COAXIAL

# Fixed Attenuator

# FW-10A+

50Ω Up to 1.7 W DC to 12000 MHz 10 dB Attenuation

## THE BIG DEAL

- Wideband Coverage, DC to 12000 MHz
- Up to 1.7 Watt Power Handling
- Rugged Unibody Construction
- Off-the-shelf Availability
- Very Low Cost

*Generic photo used for illustration purposes only*

| | |
|---|---|
| **Model No.** | FW-10A+ |
| **Case Style** | FF704 |
| **Connectors** | SMA |

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

## APPLICATIONS

- Impedance Matching
- Signal Level Adjustment

## PRODUCT OVERVIEW

Mini-Circuits' FW-A series are fixed attenuators from DC to 12000 MHz frequency range with excellent flatness in attenuation. FW-A series is available with nominal attenuation of 1 to 20 dB. This attenuator series support testing and measurement application. Precise performance, excellent VSWR and rugged unibody construction makes the model ideal solution for systems requiring precise attenuation across very wide frequency range.

## KEY FEATURES

| Feature | Advantages |
|---|---|
| Rugged Construction | Excellent durability for a long lifetime of use |
| Up to 1.7 Watt Power Handling | Good power handling |
| Excellent VSWR | Well-matched for 50 Ω systems |
| Flat Attenuation | Good performance over the band |

REV. C
ECO-029367
FW-10A+
EDU4299
MCINU
260428

COAXIAL

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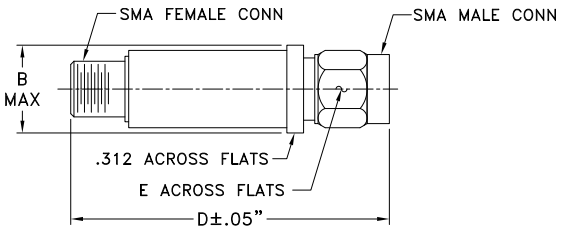
50Ω Up to 1.7 W DC to 12000 MHz 10 dB Attenuation

## MAXIMUM RATINGS

| | |
|---|---|
| Operating Temperature | -40°C to 85°C |
| Storage Temperature | -55°C to 100°C |

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

## OUTLINE DRAWING

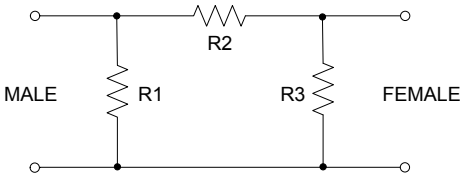



## OUTLINE DIMENSIONS (Inch / mm)

| B | D | E | wt |
|---|---|---|---|
| .410 | 1.43 | .312 | grams |
| 10.41 | 36.32 | 7.92 | 10.0 |

Note: Please refer to case style drawing for details

## ELECTRICAL SCHEMATIC



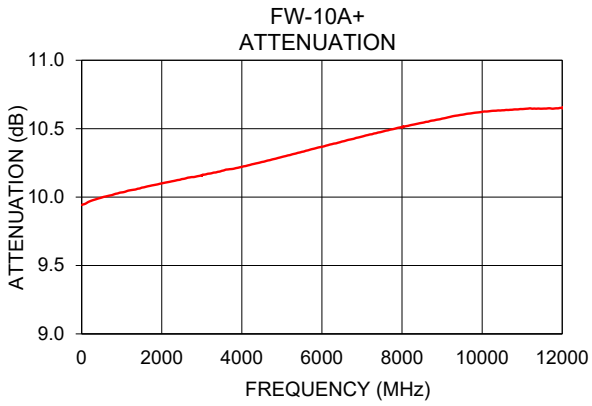

## ELECTRICAL SPECIFICATIONS AT 25°C

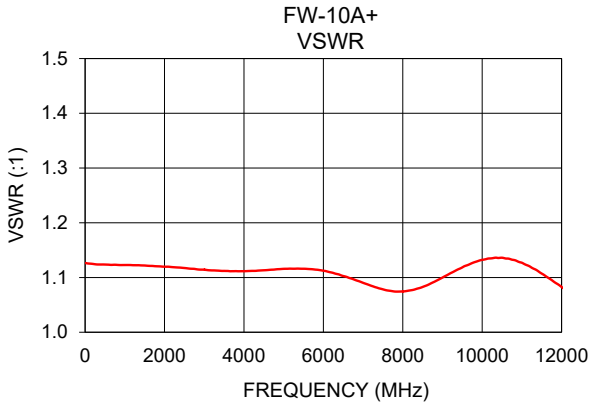
| Parameter | Condition (MHz) | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Frequency Range | | DC | - | 12000 | MHz |
| Attenuation[1] | 10 | - | 10 | - | dB |
| | DC - 3000 | 9.7 | 10.1 | 10.5 | |
| | 3000 - 8000 | 9.8 | 10.3 | 11.0 | |
| | 8000 - 12000 | 10.1 | 10.7 | 11.2 | |
| VSWR | DC - 3000 | - | 1.10 | 1.45 | :1 |
| | 3000 - 8000 | - | 1.15 | 1.55 | |
| | 8000 - 12000 | - | 1.20 | - | |
| Input Power[2] | DC - 12000 | - | - | 1.7 | W |

1. Attenuation varies by 0.3 dB max. over temperature.
2. Maximum RF power at 25°C is 1.7 W; Derate linearly to 1.0 W at 85°C

## TYPICAL PERFORMANCE DATA

| Frequency (MHz) | Attenuation (dB) | VSWR (:1) |
|---|---|---|
| 10 | 9.94 | 1.12 |
| 100 | 9.95 | 1.13 |
| 500 | 10.00 | 1.12 |
| 1000 | 10.03 | 1.12 |
| 2000 | 10.10 | 1.12 |
| 3000 | 10.16 | 1.11 |
| 5000 | 10.29 | 1.12 |
| 6000 | 10.37 | 1.11 |
| 8000 | 10.51 | 1.07 |
| 9000 | 10.57 | 1.10 |
| 9500 | 10.60 | 1.12 |
| 10000 | 10.62 | 1.13 |
| 10500 | 10.63 | 1.14 |
| 11000 | 10.64 | 1.13 |
| 12000 | 10.65 | 1.08 |




NOTES

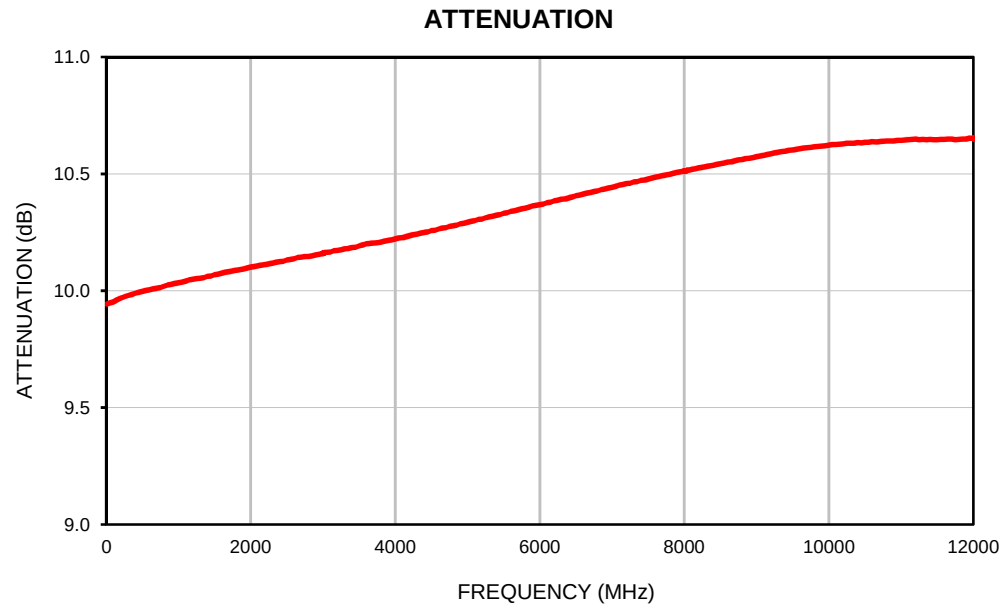
A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's 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

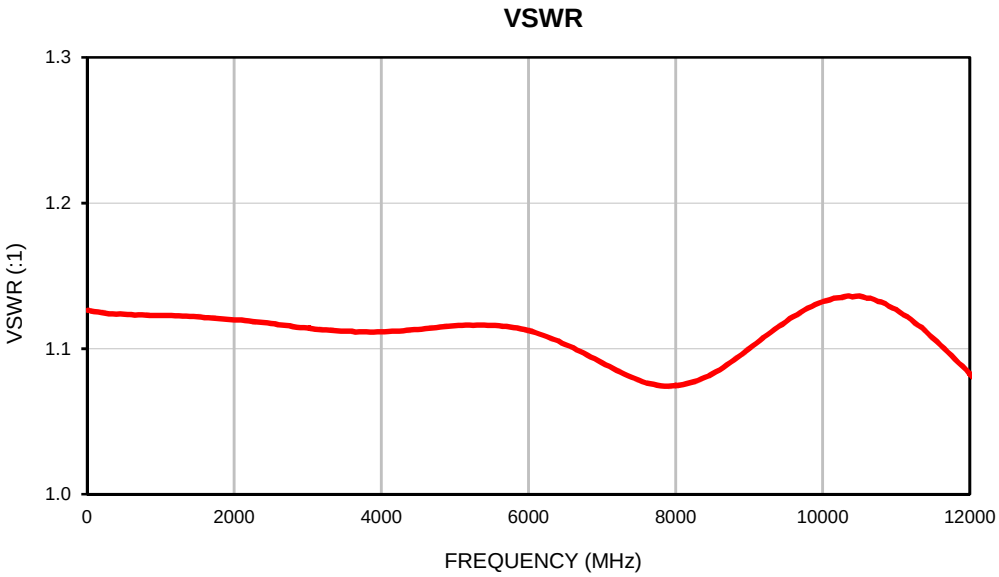
# Coaxial Fixed Attenuator FW-10A+

*Typical Performance Data*

| FREQ. (MHz) | ATTENUATION (dB) | VSWR (:1) |
|---|---|---|
| 10 | 9.94 | 1.13 |
| 20 | 9.94 | 1.13 |
| 50 | 9.95 | 1.13 |
| 100 | 9.95 | 1.13 |
| 200 | 9.97 | 1.12 |
| 300 | 9.98 | 1.12 |
| 400 | 9.99 | 1.12 |
| 500 | 10.00 | 1.12 |
| 600 | 10.00 | 1.12 |
| 700 | 10.01 | 1.12 |
| 800 | 10.02 | 1.12 |
| 900 | 10.03 | 1.12 |
| 1000 | 10.03 | 1.12 |
| 1200 | 10.05 | 1.12 |
| 1400 | 10.06 | 1.12 |
| 1600 | 10.07 | 1.12 |
| 1800 | 10.09 | 1.12 |
| 2000 | 10.10 | 1.12 |
| 2200 | 10.11 | 1.12 |
| 2400 | 10.12 | 1.12 |
| 2600 | 10.14 | 1.12 |
| 2800 | 10.15 | 1.12 |
| 3000 | 10.16 | 1.11 |
| 3200 | 10.17 | 1.11 |
| 3400 | 10.18 | 1.11 |
| 3600 | 10.20 | 1.11 |
| 3800 | 10.21 | 1.11 |
| 4000 | 10.22 | 1.11 |
| 4200 | 10.23 | 1.11 |
| 4400 | 10.25 | 1.11 |
| 4600 | 10.26 | 1.11 |
| 4800 | 10.28 | 1.11 |
| 5000 | 10.29 | 1.12 |
| 5200 | 10.31 | 1.12 |
| 5400 | 10.32 | 1.12 |
| 5600 | 10.34 | 1.12 |
| 5800 | 10.35 | 1.11 |
| 6000 | 10.37 | 1.11 |
| 6200 | 10.38 | 1.11 |
| 6400 | 10.40 | 1.11 |
| 6600 | 10.41 | 1.10 |
| 6800 | 10.43 | 1.10 |
| 7000 | 10.44 | 1.09 |
| 7200 | 10.46 | 1.09 |
| 7400 | 10.47 | 1.08 |
| 7600 | 10.49 | 1.08 |
| 7800 | 10.50 | 1.07 |
| 8000 | 10.51 | 1.07 |
| 8200 | 10.52 | 1.08 |
| 8400 | 10.54 | 1.08 |
| 8600 | 10.55 | 1.09 |
| 8800 | 10.56 | 1.09 |
| 9000 | 10.57 | 1.10 |
| 9200 | 10.59 | 1.11 |
| 9400 | 10.60 | 1.12 |
| 9600 | 10.61 | 1.12 |
| 10000 | 10.62 | 1.13 |
| 11000 | 10.64 | 1.13 |
| 11500 | 10.65 | 1.11 |
| 12000 | 10.65 | 1.08 |

*Typical Performance Curves*

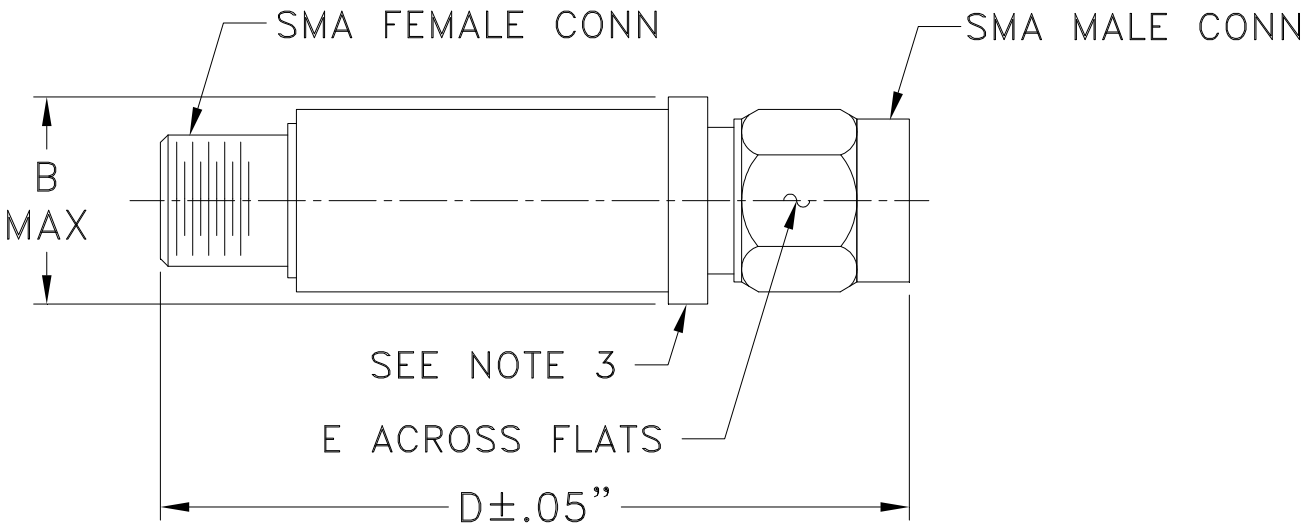


# Case Style FF

**FF704**

## Outline Dimensions




| CASE #. | A | B | C | D | E | WT GRAMS |
|---|---|---|---|---|---|---|
| FF704 | --<br>-- | .410<br>(10.41) | --<br>-- | 1.43<br>(36.32) | .312<br>(7.92) | 10.0 |

**Dimensions are in inches (mm). Tolerances: 2Pl. ± .04; 3Pl. ± .030**

**Notes:**

1. Case material: Stainless steel.
2. Case finish: Gold plated.
3. Round Flange may have .312 Across Flats in some models.



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Mini-Circuits

# Environmental Specifications ENV132

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<br>Ambient Environment | Individual Model Data Sheet |
| Storage Temperature | -55° to 100° C<br>Ambient Environment | Individual Model Data Sheet |
| Thermal Shock | -55° to 100°C, 5cycles | MIL-STD-202, Method 107, Condition A, 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 | 75g, 6ms , Half Sine, 3 shocks each direction 3 axes (total 18) | MIL-STD-202, Method 213, Condition B |


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