



COAXIAL

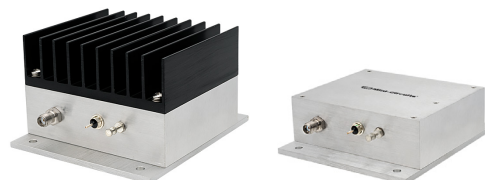
## Low Noise Amplifier

**ZHL-0812HLN+  
ZHL-0812HLNX+**

50Ω 800 to 1200 MHz

## FEATURES

- Very Low Noise Figure, 1.5 dB max.
- Wideband, 800 to 1200 MHz
- High Dynamic Range



Generic photo used for illustration purposes only

| Model No.  | ZHL-0812HLN+ | ZHL-0812HLNX+ ▲ |
|------------|--------------|-----------------|
| Case Style | NN92         |                 |
| Connectors | SMA          |                 |

**+RoHS Compliant**

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

## APPLICATIONS

- UHF
- Cellular
- Communication Systems

## ELECTRICAL SPECIFICATIONS AT 25°C

| Parameter                          | Frequency (MHz) | ZHL-0812HLN+ |      |      | ZHL-0812HLNX+▲ |      |      | Units |
|------------------------------------|-----------------|--------------|------|------|----------------|------|------|-------|
|                                    |                 | Min.         | Typ. | Max. | Min            | Typ. | Max. |       |
| Frequency Range                    |                 | 800          |      | 1200 | 800            |      | 1200 | MHz   |
| Noise Figure <sup>1</sup>          | 800-1200        | —            | 0.5  | 1.5  | —              | 0.5  | 1.5  | dB    |
| Gain                               | 800-1200        | 38           | —    | —    | 30             | —    | —    | dB    |
| Gain Flatness                      | 800-1200        | —            | —    | ±1.0 | —              | —    | ±1.0 | dB    |
| Output Power at 1dB compression    | 800-1200        | —            | +26  | —    | —              | +26  | —    | dBm   |
| Output third order intercept point | 800-1200        | —            | +36  | —    | —              | +36  | —    | dBm   |
| Input VSWR                         | 800-1200        | —            | 1.4  | —    | —              | 1.4  | —    | :1    |
| Output VSWR                        | 800-1200        | —            | 1.3  | —    | —              | 1.3  | —    | :1    |
| DC Supply Voltage                  |                 | —            | 15   | —    | —              | 15   | —    | V     |
| Supply Current                     |                 | —            | 620  | 725  | —              | 620  | 725  | mA    |

1. Noise Figure specified at room temperature, increases to 2.3 dB max. at +65°C  
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 1.8°C/W max.

## ABSOLUTE MAXIMUM RATINGS

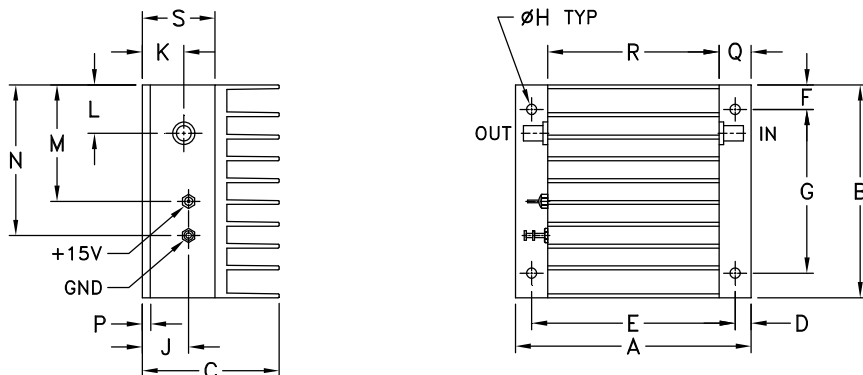
| Parameter                  | Ratings         |
|----------------------------|-----------------|
| Operating Temperature      | -20°C to +65°C  |
| Storage Temperature        | -55°C to +100°C |
| DC Voltage                 | +20V            |
| Input RF Power (no damage) | +10 dBm         |

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

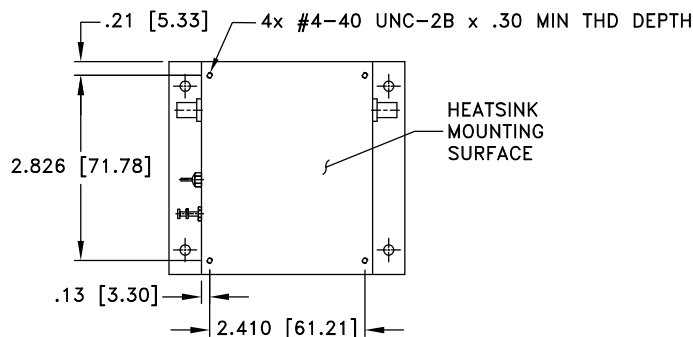




## OUTLINE DRAWING



## 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    | wt     |
|-------|-------|-------|------|-------|------|-------|------|-------|-------|-------|-------|-------|------|-------|-------|------|--------|
| 3.66  | 3.25  | 2.13  | .25  | 3.16  | .38  | 2.50  | .156 | .72   | .64   | .74   | 1.78  | 2.30  | .125 | .50   | 2.66  | 1.13 | grams* |
| 92.96 | 82.55 | 54.10 | 6.35 | 80.26 | 9.65 | 63.50 | 3.96 | 18.29 | 16.26 | 18.80 | 45.21 | 58.42 | 3.18 | 12.70 | 67.56 | 28.7 | 500.0  |

\*362 grams without heatsink



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## Low Noise Amplifier

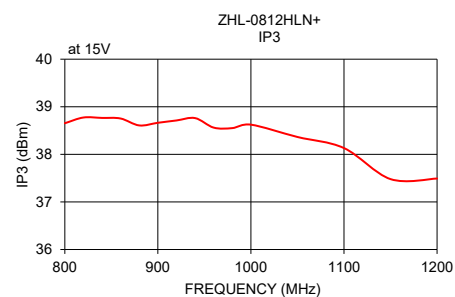
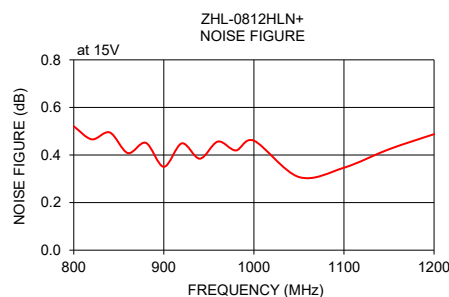
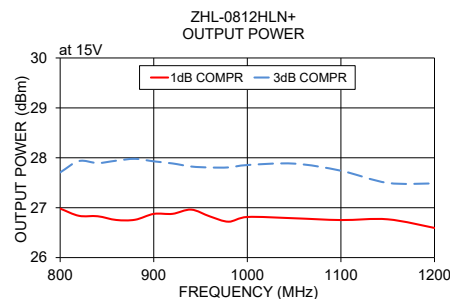
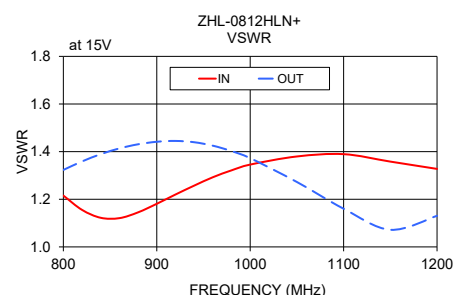
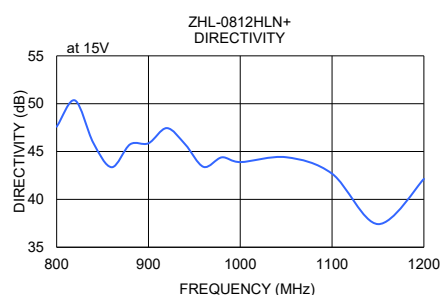
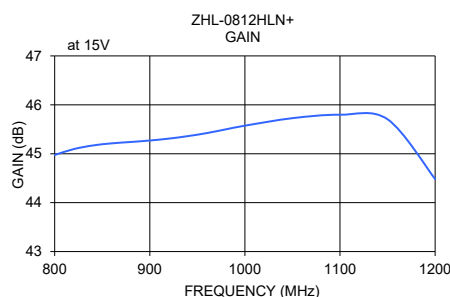
ZHL-0812HLN+  
ZHL-0812HLNX+

Mini-Circuits

50Ω 800 to 1200 MHz

## TYPICAL PERFORMANCE DATA/CURVES

| FREQUENCY<br>(MHz) | GAIN<br>(dB) | DIRECTIVITY<br>(dB) | VSWR<br>(:1) |      | POUT at<br>1 dB COMPR.<br>(dBm) | NOISE<br>FIGURE<br>(dB) | IP3<br>(dBm) |
|--------------------|--------------|---------------------|--------------|------|---------------------------------|-------------------------|--------------|
|                    | 15V          | 15V                 | IN           | OUT  | 15V                             | 15V                     | 15V          |
| 800                | 44.97        | 47.60               | 1.22         | 1.32 | 26.98                           | 0.52                    | 38.65        |
| 820                | 45.09        | 50.34               | 1.16         | 1.36 | 26.84                           | 0.47                    | 38.77        |
| 840                | 45.17        | 45.89               | 1.12         | 1.39 | 26.83                           | 0.49                    | 38.77        |
| 860                | 45.21        | 43.36               | 1.12         | 1.41 | 26.75                           | 0.41                    | 38.75        |
| 880                | 45.24        | 45.75               | 1.15         | 1.43 | 26.76                           | 0.45                    | 38.61        |
| 900                | 45.27        | 45.86               | 1.18         | 1.44 | 26.88                           | 0.35                    | 38.66        |
| 920                | 45.31        | 47.45               | 1.22         | 1.44 | 26.88                           | 0.45                    | 38.71        |
| 940                | 45.36        | 45.75               | 1.26         | 1.44 | 26.96                           | 0.38                    | 38.76        |
| 960                | 45.42        | 43.40               | 1.29         | 1.43 | 26.83                           | 0.46                    | 38.56        |
| 980                | 45.50        | 44.39               | 1.32         | 1.40 | 26.72                           | 0.42                    | 38.55        |
| 1000               | 45.57        | 43.90               | 1.35         | 1.37 | 26.81                           | 0.46                    | 38.62        |
| 1050               | 45.73        | 44.40               | 1.38         | 1.27 | 26.79                           | 0.31                    | 38.36        |
| 1100               | 45.80        | 42.68               | 1.39         | 1.16 | 26.75                           | 0.35                    | 38.13        |
| 1150               | 45.70        | 37.41               | 1.36         | 1.07 | 26.77                           | 0.42                    | 37.48        |
| 1200               | 44.48        | 42.14               | 1.33         | 1.13 | 26.59                           | 0.49                    | 37.49        |



## 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.
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# Low Noise Amplifier

ZHL-0812HLN+

## Typical Performance Data

| FREQ.<br>(MHz) | GAIN<br>(dB)<br>15V | DIRECTIVITY<br>(dB)<br>15V | VSWR<br>(:1) |            | NOISE<br>FIGURE<br>(dB)<br>15V | POUT @ 1 dB<br>COMPRESSION<br>(dBm)<br>15V | POUT @ 3 dB<br>COMPRESSION<br>(dBm)<br>15V | OUTPUT IP3<br>(dBm)<br>15V |
|----------------|---------------------|----------------------------|--------------|------------|--------------------------------|--------------------------------------------|--------------------------------------------|----------------------------|
|                |                     |                            | IN<br>15V    | OUT<br>15V |                                |                                            |                                            |                            |
| 800            | 44.97               | 47.60                      | 1.22         | 1.32       | 0.52                           | 26.98                                      | 27.71                                      | 38.65                      |
| 810            | 45.04               | 46.22                      | 1.18         | 1.34       | 0.50                           | 26.83                                      | 27.69                                      | 38.73                      |
| 820            | 45.09               | 50.34                      | 1.16         | 1.36       | 0.47                           | 26.84                                      | 27.93                                      | 38.77                      |
| 840            | 45.17               | 45.89                      | 1.12         | 1.39       | 0.49                           | 26.83                                      | 27.89                                      | 38.77                      |
| 850            | 45.19               | 49.32                      | 1.12         | 1.40       | 0.51                           | 26.88                                      | 27.75                                      | 38.67                      |
| 860            | 45.21               | 43.36                      | 1.12         | 1.41       | 0.41                           | 26.75                                      | 27.94                                      | 38.75                      |
| 870            | 45.22               | 45.37                      | 1.13         | 1.42       | 0.44                           | 26.63                                      | 27.84                                      | 38.73                      |
| 880            | 45.24               | 45.75                      | 1.15         | 1.43       | 0.45                           | 26.76                                      | 27.98                                      | 38.61                      |
| 890            | 45.26               | 47.98                      | 1.16         | 1.44       | 0.36                           | 26.77                                      | 27.88                                      | 38.66                      |
| 900            | 45.27               | 45.86                      | 1.18         | 1.44       | 0.35                           | 26.88                                      | 27.93                                      | 38.66                      |
| 910            | 45.29               | 46.84                      | 1.20         | 1.44       | 0.42                           | 26.89                                      | 27.98                                      | 38.69                      |
| 920            | 45.31               | 47.45                      | 1.22         | 1.44       | 0.45                           | 26.88                                      | 27.89                                      | 38.71                      |
| 930            | 45.34               | 44.87                      | 1.24         | 1.44       | 0.45                           | 26.84                                      | 27.85                                      | 38.63                      |
| 940            | 45.36               | 45.75                      | 1.26         | 1.44       | 0.38                           | 26.96                                      | 27.83                                      | 38.76                      |
| 950            | 45.39               | 45.30                      | 1.28         | 1.43       | 0.36                           | 26.86                                      | 27.87                                      | 38.63                      |
| 960            | 45.42               | 43.40                      | 1.29         | 1.43       | 0.46                           | 26.83                                      | 27.81                                      | 38.56                      |
| 970            | 45.46               | 49.12                      | 1.31         | 1.41       | 0.37                           | 26.96                                      | 27.87                                      | 38.64                      |
| 980            | 45.50               | 44.39                      | 1.32         | 1.40       | 0.42                           | 26.72                                      | 27.81                                      | 38.55                      |
| 990            | 45.54               | 42.03                      | 1.33         | 1.39       | 0.36                           | 26.99                                      | 27.79                                      | 38.64                      |
| 1000           | 45.57               | 43.90                      | 1.35         | 1.37       | 0.46                           | 26.81                                      | 27.85                                      | 38.62                      |
| 1010           | 45.61               | 43.26                      | 1.36         | 1.36       | 0.40                           | 26.78                                      | 27.73                                      | 38.48                      |
| 1020           | 45.65               | 43.99                      | 1.36         | 1.34       | 0.33                           | 26.93                                      | 27.68                                      | 38.47                      |
| 1030           | 45.68               | 42.00                      | 1.37         | 1.32       | 0.32                           | 26.93                                      | 27.70                                      | 38.44                      |
| 1040           | 45.70               | 43.84                      | 1.38         | 1.30       | 0.39                           | 26.90                                      | 27.93                                      | 38.43                      |
| 1050           | 45.73               | 44.40                      | 1.38         | 1.27       | 0.31                           | 26.79                                      | 27.88                                      | 38.36                      |
| 1060           | 45.74               | 43.28                      | 1.38         | 1.25       | 0.34                           | 27.04                                      | 27.93                                      | 38.34                      |
| 1070           | 45.76               | 45.84                      | 1.39         | 1.23       | 0.38                           | 26.89                                      | 27.79                                      | 38.27                      |
| 1080           | 45.77               | 46.56                      | 1.39         | 1.20       | 0.39                           | 26.91                                      | 27.92                                      | 38.35                      |
| 1090           | 45.78               | 51.77                      | 1.39         | 1.18       | 0.34                           | 26.91                                      | 27.58                                      | 38.11                      |
| 1100           | 45.80               | 42.68                      | 1.39         | 1.16       | 0.35                           | 26.75                                      | 27.74                                      | 38.13                      |
| 1110           | 45.82               | 47.52                      | 1.39         | 1.14       | 0.36                           | 26.94                                      | 27.67                                      | 38.04                      |
| 1120           | 45.84               | 43.45                      | 1.39         | 1.13       | 0.43                           | 26.74                                      | 27.63                                      | 37.91                      |
| 1130           | 45.85               | 44.49                      | 1.38         | 1.11       | 0.45                           | 26.76                                      | 27.53                                      | 37.78                      |
| 1140           | 45.82               | 41.91                      | 1.37         | 1.10       | 0.41                           | 26.90                                      | 27.73                                      | 37.66                      |
| 1150           | 45.70               | 37.41                      | 1.36         | 1.07       | 0.42                           | 26.77                                      | 27.50                                      | 37.48                      |
| 1160           | 45.50               | 37.94                      | 1.34         | 1.04       | 0.40                           | 26.58                                      | 27.67                                      | 37.44                      |
| 1170           | 45.25               | 39.54                      | 1.33         | 1.03       | 0.45                           | 26.58                                      | 27.53                                      | 37.53                      |
| 1180           | 44.98               | 40.82                      | 1.32         | 1.05       | 0.49                           | 26.49                                      | 27.62                                      | 37.54                      |
| 1190           | 44.72               | 39.74                      | 1.32         | 1.09       | 0.49                           | 26.52                                      | 27.65                                      | 37.49                      |
| 1200           | 44.48               | 42.14                      | 1.33         | 1.13       | 0.49                           | 26.59                                      | 27.49                                      | 37.49                      |



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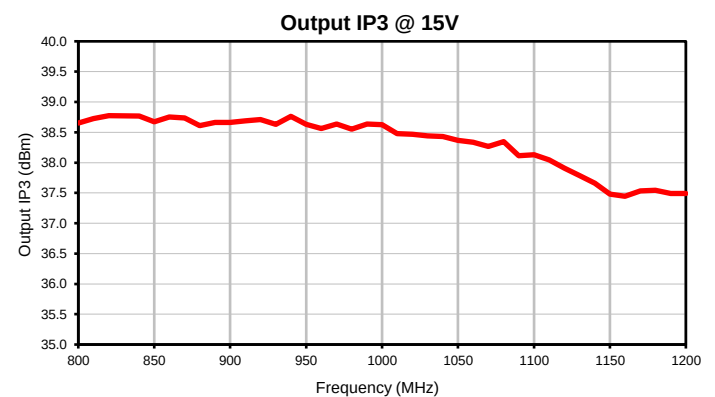
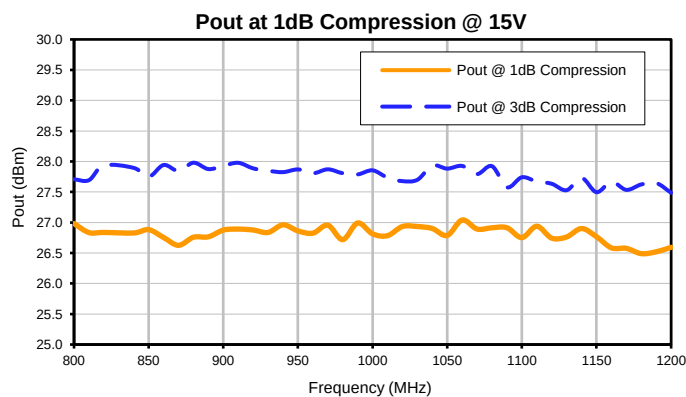
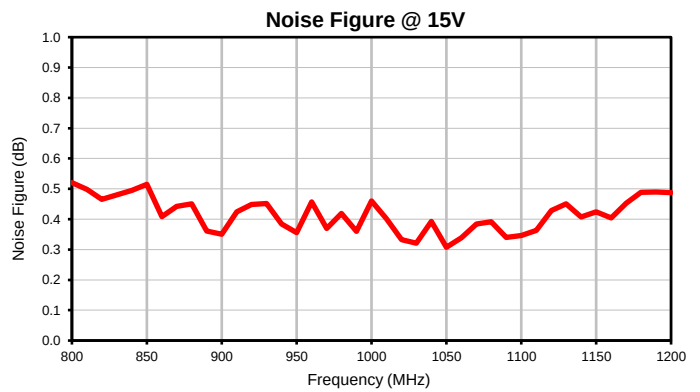
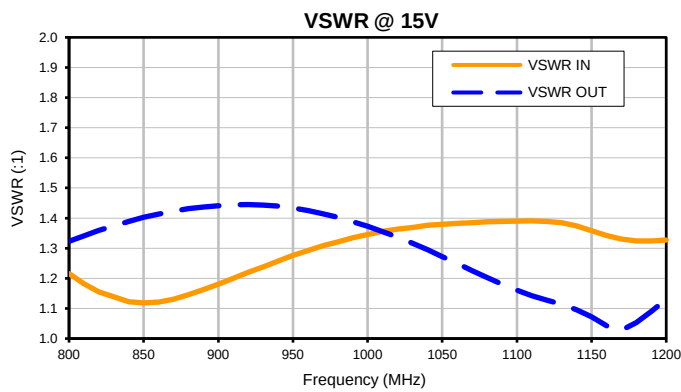
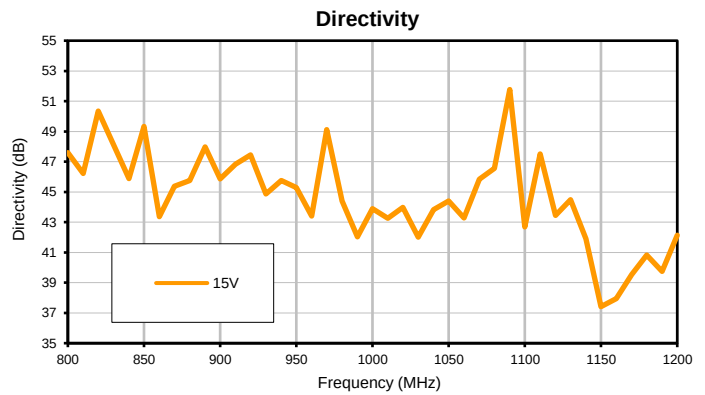
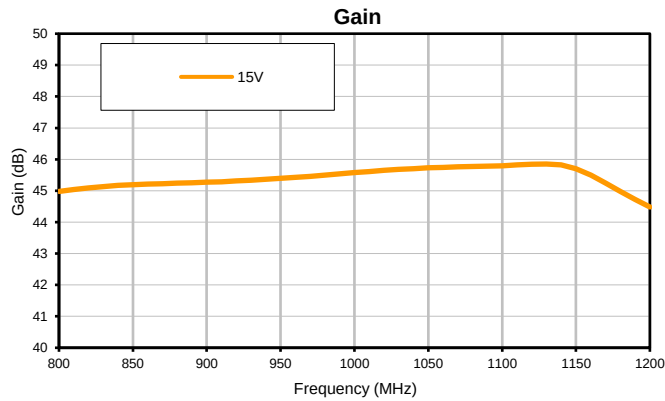
IF/RF MICROWAVE COMPONENTS

REV. OR  
ZHL-0812HLN+  
8/7/2015  
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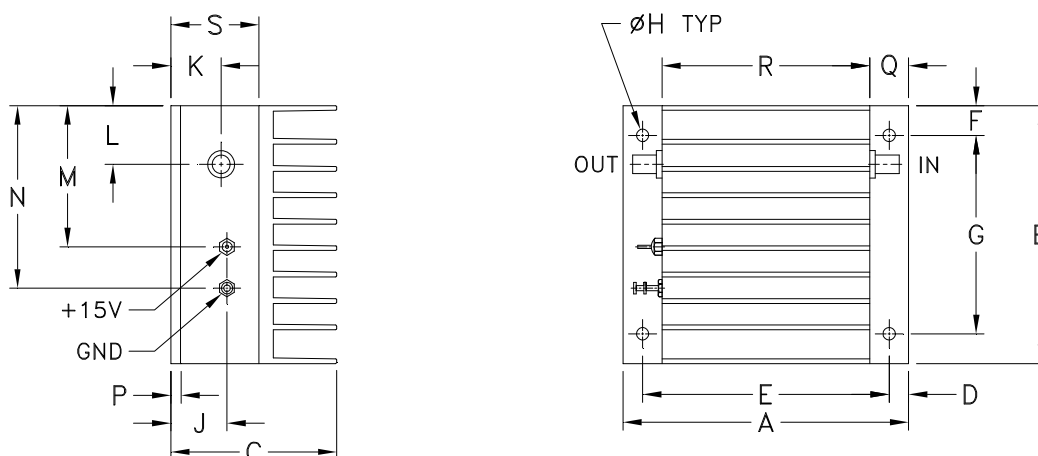
# Low Noise Amplifier

ZHL-0812HLN+

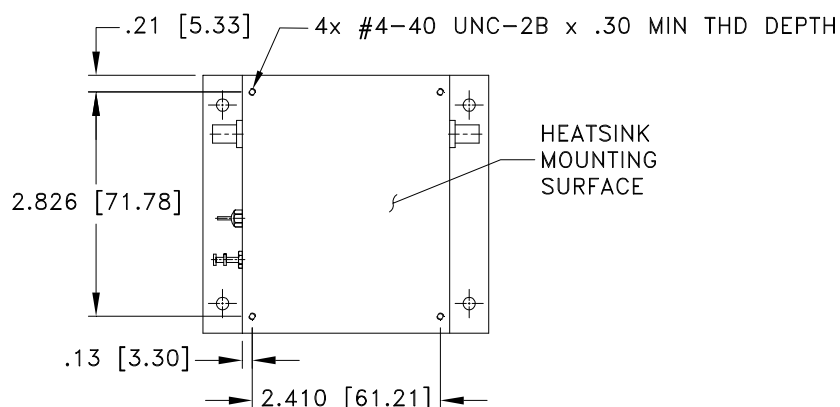
## Typical Performance Curves



### Outline Dimensions



### MOUNTING INFORMATION FOR MODELS WITHOUT HEATSINK



| CASE# | A               | B               | C               | D             | E               | F             | G               | H              | J              | K              | L              | M               | N               |
|-------|-----------------|-----------------|-----------------|---------------|-----------------|---------------|-----------------|----------------|----------------|----------------|----------------|-----------------|-----------------|
| NN92  | 3.66<br>(92.96) | 3.25<br>(82.55) | 2.13<br>(54.10) | .25<br>(6.35) | 3.16<br>(80.26) | .38<br>(9.65) | 2.50<br>(63.50) | .156<br>(3.96) | .72<br>(18.29) | .64<br>(16.26) | .74<br>(18.80) | 1.78<br>(45.21) | 2.30<br>(58.42) |

| CASE# | P              | Q              | R               | S               | WT. GRAMS | WT. WITHOUT HEATSINK GRAMS |
|-------|----------------|----------------|-----------------|-----------------|-----------|----------------------------|
| NN92  | .125<br>(3.18) | .50<br>(12.70) | 2.66<br>(67.56) | 1.13<br>(28.58) | 500.0     | 362.0                      |

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

### Notes:

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



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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     | -54° 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 |