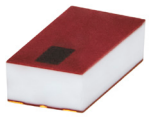
*Ceramic*

# Low Pass Filter

# LFCN-2752+

50Ω DC to 27500 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-2752+ is an LTCC low pass filter with a passband from DC to 27500 MHz, supporting a variety of applications. This model provides 1.5 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 46 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. |

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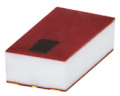
## LFCN-2752+

50Ω DC to 27500 MHz



*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*

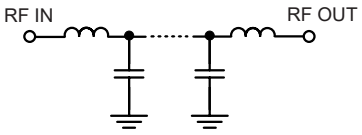
### Features

- Low loss, 1.5 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

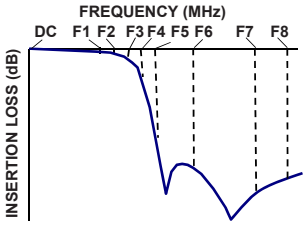
| Parameter | | F# | Frequency (MHz) | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| Pass Band | Insertion Loss | DC-F1 | DC - 17000 | — | 0.6 | 1.0 | dB |
| | | F1-F2 | 17000 - 25500 | — | 1.0 | 1.8 | dB |
| | | F2-F3 | 25500 - 27500 | — | 1.5 | — | dB |
| | Frequncy Cut-off | F4 | 29500 | — | 3 | — | dB |
| | Return Loss | DC-F3 | DC - 27500 | — | 12 | — | dB |
| Stop Band | Rejection Loss | F5-F6 | 34500 - 39000 | 19 | 30 | — | dB |
| | | F6-F7 | 39000 - 45000 | 29 | 40 | — | dB |
| | | F7-F8 | 45000 - 46000 | — | 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-2752C+

| 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 Frequency Response

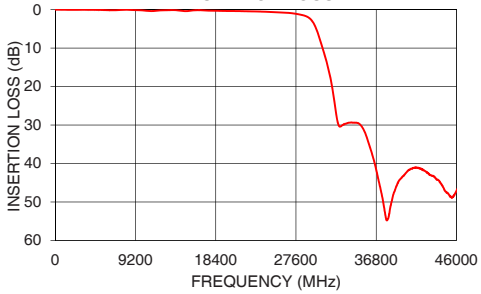



### Typical Performance Data at 25°C

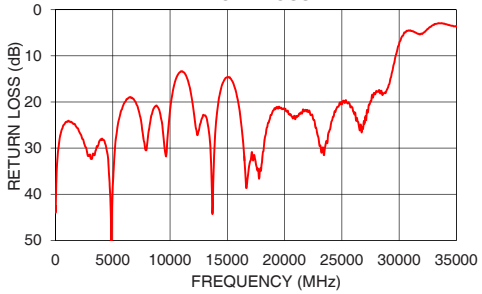
| Frequency (MHz) | Insertion Loss (dB) | Return Loss (dB) |
|---|---|---|
| 10 | 0.01 | 42.56 |
| 100 | 0.02 | 35.35 |
| 500 | 0.02 | 26.42 |
| 1000 | 0.04 | 24.26 |
| 5000 | 0.07 | 38.21 |
| 10000 | 0.19 | 21.80 |
| 17000 | 0.19 | 32.82 |
| 25500 | 0.71 | 20.31 |
| 27500 | 1.05 | 19.85 |
| 29500 | 3.09 | 12.10 |
| 31000 | 12.67 | 4.49 |
| 31800 | 20.85 | 5.35 |
| 32500 | 30.10 | 4.17 |
| 34500 | 29.38 | 3.43 |
| 39000 | 46.63 | 2.68 |
| 40000 | 43.07 | 2.78 |
| 42000 | 41.42 | 3.15 |
| 44000 | 44.48 | 2.99 |
| 45000 | 47.73 | 3.70 |
| 46000 | 47.10 | 3.34 |

LFCN-2752+
INSERTION LOSS (Zoomed)


LFCN-2752+
INSERTION LOSS




LFCN-2752+
RETURN LOSS



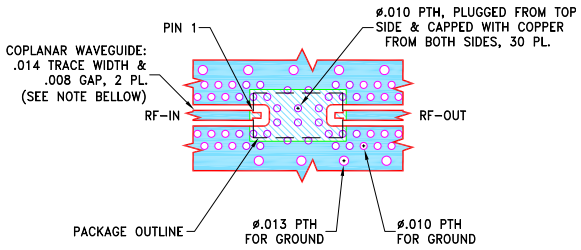

Notes
A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's 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:** LW

***Demo Board MCL P/N: TB-LFCN-2752C+***
***Suggested PCB Layout (PL-702)***

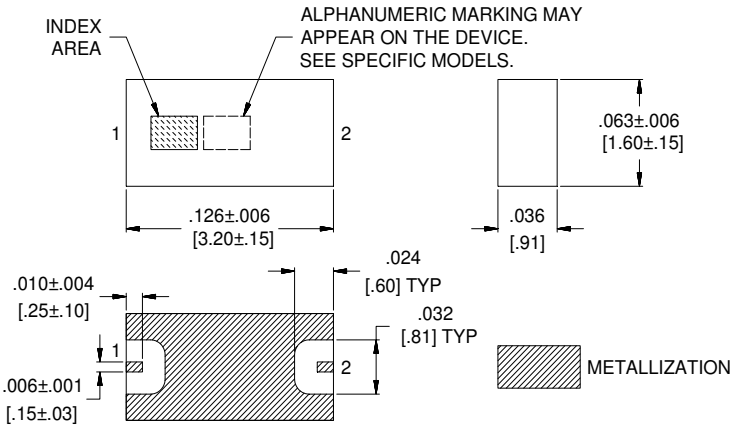



NOTES:
1. TRACE WIDTH & GAP PARAMETERS ARE SHOWN FOR MEGTRON-7 R5785(N); DIELECTRIC THICKNESS: .0079±.001; COPPER: HVLP/HVLP, 1/2 Oz EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH & GAP MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

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

DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK.

## Outline Drawing




Weight: 0.17 grams
Dimensions are in inches [mm]

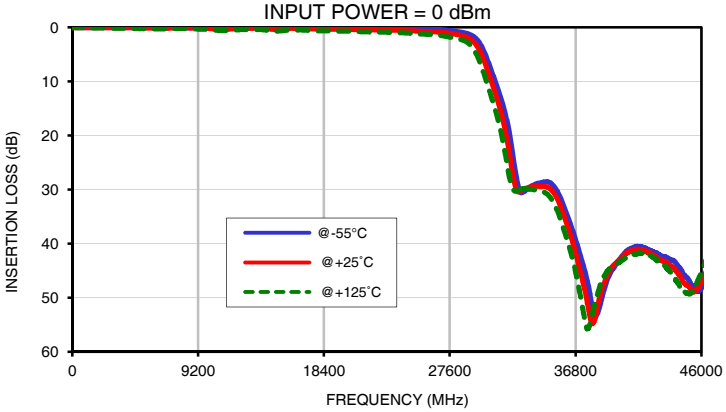
# Ceramic Low Pass Filter LFCN-2752+

*Typical Performance Data*

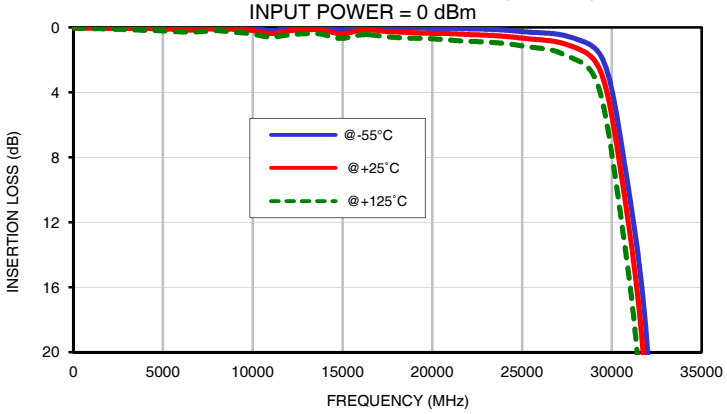
| FREQ. | INSERTION LOSS | | | INPUT RETURN LOSS | | | OUTPUT RETURN LOSS | | |
|---|---|---|---|---|---|---|---|---|---|
| (MHz) | (dB) | | | (dB) | | | (dB) | | |
| | @-55°C | @+25°C | @+125°C | @-55°C | @+25°C | @+125°C | @-55°C | @+25°C | @+125°C |
| 10 | 0.00 | 0.01 | 0.01 | 43.54 | 42.56 | 42.03 | 46.24 | 45.11 | 45.10 |
| 100 | 0.00 | 0.02 | 0.03 | 36.74 | 35.35 | 34.22 | 37.72 | 36.04 | 34.57 |
| 200 | 0.00 | 0.02 | 0.04 | 32.12 | 31.37 | 30.63 | 32.58 | 31.60 | 30.96 |
| 250 | 0.01 | 0.02 | 0.04 | 30.61 | 30.06 | 29.75 | 30.96 | 30.33 | 29.99 |
| 300 | 0.01 | 0.02 | 0.04 | 29.52 | 29.20 | 28.86 | 29.66 | 29.26 | 29.08 |
| 350 | 0.01 | 0.02 | 0.05 | 28.28 | 28.17 | 28.20 | 28.32 | 28.23 | 28.53 |
| 400 | 0.01 | 0.02 | 0.05 | 27.27 | 27.41 | 27.51 | 27.35 | 27.47 | 27.83 |
| 500 | 0.02 | 0.02 | 0.05 | 26.18 | 26.42 | 26.73 | 26.14 | 26.35 | 26.96 |
| 550 | 0.02 | 0.02 | 0.05 | 25.69 | 25.97 | 26.32 | 25.55 | 25.87 | 26.37 |
| 600 | 0.02 | 0.02 | 0.05 | 25.45 | 25.69 | 25.93 | 25.29 | 25.51 | 25.91 |
| 800 | 0.02 | 0.03 | 0.06 | 24.43 | 24.74 | 25.00 | 24.25 | 24.52 | 24.87 |
| 1000 | 0.02 | 0.04 | 0.06 | 23.83 | 24.26 | 24.57 | 23.58 | 23.94 | 24.44 |
| 5000 | 0.05 | 0.07 | 0.20 | 40.88 | 38.21 | 38.86 | 51.90 | 48.32 | 51.76 |
| 8000 | 0.11 | 0.04 | 0.19 | 29.16 | 29.17 | 28.78 | 32.64 | 31.55 | 31.32 |
| 10000 | 0.02 | 0.19 | 0.40 | 22.15 | 21.80 | 21.68 | 19.81 | 19.50 | 19.29 |
| 12000 | 0.02 | 0.21 | 0.45 | 19.95 | 20.83 | 21.94 | 21.25 | 22.26 | 23.49 |
| 14000 | 0.06 | 0.17 | 0.45 | 27.46 | 24.94 | 23.14 | 24.85 | 22.91 | 21.66 |
| 16000 | 0.10 | 0.16 | 0.45 | 20.23 | 20.76 | 21.97 | 20.93 | 21.21 | 22.44 |
| 17000 | 0.07 | 0.19 | 0.51 | 29.82 | 32.82 | 43.56 | 28.88 | 31.67 | 42.66 |
| 18000 | 0.01 | 0.27 | 0.62 | 37.49 | 33.43 | 25.96 | 32.24 | 30.65 | 25.92 |
| 20000 | 0.05 | 0.36 | 0.70 | 21.16 | 21.61 | 27.00 | 21.48 | 21.60 | 27.31 |
| 21000 | 0.05 | 0.38 | 0.77 | 22.44 | 23.10 | 21.52 | 24.84 | 25.64 | 24.00 |
| 25000 | 0.25 | 0.65 | 1.13 | 19.38 | 20.29 | 20.81 | 21.44 | 22.18 | 21.59 |
| 25500 | 0.29 | 0.71 | 1.21 | 19.66 | 20.31 | 19.85 | 20.36 | 21.23 | 19.87 |
| 27500 | 0.53 | 1.05 | 1.74 | 21.18 | 19.85 | 16.40 | 20.54 | 19.57 | 16.49 |
| 28000 | 0.70 | 1.26 | 1.99 | 17.65 | 17.64 | 15.83 | 18.03 | 18.24 | 16.88 |
| 28500 | 0.90 | 1.51 | 2.29 | 17.75 | 18.10 | 18.52 | 19.43 | 20.30 | 21.57 |
| 29500 | 1.99 | 3.09 | 4.68 | 13.46 | 12.10 | 10.97 | 12.23 | 10.90 | 9.30 |
| 30000 | 3.83 | 5.44 | 7.80 | 8.17 | 7.40 | 6.54 | 7.02 | 6.44 | 5.72 |
| 31000 | 10.49 | 12.67 | 15.80 | 3.94 | 4.49 | 5.22 | 4.05 | 4.52 | 5.23 |
| 31500 | 14.40 | 17.21 | 21.18 | 4.29 | 5.03 | 6.06 | 4.56 | 5.20 | 6.00 |
| 31800 | 17.44 | 20.85 | 25.34 | 4.74 | 5.35 | 6.14 | 4.81 | 5.36 | 5.81 |
| 32000 | 20.06 | 23.83 | 28.08 | 4.85 | 5.27 | 5.82 | 4.71 | 5.14 | 5.36 |
| 32500 | 28.16 | 30.10 | 30.27 | 3.95 | 4.17 | 4.42 | 3.70 | 4.00 | 4.08 |
| 33000 | 30.39 | 29.92 | 29.80 | 2.96 | 3.31 | 3.65 | 2.83 | 3.15 | 3.42 |
| 33500 | 29.46 | 29.48 | 29.92 | 2.45 | 2.95 | 3.41 | 2.50 | 2.88 | 3.35 |
| 34000 | 28.83 | 29.33 | 30.11 | 2.56 | 3.09 | 3.73 | 2.57 | 3.04 | 3.71 |
| 34500 | 28.57 | 29.38 | 30.49 | 2.91 | 3.43 | 4.21 | 2.99 | 3.56 | 4.31 |
| 35000 | 28.81 | 29.97 | 31.59 | 3.17 | 3.65 | 4.40 | 3.56 | 4.16 | 4.79 |
| 35500 | 30.43 | 31.87 | 34.05 | 2.90 | 3.37 | 3.95 | 3.60 | 4.09 | 4.50 |
| 36000 | 33.45 | 35.16 | 37.82 | 2.57 | 3.07 | 3.48 | 3.16 | 3.57 | 3.88 |
| 36500 | 36.88 | 38.89 | 41.98 | 2.54 | 3.01 | 3.38 | 2.73 | 3.16 | 3.49 |
| 37000 | 40.84 | 43.63 | 47.63 | 2.66 | 3.07 | 3.55 | 2.54 | 3.02 | 3.45 |
| 37500 | 45.25 | 48.79 | 54.24 | 2.73 | 3.17 | 3.88 | 2.56 | 3.09 | 3.66 |
| 38000 | 51.28 | 54.60 | 53.03 | 2.70 | 3.24 | 4.13 | 2.76 | 3.33 | 4.10 |
| 38500 | 52.00 | 50.56 | 48.54 | 2.39 | 2.98 | 3.87 | 2.94 | 3.52 | 4.39 |
| 39000 | 47.59 | 46.63 | 45.64 | 2.07 | 2.68 | 3.38 | 3.05 | 3.57 | 4.32 |
| 39500 | 44.64 | 44.20 | 44.19 | 2.11 | 2.64 | 3.15 | 3.01 | 3.48 | 3.99 |
| 40000 | 42.95 | 43.07 | 43.39 | 2.33 | 2.78 | 3.17 | 2.89 | 3.36 | 3.72 |
| 42000 | 40.99 | 41.42 | 41.91 | 2.44 | 3.15 | 4.04 | 2.86 | 3.47 | 4.30 |
| 42500 | 41.54 | 42.08 | 42.56 | 2.18 | 2.78 | 3.63 | 2.75 | 3.33 | 4.20 |
| 43000 | 42.15 | 42.96 | 43.46 | 2.09 | 2.56 | 3.35 | 2.72 | 3.26 | 4.06 |
| 43500 | 42.57 | 43.50 | 44.54 | 2.19 | 2.62 | 3.38 | 2.76 | 3.29 | 4.01 |
| 44000 | 43.20 | 44.48 | 46.18 | 2.48 | 2.99 | 3.71 | 2.93 | 3.48 | 4.11 |
| 44500 | 44.72 | 46.22 | 48.31 | 2.64 | 3.29 | 3.89 | 3.06 | 3.63 | 4.18 |
| 45000 | 46.40 | 47.73 | 49.12 | 2.89 | 3.70 | 4.16 | 3.28 | 3.86 | 4.34 |
| 45100 | 46.77 | 47.99 | 49.29 | 2.86 | 3.63 | 4.06 | 3.23 | 3.80 | 4.27 |
| 45200 | 47.31 | 48.25 | 49.15 | 3.00 | 3.81 | 4.19 | 3.29 | 3.87 | 4.36 |
| 45300 | 47.73 | 48.47 | 48.96 | 2.84 | 3.59 | 3.99 | 3.17 | 3.76 | 4.26 |
| 46000 | 48.29 | 47.10 | 45.38 | 2.84 | 3.34 | 3.88 | 3.11 | 3.67 | 4.31 |

*Typical Performance Curves*

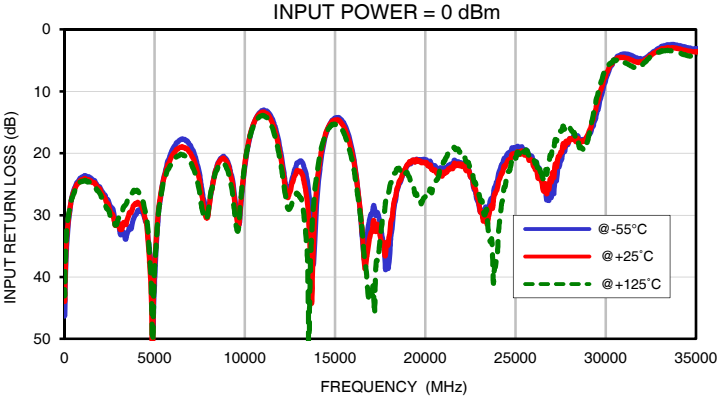
**INSERTION LOSS vs. TEMPERATURE**
INPUT POWER = 0 dBm



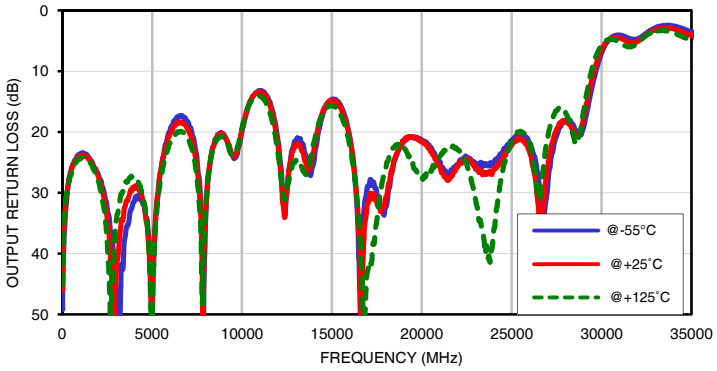

**INSERTION LOSS vs. TEMPERATURE (Zoomed)**
INPUT POWER = 0 dBm




**INPUT RETURN LOSS vs. TEMPERATURE**
INPUT POWER = 0 dBm

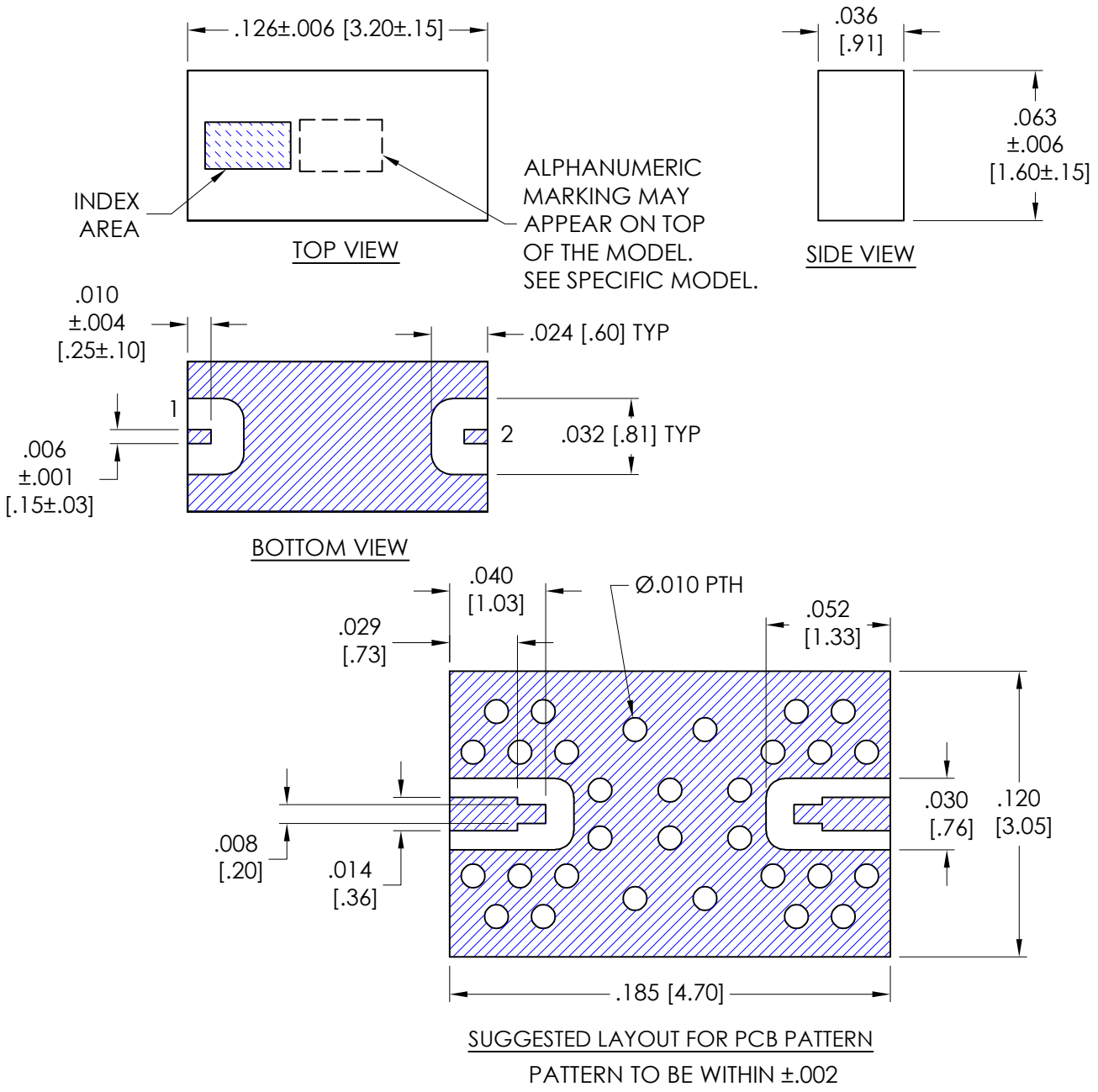



**OUTPUT RETURN LOSS vs. TEMPERATURE**
INPUT POWER = 0 dBm



# Case Style FV

## Outline Dimensions FV1206-11




Weight: .017 grams.

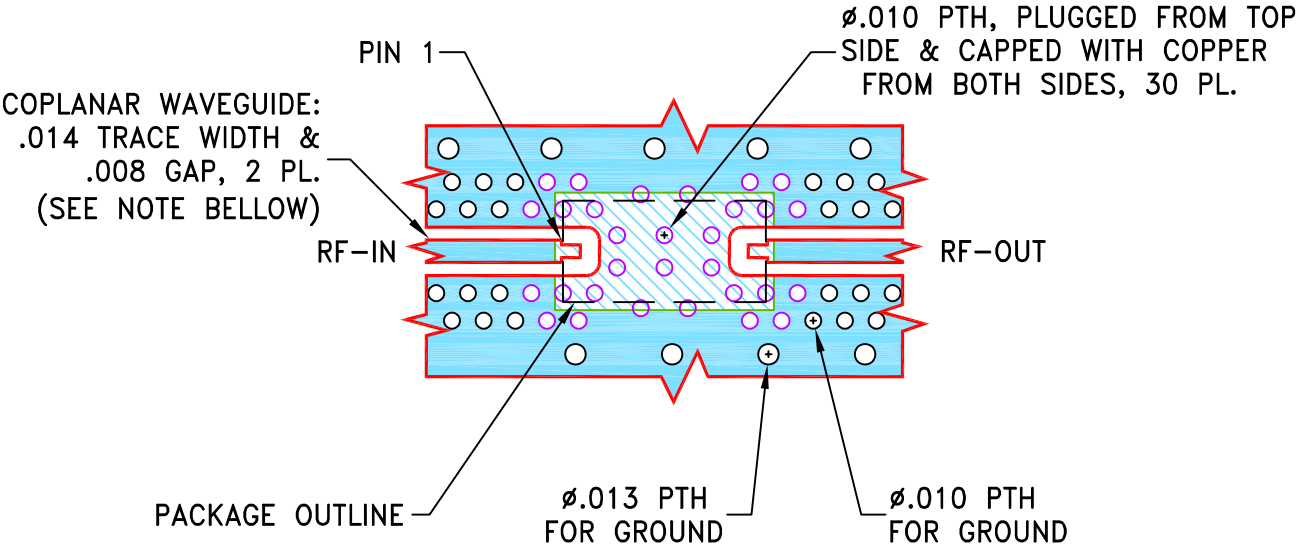
Dimensions are in inches [mm]. Tolerances: 2 Pl.±.01; 3 Pl. ±.005 Inches

**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 ± | APPROVED | WY | 02/03/21 |
| 3 PL DECIMALS ± .005 | | | |
| ANGLES ± | | | |
| FRACTIONS ± | | | |



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

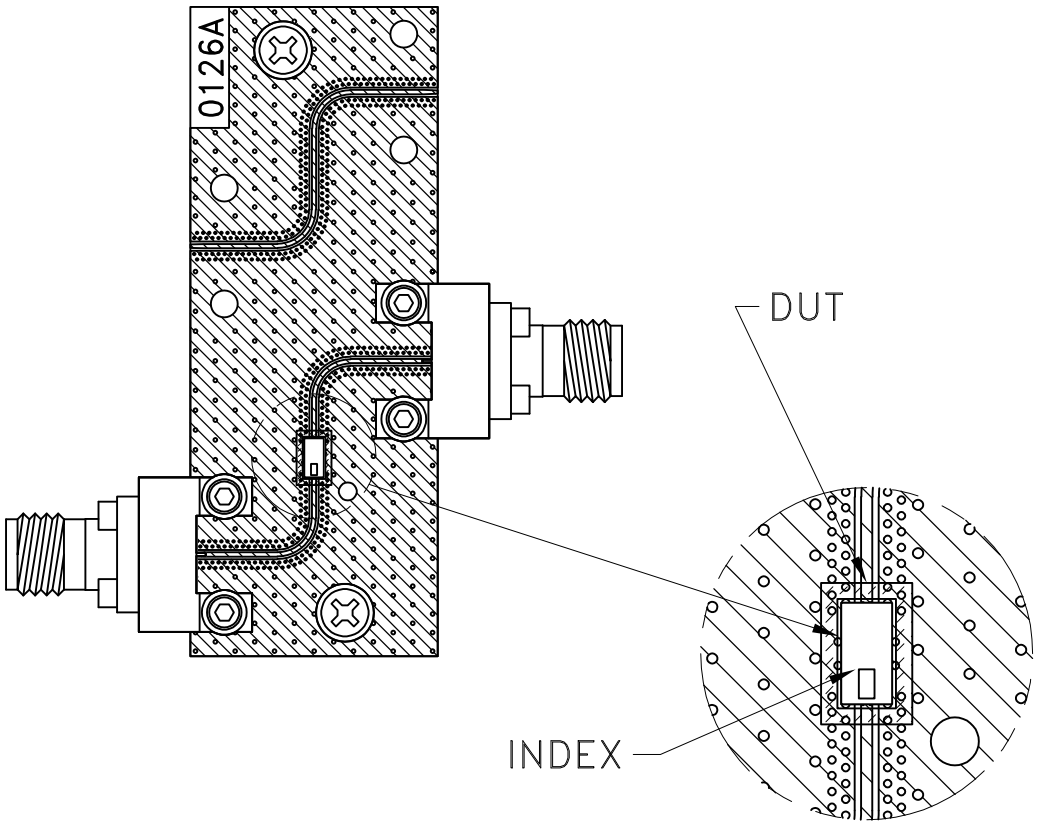
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

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

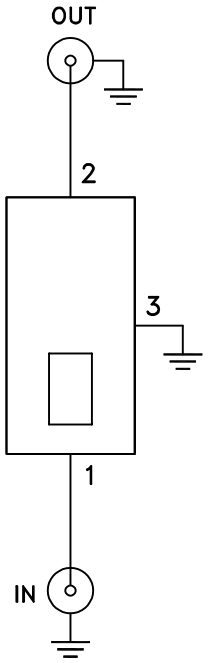
| SIZE | CODE IDENT | DRAWING NO: | REV: |
|---|---|---|---|
| A | 15542 | 98-PL-702 | OR |

| FILE: | SCALE: | SHEET: |
|---|---|---|
| 98PL702 | 8:1 | 1 OF 1 |

# Evaluation Board and Circuit




TB-LFCN-2752C+




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®

Mini-Circuits

# Environmental Specifications ENV06T8

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<br>Ambient Environment | Individual Model Data Sheet |
| Storage Temperature | -55° to 125° C<br>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 | |