

High Power Amplifier

ZHL-20W-13SW+

50Ω 20W 20 to 1000 MHz

Features

- High power, 20 Watt
- Protected against overheat - shuts off automatically at about +100°C case temperature
- Protected against over voltage - shuts off automatically at about +29V(excluding fan)
- Excellent gain flatness, ±1.2 dB typ.
- RF built-in switch with TTL/CMOS control
- Class A amplifier
- Protected by US patent 7,348,854

Applications

- VHF/UHF transmitters
- Defense
- Amateur radio, FM, TV



| | | |
|------------|---------------|-----------------|
| Model No. | ZHL-20W-13SW+ | ▲ZHL-20W-13SWX+ |
| Case Style | CP1683 | |
| Connectors | SMA | |

+RoHS Compliant

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

Product Description

ZHL-20W-13SW+ is a Class-A, high dynamic range, unconditionally stable amplifier with automatic over temperature and over voltage protection. It features a built-in RF switch with TTL/CMOS control.

Electrical Specifications at 25°C

| Parameter | Condition (MHz) | ZHL-20W-13SW+ ▲ZHL-20W-13SWX+ | | | Units |
|------------------------------------|-----------------|----------------------------------|------|------|-------|
| | | Min. | Typ. | Max. | |
| Frequency Range | | 20 | | 1000 | MHz |
| Gain | 20 - 1000 | 46 | 50 | 55 | dB |
| Gain Flatness | 20 - 1000 | — | | ±1.8 | dB |
| Output Power at 1dB compression | 20 - 1000 | +39 | +41 | — | dBm |
| Output Power at 3 dB compression | 20 - 1000 | +40 | +43 | — | dBm |
| Noise Figure | 20 - 1000 | — | 3.5 | — | dB |
| Output third order intercept point | 20 - 1000 | — | +50 | — | dBm |
| Input VSWR | 20 - 1000 | — | 1.7 | — | :1 |
| Output VSWR | 20 - 1000 | — | 2.5 | — | :1 |
| DC Supply Voltage | | — | 24* | — | V |
| Supply Current | | — | — | 2.8 | A |
| SW Low (V_{IL}), RF ON | | — | — | 0.5 | V |
| SW High (V_{IH}), RF OFF | | 2.7 | 5.0 | — | V |
| SW Current | | — | 5 | — | μA |
| Rise Time (SW ON to 90% RF) | | — | — | 50 | μsec |
| Fall Time (SW OFF to 10% RF) | | — | — | 5 | μsec |

* Recommended Operating Voltage.

▲ Heat sink and fan 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 0.3°C/W max.

Maximum Ratings

| Parameter | Ratings |
|---|----------------|
| Operating Temperature | -20°C to 65°C |
| Storage Temperature | -55°C to 100°C |
| Base Plate Temperature | 85°C |
| DC Voltage | 28V |
| SW Voltage | 10V |
| Input RF Power ¹ (no damage) | -3 dBm |

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

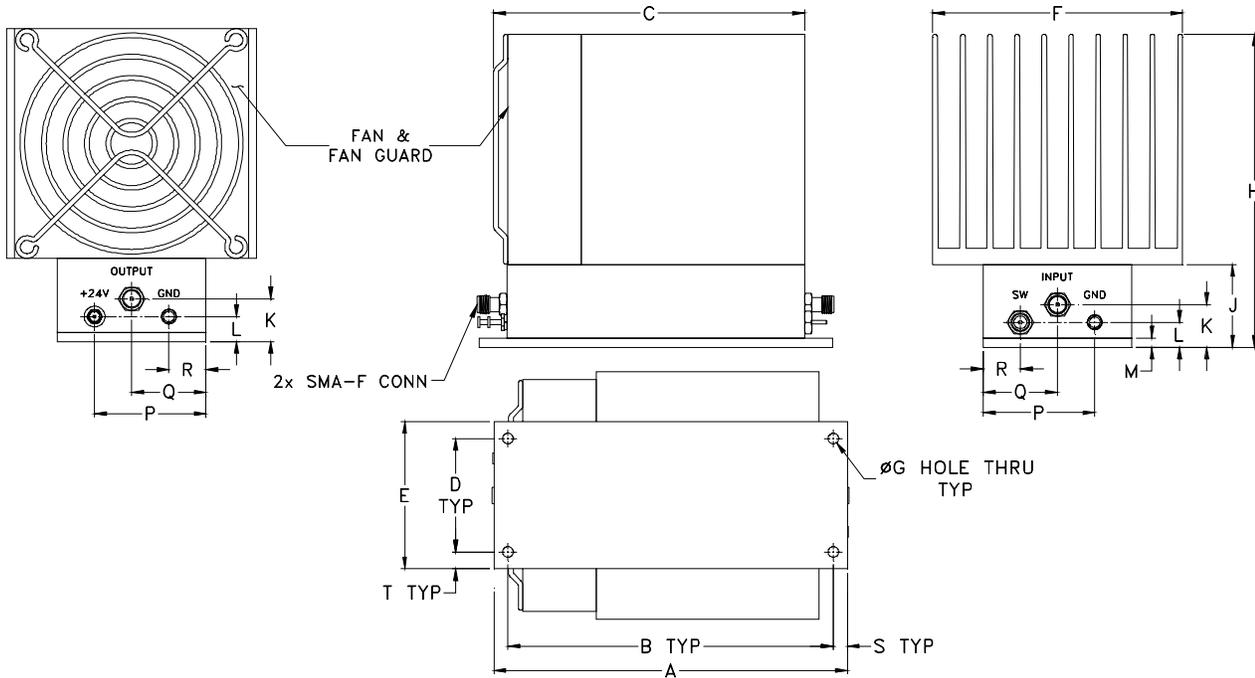
1. At nominal 50 Ohms RF load. Amplifier can withstand a full mismatch (short or open) across all phases at RF output, if the input RF power does not exceed -13dBm. Maximum RF input power is defined as a peak envelope power (PEP). See the application note [AN-60-037](#) for PEP calculation.

Notes

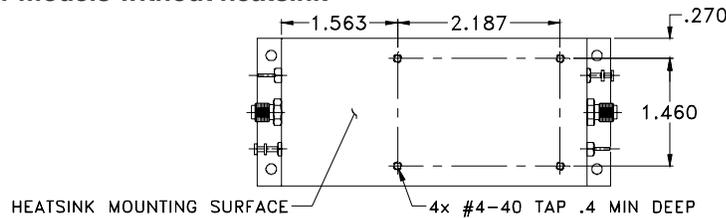
- A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
 B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's 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/MCLStore/terms.jsp



Outline Drawing for models with heatsink



Outline Drawing for models without heatsink



Outline Dimensions (inch/mm)

| A | B | C | D | E | F | G | H | J | K | L | M | P | Q | R | S | T | wt |
|--------|--------|--------|-------|-------|-------|------|--------|-------|-------|-------|------|-------|-------|-------|------|------|--------|
| 4.75 | 4.375 | 4.18 | 1.540 | 2.00 | 3.36 | .144 | 4.25 | 1.12 | 0.58 | 0.34 | .13 | 1.50 | 1.00 | .50 | .19 | .23 | grams* |
| 120.65 | 111.13 | 106.17 | 39.12 | 50.80 | 85.34 | 3.66 | 107.95 | 28.45 | 14.73 | 8.636 | 3.30 | 38.10 | 25.40 | 12.70 | 4.83 | 5.84 | 750 |

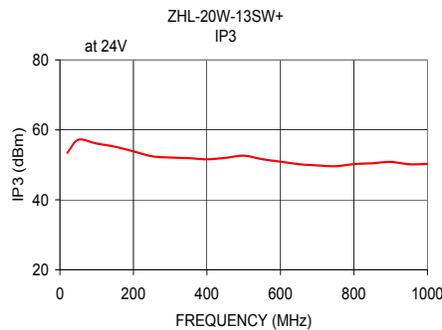
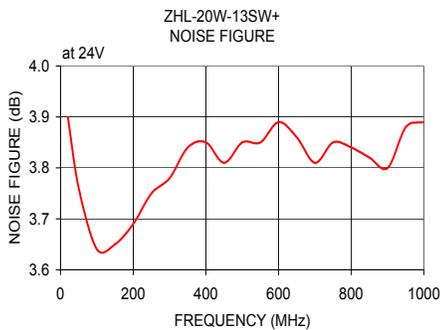
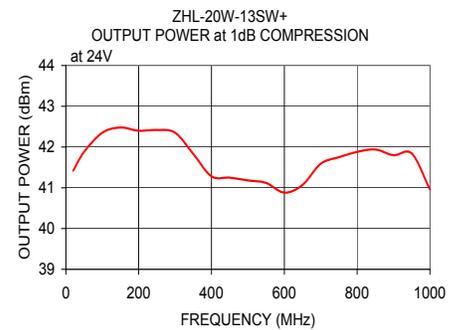
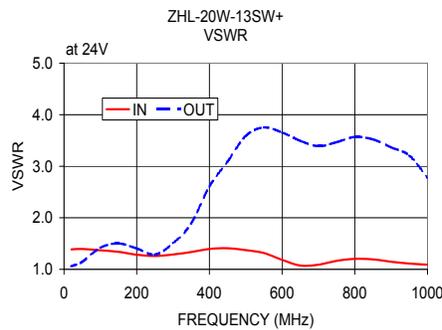
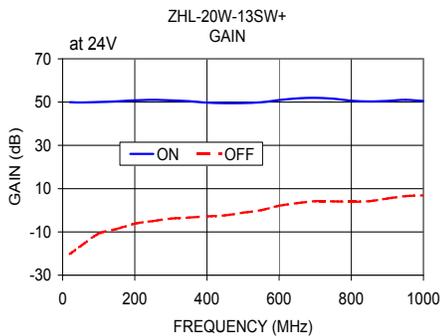
*290 grams without heatsink

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| FREQUENCY (MHz) | GAIN (dB) | | VSWR (:1) | | NOISE FIGURE (dB) | POUT at 1 dB COMPR. (dBm) | | IP3 (dBm) |
|-----------------|-------------------|-------------|-----------|------|-------------------|---------------------------|-------|-----------|
| | SW Low or Open ON | SW High OFF | IN | OUT | | 24V | 24V | |
| 20.00 | 49.96 | -20.25 | 1.39 | 1.06 | 3.90 | 41.42 | 53.41 | |
| 50.00 | 49.84 | -16.58 | 1.40 | 1.15 | 3.76 | 41.88 | 57.17 | |
| 100.00 | 50.04 | -10.82 | 1.37 | 1.42 | 3.64 | 42.35 | 56.07 | |
| 150.00 | 50.35 | -8.63 | 1.34 | 1.50 | 3.65 | 42.48 | 55.19 | |
| 200.00 | 50.83 | -6.18 | 1.28 | 1.41 | 3.69 | 42.40 | 53.84 | |
| 250.00 | 51.02 | -4.97 | 1.26 | 1.29 | 3.75 | 42.42 | 52.46 | |
| 300.00 | 50.82 | -3.82 | 1.29 | 1.51 | 3.78 | 42.35 | 52.10 | |
| 350.00 | 50.41 | -3.39 | 1.34 | 1.89 | 3.84 | 41.83 | 51.92 | |
| 400.00 | 49.76 | -2.83 | 1.40 | 2.61 | 3.85 | 41.28 | 51.59 | |
| 450.00 | 49.48 | -2.34 | 1.41 | 3.09 | 3.81 | 41.25 | 52.00 | |
| 500.00 | 49.52 | -1.13 | 1.37 | 3.59 | 3.85 | 41.18 | 52.60 | |
| 550.00 | 49.91 | 0.03 | 1.32 | 3.75 | 3.85 | 41.12 | 51.63 | |
| 600.00 | 50.92 | 2.06 | 1.18 | 3.66 | 3.89 | 40.88 | 50.91 | |
| 650.00 | 51.69 | 3.33 | 1.07 | 3.49 | 3.86 | 41.07 | 50.19 | |
| 700.00 | 51.98 | 4.21 | 1.09 | 3.39 | 3.81 | 41.59 | 49.83 | |
| 750.00 | 51.57 | 4.13 | 1.16 | 3.47 | 3.85 | 41.75 | 49.60 | |
| 800.00 | 50.64 | 3.93 | 1.20 | 3.57 | 3.84 | 41.88 | 50.23 | |
| 850.00 | 50.31 | 4.18 | 1.19 | 3.52 | 3.82 | 41.94 | 50.44 | |
| 900.00 | 50.55 | 5.44 | 1.15 | 3.37 | 3.80 | 41.80 | 50.84 | |
| 950.00 | 51.01 | 6.55 | 1.11 | 3.21 | 3.88 | 41.84 | 50.17 | |
| 1000.00 | 50.52 | 6.87 | 1.09 | 2.78 | 3.89 | 40.96 | 50.28 | |



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