

# Coaxial Bandpass Filter

## BBP-101+

50 $\Omega$

94 to 108 MHz



Generic photo used for illustration purposes only  
CASE STYLE: FF55

## The Big Deal

- Flat group delay over passband
- Narrow bandwidth
- Good VSWR (1.2:1 typical)
- Fast roll-off
- High rejection

## Product Overview

BBP-101+ is a 50 $\Omega$  bandpass filter in a connectorized package. The bandpass filter covers from 94 to 108 MHz, and offers good matching within the passband with high out of band rejection. The filter uses miniature high Q capacitors and wire welded inductors for high reliability. It has repeatable performance across production lots and consistent performance across temperature.

## Key Features

| Feature                                | Advantages                                                                                           |
|----------------------------------------|------------------------------------------------------------------------------------------------------|
| Flat group delay over passband         | The model has group delay over passband around 45 ns                                                 |
| Good VSWR, 1.2:1 typical over passband | This provides well matched input and output ports.                                                   |
| High rejection                         | This enables the filter to attenuate spurious signals and reject harmonics for broad frequency band. |
| Connectorized package                  | 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.  
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# Bandpass Filter

50Ω 94 to 108 MHz

## BBP-101+



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CASE STYLE: FF55

Connectors Model  
BNC BBP-101+

### Features

- Flat group delay over passband
- Good VSWR, 1.2:1 typical in passband
- High rejection, 60 dB typ
- Rugged shielded case
- Connectorized package
- Fast roll-off

### Applications

- Test equipment
- Harmonic rejection
- Transmitters / Receivers
- Military

### Electrical Specifications at 25°C

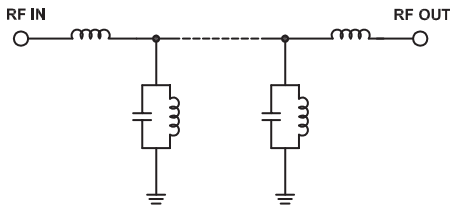
| Parameter        | F#               | Frequency (MHz) | Min. | Typ. | Max. | Unit |
|------------------|------------------|-----------------|------|------|------|------|
| Pass Band        | Center frequency | -               | -    | 101  | -    | MHz  |
|                  | Insertion Loss   | F1-F2           | -    | 2.3  | 3.5  | dB   |
|                  | VSWR             | F1-F2           | -    | 1.2  | 1.6  | :1   |
| Stop Band, Lower | Insertion Loss   | DC-F3           | 50   | 65   | -    | dB   |
|                  |                  | F3-F4           | 20   | 29   | -    | dB   |
|                  | VSWR             | DC-F4           | -    | 20   | -    | :1   |
| Stop Band, Upper | Insertion Loss   | F5-F6           | 20   | 28   | -    | dB   |
|                  |                  | F6-F7           | 50   | 60   | -    | dB   |
|                  | VSWR             | F7-F8           | -    | 40   | -    | dB   |
|                  |                  |                 | -    | 20   | -    | :1   |

### Maximum Ratings

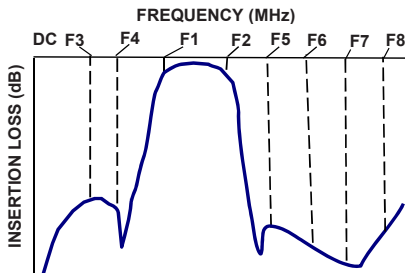
|                       |                |
|-----------------------|----------------|
| Operating Temperature | -40°C to 85°C  |
| Storage Temperature   | -55°C to 100°C |
| RF Power Input        | 0.25 W max.    |

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

### Functional Schematic



### Typical Frequency Response

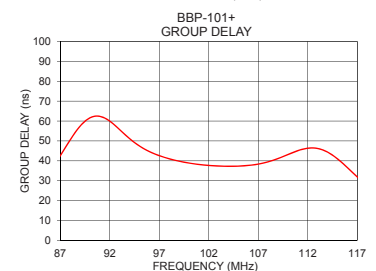
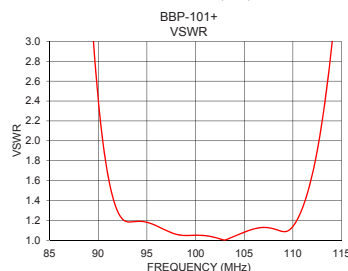
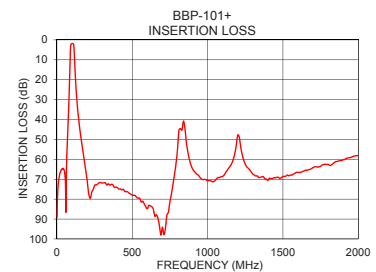
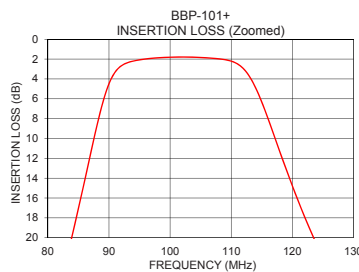


#### +RoHS Compliant

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### Typical Performance Data at 25°C

| Frequency (MHz) | Insertion Loss (dB) | VSWR (:1) | Frequency (MHz) | Group Delay (ns) |
|-----------------|---------------------|-----------|-----------------|------------------|
| 1               | 88.85               | 84.83     | 94.0            | 51.17            |
| 10              | 71.57               | 64.16     | 94.5            | 49.18            |
| 30              | 65.06               | 47.20     | 95.0            | 47.44            |
| 50              | 65.99               | 47.41     | 95.5            | 45.94            |
| 79              | 31.55               | 36.76     | 96.0            | 44.65            |
| 80              | 29.37               | 34.02     | 96.5            | 43.55            |
| 83              | 22.30               | 24.16     | 97.0            | 42.60            |
| 91              | 3.31                | 1.65      | 97.5            | 41.76            |
| 94              | 2.19                | 1.19      | 98.0            | 41.03            |
| 101             | 1.80                | 1.05      | 98.5            | 40.39            |
| 108             | 1.98                | 1.12      | 99.0            | 39.82            |
| 124             | 20.71               | 16.97     | 99.5            | 39.32            |
| 130             | 27.84               | 23.53     | 100.0           | 38.88            |
| 133             | 30.83               | 26.35     | 100.5           | 38.49            |
| 145             | 40.41               | 35.58     | 101.0           | 38.18            |
| 200             | 70.25               | 69.12     | 101.5           | 37.91            |
| 680             | 93.18               | 198.49    | 102.0           | 37.69            |
| 1000            | 70.76               | 104.09    | 106.0           | 37.67            |
| 1500            | 68.61               | 51.28     | 107.0           | 38.36            |
| 2000            | 58.15               | 41.32     | 108.0           | 39.51            |



#### Notes

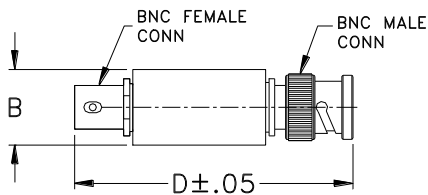
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Coaxial Connections

|          |            |
|----------|------------|
| PORT - 1 | BNC-Male   |
| PORT - 2 | BNC-Female |

Outline Drawing



Outline Dimensions ( <sup>inch</sup><sub>mm</sub> )

|    |       |    |       |    |       |
|----|-------|----|-------|----|-------|
| A  | B     | C  | D     | E  | Wt.   |
| -- | 0.57  | -- | 2.59  | -- | grams |
| -- | 14.47 | -- | 65.79 | -- | 40    |

Note: Please refer to case style drawing for details

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## Typical Performance Data

| FREQ.  | INSERTION LOSS |        |        | INPUT RETURN LOSS |        |        | OUTPUT RETURN LOSS |        |        |
|--------|----------------|--------|--------|-------------------|--------|--------|--------------------|--------|--------|
| (MHz)  | (dB)           |        |        | (dB)              |        |        | (dB)               |        |        |
|        | @-40°C         | @+25°C | @+85°C | @-40°C            | @+25°C | @+85°C | @-40°C             | @+25°C | @+85°C |
| 1.0    | 90.02          | 88.85  | 88.68  | 0.15              | 0.20   | 0.23   | 0.15               | 0.20   | 0.23   |
| 5.0    | 77.46          | 76.11  | 75.89  | 0.18              | 0.23   | 0.26   | 0.18               | 0.23   | 0.26   |
| 10.0   | 71.99          | 71.57  | 71.33  | 0.22              | 0.27   | 0.30   | 0.22               | 0.26   | 0.29   |
| 12.0   | 70.77          | 70.39  | 69.79  | 0.23              | 0.28   | 0.30   | 0.23               | 0.28   | 0.31   |
| 14.0   | 69.78          | 69.20  | 68.74  | 0.25              | 0.30   | 0.32   | 0.24               | 0.29   | 0.32   |
| 18.0   | 68.10          | 67.49  | 67.50  | 0.27              | 0.32   | 0.34   | 0.27               | 0.31   | 0.34   |
| 20.0   | 67.68          | 66.80  | 66.64  | 0.28              | 0.33   | 0.35   | 0.28               | 0.32   | 0.35   |
| 30.0   | 65.66          | 65.06  | 64.95  | 0.32              | 0.37   | 0.39   | 0.32               | 0.36   | 0.38   |
| 32.0   | 65.29          | 65.01  | 64.65  | 0.33              | 0.37   | 0.39   | 0.32               | 0.36   | 0.39   |
| 34.0   | 65.12          | 64.77  | 64.45  | 0.33              | 0.38   | 0.39   | 0.32               | 0.37   | 0.39   |
| 36.0   | 65.03          | 64.79  | 64.30  | 0.33              | 0.38   | 0.39   | 0.33               | 0.37   | 0.39   |
| 40.0   | 65.05          | 64.49  | 64.23  | 0.34              | 0.38   | 0.39   | 0.33               | 0.37   | 0.39   |
| 42.0   | 65.02          | 64.97  | 64.50  | 0.34              | 0.38   | 0.39   | 0.33               | 0.37   | 0.39   |
| 50.0   | 66.62          | 65.99  | 66.00  | 0.33              | 0.37   | 0.38   | 0.32               | 0.36   | 0.38   |
| 52.0   | 67.41          | 66.79  | 66.90  | 0.33              | 0.36   | 0.38   | 0.32               | 0.36   | 0.38   |
| 60.0   | 79.78          | 80.46  | 81.36  | 0.31              | 0.35   | 0.37   | 0.31               | 0.35   | 0.37   |
| 70.0   | 49.43          | 49.31  | 49.15  | 0.31              | 0.36   | 0.38   | 0.31               | 0.36   | 0.38   |
| 79.5   | 30.75          | 30.47  | 30.26  | 0.42              | 0.49   | 0.53   | 0.43               | 0.50   | 0.54   |
| 80.0   | 29.66          | 29.37  | 29.15  | 0.43              | 0.51   | 0.55   | 0.44               | 0.52   | 0.56   |
| 83.5   | 21.39          | 21.04  | 20.77  | 0.66              | 0.78   | 0.85   | 0.68               | 0.81   | 0.89   |
| 91.0   | 3.12           | 3.31   | 3.39   | 11.11             | 12.20  | 13.06  | 12.02              | 13.42  | 14.61  |
| 94.0   | 1.94           | 2.19   | 2.33   | 20.66             | 21.23  | 21.25  | 22.28              | 22.66  | 22.40  |
| 100.0  | 1.58           | 1.81   | 1.94   | 33.07             | 32.15  | 30.75  | 29.86              | 29.44  | 28.90  |
| 101.0  | 1.57           | 1.80   | 1.93   | 32.85             | 32.86  | 31.72  | 31.22              | 31.26  | 30.72  |
| 108.0  | 1.71           | 1.98   | 2.13   | 26.38             | 25.21  | 25.29  | 26.72              | 25.84  | 26.17  |
| 113.0  | 3.24           | 3.77   | 4.11   | 8.96              | 8.57   | 8.27   | 9.10               | 8.73   | 8.45   |
| 123.5  | 19.49          | 20.03  | 20.37  | 0.98              | 1.06   | 1.10   | 0.97               | 1.06   | 1.10   |
| 130.0  | 27.42          | 27.84  | 28.12  | 0.67              | 0.74   | 0.76   | 0.66               | 0.73   | 0.77   |
| 133.0  | 30.45          | 30.83  | 31.08  | 0.60              | 0.66   | 0.68   | 0.59               | 0.65   | 0.69   |
| 140.0  | 36.47          | 36.78  | 37.00  | 0.49              | 0.54   | 0.56   | 0.48               | 0.54   | 0.56   |
| 145.0  | 40.15          | 40.41  | 40.63  | 0.44              | 0.49   | 0.50   | 0.43               | 0.48   | 0.51   |
| 146.0  | 40.83          | 41.09  | 41.29  | 0.43              | 0.48   | 0.50   | 0.42               | 0.48   | 0.50   |
| 150.0  | 43.44          | 43.69  | 43.90  | 0.40              | 0.45   | 0.46   | 0.39               | 0.44   | 0.46   |
| 200.0  | 70.47          | 70.25  | 70.46  | 0.21              | 0.25   | 0.26   | 0.21               | 0.25   | 0.27   |
| 221.0  | 81.64          | 79.69  | 77.80  | 0.17              | 0.22   | 0.23   | 0.18               | 0.22   | 0.23   |
| 231.0  | 78.32          | 76.54  | 76.36  | 0.16              | 0.20   | 0.21   | 0.16               | 0.20   | 0.22   |
| 241.0  | 75.52          | 75.03  | 73.98  | 0.15              | 0.19   | 0.20   | 0.15               | 0.19   | 0.20   |
| 251.0  | 74.34          | 72.96  | 73.44  | 0.14              | 0.18   | 0.19   | 0.14               | 0.18   | 0.19   |
| 301.0  | 71.77          | 71.87  | 72.01  | 0.10              | 0.13   | 0.14   | 0.10               | 0.14   | 0.15   |
| 421.0  | 74.59          | 74.90  | 74.53  | 0.05              | 0.09   | 0.10   | 0.05               | 0.09   | 0.10   |
| 501.0  | 77.29          | 78.01  | 78.15  | 0.04              | 0.08   | 0.09   | 0.03               | 0.07   | 0.08   |
| 510.0  | 77.18          | 78.06  | 78.58  | 0.04              | 0.08   | 0.09   | 0.03               | 0.07   | 0.08   |
| 520.0  | 78.04          | 78.23  | 78.78  | 0.04              | 0.08   | 0.09   | 0.03               | 0.07   | 0.08   |
| 530.0  | 79.63          | 79.20  | 79.29  | 0.04              | 0.08   | 0.09   | 0.03               | 0.07   | 0.08   |
| 600.0  | 82.12          | 84.83  | 83.39  | 0.03              | 0.08   | 0.09   | 0.02               | 0.06   | 0.07   |
| 650.0  | 85.01          | 88.59  | 86.99  | 0.04              | 0.08   | 0.10   | 0.01               | 0.06   | 0.07   |
| 680.0  | 90.11          | 93.18  | 91.88  | 0.04              | 0.09   | 0.10   | 0.01               | 0.06   | 0.07   |
| 700.0  | 89.44          | 94.11  | 99.46  | 0.04              | 0.09   | 0.11   | 0.01               | 0.06   | 0.08   |
| 750.0  | 82.55          | 81.22  | 81.62  | 0.05              | 0.10   | 0.12   | 0.01               | 0.06   | 0.08   |
| 800.0  | 56.21          | 55.30  | 54.58  | 0.06              | 0.12   | 0.15   | 0.03               | 0.08   | 0.10   |
| 850.0  | 43.20          | 44.72  | 45.92  | 0.12              | 0.17   | 0.19   | 0.06               | 0.11   | 0.12   |
| 900.0  | 64.43          | 64.80  | 64.89  | 0.08              | 0.14   | 0.17   | 0.03               | 0.09   | 0.11   |
| 950.0  | 69.19          | 69.12  | 69.50  | 0.09              | 0.15   | 0.18   | 0.03               | 0.09   | 0.12   |
| 1000.0 | 69.66          | 70.76  | 70.82  | 0.10              | 0.17   | 0.20   | 0.04               | 0.10   | 0.13   |
| 1100.0 | 68.44          | 68.60  | 68.94  | 0.13              | 0.20   | 0.23   | 0.06               | 0.13   | 0.16   |
| 1200.0 | 47.93          | 47.77  | 47.66  | 0.19              | 0.27   | 0.31   | 0.12               | 0.19   | 0.22   |
| 1300.0 | 67.16          | 67.38  | 67.16  | 0.20              | 0.27   | 0.31   | 0.12               | 0.19   | 0.22   |
| 1500.0 | 68.98          | 68.61  | 67.88  | 0.26              | 0.34   | 0.38   | 0.19               | 0.27   | 0.30   |
| 1800.0 | 63.11          | 62.51  | 62.16  | 0.31              | 0.40   | 0.45   | 0.29               | 0.38   | 0.41   |
| 2000.0 | 58.75          | 58.15  | 57.78  | 0.32              | 0.42   | 0.46   | 0.33               | 0.43   | 0.47   |

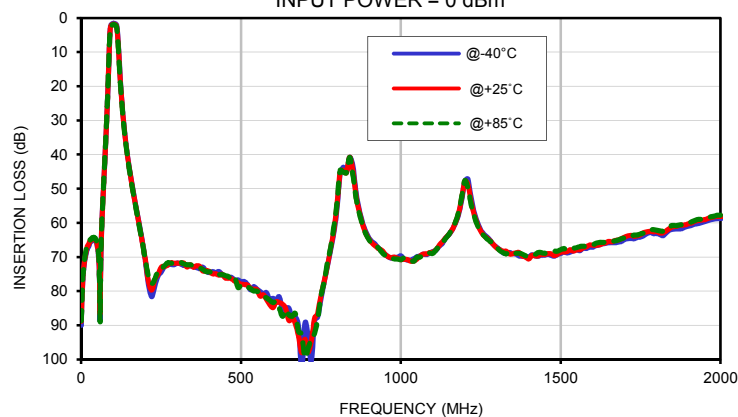
## Typical Performance Data

| FREQ. | GROUP DELAY |        |        |
|-------|-------------|--------|--------|
| (MHz) | (nsec)      |        |        |
|       | @-40°C      | @+25°C | @+85°C |
| 90.0  | 61.86       | 61.62  | 61.63  |
| 90.5  | 63.06       | 62.43  | 62.14  |
| 91.0  | 63.33       | 62.35  | 61.83  |
| 91.5  | 62.71       | 61.48  | 60.76  |
| 92.0  | 61.32       | 59.96  | 59.11  |
| 92.5  | 59.34       | 57.93  | 57.05  |
| 93.0  | 57.00       | 55.67  | 54.82  |
| 93.5  | 54.54       | 53.36  | 52.58  |
| 94.0  | 52.16       | 51.17  | 50.48  |
| 94.5  | 50.01       | 49.18  | 48.62  |
| 95.0  | 48.10       | 47.44  | 46.98  |
| 95.5  | 46.48       | 45.94  | 45.56  |
| 96.0  | 45.09       | 44.65  | 44.35  |
| 96.5  | 43.92       | 43.55  | 43.29  |
| 97.0  | 42.90       | 42.60  | 42.37  |
| 97.5  | 42.02       | 41.76  | 41.56  |
| 98.0  | 41.27       | 41.03  | 40.87  |
| 98.5  | 40.59       | 40.39  | 40.25  |
| 99.0  | 39.98       | 39.82  | 39.69  |
| 99.5  | 39.46       | 39.32  | 39.21  |
| 100.0 | 39.00       | 38.88  | 38.79  |
| 100.5 | 38.59       | 38.49  | 38.43  |
| 101.0 | 38.25       | 38.18  | 38.13  |
| 101.5 | 37.95       | 37.91  | 37.88  |
| 102.0 | 37.71       | 37.69  | 37.68  |
| 102.5 | 37.52       | 37.51  | 37.51  |
| 103.0 | 37.37       | 37.38  | 37.39  |
| 103.5 | 37.28       | 37.30  | 37.33  |
| 104.0 | 37.21       | 37.25  | 37.31  |
| 104.5 | 37.21       | 37.28  | 37.33  |
| 105.0 | 37.26       | 37.34  | 37.42  |
| 105.5 | 37.36       | 37.47  | 37.56  |
| 106.0 | 37.54       | 37.67  | 37.79  |
| 106.5 | 37.80       | 37.96  | 38.11  |
| 107.0 | 38.14       | 38.36  | 38.54  |
| 107.5 | 38.62       | 38.88  | 39.09  |
| 108.0 | 39.21       | 39.51  | 39.75  |
| 108.5 | 39.94       | 40.28  | 40.54  |
| 109.0 | 40.78       | 41.16  | 41.44  |
| 109.5 | 41.74       | 42.14  | 42.42  |
| 110.0 | 42.78       | 43.16  | 43.43  |

## Typical Performance Curves

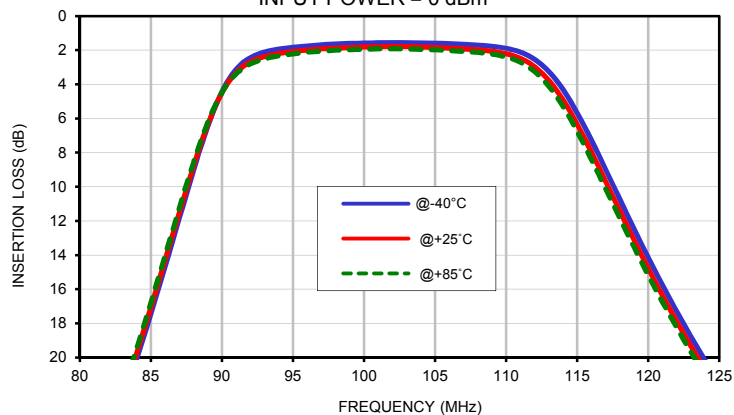
INSERTION LOSS vs. TEMPERATURE

INPUT POWER = 0 dBm



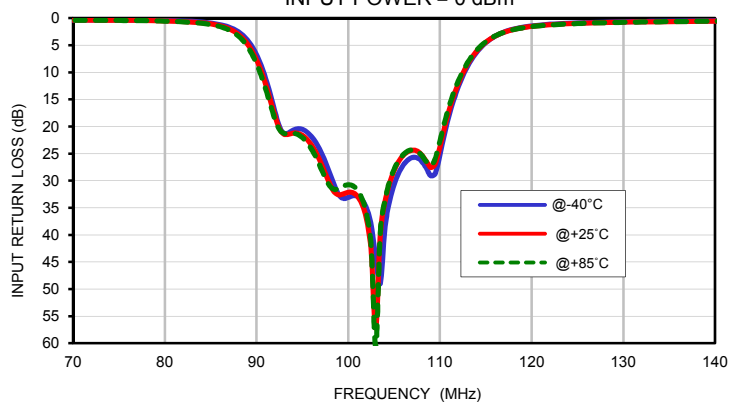
INSERTION LOSS vs. TEMPERATURE (Zoomed)

INPUT POWER = 0 dBm



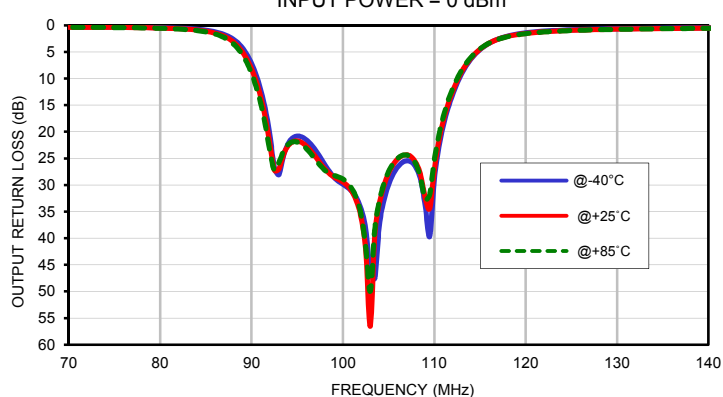
INPUT RETURN LOSS vs. TEMPERATURE

INPUT POWER = 0 dBm



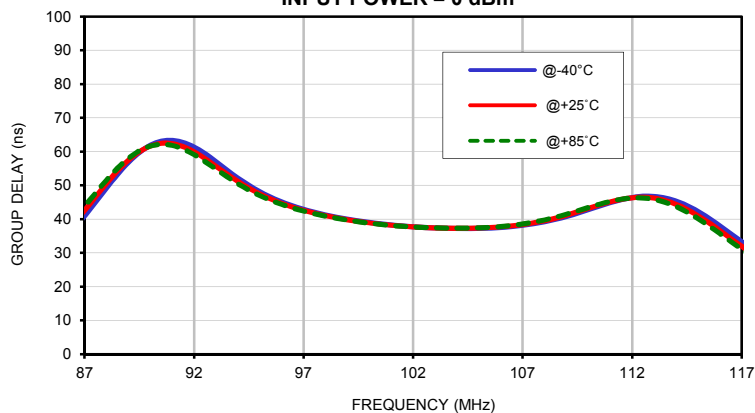
OUTPUT RETURN LOSS vs. TEMPERATURE

INPUT POWER = 0 dBm

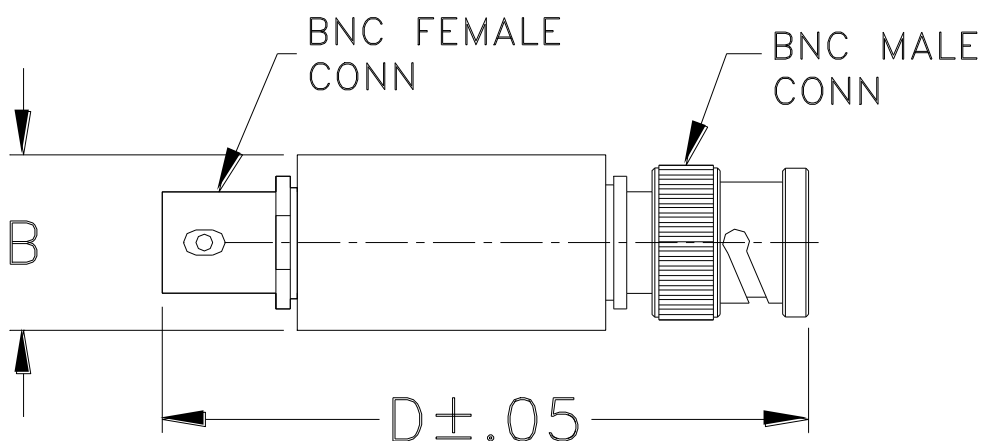


GROUP DELAY vs. TEMPERATURE

INPUT POWER = 0 dBm



### Outline Dimensions



| CASE #. | A  | B              | C  | D               | E  | WT GRAMS |
|---------|----|----------------|----|-----------------|----|----------|
| FF55    | -- | .57<br>(14.47) | -- | 2.59<br>(65.79) | -- | 40.0     |

Dimensions are in inches (mm). Tolerances: 2Pl. +.03/-.04; 3Pl. ± .015

#### Note:

- Case material: Stainless steel.



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 | -40° to 85° C<br>Ambient Environment  | Individual Model Data Sheet                           |
| Storage Temperature   | -55° to 100° C<br>Ambient Environment | Individual Model Data Sheet                           |
| Thermal Shock         | -55° to 100°C, 100 cycles             | MIL-STD-202, Method 107, Condition A-3, except +100°C |