

36-40GHz High Power Amplifier

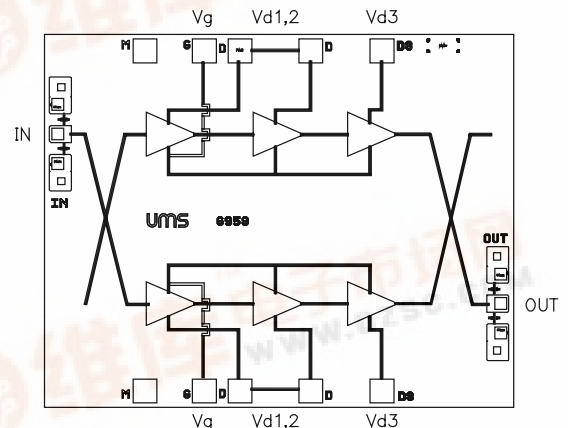
GaAs Monolithic Microwave IC

Description

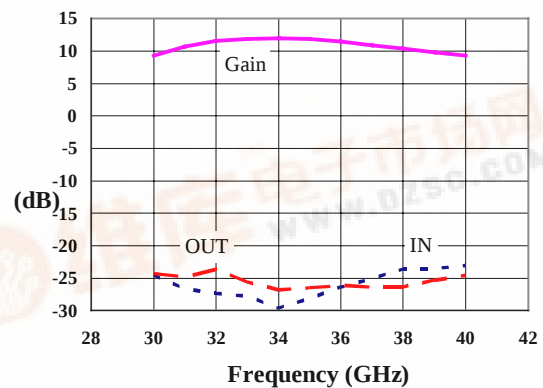
The CHA4094 is a high gain broadband three-stage balanced monolithic power amplifier. It is designed for a wide range of applications, from military to commercial communication systems.

The circuit is manufactured with a PM-HEMT process, 0.25 μ m gate length, via holes through the substrate, air bridges and electron beam gate lithography.

It is available in chip form.



Typical on wafer measurements :



Main Features

- Broadband performances
- 22 dBm output power (1dB gain comp.)
- 9 dB $\pm$ 1 dB gain
- Chip size : 1.65 X 2.05 X 0.10 mm

Main Characteristics

Tamb. = 25°C

Symbol	Parameter	Min	Typ	Max	Unit
Fop	Operating frequency range	36		40	GHz
G	Small signal gain	7	9		dB
P1dB	Output power at 1dB gain compression		22		dBm
Id	Bias current		750	920	mA

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

Electrical Characteristics for Broadband Operation

Tamb = +25°C, Vd1,2,3 = 3.5Volts

Symbol	Parameter	Min	Typ	Max	Unit
Fop	Operating frequency range (1)	36		40	GHz
G	Small signal gain (1) (2)	7	9		dB
ΔG	Small signal gain flatness (1) (2)		± 1		dB
Is	Reverse isolation (1)		30		dB
P1db	Pulsed Output power at 1dB gain compression (1)		22		dBm
VSWRin	Input VSWR (1)			2.0:1	
VSWRout	Output VSWR (1)			2.0:1	
Id	Bias current (3)		750	920	mA

(1) These values are representative of on-wafer measurements that are made without bonding wires at the RF ports. In the case of a jig or a module CW mode operation, the typical output power may be around 2dB less.

(2) Vd1, 2, 3 = 2Volts

(3) Depends on Biasing point, see application note for recommended biasing point

Absolute Maximum Ratings

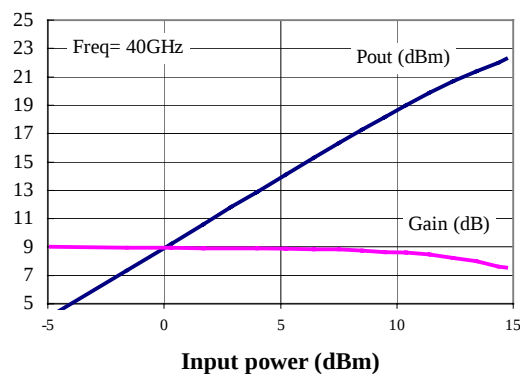
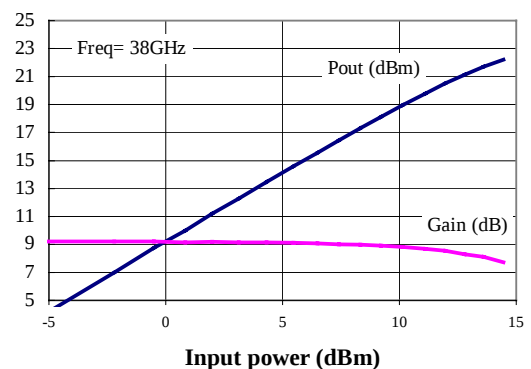
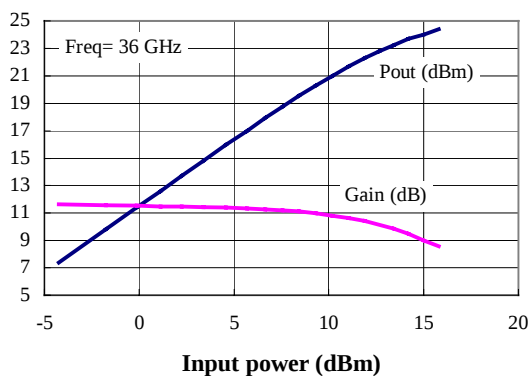
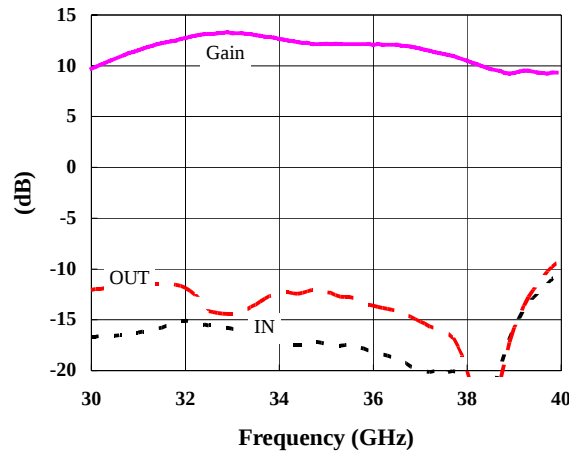
Tamb. = 25°C (1)

Symbol	Parameter	Values	Unit
Vd	Drain bias voltage	4	V
Id	Drain bias current	1200	mA
Vg	Gate bias voltage	-2 to +0.4	V
Ta	Operating temperature range	-40 to +85	°C
Tstg	Storage temperature range	-55 to +155	°C

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

Typical On Jig Measurements

Bias Conditions : $T_{amb} = +25^{\circ}\text{C}$, $V_d = 3.5\text{V}$, $V_g = -0.2\text{V}$.



Application note

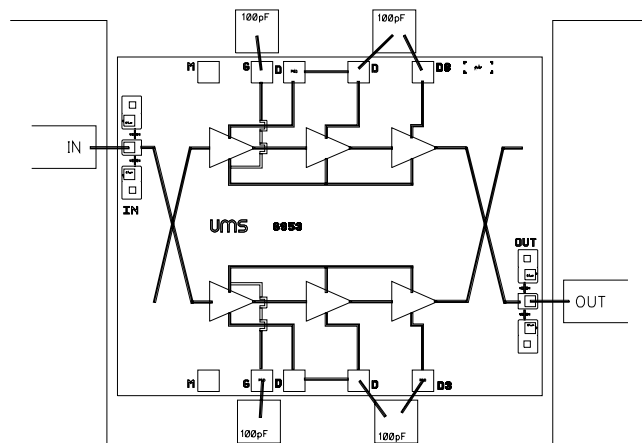
The given DC Bias condition in table or curves are for class A biasing point. This amplifier could be used in class AB.

For this the Gate voltage must be adjusted for a total drain supply current of typically 500mA.

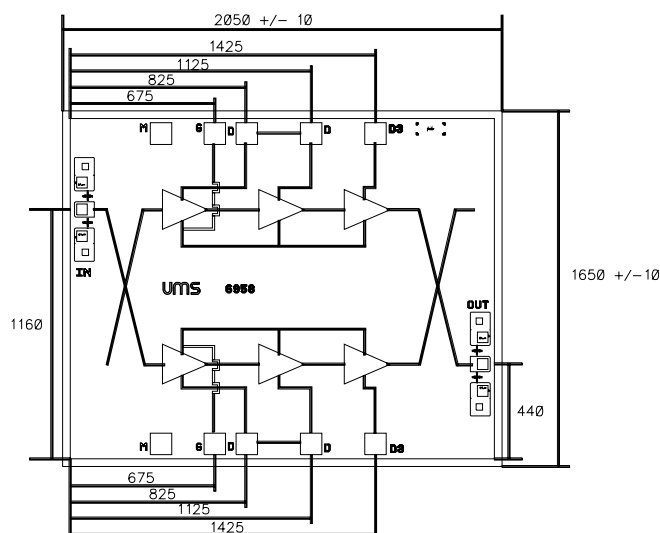
The loss in linear gain is around 0.4dB, but the output power at 1dB compression point is higher, between 0.5 and 1dBm more.

This biasing point shows a main advantage in regard of thermal aspect. Indeed the junction temperature in transistor decreases approximatively of 10°C for 20% reduction in drain current.

Chip Assembly and Mechanical Data



Note : Supply feed should be capacitively bypassed.



Bonding pad positions.

(Chip thickness : 100 μ m. All dimensions are in micrometers)

Ordering Information

Chip form : CHA4094-99F/00

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