



WIDEBAND

# Medium Power Amplifier ZX60-83MP-S+

50Ω 0.4 to 8 GHz SMA Female

## THE BIG DEAL

- Wideband, 400 MHz to 8 GHz
- P1dB, +27 dBm Typ.
- Excellent OIP3, +40 dBm Typ.
- Noise Figure, 3.2 dB Typ.
- Reverse Polarity Protection



Generic photo used for illustration purposes only

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

## APPLICATIONS

- Sub-6 GHz 5G Infrastructure
- WiFi6E, IoT & ISM Applications
- Test & Measurement Equipment
- R&D Lab, Production, and OTA Test Systems

### +RoHS Compliant

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

## PRODUCT OVERVIEW

Mini-Circuits' ZX60-83MP-S+ is a medium power amplifier offering industry-leading performance over its full frequency range from 400 MHz to 8 GHz. This design operates on a single +8 V supply at 144 mA and comes in a rugged, compact unibody case (0.74x0.75x0.46") with integrated SMA female connectors, making it an excellent candidate for tough operating conditions and crowded system layouts.

## KEY FEATURES

Feature	Advantages
Wideband, 0.4 to 8 GHz	Ideal for a wide range of transmitter applications including military, commercial wireless, and instrumentation.
Flat Gain	Ideal for broadband or multi-band applications. Just one, cost-efficient model required for multiple frequency usage.
High OIP3, +38 dBm Typ.	Provides enhanced linearity over a broad frequency range.
High Gain, 20 dB Typ.	Reduces the number of gain stages, lowering component count and overall system cost.
Rugged Unibody Construction	Mini-Circuits' unibody construction integrates the RF connectors into the case body, providing high reliability and excellent survivability in critical applications.

REV. B  
ECO-028560  
ZX60-83MP-S+  
MCL NY  
260309



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**ELECTRICAL SPECIFICATIONS AT +25 °C, Z<sub>0</sub> = 50Ω AND +8 V, UNLESS NOTED OTHERWISE**

Parameter	Condition (GHz)	Min.	Typ.	Max.	Units
Frequency Range		0.4		8	GHz
Gain	0.4		21.5		dB
	1.0		21.4		
	2.0		20.7		
	4.0		19.5		
	6.0		18.5		
	8.0		16.5		
Gain Flatness	0.4-4.0		±1.0		dB
	0.4-8.0		±2.5		
Input Return Loss	0.4		13.5		dB
	1.0		14.5		
	2.0		13.5		
	4.0		12.5		
	6.0		9.7		
	8.0		5.4		
Output Return Loss	0.4		10.0		dB
	1.0		12.5		
	2.0		13.2		
	4.0		16.2		
	6.0		13.2		
	8.0		11.3		
Output Power at 1 dB Compression	0.4		+27.0		dBm
	1.0		+27.5		
	2.0		+27.5		
	4.0		+27.2		
	6.0		+25.5		
	8.0		+24.2		
Output IP3 <sup>1</sup>	0.4		+40.0		dBm
	2.0		+37.7		
	4.0		+40.0		
	8.0		+34.3		
Noise Figure	0.4		3.3		dB
	2.0		3.2		
	4.0		2.8		
	8.0		3.2		
Device Operating Voltage (V <sub>DD</sub> )		+7.7	+8.0	+8.3	V
Device Operating Current (I <sub>DD</sub> ) <sup>2</sup>			144	180	mA

1. Output IP3 (OIP3): Two tones, spaced 1 Mhz apart, +13 dBm/tone at output.

2. Current at P<sub>IN</sub> = -25 dBm. Increases to 280 mA at P<sub>SAT</sub>.**ABSOLUTE MAXIMUM RATINGS<sup>3</sup>**

Parameter	Ratings
Operating Temperature (Baseplate)	-40 °C to +85 °C
Storage Temperature	-55 °C to +100 °C
Total Power Dissipation	1.4 W
Input Power	+17 dBm
DC Voltage V <sub>DD</sub> <sup>4</sup>	+8.8 V

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

Electrical maximum ratings are not intended for continuous normal operation.

4. This module includes reverse voltage protection, however it does not include over-voltage protection or internal voltage regulation. Caution must be used to not exceed the maximum rated voltage at all times.





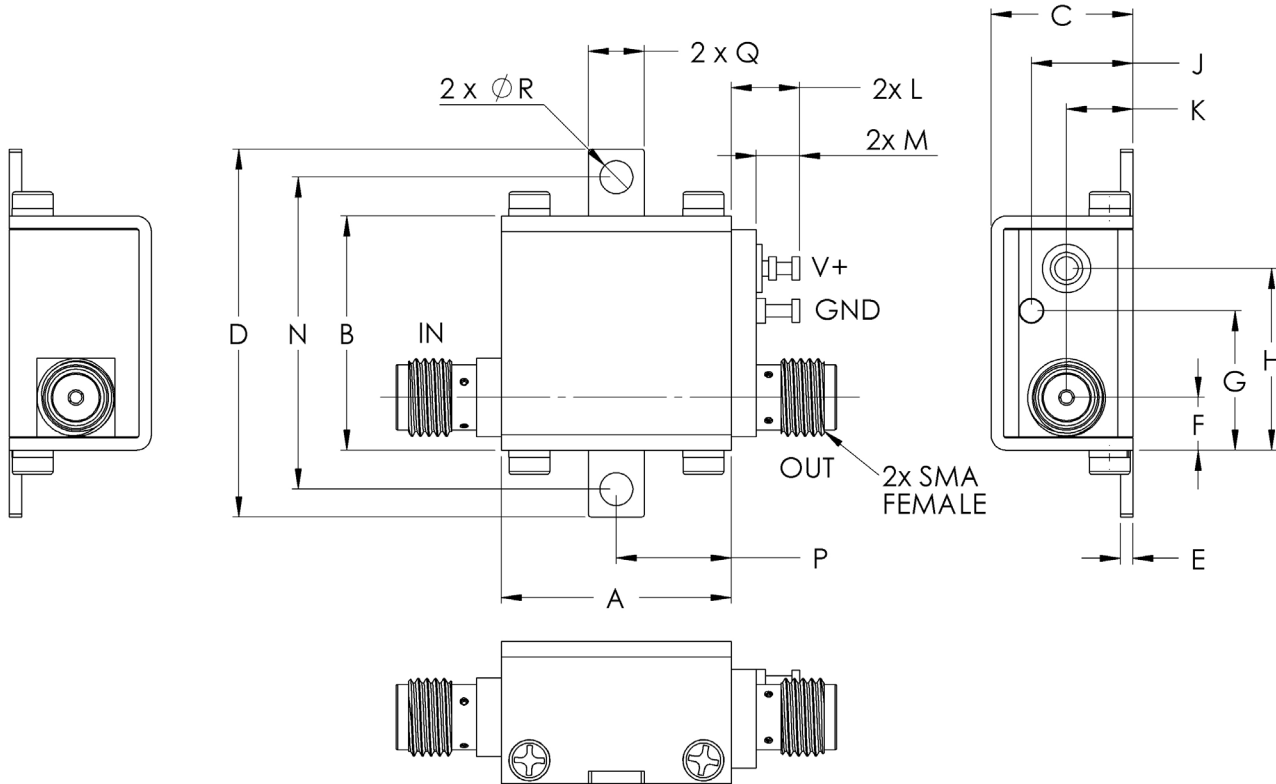
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Mini-Circuits

50Ω 0.4 to 8 GHz SMA Female

## 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	19.15	11.61	30.07	1.02	4.32	11.40	14.86	8.31	5.44	5.59	3.56	25.4	9.40	4.57	2.69	23.0





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### TYPICAL PERFORMANCE DATA

Frequency (MHz)	Gain (dB)	VSWR (:1)		Power Out at 1 dB COMPR. (dBm)	Noise Figure (dB)	Frequency (MHz)	Output IP3 (dBm)
	+8 V	IN	OUT	+8 V	+8 V	+8 V	+8 V
400	21.60	1.51	1.87	27.04	3.24	400	39.73
500	21.63	1.46	1.79	27.44	3.28	2000	37.55
600	21.63	1.44	1.73	27.22	3.22	4000	41.65
1000	21.44	1.43	1.64	27.70	3.29	8000	35.63
2000	20.71	1.51	1.51	27.69	3.14		
3000	19.89	1.51	1.32	27.44	3.12		
4000	19.57	1.61	1.32	27.05	2.86		
5000	19.11	1.69	1.35	26.65	2.81		
6000	18.58	1.93	1.43	25.75	2.97		
6600	18.17	2.17	1.48	25.54	3.16		
7000	17.87	2.44	1.53	25.29	3.29		
7600	17.19	2.90	1.66	24.41	3.27		
8000	16.70	3.37	1.68	24.24	3.23		



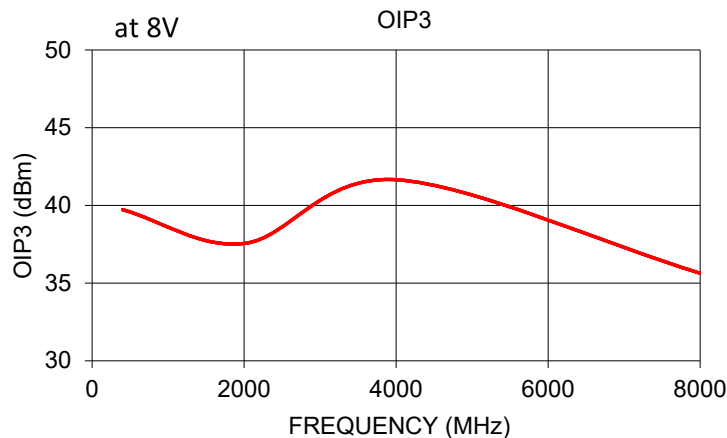
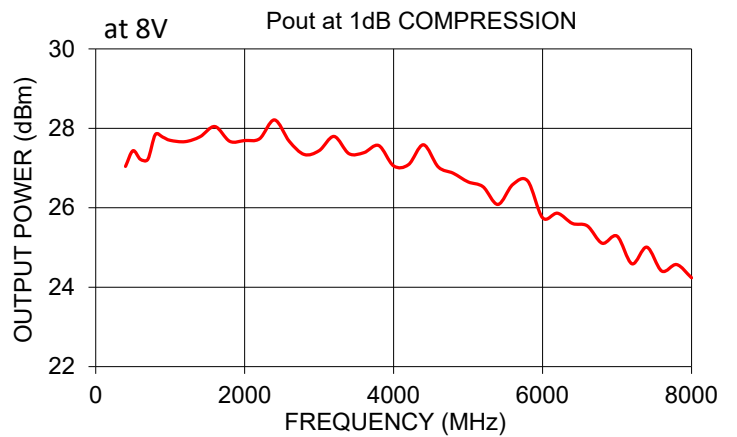
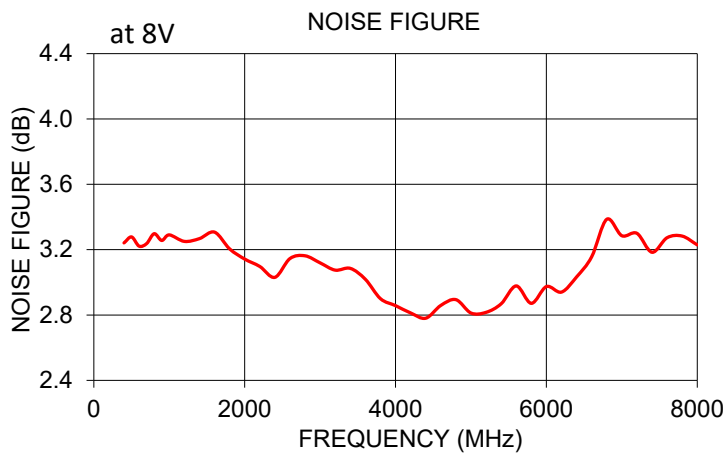
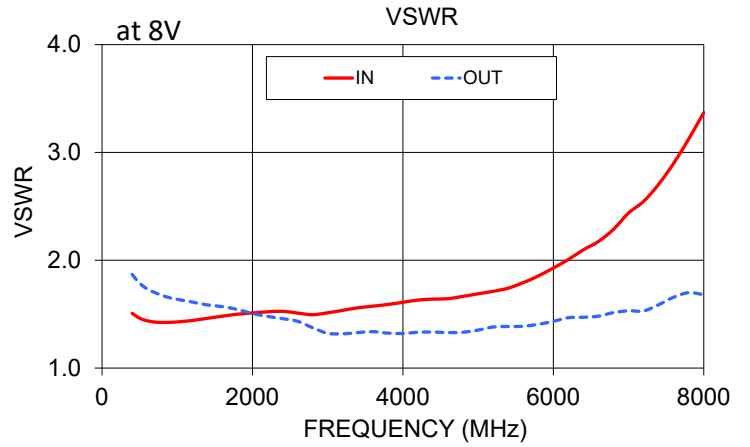
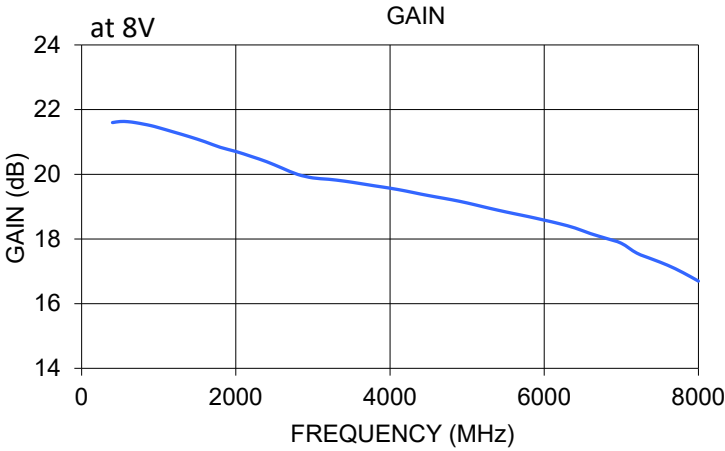
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## TYPICAL PERFORMANCE GRAPHS



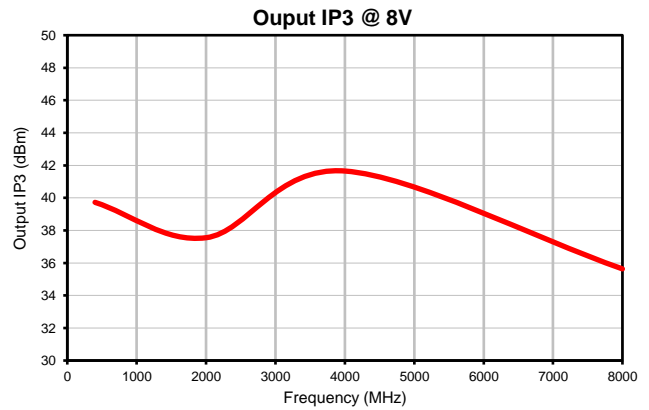
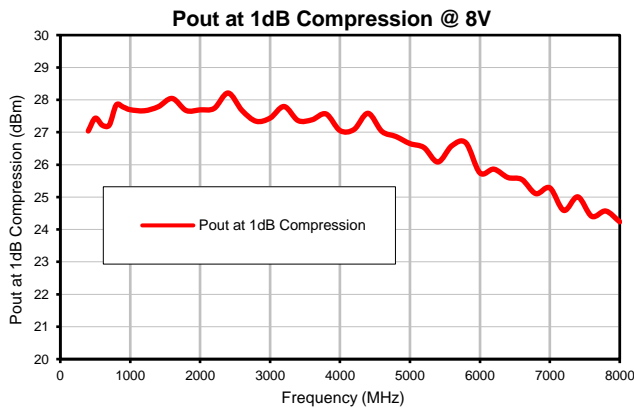
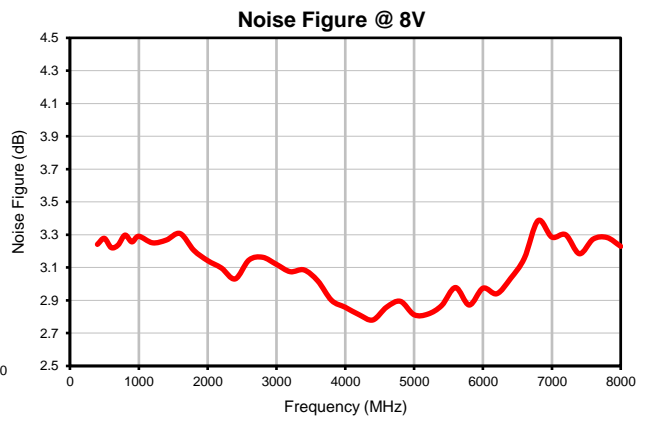
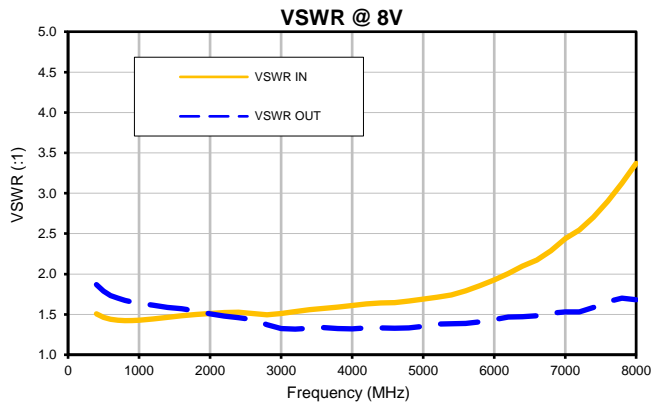
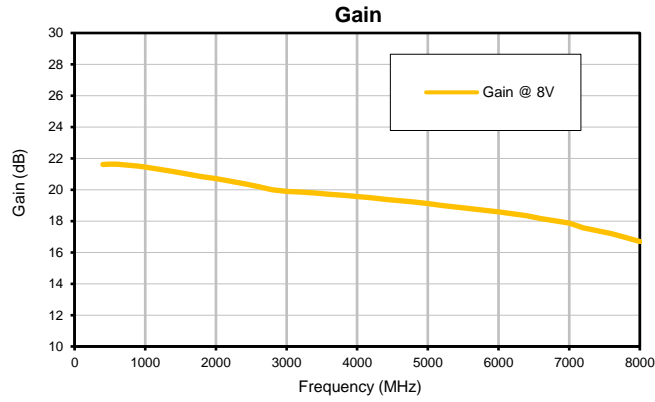
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  - B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
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## Typical Performance Data

FREQUENCY (MHz)	GAIN (dB) 8V	VSWR (:1)		NOISE FIGURE (dB) 8V	POUT @ 1 dB COMPRESSION (dBm) 8V	FREQUENCY (MHz)	OUTPUT IP3 (dBm) 8V
		IN 8V	OUT 8V				
400	21.60	1.51	1.87	3.24	27.04	400	39.73
500	21.63	1.46	1.79	3.28	27.44	2000	37.55
600	21.63	1.44	1.73	3.22	27.22	4000	41.65
700	21.60	1.43	1.70	3.24	27.22	8000	35.63
800	21.55	1.42	1.67	3.30	27.84		
900	21.50	1.42	1.65	3.26	27.78		
1000	21.44	1.43	1.64	3.29	27.70		
1200	21.30	1.44	1.61	3.25	27.66		
1400	21.16	1.46	1.59	3.27	27.79		
1600	21.01	1.48	1.57	3.31	28.04		
1800	20.83	1.50	1.54	3.20	27.67		
2000	20.71	1.51	1.51	3.14	27.69		
2200	20.55	1.52	1.48	3.10	27.74		
2400	20.39	1.53	1.46	3.03	28.21		
2600	20.19	1.51	1.43	3.15	27.67		
2800	20.00	1.49	1.37	3.16	27.34		
3000	19.89	1.51	1.32	3.12	27.44		
3200	19.85	1.54	1.32	3.07	27.80		
3400	19.79	1.56	1.33	3.09	27.36		
3600	19.72	1.57	1.34	3.02	27.39		
3800	19.64	1.59	1.32	2.90	27.57		
4000	19.57	1.61	1.32	2.86	27.05		
4200	19.49	1.63	1.33	2.81	27.09		
4400	19.39	1.64	1.33	2.78	27.59		
4600	19.30	1.64	1.33	2.86	27.03		
4800	19.21	1.67	1.33	2.89	26.87		
5000	19.11	1.69	1.35	2.81	26.65		
5200	19.00	1.71	1.38	2.82	26.53		
5400	18.89	1.74	1.39	2.87	26.08		
5600	18.79	1.79	1.39	2.98	26.59		
5800	18.69	1.85	1.41	2.87	26.67		
6000	18.58	1.93	1.43	2.97	25.75		
6200	18.47	2.01	1.47	2.94	25.86		
6400	18.34	2.10	1.47	3.03	25.60		
6600	18.17	2.17	1.48	3.16	25.54		
6800	18.02	2.29	1.51	3.39	25.11		
7000	17.87	2.44	1.53	3.29	25.29		
7200	17.56	2.55	1.53	3.30	24.59		
7400	17.38	2.70	1.59	3.18	25.01		
7600	17.19	2.90	1.66	3.27	24.41		
7800	16.96	3.13	1.70	3.28	24.57		
8000	16.70	3.37	1.68	3.23	24.24		

## Typical Performance Curves

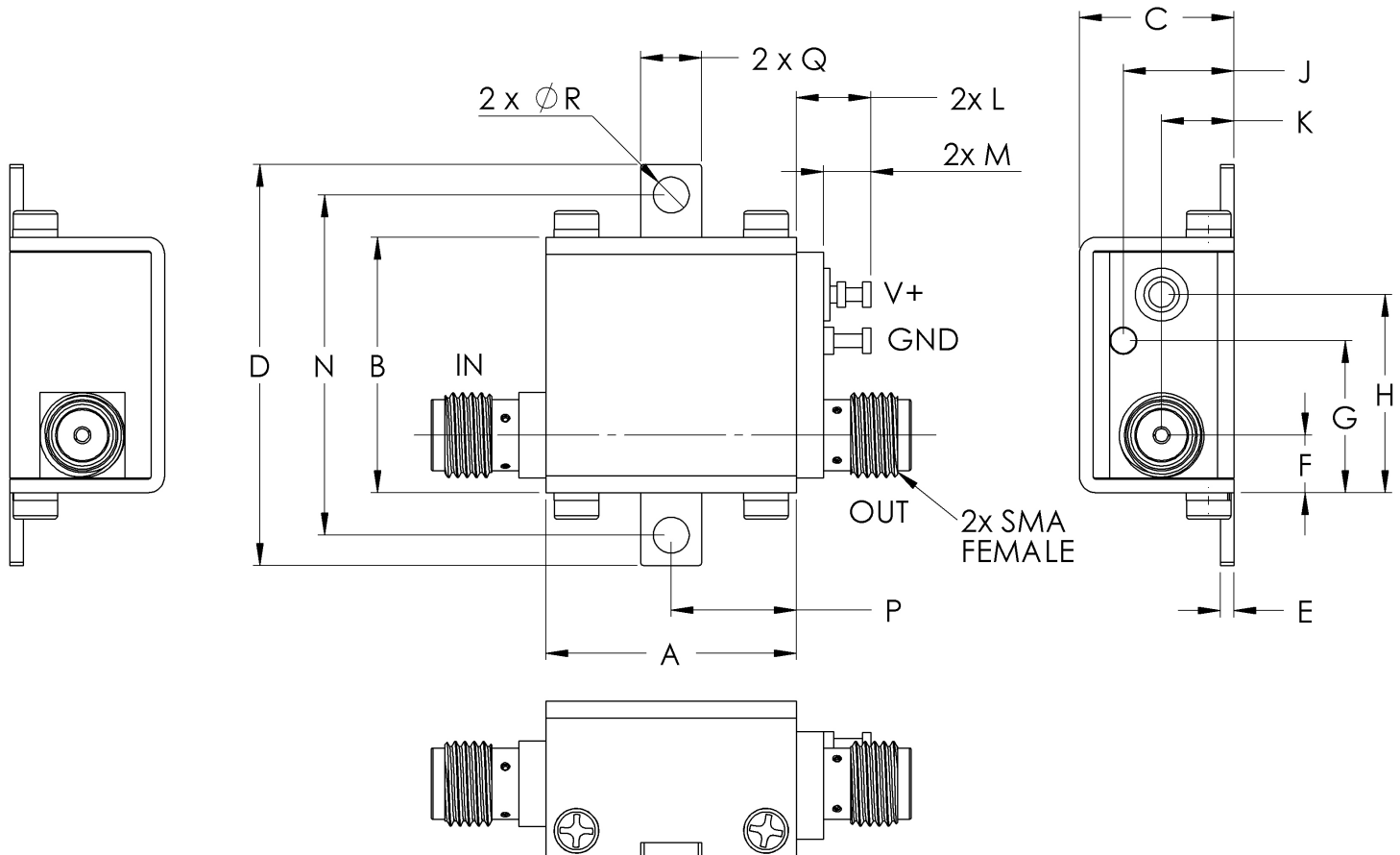


# Case Style

# 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**<sup>®</sup>

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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