

Coaxial

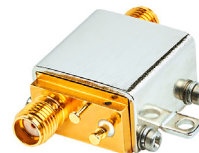
Wideband Amplifier

ZX60-V83-S+

50Ω 20 to 4700 MHz

The Big Deal

- Wideband
- High dynamic range:
 - +17dBm P1dB compression
 - +30dBm Output IP3



CASE STYLE: GC957

Product Overview

The ZX60-V83-S+ (RoHS compliant) is a very compact wideband amplifier covering 20 to 4700MHz with 17dB 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-V83-S+ covers a wide spectrum of application frequencies from VHF through 'S' 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 1GHz, the ZX60-V83-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-V83-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-V83-S+

50Ω 20 to 4700 MHz

Features

- Wideband, 20 to 4700 MHz
- Output power at 1dB compression, +17 dBm typ.
- Good output IP3, 30 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-V83-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		4700	MHz
Gain	100	18.0	20.0	22.0	dB
	1000		19.0		
	2000	15.0	16.8	18.5	
	3000		15.0		
	4000	11.5	13.5	15.0	
	4700		12.3		
Output Power at 1dB compression	100	15.0	17.0		dBm
	1000	15.0	17.0		
	2000	15.0	17.0		
	3000		17.0		
	4000		18.0		
	4700		17.5		
Noise Figure	100		6.0	7.2	dB
	1000		6.0		
	2000		6.0	7.3	
	3000		6.0		
	4000		6.5		
	4700		6.8		
Output third order intercept point	100		29.5		dBm
	1000		30.0		
	2000	28.0	31.0		
	3000		31.0		
	4000		30.0		
	4700		29.5		
Input VSWR	100		1.10		:1
	1000		1.20		
	2000		1.25	1.6	
	3000		1.30		
	4000		1.20		
	4700		1.30		
Output VSWR	100		1.35		:1
	1000		1.50		
	2000		1.70	2.3	
	3000		1.80		
	4000		1.70		
	4700		1.75		
Active Directivity	20-4700		10		dB
DC Supply Voltage		4.8	5.0	5.2	V
DC Supply Current			72	82	mA

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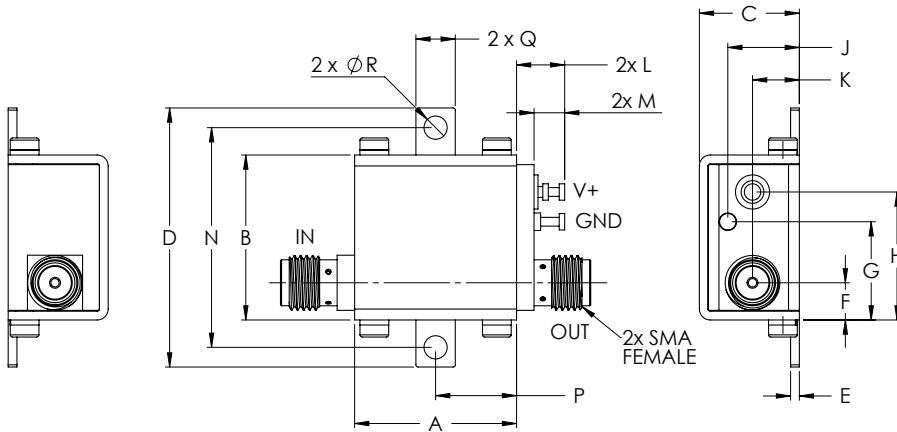


Maximum Ratings

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	740 mW

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 (inch/mm)

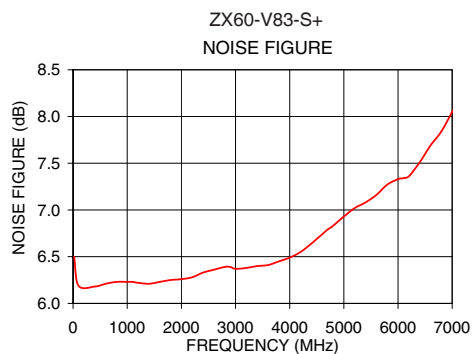
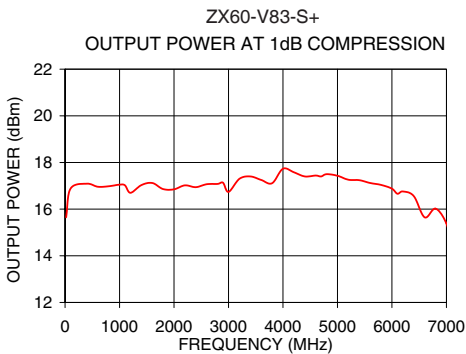
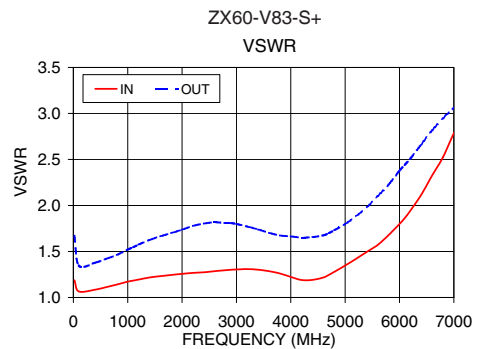
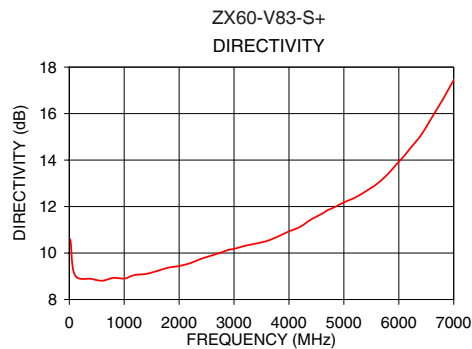
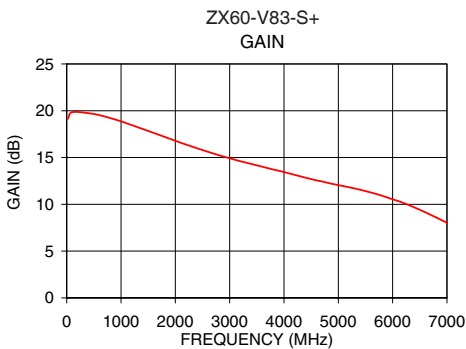
A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	WT.
																GRAM
.74	.75	.46	1.18	.04	.17	.45	.59	.33	.21	.22	.14	1.00	.37	.18	.106	23.0
18.80	19.05	11.68	29.97	1.02	4.32	11.43	14.99	8.38	5.33	5.59	3.56	25.40	9.40	4.57	2.69	

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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	19.12	10.58	1.19	1.67	15.65	27.56	6.50
100	19.84	9.06	1.07	1.35	16.88	29.27	6.19
400	19.74	8.89	1.08	1.38	17.09	29.85	6.18
1000	18.87	8.90	1.17	1.52	17.05	28.75	6.23
1200	18.46	9.06	1.19	1.58	16.70	29.46	6.22
1400	18.05	9.10	1.22	1.62	17.03	29.56	6.21
1600	17.63	9.23	1.23	1.66	17.12	29.73	6.23
2000	16.79	9.44	1.26	1.74	16.85	30.55	6.26
2200	16.38	9.56	1.27	1.78	17.02	30.78	6.28
2400	15.99	9.75	1.27	1.80	16.94	31.06	6.33
2600	15.61	9.90	1.29	1.82	17.07	30.55	6.36
3000	14.92	10.18	1.30	1.80	16.74	30.69	6.37
3400	14.31	10.41	1.30	1.74	17.40	30.06	6.40
4000	13.45	10.93	1.22	1.66	17.73	30.03	6.49
4400	12.84	11.44	1.19	1.66	17.40	29.76	6.64
4700	12.44	11.84	1.25	1.70	17.40	29.61	6.79
5000	12.05	12.18	1.35	1.80	17.43	29.49	6.93
6000	10.54	13.93	1.80	2.38	16.88	28.86	7.33
6600	9.15	15.82	2.33	2.82	15.65	28.17	7.69
7000	8.02	17.44	2.78	3.06	15.38	27.77	8.05



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Amplifier

ZX60-V83-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
					K	Delta			
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Delta	(dBm)	(dBm)	(dB)
20	19.12	29.70	21.36	12.01	1.74	0.32	27.19	15.65	6.50
100	19.84	28.90	29.98	16.60	1.56	0.35	29.84	16.88	6.19
200	19.84	28.87	31.46	16.50	1.56	0.35	29.47	16.83	6.18
400	19.74	28.63	27.85	15.98	1.53	0.35	30.33	17.09	6.18
500	19.65	28.53	26.99	15.53	1.52	0.35	29.51	16.99	6.20
800	19.22	28.15	23.66	14.54	1.51	0.35	29.45	16.98	6.23
1000	18.87	27.77	22.04	13.70	1.49	0.34	29.14	17.05	6.23
1200	18.46	27.52	21.04	13.02	1.49	0.33	29.64	16.70	6.22
1400	18.05	27.15	20.17	12.47	1.49	0.33	29.85	17.03	6.21
1500	17.84	27.04	19.93	12.25	1.49	0.32	30.21	17.14	6.22
1600	17.63	26.86	19.67	12.06	1.49	0.32	30.32	17.12	6.23
1800	17.21	26.58	19.26	11.73	1.50	0.32	31.41	16.86	6.25
2000	16.79	26.23	18.88	11.40	1.50	0.31	31.78	16.85	6.26
2200	16.38	25.94	18.56	11.06	1.51	0.31	31.48	17.02	6.28
2400	15.99	25.74	18.38	10.86	1.53	0.30	32.07	16.94	6.33
2500	15.79	25.64	18.24	10.79	1.54	0.29	31.36	17.03	6.34
2600	15.61	25.51	18.05	10.75	1.54	0.29	30.77	17.07	6.36
2800	15.25	25.30	17.78	10.82	1.56	0.28	31.23	17.08	6.39
3000	14.92	25.10	17.58	10.89	1.58	0.28	31.10	16.74	6.37
3200	14.60	24.91	17.48	11.11	1.61	0.27	30.90	17.30	6.38
3400	14.31	24.72	17.65	11.37	1.63	0.27	30.62	17.40	6.40
3500	14.17	24.65	17.78	11.51	1.65	0.27	30.48	17.43	6.41
3800	13.72	24.43	18.75	11.97	1.70	0.27	30.51	17.11	6.45
4000	13.45	24.38	19.96	12.07	1.76	0.26	30.64	17.73	6.49
4200	13.14	24.26	21.25	12.20	1.80	0.26	30.40	17.58	6.55
4400	12.84	24.28	21.16	12.14	1.87	0.26	30.24	17.40	6.64
4500	12.70	24.31	20.75	12.05	1.90	0.26	30.28	17.38	6.69
4600	12.56	24.25	20.19	11.96	1.91	0.26	30.08	17.44	6.74
4700	12.44	24.28	19.22	11.73	1.94	0.26	30.15	17.40	6.79
4800	12.30	24.24	18.26	11.45	1.95	0.27	30.17	17.50	6.83
5000	12.05	24.23	16.60	10.90	1.97	0.27	30.08	17.43	6.93
5500	11.42	24.28	13.55	9.37	2.02	0.28	29.56	17.25	7.11
5800	10.92	24.32	11.93	8.40	2.05	0.30	29.17	17.04	7.27
6000	10.54	24.47	10.89	7.79	2.10	0.30	29.20	16.88	7.33
6500	9.42	24.87	8.46	6.66	2.22	0.33	28.48	16.51	7.60
6600	9.15	24.97	7.99	6.45	2.24	0.33	28.52	15.65	7.69
6800	8.60	25.20	7.28	6.14	2.32	0.34	28.15	16.02	7.84
7000	8.02	25.46	6.53	5.89	2.40	0.35	28.37	15.38	8.05



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Amplifier

ZX60-V83-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
					K	Delta			
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Delta	(dBm)	(dBm)	(dB)
20	19.20	29.71	21.25	11.59	1.72	0.32	26.12	15.17	5.96
100	19.77	28.83	29.25	15.43	1.56	0.36	28.49	16.21	5.59
200	19.77	28.75	31.41	15.04	1.54	0.36	28.09	16.11	5.55
400	19.69	28.52	28.25	15.61	1.52	0.36	29.19	16.48	5.53
500	19.61	28.41	27.92	15.11	1.51	0.36	28.46	16.40	5.54
800	19.20	28.01	24.27	14.04	1.49	0.35	28.52	16.38	5.55
1000	18.87	27.66	23.08	13.28	1.47	0.35	28.15	16.42	5.54
1200	18.48	27.41	22.02	12.73	1.48	0.34	28.76	16.03	5.54
1400	18.09	27.07	20.37	12.55	1.47	0.33	29.17	16.42	5.53
1500	17.89	26.92	19.91	12.36	1.47	0.33	29.49	16.54	5.54
1600	17.68	26.75	19.43	12.20	1.47	0.33	29.67	16.54	5.56
1800	17.27	26.43	18.93	11.81	1.47	0.32	30.97	16.26	5.58
2000	16.85	26.14	18.81	11.38	1.48	0.32	30.50	16.22	5.57
2200	16.45	25.91	18.68	10.93	1.49	0.31	31.23	16.38	5.59
2400	16.07	25.72	18.31	10.74	1.51	0.30	31.61	16.35	5.62
2500	15.87	25.56	18.06	10.64	1.51	0.30	31.45	16.45	5.63
2600	15.69	25.45	17.91	10.55	1.51	0.29	31.43	16.45	5.65
2800	15.35	25.22	18.00	10.57	1.53	0.29	31.87	16.45	5.65
3000	15.04	25.01	18.36	10.58	1.54	0.29	31.43	16.04	5.63
3200	14.76	24.76	18.69	10.80	1.56	0.29	30.83	16.77	5.65
3400	14.49	24.61	18.79	11.08	1.59	0.28	30.58	16.93	5.66
3500	14.36	24.49	18.86	11.17	1.59	0.28	30.79	17.03	5.67
3800	13.97	24.27	18.97	11.72	1.64	0.28	30.65	16.58	5.69
4000	13.71	24.20	19.57	11.80	1.67	0.28	30.77	17.43	5.73
4200	13.44	24.12	20.45	11.90	1.72	0.28	30.98	17.45	5.80
4400	13.16	24.05	20.99	11.71	1.75	0.28	30.73	17.06	5.87
4500	13.03	24.07	21.01	11.62	1.78	0.28	31.15	17.19	5.93
4600	12.90	24.03	21.09	11.51	1.80	0.28	30.70	17.19	5.97
4700	12.77	24.04	20.48	11.37	1.82	0.28	30.81	17.30	6.03
4800	12.63	24.00	19.58	11.13	1.84	0.28	30.96	17.26	6.08
5000	12.36	24.02	17.85	10.65	1.87	0.28	30.73	17.34	6.16
5200	12.12	24.04	15.96	10.20	1.90	0.29	30.62	17.11	6.23
5500	11.69	24.11	13.63	9.41	1.94	0.30	30.12	17.02	6.30
5800	11.25	24.20	12.23	8.54	1.98	0.30	29.88	17.08	6.39
6000	10.92	24.30	11.31	8.00	2.01	0.31	30.10	16.91	6.44
6500	9.92	24.61	8.88	6.79	2.10	0.34	29.35	16.68	6.70
6600	9.67	24.69	8.35	6.51	2.11	0.34	29.24	16.10	6.81
6800	9.09	24.92	7.24	6.00	2.14	0.37	29.37	16.36	7.11
7000	8.48	25.27	6.35	5.64	2.21	0.38	29.50	15.64	7.43



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Amplifier

ZX60-V83-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
					K	Delta			
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Delta	(dBm)	(dBm)	(dB)
20	18.88	30.03	20.77	11.56	1.83	0.30	27.58	15.63	6.95
100	19.82	28.95	29.99	17.09	1.58	0.35	30.55	17.08	6.68
200	19.83	28.75	29.47	17.64	1.55	0.36	30.19	17.09	6.68
400	19.70	28.54	26.47	16.34	1.52	0.36	30.88	17.29	6.69
500	19.59	28.50	26.08	15.61	1.53	0.35	30.17	17.20	6.71
800	19.14	28.07	22.87	14.56	1.51	0.34	30.09	17.15	6.75
1000	18.77	27.73	21.42	13.76	1.49	0.34	29.80	17.22	6.75
1200	18.36	27.45	20.56	13.12	1.50	0.33	30.37	16.94	6.74
1400	17.93	27.17	19.98	12.52	1.50	0.32	30.51	17.22	6.75
1500	17.71	26.98	19.84	12.26	1.50	0.32	30.90	17.33	6.76
1600	17.50	26.86	19.64	12.07	1.51	0.32	31.00	17.31	6.78
1800	17.06	26.53	19.21	11.75	1.51	0.31	32.10	17.07	6.80
2000	16.63	26.27	18.87	11.45	1.53	0.30	31.08	17.10	6.81
2200	16.22	25.98	18.49	11.21	1.54	0.30	32.13	17.26	6.85
2400	15.81	25.74	18.13	11.06	1.55	0.29	32.41	17.15	6.89
2500	15.61	25.65	17.85	11.04	1.57	0.29	31.90	17.26	6.91
2600	15.42	25.49	17.56	11.03	1.57	0.28	31.08	17.31	6.93
2800	15.04	25.31	16.98	11.12	1.60	0.28	31.41	17.30	6.96
3000	14.68	25.13	16.77	11.20	1.62	0.27	31.76	17.03	6.95
3200	14.33	24.97	16.69	11.39	1.66	0.26	31.40	17.43	6.97
3400	14.00	24.81	16.83	11.58	1.69	0.25	31.33	17.51	6.99
3500	13.84	24.77	17.02	11.74	1.72	0.25	31.14	17.44	6.99
3800	13.32	24.62	18.29	12.24	1.81	0.25	31.30	17.15	7.03
4000	12.98	24.54	19.62	12.44	1.88	0.24	31.15	17.55	7.09
4200	12.58	24.60	20.05	12.63	1.98	0.24	30.94	17.21	7.16
4400	12.21	24.63	19.42	12.40	2.06	0.23	30.29	17.13	7.25
4500	12.09	24.61	18.97	12.24	2.08	0.23	30.58	17.11	7.29
4600	11.99	24.54	18.42	12.03	2.08	0.24	30.53	17.17	7.33
4700	11.92	24.51	17.70	11.75	2.08	0.24	30.57	17.09	7.37
4800	11.84	24.49	16.97	11.38	2.07	0.25	30.53	17.32	7.42
5000	11.71	24.30	15.73	10.86	2.04	0.26	30.78	17.35	7.53
5200	11.52	24.23	14.75	10.37	2.04	0.26	30.24	17.19	7.60
5500	11.13	24.22	13.86	9.49	2.07	0.27	29.83	17.21	7.69
5800	10.60	24.30	12.21	8.45	2.12	0.28	29.95	16.87	7.82
6000	10.15	24.44	11.04	7.75	2.17	0.29	30.60	16.66	7.93
6500	8.81	25.05	8.14	6.54	2.36	0.32	29.96	16.10	8.30
6600	8.52	25.15	7.61	6.38	2.38	0.33	29.34	15.10	8.41
6800	7.94	25.44	6.93	6.17	2.49	0.33	28.79	15.36	8.59
7000	7.37	25.66	6.33	6.02	2.58	0.34	29.35	14.80	8.75



For detailed performance specs & shopping online see web site

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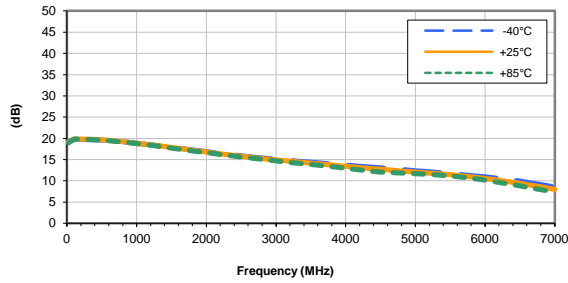
IF/RF MICROWAVE COMPONENTS

Notes: 1. Performance and quality attributes and conditions not expressly stated in this specification sheet are intended to be excluded and do not form a part of this specification sheet. 2. Electrical specifications and performance data contained herein are based on Mini-Circuits' applicable established test performance criteria and measurement instructions. 3. The parts covered by this specification sheet 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/MCIStore/terms.jsp.

Typical Performance Curves

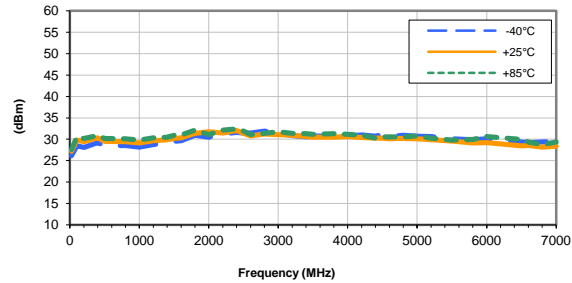
GAIN vs. FREQUENCY & TEMPERATURE

INPUT POWER = -25, VOLTAGE = 5V



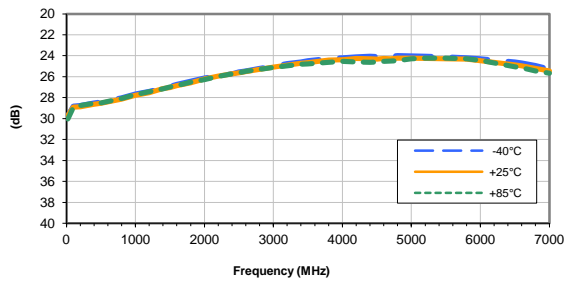
OUTPUT IP3 vs. FREQUENCY & TEMPERATURE

INPUT POWER = -10, VOLTAGE = 5V



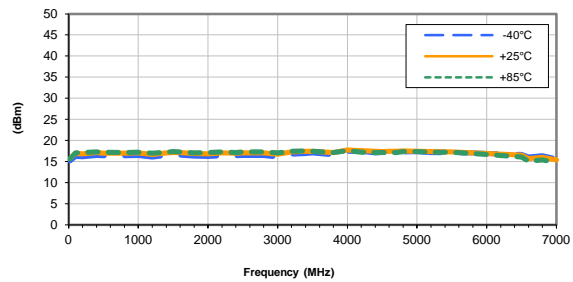
ISOLATION vs. FREQUENCY & TEMPERATURE

INPUT POWER = -25, VOLTAGE = 5V



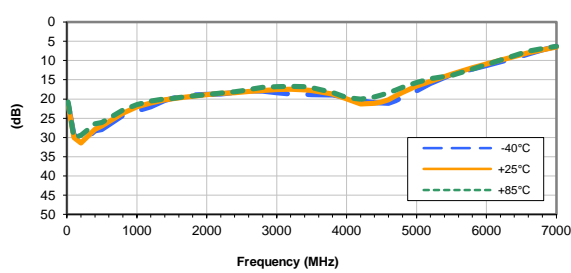
OUTPUT POWER at 1dB COMPRESSION vs. FREQUENCY & TEMPERATURE

VOLTAGE = 5V



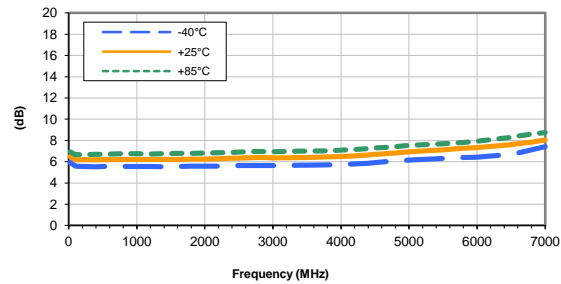
INPUT RETURN LOSS vs. FREQUENCY & TEMPERATURE

INPUT POWER = -25, VOLTAGE = 5V



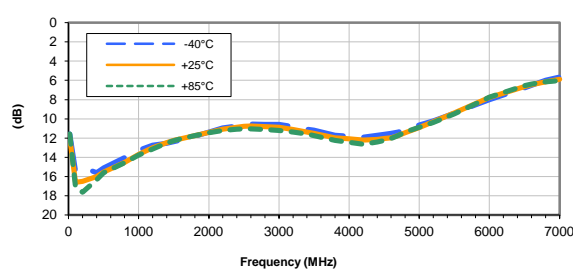
NOISE FIGURE vs. FREQUENCY & TEMPERATURE

VOLTAGE = 5V



OUTPUT RETURN LOSS vs. FREQUENCY & TEMPERATURE

INPUT POWER = -25, VOLTAGE = 5V



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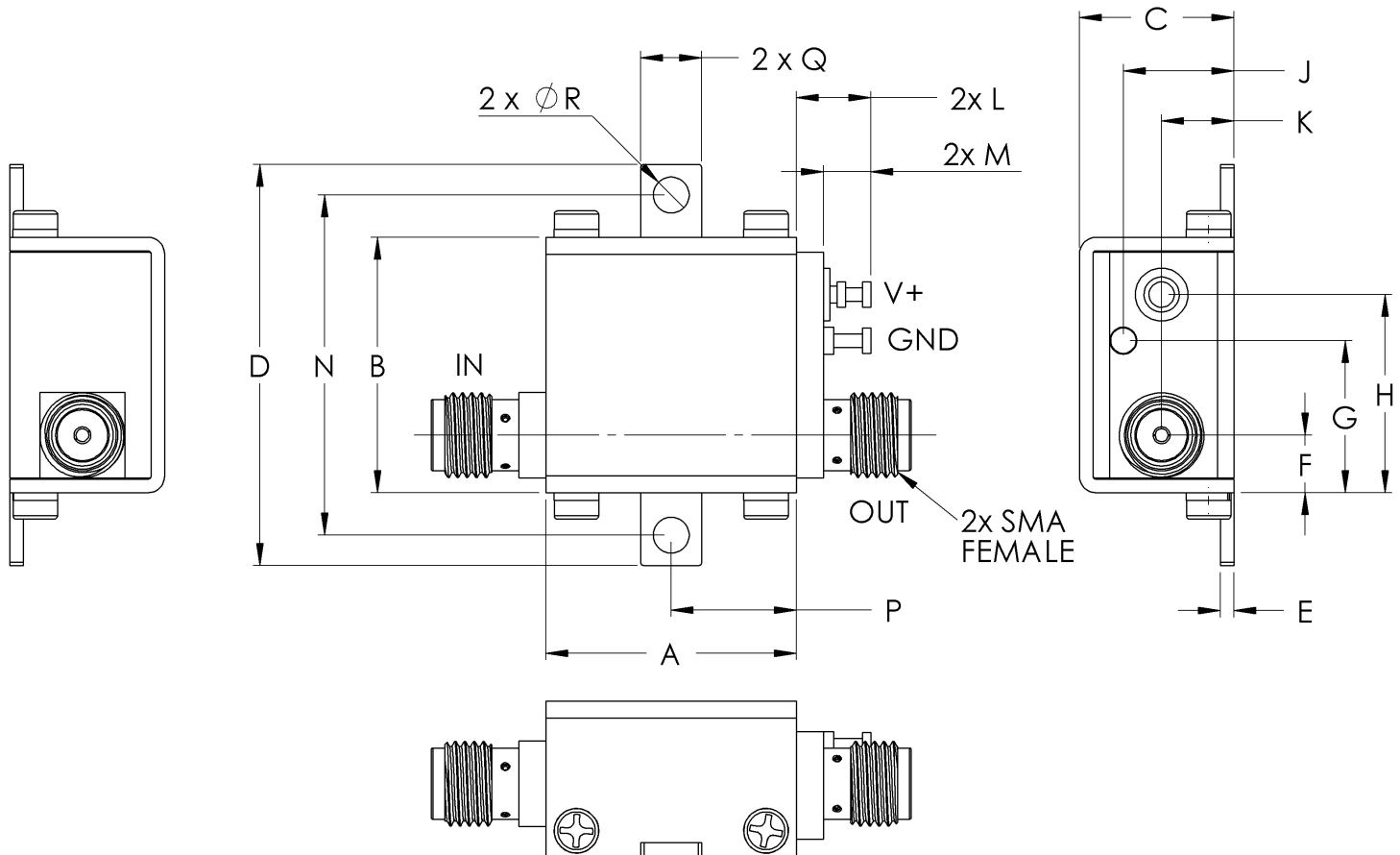
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Case Style

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

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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