



WIDEBAND

# Low Noise Amplifier

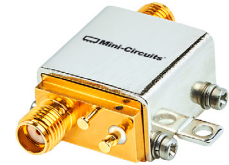
## ZX60-14LN-S+

Mini-Circuits

50Ω 0.05 to 10 GHz SMA Female

### THE BIG DEAL

- Low NF, <2dB Typ. to 7.5 GHz
- Very Flat Gain, 22 ± 0.7 dB Typ. to 8 GHz
- Wideband, 50 MHz to 10 GHz
- Single +6V Supply



Generic photo used for illustration purposes only

### APPLICATIONS

- Broadband Telecom
- LTE & 5G MIMO Infrastructure
- WiFi6E, IoT, & UWB
- L, S, C-Band Radar and SATCOM
- Test & Measurement Equipment
- R&D Lab, Production, and OTA Test Systems
- Communications and Radar Defense Systems

Model No.	ZX60-14LN-S+
Case Style	GC957
Connectors	SMA Female

#### +RoHS Compliant

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

### PRODUCT OVERVIEW

Mini-Circuits' ZX60-14LN-S+ is a low-noise amplifier offering industry-leading performance over its full frequency range from 50 MHz to 10 GHz. The internal MMIC amplifier utilizes E-pHEMT technology to achieve excellent noise figure performance in a unique configuration enabling the combination of very wide band performance and flat gain. This design operates on a single 6V supply.

### KEY FEATURES

Feature	Advantages
Ultra-wideband: 50 MHz – 10 GHz	Ideal for a wide range of transmitter applications including military, commercial wireless, and instrumentation.
Very flat gain	Ideal for broadband or multi-band applications. Just one, cost-efficient model required for multiple frequency usage.
High OIP3, +32 dBm typ., up to 10 GHz	Provides enhanced linearity over a broad frequency range.
High gain, 22 dB typ.	Reduces the number of gain stages, lowering component count and overall system cost.
Rugged unibody construction	Mini-Circuits' unibody construction integrates the RF connectors into the case body, providing high reliability and excellent survivability in critical applications.

REV. OR  
ECO-016347  
ZX60-14LN-S+  
MM/CP/AM  
230105





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### ELECTRICAL SPECIFICATIONS AT 25°C, Z<sub>0</sub> =50Ω AND +6V, UNLESS NOTED OTHERWISE

Parameter	Condition (GHz)	Min.	Typ.	Max.	Units
Frequency Range		0.05		10	GHz
Gain	0.05	21.0	22.0	23.9	dB
	0.8		22.5		
	2.0		22.2		
	3.2		22.0		
	4.0		21.9		
	5.2		21.8		
	8.0		20.6		
Gain Flatness	0.05-8.0		±1.0		dB
	0.05-10.0		±2.2		
Input Return Loss	0.05		22.2		dB
	0.8		24.0		
	2.0		17.4		
	3.2		14.1		
	4.0		13.2		
	5.2		14.5		
	8.0		18.4		
Output Return Loss	0.05		16.2		dB
	0.8		20.4		
	2.0		24.5		
	3.2		20.5		
	4.0		19.1		
	5.2		21.2		
	8.0		16.4		
Output Power at 1dB Compression	0.05		21.7		dBm
	0.8		22.8		
	2.0		22.8		
	3.2		21.3		
	4.0		21.6		
	5.2		21.3		
	8.0		19.6		
Output IP3	0.5		33.1		dBm
	2.0		32.3		
	4.0		30.8		
	8.0		32.8		
	10.0		33.5		
Noise Figure	0.05		1.81		dB
	0.8		1.07		
	2.0		1.22		
	3.2		1.32		
	4.0		1.40		
	5.2		1.59		
	8.0		2.20		
10.0	3.62				
Device Operating Voltage (V <sub>DD</sub> )	—	5.75	6.0	6.25	V
Device Operating Current (I <sub>DD</sub> )	—	—	72	96	mA





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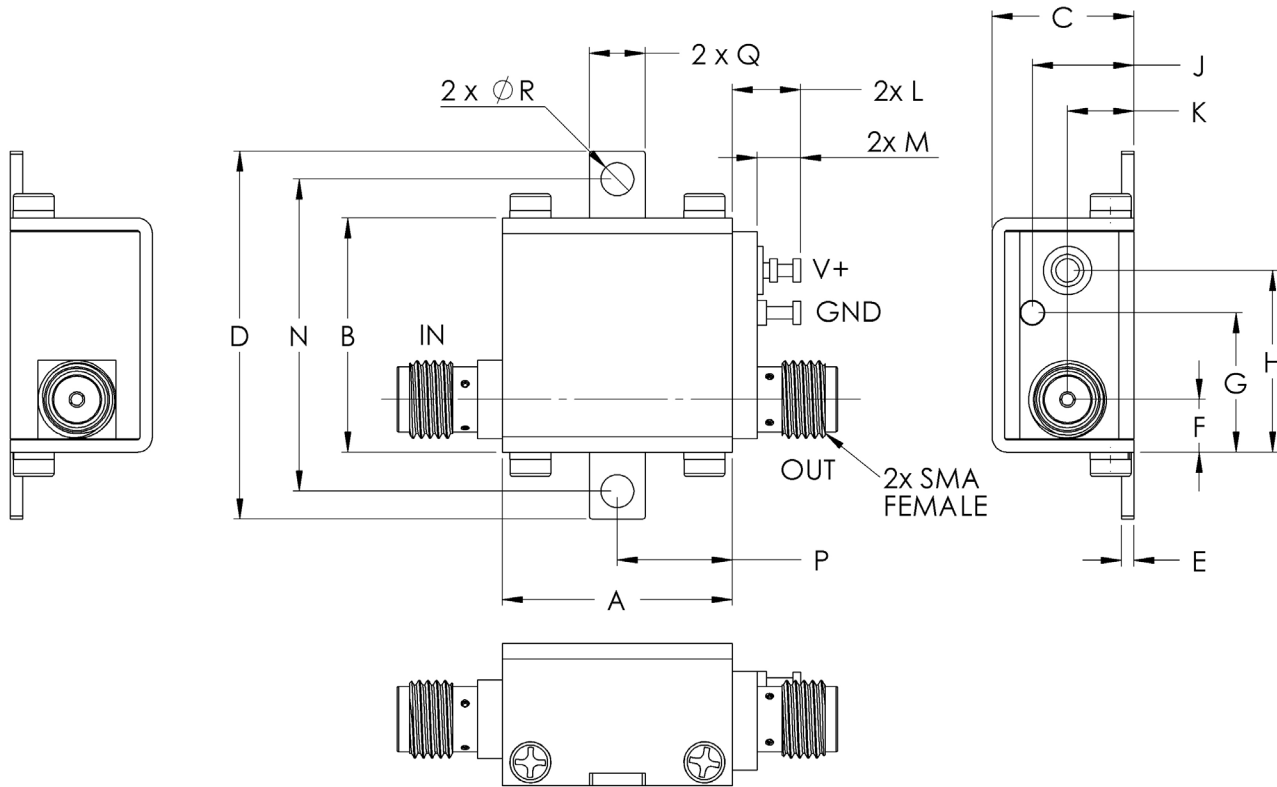
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### ABSOLUTE MAXIMUM RATINGS<sup>1</sup>

Parameter	Ratings
Operating Temperature (Baseplate)	-40°C to 85°C
Storage Temperature	-55°C to 100°C
Total Power Dissipation	0.6 W
Input Power	+25 dBm (5 minutes max.) +12 dBm (continuous)
DC Voltage Vdd	+7V

1. 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 (Inches)

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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### TYPICAL PERFORMANCE DATA

Frequency (MHz)	Gain (dB)	VSWR (:1)		Power Out @1 dB COMPR. (dBm)	Noise Figure (dB)	Frequency (MHz)	Output IP3 (dBm)
		IN	OUT				
50	21.99	1.2	1.4	21.72	1.81	500	33.06
500	22.49	1.1	1.2	22.46	1.03	2000	32.30
1000	22.41	1.2	1.2	22.91	1.07	4000	30.75
1600	22.25	1.2	1.1	22.65	1.31	8000	32.75
2000	22.19	1.3	1.1	22.83	1.22	10000	33.51
3000	22.06	1.5	1.2	22.40	1.40		
4000	21.92	1.6	1.2	21.57	1.40		
5000	21.79	1.5	1.2	21.54	1.52		
6000	21.61	1.3	1.1	21.10	1.71		
7000	21.35	1.1	1.3	21.07	1.90		
8000	20.62	1.3	1.4	19.63	2.20		
9000	19.53	1.4	1.2	17.08	2.92		
10000	18.21	1.5	1.1	15.94	3.62		





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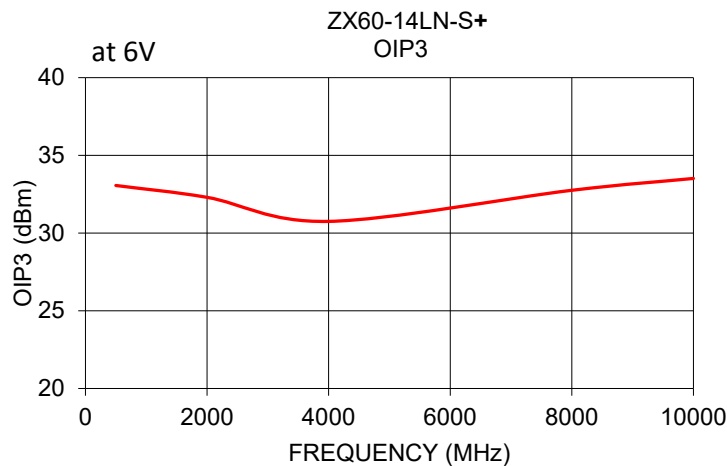
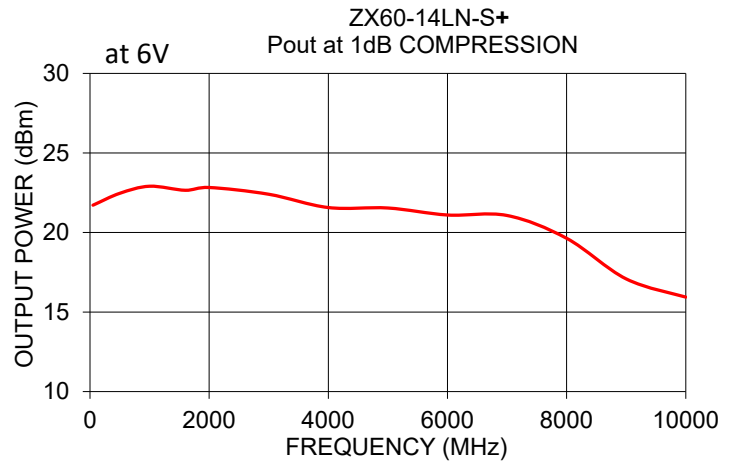
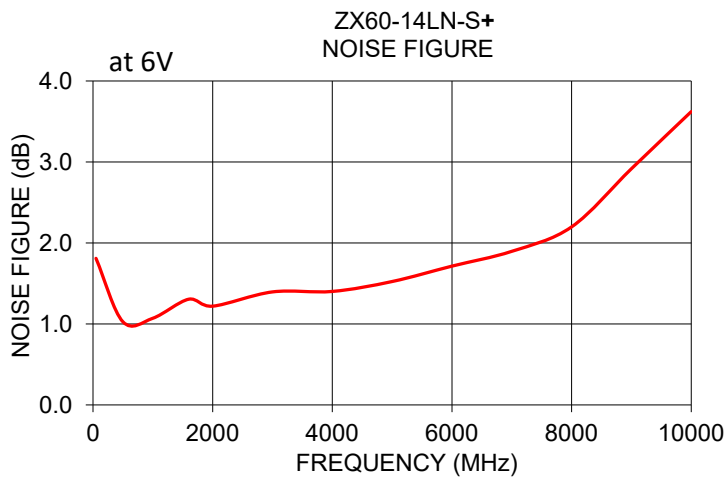
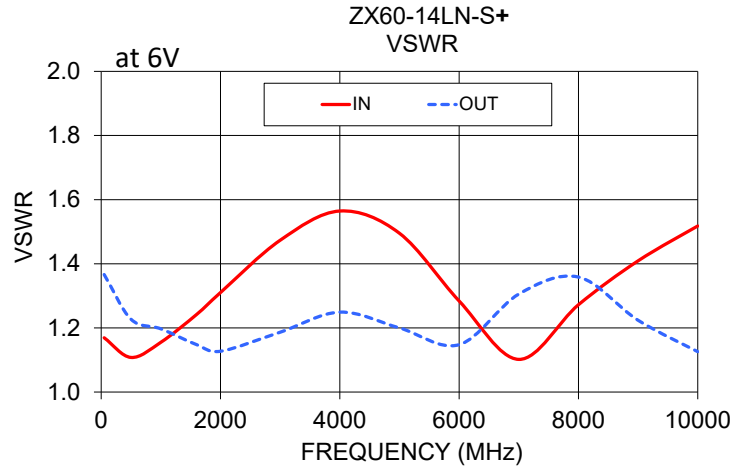
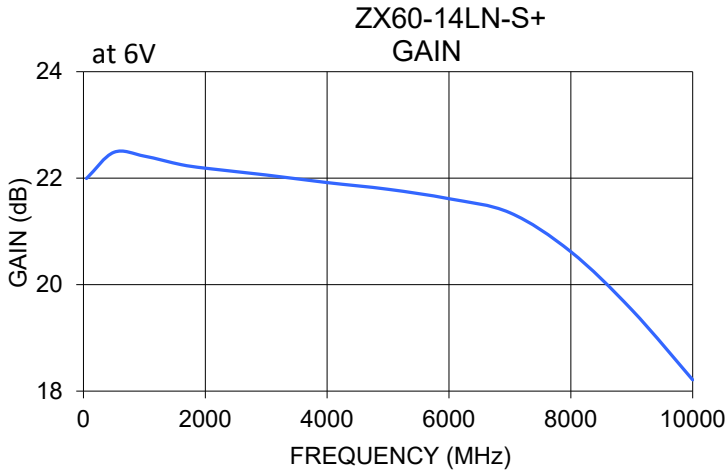
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### TYPICAL PERFORMANCE GRAPHS





#### 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)



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