

# Plug-In Low Noise Amplifier

## MAN-1HLN+ MAN-1HLN

50Ω

10 to 500 MHz

### Features

- low noise, 3.7 dB typ.
- high IP3, +30 dB typ.
- hermetic case
- protected by US Patent, 6,943,629

### Applications

- VHF/UHF
- military, hi-rel applications



Generic photo used for illustration purposes only

CASE STYLE: A06

**+RoHS Compliant**

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

### Low Noise Amplifier Electrical Specifications

| MODEL NO.   | FREQUENCY (MHz) |       | NOISE FIGURE (dB) | GAIN (dB) |      |             | MAXIMUM POWER (dBm)  |                   | INTERCEPT POINT (dBm) | VSWR (:1) Typ. |     | DC POWER      |                   |
|-------------|-----------------|-------|-------------------|-----------|------|-------------|----------------------|-------------------|-----------------------|----------------|-----|---------------|-------------------|
|             | $f_L$           | $f_U$ |                   | Min.      | m    | Total Range | Output (1 dB Compr.) | Input (no damage) |                       | In             | Out | Volt (V) Nom. | Current (mA) Max. |
| MAN-1HLN(+) | 10              | 500   | 3.7               | 10        | ±0.5 | ±0.8        | +15                  | +15               | +30                   | 1.8            | 1.8 | 12            | 70                |

m = mid range [ $2 f_L$  to  $f_U/2$ ]

Open load is not recommended, potentially can cause damage.

With no load derate max input power by 20 dB

### Pin Connections

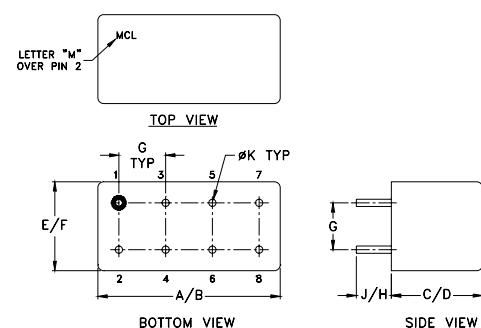
|             |         |
|-------------|---------|
| RF IN       | 1       |
| RF OUT      | 8       |
| DC          | 5       |
| GROUND      | 2,3,4,6 |
| CASE GROUND | 2,3,4,6 |
| NOT USED    | 7       |

### Maximum Ratings

|                       |                |
|-----------------------|----------------|
| Operating Temperature | -54°C to 85°C  |
| Storage Temperature   | -55°C to 100°C |
| DC Voltage            | +12.5V Max.    |

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

### Outline Drawing



### Outline Dimensions (inch mm)

| A      | B     | C     | D     | E     | F     | G    | H    | J     | K      | wt    |
|--------|-------|-------|-------|-------|-------|------|------|-------|--------|-------|
| .770   | .800  | .285  | .310  | .370  | .400  | .200 | .20  | .14   | .031   | grams |
| 19.558 | 20.32 | 7.239 | 7.874 | 9.398 | 10.16 | 5.08 | 5.08 | 3.556 | 0.7874 | 5.2   |

#### Notes

- 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.
- 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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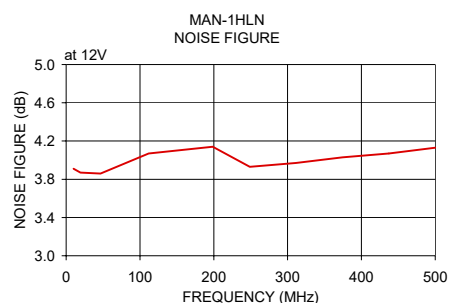
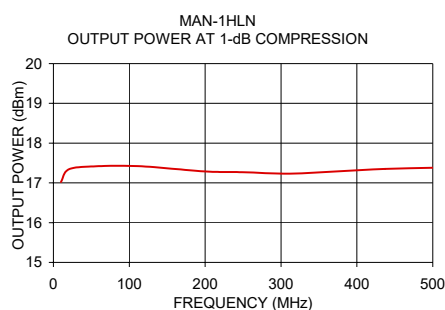
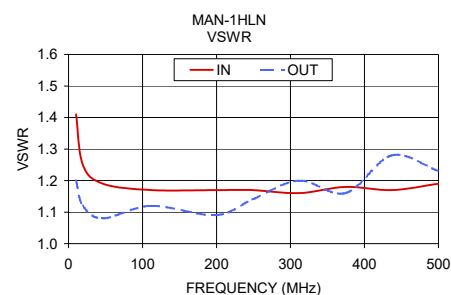
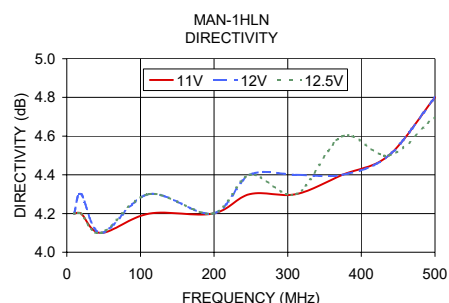
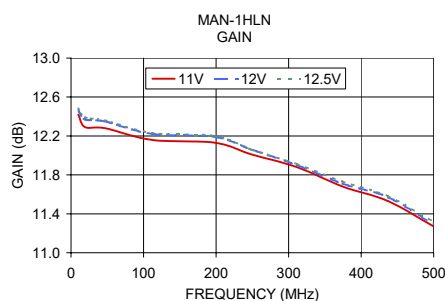
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REV. B  
M151107  
MAN-1HLN  
160526  
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# Typical Performance Data/Curves

# MAN-1HLN+ MAN-1HLN

| FREQUENCY<br>(MHz) | GAIN<br>(dB) |       |       | DIRECTIVITY<br>(dB) |      |       | VSWR<br>(:1) |      | NOISE<br>FIGURE<br>(dB) | POUT<br>at 1 dB<br>COMPR.<br>(dBm) |
|--------------------|--------------|-------|-------|---------------------|------|-------|--------------|------|-------------------------|------------------------------------|
|                    | 11V          | 12V   | 12.5V | 11V                 | 12V  | 12.5V | IN           | OUT  | 12V                     | 12V                                |
| 10.00              | 12.42        | 12.46 | 12.48 | 4.20                | 4.20 | 4.20  | 1.41         | 1.20 | 3.91                    | 17.02                              |
| 19.30              | 12.29        | 12.37 | 12.39 | 4.20                | 4.30 | 4.20  | 1.25         | 1.12 | 3.87                    | 17.33                              |
| 46.50              | 12.28        | 12.35 | 12.36 | 4.10                | 4.10 | 4.10  | 1.19         | 1.08 | 3.86                    | 17.41                              |
| 111.80             | 12.16        | 12.22 | 12.23 | 4.20                | 4.30 | 4.30  | 1.17         | 1.12 | 4.07                    | 17.42                              |
| 198.50             | 12.13        | 12.19 | 12.20 | 4.20                | 4.20 | 4.20  | 1.17         | 1.09 | 4.14                    | 17.29                              |
| 248.70             | 12.01        | 12.06 | 12.06 | 4.30                | 4.40 | 4.40  | 1.17         | 1.14 | 3.93                    | 17.27                              |
| 311.50             | 11.88        | 11.90 | 11.91 | 4.30                | 4.40 | 4.30  | 1.16         | 1.20 | 3.97                    | 17.23                              |
| 374.40             | 11.68        | 11.71 | 11.73 | 4.40                | 4.40 | 4.60  | 1.18         | 1.16 | 4.03                    | 17.29                              |
| 437.20             | 11.53        | 11.57 | 11.58 | 4.50                | 4.50 | 4.50  | 1.17         | 1.28 | 4.07                    | 17.35                              |
| 500.00             | 11.27        | 11.29 | 11.32 | 4.80                | 4.80 | 4.70  | 1.19         | 1.23 | 4.13                    | 17.38                              |



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# Low Noise Amplifier

MAN-1HLN

## Typical Performance Data

| FREQUENCY<br>(MHz) | GAIN<br>(dB) |       |       | DIRECTIVITY<br>(dB) |      |       | VSWR<br>IN<br>(:1)<br>12V | VSWR OUT<br>(:1)<br>12V | NOISE<br>FIGURE<br>(dB)<br>12V | Pout at<br>1dB Comp.<br>(dBm)<br>12V |
|--------------------|--------------|-------|-------|---------------------|------|-------|---------------------------|-------------------------|--------------------------------|--------------------------------------|
|                    | 11V          | 12V   | 12.5V | 11V                 | 12V  | 12.5V |                           |                         |                                |                                      |
| 10.0               | 12.42        | 12.46 | 12.48 | 4.20                | 4.20 | 4.20  | 1.41                      | 1.20                    | 3.91                           | 17.02                                |
| 19.3               | 12.29        | 12.37 | 12.39 | 4.20                | 4.30 | 4.20  | 1.25                      | 1.12                    | 3.87                           | 17.33                                |
| 46.5               | 12.28        | 12.35 | 12.36 | 4.10                | 4.10 | 4.10  | 1.19                      | 1.08                    | 3.86                           | 17.41                                |
| 111.8              | 12.16        | 12.22 | 12.23 | 4.20                | 4.30 | 4.30  | 1.17                      | 1.12                    | 4.07                           | 17.42                                |
| 198.5              | 12.13        | 12.19 | 12.20 | 4.20                | 4.20 | 4.20  | 1.17                      | 1.09                    | 4.14                           | 17.29                                |
| 248.7              | 12.01        | 12.06 | 12.06 | 4.30                | 4.40 | 4.40  | 1.17                      | 1.14                    | 3.93                           | 17.27                                |
| 311.5              | 11.88        | 11.90 | 11.91 | 4.30                | 4.40 | 4.30  | 1.16                      | 1.20                    | 3.97                           | 17.23                                |
| 374.4              | 11.68        | 11.71 | 11.73 | 4.40                | 4.40 | 4.60  | 1.18                      | 1.16                    | 4.03                           | 17.29                                |
| 437.2              | 11.53        | 11.57 | 11.58 | 4.50                | 4.50 | 4.50  | 1.17                      | 1.28                    | 4.07                           | 17.35                                |
| 500.0              | 11.27        | 11.29 | 11.32 | 4.80                | 4.80 | 4.70  | 1.19                      | 1.23                    | 4.13                           | 17.38                                |

REV. X1  
MAN-1HLN  
060912  
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IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS 9100 CERTIFIED RoHS compliant

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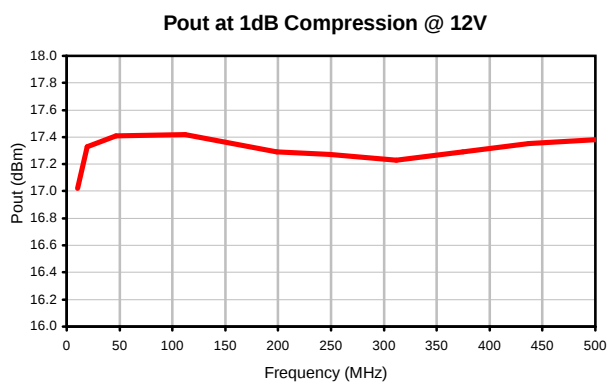
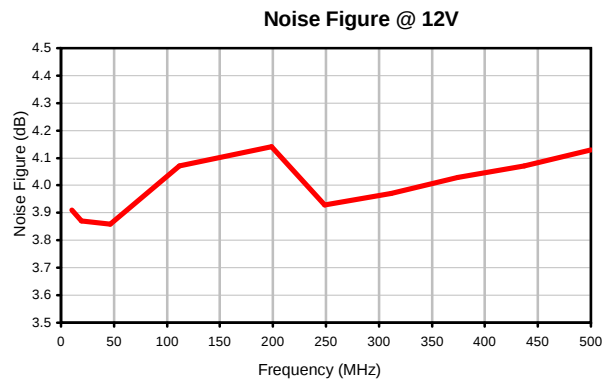
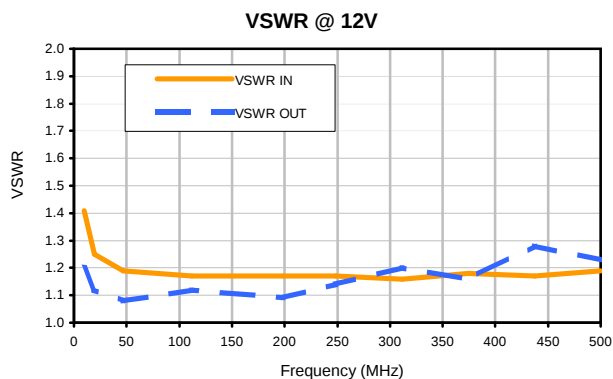
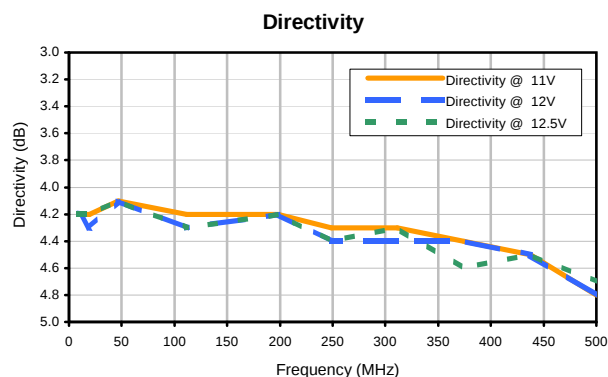
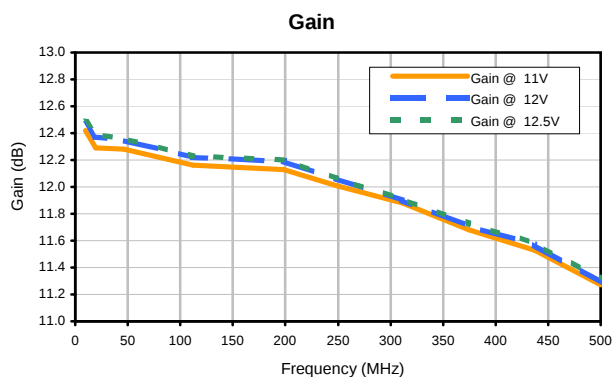
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# Low Noise Amplifier

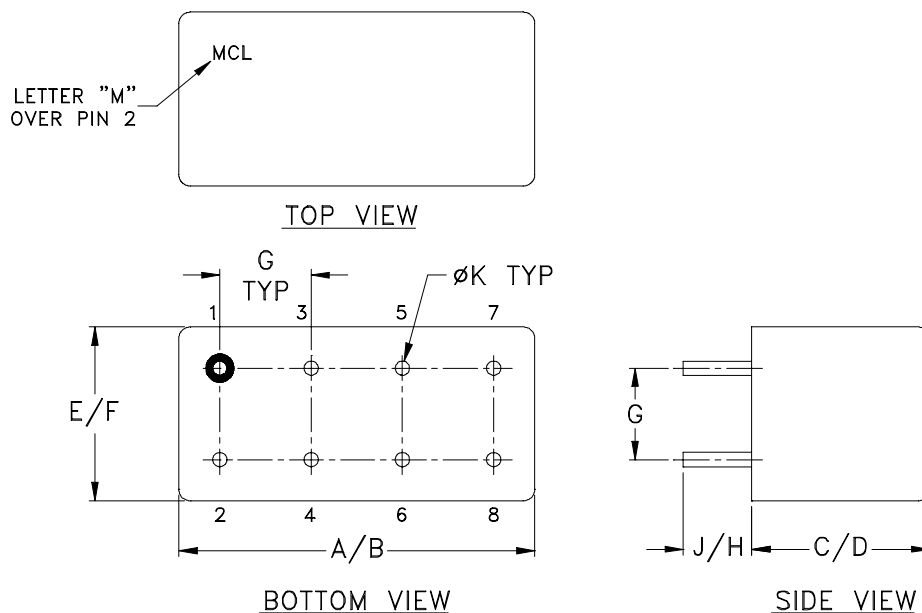
## Typical Performance Curves

MAN-1HLN



A01  
A04  
A05  
A06

## Outline Dimensions



| CASE# | A               | B               | C              | D               | E              | F               | G              | H             | J             | K             | WT,<br>GRAM |
|-------|-----------------|-----------------|----------------|-----------------|----------------|-----------------|----------------|---------------|---------------|---------------|-------------|
| A01   | .770<br>(19.56) | .800<br>(20.32) | .385<br>(9.78) | .400<br>(10.16) | .370<br>(9.40) | .400<br>(10.16) | .200<br>(5.08) | .20<br>(5.08) | .14<br>(3.56) | .031<br>(.79) | 5.2         |
| A04   |                 |                 | .200<br>(5.08) | .210<br>(5.33)  |                |                 |                |               |               |               | 3.7         |
| A05   |                 |                 | .240<br>(6.10) | .250<br>(6.35)  |                |                 |                |               |               |               | 3.7         |
| A06   |                 |                 | .285<br>(7.24) | .310<br>(7.87)  |                |                 |                |               |               |               | 5.2         |

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

### Notes:

- Header material: C.R.S.  
Pin material: #52 alloy.  
Cover material: Cupro-Nickel.
- Pin finish: Electro Tin-Silver.
- Insulated spacer available. Request P/N B14-045-01.
- Tolerance on pin diameter  $\pm .005$  inch.
- Glass meniscus 0.015 inch max.
- Blue bead indicates Pin 1. Pin numbers do not appear on unit, for reference only.



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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          | -55° to 100° C<br>Ambient Environment                                                                                                                           | Individual Model Data Sheet                                                                          |
| Storage Temperature            | -55° to 100° C<br>Ambient Environment                                                                                                                           | Individual Model Data Sheet                                                                          |
| Thermal Shock                  | -55° to 100°C, 100 cycles                                                                                                                                       | MIL-STD-202, Method 107, Condition A-3, except +100°C                                                |
| Vibration (High Frequency)     | 20g peak, 10-2000 Hz, 12 times in each of three perpendicular directions (total 36)                                                                             | MIL-STD-202, Method 204, Condition D                                                                 |
| Mechanical Shock               | 50g, 11 ms, 1/2-sine, 18 shocks: 3 each direction, each of 3 axes                                                                                               | MIL-STD-202, Method 213, Condition A                                                                 |
| Moisture Resistance            | 10 cycles, 24 hours per cycle                                                                                                                                   | MIL-STD-202, Method 106, Condition A, except 50°C and end point electrical test done within 12 hours |
| Solderability                  | 10X Magnification                                                                                                                                               | J-STD-002, 95% Coverage                                                                              |
| Resistance to Solder Heat      | 260°C for 10 seconds                                                                                                                                            | MIL-STD-202, Method 210, Condition B                                                                 |
| Marking Resistance to Solvents | Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C;<br>distilled water + proylene glycol monomethyl ether + monoethanolamine at 63°C to 70°C | MIL-STD-202, Method 215                                                                              |
| Terminal Strength              | 4 1/2 Pound Pull                                                                                                                                                | MIL-STD-202, Method 211, Condition A                                                                 |



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| Specification       | Test/Inspection Condition | Reference/Spec                       |
|---------------------|---------------------------|--------------------------------------|
| Gross Leak          | 125°C Bubble Test         | MIL-STD-202, Method 112, Condition D |
| Barometric Pressure | 100,000 Feet              | MIL-STD-202, Method 105, Condition D |