

# 2SK117

## Low Noise Audio Amplifier Applications

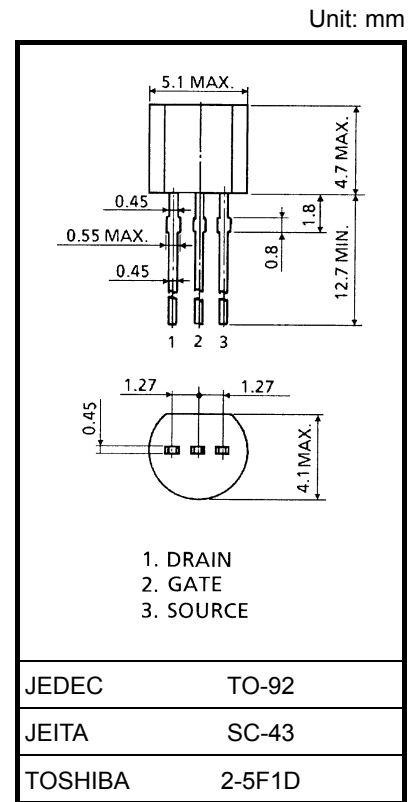
- High  $|Y_{fs}|$ :  $|Y_{fs}| = 15 \text{ mS (typ.)}$  ( $V_{DS} = 10 \text{ V}$ ,  $V_{GS} = 0$ )
- High breakdown voltage:  $V_{GDS} = -50 \text{ V}$
- Low noise:  $NF = 1.0\text{dB (typ.)}$   
( $V_{DS} = 10 \text{ V}$ ,  $I_D = 0.5 \text{ mA}$ ,  $f = 1 \text{ kHz}$ ,  $R_G = 1 \text{ k}\Omega$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

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

Characteristics	Symbol	Rating	Unit
Gate-drain voltage	$V_{GDS}$	-50	V
Gate current	$I_G$	10	mA
Drain power dissipation	$P_D$	300	mW
Junction temperature	$T_j$	125	$^\circ\text{C}$
Storage temperature range	$T_{stg}$	-55~125	$^\circ\text{C}$

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).



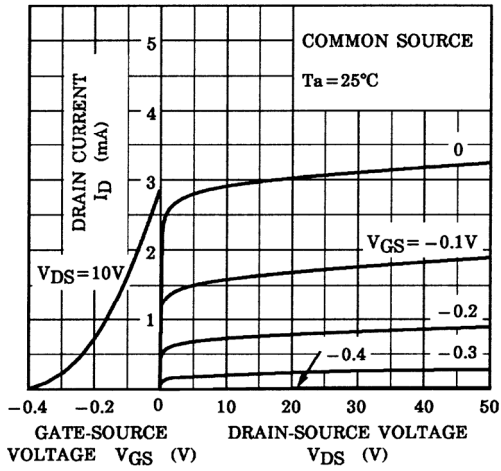
Weight: 0.21 g (typ.)

## Electrical Characteristics ( $T_a = 25^\circ\text{C}$ )

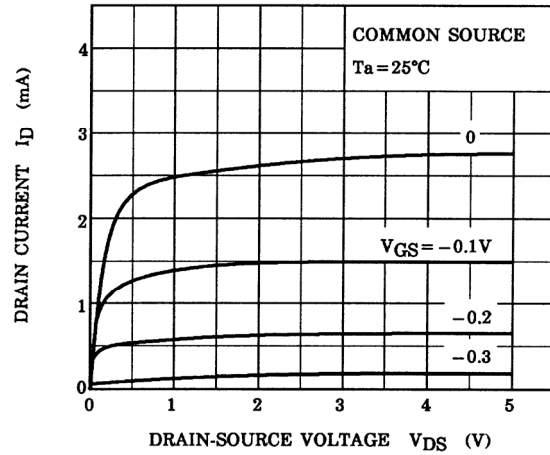
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Gate cut-off current	$I_{GSS}$	$V_{GS} = -30 \text{ V}$ , $V_{DS} = 0$	—	—	-1.0	nA
Gate-drain breakdown voltage	$V_{(BR)GDS}$	$V_{DS} = 0$ , $I_G = -100 \mu\text{A}$	-50	—	—	V
Drain current	$I_{DSS}$ (Note)	$V_{DS} = 10 \text{ V}$ , $V_{GS} = 0$	1.2	—	14	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	$C_{rss}$	$V_{GD} = -10 \text{ V}$ , $I_D = 0$ , $f = 1 \text{ MHz}$	—	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	10	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	2	

Note:  $I_{DSS}$  classification Y: 1.2~3.0 mA, GR: 2.6~6.5 mA, BL: 6~14 mA

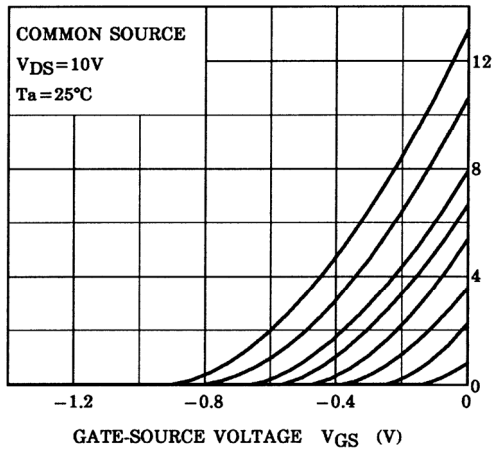
STATIC CHARACTERISTICS



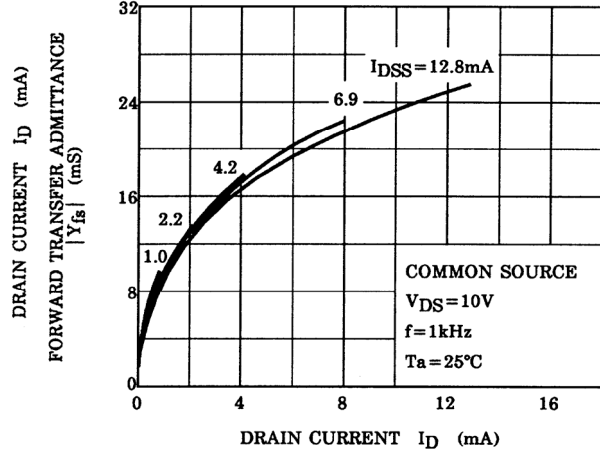
$I_D - V_{DS}$  (LOW VOLTAGE REGION)



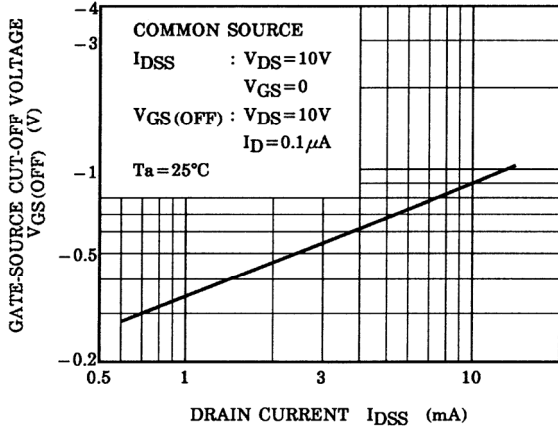
$I_D - V_{GS}$



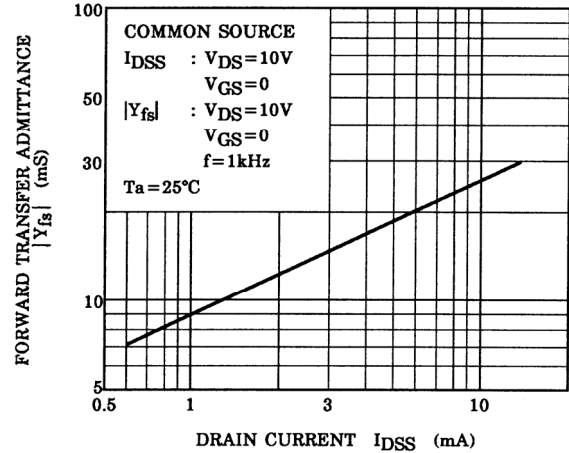
$|Y_{fs}| - I_D$

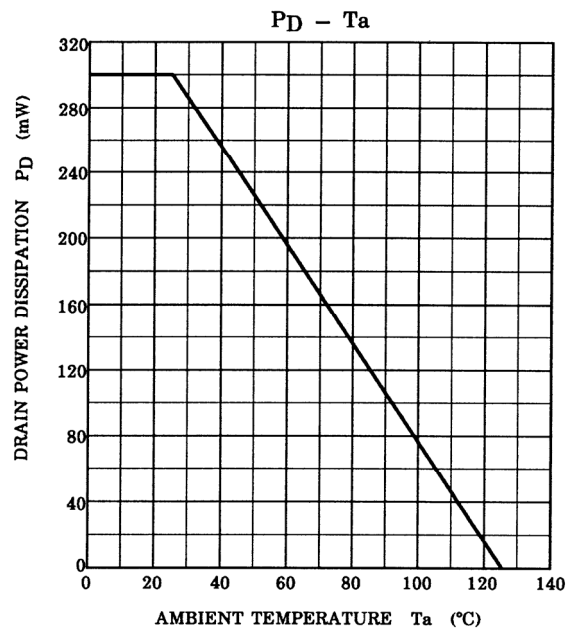
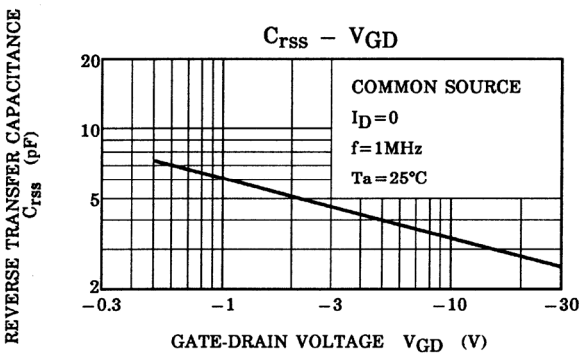
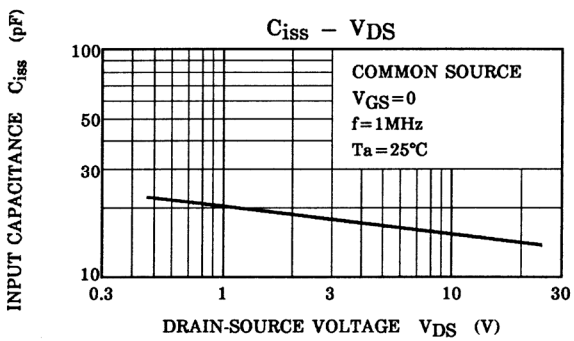
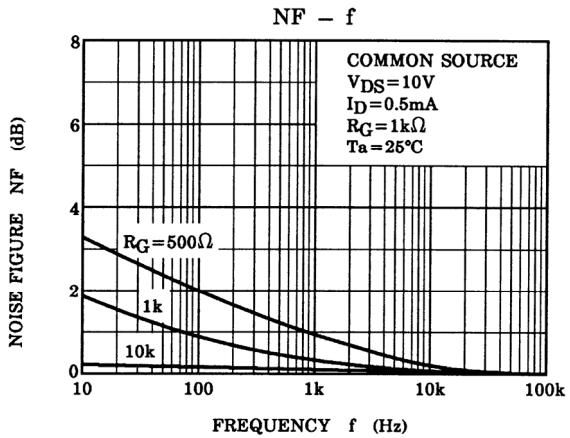
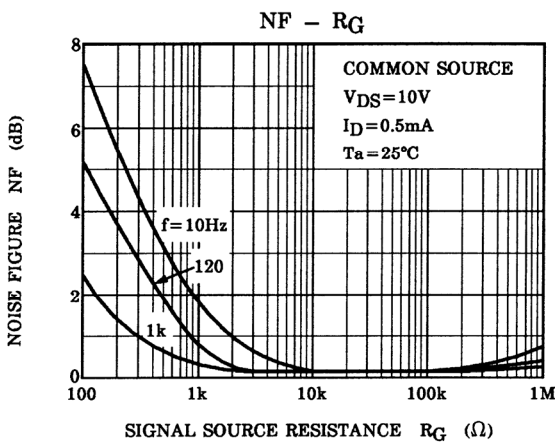
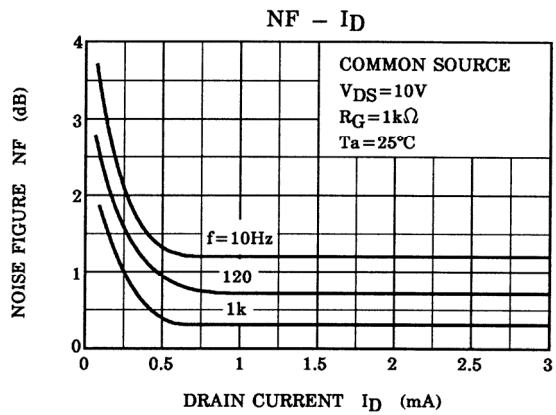
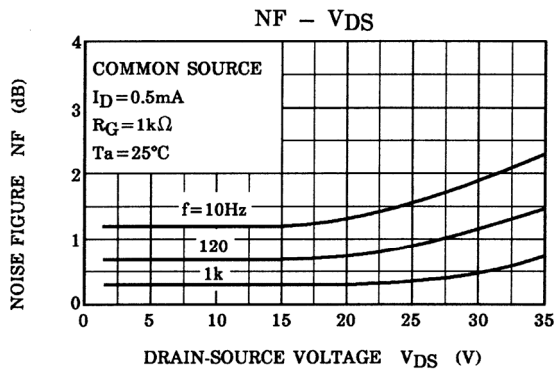


$V_{GS(OFF)} - I_{DSS}$



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





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20070701-EN GENERAL

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