

7-16GHz High Power Amplifier

GaAs Monolithic Microwave IC

preliminary

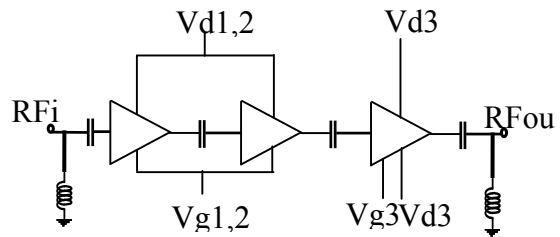
Description

The CHA5052 is a three-stage monolithic high power amplifier.

The backside of the chip is both RF and DC grounds. This helps to simplify the assembly process.

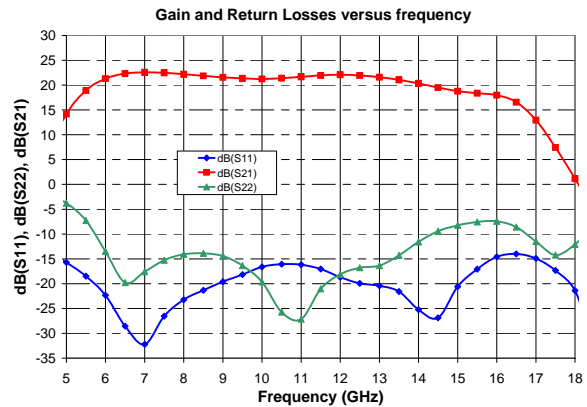
The circuit is manufactured with a power P-HEMT process, 0.15µm gate length, via holes through the substrate.

It is supplied in chip form



Main Features

- Broadband performance 7-16GHz
- High gain: 21dB
- ESD protections (see page 10)
- 29dBm Output Power @ 1dB compression
- Typical 37dBm 3rd order intercept point
- DC power consumption, 700mA @ 5V



Typical on jig measurements

Main Characteristics

Tamb. = 25°C, Vd = 5V

Symbol	Parameter	Min	Typ	Max	Unit
Fop	Operating frequency range	7		16	GHz
G	Small signal gain		21		dB
P1dB	Output power at 1dB gain compression		29		dBm
Id	Power Supply quiescent current		700		mA

ESD Protection : Electrostatic discharge sensitive device. Observe handling precautions !

*preliminary***Electrical Characteristics**

Tamb. = 25°C, Vd = 5 V and Id = 700 mA, CW biasing mode. These values are representative of on wafer measurements.

Symbol	Parameter	Min	Typ	Max	Unit
Fop	Operating frequency range	7		16	GHz
G_1	Small signal gain (7 to 14GHz)		21		dB
G_2	Small signal gain (14 to 16GHz)		17		dB
P1dB_1	Output power at 1dB compression (7 to 14GHz)		29		dBm
P1dB_2	Output power at 1dB compression (14 to 16GHz)		26		dBm
Psat_1	Saturated output power (7 to 14GHz)		30		dBm
Psat_2	Saturated output power (14 to 16GHz)		29		dBm
S11	Input return loss		2.0:1		
S22	Output return loss		2.2:1		
IP3	Output IP3		37		dBm
Vg	Negative gate bias voltage		-1.7		V
Vd 1,2,3	Positive drain bias voltage		5		V
Id	Power supply quiescent current (1)		700		mA
Id_1dBc	Power supply @1dB gain compression		900		mA
Id_sat	Power supply in saturation mode		1000		mA

(1) This value is fixed by gate voltage Vg

Absolute Maximum Ratings

Tamb. = 25°C (1)

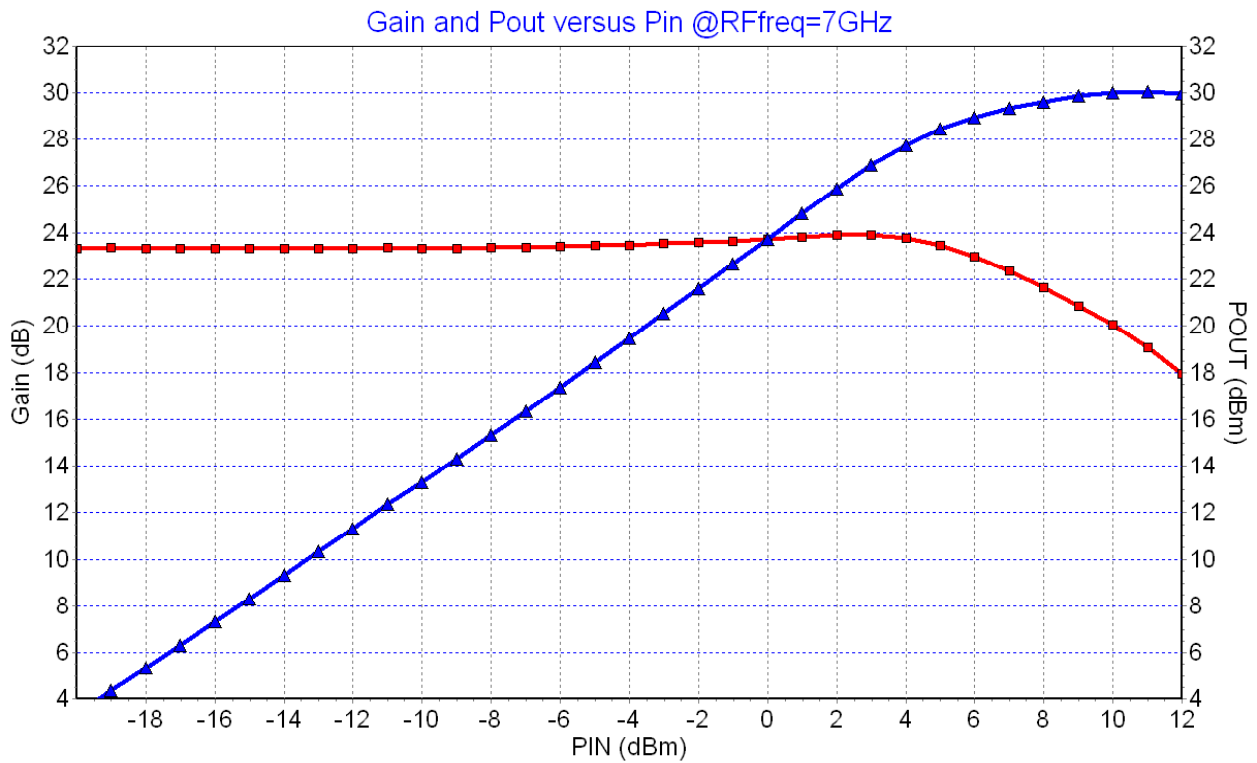
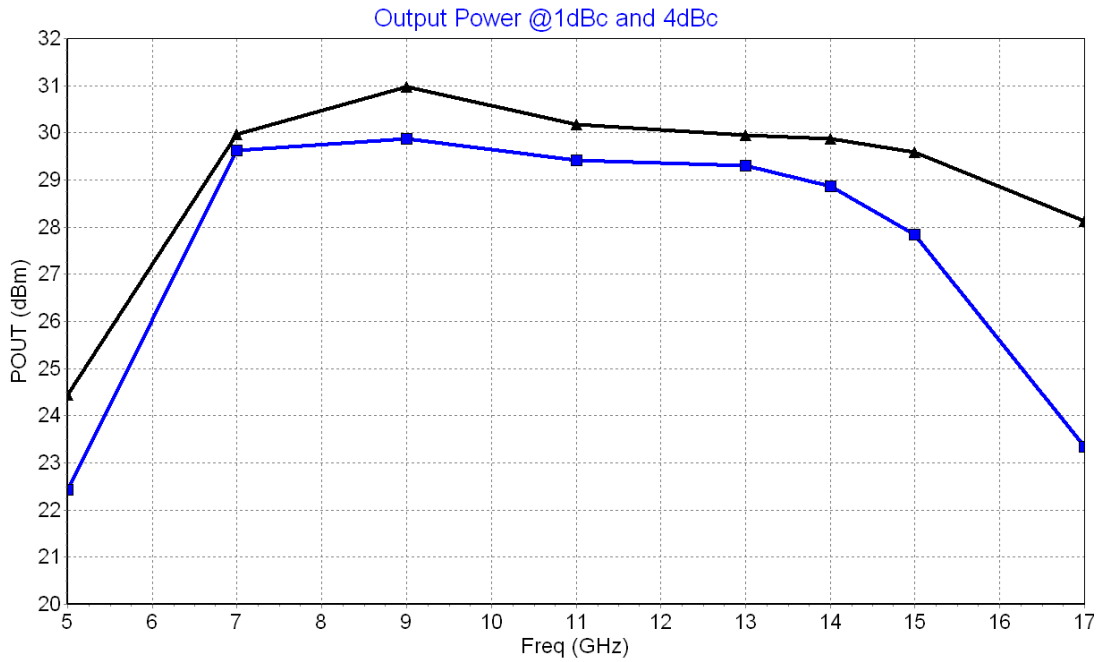
Symbol	Parameter	Values	Unit
Vd	Maximum Drain bias voltage	+5.5	V
Id	Power supply quiescent current	800	mA
Vg	Gate bias voltage	-4 to +0.8	V
Pin	Maximum input power overdrive	+15.0	dBm
Tch	Maximum channel temperature	+175	°C
Ta	Operating temperature range	-40 to +85	°C
Tstg	Storage temperature range	-55 to +125	°C

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

Typical Measured Performance

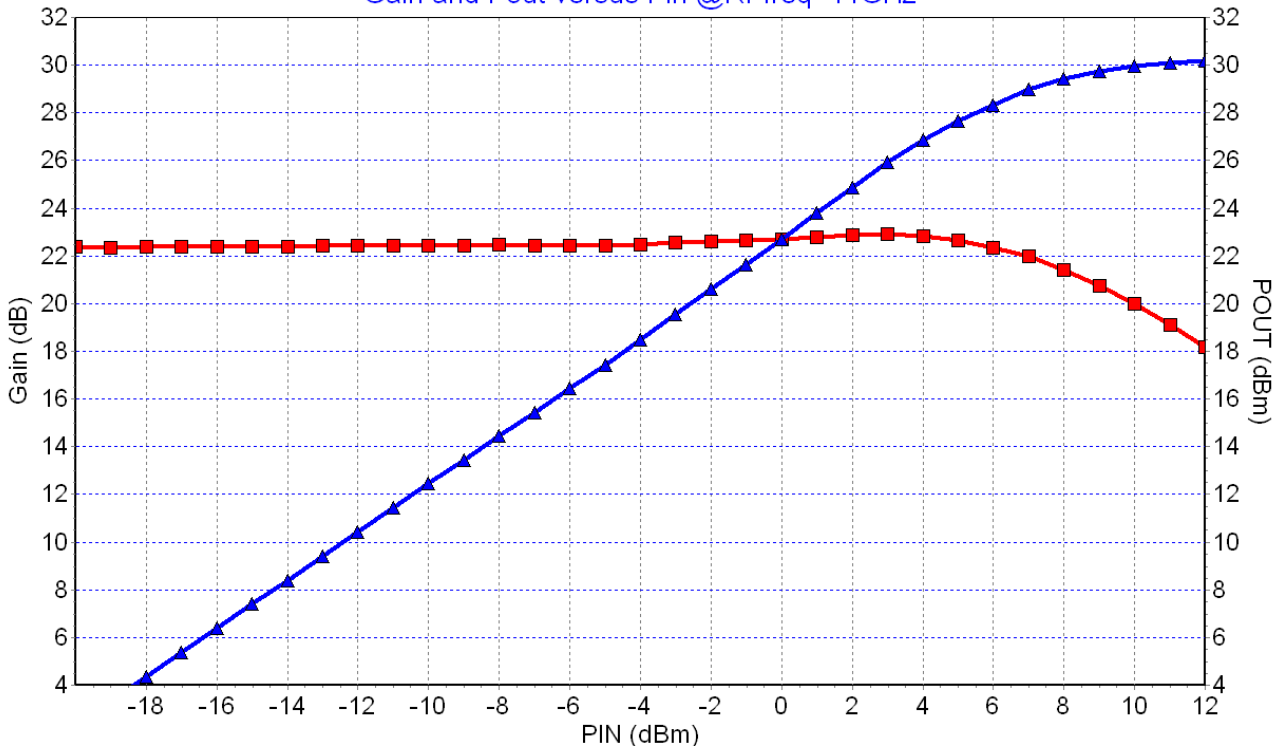
On jig measurement, $T_{amb} = +25^{\circ}\text{C}$, $V_d = +5\text{V}$ and $I_d = 700\text{ mA}$

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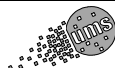
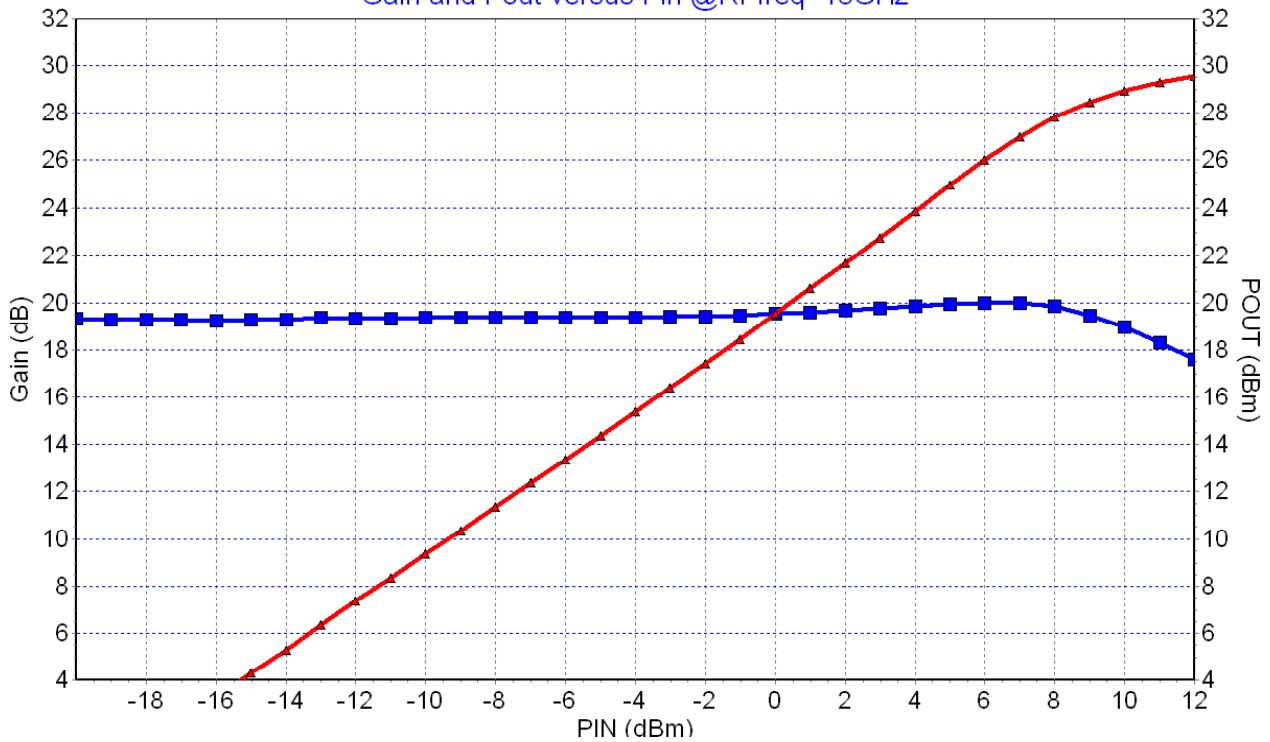


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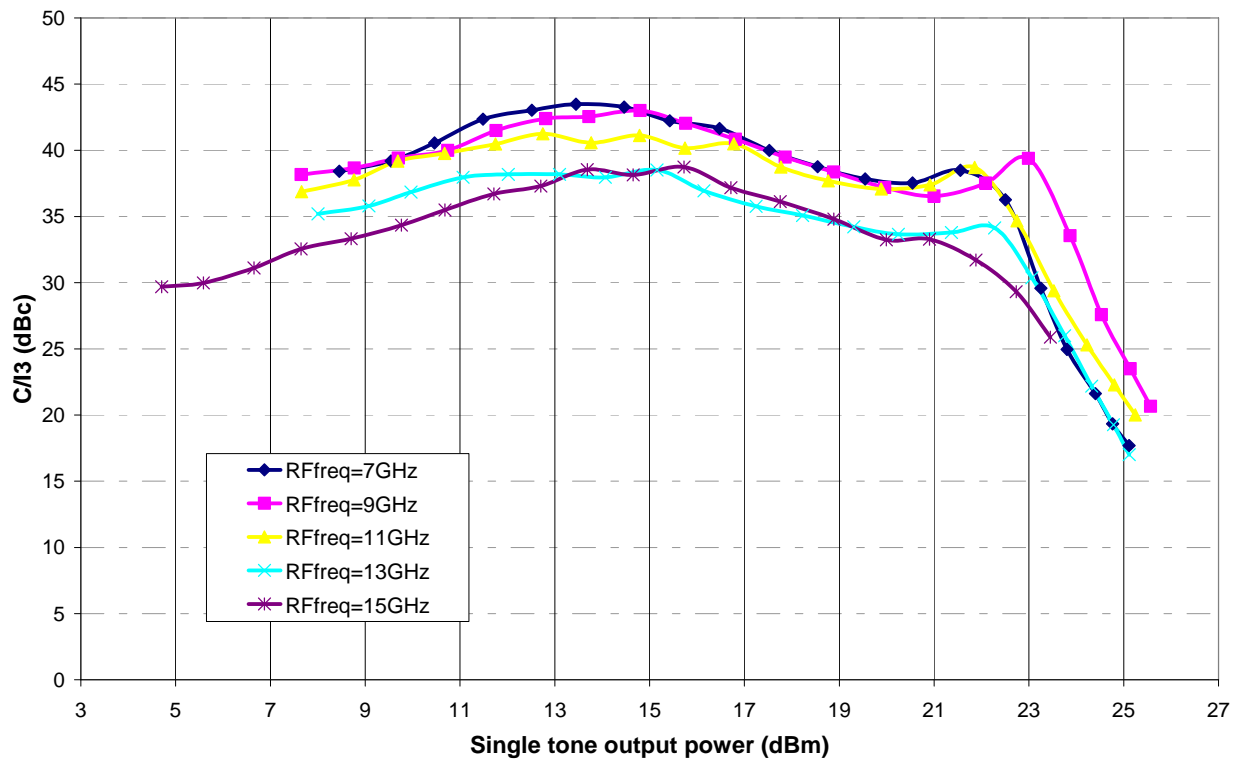
Gain and Pout versus Pin @RFfreq=11GHz



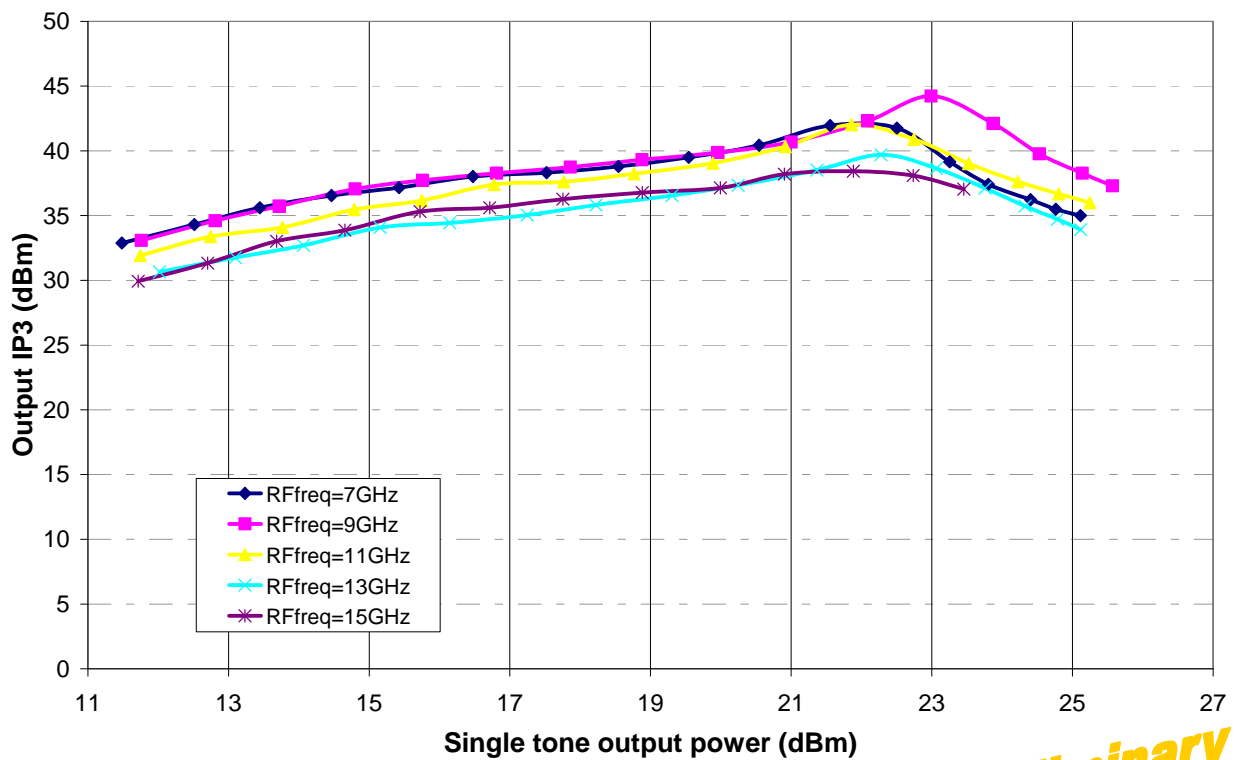
Gain and Pout versus Pin @RFfreq=15GHz



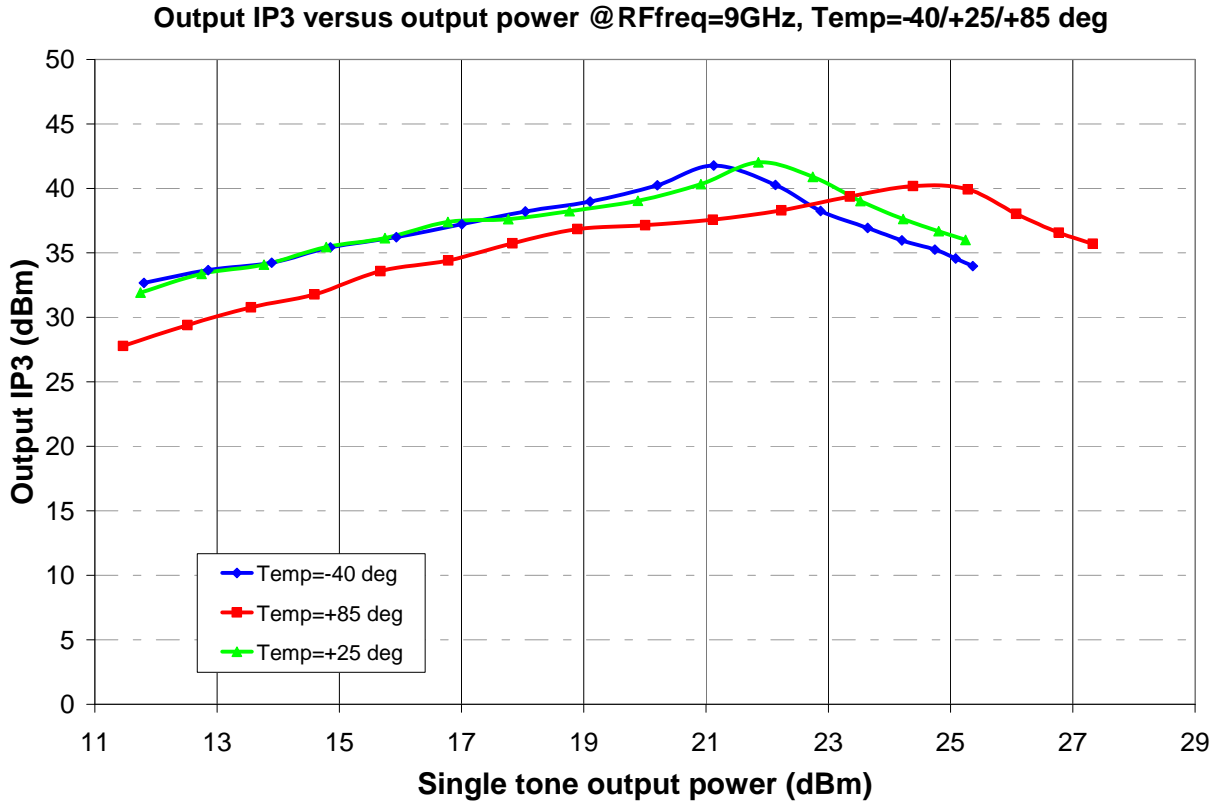
C/I3 versus output power, Temp= +25deg



IP3 versus output power, Temp= +25deg

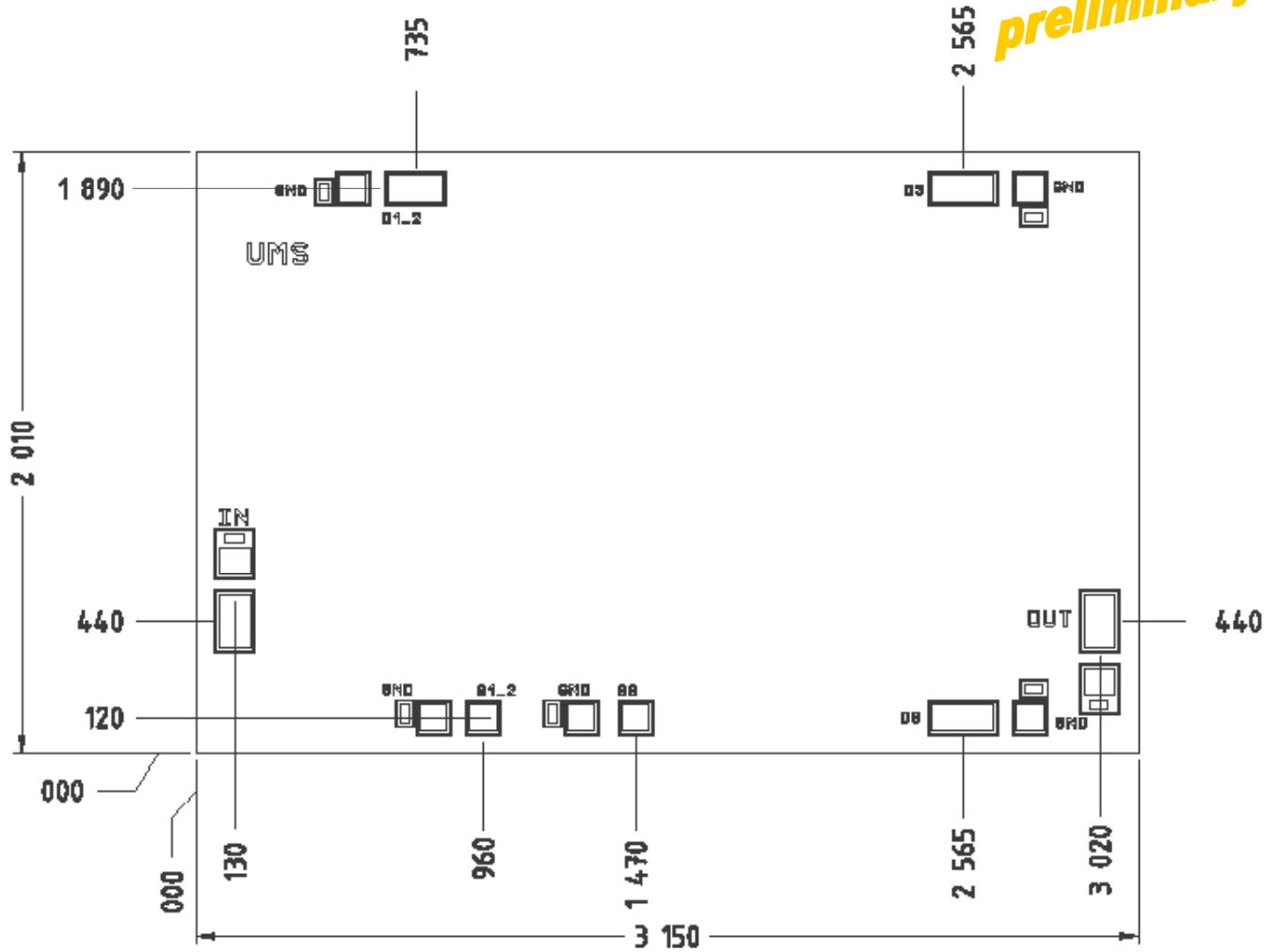


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Chip Mechanical Data and Pin references

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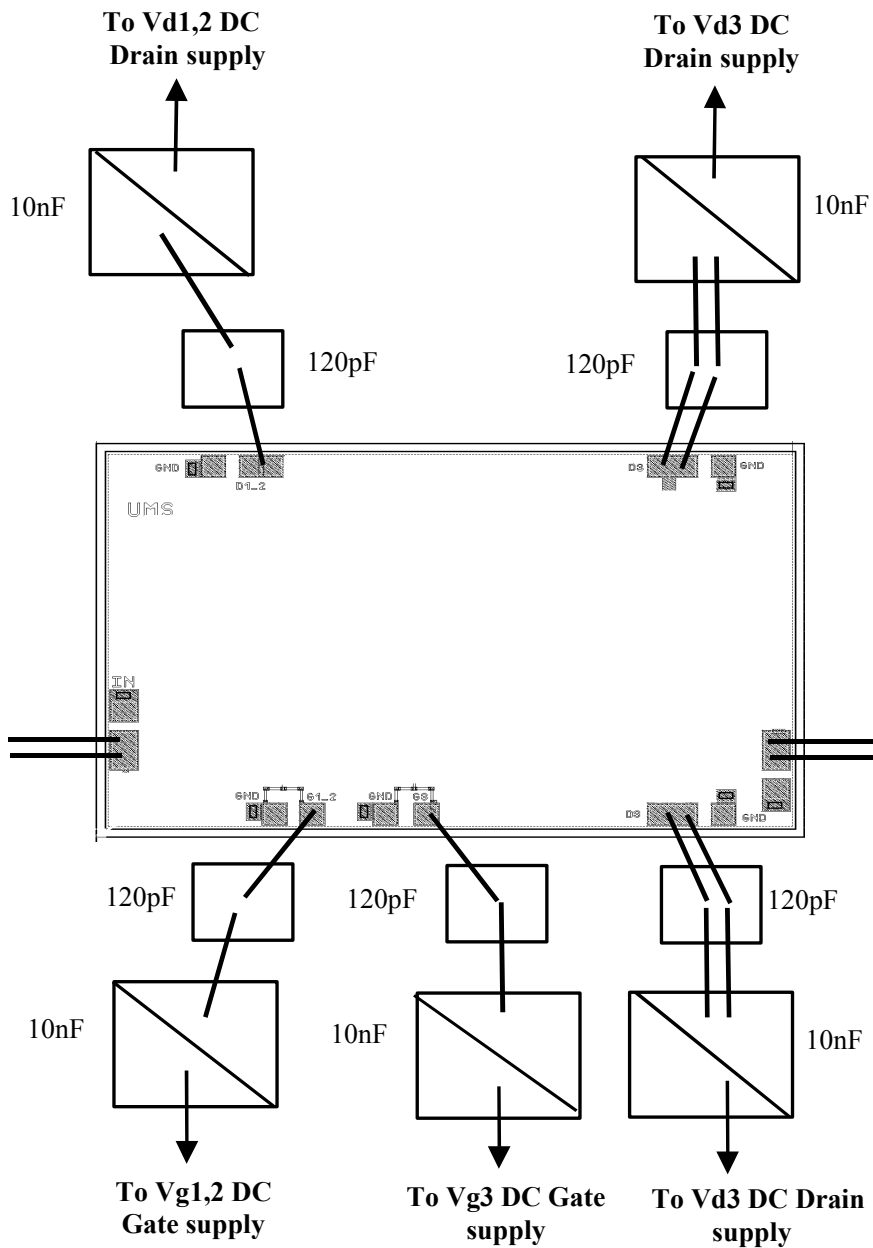


UNITS : μm
Tol : $\pm 35\mu\text{m}$

Assembly recommendations

Note : Supply feed might be capacitively bypassed.
 25µm diameter gold wire is to be preferred.
 DC Pads Size : 100/100 µm
 RF Pads Size : 125/200 µm
 RF bounding wire length: 400µm
 Chip thickness : 100 µm.

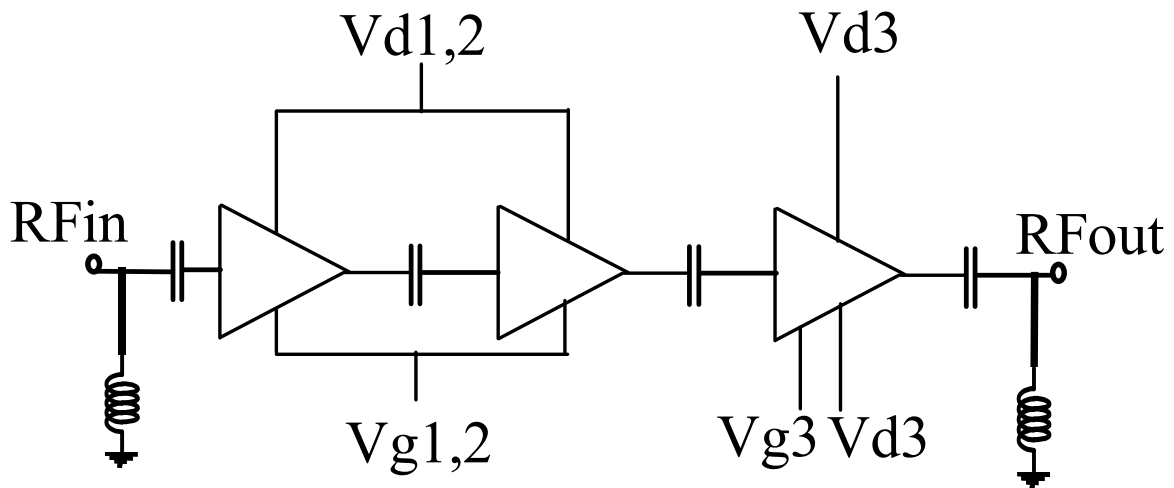
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Note

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Due to ESD protection, RFin and RFout are DC grounded, an external capacitance might be requested to isolate the product from external voltage that could be present on the RF accesses.



Gate access are also protected with high-current shunt diodes

Ordering Information

Chip form : CHA5052-98F/00

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