

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.)

Outline Drawing

Fig.1

APPLICATION

S to Ku band low noise amplifiers

MITSUBISHI Proprietary

Not to be reproduced or disclosed without permission by Mitsubishi Electric

QUALITY GRADE

GG

RECOMMENDED BIAS CONDITIONS

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

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-flammable material or (iii) prevention against any malfunction or mishap.

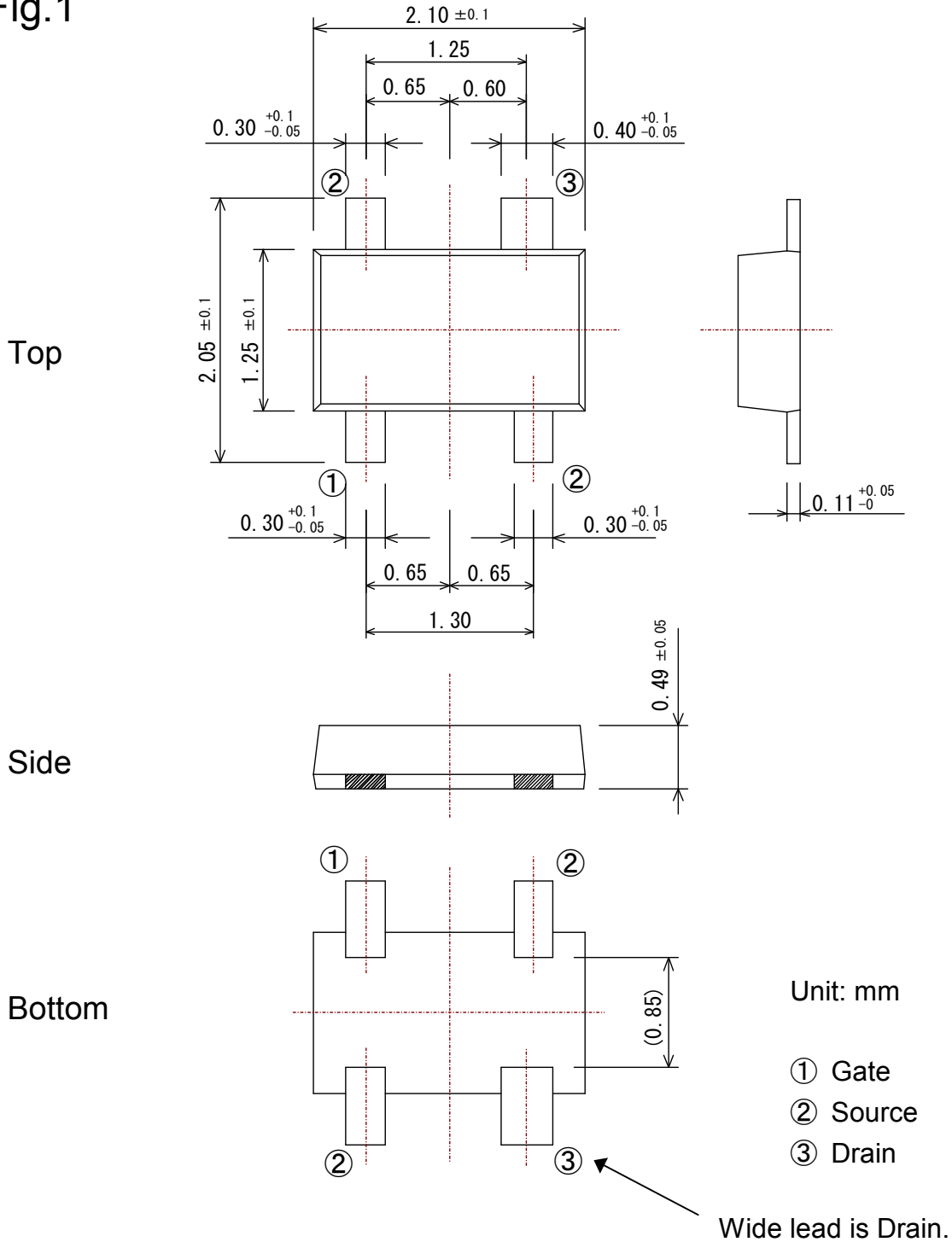
ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

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)

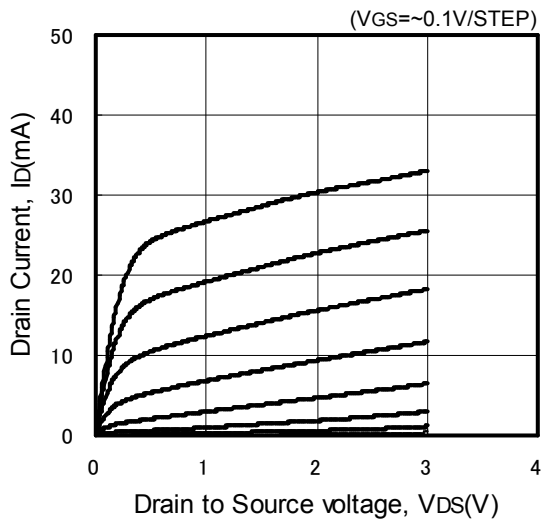
Symbol	Parameter	Test conditions	Limits			Unit
			MIN.	TYP.	MAX	
$V_{(BR)GDO}$	Gate to drain breakdown voltage	$I_G=-10\mu A$	-3	--	--	V
I_{GSS}	Gate to source leakage current	$V_{GS}=-2V, V_{DS}=0V$	--	--	50	μA
I_{DSS}	Saturated drain current	$V_{GS}=0V, V_{DS}=2V$	10	--	60	mA
$V_{GS(off)}$	Gate to source cut-off voltage	$V_{DS}=2V, I_D=500\mu A$	-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

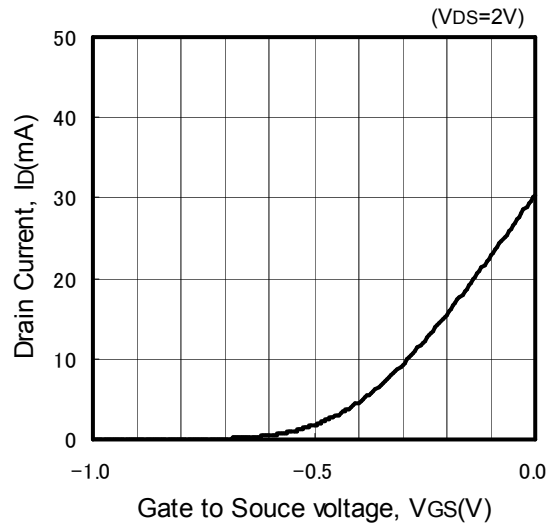


TYPICAL CHARACTERISTICS (Ta=25°C)

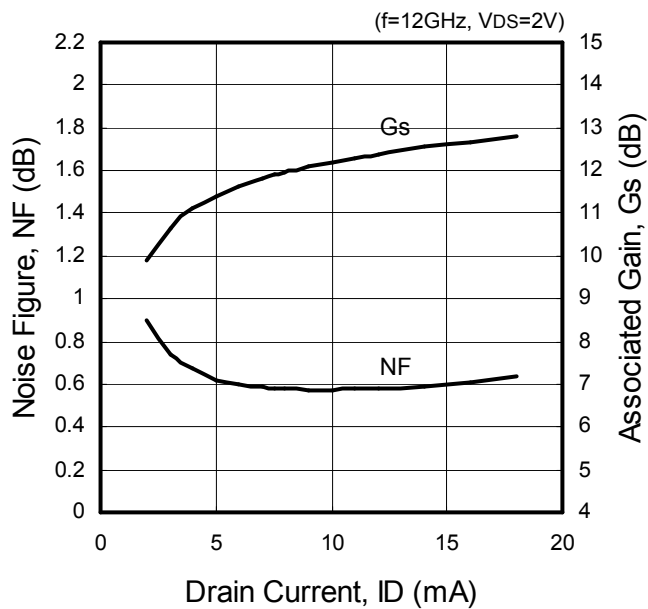
ID vs. VDS



ID vs. VGS



NF & Gs vs. ID

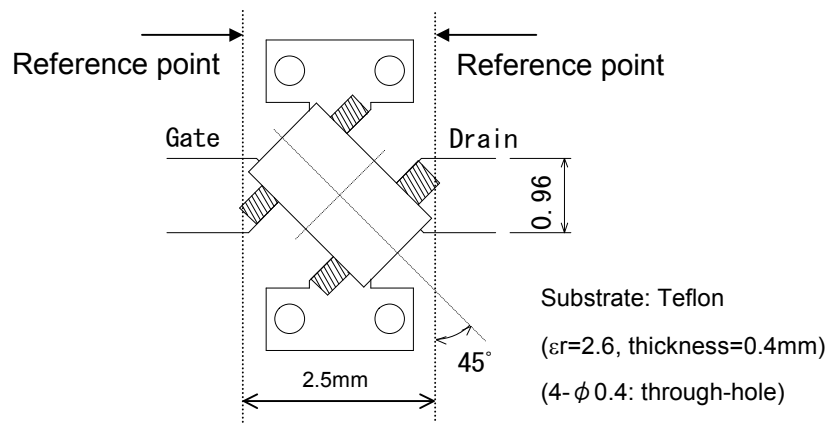


S Parameters (Conditions: $V_{DS}=2V, I_D=7.5mA, T_a=25^\circ C$)

Freq. (GHz)	S11		S21		S12		S22	
	(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 ($V_{DS}=2V, I_D=7.5mA, T_a=25^\circ C$)

f (GHz)	Γ_{opt}		Rn	NFmin
	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



Requests Regarding Safety Designs

Mitsubishi Electric constantly strives to raise the level of its quality and reliability. Despite these concerted efforts, however, there will be occasions when our semiconductor products suffer breakdowns, malfunctions or other problems. In view of this reality, it is requested that every feasible precaution be taken in the pursuit of redundancy design, malfunction prevention design and other safety-related designs, to prevent breakdowns or malfunctions in our products from resulting in accidents involving people, fires, social losses or other problems, thereby upholding the highest levels of safety in the products when in use by customers.

Matters of Importance when Using these Materials

1. These materials are designed as reference materials to ensure that all customers purchase Mitsubishi Electric semiconductors best suited to their specific use applications. Please be aware, however, that the technical information contained in these materials does not comprise consent for the execution or use of intellectual property rights or other rights owned by Mitsubishi Electric Corporation.
2. Mitsubishi Electric does not assume responsibility for damages resulting from the use of product data, graphs, charts, programs, algorithms or other applied circuit examples described in these materials, or for the infringement of the rights of third-party owners resulting from such use.
3. The data, graphs, charts, programs, algorithms and all other information described in these materials were current at the issue of these materials, with Mitsubishi Electric reserving the right to make any necessary updates or changes in the products or specifications in these materials without prior notice. Before purchasing Mitsubishi Electric semiconductor products, therefore, please obtain the latest available information from Mitsubishi Electric directly or an authorized dealer.
4. Every possible effort has been made to ensure that the information described in these materials is fully accurate. However, Mitsubishi Electric assumes no responsibility for damages resulting from inaccuracies occurring within these materials.
5. When using the product data, technical contents indicated on the graphs, charts, programs or algorithms described in these materials, assessments should not be limited to only the technical contents, programs and algorithm units. Rather, it is requested that ample evaluations be made of each individual system as a whole, with the customer assuming full responsibility for decisions on the propriety of application. Mitsubishi Electric does not accept responsibility for the propriety of application.
6. The products described in these materials, with the exception of special mention concerning use and reliability, have been designed and manufactured with the purpose of use in general electronic machinery. Accordingly these products have not been designed and manufactured with the purpose of application in machinery or systems that will be used under conditions that can affect human life, or in machinery or systems used in social infrastructure that demand a particularly high degree of reliability. When considering the use of the products described in these materials in transportation machinery (automobiles, trains, vessels), for objectives related to medical treatment, aerospace, nuclear power control, submarine repeaters or systems or other specialized applications, please consult with Mitsubishi Electric directly or an authorized dealer.
7. When considering use of products for purposes other than the specific applications described in these materials, please inquire at Mitsubishi Electric or an authorized dealer.
8. The prior consent of Mitsubishi Electric in writing is required for any reprinting or reproduction of these materials.
9. Please direct any inquiries regarding further details of these materials, or any other comments or matters of attention, to Mitsubishi Electric or an authorized dealer.