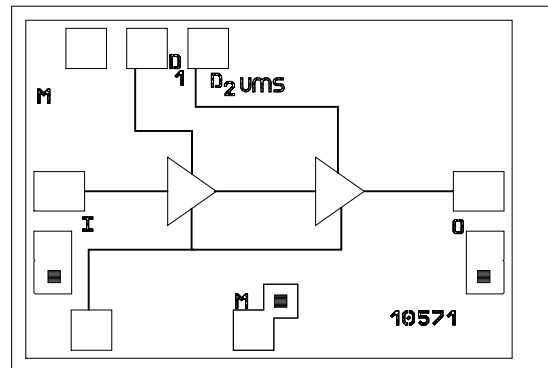


5.5-23GHz Driver Amplifier GaAs Monolithic Microwave IC

Description

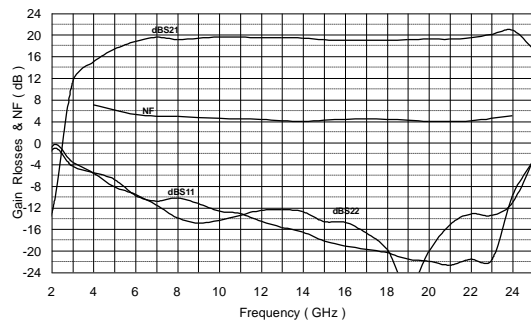
The CHA3063-99F is a two-stage general purpose monolithic medium power amplifier. The backside of the chip is both RF and DC grounded. This helps to simplify the assembly process.

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 supplied in chip form.



Main Features

- Broadband performance: 5.5-23GHz
- 21dBm output power (P_{sat})
- 19dB gain, ± 1dB gain flatness
- Typical PAE: 11% @ P-1dB comp.
- Chip size: 1.33 x 0.910 x 0.1mm



Typical On wafer measurements

Main Electrical Characteristics

T_{amb} = +25°C

Symbol	Parameter	Min	Typ	Max	Unit
Fop	Operating frequency range	5.5		23	GHz
G	Small signal gain	18	19		dB
Pout	Output power, Pin=0dBm	+18	+20		dBm
Id_small_signal	Bias current		160	210	mA

ESD Protection : Electrostatic discharge sensitive device observe handling precautions !

Electrical Characteristics on wafer

Tamb = +25°C, Vd1=Vd2=4V Vg tuned for Id=160mA (around -0.27V)

Symbol	Parameter	Min	Typ	Max	Unit
Fop	Operating frequency range	5.5		23	GHz
G	Small signal gain (5.5-6GHz)	17			dB
	Small signal gain (6-23GHz)	18	19		dB
ΔG	Small signal gain flatness		±1.0		dB
Is	Reverse isolation		35		dB
P1dB	CW output power at 1dB compression (1)	+16	+18		dBm
Pout	Output Power (Pin=0dBm)	+18	+20		dBm
OIP3	Output 3rd order intercept point (2)		28		dBm
RL_IN	Input Return Loss (3)		-15	-7	dB
RL_OUT	Output Return Loss (3)		-15	-7	dB
NF	Noise figure		4.5	6	dB
Id_small signal	Bias current		160	210	mA

(1) These values are representative for CW on-wafer measurements that are made without bonding wires at the RF ports.

(2) Value representative for CW on jig measurement

(3) RL_IN, RL_OUT < 6dB from 5.5GHz to 7GHz

Absolute Maximum Ratings (1)

Tamb. = 25°C

Symbol	Parameter	Values	Unit
Vds	Drain bias voltage_small signal	5.0	V
Ids	Drain bias current_small signal	210	mA
Vg	Gate bias voltage	-2 to +0.4	V
Ig	Gate bias current	0.7	mA
Vgd	Maximum negative gate drain Voltage (Vg-Vd)	-5	V
Pin	Maximum continuous input power	+1	dBm
	Maximum peak input power overdrive (2)	+15	dBm
Ta	Operating temperature range	-40 to +85	°C
Tstg	Storage temperature range	-55 to +150	°C

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

(2) Duration < 1s.

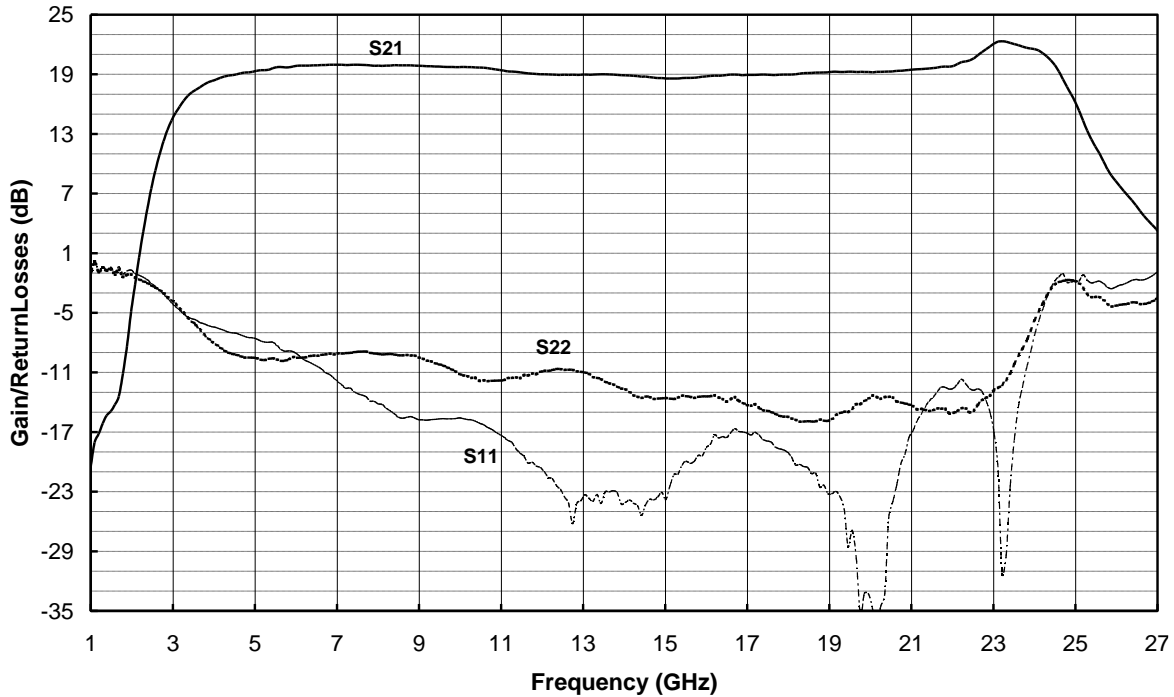
Typical Scattering Parameters (On wafer S_{ij} measurements)Bias Conditions: $V_{d1,2} = 4V$, $V_g = -0.27V$, $I_d = 160\text{ mA}$, $T_a = +25^\circ\text{C}$.

FREQ GHz	S11 dB	S11 /°	S12 dB	S12 /°	S21 dB	S21 /°	S22 dB	S22 /°
1.0	-0.3	-35.6	-60.9	84.0	-12.7	86.9	-0.6	-35.0
2.0	-0.7	-75.6	-63.1	142.8	-13.7	-179.2	-1.4	-67.7
3.0	-3.4	-113.7	-54.5	-53.2	11.6	123.1	-4.7	-93.2
4.0	-5.7	-140.7	-53.1	138.2	15.2	58.5	-6.2	-111.6
5.0	-7.9	-170.3	-43.5	67.4	16.4	19.0	-7.4	-133.3
6.0	-9.0	162.5	-44.2	34.7	18.8	-12.3	-11.1	-149.1
7.0	-11.3	121.8	-41.0	13.6	19.3	-46.9	-12.0	-155.1
8.0	-13.5	82.5	-38.7	-16.7	18.9	-75.2	-11.6	-173.2
9.0	-14.3	39.7	-37.6	-39.6	19.1	-100.4	-12.9	171.7
10.0	-14.0	0.9	-37.1	-61.4	19.3	-125.2	-14.4	165.8
11.0	-13.2	-34.0	-36.7	-82.9	19.5	-150.7	-13.7	164.9
12.0	-13.2	-62.6	-35.6	-107.7	19.6	-175.1	-13.5	148.9
13.0	-15.3	-95.8	-36.0	-126.6	19.5	159.3	-11.9	131.3
14.0	-16.7	-125.2	-35.0	-148.4	19.2	133.1	-11.9	116.0
15.0	-21.2	-125.5	-34.7	-175.9	18.5	111.1	-13.1	95.0
16.0	-18.6	-140.0	-36.4	170.4	18.2	89.1	-14.7	79.9
17.0	-19.8	-124.7	-36.4	137.3	18.1	70.4	-19.5	72.4
18.0	-18.8	-172.0	-38.5	135.9	18.1	44.3	-17.4	72.2
19.0	-20.8	101.6	-37.4	154.6	18.0	22.0	-18.5	57.4
20.0	-19.8	23.1	-35.2	125.8	18.0	-2.5	-19.4	47.4
21.0	-15.4	-14.7	-34.0	101.5	18.2	-26.4	-23.3	32.5
22.0	-14.2	-34.2	-33.8	71.7	18.9	-57.7	-21.4	76.8
23.0	-11.5	-43.5	-35.3	46.5	19.5	-89.3	-16.9	77.6
24.0	-11.6	-30.9	-33.1	-0.4	20.4	-144.0	-6.3	46.6
25.0	-3.9	-46.7	-34.9	-86.0	17.6	153.9	-3.1	-13.3
26.0	-2.0	-74.8	-35.3	-172.0	10.9	104.5	-3.2	-59.0
27.0	-1.3	-99.2	-39.7	157.6	3.9	69.9	-4.3	-90.9
28.0	-1.3	-115.8	-33.9	138.6	-3.5	44.6	-4.7	-113.7
29.0	-1.3	-128.4	-32.3	128.4	-12.1	29.3	-5.0	-133.9
30.0	-1.2	-140.1	-28.7	96.4	-21.0	47.7	-5.9	-153.6

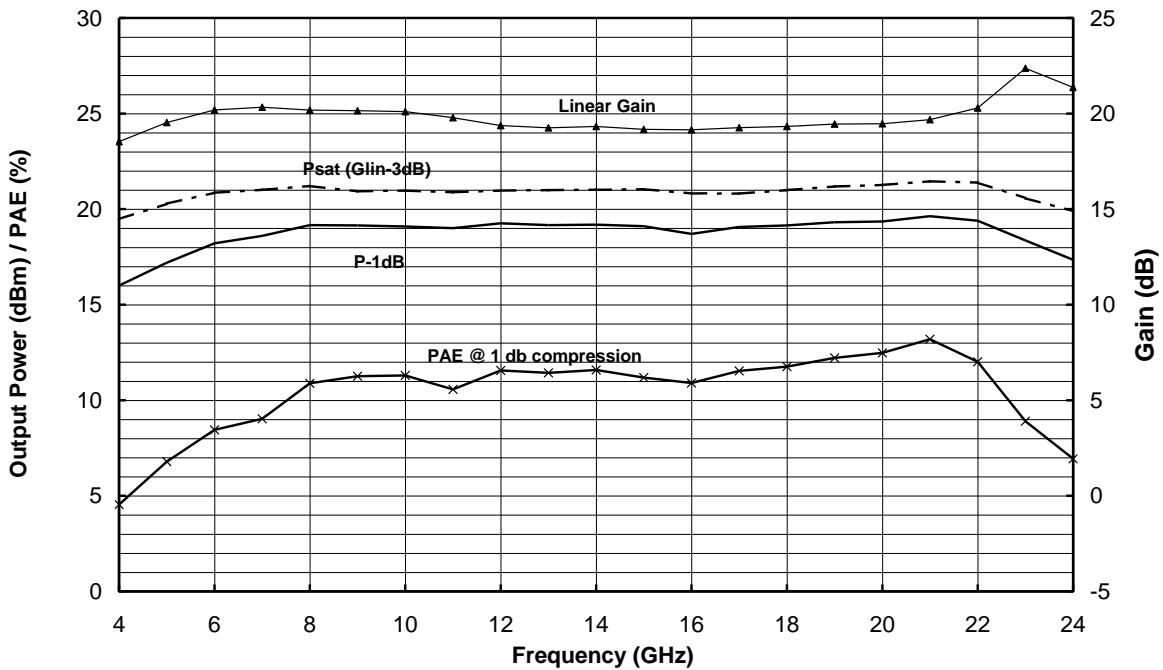
Typical ON JIG Measurements (deembedded)

Bias Conditions: $V_{d1,2} = 4V$, $V_g = -0.27V$, $I_d = 160\text{ mA}$, $T_a = +25^\circ\text{C}$

GAIN & ReturnLosses MEASUREMENTS IN TEST JIG



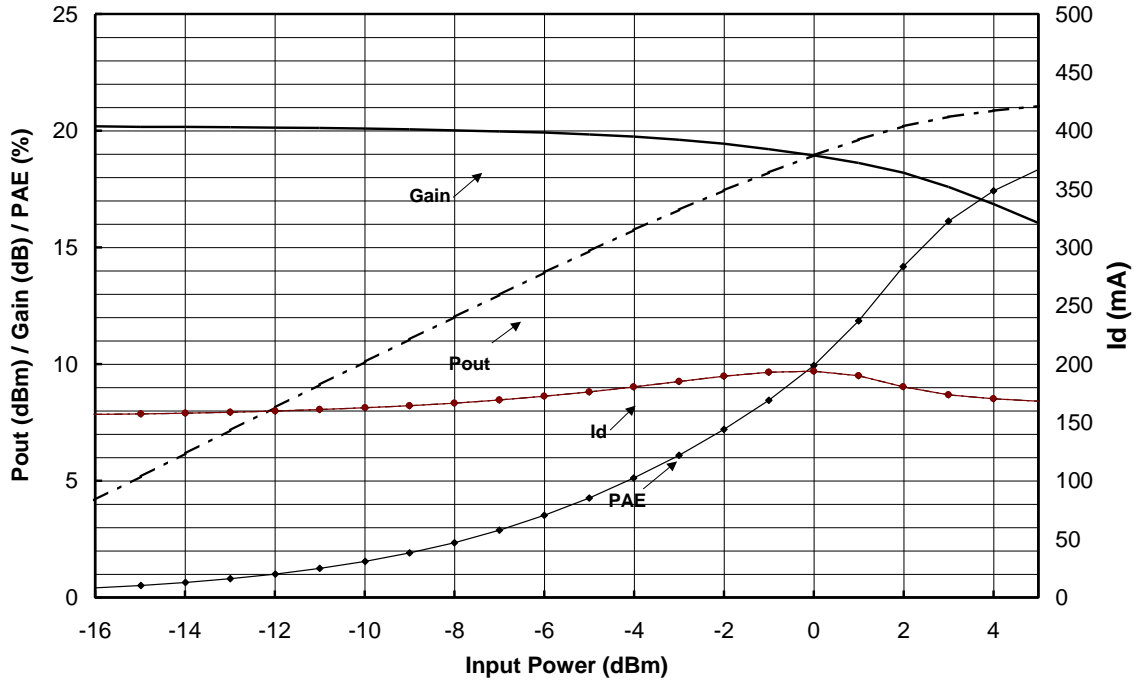
POWER MEASUREMENTS IN TEST JIG (deembedded)



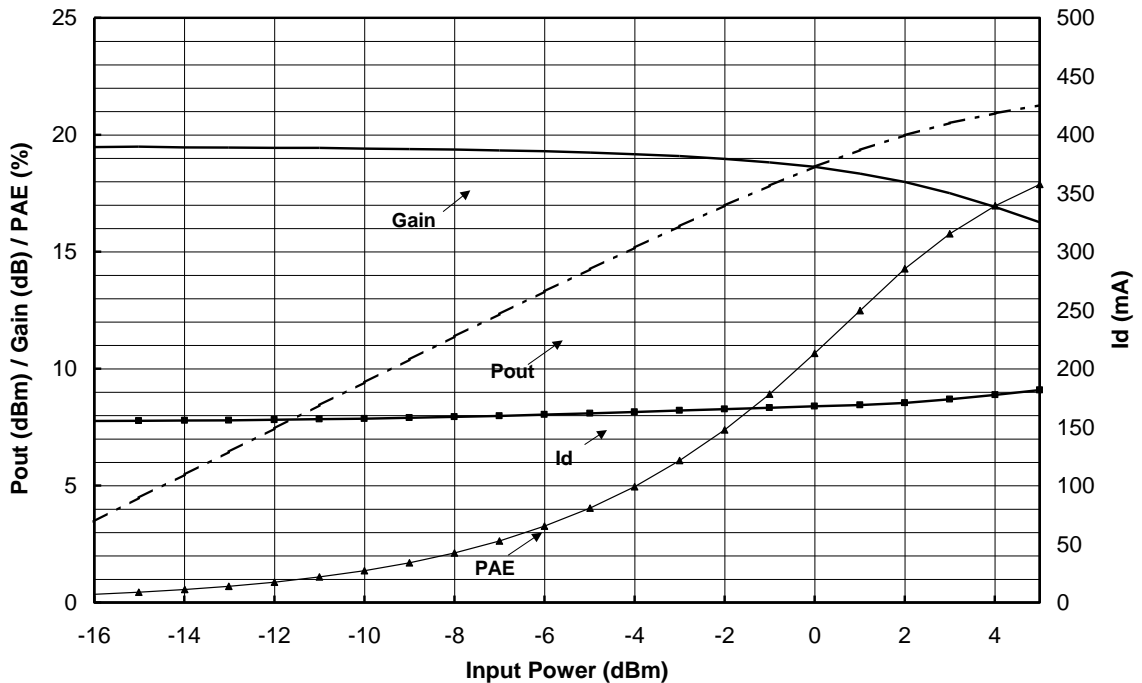
Typical ON JIG Power Measurements (deembedded)

Bias Conditions: $V_{d1,2} = 4V$, $V_g = -0.27V$, $I_d = 160\text{ mA}$, $T_a = +25^\circ\text{C}$

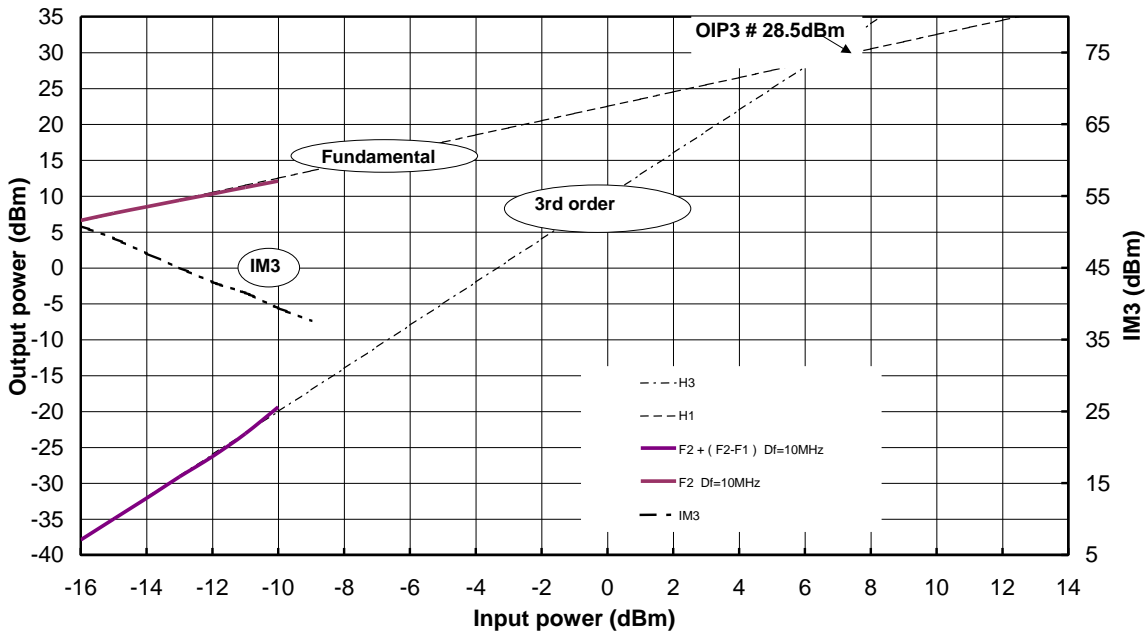
Frequency : 6 GHz



Frequency : 20GHz

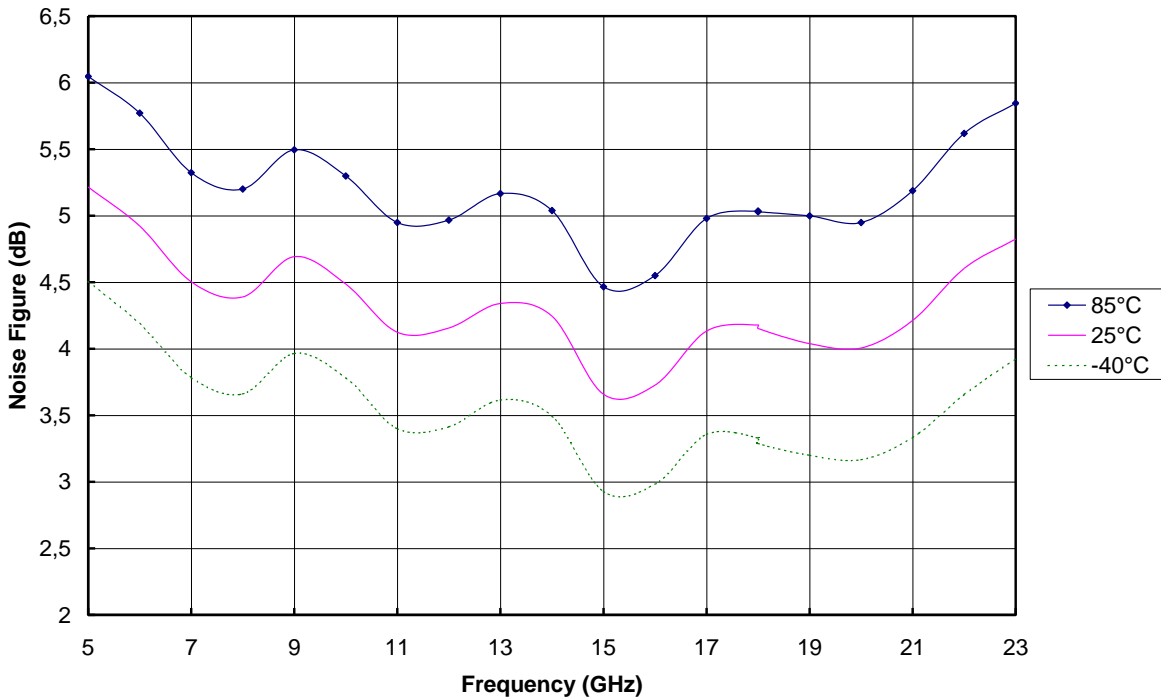


$V_d=4V$ $I_d=160mA$ @ 23GHz $\Delta f=10MHz$

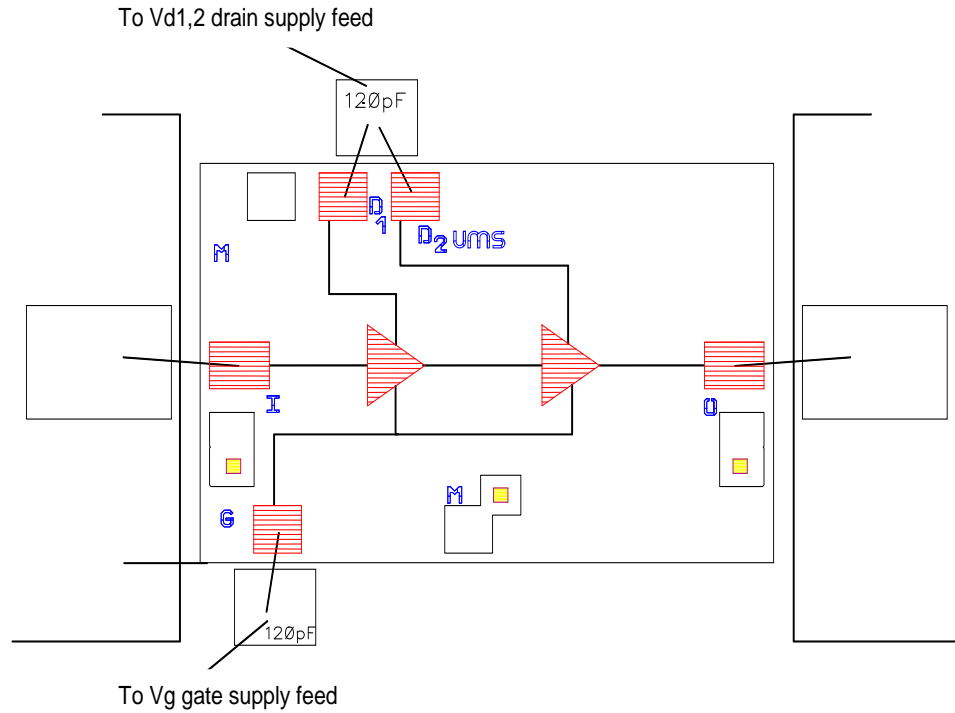


Typical ON JIG Noise Figure Measurements

Noise Figure versus Temperature



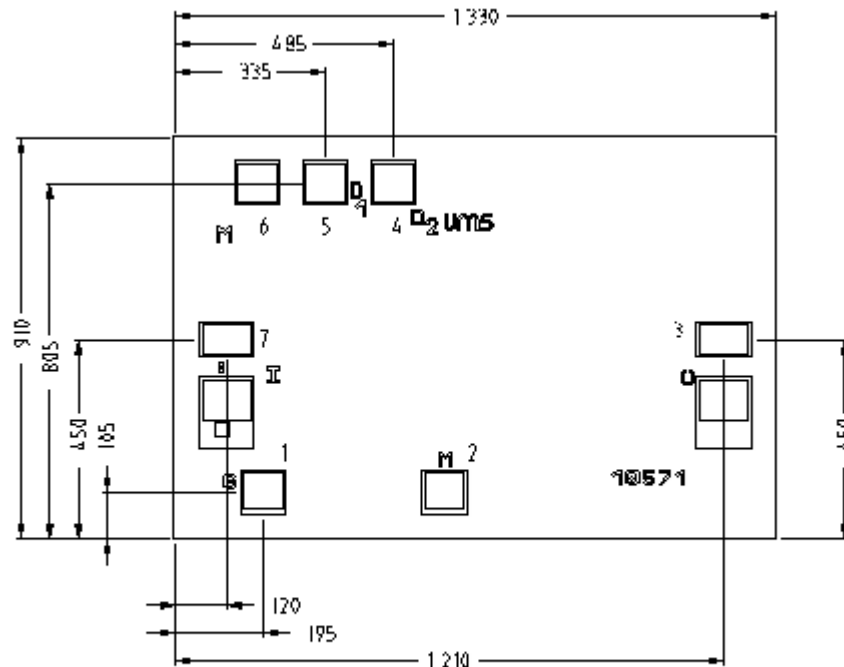
Chip Assembly and Mechanical Data



Note: Supply feed should be capacitively bypassed. 25µm diameter gold wire is recommended

Chip Mechanical Data and Pin references

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



UNITS : µm
Tol : ± 35µm

Ordering Information

Chip form : CHA3063-99F/00

Information furnished is believed to be accurate and reliable. However **United Monolithic Semiconductors S.A.S.** assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of **United Monolithic Semiconductors S.A.S.**. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. **United Monolithic Semiconductors S.A.S.** products are not authorised for use as critical components in life support devices or systems without express written approval from **United Monolithic Semiconductors S.A.S.**