NEC

MOS FIELD EFFECT TRANSISTOR

3SK222

RF AMPLIFIER FOR FM TUNER AND VHF TV TUNER
N-CHANNEL Si DUAL GATE MOS FIELD-EFFECT TRANSISTOR
4 PINS MINI MOLD

FEATURES

- The Characteristic of Cross-Modulation is good.
  CM = 92 dBμ TYP. @ f = 200 MHz, G_R = –30 dB
- Low Noise Figure: NF1 = 1.2 dB TYP. (f = 200 MHz)
  NF2 = 1.0 dB TYP. (f = 55 MHz)
- High Power Gain: G_{PS} = 23 dB TYP. (f = 200 MHz)
- Enhancement Type.
- Suitable for use as RF amplifier in FM tuner and VHF TV tuner.
- Automatically Mounting: Embossed Type Taping
- Small Package: 4 Pins Mini Mold

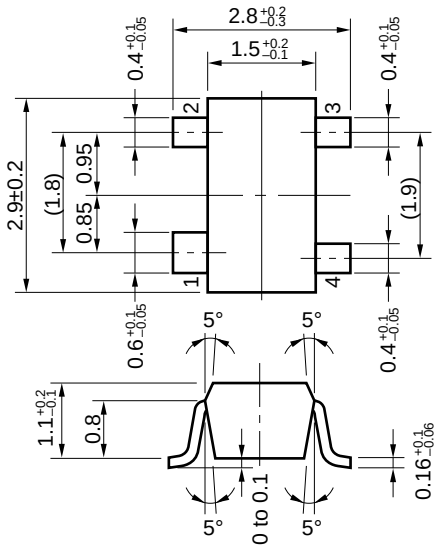
ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C)

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

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

PACKAGE DIMENSIONS

(Unit: mm)



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 voltage 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} = 3 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		+1.0	V	V_{DS} = 6 V, V_{G2S} = 3 V, I_D = 10 μA
Gate1 Reverse Current	I_{G1SS}			±20	nA	V_{DS} = 0, V_{G2S} = 0, V_{G1S} = ±8 V
Gate2 Reverse Current	I_{G2SS}			±20	nA	V_{DS} = 0, V_{G1S} = 0, V_{G2S} = ±8 V
Forward Transfer Admittance	$\|y_{fs}\|$	15	19.5		mS	V_{DS} = 5 V, V_{G2S} = 4 V, I_D = 10 mA f = 1 kHz
Input Capacitance	C_{iss}	3.6	4.3	5.0	pF	V_{DS} = 6 V, V_{G2S} = 3 V, I_D = 10 mA f = 1 MHz
Output Capacitance	C_{DSS}	1.0	1.5	2.0	pF	
Reverse Transfer Capacitance	C_{rss}		0.02	0.03	pF	
Power Gain	G_{PS}	21.0	23.0		dB	V_{DS} = 6 V, V_{G2S} = 4 V, I_D = 10 mA f = 200 MHz
Noise Figure 1	NF1		1.2	2.0	dB	
Noise Figure 2	NF2		1.0	2.0	dB	V_{DS} = 6 V, V_{G2S} = 4 V, I_D = 10 mA f = 55 MHz

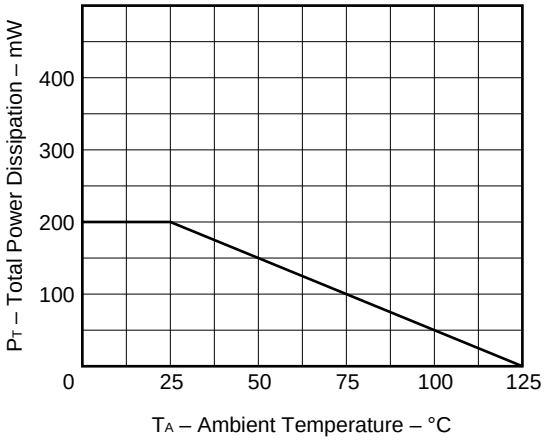
I_{DSX} Classification

Class	V21/VBA*	V22/VBB*
Marking	V21	V22
I_{DSX} (mA)	0.01 to 3.0	1.0 to 8.0

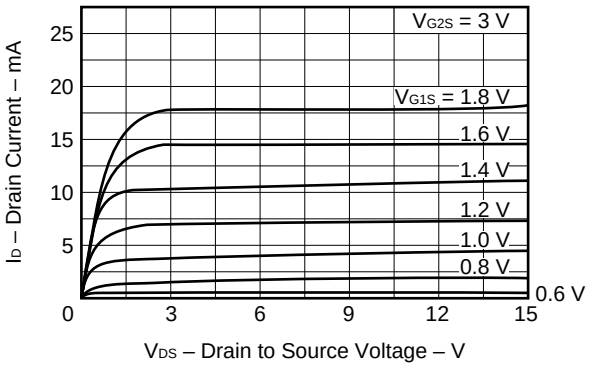
* Old specification/New specification

TYPICAL CHARACTERISTICS (T_A = 25 °C)

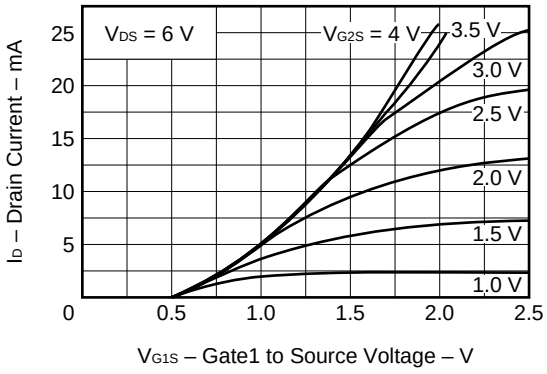
TOTAL POWER DISSIPATION vs.
AMBIENT TEMPERATURE



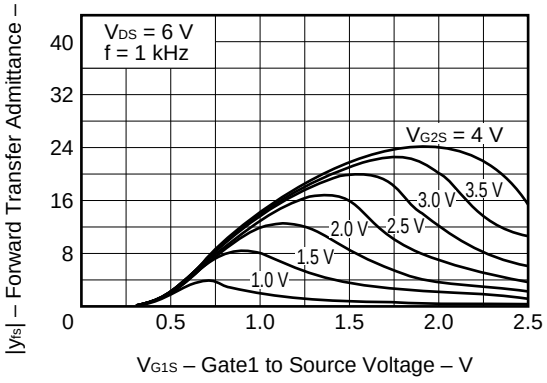
DRAIN CURRENT vs.
DRAIN TO SOURCE VOLTAGE



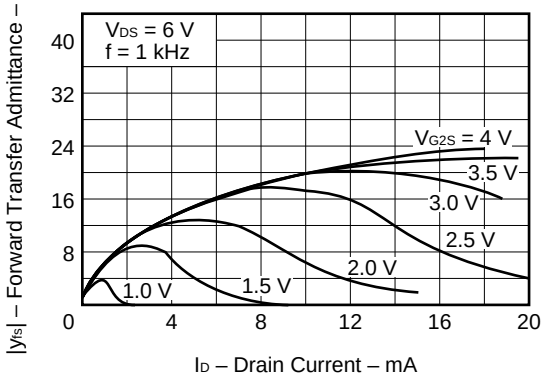
DRAIN CURRENT vs.
GATE1 TO SOURCE VOLTAGE



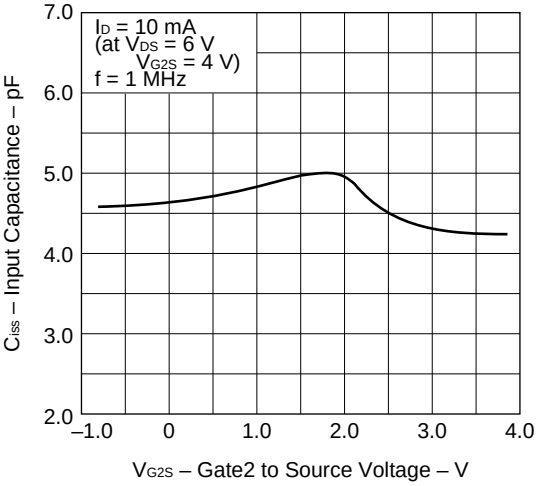
FORWARD TRANSFER ADMITTANCE vs.
GATE1 TO SOURCE VOLTAGE



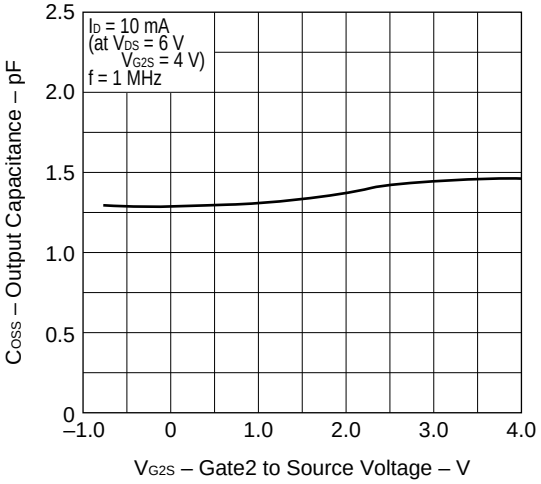
FORWARD TRANSFER ADMITTANCE vs.
DRAIN CURRENT



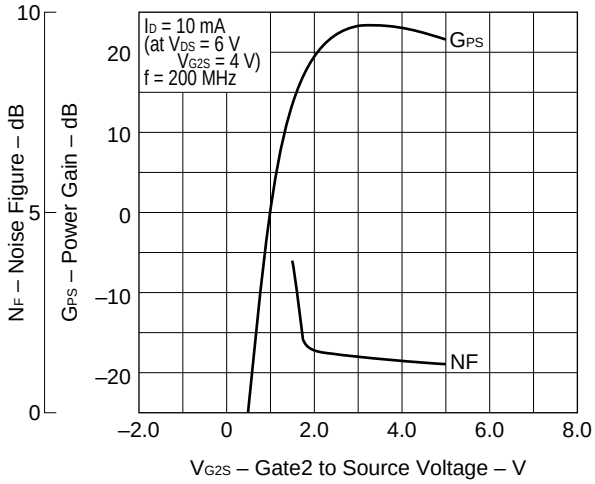
INPUT CAPACITANCE vs.
GATE2 TO SOURCE VOLTAGE



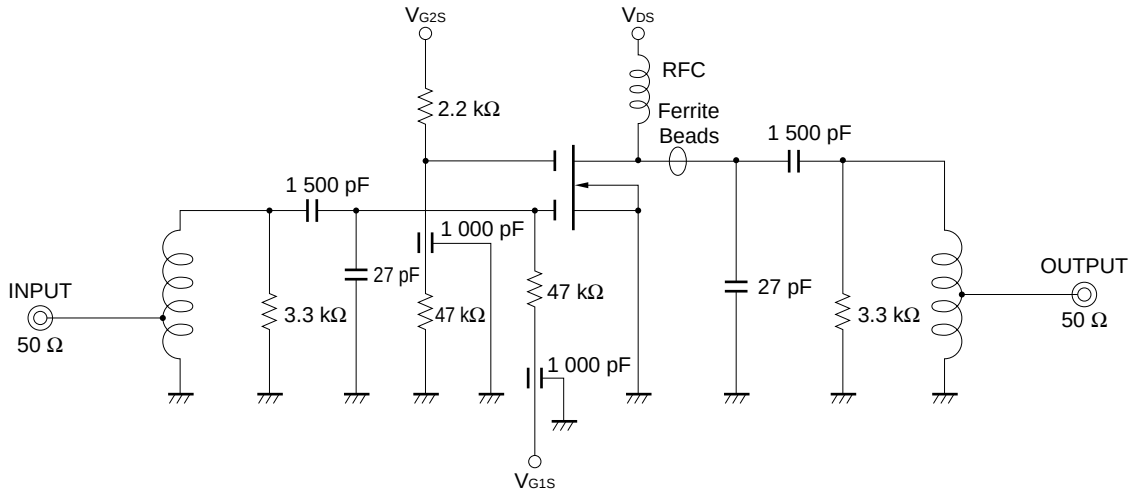
OUTPUT CAPACITANCE vs.
GATE2 TO SOURCE VOLTAGE



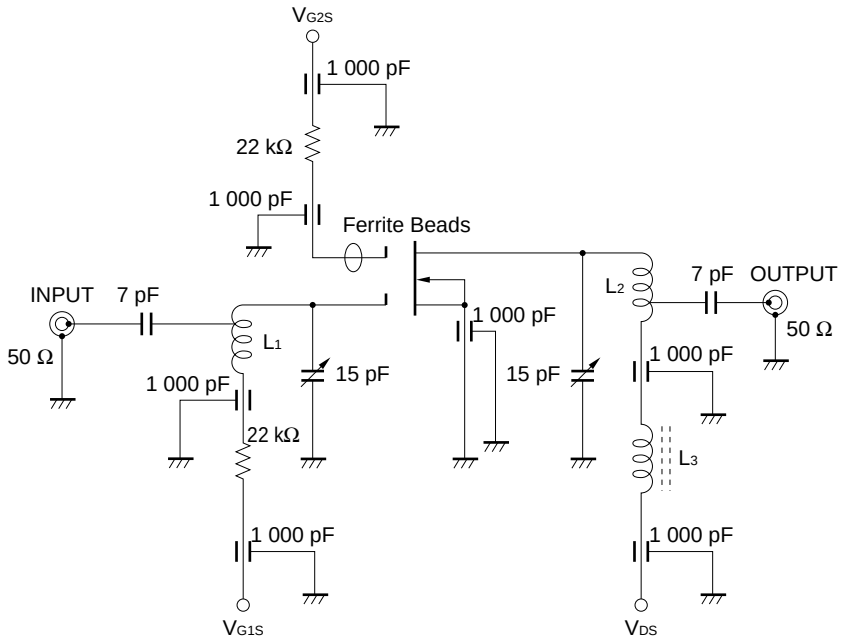
POWER GAIN AND NOISE FIGURE vs.
GATE2 TO SOURCE VOLTAGE



NF TEST CIRCUIT AT f = 55 MHz



GPS AND NF TEST CIRCUIT AT f = 200 MHz



L1: ϕ0.6 mm U.E.W ϕ7 mm 3 T
L2: ϕ0.6 mm U.E.W ϕ7 mm 3 T
L3: RFC 2.2 μH