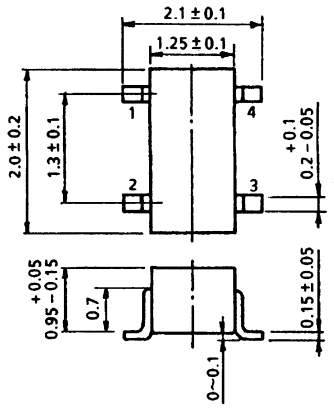
TOSHIBA Field Effect Transistor Silicon N Channel Dual Gate MOS Type

3SK249

TV Tuner, UHF RF Amplifier Applications

- Superior cross modulation performance.
- Low reverse transfer capacitance: C_{rss} = 20 fF (typ.)
- Low noise figure.: NF = 1.5dB (typ.)

Unit: mm



1. GATE 1
2. GATE 2
3. DRAIN
4. SOURCE

USQ

JEDEC	—
JEITA	—
TOSHIBA	2-2K1B

Weight: 0.006 g (typ.)

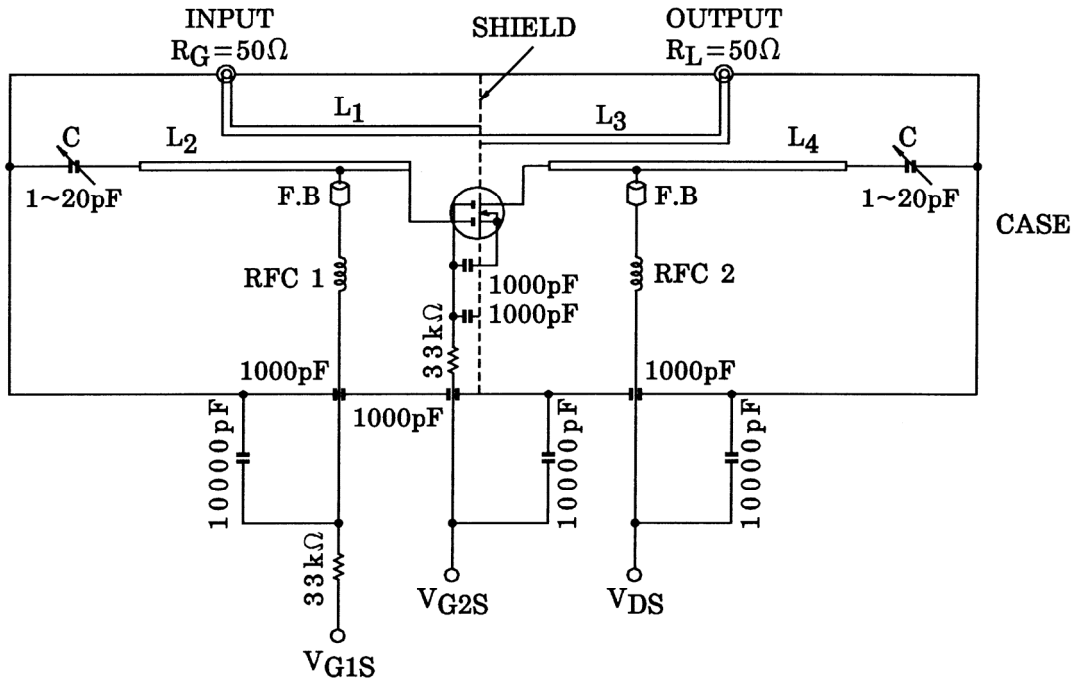
Absolute Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Drain-source voltage	V_{DS}	12.5	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	100	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} = ±6 V, V_{G2S} = 0	—	—	±50	nA
Gate 2 leakage current	I_{G2SS}	V_{DS} = 0, V_{G1S} = 0, V_{G2S} = ±6 V	—	—	±50	nA
Drain-source voltage	$V_{(BR)\ DSX}$	V_{G1S} = −0.5 V, V_{G2S} = −0.5 V, I_D = 100 μA	12.5	—	—	V
Drain current	I_{DSS}	V_{DS} = 6 V, V_{G2S} = 4.5 V, V_{G1S} = 0 V	0	—	0.1	mA
Gate 1-source cut-off voltage	$V_{G1S\ (OFF)}$	V_{DS} = 6 V, V_{G2S} = 4.5 V, I_D = 100 μA	0.4	0.9	1.4	V
Gate 2-source cut-off voltage	$V_{G2S\ (OFF)}$	V_{DS} = 6 V, V_{G1S} = 4.0 V, I_D = 100 μA	0.5	1.0	1.5	V
Forward transfer admittance	$\lvert Y_{fs} \rvert$	V_{DS} = 6 V, V_{G2S} = 4.5 V, I_D = 10 mA, f = 1 kHz	17	21	—	mS
Input capacitance	C_{iss}	V_{DS} = 6 V, V_{G2S} = 4.5 V, I_D = 10 mA, f = 1 MHz	0.9	1.5	2.1	pF
Reverse transfer capacitance	C_{rss}		—	20	40	fF
Power gain	G_{ps}	V_{DS} = 6 V, V_{G2S} = 4.5 V, I_D = 10 mA, f = 800 MHz	18	20	—	dB
Noise figure	NF		—	1.5	2.5	dB



L_1~L_4: ϕ0.8 mm silver plated copper wire

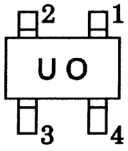
C: Air trimmer TTA25A200A (MURATA Manufacturing, Co., Ltd.)

RFC 1: ϕ0.35 mm copper wire 3 mm ID, 7 T

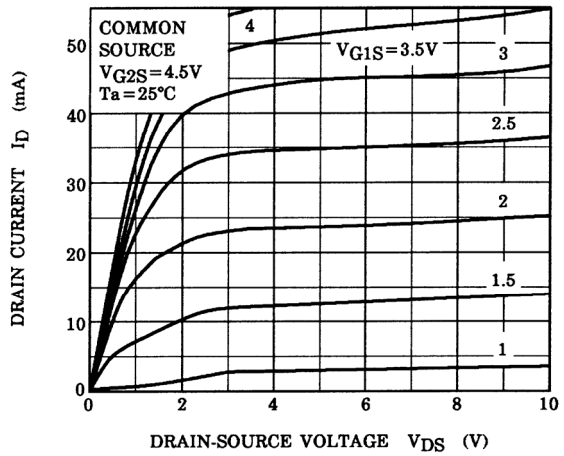
RFC 2: ϕ0.35 mm copper wire 3 mm ID, 10 T

Figure 1 G_{ps}, NF Test Circuit

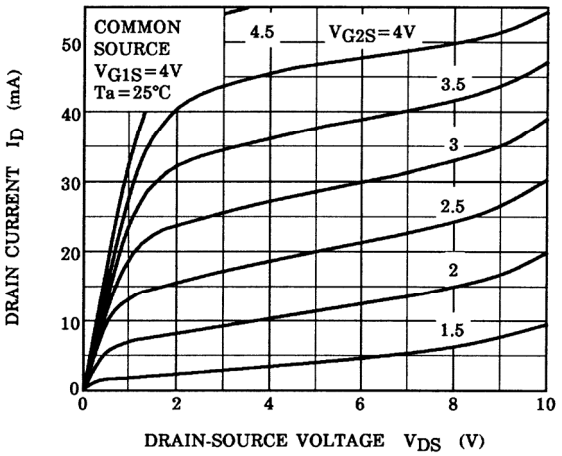
Marking



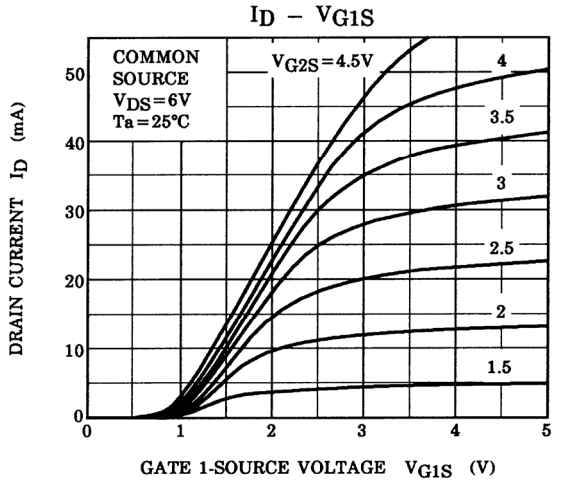
$I_D - V_{DS}$



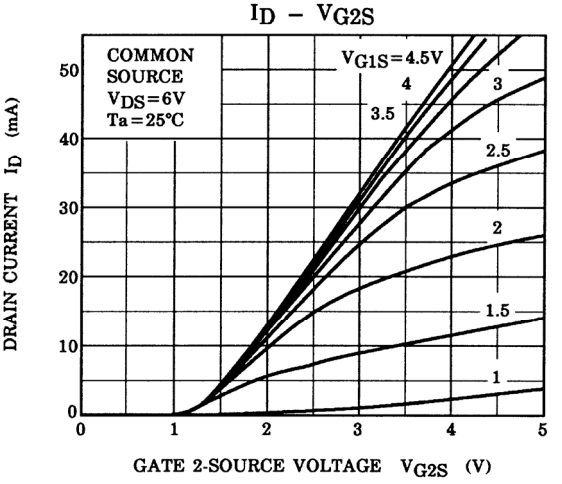
$I_D - V_{DS}$



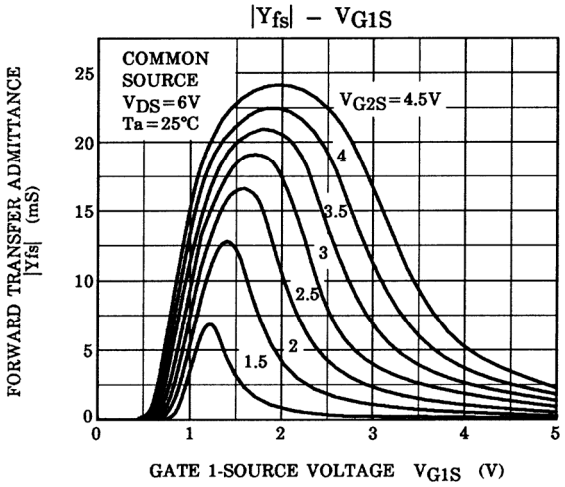
$I_D - V_{G1S}$



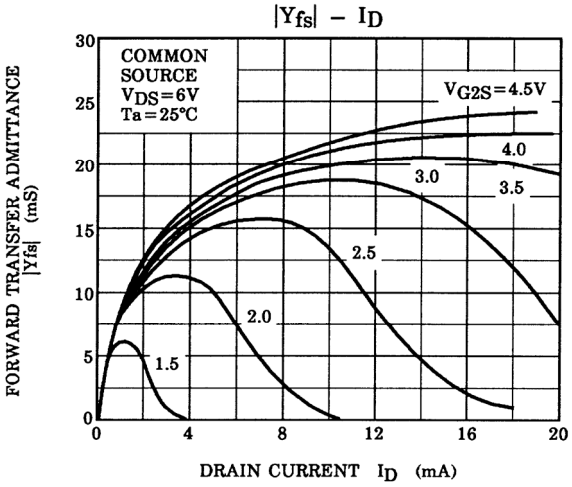
$I_D - V_{G2S}$



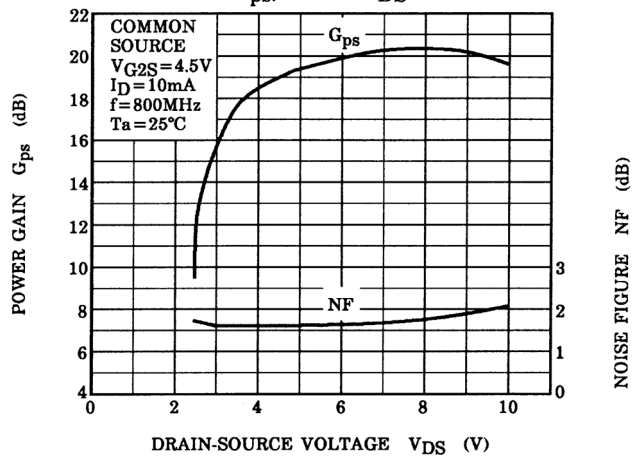
$|Y_{fs}| - V_{G1S}$



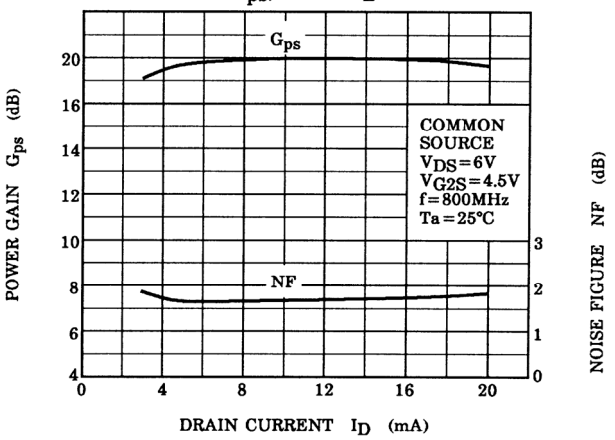
$|Y_{fs}| - I_D$



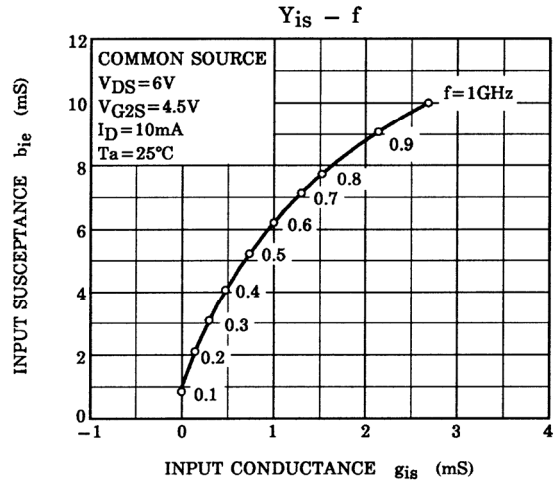
G_{ps}, NF – V_{DS}



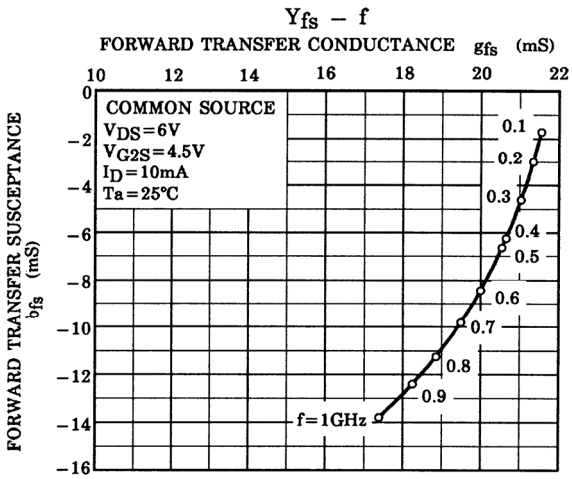
G_{ps}, NF – I_D



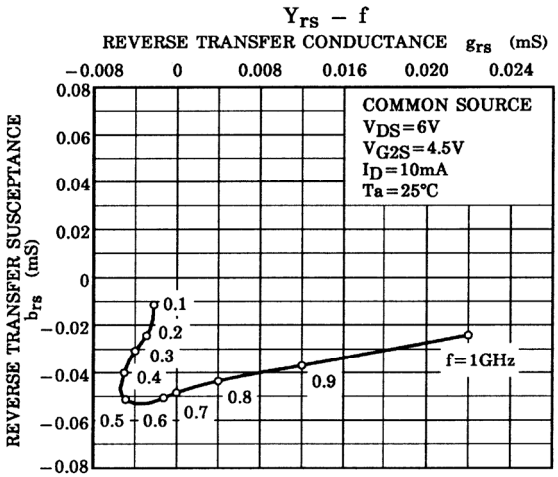
Y_{is} – f



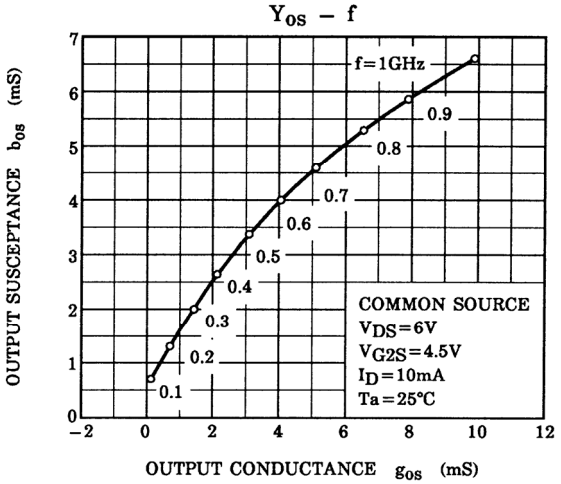
Y_{fs} – f

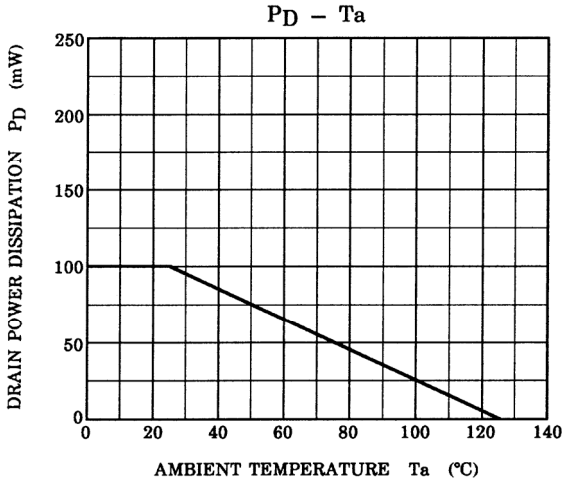


Y_{rs} – f



Y_{os} – f




P_D – Ta
DRAIN POWER DISSIPATION P_D (mW)
250
200
150
100
50
0
0
20
40
60
80
100
120
140
AMBIENT TEMPERATURE Ta (°C)

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20070701-EN GENERAL

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