

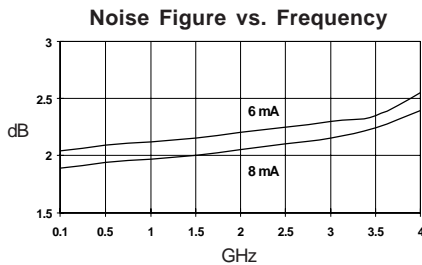
Product Description

Stanford Microdevices' SLN-186 is a high performance gallium arsenide heterojunction bipolar transistor MMIC housed in a low-cost surface mount plastic package. A Darlington configuration is used for broadband performance from DC-4.0 GHz.

The SLN-186 needs only 2 DC-blocking capacitors and a bias resistor for operation. Noise figure may be optimized by using 2-element matching at the input to yield <2.0dB noise figure.

This 50 Ohm LNA requires only a single supply voltage and draws only 8mA. For broadband applications, it may be biased at 6mA with minimal effect on noise figure and gain.

The SLN-186 is available in tape and reel at 1000, 3000 and 5000 devices per reel.



Electrical Specifications at Ta = 25C

| Symbol | Parameters: Test Conditions | | Units | Min. | Typ. | Max. |
|------------------|--|--|------------|------|----------------|------|
| NF 50 Ohm | Noise Figure in 50 Ohms: Vds = 3.5V, Ids = 8mA | f = DC-1.5 GHz f = 1.5-4.0 GHz | dB dB | | 2.0 2.4 | 2.4 |
| S ₂₁ | 50 Ohm Gain: Vds = 3.5V, Ids = 8mA | f = DC-1.5 GHz f = 1.5-4.0 GHz | dB | 19 | 22 20 | |
| VSWR | 50 Ohm Match(Input and Output): Vds = 3.5V, Ids = 8mA | f = DC-1.5 GHz f = 1.5-4.0 GHz | - | | 1.8:1 3.0:1 | |
| NF 50 Ohm | Noise Figure in 50 Ohms: Vds = 3.2V, Ids = 6mA | f = DC-1.5 GHz f = 1.5-4.0 GHz | dB dB | | 2.2 2.6 | 2.5 |
| S ₂₁ | 50 Ohm Gain: Vds = 3.2V, Ids = 6mA | f = DC-1.5 GHz f = 1.5-4.0 GHz | dB | 14 | 17 16 | |
| VSWR | 50 Ohm Match(Input and Output): Vds = 3.2V, Ids = 6mA | f = DC-1.5 GHz f = 1.5-4.0 GHz | - | | 1.4:1 2.5:1 | |
| P _{1dB} | Output Power at 1dB Compression: f = DC-1.5 GHz | Vd= 3.5V, Id = 8 mA Vd= 3.2V, Id = 6 mA | dBm dBm | | -10 -12 | |
| IP ₃ | Third Order Intercept Point: f = DC-1.5 GHz | Vd= 3.5V, Id = 8 mA Vd= 3.2V, Id = 6 mA | dBm | | +5 +3 | |

The information provided herein is believed to be reliable at press time. Stanford Microdevices assumes no responsibility for inaccuracies or omissions. Stanford Microdevices assumes no responsibility for the use of this information, and all such information shall be entirely at the user's own risk. Prices and specifications are subject to change without notice. No patent rights or licenses to any of the circuits described herein are implied or granted to any third party. Stanford Microdevices does not authorize or warrant any Stanford Microdevices product for use in life-support devices and/or systems. Copyright 1999 Stanford Microdevices, Inc. All worldwide rights reserved.

SLN-186

DC-4.0 GHz, 3.5 Volt 50 Ohm LNA MMIC Amplifier



Product Features

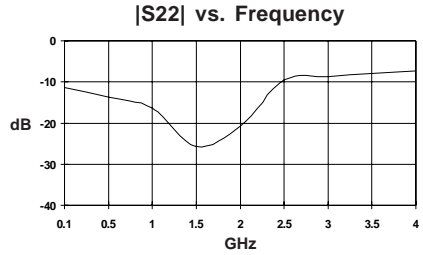
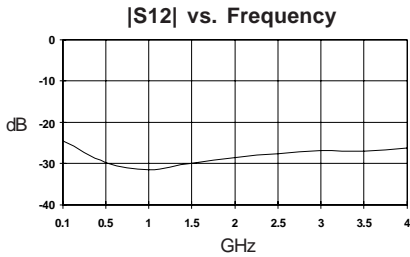
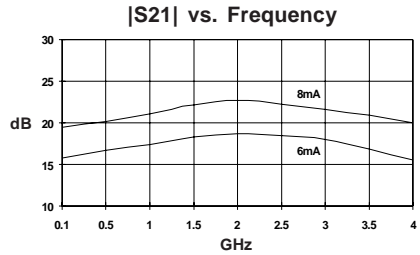
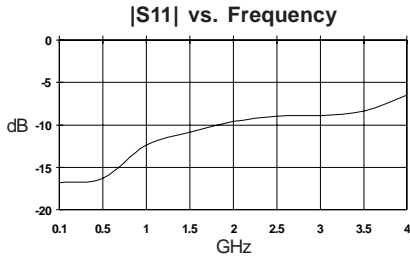
- Patented, Reliable GaAs HBT Technology
- Low Noise Figure: 2.0dB from 0.1 to 1.5 GHz
- High Associated Gain: 22dB Typ. at 2.0 GHz
- True 50 Ohm MMIC : No External Matching Required
- Low Current Draw : Only 8mA
- Low Cost Surface Mount Plastic Package

Applications

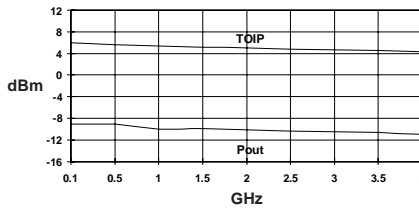
- AMPS, PCS, DECT, Handsets
- Tri-Band & Broadband Receivers

SLN-186 DC-4.0 GHz LNA MMIC Amplifier

Typical Performance at 25°C ($V_{ds} = 3.5V$, $I_{ds} = 8mA$)



Pout & TOIP vs. Frequency



Typical S-Parameters $V_{ds} = 3.5V$, $I_{ds} = 8mA$

| Freq GHz | S11 | S11 Ang | S21 | S21 Ang | S12 | S12 Ang | S22 | S22 Ang |
|----------|-------|---------|-------|---------|------|---------|------|---------|
| .100 | 0.092 | 122 | 11.69 | -12 | .080 | -11 | .044 | 35 |
| .250 | 0.068 | -154 | 11.99 | -4 | .053 | 5 | .089 | -22 |
| .500 | 0.067 | -153 | 12.32 | -13 | .042 | 16 | .091 | -46 |
| 1.00 | 0.125 | -160 | 13.03 | -39 | .040 | 29 | .123 | -112 |
| 1.50 | 0.215 | 152 | 14.07 | -72 | .048 | 45 | .245 | 169 |
| 2.00 | 0.309 | 90 | 15.11 | -138 | .045 | 31 | .394 | 86 |
| 2.50 | 0.423 | 36 | 15.20 | -173 | .056 | 14 | .421 | 12 |
| 3.00 | 0.513 | 8 | 13.18 | 152 | .059 | 14 | .445 | -26 |
| 3.50 | 0.509 | -14 | 10.47 | 138 | .061 | 17 | .444 | -51 |
| 4.00 | 0.491 | -20 | 8.89 | 125 | .075 | 20 | .468 | -71 |

(S-Parameters include the effects of two 1.0 mil diameter bond wires, each 30 mils long, connected to the gate and drain pads on the die)

Low Noise MMICs

Absolute Maximum Ratings

| Parameter | Absolute Maximum |
|-----------------------|------------------|
| Device Current | 50mA |
| Power Dissipation | 440mW |
| RF Input Power | 100mW |
| Junction Temperature | +200C |
| Operating Temperature | -45C to +85C |
| Storage Temperature | -65C to +150C |

Notes:

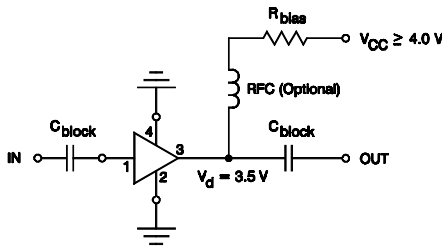
1. Operation of this device above any one of these parameters may cause permanent damage.

Part Number Ordering Information

| Part Number | Devices Per Reel | Reel Size |
|-------------|------------------|-----------|
| SLN-186-TR1 | 1000 | 7" |
| SLN-186-TR2 | 3000 | 13" |
| SLN-186-TR3 | 5000 | 13" |

| Recommended Bias Resistor Values | | | | | | | |
|----------------------------------|------|-----|------|-----|------|------|------|
| Supply Voltage(Vs) | 3.3V | 5V | 7.5V | 9V | 12V | 15V | 20V |
| Rbias (Ohms) @ 8mA | * | 188 | 500 | 688 | 1063 | 1438 | 2063 |
| Rbias (Ohms) @ 6mA | * | 300 | 717 | 967 | 1467 | 1967 | 2800 |

* Needs active biasing for constant current source

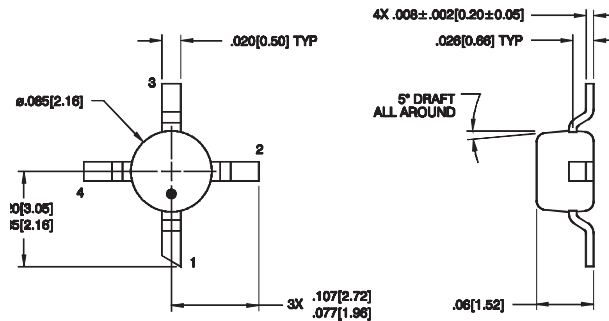


Typical Biasing Configuration

Device Pinout

| Pin | Function |
|-----|--------------------|
| 1 | RF Input |
| 2 | Ground |
| 3 | RF Output and Bias |
| 4 | Ground |

Device Outline



Low Noise MMICs