Low Noise Amplifier RAMP-33LN+

50Ω 50 to 3000 MHz

The Big Deal

- Low Noise Figure, 1.1 dB typ.
- Wide bandwidth, 50 to 3000MHz
- High IP3, 30 dBm typ.
- Integrated Bias Matching and Stability Circuits

CASE STYLE: CK605

Product Overview

The RAMP-33LN+ (RoHS compliant) utilizes advanced E-PHEMT technology in a single stage low noise amplifier design built into a shielded case (size: .500"x.500"x.180"). The drop-in module offers low noise figure and high output IP3 over the full bandwith of 50 to 3000MHz, without the need for external matching components. This amplifier supports a wide variety of applications requiring moderate power output, low distortion and 50 ohm matched input/output ports.

Key Features

Feature	Advantages
Wide band high dynamic range	The RAMP-33LN+ covers a wide spectrum of application frequencies from VHF through 'S' band. When combined with the output power and IP3, this amplifier supports a broad array of systems and test applications.
Low NF	With typical 1.1dB NF, the RAMP-33LN+ enables greater sensitivity for receiver applications. It includes all matching and stability circuits making this Drop-in LNA module a turn-key solution for ensuring system sensitivity in demanding applications.
High Output IP3	At +30 dBm IP3, in combination with its low noise performance, the RAMP-33LN+ can improve a systems' spur-free dynamic range which is often the critical driver in many receiver applications.
Power In at 1dB Comp.: +1dBm typ. Input no damage, +13dBm	Provides a good safety margin against damage or saturation from unwanted high power RF signals present at the input to a receiver.
Drop-in Module	Eliminates the need for designers to optimize low noise transistor bias and matching circuitry. The RAMP-33LN+ provides the outstanding combined performance and does not require any external elements. The case PCB area is smaller than most LNA transistor designs with external circuitry.
Metal Case	Provides a protective enclosure improving handling robustness in addition to shielding this sensitive high gain device from close by circuitry.
Unconditionally stable	No adverse effects due to loading of the input and output ports avoiding potential instability which can be a critical requirement when integrating high gain, high frequency devices on an open PCB assembly.

Notes: 1. Performance and quality attributes and conditions not expressly stated in this specification sheet are intended to be excluded and do not form a part of this specification sheet. **2.** Electrical specifications and performance data contained herein are based on Mini-Circuit's applicable established test performance criteria and measurement instructions. **3.** The parts covered by this specification sheet 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.

Surface Mount

Low Noise Amplifier

RAMP-33LN+

50Ω 50 to 3000 MHz

Features

- Wide bandwidth, 50 to 3000MHz
- Low noise figure, 1.1 dB typ.
- Output power, up to +16.5 dBm typ.
- Good output IP3, 30 dBm typ.
- Unconditionally stable

Applications

- Front-end amplifier
- Cellular
- GPS
- Bluetooth

CASE STYLE: CK605
PRICE: $19.95 ea. QTY (1-24)

+ RoHS compliant in accordance with EU Directive (2002/95/EC)

The +Suffix has been added in order to identify 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		50		3000	MHz
Noise Figure	50 - 3000		1.1	2.0	dB
Gain	100 1000 2000 3000	13.0	22.0 18.5 14.5 11.0		dB
Output Power at 1dB compression	50 - 3000	14.5	16.5		dBm
Output third order intercept point (OIP3)	50 - 3000		30		dBm
Input VSWR	50 - 3000		2.0		:1
Output VSWR	50 - 3000		1.4		:1
DC Supply Voltage			5.0		V
DC Supply Current			70	80	mA

Pin Connections

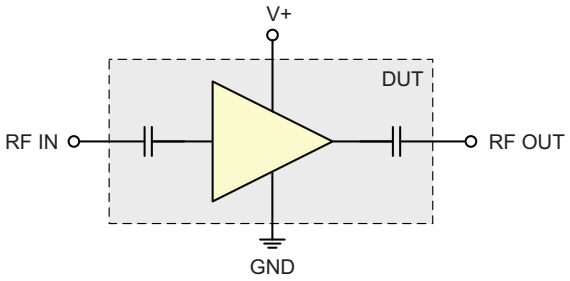
V+	10
RF OUT	14
RF IN	2
GROUND	1,3,4,5,6,7,8,9,11,12,13,15,16

Maximum Ratings

Parameter	Ratings
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
Operating Voltage	5.5 V
Input RF Power (no damage)	+13 dBm
Power Consumption	440 mW

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

Simplified Schematic

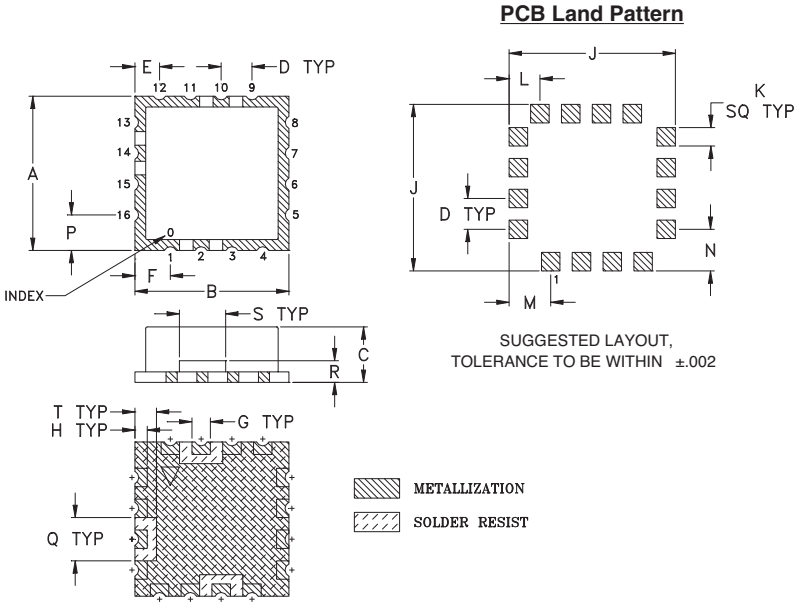


ESD Rating

Human Body Model (HBM): Class 0 (< 250 V) in accordance with EIA/JESD22-A114-B
Machine Model (MM): Class A (< 200 V) in accordance with EIA/JESD22-A115-A

Notes: 1. Performance and quality attributes and conditions not expressly stated in this specification sheet are intended to be excluded and do not form a part of this specification sheet. **2.** Electrical specifications and performance data contained herein are based on Mini-Circuit's applicable established test performance criteria and measurement instructions. **3.** The parts covered by this specification sheet 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.

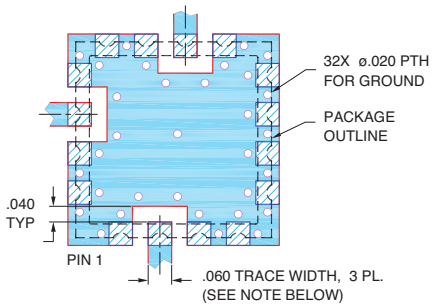
Outline Drawing



Outline Dimensions (inch / mm)

A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	wt.
.500	.500	.180	.100	.080	.115	.060	.040	.540	.060	.100	.135	.135	.115	.140	.070	.150	.070	grams
12.70	12.70	4.57	2.54	2.03	2.92	1.52	1.02	13.72	1.52	2.54	3.43	3.43	2.92	3.56	1.78	3.81	1.78	1.0

Demo Board MCL P/N: TB-10
Suggested PCB Layout (PL-012)



NOTES:

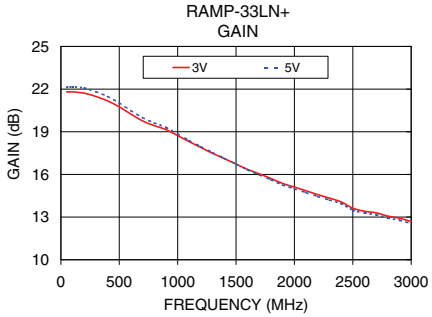
1. TRACE WIDTH IS SHOWN FOR RF4 WITH DIELECTRIC THICKNESS . 030" ± .002"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

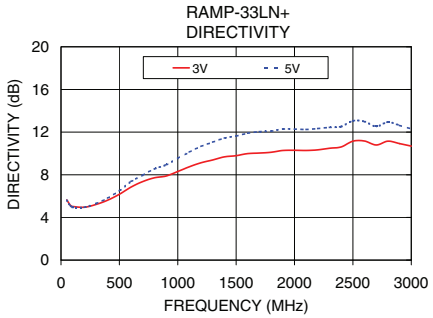
DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)

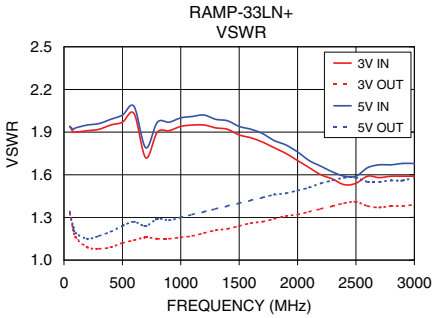
DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

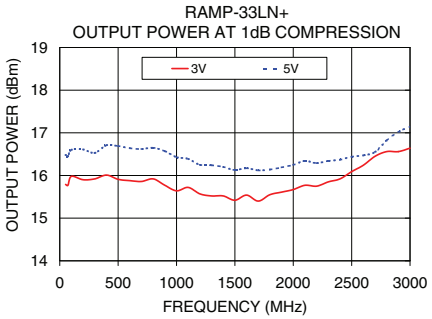
Notes: 1. Performance and quality attributes and conditions not expressly stated in this specification sheet are intended to be excluded and do not form a part of this specification sheet. **2.** Electrical specifications and performance data contained herein are based on Mini-Circuit's applicable established test performance criteria and measurement instructions. **3.** The parts covered by this specification sheet 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.

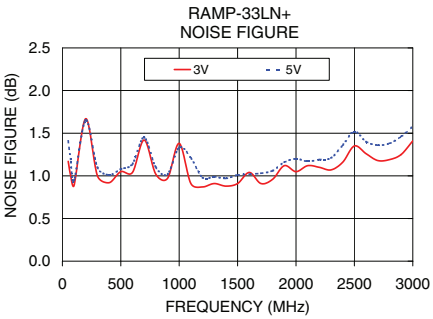
FREQUENCY (MHz)	GAIN (dB)		DIRECTIVITY (dB)		VSWR IN (:1)		VSWR OUT (:1)		NOISE FIGURE (dB)		P. OUT at 1dB COMPR. (dBm)		IP3 (dBm)	
	3V	5V	3V	5V	3V	5V	3V	5V	3V	5V	3V	5V	3V	5V
50	21.81	22.12	5.64	5.60	1.94	1.94	1.33	1.34	1.17	1.41	15.79	16.48	28.00	31.36
100	21.81	22.16	5.03	4.95	1.90	1.93	1.16	1.19	0.89	0.95	15.98	16.60	28.42	31.66
200	21.71	22.07	4.96	4.95	1.91	1.95	1.09	1.15	1.67	1.65	15.90	16.61	28.92	32.07
300	21.48	21.82	5.22	5.30	1.92	1.96	1.08	1.17	1.00	1.10	15.92	16.53	28.92	32.20
400	21.17	21.48	5.62	5.81	1.95	1.99	1.09	1.20	0.92	1.01	16.01	16.71	28.71	32.13
500	20.75	21.03	6.17	6.50	1.97	2.02	1.12	1.24	1.05	1.08	15.91	16.69	28.47	32.19
600	20.24	20.49	6.85	7.37	2.03	2.08	1.14	1.27	1.04	1.14	15.88	16.64	28.39	32.19
700	19.76	20.00	7.36	7.96	1.72	1.79	1.16	1.24	1.42	1.45	15.86	16.62	28.44	31.43
800	19.43	19.62	7.72	8.55	1.90	1.97	1.15	1.29	1.02	1.10	15.92	16.65	28.63	31.47
900	19.15	19.30	7.88	8.93	1.91	1.97	1.15	1.28	0.97	1.02	15.77	16.57	28.90	31.24
1000	18.73	18.85	8.31	9.54	1.94	2.00	1.16	1.30	1.38	1.33	15.64	16.43	29.08	31.08
1500	16.73	16.73	9.79	11.63	1.88	1.94	1.24	1.40	0.91	1.01	15.42	16.13	29.43	29.63
2000	15.11	14.99	10.30	12.28	1.70	1.76	1.32	1.49	1.05	1.20	15.67	16.25	30.40	28.68
2500	13.63	13.50	11.15	13.06	1.54	1.59	1.41	1.58	1.35	1.52	16.09	16.44	30.40	27.87
3000	12.69	12.54	10.69	12.30	1.59	1.68	1.39	1.58	1.41	1.58	16.64	17.15	30.24	27.40

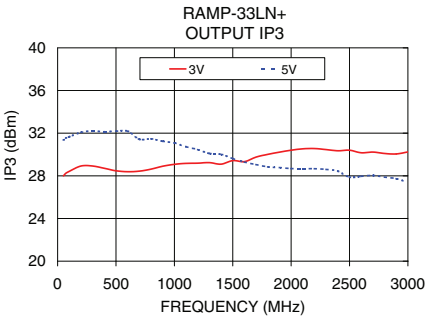












Notes: 1. Performance and quality attributes and conditions not expressly stated in this specification sheet are intended to be excluded and do not form a part of this specification sheet. **2.** Electrical specifications and performance data contained herein are based on Mini-Circuit's applicable established test performance criteria and measurement instructions. **3.** The parts covered by this specification sheet 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.