



COAXIAL

Low Noise Amplifier

ZHL-1724HLN+ ZHL-1724HLNX+

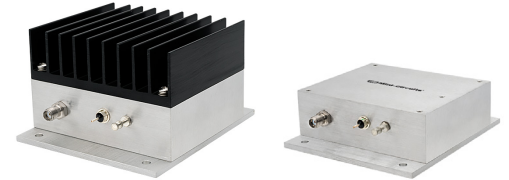
50Ω 1700 to 2400 MHz

FEATURES

- Very Low Noise Figure, 1.5 dB max.
- Wideband, 1700 to 2400 MHz
- High Dynamic Range

APPLICATIONS

- PCS/DCS
- UMTS
- Communication Systems



Generic photo used for illustration purposes only

| | | |
|-------------------|--------------|----------------|
| Model No. | ZHL-1724HLN+ | ZHL-1724HLNX+▲ |
| Case Style | NN92 | |
| Connectors | SMA | |

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

ELECTRICAL SPECIFICATIONS AT 25°C

| Parameter | Frequency (MHz) | ZHL-1724HLN-S+ | | | ZHL-1724HLNX-S+ ▲ | | | Units |
|------------------------------------|-----------------|----------------|------|------|-------------------|------|------|-------|
| | | Min. | Typ. | Max. | Min | Typ. | Max. | |
| Frequency Range | | 1700 | | 2400 | 1700 | | 2400 | MHz |
| Noise Figure ¹ | 1700-2400 | — | 1.10 | 1.5 | — | 1.10 | 1.5 | dB |
| Gain | 1700-2400 | 30 | 36 | — | 30 | 36 | — | dB |
| Gain Flatness | 1700-2400 | — | 0.7 | ±1.0 | — | 0.7 | ±1.0 | dB |
| Output Power at 1dB compression | 1700-2400 | — | +26 | — | — | +26 | — | dBm |
| Output third order intercept point | 1700-2400 | — | +36 | — | — | +36 | — | dBm |
| Input VSWR | 1700-2400 | — | 1.4 | — | — | 1.4 | — | :1 |
| Output VSWR | 1700-2400 | — | 1.6 | — | — | 1.6 | — | :1 |
| DC Supply Voltage | | — | 15 | — | — | 15 | — | V |
| Supply Current ¹ | | — | 580 | 725 | — | 580 | 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.

REV. B
 ECO-018348
 ZHL-1724HLN+
 MCL NY
 230626





COAXIAL

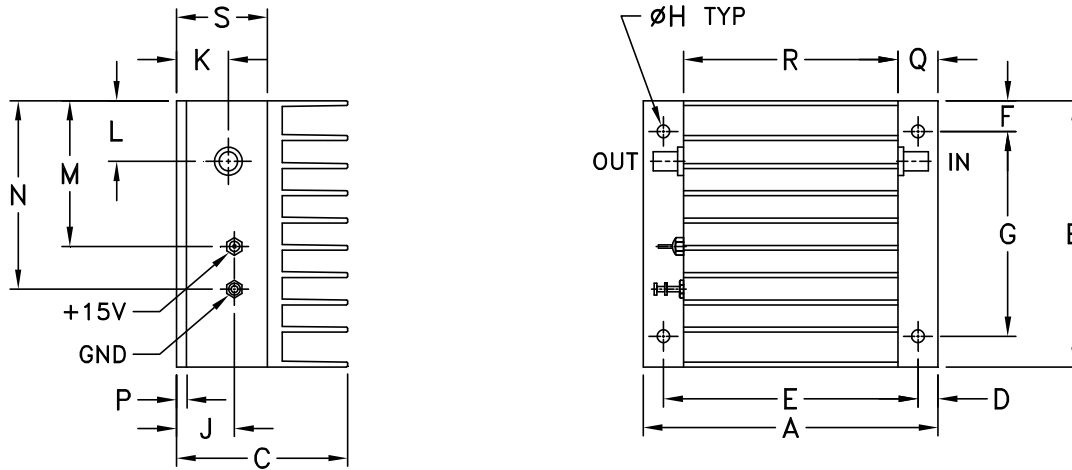
Low Noise Amplifier

ZHL-1724HLN+ ZHL-1724HLNX+

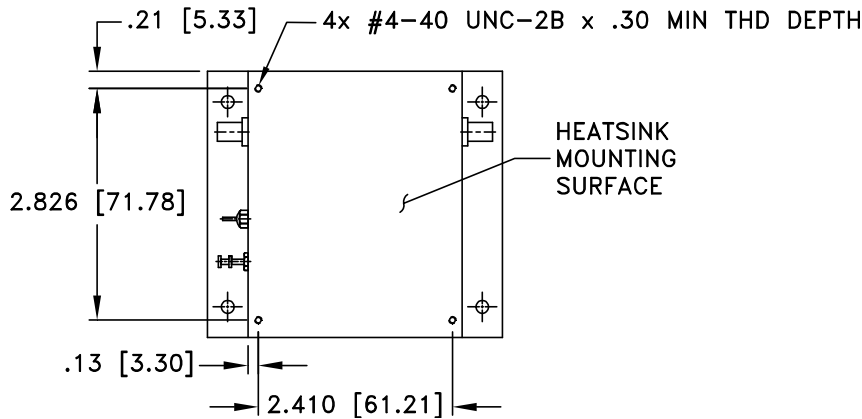
Mini-Circuits

50Ω 1700 to 2400 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 | 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

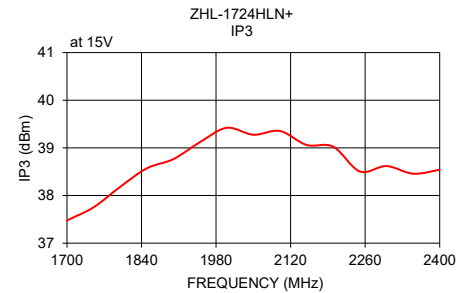
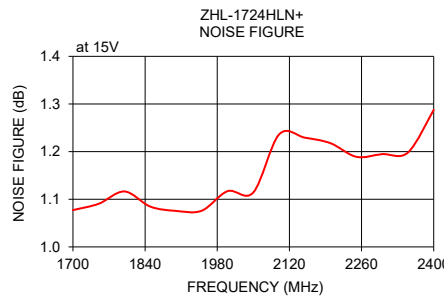
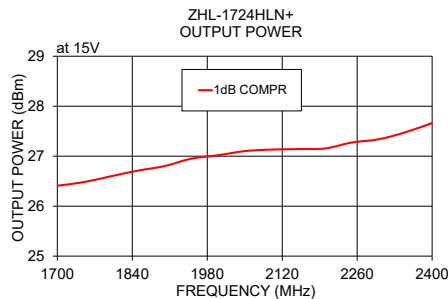
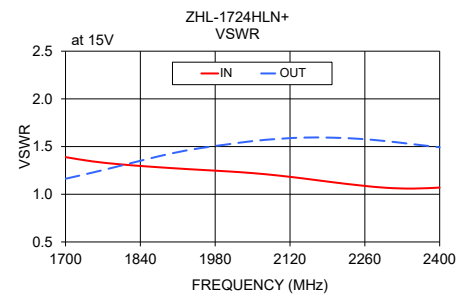
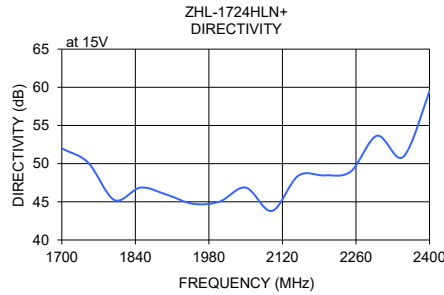
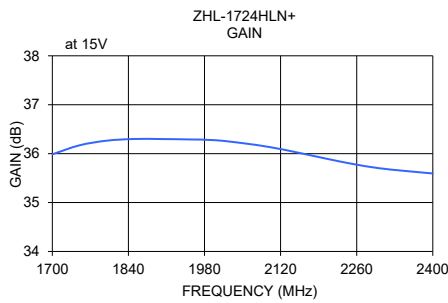
ZHL-1724HLN+ ZHL-1724HLNX+

Mini-Circuits

50Ω 1700 to 2400 MHz

TYPICAL PERFORMANCE DATA/CURVES

| FREQUENCY (MHz) | GAIN (dB) | DIRECTIVITY (dB) | VSWR (:1) | | POUT at 1 dB COMPR. (dBm) | NOISE FIGURE (dB) | IP3 (dBm) |
|-----------------|-----------|------------------|-----------|------|---------------------------|-------------------|-----------|
| | 15V | 15V | IN | OUT | 15V | 15V | 15V |
| 1700 | 35.99 | 51.99 | 1.39 | 1.16 | 26.41 | 1.08 | 37.48 |
| 1750 | 36.17 | 50.14 | 1.35 | 1.23 | 26.48 | 1.09 | 37.75 |
| 1800 | 36.26 | 45.24 | 1.32 | 1.29 | 26.60 | 1.12 | 38.18 |
| 1850 | 36.30 | 46.87 | 1.29 | 1.36 | 26.71 | 1.08 | 38.57 |
| 1900 | 36.30 | 45.92 | 1.27 | 1.43 | 26.80 | 1.08 | 38.76 |
| 1950 | 36.29 | 44.73 | 1.26 | 1.48 | 26.95 | 1.08 | 39.12 |
| 2000 | 36.27 | 45.02 | 1.24 | 1.52 | 27.02 | 1.12 | 39.42 |
| 2050 | 36.21 | 46.87 | 1.22 | 1.56 | 27.10 | 1.11 | 39.28 |
| 2100 | 36.13 | 43.80 | 1.20 | 1.58 | 27.13 | 1.24 | 39.35 |
| 2150 | 36.03 | 48.41 | 1.16 | 1.59 | 27.14 | 1.23 | 39.06 |
| 2200 | 35.91 | 48.46 | 1.13 | 1.59 | 27.16 | 1.22 | 39.03 |
| 2250 | 35.79 | 48.96 | 1.09 | 1.58 | 27.27 | 1.19 | 38.50 |
| 2300 | 35.70 | 53.65 | 1.07 | 1.56 | 27.34 | 1.19 | 38.62 |
| 2350 | 35.65 | 50.89 | 1.06 | 1.52 | 27.48 | 1.20 | 38.46 |
| 2400 | 35.59 | 59.49 | 1.07 | 1.49 | 27.66 | 1.29 | 38.54 |



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-1724HLN+

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 | | | |
| 1500 | 34.60 | 51.78 | 1.80 | 1.05 | 1.08 | 25.85 | 36.17 |
| 1525 | 34.74 | 55.68 | 1.74 | 1.05 | 1.11 | 26.00 | 36.47 |
| 1550 | 34.97 | 57.94 | 1.66 | 1.05 | 1.12 | 26.10 | 36.54 |
| 1575 | 35.12 | 54.99 | 1.61 | 1.06 | 1.09 | 26.12 | 36.77 |
| 1600 | 35.36 | 54.43 | 1.54 | 1.07 | 1.07 | 26.23 | 36.91 |
| 1625 | 35.50 | 54.41 | 1.50 | 1.08 | 1.09 | 26.26 | 37.18 |
| 1650 | 35.71 | 52.13 | 1.45 | 1.11 | 1.09 | 26.29 | 37.27 |
| 1675 | 35.83 | 49.01 | 1.42 | 1.13 | 1.05 | 26.35 | 37.39 |
| 1700 | 35.99 | 51.99 | 1.39 | 1.16 | 1.08 | 26.41 | 37.48 |
| 1725 | 36.07 | 48.38 | 1.37 | 1.19 | 1.02 | 26.44 | 37.77 |
| 1750 | 36.17 | 50.14 | 1.35 | 1.23 | 1.09 | 26.48 | 37.75 |
| 1775 | 36.22 | 48.25 | 1.33 | 1.25 | 1.02 | 26.50 | 37.85 |
| 1800 | 36.26 | 45.24 | 1.32 | 1.29 | 1.12 | 26.60 | 38.18 |
| 1825 | 36.29 | 48.07 | 1.31 | 1.32 | 1.01 | 26.63 | 38.34 |
| 1850 | 36.30 | 46.87 | 1.29 | 1.36 | 1.08 | 26.71 | 38.57 |
| 1875 | 36.30 | 47.40 | 1.29 | 1.39 | 1.13 | 26.81 | 38.87 |
| 1900 | 36.30 | 45.92 | 1.27 | 1.43 | 1.08 | 26.80 | 38.76 |
| 1925 | 36.29 | 44.39 | 1.27 | 1.45 | 1.04 | 26.85 | 38.97 |
| 1950 | 36.29 | 44.73 | 1.26 | 1.48 | 1.08 | 26.95 | 39.12 |
| 1975 | 36.29 | 42.97 | 1.25 | 1.50 | 1.15 | 26.90 | 39.19 |
| 2000 | 36.27 | 45.02 | 1.24 | 1.52 | 1.12 | 27.02 | 39.42 |
| 2025 | 36.25 | 45.17 | 1.23 | 1.54 | 1.08 | 27.01 | 39.25 |
| 2050 | 36.21 | 46.87 | 1.22 | 1.56 | 1.11 | 27.10 | 39.28 |
| 2075 | 36.19 | 45.19 | 1.21 | 1.57 | 1.16 | 27.08 | 39.39 |
| 2100 | 36.13 | 43.80 | 1.20 | 1.58 | 1.24 | 27.13 | 39.35 |
| 2125 | 36.09 | 45.51 | 1.18 | 1.59 | 1.16 | 27.11 | 39.19 |
| 2150 | 36.03 | 48.41 | 1.16 | 1.59 | 1.23 | 27.14 | 39.06 |
| 2175 | 35.98 | 47.32 | 1.15 | 1.60 | 1.20 | 27.20 | 38.84 |
| 2200 | 35.91 | 48.46 | 1.13 | 1.59 | 1.22 | 27.16 | 39.03 |
| 2225 | 35.86 | 48.40 | 1.11 | 1.59 | 1.24 | 27.19 | 38.53 |
| 2250 | 35.79 | 48.96 | 1.09 | 1.58 | 1.19 | 27.27 | 38.50 |
| 2275 | 35.76 | 51.86 | 1.08 | 1.57 | 1.10 | 27.30 | 38.40 |
| 2300 | 35.70 | 53.65 | 1.07 | 1.56 | 1.19 | 27.34 | 38.62 |
| 2325 | 35.68 | 56.50 | 1.06 | 1.54 | 1.19 | 27.43 | 38.41 |
| 2350 | 35.65 | 50.89 | 1.06 | 1.52 | 1.20 | 27.48 | 38.46 |
| 2375 | 35.62 | 58.02 | 1.06 | 1.51 | 1.20 | 27.55 | 38.51 |
| 2400 | 35.59 | 59.49 | 1.07 | 1.49 | 1.29 | 27.66 | 38.54 |
| 2425 | 35.58 | 53.56 | 1.08 | 1.48 | 1.37 | 27.80 | 38.61 |
| 2450 | 35.58 | 52.25 | 1.09 | 1.47 | 1.33 | 27.86 | 38.59 |
| 2475 | 35.59 | 52.55 | 1.10 | 1.46 | 1.35 | 27.96 | 38.55 |
| 2500 | 35.58 | 53.57 | 1.11 | 1.46 | 1.37 | 27.94 | 38.68 |

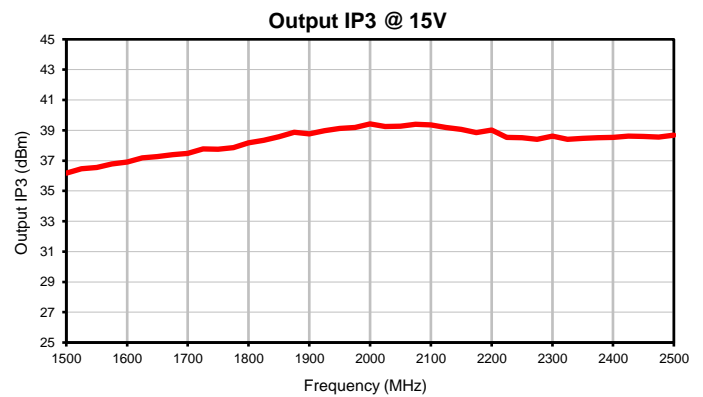
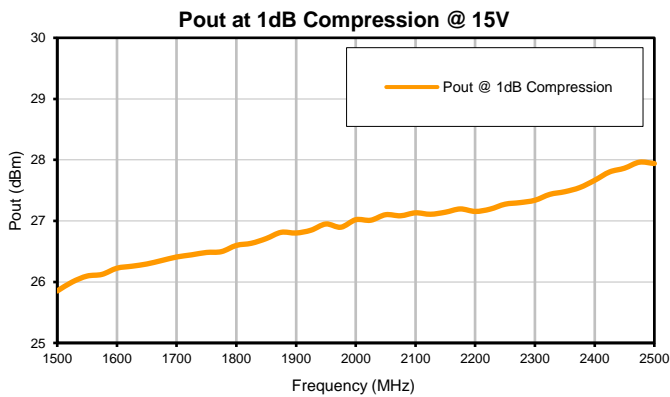
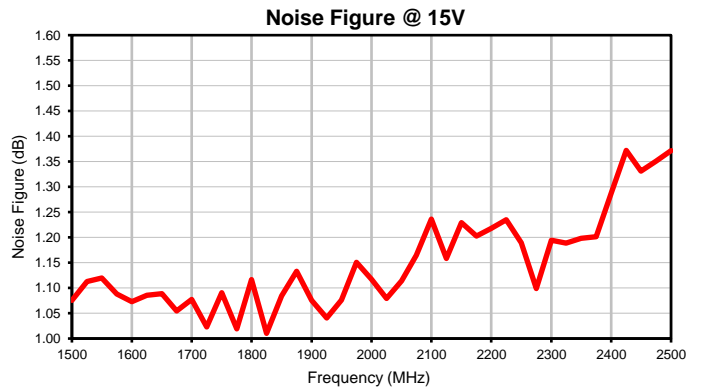
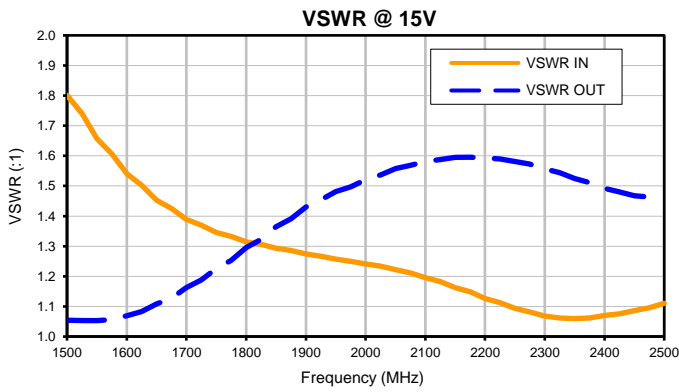
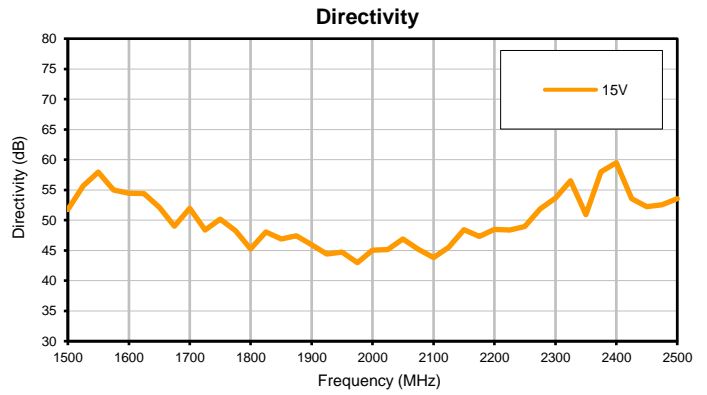
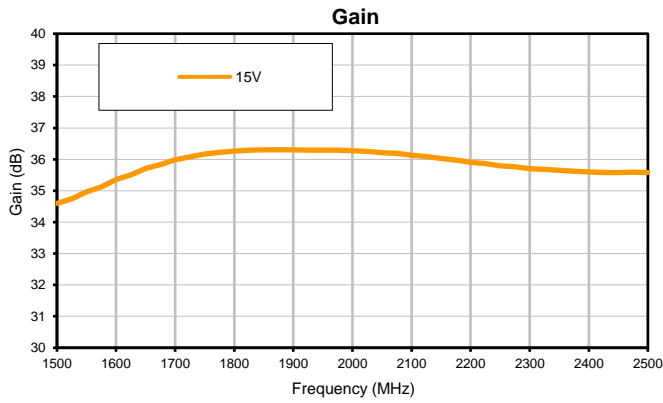


P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 • Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site
 The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com

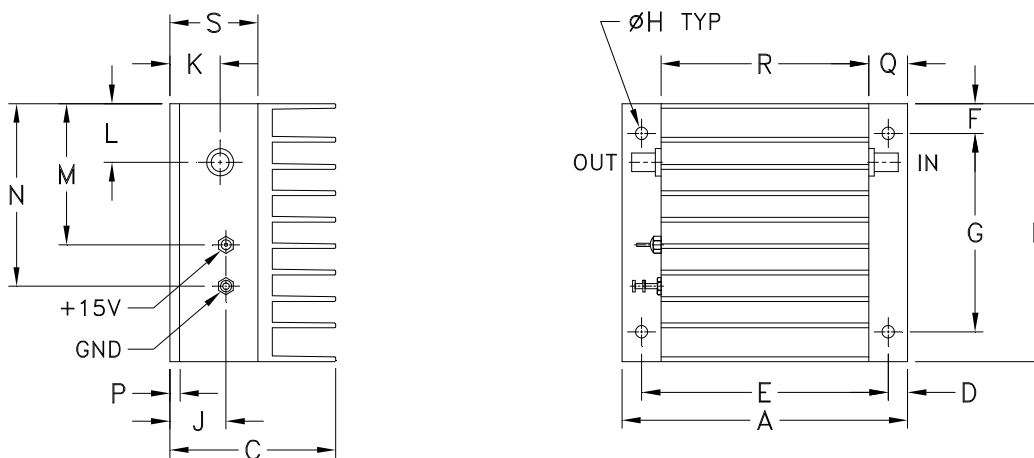
IF/RF MICROWAVE COMPONENTS

REV. OR
 ZHL-1724HLN+
 7/22/2015
 Page 1 of 1

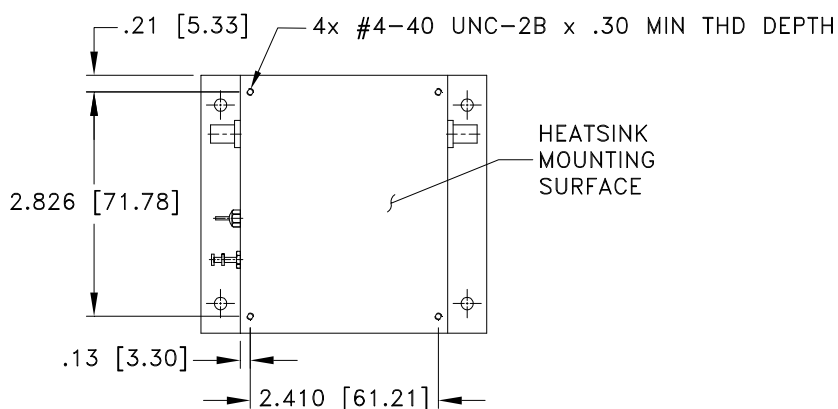
Typical Performance Curves



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 |