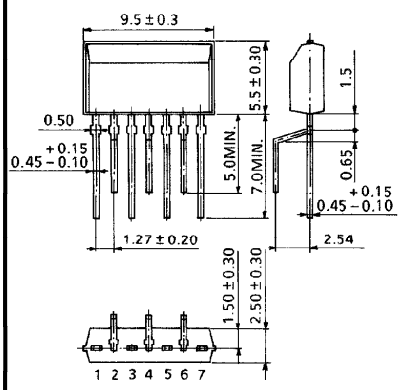
TOSHIBA DUAL FIELD EFFECT TRANSISTOR SILICON MONOLITHIC N CHANNEL JUNCTION TYPE

2SK389

LOW NOISE AUDIO AND DIFFERENTIAL AMPLIFIER APPLICATIONS.

Unit in mm

- 1 Chip Dual Type.
- Recommended for First Differential Stages of DC Amplifiers.
- Very High $|Y_{fs}|$: $|Y_{fs}|$ = 20mS (Typ.)
  (V_{DS} = 10V, V_{GS} = 0, f = 1kHz, I_{DSS} = 3mA)
- Good Pair Characteristics
- High Breakdown Voltage : V_{GDS} = −50V (Min.)
- Very Low Noise : NF = 0.5dB (Typ.)
  (V_{DS} = 10V, I_D = 1mA, R_G = 1kΩ, f = 1kHz)
- High Input Impedance : I_{GSS} = −1.0nA (Max.) (V_{GS} = −30V)
- Complementary to 2SJ109



1. DRAIN 1
2. GATE 1
3. SOURCE 1
4. SUBSTRATE (Note 2)
5. SOURCE 2
6. GATE 2
7. DRAIN 2

JEDEC	—
EIAJ	—
TOSHIBA	2-10M1A

Weight : 0.37g (Typ.)

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Gate-Drain Voltage	V_{GDS}	−50	V
Gate Current	I_G	10	mA
Drain Power Dissipation	P_D	200	mW
Junction Temperature	T_j	125	°C
Storage Temperature Range	T_{stg}	−55~125	°C

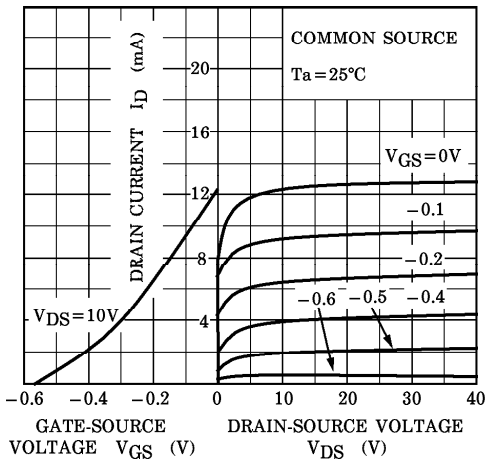
961001EAA2

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

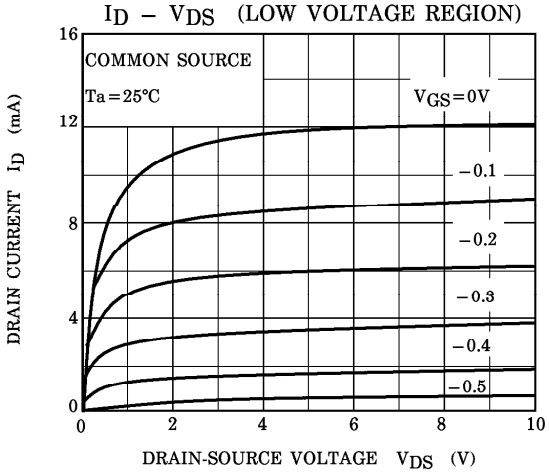
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Cut-off Current	I_{GSS}	$V_{GS}=-30V$, $V_{DS}=0$	—	—	−1.0	nA
Gate-Drain Breakdown Voltage	$V_{(BR)GDS}$	$V_{DS}=0$, $I_G=-100\mu A$	−50	—	—	V
Drain Current	I_{DSS} (Note 1)	$V_{DS}=10V$, $V_{GS}=0$	2.6	—	20	mA
Drain Current Ratio	I_{DSS} (small) / I_{DSS} (large)	$V_{DS}=10V$, $V_{GS}=0$	0.9	—	—	—
Gate-Source Cut-off Voltage	$V_{GS(OFF)}$	$V_{DS}=10V$, $I_D=0.1\mu A$	−0.15	—	−2.0	V
Forward Transfer Admittance	$\|Y_{fs}\|$	$V_{DS}=10V$, $V_{GS}=0$ f=1kHz, $I_{DSS}=3mA$	8	20	—	mS
Forward Transfer Admittance Ratio	$\|Y_{fs}\|$ (small) / $\|Y_{fs}\|$ (large)	$V_{DS}=10V$, $V_{GS}=0$, f=1kHz	0.9	—	—	—
Differential Gate-Source Voltage	$\|V_{GS1}-V_{GS2}\|$	$V_{DS}=10V$, $I_D=1mA$	—	—	20	mV
Input Capacitance	C_{iss}	$V_{DS}=10V$, $V_{GS}=0$, f=1MHz	—	25	—	pF
Reverse Transfer Capacitance	C_{rss}	$V_{GD}=-10V$, $I_D=0$, f=1MHz	—	5.5	—	pF
Noise Figure	NF (1)	$V_{DS}=10V$, $R_G=1k\Omega$ $I_D=1mA$, f=10Hz	—	1.5	10	dB
	NF (2)	$V_{DS}=10V$, $R_G=1k\Omega$ $I_D=1mA$, f=1kHz	—	0.5	2	dB

Note 1 : I_{DSS} Classification GR : 2.6~6.5mA, BL : 6~12mA, V : 10~20mA
Note 2 : Use the substrate lead with open.

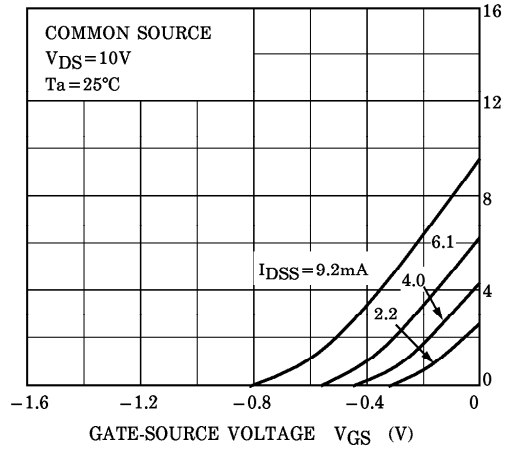
STATIC CHARACTERISTICS



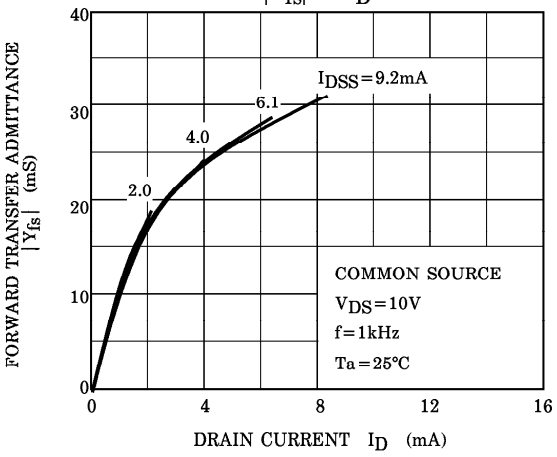
$I_D - V_{DS}$ (LOW VOLTAGE REGION)



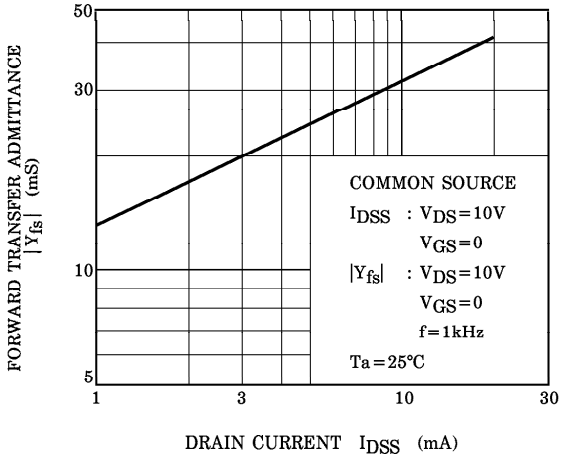
$I_D - V_{GS}$



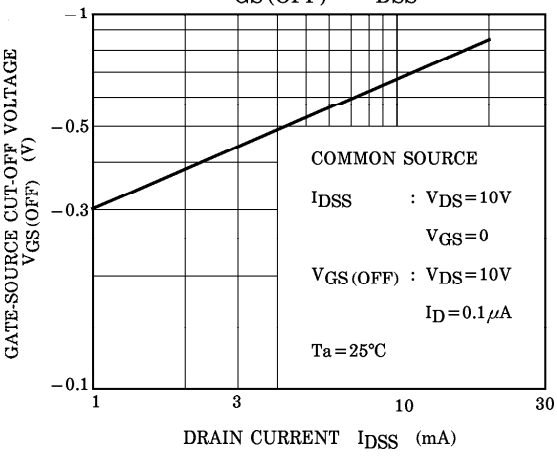
$|Y_{fs}| - I_D$



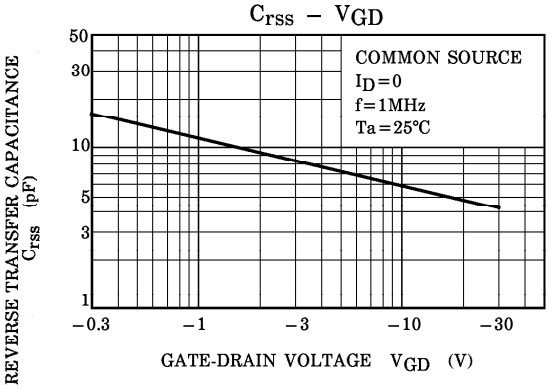
$|Y_{fs}| - I_{DSS}$



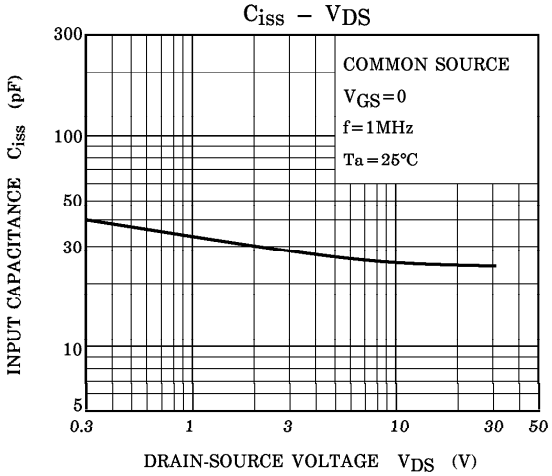
$V_{GS(OFF)} - I_{DSS}$



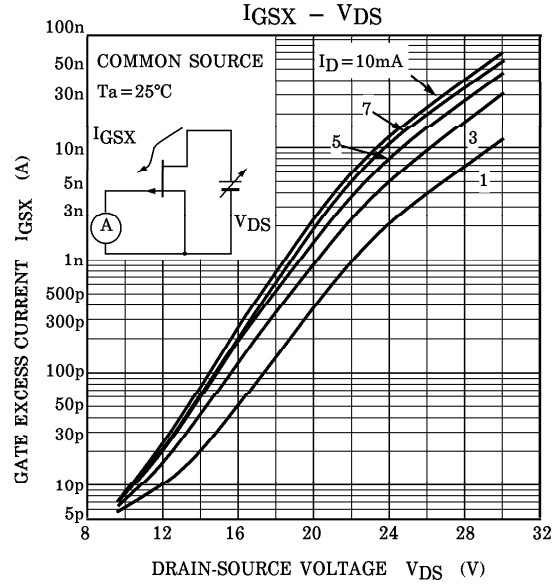
C_{rss} – V_{GD}



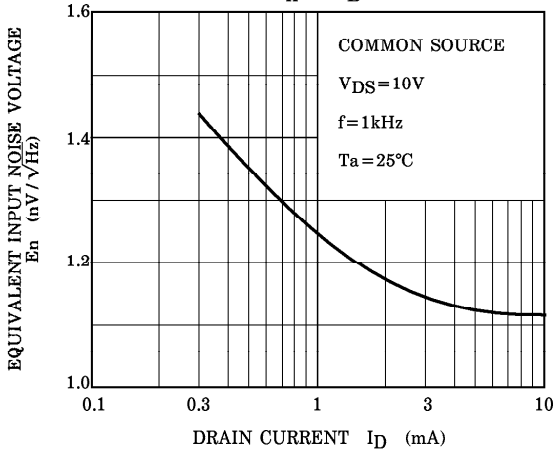
C_{iss} – V_{DS}



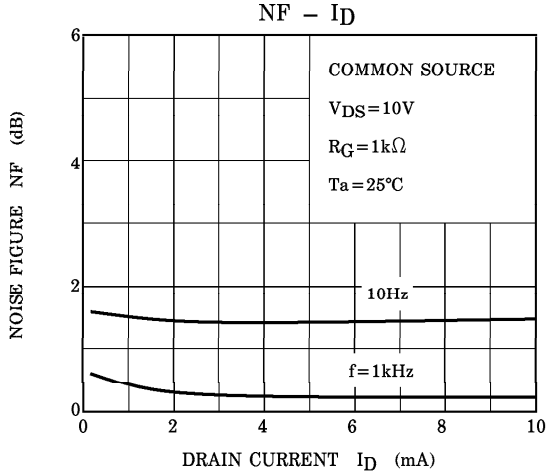
I_{GSX} – V_{DS}



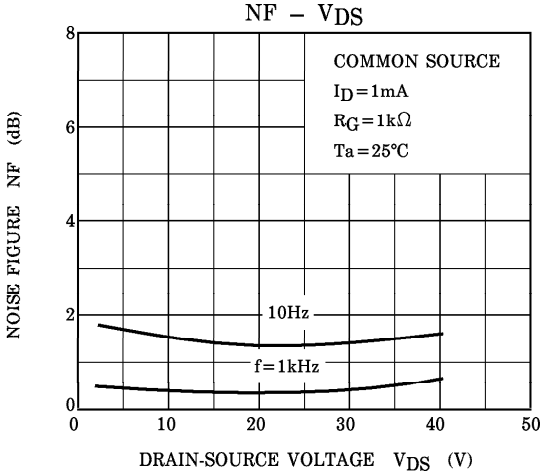
E_n – I_D

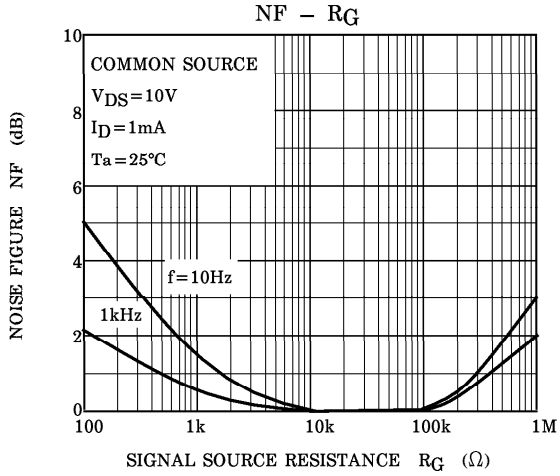


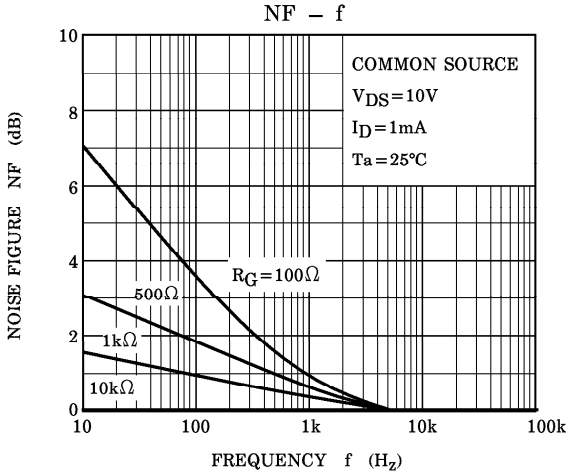
NF – I_D



NF – V_{DS}




NF – RG
COMMON SOURCE
VDS=10V
ID=1mA
Ta=25°C
f=10Hz
1kHz
NOISE FIGURE NF (dB)
SIGNAL SOURCE RESISTANCE RG (Ω)
10
8
6
4
2
0
100
1k
10k
100k
1M


NF – f
COMMON SOURCE
VDS=10V
ID=1mA
Ta=25°C
RG=100Ω
500Ω
1kΩ
10kΩ
NOISE FIGURE NF (dB)
FREQUENCY f (Hz)
10
8
6
4
2
0
10
100
1k
10k
100k