

Low Noise Amplifier

RAMP-33LN+

50Ω 50 to 3000 MHz

The Big Deal

- Low Noise Figure, 1.1 dB typ.
- Wide bandwidth, 50 to 3000 MHz
- 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 bandwidth 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. |



For detailed performance specs & shopping online see web site

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IF/RF MICROWAVE COMPONENTS

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

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 | | 50 | | 3000 | MHz |
| Noise Figure | 50 - 3000 | | 1.1 | 2.0 | dB |
| Gain | 100 | 13.0 | 22.0 | | dB |
| | 1000 | | 18.5 | | |
| | 2000 | | 14.5 | | |
| | 3000 | | 11.0 | | |
| 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

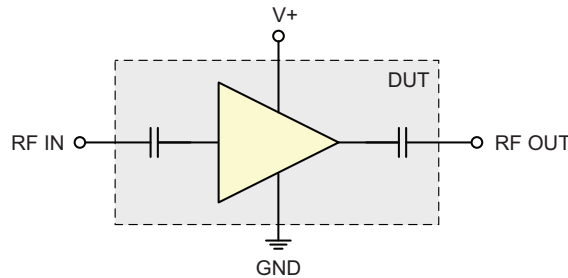
| | |
|--------|--------------------------------|
| V+ | 10 |
| RF OUT | 14 |
| RF IN | 2 |
| GROUND | 1,3,4,5,6,7,8,9,11,12,13,15,16 |

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



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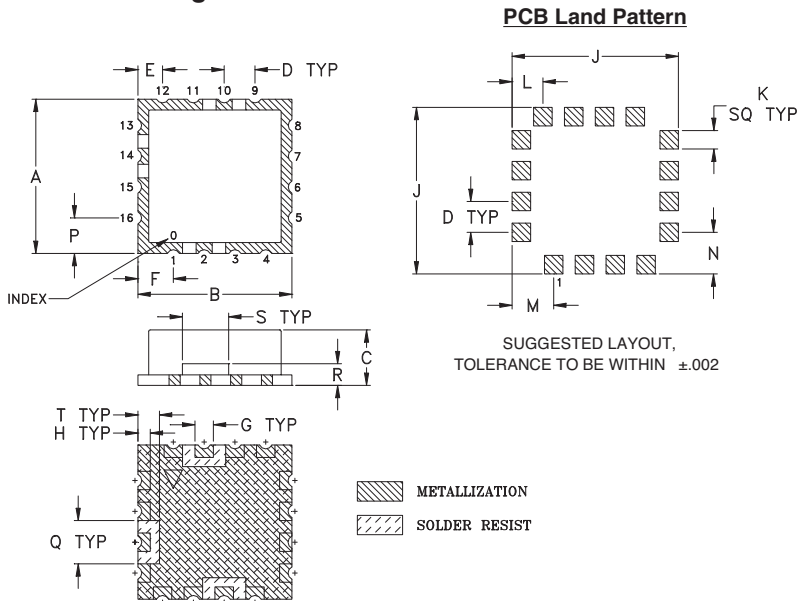
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REV. B
 M134944
 RAMP-33LN+
 EDR-9084/1AF1
 RAV
 121021
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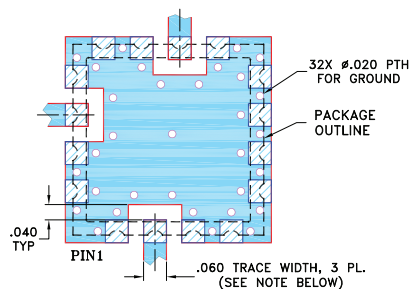
Outline Drawing



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-548+ Suggested PCB Layout (PL-012)

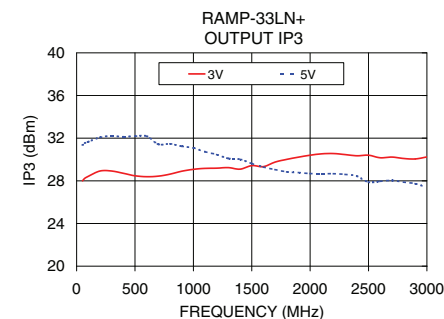
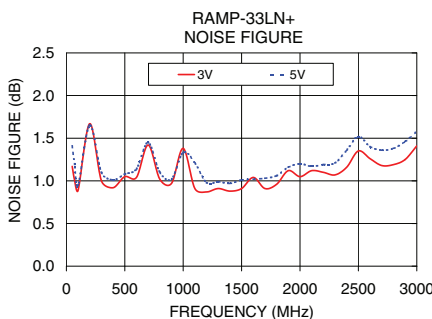
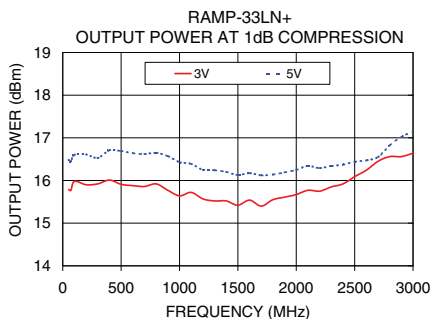
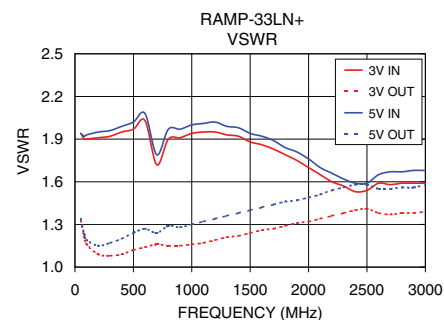
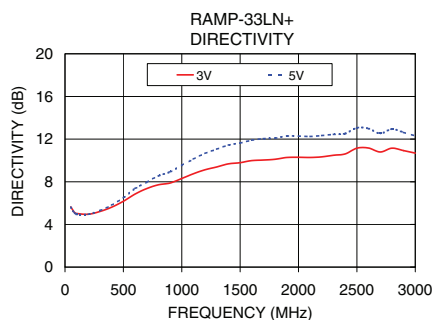
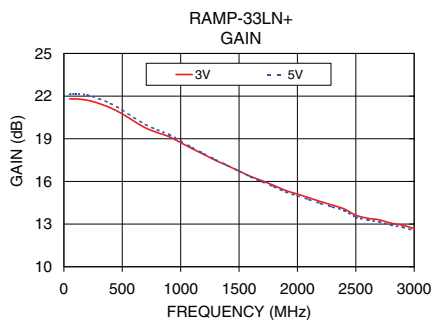


NOTES:

- TRACE WIDTH IS SHOWN FOR FR4 WITH DIELECTRIC THICKNESS $.030" \pm .002"$; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
- BOTTOM SIDE OF THE BOTTOM IS CONTINUOUS GROUND PLANE.

- DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)
- DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

| 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 |



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