

Coaxial Low Pass Filter

VLF-8400+

50Ω DC to 8400 MHz

The Big Deal

- Excellent power handling, 8W
- Temperature stable
- Rugged unibody construction



CASE STYLE: FF704

Product Overview

VLF-8400+ is a 50Ω low pass filter built in rugged unibody construction. Covering DC-8400 MHz bandwidth, these units offer good matching within the passband and high rejection in stopband. VLF-8400+ offer low insertion loss, and excellent power handling capability.

Key Features

| Feature | Advantages |
|-----------------------------|---|
| Low passband insertion loss | Suitable for high performance application |
| 8W Power handling | Supports a range of system power requirements. |
| Connectorized package | The connectorized package is easy to interface with other devices and well suited for test setups |

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



Low Pass Filter

50Ω DC to 8400 MHz

VLF-8400+



CASE STYLE: FF704

Connectors Model
SMA VLF-8400+

Features

- Rugged uni-body construction, small size
- Excellent power handling, 8W
- Temperature stable
- Protected by US patent 6,943,646

Applications

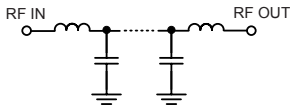
- Harmonic rejection
- VHF/UHF Transmitters / Receivers
- Lab use

Electrical Specifications⁽¹⁾ at 25°C

| Parameter | F# | Frequency (MHz) | Min. | Typ. | Max. | Unit | |
|-----------|----------------|-----------------|-------------|------|------|------|----|
| Pass Band | Insertion Loss | DC-F1 | DC-8400 | — | 1.6 | 1.8 | dB |
| | Freq. Cut-Off | F2 | 9100 | — | 3.0 | — | dB |
| | VSWR | DC-F1 | DC-8400 | — | 1.6 | — | :1 |
| Stop Band | Insertion Loss | F3 | 10300 | 18 | 20 | — | dB |
| | | F3-F4 | 10300-15000 | — | 30 | — | dB |
| | VSWR | F3-F4 | 10300-15000 | — | 17 | — | :1 |

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

Functional Schematic



Maximum Ratings

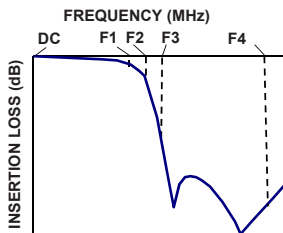
| | |
|-----------------------|-----------------|
| Operating Temperature | -55°C to 100°C |
| Storage Temperature | -55°C to 100°C |
| RF Power Input* | 8W max. at 25°C |

*Passband rating derated linearly to 3W at 100°C ambient. Permanent damage may occur if any of these limits are exceeded.

Typical Performance Data at 25°C

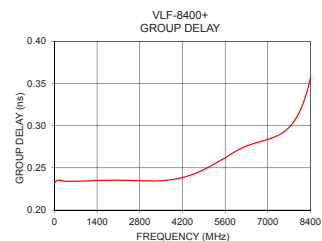
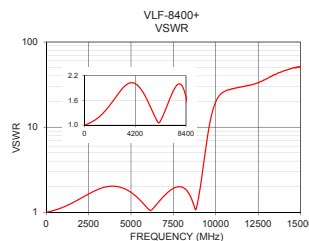
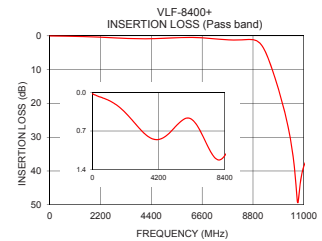
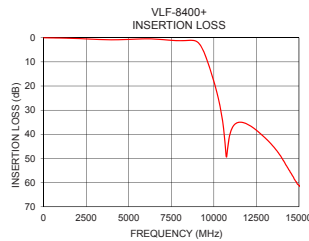
| Frequency (MHz) | Insertion Loss (dB) | VSWR (:1) | Frequency (MHz) | Group Delay (nsec) |
|-----------------|---------------------|-----------|-----------------|--------------------|
| 10 | 0.02 | 1.00 | 10 | 0.23 |
| 100 | 0.04 | 1.01 | 100 | 0.24 |
| 500 | 0.08 | 1.06 | 750 | 0.23 |
| 1000 | 0.14 | 1.15 | 1500 | 0.23 |
| 2000 | 0.34 | 1.45 | 2000 | 0.24 |
| 4000 | 0.86 | 2.03 | 2500 | 0.23 |
| 8000 | 1.23 | 1.98 | 3000 | 0.23 |
| 8400 | 1.15 | 1.68 | 3500 | 0.23 |
| 9100 | 2.16 | 2.05 | 4000 | 0.24 |
| 9200 | 3.02 | 2.81 | 4500 | 0.24 |
| 9750 | 12.38 | 13.85 | 5000 | 0.25 |
| 10100 | 20.57 | 21.79 | 5500 | 0.26 |
| 10300 | 26.29 | 24.58 | 6000 | 0.27 |
| 10400 | 29.71 | 25.42 | 6500 | 0.28 |
| 11000 | 38.63 | 28.25 | 7000 | 0.28 |
| 11500 | 34.98 | 29.64 | 7500 | 0.29 |
| 12000 | 35.92 | 31.17 | 8000 | 0.31 |
| 13000 | 41.39 | 36.90 | 8100 | 0.32 |
| 14000 | 49.90 | 45.60 | 8200 | 0.33 |
| 15000 | 61.14 | 50.27 | 8400 | 0.36 |

Typical Frequency Response



+RoHS Compliant

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



Notes

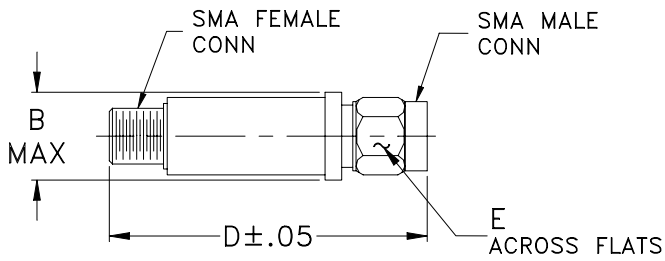
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Coaxial Connections

| | |
|--------|------------|
| INPUT | SMA-Female |
| OUTPUT | SMA-Male |

Outline Drawing



Outline Dimensions ($\frac{\text{inch}}{\text{mm}}$)

| B | D | E | wt. |
|-------|-------|------|-------|
| .410 | 1.43 | .312 | grams |
| 10.41 | 36.32 | 7.92 | 10 |

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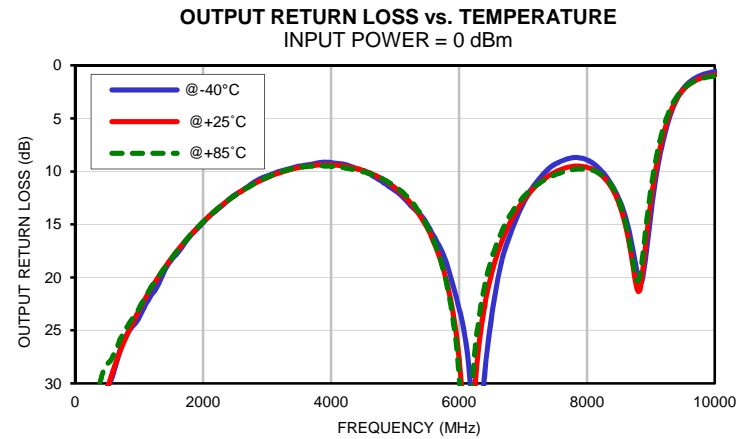
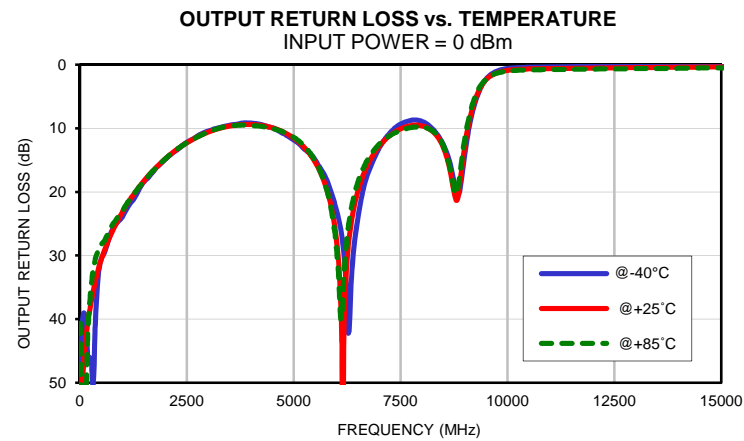
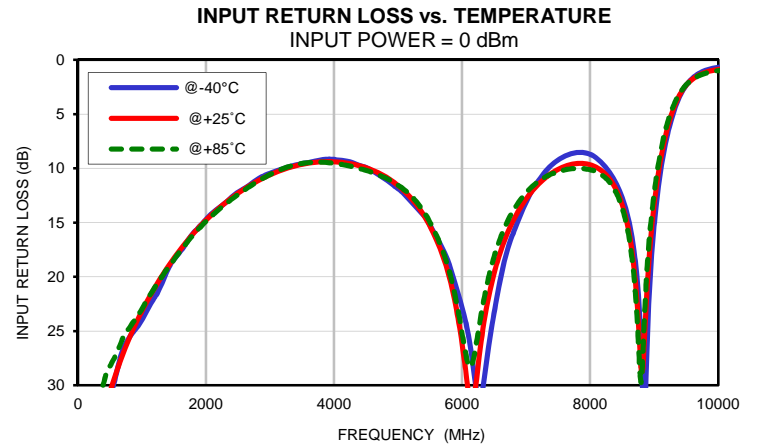
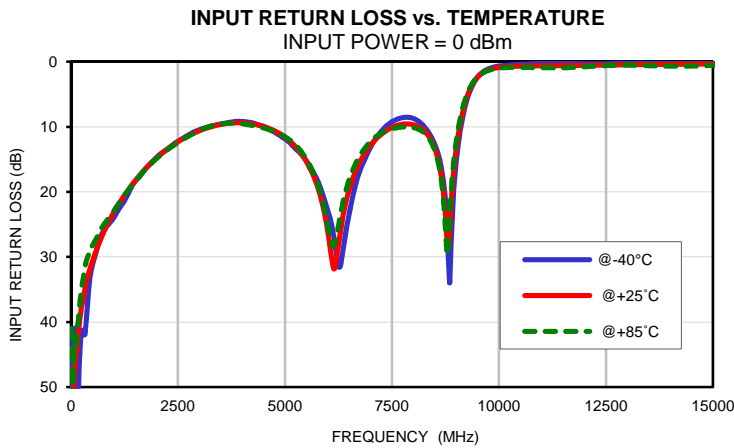
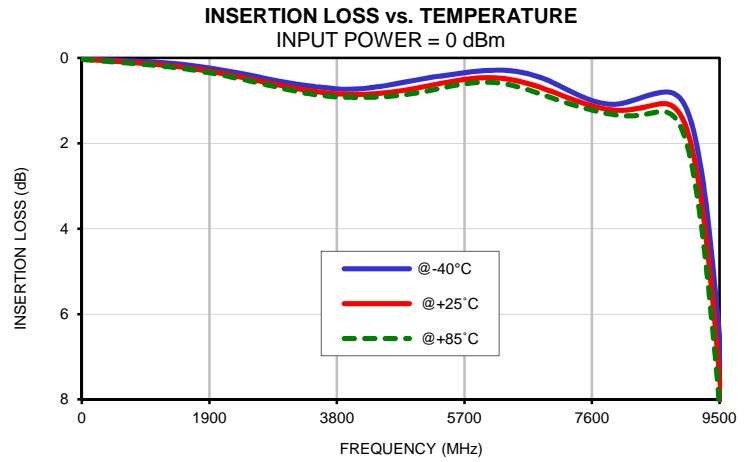
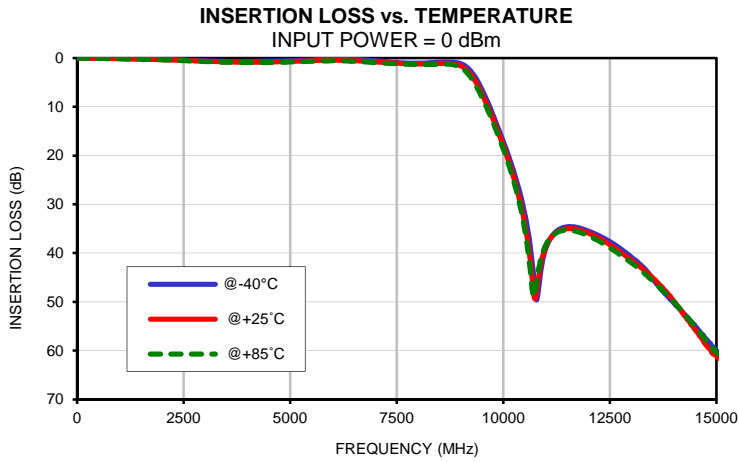
Typical Performance Data

| FREQ. (MHz) | INSERTION LOSS | | | INPUT RETURN LOSS | | | OUTPUT RETURN LOSS | | |
|--------------------|----------------|--------|--------|-------------------|--------|--------|--------------------|--------|--------|
| | (dB) | | | (dB) | | | (dB) | | |
| | @-40°C | @+25°C | @+85°C | @-40°C | @+25°C | @+85°C | @-40°C | @+25°C | @+85°C |
| 10 | 0.02 | 0.02 | 0.03 | 76.87 | 55.19 | 40.97 | 52.62 | 50.60 | 40.66 |
| 20 | 0.01 | 0.02 | 0.03 | 47.84 | 56.20 | 47.27 | 45.32 | 52.03 | 45.92 |
| 40 | 0.02 | 0.03 | 0.04 | 43.73 | 53.53 | 50.12 | 43.00 | 53.22 | 53.91 |
| 60 | 0.03 | 0.03 | 0.04 | 41.98 | 50.89 | 47.52 | 40.31 | 49.65 | 52.14 |
| 80 | 0.03 | 0.04 | 0.04 | 41.07 | 48.82 | 44.10 | 39.30 | 47.71 | 50.56 |
| 100 | 0.03 | 0.04 | 0.04 | 41.32 | 46.32 | 43.99 | 39.14 | 46.11 | 61.57 |
| 150 | 0.03 | 0.04 | 0.05 | 49.77 | 43.13 | 40.79 | 42.46 | 42.51 | 51.38 |
| 200 | 0.03 | 0.05 | 0.06 | 45.64 | 40.03 | 37.69 | 46.67 | 39.61 | 40.29 |
| 250 | 0.04 | 0.05 | 0.06 | 41.71 | 37.57 | 34.82 | 46.23 | 37.85 | 35.76 |
| 300 | 0.04 | 0.06 | 0.07 | 41.66 | 35.98 | 32.71 | 50.38 | 36.01 | 32.70 |
| 350 | 0.04 | 0.07 | 0.08 | 40.38 | 34.05 | 30.80 | 42.72 | 34.33 | 30.85 |
| 400 | 0.05 | 0.07 | 0.09 | 36.21 | 32.89 | 29.84 | 35.64 | 32.94 | 29.74 |
| 500 | 0.05 | 0.08 | 0.10 | 31.25 | 30.70 | 28.24 | 30.48 | 30.61 | 28.25 |
| 750 | 0.07 | 0.11 | 0.13 | 26.12 | 26.41 | 25.23 | 26.05 | 26.28 | 25.29 |
| 1000 | 0.09 | 0.14 | 0.16 | 23.99 | 23.16 | 22.98 | 23.80 | 23.08 | 22.93 |
| 1500 | 0.15 | 0.22 | 0.25 | 18.39 | 18.29 | 18.43 | 18.40 | 18.27 | 18.29 |
| 2000 | 0.26 | 0.34 | 0.38 | 14.72 | 14.78 | 14.89 | 14.84 | 14.78 | 14.76 |
| 4000 | 0.74 | 0.86 | 0.92 | 9.18 | 9.39 | 9.53 | 9.16 | 9.38 | 9.52 |
| 6000 | 0.30 | 0.46 | 0.57 | 22.85 | 26.13 | 25.22 | 22.93 | 27.55 | 29.04 |
| 7000 | 0.57 | 0.79 | 0.94 | 13.10 | 12.81 | 12.23 | 13.06 | 12.81 | 12.46 |
| 8000 | 1.08 | 1.23 | 1.35 | 8.70 | 9.66 | 10.11 | 8.90 | 9.61 | 9.79 |
| 8500 | 0.85 | 1.11 | 1.29 | 12.69 | 13.31 | 13.62 | 12.61 | 13.00 | 12.75 |
| 9000 | 1.16 | 1.61 | 1.94 | 15.32 | 13.38 | 12.29 | 14.00 | 12.75 | 11.65 |
| 9100 | 1.62 | 2.16 | 2.60 | 10.33 | 9.27 | 8.52 | 9.82 | 9.02 | 8.20 |
| 9200 | 2.35 | 3.02 | 3.57 | 7.10 | 6.47 | 5.99 | 6.88 | 6.36 | 5.79 |
| 9300 | 3.41 | 4.20 | 4.84 | 4.89 | 4.53 | 4.25 | 4.76 | 4.48 | 4.12 |
| 9500 | 6.51 | 7.39 | 8.12 | 2.34 | 2.34 | 2.31 | 2.22 | 2.33 | 2.23 |
| 9750 | 11.56 | 12.38 | 13.08 | 1.09 | 1.26 | 1.32 | 0.99 | 1.27 | 1.32 |
| 10000 | 17.16 | 18.06 | 18.73 | 0.68 | 0.87 | 0.98 | 0.59 | 0.88 | 0.99 |
| 10100 | 19.56 | 20.57 | 21.25 | 0.59 | 0.80 | 0.92 | 0.52 | 0.80 | 0.92 |
| 10200 | 22.15 | 23.29 | 24.03 | 0.53 | 0.75 | 0.88 | 0.46 | 0.74 | 0.88 |
| 10300 | 24.95 | 26.29 | 27.14 | 0.47 | 0.71 | 0.86 | 0.43 | 0.71 | 0.85 |
| 10400 | 28.12 | 29.71 | 30.72 | 0.42 | 0.68 | 0.85 | 0.41 | 0.68 | 0.82 |
| 10500 | 31.87 | 33.86 | 35.17 | 0.39 | 0.66 | 0.85 | 0.39 | 0.65 | 0.79 |
| 10600 | 36.61 | 39.40 | 41.32 | 0.36 | 0.65 | 0.87 | 0.38 | 0.64 | 0.78 |
| 10700 | 43.78 | 47.51 | 48.89 | 0.33 | 0.64 | 0.88 | 0.38 | 0.63 | 0.78 |
| 10800 | 48.90 | 46.48 | 44.66 | 0.31 | 0.63 | 0.89 | 0.36 | 0.62 | 0.77 |
| 10900 | 42.46 | 41.38 | 40.53 | 0.27 | 0.62 | 0.90 | 0.35 | 0.61 | 0.75 |
| 11000 | 38.97 | 38.63 | 38.23 | 0.25 | 0.62 | 0.91 | 0.35 | 0.60 | 0.74 |
| 11250 | 35.47 | 35.71 | 35.81 | 0.24 | 0.60 | 0.93 | 0.33 | 0.58 | 0.72 |
| 11500 | 34.61 | 34.98 | 35.31 | 0.25 | 0.59 | 0.91 | 0.29 | 0.56 | 0.71 |
| 11750 | 34.78 | 35.19 | 35.64 | 0.29 | 0.57 | 0.86 | 0.25 | 0.54 | 0.69 |
| 12000 | 35.48 | 35.92 | 36.45 | 0.32 | 0.56 | 0.77 | 0.22 | 0.52 | 0.67 |
| 12250 | 36.50 | 36.97 | 37.59 | 0.34 | 0.54 | 0.68 | 0.19 | 0.50 | 0.66 |
| 12500 | 37.67 | 38.30 | 38.92 | 0.34 | 0.52 | 0.59 | 0.17 | 0.48 | 0.64 |
| 12750 | 39.10 | 39.79 | 40.42 | 0.30 | 0.50 | 0.54 | 0.15 | 0.45 | 0.62 |
| 13000 | 40.77 | 41.39 | 41.99 | 0.21 | 0.47 | 0.53 | 0.13 | 0.44 | 0.60 |
| 13250 | 42.71 | 43.13 | 43.71 | 0.13 | 0.44 | 0.55 | 0.13 | 0.42 | 0.58 |
| 13500 | 45.23 | 45.08 | 45.70 | 0.06 | 0.42 | 0.60 | 0.13 | 0.41 | 0.57 |
| 13750 | 47.90 | 47.29 | 47.83 | 0.01 | 0.40 | 0.65 | 0.13 | 0.40 | 0.56 |
| 14000 | 50.25 | 49.90 | 50.03 | 0.00 | 0.38 | 0.68 | 0.12 | 0.39 | 0.54 |
| 14250 | 52.55 | 52.87 | 52.51 | 0.02 | 0.37 | 0.68 | 0.11 | 0.37 | 0.52 |
| 14300 | 53.04 | 53.42 | 53.01 | 0.02 | 0.36 | 0.68 | 0.12 | 0.37 | 0.53 |
| 14400 | 54.01 | 54.64 | 54.05 | 0.04 | 0.36 | 0.67 | 0.12 | 0.36 | 0.52 |
| 14500 | 55.09 | 55.76 | 55.07 | 0.05 | 0.35 | 0.65 | 0.11 | 0.35 | 0.50 |
| 14600 | 56.04 | 56.97 | 56.22 | 0.06 | 0.35 | 0.64 | 0.11 | 0.34 | 0.49 |
| 14700 | 57.01 | 58.13 | 57.30 | 0.08 | 0.35 | 0.63 | 0.12 | 0.34 | 0.48 |
| 14800 | 58.07 | 59.37 | 58.49 | 0.09 | 0.34 | 0.60 | 0.12 | 0.34 | 0.48 |
| 14900 | 59.15 | 60.52 | 59.52 | 0.11 | 0.34 | 0.58 | 0.11 | 0.34 | 0.48 |
| 15000 | 60.17 | 61.14 | 60.43 | 0.12 | 0.35 | 0.57 | 0.10 | 0.34 | 0.47 |

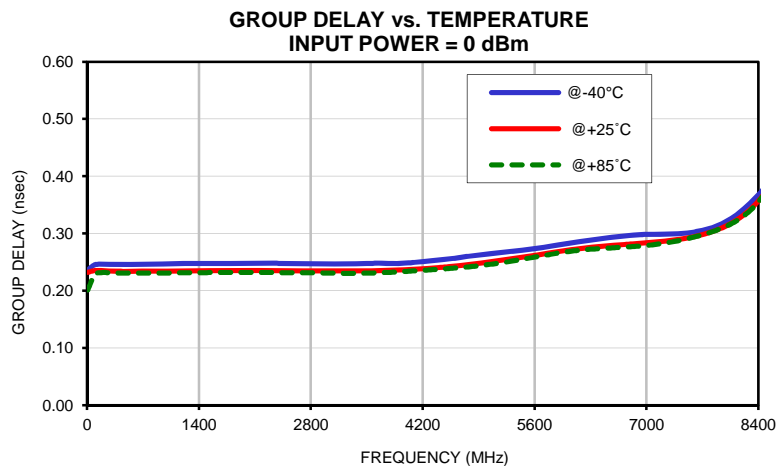
Typical Performance Data

| FREQ. (MHz) | GROUP DELAY | | |
|--------------------|-------------|--------|--------|
| | (nsec) | | |
| | @-40°C | @+25°C | @+85°C |
| 10 | 0.24 | 0.23 | 0.20 |
| 20 | 0.24 | 0.23 | 0.20 |
| 40 | 0.24 | 0.23 | 0.21 |
| 50 | 0.24 | 0.23 | 0.22 |
| 100 | 0.25 | 0.24 | 0.23 |
| 100 | 0.25 | 0.24 | 0.23 |
| 125 | 0.25 | 0.24 | 0.23 |
| 150 | 0.25 | 0.24 | 0.23 |
| 175 | 0.25 | 0.24 | 0.23 |
| 200 | 0.25 | 0.24 | 0.23 |
| 225 | 0.25 | 0.23 | 0.23 |
| 250 | 0.25 | 0.23 | 0.23 |
| 275 | 0.25 | 0.23 | 0.23 |
| 300 | 0.25 | 0.23 | 0.23 |
| 325 | 0.25 | 0.23 | 0.23 |
| 350 | 0.25 | 0.23 | 0.23 |
| 375 | 0.25 | 0.23 | 0.23 |
| 400 | 0.25 | 0.23 | 0.23 |
| 500 | 0.25 | 0.23 | 0.23 |
| 750 | 0.25 | 0.23 | 0.23 |
| 1000 | 0.25 | 0.23 | 0.23 |
| 1250 | 0.25 | 0.23 | 0.23 |
| 1500 | 0.25 | 0.23 | 0.23 |
| 1750 | 0.25 | 0.24 | 0.23 |
| 2000 | 0.25 | 0.24 | 0.23 |
| 2250 | 0.25 | 0.24 | 0.23 |
| 2500 | 0.25 | 0.23 | 0.23 |
| 2750 | 0.25 | 0.23 | 0.23 |
| 3000 | 0.25 | 0.23 | 0.23 |
| 3250 | 0.25 | 0.23 | 0.23 |
| 3500 | 0.25 | 0.23 | 0.23 |
| 3750 | 0.25 | 0.24 | 0.23 |
| 4000 | 0.25 | 0.24 | 0.23 |
| 4250 | 0.25 | 0.24 | 0.24 |
| 4500 | 0.26 | 0.24 | 0.24 |
| 4750 | 0.26 | 0.25 | 0.24 |
| 5000 | 0.26 | 0.25 | 0.25 |
| 5250 | 0.27 | 0.25 | 0.25 |
| 5500 | 0.27 | 0.26 | 0.26 |
| 5750 | 0.28 | 0.27 | 0.26 |
| 6000 | 0.28 | 0.27 | 0.27 |
| 6250 | 0.29 | 0.28 | 0.27 |
| 6500 | 0.29 | 0.28 | 0.27 |
| 6750 | 0.30 | 0.28 | 0.28 |
| 7000 | 0.30 | 0.28 | 0.28 |
| 7100 | 0.30 | 0.28 | 0.28 |
| 7200 | 0.30 | 0.29 | 0.28 |
| 7300 | 0.30 | 0.29 | 0.28 |
| 7400 | 0.30 | 0.29 | 0.29 |
| 7500 | 0.30 | 0.29 | 0.29 |
| 7600 | 0.30 | 0.29 | 0.29 |
| 7700 | 0.31 | 0.30 | 0.30 |
| 7800 | 0.31 | 0.30 | 0.30 |
| 7900 | 0.31 | 0.31 | 0.31 |
| 8000 | 0.32 | 0.31 | 0.31 |
| 8100 | 0.33 | 0.32 | 0.32 |
| 8200 | 0.34 | 0.33 | 0.33 |
| 8300 | 0.35 | 0.34 | 0.34 |
| 8350 | 0.36 | 0.35 | 0.35 |
| 8400 | 0.37 | 0.36 | 0.36 |

Typical Performance Curves



Typical Performance Curves

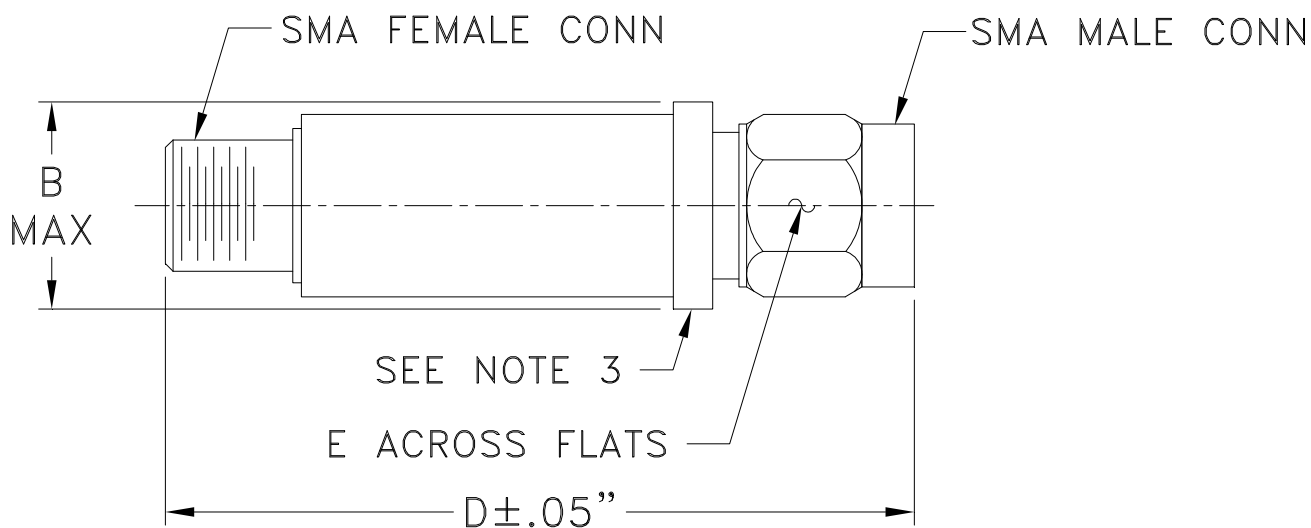


Case Style

FF

FF704

Outline Dimensions



| CASE #. | A | B | C | D | E | WT GRAMS |
|---------|----|-----------------|----|-----------------|----------------|----------|
| FF704 | -- | .410 (10.41) | -- | 1.43 (36.32) | .312 (7.92) | 10.0 |

Dimensions are in inches (mm). Tolerances: 2Pl. ± .04; 3Pl. ± .030

Notes:

1. Case material: Stainless steel.
2. Case finish: Gold plated.
3. Round Flange may have .312 Across Flats in some models.

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RF/IF MICROWAVE COMPONENTS



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 Ambient Environment | Individual Model Data Sheet |
| Storage Temperature | -55° to 100° C Ambient Environment | Individual Model Data Sheet |
| Barometric Pressure | 100,000 Feet | MIL-STD-202, Method 105, Condition D |
| Humidity | 90% RH, 65°C Units may require bake-out after humidity to restore full performance. | MIL-STD-202, Method 103 |
| Thermal Shock | -65° to 125°C, 5 cycles | MIL-STD-202, Method 107, Condition B |
| 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 | 100g, 6ms sawtooth, 3 shocks each direction 3 axes (total 18) | MIL-STD-202, Method 213, Condition I |