CERAMIC

High Pass Filter

HFCN-2502+

50Ω 25 to 57 GHz

THE BIG DEAL

- Pass Band, 25 to 57 GHz
- Low Insertion Loss, Typ. 1.8 dB
- Return Loss, Typ. 13 dB
- Stop Band Rejection, Typ. 17 dB
- Power Handling, 1W

Generic photo used for illustration purposes only

CASE STYLE: FV1206-12

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

APPLICATIONS

- Test & Measurement Equipment
- SATCOM
- 5G mmWave Radio Systems

PRODUCT OVERVIEW

HFCN-2502+ is a miniature low temperature co-fired ceramic (LTCC) high pass filter with a 25 to 57 GHz passband supporting a variety of applications. This model provides 1.8 dB typical insertion loss over a wide band due to its rugged monolithic construction. Housed in a tiny 1206 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 passband	More than an octave bandwidth for wideband applications
Cost effective	LTCC is a scalable technology that is cost effective due to ease of production in high quantities.
Small size 1206	Allows for high layout density of circuit boards, while minimizing effects of parasites.
Surface Mountable	Suitable for very high volume automated assembly process.

REV. OR
ECO-016066
HFCN-2502+
ATHARVA/CP/AM
221223

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ELECTRICAL SPECIFICATIONS [1,2] AT 25°C

Parameter		F#	Frequency (GHz)	Min.	Typ.	Max.	Units
Stop Band	Insertion Loss	DC-F1	0.1 - 10.4	—	20.9	—	dB
		F1-F2	10.5 - 19.2	—	17.2	—	
Pass Band	Insertion Loss	F3-F4	25 - 33.7	—	1.0	1.5	dB
		F4-F5	33.8 - 50	—	1.8	2.5	
		F5-F6	50.1 - 57	—	2.8	3.6	
	Return Loss	F3-F4	25 - 33.7	—	16.7	—	dB
		F4-F5	33.8 - 50	—	13.6	—	
		F5-F6	50.1 - 57	—	15.6	—	

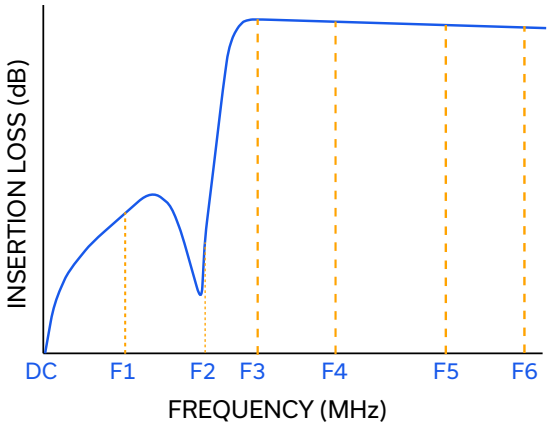
1. Measured on Mini-Circuits Test Board TB-HFCN-2502C+ with connectors and feedlines effects de-embedded using 2X Thru IEEE P370 method.
2. This component is not intended to act as a DC block. Please consult with Mini-Circuits for further details.
   DC blocking capacitors are required in applications where DC voltage and/or current is present at either input or output ports.

ABSOLUTE MAXIMUM RATINGS

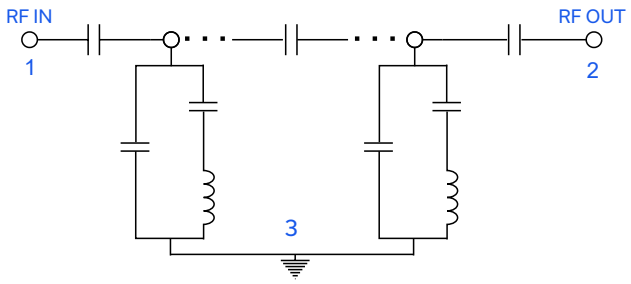
Parameter	Ratings
Operating Temperature	-55°C to +125°C
Storage Temperature	-55°C to +125°C
RF Power Input	1W max.

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

TYPICAL FREQUENCY RESPONSE



FUNCTIONAL SCHEMATIC



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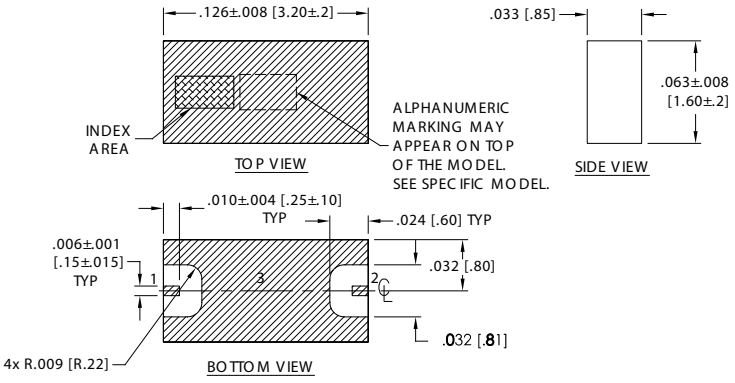
PIN CONNECTIONS

RF IN	1
RF OUT	2
GROUND	3

PRODUCT MARKING: VK

OUTLINE DRAWING

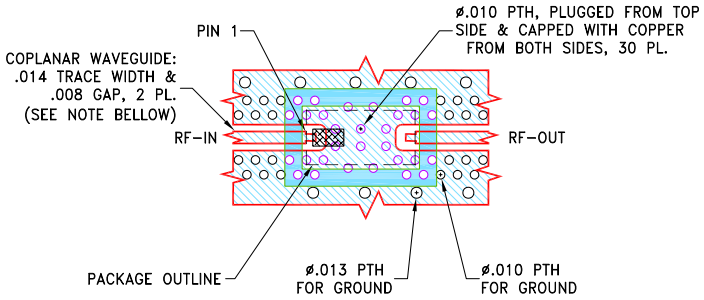


Weight: .017 grams.

Dimensions are in inches [mm]. Tolerances: 2 Pl.±.01; 3 Pl. ±.005

EVALUATION BOARD MCL P/N: TB-HFCN-2502C+

SUGGESTED PCB LAYOUT (PL-748)



NOTES:

1. TRACE WIDTH & GAP PARAMETERS ARE SHOWN FOR MEGTRON-7 R5785(N); DIELECTRIC THICKNESS: .0079±.001; COPPER: HVLP/HVLP. 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.

TAPE & REEL INFORMATION: F75

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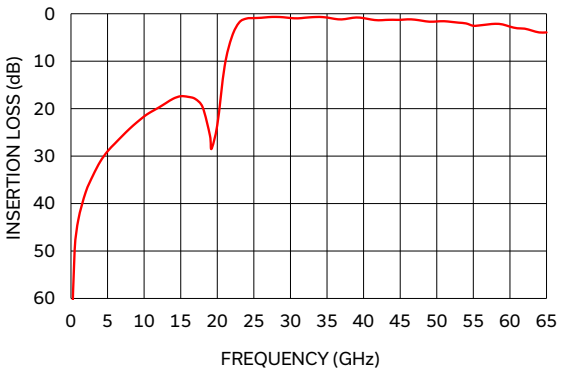
50Ω 25 to 57 GHz

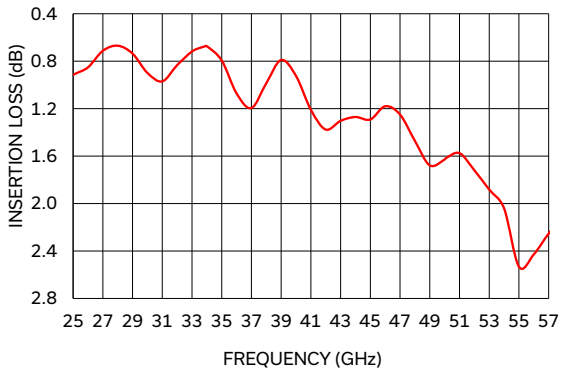
TYPICAL PERFORMANCE DATA AT 25°C

Frequency (GHz)	Insertion Loss (dB)	Return Loss (dB)
0.1	68.94	0.04
0.5	49.87	0.11
1.0	43.45	0.06
5.0	28.99	0.07
10.4	21.20	0.18
10.5	21.10	0.18
19.2	28.49	0.43
25.0	0.92	20.81
33.7	0.68	22.11
33.8	0.68	22.04
40.0	0.92	27.03
50.0	1.63	24.32
50.1	1.62	24.86
57.0	2.25	32.69
65.0	3.93	9.96

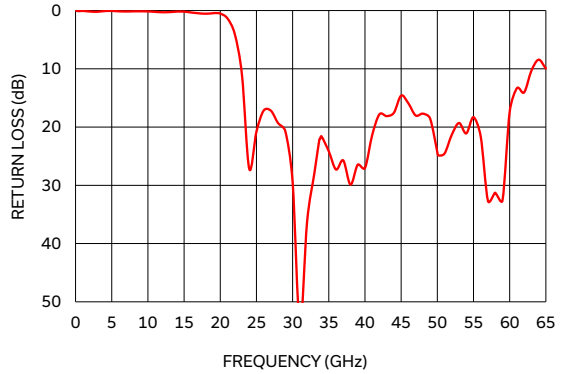
HFCN-2502+
INSERTION LOSS



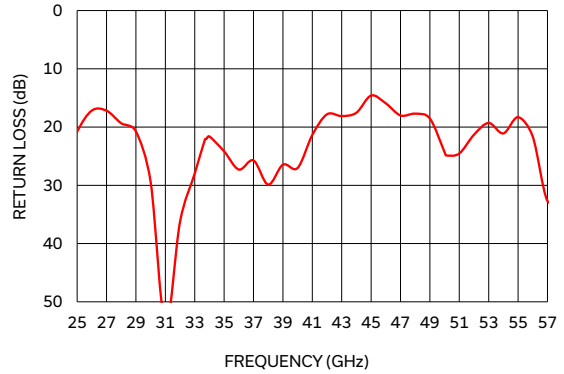
HFCN-2502+
INSERTION LOSS (Passband)



HFCN-2502+
RETURN LOSS



HFCN-2502+
RETURN LOSS (Passband)



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/terms/viewterm.html

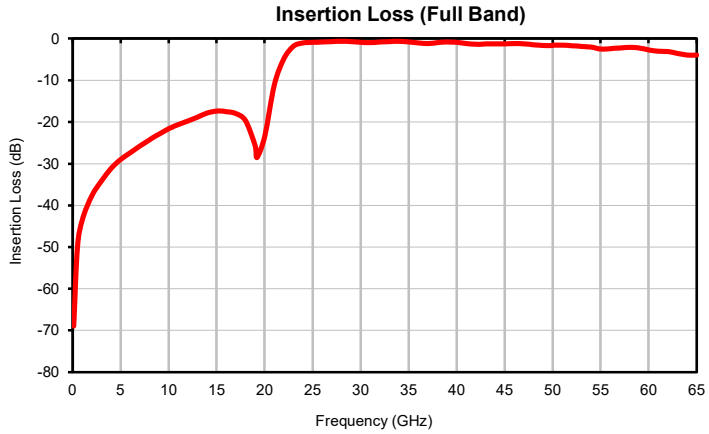
Ceramic Bandpass Filter HFCN-2502+

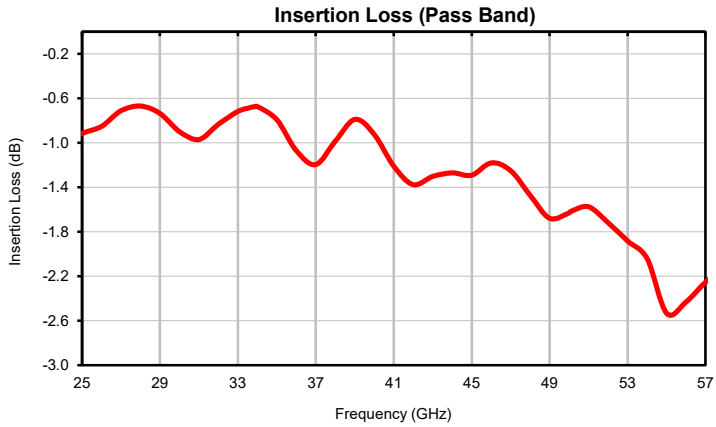
Typical Performance Data

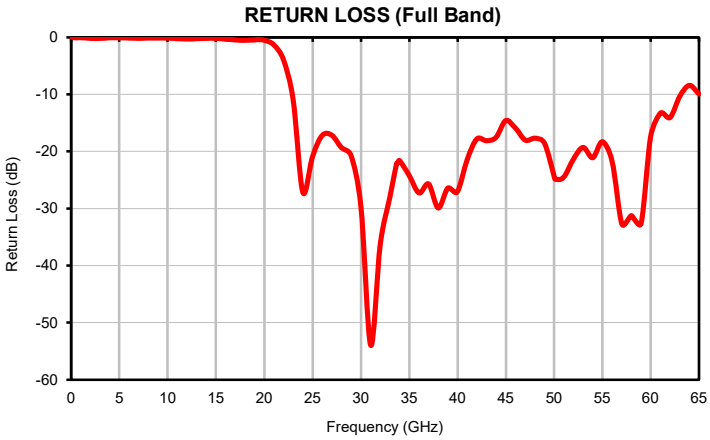
FREQUENCY (GHz)	INSERTION LOSS (dB)	RETURN LOSS (dB)
0.1	68.94	0.04
0.5	49.87	0.11
1.0	43.45	0.06
2.0	37.65	0.17
3.0	34.11	0.21
4.0	31.16	0.09
5.0	28.99	0.07
6.0	27.35	0.14
7.0	25.78	0.17
8.0	24.26	0.14
9.0	22.89	0.13
10.0	21.64	0.15
10.4	21.20	0.18
10.5	21.10	0.18
11.0	20.63	0.22
12.0	19.77	0.29
13.0	18.81	0.27
14.0	17.88	0.19
15.0	17.38	0.19
16.0	17.51	0.34
17.0	17.97	0.47
18.0	19.70	0.54
19.0	25.69	0.46
19.2	28.49	0.43
20.0	23.46	0.53
21.0	11.09	1.36
22.0	4.84	4.01
23.0	1.83	11.04
24.0	1.01	27.15
25.0	0.92	20.81
26.0	0.85	17.17
27.0	0.71	17.19
28.0	0.67	19.35
29.0	0.74	20.75
30.0	0.90	29.41
31.0	0.97	53.94
32.0	0.83	36.26
33.0	0.72	27.98
33.7	0.68	22.11
33.8	0.68	22.04
34.0	0.67	21.61
35.0	0.79	24.17
36.0	1.07	27.30
37.0	1.19	25.73
38.0	0.99	29.88
39.0	0.79	26.46
40.0	0.92	27.03
41.0	1.21	21.36
42.0	1.38	17.81
43.0	1.30	18.12
44.0	1.27	17.54
45.0	1.29	14.59
46.0	1.18	15.93
47.0	1.25	18.01
48.0	1.47	17.70
49.0	1.68	18.54
50.0	1.63	24.32
50.1	1.62	24.86
51.0	1.57	24.54
52.0	1.72	21.32
53.0	1.88	19.30
54.0	2.04	21.09
55.0	2.53	18.30
56.0	2.43	21.65
57.0	2.25	32.69
58.0	2.12	31.27
59.0	2.25	32.63
60.0	2.72	17.37
61.0	3.06	13.33
62.0	3.14	14.04
63.0	3.55	10.34
64.0	3.94	8.44
65.0	3.93	9.96

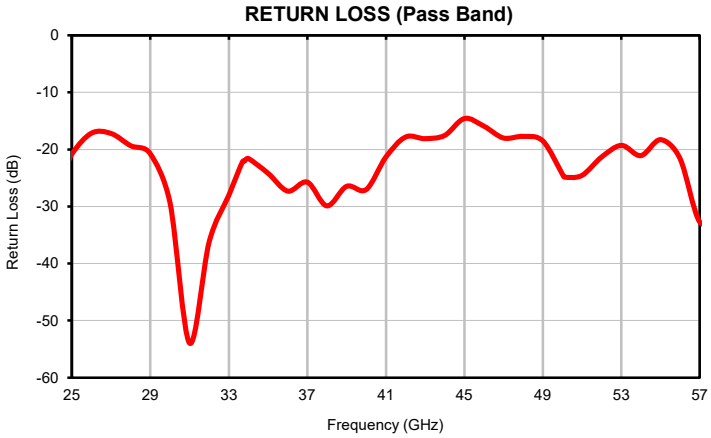
Ceramic Bandpass Filter HFCN-2502+

Typical Performance Curves





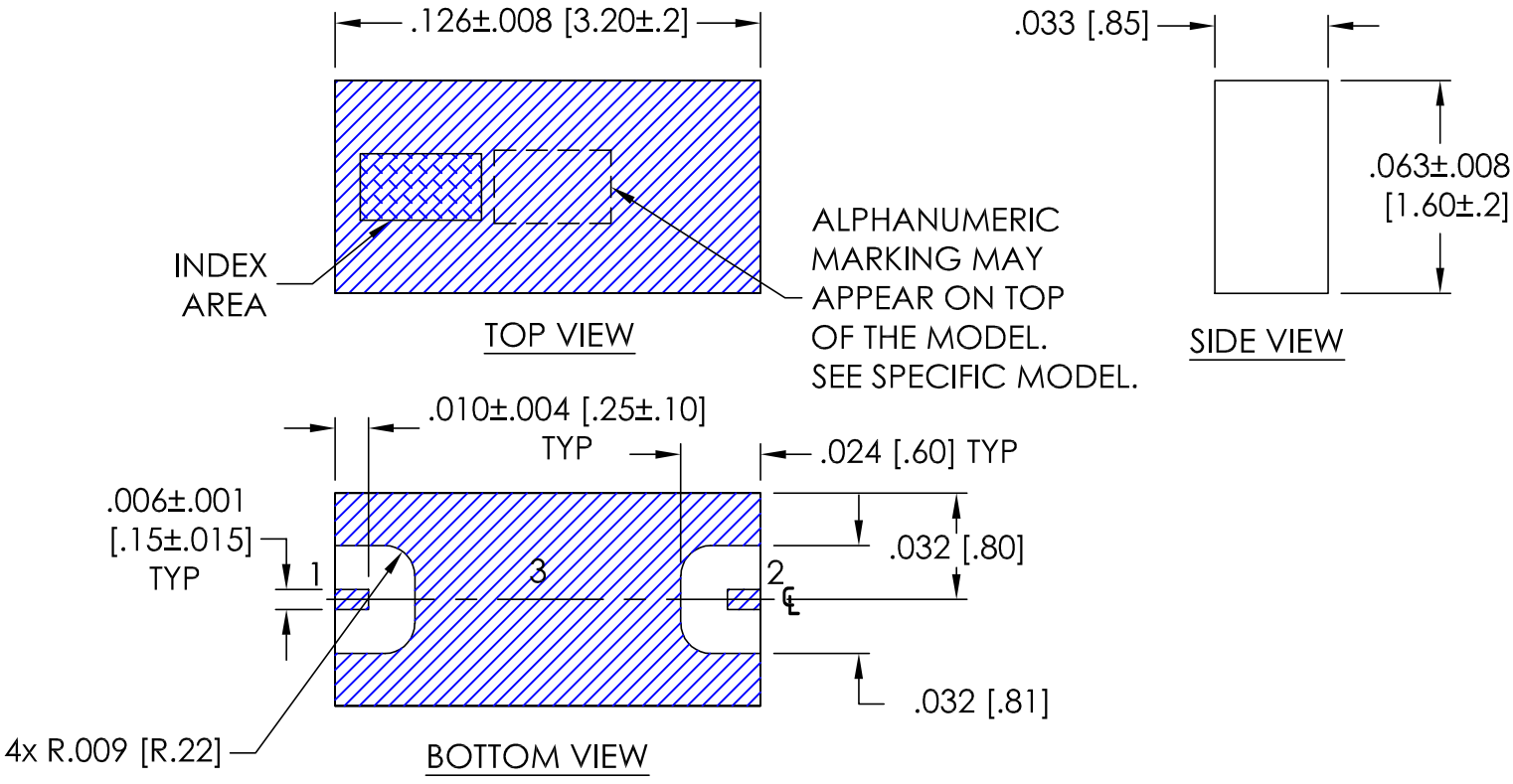




Case Style FV

Outline Dimensions

FV1206-12



Weight: .017 grams.

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

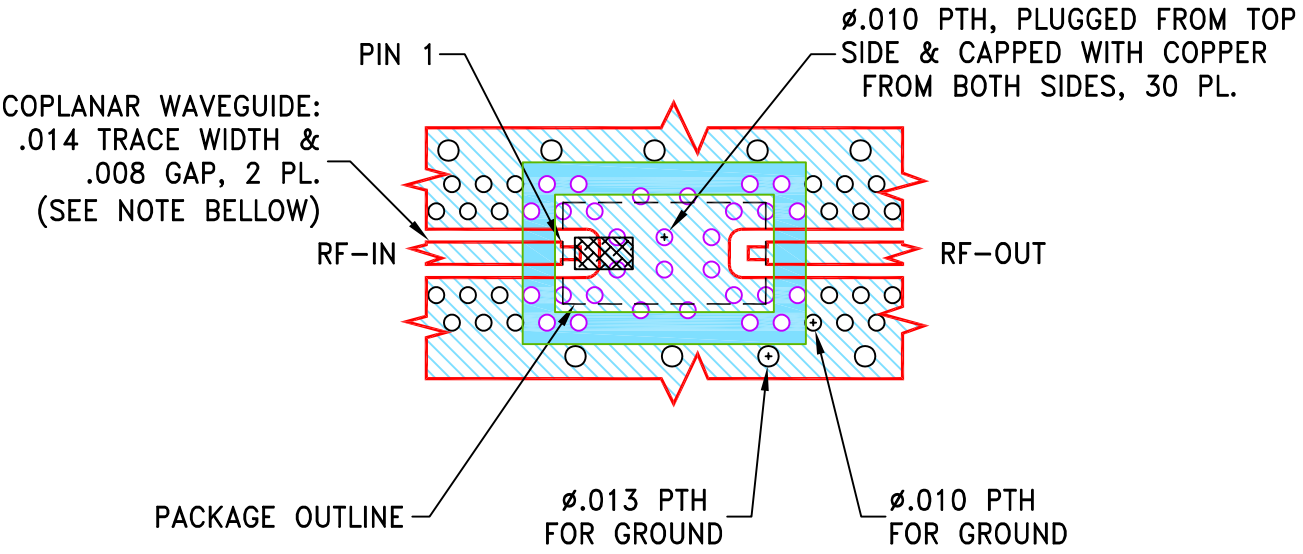
Notes:

1. Case material: Ceramic.
2. Termination Finish: **as shown below or indicated on Data Sheet.**
   For RoHS Case Styles: Gold plate over Nickel plate All models, (+) suffix.

THIRD ANGLE PROJECTION

REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	ECO-016075	NEW RELEASE	12/09/22	ITG	IL

SUGGESTED MOUNTING CONFIGURATION
FV1206-12 CASE STYLE



NOTES:
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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	ITG	12/09/22
TOLERANCES ON:	CHECKED	GF	12/09/22
2 PL DECIMALS ±	APPROVED	IL	12/09/22
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

Mini-Circuits®

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

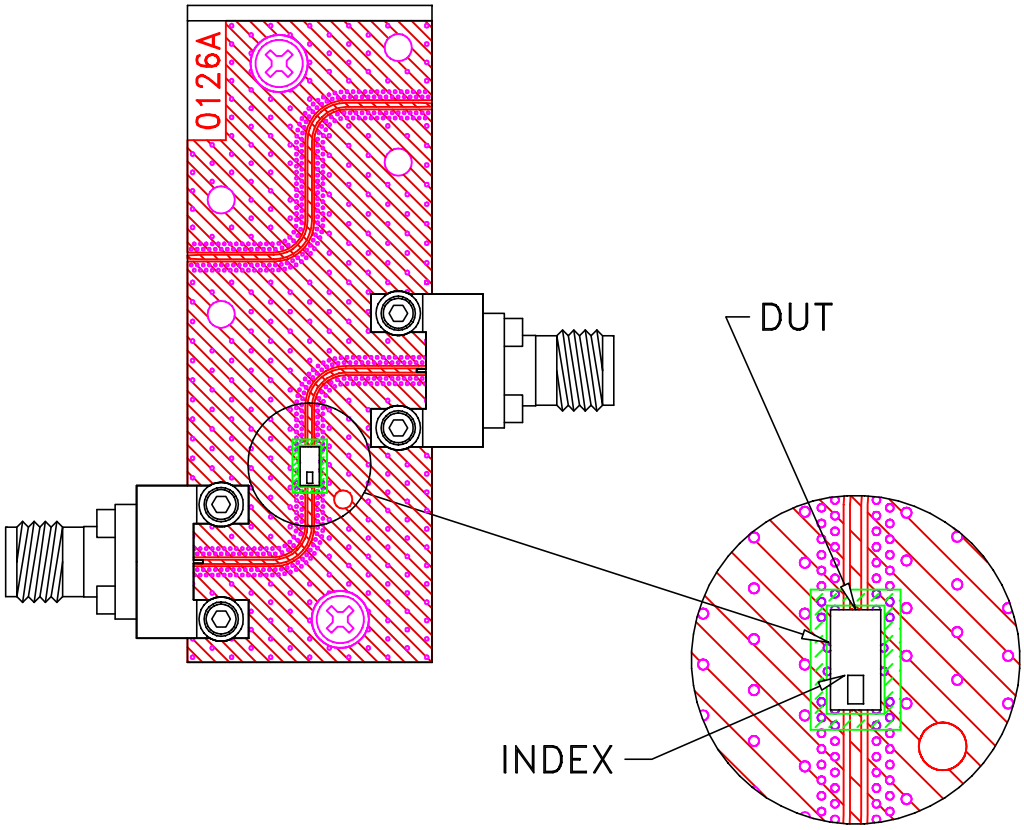
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

PL, FV1206-12, TB-HFCN-2502+

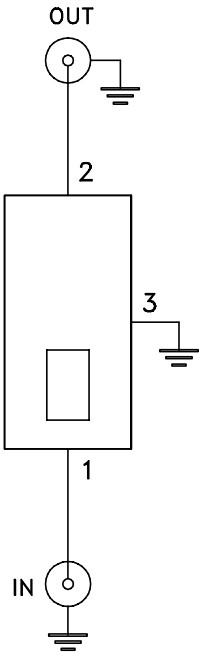
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-748	OR

FILE:	SCALE:	SHEET:
98PL748	8:1	1 OF 1

Evaluation Board and Circuit



TB-HFCN-2502C+



Schematic Diagram

1. 50 Ohm 2.4 End Launch Female connectors.
2. PCB Material: Megtron 7(N) or equivalent, Dielectric Constant=3.4, Thickness=.0079 inch.

Mini-Circuits®

Mini-Circuits

Environmental Specifications ENV06T10

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	---