



COAXIAL

High Power Amplifier

ZHL-4W-422+
ZHL-4W-422X+

Mini-Circuits

50Ω 4 W 500 to 4200 MHz SMA Female/D-Sub Male

THE BIG DEAL

- High Power, 4 Watt
- Excellent IP3, +44 dBm Typ.
- Excellent IP2, +45 dBm Typ.
- High Efficiency, 30% Typ. at Saturation
- Class A Amplifier
- No Damage With an Open or Short Output Load Under Full CW Output Power
- Shuts Off When Base Plate Temperature Exceeds +85 °C
- Over Voltage Protection, Shuts Off Above +35 V
- Reverse Polarity Protected
- Unconditionally Stable

APPLICATIONS

- Transmitters
- Defense
- Amateur Radio, FM, TV
- Laboratory Use



Generic photo used for illustration purposes only

Model No.	ZHL-4W-422+	ZHL-4W-422X+ [▲]
Case Style	BT1972	
Connectors	SMA female/D-Sub male	

+RoHS Compliant

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

ELECTRICAL SPECIFICATIONS AT +25 °C

Parameter	Condition (MHz)	ZHL-4W-422+ ZHL-4W-422X+ [▲]			Units
		Min.	Typ.	Max.	
Frequency Range		500		4200	MHz
Gain ¹	500-4200	20	25		dB
Gain Flatness ¹	500-4200		±1.0	±1.5	dB
Output Power at 1 dB Compression	500-4200	+31	+34		dBm
Output Power at 3 dB Compression	500-4200	+33	+36		dBm
Noise Figure	500-4200		10	15	dB
Output Third Order Intercept Point ²	500-4200	+40	+44		dBm
Output Second Order Intercept Point ²	500-4200	+38	+45		dBm
Input VSWR ¹	500-4200		1.6	2.0	:1
Output VSWR ¹	500-4200		2.6	3.3	:1
Non-Harmonic Spurious at P _{OUT} = 4 W	500-4200			-60	dBc
Second and Third Harmonics at P _{OUT} = 2 W	500-4200		-10		dBc
DC Supply Voltage			+28	+30	V
Supply Current ³			2	3	A

1. Measurements with small signal, P_{IN} = -15 dBm input.

2. Measured with 2 tones, 1 MHz apart, +20 dBm/line.

3. Power Supply should be capable of delivering 6 A at startup.

▲ Heatsink and fan not included. Alternative heat sinking and heat removal must be provided by the user to limit maximum base-plate temperature to +85 °C, in order to ensure proper performance. For reference, this requires thermal resistance of user's external heat sink to be 0.3 °C/W max.

ABSOLUTE MAXIMUM RATINGS

Parameter	Ratings
Operating Temperature	-20 °C to +50 °C
Storage Temperature	-55 °C to +100 °C
Base Plate Temperature	+85 °C
Input RF Power (No Damage)	+20 dBm

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

D-SUB MALE CONNECTOR PIN CONNECTIONS⁴

Pin Function	Label on Unit	Pin#	Color	Gauge
None	N/C1, N/C2, N/C3, N/C4, N/C5	1,2,3,4,5	None	None
DC Input (+)	V _{DC}	6,7	Red	18 AWG
Ground	GND	8,9	Black	18 AWG

4. Each amplifier includes an additional D-Sub connector (B20-99-53-1+) for mating with the amplifier.

Mini-Circuits

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REV. D
ECO-017770
ZHL-4W-422(X)+
MCL NY
260219

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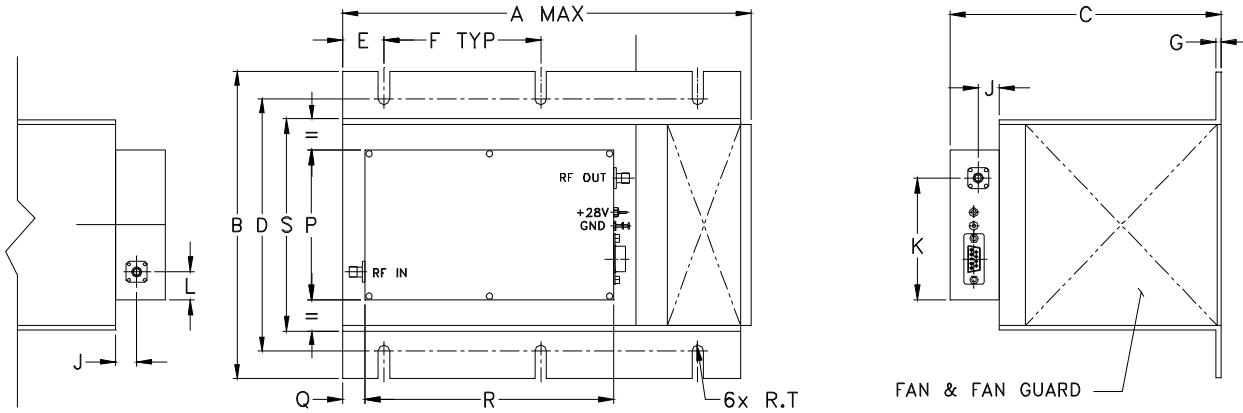
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**ZHL-4W-422+
ZHL-4W-422X+**

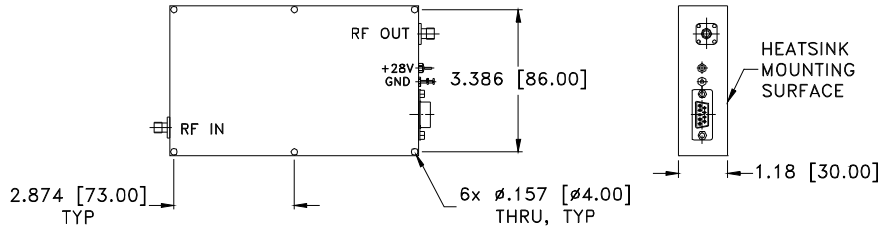
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OUTLINE DRAWING FOR MODELS WITH HEATSINK



OUTLINE DRAWING FOR MODELS WITHOUT HEATSINK

OUTLINE DIMENSIONS (Inch
mm)

A	B	C	D	E	F	G	J	K	L	P	Q	R	S	T	wt
9.85	7.3	6.4	6.43	1.00	3.75	.13	.51	2.91	.67	3.58	.53	5.94	5.1	.135	grams*
250.19	185.42	162.56	163.32	25.40	95.25	3.30	12.95	73.91	17.02	90.93	13.46	150.88	129.54	3.43	4245

*580 grams without heatsink

*580 grams without heatsink





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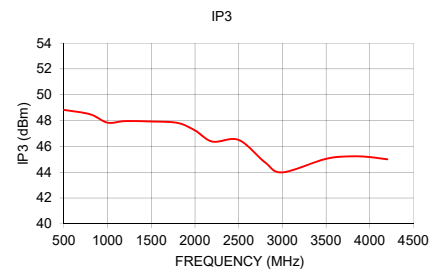
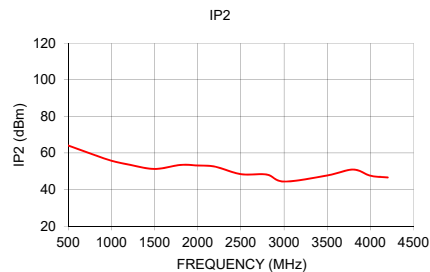
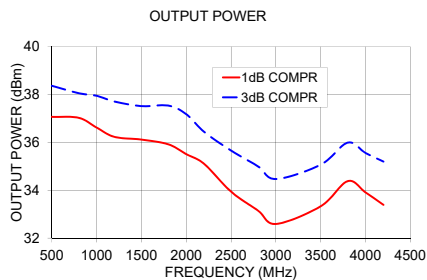
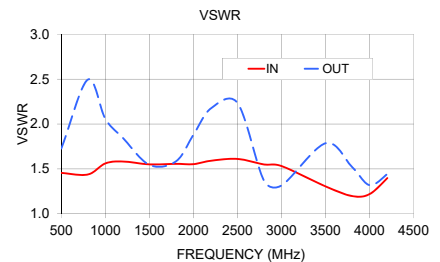
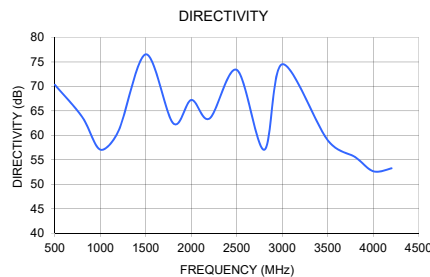
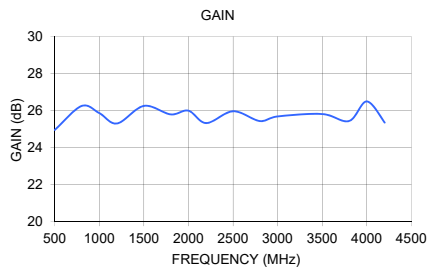
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TYPICAL PERFORMANCE DATA/GRAPHS

FREQUENCY (MHz)	GAIN (dB)	DIRECTIVITY (dB)	VSWR (:1)		P _{OUT} at 1 dB COMPR. (dBm)	P _{OUT} at 3 dB COMPR. (dBm)	OUTPUT IP2 (dBm)	OUTPUT IP3 (dBm)
			IN	OUT				
500	24.96	70.34	1.46	1.73	37.07	38.37	64.09	48.83
800	26.25	63.77	1.44	2.49	37.03	38.06	58.97	48.49
1000	25.87	57.07	1.56	2.06	36.62	37.95	55.77	47.84
1200	25.31	60.91	1.58	1.84	36.23	37.71	53.67	47.96
1500	26.26	76.56	1.55	1.55	36.12	37.52	51.26	47.93
1800	25.80	62.48	1.56	1.58	35.92	37.54	53.45	47.82
2000	26.00	67.23	1.55	1.88	35.51	37.18	53.13	47.24
2200	25.33	63.44	1.59	2.18	35.10	36.44	52.53	46.37
2500	25.97	73.37	1.61	2.23	33.94	35.66	48.41	46.50
2800	25.44	57.05	1.55	1.37	33.15	35.00	48.19	44.77
3000	25.69	74.54	1.53	1.32	32.59	34.47	44.33	43.99
3500	25.82	58.97	1.31	1.79	33.33	35.07	47.70	45.04
3800	25.44	55.56	1.20	1.52	34.38	35.99	50.93	45.23
4000	26.50	52.65	1.22	1.32	33.91	35.56	47.54	45.17
4200	25.36	53.26	1.40	1.44	33.39	35.20	46.59	45.00



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

