

MOS FIELD EFFECT TRANSISTOR  
**3SK131**

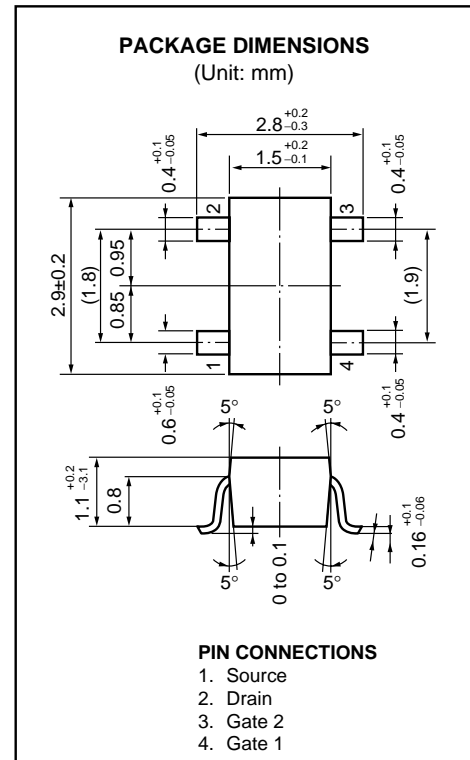
RF AMP. FOR VHF TV TUNER  
 N-CHANNEL SILICON DUAL-GATE MOS FIELD-EFFECT TRANSISTOR  
 4PIN MINI MOLD

**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	$V_{G1S}$	$\pm 8$	V
Gate2 to Source Voltage	$V_{G2S}$	$\pm 8$	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	$^\circ\text{C}$

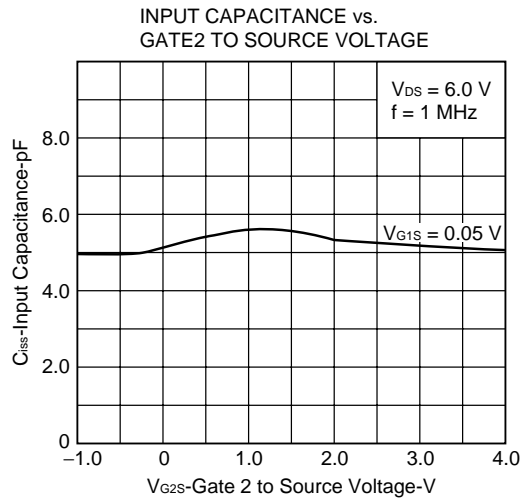
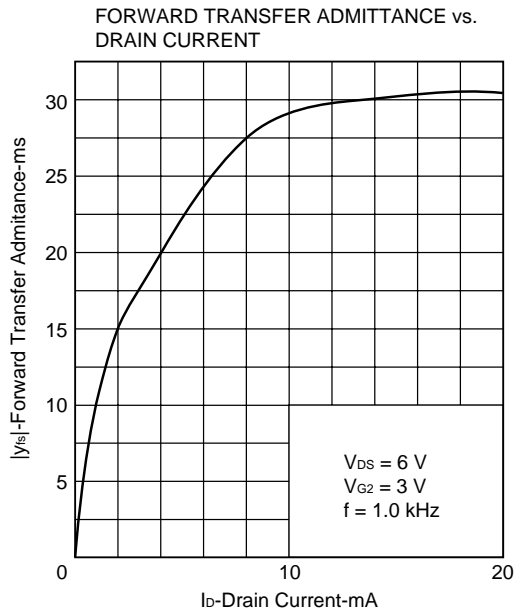
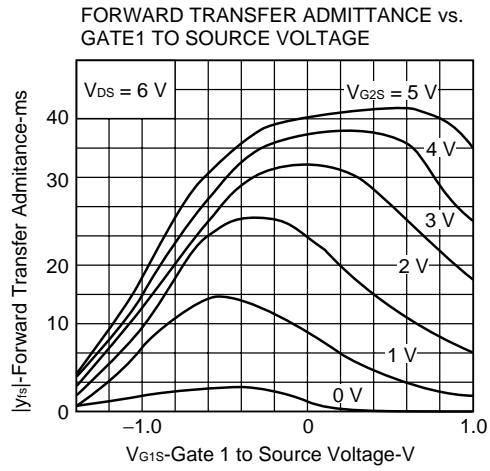
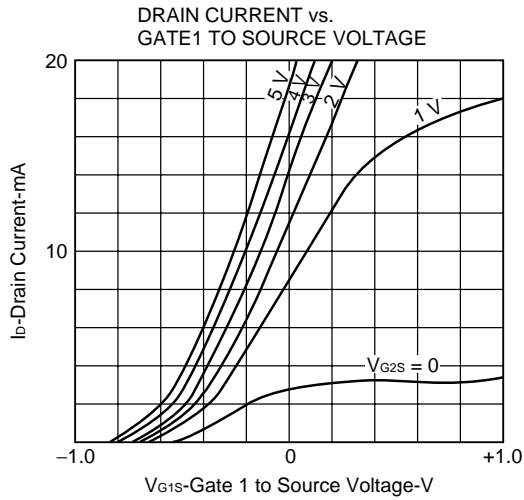
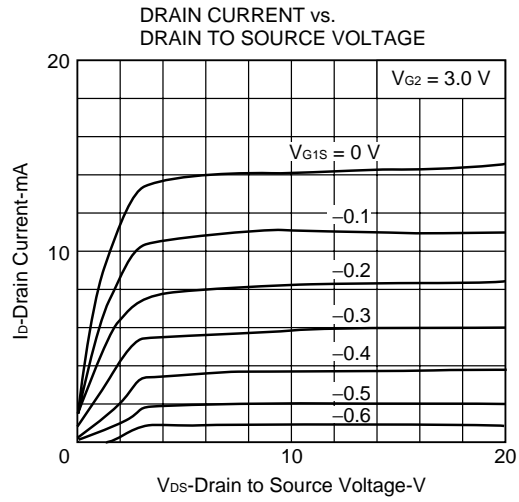
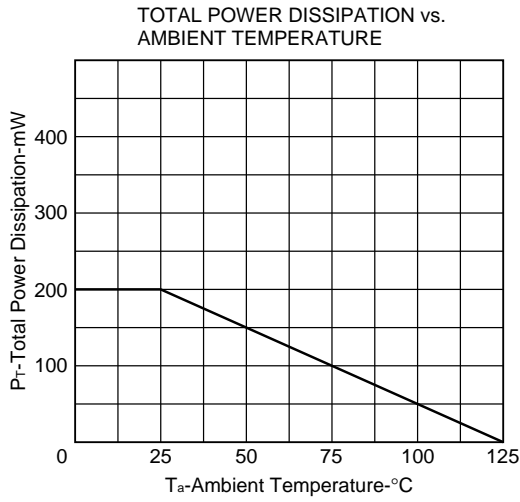


**ELECTRICAL CHARACTERISTICS ( $T_A = 25\text{ }^\circ\text{C}$ )**

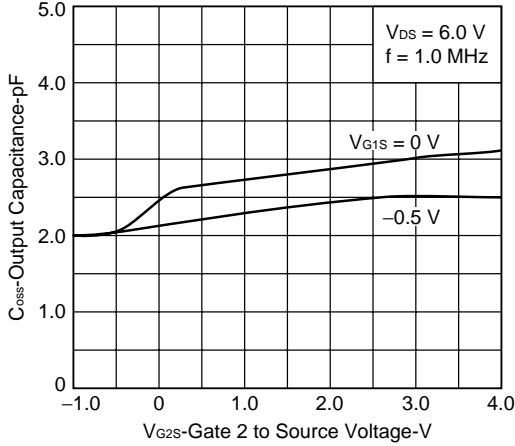
CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Drain to Source Breakdown Voltage	$BV_{DSX}$	20			V	$V_{G1S} = V_{G2S} = -2\text{ V}$ , $I_D = 10\text{ }\mu\text{A}$
Drain Current	$I_{DSS}$	7	10	25	mA	$V_{DS} = 6\text{ V}$ , $V_{G2S} = 3\text{ V}$ , $V_{G1S} = 0$
Gate1 to Source Cutoff Voltage	$V_{G1S(OFF)}$			-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	$I_{G1SS}$			$\pm 20$	nA	$V_{DS} = 0$ , $V_{G1S} = \pm 8\text{ V}$ , $V_{G2S} = 0$
Gate2 Reverse Current	$I_{G2SS}$			$\pm 20$	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	$V_{DS} = 6\text{ V}$ , $V_{G2S} = 3\text{ V}$ , $I_D = 10\text{ mA}$ $f = 1\text{ MHz}$
Output Capacitance	$C_{oss}$	2.2	2.9	3.7	pF	
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

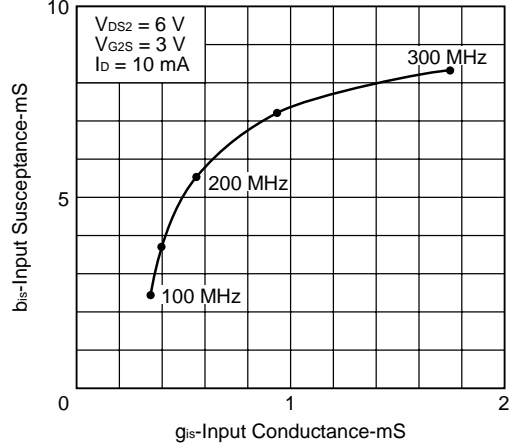
TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25 °C)



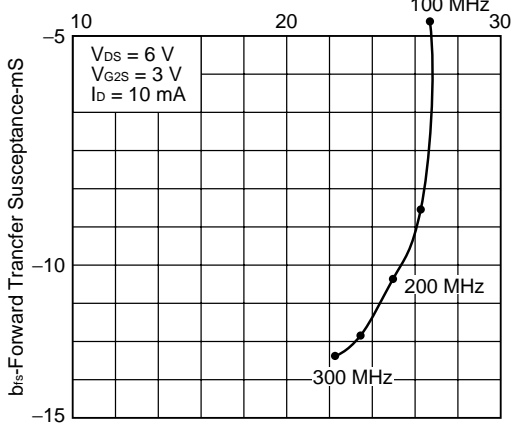
OUTPUT CAPACITANCE vs. GATE2 TO SOURCE VOLTAGE



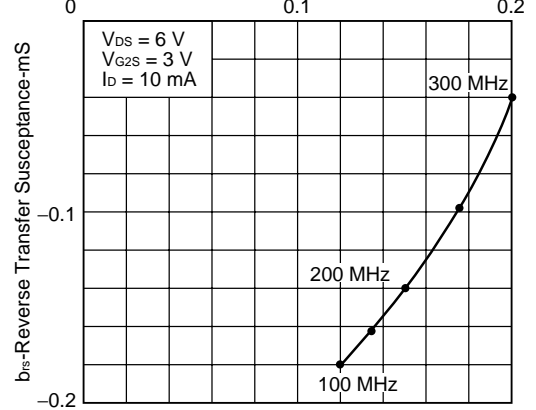
INPUT ADMITTANCE ( $y_{is}$ ) vs. FREQUENCY



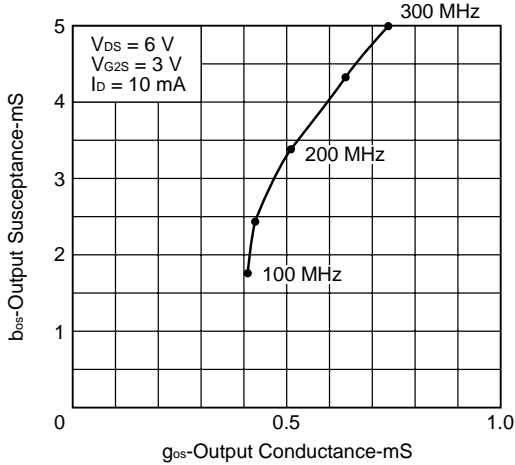
FORWARD TRANSFER ADMITTANCE ( $y_{fs}$ ) vs. FREQUENCY



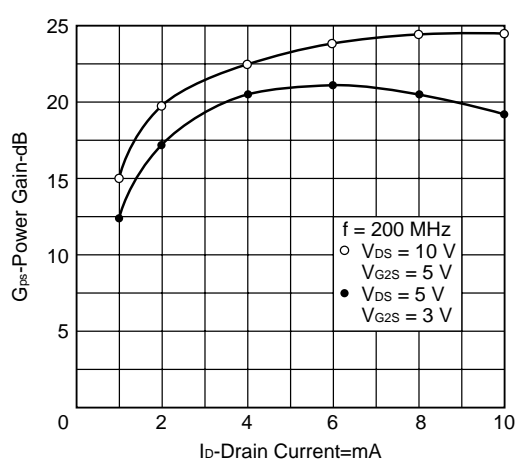
REVERSE TRANSFER ADMITTANCE ( $y_{rs}$ ) vs. FREQUENCY



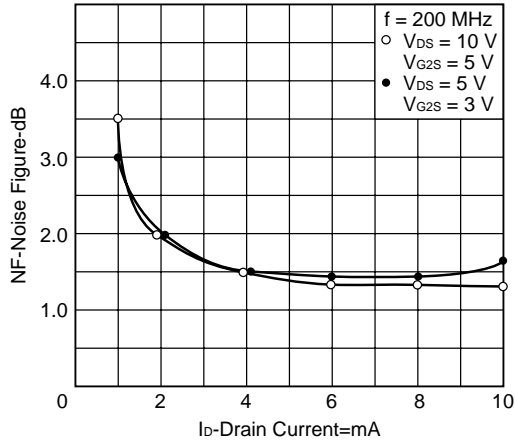
OUTPUT ADMITTANCE ( $y_{os}$ ) vs. FREQUENCY



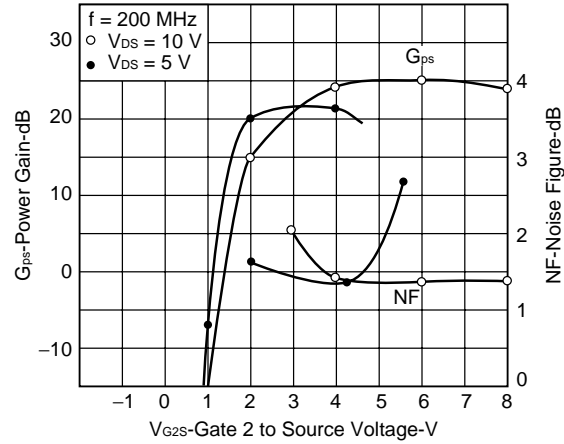
POWER GAIN vs. DRAIN CURRENT



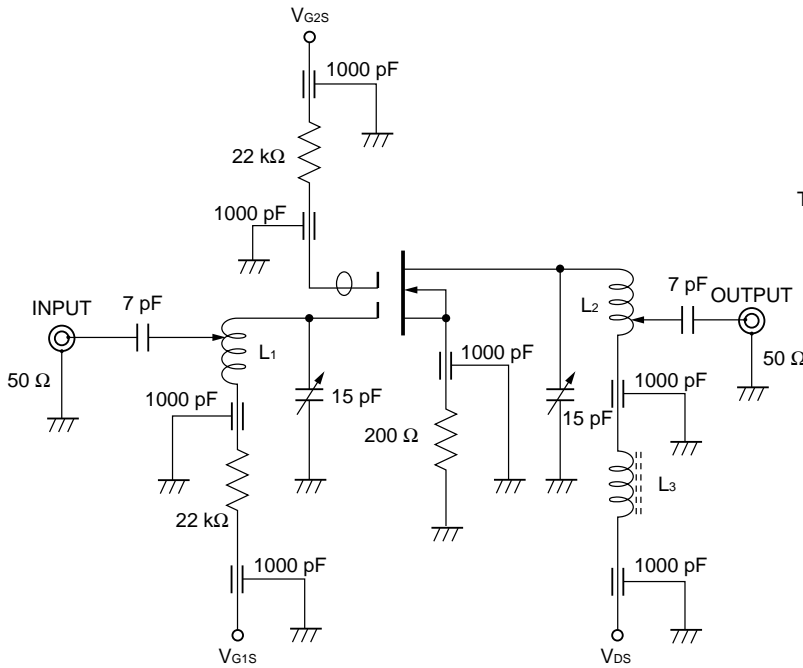
NOISE FIGURE vs. DRAIN CURRENT



NOISE FIGURE, POWER GAIN vs. GATE2 TO SOURCE VOLTAGE



TEST CIRCUIT



TEST CONDITION

- $V_{DS} = 10 \text{ V}$ ,  $V_{GS2} = 5 \text{ V}$ ,  $I_D = 10 \text{ mA}$
- $f = 200 \text{ MHz}$
- $L_1$ :  $\phi 0.6 \text{ mm U.E.W. 7 mm 3T}$
- $L_2$ :  $\phi 0.6 \text{ mm U.E.W. 7 mm 3T}$
- $L_3$ : RFC  $2.2 \mu\text{H}$

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Anti-radioactive design is not implemented in this product.