COAXIAL

RF Instrument Amplifier

HPA-0M51G02W5+

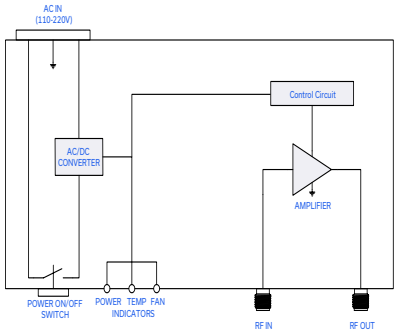
50Ω 0.5 to 1000 MHz 3 W N-type Female

THE BIG DEAL

- High Gain, 40 dB Typ.
- High P1dB, +35 dBm Typ.
- High OIP3, +44 dBm Typ.
- Thermally Self-Protected, LED Indicators
- Built-in 110/220 AC Power Supply

Generic photo used for illustration purposes only

FUNCTIONAL DIAGRAM



APPLICATIONS

- Laboratory Test Instrument
- RF Power Stress Test
- EMI and Antenna Testing
- Industrial, Scientific, Medical Amplifier

PRODUCT OVERVIEW

The HPA-0M51G02W5+ is an instrument amplifier operating over the 0.5 to 1000 MHz frequency band providing more than 3 W of output power with a typical small signal gain of 40 dB.

The amplifier uses state-of-the-art semiconductor technology and can be used in a wide range of applications. The amplifier runs on a built-in 110/220 V power supply, making it easy to use in most lab environments. It features thermal self-protection, preventing damage to the amplifier and providing added reliability. It is housed in a lightweight aluminum alloy case (8.27" × 15.35" × 3.25") with N-type connectors, ideal for bench-top use.

KEY FEATURES

Features	Advantages
Broadband, Useable from 0.5 to 1000 MHz	One single amplifier that covers the entire frequency band delivering rated power.
High Gain, 40 dB Typ.	High gain allows low drive levels to achieve rated output power which can be obtained from many standard lab generators.
High OIP3, +44 dBm Typ.	High OIP3 makes the amplifier suitable for applications requiring high linearity such as digitally modulated signals.
Thermally Self-Protected	A built-in sensing feature signals the unit to power off when the amplifier reaches its maximum rated operating temperature, preventing damage to the equipment and providing added reliability.
Built-in 110V/220V Power Supply	Operating from a standard AC line power supply, the amplifier can be powered from 110 to 220 V, making it versatile for use in most lab environments.

ELECTRICAL SPECIFICATIONS, +25°C

Parameter	Symbol	Condition (MHz)		Min.	Typ.	Max.	Units
Frequency Range	f	–		0.5	–	1000	MHz
Gain	G_{SS}	P_{IN}= -30 dBm	0.5 - 1000	34	40	–	dB
Gain Flatness	$G_{SS\text{-}FLAT}$	P_{IN}= -30 dBm	0.5 - 1000	–	±1.5	±2.2	dB
Output Power at 1 dB Compression	P_{1dB}	0.5 - 1000		+32	+35	–	dBm
Noise Figure	NF	P_{IN}= -30 dBm	0.5 - 1000	–	9	14	dB
Output 3rd Order Intercept Point	OIP3	P_{OUT}=+30 dBm/tone	0.5 - 1000	+38	+44	–	dBm
Input Return Loss	I-RL	P_{IN}= -30 dBm	0.5 - 1000	9.5	17.5	–	dB
Output Return Loss	O-RL	P_{IN}= -30 dBm	0.5 - 1000	–	21	–	dB
AC Supply Voltage	V_{AC}	–		85	110 / 220	265	V

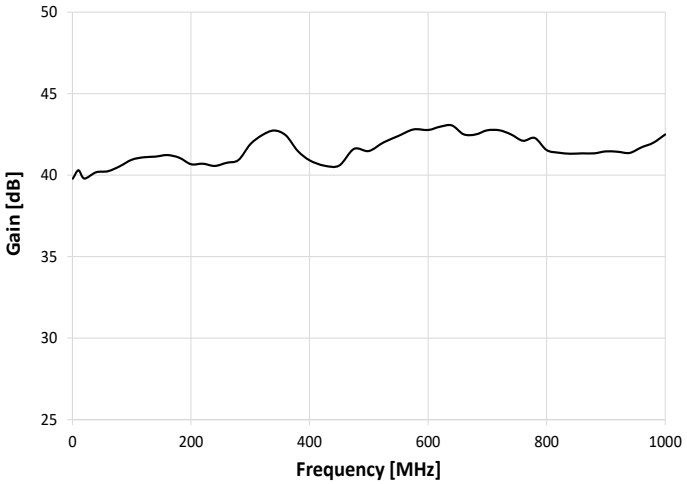
ABSOLUTE MAXIMUM RATINGS

Parameter	Ratings
Operating Temperature	$T_{AMBIENT}$: 0°C to +55°C
Storage Temperature	-55°C to +100°C
RF Input Power (no damage)	+7 dBm

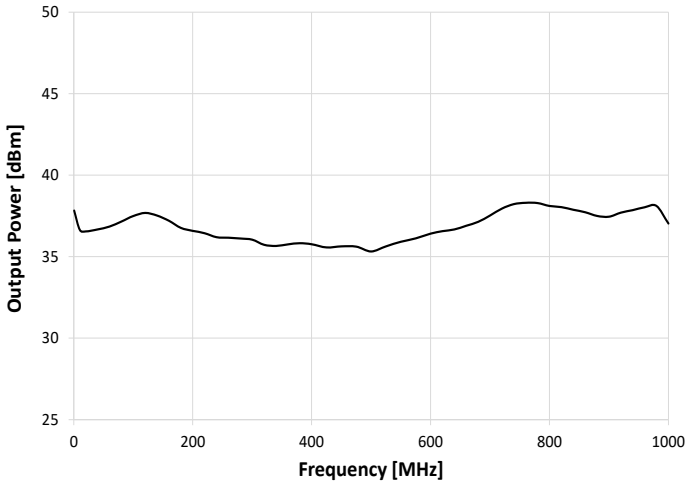
Permanent damage may occur if any of these limits are exceeded.

TYPICAL PERFORMANCE GRAPHS, +25°C

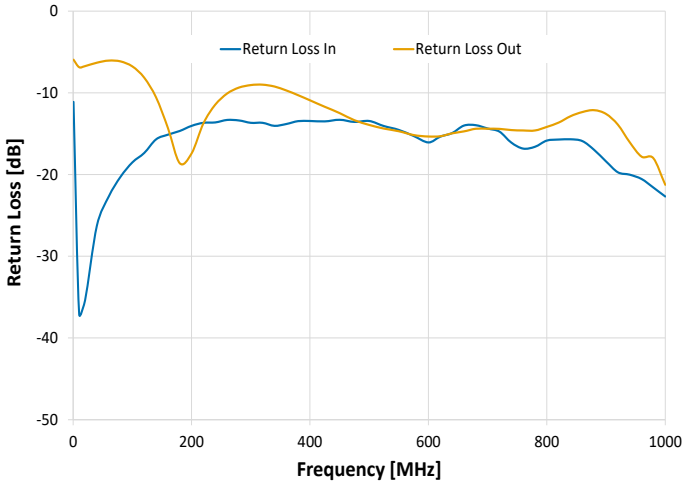
Small Signal Gain vs. Output Frequency



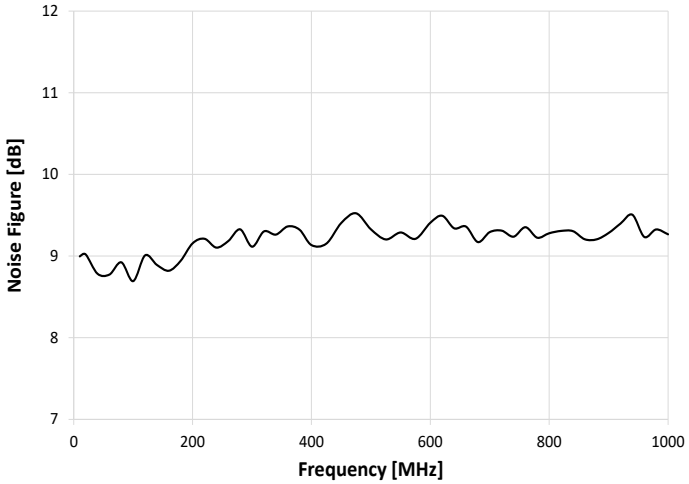
Output Power at 1dB Compression vs. Output Frequency



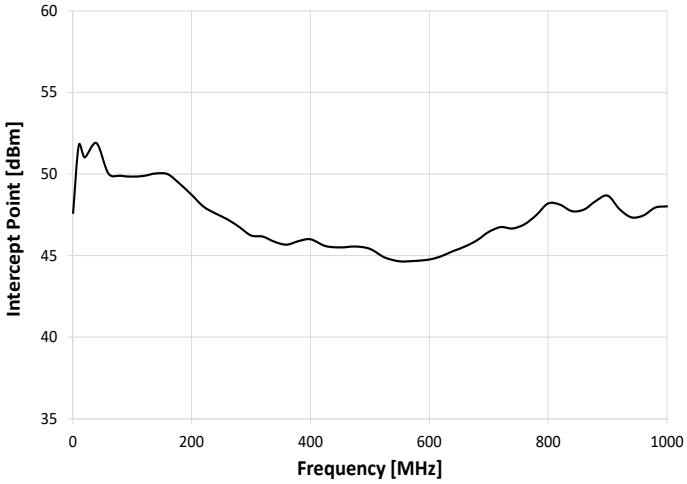
Return Loss vs. Output Frequency



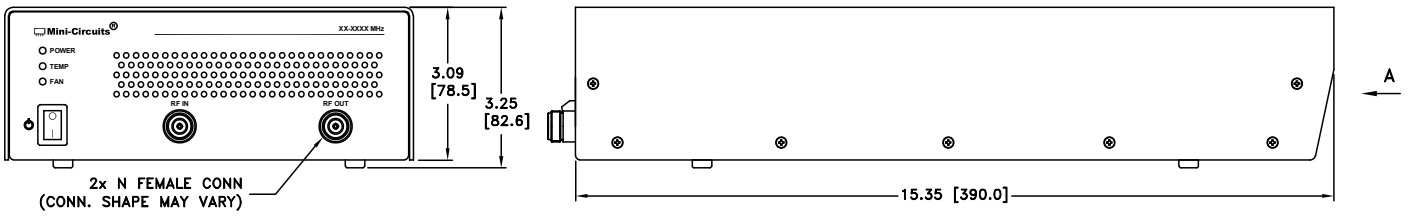
Noise Figure vs. Output Frequency

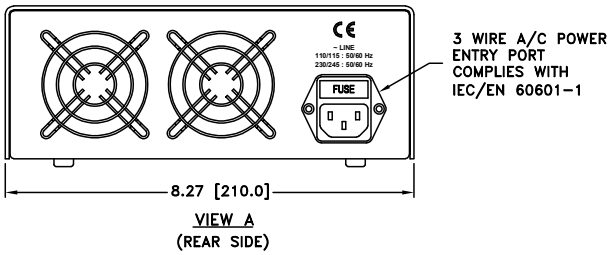


3rd Order Intercept Point vs. Output Frequency



CASE STYLE DRAWING (PJ2059-2)





Notes:

1. Case material: Aluminum alloy.
2. Case finish: White paint.
3. Weight: 3870 grams.
4. Dimensions: Inches [mm].
   Tolerances: 2 PI. ±.03 inch; 3 PI. ±.015 inch.
5. Connector shape may vary.
6. Keep area adjacent to airvents clear to allow free air flow.
   Caution: Do not insert anything, especially conductors or fingers, into case opening.

COAXIAL CONNECTIONS

Port	Connector
RF IN	N-type Female
RF OUT	N-type Female

ALARM LED INDICATORS

Parameter	LED Color
Power	Green at normal operation
Temperature Shutdown	Red at temperature shutdown (85±5°C)
Fan	Red at fan failure (#1 or #2)

DETAILED MODEL INFORMATION IS AVAILABLE ON OUR WEBSITE CLICK HERE

Performance Data	Table Graphs S-Parameter (S2P Files) Data Set (.zip file)
RoHS Status	Compliant
Environmental Ratings	ENV76

ORDERING INFORMATION

Model No. Links	HPA-0M51G02W5+
Case Style	PJ2059-2
Connector	IN (N-type Female) / OUT (N-type Female)

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-Circuits' 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

Rack Mount

Amplifier

HPA-0M51G02W5+

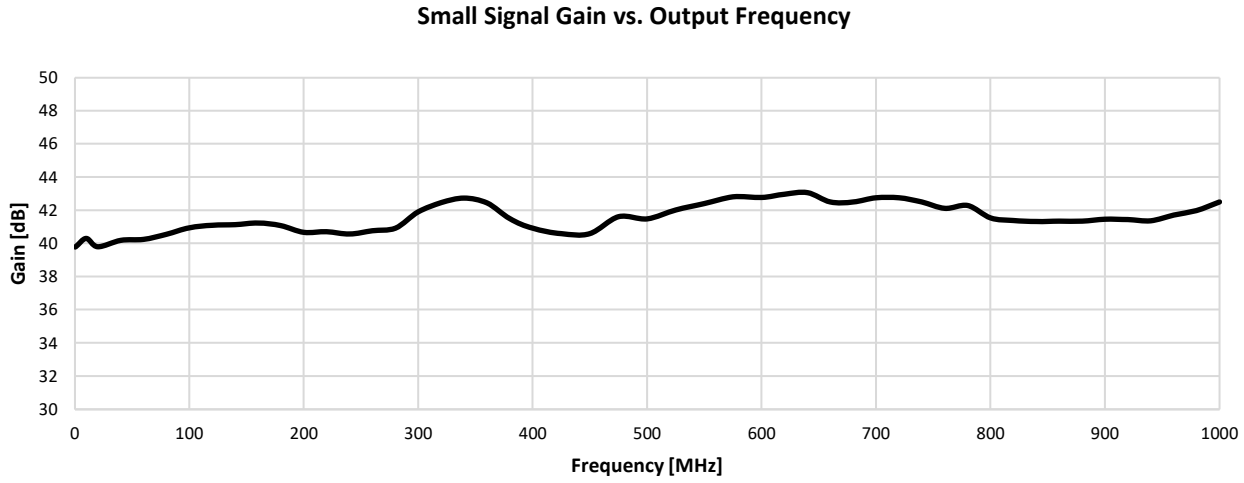
Typical Performance Data

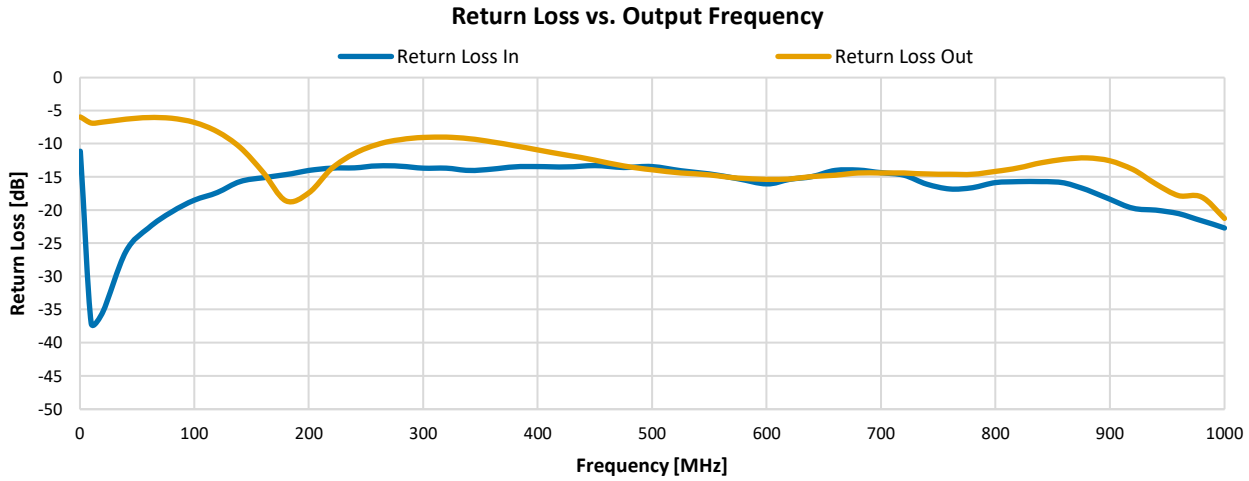
Test Conditions: Temperature = +25°C.

Freq. (MHz)	Gain (dB)	Return Loss In (dB)	Return Loss Out (dB)	Noise Figure (dBm)	P1dB (dBm)	IP3 (dBm)
0.5	39.79	-11.10	-5.94	–	37.83	47.62
10	40.30	-37.07	-6.85	9.00	36.65	51.77
20	39.80	-35.40	-6.72	9.02	36.55	51.03
40	40.18	-26.28	-6.31	8.78	36.67	51.89
60	40.25	-22.68	-6.04	8.77	36.85	50.03
80	40.55	-20.27	-6.15	8.92	37.15	49.90
100	40.95	-18.50	-6.76	8.69	37.50	49.85
120	41.10	-17.35	-8.15	9.01	37.68	49.90
140	41.14	-15.69	-10.54	8.89	37.53	50.04
160	41.23	-15.11	-14.30	8.82	37.20	49.99
180	41.08	-14.66	-18.60	8.94	36.77	49.41
200	40.67	-14.03	-17.39	9.16	36.59	48.73
220	40.71	-13.66	-13.72	9.21	36.44	48.01
240	40.57	-13.61	-11.45	9.10	36.20	47.59
260	40.77	-13.32	-10.08	9.18	36.16	47.23
280	40.93	-13.37	-9.36	9.33	36.11	46.76
300	41.90	-13.67	-9.04	9.11	36.04	46.23
320	42.46	-13.66	-9.00	9.30	35.73	46.17
340	42.74	-14.03	-9.23	9.26	35.66	45.84
360	42.44	-13.81	-9.71	9.36	35.76	45.67
380	41.49	-13.46	-10.28	9.32	35.83	45.89
400	40.91	-13.44	-10.91	9.13	35.76	46.00
425	40.59	-13.49	-11.69	9.27	35.57	45.59
450	40.60	-13.29	-12.47	9.40	35.63	45.51
475	41.61	-13.55	-13.35	9.38	35.62	45.56
500	41.48	-13.44	-13.92	9.33	35.32	45.42
525	42.02	-14.07	-14.37	9.27	35.64	44.89
550	42.41	-14.53	-14.69	9.29	35.92	44.65
575	42.81	-15.27	-15.16	9.35	36.12	44.68
600	42.77	-16.06	-15.34	9.41	36.42	44.76
620	42.97	-15.36	-15.30	9.49	36.56	44.97
640	43.06	-14.92	-14.95	9.34	36.67	45.28
660	42.51	-14.00	-14.72	9.36	36.90	45.56
680	42.50	-13.95	-14.39	9.17	37.14	45.94
700	42.76	-14.36	-14.38	9.29	37.52	46.46
720	42.76	-14.74	-14.40	9.31	37.95	46.75
740	42.50	-16.09	-14.55	9.24	38.22	46.67
760	42.11	-16.81	-14.60	9.35	38.31	46.92
780	42.28	-16.60	-14.61	9.23	38.29	47.49
800	41.54	-15.84	-14.16	9.28	38.11	48.20
820	41.38	-15.71	-13.63	9.31	38.04	48.12
840	41.32	-15.68	-12.85	9.31	37.88	47.73
860	41.34	-15.90	-12.34	9.21	37.73	47.82
880	41.34	-16.98	-12.11	9.21	37.50	48.35
900	41.46	-18.38	-12.58	9.28	37.46	48.68
920	41.44	-19.72	-13.89	9.40	37.71	47.85
940	41.37	-20.01	-16.04	9.51	37.86	47.35
960	41.71	-20.54	-17.81	9.23	38.04	47.46
980	41.99	-21.59	-17.99	9.33	38.11	47.94
1000	42.50	-22.68	-21.25	9.27	37.03	48.02

Typical Performance Graphs

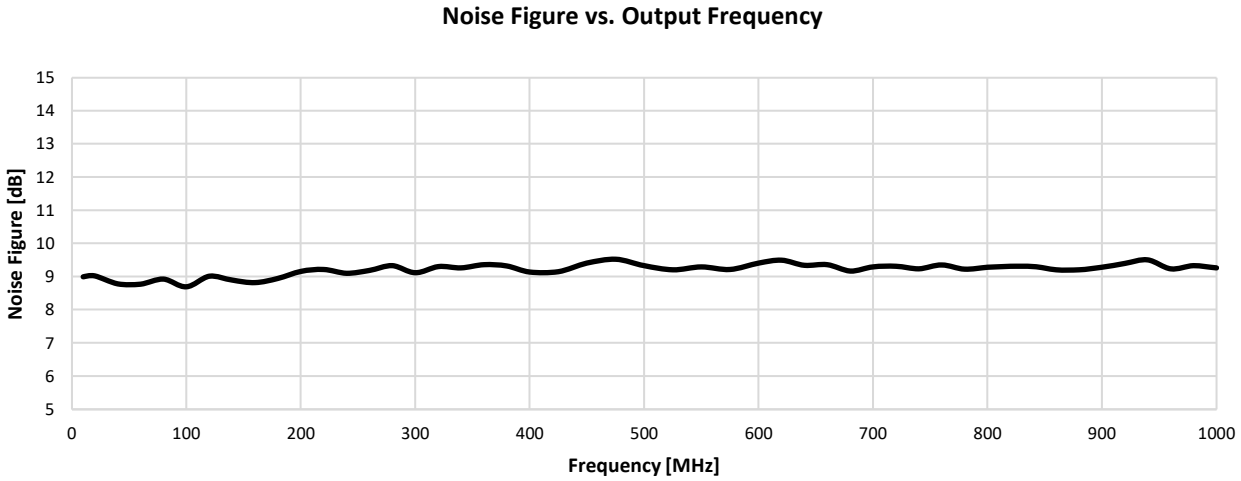
Test Conditions: Temperature = +25°C.

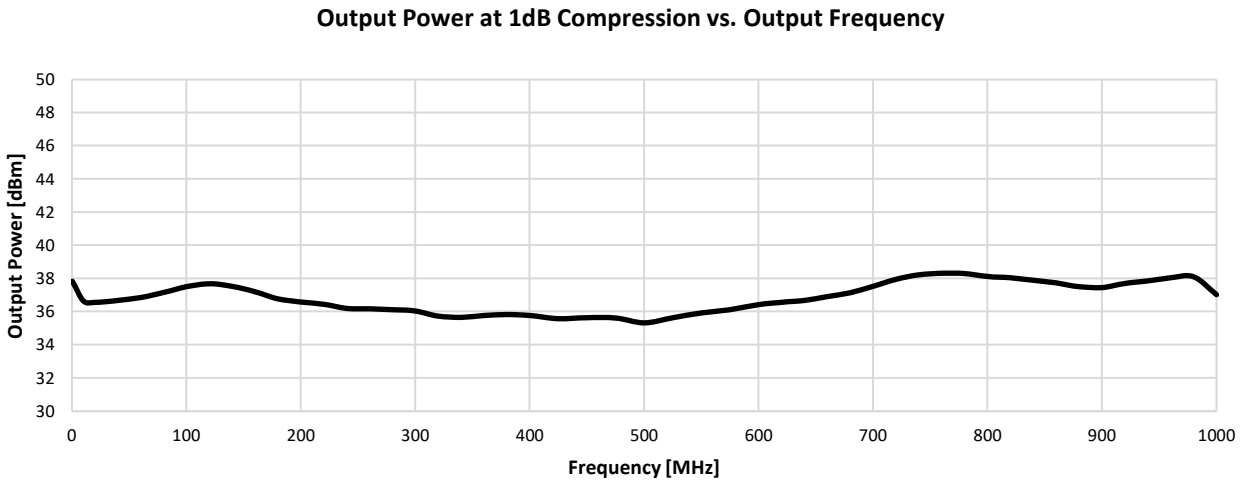


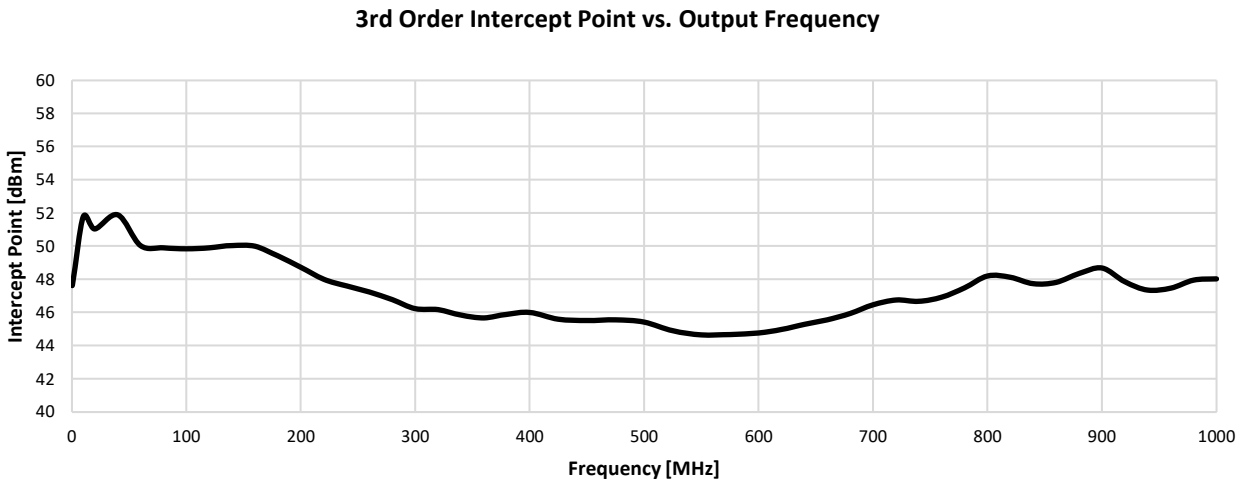


Typical Performance Graphs

Test Conditions: Temperature = +25°C.



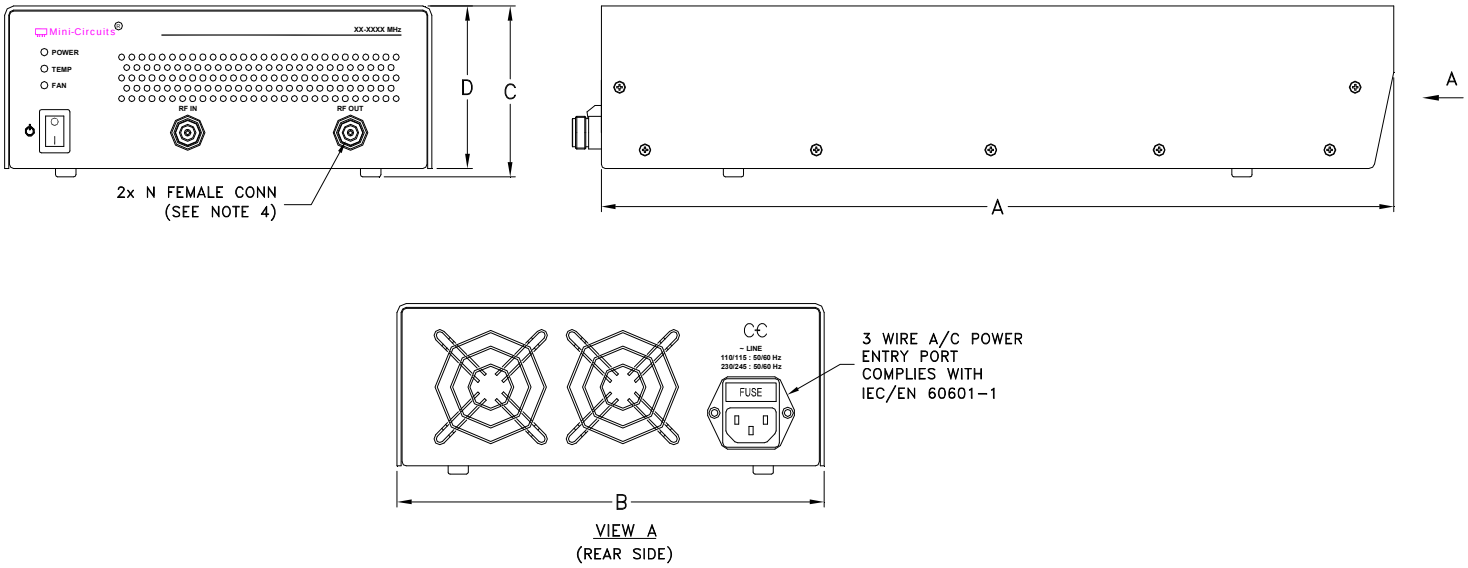




Case Style PJ

PJ2059-2

Outline Dimensions



CASE#	A	B	C	D	E	WT, GRAM
PJ2059-2	15.35 (390.0)	8.27 (210.0)	3.25 (82.6)	3.09 (78.5)	-- --	3870

Dimensions are in inches (mm). Tolerances: 2 Pl. ± .03; 3 Pl. ± .015

Notes:

1. Case material: Aluminum alloy.
2. Finish: White paint.
3. Keep area adjacent to airvents clear to allow free air flow. Caution: Do not insert anything, especially conductors or fingers into case opening. Physical injury, shock or death may occur.
4. Connector shape may vary.

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INTERNET http://www.minicircuits.com
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661
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Environmental Specifications ENV76

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	-0° to 50° C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-20° to 70° C (non condensing)	Individual Model Data Sheet

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