



Mini-Circuits

COAXIAL, ULTRA FLAT GAIN

Wideband Amplifier

ZX60-V62+

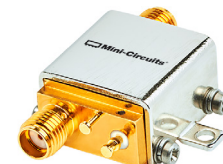
50Ω 0.05 to 6 GHz SMA Female

THE BIG DEAL

- Ultra Flat Gain
- Broadband High Dynamic Range
- Wideband, 0.05 to 6 GHz
- Protected by US Patent 6,790,049

APPLICATIONS

- Base Station Infrastructure
- Portable Wireless
- CATV & DBS
- MMDS & Wireless LAN
- LTE
- SATCOM
- Radar



Generic photo used for illustration purposes only

Model No.	ZX60-V62+
Case Style	GC957
Connectors	SMA female

+RoHS Compliant

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

PRODUCT OVERVIEW

The ZX60-V62+ (RoHS compliant) uses Mini-Circuits' HBT technology to offer ultra flat gain over a broad frequency range and high IP3. Housed in a rugged, cost effective unibody chassis, this amplifier supports a wide variety of applications requiring moderate power output, low distortion, and 50Ω matched input/output ports.

KEY FEATURES

Feature	Advantages
Ultra Flat Gain	±1.1 dB over 50 to 6000 MHz; ±0.1 dB over 700 to 2700 MHz; ±0.2 dB over 500 to 4500 MHz supports a variety of multi-band applications.
Broadband, 0.05 to 6 GHz	Broadband covering primary wireless communications bands: Cellular, PCS, LTE, WiMAX, UHF, VHF, L band, SATCOM, radar, etc.
High IP3 vs. DC Power Consumption +39 dBm Typical at 0.05 GHz +36 dBm Typical at 0.8 GHz	This model matches good IP3 performance relative to power consumption. The HBT structure provides good linearity over a broad frequency range as shown in the IP3 being typically 20 dB above the P1dB point to 0.8 GHz. This feature makes this amplifier ideal for use in: • Driver amplifiers for complex waveform upconverter paths • Drivers in linearized transmit systems
Unconditionally Stable	No risk of damage to other components from impedance mismatch or internal oscillation.
Very Small Size, 0.75x0.75"	The unique unibody construction enables the ZX60-V62+ to be used in compact designs.

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ELECTRICAL SPECIFICATIONS AT +25 °C AND +5.0 V, UNLESS NOTED OTHERWISE

Parameter	Condition (GHz)	Min.	Typ.	Max.	Units
Frequency Range		0.05		6	GHz
Gain	0.05	14.8	16.6	18.2	dB
	0.8	13.9	15.5	17.2	
	2.0		15.4		
	3.0		15.5		
	4.0	13.5	15.6	17.0	
	6.0		14.4		
Gain Flatness	0.05-4		±0.7		dB
	0.7-2.6		±0.2		
Input Return Loss	0.05	11.0	15.4		dB
	0.8		14.7		
	2.0		20.1		
	3.0		26.6		
	4.0		20.7		
	6.0		18.6		
Output Return Loss	0.05	12.0	13.8		dB
	0.8		15.3		
	2.0		11.0		
	3.0		10.5		
	4.0		12.0		
	6.0		8.5		
Output IP3	0.05	+31.5	+39.1		dBm
	0.8		+36.2		
	2.0		+33.4		
	3.0		+30.4		
	4.0		+27.6		
	6.0		+22.5		
Output Power at 1 dB Compression	0.05	+17.5	+19.7		dBm
	0.8	+17.5	+19.5		
	2.0	+17.2	+19.0		
	3.0		+17.9		
	4.0		+15.8		
	6.0		+11.6		
Noise Figure	0.05		5.0	6.2	dB
	0.8		5.0	6.6	
	2.0		5.1		
	3.0		5.1		
	4.0		5.1		
	6.0		5.4		
Active Directivity (Isolation - Gain)	0.05-6		6.0		dB
DC Supply Voltage		+4.8	+5.0	+5.2	V
Supply Current		72	82	92	mA





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Wideband Amplifier

ZX60-V62+

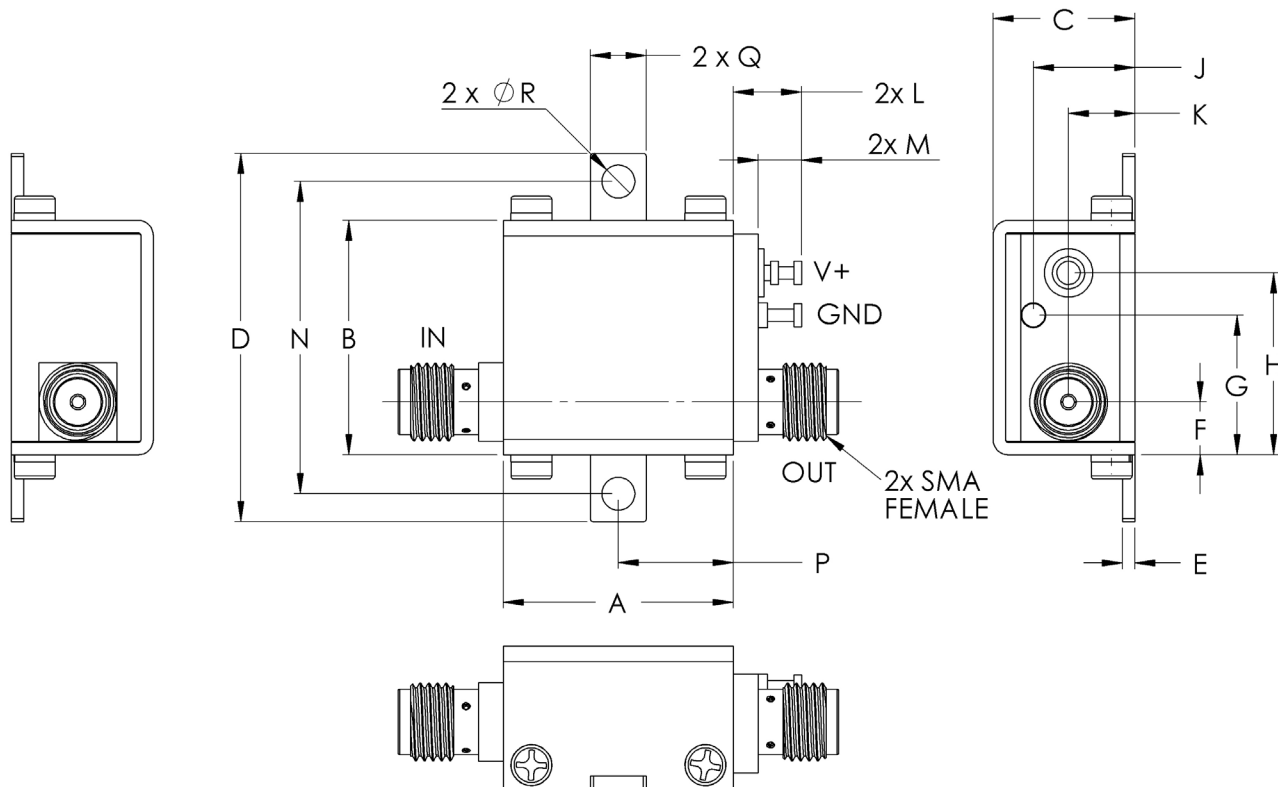
50Ω 0.05 to 6 GHz SMA Female

ABSOLUTE MAXIMUM RATINGS

Parameter	Ratings
Operating Temperature	-40 °C to +85 °C case
Storage Temperature	-55 °C to +100 °C
DC Voltage	+6 V
Input RF Power (No Damage) $V_D = +5$ V	+24 dBm
Power Consumption	0.725 W

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
mm)

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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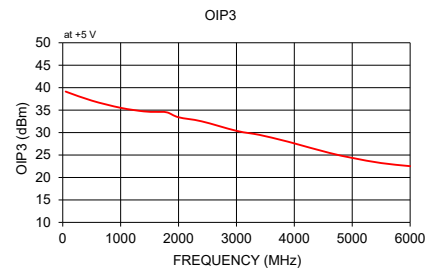
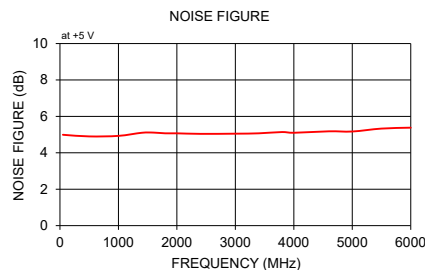
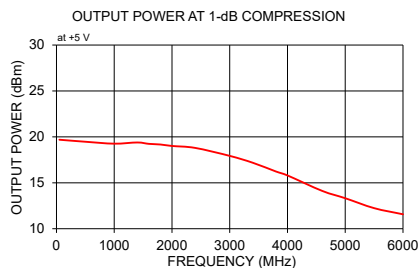
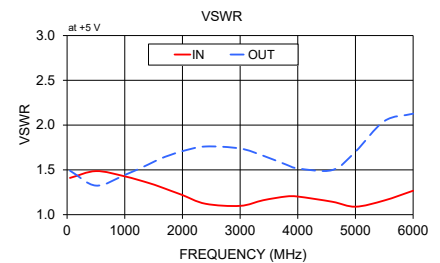
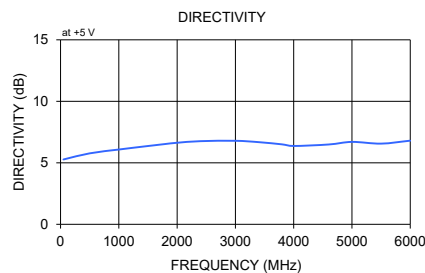
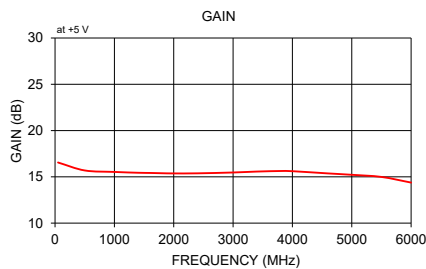
Wideband Amplifier

ZX60-V62+

50Ω 0.05 to 6 GHz SMA Female

TYPICAL PERFORMANCE DATA/CURVES

Frequency (MHz)	Gain (dB)	Directivity (dB)	VSWR (:1)		Power Out at 1 dB COMPR. (dBm)	Noise Figure (dB)	Output IP3 (dBm)
	+5 V	+5 V	IN	OUT	+5 V	+5 V	+5 V
50	16.55	5.27	1.41	1.49	19.7	5.0	39.1
500	15.69	5.77	1.49	1.32	19.5	4.9	37.1
1000	15.53	6.08	1.43	1.44	19.3	4.9	35.5
1400	15.44	6.31	1.36	1.56	19.4	5.1	34.7
1600	15.42	6.42	1.31	1.62	19.2	5.1	34.6
1800	15.39	6.53	1.27	1.67	19.2	5.1	34.5
2000	15.37	6.63	1.22	1.71	19.0	5.1	33.4
2400	15.38	6.76	1.12	1.76	18.8	5.0	32.5
3000	15.47	6.79	1.10	1.74	17.9	5.1	30.4
3400	15.57	6.68	1.16	1.66	17.2	5.1	29.5
3800	15.63	6.50	1.20	1.56	16.2	5.1	28.3
4000	15.61	6.37	1.20	1.52	15.8	5.1	27.6
4600	15.37	6.49	1.14	1.50	14.1	5.2	25.5
5000	15.22	6.70	1.09	1.70	13.3	5.2	24.4
5500	14.99	6.56	1.16	2.04	12.2	5.3	23.2
6000	14.38	6.80	1.27	2.13	11.6	5.4	22.5



NOTES

- 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.
- Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
- 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



Typical Performance Data

NOTE: Use PDF Bookmarks to view DATA at required conditions**Definitions:**

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 5V, Id = 82.76mA @ Temperature = +25degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
50.0	16.53	22.23	15.73	14.35	1.13	0.75	38.96	19.87	4.69
100.0	16.17	21.84	14.55	16.24	1.14	0.77	38.28	19.57	4.76
200.0	15.89	21.53	14.07	17.76	1.14	0.77	37.90	19.70	4.67
300.0	15.79	21.51	14.04	17.96	1.15	0.78	37.78	19.74	4.83
400.0	15.73	21.50	14.03	17.87	1.15	0.78	38.29	19.71	4.77
500.0	15.69	21.52	14.11	17.52	1.16	0.78	37.43	19.70	4.82
600.0	15.65	21.61	14.22	17.09	1.17	0.78	37.22	19.63	4.91
700.0	15.61	21.59	14.31	16.65	1.17	0.78	36.88	19.66	4.88
800.0	15.54	21.71	14.64	16.07	1.19	0.79	36.58	19.66	4.89
900.0	15.54	21.70	14.88	15.45	1.18	0.78	36.49	19.59	4.91
1000.0	15.53	21.77	15.03	14.98	1.19	0.78	35.63	19.60	4.84
1100.0	15.50	21.81	15.27	14.51	1.19	0.78	35.81	19.68	4.95
1200.0	15.48	21.86	15.59	14.06	1.20	0.77	35.79	19.61	4.93
1300.0	15.45	21.88	15.98	13.65	1.20	0.77	35.26	19.53	5.02
1400.0	15.44	21.90	16.42	13.30	1.20	0.76	35.10	19.55	5.00
1500.0	15.42	22.00	16.91	12.96	1.21	0.76	35.20	19.43	4.97
1600.0	15.41	22.02	17.40	12.65	1.21	0.76	35.18	19.52	5.02
1700.0	15.39	22.05	18.01	12.37	1.22	0.75	35.17	19.37	5.00
1800.0	15.38	22.13	18.66	12.12	1.22	0.75	35.01	19.34	4.99
1900.0	15.37	22.18	19.41	11.92	1.23	0.75	34.53	19.33	4.98
2000.0	15.36	22.21	20.23	11.75	1.23	0.75	34.21	19.22	4.99
2200.0	15.35	22.28	22.56	11.47	1.24	0.74	33.51	19.06	4.98
2400.0	15.36	22.39	25.53	11.36	1.25	0.74	32.83	19.01	5.03
2600.0	15.38	22.45	29.94	11.41	1.26	0.74	32.12	18.71	4.99
2800.0	15.41	22.48	37.62	11.51	1.27	0.74	31.63	18.60	5.05
3000.0	15.46	22.48	38.77	11.80	1.27	0.74	31.16	18.17	5.00
3200.0	15.51	22.53	31.96	12.25	1.28	0.74	30.59	17.88	5.00
3400.0	15.56	22.50	28.32	12.98	1.28	0.75	29.87	17.31	5.04
3600.0	15.62	22.47	26.79	13.77	1.28	0.75	29.35	16.93	4.99
3800.0	15.66	22.46	25.82	14.77	1.28	0.76	28.71	16.58	4.97
4000.0	15.67	22.46	26.04	15.77	1.29	0.77	27.92	16.03	4.98
4500.0	15.55	22.49	28.67	15.89	1.30	0.78	25.77	14.57	5.09
5000.0	15.29	22.47	27.39	12.60	1.29	0.76	24.27	13.64	4.95
5500.0	15.04	22.29	22.87	9.72	1.24	0.71	23.16	12.81	5.13
6000.0	14.41	22.08	18.86	9.00	1.25	0.72	22.16	12.00	5.24
6500.0	13.71	21.74	14.80	9.54	1.27	0.77	21.14	11.23	5.41
7000.0	12.81	21.59	11.73	10.11	1.34	0.83	20.73	10.69	5.49
7500.0	11.49	21.65	9.65	8.90	1.44	0.85	19.81	10.08	5.69
8000.0	9.77	22.10	8.50	6.76	1.59	0.81	18.81	9.35	5.99

Typical Performance Data

Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 5V, Id = 83.36mA @ Temperature = -45degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
50.0	16.60	21.86	15.24	14.46	1.10	0.73	39.32	19.56	3.92
100.0	16.26	21.90	14.53	16.07	1.13	0.77	38.41	19.28	4.00
200.0	15.98	21.62	14.18	17.43	1.14	0.77	37.95	19.39	3.90
300.0	15.90	21.57	14.11	17.74	1.14	0.77	38.02	19.44	3.92
400.0	15.84	21.59	13.98	17.77	1.15	0.78	38.52	19.44	3.96
500.0	15.80	21.58	13.98	17.46	1.15	0.78	37.74	19.42	3.99
600.0	15.77	21.57	14.11	16.99	1.15	0.78	37.75	19.36	4.07
700.0	15.74	21.60	14.22	16.57	1.16	0.78	37.31	19.40	4.02
800.0	15.66	21.73	14.46	16.18	1.18	0.78	37.05	19.39	4.04
900.0	15.67	21.73	14.61	15.58	1.17	0.78	37.10	19.36	4.09
1000.0	15.66	21.74	14.67	15.08	1.17	0.77	36.18	19.26	4.06
1100.0	15.63	21.79	14.88	14.59	1.18	0.77	36.40	19.38	4.08
1200.0	15.61	21.80	15.20	14.20	1.18	0.77	36.50	19.32	4.09
1300.0	15.60	21.85	15.45	13.87	1.18	0.77	36.10	19.30	4.19
1400.0	15.58	21.93	15.69	13.54	1.19	0.77	35.89	19.29	4.18
1500.0	15.56	21.94	16.06	13.09	1.19	0.76	35.99	19.15	4.15
1600.0	15.55	21.93	16.52	12.72	1.19	0.75	35.97	19.21	4.15
1700.0	15.54	22.03	17.00	12.49	1.20	0.75	36.17	19.18	4.16
1800.0	15.54	22.06	17.49	12.35	1.20	0.75	36.08	19.14	4.17
1900.0	15.53	22.12	18.01	12.14	1.21	0.75	35.63	19.19	4.14
2000.0	15.51	22.09	18.62	11.89	1.20	0.74	35.35	19.03	4.15
2200.0	15.50	22.22	20.25	11.55	1.22	0.74	34.83	18.96	4.11
2400.0	15.52	22.29	22.20	11.48	1.22	0.74	34.20	19.09	4.14
2600.0	15.54	22.24	24.85	11.37	1.22	0.73	33.48	18.86	4.17
2800.0	15.58	22.30	27.97	11.46	1.23	0.73	33.02	18.73	4.17
3000.0	15.63	22.31	30.42	11.71	1.23	0.73	32.61	18.41	4.18
3200.0	15.69	22.34	30.99	12.14	1.24	0.73	32.15	18.33	4.11
3400.0	15.75	22.34	29.75	12.74	1.24	0.73	31.49	17.88	4.20
3600.0	15.83	22.26	28.59	13.40	1.23	0.73	31.13	17.59	4.10
3800.0	15.90	22.23	27.38	14.29	1.23	0.74	30.71	17.32	4.09
4000.0	15.93	22.20	26.74	15.49	1.23	0.74	30.08	16.85	4.06
4500.0	15.85	22.27	25.37	15.66	1.25	0.75	27.92	15.35	4.15
5000.0	15.73	22.34	22.01	11.81	1.23	0.72	26.39	14.52	4.05
5500.0	15.61	22.22	19.51	8.78	1.17	0.64	25.16	13.68	4.24
6000.0	15.12	22.04	17.36	7.90	1.16	0.63	24.07	12.89	4.31
6500.0	14.64	21.67	14.41	8.17	1.15	0.67	22.78	12.11	4.48
7000.0	13.94	21.44	11.46	8.58	1.17	0.73	22.25	11.52	4.57
7500.0	12.78	21.52	9.32	7.61	1.23	0.76	21.06	10.90	4.72
8000.0	11.18	21.93	8.07	5.89	1.31	0.72	19.71	10.11	4.96

Typical Performance Data

Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

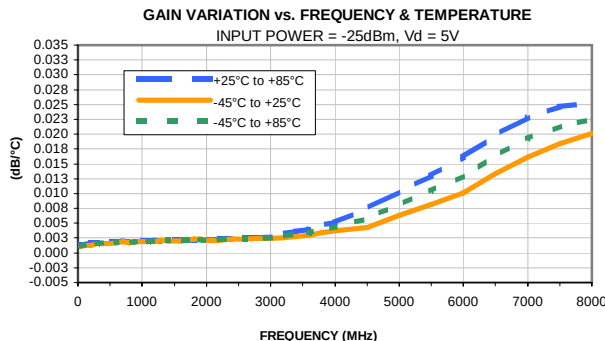
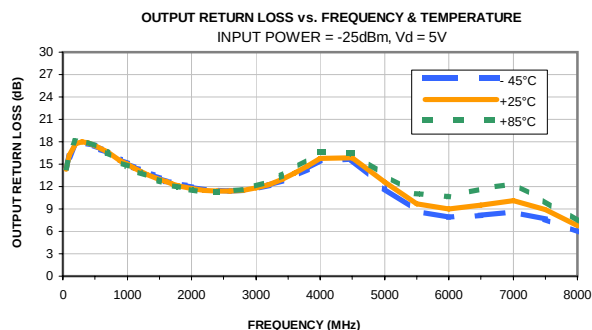
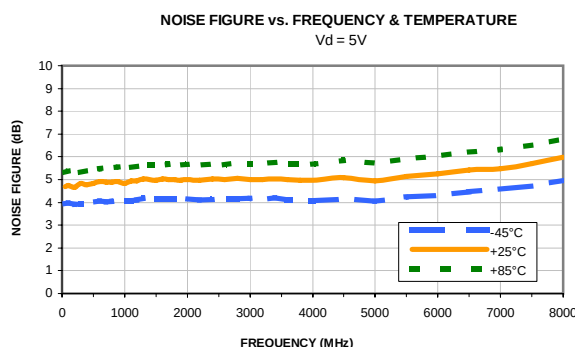
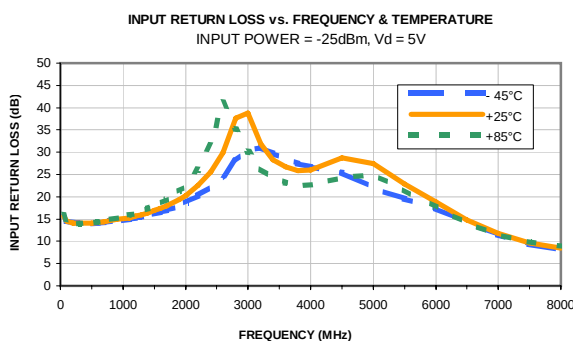
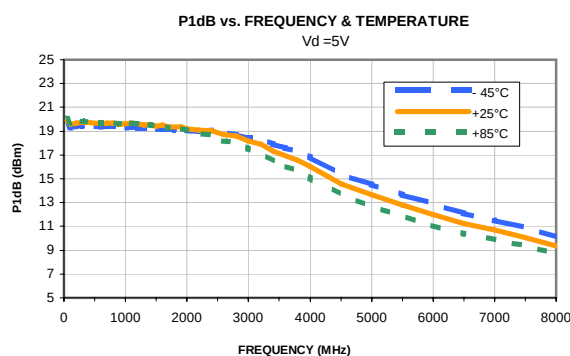
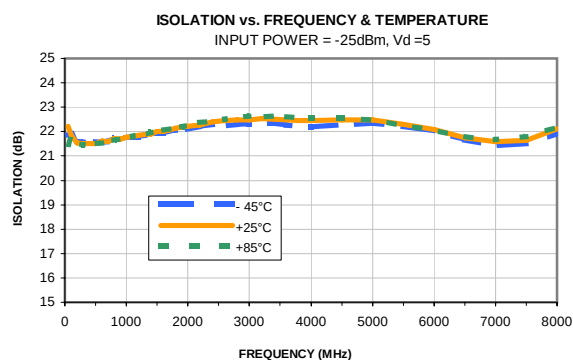
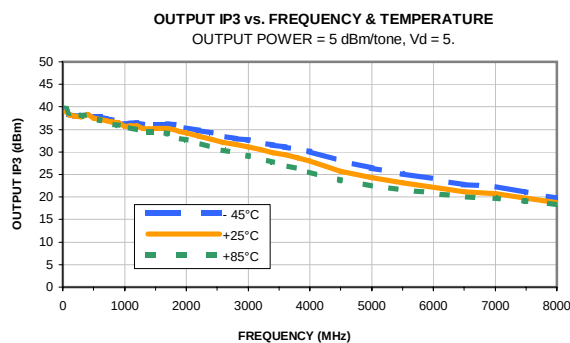
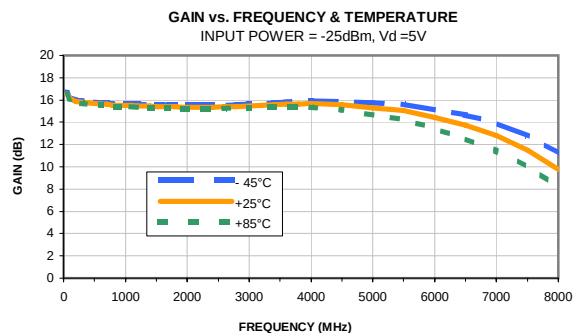
TEST CONDITIONS: Vd = 5V, Id = 77.97mA @ Temperature = +85degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
50.0	16.45	21.45	15.75	14.49	1.09	0.71	39.50	20.02	5.31
100.0	16.09	21.74	14.64	16.33	1.14	0.77	38.58	19.68	5.39
200.0	15.79	21.49	14.03	18.06	1.15	0.78	38.17	19.77	5.30
300.0	15.69	21.46	13.99	18.22	1.15	0.78	38.09	19.84	5.32
400.0	15.62	21.47	14.11	17.92	1.16	0.78	38.25	19.76	5.40
500.0	15.58	21.50	14.29	17.46	1.17	0.78	37.52	19.76	5.41
600.0	15.54	21.54	14.42	17.04	1.17	0.78	37.09	19.66	5.48
700.0	15.49	21.60	14.53	16.58	1.18	0.79	36.58	19.73	5.52
800.0	15.43	21.65	14.90	15.93	1.19	0.78	36.22	19.72	5.51
900.0	15.42	21.71	15.21	15.24	1.20	0.78	35.95	19.60	5.56
1000.0	15.40	21.74	15.55	14.73	1.20	0.78	35.38	19.68	5.51
1100.0	15.38	21.79	15.90	14.31	1.20	0.78	35.31	19.70	5.54
1200.0	15.35	21.87	16.27	13.91	1.21	0.77	34.99	19.60	5.60
1300.0	15.33	21.88	16.74	13.44	1.21	0.77	34.44	19.47	5.64
1400.0	15.31	21.98	17.32	13.11	1.22	0.77	34.43	19.49	5.66
1500.0	15.29	22.02	17.92	12.78	1.23	0.76	34.42	19.43	5.65
1600.0	15.28	22.06	18.53	12.45	1.23	0.76	34.40	19.46	5.65
1700.0	15.26	22.11	19.33	12.19	1.24	0.75	34.07	19.24	5.68
1800.0	15.25	22.20	20.25	11.93	1.25	0.75	33.59	19.21	5.65
1900.0	15.24	22.18	21.22	11.74	1.25	0.75	33.03	19.19	5.66
2000.0	15.23	22.26	22.47	11.60	1.25	0.75	32.71	19.06	5.67
2200.0	15.21	22.37	26.05	11.35	1.27	0.74	31.94	18.83	5.65
2400.0	15.22	22.42	31.57	11.28	1.28	0.74	31.16	18.63	5.67
2600.0	15.23	22.50	41.44	11.38	1.29	0.74	30.39	18.19	5.65
2800.0	15.26	22.56	35.05	11.60	1.30	0.74	29.78	18.05	5.72
3000.0	15.30	22.64	30.01	12.05	1.31	0.75	29.12	17.55	5.71
3200.0	15.32	22.60	26.36	12.61	1.31	0.76	28.34	17.14	5.72
3400.0	15.34	22.63	24.47	13.50	1.32	0.77	27.64	16.50	5.75
3600.0	15.38	22.62	23.15	14.42	1.32	0.78	26.97	16.06	5.67
3800.0	15.38	22.55	22.47	15.60	1.32	0.78	26.31	15.65	5.68
4000.0	15.36	22.57	22.72	16.64	1.33	0.80	25.53	15.08	5.68
4500.0	15.10	22.57	24.33	16.55	1.35	0.81	23.75	13.66	5.84
5000.0	14.67	22.47	25.00	13.57	1.36	0.80	22.50	12.67	5.73
5500.0	14.26	22.25	21.53	11.10	1.33	0.78	21.64	11.87	5.90
6000.0	13.44	22.07	17.66	10.64	1.38	0.81	20.84	11.09	6.03
6500.0	12.52	21.81	14.02	11.62	1.45	0.86	20.03	10.38	6.21
7000.0	11.44	21.66	11.44	12.33	1.57	0.92	19.68	9.87	6.31
7500.0	10.01	21.79	9.85	10.15	1.73	0.92	19.01	9.38	6.53
8000.0	8.26	22.19	8.90	7.46	1.93	0.86	18.26	8.72	6.81

Wideband Amplifier

ZX60-V62+

Typical Performance Curves



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IF/RF MICROWAVE COMPONENTS

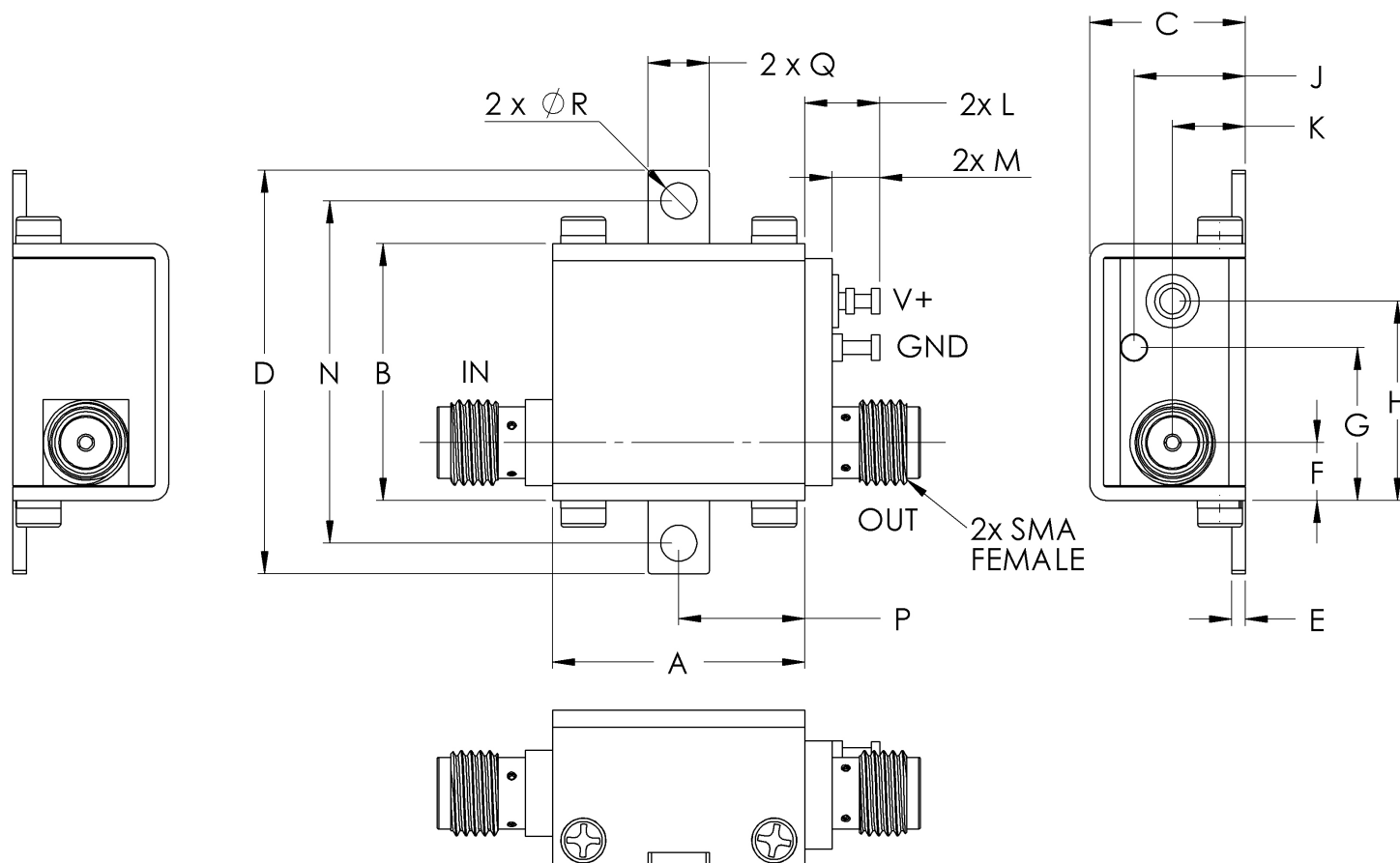
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2/6/2012
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Case Style

Outline Dimensions

GC

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

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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 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 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