

# 2SK3320

## For Low Noise Audio Amplifier Applications

- Two devices in a ultra super mini (five pins) package
- High  $|Y_{fs}|$ :  $|Y_{fs}| = 15 \text{ mS (typ.) (} V_{DS} = 10 \text{ V, } V_{GS} = 0)$
- High breakdown voltage:  $V_{GDS} = -50 \text{ V}$
- Super low noise:  $NF = 1.0\text{dB (typ.)}$   
( $V_{DS} = 10 \text{ V, } I_D = 0.5 \text{ mA, } f = 1 \text{ kHz, } R_G = 1 \text{ k}\Omega$ )
- High input impedance:  $I_{GSS} = -1 \text{ nA (max) (} V_{GS} = -30 \text{ V)}$

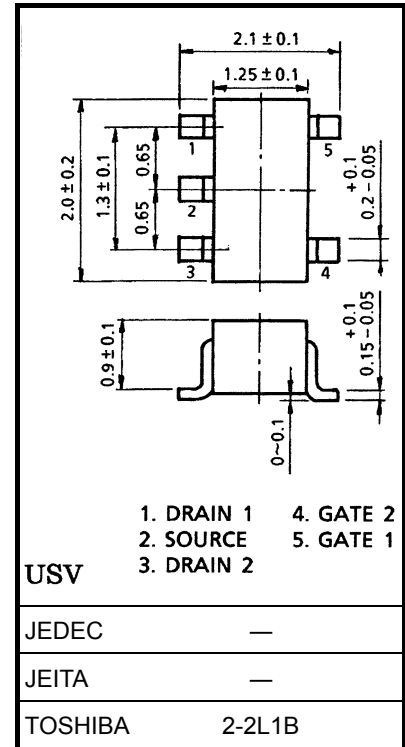
### Absolute Maximum Ratings ( $T_a = 25^\circ\text{C}$ ) (Q1, Q2 common)

Characteristics	Symbol	Rating	Unit
Gate-drain voltage	$V_{GDS}$	-50	V
Gate current	$I_G$	10	mA
Drain power dissipation	$P_D$ (Note 1)	200	mW
Junction temperature	$T_j$	125	$^\circ\text{C}$
Storage temperature range	$T_{stg}$	-55 to 125	$^\circ\text{C}$

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).

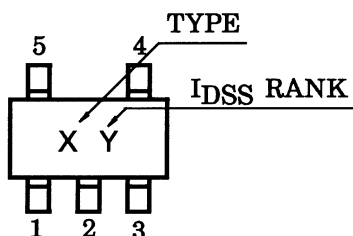
Note 1: Total rating

Unit: mm

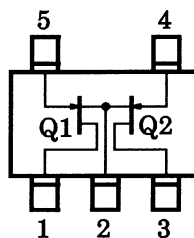


Weight: 6.2 mg (typ.)

### Marking



### Pin Assignment (top view)



Start of commercial production  
1999-01

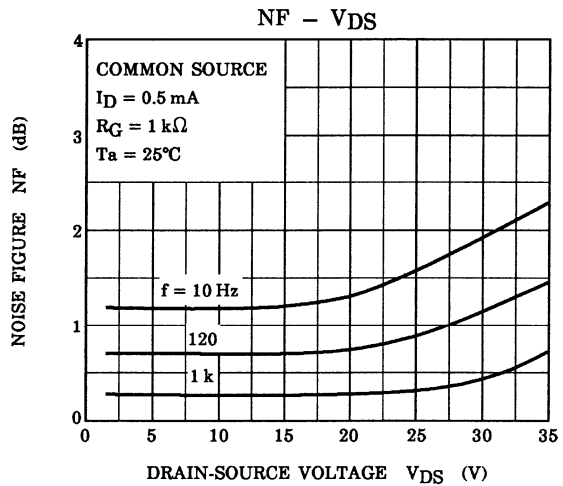
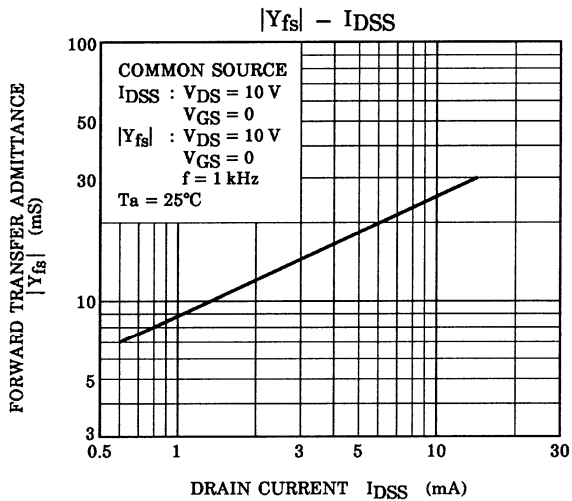
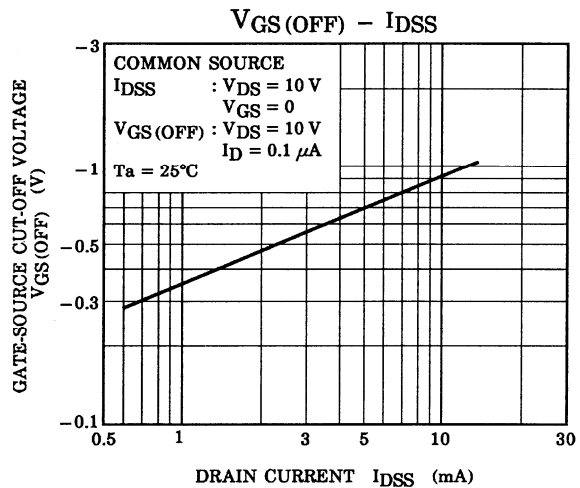
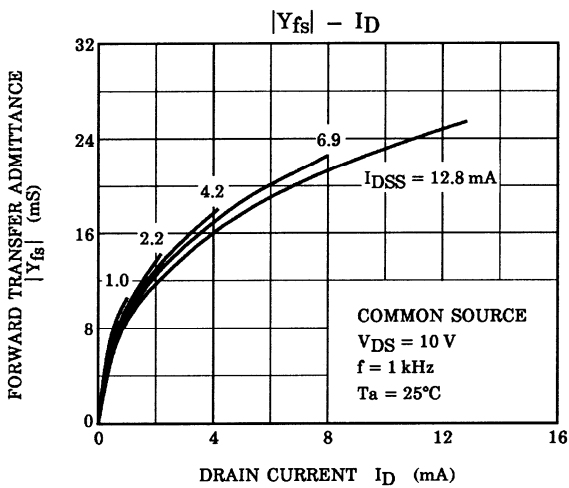
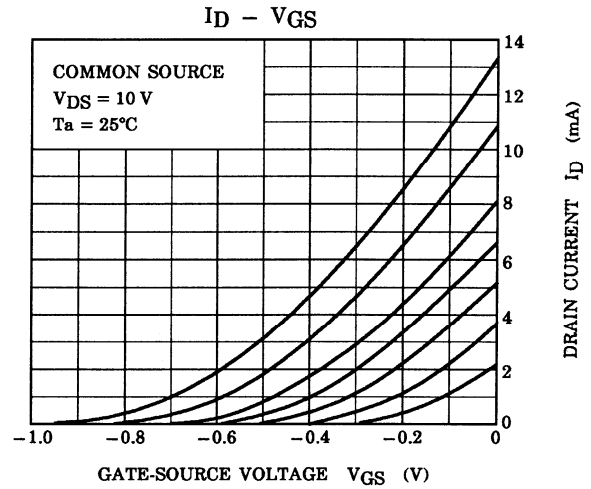
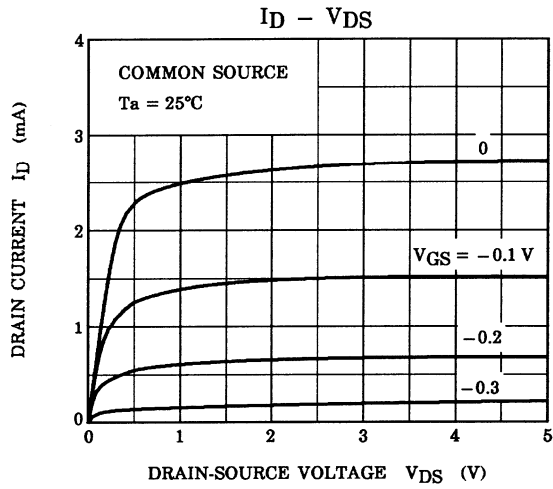
## Electrical Characteristics (Ta = 25°C) (Q1, Q2 common)

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 2)	$V_{DS} = 10\text{ V}, V_{GS} = 0$	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
	NF (2)	$V_{DS} = 10\text{ V}, R_G = 1\text{ k}\Omega, I_D = 0.5\text{ mA}, f = 1\text{ kHz}$	—	1	—	

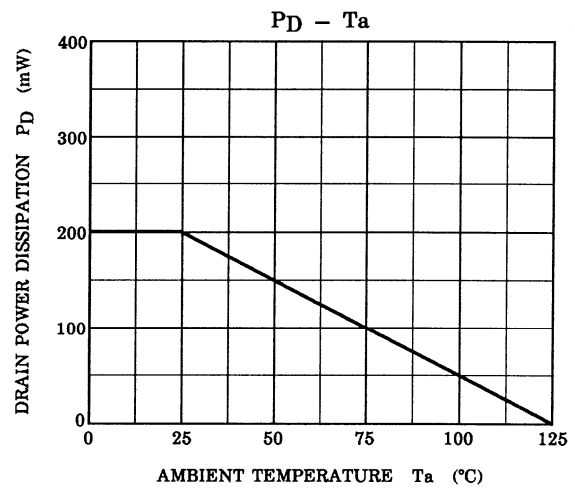
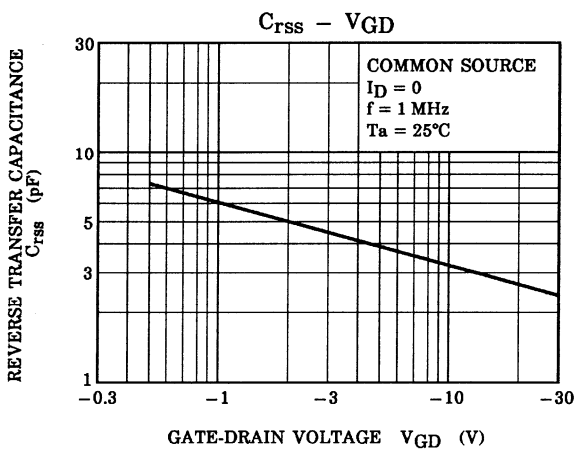
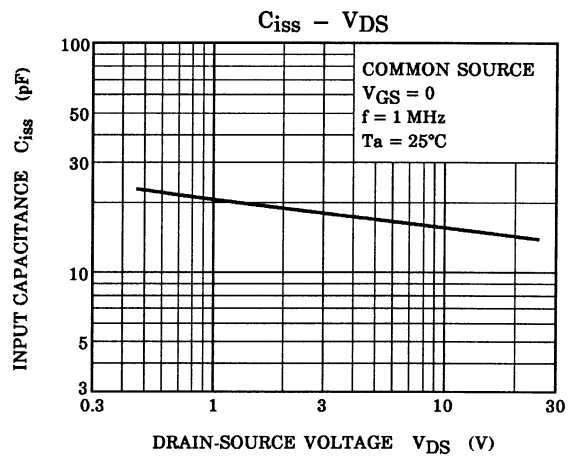
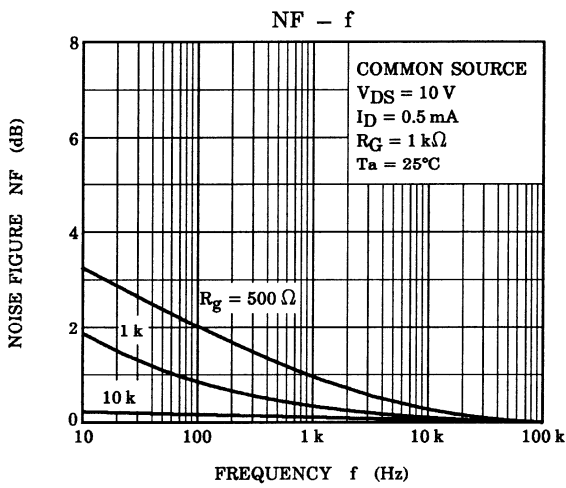
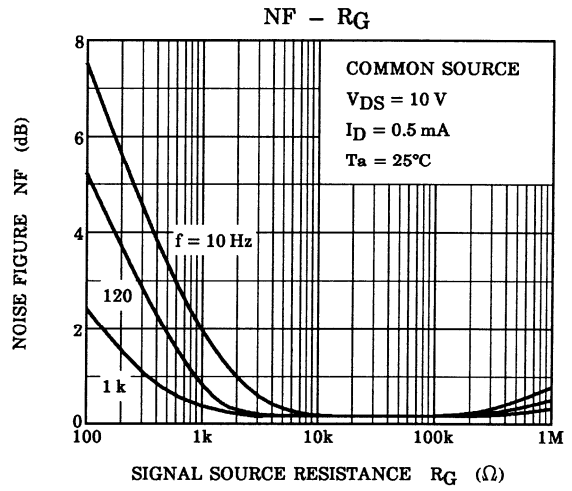
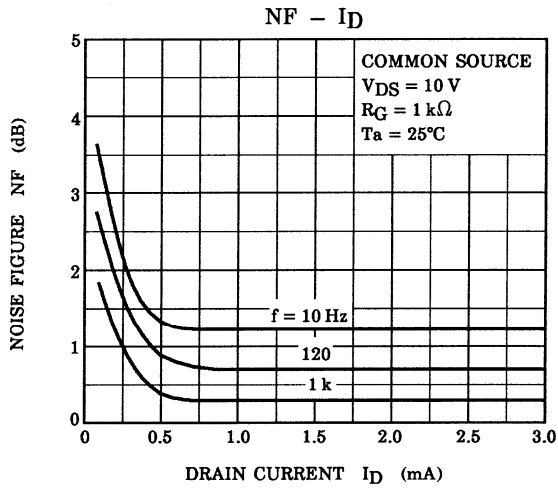
Note 2:  $I_{DSS}$  classification Y (Y): 1.2 to 3.0 mA, GR (G): 2.6 to 6.5 mA, BL (L): 6.0 to 14.0 mA

( )..... $I_{DSS}$  rank marking

(Q1, Q2 common)



(Q1, Q2 common)



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