CERAMIC

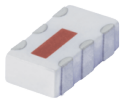
High Pass Filter

HFCN-672+

50Ω 6700 to 13000 MHz

THE BIG DEAL

- Small size (0.12 x 0.06 X .04")
- Temperature stable
- Excellent power handling, 7W
- Hermetically sealed
- Low cost
- LTCC construction
- Protected by US Patent 7,760,485



Generic photo used for illustration purposes only

CASE STYLE: FV1206-1

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

APPLICATIONS

- Sub-harmonic rejection
- Transmitters/receivers
- Point-to-point radio

PRODUCT OVERVIEW

The HFCN-672+ is an LTCC high pass filter with a wide passband from the 6700 to 13000 MHz. This model provides 2.0 dB passband insertion loss and 27 dB stopband rejection, and is capable of handling up to 7W RF input power. Utilizing LTCC multi-layer construction, the filter achieves excellent repeatability of performance and comes in a tiny 1206 ceramic package with wraparound terminations, minimizing performance variations due to parasitics and saving space in dense PCB layouts. The unit has an operating temperature range from -55 to +100°C, and its rugged, ceramic construction provides makes it an excellent candidate for harsh operating environments.

KEY FEATURES

Feature	Advantages
LTCC Construction	Provides repeatable performance in a rugged, ceramic package well suited for tough environments such as high humidity and temperature extremes.
Tiny size (0.12 x 0.06 x .04")	Saves space in dense circuit board layouts and minimizes the effects of parasitics.
Wrap-around terminations	Provides excellent solderability and easy visual inspection
Wide operating temperature range, -55 to +100°C	Enables reliable performance in extreme environments

REV. B
ECO-023703
HFCN-672+
MCL NY
241122

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High Pass Filter

HFCN-672+

50Ω 6700 to 13000 MHz

ELECTRICAL SPECIFICATIONS [1,2] AT 25°C

Parameter		F#	Frequency (MHz)	Min.	Typ.	Max.	Units
Stop Band	Rejection Loss	DC-F1	DC-4435	27	32	—	dB
		F1-F2	4435-5500	16	27	—	
	Freq. Cut-Off	F3	6275	—	3.0	—	dB
	VSWR	DC-F2	DC-5500	—	30	—	:1
Pass Band	Insertion Loss[3]	F4-F7	6700-13000	—	2.0	4.0	dB
		F5-F6	6900-12770	—	2.0	3.5	dB
	VSWR	F4-F7	6700-13000	—	1.9	—	:1

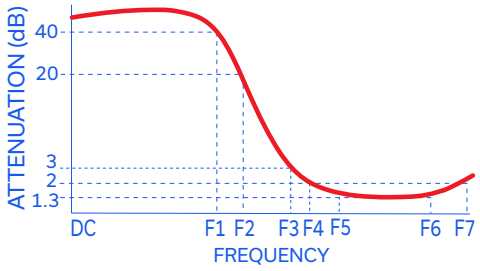
1. In Application where DC voltage is present at either input or output ports, coupling capacitors are required.
2. Measured on Mini-Circuits Characterization Test Board TB-285+.
3. Referenced to mid-band insertion loss, 0.5 dB typ.

MAXIMUM RATINGS

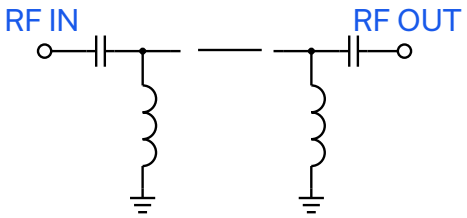
Parameter	Ratings
Operating temperature	-55°C to +100°C
Storage temperature	-55°C to +100°C
RF Power Input[4]	7W max. at 25°C

4. Passband rating, derate linearly to 3W at 100°C ambient.
Permanent damage may occur if any of these limits are exceeded.

TYPICAL FREQUENCY RESPONSE



FUNCTIONAL SCHEMATIC



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High Pass Filter

HFCN-672+

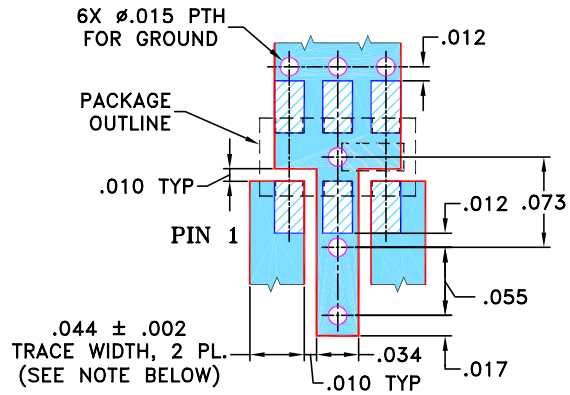
50Ω 6700 to 13000 MHz

PIN CONNECTIONS

RF IN	1
RF OUT	3
GROUND	2,4,5,6

PRODUCT MARKING: XP

DEMO BOARD MCL P/N: TB-285+
SUGGESTED PCB LAYOUT (PL-158)

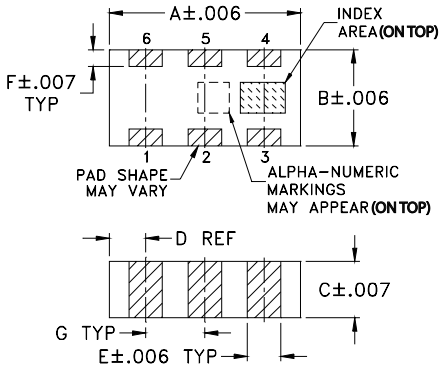


NOTE: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350 WITH DIELECTRIC THICKNESS: .020 ± .0015; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

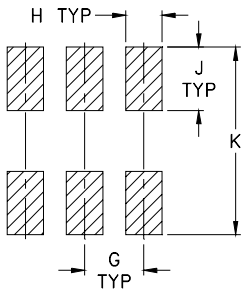
DENOTES PCB COPPER LAYOUT

DENOTES COPPER LAND PATTERN FREE OF SOLDERMASK

OUTLINE DRAWING



PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.002

OUTLINE DIMENSIONS (Inches / mm)

A	B	C	D	E	F
.126	.063	.035	.024	.022	.011
3.20	1.60	0.89	0.61	0.56	0.28

G	H	J	K		wt
.039	.024	.042	.123		grams
0.99	0.61	1.07	3.12		.020

TAPE & REEL INFORMATION: F75

CERAMIC

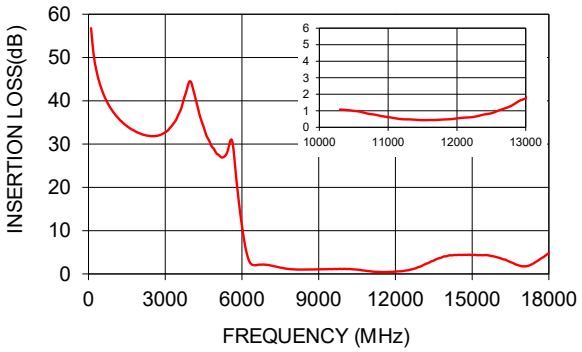
High Pass Filter

HFCN-672+

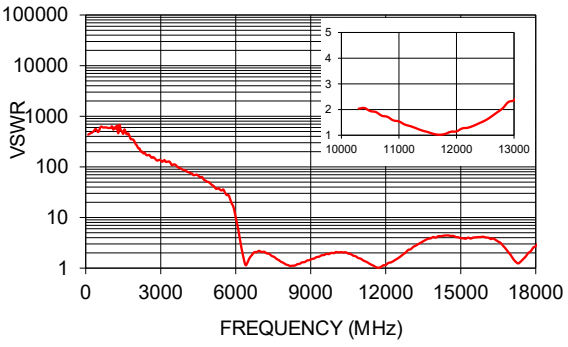
TYPICAL PERFORMANCE DATA AT 25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR :1
100	56.76	435.00
500	42.89	487.79
1000	37.15	591.02
2700	31.94	156.03
3000	32.72	134.81
4400	35.68	69.56
5500	29.76	35.88
6000	11.10	10.02
6700	2.14	1.97
7550	1.41	1.65
9100	1.07	1.53
9700	1.11	1.89
11500	0.43	1.13
13000	1.76	2.36
15000	4.35	3.90
16500	2.73	3.34
17000	1.77	1.81
17100	1.77	1.52

HFCN-672+
INSERTION LOSS



HFCN-672+
VSWR



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 High Pass Filter HFCN-672+

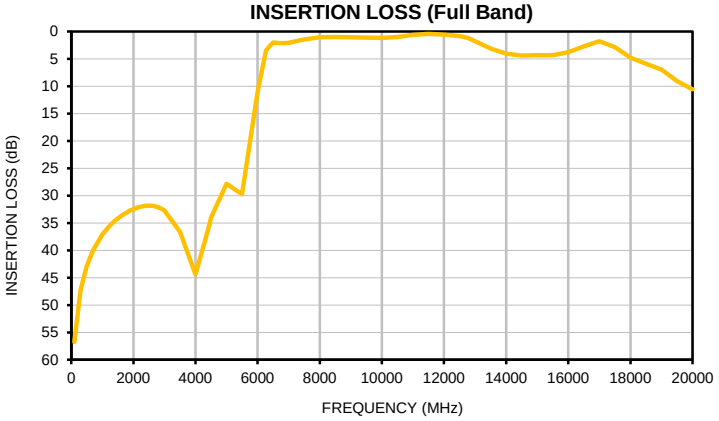
Typical Performance Data

FREQUENCY (MHz)	INSERTION LOSS (dB)	INPUT RETURN LOSS (dB)	OUTPUT RETURN LOSS (dB)
100	56.76	0.04	0.02
300	47.24	0.04	0.01
500	42.89	0.04	0.01
700	40.04	0.03	0.03
1000	37.15	0.03	0.06
1100	36.43	0.03	0.07
1200	35.75	0.03	0.07
1300	35.19	0.04	0.10
1400	34.64	0.03	0.10
1500	34.17	0.04	0.13
1600	33.73	0.04	0.12
1700	33.36	0.04	0.14
1800	33.05	0.05	0.13
1900	32.71	0.05	0.14
2000	32.49	0.06	0.14
2100	32.24	0.07	0.14
2200	32.09	0.09	0.13
2300	31.95	0.09	0.12
2400	31.87	0.10	0.12
2500	31.84	0.10	0.11
2600	31.84	0.11	0.11
2700	31.94	0.11	0.09
2800	32.11	0.12	0.11
2900	32.38	0.13	0.11
3000	32.72	0.13	0.10
3500	36.62	0.16	0.15
4000	44.39	0.21	0.21
4435	35.68	0.25	0.27
4500	34.00	0.26	0.28
5000	27.86	0.38	0.45
5500	29.76	0.48	0.61
6000	11.10	1.74	1.51
6275	3.46	8.40	6.84
6500	2.01	15.64	11.44
6700	2.14	9.73	8.78
6900	2.15	8.68	8.13
7000	2.09	8.92	8.15
7500	1.46	11.73	12.22
8000	1.06	21.52	25.21
8500	1.02	20.56	18.89
9000	1.06	14.21	13.52
9500	1.11	10.85	10.82
10000	1.17	9.09	9.32
10500	1.00	9.89	10.00
11000	0.62	13.48	13.85
11500	0.43	24.61	26.09
12000	0.54	23.12	21.24
12500	0.85	13.00	11.94
12770	1.15	10.29	9.82
13000	1.76	7.84	7.24
13500	3.10	5.28	4.90
14000	4.08	4.44	3.72
14500	4.41	3.99	3.58
15000	4.35	4.55	3.66
15500	4.34	4.42	4.03
16000	3.80	4.40	4.15
16500	2.73	5.37	5.43
17000	1.77	10.79	10.80
17500	2.82	13.78	12.51
18000	4.79	6.69	9.06
18500	5.92	4.77	8.82
19000	6.95	3.62	7.25
19500	9.08	2.78	4.37
20000	10.56	2.02	3.48

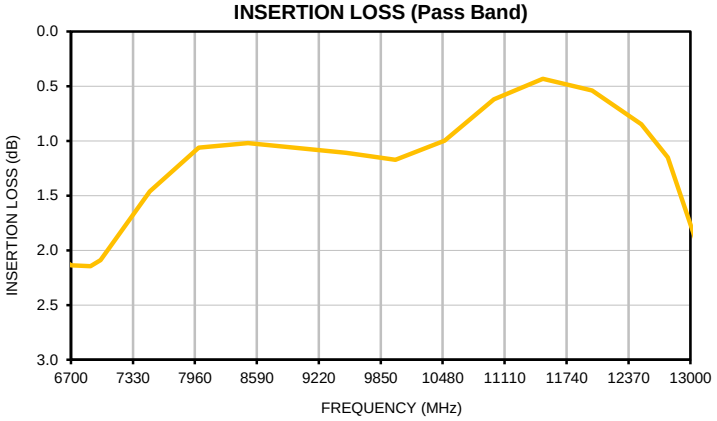
Ceramic High Pass Filter HFCN-672+

Typical Performance Curves

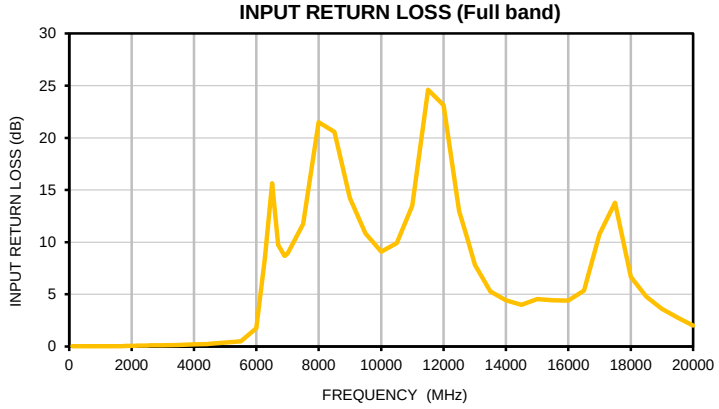
INSERTION LOSS (Full Band)



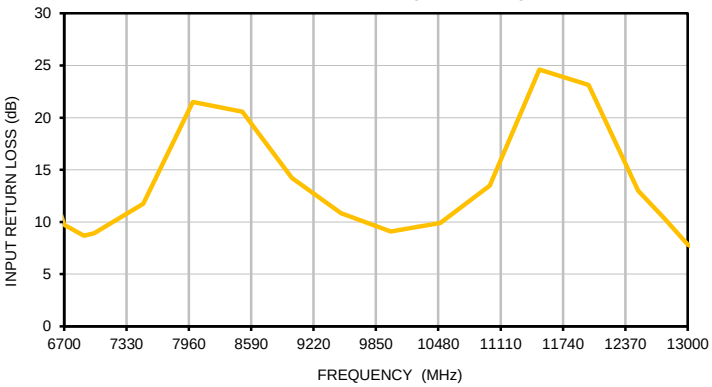
INSERTION LOSS (Pass Band)



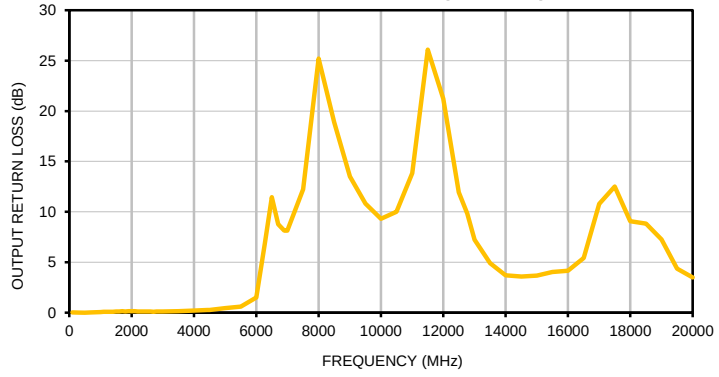
INPUT RETURN LOSS (Full band)



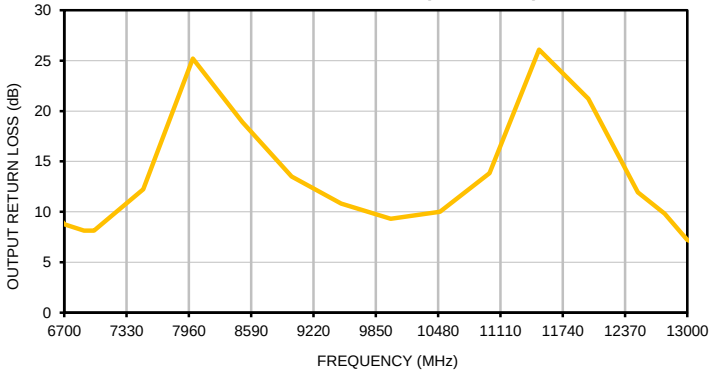
INPUT RETURN LOSS (Pass band)



OUTPUT RETURN LOSS (Full band)



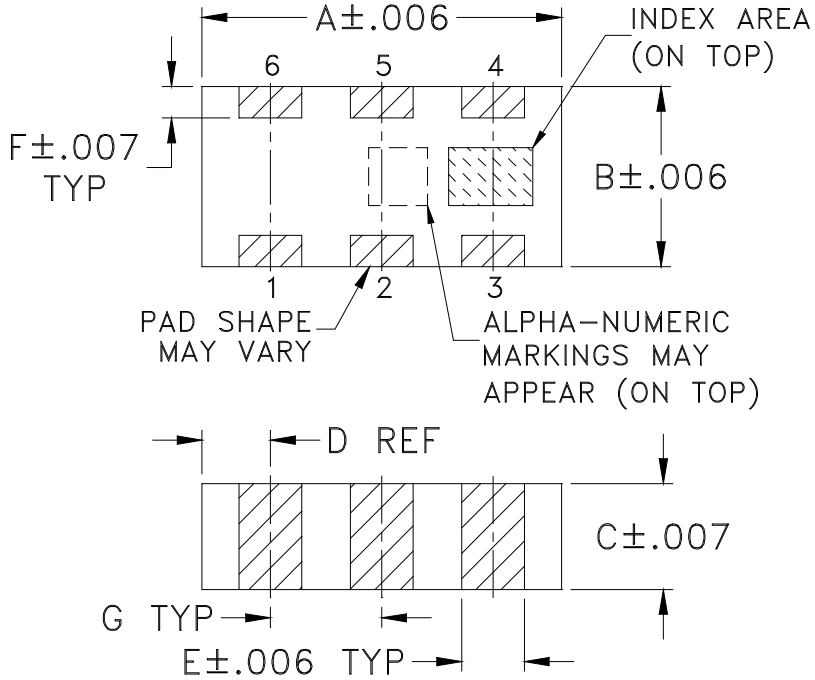
OUTPUT RETURN LOSS (Pass band)



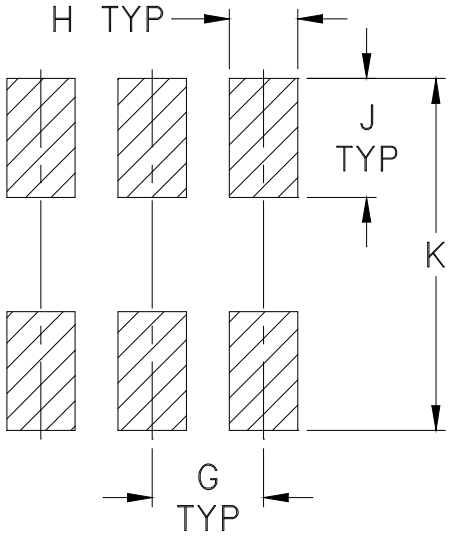
Case Style FV

FV1206-1

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	N	P	WT. GRAM
FV1206-1	.126 (3.20)	.063 (1.60)	.035 (0.89)	.024 (0.61)	.022 (0.56)	.011 (0.28)	.039 (0.99)	.024 (0.61)	.042 (1.07)	.123 (3.12)	-- --	-- --	-- --	-- --	.020

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.

Tape & Reel Packaging TR-F75

DEVICE ORIENTATION IN T&R

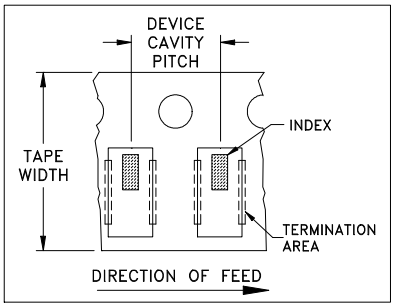


ILLUSTRATION 1

Applicable Case Styles
FV1206-1
FV1206-3

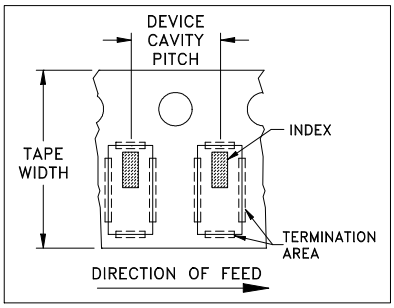


ILLUSTRATION 2

Applicable Case Styles
FV1206-4
FV1206-5
FV1206-6
FV1206-7
FV1206-9

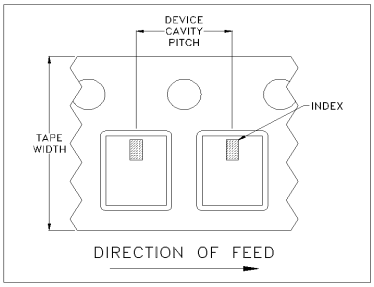


ILLUSTRATION 3

Applicable Case Styles
FV1206-11
FV1206-12
GE0805C-18
NL1008C-6
NL1008C-7
NL1008C-9
NL1008C-10
NL1008C-12

Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel	
8	4	7	Small quantity standards (see note)	20
				50
				100
				200
				500
				1000
			Standard	3000

Note: Please consult individual model data sheet to determine device per reel availability.

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

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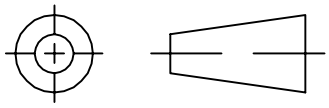
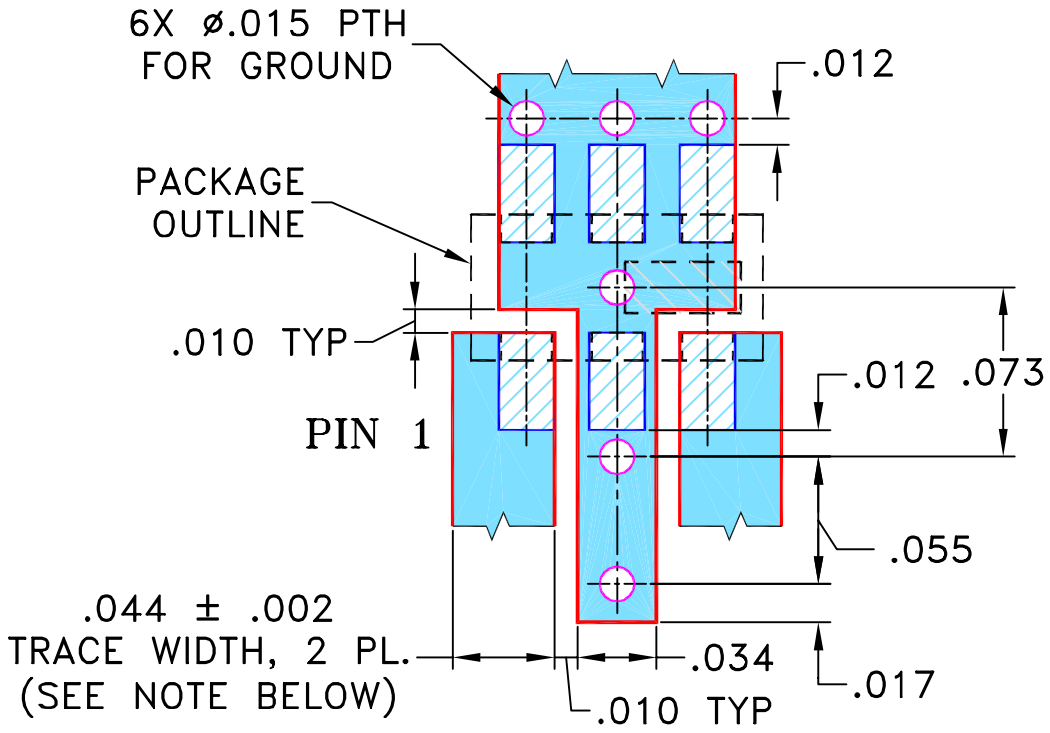
THIRD ANGLE PROJECTION



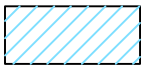
REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M92199	NEW RELEASE	05/24/04	AV	ABD
A	M99247	ADD GROUND PTH	06/05	RZ	RZ
A	R60782	ADD GROUND PTH	06/05	RZ	RZ
B	M102713	ADDED "...WITH SMOBC"	01/12/06	GF	IL

SUGGESTED MOUNTING CONFIGURATION
FOR FV1206-1 CASE STYLE, "pr" PIN CONNECTION.



NOTE:
1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .020" ± .0015". COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE 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 SOLDER MASK

UNLESS OTHERWISE SPECIFIED		INITIALS	DATE
DIMENSIONS ARE IN INCHES	DRAWN	AV	05/03/04
TOLERANCES ON:	CHECKED	IL	05/24/04
2 PL DECIMALS ±	APPROVED	ABD	05/24/04
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

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

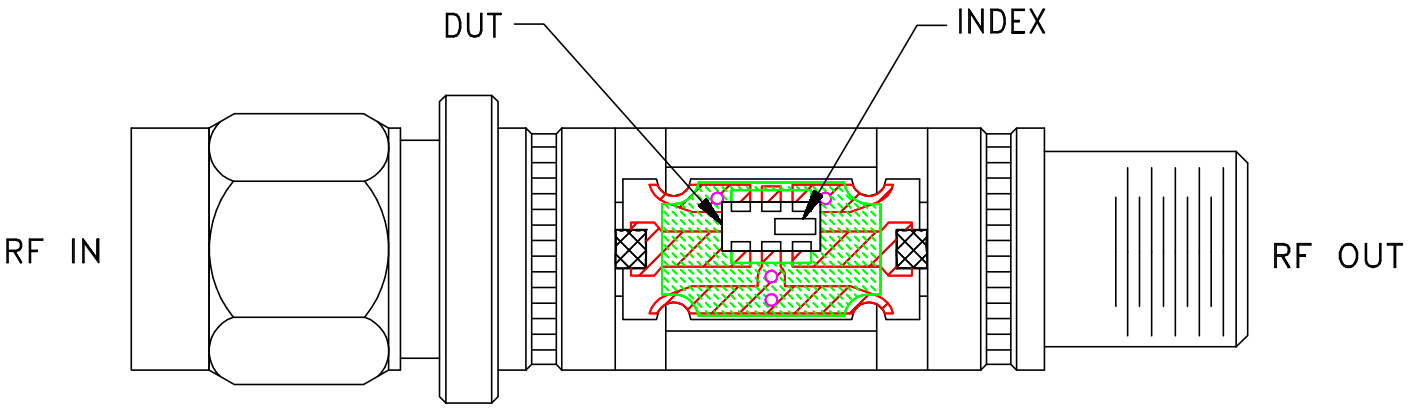
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

PL, pr, FV1206-1, HFCN, TB-285

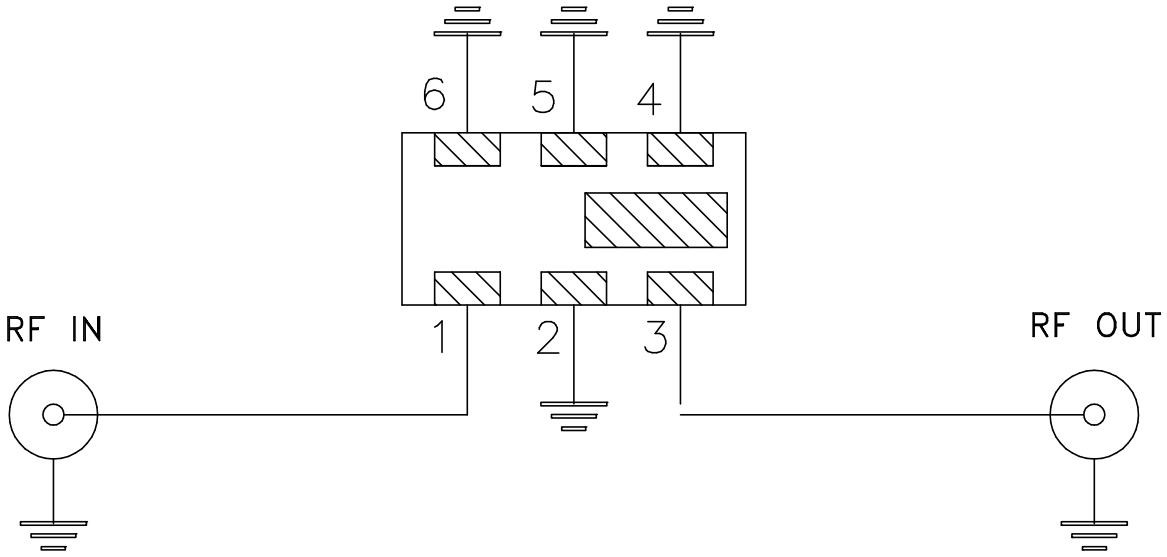
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-158	B

FILE:	SCALE:	SHEET:
98PL158	12:1	1 OF 1

Evaluation Board and Circuit



TB-285



Schematic Diagram

Notes:

1. SMA Female connectors.
2. PCB Material: Rogers RO4350 or equivalent, Dielectric Constant=3.5, Thickness=.020 inch.

Mini-Circuits®

Mini-Circuits

Environmental Specifications ENV06

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 100°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
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, Para 4.2.5, Test S, 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