MITSUBISHI ELECTRIC

< Low Noise GaAs HEMT >

MGF4936AM

4pin flat lead package

DESCRIPTION

The MGF4936AM super-low noise InGaAs 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.

Outline Drawing

Fig.1

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FEATURES

Low noise figure @ f=12GHz
NFmin. = 0.50dB (Typ.)
High associated gain @ f=12GHz
Gs = 12.0dB (Typ.)

APPLICATION

S to Ku band low noise amplifiers

QUALITY GRADE

GG

RECOMMENDED BIAS CONDITIONS

V_{DS}=2V , I_D=7mA

ORDERING INFORMATION

General part number: **MGF4936AM-75**

Tape & reel 15000pcs/reel

RoHS COMPLIANT

MGF4936AM is a RoHS compliant product. RoHS compliance is indicated by the letter “G” after the Lot Marking.

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

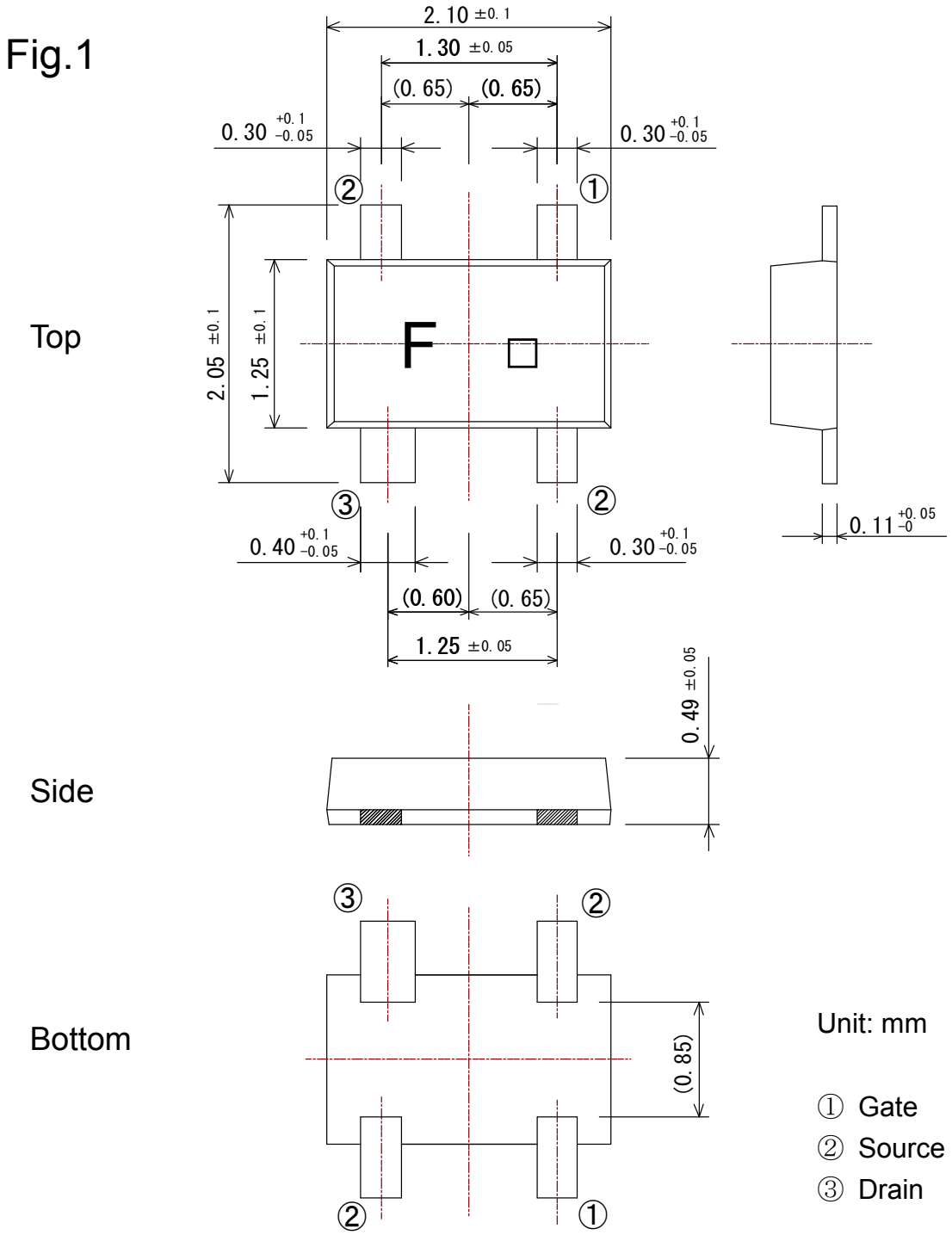
Symbol	Parameter	Ratings	Unit
V_{GDO}	Gate to drain voltage	-3	V
V_{GSO}	Gate to source voltage	-3	V
I_D	Drain current	IDSS	mA
PT	Total power dissipation	50	mW
T_{ch}	Channel temperature	125	°C
T_{stg}	Storage temperature	-55 to +125	°C

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	-3.5	--	--	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	12	--	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,	11.0	12.0	--	dB
NFmin.	Minimum noise figure	I_D=7mA,f=12GHz	--	0.50	0.70	dB

Note: Gs and NFmin. are tested with sampling inspection.

Fig.1



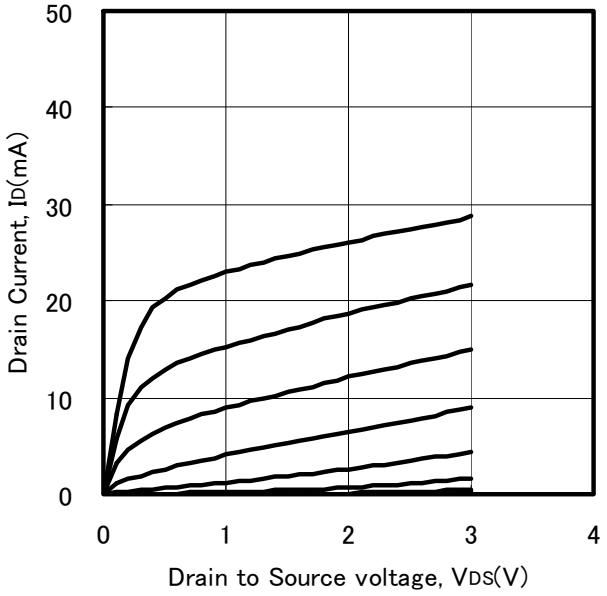
Unit: mm

① Gate
② Source
③ Drain

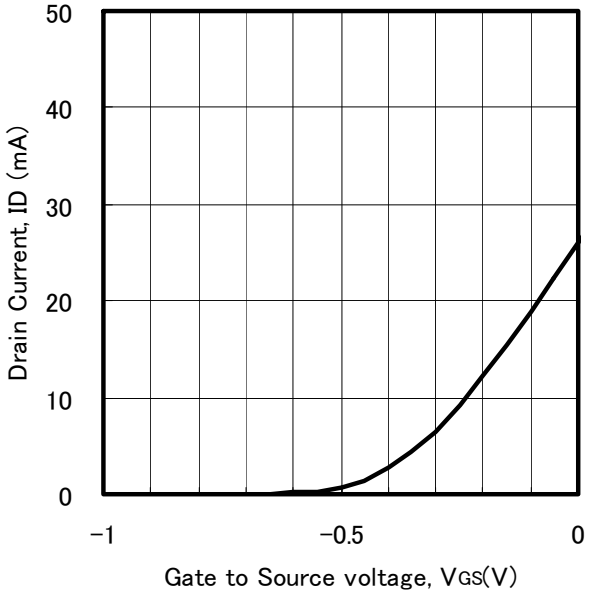
(GD-30)

TYPICAL CHARACTERISTICS (Ta=25°C)

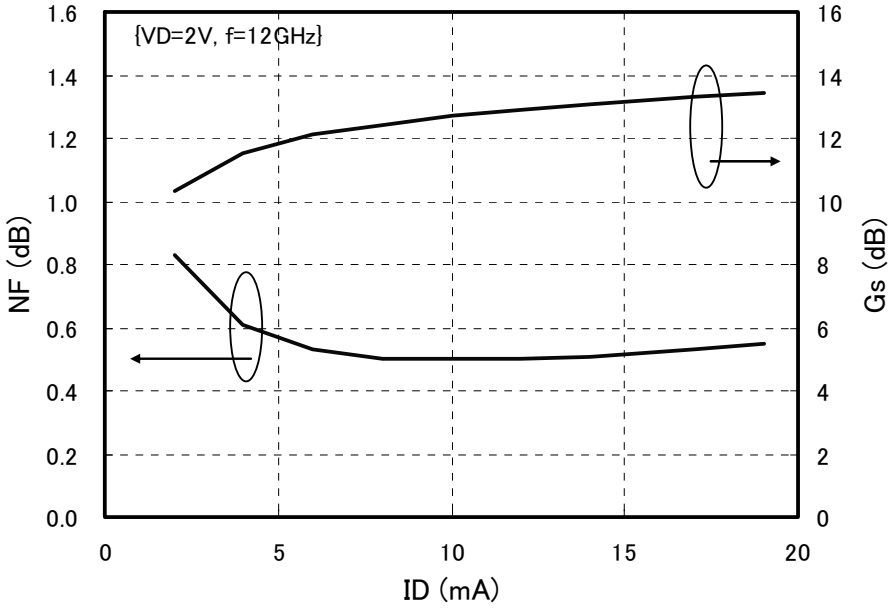
ID vs. VDS



ID vs. VGS



NF & Gs vs. ID



S PARAMETERS

(VDS=2V, ID=7mA, Ta=25deg.C)

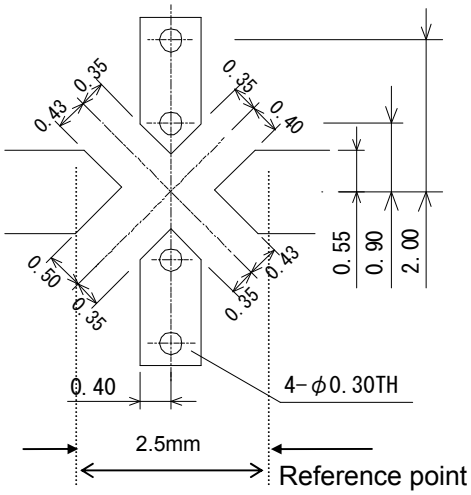
Freq.	S11		S21		S12		S22	
(GHz)	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)
1	0.998	-12.7	3.891	165.0	0.014	80.2	0.693	-10.5
2	0.978	-25.7	3.886	150.2	0.028	70.3	0.680	-21.1
3	0.950	-38.8	3.881	135.7	0.042	60.9	0.659	-31.7
4	0.908	-52.5	3.874	120.9	0.054	51.2	0.631	-42.5
5	0.856	-66.6	3.859	105.9	0.065	41.7	0.594	-53.5
6	0.794	-81.4	3.828	90.8	0.075	32.1	0.551	-64.6
7	0.730	-97.6	3.797	75.4	0.084	22.9	0.505	-76.7
8	0.654	-115.3	3.707	59.8	0.090	12.8	0.444	-89.5
9	0.579	-133.6	3.578	44.6	0.093	3.7	0.384	-101.9
10	0.513	-154.1	3.435	29.7	0.094	-5.1	0.322	-116.0
11	0.479	-174.3	3.313	15.5	0.095	-11.6	0.275	-131.1
12	0.449	163.9	3.154	1.7	0.092	-19.3	0.221	-147.1
13	0.462	142.5	3.038	-12.5	0.094	-24.7	0.195	-169.8
14	0.491	125.9	2.998	-26.3	0.092	-25.6	0.198	171.0
15	0.543	108.2	2.914	-41.3	0.095	-28.3	0.219	148.4
16	0.597	90.4	2.730	-57.1	0.105	-35.7	0.263	122.3
17	0.643	76.3	2.556	-73.0	0.110	-44.3	0.319	100.9
18	0.680	63.2	2.303	-87.8	0.115	-52.9	0.369	82.0
19	0.723	52.2	2.054	-100.4	0.115	-61.3	0.418	67.1
20	0.758	41.8	1.883	-112.9	0.118	-70.6	0.466	54.0

NOISE PARAMETERS

Freq.	NFmin	Γopt		rn
(GHz)	(dB)	(mag)	(ang)	
6	0.20	0.75	47.6	0.23
7	0.25	0.68	62.4	0.19
8	0.29	0.61	78.8	0.15
9	0.34	0.54	96.9	0.12
10	0.38	0.48	116.4	0.08
11	0.43	0.42	137.2	0.05
12	0.47	0.38	159.4	0.04
13	0.52	0.35	-177.7	0.04
14	0.56	0.35	-153.9	0.06
15	0.61	0.36	-129.7	0.07
16	0.65	0.39	-105.2	0.12
17	0.70	0.45	-80.4	0.16
18	0.74	0.53	-55.3	0.23

Note: rn is normarised by 50 ohm.

[Foot pattern for measurement]



Board: εr=3.38

Thickness: 0.5mm

S PARAMETERS

(VDS=2V, ID=10mA, Ta=25deg.C)

Freq.	S11		S21		S12		S22	
(GHz)	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)
1	0.996	-13.4	4.971	164.1	0.013	80.2	0.638	-10.3
2	0.970	-27.0	4.929	148.5	0.026	71.3	0.623	-20.7
3	0.932	-40.5	4.872	133.1	0.038	62.1	0.601	-31.0
4	0.880	-54.6	4.799	117.8	0.050	53.1	0.571	-41.3
5	0.817	-68.8	4.702	102.5	0.060	44.3	0.534	-51.7
6	0.746	-83.6	4.585	87.3	0.069	36.0	0.492	-62.0
7	0.675	-99.8	4.471	72.0	0.078	27.6	0.446	-73.4
8	0.595	-117.2	4.295	56.8	0.085	18.5	0.388	-85.1
9	0.519	-135.5	4.089	42.2	0.089	10.2	0.333	-96.2
10	0.454	-155.9	3.890	27.9	0.092	2.0	0.272	-109.2
11	0.422	-176.2	3.724	14.5	0.096	-4.6	0.226	-123.1
12	0.395	161.6	3.532	1.3	0.095	-12.2	0.174	-137.9
13	0.413	140.3	3.399	-12.1	0.099	-18.7	0.143	-162.2
14	0.447	124.3	3.360	-25.2	0.101	-21.2	0.143	176.8
15	0.501	107.1	3.287	-39.6	0.104	-25.4	0.162	151.6
16	0.562	89.5	3.098	-55.0	0.113	-33.7	0.206	121.7
17	0.613	75.5	2.925	-70.5	0.118	-42.6	0.264	99.6
18	0.654	62.5	2.656	-85.3	0.123	-51.8	0.317	79.8
19	0.701	51.6	2.375	-97.9	0.123	-60.1	0.369	65.2
20	0.736	41.3	2.194	-110.2	0.124	-70.2	0.419	52.1

NOISE PARAMETERS

Freq.	NFmin	Γopt		rn
(GHz)	(dB)	(mag)	(ang)	
6	0.19	0.70	47.3	0.21
7	0.23	0.63	62.4	0.18
8	0.28	0.56	79.1	0.13
9	0.32	0.49	97.6	0.10
10	0.37	0.43	117.4	0.07
11	0.41	0.38	138.7	0.06
12	0.46	0.34	161.3	0.05
13	0.51	0.32	-175.4	0.05
14	0.55	0.31	-151.3	0.06
15	0.60	0.33	-126.9	0.07
16	0.64	0.36	-102.3	0.11
17	0.69	0.42	-77.4	0.16
18	0.73	0.50	-52.3	0.22

Note: rn is normarised by 50 ohm.

Note:

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