

50Ω

DC to 10.6 GHz

## The Big Deal

- Small size 0603 (1.6 x 0.8 mm)
- Low insertion loss, 2.1 dB typical
- Rejection 20 dB typical from 12 to 15.21 GHz
- Good power handling, 4W



CASE STYLE: JC0603C-1

## Product Overview

Mini-Circuits' LFCW-1062+ is a Low Temperature Co-fired Ceramic (LTCC) low pass filter, designed in a very small, 0603 package. The multilayer construction provides high repeatability of performance. Small, wrap-around terminations minimize variations in performance due to parasitics. Covering DC – 10.6 GHz, these units offer low insertion loss, good rejection, and excellent power handling capability.

## Key Features

| Feature                                              | Advantages                                                                                                |
|------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| Small size 0603 (1.6 x 0.8 mm)                       | Allows for high layout density of circuit boards while minimizing the effects of parasitics.              |
| Stop band rejection 20 dB typical over 12 –15.21 GHz | Provides good rejection in a tiny package, saving PCB space for customers.                                |
| Wrap-around terminations                             | Provides excellent solderability and easy visual inspection.                                              |
| LTCC construction                                    | Rugged package, well-suited for tough environments including high humidity and high temperature extremes. |

### Notes

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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)



# Ceramic Low Pass Filter

50Ω DC<sup>1</sup> to 10.6 GHz

LFCW-1062+



Generic photo used for illustration purposes only

CASE STYLE: JC0603C-1

## Features

- Good power handling, 4W
- Small size 0603 (1.6 x 0.8 mm)
- 7 sections
- Temperature stable
- LTCC construction

## +RoHS Compliant

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

## Applications

- Harmonic Rejection
- VHF/UHF transmitters / receivers
- lab use

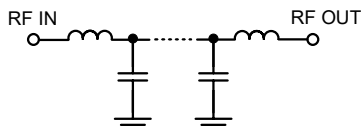
## Electrical Specifications<sup>1,2</sup> at 25°C

| Parameter | F#             | Frequency (GHz) | Min. | Typ. | Max. | Unit |
|-----------|----------------|-----------------|------|------|------|------|
| Pass Band | Insertion Loss | DC - F1         | —    | —    | 2.8  | dB   |
|           | Freq. cut-off  | F2              | —    | 3.0  | —    | dB   |
|           | VSWR           | DC - F1         | —    | 2.2  | —    | :1   |
| Stop Band | Rejection      | F3              | —    | 20   | —    | dB   |
|           | Loss           | F4 - F5         | 25   | 31   | —    | :1   |
|           |                | F6              | —    | 20   | —    | dB   |

1 In Application where DC voltage is present at either input or output port, coupling capacitors are required.

2 Measured on Mini-Circuits Characterization Test Board TB-720+

## Functional Schematic



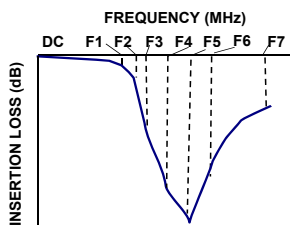
## Maximum Ratings

|                             |                |
|-----------------------------|----------------|
| Operating Temperature       | -55°C to 100°C |
| Storage Temperature         | -55°C to 100°C |
| RF Power Input <sup>3</sup> | 4W at 25°C     |

<sup>3</sup>Passband rating, derate linearly to 1.6W at 100°C ambient ([Reference AN-75-005](#))

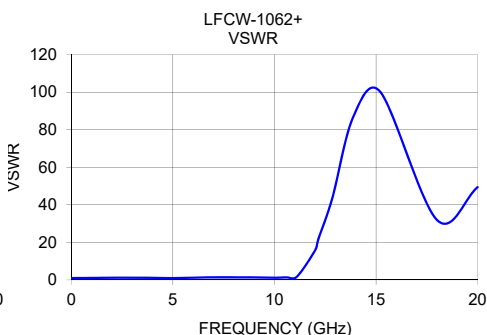
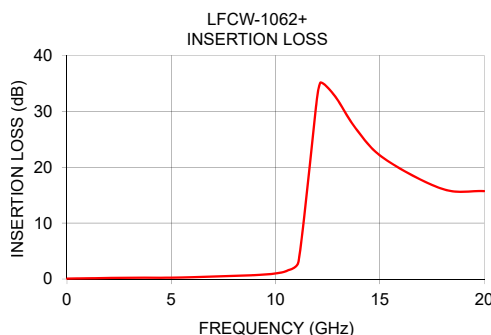
Permanent damage may occur if any of these limits are exceeded.

## Typical Frequency Response



## Typical Performance Data at 25°C

| Frequency (MHz) | Insertion Loss (dB) | VSWR (:1) |
|-----------------|---------------------|-----------|
| 0.01            | 0.07                | 1.00      |
| 0.50            | 0.10                | 1.03      |
| 1.00            | 0.13                | 1.07      |
| 3.00            | 0.23                | 1.21      |
| 5.00            | 0.24                | 1.01      |
| 7.00            | 0.44                | 1.38      |
| 9.00            | 0.69                | 1.34      |
| 10.00           | 1.00                | 1.18      |
| 10.60           | 1.56                | 1.38      |
| 11.10           | 3.10                | 1.69      |
| 12.00           | 32.69               | 15.76     |
| 12.16           | 35.14               | 21.74     |
| 12.86           | 32.64               | 44.06     |
| 13.86           | 26.86               | 86.35     |
| 15.21           | 21.54               | 100.15    |
| 18.00           | 16.11               | 31.94     |
| 20.00           | 15.72               | 49.40     |



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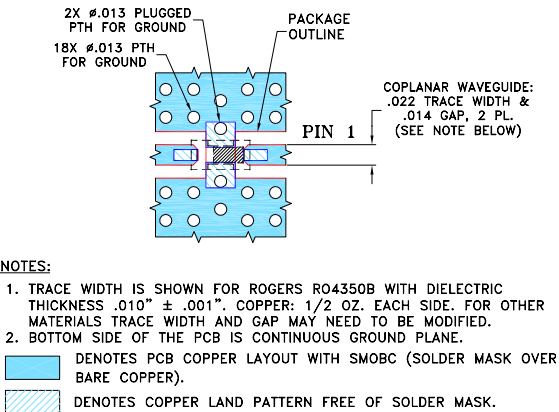
[www.minicircuits.com](http://www.minicircuits.com) P.O. Box 350166, Brooklyn, NY 11235-0003 (718) 934-4500 [sales@minicircuits.com](mailto:sales@minicircuits.com)

REV. C  
ECO-011685  
ED-15030/1  
LFCW-1062+  
MY/CP/AM  
220201  
Page 2 of 3

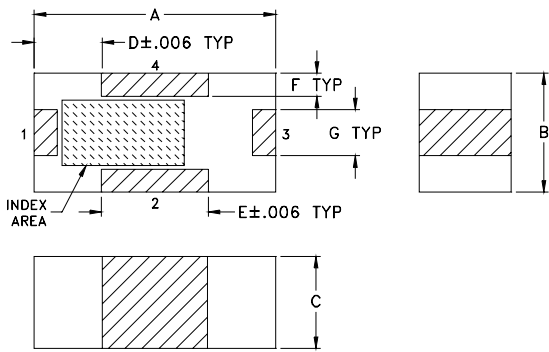
|                 |     |
|-----------------|-----|
| Pad Connections |     |
| INPUT           | 1   |
| OUTPUT          | 3   |
| GROUND          | 2,4 |

Product Marking: N/A

Evaluation Board MCL P/N: TB-720+  
Suggested PCB Layout (PL-412)



Outline Drawing



Outline Dimensions ( inch mm)

| A    | B    | C    | D    | E    | F    | G    | wt    |
|------|------|------|------|------|------|------|-------|
| .063 | .031 | .024 | .018 | .028 | .006 | .012 | grams |
| 1.60 | 0.79 | 0.61 | 0.46 | 0.71 | 0.15 | 0.30 | 0.005 |

Notes

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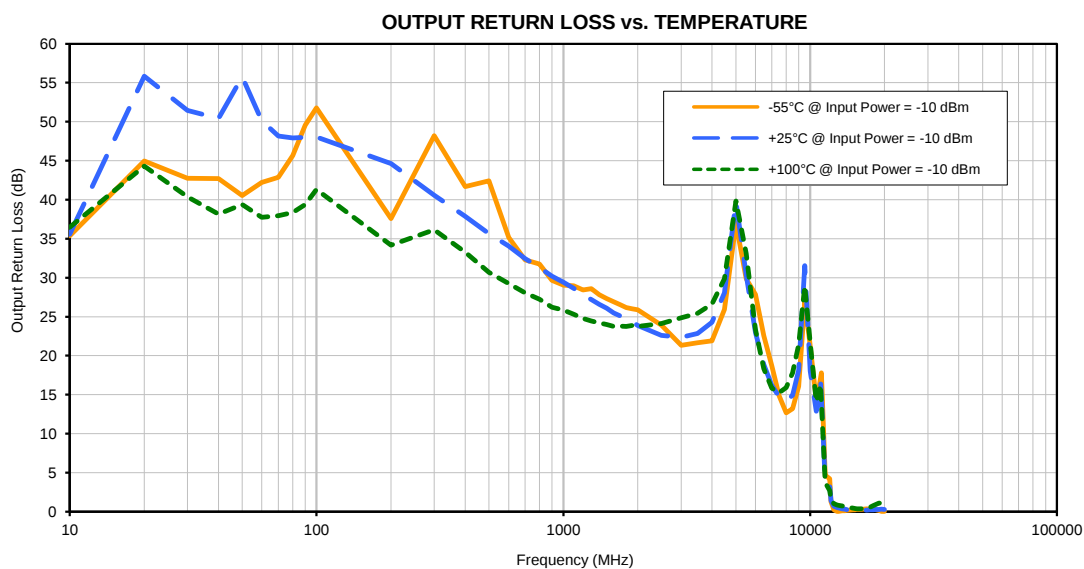
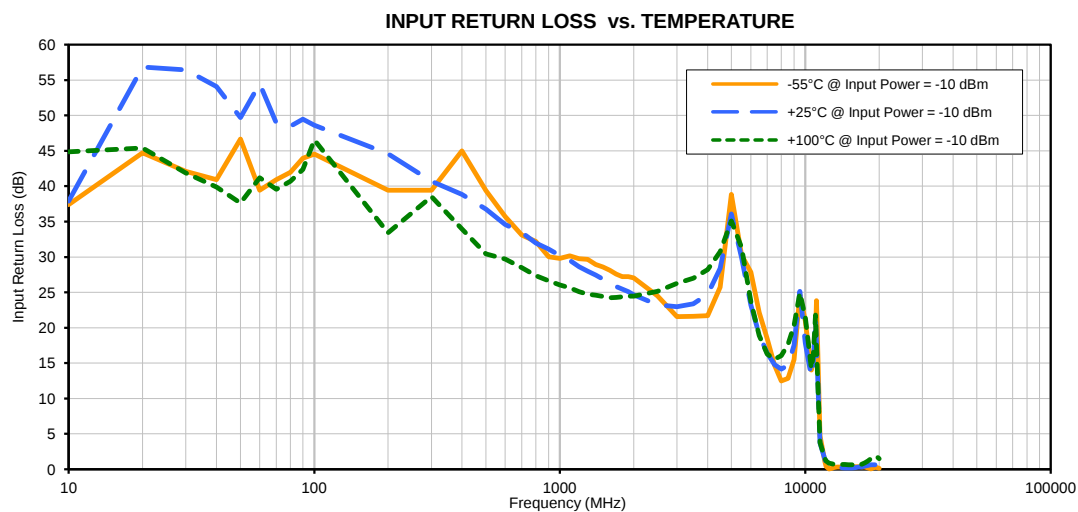
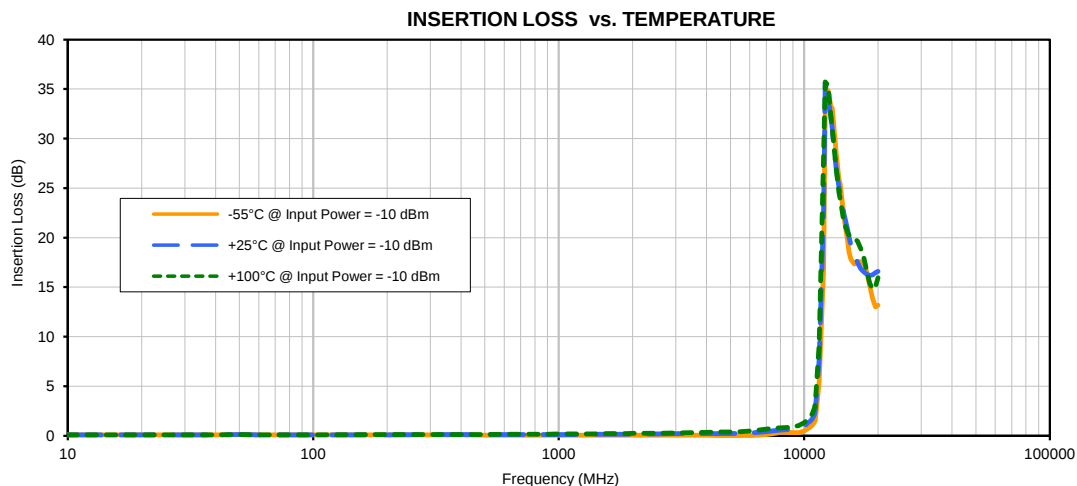
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## Typical Performance Data

| FREQ.<br>(MHz) | INSERTION LOSS<br>(dB) |        |         | INPUT RETURN LOSS<br>(dB) |        |         | OUTPUT RETURN LOSS<br>(dB) |        |         |
|----------------|------------------------|--------|---------|---------------------------|--------|---------|----------------------------|--------|---------|
|                |                        |        |         |                           |        |         |                            |        |         |
|                | @ -55°C                | @+25°C | @+100°C | @ -55°C                   | @+25°C | @+100°C | @ -55°C                    | @+25°C | @+100°C |
| 10.0           | 0.08                   | 0.09   | 0.08    | 37.38                     | 37.90  | 44.86   | 35.37                      | 35.59  | 36.46   |
| 20.0           | 0.08                   | 0.08   | 0.09    | 44.74                     | 56.84  | 45.42   | 44.95                      | 55.82  | 44.32   |
| 30.0           | 0.08                   | 0.08   | 0.09    | 42.09                     | 56.44  | 41.87   | 42.75                      | 51.44  | 40.35   |
| 40.0           | 0.08                   | 0.08   | 0.09    | 40.94                     | 54.10  | 39.89   | 42.71                      | 50.41  | 38.17   |
| 50.0           | 0.12                   | 0.13   | 0.13    | 46.68                     | 49.68  | 37.60   | 40.55                      | 55.75  | 39.39   |
| 60.0           | 0.08                   | 0.08   | 0.09    | 39.41                     | 54.47  | 41.17   | 42.22                      | 50.12  | 37.73   |
| 70.0           | 0.08                   | 0.09   | 0.10    | 40.92                     | 48.94  | 39.56   | 42.89                      | 48.17  | 37.95   |
| 80.0           | 0.09                   | 0.09   | 0.10    | 41.94                     | 48.46  | 40.70   | 45.68                      | 47.92  | 38.38   |
| 90.0           | 0.08                   | 0.09   | 0.10    | 43.94                     | 49.48  | 42.37   | 49.56                      | 47.98  | 39.39   |
| 100.0          | 0.08                   | 0.09   | 0.10    | 44.55                     | 48.60  | 46.51   | 51.79                      | 48.06  | 41.31   |
| 100.0          | 0.08                   | 0.09   | 0.10    | 44.55                     | 48.60  | 46.51   | 51.79                      | 48.06  | 41.31   |
| 200.0          | 0.08                   | 0.10   | 0.11    | 39.43                     | 44.58  | 33.41   | 37.57                      | 44.63  | 34.18   |
| 300.0          | 0.08                   | 0.11   | 0.12    | 39.44                     | 40.68  | 38.52   | 48.20                      | 40.58  | 36.15   |
| 400.0          | 0.08                   | 0.11   | 0.13    | 44.99                     | 38.84  | 33.96   | 41.68                      | 37.86  | 33.26   |
| 500.0          | 0.07                   | 0.11   | 0.14    | 39.38                     | 36.76  | 30.42   | 42.41                      | 35.66  | 30.69   |
| 600.0          | 0.07                   | 0.12   | 0.15    | 35.71                     | 34.61  | 29.70   | 35.17                      | 34.04  | 29.24   |
| 700.0          | 0.07                   | 0.12   | 0.15    | 33.08                     | 33.44  | 28.49   | 32.30                      | 32.45  | 28.05   |
| 800.0          | 0.07                   | 0.12   | 0.16    | 32.20                     | 31.97  | 27.36   | 31.75                      | 31.28  | 27.23   |
| 900.0          | 0.07                   | 0.13   | 0.17    | 30.01                     | 31.11  | 26.62   | 29.67                      | 30.17  | 26.20   |
| 1000.0         | 0.07                   | 0.13   | 0.17    | 29.82                     | 30.20  | 26.06   | 29.04                      | 29.43  | 25.83   |
| 1100.0         | 0.07                   | 0.13   | 0.18    | 30.18                     | 29.51  | 25.63   | 28.97                      | 28.63  | 25.32   |
| 1200.0         | 0.06                   | 0.14   | 0.19    | 29.76                     | 28.63  | 25.09   | 28.42                      | 27.80  | 24.79   |
| 1300.0         | 0.06                   | 0.14   | 0.19    | 29.65                     | 27.98  | 24.75   | 28.60                      | 27.21  | 24.44   |
| 1400.0         | 0.06                   | 0.14   | 0.20    | 28.92                     | 27.46  | 24.62   | 27.81                      | 26.59  | 24.21   |
| 1500.0         | 0.06                   | 0.15   | 0.21    | 28.59                     | 26.87  | 24.42   | 27.32                      | 26.10  | 24.00   |
| 1600.0         | 0.06                   | 0.15   | 0.21    | 28.14                     | 26.26  | 24.24   | 26.90                      | 25.49  | 23.75   |
| 1700.0         | 0.06                   | 0.16   | 0.22    | 27.60                     | 25.80  | 24.30   | 26.54                      | 25.10  | 23.80   |
| 1800.0         | 0.06                   | 0.16   | 0.23    | 27.20                     | 25.47  | 24.37   | 26.16                      | 24.66  | 23.73   |
| 1900.0         | 0.06                   | 0.16   | 0.23    | 27.20                     | 25.07  | 24.45   | 26.01                      | 24.36  | 23.88   |
| 2000.0         | 0.06                   | 0.17   | 0.24    | 27.06                     | 24.63  | 24.45   | 25.88                      | 23.86  | 23.74   |
| 2500.0         | 0.06                   | 0.19   | 0.26    | 24.49                     | 23.25  | 25.16   | 23.92                      | 22.58  | 24.13   |
| 3000.0         | 0.07                   | 0.20   | 0.29    | 21.56                     | 22.97  | 26.26   | 21.34                      | 22.35  | 24.85   |
| 3500.0         | 0.06                   | 0.21   | 0.31    | 21.63                     | 23.40  | 26.98   | 21.67                      | 22.87  | 25.42   |
| 4000.0         | 0.06                   | 0.22   | 0.34    | 21.72                     | 24.73  | 28.20   | 21.90                      | 24.30  | 26.62   |
| 4500.0         | 0.04                   | 0.22   | 0.37    | 25.72                     | 28.38  | 30.73   | 25.93                      | 28.08  | 29.86   |
| 5000.0         | 0.03                   | 0.23   | 0.39    | 38.85                     | 36.07  | 35.10   | 36.97                      | 39.77  | 39.83   |
| 5500.0         | 0.03                   | 0.25   | 0.42    | 30.26                     | 29.87  | 31.33   | 29.86                      | 30.34  | 33.11   |
| 6000.0         | 0.04                   | 0.29   | 0.48    | 27.83                     | 23.17  | 23.68   | 27.84                      | 22.99  | 23.34   |
| 6500.0         | 0.06                   | 0.35   | 0.56    | 22.14                     | 19.06  | 18.90   | 22.58                      | 18.88  | 18.35   |
| 7000.0         | 0.11                   | 0.43   | 0.67    | 18.43                     | 16.39  | 16.27   | 18.69                      | 16.20  | 15.84   |
| 7500.0         | 0.21                   | 0.52   | 0.75    | 14.67                     | 14.77  | 15.55   | 14.87                      | 14.73  | 15.24   |
| 8000.0         | 0.34                   | 0.59   | 0.80    | 12.50                     | 14.14  | 16.07   | 12.66                      | 14.18  | 15.93   |
| 8500.0         | 0.35                   | 0.62   | 0.84    | 12.84                     | 14.71  | 17.63   | 13.22                      | 14.93  | 17.79   |
| 9000.0         | 0.32                   | 0.64   | 0.91    | 15.52                     | 17.52  | 20.36   | 16.09                      | 18.13  | 21.43   |
| 9500.0         | 0.32                   | 0.69   | 1.03    | 24.67                     | 25.12  | 24.92   | 27.00                      | 31.54  | 28.96   |
| 10000.0        | 0.48                   | 0.96   | 1.30    | 21.00                     | 17.86  | 21.53   | 21.28                      | 18.05  | 21.65   |
| 10600.0        | 0.91                   | 1.53   | 1.94    | 14.01                     | 13.07  | 14.25   | 14.31                      | 12.88  | 14.10   |
| 10800.0        | 1.08                   | 1.73   | 2.24    | 15.44                     | 14.82  | 16.10   | 15.24                      | 14.13  | 14.92   |
| 11000.0        | 1.36                   | 2.11   | 2.77    | 19.04                     | 21.43  | 21.79   | 17.07                      | 17.05  | 16.27   |
| 11100.0        | 1.58                   | 2.53   | 3.30    | 23.84                     | 18.02  | 17.34   | 17.80                      | 14.86  | 13.95   |
| 11500.0        | 5.42                   | 7.68   | 9.23    | 4.76                      | 3.70   | 3.78    | 4.65                       | 3.70   | 3.71    |
| 12000.0        | 16.92                  | 22.84  | 28.52   | 1.13                      | 1.46   | 1.53    | 4.22                       | 3.34   | 2.68    |
| 12160.0        | 33.32                  | 35.67  | 35.73   | 0.39                      | 0.91   | 1.17    | 1.25                       | 1.43   | 1.56    |
| 12500.0        | 34.84                  | 34.17  | 35.38   | 0.02                      | 0.60   | 0.87    | 0.22                       | 0.71   | 1.03    |
| 12860.0        | 33.17                  | 32.10  | 32.07   | 0.15                      | 0.40   | 0.75    | 0.02                       | 0.51   | 0.87    |
| 13000.0        | 33.06                  | 31.00  | 30.94   | 0.20                      | 0.38   | 0.72    | 0.03                       | 0.48   | 0.82    |
| 13500.0        | 28.60                  | 27.05  | 26.99   | 0.31                      | 0.26   | 0.69    | 0.13                       | 0.35   | 0.75    |
| 13860.0        | 25.82                  | 25.05  | 24.52   | 0.31                      | 0.25   | 0.67    | 0.13                       | 0.32   | 0.67    |
| 14000.0        | 25.37                  | 24.51  | 23.86   | 0.32                      | 0.21   | 0.67    | 0.15                       | 0.27   | 0.64    |
| 14500.0        | 22.18                  | 22.48  | 21.64   | 0.34                      | 0.19   | 0.67    | 0.18                       | 0.21   | 0.54    |
| 15000.0        | 19.68                  | 20.79  | 20.52   | 0.37                      | 0.18   | 0.65    | 0.25                       | 0.17   | 0.45    |
| 15210.0        | 18.61                  | 20.10  | 20.27   | 0.32                      | 0.18   | 0.63    | 0.25                       | 0.14   | 0.42    |
| 15500.0        | 17.84                  | 19.30  | 20.08   | 0.32                      | 0.19   | 0.63    | 0.26                       | 0.16   | 0.37    |
| 16000.0        | 17.33                  | 18.33  | 19.97   | 0.34                      | 0.22   | 0.59    | 0.29                       | 0.16   | 0.37    |
| 16500.0        | 17.56                  | 17.47  | 19.62   | 0.37                      | 0.29   | 0.60    | 0.32                       | 0.19   | 0.40    |
| 17000.0        | 17.57                  | 16.86  | 18.89   | 0.32                      | 0.33   | 0.71    | 0.36                       | 0.21   | 0.49    |
| 17500.0        | 17.34                  | 16.52  | 17.91   | 0.30                      | 0.44   | 0.89    | 0.33                       | 0.22   | 0.56    |
| 18000.0        | 16.54                  | 16.32  | 16.60   | 0.19                      | 0.52   | 1.18    | 0.31                       | 0.22   | 0.76    |
| 18500.0        | 15.19                  | 16.19  | 15.41   | 0.06                      | 0.62   | 1.49    | 0.22                       | 0.28   | 0.92    |
| 19000.0        | 13.86                  | 16.24  | 14.77   | 0.23                      | 0.62   | 1.82    | 0.14                       | 0.28   | 1.09    |
| 19500.0        | 13.00                  | 16.47  | 15.06   | 0.27                      | 0.65   | 1.84    | 0.03                       | 0.30   | 1.06    |
| 20000.0        | 13.16                  | 16.59  | 15.95   | 0.13                      | 0.60   | 1.49    | 0.03                       | 0.27   | 0.93    |

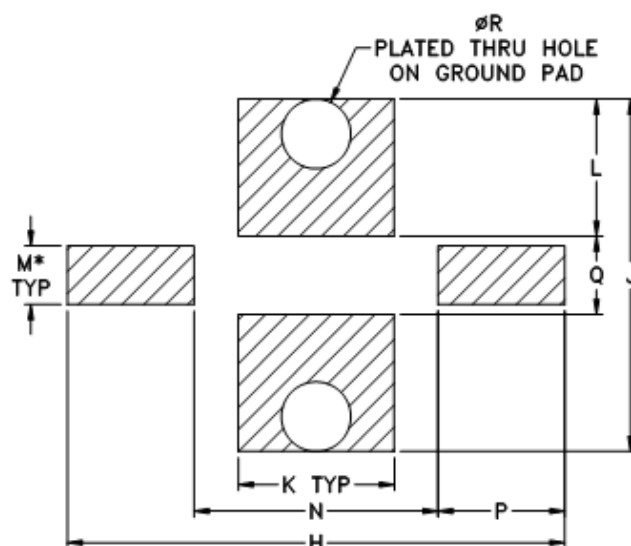
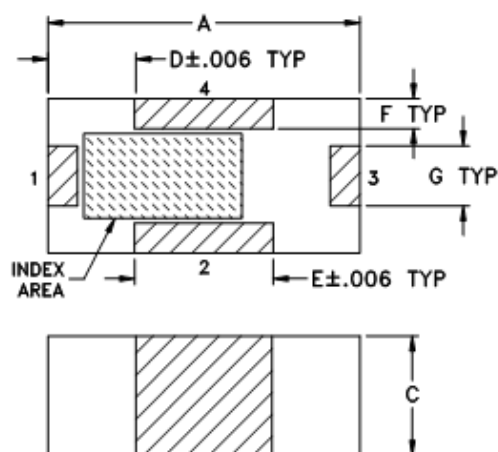
## Typical Performance Data



## Outline Dimensions

JC0603C-1

## PCB Land Pattern



Suggested Layout,  
Tolerance to be within  $\pm .002$

| CASE #    | A              | B              | C              | D              | E              | F              | G              | H              | J              | K              | L              |
|-----------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| JC0603C-1 | .063<br>(1.60) | .031<br>(0.80) | .024<br>(0.60) | .018<br>(0.45) | .028<br>(0.70) | .006<br>(0.15) | .012<br>(0.30) | .100<br>(2.54) | .071<br>(1.80) | .032<br>(0.80) | .028<br>(0.70) |

| CASE #    | M*             | N              | P              | Q              | R              | WT. GRAMS |
|-----------|----------------|----------------|----------------|----------------|----------------|-----------|
| JC0603C-1 | .012<br>(0.30) | .049<br>(1.24) | .026<br>(0.65) | .016<br>(0.40) | .014<br>(0.35) | .005      |

Dimensions are in inches (mm). Tolerances: 3 Pl.  $\pm .004$

### Notes:

1. Open style, ceramic base.
2. Termination finish:  
For RoHS Case Styles: Tin plate over Nickel plate. All models, (+) suffix.
- 3.\* - Line width should be designed to match 50 OHMS characteristic impedance, depending on PCB material & thickness.



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

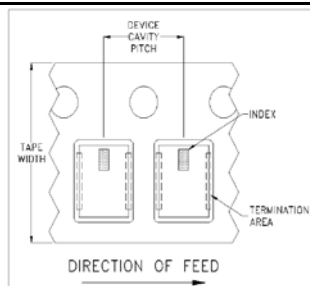


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RF/IF MICROWAVE COMPONENTS

# Tape & Reel Packaging TR-F74

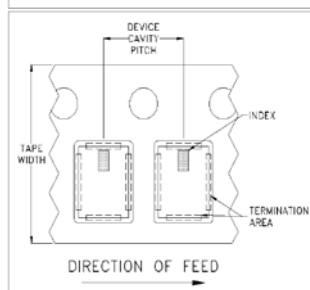
## DEVICE ORIENTATION IN T&R



**ILLUSTRATION 1**

### Applicable Case Styles

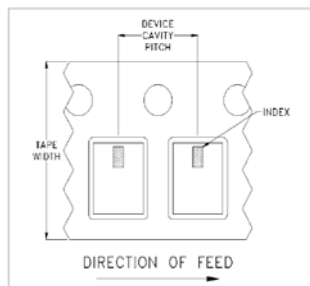
GE0805C-1  
GE0805C-1AP  
JV1210C-1  
GU2939



**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,<br>mm | Device Cavity Pitch,<br>mm | Real Size,<br>inches | Devices per Reel                             |      |
|-------------------|----------------------------|----------------------|----------------------------------------------|------|
| 8                 | 4                          | 7                    | Small<br>quantity<br>standards<br>(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](http://www.minicircuits.com/pages/pdfs/tape.pdf)

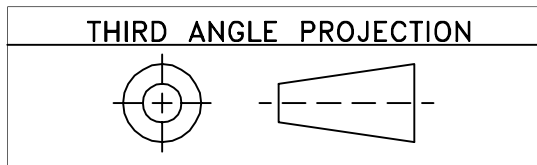


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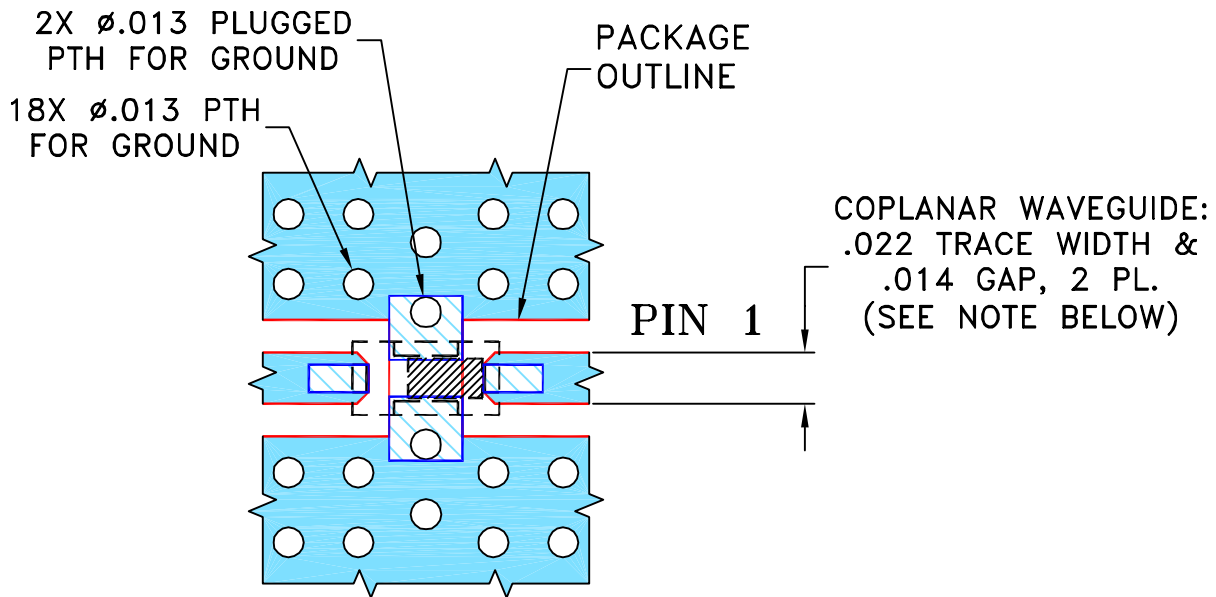
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| REVISIONS |         |             |          |    |      |
|-----------|---------|-------------|----------|----|------|
| REV OR    | ECN No. | DESCRIPTION | DATE     | DR | AUTH |
|           | M144975 | NEW RELEASE | 02/04/14 | AV | RS   |
|           |         |             |          |    |      |
|           |         |             |          |    |      |
|           |         |             |          |    |      |

**SUGGESTED MOUNTING CONFIGURATION**  
**FOR JC0603C-1 CASE STYLE, "04FL01" PIN CODE**

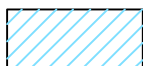


**NOTES:**

1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .010"  $\pm$  .001". COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH AND 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<br>TOLERANCES ON:<br>2 PL DECIMALS $\pm$<br>3 PL DECIMALS $\pm$ .005<br>ANGLES $\pm$<br>FRACTIONS $\pm$ | DRAWN    | AV | 01/24/14 |
|                                                                                                                                  | CHECKED  | IL | 02/03/14 |
|                                                                                                                                  | APPROVED | RS | 02/04/14 |
|                                                                                                                                  |          |    |          |



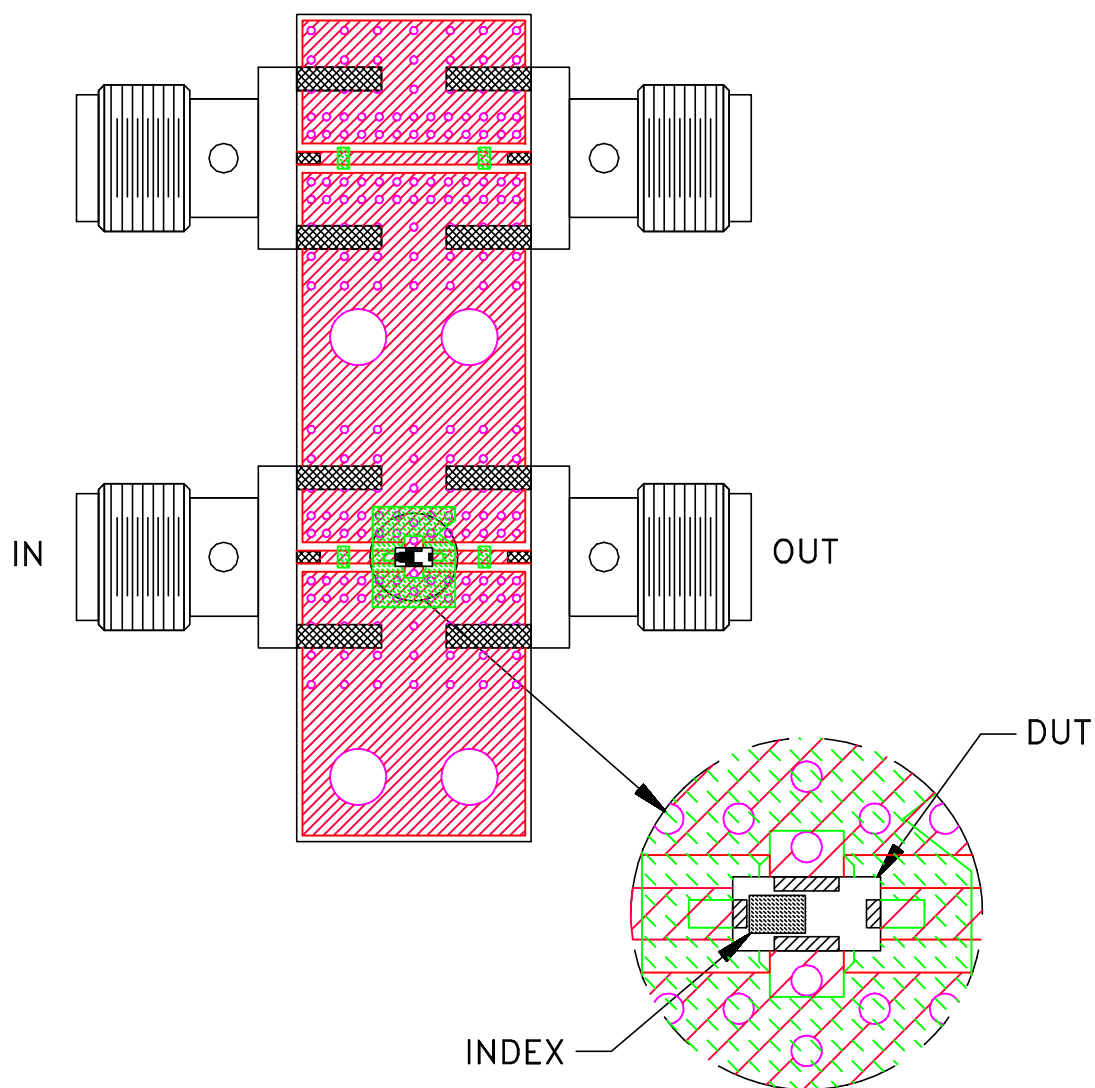
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**PL, 04FL01, JC0603C-1, TB-720+**

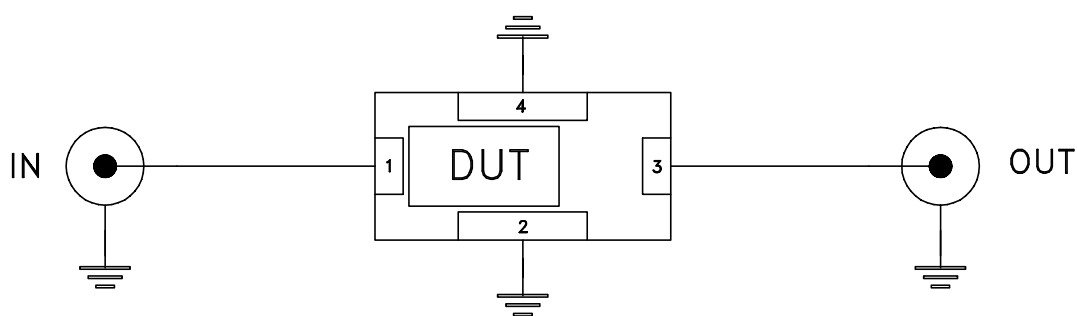
|                                                                                                                                                                                                                                                                                                           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

|                  |                     |                          |            |
|------------------|---------------------|--------------------------|------------|
| SIZE<br>A        | CODE IDENT<br>15542 | DRAWING NO:<br>98-PL-412 | REV:<br>OR |
| FILE:<br>98PL412 | SCALE:<br>12:1      | SHEET:<br>1 OF 1         |            |

# Evaluation Board and Circuit



TB-720+



Schematic Diagram

## Notes:

1. 50 Ohm 2.92 mm End Launch Female connectors.
2. PCB Material: R04350 or equivalent,  
Dielectric Constant=3.5, Thickness=.010 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 100°C<br>Ambient Environment                                                | Individual Model Data Sheet                                                                          |
| Storage Temperature        | -55° to 100° C<br>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<br>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                                                                 |