COAXIAL

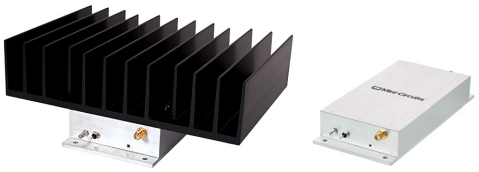
High Power Amplifier

ZHL-5W-2G-S+
ZHL-5W-2GX+

50Ω 5W 800 to 2000 MHz

FEATURES

- High Power, 5 Watt
- Low Current Consumption, 1.7A typ.
- High IP3, +44 dBm typ.
- Usable over 700 to 2200 MHz
- No damage with an open or short output load under full CW output power



Generic photo used for illustration purposes only

Model No.	ZHL-5W-2G-S+	ZHL-5W-2GX+▲
Case Style	DDD131	
Connectors	SMA	

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

APPLICATIONS

- Cellular
- PCN
- GSM
- ISM
- Lab Test

ELECTRICAL SPECIFICATIONS

Parameter	Min.	Typ.	Max.	Units
Frequency Range	800	—	2000	MHz
Gain	40	45	50	dB
Gain Flatness	—	—	±2.1	dB
Output Power at 1dB compression	+36	+37	—	dBm
Saturated Output Power at 3dB compression	+37	+38	—	dBm
Noise Figure	—	8.0	—	dB
Output third order intercept point	—	+44	—	dBm
Input VSWR	—	1.7	—	:1
Output VSWR	—	1.5	—	:1
DC Supply Voltage	—	24	28	V
Supply Current[1]	—	—	2.5	A

1. Power Supply should be capable of delivering 3A at start up.

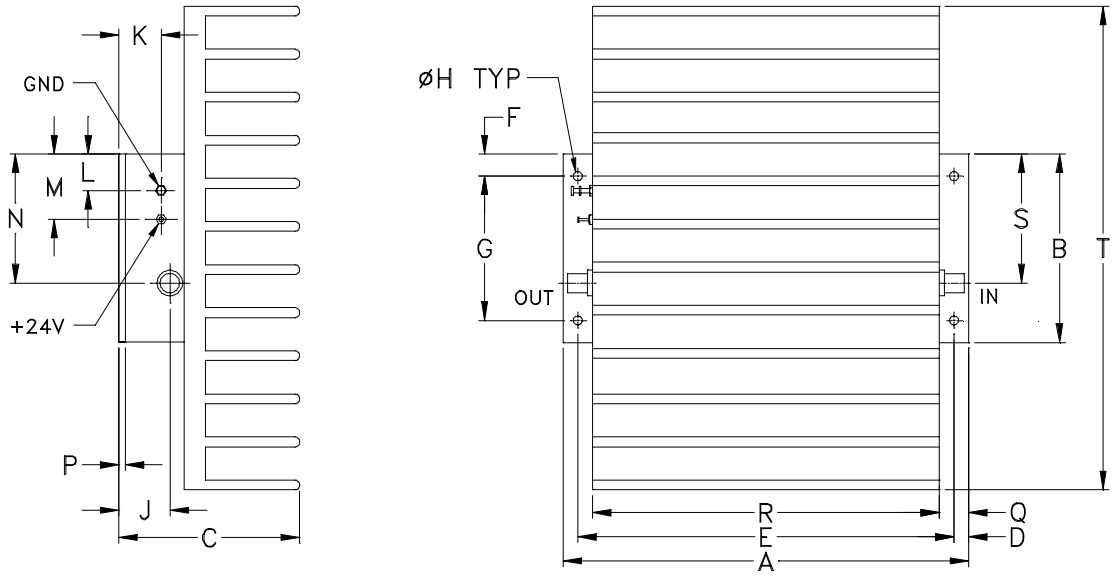
▲ Heat sink not included. Alternative heat sinking and heat removal must be provided by the user to limit maximum base-plate temperature to 87°C, in order to ensure proper performance. For reference, this requires thermal resistance of user's external heat sink to be 0.46°C/W max.

ABSOLUTE MAXIMUM RATINGS

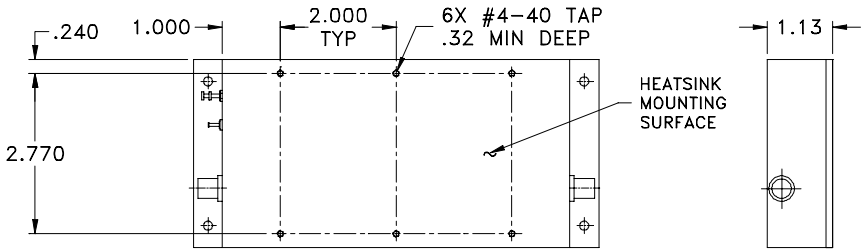
Parameter	Ratings
Operating Temperature	-20°C to +65°C
Storage Temperature	-55°C to +100°C
Input RF Power (no damage)	+1 dBm

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
7.00	3.25	3.13	.25	6.500	.38	2.500	.156	.88	.43	.62	1.00	2.63	.125	.50	6.00	2.23	8.35	grams*
177.80	82.55	79.50	6.35	165.10	9.65	63.50	3.96	22.35	10.92	15.75	25.40	66.80	3.18	12.70	152.40	56.64	212.09	1780

*510 grams without heatsink

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High Power Amplifier

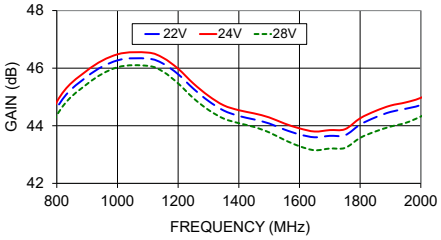
50Ω 5W 800 to 2000 MHz

ZHL-5W-2G-S+
ZHL-5W-2GX+

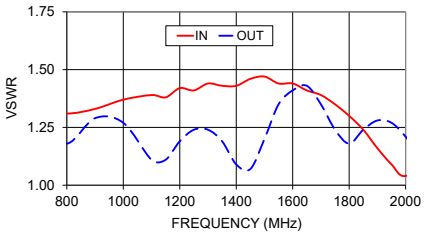
TYPICAL PERFORMANCE DATA AND CHARTS

FREQ. (MHz)	GAIN (dB)			VSWR (:1)		POUT at 1 dB COMPR. (dBm)	FREQ. (MHz)	IP3 (dBm)	NOISE FIGURE (dB)
	22V	24V	28V	IN	OUT	24V		24V	24V
800	44.61	44.83	44.36	1.31	1.18	36.16	800	44.07	9.00
900	45.71	45.92	45.45	1.33	1.29	36.81	1000	44.17	9.00
1000	46.27	46.48	46.03	1.37	1.27	37.09	1250	44.16	9.15
1100	46.33	46.54	46.08	1.39	1.11	37.14	1500	44.76	9.18
1200	45.79	45.98	45.47	1.42	1.19	36.72	1750	45.25	8.91
1300	44.86	45.04	44.55	1.44	1.24	36.30	2000	44.64	8.59
1350	44.53	44.71	44.25	1.43	1.19	36.06	-	-	-
1400	44.34	44.54	44.09	1.43	1.09	35.79	-	-	-
1450	44.22	44.43	43.96	1.46	1.07	35.73	-	-	-
1500	44.08	44.29	43.77	1.47	1.20	35.72	-	-	-
1550	43.87	44.08	43.51	1.44	1.35	35.85	-	-	-
1600	43.70	43.91	43.29	1.44	1.41	35.95	-	-	-
1650	43.60	43.80	43.15	1.41	1.43	36.19	-	-	-
1700	43.65	43.85	43.21	1.39	1.35	36.63	-	-	-
1750	43.67	43.88	43.23	1.35	1.24	37.02	-	-	-
1800	44.04	44.26	43.58	1.30	1.18	37.59	-	-	-
1850	44.29	44.51	43.80	1.24	1.24	37.99	-	-	-
1900	44.48	44.70	43.97	1.16	1.28	38.31	-	-	-
1950	44.59	44.81	44.10	1.09	1.27	38.22	-	-	-
2000	44.72	44.97	44.32	1.04	1.21	37.49	-	-	-

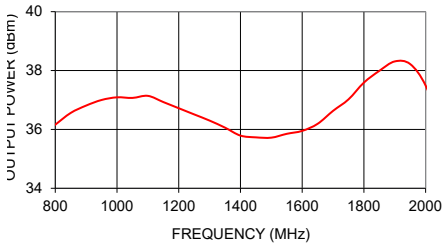
ZHL-5W-2G-S+
GAIN



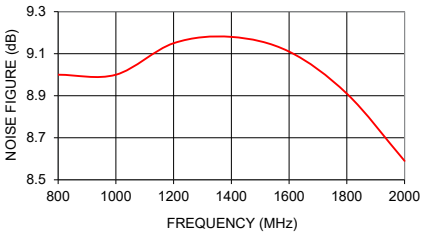
ZHL-5W-2G-S+
VSWR



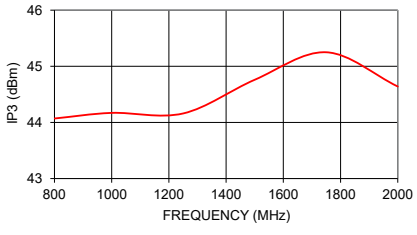
ZHL-5W-2G-S+
OUTPUT POWER AT 1dB COMPRESSION



ZHL-5W-2G-S+
NOISE FIGURE



ZHL-5W-2G-S+
IP3



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

Amplifier ZHL-5W-2G+

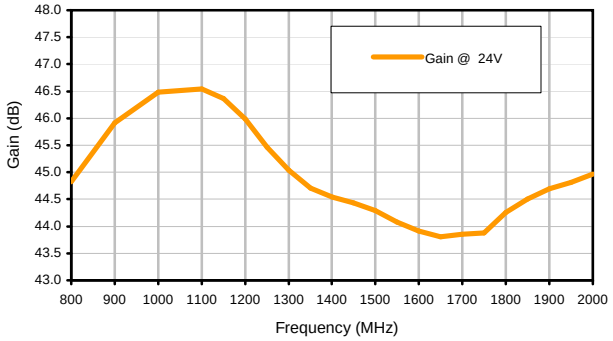
Typical Performance Data

FREQUENCY (MHz)	GAIN (dB) 24V	DIRECTIVITY (dB) 24V	VSWR IN (:1) 24V	VSWR OUT (:1) 24V	NOISE FIGURE (dB) 24V	Pout at 1dB Comp. (dBm) 24V
800.0	44.83	40.40	1.31	1.18	8.50	36.16
900.0	45.92	39.10	1.33	1.29	8.34	36.81
1000.0	46.48	36.70	1.37	1.27	8.31	37.09
1100.0	46.54	33.20	1.39	1.11	8.38	37.14
1150.0	46.36	30.20	1.38	1.11	8.35	36.93
1200.0	45.98	40.40	1.42	1.19	8.37	36.72
1250.0	45.47	51.70	1.41	1.24	8.39	36.51
1300.0	45.04	36.00	1.44	1.24	8.42	36.30
1350.0	44.71	38.30	1.43	1.19	8.42	36.06
1400.0	44.54	47.70	1.43	1.09	8.45	35.79
1450.0	44.43	45.80	1.46	1.07	8.42	35.73
1500.0	44.29	40.10	1.47	1.20	8.38	35.72
1550.0	44.08	47.90	1.44	1.35	8.43	35.85
1600.0	43.91	30.40	1.44	1.41	8.35	35.95
1650.0	43.80	47.50	1.41	1.43	8.28	36.19
1700.0	43.85	39.30	1.39	1.35	8.19	36.63
1750.0	43.88	40.50	1.35	1.24	8.14	37.02
1800.0	44.26	33.70	1.30	1.18	8.10	37.59
1850.0	44.51	39.80	1.24	1.24	8.00	37.99
1900.0	44.70	38.40	1.16	1.28	7.91	38.31
1950.0	44.81	33.50	1.09	1.27	7.85	38.22
2000.0	44.97	37.10	1.04	1.21	7.73	37.49

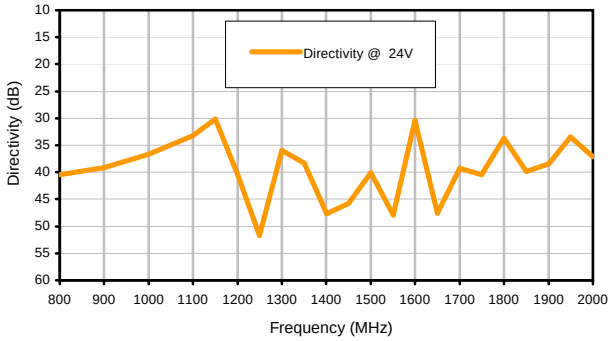
FREQUENCY (MHz)	Output IP3 (dBm) 24V
800.0	44.07
1000.0	44.17
1250.0	44.16
1500.0	44.76
1750.0	45.25
2000.0	44.64

Typical Performance Curves

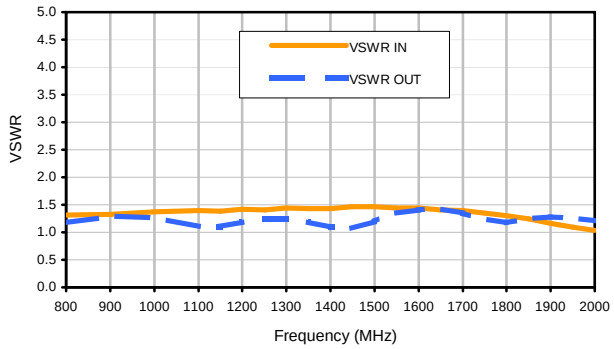
Gain



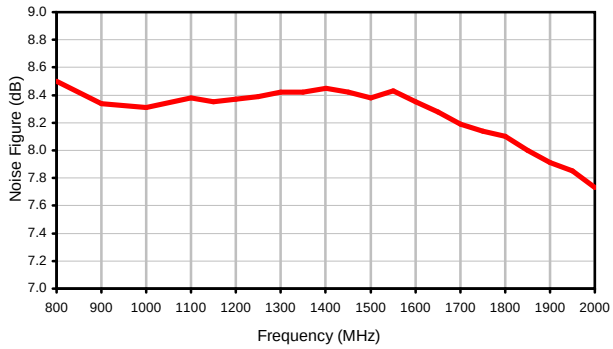
Directivity



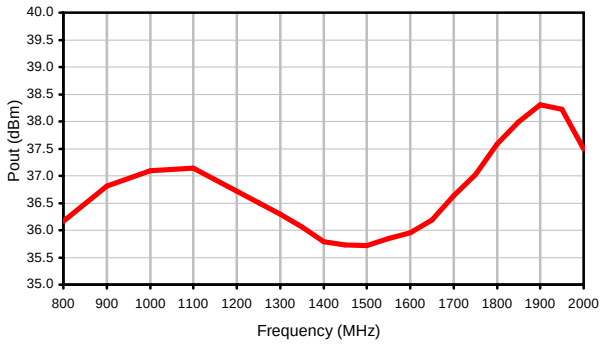
VSWR @ 24V



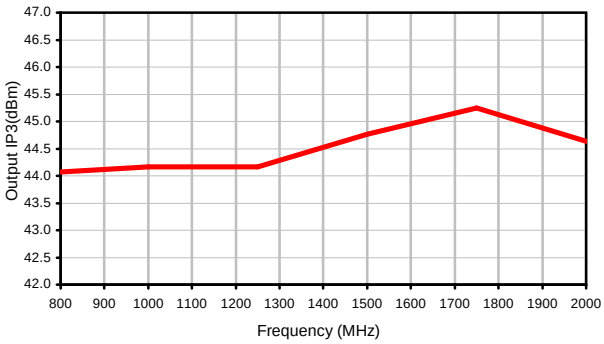
Noise Figure @ 24V



Pout at 1dB Compression @ 24V



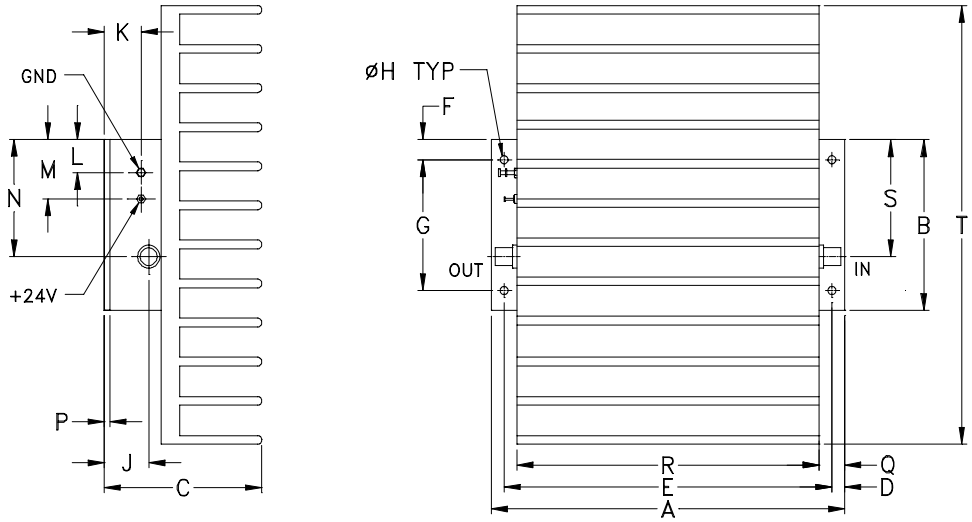
Output IP3 @ 24V



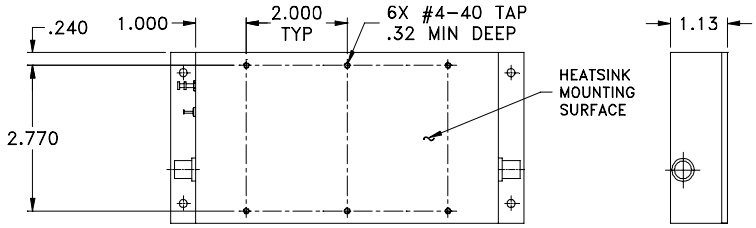
Case Style DDD

Outline Dimensions

DDD131



MOUNTING INFORMATION FOR MODELS WITHOUT HEATSINK



CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N
DDD131	7.00 (177.80)	3.25 (82.55)	3.13 (79.50)	.25 (6.35)	6.500 (165.10)	.38 (9.65)	2.500 (63.50)	.156 (3.96)	.88 (22.35)	.43 (10.92)	.62 (15.75)	1.00 (25.40)	2.63 (66.68)

CASE#	P	Q	R	S	T	WT. GRAMS	WT. WITHOUT HEATSINK GRAMS
DDD131	.125 (3.18)	.50 (12.70)	6.00 (152.40)	2.23 (56.64)	8.35 (212.09)	1780	510

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

Notes:

1. Case material: Aluminum alloy.
2. Case finish:
   For RoHS Case Styles: Clear chemical conversion coating, non-chrome or trivalent chrome based.
3. Heatsink finish: Black anodize if supplied with heatsink.
4. Refer to the individual model data sheet for the type of connectors available.

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Environmental Specifications **ENV23T13**

All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	87° C Base Plate Temperture	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
Stabilization Bake	(non-operating) 125°C, 24 hours	- - -
Burn-in at Elevated Temp.	(DC on) 160 hours at 87° C Base Plate Temperature	MIL-STD-202, Method 108
Thermal Shock	-55° to 100°C, 5 cycles	MIL-STD-202, Method 107, Condition A, except 100°C