7 to 13GHz / 19dB / 1.6dB NF Low Noise Amplifier

DATA SHEET **VWA 5005017 LA**

General Description

The **VWA5005017LA** is a low noise amplifier MMIC die operating in the frequency range 7 to 13GHz.

The device has a typical noise figure of 1.6dB with a typical gain of 19dB.

It is manufactured on a pHEMT Technology and is especially suited for radar and for telecommunication applications.

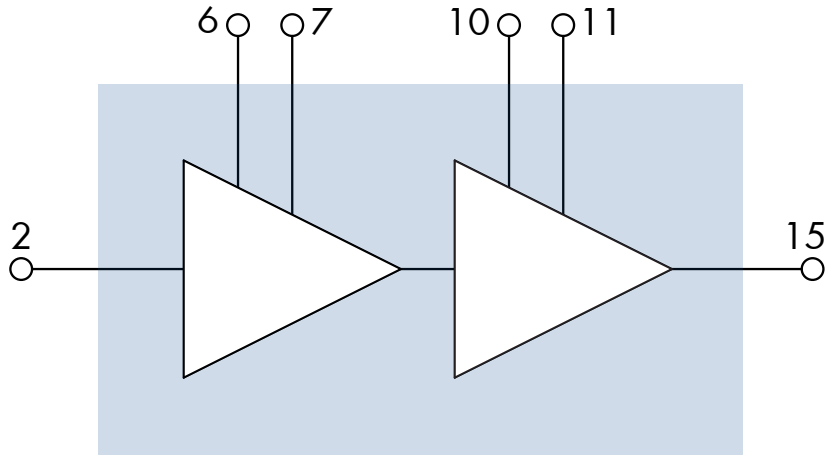
Features

- Low Noise PHEMT GaAs Amplifier
- Noise Figure: 1.6dB
- Wide band: 7 to 13GHz
- Gain: 19dB
- Gain Flatness: +/- 1dB
- Input Return Loss: -12dB
- Output Return Loss: -12dB
- Power supply: 70mA @ +5V
- Die dimension: 1,6 x 1,1 x 0.1 (mm)

Applications

- Telecommunications
- Radar Meteo / Survey
- Telecommunications

Pins Assignement & Functional Block Diagram



Symbol	Pad N°
RF In	2
V_{G1}	6
V_{D1}	7
V_{G2}	10
V_{D2}	11
RF Out	15

Electrical Specifications

Test conditions unless otherwise noted:

- Tamb.= +25°C
- V_D= V_{D1}= V_{D2}= V_{G1}= V_{G2}= +5V

Symbol	Parameter	Min	Typ	Max	Unit
F	Frequency range	7		13	GHz
NF	Noise figure		1.6		dB
G	Small signal gain		19		dB
ΔG	Small signal gain flatness		+/-1		dB
S11	Input return loss		-12		dB
S22	Output return loss		-12		dB
P1dBc	1 dB compression point		10		dBm
I_{TOTAL}	Total Drain current		70		mA

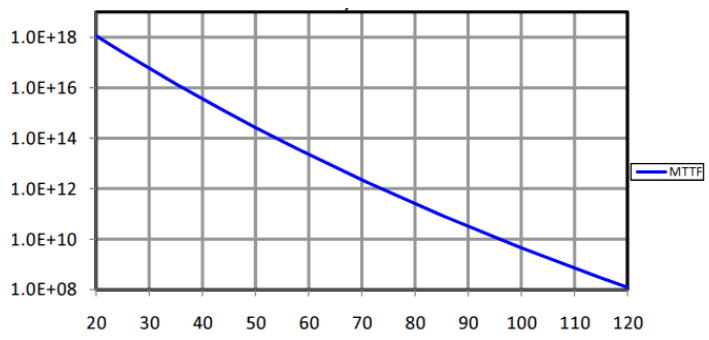
Absolute Maximum Ratings

Symbol	Parameter	Max	Unit
V_{D1_2}	Drain voltage	6	V
V_{G1_2}	Gate voltage	6	V
I_{TOTAL}	Supply current	90	mA
Pin	CW Input power	20	dBm
Tch	Channel temperature	150	°C
Tprocess	Soldering temperature	300	°C
Ta	Operating temperature range	-40/+85	°C
Tstg	Storage temperature range	-55/+150	°C

(*) Rth, thermal resistance from channel to backside: TBD.
Operation above any of these parameters may cause permanent damages. Care should be taken to avoid supply transient and over voltage

MTTF

The values shown here are calculated, only to be used as a guideline and represent reliability information under V_D= +5V

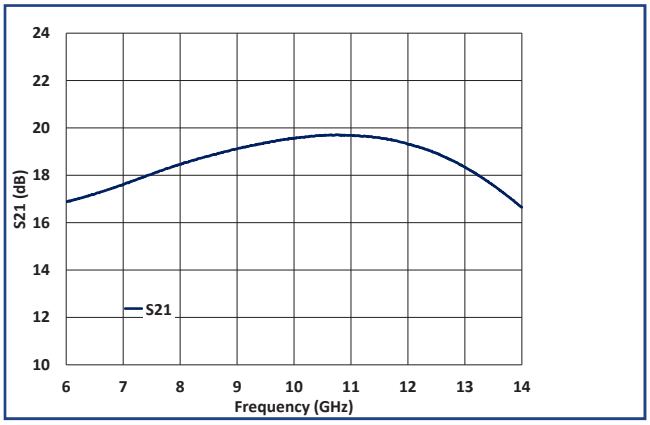


Typical Performance (Test Under Probes)

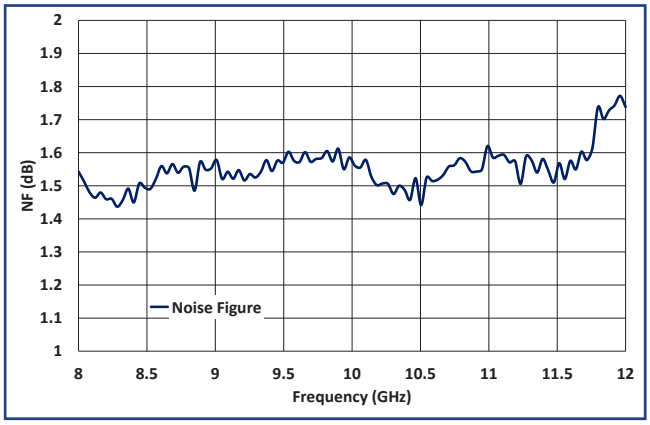
Test conditions unless otherwise noted:

- Tamb.= +25°C
- V_D= V_{D1}= V_{D2}= V_{G1}= V_{G2}= +5V
- I_D= I_{D1}= I_{D2}= I_{G1}= I_{G2}= 70mA

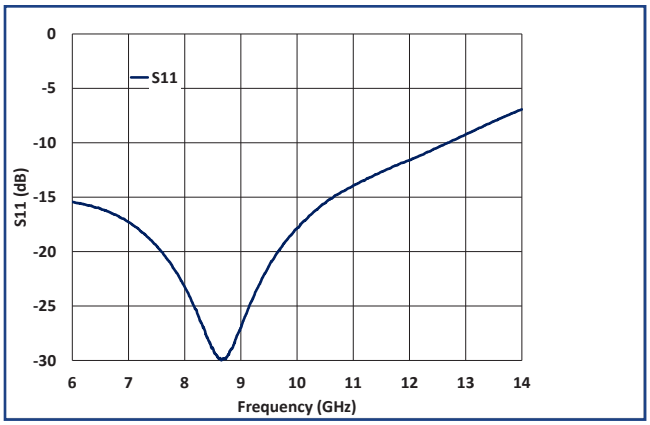
Small Signal Gain



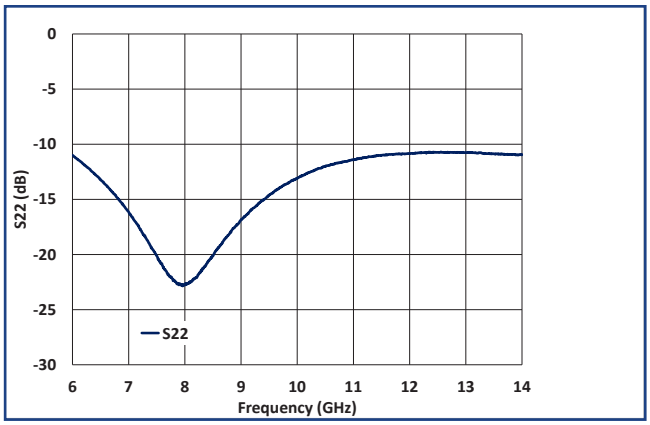
Noise Figure



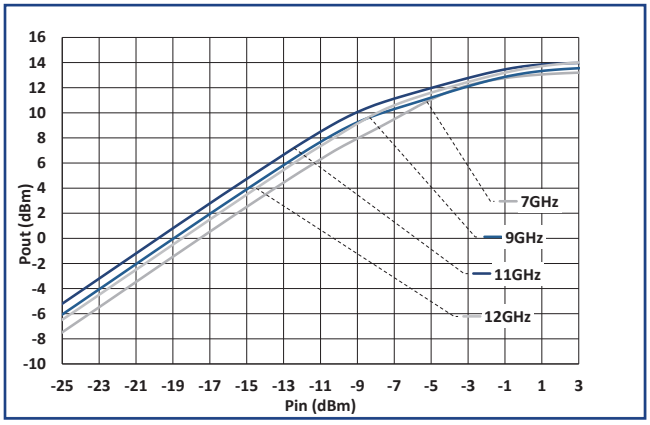
Input Return Loss



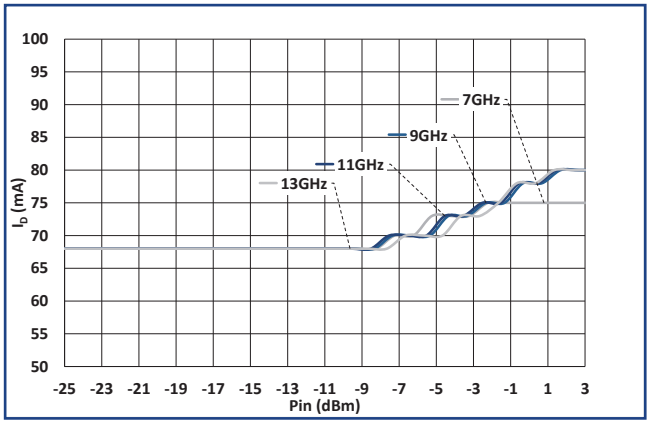
Output Return Loss



Output Power VS Input Power for various Frequency



Drain Current VS Input Power for various Frequency



Biasing procedure

Switch on

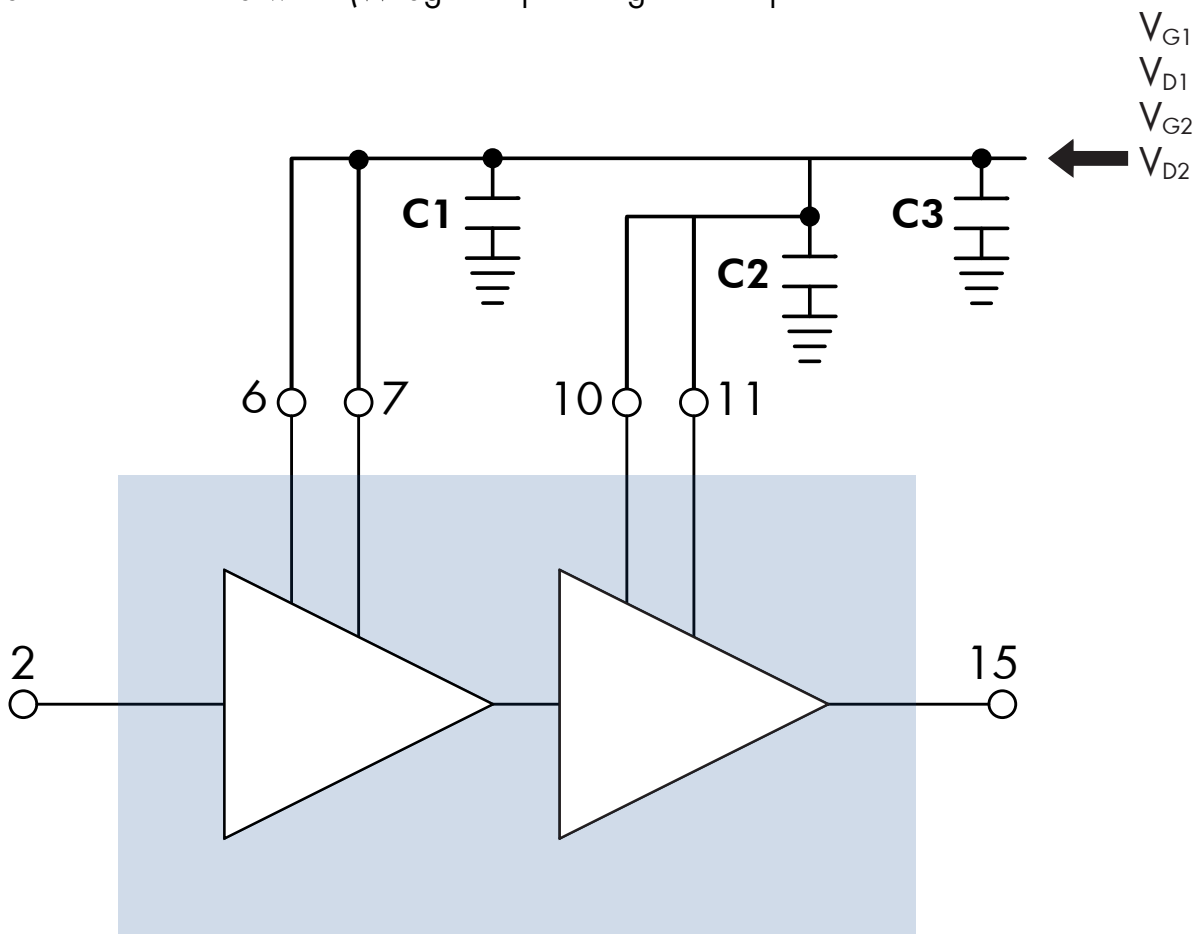
1. Set V_{D1}, V_{D2}, V_{G1} and V_{G2} to +5V
2. Optional : V_{G1} and V_{G2} can be tuned between 0V and +5V
3. Tunr RF Input ON

Switch off

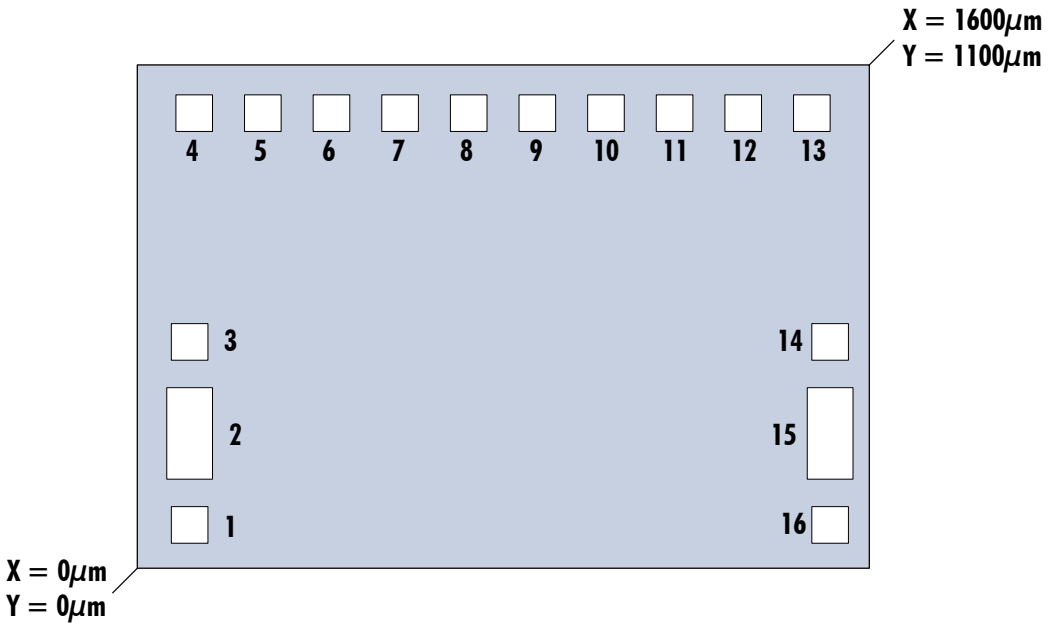
1. Turn RF OFF
2. Decrease V_{D1}, V_{D2}, V_{G1} and V_{G2} to 0V

Application Circuit

- C1 to C2 = 100pF MIM capacitor (Close to the die)
- C3 = 1µF
- RF In and RF Out : 2 Gold wires (Wedges 25µm. Length < 300µm



Die Layout



Pinout and Bonding Pad Coordinates

Die Pin Out				
Pad	**X (µm)**	**Y (µm)**	**Size (µm x µm)**	**Function**
1	100	100	80x80	GND
2	100	300	100x200	RF In
3	100	500	80x80	GND
4	110	1000	80x80	GND
5	260	1000	80x80	GND
6	410	1000	80x80	V_{G1}
7	560	1000	80x80	V_{D1}
8	710	1000	80x80	V_{S1}
9	860	1000	80x80	GND
10	1010	1000	80x80	V_{G2}
11	1160	1000	80x80	V_{D2}
12	1310	1000	80x80	V_{S2}
13	1460	1000	80x80	GND
14	1500	500	80x80	GND
15	1500	300	100x200	RF Out
16	1500	100	80x80	GND

Die thickness = 100µm
Die bottom must be connected to ground (RF and DC)

Ordering Information

Product Code	Definition
VWA 5005017 LA	7 to 13GHz / 19dB / 1.6dB NF

Associated Material

Material	Status
Packaged die	Contact factory
Die Evaluation Board (die EVB)	Contact factory
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Mechanical files (DXF)	Contact factory
Measurents files (S2P)	Contact factory

Product Compliance Information

Solderability :

Use only AuSn (80/20) solder and limit exposure to temperature above 300 °C TO 3 - 4 minutes, maximum

ESD Sensitivy Rating :

Test : Human Body Model (HBM)
Standard : JEDEC Standard JESD22-A114

CAUTION ! ESD-Sensitive device

RoHS-Compliance :

This part is compliant with EU 2011/65/EU RoHS directive (Restrictions on the Use of Certain Hazardous Substances in Electrical and Electronic Equipment).
This product also has the following attributes:

- Lead Free
- Halogen Free (Chlorine, Bromine)
- Antimony Free
- TBBP-A (C15H12Br402) Free
- PFOS Free
- SVHC Free

Contact Information

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