



Mini-Circuits

CERAMIC

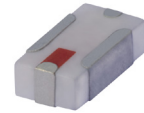
High Pass Filter

HFCN-9700+

50Ω 9700 to 16980 MHz

THE BIG DEAL

- Small size (0.12 x 0.06 x .04")
- Temperature stable
- Excellent power handling, 7W
- Hermetically sealed
- Low cost



Generic photo used for illustration purposes only

CASE STYLE: FV1206-4

+RoHS Compliant

The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

APPLICATIONS

- Electronic warfare exciters and receivers
- Sub-harmonic rejection
- Transmitters/receivers
- Lab use

PRODUCT OVERVIEW

New High Pass Filter HFCN-9700+ is an LTCC based filter, that extends the upper frequency cutoff range of the existing HFCN series to 9.7 GHz. Systems that previously relied on large distributed filter elements to support these lower frequencies can save space and system complexity by integrating the HFCN-9700+ into new designs. These filters are offered in a EIA 1206 package size and have a typical stop band rejection of 32 dB.

KEY FEATURES

Feature	Advantages
Small Size	Available in the size of typical resistors or capacitors (EIA 1206), the ultra small HFCN series integrates an entire high pass filter into a simple SMT chip form factor.
High Power Handling	The HFCN series can withstand up to 7W CW signal without damage making this filter ideal for use in medium power to transmit paths.
Temperature Stability	Over a 155°C operating temperature range (-55°C to +100°C), the HFCN series ceramic filters typically exhibit low pass band insertion loss variation.
High Rejection	Achieving 32dB rejection from DC-6770 MHz; the HFCN-9700+ provides a versatile high pass configuration for many up converter applications.

REV. A
ECO-012120
HFCN-9700+
AD/CP/AM
220302





CERAMIC

High Pass Filter

HFCN-9700+

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

Parameter	F#	Frequency (MHz)	Min.	Typ.	Max.	Units
Stop Band	DC-F1	DC - 6770	25	32	—	dB
	F1-F2	DC - 7550	18	27	—	
	Freq. Cut-Off	F3	—	3.0	—	dB
	VSWR	DC-F2	—	20	—	:1
Pass Band	Insertion Loss ³	F4-F7	—	1.0	3.0	dB
		F5-F6	—	0.8	2.0	dB
	VSWR	F4-F7	—	1.8	—	:1

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

2. Measured on Mini-Circuits Characterization Test Board TB-860+.

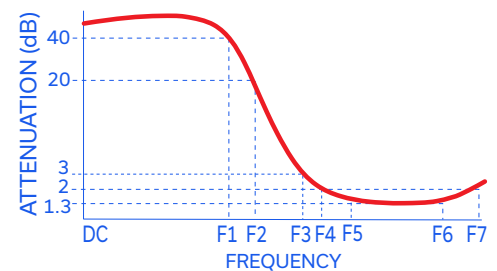
3. Referenced to mid-band loss, 1 dB typ.

MAXIMUM RATINGS

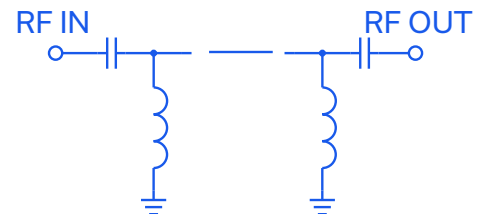
Parameter	Ratings
Operating temperature	-55°C to +100°C
Storage temperature	-55°C to +100°C
RF Power Input ³	7W max. at 25°C

3. 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

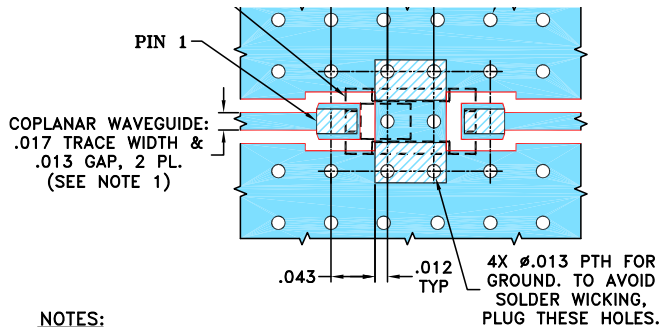
HFCN-9700+

PIN CONNECTIONS

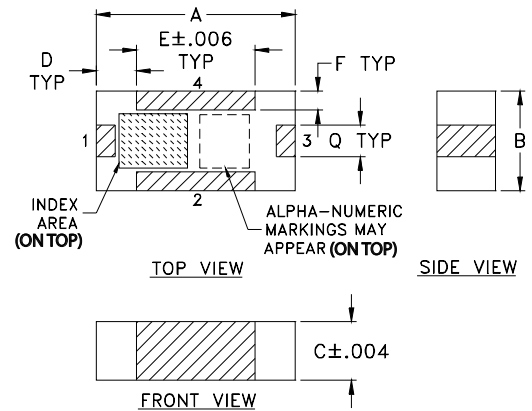
RF IN	1
RF OUT	3
GROUND	2,4

PRODUCT MARKING: EE

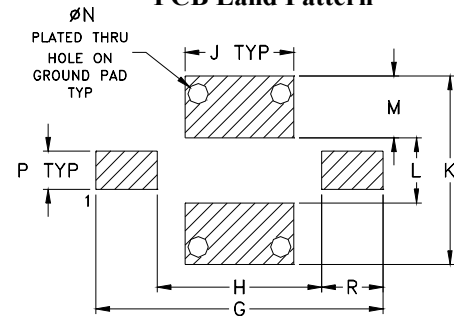
DEMO BOARD MCL P/N: TB-860+
SUGGESTED PCB LAYOUT (PL-487)



OUTLINE DRAWING



PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.002

OUTLINE DIMENSIONS (Inches mm)

A	B	C	D	E	F	G	H	J
.126	.063	.037	.026	.075	.012	.182	.104	.069
3.20	1.60	0.94	0.66	1.91	0.30	4.62	2.64	1.75
K	L	M	N	P	Q	R	wt	
.119	.041	.039	.013	.024	.020	.039	grams	
3.02	1.04	0.99	0.33	0.61	0.51	0.99	.020	

TAPE & REEL INFORMATION: F75



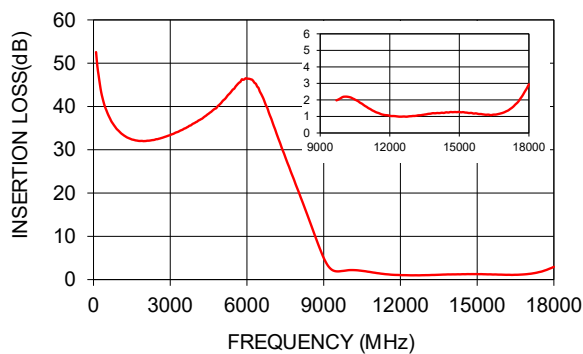
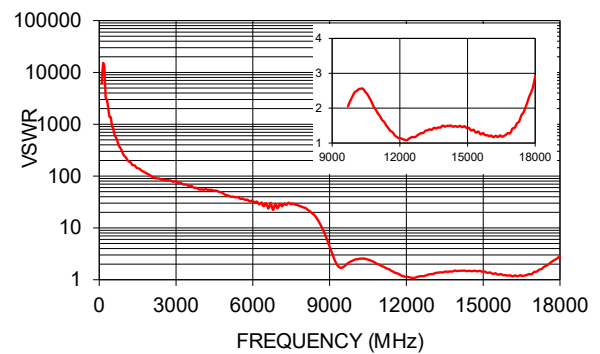
CERAMIC

High Pass Filter

HFCN-9700+

TYPICAL PERFORMANCE DATA AT 25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR :1
100	52.56	6169.40
500	39.17	922.97
1000	34.27	239.27
2000	32.01	101.87
3000	33.40	78.91
4000	36.36	55.49
5500	44.10	36.67
6500	43.49	30.11
6800	39.61	22.26
7550	27.48	29.33
9100	3.85	3.21
9700	1.98	2.05
11500	1.21	1.42
13000	1.03	1.29
15000	1.27	1.43
16500	1.11	1.20
17000	1.30	1.42
18000	2.95	2.91

HFCN-9700+
INSERTION LOSSHFCN-9700+
VSWR

NOTES

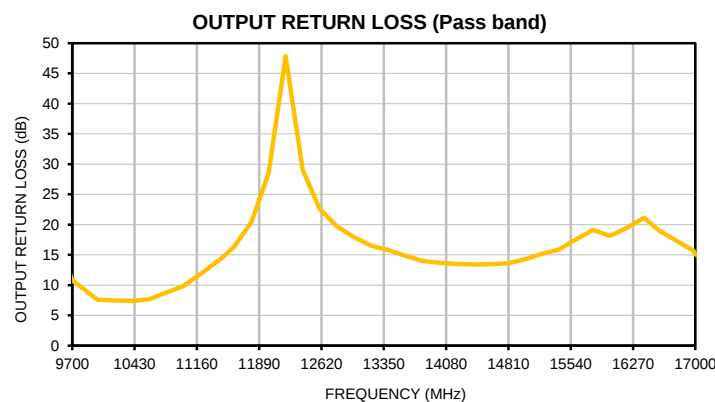
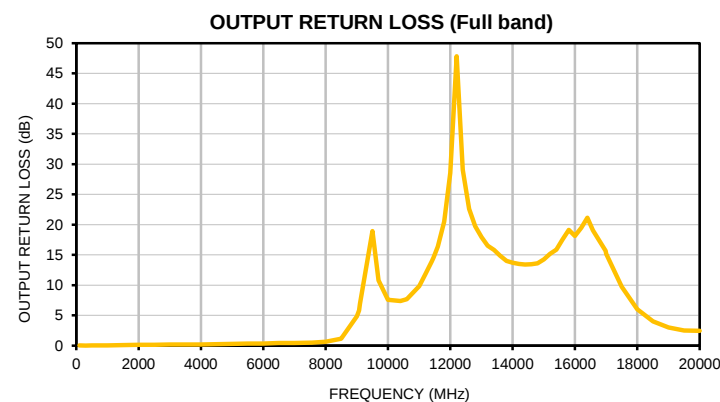
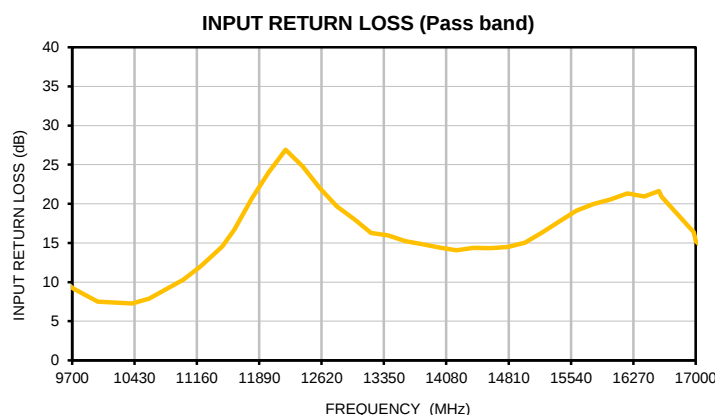
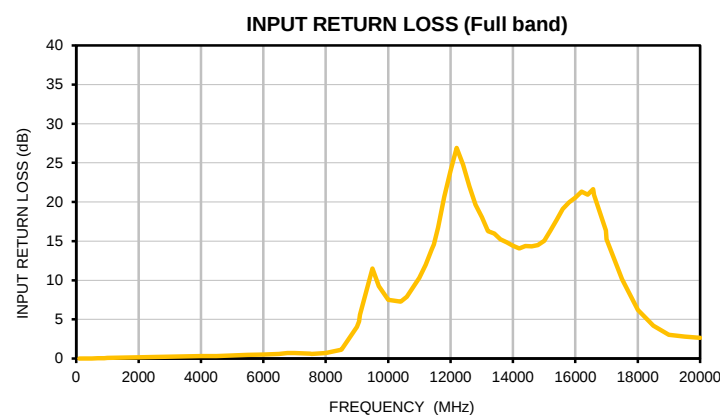
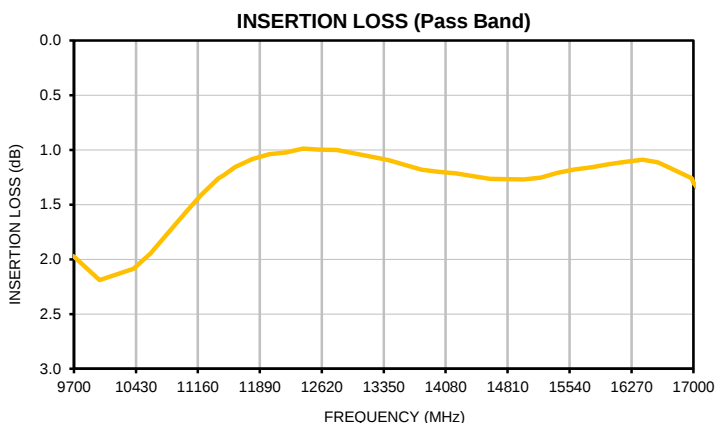
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Typical Performance Data

FREQUENCY (MHz)	INSERTION LOSS (dB)	INPUT RETURN LOSS (dB)	OUTPUT RETURN LOSS (dB)
100	52.56	0.00	0.02
300	43.30	0.01	0.01
500	39.17	0.02	0.02
700	36.55	0.04	0.03
900	34.85	0.06	0.05
1000	34.27	0.07	0.06
1500	32.38	0.12	0.10
2000	32.01	0.17	0.14
2500	32.44	0.20	0.17
3000	33.40	0.22	0.17
3500	34.70	0.27	0.19
4000	36.36	0.31	0.20
4500	38.33	0.33	0.23
5000	40.88	0.41	0.27
5500	44.10	0.47	0.32
6000	46.44	0.53	0.36
6500	43.49	0.58	0.42
6770	40.16	0.70	0.43
7000	36.32	0.69	0.45
7500	28.28	0.61	0.47
7550	27.48	0.59	0.48
8000	20.59	0.71	0.63
8500	12.73	1.14	1.14
9000	5.01	4.06	4.88
9070	4.40	4.75	5.80
9100	3.85	5.60	6.94
9500	1.91	11.51	18.94
9700	1.98	9.24	10.78
10000	2.19	7.51	7.60
10400	2.09	7.27	7.37
10600	1.95	7.87	7.69
11000	1.58	10.31	9.84
11200	1.41	11.97	11.78
11400	1.26	13.95	13.94
11460	1.23	14.59	14.55
11600	1.16	16.76	16.39
11800	1.08	20.62	20.48
12000	1.04	24.00	28.53
12200	1.02	26.91	47.84
12400	0.99	24.78	29.11
12600	1.00	21.97	22.62
12800	1.00	19.66	19.75
13000	1.03	18.07	17.94
13200	1.06	16.27	16.54
13400	1.09	15.96	15.84
13600	1.14	15.24	14.88
13800	1.18	14.85	14.03
14000	1.20	14.40	13.69
14200	1.21	14.06	13.52
14400	1.24	14.39	13.39
14600	1.26	14.34	13.47
14800	1.27	14.50	13.62
15000	1.27	15.04	14.26
15200	1.25	16.31	15.15
15400	1.21	17.71	15.90
15600	1.18	19.11	17.55
15800	1.16	19.98	19.14
16000	1.13	20.54	18.14
16200	1.11	21.34	19.49
16400	1.09	20.93	21.16
16570	1.11	21.63	19.07
16600	1.12	20.88	18.82
16980	1.26	16.36	15.69
17000	1.30	15.22	15.17
17500	1.83	10.15	9.76
18000	2.95	6.23	6.05
18500	4.33	4.19	4.03
19000	5.71	3.04	3.00
19500	6.92	2.81	2.52
20000	8.78	2.66	2.44

Typical Performance Curves



Sheet 4 of 8

DEVICE ORIENTATION IN T&R

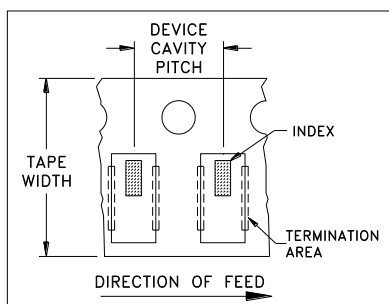


ILLUSTRATION 1

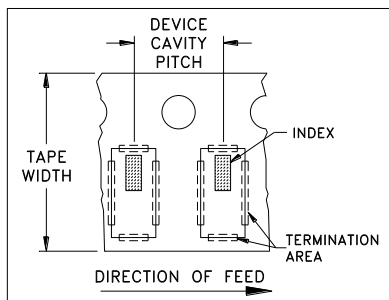


ILLUSTRATION 2

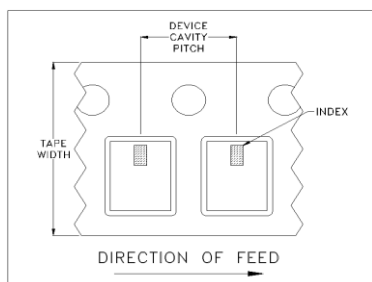


ILLUSTRATION 3

Applicable Case Styles

FV1206-1
FV1206-3

Applicable Case Styles

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

Applicable Case Styles

FV1206-12
GE0805C-18
NL1008C-6
NL1008C-7
NL1008C-9
NL1008C-10

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

Mini-Circuits ISO 9001 & ISO 14001 Certified

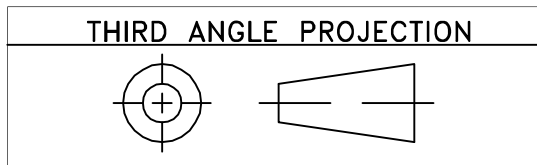
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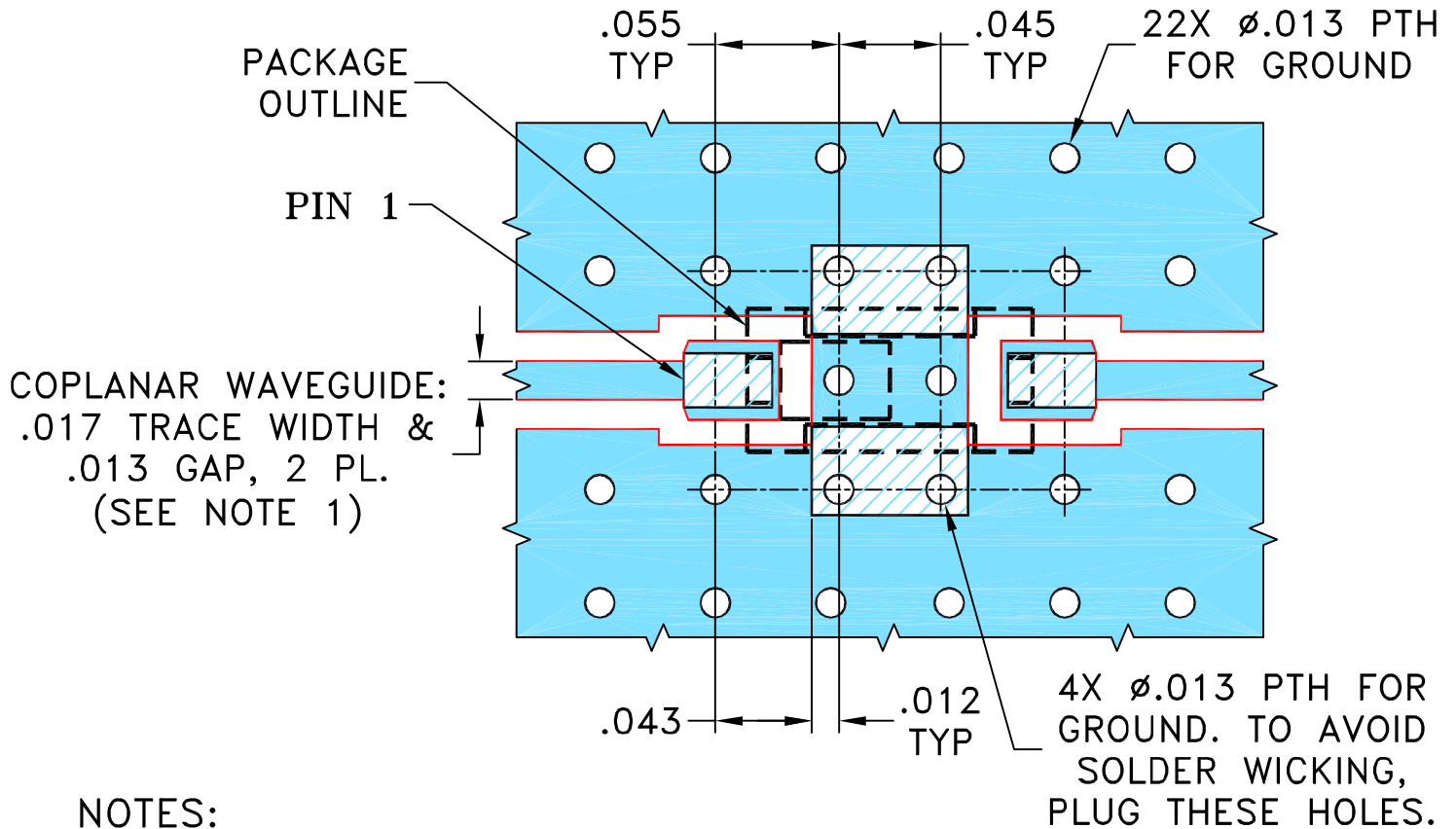
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REVISIONS					
REV OR	ECN No.	DESCRIPTION	DATE	DR	AUTH
	M158043	NEW RELEASE	09/28/16	CA	ZL

**SUGGESTED MOUNTING CONFIGURATION
FOR FV1206-4 CASE STYLE, "04FL01" PIN CODE**

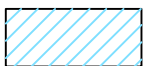


NOTES:

1. TRACE WIDTH AND GAP ARE SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS .010" $\pm$.001".
COPPER: 1/2 OZ. EACH SIDE.
FOR OTHER MATERIALS TRACE WIDTH AND 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

UNLESS OTHERWISE SPECIFIED	INITIALS	DATE
DIMENSIONS ARE IN INCHES	DRAWN CA	09/23/16
TOLERANCES ON:	CHECKED IL	09/27/16
2 PL DECIMALS $\pm$	APPROVED ZL	09/28/16
3 PL DECIMALS $\pm$.005		
ANGLES $\pm$		
FRACTIONS $\pm$		



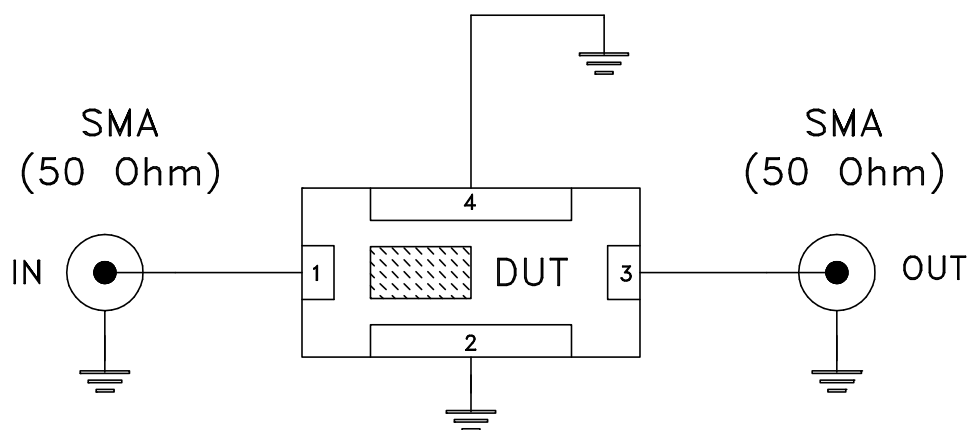
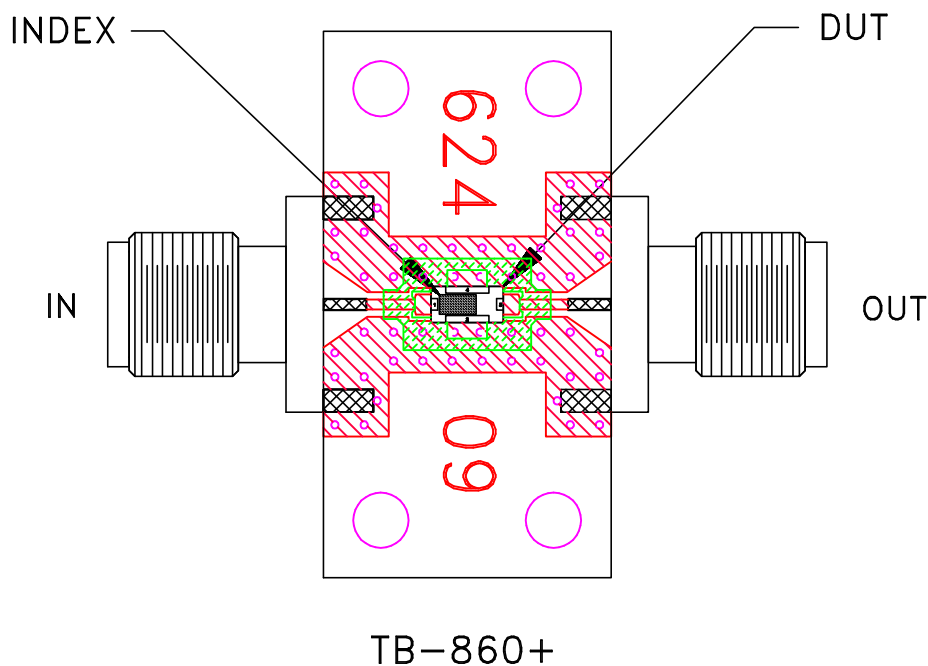
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PL, 04FL01, FV1206-4, TB-860+

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SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-487	OR
FILE:	98PL487	SCALE:	12:1
		SHEET:	1 OF 1

Evaluation Board and Circuit



Schematic Diagram

Notes:

1. 50 Ohm SMA Female connectors.
2. PCB Material: R04350 or equivalent,
Dielectric Constant=3.5, Thickness=.010 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