June/2004

MITSUBISHI SEMICONDUCTOR <GaAs FET>

MGF4951A/MGF4952A

SUPER LOW NOISE InGaAs HEMT (Leadless Ceramic Package)

DESCRIPTION

The MGF4951A/MGF4952A super-low noise HEMT (High Electron Mobility Transistor) is designed for use in C to K band amplifiers.

The lead-less ceramic package assures minimum parasitic losses.

FEATURES

Low noise figure @ f=12GHz

MGF4951A : NFmin. = 0.40dB (Typ.)

MGF4952A : NFmin. = 0.60dB (Typ.)

High associated gain @ f=12GHz

Gs = 12.0dB (Typ.)

APPLICATION

C to K band low noise amplifiers

QUALITY GRADE

GG

RECOMMENDED BIAS CONDITIONS

V_{DS}=2V , I_D=10mA

ORDERING INFORMATION

Tape & reel 3000pcs./reel

Outline Drawing

Fig.1

MITSUBISHI Proprietary

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ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

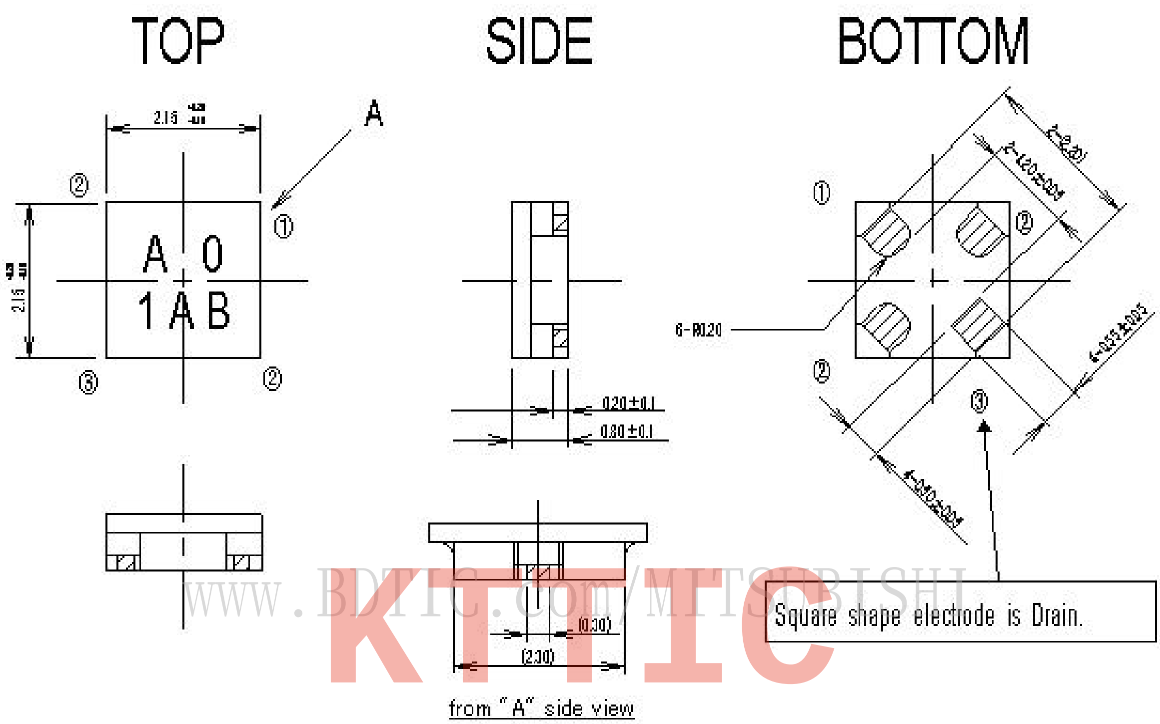
Symbol	Parameter	Ratings	Unit
V_{GDO}	Gate to drain voltage	-4	V
V_{GSO}	Gate to source voltage	-4	V
I_D	Drain current	60	mA
PT	Total power dissipation	50	mW
T_{ch}	Channel temperature	125	°C
T_{stg}	Storage temperature	-65 to +125	°C

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		15	--	60	mA
$V_{GS(off)}$	Gate to source cut-off voltage	V_{DS}=2V,I_D=500μA		-0.1	--	-1.5	V
gm	Transconductance	V_{DS}=2V,I_D=10mA		--	70	--	mS
Gs	Associated gain	V_{DS}=2V,		11.0	12.0	--	dB
NFmin.	Minimum noise figure	I_D=10mA	MGF4951A	--	0.40	0.50	dB
		f=12GHz	MGF4952A	--	0.60	0.80	dB

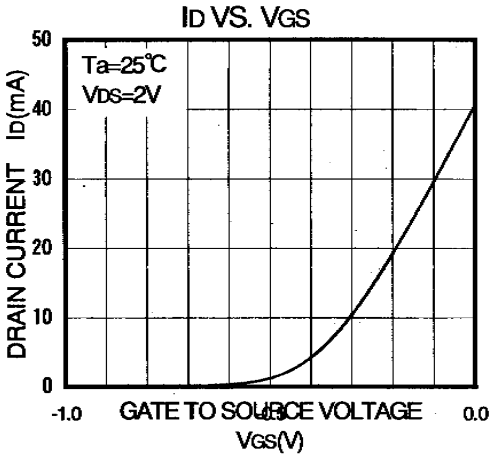
Fig.1

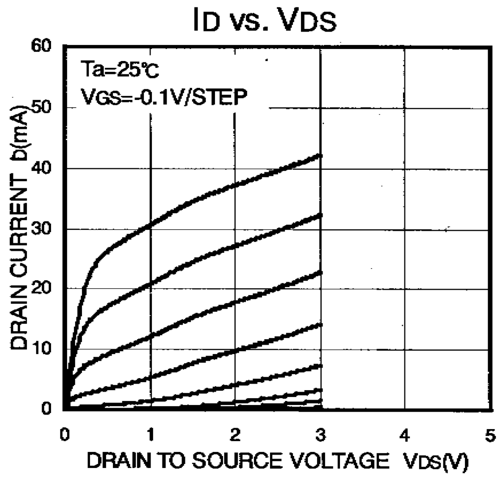
Unit : mm

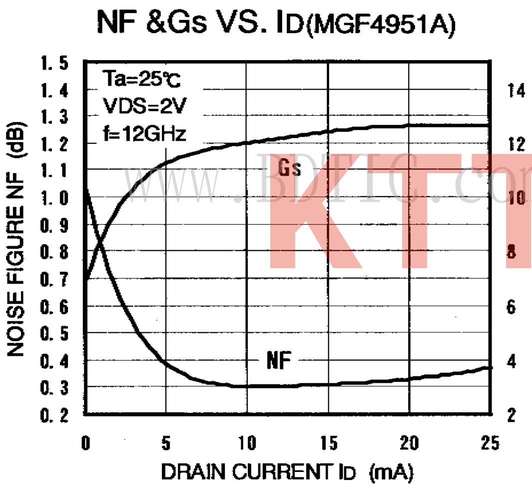


① Gate
② Source
③ Drain

TYPICAL CHARACTERISTICS (Ta=25°C)







S PARAMETERS

(Ta=25°C,VDS=2V,ID=10mA)

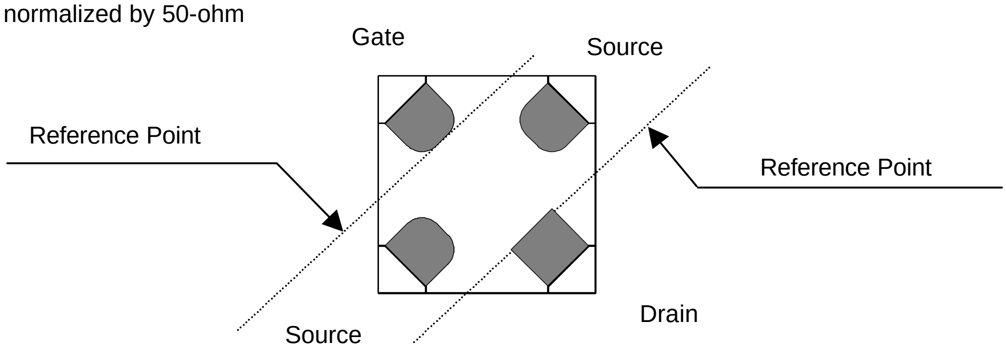
f	S11		S21		S12		S22	
(GHz)	Magn.	Angle	Magn.	Angle	Magn.	Angle	Magn.	Angle
1.0	0.978	-14.5	4.800	163.6	0.019	78.3	0.525	-13.5
2.0	0.930	-26.3	4.857	152.8	0.037	72.5	0.513	-22.5
3.0	0.884	-43.8	4.702	133.4	0.053	59.5	0.491	-37.6
4.0	0.818	-59.6	4.514	119.5	0.066	51.1	0.458	-47.5
5.0	0.768	-71.1	4.224	108.2	0.076	44.7	0.449	-54.6
6.0	0.722	-80.2	4.008	98.9	0.084	40.1	0.444	-58.7
7.0	0.681	-88.9	3.841	89.8	0.092	36.6	0.439	-61.2
8.0	0.652	-100.4	3.681	45.6	0.099	27.8	0.440	-68.2
9.0	0.627	-17.3	3.540	66.6	0.108	24.0	0.444	-70.2
10.0	0.593	-114.4	3.476	57.5	0.117	21.3	0.442	-72.3
11.0	0.542	-123.2	3.474	47.7	0.130	15.6	0.418	-76.0
12.0	0.475	-133.8	3.487	37.0	0.142	9.6	0.380	-78.3
13.0	0.406	-148.6	3.458	25.5	0.153	2.4	0.326	-82.4
14.0	0.333	-178.7	3.415	7.5	0.162	-11.0	0.234	-90.5
15.0	0.298	147.3	3.309	-5.6	0.172	-20.2	0.132	-83.7
16.0	0.338	110.1	3.150	-20.1	0.175	-30.0	0.068	-20.3
17.0	0.443	81.5	2.965	-34.2	0.176	-39.6	0.169	25.0
18.0	0.564	60.0	2.670	-48.8	0.171	-50.4	0.301	26.1
19.0	0.675	44.4	2.323	-62.6	0.159	-60.0	0.431	21.3
20.0	0.763	32.1	2.030	-74.2	0.146	-69.4	0.537	15.7
21.0	0.846	18.5	1.714	-90.8	0.133	-80.3	0.612	4.5
22.0	0.892	8.8	1.457	-101.1	0.119	-86.8	0.684	1.2
23.0	0.912	1.4	1.233	-109.9	0.104	-92.2	0.749	-2.5
24.0	0.927	-4.8	1.026	-118.4	0.093	-95.3	0.796	-5.5
25.0	0.932	-9.4	0.864	-124.7	0.080	-98.0	0.843	-7.1
26.0	0.933	-14.0	0.732	-130.2	0.069	-100.6	0.881	-8.6

NOISE PARAMETERS

(Ta=25°C,VDS=2V,ID=10mA)

f	Ganma-opt		Rn	NF
(GHz)	Magn.	Angle	(ohm)	(dB)
4.0	0.64	49.7	0.21	0.21
8.0	0.61	100.5	0.12	0.31
12.0	0.55	143.4	0.04	0.45
14.0	0.51	158.9	0.03	0.52
18.0	0.41	172.5	0.06	0.66

Note) Rn is normalized by 50-ohm



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