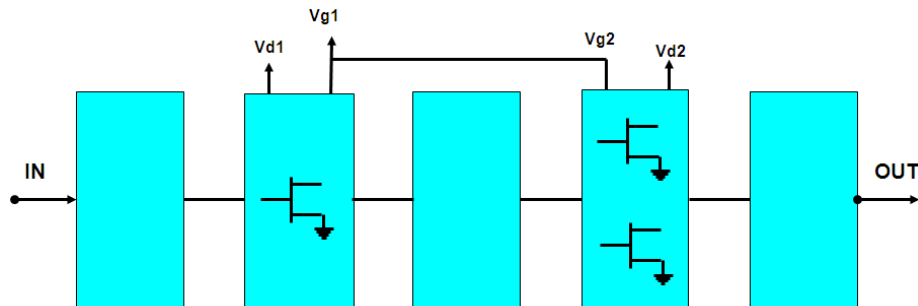


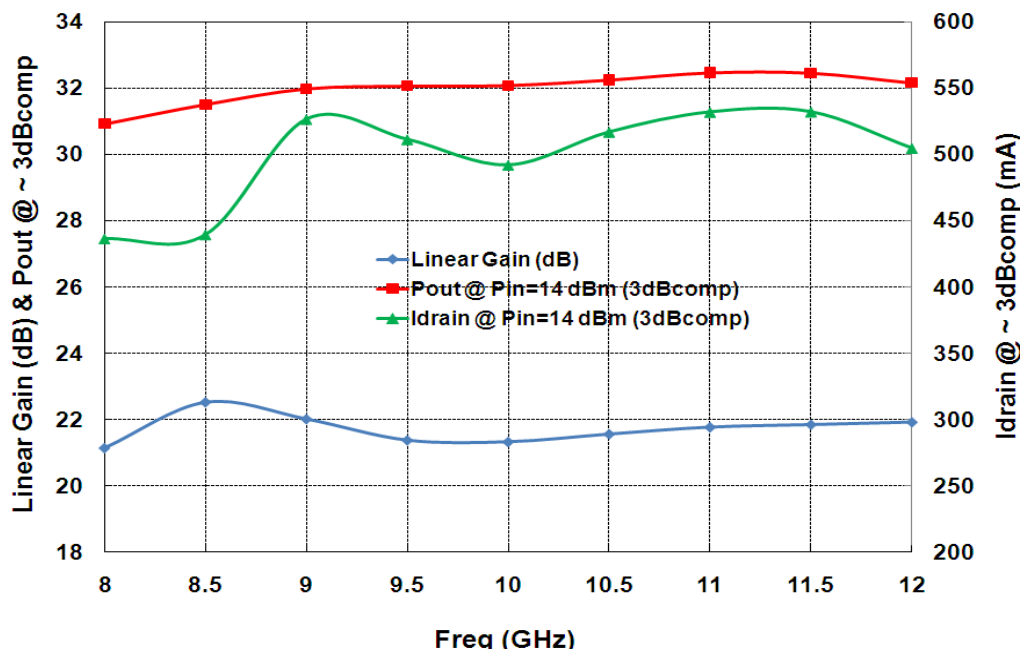
Advance Information: AI1216

8-12GHz High Power Amplifier

GaAs Monolithic Microwave IC



UMS develops a monolithic two stage GaAs High power amplifier designed for X band applications, covering 8 to 12GHz. The 21dB gain and the high saturated output power of 32.5dBm associated with a very high PAE of 38% makes of this circuit a very versatile driver for high power amplifiers needed for active antennas. The overall power supply is 8.0V/350mA. The circuit is dedicated to a wide range of microwave and military wave applications and systems. It is developed on a robust 0.25 μ m gate length power pHEMT process, and will be available as a bare die compliant with the regulation in particular with the directives RoHS N°2011/65 and REACH N°1907/2006.



Electrical Characteristics

Vd = 8V, Id (Quiescent) = 350 mA, Drain Pulse width = 25µs, Duty cycle = 10%

Symbol	Parameter	Min	Typ	Max	Unit
Fop	Operating frequency	8		12	GHz
G	Small signal gain		21		dB
RLin	Input Return Loss		13		dB
RLout	Output Return Loss		10		dB
Pout_1dBcomp	Output power @ 1dBcomp		31.5		dBm
Pout_3dBcomp	Output power @ 3dBcomp		32.5		dBm
PAE_3dBcomp	Power Added Efficiency @ 3dBcomp		38		%
Id_3dBcomp	Supply drain current @ 3dBcomp		500		mA
Vd1, 2	Drain supply voltage		8		V
Id	Supply quiescent current		350		mA
Vg	Gate supply voltage		-1		V

These values are representative of on-wafer measurements that are made without bonding wires at the RF ports.

A bonding wire of typically 0.25 to 0.3nH will improve the matching at the accesses.

Absolute Maximum Ratings ⁽¹⁾

Tamb.= +25°C

Symbol	Parameter	Values	Unit
Vd	Drain bias voltage	9.0	V
Id	Drain bias current	550	mA
Vg	Gate bias voltage	-0.6	V
Pin	Maximum peak input power overdrive ⁽²⁾	+20	dBm
Tj	Junction temperature	175	°C
Ta	Operating temperature range	-40 to +85	°C
Tstg	Storage temperature range	-55 to +150	°C

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

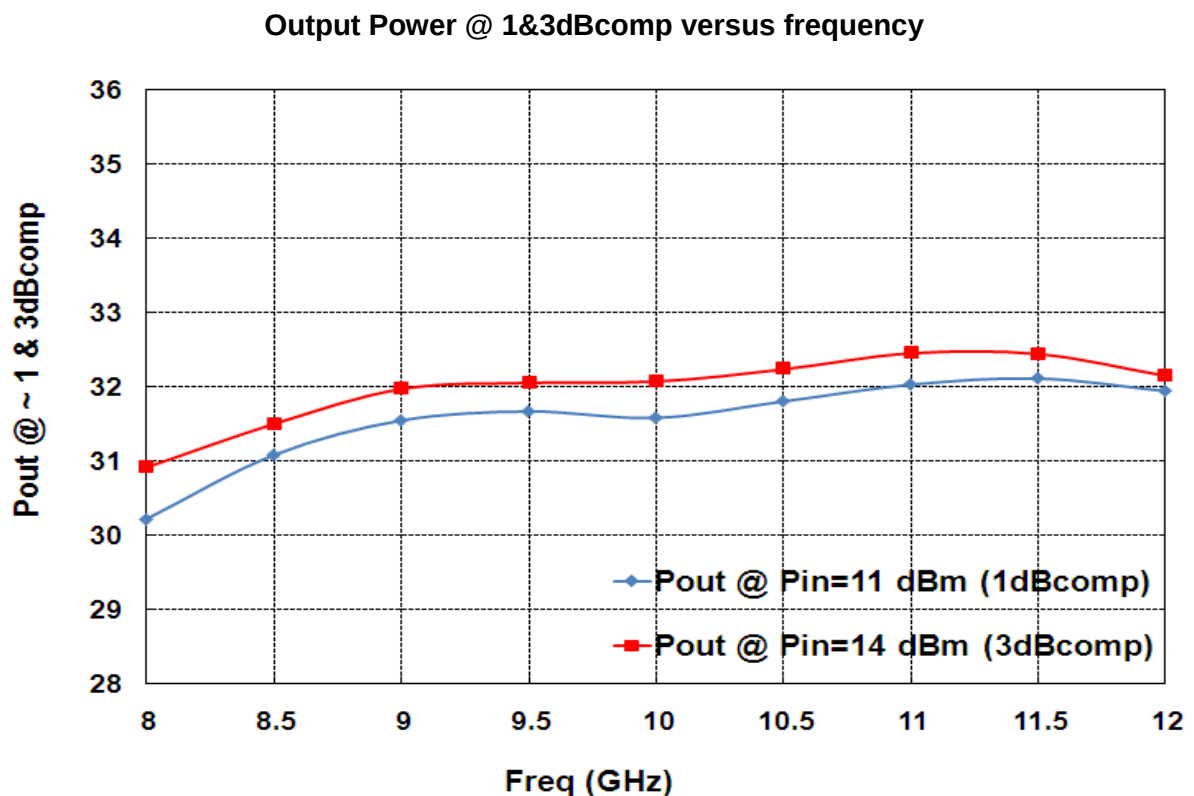
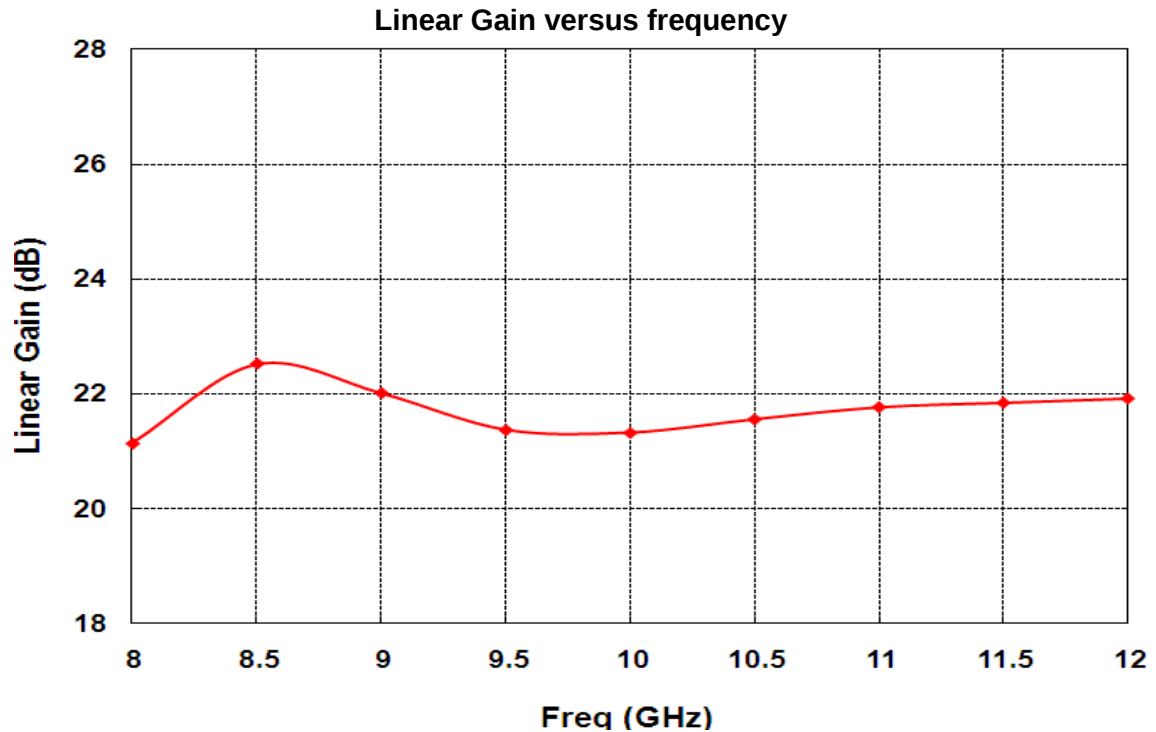
⁽²⁾ Duration < 1s.

Advanced Information

Typical on Jig Measurements

Tamb.= +25°C,

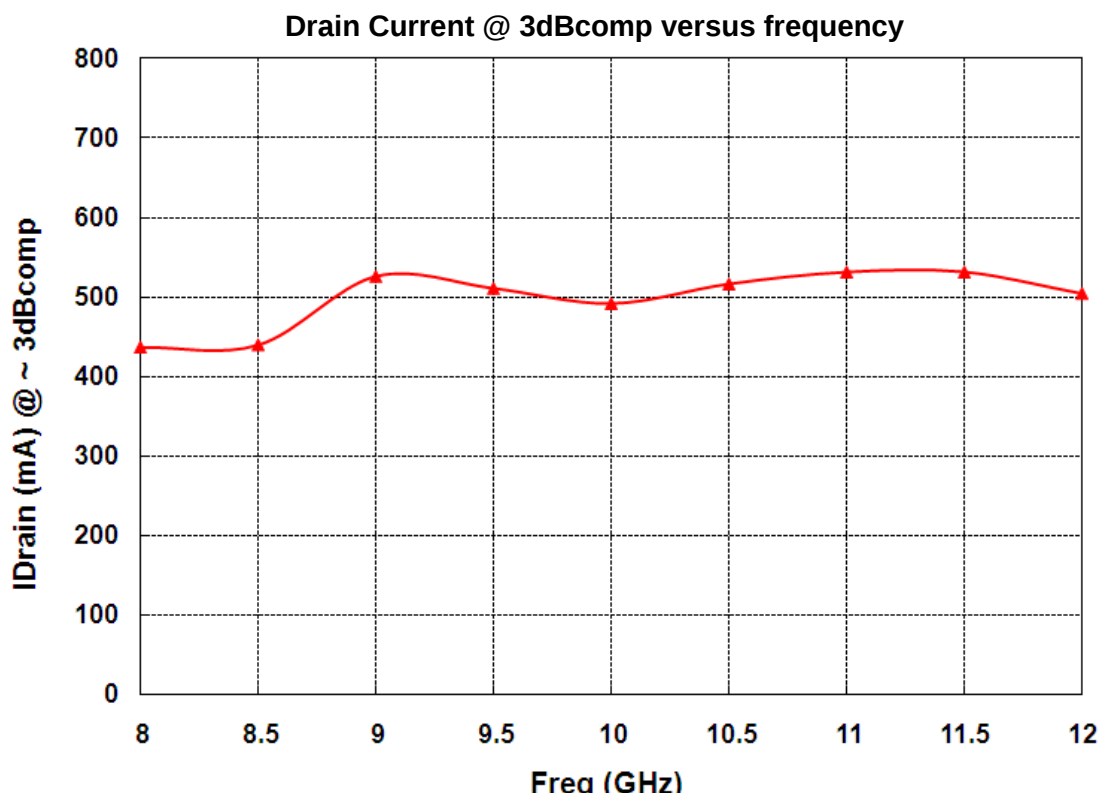
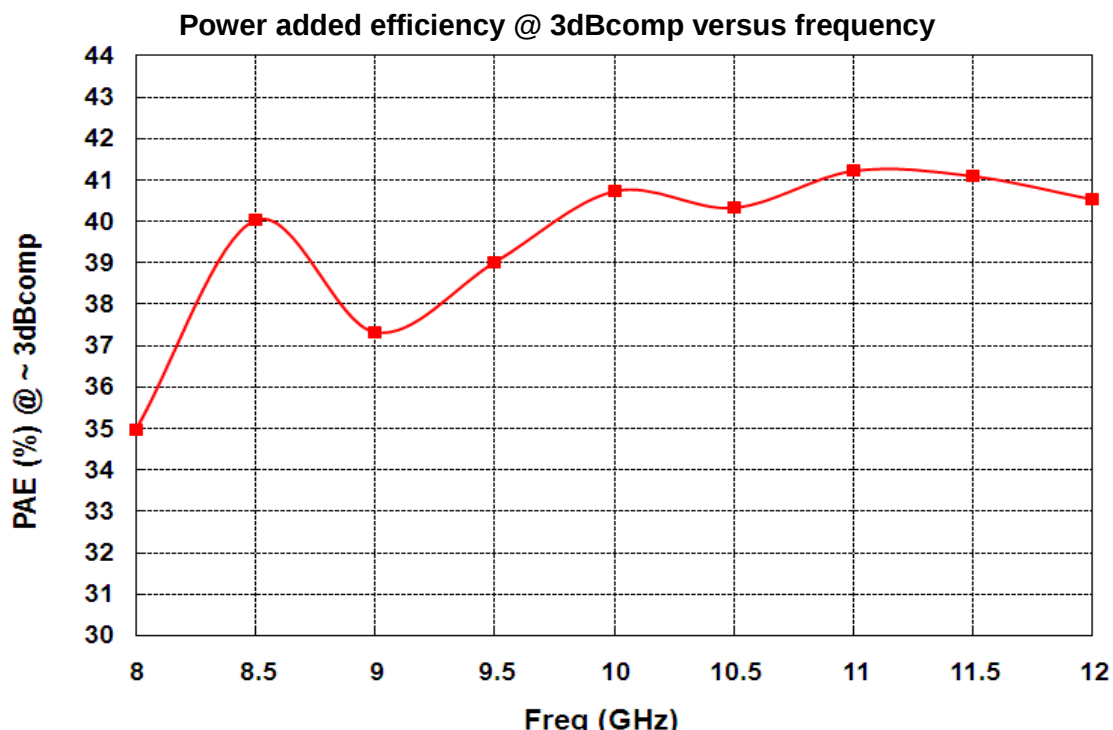
Vd = 8V, Id (Quiescent) = 350mA, Drain Pulse width = 25µs, Duty cycle = 10%

**Advanced Information**

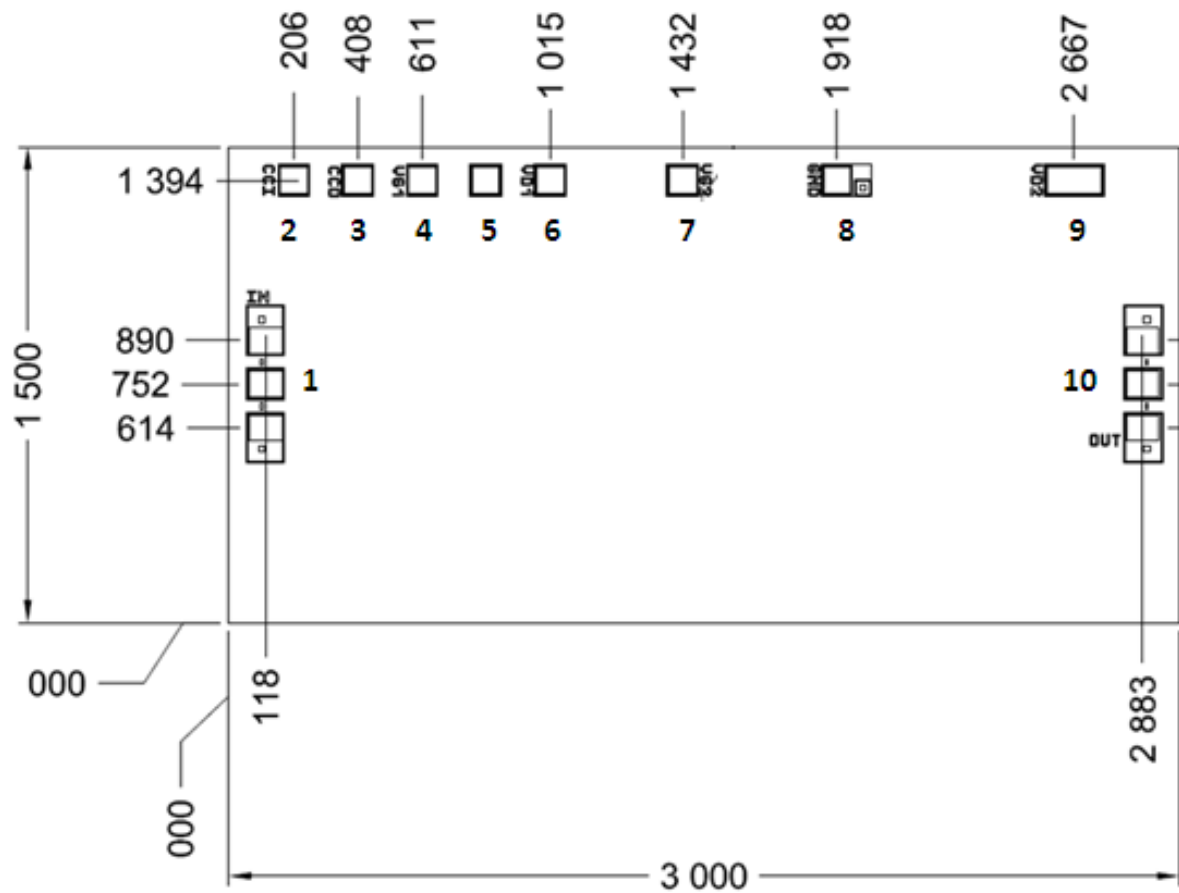
Typical on Jig Measurements

T_{amb} = +25°C,

V_d = 8V, I_d (Quiescent) = 350mA, Drain Pulse width = 25μs, Duty cycle = 10%



Advanced Information

Mechanical data

All dimensions are in micrometers

Chip size = 3000x1500 ±35μm

Chip thickness = 70μm ±10μm

RF pads (1, 8) = 122 x 100μm²

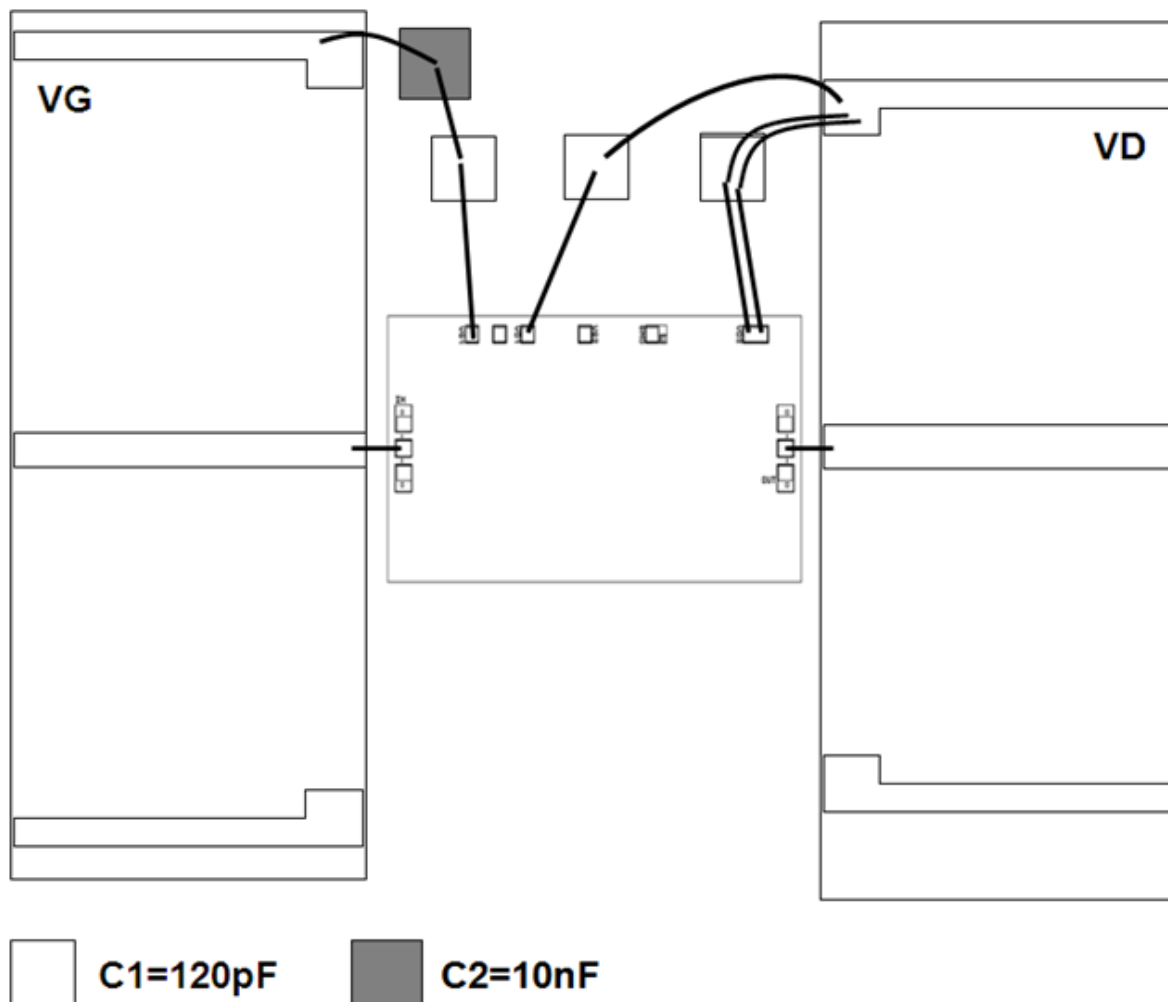
DC pads (4, 6, 7, 8, 9) = 100 x 100μm²

Chip width and length are given with a tolerance of ±35μm

Pin number	Pin name	Description
1	IN	Input RF
2, 3, 5	-	NC
4	VG1	Vg1
6	VD1	Vd1
7	VG2	Vg2
8	GND	ground
9	VD2	Vd2
10	OUT	Output RF

Advanced Information

Recommended assembly plan

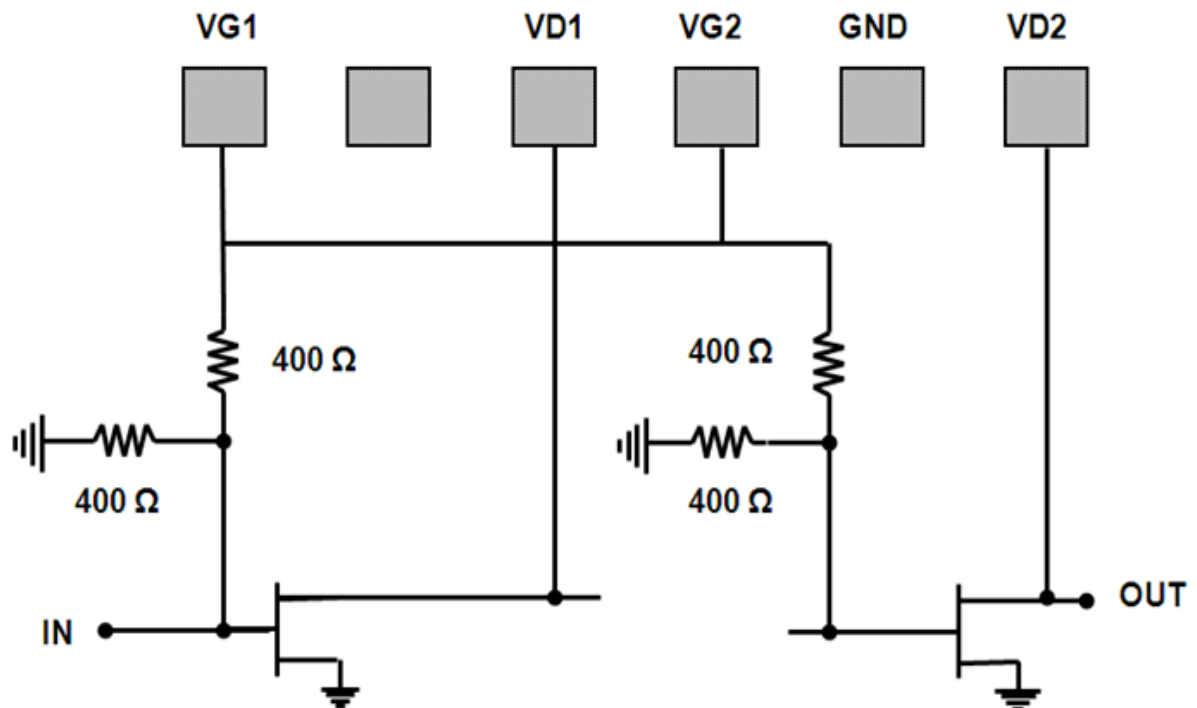


Equivalent RF Wire Bonding: 0.25nH (typical length of 200μm for a 25μm diameter wire).

Bonding recommendations

Port	Connection	External capacitor
IN	Inductance (Lbonding) = 0.3nH 400μm length with a wire diameter of 25 μm	
OUT	Inductance (Lbonding) = 0.3nH 400μm length with a wire diameter of 25 μm	
Vg	Inductance ≤ 1nH	C1 ~ 120pF, C2 ~ 10nF
Vd	Inductance ≤ 1nH	C1 ~ 120pF

Advanced Information

DC Schematic

Medium Power Amplifier: 8V, 350mA

Advanced Information

Recommended environmental management

UMS products are compliant with the regulation in particular with the directives RoHS N°2011/65 and REACH N°1907/2006. More environmental data are available in the application note AN0019 also available at <http://www.ums-gaas.com>.

Recommended ESD management

Refer to the application note AN0020 available at <http://www.ums-gaas.com> for ESD sensitivity and handling recommendations for the UMS package products.

Sampling request reference

Die: ES-CHA6005-99F

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Advanced Information