



COAXIAL

# High Power Amplifier

# ZHL-1-2W+ ZHL-1-2WX+

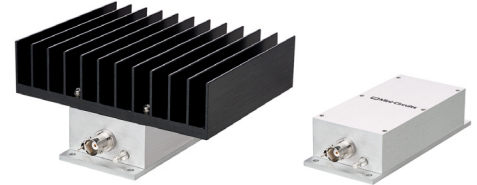
50Ω 2W 5 to 500 MHz

## FEATURES

- Wideband, 5 to 500 MHz
- High Power Output, +33 dBm min.
- High Gain, +29 dB min.
- High IP3, +44 dBm typ.
- Good matching VSWR, 1.5:1

## APPLICATIONS

- VHF/UHF
- Instrumentation
- Laboratory



Generic photo used for illustration purposes only

Case Style: T35

| Connectors | Model No           |
|------------|--------------------|
| BNC        | ZHL-1-2W+ (shown)  |
| BNC        | ZHL-1-2WX+ (shown) |
| SMA        | ZHL-1-2W-S+        |
| SMA        | ZHL-1-2WX-S+       |
| N-TYPE     | ZHL-1-2W-N+        |
| N-TYPE     | ZHL-1-2WX-N+       |

### +RoHS Compliant

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

## ELECTRICAL SPECIFICATIONS AT 25°C

| Parameter                          | Condition (MHz) | ZHL-1-2W+<br>ZHL-1-2WX+ <sup>▲</sup> |      |      | Units |
|------------------------------------|-----------------|--------------------------------------|------|------|-------|
|                                    |                 | Min.                                 | Typ. | Max. |       |
| Frequency Range                    |                 | 5                                    | —    | 500  | MHz   |
| Gain                               | 5-500           | 29                                   | —    | —    | dB    |
| Gain Flatness                      | 5-500           | —                                    | —    | ±1.0 | dB    |
| Output Power at 1dB compression    | 5-500           | +33                                  | —    | —    | dBm   |
| Noise Figure                       | 5-500           | —                                    | 7.0  | —    | dB    |
| Output third order intercept point | 5-500           | —                                    | +44  | —    | dBm   |
| Input VSWR                         | 5-500           | —                                    | 1.5  | —    | :1    |
| Output VSWR                        | 5-500           | —                                    | 1.5  | —    | :1    |
| DC Supply Voltage                  |                 | —                                    | 24   | —    | V     |
| Supply Current                     |                 | —                                    | —    | 0.9  | A     |

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

<sup>▲</sup> Heat sink 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 1.0°C/W max.

## ABSOLUTE MAXIMUM RATINGS

| Parameter                  | Ratings         |
|----------------------------|-----------------|
| Operating Temperature      | -20°C to +65°C  |
| Storage Temperature        | -55°C to +100°C |
| DC Voltage                 | +25V            |
| Input RF Power (no damage) | +10 dBm         |

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

REV. F  
ECO-017840  
ZHL-1-2W+  
MCL NY  
230516





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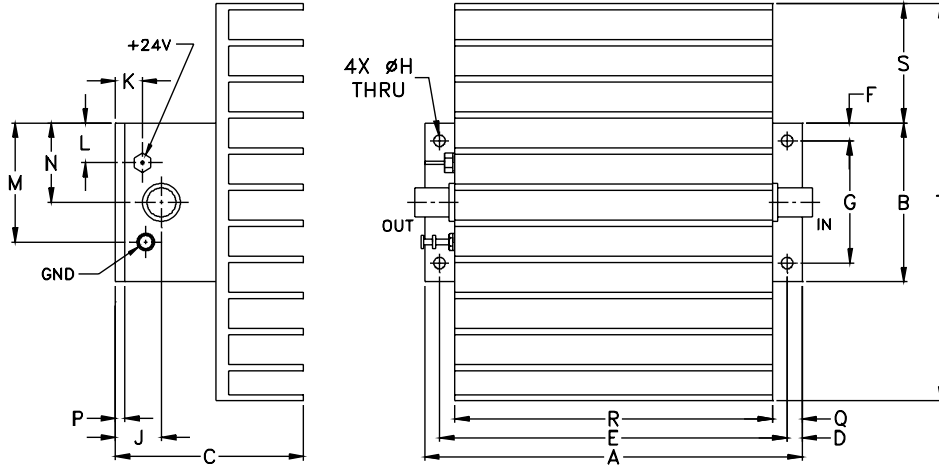
# High Power Amplifier

## ZHL-1-2W+ ZHL-1-2WX+

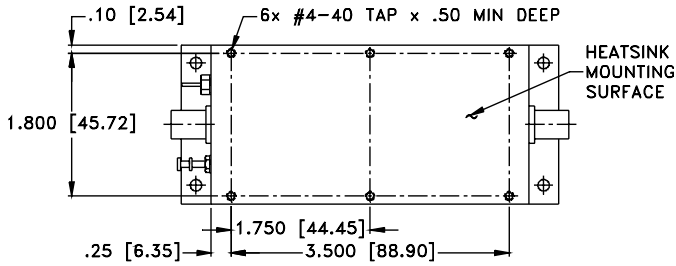
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50Ω 2W 5 to 500 MHz

### 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  | 2.37  | .19  | 4.375  | .23  | 1.540 | .144 | .58   | .34  | .50   | 1.50  | 1.00  | .13  | .38  | 4.00   | 1.50  | 5.0    | grams* |
| 120.65 | 50.80 | 60.20 | 4.83 | 111.13 | 5.84 | 39.12 | 3.66 | 14.73 | 8.64 | 12.70 | 38.10 | 25.40 | 3.30 | 9.65 | 101.60 | 38.10 | 127.00 | 700    |

\*300 grams without heatsink



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# High Power Amplifier

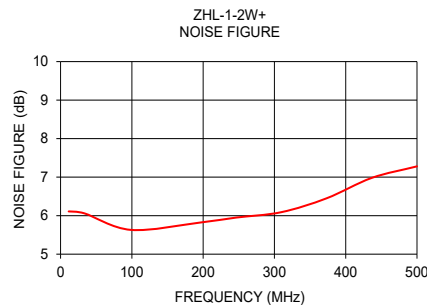
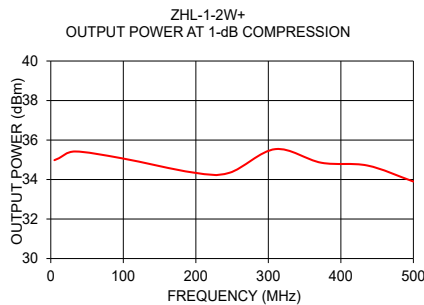
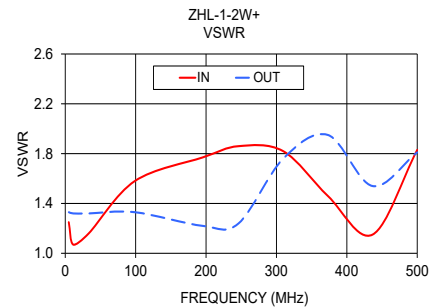
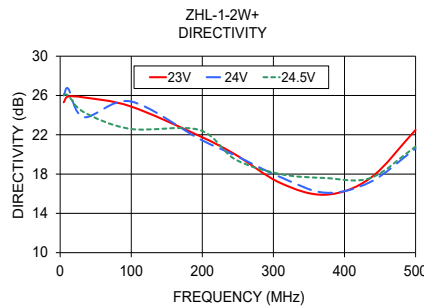
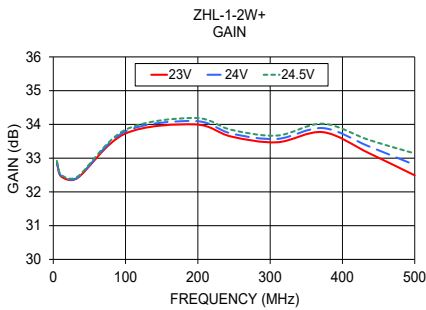
## ZHL-1-2W+ ZHL-1-2WX+

Mini-Circuits

50Ω 2W 5 to 500 MHz

### TYPICAL PERFORMANCE DATA/CURVES

| FREQUENCY (MHz) | GAIN (dB) |       |       | DIRECTIVITY (dB) |       |       | VSWR (:1) |      | NOISE FIGURE (dB) | P <sub>OUT</sub> at 1 dB COMPR. (dBm) |
|-----------------|-----------|-------|-------|------------------|-------|-------|-----------|------|-------------------|---------------------------------------|
|                 | 23V       | 24V   | 24.5V | 23V              | 24V   | 24.5V | IN        | OUT  |                   |                                       |
| 5.00            | 32.84     | 32.87 | 32.92 | 25.30            | 26.00 | 26.10 | 1.12      | 1.51 |                   | 34.98                                 |
| 11.30           | 32.45     | 32.47 | 32.50 | 25.90            | 26.70 | 26.00 | 1.10      | 1.49 | 6.11              | 35.08                                 |
| 33.40           | 32.41     | 32.42 | 32.45 | 25.80            | 23.80 | 24.30 | 1.16      | 1.49 | 6.06              | 35.42                                 |
| 98.80           | 33.72     | 33.78 | 33.83 | 24.90            | 25.40 | 22.60 | 1.28      | 1.43 | 5.63              | 35.07                                 |
| 195.40          | 34.00     | 34.10 | 34.19 | 21.90            | 21.60 | 22.50 | 1.41      | 1.18 | 5.82              | 34.36                                 |
| 246.20          | 33.64     | 33.73 | 33.84 | 20.00            | 19.90 | 19.50 | 1.45      | 1.11 | 5.95              | 34.34                                 |
| 309.60          | 33.47     | 33.57 | 33.67 | 17.10            | 17.70 | 18.00 | 1.48      | 1.19 | 6.09              | 35.54                                 |
| 373.10          | 33.77     | 33.89 | 34.02 | 15.90            | 16.10 | 17.60 | 1.51      | 1.29 | 6.45              | 34.85                                 |
| 436.50          | 33.15     | 33.35 | 33.54 | 17.60            | 17.20 | 17.60 | 1.56      | 1.37 | 6.98              | 34.71                                 |
| 500.00          | 32.49     | 32.80 | 33.14 | 22.50            | 20.60 | 20.80 | 1.59      | 1.57 | 7.28              | 33.90                                 |



#### 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-1-2W+

## Typical Performance Data

| FREQUENCY<br>(MHz) | GAIN<br>(dB) |       |       | DIRECTIVITY<br>(dB) |       |       | VSWR<br>IN<br>(:1) | VSWR<br>OUT<br>(:1) | NOISE<br>FIGURE<br>(dB) | Pout at<br>1dB Comp.<br>(dBm) |
|--------------------|--------------|-------|-------|---------------------|-------|-------|--------------------|---------------------|-------------------------|-------------------------------|
|                    | 23V          | 24V   | 24.5V | 23V                 | 24V   | 24.5V | 24V                | 24V                 | 24V                     | 24V                           |
| 5.0                | 32.84        | 32.87 | 32.92 | 25.30               | 26.00 | 26.10 | 1.25               | 1.33                |                         | 34.98                         |
| 11.3               | 32.45        | 32.47 | 32.50 | 25.90               | 26.70 | 26.00 | 1.07               | 1.32                | 6.11                    | 35.08                         |
| 33.4               | 32.41        | 32.42 | 32.45 | 25.80               | 23.80 | 24.30 | 1.16               | 1.32                | 6.06                    | 35.42                         |
| 98.8               | 33.72        | 33.78 | 33.83 | 24.90               | 25.40 | 22.60 | 1.58               | 1.33                | 5.63                    | 35.07                         |
| 195.4              | 34.00        | 34.10 | 34.19 | 21.90               | 21.60 | 22.50 | 1.77               | 1.22                | 5.82                    | 34.36                         |
| 246.2              | 33.64        | 33.73 | 33.84 | 20.00               | 19.90 | 19.50 | 1.86               | 1.24                | 5.95                    | 34.34                         |
| 309.6              | 33.47        | 33.57 | 33.67 | 17.10               | 17.70 | 18.00 | 1.82               | 1.76                | 6.09                    | 35.54                         |
| 373.1              | 33.77        | 33.89 | 34.02 | 15.90               | 16.10 | 17.60 | 1.46               | 1.95                | 6.45                    | 34.85                         |
| 436.5              | 33.15        | 33.35 | 33.54 | 17.60               | 17.20 | 17.60 | 1.15               | 1.54                | 6.98                    | 34.71                         |
| 500.0              | 32.49        | 32.80 | 33.14 | 22.50               | 20.60 | 20.80 | 1.83               | 1.81                | 7.28                    | 33.90                         |



ISO 9001 ISO 14001 AS 9100 CERTIFIED

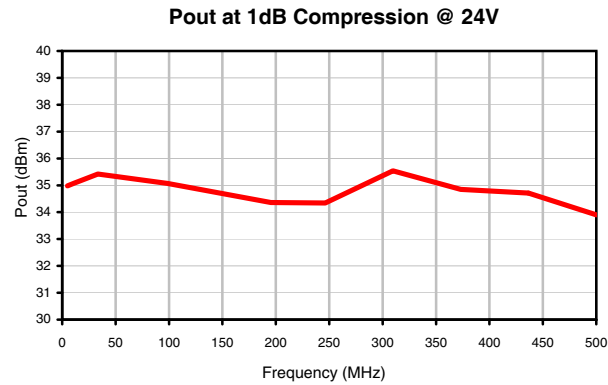
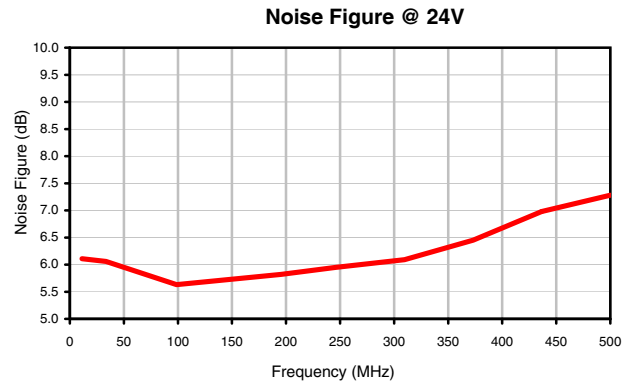
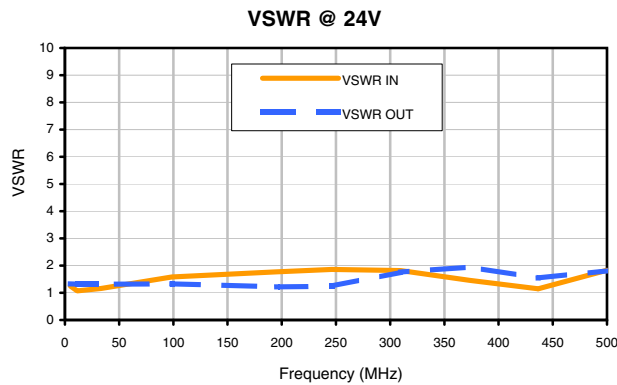
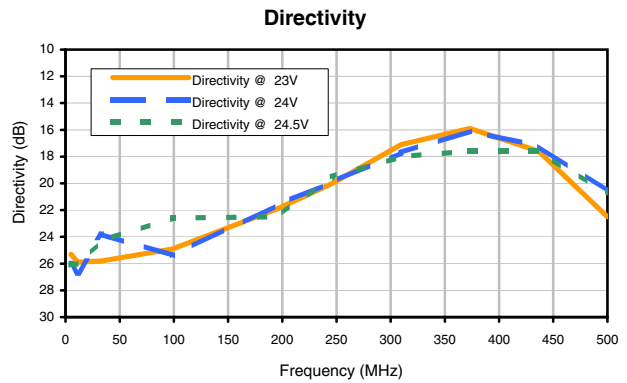
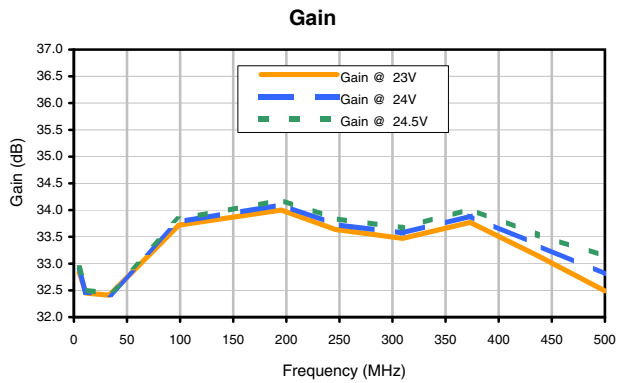
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IF/RF MICROWAVE COMPONENTS

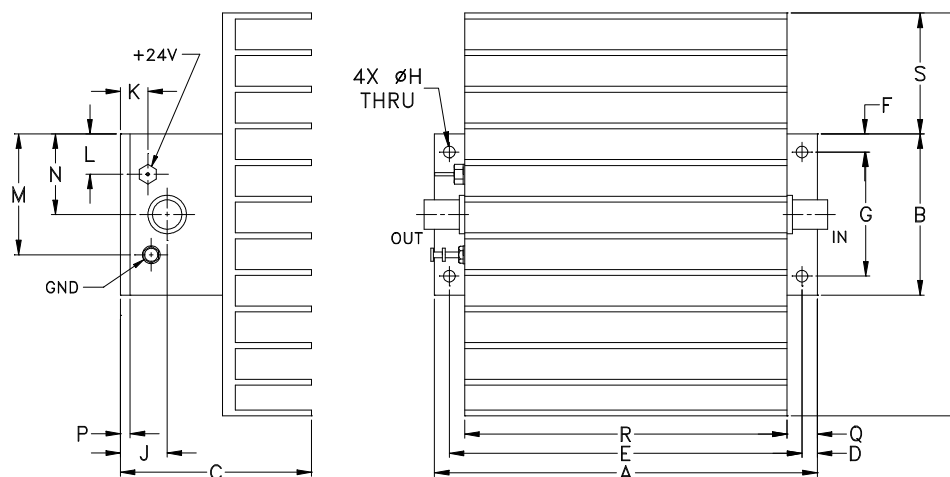
For detailed performance specs & shopping online see web site

Notes: 1. Performance and quality attributes and conditions not expressly stated in this specification sheet are intended to be excluded and do not form a part of this specification sheet. 2. Electrical specifications and performance data contained herein are based on Mini-Circuits' applicable established test performance criteria and measurement instructions. 3. The parts covered by this specification sheet 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](http://www.minicircuits.com/MCLStore/terms.jsp).

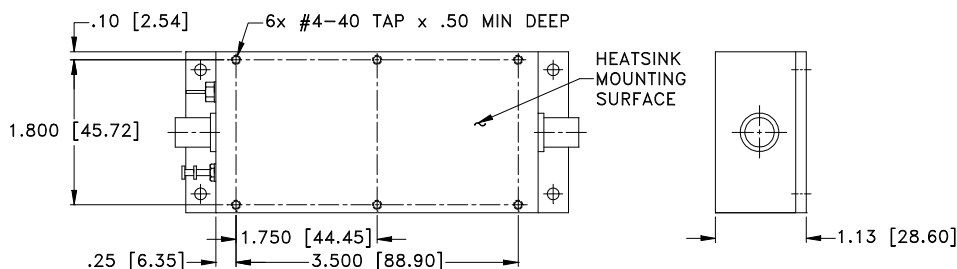
## Typical Performance Curves



### Outline Dimensions



#### MOUNTING INFORMATION FOR MODELS WITHOUT HEATSINK



| CASE# | A                | B               | C               | D             | E                 | F             | G                | H              | J              | K             | L              | M               | N               |
|-------|------------------|-----------------|-----------------|---------------|-------------------|---------------|------------------|----------------|----------------|---------------|----------------|-----------------|-----------------|
| T35   | 4.75<br>(120.65) | 2.00<br>(50.80) | 2.37<br>(60.20) | .19<br>(4.83) | 4.375<br>(111.13) | .23<br>(5.84) | 1.540<br>(39.12) | .144<br>(3.66) | .58<br>(14.73) | .34<br>(8.64) | .50<br>(12.70) | 1.50<br>(38.10) | 1.00<br>(25.40) |

| CASE# | P             | Q             | R                | S               | T                | WT. GRAMS | WT. WITHOUT HEATSINK GRAMS |
|-------|---------------|---------------|------------------|-----------------|------------------|-----------|----------------------------|
| T35   | .13<br>(3.30) | .38<br>(9.65) | 4.00<br>(101.60) | 1.50<br>(38.10) | 5.00<br>(127.00) | 700.0     | 300.0                      |

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

#### Notes:

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



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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<br>Ambient Environment  | Individual Model Data Sheet                        |
| Storage Temperature       | -55° to 100° C<br>Ambient Environment | Individual Model Data Sheet                        |
| Stabilization Bake        | (non-operating)<br>125°C, 24 hours    | - - -  |
| Burn-in at Elevated Temp. | (DC on)<br>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 |