



Mini-Circuits®

COAXIAL SOLID-STATE

## High Power Amplifier

**ZHL6G018G020+**  
**ZHL6G018G020X+**

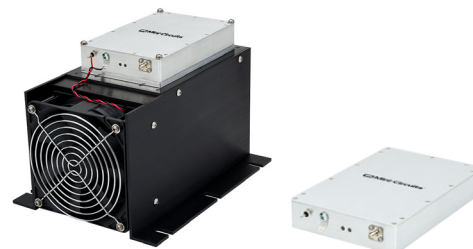
50Ω 20W 6 to 18 GHz

## THE BIG DEAL

- High output power, 20W
- 6 to 18 GHz ultra broadband
- Suitable for modulated, CW, and pulsed signals
- High power gain, 40 dB typical
- No damage with VSWR of 3:1
- Protected against: reverse polarity, over voltage, high temperature

## APPLICATIONS

- High Power test sets
- Burn-in systems
- 5G
- Wi-Fi
- Communications
- Radar



Generic photo used for illustration purposes only

| Model No.  | ZHL6G018G020+       | ZHL6G018G020X+         |
|------------|---------------------|------------------------|
| Option     | With Heatsink & Fan | Without Heatsink & Fan |
| Case Style | BT3013              |                        |
| Connectors | IN-SMA, OUT-SMA     |                        |

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

## PRODUCT OVERVIEW

ZHL6G018G020X+ is a Class AB, high power amplifier providing 20W (typical) of saturated output power over the 6 to 18 GHz band, ideal for a variety of high power test setups as well as applications including communications, radar and more. This ruggedly designed amplifier provides unconditional stability and built-in self-protection against reverse polarity, over voltage and overheating. It is capable of withstanding a VSWR of 3:1 at 20W P<sub>OUT</sub>. Housed in a rugged aluminum alloy case measuring 6 x 4 x 1", the unit features SMA connectors and an optional heat sink and fan attachment for cooling.

## KEY FEATURES

| Feature                 | Advantages                                                                                                                                                  |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Rugged design           | No damage into a VSWR of 3:1 at 20W output power                                                                                                            |
| Internal protection     | High temperature, over voltage and reverse polarity.                                                                                                        |
| Large frequency range   | Large instantaneous frequency range covers 6-18 GHz with one amplifier.                                                                                     |
| High power gain         | Enables signal amplification to 10W output without the need for multiple gain stages. The amplifier has a typical power gain of 40 dB at 0 dBm input power. |
| Unconditional stability | Provides reliable performance independent of input and load conditions.                                                                                     |

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ZHL6G018G020X+  
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50Ω 20W 6 to 18 GHz

**ELECTRICAL SPECIFICATIONS AT  $T_{\text{MOUNTING BASE}}=+25^{\circ}\text{C}$ ,  $V_{\text{DS}}=20\text{V}$ , 50Ω SYSTEM**

| Parameter                  | Symbol               | Condition                            | ZHL6G018G020+ |                 |         | ZHL6G018G020X+ |                 |         | Units |
|----------------------------|----------------------|--------------------------------------|---------------|-----------------|---------|----------------|-----------------|---------|-------|
|                            |                      |                                      | Min.          | Typ.            | Max.    | Min.           | Typ.            | Max.    |       |
| Frequency Range            | f                    |                                      | 6000          | —               | 17000   | 17000          | —               | 18000   | MHz   |
| Output Power               | $P_{\text{OUT}}$     | CW @ $P_{\text{IN}} < 8\text{dBm}$   | 13.8          | 25.7            | —       | 8.9            | 13.5            | —       | W     |
|                            |                      |                                      | 41.4          | 44.1            | —       | 39.5           | 41.3            | —       | dBm   |
| Small Signal Gain          | $G_{\text{SS}}$      | CW @ $P_{\text{IN}} = -30\text{dBm}$ | 45            | 57              | —       | 43             | 48              | —       | dB    |
| Small Signal Gain Flatness | $G_{\text{SS-FLAT}}$ | CW @ $P_{\text{IN}} = -30\text{dBm}$ | —             | $\pm 6$         | $\pm 7$ | —              | $\pm 3$         | $\pm 7$ | dB    |
| Power Gain                 | $G_{\text{P}}$       | CW @ $P_{\text{IN}} < 8\text{dBm}$   | —             | 34.5            | —       | —              | 33.8            | —       | dB    |
| Power Gain Flatness        | $G_{\text{P-FLAT}}$  | CW @ $P_{\text{IN}} = 8\text{dBm}$   | —             | $\pm 5$         | $\pm 5$ | —              | $\pm 5$         | $\pm 5$ | dBm   |
| Noise Figure               | NF                   |                                      | —             | 8               | 10      | —              | 8               | 10      | dB    |
| Input Return Loss          | IRL                  | CW @ $P_{\text{IN}} = -30\text{dBm}$ | 7.5           | 15              | —       | 7.5            | 19              | —       | dB    |
| Harmonics                  | H2, H3               | CW @ $P_{\text{IN}} < 8\text{dBm}$   | —             | -10             | —       | —              | -10             | —       | dBc   |
| Spurious Signals           | Spur                 | CW @ $P_{\text{IN}} < 8\text{dBm}$   | —             | —               | -60     | —              | —               | -60     | dBc   |
| DC Supply Voltage          | $V_{\text{DC}}$      |                                      | —             | 20 <sup>1</sup> | 22      | —              | 20 <sup>1</sup> | 22      | V     |
| DC Supply Current          | $I_{\text{DC}}$      |                                      | —             | 6               | 8       | —              | 6               | 8       | A     |

1. Recommend Operating Voltage

**MAXIMUM RATINGS**

| Parameter                                                       | Ratings                                         |
|-----------------------------------------------------------------|-------------------------------------------------|
| Operating Mounting Base Temperature                             | -20°C to +60°C                                  |
| Storage Temperature                                             | -55°C to +100°C                                 |
| DC Voltage                                                      | 22V                                             |
| Input RF Power (no damage)                                      | +10 dBm                                         |
| Output RF Power                                                 | +44 dBm (6 to 17 GHz)<br>+43 dBm (17 to 18 GHz) |
| Ruggedness through all phases at $P_{\text{OUT}}=20\text{W}$ CW | VSWR=3:1, 2 minutes                             |





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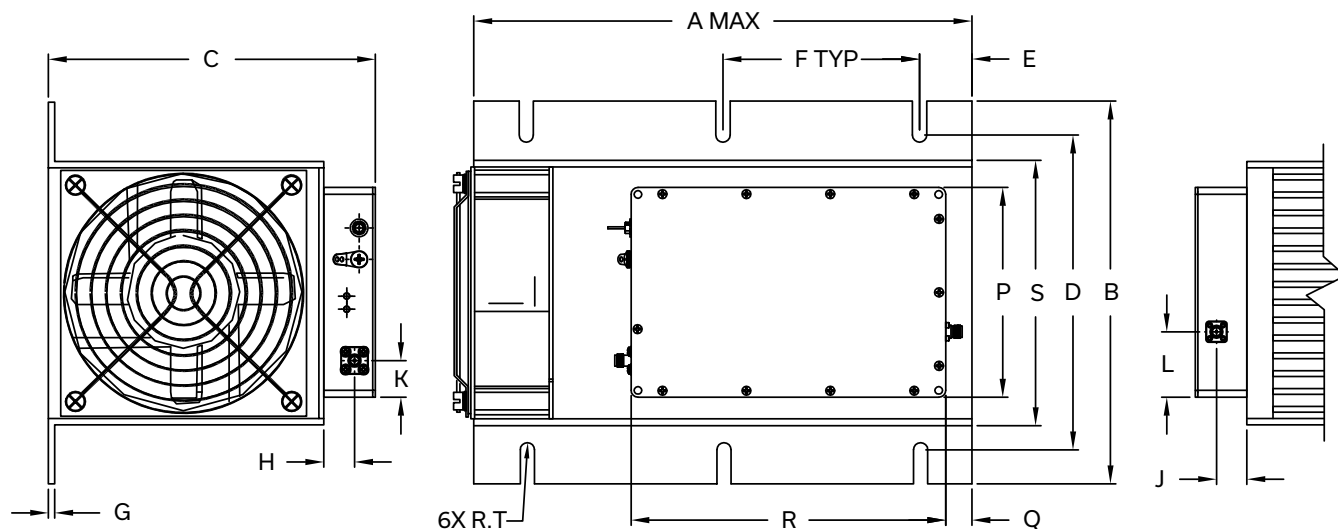
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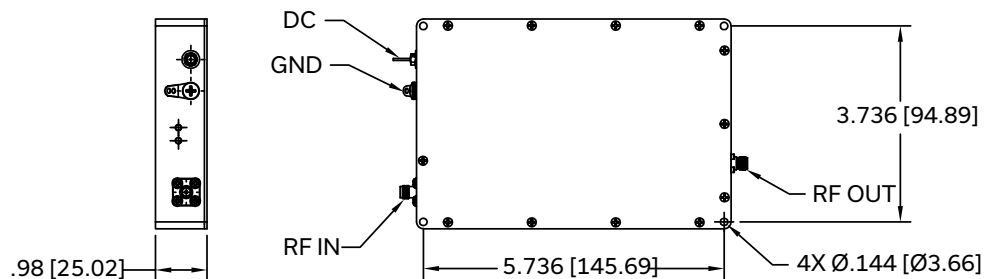
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## OUTLINE DRAWING FOR MODELS WITH HEATSINK & FAN (ZHL6G018G020+)



## MOUNTING INFORMATION FOR MODELS WITHOUT HEATSINK & FAN (ZHL6G018G020X+)



Dimensions in inches [mm]

## OUTLINE DIMENSIONS

|        | A      | B      | C      | D      | E     | F     | G    | H     | J     | K     | L     | M | N | P      | Q     | R      | S      | T     | wt     |
|--------|--------|--------|--------|--------|-------|-------|------|-------|-------|-------|-------|---|---|--------|-------|--------|--------|-------|--------|
| inches | 9.85   | 7.3    | 6.23   | 6.00   | 1.0   | 3.75  | 0.13 | 0.59  | 0.58  | 0.70  | 1.25  | — | — | 4.00   | 0.50  | 6.00   | 5.1    | 0.135 | grams* |
| mm     | 250.19 | 185.42 | 158.24 | 152.40 | 25.40 | 95.25 | 3.30 | 14.99 | 14.73 | 17.78 | 31.75 | — | — | 101.60 | 12.70 | 152.40 | 129.54 | 3.43  | 4265   |

\*580 grams without heatsink





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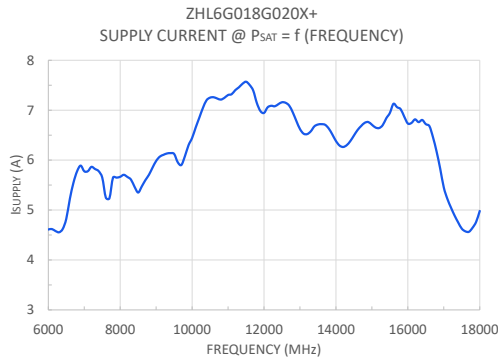
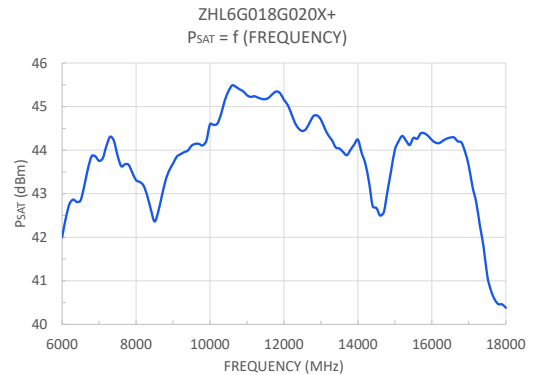
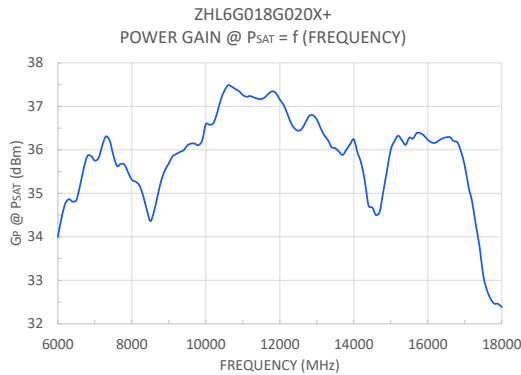
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## TYPICAL PERFORMANCE DATA/CURVES

| Frequency (MHz) | Power Gain (dB) | P <sub>SAT</sub> (dBm) | Supply Current (A) |
|-----------------|-----------------|------------------------|--------------------|
| 6000            | 34.00           | 42.00                  | 4.61               |
| 7000            | 35.75           | 43.75                  | 5.78               |
| 8000            | 35.31           | 43.31                  | 5.67               |
| 9000            | 35.69           | 43.69                  | 5.98               |
| 10000           | 36.59           | 44.59                  | 6.44               |
| 11000           | 37.26           | 45.26                  | 7.30               |
| 12000           | 37.15           | 45.15                  | 6.95               |
| 13000           | 36.70           | 44.70                  | 6.62               |
| 14000           | 36.24           | 44.24                  | 6.38               |
| 15000           | 36.01           | 44.01                  | 6.71               |
| 16000           | 36.23           | 44.23                  | 6.73               |
| 17000           | 35.63           | 43.63                  | 5.45               |
| 18000           | 32.38           | 40.38                  | 4.98               |



## 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](http://www.minicircuits.com/terms/viewterm.html)

