRAM.
2. TRACE WIDTH & GAP PARAMETERS ARE SHOWN FOR MEGTRON-7 R-5785(N/GN), WITH DIELECTRIC THICKNESS .0079; COPPER: 1/2 OZ. FOR OTHER MATERIALS TRACE WIDTH AND GAP MAY NEED TO BE MODIFIED.

- DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)
- DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

OUTLINE DRAWING



METALLIZATION

Weight: .024 grams

Dimensions are in inches [mm]. Tolerances: 2 PL. $\pm .010$; 3 PL. $\pm .005$

OUTLINE DIMENSIONS (Inches mm)

A	B	C	D	E	F	G	H	wt
.126	.098	.030	.049	.008	.010	.024	.032	grams
3.2	2.5	0.8	1.2	0.20	0.3	0.6	0.8	0.030

TAPE & REEL INFORMATION: F74



CERAMIC

Low Pass Filter

LFCV-2002+

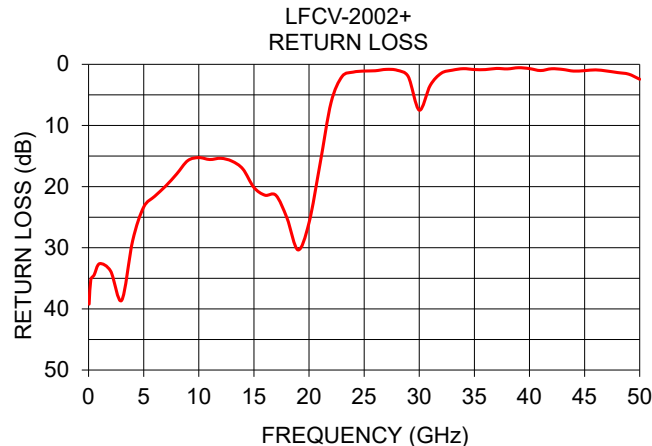
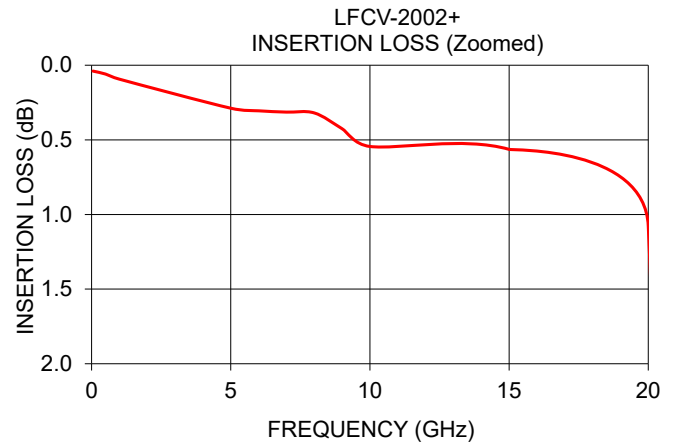
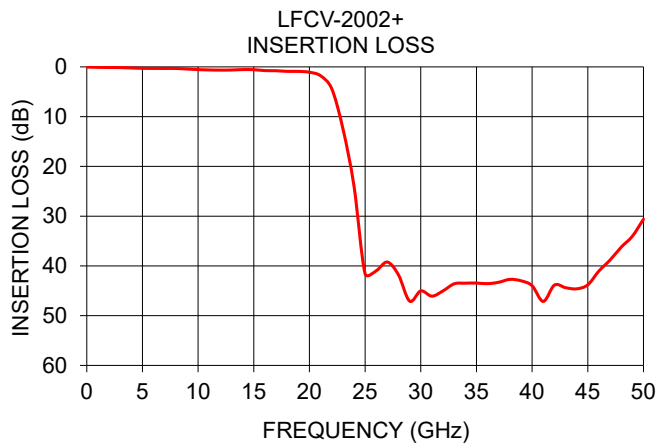
Mini-Circuits

50Ω

DC to 20 GHz

TYPICAL PERFORMANCE DATA AT 25°C

Frequency (GHz)	Insertion Loss (dB)	Return Loss (dB)
0.05	0.04	39.22
0.5	0.06	34.47
1.0	0.09	32.60
5.0	0.29	23.34
6.0	0.31	21.58
7.0	0.31	19.90
8.0	0.32	17.92
9.0	0.43	15.75
10	0.54	15.25
15	0.56	20.14
20	1.08	25.91
25	41.60	1.10
30	45.03	7.50
40	43.98	0.70
50	30.61	2.44



NOTES

- 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.
- Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
- 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



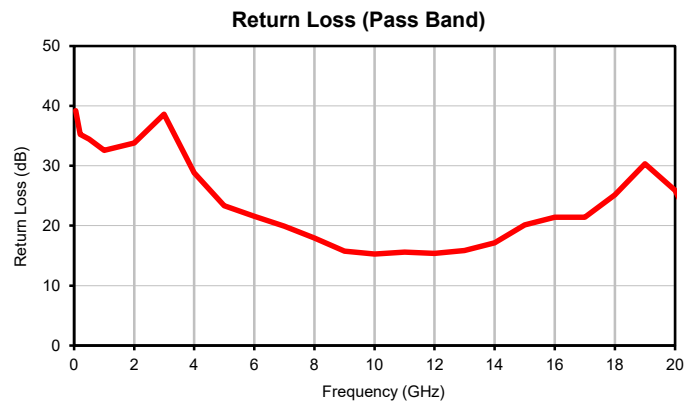
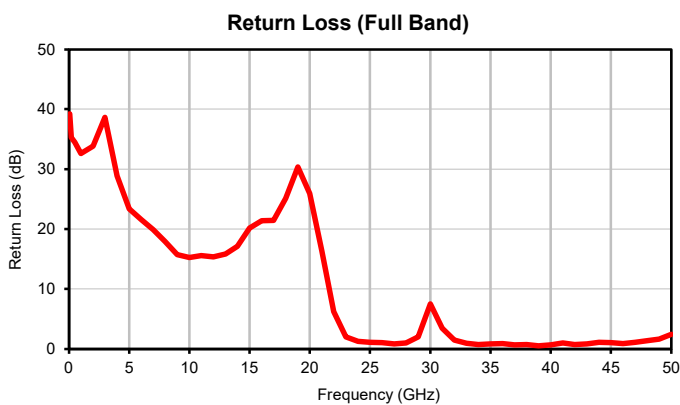
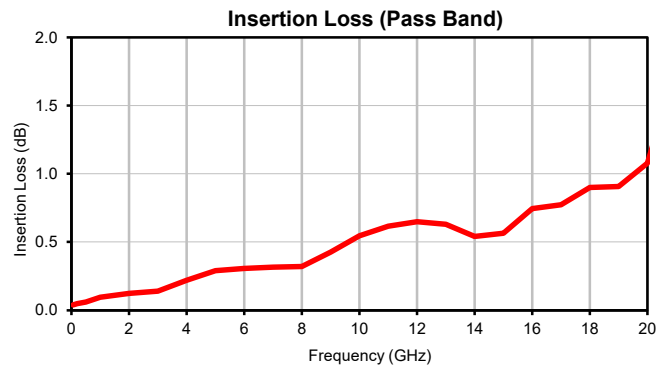
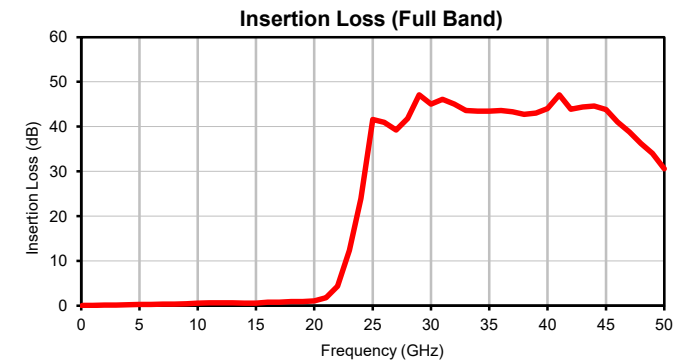
Low Pass Filter

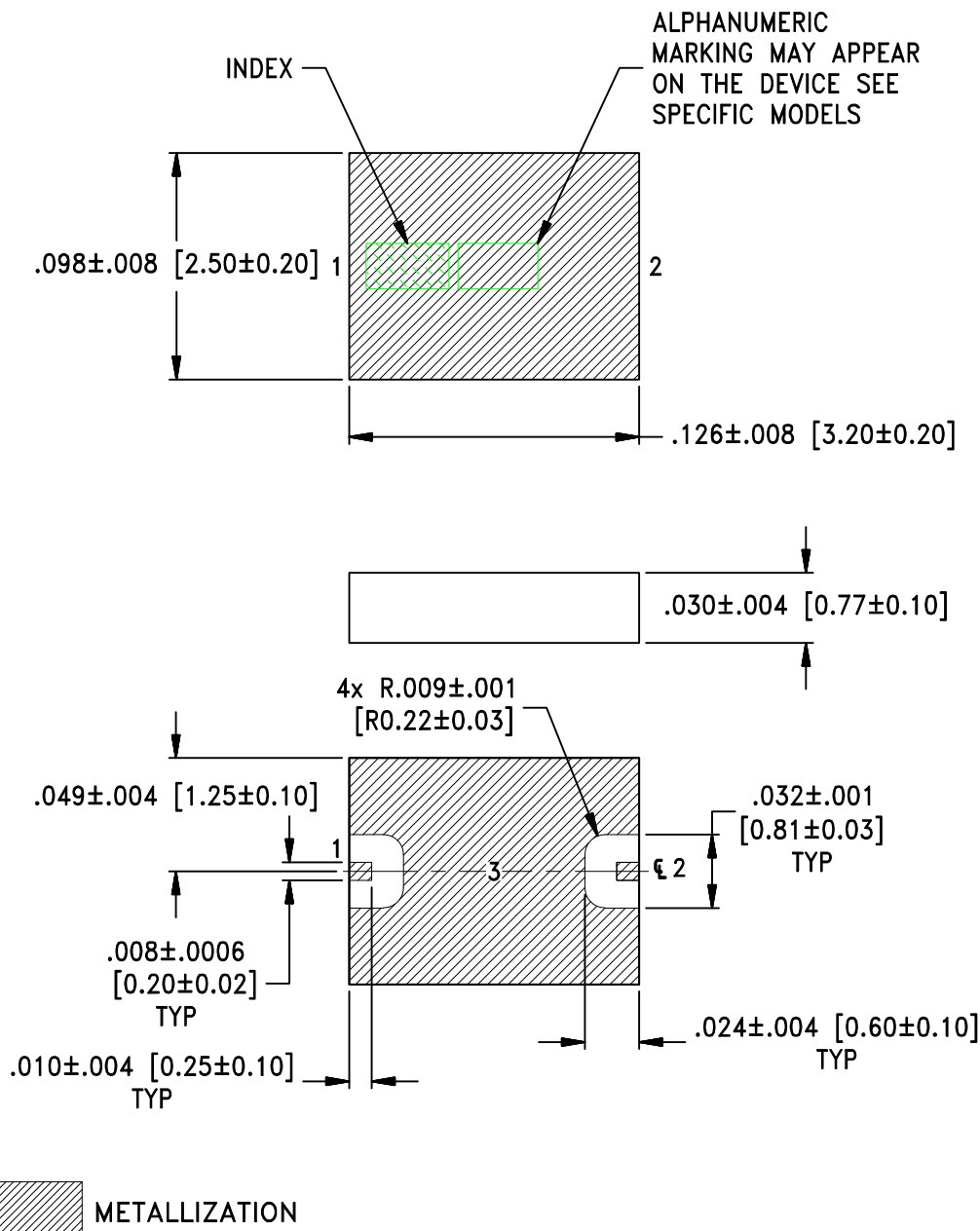
LFCV-2002+

Typical Performance Data

FREQUENCY (GHz)	INSERTION LOSS (dB)	RETURN LOSS (dB)
0.05	0.04	39.22
0.2	0.05	35.26
0.5	0.06	34.47
1.0	0.09	32.60
2.0	0.12	33.81
3.0	0.14	38.61
4.0	0.22	28.84
5.0	0.29	23.34
6.0	0.31	21.58
7.0	0.31	19.90
8.0	0.32	17.92
9.0	0.43	15.75
10.0	0.54	15.25
11.0	0.62	15.57
12.0	0.65	15.37
13.0	0.63	15.83
14.0	0.54	17.12
15.0	0.56	20.14
16.0	0.75	21.40
17.0	0.77	21.43
18.0	0.90	25.14
19.0	0.90	30.36
20.0	1.08	25.91
21.0	1.79	16.29
22.0	4.38	6.24
23.0	12.37	1.98
24.0	23.95	1.28
25.0	41.60	1.10
26.0	40.97	1.05
27.0	39.23	0.83
28.0	41.83	0.98
29.0	47.08	2.00
30.0	45.03	7.50
31.0	46.08	3.43
32.0	45.02	1.45
33.0	43.60	0.96
34.0	43.47	0.71
35.0	43.45	0.85
36.0	43.57	0.86
37.0	43.29	0.67
38.0	42.71	0.75
39.0	42.99	0.55
40.0	43.98	0.70
41.0	47.14	1.02
42.0	43.86	0.72
43.0	44.38	0.83
44.0	44.61	1.10
45.0	43.81	1.03
46.0	41.02	0.91
47.0	38.82	1.09
48.0	36.23	1.35
49.0	34.04	1.61
50.0	30.61	2.44

Typical Performance Curves





Weight: .024 grams

Dimensions are in inches (mm). Tolerances: 2 Pl. ± .010; 3 Pl. ± .005

Notes:

1. Open style, Ceramic base.
2. Termination finish: **as shown below or indicated on Data Sheet.**
For RoHS Case Styles: Gold plate over Nickel plate. All models, (+) suffix.
3. Pad tolerance is non-cumulative. Minimum spacing between each pad is .004.



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

Tape & Reel Packaging TR-F74

DEVICE ORIENTATION IN T&R

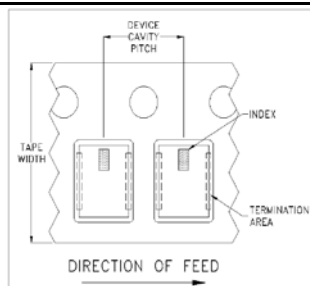


ILLUSTRATION 1

Applicable Case Styles

GE0805C-1
GE0805C-1AP
JV1210C-1
GU2939

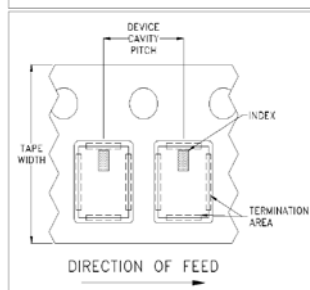


ILLUSTRATION 2

Applicable Case Styles

JV1210C
JV1210C-2
JV1210C-3
JV1210C-4
JV1210C-5
JV1210C-6
JV1210C-11

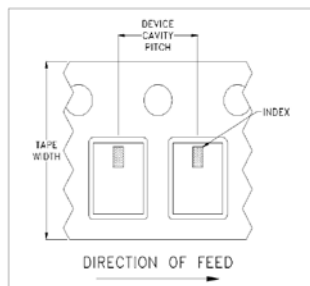


ILLUSTRATION 3

Applicable Case Styles

JC0603C-8
JV1210C-7
JV1210C-8
JV1210C-9
JV1210C-10
JV1210C-13
GE0805C-13

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.

Mini-Circuits carrier tape materials provide protection from ESD (Electro-Static Discharge) during handling and transportation. Tapes are static dissipative and comply with industry standards EIA-481/EIA-541.

Go to: www.minicircuits.com/pages/pdfs/tape.pdf

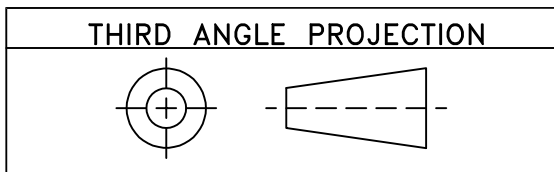


Distribution Centers NORTH AMERICA 800-654-7949 • 417-335-5935 • Fax 417-335-5945 • EUROPE 44-1252-832600 • Fax 44-1252-837010

Mini-Circuits ISO 9001 & ISO 14001 Certified

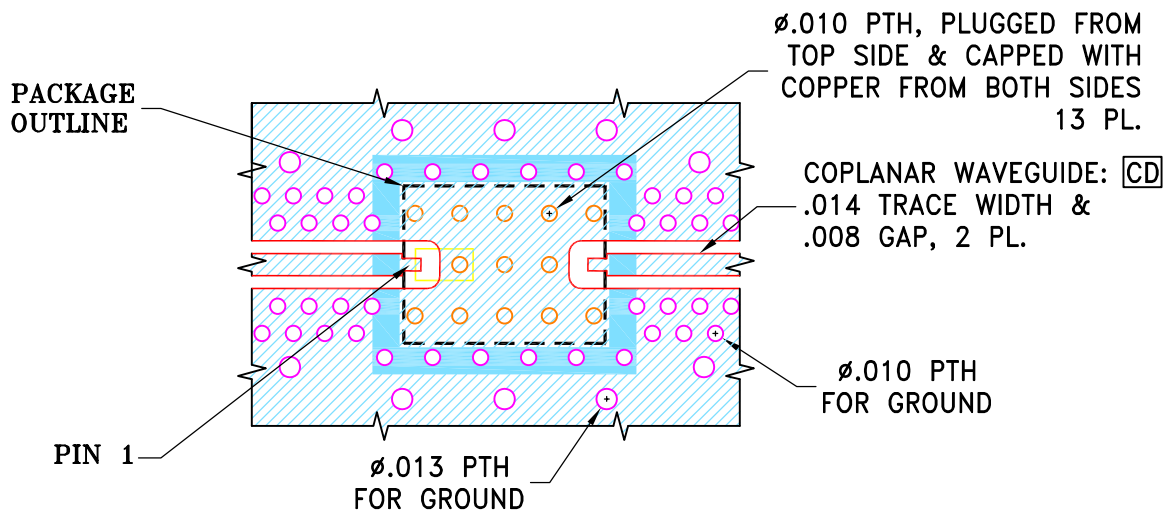
INTERNET <http://www.minicircuits.com>

P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661

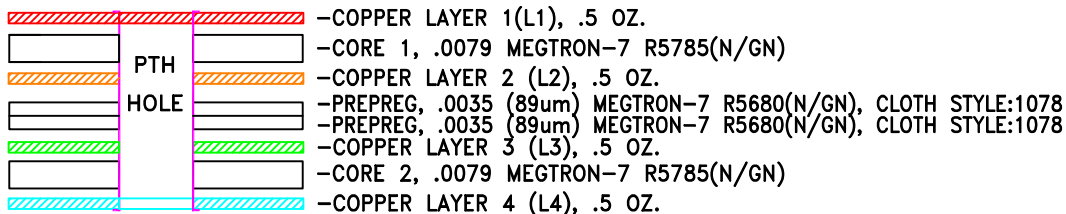


REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	ECO-015970	NEW RELEASE	12/06/22	GF	IL

**SUGGESTED MOUNTING CONFIGURATION FOR
JV1210C-13 CASE STYLE**



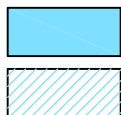
STACK-UP DIAGRAM



1. TOTAL FINISHED THICKNESS $0.026 \pm 10\%$.
2. PTH PRESENT FROM COPPER LAYER 1 TO COPPER LAYER 4.
3. INDICATED ON TOP VIEW PTH'S ARE PLUGGED WITH EPOXY AND CAPPED WITH COPPER FROM TOP SIDE.
4. L2, L3 AND L4 ARE CONTINUOUS GROUND PLANES.

NOTES:

1. PCB IS MULTILAYER PCB, SEE STACK-UP DIAGRAM.
2. TRACE WIDTH & GAP PARAMETERS ARE SHOWN FOR MEGTRON-7 R-5785(N/GN), WITH DIELECTRIC THICKNESS .0079; COPPER: 1/2 OZ. FOR OTHER MATERIALS TRACE WIDTH AND GAP MAY NEED TO BE MODIFIED.



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 TOLERANCES ON: 2 PL DECIMALS $\pm$ 3 PL DECIMALS $\pm$.005 ANGLES $\pm$ FRACTIONS $\pm$	DRAWN	GF	12/06/22
	CHECKED	IL	12/06/22
	APPROVED	IL	12/06/22



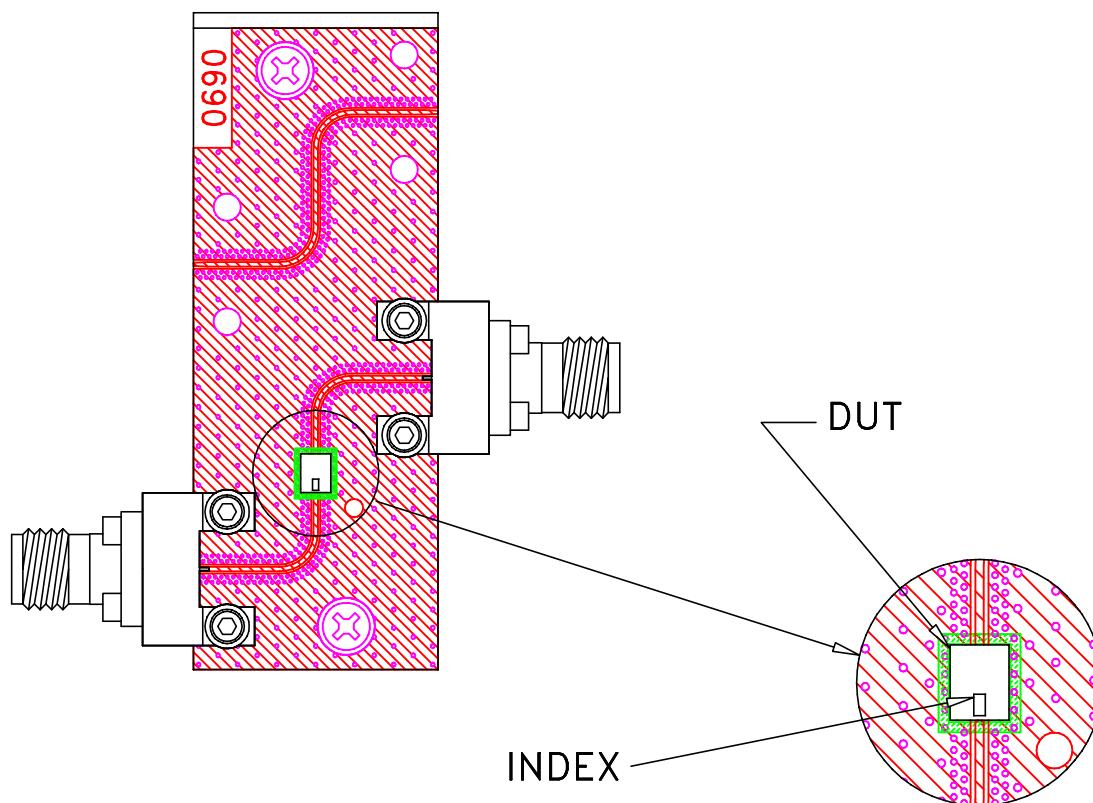
Mini-Circuits® 13 Neptune Avenue
Brooklyn NY 11235

PL, JV1210C-13, TB-HFCV-2002+

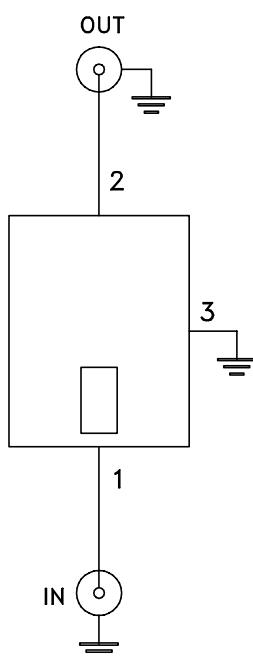
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-743	OR
FILE:	98PL743	SCALE:	8:1
SHEET:		1 OF 1	

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.

Evaluation Board and Circuit



TB-LFCV-2002C+



Schematic Diagram

1. 50 Ohm 1.85 End Launch Female connectors.
2. PCB Material: Megtron 7(N) or equivalent,
Dielectric Constant=3.4, Thickness=.0079 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	-55° to 125° C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 125° 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
Solder Reflow Heat	Sn-Pb Eutectic Process 225°C peak Pb-Free Process 245° - 250°C peak	J-STD-020C, Table 4-1, 4-2 and 5-2, Figure 5-1
Solderability	10X Magnification	J-STD-002, Test B,B1, 95% Coverage
Thermal Shock	-55° to +125°C, 15 min dwell,250 cycles	MIL-STD-202, Method 107
Bend Test	1mm, deflection for 5 seconds Span of bending: 2.75"	--
High Temp Storage	125°C to 1000 Hrs	---