



COAXIAL

# Fixed Attenuator

## FW-A-SERIES

Mini-Circuits

50Ω Up to 2W DC to 12000 MHz

### THE BIG DEAL

- Wideband coverage, DC to 12000 MHz
- Up to 2 Watt rating
- Rugged unibody construction
- Off-the-shelf availability
- Very low cost

### APPLICATIONS

- Impedance matching
- Signal level adjustment



Generic photo used for illustration purposes only

<b>Model No.</b>	FW-A-SERIES
<b>Case Style</b>	FF704
<b>Connectors</b>	SMA

#### +RoHS Compliant

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

### 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 2 Watt rating	Good power handling
Excellent VSWR	Well-matched for 50 Ω systems
Flat attenuation	Good performance over the band.





COAXIAL

# Fixed Attenuator

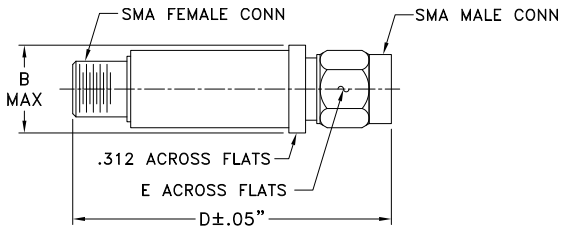
FW-20A+

## 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

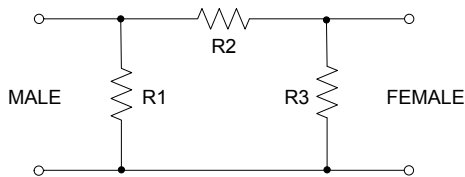


## OUTLINE DIMENSIONS (Inch/mm)

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

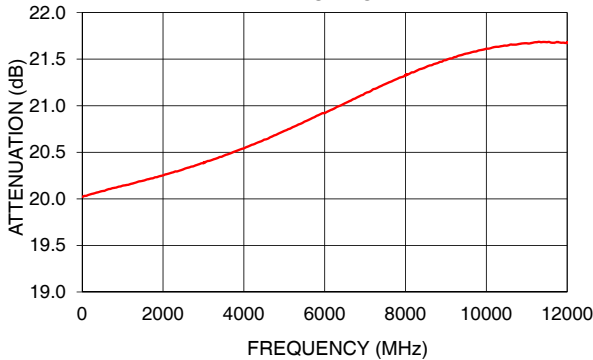
Parameter	Condition (MHz)	Min.	Typ.	Max.	Unit
Frequency Range		DC	-	12000	MHz
Attenuation <sup>1</sup>	10	-	20	-	dB
	DC - 3000	19.6	20.2	21	
	3000 - 8000	19.8	21	22	
VSWR	DC - 3000	-	1.10	1.45	:1
	3000 - 8000	-	1.10	1.55	
	8000 - 12000	-	1.20	-	
Input Power <sup>2</sup>	DC - 12000	-	-	0.8	W

- Attenuation varies by 0.3 dB max. over temperature.
- RF power at 25°C is 0.8W; Derate linearly to 0.6W at 85°C

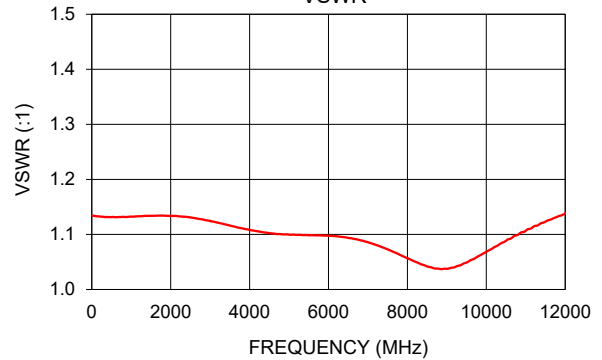
## TYPICAL PERFORMANCE DATA

Frequency (MHz)	Attenuation (dB)	VSWR (:1)
10	20.02	1.13
100	20.03	1.13
500	20.08	1.13
1000	20.14	1.13
2000	20.25	1.13
3000	20.38	1.12
5000	20.73	1.10
6000	20.92	1.10
8000	21.33	1.06
9000	21.49	1.04
9500	21.56	1.05
10000	21.61	1.07
10500	21.64	1.09
11000	21.67	1.11
12000	21.67	1.14

FW-20A+ ATTENUATION



FW-20A+ VSWR



- NOTES
- 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.
  - Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
  - 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)



# Coaxial Fixed Attenuator

# FW-20A+

## Typical Performance Data

FREQ.	ATTENUATION	VSWR
(MHz)	(dB)	(:1)
10	20.02	1.13
20	20.02	1.13
50	20.03	1.13
100	20.03	1.13
200	20.05	1.13
300	20.06	1.13
400	20.07	1.13
500	20.08	1.13
600	20.10	1.13
700	20.11	1.13
800	20.12	1.13
900	20.13	1.13
1000	20.14	1.13
1200	20.16	1.13
1400	20.19	1.13
1600	20.21	1.13
1800	20.23	1.13
2000	20.25	1.13
2200	20.28	1.13
2400	20.30	1.13
2600	20.33	1.13
2800	20.36	1.13
3000	20.38	1.12
3200	20.42	1.12
3400	20.45	1.12
3600	20.48	1.11
3800	20.51	1.11
4000	20.54	1.11
4200	20.58	1.11
4400	20.61	1.10
4600	20.65	1.10
4800	20.69	1.10
5000	20.73	1.10
5200	20.77	1.10
5400	20.81	1.10
5600	20.85	1.10
5800	20.89	1.10
6000	20.92	1.10
6200	20.96	1.10
6400	21.00	1.09
6600	21.05	1.09
6800	21.09	1.09
7000	21.13	1.09
7200	21.18	1.08
7400	21.21	1.08
7600	21.25	1.07
7800	21.29	1.06
8000	21.33	1.06
8200	21.36	1.05
8400	21.40	1.04
8600	21.43	1.04
8800	21.46	1.04
9000	21.49	1.04
9200	21.52	1.04
9400	21.55	1.05
9600	21.57	1.05
10000	21.61	1.07
11000	21.67	1.11
11500	21.68	1.12
12000	21.67	1.14



ISO 9001 ISO 14001 AS 9100 CERTIFIED

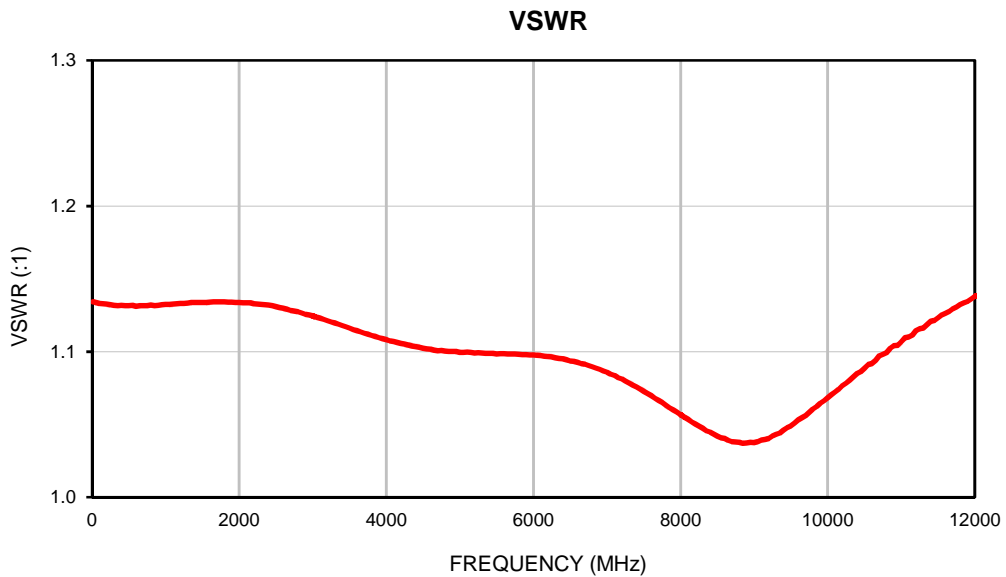
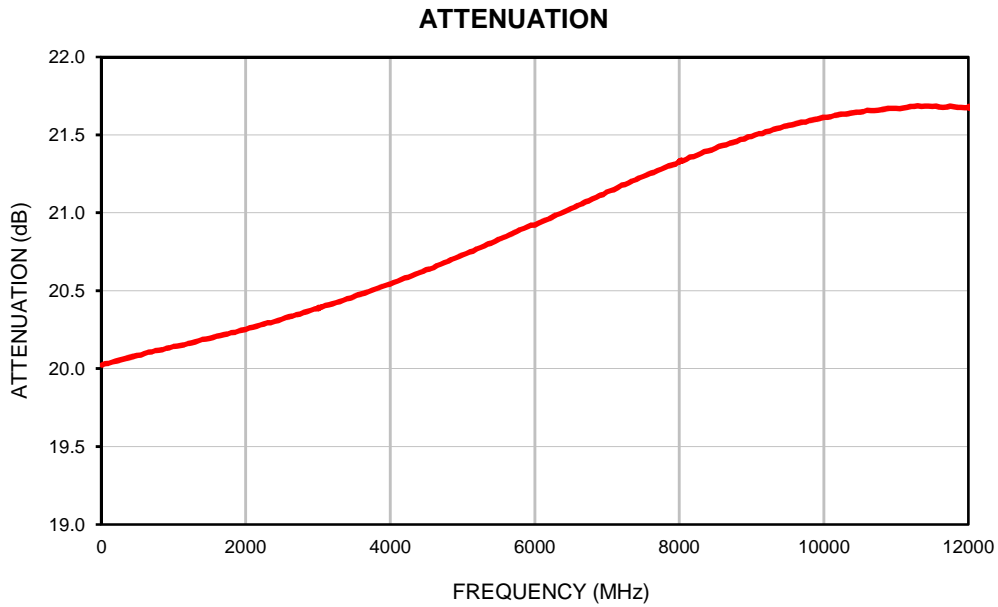


P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 • Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site  
The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: [www.minicircuits.com](http://www.minicircuits.com)



IF/RF MICROWAVE COMPONENTS

## Typical Performance Curves

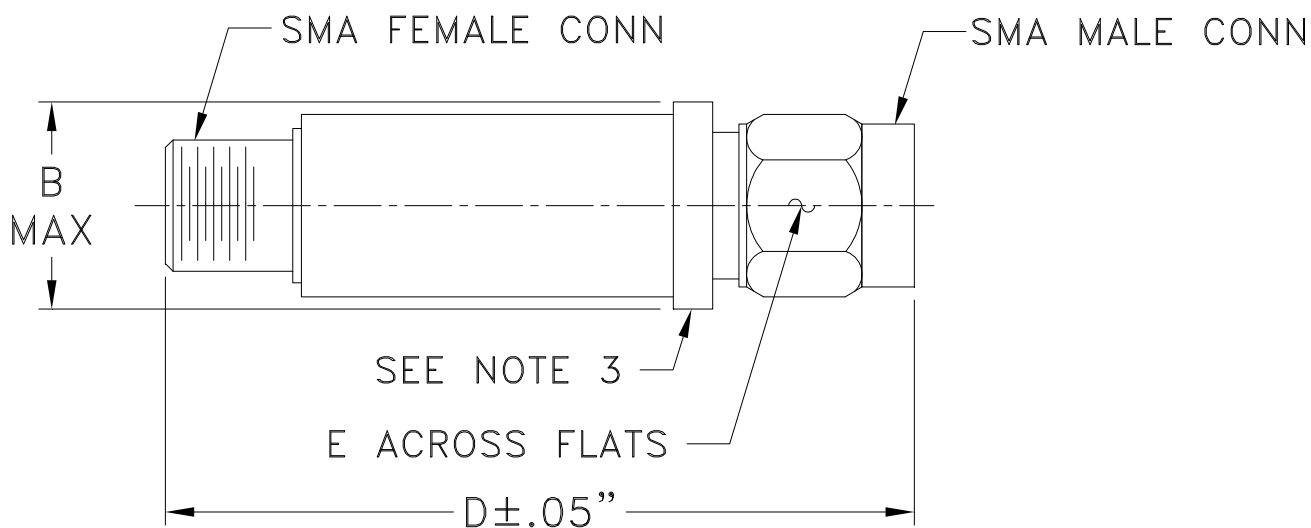


# Case Style

# FF

## FF704

### Outline Dimensions



CASE #.	A	B	C	D	E	WT GRAMS
FF704	--	.410 (10.41)	--	1.43 (36.32)	.312 (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.

**Mini-Circuits**<sup>®</sup>  
ISO 9001 ISO 14001 CERTIFIED

ALL NEW  
minicircuits.com

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.

<b>Specification</b>	<b>Test/Inspection Condition</b>	<b>Reference/Spec</b>
Operating Temperature	-40° to 85° C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C 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