



COAXIAL

# Low Noise Amplifier

## ZX60-3011+

Mini-Circuits

50Ω

400 to 3000 MHz

### FEATURES

- High Dynamic Range
- Wide Bandwidth, 400 to 3000 MHz
- Low Noise Figure 1.5 dB typ.
- 1dB Compression, +21 dBm
- Medium IP3
- Reverse voltage connection protected
- Over-voltage transient protected
- Low Cost
- Protected by US patent 6,790,049



Generic photo used for illustration purposes only

Model No.	ZX60-3011+
Case Style	GC957
Connectors	SMA

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

### APPLICATIONS

- Buffer Amplifier
- LO Amplifiers for mixers
- Cellular
- PCN
- General purpose small signal

### ELECTRICAL SPECIFICATIONS AT 25°C

Parameter	Condition (MHz)	Min	Typ.	Max.	Units
Frequency		400		3000	MHz
Noise Figure	400-1000	-	1.4	2.5	dB
	1000-1700	-	1.5	2.5	
	1700-2400	-	1.7	2.6	
	2400-3000	-	1.8	2.8	
Gain	400-1000	12	15.0	-	dB
	1000-1700	11	13.5	-	
	1700-2400	9	11.5	-	
	2400-3000	7.5	10.0	-	
Gain Flatness	400-1000	-	±.70	-	dB
	1000-1700	-	±1.0	-	
	1700-2400	-	±1.0	-	
	2400-3000	-	±.70	-	
Output Power at 1dB compression	400-1000	19.5	21.5	-	dBm
	1000-1700	19.5	21.5	-	
	1700-2400	18.5	21.0	-	
	2400-3000	18.0	20.4	-	
Output third order intercept point		-	31	-	dBm
Input VSWR		-	1.7	-	:1
Output VSWR	400-3000	-	1.6	-	:1
DC Supply Voltage		-	12	-	V
Supply Current		-	120	-	mA

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 ZX60-3011+  
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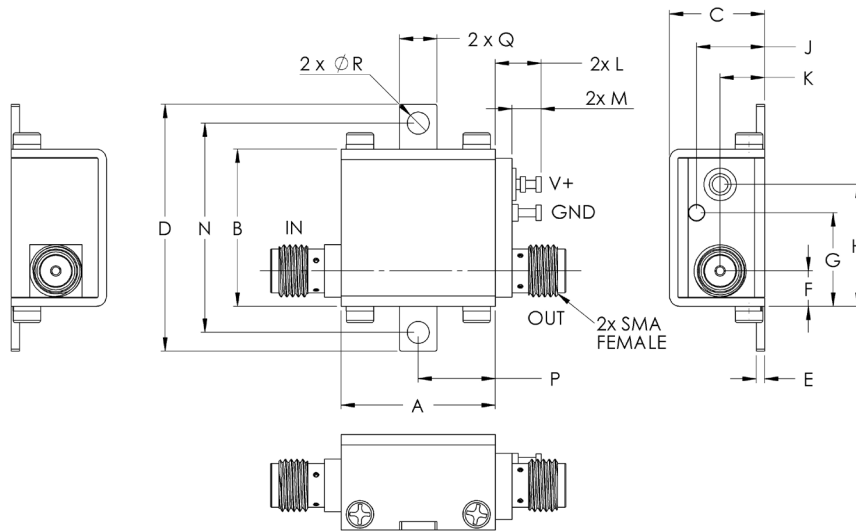
400 to 3000 MHz

### MAXIMUM RATINGS

Parameter	Ratings
Operating Temperature	-40°C to 85°C Case -40°C to 60°C Ambient
Storage Temperature	-55°C to 100°C
DC Voltage <sup>1</sup>	+6.5V Min. to +15V Max
Input RF Power (no damage)	+15 dBm
Power Dissipation	1.12W typ. at +12V

Permanent damage may occur if any of these limits are exceeded.  
 1. Other voltages available in the +6.5 to +20V range. Contact Factory.

### 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
																grams
.74	.75	.46	1.18	.04	.17	.45	.59	.33	.21	.22	.14	1.00	.37	.18	.106	23.0
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	





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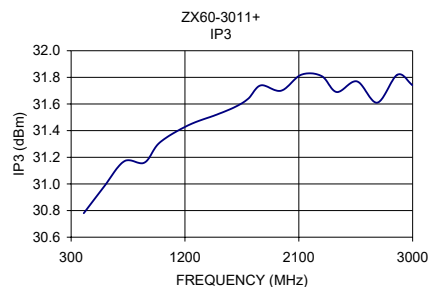
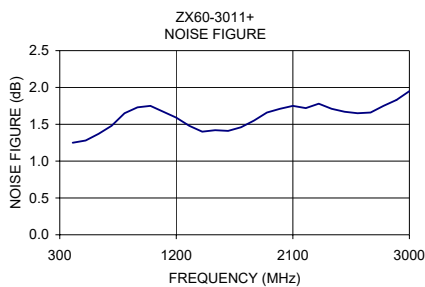
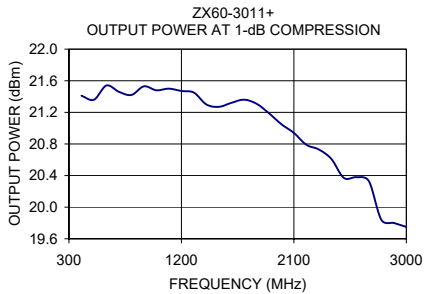
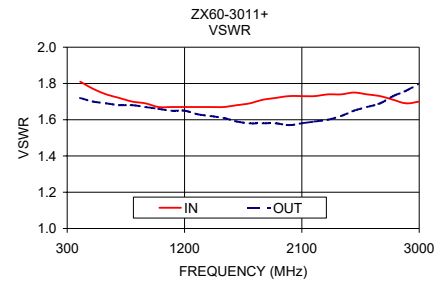
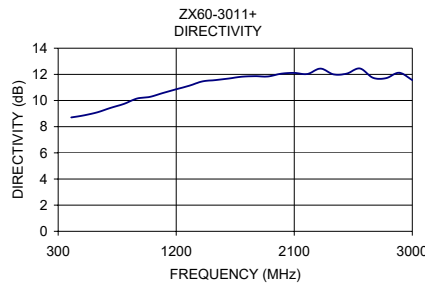
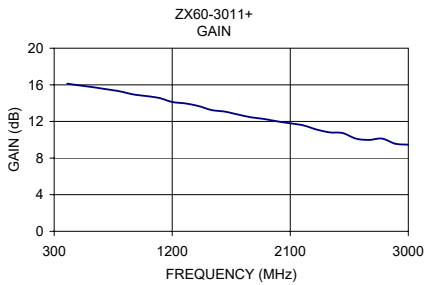
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50Ω

400 to 3000 MHz

### TYPICAL PERFORMANCE DATA/CURVES

Frequency (MHz)	Gain (dB)	Directivity (dB)	VSWR (:1)		Power Out @1 dB Compr. (dBm)	IP3 (dBm)	Noise Figure (dB)
	12V	12V	IN	OUT	12V		12V
400.00	16.13	8.71	1.81	1.72	21.41	30.78	1.25
500.00	15.92	8.87	1.77	1.70	21.36	30.98	1.28
900.20	14.96	10.15	1.69	1.67	21.53	31.16	1.73
1000.00	14.78	10.28	1.67	1.66	21.48	31.31	1.75
1200.00	14.13	10.86	1.67	1.65	21.47	31.44	1.59
1400.00	13.68	11.46	1.67	1.62	21.30	31.52	1.40
1600.00	13.08	11.68	1.68	1.59	21.32	31.58	1.41
1800.00	12.46	11.86	1.71	1.58	21.31	31.74	1.55
1900.00	12.27	11.84	1.72	1.58	21.19	31.70	1.66
2100.00	11.80	12.11	1.73	1.58	20.94	31.82	1.75
2300.00	11.12	12.14	1.74	1.60	20.73	31.81	1.78
2400.00	10.81	12.00	1.74	1.62	20.61	31.69	1.71
2600.20	10.13	12.45	1.74	1.67	20.38	31.77	1.65
2900.00	9.57	12.12	1.69	1.76	19.80	31.82	1.83
3000.00	9.46	11.56	1.70	1.80	19.75	31.74	1.95



# Low Noise Amplifier

# ZX60-3011+

## Typical Performance Data

FREQUENCY (MHz)	GAIN (dB) 15V	DIRECTIVITY (dB) 15V	VSWR IN (:1) 15V	VSWR OUT (:1) 15V	NOISE FIGURE (dB) 15V	Pout at 1dB Comp. (dBm) 15V	FREQUENCY (MHz)	Output IP3 (dBm) 15V
400.0	16.13	8.71	1.81	1.72	1.25	21.41	400.0	30.78
500.0	15.92	8.87	1.77	1.70	1.28	21.36	500.0	30.98
600.0	15.74	9.10	1.74	1.69	1.37	21.54	900.0	31.16
700.0	15.52	9.44	1.72	1.68	1.48	21.46	1000.0	31.31
800.0	15.29	9.74	1.70	1.68	1.65	21.42	1200.0	31.44
900.0	14.96	10.15	1.69	1.67	1.73	21.53	1400.0	31.52
1000.0	14.78	10.28	1.67	1.66	1.75	21.48	1600.0	31.58
1100.0	14.57	10.58	1.67	1.65	1.67	21.50	1800.0	31.74
1200.0	14.13	10.86	1.67	1.65	1.59	21.47	1900.0	31.70
1300.0	13.97	11.13	1.67	1.63	1.48	21.45	2100.0	31.82
1400.0	13.68	11.46	1.67	1.62	1.40	21.30	2300.0	31.81
1500.0	13.25	11.56	1.67	1.61	1.42	21.27	2400.0	31.69
1600.0	13.08	11.68	1.68	1.59	1.41	21.32	2600.0	31.77
1700.0	12.76	11.82	1.69	1.58	1.46	21.36	2900.0	31.82
1800.0	12.46	11.86	1.71	1.58	1.55	21.31	3000.0	31.74
1900.0	12.27	11.84	1.72	1.58	1.66	21.19		
2000.0	12.01	12.05	1.73	1.57	1.71	21.05		
2100.0	11.80	12.11	1.73	1.58	1.75	20.94		
2200.0	11.57	12.03	1.73	1.59	1.72	20.79		
2300.0	11.12	12.44	1.74	1.60	1.78	20.73		
2400.0	10.81	12.00	1.74	1.62	1.71	20.61		
2500.0	10.73	12.06	1.75	1.65	1.67	20.37		
2600.0	10.13	12.45	1.74	1.67	1.65	20.38		
2700.0	9.98	11.74	1.73	1.69	1.66	20.33		
2800.0	10.13	11.71	1.71	1.73	1.75	19.84		
2900.0	9.57	12.12	1.69	1.76	1.83	19.80		
3000.0	9.46	11.56	1.70	1.80	1.95	19.75		

REV. X1  
 ZX60-3011+  
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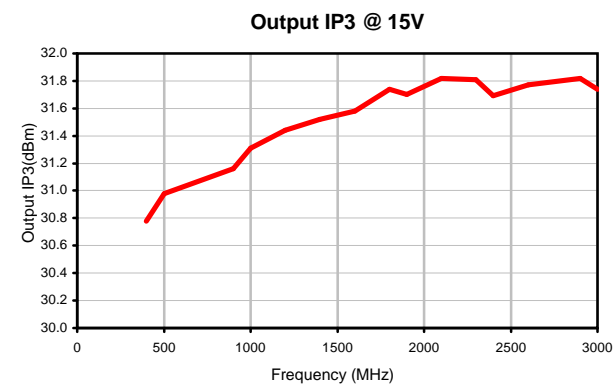
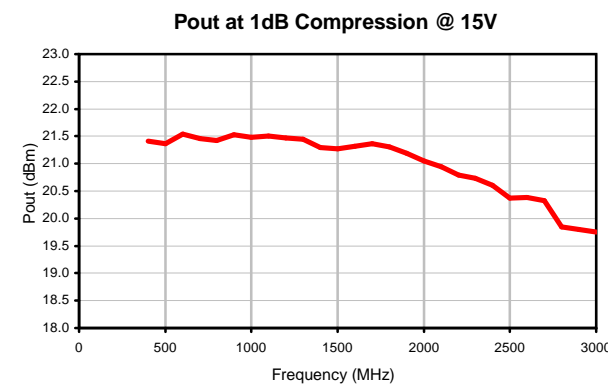
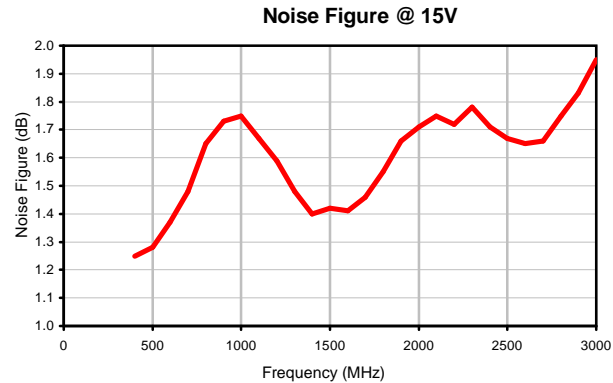
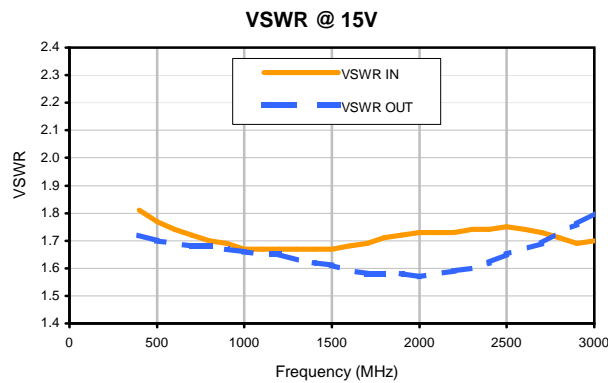
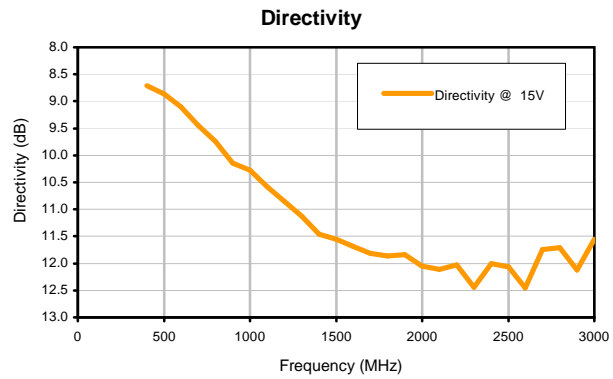
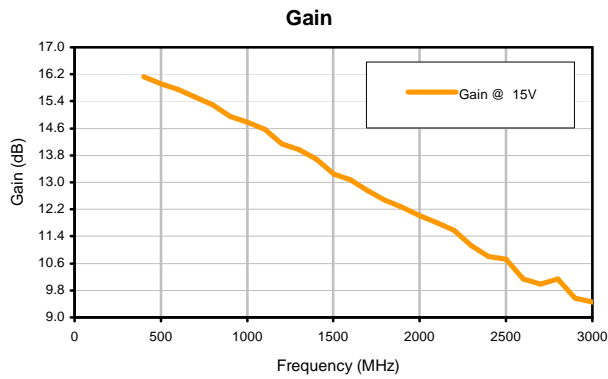
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# ZX60-3011+

## Typical Performance Curves



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ZX60-3011+  
070515  
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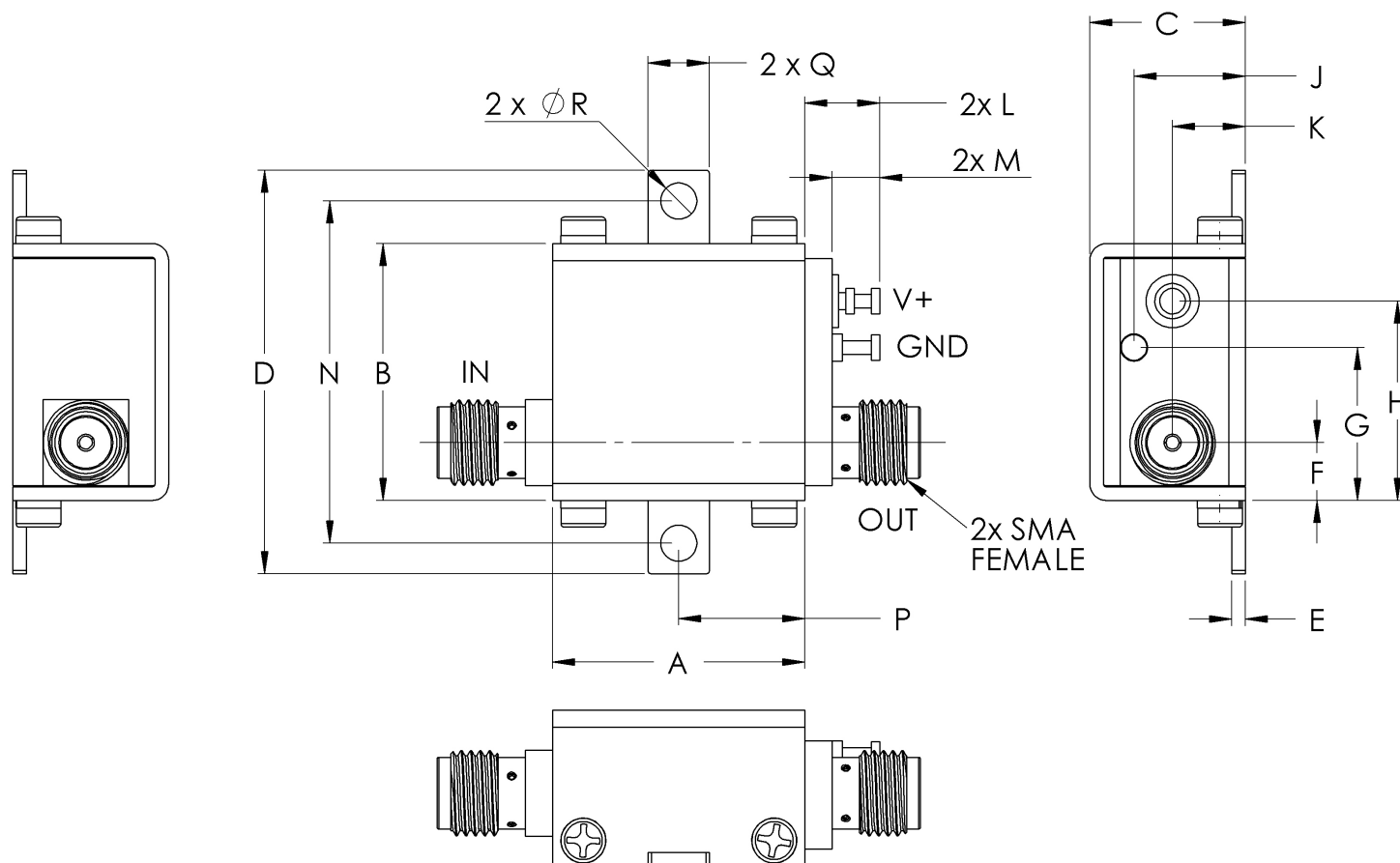


# Case Style

# GC

## Outline Dimensions

## GC957



CASE #.	A	B	C	D	E	F	G	H	J	K	L	M	N
GC957	.74 (18.80)	.75 (19.15)	.46 (11.61)	1.18 (30.07)	.04 (1.02)	.17 (4.32)	.45 (11.40)	.59 (14.86)	.33 (8.31)	.21 (5.44)	.22 (5.59)	.14 (3.56)	1.00 (25.4)

CASE #.	P	Q	R	WT GRAMS
GC957	.37 (9.40)	.18 (4.57)	.106 (2.69)	23.0

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

**Mini-Circuits**<sup>®</sup>

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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.

Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	-40° to 60° C Ambient Environment	Individual Model Data Sheet
Operating Temperature	-40° to 85° 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 80° C	MIL-STD-202, Method 108
Thermal Shock	-55° to 100°C, 5 cycles	MIL-STD-202, Method 107, Condition A, except 100°C