

Coaxial

Wideband Amplifier

ZX60-V81-S+

50Ω 20 to 6000 MHz

The Big Deal

- Ultra wideband
- High dynamic range:
 - +19 dBm P1dB compression
 - +35 dBm Output IP3



CASE STYLE: GC957

Product Overview

The ZX60-V81-S+ is a very compact wideband amplifier covering 20 to 6000MHz with 10dB gain (at 2GHz). Housed in a rugged, cost effective unibody chassis, this amplifier supports a wide variety of applications requiring moderate power output, low distortion and 50 ohm matched input/output ports.

Key Features

Feature	Advantages
Ultra Wide band high dynamic range	The ZX60-V81-S+ covers a wide spectrum of application frequencies from VHF through 'C' band. When combined with the output power and IP3, this amplifier supports a broad array of systems and test applications.
Well Matched input / output ports	With typical input VSWR of 1.2:1 and output VSWR of 1.5:1 at 2GHz, the ZX60-V81-S+ can be used in cascade with many components and maintain minimal interaction or reflections.
Very small size, 0.75" x 0.75"	The unique unibody construction enables the ZX60-V81-S+ to be used in compact designs.
Unconditionally stable	No adverse effects due to loading of the input and output ports.

Notes

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Wideband Amplifier

ZX60-V81-S+

50Ω

20 to 6000 MHz

Features

- Wideband, 20 to 6000 MHz
- Output power at 1dB compression, +19 dBm typ.
- Good output IP3, 35 dBm typ.
- Good VSWR
- Unconditionally stable
- Protected by US patents 6,790,049 & 6,943,629

Applications

- Base station infrastructure
- CATV & DBS
- MMDS & wireless LAN
- LTE
- Buffer amplifier
- PCS
- Test equipment



Case Style: GC957
Connectors Model
SMA ZX60-V81-S+

+RoHS Compliant

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

Electrical Specifications at 25°C

Parameter	Condition (MHz)	Min.	Typ.	Max.	Units
Frequency Range		20		6000	MHz
Gain	100	9.5	10.5	11.5	dB
	1000		10.2		
	2000	8.5	9.7	11.0	
	3000		9.0		
	4000	7.3	8.5	10.0	
	6000		7.0		
Output Power at 1dB compression	100	17.0	19		dBm
	1000	17.0	19.5		
	2000	17.0	19.5		
	3000		19.0		
	4000		18.5		
	6000		17.0		
Noise Figure	100		7.5	9.0	dB
	1000		7.5		
	2000		7.5	9.5	
	3000		8.0		
	4000		8.0		
	6000		8.5		
Output third order intercept point	100		39.5		dBm
	1000		37.0		
	2000	32	36.0		
	3000		35.0		
	4000		34.0		
	6000		31.0		
Input VSWR	100		1.10	1.5	:1
	1000		1.10		
	2000		1.20		
	3000		1.25		
	4000		1.30		
	6000		1.70		
Output VSWR	100		1.15	1.7	:1
	1000		1.30		
	2000		1.50		
	3000		1.50		
	4000		1.40		
	6000		1.70		
Active Directivity	20-6000		13		dB
DC Supply Voltage		4.8	5.0	5.2	V
DC Supply Current			103	115	mA

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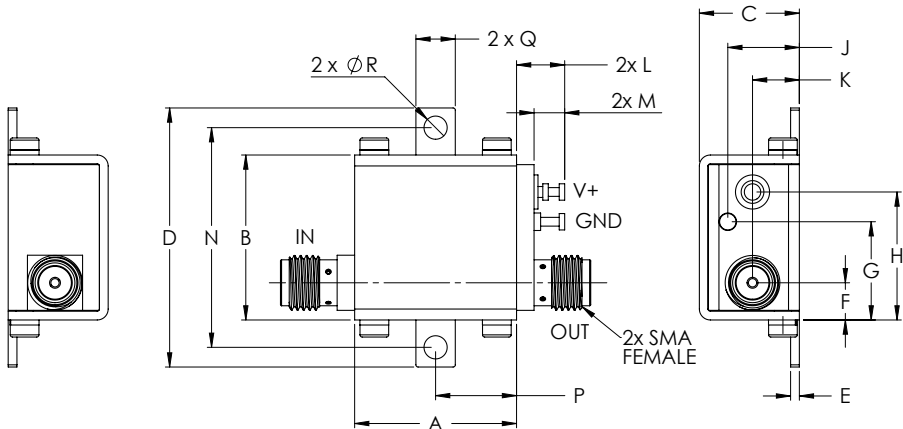


Maximum Ratings

Parameter	Ratings
Operating Temperature	-40°C to 85°C Case
Storage Temperature	-55°C to 100°C
DC Voltage	5.5 V
Input RF Power (no damage)	20 dBm
Power Consumption	1 W

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

Outline Drawing



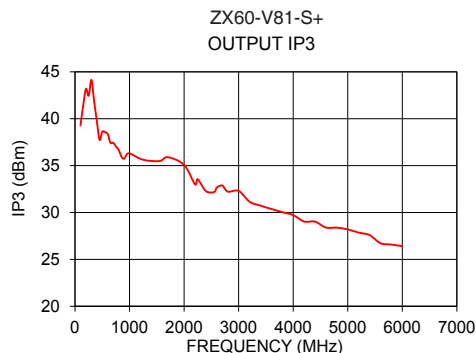
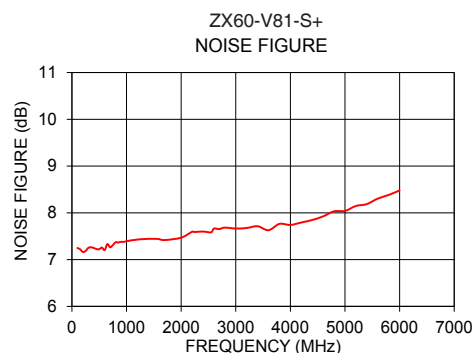
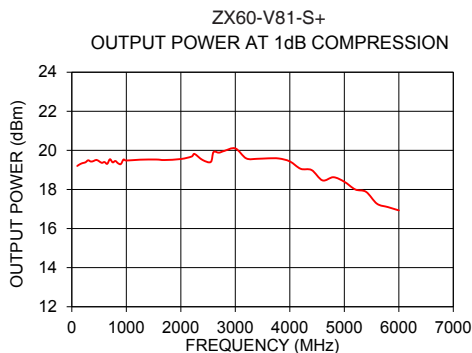
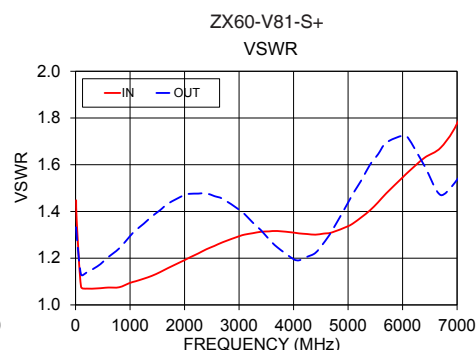
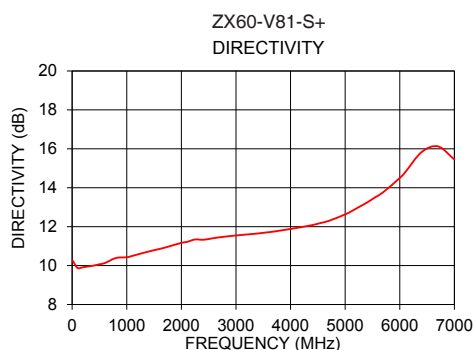
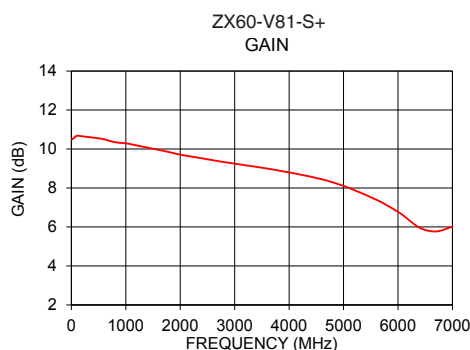
NOTE: When soldering the DC connections, caution must be used to avoid overheating the DC terminals. See Application Note [AN-40-10](#).

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	GRAM
18.80	19.05	11.68	29.97	1.02	4.32	11.43	14.99	8.38	5.33	5.59	3.56	25.40	9.40	4.57	2.69	23.0

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FREQUENCY (MHz)	GAIN (dB)	DIRECTIVITY (dB)	VSWR IN (:1)	VSWR OUT (:1)	POWER OUT @ 1dB COMPRESSION (dBm)	OUTPUT IP3 (dBm)	NF (dB)
20	10.51	10.21	1.36	1.30	—	—	—
100	10.68	9.88	1.08	1.13	19.20	39.28	7.25
500	10.54	10.07	1.07	1.18	19.44	38.63	7.22
1000	10.30	10.43	1.09	1.29	19.48	36.31	7.39
1250	10.16	10.61	1.11	1.35	19.52	35.62	7.44
1550	9.99	10.82	1.14	1.41	19.53	35.48	7.44
1700	9.90	10.92	1.16	1.43	19.51	35.90	7.42
2000	9.71	11.17	1.19	1.47	19.56	35.07	7.47
2250	9.59	11.34	1.22	1.48	19.82	33.55	7.59
2550	9.45	11.39	1.25	1.47	19.41	32.18	7.58
2700	9.38	11.46	1.27	1.45	19.88	32.87	7.65
3000	9.25	11.55	1.29	1.41	20.10	32.31	7.67
3400	9.08	11.65	1.31	1.32	19.57	30.73	7.71
4000	8.80	11.89	1.31	1.20	19.43	29.72	7.74
4400	8.58	12.08	1.30	1.22	18.99	29.03	7.85
5000	8.11	12.63	1.34	1.44	18.40	28.20	8.04
5400	7.65	13.24	1.40	1.60	17.88	27.59	8.19
6000	6.78	14.51	1.55	1.72	16.93	26.42	8.48
6700	5.77	16.12	1.67	1.47	—	—	—
7000	6.01	15.45	1.78	1.54	—	—	—



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Amplifier

ZX60-V81-S+

Typical Performance Data

**NOTE: Use PDF Bookmarks to view DATA at required conditions
or to view GRAPHS.**

Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: I = 69mA, Vd = 5V @Temperature = +25degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Delta	(dBm)	(dBm)	(dB)
20	10.57	20.80	21.06	15.98	1.73	0.32	38.23	17.89	7.24
100	10.47	20.47	26.74	27.48	1.73	0.32	40.29	18.64	7.53
220	10.49	20.46	26.73	28.32	1.73	0.32	39.74	18.76	7.61
300	10.48	20.48	26.73	29.31	1.73	0.31	39.75	18.90	7.66
420	10.39	20.55	26.60	29.23	1.76	0.31	39.27	18.93	7.70
620	10.38	20.51	25.33	27.28	1.75	0.31	38.60	18.90	7.74
820	10.29	20.57	24.68	25.85	1.77	0.30	38.13	18.87	7.76
1000	10.24	20.59	23.81	24.39	1.78	0.30	37.75	18.59	7.78
1220	10.14	20.62	22.92	22.84	1.80	0.29	37.42	18.57	7.80
1420	10.04	20.67	22.40	21.86	1.82	0.29	37.20	18.56	7.80
1500	9.99	20.70	22.18	21.41	1.83	0.29	37.09	17.45	7.79
1620	9.93	20.70	21.75	20.74	1.84	0.28	37.08	18.67	7.79
1820	9.83	20.78	21.33	20.01	1.87	0.28	36.59	19.05	7.79
2000	9.72	20.82	20.89	19.20	1.89	0.27	36.32	18.60	7.82
2220	9.60	20.87	20.51	18.40	1.91	0.26	36.02	19.31	7.84
2420	9.49	20.95	20.45	17.83	1.94	0.26	35.71	19.12	7.85
2620	9.36	20.98	20.35	17.39	1.97	0.25	35.45	19.33	7.88
2820	9.25	21.04	20.15	16.95	2.00	0.24	35.25	19.09	7.91
3000	9.17	21.06	20.39	16.55	2.02	0.24	35.01	19.02	7.90
3220	9.04	21.13	20.58	16.25	2.06	0.23	34.61	19.24	7.86
3420	8.96	21.17	21.16	16.00	2.08	0.23	34.24	18.90	7.88
3620	8.85	21.23	21.51	15.96	2.12	0.23	34.14	18.82	7.90
3820	8.76	21.27	22.19	15.97	2.15	0.22	33.98	18.87	7.93
4000	8.67	21.35	22.87	15.99	2.19	0.22	33.82	18.77	7.96
4220	8.59	21.36	23.28	15.99	2.22	0.22	33.60	18.41	8.00
4420	8.49	21.40	22.71	15.79	2.25	0.22	33.17	18.47	8.05
4620	8.39	21.45	21.37	15.65	2.28	0.22	32.96	18.41	8.12
4820	8.27	21.51	19.37	15.18	2.31	0.22	32.52	18.29	8.20
5000	8.14	21.57	17.60	14.62	2.34	0.22	32.35	18.12	8.28
5220	7.95	21.68	15.44	13.61	2.37	0.22	31.97	17.92	8.38
5420	7.75	21.75	13.68	12.62	2.39	0.23	31.68	17.83	8.41
5620	7.53	21.90	12.28	11.74	2.42	0.23	31.45	17.40	8.50
5820	7.26	22.01	11.07	10.98	2.45	0.23	31.20	17.21	8.63
6000	7.01	22.18	10.03	10.30	2.48	0.24	30.83	16.84	8.73
6220	6.65	22.29	9.04	9.64	2.50	0.24	30.57	16.35	8.85
6420	6.30	22.49	8.14	9.13	2.53	0.25	30.36	15.99	8.96
6620	5.92	22.63	7.48	8.71	2.57	0.25	29.90	15.96	9.08
7000	5.12	23.02	6.48	8.16	2.69	0.25	29.40	15.67	9.46



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IF/RF MICROWAVE COMPONENTS

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190225
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Amplifier

ZX60-V81-S+

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: I = 69mA, Vd = 5V @Temperature = -40degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Delta	(dBm)	(dBm)	(dB)
20	10.42	20.65	22.52	17.66	1.75	0.32	39.20	17.84	7.12
100	10.52	20.49	27.99	26.53	1.73	0.32	39.77	18.74	6.89
220	10.54	20.45	29.48	25.81	1.72	0.32	40.28	18.69	6.86
300	10.52	20.48	28.25	27.47	1.73	0.32	40.24	18.76	6.88
420	10.45	20.52	27.00	30.31	1.74	0.31	39.87	18.81	6.91
620	10.45	20.49	25.04	27.41	1.74	0.31	39.12	18.79	6.94
820	10.36	20.53	25.16	25.18	1.75	0.31	38.64	18.79	6.96
1000	10.32	20.54	24.21	24.12	1.76	0.30	38.29	18.67	6.99
1220	10.23	20.56	23.49	22.89	1.77	0.30	37.97	18.63	6.99
1420	10.14	20.58	22.36	22.58	1.79	0.29	37.75	18.69	6.98
1500	10.09	20.61	22.05	22.18	1.80	0.29	37.75	17.63	6.97
1620	10.03	20.63	21.51	21.47	1.81	0.29	37.92	18.90	6.98
1820	9.92	20.68	21.25	20.61	1.83	0.28	37.22	19.09	6.98
2000	9.84	20.67	21.24	20.02	1.84	0.28	36.95	18.76	6.98
2220	9.70	20.77	21.25	18.73	1.88	0.27	36.75	19.22	7.00
2420	9.58	20.79	20.75	17.86	1.90	0.26	36.38	19.11	7.01
2620	9.46	20.89	20.64	16.90	1.93	0.26	36.16	19.27	7.04
2820	9.35	20.90	20.55	16.50	1.95	0.25	36.06	19.10	7.05
3000	9.26	20.95	20.86	16.22	1.97	0.25	35.85	19.05	6.99
3220	9.15	21.01	21.18	16.01	2.01	0.24	35.40	19.34	6.92
3420	9.07	21.03	21.37	16.12	2.03	0.24	35.11	18.98	6.93
3620	8.98	21.09	21.50	16.28	2.07	0.24	35.01	18.92	6.94
3820	8.90	21.12	21.62	16.89	2.10	0.23	34.90	19.05	6.96
4000	8.83	21.14	22.47	16.64	2.12	0.23	34.72	19.01	6.99
4220	8.74	21.19	23.73	16.58	2.15	0.23	34.55	18.64	7.05
4420	8.65	21.22	23.42	16.07	2.18	0.23	34.13	18.66	7.12
4620	8.55	21.26	22.03	15.85	2.20	0.23	33.97	18.60	7.20
4820	8.43	21.33	19.67	15.19	2.24	0.23	33.45	18.47	7.23
5000	8.29	21.42	17.75	14.16	2.26	0.23	33.29	18.29	7.29
5220	8.10	21.51	14.90	13.24	2.29	0.24	32.84	18.24	7.40
5420	7.91	21.64	13.26	12.30	2.31	0.24	32.53	18.06	7.48
5620	7.71	21.70	11.87	11.85	2.32	0.24	32.38	17.72	7.56
5820	7.50	21.84	11.43	10.97	2.36	0.24	32.04	17.66	7.65
6000	7.25	21.95	10.49	10.13	2.38	0.25	31.71	17.22	7.78
6220	6.99	22.03	9.22	9.60	2.36	0.26	31.36	16.72	7.89
6420	6.71	22.16	8.62	9.30	2.40	0.25	31.14	16.55	7.94
6620	6.42	22.27	8.05	8.62	2.40	0.26	30.60	16.58	8.09
6820	6.05	22.47	7.17	8.07	2.41	0.27	30.45	15.95	8.29
7000	5.67	22.67	6.53	7.73	2.44	0.28	30.15	15.94	8.43



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Amplifier

ZX60-V81-S+

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: I = 73mA, Vd = 5V @Temperature = +85degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Delta	(dBm)	(dBm)	(dB)
20	10.04	20.90	22.37	15.91	1.85	0.30	37.55	17.81	8.52
100	10.40	20.46	25.45	27.42	1.74	0.31	39.81	18.85	8.31
220	10.43	20.45	24.27	32.02	1.73	0.31	39.26	18.80	8.31
300	10.41	20.47	24.68	33.08	1.74	0.31	39.26	18.92	8.35
420	10.33	20.52	26.03	29.77	1.76	0.31	38.82	18.96	8.39
620	10.32	20.49	24.71	26.66	1.76	0.31	38.10	18.95	8.42
820	10.22	20.57	24.40	25.06	1.78	0.30	37.60	18.90	8.45
1000	10.17	20.58	23.63	24.09	1.79	0.30	37.20	18.57	8.47
1220	10.07	20.64	22.82	22.73	1.81	0.29	36.78	18.56	8.48
1420	9.98	20.67	22.57	21.72	1.83	0.29	36.53	18.53	8.48
1500	9.93	20.70	22.26	21.15	1.84	0.28	36.42	17.44	8.49
1620	9.87	20.72	21.96	20.58	1.85	0.28	36.41	18.47	8.49
1820	9.76	20.77	21.43	19.79	1.88	0.27	35.78	18.84	8.51
2000	9.67	20.82	20.82	19.16	1.90	0.27	35.44	18.63	8.52
2220	9.53	20.90	20.42	18.33	1.93	0.26	35.13	19.25	8.55
2420	9.41	20.93	20.18	17.57	1.95	0.25	34.77	19.06	8.57
2620	9.29	21.01	19.82	17.15	1.98	0.25	34.47	19.23	8.60
2820	9.18	21.04	19.42	16.88	2.01	0.24	34.30	18.98	8.63
3000	9.08	21.15	19.46	16.45	2.05	0.23	34.02	18.92	8.59
3220	8.95	21.20	19.61	16.05	2.08	0.23	33.64	19.03	8.55
3420	8.85	21.28	19.97	15.71	2.12	0.22	33.29	18.71	8.55
3620	8.76	21.31	20.51	15.68	2.15	0.22	33.15	18.65	8.57
3820	8.66	21.35	21.40	15.79	2.18	0.22	33.00	18.70	8.61
4000	8.57	21.39	22.16	15.50	2.21	0.22	32.82	18.54	8.66
4220	8.46	21.43	22.15	15.56	2.25	0.21	32.66	18.13	8.72
4420	8.37	21.48	21.90	15.32	2.28	0.21	32.24	18.21	8.77
4620	8.26	21.51	20.60	15.37	2.31	0.21	31.97	18.05	8.84
4820	8.11	21.58	18.57	14.83	2.35	0.21	31.60	18.01	8.90
5000	7.96	21.65	16.73	14.36	2.38	0.21	31.45	17.84	8.97
5220	7.77	21.73	15.02	13.58	2.42	0.21	31.08	17.51	9.06
5420	7.58	21.82	13.64	12.79	2.45	0.21	30.83	17.59	9.13
5620	7.35	21.90	12.33	12.09	2.47	0.22	30.59	17.05	9.25
5820	7.06	22.05	10.81	11.01	2.49	0.22	30.45	16.81	9.40
6000	6.77	22.19	9.74	10.31	2.52	0.23	30.02	16.38	9.53
6220	6.40	22.36	8.83	9.48	2.55	0.24	29.78	16.09	9.68
6420	6.01	22.55	7.95	8.98	2.59	0.24	29.59	15.62	9.81
6620	5.57	22.76	7.15	8.31	2.61	0.25	29.18	15.38	10.01
6820	5.11	22.94	6.48	7.98	2.65	0.25	29.12	15.30	10.21
7000	4.71	23.06	6.23	7.93	2.74	0.25	28.84	15.04	10.34



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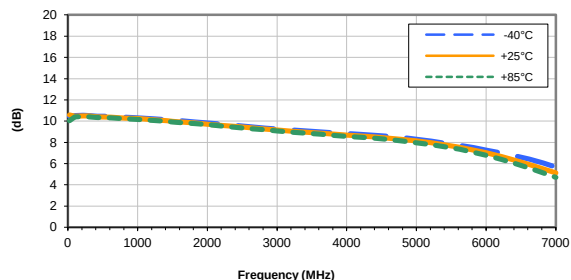
For detailed performance specs
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190225
Page 3 of 3

Typical Performance Curves

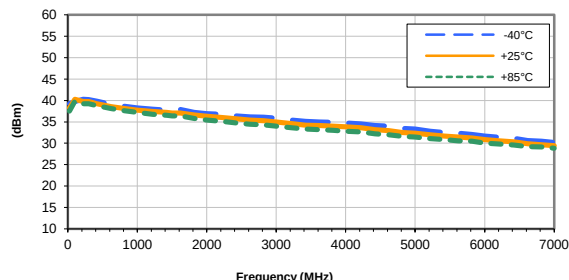
GAIN vs. FREQUENCY & TEMPERATURE

INPUT POWER = -25, VOLTAGE = 5V



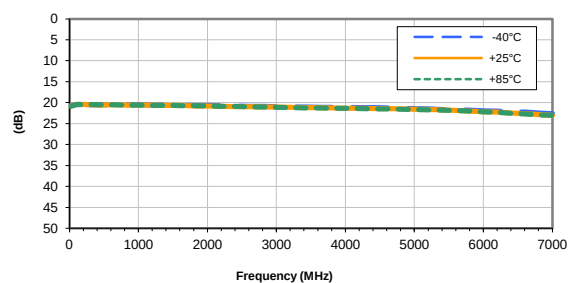
OUTPUT IP3 vs. FREQUENCY & TEMPERATURE

INPUT POWER = -10, VOLTAGE = 5V



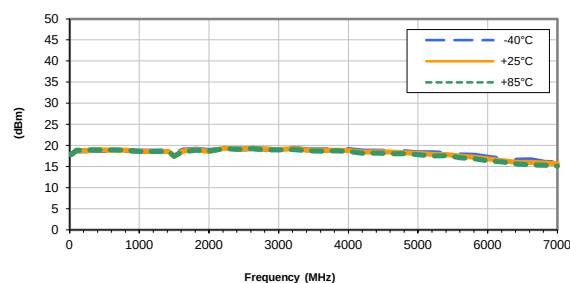
ISOLATION vs. FREQUENCY & TEMPERATURE

INPUT POWER = -25, VOLTAGE = 5V



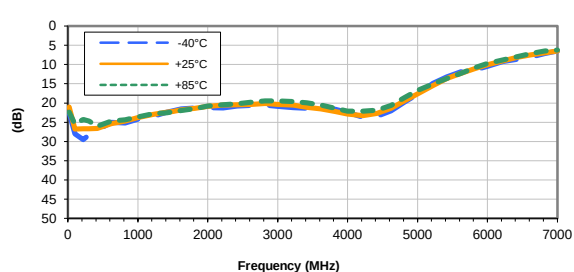
OUTPUT POWER at 1dB COMPRESSION vs. FREQUENCY & TEMPERATURE

VOLTAGE = 5V



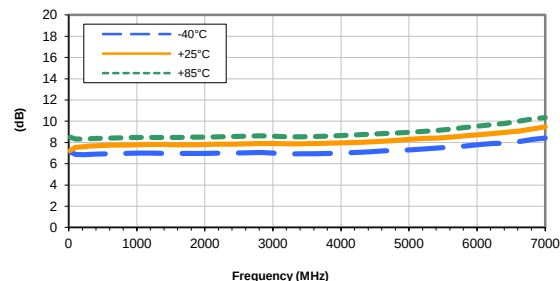
INPUT RETURN LOSS vs. FREQUENCY & TEMPERATURE

INPUT POWER = -25, VOLTAGE = 5V



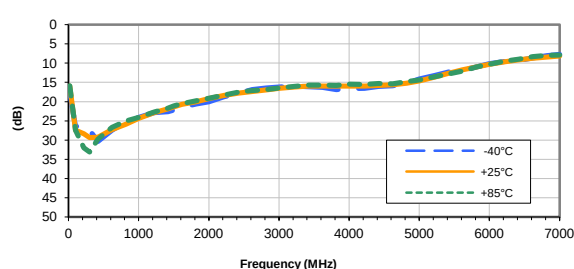
NOISE FIGURE vs. FREQUENCY & TEMPERATURE

VOLTAGE = 5V



OUTPUT RETURN LOSS vs. FREQUENCY & TEMPERATURE

INPUT POWER = -25, VOLTAGE = 5V



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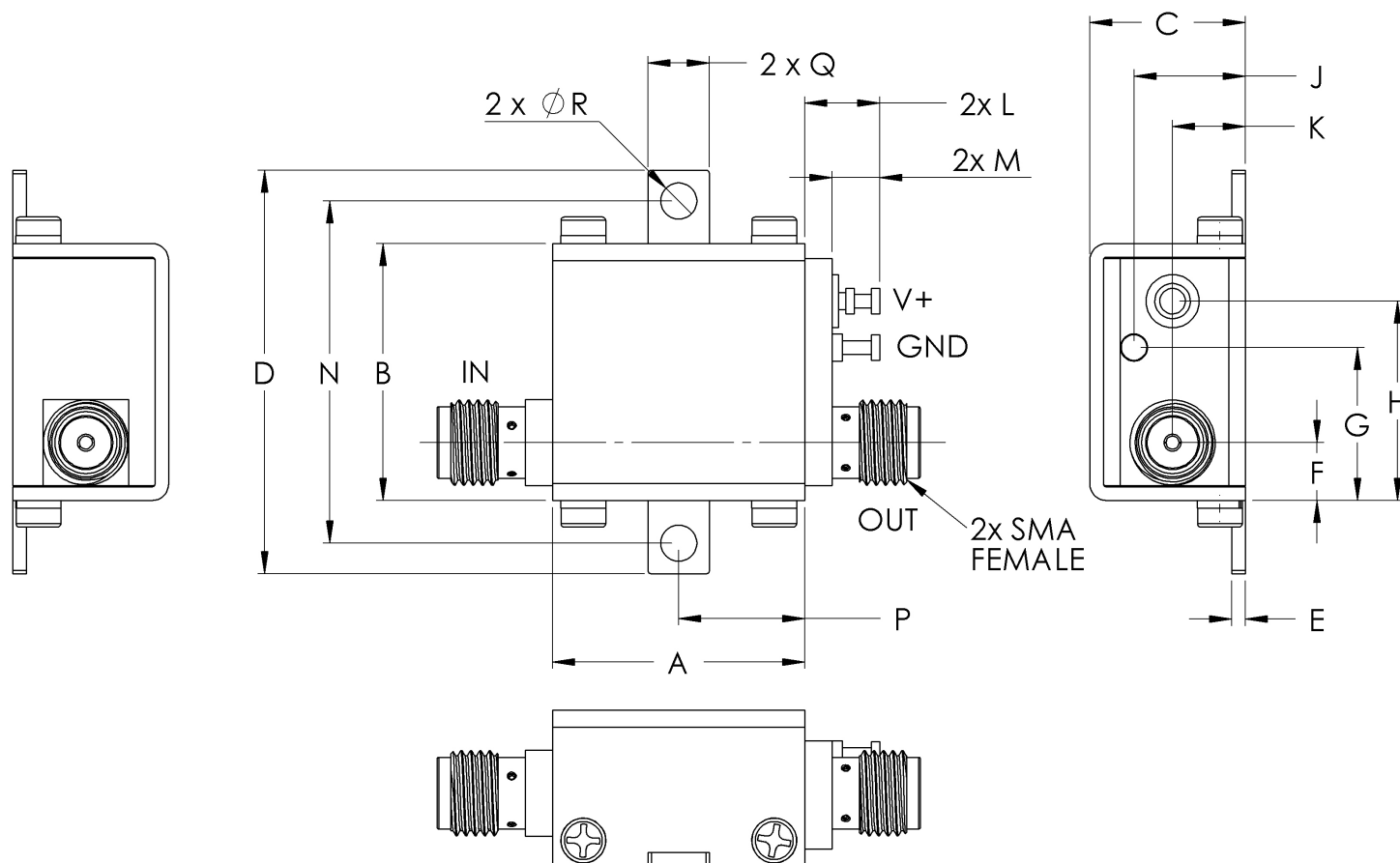
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Case Style

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:

- Case material: Brass
- 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