

# Coaxial High Pass Filter

50Ω 710 to 2490 MHz

VHF-650+



Generic photo used for illustration purposes only

## Maximum Ratings

|                       |                 |
|-----------------------|-----------------|
| Operating Temperature | -55°C to 100°C  |
| Storage Temperature   | -55°C to 100°C  |
| RF Power Input*       | 7W max. at 25°C |

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

## Features

- rugged unibody construction, small size
- 7 sections
- temperature stable
- excellent power handling, 7W
- low cost

## Applications

- sub-harmonic rejection
- transmitters/receivers
- lab use

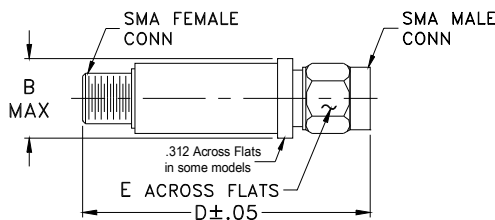
CASE STYLE: FF704

| Connectors | Model    |
|------------|----------|
| SMA        | VHF-650+ |

+RoHS Compliant

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

## Outline Drawing



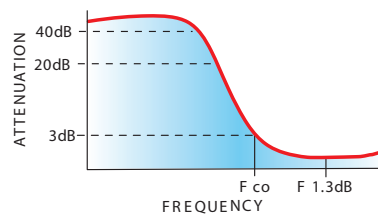
## Outline Dimensions (inch/mm)

| B     | D     | E    | wt    |
|-------|-------|------|-------|
| .410  | 1.43  | .312 | grams |
| 10.41 | 36.32 | 7.92 | 10.0  |

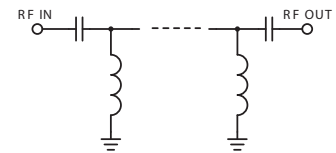
## Electrical Specifications (T<sub>AMB</sub>=25°C)

| STOP BAND<br>(MHz)<br>Min. | f <sub>co</sub> , MHz<br>Nom. | PASSBAND<br>(MHz) |                | VSWR (:1)<br>Typ.  | NO. OF<br>SECTIONS |
|----------------------------|-------------------------------|-------------------|----------------|--------------------|--------------------|
|                            |                               | (loss > 40 dB)    | (loss > 20 dB) | Frequency<br>(MHz) |                    |
|                            |                               | (loss > 40 dB)    | (loss > 20 dB) | Stopband           | 1.5:1              |
| 390                        | 650                           | 850-2000          | 710-2490       | 20:1               | 760-1700           |

## typical frequency response

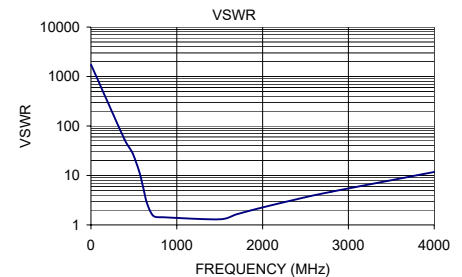
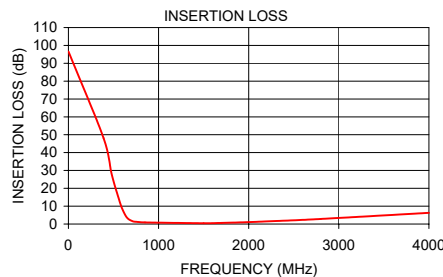


## electrical schematic



## Typical Performance Data

| Frequency<br>(MHz) | Insertion Loss<br>(dB) | VSWR<br>(:1) |
|--------------------|------------------------|--------------|
| 1                  | 96.55                  | 1737.18      |
| 390                | 48.08                  | 54.29        |
| 480                | 28.02                  | 29.46        |
| 560                | 14.00                  | 12.44        |
| 600                | 8.19                   | 6.58         |
| 650                | 3.57                   | 2.84         |
| 710                | 1.63                   | 1.65         |
| 760                | 1.20                   | 1.44         |
| 850                | 0.91                   | 1.43         |
| 1500               | 0.45                   | 1.30         |
| 1700               | 0.62                   | 1.64         |
| 2000               | 1.06                   | 2.26         |
| 2490               | 2.07                   | 3.60         |
| 2800               | 2.83                   | 4.67         |
| 4000               | 6.27                   | 11.77        |



## Notes

- 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.
- Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
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# Coaxial High Pass Filter

**VHF-650+**

## Typical Performance Data

| FREQ.<br>(MHz) | INSERTION LOSS<br>(dB) |          |           | INPUT RETURN LOSS<br>(dB) |          |           | OUTPUT RETURNLOSS<br>(dB) |          |           |
|----------------|------------------------|----------|-----------|---------------------------|----------|-----------|---------------------------|----------|-----------|
|                | @ -55° C               | @ +25° C | @ +100° C | @ -55° C                  | @ +25° C | @ +100° C | @ -55° C                  | @ +25° C | @ +100° C |
| 1              | 94.00                  | 96.55    | 93.70     | 0.00                      | 0.01     | 0.00      | 0.01                      | 0.01     | 0.01      |
| 50             | 63.60                  | 66.16    | 63.39     | 0.01                      | 0.03     | 0.01      | 0.01                      | 0.01     | 0.01      |
| 100            | 65.49                  | 66.19    | 62.19     | 0.01                      | 0.02     | 0.03      | 0.01                      | 0.01     | 0.02      |
| 265            | 59.83                  | 57.84    | 58.90     | 0.04                      | 0.08     | 0.09      | 0.13                      | 0.14     | 0.17      |
| 340            | 68.17                  | 66.44    | 66.54     | 0.16                      | 0.22     | 0.24      | 0.17                      | 0.23     | 0.24      |
| 390            | 48.95                  | 48.08    | 47.52     | 0.23                      | 0.32     | 0.34      | 0.23                      | 0.30     | 0.35      |
| 420            | 41.03                  | 40.41    | 39.90     | 0.30                      | 0.38     | 0.42      | 0.29                      | 0.37     | 0.42      |
| 470            | 30.44                  | 29.93    | 29.50     | 0.41                      | 0.54     | 0.61      | 0.43                      | 0.55     | 0.62      |
| 480            | 28.55                  | 28.02    | 27.60     | 0.47                      | 0.59     | 0.69      | 0.47                      | 0.61     | 0.68      |
| 495            | 25.74                  | 25.23    | 24.79     | 0.53                      | 0.69     | 0.78      | 0.52                      | 0.68     | 0.77      |
| 520            | 21.26                  | 20.77    | 20.34     | 0.71                      | 0.89     | 1.01      | 0.68                      | 0.86     | 1.00      |
| 550            | 16.07                  | 15.63    | 15.20     | 0.98                      | 1.23     | 1.44      | 1.00                      | 1.23     | 1.41      |
| 585            | 10.57                  | 10.23    | 9.87      | 1.70                      | 2.07     | 2.41      | 1.70                      | 2.06     | 2.42      |
| 630            | 5.11                   | 5.02     | 4.85      | 3.97                      | 4.59     | 5.25      | 3.97                      | 4.60     | 5.29      |
| 650            | 3.56                   | 3.57     | 3.51      | 5.67                      | 6.39     | 7.18      | 5.65                      | 6.40     | 7.20      |
| 660            | 2.99                   | 3.03     | 3.01      | 6.62                      | 7.38     | 8.24      | 6.65                      | 7.41     | 8.27      |
| 710            | 1.51                   | 1.63     | 1.73      | 11.47                     | 12.25    | 13.03     | 11.45                     | 12.24    | 13.02     |
| 750            | 1.10                   | 1.25     | 1.36      | 13.88                     | 14.54    | 14.88     | 13.95                     | 14.59    | 14.93     |
| 760            | 1.04                   | 1.20     | 1.31      | 14.22                     | 14.83    | 15.05     | 14.26                     | 14.87    | 15.10     |
| 810            | 0.86                   | 1.02     | 1.12      | 14.80                     | 15.21    | 15.03     | 14.95                     | 15.31    | 15.13     |
| 850            | 0.77                   | 0.91     | 1.02      | 14.79                     | 15.09    | 14.79     | 14.95                     | 15.18    | 14.92     |
| 1000           | 0.57                   | 0.67     | 0.75      | 15.78                     | 16.01    | 15.98     | 15.71                     | 15.92    | 15.90     |
| 1200           | 0.37                   | 0.47     | 0.55      | 24.78                     | 24.52    | 25.96     | 24.24                     | 24.01    | 24.95     |
| 1400           | 0.30                   | 0.42     | 0.49      | 23.72                     | 23.35    | 22.16     | 23.33                     | 22.84    | 21.37     |
| 1500           | 0.34                   | 0.45     | 0.53      | 17.98                     | 17.75    | 17.25     | 17.87                     | 17.56    | 16.93     |
| 1700           | 0.51                   | 0.62     | 0.71      | 12.31                     | 12.28    | 12.20     | 12.32                     | 12.27    | 12.17     |
| 1900           | 0.76                   | 0.89     | 0.98      | 9.48                      | 9.35     | 9.31      | 9.42                      | 9.27     | 9.26      |
| 2000           | 0.93                   | 1.06     | 1.15      | 8.40                      | 8.26     | 8.21      | 8.34                      | 8.22     | 8.22      |
| 2300           | 1.50                   | 1.65     | 1.75      | 6.01                      | 5.97     | 5.88      | 5.98                      | 5.93     | 5.88      |
| 2490           | 1.91                   | 2.07     | 2.17      | 4.97                      | 4.96     | 4.89      | 4.93                      | 4.92     | 4.88      |
| 2500           | 1.94                   | 2.09     | 2.21      | 4.90                      | 4.90     | 4.82      | 4.89                      | 4.87     | 4.82      |
| 3000           | 3.15                   | 3.34     | 3.46      | 3.11                      | 3.16     | 3.19      | 3.13                      | 3.14     | 3.12      |
| 3500           | 4.51                   | 4.74     | 4.86      | 2.03                      | 2.11     | 2.20      | 2.12                      | 2.14     | 2.16      |
| 4000           | 5.96                   | 6.27     | 6.48      | 1.40                      | 1.48     | 1.57      | 1.43                      | 1.48     | 1.53      |
| 4500           | 7.48                   | 7.89     | 8.20      | 0.94                      | 1.03     | 1.14      | 0.97                      | 1.06     | 1.13      |
| 5000           | 9.32                   | 9.77     | 10.16     | 0.61                      | 0.76     | 0.88      | 0.64                      | 0.80     | 0.90      |
| 5500           | 11.96                  | 12.37    | 12.88     | 0.38                      | 0.57     | 0.72      | 0.43                      | 0.60     | 0.75      |
| 6190           | 25.79                  | 25.80    | 21.78     | 0.31                      | 0.63     | 0.97      | 0.45                      | 0.78     | 1.19      |
| 6300           | 21.00                  | 16.27    | 12.81     | 0.58                      | 1.14     | 1.89      | 0.75                      | 1.41     | 2.42      |
| 6540           | 4.69                   | 5.26     | 6.29      | 6.20                      | 4.87     | 3.58      | 9.56                      | 6.81     | 4.60      |
| 7000           | 11.82                  | 13.30    | 14.57     | 0.65                      | 0.77     | 0.85      | 0.68                      | 0.74     | 0.87      |

REV. X1

VHF-650+

071001

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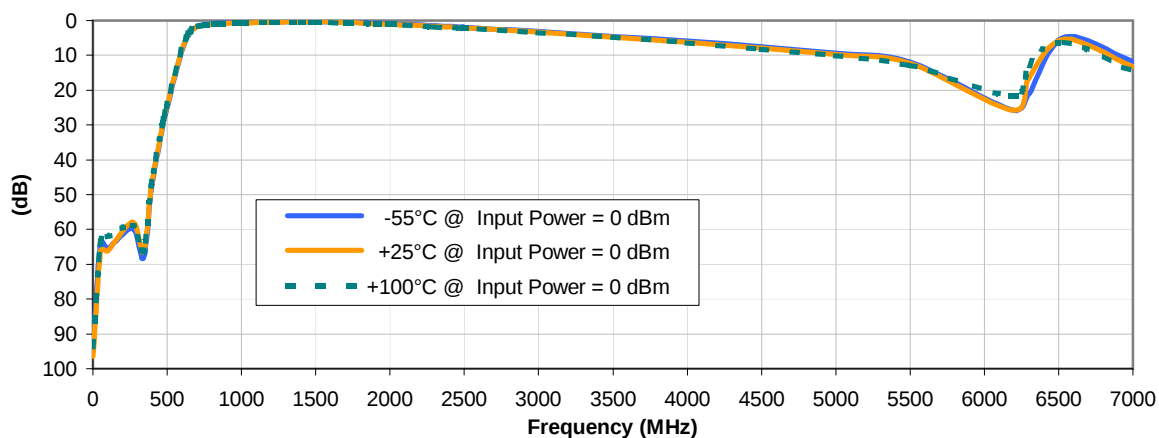


# Coaxial High Pass Filter

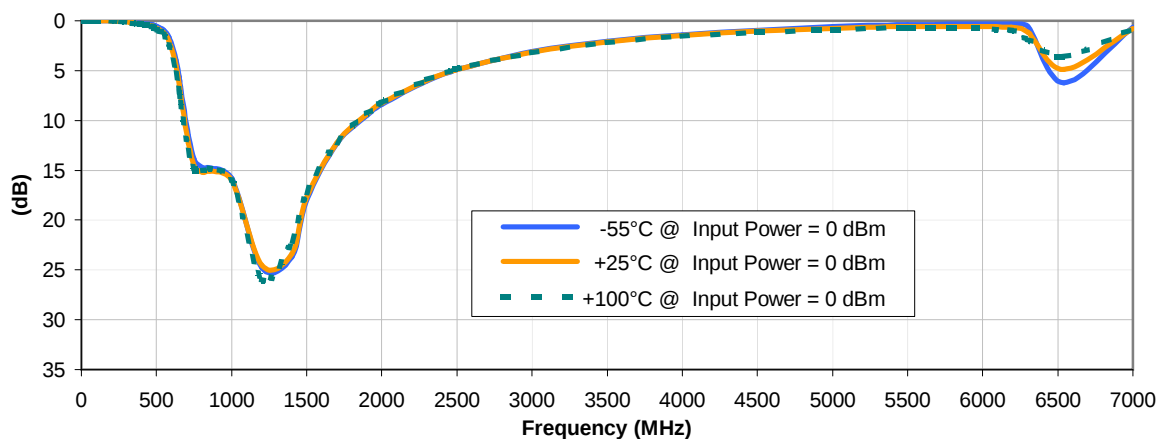
## Typical Performance Curves

VHF-650+

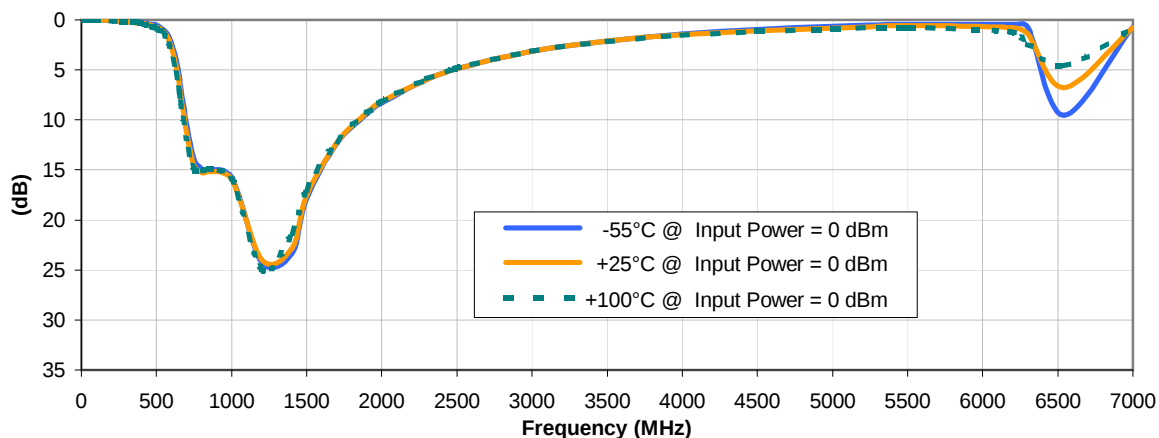
INSERTION LOSS vs. TEMPERATURE



INPUT RETURN LOSS vs. TEMPERATURE



OUTPUT RETURN LOSS vs. TEMPERATURE



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### Outline Dimensions



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



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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 |