

# High Power Amplifier

50Ω 20W 20 to 1000 MHz

## ZHL-20W-13SW+ ZHL-20W-13SWX+

### 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,  $\pm 1.2$  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

### 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+ <sup>▲</sup>			Units
		Min.	Typ.	Max.	
Frequency Range		20		1000	MHz
Gain	20 - 1000	46	50	55	dB
Gain Flatness	20 - 1000	—		$\pm 1.8$	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	—	$\mu$ A
Rise Time (SW ON to 90% RF)		—	—	50	$\mu$ sec
Fall Time (SW OFF to 10% RF)		—	—	5	$\mu$ sec

\* Recommended Operating Voltage.

### 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 <sup>1</sup> (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.

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[www.minicircuits.com](http://www.minicircuits.com) P.O. Box 350166, Brooklyn, NY 11235-0003 (718) 934-4500 sales@minicircuits.com



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Model No.	ZHL-20W-13SW+   ZHL-20W-13SWX+ <sup>▲</sup>
Case Style	CP1683
Connectors	SMA

#### +RoHS Compliant

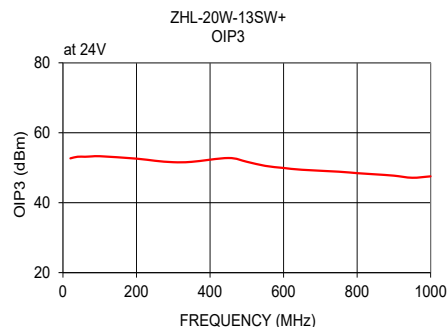
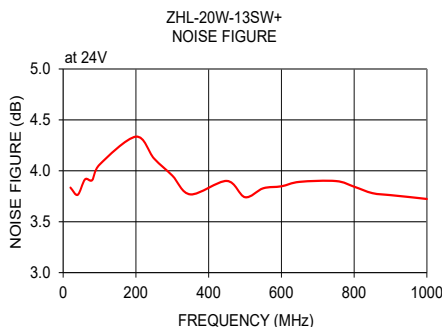
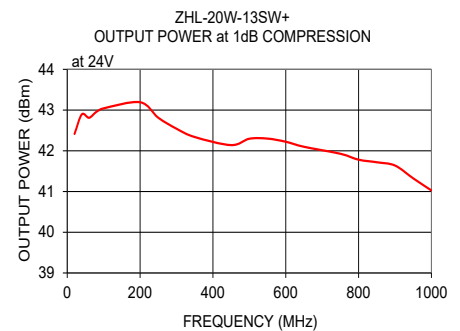
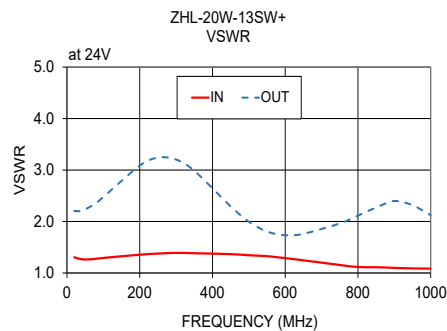
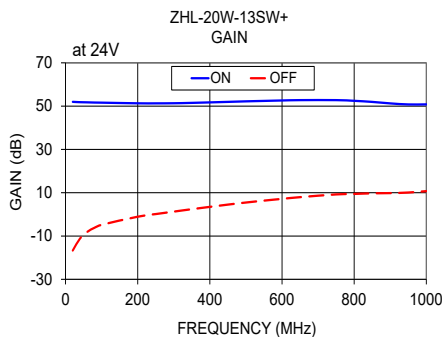
The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

<sup>▲</sup> 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.



## Typical Performance Data/Curves

FREQUENCY (MHz)	GAIN (dB)		VSWR (:1)		NOISE FIGURE (dB)	POUT at 1 dB COMPR. (dBm)	OIP3 (dBm)
	SW Low or Open ON	SW High OFF	IN	OUT			
20	51.98	-16.71	1.31	2.20	3.84	42.41	52.67
40	51.82	-11.19	1.27	2.21	3.76	42.89	53.14
60	51.75	-8.11	1.26	2.27	3.92	42.81	53.13
80	51.65	-6.21	1.28	2.36	3.91	42.96	53.25
100	51.60	-4.81	1.29	2.48	4.06	43.04	53.29
200	51.30	-1.08	1.36	3.09	4.34	43.19	52.59
250	51.28	0.14	1.38	3.24	4.12	42.81	51.99
300	51.33	1.27	1.39	3.20	3.95	42.54	51.58
350	51.50	2.40	1.38	2.99	3.77	42.34	51.68
450	51.96	4.51	1.37	2.30	3.90	42.14	52.77
500	52.21	5.48	1.34	2.00	3.74	42.30	51.70
550	52.41	6.35	1.33	1.80	3.83	42.30	50.53
600	52.61	7.17	1.29	1.73	3.85	42.22	49.93
650	52.77	7.95	1.25	1.76	3.89	42.10	49.41
750	52.77	9.22	1.16	1.96	3.90	41.93	48.86
800	52.45	9.45	1.12	2.11	3.84	41.78	48.44
850	51.95	9.73	1.11	2.27	3.78	41.72	48.10
900	51.26	9.83	1.10	2.40	3.76	41.64	47.73
950	50.78	10.09	1.09	2.32	3.74	41.32	47.13
1000	50.81	10.74	1.08	2.12	3.72	41.03	47.53



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