

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

2SK2332

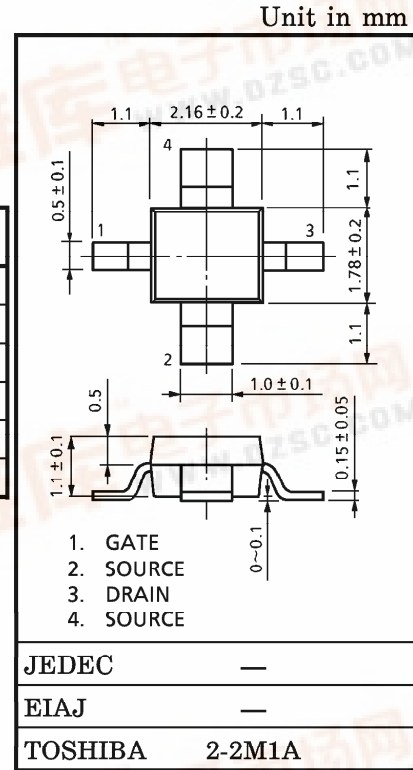
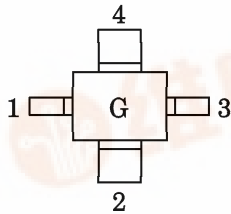
SHF BAND LOW NOISE AMPLIFIER APPLICATIONS

- Low Noise Figure : $NF=0.65\text{dB}$ ($f=12\text{GHz}$)
- High Gain : $Ga=11\text{dB}$ ($f=12\text{GHz}$)

MAXIMUM RATINGS ($T_a = 25^\circ\text{C}$)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Gate-Drain Voltage	V_{GDO}	-3	V
Gate-Source Voltage	V_{GSO}	-3	V
Drain Current	I_D	80	mA
Power Dissipation	P_D	150	mW
Channel Temperature	T_{ch}	125	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	-55~125	$^\circ\text{C}$

Marking



Weight : 0.016g (Typ.)

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current	I_{GSS}	$V_{DS}=0, V_{GS}=-2\text{V}$	—	—	-20	μA
Drain Current	I_{DSS}	$V_{DS}=2\text{V}, V_{GS}=0$	20	40	80	mA
Gate-Source Cut-off Voltage	$V_{GS}(\text{OFF})$	$V_{DS}=2\text{V}, I_D=100\mu\text{A}$	-0.2	-0.8	-2	V
Forward Transfer Admittance	$ Y_{fs} $	$V_{DS}=2\text{V}, I_D=15\text{mA}, f=1\text{kHz}$	—	90	—	mS
Noise Figure	NF	$V_{DS}=2\text{V}, I_D=15\text{mA}, f=12\text{GHz}$	—	0.65	0.8	dB
Associated Gain	Ga	$V_{DS}=2\text{V}, I_D=15\text{mA}, f=12\text{GHz}$	10	11	—	dB

CAUTION

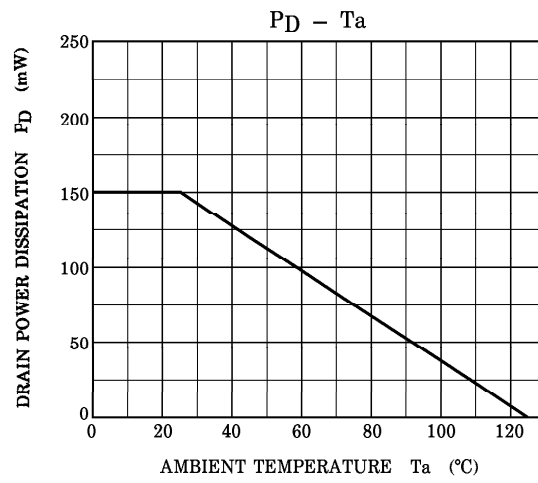
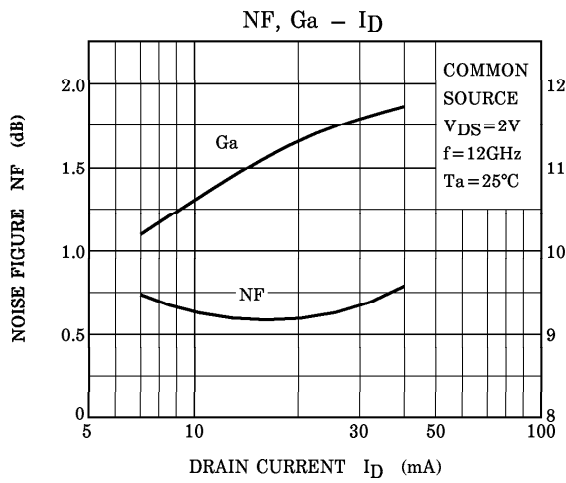
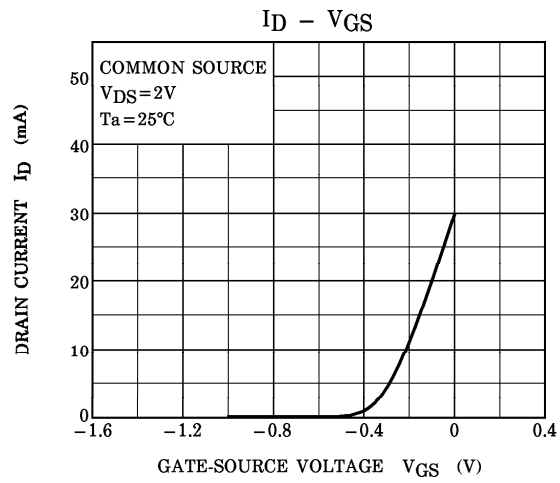
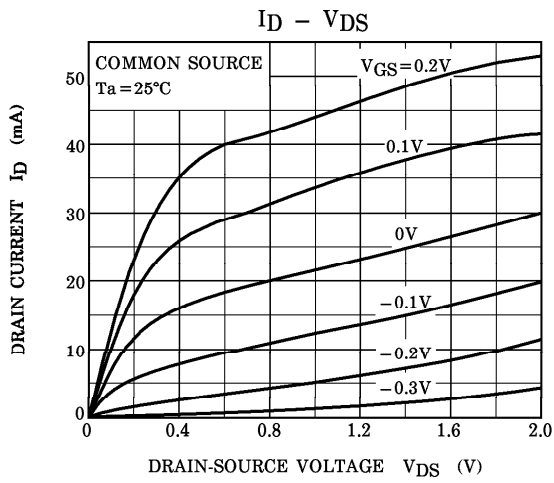
GaAs (Gallium Arsenide) is used in this product. The dust or vapor can be dangerous to humans. Do not break, cut, crush or dissolve chemically. Dispose of this product properly according to law. Do not intermingle with normal industrial or domestic waste.

This device electrostatic sensitivity. Please handle with caution.

961001EAC2

- TOSHIBA is continually working to improve the quality and the reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to observe standards of safety, and to avoid situations in which a malfunction or failure of a TOSHIBA product could cause loss of human life, bodily injury or damage to property. In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent products specifications. Also, please keep in mind the precautions and conditions set forth in the TOSHIBA Semiconductor Reliability Handbook.
- Gallium arsenide (GaAs) is a substance used in the products described in this document. GaAs dust and fumes are toxic. Do not break, cut or pulverize the product, or use chemicals to dissolve them. When disposing of the products, follow the appropriate regulations. Do not dispose of the products with other industrial waste or with domestic garbage.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA CORPORATION for any infringements of intellectual property or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any intellectual property or other rights of TOSHIBA CORPORATION or others.
- The information contained herein is subject to change without notice.

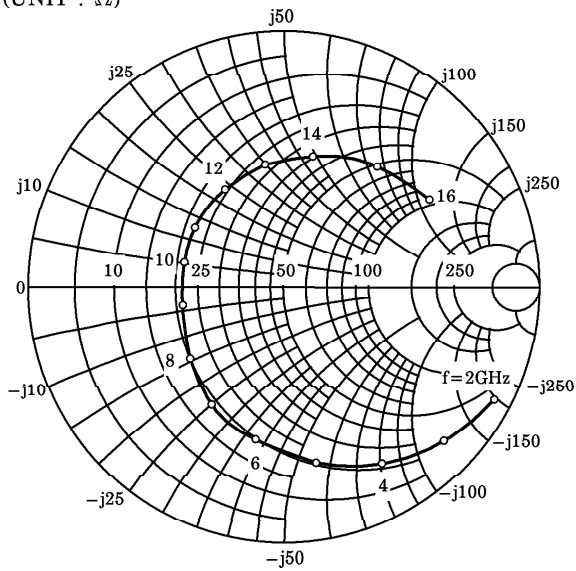




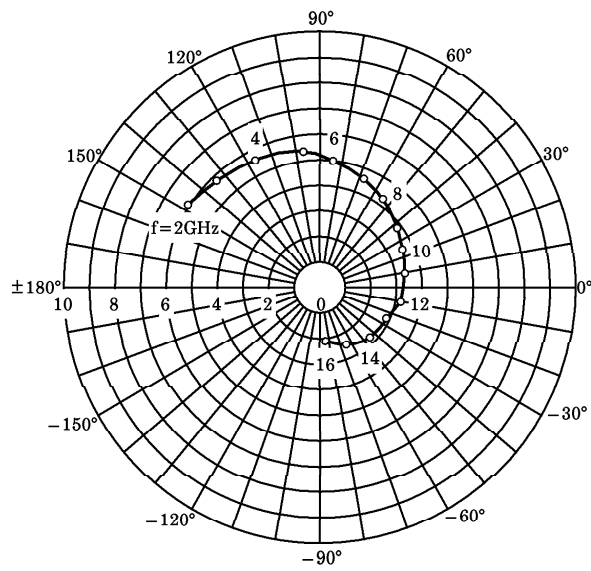
S-PARAMETER
 COMMON SOURCE
 ($V_{DS}=2V$, $I_D=15mA$, $T_a=25^\circ C$, $Z_0=50\Omega$)

FREQ. (MHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	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

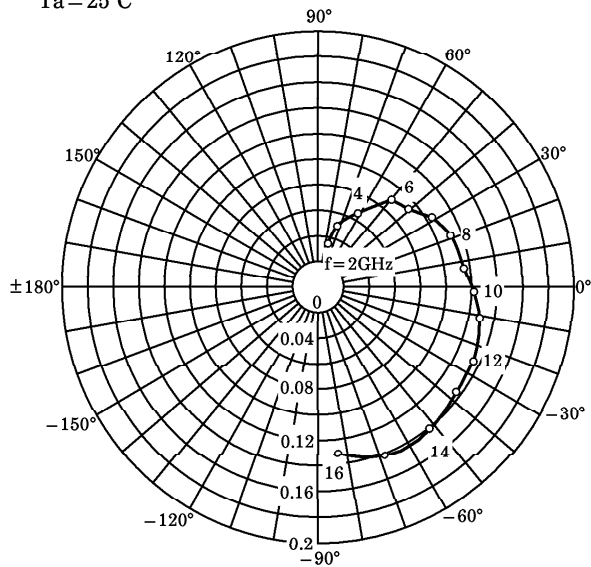
S₁₁
COMMON SOURCE
V_{DS}=2V
I_D=15mA
T_a=25°C
(UNIT : Ω)



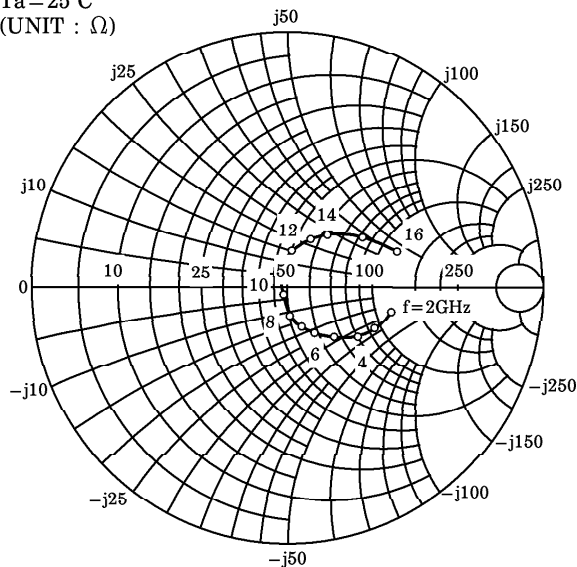
S₂₁
COMMON SOURCE
V_{DS}=2V
I_D=15mA
T_a=25°C



S₁₂
COMMON SOURCE
V_{DS}=2V
I_D=15mA
T_a=25°C

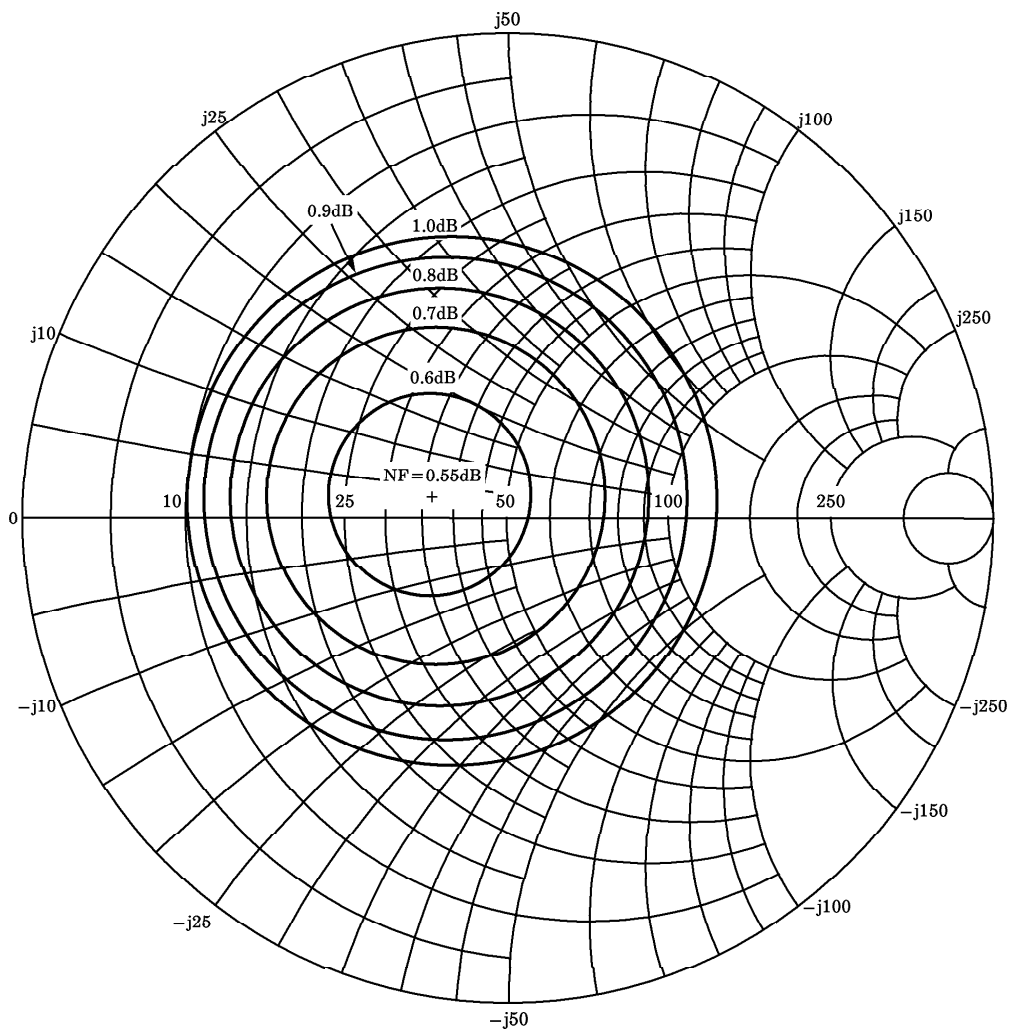


S₂₂
COMMON SOURCE
V_{DS}=2V
I_D=15mA
T_a=25°C
(UNIT : Ω)



CONSTANT NOISE FIGURE

NF min = 0.55dB, $\Gamma_{opt} = 0.17 \angle 166$, $R_n = 2.6\Omega$
@ $V_{DS} = 2V$, $I_D = 15mA$, $f = 12GHz$
 $Z_o = 50\Omega$, $T_a = 25^\circ C$



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.