

Ceramic Low Pass Filter

LFCN-2952+

50Ω

DC to 29500 MHz



Generic photo used for illustration purposes only
CASE STYLE: FV1206-11

The Big Deal

- Good rejection, 40 dB typical
- Rugged, ceramic construction
- Small size, 3.2mm X 1.6mm (1206)
- LTCC Low pass filter at mm wave frequency

Product Overview

Mini-Circuits' LFCN-2952+ is an LTCC low pass filter with a passband from DC to 29500 MHz, supporting a variety of applications. This model provides 1.4 dB typical passband insertion loss and provides a very good stopband rejection due to strategically constructed layout with minimal interaction between components. It handles up to 1W RF input power and provides a wide operating temperature range from -55 to +125°C. Housed in a small 1206 ceramic form factor, the filter is ideal for dense PCB layouts and with minimal performance variation due to parasitics.

Key Features

Feature	Advantages
Ultra-wide stopband	The LTCC lowpass filter provides a very good stopband rejection until 48 GHz suitable for high end applications.
LTCC Construction	Provides repeatable performance in a rugged, ceramic package well suited for tough environments such as high humidity and temperature extremes.
Small size 3.2mm X 1.6mm (1206)	Saves space in dense circuit board layouts and minimizes the effects of parasitics.

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



Low Pass Filter

50Ω

DC to 29500 MHz

LFCN-2952+



Generic photo used for illustration purposes only

CASE STYLE: FV1206-11

+RoHS Compliant

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

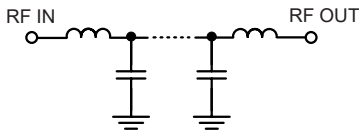
Features

- Low loss, 1.4 dB typical
- Good rejection 40 dB typical
- Good power handling, 1W
- Small size 3.2mm X 1.6mm (1206)
- Temperature stable
- LTCC construction

Applications

- 5G applications

Functional Schematic



Electrical Specifications^{1,2} at 25°C

Parameter	F#	Frequency (MHz)	Min.	Typ.	Max.	Unit
Pass Band	DC-F1	DC - 18000	—	0.7	1.2	dB
	F1-F2	18000 - 28000	—	1.4	2.1	dB
	F2-F3	28000 - 29500	—	1.4	—	dB
	F4	31000	—	3	—	dB
Stop Band	DC-F3	DC - 29500	—	12	—	dB
	F5-F6	36000 - 39000	20	30	—	dB
	F6-F7	39000 - 41000	25	33	—	dB
	F7-F8	41000 - 48000	30	42	—	dB

1 DC de-coupling capacitors are required in Applications where DC voltage and/or current is present at either input or output ports. Please contact Mini-Circuits for alternatives if DC pass from IN-OUT is required.

2 Measured on Mini-Circuits Characterization Test Board TB-LFCN-2952C+.

Maximum Ratings

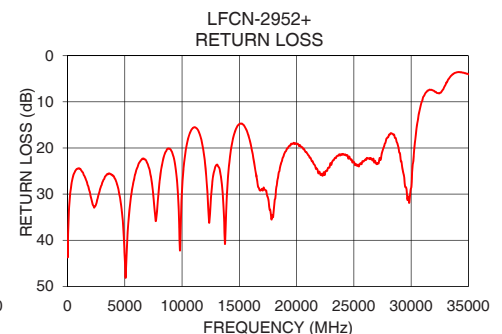
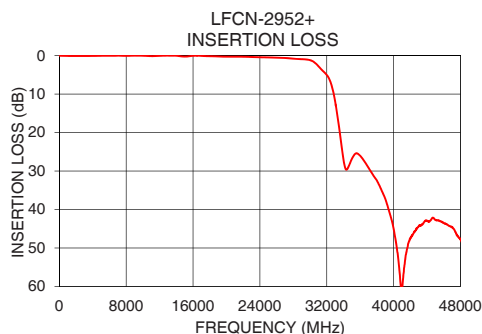
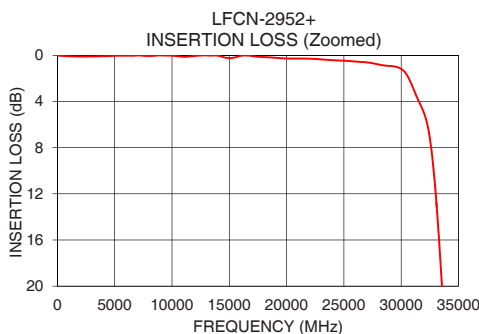
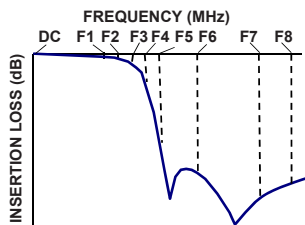
Operating Temperature	-55°C to 125°C
Storage Temperature	-55°C to 125°C
RF Power Input*	1W max. @25°C

Permanent damage may occur if any of these limits are exceeded.

Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	Return Loss (dB)
10	0.02	40.27
100	0.03	35.03
1000	0.08	24.39
10000	0.03	28.96
18000	0.15	33.62
25000	0.46	23.05
28000	0.79	17.66
29500	0.98	28.49
31000	2.74	9.47
31300	3.45	7.95
31800	4.54	7.40
33000	11.84	6.31
33600	20.63	4.06
36000	26.03	3.79
37500	30.87	3.10
39000	37.19	3.12
37500	30.87	3.10
39000	37.19	3.12
41000	60.64	3.30
48000	47.66	3.64

Typical Frequency Response



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

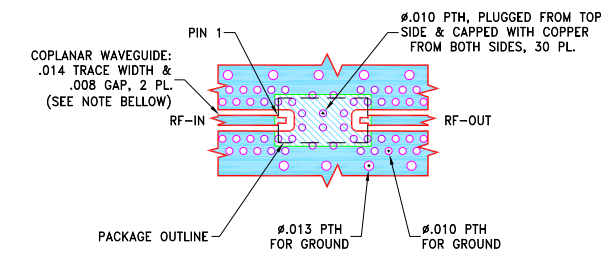


Pad Connections

INPUT	1
OUTPUT	2
GROUND	3

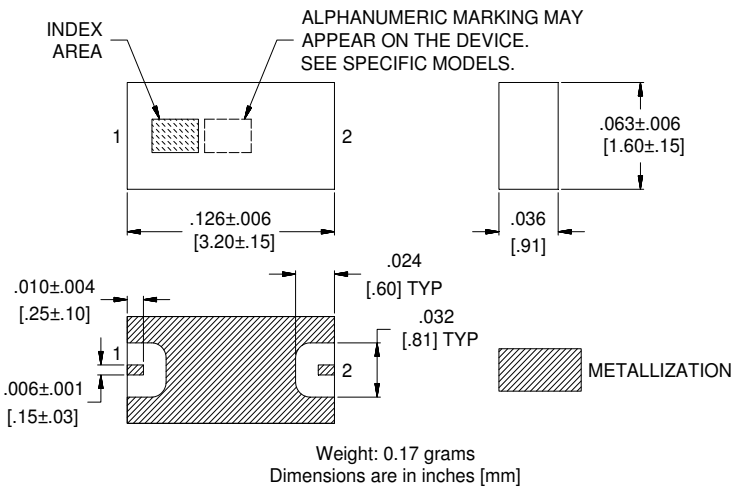
Product Marking: LV

Demo Board MCL P/N: TB-LFCN-2952C+
Suggested PCB Layout (PL-702)



- NOTES:
- TRACE WIDTH & GAP PARAMETERS ARE SHOWN FOR MEGTRON-7 R5785(N); DIELECTRIC THICKNESS: .0079±.001; COPPER: HVLP/HVLP, 1/2 Oz EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH & GAP MAY NEED TO BE MODIFIED.
 - 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



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.

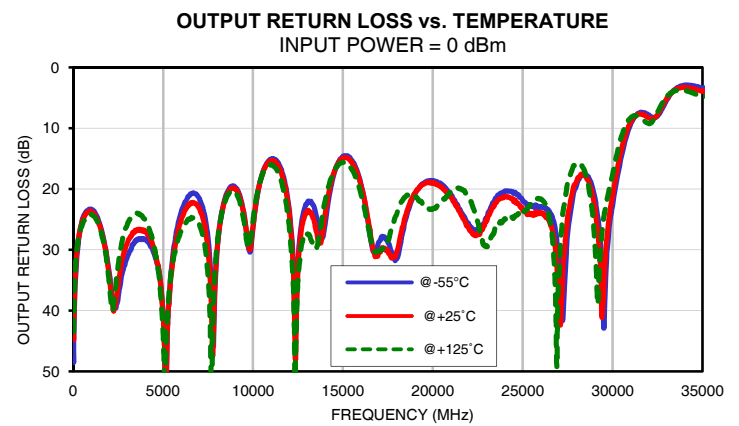
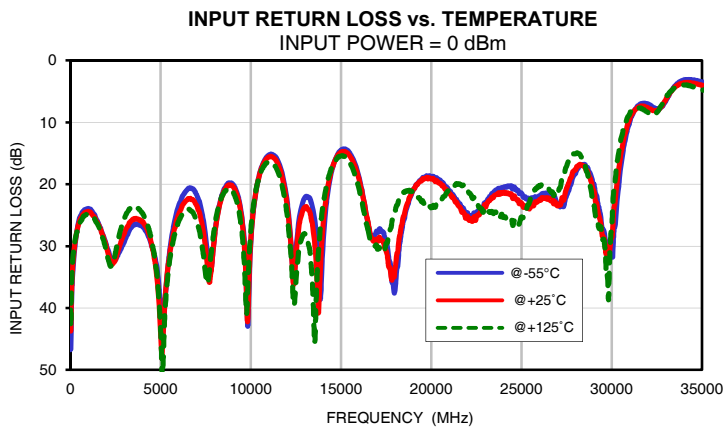
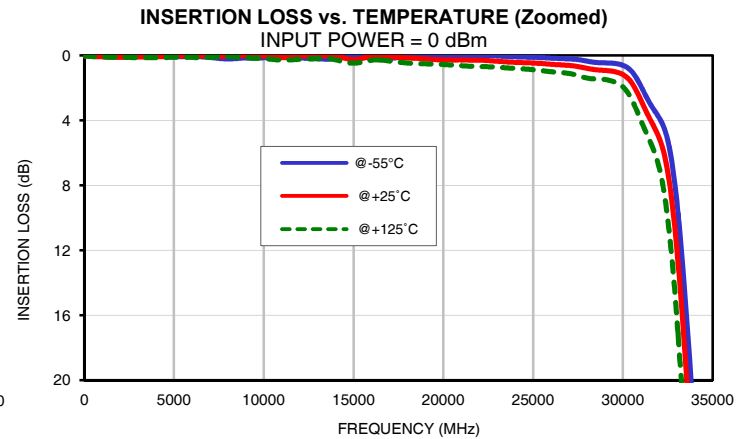
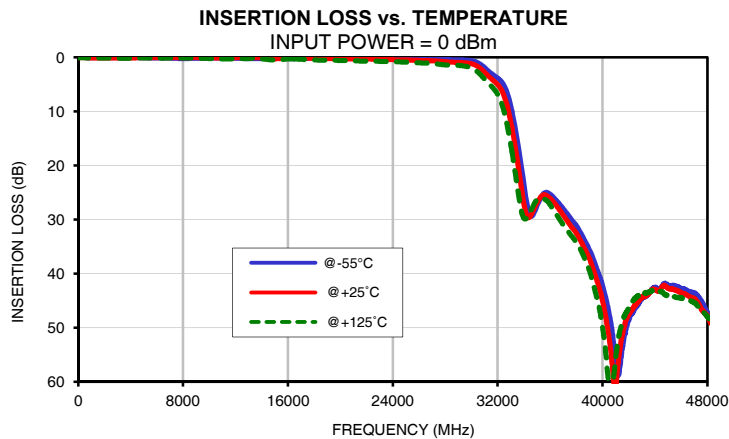
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.

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

Typical Performance Data

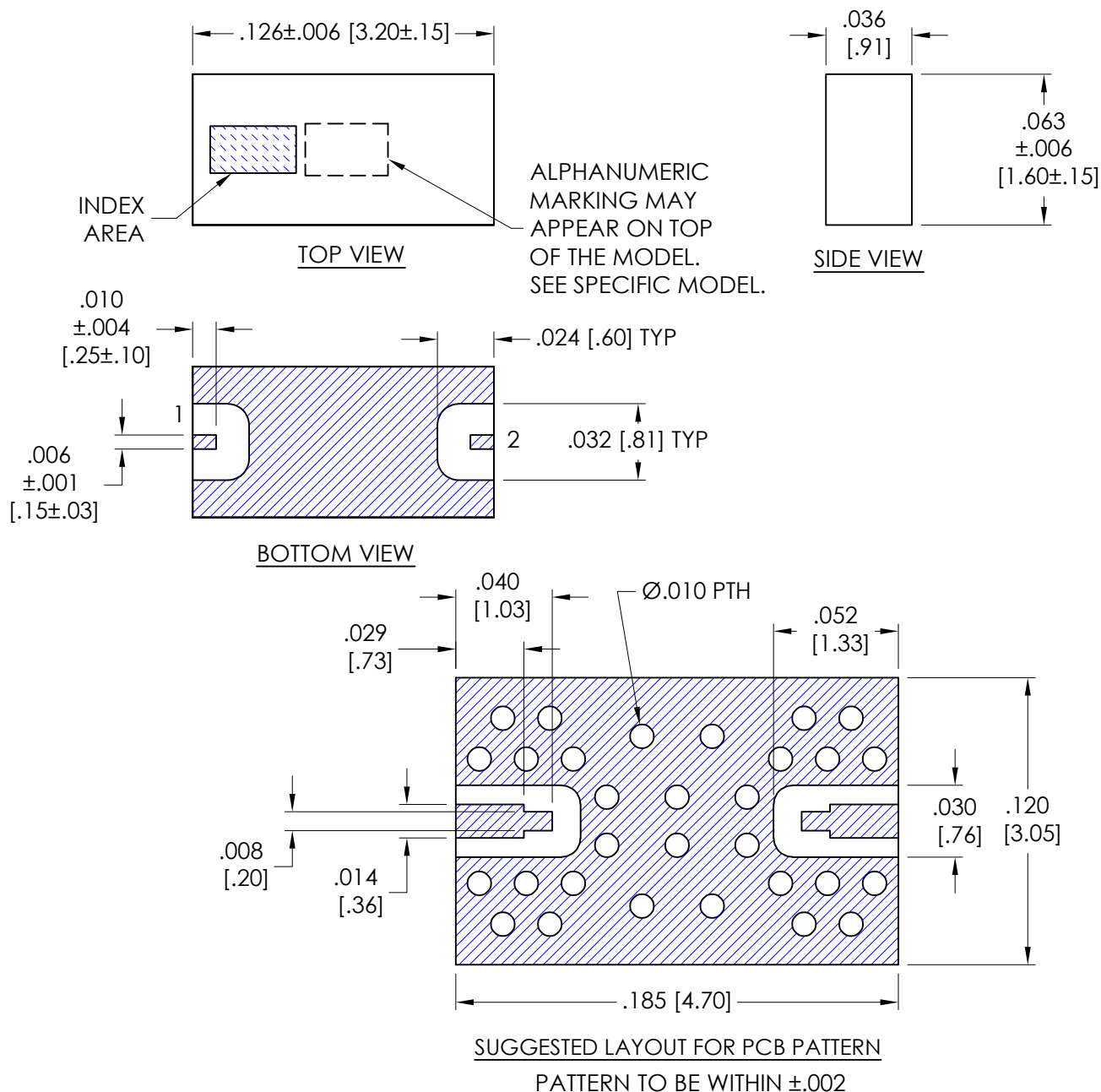
FREQ.	INSERTION LOSS			INPUT RETURN LOSS			OUTPUT RETURN LOSS		
(MHz)	(dB)			(dB)			(dB)		
	@-55°C	@+25°C	@+125°C	@-55°C	@+25°C	@+125°C	@-55°C	@+25°C	@+125°C
10	0.01	0.02	0.02	41.28	40.27	40.29	42.27	41.58	41.48
100	0.00	0.03	0.03	36.33	35.03	34.11	36.53	35.06	33.92
200	0.00	0.03	0.04	31.65	30.93	30.28	31.46	30.51	29.99
250	0.00	0.04	0.04	30.14	29.57	29.20	29.86	29.15	28.74
300	0.00	0.04	0.05	28.99	28.73	28.47	28.47	28.03	27.90
350	0.00	0.04	0.05	27.77	27.75	27.92	27.32	27.11	27.44
400	0.00	0.05	0.06	26.91	27.08	27.32	26.48	26.45	26.75
500	0.01	0.05	0.06	25.57	26.01	26.47	25.13	25.34	25.95
550	0.01	0.06	0.07	25.18	25.65	26.09	24.66	24.96	25.49
600	0.01	0.06	0.07	24.92	25.41	25.90	24.27	24.61	25.22
800	0.02	0.07	0.08	24.12	24.58	25.08	23.55	23.87	24.34
1000	0.02	0.08	0.09	23.93	24.39	24.82	23.32	23.65	24.20
5000	0.05	0.04	0.11	40.25	44.10	43.32	40.46	40.85	44.19
8000	0.21	0.06	0.07	28.25	28.26	26.79	30.24	29.97	29.28
10000	0.14	0.03	0.19	29.43	28.96	27.49	26.42	26.11	25.13
12000	0.14	0.05	0.23	22.42	23.03	24.68	23.04	23.71	25.82
14000	0.19	0.03	0.26	29.96	26.81	23.50	26.00	24.51	22.12
16000	0.19	0.05	0.29	18.90	19.23	20.78	19.15	19.38	20.78
17000	0.18	0.06	0.34	27.63	29.00	30.34	28.70	30.43	30.12
18000	0.12	0.15	0.46	36.94	33.62	24.34	31.44	30.23	24.09
20000	0.01	0.27	0.55	18.79	19.17	23.82	18.70	19.02	23.30
21000	0.02	0.28	0.63	21.06	21.50	20.90	20.97	21.42	20.54
25000	0.11	0.46	0.87	21.46	23.05	25.28	21.94	23.51	23.99
25500	0.13	0.49	0.93	22.38	23.59	22.28	22.88	24.27	22.35
27500	0.25	0.68	1.24	21.86	20.65	17.09	27.15	24.52	18.98
28000	0.34	0.79	1.39	18.24	17.66	15.08	19.33	18.72	15.81
28500	0.43	0.88	1.44	16.78	17.07	16.62	17.60	18.01	17.70
29500	0.48	0.98	1.62	27.39	28.49	28.94	42.89	36.96	24.82
30000	0.61	1.17	1.93	30.85	28.67	26.69	22.54	21.03	17.62
31000	1.88	2.74	3.99	9.91	9.47	8.57	9.38	9.00	8.30
31500	2.94	3.90	5.27	7.25	7.54	7.67	7.46	7.70	8.13
31800	3.46	4.54	6.10	6.88	7.40	7.99	7.48	7.92	8.90
32000	3.81	5.03	6.83	7.01	7.62	8.40	7.83	8.29	9.24
32500	5.23	7.17	10.08	7.82	8.08	8.36	8.01	7.77	7.38
33000	8.95	11.84	16.08	6.54	6.31	6.03	5.43	5.16	4.83
33500	15.43	19.03	23.93	4.12	4.32	4.40	3.54	3.67	3.82
34000	23.31	26.97	29.75	3.15	3.60	3.95	2.91	3.28	3.76
34500	29.24	29.34	28.57	3.17	3.68	4.26	3.02	3.53	4.24
35000	27.41	26.87	26.31	3.49	4.02	4.75	3.42	3.96	4.75
35500	25.19	25.40	26.10	3.57	4.09	4.69	3.48	3.92	4.53
36000	25.31	26.03	27.19	3.26	3.79	4.14	3.22	3.56	3.95
36500	26.50	27.46	29.10	2.90	3.38	3.62	2.91	3.24	3.53
37000	27.96	29.16	30.93	2.72	3.13	3.42	2.76	3.14	3.49
37500	29.53	30.87	32.56	2.67	3.10	3.58	2.77	3.23	3.71
38000	31.08	32.47	34.18	2.71	3.23	3.96	2.91	3.41	4.11
38500	33.21	34.68	36.37	2.61	3.21	4.07	2.90	3.40	4.24
39000	35.55	37.19	39.44	2.49	3.12	3.84	2.78	3.22	3.97
39500	38.65	40.72	43.74	2.51	3.08	3.51	2.69	3.08	3.62
40000	42.22	44.97	49.80	2.57	3.03	3.28	2.62	3.01	3.39
41000	56.35	60.64	55.88	2.80	3.30	3.70	2.99	3.47	3.79
42500	46.30	45.83	44.51	2.47	3.08	3.91	2.77	3.22	4.10
43000	44.60	44.32	43.55	2.41	2.88	3.59	2.56	2.99	3.76
43500	43.79	43.73	43.43	2.48	2.90	3.56	2.52	2.97	3.64
44000	42.61	42.94	43.44	2.59	3.10	3.66	2.69	3.19	3.74
44500	42.45	42.61	43.23	2.57	3.23	3.67	2.89	3.44	3.89
45000	42.08	42.69	43.88	2.68	3.45	3.78	3.19	3.74	4.12
45100	42.18	42.79	43.79	2.59	3.34	3.65	3.14	3.67	4.05
45200	42.32	42.81	43.76	2.69	3.45	3.76	3.20	3.74	4.14
45300	42.17	42.76	43.94	2.59	3.32	3.62	3.15	3.67	4.06
48000	47.14	47.66	47.89	2.74	3.64	4.61	3.38	4.08	4.98

Typical Performance Curves



Outline Dimensions

FV1206-11



Weight: .017 grams.

Dimensions are in inches [mm]. Tolerances: 2 Pl. $\pm .01$; 3 Pl. $\pm .005$ Inches

Notes:

1. Case material: Ceramic.
2. Termination Finish: **as shown below or indicated on Data Sheet.**
For RoHS Case Styles: Gold plate over Nickel plate. All models, (+) suffix.



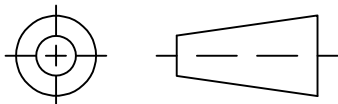
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



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

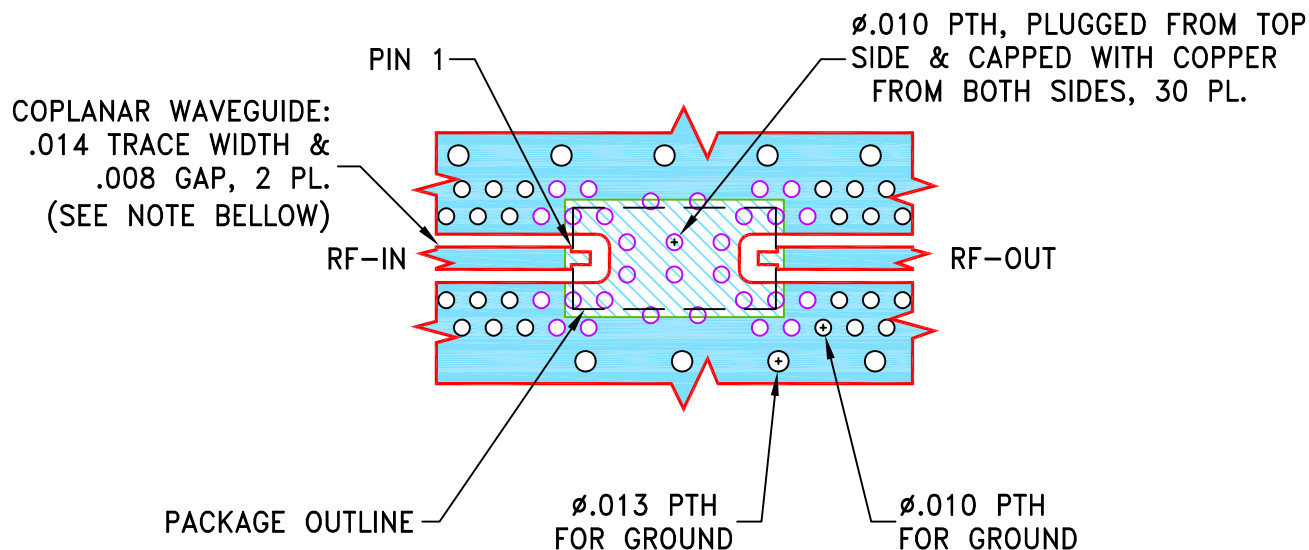
RF/IF MICROWAVE COMPONENTS

THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	ECO-006066	NEW RELEASE	02/03/21	ITG	WY

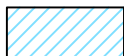
SUGGESTED MOUNTING CONFIGURATIONFV1206-11 CASE STYLE

NOTES:

- TRACE WIDTH & GAP PARAMETERS ARE SHOWN FOR MEGTRON-7 R5785(N); DIELECTRIC THICKNESS: $.0079 \pm .001$; COPPER: HVLP/HVLP, 1/2 Oz EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH & GAP MAY NEED TO BE MODIFIED.
- 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	ITG	02/03/21
TOLERANCES ON:	CHECKED	GF	02/03/21
2 PL DECIMALS $\pm$	APPROVED	WY	02/03/21
3 PL DECIMALS $\pm$.005			
ANGLES $\pm$			
FRACTIONS $\pm$			

Mini-Circuits®

THIS DOCUMENT AND ITS CONTENTS ARE THE PROPERTY OF MINI-CIRCUITS. EXCEPT FOR USE EXPRESSLY GRANTED, IN WRITING, TO ITS VENDORS, VENDEE AND THE UNITED STATES GOVERNMENT, MINI-CIRCUITS RESERVES ALL PROPRIETARY DESIGN, USE, MANUFACTURING AND REPRODUCTION RIGHTS THERETO. THESE CONTENTS SHALL NOT BE USED, DUPLICATED OR DISCLOSED TO ANY OUTSIDE PARTY, IN WHOLE OR IN PART, WITHOUT WRITTEN PERMISSION OF MINI-CIRCUITS.



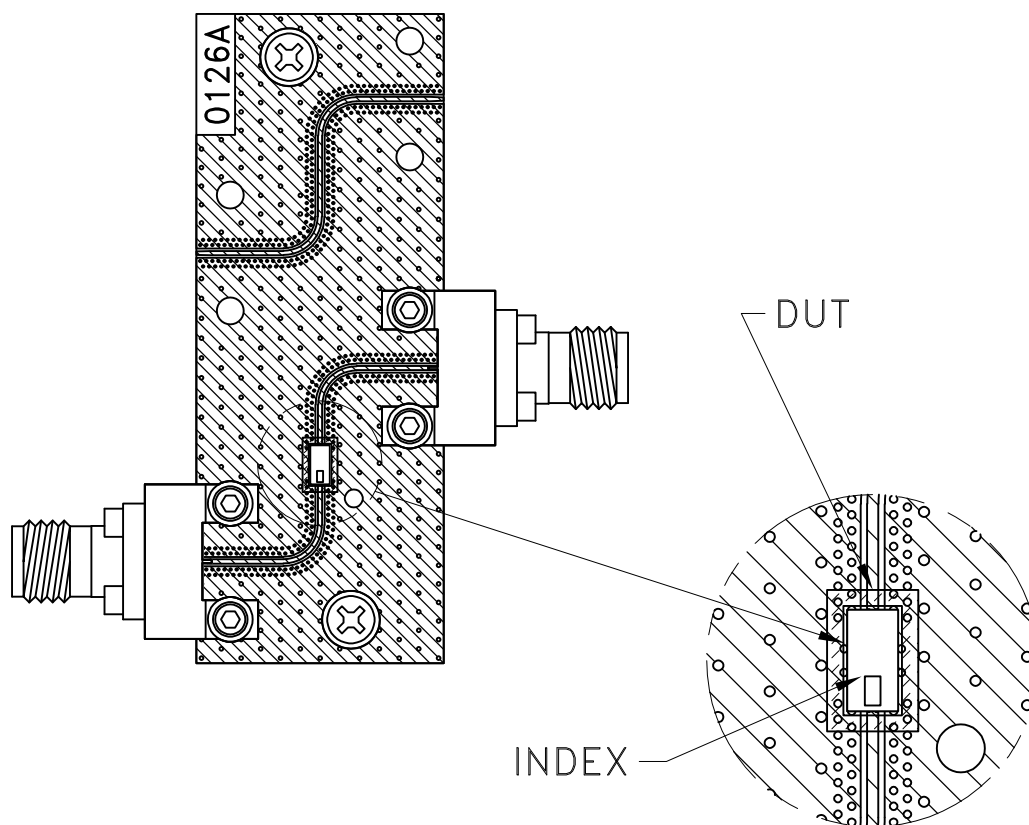
Mini-Circuits®

13 Neptune Avenue
Brooklyn NY 11235

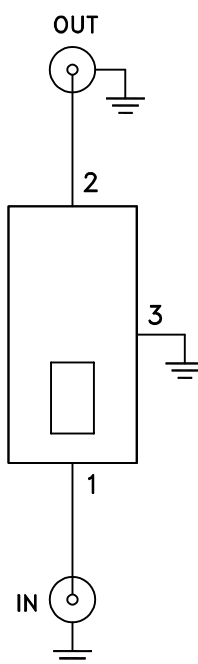
PL, FV1206-11, TB-LFCN-2352C+

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-702	OR
FILE:	98PL702	SCALE: 8:1	SHEET: 1 OF 1

Evaluation Board and Circuit



TB-LFCN-2952C+



Schematic Diagram

1. 50 Ohm 2.4 End Launch Female connectors.
2. PCB Material: Megtron 7(N) or equivalent,
Dielectric Constant=3.4, Thickness=.0079 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 125° C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 125° C Ambient Environment	Individual Model Data Sheet
Thermal Cycling	-55 to 125°C, 100 cycles, Dwell Time 15 minutes.	MIL-STD-202, Method 107, Condition A-3
Mechanical Shock	50g, 11ms half-sine, 18 shocks applied each to 3 axes	MIL-STD-202 Method 213, Condition A
Vibration	10-2000Hz sine, 20g, 12 cycles applied each to 3 axes	MIL-STD-202, Method 204, Condition D
Constant Acceleration	30Kg, Y1 Direction	MIL-STD-883, Method 2001, Condition E
Humidity	85°C, 90-95% Relative Humidity, 250hours	
Solderability	10X / 30X Magnification	J-STD-002C Test S, J-STD-002C Test S1
High Temp Storage	125°C, 250 hours	