

< Low Noise GaAs HEMT >

# MGF4953A

Leadless ceramic package

## DESCRIPTION

The MGF4953A super-low noise InGaAs 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

NFmin. = 0.35dB (Typ.)

High associated gain @ f=12GHz

Gs = 13.5dB (Typ.)

## APPLICATION

C to K band low noise amplifiers

## QUALITY GRADE

GG

## RECOMMENDED BIAS CONDITIONS

VDS=2V, ID=10mA

## ORDERING INFORMATION

Tape & reel 10,000pcs/reel

## RoHS COMPLIANT

MGF4953A 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
VGDO	Gate to drain voltage	-3	V
VGSO	Gate to source voltage	-3	V
ID	Drain current	60	mA
PT	Total power dissipation	50	mW
Tch	Channel temperature	125	°C
Tstg	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	IG=-10μA	-3	--	--	V
IGSS	Gate to source leakage current	VGS=-2V, VDS=0V	--	--	50	μA
IDSS	Saturated drain current	VGS=0V, VDS=2V	15	--	60	mA
VGS(off)	Gate to source cut-off voltage	VDS=2V, ID=500μA	-0.1	--	-1.5	V
Gs	Associated gain	VDS=2V,	12.0	13.5	--	dB
NFmin.	Minimum noise figure	ID=7.5mA, f=12GHz	--	0.35	0.50	dB

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

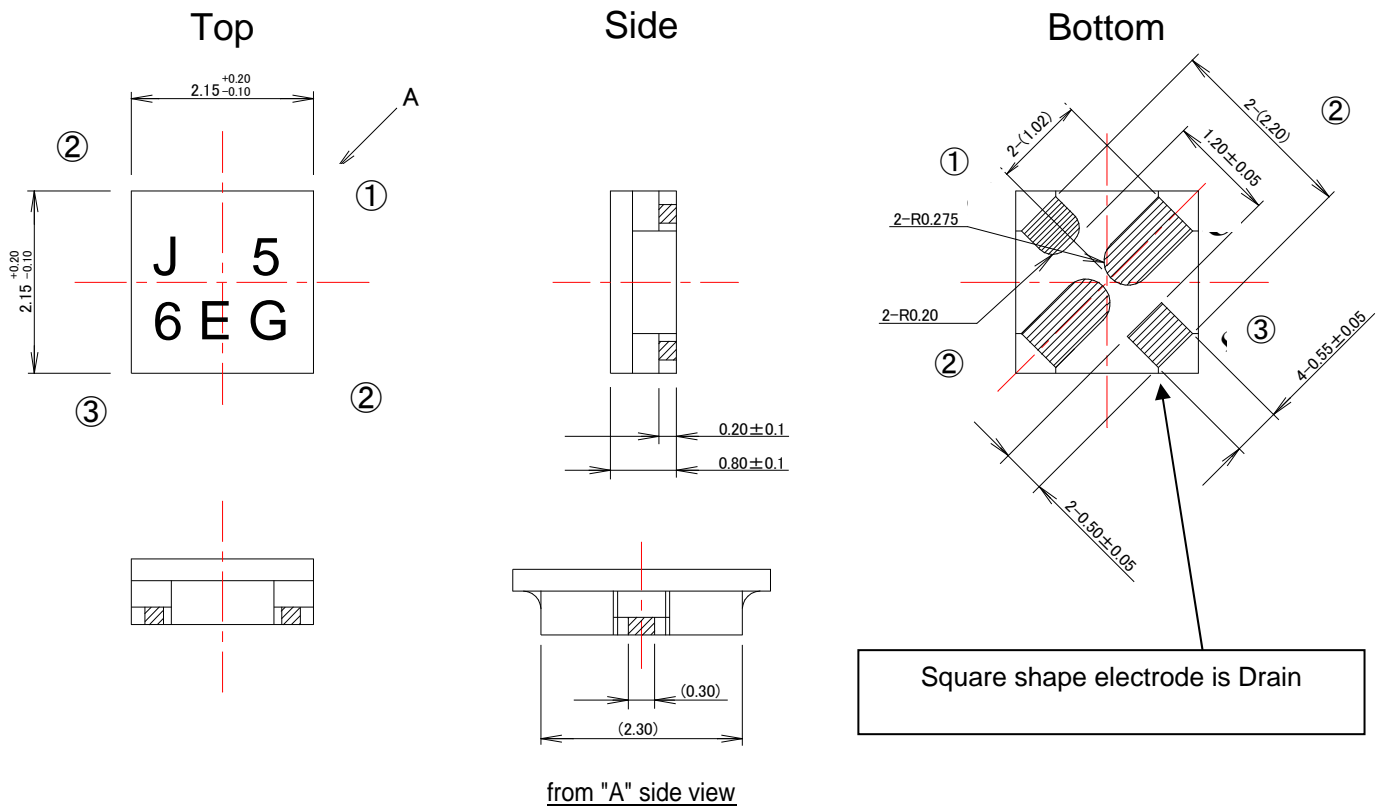
Outline Drawing

Fig.1

**MITSUBISHI Proprietary**

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Fig.1

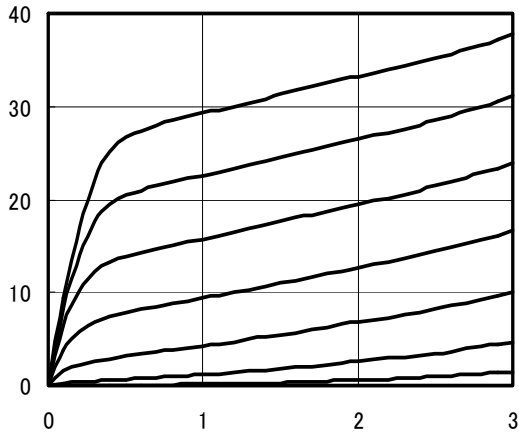


Unit: mm

- ① Gate
- ② Source
- ③ Drain

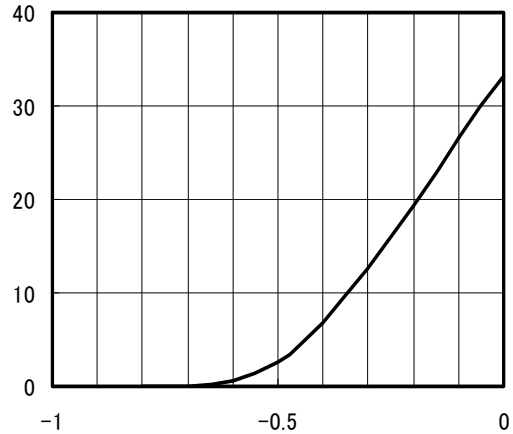
TYPICAL CHARACTERISTICS (Ta=25°C)

**ID vs. VDS**  
 (VGS=-0.1V/STEP)



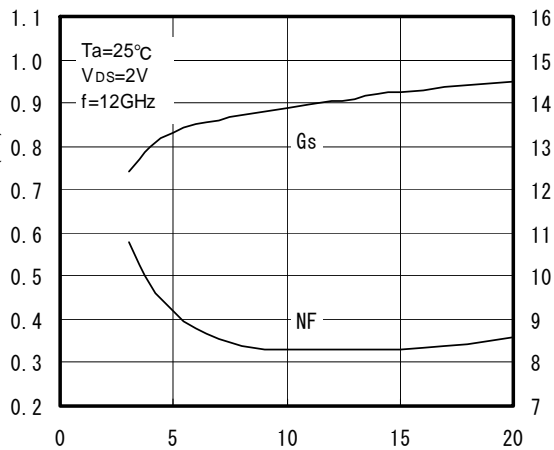
DRAIN TO SOURCE VOLTAGE VDS (V)

**ID vs. VGS**  
 (VDS=2V)



GATE TO SOURCE VOLTAGE VGS (V)

**NF & Gs vs. ID**  
 (f=12GHz, VDS=2V)



DRAIN CURRENT ID (mA)

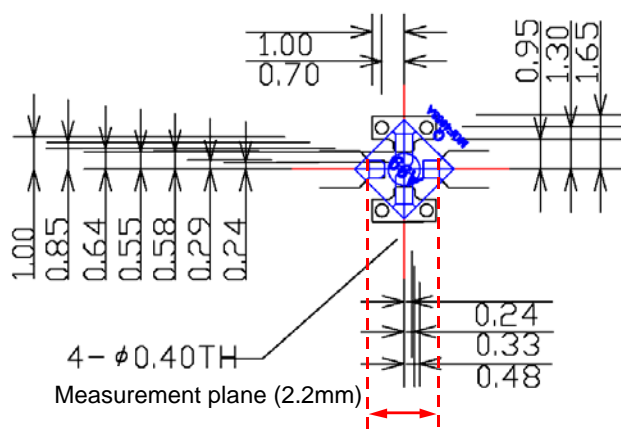
S PARAMETERS

(VDS=2V, ID=10mA, Ta=25°C)

Freq. (GHz)	S11		S21		S12		S22	
	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)
1	0.989	-4.0	5.212	166.6	0.038	82.4	0.689	-10.7
2	0.968	-20.4	5.101	152.0	0.046	72.4	0.669	-21.1
3	0.942	-36.8	4.989	137.3	0.054	62.4	0.640	-31.5
4	0.927	-53.2	4.877	122.7	0.062	52.4	0.604	-41.9
5	0.857	-69.5	4.766	108.0	0.070	42.4	0.554	-52.4
6	0.787	-85.8	4.655	93.4	0.078	32.4	0.505	-62.7
7	0.716	-101.5	4.524	79.3	0.085	23.5	0.454	-72.7
8	0.654	-119.2	4.378	64.9	0.093	13.5	0.399	-84.1
9	0.582	-135.3	4.162	52.0	0.095	4.9	0.341	-93.6
10	0.525	-152.8	4.008	39.5	0.095	-2.5	0.288	-102.8
11	0.494	-170.2	3.887	27.3	0.096	-8.4	0.250	-113.0
12	0.474	171.2	3.761	15.2	0.096	-14.2	0.212	-124.7
13	0.471	152.0	3.656	2.9	0.097	-20.6	0.180	-140.4
14	0.484	134.6	3.593	-9.4	0.096	-26.0	0.159	-156.4
15	0.501	118.4	3.522	-21.9	0.095	-33.2	0.155	-175.5
16	0.544	101.2	3.335	-36.1	0.098	-37.5	0.163	153.3
17	0.579	86.8	3.209	-49.3	0.099	-42.9	0.182	132.4
18	0.612	73.6	3.038	-62.7	0.101	-49.3	0.216	110.1
19	0.646	62.0	2.814	-73.7	0.102	-56.2	0.260	90.7
20	0.688	50.3	2.726	-85.1	0.107	-63.9	0.301	76.3
21	0.733	39.4	2.613	-96.7	0.112	-75.1	0.340	59.0
22	0.765	28.6	2.499	-108.3	0.115	-86.3	0.370	48.0
23	0.798	17.7	2.384	-120.0	0.119	-97.5	0.405	37.0
24	0.831	6.9	2.269	-131.6	0.123	-108.7	0.444	30.2
25	0.831	-3.9	2.152	-143.2	0.127	-119.9	0.483	23.1
26	0.814	-14.7	2.034	-154.8	0.131	-131.1	0.522	17.1

NOISE PARAMETERS (VDS=2V, ID=10mA, Ta=25°C)

Freq. (GHz)	NFmin (dB)	$\Gamma_{opt}$		Rn ( $\Omega$ )
		(mag)	(ang)	
6	0.27	0.71	45.4	10.0
7	0.29	0.67	58.4	8.5
8	0.30	0.61	72.7	7.0
9	0.31	0.56	88.1	5.5
10	0.35	0.52	104.7	4.0
11	0.37	0.48	122.3	3.0
12	0.38	0.44	140.9	2.5
13	0.40	0.40	160.3	1.5
14	0.43	0.38	-179.4	2.0
15	0.45	0.36	-158.4	2.0
16	0.48	0.36	-136.6	3.0
17	0.50	0.36	-114.2	4.0
18	0.53	0.38	-91.2	6.0



Board; RO4003C (Rogers Corp.)  
 $\epsilon_r=3.38$ ,  $t=0.508\text{mm}$ , Au (Cu) =  $0.035\text{mm}$

Note:

We are ready to provide nonlinear model for ADS and MWO users. If you are interested, please contact our sales offices.

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