DATA SHEET

NEC

MOS FIELD EFFECT TRANSISTOR

3SK255

RF AMPLIFIER FOR UHF TUNER
N-CHANNEL Si DUAL GATE MOS FIELD-EFFECT TRANSISTOR
4 PINS SUPER MINI MOLD

FEATURES

- Low V_{DD} Use : (V_{DS} = 3.5 V)
- Driving Battery
- Low Noise Figure : NF = 1.8 dB TYP. (f = 900 MHz)
- High Power Gain : G_{PS} = 18.0 dB TYP. (f = 900 MHz)
- Suitable for uses as RF amplifier in UHF TV tuner.
- Automatically Mounting : Embossed Type Taping
- Small Package : 4 Pins Super Mini Mold

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C)

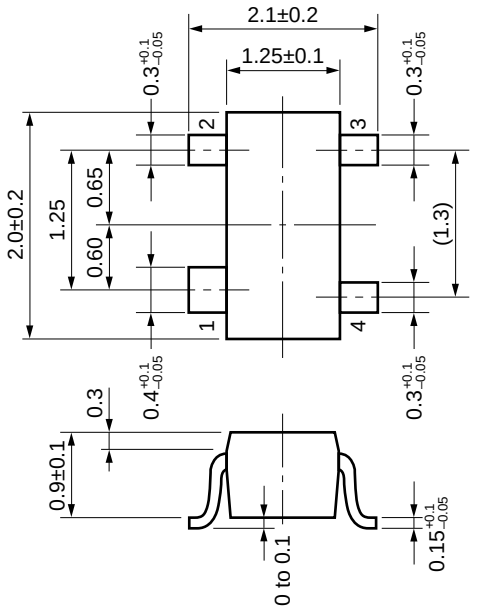
Drain to Source Voltage	V_{DSX}	18	V
Gate1 to Source Voltage	V_{G1S}	±8 ***1**	V
Gate2 to Source Voltage	V_{G2S}	±8 ***1**	V
Gate1 to Drain Voltage	V_{G1D}	18	V
Gate2 to Drain Voltage	V_{G2D}	18	V
Drain Current	I_D	25	mA
Total Power Dissipation	P_D	130	mW
Channel Temperature	T_{ch}	125	°C
Storage Temperature	T_{stg}	–55 to +125	°C

***1:** $R_L \geq 10\ k\Omega$

***2:** Free air

PACKAGE DIMENSIONS

(Unit: mm)



PIN CONNECTIONS

1. Source
2. Drain
3. Gate2
4. Gate1

PRECAUTION

Avoid high static voltages or electric fields so that this device would not suffer from any damage due to those voltage or fields.

Document No. P10586EJ3V0DS00 (3rd edition)
Date Published June 1996 P
Printed in Japan

ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

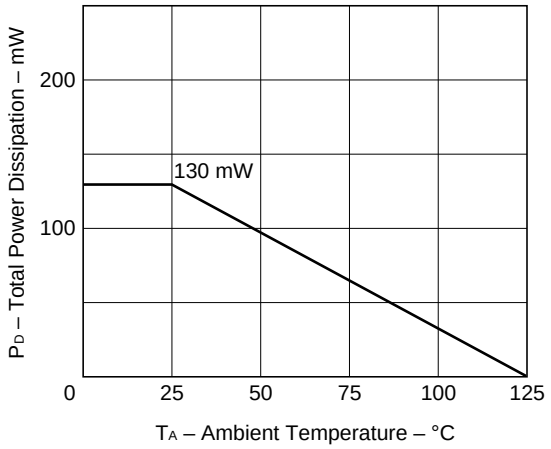
CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Drain to Source Breakdown Voltage	BV_{DSX}	18			V	V_{G1S} = V_{G2S} = –2 V, I_D = 10 μA
Drain Current	I_{DSX}	0.5		7.0	mA	V_{DS} = 3.5 V, V_{G2S} = 3 V, V_{G1S} = 0.75 V
Gate1 to Source Cutoff Voltage	$V_{G1S(off)}$	–1.0	0	+1.0	V	V_{DS} = 3.5 V, V_{G2S} = 3 V, I_D = 10 μA
Gate2 to Source Cutoff Voltage	$V_{G2S(off)}$	0	0.5	1.0	V	V_{DS} = 3.5 V, V_{G1S} = 3 V, I_D = 10 μA
Gate1 Reverse Current	I_{G1SS}			±20	nA	V_{DS} = 0, V_{G2S} = 0, V_{G1S} = ±6 V
Gate2 Reverse Current	I_{G2SS}			±20	nA	V_{DS} = 0, V_{G1S} = 0, V_{G2S} = ±6 V
Forward Transfer Admittance	$\|y_{fs}\|$	14	19	24	mS	V_{DS} = 3.5 V, V_{G2S} = 3 V, I_D = 7 mA f = 1 kHz
Input Capacitance	C_{iss}	1.2	1.7	2.2	pF	V_{DS} = 3.5 V, V_{G2S} = 3 V, I_D = 7 mA f = 1 MHz
Output Capacitance	C_{oss}	0.5	1.0	1.5	pF	
Reverse Transfer Capacitance	C_{rss}		0.01	0.03	pF	
Power Gain	G_{ps}	15	18	21	dB	V_{DS} = 3.5 V, V_{G2S} = 3 V, I_D = 7 mA f = 900 MHz
Noise Figure	NF		1.8	3.0	dB	

I_{DSX} Classification

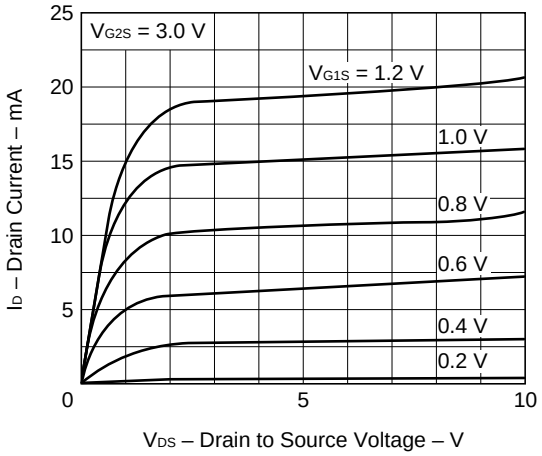
Rank	U1G
Marking	U1G
I_{DSX} (mA)	0.5 to 7.0

TYPICAL CHARACTERISTICS (T_A = 25 °C)

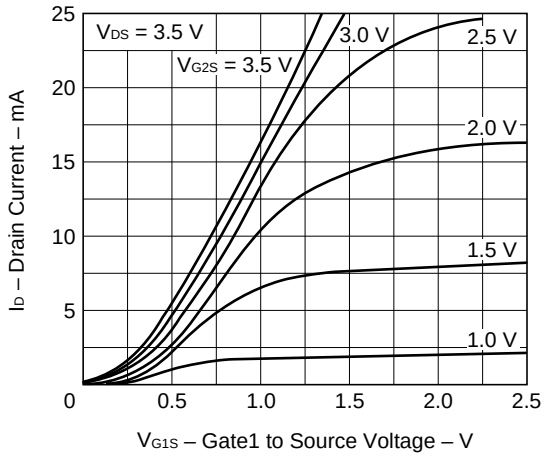
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



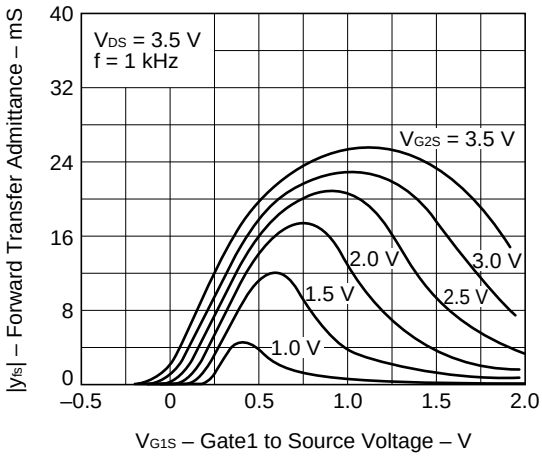
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



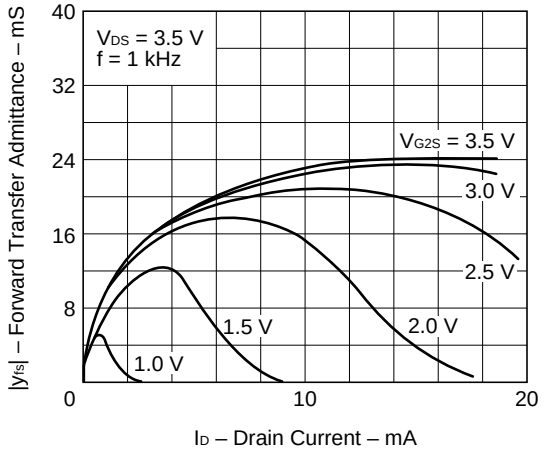
DRAIN CURRENT vs. GATE1 TO SOURCE VOLTAGE



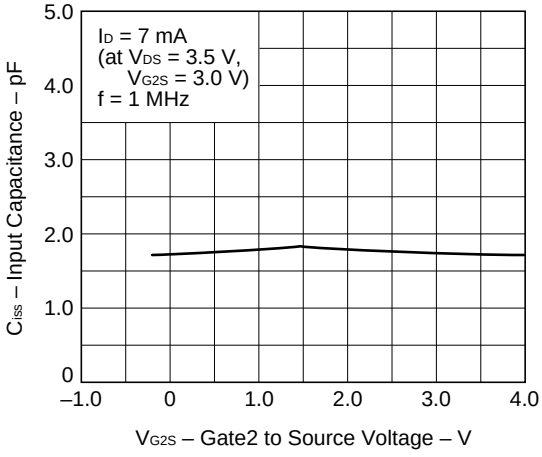
FORWARD TRANSFER ADMITTANCE vs. GATE1 TO SOURCE VOLTAGE



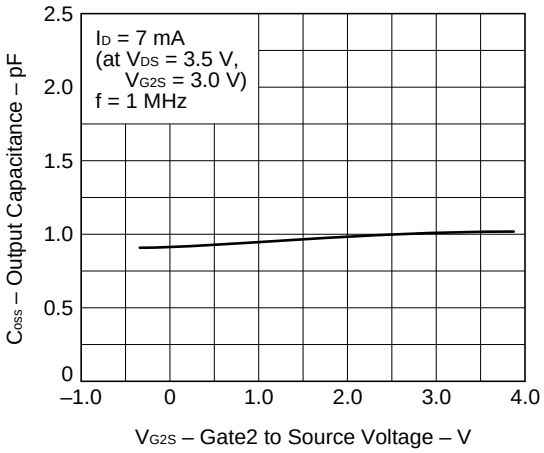
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



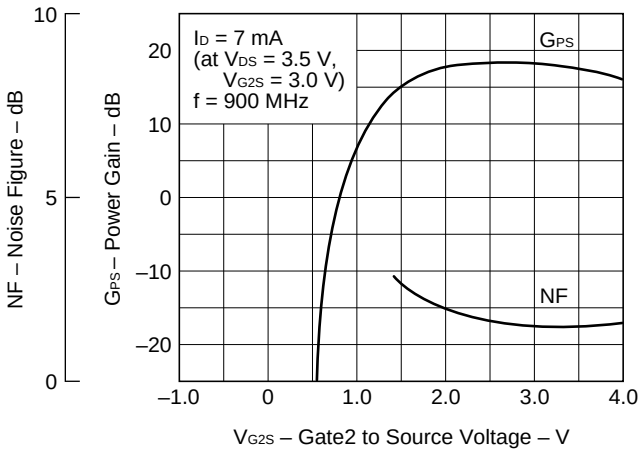
INPUT CAPACITANCE vs. GATE2 TO SOURCE VOLTAGE



OUTPUT CAPACITANCE vs.
GATE2 TO SOURCE VOLTAGE



POWER GAIN AND NOISE FIGURE vs.
GATE2 TO SOURCE VOLTAGE

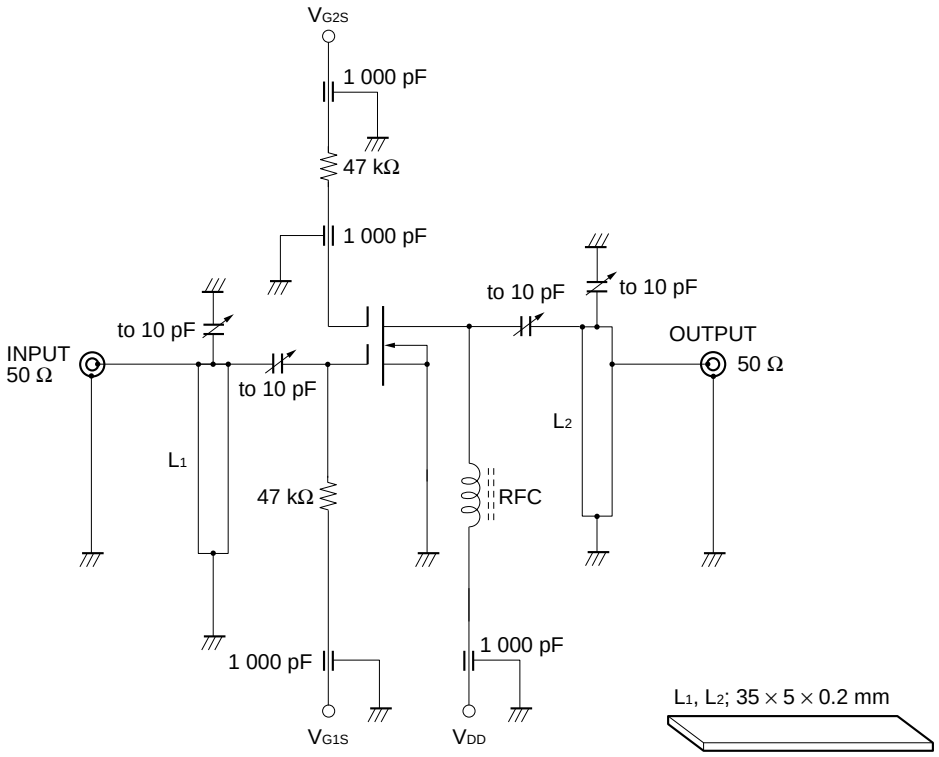


S-Parameter

V_{DS} = 3.5 V, V_{G2S} = 3 V, I_D = 7 mA

Frequency	S11		S21		S12		S22	
(MHz)	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	1.017	–6.5	2.057	173.3	0.035	–88.2	0.985	–2.9
200	1.000	–13.4	2.034	163.6	0.014	–121.6	0.987	–6.9
300	0.999	–19.8	1.991	155.5	0.006	67.0	0.988	–10.4
400	0.993	–26.6	1.996	146.8	0.006	71.3	0.983	–13.8
500	0.984	–32.6	1.956	136.7	0.005	117.8	0.985	–17.1
600	0.966	–39.1	1.930	130.4	0.002	–23.3	0.983	–20.8
700	0.948	–45.5	1.901	122.7	0.002	–162.4	0.979	–24.6
800	0.934	–51.4	1.897	114.5	0.003	37.8	0.986	–27.9
900	0.908	–57.5	1.897	105.6	0.011	–146.3	0.991	–32.1
1000	0.901	–83.8	1.984	96.6	0.010	–144.3	1.024	–36.4

G_{PS} AND NF TEST CIRCUIT AT f = 900 MHz



[MEMO]

[MEMO]