DATA SHEET

NEC

MOS FIELD EFFECT TRANSISTOR
3SK230

RF AMP. FOR VHF/CATV TUNER
N-CHANNEL SILICON DUAL-GATE MOS FIELD-EFFECT TRANSISTOR
4 PINS MINI MOLD

FEATURES

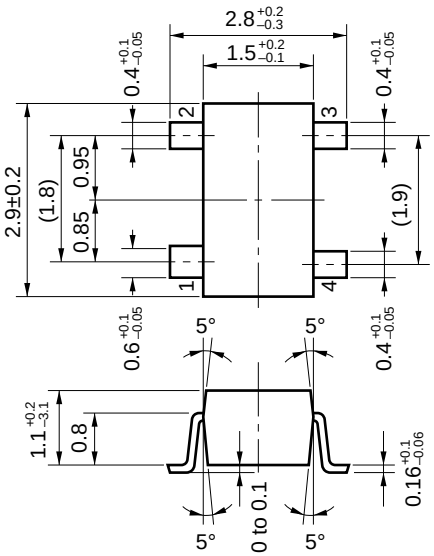
- The Characteristic of Cross-Modulation is good.
  CM = 108 dBμ (TYP.) @f = 470 MHz, G_R = –30 dB
- Low Noise Figure NF1 = 2.2 dB TYP. (@ = 470 MHz)
  NF2 = 0.9 dB TYP. (@ = 55 MHz)
- High Power Gain G_{PS} = 19.5 dB TYP. (@ = 470 MHz)
- Enhancement Typ.
- Suitable for use as RF amplifier in CATV tuner.
- Automatically Mounting: Embossed Type Taping
- Small Package: 4 Pins Mini Mold Package. (SC-61)

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C)

Drain to Source Voltage	V_{DSX}	18	V
Gate1 to Source Voltage	V_{G1S}	±8(±10)*[1]	V
Gate2 to Source Voltage	V_{G2S}	±8(±10)*[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	200	mW
Channel Temperature	T_{ch}	125	°C
Storage Temperature	T_{stg}	–55 to +125	°C

$R_L \geq 10\ k\Omega$

PACKAGE DIMENSIONS
(Unit: mm)



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

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

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ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

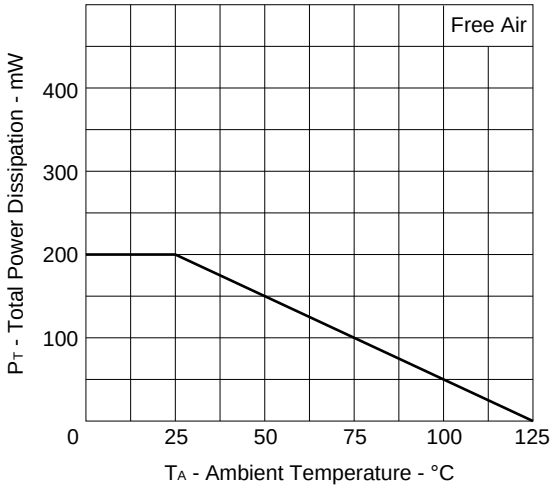
CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Drain to Source Breakdown Voltage	BV_{DSX}	18			V	V_{G1S} = V_{G2S} = −2 V, I_D = 10 μA
Drain Current	I_{DSX}	0.01		8.0	mA	V_{DS} = 6 V, V_{G2S} = 4.5 V, V_{G1S} = 0.75 V
Gate1 to Source Cutoff Voltage	$V_{G1S(off)}$	0		+1.0	V	V_{DS} = 6 V, V_{G2S} = 3 V, I_D = 10 μA
Gate2 to Source Cutoff Voltage	$V_{G2S(off)}$	+0.6	+1.1	+1.6	V	V_{DS} = 6 V, V_{G1S} = 3 V, I_D = 10 μA
Gate1 Reverse Current	I_{G1SS}			±20	nA	V_{DS} = V_{G2S} = 0, V_{G1S} = ±8 V
Gate2 Reverse Current	I_{G2SS}			±20	nA	V_{DS} = V_{G1S} = 0, V_{G2S} = ±8 V
Forward Transfer Admittance	$\lvert y_{fs} \rvert$	16	20	24	mS	V_{DS} = 6 V, V_{G2S} = 4.5 V, I_D = 10 mA f = 1 kHz
Input Capacitance	C_{iss}	2.3	2.8	3.3	pF	V_{DS} = 6 V, V_{G2S} = 4.5 V, I_D = 10 mA f = 1 MHz
Output Capacitance	C_{oss}	0.9	1.2	1.5	pF	
Reverse Transfer Capacitance	C_{rss}		0.015	0.03	pF	
Power Gain	G_{ps}	16.5	19.5	22.5	dB	V_{DS} = 6 V, V_{G2S} = 4.5 V, I_D = 10 mA f = 470 MHz
Noise Figure 1	NF1		2.2	3.2	dB	
Noise Figure 2	NF2		0.9	2.4	dB	V_{DS} = 6 V, V_{G2S} = 4.5 V, I_D = 10 mA f = 55 MHz

I_{DSX} Classification

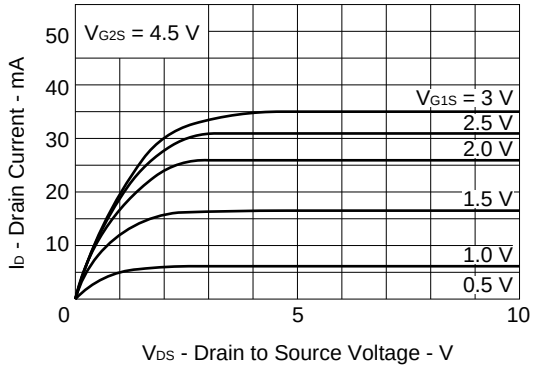
Rank	U1A	U1B
Marking	U1A	U1B
I_{DSX} (mA)	0.01 to 3.0	1.0 to 8.0

CHARACTERISTIC CURVE (T_A = 25 °C)

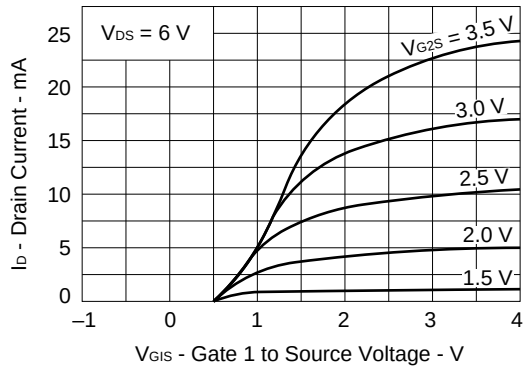
TOTAL POWER DISSIPATION vs.
AMBIENT TEMPERATURE



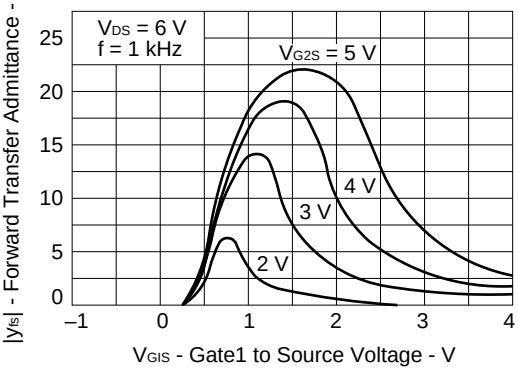
DRAIN CURRENT vs.
DRAIN TO SOURCE VOLTAGE



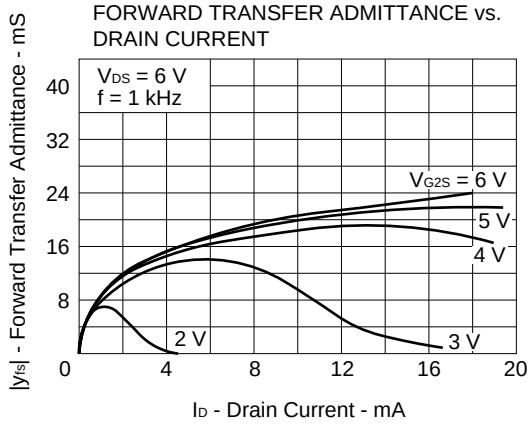
DRAIN CURRENT vs.
GATE1 TO SOURCE VOLTAGE



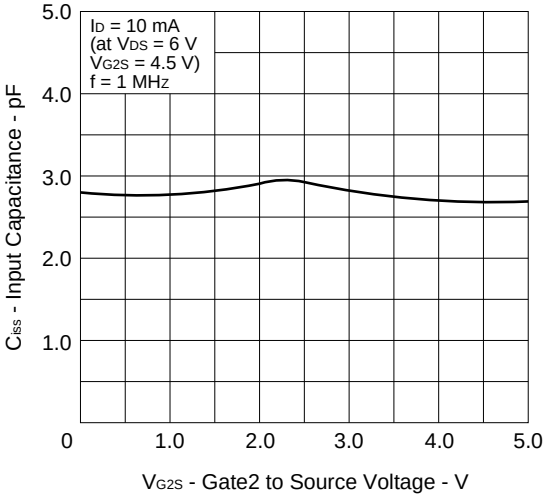
FORWARD TRANSFER ADMITTANCE vs.
GATE1 TO SOURCE VOLTAGE



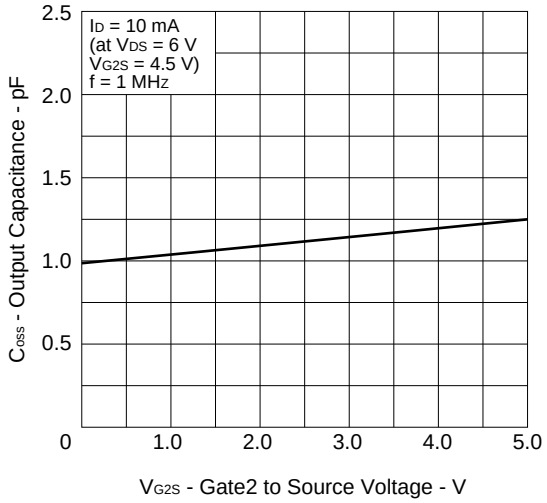
FORWARD TRANSFER ADMITTANCE vs.
DRAIN CURRENT



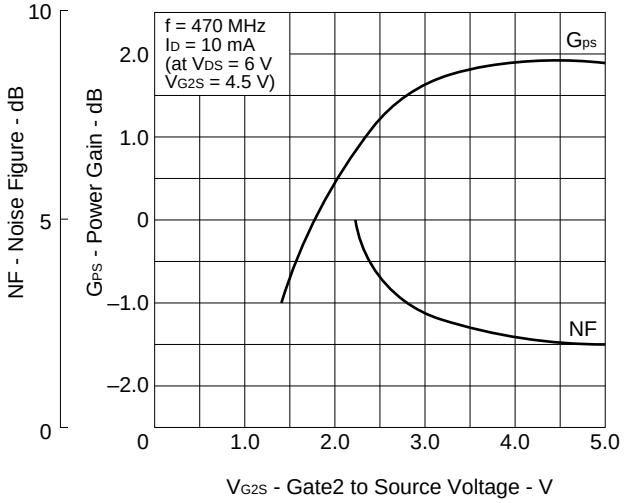
INPUT CAPACITANCE vs.
GATE2 TO SOURCE VOLTAGE



OUTPUT CAPACITANCE vs.
GATE2 TO SOURCE VOLTAGE



POWER GAIN AND NOISE FIGURE vs.
GATE2 TO SOURCE VOLTAGE

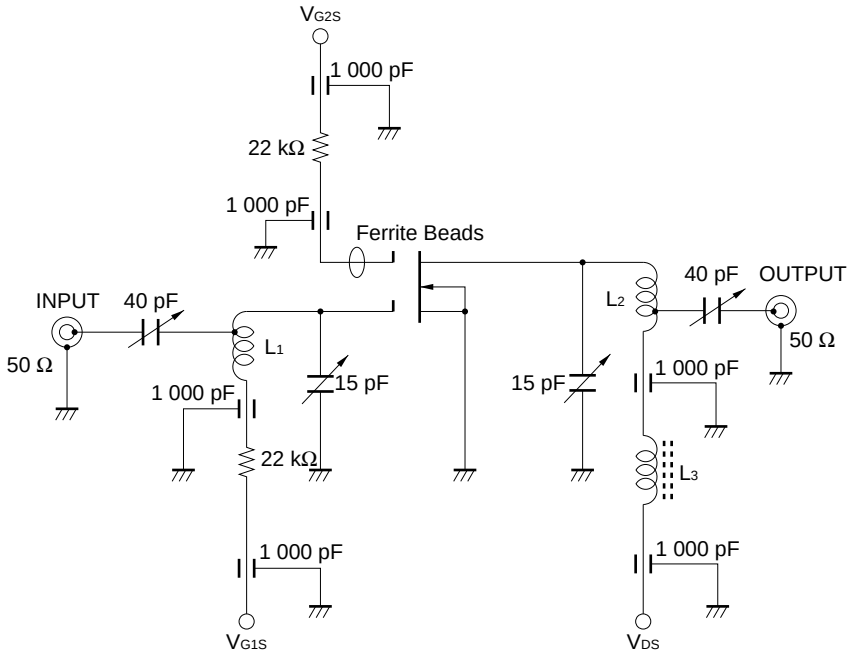


S-PARAMETER

V_{DS} = 6 V, V_{G2S} = 4.5 V, I_D = 10 mA, (Zo = 50 Ω)

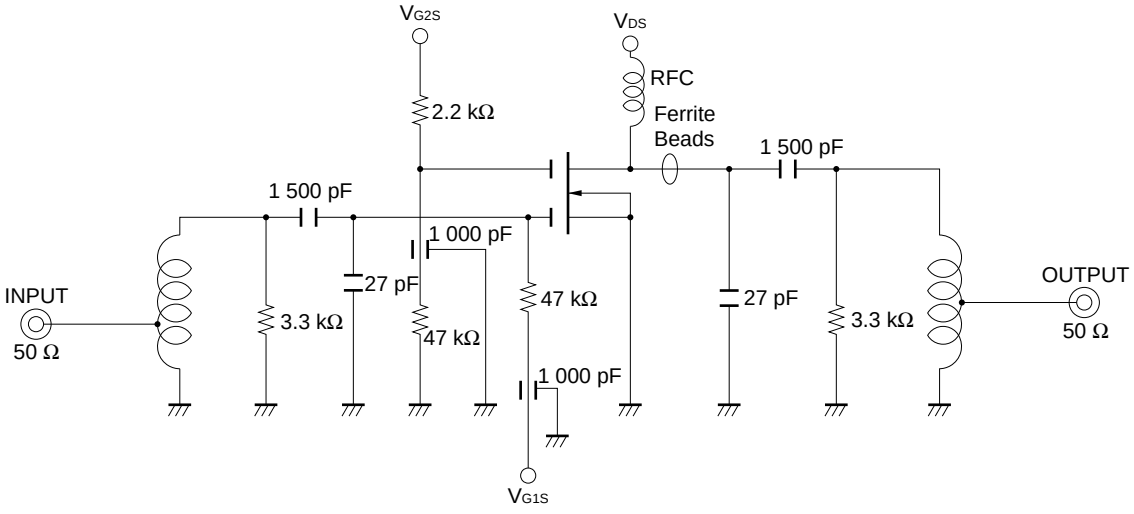
FREQUENCY	S11		S21		S12		S22	
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	1.000	−14.7	2.160	160.5	0.008	12.8	0.942	−8.2
200	0.960	−24.5	1.953	148.3	0.003	81.1	0.947	−9.6
300	0.926	−34.3	1.868	135.8	0.005	−146.8	0.906	−16.4
400	0.876	−45.0	1.760	121.2	0.003	−59.5	0.908	−19.4
500	0.853	−54.4	1.691	109.4	0.003	84.3	0.915	−25.1
600	0.842	−63.1	1.608	97.6	0.004	−87.0	0.889	−29.0

G_{PS} AND NF TEST CIRCUIT AT f = 470 MHz



L1: ϕ1.2 mm U.E.W ϕ5 mm IT
L2: ϕ1.2 mm U.E.W ϕ5 mm IT
L3: REC 2.2 μH

NF TEST CIRCUIT AT f = 55 MHz



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