CERAMIC

Low Pass Filter

LFCN-320D+

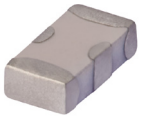
50Ω DC to 320 MHz

FEATURES

- Excellent power handling, 8.5W
- Small size
- 7 sections
- Temperature stable
- LTCC construction
- Protected by U.S Patent 6,943,646

APPLICATIONS

- Harmonic rejection
- VHF/UHF transmitters/receivers



Generic photo used for illustration purposes only

CASE STYLE: FV1206

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

ELECTRICAL SPECIFICATIONS[1,2] AT 25°C

Parameter		F#	Frequency (MHz)	Min.	Typ.	Max.	Units
Passband	Insertion Loss	DC-F1	DC-320	—	—	1.0	dB
	Freq. Cut-Off	F2	460	—	3.0	—	dB
	VSWR	DC-F1	DC-320	—	1.2	—	:1
Stop Band	Rejection Loss	F3	610	20	—	—	dB
		F4-F5	640-2500	—	30	—	
		F6	5300	—	20	—	
	VSWR	F3-F6	580-5300	—	20	—	:1

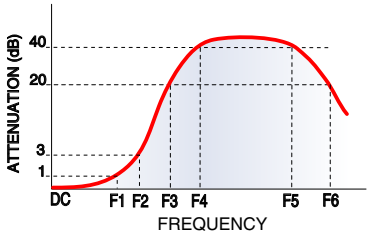
1. DC Resistance to ground is 100 Mohms min.
2. Measured on Mini-Circuits Characterization Test Board TB-270.

ABSOLUTE MAXIMUM RATINGS

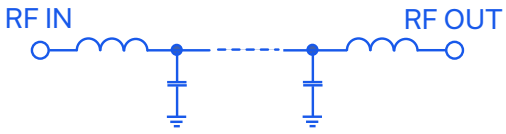
Parameter	Ratings
Operating temperature	-55°C to 100°C
Storage temperature	-55°C to 100°C
RF Power Input[3]	8.5 W max. at 25°C
Max. DC Voltage at pins 1&3	25 VDC
DC Current Input to Output	0.5A max. at 25°C

3. 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



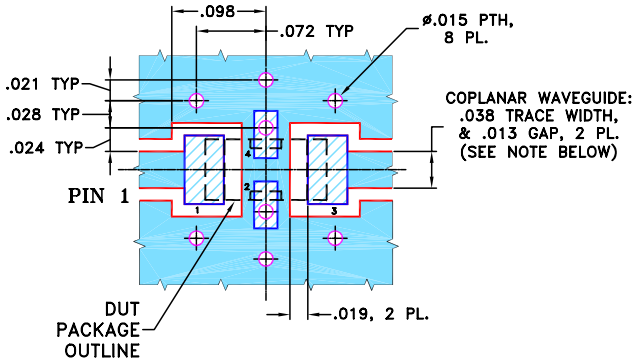
REV. O
ECO-023234
LFCN-320D+
MCL NY
241010

PIN CONNECTIONS

RF IN	1
RF OUT	3
GROUND	2,4

PRODUCT MARKING: RT

DEMO BOARD MCL P/N: TB-270
SUGGESTED PCB LAYOUT (PL-137)

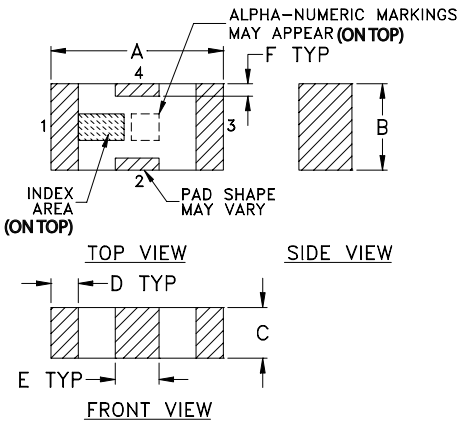


NOTES:
1. COPLANAR WAVEGUIDE PARAMETERS ARE SHOWN FOR ROGERS RO4350B WITH THICKNESS .020" ± .0015". COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH & GAP MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

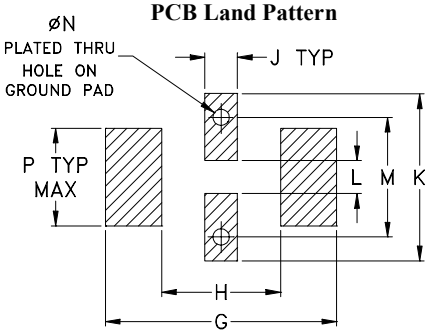
DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)

DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

OUTLINE DRAWING



PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.002

OUTLINE DIMENSIONS (Inches / mm)

A	B	C	D	E	F	G
.126	.063	.037	.020	.032	.009	.169
3.20	1.60	0.94	0.51	0.81	0.23	4.29

H	J	K	L	M	N	P	wt
.087	.024	.122	.024	.087	.012	.071	grams
2.21	0.61	3.10	0.61	2.21	0.30	1.80	.020

TAPE & REEL INFORMATION: F71

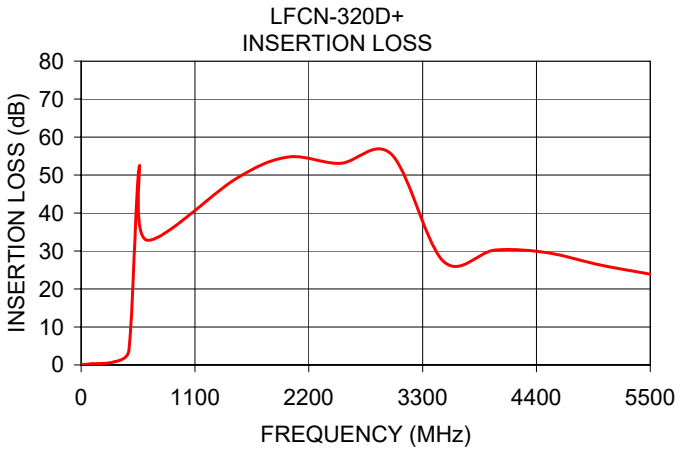
CERAMIC

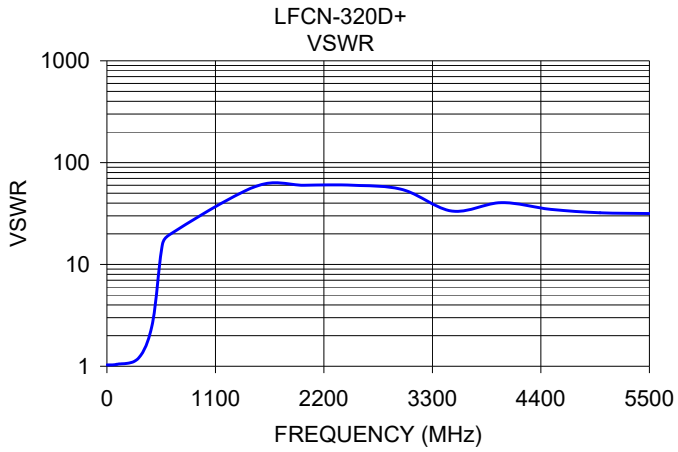
Low Pass Filter

LFCN-320D+

TYPICAL PERFORMANCE DATA AT 25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)
1.00	0.11	1.03
100.00	0.29	1.05
320.00	0.81	1.20
460.00	3.65	2.59
560.00	51.87	15.13
640.00	32.82	19.76
1500.00	49.10	57.91
2000.00	54.73	59.91
2500.00	53.07	59.91
3000.00	55.47	54.29
3500.00	27.30	33.42
4000.00	30.27	40.41
4500.00	29.58	34.75
5000.00	26.42	32.18
5500.00	23.89	31.60





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/terms/viewterm.html

Ceramic Low Pass Filter LFCN-320D+

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
1	0.04	0.09	0.11	41.09	40.09	39.00	41.56	40.09	39.80
50	0.17	0.22	0.24	32.50	31.12	30.12	32.00	30.63	29.63
100	0.24	0.30	0.33	31.68	31.02	30.51	29.46	28.67	28.17
320	0.64	0.78	0.89	23.41	23.46	23.42	22.63	22.61	22.46
360	0.82	0.99	1.15	19.05	18.69	18.27	18.76	18.42	18.01
460	2.15	2.60	3.05	9.74	9.35	8.96	12.04	12.31	12.71
470	2.47	2.99	3.53	9.00	8.61	8.20	12.33	12.96	13.82
495	3.94	4.86	5.87	6.49	6.02	5.54	13.49	14.75	15.55
520	8.37	10.06	11.90	3.13	2.95	2.78	7.23	7.15	6.88
535	13.33	15.40	17.61	1.93	1.96	1.97	4.44	4.55	4.55
545	17.48	19.74	22.15	1.50	1.61	1.67	3.41	3.60	3.71
560	24.86	27.43	30.17	1.17	1.31	1.42	2.55	2.79	2.96
580	37.88	40.10	41.33	0.97	1.12	1.23	1.99	2.25	2.44
600	42.82	42.31	42.23	0.86	1.01	1.12	1.70	1.95	2.15
640	48.40	48.87	48.59	0.73	0.87	0.98	1.39	1.63	1.83
755	37.42	37.71	37.93	0.53	0.66	0.76	0.96	1.15	1.32
975	61.57	61.06	59.45	0.35	0.46	0.56	0.49	0.62	0.73
1100	46.72	46.62	46.48	0.28	0.39	0.49	0.37	0.48	0.57
1235	44.29	44.49	44.70	0.25	0.36	0.46	0.28	0.37	0.45
1500	47.98	48.50	48.97	0.18	0.29	0.39	0.20	0.29	0.35
1880	67.81	67.48	65.94	0.16	0.27	0.37	0.15	0.23	0.29
2000	61.46	62.06	61.19	0.16	0.26	0.36	0.14	0.22	0.28
2500	52.17	53.58	54.51	0.19	0.28	0.37	0.11	0.19	0.25
3000	50.38	48.03	46.26	0.18	0.30	0.39	0.08	0.20	0.28
3500	40.75	40.54	40.55	0.16	0.29	0.40	0.03	0.15	0.26
4080	23.51	25.89	27.39	0.53	0.52	0.60	0.56	0.43	0.47
4500	29.46	29.60	29.73	0.26	0.41	0.58	0.12	0.25	0.42
5000	27.81	27.88	28.32	0.32	0.48	0.68	0.20	0.35	0.52
5300	25.11	25.47	25.61	0.42	0.56	0.80	0.21	0.36	0.54
6000	24.74	24.68	24.49	0.48	0.69	0.89	0.27	0.46	0.65
6500	22.88	22.98	22.93	0.50	0.70	0.91	0.27	0.42	0.60
7000	20.17	20.97	21.46	0.70	0.79	1.02	0.35	0.48	0.66
7500	20.69	20.65	20.54	0.70	0.87	1.09	0.33	0.52	0.68
8000	18.94	19.58	19.90	0.89	1.03	1.10	0.41	0.56	0.71
8500	17.68	18.01	18.62	0.96	1.14	1.34	0.35	0.51	0.66
9000	16.41	16.72	16.90	1.01	1.33	1.57	0.29	0.54	0.72
9500	15.62	15.77	15.75	0.65	1.03	1.38	0.32	0.60	0.86
10000	14.83	14.92	14.89	0.92	1.36	1.79	0.50	0.87	1.25
12000	25.09	24.18	23.88	3.37	3.78	3.92	3.69	3.77	3.97
14000	8.13	9.05	8.88	7.76	7.44	7.39	4.58	4.19	4.51
16000	12.52	13.76	14.23	4.40	5.40	6.98	2.89	3.45	3.81

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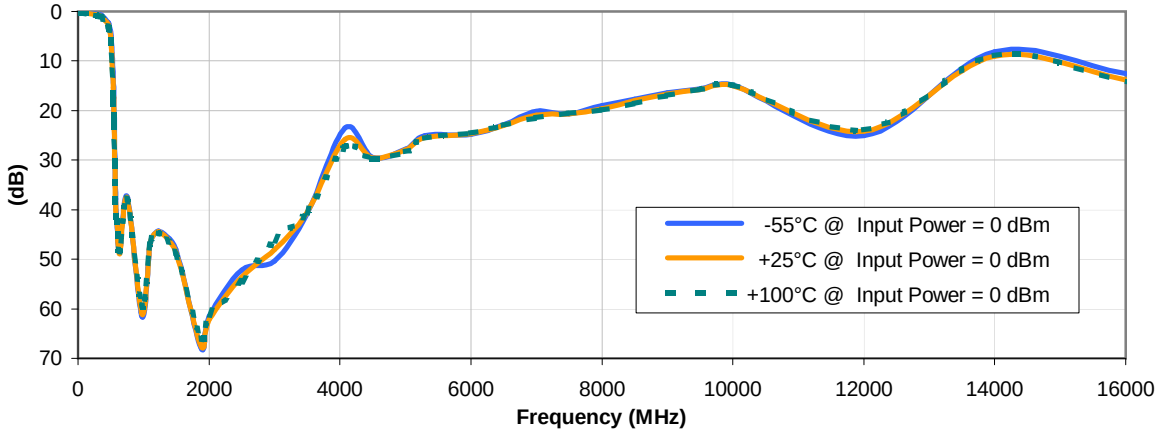
The Design Engineers Search Engine finds the model you need, Instantly • For detailed performance specs & shopping online see minicircuits.com

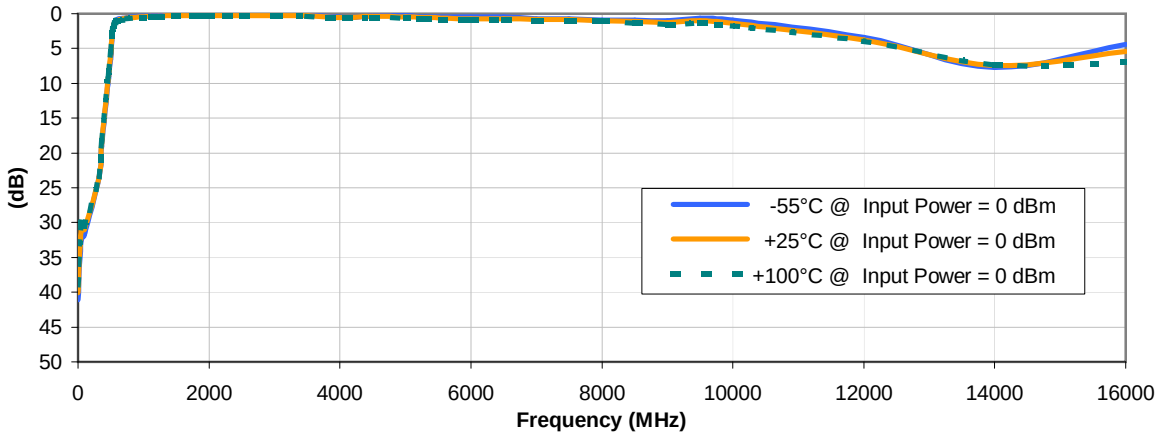
Ceramic Low Pass Filter LFCN-320D+

Typical Performance Curves

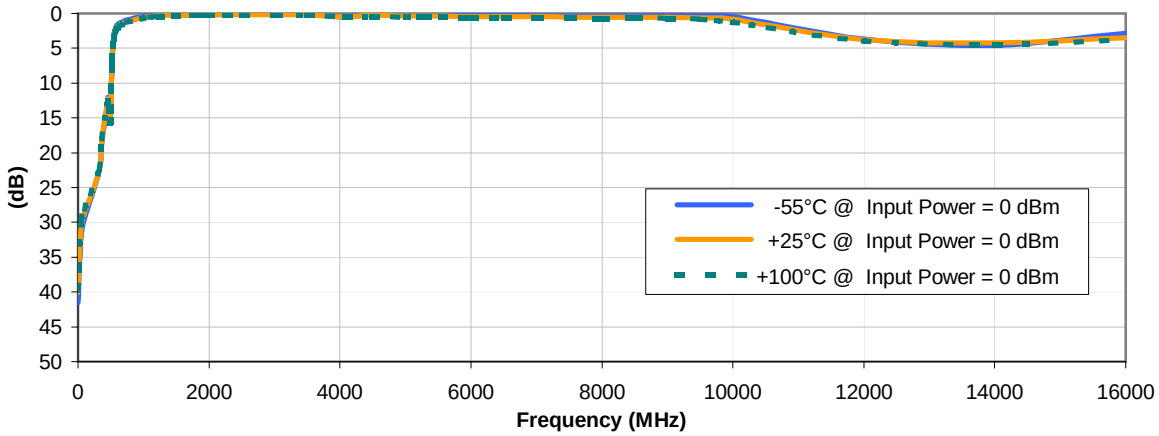
INSERTION LOSS vs. TEMPERATURE



INPUT RETURN LOSS vs. TEMPERATURE



OUTPUT RETURN LOSS vs. TEMPERATURE



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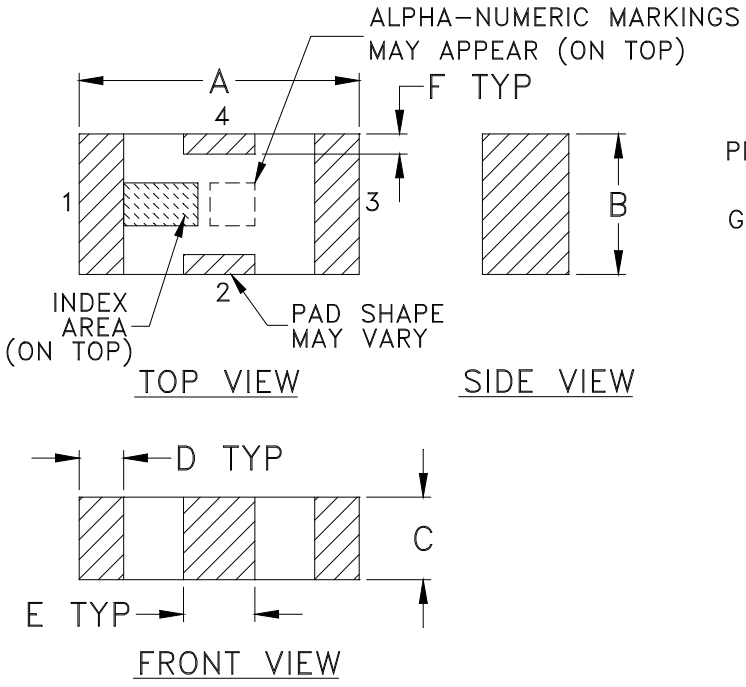
The Design Engineers Search Engine finds the model you need, Instantly • For detailed performance specs & shopping online see minicircuits.com

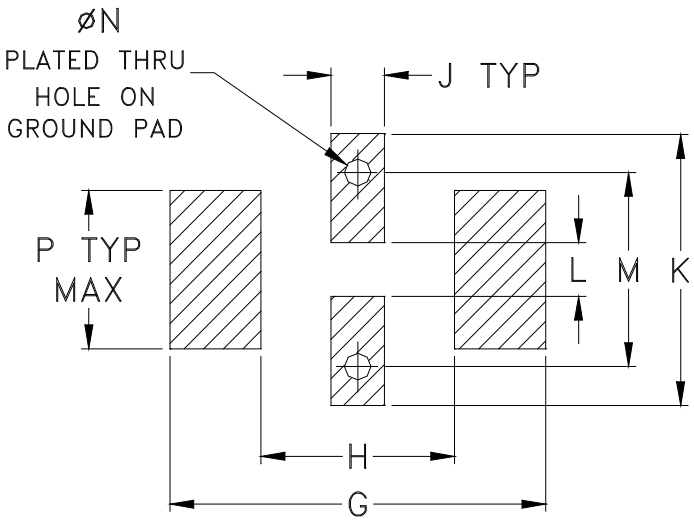
Case Style FV

FV1206

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	.126 (3.20)	.063 (1.60)	.037 (0.94)	.020 (0.51)	.032 (0.81)	.009 (0.23)	.169 (4.29)	.087 (2.21)	.024 (0.61)	.122 (3.10)	.024 (0.61)	.087 (2.21)	.012 (0.30)	.071 (1.80)	.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.

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Tape & Reel Packaging TR-F71

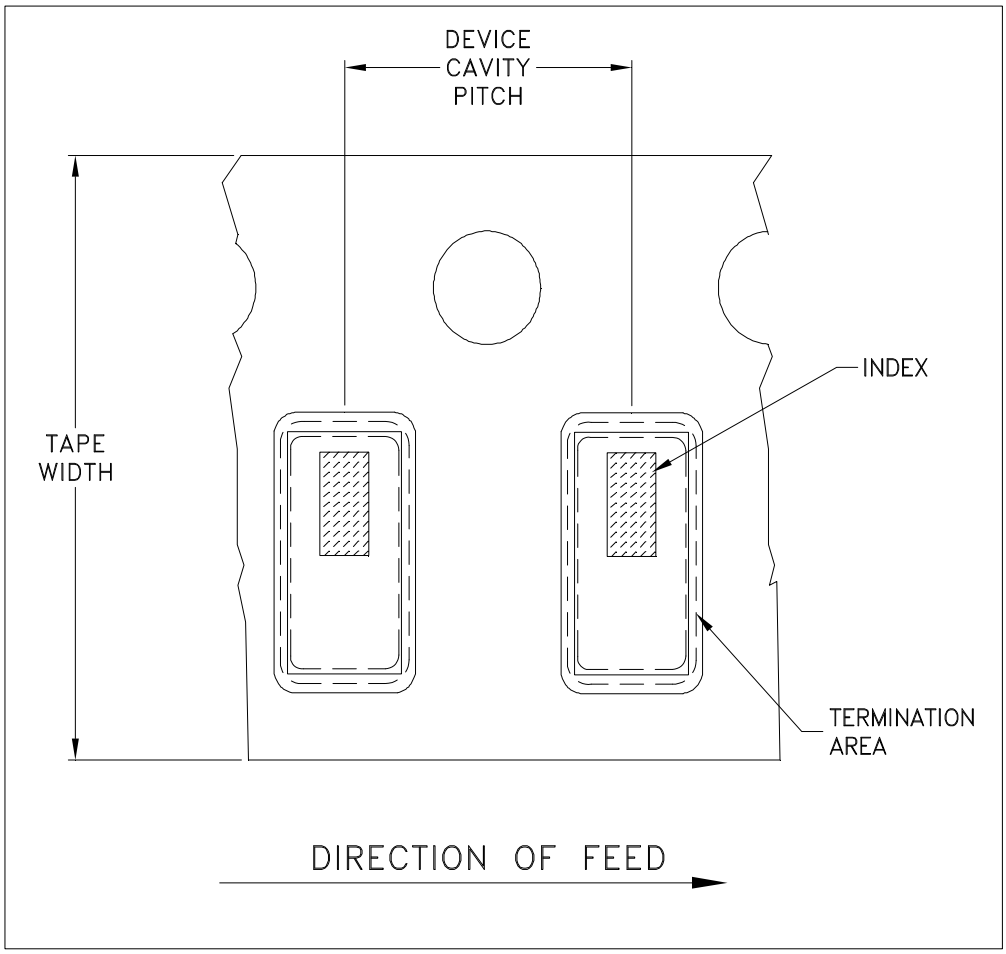

ILLUSTRATION 1

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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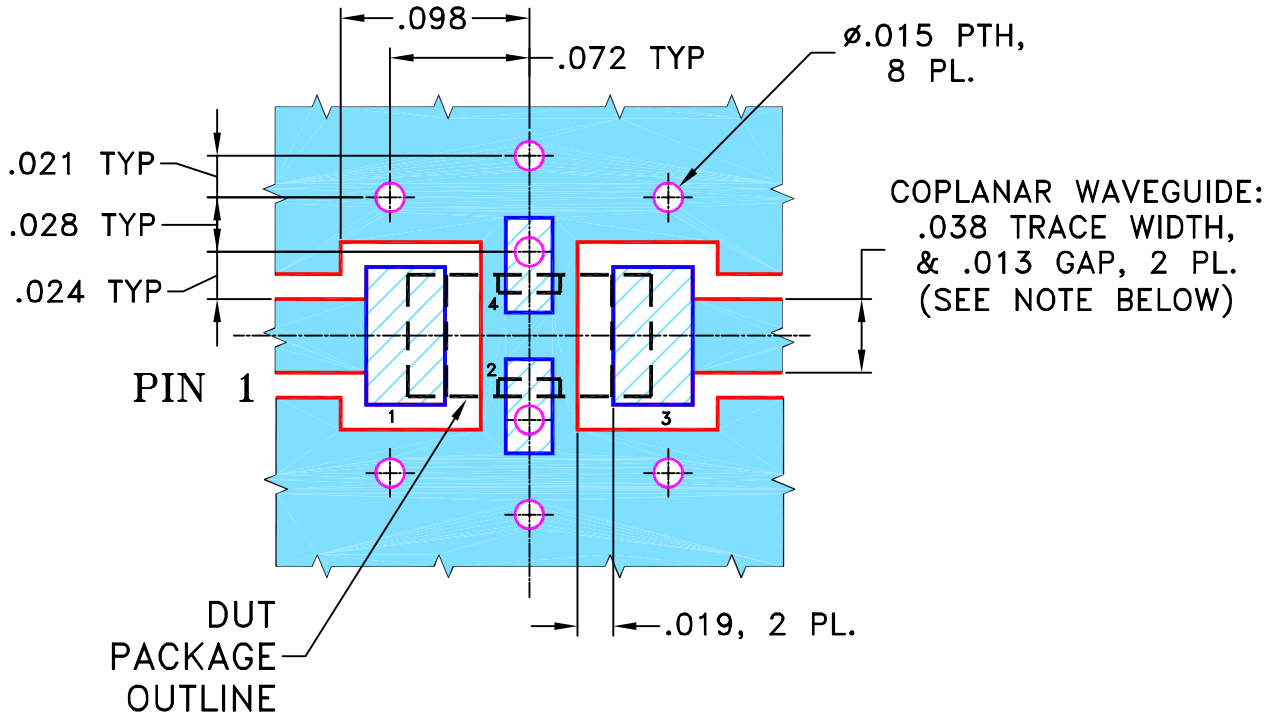
THIRD ANGLE PROJECTION

REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M88634	NEW RELEASE	08/28/03	GF	ABD
A	M102713	ADDED "...WITH SMOBC"	01/17/06	MMG	IL

SUGGESTED MOUNTING CONFIGURATION FOR FV1206 CASE STYLE, "nx" PIN CONNECTION



NOTES:
1. COPLANAR WAVEGUIDE PARAMETERS ARE SHOWN FOR ROGERS RO4350B WITH THICKNESS .020" ± .0015".
   COPPER: 1/2 OZ. EACH SIDE.
   FOR OTHER MATERIALS TRACE WIDTH & 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	GF	08/27/03
TOLERANCES ON:	CHECKED	AV	08/28/03
2 PL DECIMALS ±	APPROVED	ABD	08/28/03
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

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

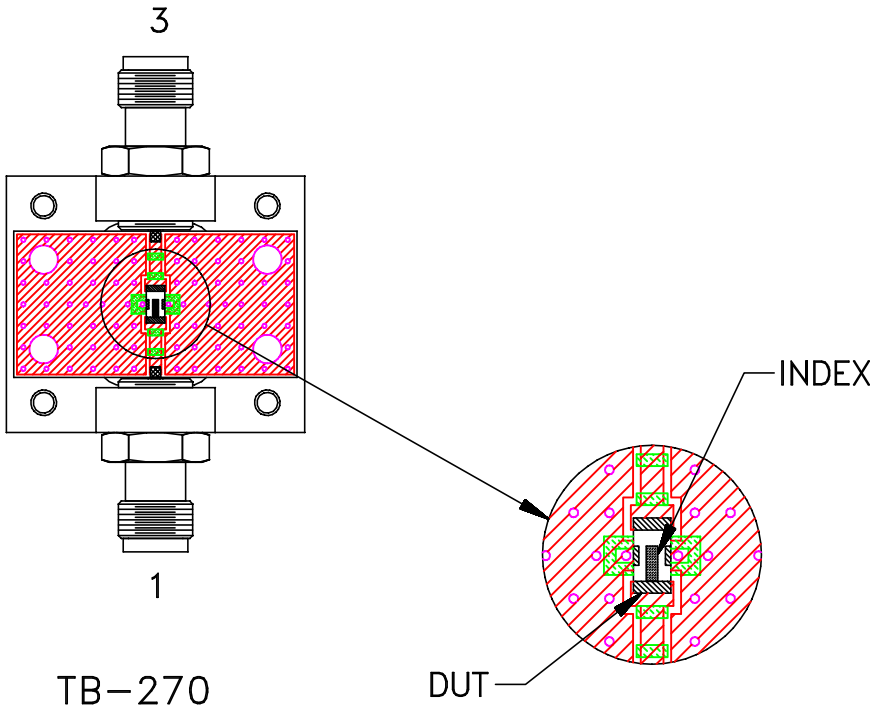
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

PL, nx, FV1206, LFCN/HFCN, TB-270

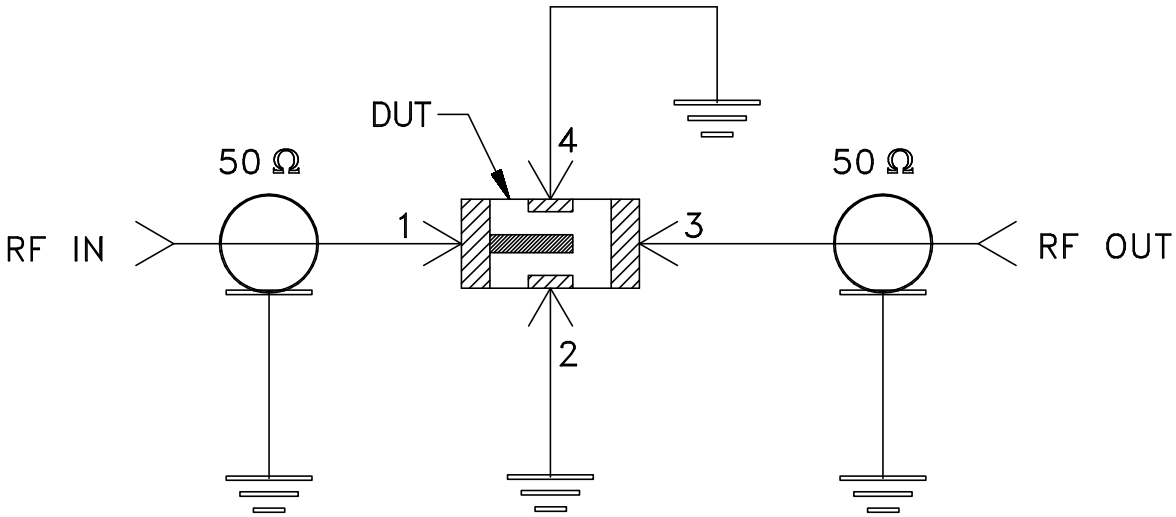
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-137	A

FILE:	SCALE:	SHEET:
98PL137	10:1	1 OF 1

Evaluation Board and Circuit



TB-270



Schematic Diagram

Notes:

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

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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

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