LTCC SURFACE MOUNT

# High Pass Filter

# HFCG-880+

50Ω 990 to 8000 MHz

## THE BIG DEAL

- Insertion Loss, Typ. 0.5 dB
- Stopband Rejection, Typ. 47 dB
- Passband Return Loss, Typ. 13 dB
- 0805 Surface Mount Footprint
- Power Handling: 3 W

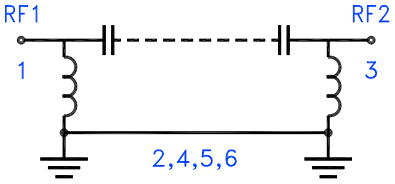


*Generic photo used for illustration purposes only*

## APPLICATIONS

- Test & Measurement Equipment
- Radar, EW, and ECM Defense System
- 5G MIMO and Back Haul Radio
- 5G Sub 6 GHz and WiFi 6E

## FUNCTIONAL DIAGRAM




## PRODUCT OVERVIEW

Mini-Circuits' HFCG-880+ is a miniature low temperature co-fired ceramic (LTCC) high pass filter with a 990 to 8000 MHz passband that supports a variety of applications. This model provides 0.5 dB typical insertion loss over a wide band due to its rugged monolithic construction. Housed in a tiny 0805 ceramic form factor which is ideal for dense signal chain PCB layouts where it complements MMIC size and performance. The LTCC fabrication process assures minimal RF performance variation while delivering a product that is well suited for environmental extremes of high humidity and temperature.

## KEY FEATURES

| Features | Advantages |
|---|---|
| Wide Passband, 7010 MHz | This filter has a very wide passband, from 990 to 8000 MHz. |
| LTCC Construction | The use of LTCC technology allows for repeatable performance in a rugged ceramic package, well suited for tough environments such as high humidity and temperature extremes. See Mini-Circuits Environmental Rating ENV06T11 for more information. |
| Small Size, 0805 | 0805 package allows for space to be saved in dense circuit board layouts, while also minimizing the effects of parasitics. |
| Rugged Power Handling, 3 W | Handles up to 3 Watts in a small 0805 package. |

# High Pass Filter

# HFCG-880+

50Ω 990 to 8000 MHz

## ELECTRICAL SPECIFICATIONS[1,2,3] AT +25°C

| Parameter | | F# | Frequency (MHz) | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|---|
| Passband | Insertion Loss | F3-F4 | 990 - 1800 | — | 1.8 | — | dB |
| | | F4-F5 | 1800 - 6500 | — | 0.5 | 1.1 | |
| | | F5-F6 | 6500 - 8000 | — | 0.5 | 1.3 | |
| | Return Loss | F3-F4 | 990 - 1800 | — | 10 | — | dB |
| | | F4-F5 | 1800 - 6500 | — | 13 | — | |
| | | F5-F6 | 6500 - 8000 | — | 15 | — | |
| Stopband | Rejection | DC-F1 | DC - 500 | 42 | 47 | — | dB |
| | | F1-F2 | 500 - 690 | 20 | 44 | — | |
| | Freq. Cut-Off[4] | Fc | 880 | — | 3 | — | |

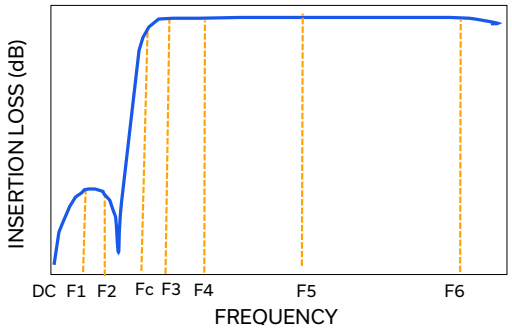
1. Tested on Evaluation Board P/N TB-HFCG-880+.
2. Bi-directional, RF1 and RF2 can be interchanged.
3. This component should not be used as a DC-block. In applications where DC voltage and/or current is present at either the input or output ports, external DC blocking capacitors are required.
4. Typical variation ±5%.

## ABSOLUTE MAXIMUM RATINGS[5]

| Parameter | Ratings |
|---|---|
| Operating Temperature | -55°C to +125°C |
| Storage Temperature | -55°C to +125°C |
| Input Power[6] | 3 W @ +25°C |

5. Permanent damage may occur if any of these limits are exceeded.
6. Power rating applies only to signals within the passband. Power rating above +25°C operating temperature decreases linearly to 0.7 W at +125°C.

## TYPICAL FREQUENCY RESPONSE AT +25°C



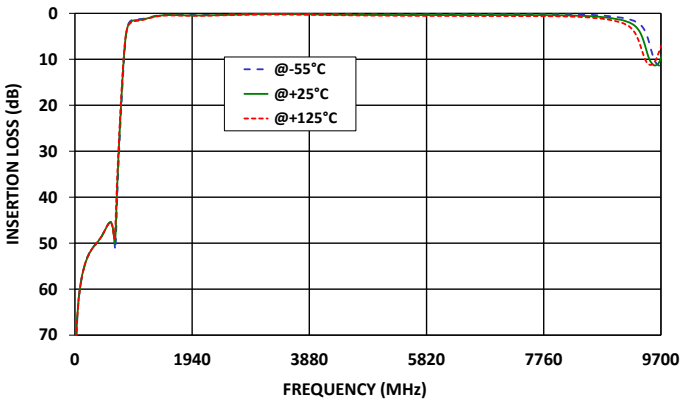
# High Pass Filter

# HFCG-880+

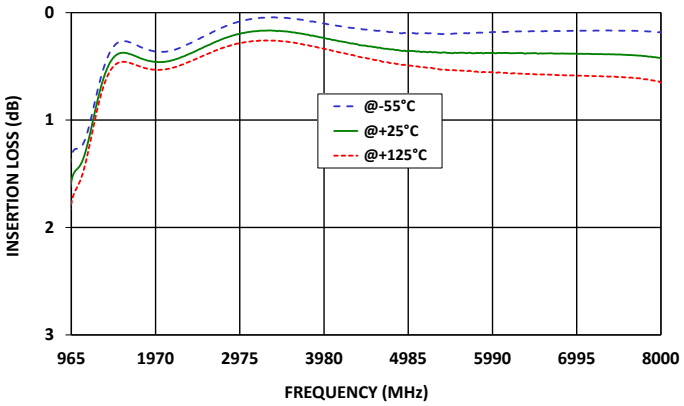
50Ω 990 to 8000 MHz

## TYPICAL PERFORMANCE GRAPHS

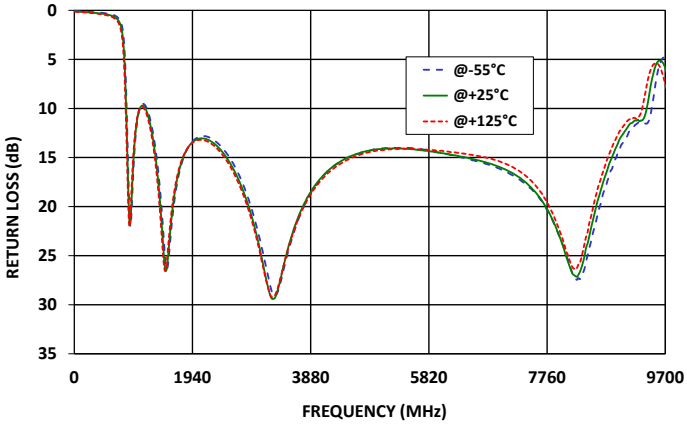
HFCG-880+
INSERTION LOSS



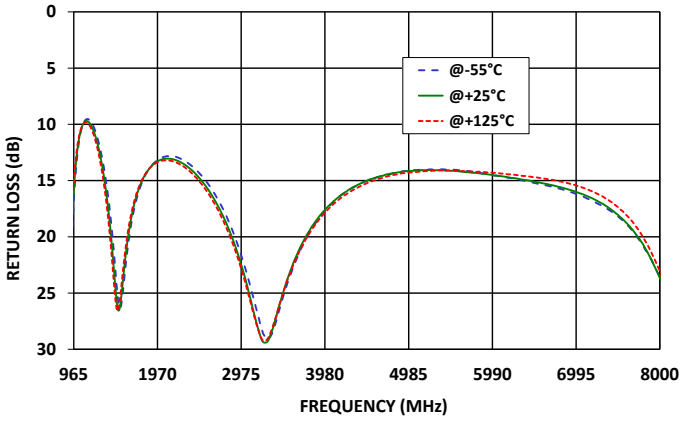

HFCG-880+
INSERTION LOSS (Zoomed)



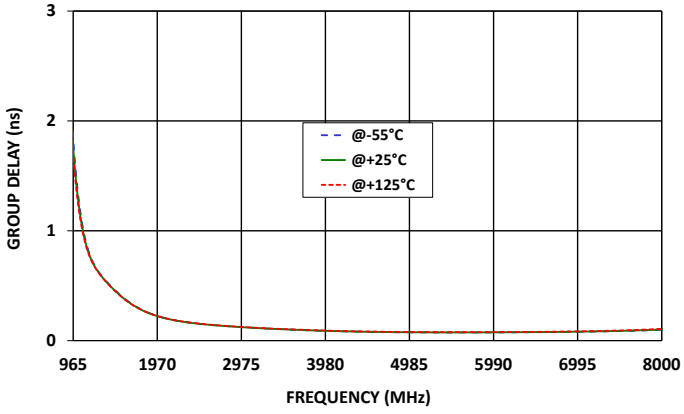

HFCG-880+
RETURN LOSS




HFCG-880+
RETURN LOSS(Zoomed)




HFCG-880+
GROUP DELAY



# High Pass Filter

# HFCG-880+

50Ω 990 to 8000 MHz

## FUNCTIONAL DIAGRAM

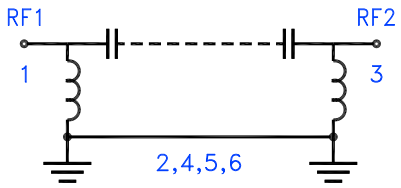
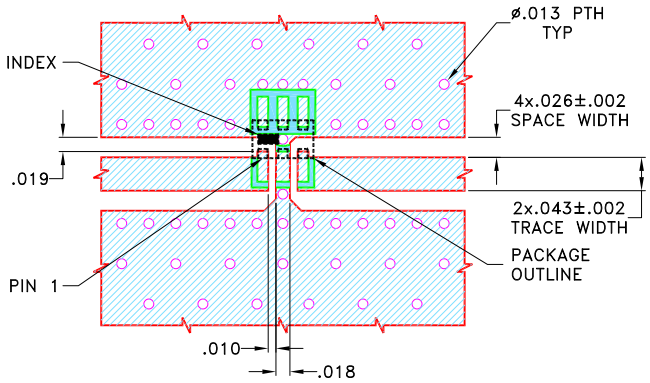



Figure 1. HFCG-880+ Functional Diagram

## PAD DESCRIPTION

| Function | Pad Number | Description |
|---|---|---|
| RF1[2] | 1 | Connects to RF Input Port |
| RF2[2] | 3 | Connects to RF Output Port |
| GROUND | 2,4,5,6 | Connects to Ground on PCB, (See drawing PL-633) |

## SUGGESTED PCB LAYOUT (PL-633)

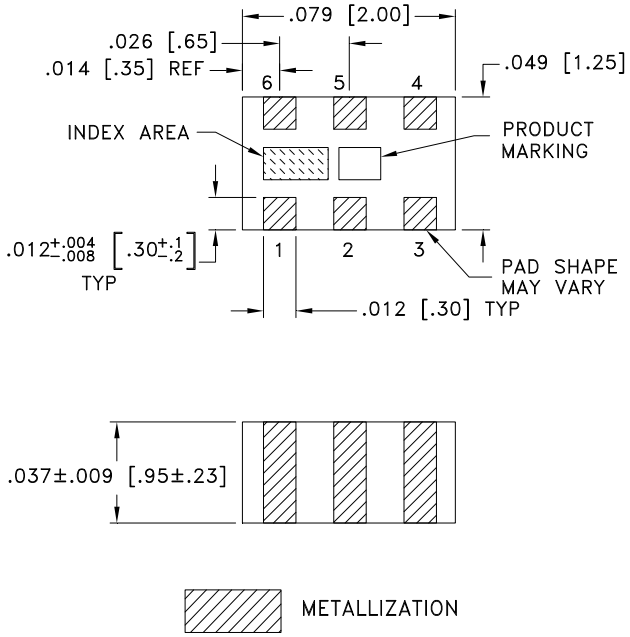



NOTES:
1. COPLANAR WAVEGUIDE PARAMETERS ARE SHOWN FOR ROGERS (RO4350B) WITH DIELECTRIC THICKNESS .020±.0015. COPPER: 1/2 Oz. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH AND GAP MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

DENOTES PCB COPPER PATTERN WITH SMOBC (SOLDER MASK OVER BARE COPPER)
DENOTES PCB COPPER PATTERN FREE OF SOLDERMASK

Figure 2. Suggested PCB Layout PL-633

## CASE STYLE DRAWING




Weight: .008 grams.
Dimensions are in inches (mm). Tolerances: 2Pl. ± .01; 3 Pl. ± .005

## PRODUCT MARKING*: XR

*Marking may contain other features or characters for internal lot control.

# High Pass Filter

# HFCG-880+

50Ω 990 to 8000 MHz

**ADDITIONAL DETAILED INFORMATION IS AVAILABLE ON OUR DASH BOARD.** CLICK HERE

| | |
|---|---|
| **Performance Data and Graphs** | Data<br>Graphs<br>S-Parameter (S2P Files) Data Set (.zip file) De-embedded to device pads |
| **Case Style** | GE0805C-9 Lead Finish: Tin over Nickel Plating. |
| **RoHS Status** | Compliant |
| **Tape and Reel** | F114 |
| **Suggested Layout for PCB Design** | PL-633 |
| **Evaluation Board** | TB-HFCG-880+ |
| | Gerber File |
| **Environmental Rating** | ENV06T11 |

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-Circuits' 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/terms/viewterm.html

# Ceramic High Pass Filter HFCG-880+

*Typical Performance Data*

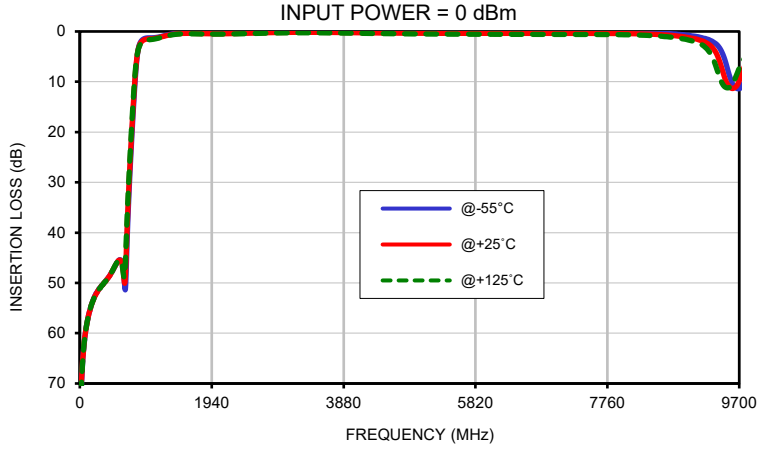
| FREQ. | INSERTION LOSS | | | INPUT RETURN LOSS | | | OUTPUT RETURN LOSS | | |
|---|---|---|---|---|---|---|---|---|---|
| (MHz) | (dB) | | | (dB) | | | (dB) | | |
| | @-55°C | @+25˚C | @+125˚C | @-55°C | @+25˚C | @+125˚C | @-55°C | @+25˚C | @+125˚C |
| 10 | 83.99 | 76.56 | 80.33 | 0.09 | 0.12 | 0.14 | 0.06 | 0.09 | 0.13 |
| 20 | 72.20 | 71.09 | 71.90 | 0.08 | 0.12 | 0.14 | 0.04 | 0.08 | 0.11 |
| 30 | 68.93 | 68.24 | 68.49 | 0.08 | 0.12 | 0.14 | 0.04 | 0.08 | 0.11 |
| 40 | 66.08 | 65.58 | 66.03 | 0.08 | 0.12 | 0.15 | 0.04 | 0.08 | 0.11 |
| 50 | 64.00 | 64.23 | 64.29 | 0.08 | 0.13 | 0.15 | 0.04 | 0.08 | 0.12 |
| 60 | 62.83 | 62.35 | 62.26 | 0.09 | 0.13 | 0.15 | 0.04 | 0.08 | 0.12 |
| 70 | 61.37 | 61.09 | 61.30 | 0.09 | 0.13 | 0.16 | 0.04 | 0.09 | 0.12 |
| 80 | 60.18 | 60.14 | 60.20 | 0.09 | 0.14 | 0.16 | 0.04 | 0.09 | 0.13 |
| 90 | 59.13 | 59.25 | 59.22 | 0.09 | 0.14 | 0.17 | 0.05 | 0.09 | 0.13 |
| 100 | 58.37 | 58.47 | 58.36 | 0.10 | 0.14 | 0.17 | 0.05 | 0.10 | 0.13 |
| 150 | 55.35 | 55.45 | 55.37 | 0.12 | 0.17 | 0.19 | 0.06 | 0.11 | 0.16 |
| 200 | 53.26 | 53.36 | 53.37 | 0.14 | 0.19 | 0.22 | 0.08 | 0.13 | 0.17 |
| 250 | 51.95 | 51.98 | 51.96 | 0.16 | 0.21 | 0.25 | 0.09 | 0.15 | 0.20 |
| 300 | 50.95 | 50.93 | 51.01 | 0.18 | 0.24 | 0.28 | 0.11 | 0.17 | 0.22 |
| 350 | 50.12 | 50.07 | 50.10 | 0.20 | 0.27 | 0.32 | 0.13 | 0.20 | 0.25 |
| 400 | 49.27 | 49.29 | 49.25 | 0.22 | 0.30 | 0.36 | 0.15 | 0.22 | 0.29 |
| 430 | 48.74 | 48.75 | 48.75 | 0.24 | 0.32 | 0.38 | 0.16 | 0.24 | 0.32 |
| 500 | 47.12 | 47.11 | 47.05 | 0.29 | 0.38 | 0.46 | 0.20 | 0.30 | 0.39 |
| 580 | 45.42 | 45.48 | 45.50 | 0.37 | 0.49 | 0.58 | 0.29 | 0.41 | 0.52 |
| 600 | 45.42 | 45.53 | 45.63 | 0.40 | 0.52 | 0.63 | 0.32 | 0.45 | 0.57 |
| 690 | 44.11 | 41.35 | 38.97 | 0.62 | 0.81 | 0.98 | 0.56 | 0.77 | 0.96 |
| 700 | 40.06 | 37.75 | 35.69 | 0.66 | 0.87 | 1.05 | 0.61 | 0.83 | 1.04 |
| 760 | 22.26 | 20.85 | 19.52 | 1.15 | 1.51 | 1.89 | 1.17 | 1.59 | 2.04 |
| 800 | 12.73 | 11.66 | 10.73 | 2.23 | 2.97 | 3.81 | 2.43 | 3.30 | 4.32 |
| 880 | 2.49 | 2.66 | 2.83 | 15.06 | 16.87 | 18.64 | 18.14 | 20.57 | 22.39 |
| 900 | 1.96 | 2.18 | 2.38 | 19.65 | 20.89 | 21.90 | 22.04 | 21.92 | 21.32 |
| 990 | 1.29 | 1.50 | 1.70 | 14.15 | 13.52 | 13.01 | 13.44 | 12.88 | 12.40 |
| 1000 | 1.28 | 1.49 | 1.68 | 13.30 | 12.79 | 12.37 | 12.71 | 12.25 | 11.86 |
| 1150 | 1.13 | 1.25 | 1.35 | 9.59 | 9.84 | 10.05 | 9.39 | 9.65 | 9.88 |
| 1200 | 0.98 | 1.08 | 1.17 | 10.15 | 10.52 | 10.84 | 9.98 | 10.37 | 10.71 |
| 1300 | 0.66 | 0.75 | 0.82 | 12.79 | 13.45 | 14.04 | 12.70 | 13.41 | 14.06 |
| 1400 | 0.41 | 0.51 | 0.58 | 17.81 | 19.00 | 20.02 | 18.05 | 19.44 | 20.78 |
| 1500 | 0.29 | 0.39 | 0.48 | 25.80 | 26.56 | 26.45 | 29.09 | 30.72 | 30.67 |
| 1600 | 0.26 | 0.37 | 0.46 | 21.75 | 20.92 | 20.29 | 22.28 | 21.17 | 20.40 |
| 1700 | 0.29 | 0.40 | 0.48 | 17.21 | 16.85 | 16.60 | 17.11 | 16.66 | 16.35 |
| 1800 | 0.32 | 0.43 | 0.51 | 14.89 | 14.78 | 14.70 | 14.66 | 14.49 | 14.37 |
| 1900 | 0.35 | 0.45 | 0.53 | 13.66 | 13.69 | 13.73 | 13.38 | 13.36 | 13.34 |
| 2000 | 0.36 | 0.46 | 0.53 | 13.05 | 13.18 | 13.29 | 12.73 | 12.81 | 12.86 |
| 2100 | 0.36 | 0.45 | 0.53 | 12.83 | 13.05 | 13.21 | 12.49 | 12.66 | 12.76 |
| 2200 | 0.34 | 0.44 | 0.51 | 12.92 | 13.21 | 13.41 | 12.56 | 12.79 | 12.93 |
| 2300 | 0.31 | 0.41 | 0.48 | 13.26 | 13.60 | 13.84 | 12.89 | 13.15 | 13.33 |
| 2400 | 0.28 | 0.38 | 0.45 | 13.81 | 14.20 | 14.47 | 13.43 | 13.72 | 13.92 |
| 2600 | 0.20 | 0.30 | 0.38 | 15.53 | 16.04 | 16.37 | 15.08 | 15.45 | 15.66 |
| 2800 | 0.13 | 0.24 | 0.32 | 18.21 | 18.86 | 19.25 | 17.65 | 18.08 | 18.25 |
| 3000 | 0.08 | 0.19 | 0.28 | 22.21 | 23.09 | 23.45 | 21.36 | 21.81 | 21.84 |
| 3200 | 0.05 | 0.17 | 0.26 | 27.66 | 28.73 | 28.73 | 26.00 | 26.16 | 25.89 |
| 3400 | 0.04 | 0.17 | 0.26 | 27.36 | 27.00 | 26.90 | 25.81 | 25.31 | 25.37 |
| 3600 | 0.05 | 0.18 | 0.28 | 22.70 | 22.35 | 22.51 | 21.85 | 21.55 | 21.85 |
| 3800 | 0.08 | 0.21 | 0.31 | 19.55 | 19.39 | 19.62 | 18.88 | 18.78 | 19.10 |
| 4000 | 0.10 | 0.24 | 0.34 | 17.54 | 17.44 | 17.70 | 16.97 | 16.92 | 17.22 |
| 4200 | 0.13 | 0.27 | 0.38 | 16.17 | 16.15 | 16.39 | 15.65 | 15.66 | 15.93 |
| 4400 | 0.15 | 0.30 | 0.41 | 15.30 | 15.29 | 15.51 | 14.82 | 14.83 | 15.06 |
| 4500 | 0.16 | 0.31 | 0.43 | 14.98 | 14.95 | 15.18 | 14.53 | 14.51 | 14.73 |
| 5000 | 0.19 | 0.36 | 0.49 | 14.10 | 14.14 | 14.27 | 13.75 | 13.78 | 13.87 |
| 5500 | 0.20 | 0.38 | 0.54 | 14.04 | 14.14 | 14.09 | 13.81 | 13.90 | 13.83 |
| 6000 | 0.18 | 0.37 | 0.56 | 14.52 | 14.52 | 14.32 | 14.44 | 14.45 | 14.25 |
| 6500 | 0.17 | 0.38 | 0.57 | 15.22 | 15.11 | 14.71 | 15.24 | 15.16 | 14.77 |
| 7000 | 0.17 | 0.38 | 0.59 | 16.21 | 16.02 | 15.45 | 16.31 | 16.16 | 15.55 |
| 7500 | 0.17 | 0.39 | 0.60 | 18.20 | 18.07 | 17.37 | 18.36 | 18.24 | 17.44 |
| 8000 | 0.18 | 0.42 | 0.65 | 23.63 | 23.67 | 23.04 | 24.56 | 24.80 | 24.13 |

## Typical Performance Data

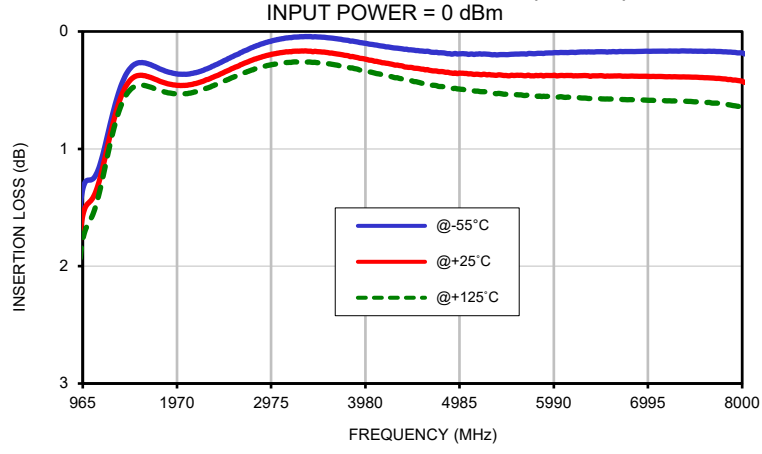
| FREQ. | GROUP DELAY | | |
|---|---|---|---|
| (MHz) | (nsec) | | |
| | @-55°C | @+25°C | @+125°C |
| 990 | 1.59 | 1.53 | 1.47 |
| 1000 | 1.50 | 1.45 | 1.40 |
| 1050 | 1.17 | 1.14 | 1.11 |
| 1100 | 0.95 | 0.93 | 0.91 |
| 1150 | 0.81 | 0.80 | 0.79 |
| 1200 | 0.72 | 0.71 | 0.70 |
| 1250 | 0.65 | 0.64 | 0.64 |
| 1300 | 0.59 | 0.59 | 0.59 |
| 1350 | 0.55 | 0.54 | 0.54 |
| 1400 | 0.51 | 0.50 | 0.50 |
| 1450 | 0.47 | 0.47 | 0.46 |
| 1500 | 0.43 | 0.43 | 0.43 |
| 1600 | 0.37 | 0.37 | 0.36 |
| 1700 | 0.32 | 0.31 | 0.31 |
| 1800 | 0.28 | 0.27 | 0.27 |
| 1900 | 0.24 | 0.24 | 0.24 |
| 2000 | 0.22 | 0.22 | 0.22 |
| 2100 | 0.20 | 0.20 | 0.20 |
| 2200 | 0.18 | 0.18 | 0.18 |
| 2300 | 0.17 | 0.17 | 0.17 |
| 2400 | 0.16 | 0.16 | 0.16 |
| 2500 | 0.15 | 0.15 | 0.15 |
| 2600 | 0.14 | 0.14 | 0.15 |
| 2700 | 0.14 | 0.14 | 0.14 |
| 2800 | 0.13 | 0.13 | 0.13 |
| 2900 | 0.13 | 0.13 | 0.13 |
| 3000 | 0.12 | 0.12 | 0.12 |
| 3200 | 0.11 | 0.11 | 0.12 |
| 3400 | 0.11 | 0.11 | 0.11 |
| 3600 | 0.10 | 0.10 | 0.10 |
| 3800 | 0.09 | 0.09 | 0.10 |
| 4000 | 0.09 | 0.09 | 0.09 |
| 4500 | 0.08 | 0.08 | 0.08 |
| 5000 | 0.08 | 0.08 | 0.08 |
| 5500 | 0.07 | 0.07 | 0.08 |
| 6000 | 0.08 | 0.08 | 0.08 |
| 6500 | 0.08 | 0.08 | 0.08 |
| 7000 | 0.08 | 0.08 | 0.08 |
| 7500 | 0.09 | 0.09 | 0.09 |
| 8000 | 0.10 | 0.10 | 0.11 |

*Typical Performance Curves*

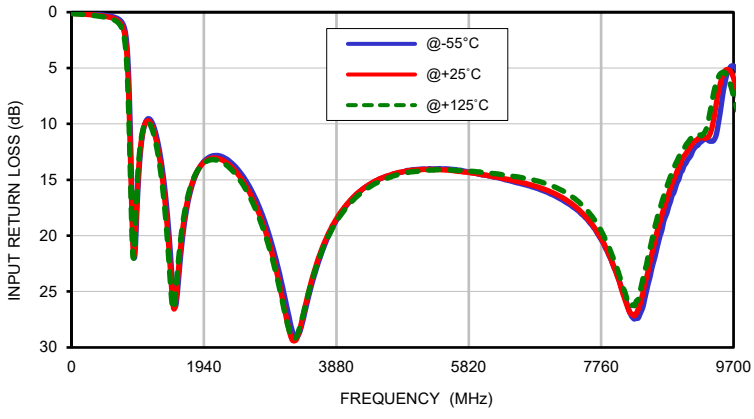
**INSERTION LOSS vs. TEMPERATURE**
INPUT POWER = 0 dBm



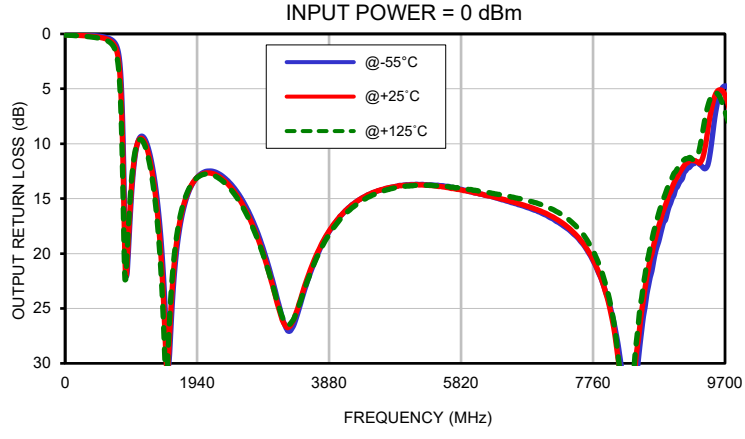

**INSERTION LOSS vs. TEMPERATURE (Zoomed)**
INPUT POWER = 0 dBm



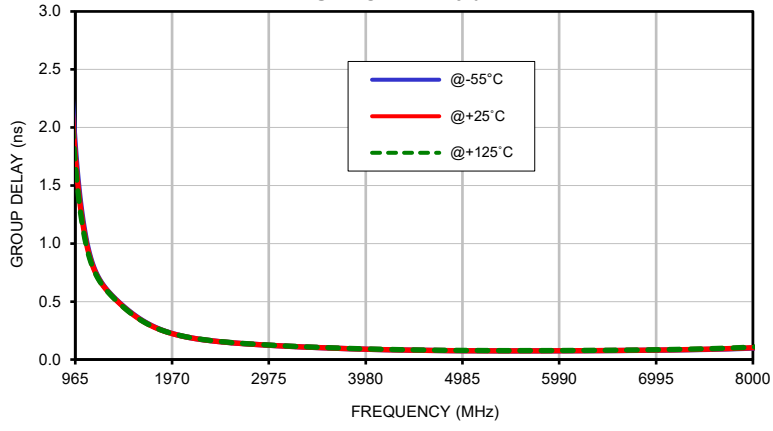

**INPUT RETURN LOSS vs. TEMPERATURE**
INPUT POWER = 0 dBm




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

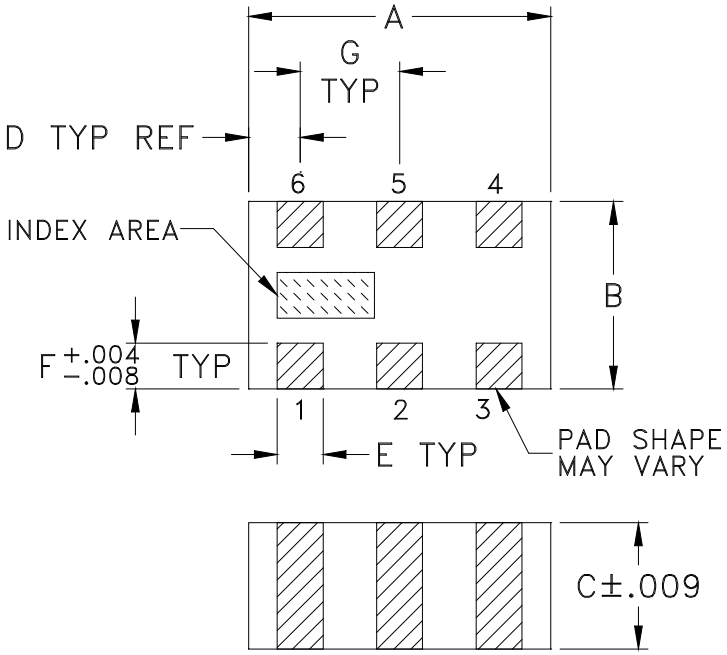



**GROUP DELAY vs. TEMPERATURE**
**INPUT POWER = 0 dBm**

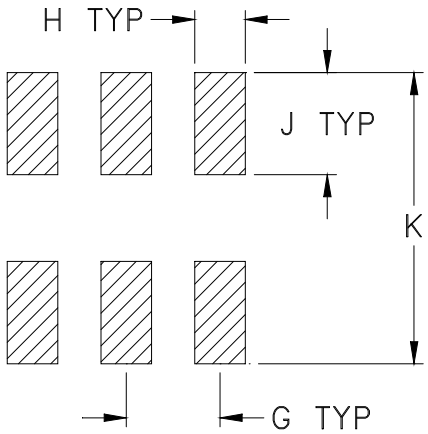


**GE0805C-9**

## Outline Dimensions




## PCB Land Pattern




Suggested Layout,
Tolerance to be within ±.002

| CASE # | A | B | C | D | E | F | G | H | J | K | WT.GRAM |
|---|---|---|---|---|---|---|---|---|---|---|---|
| GE0805C-9 | .079 (2.00) | .049 (1.25) | .037 (0.95) | .014 (0.35) | .012 (0.30) | .012 (0.30) | .026 (0.65) | .014 (0.35) | .039 (1.00) | .110 (2.80) | .008 |

**Dimensions are in inches (mm). Tolerances: 2Pl. ± .01; 3 Pl. ± .005**

### Notes:

1. Open style, ceramic base.
2. Termination finish: For RoHS Case Styles: Tin plate over Nickel plate. All models, (+) suffix.
   For RoHS-5 Case Styles: Tin-Lead plate over Nickel plate. All models, no (+) suffix.


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# Tape & Reel Packaging TR-F114

DEVICE ORIENTATION IN T&R

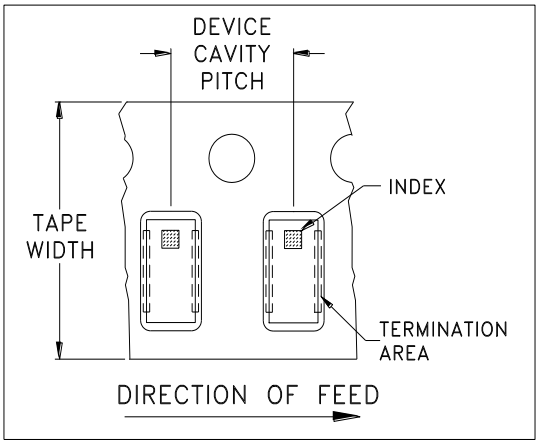



ILLUSTRATION 1

| Applicable Case Styles | |
|---|---|
| GE0805C | JC0603C |
| GE0805C-1 | JC0603C-4 |
| GE0805C-1AP | JC0603C-6 |
| GE0805C-7 | |
| GE0805C-9 | |
| GE0805C-10 | |
| GE0805C-11 | |
| GE0805C-12 | |

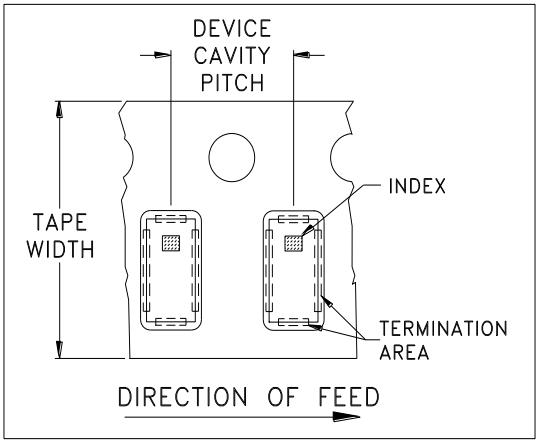



ILLUSTRATION 2

| Applicable Case Styles | |
|---|---|
| GE0805C-2 | JC0603C-1 |
| GE0805C-3 | JC0603C-2 |
| GE0805C-4 | JC0603C-3 |
| GE0805C-5 | JC0603C-5 |
| GE0805C-6 | JC0603C-7 |
| GE0805C-8 | |
| GE0805C-15 | |

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

Note: Please Consult individual model data sheet to determine device per reel availability.

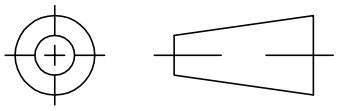
Mini-Circuits carrier tape materials provide protection from ESD (Electro-Static Discharge) during handling and transportation. Tapes are static dissipative and comply with industry standards EIA-481/EIA-541.

Go to: www.minicircuits.com/pages/pdfs/tape.pdf

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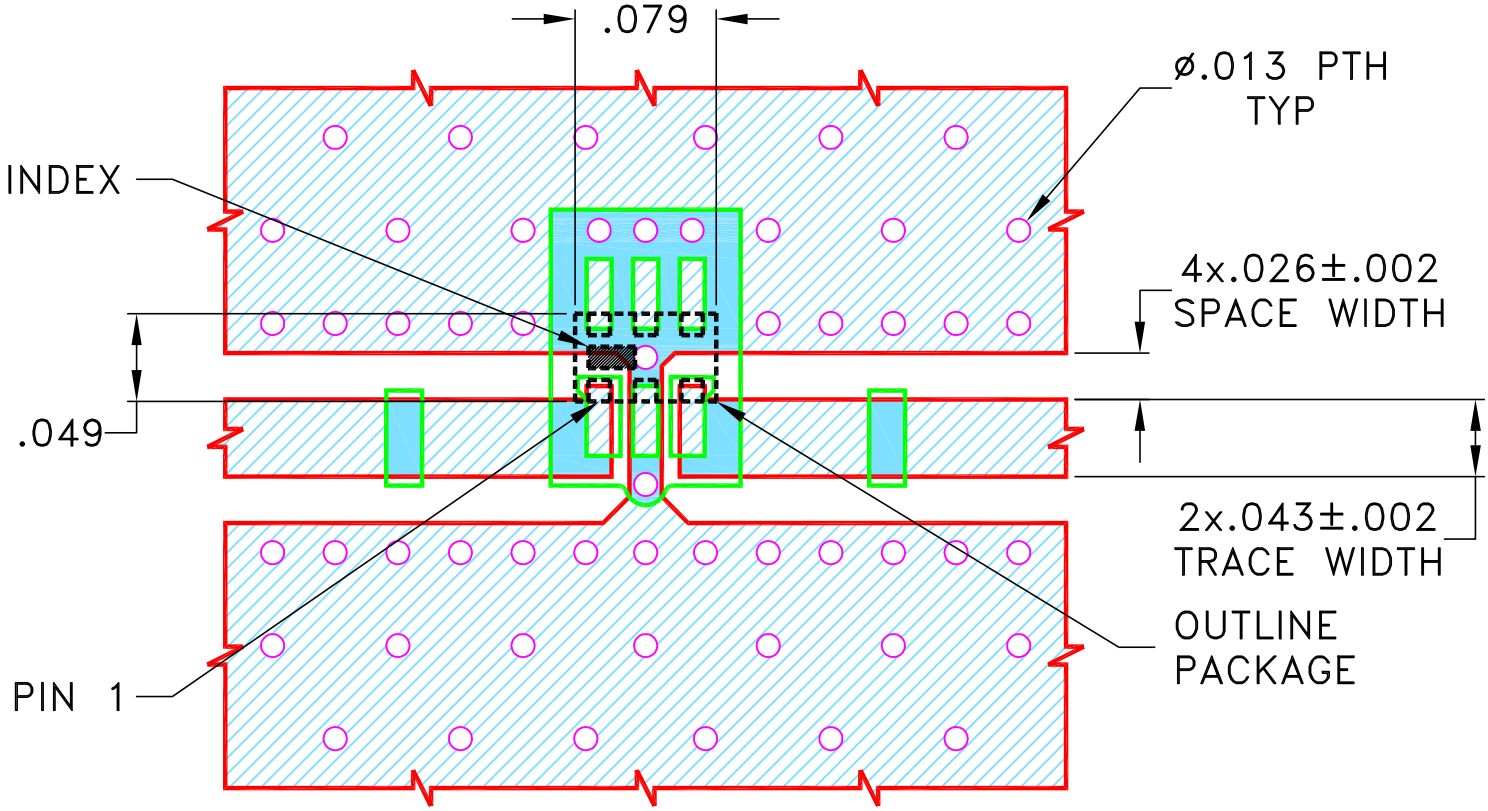
THIRD ANGLE PROJECTION



REVISIONS

| REV | ECN No. | DESCRIPTION | DATE | DR | AUTH |
|---|---|---|---|---|---|
| OR | M174039 | NEW RELEASE | MAY 19 | DDR | VC |
| | | | | | |
| | | | | | |
| | | | | | |

# SUGGESTED MOUNTING CONFIGURATION FOR GE0805C-9 CASE STYLE "06FL02" PIN CODE




## NOTES:

1. TRACE WIDTH IS SHOWN FOR ROGERS (RO4350B) WITH DIELECTRIC THICKNESS .020"±.0015". COPPER: 1/2 Oz. EACH SIDE.
   FOR OTHER MATERIALS TRACE WIDTH 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 | 08 MAY 19 |
| TOLERANCES ON: | CHECKED | RV | 08 MAY 19 |
| 2 PL DECIMALS ± | APPROVED | RKS | 08 MAY 19 |
| 3 PL DECIMALS ± .005" | | | |
| ANGLES ± | | | |
| FRACTIONS ± | | | |

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

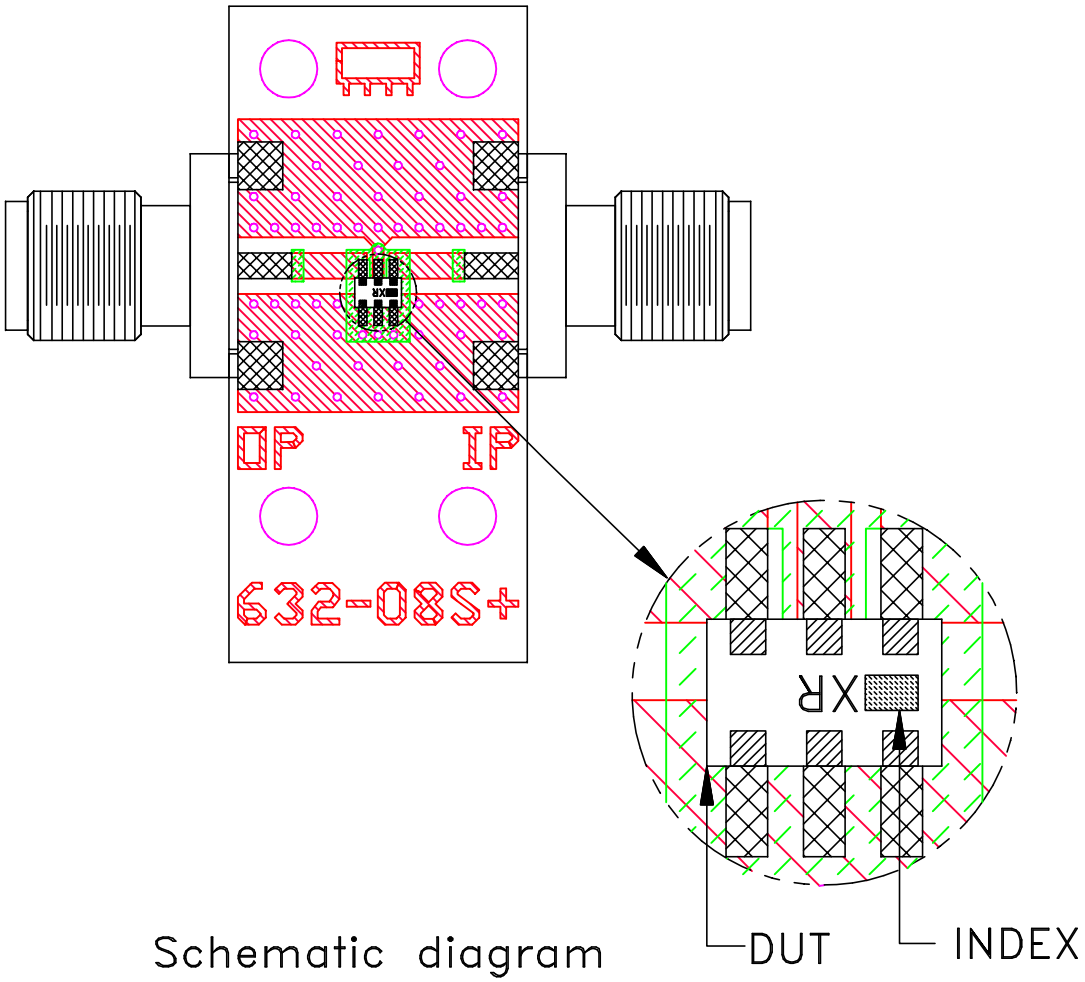
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Brooklyn NY 11235

# PL, 06FL02, GE0805C-9
# TB-1104+, 50 OHM

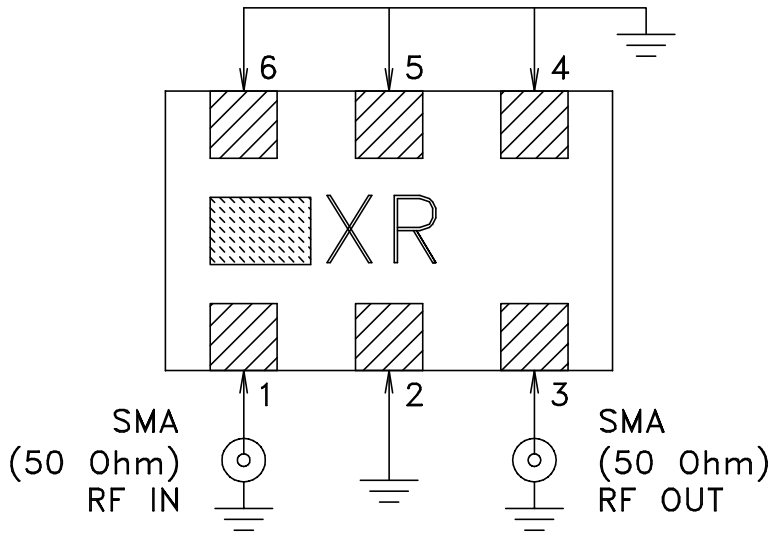
| SIZE | CODE IDENT | DRAWING NO: | REV: |
|---|---|---|---|
| A | 15542 | 98-PL-633 | OR |
| FILE: 98PL633 | | SCALE: 9:1 | SHEET: 1 OF 1 |

# Evaluation Board and Circuit

TB-HFCG-880+




Schematic diagram




Notes:

1. PCB Material: ROGERS (RO4350B) OR Equivalent, Dielectric Constant=3.48±0.05
Dielectric Thickness: .020±.0015 inch
2. 50 Ohm SMA Female Connectors.

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**Environmental Specifications** **ENV06T11**

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 |
| 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, Test B,B1, 95% Coverage |
| Thermal Shock | -40° to +125°C, 15 min dwell, 100 cycles | MIL-STD-202, Method 107 |
| Bend Test | 1mm, deflection for 5 seconds<br>Span of bending: 2.75" | -- |
| High Temp Storage | 125°C to 1000 Hrs | --- |


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