*Coaxial*

# Low Pass Filter

## VLF-160+

50Ω *DC to 160 MHz

CASE STYLE: FF704

| Connectors | Model |
|---|---|
| **SMA** | VLF-160+ |

### Maximum Ratings

| | |
|---|---|
| Operating Temperature | -55°C to 100°C |
| Storage Temperature | -55°C to 100°C |
| RF Power Input* | 8W at 25°C |
| DC Current Input to Output | 0.5A max. at 25°C |

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

### Features

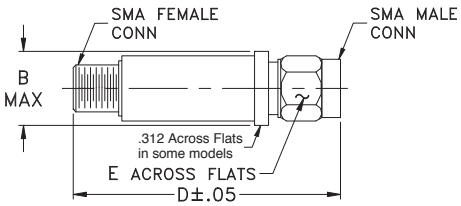
- Rugged uni-body construction, small size
- 7 sections
- Excellent power handling, 8W
- Temperature stable
- Low cost
- Protected by US patent 6,943,646

### Applications

- Harmonic rejection
- Transmitters/receivers
- Lab use

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

### Outline Drawing




### Outline Dimensions ( inch / mm )

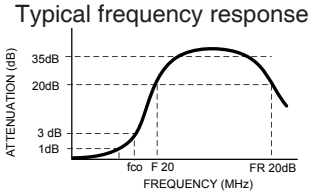
| B | D | E | wt. |
|---|---|---|---|
| .410 | 1.43 | .312 | grams |
| 10.41 | 36.32 | 7.92 | 10 |

### Low Pass Filter Electrical Specifications ($T_{AMB}$= 25°C)

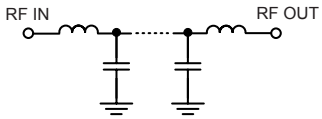
| PASSBAND (MHz) | fco, MHz Nom. | STOP BAND (MHz) (loss, dB) | | | VSWR (:1) | | NO. OF SECTIONS |
|---|---|---|---|---|---|---|---|
| (loss < 1 dB) Max. | (loss 3 dB) Typ. | F 20 Min. | 35 Typ. | FR 20 Typ. | Stopband Typ. | Passband Typ. | |
| *DC - 160 | 230 | 330 | 480 - 2700 | 6100 | 17 | 1.2 | 7 |

** Not for use with DC voitage at input and output ports*

Typical frequency response




Electrical schematic

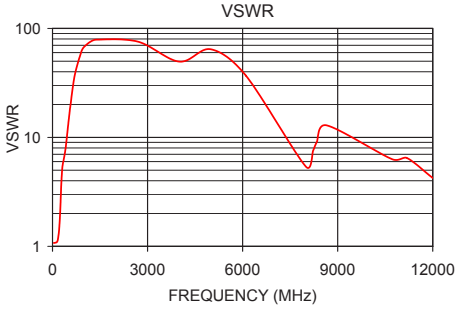



### Typical Performance Data at 25°C

| Frequency (MHz) | Insertion Loss (dB) | VSWR (:1) |
|---|---|---|
| 40 | 0.32 | 1.07 |
| 100 | 0.52 | 1.08 |
| 150 | 0.78 | 1.11 |
| 160 | 0.85 | 1.13 |
| 210 | 1.64 | 1.44 |
| 230 | 2.55 | 1.77 |
| 260 | 6.08 | 2.81 |
| 280 | 10.97 | 3.87 |
| 310 | 22.74 | 5.27 |
| 330 | 33.27 | 5.81 |
| 350 | 42.12 | 6.19 |
| 480 | 40.13 | 11.85 |
| 1000 | 64.46 | 69.49 |
| 2700 | 34.45 | 75.53 |
| 6100 | 20.50 | 36.97 |
| 9000 | 23.14 | 15.13 |
| 12000 | 16.88 | 4.24 |

VLF-160+
INSERTION LOSS


VLF-160+
VSWR




**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

# Coaxial Low Pass Filter VLF-160+

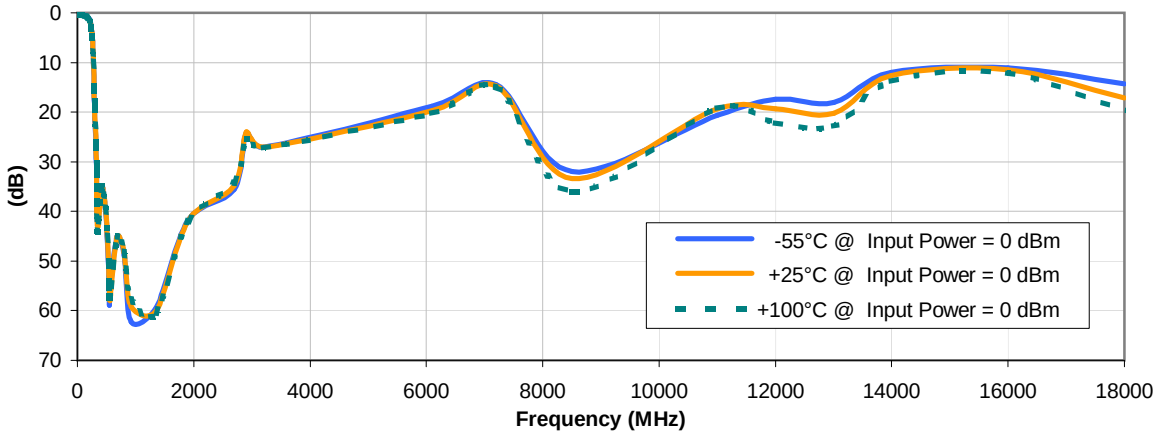
## *Typical Performance Data*

| FREQ. (MHz) | INSERTION LOSS (dB) | | | INPUT RETURN LOSS (dB) | | | OUTPUT RETURNLOSS (dB) | | |
|---|---|---|---|---|---|---|---|---|---|
| | @ -55° C | @ +25° C | @ +100° C | @ -55° C | @ +25° C | @ +100° C | @ -55° C | @ +25° C | @ +100° C |
| 40 | 0.25 | 0.32 | 0.36 | 31.60 | 30.04 | 28.08 | 31.23 | 29.65 | 27.93 |
| 50 | 0.27 | 0.32 | 0.36 | 30.79 | 29.57 | 27.77 | 30.19 | 29.00 | 27.41 |
| 80 | 0.36 | 0.42 | 0.47 | 30.14 | 29.19 | 27.83 | 28.64 | 27.64 | 26.64 |
| 100 | 0.43 | 0.50 | 0.55 | 30.44 | 29.37 | 28.28 | 28.29 | 27.08 | 26.25 |
| 150 | 0.66 | 0.76 | 0.83 | 27.70 | 28.11 | 29.55 | 24.83 | 24.46 | 24.46 |
| 160 | 0.73 | 0.83 | 0.90 | 25.45 | 26.06 | 27.74 | 23.29 | 23.20 | 23.41 |
| 175 | 0.86 | 0.97 | 1.06 | 21.73 | 22.28 | 23.48 | 20.74 | 20.90 | 21.24 |
| 205 | 1.35 | 1.48 | 1.59 | 14.23 | 14.58 | 14.96 | 15.14 | 15.53 | 15.77 |
| 230 | 2.44 | 2.56 | 2.68 | 8.56 | 8.94 | 9.18 | 10.34 | 10.99 | 11.36 |
| 235 | 2.82 | 2.92 | 3.04 | 7.55 | 7.94 | 8.18 | 9.42 | 10.13 | 10.55 |
| 250 | 4.54 | 4.56 | 4.64 | 4.90 | 5.30 | 5.56 | 6.94 | 7.74 | 8.32 |
| 275 | 10.14 | 9.89 | 9.78 | 2.23 | 2.53 | 2.75 | 4.24 | 4.87 | 5.49 |
| 290 | 15.43 | 14.96 | 14.72 | 1.56 | 1.79 | 1.96 | 3.44 | 3.92 | 4.40 |
| 300 | 19.78 | 19.14 | 18.80 | 1.33 | 1.54 | 1.69 | 3.12 | 3.53 | 3.92 |
| 315 | 27.53 | 26.61 | 26.11 | 1.15 | 1.34 | 1.47 | 2.82 | 3.17 | 3.48 |
| 325 | 33.39 | 32.36 | 31.78 | 1.09 | 1.27 | 1.40 | 2.68 | 3.03 | 3.30 |
| 330 | 36.36 | 35.40 | 34.82 | 1.06 | 1.24 | 1.37 | 2.62 | 2.97 | 3.24 |
| 335 | 39.08 | 38.38 | 37.94 | 1.05 | 1.23 | 1.36 | 2.59 | 2.97 | 3.23 |
| 350 | 42.18 | 43.21 | 44.22 | 1.01 | 1.19 | 1.31 | 2.47 | 2.84 | 3.14 |
| 420 | 35.06 | 35.15 | 35.20 | 0.85 | 1.01 | 1.15 | 1.84 | 2.15 | 2.48 |
| 480 | 39.79 | 39.40 | 39.15 | 0.74 | 0.89 | 1.01 | 1.28 | 1.48 | 1.68 |
| 515 | 46.45 | 45.45 | 44.83 | 0.67 | 0.81 | 0.92 | 1.01 | 1.17 | 1.33 |
| 535 | 53.05 | 51.16 | 49.97 | 0.64 | 0.77 | 0.88 | 0.88 | 1.03 | 1.16 |
| 550 | 58.87 | 56.79 | 55.06 | 0.63 | 0.76 | 0.87 | 0.81 | 0.94 | 1.06 |
| 560 | 56.89 | 57.85 | 57.54 | 0.62 | 0.75 | 0.85 | 0.76 | 0.89 | 1.00 |
| 680 | 44.95 | 45.08 | 45.20 | 0.46 | 0.57 | 0.65 | 0.41 | 0.49 | 0.55 |
| 800 | 48.84 | 48.32 | 48.04 | 0.35 | 0.43 | 0.50 | 0.30 | 0.35 | 0.40 |
| 920 | 62.22 | 59.17 | 57.62 | 0.27 | 0.34 | 0.41 | 0.24 | 0.27 | 0.31 |
| 1350 | 59.41 | 60.01 | 60.47 | 0.16 | 0.21 | 0.25 | 0.21 | 0.23 | 0.26 |
| 1900 | 41.76 | 41.93 | 42.07 | 0.16 | 0.19 | 0.22 | 0.19 | 0.23 | 0.26 |
| 2700 | 35.54 | 34.80 | 34.32 | 0.81 | 0.65 | 0.59 | 0.18 | 0.22 | 0.28 |
| 2900 | 24.17 | 23.97 | 25.35 | 2.32 | 5.05 | 7.60 | 0.33 | 0.33 | 0.38 |
| 3200 | 27.02 | 27.12 | 27.21 | 0.37 | 0.42 | 0.45 | 0.44 | 0.75 | 1.07 |
| 6100 | 18.76 | 19.67 | 20.19 | 3.66 | 4.52 | 4.43 | 0.52 | 0.58 | 0.67 |
| 7200 | 14.44 | 14.67 | 14.93 | 0.32 | 0.54 | 0.78 | 2.56 | 2.20 | 1.99 |
| 8500 | 31.97 | 33.45 | 36.12 | 0.24 | 0.49 | 0.80 | 1.29 | 1.52 | 1.75 |
| 11000 | 20.60 | 19.33 | 19.24 | 1.41 | 1.37 | 1.28 | 2.15 | 2.31 | 2.59 |
| 12000 | 17.34 | 19.28 | 22.22 | 3.78 | 2.87 | 2.37 | 3.81 | 3.32 | 3.41 |
| 13000 | 18.06 | 20.19 | 22.79 | 1.35 | 1.26 | 1.41 | 3.26 | 3.29 | 3.99 |
| 14000 | 11.97 | 12.64 | 13.73 | 1.69 | 2.04 | 2.50 | 4.71 | 3.99 | 3.91 |
| 16000 | 11.11 | 11.50 | 12.06 | 0.73 | 1.05 | 1.33 | 2.83 | 2.80 | 2.85 |
| 18000 | 14.37 | 17.17 | 19.70 | 0.25 | 0.62 | 1.23 | 1.27 | 1.88 | 2.59 |

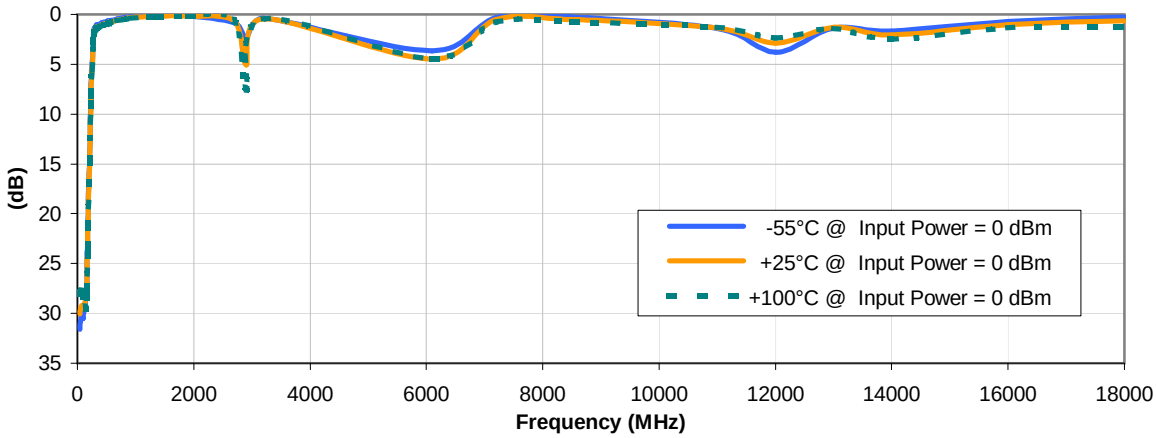
# Coaxial Low Pass Filter VLF-160+

## *Typical Performance Curves*

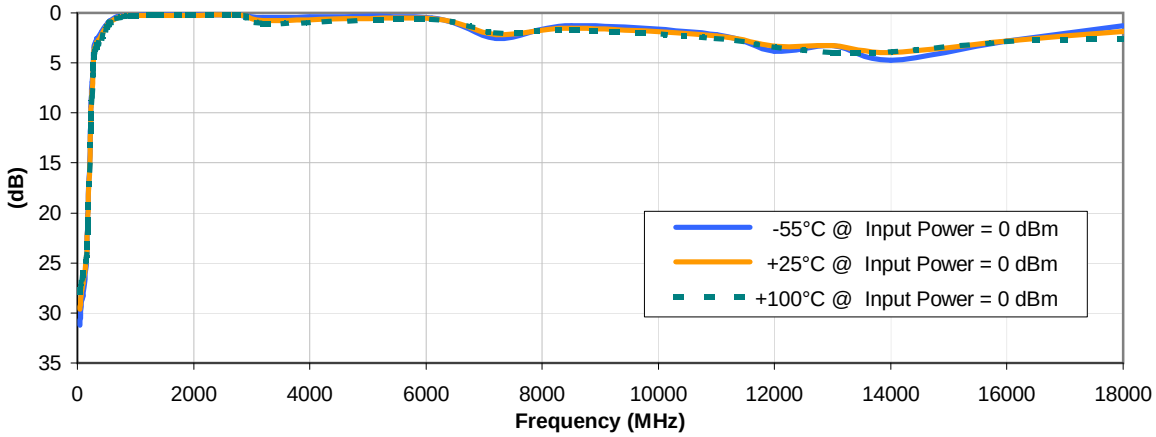
**INSERTION LOSS vs. TEMPERATURE**




**INPUT RETURN LOSS vs. TEMPERATURE**



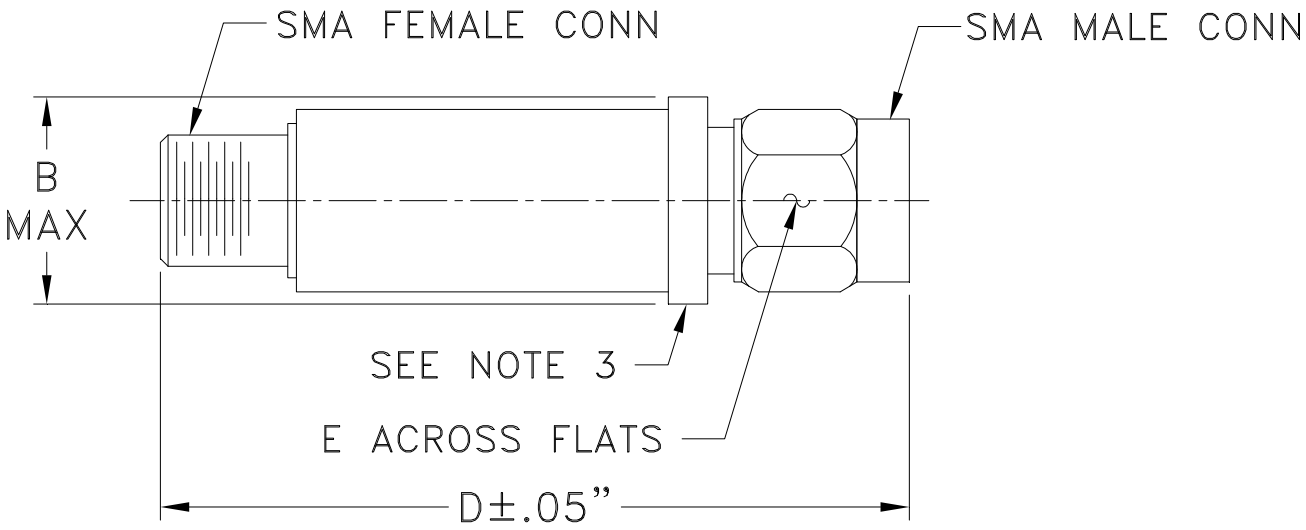

**OUTPUT RETURN LOSS vs. TEMPERATURE**



# Case Style FF

**FF704**

## Outline Dimensions




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

Mini-Circuits

# Environmental Specifications ENV28

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 |
| Barometric Pressure | 100,000 Feet | MIL-STD-202, Method 105, Condition D |
| Humidity | 90% RH, 65°C<br>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 |