MGF1908A

TAPE CARRIER LOW NOISE GaAs FET

DESCRIPTION

The MGF1908A is a low noise GaAs FET with an N-channel Schottky gate,which is designed for use in S to X band amplifiers and oscillators. The hermetically sealed metal-ceramic package assures minimum parasitic losses, and has a configueation suitable for microstrip circuits. The MGF1908A is mounted in the Super 12 tape, and is electrically equivalent to MGF1303B.

FEATURES

- Low Noise Figure
  NFmin. = 2.3dB (MAX.) @ f=12GHz
- High Associated gain
  Gs=8.0dB (MIN.) @ f=12GHz

APPLICATION

S to Ku band low noise amplifiers

QUALITY GRADE

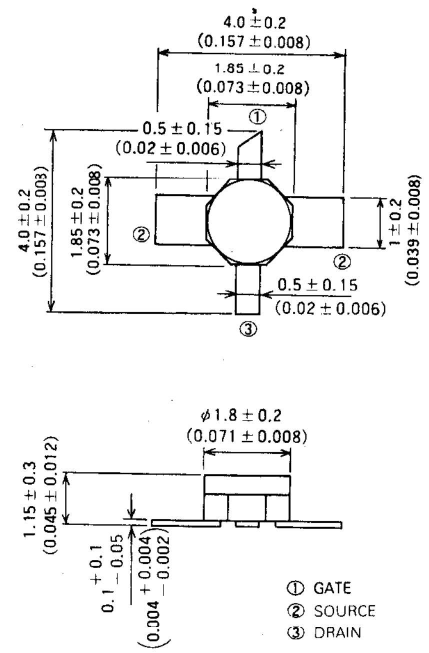
- General Grade (GG)

RECOMMENDED BIAS CONDITIONS

V_{DS}=3V , I_D=10mA

Outline Drawing

Unit: millimeters (inches)



GD-16

ABSOLUTE MAXIMUM RATINGS (Ta=25℃)

Symbol	Parameter	Ratings	Unit
V_{GDO}	Gate to drain voltage	-6	V
V_{GSO}	Gate to source voltage	-6	V
I_D	Drain current	80	mA
PT	Total power dissipation	240	mW
T_{ch}	Channel temperature	175	℃
T_{stg}	Storage temperature	-65～+175	℃

Keep safety first in your circuit designs!

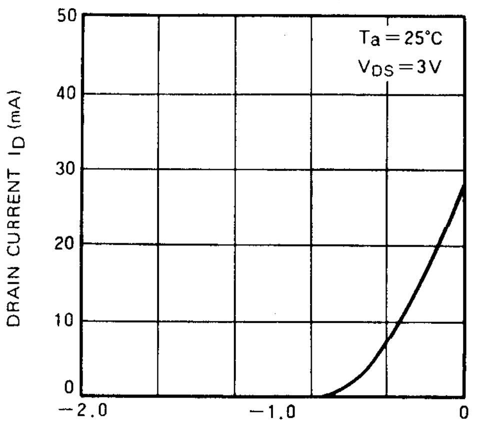
MITSUBISHI ELECTRIC Corporation puts the maximum effort into making semiconductor products better and more reliable , but there is always the possibility that trouble may occur with them. Trouble with semiconductors may lead to personal injury , fire or property damage. Remember to give due consideration to safety when making your circuit designed , with appropriate measure such as (i) placement of substitutive , auxiliary circuits , (ii) use of non-flammable material or (iii) prevention against any malfunction mishap.

ELECTRICAL CHARACTERISTICS (Ta=25℃)

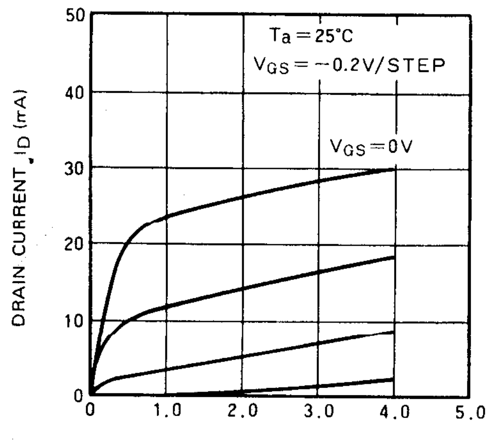
Symbol	Parameter	Test Conditions	Limits			Unit
			Min.	Typ.	Max.	
$V_{(BR)GDO}$	Gate to drain breakdown voltage	I_G=-100μA	-6	--	--	V
$V_{(BR)GSO}$	Gate to source breakdown voltage	I_G=-100μA	-6	--	--	V
I_{GSS}	Gate to source leakage current	V_{GS}=-3V,V_{DS}=0V	--	--	10	μA
I_{DSS}	Saturated drain current	V_{GS}=0V,V_{DS}=3V	15	--	80	mA
$V_{GS(off)}$	Gate to source cut-off voltage	V_{DS}=3V,I_D=100μA	-0.3	--	-3.5	V
gm	Transconductance	V_{DS}=3V,I_D=10mA	20	--	--	mS
Gs	Associated gain	V_{DS}-3V, I_D=10mA	8	--	--	dB
NFmin.	Minimum noise figure	f=12GHz	--	--	2.3	dB

TYPICAL CHARACTERISTICS

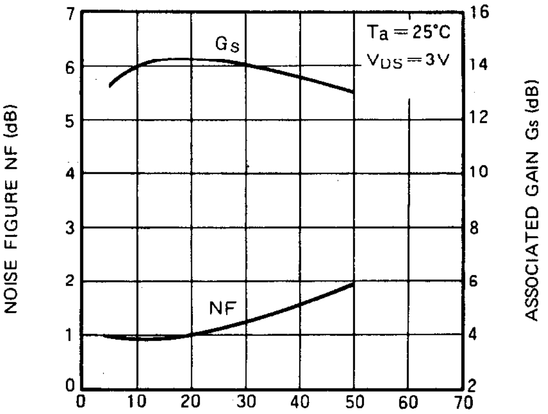
I_D vs. V_{GS}



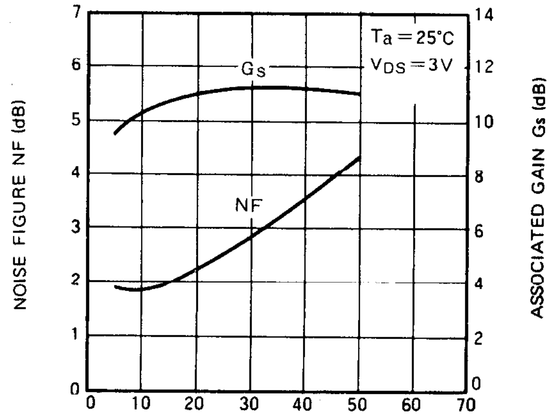
I_D vs. V_{DS}



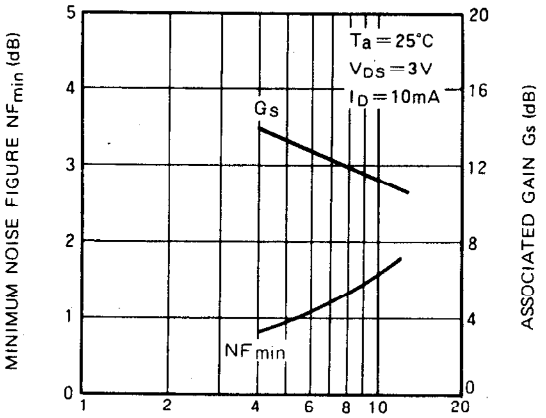
NF & G_S vs. I_D
(f = 4 GHz)



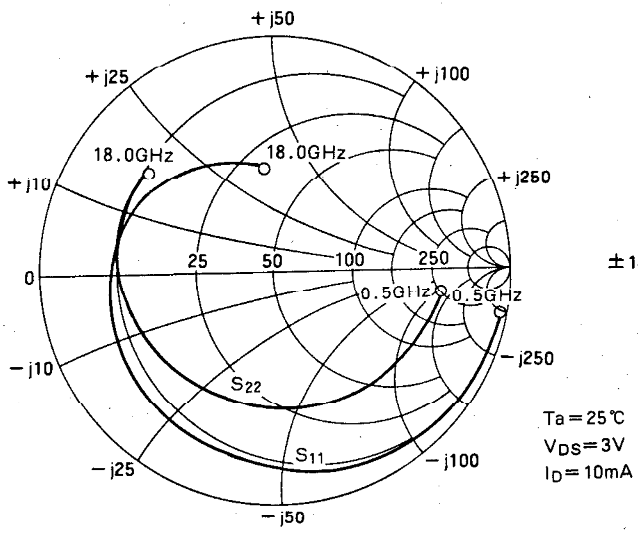
NF & G_S vs. I_D
(f = 12 GHz)



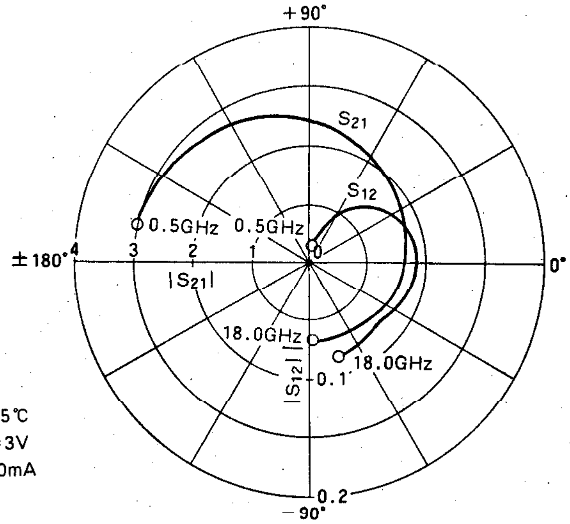
NF_{min} & Gs vs. f



S_{11}, S_{22} vs. f



S_{21}, S_{12} vs. f



S PARAMETERS (Ta=25℃, V_{DS}=3V, I_D=10mA)

Freq. (GHz)	S11		S21		S12		S22		K	MSG/MAG (dB)
	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.	Mag.	Ang.		
0.5	0.995	−12.1	2.991	167.7	0.016	77.1	0.728	−9.0	0.125	22.7
1.0	0.984	−21.8	2.937	158.6	0.026	71.3	0.708	−16.6	0.163	20.5
1.5	0.973	−31.5	2.883	149.5	0.036	65.5	0.688	−24.2	0.179	19.0
2.0	0.962	−41.2	2.829	140.4	0.046	59.7	0.668	−31.8	0.189	17.9
2.5	0.942	−50.5	2.762	131.5	0.054	52.9	0.657	−39.1	0.249	17.1
3.0	0.921	−59.9	2.696	122.6	0.061	46.0	0.646	−46.4	0.299	16.4
3.5	0.900	−69.2	2.629	113.6	0.069	39.2	0.636	−53.7	0.344	15.8
4.0	0.880	−78.5	2.563	104.7	0.077	32.3	0.625	−61.0	0.385	15.2
4.5	0.860	−87.1	2.479	96.4	0.080	26.3	0.614	−68.2	0.432	14.9
5.0	0.840	−95.7	2.395	88.1	0.084	20.4	0.604	−75.5	0.482	14.6
5.5	0.821	−104.3	2.311	79.8	0.087	14.4	0.593	−82.7	0.534	14.3
6.0	0.801	−112.9	2.227	71.5	0.090	8.4	0.582	−89.9	0.589	13.9
6.5	0.787	−119.8	2.146	64.2	0.089	3.9	0.581	−96.7	0.639	13.8
7.0	0.773	−126.7	2.066	57.0	0.089	−0.6	0.581	−103.4	0.694	13.7
7.5	0.759	−133.5	1.985	49.7	0.088	−5.1	0.580	−110.2	0.757	13.5
8.0	0.745	−140.4	1.905	42.4	0.087	−9.6	0.579	−116.9	0.827	13.4
8.5	0.735	−146.1	1.857	36.1	0.086	−12.2	0.580	−122.2	0.877	13.4
9.0	0.725	−151.8	1.808	29.8	0.084	−14.9	0.581	−127.6	0.933	13.3
9.5	0.714	−157.4	1.760	23.4	0.083	−17.5	0.583	−132.9	0.993	13.3
10.0	0.704	−163.1	1.712	17.1	0.082	−20.1	0.584	−138.2	1.059	11.7
10.5	0.694	−169.2	1.675	10.6	0.081	−23.3	0.596	−143.7	1.088	11.3
11.0	0.685	−175.4	1.637	4.2	0.081	−26.5	0.607	−149.2	1.116	11.0
11.5	0.675	178.5	1.600	−2.3	0.080	−29.7	0.619	−154.7	1.145	10.7
12.0	0.665	172.4	1.563	−8.8	0.079	−32.9	0.631	−160.2	1.174	10.4
12.5	0.653	167.0	1.531	−14.7	0.078	−34.4	0.636	−165.5	1.229	10.1
13.0	0.641	161.5	1.498	−20.7	0.077	−35.9	0.642	−170.9	1.288	9.7
13.5	0.629	156.1	1.466	−26.6	0.075	−37.3	0.647	−176.2	1.352	9.4
14.0	0.617	150.6	1.434	−32.5	0.074	−38.8	0.653	178.5	1.420	9.0
14.5	0.601	144.4	1.426	−38.9	0.075	−42.4	0.659	173.9	1.444	8.9
15.0	0.586	138.3	1.418	−45.2	0.076	−46.1	0.664	169.3	1.465	8.7
15.5	0.571	132.1	1.409	−51.6	0.076	−49.7	0.670	164.6	1.484	8.5
16.0	0.555	125.9	1.401	−57.9	0.077	−53.3	0.675	160.0	1.501	8.4
16.5	0.526	117.9	1.386	−65.3	0.079	−58.1	0.674	155.0	1.576	8.0
17.0	0.497	110.0	1.371	−72.6	0.080	−62.9	0.674	150.0	1.646	7.6
17.5	0.468	102.0	1.356	−80.0	0.082	−67.6	0.673	144.9	1.713	7.3
18.0	0.439	94.0	1.341	−87.3	0.084	−72.4	0.672	139.9	1.776	6.9

NOISE PARAMETERS (V_{DS}=3V, I_D=10mA)

Freq. (GHz)	Γopt.		Rn (Ω)	NFmin. (dB)
	Magn.	Angle (deg.)		
1	0.768	12.1	19.3	0.67
2	0.732	21.0	18.9	0.72
3	0.714	37.2	18.4	0.78
4	0.688	52.0	18.0	0.83
5	0.665	66.3	17.3	0.98
6	0.650	79.1	16.7	1.13
7	0.633	90.6	16.1	1.27
8	0.617	102.2	15.5	1.42
9	0.597	112.4	14.9	1.52
10	0.575	123.5	14.2	1.62
11	0.550	134.8	13.6	1.73
12	0.523	146.3	13.0	1.83
13	0.503	160.0	14.2	1.94
14	1.475	174.2	15.5	2.05
15	0.441	−171.9	16.6	2.12
16	0.420	−155.0	17.8	2.20
17	0.394	−138.1	18.9	2.28
18	0.372	−112.2	20.0	2.35

Glp and P1dB (T_a=25℃, V_D=3V, I_D=10mA)

	f=4GHz	f=12GHz
G_{LP} (dB)	15.5	11.1
P_{1dB} (dBm)	11.6	9.8

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.