

Wideband Microwave Amplifier ZVA-01243+

50Ω 1 to 22 GHz

The Big Deal

- Ultra wideband performance
- Usable up to 24 GHz
- Medium power, 21 dBm P1dB typ.
- Voltage regulated internally and reverse voltage protected
- Excellent directivity, 20 dB typ.



Case Style: RN2486-2

Product Overview

Mini-Circuits' ZVA-01243+ is a coaxial, ultra-wideband amplifier offering very flat gain and high dynamic range from 1 to 20 GHz. This model is capable of delivering up to +21 dBm output power at 1 dB compression with 4 dB noise figure and up to +31 dBm IP3. The model supports a wide range of high-dynamic range applications and many systems where high performance over a wide frequency range is needed. It operates on a single +8V supply and offers built-in safety features including protection against reverse bias and immunity to accidental open or short loads. The amplifier comes in a rugged, compact case (1.3 x 0.98 x 0.56") with 2.92mm connectors.

Key Features

Feature	Advantages
Ultra-wideband, 1 to 22 GHz	Enables a single amplifier to be used in a wide range of applications.
Excellent gain flatness, ± 1.0 over 1-20 GHz	Provides consistent performance across its operating frequency, minimizing the need for external equalizing networks in wideband applications.
Output power up to 24 dBm at 1 dB compression	Can be used as a driver for high power amplifiers.
Rugged design	Built-in protection against reverse bias and accidental open and short loads provides added reliability for demanding operating conditions.

50Ω 1 to 22 GHz

Features

- Output Power up to 24 dBm at 1 dB compression
- High IP3, 30 dBm typ. at 10 GHz
- Excellent gain flatness, ± 1.0 dB from 1 GHz to 20 GHz
- Fully compatible with SMA, Super SMA, and 3.5mm connectors

Applications

- WiFi
- WLAN
- UMTS
- LTE
- WiMAX
- S-band Radar
- C-band Satcom



Generic photo used for illustration purposes only

Case Style: RN2486-2

Connectors	Model
2.92mm-Female	ZVA-01243+

+RoHS Compliant

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

Electrical Specifications at 25°C

Parameter	Condition (GHz)	Min.	Typ.	Max.	Units
Frequency Range		1		22	GHz
Gain	1-10	10.0	13.4	—	dB
	10-16	10.0	12.9	—	
	16-20	10.0	12.8	—	
	20-22	9.0	12.3	—	
Input Return Loss	1-10	—	15.0	—	dB
	10-16	—	9.0	—	
	16-20	—	13.0	—	
	20-22	—	11.0	—	
Output Return Loss	1-10	—	16.0	—	dB
	10-16	—	14.0	—	
	16-20	—	15.0	—	
	20-22	—	16.0	—	
Output Power @ 1 dB compression ¹	1-10	20.0	23.6	—	dBm
	10-16	19.0	22.5	—	
	16-20	18.0	21.6	—	
	20-22	17.0	20.3	—	
Output IP3 ²	1-10	—	31.5	—	dBm
	10-16	—	29.5	—	
	16-20	—	27.5	—	
	20-22	—	25.0	—	
Noise Figure	1-10	—	5.0	—	dB
	10-16	—	3.9	—	
	16-20	—	5.0	—	
	20-22	—	6.4	—	
Device Operating Voltage (V _{DD})			8	9	V
Device Operating Current (I _{DD})			170	280	mA

1. Current increases at P1dB.

2. Two tones, spaced 1 MHz apart, 0 dBm/tone at output.

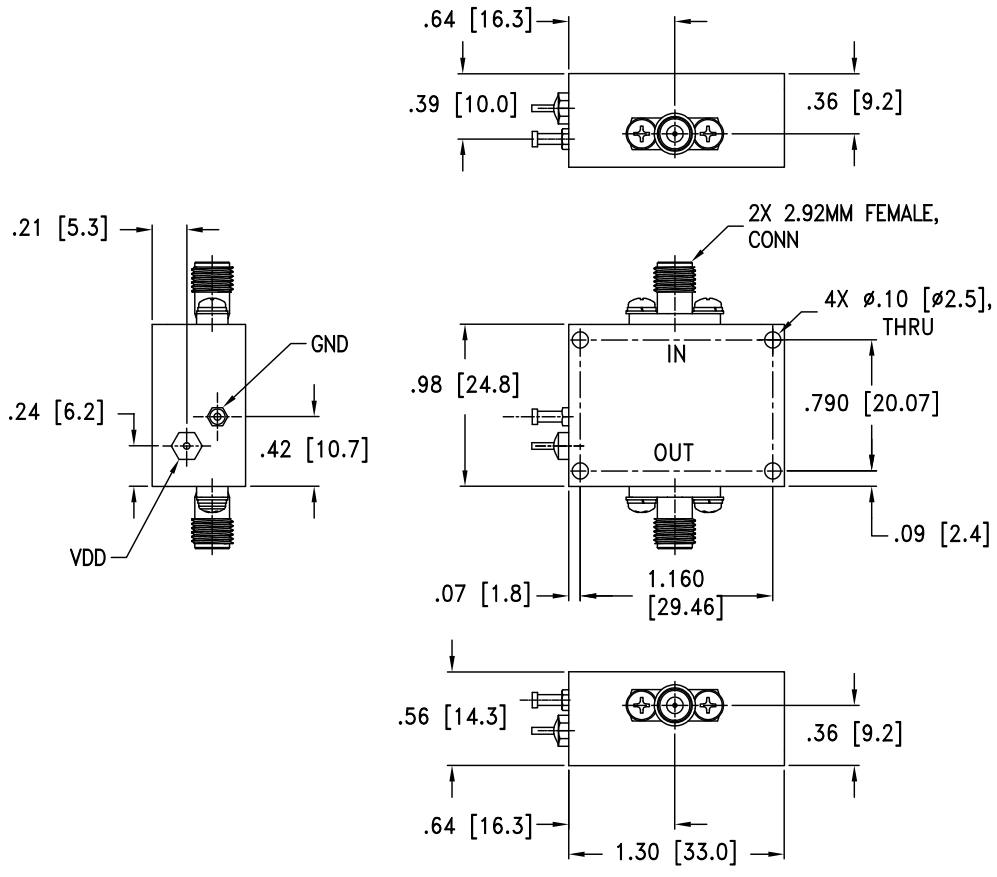
Absolute Maximum Ratings³

Parameter	Ratings
Operating Temperature (base-plate)	-40°C to 65°C
Storage Temperature	-55°C to 100°C
Total Power Dissipation	2.5W
Input Power (CW), V _d =8V	+17 dBm
DC Voltage	9V

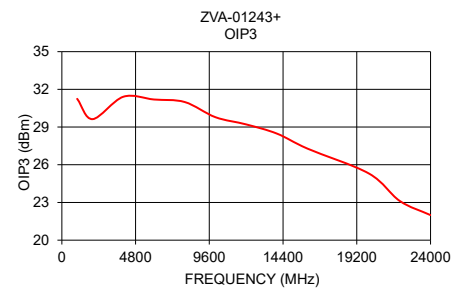
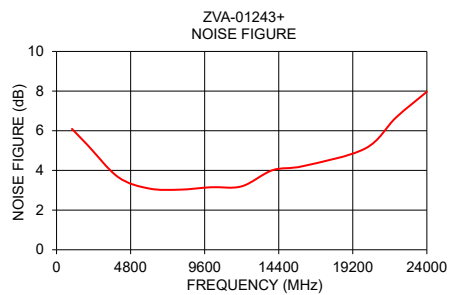
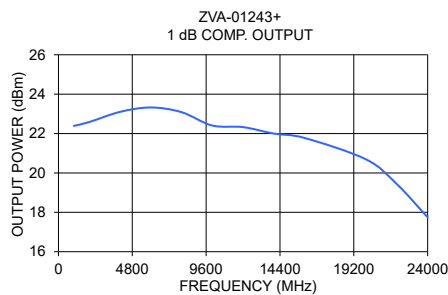
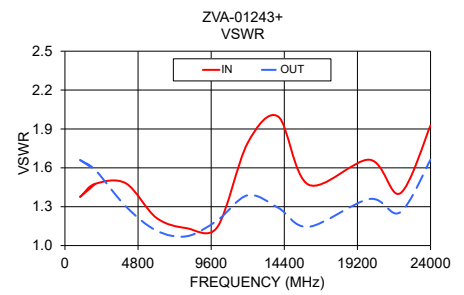
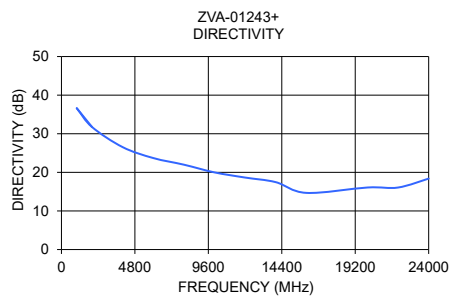
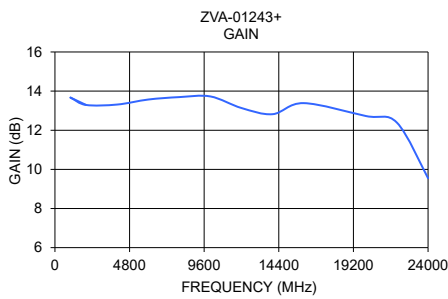
3. Permanent damage may occur if any of these limits are exceeded.

Electrical maximum ratings are not intended for continuous normal operation.

Outline Drawing



FREQUENCY (MHz)	GAIN (dB)	DIRECTIVITY (dB)	VSWR (:1)		NOISE FIGURE (dB)	POUT COMPR. (dBm)	OUTPUT IP3 (dBm)
			IN	OUT			
1000	13.67	36.61	1.38	1.66	6.09	22.39	31.24
2000	13.29	31.74	1.48	1.58	5.29	22.58	29.63
4000	13.31	26.53	1.48	1.30	3.66	23.10	31.41
6000	13.57	23.71	1.21	1.12	3.09	23.32	31.19
8000	13.69	21.99	1.13	1.07	3.03	23.09	30.99
10000	13.73	19.99	1.14	1.19	3.15	22.41	29.78
12000	13.14	18.65	1.79	1.39	3.20	22.33	29.21
14000	12.82	17.47	2.00	1.29	4.01	22.00	28.48
16000	13.39	14.68	1.47	1.14	4.22	21.78	27.28
20000	12.73	16.08	1.66	1.36	5.10	20.69	25.30
22000	12.39	16.07	1.40	1.26	6.67	19.43	23.12
24000	9.55	18.39	1.93	1.66	7.97	17.75	21.99



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



*Typical Performance Data***NOTE: Use PDF Bookmarks to view DATA at required conditions****Definitions:**

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 8.00V, Id = 183.37mA @ Temperature = +25°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
1000	13.67	50.28	16.01	12.11	30.95	0.96	31.24	22.39	6.09
1500	13.30	47.25	14.95	12.25	22.67	0.97	31.52	22.36	5.20
2000	13.29	45.03	14.31	12.93	17.65	0.98	29.63	22.58	5.29
2500	13.33	43.28	13.86	13.84	14.47	1.00	31.26	22.74	5.30
3000	13.34	41.88	13.65	14.94	12.41	1.01	31.47	22.84	5.08
3500	13.32	40.80	13.76	16.19	11.09	1.01	31.48	23.00	4.38
4000	13.31	39.84	14.26	17.65	10.07	1.02	31.41	23.10	3.66
4500	13.34	39.09	15.18	19.32	9.32	1.01	31.43	22.90	3.27
5000	13.41	38.40	16.45	21.20	8.64	1.01	30.95	23.03	3.41
5500	13.49	37.80	18.15	23.23	8.08	1.01	31.81	23.22	3.30
6000	13.57	37.28	20.28	25.21	7.60	1.00	31.19	23.32	3.09
6500	13.63	36.84	22.66	27.02	7.22	1.00	30.89	23.35	2.93
7000	13.66	36.44	24.27	28.43	6.89	1.00	30.56	23.06	2.86
7500	13.69	36.06	24.38	29.28	6.58	1.00	31.16	23.10	2.94
8000	13.69	35.68	24.04	29.18	6.29	1.00	30.99	23.09	3.03
8500	13.70	35.26	24.39	27.88	5.99	1.00	29.72	22.86	3.08
9000	13.71	34.78	25.97	25.72	5.67	0.99	30.29	22.68	3.08
9500	13.73	34.26	27.38	23.34	5.32	0.99	30.14	22.56	2.96
10000	13.73	33.72	23.59	21.07	4.98	0.99	29.78	22.41	3.15
10500	13.67	33.17	18.69	19.06	4.65	0.99	29.66	22.46	3.20
11000	13.55	32.66	14.97	17.43	4.36	1.00	29.40	22.33	3.16
11500	13.33	32.33	12.38	16.23	4.19	1.01	28.81	22.27	3.12
12000	13.14	31.79	10.94	15.78	3.93	1.03	29.21	22.33	3.20
12500	12.97	31.20	9.84	15.41	3.67	1.04	29.03	22.17	3.37
13000	12.83	30.87	9.38	15.57	3.55	1.05	29.17	22.22	3.84
13500	12.79	30.59	9.39	16.34	3.46	1.06	28.83	22.17	3.86
14000	12.82	30.29	9.57	17.90	3.37	1.06	28.48	22.00	4.01
14500	12.91	29.88	9.99	20.66	3.24	1.06	28.55	21.97	4.07
15000	13.10	29.34	10.80	26.10	3.06	1.05	28.16	21.89	4.05
15500	13.29	28.67	12.14	36.47	2.84	1.03	27.88	21.86	4.13
16000	13.39	28.07	14.42	23.41	2.69	1.00	27.28	21.78	4.22
16500	13.36	27.72	17.26	19.02	2.63	0.97	27.34	21.44	4.37
17000	13.25	27.58	18.79	16.97	2.63	0.95	27.13	21.31	4.32
17500	13.11	27.60	17.86	16.47	2.66	0.95	26.57	21.41	4.48
18000	12.98	27.72	16.17	16.65	2.72	0.96	26.13	21.20	4.52
18500	12.89	27.95	14.57	17.14	2.79	0.97	26.65	20.92	4.61
19000	12.78	28.27	13.37	17.34	2.90	0.99	26.03	21.08	4.84
19500	12.71	28.58	12.70	16.81	2.99	1.00	25.74	20.62	4.93
20000	12.73	28.80	12.08	16.34	3.03	1.00	25.30	20.69	5.10
20500	12.77	28.89	11.99	16.55	3.04	1.00	24.49	20.05	5.52
21000	12.79	28.82	12.75	18.20	3.05	1.01	24.16	20.05	5.74
21500	12.70	28.64	14.25	21.07	3.07	1.01	23.57	19.77	6.25
22000	12.39	28.46	15.52	18.89	3.11	1.00	23.12	19.43	6.67
22500	11.78	28.35	14.17	14.68	3.21	0.98	22.72	19.57	7.52
23000	11.00	28.26	11.89	12.54	3.33	0.98	22.81	19.10	7.86
23500	10.22	28.12	10.44	11.86	3.47	0.99	22.35	18.53	7.77
24000	9.55	27.94	9.99	12.08	3.64	1.00	21.99	17.75	7.97

*Typical Performance Data***Definitions:**

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 8.00V, Id = 178.07mA @ Temperature = -45°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
1000	14.26	50.12	15.75	11.95	28.27	0.96	31.53	22.33	5.19
1500	13.88	47.46	14.67	12.00	21.61	0.97	30.70	22.28	4.35
2000	13.89	44.89	14.12	12.76	16.15	0.98	31.22	22.48	4.51
2500	13.96	43.18	13.86	13.81	13.31	1.00	30.63	22.64	4.46
3000	14.01	41.76	13.78	14.97	11.35	1.01	31.56	22.77	4.25
3500	14.03	40.65	13.92	16.02	10.05	1.01	31.48	22.94	3.53
4000	14.04	39.59	14.37	17.15	8.99	1.01	31.13	23.06	2.95
4500	14.04	38.85	15.16	18.51	8.36	1.01	31.62	22.83	2.61
5000	14.06	38.33	16.16	20.08	7.95	1.01	30.99	22.99	2.88
5500	14.10	37.50	17.77	21.99	7.26	1.00	31.69	23.20	2.78
6000	14.15	37.16	19.54	22.98	7.00	1.00	31.64	23.26	2.53
6500	14.21	36.61	21.19	23.76	6.55	1.00	30.55	23.38	2.36
7000	14.27	36.36	22.14	25.27	6.34	1.00	31.36	23.01	2.31
7500	14.33	35.83	21.90	28.57	5.94	1.00	30.88	23.10	2.32
8000	14.37	35.53	21.54	33.38	5.71	1.00	31.29	23.14	2.36
8500	14.41	34.98	21.57	34.93	5.34	1.00	30.99	22.91	2.43
9000	14.46	34.45	22.89	29.25	5.01	0.99	30.95	22.75	2.42
9500	14.48	33.85	24.42	25.34	4.67	0.99	30.57	22.72	2.31
10000	14.48	33.30	23.00	22.67	4.37	0.99	30.14	22.50	2.50
10500	14.45	32.79	18.61	20.03	4.10	0.99	29.43	22.59	2.40
11000	14.31	32.44	14.73	17.71	3.91	1.00	29.32	22.45	2.31
11500	14.10	32.25	12.30	16.06	3.80	1.01	28.92	22.37	2.42
12000	13.95	31.72	10.83	15.50	3.56	1.02	29.79	22.43	2.41
12500	13.82	31.08	9.76	15.40	3.29	1.04	29.08	22.26	2.59
13000	13.68	30.67	9.21	15.64	3.15	1.05	29.55	22.28	3.03
13500	13.61	30.21	8.87	16.23	3.00	1.07	29.60	22.27	2.91
14000	13.60	29.96	8.90	16.62	2.93	1.07	29.53	22.14	3.11
14500	13.73	29.53	9.20	17.81	2.79	1.06	29.06	22.10	3.00
15000	13.92	29.04	9.50	20.91	2.62	1.06	29.12	22.02	3.02
15500	14.19	28.44	10.83	31.02	2.46	1.04	28.93	22.02	3.08
16000	14.33	27.89	12.86	26.16	2.36	1.01	28.46	21.95	3.19
16500	14.36	27.41	15.76	18.47	2.27	0.96	28.00	21.52	3.26
17000	14.31	27.22	18.48	16.36	2.26	0.93	27.79	21.34	3.24
17500	14.25	27.11	18.19	16.10	2.24	0.93	27.14	21.57	3.39
18000	14.18	27.17	16.55	17.35	2.27	0.94	27.79	21.30	3.50
18500	14.08	27.29	14.79	17.81	2.31	0.96	27.46	21.12	3.58
19000	14.00	27.57	12.92	16.46	2.35	0.97	27.03	21.36	3.84
19500	13.94	27.88	11.35	14.98	2.38	0.98	26.99	20.91	3.79
20000	13.92	28.16	10.64	14.59	2.42	0.99	26.84	20.97	3.88
20500	13.98	28.18	10.43	15.18	2.41	1.00	26.16	20.21	4.26
21000	14.15	28.04	11.02	16.83	2.37	1.00	25.59	20.15	4.38
21500	14.18	27.77	12.83	20.37	2.36	1.00	25.05	19.71	4.89
22000	13.97	27.47	15.12	20.30	2.36	0.98	24.49	19.37	5.19
22500	13.41	27.36	14.31	14.67	2.41	0.96	24.31	19.40	5.95
23000	12.55	27.36	11.32	11.16	2.49	0.94	23.72	18.99	6.24
23500	11.61	27.49	9.25	9.80	2.64	0.94	24.20	18.44	6.19
24000	10.82	27.43	8.30	9.96	2.79	0.97	24.00	17.70	6.11

Typical Performance Data

Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

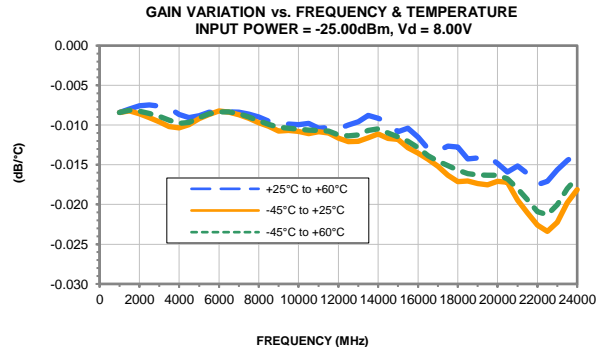
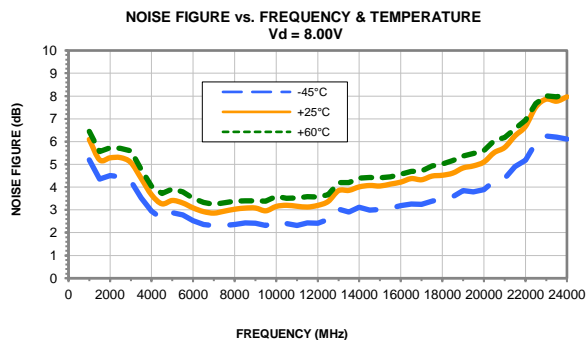
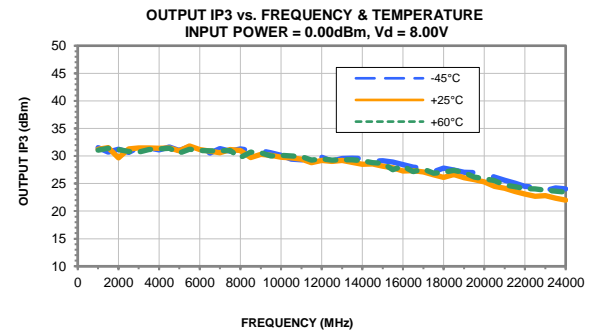
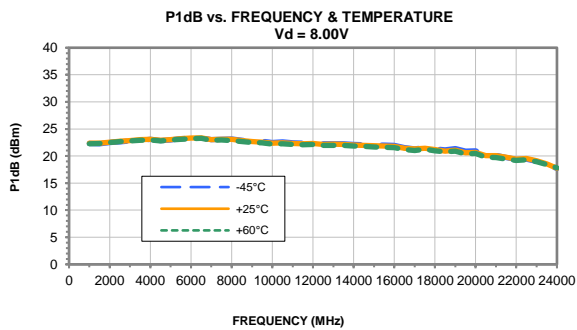
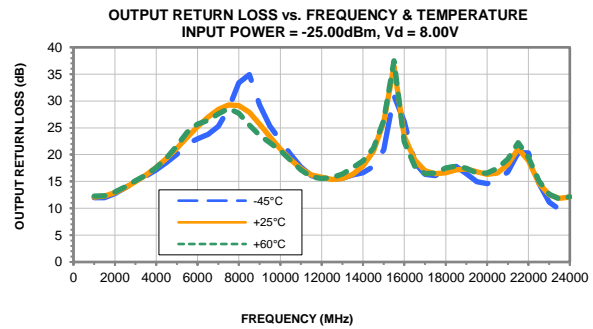
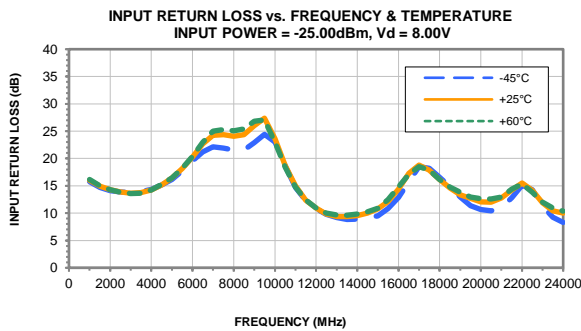
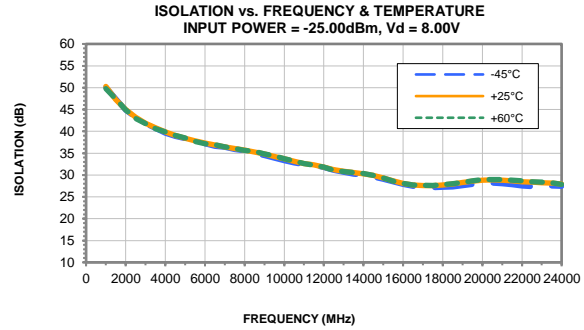
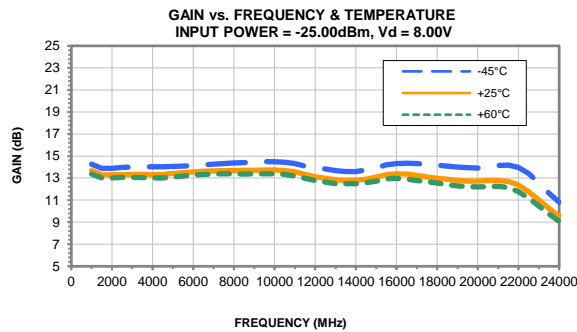
Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 8.00V, Id = 181.28mA @ Temperature = +60°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
1000	13.37	49.77	16.15	12.25	30.28	0.96	31.06	22.24	6.45
1500	13.02	47.44	15.00	12.36	23.97	0.97	31.40	22.29	5.57
2000	13.03	44.96	14.31	13.06	18.08	0.99	31.19	22.52	5.73
2500	13.07	42.98	13.81	14.02	14.42	1.00	30.83	22.68	5.70
3000	13.07	41.76	13.56	15.11	12.63	1.01	30.70	22.78	5.59
3500	13.05	40.59	13.64	16.19	11.16	1.02	31.14	22.94	4.77
4000	13.01	39.84	14.20	17.59	10.41	1.02	31.29	22.99	4.04
4500	13.03	39.06	15.26	19.38	9.64	1.01	31.37	22.82	3.72
5000	13.10	38.50	16.46	21.70	9.07	1.01	30.56	22.99	3.91
5500	13.20	37.71	18.23	24.20	8.28	1.01	31.21	23.11	3.79
6000	13.27	37.16	20.38	25.67	7.76	1.00	30.98	23.18	3.51
6500	13.34	36.97	22.93	26.40	7.57	1.00	30.91	23.28	3.32
7000	13.37	36.40	25.01	27.58	7.08	1.00	30.94	22.93	3.24
7500	13.38	36.10	25.28	28.60	6.84	1.00	30.99	22.99	3.31
8000	13.38	35.59	25.07	27.71	6.45	1.00	29.74	22.87	3.39
8500	13.37	35.39	25.39	25.52	6.31	0.99	30.70	22.69	3.40
9000	13.38	34.81	26.83	23.62	5.90	0.99	30.59	22.52	3.40
9500	13.39	34.39	27.06	22.24	5.61	0.99	30.00	22.41	3.39
10000	13.38	33.70	22.98	20.77	5.17	0.99	30.10	22.18	3.60
10500	13.33	33.20	18.39	18.95	4.85	0.99	30.02	22.25	3.51
11000	13.19	32.63	14.77	17.19	4.52	1.00	29.90	22.14	3.52
11500	12.97	32.29	12.42	15.85	4.33	1.01	29.23	22.06	3.58
12000	12.77	31.85	10.98	15.57	4.12	1.03	29.49	22.13	3.56
12500	12.62	31.06	9.99	15.74	3.77	1.04	29.24	21.96	3.66
13000	12.50	30.78	9.68	16.37	3.69	1.06	29.29	21.97	4.20
13500	12.49	30.55	9.62	17.58	3.61	1.06	29.33	21.97	4.19
14000	12.50	30.37	9.82	18.84	3.56	1.07	29.13	21.84	4.40
14500	12.58	29.91	10.26	21.22	3.39	1.06	28.79	21.77	4.42
15000	12.72	29.34	10.88	26.39	3.19	1.05	28.64	21.67	4.40
15500	12.93	28.57	12.50	37.49	2.94	1.03	27.52	21.63	4.46
16000	12.98	28.05	14.84	22.41	2.81	1.00	28.13	21.54	4.56
16500	12.90	27.71	17.12	17.85	2.75	0.97	27.17	21.18	4.70
17000	12.79	27.67	18.50	16.43	2.78	0.95	27.64	21.04	4.71
17500	12.67	27.59	17.84	16.58	2.79	0.96	26.87	21.23	4.93
18000	12.54	27.77	16.18	17.53	2.87	0.97	27.04	20.94	5.01
18500	12.39	28.01	14.75	17.86	2.98	0.98	27.39	20.76	5.17
19000	12.29	28.32	13.84	17.46	3.09	0.99	26.98	20.91	5.36
19500	12.22	28.64	12.96	16.57	3.18	0.99	26.20	20.38	5.47
20000	12.21	28.96	12.63	16.57	3.29	1.00	25.89	20.49	5.60
20500	12.22	28.98	12.58	17.48	3.30	1.01	25.53	19.76	6.04
21000	12.26	28.95	12.93	19.22	3.29	1.01	24.74	19.73	6.18
21500	12.14	28.79	14.38	22.25	3.32	1.01	24.41	19.44	6.56
22000	11.78	28.64	15.32	19.50	3.40	1.00	24.11	19.21	6.94
22500	11.18	28.48	13.83	15.09	3.47	0.99	24.04	19.30	7.66
23000	10.45	28.38	12.03	12.61	3.60	0.98	23.77	18.97	8.01
23500	9.72	28.21	10.93	11.74	3.73	0.98	23.60	18.42	7.96
24000	9.08	27.88	10.37	12.19	3.85	1.00	23.44	17.83	8.10

Typical Performance Curves

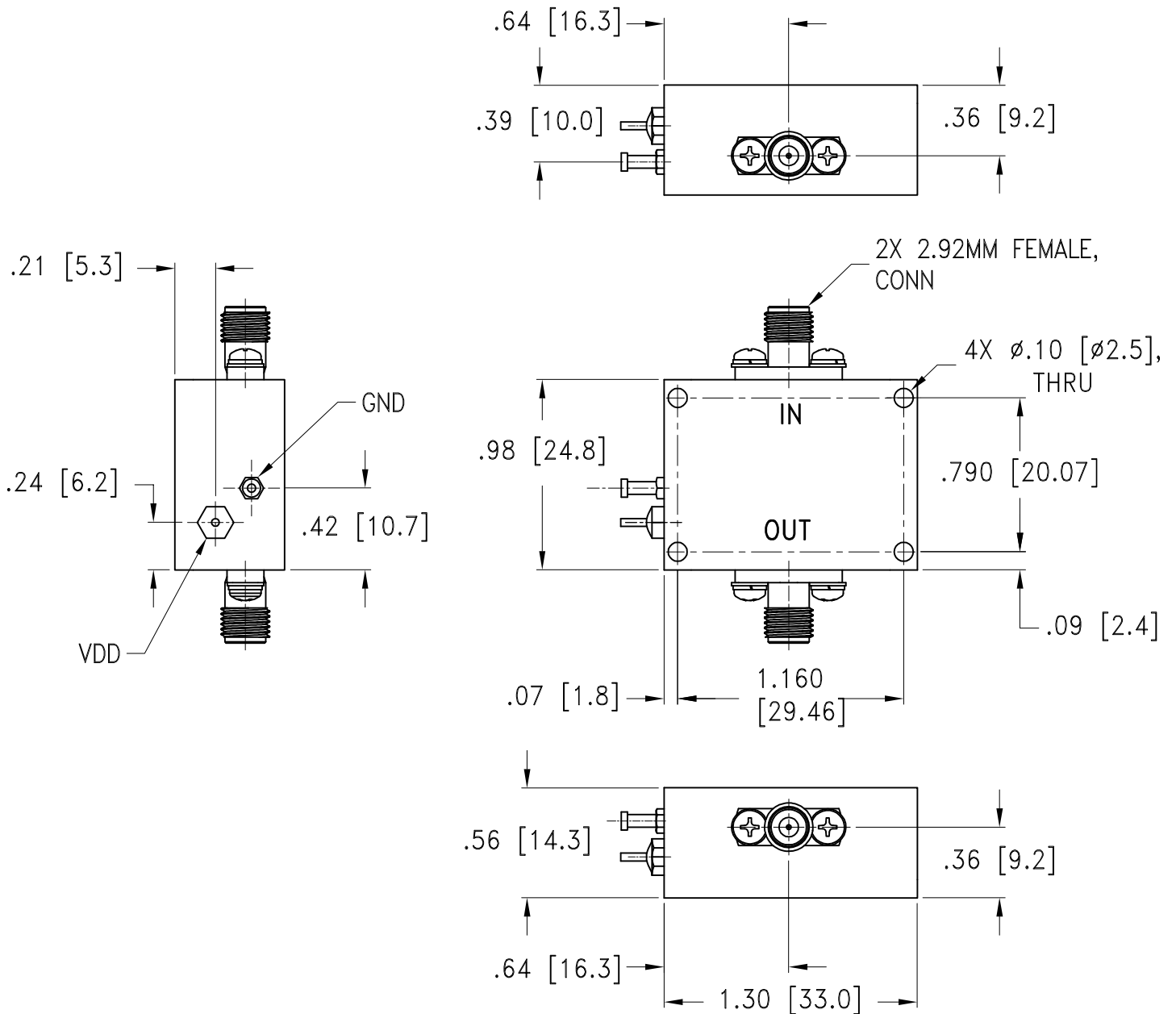


Case Style

RN

Outline Dimensions

RN2486-2



Weight: 73 grams

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

Notes:

1. Case material: Brass alloy.
2. Case finish: Gold Plating.

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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 65° C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
Stabilization Bake	(non-operating) 125°C, 24 hours	- - -
Burn-in at Elevated Temp.	(DC on) 160 hours at 85° C	MIL-STD-202, Method 108
Thermal Shock	-55° to 100°C, 5 cycles	MIL-STD-202, Method 107, Condition A, except 100°C