

DESCRIPTION

The MGF4934BM super-low noise 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

Low noise figure @ f=12GHz
NFmin. = 0.50dB (Typ.)

High associated gain @ f=12GHz
Gs = 12.5dB (Typ.)

APPLICATION

S to Ku band low noise amplifiers

QUALITY GRADE

GG

RECOMMENDED BIAS CONDITIONS

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

Outline Drawing

Fig.1

MITSUBISHI Proprietary

Not to be reproduced or disclosed
without permission by Mitsubishi Electric

ORDERING INFORMATION

Tape & reel 3000pcs/reel

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)

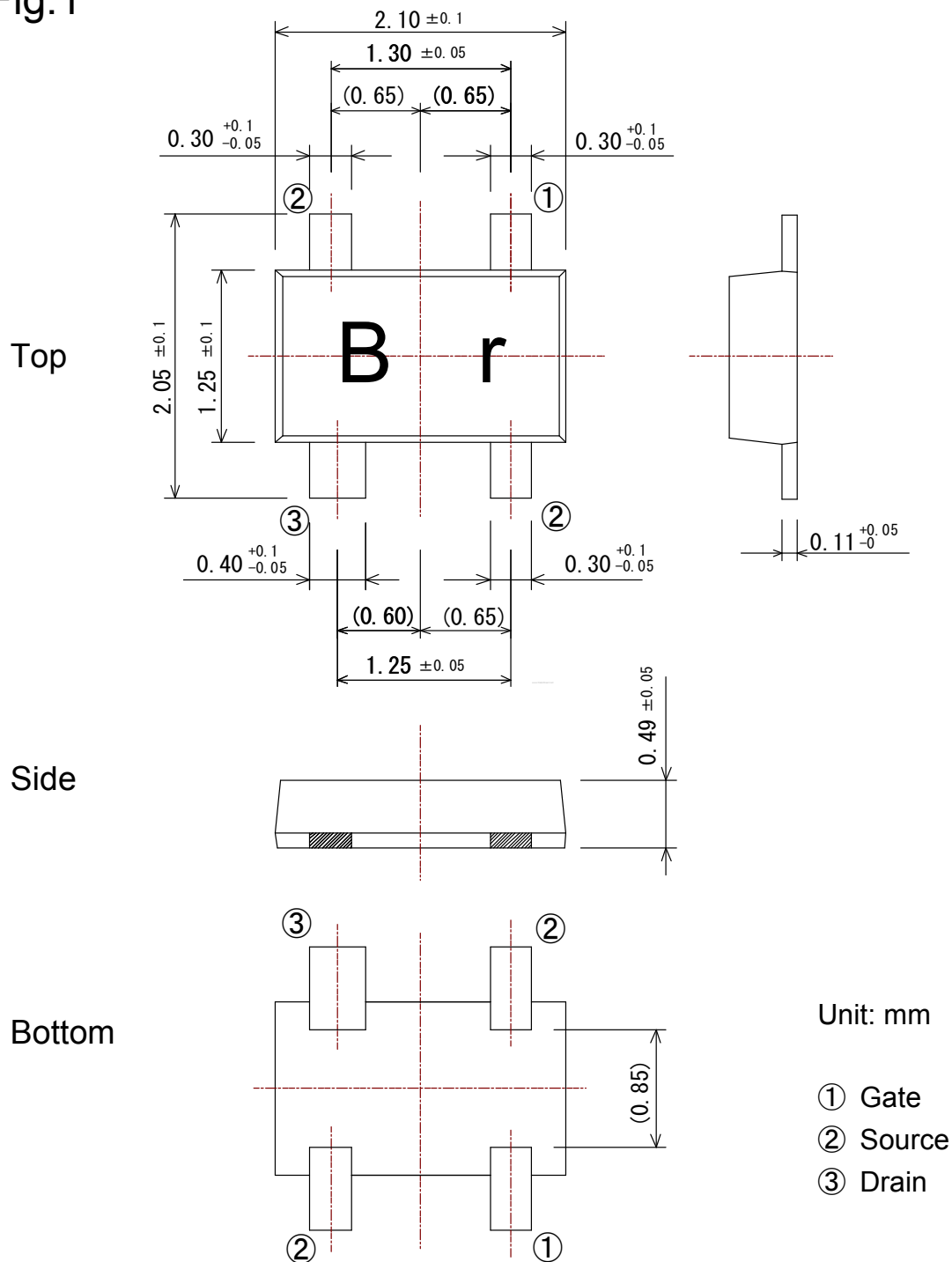
Symbol	Parameter	Ratings	Unit
V_{GDO}	Gate to drain voltage	-4	V
V_{GSO}	Gate to source voltage	-4	V
I_D	Drain current	IDSS	mA
PT	Total power dissipation	50	mW
T_{ch}	Channel temperature	125	°C
T_{stg}	Storage temperature	-55 to +125	°C

ELECTRICAL CHARACTERISTICS

(Ta=25°C)

Symbol	Parameter	Test conditions	Limits			Unit
			MIN.	TYP.	MAX	
$V_{(BR)GDO}$	Gate to drain breakdown voltage	$I_G=-10\mu A$	-3.5	--	--	V
I_{GSS}	Gate to source leakage current	$V_{GS}=-2V, V_{DS}=0V$	--	--	50	μA
IDSS	Saturated drain current	$V_{GS}=0V, V_{DS}=2V$	12	--	60	mA
$V_{GS(off)}$	Gate to source cut-off voltage	$V_{DS}=2V, I_D=500\mu A$	-0.1	--	-1.5	V
Gs	Associated gain	$V_{DS}=2V,$ $I_D=10mA, f=12GHz$	11.5	12.5	--	dB
NFmin.	Minimum noise figure		--	0.50	0.80	dB

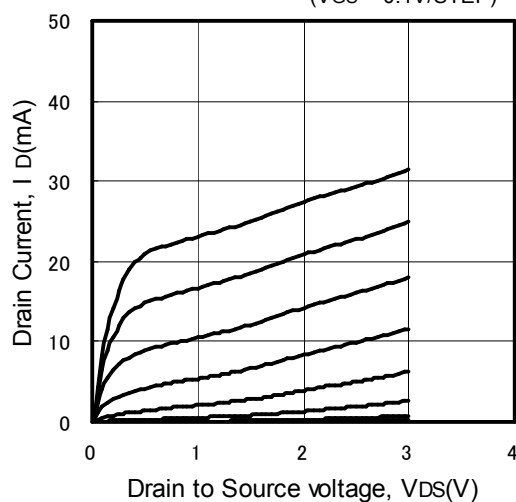
Fig.1



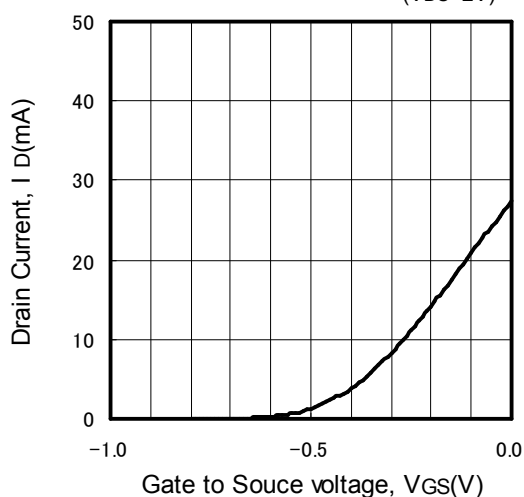
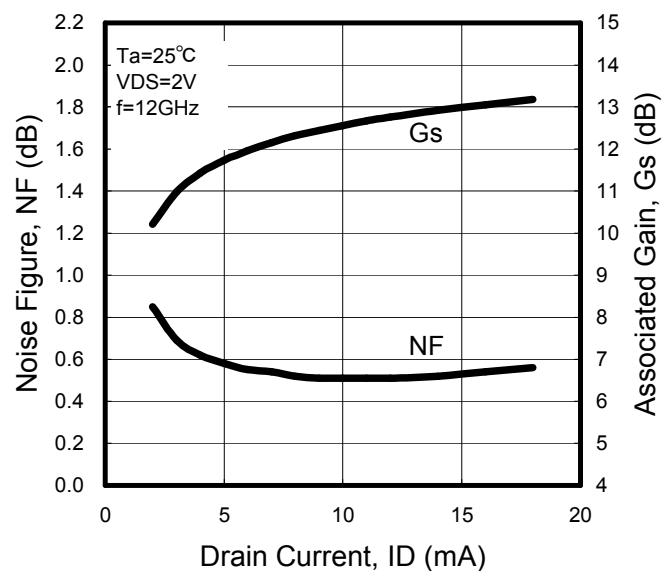
TYPICAL CHARACTERISTICS (Ta=25°C)

ID vs. VDS

(VGS≈-0.1V/STEP)

**ID vs. VGS**

(VDS=2V)

**NF & Gs vs. ID**

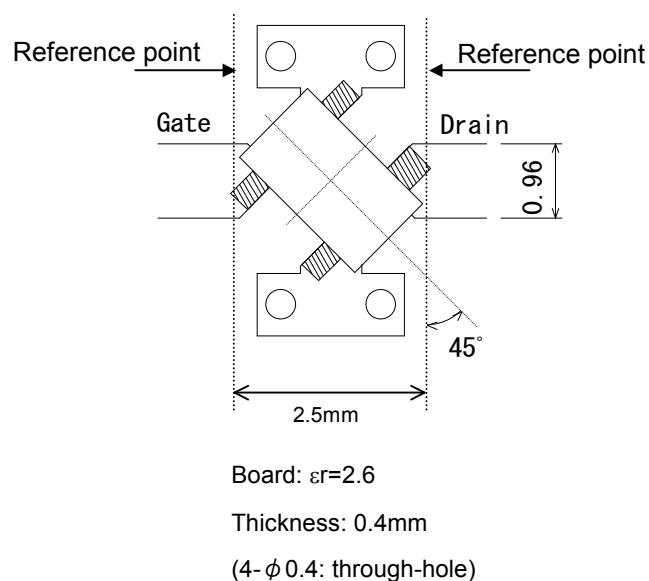
S PARAMETERS

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

Freq. (GHz)	S11		S21		S12		S22	
	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)
1	0.986	-14.0	4.534	163.6	0.014	79.1	0.676	-11.0
2	0.961	-27.8	4.478	148.2	0.027	70.5	0.663	-22.3
3	0.918	-41.9	4.394	132.8	0.038	61.9	0.638	-32.7
4	0.863	-59.4	4.523	116.2	0.052	50.3	0.580	-45.1
5	0.808	-72.1	4.309	102.2	0.060	43.3	0.559	-53.8
6	0.748	-85.2	4.148	88.6	0.067	36.9	0.530	-62.2
7	0.683	-98.1	4.015	75.1	0.073	30.5	0.496	-70.0
8	0.613	-111.9	3.860	61.9	0.078	25.3	0.454	-76.5
9	0.543	-126.8	3.744	49.0	0.082	20.9	0.411	-83.1
10	0.474	-142.9	3.644	35.8	0.087	17.1	0.364	-91.0
11	0.421	-160.9	3.552	22.8	0.092	14.0	0.321	-100.6
12	0.395	177.9	3.488	9.6	0.100	11.1	0.278	-114.7
13	0.395	154.9	3.396	-4.0	0.111	7.6	0.239	-133.9
14	0.433	132.9	3.295	-17.6	0.122	2.2	0.214	-159.5
15	0.491	114.0	3.183	-31.5	0.133	-4.2	0.219	170.8
16	0.559	97.5	3.056	-45.9	0.144	-11.1	0.256	144.4
17	0.630	83.0	2.886	-60.6	0.154	-18.6	0.315	122.4
18	0.692	70.3	2.662	-74.9	0.161	-26.6	0.379	104.1
19	0.739	60.2	2.401	-87.7	0.169	-34.2	0.440	88.4
20	0.787	52.4	2.198	-98.5	0.174	-42.1	0.484	73.6
21	0.828	45.4	2.060	-109.9	0.179	-50.4	0.527	60.5
22	0.866	39.4	1.940	-120.6	0.180	-58.5	0.575	47.9
23	0.894	33.7	1.810	-131.4	0.183	-65.4	0.632	35.7
24	0.921	26.1	1.710	-142.1	0.184	-71.5	0.695	25.4
25	0.937	16.9	1.632	-152.9	0.187	-78.0	0.770	16.7
26	0.936	5.9	1.541	-165.3	0.186	-86.0	0.846	8.8

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

Freq. (GHz)	NFmin (dB)	Γ _{opt}		R _n (Ω)
		(mag)	(ang)	
1	0.25	0.99	7.2	17.0
2	0.26	0.98	11.1	15.5
3	0.27	0.95	18.0	13.5
4	0.29	0.92	27.4	12.0
5	0.31	0.89	38.5	10.5
6	0.33	0.82	53.1	9.0
7	0.36	0.75	68.2	7.5
8	0.38	0.67	83.3	6.0
9	0.41	0.60	100.2	4.5
10	0.43	0.53	115.2	3.0
11	0.48	0.47	131.4	2.0
12	0.51	0.42	150.3	1.5
13	0.54	0.37	167.7	1.5
14	0.58	0.35	-178.8	1.5



S PARAMETERS

(VDS=0V, VGS=0V, Ta=room temperature)

Freq. (GHz)	S11		S21		S12		S22	
	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)
1	0.995	-12.5	0.008	96.4	0.008	97.7	0.673	165.1
2	0.990	-24.6	0.018	100.5	0.018	100.7	0.673	152.1
3	0.991	-37.5	0.032	99.5	0.032	98.9	0.671	138.7
4	0.983	-53.3	0.051	92.5	0.051	94.0	0.694	127.4
5	0.976	-67.1	0.074	85.0	0.075	85.5	0.697	112.5
6	0.961	-81.0	0.099	76.0	0.100	76.5	0.704	97.6
7	0.951	-95.7	0.130	65.5	0.131	65.3	0.719	83.4
8	0.940	-112.3	0.163	53.6	0.163	54.3	0.730	70.8
9	0.913	-130.9	0.196	41.0	0.198	41.3	0.745	59.2
10	0.902	-151.8	0.229	27.1	0.230	27.3	0.759	49.3
11	0.887	-175.9	0.256	12.0	0.257	12.7	0.774	41.2
12	0.883	159.0	0.274	-2.5	0.273	-2.7	0.783	34.8
13	0.884	134.4	0.276	-16.9	0.278	-17.2	0.794	29.2
14	0.889	112.1	0.268	-30.5	0.270	-30.2	0.800	24.0
15	0.896	93.6	0.257	-42.0	0.256	-42.0	0.807	18.7
16	0.907	78.5	0.241	-51.5	0.241	-51.1	0.811	13.2
17	0.911	66.4	0.228	-59.6	0.227	-59.8	0.807	7.1
18	0.919	55.9	0.221	-67.5	0.221	-67.4	0.815	0.6
19	0.924	47.1	0.217	-76.6	0.218	-76.5	0.817	-6.9
20	0.919	38.7	0.204	-87.1	0.204	-86.9	0.814	-14.8
21	0.921	31.2	0.192	-95.0	0.193	-95.3	0.810	-23.2
22	0.924	24.3	0.179	-103.1	0.179	-103.2	0.811	-31.2
23	0.928	18.1	0.168	-110.3	0.168	-110.6	0.817	-39.2
24	0.950	11.6	0.159	-116.7	0.157	-116.3	0.816	-46.5
25	0.970	5.4	0.149	-122.1	0.150	-122.1	0.830	-53.8
26	0.978	-1.5	0.141	-128.2	0.141	-128.3	0.844	-61.8

(VDS=0V, VGS=-2.5V, Ta=room temperature)

Freq. (GHz)	S11		S21		S12		S22	
	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)
1	0.993	-9.6	0.022	78.7	0.022	79.0	0.998	-10.6
2	0.996	-18.9	0.044	68.6	0.044	68.8	1.000	-21.3
3	0.992	-28.3	0.065	59.8	0.065	59.2	0.991	-31.2
4	0.987	-39.7	0.092	48.4	0.092	48.4	0.984	-42.1
5	0.981	-49.5	0.112	38.8	0.112	38.8	0.986	-51.5
6	0.975	-59.1	0.131	28.8	0.130	29.1	0.980	-60.6
7	0.968	-68.8	0.150	19.2	0.150	19.2	0.975	-70.1
8	0.963	-79.2	0.169	7.7	0.168	8.0	0.968	-80.7
9	0.949	-89.9	0.185	-4.5	0.186	-4.3	0.959	-92.1
10	0.943	-102.2	0.200	-18.4	0.200	-18.5	0.949	-105.6
11	0.932	-117.2	0.209	-34.7	0.209	-34.4	0.943	-121.1
12	0.929	-134.6	0.207	-52.4	0.207	-52.8	0.932	-139.6
13	0.932	-155.8	0.187	-73.4	0.188	-73.6	0.928	-160.7
14	0.938	-179.2	0.148	-96.3	0.149	-96.7	0.942	176.8
15	0.940	156.2	0.091	-119.2	0.091	-119.3	0.947	153.6
16	0.948	133.1	0.033	-137.6	0.034	-136.8	0.953	132.4
17	0.951	112.7	0.018	9.9	0.018	9.0	0.957	112.9
18	0.952	95.4	0.058	0.6	0.058	0.5	0.965	94.8
19	0.956	80.9	0.091	-11.2	0.090	-11.3	0.964	79.2
20	0.951	68.1	0.117	-24.5	0.118	-24.3	0.960	64.6
21	0.953	57.2	0.138	-37.5	0.137	-37.3	0.954	50.5
22	0.946	47.5	0.150	-49.7	0.150	-49.6	0.947	37.4
23	0.950	38.8	0.157	-60.4	0.157	-60.2	0.952	24.9
24	0.965	30.8	0.161	-69.7	0.161	-70.1	0.963	13.3
25	0.982	23.3	0.162	-77.8	0.162	-77.6	0.981	1.6
26	0.993	15.4	0.163	-85.8	0.163	-85.8	0.995	-10.3

Requests Regarding Safety Designs

Mitsubishi Electric constantly strives to raise the level of its quality and reliability. Despite these concerted efforts, however, there will be occasions when our semiconductor products suffer breakdowns, malfunctions or other problems. In view of this reality, it is requested that every feasible precaution be taken in the pursuit of redundancy design, malfunction prevention design and other safety-related designs, to prevent breakdowns or malfunctions in our products from resulting in accidents involving people, fires, social losses or other problems, thereby upholding the highest levels of safety in the products when in use by customers.

Matters of Importance when Using these Materials

1. These materials are designed as reference materials to ensure that all customers purchase Mitsubishi Electric semiconductors best suited to their specific use applications. Please be aware, however, that the technical information contained in these materials does not comprise consent for the execution or use of intellectual property rights or other rights owned by Mitsubishi Electric Corporation.
2. Mitsubishi Electric does not assume responsibility for damages resulting from the use of product data, graphs, charts, programs, algorithms or other applied circuit examples described in these materials, or for the infringement of the rights of third-party owners resulting from such use.
3. The data, graphs, charts, programs, algorithms and all other information described in these materials were current at the issue of these materials, with Mitsubishi Electric reserving the right to make any necessary updates or changes in the products or specifications in these materials without prior notice. Before purchasing Mitsubishi Electric semiconductor products, therefore, please obtain the latest available information from Mitsubishi Electric directly or an authorized dealer.
4. Every possible effort has been made to ensure that the information described in these materials is fully accurate. However, Mitsubishi Electric assumes no responsibility for damages resulting from inaccuracies occurring within these materials.
5. When using the product data, technical contents indicated on the graphs, charts, programs or algorithms described in these materials, assessments should not be limited to only the technical contents, programs and algorithm units. Rather, it is requested that ample evaluations be made of each individual system as a whole, with the customer assuming full responsibility for decisions on the propriety of application. Mitsubishi Electric does not accept responsibility for the propriety of application.
6. The products described in these materials, with the exception of special mention concerning use and reliability, have been designed and manufactured with the purpose of use in general electronic machinery. Accordingly these products have not been designed and manufactured with the purpose of application in machinery or systems that will be used under conditions that can affect human life, or in machinery or systems used in social infrastructure that demand a particularly high degree of reliability. When considering the use of the products described in these materials in transportation machinery (automobiles, trains, vessels), for objectives related to medical treatment, aerospace, nuclear power control, submarine repeaters or systems or other specialized applications, please consult with Mitsubishi Electric directly or an authorized dealer.
7. When considering use of products for purposes other than the specific applications described in these materials, please inquire at Mitsubishi Electric or an authorized dealer.
8. The prior consent of Mitsubishi Electric in writing is required for any reprinting or reproduction of these materials.
9. Please direct any inquiries regarding further details of these materials, or any other comments or matters of attention, to Mitsubishi Electric or an authorized dealer.