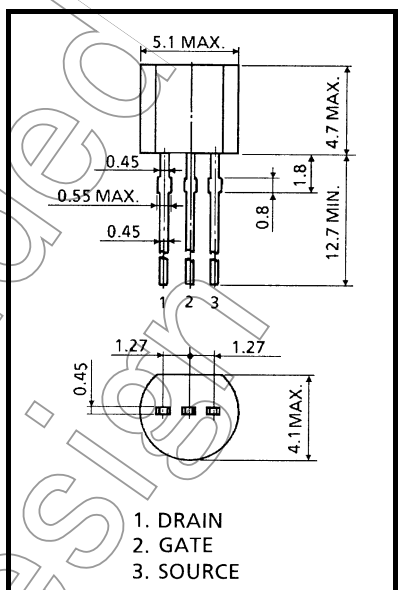
TOSHIBA Field Effect Transistor Silicon N Channel Junction Type

2SK170

Low Noise Audio Amplifier Applications

- Recommended for first stages of EQ and M.C. head amplifiers.
- High $|Y_{fs}|$: $|Y_{fs}| = 22$ mS (typ.) ($V_{DS} = 10$ V, $V_{GS} = 0$, $I_{DSS} = 3$ mA)
- High breakdown voltage: $V_{GDS} = -40$ V
- Low noise: $E_n = 0.95$ nV/Hz$^{1/2}$ (typ.)
  ($V_{DS} = 10$ V, $I_D = 1$ mA, f = 1 kHz)
- High input impedance: $I_{GSS} = -1$ nA (max) ($V_{GS} = -30$ V)

Unit: mm



JEDEC	TC-92
JEITA	SC-43
TOSHIBA	2-5F1D

Weight: 0.21 g (typ.)

Absolute Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Gate-drain voltage	V_{GDS}	−40	V
Gate current	I_G	10	mA
Drain power dissipation	P_D	400	mW
Junction temperature	T_j	125	°C
Storage temperature range	T_{stg}	−55~125	°C

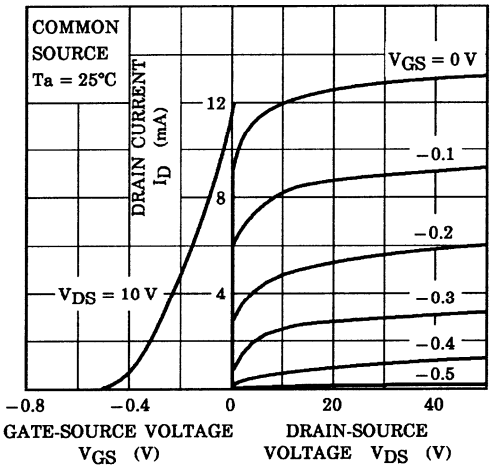
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) 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).

Electrical Characteristics (Ta = 25°C)

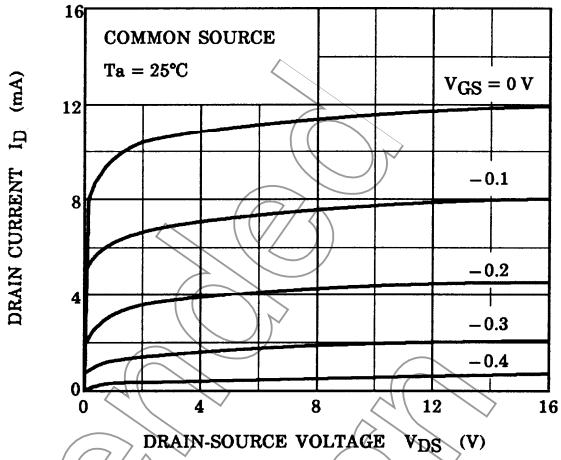
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Gate cut-off current	I_{GSS}	$V_{GS} = -30$ V, $V_{DS} = 0$	—	—	−1.0	nA
Gate-drain breakdown voltage	$V_{(BR)GDS}$	$V_{DS} = 0$, $I_G = -100$ μA	−40	—	—	V
Drain current	I_{DSS} (Note)	$V_{DS} = 10$ V, $V_{GS} = 0$	2.6	—	20	mA
Gate-source cut-off voltage	$V_{GS(OFF)}$	$V_{DS} = 10$ V, $I_D = 0.1$ μA	−0.2	—	−1.5	V
Forward transfer admittance	$\|Y_{fs}\|$	$V_{DS} = 10$ V, $V_{GS} = 0$, f = 1 kHz	—	22	—	mS
Input capacitance	C_{iss}	$V_{DS} = 10$ V, $V_{GS} = 0$, f = 1 MHz	—	30	—	pF
Reverse transfer capacitance	C_{rss}	$V_{DG} = 10$ V, $I_D = 0$, f = 1 MHz	—	6	—	pF
Noise figure	NF (1)	$V_{DS} = 10$ V, $I_D = 1.0$ mA, $R_G = 1$ kΩ, f = 1 kHz	—	1.0	10	dB
	NF (2)	$V_{DS} = 10$ V, $I_D = 1.0$ mA, $R_G = 1$ kΩ, f = 1 kHz	—	0.5	2	

Note: I_{DSS} classification GR: 2.6~6.5 mA, BL: 6.0~12 mA, V: 10~20 mA

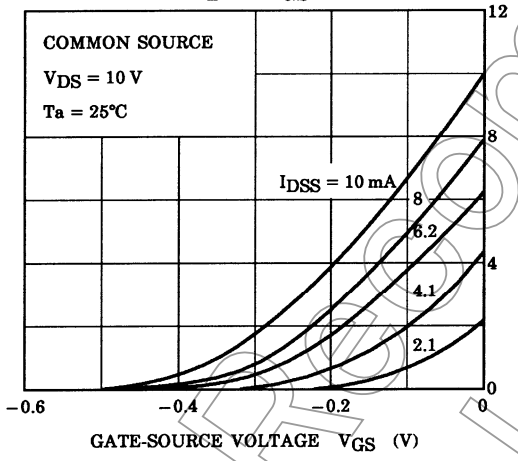
STATIC CHARACTERISTICS



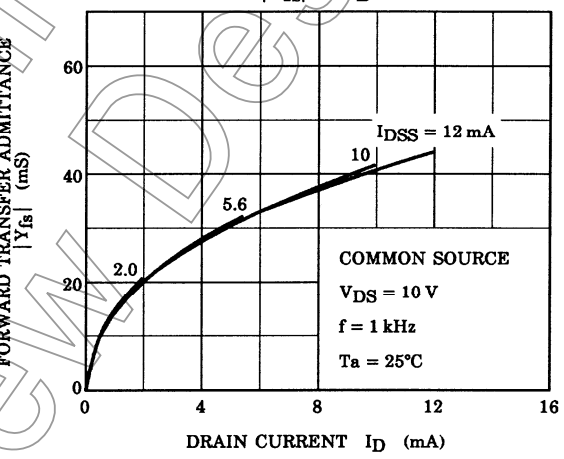
I_D – V_{DS} (LOW VOLTAGE REGION)



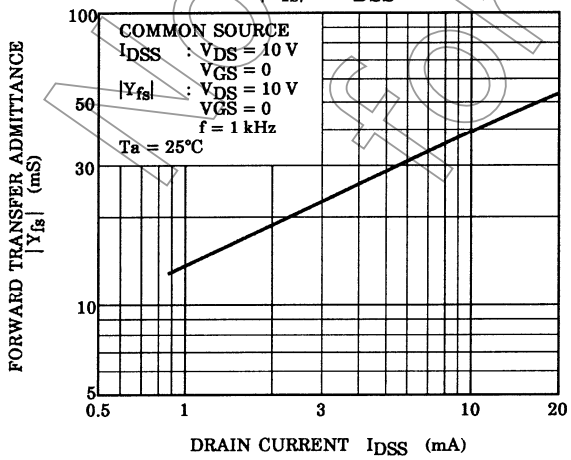
I_D – V_{GS}



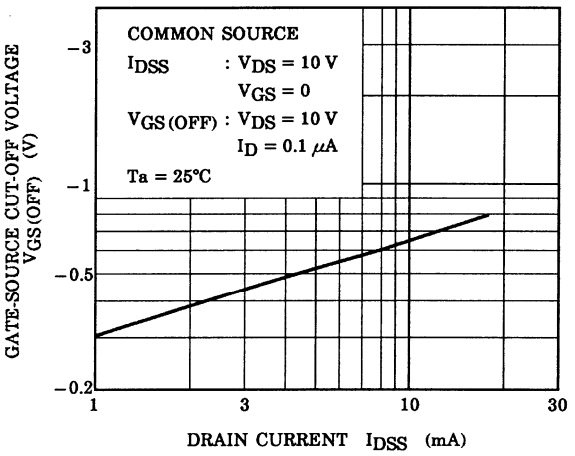
$|Y_{fs}|$ – I_D



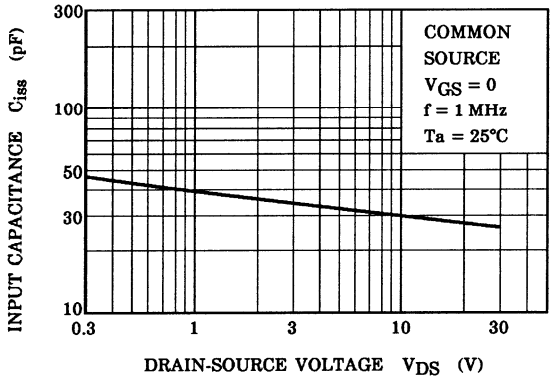
$|Y_{fs}|$ – I_{DSS}



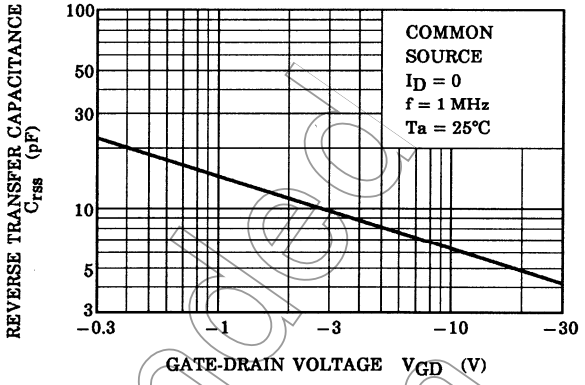
$V_{GS(OFF)}$ – I_{DSS}



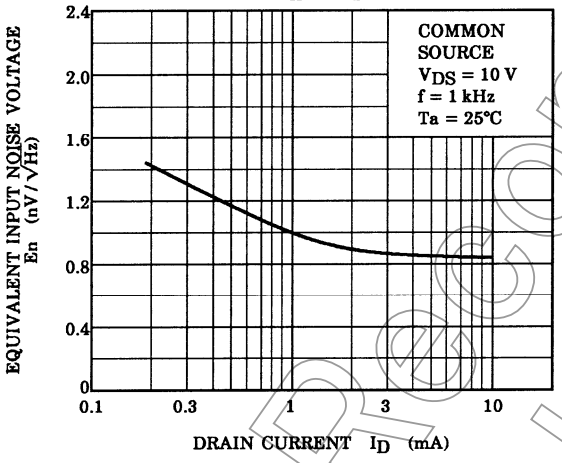
C_{iss} – V_{DS}



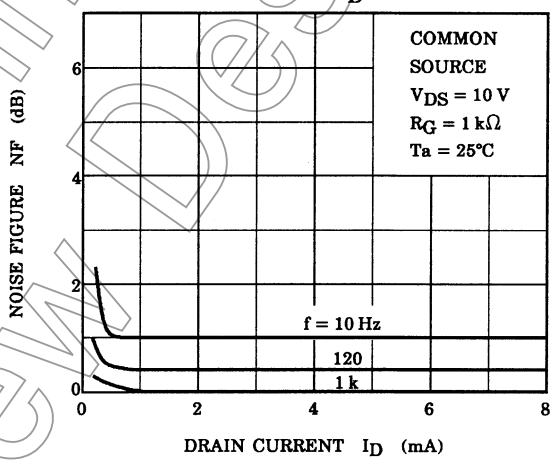
C_{rss} – V_{GD}



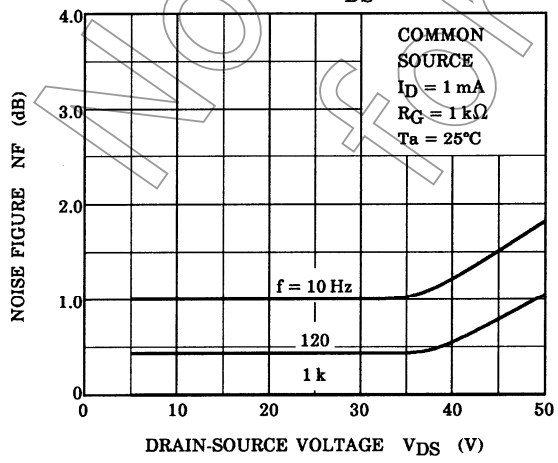
E_n – I_D



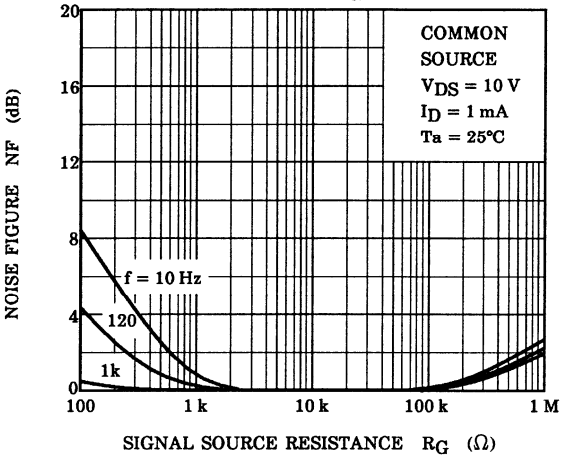
NF – I_D



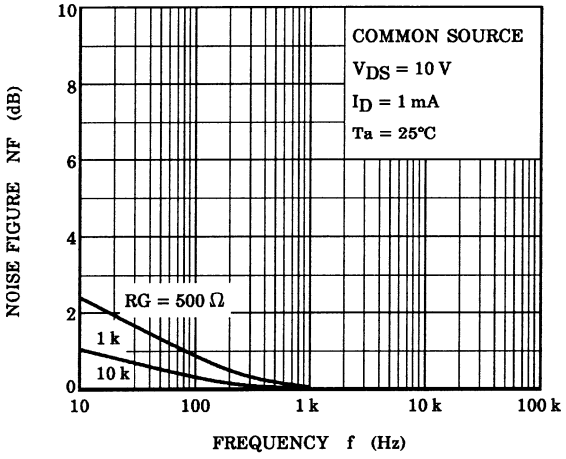
NF – V_{DS}



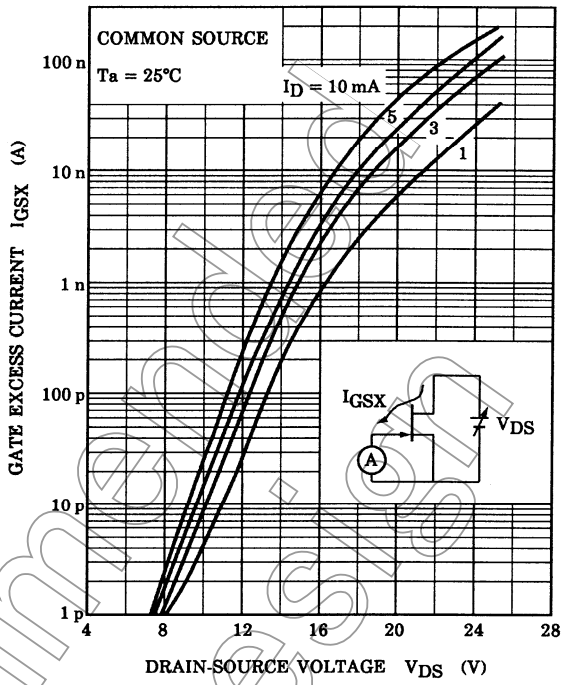
NF – R_G



NF – f



I_{GSX} – V_{DS}



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