COAXIAL

High Power Amplifier

50Ω 5W 60 to 300 MHz

ZHL-03-5WF+
ZHL-03-5WFX+

FEATURES

- High Power, +39dBm typ.
- Low Noise Figure, 3 dB typ.
- High IP3, +49 dBm typ.
- Class A amplifier
- Available with built-in fan with thermal shut-off

Generic photo used for illustration purposes only

APPLICATIONS

- VHF Transmitters
- Instrumentation
- Test Equipment

Model No.	ZHL-03-5WF	ZHL-03-5WFX+▲
Case Style	CP641	
Connectors	SMA	

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

ELECTRICAL SPECIFICATIONS

Parameter	Min.	Typ.	Max.	Units
Frequency Range	60	—	300	MHz
Gain	30	—	—	dB
Gain Flatness	—	—	±1.0	dB
Output Power at 1dB compression	+36	—	—	dBm
Noise Figure	—	3.0	—	dB
Output third order intercept point	—	+49	—	dBm
Input VSWR	—	1.4	—	:1
Output VSWR	—	1.5	—	:1
DC Supply Voltage	—	24	—	V
Supply Current	—	—	2.8	A

Open load is not recommended, potentially can cause damage.
With no load derate max. input power by 20dB.

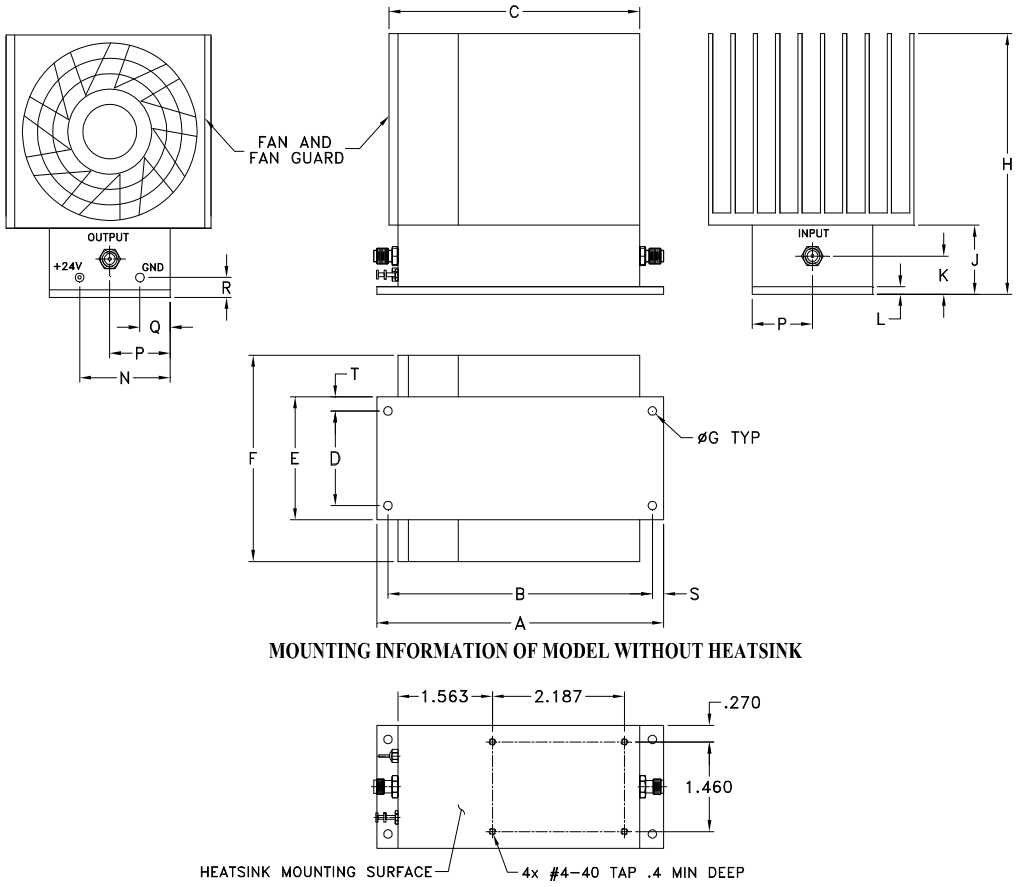
▲ Heat sink and fan not included. Alternative heat sinking and heat removal must be provided by the user to limit maximum base-plate temperature to 85°C, in order to ensure proper performance. For reference, this requires thermal resistance of user's external heat sink to be 0.3°C/W max.

ABSOLUTE 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
Input RF Power (no damage)	+10 dBm

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

OUTLINE DRAWING



MOUNTING INFORMATION OF MODEL 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
4.75	4.375	4.18	1.540	2.00	3.36	.144	4.24	1.12	.58	.125	--	1.50	1.00	.50	.34	.19	.23	grams*
120.65	111.13	106.17	39.12	50.80	85.34	3.66	107.70	28.45	14.73	3.18	--	38.10	25.40	12.70	8.64	4.83	5.84	750

*290 grams without heatsink

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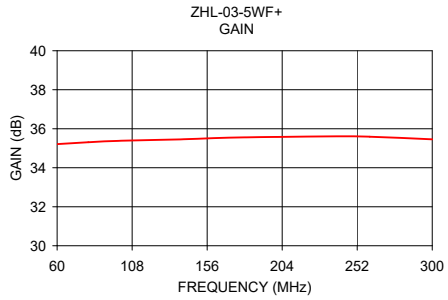
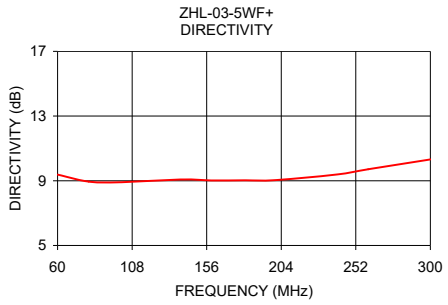
ZHL-03-5WFX+

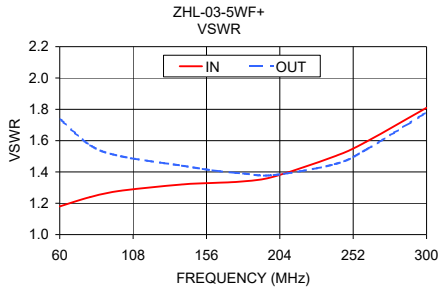
50Ω 5W 60 to 300 MHz

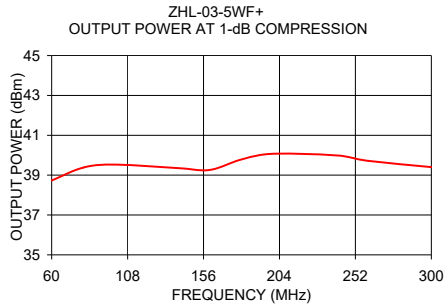
TYPICAL PERFORMANCE DATA AND CHARTS

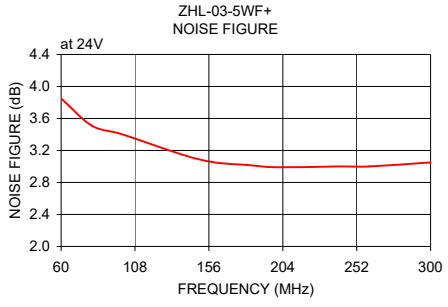
FREQUENCY (MHz)	GAIN (dB)	DIRECTIVITY (dB)	VSWR (:1)		NOISE FIGURE (dB)	POUT at 1 dB COMPR. (dBm)	IP3 (dBm)
	24V	24V	IN	OUT	24V	24V	24V
60.00	35.21	9.38	1.18	1.74	3.85	38.73	48.61
80.00	35.31	8.95	1.24	1.57	3.51	39.38	49.22
100.00	35.38	8.91	1.28	1.50	3.40	39.53	49.62
140.00	35.46	9.08	1.32	1.44	3.14	39.35	49.47
160.00	35.52	9.02	1.33	1.41	3.05	39.26	49.45
180.00	35.56	9.03	1.34	1.39	3.02	39.79	49.57
200.00	35.58	9.04	1.37	1.38	2.99	40.07	49.47
240.00	35.61	9.39	1.50	1.45	3.00	39.99	49.24
260.00	35.59	9.71	1.59	1.54	3.00	39.72	49.16
300.00	35.46	10.32	1.81	1.78	3.05	39.40	48.87

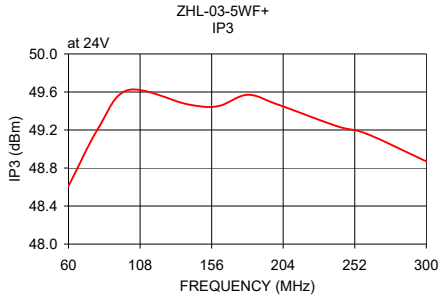












NOTES

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

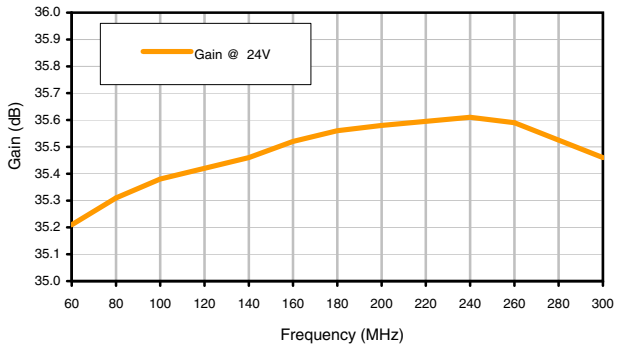
Amplifier ZHL-03-5WF+

Typical Performance Data

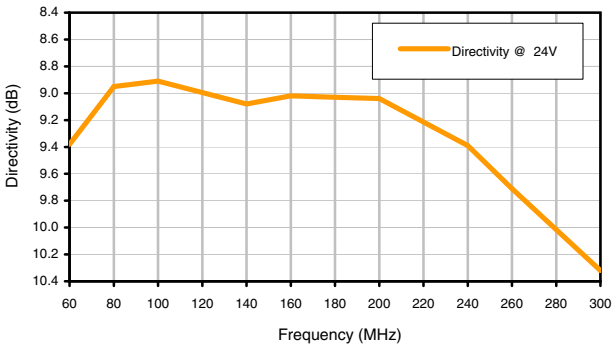
FREQUENCY (MHz)	GAIN (dB) 24V	DIRECTIVITY (dB) 24V	VSWR IN (:1) 24V	VSWR OUT (:1) 24V	Output IP3 (dBm) 24V	NOISE FIGURE (dB) 24V	Pout at 1dB Comp. (dBm) 24V
60.0	35.21	9.38	1.18	1.74	48.61	3.85	38.73
80.0	35.31	8.95	1.24	1.57	49.22	3.51	39.38
100.0	35.38	8.91	1.28	1.50	49.62	3.40	39.53
140.0	35.46	9.08	1.32	1.44	49.47	3.14	39.35
160.0	35.52	9.02	1.33	1.41	49.45	3.05	39.26
180.0	35.56	9.03	1.34	1.39	49.57	3.02	39.79
200.0	35.58	9.04	1.37	1.38	49.47	2.99	40.07
240.0	35.61	9.39	1.50	1.45	49.24	3.00	39.99
260.0	35.59	9.71	1.59	1.54	49.16	3.00	39.72
300.0	35.46	10.32	1.81	1.78	48.87	3.05	39.40

Typical Performance Curves

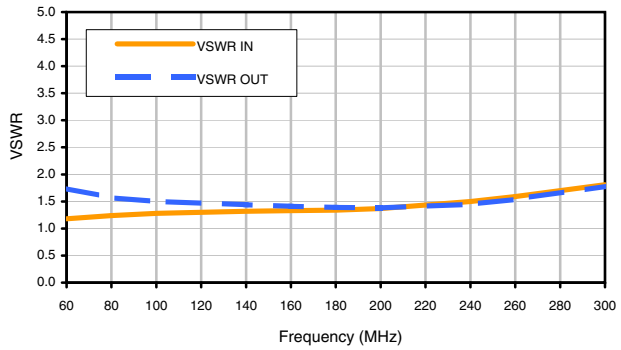
Gain



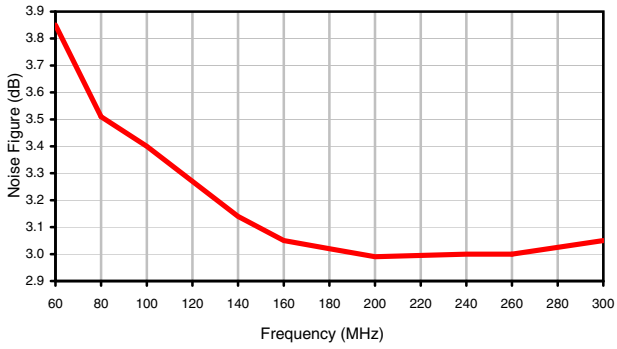
Directivity



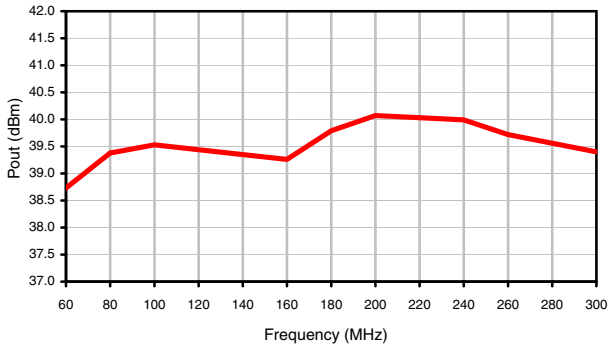
VSWR @ 24V



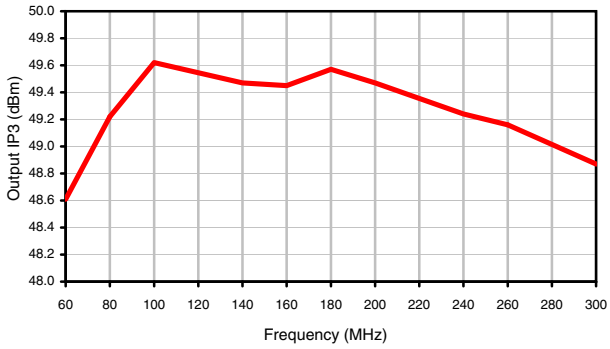
Noise Figure @ 24V



Pout at 1dB Compression @ 24V



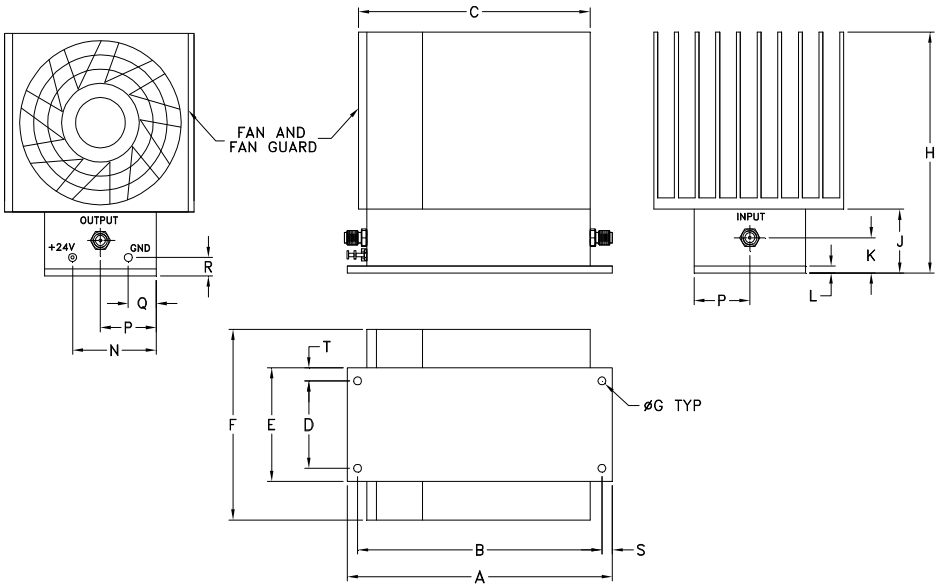
Output IP3 @ 24V



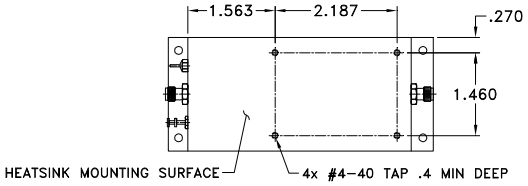
Case Style CP

Outline Dimensions

CP641



MOUNTING INFORMATION OF MODEL WITHOUT HEATSINK



CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N
CP641	4.75 (120.65)	4.375 (111.13)	4.18 (106.17)	1.540 (39.12)	2.00 (50.80)	3.36 (85.34)	.144 (3.66)	4.24 (107.70)	1.12 (28.45)	.58 (14.73)	.125 (3.18)	-- --	1.50 (38.10)

CASE#	P	Q	R	S	T	WT. GRAMS	WT. WITHOUT HEATSINK GRAMS
CP641	1.00 (25.40)	.50 (12.70)	.34 (8.64)	.19 (4.83)	.23 (5.84)	750	290

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. Heat sink finish: Black anodize if supplied with heat sink.

Mini-Circuits

Environmental Specifications **ENV23T5**

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	-20° to 80° C Ambient Environment	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 85° C	MIL-STD-202, Method 108
Thermal Shock	-55° to 100°C, 5 cycles	MIL-STD-202, Method 107, Condition A, except 100°C