

High IP3

# Low Noise Amplifier

## ZRL-2400LN+

50Ω

1000 to 2400 MHz

### Features

- High IP3, +39 dBm typ.
- Low Noise figure, 1.2 dB typ.
- Broadband flat gain response
- Internal voltage regulated
- Over-voltage and transient protected

### Applications

- PCS, UMTS, GSM, cellular, wireless data
- Defense communications
- Satellite communications



Generic photo used for illustration purposes only

Case Style: FJ893

Connectors Model

SMA ZRL-2400LN+

**+RoHS Compliant**

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

### Electrical Specifications at 25°C

Parameter	Condition (MHz)	Min.	Typ.	Max.	Units
Frequency Range		1000		2400	MHz
Noise Figure <sup>3</sup>	1000 - 1400	—	1.2	2.0	dB
	1400 - 1900	—	1.0	1.4	
	1900 - 2400	—	1.2	1.4	
Gain	1000 - 1400	29	32	—	dB
	1400 - 1900	26	30	—	
	1900 - 2400	24	28	—	
Gain Flatness	1000 - 1400	—	±1.1	±2.0	dB
	1400 - 1900	—	±1.3	±2.2	
	1900 - 2400	—	±1.6	±2.2	
Output Power at 1dB compression	1000 - 1400	21	23	—	dBm
	1400 - 1900	23	24	—	
	1900 - 2400	23	24	—	
Output Power at 3dB compression	1000 - 1400	—	25.3	—	dBm
	1400 - 1900	—	26.0	—	
	1900 - 2400	—	26.0	—	
Output third order intercept point <sup>1</sup>	1000 - 1400	—	+37	—	dBm
	1400 - 1900	—	+39	—	
	1900 - 2400	—	+40	—	
Input VSWR	1000 - 1400	—	1.6	—	:1
	1400 - 1900	—	1.2	—	
	1900 - 2400	—	1.2	—	
Output VSWR	1000 - 1400	—	1.4	—	:1
	1400 - 1900	—	1.2	—	
	1900 - 2400	—	1.2	—	
Active Directivity	1000 - 1400	—	13	—	dB
	1400 - 1900	—	16	—	
	1900 - 2400	—	16	—	
DC Supply Voltage <sup>2</sup>		—	12	—	V
Supply Current		—	470	520	mA

1. 1 MHz tone spacing.

2. Unit is internally voltage regulated for 6.5 to 17VDC input voltage range.

3. 2.2 dB max at frequency 1000-1050 MHz.

### Maximum Ratings

Parameter	Ratings
Operating Temperature	-40°C to 80°C case -40°C to 60° ambient
Storage Temperature	-55°C to 100°C
DC Voltage	+17V
Input RF Power (no damage)	+10 dBm

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

### Notes

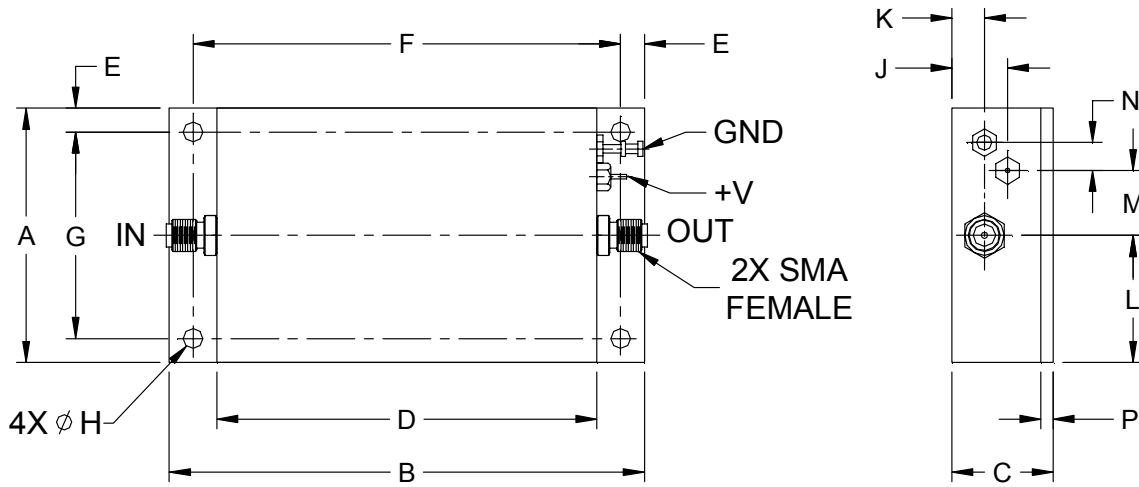
A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.

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/MCLStore/terms.jsp](http://www.minicircuits.com/MCLStore/terms.jsp)



## Outline Drawing



## Outline Dimensions (inch/mm)

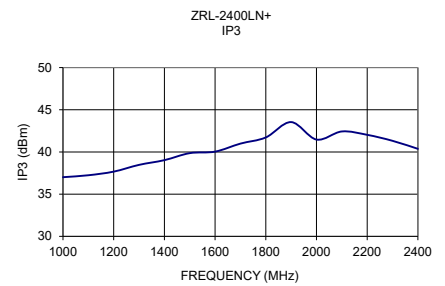
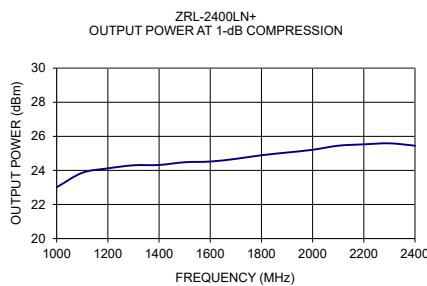
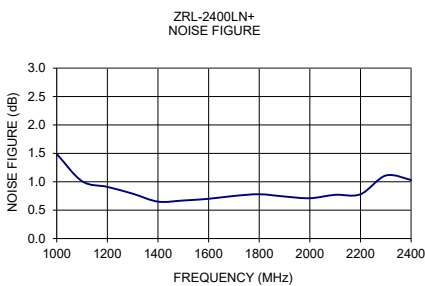
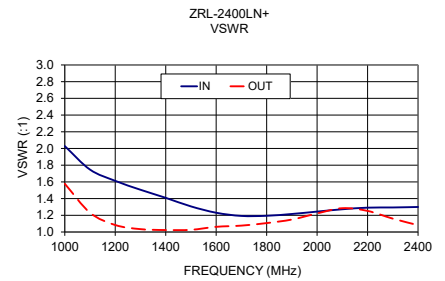
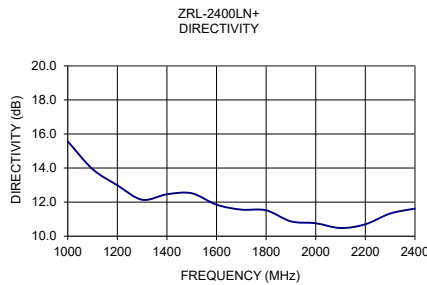
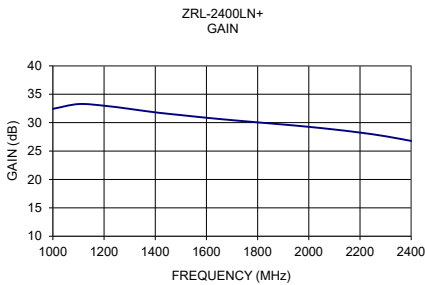
A	B	C	D	E	F	G	H	J	K	L	M	N	P	wt
2.00	3.75	0.80	3.00	0.19	3.374	1.624	0.156	0.44	0.26	1.00	0.51	0.22	0.10	grams
50.80	95.25	20.32	76.20	4.83	85.70	41.25	3.96	11.18	6.60	25.40	12.95	5.59	2.54	135

### 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/MCLStore/terms.jsp](http://www.minicircuits.com/MCLStore/terms.jsp)



FREQUENCY (MHz)	GAIN (dB)	DIRECTIVITY (dB)	VSWR (:1)		NOISE FIGURE (dB)	POUT at 1dB COMPR. (dBm)	OUTPUT IP3 (dBm)
	12V	12V	IN	OUT	12V	12V	12V
1000.00	32.43	15.57	2.03	1.58	1.49	23.01	37.01
1100.00	33.27	13.94	1.75	1.23	1.01	23.86	37.24
1200.00	32.98	12.99	1.61	1.08	0.91	24.12	37.67
1300.00	32.42	12.14	1.51	1.03	0.79	24.30	38.47
1400.00	31.81	12.46	1.41	1.02	0.65	24.32	39.03
1500.00	31.33	12.52	1.31	1.03	0.67	24.48	39.86
1600.00	30.86	11.85	1.23	1.06	0.70	24.52	40.04
1700.00	30.44	11.56	1.19	1.08	0.75	24.68	40.99
1800.00	30.05	11.52	1.19	1.11	0.78	24.89	41.72
1900.00	29.67	10.87	1.22	1.15	0.74	25.05	43.54
2000.00	29.26	10.76	1.24	1.22	0.71	25.21	41.47
2100.00	28.79	10.48	1.27	1.29	0.77	25.45	42.43
2200.00	28.25	10.70	1.29	1.25	0.78	25.53	42.03
2300.00	27.60	11.33	1.29	1.16	1.11	25.59	41.32
2400.00	26.78	11.62	1.30	1.08	1.03	25.45	40.37



**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/MCLStore/terms.jsp](http://www.minicircuits.com/MCLStore/terms.jsp)



# Low Noise Amplifier

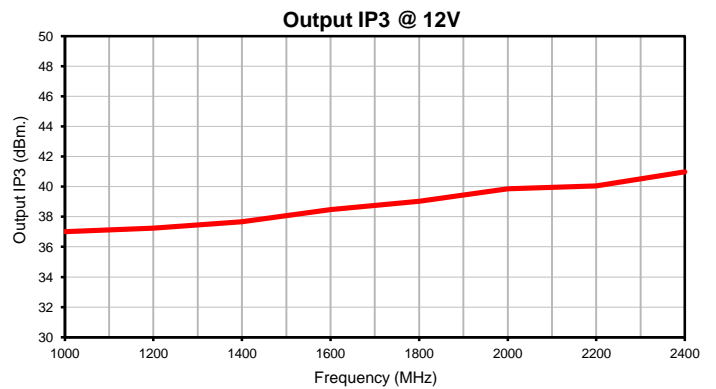
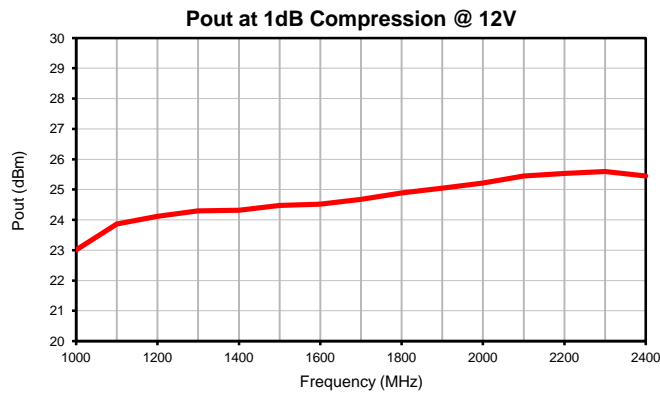
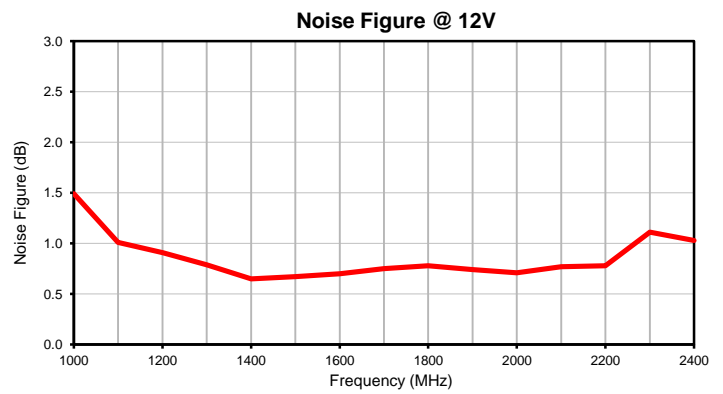
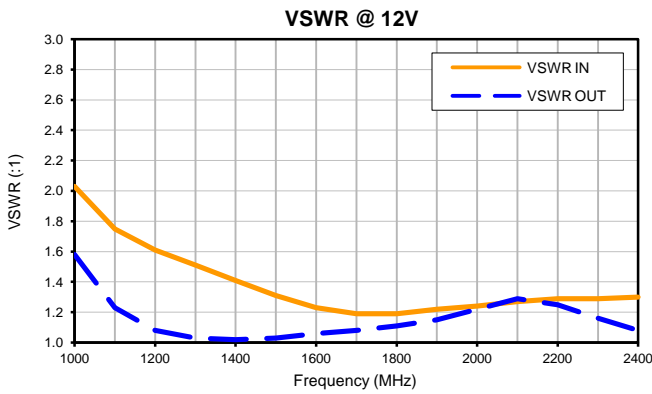
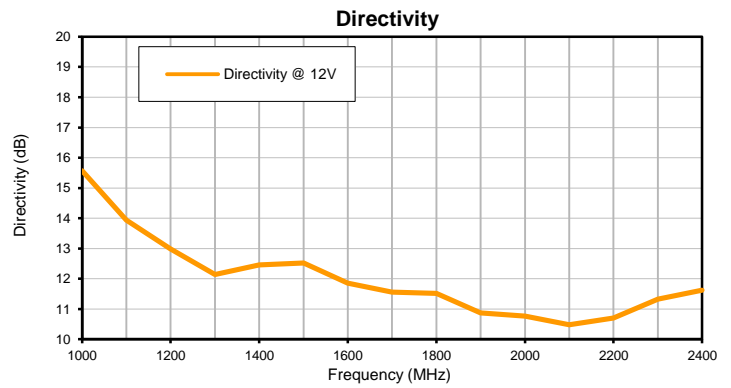
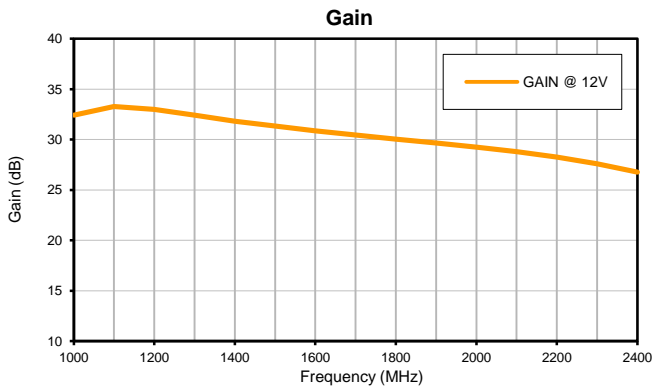
# ZRL-2400LN+

## Typical Performance Data

FREQUENCY (MHz)	GAIN (dB) 12V	DIRECTIVITY (dB) 12V	VSWR (:1)		NOISE FIGURE (dB) 12V	POUT @ 1 dB COMPRESSION (dBm) 12V	OUTPUT IP3 (dBm) 12V
			IN 12V	OUT 12V			
1000.0	32.43	15.57	2.03	1.58	1.49	23.01	37.01
1100.0	33.27	13.94	1.75	1.23	1.01	23.86	37.24
1200.0	32.98	12.99	1.61	1.08	0.91	24.12	37.67
1300.0	32.42	12.14	1.51	1.03	0.79	24.30	38.47
1400.0	31.81	12.46	1.41	1.02	0.65	24.32	39.03
1500.0	31.33	12.52	1.31	1.03	0.67	24.48	39.86
1600.0	30.86	11.85	1.23	1.06	0.70	24.52	40.04
1700.0	30.44	11.56	1.19	1.08	0.75	24.68	40.99
1800.0	30.05	11.52	1.19	1.11	0.78	24.89	41.72
1900.0	29.67	10.87	1.22	1.15	0.74	25.05	43.54
2000.0	29.26	10.76	1.24	1.22	0.71	25.21	41.47
2100.0	28.79	10.48	1.27	1.29	0.77	25.45	42.43
2200.0	28.25	10.70	1.29	1.25	0.78	25.53	42.03
2300.0	27.60	11.33	1.29	1.16	1.11	25.59	41.32
2400.0	26.78	11.62	1.30	1.08	1.03	25.45	40.37



## Typical Performance Curves

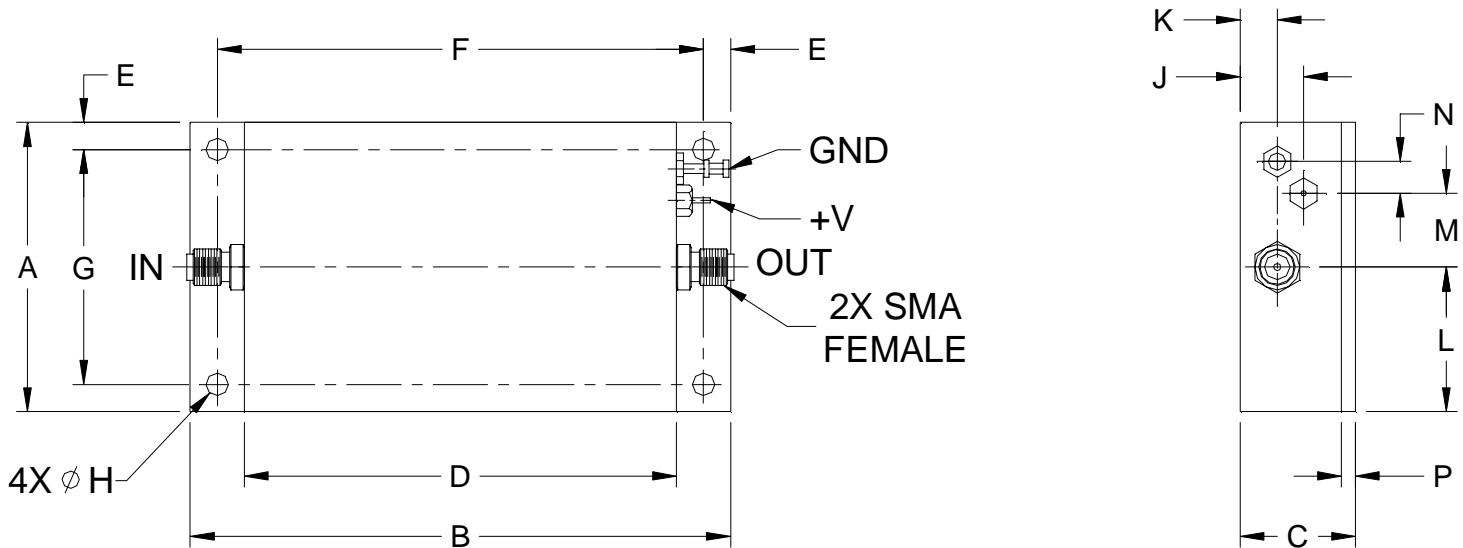


# Case Style

# FJ

## Outline Dimensions

## FJ893



CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N	P	WT. GRAMS
FJ893	2.00 (50.80)	3.75 (95.25)	.80 (20.32)	3.00 (76.20)	.19 (4.83)	3.374 (85.70)	1.624 (41.25)	.156 (3.96)	.44 (11.18)	.26 (6.60)	1.00 (25.40)	.51 (12.95)	.22 (5.59)	.10 (2.54)	135

Dimensions are in inches (mm). Tolerances: 2PL. +/- .03; 3PL. +/- .015

### Notes:

1. Case material: Aluminum alloy.
2. Case finish:

For RoHS Case Styles: Clear chemical conversion coating, non-chrome or trivalent chrome based.

**Mini-Circuits®**

INTERNET <http://www.minicircuits.com>

P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661

Distribution Centers NORTH AMERICA 800-654-7949 • 417-335-5935 • Fax 417-335-5945 • EUROPE 44-1252-832600 • Fax 44-1252-837010

Mini-Circuits ISO 9001 & ISO 14001 Certified

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.

<b>Specification</b>	<b>Test/Inspection Condition</b>	<b>Reference/Spec</b>
Operating Temperature	-40° to 60° C Ambient Environment	Individual Model Data Sheet
Operating Temperature	-40° to 80° C Case Temperature	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