COAXIAL

Low Noise Amplifier ZX60-83LN12+

50Ω 0.5 to 8 GHz SMA Female

THE BIG DEAL

- Ultra-Wideband, 0.5 to 8 GHz
- Low Noise, 1.4 dB at 2 GHz
- High IP3, +35 dBm at 2 GHz
- Excellent Gain Flatness ±1.5 dB over 0.5 to 7 GHz at +12 V
- Protected by US Patent 6,790,049

Generic photo used for illustration purposes only

Model No.	ZX60-83LN12+
Case Style	GC957
Connectors	SMA female

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

APPLICATIONS

- WiFi
- WLAN
- UMTS
- LTE
- WiMAX
- S-Band Radar
- C-Band SATCOM

PRODUCT OVERVIEW

Mini-Circuits' ZX60-83LN12+ 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 +12 V supply and comes in a rugged, compact unibody case (0.74x0.75x0.46") 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, ±1.5 dB	Enables a single amplifier to be used in a wide range of applications including WiFi, LTE, S-Band radar, C-Band SATCOM, defense, instrumentation and more.
Low Noise Over the Whole Band	Enables lower system noise figure performance.
High Gain, 21 dB Typ.	Reduces the number of gain stages, lowering component count and overall system cost.
High IP3: • +35.2 dBm at 2 GHz • +28.5 dBm at 8 GHz	The combination of low noise and high IP3 makes the ZX60-83LN12+ ideal for use in low noise receiver front end (RFE) as it gives the user the advantages of sensitivity and two-tone IM performance at both ends of the dynamic range.
Rugged, Unibody Construction	Mini-Circuits unibody construction integrates the RF connector into the case body, providing high reliability and excellent survivability in critical applications.

REV. D
ECO-015740
ZX60-83LN12+
MCL NY
260226

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ELECTRICAL SPECIFICATIONS AT +25 °C, AND +12 V UNLESS NOTED OTHERWISE

Parameter	Condition (GHz)	Min.	Typ.	Max.	Units
Frequency Range		0.5		8	GHz
Noise Figure	0.5		1.6	1.7	dB
	2.0		1.4		
	4.0		1.5		
	8.0		2.3		
Gain	0.5	19.9	22.1	24.3	dB
	2.0		22.1		
	4.0		21.5		
	8.0		18.0		
Input Return Loss	0.5		13.0		dB
	2.0		15.0		
	4.0		11.0		
	8.0		5.0		
Output Return Loss	0.5		13.0		dB
	2.0		14.0		
	4.0		18.0		
	8.0		10.0		
Output Power at 1 dB Compression[1]	0.5		+12.8		dBm
	2.0		+20.7		
	4.0		+18.3		
	8.0		+17.2		
Output IP3	0.5		+31.5		dBm
	2.0		+35.2		
	4.0		+31.0		
	8.0		+28.5		
Device Operating Voltage (V_{DD})		+11	+12	+13	V
Device Operating Current (I_{DD})			77	94	mA

1. Current increases at P1dB to 109 mA typ.

ABSOLUTE MAXIMUM RATINGS[2]

Parameter	Ratings
Operating Temperature (Ground Lead)	-40 °C to +85 °C
Storage Temperature	-55 °C to +100 °C
Total Power Dissipation	1.5 W
Input Power (CW)	+19 dBm (5 minutes max.) +16 dBm (continuous)
DC Voltage	+13 V

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

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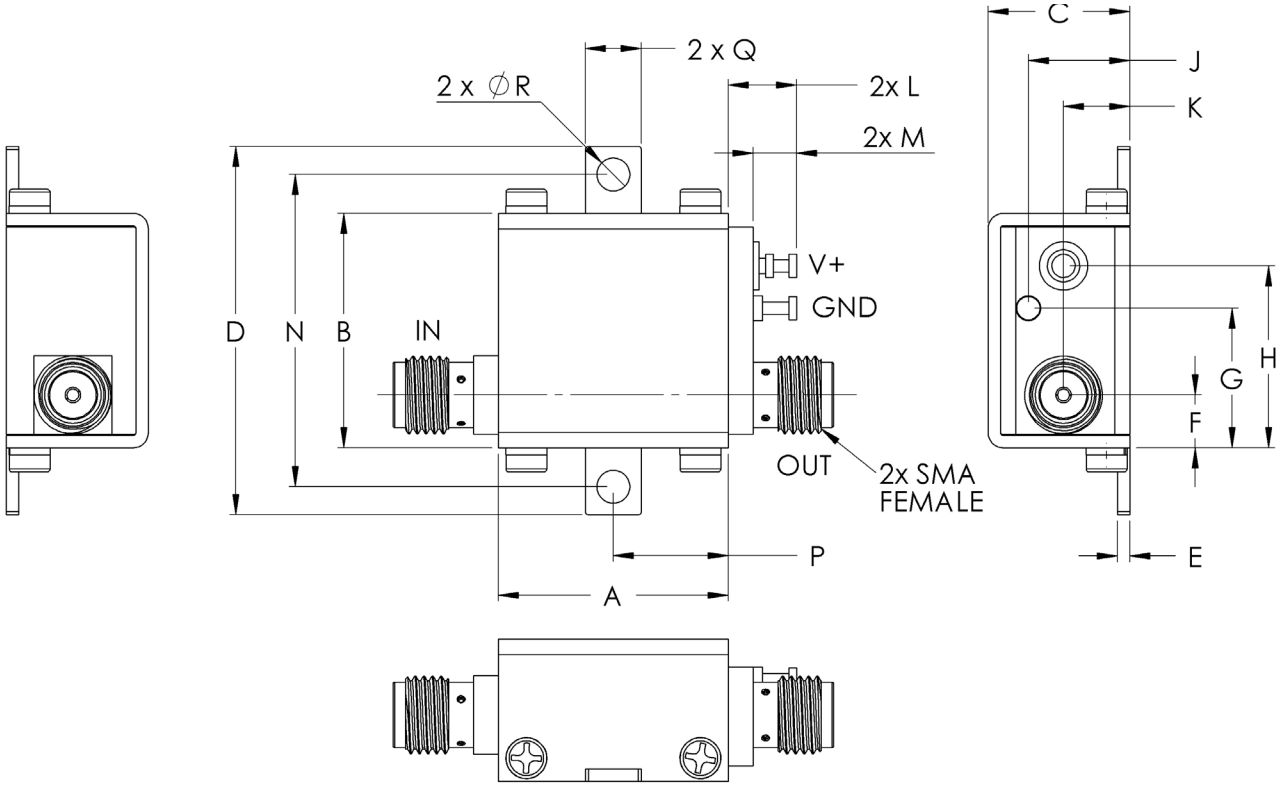
OUTLINE DRAWING



⚠ 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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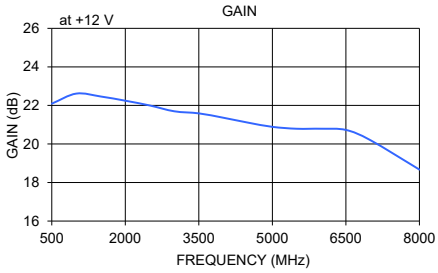
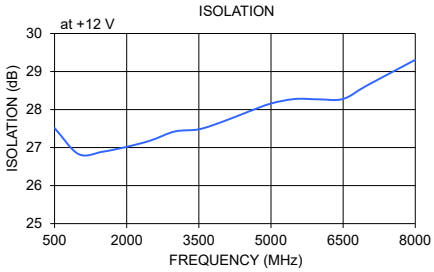
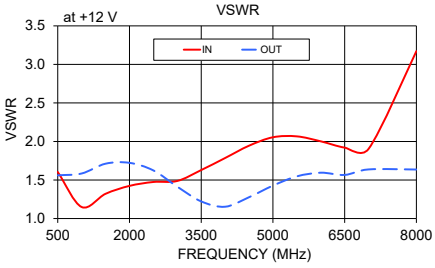
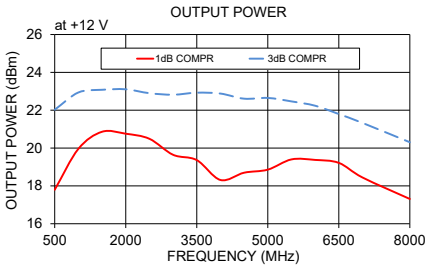
TYPICAL PERFORMANCE DATA/CURVES

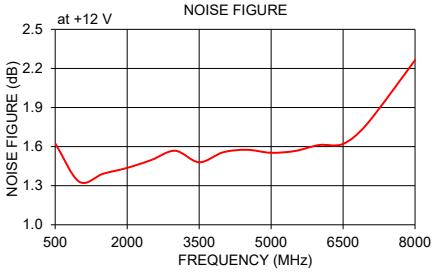
Frequency (MHz)	Gain (dB) +12 V	Isolation (dB) +12 V	VSWR (:1) +12 V IN	VSWR (:1) +12 V OUT	Power Out at 1 dB COMPR. (dBm) +12 V	Noise Figure (dB) +12 V	IP3 (dBm) +12 V
500	22.09	27.51	1.60	1.56	17.80	1.63	31.37
1000	22.61	26.83	1.15	1.58	19.96	1.33	32.12
1500	22.46	26.89	1.32	1.71	20.86	1.39	36.20
2000	22.24	27.02	1.42	1.72	20.76	1.44	37.47
2500	22.00	27.19	1.47	1.62	20.49	1.50	38.48
3000	21.70	27.42	1.49	1.41	19.64	1.57	33.01
3500	21.59	27.48	1.63	1.22	19.36	1.48	34.41
4000	21.36	27.68	1.79	1.15	18.31	1.56	31.88
4500	21.11	27.93	1.95	1.28	18.70	1.58	32.03
5000	20.89	28.16	2.05	1.43	18.86	1.55	30.90
5500	20.79	28.28	2.07	1.55	19.40	1.57	31.35
6000	20.79	28.27	2.00	1.59	19.37	1.61	31.68
6500	20.73	28.28	1.92	1.57	19.22	1.62	32.48
7000	20.20	28.64	1.90	1.64	18.44	1.77	31.92
8000	18.67	29.31	3.17	1.64	17.31	2.26	29.47

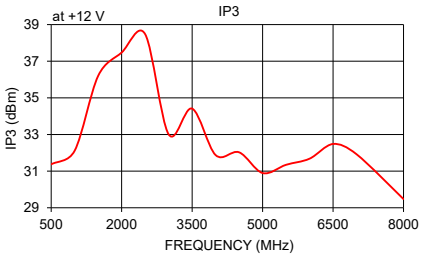












NOTES

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

Low Noise Amplifier ZX60-83LN12+

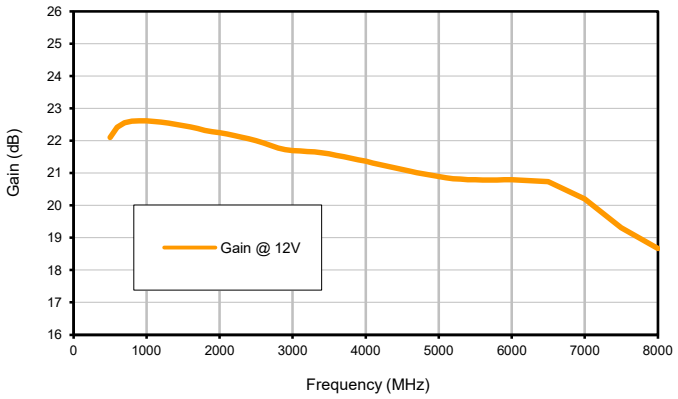
Typical Performance Data

FREQUENCY (MHz)	Gain (dB) 12V	Directivity (dB) 12V	VSWR IN (:1) 12V	VSWR OUT (:1) 12V	Noise Figure (dB) 12V	Pout @ 1dB Compression (dBm) 12V	Pout @ 3dB Compression (dBm) 12V	Output IP3 (dBm) 12V
500	22.09	27.51	1.60	1.56	1.63	17.80	22.02	31.37
600	22.41	27.14	1.31	1.45	1.57	18.29	22.27	31.47
700	22.55	26.97	1.16	1.45	1.49	18.50	22.59	32.02
800	22.60	26.89	1.09	1.49	1.46	19.32	22.65	32.48
900	22.62	26.85	1.11	1.54	1.40	20.11	22.65	33.76
1000	22.61	26.83	1.15	1.58	1.33	19.96	22.94	32.12
1100	22.59	26.83	1.19	1.62	1.35	20.53	22.86	35.26
1200	22.57	26.83	1.23	1.65	1.35	20.40	23.03	35.47
1300	22.54	26.85	1.26	1.68	1.39	20.71	23.09	36.05
1400	22.50	26.86	1.30	1.70	1.42	20.73	23.08	35.29
1500	22.46	26.89	1.32	1.71	1.39	20.86	23.08	36.20
1600	22.42	26.92	1.34	1.72	1.49	20.64	23.04	36.53
1700	22.37	26.96	1.36	1.73	1.44	20.78	22.97	39.91
1800	22.31	27.00	1.39	1.74	1.46	20.79	23.07	36.35
1900	22.28	27.00	1.41	1.73	1.41	20.68	23.28	36.34
2000	22.24	27.02	1.42	1.72	1.44	20.76	23.11	37.47
2100	22.21	27.04	1.44	1.71	1.38	20.39	23.03	35.92
2200	22.16	27.07	1.45	1.70	1.45	20.21	22.94	36.50
2300	22.11	27.10	1.46	1.67	1.39	20.62	22.89	38.43
2400	22.06	27.14	1.47	1.65	1.44	20.49	22.99	39.48
2500	22.00	27.19	1.47	1.62	1.50	20.49	22.90	38.48
2600	21.93	27.24	1.48	1.59	1.53	20.32	23.09	36.44
2700	21.85	27.31	1.47	1.56	1.59	20.04	22.84	35.25
2800	21.77	27.37	1.47	1.51	1.64	20.04	22.85	34.69
2900	21.72	27.41	1.47	1.46	1.74	19.78	22.98	34.26
3000	21.70	27.42	1.49	1.41	1.57	19.64	22.82	33.01
3100	21.68	27.42	1.51	1.37	1.59	19.32	22.96	33.30
3200	21.67	27.43	1.54	1.33	1.52	19.45	22.60	34.23
3300	21.65	27.44	1.57	1.29	1.54	18.70	22.84	32.66
3400	21.62	27.46	1.60	1.25	1.52	19.24	23.06	33.24
3500	21.59	27.48	1.63	1.22	1.48	19.36	22.93	34.41
3600	21.54	27.51	1.65	1.19	1.57	18.63	22.74	32.76
3700	21.50	27.55	1.69	1.17	1.49	18.87	22.94	32.93
3800	21.46	27.60	1.72	1.16	1.49	18.46	23.04	32.26
3900	21.41	27.64	1.75	1.15	1.54	18.49	22.99	31.66
4000	21.36	27.68	1.79	1.15	1.56	18.31	22.88	31.88
4100	21.31	27.73	1.82	1.17	1.52	18.17	22.59	31.35
4200	21.26	27.78	1.85	1.19	1.54	18.35	22.40	32.63
4300	21.21	27.83	1.89	1.22	1.54	18.24	22.37	31.75
4400	21.16	27.88	1.91	1.25	1.56	18.35	22.57	31.80
4500	21.11	27.93	1.95	1.28	1.58	18.70	22.61	32.03
4600	21.05	27.98	1.97	1.31	1.58	18.70	22.40	32.29
4700	21.01	28.03	2.00	1.34	1.59	19.01	22.38	32.98
4800	20.97	28.07	2.02	1.37	1.47	18.54	22.46	31.59
4900	20.92	28.12	2.04	1.40	1.56	18.64	22.76	31.04
5000	20.89	28.16	2.05	1.43	1.55	18.86	22.65	30.90
5100	20.85	28.20	2.06	1.45	1.61	18.54	22.18	31.03
5200	20.82	28.23	2.07	1.48	1.60	19.20	22.55	31.12
5300	20.81	28.25	2.07	1.51	1.52	18.89	21.97	32.10
5400	20.79	28.27	2.08	1.53	1.51	18.94	22.24	31.52
5500	20.79	28.28	2.07	1.55	1.57	19.40	22.47	31.35
5600	20.78	28.28	2.06	1.57	1.57	19.23	22.05	32.27
5700	20.79	28.28	2.05	1.58	1.47	19.29	22.22	32.18
5800	20.78	28.28	2.04	1.58	1.50	19.58	22.36	31.93
5900	20.79	28.28	2.02	1.59	1.50	19.47	22.29	31.96
6000	20.79	28.27	2.00	1.59	1.61	19.37	22.24	31.68
6500	20.73	28.28	1.92	1.57	1.62	19.22	21.80	32.48
7000	20.20	28.64	1.90	1.64	1.77	18.44	21.33	31.92
7500	19.30	29.24	2.09	1.56	2.28	18.04	20.86	30.57
8000	18.67	29.31	3.17	1.64	2.26	17.31	20.31	29.47

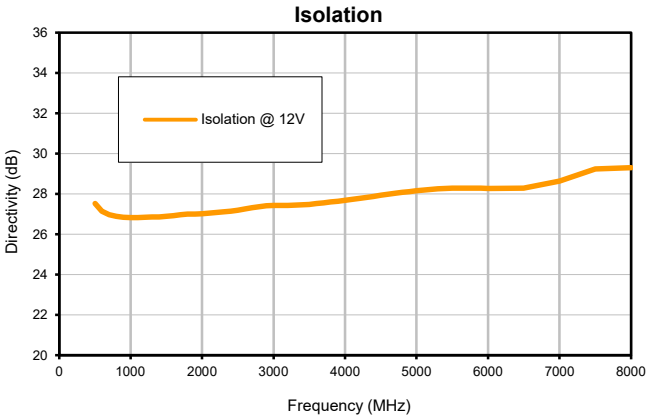
Low Noise Amplifier ZX60-83LN12+

Typical Performance Curves

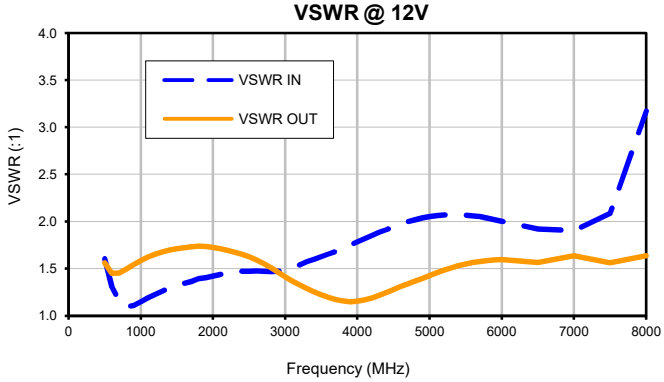
Gain



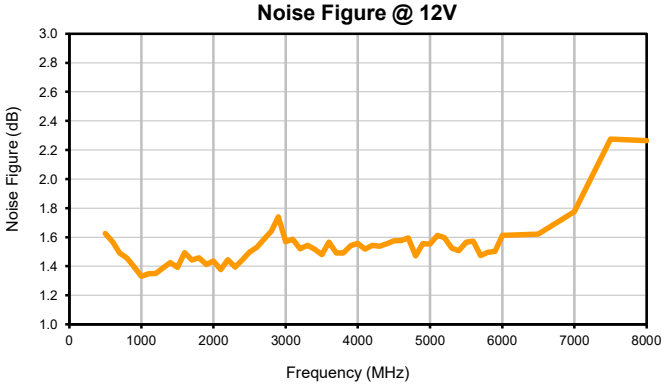
Isolation



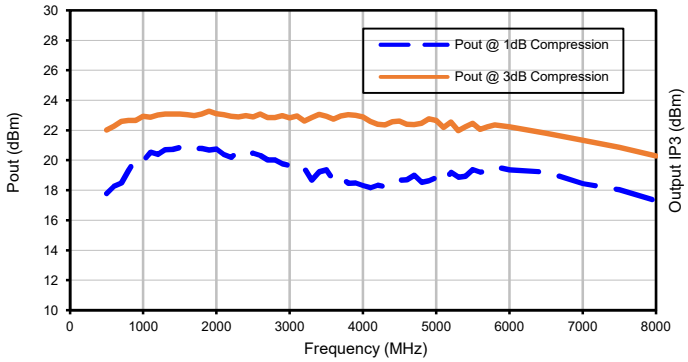
VSWR @ 12V



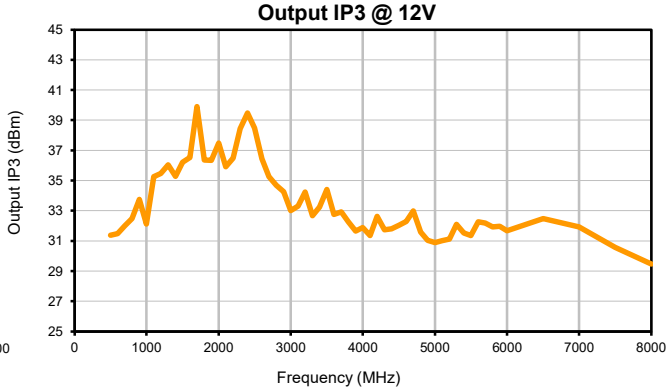
Noise Figure @ 12V



Pout @ 1dB & 3dB Compression @ 12V



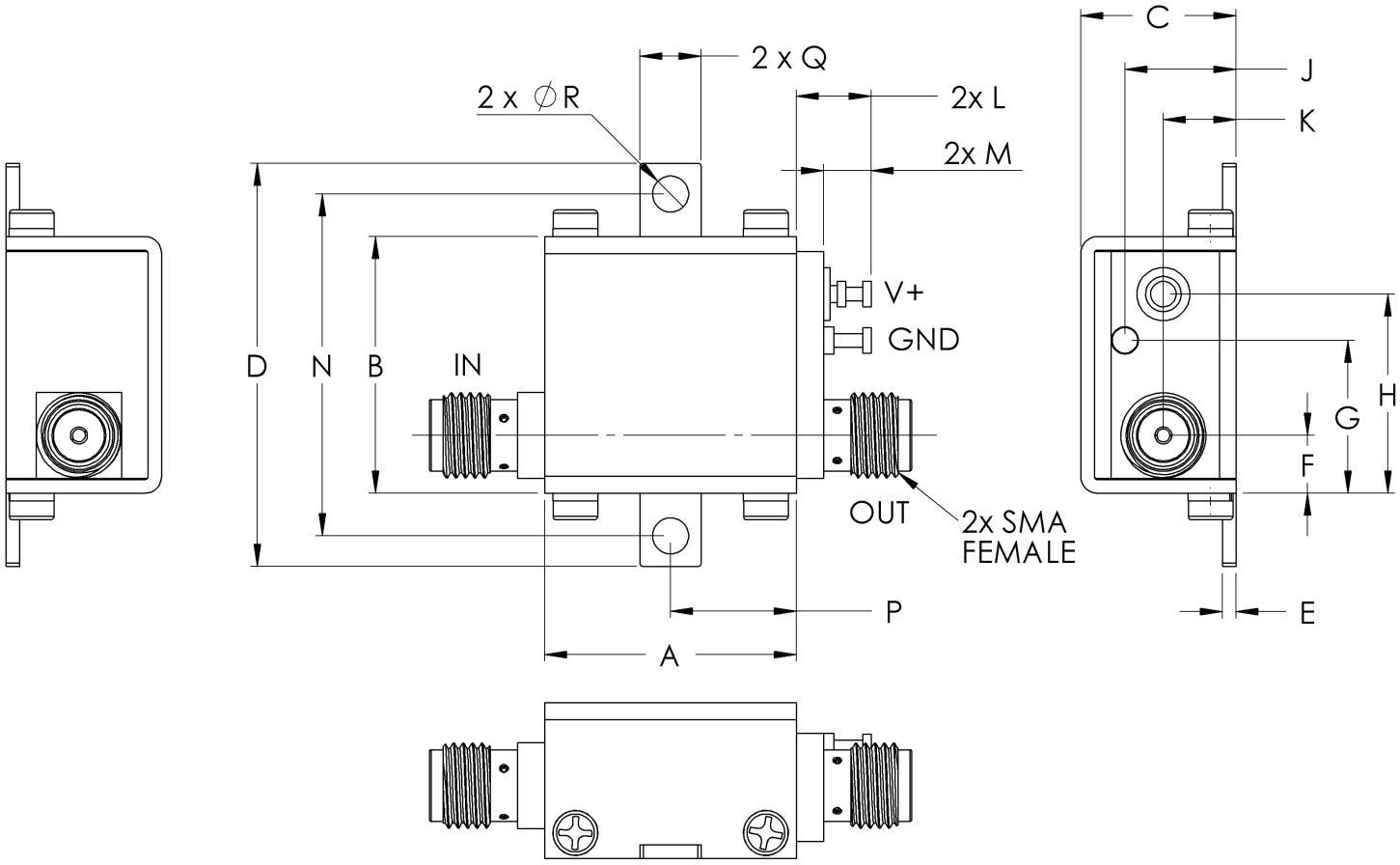
Output IP3 @ 12V



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

Mini-Circuits®
INTERNET http://www.minicircuits.com
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661
Distribution Centers NORTH AMERICA 800-654-7949 • 417-335-5935 • Fax 417-335-5945 • EUROPE 44-1252-832600 • Fax 44-1252-837010
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Mini-Circuits

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