

# Ultra Low Noise Amplifier

## ZX60-1614LN-S

50Ω 1217 MHz to 1620 MHz

### Features

- Ultra low noise figure 0.5 typ.
- 11V-13V operation
- Good IP3, +30 dBm typ.
- Reverse voltage connection protected
- Small size
- Low cost
- Protected by US patent 6,790,049

### Applications

- Low noise amplifier RF front end
- Low noise pre-amp
- Buffer amplifier
- LNA for dual GPS application, 1227MHz and 1559MHz
- General purpose small signal
- Lab
- Instrumentation
- Test equipment



CASE STYLE: GA955

Connectors	Model
SMA	ZX60-1614LN-S

### +RoHS Compliant

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

### Electrical Specifications at $T_{AMB} = 25^{\circ}\text{C}$

MODEL NO.	FREQ. (MHz)	GAIN (dB)				MAXIMUM POWER (dBm)	DYNAMIC RANGE			VSWR (:1) Typ.		ACTIVE DIRECTIVITY (dB) Isolation-Gain	DC VOLTAGE @ Pin V+ (V)	DC OPERATING CURRENT @ Pin V+ (mA)		
		Typ.	Min.	Flatness			Output (1 dB Comp.)	NF (dB)	IP3 (dBm)	In	Out			Typ.	Typ.	Max.
				Typ.	Max.											
ZX60-1614LN-S	1217-1620	14	11	±1.1	±2.0	13.5	0.5	0.9	30	1.3	1.3	11.5	12	42	50	

### Maximum Ratings

Operating Temperature -40°C to 80°C case

Storage Temperature -55°C to 100°C

DC Voltage 15V

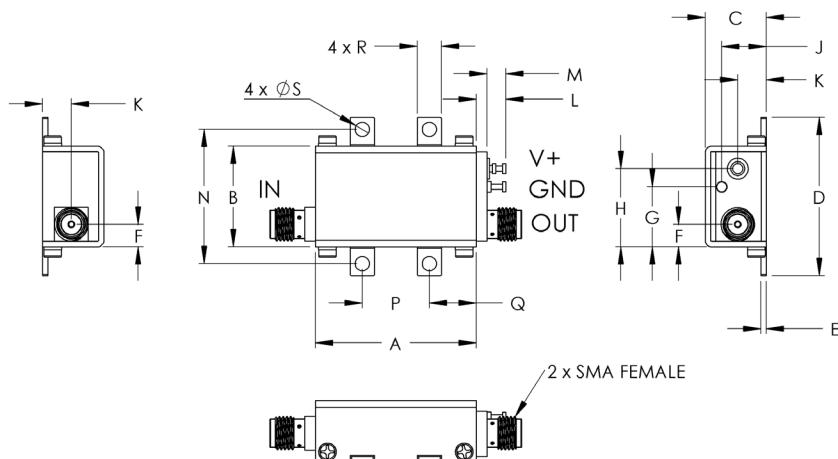
Input Power(no Damage) 13dBm

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



NOTE: When soldering the DC connections, caution must be used to avoid overheating the DC terminals. See Application Note [AN-40-10](#).

### Outline Drawing



### Outline Dimensions (inch)

A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	wt.
1.20	.75	.46	1.18	.04	.17	.45	.59	.33	.21	.22	.14	1.00	.50	.35	.18	.106	grams
30.48	19.05	11.68	29.97	1.02	4.32	11.43	14.99	8.38	5.33	5.59	3.56	25.40	12.70	8.89	4.57	2.69	35.0

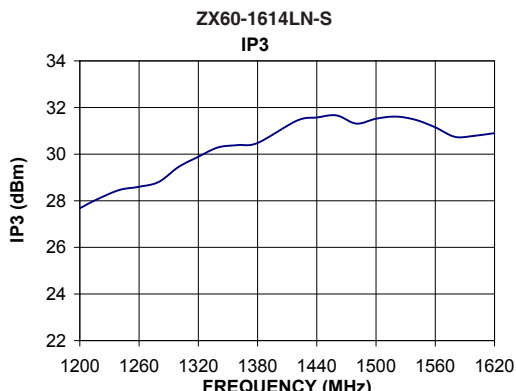
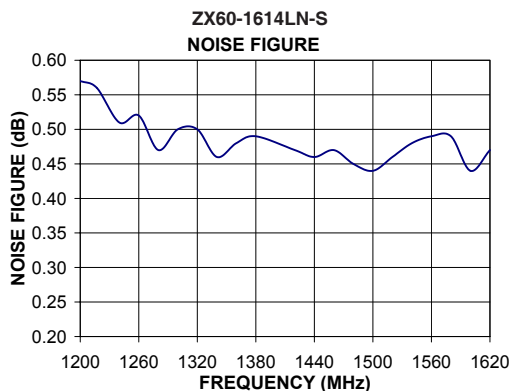
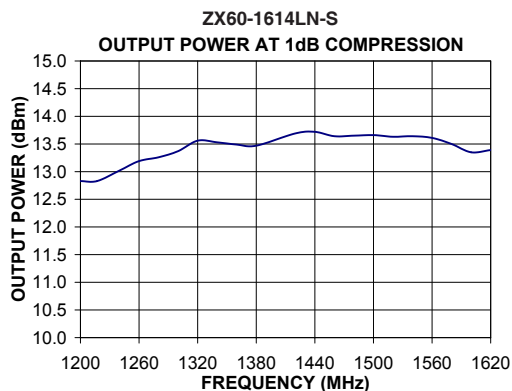
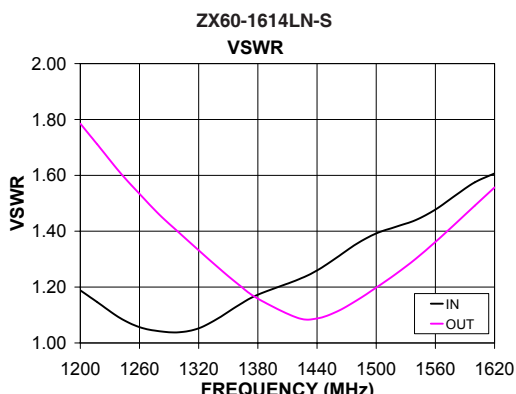
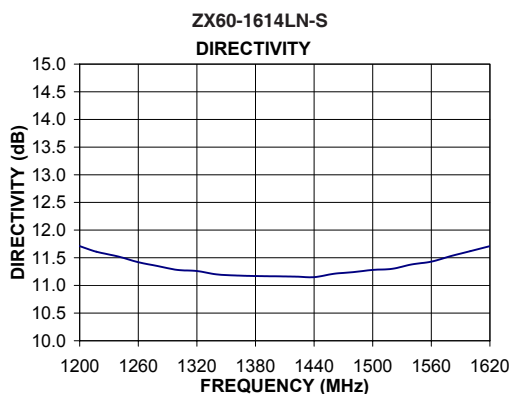
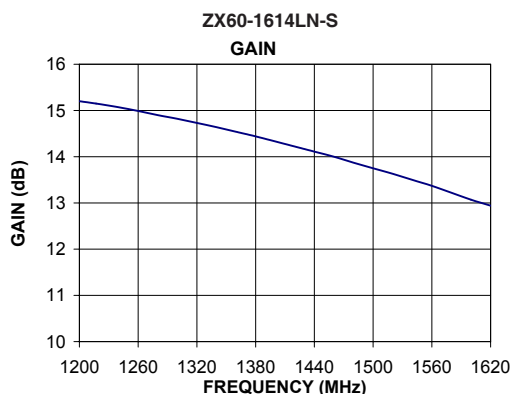
#### Notes

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# Typical Performance Data & Curves at 25°C ZX60-1614LN-S

FREQUENCY (MHz)	GAIN (dB)	DIRECTIVITY (dB)	VSWR IN (:1)	VSWR OUT (:1)	POWER OUT @1dB COMPRESSION (dBm)	IP3 (dBm)	NF (dB)
1217	15.15	11.61	1.15	1.71	12.83	28.05	0.56
1240	15.07	11.52	1.09	1.61	13.02	28.46	0.51
1260	14.99	11.42	1.06	1.53	13.19	28.60	0.52
1280	14.90	11.35	1.04	1.46	13.26	28.81	0.47
1300	14.82	11.28	1.04	1.40	13.37	29.45	0.50
1320	14.73	11.26	1.05	1.33	13.56	29.89	0.50
1340	14.64	11.20	1.09	1.27	13.53	30.29	0.46
1360	14.54	11.18	1.13	1.21	13.49	30.39	0.48
1380	14.44	11.17	1.17	1.16	13.47	30.48	0.49
1420	14.22	11.16	1.23	1.09	13.69	31.44	0.47
1440	14.11	11.15	1.26	1.09	13.72	31.57	0.46
1460	14.00	11.21	1.31	1.11	13.64	31.66	0.47
1480	13.87	11.24	1.35	1.15	13.65	31.31	0.45
1500	13.75	11.28	1.39	1.20	13.66	31.52	0.44
1520	13.63	11.30	1.42	1.25	13.63	31.61	0.46
1540	13.50	11.38	1.44	1.30	13.64	31.47	0.48
1560	13.37	11.43	1.48	1.36	13.61	31.15	0.49
1580	13.22	11.53	1.53	1.43	13.50	30.74	0.49
1600	13.07	11.62	1.58	1.49	13.35	30.79	0.44
1620	12.94	11.71	1.61	1.56	13.39	30.90	0.47



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# Amplifier

# ZX60-1614LN-S

## Typical Performance Data

FREQUENCY (MHz)	GAIN (dB) 12V	DIRECTIVITY (dB) 12V	VSWR IN (:1) 12V	VSWR OUT (:1) 12V	Output IP3 (dBm) 12V	NOISE FIGURE (dB) 12V	Pout at 1dB Comp. (dBm) 12V
1217	15.15	11.61	1.15	1.71	28.05	0.56	12.83
1240	15.07	11.52	1.09	1.61	28.46	0.51	13.02
1260	14.99	11.42	1.06	1.53	28.60	0.52	13.19
1280	14.90	11.35	1.04	1.46	28.81	0.47	13.26
1300	14.82	11.28	1.04	1.40	29.45	0.50	13.37
1320	14.73	11.26	1.05	1.33	29.89	0.50	13.56
1340	14.64	11.20	1.09	1.27	30.29	0.46	13.53
1360	14.54	11.18	1.13	1.21	30.39	0.48	13.49
1380	14.44	11.17	1.17	1.16	30.48	0.49	13.47
1420	14.22	11.16	1.23	1.09	31.44	0.47	13.69
1440	14.11	11.15	1.26	1.09	31.57	0.46	13.72
1460	14.00	11.21	1.31	1.11	31.66	0.47	13.64
1480	13.87	11.24	1.35	1.15	31.31	0.45	13.65
1500	13.75	11.28	1.39	1.20	31.52	0.44	13.66
1520	13.63	11.30	1.42	1.25	31.61	0.46	13.63
1540	13.50	11.38	1.44	1.30	31.47	0.48	13.64
1560	13.37	11.43	1.48	1.36	31.15	0.49	13.61
1580	13.22	11.53	1.53	1.43	30.74	0.49	13.50
1600	13.07	11.62	1.58	1.49	30.79	0.44	13.35
1620	12.94	11.71	1.61	1.56	30.90	0.47	13.39



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IF/RF MICROWAVE COMPONENTS

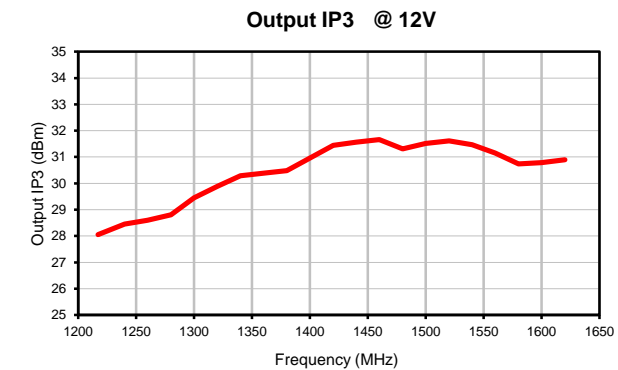
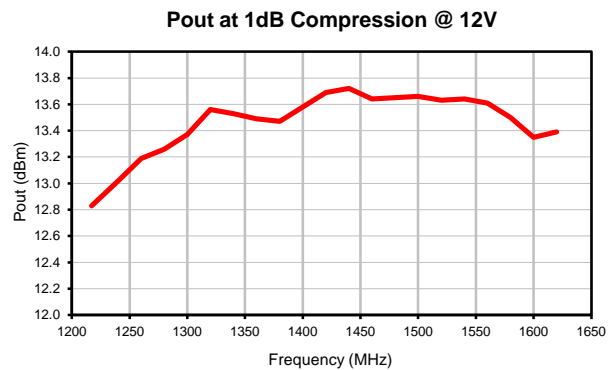
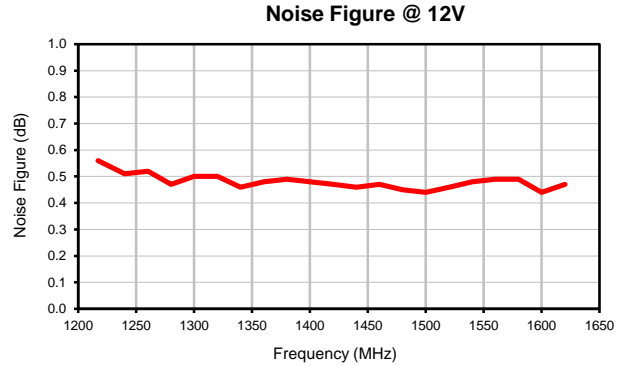
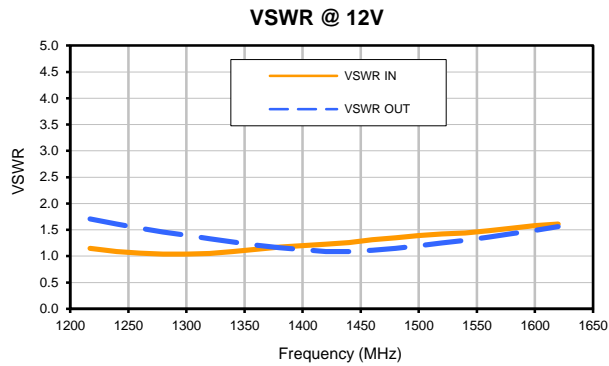
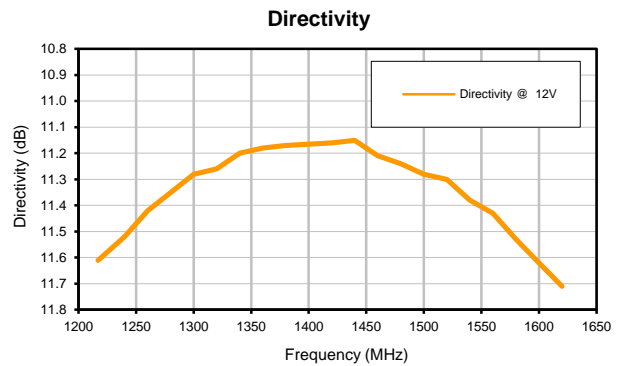
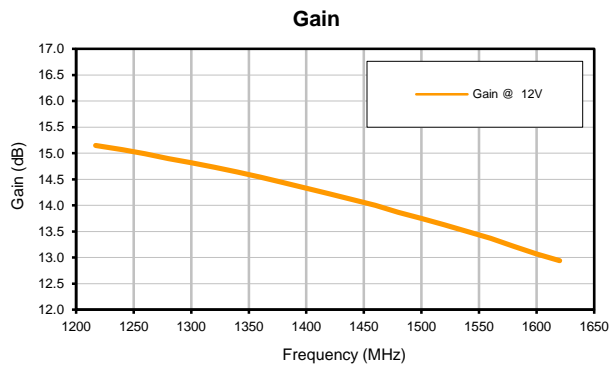
For detailed performance specs  
& shopping online see web site

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# Amplifier

# ZX60-1614LN-S

## Typical Performance Curves



For detailed performance specs & shopping online see web site

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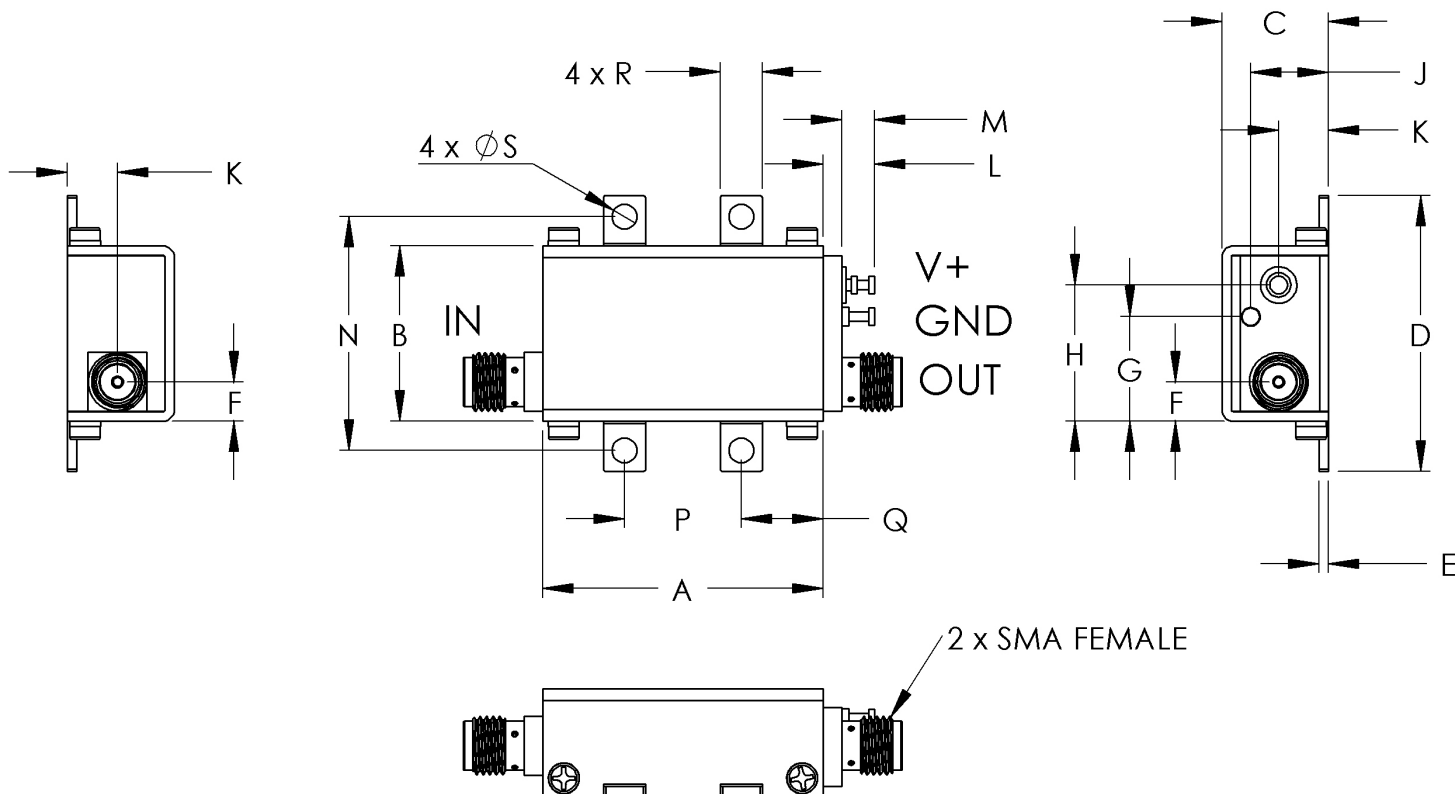
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# Case Style

# GA

## Outline Dimensions

## GA955



CASE #.	A	B	C	D	E	F	G	H	J	K	L	M	N
GA955	1.20 (30.48)	.75 (19.05)	.46 (11.61)	1.18 (29.97)	.04 (1.02)	.17 (4.27)	.45 (11.35)	.58 (14.81)	.33 (8.46)	.21 (5.44)	.22 (5.59)	.14 (3.56)	1.000 (25.4)

CASE #.	P	Q	R	S	WT GRAMS
GA955	.500 (12.70)	.35 (8.89)	.18 (4.57)	.106 (2.69)	35.0

Dimensions are in inches (mm). Tolerances: 2Pl.  $\pm .03$ ; 3Pl.  $\pm .015$   
Tolerance on hole size and interaxes dimensions to be  $\pm .005$ .

### Note:

1. Case material: Brass
2. Case finish: Nickel plate

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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	-40° to 80° C Case Temperature	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
Stabilization Bake	(non-operating) 125°C, 24 hours	- - -
Burn-in at Elevated Temp.	(DC on) 160 hours at 85° C	MIL-STD-202, Method 108
Thermal Shock	-55° to 100°C, 5 cycles	MIL-STD-202, Method 107, Condition A, except 100°C