Flat Gain

Wideband Amplifier

ZVA-443X+

50Ω 0.050 to 43500 MHz

The Big Deal

- Excellent gain flatness, ±1.5 dB
- Single +5V supply with 80mA typ. current
- Small package

Case Style: AV2578

Product Overview

Mini-Circuits' ZVA-443X+ is a coaxial, ultra-wideband amplifier offering flat gain across an extremely wide frequency range from 50 kHz to 43.5 GHz. This model operates on a single +5V supply with just 80mA typical current consumption, and has exceptional noise figure performance of 4 dB typ. from 500 MHz to 26 GHz and less than 5 dB typ. to 43.5 GHz. The amplifier comes in a rugged, compact case (0.84 x 0.96 x 0.36") with 2.4mm RF connectors.

Key Features

Feature	Advantages
Ultra-wideband, 50 kHz to 43.5 GHz	Enables a single amplifier to be used in a wide range of applications from 5G to satellite, military systems, fiber-optic equipment, test and measurement, and more.
Excellent gain flatness, ±1.5 dB across full frequency range	Provides consistent performance across its operating frequency, minimizing the need for external equalizing networks in wideband applications.
Single +5V supply	Avoids the requirement for dual supply voltage common among other amplifiers of similar bandwidth, simplifying system design, saving cost and space.
Small package, 0.84 x 0.96 x 0.36"	Saves space in tight system layouts.

Flat Gain

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Features

- Excellent gain flatness, ±1.5 dB typ.
- Uses a single +5V power supply

Applications

- very wideband test instrumentation
- lab use
- 5G systems
- optical communications

Case Style: AV2578

Connectors	Model No.
2.4mm	ZVA-443X+

+RoHS Compliant

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

Electrical Specifications at 25°C, Vdd=+5.0V, unless noted

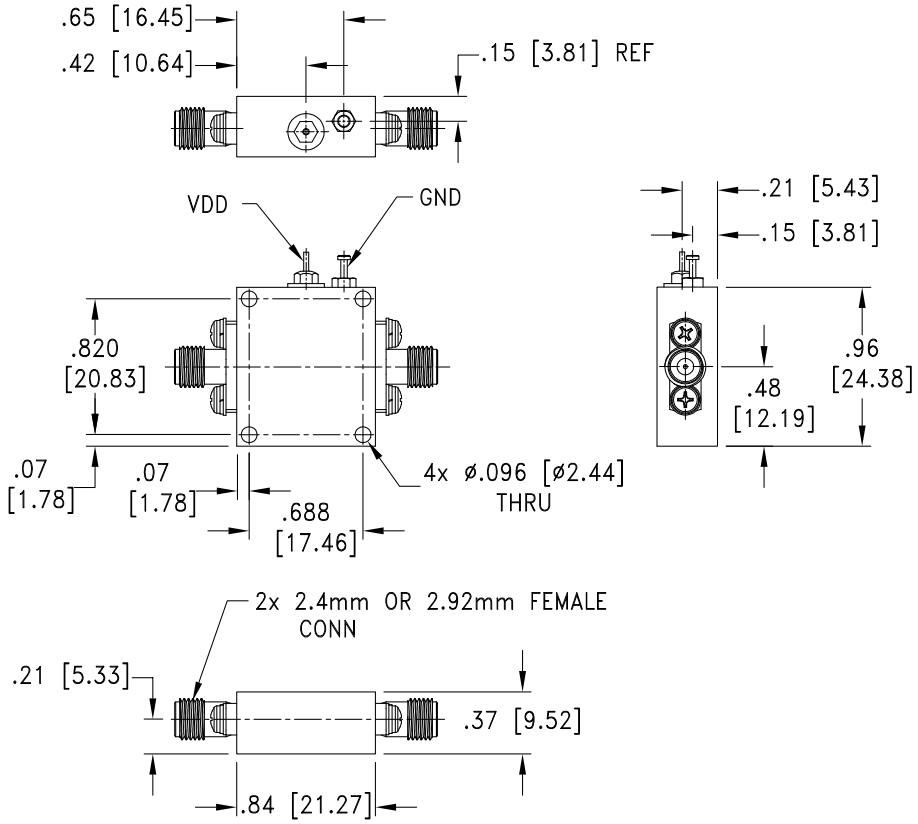
Parameter	Condition (MHz)	Min.	Typ.	Max.	Units
Frequency Range		0.05		43500	MHz
Gain[1]	50 - 7500	10.7	12.0	—	dB
	7500 - 15000	10.0	11.5	—	
	15000 - 30000	8.2	11.0	—	
	30000 - 43500	8.0	10.5	—	
Noise Figure[2]	50 - 500	—	6.0	—	dB
	500 - 2000	—	4.5	—	
	2000 - 20000	—	3.5	—	
	20000 - 26500	—	4.5	—	
Input Return Loss	50 - 5000	11.0	14.0	—	dB
	5000 - 18000	8.5	12.0	—	
	18000 - 43500	7.0	10.0	—	
Output Return Loss	50 - 18000	9.0	12.0	—	dB
	18000 - 43500	7.0	9.5	—	
Output Power at 1dB Compression	50 - 22000	—	12.0	—	dBm
	22000 - 43500	—	10.0	—	
Output IP3	50 - 43500	—	22.0	—	dBm
Device Operating Current		50.0	80.0	150.0	mA

1. This model is measured down to 50 MHz but the performance is usable to 50 KHz.
2. The Noise Figure is measured up to 26.5 GHz but the performance is usable to 43.5 GHz.

Absolute Maximum Ratings

Parameter	Ratings
Operating Temperature (baseplate)	-10°C to 85°C
Storage Temperature	-55°C to 100°C
Total Power Dissipation	0.75W
Input Power (CW), V_{dd}=5V	+4 dBm
DC Voltage	6V

Outline Drawing



Weight: 45 grams

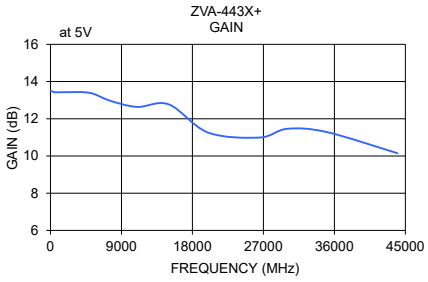
Dimensions are in inches (mm). Tolerances: 2 Pl. ±.03; 3 Pl. ±.015

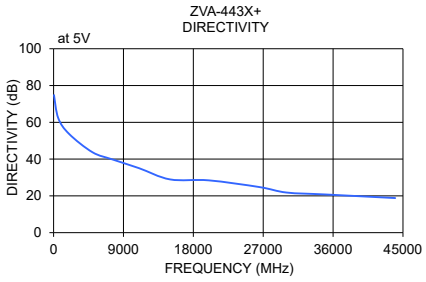
Coaxial Connections

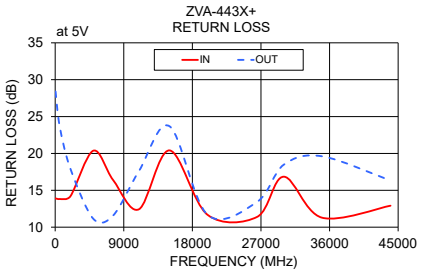
J1	RF IN (DC BLOCKED)
J2	RF OUT (DC BLOCKED)
J3	VDD
J4	GROUND

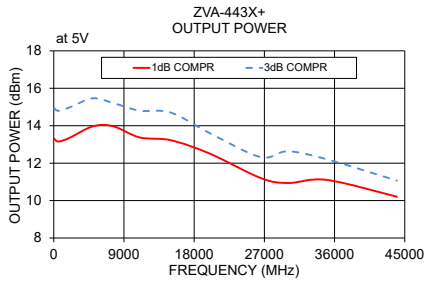
Typical Performance Data

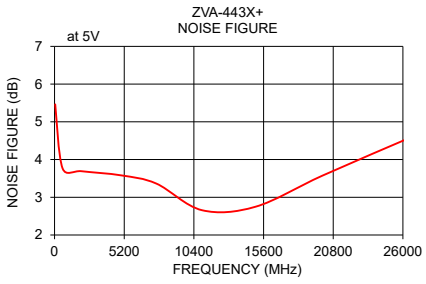
FREQUENCY (MHz)	GAIN (dB)	DIRECTIVITY (dB)	RETURN LOSS (dB)		POUT at 1 dB COMPR. (dBm)	POUT at 3 dB COMPR. (dBm)	NOISE FIGURE (dB)	IP3 (dBm)
			IN	OUT				
50	13.50	74.80	13.90	28.40	13.31	14.93	5.46	23.20
600	13.42	62.25	13.82	23.63	13.15	14.80	3.77	23.50
2000	13.43	53.67	14.19	17.92	13.35	14.97	3.69	24.09
5000	13.39	43.74	20.37	11.14	13.97	15.46	3.58	25.08
7600	12.96	39.78	16.39	11.57	13.97	15.21	3.36	25.57
11000	12.64	35.07	12.43	17.62	13.37	14.80	2.66	24.84
15000	12.77	28.95	20.41	23.69	13.22	14.70	2.75	24.62
20000	11.26	28.43	11.67	11.67	12.51	13.60	3.57	24.53
26500	10.99	24.80	11.40	13.44	11.21	12.33	4.57	25.53
30000	11.46	21.81	16.84	18.48	10.94	12.63		23.31
35000	11.29	20.76	11.29	19.62	11.10	12.21		24.40
44000	10.15	18.81	12.91	16.32	10.21	11.07		24.67

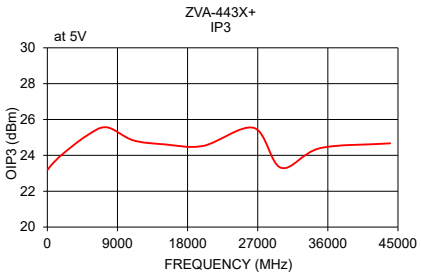












Additional Notes

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.

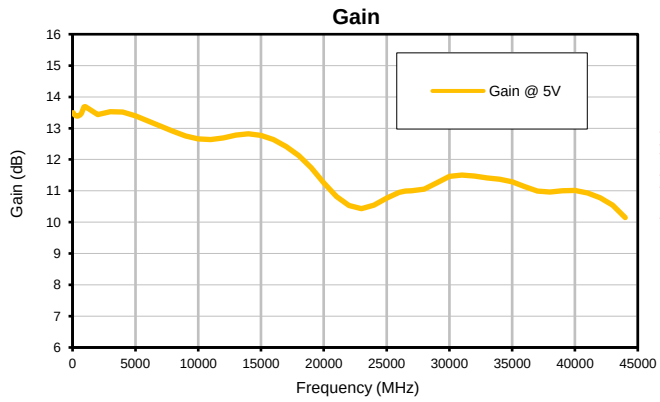
C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/MCLStore/terms.jsp

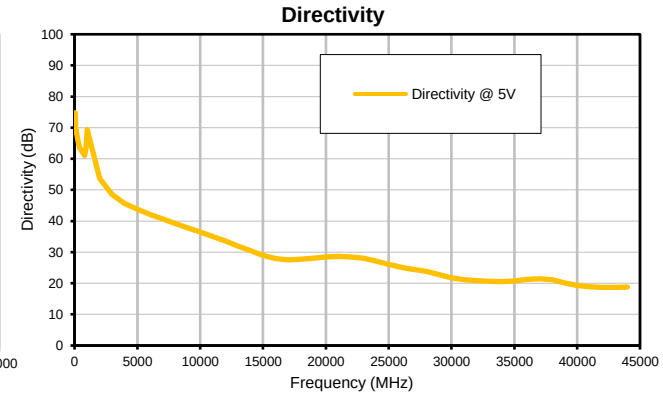
Widband Amplifier ZVA-443X+

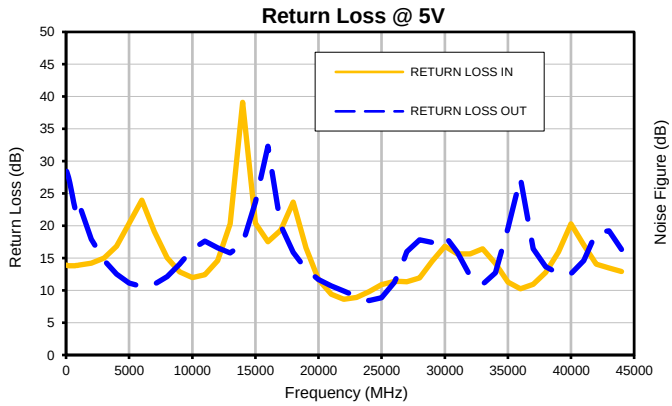
Typical Performance Data

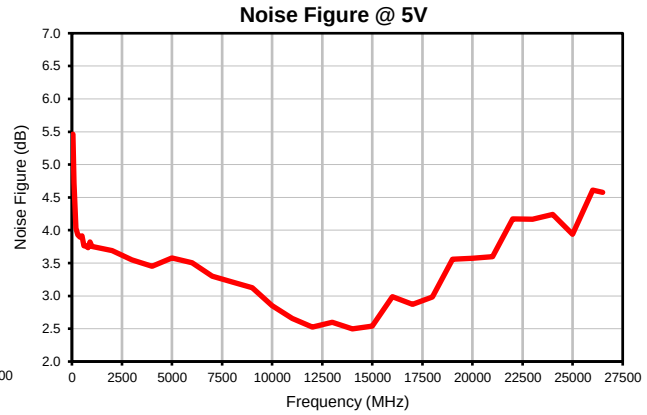
FREQUENCY (MHz)	GAIN (dB) 5V	DIRECTIVITY (dB) 5V	RETURN LOSS (dB) IN 5V	RETURN LOSS (dB) OUT 5V	NOISE FIGURE (dB) 5V	POUT @ 1 dB COMPRESSION (dBm) 5V	POUT @ 3 dB COMPRESSION (dBm) 5V	OUTPUT IP3 (dBm) 5V
50	13.50	74.80	13.90	28.40	5.46	13.31	14.93	23.20
100	13.46	70.05	13.87	28.11	4.72	13.17	14.82	23.40
200	13.41	67.50	13.84	27.47	4.03	13.05	14.78	22.97
300	13.39	65.35	13.83	26.63	3.93	13.05	14.78	22.97
400	13.39	63.54	13.83	25.66	3.89	13.13	14.79	23.36
500	13.40	62.98	13.82	24.65	3.92	13.13	14.79	23.36
600	13.42	62.25	13.82	23.63	3.77	13.15	14.80	23.50
700	13.48	61.63	13.83	22.74	3.76	13.15	14.80	23.50
800	13.58	61.03	13.84	22.14	3.73	13.26	14.94	23.69
900	13.68	63.31	13.88	22.31	3.82	13.26	14.94	23.69
1000	13.69	69.33	13.92	23.46	3.75	13.42	15.13	24.01
2000	13.43	53.67	14.19	17.92	3.69	13.35	14.97	24.09
3000	13.53	48.52	15.00	14.63	3.55	13.64	15.23	24.39
4000	13.51	45.59	16.84	12.55	3.45	13.81	15.35	24.91
5000	13.39	43.74	20.37	11.14	3.58	13.97	15.46	25.08
6000	13.23	42.15	23.97	10.61	3.51	13.87	15.30	25.23
7000	13.07	40.64	19.09	10.96	3.30	13.93	15.22	25.55
8000	12.90	39.21	15.06	12.14	3.21	14.00	15.22	25.65
9000	12.75	37.78	12.87	14.05	3.13	13.77	15.02	25.69
10000	12.65	36.43	11.99	16.40	2.85	13.35	14.73	25.15
11000	12.64	35.07	12.43	17.62	2.66	13.37	14.80	24.84
12000	12.69	33.60	14.61	16.60	2.52	13.10	14.62	24.56
13000	12.78	31.99	20.32	15.77	2.60	13.19	14.74	24.81
14000	12.82	30.47	39.11	17.21	2.50	13.25	14.77	24.51
15000	12.77	28.95	20.41	23.69	2.54	13.22	14.70	24.62
16000	12.64	27.95	17.50	32.31	2.99	12.99	14.43	25.22
17000	12.42	27.55	19.32	20.06	2.87	12.96	14.42	24.56
18000	12.13	27.68	23.65	15.89	2.98	12.98	14.30	24.46
19000	11.74	28.04	16.57	13.27	3.56	12.76	13.93	24.75
20000	11.26	28.43	11.67	11.67	3.57	12.51	13.60	24.53
21000	10.82	28.63	9.40	10.69	3.60	12.17	13.16	24.20
22000	10.53	28.50	8.63	9.92	4.17	11.51	12.66	23.34
23000	10.44	28.02	8.91	9.05	4.17	11.11	12.43	22.97
24000	10.55	27.16	9.82	8.42	4.24	10.84	12.11	22.58
25000	10.77	26.12	10.88	8.85	3.94	11.17	12.42	23.83
26000	10.95	25.17	11.40	11.25	4.61	11.07	12.22	25.12
26500	10.99	24.80	11.40	13.44	4.57	10.88	12.15	25.25
27000	11.00	24.49	11.33	15.98	--	10.92	12.22	25.27
28000	11.05	23.78	11.93	17.80	--	11.03	12.48	24.59
29000	11.26	22.78	14.50	17.42	--	10.90	12.46	24.45
30000	11.46	21.81	16.84	18.48	--	10.94	12.63	23.31
31000	11.51	21.19	15.65	15.88	--	10.76	12.56	22.65
32000	11.47	20.82	15.66	12.22	--	10.83	12.72	22.40
33000	11.42	20.62	16.42	10.94	--	11.09	12.65	23.09
34000	11.37	20.55	14.15	12.74	--	11.29	12.49	23.45
35000	11.29	20.76	11.29	19.62	--	11.10	12.21	24.40
36000	11.14	21.23	10.25	27.38	--	10.69	11.88	25.96
37000	11.00	21.51	10.93	16.42	--	11.31	12.40	24.37
38000	10.97	21.10	12.79	13.65	--	11.19	12.39	23.99
39000	11.01	20.14	15.92	12.61	--	10.87	12.04	23.53
40000	11.01	19.29	20.32	12.59	--	10.82	11.95	22.35
41000	10.93	18.87	17.04	14.59	--	11.20	12.06	24.24
42000	10.78	18.73	14.06	18.97	--	10.80	11.90	27.52
43000	10.54	18.70	13.48	19.22	--	10.70	11.53	24.45
44000	10.15	18.81	12.91	16.32	--	10.21	11.07	24.67

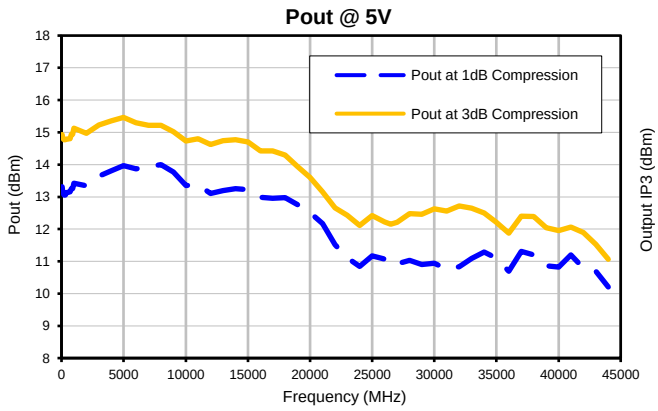
Typical Performance Curves

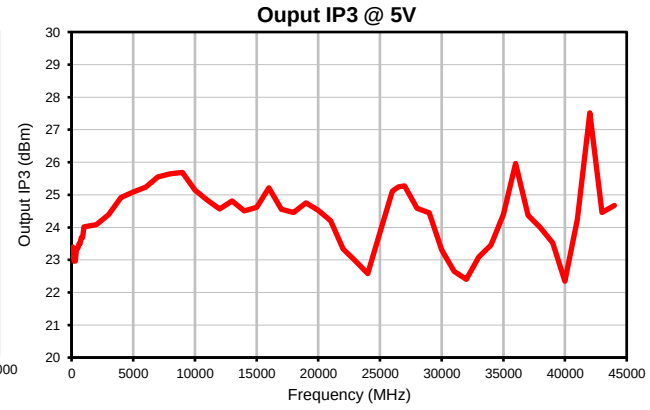






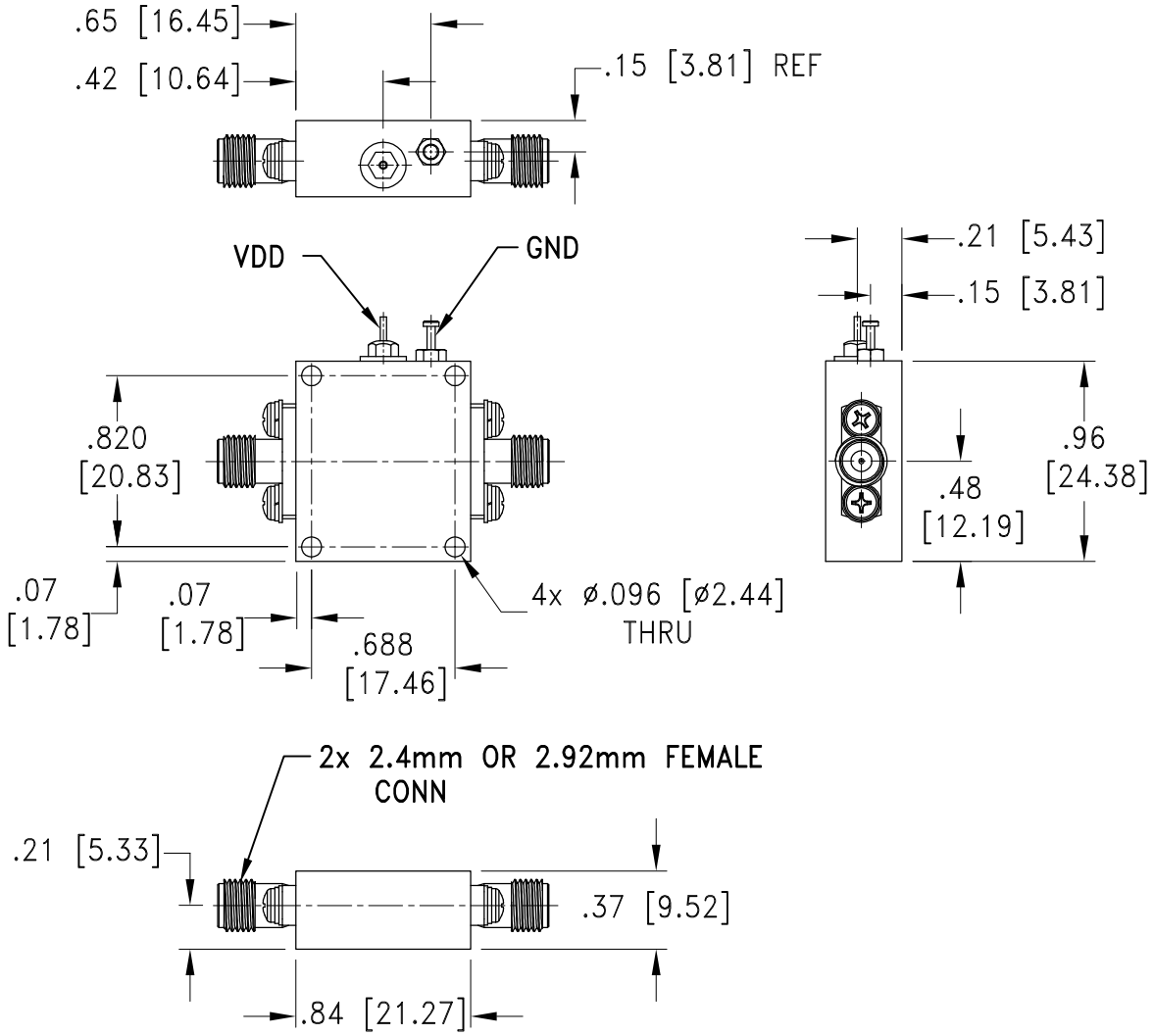






Case Style AV

Outline Dimensions AV2578



Weight: 45 grams

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

Notes:

1. Case material: Brass alloy
2. Case finish: Gold plating 20 µinches, over Nickel plating 100 µinches .
3. Refer to the individual Model Data Sheet for all Type of Connectors available.

Mini-Circuits

Environmental Specifications ENV96

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	-10° to +85° C Case Temperature or Ambient Temperature	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet