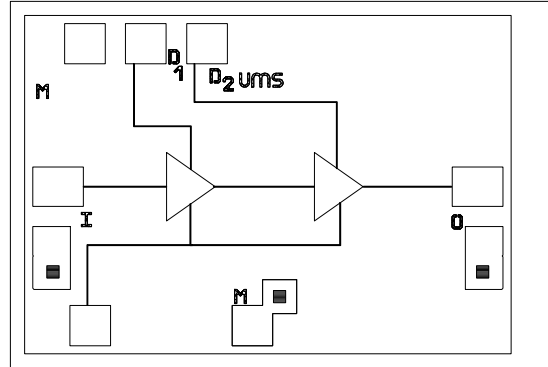


5.5-23GHz Driver Amplifier GaAs Monolithic Microwave IC

Description

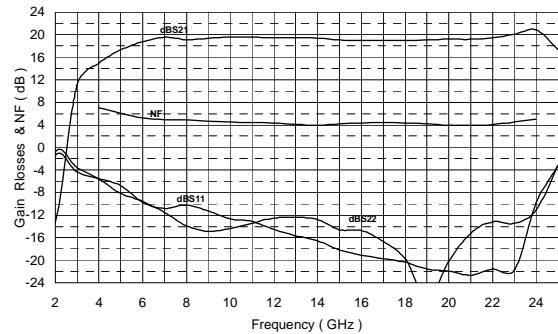
The CHA3063 is a two-stage general purpose monolithic medium power amplifier. The backside of the chip is both RF and DC grounded. This helps to simplify the assembly process.

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 Feature

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



Typical On wafer measurements

Main Characteristics

T_{amb} = +25°C

Symbol	Parameter	Min	Typ	Max	Unit
F _{op}	Operating frequency range	5.5		23	GHz
G	Small signal gain	18	19		dB
P _{out}	Output power, P _{in} =0dBm	+18	+20		dBm
I _{d_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 +125	°C

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

(2) Duration < 1s.

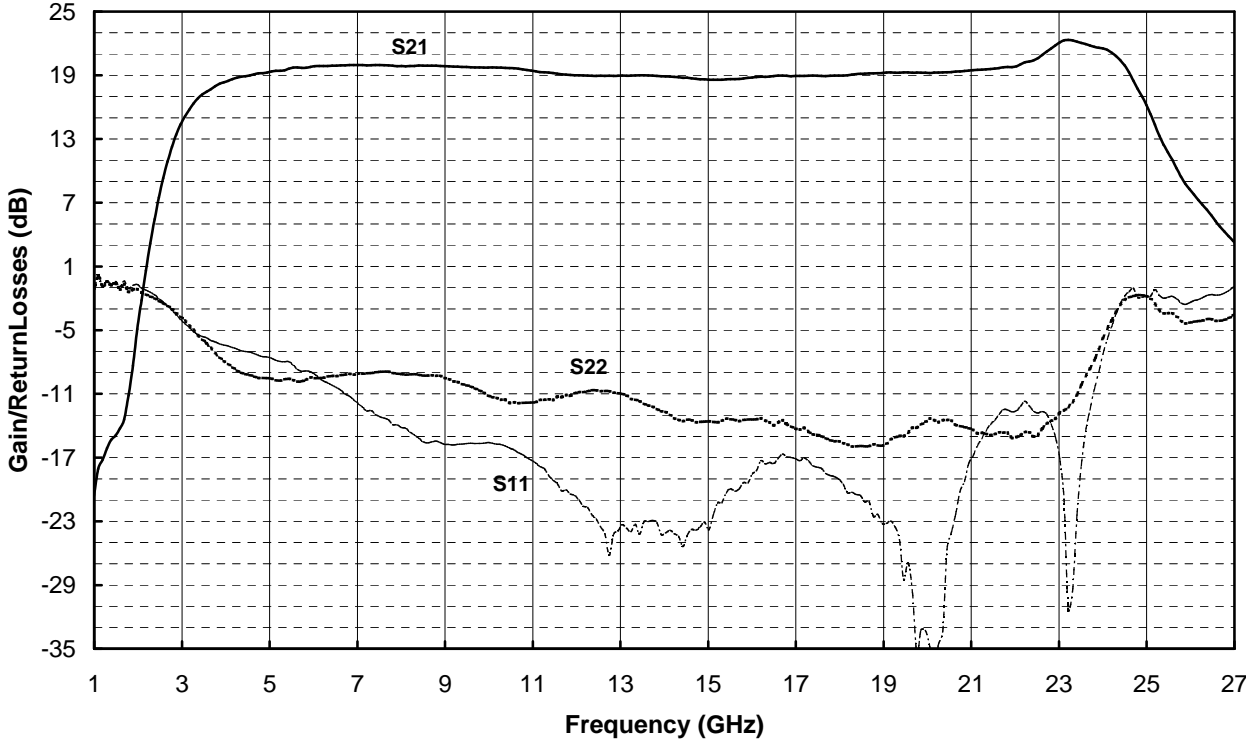
Typical Scattering Parameters (On wafer S_{ij} measurements)Bias Conditions : $V_{d1,2} = 4V$, $V_g = -0.27V$, $I_d = 160\text{ mA}$, $T_a = +25^\circ\text{C}$.

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

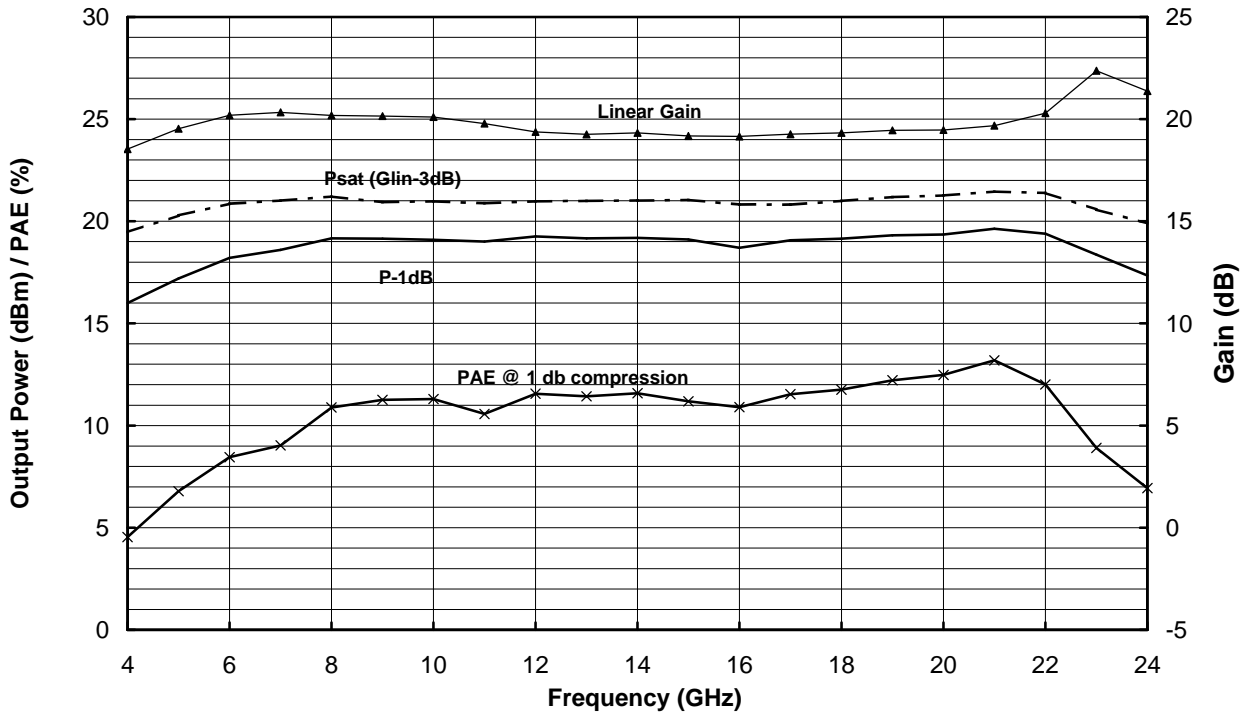
Typical ON JIG Measurements (deembedded)

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



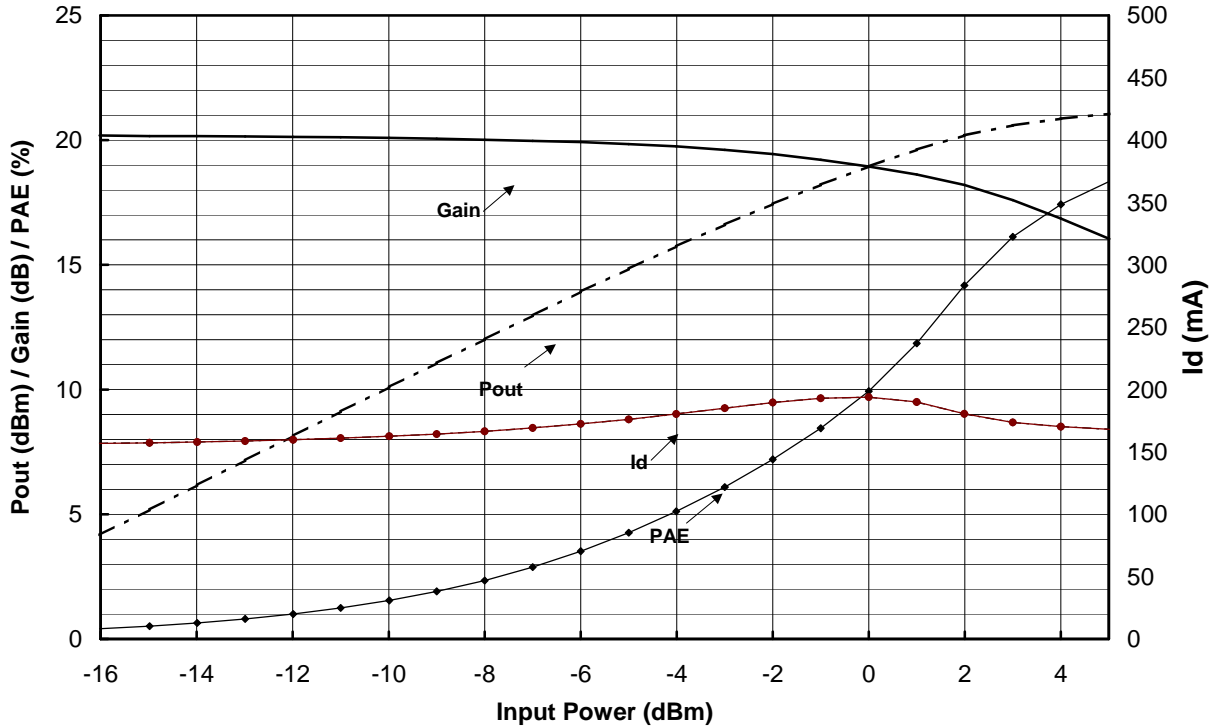
POWER MEASUREMENTS IN TEST JIG (deembedded)



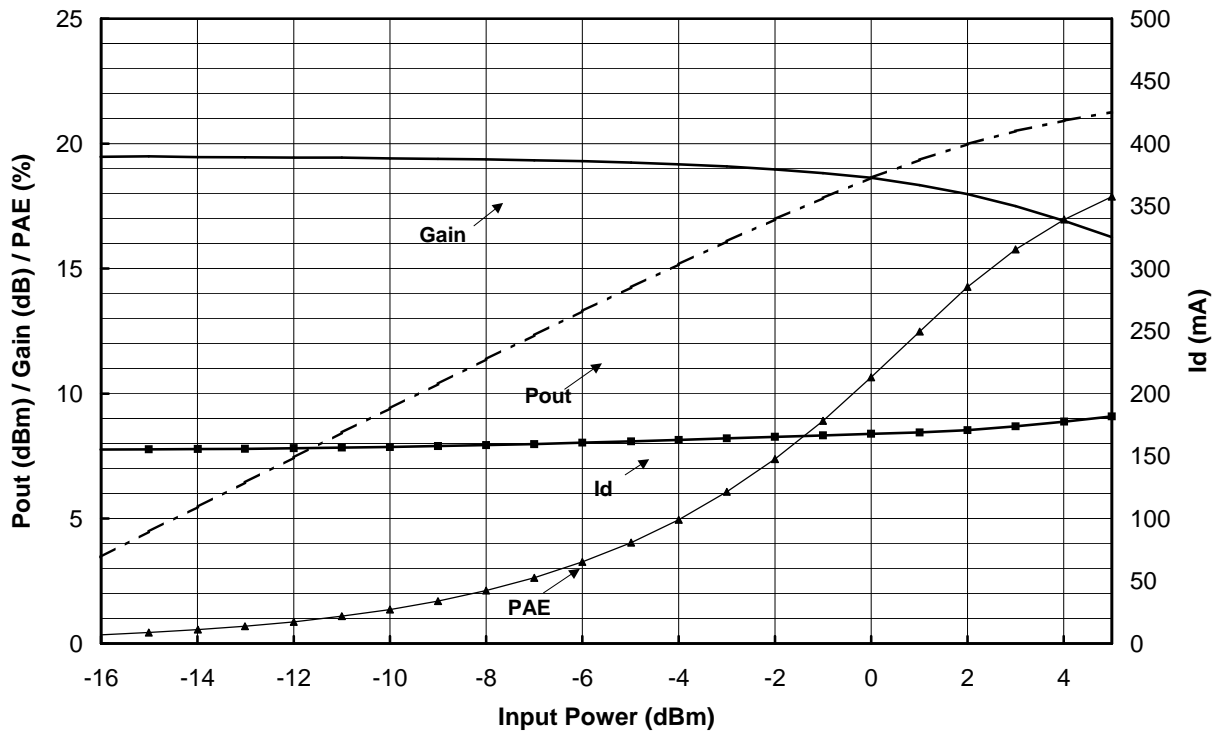
Typical ON JIG Power Measurements (deembedded)

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

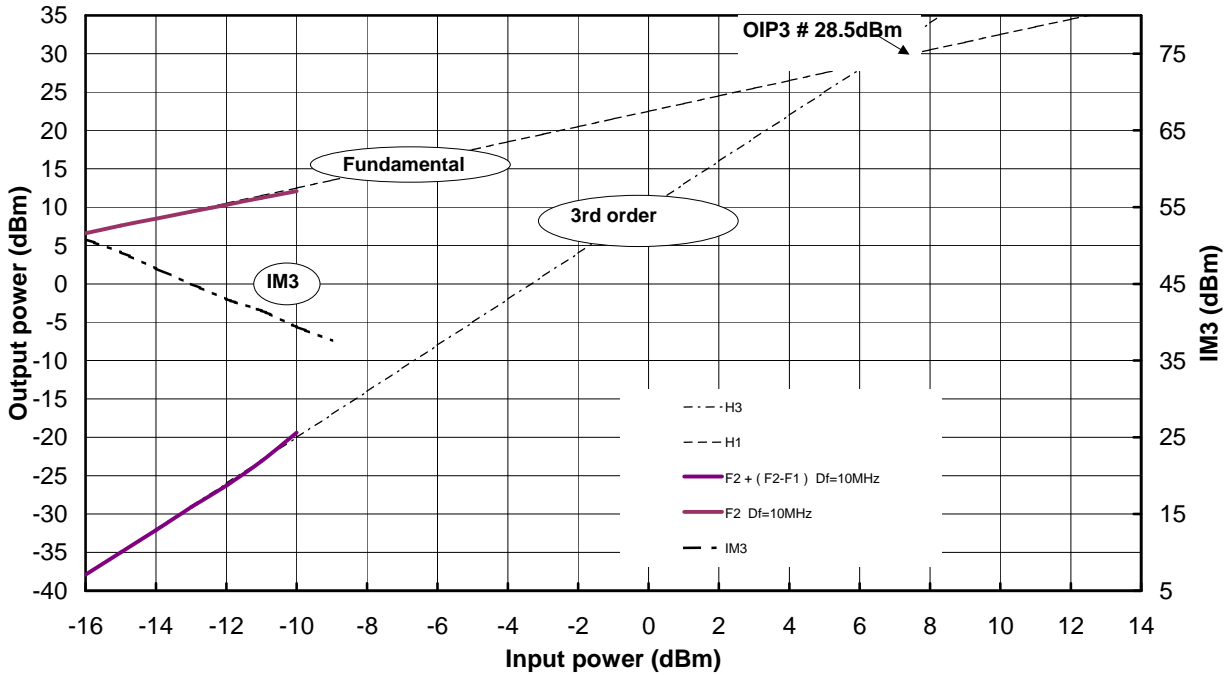
Frequency : 6 GHz



Frequency : 20GHz

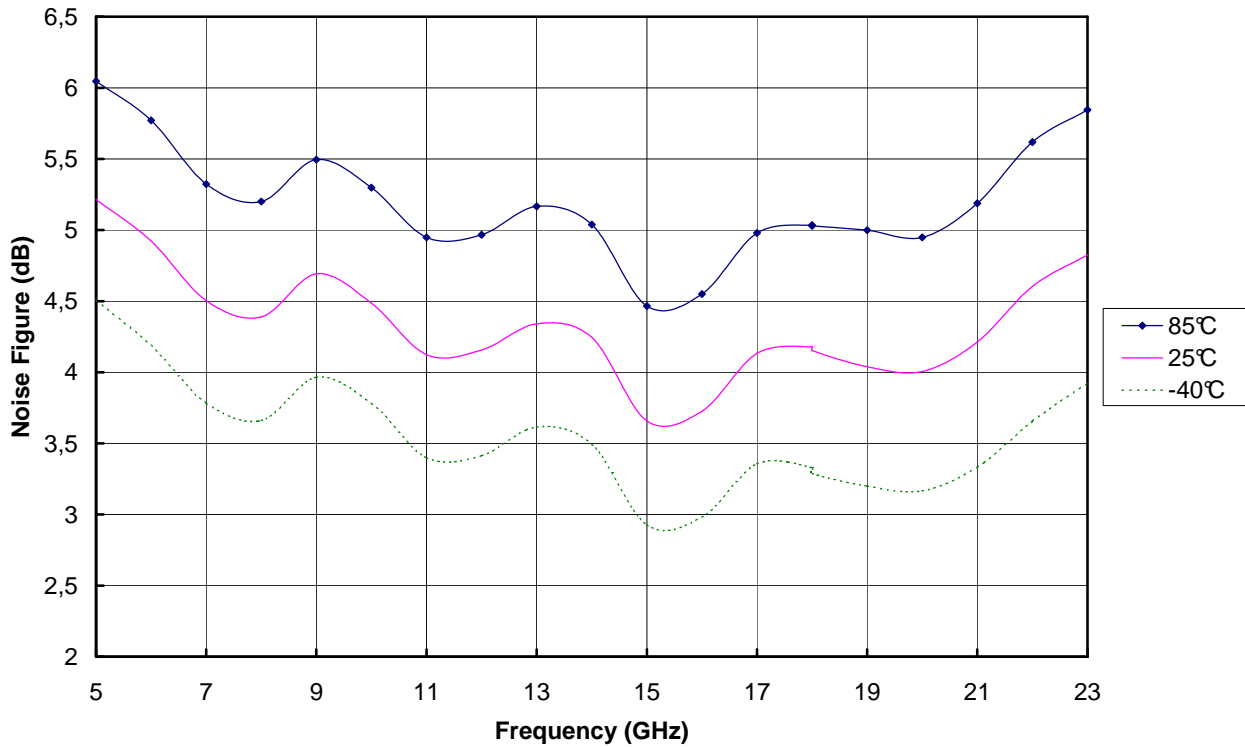


$V_d=4V$ $I_d=160mA$ @ 23GHz $\Delta f=10MHz$

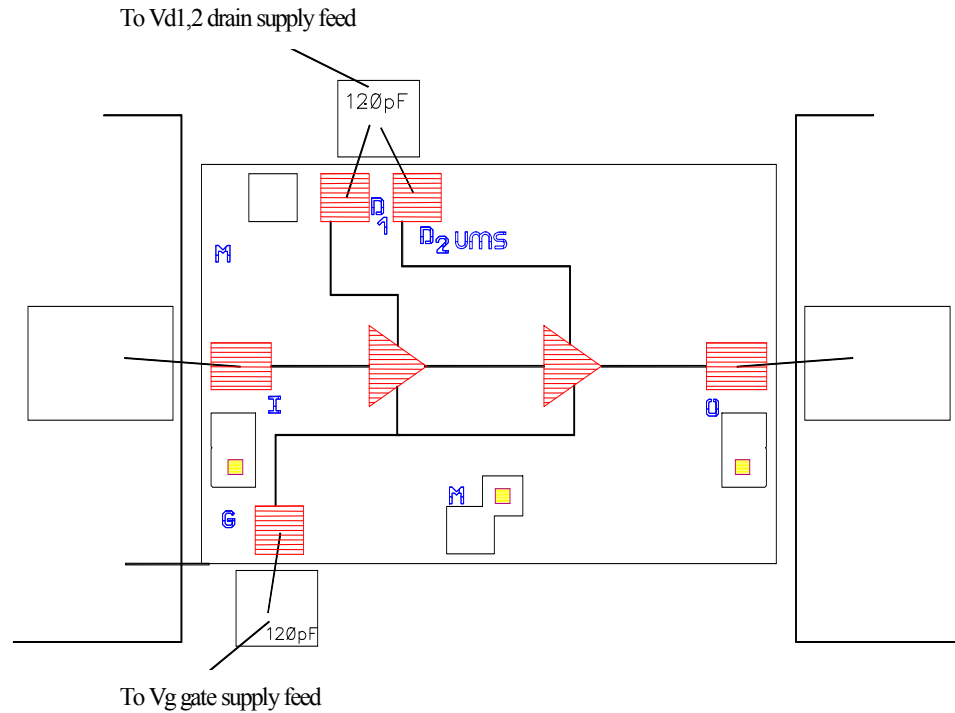


Typical ON JIG Noise Figure Measurements

Noise Figure versus Temperature



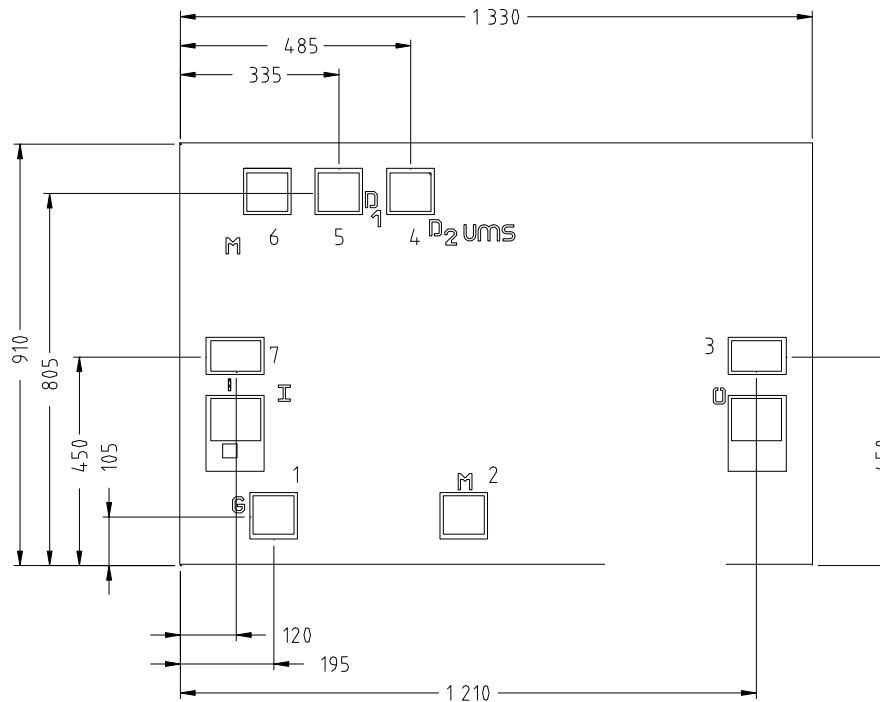
Chip Assembly and Mechanical Data



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

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