



SUPER ULTRA

# Wideband Amplifier

## ZVE-323LN-K+ ZVE-323LNX-K+

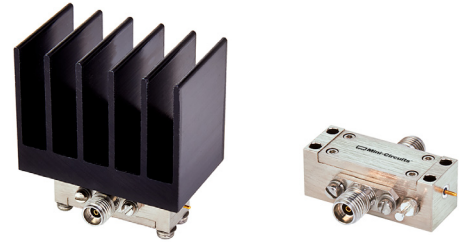
50Ω 18 to 32 GHz

### THE BIG DEAL

- Extremely wideband, 18 to 32 GHz
- Flat Gain, 20±1.5 dB typ.
- High OIP3, +23 dBm typ.
- +10 dBm Pout typ.

### APPLICATIONS

- Radar and military
- Test instrumentation
- Satellite repeaters
- Communication



Generic photo used for illustration purposes only

|                   |                 |                  |
|-------------------|-----------------|------------------|
| <b>Model No.</b>  | ZVE-323LN-K+    | ZVE-323LNX-K+ ▲  |
| <b>Option</b>     | With heatsink   | Without heatsink |
| <b>Case Style</b> | AV1280-1        |                  |
| <b>Connectors</b> | 2.92mm (K-Type) |                  |

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

### PRODUCT OVERVIEW

Mini-Circuits' ZVE-323LN-K+ is a Class-A, three-stage, unconditionally stable amplifier providing flat gain over an extremely wide frequency range from 18 to 32 GHz. This model is capable of delivering up to 10mW output power at P1dB with high output IP3 supporting a wide range of sensitive, high-dynamic range receiver applications and many systems where high performance over wideband is needed. It operates on a +12V supply and features built-in safety features including protection against reverse bias and immunity to accidental open or short loads for 2 minutes. The amplifier comes in a rugged, compact case (1.2 x0.46 x0.45") with K-type (2.92mm) connectors and an optional heat sink for efficient cooling.

### KEY FEATURES

| Feature   | Advantages  |
|---|---|
| Ultra-wideband, 18 to 32 GHz able to work from 17 to 33 GHz         | Enables a single amplifier to be used in a wide range of applications.  |
| Excellent gain flatness, ±1.5 dB across full frequency range        | Provides consistent performance across its operating frequency, minimizing the need for external equalizing networks in wideband applications.  |
| High gain, 20 dB typ.   | Reduces the number of gain stages, lowering component count and overall system cost.  |
| Class A Amplifier   | Provides good linearity with low signal distortion.   |
| Low Noise and High OIP3:<br>• NF, 3 dB typ.<br>• OIP3, +23 dBm typ. | The combination of low noise and high OIP3 makes the ZVE-323LN-K+ ideal for use in low noise receiver front end (RFE) as it gives the user the advantages of sensitivity and two-tone IM performance at both ends of the dynamic range. |
| Rugged design   | Built-in protection against reverse bias and accidental open and short loads provides added reliability for demanding operating conditions.   |





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Mini-Circuits

## ELECTRICAL SPECIFICATIONS AT 25°C

| Parameter                          | Condition (GHz) | ZVE-323LN-K+<br>ZVE-323LNK-K+▲ |      |      | Units |
|------------------------------------|-----------------|--------------------------------|------|------|-------|
|                                    |                 | Min.                           | Typ. | Max. |       |
| Frequency range                    |                 | 18                             |      | 32   | GHz   |
| Gain                               | 18-32           | 17                             | 20   | 24   | dB    |
| Gain Flatness                      | 18-32           |                                | ±1.5 | ±2.5 | dB    |
| Output Power at 1dB compression    | 18-32           |                                | 10   |      | dBm   |
| Noise Figure                       | 18-32           |                                | 3    | 4    | dB    |
| Output third order intercept point | 18-32           |                                | 23   |      | dBm   |
| Input VSWR                         | 18-32           |                                | 1.9  | 3.0  | :1    |
| Output VSWR                        | 18-32           |                                | 1.8  | 3.0  | :1    |
| DC Supply Voltage                  |                 |                                | 12*  |      | V     |
| Supply Current                     |                 |                                | 50   | 75   | mA    |

\* Recommended operating voltage

▲ 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 20°C/W max.

## MAXIMUM RATINGS

| Parameter                     | Ratings  |
|-------------------------------|--|
| Operating temperature         | ZVE-323LN-K+ -40°C to 60°C ambient<br>ZVE-323LNK-K+ -40°C to 85°C base plate temp. |
| Storage temperature           | -65°C to 150°C   |
| DC Voltage                    | 14V  |
| CW Input RF Power (no damage) | +15 dBm  |

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



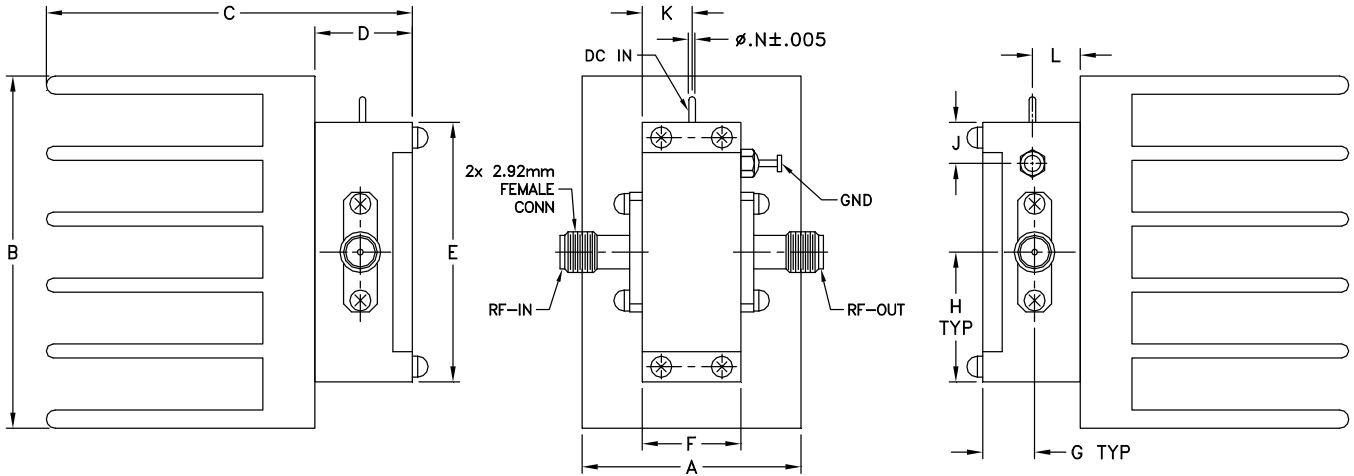


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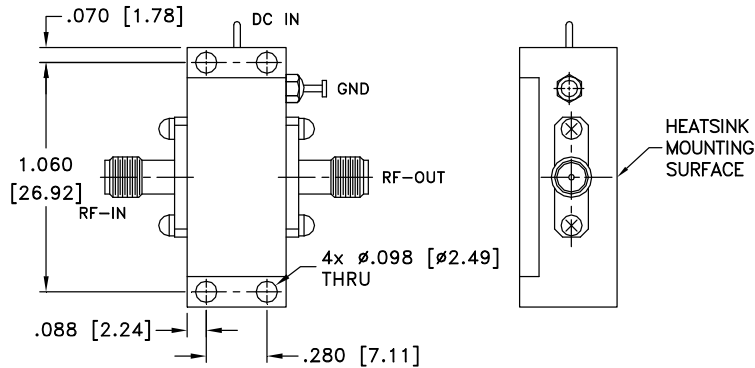
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## OUTLINE DRAWING FOR MODELS WITH HEATSINK (ZVE-323LN-K+)



## MOUNTING INFORMATION FOR MODELS WITHOUT HEATSINK (ZVE-323LNK-K+)



## OUTLINE DIMENSIONS (MM/INCH)

| A     | B     | C     | D     | E     | F     | G    | H     | J    | K    | L    | M | N    | wt     |
|-------|-------|-------|-------|-------|-------|------|-------|------|------|------|---|------|--------|
| 1.01  | 1.63  | 1.74  | .45   | 1.20  | .46   | .24  | .60   | .19  | .23  | .27  | - | .03  | grams* |
| 25.65 | 41.40 | 44.20 | 11.43 | 30.48 | 11.68 | 6.10 | 15.24 | 4.83 | 5.84 | 6.86 | - | 0.76 | 58     |

\*17 grams without heatsink





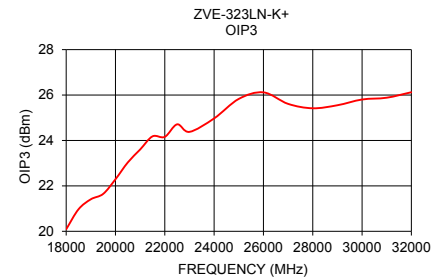
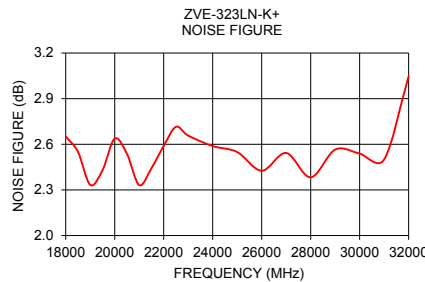
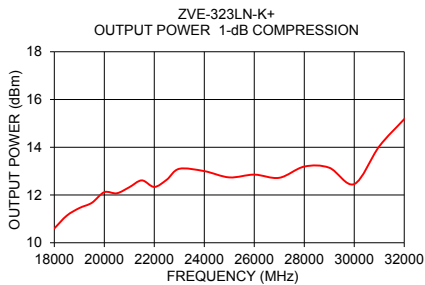
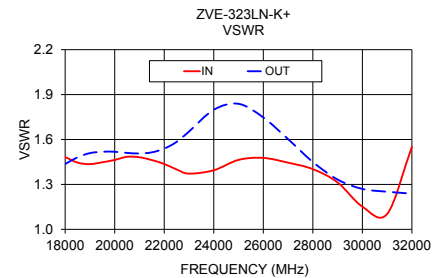
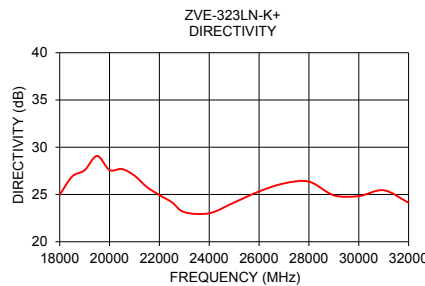
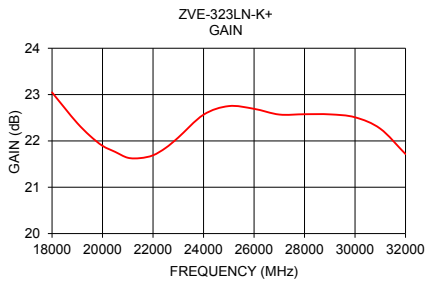
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## TYPICAL PERFORMANCE DATA/CURVES

| Frequency (MHz) | Gain (dB) | Directivity (dB) | VSWR (:1) |      | Pout at 1 dB Compr. (dBm) | Noise Figure (dB) | OIP3 (dBm) |
|-----------------|-----------|------------------|-----------|------|---------------------------|-------------------|------------|
|                 | 12V       | 12V              | IN        | OUT  | 12V                       | 12V               | 12V        |
| 18000           | 23.05     | 24.97            | 1.48      | 1.44 | 10.60                     | 2.65              | 20.09      |
| 18500           | 22.71     | 26.90            | 1.45      | 1.48 | 11.14                     | 2.55              | 20.97      |
| 19000           | 22.38     | 27.57            | 1.44      | 1.51 | 11.45                     | 2.33              | 21.41      |
| 19500           | 22.11     | 29.08            | 1.45      | 1.52 | 11.67                     | 2.43              | 21.65      |
| 20000           | 21.89     | 27.59            | 1.46      | 1.52 | 12.12                     | 2.64              | 22.29      |
| 20500           | 21.76     | 27.70            | 1.48      | 1.51 | 12.07                     | 2.54              | 23.03      |
| 21000           | 21.64     | 27.00            | 1.48      | 1.51 | 12.33                     | 2.33              | 23.60      |
| 21500           | 21.63     | 25.79            | 1.46      | 1.51 | 12.61                     | 2.44              | 24.18      |
| 22000           | 21.69     | 24.94            | 1.44      | 1.54 | 12.34                     | 2.59              | 24.16      |
| 22500           | 21.85     | 24.18            | 1.40      | 1.58 | 12.64                     | 2.71              | 24.71      |
| 23000           | 22.07     | 23.13            | 1.37      | 1.65 | 13.10                     | 2.66              | 24.38      |
| 24000           | 22.57     | 23.02            | 1.39      | 1.80 | 13.00                     | 2.59              | 24.97      |
| 25000           | 22.75     | 24.15            | 1.46      | 1.84 | 12.74                     | 2.55              | 25.83      |
| 26000           | 22.69     | 25.32            | 1.48      | 1.75 | 12.85                     | 2.43              | 26.12      |
| 27000           | 22.57     | 26.17            | 1.45      | 1.60 | 12.72                     | 2.54              | 25.61      |
| 28000           | 22.58     | 26.36            | 1.40      | 1.45 | 13.19                     | 2.38              | 25.42      |
| 29000           | 22.57     | 24.92            | 1.31      | 1.33 | 13.14                     | 2.57              | 25.55      |
| 30000           | 22.51     | 24.83            | 1.15      | 1.27 | 12.46                     | 2.54              | 25.80      |
| 31000           | 22.26     | 25.45            | 1.10      | 1.25 | 14.04                     | 2.50              | 25.88      |
| 32000           | 21.72     | 24.13            | 1.55      | 1.24 | 15.18                     | 3.05              | 26.12      |



### 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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