



Mini-Circuits®

CERAMIC

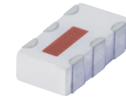
High Pass Filter

50Ω 5000 to 11000 MHz

HFCN-4600+

FEATURES

- 5 Sections
- Temperature stable
- Excellent power handling, 7W
- Hermetically sealed
- LTCC construction
- Low cost
- 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

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

Parameter	Frequency (MHz)	Min.	Typ.	Max.	Units
Stop Band	Rejection Loss	3700	30	—	dB
		3800	20	—	
	Freq. Cut-Off	4600	—	3.0	dB
	VSWR	3700-3800	—	20	:1
Pass Band	Insertion Loss	5000-11000	—	2.0	dB
		5200-10500	—	1.5	dB
	VSWR	4720-11000	—	1.5	:1

1. In Application where DC voltage is present at either input or output ports, coupling capacitors are required.

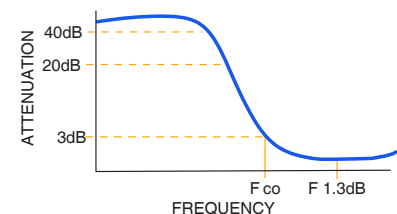
2. Measured on Mini-Circuits Characterization Test Board TB-285.

MAXIMUM RATINGS

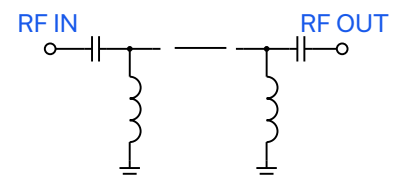
Parameter	Ratings
Operating temperature	-55°C to 100°C
Storage temperature	-55°C to 100°C
RF Power Input ³	7 W max. at 25°C

3. Passband rating, derate linearly to 3.5W at 100°C ambient.
Permanent damage may occur if any of these limits are exceeded.

TYPICAL FREQUENCY RESPONSE



FUNCTIONAL SCHEMATIC



REV. H
ECO-023092
HFCN-4600+
MCL NY
241014

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High Pass Filter

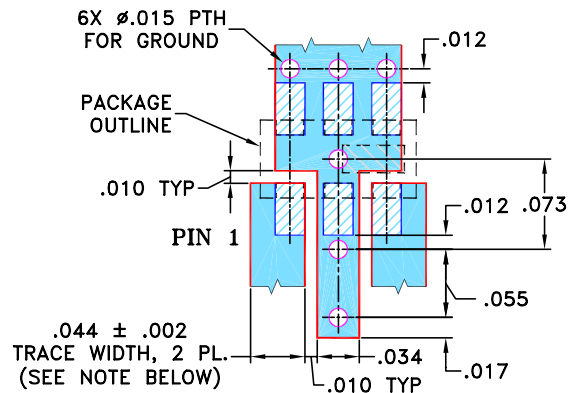
HFCN-4600+

PIN CONNECTIONS

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

PRODUCT MARKING: G3

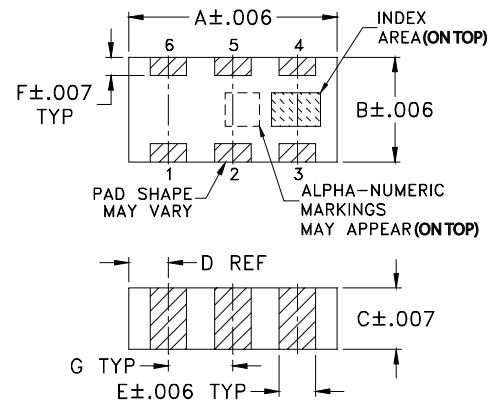
DEMO BOARD MCL P/N: TB-285
SUGGESTED PCB LAYOUT (PL-158)



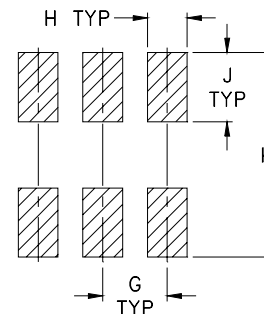
- NOTE:** 1. TRACE WIDTH IS SHOWN FOR ROGERS R04350 WITH DIELECTRIC THICKNESS: $.020 \pm .0015$; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

	DENOTES PCB COPPER LAYOUT
	DENOTES COPPER LAND PATTERN FREE OF SOLDERMASK

OUTLINE DRAWING



PCB Land Pattern



Suggested Layout,
Tolerance to be within $\pm .002$

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



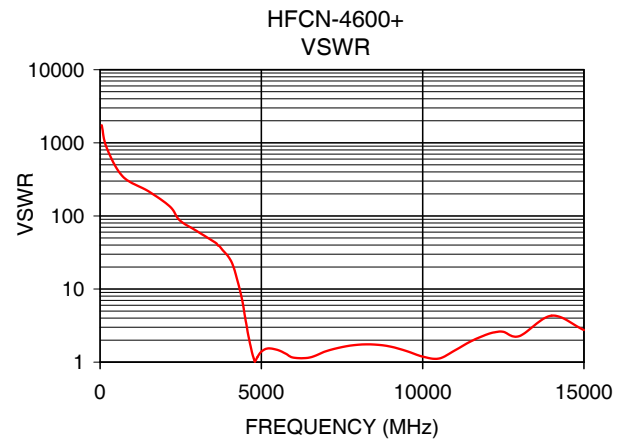
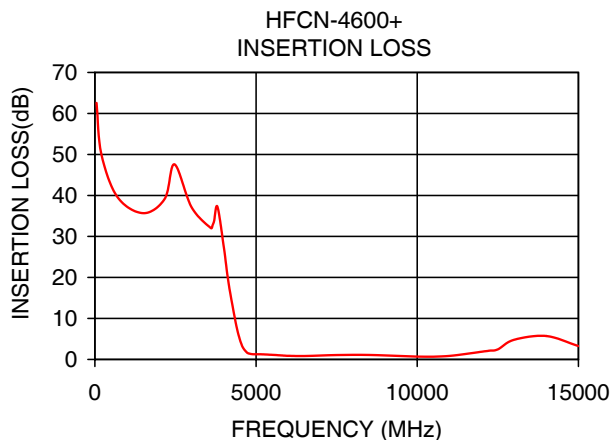
CERAMIC

High Pass Filter

HFCN-4600+

TYPICAL PERFORMANCE DATA AT 25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)
50	62.56	1737.18
1500	35.68	217.15
2470	47.59	86.86
3700	33.77	38.61
3800	37.24	34.07
4150	18.50	19.32
4380	8.52	7.90
4500	4.77	3.97
4600	2.78	2.25
4720	1.66	1.31
5000	1.27	1.39
5200	1.25	1.54
8000	1.11	1.73
10500	0.66	1.12
11000	0.85	1.45
14000	5.72	4.32
15000	3.27	2.75



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-4600+

Typical Performance Data

FREQ. (MHz)	INSERTION LOSS (dB)			INPUT RETURN LOSS (dB)			OUTPUT RETURNLOSS (dB)		
	@ -55° C	@ +25° C	@ +100° C	@ -55° C	@ +25° C	@ +100° C	@ -55° C	@ +25° C	@ +100° C
50	62.08	63.88	61.65	0.02	0.04	0.02	0.01	0.00	0.00
200	50.18	49.92	49.76	0.01	0.00	0.01	0.00	0.01	0.03
700	39.58	39.60	39.64	0.02	0.01	0.03	0.02	0.02	0.05
1500	35.54	35.62	35.70	0.02	0.08	0.12	0.04	0.11	0.16
2170	38.75	39.18	39.60	0.10	0.18	0.21	0.09	0.14	0.19
2470	46.44	47.81	49.37	0.07	0.16	0.20	0.15	0.22	0.29
3000	37.29	36.90	36.49	0.17	0.27	0.31	0.20	0.32	0.42
3600	31.20	31.53	31.97	0.27	0.42	0.50	0.33	0.47	0.61
3650	31.74	32.20	32.79	0.31	0.43	0.52	0.33	0.48	0.62
3700	32.31	32.95	33.83	0.32	0.46	0.55	0.29	0.45	0.59
4000	29.89	27.61	25.66	0.44	0.62	0.77	0.45	0.63	0.81
4150	19.96	18.52	17.27	0.60	0.85	1.07	0.66	0.87	1.10
4380	9.26	8.47	7.76	1.62	2.18	2.76	1.63	2.10	2.63
4500	5.17	4.71	4.33	3.50	4.47	5.53	3.37	4.17	5.11
4600	2.87	2.72	2.61	6.72	8.31	10.04	6.30	7.51	8.86
4720	1.53	1.61	1.70	14.07	17.49	21.63	12.18	13.74	15.18
4750	1.34	1.46	1.59	17.01	21.62	28.49	13.94	15.30	16.43
4770	1.27	1.41	1.54	19.64	25.86	40.50	15.16	16.23	16.99
4800	1.18	1.33	1.49	25.35	42.51	30.84	16.72	17.16	17.26
4880	1.04	1.24	1.42	26.06	21.98	19.78	17.71	16.85	16.24
5000	0.99	1.18	1.36	16.49	15.71	15.33	15.06	14.56	14.34
5500	0.89	1.07	1.22	13.90	14.30	15.10	13.75	14.20	15.03
5750	0.77	0.95	1.10	16.09	17.25	18.49	16.32	17.11	18.20
6000	0.70	0.87	1.04	19.37	21.79	23.96	20.14	21.65	22.80
6500	0.58	0.79	0.98	25.48	23.59	23.65	30.75	27.78	27.88
7000	0.66	0.89	1.11	16.01	15.75	15.40	17.13	17.22	17.88
7500	0.79	1.01	1.26	12.46	12.80	12.60	13.20	13.83	14.26
8000	0.92	1.08	1.32	10.73	11.77	11.96	11.34	12.55	12.93
8500	0.91	1.08	1.27	10.88	11.86	12.66	11.51	12.44	12.82
9000	0.71	0.95	1.13	12.70	12.82	14.02	13.45	13.23	13.61
9500	0.52	0.79	1.00	15.51	15.13	15.50	16.26	15.31	14.84
10000	0.38	0.64	0.89	19.40	19.64	18.02	19.29	19.86	17.57
11000	0.44	0.78	1.09	15.90	15.55	15.70	15.38	15.30	14.57
11500	0.80	1.19	1.50	10.98	10.70	10.90	10.33	10.62	10.99
12000	1.31	1.80	2.15	8.54	8.04	8.08	8.03	7.96	8.49
12250	1.53	2.11	2.54	7.93	7.30	7.12	7.58	7.14	7.36
12500	1.79	2.47	3.07	7.34	7.08	6.79	6.97	6.55	6.52
13000	3.71	4.75	5.33	9.24	7.99	5.79	5.38	5.12	4.84
14000	6.76	5.76	5.07	3.11	4.40	5.24	9.89	8.29	8.26
15000	3.28	3.55	3.30	5.70	6.02	7.74	5.95	5.75	6.95

REV. X1

HFCN-4600+

090118

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IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS9100 CERTIFIED RoHS compliant

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



The Design Engineers Search Engine finds the model you need, Instantly • For detailed performance specs & shopping online see

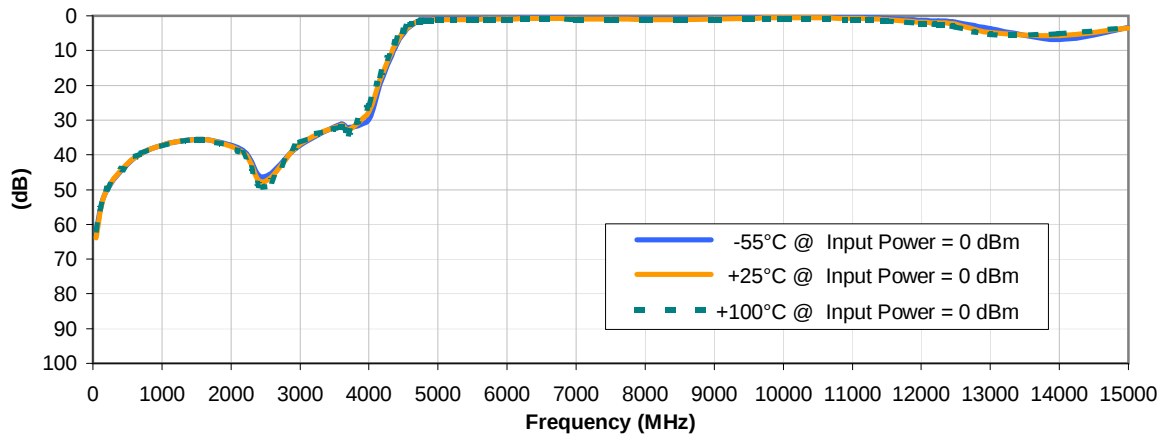


Ceramic High Pass Filter

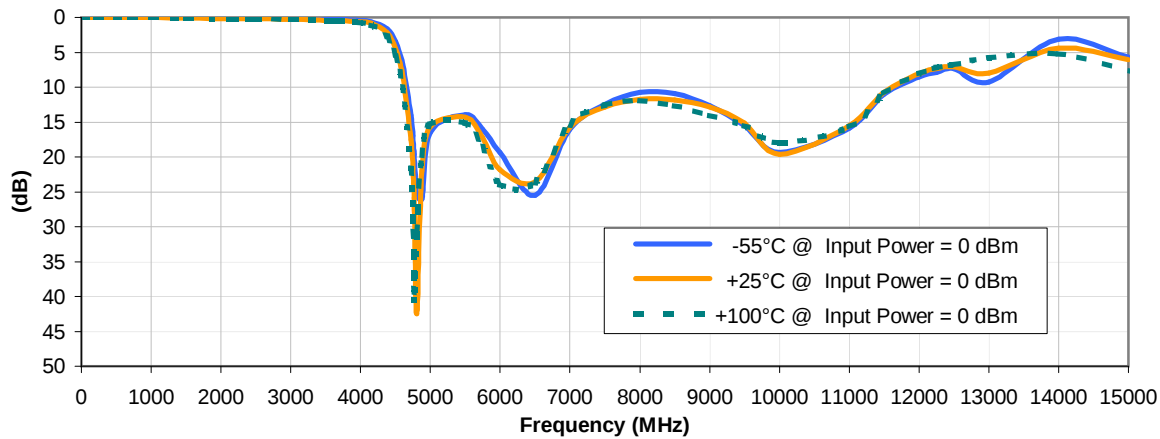
Typical Performance Curves

HFCN-4600+

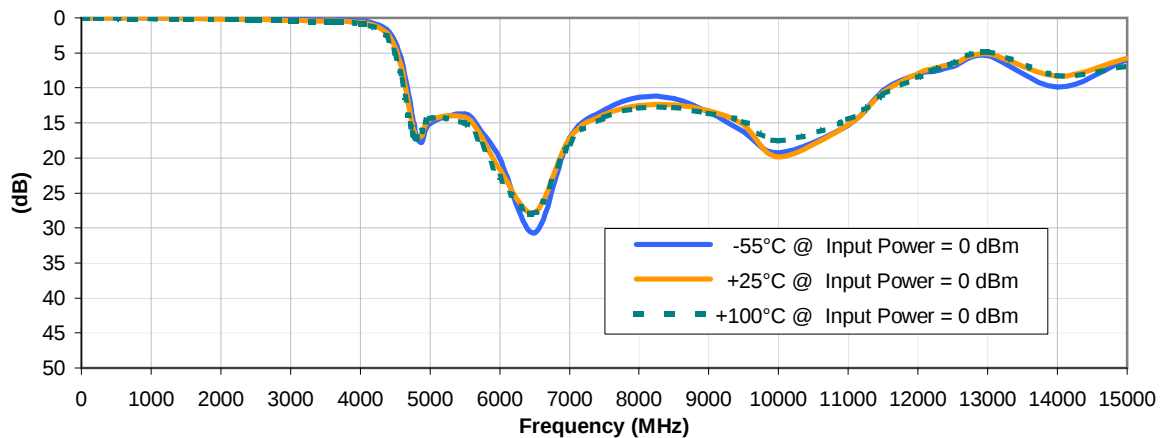
INSERTION LOSS vs. TEMPERATURE



INPUT RETURN LOSS vs. TEMPERATURE



OUTPUT RETURN LOSS vs. TEMPERATURE



REV. X1
HFCN-4600+
090118
Page 1 of 1

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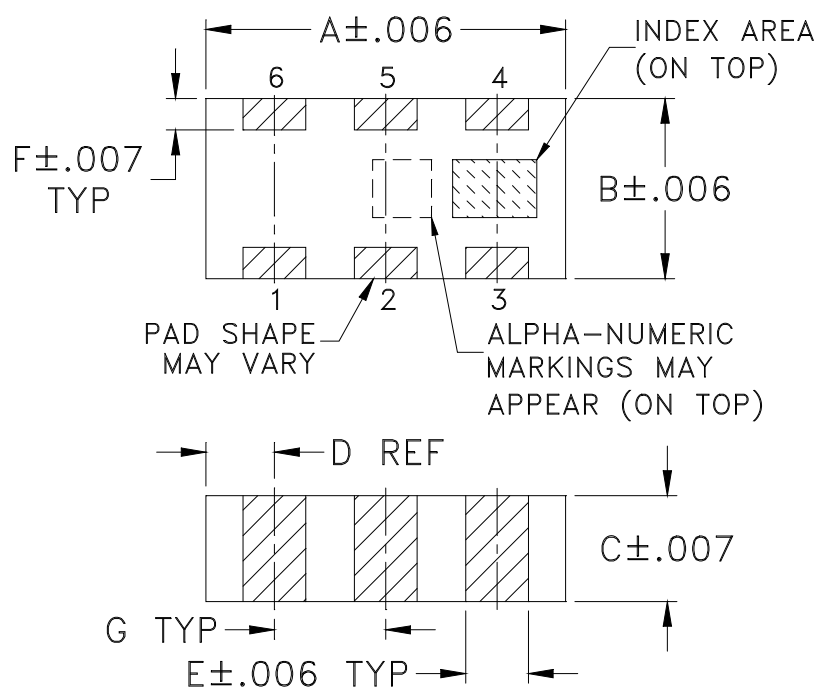
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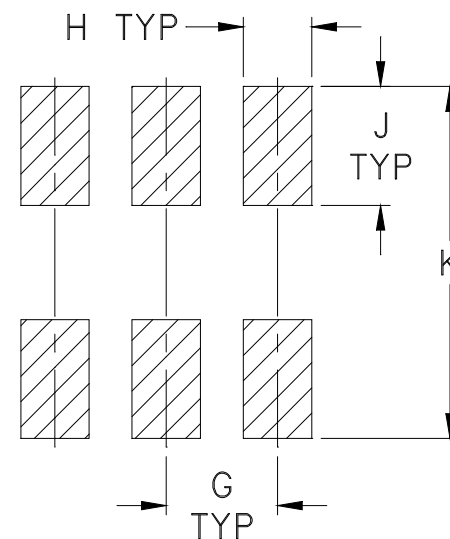
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Outline Dimensions



PCB Land Pattern



Suggested Layout,
Tolerance to be within $\pm .002$

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. $\pm .01$; 3 PL. $\pm .005$

Notes:

- Open style, ceramic base.
- 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.



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The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com

RF/IF MICROWAVE COMPONENTS

DEVICE ORIENTATION IN T&R

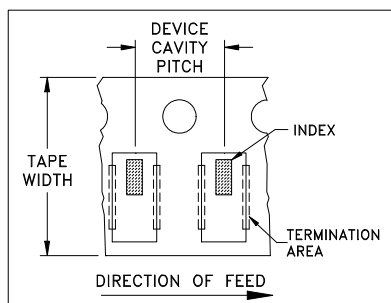


ILLUSTRATION 1

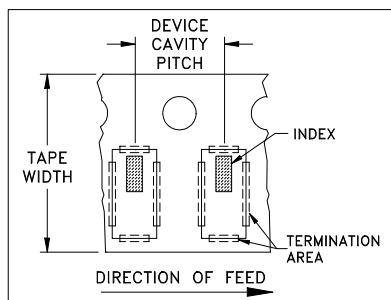


ILLUSTRATION 2

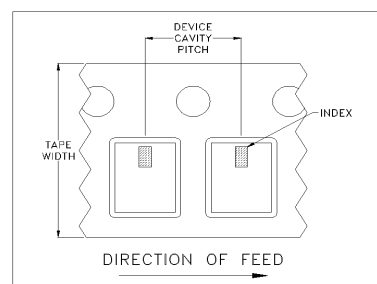


ILLUSTRATION 3

Applicable Case Styles

FV1206-1
FV1206-3

Applicable Case Styles

FV1206-4
FV1206-5
FV1206-6
FV1206-7
FV1206-9

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

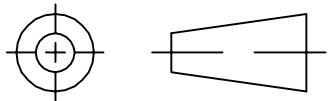


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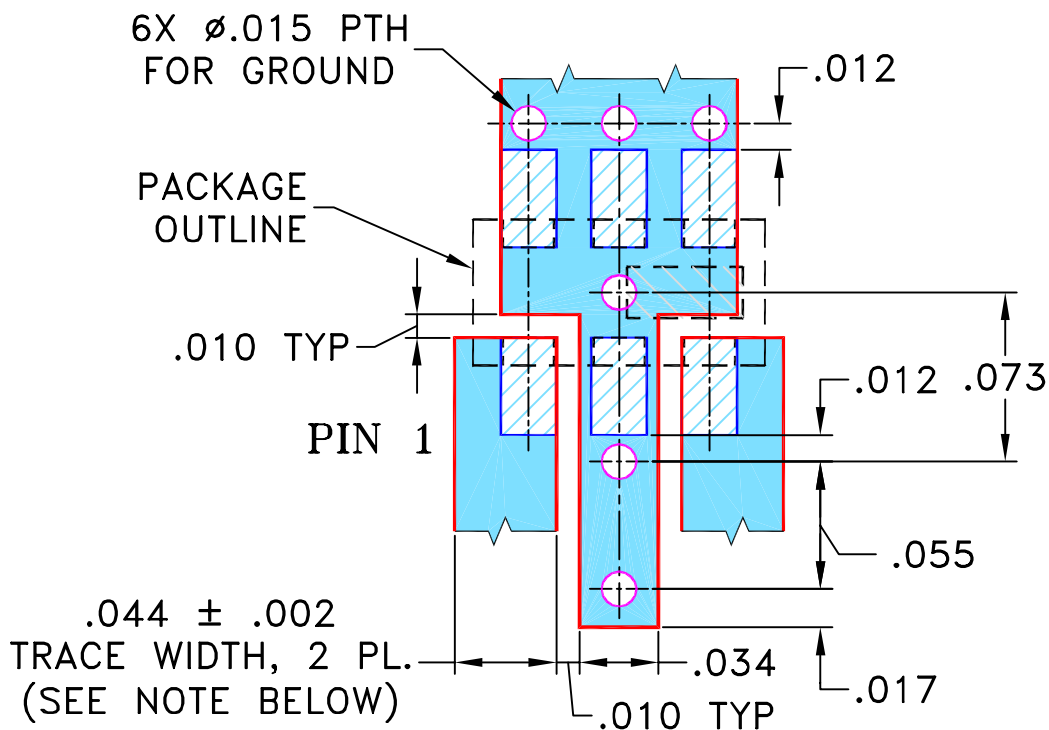
THIRD ANGLE PROJECTION



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

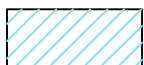
SUGGESTED MOUNTING CONFIGURATION
FOR FV1206-1 CASE STYLE, "pr" PIN CONNECTION.



- NOTE: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .020" $\pm$.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

TOLERANCES ON:

2 PL DECIMALS $\pm$ 3 PL DECIMALS $\pm$.005ANGLES $\pm$ FRACTIONS $\pm$

DRAWN

AV

05/03/04

CHECKED

IL

05/24/04

APPROVED

ABD

05/24/04

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



Mini-Circuits®

13 Neptune Avenue
Brooklyn NY 11235

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

SIZE

A

CODE IDENT

15542

DRAWING NO:

98-PL-158

REV:

B

FILE:

98PL158

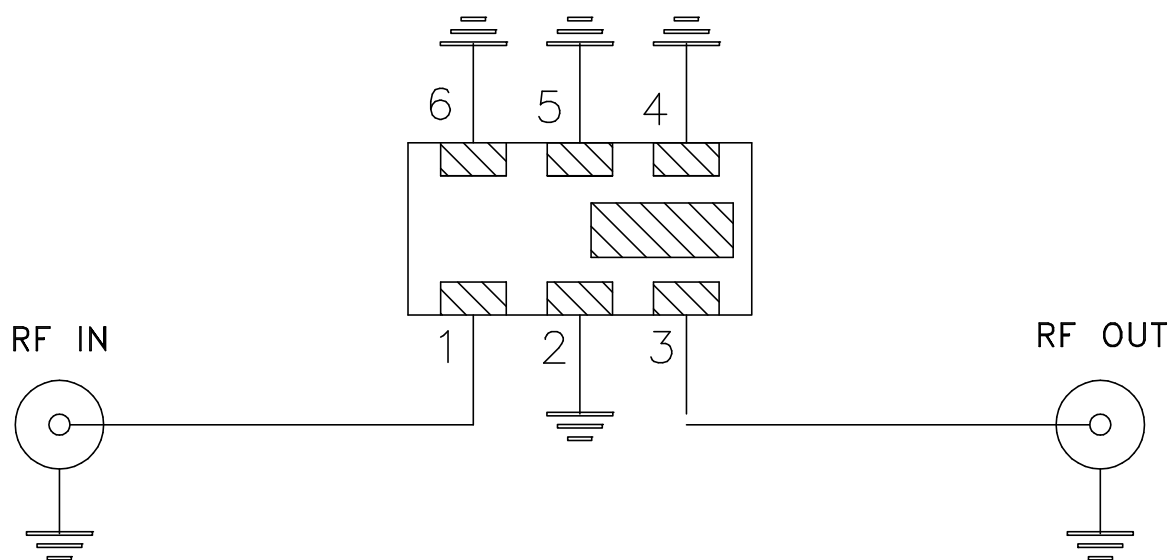
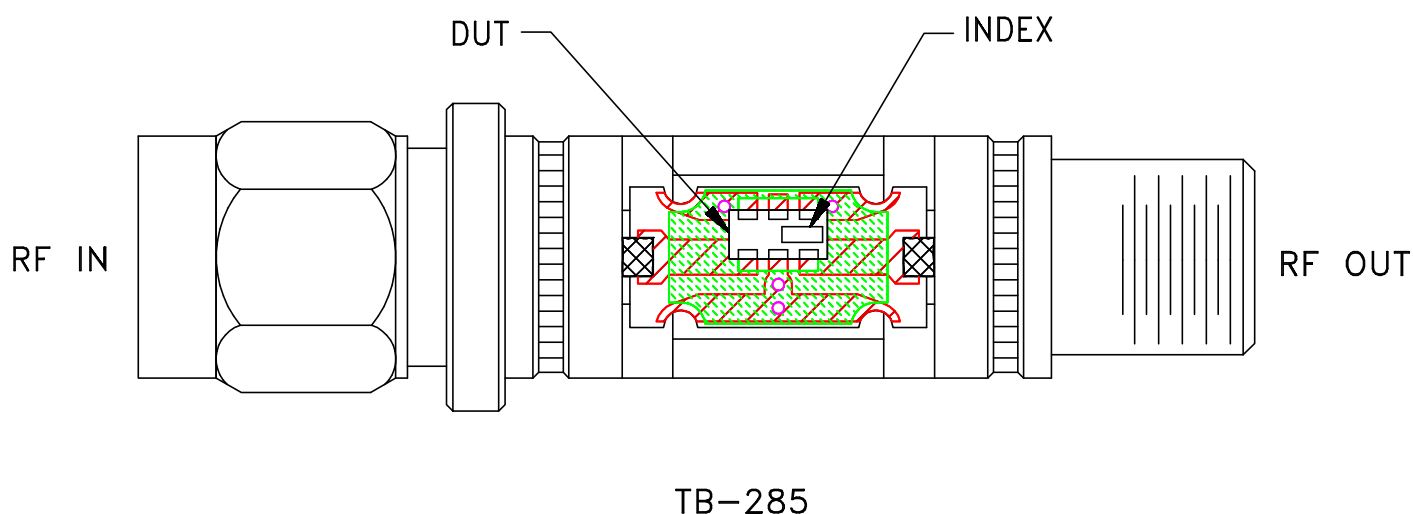
SCALE:

12:1

SHEET:

1 OF 1

Evaluation Board and Circuit



Notes:

1. SMA Female connectors.
2. PCB Material: Rogers R04350 or equivalent,
Dielectric Constant=3.5, Thickness=.020 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 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