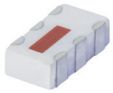
Ceramic

High Pass Filter

HFCN-8400

50Ω 9000 to 13000 MHz



Generic photo used for illustration purposes only

CASE STYLE: FV1206-1

Maximum Ratings

Operating Temperature	-55°C to 100°C
Storage Temperature	-55°C to 100°C
RF Power Input*	7W max. at 25°C

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

Pin Connections

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

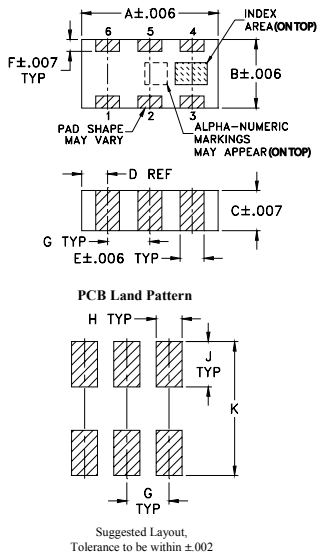
Features

- Low cost
- Small size
- 5 sections
- Temperature stable
- Excellent power handling, 7W
- Hermetically sealed
- LTCC construction
- Protected by US Patent 7,760,485

Applications

- Sub-harmonic rejection
- Transmitters / receivers

Outline Drawing

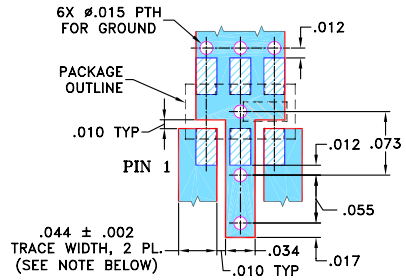


Outline Dimensions (inch / mm)

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

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

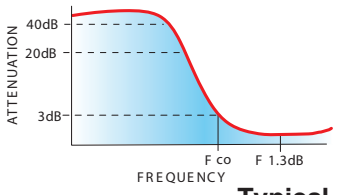
Electrical Specifications[1,2] at 25°C

STOPBAND (MHz)		fco, MHz Nom.	PASSBAND (MHz)		VSWR Typ.		POWER INPUT (W)	NO. OF SECTIONS
(Loss > 30dB) Typ.	(Loss > 20dB) Min.	(Loss 3 dB) Typ.	(Loss < 2.5dB) Max.	(Loss < 3dB) Max.	Stopband	Frequency (MHz) 1.5:1	Max.	
5700	6000	8400	9500-13000	9000-13000	20:1	9000-13000	7	5

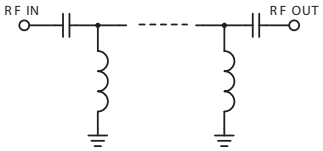
(1) In Application where DC voltage is present at either input or output ports, coupling capacitors are required. Alternatively, Mini-Circuits' "D" suffix version of this model will provide>100 MOhm isolation to ground.

(2) Measured on Mini-Circuits Characterization Test Board TB-285.

typical frequency response



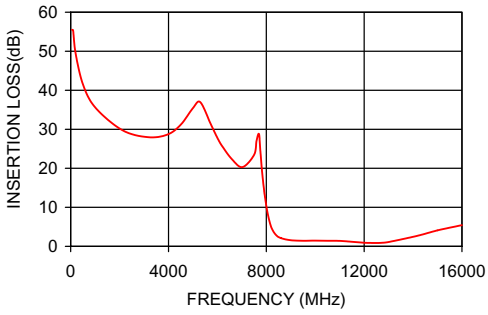
electrical schematic



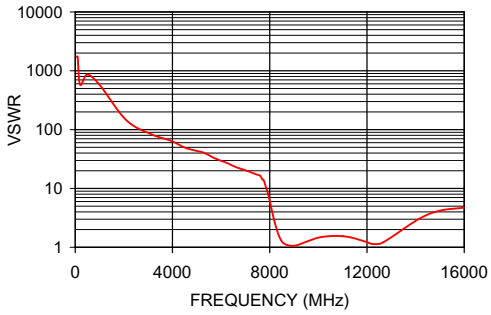
Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)
50	55.48	1737.18
500	41.57	868.59
4500	31.17	49.64
5700	36.69	31.60
6000	27.78	29.46
7500	23.46	17.05
8020	9.65	5.68
8400	2.88	1.50
8600	2.11	1.15
9000	1.57	1.06
9500	1.43	1.24
10000	1.47	1.46
12000	0.92	1.22
13000	1.10	1.48
16000	5.43	4.72

HFCN-8400
INSERTION LOSS



HFCN-8400
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

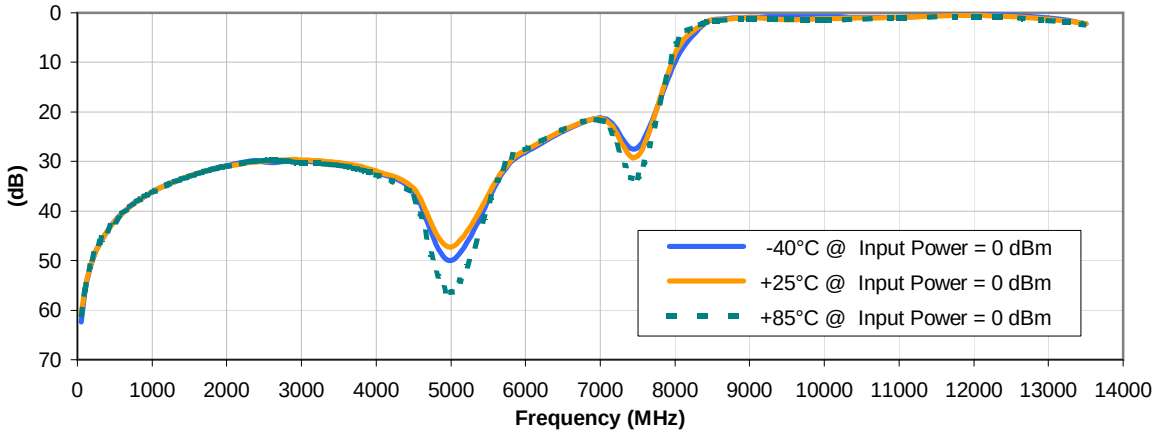
Ceramic High Pass Filter HFCN-8400

Typical Performance Data

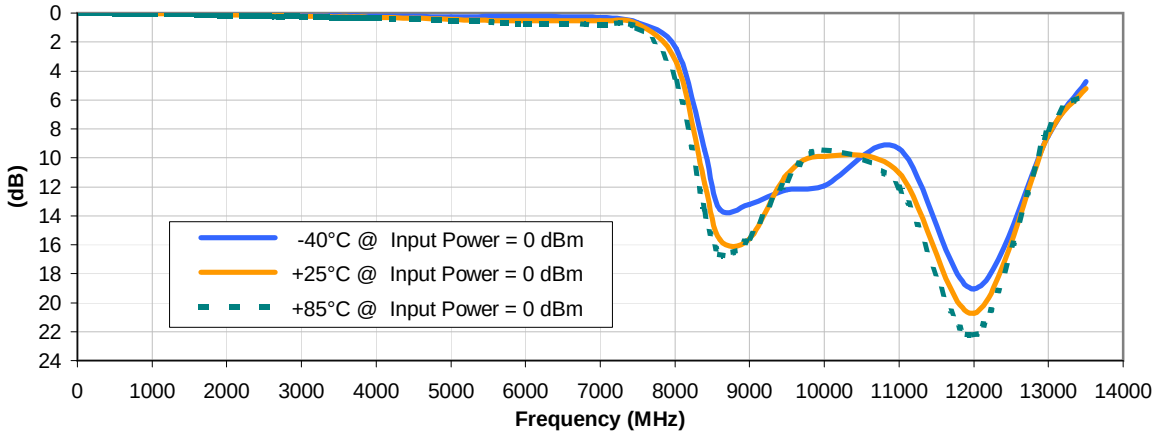
FREQ. (MHz)	INSERTION LOSS (dB)			INPUT RETURN LOSS (dB)			OUTPUT RETURNLOSS (dB)		
	@ -40° C	@ +25° C	@ +85° C	@ -40° C	@ +25° C	@ +85° C	@ -40° C	@ +25° C	@ +85° C
50	62.39	60.58	61.01	0.02	0.00	0.00	0.01	0.00	0.00
100	56.09	55.68	55.95	0.00	0.00	0.00	0.00	0.00	0.01
200	50.16	50.02	49.77	0.00	0.00	0.01	0.01	0.01	0.01
300	46.55	46.48	46.25	0.00	0.00	0.01	0.01	0.01	0.02
400	44.01	43.99	43.89	0.00	0.01	0.02	0.01	0.01	0.03
500	42.06	42.05	42.04	0.00	0.01	0.03	0.01	0.01	0.04
600	40.48	40.49	40.49	0.00	0.02	0.04	0.01	0.02	0.04
700	39.15	39.18	39.20	0.00	0.02	0.04	0.02	0.02	0.05
800	38.02	38.05	38.09	0.00	0.03	0.05	0.02	0.02	0.05
900	37.02	37.04	37.11	0.01	0.04	0.06	0.02	0.02	0.05
1000	36.17	36.16	36.25	0.01	0.03	0.06	0.03	0.01	0.06
1200	34.67	34.66	34.78	0.01	0.05	0.08	0.03	0.02	0.06
1300	34.04	34.04	34.15	0.01	0.05	0.09	0.05	0.01	0.06
1400	33.45	33.45	33.55	0.03	0.08	0.11	0.05	0.02	0.06
1500	32.91	32.92	33.00	0.02	0.07	0.11	0.06	0.01	0.06
1600	32.42	32.45	32.49	0.04	0.09	0.13	0.06	0.01	0.06
1700	31.98	32.01	32.04	0.03	0.08	0.13	0.04	0.03	0.08
1800	31.56	31.62	31.64	0.05	0.10	0.14	0.06	0.01	0.07
1900	31.17	31.27	31.26	0.06	0.11	0.16	0.05	0.02	0.07
2000	30.82	30.97	30.94	0.07	0.12	0.16	0.05	0.02	0.08
2200	30.21	30.44	30.37	0.08	0.13	0.18	0.03	0.03	0.09
2300	29.95	30.22	30.13	0.10	0.14	0.19	0.03	0.02	0.09
2400	29.88	30.03	29.92	0.12	0.16	0.20	0.00	0.03	0.11
2500	30.14	29.90	29.78	0.12	0.16	0.21	0.01	0.04	0.12
2600	30.21	29.77	29.67	0.12	0.16	0.20	0.04	0.09	0.19
2700	30.12	29.72	29.79	0.14	0.19	0.25	0.01	0.03	0.12
2800	30.02	29.65	29.89	0.14	0.19	0.24	0.04	0.09	0.18
2900	29.97	29.63	30.05	0.15	0.19	0.24	0.02	0.06	0.15
3000	29.96	29.65	30.17	0.16	0.21	0.25	0.04	0.09	0.17
3200	30.05	29.79	30.35	0.17	0.23	0.28	0.06	0.09	0.17
3300	30.17	29.90	30.45	0.19	0.23	0.27	0.10	0.15	0.24
3400	30.35	30.06	30.61	0.19	0.25	0.29	0.08	0.12	0.20
3500	30.52	30.21	30.79	0.18	0.25	0.30	0.10	0.13	0.20
3600	30.80	30.46	31.03	0.21	0.26	0.31	0.12	0.17	0.25
3700	31.02	30.74	31.34	0.17	0.26	0.31	0.12	0.14	0.22
3800	31.35	31.04	31.68	0.20	0.27	0.33	0.14	0.16	0.24
3900	31.73	31.45	32.16	0.21	0.29	0.34	0.15	0.17	0.25
4000	32.14	31.86	32.67	0.22	0.30	0.36	0.17	0.18	0.26
4500	35.97	35.42	37.29	0.24	0.35	0.44	0.25	0.26	0.34
5000	49.96	47.25	56.48	0.26	0.43	0.53	0.41	0.42	0.48
5700	32.18	31.77	31.40	0.23	0.51	0.68	0.61	0.69	0.80
6000	28.19	27.77	27.68	0.22	0.53	0.75	0.60	0.76	0.91
7000	21.23	21.33	21.69	0.32	0.53	0.81	0.86	1.03	1.38
7500	27.25	28.94	33.14	0.66	0.74	1.00	0.66	1.04	1.59
8020	9.33	7.67	6.29	2.49	3.41	4.75	1.83	2.59	3.92
8400	2.25	2.09	2.10	9.45	11.74	13.71	8.57	10.10	11.68
8600	1.33	1.41	1.60	13.55	15.64	16.68	12.70	14.50	15.16
9000	0.92	1.09	1.31	13.21	15.59	15.53	14.00	17.46	16.36
9500	0.80	1.42	1.32	12.21	11.16	11.53	13.14	15.40	12.97
10000	0.74	1.14	1.39	11.94	9.89	9.45	12.30	11.15	10.56
11000	0.96	0.84	0.98	9.36	11.03	12.05	9.94	10.88	11.88
12000	0.30	0.50	0.82	19.07	20.75	22.25	19.49	43.89	28.49
13000	1.08	1.28	1.61	8.47	8.44	8.02	10.66	9.39	8.73
13500	2.22	2.18	2.42	4.75	5.23	5.45	5.09	6.48	6.71

Typical Performance Curves

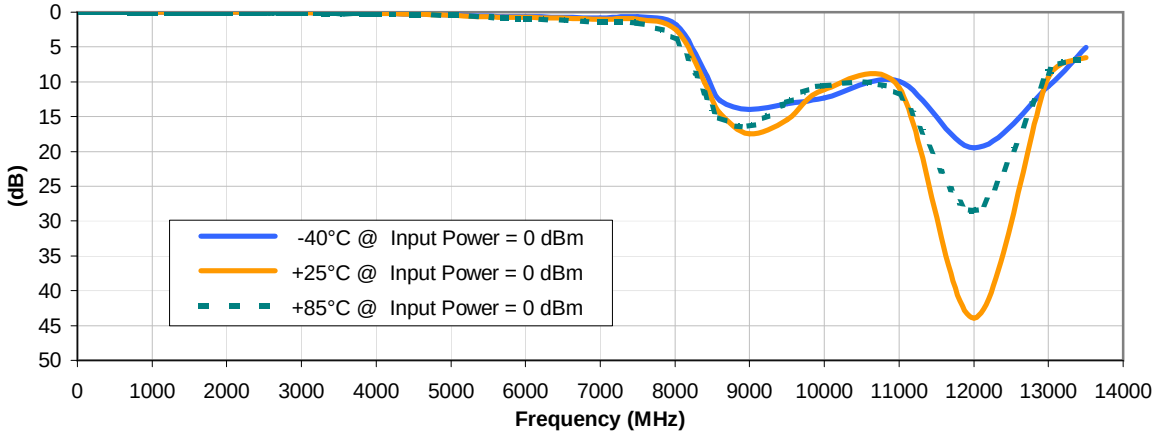
INSERTION LOSS vs. TEMPERATURE



INPUT RETURN LOSS vs. TEMPERATURE



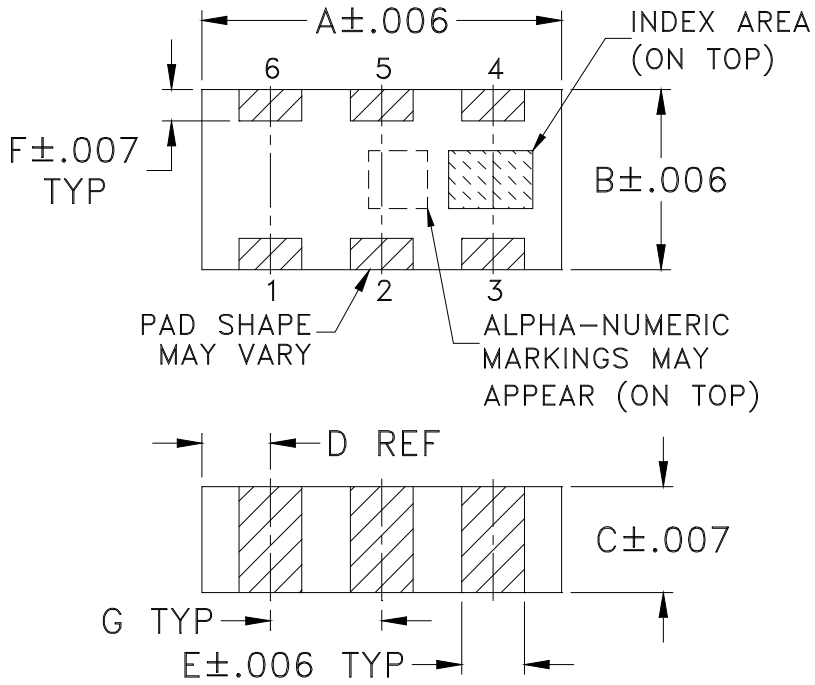
OUTPUT RETURN LOSS vs. TEMPERATURE



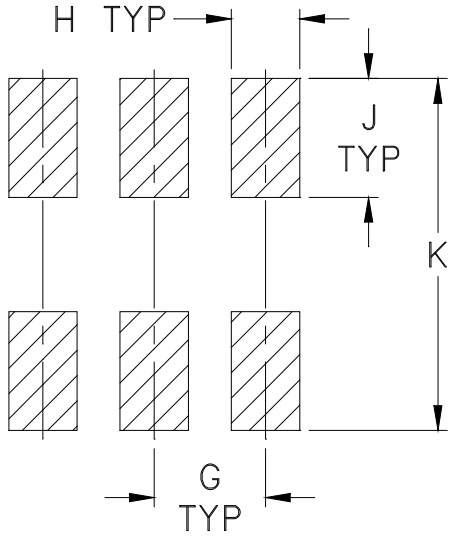
Case Style FV

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

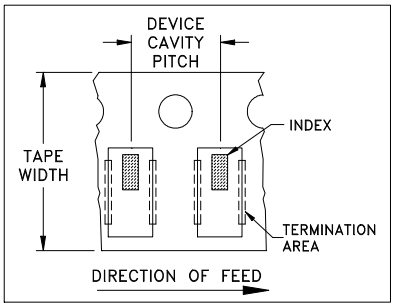


ILLUSTRATION 1

Applicable Case Styles
FV1206-1 FV1206-3

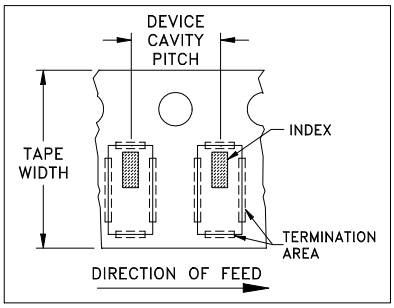


ILLUSTRATION 2

Applicable Case Styles
FV1206-4 FV1206-5 FV1206-6 FV1206-7 FV1206-9 JC0603C-1

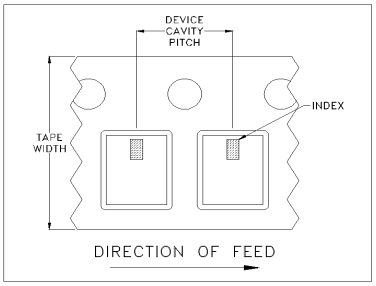


ILLUSTRATION 3

Applicable Case Styles
NL1008C-6

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.

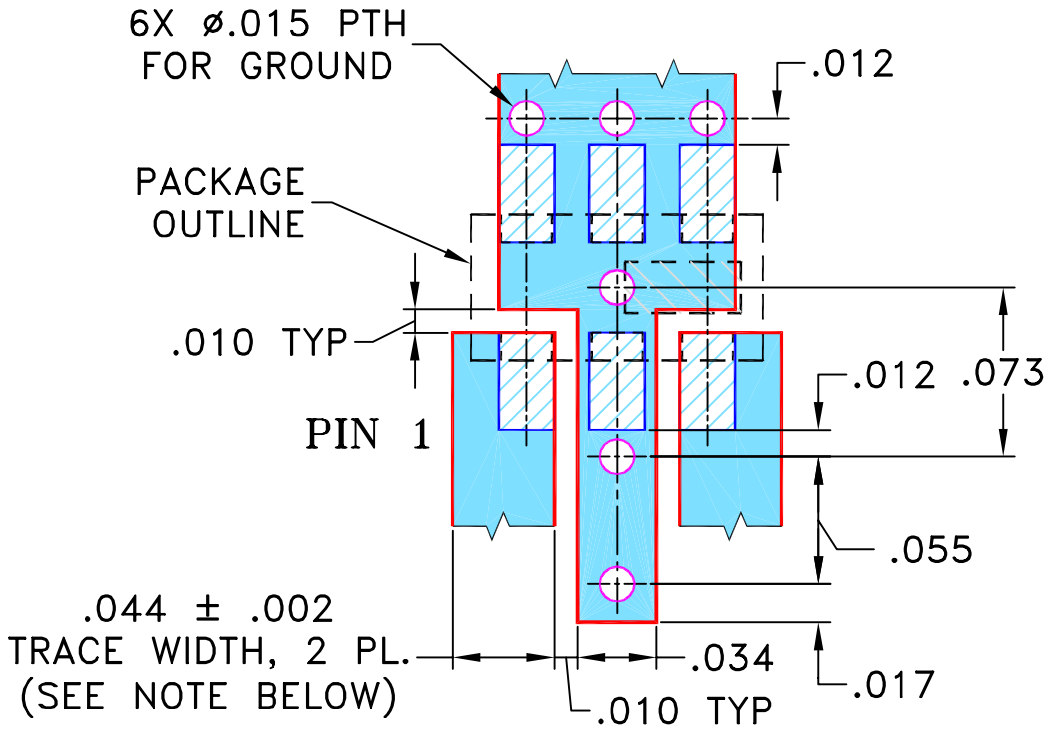
Mini-Circuits carrier tape materials provide protection from ESD (Electro-Static Discharge) during handling and transportation. Tapes are static dissipative and comply with industry standards EIA-481/EIA-541.

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

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

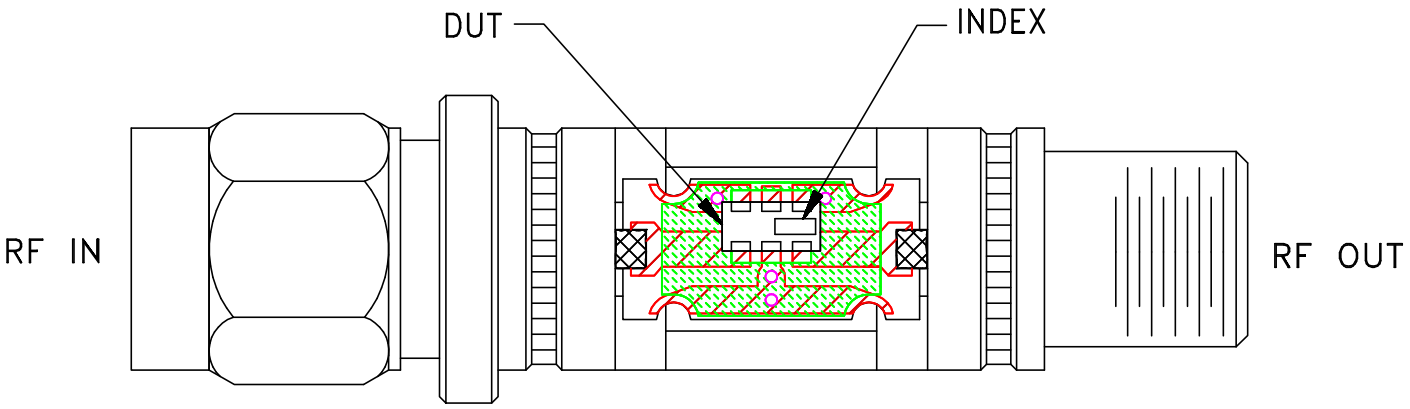
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

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

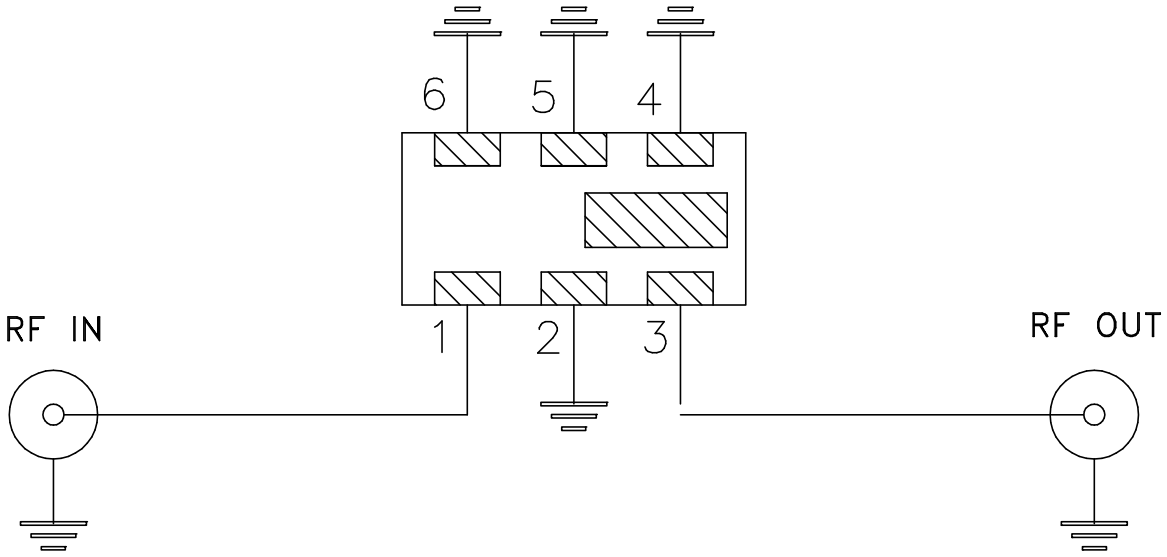
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-158	B

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