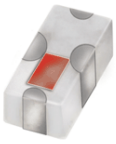
*Ceramic*

# Low Pass Filter

## LFCW-6500+

50Ω DC to 6.5 GHz



*Generic photo used for illustration purposes only*

CASE STYLE: JC0603C-1

## The Big Deal

- Very good rejection, 43 dB typical
- Rugged, ceramic construction
- Tiny size, 0.063" x 0.032" x 0.024" (0603)
- Good power handling, 2.5W

## Product Overview

Mini-Circuits' LFCW-6500+ is an LTCC low pass filter with a passband from DC to 6.5 GHz, supporting a variety of applications. This model provides 1.6 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 2.5W RF input power and provides a wide operating temperature range from -55 to +125°C. Housed in a tiny 0603 ceramic form factor with wraparound terminations, the filter is ideal for dense PCB layouts and with minimal performance variation due to parasitics.

## Key Features

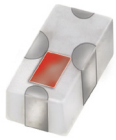
| Feature | Advantages |
|---|---|
| Ultra-wide stopband | The LTCC lowpass filter provides a very good stopband rejection until 26.5 GHz suitable for high end applications. |
| LTCC Construction | Provides repeatable performance in a rugged, ceramic package well suited for tough environments such as high humidity and temperature extremes. |
| Tiny size ( 0.063" x 0.032" x 0.024") | Saves space in dense circuit board layouts and minimizes the effects of parasitics. |
| Good power handling, 2.5W | Supports a wide range of system power requirements. |
| Wrap-around terminations | Provides excellent solderability and easy visual inspection. |

*Ceramic*

# Low Pass Filter

## LFCW-6500+

50Ω DC to 6.5 GHz



*Generic photo used for illustration purposes only*

CASE STYLE: JC0603C-1

***+RoHS Compliant***

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

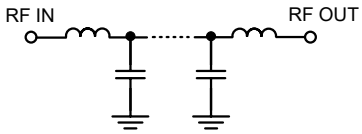
### Features

- Low loss, 1.6 dB typical
- Good rejection 43 dB typical
- Extremely small size 0603 (0.063" X 0.032" X 0.024")
- Temperature stable
- LTCC construction

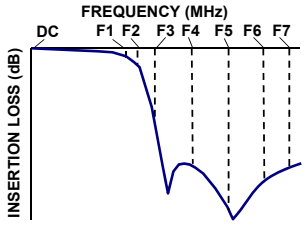
### Applications

- Military radios
- Point-Point communication
- 5G Sub 6 GHz
- WiFi
- ISM band

### Functional Schematic




### Typical Frequency Response




### Electrical Specifications[1,2] at 25°C

| Parameter | | F# | Frequency (MHz) | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| Pass Band | Insertion Loss | DC-F1 | DC - 6500 | — | 1.6 | 2.5 | dB |
| | Freq. Cut-Off | F2* | 7500 | — | 3.0 | — | dB |
| | Return Loss | DC-F1 | DC - 6500 | — | 10 | — | dB |
| Stop Band | Rejection Loss | F3-F4 | 9000 - 9500 | 20 | 43 | — | dB |
| | | F4-F5 | 9500 - 15000 | 30 | 40 | — | dB |
| | | F5-F6 | 15000 - 18500 | 25 | 37 | — | dB |
| | | F6-F7 | 18500 - 26500 | — | 23 | — | dB |

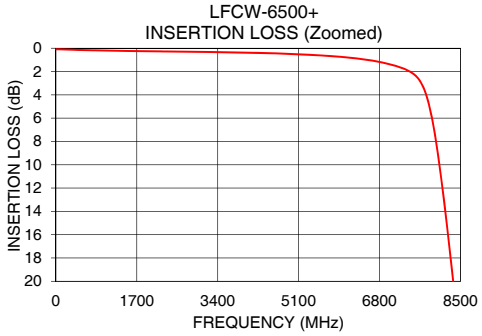
1 DC de-coupling capacitors are required in Applications where DC voltage and/or current is present at either input or output ports. Please contact Mini-Circuits for alternatives if DC pass from IN-OUT is required.
2 Measured on Mini-Circuits Characterization Test Board TB-LFCW-6500+
* Typically, a ±5% frequency deviation from the stated value may occur on a unit-to-unit basis.

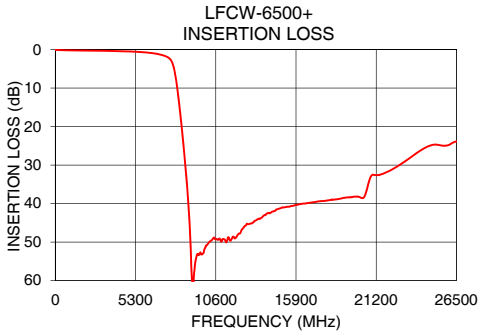
| Maximum Ratings | |
|---|---|
| Operating Temperature | -55°C to 125°C |
| Storage Temperature | -55°C to 125°C |
| RF Power Input* | 2.5W @25°C |

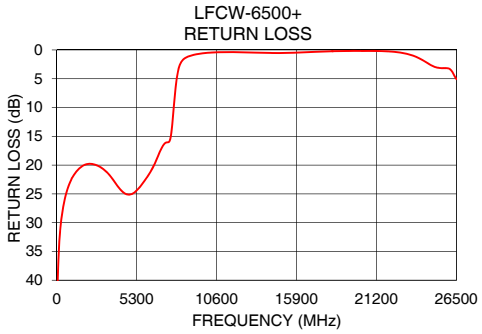
*Passband rating, derate linearly to 0.8W at 125°C ambient
Permanent damage may occur if any of these limits are exceeded.

### Typical Performance Data at 25°C

| Frequency (MHz) | Insertion Loss (dB) | Return Loss (dB) |
|---|---|---|
| 10 | 0.09 | 42.89 |
| 100 | 0.09 | 37.66 |
| 500 | 0.15 | 26.38 |
| 1000 | 0.20 | 22.30 |
| 2000 | 0.26 | 19.84 |
| 3000 | 0.31 | 20.52 |
| 6000 | 0.74 | 22.08 |
| 6500 | 0.97 | 19.76 |
| 7500 | 2.17 | 15.72 |
| 7700 | 3.19 | 11.83 |
| 8200 | 14.69 | 2.36 |
| 8340 | 19.80 | 1.79 |
| 8600 | 30.42 | 1.28 |
| 9000 | 57.67 | 0.90 |
| 9500 | 53.32 | 0.65 |
| 10000 | 50.81 | 0.49 |
| 15000 | 40.98 | 0.53 |
| 18500 | 38.91 | 0.21 |
| 20000 | 38.21 | 0.17 |
| 26500 | 23.87 | 5.08 |




**Notes**

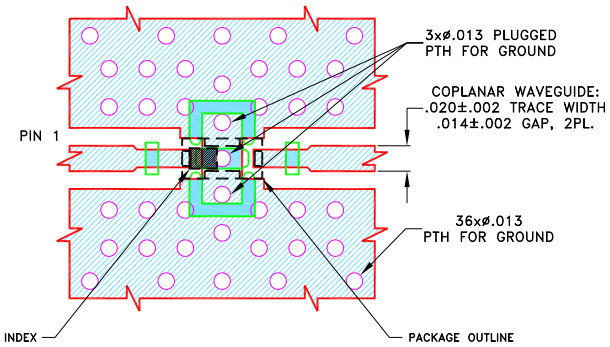
**A.** Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
**B.** Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's 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 | 3 |
| GROUND | 2, 4 |

**Product Marking:** T

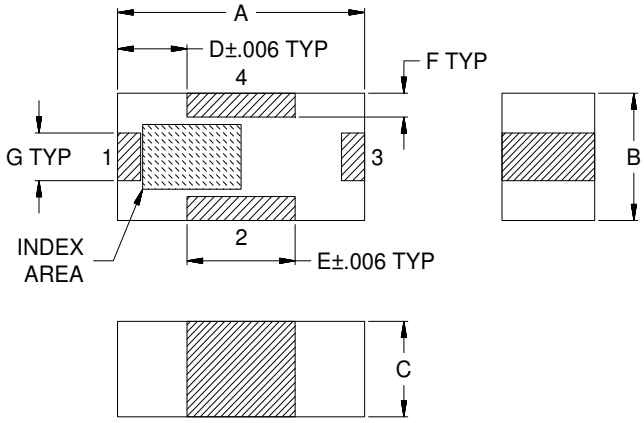
***Demo Board MCL P/N: TB-LFCW-6500+***
***Suggested PCB Layout (PL-650)***




NOTES:
1. COPLANAR WAVEGUIDE PARAMETERS ARE SHOWN FOR ROGERS (RO4835 Lo Pro) WITH DIELECTRIC THICKNESS .0107±.0010. 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 SOLDERMASK

## Outline Drawing




## Outline Dimensions ( inch / mm )

| A | B | C | D | E | F | G | Wt. |
|---|---|---|---|---|---|---|---|
| **.063** | **.032** | **.024** | **.018** | **.028** | **.006** | **.012** | grams |
| 1.60 | 0.80 | 0.60 | 0.45 | 0.70 | 0.15 | 0.30 | .005 |

*Note: Please refer to case style drawing for details*

# Ceramic Low Pass Filter LFCW-6500+

*Typical Performance Data*

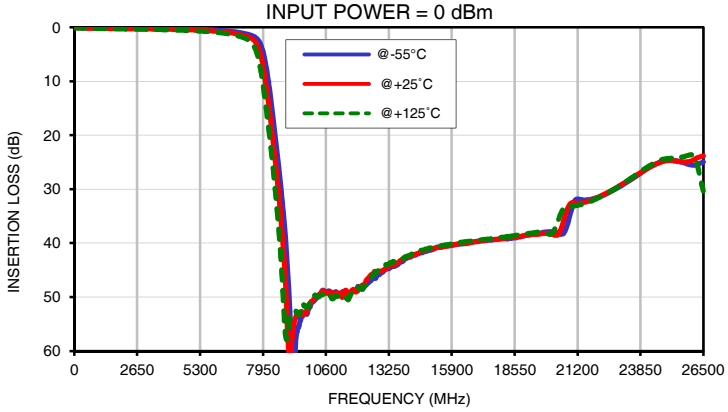
| FREQ. | INSERTION LOSS | | | INPUT RETURN LOSS | | | OUTPUT RETURN LOSS | | |
|---|---|---|---|---|---|---|---|---|---|
| (MHz) | (dB) | | | (dB) | | | (dB) | | |
| | @-55°C | @+25°C | @+125°C | @-55°C | @+25°C | @+125°C | @-55°C | @+25°C | @+125°C |
| 10 | 0.07 | 0.09 | 0.10 | 41.29 | 42.89 | 38.79 | 42.06 | 42.76 | 38.96 |
| 100 | 0.07 | 0.09 | 0.11 | 40.09 | 37.66 | 36.43 | 39.47 | 37.26 | 35.98 |
| 200 | 0.08 | 0.11 | 0.13 | 32.57 | 32.38 | 31.99 | 32.26 | 32.12 | 31.69 |
| 250 | 0.09 | 0.12 | 0.14 | 30.51 | 30.87 | 30.75 | 30.23 | 30.62 | 30.46 |
| 300 | 0.09 | 0.12 | 0.15 | 29.06 | 29.65 | 29.71 | 28.81 | 29.40 | 29.43 |
| 350 | 0.10 | 0.13 | 0.16 | 28.04 | 28.65 | 28.78 | 27.82 | 28.41 | 28.50 |
| 400 | 0.10 | 0.14 | 0.17 | 27.28 | 27.79 | 27.93 | 27.09 | 27.55 | 27.65 |
| 500 | 0.11 | 0.15 | 0.19 | 26.01 | 26.38 | 26.47 | 25.84 | 26.11 | 26.16 |
| 550 | 0.11 | 0.15 | 0.19 | 25.37 | 25.75 | 25.84 | 25.19 | 25.47 | 25.52 |
| 600 | 0.11 | 0.16 | 0.20 | 24.79 | 25.22 | 25.32 | 24.57 | 24.92 | 24.97 |
| 650 | 0.12 | 0.16 | 0.20 | 24.26 | 24.76 | 24.90 | 24.01 | 24.41 | 24.51 |
| 700 | 0.12 | 0.17 | 0.21 | 23.77 | 24.31 | 24.50 | 23.49 | 23.94 | 24.08 |
| 750 | 0.12 | 0.17 | 0.22 | 23.34 | 23.93 | 24.16 | 23.06 | 23.53 | 23.71 |
| 800 | 0.13 | 0.18 | 0.22 | 22.95 | 23.56 | 23.84 | 22.65 | 23.14 | 23.36 |
| 850 | 0.13 | 0.18 | 0.23 | 22.60 | 23.23 | 23.53 | 22.28 | 22.79 | 23.03 |
| 1000 | 0.14 | 0.20 | 0.24 | 21.69 | 22.30 | 22.65 | 21.32 | 21.81 | 22.09 |
| 1200 | 0.15 | 0.21 | 0.26 | 20.93 | 21.50 | 21.90 | 20.51 | 20.95 | 21.27 |
| 1500 | 0.17 | 0.23 | 0.28 | 20.11 | 20.58 | 21.09 | 19.66 | 20.01 | 20.41 |
| 2000 | 0.19 | 0.26 | 0.32 | 19.43 | 19.84 | 20.47 | 19.11 | 19.37 | 19.89 |
| 2500 | 0.20 | 0.29 | 0.35 | 19.53 | 19.90 | 20.73 | 19.44 | 19.63 | 20.29 |
| 3000 | 0.22 | 0.31 | 0.38 | 19.97 | 20.52 | 21.59 | 20.24 | 20.52 | 21.30 |
| 3500 | 0.24 | 0.34 | 0.42 | 20.98 | 21.73 | 22.93 | 21.51 | 21.85 | 22.62 |
| 4000 | 0.26 | 0.38 | 0.48 | 22.62 | 23.51 | 24.60 | 22.92 | 23.34 | 23.82 |
| 5000 | 0.35 | 0.50 | 0.64 | 24.90 | 25.01 | 25.15 | 24.13 | 24.04 | 23.83 |
| 5100 | 0.36 | 0.52 | 0.66 | 24.81 | 24.87 | 25.09 | 23.93 | 23.86 | 23.74 |
| 5200 | 0.38 | 0.54 | 0.68 | 24.60 | 24.66 | 25.00 | 23.65 | 23.63 | 23.63 |
| 6000 | 0.54 | 0.74 | 0.94 | 21.78 | 22.08 | 22.32 | 21.20 | 21.63 | 22.08 |
| 6100 | 0.57 | 0.78 | 0.99 | 21.40 | 21.67 | 21.70 | 20.92 | 21.32 | 21.67 |
| 6200 | 0.60 | 0.82 | 1.04 | 21.03 | 21.25 | 21.05 | 20.65 | 21.00 | 21.21 |
| 6300 | 0.63 | 0.87 | 1.10 | 20.66 | 20.79 | 20.38 | 20.37 | 20.65 | 20.70 |
| 6400 | 0.67 | 0.92 | 1.16 | 20.28 | 20.31 | 19.71 | 20.04 | 20.23 | 20.14 |
| 6500 | 0.71 | 0.97 | 1.23 | 19.86 | 19.76 | 19.03 | 19.67 | 19.78 | 19.56 |
| 6600 | 0.76 | 1.03 | 1.31 | 19.36 | 19.15 | 18.35 | 19.24 | 19.30 | 18.98 |
| 6800 | 0.87 | 1.18 | 1.50 | 18.30 | 17.92 | 17.14 | 18.33 | 18.26 | 18.00 |
| 7000 | 1.01 | 1.36 | 1.73 | 17.24 | 16.84 | 16.33 | 17.42 | 17.39 | 17.58 |
| 7200 | 1.19 | 1.60 | 2.05 | 16.43 | 16.16 | 16.07 | 16.88 | 17.30 | 18.71 |
| 7300 | 1.29 | 1.74 | 2.26 | 16.19 | 16.05 | 16.00 | 16.97 | 17.97 | 20.73 |
| 7500 | 1.57 | 2.17 | 3.00 | 16.11 | 15.72 | 14.03 | 19.04 | 22.65 | 23.12 |
| 7700 | 2.12 | 3.19 | 4.92 | 14.52 | 11.83 | 8.66 | 21.63 | 17.21 | 11.36 |
| 8200 | 10.73 | 14.69 | 19.21 | 2.72 | 2.36 | 2.20 | 3.28 | 2.87 | 2.68 |
| 8340 | 15.48 | 19.80 | 24.71 | 1.81 | 1.79 | 1.81 | 2.21 | 2.19 | 2.22 |
| 8600 | 25.39 | 30.42 | 36.69 | 1.11 | 1.28 | 1.39 | 1.41 | 1.61 | 1.75 |
| 8800 | 34.13 | 40.63 | 50.23 | 0.86 | 1.06 | 1.19 | 1.13 | 1.38 | 1.53 |
| 9000 | 45.74 | 57.67 | 56.74 | 0.69 | 0.90 | 1.03 | 0.96 | 1.21 | 1.37 |
| 9300 | 60.92 | 54.15 | 52.57 | 0.52 | 0.73 | 0.86 | 0.78 | 1.04 | 1.19 |
| 9500 | 54.71 | 53.32 | 52.89 | 0.44 | 0.65 | 0.77 | 0.70 | 0.94 | 1.10 |
| 9800 | 53.20 | 52.73 | 51.85 | 0.34 | 0.55 | 0.67 | 0.60 | 0.83 | 0.99 |
| 10000 | 50.91 | 50.81 | 50.19 | 0.29 | 0.49 | 0.62 | 0.55 | 0.77 | 0.92 |
| 12000 | 48.29 | 48.42 | 48.13 | 0.18 | 0.38 | 0.54 | 0.24 | 0.43 | 0.57 |
| 13500 | 44.32 | 44.00 | 43.54 | 0.25 | 0.48 | 0.64 | 0.11 | 0.31 | 0.44 |
| 15000 | 41.27 | 40.98 | 40.93 | 0.29 | 0.53 | 0.68 | 0.04 | 0.25 | 0.37 |
| 16000 | 40.30 | 40.29 | 40.07 | 0.20 | 0.45 | 0.59 | 0.00 | 0.24 | 0.35 |
| 17000 | 39.65 | 39.67 | 39.47 | 0.09 | 0.34 | 0.46 | 0.03 | 0.23 | 0.33 |
| 18500 | 39.05 | 38.91 | 38.63 | 0.04 | 0.21 | 0.35 | 0.05 | 0.22 | 0.38 |
| 20000 | 37.88 | 38.21 | 38.38 | 0.08 | 0.17 | 0.30 | 0.03 | 0.41 | 0.93 |
| 21000 | 33.07 | 32.51 | 33.15 | 0.09 | 0.17 | 0.32 | 2.26 | 1.22 | 0.77 |
| 22000 | 31.62 | 31.64 | 31.77 | 0.04 | 0.25 | 0.44 | 0.00 | 0.29 | 0.43 |
| 23000 | 29.46 | 29.31 | 29.32 | 0.20 | 0.56 | 0.80 | 0.08 | 0.24 | 0.38 |
| 25000 | 24.65 | 24.71 | 24.31 | 2.28 | 2.88 | 3.62 | 0.16 | 0.19 | 0.34 |
| 26500 | 24.95 | 23.87 | 30.34 | 2.91 | 5.08 | 5.49 | 0.11 | 0.31 | 0.44 |

## Typical Performance Data

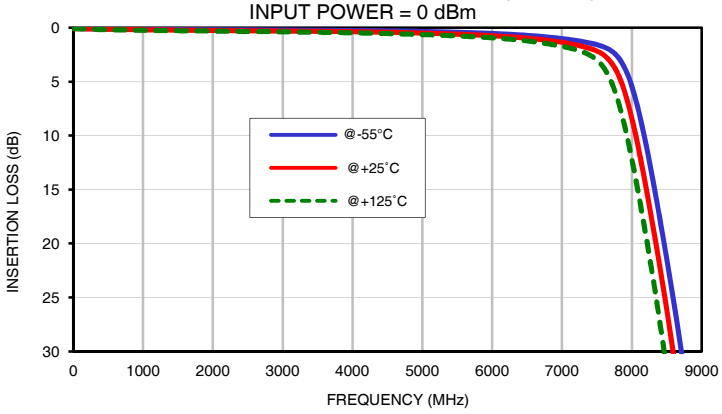
| FREQ. (MHz) | GROUP DELAY (nsec) | | |
|---|---|---|---|
| | @-55°C | @+25°C | @+125°C |
| 10 | 0.05 | 0.09 | 0.07 |
| 50 | 0.07 | 0.09 | 0.08 |
| 100 | 0.09 | 0.09 | 0.09 |
| 150 | 0.09 | 0.09 | 0.09 |
| 200 | 0.09 | 0.09 | 0.09 |
| 250 | 0.08 | 0.08 | 0.09 |
| 300 | 0.08 | 0.08 | 0.09 |
| 350 | 0.08 | 0.08 | 0.09 |
| 400 | 0.08 | 0.08 | 0.09 |
| 450 | 0.08 | 0.08 | 0.09 |
| 500 | 0.08 | 0.08 | 0.09 |
| 550 | 0.08 | 0.08 | 0.09 |
| 1000 | 0.08 | 0.08 | 0.09 |
| 1150 | 0.08 | 0.08 | 0.09 |
| 1300 | 0.08 | 0.08 | 0.09 |
| 1450 | 0.08 | 0.08 | 0.09 |
| 1600 | 0.08 | 0.08 | 0.09 |
| 1750 | 0.09 | 0.09 | 0.09 |
| 1900 | 0.09 | 0.09 | 0.09 |
| 2050 | 0.09 | 0.09 | 0.09 |
| 2200 | 0.09 | 0.09 | 0.09 |
| 2350 | 0.09 | 0.09 | 0.09 |
| 2500 | 0.09 | 0.09 | 0.09 |
| 2650 | 0.09 | 0.09 | 0.09 |
| 2800 | 0.09 | 0.09 | 0.10 |
| 2950 | 0.09 | 0.09 | 0.10 |
| 3100 | 0.09 | 0.10 | 0.10 |
| 3250 | 0.10 | 0.10 | 0.10 |
| 3400 | 0.10 | 0.10 | 0.10 |
| 3550 | 0.10 | 0.10 | 0.10 |
| 3600 | 0.10 | 0.10 | 0.11 |
| 3700 | 0.10 | 0.10 | 0.11 |
| 3800 | 0.10 | 0.10 | 0.11 |
| 4000 | 0.11 | 0.11 | 0.11 |
| 5000 | 0.13 | 0.13 | 0.13 |
| 5100 | 0.13 | 0.13 | 0.14 |
| 5500 | 0.14 | 0.15 | 0.15 |
| 6000 | 0.16 | 0.17 | 0.18 |
| 6100 | 0.17 | 0.18 | 0.19 |
| 6300 | 0.18 | 0.19 | 0.20 |
| 6500 | 0.20 | 0.21 | 0.22 |

*Typical Performance Curves*

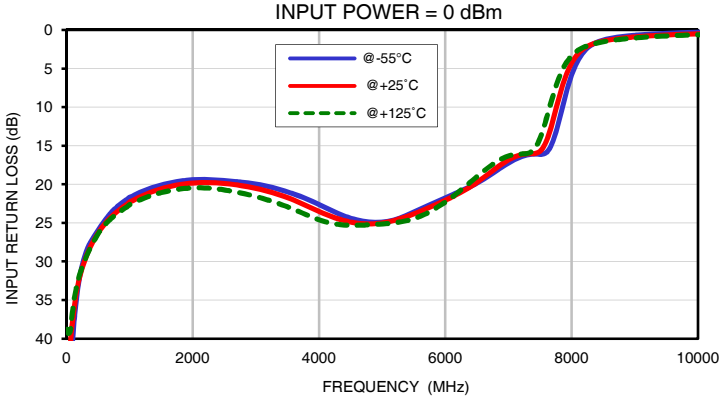
**INSERTION LOSS vs. TEMPERATURE**
INPUT POWER = 0 dBm



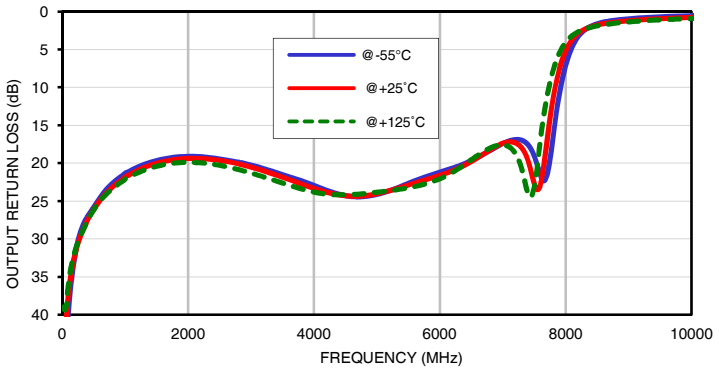

**INSERTION LOSS vs. TEMPERATURE (Zoomed)**
INPUT POWER = 0 dBm



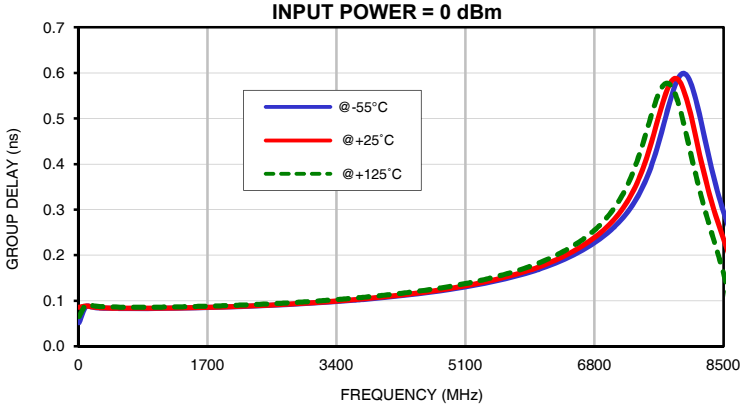

**INPUT RETURN LOSS vs. TEMPERATURE**
INPUT POWER = 0 dBm




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



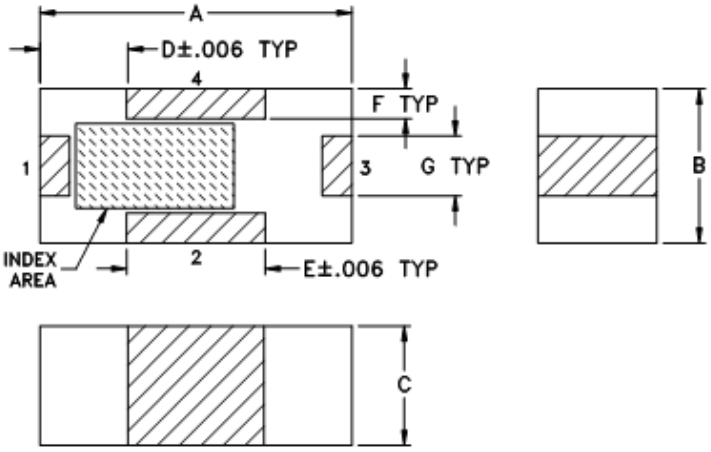

**GROUP DELAY vs. TEMPERATURE**
**INPUT POWER = 0 dBm**



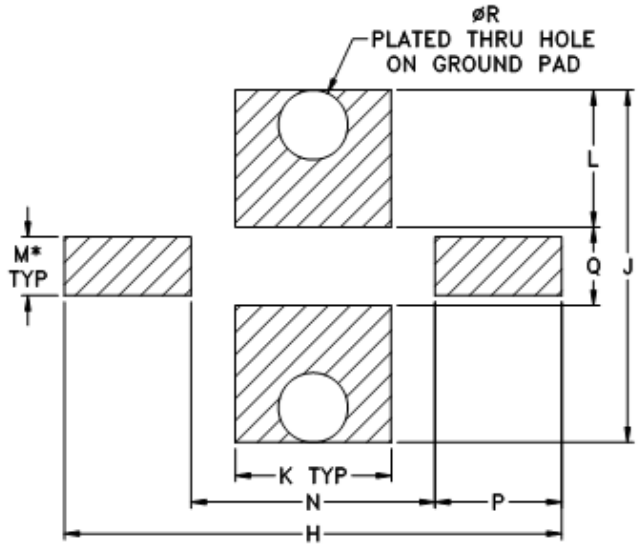
# Case Style JC

## Outline Dimensions

**JC0603C-1**




### PCB Land Pattern




Suggested Layout,
Tolerance to be within ±.002

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

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

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

# Tape & Reel Packaging TR-F74

## DEVICE ORIENTATION IN T&R

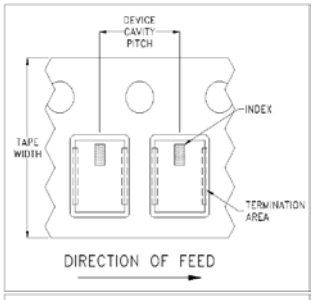



**ILLUSTRATION 1**

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

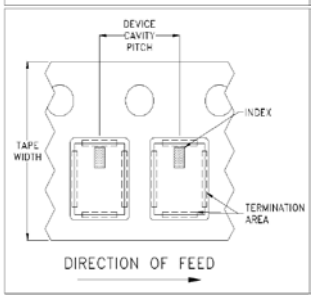



**ILLUSTRATION 2**

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

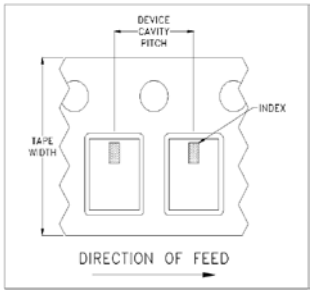



**ILLUSTRATION 3**

| 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

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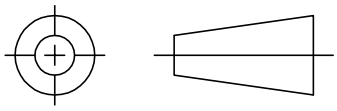
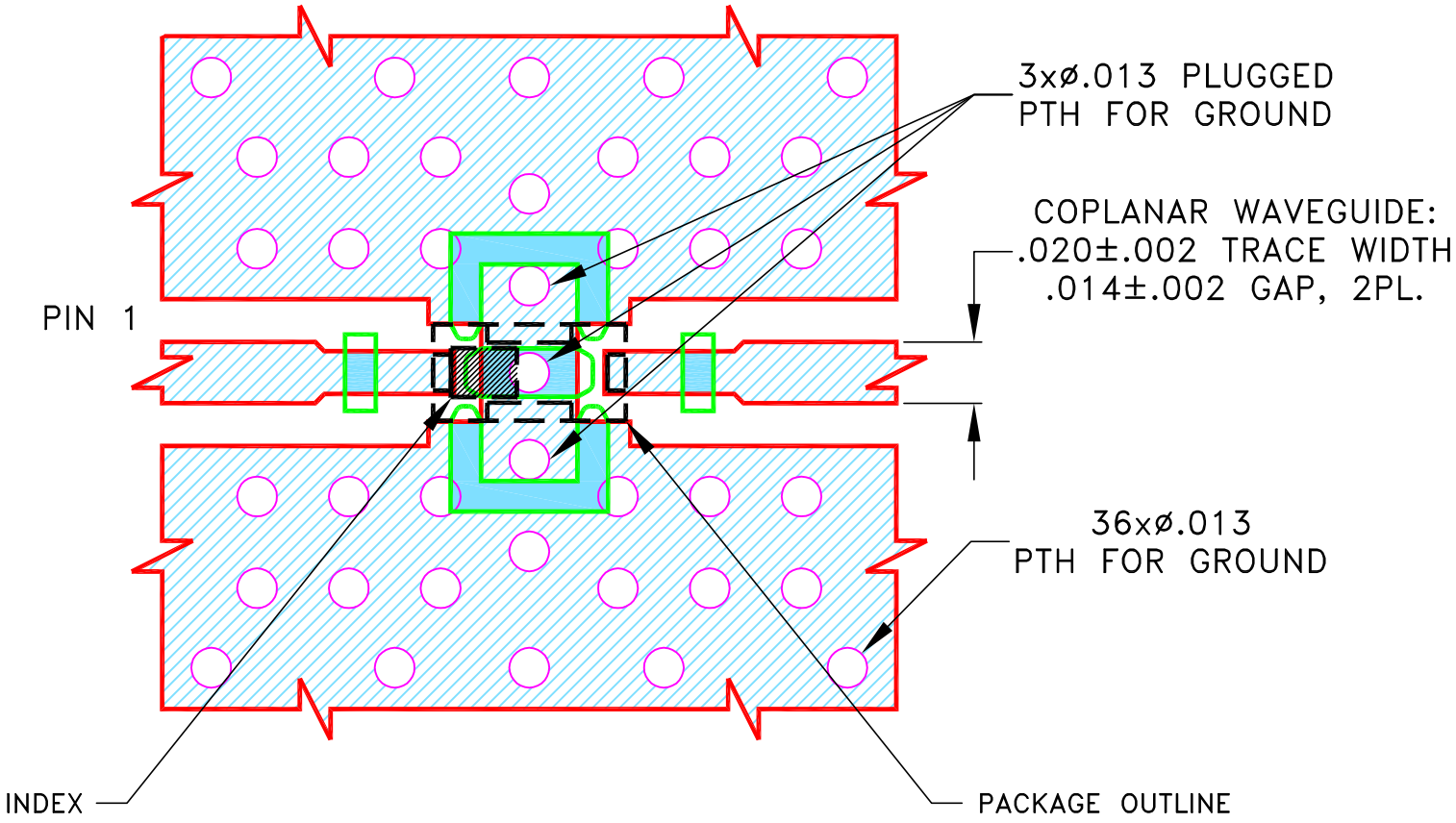
THIRD ANGLE PROJECTION



| REVISIONS | | | | | |
|---|---|---|---|---|---|
| REV | ECN No. | DESCRIPTION | DATE | DR | AUTH |
| OR | M175765 | NEW RELEASE | AUG 19 | DDR | VC |
| A | M175661 | DESIGN CHANGED | NOV 19 | DDR | VC |
| | | | | | |
| | | | | | |

## SUGGESTED MOUNTING CONFIGURATION FOR JC0603C-1 CASE STYLE




NOTES:

1. COPLANAR WAVEGUIDE PARAMETERS ARE SHOWN FOR ROGERS (RO4835 Lo Pro) WITH DIELECTRIC THICKNESS .0107±.0010. 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 SOLDERMASK

| UNLESS OTHERWISE SPECIFIED | | INITIALS | DATE |
|---|---|---|---|
| DIMENSIONS ARE IN INCHES | DRAWN | DDR | 05 AUG 19 |
| TOLERANCES ON: | CHECKED | RV | 05 AUG 19 |
| 2 PL DECIMALS ± 3 PL DECIMALS ± .005 | APPROVED | RKS | 05 AUG 19 |
| ANGLES ± FRACTIONS ± | | | |



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

Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

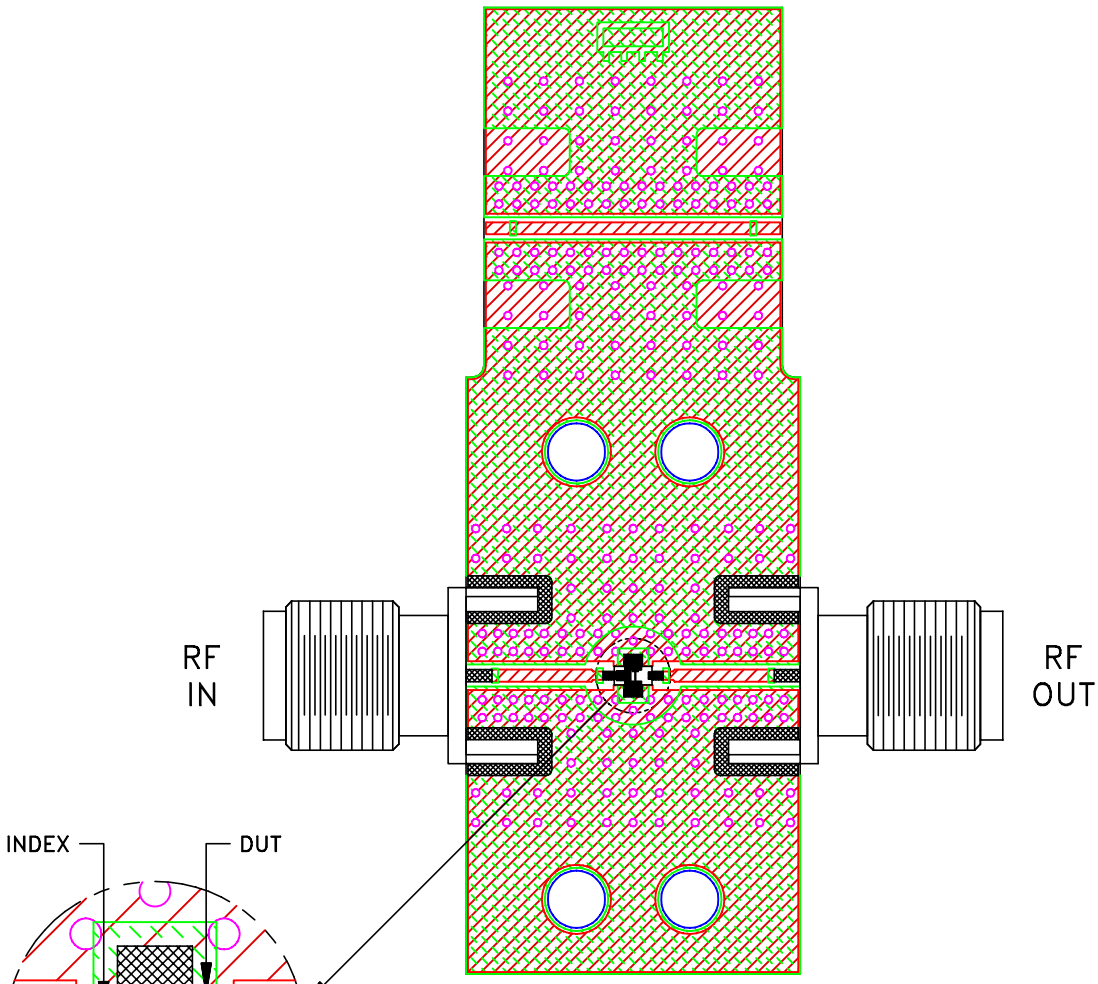
# PL, JC0603C-1, TB-1114+

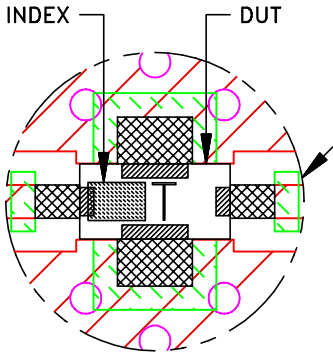
| SIZE | CODE IDENT | DRAWING NO: | REV: |
|---|---|---|---|
| A | 15542 | 98-PL-650 | A |

| FILE: | SCALE: | SHEET: |
|---|---|---|
| 98PL650 | 16:1 | 1 OF 1 |

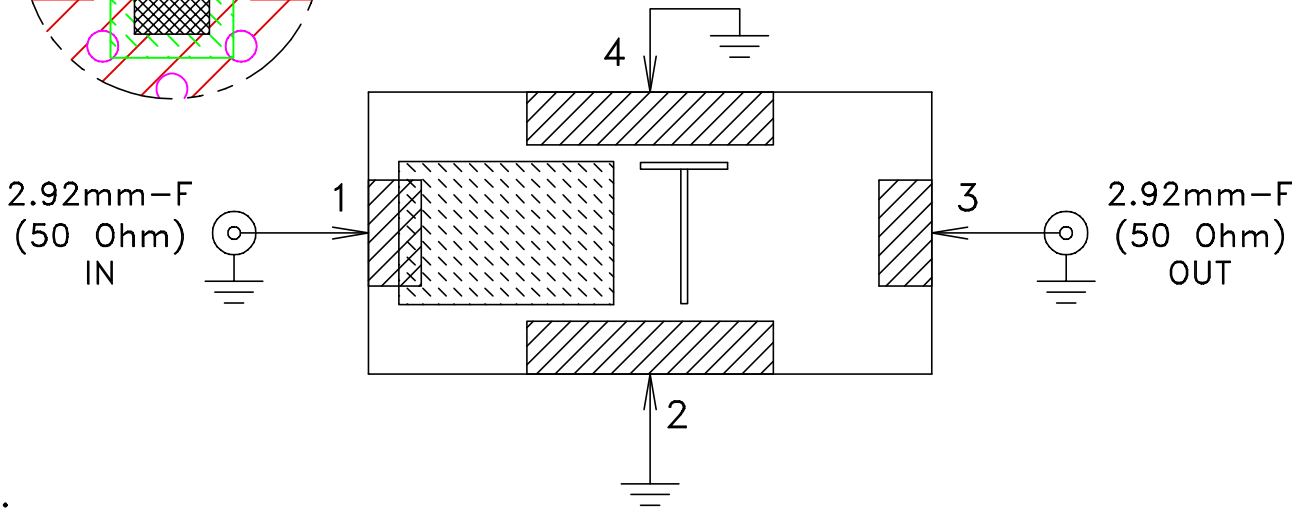
# Evaluation Board and Circuit

TB-LFCW-6500+




## Schematic diagram




Notes:

1. PCB Material: ROGERS (RO4835 Lo Pro) OR Equivalent, Dielectric Constant=3.48±.05 Dielectric Thickness: .0107±.0010
2. 50 Ohm 2.92mm Female Connectors.
3. Connectors on the test board shall not be subjected to temperature greater than 200°C to avoid permanent damage to the connectors.

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# Environmental Specifications ENV06

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 |