

MGF431xG

Super Low Noise InGaAs HEMT

DESCRIPTION

The MGF431xG series super-low-noise HEMT(High Electron Mobility Transistor) is designed for use in L to K band amplifiers. The hermetically sealed metal-ceramic package assures minimum parasitic losses, and has a configuration suitable for microstrip circuits.

FEATURES

- Low noise figure @ f=12GHz
MGF4316G : NF min.=0.80dB (MAX.)
MGF4319G : NF min.=0.50dB (MAX.)
- High associated gain
Gs=12.0 dB (MIN.) @ f=12GHz

APPLICATION

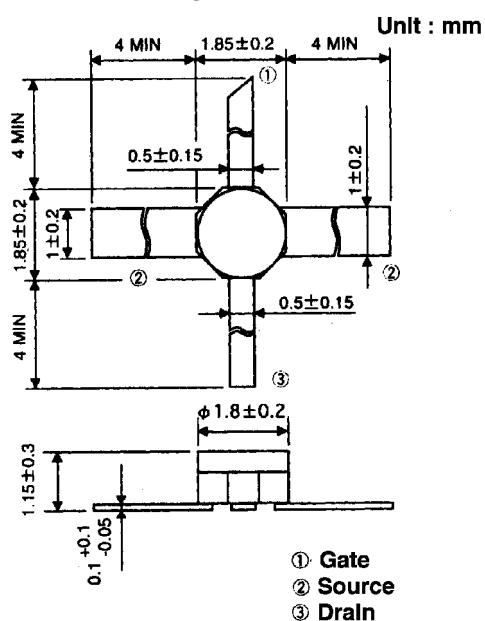
L to K band low noise amplifiers.

QUALITY GRADE

- GG

RECOMMENDED BIAS CONDITIONS

- $V_{DS}=2V$, $I_D=10mA$
- Refer to Bias Procedure

OUTLINE DRAWING

GD-4

ABSOLUTE MAXIMUM RATINGS ($T_a=25^\circ C$)

Symbol	Parameter	Ratings	Unit
V_{GDO}	Gate to drain voltage	-4	V
V_{GSO}	Gate to source voltage	-4	V
I_D	Drain current	60	mA
P_T	Total power dissipation	50	mW
T_{ch}	Channel temperature	125	$^\circ C$
T_{stg}	Storage temperature	-65 ~ +125	$^\circ C$

< 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 measures such as (i) placement of substitutive, auxiliary circuits, (ii) use of non-flammable material or (iii) prevention against any malfunction or mishap.

ELECTRICAL CHARACTERISTICS ($T_a=25^\circ C$)

Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max	
$V_{(BR)GDO}$	Gate to drain breakdown voltage	$I_G = -10\mu A$	-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	$V_{DS} = 2V$, $I_D = 500\mu A$	-0.1	—	-1.5	V
g_m	Transconductance	$V_{DS} = 2V$, $I_D = 10mA$	—	75	—	mS
G_s	Associated gain	$V_{DS} = 2V$, $I_D = 10mA$, $f = 12GHz$	12	13.5	—	dB
NF_{min}	Minimum noise figure	$V_{DS} = 2V$, $I_D = 10mA$, $f = 12GHz$	—	—	0.8	dB
		MGF4319G	—	—	0.5	
$R_{th(ch-a)}$	Thermal resistance	*1 DVf method	—	625	—	$^\circ C/W$

*1 : Channel to ambient



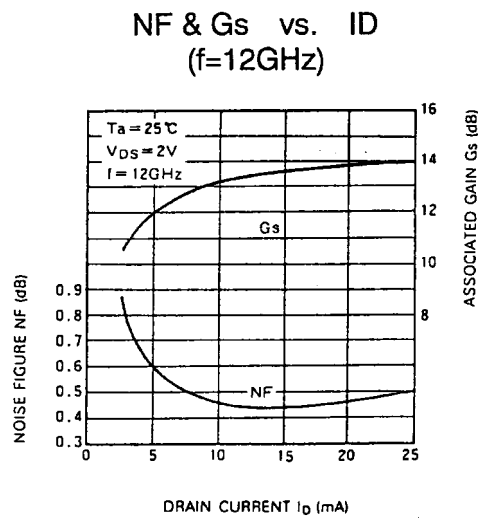
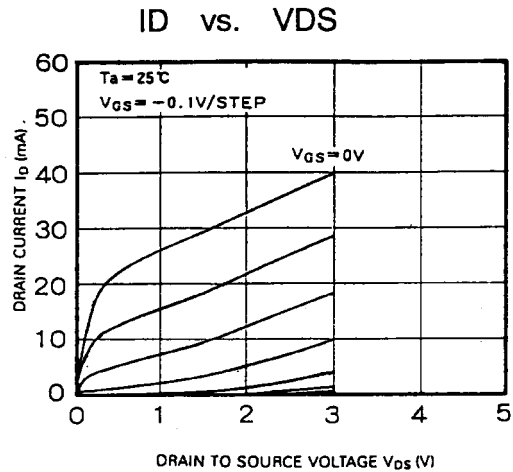
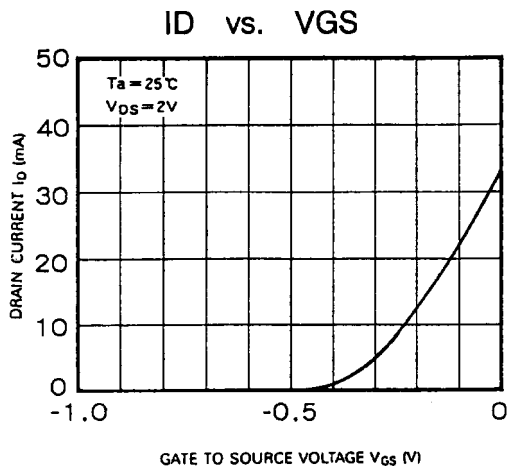
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MGF431xG

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Typical Characteristics



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Typical Characteristics

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

f (GHz)	S11		S21		S12		S22		MSG/MAG (dB)	K
	Magn.	Angle	Magn.	Angle	Magn.	Angle	Magn.	Angle		
1	0.990	-22.3	5.775	158.1	0.020	71.9	0.533	-19.2	28.8	0.10
2	0.967	-40.6	5.585	140.6	0.035	61.8	0.514	-33.4	26.5	0.19
3	0.925	-53.2	5.401	128.9	0.051	53.3	0.489	-42.9	24.3	0.27
4	0.874	-70.9	5.161	111.8	0.064	42.4	0.457	-58.2	21.6	0.35
5	0.831	-88.8	4.899	96.8	0.075	29.3	0.424	-71.6	19.8	0.43
6	0.783	-105.7	4.626	80.8	0.083	19.0	0.391	-87.5	18.1	0.50
7	0.743	-120.6	4.316	67.9	0.087	9.1	0.369	-100.6	16.8	0.57
8	0.706	-132.1	4.100	56.4	0.090	4.1	0.357	-110.8	15.9	0.64
9	0.682	-144.7	3.887	43.2	0.093	-6.4	0.357	-122.3	15.1	0.69
10	0.670	-159.1	3.765	30.1	0.094	-14.3	0.351	-133.0	14.7	0.72
11	0.639	-171.8	3.617	17.5	0.095	-24.4	0.339	-143.5	14.0	0.80
12	0.617	175.3	3.526	4.5	0.096	-33.5	0.329	-154.0	13.5	0.86
13	0.591	163.1	3.421	-8.1	0.094	-42.5	0.328	-163.9	13.0	0.91
14	0.571	152.9	3.349	-17.4	0.094	-50.9	0.328	-171.3	12.7	0.95
15	0.565	140.1	3.333	-29.6	0.096	-61.1	0.343	179.5	12.7	0.96
16	0.560	125.8	3.349	-44.4	0.098	-74.1	0.351	170.5	12.7	0.98
17	0.533	109.8	3.356	-59.9	0.101	-88.8	0.337	161.8	12.5	1.01
18	0.484	91.2	3.337	-77.0	0.104	-105.1	0.310	151.6	12.1	1.11

Noise Parameters (Ta=25°C , VDS=2V , ID=10mA)

f (GHz)	G opt.		Rn (W)	NFmin.(dB)		Gs (dB)
	Magn.	Angle		MGF4316G	MGF4319G	
4	0.76	49	12.5	0.31	0.24	18.3
8	0.59	95	4.7	0.47	0.35	15.9
12	0.48	139	2.3	0.60	0.45	13.5
14	0.41	166	1.8	0.69	0.50	12.3
18	0.34	-142	1.5	0.88	0.61	9.9

