

**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.
- Suitable for low phase noise applications



CASE STYLE: GC957

**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.

**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.  
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Coaxial

# Wideband Microwave Amplifier

ZX60-02203LPN+

50Ω

2 to 20 GHz

## Features

- High Gain, 16 dB typ, over 2 to 18 GHz
- Medium Power, 15 dBm P1dB typ
- Excellent Linearity, 30 dBm typ.
- Excellent Directivity, 20 dB typ

## Applications

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



Generic photo used for illustration purposes only

CASE STYLE: GC957

Connectors Model

SMA ZX60-02203LPN+

**+RoHS Compliant**

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

## Electrical Specifications at 25°C and 5V, unless noted

Parameter	Condition (GHz)	V <sub>DD</sub> =5.0			Units
		Min.	Typ.	Max.	
Frequency Range		2.0		20.0	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 <sup>(1)</sup>	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 IP <sub>3</sub> <sup>2</sup>	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 <sub>DD</sub> )		4.9	5.0	7.0	V
Device Operating Current (I <sub>DD</sub> )			79	130	mA

1. Current increases at P1dB

2. OIP<sub>3</sub> measured with 0 dBm tones and 1 MHz spacing.

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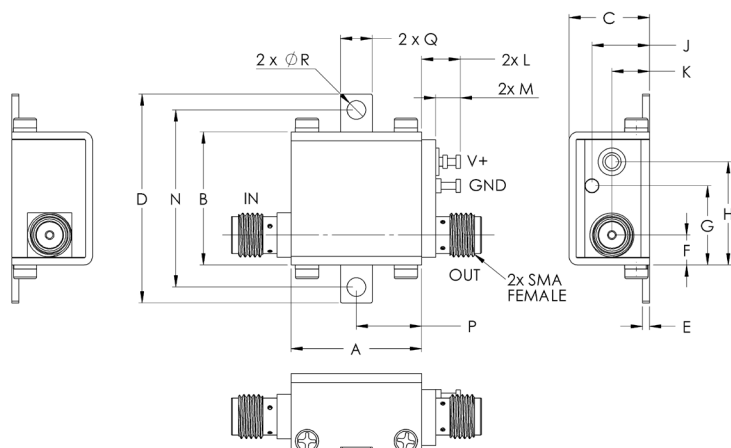
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ZX60-02203LPN+  
AG/CP/AM  
200521  
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## Absolute Maximum Ratings<sup>3</sup>

Parameter	Ratings
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
Total Power Dissipation	0.9 W
Input Power (CW), Vd=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.

## 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 (inch/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

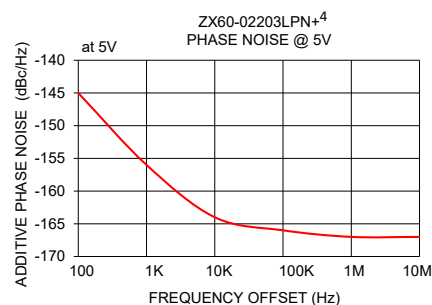
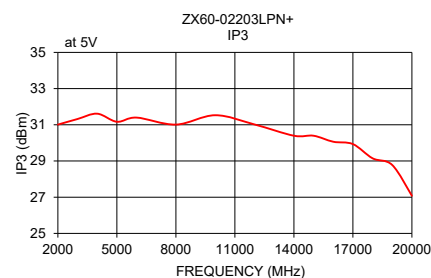
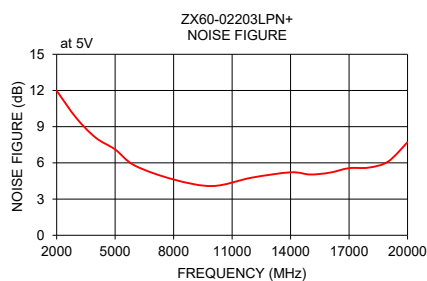
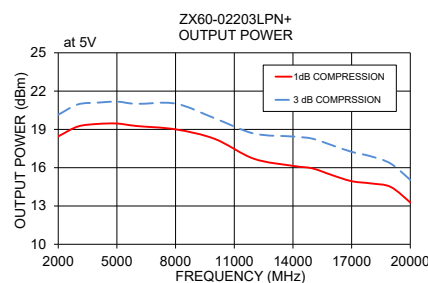
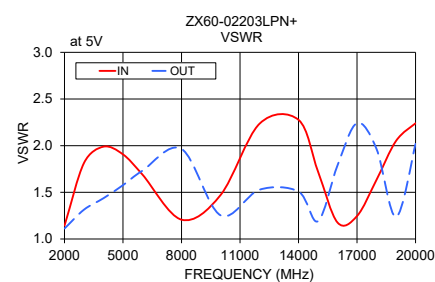
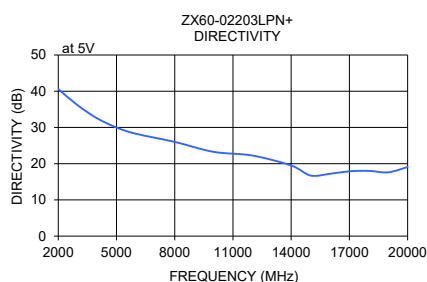
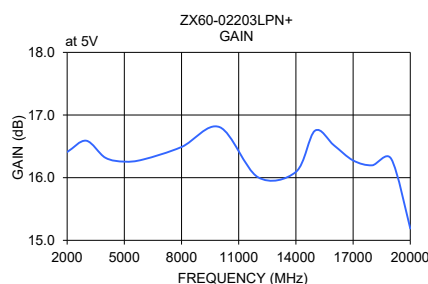
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FREQUENCY (MHz)	GAIN (dB)	DIRECTIVITY (dB)	VSWR (:1)		POWER OUT @1 dB COM- PR.(dBm)	NF (dB)	IP3 (dBm)	FREQUENCY OFFSET (Hz)	ADDITIVE <sup>4</sup> PHASE NOISE (dBc/Hz)
	5V	5V	IN	OUT	5V	5V	5V		5V
2000	16.41	40.60	1.14	1.11	18.45	11.98	31.01	100	-145
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.



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