

TOSHIBA Field Effect Transistor Silicon N Channel Junction Type

# 2SK209

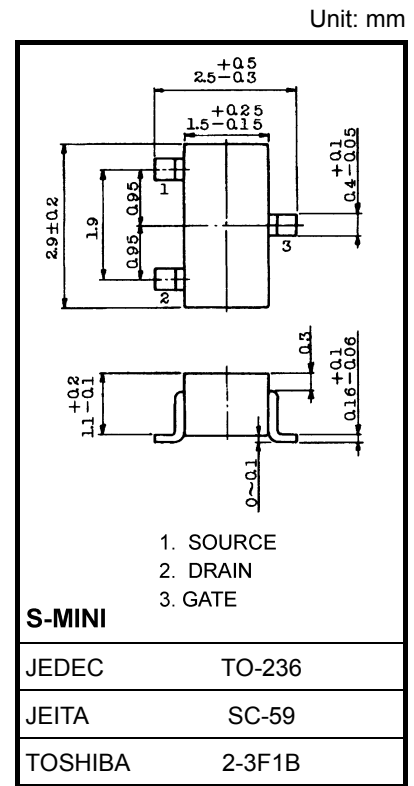
## Audio Frequency Low Noise Amplifier Applications

- High  $|Y_{fs}|$ :  $|Y_{fs}| = 15 \text{ mS (typ.)}$  at  $V_{DS} = 10 \text{ V}$ ,  $V_{GS} = 0$
- High breakdown voltage:  $V_{GDS} = -50 \text{ V}$
- Low noise:  $NF = 1.0\text{dB (typ.)}$   
at  $V_{DS} = 10 \text{ V}$ ,  $I_D = 0.5 \text{ mA}$ ,  $f = 1 \text{ kHz}$ ,  $R_G = 1 \text{ k}\Omega$
- High input impedance:  $I_{GSS} = -1 \text{ nA (max)}$  at  $V_{GS} = -30 \text{ V}$
- Small package

## Absolute Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Gate-drain voltage	$V_{GDS}$	-50	V
Gate current	$I_G$	10	mA
Drain power dissipation	$P_D$	150	mW
Junction temperature	$T_j$	125	°C
Storage temperature range	$T_{stg}$	-55 to 125	°C

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings. Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).



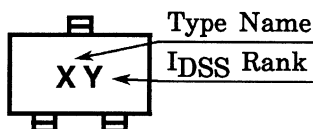
Weight: 0.012 g (typ.)

## Electrical Characteristics (Ta = 25°C)

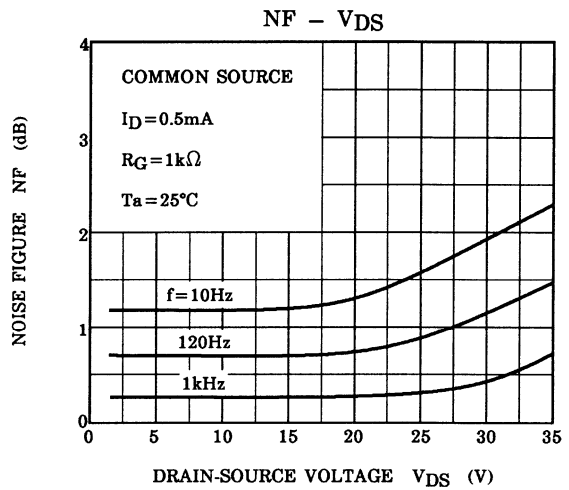
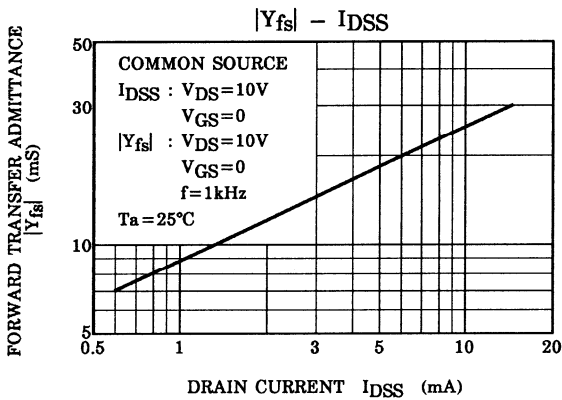
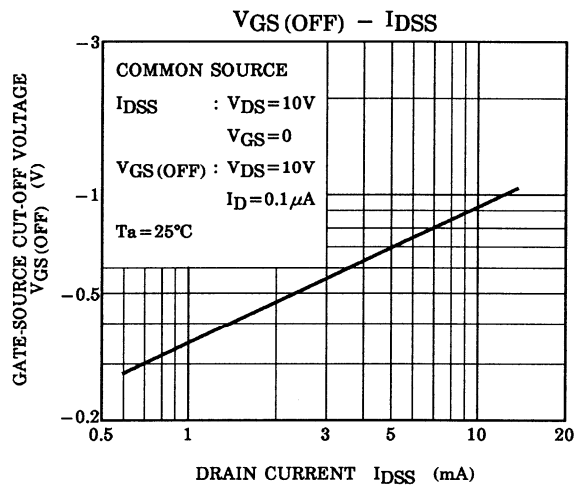
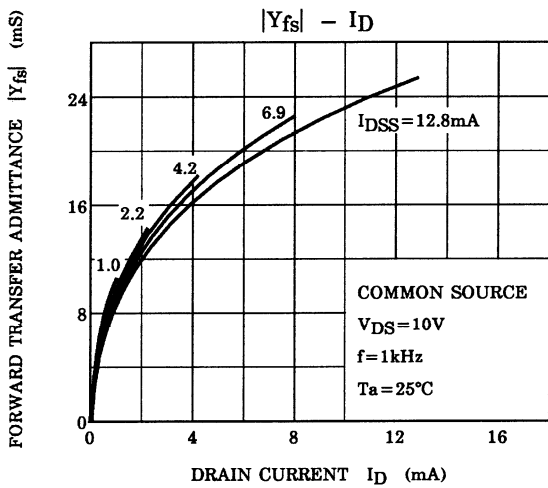
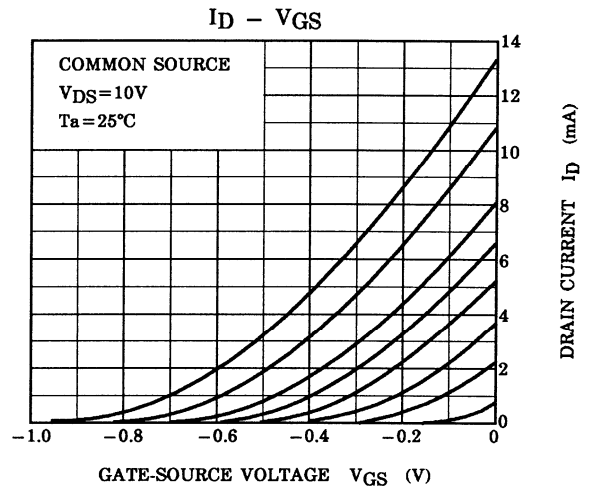
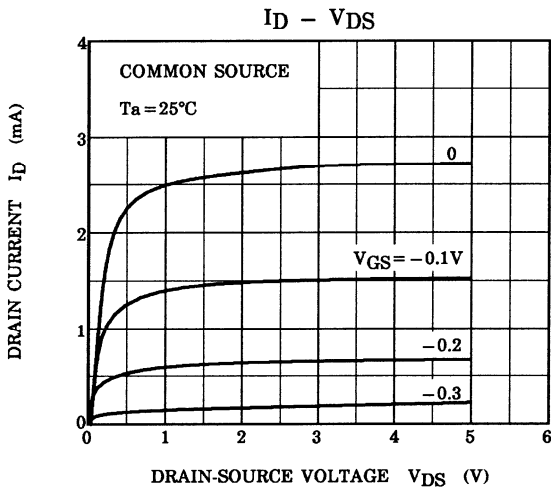
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Gate cut-off current	$I_{GSS}$	$V_{GS} = -30 \text{ V}$ , $V_{DS} = 0$	—	—	-1.0	nA
Gate-drain breakdown voltage	$V_{(BR)GDS}$	$V_{DS} = 0$ , $I_G = -100 \mu\text{A}$	-50	—	—	V
Drain current	$I_{DSS}$ (Note)	$V_{DS} = 10 \text{ V}$ , $V_{GS} = 0$	1.2	—	14.0	mA
Gate-source cut-off voltage	$V_{GS(OFF)}$	$V_{DS} = 10 \text{ V}$ , $I_D = 0.1 \mu\text{A}$	-0.2	—	-1.5	V
Forward transfer admittance	$ Y_{fs} $	$V_{DS} = 10 \text{ V}$ , $V_{GS} = 0$ , $f = 1 \text{ kHz}$	4.0	15	—	mS
Input capacitance	$C_{iss}$	$V_{DS} = 10 \text{ V}$ , $V_{GS} = 0$ , $f = 1 \text{ MHz}$	—	13	—	pF
Reverse transfer capacitance	$C_{rss}$	$V_{DG} = 10 \text{ V}$ , $I_D = 0$ , $f = 1 \text{ MHz}$	—	3	—	pF
Noise figure	NF (1)	$V_{DS} = 10 \text{ V}$ , $R_G = 1 \text{ k}\Omega$ $I_D = 0.5 \text{ mA}$ , $f = 10 \text{ Hz}$	—	5	—	dB
Noise figure	NF (2)	$V_{DS} = 10 \text{ V}$ , $R_G = 1 \text{ k}\Omega$ $I_D = 0.5 \text{ mA}$ , $f = 1 \text{ kHz}$	—	1	—	dB

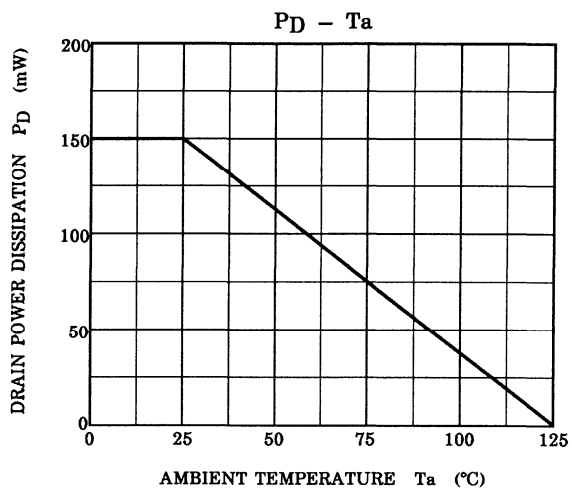
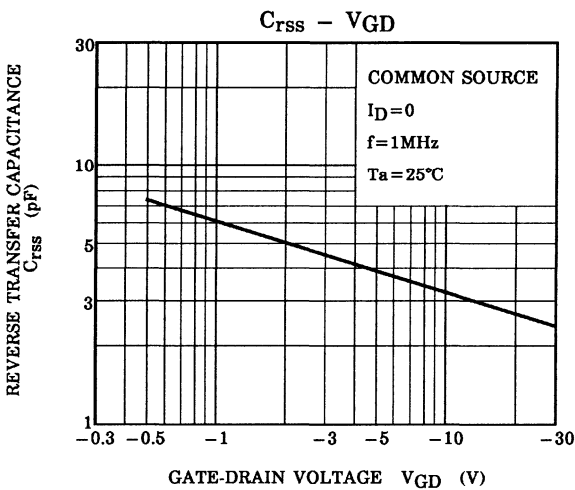
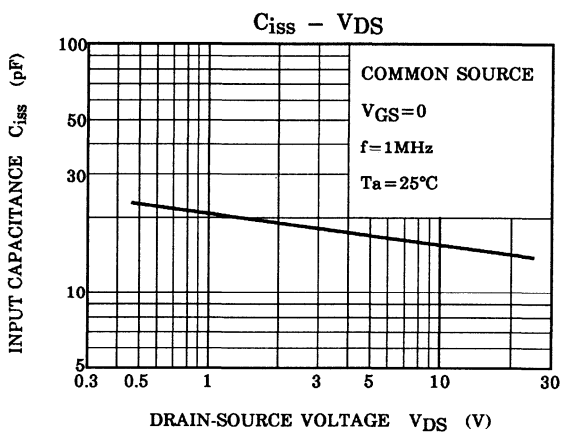
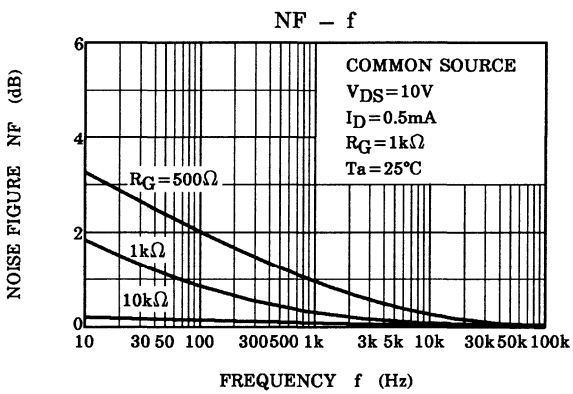
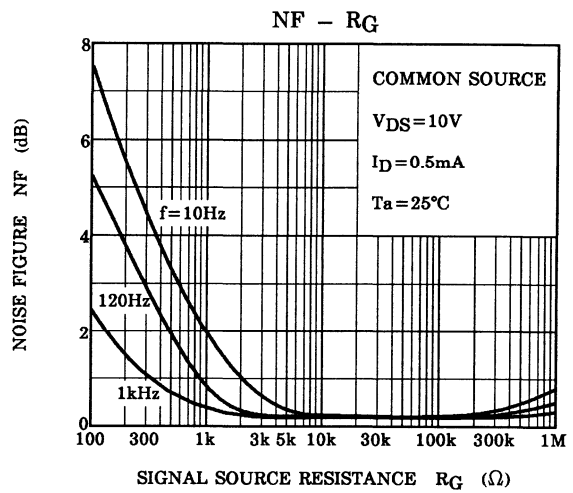
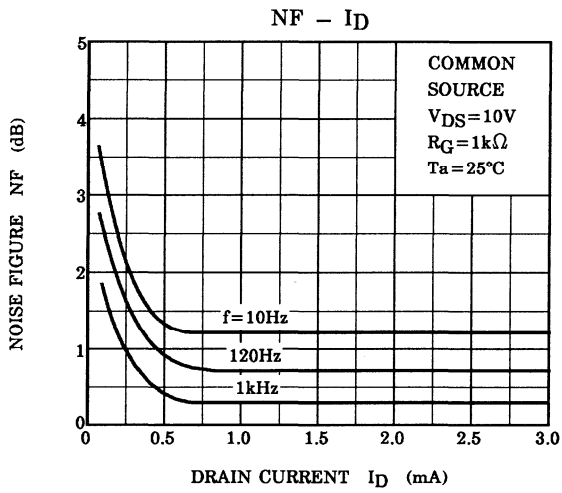
Note:  $I_{DSS}$  classification Y: 1.2~3.0 mA, GR: 2.6~6.5 mA, BL: 6.0~14 mA

## Marking



Start of commercial production  
1981-06





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