COAXIAL

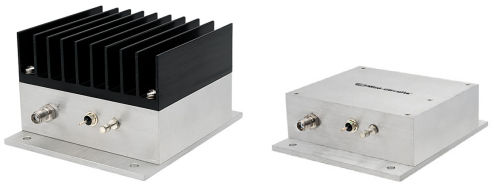
Low Noise Amplifier

ZHL-1724HLN+
ZHL-1724HLNX+

50Ω 1700 to 2400 MHz SMA Female

FEATURES

- Very Low Noise Figure, 1.5 dB Max.
- Wideband, 1700 to 2400 MHz
- High Dynamic Range



Generic photo used for illustration purposes only

Model No.	ZHL-1724HLN+	ZHL-1724HLNX+▲
Case Style	NN92	
Connectors	SMA female	

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

APPLICATIONS

- PCS/DCS
- UMTS
- Communication Systems

ELECTRICAL SPECIFICATIONS AT +25 °C

Parameter	Frequency (MHz)	ZHL-1724HLN-S+			ZHL-1724HLNX-S+ ▲			Units
		Min.	Typ.	Max.	Min	Typ.	Max.	
Frequency Range		1700		2400	1700		2400	MHz
Noise Figure[1]	1700-2400		1.10	1.5		1.10	1.5	dB
Gain	1700-2400	30	36		30	36		dB
Gain Flatness	1700-2400		0.7	±1.0		0.7	±1.0	dB
Output Power at 1 dB Compression	1700-2400		+26			+26		dBm
Output Third Order Intercept Point	1700-2400		+36			+36		dBm
Input VSWR	1700-2400		1.4			1.4		:1
Output VSWR	1700-2400		1.6			1.6		:1
DC Supply Voltage			+15			+15		V
Supply Current[1]			580	725		580	725	mA

1. Noise Figure specified at room temperature, increases to 2.3 dB max. at +65 °C.
Open load is not recommended, may cause damage.
With no load derate max input power by 20 dB.

▲ Heat sink not included. Alternative heat sinking and heat removal must be provided by the user to limit maximum base-plate temperature up to +65 °C, in order to ensure proper performance. For reference, this requires thermal resistance of user's external heat sink to be 1.8°C/W max.

ABSOLUTE MAXIMUM RATINGS

Parameter	Ratings
Operating Temperature	-20 °C to +65 °C
Storage Temperature	-55 °C to +100 °C
DC Voltage	+20 V
Input RF Power (No Damage)	+10 dBm

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

REV. B
ECO-018348
ZHL-1724HLN+
MCL NY
260204

Low Noise Amplifier

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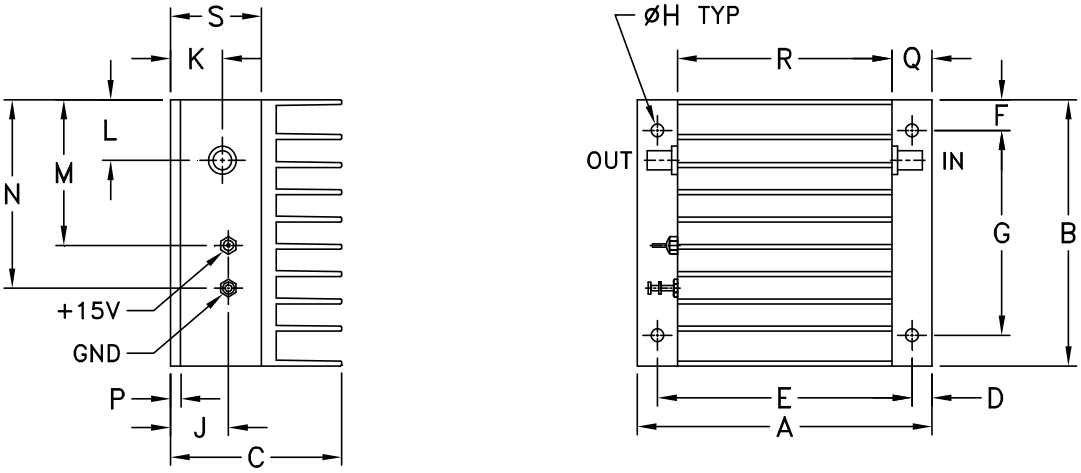
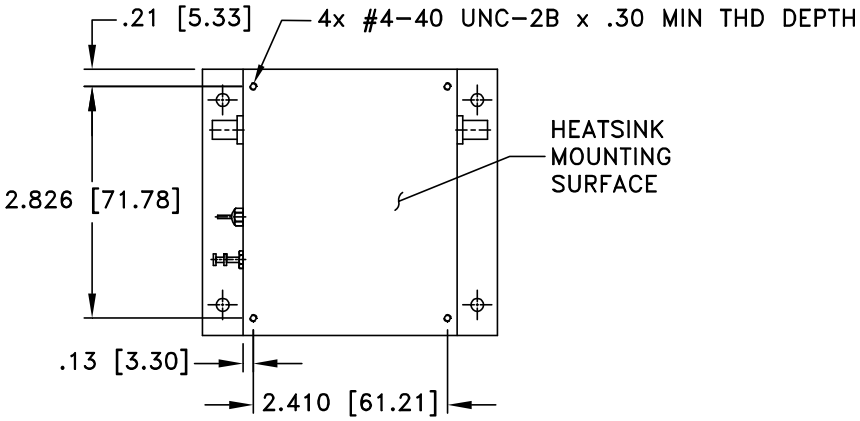
ZHL-1724HLNX+

50Ω 1700 to 2400 MHz SMA Female

OUTLINE DRAWING FOR MODELS WITH HEATSINK



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	wt
3.66	3.25	2.13	.25	3.16	.38	2.50	.156	.72	.64	.74	1.78	2.30	.125	.50	2.66	1.13	grams*
92.96	82.55	54.10	6.35	80.26	9.65	63.50	3.96	18.29	16.26	18.80	45.21	58.42	3.18	12.70	67.56	28.7	500.0

*362 grams without heatsink

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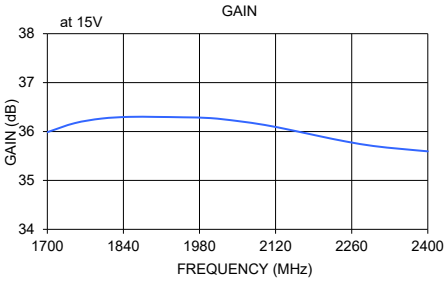
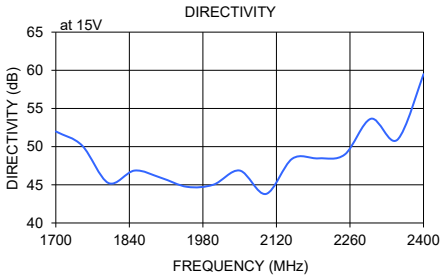
ZHL-1724HLNX+

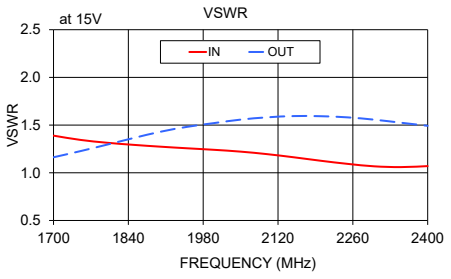
50Ω 1700 to 2400 MHz SMA Female

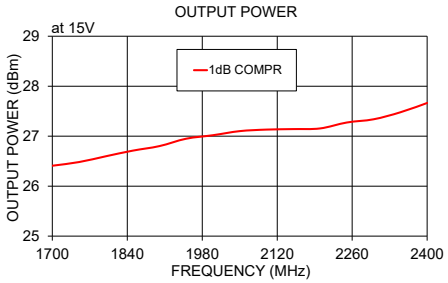
TYPICAL PERFORMANCE DATA/CURVES

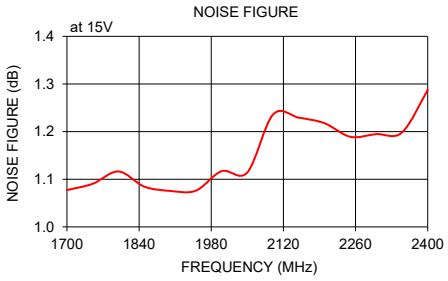
FREQUENCY (MHz)	GAIN (dB)	DIRECTIVITY (dB)	VSWR (:1)		P_{OUT} at 1 dB COMPR. (dBm)	NOISE FIGURE (dB)	IP3 (dBm)
	+15 V	+15 V	IN	OUT	+15 V	+15 V	+15 V
1700	35.99	51.99	1.39	1.16	26.41	1.08	37.48
1750	36.17	50.14	1.35	1.23	26.48	1.09	37.75
1800	36.26	45.24	1.32	1.29	26.60	1.12	38.18
1850	36.30	46.87	1.29	1.36	26.71	1.08	38.57
1900	36.30	45.92	1.27	1.43	26.80	1.08	38.76
1950	36.29	44.73	1.26	1.48	26.95	1.08	39.12
2000	36.27	45.02	1.24	1.52	27.02	1.12	39.42
2050	36.21	46.87	1.22	1.56	27.10	1.11	39.28
2100	36.13	43.80	1.20	1.58	27.13	1.24	39.35
2150	36.03	48.41	1.16	1.59	27.14	1.23	39.06
2200	35.91	48.46	1.13	1.59	27.16	1.22	39.03
2250	35.79	48.96	1.09	1.58	27.27	1.19	38.50
2300	35.70	53.65	1.07	1.56	27.34	1.19	38.62
2350	35.65	50.89	1.06	1.52	27.48	1.20	38.46
2400	35.59	59.49	1.07	1.49	27.66	1.29	38.54

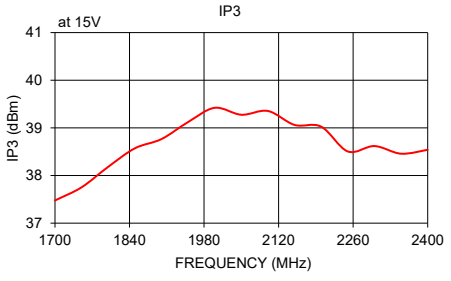












NOTES

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

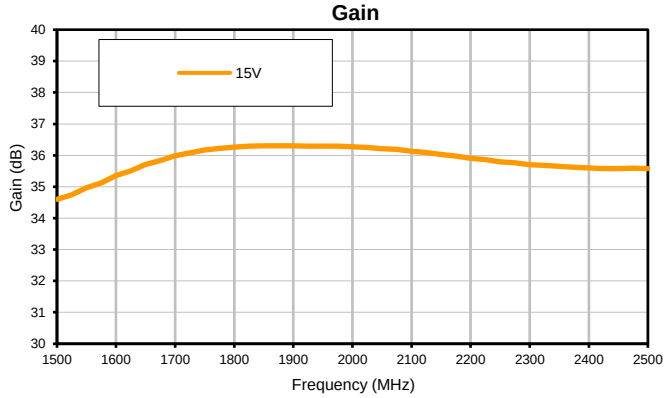
Low Noise Amplifier ZHL-1724HLN+

Typical Performance Data

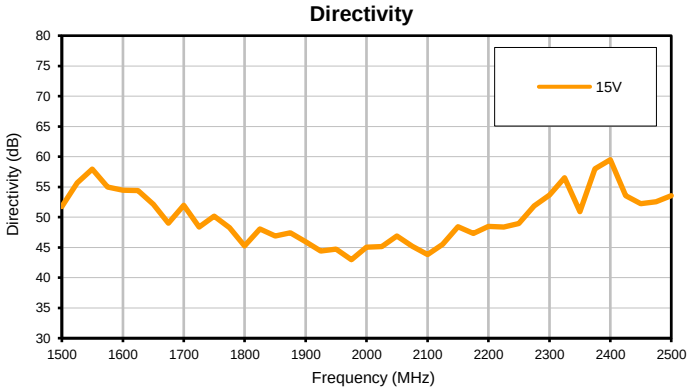
FREQ. (MHz)	GAIN (dB) 15V	DIRECTIVITY (dB) 15V	VSWR (:1) IN 15V	VSWR (:1) OUT 15V	NOISE FIGURE (dB) 15V	POUT @ 1 dB COMPRESSION (dBm) 15V	OUTPUT IP3 (dBm) 15V
1500	34.60	51.78	1.80	1.05	1.08	25.85	36.17
1525	34.74	55.68	1.74	1.05	1.11	26.00	36.47
1550	34.97	57.94	1.66	1.05	1.12	26.10	36.54
1575	35.12	54.99	1.61	1.06	1.09	26.12	36.77
1600	35.36	54.43	1.54	1.07	1.07	26.23	36.91
1625	35.50	54.41	1.50	1.08	1.09	26.26	37.18
1650	35.71	52.13	1.45	1.11	1.09	26.29	37.27
1675	35.83	49.01	1.42	1.13	1.05	26.35	37.39
1700	35.99	51.99	1.39	1.16	1.08	26.41	37.48
1725	36.07	48.38	1.37	1.19	1.02	26.44	37.77
1750	36.17	50.14	1.35	1.23	1.09	26.48	37.75
1775	36.22	48.25	1.33	1.25	1.02	26.50	37.85
1800	36.26	45.24	1.32	1.29	1.12	26.60	38.18
1825	36.29	48.07	1.31	1.32	1.01	26.63	38.34
1850	36.30	46.87	1.29	1.36	1.08	26.71	38.57
1875	36.30	47.40	1.29	1.39	1.13	26.81	38.87
1900	36.30	45.92	1.27	1.43	1.08	26.80	38.76
1925	36.29	44.39	1.27	1.45	1.04	26.85	38.97
1950	36.29	44.73	1.26	1.48	1.08	26.95	39.12
1975	36.29	42.97	1.25	1.50	1.15	26.90	39.19
2000	36.27	45.02	1.24	1.52	1.12	27.02	39.42
2025	36.25	45.17	1.23	1.54	1.08	27.01	39.25
2050	36.21	46.87	1.22	1.56	1.11	27.10	39.28
2075	36.19	45.19	1.21	1.57	1.16	27.08	39.39
2100	36.13	43.80	1.20	1.58	1.24	27.13	39.35
2125	36.09	45.51	1.18	1.59	1.16	27.11	39.19
2150	36.03	48.41	1.16	1.59	1.23	27.14	39.06
2175	35.98	47.32	1.15	1.60	1.20	27.20	38.84
2200	35.91	48.46	1.13	1.59	1.22	27.16	39.03
2225	35.86	48.40	1.11	1.59	1.24	27.19	38.53
2250	35.79	48.96	1.09	1.58	1.19	27.27	38.50
2275	35.76	51.86	1.08	1.57	1.10	27.30	38.40
2300	35.70	53.65	1.07	1.56	1.19	27.34	38.62
2325	35.68	56.50	1.06	1.54	1.19	27.43	38.41
2350	35.65	50.89	1.06	1.52	1.20	27.48	38.46
2375	35.62	58.02	1.06	1.51	1.20	27.55	38.51
2400	35.59	59.49	1.07	1.49	1.29	27.66	38.54
2425	35.58	53.56	1.08	1.48	1.37	27.80	38.61
2450	35.58	52.25	1.09	1.47	1.33	27.86	38.59
2475	35.59	52.55	1.10	1.46	1.35	27.96	38.55
2500	35.58	53.57	1.11	1.46	1.37	27.94	38.68

Typical Performance Curves

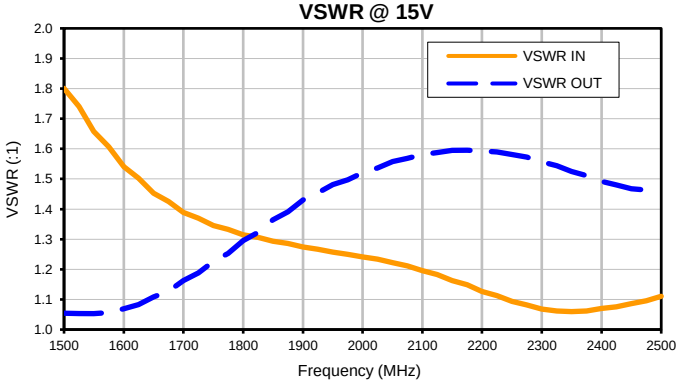
Gain



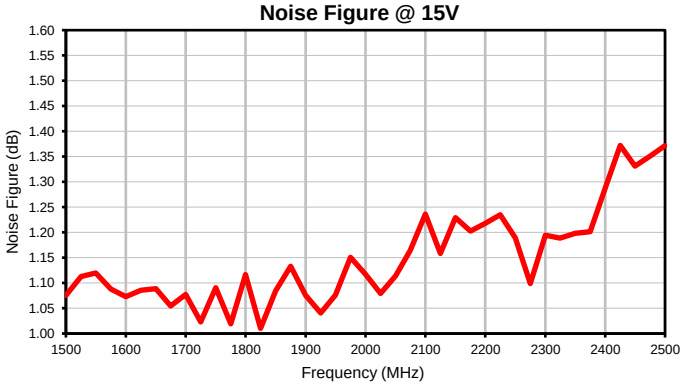
Directivity



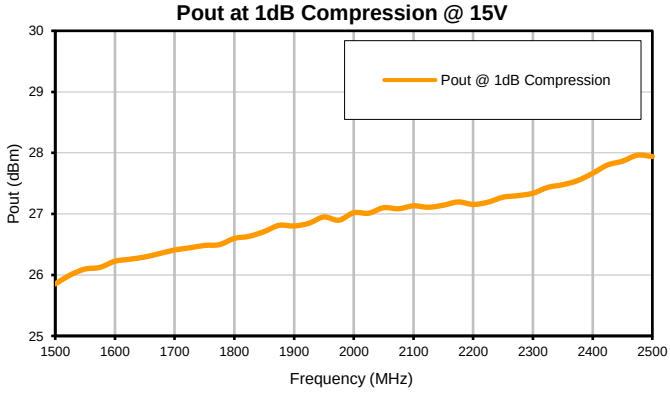
VSWR @ 15V



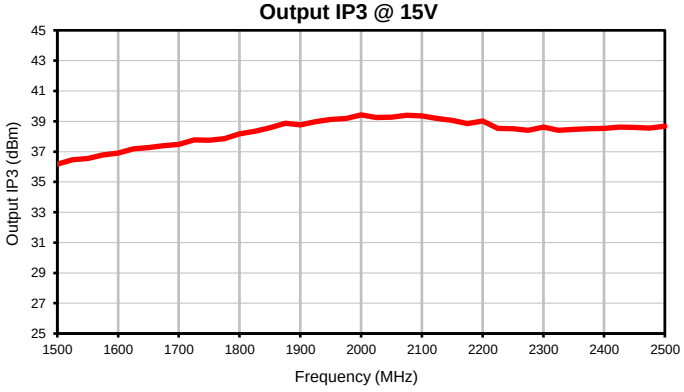
Noise Figure @ 15V



Pout at 1dB Compression @ 15V



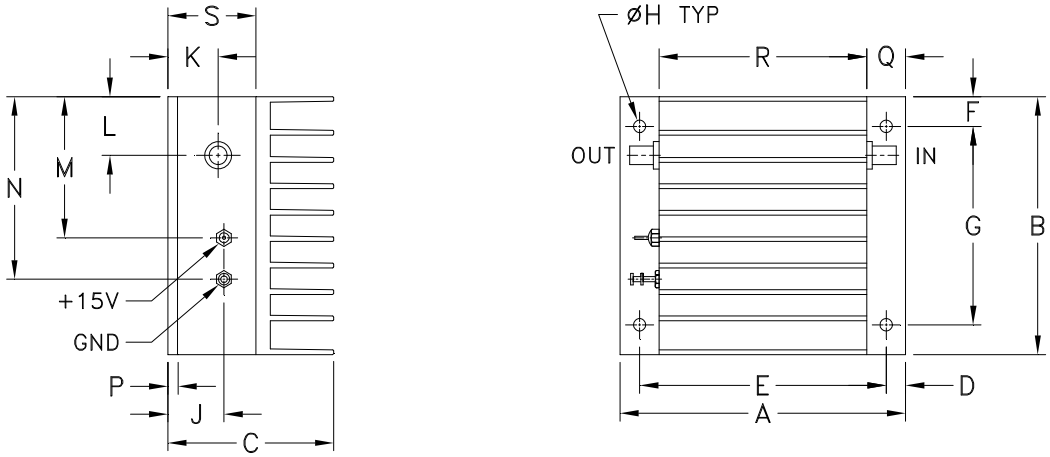
Output IP3 @ 15V



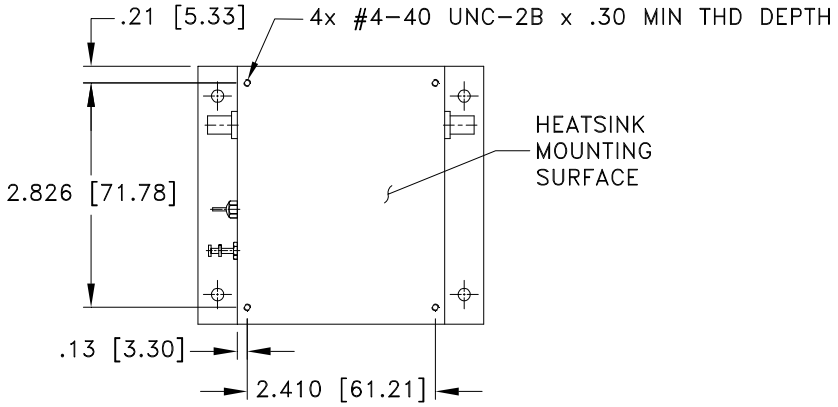
Case Style NN

NN92

Outline Dimensions



MOUNTING INFORMATION FOR MODELS WITHOUT HEATSINK



CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N
NN92	3.66 (92.96)	3.25 (82.55)	2.13 (54.10)	.25 (6.35)	3.16 (80.26)	.38 (9.65)	2.50 (63.50)	.156 (3.96)	.72 (18.29)	.64 (16.26)	.74 (18.80)	1.78 (45.21)	2.30 (58.42)

CASE#	P	Q	R	S	WT. GRAMS	WT. WITHOUT HEATSINK GRAMS
NN92	.125 (3.18)	.50 (12.70)	2.66 (67.56)	1.13 (28.58)	500.0	362.0

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

Notes:

1. Case material: Aluminum alloy.
2. Case and mounting bracket finish:
   For RoHS Case Styles: Clear chemical conversion coating, non-chrome or trivalent chrome based.
3. Heat sink finish: Black anodize.

Mini-Circuits®
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Environmental Specifications ENV23T4

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	-54° to 65°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