CERAMIC

# Bandpass Filter

# BFCV-2792+

50Ω 27.5 to 28.35 GHz

## THE BIG DEAL

- 5G n261 bandpass filter
- Low Insertion Loss – Mid band 3 dB typical
- Pick and place standard case style
- Small size 3.2mm x 2.5mm
- Reduced footprint area by employing LGA (Land grid array)
- Suited for very high-volume production
- High quality distributed filter topology

*Generic photo used for illustration purposes only*

CASE STYLE: JV1210C-10

***+RoHS Compliant***

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

## APPLICATIONS

- 5G Telecommunications

## PRODUCT OVERVIEW

The BFCV-2792+ LTCC Bandpass Filter covers the 5G n261 band. This corresponds to a passband of 27.5 to 28.35 GHz, with as low as 2.3 dB passband loss, and up to 35dB stopband rejection. This model handles up to 1W RF input power and provides a wide operating temperature range from -55 to +125°C. Utilizing a proprietary LTCC material system and a distributed filter topology, this filter is able to achieve repeatable performance on a lot-to-lot basis, up to mmWave frequencies.

## KEY FEATURES

| Feature | Advantages |
|---|---|
| 5G n261 band compatible | Designed for 5G Telecommunications, n261 band, 27.5 - 28.35 GHz |
| Proprietary mmWave compatible LTCC material system | Low loss and repeatable performance on a lot-to-lot basis up to mmWave frequencies. |
| Cost effective | LTCC is scalable technology that allows for cost reduction at volume. |
| Small size (3.2mm x 2.5mm) | Allows for high layout density of circuit boards, while minimizing effects of parasitics. |
| Surface Mountable | Suitable for very high volume automated assembly process |

# Bandpass Filter

## BFCV-2792+

### ELECTRICAL SPECIFICATIONS[1] AT 25°C

| Parameter | | F# | Frequency (GHz) | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|---|
| Passband | Center Frequency | — | — | — | 28.3 | — | GHz |
| | Insertion Loss | F1-F2 | 27.5 - 28.35 | — | 3.0 | — | dB |
| | Return Loss | F1-F2 | 27.5 - 28.35 | — | 11 | — | dB |
| Stop Band, Lower | Insertion Loss | DC-F3 | 0.1 - 21 | 35 | 42 | — | dB |
| | | | 21 - 25.5 | 20 | 26 | — | |
| Stop Band, Upper | Insertion Loss | F4-F5 | 31 - 35 | 16 | 22 | — | dB |
| | | | 35 - 45 | — | 12 | — | |

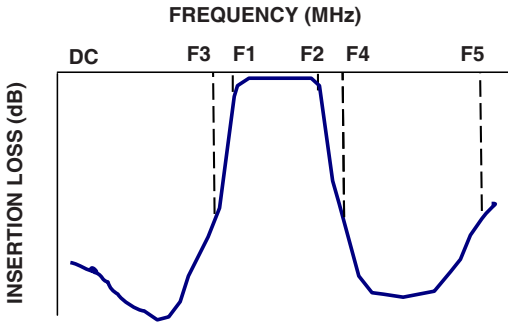
1. Measured on Mini-Circuits Test Board TB-BFCV-2792C+ with feedline losses removed by normalization of S12 and S21 traces to measurement of the thru-line.

### MAXIMUM RATINGS

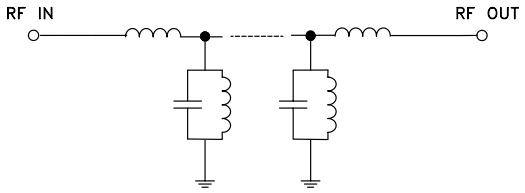
| Parameter | Ratings |
|---|---|
| Operating temperature | -55°C to +125°C |
| Storage temperature | -55°C to +125°C |
| RF Power Input | 1W max. |

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

### TYPICAL FREQUENCY RESPONSE




### FUNCTIONAL SCHEMATIC



# Bandpass Filter

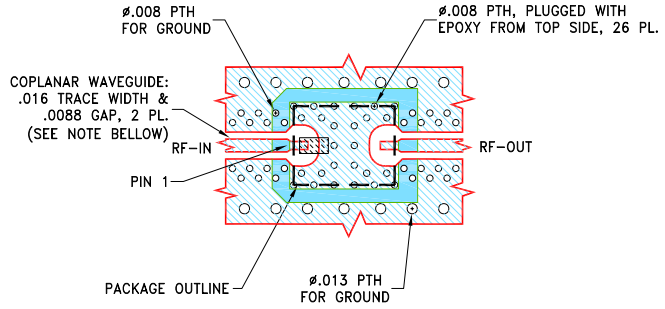
## BFCV-2792+

### PAD CONNECTIONS

| | |
|---|---|
| INPUT | 1 |
| OUTPUT | 2 |
| GROUND | 3 |

### PRODUCT MARKING: N/A

### DEMO BOARD MCL P/N: TB-BFCV-2792C+
### SUGGESTED PCB LAYOUT: PL-712

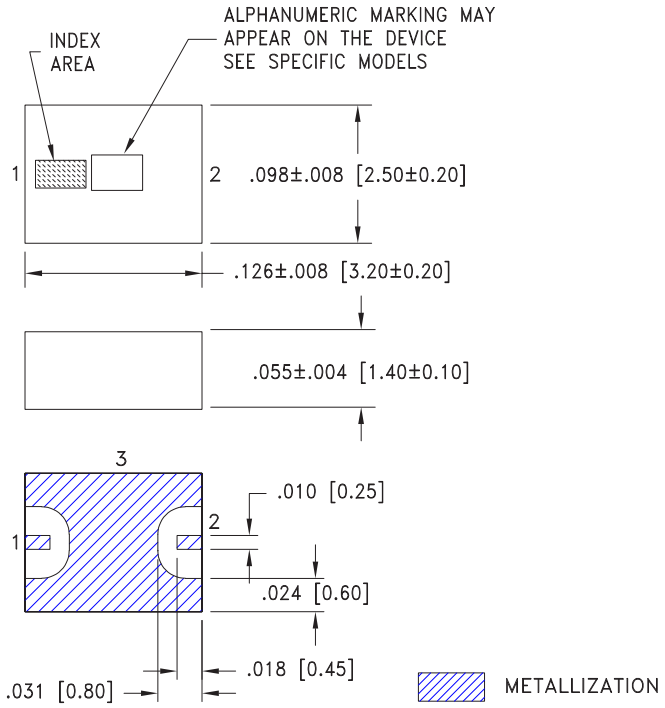



NOTES:
1. TRACE WIDTH & GAP PARAMETERS ARE SHOWN FOR MEGTRON-7 R5785(N); DIELECTRIC THICKNESS: .0079±.001; COPPER: HVLP/HVLP. FOR OTHER MATERIALS TRACE WIDTH & GAP MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

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

DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK.

### OUTLINE DRAWING

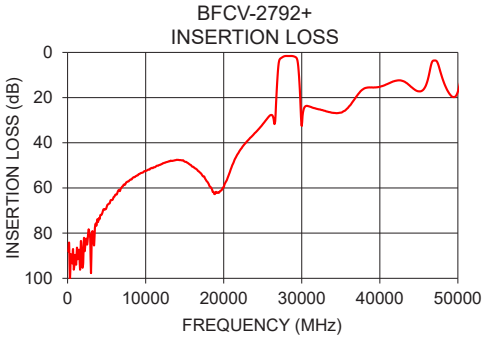


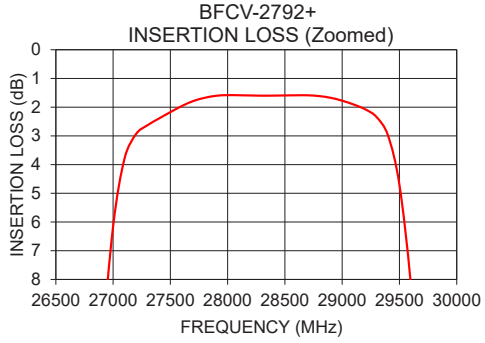

Weight: .045 grams

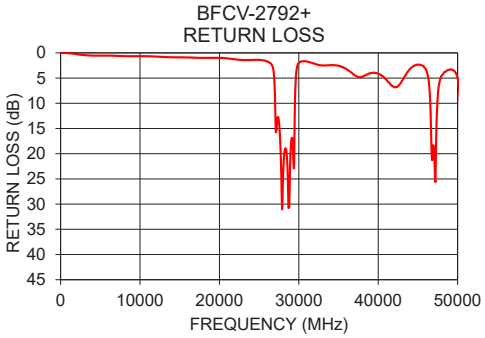
Dimensions are in inches (mm). Tolerances: 3 Pl. ±.005

## TYPICAL PERFORMANCE DATA AT 25°C

| Frequency (MHz) | Insertion Loss (dB) | Return Loss (dB) |
|---|---|---|
| 100 | 88.09 | 0.01 |
| 5000 | 68.52 | 0.54 |
| 10000 | 52.51 | 0.65 |
| 12500 | 48.81 | 0.77 |
| 15000 | 48.32 | 0.88 |
| 17500 | 54.91 | 0.98 |
| 20000 | 59.70 | 0.98 |
| 22500 | 41.35 | 1.38 |
| 25000 | 31.80 | 1.39 |
| 27500 | 2.17 | 13.76 |
| 28300 | 1.58 | 25.19 |
| 28400 | 1.61 | 30.54 |
| 30000 | 32.58 | 1.99 |
| 32500 | 25.47 | 2.37 |
| 35000 | 26.66 | 2.55 |
| 37500 | 17.32 | 4.79 |
| 40000 | 15.22 | 4.12 |
| 42500 | 12.37 | 6.58 |
| 45000 | 17.23 | 2.36 |
| 50000 | 17.34 | 5.01 |




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

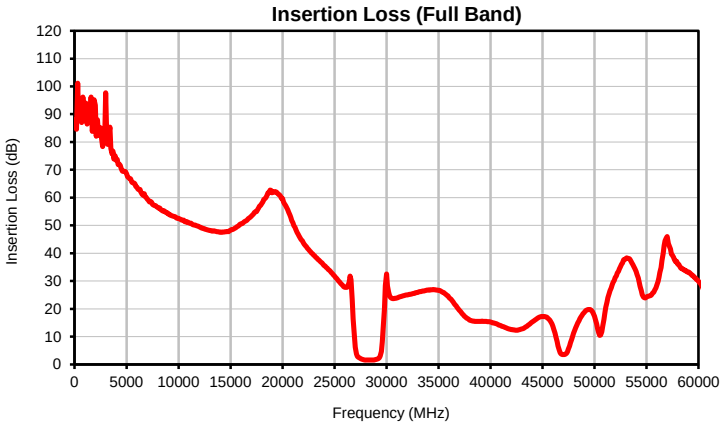
# Ceramic Bandpass Filter BFCV-2792+

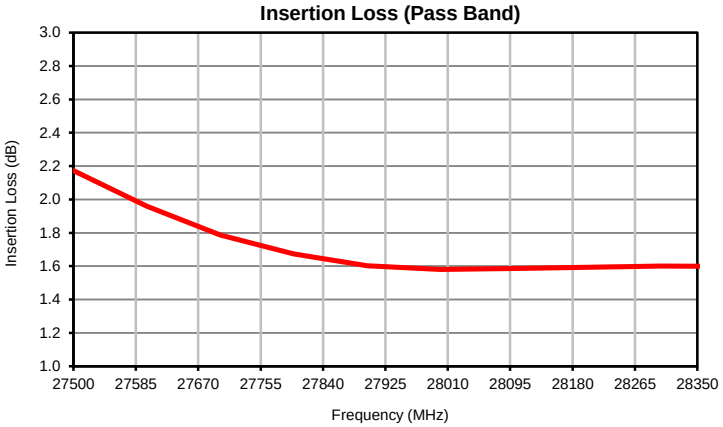
*Typical Performance Data*

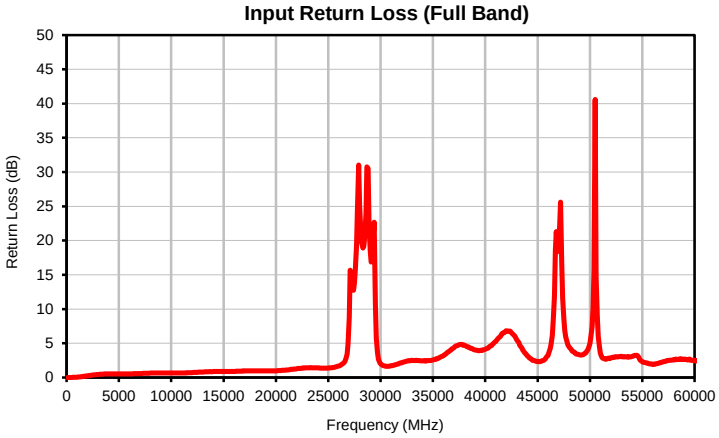
| FREQUENCY (MHz) | INSERTION LOSS (dB) | INPUT RETURN LOSS (dB) | OUTPUT RETURN LOSS (dB) |
|---|---|---|---|
| 100 | 88.09 | 0.01 | 0.01 |
| 2600 | 81.72 | 0.38 | 0.32 |
| 5100 | 67.51 | 0.54 | 0.50 |
| 7700 | 57.13 | 0.63 | 0.56 |
| 10200 | 52.19 | 0.65 | 0.60 |
| 12800 | 48.44 | 0.80 | 0.74 |
| 15300 | 48.76 | 0.89 | 0.79 |
| 17900 | 57.26 | 0.99 | 0.93 |
| 20400 | 56.53 | 1.01 | 0.95 |
| 23000 | 39.31 | 1.43 | 1.24 |
| 23100 | 38.97 | 1.42 | 1.25 |
| 26500 | 31.73 | 2.17 | 2.07 |
| 26600 | 30.43 | 2.40 | 2.26 |
| 26700 | 23.22 | 2.76 | 2.63 |
| 26800 | 16.38 | 3.41 | 3.27 |
| 26900 | 10.57 | 4.93 | 4.77 |
| 27000 | 6.15 | 8.72 | 8.55 |
| 27100 | 3.78 | 15.66 | 15.56 |
| 27200 | 2.94 | 15.15 | 15.13 |
| 27300 | 2.63 | 12.96 | 12.75 |
| 27400 | 2.40 | 12.72 | 12.46 |
| 27500 | 2.17 | 13.76 | 13.59 |
| 27600 | 1.96 | 15.81 | 15.73 |
| 27700 | 1.79 | 19.25 | 19.28 |
| 27800 | 1.67 | 24.61 | 26.03 |
| 27900 | 1.60 | 31.04 | 35.84 |
| 28000 | 1.58 | 25.19 | 25.10 |
| 28100 | 1.59 | 21.39 | 20.62 |
| 28200 | 1.59 | 19.67 | 18.52 |
| 28300 | 1.60 | 18.91 | 17.73 |
| 28400 | 1.60 | 19.20 | 17.74 |
| 28500 | 1.59 | 20.65 | 18.28 |
| 28600 | 1.59 | 23.89 | 19.87 |
| 28700 | 1.59 | 30.76 | 21.42 |
| 28800 | 1.61 | 30.54 | 21.53 |
| 28900 | 1.67 | 22.53 | 19.90 |
| 29000 | 1.78 | 18.56 | 17.47 |
| 29100 | 1.91 | 16.86 | 15.86 |
| 29200 | 2.07 | 16.97 | 15.54 |
| 29300 | 2.34 | 20.87 | 16.12 |
| 29400 | 2.99 | 22.68 | 14.29 |
| 29500 | 4.72 | 10.70 | 8.64 |
| 29600 | 8.20 | 5.74 | 4.81 |
| 29700 | 13.31 | 3.59 | 3.06 |
| 29800 | 19.82 | 2.66 | 2.32 |
| 29900 | 28.43 | 2.22 | 1.95 |
| 30000 | 32.58 | 1.99 | 1.75 |
| 30100 | 28.14 | 1.84 | 1.65 |
| 32500 | 25.47 | 2.37 | 2.24 |
| 35000 | 26.66 | 2.55 | 2.09 |
| 35100 | 26.61 | 2.60 | 2.10 |
| 36300 | 23.00 | 3.54 | 2.86 |
| 37500 | 17.32 | 4.79 | 3.95 |
| 38700 | 15.48 | 4.25 | 3.59 |
| 40000 | 15.22 | 4.12 | 3.47 |
| 40100 | 15.12 | 4.22 | 3.51 |
| 43000 | 12.72 | 5.51 | 4.65 |
| 46000 | 13.74 | 3.25 | 3.11 |
| 49000 | 18.66 | 3.33 | 2.91 |
| 52000 | 31.21 | 2.86 | 2.51 |
| 55000 | 24.23 | 2.31 | 2.96 |
| 58000 | 36.05 | 2.60 | 2.48 |
| 61000 | 20.17 | 2.63 | 3.10 |

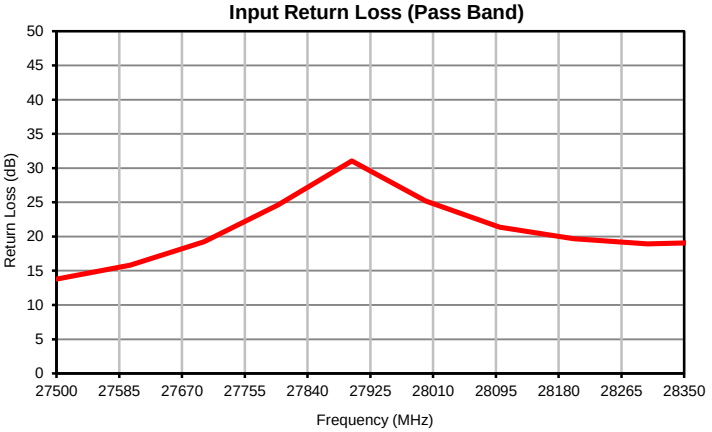
# Ceramic Bandpass Filter BFCV-2792+

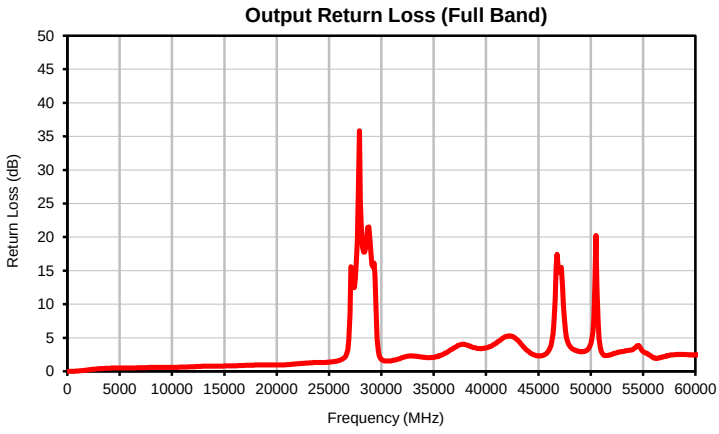
*Typical Performance Curves*

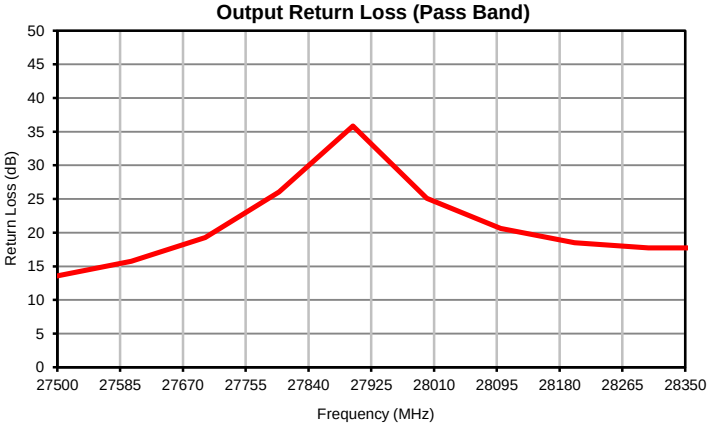


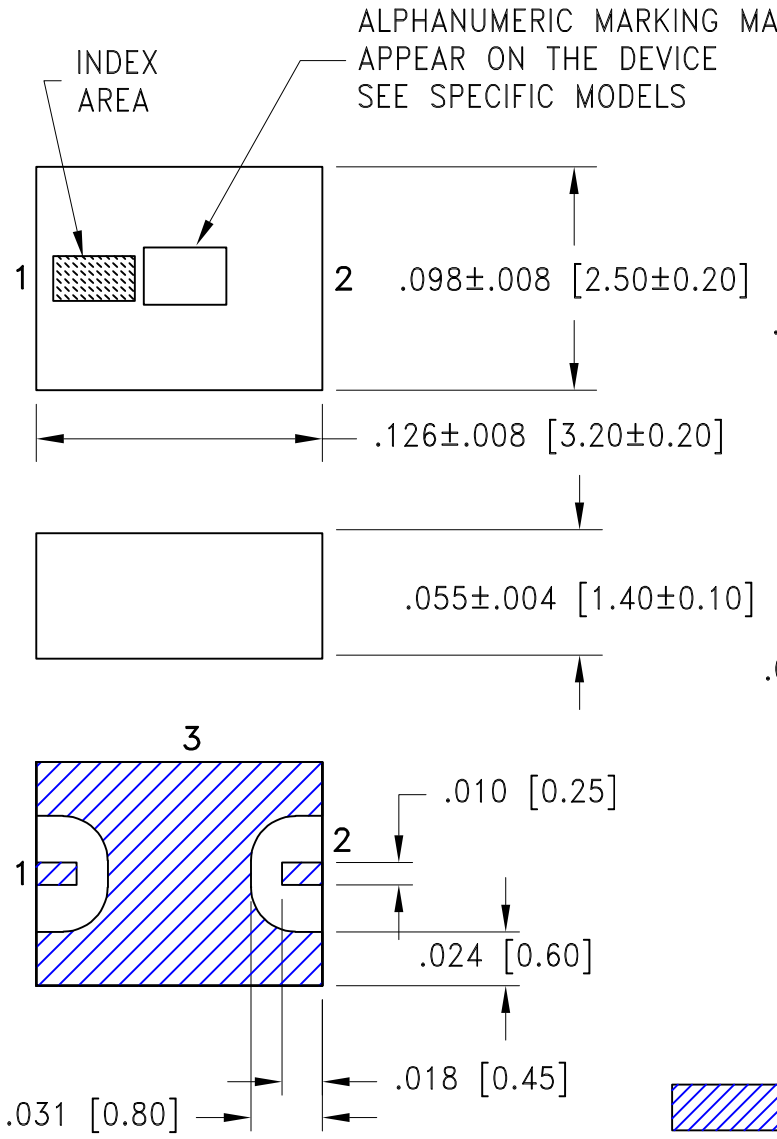



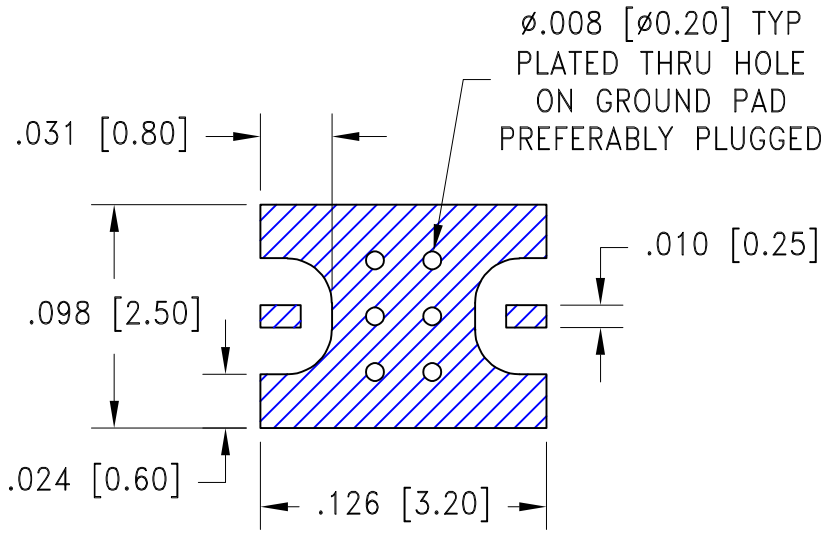
# Case Style JV

## Outline Dimensions

**JV1210C-10**




### PCB Land Pattern




**Suggested Layout**
**Tolerances to be within ±.002**

**Weight: .045 grams**

**Dimensions are in inches (mm). Tolerances: 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.
3. Pad tolerance is non-cumulative. Minimum spacing between each pad is .004.

# Tape & Reel Packaging TR-F74

## DEVICE ORIENTATION IN T&R

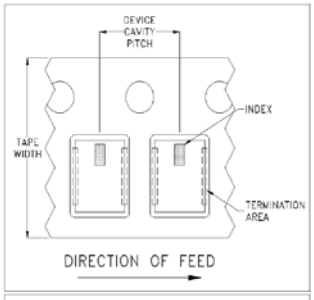



**ILLUSTRATION 1**

| Applicable Case Styles |
|---|
| GE0805C-1 |
| GE0805C-1AP |
| JV1210C-1 |
| GU2939 |

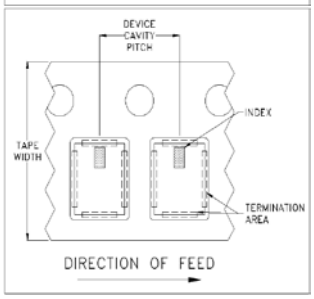



**ILLUSTRATION 2**

| Applicable Case Styles |
|---|
| JV1210C |
| JV1210C-2 |
| JV1210C-3 |
| JV1210C-4 |
| JV1210C-5 |
| JV1210C-6 |
| JV1210C-11 |

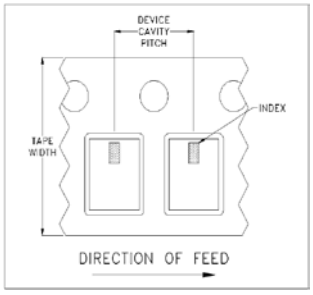



**ILLUSTRATION 3**

| Applicable Case Styles |
|---|
| JC0603C-8 |
| JV1210C-7 |
| JV1210C-8 |
| JV1210C-9 |
| JV1210C-10 |
| JV1210C-13 |
| GE0805C-13 |

| Tape Width, mm | Device Cavity Pitch, mm | Real Size, inches | Devices per Reel | |
|---|---|---|---|---|
| 8 | 4 | 7 | Small quantity standards **(see note)** | 20 |
| | | | | 50 |
| | | | | 100 |
| | | | | 200 |
| | | | | 500 |
| | | | | 1000 |
| | | | Standard | 2000 |
| | | | | 4000 |

Note: Small reel availability varies by model. Refer to pricing and availability on individual model dashboard.

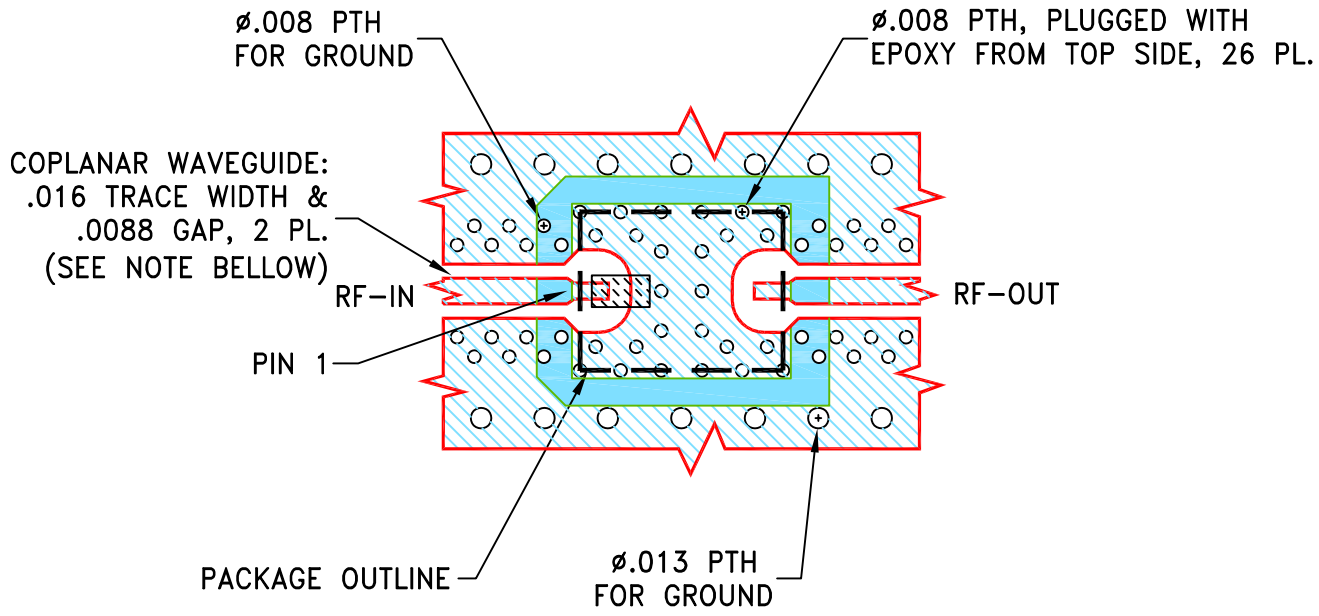
Mini-Circuits carrier tape materials provide protection from ESD (Electro-Static Discharge) during handling and transportation. Tapes are static dissipative and comply with industry standards EIA-481/EIA-541.
Go to: www.minicircuits.com/pages/pdfs/tape.pdf

Mini-Circuits®
INTERNET http://www.minicircuits.com
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661
Distribution Centers NORTH AMERICA 800-654-7949 • 417-335-5935 • Fax 417-335-5945 • EUROPE 44-1252-832600 • Fax 44-1252-837010
Mini-Circuits ISO 9001 & ISO 14001 Certified

THIRD ANGLE PROJECTION

| REVISIONS | | | | | |
|---|---|---|---|---|---|
| REV | ECN No. | DESCRIPTION | DATE | DR | AUTH |
| OR | ECO-008442 | NEW RELEASE | 06/24/21 | ITG | IL |
| | | | | | |
| | | | | | |
| | | | | | |

## SUGGESTED MOUNTING CONFIGURATION
## JV1210C-10 CASE STYLE




NOTES:
1. TRACE WIDTH & GAP PARAMETERS ARE SHOWN FOR MEGTRON-7 R5785(N); DIELECTRIC THICKNESS: .0079±.001; COPPER: HVLP/HVLP. 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 | ITG | 06/24/21 |
| TOLERANCES ON: | CHECKED | GF | 06/24/21 |
| 2 PL DECIMALS ± | APPROVED | IL | 06/24/21 |
| 3 PL DECIMALS ± .005 | | | |
| ANGLES ± | | | |
| FRACTIONS ± | | | |



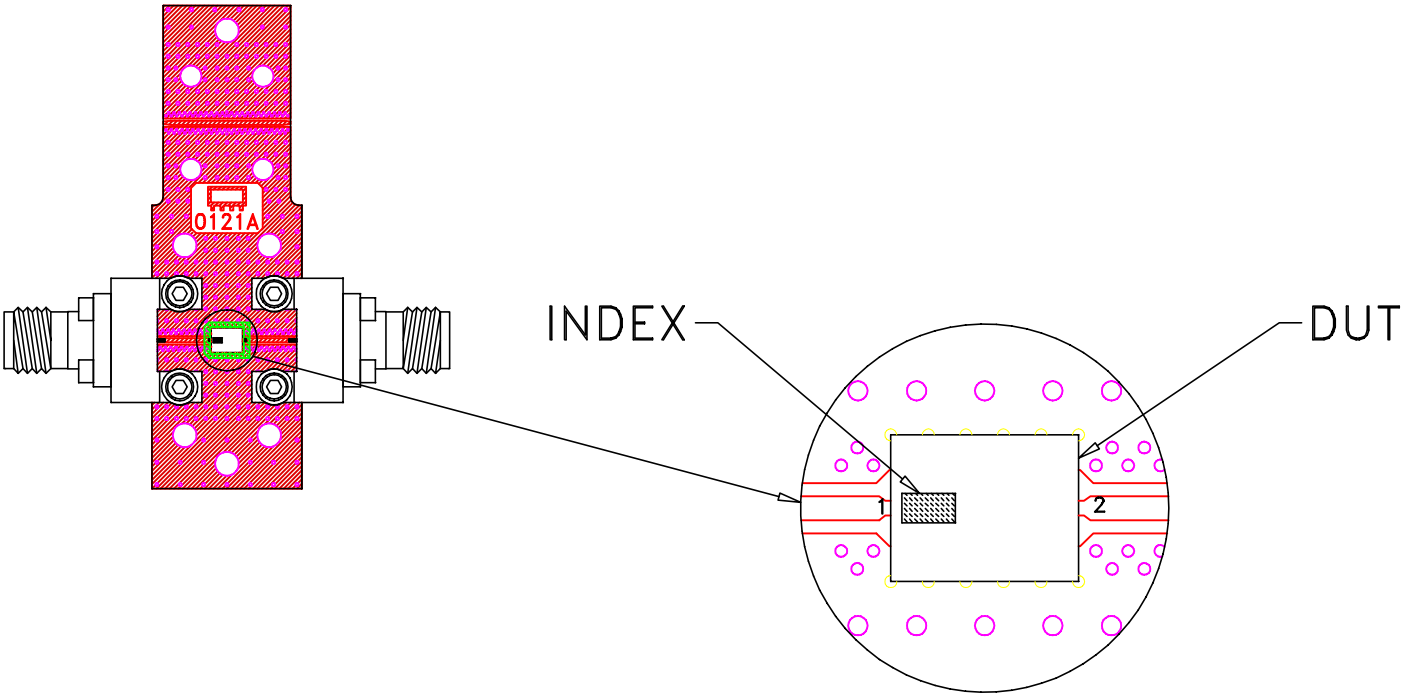
ASHEETA1.DWG REV:A DATE:01/12/95

Mini-Circuits®
13 Neptune Avenue
Brooklyn NY 11235

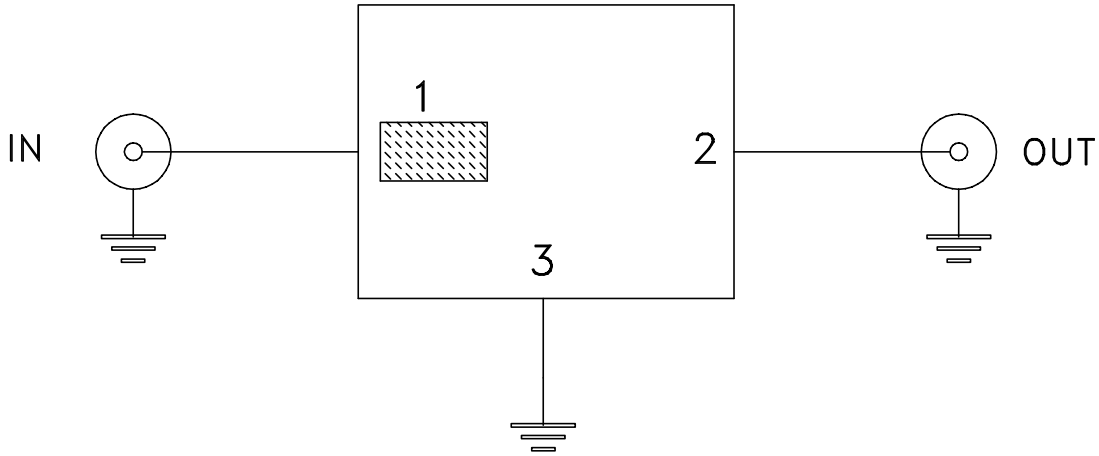
# PL, JV1210C-10, TB-BFCV-2852C+

| SIZE | CODE IDENT | DRAWING NO: | REV: |
|---|---|---|---|
| A | 15542 | 98-PL-712 | OR |
| FILE: 98PL712 | SCALE: 8:1 | SHEET: 1 OF 1 | |

# Evaluation Board and Circuit




TB-BFCV-2792C+




Schematic Diagram

1. 50 Ohm SMA Female connectors.
2. PCB Material: Megtron 7 or equivalent,
   Dielectric Constant=3.6, 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 | |