

MOS FIELD EFFECT TRANSISTOR

3SK131

RF AMP. FOR VHF TV TUNER

N-CHANNEL SILICON DUAL-GATE MOS FIELD-EFFECT TRANSISTOR

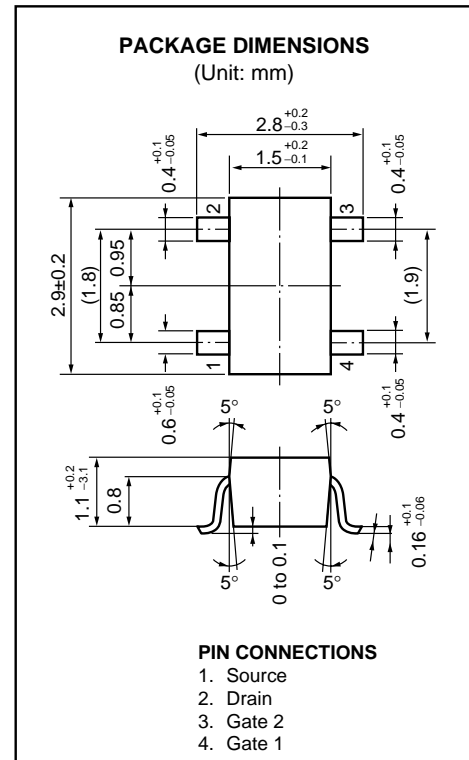
4PIN MINI MOLD

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 ($T_A = 25\text{ }^\circ\text{C}$)

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	$^\circ\text{C}$
Storage Temperature	T_{stg}	-55 to +125	$^\circ\text{C}$

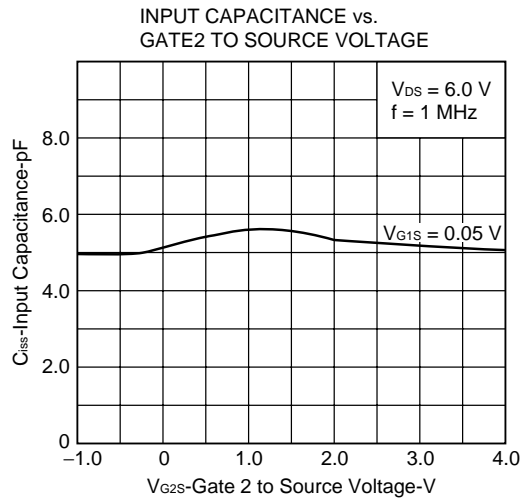
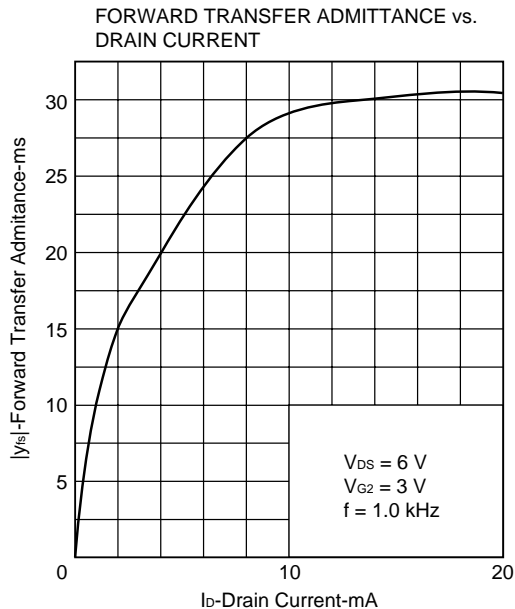
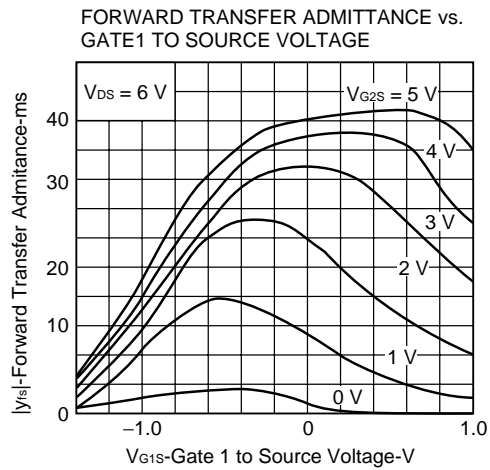
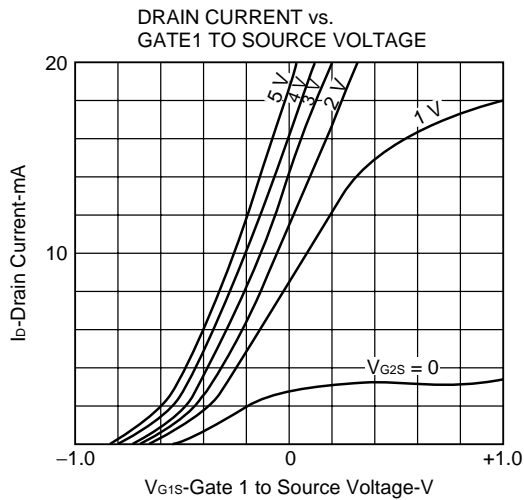
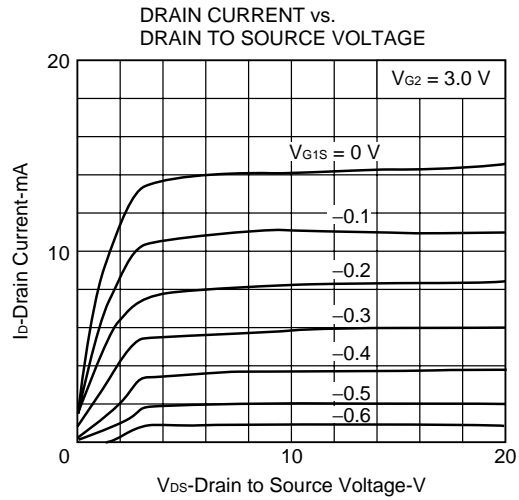
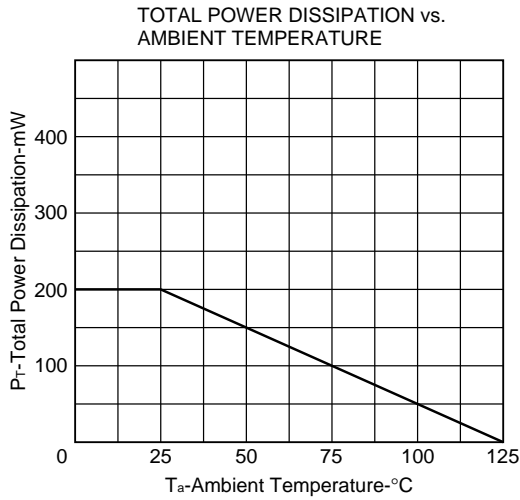


ELECTRICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$)

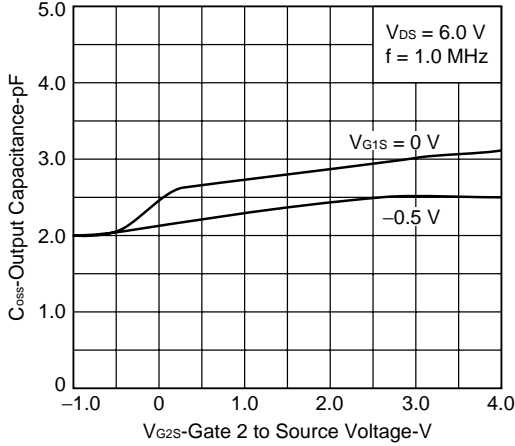
CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Drain to Source Breakdown Voltage	BV_{DSX}	20			V	$V_{G1S} = V_{G2S} = -2\text{ V}$, $I_D = 10\text{ }\mu\text{A}$
Drain Current	I_{DSS}	7	10	25	mA	$V_{DS} = 6\text{ V}$, $V_{G2S} = 3\text{ V}$, $V_{G1S} = 0$
Gate1 to Source Cutoff Voltage	$V_{G1S(OFF)}$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

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

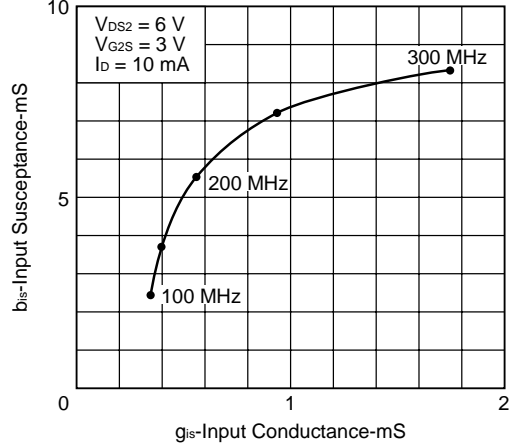
TYPICAL CHARACTERISTICS (T_A = 25 °C)



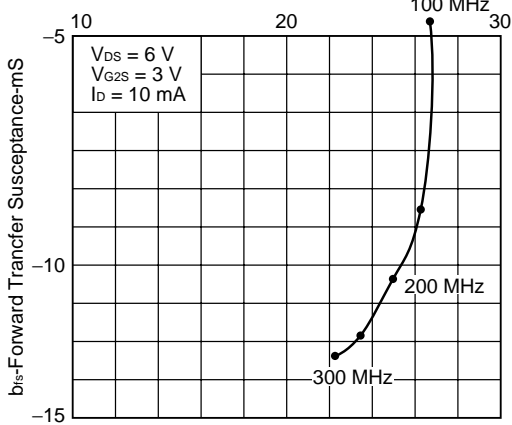
OUTPUT CAPACITANCE vs. GATE2 TO SOURCE VOLTAGE



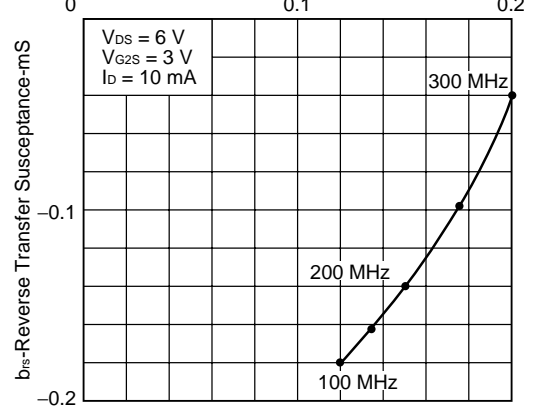
INPUT ADMITTANCE (y_{is}) vs. FREQUENCY



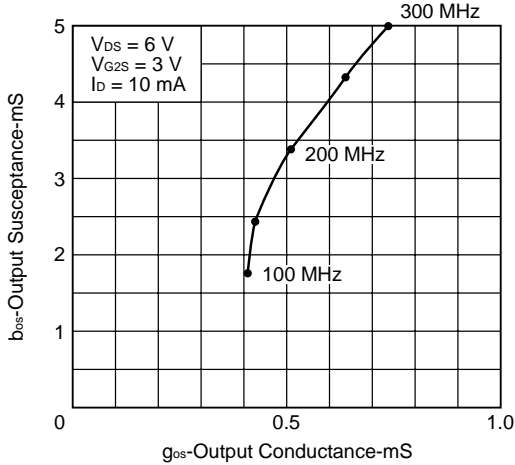
FORWARD TRANSFER ADMITTANCE (y_{fs}) vs. FREQUENCY



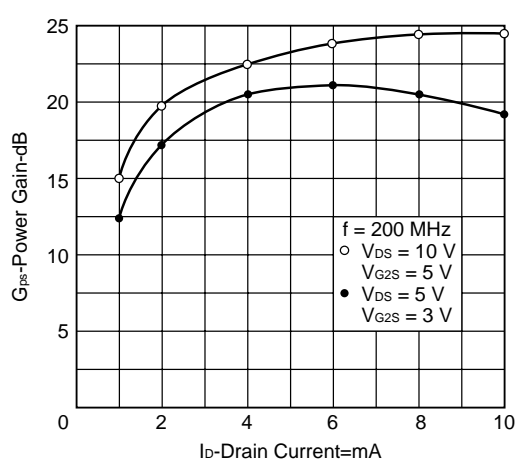
REVERSE TRANSFER ADMITTANCE (y_{rs}) vs. FREQUENCY



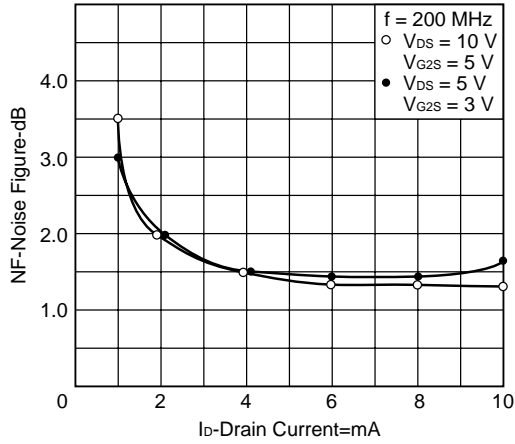
OUTPUT ADMITTANCE (y_{os}) vs. FREQUENCY



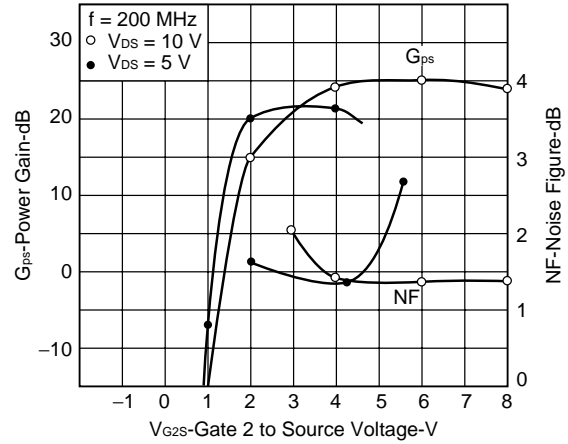
POWER GAIN vs. DRAIN CURRENT



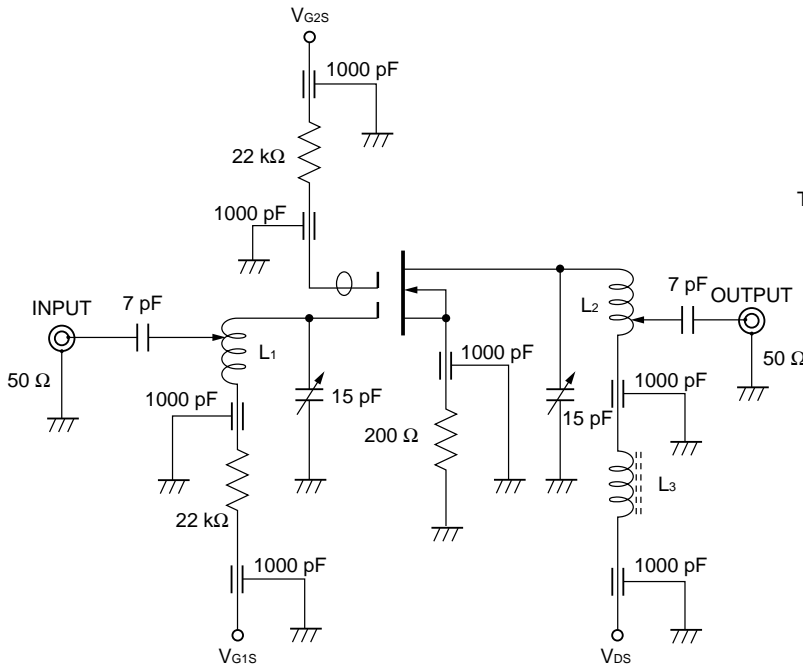
NOISE FIGURE vs. DRAIN CURRENT



NOISE FIGURE, POWER GAIN vs. GATE2 TO SOURCE VOLTAGE



TEST CIRCUIT



TEST CONDITION

- V_{ds} = 10 V, V_{gs2} = 5 V, I_b = 10 mA
- f = 200 MHz
- L₁: φ 0.6 mm U.E.W. 7 mm 3T
- L₂: φ 0.6 mm U.E.W. 7 mm 3T
- L₃: RFC 2.2 μH

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