

# Ceramic Low Pass Filter

## LFCN-3052+

50Ω DC to 30500 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-3052+ is an LTCC low pass filter with a passband from DC to 30500 MHz, supporting a variety of applications. This model provides 1.2 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 50 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](http://www.minicircuits.com/MCLStore/terms.jsp)



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

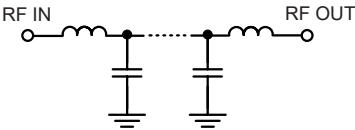
### Features

- Low loss, 1.2 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<sup>1,2</sup> at 25°C

Parameter		F#	Frequency (MHz)	Min.	Typ.	Max.	Unit
Pass Band	Insertion Loss	DC-F1	DC - 19000	—	0.7	1.1	dB
		F1-F2	19000 - 29000	—	1.2	1.7	dB
	Frequency Cut-off	F2-F3	29000 - 30500	—	2.6	—	dB
		F4	32000	—	3.0	—	dB
Stop Band	Return Loss	DC-F3	DC - 30500	—	12	—	dB
		F5-F6	36500 - 41000	20	26	—	dB
	Rejection Loss	F6-F7	41000 - 47500	30	40	—	dB
		F7-F8	47500 - 50000	—	38	—	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-3052C+

### Maximum Ratings

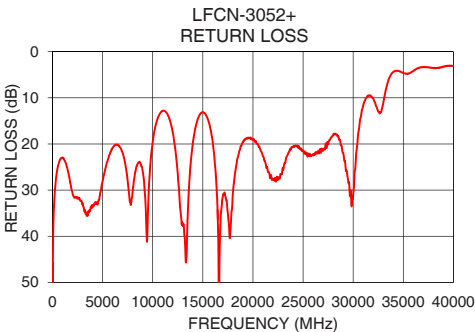
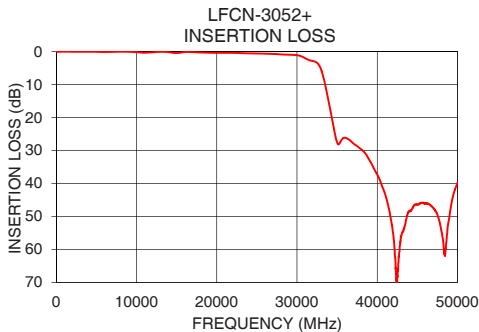
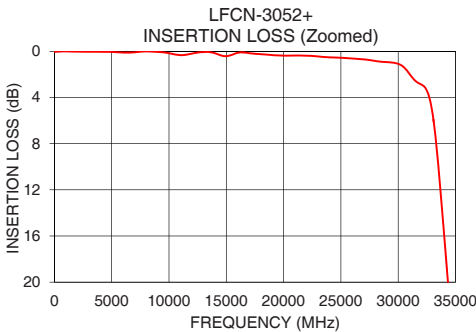
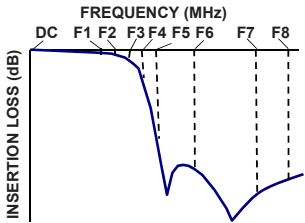
Operating Temperature	-55°C to 125°C
Storage Temperature	-55°C to 125°C
RF Power Input*	1W max. @25°C

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	0.04	45.73
100	0.04	36.72
1000	0.01	22.93
10000	0.16	19.51
19000	0.32	19.47
20000	0.37	19.10
28000	0.84	18.07
29000	0.93	21.93
30500	1.38	17.76
32000	2.87	10.15
32500	3.40	12.98
34000	15.80	4.41
34400	20.76	4.12
36500	26.72	3.58
38500	30.82	3.49
39000	32.80	3.20
37500	28.67	3.37
41000	43.31	3.75
47500	49.43	3.63
50000	39.76	3.69

### Typical Frequency Response



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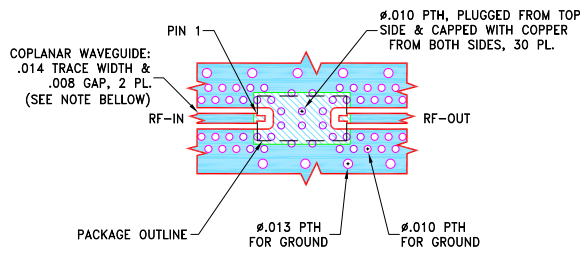


## Pad Connections

INPUT	1
OUTPUT	2
GROUND	3

Product Marking: LX

Demo Board MCL P/N: TB-LFCN-3052C+  
Suggested PCB Layout (PL-702)

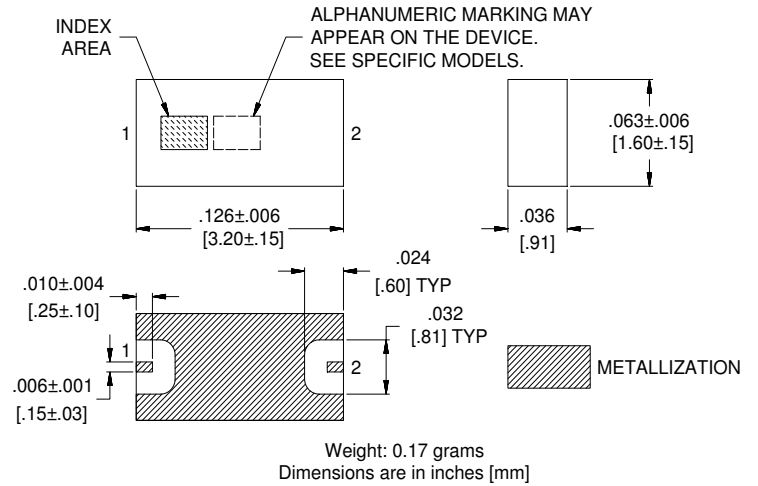


### NOTES:

- 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



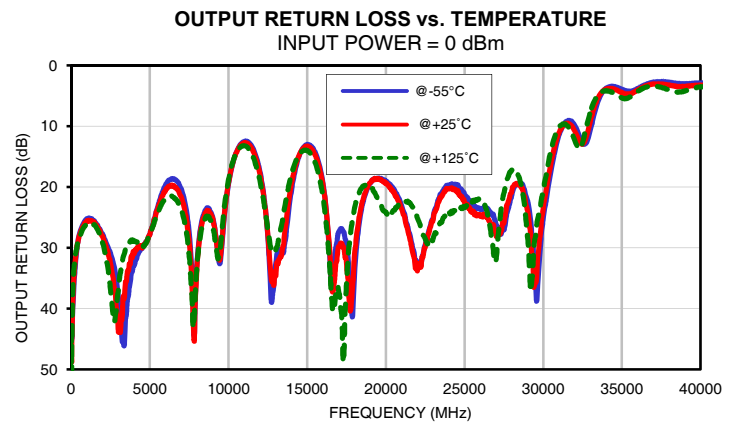
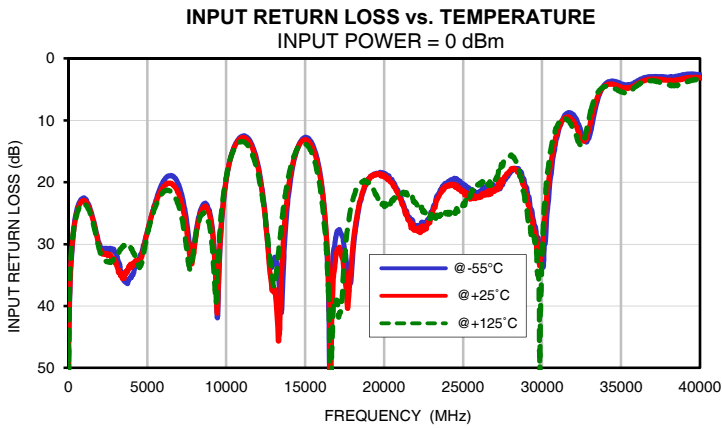
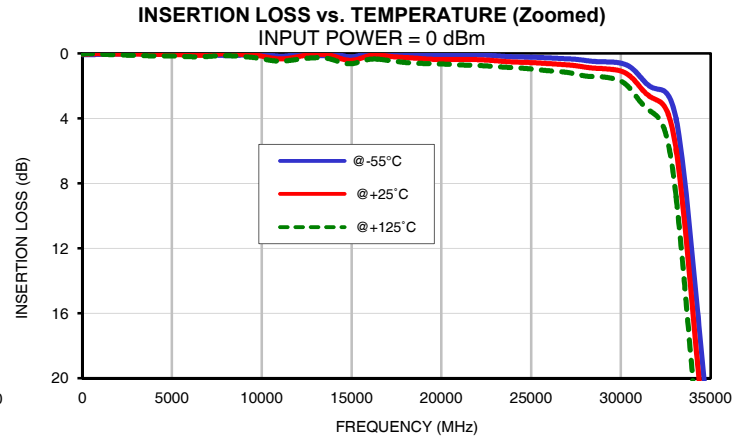
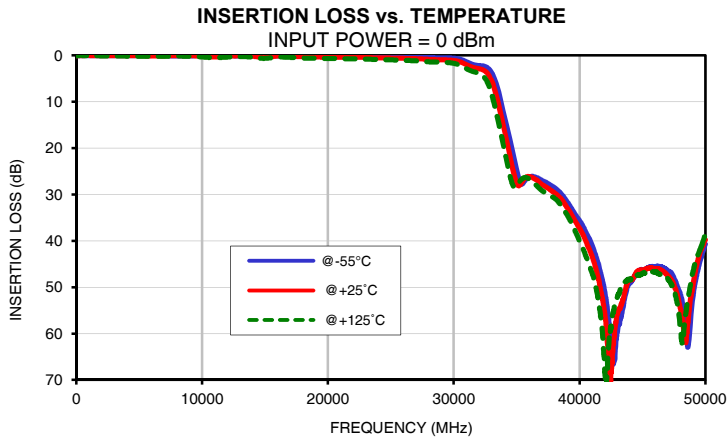
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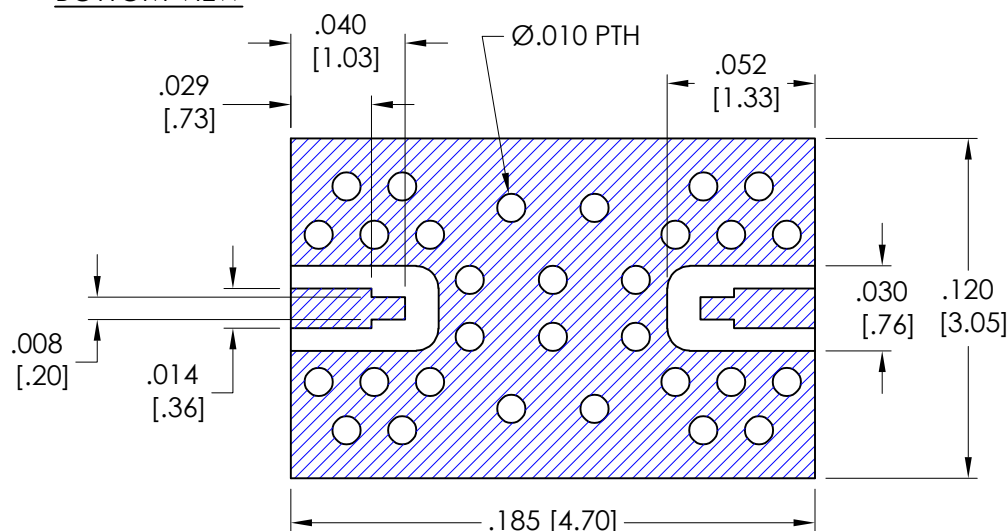
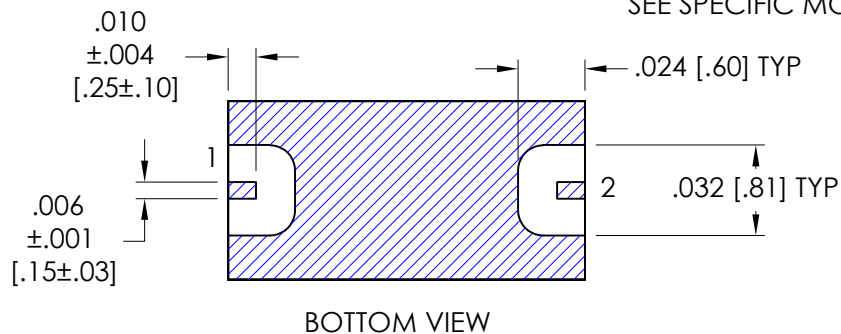
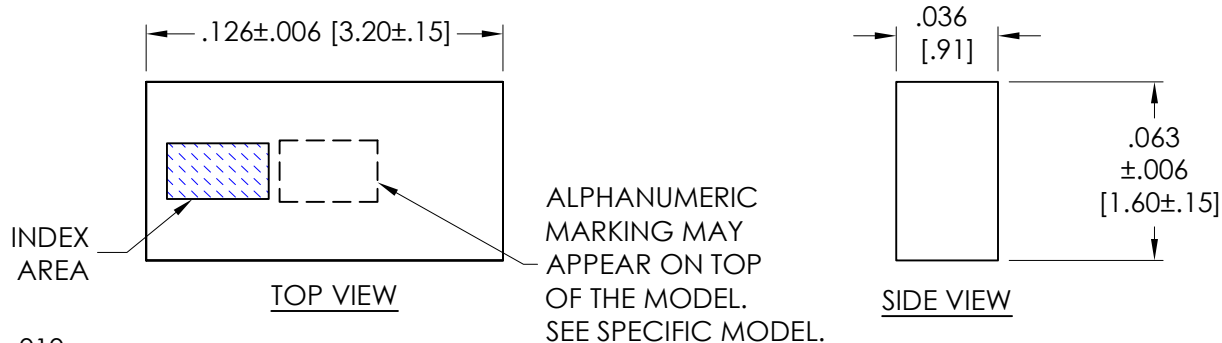
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Typical Performance Data

FREQ.  (MHz)	INSERTION LOSS			INPUT RETURN LOSS			OUTPUT RETURN LOSS		
	(dB)			(dB)			(dB)		
	@-55°C	@+25°C	@+125°C	@-55°C	@+25°C	@+125°C	@-55°C	@+25°C	@+125°C
10	0.06	0.04	0.03	43.92	45.73	46.24	41.41	43.17	43.71
100	0.07	0.04	0.03	37.79	36.72	35.39	40.02	38.97	37.14
200	0.07	0.03	0.02	32.23	31.56	30.67	35.10	33.95	32.82
250	0.07	0.03	0.01	30.30	29.77	29.26	33.31	32.34	31.49
300	0.07	0.03	0.00	28.91	28.74	28.34	31.73	31.14	30.62
350	0.07	0.03	0.00	27.51	27.51	27.49	30.39	30.08	30.06
400	0.07	0.02	0.00	26.40	26.61	26.67	29.49	29.32	29.32
500	0.07	0.02	0.01	24.85	25.29	25.65	27.91	28.10	28.67
550	0.07	0.02	0.02	24.37	24.81	25.09	27.48	27.78	28.10
600	0.06	0.01	0.02	23.96	24.41	24.72	27.08	27.40	27.77
800	0.06	0.00	0.03	22.81	23.20	23.57	25.90	26.29	26.61
1000	0.05	0.01	0.04	22.54	22.93	23.41	25.21	25.55	26.12
5000	0.05	0.05	0.15	28.08	28.11	28.51	27.79	27.83	27.82
8000	0.12	0.01	0.13	29.61	30.19	29.71	32.23	32.64	32.70
10000	0.00	0.16	0.32	19.64	19.51	19.07	19.49	19.31	18.80
12000	0.02	0.20	0.36	17.06	17.48	18.48	17.49	17.91	19.07
14000	0.05	0.16	0.40	20.96	19.89	18.39	20.60	19.56	17.92
16000	0.09	0.13	0.36	19.46	19.83	21.75	19.30	19.64	21.59
17000	0.07	0.16	0.42	28.16	31.26	39.21	27.43	29.83	37.20
19000	0.06	0.32	0.61	19.46	19.47	20.00	19.37	19.33	19.87
20000	0.10	0.37	0.64	18.74	19.10	23.83	19.04	19.39	24.13
21000	0.08	0.36	0.70	22.25	22.66	21.95	23.07	23.64	22.54
25000	0.23	0.56	0.95	20.26	21.44	23.54	21.23	22.58	23.41
25500	0.25	0.59	1.01	21.40	22.37	21.71	22.82	24.16	22.43
27500	0.36	0.75	1.27	20.43	20.08	17.39	27.08	25.96	21.00
28000	0.43	0.84	1.38	18.36	18.07	15.72	21.41	20.69	17.24
28500	0.49	0.90	1.42	17.78	18.19	17.53	19.35	19.74	18.63
29000	0.51	0.93	1.45	20.78	21.93	24.07	22.23	23.92	28.10
30000	0.59	1.08	1.70	33.31	31.29	31.78	25.17	23.43	20.61
30500	0.82	1.38	2.14	19.89	17.76	15.30	17.25	15.95	13.86
31500	1.92	2.55	3.43	9.09	9.60	9.80	9.20	9.57	9.89
31800	2.12	2.76	3.67	8.81	9.66	10.53	9.18	9.90	11.03
32000	2.18	2.87	3.86	9.11	10.15	11.42	9.85	10.80	12.33
32500	2.39	3.40	4.95	11.99	12.98	14.04	12.74	12.97	12.69
33000	3.66	5.40	8.14	12.61	11.14	9.37	10.52	9.15	7.59
33500	7.27	9.88	13.68	6.86	6.28	5.61	5.80	5.27	4.82
34000	12.76	15.80	20.03	4.13	4.41	4.52	3.76	3.89	4.16
34500	18.54	22.04	26.31	3.66	4.17	4.73	3.47	3.91	4.59
35000	24.76	27.57	28.23	4.09	4.63	5.39	3.95	4.52	5.38
35500	27.60	26.98	26.48	4.23	4.70	5.27	4.25	4.67	5.21
36000	26.22	26.12	26.69	3.72	4.18	4.43	3.79	4.04	4.29
36500	26.26	26.72	27.83	3.14	3.58	3.77	3.16	3.41	3.61
37000	26.95	27.79	29.13	2.94	3.33	3.60	2.76	3.08	3.42
37500	27.65	28.67	29.97	2.93	3.37	3.84	2.66	3.07	3.60
38000	28.52	29.61	30.79	3.05	3.56	4.30	2.79	3.28	4.06
38500	29.72	30.82	32.20	2.89	3.49	4.34	2.97	3.47	4.39
39000	31.52	32.80	34.35	2.60	3.20	3.90	3.03	3.47	4.22
39500	33.65	35.01	36.94	2.54	3.08	3.53	2.97	3.34	3.80
40000	35.60	37.26	39.93	2.67	3.11	3.40	2.88	3.23	3.50
41000	40.96	43.31	46.93	3.27	3.75	4.11	3.01	3.42	3.84
42500	61.88	68.01	59.05	2.58	3.18	3.98	2.72	3.13	4.01
43000	59.80	55.99	52.22	2.48	2.95	3.66	2.57	2.97	3.72
43500	53.71	52.35	49.22	2.61	3.04	3.73	2.61	3.01	3.64
44000	48.97	48.36	48.36	2.88	3.39	4.03	2.81	3.26	3.78
44500	47.03	46.88	47.27	3.09	3.77	4.25	3.09	3.57	4.01
45000	46.38	46.34	47.11	3.27	4.10	4.41	3.38	3.85	4.22
47000	46.37	47.46	48.12	2.88	3.38	4.40	2.83	3.28	4.21
47500	48.04	49.43	50.54	2.89	3.63	4.77	2.96	3.51	4.53
48000	51.30	54.41	58.87	3.10	4.05	4.99	3.14	3.76	4.66
50000	40.72	39.76	38.69	3.25	3.69	4.10	3.47	3.90	4.42

## Typical Performance Curves





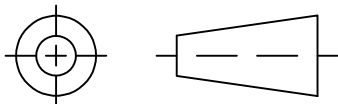
Weight: .017 grams.

Dimensions are in inches [mm]. Tolerances: 2 Pl. ±.01; 3 Pl. ±.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.

THIRD ANGLE PROJECTION

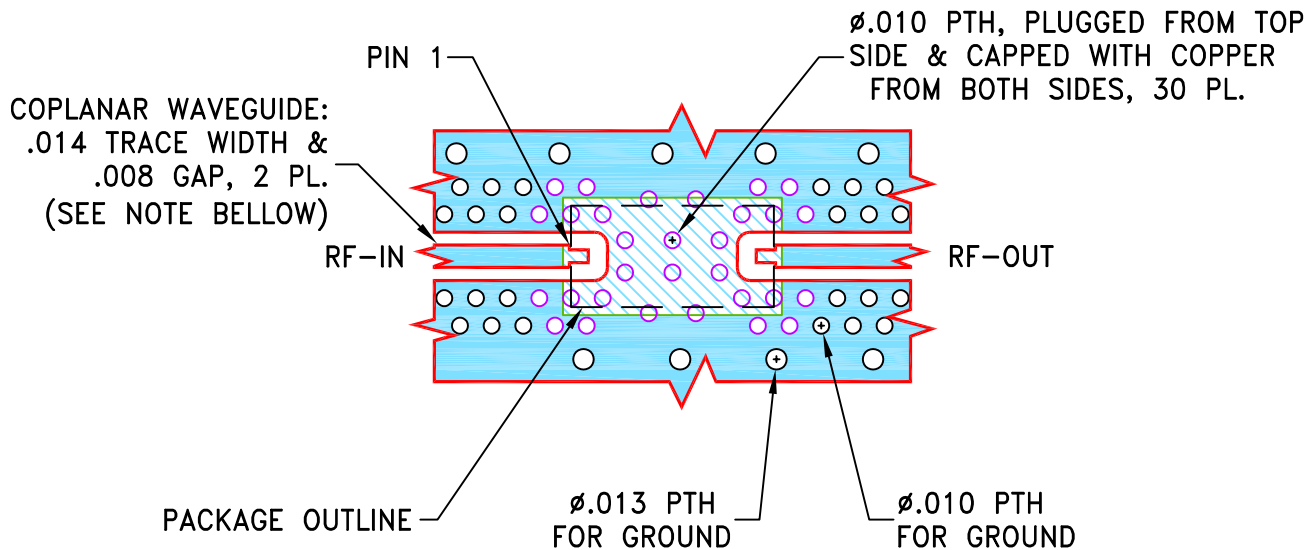


REVISIONS

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

SUGGESTED MOUNTING CONFIGURATION

FV1206-11 CASE STYLE

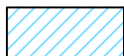


**NOTES:**

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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	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 $\pm$			



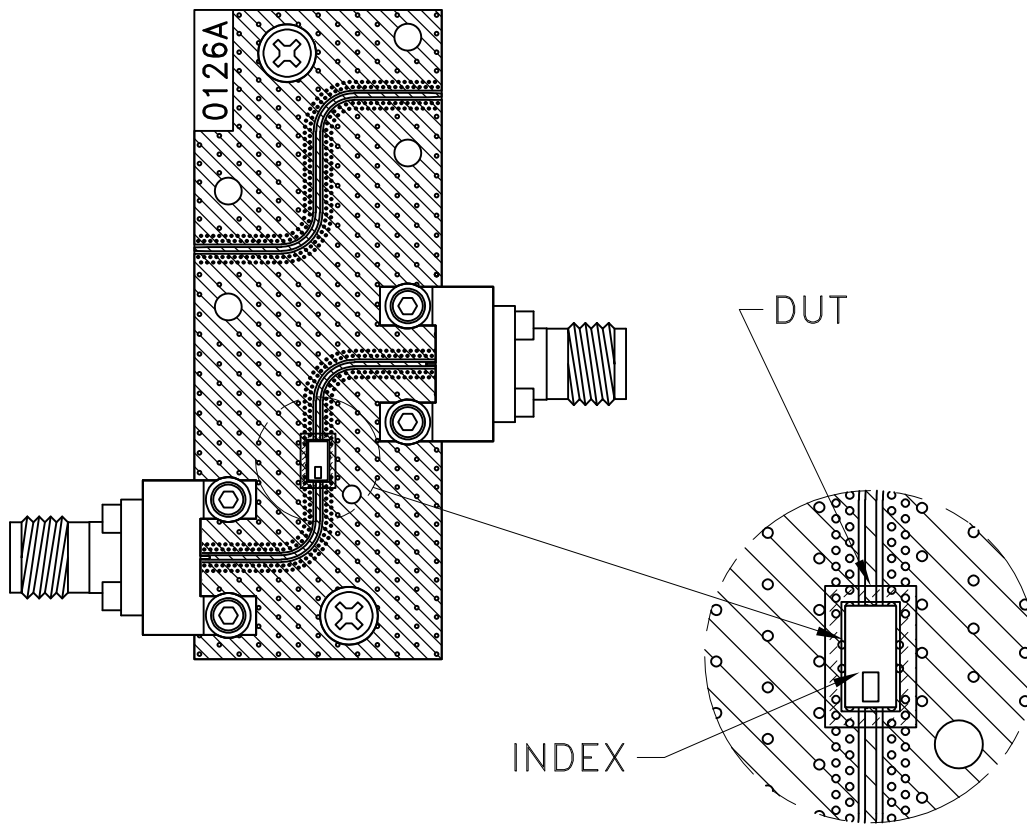
**Mini-Circuits®**

13 Neptune Avenue  
Brooklyn NY 11235

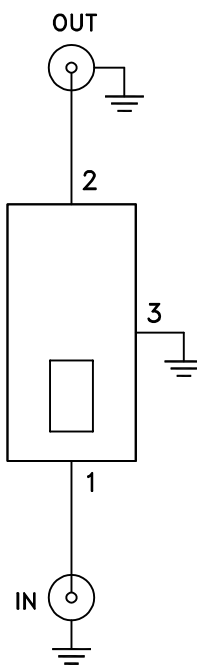
PL, FV1206-11, TB-LFCN-2352C+

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

# Evaluation Board and Circuit




TB-LFCN-3052C+



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	