



(LTCC) COAXIAL

High Pass Filter

VHFG-1780+

50Ω 1980 to 11000 MHz SMA Male/Female

KEY FEATURES

- Low Insertion Loss, 1 dB Typ.
- Return Loss, 14 dB Typ.
- Stop Band Rejection, 48 dB Typ.
- Rugged unibody construction
- Power Handling: 4 Watts

APPLICATIONS

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

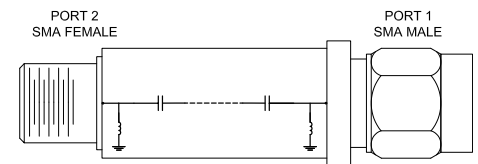


Generic photo used for illustration purposes only

PRODUCT OVERVIEW

VHFG-1780+ is a 50Ω high pass filter built in rugged unibody construction. Covering 1980-11000 MHz bandwidth, these units offer good matching within the passband and good rejection in stopband. VHFG-1780+ offer low insertion loss, and excellent power handling capability. It handles up to 4 W RF input power and provides a wide operating temperature range from -55°C to 125°C.

FUNCTIONAL DIAGRAM



ELECTRICAL SPECIFICATIONS^{1,2} AT +25°C

| Parameter | | F# | Frequency (MHz) | Min. | Typ. | Max. | Units |
|-----------|----------------------------|-----------------------------|-----------------|------|------|------|-------|
| Pass Band | Insertion Loss | F3-F4 | 1980 - 2500 | — | 2.0 | — | dB |
| | | F4-F5 | 2500 - 10000 | — | 1.0 | 1.6 | |
| | | F5-F6 | 10000 - 11000 | — | 1.6 | — | |
| Pass Band | Return Loss | F3-F4 | 1980 - 2500 | — | 14 | — | dB |
| | | F4-F5 | 2500 - 10000 | — | 14 | — | |
| | | F5-F6 | 10000 - 11000 | — | 12 | — | |
| Stop Band | Rejection | DC-F1 | DC - 1100 | 43 | 48 | — | dB |
| | | F1-F2 | 1100 - 1400 | 22 | 34 | — | |
| | Freq. Cut-Off ³ | F _c ³ | 1780 | — | 3.0 | — | dB |

1. This filter is bi-directional, RF1 and RF2 ports may be interchanged, see S-Parameters for actual performance.

2. 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.

3. Typical variation ± 5%

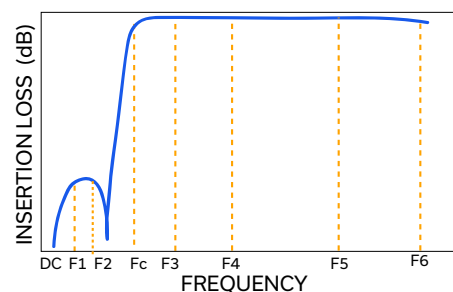
ABSOLUTE MAXIMUM RATINGS⁴

| Parameter | Ratings |
|--------------------------|-------------------|
| Operating Temperature | -55 °C to +125 °C |
| Storage Temperature | -55 °C to +125 °C |
| Input Power ⁵ | 4W @+25°C |

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

5. Power rating applies only to signals within the passband. Power rating above +25°C operating temperature decreases linearly to 0.9W at +125°C.

TYPICAL FREQUENCY RESPONSE





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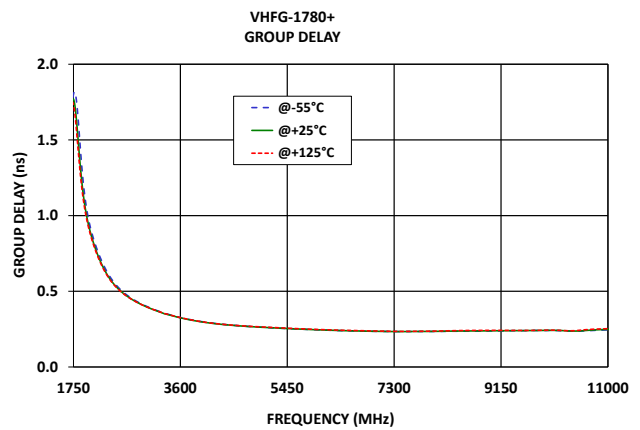
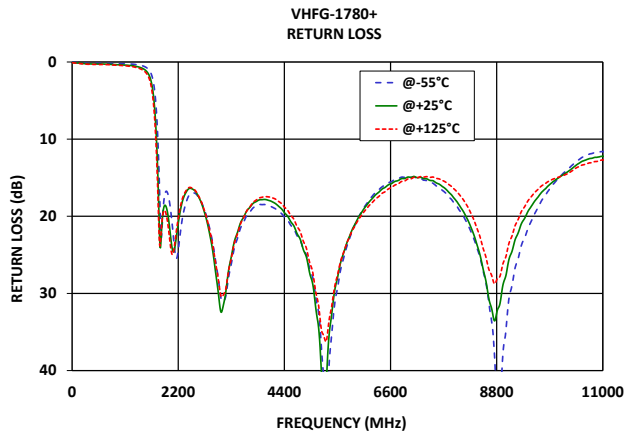
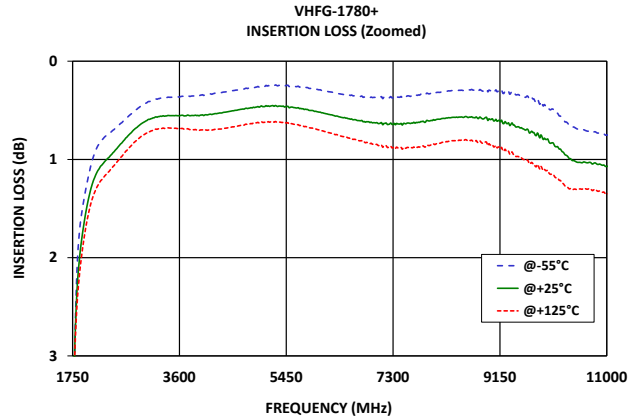
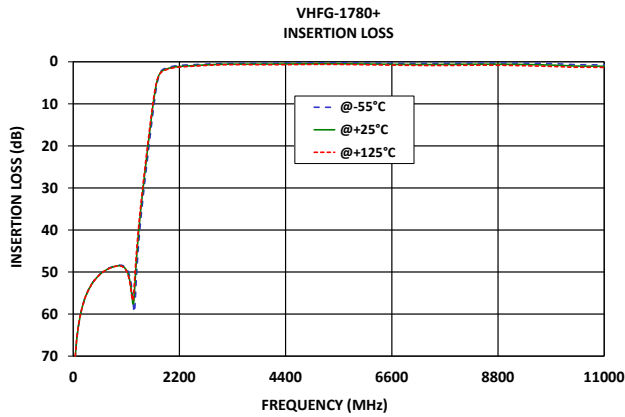
High Pass Filter

VHFG-1780+

Mini-Circuits

50Ω 1980 to 11000 MHz SMA Male/Female

TYPICAL PERFORMANCE GRAPHS





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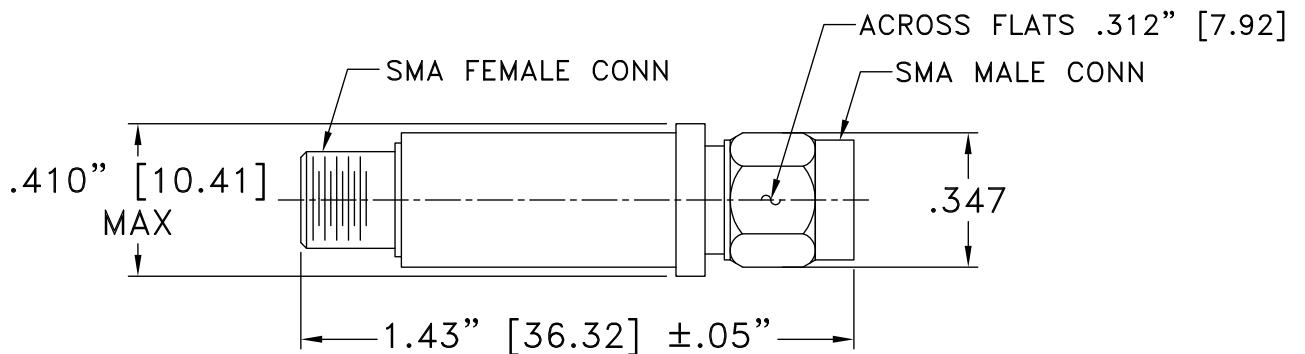
Mini-Circuits

50Ω 1980 to 11000 MHz SMA Male/Female

CONNECTOR DESCRIPTION

| Function | Functionality | Connector |
|------------------|---------------|------------|
| RF1 ¹ | Port-1 | SMA MALE |
| RF2 ¹ | Port-2 | SMA FEMALE |

CASE STYLE DRAWING



Unit weight: 10.0grams

Dimensions are in inches (mm). Tolerances: 2 Pl. ± 0.04 "; 3 Pl. ± 0.30 "

PRODUCT MARKING*: VHFG-1780+

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



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VHFG-1780+

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ADDITIONAL INFORMATION IS AVAILABLE ON OUR DASHBOARD

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| | |
|---------------------------|---|
| Performance Data & Graphs | <p>Data</p> <p>Graphs</p> <p>S-Parameter (S2P Files) Data Set (.zip file)</p> |
| Case Style | FF704 |
| RoHS Status | Compliant |
| Environmental Ratings | ENV113 |

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



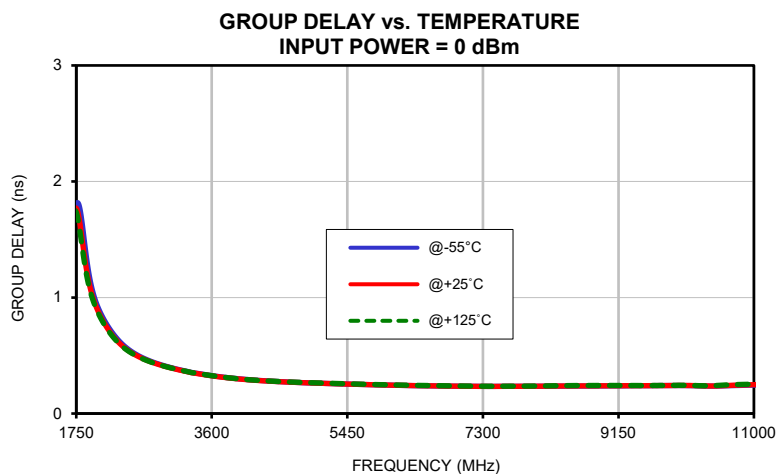
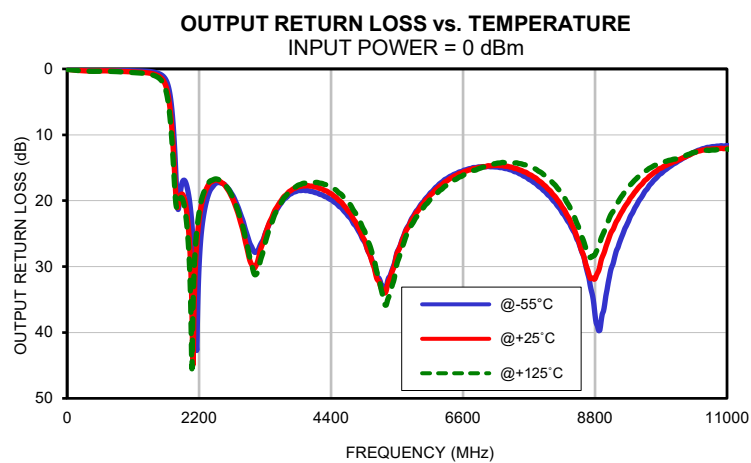
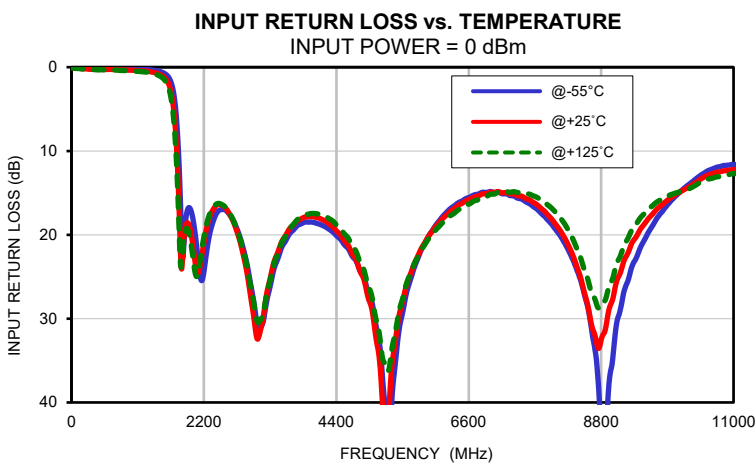
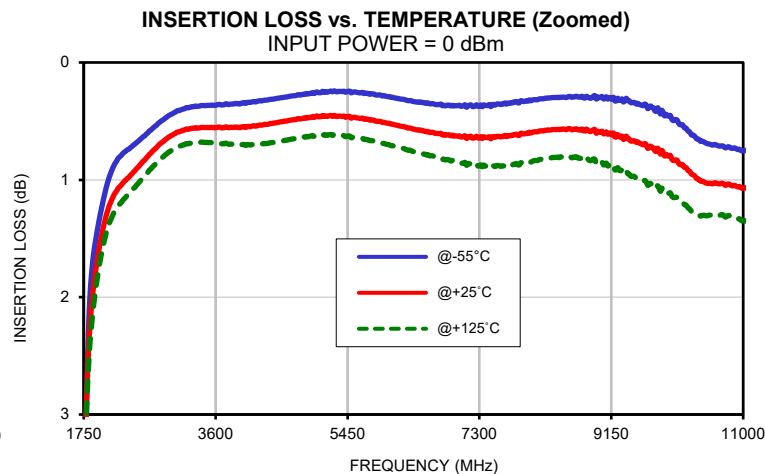
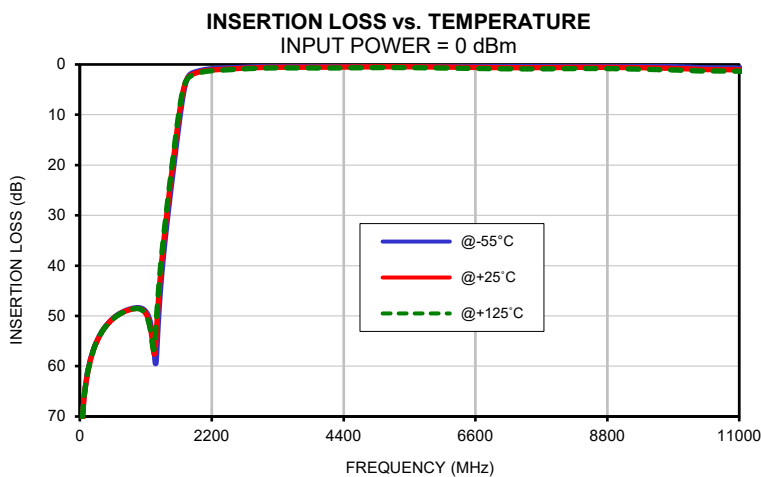
Typical Performance Data

| FREQ. (MHz) | INSERTION LOSS | | | INPUT RETURN LOSS | | | OUTPUT RETURN LOSS | | |
|----------------|----------------|--------|---------|-------------------|--------|---------|--------------------|--------|---------|
| | (dB) | | | (dB) | | | (dB) | | |
| | @-55°C | @+25°C | @+125°C | @-55°C | @+25°C | @+125°C | @-55°C | @+25°C | @+125°C |
| 10 | 81.84 | 83.71 | 75.45 | 0.04 | 0.08 | 0.10 | 0.03 | 0.07 | 0.10 |
| 50 | 69.70 | 69.07 | 69.11 | 0.06 | 0.10 | 0.13 | 0.04 | 0.10 | 0.12 |
| 100 | 63.58 | 63.57 | 63.35 | 0.07 | 0.13 | 0.16 | 0.07 | 0.15 | 0.16 |
| 150 | 60.17 | 60.24 | 60.12 | 0.09 | 0.15 | 0.19 | 0.10 | 0.19 | 0.21 |
| 200 | 57.70 | 57.77 | 57.84 | 0.13 | 0.20 | 0.23 | 0.14 | 0.23 | 0.25 |
| 250 | 55.94 | 56.02 | 56.00 | 0.14 | 0.21 | 0.25 | 0.17 | 0.26 | 0.29 |
| 300 | 54.60 | 54.73 | 54.65 | 0.17 | 0.24 | 0.28 | 0.20 | 0.29 | 0.33 |
| 350 | 53.42 | 53.63 | 53.49 | 0.18 | 0.25 | 0.30 | 0.21 | 0.31 | 0.35 |
| 400 | 52.51 | 52.65 | 52.59 | 0.17 | 0.25 | 0.30 | 0.21 | 0.31 | 0.36 |
| 450 | 51.75 | 51.83 | 51.83 | 0.18 | 0.27 | 0.32 | 0.20 | 0.31 | 0.36 |
| 150 | 60.17 | 60.24 | 60.12 | 0.09 | 0.15 | 0.19 | 0.10 | 0.19 | 0.21 |
| 200 | 57.70 | 57.77 | 57.84 | 0.13 | 0.20 | 0.23 | 0.14 | 0.23 | 0.25 |
| 400 | 52.51 | 52.65 | 52.59 | 0.17 | 0.25 | 0.30 | 0.21 | 0.31 | 0.36 |
| 600 | 50.03 | 50.10 | 50.16 | 0.17 | 0.27 | 0.33 | 0.17 | 0.29 | 0.35 |
| 800 | 48.78 | 48.88 | 48.88 | 0.19 | 0.31 | 0.38 | 0.19 | 0.33 | 0.40 |
| 1000 | 48.39 | 48.57 | 48.61 | 0.21 | 0.36 | 0.44 | 0.26 | 0.41 | 0.50 |
| 1100 | 49.12 | 49.54 | 49.73 | 0.24 | 0.40 | 0.50 | 0.28 | 0.45 | 0.55 |
| 1200 | 52.66 | 54.06 | 54.68 | 0.26 | 0.45 | 0.56 | 0.31 | 0.49 | 0.61 |
| 1300 | 53.41 | 48.81 | 46.87 | 0.31 | 0.54 | 0.67 | 0.34 | 0.56 | 0.69 |
| 1400 | 37.55 | 35.17 | 33.99 | 0.41 | 0.69 | 0.85 | 0.42 | 0.68 | 0.86 |
| 1500 | 26.84 | 24.80 | 23.79 | 0.59 | 0.97 | 1.20 | 0.62 | 0.97 | 1.21 |
| 1600 | 17.10 | 15.18 | 14.27 | 1.08 | 1.77 | 2.20 | 1.10 | 1.73 | 2.16 |
| 1750 | 4.52 | 4.01 | 3.91 | 6.70 | 10.23 | 12.17 | 6.60 | 9.57 | 11.39 |
| 1780 | 3.20 | 3.09 | 3.14 | 10.48 | 15.26 | 17.66 | 10.26 | 13.88 | 15.93 |
| 1980 | 1.30 | 1.54 | 1.69 | 17.01 | 19.60 | 20.82 | 17.33 | 20.87 | 22.42 |
| 2000 | 1.24 | 1.47 | 1.62 | 17.49 | 20.43 | 21.78 | 17.97 | 22.22 | 24.16 |
| 2200 | 0.85 | 1.10 | 1.25 | 24.40 | 20.92 | 20.26 | 29.80 | 22.88 | 21.76 |
| 2500 | 0.68 | 0.90 | 1.04 | 16.98 | 16.49 | 16.40 | 17.28 | 16.87 | 16.73 |
| 2800 | 0.52 | 0.70 | 0.84 | 20.30 | 20.80 | 20.47 | 19.95 | 20.66 | 20.33 |
| 3000 | 0.43 | 0.62 | 0.74 | 26.82 | 28.45 | 27.01 | 25.19 | 27.29 | 26.71 |
| 3200 | 0.38 | 0.57 | 0.69 | 29.83 | 29.10 | 28.88 | 27.17 | 28.32 | 29.98 |
| 3400 | 0.37 | 0.55 | 0.68 | 23.34 | 22.56 | 22.76 | 23.00 | 22.80 | 23.62 |
| 3600 | 0.37 | 0.56 | 0.69 | 20.14 | 19.53 | 19.56 | 19.95 | 19.54 | 19.77 |
| 3800 | 0.36 | 0.55 | 0.70 | 18.74 | 18.14 | 17.97 | 18.65 | 18.10 | 17.95 |
| 4000 | 0.34 | 0.55 | 0.70 | 18.49 | 17.82 | 17.45 | 18.45 | 17.72 | 17.25 |
| 4200 | 0.33 | 0.54 | 0.70 | 18.97 | 18.29 | 17.73 | 18.98 | 18.10 | 17.31 |
| 4400 | 0.31 | 0.52 | 0.68 | 20.09 | 19.52 | 18.80 | 19.85 | 18.94 | 17.92 |
| 4600 | 0.29 | 0.50 | 0.66 | 21.68 | 21.29 | 20.42 | 21.40 | 20.57 | 19.38 |
| 4800 | 0.27 | 0.48 | 0.64 | 24.38 | 24.45 | 23.35 | 23.72 | 23.14 | 21.80 |
| 5000 | 0.26 | 0.46 | 0.62 | 28.32 | 29.25 | 27.70 | 27.31 | 27.19 | 25.75 |
| 5200 | 0.25 | 0.45 | 0.62 | 39.79 | 42.29 | 35.26 | 31.80 | 32.27 | 31.74 |
| 5400 | 0.24 | 0.46 | 0.62 | 33.98 | 31.63 | 30.84 | 30.98 | 31.31 | 33.58 |
| 5500 | 0.26 | 0.47 | 0.64 | 29.32 | 28.01 | 27.67 | 27.83 | 28.01 | 29.47 |
| 5600 | 0.26 | 0.47 | 0.64 | 26.06 | 25.27 | 25.15 | 25.57 | 25.72 | 26.71 |
| 5800 | 0.27 | 0.49 | 0.67 | 21.97 | 21.81 | 21.96 | 21.88 | 22.11 | 22.77 |
| 6000 | 0.29 | 0.52 | 0.70 | 19.44 | 19.51 | 19.86 | 19.45 | 19.74 | 20.41 |
| 6200 | 0.31 | 0.54 | 0.73 | 17.55 | 17.83 | 18.34 | 17.50 | 17.89 | 18.55 |
| 7000 | 0.37 | 0.63 | 0.85 | 14.90 | 14.94 | 15.15 | 14.81 | 14.74 | 14.70 |
| 7200 | 0.38 | 0.64 | 0.88 | 15.11 | 14.96 | 14.90 | 14.94 | 14.66 | 14.28 |
| 7400 | 0.37 | 0.64 | 0.88 | 15.59 | 15.31 | 14.94 | 15.34 | 14.90 | 14.18 |
| 7600 | 0.36 | 0.63 | 0.89 | 16.24 | 15.81 | 15.14 | 16.21 | 15.55 | 14.50 |
| 8000 | 0.32 | 0.59 | 0.84 | 18.94 | 18.33 | 16.99 | 18.96 | 18.07 | 16.45 |
| 8400 | 0.30 | 0.57 | 0.81 | 24.26 | 23.84 | 21.70 | 23.96 | 23.35 | 21.41 |
| 8800 | 0.29 | 0.57 | 0.81 | 42.99 | 32.54 | 28.24 | 37.36 | 31.85 | 28.15 |
| 9000 | 0.30 | 0.59 | 0.85 | 34.21 | 27.45 | 25.04 | 33.53 | 26.51 | 23.51 |
| 9400 | 0.32 | 0.65 | 0.95 | 22.47 | 20.01 | 18.54 | 22.20 | 19.48 | 17.49 |
| 9600 | 0.37 | 0.70 | 1.01 | 19.52 | 17.94 | 16.84 | 19.09 | 17.28 | 15.78 |
| 10000 | 0.49 | 0.82 | 1.14 | 15.66 | 15.38 | 15.11 | 15.15 | 14.57 | 13.98 |
| 10500 | 0.69 | 1.03 | 1.31 | 12.68 | 13.16 | 13.58 | 12.43 | 12.55 | 12.56 |
| 11000 | 0.75 | 1.07 | 1.35 | 11.62 | 12.23 | 12.70 | 11.64 | 12.03 | 12.17 |

Typical Performance Data

| FREQ. (MHz) | GROUP DELAY | | |
|--------------------|-------------|--------|---------|
| | (nsec) | | |
| | @-55°C | @+25°C | @+125°C |
| 1980 | 1.04 | 0.99 | 0.97 |
| 2000 | 1.00 | 0.96 | 0.94 |
| 2500 | 0.54 | 0.53 | 0.52 |
| 2800 | 0.44 | 0.44 | 0.44 |
| 3000 | 0.40 | 0.40 | 0.40 |
| 3600 | 0.33 | 0.32 | 0.33 |
| 3800 | 0.31 | 0.31 | 0.31 |
| 4000 | 0.30 | 0.30 | 0.30 |
| 4600 | 0.27 | 0.27 | 0.27 |
| 4800 | 0.27 | 0.27 | 0.27 |
| 5000 | 0.26 | 0.26 | 0.26 |
| 5200 | 0.26 | 0.26 | 0.26 |
| 5600 | 0.25 | 0.25 | 0.25 |
| 5800 | 0.25 | 0.25 | 0.25 |
| 6000 | 0.25 | 0.25 | 0.25 |
| 6400 | 0.24 | 0.24 | 0.24 |
| 6800 | 0.24 | 0.24 | 0.24 |
| 7000 | 0.24 | 0.24 | 0.24 |
| 7200 | 0.23 | 0.23 | 0.24 |
| 7400 | 0.23 | 0.23 | 0.24 |
| 7600 | 0.23 | 0.23 | 0.24 |
| 7800 | 0.23 | 0.23 | 0.24 |
| 8000 | 0.23 | 0.24 | 0.24 |
| 8200 | 0.24 | 0.24 | 0.24 |
| 8400 | 0.24 | 0.24 | 0.24 |
| 8600 | 0.24 | 0.24 | 0.24 |
| 8800 | 0.24 | 0.24 | 0.24 |
| 9000 | 0.24 | 0.24 | 0.24 |
| 9200 | 0.24 | 0.24 | 0.24 |
| 9400 | 0.24 | 0.24 | 0.24 |
| 9600 | 0.24 | 0.24 | 0.24 |
| 9800 | 0.24 | 0.24 | 0.24 |
| 10000 | 0.24 | 0.24 | 0.24 |
| 10200 | 0.24 | 0.24 | 0.24 |
| 10400 | 0.24 | 0.24 | 0.24 |
| 10600 | 0.24 | 0.24 | 0.25 |
| 10700 | 0.24 | 0.24 | 0.25 |
| 10800 | 0.24 | 0.25 | 0.25 |
| 10900 | 0.24 | 0.25 | 0.25 |
| 11000 | 0.25 | 0.25 | 0.25 |

Typical Performance Curves

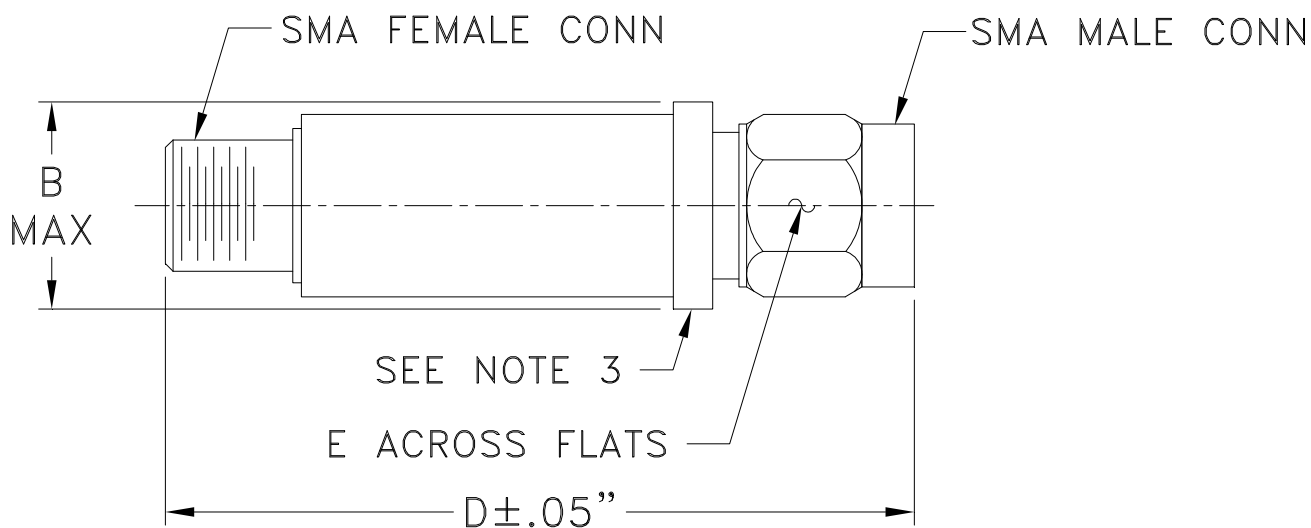


Case Style

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 125° C Ambient Environment | Individual Model Data Sheet |
| Storage Temperature | -55° to 125° C 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 |
| 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 |
| Thermal Shock | -55° to 125°C, 100 cycles | MIL-STD-202, Method 107, Condition A-3, Except +125°C |