TOSHIBA Field Effect Transistor Silicon N Channel Junction Type

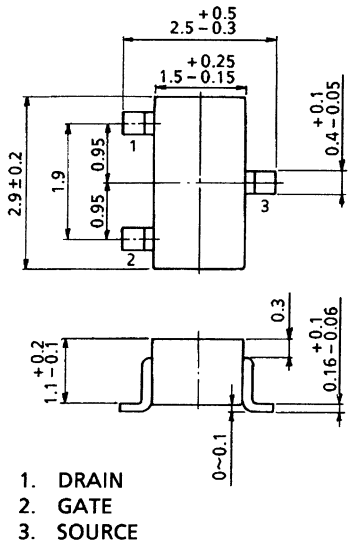
2SK210

FM Tuner Applications

VHF Band Amplifier Applications

- High power gain: G_{PS} = 24dB (typ.) (f = 100 MHz)
- Low noise figure: NF = 1.8dB (typ.) (f = 100 MHz)
- High forward transfer admittance: $|Y_{fs}|$ = 7 mS (typ.) (f = 1 kHz)

Unit: mm



JEDEC	—
JEITA	SC-59
TOSHIBA	2-3F1C

Weight: 0.012 g (typ.)

Absolute Maximum Ratings (Ta = 25°C)

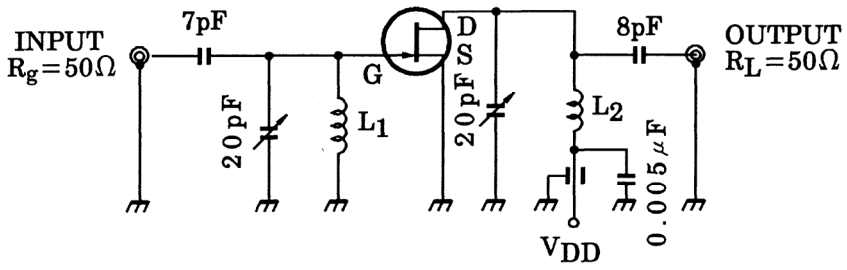
Characteristics	Symbol	Rating	Unit
Gate-drain voltage	V_{GDO}	−18	V
Gate current	I_G	10	mA
Drain power dissipation	P_D	100	mW
Junction temperature	T_j	125	°C
Storage temperature range	T_{stg}	−55~125	°C

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 leakage current	I_{GSS}	V_{GS} = −1.0 V, V_{DS} = 0 V	—	—	−10	nA
Gate-drain breakdown voltage	$V_{(BR)\ GDO}$	I_G = −100 μA	−18	—	—	V
Drain current	I_{DSS} (Note)	V_{GS} = 0 V, V_{DS} = 10 V	3	—	24	mA
Gate-source cut-off voltage	$V_{GS\ (OFF)}$	V_{DS} = 10 V, I_D = 1 μA	−1.2	−3	—	V
Forward transfer admittance	$\|Y_{fs}\|$	V_{GS} = 0 V, V_{DS} = 10 V, f = 1 kHz	—	7	—	mS
Input capacitance	C_{iss}	V_{DS} = 10 V, V_{GS} = 0, f = 1 MHz	—	3.5	—	pF
Reverse transfer capacitance	C_{rss}	V_{GD} = −10 V, f = 1 MHz	—	—	0.65	pF
Power gain	G_{PS}	V_{DD} = 10 V, f = 100 MHz (Figure 1)	—	24	—	dB
Noise figure	NF	V_{DD} = 10 V, f = 100 MHz (Figure 1)	—	1.8	3.5	dB

Note: I_{DSS} classificatopn Y: 3.0~7.0 mA, GR (R): 6.0~14.0 mA, BL (L): 12.0~24.0 mA

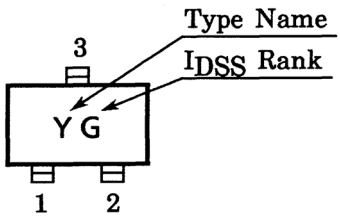


L_1: 0.8 mmϕ A_g plated Cu wire 3 turns, 10 mm ID, 10 mm length

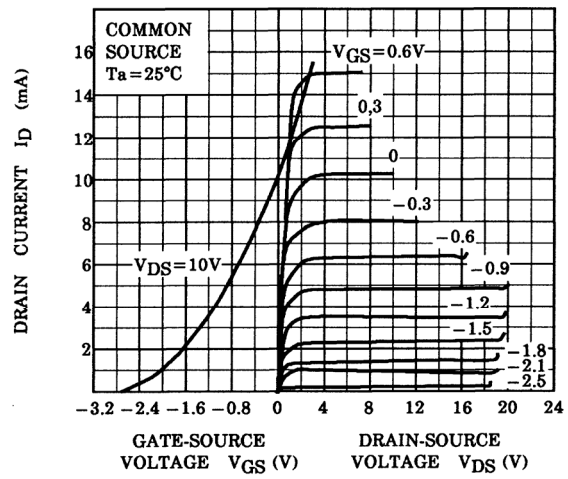
L_2: 0.8 mmϕ A_g plated Cu wire 3.5 turns, 10 mm ID, 10 mm length

Figure 1 100 MHz G_{ps} NF Test Circuit

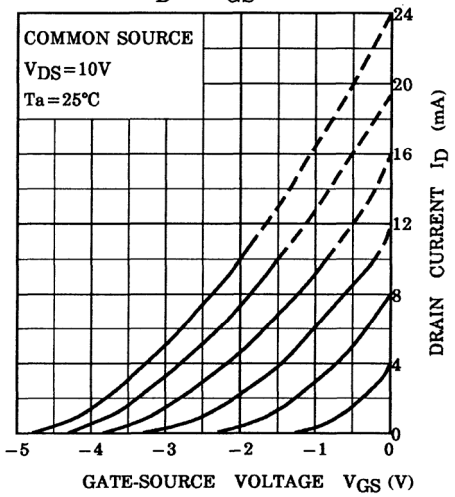
Marking



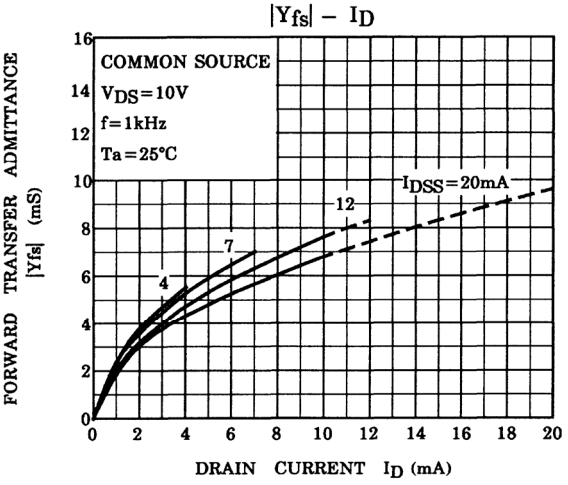
STATIC CHARACTERISTICS



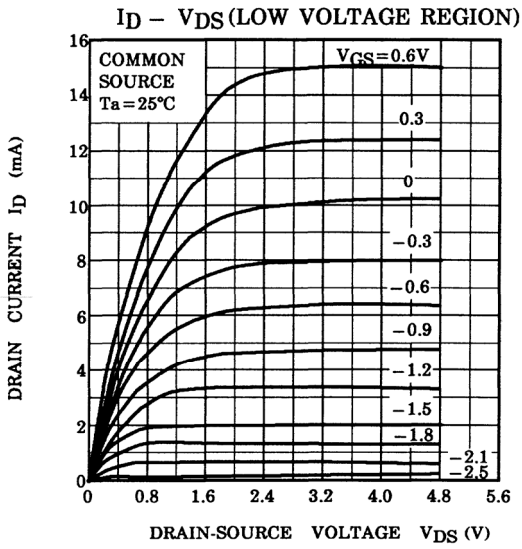
$I_D - V_{GS}$



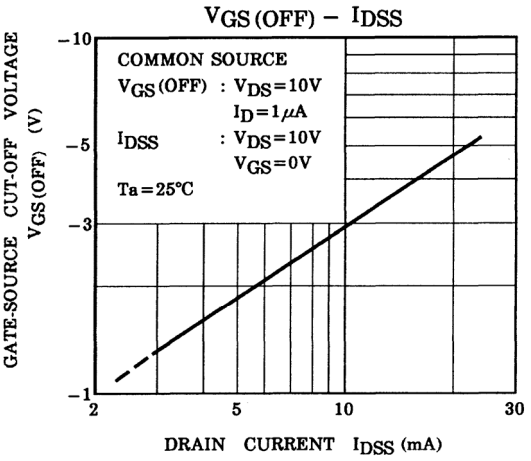
$|Y_{fs}| - I_D$



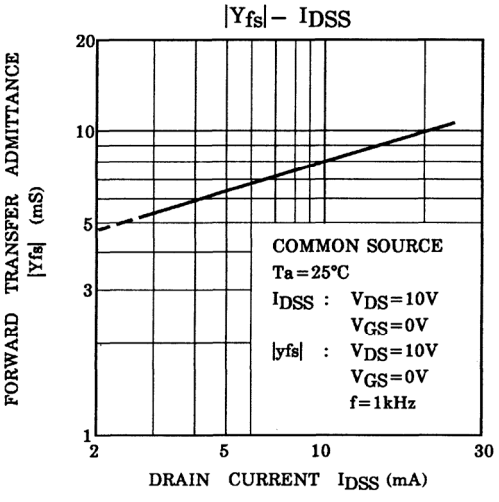
$I_D - V_{DS}$ (LOW VOLTAGE REGION)



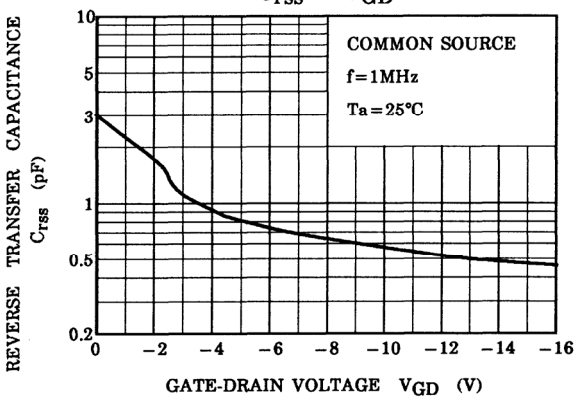
$V_{GS\,(OFF)} - I_{DSS}$



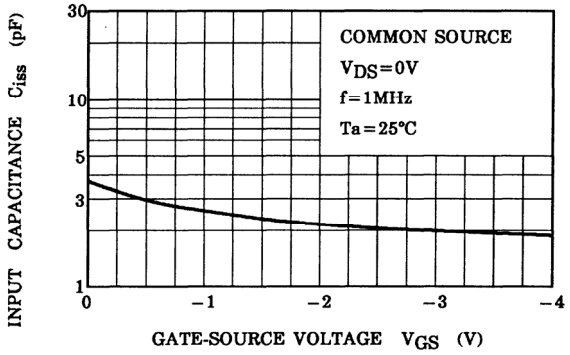
$|Y_{fs}| - I_{DSS}$



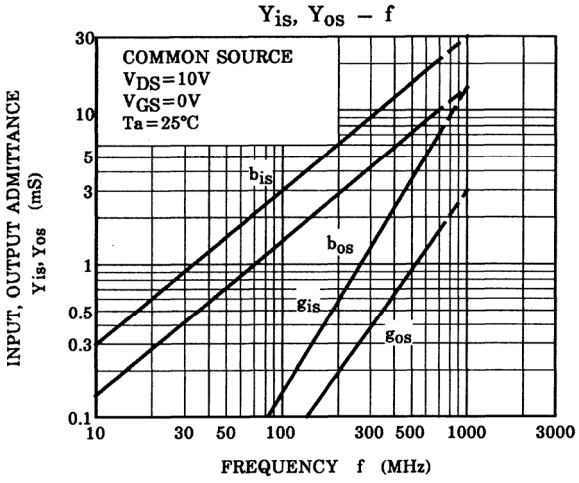
C_{rss} – V_{GD}



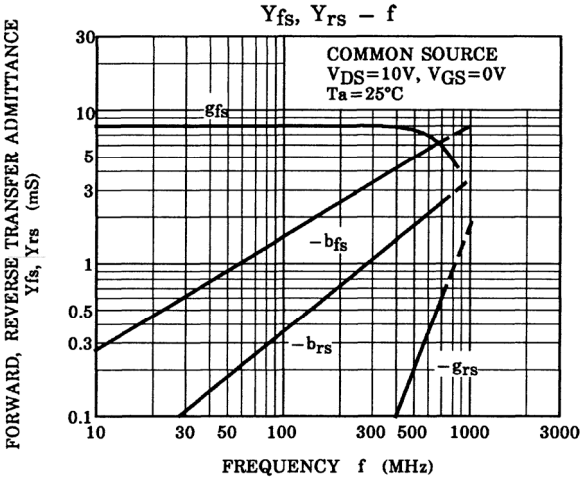
C_{iss} – V_{GS}



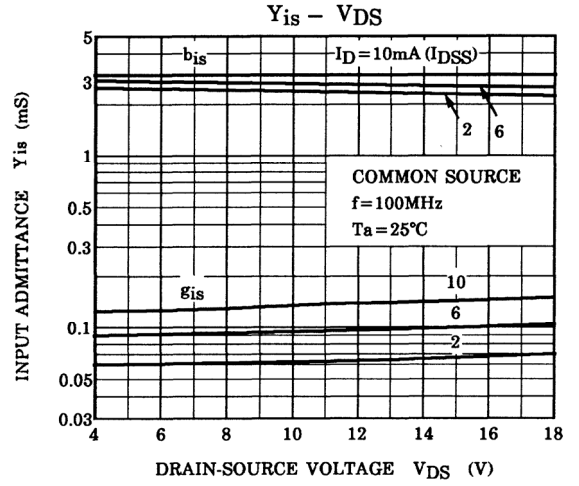
Y_{is}, Y_{os} – f



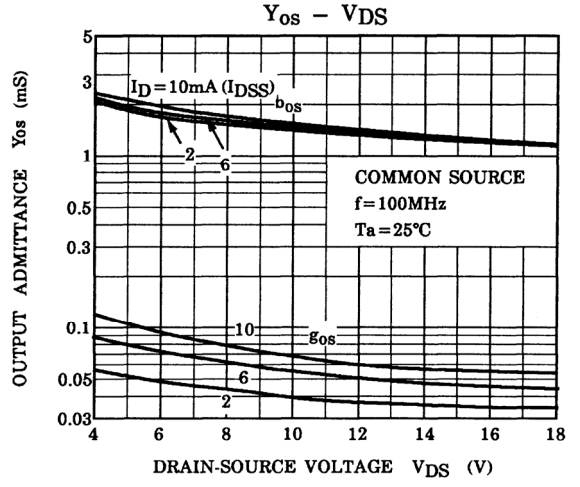
Y_{fs}, Y_{rs} – f

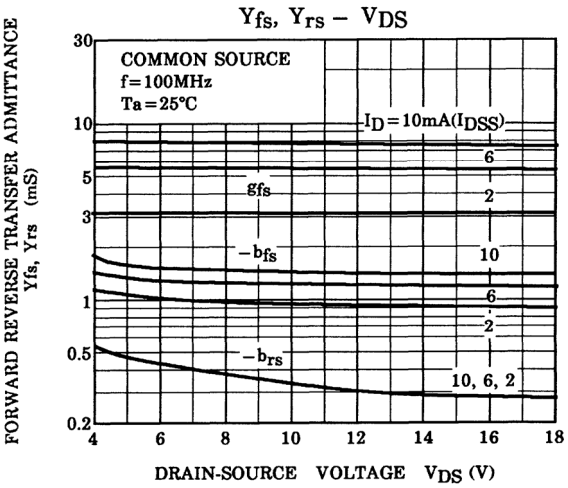


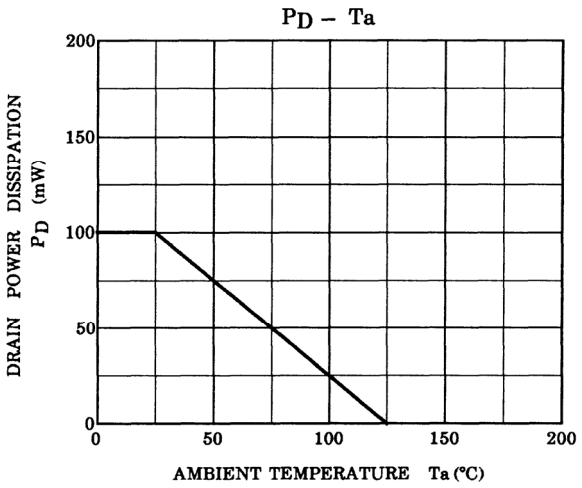
Y_{is} – V_{DS}



Y_{os} – V_{DS}




Y_{fs}, Y_{rs} – V_{DS}
COMMON SOURCE
f=100MHz
Ta=25°C
I_D=10mA(I_{DSS})
6
2
10
6
2
10, 6, 2
g_{fs}
$-b_{fs}$
$-b_{rs}$
FORWARD REVERSE TRANSFER ADMITTANCE
Yfs, Yrs (mS)
30
10
5
3
1
0.5
0.2
4
6
8
10
12
14
16
18
DRAIN-SOURCE VOLTAGE V_{DS} (V)


P_D – Ta
DRAIN POWER DISSIPATION
P_D (mW)
200
150
100
50
0
0
50
100
150
200
AMBIENT TEMPERATURE Ta (°C)

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20070701-EN GENERAL

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