

TOSHIBA FIELD EFFECT TRANSISTOR  
GaAs N CHANNEL SINGLE GATE MODULATION DOPE TYPE

**2SK2332**

SHF BAND LOW NOISE AMPLIFIER APPLICATIONS

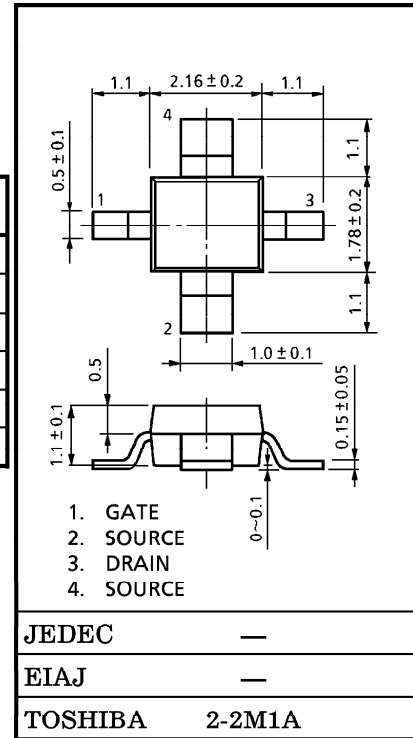
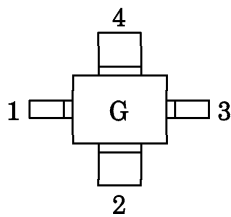
Unit in mm

- Low Noise Figure : NF=0.65dB (f=12GHz)
- High Gain : Ga=11dB (f=12GHz)

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Gate-Drain Voltage	V <sub>GDO</sub>	-3	V
Gate-Source Voltage	V <sub>GSO</sub>	-3	V
Drain Current	I <sub>D</sub>	80	mA
Power Dissipation	P <sub>D</sub>	150	mW
Channel Temperature	T <sub>ch</sub>	125	°C
Storage Temperature Range	T <sub>stg</sub>	-55~125	°C

Marking



JEDEC	—
EIAJ	—
TOSHIBA	2-2M1A

Weight : 0.016g (Typ.)

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current	I <sub>GSS</sub>	V <sub>DS</sub> =0, V <sub>GS</sub> =-2V	—	—	-20	μA
Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =2V, V <sub>GS</sub> =0	20	40	80	mA
Gate-Source Cut-off Voltage	V <sub>GS(OFF)</sub>	V <sub>DS</sub> =2V, I <sub>D</sub> =100μA	-0.2	-0.8	-2	V
Forward Transfer Admittance	Y <sub>fs</sub>	V <sub>DS</sub> =2V, I <sub>D</sub> =15mA, f=1kHz	—	90	—	mS
Noise Figure	NF	V <sub>DS</sub> =2V, I <sub>D</sub> =15mA, f=12GHz	—	0.65	0.8	dB
Associated Gain	Ga	V <sub>DS</sub> =2V, I <sub>D</sub> =15mA, f=12GHz	10	11	—	dB

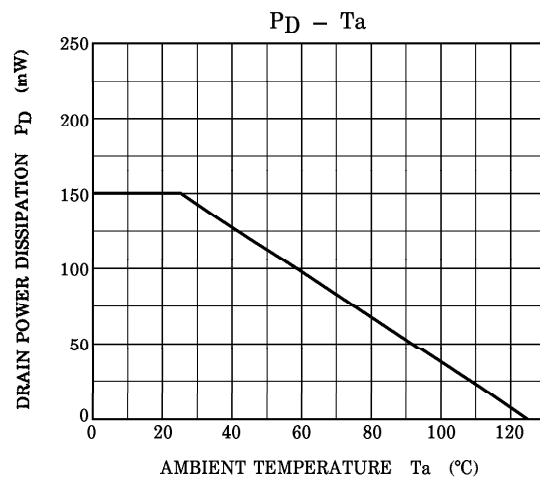
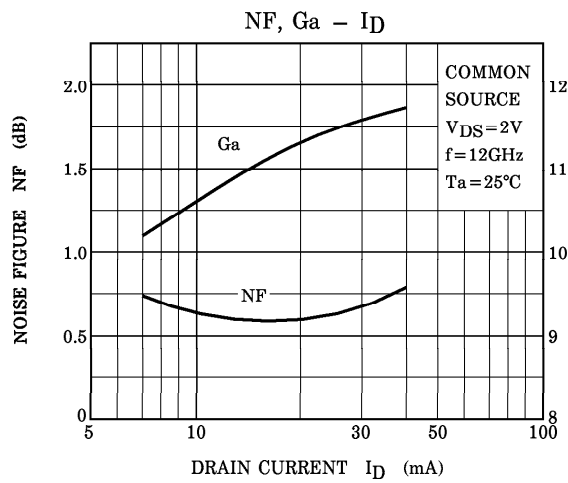
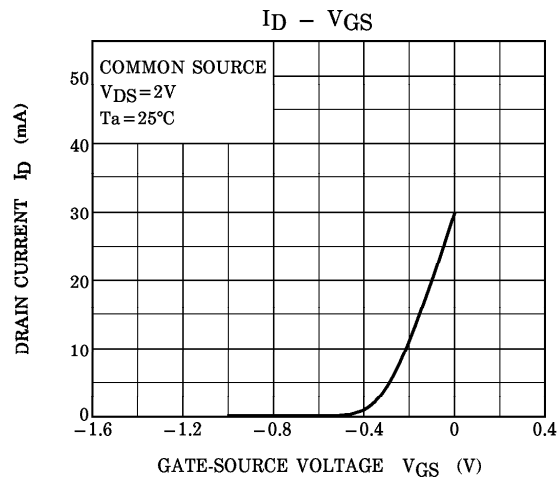
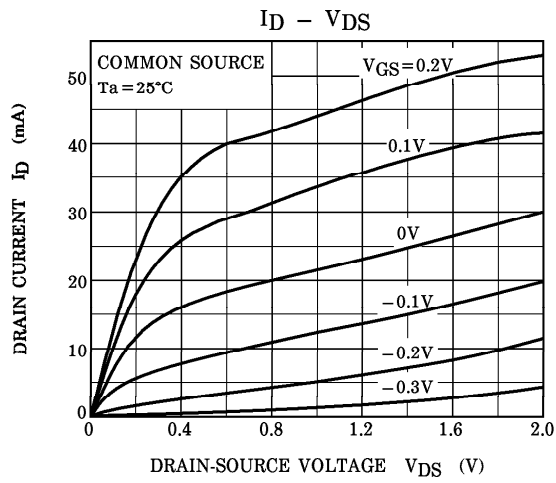
**CAUTION**

GaAs (Gallium Arsenide) is used in this product. The dust or vapor can be dangerous to humans. Do not break, cut, crush or dissolve chemically. Dispose of this product properly according to law. Do not intermingle with normal industrial or domestic waste.

This device electrostatic sensitivity. Please handle with caution.

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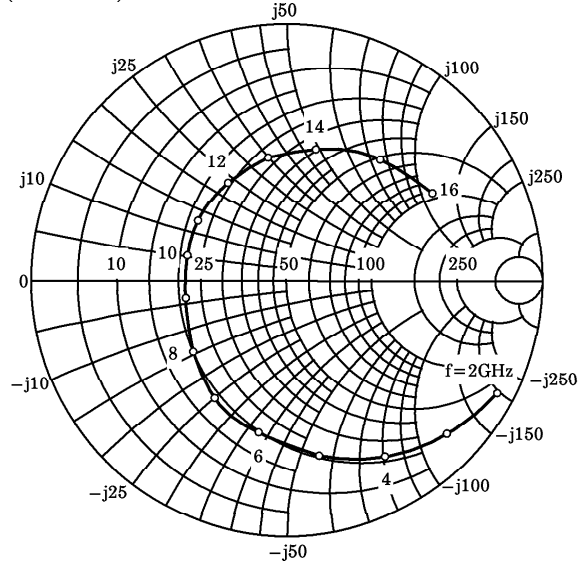
S-PARAMETER

COMMON SOURCE

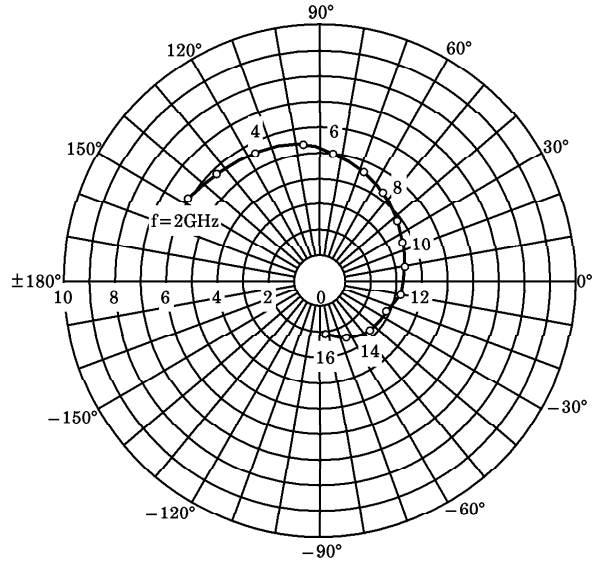
( $V_{DS} = 2V$ ,  $I_D = 15mA$ ,  $T_a = 25^\circ C$ ,  $Z_0 = 50\Omega$ )

FREQ. (MHz)	S <sub>11</sub>		S <sub>21</sub>		S <sub>12</sub>		S <sub>22</sub>	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
2000	0.936	-28	6.008	148	0.035	76	0.420	-14
3000	0.867	-44	5.833	133	0.051	71	0.385	-24
4000	0.787	-61	5.617	117	0.066	60	0.344	-34
5000	0.696	-80	5.363	97	0.088	49	0.279	-45
6000	0.608	-100	4.996	83	0.094	40	0.211	-58
7000	0.539	-121	4.579	68	0.104	31	0.163	-72
8000	0.468	-142	4.204	53	0.112	20	0.112	-83
9000	0.410	-169	3.839	37	0.116	7	0.032	-108
10000	0.399	166	3.546	23	0.122	-2	0.043	118
11000	0.417	146	3.365	9	0.129	-11	0.086	100
12000	0.441	121	3.141	-10	0.135	-25	0.145	78
13000	0.478	98	2.921	-25	0.136	-37	0.210	63
14000	0.524	77	2.740	-44	0.140	-52	0.262	51
15000	0.594	52	2.465	-65	0.143	-69	0.354	34
16000	0.662	31	2.099	-82	0.130	-83	0.453	18

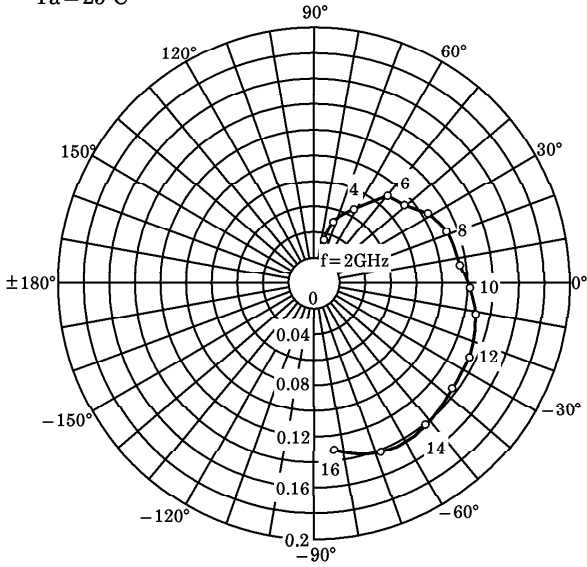
S<sub>11</sub>  
COMMON SOURCE  
V<sub>DS</sub>=2V  
I<sub>D</sub>=15mA  
T<sub>a</sub>=25°C  
(UNIT : Ω)



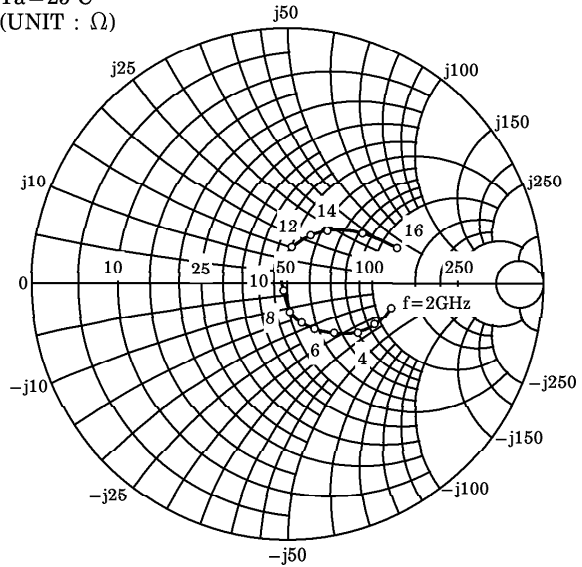
S<sub>21</sub>  
COMMON SOURCE  
V<sub>DS</sub>=2V  
I<sub>D</sub>=15mA  
T<sub>a</sub>=25°C



S<sub>12</sub>  
COMMON SOURCE  
V<sub>DS</sub>=2V  
I<sub>D</sub>=15mA  
T<sub>a</sub>=25°C



S<sub>22</sub>  
COMMON SOURCE  
V<sub>DS</sub>=2V  
I<sub>D</sub>=15mA  
T<sub>a</sub>=25°C  
(UNIT : Ω)

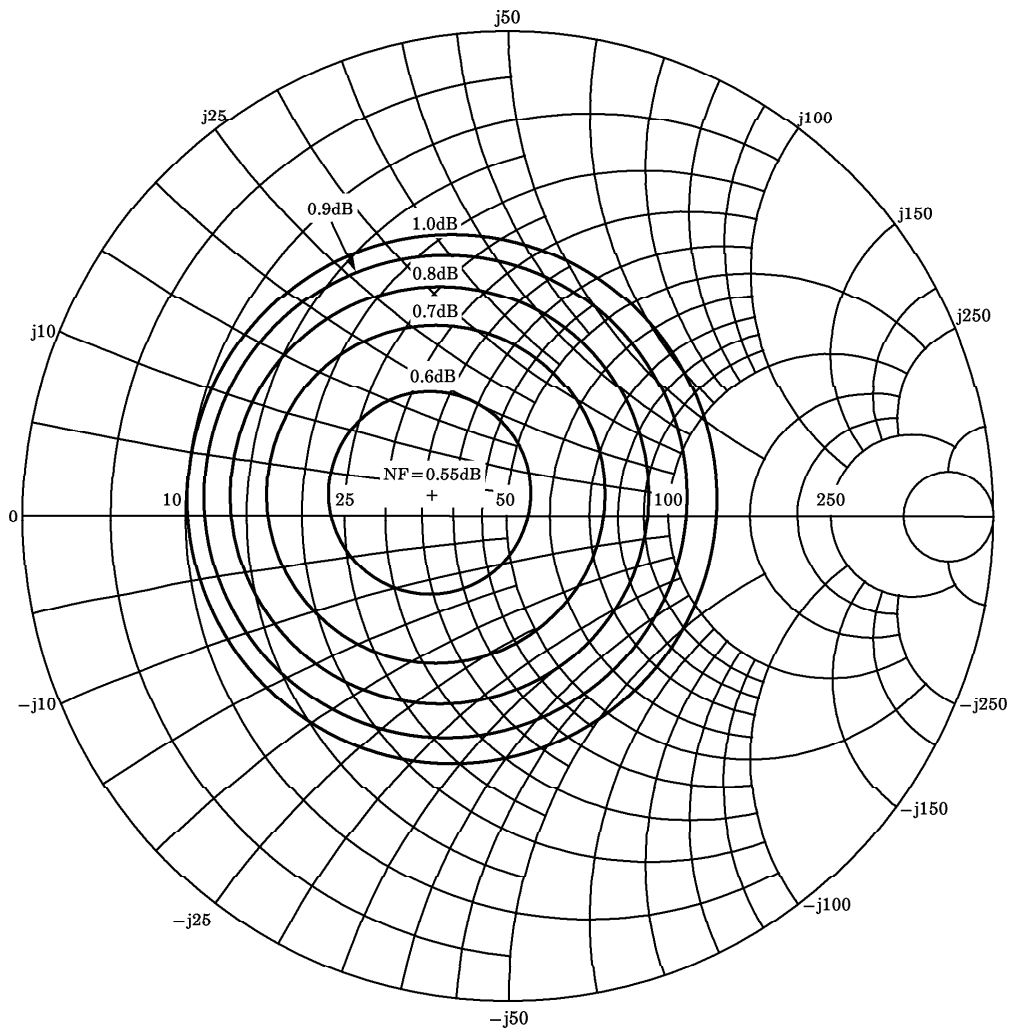


CONSTANT NOISE FIGURE

NF min = 0.55dB,  $\Gamma_{opt} = 0.17 \angle 166$ ,  $R_n = 2.6\Omega$

@  $V_{DS} = 2V$ ,  $I_D = 15mA$ ,  $f = 12GHz$

$Z_0 = 50\Omega$ ,  $T_a = 25^\circ C$



## Recommended Methods of Mounting for This Device

Mounting method				
Solder flow	Nearinfrared reflow	Farinfrared reflow	VPS & hot air reflow	Soldering iron
×	○	◎	◎	○

◎ : Applicable

○ : Applicable only once

× : Not applicable; other methods are recommended.

Note 1 : For either method of mounting, the above table shows whether applicable or not under Toshiba's recommended mounting conditions.

Note 2 : When mounted a number of times, those marked by ◎ can only be used. In this case, mounting is allowed up to three times, with the interval from the first to the third mounting completed within 24 hours.