



COAXIAL

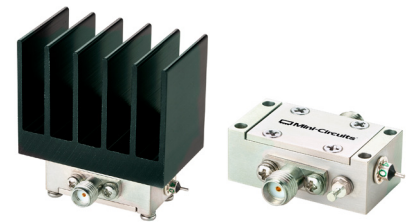
# Wideband Amplifier

## ZVA-02203LN+ ZVA-02203LN(X)+

50Ω 2 to 20 GHz Gain 30 dB SMA Female

### KEY FEATURES

- Ultra-Wideband Coverage, 2 to 20 GHz
- Excellent Gain Flatness, ±1.5 dB Typ
- Single +12V Supply
- Reverse Voltage Protected
- Compact Case for Ease of System Integration

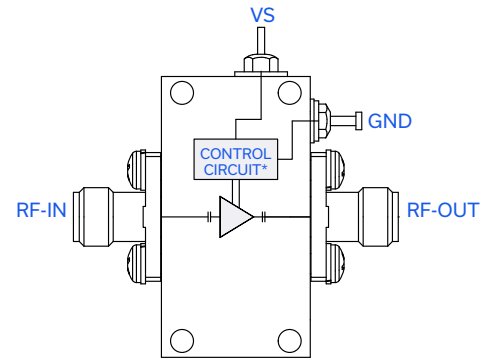


Generic photo used for illustration purposes only

### APPLICATIONS

- Fiber Optics
- Wideband Test and Instrumentation
- Military EW and Radar
- Satellite Systems
- 4G LTE & 5G FR1 Infrastructure
- WiFi 6E & WiFi 7
- Aerospace and Defense
- Microwave Point to Point Radio

### FUNCTIONAL DIAGRAM



\*Voltage Regulation, over-voltage, reverse voltage, and in-rush current protection circuit

### PRODUCT OVERVIEW

Mini-Circuits' ZVA-02203LN(X)+ is a coaxial, wideband amplifier offering flat gain across a wide frequency range from 2 to 20 GHz. This model operates on a single +12 V supply with 290 mA typical current consumption and is capable of delivering up to 60 mW output power at 1 dB compression. The amplifier comes in a rugged, compact case (1.2" x 0.64" x 0.45") with SMA (f) RF connectors.

### ELECTRICAL SPECIFICATIONS AT +25 °C BASEPLATE AND $V_{DD} = +12.0$ V

Parameter	Condition (GHz)	Min.	Typ.	Max.	Units
Frequency Range	-	2	-	20	GHz
Gain	2 – 20	27	30	-	dB
Noise Figure	2 – 14	-	3.5	-	dBm
	18 – 20	-	2.5	-	
Input Return Loss	2 – 20	11.0	13.0	-	dB
Output Return Loss	2 – 20	11.0	13.0	-	dB
Output Power at 1 dB Compression (P1dB)	2 – 14	+18.5	+20.0	-	dBm
	18 – 20	+17.0	+18.0	-	
Output Third Order Intercept Point (Output Power = +5 dBm/tone)	2-20	-	+28.0	-	dBm
DC Supply Voltage ( $V_S$ )	-	+10.0	-	+12.0	V
DC Current	-	-	290	320	mA





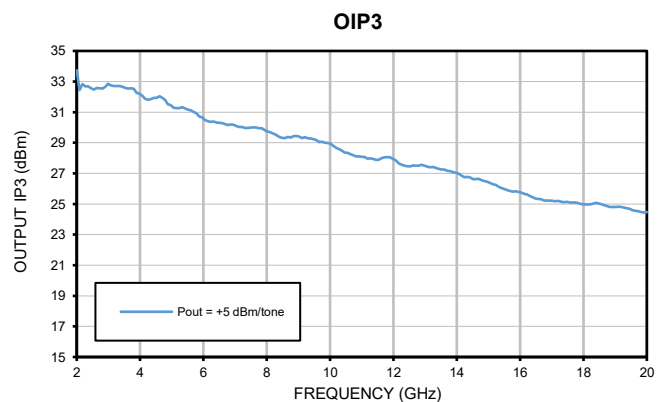
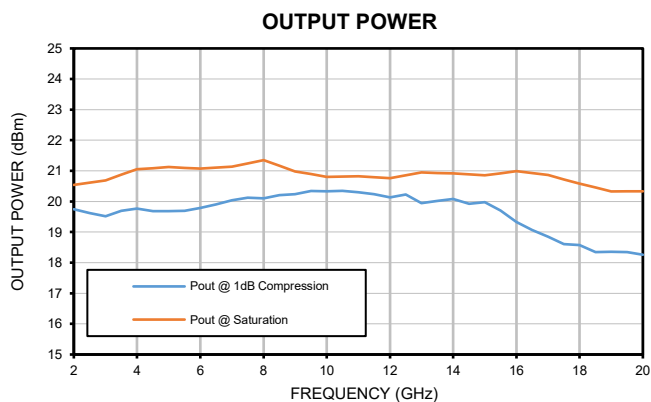
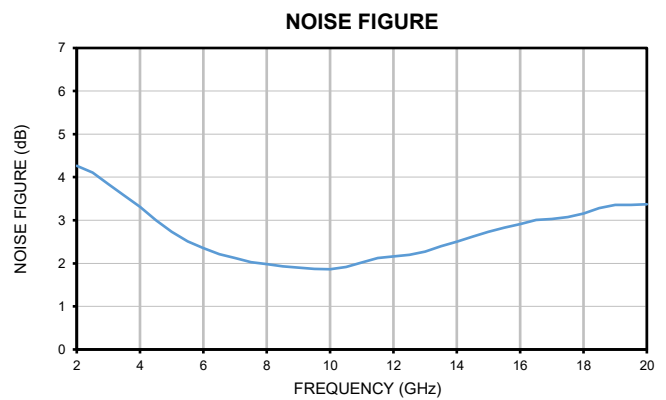
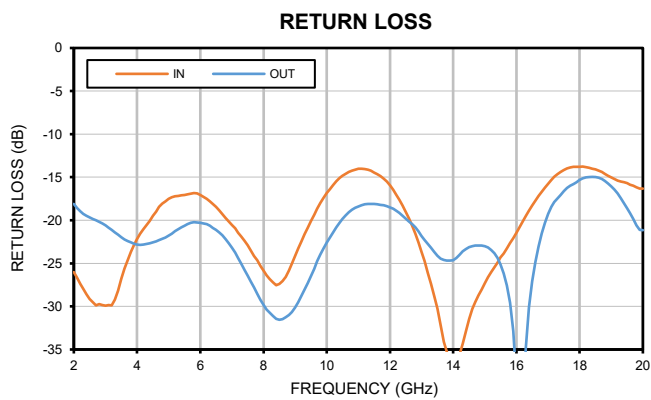
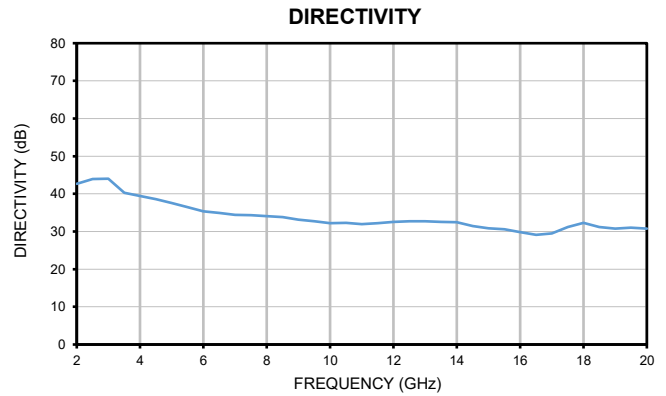
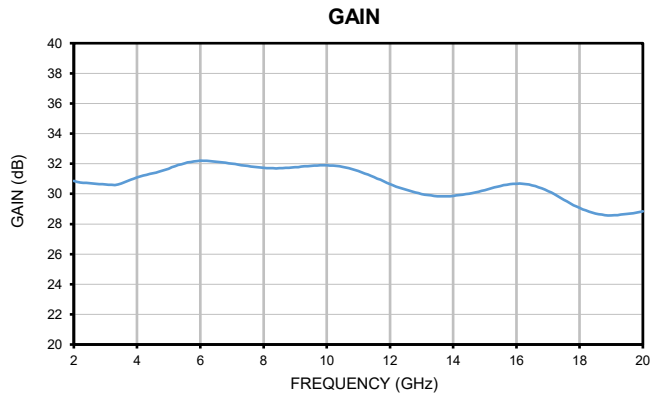
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# Wideband Amplifier

## ZVA-02203LN+ ZVA-02203LNX+

50Ω 2 to 20 GHz Gain 30 dB SMA Female

### TYPICAL PERFORMANCE GRAPHS





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# Wideband Amplifier

**ZVA-02203LN+**  
**ZVA-02203LNX+**

50Ω 2 to 20 GHz Gain 30 dB SMA Female

## ABSOLUTE MAXIMUM RATINGS<sup>1</sup>

Parameter	Ratings
Operating Temperature (Baseplate)	-45°C to +85 °C
Storage Temperature	-55 °C to +100 °C
Total Power Dissipation	4.0 W
RF Input Power <sup>2</sup> (CW), Vs = +12.0 V	+5 dBm
DC Operating Voltage <sup>3</sup> (Vs)	+13 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

<i>MAXIMUM THERMAL RESISTANCE</i>	$= \frac{\text{MAXIMUM OPERATING CASE TEMP} - \text{MAXIMUM USER AMBIENT TEMP}}{\text{POWER DISSIPATION}}$
<b>Example:</b>	<p>MAXIMUM OPERATING CASE TEMP = +50 °C (CHECK MAXIMUM RATINGS TABLE FOR THIS VALUE)</p> <p>MAXIMUM USER AMBIENT TEMP = +30 °C (USER DEFINED)</p> <p>POWER DISSIPATION = 10 WATTS (CHECK MAXIMUM RATINGS TABLE FOR THIS VALUE)</p> <p>THEN MAXIMUM ALLOWABLE THERMAL RESISTANCE = 2 °C/W</p>





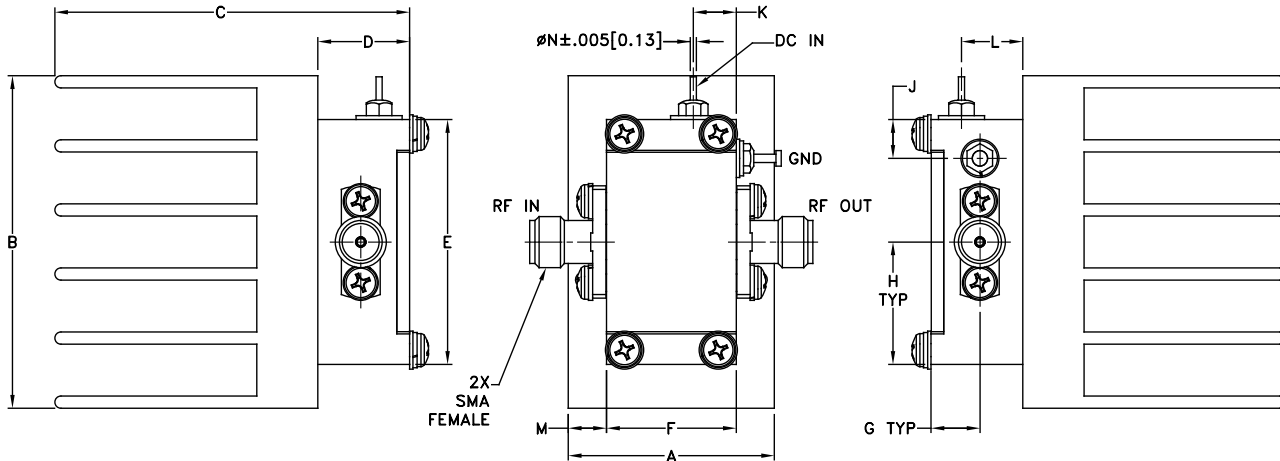
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# Wideband Amplifier

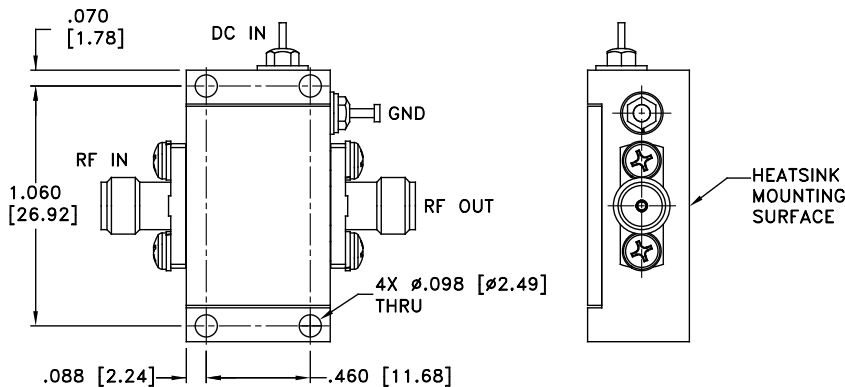
## ZVA-02203LN+ ZVA-02203LNX+

50Ω 2 to 20 GHz Gain 30 dB SMA Female

### CASE STYLE DRAWING FOR MODELS WITH HEATSINK (ZVA-02203LN+)



### CASE STYLE DRAWING FOR MODELS WITHOUT HEATSINK (ZVA-02203LNX+)



CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N
AV3598	1.01 (25.65)	1.63 (41.40)	1.74 (44.20)	0.45 (11.43)	1.20 (30.48)	0.64 (16.26)	0.24 (15.24)	0.06 (15.24)	0.19 (4.83)	0.21 (5.33)	0.30 (7.62)	0.19 (4.75)	0.03 (0.76)

Weight: 58 grams; Without Heatsink 17 grams  
Dimensions are in inches [mm]. Tolerances: 2 PL±.03; 3 PL ±.015 Inches





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# Wideband Amplifier

## ZVA-02203LN+ ZVA-02203LNX+

50Ω 2 to 20 GHz Gain 30 dB SMA Female

### ADDITIONAL INFORMATION IS AVAILABLE ON OUR DASHBOARD.

Performance Data & Graphs	Data
	Graphs
	S-Parameter (S2P Files) Data Set (.zip file)
RoHS Status	Compliant
Environmental Ratings	ENV141
Export Information	ECCN# EAR99

### ORDERING INFORMATION

Model No. Links	<a href="#">ZVA-02203LN+</a>	<a href="#">ZVA-02203LNX+</a>
Option	With heatsink	Without heatsink
Product Marking	ZVA-02203LN+	ZVA-02203LNX+
Case Style	AV3598	AV3598
Connector	SMA (Female)	

- 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/terms/viewterm.html](http://www.minicircuits.com/terms/viewterm.html)



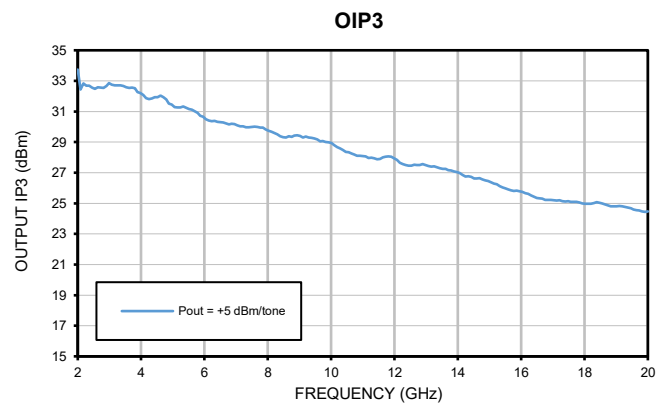
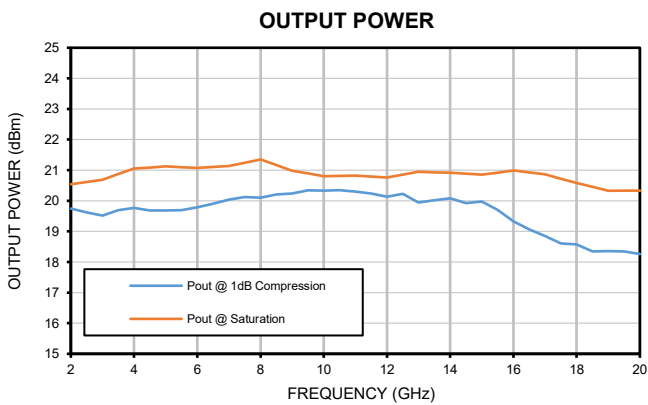
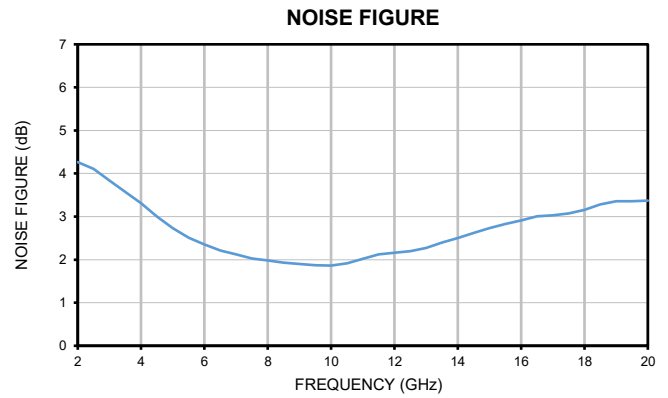
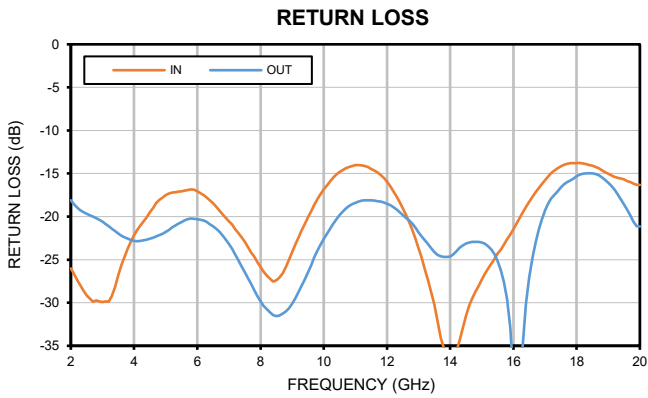
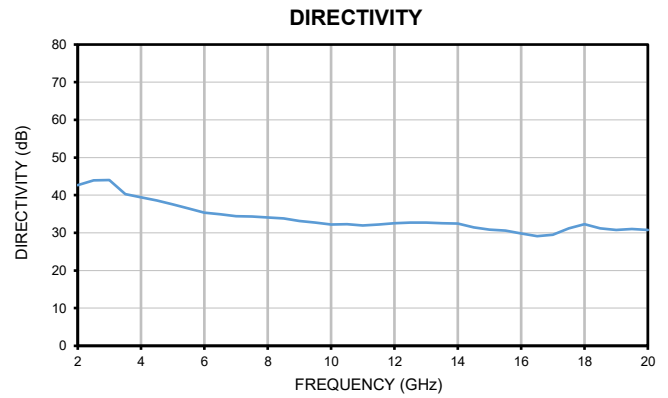
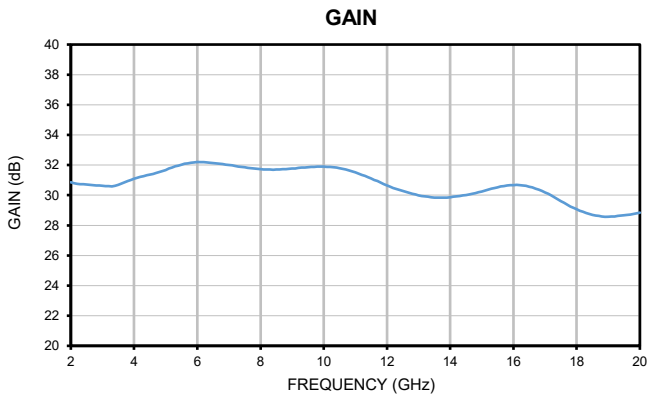
## Typical Performance Data @ +25°C

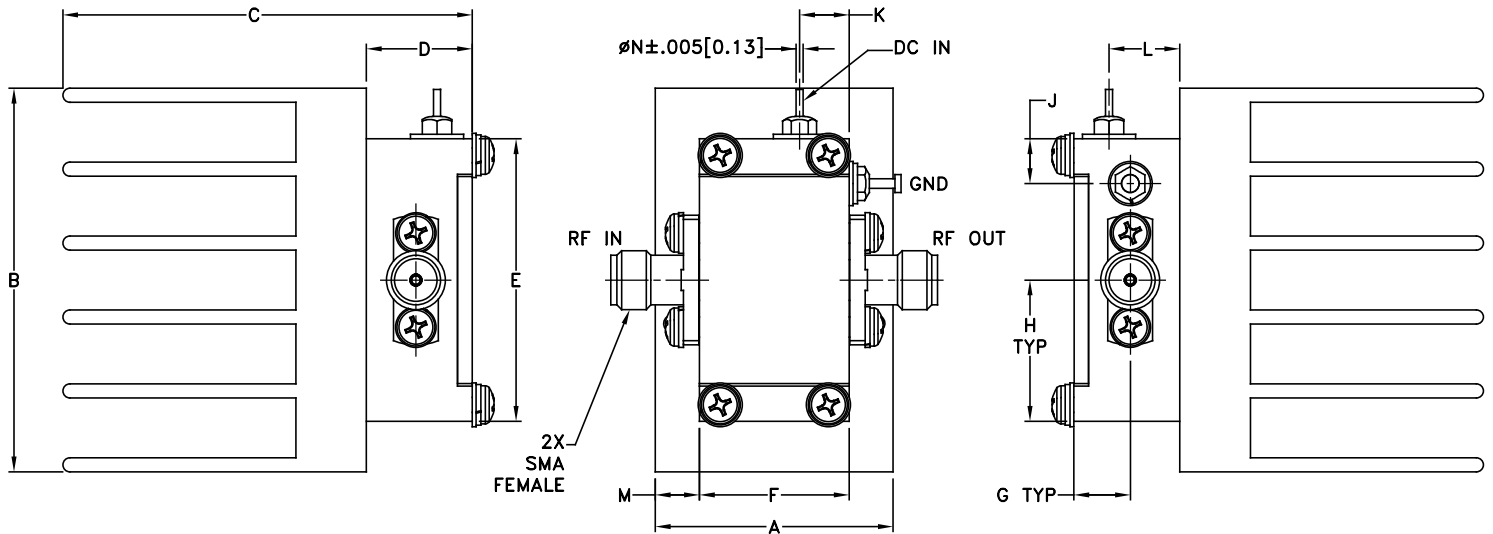
FREQUENCY (GHz)	GAIN (dB)	DIRECTIVITY (dB)	RETURN LOSS (dB)		Pout @ 1 dB COMPRESSION (dBm)	Pout at SATURATION (dBm)	Noise Figure (dB)	OUTPUT IP3 (dBm)	
			IN	OUT				@ +5 dBm	
2.0	30.28	42.64	25.40	17.54	19.80	20.54	4.26	33.74	
2.5	30.19	43.92	28.07	19.46	19.99	20.62	4.11	32.56	
3.0	30.19	44.02	30.28	20.34	19.90	20.69	3.84	32.85	
3.5	30.29	40.27	28.76	21.67	20.04	20.87	3.58	32.67	
4.0	30.73	39.47	23.39	22.71	20.08	21.06	3.31	32.22	
4.5	31.03	38.57	20.27	22.67	19.76	21.09	3.00	31.93	
5.0	31.37	37.60	17.87	22.01	20.14	21.12	2.73	31.46	
5.5	31.74	36.43	17.03	20.81	20.10	21.10	2.51	31.25	
6.0	31.96	35.38	16.81	20.23	20.15	21.08	2.35	30.66	
6.5	31.94	34.93	18.05	20.87	20.18	21.11	2.21	30.31	
7.0	31.85	34.44	19.80	22.69	20.31	21.14	2.12	30.17	
7.5	31.71	34.30	22.23	25.76	20.34	21.25	2.03	29.98	
8.0	31.60	34.06	25.87	29.23	20.30	21.35	1.98	29.83	
8.5	31.57	33.81	28.09	31.46	20.22	21.17	1.93	29.31	
9.0	31.64	33.12	25.25	30.68	20.31	20.98	1.90	29.44	
9.5	31.75	32.69	21.03	27.30	20.30	20.90	1.87	29.24	
10.0	31.85	32.24	17.61	23.27	20.27	20.81	1.86	28.98	
10.5	31.76	32.27	14.97	20.26	20.28	20.82	1.92	28.36	
11.0	31.54	31.92	14.06	18.53	20.23	20.82	2.02	28.09	
11.5	31.18	32.25	14.22	18.09	20.15	20.79	2.13	27.89	
12.0	30.79	32.53	15.47	18.34	20.11	20.76	2.16	27.93	
12.5	30.39	32.70	18.05	19.47	20.04	20.85	2.20	27.45	
13.0	30.02	32.73	22.43	21.28	20.05	20.94	2.27	27.50	
13.5	29.77	32.58	29.02	23.67	19.88	20.93	2.40	27.28	
14.0	29.71	32.43	37.53	24.71	19.80	20.92	2.51	27.05	
14.5	29.83	31.43	33.59	23.32	19.69	20.88	2.62	26.73	
15.0	30.04	30.84	28.21	22.96	19.52	20.85	2.73	26.45	
15.5	30.35	30.58	25.14	24.28	19.02	20.92	2.83	25.98	
16.0	30.60	29.80	22.28	32.34	19.05	20.99	2.91	25.79	
16.5	30.65	29.12	18.59	29.82	18.88	20.93	3.01	25.36	
17.0	30.35	29.52	16.05	20.26	18.57	20.86	3.03	25.22	
17.5	29.91	31.22	14.39	17.07	18.39	20.72	3.07	25.14	
18.0	29.32	32.27	13.86	15.56	18.12	20.58	3.16	24.98	
18.5	28.93	31.21	14.09	14.95	18.17	20.46	3.28	25.04	
19.0	28.77	30.76	14.98	15.70	17.97	20.33	3.35	24.80	
19.5	28.84	31.04	15.74	18.06	18.02	20.33	3.36	24.69	
20.0	28.93	30.76	16.32	21.41	18.09	20.34	3.37	24.47	

# Coaxial Amplifier

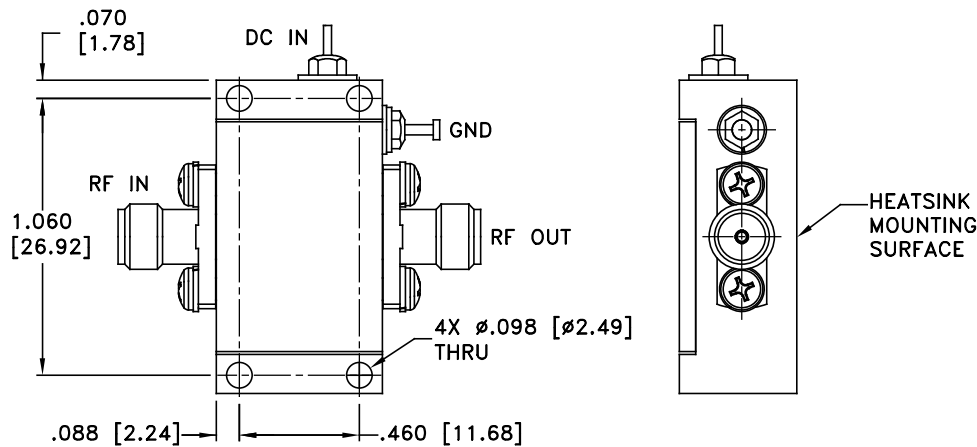
## Typical Performance Curves

# ZVA-02203LN(X)+





### MOUNTING INFORMATION OF MODEL WITHOUT HEATSINK



CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N
AV3598	1.01 (25.65)	1.63 (41.40)	1.74 (44.20)	0.45 (11.43)	1.20 (30.48)	0.64 (16.26)	0.24 (15.24)	0.06 (15.24)	0.19 (4.83)	0.21 (5.33)	0.30 (7.62)	0.19 (4.75)	0.03 (0.76)

### Notes:

1. Case material: Aluminum
2. Case finish: Tri-alloy
3. Heat sink finish: Black anodize

Weight: 58 grams; Without Heatsink 17 grams

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



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	See Data Sheet	Individual Model Data Sheet
Storage Temperature	See Data Sheet	Individual Model Data Sheet
Burn-in	(DC on) 72 hours at 25°C	----
Thermal Shock	-55 °C to +100 °C, 5 cycles	MIL-STD-202, Method 108
Vibration	Random Vibration (non-operating)	MIL-STD-883K, Method 2025, Cond. 1A