COAXIAL

RF Instrument Amplifier HPA-20M2G7025+

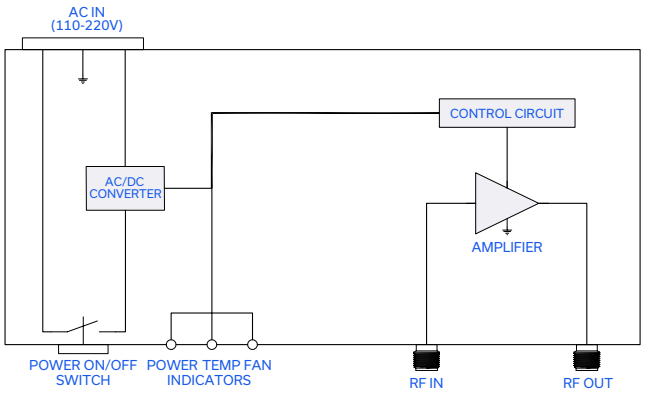
50Ω 20 to 2700 MHz Broadband 25 W N-Type Female

THE BIG DEAL

- Broadband, 20 to 2700 MHz
- High Gain, 50 dB typ.
- High P1dB, +40 dBm typ.
- High OIP3, +49 dBm typ.
- Built-in 110/220V AC power supply

Generic photo used for illustration purposes only

FUNCTIONAL DIAGRAM



APPLICATIONS

- Communication Systems
- R&D, Production, and OTA Test Systems
- General Laboratory Applications
- Test & Measurement Equipment

PRODUCT OVERVIEW

Mini-Circuits' HPA-20M2G7025+ is an instrument amplifier providing 25 W of output power with a typical small signal gain of 50 dB over the 20 to 2700 MHz frequency band. 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 110/220V 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 (15.35 x 8.27 x 3.25") with N-type connectors, ideal for bench-top use.

KEY FEATURES

Features	Advantages
Extremely Broadband, 20 to 2700 MHz, and High Power, 25 W	One single amplifier that covers the entire frequency band delivering rated power.
High Gain, 50 dB Typ.	High gain allows low drive levels to achieve rated output power which can be obtained from many standard lab generators.
High OIP3, +49 dBm Typ.	High OIP3 makes the amplifier suitable for applications requiring high linearity such as digitally modulated signals.
Built-in 110V/220V power supply	Operating from a standard AC line power supply, the HPA-20M2G7025+ can be powered from 110 to 220V, making the amplifier versatile for use in most lab environments.
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.
CE marked	Meets conformity standards for sale within the European Economic Area (EEA).

REV. OR
ECO-021920
HPA-20M2G7025+
MCL NY
240528

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ELECTRICAL SPECIFICATIONS AT $T_{AMBIENT}$ = +25°C

Parameter	Symbol	Condition	Min.	Typ.	Max.	Units
Frequency Range	f		20		2700	MHz
Small Signal Gain	G_{SS}	P_{OUT} = -25 dBm	45	50	55	dB
Small Signal Gain Flatness	$G_{SS-FLAT}$	P_{OUT} = -25 dBm		± 0.8	± 2.0	dB
Output Power at 1dB compression	P_{1dB}	$P_{OUT-REF}$ = +35 dBm	+36	+40		dBm
Output Power at 3dB compression	P_{3dB}	$P_{OUT-REF}$ = +35 dBm	+40	+44		dBm
Output Power at Saturation	P_{SAT}	$P_{OUT-REF}$ = +35 dBm	+42	+45		dBm
Noise Figure	NF			10		dB
Output Third Order Intercept Point	OIP3	P_{OUT}= +30 dBm/tone	+40	+49		dBm
Input Return VSWR	I-VSWR	P_{OUT} = -25 dBm		1.2:1	2.5:1	dB
Output Return VSWR	O-VSWR	P_{OUT} = -25 dBm		1:9:1	5:1	dB
AC Supply Voltage	V_{AC}		85	110/220	264	V
Power Consumption		AC = 220 V, P_{OUT}= 25 W		200	300	W

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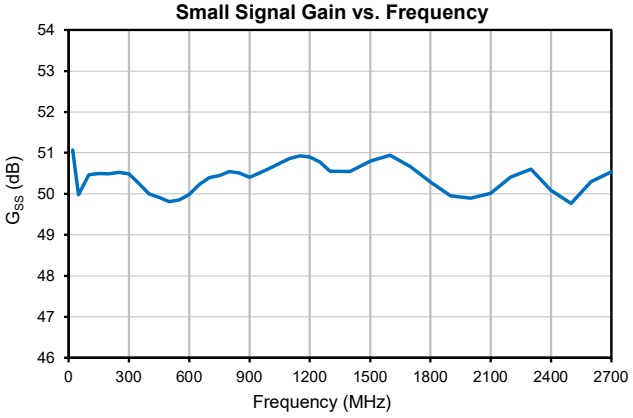
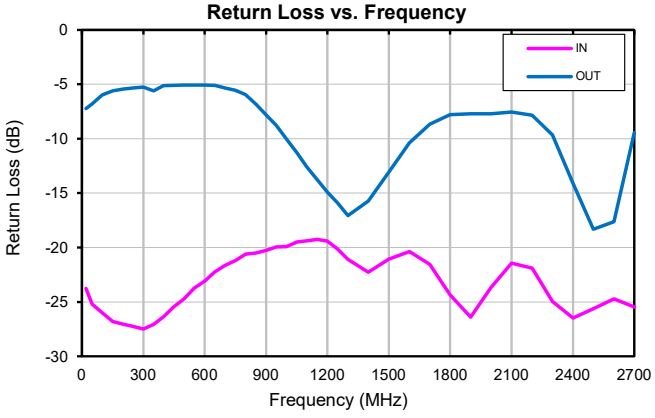
TYPICAL PERFORMANCE CHARTS AT $T_{AMBIENT}$ = +25°C, 50 OHM

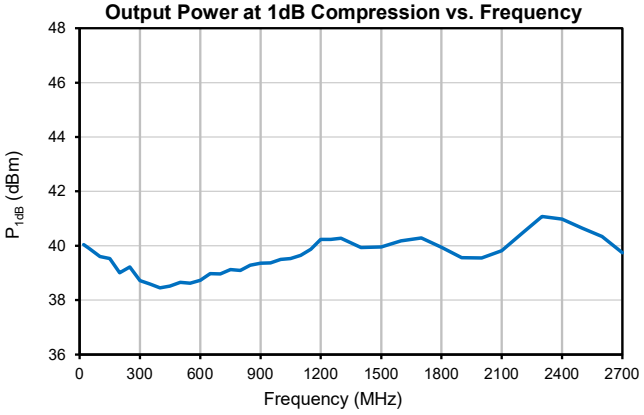
Small Signal Gain vs. Frequency



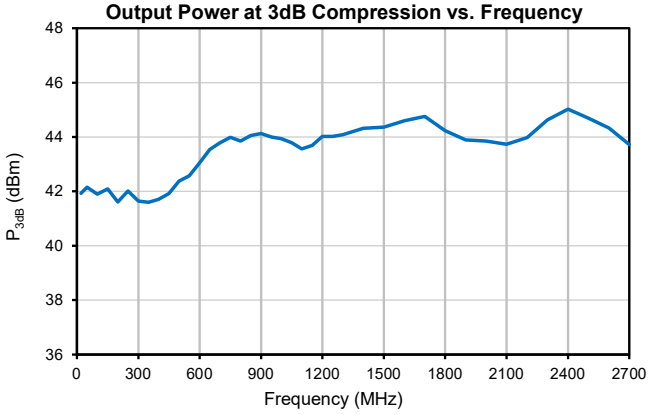
Return Loss vs. Frequency



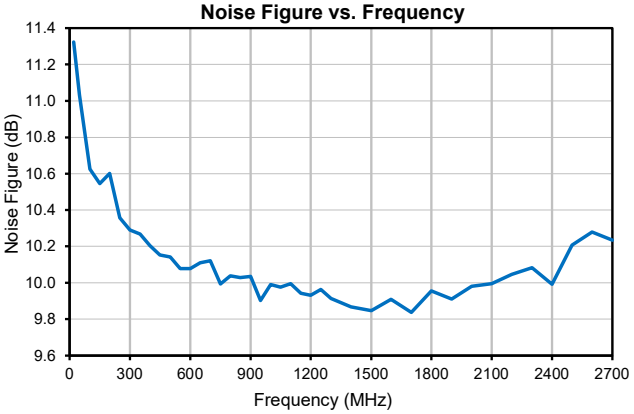
Output Power at 1dB Compression vs. Frequency



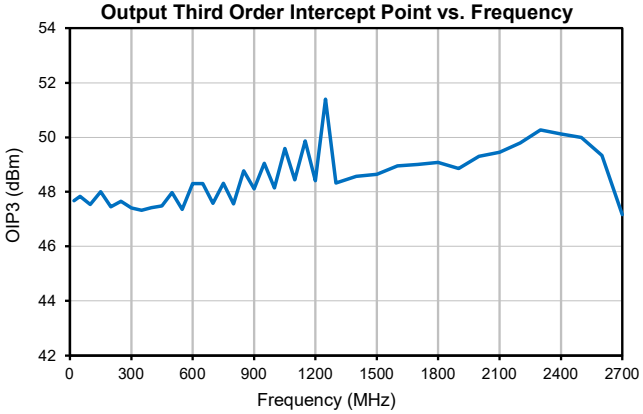
Output Power at 3dB Compression vs. Frequency



Noise Figure vs. Frequency



Output Third Order Intercept Point vs. Frequency



ABSOLUTE MAXIMUM RATINGS

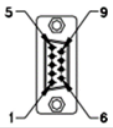
Parameter	Ratings
Operating Temperature	$T_{AMBIENT}$: 0 °C to +50 °C
Storage Temperature	-20 °C to +70 °C
No damage with an open or short output load under +42 dBm CW output power (2 minutes)	
RF Input Power (no damage)	+5 dBm

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

LED INDICATORS ON THE FRONT PANEL

Parameter	LED Color
Power	Green at Normal Operation
HPA Temperature Shutdown	Red at Temperature Shutdown (85˚C internal heatsink temperature ± 5˚C)
Fan #1 and Fan #2	Red at Fan Failure

FRONT PANEL D-SUB PIN-OUTS FOR ALARMS

Pin#	Status	D-Sub Pin-Out
1	TTL High (3.3V) in case of High-Temperature Shut down	
2	TTL High (3.3V) in case of Fan Failure	
3	Ground	

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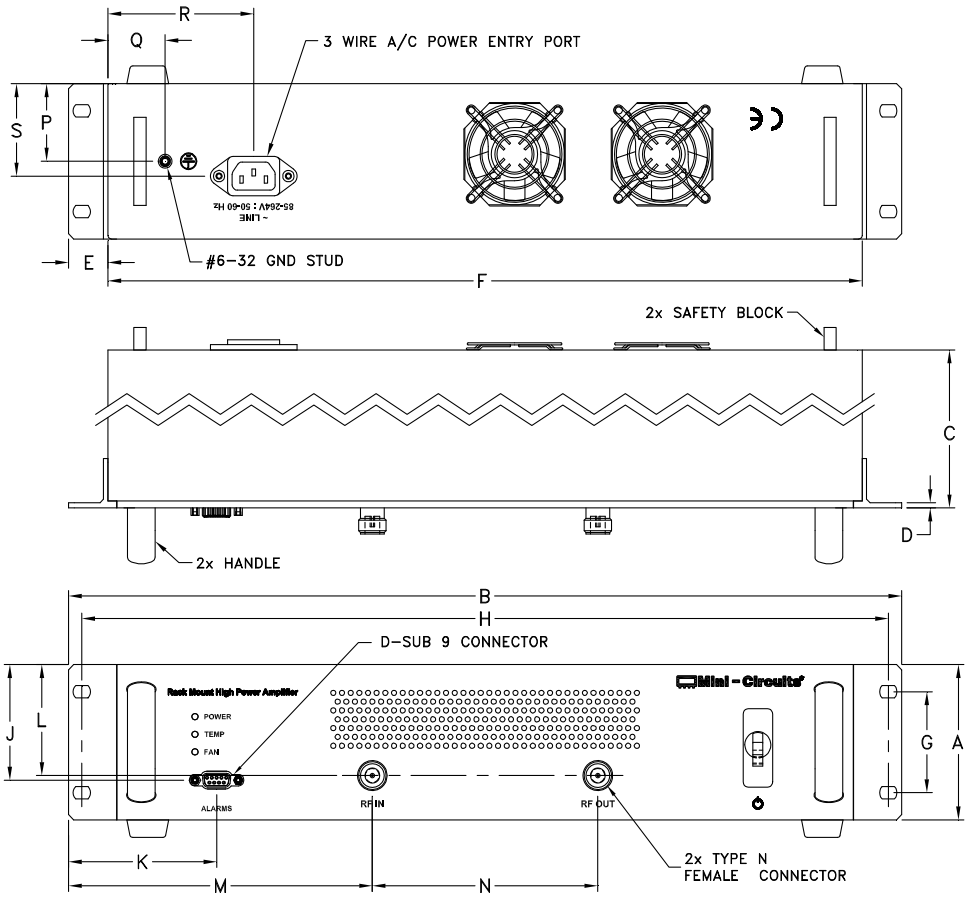
COAXIAL CONNECTIONS

IN (RF IN)	N-Female
OUT (RF OUT)	N-Female

CASE STYLE DRAWING



CASE #	A	B	C	D	E	F	G	H	J	K	L
NG1942-1	3.46 (88.0)	18.91 (480.4)	20.2 (513.0)	.12 (3.0)	.89 (22.7)	17.13 (435.0)	2.25 (57.2)	18.31 (465.0)	2.58 (65.5)	3.36 (85.4)	2.48 (62.9)

CASE #	M	N	P	Q	R	S	T	WT, GRAMS
NG1942-1	6.90 (175.2)	5.12 (130.0)	1.73 (44.0)	1.30 (33.0)	3.31 (84.1)	2.06 (52.4)	-- --	13910

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

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50Ω 20 to 2700 MHz Broadband 25 W N-Type Female

ADDITIONAL INFORMATION IS AVAILABLE ON OUR DASHBOARD

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

ORDERING INFORMATION

Model No. Links	HPA-20M2G7025+
Case Style	NG1942-1
Connector	IN (N-Female) / OUT (N-Female)

NOTES

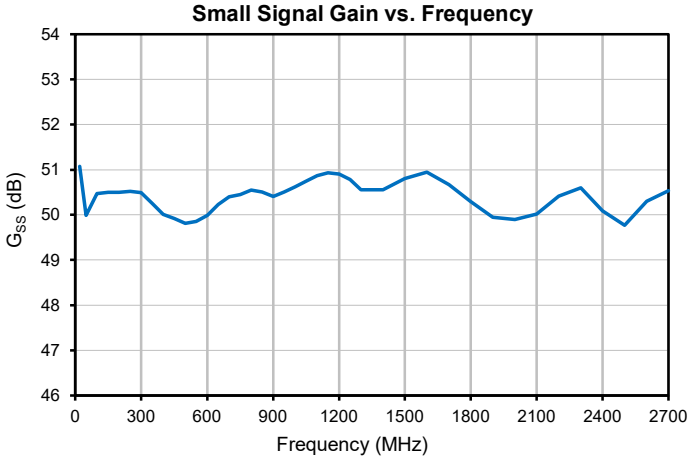
A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuits' 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

Typical Performance Data

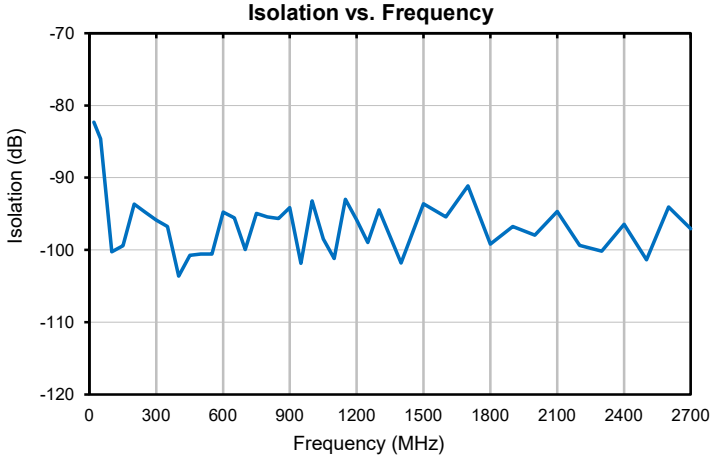
Frequency (MHz)	Gain (dB)	Isolation (dB)	Return Loss (dB)		P_{OUT} @ 1dB Compression (dBm)	P_{OUT} @ 3dB Compression (dBm)	P_{OUT} @ Saturation (dBm)	OIP3 (dBm)	Noise Figure (dB)
			IN	OUT					
	28V	28V	28V	28V	28V	28V	28V	28V	28V
20	51.07	82.32	23.77	7.23	40.05	41.93	42.73	47.67	11.32
50	49.98	84.62	25.21	6.81	39.90	42.15	43.08	47.83	11.03
100	50.47	100.27	26.00	5.98	39.60	41.90	43.05	47.53	10.62
150	50.49	99.39	26.80	5.61	39.53	42.09	43.62	48.00	10.54
200	50.49	93.67	27.04	5.44	39.00	41.61	43.40	47.44	10.60
250	50.52	94.76	27.26	5.35	39.23	42.01	44.00	47.65	10.36
300	50.49	95.87	27.48	5.24	38.72	41.64	43.93	47.41	10.29
350	50.24	96.75	27.06	5.60	38.58	41.61	44.17	47.33	10.27
400	50.00	103.63	26.37	5.11	38.45	41.70	44.83	47.42	10.20
450	49.91	100.74	25.46	5.10	38.52	41.92	44.89	47.48	10.15
500	49.81	100.60	24.70	5.08	38.66	42.37	45.31	47.97	10.14
550	49.85	100.57	23.73	5.06	38.63	42.56	45.45	47.35	10.08
600	49.99	94.78	23.09	5.07	38.73	43.05	45.38	48.30	10.08
650	50.23	95.59	22.23	5.10	38.98	43.54	45.32	48.30	10.11
700	50.40	99.92	21.66	5.35	38.97	43.79	44.98	47.58	10.12
750	50.45	94.95	21.22	5.54	39.12	43.98	44.94	48.32	9.99
800	50.55	95.47	20.62	5.97	39.10	43.85	44.71	47.55	10.04
850	50.51	95.67	20.53	6.80	39.28	44.06	44.57	48.78	10.03
900	50.40	94.15	20.26	7.82	39.37	44.12	44.64	48.11	10.03
950	50.51	101.83	19.94	8.80	39.38	44.00	44.39	49.05	9.90
1000	50.62	93.21	19.92	10.04	39.51	43.93	44.56	48.14	9.99
1050	50.75	98.49	19.50	11.28	39.53	43.79	44.37	49.59	9.98
1100	50.87	101.17	19.38	12.58	39.65	43.56	44.36	48.45	10.00
1150	50.93	93.00	19.25	13.78	39.87	43.68	44.49	49.87	9.94
1200	50.90	95.83	19.42	14.91	40.24	44.02	45.03	48.40	9.93
1250	50.78	98.95	20.11	15.90	40.23	44.02	45.37	51.39	9.96
1300	50.55	94.47	21.09	17.07	40.27	44.08	45.91	48.32	9.91
1400	50.55	101.82	22.29	15.73	39.94	44.32	45.86	48.56	9.87
1500	50.80	93.63	21.07	13.09	39.96	44.36	45.38	48.64	9.85
1600	50.95	95.44	20.37	10.39	40.19	44.59	45.08	48.95	9.91
1700	50.67	91.13	21.56	8.67	40.29	44.76	44.91	48.99	9.84
1800	50.29	99.18	24.33	7.79	39.94	44.23	44.75	49.08	9.96
1900	49.95	96.74	26.40	7.69	39.56	43.89	44.43	48.85	9.91
2000	49.89	97.93	23.68	7.69	39.55	43.86	43.98	49.31	9.98
2100	50.02	94.67	21.42	7.54	39.82	43.74	43.76	49.45	10.00
2200	50.41	99.35	21.90	7.85	40.44	43.97	44.01	49.79	10.05
2300	50.60	100.18	24.96	9.66	41.07	44.63	44.66	50.27	10.08
2400	50.09	96.43	26.47	14.11	40.97	45.02	45.29	50.12	9.99
2500	49.77	101.35	25.64	18.31	40.66	44.69	45.74	50.00	10.21
2600	50.30	94.08	24.74	17.62	40.35	44.33	45.70	49.33	10.28
2700	50.53	97.07	25.48	9.44	39.74	43.72	45.06	47.17	10.23

Typical Performance Curves

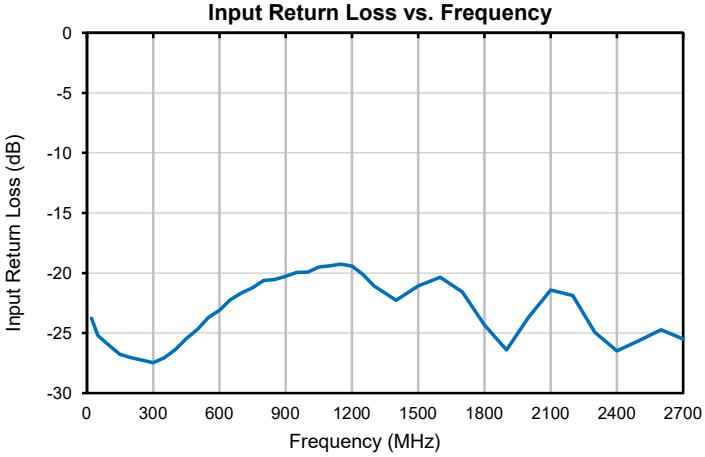
Small Signal Gain vs. Frequency



Isolation vs. Frequency



Input Return Loss vs. Frequency



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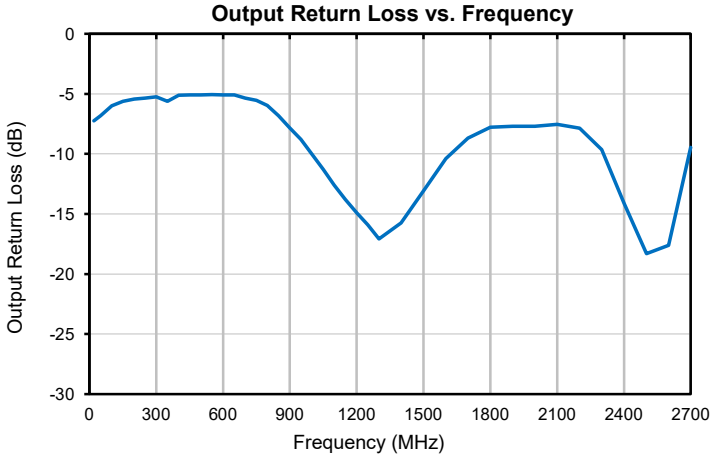
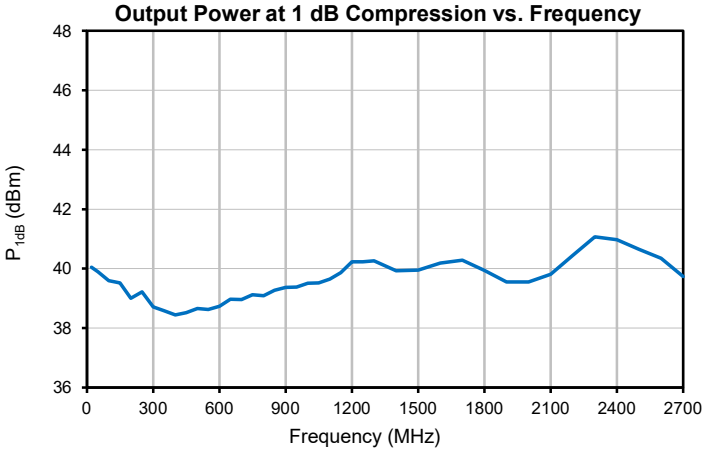
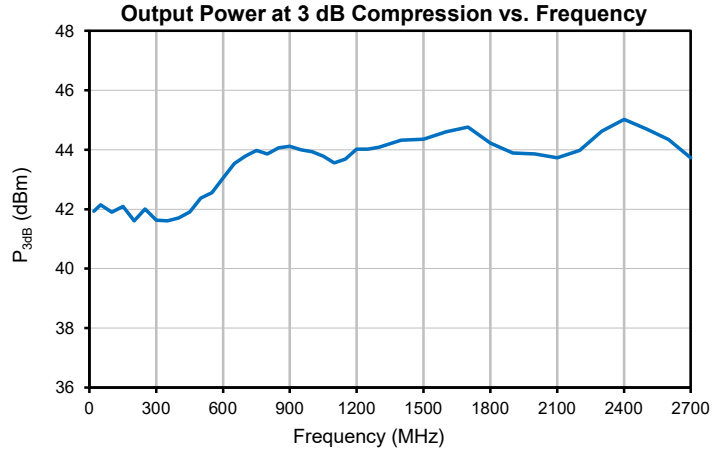


Output Power at 1 dB Compression vs. Frequency

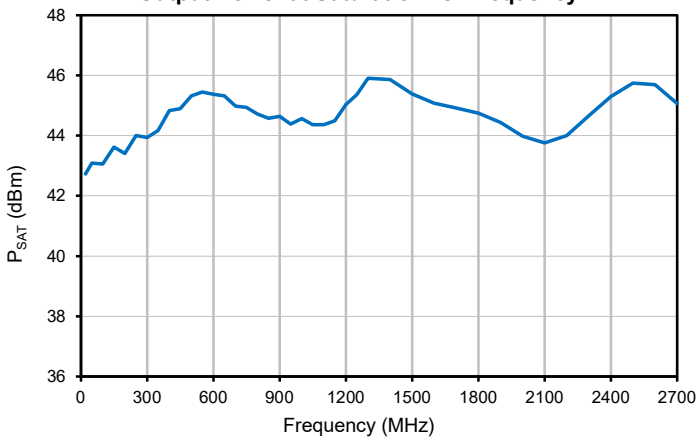


Output Power at 3 dB Compression vs. Frequency

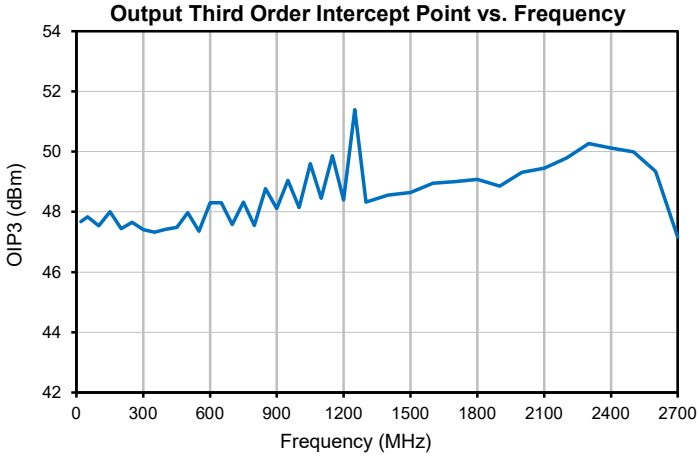


Typical Performance Curves

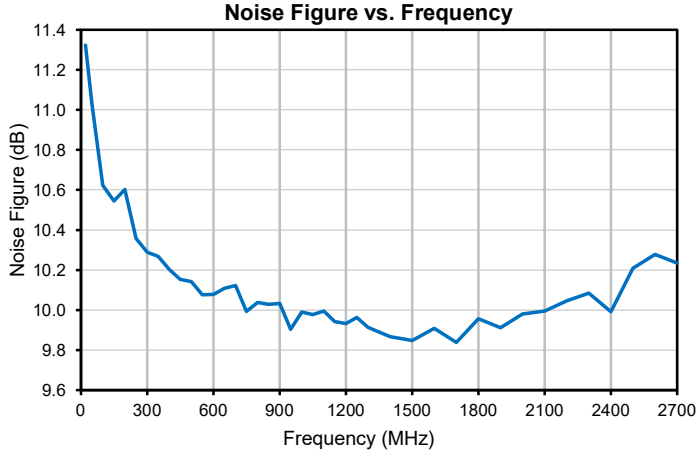
Output Power at Saturation vs. Frequency



Output Third Order Intercept Point vs. Frequency



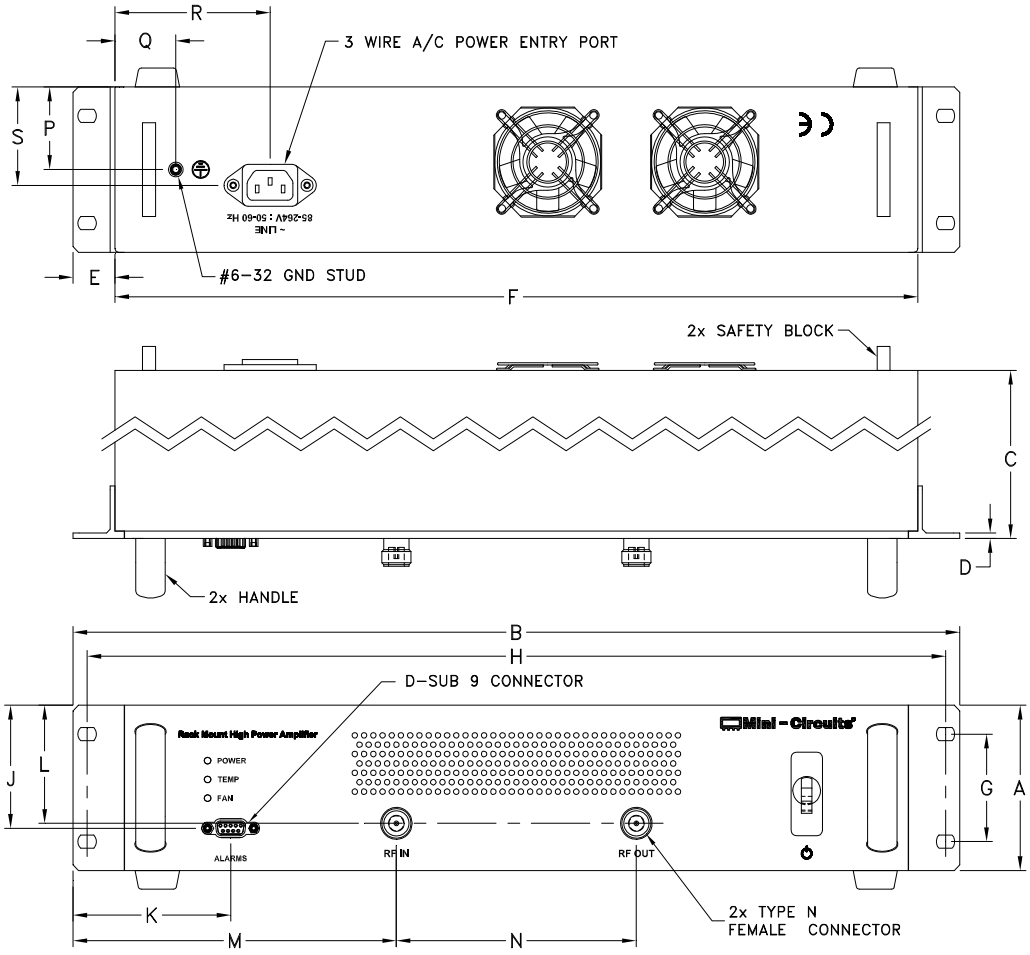
Noise Figure vs. Frequency



Case Style NG

Outline Dimensions

NG1942-1



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

Note:

3. Case material: Aluminum alloy.
4. Finish: Powder coating, Color: White.

Mini-Circuits®
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Mini-Circuits

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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