MITSUBISHI ELECTRIC

< Low Noise GaAs HEMT >

MGF4965BM

4pin flat lead package

DESCRIPTION

The MGF4965BM super-low noise InGaAs HEMT (High Electron Mobility Transistor) is designed for use in K band amplifiers.

The 4pin flat lead package is small-thin size, and offers high cost performance.

FEATURES

Low noise figure @ f=20GHz
NFmin. = 0.95dB (Typ.)
High associated gain @ f=20GHz
Gs = 11.5dB (Typ.)

APPLICATION

C to K band low noise amplifiers

QUALITY GRADE

GG

RECOMMENDED BIAS CONDITIONS

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

ORDERING INFORMATION

Tape & reel 15000pcs/reel

RoHS COMPLIANT

MGF4965BM is a RoHS2 compliant product.

Outline Drawing

Fig.1

⚠ **CAUSION!**
This device is sensitive to ElectroStatic Discharge (ESD). Care should be needed during transport and handling.

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
V_{DS}	Drain to source voltage	3	V
I_D	Drain current	IDSS	mA
PT	Total power dissipation	50	mW
Tch	Channel temperature	125	°C
Tstg	Storage temperature	-55 to +125	°C
Top	Operation temperature	-55 to +125	°C

ELECTRICAL CHARACTERISTICS (Ta=25°C)

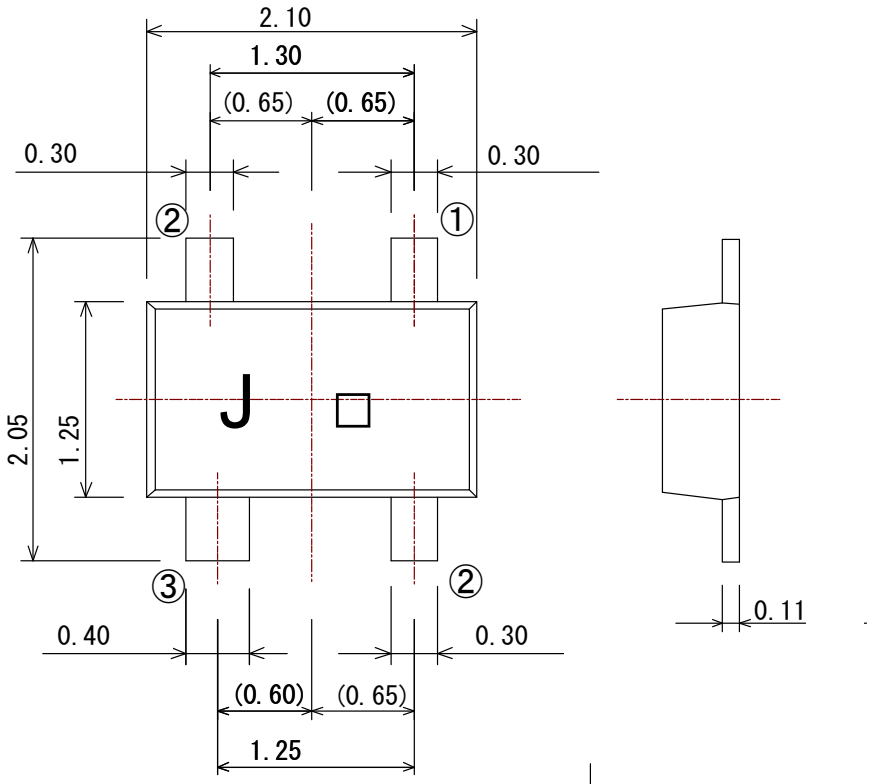
Symbol	Parameter	Test conditions	Limits			Unit
			MIN.	TYP.	MAX	
$V_{(BR)GDO}$	Gate to drain breakdown voltage	I_G=-10μA	-3.5	--	--	V
I_{GSS}	Gate to source leakage current	V_{GS}=-2V,V_{DS}=0V	--	--	50	μA
I_{DSS}	Saturated drain current	V_{GS}=0V,V_{DS}=2V	12	--	60	mA
$V_{GS(off)}$	Gate to source cut-off voltage	V_{DS}=2V,I_D=500μA	-0.1	--	-1.5	V
Gs	Associated gain	V_{DS}=2V,	9.5	11.5	--	dB
NFmin.	Minimum noise figure	I_D=10mA,f=20GHz	--	0.95	1.25	dB

Note: Gs and NFmin. are tested with sampling inspection.
Thermal resistance (Rth) of this product : 800°C/W

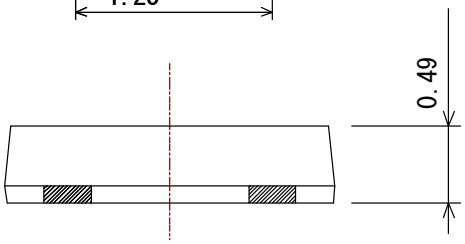
Publication Date :Nov., 2022
CTHA-221107-05

MITSUBISHI ELECTRIC CORPORATION

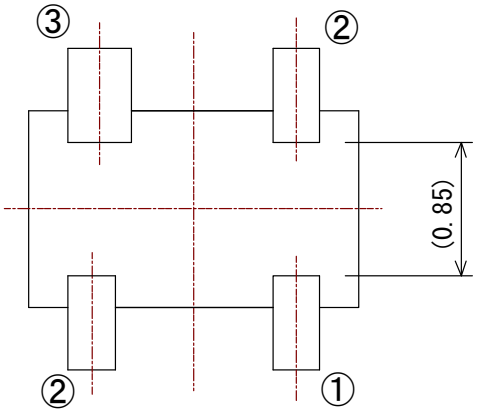
Fig.1



Top



Side



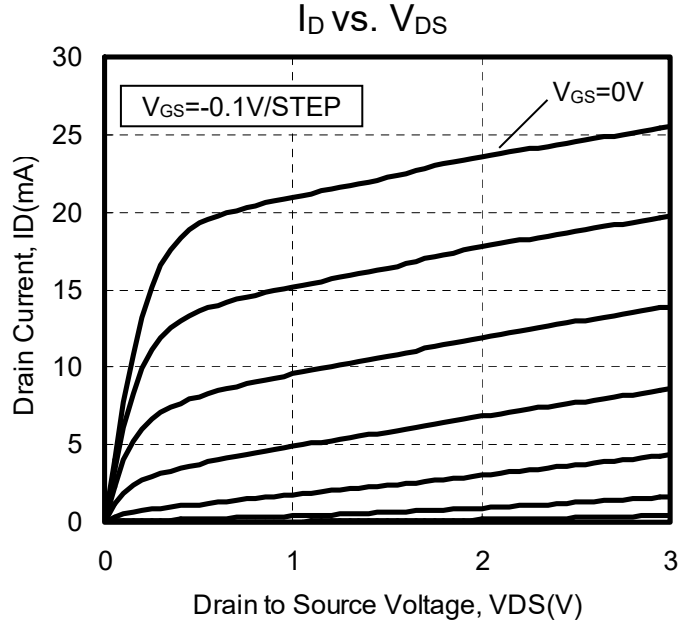
Bottom

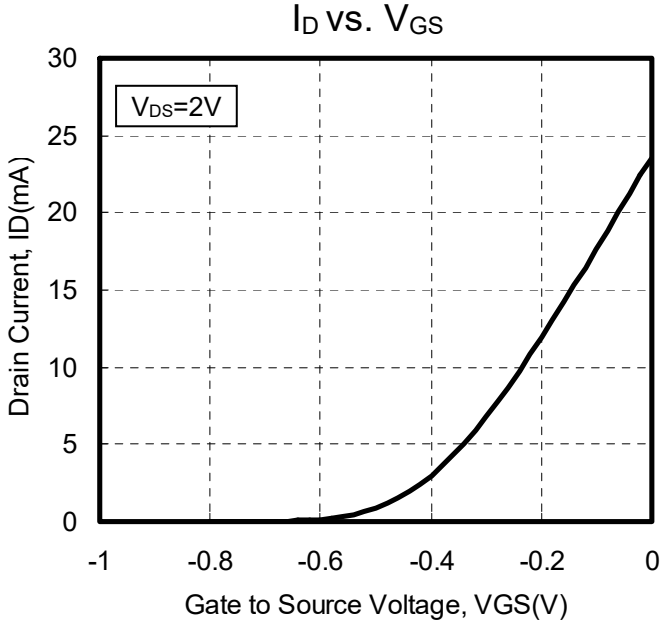
Unit: mm

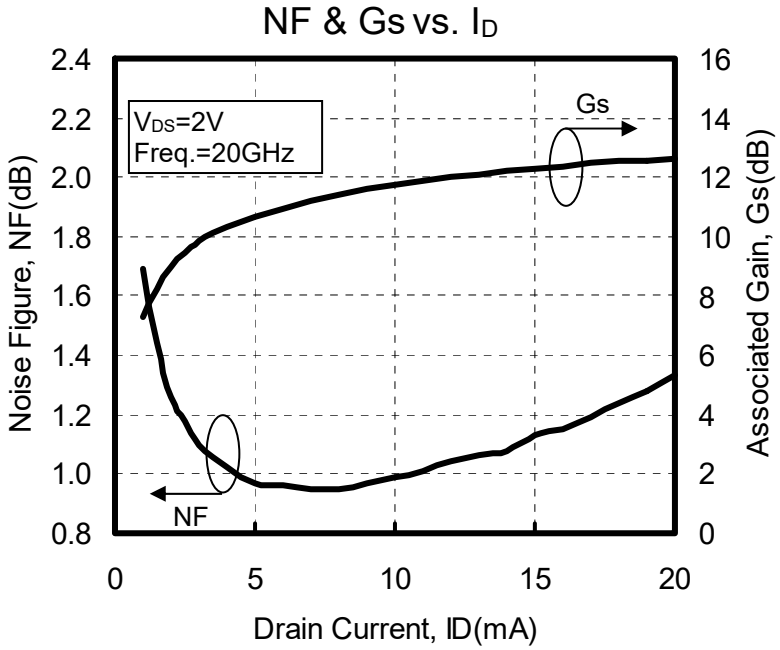
① Gate
② Source
③ Drain

(GD-30)

TYPICAL CHARACTERISTICS (Ta=25°C)





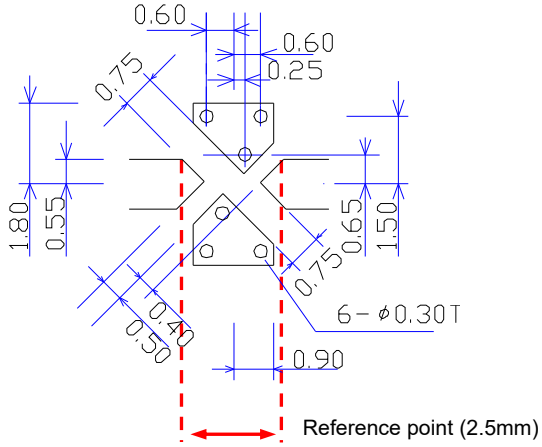


S PARAMETERS (Ta=25°C, VDS=2V, ID=10mA)

Freq.	S11		S21		S12		S22	
GHz	Magn.	Angle	Magn.	Angle	Magn.	Angle	Magn.	Angle
1	0.986	-12.3	4.240	166.2	0.011	79.8	0.743	-9.7
2	0.971	-24.5	4.301	153.3	0.022	70.5	0.732	-19.7
3	0.948	-37.0	4.261	140.2	0.033	61.0	0.716	-29.9
4	0.918	-50.2	4.349	126.5	0.043	51.2	0.692	-40.4
5	0.875	-64.4	4.414	112.1	0.052	40.9	0.661	-51.4
6	0.826	-79.3	4.408	97.7	0.060	30.6	0.625	-62.8
7	0.764	-95.4	4.417	82.5	0.067	20.0	0.580	-74.8
8	0.686	-113.2	4.324	67.0	0.071	7.2	0.522	-87.3
9	0.615	-131.4	4.167	52.2	0.074	-4.5	0.466	-99.8
10	0.546	-149.1	3.994	38.5	0.068	-13.8	0.411	-109.8
11	0.508	-167.4	3.863	25.5	0.064	-20.2	0.375	-120.2
12	0.493	173.4	3.764	12.2	0.062	-23.7	0.352	-132.4
13	0.481	153.9	3.631	-1.0	0.058	-30.1	0.318	-145.2
14	0.494	135.2	3.539	-14.2	0.056	-34.2	0.298	-158.6
15	0.531	118.7	3.504	-28.9	0.056	-33.4	0.305	-174.4
16	0.568	102.2	3.363	-44.0	0.057	-36.8	0.312	165.8
17	0.607	86.3	3.147	-59.0	0.061	-40.7	0.324	142.6
18	0.642	72.8	2.923	-74.2	0.067	-46.8	0.348	121.3
19	0.673	60.2	2.644	-88.1	0.070	-56.8	0.381	100.9
20	0.704	48.8	2.401	-99.6	0.070	-65.1	0.414	82.3
21	0.723	38.2	2.215	-112.4	0.071	-75.5	0.452	67.3
22	0.727	28.5	2.006	-125.4	0.074	-81.3	0.489	54.1
23	0.742	20.1	1.826	-136.0	0.072	-91.2	0.525	44.1
24	0.746	13.9	1.650	-145.8	0.073	-103.1	0.563	35.0
25	0.759	7.0	1.549	-155.7	0.071	-111.4	0.601	26.8
26	0.777	-0.8	1.450	-166.9	0.067	-118.4	0.628	18.7

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

Freq.	NFmin	Γopt		Rn/50
GHz	dB	Magn.	Angle	
12	0.45	0.414	146.1	0.06
13	0.52	0.356	167.0	0.05
14	0.58	0.314	-171.5	0.07
15	0.65	0.292	-149.9	0.08
16	0.72	0.292	-128.2	0.11
17	0.78	0.319	-106.8	0.14
18	0.85	0.373	-85.6	0.19
19	0.90	0.458	-64.5	0.26
20	0.95	0.577	-43.8	0.38



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 or 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.

Publication Date :Nov., 2022