

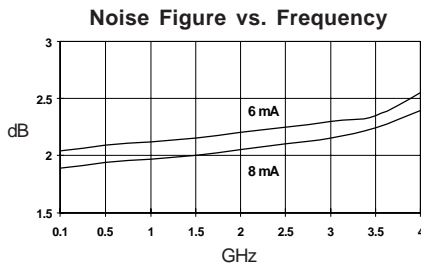
## Product Description

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 <sub>21</sub>	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 <sub>21</sub>	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 <sub>1dB</sub>	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 <sub>3</sub>	Third Order Intercept Point: f = DC-1.5 GHz	Vd= 3.5V, Id = 8 mA Vd= 3.2V, Id = 6 mA	dBm		+5 +3	

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## SLN-186

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



### Product Features

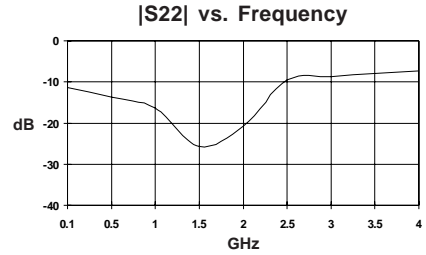
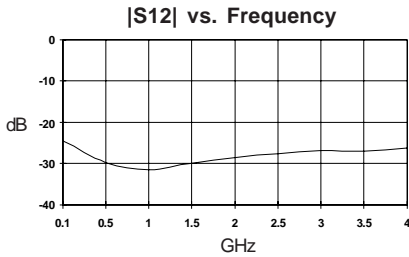
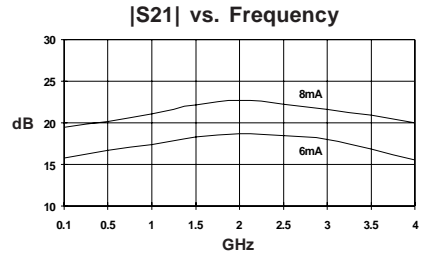
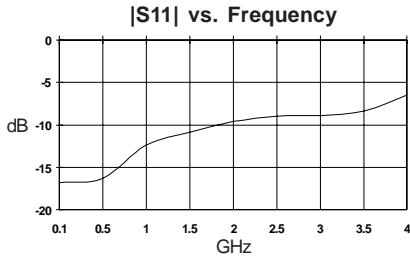
- Patented, Reliable GaAs HBT Technology
- Low Noise Figure: 2.0dB from 0.1 to 1.5 GHz
- High Associated Gain: 22dB Typ. at 2.0 GHz
- True 50 Ohm MMIC : No External Matching Required
- Low Current Draw : Only 8mA
- Low Cost Surface Mount Plastic Package

### Applications

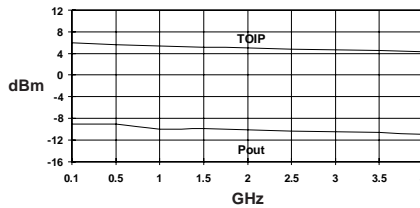
- AMPS, PCS, DECT, Handsets
- Tri-Band & Broadband Receivers

## 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:

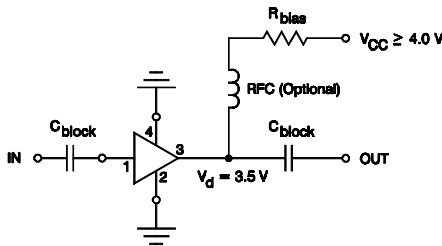
1. Operation of this device above any one of these parameters may cause permanent damage.

## 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

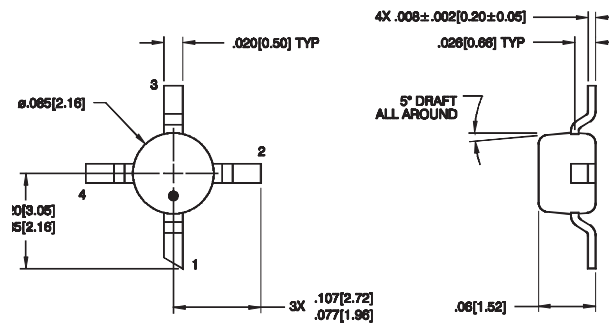


Typical Biasing Configuration

## Device Pinout

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

## Device Outline



Low Noise MMICs