

Coaxial Low Noise Amplifier

ZX60-06183LN+

50Ω 6 to 18 GHz

The Big Deal

- Low noise figure, 1.9 dB typ, 8 to 16 GHz
- Excellent gain flatness
- High gain broadband performance
- Voltage regulated internally and reverse voltage protected
- Excellent directivity, 20 dB typ.



CASE STYLE: GC957

Product Overview

Mini-Circuits' ZX60-06183LN+ is a wideband low noise connectorized amplifier providing a unique combination of low noise figure, high IP3 and flat gain over a very wide frequency range, supporting a wide range of sensitive, high-dynamic range receiver applications and many systems where high performance over wideband is needed. This design operates on a single 5 V supply and comes in a rugged, compact unibody case (0.74 x 0.75 x 0.46") with SMA connectors, making it an excellent candidate for tough operating conditions and crowded system layouts.

Key Features

Feature	Advantages
Ultra-wideband with excellent gain flatness, ± 1 dB for entire band 6 - 18 GHz	Enables a single amplifier to be used in a wide range of applications including EW and communication systems instrumentation and more.
Low noise over the whole band	Enables lower system noise figure performance.
High gain, 25 dB typ.	Reduces the number of gain stages, lowering component count and overall system cost.
Low operating voltage, 5V	The amplifier features low operating voltage
Rugged, unibody construction	Mini-Circuits unibody construction integrates the RF connector into the case body, providing high reliability and excellent survivability in critical applications.
Excellent Directivity (Isolation-Gain), 20 dB typ	Ideal for use as a buffer amplifier, minimizing need for adjacent components.

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/MCLStore/terms.jsp



Coaxial Low Noise Amplifier

ZX60-06183LN+

50Ω 6 to 18 GHz

Features

- Low noise figure, 1.9 dB typ, over 8 to 16 GHz
- High gain 25 dB typ over 6 to 18 GHz
- Excellent Gain flatness, ±1 dB over 6 to 18 GHz
- Excellent Directivity, 20 dB typ

Applications

- Microwave point-to-point radios
- Military EW and radar
- Satellite Systems



Generic photo used for illustration purposes only

CASE STYLE: GC957

Connectors	Model
SMA	ZX60-06183LN+

+RoHS Compliant

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

Electrical Specifications at 25°C and 5V, unless noted

Parameter	Condition (GHz)	V _{DD} =5.0			Units
		Min.	Typ.	Max.	
Frequency Range		6.0		18.0	GHz
Noise Figure	6.0-8.0		2.2		dB
	8.0-12.0		2.0		
	12.0-16.0		2.1		
	16.0-18.0		2.0		
Gain	6.0-8.0		25.4		dB
	8.0-12.0	22.0	26.2		
	12.0-16.0	21.0	25.3		
	16.0-18.0		25.2		
Input Return Loss	6.0-8.0		16.5		dB
	8.0-12.0		9.8		
	12.0-16.0		8.5		
	16.0-18.0		11.0		
Output Return Loss	6.0-8.0		12.3		dB
	8.0-12.0		12.4		
	12.0-16.0		9.5		
	16.0-18.0		8.9		
Output Power at 1dB Compression ⁽¹⁾	6.0-8.0		11.8		dBm
	8.0-12.0		12.0		
	12.0-16.0		10.5		
	16.0-18.0		11.5		
Output IP ₃ ²	6.0-8.0		25.0		dBm
	8.0-12.0		25.0		
	12.0-16.0		21.3		
	16.0-18.0		23.8		
Device Operating Voltage (V _{DD})		4.9	5.0	7.0	V
Device Operating Current (I _{DD})			64	75	mA

1. Current increases at P1dB
2. OIP3 measured with 0 dBm tones and 1 MHz spacing.

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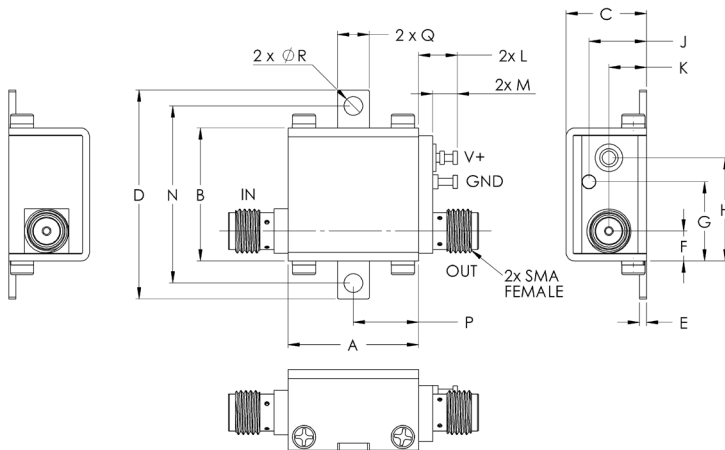
REV. A
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ZX60-06183LN+
ED-15070802
DJ/CP/AM
191118
Page 2 of 4

Absolute Maximum Ratings³

Parameter	Ratings
Operating Temperature (ground)	-40°C to 85°C
Storage Temperature	-55°C to 100°C
Total Power Dissipation	0.7 W
Input Power (CW), Vd=5V	17 dBm
DC Voltage	7V

3. Permanent damage may occur if any of these limits are exceeded.
Electrical maximum ratings are not intended for continuous normal operation.

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 (inch/mm)

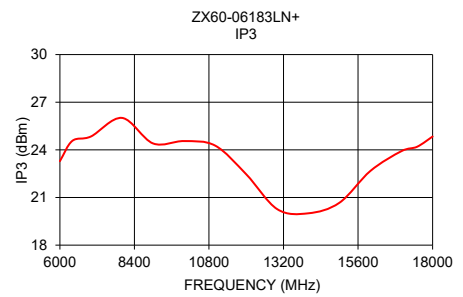
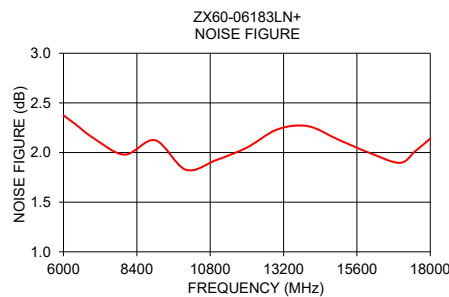
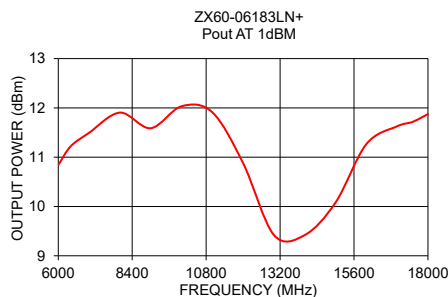
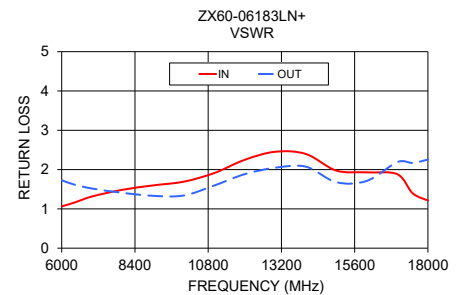
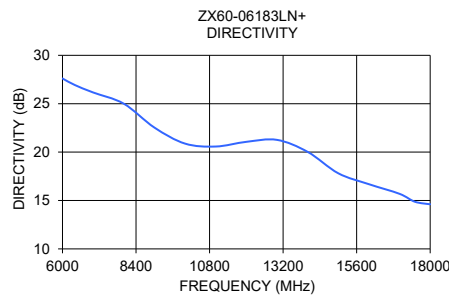
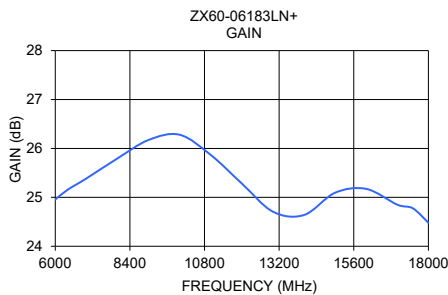
A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	wt
.74	.75	.46	1.18	.04	.17	.45	.59	.33	.21	.22	.14	1.00	.37	.18	.106	grams
18.80	19.1	11.68	30.0	1.02	4.32	11.4	14.99	8.38	5.33	5.59	3.56	25.40	9.40	4.57	2.69	23.0

Notes

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FREQUENCY (MHz)	GAIN (dB)	DIRECTIVITY (dB)	VSWR (:1)		POWER OUT @ 1 dB COMPR. (dBm)	NF (dB)	IP3 (dBm)
	5V	5V	IN	OUT	5V	5V	5V
6000	24.96	27.61	1.06	1.73	10.84	2.37	23.29
6400	25.16	26.93	1.16	1.62	11.22	2.28	24.56
7000	25.39	26.16	1.32	1.52	11.49	2.14	24.84
8000	25.80	25.00	1.49	1.41	11.90	1.98	26.01
9000	26.17	22.53	1.60	1.33	11.59	2.12	24.40
10000	26.28	20.88	1.69	1.34	12.03	1.83	24.55
11000	25.87	20.58	1.91	1.59	11.91	1.92	24.27
12000	25.28	21.06	2.25	1.88	10.88	2.05	22.46
13000	24.71	21.26	2.45	2.05	9.42	2.23	20.26
14000	24.64	20.03	2.40	2.07	9.42	2.27	20.00
15000	25.09	17.81	1.97	1.68	10.08	2.13	20.67
16000	25.17	16.68	1.93	1.71	11.27	2.00	22.68
17000	24.85	15.69	1.88	2.19	11.63	1.90	23.92
17500	24.78	14.87	1.40	2.17	11.72	2.01	24.19
18000	24.48	14.61	1.21	2.25	11.87	2.14	24.84



Notes

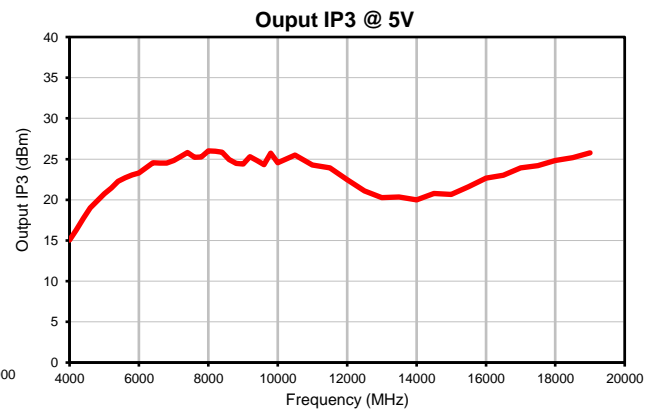
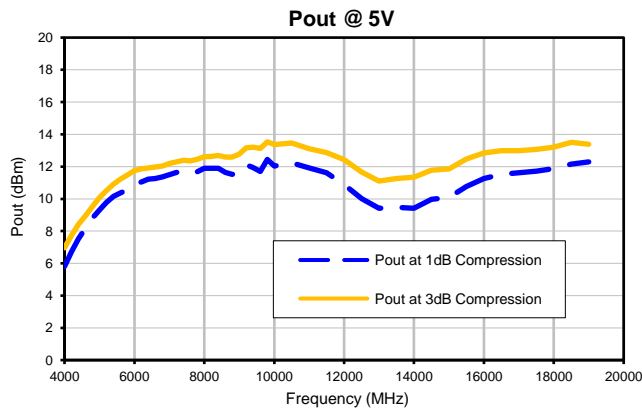
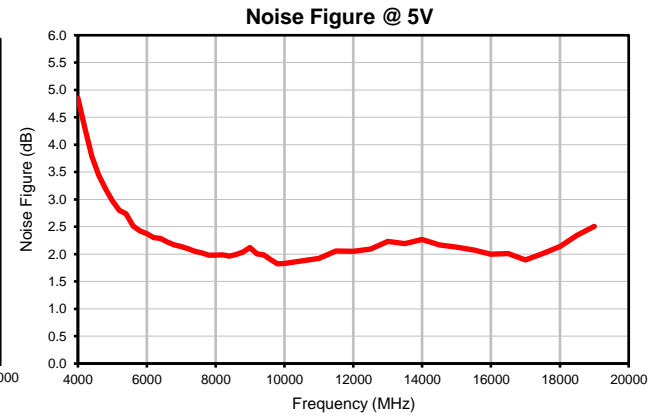
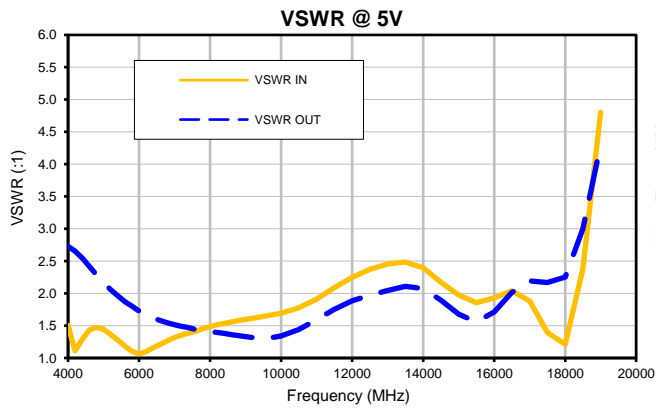
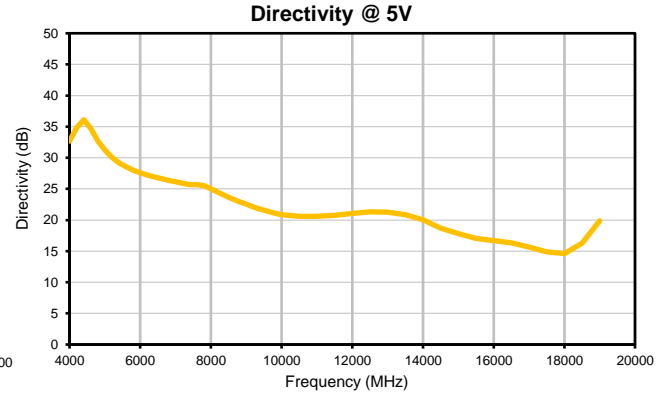
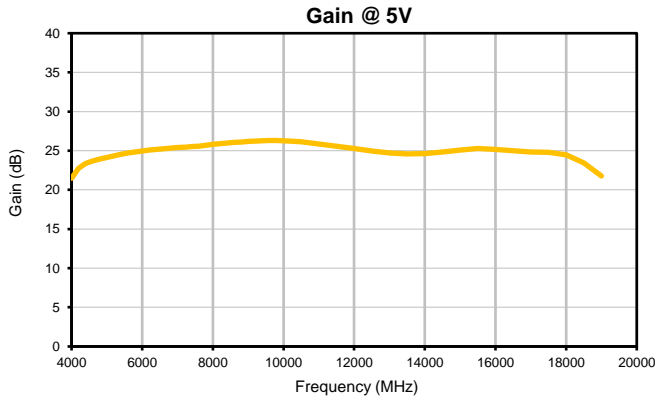
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Typical Performance Data

FREQUENCY (MHz)	GAIN (dB) 5V	DIRECTIVITY (dB) 5V	VSWR (:1)		NOISE FIGURE (dB) 5V	POUT @ 1 dB COMPRESSION (dBm) 5V	POUT @ 3 dB COMPRESSION (dBm) 5V	OUTPUT IP3 (dBm) 5V
			IN 5V	OUT 5V				
4000	21.48	32.66	1.51	2.73	4.85	5.80	6.96	15.05
4200	22.76	34.80	1.11	2.66	4.31	6.72	7.72	16.35
4400	23.36	36.11	1.29	2.54	3.79	7.53	8.42	17.73
4600	23.69	34.66	1.44	2.42	3.45	8.18	8.96	19.00
4800	23.93	32.70	1.48	2.29	3.19	8.81	9.53	19.86
5000	24.14	31.23	1.44	2.17	2.98	9.30	10.08	20.73
5200	24.34	30.08	1.37	2.06	2.80	9.77	10.51	21.43
5400	24.53	29.20	1.27	1.96	2.73	10.15	10.90	22.27
5600	24.69	28.57	1.18	1.87	2.52	10.37	11.22	22.72
5800	24.83	28.02	1.10	1.80	2.43	10.56	11.48	23.05
6000	24.96	27.61	1.06	1.73	2.37	10.84	11.75	23.29
6200	25.06	27.21	1.10	1.67	2.30	11.04	11.85	23.93
6400	25.16	26.93	1.16	1.62	2.28	11.22	11.91	24.56
6600	25.24	26.69	1.21	1.58	2.22	11.26	11.97	24.52
6800	25.31	26.37	1.27	1.55	2.17	11.36	12.04	24.52
7000	25.39	26.16	1.32	1.52	2.14	11.49	12.18	24.84
7200	25.45	25.92	1.35	1.49	2.10	11.63	12.30	25.30
7400	25.51	25.70	1.39	1.47	2.05	11.75	12.40	25.81
7600	25.58	25.70	1.42	1.44	2.02	11.61	12.34	25.24
7800	25.69	25.52	1.46	1.42	1.98	11.67	12.44	25.24
8000	25.80	25.00	1.49	1.41	1.98	11.90	12.62	26.01
8200	25.88	24.44	1.51	1.40	1.99	11.90	12.64	25.97
8400	25.97	23.94	1.54	1.38	1.96	11.89	12.70	25.87
8600	26.04	23.42	1.56	1.36	1.99	11.64	12.60	24.95
8800	26.11	22.96	1.58	1.35	2.04	11.51	12.59	24.46
9000	26.17	22.53	1.60	1.33	2.12	11.59	12.76	24.40
9200	26.23	22.09	1.61	1.32	2.00	12.12	13.17	25.29
9400	26.27	21.72	1.63	1.31	1.99	11.93	13.21	24.82
9600	26.29	21.42	1.65	1.31	1.90	11.70	13.13	24.31
9800	26.30	21.10	1.67	1.32	1.82	12.44	13.53	25.74
10000	26.28	20.88	1.69	1.34	1.83	12.03	13.37	24.55
10500	26.13	20.60	1.78	1.44	1.88	12.23	13.45	25.48
11000	25.87	20.58	1.91	1.59	1.92	11.91	13.11	24.27
11500	25.56	20.74	2.09	1.75	2.06	11.61	12.87	23.92
12000	25.28	21.06	2.25	1.88	2.05	10.88	12.43	22.46
12500	24.96	21.32	2.37	1.97	2.09	10.01	11.66	21.11
13000	24.71	21.26	2.45	2.05	2.23	9.42	11.10	20.26
13500	24.58	20.88	2.48	2.11	2.19	9.47	11.25	20.34
14000	24.64	20.03	2.40	2.07	2.27	9.42	11.34	20.00
14500	24.82	18.71	2.17	1.89	2.17	9.97	11.77	20.78
15000	25.09	17.81	1.97	1.68	2.13	10.08	11.87	20.67
15500	25.27	17.03	1.86	1.56	2.08	10.77	12.46	21.61
16000	25.17	16.68	1.93	1.71	2.00	11.27	12.85	22.68
16500	24.98	16.33	2.04	2.02	2.01	11.52	12.99	23.00
17000	24.85	15.69	1.88	2.19	1.90	11.63	12.98	23.92
17500	24.78	14.87	1.40	2.17	2.01	11.72	13.06	24.19
18000	24.48	14.61	1.21	2.25	2.14	11.87	13.21	24.84
18500	23.46	16.30	2.38	3.00	2.34	12.16	13.50	25.17
19000	21.76	19.90	4.80	4.30	2.51	12.29	13.38	25.76

Typical Performance Curves

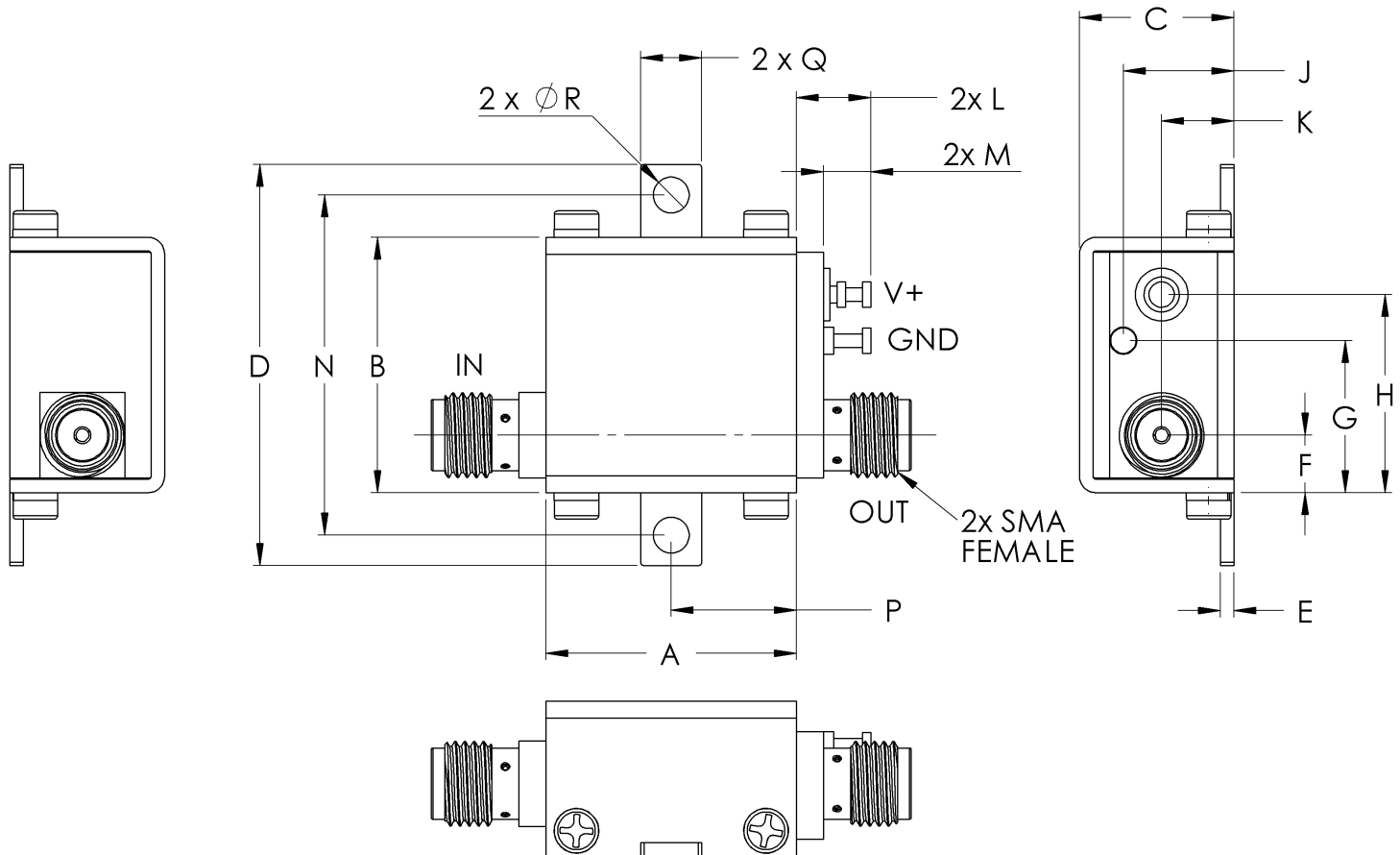


Case Style

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 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