COAXIAL

Low Noise Amplifier

ZQL-2G22G70W3+

50Ω 2200 to 2700 MHz 0.3 W SMA Female

THE BIG DEAL

- Very Low Noise Figure, 1.1 dB Typ.
- High OIP3, +36 dBm Typ.
- Rugged, Shielded Case

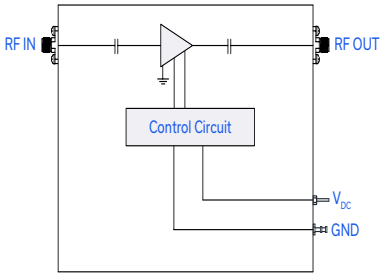


Generic photo used for illustration purposes only

APPLICATIONS

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

FUNCTIONAL DIAGRAM



PRODUCT OVERVIEW

The ZQL-2G22G70W3+ is a low noise amplifier operating over the 2200 to 2700 MHz frequency band providing about 0.5 W of output power with a typical small signal gain of 34 dB.

The amplifier uses state-of-the-art semiconductor technology and can be used in a wide range of applications. A single supply voltage ensures ease of operation. The amplifier is made with a rugged aluminum housing and sports a compact size (44.96 × 61.47 × 13.97 mm).

KEY FEATURES

Features	Advantages
Very Low Noise Figure	Enables signal amplification with minimal siganl degradation, 1.1 Typ.
High OIP3, +36 dBm Typ.	High OIP3 makes the amplifier suitable for applications requiring high linearity such as digitally modulated signals.
Small and Lightweight	Sports a small footprint (44.96 mm × 61.47 mm × 13.97 mm) and lightweight (71 grams) modular design.
Low Voltage	Powered by a low voltage of +15 V supply.

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ELECTRICAL SPECIFICATIONS, +25°C, V_{DC}= +15 V

Parameter	Symbol	Condition (MHz)		Min.	Typ.	Max.	Units
Frequency Range	f	–		2200	–	2700	MHz
Gain	G_{SS}	P_{IN}= -25 dBm	2200 - 2700	29	34	36	dB
Gain Flatness	$G_{SS-FLAT}$	P_{IN}= -25 dBm	2200 - 2700	–	±1.0	±1.5	dB
Output Power at 1 dB Compression	P_{1dB}	2200 - 2700		+22.5	+25.5	–	dBm
Noise Figure	NF	P_{IN}= -25 dBm	2200 - 2700	–	1.1	1.5	dB
Output 3rd Order Intercept Point	OIP3	P_{OUT}=+10 dBm/tone	2200 - 2700	+34	+36	–	dBm
Input Return Loss	I-RL	P_{IN}= -25 dBm	2200 - 2700	14	17.5	–	dB
Output Return Loss	O-RL	P_{IN}= -25 dBm	2200 - 2700	14	17.5	–	dB
DC Supply Voltage	V_{SUPPLY}	2200 - 2700		+13	+15	+17	V
DC Supply Current	I_{SUPPLY}	2200 - 2700		–	200	340	mA

ABSOLUTE MAXIMUM RATINGS

Parameter	Ratings
Operating Temperature	$T_{AMBIENT}$: -40°C to +70°C $T_{MOUNTINGBASE}$: Max +80°C
Storage Temperature	-55°C to +100°C
Max Power Dissipation	6 W
No damage with an open or short at P_{OUT} = +25 dBm CW for 2 minutes max	
RF Input Power (no damage)	-12 dBm (without load) +3 dBm (with load)
DC Operating Voltage	±17 V

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

DETERMINING MAXIMUM THERMAL RESISTANCE OF USERS' EXTERNAL HEAT SINK

$$\textit{MAXIMUM THERMAL RESISTANCE} = \frac{\textit{MAXIMUM OPERATING CASE TEMP} - \textit{MAXIMUM USER AMBIENT TEMP}}{\textit{POWER DISSIPATION}}$$

Example:	MAXIMUM MOUNTING BASE TEMP = +80 °C (CHECK MAXIMUM RATINGS TABLE FOR THIS VALUE) MAXIMUM USER AMBIENT TEMP = +70 °C (USER DEFINED) POWER DISSIPATION = 6 WATTS (EXAMPLE) THEN MAXIMUM ALLOWABLE THERMAL RESISTANCE = 1.67 °C/W

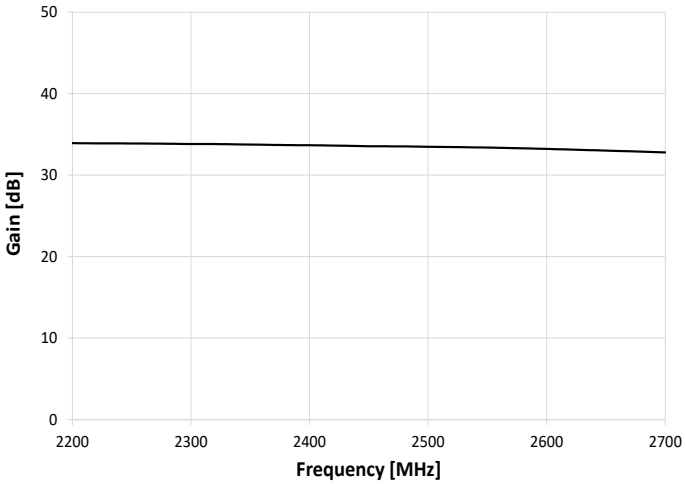
Low Noise Amplifier

ZQL-2G22G70W3+

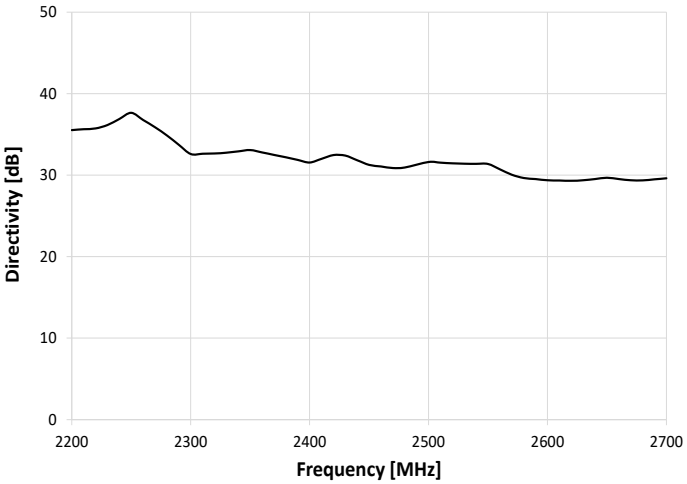
50Ω 2200 to 2700 MHz 0.3 W SMA Female

TYPICAL PERFORMANCE GRAPHS

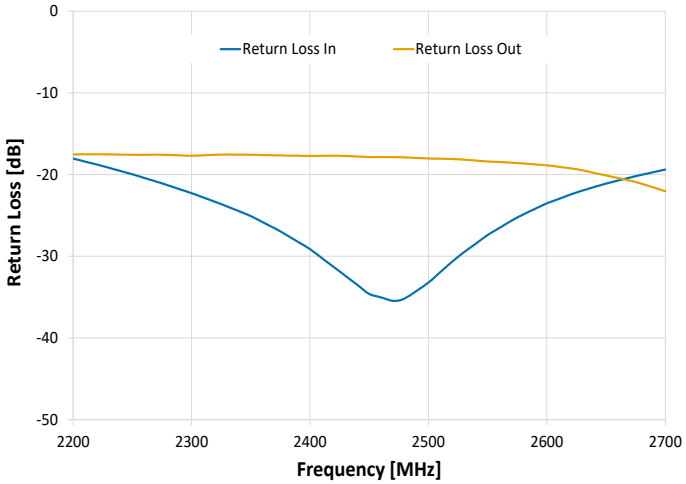
Small Signal Gain vs. Output Frequency



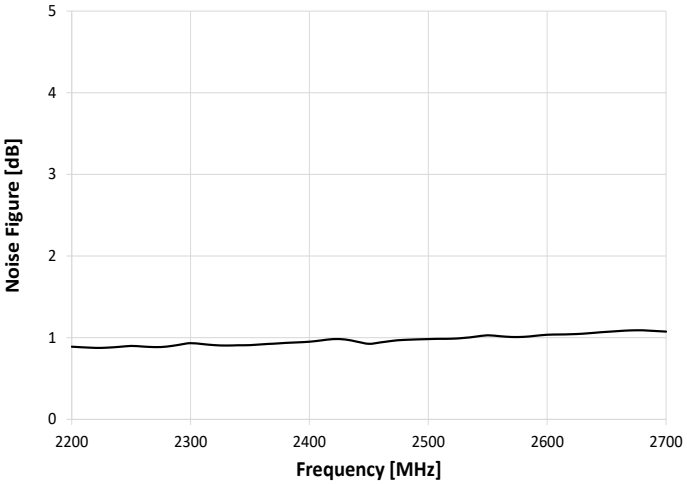
Directivity vs. Output Frequency



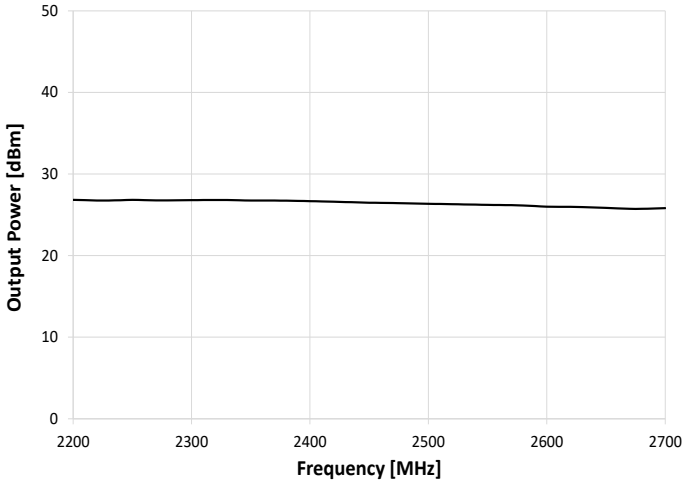
Return Loss vs. Output Frequency



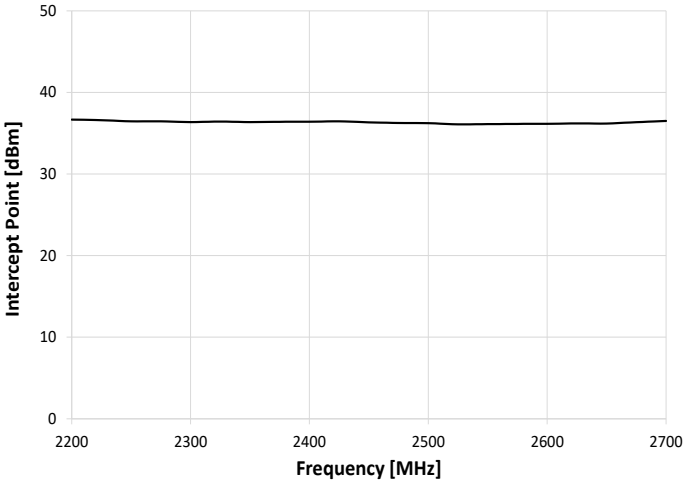
Noise Figure vs. Output Frequency



Output Power at 1dB Compression vs. Output Frequency



3rd Order Intercept Point vs. Output Frequency

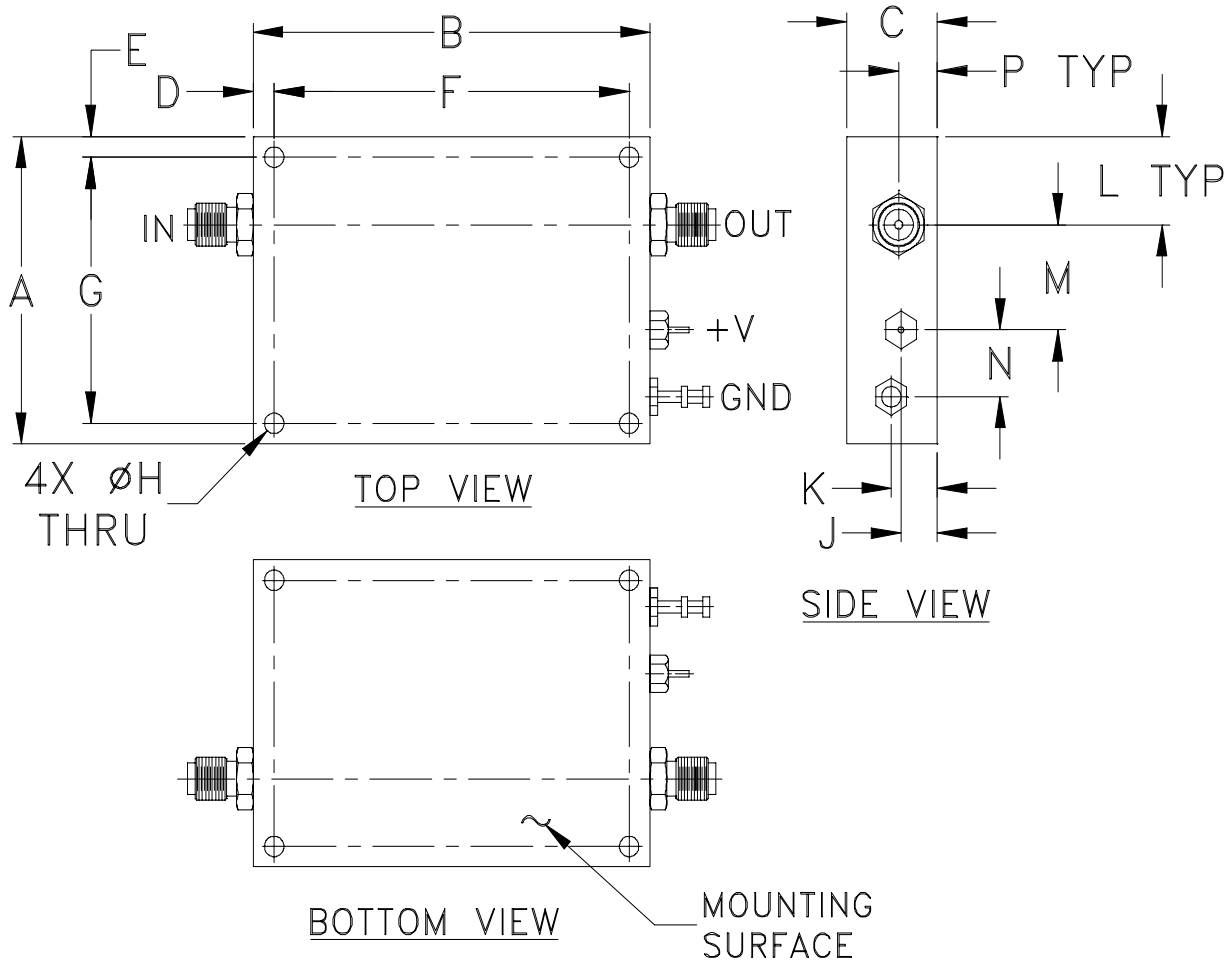


Low Noise Amplifier

ZQL-2G22G70W3+

50Ω 2200 to 2700 MHz 0.3 W SMA Female

CASE STYLE DRAWING (CW686)



CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N	P
Inch	1.77	2.42	.55	.13	.12	2.165	1.535	.126	.22	.28	.51	.61	.39	.22
mm	44.96	61.47	13.97	3.30	3.05	54.99	38.99	3.20	5.59	7.11	12.95	15.49	9.91	5.59

Notes:

1. Case material: Aluminum alloy.
2. Case finish: Clear chemical conversion coating, non-chrome or trivalent chrome based.
3. Weight: 71 grams
4. Dimensions: Inches [mm].
   Tolerances: 2 PI. ±.03 inch; 3 PI. ±.015 inch.

COAXIAL CONNECTIONS

IN (RF IN)	SMA Female
OUT (RF OUT)	SMA Female

Low Noise Amplifier

ZQL-2G22G70W3+

50Ω 2200 to 2700 MHz 0.3 W SMA Female

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	ENV26

ORDERING INFORMATION

Model No. Links	ZQL-2G22G70W3+
Case Style	CW686
Connector	IN (SMA Female) / OUT (SMA 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

Coaxial

Amplifier

ZQL-2G22G70W3+

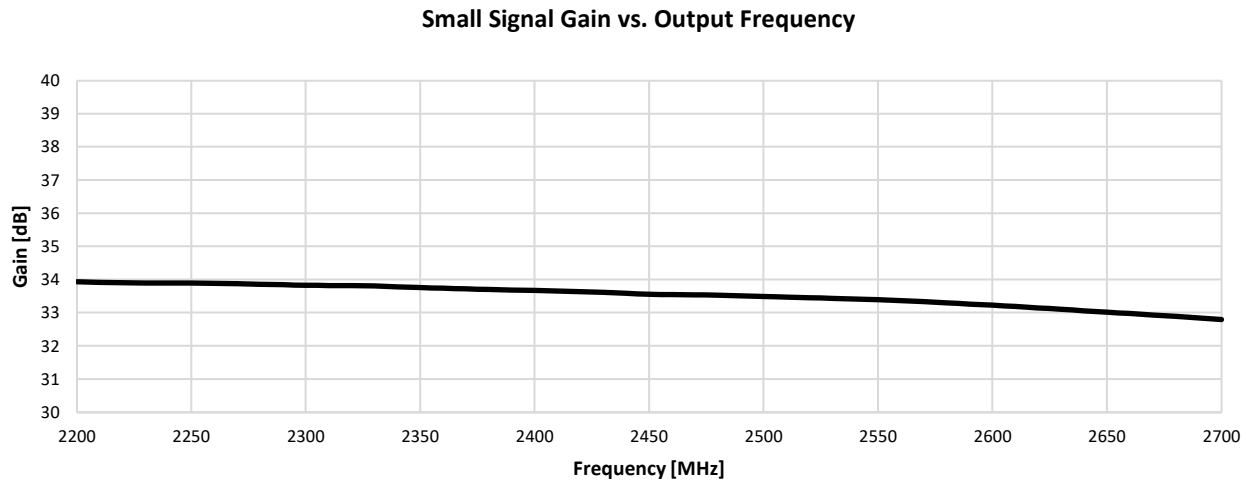
Typical Performance Data

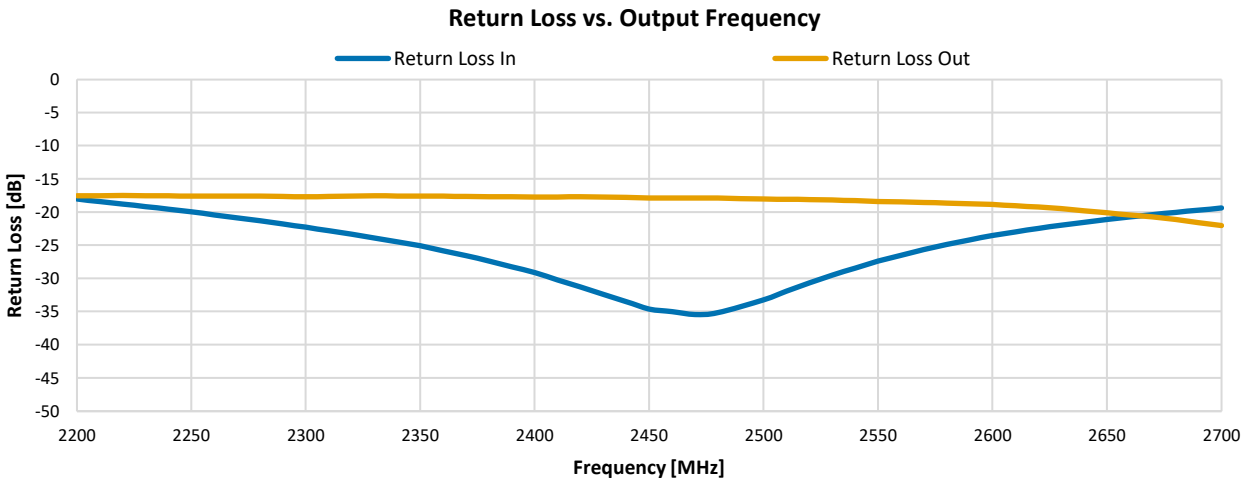
Test Conditions: Temperature = +25°C, DC Supply Voltage = +15 V.

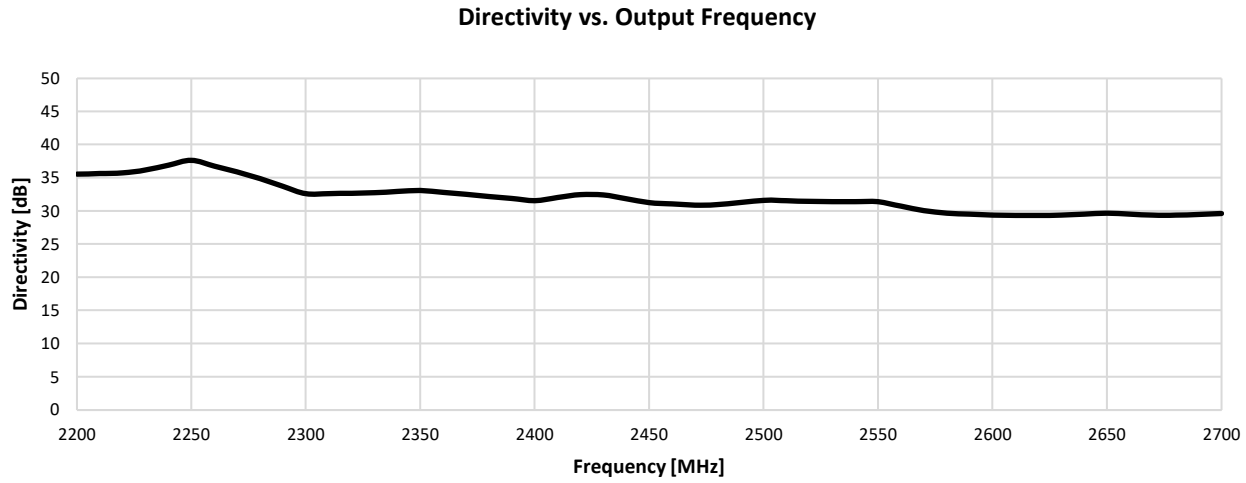
Freq. (MHz)	Gain (dB)	Return Loss In (dB)	Return Loss Out (dB)	Directivity (dB)	Noise Figure (dBm)	P1dB (dBm)	IP3 (dBm)
2200	33.93	-18.04	-17.52	35.54	0.89	26.84	36.68
2210	33.92	-18.41	-17.52	35.64	0.88	26.80	36.65
2220	33.91	-18.77	-17.51	35.74	0.88	26.76	36.62
2230	33.90	-19.16	-17.52	36.16	0.88	26.76	36.58
2240	33.90	-19.56	-17.55	36.90	0.89	26.80	36.52
2250	33.90	-19.97	-17.58	37.65	0.90	26.83	36.46
2260	33.89	-20.41	-17.58	36.77	0.89	26.81	36.46
2270	33.88	-20.84	-17.57	35.89	0.89	26.78	36.47
2280	33.86	-21.31	-17.59	34.88	0.89	26.77	36.45
2290	33.85	-21.79	-17.64	33.74	0.91	26.79	36.41
2300	33.83	-22.27	-17.70	32.60	0.93	26.80	36.37
2310	33.82	-22.80	-17.64	32.63	0.92	26.82	36.40
2320	33.82	-23.33	-17.58	32.67	0.91	26.83	36.43
2330	33.81	-23.90	-17.55	32.76	0.90	26.82	36.43
2340	33.78	-24.49	-17.56	32.93	0.91	26.79	36.40
2350	33.76	-25.08	-17.57	33.09	0.91	26.76	36.37
2360	33.74	-25.82	-17.60	32.79	0.92	26.76	36.39
2370	33.72	-26.56	-17.63	32.50	0.93	26.75	36.40
2380	33.70	-27.37	-17.66	32.19	0.94	26.74	36.41
2390	33.69	-28.25	-17.69	31.88	0.94	26.71	36.41
2400	33.67	-29.12	-17.72	31.56	0.95	26.68	36.42
2410	33.66	-30.21	-17.71	32.01	0.97	26.65	36.44
2420	33.64	-31.30	-17.69	32.47	0.98	26.61	36.46
2430	33.61	-32.40	-17.72	32.41	0.98	26.57	36.45
2440	33.59	-33.50	-17.78	31.84	0.95	26.53	36.39
2450	33.56	-34.60	-17.85	31.26	0.93	26.49	36.34
2460	33.55	-35.02	-17.85	31.07	0.94	26.47	36.31
2470	33.54	-35.44	-17.86	30.88	0.96	26.45	36.27
2480	33.53	-35.16	-17.89	30.95	0.97	26.42	36.25
2500	33.49	-33.21	-18.02	31.61	0.98	26.36	36.24
2510	33.47	-31.94	-18.06	31.54	0.99	26.33	36.18
2520	33.45	-30.66	-18.09	31.46	0.99	26.31	36.12
2530	33.44	-29.50	-18.17	31.41	1.00	26.28	36.09
2540	33.41	-28.45	-18.28	31.40	1.01	26.25	36.11
2550	33.39	-27.40	-18.39	31.38	1.03	26.22	36.12
2560	33.36	-26.53	-18.47	30.72	1.02	26.21	36.13
2570	33.33	-25.65	-18.54	30.06	1.01	26.19	36.14
2580	33.30	-24.88	-18.64	29.66	1.01	26.15	36.15
2590	33.26	-24.20	-18.75	29.52	1.02	26.07	36.16
2600	33.23	-23.52	-18.86	29.38	1.04	26.00	36.16
2610	33.19	-22.98	-19.04	29.34	1.04	25.99	36.18
2620	33.15	-22.44	-19.23	29.31	1.04	25.98	36.20
2630	33.11	-21.96	-19.48	29.37	1.05	25.95	36.21
2640	33.06	-21.53	-19.79	29.53	1.06	25.90	36.20
2650	33.02	-21.10	-20.11	29.68	1.07	25.85	36.19
2660	32.98	-20.73	-20.42	29.53	1.08	25.80	36.26
2670	32.93	-20.37	-20.73	29.37	1.09	25.74	36.33
2680	32.89	-20.03	-21.12	29.36	1.09	25.74	36.39
2690	32.85	-19.71	-21.58	29.49	1.08	25.78	36.45
2700	32.80	-19.39	-22.03	29.62	1.08	25.82	36.51

Typical Performance Graphs

Test Conditions: Temperature = +25°C, DC Supply Voltage = +15 V.



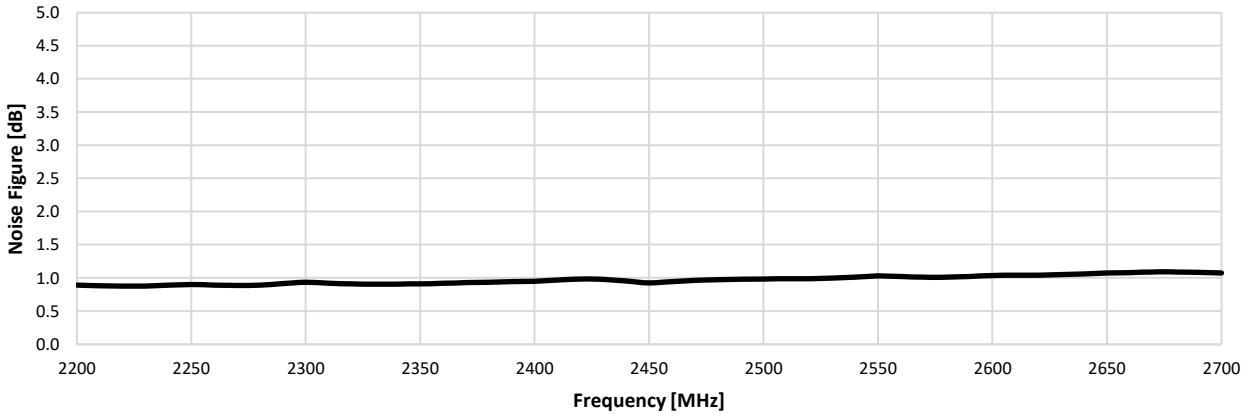




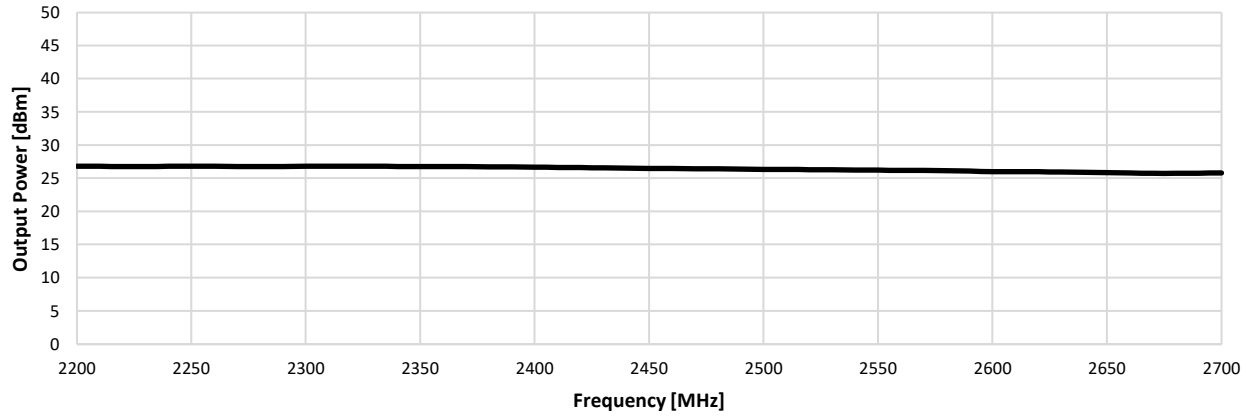
Typical Performance Graphs

Test Conditions: Temperature = +25°C, DC Supply Voltage = +15 V.

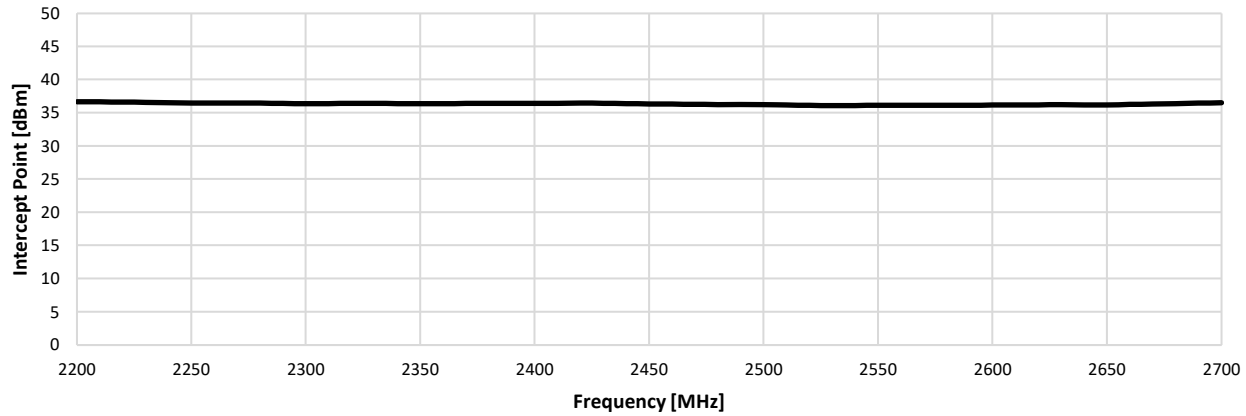
Noise Figure vs. Output Frequency



Output Power at 1dB Compression vs. Output Frequency



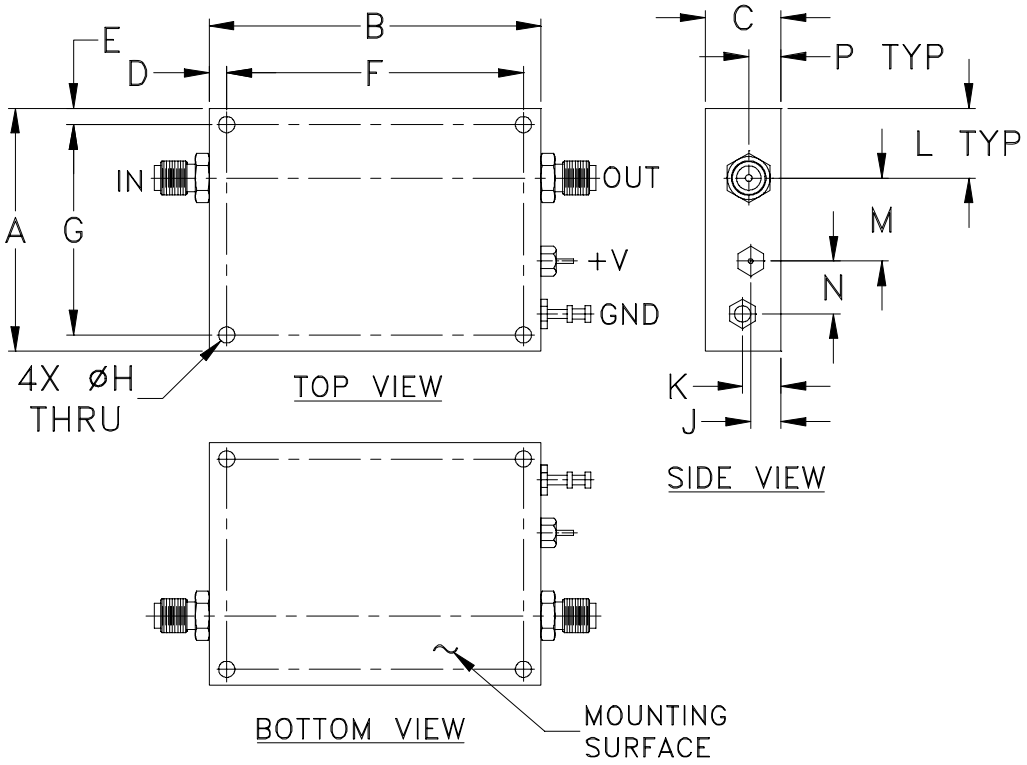
3rd Order Intercept Point vs. Output Frequency



Case Style CW

CW686

Outline Dimensions



CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N
CW686	1.77 (44.96)	2.42 (61.47)	.55 (13.97)	.13 (3.30)	.12 (3.05)	2.165 (54.99)	1.535 (38.99)	.126 (3.20)	.22 (5.59)	.28 (7.11)	.51 (12.95)	.61 (15.49)	.39 (9.91)

CASE#	P	Q	WT. GRAMS
CW686	.22 (5.59)	-- --	71

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

Notes:

1. Case material: Aluminum alloy.
2. Case finish:
   For RoHS Case Styles: Clear chemical conversion coating, non-chrome or trivalent chrome based.

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Mini-Circuits

Environmental Specifications ENV26

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 70° C Ambient Environment	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 85°C, 5 cycles	MIL-STD-202, Method 107, Condition A

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