*Coaxial*

# Bandpass Filter

## ZABP-45-S+

50Ω 30 to 70 MHz


*Generic photo used for illustration purposes only*
CASE STYLE: UU1842

## The Big Deal

- High rejection
- Good VSWR
- Connectorized package

## Product Overview

ZABP-45-S+ is a 50Ω bandpass filter with a rugged connectorized package covering the passband of 30 to 70 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-45-S+ has sharper transition and rejects spurious signals in the stopband. |
| Good VSWR | This filter maintains typical VSWR 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

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# ZABP-45-S+


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CASE STYLE: UU1842

| Connectors | Model |
|---|---|
| **SMA-M\F** | ZABP-45-S+ |

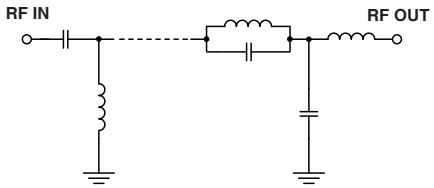
## Features

- High rejection
- Good VSWR, 1.3:1 typical@ passband
- Connectorized package

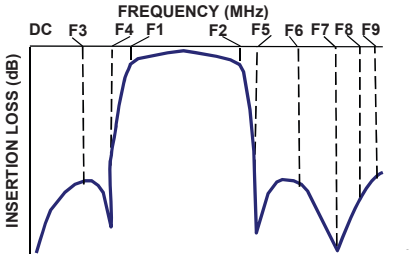
## Applications

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

## Functional Schematic




## Typical Frequency Response




***+RoHS Compliant***

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

## Electrical Specifications at 25°C

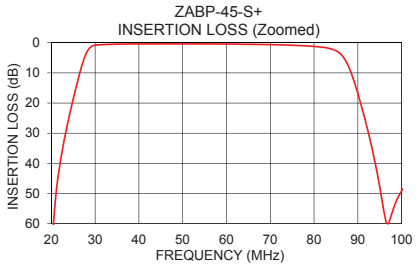
| Parameter | | F# | Frequency (MHz) | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| **Pass Band** | Center Frequency | - | - | - | 45 | - | MHz |
| | Insertion Loss | F1-F2 | 30 - 70 | - | 0.8 | 1.5 | dB |
| | VSWR | F1-F2 | 30 - 70 | - | 1.3 | 1.5 | :1 |
| **Stop Band, Lower** | Insertion Loss | DC-F3 | DC - 21 | 40 | 49 | - | dB |
| | | F3-F4 | 21 - 23 | 20 | 31 | - | dB |
| | VSWR | DC-F4 | DC - 23 | - | 20 | - | :1 |
| **Stop Band, Upper** | Insertion Loss | F5-F6 | 95 - 120 | 20 | 42 | - | dB |
| | | F6-F7 | 120 - 1000 | 40 | 48 | - | dB |
| | | F7-F8 | 1000 - 2500 | 45 | 55 | - | dB |
| | | F8-F9 | 2500 - 4000 | - | 35 | - | dB |
| | VSWR | F5-F9 | 95 - 4000 | - | 20 | - | :1 |

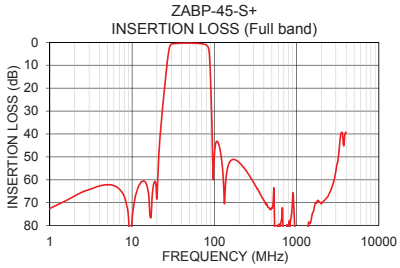
| Maximum Ratings | |
|---|---|
| Operating Temperature | -40°C to 85°C |
| Storage Temperature | -55°C to 100°C |
| RF Power Input | 0.5 W max. |

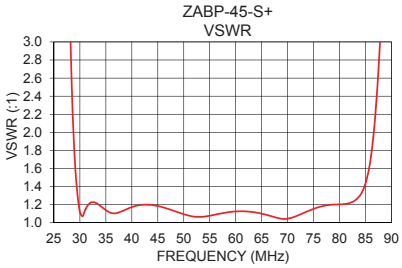
Permanent damage may occur if any of these limits are exceeded.

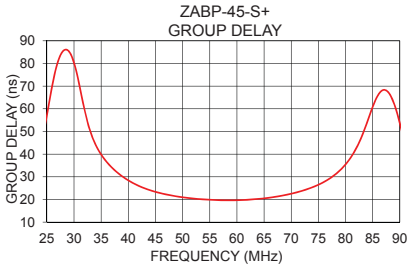
## Typical Performance Data at 25°C

| Frequency (MHz) | Insertion Loss (dB) | VSWR (:1) | Frequency (MHz) | Group Delay (ns) |
|---|---|---|---|---|
| 1 | 72.45 | 24654.81 | 30 | 80.35 |
| 10 | 77.07 | 626.40 | 32 | 58.84 |
| 21 | 50.93 | 81.67 | 34 | 44.03 |
| 23 | 31.81 | 54.92 | 36 | 36.59 |
| 24 | 24.91 | 42.71 | 38 | 31.83 |
| 26 | 12.77 | 17.95 | 40 | 28.41 |
| 28 | 3.42 | 3.56 | 42 | 25.92 |
| 30 | 0.81 | 1.12 | 44 | 24.09 |
| 45 | 0.38 | 1.19 | 45 | 23.36 |
| 70 | 0.62 | 1.04 | 48 | 21.73 |
| 80 | 1.20 | 1.20 | 50 | 20.99 |
| 86 | 3.62 | 1.72 | 52 | 20.42 |
| 90 | 16.78 | 6.19 | 54 | 20.02 |
| 91 | 21.90 | 7.82 | 56 | 19.76 |
| 93 | 33.47 | 11.05 | 58 | 19.65 |
| 95 | 47.83 | 14.15 | 60 | 19.68 |
| 120 | 48.94 | 31.66 | 62 | 19.88 |
| 1000 | 87.39 | 16.80 | 64 | 20.24 |
| 2500 | 65.86 | 5.61 | 66 | 20.80 |
| 4000 | 39.51 | 1.32 | 70 | 22.53 |



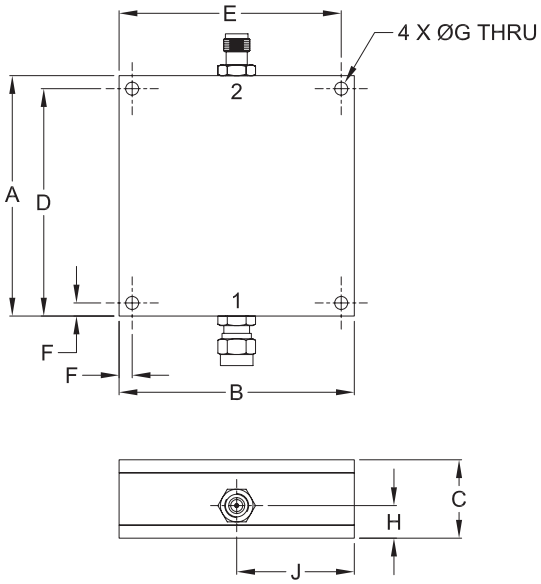

Notes

**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.
**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

## Coaxial Connections

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

## Outline Drawing




## Outline Dimensions ( inch / 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*

# Coaxial Band Pass Filter ZABP-45-S+

*Typical Performance Data*

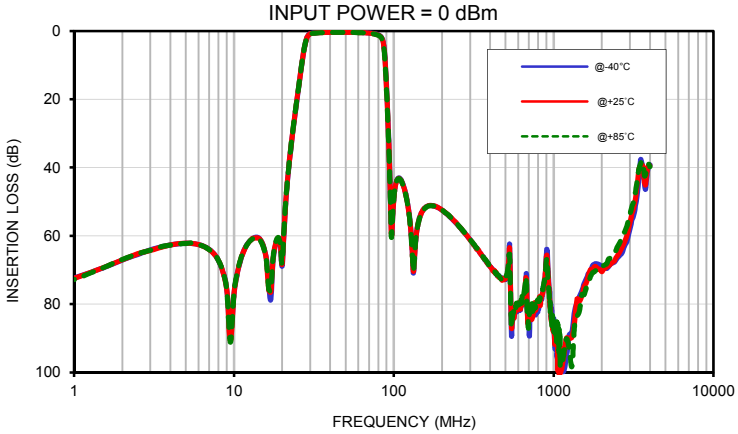
| FREQ. | INSERTION LOSS | | | INPUT RETURN LOSS | | | OUTPUT RETURN LOSS | | |
|---|---|---|---|---|---|---|---|---|---|
| (MHz) | (dB) | | | (dB) | | | (dB) | | |
| | @-40°C | @+25°C | @+85°C | @-40°C | @+25°C | @+85°C | @-40°C | @+25°C | @+85°C |
| 1 | 72.37 | 72.45 | 72.80 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | 67.06 | 67.04 | 66.96 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.01 |
| 4 | 62.67 | 62.67 | 62.70 | 0.01 | 0.00 | 0.00 | 0.01 | 0.01 | 0.01 |
| 6 | 62.52 | 62.55 | 62.60 | 0.01 | 0.01 | 0.01 | 0.03 | 0.03 | 0.04 |
| 8 | 67.28 | 67.07 | 67.21 | 0.02 | 0.02 | 0.02 | 0.05 | 0.06 | 0.07 |
| 10 | 77.13 | 77.07 | 76.74 | 0.03 | 0.03 | 0.03 | 0.09 | 0.10 | 0.11 |
| 12 | 62.66 | 62.71 | 62.85 | 0.04 | 0.04 | 0.05 | 0.13 | 0.15 | 0.16 |
| 14 | 60.42 | 60.55 | 60.51 | 0.06 | 0.06 | 0.07 | 0.18 | 0.21 | 0.22 |
| 16 | 67.20 | 67.48 | 67.81 | 0.08 | 0.09 | 0.09 | 0.24 | 0.27 | 0.29 |
| 18 | 63.59 | 63.24 | 63.12 | 0.11 | 0.13 | 0.13 | 0.30 | 0.33 | 0.35 |
| 20 | 68.91 | 68.42 | 68.16 | 0.16 | 0.18 | 0.18 | 0.35 | 0.39 | 0.41 |
| 21 | 51.27 | 50.93 | 50.79 | 0.20 | 0.21 | 0.22 | 0.38 | 0.42 | 0.44 |
| 22 | 40.11 | 39.91 | 39.80 | 0.24 | 0.26 | 0.27 | 0.41 | 0.45 | 0.48 |
| 23 | 31.97 | 31.81 | 31.71 | 0.29 | 0.32 | 0.33 | 0.45 | 0.49 | 0.52 |
| 24 | 25.05 | 24.91 | 24.81 | 0.38 | 0.41 | 0.43 | 0.51 | 0.55 | 0.59 |
| 25 | 18.77 | 18.64 | 18.55 | 0.54 | 0.58 | 0.60 | 0.64 | 0.69 | 0.73 |
| 26 | 12.89 | 12.77 | 12.69 | 0.91 | 0.97 | 1.01 | 0.97 | 1.04 | 1.10 |
| 27 | 7.53 | 7.45 | 7.40 | 1.95 | 2.05 | 2.14 | 1.94 | 2.06 | 2.16 |
| 28 | 3.44 | 3.42 | 3.42 | 4.83 | 5.02 | 5.17 | 4.72 | 4.94 | 5.12 |
| 29 | 1.37 | 1.41 | 1.45 | 11.31 | 11.57 | 11.80 | 11.02 | 11.36 | 11.66 |
| 30 | 0.75 | 0.81 | 0.85 | 25.20 | 25.00 | 24.97 | 24.66 | 25.40 | 26.07 |
| 31 | 0.61 | 0.67 | 0.71 | 23.83 | 23.72 | 23.50 | 25.34 | 25.31 | 25.18 |
| 35 | 0.43 | 0.47 | 0.50 | 23.38 | 23.72 | 23.89 | 24.12 | 24.59 | 24.88 |
| 40 | 0.36 | 0.40 | 0.43 | 22.29 | 22.00 | 21.75 | 24.14 | 23.77 | 23.52 |
| 45 | 0.35 | 0.38 | 0.41 | 21.44 | 21.45 | 21.39 | 22.14 | 22.09 | 22.03 |
| 50 | 0.34 | 0.37 | 0.39 | 26.45 | 26.92 | 27.19 | 26.79 | 27.20 | 27.45 |
| 55 | 0.35 | 0.39 | 0.42 | 28.38 | 28.58 | 28.76 | 30.06 | 30.46 | 30.87 |
| 60 | 0.40 | 0.44 | 0.47 | 24.91 | 24.64 | 24.46 | 26.10 | 25.72 | 25.54 |
| 65 | 0.47 | 0.51 | 0.55 | 27.07 | 26.42 | 25.94 | 27.43 | 26.52 | 25.96 |
| 70 | 0.56 | 0.62 | 0.66 | 35.21 | 33.30 | 32.02 | 31.07 | 29.48 | 28.43 |
| 75 | 0.75 | 0.82 | 0.87 | 22.94 | 22.95 | 22.98 | 23.55 | 23.33 | 23.18 |
| 80 | 1.11 | 1.20 | 1.28 | 20.64 | 20.72 | 20.78 | 22.89 | 22.83 | 22.80 |
| 85 | 2.44 | 2.63 | 2.80 | 15.04 | 14.95 | 14.84 | 13.29 | 13.22 | 13.13 |
| 86 | 3.36 | 3.62 | 3.85 | 11.74 | 11.58 | 11.43 | 9.60 | 9.49 | 9.38 |
| 87 | 5.05 | 5.40 | 5.72 | 8.26 | 8.17 | 8.07 | 6.34 | 6.27 | 6.20 |
| 89 | 11.67 | 12.16 | 12.60 | 3.76 | 3.83 | 3.87 | 2.57 | 2.61 | 2.64 |
| 90 | 16.28 | 16.78 | 17.25 | 2.74 | 2.83 | 2.89 | 1.82 | 1.87 | 1.92 |
| 91 | 21.39 | 21.90 | 22.38 | 2.13 | 2.23 | 2.30 | 1.41 | 1.47 | 1.51 |
| 92 | 26.91 | 27.44 | 27.94 | 1.75 | 1.84 | 1.91 | 1.17 | 1.23 | 1.27 |
| 93 | 32.92 | 33.47 | 34.00 | 1.49 | 1.58 | 1.64 | 1.02 | 1.06 | 1.10 |
| 94 | 39.56 | 40.18 | 40.77 | 1.29 | 1.38 | 1.44 | 0.91 | 0.95 | 0.98 |
| 95 | 47.10 | 47.83 | 48.54 | 1.15 | 1.23 | 1.28 | 0.83 | 0.86 | 0.89 |
| 100 | 49.18 | 49.12 | 49.01 | 0.77 | 0.83 | 0.87 | 0.60 | 0.62 | 0.64 |
| 120 | 48.76 | 48.94 | 49.04 | 0.53 | 0.55 | 0.56 | 0.38 | 0.38 | 0.39 |
| 200 | 52.44 | 52.40 | 52.43 | 0.53 | 0.58 | 0.60 | 0.25 | 0.27 | 0.28 |
| 250 | 56.68 | 56.64 | 56.61 | 0.52 | 0.59 | 0.63 | 0.23 | 0.25 | 0.26 |
| 500 | 72.67 | 72.20 | 71.99 | 0.58 | 0.69 | 0.74 | 0.24 | 0.27 | 0.29 |
| 750 | 82.74 | 81.57 | 81.54 | 0.70 | 0.85 | 0.93 | 0.31 | 0.36 | 0.38 |
| 1000 | 84.25 | 87.39 | 84.49 | 0.87 | 1.04 | 1.14 | 0.40 | 0.47 | 0.50 |
| 1250 | 89.14 | 90.00 | 93.06 | 1.04 | 1.25 | 1.39 | 0.49 | 0.57 | 0.61 |
| 1500 | 76.17 | 77.68 | 77.24 | 1.83 | 2.10 | 2.27 | 0.56 | 0.65 | 0.69 |
| 1750 | 68.75 | 70.17 | 70.79 | 2.17 | 2.47 | 2.60 | 0.60 | 0.69 | 0.74 |
| 2000 | 69.40 | 70.50 | 69.34 | 2.37 | 2.55 | 2.66 | 0.61 | 0.72 | 0.78 |
| 2250 | 68.51 | 68.46 | 66.58 | 2.34 | 2.64 | 2.83 | 0.64 | 0.76 | 0.82 |
| 2500 | 66.49 | 65.86 | 63.25 | 2.75 | 3.13 | 3.37 | 0.68 | 0.82 | 0.89 |
| 2750 | 63.39 | 62.17 | 59.40 | 3.61 | 4.07 | 4.31 | 0.77 | 0.94 | 1.01 |
| 3000 | 57.96 | 56.14 | 53.75 | 4.33 | 4.44 | 4.47 | 0.97 | 1.15 | 1.24 |
| 3250 | 51.22 | 48.79 | 47.08 | 3.82 | 4.04 | 4.18 | 1.27 | 1.50 | 1.61 |
| 3500 | 37.64 | 39.66 | 38.83 | 4.58 | 5.14 | 5.50 | 1.87 | 2.06 | 2.18 |
| 4000 | 39.20 | 39.51 | 39.72 | 14.69 | 17.32 | 19.01 | 3.45 | 3.93 | 4.11 |

## Typical Performance Data

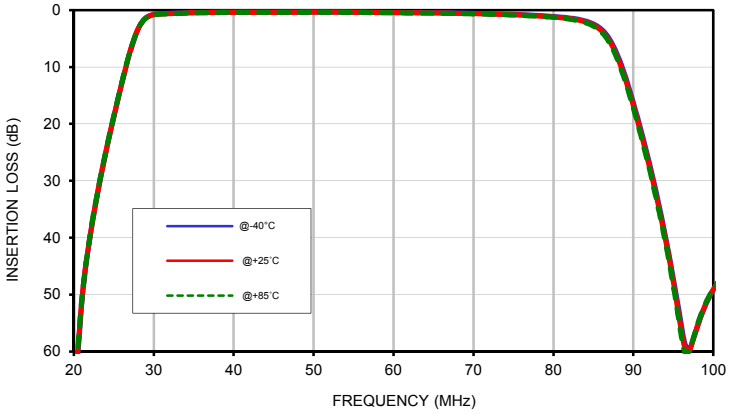
| FREQ. (MHz) | GROUP DELAY (nsec) | | |
|---|---|---|---|
| | @-40°C | @+25°C | @+85°C |
| 30 | 80.75 | 80.35 | 80.05 |
| 31 | 70.74 | 70.28 | 69.93 |
| 32 | 59.19 | 58.84 | 58.58 |
| 33 | 50.22 | 50.01 | 49.86 |
| 34 | 44.15 | 44.03 | 43.94 |
| 35 | 39.90 | 39.81 | 39.74 |
| 36 | 36.67 | 36.59 | 36.54 |
| 37 | 34.07 | 34.00 | 33.96 |
| 38 | 31.88 | 31.83 | 31.79 |
| 39 | 30.04 | 29.99 | 29.95 |
| 40 | 28.45 | 28.41 | 28.38 |
| 41 | 27.11 | 27.07 | 27.05 |
| 42 | 25.95 | 25.92 | 25.90 |
| 43 | 24.96 | 24.93 | 24.92 |
| 44 | 24.11 | 24.09 | 24.08 |
| 45 | 23.37 | 23.36 | 23.36 |
| 46 | 22.74 | 22.74 | 22.73 |
| 47 | 22.19 | 22.19 | 22.20 |
| 48 | 21.73 | 21.73 | 21.74 |
| 49 | 21.31 | 21.32 | 21.33 |
| 50 | 20.97 | 20.99 | 20.99 |
| 51 | 20.67 | 20.67 | 20.69 |
| 52 | 20.41 | 20.42 | 20.44 |
| 53 | 20.18 | 20.19 | 20.22 |
| 54 | 20.00 | 20.02 | 20.04 |
| 55 | 19.86 | 19.87 | 19.90 |
| 56 | 19.74 | 19.76 | 19.79 |
| 57 | 19.66 | 19.68 | 19.71 |
| 58 | 19.63 | 19.65 | 19.68 |
| 59 | 19.62 | 19.64 | 19.67 |
| 60 | 19.66 | 19.68 | 19.71 |
| 61 | 19.73 | 19.76 | 19.78 |
| 62 | 19.85 | 19.88 | 19.90 |
| 63 | 20.01 | 20.04 | 20.07 |
| 64 | 20.21 | 20.24 | 20.27 |
| 65 | 20.46 | 20.49 | 20.52 |
| 66 | 20.76 | 20.80 | 20.83 |
| 67 | 21.11 | 21.15 | 21.18 |
| 68 | 21.50 | 21.54 | 21.59 |
| 69 | 21.96 | 22.01 | 22.05 |
| 70 | 22.48 | 22.53 | 22.59 |

## *Typical Performance Curves*

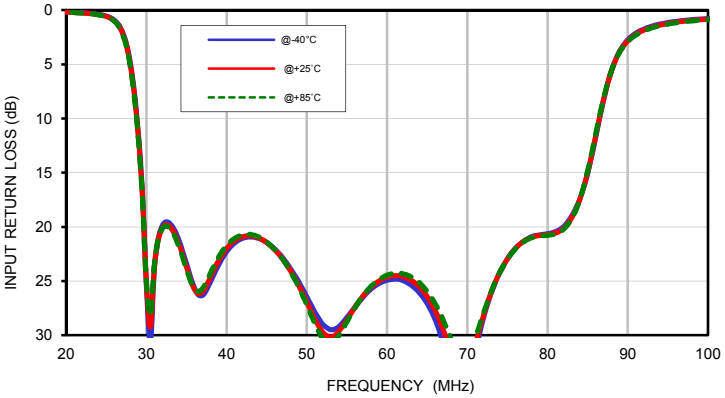
**INSERTION LOSS vs. TEMPERATURE**
INPUT POWER = 0 dBm



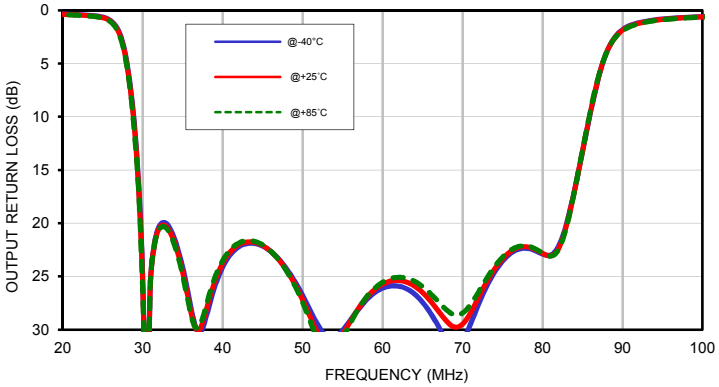

**INSERTION LOSS vs. TEMPERATURE (Zoomed)**
INPUT POWER = 0 dBm



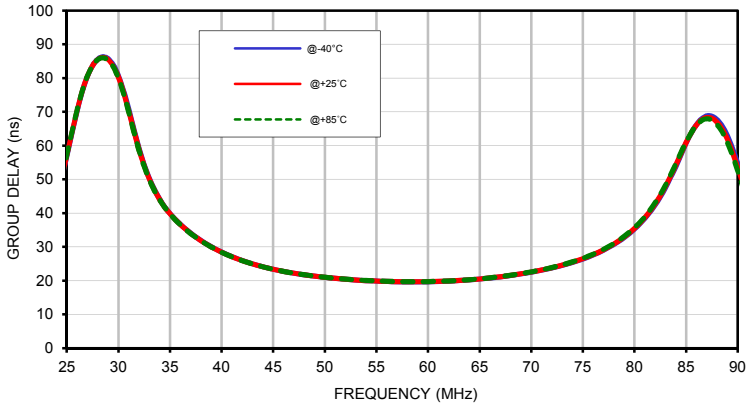

**INPUT RETURN LOSS vs. TEMPERATURE**
INPUT POWER = 0 dBm




**OUTPUT RETURN LOSS vs. TEMPERATURE**
INPUT POWER = 0 dBm



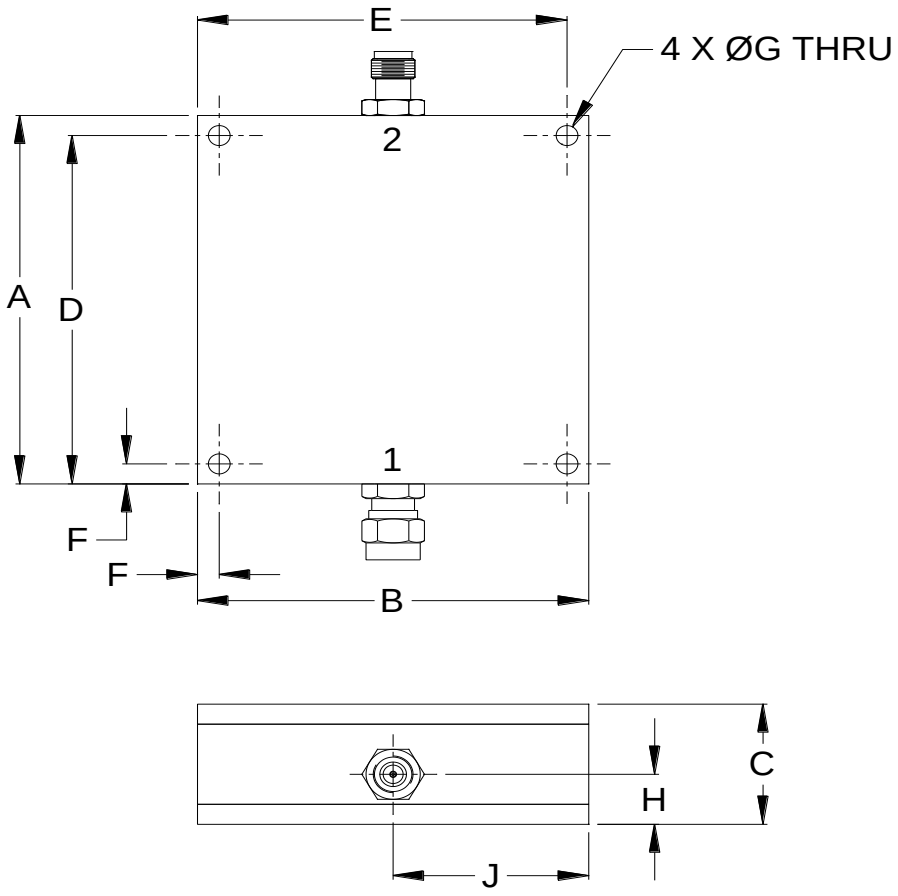

**GROUP DELAY vs. TEMPERATURE**
**INPUT POWER = 0 dBm**



# Case Style UU

## Outline Dimensions

**UU1842**




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

**Dimensions are in inches (mm). Tolerances: 2 Pl. ± .03; 3 Pl. ± .015**

**Notes:**

1. Case material: Aluminum alloy.
2. Case finish:
   For RoHS Case Styles: Clear chemical conversion coating, non-chrome or trivalent chrome based.

Mini-Circuits

**Environmental Specifications** **ENV28T5**

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 |