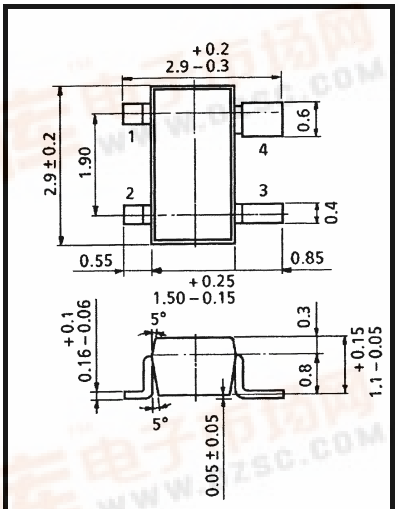
TOSHIBA Field Effect Transistor Silicon N Channel Dual Gate MOS Type

3SK195

TV Tuner, VHF RF Amplifier Applications
FM Tuner Applications

- Superior cross modulation performance.
- Low reverse transfer capacitance: C_{rss} = 0.015 pF (typ.)
- Low noise figure: NF = 1.1dB (typ.)

Unit: mm



JEDEC	—
JEITA	—
TOSHIBA	2-3J1A

Weight: 0.013 g (typ.)

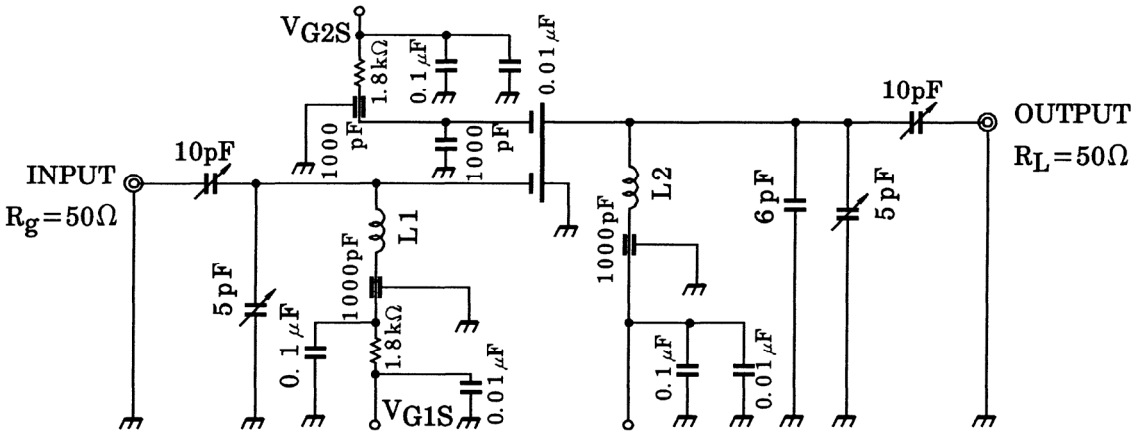
Absolute Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Drain-source voltage	V_{DS}	13.5	V
Gate 1-source voltage	V_{G1S}	±8	V
Gate 2-source voltage	V_{G2S}	±8	V
Drain current	I_D	30	mA
Drain power dissipation	P_D	150	mW
Channel temperature	T_{ch}	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 1 leakage current	I_{G1SS}	V_{DS} = 0, V_{G1S} = ±4 V, V_{G2S} = 0	—	—	±50	nA
Gate 2 leakage current	I_{G2SS}	V_{DS} = 0, V_{G1S} = 0, V_{G2S} = ±4 V	—	—	±50	nA
Drain-source voltage	$V_{(BR)\ DSX}$	V_{G1S} = −4 V, V_{G2S} = −4 V, I_D = 100 μA	13.5	—	—	V
Drain current	I_{DSS}	V_{DS} = 6 V, V_{G1S} = 0, V_{G2S} = 4 V	0	—	0.1	mA
Gate 1-source cut-off voltage	$V_{G1S\ (OFF)}$	V_{DS} = 6 V, V_{G2S} = 4 V, I_D = 100 μA	0	—	1.0	V
Gate 2-source cut-off voltage	$V_{G2S\ (OFF)}$	V_{DS} = 6 V, V_{G1S} = 4 V, I_D = 100 μA	0	—	1.2	V
Forward transfer admittance	$\|Y_{fs}\|$	V_{DS} = 6 V, V_{G2S} = 4 V, I_D = 10 mA, f = 1 kHz	—	13	—	mS
Input capacitance	C_{iss}	V_{DS} = 6 V, V_{G2S} = 4 V, I_D = 10 mA, f = 1 MHz	2.0	2.7	3.4	pF
Reverse transfer capacitance	C_{rss}		—	0.015	0.03	pF
Power gain	G_{ps}	V_{DS} = 6 V, V_{G2S} = 4 V, I_D = 10 mA, f = 200 MHz (Figure 1)	22	27	—	dB
Noise figure	NF		—	1.1	2.2	dB

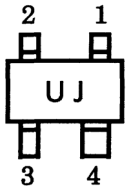


L1: 1 mmϕ silver plated copper wire, 2 turns, 8 mm ID

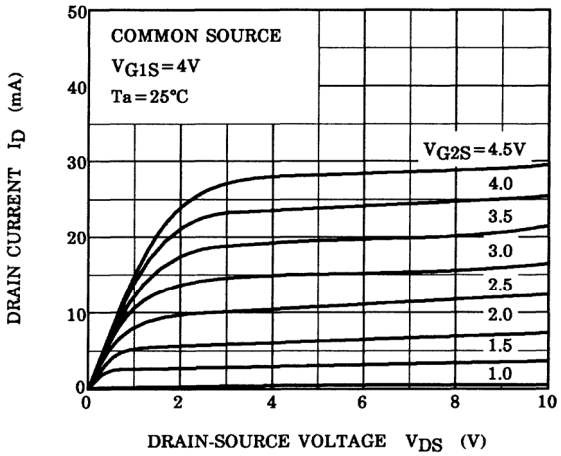
L2: 1 mmϕ silver plated copper wire, 2.5 turns, 8 mm ID

Figure 1 200 MHz, G_{ps} NF Test Circuit

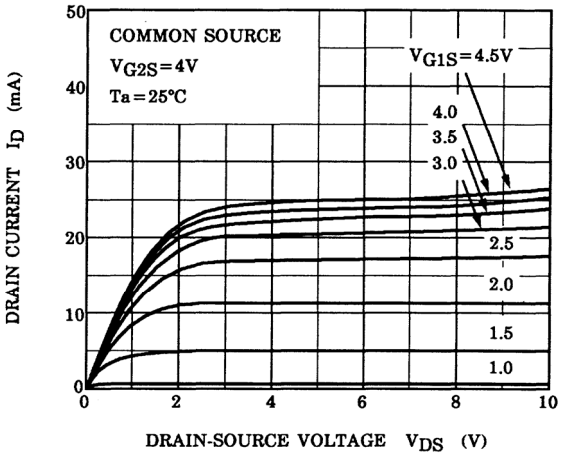
Marking



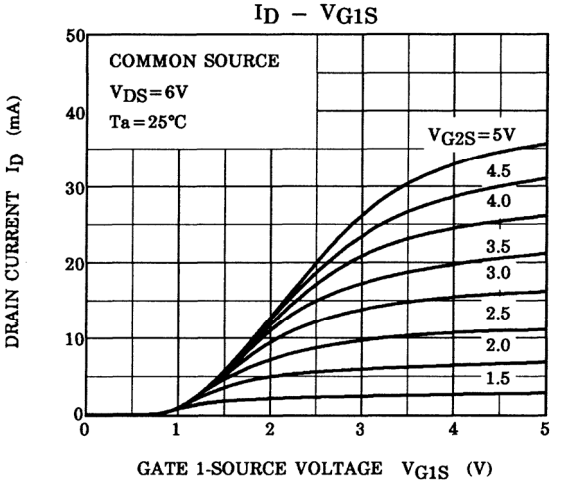
I_D – V_{DS}



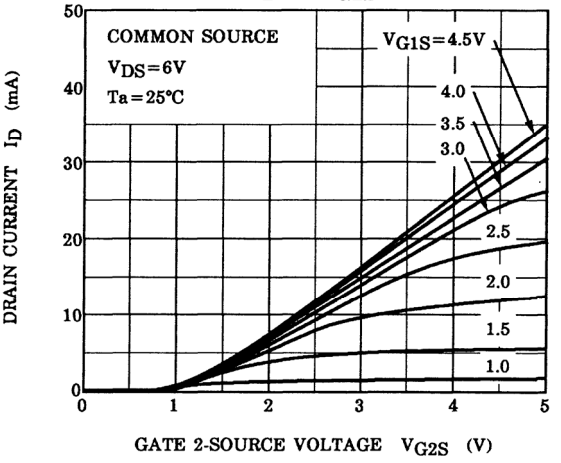
I_D – V_{DS}



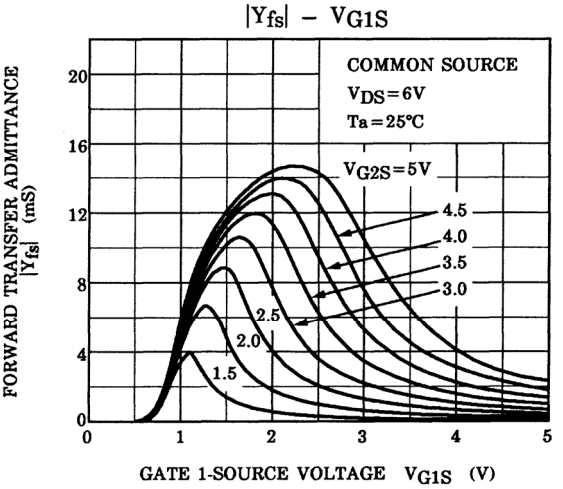
I_D – V_{G1S}



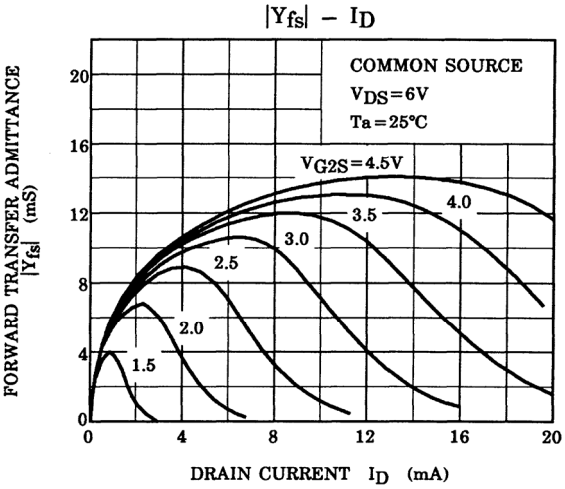
I_D – V_{G2S}



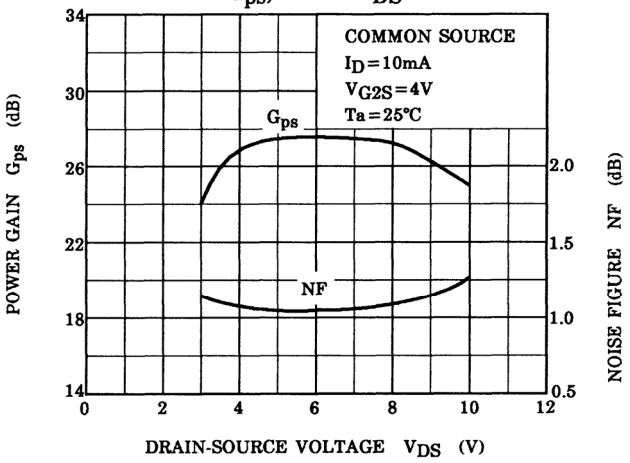
$|Y_{fs}|$ – V_{G1S}



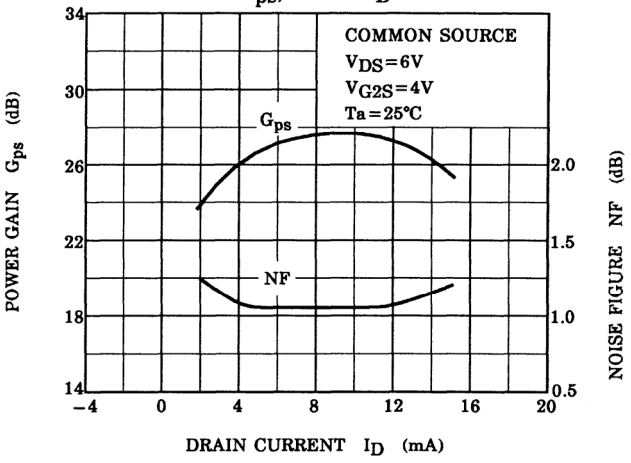
$|Y_{fs}|$ – I_D



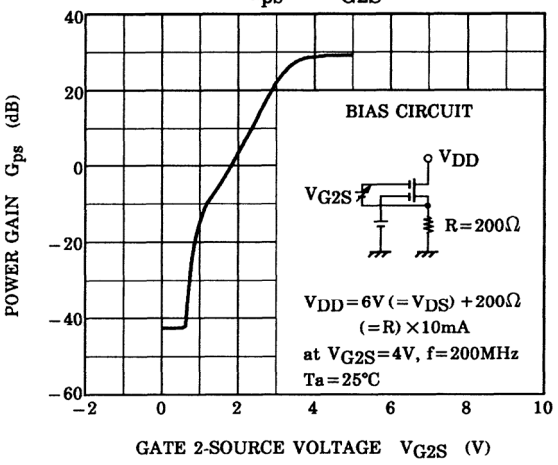
G_{ps}, NF – V_{DS}



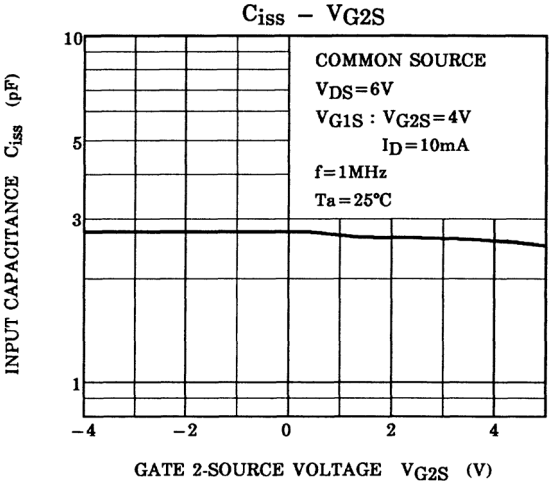
G_{ps}, NF – I_D



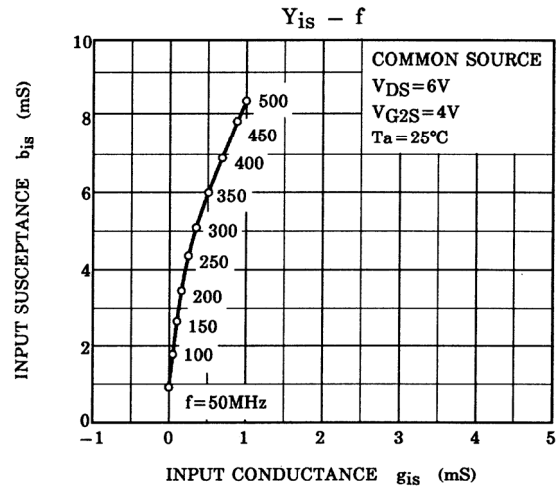
G_{ps} – V_{G2S}



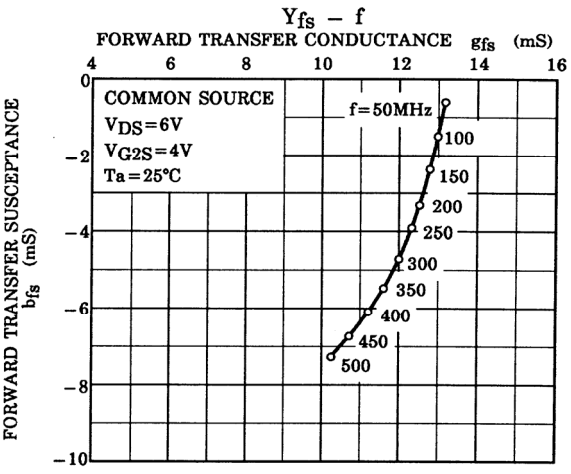
C_{iss} – V_{G2S}

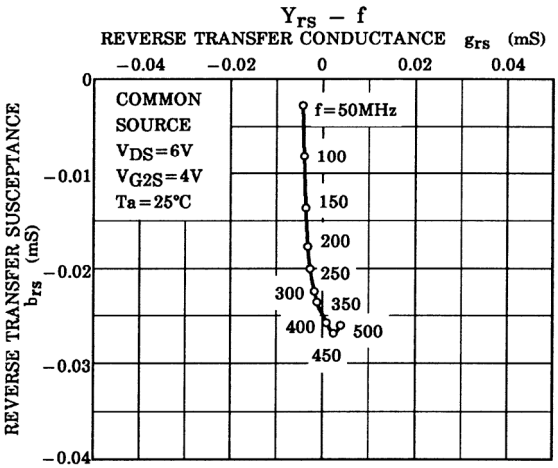


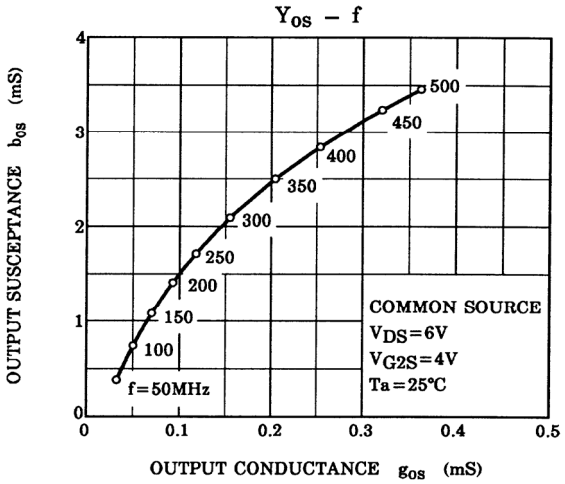
Y_{is} – f

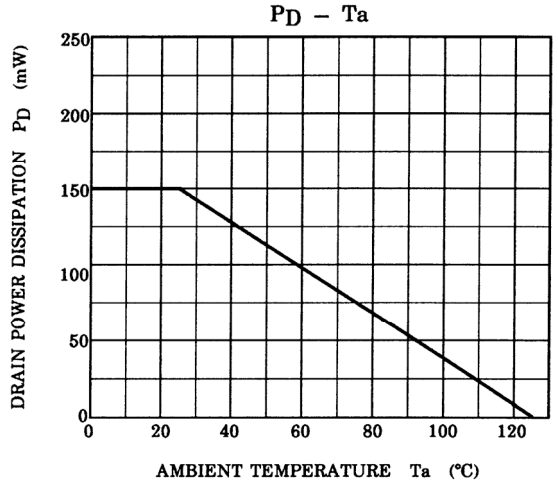


Y_{fs} – f




Y_{rs} – f
REVERSE TRANSFER CONDUCTANCE g_{rs} (mS)
−0.04
−0.02
0
0.02
0.04
0
−0.01
−0.02
−0.03
−0.04
REVERSE TRANSFER SUSCEPTANCE b_{rs} (mS)
COMMON SOURCE
V_{DS}=6V
V_{G2S}=4V
Ta=25°C
f=50MHz
100
150
200
250
300
350
400
450
500


Y_{os} – f
OUTPUT SUSCEPTANCE b_{os} (mS)
0
1
2
3
4
0
0.1
0.2
0.3
0.4
0.5
OUTPUT CONDUCTANCE g_{os} (mS)
COMMON SOURCE
V_{DS}=6V
V_{G2S}=4V
Ta=25°C
f=50MHz
100
150
200
250
300
350
400
450
500


P_D – Ta
DRAIN POWER DISSIPATION P_D (mW)
250
200
150
100
50
0
0
20
40
60
80
100
120
AMBIENT TEMPERATURE Ta (°C)

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20070701-EN GENERAL

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