

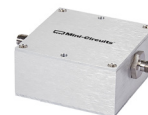
# Coaxial Low Pass Filter

## ZLPF-120+

50Ω DC to 120 MHz

### The Big Deal

- High rejection
- Fast roll-off
- Good VSWR
- Connectorized package



Generic photo used for illustration purposes only  
CASE STYLE: CC1935

### Product Overview

ZLPF-120+ is a 50Ω low pass filter built in connectorized package. Covering DC-120 MHz bandwidth, these units offer good matching within the passband and high rejection in stopband. This will find its applications in military communication and mobile satellites. It has repeatable performance across production lots and consistent performance across temperature.

### Key Features

| Feature                     | Advantages                                                                                        |
|-----------------------------|---------------------------------------------------------------------------------------------------|
| Low passband insertion loss | Suitable for high performance application                                                         |
| Fast roll-off               | Provides very good adjacent band rejection                                                        |
| Connectorized package       | The connectorized package is easy to interface with other devices and well suited for test setups |
| Good VSWR                   | Provides good interface when used with other devices.                                             |

#### Notes

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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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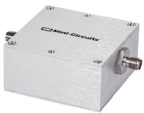


Coaxial

# Low Pass Filter

50Ω DC to 120 MHz

ZLPF-120+



Generic photo used for illustration purposes only

CASE STYLE: CC1935  
Connectors Model  
SMA-F ZLPF-120+

Features

- High rejection
- Fast roll-off
- Good VSWR
- Connectorized package

Applications

- Military Communication
- Mobile satellite
- Auxiliary broadcasting

Electrical Specifications at 25°C

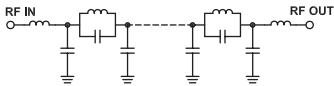
| Parameter |                | F#    | Frequency (MHz) | Min. | Typ. | Max. | Unit |
|-----------|----------------|-------|-----------------|------|------|------|------|
| Pass Band | Insertion Loss | DC-F1 | DC-120          | —    | 2.5  | 4.0  | dB   |
|           | Freq. Cut-Off  | F2    | 121             | —    | 3.0  | —    | dB   |
|           | VSWR           | DC-F1 | DC-120          | —    | 1.3  | 1.9  | :1   |
| Stop Band | Insertion Loss | F3-F4 | 125-2000        | 20   | 30.3 | —    | dB   |
|           | VSWR           | F3-F4 | 125-2000        | —    | 20   | —    | :1   |

Maximum Ratings

|                       |                |
|-----------------------|----------------|
| Operating Temperature | -40°C to 85°C  |
| Storage Temperature   | -55°C to 100°C |
| RF Power Input        | 2.0W max.      |

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

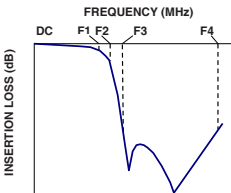
Functional Schematic



Typical Performance Data at 25°C

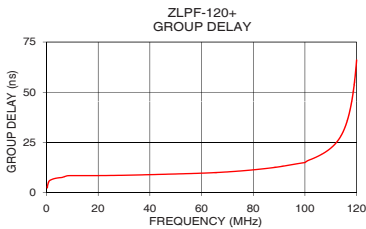
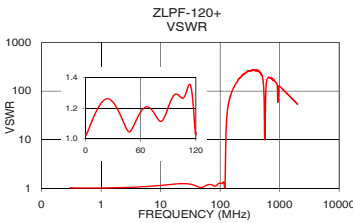
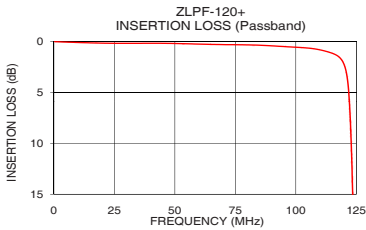
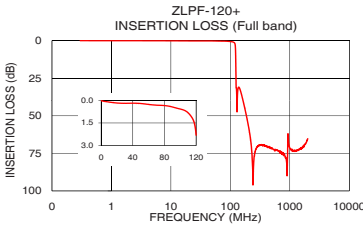
| Frequency (MHz) | Insertion Loss (dB) | VSWR (:1) | Frequency (MHz) | Group Delay (nsec) |
|-----------------|---------------------|-----------|-----------------|--------------------|
| 0.3             | 0.00                | 1.03      | 0.3             | 2.35               |
| 10.0            | 0.11                | 1.16      | 1.0             | 5.71               |
| 50.0            | 0.20                | 1.06      | 2.0             | 6.50               |
| 100.0           | 0.57                | 1.29      | 5.0             | 7.40               |
| 120.0           | 2.30                | 1.04      | 10.0            | 8.45               |
| 121.0           | 3.21                | 1.22      | 15.0            | 8.44               |
| 123.8           | 17.91               | 6.63      | 20.0            | 8.46               |
| 124.0           | 20.01               | 7.43      | 25.0            | 8.52               |
| 125.0           | 30.15               | 11.60     | 30.0            | 8.62               |
| 150.0           | 34.12               | 81.25     | 35.0            | 8.76               |
| 250.0           | 78.16               | 225.77    | 40.0            | 8.92               |
| 400.0           | 70.09               | 266.54    | 45.0            | 9.09               |
| 550.0           | 72.68               | 56.81     | 50.0            | 9.26               |
| 750.0           | 74.67               | 177.50    | 75.0            | 10.76              |
| 900.0           | 89.91               | 139.76    | 90.0            | 12.83              |
| 950.0           | 66.32               | 118.54    | 100.0           | 14.96              |
| 1000.0          | 71.51               | 123.80    | 105.0           | 18.05              |
| 1050.0          | 72.50               | 120.33    | 110.0           | 22.14              |
| 1500.0          | 72.03               | 76.72     | 115.0           | 30.94              |
| 2000.0          | 65.26               | 53.68     | 120.0           | 66.01              |

Typical Frequency Response



+RoHS Compliant

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



Notes

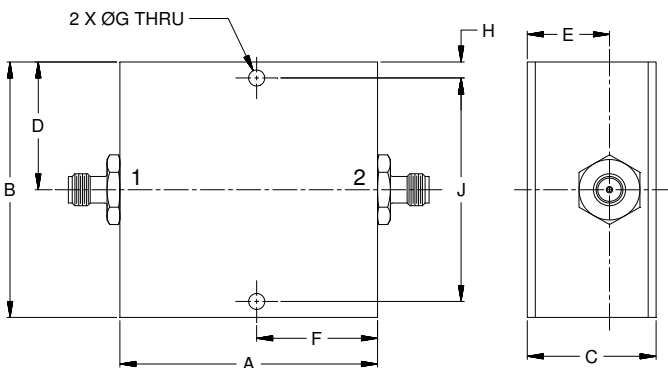
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Coaxial Connections

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

Outline Drawing



Outline Dimensions ( inch mm )

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| A     | B     | C     | D     | E     |
| 2.00  | 2.00  | 1.00  | 1.00  | .638  |
| 50.80 | 50.80 | 25.40 | 25.40 | 16.21 |
| F     | G     | H     | J     | Wt.   |
| .938  | .125  | .125  | 1.750 | grams |
| 23.83 | 3.18  | 3.18  | 44.45 | 103   |

*Note: Please refer to case style drawing for details*

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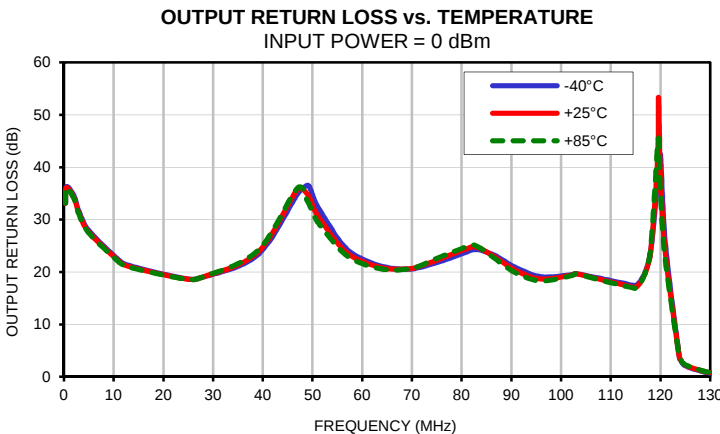
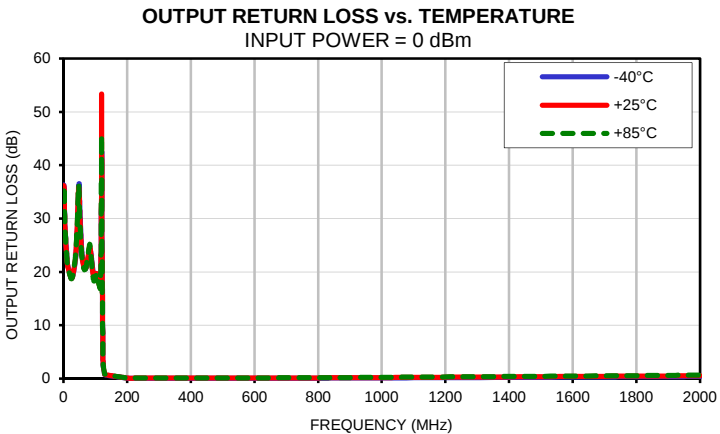
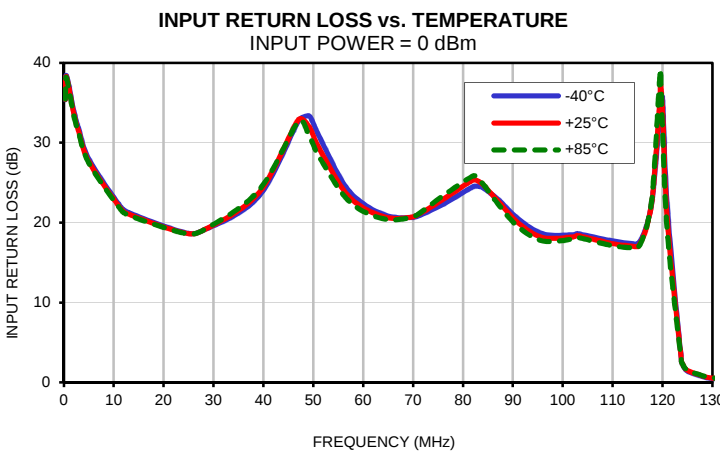
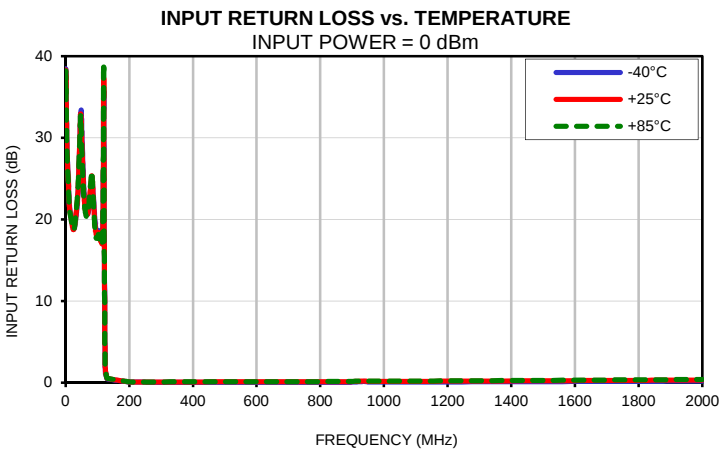
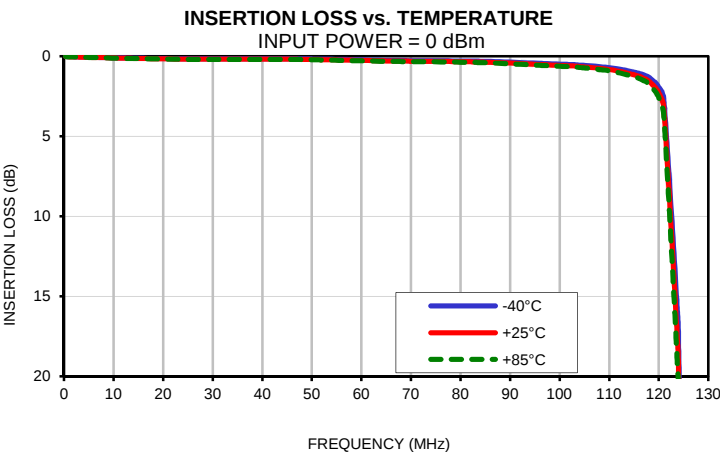
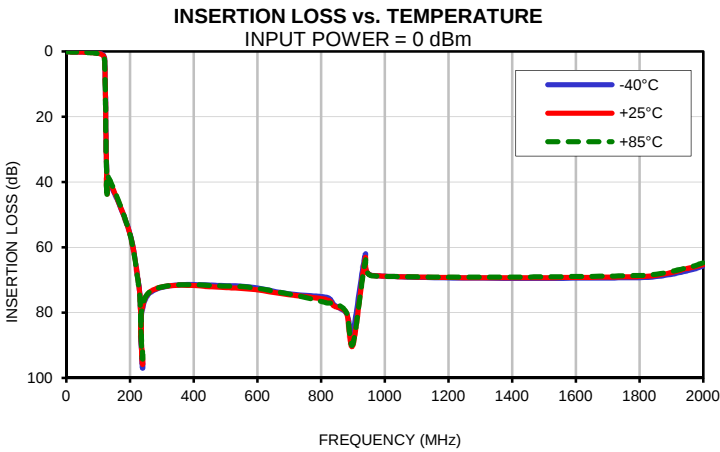
## Typical Performance Data

| 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 |
| 0.3    | 0.00           | 0.00   | 0.01   | 35.38             | 35.42  | 35.47  | 33.12              | 33.15  | 33.17  |
| 0.5    | 0.02           | 0.03   | 0.03   | 38.43             | 38.27  | 38.17  | 36.29              | 36.14  | 36.06  |
| 2.0    | 0.04           | 0.04   | 0.05   | 33.95             | 33.62  | 33.42  | 34.60              | 34.23  | 34.01  |
| 3.0    | 0.05           | 0.06   | 0.06   | 31.71             | 31.37  | 31.16  | 31.65              | 31.31  | 31.11  |
| 5.0    | 0.06           | 0.07   | 0.08   | 27.95             | 27.65  | 27.47  | 27.93              | 27.63  | 27.45  |
| 11.0   | 0.10           | 0.12   | 0.13   | 22.32             | 22.10  | 21.96  | 22.33              | 22.11  | 21.97  |
| 13.0   | 0.12           | 0.13   | 0.14   | 21.26             | 21.06  | 20.94  | 21.28              | 21.08  | 20.96  |
| 24.0   | 0.17           | 0.19   | 0.20   | 18.79             | 18.74  | 18.70  | 18.81              | 18.76  | 18.72  |
| 28.0   | 0.17           | 0.19   | 0.20   | 19.05             | 19.07  | 19.08  | 19.04              | 19.06  | 19.08  |
| 39.0   | 0.16           | 0.19   | 0.20   | 23.24             | 23.67  | 23.98  | 23.30              | 23.74  | 24.08  |
| 47.0   | 0.17           | 0.19   | 0.21   | 32.69             | 32.86  | 32.63  | 34.88              | 35.76  | 36.04  |
| 49.0   | 0.17           | 0.20   | 0.22   | 33.39             | 32.15  | 31.07  | 36.56              | 34.83  | 33.46  |
| 50.0   | 0.17           | 0.20   | 0.23   | 32.43             | 30.90  | 29.75  | 34.76              | 32.79  | 31.43  |
| 51.0   | 0.18           | 0.21   | 0.23   | 31.02             | 29.51  | 28.42  | 32.54              | 30.79  | 29.59  |
| 56.0   | 0.21           | 0.24   | 0.26   | 24.97             | 24.14  | 23.49  | 25.29              | 24.49  | 23.85  |
| 60.0   | 0.23           | 0.27   | 0.29   | 22.38             | 21.86  | 21.42  | 22.50              | 22.03  | 21.60  |
| 65.0   | 0.26           | 0.30   | 0.32   | 20.83             | 20.61  | 20.38  | 20.84              | 20.65  | 20.43  |
| 69.0   | 0.27           | 0.31   | 0.34   | 20.62             | 20.64  | 20.58  | 20.57              | 20.60  | 20.55  |
| 71.0   | 0.28           | 0.32   | 0.35   | 20.84             | 20.99  | 21.05  | 20.75              | 20.91  | 20.95  |
| 76.0   | 0.29           | 0.33   | 0.36   | 22.30             | 22.91  | 23.37  | 22.09              | 22.63  | 22.99  |
| 82.0   | 0.31           | 0.35   | 0.39   | 24.50             | 25.33  | 25.85  | 24.18              | 24.78  | 25.15  |
| 83.0   | 0.31           | 0.36   | 0.39   | 24.55             | 25.20  | 25.52  | 24.27              | 24.71  | 24.92  |
| 84.0   | 0.32           | 0.37   | 0.40   | 24.36             | 24.76  | 24.85  | 24.15              | 24.37  | 24.39  |
| 87.0   | 0.34           | 0.40   | 0.43   | 22.94             | 22.72  | 22.36  | 23.01              | 22.70  | 22.35  |
| 91.0   | 0.39           | 0.45   | 0.49   | 20.51             | 20.01  | 19.51  | 20.78              | 20.24  | 19.77  |
| 96.0   | 0.45           | 0.52   | 0.57   | 18.61             | 18.14  | 17.71  | 19.10              | 18.66  | 18.29  |
| 102.0  | 0.52           | 0.60   | 0.66   | 18.48             | 18.21  | 17.95  | 19.47              | 19.39  | 19.30  |
| 102.6  | 0.53           | 0.61   | 0.67   | 18.56             | 18.32  | 18.07  | 19.61              | 19.57  | 19.52  |
| 103.0  | 0.53           | 0.62   | 0.67   | 18.62             | 18.39  | 18.16  | 19.71              | 19.69  | 19.67  |
| 110.0  | 0.72           | 0.83   | 0.91   | 17.71             | 17.37  | 17.12  | 18.38              | 18.12  | 17.96  |
| 115.0  | 1.00           | 1.16   | 1.28   | 17.29             | 16.98  | 16.81  | 17.37              | 17.04  | 16.87  |
| 115.2  | 1.01           | 1.18   | 1.30   | 17.44             | 17.14  | 16.98  | 17.50              | 17.18  | 17.02  |
| 116.0  | 1.08           | 1.26   | 1.39   | 18.27             | 18.02  | 17.94  | 18.32              | 18.05  | 17.96  |
| 117.0  | 1.18           | 1.38   | 1.53   | 20.05             | 19.92  | 19.98  | 20.17              | 20.03  | 20.08  |
| 118.0  | 1.33           | 1.56   | 1.74   | 23.22             | 23.30  | 23.70  | 23.70              | 23.82  | 24.20  |
| 119.4  | 1.68           | 1.99   | 2.24   | 33.20             | 34.74  | 37.82  | 37.10              | 40.56  | 43.91  |
| 119.6  | 1.76           | 2.08   | 2.35   | 35.58             | 37.28  | 39.18  | 42.27              | 53.36  | 45.52  |
| 120.0  | 1.93           | 2.30   | 2.61   | 35.74             | 34.16  | 31.79  | 42.45              | 38.75  | 35.21  |
| 121.0  | 2.66           | 3.21   | 3.68   | 21.55             | 19.95  | 18.44  | 25.36              | 23.56  | 22.14  |
| 123.8  | 16.11          | 17.91  | 19.46  | 2.61              | 2.64   | 2.60   | 3.62               | 3.70   | 3.69   |
| 124.0  | 18.20          | 20.01  | 21.55  | 2.29              | 2.35   | 2.33   | 3.24               | 3.34   | 3.35   |
| 125.0  | 29.70          | 30.15  | 30.44  | 1.40              | 1.50   | 1.53   | 2.10               | 2.23   | 2.29   |
| 129.0  | 42.16          | 43.48  | 44.84  | 0.57              | 0.63   | 0.66   | 0.87               | 0.95   | 1.00   |
| 131.0  | 39.36          | 38.84  | 38.29  | 0.45              | 0.51   | 0.53   | 0.68               | 0.74   | 0.78   |
| 198.0  | 55.06          | 55.19  | 55.29  | 0.08              | 0.11   | 0.11   | 0.09               | 0.11   | 0.12   |
| 226.0  | 70.34          | 70.54  | 70.92  | 0.06              | 0.09   | 0.09   | 0.07               | 0.09   | 0.10   |
| 232.0  | 75.96          | 76.76  | 77.06  | 0.06              | 0.08   | 0.09   | 0.07               | 0.09   | 0.10   |
| 240.0  | 97.01          | 95.84  | 94.21  | 0.06              | 0.08   | 0.09   | 0.06               | 0.08   | 0.09   |
| 260.0  | 74.17          | 73.83  | 73.79  | 0.05              | 0.08   | 0.09   | 0.05               | 0.08   | 0.09   |
| 518.0  | 71.74          | 72.39  | 71.89  | 0.05              | 0.09   | 0.11   | 0.04               | 0.08   | 0.10   |
| 698.0  | 74.18          | 74.48  | 74.24  | 0.04              | 0.09   | 0.11   | 0.06               | 0.11   | 0.14   |
| 820.0  | 75.36          | 76.08  | 77.00  | 0.04              | 0.11   | 0.13   | 0.07               | 0.14   | 0.17   |
| 840.0  | 77.52          | 77.92  | 77.00  | 0.05              | 0.11   | 0.14   | 0.08               | 0.14   | 0.18   |
| 880.0  | 80.17          | 80.15  | 79.99  | 0.05              | 0.12   | 0.15   | 0.09               | 0.15   | 0.19   |
| 900.0  | 85.49          | 89.91  | 89.55  | 0.05              | 0.12   | 0.16   | 0.09               | 0.16   | 0.19   |
| 940.0  | 62.01          | 63.07  | 63.85  | 0.14              | 0.20   | 0.22   | 0.10               | 0.17   | 0.21   |
| 960.0  | 68.56          | 68.61  | 68.69  | 0.06              | 0.14   | 0.17   | 0.10               | 0.17   | 0.22   |
| 1800.0 | 69.27          | 68.96  | 68.60  | 0.16              | 0.28   | 0.34   | 0.32               | 0.45   | 0.55   |
| 1950.0 | 67.18          | 66.43  | 66.20  | 0.18              | 0.31   | 0.38   | 0.37               | 0.52   | 0.63   |
| 2000.0 | 65.71          | 65.26  | 64.73  | 0.19              | 0.32   | 0.39   | 0.39               | 0.54   | 0.65   |

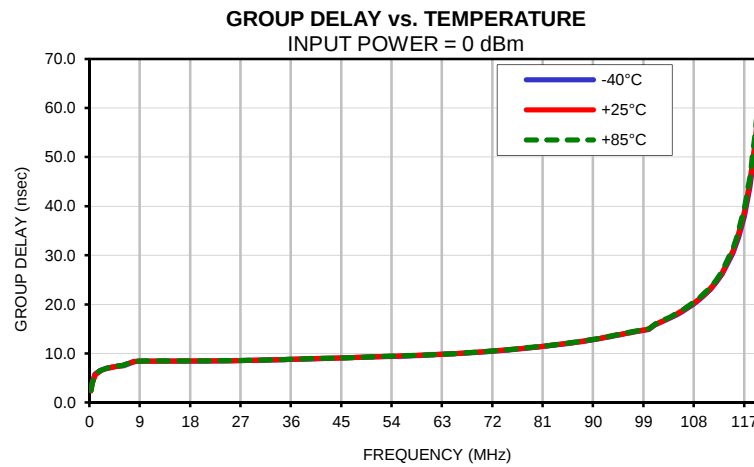
## Typical Performance Data

| FREQ. | GROUP DELAY |        |        |
|-------|-------------|--------|--------|
| (MHz) | (nsec)      |        |        |
|       | @-40°C      | @+25°C | @+85°C |
| 0.3   | 2.51        | 2.35   | 2.50   |
| 0.5   | 4.01        | 3.94   | 4.05   |
| 1.0   | 5.72        | 5.71   | 5.78   |
| 2.0   | 6.51        | 6.50   | 6.55   |
| 3.0   | 6.94        | 6.94   | 6.99   |
| 4.0   | 7.21        | 7.21   | 7.26   |
| 5.0   | 7.40        | 7.40   | 7.44   |
| 6.0   | 7.53        | 7.54   | 7.57   |
| 7.0   | 7.93        | 7.95   | 7.97   |
| 8.0   | 8.33        | 8.35   | 8.37   |
| 9.0   | 8.42        | 8.44   | 8.45   |
| 10.0  | 8.43        | 8.45   | 8.46   |
| 11.0  | 8.44        | 8.45   | 8.46   |
| 20.0  | 8.45        | 8.46   | 8.48   |
| 25.0  | 8.51        | 8.52   | 8.53   |
| 30.0  | 8.60        | 8.62   | 8.64   |
| 35.0  | 8.74        | 8.76   | 8.78   |
| 40.0  | 8.90        | 8.92   | 8.94   |
| 45.0  | 9.07        | 9.09   | 9.11   |
| 50.0  | 9.25        | 9.26   | 9.28   |
| 55.0  | 9.44        | 9.45   | 9.46   |
| 60.0  | 9.65        | 9.66   | 9.67   |
| 65.0  | 9.92        | 9.93   | 9.95   |
| 70.0  | 10.27       | 10.29  | 10.32  |
| 75.0  | 10.72       | 10.76  | 10.79  |
| 80.0  | 11.28       | 11.32  | 11.37  |
| 85.0  | 11.95       | 12.00  | 12.04  |
| 86.0  | 12.10       | 12.15  | 12.19  |
| 87.0  | 12.26       | 12.31  | 12.35  |
| 88.0  | 12.43       | 12.47  | 12.52  |
| 89.0  | 12.60       | 12.64  | 12.69  |
| 90.0  | 12.79       | 12.83  | 12.88  |
| 91.0  | 12.98       | 13.03  | 13.07  |
| 92.0  | 13.19       | 13.23  | 13.28  |
| 93.0  | 13.41       | 13.46  | 13.51  |
| 94.0  | 13.64       | 13.69  | 13.74  |
| 95.0  | 13.86       | 13.91  | 13.96  |
| 96.0  | 14.07       | 14.13  | 14.18  |
| 97.0  | 14.28       | 14.36  | 14.41  |
| 98.0  | 14.49       | 14.57  | 14.63  |
| 99.0  | 14.70       | 14.77  | 14.83  |
| 100.0 | 14.89       | 14.96  | 15.03  |
| 101.0 | 15.73       | 15.82  | 15.91  |
| 102.0 | 16.26       | 16.38  | 16.49  |
| 103.0 | 16.75       | 16.88  | 17.00  |
| 104.0 | 17.30       | 17.45  | 17.57  |
| 105.0 | 17.90       | 18.05  | 18.18  |
| 106.0 | 18.56       | 18.73  | 18.87  |
| 108.0 | 20.05       | 20.23  | 20.43  |
| 109.0 | 20.93       | 21.13  | 21.33  |
| 110.0 | 21.91       | 22.14  | 22.36  |
| 111.0 | 23.05       | 23.30  | 23.53  |
| 112.0 | 24.38       | 24.66  | 24.93  |
| 113.0 | 26.00       | 26.32  | 26.63  |
| 115.0 | 30.46       | 30.94  | 31.42  |
| 116.0 | 33.66       | 34.27  | 34.88  |
| 117.0 | 37.86       | 38.66  | 39.47  |
| 118.0 | 43.54       | 44.62  | 45.68  |
| 119.0 | 51.61       | 53.09  | 54.57  |
| 120.0 | 64.06       | 66.01  | 67.88  |

Typical Performance Curves

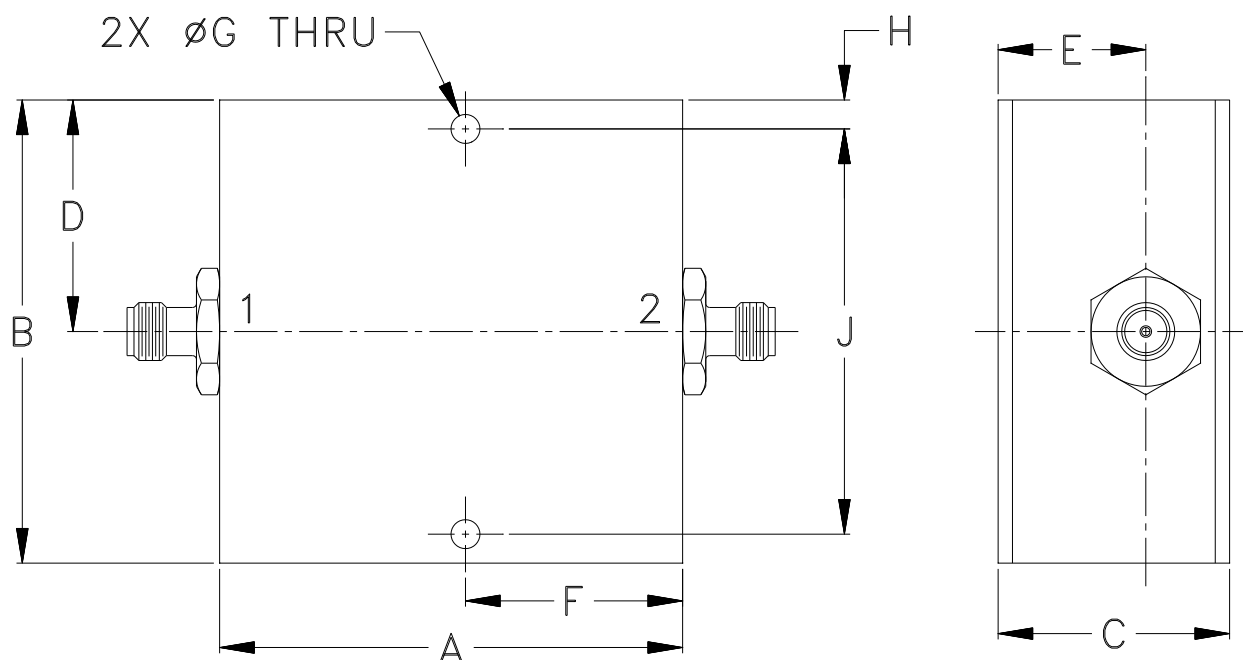


## Typical Performance Curves



## Outline Dimensions

CC1935



| CASE#  | A                | B                | C                | D                | E                | F                | G               | H               | J                | WT. GRAMS |
|--------|------------------|------------------|------------------|------------------|------------------|------------------|-----------------|-----------------|------------------|-----------|
| CC1935 | 2.000<br>(50.80) | 2.000<br>(50.80) | 1.000<br>(25.40) | 1.000<br>(25.40) | 0.638<br>(16.21) | 0.938<br>(23.83) | 0.125<br>(3.18) | 0.125<br>(3.18) | 1.750<br>(44.45) | 103       |

Dimensions are in inches (mm). Tolerances: 2 Pl.  $\pm .03$ ; 3 Pl.  $\pm .015$

### Notes:

- Case material: Aluminum alloy.
- Case finish:  
For RoHS Case Styles: Clear chemical conversion coating, non-chrome or trivalent chrome based.
- Refer to the individual model data sheet for the type of connectors available.



P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



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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      | -40° to 85°C                                                                           | 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 |