



COAXIAL

Low Phase Noise Amplifier

ZX60-223LPN+

Mini-Circuits

50Ω 0.01 to 22 GHz SMA Female

KEY FEATURES

- Ultra Broadband Performance
- Gain, 16 dB typ.
- Output P1dB, +18 dBm typ.
- Output OIP3, +27 dBm typ.
- Voltage Regulated Internally and Reverse Voltage Protected
- Ultra-Low Additive Phase Noise, Typ. -172 dBc/Hz @10 kHz Offset

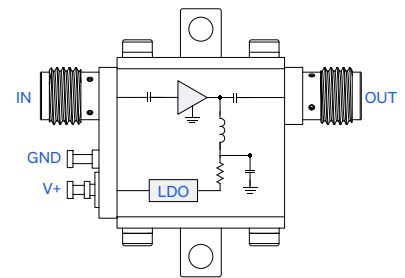


Generic photo used for illustration purposes only

APPLICATIONS

- Test and Measurement Equipment
- Radar, EW, and ECM Defense Systems
- 5G MIMO and Back Haul Radio Systems
- Signal Distribution Networks

FUNCTIONAL DIAGRAM



PRODUCT OVERVIEW

Mini-Circuits' ZX60-223LPN+ is an ultra-wideband amplifier utilizing a GaAs HBT (Mini-Circuits LVA-273-PN+) that provides extremely low additive phase noise and offers excellent gain over a broad frequency range. Housed in a rugged, compact unibody case (0.74 x 0.75 x 0.46") with SMA connectors, making it an excellent candidate for tough operating conditions and crowded system layouts.

ELECTRICAL SPECIFICATIONS AT +25°C

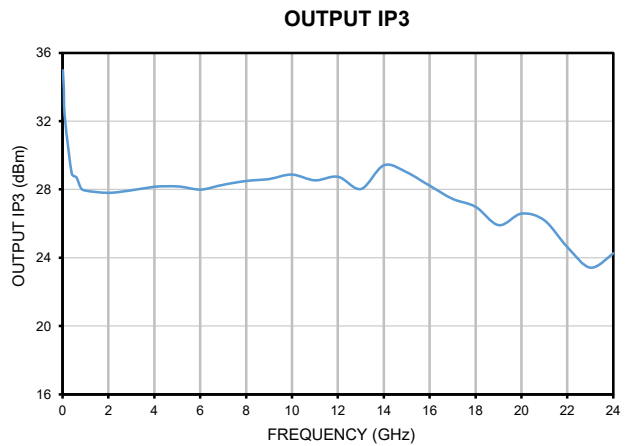
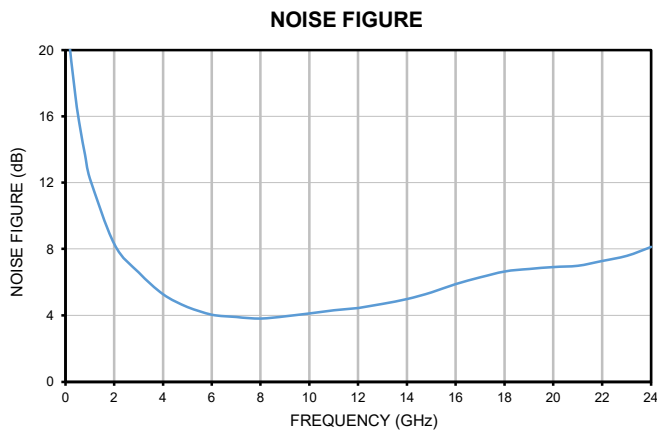
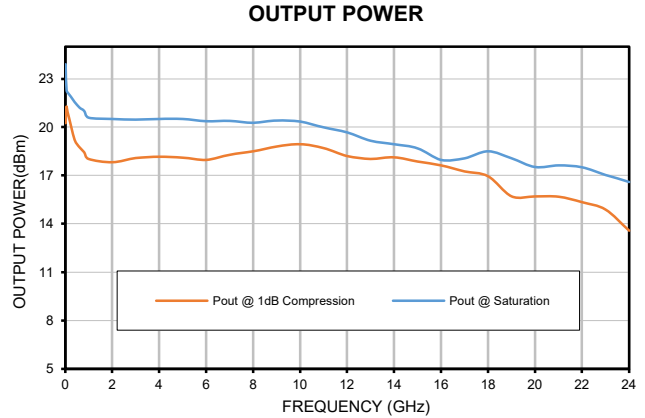
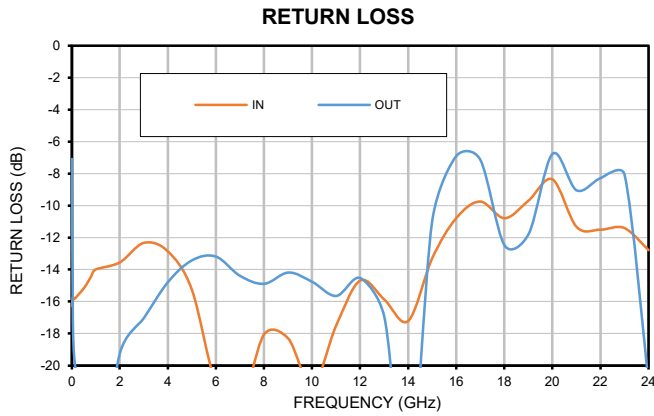
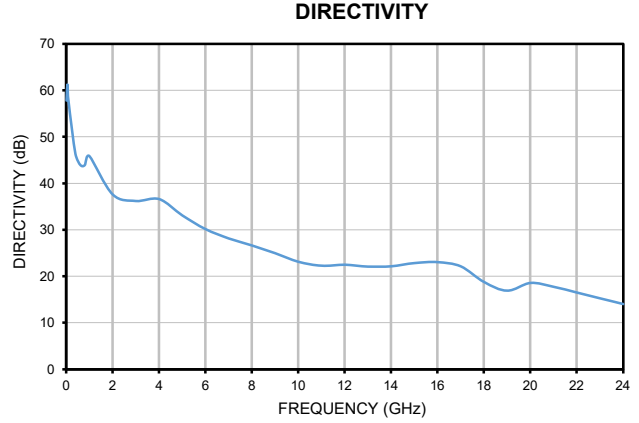
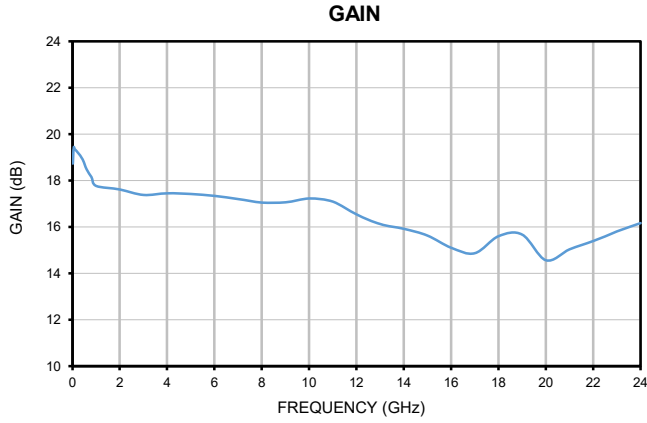
Parameter	Condition (GHz)	Min.	Typ.	Max.	Units
Frequency Range		.01		22	GHz
Gain	.01-10	15	17	—	dB
	10-22	12	15	—	
Output Power at 1 dB Compression (P1dB)	.01-10	+15	+18	—	dBm
	10-22	+12	+16	—	
Output Third Order Intercept Point (OIP3)	2-22	—	+27	—	dBm
Input Return Loss	.01-10	—	15	—	dB
	10-22	—	12	—	
Output Return Loss	.01-10	—	15	—	dB
	10-22	—	10	—	
Noise Figure	2-22	—	5.5	—	dB
Additive Phase Noise @10 kHz Offset	—	—	-174	—	dBc/Hz
DC Supply Voltage (Vs)	—	+5.9	+6	+9	V
DC Current ¹	—	—	110	150	mA

1. DC Current increases at P1dB/Psat as applicable.





TYPICAL PERFORMANCE GRAPHS





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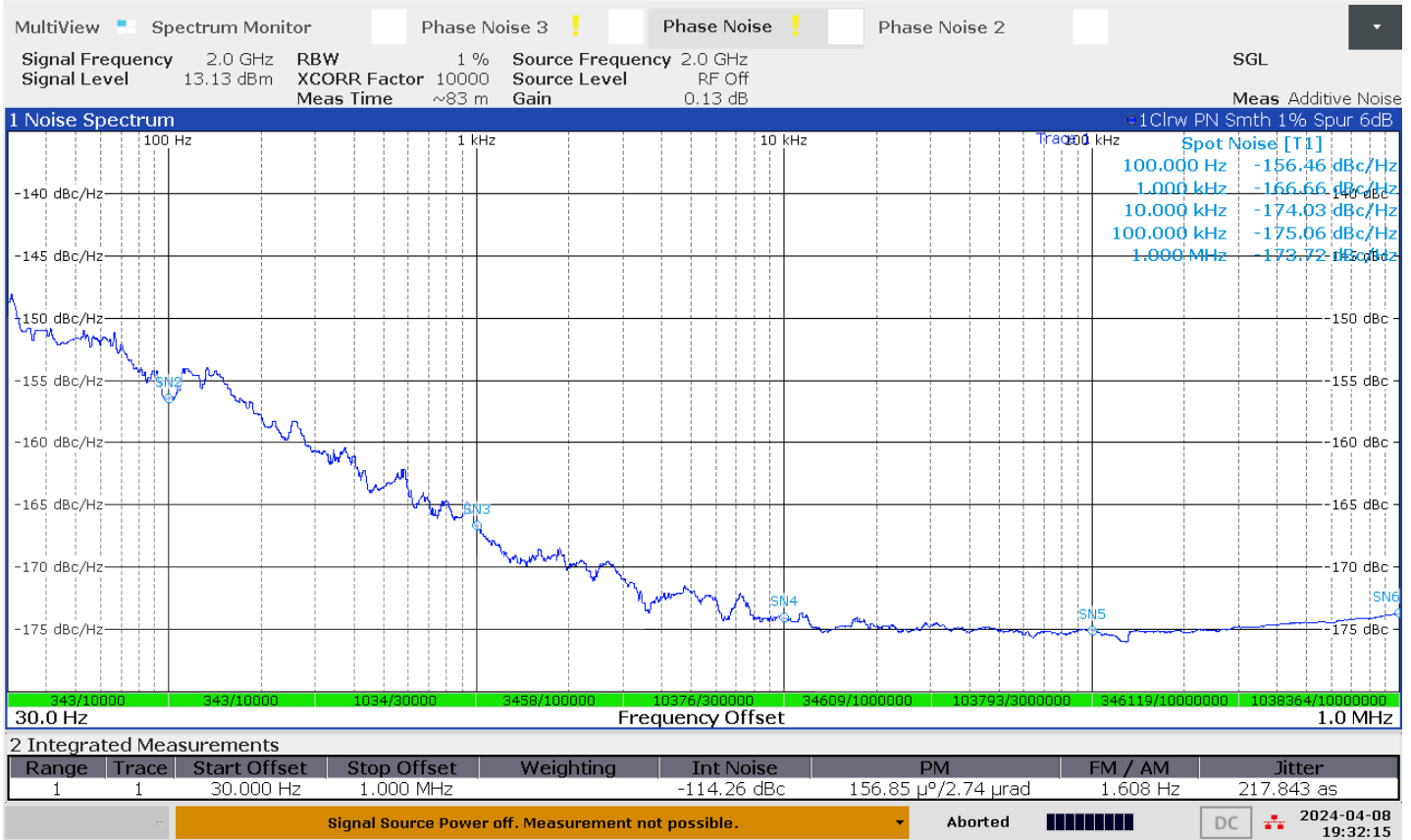
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ADDITIVE PHASE NOISE VS. OFFSET FREQUENCY



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ABSOLUTE MAXIMUM RATINGS²

Parameter	Ratings
Operating Temperature (Baseplate)	-40°C to +85°C
Storage Temperature	-55°C to +100°C
Total Power Dissipation	1.3 W
RF Input Power (CW) ³	+10 dBm
DC Operating Voltage (Vs)	+9.5 V

- 2. Continuous operation is not recommended at these extremes. Permanent damage may occur if any of these limits are exceeded.
- 3. Specified under matched load to 50 ohms.

DETERMINING MAXIMUM THERMAL RESISTANCE OF USERS' EXTERNAL HEAT SINK

<i>MAXIMUM THERMAL RESISTANCE</i>	$= \frac{\text{MAXIMUM OPERATING CASE TEMP} - \text{MAXIMUM USER AMBIENT TEMP}}{\text{POWER DISSIPATION}}$
Example:	<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>

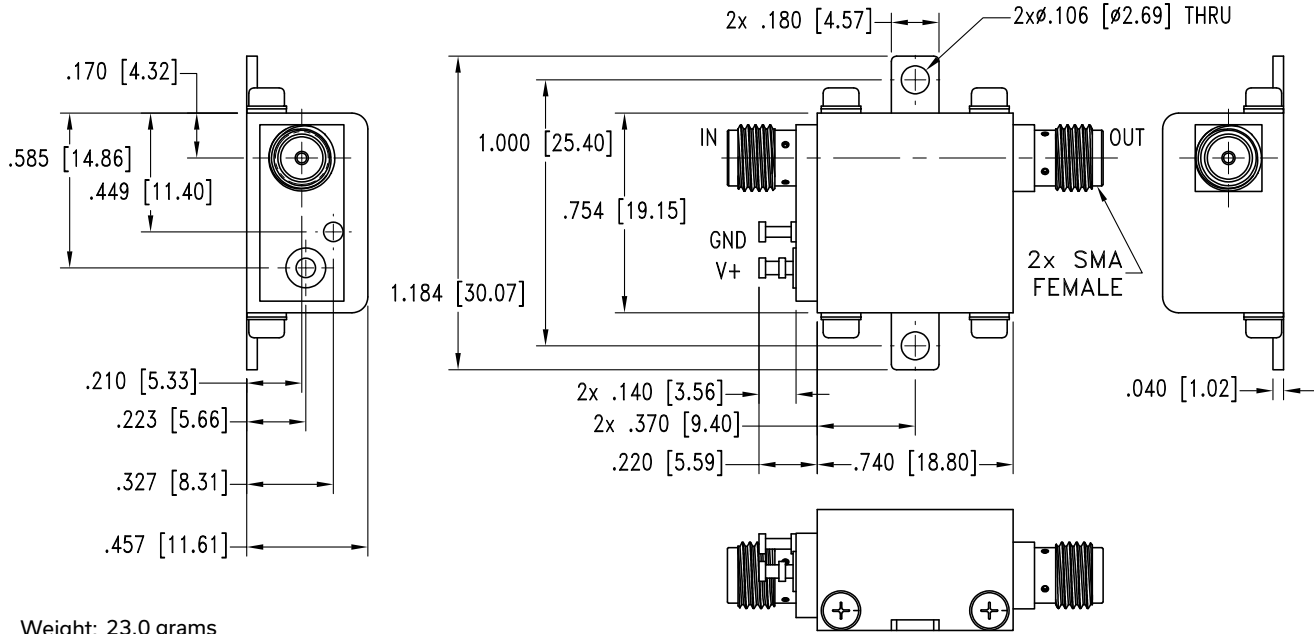


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CASE STYLE DRAWING



Weight: 23.0 grams

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

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



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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	ENV23T10
Export Information	ECCN# EAR99

ORDERING INFORMATION

Model No. Link	ZX60-223LPN+
Case Style	GC957-2
Connector	IN SMA/Female / OUT 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-Circuits' 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



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