COAXIAL

High Power Amplifier

ZHL-100W-GAN+
ZHL-100W-GANX+

50Ω 100W 20 to 500 MHz

THE BIG DEAL

- High Power, 100 Watt
- Excellent IP3, +60 dBm typ.
- Excellent IP2, +84 dBm typ.
- High efficiency, 50% typ. at Pin= +15dBm
- Class A amplifier
- No damage with an open or short output load under full CW output power[1]
- Shuts off when base plate temperature exceeds +100 °C
- Over voltage protection, shut off above +37 V
- Reverse Polarity Protected
- Unconditionally stable
- Protected by US patent 7,348,854



Generic photo used for illustration purposes only

Model No.	ZHL-100W-GAN+	ZHL-100W-GANX+▲
Case Style	BT1165	
Connectors	SMA	

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

APPLICATIONS

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

PRODUCT OVERVIEW

The Mini-Circuits ZHL-100W-GAN+ utilizes high power Galium Nitride (GaN) output stage, which results in higher efficiency (50% typ.) as compared to GaAs, LDMOS and VDMOS counterparts. GaN FET's boast a maximum junction temperature of 250°C translating into higher operating temperatures without adversely affecting the MTBF.

KEY FEATURES

Feature	Advantages
High Efficiency	Higher PAE results in significant cost savings over the operating life of amplifier.
Rugged Design	Extreme load mismatch such as open/short at output are tolerated without damaging the amplifiers.
Range of Protections	Over temperature, over voltage and reverse polarity protection add to the ruggedness of amplifier.

REV. E
ECO-017544
ZHL-100W-GAN+
ED-14042/4
MCL NY
230420

ELECTRICAL SPECIFICATIONS AT +25 °C

Parameter	ZHL-100W-GAN+			ZHL-100W-GANX+▲			Units
	Min.	Typ.	Max.	Min.	Typ.	Max.	
Frequency Range	20	—	500	20	—	500	MHz
Gain	40	42	47	40	42	47	dB
Gain Flatness	—	±1.5	±2.5	—	±1.5	±2.5	dB
Output Power at 1dB compression	+46	+49	—	+46	+49	—	dBm
Output Power at 3dB compression	+48.5	+50	—	+48.5	+50	—	dBm
Saturated Output Power (at Pin: +15 dBm)	+48.5	+50	—	+48.5	+50	—	dBm
Noise Figure	—	7.0	12.0	—	7.0	12.0	dB
Output third order intercept point[2]	—	+60	—	—	+60	—	dBm
Output second order intercept point[2]	—	+84	—	—	+84	—	dBm
Input VSWR	—	1.5	—	—	1.5	—	:1
Output VSWR	—	2.5	—	—	2.5	—	:1
DC Supply Voltage	—	30	31	—	30	31	V
Supply Current[3]	—	8.2	9.4	—	7.8	9.0	A

1. At constant open or short load 30V nominal supply voltage
2. Measured with 2 tones, 1 MHz apart, +36 dBm/tone
3. The DC Power Supply should be able to deliver 13A DC at startup.

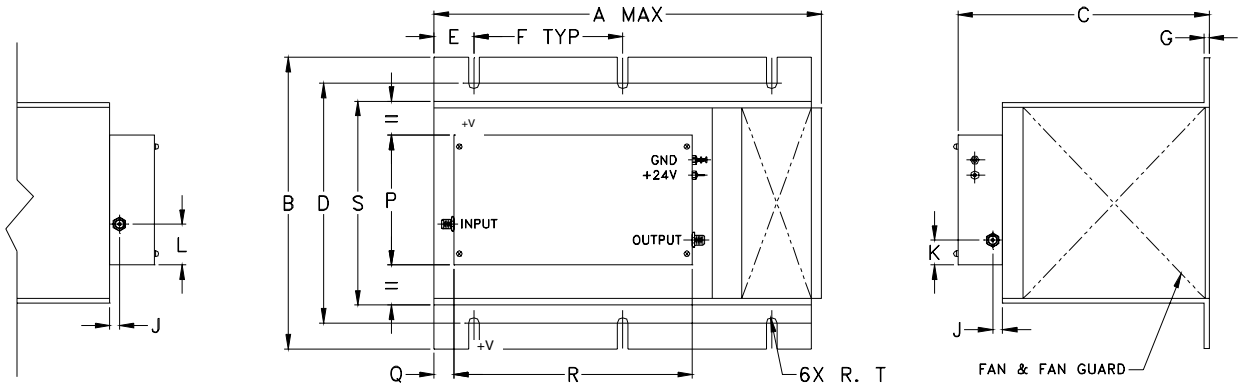
▲ Heat sink and fan not included. Alternative heat sinking and heat removal must be provided by the user to limit maximum base-plate temperature to 85°C, in order to ensure proper performance. For reference, this requires thermal resistance of user's external heat sink to be 0.074°C/W max.

ABSOLUTE MAXIMUM RATINGS

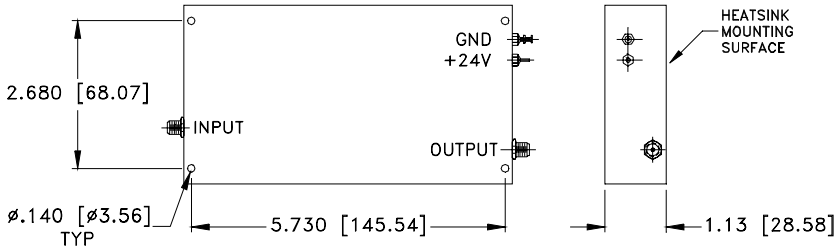
Parameter	Ratings
Operating Temperature	-25 °C to +65 °C
Storage Temperature	-55 °C to +100 °C
Base Plate Temperature	+85 °C
Input RF Power (no damage)[4]	+20 dBm

4. At nominal output load, 30V nominal supply voltage.
Permanent damage may occur if any of these limits are exceeded.

OUTLINE DRAWING



MOUNTING INFORMATION FOR MODELS WITHOUT HEATSINK.



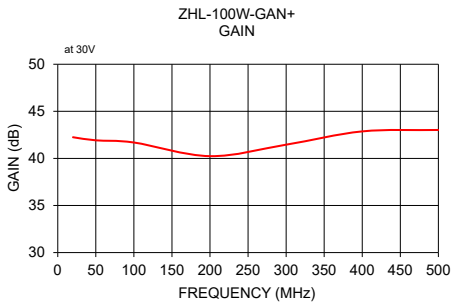
OUTLINE DIMENSIONS (Inch / mm)

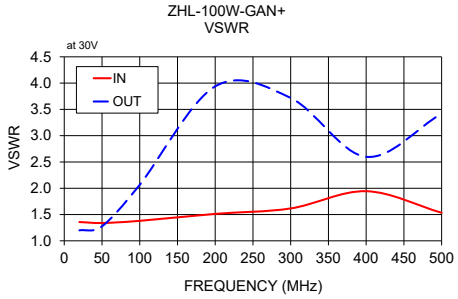
A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	wt
9.85	7.3	6.3	6.00	1.00	3.75	.13	__	.25	.63	1.03	__	__	3.25	.5	6.00	5.1	.135	grams*
250.19	185.42	160.02	152.40	25.40	95.25	3.30	__	6.35	16.00	26.16	__	__	82.55	12.70	152.40	129.54	3.43	4185

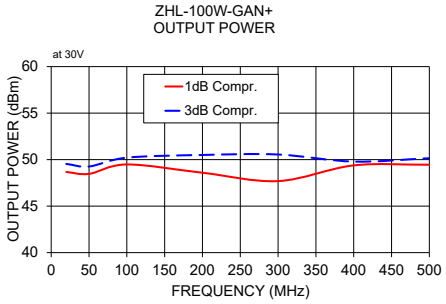
*500 grams without heatsink

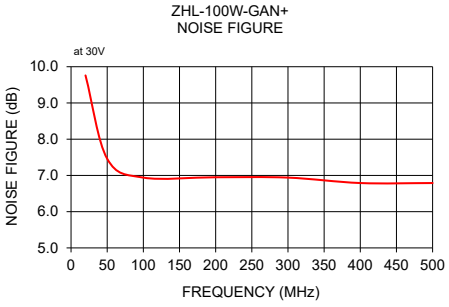
TYPICAL PERFORMANCE DATA AND CHARTS

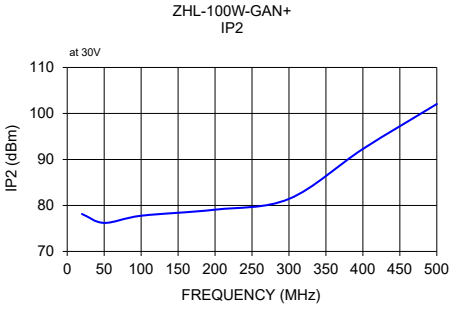
Frequency (MHz)	Gain (dB)	VSWR (:1)		Noise Figure (dB)	P_{OUT} (dBm) at 30V		OUTPUT IP2 (dBm)	OUTPUT IP3 (dBm)
	30V	IN	OUT	30V	1 dB Compr.	3 dB Compr.	30V	30V
20.00	42.25	1.36	1.20	9.76	48.67	49.54	78.14	61.56
50.00	41.92	1.34	1.28	7.46	48.47	49.26	76.21	61.66
100.00	41.69	1.38	2.07	6.94	49.48	50.21	77.76	62.99
200.00	40.24	1.51	3.94	6.95	48.59	50.50	79.08	61.23
300.00	41.46	1.62	3.72	6.94	47.69	50.55	81.42	58.98
400.00	42.87	1.94	2.60	6.79	49.38	49.79	92.28	55.67
500.00	43.02	1.53	3.42	6.79	49.45	50.15	102.05	56.70

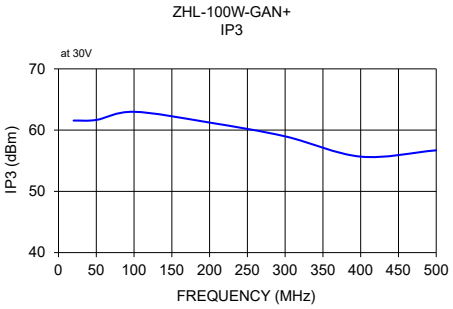












NOTES

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

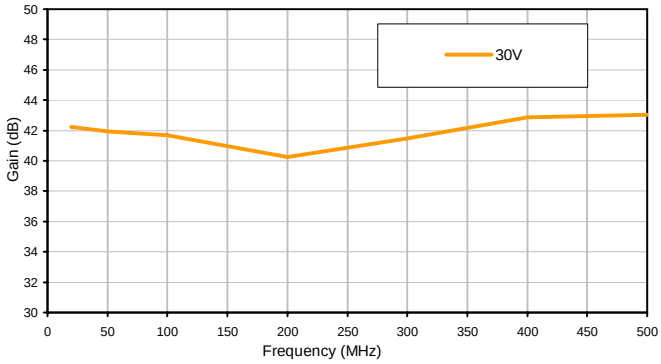
High Power Amplifier ZHL-100W-GAN+

Typical Performance Data

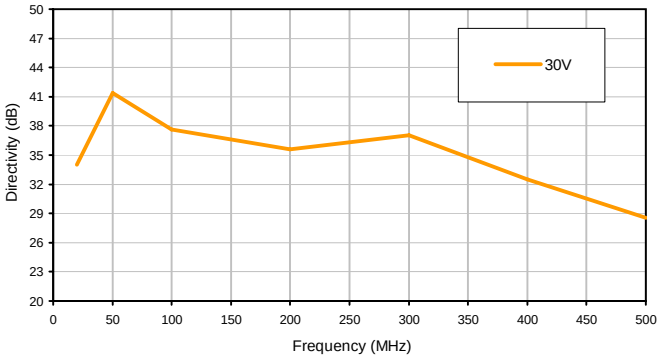
FREQ. (MHz)	GAIN (dB) 30V	DIRECTIVITY (dB) 30V	VSWR (:1) IN 30V	VSWR (:1) OUT 30V	NOISE FIGURE (dB) 30V	POUT @ 1 dB COMPRESSION (dBm) 30V	POUT @ 3 dB COMPRESSION (dBm) 30V	OUTPUT IP2 (dBm) 30V	OUTPUT IP3 (dBm) 30V
20.0	42.25	34.03	1.36	1.20	9.76	48.67	49.54	78.14	61.56
50.0	41.92	41.40	1.34	1.28	7.46	48.47	49.26	76.21	61.66
100.0	41.69	37.60	1.38	2.07	6.94	49.48	50.21	77.76	62.99
200.0	40.24	35.57	1.51	3.94	6.95	48.59	50.50	79.08	61.23
300.0	41.46	37.04	1.62	3.72	6.94	47.69	50.55	81.42	58.98
400.0	42.87	32.52	1.94	2.60	6.79	49.38	49.79	92.28	55.67
500.0	43.02	28.58	1.53	3.42	6.79	49.45	50.15	102.05	56.70

Typical Performance Curves

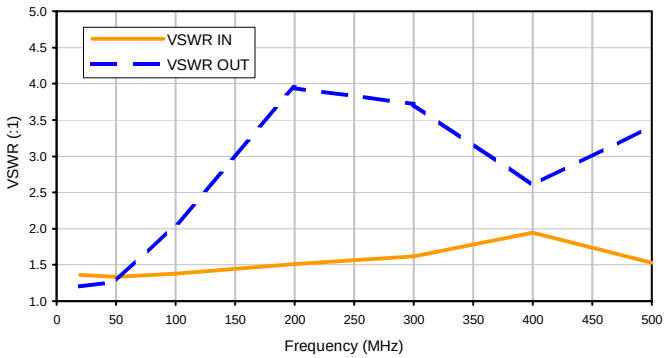
Gain



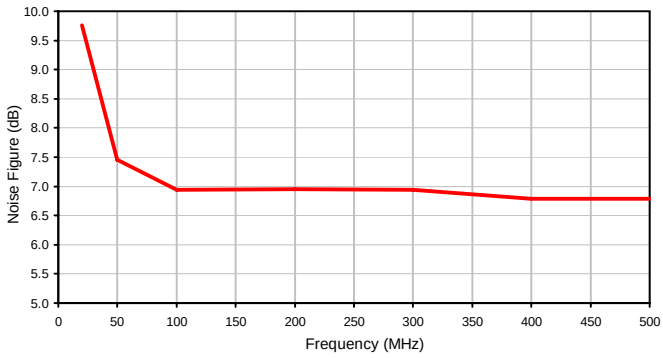
Directivity



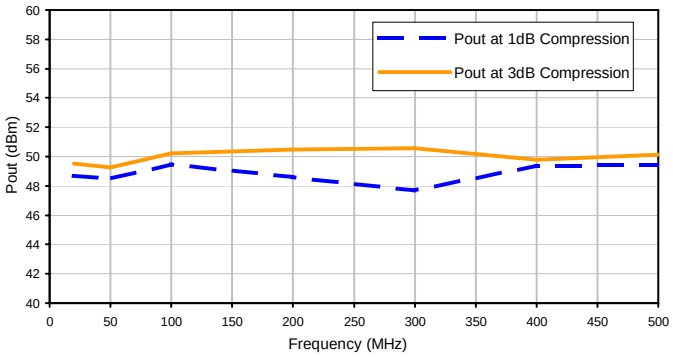
VSWR @ 30V



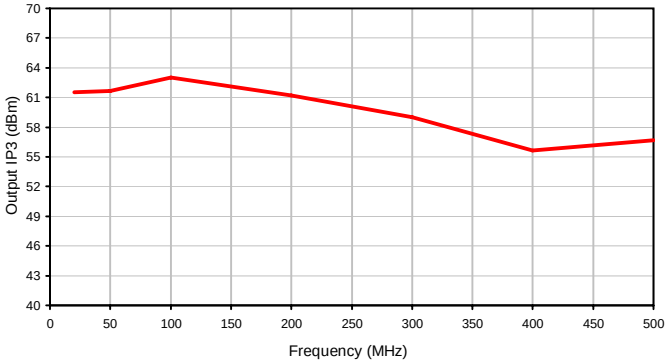
Noise Figure @ 30V



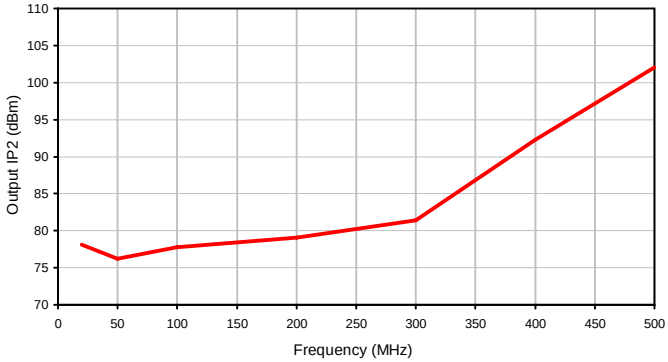
Pout at 1dB & 3dB Compression @ 30V



Output IP3 @ 30V



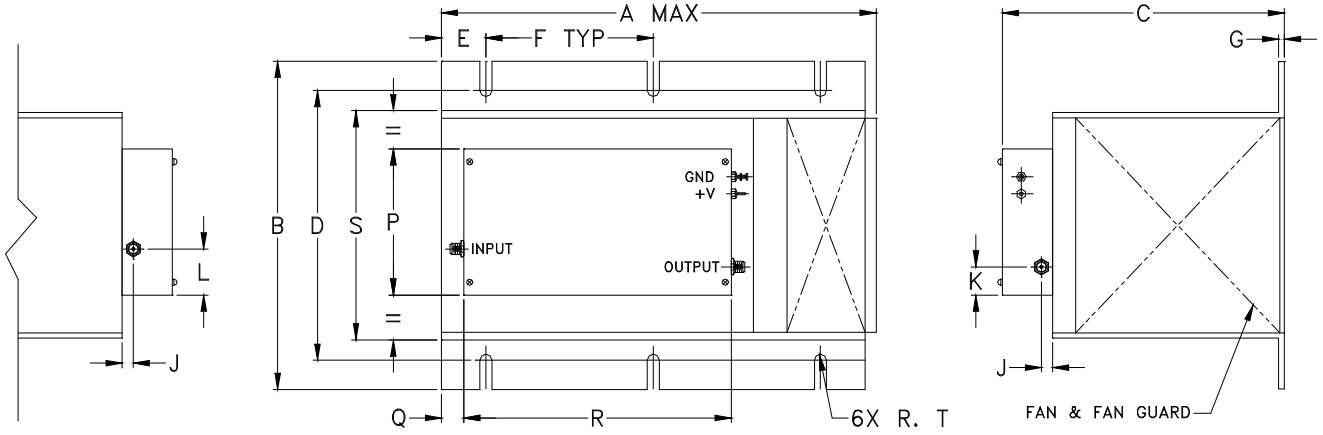
Output IP2 @ 30V



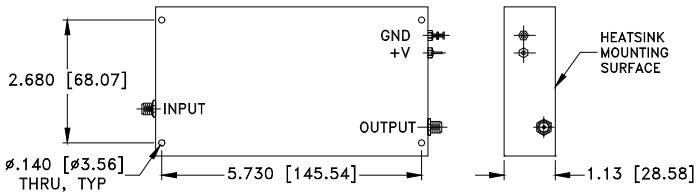
Case Style BT

BT1165

Outline Dimensions



MOUNTING INFORMATION FOR MODELS WITHOUT HEATSINK.



CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N
BT1165	9.85 (250.19)	7.3 (185.42)	6.3 (160.02)	6.00 (152.40)	1.00 (25.40)	3.75 (95.25)	.13 (3.30)	- -	.25 (6.35)	.63 (16.00)	1.03 (26.16)	- -	- -

CASE#	P	Q	R	S	T	WT, GRAM	WT WITHOUT HEATSINK, GRAM
BT1165	3.25 (82.55)	.5 (12.70)	6.00 (152.40)	5.1 (129.54)	.135 (3.43)	4185	500

Dimensions are in inches (mm). Tolerances: 1 Pl. ± .1; 2 Pl. ± .03; 3 Pl. ± .015

Notes:

1. Case material: Aluminum alloy.
2. Finish:
   For RoHS Case Styles: Clear Chemical conversion coating, non-chrome or trivalent chrome based.
   For non RoHS Case Styles: Yellow Chromate with low electrical Resistance.
3. Heatsink finish: Black anodize.
4. Refer to the individual model data sheet for the type of connectors available.
5. Recommended screws for mounting model without heat sink on 3/32" thick sheet: #6-32, 1.50" Length.

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