



COAXIAL

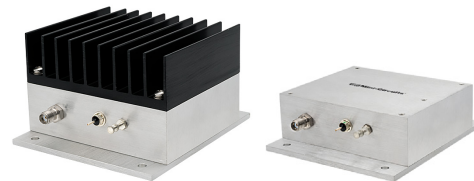
Low Noise Amplifier

ZHL-1217HLN+ ZHL-1217HLNX+

50Ω 1200 to 1700 MHz SMA Female

FEATURES

- Very Low Noise Figure, 1.5 dB Max.
- Wideband, 1200 to 1700 MHz
- High Dynamic Range



Generic photo used for illustration purposes only

APPLICATIONS

- GPS
- Mar Sat
- Communication Systems

| | | |
|------------|---------------|------------------|
| Model No. | ZHL-1217HLN+ | ZHL-1217HLNX+ ▲ |
| Option | With Heatsink | Without Heatsink |
| Case Style | NN92 | |
| Connectors | SMA female | |

+RoHS Compliant

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

ELECTRICAL SPECIFICATIONS¹ AT +25 °C

| Parameter | Frequency (MHz) | ZHL-1217HLN+ | | | ZHL-1217HLNX+ ▲ | | | Units |
|------------------------------------|-----------------|--------------|------|------|-----------------|------|------|-------|
| | | Min. | Typ. | Max. | Min | Typ. | Max. | |
| Frequency Range | | 1200 | | 1700 | 1200 | | 1700 | MHz |
| Noise Figure ² | 1200-1700 | | 0.75 | 1.5 | | 0.75 | 1.5 | dB |
| Gain | 1200-1700 | 36 | 42 | | 36 | 42 | | dB |
| Gain Flatness | 1200-1700 | | | ±1.0 | | | ±1.0 | dB |
| Output Power at 1 dB Compression | 1200-1700 | | +27 | | | +27 | | dBm |
| Output Third Order Intercept Point | 1200-1700 | | +40 | | | +40 | | dBm |
| Input VSWR | 1200-1700 | | 1.4 | | | 1.4 | | :1 |
| Output VSWR | 1200-1700 | | 1.3 | | | 1.3 | | :1 |
| DC Supply Voltage | | | +15 | | | +15 | | V |
| Supply Current | | | 650 | 725 | | 650 | 725 | mA |

1. Open load is not recommended, potentially can cause damage.

2. Noise Figure specified at room temperature, increases to 2.3 dB max. at +65 °C.

▲ Heatsink not included. Alternative heat sinking and heat removal must be provided by the user to limit maximum baseplate temperature to +65 °C, in order to ensure proper performance. For reference, this requires thermal resistance of user's external heatsink to be 1.8 °C/W max.

ABSOLUTE MAXIMUM RATINGS³

| Parameter | Ratings |
|---|-------------------|
| Operating Temperature | -20 °C to +65 °C |
| Storage Temperature | -55 °C to +100 °C |
| DC Voltage | +20 V |
| Input RF Power ⁴ (No Damage) | +10 dBm |

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

4. With no load, derate max. input power by 20 dB.





COAXIAL

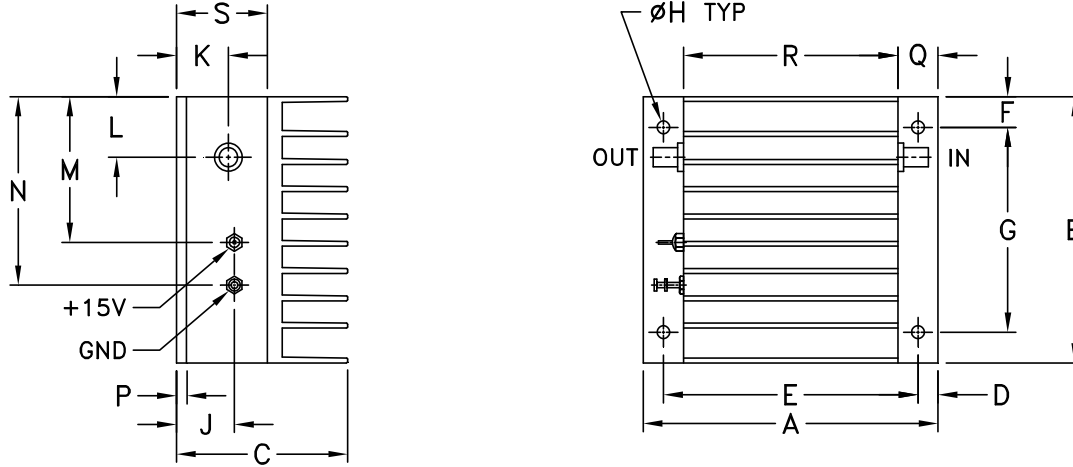
Low Noise Amplifier

ZHL-1217HLN+ ZHL-1217HLNX+

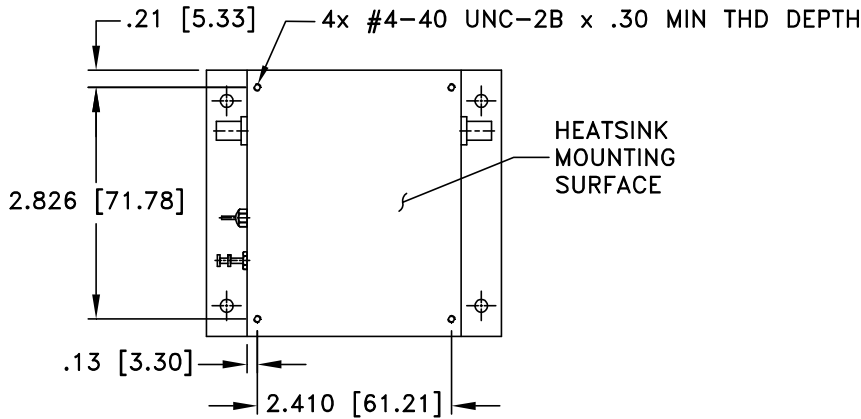
Mini-Circuits

50Ω 1200 to 1700 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 | 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





COAXIAL

Low Noise Amplifier

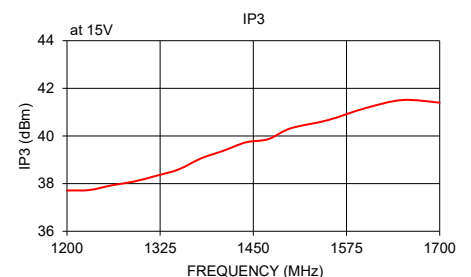
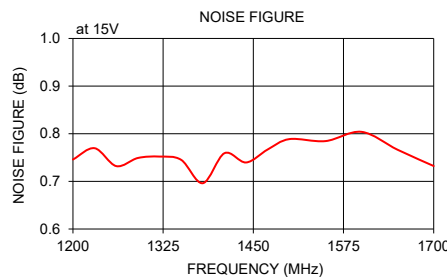
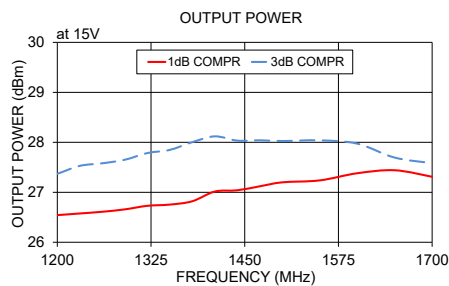
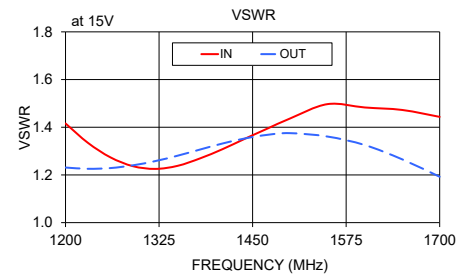
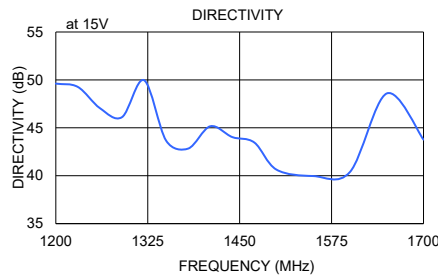
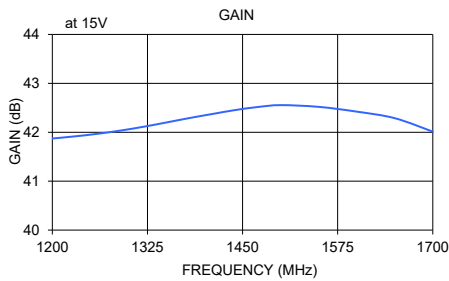
ZHL-1217HLN+ ZHL-1217HLNX+

Mini-Circuits

50Ω 1200 to 1700 MHz SMA Female

TYPICAL PERFORMANCE DATA AND CHARTS

| FREQUENCY (MHz) | GAIN (dB) | DIRECTIVITY (dB) | VSWR (:1) | | P _{OUT} at 1 dB COMPR. (dBm) | NOISE FIGURE (dB) | IP3 (dBm) |
|-----------------|-----------|------------------|-----------|------|---------------------------------------|-------------------|-----------|
| | +15 V | +15 V | IN | OUT | +15 V | +15 V | +15 V |
| 1200 | 41.87 | 49.61 | 1.42 | 1.23 | 26.54 | 0.75 | 37.71 |
| 1230 | 41.92 | 49.26 | 1.33 | 1.23 | 26.58 | 0.77 | 37.73 |
| 1260 | 41.97 | 47.05 | 1.27 | 1.23 | 26.61 | 0.73 | 37.93 |
| 1290 | 42.04 | 46.11 | 1.24 | 1.24 | 26.66 | 0.75 | 38.09 |
| 1320 | 42.11 | 49.96 | 1.23 | 1.26 | 26.73 | 0.75 | 38.33 |
| 1350 | 42.20 | 43.66 | 1.24 | 1.28 | 26.75 | 0.75 | 38.60 |
| 1380 | 42.29 | 42.83 | 1.27 | 1.31 | 26.82 | 0.70 | 39.06 |
| 1410 | 42.37 | 45.16 | 1.31 | 1.33 | 27.01 | 0.76 | 39.38 |
| 1440 | 42.45 | 44.03 | 1.35 | 1.35 | 27.04 | 0.74 | 39.73 |
| 1470 | 42.52 | 43.46 | 1.39 | 1.37 | 27.12 | 0.77 | 39.87 |
| 1500 | 42.55 | 40.64 | 1.44 | 1.38 | 27.20 | 0.79 | 40.32 |
| 1550 | 42.52 | 39.97 | 1.50 | 1.36 | 27.24 | 0.78 | 40.66 |
| 1600 | 42.42 | 40.39 | 1.48 | 1.33 | 27.38 | 0.80 | 41.16 |
| 1650 | 42.29 | 48.58 | 1.47 | 1.27 | 27.44 | 0.77 | 41.51 |
| 1700 | 42.01 | 43.77 | 1.44 | 1.19 | 27.31 | 0.73 | 41.40 |



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



Low Noise Amplifier

ZHL-1217HLN+

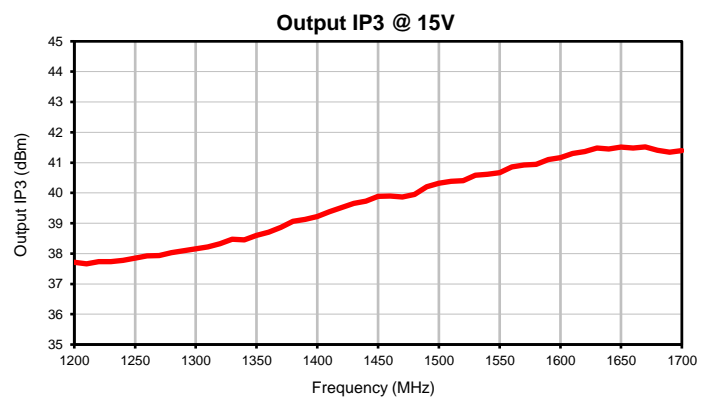
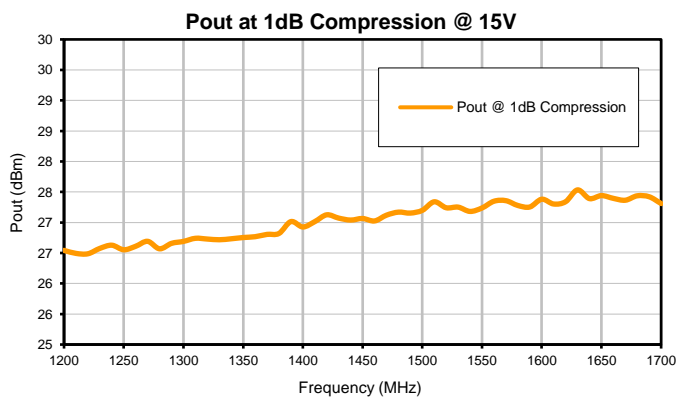
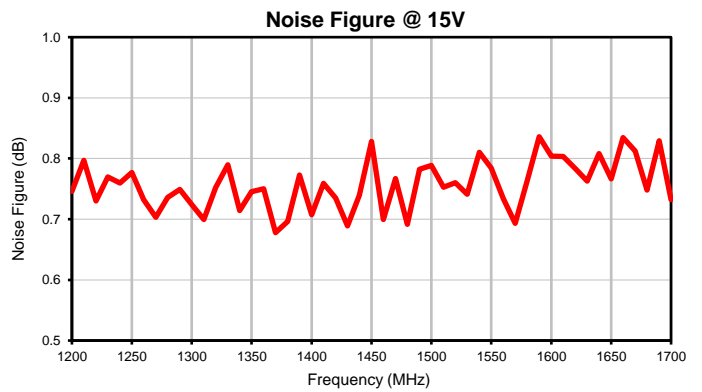
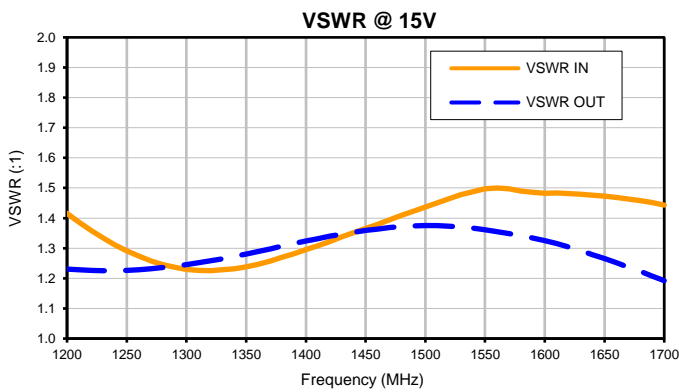
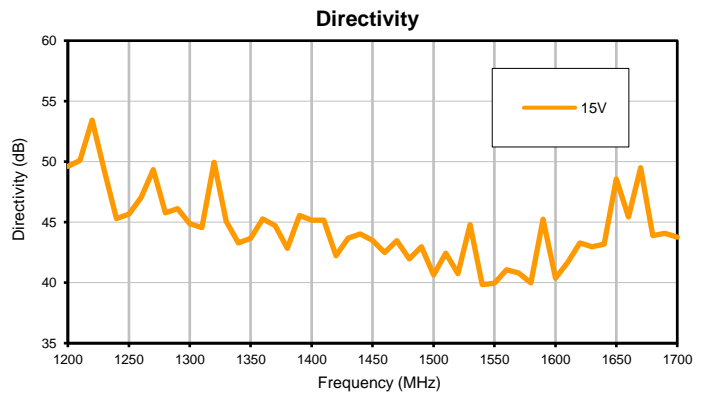
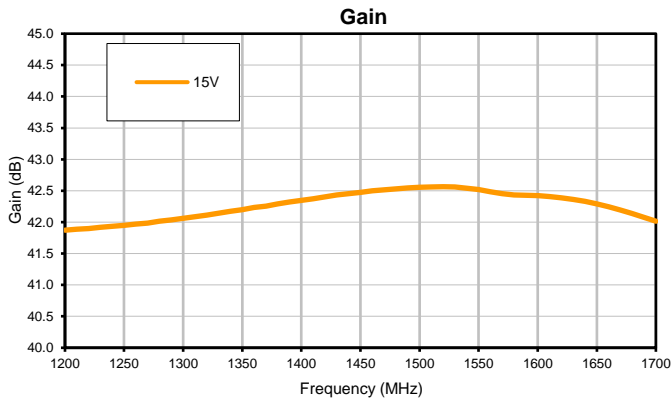
Typical Performance Data

| FREQ. (MHz) | GAIN (dB) 15V | DIRECTIVITY (dB) 15V | VSWR (:1) | | NOISE FIGURE (dB) 15V | POUT @ 1 dB COMPRESSION (dBm) 15V | OUTPUT IP3 (dBm) 15V |
|----------------|---------------------|----------------------------|--------------|------------|--------------------------------|--|----------------------------|
| | | | IN 15V | OUT 15V | | | |
| 1200 | 41.87 | 49.61 | 1.42 | 1.23 | 0.75 | 26.54 | 37.71 |
| 1210 | 41.89 | 50.10 | 1.39 | 1.23 | 0.80 | 26.49 | 37.66 |
| 1220 | 41.90 | 53.44 | 1.36 | 1.23 | 0.73 | 26.49 | 37.73 |
| 1230 | 41.92 | 49.26 | 1.33 | 1.23 | 0.77 | 26.58 | 37.73 |
| 1240 | 41.93 | 45.29 | 1.31 | 1.23 | 0.76 | 26.63 | 37.77 |
| 1250 | 41.95 | 45.66 | 1.29 | 1.23 | 0.78 | 26.55 | 37.85 |
| 1260 | 41.97 | 47.05 | 1.27 | 1.23 | 0.73 | 26.61 | 37.93 |
| 1270 | 41.99 | 49.33 | 1.26 | 1.23 | 0.70 | 26.69 | 37.94 |
| 1280 | 42.01 | 45.77 | 1.25 | 1.24 | 0.74 | 26.57 | 38.03 |
| 1290 | 42.04 | 46.11 | 1.24 | 1.24 | 0.75 | 26.66 | 38.09 |
| 1300 | 42.06 | 44.87 | 1.23 | 1.25 | 0.72 | 26.69 | 38.16 |
| 1310 | 42.09 | 44.57 | 1.23 | 1.25 | 0.70 | 26.74 | 38.22 |
| 1320 | 42.11 | 49.96 | 1.23 | 1.26 | 0.75 | 26.73 | 38.33 |
| 1330 | 42.14 | 45.05 | 1.23 | 1.27 | 0.79 | 26.72 | 38.47 |
| 1340 | 42.17 | 43.29 | 1.23 | 1.27 | 0.71 | 26.73 | 38.45 |
| 1350 | 42.20 | 43.66 | 1.24 | 1.28 | 0.75 | 26.75 | 38.60 |
| 1360 | 42.23 | 45.26 | 1.25 | 1.29 | 0.75 | 26.77 | 38.70 |
| 1370 | 42.26 | 44.70 | 1.26 | 1.30 | 0.68 | 26.81 | 38.86 |
| 1380 | 42.29 | 42.83 | 1.27 | 1.31 | 0.70 | 26.82 | 39.06 |
| 1390 | 42.32 | 45.55 | 1.28 | 1.32 | 0.77 | 27.02 | 39.12 |
| 1400 | 42.35 | 45.16 | 1.30 | 1.32 | 0.71 | 26.93 | 39.22 |
| 1410 | 42.37 | 45.16 | 1.31 | 1.33 | 0.76 | 27.01 | 39.38 |
| 1420 | 42.40 | 42.22 | 1.32 | 1.34 | 0.73 | 27.13 | 39.52 |
| 1430 | 42.43 | 43.69 | 1.34 | 1.35 | 0.69 | 27.07 | 39.66 |
| 1440 | 42.45 | 44.03 | 1.35 | 1.35 | 0.74 | 27.04 | 39.73 |
| 1450 | 42.48 | 43.50 | 1.37 | 1.36 | 0.83 | 27.07 | 39.88 |
| 1460 | 42.50 | 42.49 | 1.38 | 1.36 | 0.70 | 27.03 | 39.90 |
| 1470 | 42.52 | 43.46 | 1.39 | 1.37 | 0.77 | 27.12 | 39.87 |
| 1480 | 42.53 | 41.95 | 1.41 | 1.37 | 0.69 | 27.17 | 39.95 |
| 1490 | 42.54 | 42.98 | 1.42 | 1.37 | 0.78 | 27.15 | 40.20 |
| 1500 | 42.55 | 40.64 | 1.44 | 1.38 | 0.79 | 27.20 | 40.32 |
| 1510 | 42.56 | 42.45 | 1.45 | 1.37 | 0.75 | 27.34 | 40.39 |
| 1520 | 42.56 | 40.74 | 1.46 | 1.37 | 0.76 | 27.24 | 40.41 |
| 1530 | 42.56 | 44.80 | 1.48 | 1.37 | 0.74 | 27.25 | 40.59 |
| 1540 | 42.54 | 39.84 | 1.49 | 1.37 | 0.81 | 27.18 | 40.61 |
| 1550 | 42.52 | 39.97 | 1.50 | 1.36 | 0.78 | 27.24 | 40.66 |
| 1560 | 42.48 | 41.07 | 1.50 | 1.35 | 0.73 | 27.35 | 40.85 |
| 1570 | 42.45 | 40.80 | 1.50 | 1.35 | 0.69 | 27.36 | 40.92 |
| 1580 | 42.43 | 39.97 | 1.49 | 1.34 | 0.76 | 27.28 | 40.94 |
| 1590 | 42.43 | 45.24 | 1.49 | 1.33 | 0.84 | 27.25 | 41.10 |
| 1600 | 42.42 | 40.39 | 1.48 | 1.33 | 0.80 | 27.38 | 41.16 |
| 1610 | 42.41 | 41.69 | 1.48 | 1.32 | 0.80 | 27.30 | 41.30 |
| 1620 | 42.39 | 43.29 | 1.48 | 1.30 | 0.78 | 27.34 | 41.36 |
| 1630 | 42.36 | 42.98 | 1.48 | 1.29 | 0.76 | 27.53 | 41.48 |
| 1640 | 42.33 | 43.19 | 1.48 | 1.28 | 0.81 | 27.39 | 41.45 |
| 1650 | 42.29 | 48.58 | 1.47 | 1.27 | 0.77 | 27.44 | 41.51 |
| 1660 | 42.25 | 45.44 | 1.47 | 1.25 | 0.83 | 27.40 | 41.48 |
| 1670 | 42.20 | 49.49 | 1.46 | 1.24 | 0.81 | 27.36 | 41.52 |
| 1680 | 42.14 | 43.89 | 1.46 | 1.22 | 0.75 | 27.44 | 41.41 |
| 1690 | 42.08 | 44.07 | 1.45 | 1.21 | 0.83 | 27.42 | 41.35 |
| 1700 | 42.01 | 43.77 | 1.44 | 1.19 | 0.73 | 27.31 | 41.40 |

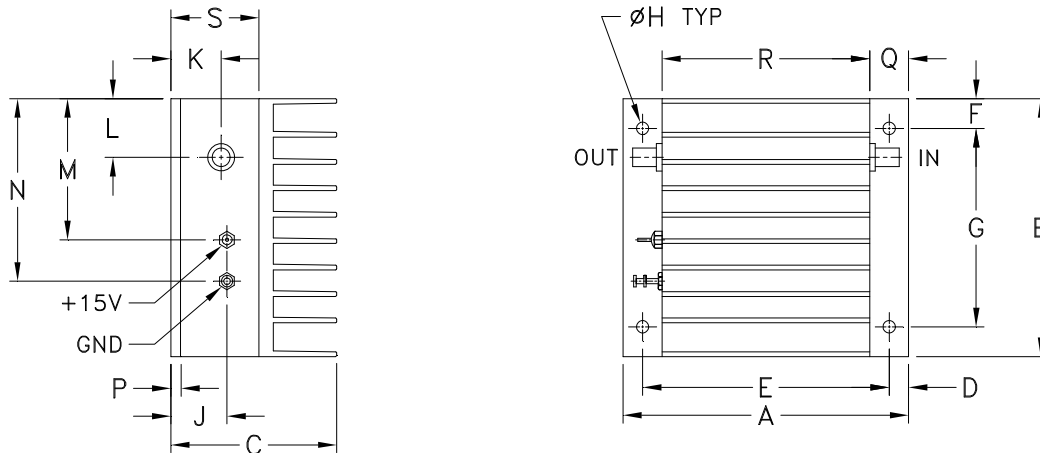
Low Noise Amplifier

ZHL-1217HLN+

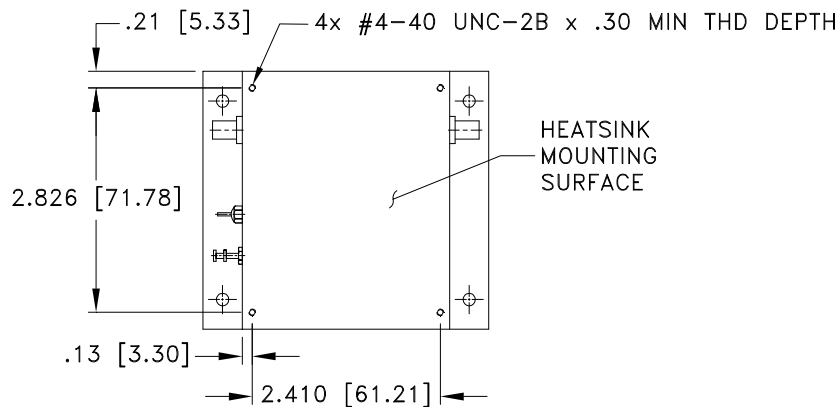
Typical Performance Curves



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 (92.96) | 3.25 (82.55) | 2.13 (54.10) | .25 (6.35) | 3.16 (80.26) | .38 (9.65) | 2.50 (63.50) | .156 (3.96) | .72 (18.29) | .64 (16.26) | .74 (18.80) | 1.78 (45.21) | 2.30 (58.42) |

| CASE# | P | Q | R | S | WT. GRAMS | WT. WITHOUT HEATSINK GRAMS |
|-------|----------------|----------------|-----------------|-----------------|-----------|----------------------------|
| NN92 | .125 (3.18) | .50 (12.70) | 2.66 (67.56) | 1.13 (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.



INTERNET <http://www.minicircuits.com>

P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661

Distribution Centers NORTH AMERICA 800-654-7949 • 417-335-5935 • Fax 417-335-5945 • EUROPE 44-1252-832600 • Fax 44-1252-837010

Mini-Circuits ISO 9001 & ISO 14001 Certified

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 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 |