MITSUBISHI ELECTRIC

< Low Noise GaAs HEMT >

MGF4963BL

Micro-X type plastic package

DESCRIPTION

The MGF4963BL super-low noise InGaAs HEMT (High Electron Mobility Transistor) is designed for use in K band amplifiers.

Outline Drawing

Fig.1

FEATURES

Low noise figure @ f=20GHz
NFmin. = 0.70dB (Typ.)

High associated gain @ f=20GHz
Gs = 13.5dB (Typ.)

APPLICATION

C to K band low noise amplifiers

QUALITY GRADE

GG

RECOMMENDED BIAS CONDITIONS

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

ORDERRING INFORMATION

Tape & reel 4000pcs./reel

RoHS COMPLIANT

MGF4963BL 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
V_{GDO}	Gate to drain voltage	-3	V
V_{GSO}	Gate to source voltage	-3	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

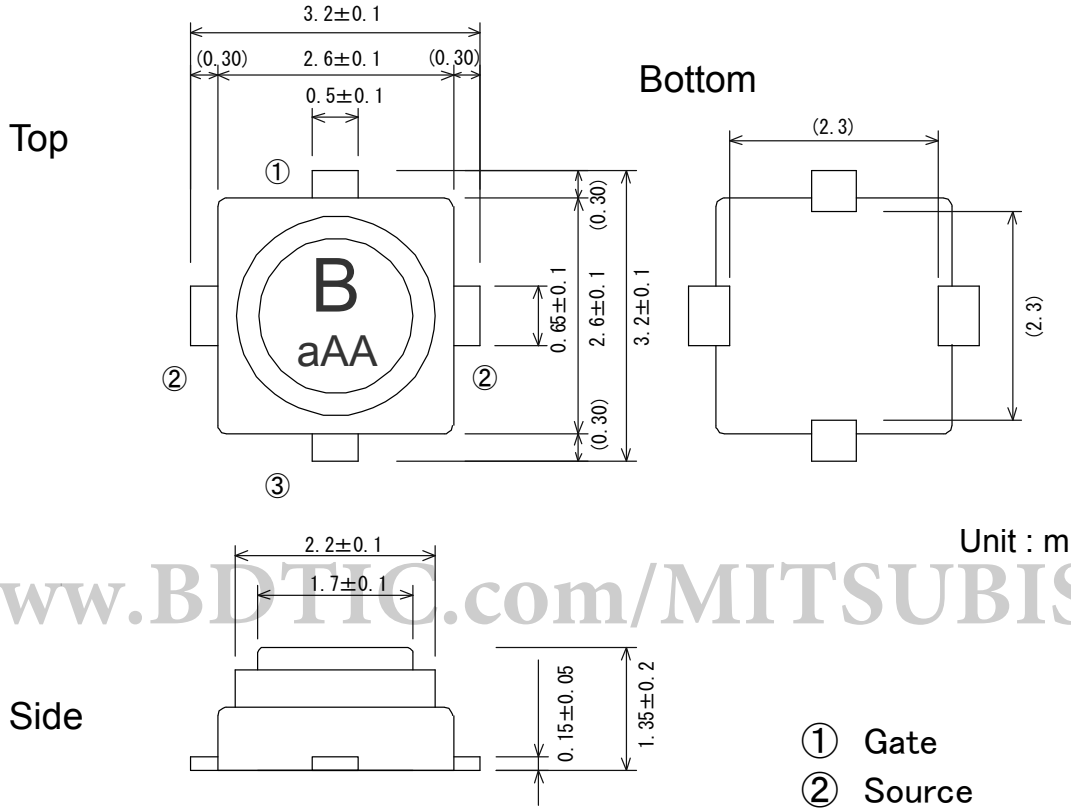
ELECTRICAL CHARACTERISTICS (Ta=25°C)

Symbol	Parameter	Test conditions	Limits			Unit
			MIN.	TYP.	MAX	
$V_{(BR)GDO}$	Gate to drain breakdown voltage	I_G=-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
Gs	Associated gain	V_{DS}=2V,	11.0	13.5	--	dB
NFmin.	Minimum noise figure	I_D=10mA,f=20GHz	--	0.70	0.95	dB

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

Publication Date : Apr., 2011

Fig.1



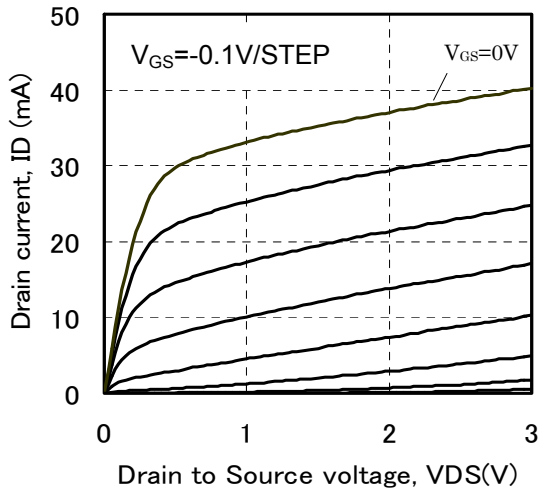
Unit : mm

① Gate
② Source
③ Drain

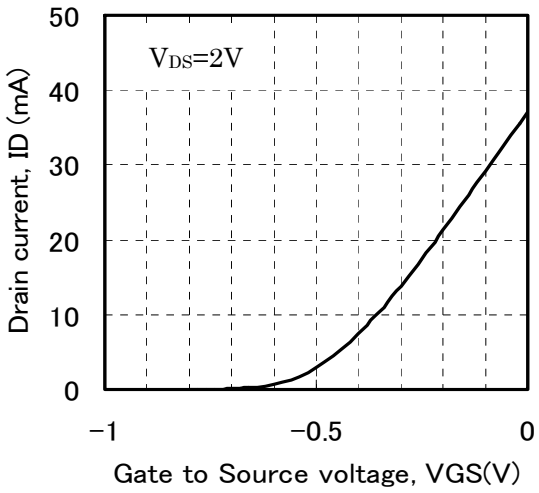
(GD-32)

TYPICAL CHARACTERISTICS (Ta=25°C)

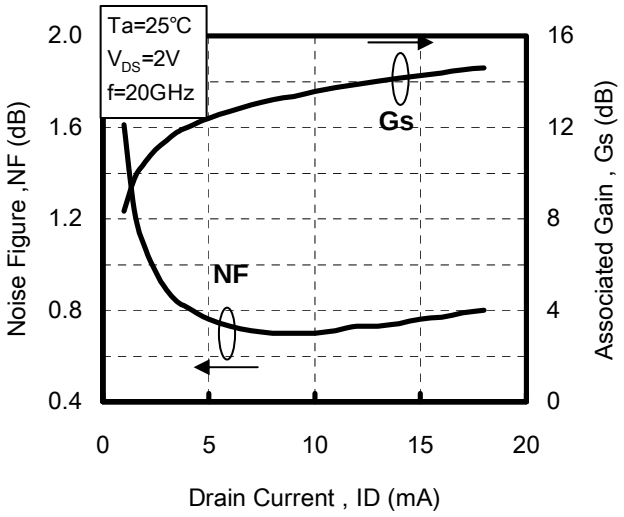
I_D vs. V_{DS}



I_D vs. V_{GS}



NF & Gs vs. I_D

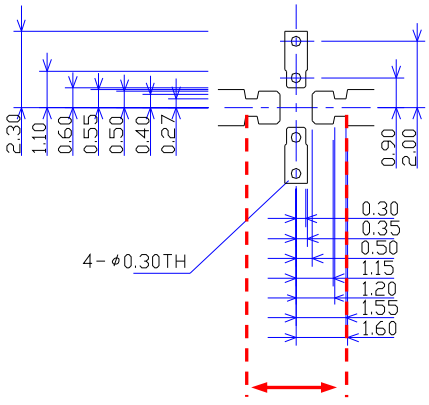


S PARAMETERS (Ta=25°C, VDS=2V, ID=10mA)

Freq. (GHz)	S11		S21		S12		S22	
	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)
1	0.991	-16.9	5.095	162.1	0.014	78.6	0.645	-13.4
2	0.963	-33.4	4.942	145.3	0.027	63.9	0.632	-26.8
3	0.934	-50.1	4.893	128.5	0.038	52.8	0.613	-40.5
4	0.876	-65.8	4.799	111.5	0.049	40.7	0.599	-56.2
5	0.836	-82.8	4.684	94.4	0.058	28.5	0.565	-70.7
6	0.781	-99.4	4.469	78.3	0.064	16.0	0.533	-82.9
7	0.732	-117.3	4.277	62.5	0.067	4.6	0.489	-93.7
8	0.683	-133.8	4.030	47.5	0.068	-7.2	0.444	-102.8
9	0.640	-149.7	3.863	33.6	0.065	-16.9	0.401	-110.8
10	0.595	-165.5	3.710	19.6	0.063	-25.7	0.369	-119.9
11	0.547	179.7	3.639	6.4	0.058	-33.1	0.345	-129.0
12	0.516	162.4	3.664	-7.5	0.057	-36.5	0.344	-140.3
13	0.490	143.1	3.728	-22.1	0.056	-42.9	0.330	-152.9
14	0.500	121.1	3.797	-38.8	0.057	-49.9	0.317	-169.4
15	0.522	99.8	3.819	-56.6	0.059	-58.8	0.313	170.5
16	0.557	78.9	3.696	-75.6	0.060	-68.7	0.315	145.4
17	0.576	61.8	3.471	-94.8	0.059	-81.8	0.343	122.8
18	0.601	47.8	3.076	-112.3	0.059	-92.8	0.378	98.5
19	0.628	39.2	2.770	-124.1	0.058	-104.7	0.413	79.1
20	0.658	27.9	2.725	-135.5	0.060	-116.5	0.448	63.4
21	0.656	16.2	2.741	-150.1	0.062	-130.9	0.489	52.7
22	0.640	2.4	2.741	-165.8	0.065	-146.3	0.516	42.8
23	0.624	-12.0	2.734	178.2	0.063	-162.7	0.546	32.4
24	0.601	-29.9	2.742	161.0	0.063	-174.9	0.543	20.4
25	0.576	-47.3	2.723	142.9	0.064	167.4	0.518	8.1
26	0.552	-67.6	2.683	124.2	0.062	149.4	0.492	-5.2

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

Freq. (GHz)	NF min (dB)	Γopt		Rn
		(mag)	(ang)	
6	0.29	0.680	63.7	0.15
7	0.30	0.620	79.7	0.12
8	0.31	0.570	96.9	0.10
9	0.33	0.510	115.1	0.08
10	0.36	0.470	134.2	0.06
11	0.39	0.430	154.0	0.04
12	0.41	0.400	174.2	0.04
13	0.43	0.370	-165.2	0.05
14	0.46	0.360	-144.6	0.06
15	0.50	0.360	-124.3	0.10
16	0.53	0.370	-104.1	0.13
17	0.58	0.390	-84.4	0.19
18	0.64	0.420	-65.3	0.25
19	0.68	0.470	-46.7	0.31
20	0.73	0.530	-28.8	0.38
21	0.77	0.610	-11.7	0.46



Measurement plane (3.2mm)

Recommended foot pattern; RO4003C/ROGERS
(εr=3.38, t=0.51mm)

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

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 ore property damage. Remember to give due consideration to safety when making your circuit designs, with appropriate measures such as (i) placement of substitutive, auxiliary circuits, (ii) use of non-flammable material or (iii) prevention against any malfunction or mishap.

Notes regarding these materials

- These materials are intended as a reference to assist our customers in the selection of the Mitsubishi semiconductor product best suited to the customer's application; they do not convey any license under any intellectual property rights, or any other rights, belonging to Mitsubishi Electric Corporation or a third party.
- Mitsubishi Electric Corporation assumes no responsibility for any damage, or infringement of any third-party's rights, originating in the use of any product data, diagrams, charts, programs, algorithms, or circuit application examples contained in these materials.
- All information contained in these materials, including product data, diagrams, charts, programs and algorithms represents information on products at the time of publication of these materials, and are subject to change by Mitsubishi Electric Corporation without notice due to product improvements or other reasons. It is therefore recommended that customers contact Mitsubishi Electric Corporation or an authorized Mitsubishi Semiconductor product distributor for the latest product information before purchasing a product listed herein.
  The information described here may contain technical in accuracies or typographical errors.
  Mitsubishi Electric Corporation assumes no responsibility for any damage, liability, or other loss rising from these inaccuracies or errors.
  Please also pay attention to information published by Mitsubishi Electric Corporation by various means, including the Mitsubishi Semiconductor home page (http://www.mitsubishielectric.com/).
- When using any or all of the information contained in these materials, including product data, diagrams, charts, programs, and algorithms, please be sure to evaluate all information as a total system before making a final decision on the applicability of the information and products. Mitsubishi Electric Corporation assumes no responsibility for any damage, liability or other loss resulting from the information contained herein.
- Mitsubishi Electric Corporation semiconductors are not designed or manufactured for use in a device or system that is used under circumstances in which human life is potentially at stake. Please contact Mitsubishi Electric Corporation or an authorized Mitsubishi Semiconductor product distributor when considering the use of a product contained herein for any specific purposes, such as apparatus or systems for transportation, vehicular, medical, aerospace, nuclear, or undersea repeater use.
- The prior written approval of Mitsubishi Electric Corporation is necessary to reprint or reproduce in whole ore in part these materials.
- If these products or technologies are subject to the Japanese export control restrictions, they must be exported under a license from the Japanese government and cannot be imported into a country other than the approved destination.
  Any diversion or re-export contrary to the export control laws and regulations of Japan and/or the country of destination is prohibited.
- Please contact Mitsubishi Electric Corporation or an authorized Mitsubishi Semiconductor product distributor for further details on these materials or the products contained therein.