



COAXIAL

Low Noise Amplifier

ZX60-3011+

Mini-Circuits

50Ω 400 to 3000 MHz SMA Female

FEATURES

- High Dynamic Range
- Wide Bandwidth, 400 to 3000 MHz
- Low Noise Figure, 1.5 dB Typ.
- Output Power at 1 dB Compression, +21 dBm Typ.
- 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 female

+RoHS Compliant

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

APPLICATIONS

- Buffer Amplifier
- LO Amplifiers for Mixers
- Cellular
- Private Cellular Network
- 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		±2.0		dB
	1000-1700		±1.0		
	1700-2400		±1.0		
	2400-3000		±2.0		
Output Power at 1 dB 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	400-3000		+31		dBm
Input VSWR	400-3000		1.7		:1
Output VSWR	400-3000		1.6		:1
DC Supply Voltage	400-3000		+12		V
Supply Current	400-3000		120		mA

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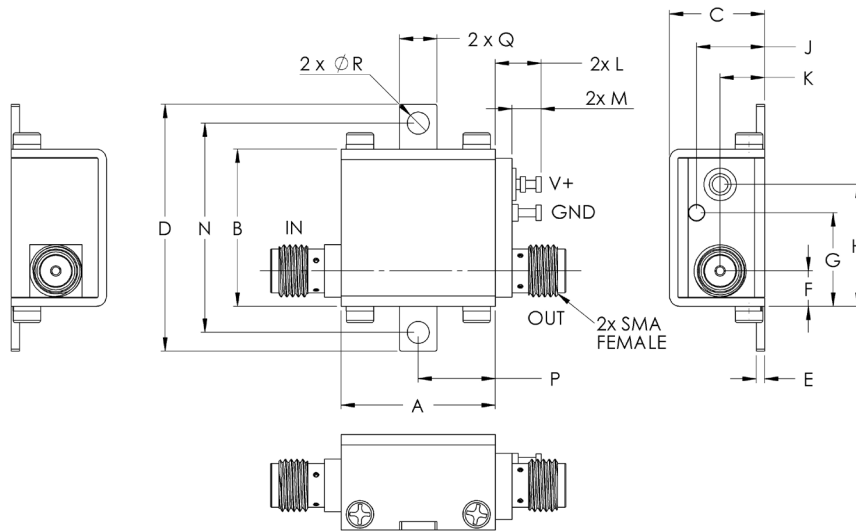
50Ω 400 to 3000 MHz SMA Female

ABSOLUTE 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 ¹	+6.5 V min. to +15 V max.
Input RF Power (No Damage)	+15 dBm
Power Dissipation	1.12 W typ. at +12 V

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

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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Low Noise Amplifier

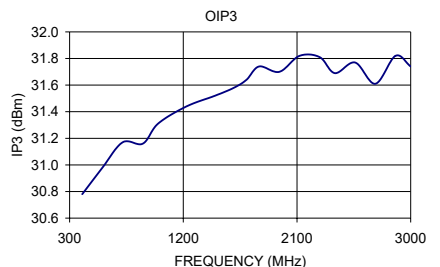
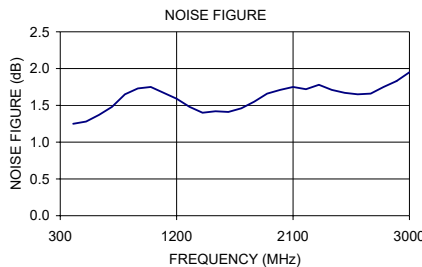
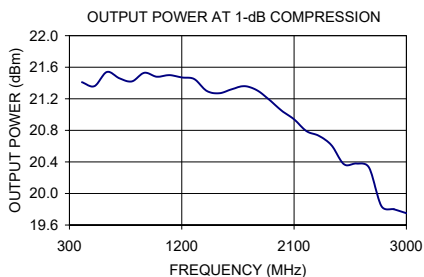
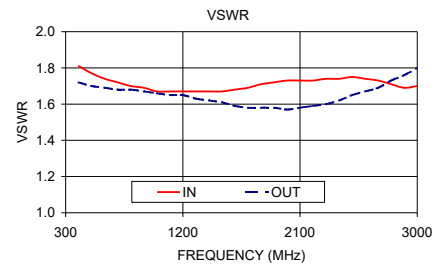
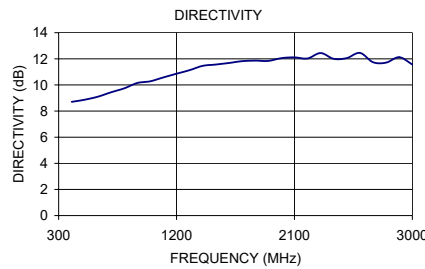
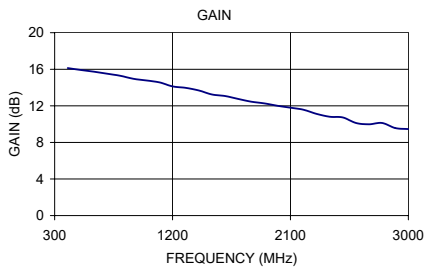
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50Ω 400 to 3000 MHz SMA Female

TYPICAL PERFORMANCE DATA/CURVES

Frequency (MHz)	Gain (dB)	Directivity (dB)	VSWR (:1)		Power Out at 1 dB Compr. (dBm)	OIP3 (dBm)	Noise Figure (dB)
	+12 V	+12 V	IN	OUT	+12 V		+12 V
400.0	16.13	8.71	1.81	1.72	21.41	30.78	1.25
500.0	15.92	8.87	1.77	1.70	21.36	30.98	1.28
900.2	14.96	10.15	1.69	1.67	21.53	31.16	1.73
1000.0	14.78	10.28	1.67	1.66	21.48	31.31	1.75
1200.0	14.13	10.86	1.67	1.65	21.47	31.44	1.59
1400.0	13.68	11.46	1.67	1.62	21.30	31.52	1.40
1600.0	13.08	11.68	1.68	1.59	21.32	31.58	1.41
1800.0	12.46	11.86	1.71	1.58	21.31	31.74	1.55
1900.0	12.27	11.84	1.72	1.58	21.19	31.70	1.66
2100.0	11.80	12.11	1.73	1.58	20.94	31.82	1.75
2300.0	11.12	12.14	1.74	1.60	20.73	31.81	1.78
2400.0	10.81	12.00	1.74	1.62	20.61	31.69	1.71
2600.2	10.13	12.45	1.74	1.67	20.38	31.77	1.65
2900.0	9.57	12.12	1.69	1.76	19.80	31.82	1.83
3000.0	9.46	11.56	1.70	1.80	19.75	31.74	1.95



- 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



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		

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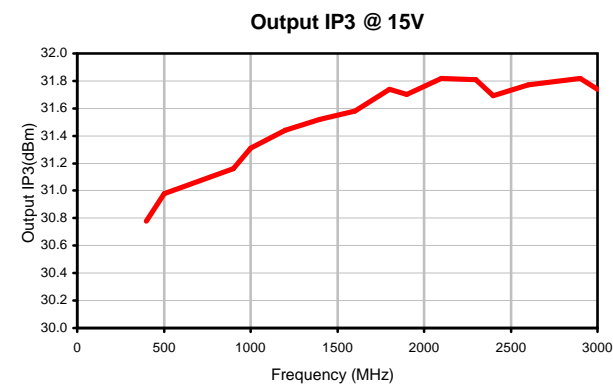
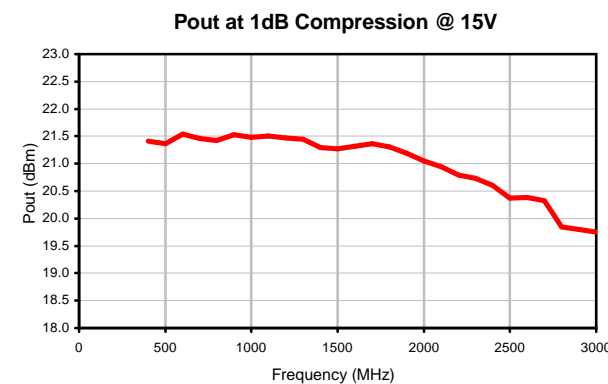
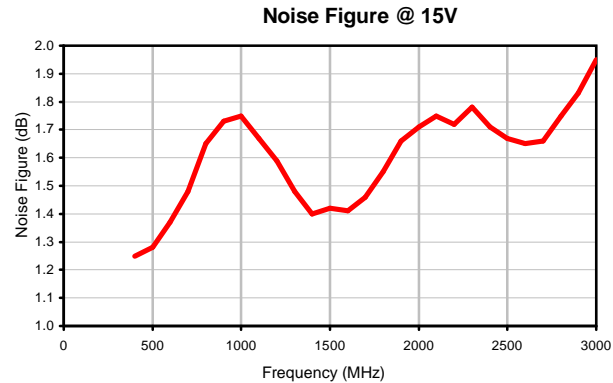
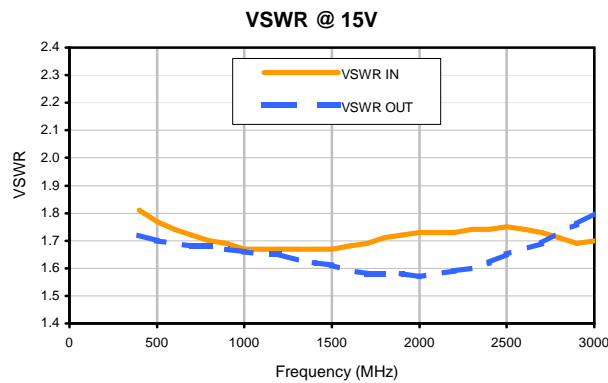
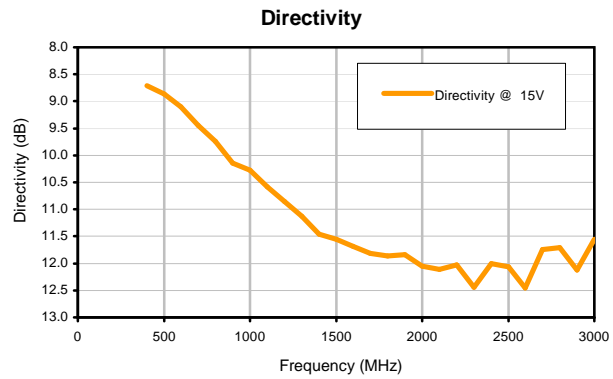
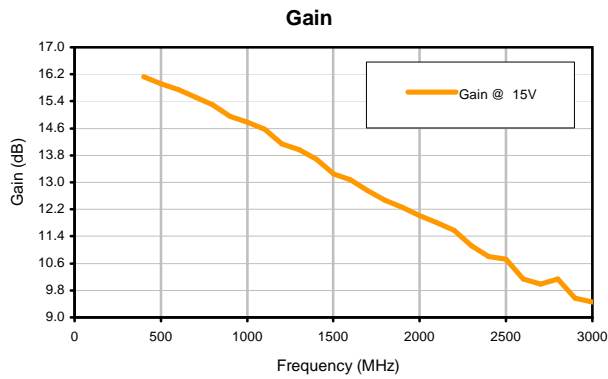
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The Design Engineers Search Engine finds the model you need, Instantly • For detailed performance specs & shopping online see



Typical Performance Curves

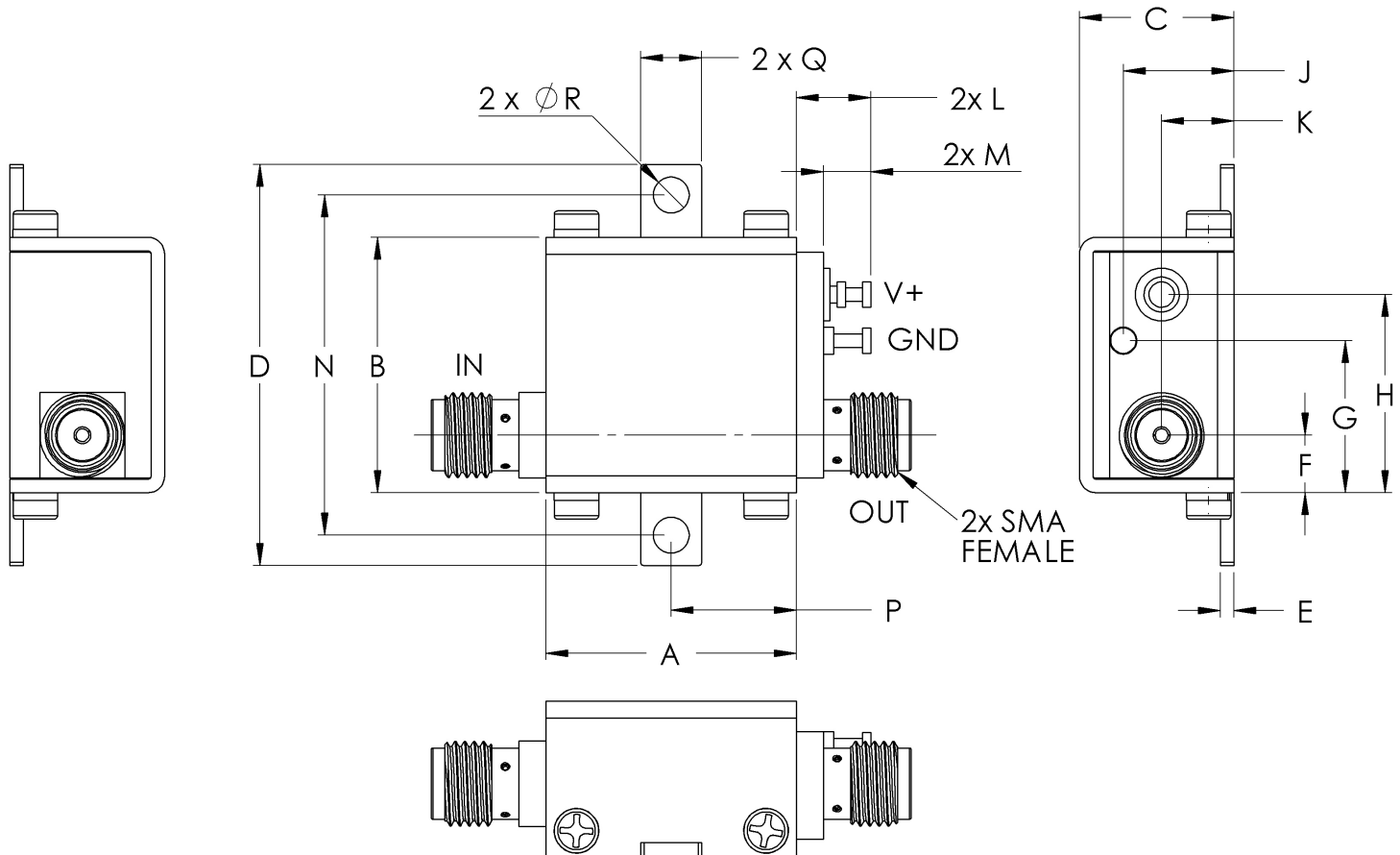


Case Style

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[®]

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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