COAXIAL

Ultra-Wideband Amplifier ZVA-503GX+

50Ω 50 kHz to 50 GHz Gain 12 dB 2.4mm Female

KEY FEATURES

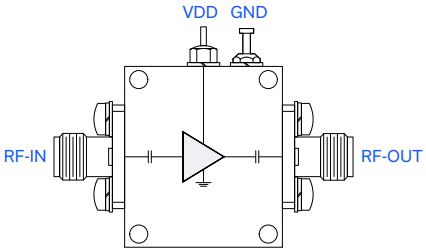
- Ultra-Broadband Coverage, 50 kHz to 50 GHz
- Excellent Gain Flatness, ±1.5 dB Typ.
- Single +5 V Supply
- Compact Case for Ease of System Integration

Generic photo used for illustration purposes only

APPLICATIONS

- Fiber Optics
- Wideband Test and Instrumentation
- 4G LTE & 5G FR1, FR2 & FR2+ Infrastructure
- WiFi 6E & WiFi 7
- Aerospace and Defense

FUNCTIONAL DIAGRAM



PRODUCT OVERVIEW

Mini-Circuits' ZVA-503GX+ is a coaxial, ultra-wideband amplifier offering flat gain across an extremely wide frequency range from 50 kHz to 50 GHz. This model operates on a single +5 V supply with just 100 mA typical current consumption and is capable of delivering up to 20 mW output power at 1 dB compression. The amplifier comes in a rugged, compact case (0.84" x 0.96" x 0.36") with 2.4mm RF connectors.

ELECTRICAL SPECIFICATIONS AT +25 °C BASEPLATE AND V_{DD} = +5.0 V

Parameter	Condition (GHz)	Min.	Typ.	Max.	Units
Frequency Range		0.01		50	GHz
Gain	0.01 – 7.5	11.0	12.5	-	dB
	7.5 – 15	10.0	12.0	-	
	15 – 40	9.0	11.0	-	
	40 – 50	8.0	10.5	-	
Noise Figure	0.01 – 7.5	-	4.0	-	dB
	7.5 – 15	-	3.5	-	
	15 – 40	-	4.0	-	
	40 – 50	-	6.5	-	
Input Return Loss	0.01 – 7.5	10.0	14.0	-	dB
	7.5 – 15	8.0	14.0	-	
	15 – 40	8.0	14.0	-	
	40 – 50	8.0	14.0	-	
Output Return Loss	0.01 – 7.5	9.0	12.0	-	dB
	7.5 – 15	9.0	14.0	-	
	15 – 40	8.0	14.0	-	
	40 – 50	8.0	13.0	-	
Output Power at 1 dB Compression (P1dB)	0.01 – 7.5	-	+13.0	-	dBm
	7.5 – 15	-	+13.0	-	
	15 – 40	-	+10.5	-	
	40 – 50	-	+8.0	-	
Output Third Order Intercept Point (OIP3)	0.01 – 40	-	+23.0	-	dBm
	40 – 50	-	+18.0	-	
DC Supply Voltage (V_{DD})		+4.5	+5.0	+5.5	V
DC Current		50	100	150	mA

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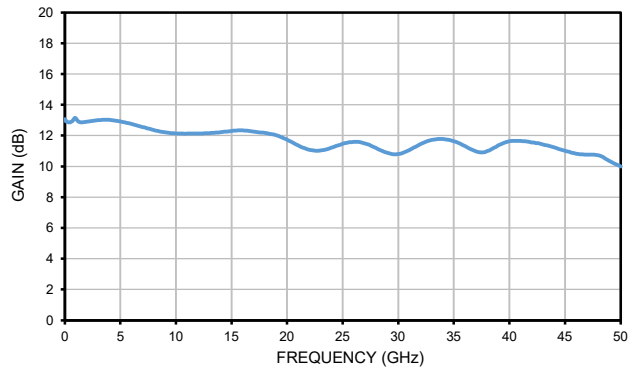
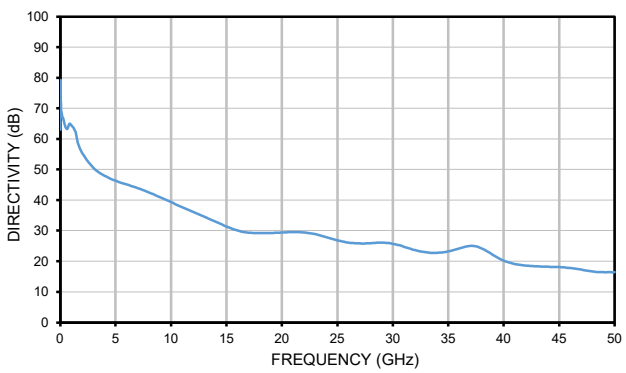
TYPICAL PERFORMANCE GRAPHS

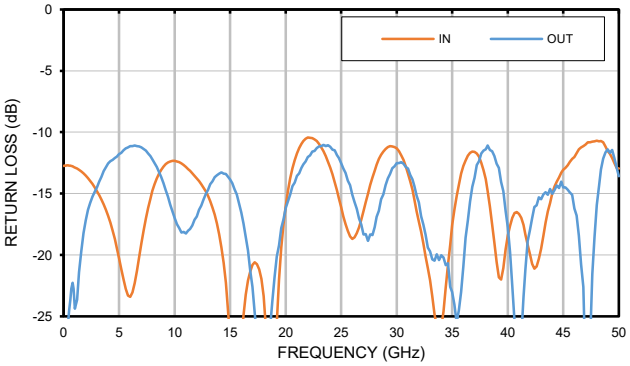
GAIN



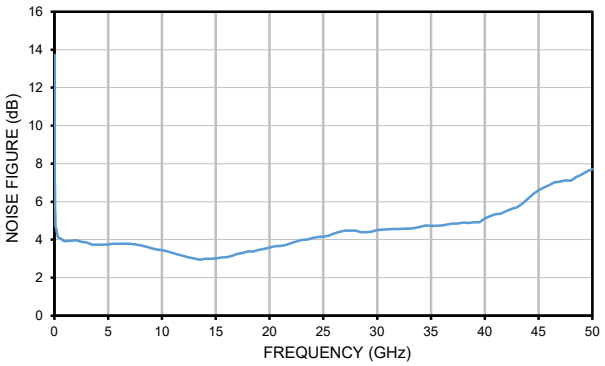
DIRECTIVITY



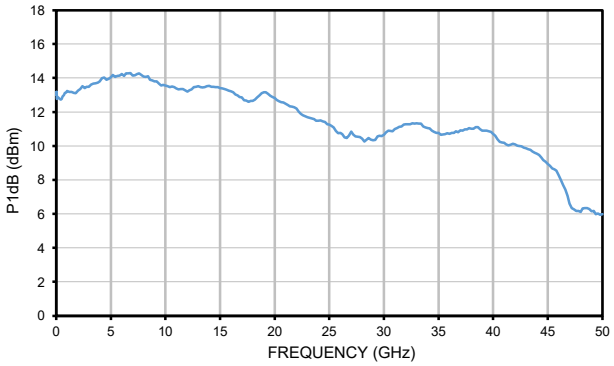
RETURN LOSS



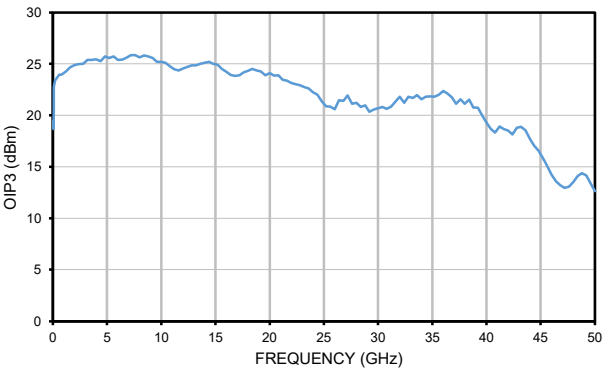
NOISE FIGURE



P_{OUT} @ 1dB GAIN COMPRESSION



OUTPUT IP3



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ABSOLUTE MAXIMUM RATINGS[1]

Parameter	Ratings
Operating Temperature (Baseplate)	-10 °C to +85 °C
Storage Temperature	-55 °C to +100 °C
Total Power Dissipation	0.75 W
RF Input Power[2] (CW), V_{DD} = +5.0 V	+4 dBm
DC Operating Voltage[3] (V_{DD})	+6 V

1. Continuous operation is not recommended at these extremes. Permanent damage may occur if any of these limits are exceeded.
2. Specified under matched load to 50 ohms.
3. This model does not contain an internal voltage regulator. Take caution when applying voltage.

DETERMINING MAXIMUM THERMAL RESISTANCE OF USERS' EXTERNAL HEAT SINK

$$\textit{MAXIMUM THERMAL RESISTANCE} = \frac{\textit{MAXIMUM OPERATING CASE TEMP} - \textit{MAXIMUM USER AMBIENT TEMP}}{\textit{POWER DISSIPATION}}$$

Example:	MAXIMUM OPERATING CASE TEMP = +50 °C (CHECK MAXIMUM RATINGS TABLE FOR THIS VALUE) MAXIMUM USER AMBIENT TEMP = +30 °C (USER DEFINED) POWER DISSIPATION = 10 WATTS (CHECK MAXIMUM RATINGS TABLE FOR THIS VALUE) THEN MAXIMUM ALLOWABLE THERMAL RESISTANCE = 2 °C/W

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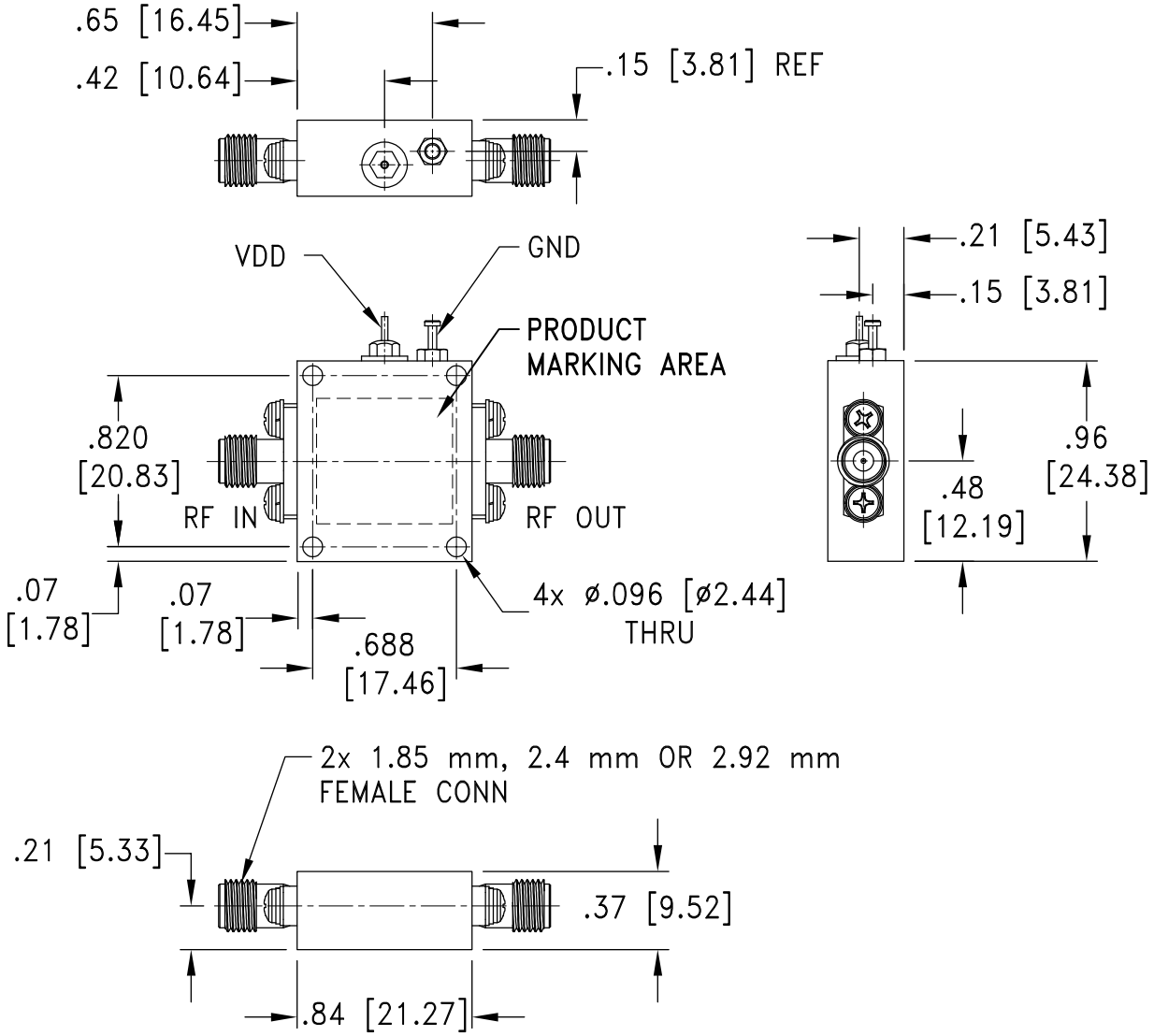
CASE STYLE DRAWING



Weight: 45 grams

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

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ADDITIONAL INFORMATION IS AVAILABLE ON OUR DASHBOARD.

Performance Data	Table Graphs S-Parameter (S2P Files) Data Set (.zip file)
RoHs Status	Compliant
Environmental Ratings	ENV96
Export Information	ECCN# EAR99

ORDERING INFORMATION

Model No. Links	ZVA-503GX+
Product Marking	ZVA-503GX+
Case Style	AV2578
Connector	2.4 mm (Female)

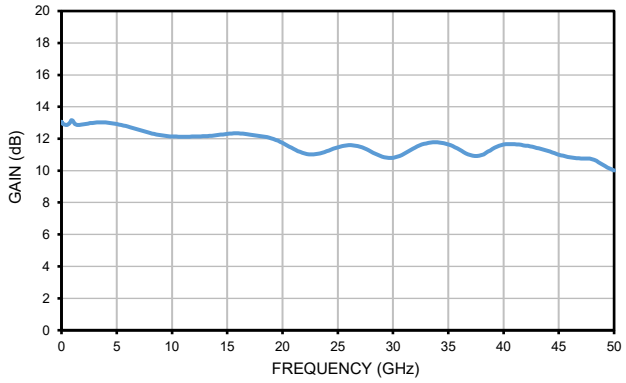
Typical Performance Data

ZVA-503GX+

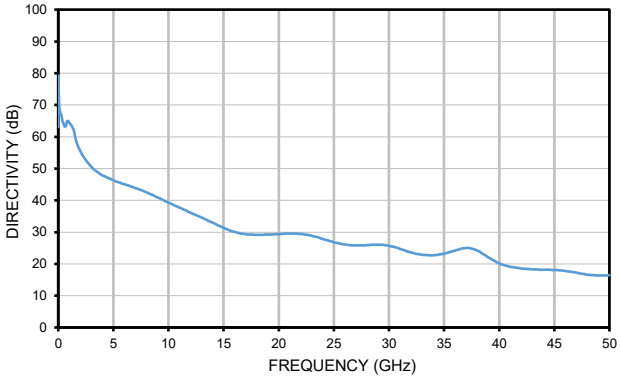
FREQUENCY (GHz)	GAIN (dB)	DIRECTIVITY (dB)	RETURN LOSS (dB)		Pout @ 1 dB COMPRESSION (dBm)	NOISE FIGURE (dB)	OIP3 dBm
			IN	OUT			
0.01	13.06	63.03	12.75	28.61	13.0	13.7	19.37
2	12.90	55.39	13.53	17.17	13.2	4.0	24.87
4	13.02	47.91	16.81	12.54	13.8	3.7	25.44
6	12.76	45.08	23.42	11.13	14.2	3.8	25.39
8	12.36	42.54	14.80	12.21	14.1	3.7	25.61
10	12.14	39.34	12.33	17.01	13.6	3.4	25.19
12	12.14	36.13	13.78	16.88	13.2	3.2	24.52
14	12.22	32.97	18.34	13.37	13.5	3.0	25.09
16	12.34	30.01	27.00	16.54	13.2	3.1	24.21
18	12.17	29.18	23.36	36.76	12.7	3.4	24.32
20	11.74	29.38	16.00	16.17	12.8	3.6	24.09
22	11.08	29.41	10.44	12.03	12.2	3.8	23.13
24	11.21	27.88	12.89	11.19	11.5	4.1	22.24
26	11.59	26.09	18.69	15.09	10.8	4.3	20.58
28	11.20	25.89	13.14	17.73	10.4	4.5	21.22
30	10.80	25.70	11.33	12.51	10.6	4.5	20.68
32	11.45	23.62	17.29	15.71	11.3	4.6	21.79
34	11.78	22.74	25.89	20.03	11.1	4.7	21.55
36	11.31	24.23	12.76	20.94	10.7	4.7	22.37
38	10.98	24.22	13.81	11.39	11.0	4.9	21.13
40	11.64	20.22	18.42	17.76	10.7	5.1	19.28
42	11.56	18.56	19.93	17.99	10.1	5.5	18.51
44	11.24	18.18	14.98	15.02	9.5	6.1	17.70
46	10.83	17.77	12.01	16.22	8.3	6.9	14.26
48	10.73	16.60	10.70	15.94	6.1	7.1	13.49
50	10.01	16.42	12.96	13.58	6.0	7.7	12.66

Typical Performance Curves

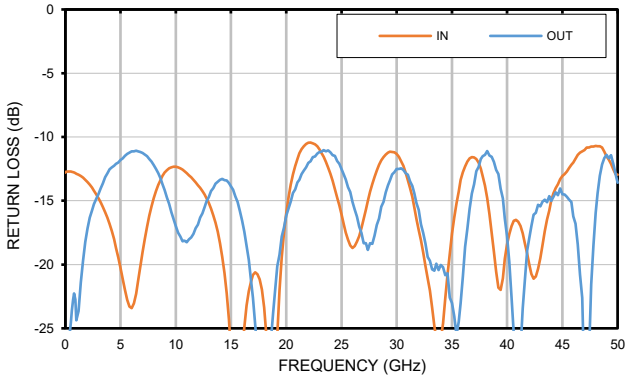
GAIN



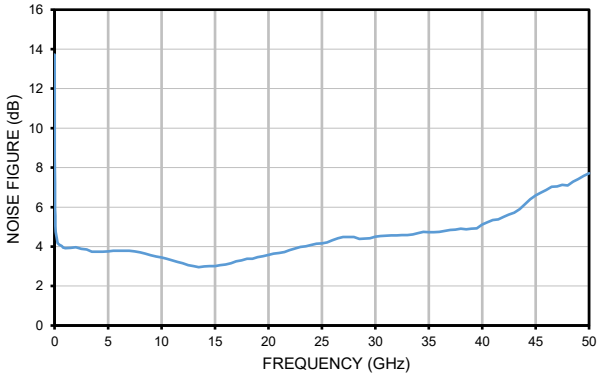
DIRECTIVITY



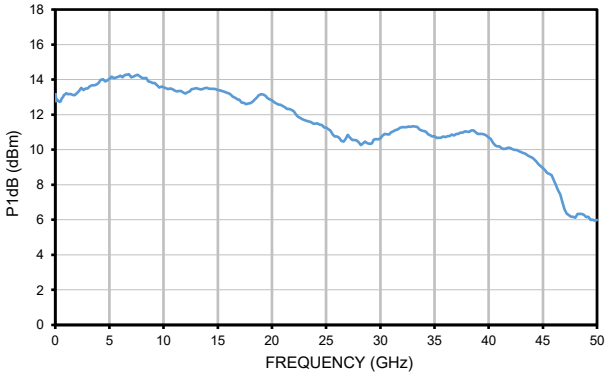
RETURN LOSS



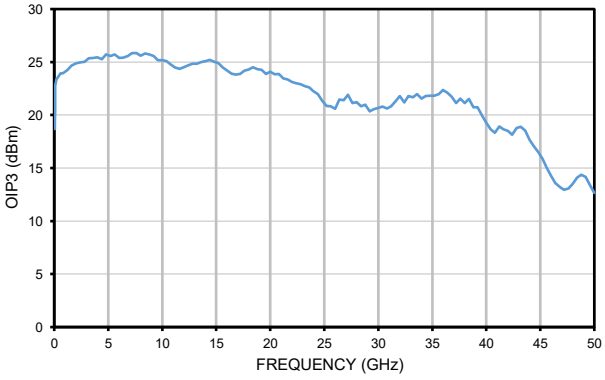
NOISE FIGURE



P_{OUT} @ 1dB GAIN COMPRESSION



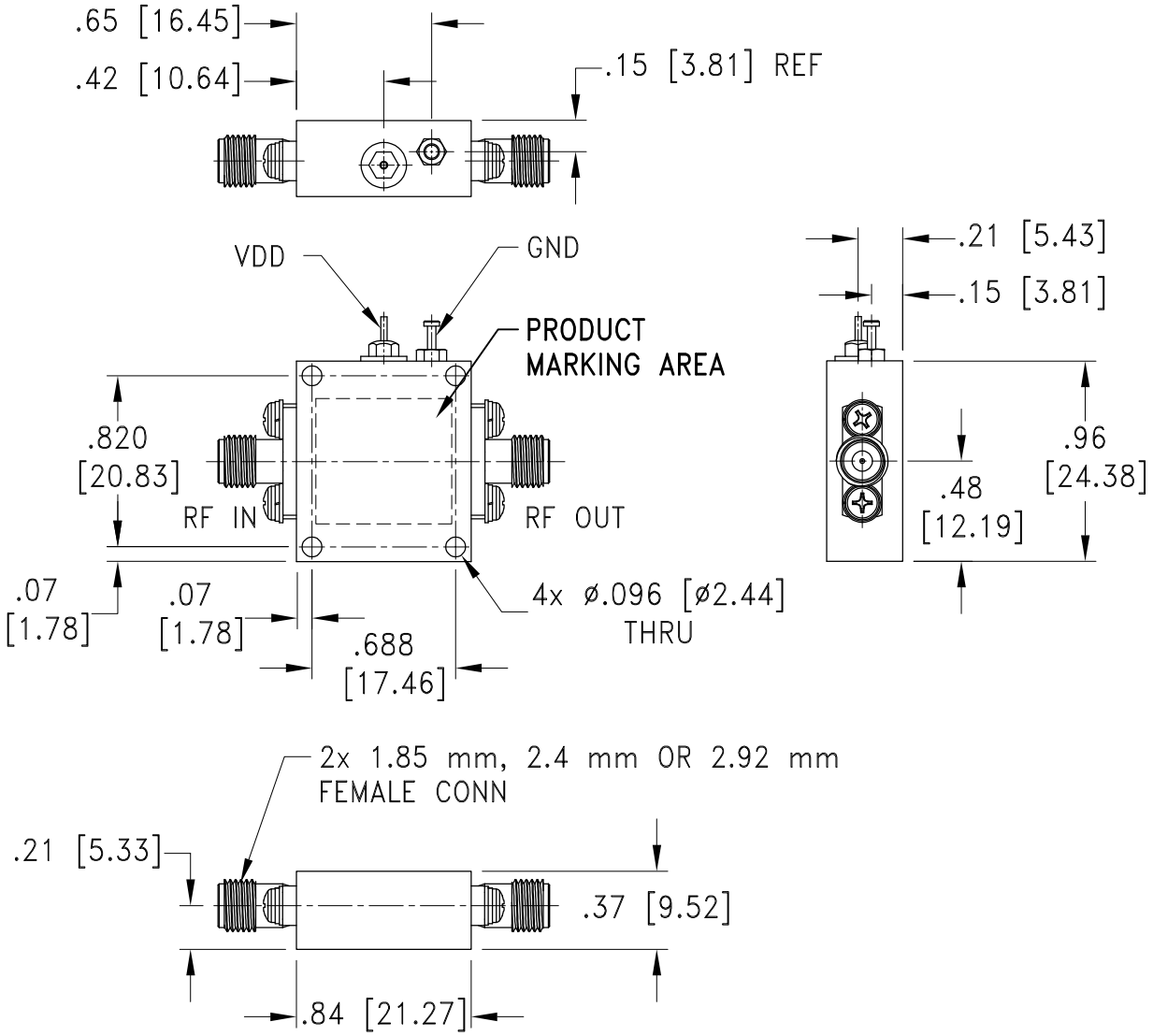
OUTPUT IP3



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