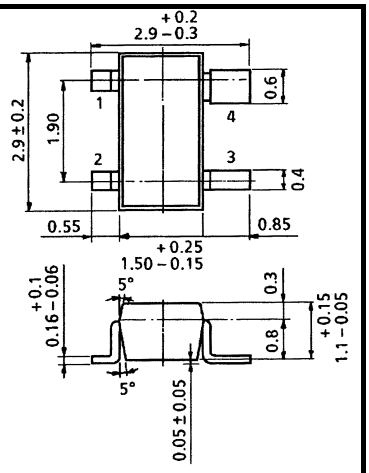
TOSHIBA Field Effect Transistor Silicon N-Channel Dual Gate MOS Type

3SK292

TV Tuner, VHF RF Amplifier Application

- Superior cross modulation performance.
- Low reverse transfer capacitance: C_{rss} = 20 fF (typ.)
- Low noise figure: NF = 1.4dB (typ.)

Unit: mm



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

SMQ

JEDEC	—
JEITA	—
TOSHIBA	2-3J1A

Weight: 13 mg (typ.)

Absolute Maximum Ratings (Ta = 25°C)

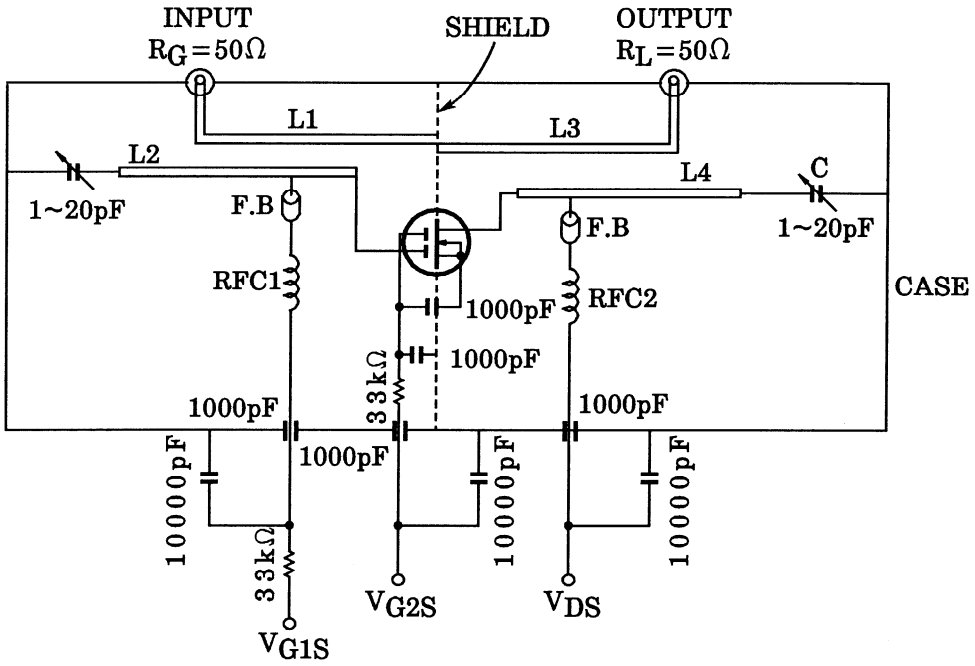
Characteristics	Symbol	Rating	Unit
Drain-source voltage	V_{DS}	12.5	V
Gate 1-source voltage	V_{G1S}	±8	V
Gate 2-source voltage	V_{G2S}	±8	V
Drain current	I_D	30	mA
Drain power dissipation	P_D	150	mW
Channel temperature	T_{ch}	125	°C
Storage temperature range	T_{stg}	−55 to 125	°C

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_{G1S} = 0, V_{G2S} = 4.5 V	—	—	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	0.3	0.9	1.3	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	$\|Y_{fs}\|$	V_{DS} = 6 V, V_{G2S} = 4.5 V, I_D = 10 mA, f = 1 kHz	19.5	23.5	—	mS
Input capacitance	C_{iss}	V_{DS} = 6 V, V_{G2S} = 4.5 V, I_D = 10 mA, f = 1 MHz	—	2.5	3.1	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 = 500 MHz (Figure 1)	23.5	26.0	—	dB
Noise figure	NF		—	1.4	2.5	dB

Start of commercial production
1996-04



L1 to L4: ϕ0.8 mm silver plated copper wire

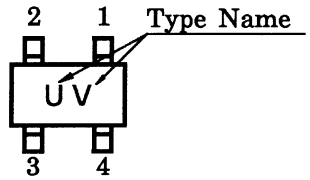
C: Air trimmer TTA25A200A (MURATA Manufacturing, Co., Ltd.)

RFC 1: ϕ0.35 mm UEW 3I.D. 7 T

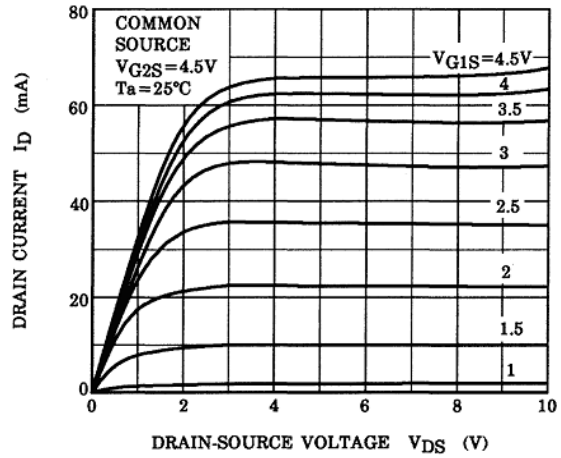
RFC 2: ϕ0.35 mm UEW 3I.D. 10 T

Figure 1 G_{ps}/NF Test Circuit

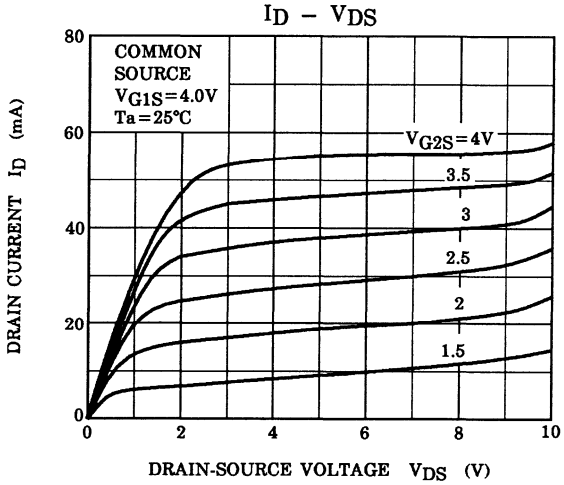
Marking



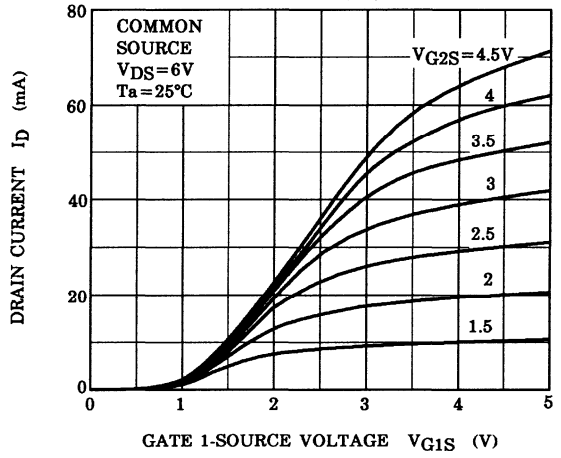
I_D – V_{DS}



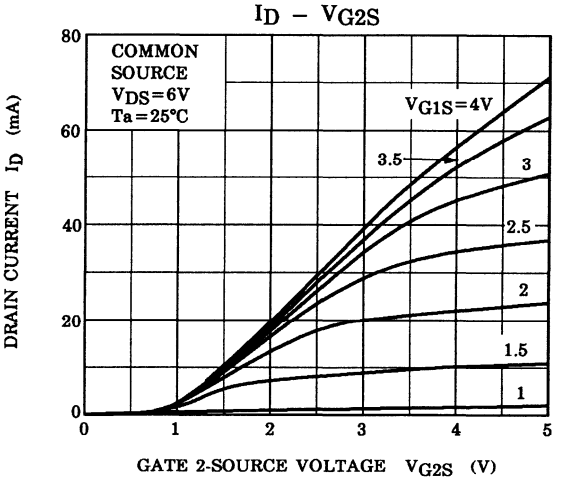
I_D – V_{DS}



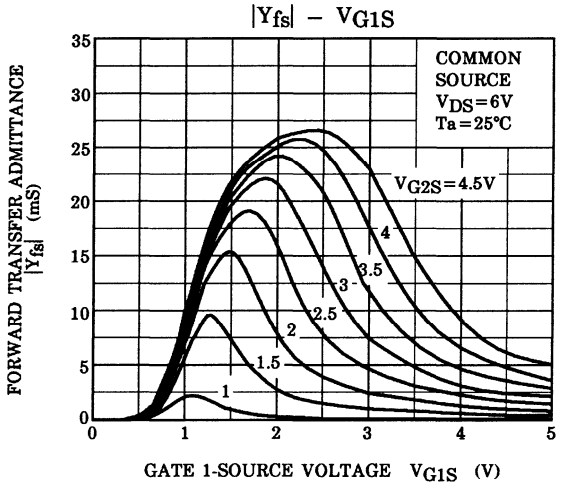
I_D – V_{G1S}



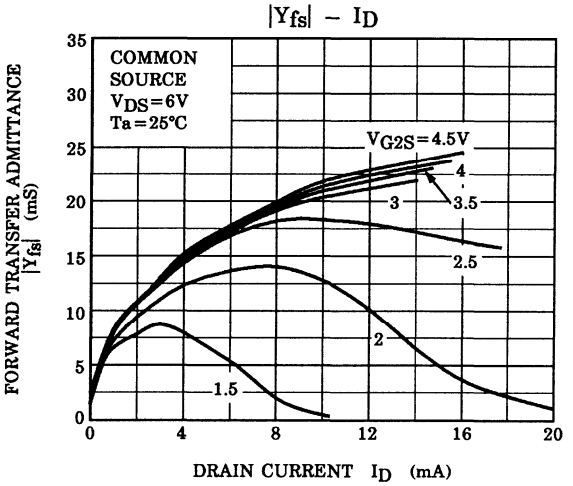
I_D – V_{G2S}

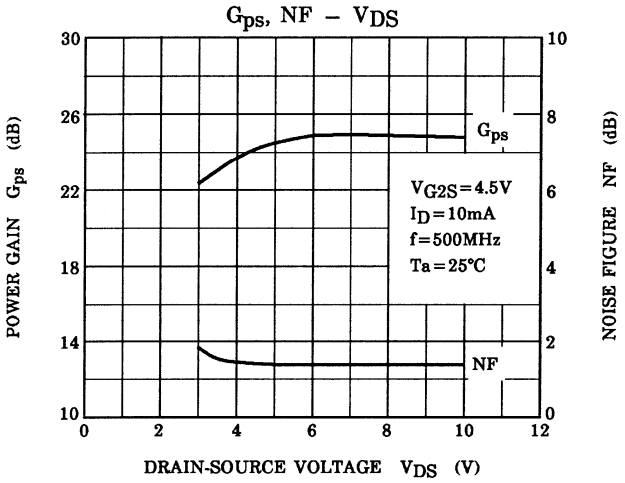


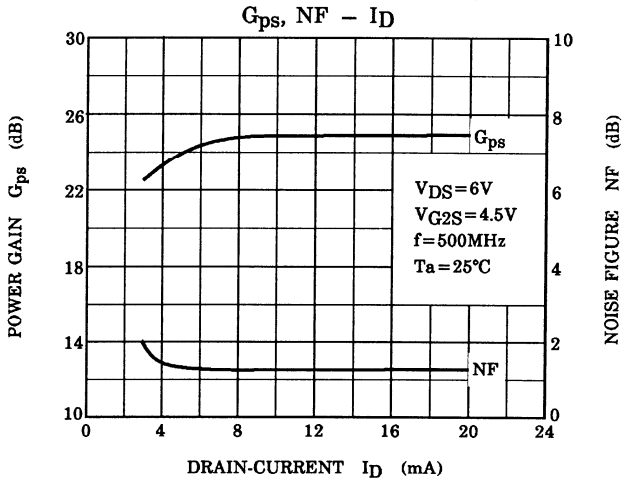
$|Y_{fs}|$ – V_{G1S}

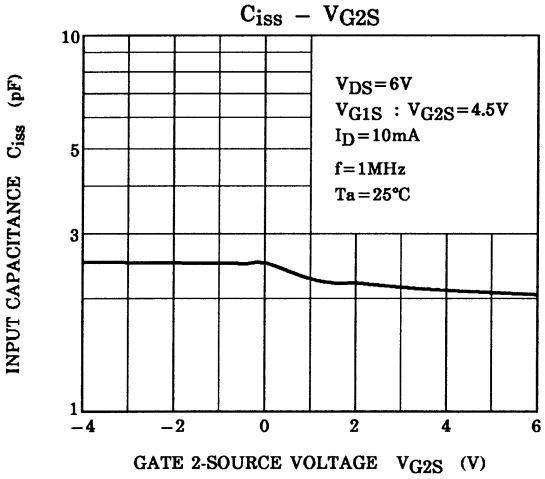


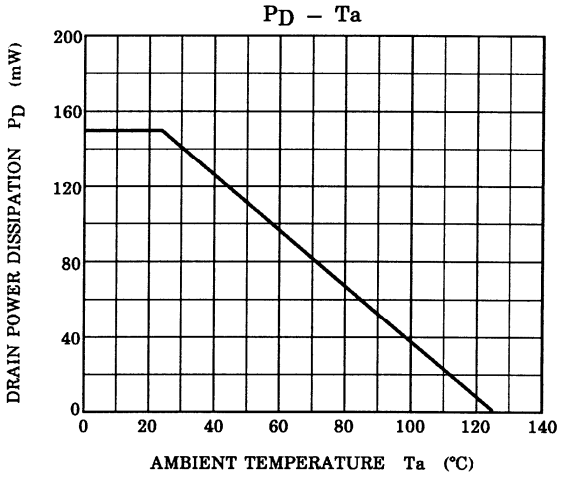
$|Y_{fs}|$ – I_D




G_{ps}, NF – V_{DS}
POWER GAIN G_{ps} (dB)
NOISE FIGURE NF (dB)
G_{ps}
NF
V_{G2S}=4.5V
I_D=10mA
f=500MHz
Ta=25°C
DRAIN-SOURCE VOLTAGE V_{DS} (V)


G_{ps}, NF – I_D
POWER GAIN G_{ps} (dB)
NOISE FIGURE NF (dB)
G_{ps}
NF
V_{DS}=6V
V_{G2S}=4.5V
f=500MHz
Ta=25°C
DRAIN-CURRENT I_D (mA)


C_{iss} – V_{G2S}
INPUT CAPACITANCE C_{iss} (pF)
V_{DS}=6V
V_{G1S} : V_{G2S}=4.5V
I_D=10mA
f=1MHz
Ta=25°C
GATE 2-SOURCE VOLTAGE V_{G2S} (V)


P_D – Ta
DRAIN POWER DISSIPATION P_D (mW)
AMBIENT TEMPERATURE Ta (°C)

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