DATA SHEET

MOS FIELD EFFECT TRANSISTOR
3SK223

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

FEATURES

- The Characteristic of Cross-Modulation is good.
  CM = 101 dBμ TYP. @ f = 470 MHz, G_R = –30 dB
- Low Noise Figure: NF1 = 2.2 dB TYP. (f = 470 MHz)
  NF2 = 0.9 dB TYP. (f = 55 MHz)
- High Power Gain: G_{PS} = 20 dB TYP. (f = 470 MHz)
- Enhancement Type.
- Suitable for use as RF amplifier in CATV tuner.
- Automatically Mounting: Embossed Type Taping
- Small Package: 4 Pins Mini Mold

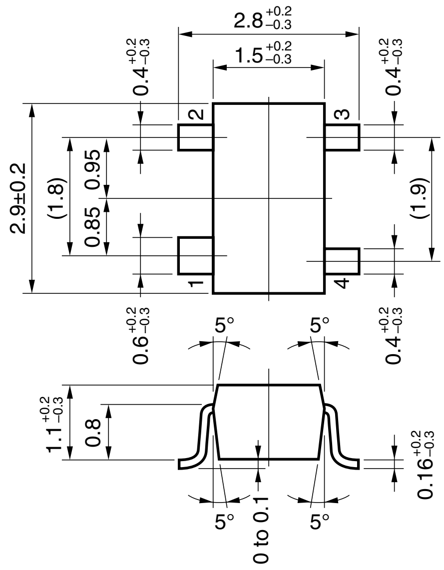
ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C)

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** $R_L \geq 10$ kΩ

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.

The information in this document is subject to change without notice. Before using this document, please confirm that this is the latest version.
Not all devices/types available in every country. Please check with local NEC Compound Semiconductor Devices representative for availability and additional information.

Document No. PU10028EJ01V0DS (1st edition)
(Previous No. P10575EJ2V0DS00)
Date Published October 2001 CP(K)
Printed in Japan

The mark ★ shows major revised points.

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	$V_{DS} = 5$ V, $V_{G2S} = 4$ 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, $V_{G1S} = 3$ V, $I_D = 10$ μA
Gate1 Reverse Current	I_{G1SS}			±20	nA	$V_{DS} = 0$, $V_{G2S} = 0$, $V_{G1S} = \pm 8$ V
Gate2 Reverse Current	I_{G2SS}			±20	nA	$V_{DS} = 0$, $V_{G1S} = 0$, $V_{G2S} = \pm 8$ 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}	2.5	3.0	3.5	pF	$V_{DS} = 6$ V, $V_{G2S} = 3$ V, $I_D = 10$ mA f = 1 MHz
Output Capacitance	C_{DSS}	0.9	1.2	1.5	pF	
Reverse Transfer Capacitance	C_{rss}		0.015	0.03	pF	
Power Gain	G_{PS}	17.0	20.0		dB	$V_{DS} = 6$ V, $V_{G2S} = 3$ 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, $V_{G2S} = 3$ V, $I_D = 10$ mA f = 55 MHz

I_{DSX} Classification

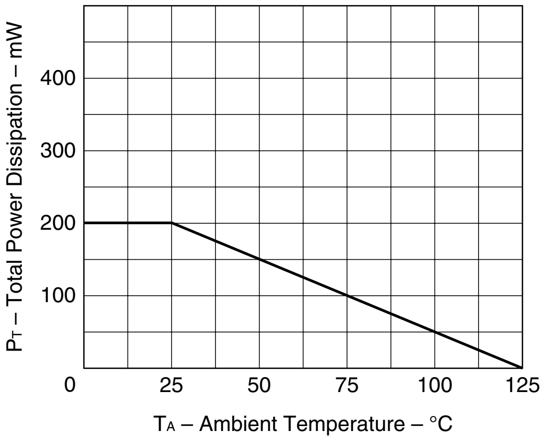
★

Class	U90/UI0*	U91/UIA*
Marking	U90	U91
I_{DSX} (mA)	0.01 to 3.0	1.0 to 8.0

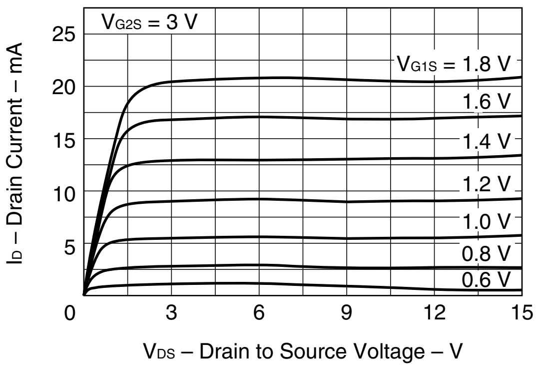
* Old Specification/New Specification

TYPICAL CHARACTERISTICS (T_A = 25 °C)

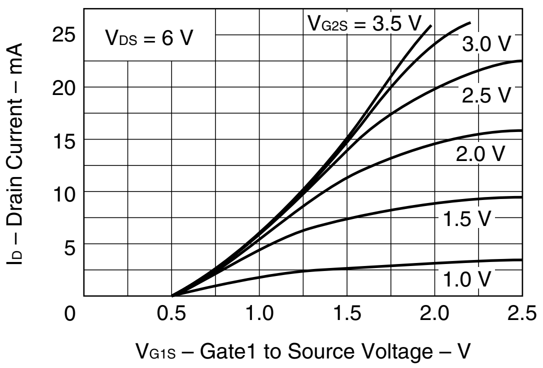
TOTAL POWER DISSIPATION vs.
AMBIENT TEMPERATURE



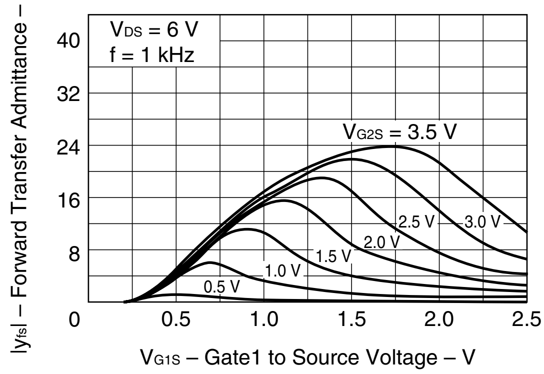
DRAIN CURRENT vs.
DRAIN TO SOURCE VOLTAGE



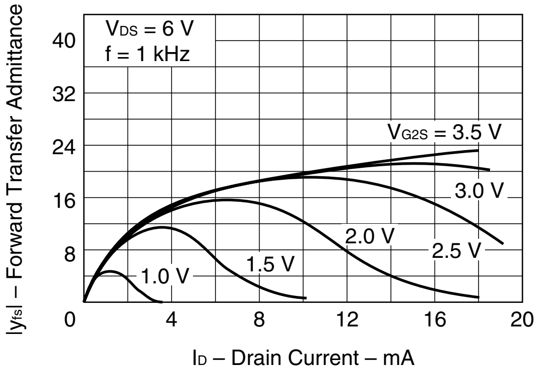
DRAIN CURRENT vs.
GATE1 TO SOURCE VOLTAGE



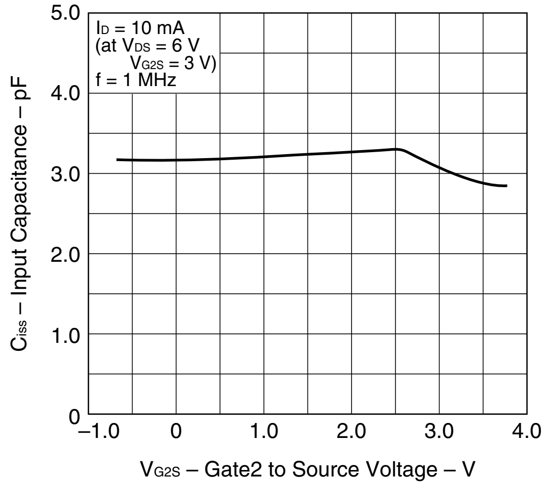
FORWARD TRANSFER ADMITTANCE vs.
GATE1 TO SOURCE VOLTAGE



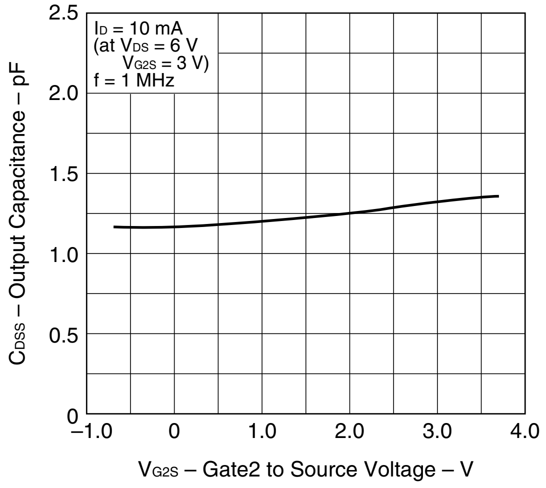
FORWARD TRANSFER ADMITTANCE vs.
DRAIN CURRENT



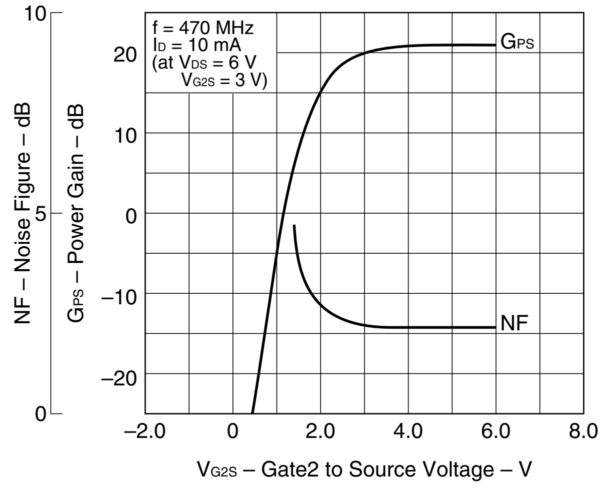
INPUT CAPACITANCE vs.
GATE2 TO SOURCE VOLTAGE



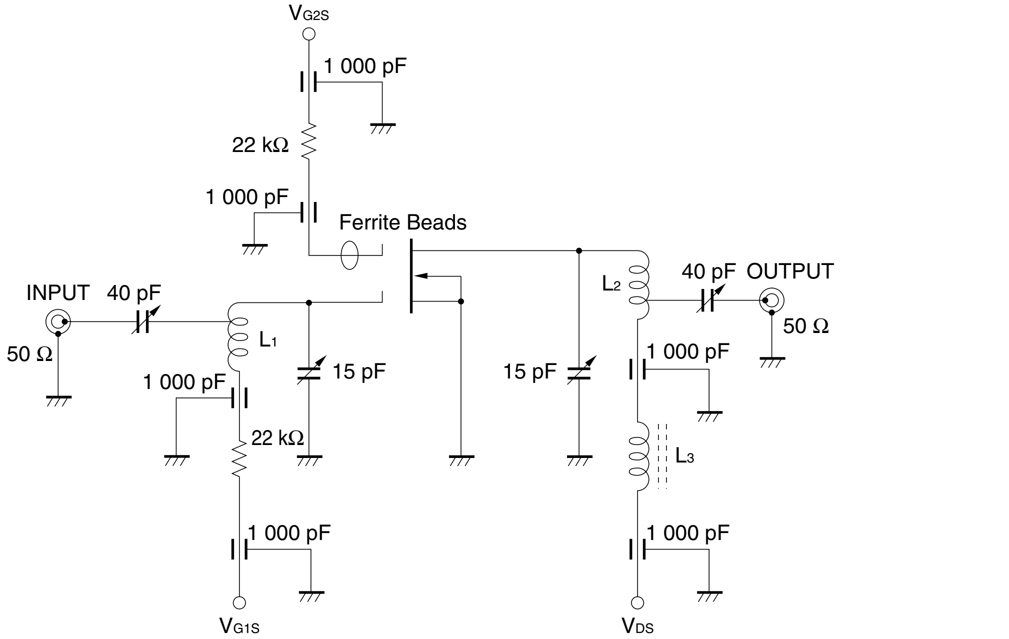
OUTPUT CAPACITANCE vs.
GATE2 TO SOURCE VOLTAGE



POWER GAIN AND NOISE FIGURE vs.
GATE2 TO SOURCE VOLTAGE

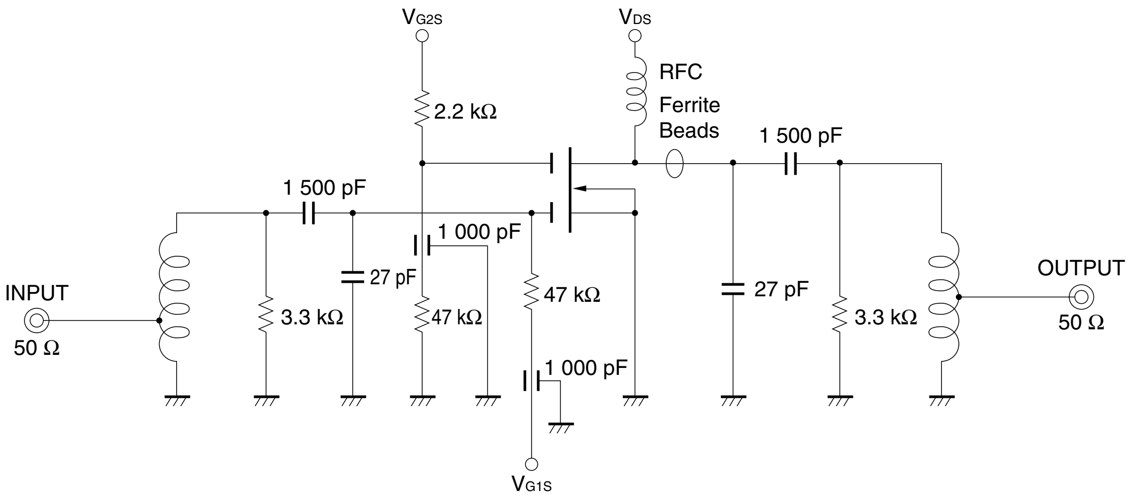


G_{PS} AND NF TEST CIRCUIT AT f = 470 MHz



L_1: ϕ1.2 mm U.E.W ϕ5 mm 1T
L_2: ϕ1.2 mm U.E.W ϕ5 mm 1T
L_3: REC 2.2 μH

NF TEST CIRCUIT AT f = 55 MHz



▶**Business issue**

NEC Compound Semiconductor Devices, Ltd.
5th Sales Group, Sales Division TEL: +81-3-3798-6372 FAX: +81-3-3798-6783 E-mail: salesinfo@csd-nec.com

NEC Compound Semiconductor Devices Hong Kong Limited

Hong Kong Head Office	TEL: +852-3107-7303	FAX: +852-3107-7309
Taipei Branch Office	TEL: +886-2-8712-0478	FAX: +886-2-2545-3859
Korea Branch Office	TEL: +82-2-528-0301	FAX: +82-2-528-0302

NEC Electron Devices European Operations **http://www.nec.de/**
TEL: +49-211-6503-101 FAX: +49-211-6503-487

California Eastern Laboratories, Inc. **http://www.cel.com/**
TEL: +1-408-988-3500 FAX: +1-408-988-0279

▶**Technical issue**

NEC Compound Semiconductor Devices, Ltd. **http://www.csd-nec.com/**
Sales Engineering Group, Sales Division
E-mail: techinfo@csd-nec.com FAX: +81-44-435-1918

0110