May/2007

MITSUBISHI SEMICONDUTOR <GaAs FET>

MGF4931AM

SUPER LOW NOISE InGaAs HEMT (4pin flat lead package)

DESCRIPTION

The MGF4931AM super-low noise HEMT (High Electron Mobility Transistor) is designed for use in S to Ku band amplifiers.

The 4pin flat lead package is small-thin size, and offers high cost performance.

FEATURES

Low noise figure @ f=12GHz
NFmin. = 0.6dB (Typ.)

High associated gain @ f=12GHz
Gs = 11.5dB (Typ.)

APPLICATION

S to Ku band low noise amplifiers

QUALITY GRADE

GG

RECOMMENDED BIAS CONDITIONS

V_{DS}=2V , I_D=7.5mA

Outline Drawing

Fig.1

Keep Safety first in your circuit designs!

Mitsubishi Electric Corporation puts the maximum effort into making semiconductor products better and more reliable , but there is always the possibility that trouble may occur with them. Trouble with semiconductors may lead to personal injury , fire or property damage. Remember to give due consideration to safety when making your circuit designs , with appropriate measure such as (I) placement of substitutive , auxiliary circuits , (ii) use of non-flammble material or (iii) prevention against any malfunction or mishap.

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Symbol	Parameter	Ratings	Unit
V_{GDO}	Gate to drain voltage	-4	V
V_{GSO}	Gate to source voltage	-4	V
I_D	Drain current	IDSS	mA
PT	Total power dissipation	50	mW
T_{ch}	Channel temperature	125	°C
T_{stg}	Storage temperature	-55 to +125	°C

ELECTRICAL CHARACTERISTICS (Ta=25°C)

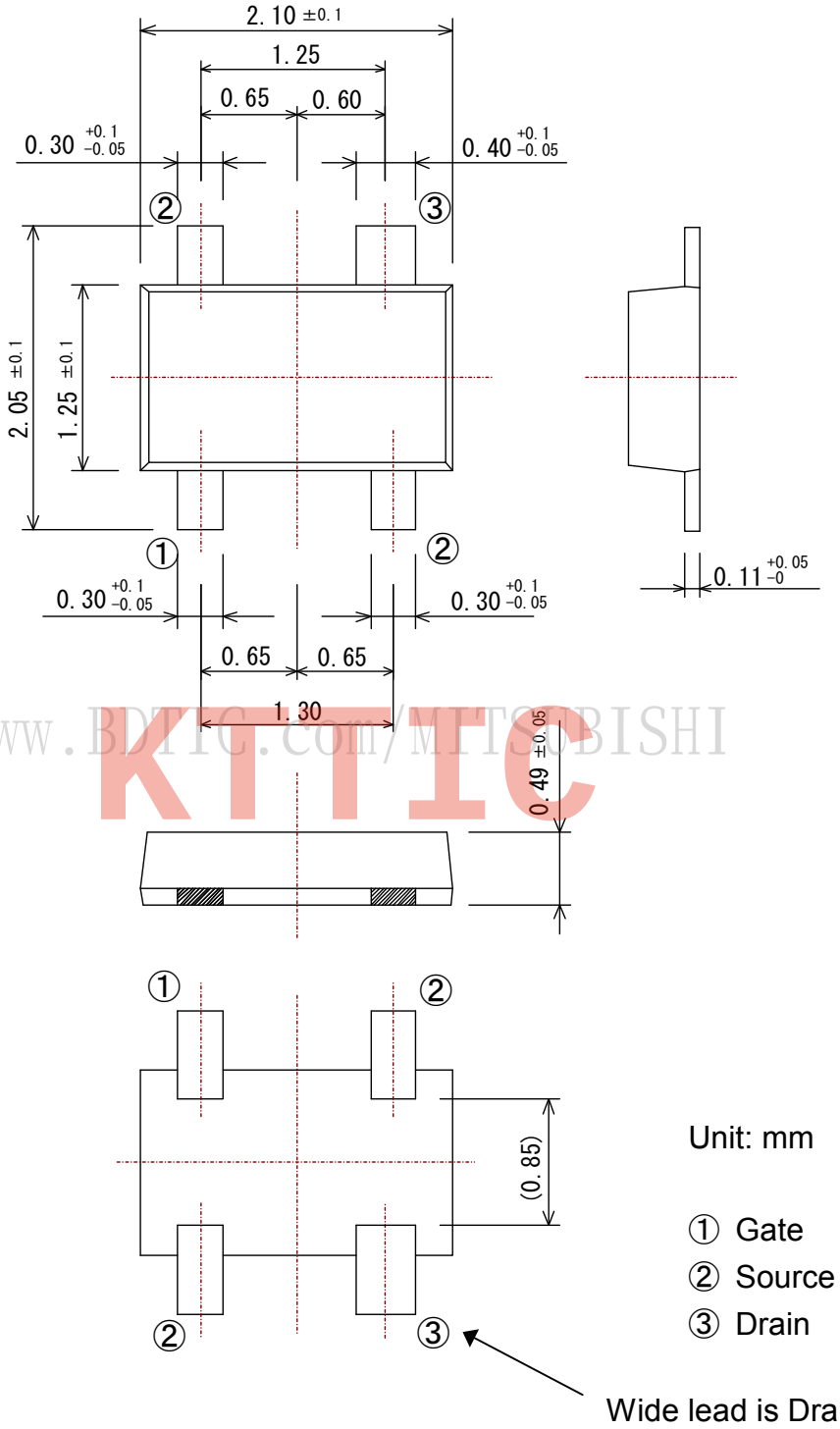
Symbol	Parameter	Test conditions	Limits			Unit
			MIN.	TYP.	MAX	
$V_{(BR)GDO}$	Gate to drain breakdown voltage	I_G=-10μA	-3	--	--	V
I_{GSS}	Gate to source leakage current	V_{GS}=-2V,V_{DS}=0V	--	--	50	μA
I_{DSS}	Saturated drain current	V_{GS}=0V,V_{DS}=2V	10	--	60	mA
$V_{GS(off)}$	Gate to source cut-off voltage	V_{DS}=2V,I_D=500μA	-0.1	--	-1.5	V
Gs	Associated gain	V_{DS}=2V,	10.0	11.5	--	dB
NFmin.	Minimum noise figure	I_D=7.5mA,f=12GHz	--	0.6	0.8	dB

Fig.1

Top

Side

Bottom



Unit: mm

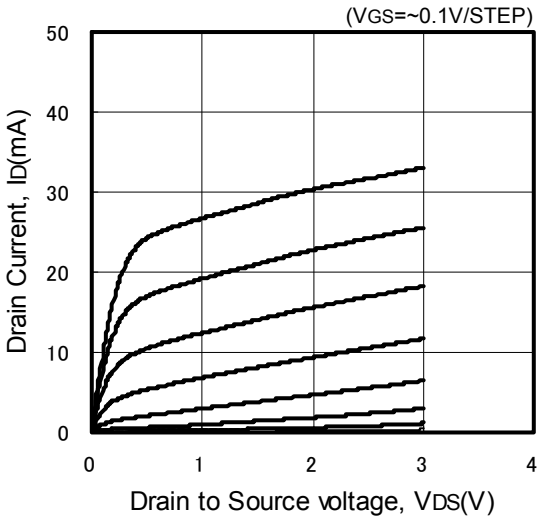
① Gate
② Source
③ Drain

Wide lead is Drain.

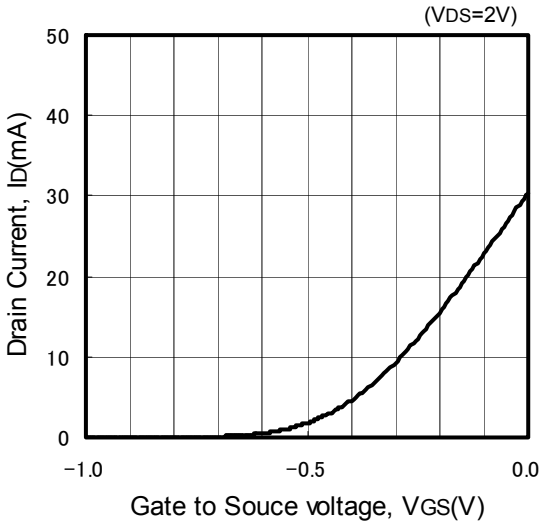
(GD-30)

TYPICAL CHARACTERISTICS (Ta=25°C)

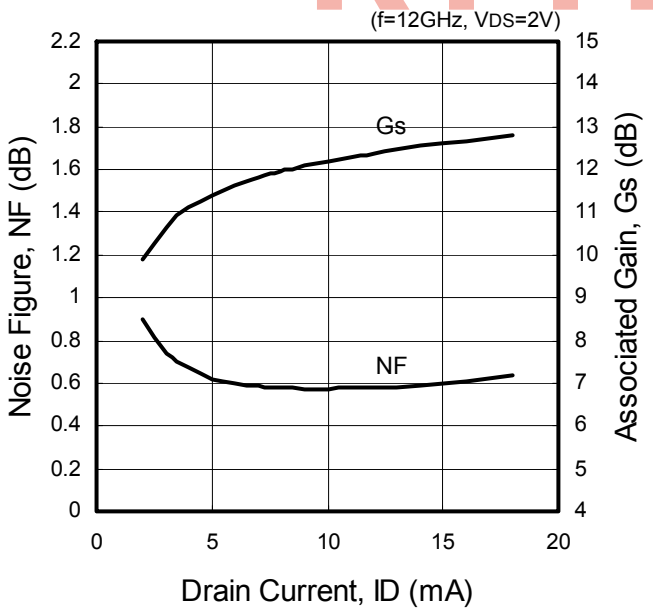
ID vs. VDS



ID vs. VGS



NF & Gs vs. ID

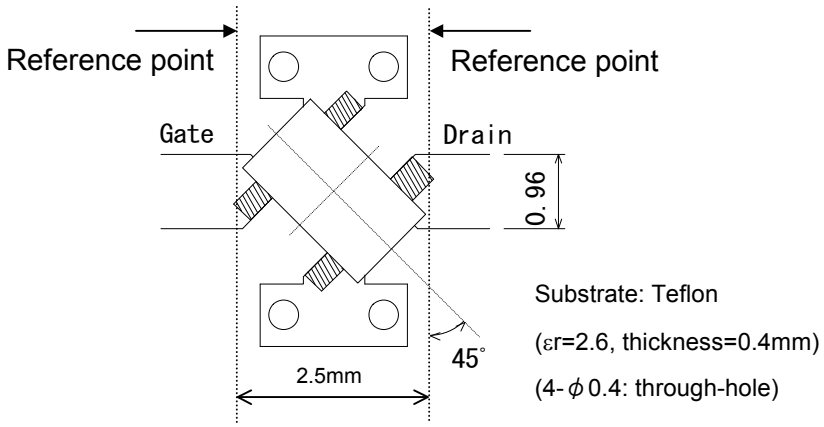


S Parameters (Conditions: V_{DS}=2V, I_D=7.5mA, Ta=25°C)

Freq.	S11		S21		S12		S22	
(GHz)	(Mag)	(Ang)	(Mag)	(Ang)	(Mag)	(Ang)	(Mag)	(Ang)
1	0.989	-14.5	4.153	163.1	0.018	77.153	0.734	-12.6
2	0.958	-29.2	4.063	146.8	0.034	66.346	0.709	-24.5
3	0.915	-44.1	4.038	131.1	0.050	56.177	0.686	-36.7
4	0.852	-62.3	4.137	113.8	0.066	43.717	0.621	-51.7
5	0.794	-76.7	3.970	99.2	0.075	35.035	0.592	-62.5
6	0.729	-89.9	3.762	85.1	0.082	27.81	0.557	-72.0
7	0.667	-104.0	3.640	71.1	0.087	20.495	0.518	-81.5
8	0.596	-118.7	3.491	57.3	0.090	13.979	0.473	-90.2
9	0.533	-134.1	3.371	44.1	0.091	9.165	0.421	-99.6
10	0.471	-151.1	3.266	30.6	0.094	5.1001	0.374	-109.1
11	0.425	-170.4	3.179	17.1	0.096	2.4743	0.325	-120.5
12	0.407	168.2	3.137	3.4	0.103	0.389	0.287	-137.2
13	0.413	145.8	3.034	-10.5	0.111	-2.411	0.254	-158.5
14	0.449	124.2	2.935	-25.1	0.120	-6.73	0.246	174.4
15	0.509	105.1	2.805	-40.2	0.131	-13.04	0.273	144.9
16	0.584	88.5	2.646	-55.3	0.141	-20.38	0.329	120.2
17	0.650	74.6	2.444	-70.3	0.147	-27.74	0.402	100.0
18	0.711	62.0	2.179	-85.1	0.150	-35.89	0.478	83.7
19	0.761	51.9	1.920	-97.9	0.153	-43.61	0.543	69.9
20	0.805	43.6	1.737	-108.8	0.155	-51.69	0.597	57.9
21	0.835	37.3	1.580	-119.6	0.156	-59.69	0.642	46.8
22	0.856	32.2	1.453	-129.8	0.154	-66.83	0.681	36.5
23	0.878	28.1	1.350	-139.9	0.150	-73.14	0.724	26.4
24	0.880	23.3	1.261	-149.5	0.148	-77.89	0.768	17.4
25	0.884	16.4	1.205	-159.6	0.150	-83.6	0.824	9.2
26	0.874	9.1	1.140	-170.4	0.147	-89.39	0.856	1.6

Noise Parameters (VDS=2V,ID=7.5mA, Ta=25°C)

f	Γ_{opt}		Rn	NFmin
(GHz)	Magn.	Angle(deg.)	(Ω)	(dB)
8	0.43	105.6	13.5	0.52
12	0.33	164.0	5.6	0.59
14	0.46	−147.9	7.2	0.89



Substrate: Teflon
(εr=2.6, thickness=0.4mm)
(4-φ0.4: through-hole)

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