8-12GHz Driver Amplifier

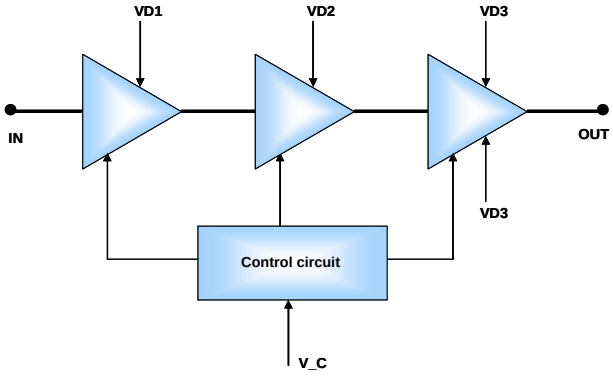
GaAs Monolithic Microwave IC

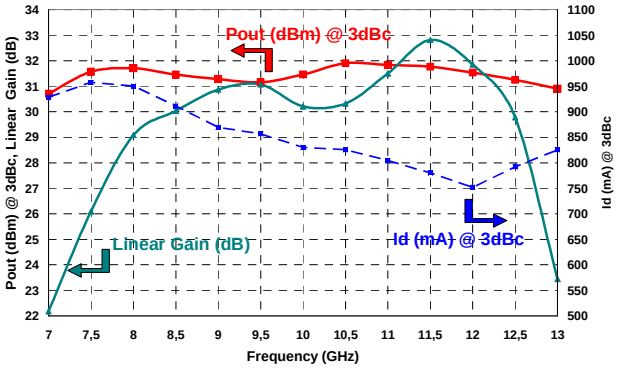
Description

The CHA6105 is a monolithic three-stage medium power amplifier designed for X-band applications.
The driver provides typically 31.5dBm output power at saturation and is suitable for systems requiring a high compression level. Moreover it includes a biasing control circuit that makes Pout less sensitive to spread and chip environment.

The circuit is manufactured with a pHEMT process, 0.25µm gate length, via holes through the substrate, air bridges and electron beam gate lithography.

It is available in chip form.





Pout & Id @ 3dB gain compression and Linear Gain (Pulse 25µs 10% Tamb. 20°C)

Main Features

- Frequency range: 8-12GHz
- 31.5dBm Saturated output power
- 30dB Linear Gain
- Quiescent bias point: 8V@700mA
- Chip size: 2.80 x 2.21 x 0.07mm

Main Characteristics

Tamb = +20°C, Vc = +8V (Pulse 25µs 10%)

Symbol	Parameter	Min	Typ	Max	Unit
Fop	Operating frequency range	8		12	GHz
G	Small signal gain		30		dB
Psat	Saturated output power		31.5		dBm
Idq	Power supply quiescent current		700		mA

ESD Protections: Electrostatic discharge sensitive device observe handling precautions!

United Monolithic Semiconductors S.A.S.
Route Départementale 128 - B.P.46 - 91401 Orsay Cedex France
Tel. : +33 (0)1 69 33 03 08 - Fax : +33 (0)1 69 33 03 09

Electrical Characteristics

Vd = +8V, Pulse 25µs 10%

Symbol	Parameter	Min	Typ	Max	Unit
Top	Operating temperature range	-40		85	℃
Fop	Operating frequency range	8		12	GHz
G	Small signal gain at 25℃	25.5	30	34	dB
ΔG_T	Linear gain variation vs temperature at 25℃		-0.03 5		dB/℃
P1dB	Output power at 1dB gain compression at 25℃		30.5		dBm
P3dB	Output power at 3dB gain compression at 25℃	29.5	31		dBm
Psat	Output power at saturation		31.5		dBm
dBS11	Input Return Loss		2:1		dB
dBS22	Output Return Loss		2:1		dB
Vd	Power supply voltage		8		V
Idq	Power supply quiescent current		700		mA
Id_3dBc	Consumption under 3dB gain compression		925	1150	mA
V_c	Drain current control voltage		-5		V
I_c	Biasing circuit consumption		25		mA

Absolute Maximum Ratings (1)

Tamb = 20℃

Symbol	Parameter	Values	Unit
Pin_max	Maximum RF input power	13	dBm
Cmp	Compression level	13	dB
Vd	Power supply voltage	9	V
<Id>	maximum value of CW power supply current	850	mA
V_c	Drain current control voltage	-6	V
Tj	Maximum Junction temperature	175	℃
Tstg	Storage temperature range	-55 to +125	℃

(1) Operation of this device above anyone of these parameters may cause permanent damage

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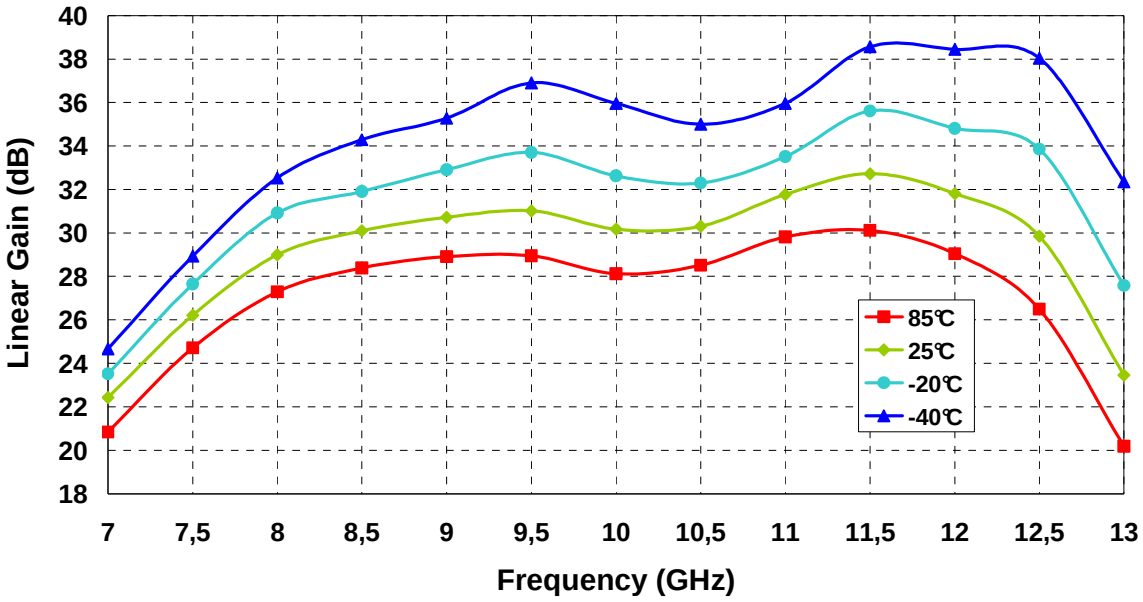
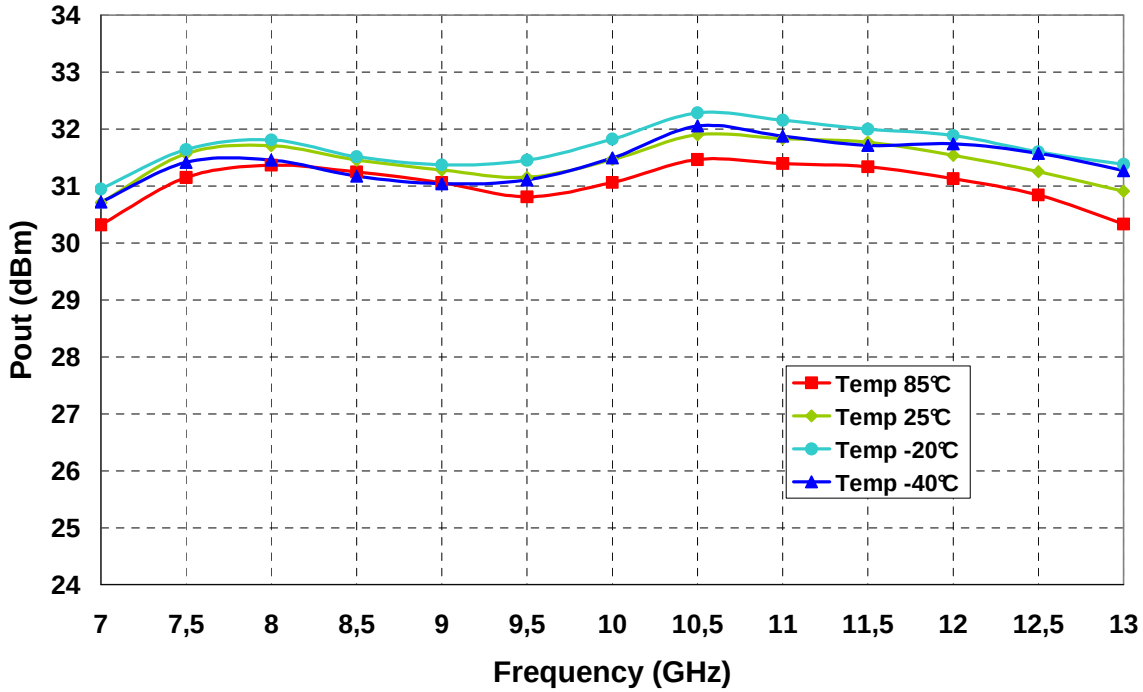
Typical measurement characteristics

Measurements

Vd = 8V; Vctrl = -5V (Id Quiescent = 700mA). Pulsed = 25µs 10%



Linear gain vs frequency and temperature



Output Power @ 3dB gain compression vs frequency and temperature

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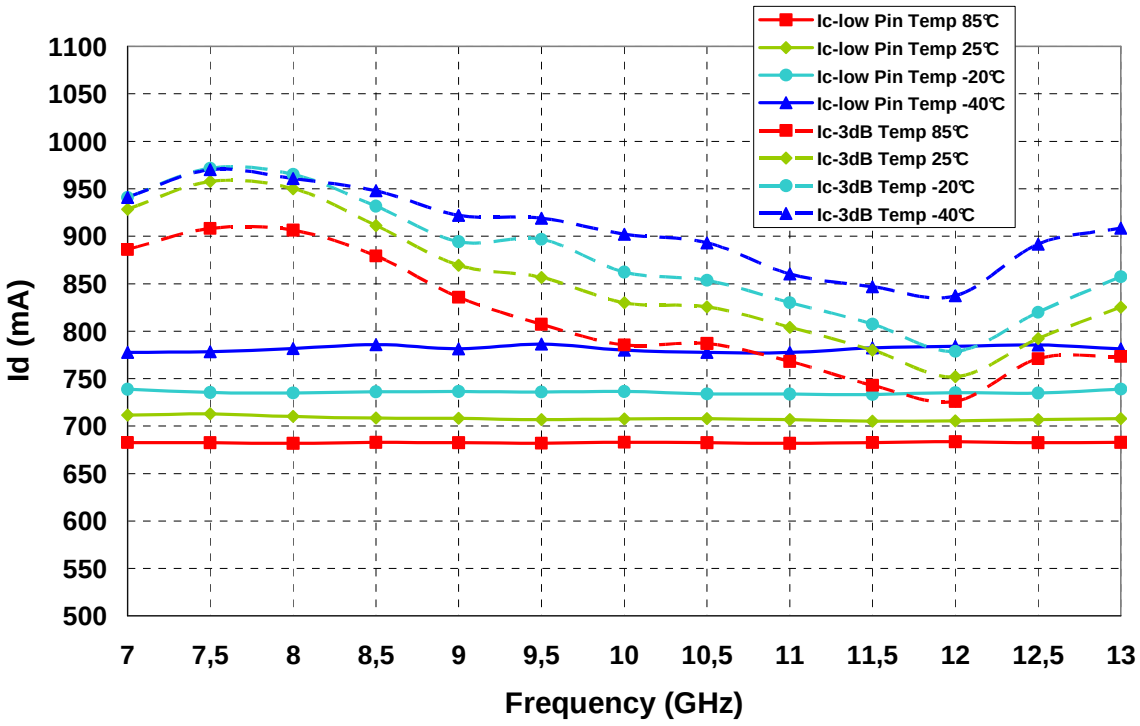
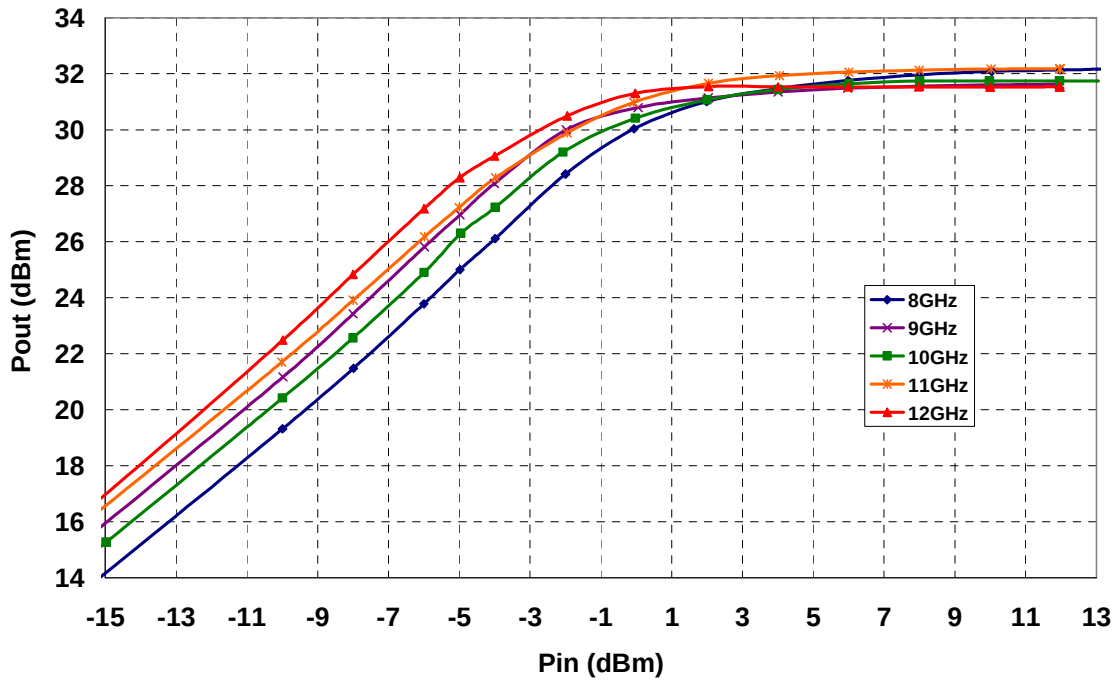


Drain current @ low Pin and @ 3dB gain compression vs frequency and temperature

Tamb = 25℃, Vd = 8V; Vctrl = -5V (Id Quiescent = 7 00mA). Pulsed = 25µs 10%



Output power vs Input power

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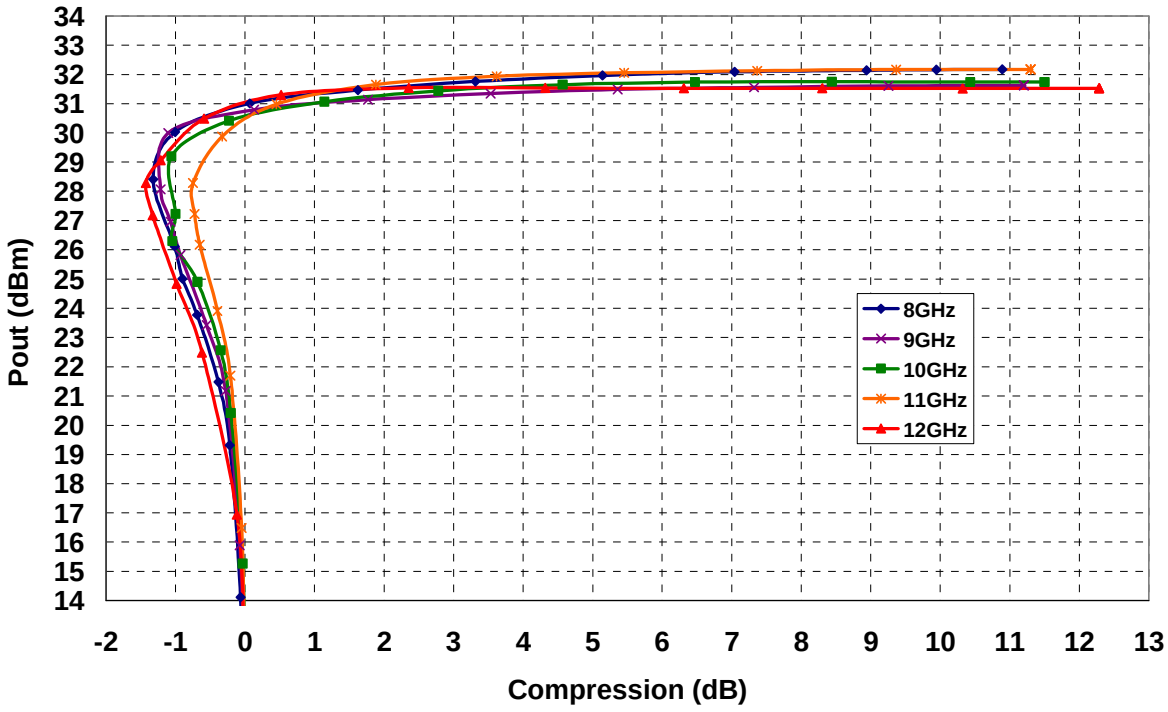
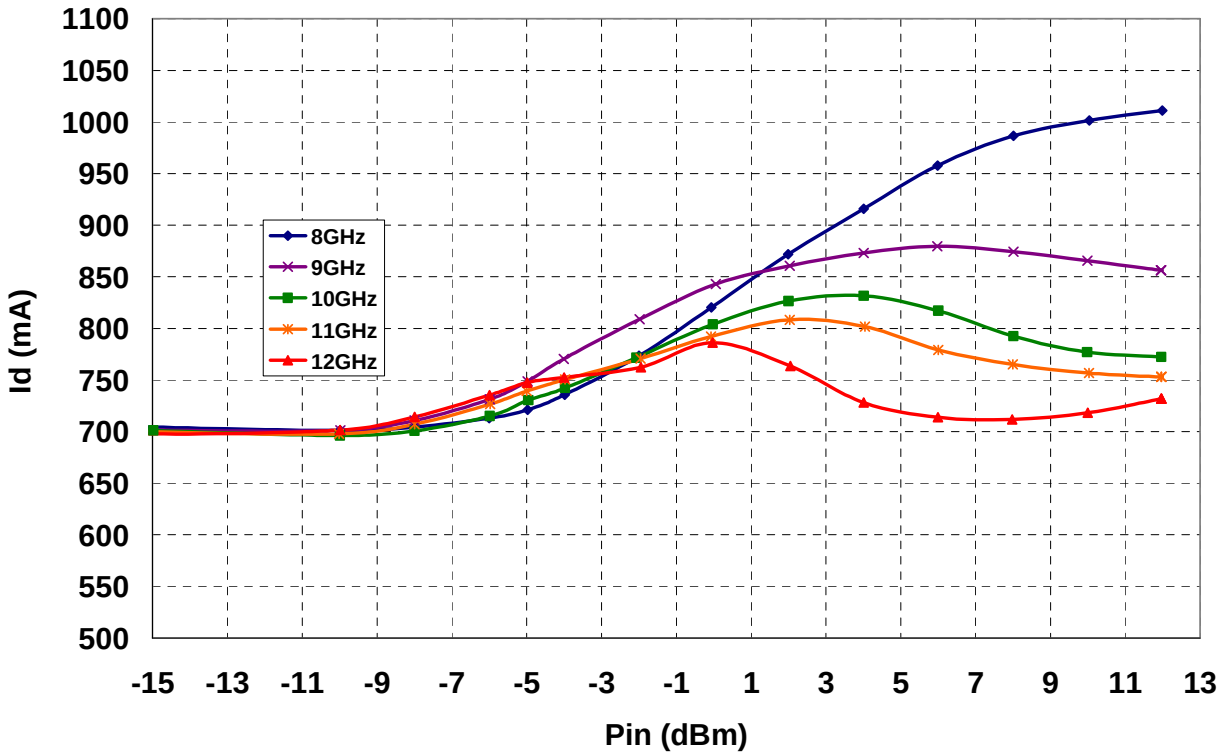


Output power vs Gain compression



Drain current vs Input power

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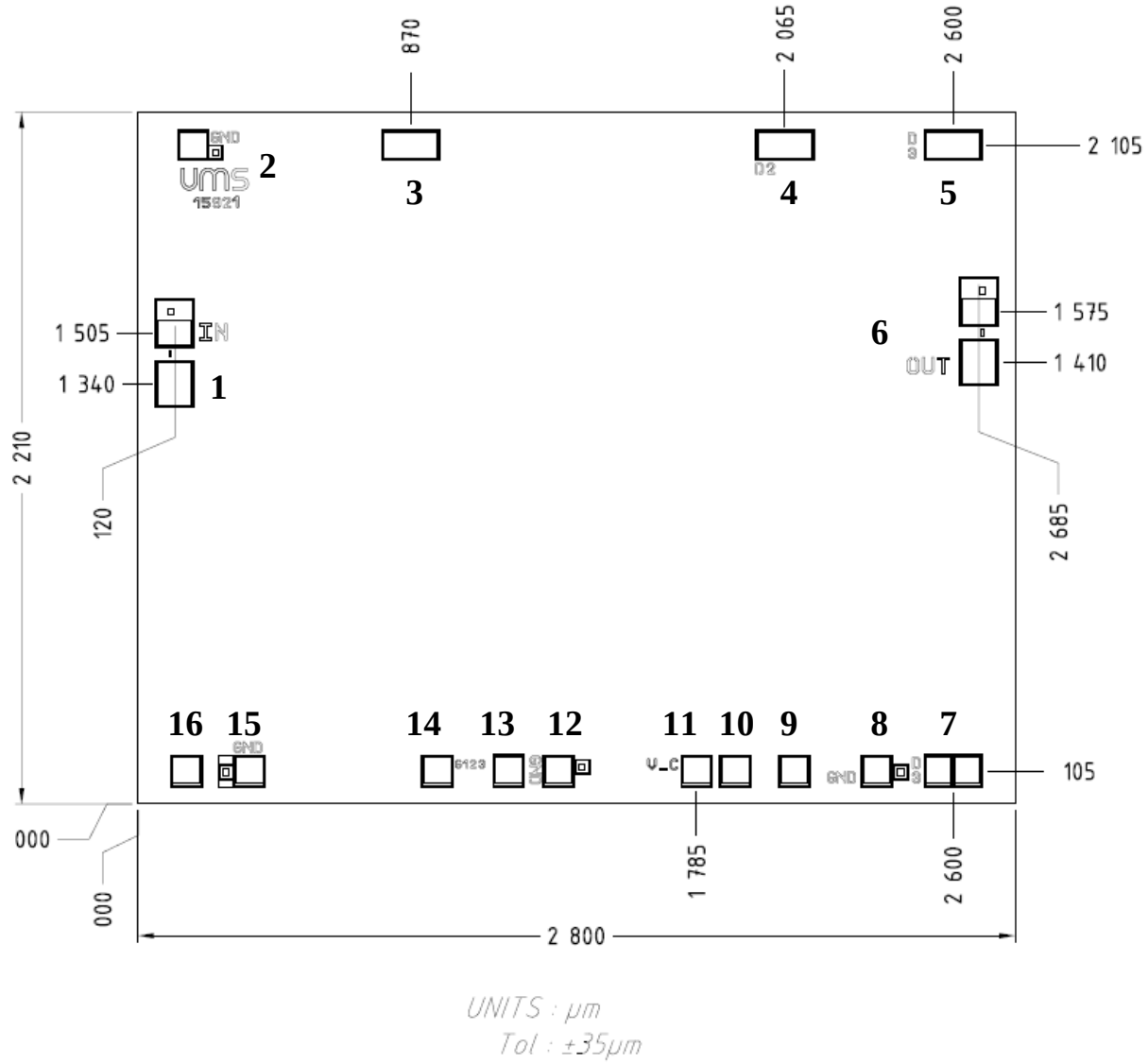
Chip Mechanical Data and Pin references



Chip thickness = 70µm +/- 10µm
RF pads (1, 6) = 122 x 150µm²
DC pads (2, 8, 9, 10, 11, 12, 13, 14, 15, 16) = 100 x 100µm²
DC pads (3, 4, 5, 7) = 186 x 100µm²

Pin number	Pin name	Description
1	IN	Input RF
11	V_C	Control Voltage
14	GR	Not used
2, 8, 12, 15	GND	Ground (NC)
9, 10, 13, 16	-	Not Used
3, 4, 5, 7	VD	Drain supply voltage
6	OUT	Output RF

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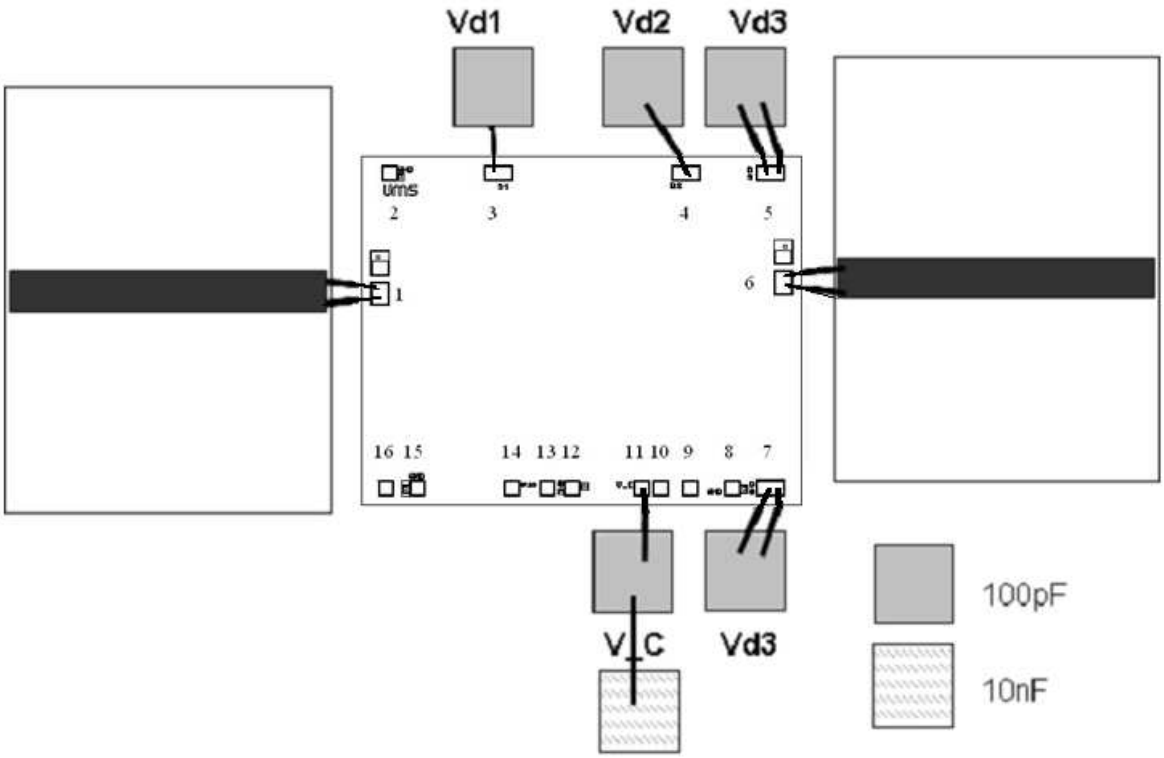
Assembly recommendations in test fixture



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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 products.

Ordering Information

Chip form : CHA6105-99F/00

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