MITSUBISHI SEMICONDUCTOR <GaAs FET>

MGF4953A/MGF4954A

SUPER LOW NOISE InGaAs HEMT (Leadless Ceramic Package)

DESCRIPTION

The MGF4953A/MGF4954A 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

MGF4953A : NFmin. = 0.40dB (Typ.)

MGF4954A : NFmin. = 0.60dB (Typ.)

High associated gain @ f=12GHz

Gs = 13.5dB (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

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)

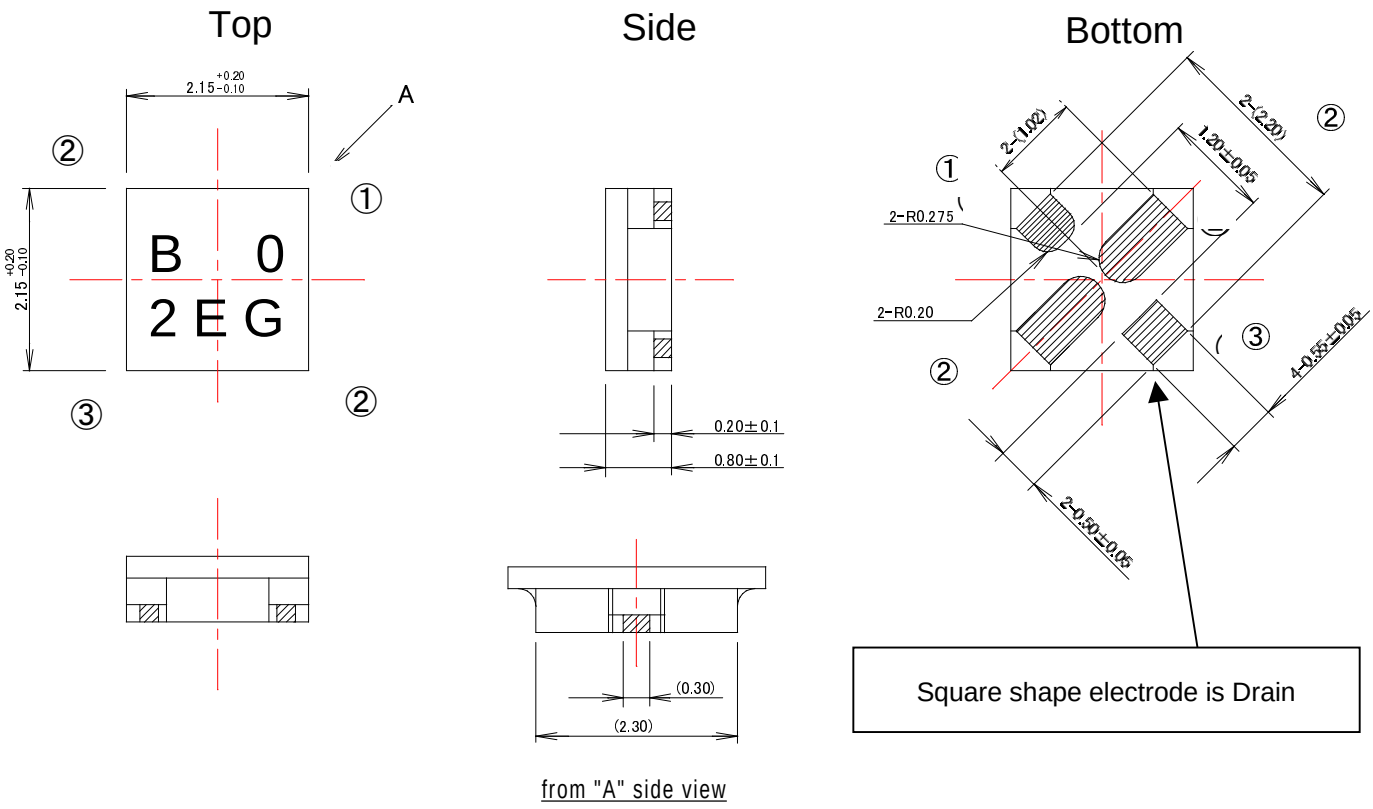
Symbol	Parameter	Ratings	Unit
V_{GDO}	Gate to drain voltage	-4	V
V_{GSO}	Gate to source voltage	-4	V
I_D	Drain current	60	mA
PT	Total power dissipation	50	mW
T_{ch}	Channel temperature	125	°C
T_{stg}	Storage temperature	-65 to +125	°C

ELECTRICAL CHARACTERISTICS (Ta=25°C)

Synbol	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,		12.0	13.5	--	dB
NFmin.	Minimum noise figure	I_D=10mA	MGF4953A	--	0.40	0.50	dB
		f=12GHz	MGF4954A	--	0.60	0.80	dB

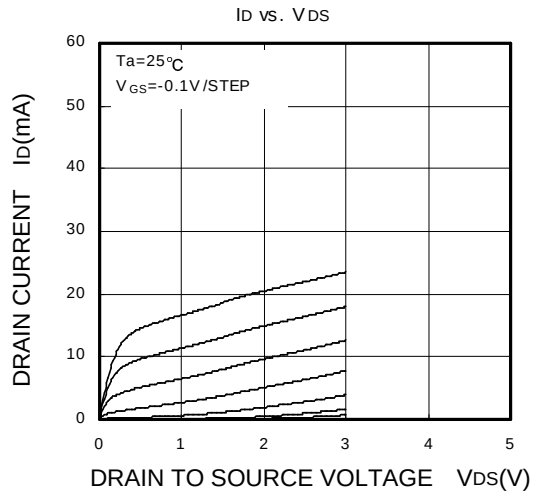
Fig.1

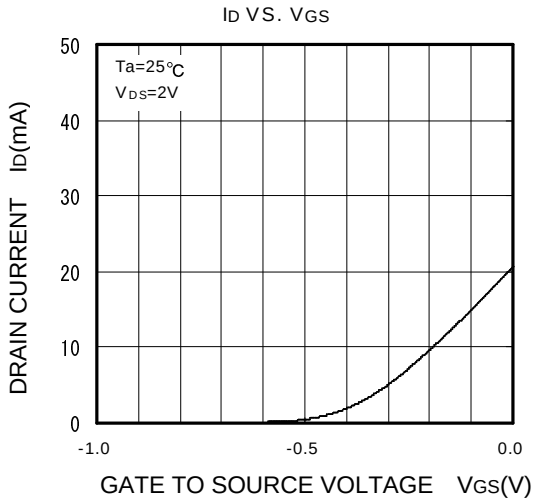
Unit : mm

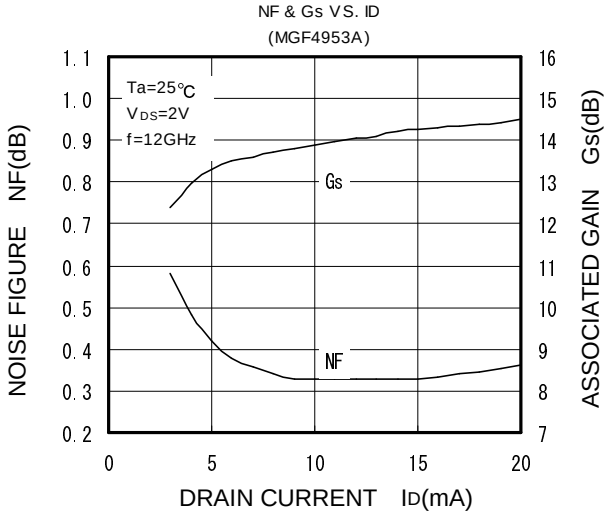


① Gate
② Source
③ Drain

TYPICAL CHARACTERISTICS (Ta=25°C)







S PARAMETERS

(Ta=25°C,VDS=2V,ID=10mA)

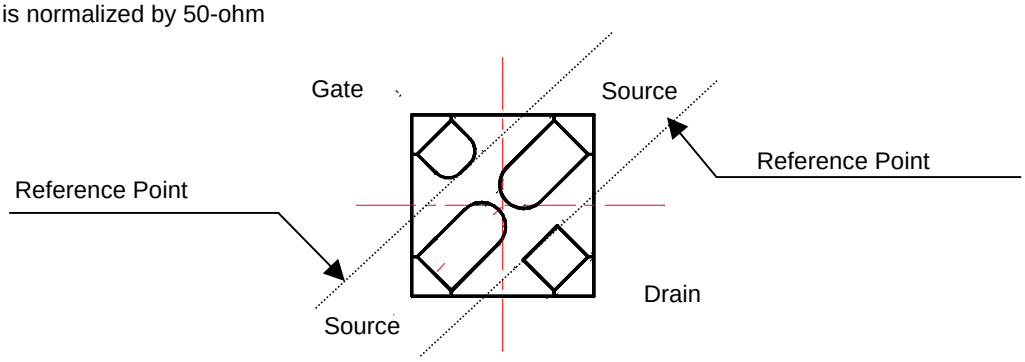
Freq	S11		S21		S12		S22	
(GHz)	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)
1	0.911	-12.7	4.924	168.1	0.008	70.3	0.709	-10.7
2	0.894	-29.2	4.806	155.3	0.031	68.8	0.691	-22.7
3	0.875	-40.7	4.796	142.7	0.043	62.2	0.682	-30.1
4	0.858	-53.9	4.672	131.6	0.061	49.4	0.652	-41.7
5	0.830	-66.5	4.524	121.2	0.066	42.9	0.639	-49.6
6	0.797	-77.7	4.308	109.5	0.073	33.5	0.631	-58.5
7	0.770	-87.0	4.114	101.1	0.080	26.2	0.628	-64.4
8	0.751	-94.2	3.984	90.8	0.089	22.1	0.625	-71.0
9	0.727	-103.0	3.886	81.4	0.090	17.4	0.624	-76.1
10	0.713	-110.8	3.881	75.0	0.101	9.2	0.628	-80.4
11	0.686	-119.9	3.886	66.0	0.110	2.2	0.612	-87.5
12	0.636	-132.8	3.937	54.7	0.120	-4.6	0.581	-94.3
13	0.590	-146.6	4.078	45.0	0.127	-13.0	0.540	-101.0
14	0.538	-165.8	4.163	31.5	0.136	-25.2	0.485	-112.5
15	0.507	170.2	4.239	18.9	0.144	-35.8	0.396	-122.4
16	0.506	140.8	4.238	4.5	0.151	-48.2	0.283	-137.3
17	0.552	110.4	4.067	-10.5	0.151	-62.0	0.159	-162.3
18	0.625	86.0	3.791	-26.5	0.145	-74.0	0.076	120.8
19	0.696	65.9	3.428	-40.5	0.137	-85.8	0.164	54.1
20	0.745	50.8	3.045	-54.3	0.118	-97.6	0.271	31.6
21	0.791	38.2	2.677	-66.5	0.109	-106.8	0.375	20.9
22	0.794	28.2	2.281	-76.2	0.102	-114.0	0.455	14.3
23	0.776	18.4	1.984	-84.5	0.091	-118.9	0.539	8.5
24	0.802	11.0	1.828	-93.8	0.078	-127.7	0.607	5.7
25	0.796	2.9	1.626	-102.1	0.071	-130.2	0.675	2.1
26	0.799	-8.5	1.424	-114.5	0.064	-138.3	0.730	0.9

NOISE PARAMETERS

(Ta=25°C,VDS=2V,ID=10mA)

f	Gamma-opt		Rn	NFmin.	Gs
(GHz)	Magn.	Angle	(ohm)	(dB)	(dB)
4	0.64	52.7	0.27	0.22	18.3
8	0.61	103.5	0.15	0.28	15.9
12	0.55	146.4	0.06	0.35	13.5
14	0.51	161.9	0.04	0.39	12.5
18	0.41	175.3	0.03	0.48	11.0
20	0.35	-177.3	0.05	0.55	10.5

Note) Rn is normalized by 50-ohm



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