



COAXIAL

# Medium High Power Amplifier

# ZHL-1A+ ZHL-1A-S+

50Ω 2 to 500 MHz BNC Female / SMA Female

## FEATURES

- Wideband, 2 to 500 MHz
- High IP3, +38 dBm Typ.
- Medium High Power, +28 dBm Min.

## APPLICATIONS

- HF/VHF/UHF
- Test Setups
- Instrumentation



Generic photo used for illustration purposes only

<b>Model No.</b>	ZHL-1A+	ZHL-1A-S+
<b>Case Style</b>	S32	
<b>Connectors</b>	BNC female	SMA female

### +RoHS Compliant

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

## ELECTRICAL SPECIFICATIONS

Parameter	Frequency (MHz)	Min.	Typ.	Max.	Units
Frequency Range		2		500	MHz
Gain		16			dB
Gain Flatness				±1.0	dB
Output Power at 1 dB Compression		+28			dBm
Output Third Order Intercept Point			+38		dBm
Noise Figure			11.0		dB
Input VSWR				2.0	:1
Output VSWR				2.0	:1
DC Supply Voltage			+24		V
Supply Current				0.6	A

Open load is not recommended, may cause damage.  
With no load, derate max input power by 20 dB.

## ABSOLUTE MAXIMUM RATINGS

Parameter	Ratings
Operating Temperature	-20 °C to +65 °C
Storage Temperature	-55 °C to +100 °C
DC Voltage	+24.5 V max.
RF Input Power (No Damage)	+20 dBm

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

REV. F  
ECO-017949  
ZHL-1A+  
MCL NY  
260205





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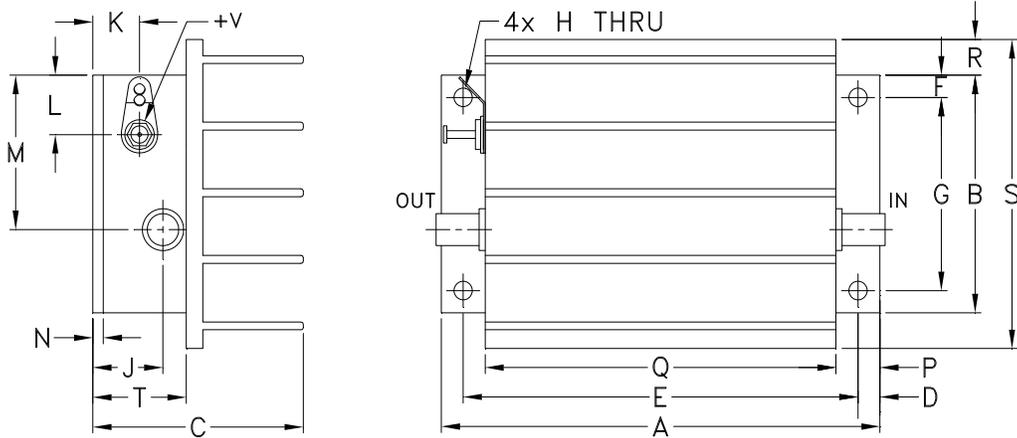
# Medium High Power Amplifier

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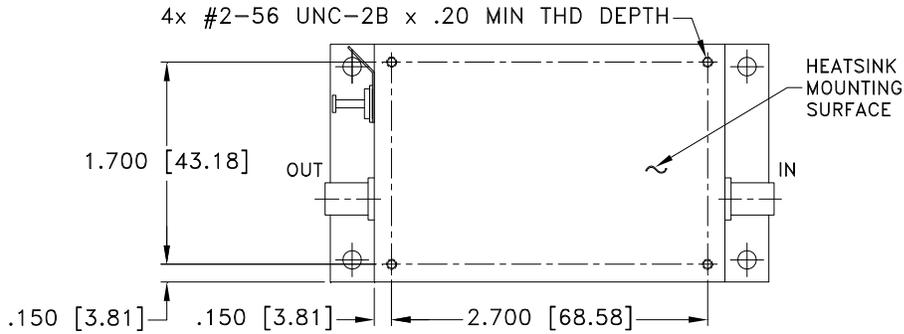
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50Ω 2 to 500 MHz BNC Female / SMA Female

### OUTLINE DRAWING



### MOUNTING INFORMATION FOR MODELS WITHOUT HEATSINK



### OUTLINE DIMENSIONS (Inch/mm)

A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	wt
3.75	2.00	1.80	.19	3.375	.19	1.625	.144	.50	.40	.50	1.30	.10	.38	3.00	.30	2.60	.80	grams
95.25	50.80	45.72	4.83	85.73	4.83	41.28	3.66	12.70	10.16	12.70	33.02	2.54	9.65	76.20	7.62	66.04	20.32	220.0
																	wt. w/o heat sink	150





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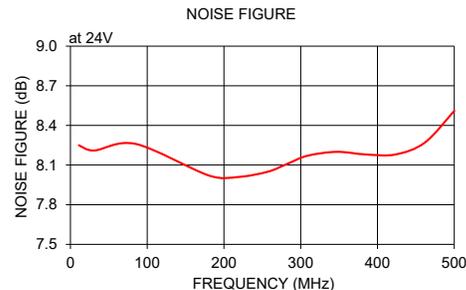
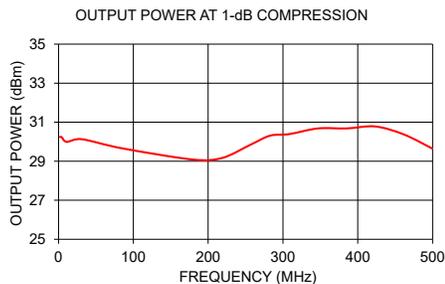
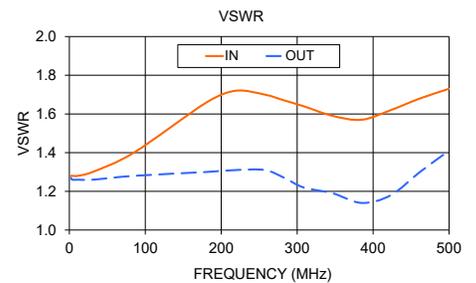
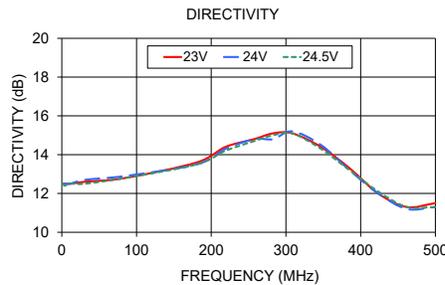
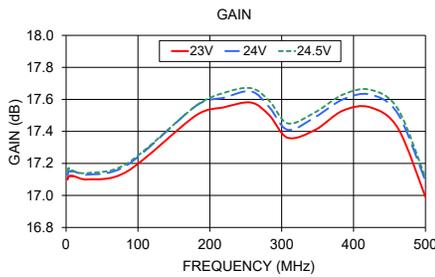
# Medium High Power Amplifier

# ZHL-1A+ ZHL-1A-S+

50Ω 2 to 500 MHz BNC Female / SMA Female

### TYPICAL PERFORMANCE DATA / GRAPHS

FREQUENCY (MHz)	GAIN (dB)			DIRECTIVITY (dB)			VSWR (:1)		NOISE FIGURE (dB)	P <sub>OUT</sub> at 1 dB COMPR. (dBm)	
	+23 V	+24 V	+24.5 V	+23 V	+24 V	+24.5 V	IN	OUT		+24 V	+24 V
2.0	17.10	17.13	17.15	12.50	12.50	12.50	1.28	1.27			30.24
4.0	17.12	17.15	17.17	12.50	12.50	12.40	1.28	1.26			30.24
11.0	17.12	17.15	17.15	12.50	12.50	12.50	1.28	1.26	8.25		29.99
30.6	17.10	17.13	17.14	12.60	12.70	12.50	1.30	1.26	8.21		30.13
85.0	17.15	17.19	17.20	12.80	12.90	12.80	1.40	1.28	8.26		29.66
180.8	17.50	17.56	17.56	13.60	13.50	13.50	1.66	1.30	8.02		29.08
219.1	17.55	17.61	17.64	14.40	14.30	14.20	1.72	1.31	8.01		29.17
257.4	17.58	17.65	17.67	14.80	14.80	14.70	1.70	1.31	8.05		29.86
282.9	17.50	17.55	17.59	15.10	14.80	15.00	1.67	1.27	8.11		30.31
308.5	17.36	17.41	17.45	15.10	15.20	15.10	1.64	1.22	8.17		30.39
346.8	17.41	17.49	17.52	14.40	14.50	14.30	1.59	1.19	8.20		30.68
385.1	17.53	17.60	17.63	13.30	13.20	13.20	1.57	1.14	8.18		30.68
423.4	17.55	17.63	17.66	12.00	12.00	12.10	1.62	1.18	8.18		30.78
461.7	17.42	17.51	17.54	11.30	11.20	11.30	1.68	1.30	8.27		30.37
500.0	16.99	17.09	17.11	11.50	11.30	11.30	1.73	1.41	8.51		29.64



#### 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/terms/viewterm.html](http://www.minicircuits.com/terms/viewterm.html)



# Amplifier

# ZHL-1A+

## Typical Performance Data

FREQUENCY (MHz)	GAIN (dB)			DIRECTIVITY (dB)			VSWR IN (:1)	VSWR OUT (:1)	NOISE FIGURE (dB) 24V	Pout at 1dB Comp. (dBm) 24V
	23V	24V	24.5V	23V	24V	24.5V	24V	24V		
2.0	17.10	17.13	17.15	12.50	12.50	12.50	1.28	1.27		30.24
4.0	17.12	17.15	17.17	12.50	12.50	12.40	1.28	1.26		30.24
11.0	17.12	17.15	17.15	12.50	12.50	12.50	1.28	1.26	8.25	29.99
30.6	17.10	17.13	17.14	12.60	12.70	12.50	1.30	1.26	8.21	30.13
85.0	17.15	17.19	17.20	12.80	12.90	12.80	1.40	1.28	8.26	29.66
180.8	17.50	17.56	17.56	13.60	13.50	13.50	1.66	1.30	8.02	29.08
219.1	17.55	17.61	17.64	14.40	14.30	14.20	1.72	1.31	8.01	29.17
257.4	17.58	17.65	17.67	14.80	14.80	14.70	1.70	1.31	8.05	29.86
282.9	17.50	17.55	17.59	15.10	14.80	15.00	1.67	1.27	8.11	30.31
308.5	17.36	17.41	17.45	15.10	15.20	15.10	1.64	1.22	8.17	30.39
346.8	17.41	17.49	17.52	14.40	14.50	14.30	1.59	1.19	8.20	30.68
385.1	17.53	17.60	17.63	13.30	13.20	13.20	1.57	1.14	8.18	30.68
423.4	17.55	17.63	17.66	12.00	12.00	12.10	1.62	1.18	8.18	30.78
461.7	17.42	17.51	17.54	11.30	11.20	11.30	1.68	1.30	8.27	30.37
500.0	16.99	17.09	17.11	11.50	11.30	11.30	1.73	1.41	8.51	29.64



ISO 9001 ISO 14001 AS 9100 CERTIFIED

P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 The Design Engineers Search Engine Provides ACTUAL Data Instantly at [minicircuits.com](http://minicircuits.com)

IF/RF MICROWAVE COMPONENTS

For detailed performance specs & shopping online see web site

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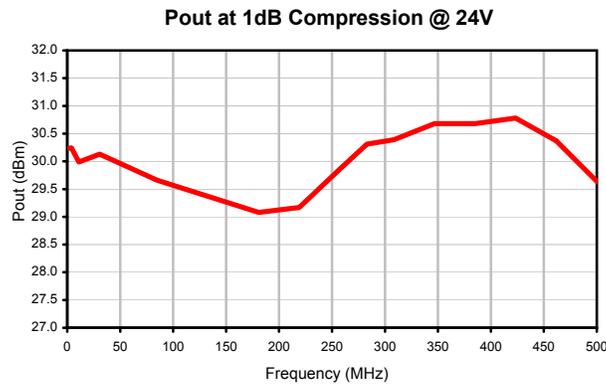
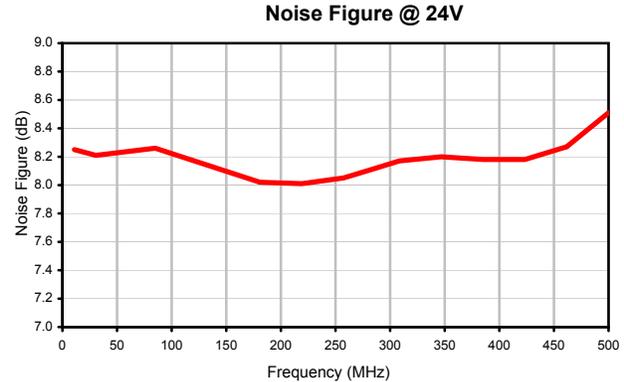
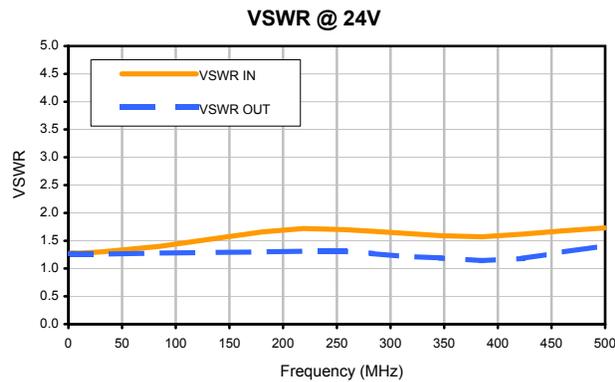
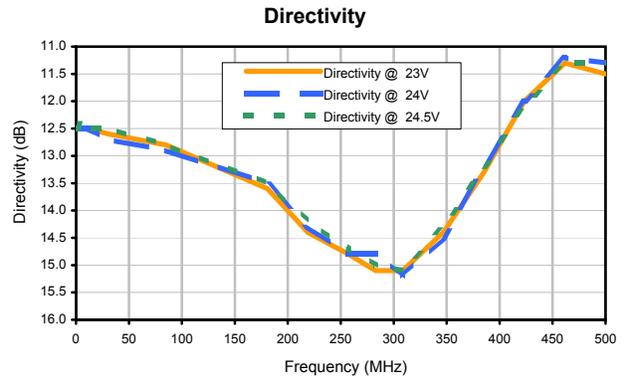
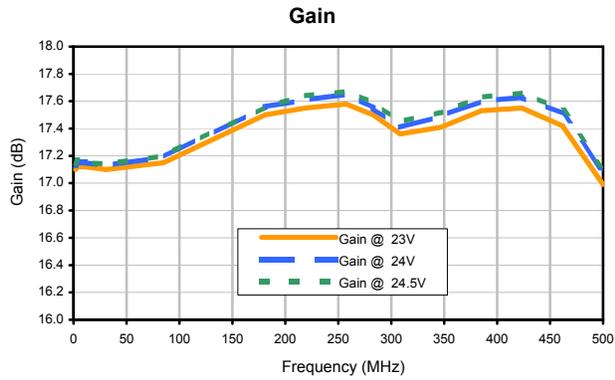
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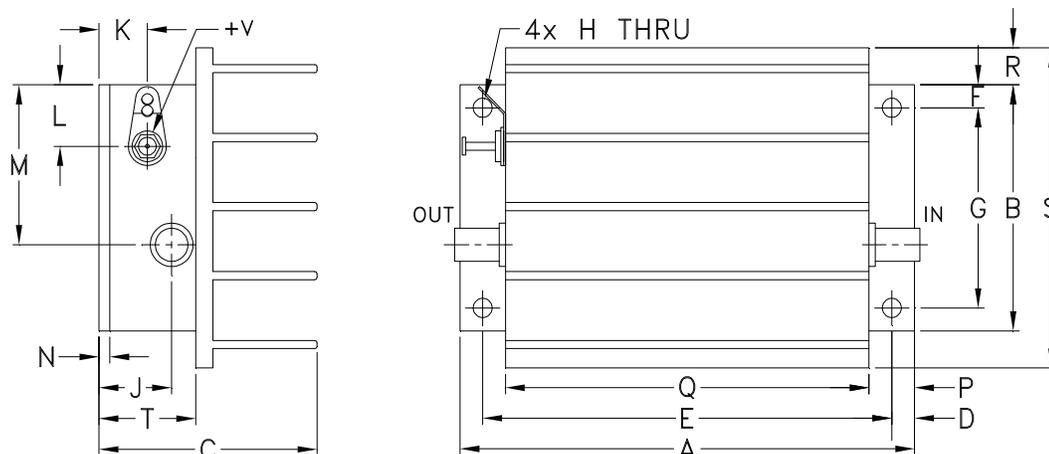
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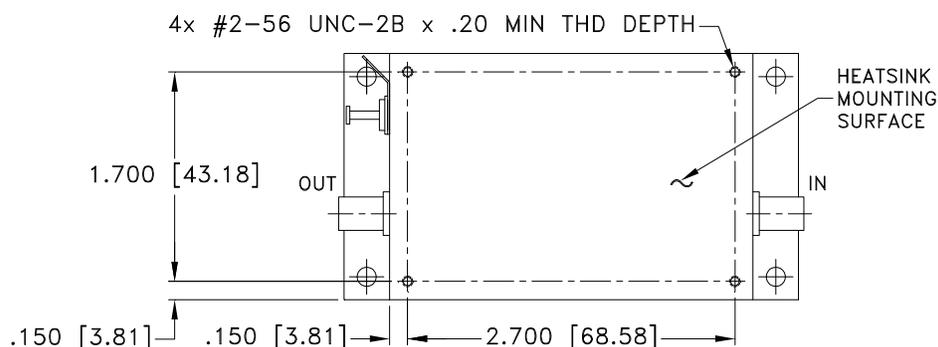
## Typical Performance Curves



### Outline Dimensions



#### MOUNTING INFORMATION FOR MODELS WITHOUT HEATSINK



CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N
S32	3.75 (95.25)	2.00 (50.80)	1.80 (45.72)	.19 (4.83)	3.375 (85.73)	.19 (4.83)	1.625 (41.28)	.144 (3.66)	.50 (12.70)	.40 (10.16)	.50 (12.70)	1.30 (33.02)	.10 (2.54)

CASE#	P	Q	R	S	T	WT. GRAMS	WT. WITHOUT HEATSINK GRAMS
S32	.38 (9.65)	3.00 (76.20)	.30 (7.62)	2.60 (66.04)	.80 (20.32)	220.0	150.0

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

#### Notes:

- Case material: Aluminum alloy.
- Case finish:  
For RoHS Case Styles: Clear chemical conversion coating, non-chrome or trivalent chrome based.
- Heat sink finish: Black anodize.



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The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: [www.minicircuits.com](http://www.minicircuits.com)

RF/IF MICROWAVE COMPONENTS



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	-20° 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