CAVITY COAXIAL

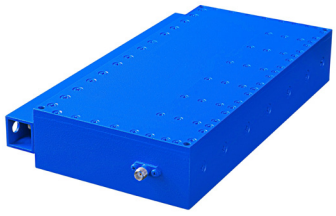
# Bandpass Filter

## ZVBP-435-S+

50Ω 425 to 445 MHz SMA Female

### KEY FEATURES

- Low Insertion Loss, 0.9dB Typ.
- Good Return Loss, 18dB Typ.
- High Rejection, 80dB Typ.
- Wide Stopband up to 1750MHz



Generic photo used for illustration purposes only

### APPLICATIONS

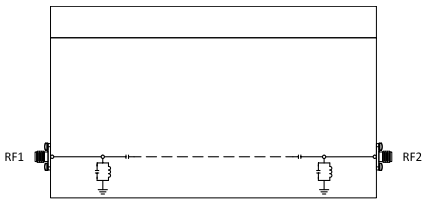
- ISM band - RFID, Low Power Communications.

### PRODUCT OVERVIEW

Mini-Circuits' ZVBP-435-S+ is a coaxial cavity filter designed by implementing resonant structures with very high Q and are ideal for narrow-band, high-selectivity applications.

Mini-Circuits' coaxial cavity filters feature a special protective assembly to prevent accidental de-tuning that would otherwise require expensive replacement or return to factory for re-tuning. Precise machining allows realization of cavity filters with small form factors for applications where size is critical.

### FUNCTIONAL DIAGRAM




### ELECTRICAL SPECIFICATIONS[1,2] AT +25°C

| Parameter | | F# | Frequency (MHz) | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|---|
| Passband | Center Frequency | — | — | — | 435 | — | MHz |
| | Insertion Loss | F1-F2 | 425 - 445 | — | 0.9 | 1.5 | dB |
| | Return Loss | F1-F2 | 425 - 445 | 14 | 18 | — | dB |
| Stop Band, Lower | Rejection | DC-F3 | DC - 400 | 65 | 72 | — | dB |
| | | F3-F4 | 400 - 412 | 40 | 46 | — | |
| | | F4-F5 | 412 - 417 | 20 | 28 | — | |
| Stop Band, Upper | Rejection | F6-F7 | 453 - 458 | 20 | 28 | — | dB |
| | | F7-F8 | 458 - 470 | 40 | 49 | — | |
| | | F8-F9 | 470 - 1750 | 65 | 80 | — | |

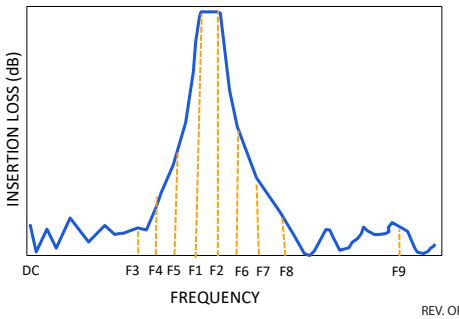
1. This filter is bi-directional RF1 and RF2 ports may be interchanged, see S-Parameters for actual performance.

### ABSOLUTE MAXIMUM RATINGS[2,3]

| Parameter | Ratings |
|---|---|
| Operating Temperature | -40°C to +85°C |
| Storage Temperature | -55°C to +100°C |
| Input Power[4] | 50W at +25°C |

2. Permanent damage may occur if any of these limits are exceeded.
3. Input and output ports are DC short to ground.
4. Power rating applies only to signals within the passband.

### TYPICAL FREQUENCY RESPONSE AT +25°C




REV. OR
ECO-019638
ZVBP-435-S+
EDU4635
URJ
231219

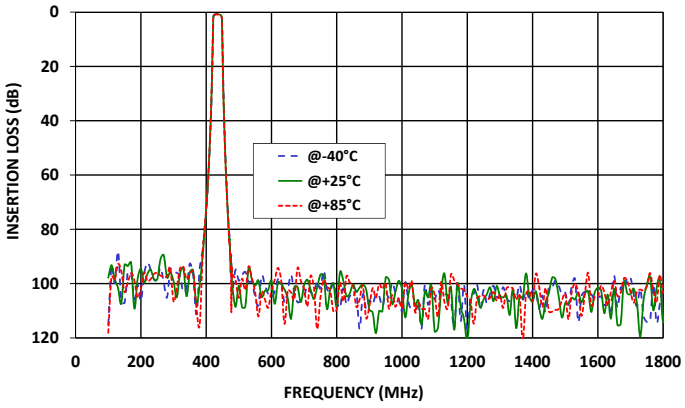
# Bandpass Filter

## ZVBP-435-S+

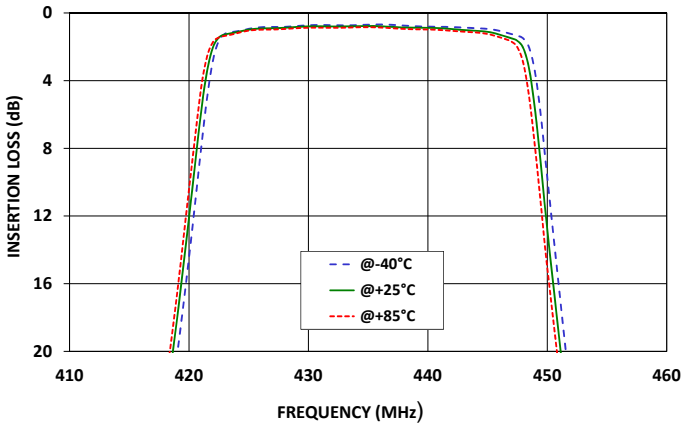
50Ω 425 to 445 MHz SMA Female

### TYPICAL PERFORMANCE GRAPHS

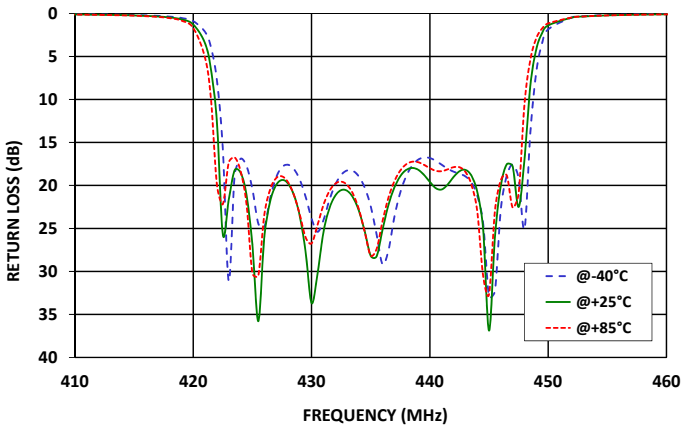
ZVBP-435-S+
INSERTION LOSS



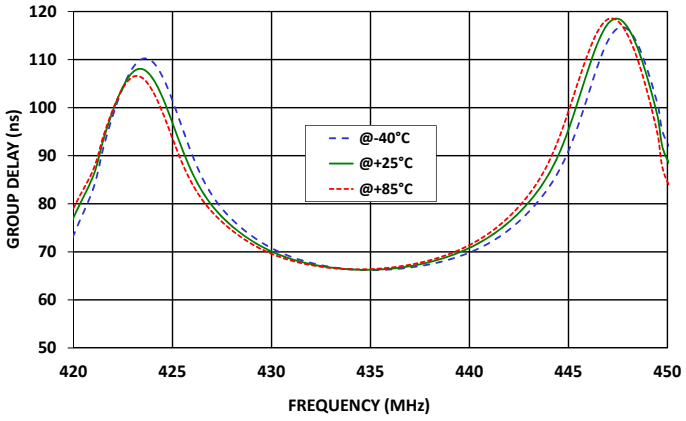

ZVBP-435-S+
INSERTION LOSS (Zoomed)




ZVBP-435-S+
RETURN LOSS




ZVBP-435-S+
GROUP DELAY



# Bandpass Filter

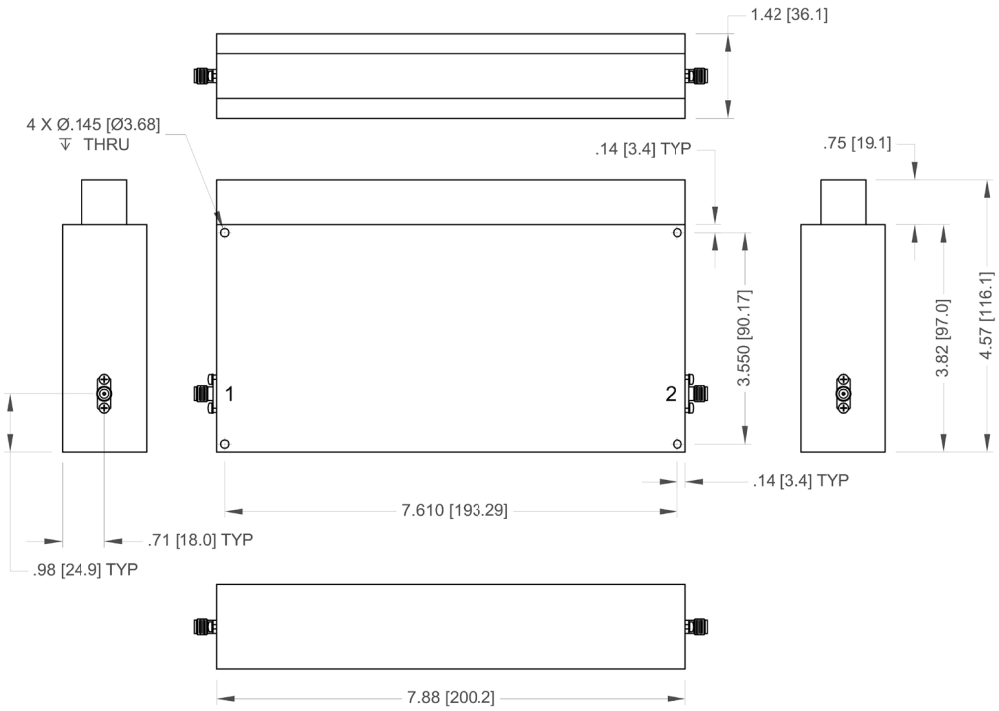
## ZVBP-435-S+

50Ω 425 to 445 MHz SMA Female

### CONNECTOR DESCRIPTION

| Function | Marking on Unit | Connector |
|---|---|---|
| RF1[1] | 1 | SMA Female |
| RF2[1] | 2 | SMA Female |

### CASE STYLE DRAWING




Unit Weight: 880 grams

Dimensions are in inches (mm). Tolerances: 2 Pl. ± .100; 3 Pl. ± .015

### PRODUCT MARKING*: ZVBP-435-S+

*Marking may contain other features or characters for internal lot control.

CAVITY COAXIAL

# Bandpass Filter

## ZVBP-435-S+

50Ω 425 to 445 MHz SMA Female

ADDITIONAL INFORMATION IS AVAILABLE ON OUR DASHBOARD **CLICK HERE**

| | |
|---|---|
| Performance Data & Graphs | Data<br>Graphs<br>S-Parameter (S2P Files) Data Set (.zip file) |
| Case Style | ZJ3545 |
| RoHS Status | Compliant |
| Environmental Ratings | ENV77T1 |

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/terms/viewterm.html

# Cavity Band Pass Filter ZVBP-435-S+

*Typical Performance Data*

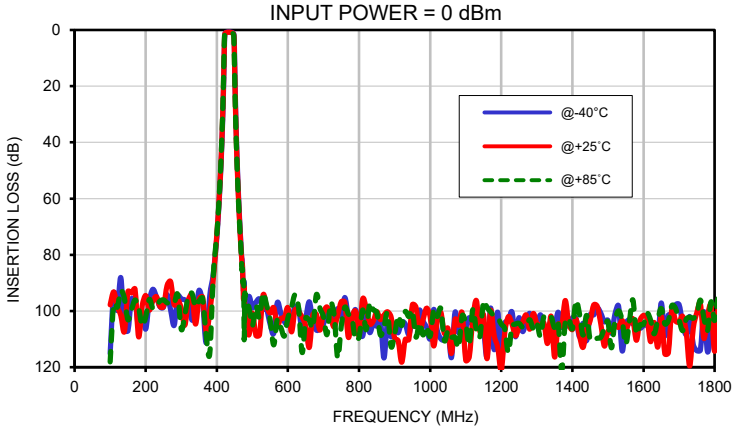
| FREQ. (MHz) | INSERTION LOSS (dB) | | | INPUT RETURN LOSS (dB) | | | OUTPUT RETURN LOSS (dB) | | |
|---|---|---|---|---|---|---|---|---|---|
| | @-40°C | @+25°C | @+85°C | @-40°C | @+25°C | @+85°C | @-40°C | @+25°C | @+85°C |
| 100 | 115.15 | 97.81 | 118.10 | 0.02 | 0.01 | 0.00 | 0.04 | 0.03 | 0.03 |
| 120 | 99.78 | 98.35 | 98.71 | 0.02 | 0.01 | 0.00 | 0.05 | 0.03 | 0.03 |
| 140 | 106.73 | 107.34 | 95.42 | 0.03 | 0.00 | 0.01 | 0.06 | 0.04 | 0.03 |
| 160 | 95.72 | 93.57 | 99.55 | 0.03 | 0.01 | 0.01 | 0.06 | 0.04 | 0.04 |
| 180 | 105.82 | 109.18 | 98.85 | 0.03 | 0.01 | 0.02 | 0.06 | 0.04 | 0.03 |
| 200 | 106.45 | 94.49 | 102.11 | 0.03 | 0.01 | 0.02 | 0.06 | 0.04 | 0.03 |
| 220 | 92.29 | 96.47 | 99.04 | 0.04 | 0.01 | 0.02 | 0.06 | 0.04 | 0.03 |
| 240 | 98.48 | 98.40 | 96.46 | 0.03 | 0.01 | 0.01 | 0.05 | 0.03 | 0.03 |
| 260 | 94.14 | 90.98 | 97.06 | 0.04 | 0.01 | 0.01 | 0.05 | 0.03 | 0.03 |
| 280 | 105.12 | 97.74 | 97.38 | 0.03 | 0.01 | 0.01 | 0.05 | 0.03 | 0.02 |
| 300 | 95.72 | 99.13 | 106.54 | 0.03 | 0.02 | 0.02 | 0.05 | 0.03 | 0.02 |
| 320 | 97.23 | 96.17 | 94.38 | 0.04 | 0.02 | 0.02 | 0.04 | 0.02 | 0.02 |
| 340 | 101.36 | 104.67 | 98.45 | 0.03 | 0.02 | 0.01 | 0.04 | 0.03 | 0.02 |
| 360 | 96.87 | 95.08 | 95.44 | 0.03 | 0.01 | 0.00 | 0.04 | 0.02 | 0.01 |
| 380 | 94.71 | 100.69 | 115.31 | 0.02 | 0.00 | 0.01 | 0.03 | 0.01 | 0.00 |
| 400 | 73.95 | 72.77 | 72.73 | 0.02 | 0.04 | 0.04 | 0.00 | 0.02 | 0.04 |
| 405 | 64.37 | 63.59 | 63.13 | 0.04 | 0.06 | 0.07 | 0.02 | 0.05 | 0.06 |
| 410 | 52.76 | 51.78 | 51.09 | 0.08 | 0.11 | 0.12 | 0.06 | 0.09 | 0.11 |
| 412 | 47.34 | 46.06 | 45.41 | 0.11 | 0.14 | 0.16 | 0.08 | 0.12 | 0.14 |
| 415 | 37.65 | 36.16 | 35.27 | 0.18 | 0.23 | 0.26 | 0.14 | 0.20 | 0.23 |
| 416 | 33.92 | 32.31 | 31.31 | 0.22 | 0.28 | 0.32 | 0.17 | 0.24 | 0.28 |
| 417 | 29.84 | 28.07 | 26.96 | 0.28 | 0.35 | 0.40 | 0.22 | 0.31 | 0.35 |
| 419 | 20.23 | 18.07 | 16.60 | 0.53 | 0.69 | 0.84 | 0.43 | 0.62 | 0.76 |
| 420 | 14.46 | 12.10 | 10.43 | 0.90 | 1.28 | 1.69 | 0.76 | 1.17 | 1.58 |
| 421 | 8.09 | 5.92 | 4.50 | 2.15 | 3.48 | 5.16 | 1.93 | 3.30 | 4.99 |
| 422 | 2.83 | 2.04 | 1.73 | 7.77 | 12.63 | 19.90 | 7.27 | 12.18 | 19.50 |
| 425 | 0.94 | 0.99 | 1.05 | 20.43 | 26.90 | 30.22 | 18.44 | 23.38 | 23.71 |
| 428 | 0.82 | 0.87 | 0.95 | 17.59 | 19.75 | 19.59 | 16.87 | 19.22 | 18.43 |
| 430 | 0.73 | 0.79 | 0.87 | 23.85 | 33.67 | 26.74 | 20.78 | 25.82 | 22.06 |
| 432 | 0.72 | 0.80 | 0.88 | 19.93 | 21.20 | 19.80 | 19.11 | 20.97 | 19.51 |
| 435 | 0.69 | 0.77 | 0.84 | 22.43 | 28.19 | 28.16 | 24.11 | 39.83 | 46.84 |
| 438 | 0.75 | 0.86 | 0.94 | 18.92 | 18.19 | 17.54 | 19.00 | 18.46 | 17.97 |
| 440 | 0.81 | 0.88 | 0.98 | 16.81 | 19.59 | 18.00 | 17.63 | 21.58 | 20.07 |
| 442 | 0.83 | 0.95 | 1.06 | 18.40 | 19.02 | 17.88 | 20.64 | 21.06 | 19.71 |
| 445 | 0.94 | 1.12 | 1.24 | 32.93 | 36.88 | 32.65 | 27.40 | 23.85 | 23.87 |
| 448 | 1.52 | 2.10 | 3.01 | 25.03 | 16.94 | 10.49 | 28.44 | 16.94 | 10.10 |
| 449 | 3.63 | 5.90 | 8.14 | 6.77 | 4.14 | 2.87 | 6.68 | 4.03 | 2.77 |
| 450 | 9.74 | 12.83 | 15.08 | 1.85 | 1.39 | 1.16 | 1.84 | 1.33 | 1.13 |
| 452 | 22.89 | 25.49 | 27.15 | 0.47 | 0.48 | 0.46 | 0.49 | 0.46 | 0.47 |
| 453 | 28.37 | 30.75 | 32.22 | 0.32 | 0.35 | 0.35 | 0.34 | 0.34 | 0.36 |
| 455 | 37.78 | 39.80 | 41.00 | 0.19 | 0.22 | 0.23 | 0.20 | 0.21 | 0.24 |
| 458 | 49.27 | 51.04 | 51.96 | 0.10 | 0.13 | 0.14 | 0.10 | 0.12 | 0.15 |
| 460 | 55.83 | 57.38 | 58.23 | 0.06 | 0.10 | 0.10 | 0.07 | 0.09 | 0.12 |
| 470 | 81.22 | 81.32 | 84.15 | 0.00 | 0.03 | 0.03 | 0.01 | 0.02 | 0.04 |
| 500 | 98.88 | 100.72 | 105.23 | 0.03 | 0.00 | 0.01 | 0.04 | 0.01 | 0.00 |
| 520 | 95.72 | 108.47 | 102.33 | 0.03 | 0.00 | 0.00 | 0.04 | 0.01 | 0.00 |
| 540 | 99.44 | 98.53 | 97.94 | 0.03 | 0.01 | 0.00 | 0.04 | 0.01 | 0.00 |
| 560 | 107.96 | 98.82 | 112.08 | 0.03 | 0.01 | 0.00 | 0.04 | 0.01 | 0.00 |
| 580 | 100.63 | 102.65 | 105.84 | 0.03 | 0.01 | 0.00 | 0.04 | 0.01 | 0.00 |
| 600 | 105.05 | 98.83 | 102.45 | 0.03 | 0.01 | 0.00 | 0.04 | 0.01 | 0.00 |
| 700 | 104.65 | 100.49 | 102.05 | 0.03 | 0.00 | 0.00 | 0.04 | 0.01 | 0.00 |
| 800 | 105.96 | 108.76 | 109.35 | 0.03 | 0.01 | 0.01 | 0.04 | 0.00 | 0.01 |
| 900 | 106.06 | 109.62 | 108.34 | 0.03 | 0.02 | 0.02 | 0.03 | 0.00 | 0.02 |
| 1000 | 109.85 | 102.02 | 108.96 | 0.04 | 0.01 | 0.01 | 0.03 | 0.00 | 0.02 |
| 1100 | 105.75 | 117.50 | 104.13 | 0.02 | 0.03 | 0.03 | 0.02 | 0.02 | 0.04 |
| 1200 | 118.22 | 121.09 | 104.69 | 0.02 | 0.04 | 0.05 | 0.02 | 0.02 | 0.05 |
| 1300 | 105.05 | 104.45 | 104.21 | 0.02 | 0.04 | 0.05 | 0.02 | 0.02 | 0.05 |
| 1400 | 102.44 | 106.64 | 106.31 | 0.01 | 0.05 | 0.07 | 0.01 | 0.04 | 0.07 |
| 1500 | 103.29 | 107.20 | 103.83 | 0.01 | 0.05 | 0.07 | 0.01 | 0.04 | 0.07 |
| 1750 | 114.13 | 100.62 | 101.02 | 0.01 | 0.08 | 0.11 | 0.01 | 0.07 | 0.11 |

## Typical Performance Data

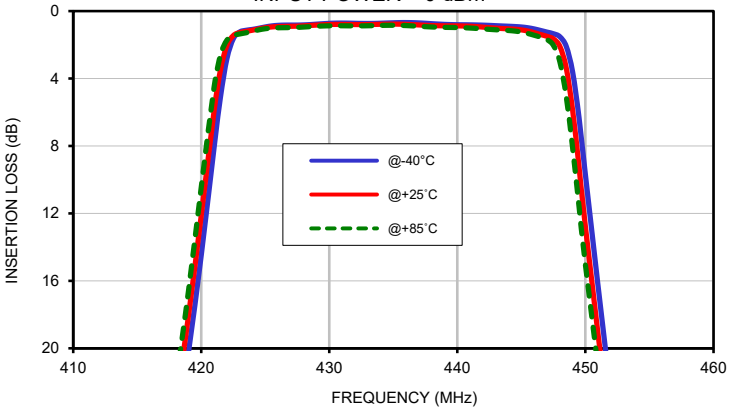
| FREQ. | GROUP DELAY | | |
|---|---|---|---|
| (MHz) | (nsec) | | |
| | @-40°C | @+25°C | @+85°C |
| 425.0 | 101.46 | 96.80 | 93.57 |
| 425.5 | 95.68 | 91.25 | 88.35 |
| 426.0 | 90.11 | 86.40 | 84.09 |
| 426.5 | 85.39 | 82.55 | 80.83 |
| 427.0 | 81.76 | 79.61 | 78.30 |
| 427.5 | 78.99 | 77.28 | 76.24 |
| 428.0 | 76.77 | 75.36 | 74.48 |
| 428.5 | 74.91 | 73.72 | 72.96 |
| 429.0 | 73.32 | 72.30 | 71.65 |
| 429.5 | 71.94 | 71.10 | 70.53 |
| 430.0 | 70.77 | 70.07 | 69.59 |
| 430.5 | 69.79 | 69.22 | 68.82 |
| 431.0 | 68.96 | 68.50 | 68.18 |
| 431.5 | 68.27 | 67.91 | 67.66 |
| 432.0 | 67.69 | 67.43 | 67.23 |
| 432.5 | 67.22 | 67.04 | 66.90 |
| 433.0 | 66.85 | 66.73 | 66.64 |
| 433.5 | 66.56 | 66.50 | 66.47 |
| 434.0 | 66.36 | 66.35 | 66.37 |
| 434.5 | 66.24 | 66.27 | 66.35 |
| 435.0 | 66.20 | 66.26 | 66.41 |
| 435.5 | 66.23 | 66.33 | 66.53 |
| 436.0 | 66.33 | 66.48 | 66.72 |
| 436.5 | 66.50 | 66.71 | 66.98 |
| 437.0 | 66.74 | 67.01 | 67.32 |
| 437.5 | 67.04 | 67.40 | 67.74 |
| 438.0 | 67.42 | 67.88 | 68.25 |
| 438.5 | 67.87 | 68.45 | 68.86 |
| 439.0 | 68.42 | 69.13 | 69.58 |
| 439.5 | 69.07 | 69.91 | 70.43 |
| 440.0 | 69.85 | 70.82 | 71.41 |
| 440.5 | 70.76 | 71.88 | 72.57 |
| 441.0 | 71.84 | 73.11 | 73.91 |
| 441.5 | 73.12 | 74.54 | 75.49 |
| 442.0 | 74.61 | 76.20 | 77.32 |
| 442.5 | 76.34 | 78.13 | 79.45 |
| 443.0 | 78.35 | 80.35 | 81.93 |
| 443.5 | 80.65 | 82.95 | 84.90 |
| 444.0 | 83.37 | 86.12 | 88.64 |
| 444.5 | 86.71 | 90.18 | 93.42 |
| 445.0 | 91.00 | 95.40 | 99.23 |

*Typical Performance Curves*

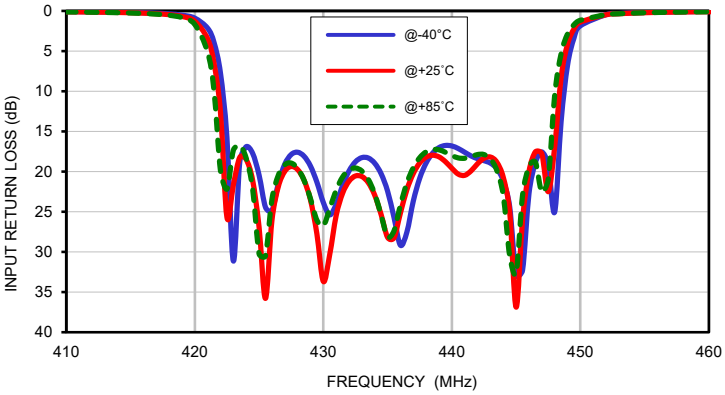
**INSERTION LOSS vs. TEMPERATURE**
INPUT POWER = 0 dBm



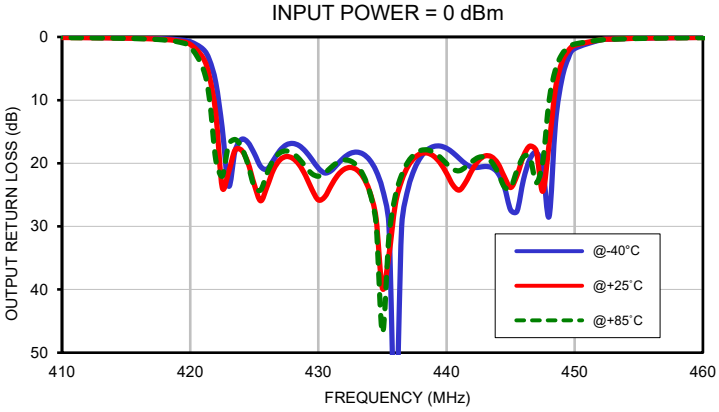

**INSERTION LOSS vs. TEMPERATURE (Zoomed)**
INPUT POWER = 0 dBm



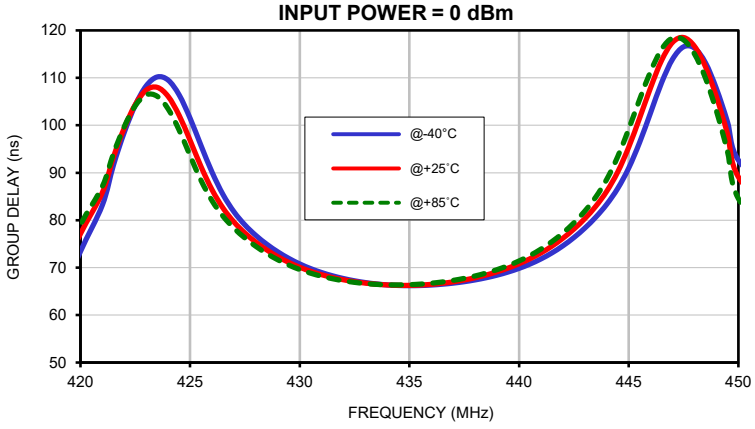

**INPUT RETURN LOSS vs. TEMPERATURE**
INPUT POWER = 0 dBm




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



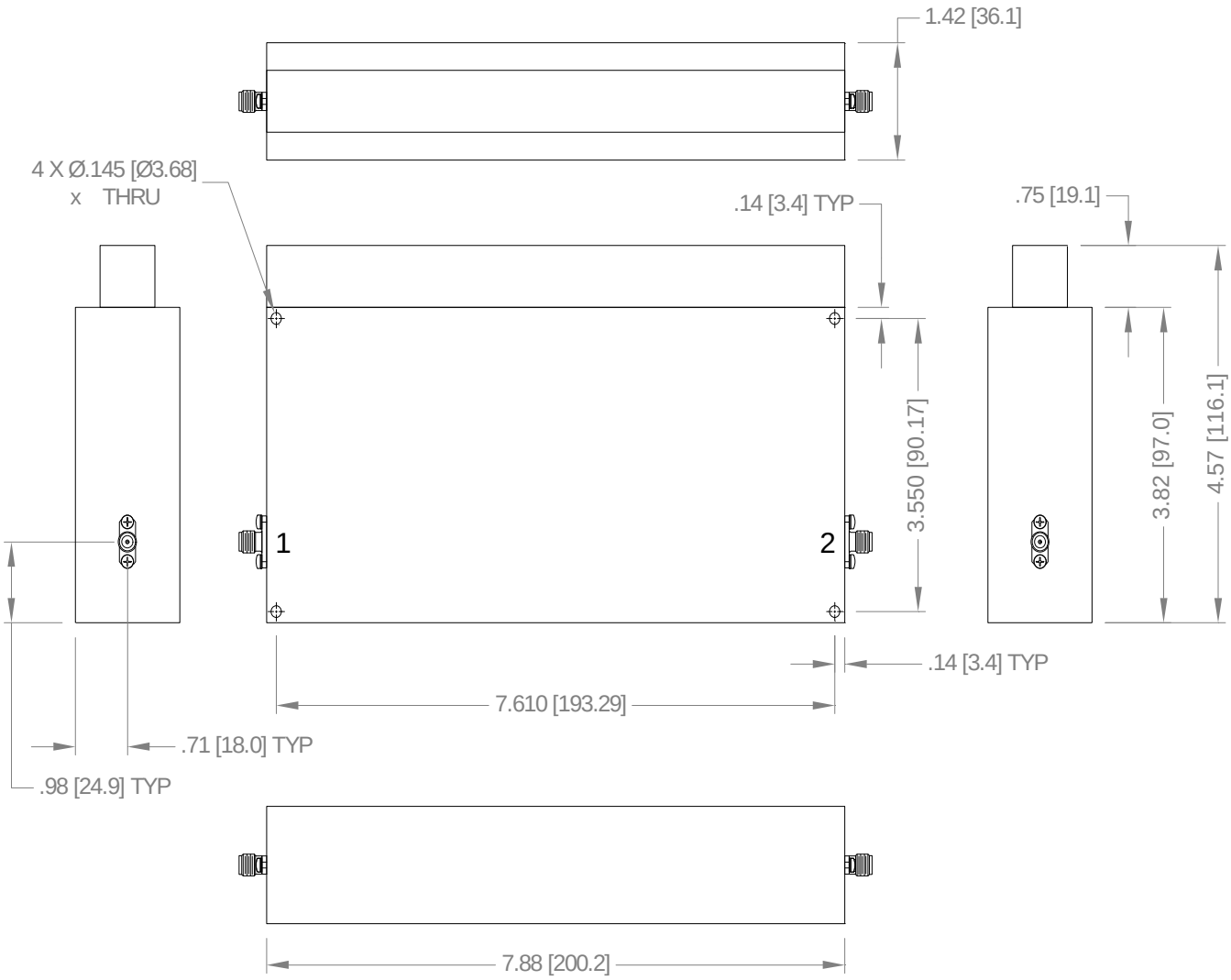

**GROUP DELAY vs. TEMPERATURE**
**INPUT POWER = 0 dBm**



# Case Style ZJ

## Outline Dimensions

**ZJ3545**




**Dimensions are in inches [mm]. Tolerances: 2 Pl. ± .100; 3 Pl. ± .015**

### Notes:

1. Case material: Aluminum alloy.
2. Case Finish: Powder coated.
3. Unit Weight: 880 grams.
4. Refer to the individual model data sheet for the type of connectors available.

Mini-Circuits

# Environmental Specifications ENV77T1

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 | -30° to 70°C<br>Ambient Environment | Individual Model Data Sheet |
| Storage Temperature | -30° to 70° 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 |