

< Low Noise GaAs HEMT >

# MGF4937AM

4pin flat lead package

## DESCRIPTION

The MGF4937AM 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.

## FEATURES

- Very Low noise figure @ f=12GHz  
NFmin. = **0.35dB** (Typ.)
- High associated gain @ f=12GHz  
Gs = 13.0dB (Typ.)

## APPLICATION

S to Ku band low noise amplifiers

## QUALITY GRADE

GG

## RECOMMENDED BIAS CONDITIONS

VDS=2V, ID=10mA

## ORDERING INFORMATION

Tape & reel 15000pcs/reel

## RoHS COMPLIANT

MGF4937AM 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	IDSS	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	-3.5	--	--	V
Igss	Gate to source leakage current	VGS=-2V, VDS=0V	--	--	50	μA
IDSS	Saturated drain current	VGS=0V, VDS=2V	12	--	60	mA
VGS(off)	Gate to source cut-off voltage	VDS=2V, ID=500μA	-0.1	--	-1.5	V
Gs	Associated gain	VDS=2V, ID=10mA, f=12GHz	11.5	13.0	--	dB
NFmin.	Minimum noise figure		--	0.35	0.50	dB

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

Outline Drawing

Fig.1

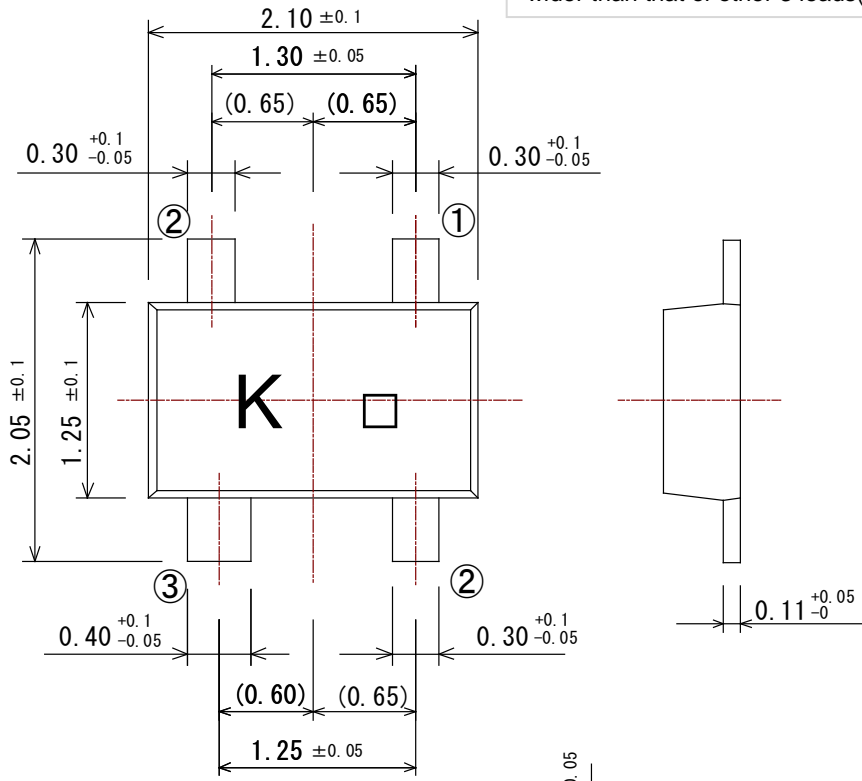
**MITSUBISHI Proprietary**

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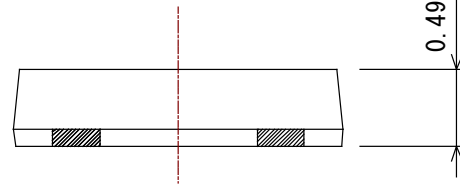
Drain lead (③) width is always at least 0.03mm wider than that of other 3 leads(① and ②)

Fig.1

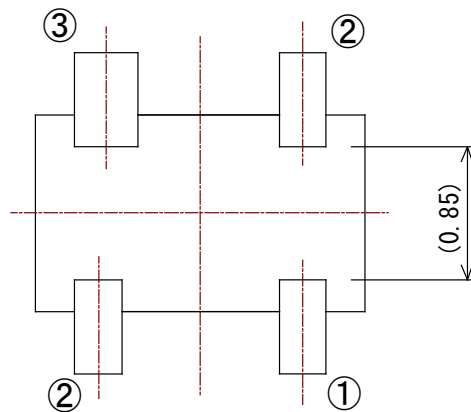
Top



Side



Bottom



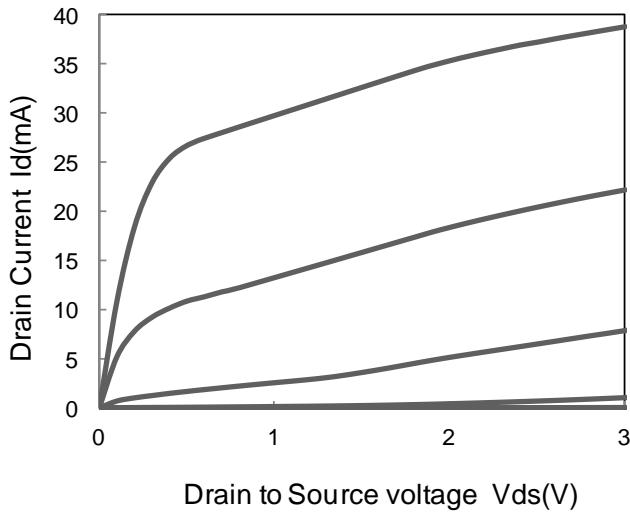
Unit: mm

- ① Gate
- ② Source
- ③ Drain

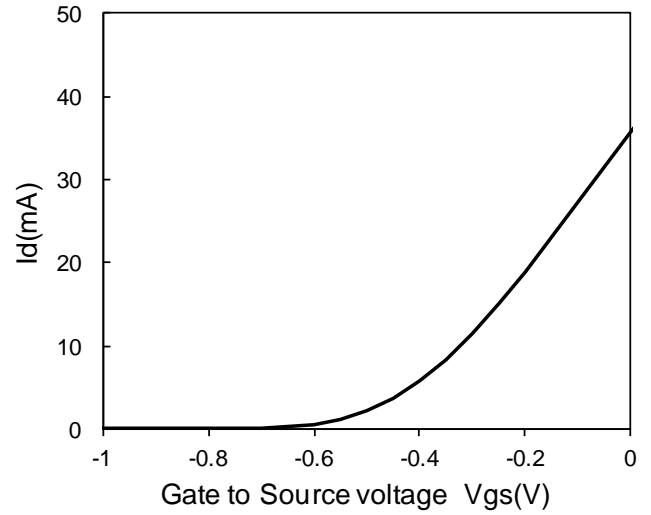
(GD-30)

TYPICAL CHARACTERISTICS (Ta=25°C)

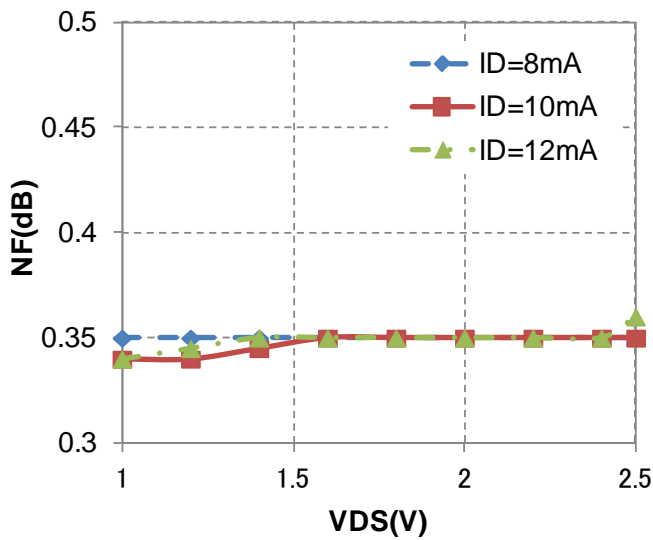
**ID vs. VDS**



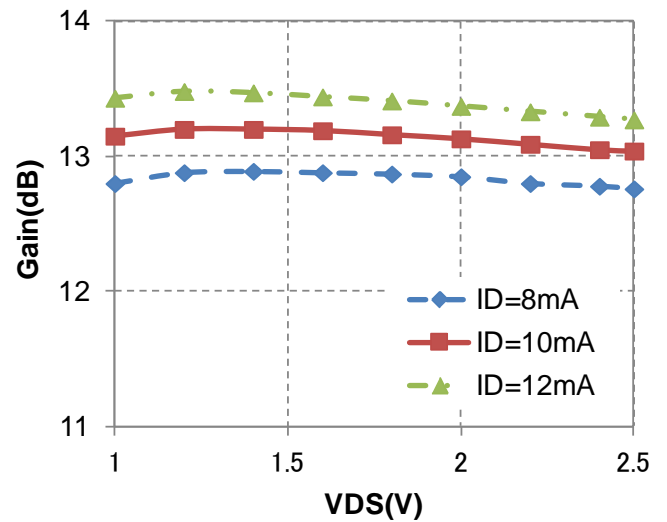
**ID vs. VGS**



**NF vs. VDS, ID**



**Gs vs. VDS, ID**



# MGF4937AM

4pin flat lead package

## S PARAMETERS

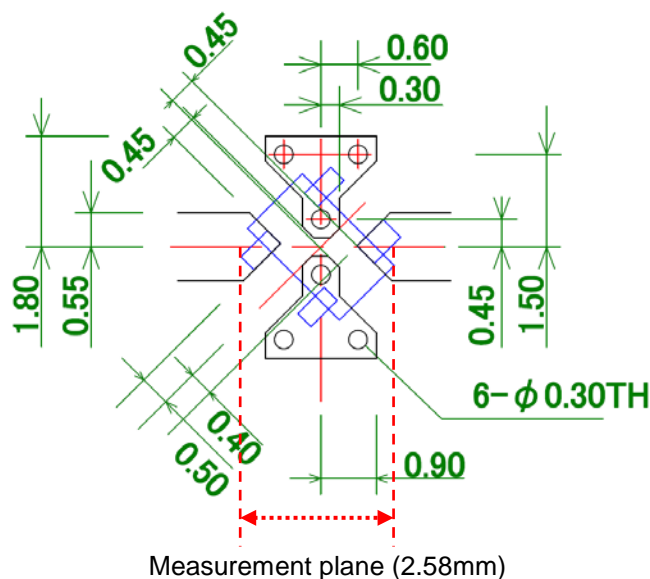
( $V_{DS}=2V$ ,  $I_D=10mA$ ,  $T_a=room\ temperature$ )

Freq. (GHz)	S11		S21		S12		S22	
	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)
6	0.798	-83.3	4.976	92.4	0.076	28.8	0.538	-71.3
7	0.717	-101.6	4.918	76.1	0.085	17.5	0.485	-85.1
8	0.641	-122.3	4.778	59.7	0.095	5.1	0.431	-101.2
9	0.555	-143.2	4.530	44.3	0.096	-6.5	0.371	-115.7
10	0.481	-166.1	4.253	29.7	0.094	-17.5	0.306	-129.0
11	0.455	171.7	4.053	16.3	0.094	-26.0	0.264	-143.5
12	0.450	148.8	3.875	2.6	0.094	-33.7	0.237	-159.6
13	0.477	124.8	3.671	-12.1	0.095	-43.5	0.212	179.8
14	0.513	104.7	3.489	-25.8	0.093	-51.3	0.195	161.5
15	0.555	86.8	3.301	-39.5	0.092	-60.9	0.189	140.2
16	0.607	70.2	3.058	-55.5	0.092	-67.6	0.224	116.4
17	0.642	56.9	2.791	-69.2	0.088	-75.3	0.234	96.2
18	0.679	45.0	2.518	-81.9	0.088	-81.5	0.260	78.1
19	0.700	34.9	2.245	-94.5	0.088	-90.0	0.297	63.3
20	0.737	26.0	2.045	-105.2	0.090	-96.1	0.329	48.6

## Noise Parameter

( $V_{DS}=2V$ ,  $I_D=10mA$ ,  $T_a=room\ temperature$ )

Freq. (GHz)	NFmin. (dB)	$\Gamma_{opt}$		Rn/50 ( $\Omega$ )
		(mag)	(ang)	
6	0.14	0.729	36.8	0.21
7	0.17	0.658	53.2	0.19
8	0.21	0.587	71.9	0.16
9	0.24	0.518	92.3	0.13
10	0.27	0.454	114.3	0.10
11	0.31	0.399	137.7	0.07
12	0.35	0.356	161.9	0.06
13	0.37	0.326	-173.4	0.05
14	0.41	0.313	-149.1	0.05
15	0.44	0.318	-125.3	0.05
16	0.47	0.343	-102.5	0.07
17	0.52	0.389	-80.8	0.09
18	0.55	0.459	-60.1	0.13
19	0.58	0.554	-40.8	0.18
20	0.62	0.679	-23.1	0.25



Board:  $\epsilon_r=3.38$   
 Thickness: 0.508mm  
 (Rogers RO4003C)  
 (4- $\phi 0.3$ : through-hole)

S PARAMETERS

( $V_{DS}=2V, I_D=10mA, T_a=room\ temperature$ )

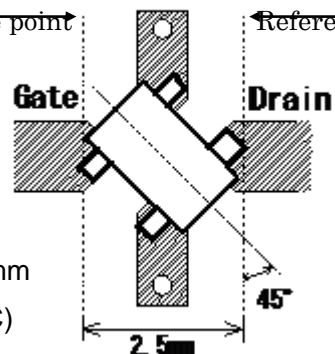
Freq. (GHz)	S11		S21		S12		S22	
	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)
6	0.764	-80.3	4.718	91.3	0.072	34.0	0.527	-65.9
7	0.677	-97.2	4.649	75.5	0.081	24.6	0.474	-77.7
8	0.588	-116.9	4.513	59.6	0.090	13.6	0.414	-91.2
9	0.501	-137.1	4.302	44.5	0.092	4.6	0.350	-103.3
10	0.420	-159.4	4.070	30.4	0.091	-3.9	0.282	-114.4
11	0.394	176.6	3.914	16.8	0.093	-10.3	0.237	-128.2
12	0.393	151.0	3.755	3.0	0.095	-16.3	0.202	-145.5
13	0.424	124.9	3.570	-11.9	0.099	-25.2	0.180	-173.8
14	0.465	105.2	3.403	-25.4	0.098	-30.9	0.171	162.3
15	0.515	88.2	3.219	-38.6	0.096	-38.9	0.170	136.0
16	0.594	72.9	3.022	-54.9	0.102	-43.9	0.231	115.6
17	0.646	59.1	2.793	-69.0	0.103	-51.6	0.278	98.6
18	0.683	47.2	2.525	-82.3	0.103	-59.4	0.331	80.5
19	0.718	37.4	2.245	-95.3	0.103	-67.1	0.377	67.6
20	0.758	28.6	2.047	-106.6	0.106	-75.1	0.417	55.1

Noise Parameter

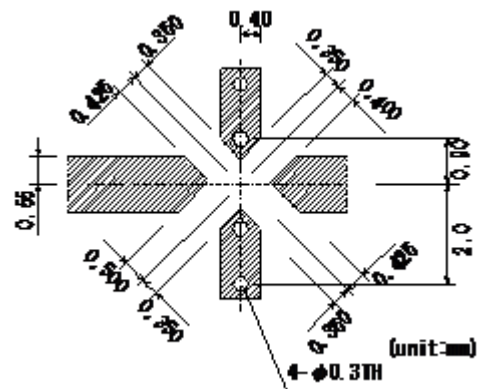
( $V_{DS}=2V, I_D=10mA, T_a=room\ temperature$ )

Freq. (GHz)	NFmin (dB)	$\Gamma_{opt}$		Rn/50 ( $\Omega$ )
		(mag)	(ang)	
6	0.19	0.651	34.2	0.23
7	0.22	0.575	52.6	0.19
8	0.25	0.500	73.4	0.15
9	0.28	0.432	96.5	0.10
10	0.31	0.371	121.2	0.08
11	0.34	0.323	147.1	0.06
12	0.37	0.290	173.5	0.05
13	0.40	0.274	-160.2	0.06
14	0.43	0.276	-134.9	0.08
15	0.46	0.300	-111.0	0.10
16	0.49	0.347	-88.7	0.13
17	0.53	0.418	-68.1	0.17
18	0.56	0.517	-49.7	0.23
19	0.59	0.647	-33.7	0.30
20	0.62	0.759	-28.9	0.41

Reference point →



Board:  $\epsilon_r=3.38$   
 Thickness: 0.508mm  
 (Rogers RO4003C)  
 (4- $\phi$ 0.3: through-hole)



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