SLN-186

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

Product Description

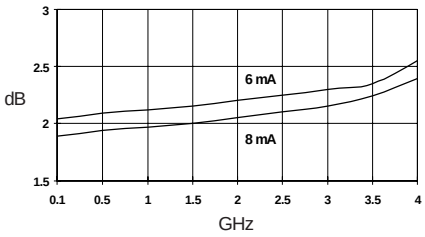
Stanford Microdevices' SLN-186 is a high performance gallium arsenide heterojunction bipolar transistor MMIC housed in a low-cost surface mount plastic package. A Darlington configuration is used for broadband performance from DC-4.0 GHz.

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.

Noise Figure vs. Frequency



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**

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	

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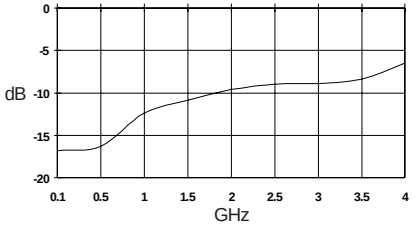
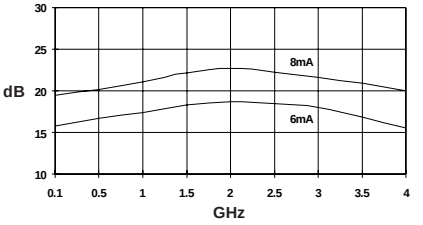
Typical Performance at 25° C (Vds = 3.5V, Ids = 8mA)

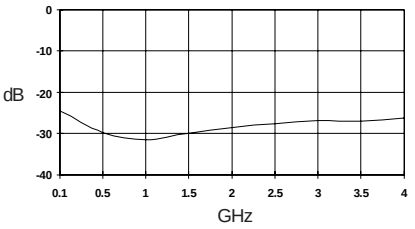
|S11| vs. Frequency



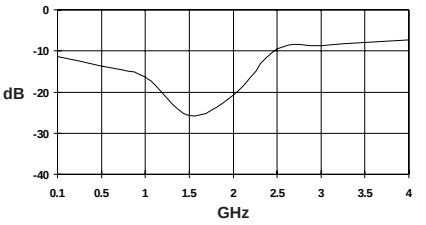
|S21| vs. Frequency



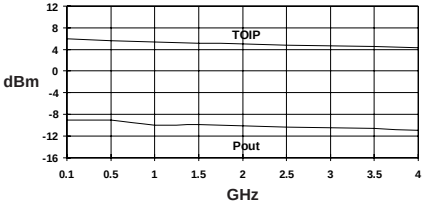
|S12| vs. Frequency



|S22| vs. Frequency



Pout & TOIP vs. Frequency



Typical S-Parameters Vds = 3.5V, Ids = 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)

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:

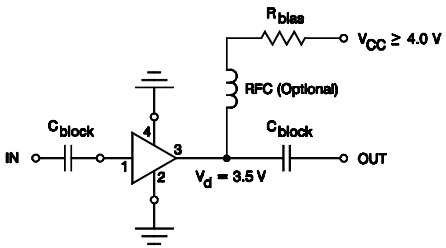
1. Operation of this device above any one of these parameters may cause permanent damage.

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