NEC

MOS FIELD EFFECT TRANSISTOR

3SK131

RF AMP. FOR VHF TV TUNER
N-CHANNEL SILICON DUAL-GATE MOS FIELD-EFFECT TRANSISTOR
4PIN MINI MOLD

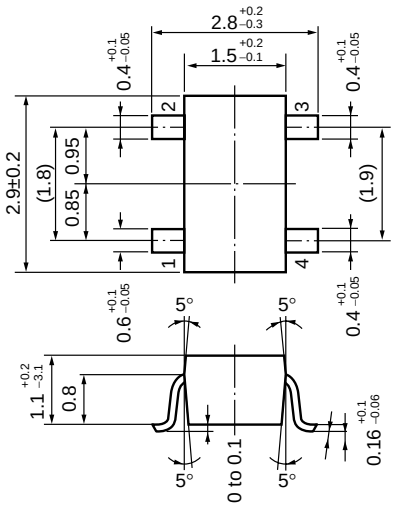
FEATURES

- Suitable for use as RF amplifier in VHF TV tuner.
- Low C_{rss} : 0.05 pF TYP.
- High G_{ps} : 23 dB TYP.
- Low NF : 1.3 dB TYP.

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C)

Drain to Source Voltage	V_{DSX}	20	V
Gate1 to Source Voltage	V_{G1S}	±8	V
Gate2 to Source Voltage	V_{G2S}	±8	V
Drain Current	I_D	25	mA
Total Power Dissipation	P_T	200	mW
Channel Temperature	T_{ch}	125	°C
Storage Temperature	T_{stg}	–55 to +125	°C

PACKAGE DIMENSIONS
(Unit: mm)



PIN CONNECTIONS
1. Source
2. Drain
3. Gate 2
4. Gate 1

ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Drain to Source Breakdown Voltage	BV_{DSX}	20			V	V_{G1S} = V_{G2S} = –2 V, I_D = 10 μA
Drain Current	I_{DSS}	7	10	25	mA	V_{DS} = 6 V, V_{G2S} = 3 V, V_{G1S} = 0
Gate1 to Source Cutoff Voltage	$V_{G1S(OFF)}$			–2.0	V	V_{DS} = 8 V, V_{G2S} = 0, I_D = 5 μA
Gate2 to Source Cutoff Voltage	$V_{G2S(OFF)}$			–1.5	V	V_{DS} = 8 V V_{G1S} = 0, I_D = 5 μA
Gate1 Reverse Current	I_{G1SS}			±20	nA	V_{DS} = 0, V_{G1S} = ±8 V, V_{G2S} = 0
Gate2 Reverse Current	I_{G2SS}			±20	nA	V_{DS} = 0, V_{G2S} = ±8 V, V_{G1S} = 0
Forward Transfer Admittance	$\|y_{fs}\|$	22	28		mS	V_{DS} = 6 V, V_{G2S} = 3 V, I_D = 10 mA f = 1 kHz
Input Capacitance	C_{iss}	4.0	5.0	6.5	pF	V_{DS} = 6 V, V_{G2S} = 3 V, I_D = 10 mA
Output Capacitance	C_{oss}	2.2	2.9	3.7	pF	f = 1 MHz
Reverse Transfer Capacitance	C_{rss}		0.05	0.08	pF	
Power Gain	C_{ps}	21	24		dB	V_{DS} = 10 V, V_{G2S} = 5 V, I_D = 10 mA
Noise Figure	NF		1.2	2.5	dB	f = 200 MHz

I_{DSS} classification V11 7-13 mA V12 11-19 mA V13 17-25 mA

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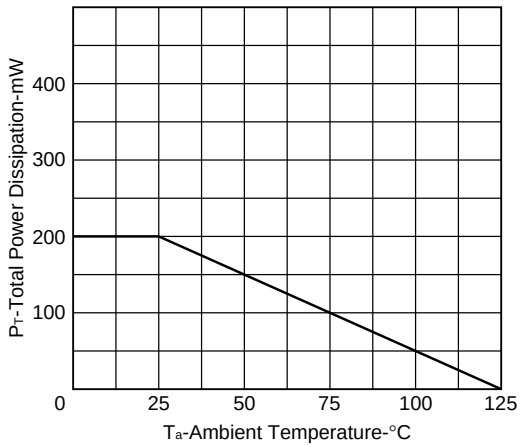
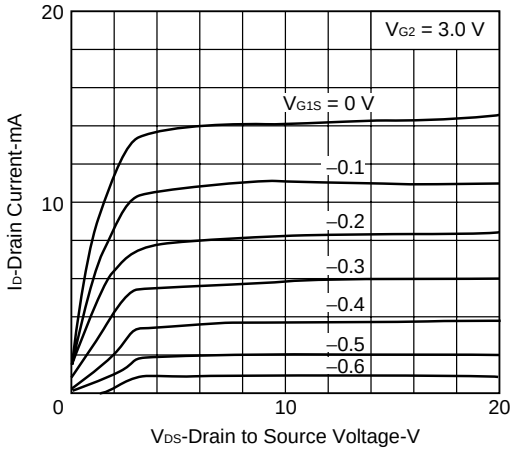
TYPICAL CHARACTERISTICS (T_A = 25 °C)

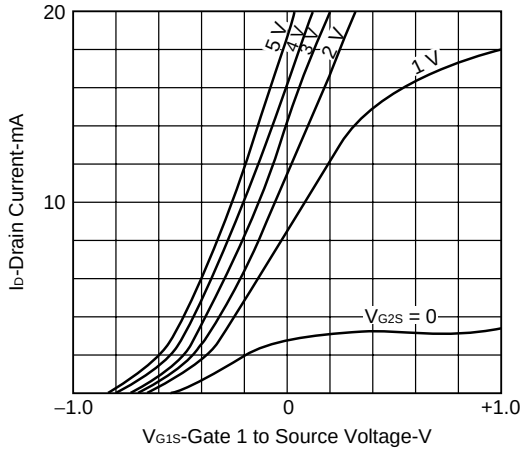
TOTAL POWER DISSIPATION vs.
AMBIENT TEMPERATURE



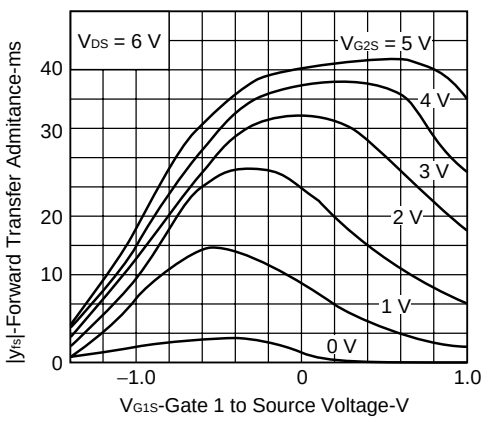
DRAIN CURRENT vs.
DRAIN TO SOURCE VOLTAGE



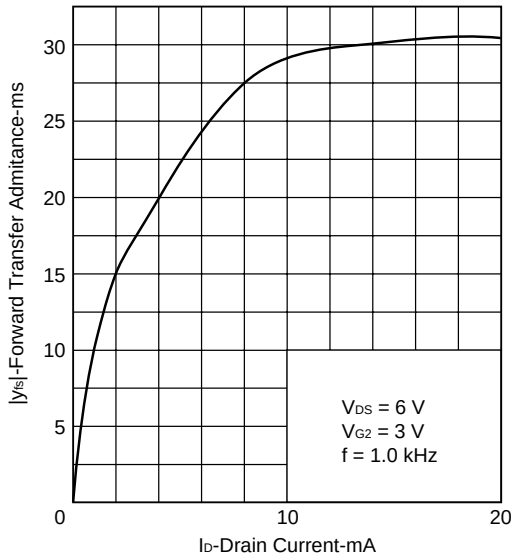
DRAIN CURRENT vs.
GATE1 TO SOURCE VOLTAGE



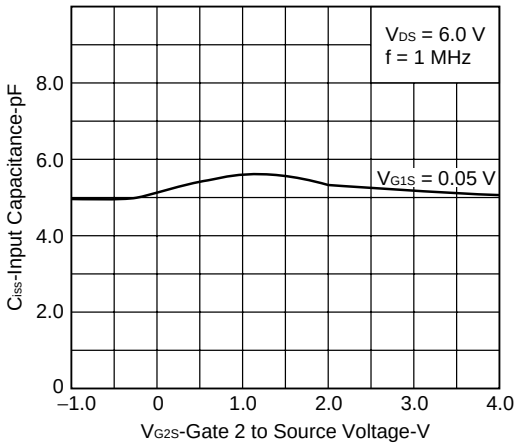
FORWARD TRANSFER ADMITTANCE vs.
GATE1 TO SOURCE VOLTAGE



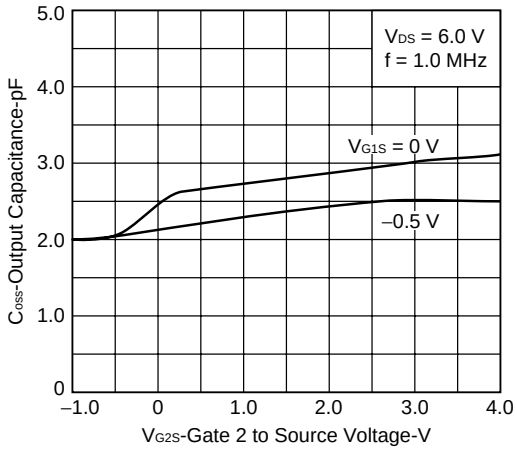
FORWARD TRANSFER ADMITTANCE vs.
DRAIN CURRENT



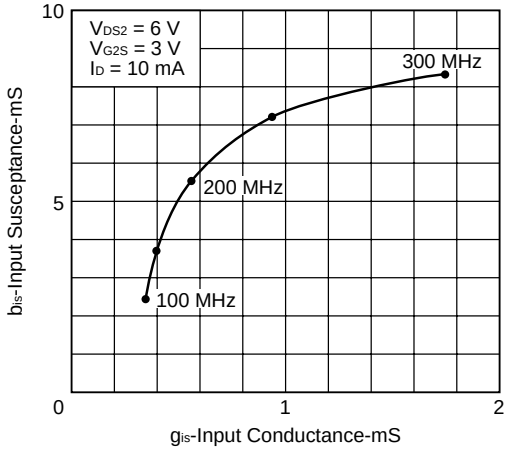
INPUT CAPACITANCE vs.
GATE2 TO SOURCE VOLTAGE



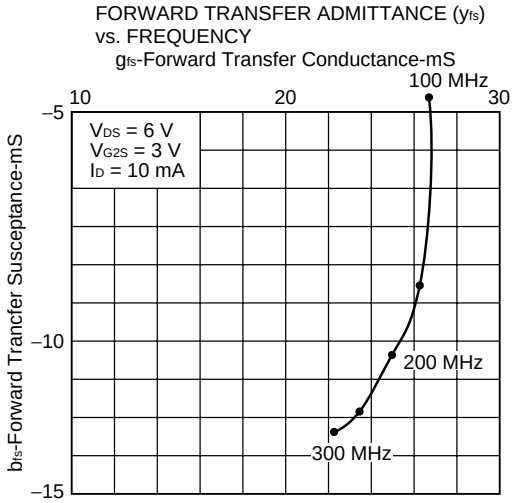
OUTPUT CAPACITANCE vs.
GATE2 TO SOURCE VOLTAGE



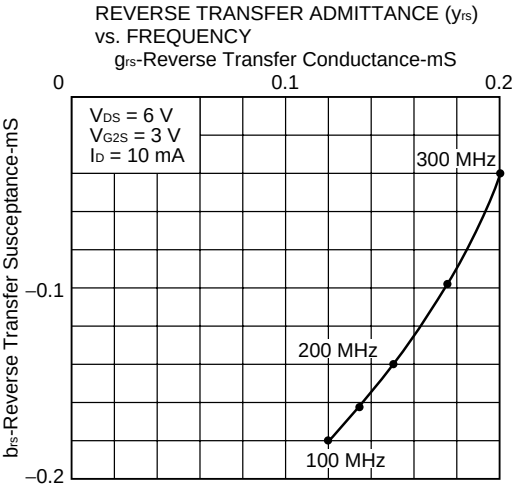
INPUT ADMITTANCE (y_{is})
vs. FREQUENCY



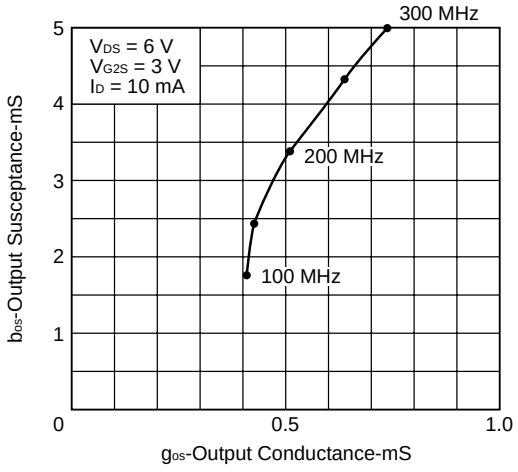
FORWARD TRANSFER ADMITTANCE (y_{fs})
vs. FREQUENCY



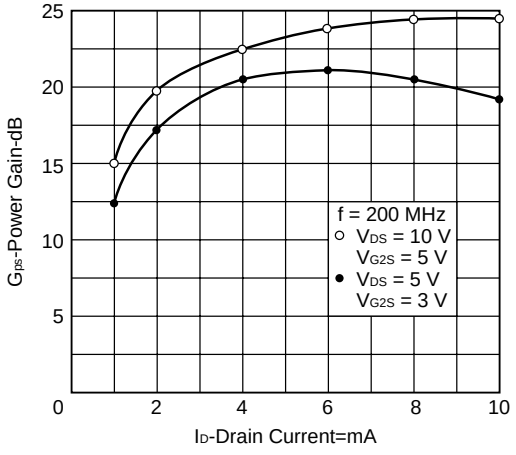
REVERSE TRANSFER ADMITTANCE (y_{rs})
vs. FREQUENCY



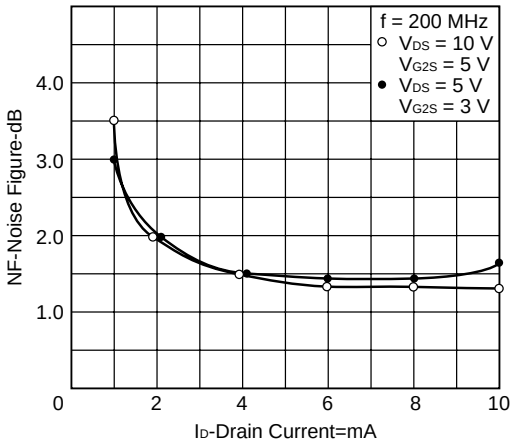
OUTPUT ADMITTANCVE (y_{os})
vs. FREQUENCY



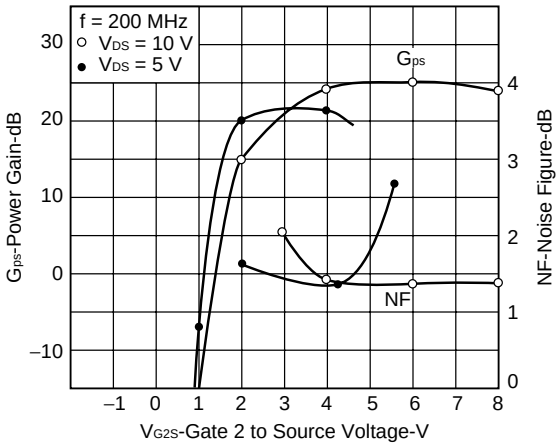
POWER GAIN vs. DRAIN CURRENT



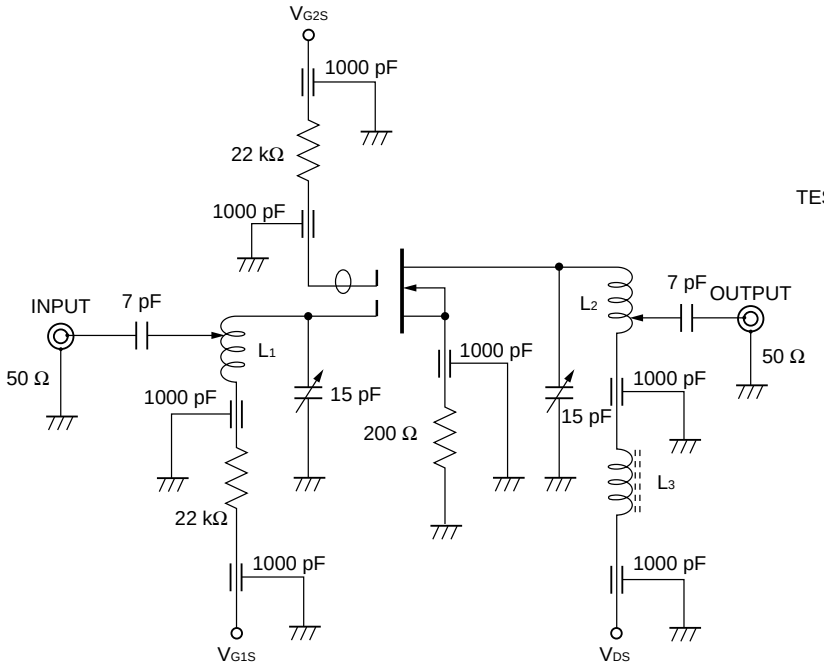
NOISE FIGURE vs. DRAIN CURRENT



NOISE FIGURE, POWER GAIN vs.
GATE2 TO SOURCE VOLTAGE



TEST CIRCUIT



TEST CONDITION

V_{DS} = 10 V, V_{G2S} = 5 V, I_D = 10 mA
f = 200 MHz
L_1: ϕ0.6 mm U.E.W. 7 mm 3T
L_2: ϕ0.6 mm U.E.W. 7 mm 3T
L_3: RFC 2.2 μH

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