



Mini-Circuits

COAXIAL

# Bandpass Filter

50 $\Omega$  110 to 180 MHz

**ZABP-141-S+**

## THE BIG DEAL

- High rejection
- Good Return Loss
- Connectorized package

## APPLICATIONS

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



Generic photo used for illustration purposes only

|            |             |
|------------|-------------|
| Model No.  | ZABP-141-S+ |
| Case Style | UU1842      |
| Connectors | SMA-FEMALE  |

### +RoHS Compliant

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

## PRODUCT OVERVIEW

ZABP-141-S+ is a 50 $\Omega$  bandpass filter with a rugged connectorized package covering the passband of 110 to 180 MHz. The bandpass filter offers good matching within the passband and provides high rejection. This filter has miniature high Q capacitors and wire welded inductors for high reliability. It has repeatable performance across lots and consistent performance across temperature.

## KEY FEATURES

| Feature               | Advantages                                                                                                                                                                                              |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| High rejection        | ZABP-141-S+ has sharper transition and rejects spurious signals in the stopband.                                                                                                                        |
| Good Return Loss      | This filter maintains typical Return Loss over passband frequency range making this filter easier to integrate into receiver and transmitter RF chains with less concerns for in band frequency ripple. |
| Connectorized package | Connectorized package is easy to interface with other devices and well suited for test setups.                                                                                                          |





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## Bandpass Filter

ZABP-141-S+

## ELECTRICAL SPECIFICATIONS AT 25°C

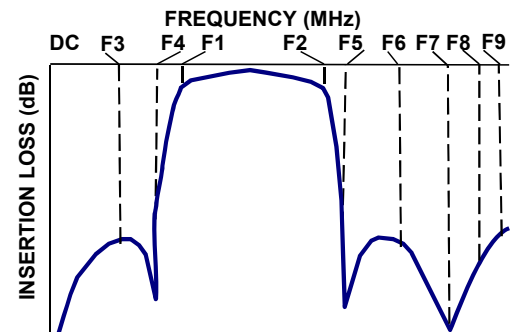
| Parameter        | F#               | Frequency (MHz) | Min. | Typ. | Max. | Units |
|------------------|------------------|-----------------|------|------|------|-------|
| Passband         | Center Frequency | —               | —    | 141  | —    | MHz   |
|                  | Insertion Loss   | F1-F2           | —    | 1.3  | 2.0  | dB    |
|                  | Return Loss      | F1-F2           | 11.7 | 17.7 | —    | dB    |
| Stop Band, Lower | Rejection        | DC-F3           | —    | 40   | —    | dB    |
|                  |                  | F3-F4           | 20   | 38   | —    |       |
| Stop Band, Upper | Rejection        | F5-F6           | 20   | 33   | —    | dB    |
|                  |                  | F6-F7           | —    | 40   | —    |       |
|                  |                  | F7-F8           | —    | 50   | —    |       |
|                  |                  | F8-F9           | —    | 35   | —    |       |

## MAXIMUM RATINGS

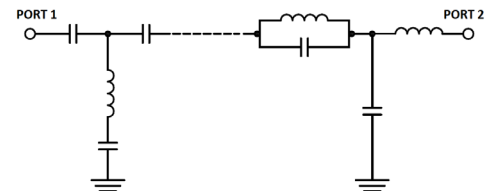
| Parameter             | Ratings         |
|-----------------------|-----------------|
| Operating temperature | -40°C to +85°C  |
| Storage temperature   | -55°C to +100°C |
| RF Power Input        | 0.2W max        |

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

## TYPICAL FREQUENCY RESPONSE



## FUNCTIONAL SCHEMATIC





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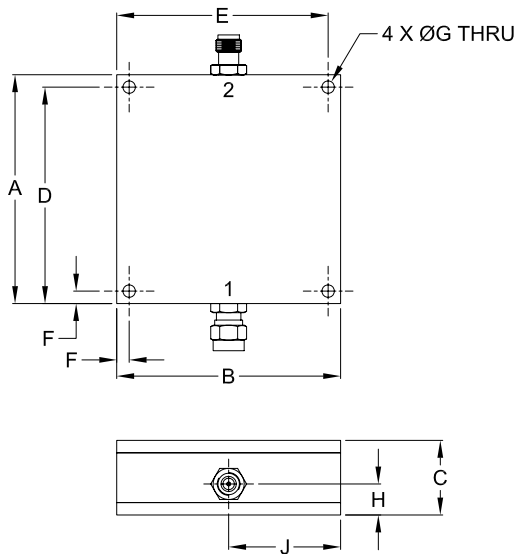
# Bandpass Filter

**ZABP-141-S+**

## COAXIAL CONNECTIONS

|        |            |
|--------|------------|
| PORT 1 | SMA-MALE   |
| PORT 2 | SMA-FEMALE |

## OUTLINE DRAWING



## OUTLINE DIMENSIONS (Inches/mm)

| A     | B     | C     | D     | E     |
|-------|-------|-------|-------|-------|
| 2.300 | 2.250 | .750  | 2.175 | 2.125 |
| 58.42 | 57.15 | 19.05 | 55.25 | 53.98 |
| F     | G     | H     | J     | wt.   |
| .125  | .125  | .312  | 1.125 | grams |
| 3.18  | 3.18  | 7.93  | 28.58 | 124   |

Note. Please refer to case style drawing for details





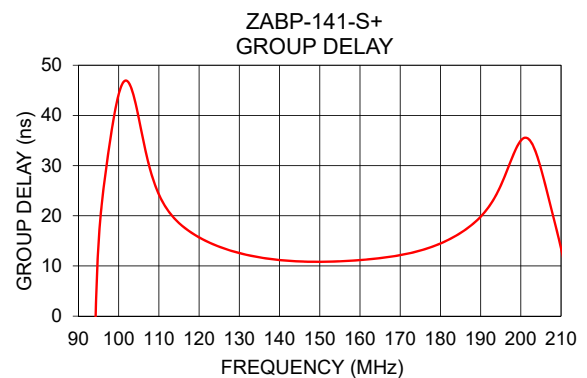
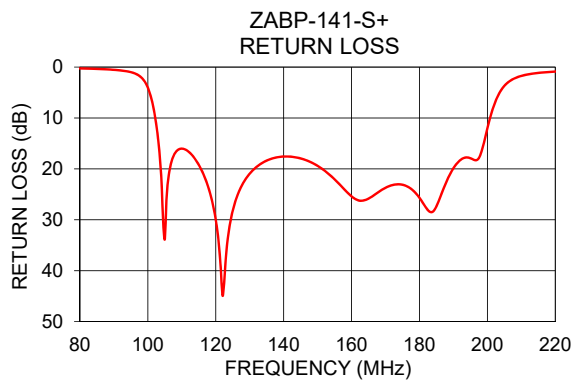
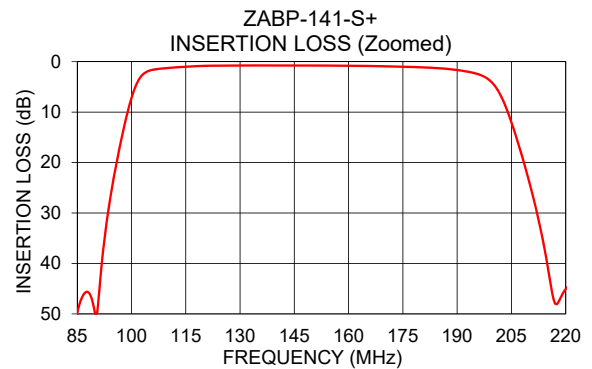
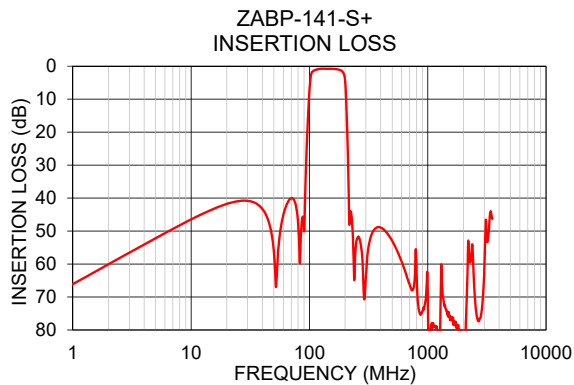
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## Bandpass Filter

ZABP-141-S+

## TYPICAL PERFORMANCE DATA AT 25°C

| Frequency (MHz) | Insertion Loss (dB) | VSWR (:1) | Frequency (MHz) | Group (nsec) |
|-----------------|---------------------|-----------|-----------------|--------------|
| 1               | 66.07               | 0.01      | 110             | 24.23        |
| 90              | 50.03               | 0.54      | 114             | 19.35        |
| 92              | 38.53               | 0.67      | 118             | 16.67        |
| 96              | 19.57               | 1.21      | 124             | 14.15        |
| 103             | 2.64                | 14.03     | 130             | 12.57        |
| 110             | 1.26                | 16.02     | 136             | 11.58        |
| 141             | 0.77                | 17.57     | 141             | 11.10        |
| 180             | 1.12                | 25.69     | 145             | 10.90        |
| 198             | 3.19                | 17.16     | 148             | 10.84        |
| 209             | 21.42               | 1.95      | 154             | 10.90        |
| 213             | 33.00               | 1.33      | 157             | 11.02        |
| 217             | 47.85               | 1.02      | 160             | 11.17        |
| 1600            | 77.03               | 0.58      | 165             | 11.56        |
| 3000            | 62.58               | 0.94      | 170             | 12.15        |
| 3500            | 46.30               | 0.90      | 180             | 14.48        |



## 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-Circuits' 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](http://www.minicircuits.com/MCLStore/terms.jsp)



## 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    | 65.94          | 66.16  | 65.95  | 0.00              | 0.00   | 0.00   | 0.00               | 0.00   | 0.00   |
| 5.0    | 52.08          | 52.09  | 52.09  | 0.00              | 0.00   | 0.00   | 0.01               | 0.00   | 0.01   |
| 10.0   | 46.37          | 46.37  | 46.38  | 0.00              | 0.00   | 0.00   | 0.01               | 0.02   | 0.02   |
| 20.0   | 41.69          | 41.68  | 41.67  | 0.00              | 0.00   | 0.01   | 0.05               | 0.07   | 0.07   |
| 40.0   | 43.11          | 43.15  | 43.20  | 0.02              | 0.03   | 0.03   | 0.23               | 0.27   | 0.29   |
| 50.0   | 55.15          | 55.40  | 55.67  | 0.04              | 0.05   | 0.06   | 0.35               | 0.40   | 0.44   |
| 75.0   | 41.59          | 41.77  | 41.93  | 0.18              | 0.22   | 0.23   | 0.64               | 0.73   | 0.79   |
| 90.0   | 42.79          | 43.11  | 43.40  | 0.55              | 0.63   | 0.69   | 0.85               | 0.99   | 1.09   |
| 92.0   | 44.04          | 42.02  | 40.50  | 0.67              | 0.77   | 0.84   | 0.91               | 1.07   | 1.18   |
| 93.5   | 32.60          | 31.56  | 30.68  | 0.80              | 0.92   | 1.01   | 0.98               | 1.16   | 1.28   |
| 94.0   | 29.75          | 28.86  | 28.08  | 0.86              | 0.98   | 1.08   | 1.01               | 1.19   | 1.32   |
| 95.0   | 24.84          | 24.14  | 23.50  | 0.99              | 1.14   | 1.25   | 1.10               | 1.29   | 1.43   |
| 96.0   | 20.60          | 20.03  | 19.49  | 1.18              | 1.36   | 1.50   | 1.22               | 1.44   | 1.60   |
| 100.0  | 7.53           | 7.35   | 7.14   | 3.66              | 4.18   | 4.63   | 3.19               | 3.66   | 4.05   |
| 102.5  | 3.12           | 3.21   | 3.23   | 9.65              | 10.71  | 11.61  | 8.09               | 8.77   | 9.36   |
| 103.0  | 2.66           | 2.78   | 2.82   | 11.58             | 12.80  | 13.85  | 9.54               | 10.23  | 10.82  |
| 104.0  | 2.03           | 2.18   | 2.26   | 16.26             | 17.94  | 19.42  | 12.66              | 13.25  | 13.78  |
| 105.0  | 1.67           | 1.83   | 1.92   | 21.28             | 23.12  | 24.49  | 15.46              | 15.78  | 16.11  |
| 110.0  | 1.10           | 1.24   | 1.32   | 18.71             | 18.37  | 18.26  | 17.38              | 17.13  | 17.09  |
| 120.0  | 0.75           | 0.86   | 0.92   | 26.57             | 27.24  | 27.65  | 22.78              | 22.60  | 22.50  |
| 141.0  | 0.69           | 0.79   | 0.85   | 17.65             | 17.33  | 17.24  | 18.28              | 17.83  | 17.71  |
| 150.0  | 0.67           | 0.78   | 0.84   | 21.51             | 20.85  | 20.49  | 22.04              | 21.06  | 20.57  |
| 165.0  | 0.75           | 0.86   | 0.93   | 25.74             | 26.01  | 26.38  | 24.06              | 23.39  | 22.90  |
| 180.0  | 1.00           | 1.16   | 1.26   | 21.31             | 20.82  | 20.73  | 20.35              | 19.48  | 19.16  |
| 190.0  | 1.40           | 1.62   | 1.77   | 23.00             | 22.45  | 21.97  | 19.58              | 18.73  | 18.23  |
| 193.5  | 1.69           | 1.95   | 2.14   | 19.99             | 19.96  | 19.83  | 19.03              | 18.70  | 18.55  |
| 196.0  | 2.00           | 2.33   | 2.56   | 20.01             | 19.86  | 19.49  | 22.95              | 22.89  | 23.13  |
| 198.0  | 2.44           | 2.86   | 3.17   | 17.99             | 17.23  | 16.35  | 27.88              | 24.35  | 22.39  |
| 200.0  | 3.37           | 3.94   | 4.40   | 11.94             | 11.39  | 10.78  | 13.96              | 13.08  | 12.30  |
| 208.5  | 18.94          | 19.92  | 20.75  | 1.58              | 1.75   | 1.84   | 1.57               | 1.67   | 1.70   |
| 209.0  | 20.24          | 21.23  | 22.06  | 1.47              | 1.65   | 1.74   | 1.46               | 1.56   | 1.60   |
| 212.0  | 28.73          | 29.79  | 30.71  | 1.08              | 1.24   | 1.33   | 1.06               | 1.15   | 1.18   |
| 212.5  | 30.32          | 31.40  | 32.35  | 1.04              | 1.19   | 1.28   | 1.02               | 1.10   | 1.14   |
| 213.0  | 31.98          | 33.08  | 34.06  | 1.00              | 1.15   | 1.24   | 0.98               | 1.06   | 1.09   |
| 217.0  | 47.96          | 47.49  | 47.11  | 0.78              | 0.91   | 0.99   | 0.77               | 0.83   | 0.86   |
| 250.0  | 53.68          | 53.87  | 53.99  | 0.41              | 0.47   | 0.50   | 0.38               | 0.42   | 0.43   |
| 300.0  | 59.37          | 59.04  | 58.76  | 0.41              | 0.47   | 0.48   | 0.26               | 0.30   | 0.31   |
| 320.0  | 51.94          | 51.87  | 51.73  | 0.41              | 0.48   | 0.50   | 0.23               | 0.27   | 0.28   |
| 340.0  | 49.28          | 49.19  | 49.12  | 0.41              | 0.48   | 0.51   | 0.20               | 0.25   | 0.26   |
| 350.0  | 48.61          | 48.51  | 48.46  | 0.41              | 0.48   | 0.51   | 0.19               | 0.24   | 0.25   |
| 360.0  | 48.16          | 48.09  | 48.01  | 0.40              | 0.48   | 0.51   | 0.18               | 0.23   | 0.24   |
| 380.0  | 47.81          | 47.75  | 47.70  | 0.39              | 0.47   | 0.51   | 0.17               | 0.21   | 0.22   |
| 400.0  | 47.93          | 47.92  | 47.82  | 0.37              | 0.45   | 0.50   | 0.15               | 0.20   | 0.21   |
| 420.0  | 48.34          | 48.35  | 48.29  | 0.35              | 0.44   | 0.48   | 0.14               | 0.18   | 0.20   |
| 450.0  | 49.37          | 49.39  | 49.29  | 0.32              | 0.41   | 0.45   | 0.13               | 0.17   | 0.18   |
| 500.0  | 51.59          | 51.73  | 51.63  | 0.27              | 0.36   | 0.41   | 0.11               | 0.15   | 0.16   |
| 700.0  | 61.94          | 61.99  | 61.97  | 0.20              | 0.31   | 0.36   | 0.09               | 0.14   | 0.15   |
| 750.0  | 62.14          | 62.16  | 62.19  | 0.20              | 0.32   | 0.37   | 0.09               | 0.15   | 0.16   |
| 1000.0 | 55.14          | 56.04  | 56.86  | 0.47              | 0.57   | 0.60   | 0.14               | 0.20   | 0.22   |
| 1200.0 | 88.91          | 91.31  | 95.97  | 0.35              | 0.46   | 0.53   | 0.18               | 0.25   | 0.26   |
| 1250.0 | 74.11          | 74.86  | 73.59  | 0.36              | 0.48   | 0.55   | 0.20               | 0.26   | 0.28   |
| 1300.0 | 54.82          | 54.29  | 53.41  | 0.37              | 0.49   | 0.56   | 0.29               | 0.38   | 0.42   |
| 1500.0 | 70.67          | 71.08  | 71.50  | 0.39              | 0.53   | 0.61   | 0.24               | 0.31   | 0.33   |
| 1600.0 | 73.76          | 73.20  | 73.53  | 0.40              | 0.55   | 0.63   | 0.25               | 0.32   | 0.34   |
| 2000.0 | 76.77          | 77.04  | 76.17  | 0.49              | 0.66   | 0.75   | 0.27               | 0.36   | 0.38   |
| 2250.0 | 54.76          | 55.41  | 55.91  | 14.84             | 9.10   | 10.08  | 0.27               | 0.36   | 0.39   |
| 2500.0 | 73.36          | 73.55  | 74.19  | 0.54              | 0.72   | 0.84   | 0.27               | 0.37   | 0.40   |
| 3000.0 | 63.44          | 64.84  | 63.75  | 0.82              | 0.98   | 1.11   | 0.29               | 0.42   | 0.47   |
| 3250.0 | 59.89          | 56.21  | 59.64  | 1.71              | 2.02   | 2.18   | 0.36               | 0.51   | 0.56   |
| 3500.0 | 37.51          | 37.69  | 37.63  | 1.25              | 1.44   | 1.62   | 0.42               | 0.57   | 0.65   |

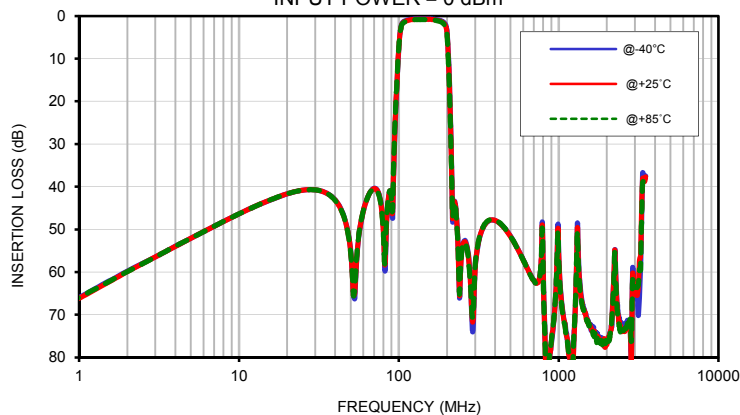
## Typical Performance Data

| FREQ. | GROUP DELAY |        |        |
|-------|-------------|--------|--------|
| (MHz) | (ns)        |        |        |
|       | @-40°C      | @+25°C | @+85°C |
| 110   | 24.66       | 24.29  | 23.98  |
| 111   | 22.99       | 22.68  | 22.43  |
| 112   | 21.62       | 21.37  | 21.15  |
| 113   | 20.48       | 20.26  | 20.08  |
| 114   | 19.51       | 19.32  | 19.16  |
| 115   | 18.66       | 18.50  | 18.36  |
| 116   | 17.92       | 17.78  | 17.66  |
| 117   | 17.26       | 17.14  | 17.03  |
| 118   | 16.67       | 16.56  | 16.47  |
| 119   | 16.13       | 16.04  | 15.96  |
| 120   | 15.64       | 15.57  | 15.49  |
| 121   | 15.19       | 15.12  | 15.06  |
| 122   | 14.78       | 14.72  | 14.66  |
| 123   | 14.40       | 14.35  | 14.30  |
| 124   | 14.06       | 14.01  | 13.97  |
| 125   | 13.73       | 13.69  | 13.65  |
| 126   | 13.44       | 13.40  | 13.37  |
| 127   | 13.16       | 13.13  | 13.10  |
| 128   | 12.91       | 12.88  | 12.85  |
| 129   | 12.67       | 12.64  | 12.63  |
| 130   | 12.45       | 12.43  | 12.41  |
| 131   | 12.26       | 12.24  | 12.22  |
| 132   | 12.07       | 12.06  | 12.05  |
| 133   | 11.91       | 11.89  | 11.88  |
| 134   | 11.76       | 11.74  | 11.73  |
| 135   | 11.62       | 11.60  | 11.59  |
| 136   | 11.49       | 11.47  | 11.47  |
| 137   | 11.39       | 11.37  | 11.36  |
| 138   | 11.28       | 11.26  | 11.26  |
| 140   | 11.11       | 11.10  | 11.10  |
| 141   | 11.04       | 11.03  | 11.03  |
| 142   | 10.99       | 10.97  | 10.97  |
| 143   | 10.93       | 10.92  | 10.92  |
| 145   | 10.86       | 10.85  | 10.85  |
| 146   | 10.83       | 10.83  | 10.83  |
| 148   | 10.81       | 10.80  | 10.81  |
| 150   | 10.80       | 10.80  | 10.81  |
| 152   | 10.82       | 10.83  | 10.84  |
| 154   | 10.87       | 10.89  | 10.90  |
| 155   | 10.90       | 10.92  | 10.93  |
| 158   | 11.02       | 11.04  | 11.06  |
| 160   | 11.12       | 11.15  | 11.17  |
| 161   | 11.18       | 11.21  | 11.24  |
| 162   | 11.24       | 11.28  | 11.31  |
| 163   | 11.31       | 11.34  | 11.38  |
| 164   | 11.39       | 11.42  | 11.46  |
| 165   | 11.47       | 11.51  | 11.55  |
| 166   | 11.56       | 11.60  | 11.64  |
| 167   | 11.66       | 11.70  | 11.75  |
| 168   | 11.76       | 11.80  | 11.86  |
| 169   | 11.88       | 11.93  | 11.98  |
| 170   | 12.01       | 12.06  | 12.11  |
| 171   | 12.15       | 12.20  | 12.26  |
| 172   | 12.30       | 12.36  | 12.42  |
| 173   | 12.46       | 12.53  | 12.59  |
| 174   | 12.65       | 12.71  | 12.79  |
| 176   | 13.07       | 13.14  | 13.22  |
| 177   | 13.31       | 13.39  | 13.47  |
| 178   | 13.57       | 13.65  | 13.75  |
| 180   | 14.17       | 14.27  | 14.36  |

## Typical Performance Curves

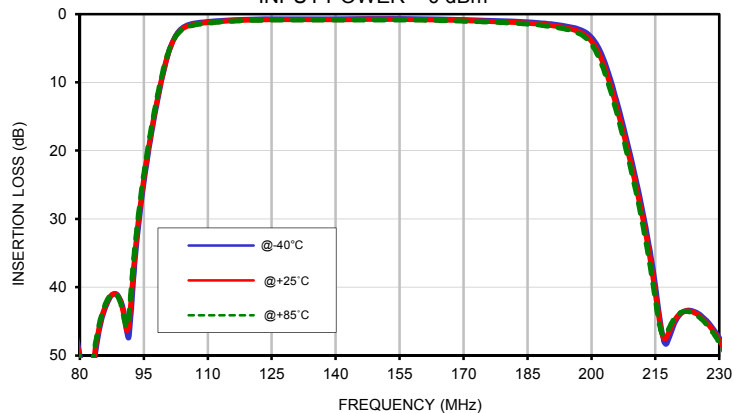
INSERTION LOSS vs. TEMPERATURE

INPUT POWER = 0 dBm



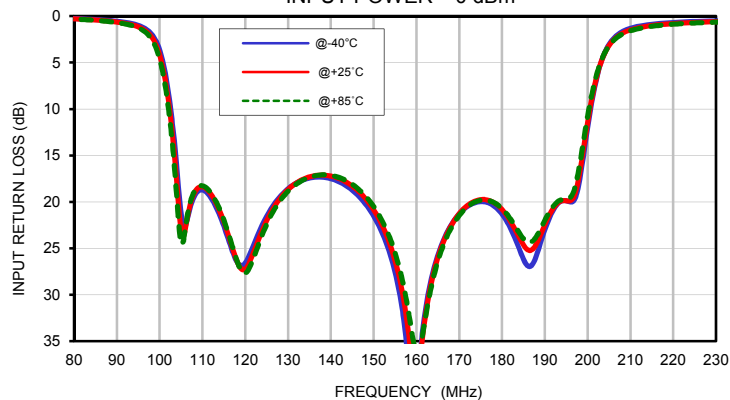
INSERTION LOSS vs. TEMPERATURE (Zoomed)

INPUT POWER = 0 dBm



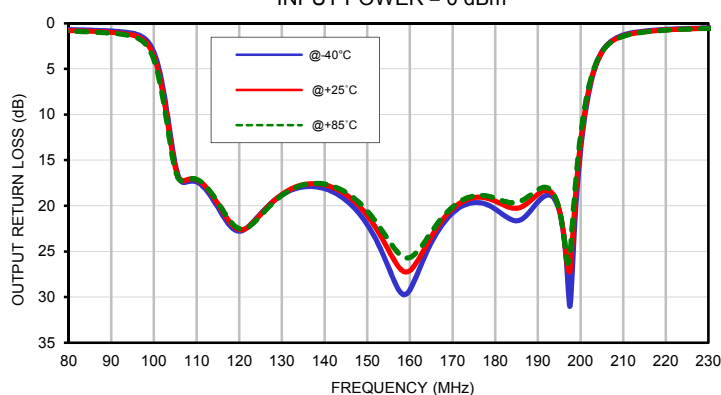
INPUT RETURN LOSS vs. TEMPERATURE

INPUT POWER = 0 dBm



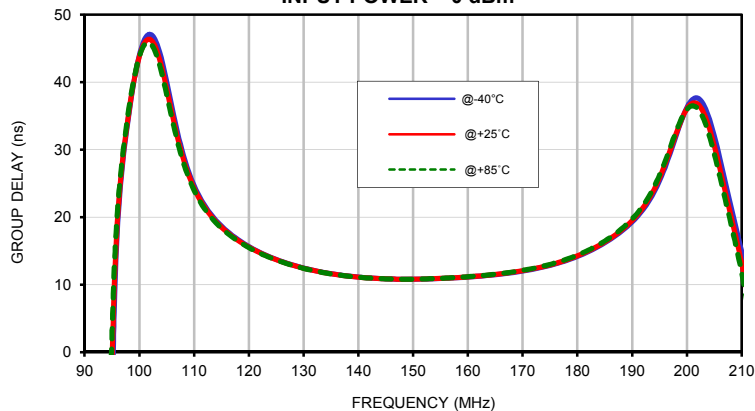
OUTPUT RETURN LOSS vs. TEMPERATURE

INPUT POWER = 0 dBm



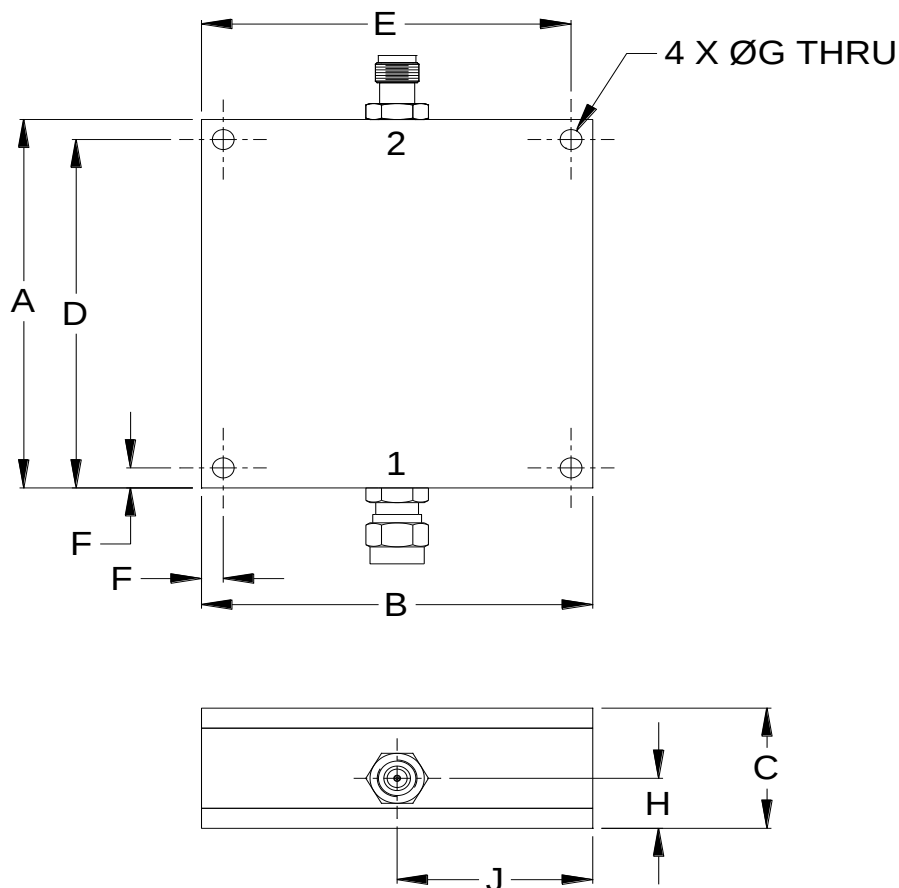
GROUP DELAY vs. TEMPERATURE

INPUT POWER = 0 dBm



## Outline Dimensions

UU1842



| CASE#  | A                | B                | C                | D                | E                | F               | G               | H               | J                | WT.GRAMS |
|--------|------------------|------------------|------------------|------------------|------------------|-----------------|-----------------|-----------------|------------------|----------|
| UU1842 | 2.300<br>(58.42) | 2.250<br>(57.15) | 0.750<br>(19.05) | 2.175<br>(55.25) | 2.125<br>(53.98) | 0.125<br>(3.18) | 0.125<br>(3.18) | 0.312<br>(7.93) | 1.125<br>(28.58) | 124      |

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.



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



The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: [www.minicircuits.com](http://www.minicircuits.com)

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      | -55° to 100°C<br>Ambient Environment                                                                    | Individual Model Data Sheet                           |
| Storage Temperature        | -55° to 100° C<br>Ambient Environment                                                                   | Individual Model Data Sheet                           |
| Humidity                   | 90 to 95% RH, 40°C, 96 hours;<br>Units may require bake-out after humidity to restore full performance. | MIL-STD-202, Method 103, Condintion B                 |
| Thermal Shock              | -55° to 100°C, 100 cycles                                                                               | MIL-STD-202, Method 107, Condition A-3, except +100°C |
| 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           | 50g, 11ms half-sine, 3 shocks each direction 3 axes (total 18)                                          | MIL-STD-202, Method 213, Condition A                  |