



COAXIAL

Wideband Microwave Amplifier **ZX60-02203LPN+**

50Ω 2 to 20 GHz SMA Female

THE BIG DEAL

- Ultra Wideband performance
- Medium power, +15dBm P1dB typ.
- High gain and excellent gain flatness, <1dB, p-p typ.
- Voltage regulated internally and reverse voltage protected
- Excellent directivity, 20 dB typ.
- Protected by US patent 6,790,049



Generic photo used for illustration purposes only

Model No.	ZX60-02203LPN+
Case Style	GC957
Connectors	SMA Female

+RoHS Compliant

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

APPLICATIONS

- Microwave point-to-point radios
- Military EW and radar
- Satellite Systems
- Suitable for low phase noise applications

PRODUCT OVERVIEW

Mini-Circuits' ZX60-02203LPN+ is a wideband connectorized amplifier providing a combination of high gain, medium power, and high IP3 over a very wide frequency range, supporting a diverse range of applications and many systems where high performance over a wideband is needed. This design operates on a single +5 V supply and comes in a rugged, compact unibody case (0.74 x 0.75 x 0.46") with SMA connectors, making it an excellent candidate for crowded system layouts.

KEY FEATURES

Feature	Advantages
Ultra-wideband 2-20 GHz	Enables a single amplifier to be used in a wide range of applications including EW and communication systems instrumentation and more.
High gain, 16 dB typ. across entire band, and excellent gain flatness, <1dB, p-p typ.	Reduces the number of gain stages, lowering component count and overall system cost.
Low operating voltage, +5V	The amplifier features low operating voltage
Rugged, unibody construction	Mini-Circuits unibody construction integrates the RF connector into the case body.
Excellent Directivity (Isolation-Gain), 20 dB typ	Ideal for use as a buffer amplifier, minimizing need for adjacent components.
Low additive phase noise, typically -164 dBc/Hz @10 KHz offset	Ideal for low phase noise synthesizer applications.

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50Ω 2 to 20 GHz SMA Female**ELECTRICAL SPECIFICATIONS AT 25°C AND +5V, UNLESS NOTED OTHERWISE**

Parameter	Condition (GHz)	$V_{DD}=5.0$			Units
		Min.	Typ.	Max.	
Frequency Range		2.0		20	GHz
Gain	2.0-6.0	13.5	16.5	—	dB
	6.0-10.0	13.5	16.5	—	
	10.0-14.0	13.5	16.0	—	
	14.0-18.0	13.5	16.2	—	
	18.0-20.0	12.5	15.7	—	
Input Return Loss	2.0-6.0	—	10.0	—	dB
	6.0-10.0	—	15.0	—	
	10.0-14.0	—	7.5	—	
	14.0-18.0	—	11.5	—	
	18.0-20.0	—	8.0	—	
Output Return Loss	2.0-6.0	—	13.0	—	dB
	6.0-10.0	—	10.0	—	
	10.0-14.0	—	14.0	—	
	14.0-18.0	—	10.0	—	
	18.0-20.0	—	11.5	—	
Output Power at 1dB Compression ¹	2.0-6.0	—	19.0	—	dBm
	6.0-10.0	—	19.0	—	
	10.0-14.0	—	17.0	—	
	14.0-18.0	—	15.0	—	
	18.0-20.0	—	14.0	—	
Output IP3 ²	2.0-6.0	—	32.0	—	dBm
	6.0-10.0	—	31.0	—	
	10.0-14.0	—	31.0	—	
	14.0-18.0	—	30.0	—	
	18.0-20.0	—	28.0	—	
Noise Figure	2.0-6.0	—	8.0	—	dB
	6.0-10.0	—	5.0	—	
	10.0-14.0	—	5.0	—	
	14.0-18.0	—	5.5	—	
	18.0-20.0	—	7.0	—	
Device Operating Voltage (V_{DD})	—	4.9	5.0	7.0	V
Device Operating Current (I_{DD})	—	—	79	130	mA

1. Current increases at P1dB

2. OIP3 measured with 0 dBm tones and 1 MHz spacing.

ABSOLUTE MAXIMUM RATINGS³

Parameter	Ratings
Operating Temperature (ground lead)	-40°C to 85°C
Storage Temperature	-55°C to 100°C
Total Power Dissipation	0.9 W
Input Power (CW), $V_d=5V$	7 dBm
DC Voltage	7V

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

Electrical maximum ratings are not intended for continuous normal operation.



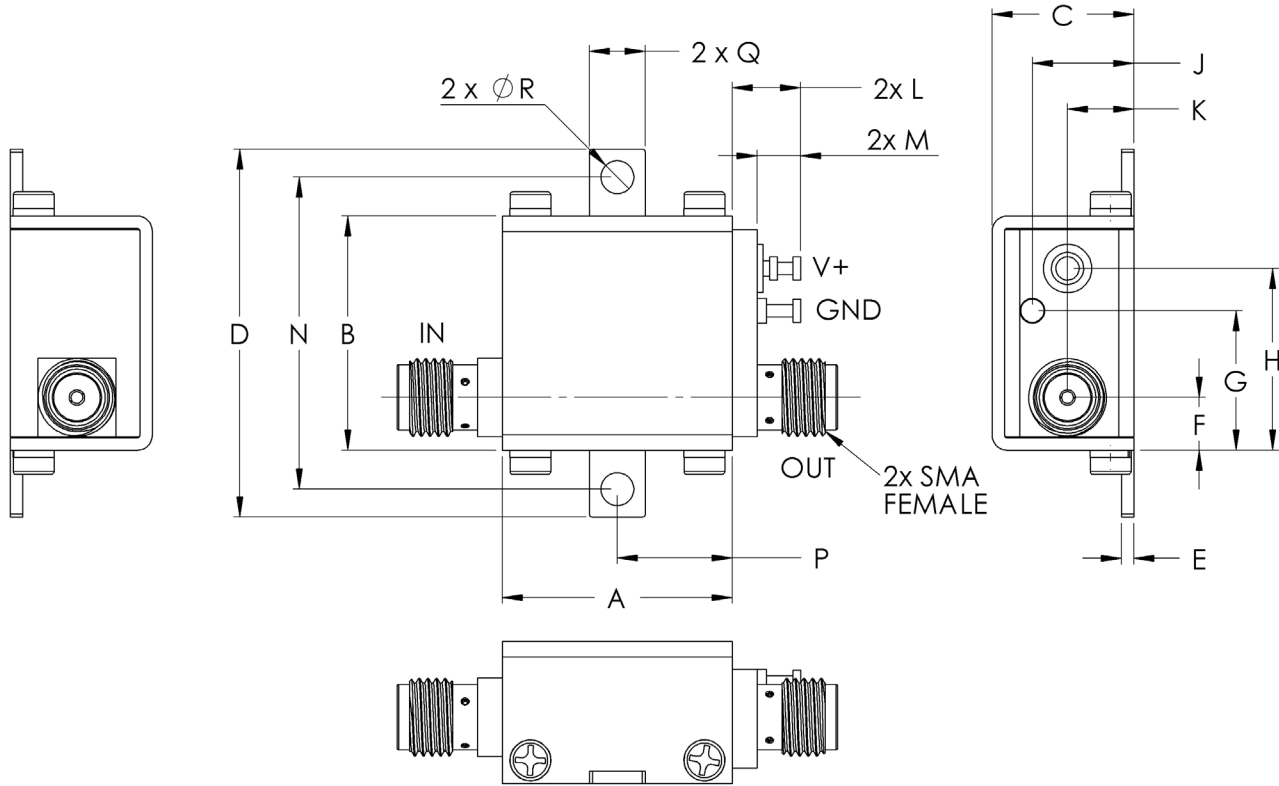


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OUTLINE DRAWING



⚠ NOTE: When soldering the DC connections, caution must be used to avoid overheating the DC terminal. See Application Note. [AN-40-010](#).

OUTLINE DIMENSIONS (Inches) mm

A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	wt
.74	.75	.46	1.18	.04	.17	.45	.59	.33	.21	.22	.14	1.00	.37	.18	.106	grams
18.80	19.1	11.68	30.0	1.02	4.32	11.4	14.99	8.38	5.33	5.59	3.56	25.40	9.40	4.57	2.69	23.0



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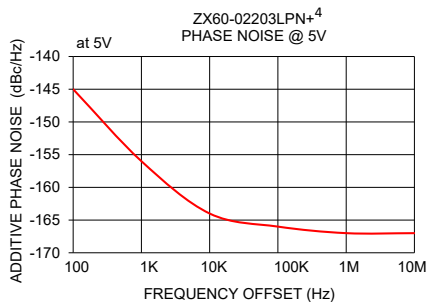
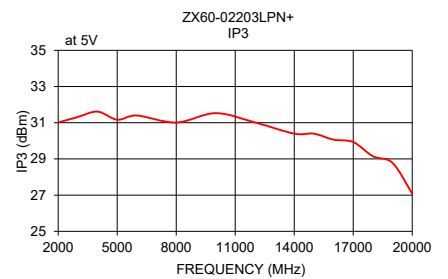
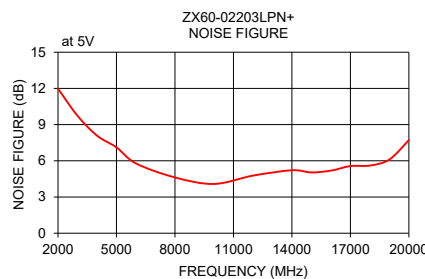
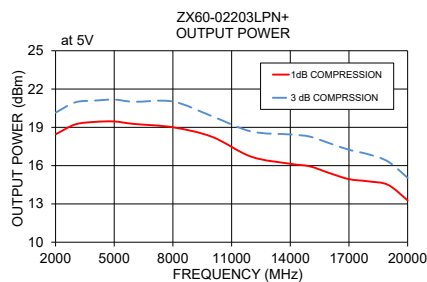
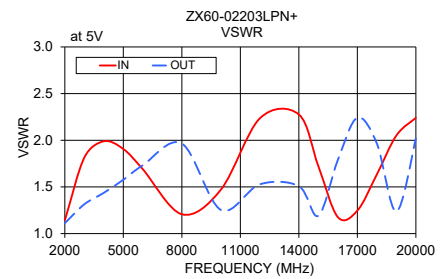
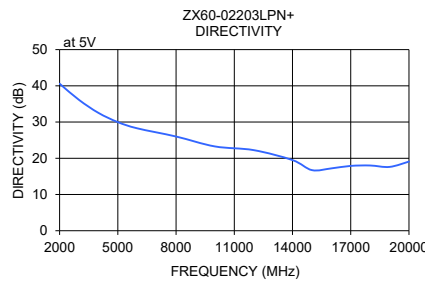
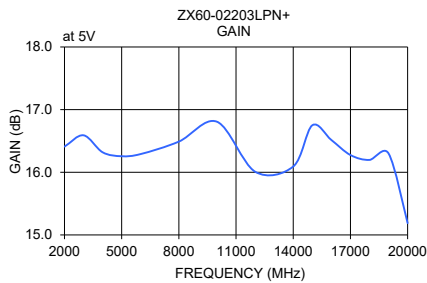
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TYPICAL PERFORMANCE DATA/CURVES

Frequency (MHz)	Gain (dB)	Directivity (dB)	VSWR (:1) 5V		Power Out @ 1 dB COMPR. (dBm)	Noise Figure (dB)	IP3 (dBm)	Frequency Offset (Hz)	Additive Phase Noise (dBc/Hz)
	5V	5V	IN	OUT	5V	5V	5V	5V	
2000	16.41	40.60	1.14	1.11	18.45	11.98	31.01	100	-145
3000	16.59	36.12	1.81	1.31	19.22	9.74	31.32	1K	-156
4000	16.32	32.53	1.99	1.44	19.42	8.09	31.61	10K	-164
5000	16.26	29.98	1.91	1.58	19.46	7.11	31.17	100K	-166
6000	16.29	28.27	1.69	1.73	19.27	5.78	31.40	1M	-167
8000	16.49	26.01	1.21	1.97	19.00	4.62	31.01	10M	-167
10000	16.81	23.27	1.47	1.25	18.26	4.08	31.53		
12000	16.01	22.25	2.23	1.53	16.70	4.77	31.02		
14000	16.09	19.50	2.28	1.51	16.14	5.22	30.40		
15000	16.75	16.73	1.72	1.19	15.94	5.04	30.40		
16000	16.52	17.21	1.18	1.79	15.42	5.19	30.06		
17000	16.28	17.90	1.25	2.24	14.94	5.56	29.93		
18000	16.20	18.01	1.63	1.96	14.77	5.61	29.15		
19000	16.30	17.62	2.05	1.24	14.49	6.11	28.78		
20000	15.19	19.09	2.24	2.02	13.27	7.72	27.08		

4. Typical Additive Phase Noise @4GHz, 2 dBm Input Power..



- 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

