COAXIAL

Wideband Microwave Amplifier ZX60-183A-S+

50Ω 6 to 18 GHz SMA Female

THE BIG DEAL

- Wideband, 6 to 18 GHz, Usable Over 5 to 20 GHz
- Gain, 28 dB Typ. and Flatness, ±1.6 dB Typ.
- Output Power at 1 dB Compression, +18.0 dBm Typ.
- Excellent Isolation, 65 dB Typ.
- Unconditionally Stable
- Protected by US Patent 6,790,049



Generic photo used for illustration purposes only

Model No.	ZX60-183A-S+
Case Style	GC957
Connectors	SMA female

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

APPLICATIONS

- Military and Radar
- Direct Broadcast Satellite
- Wideband Isolation Amplifier
- Microwave Point-to-Point Radio
- Satellite Systems

PRODUCT OVERVIEW

The ZX60-183A-S+ two-stage amplifier provides high gain in a very small package, only 0.75x0.74x 0.46". Internal compensating circuitry provides a consistent, very flat response over the full bandwidth. Designed for 50Ω SMA coax systems, the gold-plated package uses convenient +5 V DC power, and has a nickel-plated brass cover and unibody construction for rugged use.

KEY FEATURES

Feature	Advantages
Wideband, 6 to 18 GHz, Usable over 5 to 20 GHz	Wide frequency range supports a wide array of applications, from microwave radio and radar to military communications, satellite communications, and countermeasures.
Excellent Gain Flatness	±1.7 dB gain flatness across entire bandwidth minimizes the need for external equalizer networks, making it a great fit for instrumentation, test lab, EW, or any other amplitude-sensitive system.
High Gain and Excellent Isolation	28 dB gain with reverse isolation of 65 dB (38 dB directivity) prevents leakage, making the ZX60-183A-S+ an excellent choice for minimizing interactions between different microwave components. It is an ideal LO driver amplifier and provides designers system flexibility and robustness when integrating cascaded RF components.
Unconditionally Stable	No risk of damage to other components from impedance mismatch or internal oscillation.

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ZX60-183A-S+
MCL NY
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Wideband Microwave Amplifier ZX60-183A-S+

50Ω 6 to 18 GHz SMA Female

ELECTRICAL SPECIFICATIONS AT +25 °C

Parameter	Condition (GHz)	Min.	Typ.	Max.	Units
Frequency Range		6.0		18.0	GHz
Gain	6.0		29.3		dB
	8.0	24.0	29.3		
	10.0	24.0	28.6		
	12.0		27.2		
	14.0		26.7		
	16.0		27.7		
	18.0	21.6	26.1		
Gain Flatness	6.0-18.0		±1.6		dB
Input Return Loss	6.0		12.5		dB
	8.0	10.0	14.1		
	10.0		18.3		
	12.0	10.0	14.8		
	14.0		12.5		
	16.0		12.4		
	18.0		9.0		
Output Return Loss	6.0		13.2		dB
	8.0	10.0	14.2		
	10.0		12.8		
	12.0	10.0	14.6		
	14.0		11.8		
	16.0		12.1		
	18.0	9.5	11.5		
Output IP3[1]	6.0		+32.4		dBm
	8.0		+28.3		
	10.0		+26.7		
	12.0		+25.7		
	14.0		+24.9		
	16.0		+24.9		
	18.0		+25.2		
Output Power at 1 dB Compression	6.0		+17.0		dBm
	8.0		+17.8		
	10.0	+16.0	+18.8		
	12.0		+17.4		
	14.0		+18.0		
	16.0		+18.8		
	18.0		+17.6		
Noise Figure	6.0		5.2		dB
	8.0		4.8		
	10.0		5.1		
	12.0		5.2		
	14.0		5.5		
	16.0		5.8		
	18.0		6.5		
Directivity (Isolation-Gain)			41		dB
DC Voltage			+5.0		V
DC Current			277	332	mA

1. Tested at P_{OUT} of 8 dBm/tone, 1 MHz tone spacing.

Wideband Microwave Amplifier ZX60-183A-S+

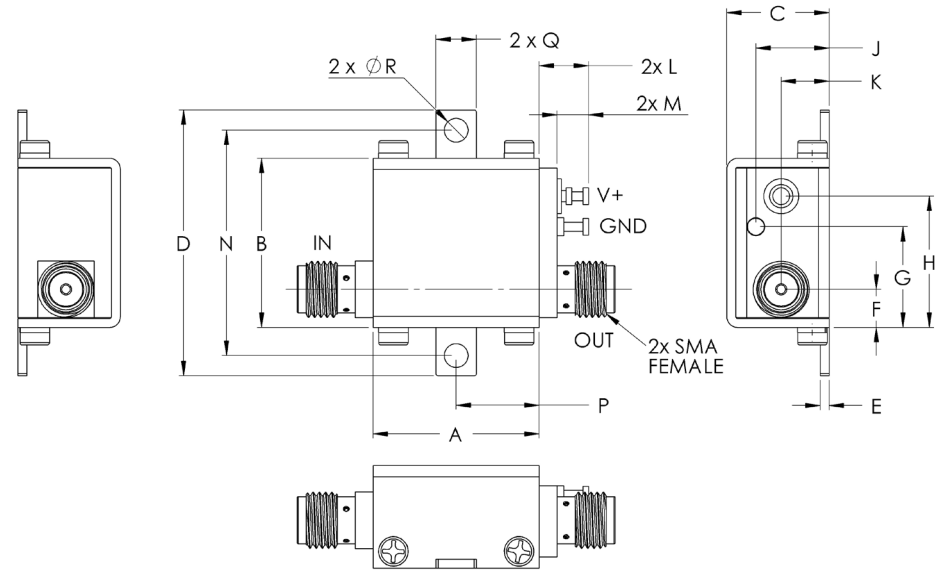
50Ω 6 to 18 GHz SMA Female

ABSOLUTE MAXIMUM RATINGS

Parameter	Ratings
Operating Temperature	-40 °C to +85 °C Baseplate Temp.
Storage Temperature	-55 °C to +100 °C
DC Voltage	+5.5 V
Input RF Power (No Damage)	+20 dBm
Power Dissipation	1.9 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)

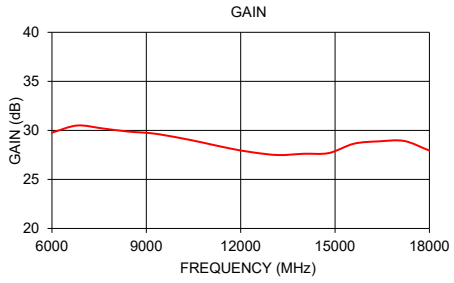
A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	wt
.74	.75	.46	1.18	.04	.17	.45	.59	.33	.21	.22	.14	1.00	.37	.18	.106	grams
18.80	19.1	11.68	30.0	1.02	4.32	11.4	14.99	8.38	5.33	5.59	3.56	25.40	9.40	4.57	2.69	23.0

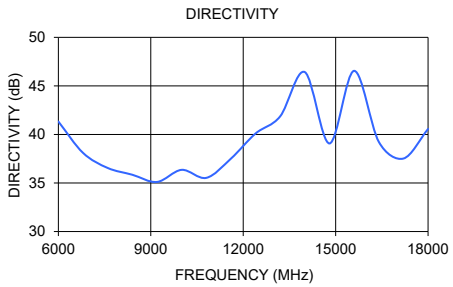
Wideband Microwave Amplifier ZX60-183A-S+

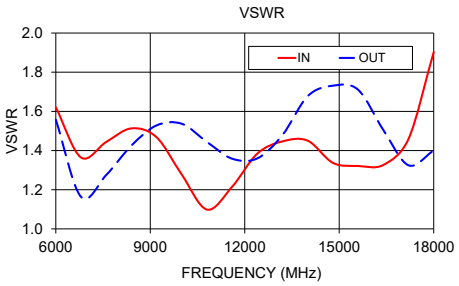
50Ω 6 to 18 GHz SMA Female

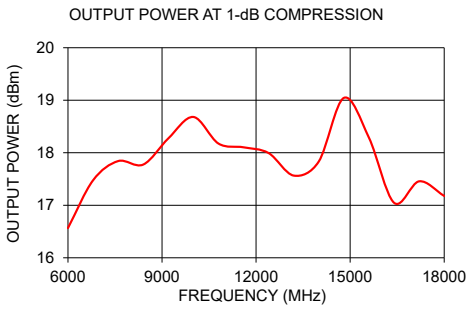
TYPICAL PERFORMANCE DATA/CURVES

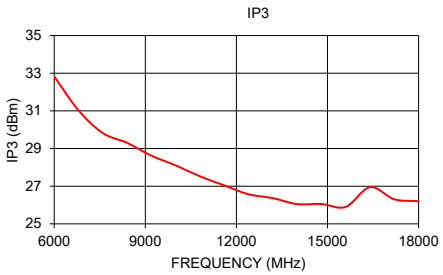
Frequency (MHz)	Gain (dB)	Directivity (dB)	VSWR (:1)		Power Out at 1 dB Compr. (dBm)	Noise Figure (dB)	IP3 (dBm)
			IN	OUT			
6000	29.77	41.33	1.62	1.56	16.57	5.22	32.83
6800	30.49	38.10	1.36	1.16	17.48	4.66	31.03
7600	30.20	36.55	1.44	1.27	17.84	4.71	29.82
8400	29.89	35.85	1.51	1.43	17.78	4.96	29.30
9200	29.69	35.11	1.47	1.53	18.27	5.09	28.62
10000	29.27	36.35	1.28	1.54	18.68	5.07	28.11
10800	28.75	35.53	1.10	1.44	18.18	5.03	27.53
11600	28.19	37.50	1.22	1.36	18.10	5.01	27.04
12400	27.75	40.10	1.38	1.36	17.99	5.23	26.57
13200	27.48	41.87	1.45	1.48	17.57	5.34	26.36
14000	27.61	46.42	1.45	1.68	17.83	5.49	26.05
14800	27.69	39.07	1.34	1.73	19.04	5.61	26.05
15600	28.64	46.55	1.32	1.71	18.29	5.69	25.90
16400	28.88	39.24	1.33	1.50	17.05	5.83	26.95
17200	28.92	37.52	1.46	1.32	17.46	5.96	26.30
18000	27.94	40.56	1.90	1.40	17.18	6.45	26.20

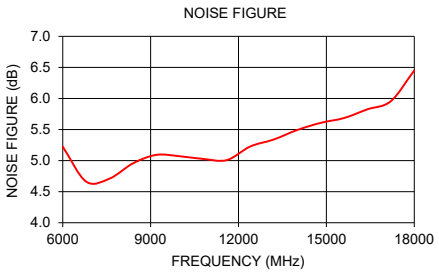












NOTES

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

Coaxial

Wideband Microwave Amplifier ZX60-183A-S+

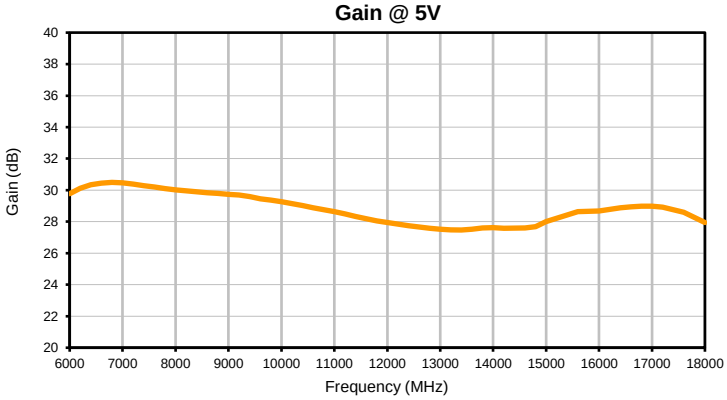
Typical Performance Data

Frequency (MHz)	Gain (dB) 5V	Directivity (dB) 5V	VSWR IN (:1) 5V	VSWR OUT (:1) 5V	Noise Figure (dB) 5V	Pout @ 1dB Compression (dBm) 5V	Output IP3 (dBm) 5V
6000	29.77	41.33	1.62	1.56	5.22	16.57	32.83
6200	30.11	40.55	1.51	1.42	4.92	16.79	32.89
6400	30.34	39.41	1.43	1.30	4.79	17.04	32.12
6600	30.45	38.55	1.38	1.21	4.72	17.58	31.26
6800	30.49	38.10	1.36	1.16	4.66	17.48	31.03
7000	30.46	37.83	1.37	1.16	4.63	16.99	31.06
7200	30.38	37.12	1.39	1.19	4.60	17.23	30.59
7400	30.29	37.04	1.42	1.23	4.73	17.71	29.97
7600	30.20	36.55	1.44	1.27	4.71	17.84	29.82
7800	30.11	36.27	1.47	1.31	4.78	17.83	29.88
8000	30.02	36.33	1.49	1.35	4.84	17.51	29.70
8200	29.95	36.27	1.51	1.39	4.86	17.92	29.46
8400	29.89	35.85	1.51	1.43	4.96	17.78	29.30
8600	29.84	36.20	1.52	1.46	4.95	18.29	29.09
8800	29.79	35.78	1.51	1.49	4.98	17.80	29.05
9000	29.74	35.87	1.49	1.51	5.04	17.57	28.98
9200	29.69	35.11	1.47	1.53	5.09	18.27	28.62
9400	29.58	35.58	1.41	1.54	5.03	18.11	28.49
9600	29.46	36.47	1.37	1.54	5.08	18.04	28.46
9800	29.37	36.57	1.33	1.54	5.04	19.01	28.16
10000	29.27	36.35	1.28	1.54	5.07	18.68	28.11
10200	29.15	36.85	1.23	1.53	5.02	18.85	27.97
10400	29.03	36.79	1.17	1.52	4.98	18.81	27.87
10600	28.88	35.85	1.13	1.48	5.00	18.11	27.74
10800	28.75	35.53	1.10	1.44	5.03	18.18	27.53
11000	28.63	36.17	1.09	1.41	4.98	18.30	27.37
11200	28.49	36.63	1.12	1.39	5.01	18.77	27.22
11400	28.34	37.21	1.17	1.37	5.01	18.17	27.19
11600	28.19	37.50	1.22	1.36	5.01	18.10	27.04
11800	28.06	38.35	1.27	1.34	5.06	17.35	27.16
12000	27.94	39.12	1.31	1.34	5.16	17.12	27.13
12200	27.85	40.55	1.35	1.34	5.15	17.68	26.74
12400	27.75	40.10	1.38	1.36	5.23	17.99	26.57
12600	27.67	40.70	1.41	1.37	5.22	17.66	26.61
12800	27.58	40.90	1.43	1.41	5.23	17.09	26.65
13000	27.53	41.08	1.44	1.44	5.25	16.75	26.89
13200	27.48	41.87	1.45	1.48	5.34	17.57	26.36
13400	27.47	42.17	1.45	1.51	5.34	18.39	26.06
13600	27.52	42.63	1.45	1.55	5.36	17.83	26.16
13800	27.60	44.07	1.45	1.61	5.39	18.06	26.00
14000	27.61	46.42	1.45	1.68	5.49	17.83	26.05
14200	27.57	49.23	1.44	1.74	5.50	17.89	26.17
14600	27.60	42.09	1.39	1.77	5.56	18.00	26.32
14800	27.69	39.07	1.34	1.73	5.61	19.04	26.05
15000	28.00	39.22	1.30	1.68	5.62	18.60	26.52
15600	28.64	46.55	1.32	1.71	5.69	18.29	25.90
16000	28.67	45.30	1.33	1.65	5.76	18.77	25.80
16400	28.88	39.24	1.33	1.50	5.83	17.05	26.95
16600	28.95	38.46	1.34	1.44	5.84	18.24	25.96
16800	28.99	37.61	1.36	1.39	5.85	17.94	26.16
17000	28.98	37.86	1.40	1.34	5.93	18.60	25.44
17200	28.92	37.52	1.46	1.32	5.96	17.46	26.30
17600	28.59	39.07	1.63	1.31	6.22	17.77	25.82
18000	27.94	40.56	1.90	1.40	6.45	17.18	26.20

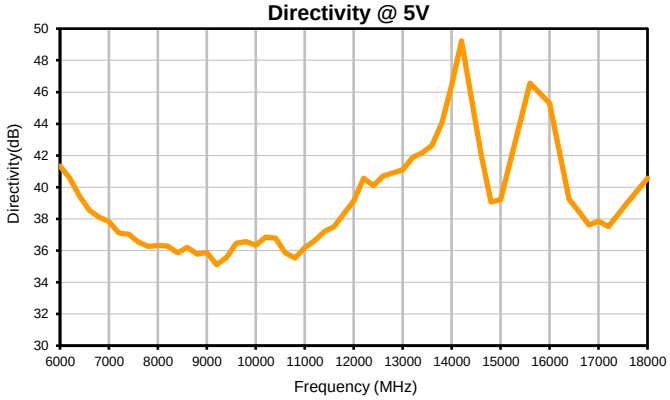
Wideband Microwave Amplifier ZX60-183A-S+

Typical Performance Curves

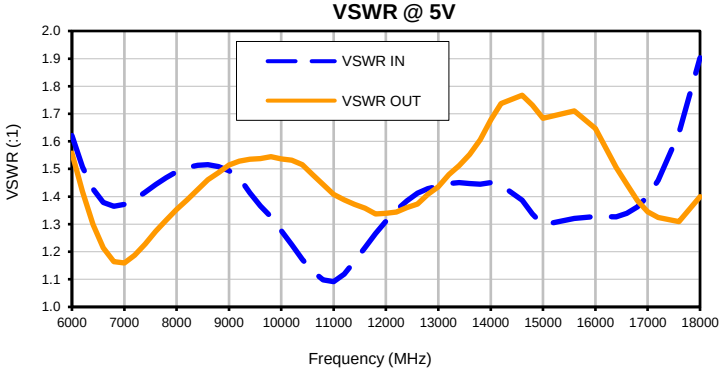
Gain @ 5V



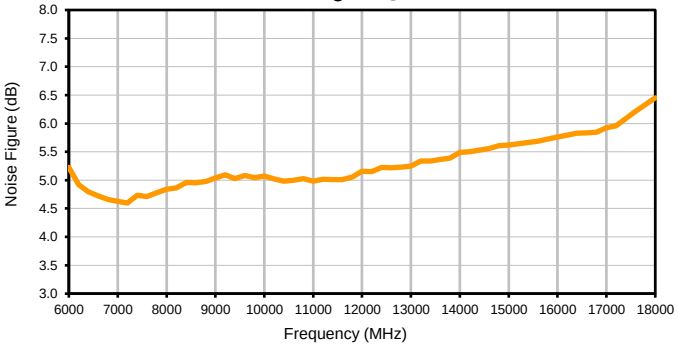
Directivity @ 5V



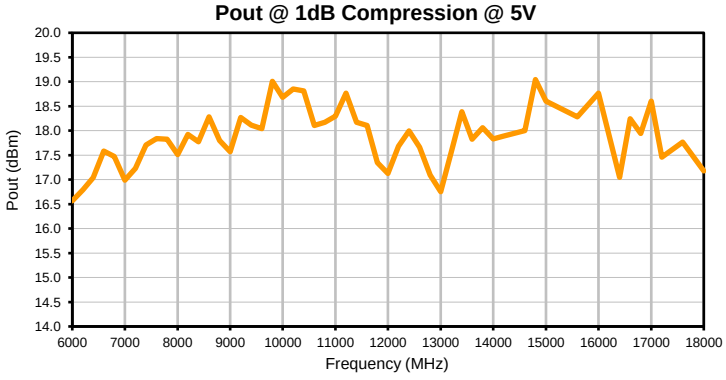
VSWR @ 5V



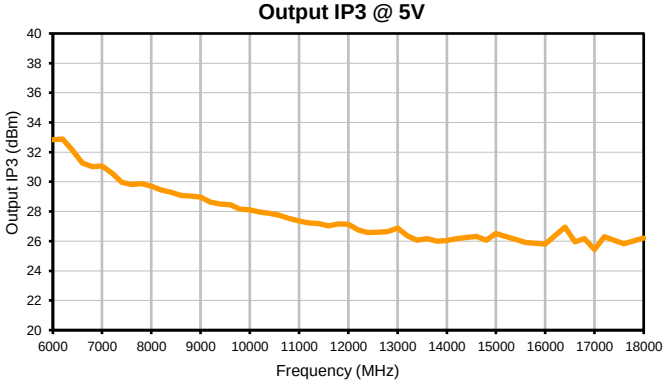
Noise Figure @ 5V



Pout @ 1dB Compression @ 5V



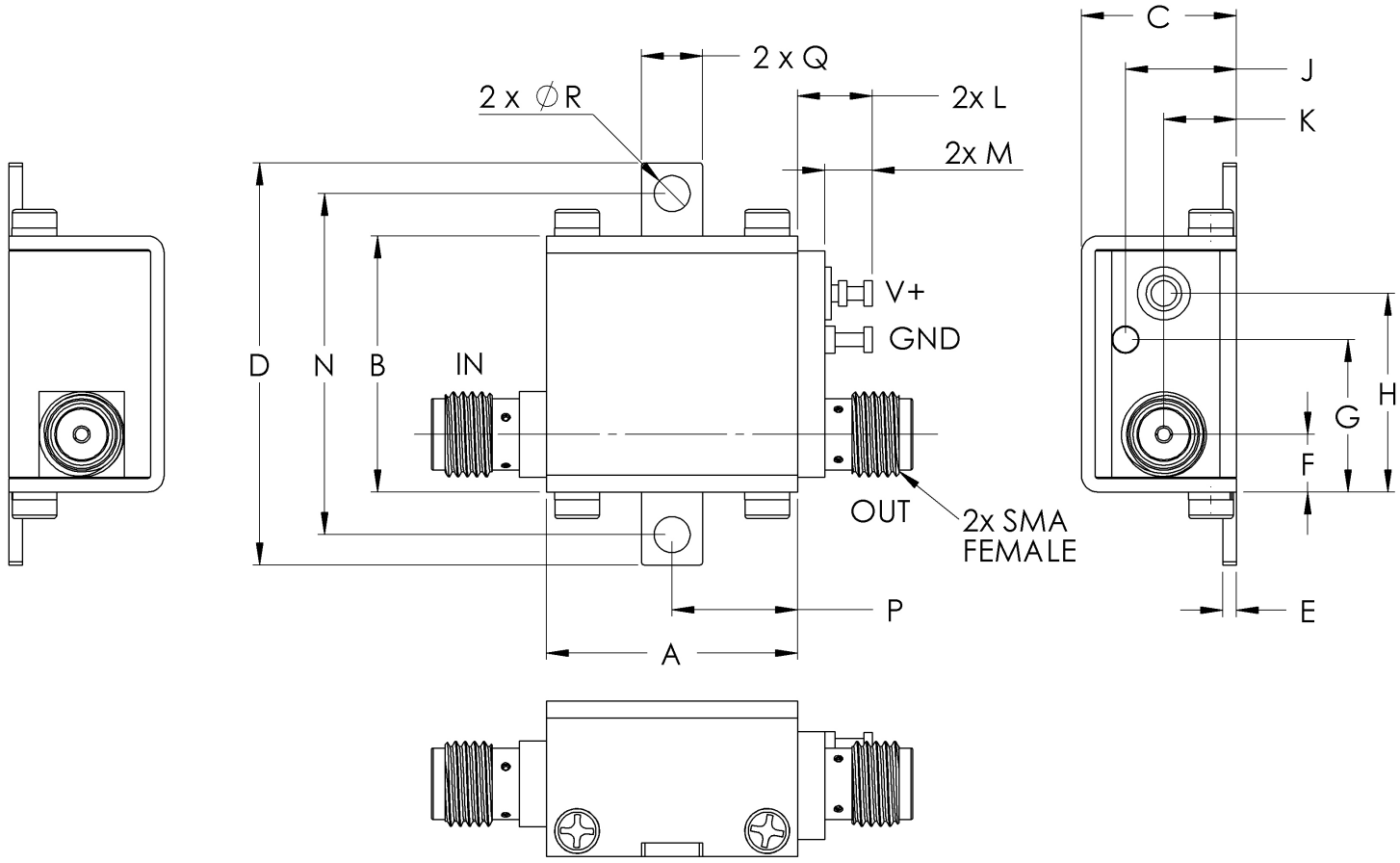
Output IP3 @ 5V



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. ± .03; 3Pl. ± .015
Tolerance on hole size and interaxes dimensions to be ± .005.

Note:

1. Case material: Brass
2. Case finish: Nickel plate

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Environmental Specifications ENV23T10

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

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