TOSHIBA FIELD EFFECT TRANSISTOR SILICON N CHANNEL DUAL GATE MOS TYPE

3SK199

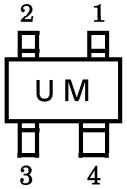
TV TUNER, UHF RF AMPLIFIER APPLICATIONS

- Superior Cross Modulation Performance.
- Low Reverse Transfer Capacitance : C_{rss} = 0.015pF (Typ.)
- Low Noise Figure : NF = 1.9dB (Typ.)

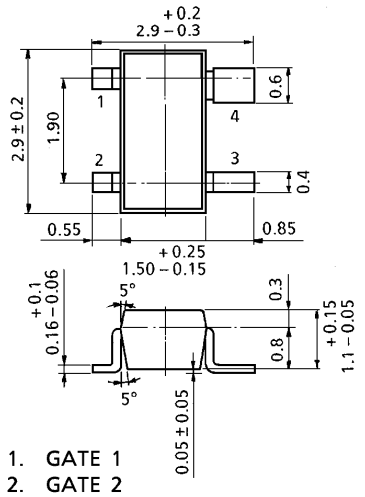
MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	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

Marking



Unit in mm

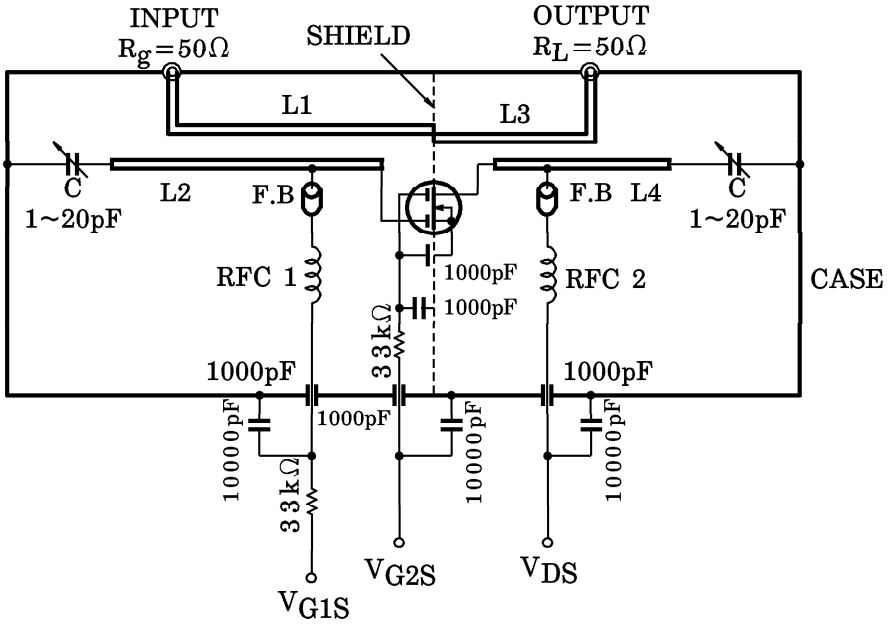


SMQ	
JEDEC	—
EIAJ	—
TOSHIBA	2-3J1A

Weight : 0.013g

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

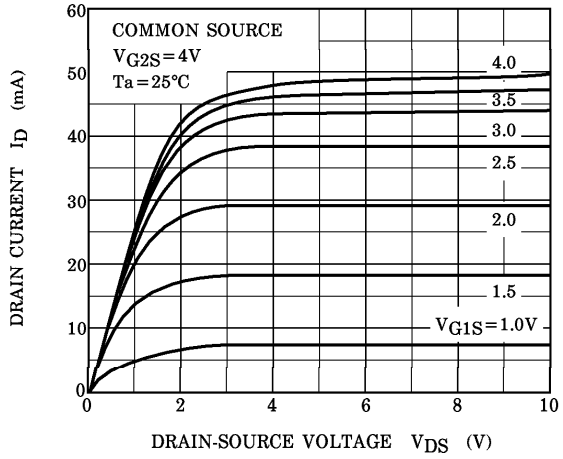
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate 1 Leakage Current	I_{G1SS}	V_{DS} = 0, V_{G1S} = ±6V, V_{G2S} = 0	—	—	±50	nA
Gate 2 Leakage Current	I_{G2SS}	V_{DS} = 0, V_{G1S} = 0, V_{G2S} = ±6V	—	—	±50	nA
Drain-Source Voltage	$V_{(BR)DSX}$	V_{G1S} = −4V, V_{G2S} = −4V, I_D = 100μA	13.5	—	—	V
Drain Current	I_{DSS}	V_{DS} = 6V, V_{G1S} = 0, V_{G2S} = 4V	0	—	0.1	mA
Gate 1-Source Cut-off Voltage	$V_{G1S(OFF)}$	V_{DS} = 6V, V_{G2S} = 4V, I_D = 100μA	0	—	1.0	V
Gate 2-Source Cut-off Voltage	$V_{G2S(OFF)}$	V_{DS} = 6V, V_{G1S} = 4V, I_D = 100μA	0	—	1.2	V
Forward Transfer Admittance	$\|Y_{fs}\|$	V_{DS} = 6V, V_{G2S} = 4V, I_D = 10mA, f = 1kHz	—	21.5	—	mS
Input Capacitance	C_{iss}	V_{DS} = 6V, V_{G2S} = 4V, I_D = 10mA, f = 1MHz	1.0	1.6	2.4	pF
Reverse Transfer Capacitance	C_{rss}		—	0.015	0.03	pF
Power Gain	G_{ps}	V_{DS} = 6V, V_{G2S} = 4V, I_D = 10mA, f = 800MHz (Fig.1)	18	19.5	—	dB
Noise Figure	NF		—	1.9	3.0	dB



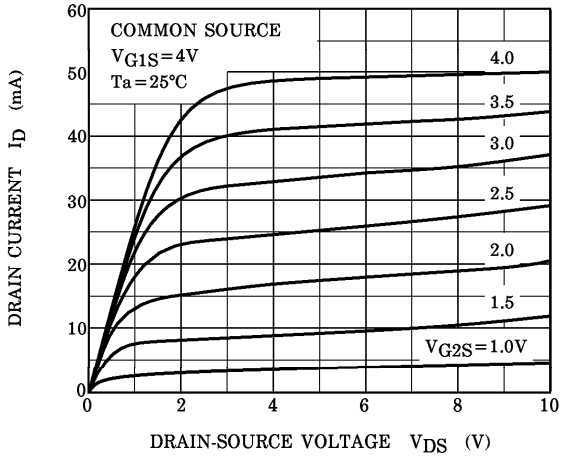
L1~L4 : ϕ0.8mm SILVER PLATED COPPER WIRE
C : AIR TRIMMER TTA25A200A (MURATA MFG. Co., Ltd.)
RFC 1 : ϕ0.35mm COPPER WIRE 3mm ID, 7T
RFC 2 : ϕ0.35mm COPPER WIRE 3mm ID, 10T

Fig.1 800MHz G_{ps}, NF TEST CIRCUIT

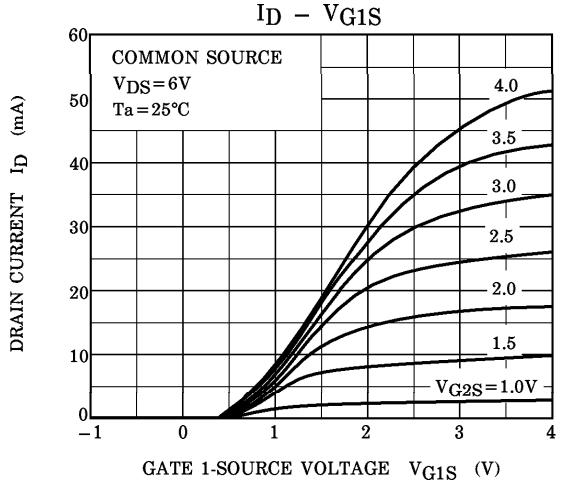
I_D – V_{DS}



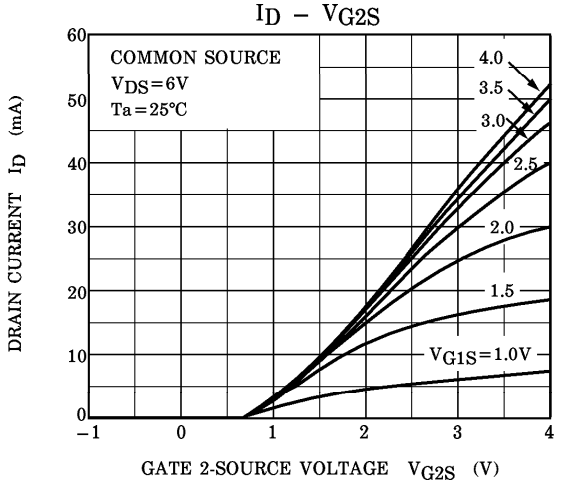
I_D – V_{DS}



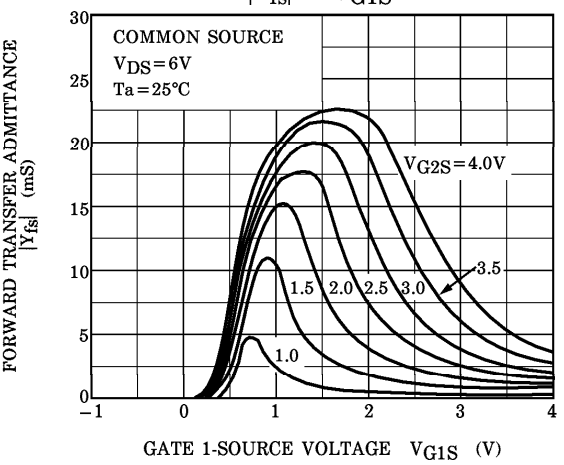
I_D – V_{G1S}



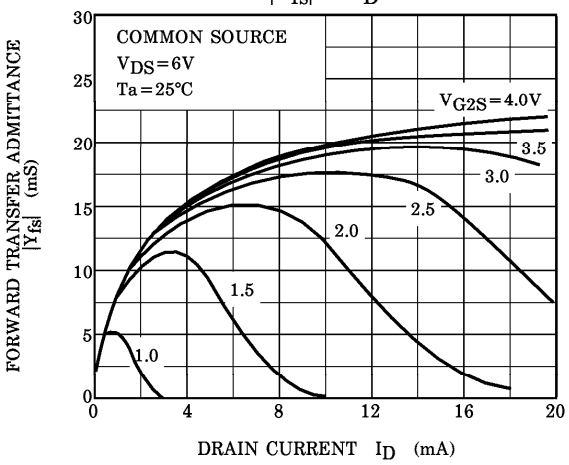
I_D – V_{G2S}



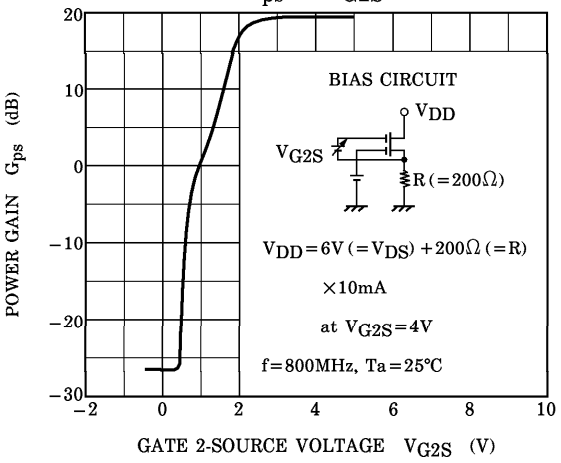
$|Y_{fs}|$ – V_{G1S}



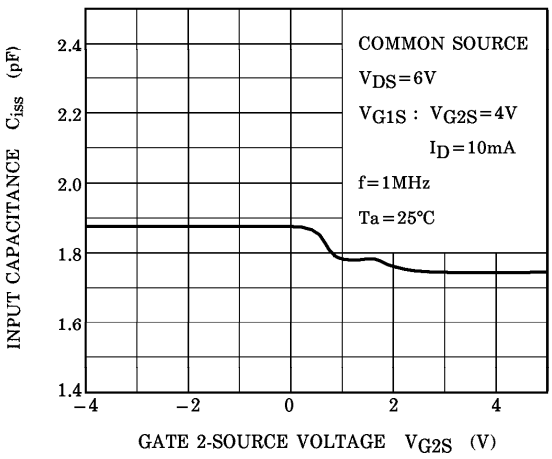
$|Y_{fs}|$ – I_D



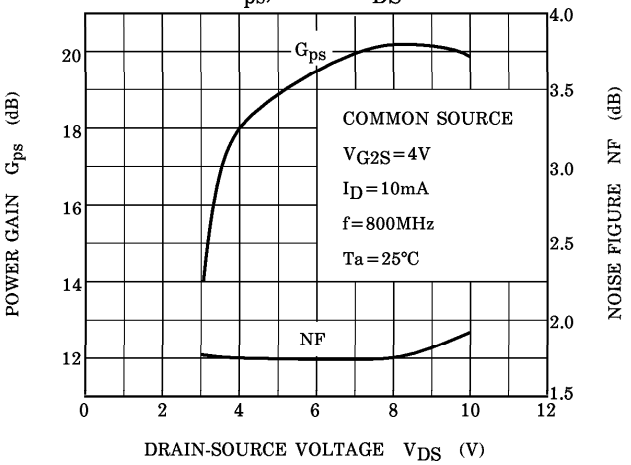
G_{ps} – V_{G2S}



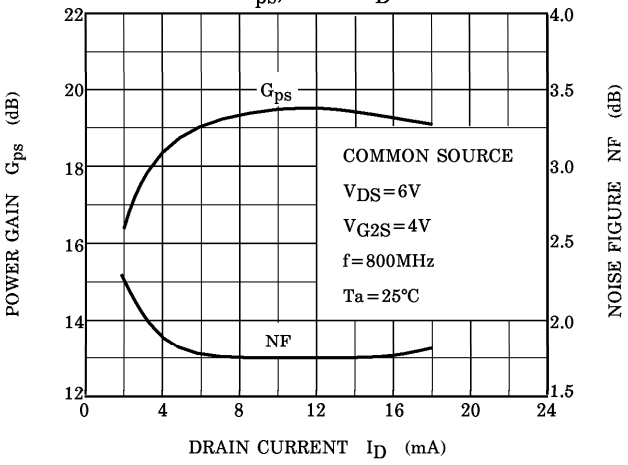
C_{iss} – V_{G2S}



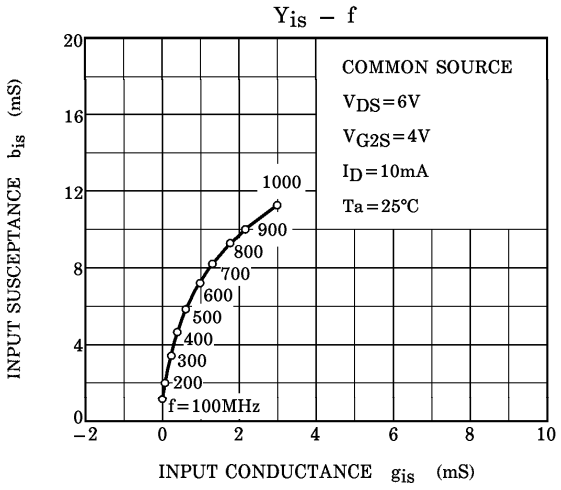
G_{ps}, NF – V_{DS}



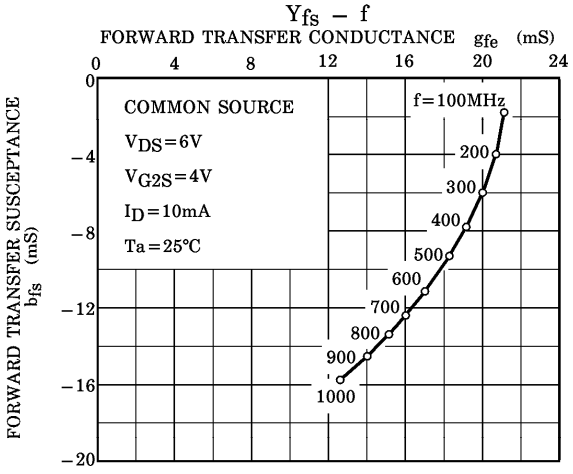
G_{ps}, NF – I_D

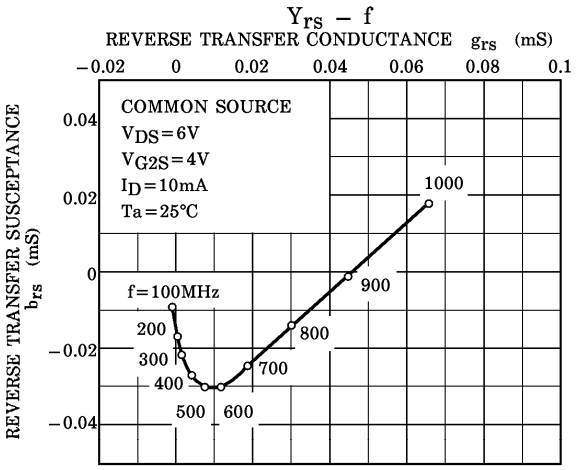


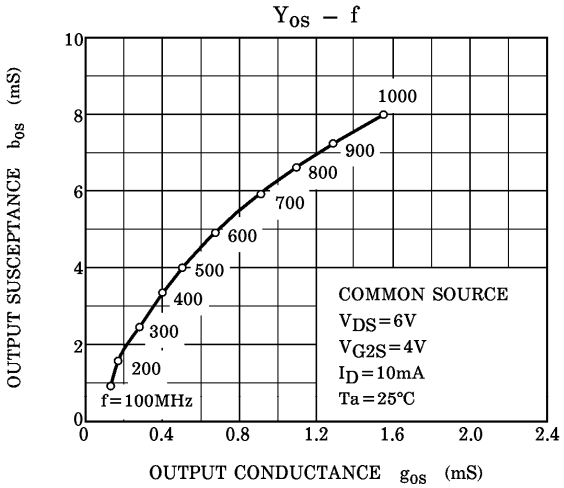
Y_{is} – f

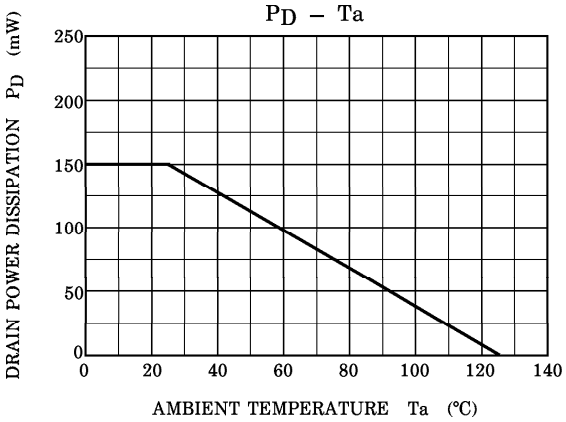


Y_{fs} – f




Y_{rs} – f
REVERSE TRANSFER CONDUCTANCE g_{rs} (mS)
−0.02 0 0.02 0.04 0.06 0.08 0.1
REVERSE TRANSFER SUSCEPTANCE b_{rs} (mS)
0.04 0.02 0 −0.02 −0.04
COMMON SOURCE
V_{DS}=6V
V_{G2S}=4V
I_D=10mA
Ta=25°C
f=100MHz
200
300
400
500
600
700
800
900
1000


Y_{os} – f
OUTPUT SUSCEPTANCE b_{os} (mS)
10 8 6 4 2 0
0 0.4 0.8 1.2 1.6 2.0 2.4
OUTPUT CONDUCTANCE g_{os} (mS)
COMMON SOURCE
V_{DS}=6V
V_{G2S}=4V
I_D=10mA
Ta=25°C
f=100MHz
200
300
400
500
600
700
800
900
1000


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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000707EAA

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