

DESCRIPTION

The MGF4921AM super-low noise HEMT (High Electron Mobility Transistor) is designed for use in L to C band amplifiers.

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

FEATURES

Low noise figure

NFmin. = 0.35dB (Typ.) @ f=2.4GHz

NFmin. = 0.35dB (Typ.) @ f=4GHz

High associated gain

Gs = 18.0dB (Typ.) @ f=2.4GHz

Gs = 13.0dB (Typ.) @ f=4GHz

APPLICATION

L to C band low noise amplifiers

QUALITY GRADE

GG

RECOMMENDED BIAS CONDITIONS

$V_{DS}=2V$, $I_D=10\sim 25mA$

ORDERING INFORMATION

Tape & reel 3000pcs/reel

Outline Drawing

Fig.1

MITSUBISHI Proprietary

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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

($T_a=25^\circ C$)

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	130	mW
T_{ch}	Channel temperature	125	$^\circ C$
T_{stg}	Storage temperature	-55 to +125	$^\circ C$

ELECTRICAL CHARACTERISTICS

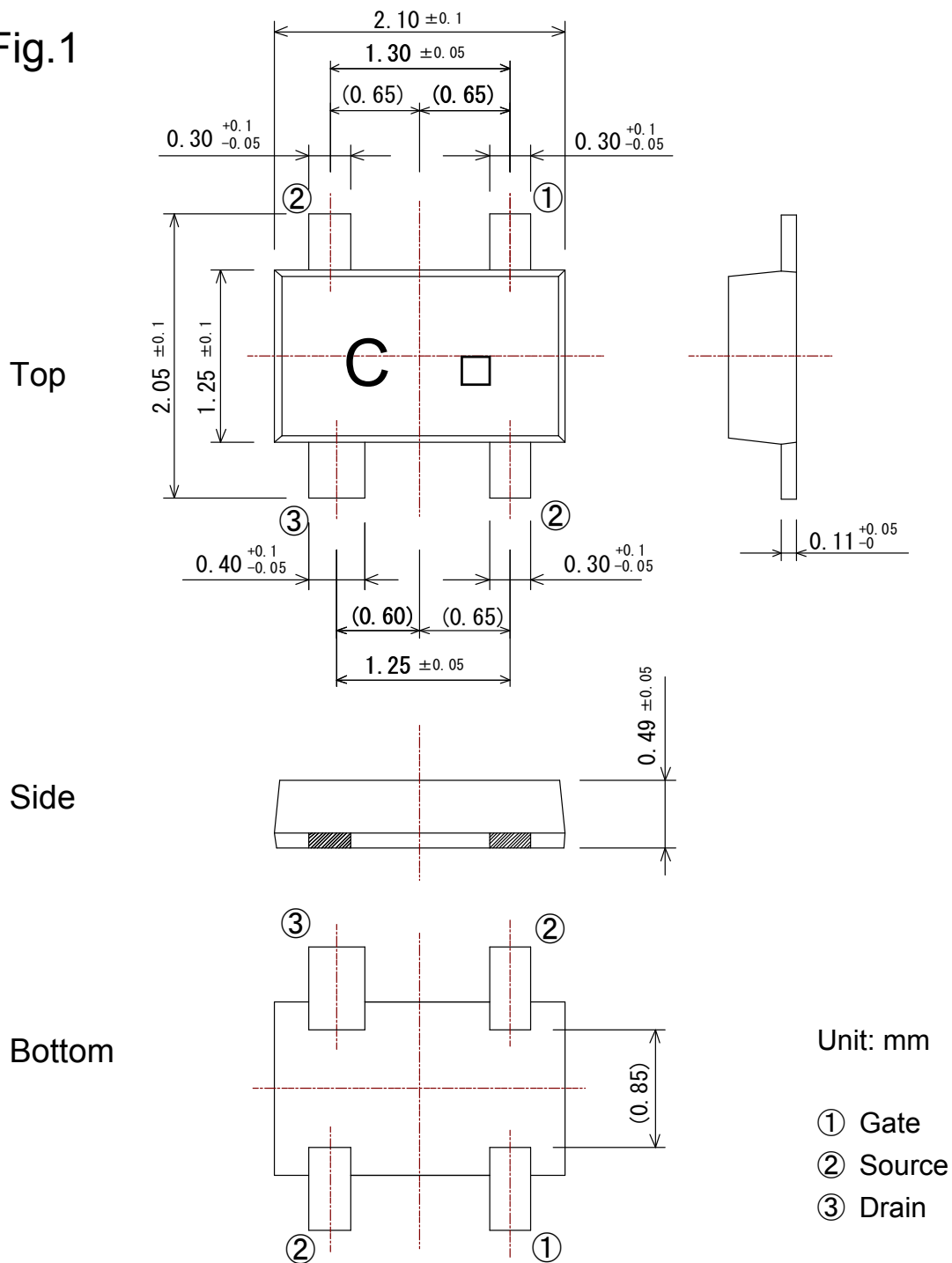
($T_a=25^\circ C$)

Symbol	Parameter	Test conditions	Limits			Unit
			MIN.	TYP.	MAX	
$V_{(BR)GDO}$	Gate to drain breakdown voltage	$I_G=-78\mu A$	-3.5	--	--	V
I_{GSS}	Gate to source leakage current	$V_{GS}=-2V, V_{DS}=0V$	--	--	50	μA
I_{DSS}	Saturated drain current	$V_{GS}=0V, V_{DS}=2V$	30	--	150	mA
$V_{GS(off)}$	Gate to source cut-off voltage	$V_{DS}=2V, I_D=390\mu A$	-0.2	--	-1.5	V
Gs	Associated gain	$V_{DS}=2V,$	--	18	--	dB
NFmin.	Minimum noise figure	$I_D=10mA, f=2.4GHz$	--	0.35	--	dB
Gs	Associated gain	$V_{DS}=2V,$	11.5	13	--	dB
NFmin.	Minimum noise figure	$I_D=15mA, f=4GHz$	--	0.35	0.55	dB

Note) Gs and NFmin. @4GHz are tested with sampling inspection.

Gs and NFmin. @2.4GHz are not tested.

Fig.1



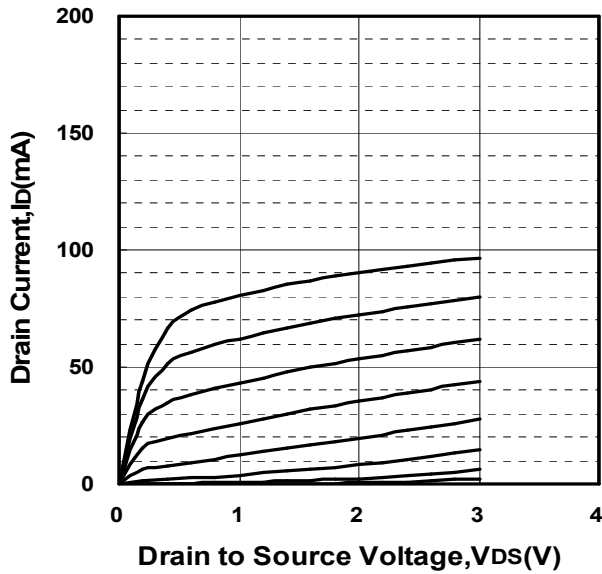
(GD-30)

(Reference data)

TYPICAL CHARACTERISTICS (Ta=25°C)

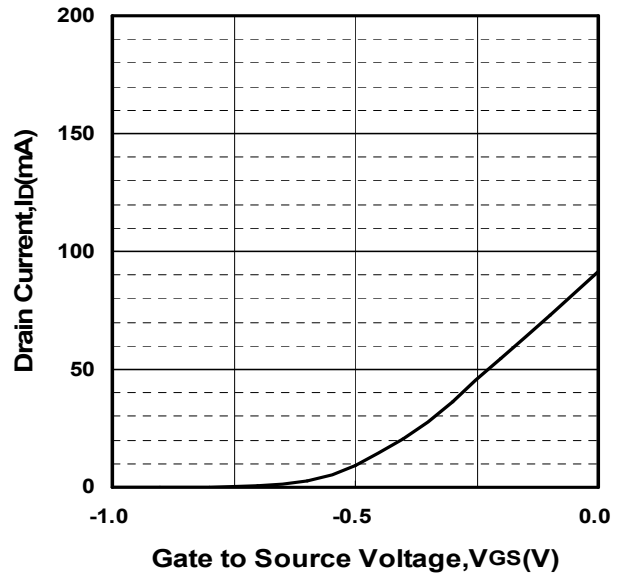
ID vs. VDS

VGS≈-0.1V/STEP

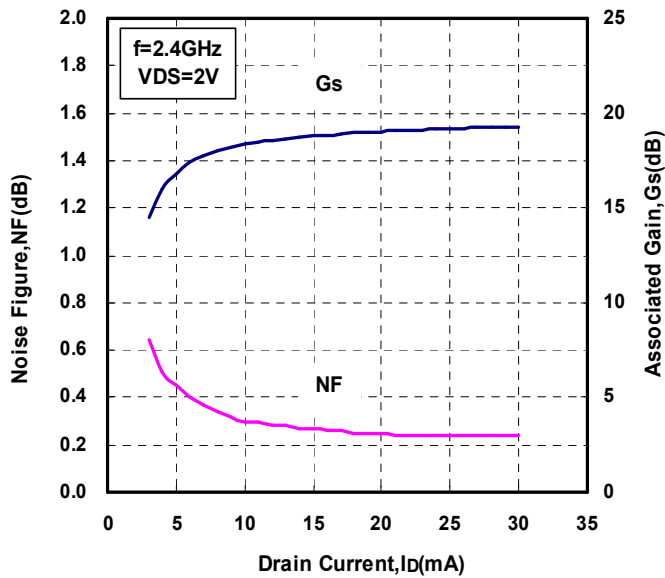


ID vs. VGS

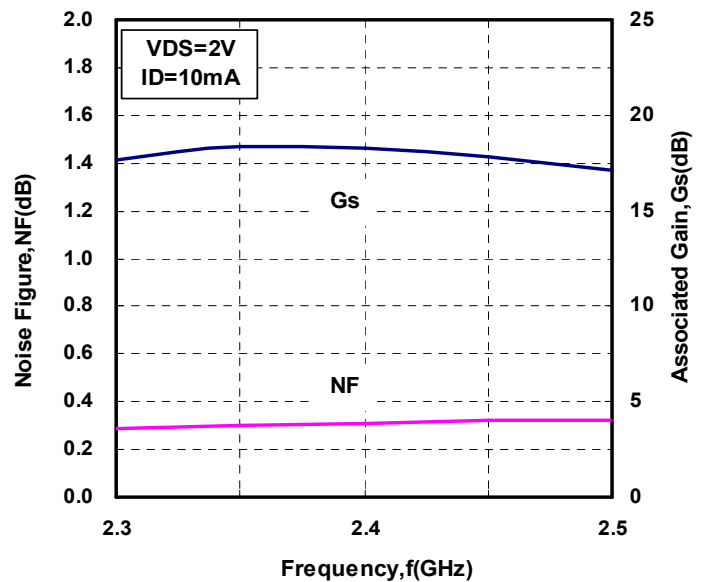
(VDS=2V)



NF&Gs vs. ID



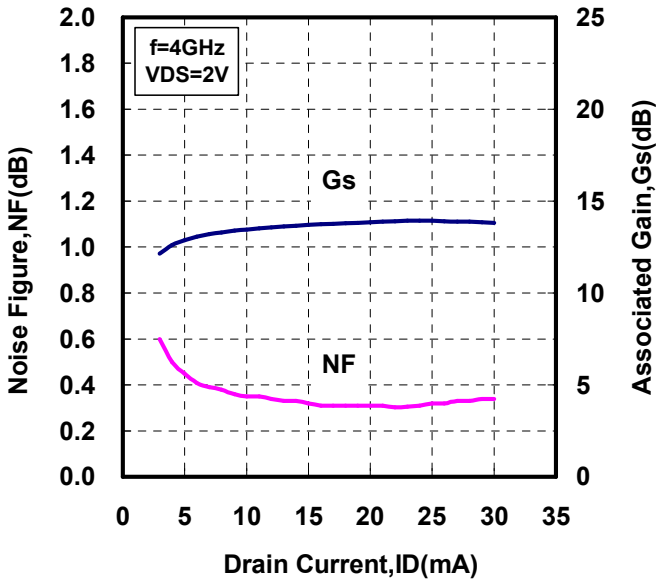
NF&Gs vs f



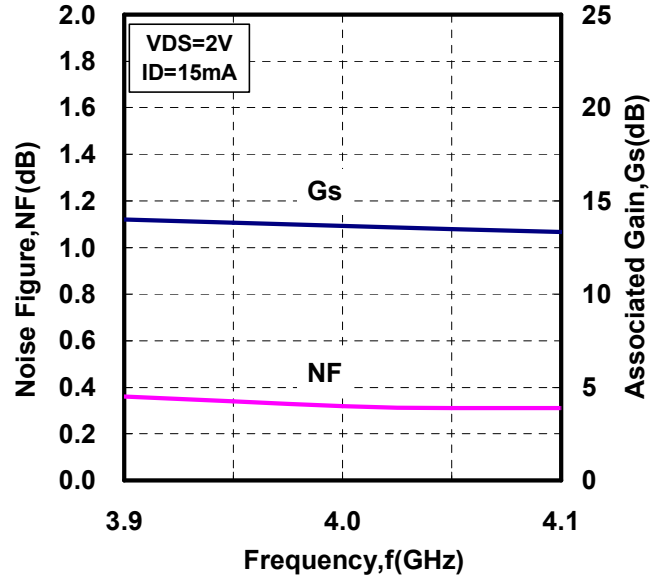
(Reference data)

TYPICAL CHARACTERISTICS (Ta=25°C)

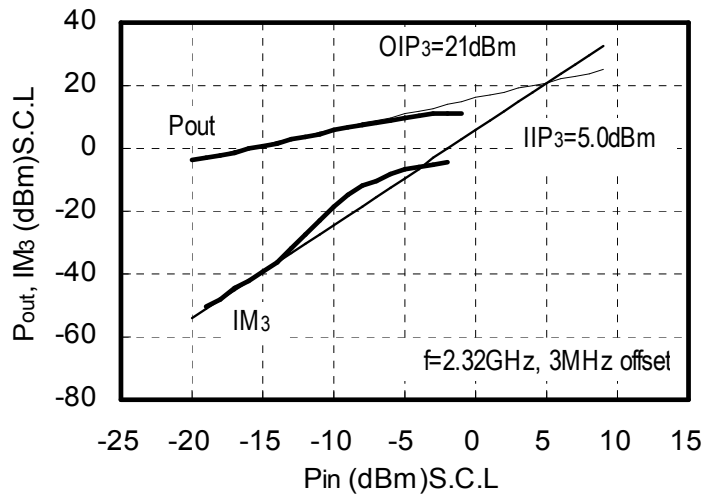
NF&Gs vs. ID



NF&Gs vs f



Po,IM3 vs. Pin

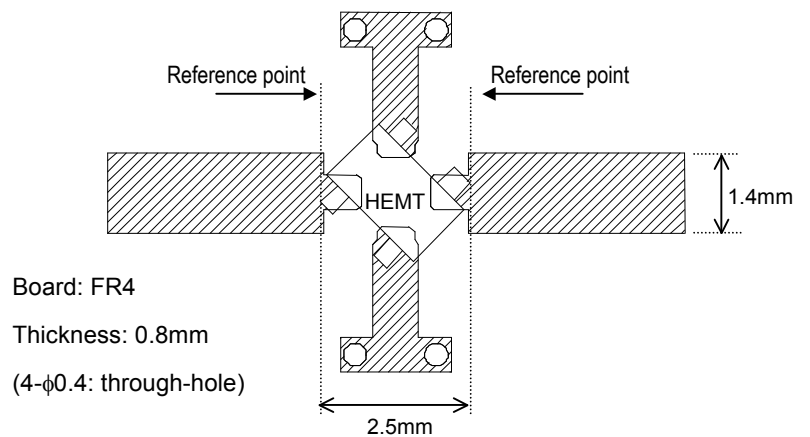


(Reference data)

TYPICAL S PARAMETERS

(VDS=2V, ID=15mA, Ta=room temperature)

f (GHz)	S11		S21		S12		S22	
	(Mag)	(Ang)	(Mag)	(Ang)	(Mag)	(Ang)	(Mag)	(Ang)
1	0.916	-33.4	7.378	144.5	0.038	76.4	0.346	-19.7
2	0.738	-60.5	6.083	115.8	0.072	66.4	0.306	-33.0
3	0.560	-80.3	4.864	92.4	0.099	59.7	0.281	-38.4
4	0.417	-102.9	4.091	72.8	0.133	51.7	0.230	-53.3
5	0.322	-124.3	3.471	55.6	0.163	44.7	0.176	-62.3
6	0.261	-148.5	3.053	41.0	0.197	37.8	0.137	-71.8
7	0.246	-175.8	2.747	26.7	0.235	30.2	0.094	-90.1
8	0.257	156.3	2.494	12.4	0.276	22.0	0.060	-129.8
9	0.300	132.3	2.301	-1.5	0.323	13.0	0.078	163.2
10	0.359	113.6	2.134	-15.6	0.372	3.2	0.140	130.5
11	0.425	98.9	1.959	-29.3	0.425	-6.9	0.229	111.3
12	0.506	87.3	1.815	-42.9	0.489	-18.0	0.333	96.2
13	0.595	76.6	1.678	-56.4	0.562	-30.1	0.462	82.5
14	0.700	64.2	1.519	-70.9	0.645	-44.0	0.613	68.3



(Reference data)

TYPICAL S PARAMETERS

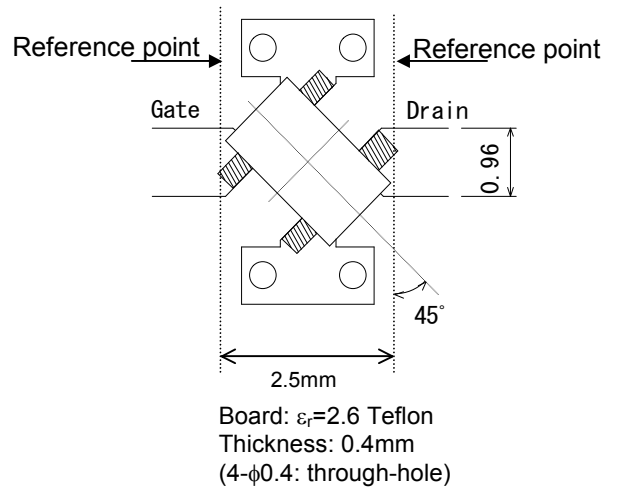
(V_{DS}=2V, I_D=10mA, T_a=room temperature)

Freq. (GHz)	S11		S21		S12		S22	
	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)
2.0	0.873	-57.9	5.887	129.1	0.072	54.7	0.383	-50.0
2.2	0.853	-64.2	5.870	124.4	0.079	51.9	0.378	-54.0
2.4	0.833	-69.7	5.750	119.9	0.084	48.8	0.368	-58.7
2.6	0.818	-73.6	5.442	116.1	0.089	45.1	0.363	-65.0
2.8	0.795	-79.7	5.401	111.5	0.093	43.0	0.336	-68.9
3.0	0.769	-86.7	5.366	106.7	0.098	40.3	0.328	-73.9
3.2	0.752	-91.6	5.201	102.8	0.103	37.5	0.320	-78.7
3.4	0.737	-96.5	5.029	99.0	0.106	34.4	0.310	-84.8
3.6	0.714	-102.4	4.959	94.8	0.109	32.4	0.291	-89.1
3.8	0.694	-107.8	4.856	90.7	0.113	30.2	0.282	-93.1
4.0	0.680	-113.1	4.733	86.8	0.117	27.7	0.274	-98.2
4.2	0.667	-118.0	4.587	83.3	0.119	25.1	0.265	-104.0
4.4	0.648	-123.5	4.503	79.3	0.122	23.2	0.252	-108.7
4.6	0.634	-128.9	4.399	75.6	0.124	21.2	0.244	-113.4
4.8	0.621	-134.2	4.287	72.1	0.127	19.0	0.237	-118.8
5.0	0.612	-138.9	4.172	68.7	0.129	16.9	0.229	-124.4
5.2	0.602	-143.9	4.068	65.1	0.131	15.0	0.220	-130.1
5.4	0.591	-149.4	3.986	61.6	0.133	13.0	0.215	-135.6
5.6	0.583	-154.2	3.880	58.3	0.135	11.1	0.209	-140.4
5.8	0.577	-159.2	3.785	54.9	0.136	9.1	0.206	-147.0
6.0	0.569	-164.4	3.697	51.6	0.138	7.3	0.204	-152.6

TYPICAL NOISE PARAMETERS

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

Freq. (GHz)	NFmin (dB)	Γ _{opt}		R _n (Ω)
		(mag)	(ang)	
2.0	0.36	0.86	13.9	0.23
2.2	0.37	0.83	16.5	0.22
2.4	0.35	0.81	19.4	0.22
2.6	0.33	0.79	22.5	0.21
2.8	0.34	0.76	25.7	0.20
3.0	0.33	0.74	29.1	0.19
3.2	0.35	0.71	32.6	0.19
3.4	0.35	0.69	36.4	0.18
3.6	0.35	0.66	40.3	0.17
3.8	0.37	0.64	44.4	0.16
4.0	0.35	0.62	48.6	0.15
4.2	0.41	0.60	53.0	0.15
4.4	0.39	0.59	57.6	0.14
4.6	0.38	0.57	62.3	0.13
4.8	0.40	0.56	67.1	0.12
5.0	0.38	0.55	72.0	0.12
5.2	0.39	0.54	77.1	0.11
5.4	0.40	0.54	82.3	0.10
5.6	0.40	0.54	87.7	0.10
5.8	0.39	0.54	93.1	0.09
6.0	0.39	0.55	98.7	0.08



(Reference data)

TYPICAL S PARAMETERS

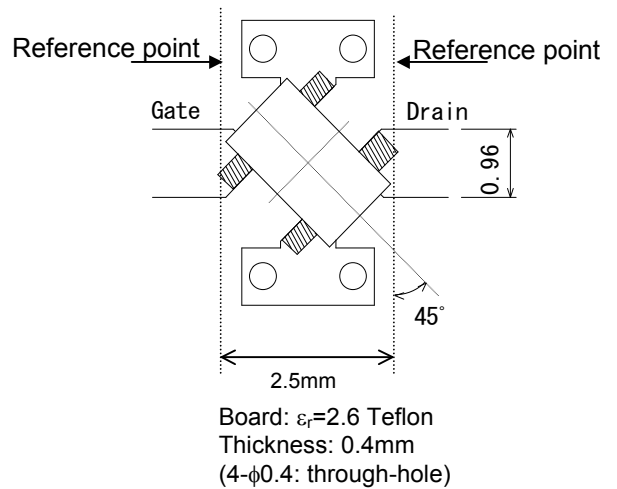
(V_{DS}=2V, I_D=15mA, T_a=room temperature)

Freq. (GHz)	S11		S21		S12		S22	
	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)
2.0	0.851	-61.9	6.821	126.7	0.066	55.4	0.313	-54.2
2.2	0.826	-68.4	6.756	121.7	0.072	52.5	0.308	-58.8
2.4	0.804	-74.0	6.578	117.2	0.077	49.7	0.298	-63.9
2.6	0.789	-78.5	6.248	113.4	0.082	46.3	0.292	-70.9
2.8	0.762	-84.7	6.160	108.7	0.085	44.5	0.270	-74.7
3.0	0.734	-91.7	6.063	103.8	0.090	41.9	0.262	-80.6
3.2	0.716	-96.8	5.857	100.0	0.094	39.4	0.255	-85.9
3.4	0.701	-102.0	5.661	96.2	0.097	36.6	0.246	-92.5
3.6	0.677	-107.8	5.544	91.9	0.100	34.8	0.231	-97.3
3.8	0.657	-113.2	5.397	88.0	0.104	32.7	0.223	-101.9
4.0	0.643	-118.7	5.244	84.2	0.107	30.5	0.217	-107.5
4.2	0.629	-123.8	5.076	80.7	0.109	28.2	0.210	-113.8
4.4	0.612	-129.2	4.965	76.8	0.112	26.5	0.198	-119.4
4.6	0.599	-134.5	4.826	73.2	0.115	24.6	0.194	-124.8
4.8	0.587	-139.9	4.692	69.7	0.117	22.6	0.190	-130.7
5.0	0.578	-144.6	4.557	66.4	0.119	20.7	0.185	-136.9
5.2	0.570	-149.6	4.435	63.0	0.122	19.0	0.180	-143.5
5.4	0.561	-155.0	4.326	59.6	0.124	17.1	0.178	-149.4
5.6	0.554	-159.8	4.207	56.4	0.126	15.4	0.175	-154.7
5.8	0.549	-164.8	4.096	53.2	0.128	13.6	0.175	-161.7
6.0	0.543	-169.9	3.993	49.9	0.130	11.9	0.177	-167.5

TYPICAL NOISE PARAMETERS

(V_{DS}=2V, I_D=15mA, T_a=room temperature)

Freq. (GHz)	NFmin (dB)	Γ _{opt}		R _n (Ω)
		(mag)	(ang)	
2.0	0.33	0.80	12.7	0.20
2.2	0.33	0.77	15.3	0.19
2.4	0.35	0.75	18.2	0.19
2.6	0.33	0.72	21.1	0.18
2.8	0.32	0.70	24.3	0.17
3.0	0.34	0.67	27.7	0.16
3.2	0.36	0.65	31.3	0.16
3.4	0.31	0.63	35.1	0.15
3.6	0.32	0.61	39.0	0.14
3.8	0.32	0.59	43.2	0.13
4.0	0.35	0.58	47.5	0.13
4.2	0.34	0.56	52.0	0.12
4.4	0.35	0.55	56.6	0.12
4.6	0.36	0.54	61.5	0.11
4.8	0.34	0.53	66.4	0.10
5.0	0.35	0.53	71.6	0.10
5.2	0.33	0.53	76.8	0.09
5.4	0.36	0.53	82.3	0.09
5.6	0.37	0.54	87.9	0.08
5.8	0.36	0.55	93.6	0.07
6.0	0.38	0.56	99.4	0.07



(Reference data)

TYPICAL S PARAMETERS

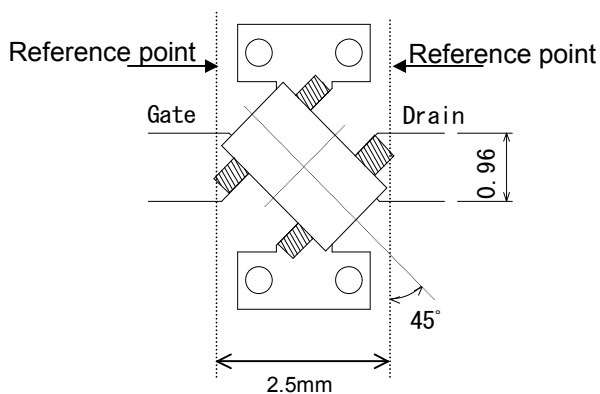
(V_{DS}=2V, I_D=20mA, T_a=room temperature)

Freq. (GHz)	S11		S21		S12		S22	
	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)
2.0	0.839	-63.7	7.275	125.6	0.064	55.9	0.283	-56.2
2.2	0.813	-70.2	7.173	120.5	0.069	53.2	0.278	-61.1
2.4	0.790	-75.9	6.969	116.0	0.074	50.4	0.268	-66.5
2.6	0.773	-80.6	6.635	112.1	0.078	47.3	0.261	-73.6
2.8	0.747	-86.9	6.513	107.4	0.082	45.4	0.241	-77.6
3.0	0.718	-93.8	6.383	102.6	0.086	42.9	0.234	-84.0
3.2	0.699	-99.0	6.161	98.7	0.090	40.5	0.228	-89.6
3.4	0.683	-104.3	5.951	94.9	0.093	37.9	0.220	-96.4
3.6	0.660	-110.1	5.808	90.7	0.096	36.2	0.206	-101.6
3.8	0.640	-115.4	5.641	86.9	0.100	34.2	0.199	-106.4
4.0	0.625	-120.9	5.476	83.1	0.103	32.1	0.194	-112.3
4.2	0.612	-126.2	5.297	79.6	0.105	29.9	0.188	-118.9
4.4	0.596	-131.5	5.171	75.9	0.108	28.3	0.178	-125.0
4.6	0.583	-136.7	5.018	72.3	0.111	26.4	0.175	-130.5
4.8	0.571	-142.2	4.872	68.8	0.114	24.5	0.173	-136.7
5.0	0.564	-146.9	4.730	65.6	0.116	22.7	0.169	-143.2
5.2	0.556	-151.8	4.598	62.2	0.118	21.0	0.166	-150.1
5.4	0.547	-157.2	4.480	58.9	0.121	19.2	0.165	-156.1
5.6	0.541	-162.0	4.354	55.7	0.123	17.5	0.163	-161.5
5.8	0.536	-167.0	4.237	52.5	0.125	15.7	0.165	-168.6
6.0	0.531	-172.0	4.126	49.4	0.127	14.1	0.169	-174.3

TYPICAL NOISE PARAMETERS

(V_{DS}=2V, I_D=20mA, T_a=room temperature)

Freq. (GHz)	NFmin (dB)	Γ _{opt}		R _n (Ω)
		(mag)	(ang)	
2.0	0.34	0.78	12.5	0.19
2.2	0.32	0.76	15.0	0.18
2.4	0.33	0.74	17.9	0.18
2.6	0.34	0.72	20.9	0.17
2.8	0.31	0.70	24.0	0.16
3.0	0.32	0.68	27.4	0.15
3.2	0.30	0.66	31.0	0.15
3.4	0.33	0.64	34.8	0.14
3.6	0.33	0.62	38.7	0.13
3.8	0.34	0.60	42.9	0.13
4.0	0.33	0.59	47.2	0.12
4.2	0.32	0.57	51.7	0.12
4.4	0.33	0.56	56.3	0.11
4.6	0.34	0.55	61.1	0.10
4.8	0.35	0.54	66.1	0.10
5.0	0.33	0.54	71.2	0.09
5.2	0.34	0.53	76.5	0.08
5.4	0.32	0.53	81.9	0.08
5.6	0.34	0.53	87.5	0.07
5.8	0.35	0.53	93.2	0.07
6.0	0.34	0.54	99.0	0.06



Board: ε_r=2.6 Teflon
Thickness: 0.4mm
(4-φ0.4: through-hole)

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