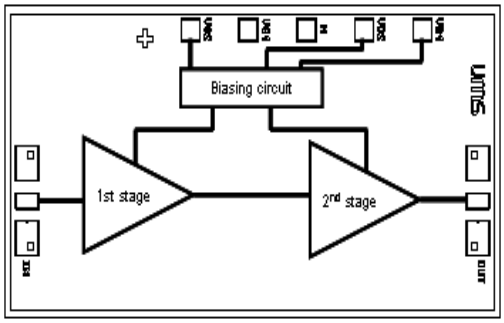
7-14GHz Low Noise Amplifier
GaAs Monolithic Microwave IC

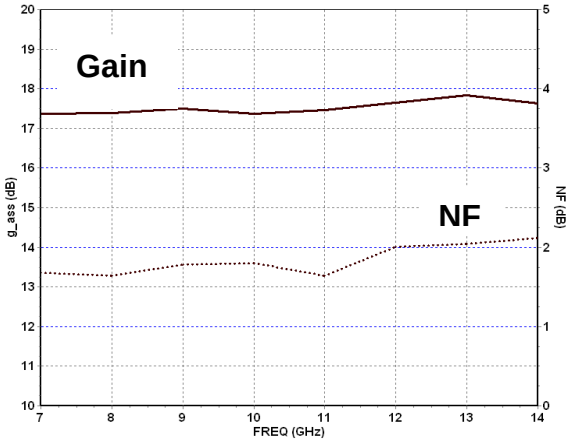
Description

The CHA1014 is a monolithic two-stage wide band low noise amplifier designed for a wide range of applications.

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

It is supplied in chip form.





Main Features

- Frequency range: 7 - 14GHz
- 1.5dB Noise figure
- 17dB Gain
- ± 0.5dB Gain flatness
- 10dBm Output power@1dB Gain compression.
- DC power comsumption: 57mA
- Chip size: 2.57 x 1.37 x 0.1mm

Main Characteristics

Tamb = +25°C

Symbol	Parameter	Min	Typ	Max	Unit
Fop	Operating frequency range	7		14	
NF	Noise figure		1.5	2.0	dB
G	Gain		17		dB
P1dB	Output power at 1dB gain compression		10		dBm

ESD Protections: Electrostatic discharge sensitive device observe handling precautions!

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Electrical Characteristics

Tamb = +25℃, Vd = +2V

Symbol	Parameter	Min	Typ	Max	Unit
Fop	Operating frequency range	7		14	Ghz
G	Gain at 25℃		17		dB
ΔG	Gain flatness		± 0.5		dB
NF	Noise figure 25℃		1.5	2	dB
NF	Noise figure 85℃		2	2.8	dB
RL_in	Input RL			-10	dB
RL_out	Ouput RL			-10	dB
P1dB	Output power at 1dB gain compression		10		dBm
Vd_1	Positive drain supply voltage		2		V
Vd_2	Positive drain supply voltage		3		V
Id1	Drain bias current		55		mA
Vg_2	Negative supply voltage		-2.5		V
Id2	Biasing circuit current		2		mA

Absolute Maximum Ratings (1)

Tamb = +25℃

Symbol	Parameter (1)	Values	Unit
Vd	Drain bias voltage (2)	4	V
Pin	Maximum input power overdrive	10	dBm
Top	Operating temperature range	-40 to + 85	℃
Tstg	Storage temperature range	-55 to +125	℃

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

(2) Without RF signal

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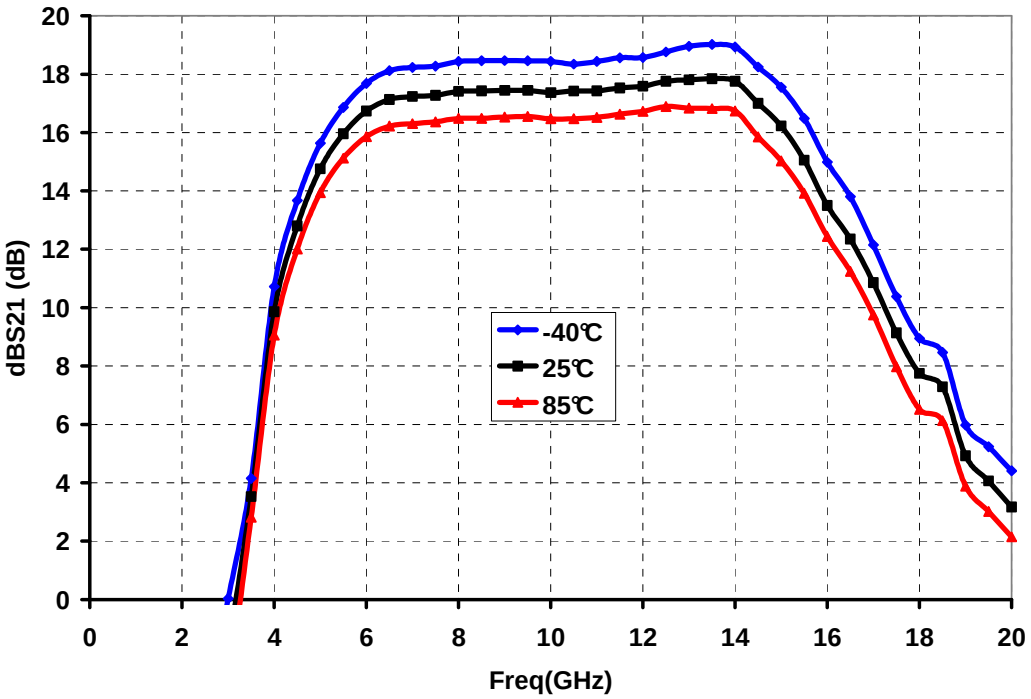
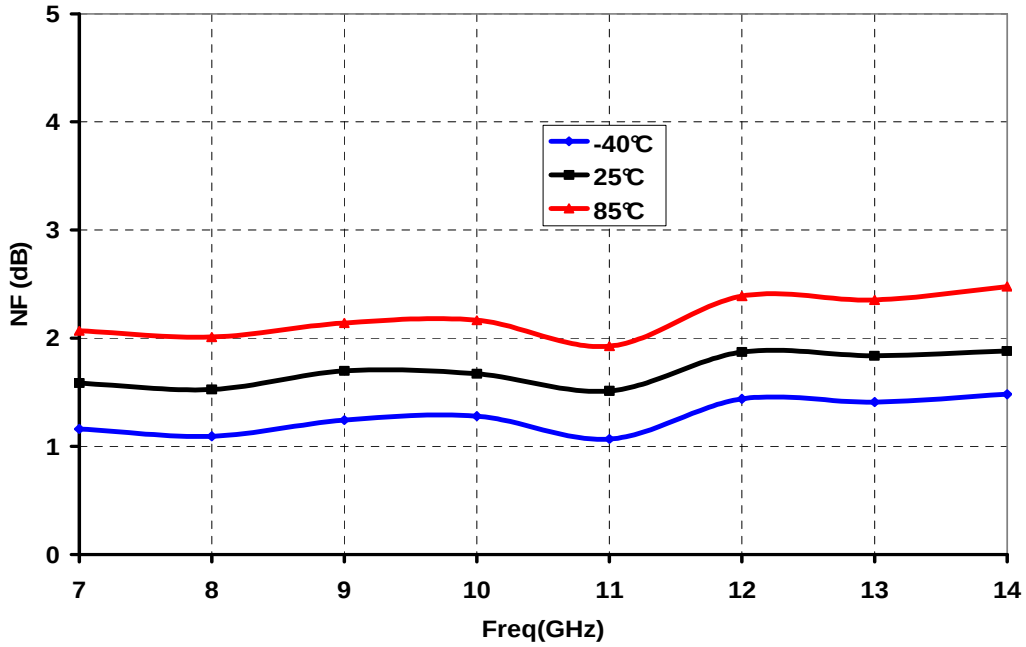
Typical Measured Performance in test fixture.
Tamb = -40℃, +25℃, +85℃, Vd1 = +2V, Vd2 = +3V, Vg2 = -2.5V

Gain versus frequency and temperature from 0.5GHz to 20GHz.



Noise figure versus frequency and temperature from 7GHz to 14GHz.



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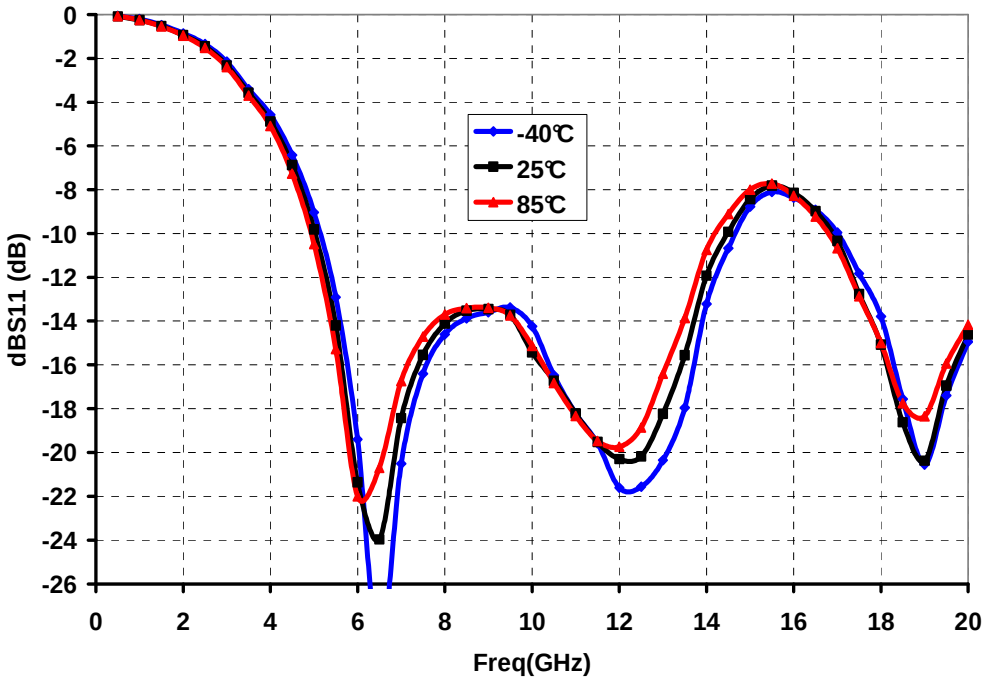
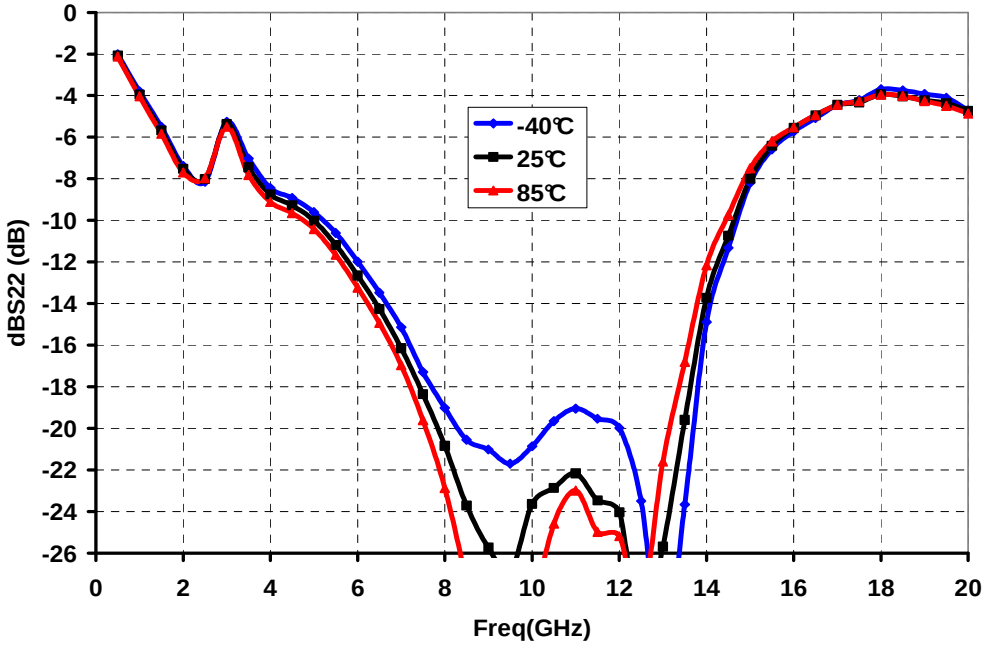
Tamb = -40℃, +25℃, +85℃, Vd1 = +2V

Input return loss versus frequency and temperature from 0.5GHz to 20GHz.



Output return loss versus frequency and temperature from 0.5GHz to 20GHz.



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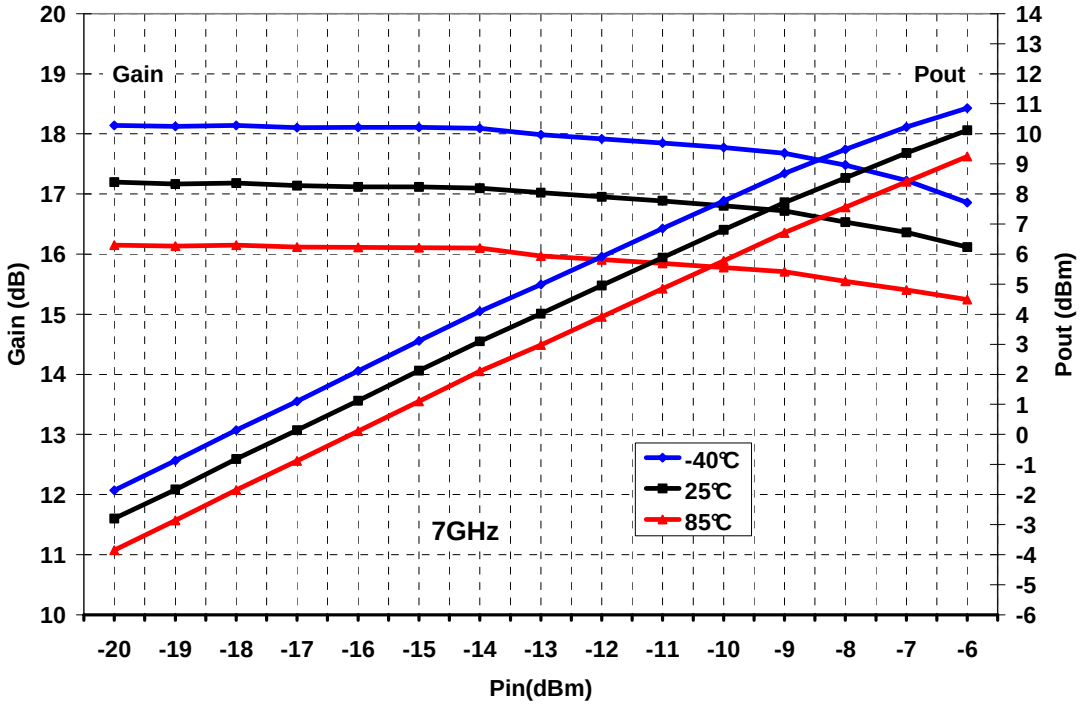
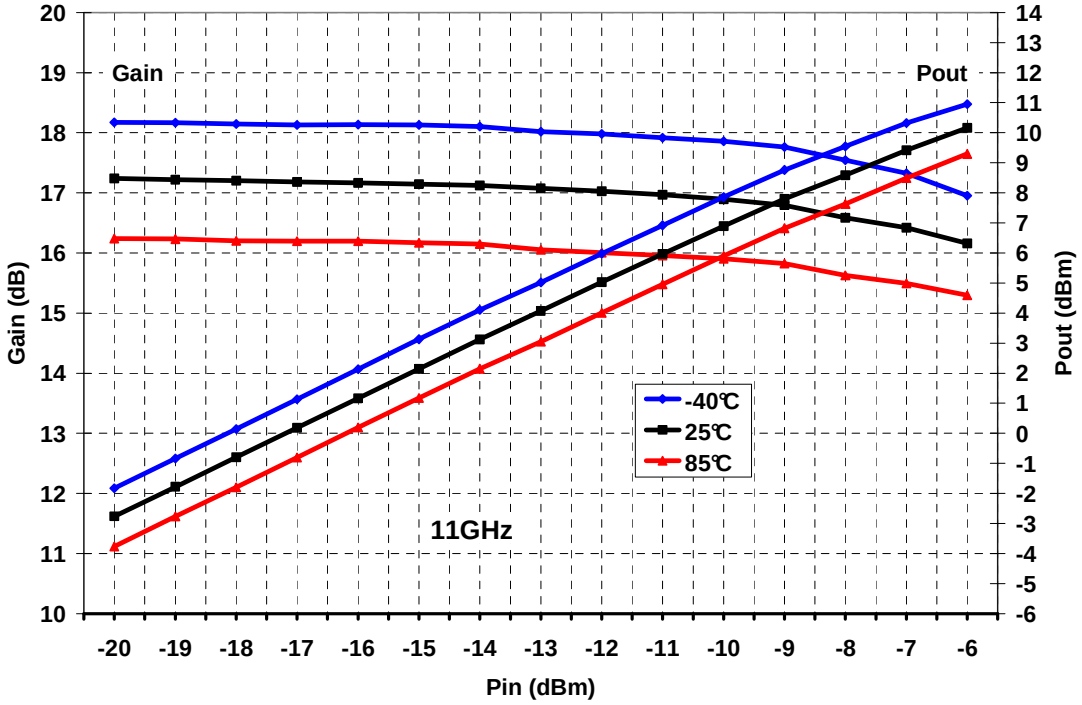
Gain and Output power versus Pin and temperature





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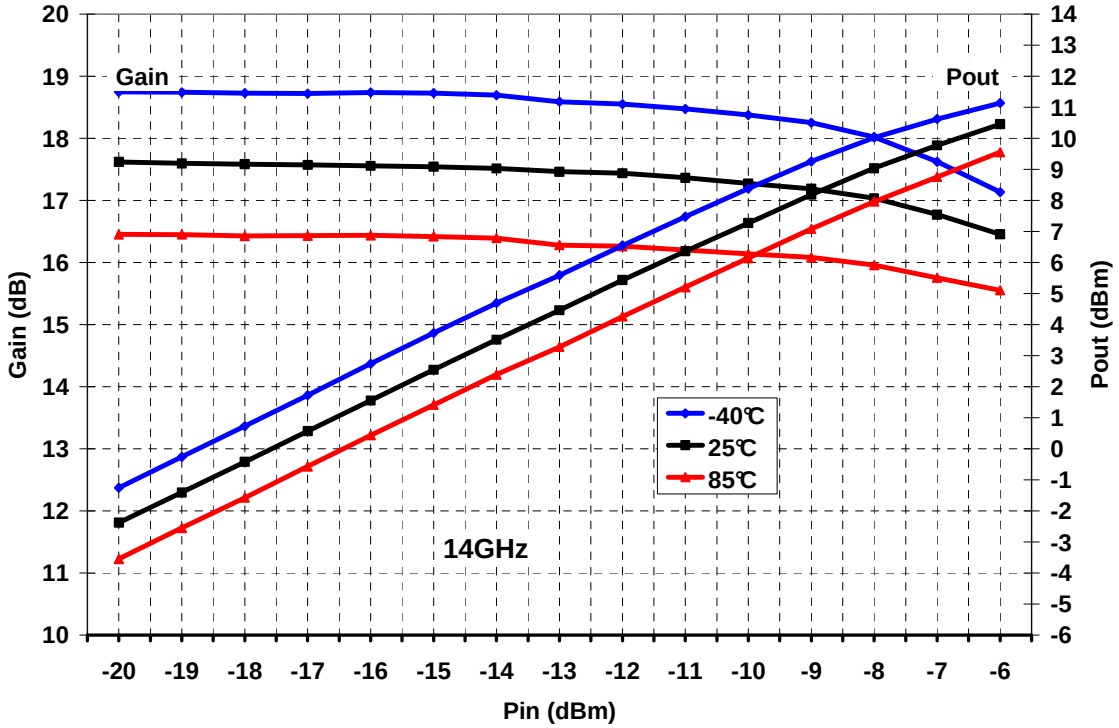

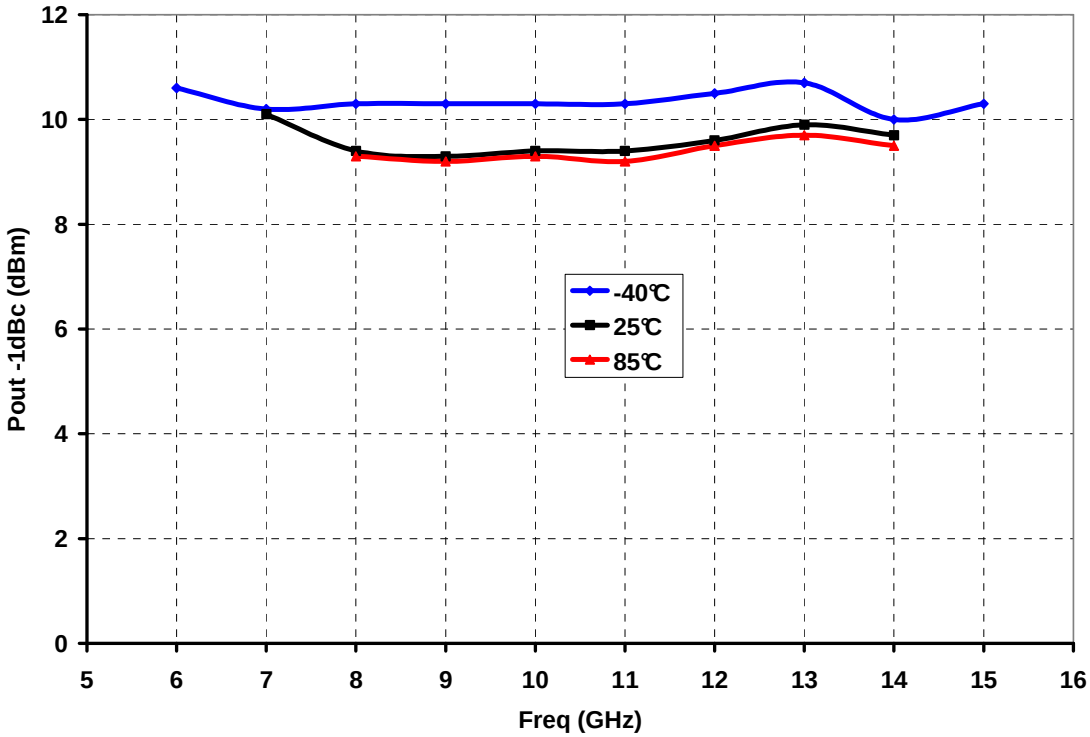

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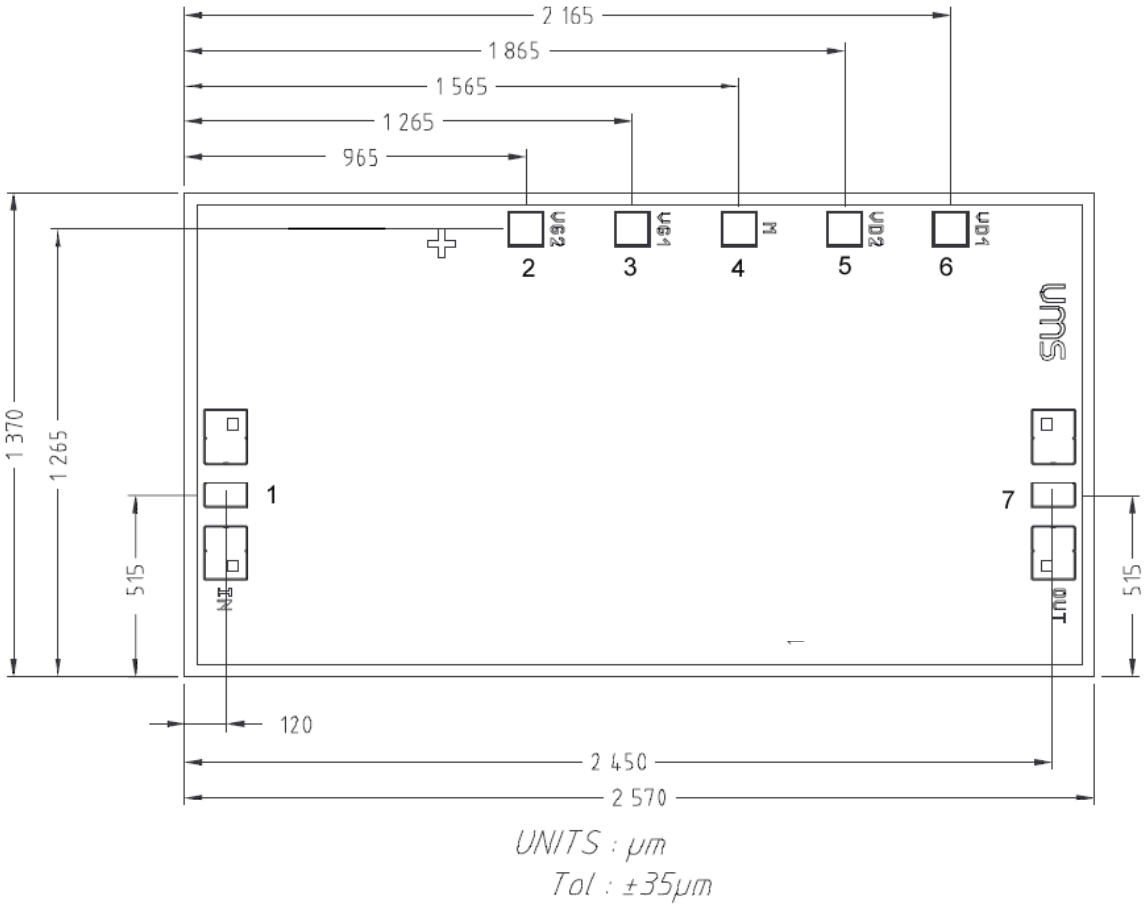
Chip Mechanical Data and Pin references



Chip thickness = 100 +/- 10µm
RF pads (1, 7) = 68 x 118µm²
DC pads (2, 3, 4, 5, 6) = 96 x 96µm²

Pin number	Pin name	Description
1	IN	Input RF port
2	Vg_2	Negative supply voltage Vg_2
3	Vg_1	Negative supply voltage Vg_1 (NC)
4	M	Ground (NC)
5	Vd_2	Positive supply voltage Vd_2
6	Vd_1	Positive supply voltage Vd_1
7	OUT	Output RF port

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.

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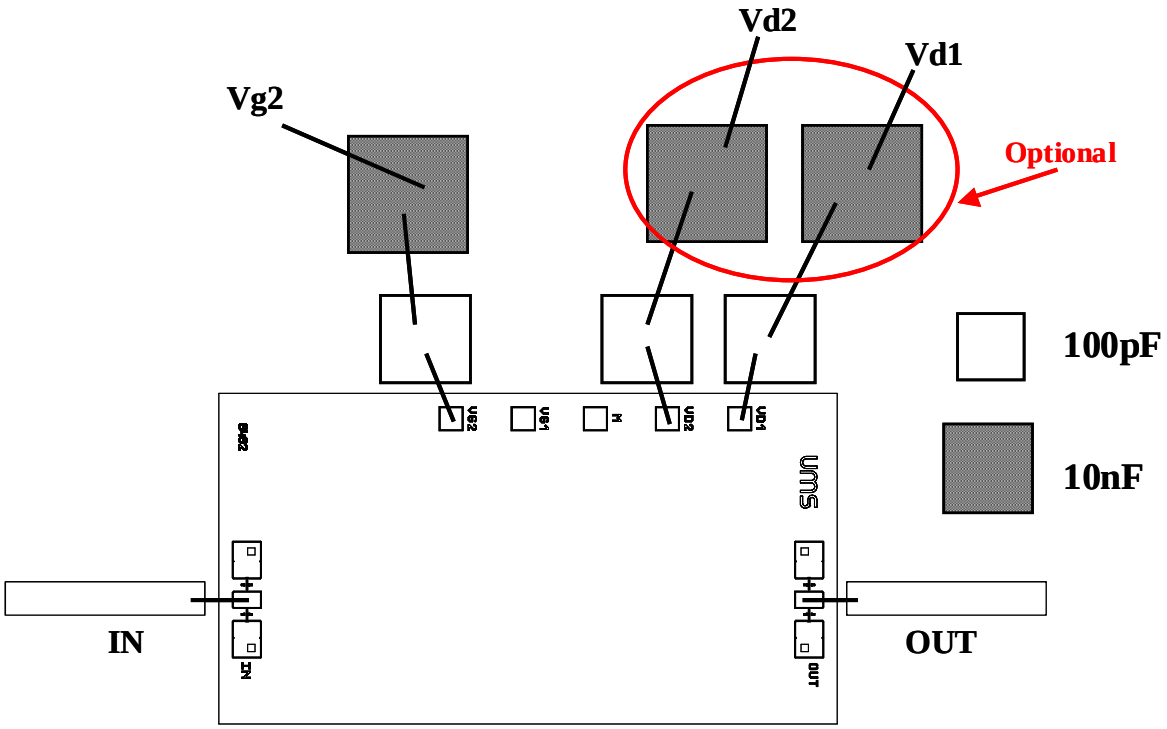
Bonding recommendations

Port	Connection
IN (1)	Inductance (Lbonding) = 0.4nH 530 µm length with wire diameter of 25µm
OUT (7)	Inductance (Lbonding) = 0.4nH 530µm length with wire diameter of 25µm

Assembly recommendations in test fixture



Ordering Information

Chip form : CHA1014-99F/00

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