

# Coaxial Low Pass Filter

## ZX75LP-176-S+

50Ω

DC to 176 MHz

### The Big Deal

- High rejection
- Low Insertion loss, 1.3 dB typical in passband
- Fast roll-off
- Good VSWR
- Connectorized package



Generic photo used for illustration purposes only  
CASE STYLE: KE1467

### Product Overview

ZX75LP-176-S+ is a 50Ω low pass filter built in a connectorized package. Covering DC-176 MHz bandwidth, these units offer good matching within the passband and high rejection in stopband. This will find its applications in receivers and transmitters to suppress spurious emission. It will also be useful in I.Q demodulator and harmonic suppression of Local Oscillator. 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

- 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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# Low Pass Filter

50Ω

DC to 176 MHz

ZX75LP-176-S+



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CASE STYLE: KE1467

| Connectors | Model         |
|------------|---------------|
| SMA-MF     | ZX75LP-176-S+ |

## Features

- High rejection
- Low Insertion loss
- Fast roll-off
- Good VSWR
- Connectorized package

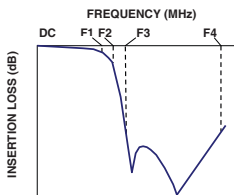
## Applications

- Baseband
- Harmonic suppression
- I.Q Demodulators
- Satellite
- Wireless communications
- Receivers / Transmitters

## Functional Schematic



## Typical Frequency Response



## Electrical Specifications at 25°C

| Parameter | F#             | Frequency (MHz) | Min. | Typ. | Max. | Unit |
|-----------|----------------|-----------------|------|------|------|------|
| Pass Band | Insertion Loss | DC-F1           | —    | 1.3  | 2.0  | dB   |
|           | Freq. Cut-Off  | F2              | —    | 3.0  | —    | dB   |
|           | VSWR           | DC-F1           | —    | 1.3  | 1.6  | :1   |
| Stop Band | Rejection Loss | F3-F4           | 20   | 30   | —    | dB   |
|           | VSWR           | F3-F4           | —    | 31   | —    | :1   |

## Maximum Ratings

|                       |                |
|-----------------------|----------------|
| Operating Temperature | -40°C to 85°C  |
| Storage Temperature   | -55°C to 100°C |
| RF Power Input        | 0.5W max.      |

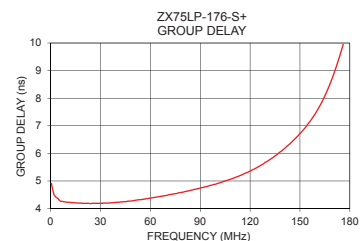
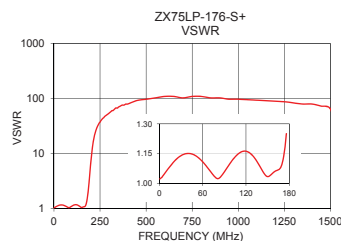
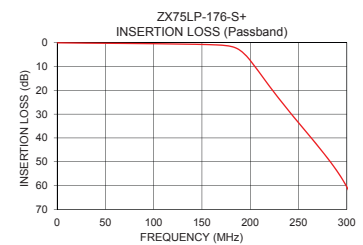
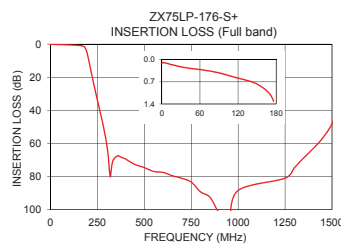
Permanent damage may occur if any of these limits are exceeded.

## Typical Performance Data at 25°C

| Frequency (MHz) | Insertion Loss (dB) | VSWR (:1) | Frequency (MHz) | Group Delay (nsec) |
|-----------------|---------------------|-----------|-----------------|--------------------|
| 1               | 0.09                | 1.02      | 1               | 4.75               |
| 25              | 0.20                | 1.13      | 5               | 4.32               |
| 120             | 0.58                | 1.16      | 10              | 4.23               |
| 176             | 1.31                | 1.25      | 25              | 4.19               |
| 189             | 3.12                | 2.66      | 50              | 4.29               |
| 200             | 7.48                | 6.89      | 75              | 4.54               |
| 210             | 12.86               | 13.81     | 100             | 4.90               |
| 230             | 23.63               | 27.59     | 110             | 5.10               |
| 245             | 31.15               | 35.46     | 120             | 5.36               |
| 275             | 45.87               | 46.96     | 125             | 5.52               |
| 350             | 68.10               | 69.49     | 130             | 5.70               |
| 450             | 72.68               | 91.43     | 135             | 5.91               |
| 500             | 74.54               | 96.51     | 140             | 6.14               |
| 600             | 77.46               | 108.58    | 145             | 6.41               |
| 700             | 81.06               | 102.19    | 150             | 6.72               |
| 800             | 89.23               | 108.58    | 160             | 7.52               |
| 900             | 102.10              | 102.19    | 165             | 8.09               |
| 1000            | 88.34               | 96.51     | 170             | 8.82               |
| 1250            | 80.97               | 86.86     | 175             | 9.75               |
| 1500            | 48.16               | 64.35     | 176             | 9.95               |

## +RoHS Compliant

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



## Notes

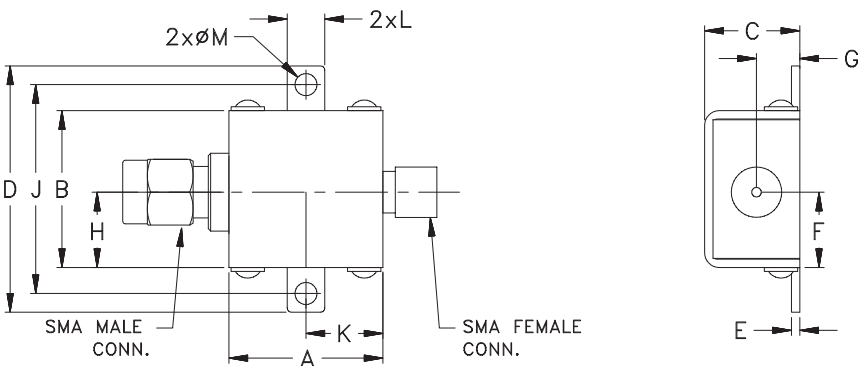
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Coaxial Connections

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

Outline Drawing



Outline Dimensions ( inch / mm )

|       |       |       |       |      |      |       |
|-------|-------|-------|-------|------|------|-------|
| A     | B     | C     | D     | E    | F    | G     |
| .74   | .75   | .46   | 1.18  | .04  | .362 | .21   |
| 18.80 | 19.05 | 11.68 | 29.97 | 1.02 | 9.19 | 5.33  |
| H     | J     | K     | L     | M    |      | Wt.   |
| .362  | 1.00  | .37   | .18   | .11  |      | grams |
| 9.19  | 25.40 | 9.40  | 4.57  | 2.79 |      | 24.4  |

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

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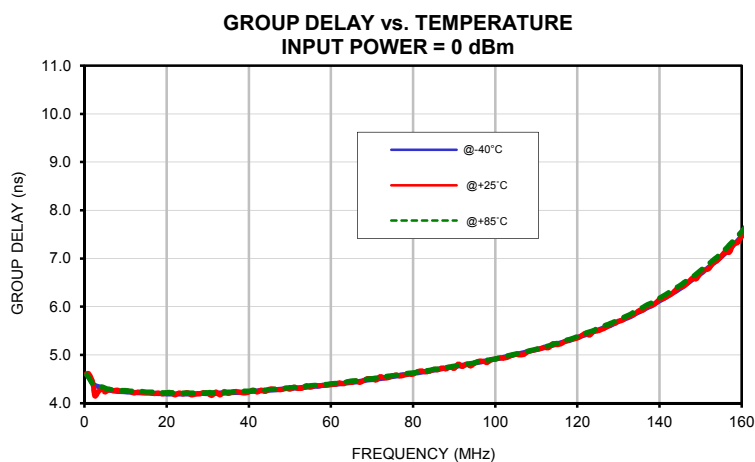
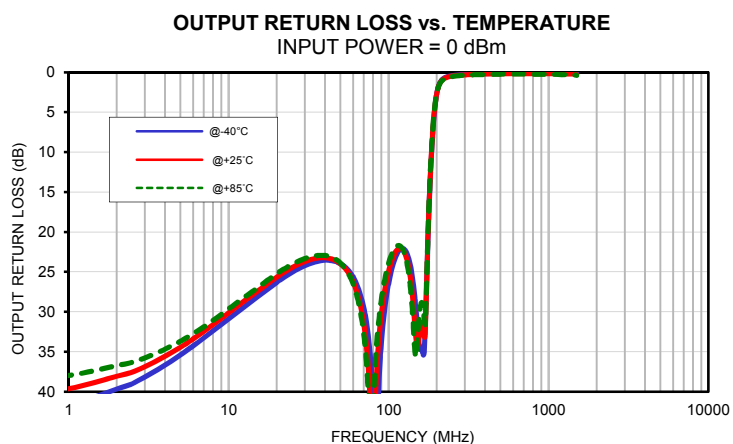
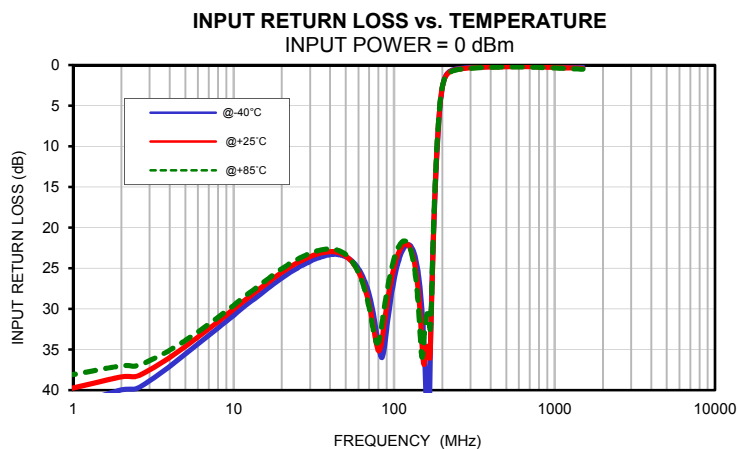
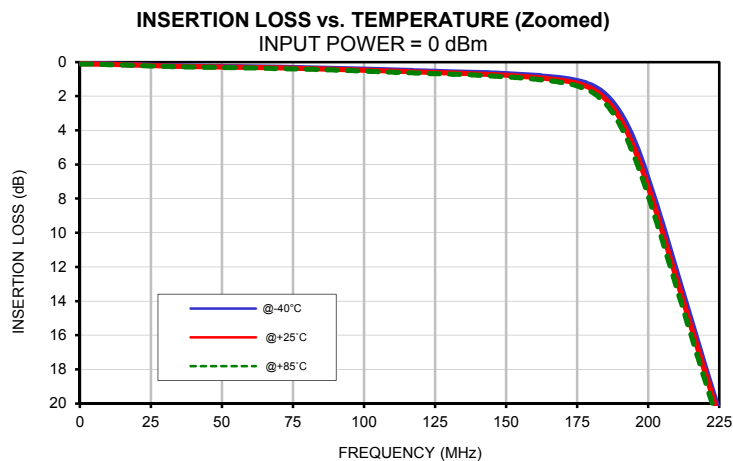
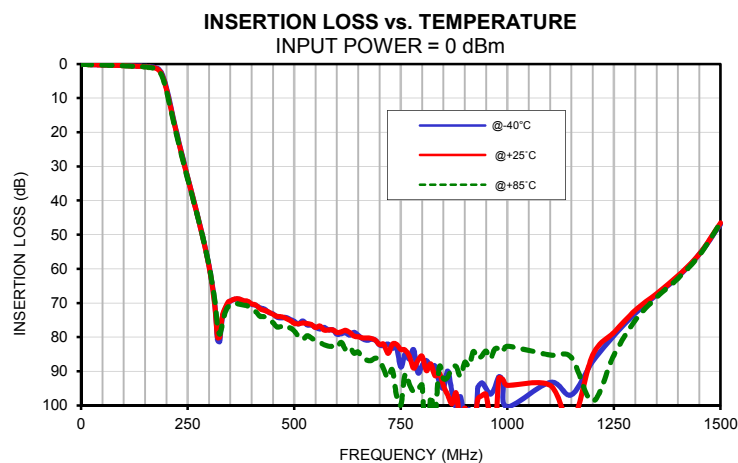
## Typical Performance Data

| FREQ.<br><br>(MHz) | INSERTION LOSS |        |        | INPUT RETURN LOSS |        |        | OUTPUT RETURN LOSS |        |        |
|--------------------|----------------|--------|--------|-------------------|--------|--------|--------------------|--------|--------|
|                    | (dB)           |        |        | (dB)              |        |        | (dB)               |        |        |
|                    | @-40°C         | @+25°C | @+85°C | @-40°C            | @+25°C | @+85°C | @-40°C             | @+25°C | @+85°C |
| 0.5                | 0.08           | 0.10   | 0.12   | 43.51             | 40.87  | 38.91  | 42.75              | 40.31  | 38.47  |
| 1                  | 0.07           | 0.09   | 0.11   | 41.78             | 39.72  | 38.06  | 41.71              | 39.63  | 37.98  |
| 10                 | 0.11           | 0.13   | 0.15   | 30.79             | 30.04  | 29.56  | 30.85              | 30.11  | 29.62  |
| 20                 | 0.16           | 0.18   | 0.20   | 26.18             | 25.48  | 25.04  | 26.31              | 25.65  | 25.23  |
| 25                 | 0.18           | 0.20   | 0.22   | 24.97             | 24.32  | 23.89  | 25.04              | 24.44  | 24.04  |
| 30                 | 0.20           | 0.23   | 0.25   | 24.14             | 23.56  | 23.15  | 24.21              | 23.68  | 23.31  |
| 40                 | 0.23           | 0.26   | 0.29   | 23.31             | 22.94  | 22.61  | 23.53              | 23.22  | 22.95  |
| 50                 | 0.26           | 0.29   | 0.32   | 23.57             | 23.49  | 23.30  | 23.95              | 23.98  | 23.88  |
| 60                 | 0.28           | 0.31   | 0.34   | 25.06             | 25.45  | 25.50  | 25.61              | 26.21  | 26.47  |
| 65                 | 0.29           | 0.33   | 0.36   | 26.42             | 27.16  | 27.39  | 27.18              | 28.28  | 28.89  |
| 70                 | 0.30           | 0.34   | 0.37   | 28.25             | 29.45  | 29.88  | 29.49              | 31.47  | 32.79  |
| 75                 | 0.32           | 0.36   | 0.39   | 31.00             | 32.66  | 33.04  | 33.31              | 37.55  | 41.45  |
| 85                 | 0.35           | 0.40   | 0.44   | 35.79             | 33.17  | 31.17  | 44.91              | 36.15  | 33.01  |
| 90                 | 0.37           | 0.42   | 0.47   | 32.47             | 29.63  | 27.98  | 34.00              | 30.39  | 28.53  |
| 95                 | 0.39           | 0.45   | 0.50   | 29.01             | 26.88  | 25.60  | 29.33              | 27.10  | 25.76  |
| 100                | 0.41           | 0.48   | 0.53   | 26.43             | 24.87  | 23.86  | 26.48              | 24.95  | 23.92  |
| 110                | 0.47           | 0.53   | 0.59   | 23.30             | 22.54  | 21.93  | 23.27              | 22.58  | 21.98  |
| 120                | 0.52           | 0.59   | 0.65   | 22.11             | 21.99  | 21.77  | 22.10              | 22.07  | 21.88  |
| 130                | 0.57           | 0.64   | 0.70   | 22.58             | 23.23  | 23.56  | 22.63              | 23.40  | 23.80  |
| 140                | 0.61           | 0.70   | 0.77   | 24.99             | 26.94  | 28.42  | 25.24              | 27.40  | 29.20  |
| 150                | 0.68           | 0.77   | 0.86   | 30.76             | 34.92  | 35.92  | 30.91              | 34.25  | 34.75  |
| 170                | 0.94           | 1.08   | 1.20   | 31.47             | 31.94  | 30.87  | 31.45              | 31.67  | 31.06  |
| 176                | 1.12           | 1.29   | 1.45   | 20.92             | 20.76  | 20.33  | 21.27              | 21.04  | 20.74  |
| 180                | 1.35           | 1.55   | 1.74   | 15.75             | 15.40  | 14.94  | 15.96              | 15.55  | 15.15  |
| 185                | 1.89           | 2.17   | 2.43   | 10.67             | 10.31  | 9.91   | 10.77              | 10.37  | 10.01  |
| 186                | 2.05           | 2.34   | 2.63   | 9.82              | 9.47   | 9.09   | 9.90               | 9.52   | 9.18   |
| 187                | 2.23           | 2.54   | 2.85   | 9.01              | 8.68   | 8.33   | 9.08               | 8.72   | 8.40   |
| 188                | 2.43           | 2.77   | 3.09   | 8.25              | 7.95   | 7.62   | 8.31               | 7.98   | 7.68   |
| 189                | 2.66           | 3.02   | 3.36   | 7.55              | 7.27   | 6.96   | 7.60               | 7.29   | 7.02   |
| 190                | 2.91           | 3.29   | 3.66   | 6.89              | 6.64   | 6.36   | 6.93               | 6.66   | 6.41   |
| 195                | 4.57           | 5.04   | 5.50   | 4.30              | 4.18   | 4.03   | 4.31               | 4.18   | 4.05   |
| 200                | 6.81           | 7.32   | 7.84   | 2.71              | 2.69   | 2.64   | 2.70               | 2.67   | 2.64   |
| 210                | 12.22          | 12.70  | 13.22  | 1.28              | 1.35   | 1.38   | 1.25               | 1.32   | 1.36   |
| 220                | 17.81          | 18.20  | 18.66  | 0.81              | 0.89   | 0.93   | 0.78               | 0.85   | 0.91   |
| 230                | 23.16          | 23.48  | 23.87  | 0.61              | 0.69   | 0.73   | 0.58               | 0.65   | 0.71   |
| 240                | 28.26          | 28.51  | 28.84  | 0.50              | 0.57   | 0.62   | 0.47               | 0.55   | 0.60   |
| 245                | 30.74          | 30.96  | 31.26  | 0.47              | 0.54   | 0.58   | 0.44               | 0.51   | 0.56   |
| 250                | 33.18          | 33.38  | 33.66  | 0.44              | 0.51   | 0.55   | 0.41               | 0.48   | 0.53   |
| 260                | 38.01          | 38.19  | 38.40  | 0.39              | 0.46   | 0.50   | 0.37               | 0.43   | 0.48   |
| 270                | 42.85          | 42.98  | 43.14  | 0.35              | 0.42   | 0.46   | 0.33               | 0.39   | 0.45   |
| 275                | 45.28          | 45.43  | 45.55  | 0.34              | 0.40   | 0.45   | 0.32               | 0.38   | 0.43   |
| 300                | 59.10          | 59.30  | 59.01  | 0.28              | 0.34   | 0.39   | 0.27               | 0.32   | 0.37   |
| 350                | 69.46          | 69.41  | 70.87  | 0.21              | 0.27   | 0.31   | 0.21               | 0.26   | 0.30   |
| 400                | 70.41          | 70.24  | 71.77  | 0.17              | 0.23   | 0.27   | 0.18               | 0.22   | 0.27   |
| 450                | 73.19          | 73.36  | 75.76  | 0.14              | 0.21   | 0.25   | 0.15               | 0.20   | 0.25   |
| 500                | 75.38          | 75.95  | 78.23  | 0.13              | 0.20   | 0.24   | 0.13               | 0.18   | 0.24   |
| 600                | 79.17          | 78.66  | 83.12  | 0.12              | 0.19   | 0.24   | 0.11               | 0.17   | 0.23   |
| 700                | 82.29          | 82.20  | 86.66  | 0.12              | 0.20   | 0.25   | 0.10               | 0.17   | 0.23   |
| 800                | 88.26          | 85.65  | 94.15  | 0.13              | 0.22   | 0.28   | 0.10               | 0.17   | 0.23   |
| 900                | 104.74         | 100.79 | 87.38  | 0.15              | 0.25   | 0.31   | 0.09               | 0.18   | 0.25   |
| 950                | 95.07          | 96.83  | 84.09  | 0.15              | 0.27   | 0.33   | 0.09               | 0.18   | 0.26   |
| 1000               | 100.45         | 94.12  | 82.69  | 0.17              | 0.29   | 0.35   | 0.09               | 0.18   | 0.26   |
| 1100               | 93.25          | 94.11  | 85.24  | 0.19              | 0.32   | 0.38   | 0.09               | 0.19   | 0.27   |
| 1150               | 96.92          | 105.34 | 85.98  | 0.20              | 0.33   | 0.40   | 0.10               | 0.20   | 0.28   |
| 1200               | 87.15          | 85.23  | 98.80  | 0.22              | 0.34   | 0.41   | 0.10               | 0.20   | 0.29   |
| 1250               | 79.56          | 78.61  | 85.24  | 0.22              | 0.35   | 0.43   | 0.11               | 0.21   | 0.30   |
| 1300               | 73.05          | 72.14  | 75.09  | 0.23              | 0.36   | 0.44   | 0.11               | 0.22   | 0.31   |
| 1350               | 67.64          | 67.27  | 68.35  | 0.24              | 0.37   | 0.45   | 0.11               | 0.22   | 0.31   |
| 1400               | 62.35          | 62.05  | 62.82  | 0.25              | 0.38   | 0.47   | 0.11               | 0.23   | 0.32   |
| 1500               | 46.89          | 46.57  | 46.54  | 0.26              | 0.41   | 0.50   | 0.16               | 0.29   | 0.39   |

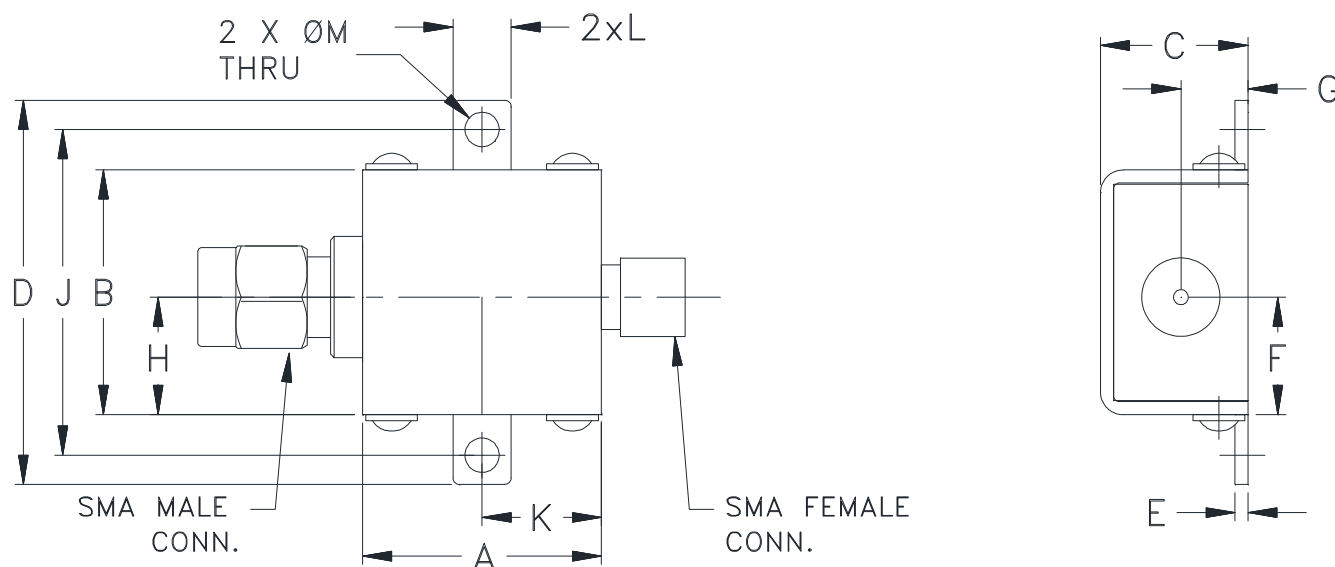
## Typical Performance Data

| FREQ. | GROUP DELAY |        |        |
|-------|-------------|--------|--------|
| (MHz) | (ns)        |        |        |
|       | @-40°C      | @+25°C | @+85°C |
| 0.5   | 4.59        | 4.61   | 4.59   |
| 5     | 4.29        | 4.23   | 4.31   |
| 10    | 4.23        | 4.26   | 4.26   |
| 15    | 4.21        | 4.22   | 4.23   |
| 20    | 4.19        | 4.21   | 4.22   |
| 21    | 4.19        | 4.22   | 4.22   |
| 22    | 4.19        | 4.17   | 4.21   |
| 23    | 4.19        | 4.21   | 4.21   |
| 24    | 4.19        | 4.19   | 4.21   |
| 25    | 4.19        | 4.22   | 4.21   |
| 26    | 4.19        | 4.17   | 4.21   |
| 27    | 4.19        | 4.19   | 4.21   |
| 28    | 4.20        | 4.19   | 4.21   |
| 29    | 4.20        | 4.22   | 4.21   |
| 30    | 4.20        | 4.20   | 4.22   |
| 35    | 4.21        | 4.20   | 4.23   |
| 40    | 4.24        | 4.23   | 4.25   |
| 45    | 4.27        | 4.29   | 4.28   |
| 50    | 4.30        | 4.29   | 4.32   |
| 55    | 4.34        | 4.33   | 4.36   |
| 60    | 4.38        | 4.39   | 4.40   |
| 65    | 4.43        | 4.43   | 4.46   |
| 70    | 4.49        | 4.50   | 4.51   |
| 75    | 4.55        | 4.57   | 4.57   |
| 80    | 4.62        | 4.60   | 4.63   |
| 85    | 4.68        | 4.70   | 4.70   |
| 90    | 4.75        | 4.72   | 4.77   |
| 95    | 4.83        | 4.83   | 4.84   |
| 100   | 4.91        | 4.91   | 4.92   |
| 105   | 5.01        | 5.01   | 5.02   |
| 110   | 5.11        | 5.11   | 5.12   |
| 115   | 5.23        | 5.21   | 5.24   |
| 120   | 5.36        | 5.35   | 5.38   |
| 125   | 5.51        | 5.50   | 5.55   |
| 130   | 5.69        | 5.70   | 5.73   |
| 135   | 5.89        | 5.92   | 5.94   |
| 140   | 6.12        | 6.15   | 6.18   |
| 145   | 6.38        | 6.40   | 6.44   |
| 150   | 6.68        | 6.71   | 6.75   |
| 155   | 7.03        | 7.04   | 7.11   |
| 160   | 7.46        | 7.46   | 7.56   |
| 165   | 8.00        | 7.99   | 8.13   |
| 170   | 8.71        | 8.69   | 8.88   |
| 172   | 9.05        | 9.00   | 9.24   |
| 175   | 9.62        | 9.61   | 9.82   |
| 176   | 9.82        | 9.83   | 10.03  |

## Typical Performance Curves



### Outline Dimensions



| CASE #. | A              | B              | C              | D               | E             | F              | G             | H              | J               | K             | L             | M             |
|---------|----------------|----------------|----------------|-----------------|---------------|----------------|---------------|----------------|-----------------|---------------|---------------|---------------|
| KE1467  | .74<br>(18.80) | .75<br>(19.05) | .46<br>(11.68) | 1.18<br>(29.97) | .04<br>(1.02) | .362<br>(9.19) | .21<br>(5.33) | .362<br>(9.19) | 1.00<br>(25.40) | .37<br>(9.40) | .18<br>(4.57) | .11<br>(2.79) |

| CASE #. | WT. GRAM |
|---------|----------|
| KE1467  | 24.4     |

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

Tolerance on hole size and interaxes dimensions to be  $\pm .005$ .

#### Note:

1. Case material: Brass
2. Case finish: Gold
3. Cover: Nickel plated.



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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      | -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 |