



COAXIAL

# Medium High Power Amplifier **ZHL-2-8-S+** **ZHL-2-8X-S+**

Mini-Circuits

50Ω 10 to 1000 MHz SMA Female

### THE BIG DEAL

- Wideband, 10 to 1000 MHz
- Medium Power, +30 dBm P3dB
- High Gain, 34 dB
- Excellent Gain Flatness,  $\pm 0.8$  dB
- High IP3, +42 dBm



Generic photo used for illustration purposes only

Model No.	ZHL-2-8-S+	ZHL-2-8X-S+ <sup>+</sup>
Case Style	T34	
Connectors	SMA female	

#### +RoHS Compliant

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

### APPLICATIONS

- VHF/UHF
- Test Equipment
- Cellular
- Instrumentation
- Laboratory

### PRODUCT OVERVIEW

Mini-Circuits' ZHL-2-8-S+ is a medium-power connectorized amplifier providing 34 dB gain and +30 dBm P3dB across the 10 to 1000 MHz frequency range. Excellent gain flatness across its entire frequency range ( $\pm 0.8$  dB) makes it ideal for systems where consistent performance across frequency is required. The amplifier operates on a +24 V DC supply and comes housed in compact aluminum alloy case (4.75x2.00x1.12") with SMA connectors and an optional heat sink for efficient cooling.

### KEY FEATURES

Feature	Advantages
Wideband, 10 to 1000 MHz	Supports a broad range of system and test lab applications.
High Gain, 34 dB	Reduces the number of gain stages, lowering component count and overall system cost.
Excellent Gain Flatness, $\pm 0.8$ dB	Provides consistent performance across frequency, minimizing the need for external equalizing networks in wideband applications.
High Output Power, +30 dBm P3dB	Supports a wide range of high power applications.
High OIP3, +42 dBm	Provides highly linear performance with excellent sensitivity and two-tone spur-free dynamic range.





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## ELECTRICAL SPECIFICATIONS AT +25 °C

Parameter	Condition (MHz)	ZHL-2-8-S+ ZHL-2-8X-S+ <sup>▲</sup>			Units
		Min.	Typ.	Max.	
Frequency Range		10		1000	MHz
Gain	10-1000	31	34	39	dB
Gain Flatness	10-1000		±0.8	±1.3	dB
Output Power at 1 dB Compression	10-1000	+28	+29		dBm
Output Power at 3 dB Compression	10-1000	+29	+30		dBm
Noise Figure	10-1000		7		dB
Output Third Order Intercept Point	10-1000		+42		dBm
Input VSWR	10-1000			2.0	:1
Output VSWR	10-1000			2.0	:1
DC Supply Voltage			+24		V
Supply Current				0.7	A

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

▲ Heat sink not included. Alternative heat sinking and heat removal must be provided by the user to limit maximum base-plate temperature to +65 °C, in order to ensure proper performance. For reference, this requires thermal resistance of user's external heat sink to be 1.5°C/W max.

## ABSOLUTE MAXIMUM RATINGS

Parameter	Ratings
Operating Temperature	-20 °C to +65 °C
Storage Temperature	-55 °C to +100 °C
DC Voltage	+25 V
Input RF Power (No Damage)	+5 dBm

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





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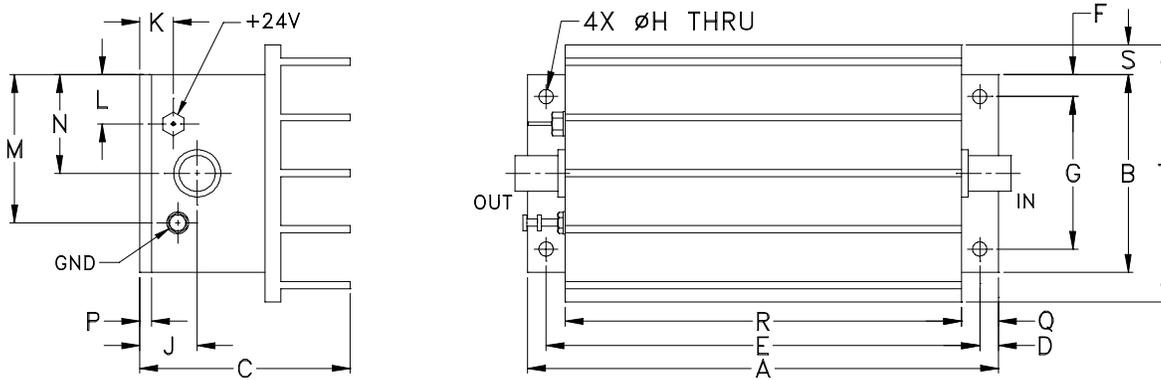
# Medium High Power Amplifier

# ZHL-2-8-S+ ZHL-2-8X-S+

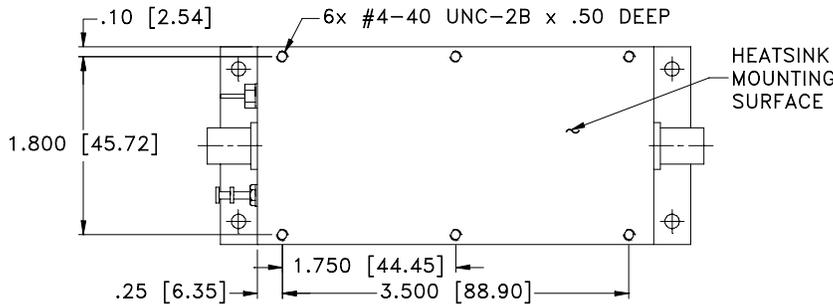
Mini-Circuits

50Ω 10 to 1000 MHz SMA Female

## OUTLINE DRAWING FOR MODELS WITH HEATSINK



## 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
4.75	2.00	2.12	.19	4.375	.23	1.540	.144	.58	.34	.50	1.50	1.00	.12	.38	4.00	.30	2.60	grams*
120.65	50.80	53.85	4.83	111.13	5.84	39.12	3.66	14.73	8.64	12.70	38.10	25.40	3.05	9.65	101.60	7.62	66.04	440.0

\*325 grams without heatsink



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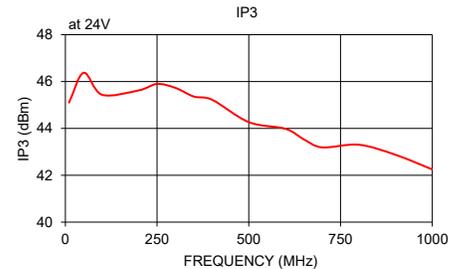
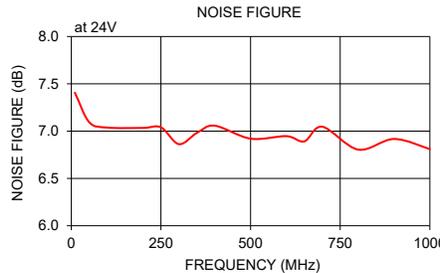
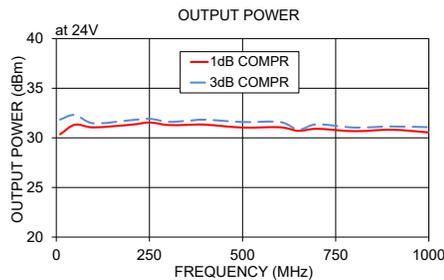
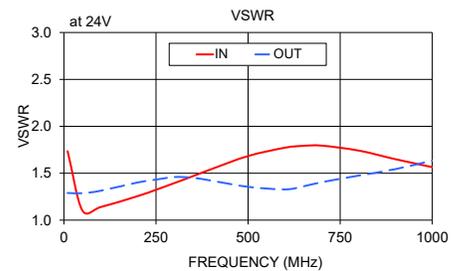
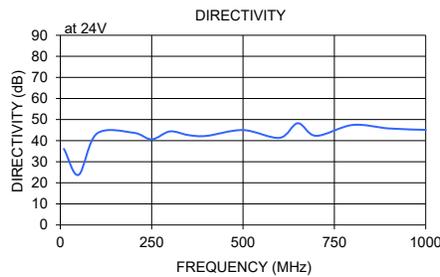
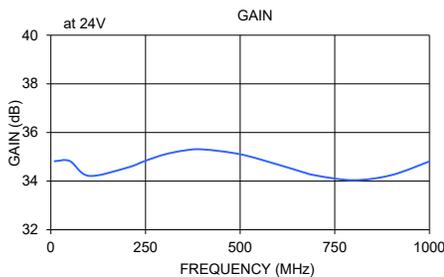
# Medium High Power Amplifier

# ZHL-2-8-S+ ZHL-2-8X-S+

50Ω 10 to 1000 MHz SMA Female

### TYPICAL PERFORMANCE DATA/CURVES

FREQUENCY (MHz)	GAIN (dB)	DIRECTIVITY (dB)	VSWR (:1)		P <sub>OUT</sub> at 1 dB COMPR. (dBm)	NOISE FIGURE (dB)	IP3 (dBm)
	+24 V	+24 V	IN	OUT	+24 V	+24 V	+24 V
10	34.82	36.07	1.73	1.29	30.35	7.41	45.10
50	34.82	23.76	1.10	1.29	31.33	7.09	46.37
100	34.22	43.31	1.14	1.31	31.05	7.04	45.44
200	34.55	43.75	1.26	1.40	31.32	7.03	45.62
250	34.84	40.60	1.32	1.43	31.55	7.04	45.90
300	35.09	44.38	1.40	1.46	31.29	6.86	45.73
350	35.25	42.64	1.47	1.45	31.31	6.98	45.36
400	35.30	42.24	1.54	1.42	31.33	7.06	45.22
500	35.10	45.01	1.68	1.36	31.04	6.92	44.27
600	34.68	41.32	1.77	1.33	31.07	6.95	43.98
650	34.44	48.24	1.79	1.36	30.71	6.89	43.53
700	34.23	42.27	1.79	1.40	30.91	7.05	43.19
800	34.04	47.43	1.74	1.47	30.67	6.80	43.30
900	34.25	45.76	1.65	1.54	30.82	6.92	42.87
1000	34.81	45.11	1.56	1.63	30.55	6.81	42.25



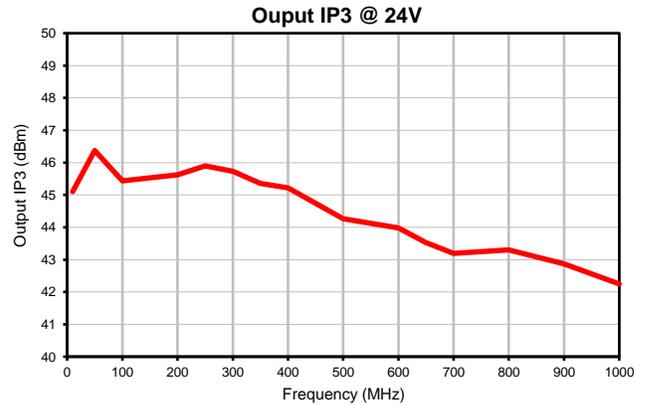
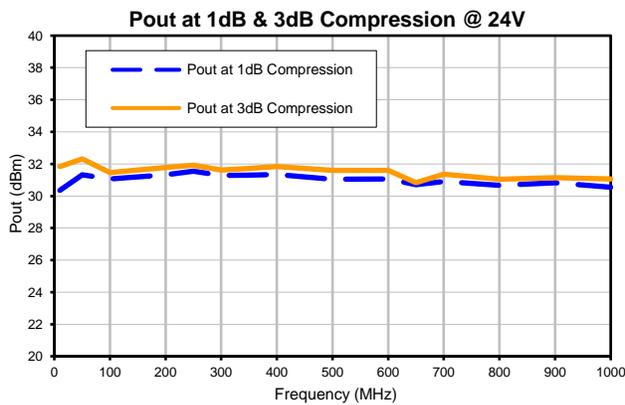
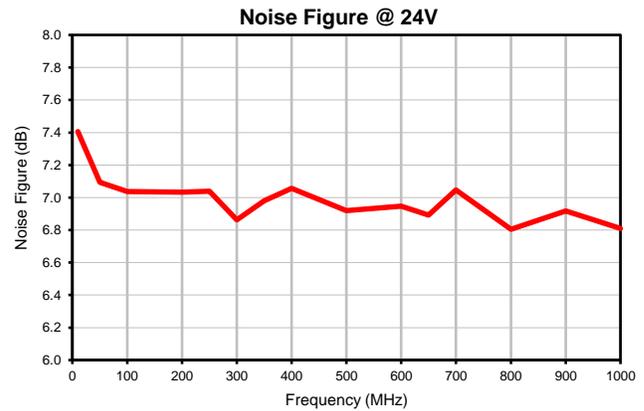
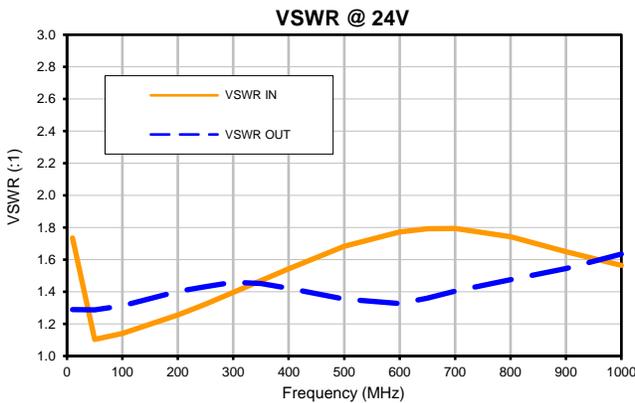
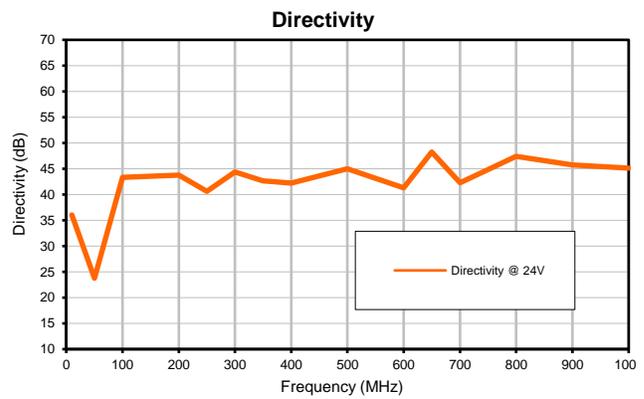
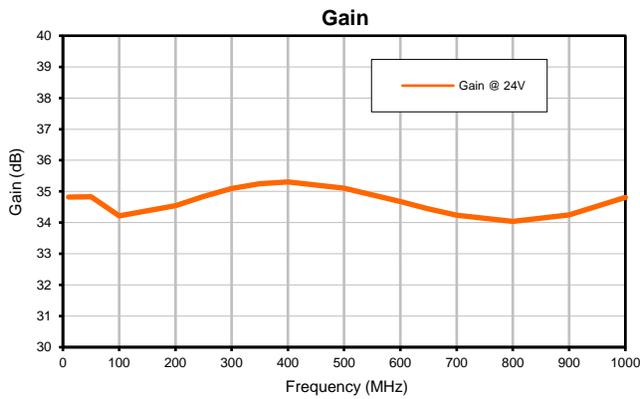
- NOTES**
- A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
  - B. Electrical specifications and performance data contained in this specification document are based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



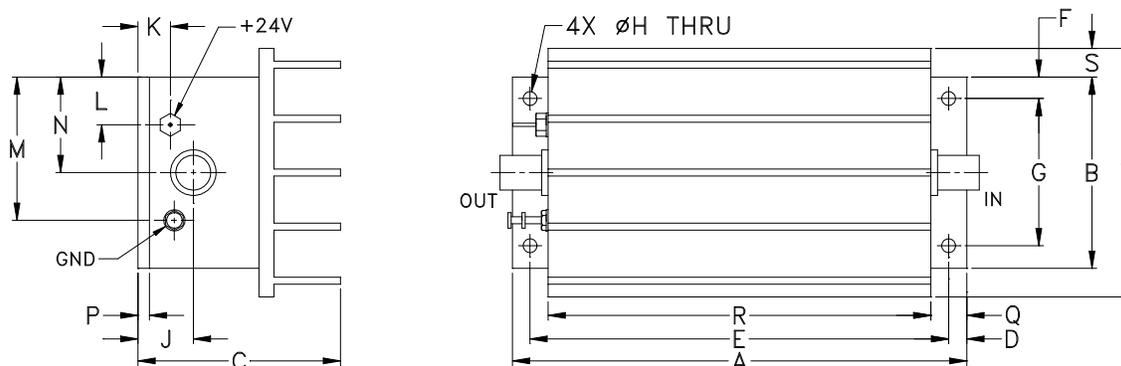
## Typical Performance Data

FREQUENCY (MHz)	GAIN (dB) 24V	DIRECTIVITY (dB) 24V	VSWR (:1)		NOISE FIGURE (dB) 24V	POUT @ 1 dB COMPRESSION (dBm) 24V	POUT @ 3 dB COMPRESSION (dBm) 24V	OUTPUT IP3 (dBm) 24V
			IN 24V	OUT 24V				
10	34.82	36.07	1.73	1.29	7.41	30.35	31.84	45.10
50	34.82	23.76	1.10	1.29	7.09	31.33	32.31	46.37
100	34.22	43.31	1.14	1.31	7.04	31.05	31.46	45.44
200	34.55	43.75	1.26	1.40	7.03	31.32	31.78	45.62
250	34.84	40.60	1.32	1.43	7.04	31.55	31.91	45.90
300	35.09	44.38	1.40	1.46	6.86	31.29	31.61	45.73
350	35.25	42.64	1.47	1.45	6.98	31.31	31.71	45.36
400	35.30	42.24	1.54	1.42	7.06	31.33	31.83	45.22
500	35.10	45.01	1.68	1.36	6.92	31.04	31.59	44.27
600	34.68	41.32	1.77	1.33	6.95	31.07	31.60	43.98
650	34.44	48.24	1.79	1.36	6.89	30.71	30.83	43.53
700	34.23	42.27	1.79	1.40	7.05	30.91	31.36	43.19
800	34.04	47.43	1.74	1.47	6.80	30.67	31.04	43.30
900	34.25	45.76	1.65	1.54	6.92	30.82	31.14	42.87
1000	34.81	45.11	1.56	1.63	6.81	30.55	31.07	42.25

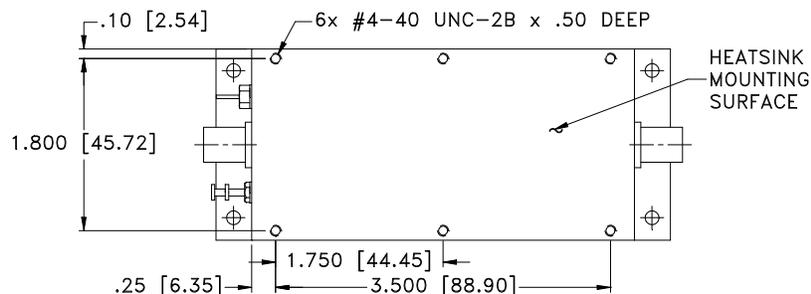
## Typical Performance Curves



### Outline Dimensions



### MOUNTING INFORMATION FOR MODELS WITHOUT HEATSINK



CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N
T34	4.75 (120.65)	2.00 (50.80)	2.12 (53.85)	.19 (4.83)	4.375 (111.13)	.23 (5.84)	1.540 (39.12)	.144 (3.66)	.58 (14.73)	.34 (8.64)	.50 (12.70)	1.50 (38.10)	1.00 (25.40)

CASE#	P	Q	R	S	T	WT. GRAMS	WT. WITHOUT HEATSINK GRAMS
T34	.12 (3.05)	.38 (9.65)	4.00 (101.60)	.30 (7.62)	2.60 (66.04)	440.0	325.0

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

### Notes:

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



P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



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