

High Pass Filter

50Ω 5000 to 11000 MHz
HFCN-4600D+


CASE STYLE: FV1206-1

PRICE: Contact Sales Dept.

Maximum Ratings

Operating Temperature -55°C to 100°C

Storage Temperature -55°C to 100°C

RF Power Input* 7W max. at 25°C

Max. DC Voltage at pins 1&3 25 VDC

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

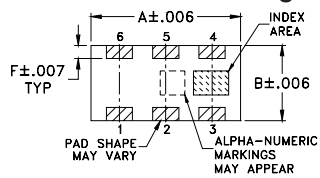
Pin Connections

RF IN 1

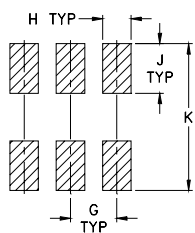
RF OUT 3

GROUND 2,4,5,6

Outline Drawing



PCB Land Pattern

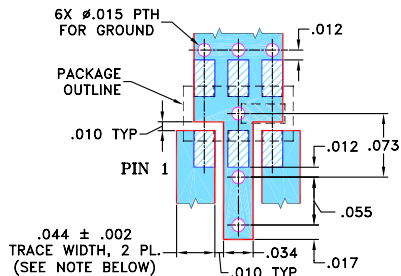


Suggested Layout,
Tolerance to be within ±.002

Outline Dimensions (inch)

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	L	M
.039	.024	.042	.123	.034	.017
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.

6X .015 PTH FOR GROUND
PACKAGE OUTLINE
.010 TYP
PIN 1
.044 ± .002
TRACE WIDTH, 2 PL.
(SEE NOTE BELOW)
.010 TYP
.034
.017
.055
.012
.073
.012

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

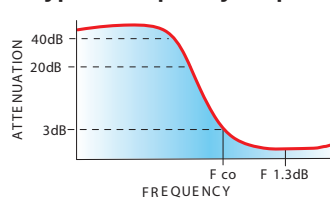
- Sub-harmonic rejection and DC blocking
- Transmitters / receivers

Electrical Specifications¹ at 25°C

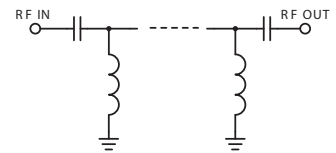
STOPBAND (MHz)	fco, MHz Nom.	PASSBAND (MHz)	VSWR Typ. Frequency (MHz)	POWER INPUT (W)	NO. OF SECTIONS
(Loss > 30dB) Typ.	(Loss > 20dB) Min.	(Loss < 1.5dB) Max.	Stopband 1.5:1	Max.	
3700	3800	4600	4720-11000	7	5

1. DC Resistance to ground is 100 Mohms min.

typical frequency response



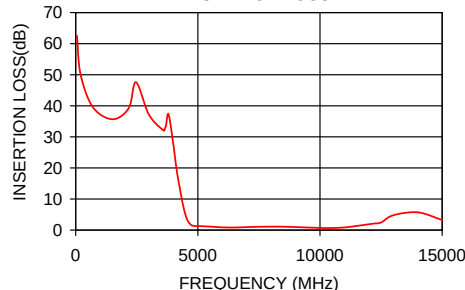
electrical schematic



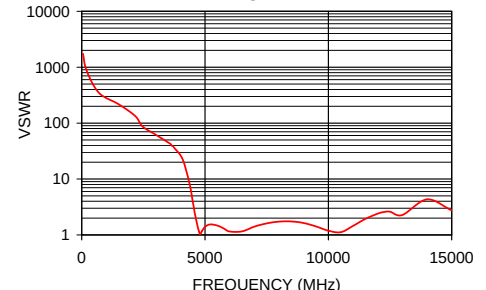
Typical Performance Data at 25°C

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

HFCN-4600D+ INSERTION LOSS



HFCN-4600D+ VSWR



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Notes: 1. Performance and quality attributes and conditions not expressly stated in this specification sheet are intended to be excluded and do not form a part of this specification sheet. 2. Electrical specifications and performance data contained herein are based on Mini-Circuit's applicable established test performance criteria and measurement instructions. 3. The parts covered by this specification sheet 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.

REV. B
M132298
EDR-8120/1
HFCN-4600D+
RAV/CP/AM
110708
page 1

Ceramic High Pass Filter

HFCN-4600D+

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-4600D+

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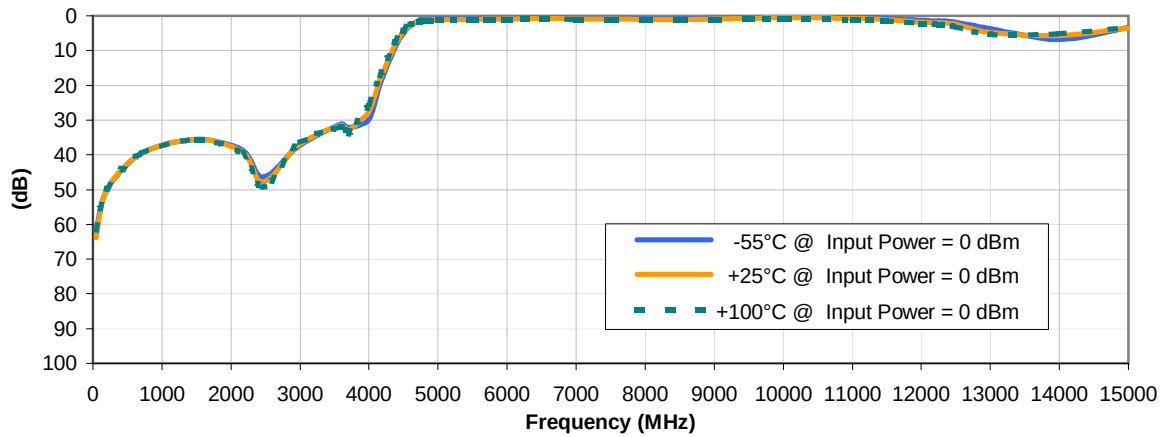


Ceramic High Pass Filter

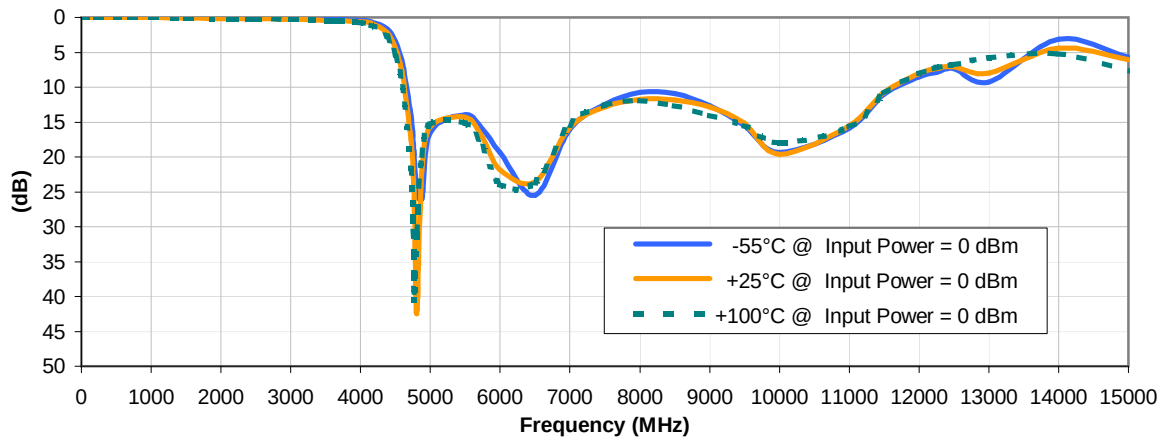
Typical Performance Curves

HFCN-4600D+

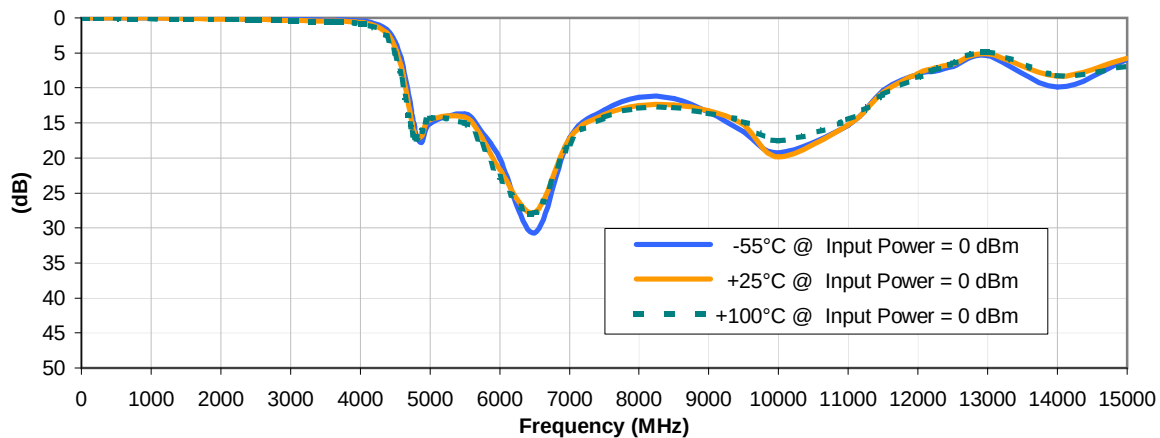
INSERTION LOSS vs. TEMPERATURE



INPUT RETURN LOSS vs. TEMPERATURE



OUTPUT RETURN LOSS vs. TEMPERATURE



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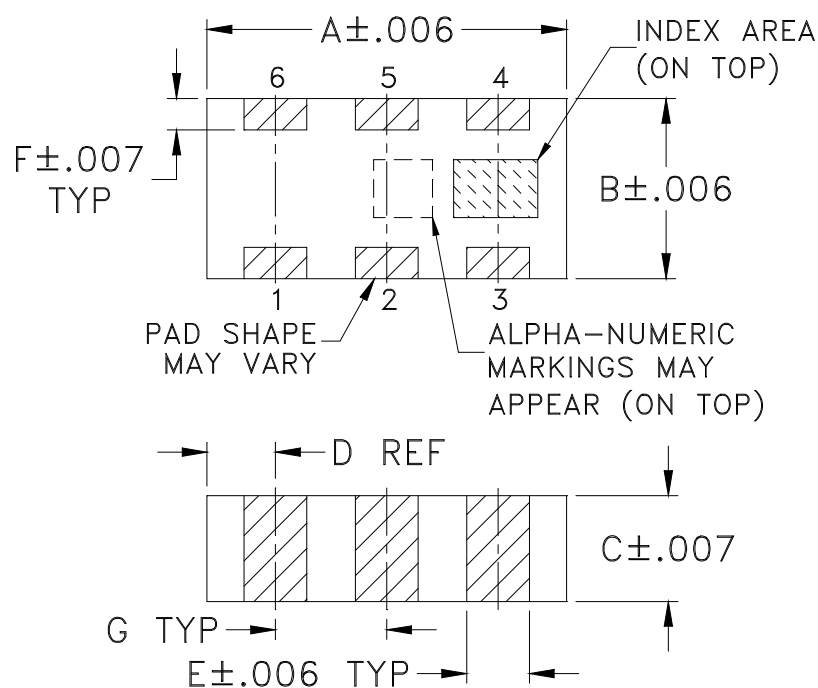
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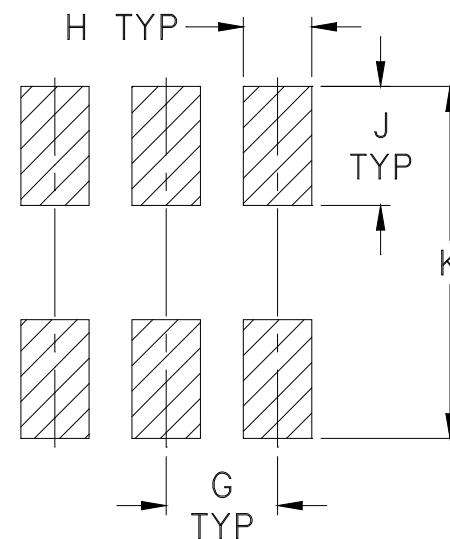
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Outline Dimensions



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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RF/IF MICROWAVE COMPONENTS

DEVICE ORIENTATION IN T&R

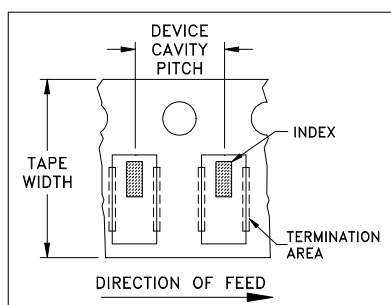


ILLUSTRATION 1

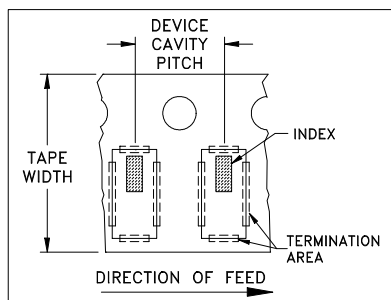


ILLUSTRATION 2

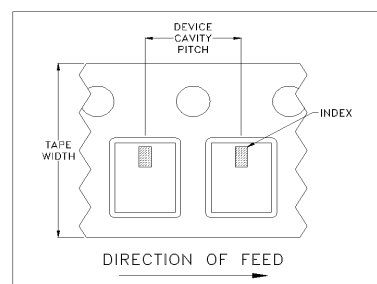


ILLUSTRATION 3

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

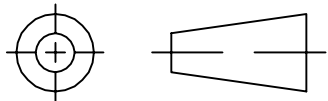


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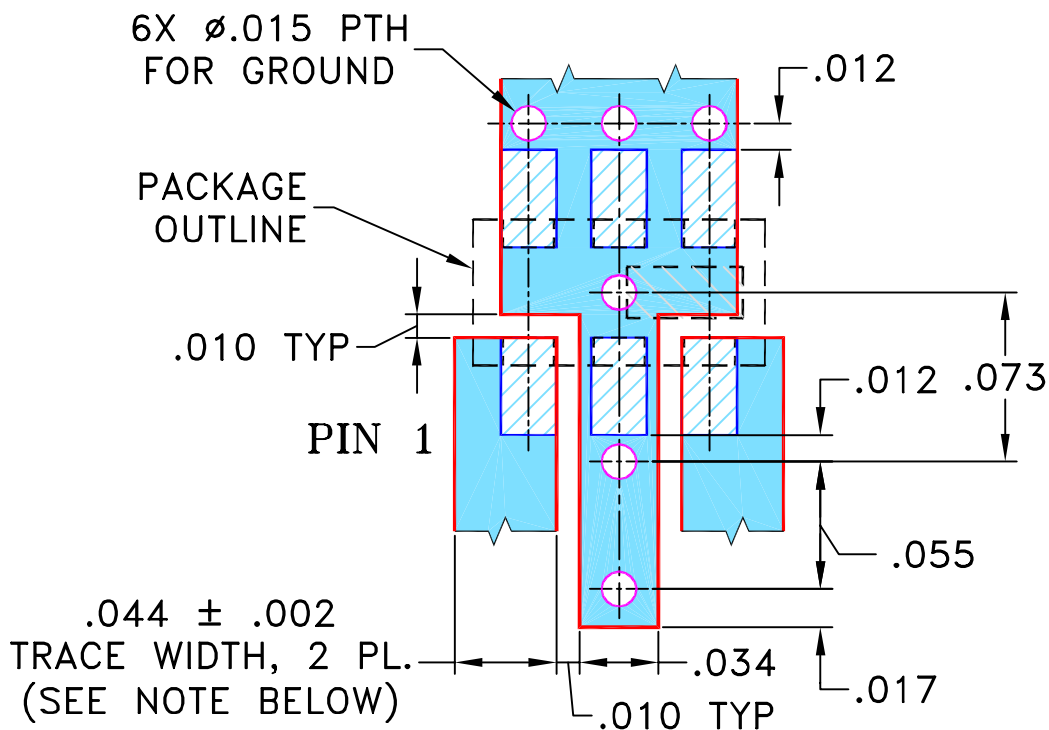
THIRD ANGLE PROJECTION



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

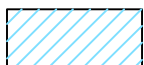
SUGGESTED MOUNTING CONFIGURATION
FOR FV1206-1 CASE STYLE, "pr" PIN CONNECTION.



- 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



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

 SIZE
 A

 CODE IDENT
 15542

 DRAWING NO:
 98-PL-158

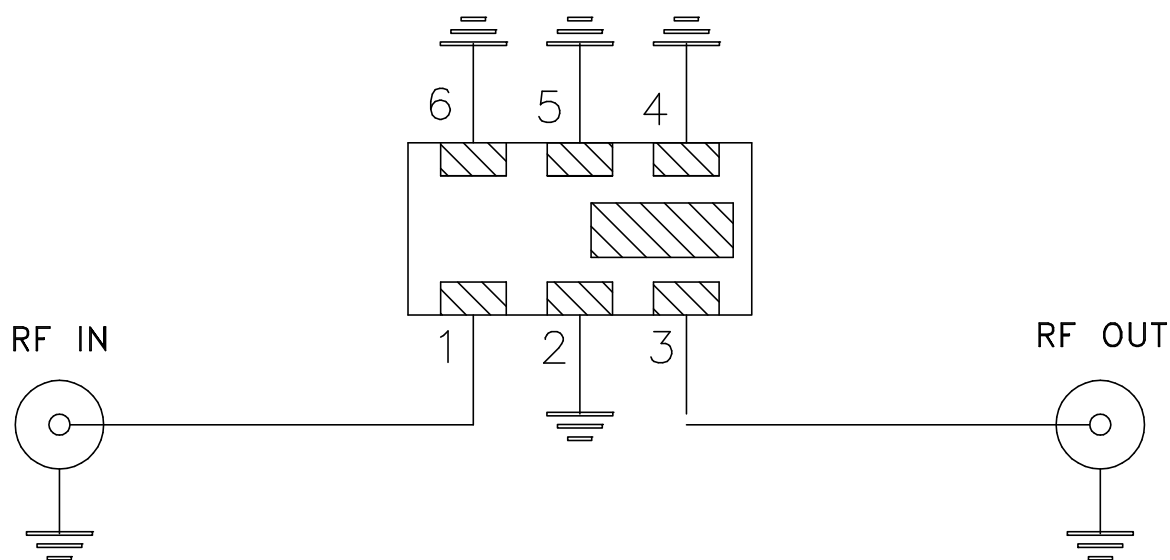
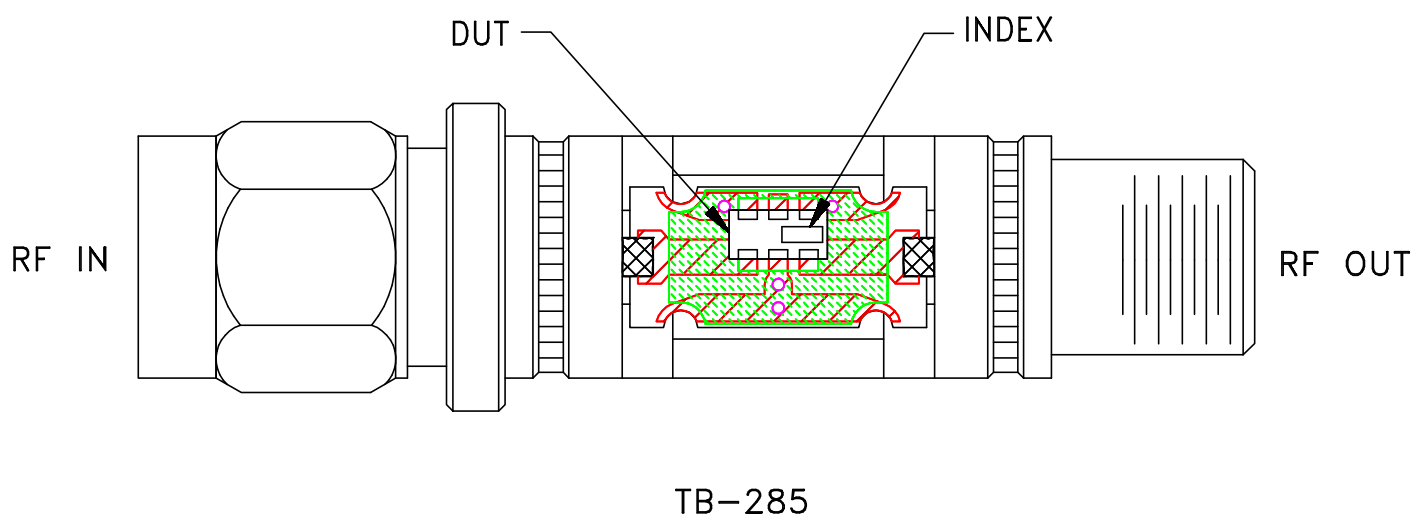
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FILE: 98PL158

SCALE: 12:1

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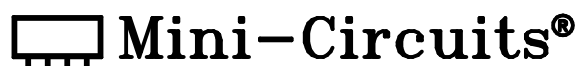
Evaluation Board and Circuit



Schematic Diagram

Notes:

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





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