NON-CATALOG

Connectorized Push-Pull

Wideband Amplifier

ZHL-22LM-75+

75Ω 5 to 200 MHz

Case Style: S860

The Big Deal

- Ultra low second harmonic, very high output IP2, 85 dBm typ.
- Excellent output IP3, 42 dBm typ.
- Output power at 1 dB compression, +25 dBm typ.

Product Overview

The ZHL-22LM-75+ is a high-performance, push-pull amplifier featuring very low second-and third-order distortion products across its 5-200 MHz bandwidth. Designed for a 6V/300 mA typ. power supply, with F connectors in/out, it's a high-value, low-cost solution providing a 15-dB gain for CATV return path applications under DOCSIS 2.0 and 3.0. The rugged, aluminum alloy case measures 3.75 x 2.0 x 0.80" high.

Feature	Advantages
Ultra low second harmonic, -86 dBc typ. at 0 dBm output	Exceptionally low second order harmonic distortion, optimized for CATV return path frequencies
Very high output IP2, 85 dBm typ	Very high linearity across entire 5-200 MHz bandwidth
Excellent output IP3, 42 dBm typ	Excellent suppression of unwanted intermods in the presence of multi carriers
Output power, 25 dBm typ	Very consistent output power across entire bandwidth
Flat gain, 15.5 ± 0.5 dB	Ideal for applications requiring consistent, repeatable amplification across a wide range of frequencies

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/MCLStore/terms.jsp

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Features

- Ultra low second harmonic, -86 dBc typ. at 0 dBm output
- Very high output IP2, 85 dBm typ.
- Excellent output IP3, 42 dBm typ.
- Output power, 25.0 dBm typ.

Applications

- Cable TV

Case Style: S860

Connectors	Model
F-Female	ZHL-22LM-75-F+

+RoHS Compliant

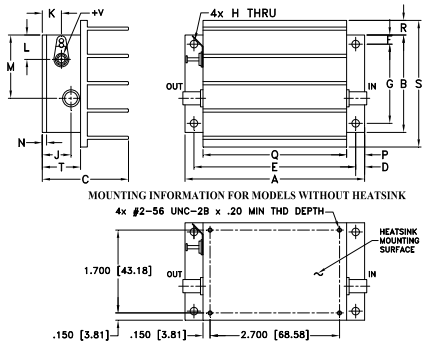
The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

Electrical Specifications at 25°C

Parameter	Condition (MHz)	Min	Typ.	Max.	Units
Frequency Range	—	5	—	200	MHz
Gain	5-200	14	15.5	—	dB
Output Power at 1dB compression	5-200	23	25.0	—	dBm
Output third order intercept point IP3*	5 100 200	36 40 40	40 42 42	— — —	dBm
Output second order intercept point IP2*	5-200	60	85	—	dBm
Noise Figure	10-200	—	3.7	7	dB
Input VSWR	5-200	—	1.3	1.5	:1
Output VSWR	5-200	—	1.4	1.7	:1
DC Supply Voltage	—	—	6.0	6.2	V
Supply Current at +6V supply	—	215	300	400	mA

*Two tones, spaced 1 MHz apart, 0 dBm/tone at output.

Outline Drawing



Maximum Ratings

Parameter	Ratings
Operating Temperature	-40°C to 65°C Case
Storage Temperature	-55°C to 100°C
DC Voltage	6.5V
Input RF Power (no damage)	24dBm

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

Outline Dimensions (inch / mm)

A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	wt
3.75	2.00	2.700	.19	3.375	.19	1.625	.144	.50	.40	.50	1.30	.10	.38	3.00	.15	.15	.80	1.700	grams
95.25	50.80	68.58	4.83	85.73	4.83	41.28	3.66	12.70	10.16	12.70	33.02	2.54	9.65	76.20	3.81	3.81	20.32	43.18	150.0

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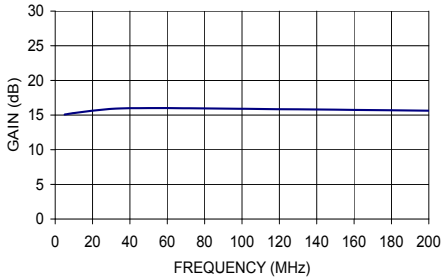
NON-CATALOG

Typical Performance Data/Curves

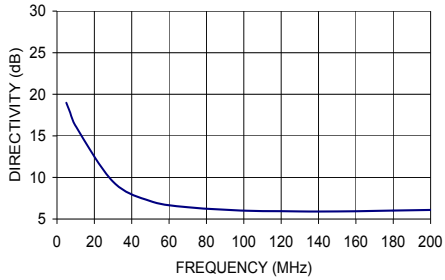
ZHL-22LM-75+

FREQUENCY (MHz)	GAIN (dB)	DIRECTIVITY (dB)	VSWR (:1)		NOISE FIGURE (dB)	POUT at 1dB COMPR. (dBm)	OUTPUT IP3 (dBm)
			IN	OUT			
	6V	6V	6V	6V	6V	6V	6V
5.00	15.08	18.98	1.27	1.43		25.16	40.85
7.00	15.17	17.83	1.28	1.41		25.11	42.41
10.00	15.29	16.18	1.29	1.40	5.67	25.05	44.66
30.00	15.89	9.49	1.35	1.38	3.91	24.98	43.92
50.00	16.01	7.16	1.31	1.34	3.38	25.08	43.55
70.00	15.98	6.42	1.25	1.32	3.25	25.07	42.89
100.00	15.91	6.01	1.18	1.30	3.05	25.03	42.92
120.00	15.85	5.95	1.15	1.31	3.15	25.05	42.33
140.00	15.81	5.90	1.13	1.31	3.04	25.13	42.54
160.00	15.75	5.94	1.11	1.32	3.06	25.11	42.01
180.00	15.70	6.02	1.09	1.34	3.03	25.09	42.31
200.00	15.63	6.09	1.07	1.36	3.11	25.03	42.21

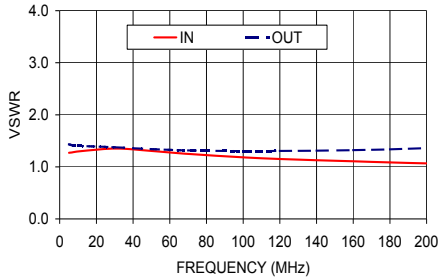
ZHL-22LM-75+
GAIN



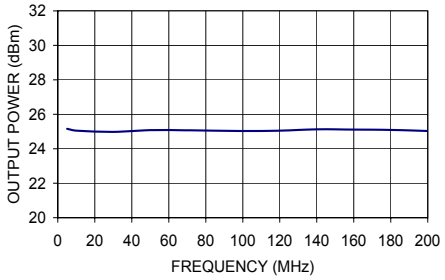
ZHL-22LM-75+
DIRECTIVITY



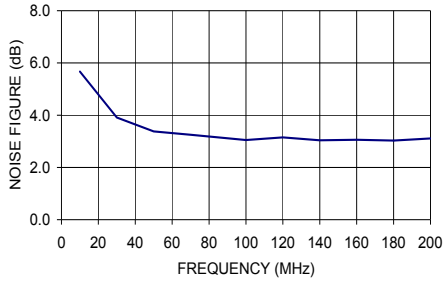
ZHL-22LM-75+
VSWR



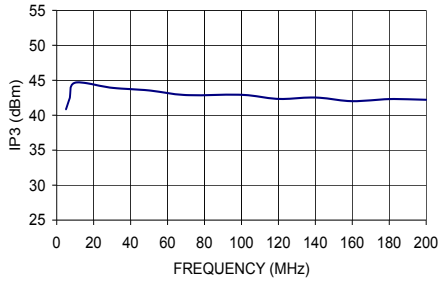
ZHL-22LM-75+
OUTPUT POWER AT 1-dB COMPRESSION



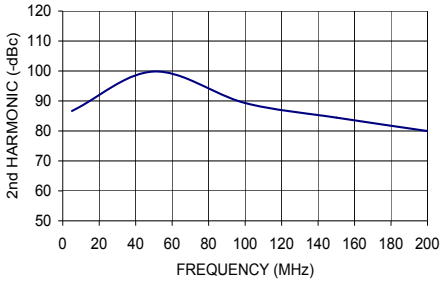
ZHL-22LM-75+
NOISE FIGURE



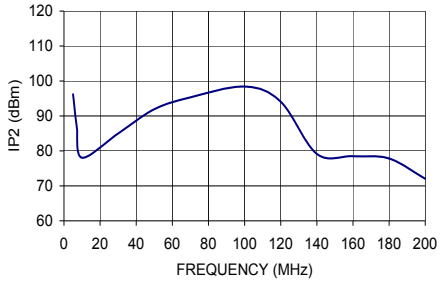
ZHL-22LM-75+
IP3



ZHL-22LM-75+
2nd HARMONIC



ZHL-22LM-75+
IP2



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Push-Pull

Wideband Amplifier ZHL-22LM-75+

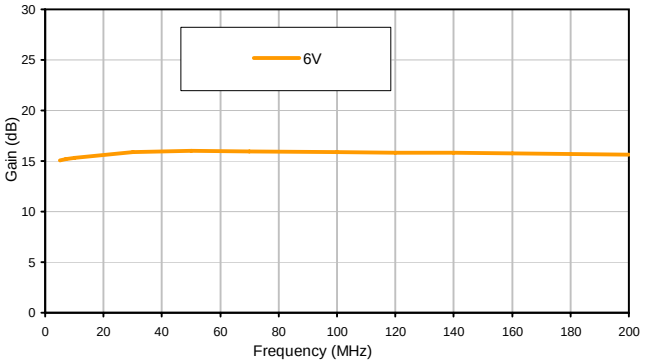
Typical Performance Data

FREQ. (MHz)	GAIN (dB) 6V	DIRECTIVITY (dB) 6V	VSWR (:1) IN 6V	VSWR (:1) OUT 6V	NOISE FIGURE (dB) 6V	POUT @ 1 dB COMPRESSION (dBm) 6V	OUTPUT IP2 (dBm) 6V	OUTPUT IP3 (dBm) 6V
5.0	15.08	18.98	1.27	1.43	--	25.16	96.22	39.82
7.0	15.17	17.83	1.28	1.41	--	25.11	87.14	40.13
10.0	15.29	16.18	1.29	1.40	5.67	25.05	78.05	40.43
30.0	15.89	9.49	1.35	1.38	3.91	24.98	84.99	41.05
50.0	16.01	7.16	1.31	1.34	3.38	25.08	91.92	41.66
70.0	15.98	6.42	1.25	1.32	3.25	25.07	95.31	43.11
100.0	15.91	6.01	1.18	1.30	3.05	25.03	98.43	44.44
120.0	15.85	5.95	1.15	1.31	3.15	25.05	94.08	45.74
140.0	15.81	5.90	1.13	1.31	3.04	25.13	79.14	46.54
160.0	15.75	5.94	1.11	1.32	3.06	25.11	78.49	47.235
180.0	15.70	6.02	1.09	1.34	3.03	25.09	77.83	47.93
200.0	15.63	6.09	1.07	1.36	3.11	25.03	72.05	48.70

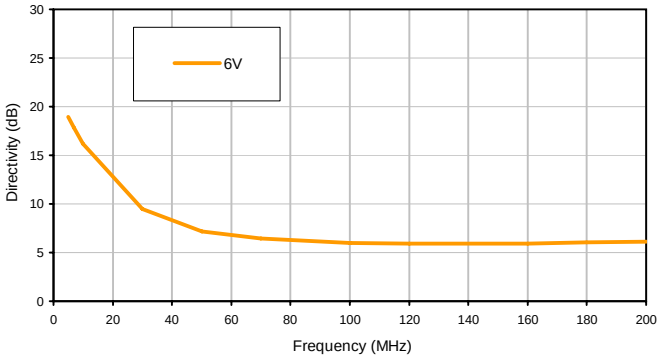
FREQ. (MHz)	2nd HARMONIC (-dBc) 6V
5.0	86.65
50.0	99.82
100.0	89.31
150.0	84.44
200.0	79.97

Typical Performance Curves

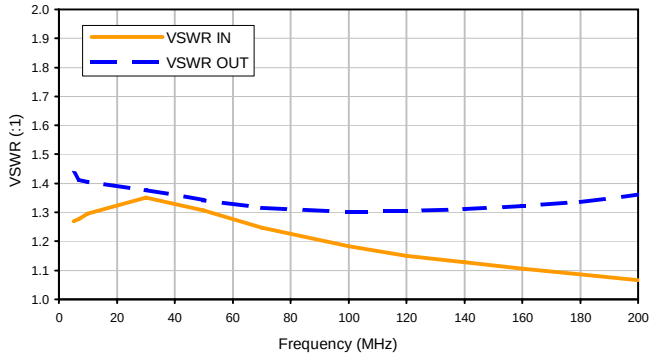
Gain



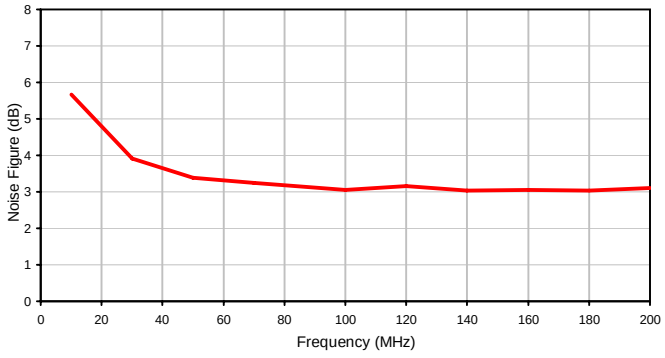
Directivity



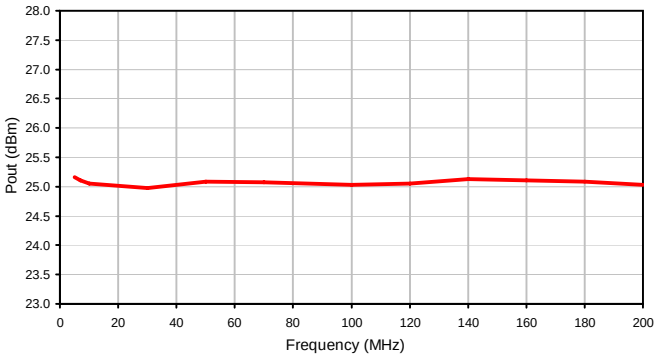
VSWR @ 6V



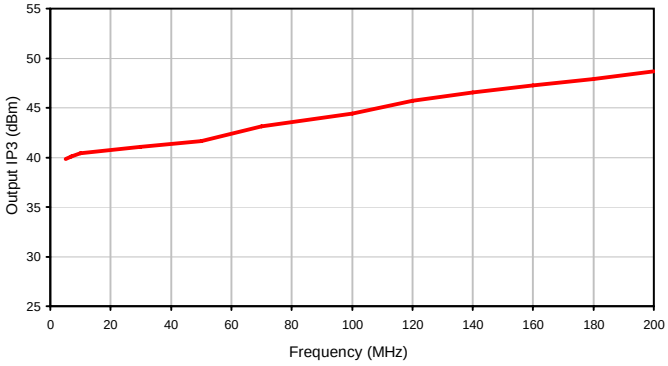
Noise Figure @ 6V



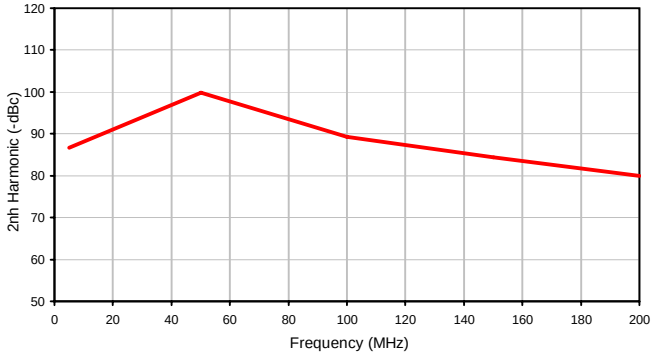
Pout at 1dB Compression @ 6V



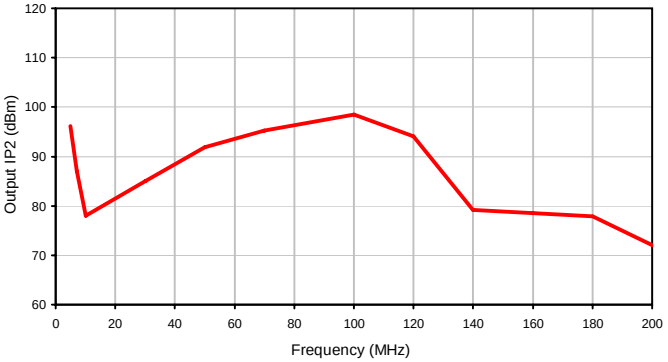
Output IP3 @ 6V



2nd Harmonic @ 6V



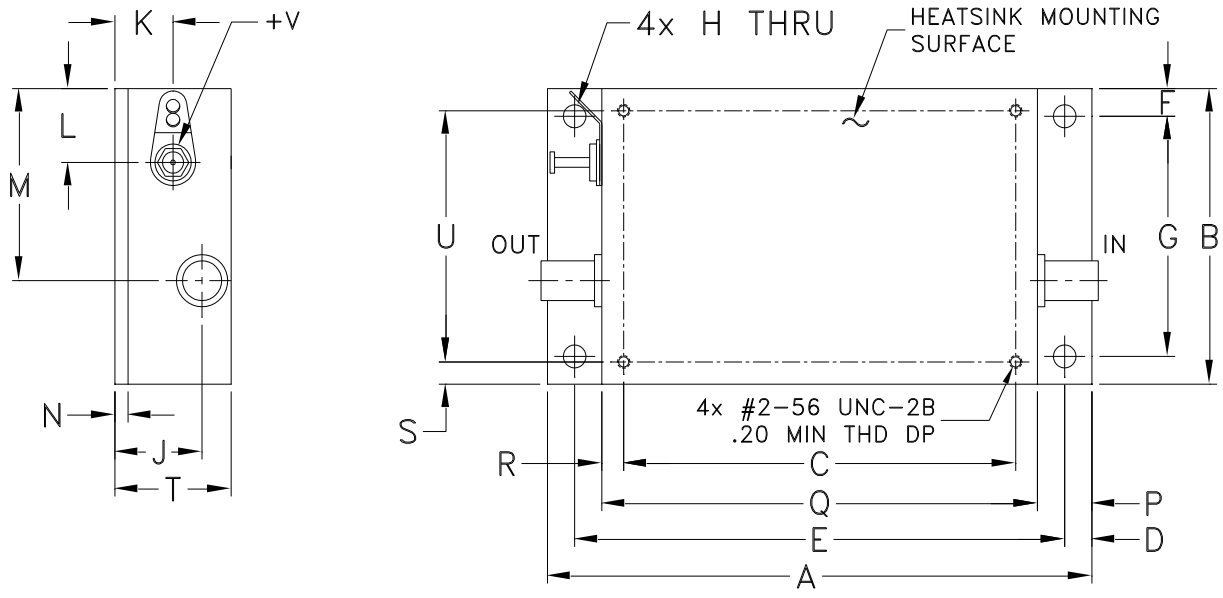
Output IP2 @ 6V



Case Style S

S860

Outline Dimensions



CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N
S860	3.75 (95.25)	2.00 (50.80)	2.700 (68.58)	.19 (4.83)	3.375 (85.73)	.19 (4.83)	1.625 (41.28)	.144 (3.66)	.54 (13.72)	.40 (10.16)	.50 (12.70)	1.30 (33.02)	.10 (2.54)

CASE#	P	Q	R	S	T	U	WT. GRAMS
S860	.38 (9.65)	3.00 (76.20)	.15 (3.81)	.15 (3.81)	.84 (21.34)	1.700 (43.18)	150.0

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 **ENV23T16**

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 65° 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 100°C, 5 cycles	MIL-STD-202, Method 107, Condition A, except 100°C

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