FLAT GAIN

Wideband Amplifier

ZVA-403GX+

50Ω 50 KHz to 40 GHz

THE BIG DEAL

- Excellent gain flatness, ±1.5 dB
- Single +5V supply with 100mA typ. current
- Small package

Generic photo used for illustration purposes only

Model No.	ZVA-403GX+
Case Style	AV2578
Connectors	2.9mm Female

+RoHS Compliant

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

APPLICATIONS

- Fiber optics
- Very wideband test instrumentation
- Lab use
- 5G systems

PRODUCT OVERVIEW

Mini-Circuits' ZVA-403GX+ is a coaxial, ultra-wideband amplifier offering flat gain across an extremely wide frequency range from 50 kHz to 40 GHz. This model operates on a single +5V supply with just 100mA typical current consumption, and is capable of delivering up to 20mW output power at 1 dB compression. The amplifier comes in a rugged, compact case (0.84 x 0.96 x 0.36") with 2.92mm RF connectors.

KEY FEATURES

Feature	Advantages
Ultra-wideband, 50 kHz to 40 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.

REV. D
ECO-012215
ZVA-403GX+
MCL NY
201022

ELECTRICAL SPECIFICATIONS AT 25°C, VDD=+5.0V, UNLESS NOTED OTHERWISE

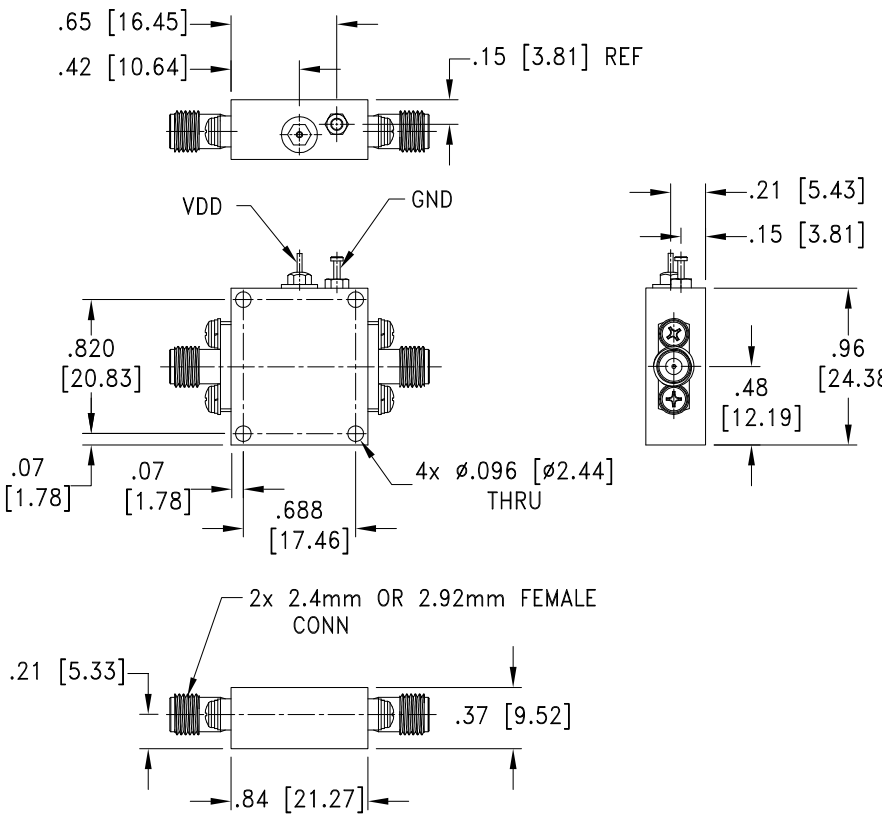
Parameter	Condition (MHz)	Min.	Typ.	Max.	Units
Frequency Range		0.050		40000	MHz
Gain	50 - 7500	10.7	12.0	—	dB
	7500 - 15000	10.0	11.5	—	
	15000 - 30000	8.2	11.0	—	
	30000 - 40000	8.0	10.5	—	
Noise Figure	250 - 2000	—	6	—	dB
	2000 - 7500	—	4.5	—	
	7500 - 26500	—	4.0	—	
	26500 - 40000	—	5.5	—	
Input Return Loss	50 - 5000	12.0	14.0	—	dB
	5000 - 15000	8.0	14.0	—	
	15000 - 20000	8.5	16.0	—	
	20000 - 27500	8.0	17.0	—	
	27500 - 40000	8.0	12.5	—	
Output Return Loss	50 - 10000	7.0	10.0	—	dB
	10000 - 20000	8.5	16.0	—	
	20000 - 30000	7.5	15.0	—	
	30000 - 40000	7.0	12.0	—	
Output Power at 1dB Compression	50 - 15000	—	13.0	—	dBm
	15000 - 30000	—	11.0	—	
	30000 - 40000	—	10.0	—	
Output IP3	50 - 30000	—	22.0	—	dBm
	30000 - 40000	—	21.0	—	
Device Operating Current		50.0	100.0	150.0	mA

MAXIMUM RATINGS[1]

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

Wideband Amplifier ZVA-403GX+

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

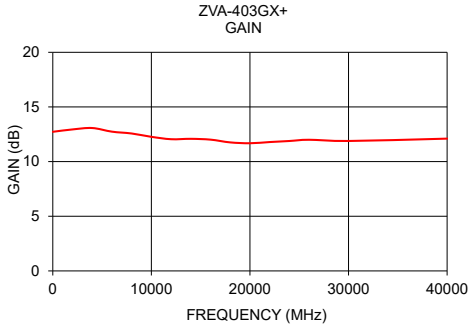
OUTLINE DIMENSIONS (Inch / mm)

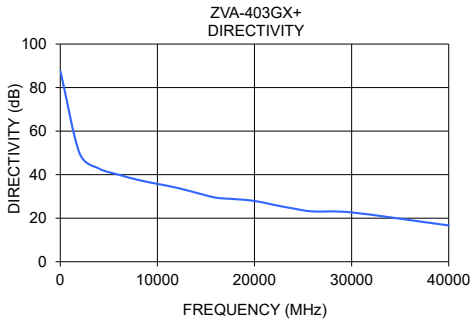
A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	wt
0.84	0.96	0.36	0.48	0.19	0.687	0.820	0.07	0.07	0.096	0.42	0.65	--	0.15	0.21	grams
21.27	24.38	9.27	12.19	4.93	17.46	20.83	1.78	1.78	2.44	10.64	16.51	--	3.81	5.43	45

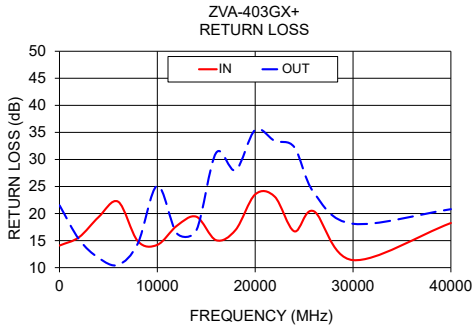
Wideband Amplifier ZVA-403GX+

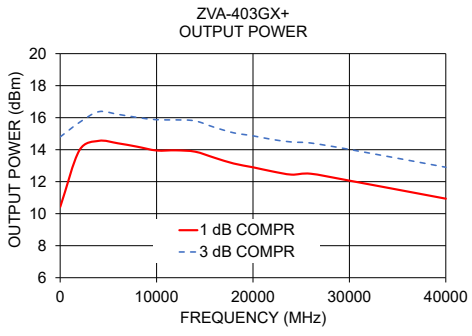
TYPICAL PERFORMANCE DATA/CURVES

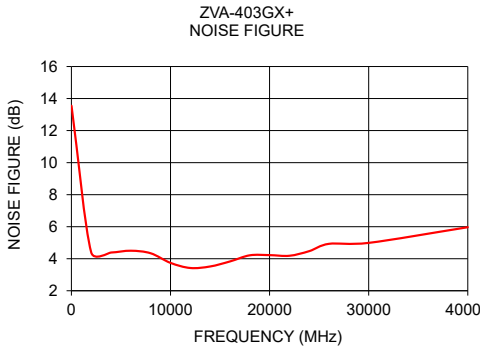
Frequency (MHz)	Gain (dB)	Directivity (dB)	Return Loss (dB)		POUT at 1 dB COMPR. (dBm)	POUT at 3 dB COMPR. (dBm)	Noise Figure (dB)	IP3 (dBm)
			IN	OUT				
10	12.73	87.68	14.08	21.51	10.43	14.80	13.55	23.17
2000	12.94	49.68	15.62	15.23	13.96	15.70	4.40	24.43
4000	13.07	42.78	19.35	11.80	14.55	16.37	4.39	25.47
6000	12.74	39.99	22.19	10.51	14.40	16.21	4.50	25.58
8000	12.57	37.60	14.91	14.43	14.18	16.01	4.34	25.96
10000	12.27	35.76	14.21	25.15	13.95	15.87	3.74	25.71
12000	12.05	33.99	17.74	16.32	13.96	15.86	3.42	25.13
14000	12.08	31.68	19.41	16.94	13.87	15.80	3.51	24.65
16000	12.01	29.46	15.08	31.20	13.50	15.40	3.83	25.02
18000	11.76	28.75	16.97	28.01	13.13	15.05	4.21	24.28
20000	11.68	27.94	23.54	35.45	12.90	14.86	4.22	24.45
22000	11.79	26.12	23.12	33.42	12.64	14.64	4.18	24.29
24000	11.89	24.45	16.71	32.27	12.44	14.48	4.47	25.62
26000	12.00	23.10	20.42	23.85	12.50	14.42	4.93	24.01
30000	11.89	22.65	11.39	18.11	12.07	14.02	4.99	25.45
40000	12.10	16.67	18.25	20.80	10.94	12.90	5.97	22.15

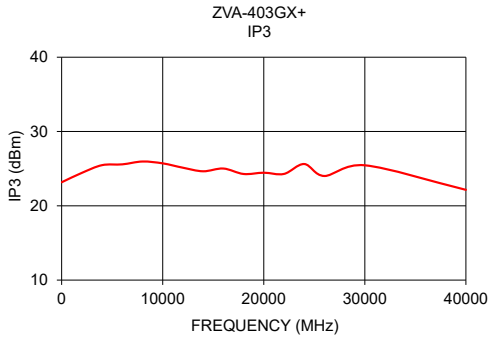












NOTES

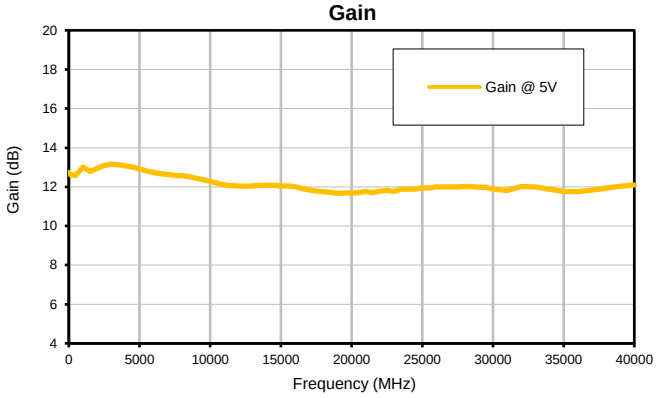
A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's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

Typical Performance Data

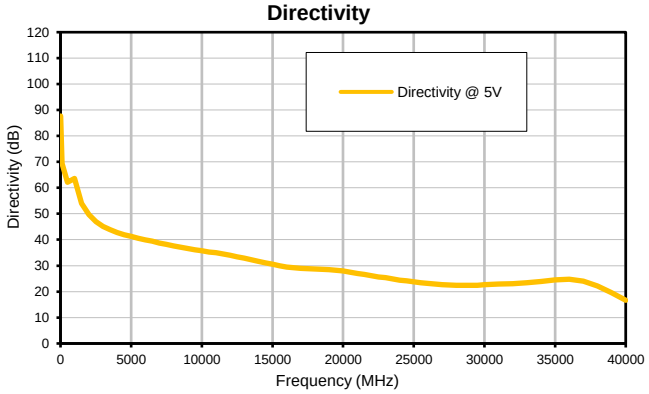
FREQUENCY (MHz)	GAIN (dB) 5V	DIRECTIVITY (dB) 5V	RETURN LOSS (dB) IN 5V	RETURN LOSS (dB) OUT 5V	NOISE FIGURE (dB) 5V	POUT @ 1 dB COMPRESSION (dBm) 5V	POUT @ 3 dB COMPRESSION (dBm) 5V	OUTPUT IP3 (dBm) 5V
10	12.73	87.68	14.08	21.51	13.55	10.43	14.80	23.17
100	12.61	69.43	14.01	21.58	6.82	10.85	15.08	23.04
500	12.58	62.13	13.89	20.16	4.78	13.31	15.00	22.65
1000	13.01	63.65	14.12	19.76	4.48	13.85	15.55	24.11
1500	12.79	54.05	14.80	17.29	4.47	13.63	15.32	23.51
2000	12.94	49.68	15.62	15.23	4.40	13.96	15.70	24.43
2500	13.09	46.93	16.28	14.09	4.36	14.19	15.92	24.81
3000	13.16	45.14	16.95	13.30	4.30	14.37	16.12	25.01
3500	13.13	43.91	17.95	12.53	4.27	14.50	16.28	25.21
4000	13.07	42.78	19.35	11.80	4.39	14.55	16.37	25.47
4500	13.00	41.90	21.09	11.15	4.29	14.66	16.55	25.24
5000	12.91	41.28	23.01	10.69	4.41	14.61	16.48	25.64
5500	12.81	40.53	23.87	10.49	4.42	14.23	16.04	25.79
6000	12.74	39.99	22.19	10.51	4.50	14.40	16.21	25.58
6500	12.67	39.40	19.63	10.83	4.46	14.33	16.13	25.84
7000	12.63	38.75	17.44	11.55	4.56	14.44	16.31	25.82
7500	12.59	38.19	15.90	12.70	4.45	14.33	16.17	25.76
8000	12.57	37.60	14.91	14.43	4.34	14.18	16.01	25.96
8500	12.51	37.08	14.33	16.89	4.17	14.18	16.05	26.18
9000	12.44	36.60	14.06	20.24	4.04	13.83	15.74	25.82
9500	12.37	36.15	14.01	24.20	3.94	13.91	15.80	25.83
10000	12.27	35.76	14.21	25.15	3.74	13.95	15.87	25.71
10500	12.20	35.29	14.71	22.08	3.61	13.87	15.77	25.57
11000	12.10	34.94	15.39	19.37	3.51	14.13	16.03	25.48
11500	12.07	34.46	16.40	17.51	3.51	13.86	15.80	25.50
12000	12.05	33.99	17.74	16.32	3.42	13.96	15.86	25.13
12500	12.03	33.44	19.29	15.65	3.42	13.99	15.92	25.36
13000	12.05	32.87	20.63	15.54	3.49	13.97	15.89	25.26
13500	12.08	32.28	20.77	15.95	3.43	13.88	15.80	24.87
14000	12.08	31.68	19.41	16.94	3.51	13.87	15.80	24.65
14500	12.08	31.07	17.70	18.61	3.54	13.78	15.64	25.62
15000	12.05	30.54	16.41	21.20	3.63	13.83	15.75	24.62
15500	12.04	30.00	15.51	25.05	3.71	13.74	15.58	24.88
16000	12.01	29.46	15.08	31.20	3.83	13.50	15.40	25.02
16500	11.91	29.22	15.09	39.82	3.99	13.60	15.51	24.81
17000	11.85	29.01	15.45	33.71	4.09	13.44	15.32	24.32
17500	11.78	28.85	16.07	29.66	4.08	13.50	15.37	24.75
18000	11.76	28.75	16.97	28.01	4.21	13.13	15.05	24.28
18500	11.73	28.62	17.97	27.69	4.04	12.92	14.85	24.78
19000	11.66	28.50	19.19	28.59	4.10	13.03	15.02	24.52
19500	11.68	28.26	21.00	30.99	4.17	12.99	14.93	24.46
20000	11.68	27.94	23.54	35.45	4.22	12.90	14.86	24.45
20500	11.70	27.51	28.49	46.05	4.16	12.92	14.83	24.24
21000	11.76	27.03	41.92	43.64	4.16	12.57	14.55	24.31
21500	11.71	26.62	29.55	36.21	4.22	12.87	14.80	24.72
22000	11.79	26.12	23.12	33.42	4.18	12.64	14.64	24.29
22500	11.81	25.68	19.92	32.21	4.16	12.38	14.52	24.21
23000	11.77	25.38	18.11	31.72	4.28	12.83	14.80	23.94
23500	11.89	24.87	17.09	31.82	4.35	12.58	14.50	24.82
24000	11.89	24.45	16.71	32.27	4.47	12.44	14.48	25.62
24500	11.89	24.16	16.99	32.66	4.45	12.92	14.73	26.27
25000	11.95	23.72	17.55	31.10	4.70	12.70	14.52	25.31
25500	11.95	23.38	18.70	27.60	4.90	12.67	14.62	24.51
26000	12.00	23.10	20.42	23.85	4.93	12.50	14.42	24.01
27000	11.99	22.66	25.48	18.76	4.91	12.58	14.44	25.86
27500	12.00	22.56	24.77	17.38	4.88	12.86	14.54	25.70
28000	12.02	22.41	20.18	16.71	4.63	12.81	14.51	25.81
28500	12.01	22.41	16.57	16.74	4.85	12.53	14.27	25.32
29000	11.98	22.43	14.09	17.44	4.98	12.44	14.21	25.75
29500	11.98	22.36	12.40	18.33	4.94	12.23	14.08	25.65
30000	11.89	22.65	11.39	18.11	4.99	12.07	14.02	25.45
31000	11.81	22.94	10.77	13.45	5.05	11.43	13.57	24.01
32000	12.01	23.02	11.55	10.69	4.95	11.23	13.39	23.73
33000	11.99	23.40	12.72	11.27	5.04	11.88	13.68	24.60
34000	11.89	23.90	11.54	16.15	5.00	11.74	13.41	25.52
35000	11.77	24.57	10.20	26.39	5.10	11.96	13.60	25.20
36000	11.75	24.76	10.67	17.09	5.42	12.07	13.62	26.20
37000	11.83	24.08	11.24	14.74	5.90	12.20	13.83	25.57
38000	11.94	22.18	10.81	15.39	6.09	12.13	13.70	23.79
39000	12.03	19.59	12.06	16.33	5.97	11.44	13.28	23.35
40000	12.10	16.67	18.25	20.80	5.97	10.94	12.90	22.15

Typical Performance Curves

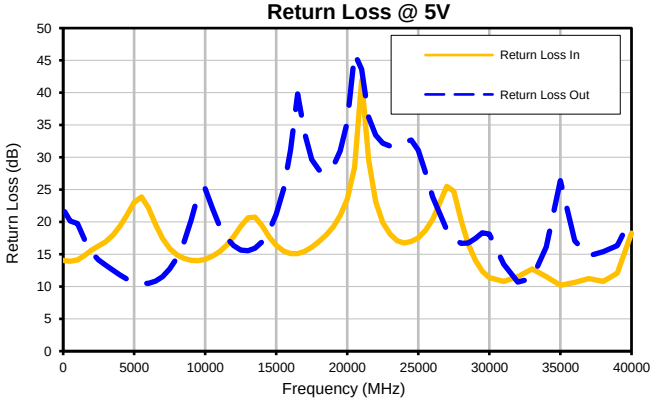
Gain



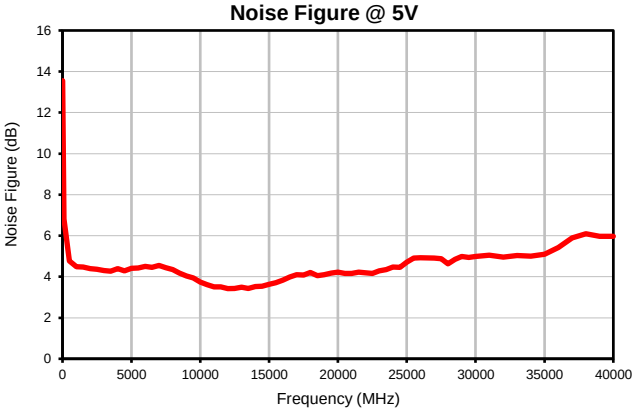
Directivity



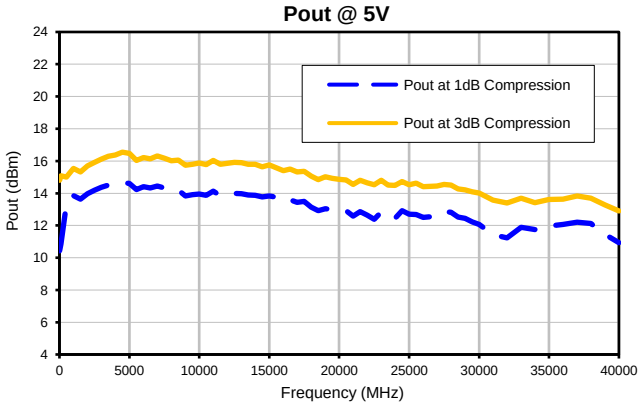
Return Loss @ 5V



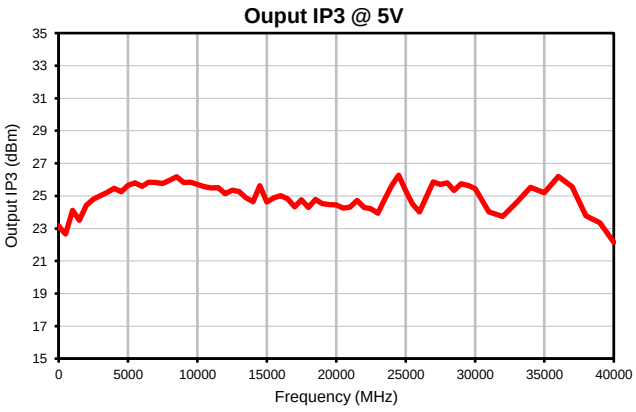
Noise Figure @ 5V



Pout @ 5V



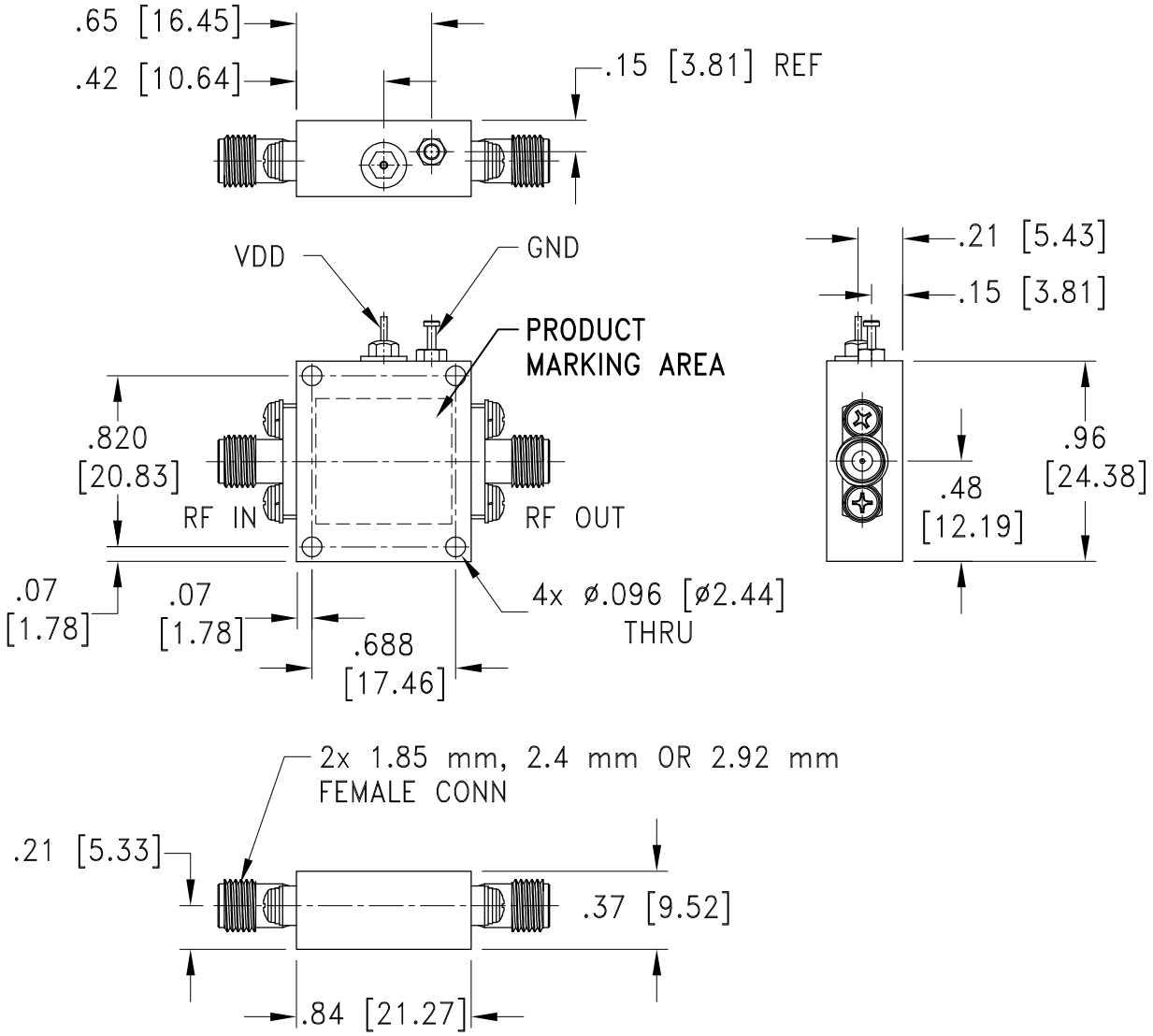
Ouput IP3 @ 5V



Case Style AV

Outline Dimensions

AV2578



Weight: 45 grams

Dimensions are in inches [mm]. Tolerances: 2 Pl.±.03; 3 Pl. ±.015 Inches

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