DATA SHEET

NEC

MOS FIELD EFFECT TRANSISTOR

3SK176A

RF AMP. AND MIXER FOR CATV TUNER
N-CHANNEL Si DUAL GATE MOS FIELD-EFFECT TRANSISTOR
4 PINS MINI MOLD

FEATURES

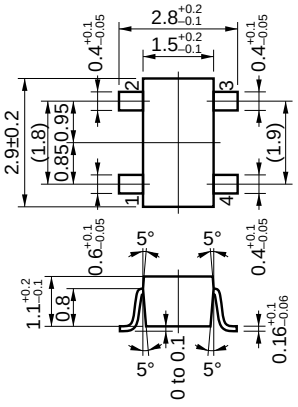
- High Power Gain: G_{PS} = 24 dB TYP. (f = 470 MHz)
- Low Noise Figure: NF = 2.0 dB TYP. (f = 470 MHz)
  NF = 1.0 dB TYP. (f = 55 MHz)
- Automatically Mounting: Embossed Type Taping
- Suitable for use as RF amplifier and Mixer in CATV tuner.
- Small Package: 4 Pins Mini Mold

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C)

Drain to Source Voltage	V_{DSX}	18	V
Gate1 to Source Voltage	V_{G1S}	±8 (±10)*	V
Gate2 to Source Voltage	V_{G2S}	±8 (±10)*	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)



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

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}	1.0		10	mA	V_{DS} = 5 V, V_{G1S} = 0.75 V, V_{G2S} = 4 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} = ±10 V
Gate2 Reverse Current	I_{G2SS}			±20	nA	V_{DS} = 0, V_{G1S} = 0, V_{G2S} = ±10 V
Forward Transfer Admittance	$\lvert y_{fs} \rvert$	22	25.5		mS	V_{DS} = 5 V, V_{G2S} = 4 V, I_D = 10 mA f = 1 kHz
Input Capacitance	C_{iss}	2.2	2.7	3.2	pF	V_{DS} = 6 V, V_{G2S} = 3 V, I_D = 10 mA f = 1 MHz
Output Capacitance	C_{oss}	1.3	1.6	1.9	pF	
Reverse Transfer Capacitance	C_{rss}		0.015	0.03	pF	
Power Gain	G_{PS}	21.0	24.0		dB	V_{DS} = 6 V, V_{G2S} = 3 V, I_D = 10 mA f = 470 MHz
Noise Figure 1	NF1		2.0	3.5	dB	
Noise Figure 2	NF2		1.0	2.5	dB	V_{DS} = 6 V, V_{G2S} = 3 V, I_D = 10 mA f = 55 MHz

I_{DSX} Classification

Class	U87/UHG*	U88/UHH*
Marking	U87	U88
I_{DSX} (mA)	1.0 to 6.0	4.0 to 10.0

* Old Specification/New Specification

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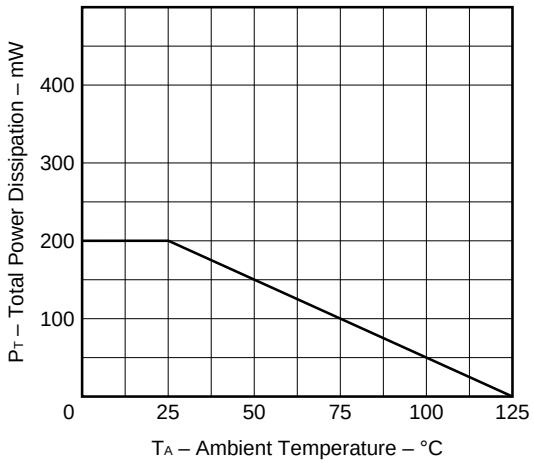
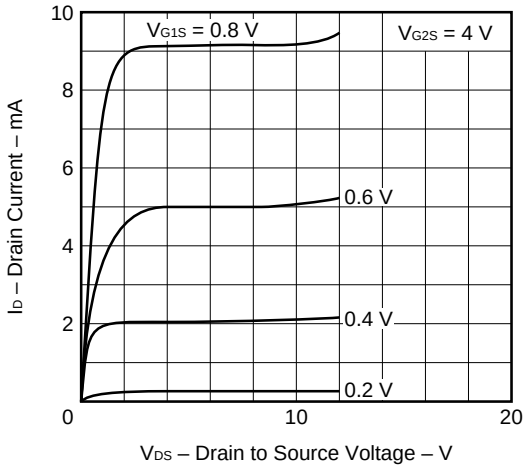
TYPICAL CHARACTERISTICS (T_A = 25 °C)

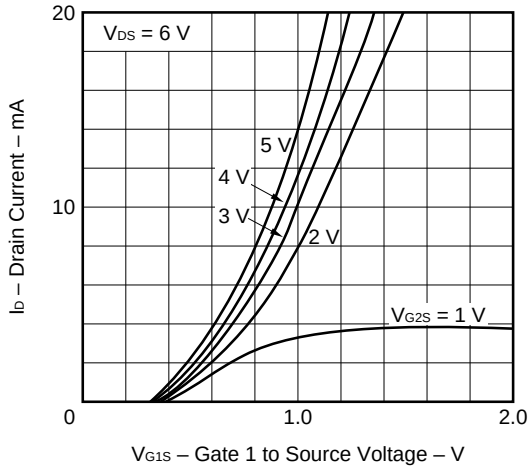
TOTAL POWER DISSIPATION vs.
AMBIENT TEMPERATURE



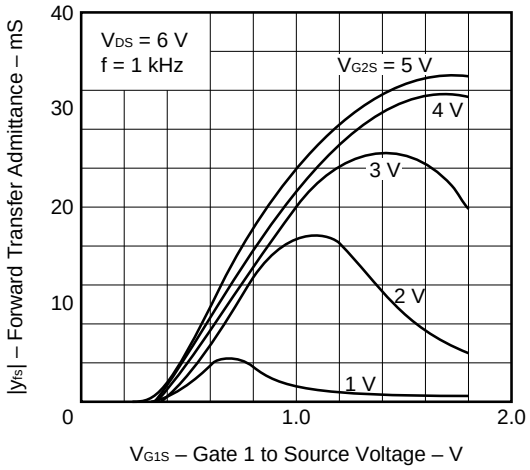
DRAIN CURRENT vs.
DRAIN TO SOURCE VOLTAGE



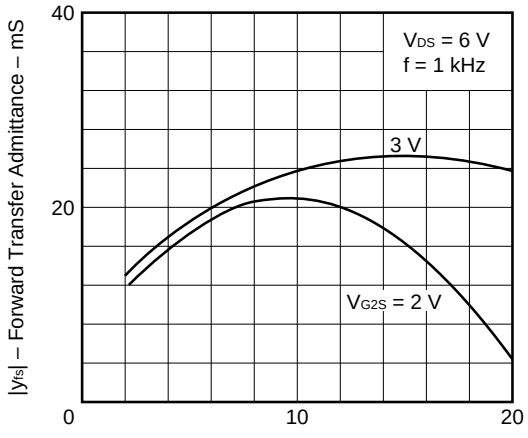
DRAIN CURRENT vs.
GATE1 TO SOURCE VOLTAGE



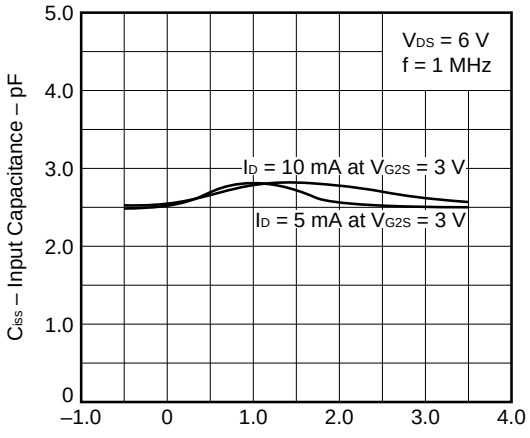
FORWARD TRANSFER ADMITTANCE vs.
GATE1 TO SOURCE VOLTAGE



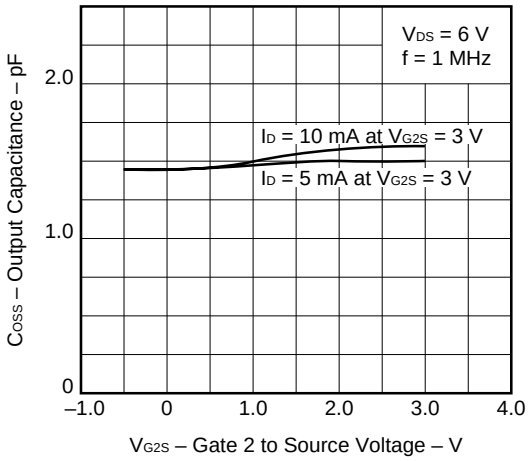
FORWARD TRANSFER ADMITTANCE vs.
DRAIN CURRENT



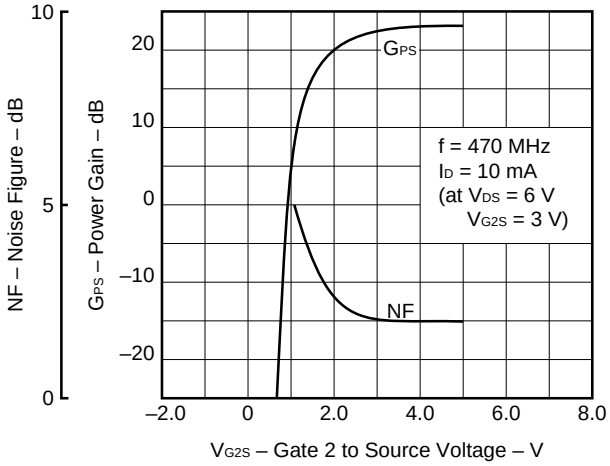
INPUT CAPACITANCE vs.
GATE2 TO SOURCE VOLTAGE



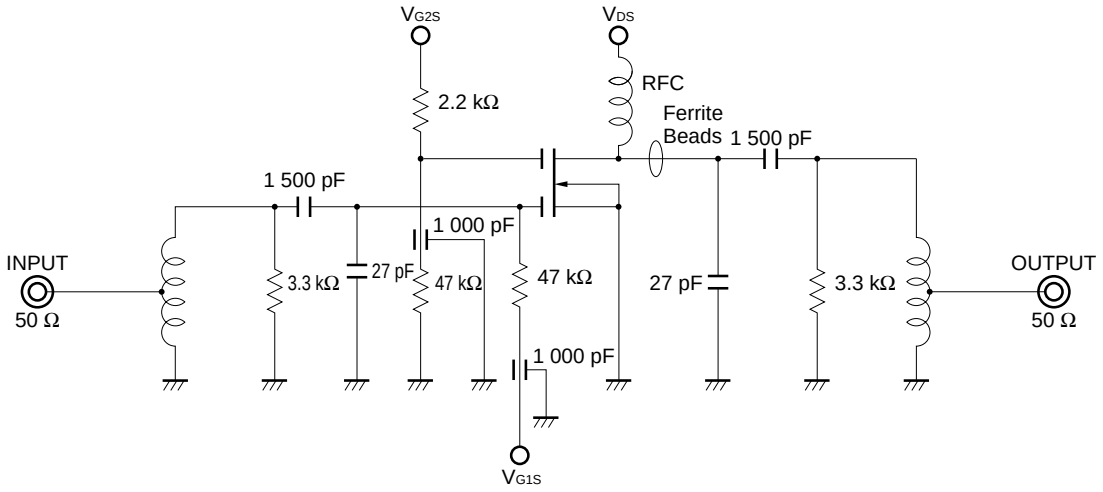
OUTPUT CAPACITANCE vs.
GATE2 TO SOURCE VOLTAGE



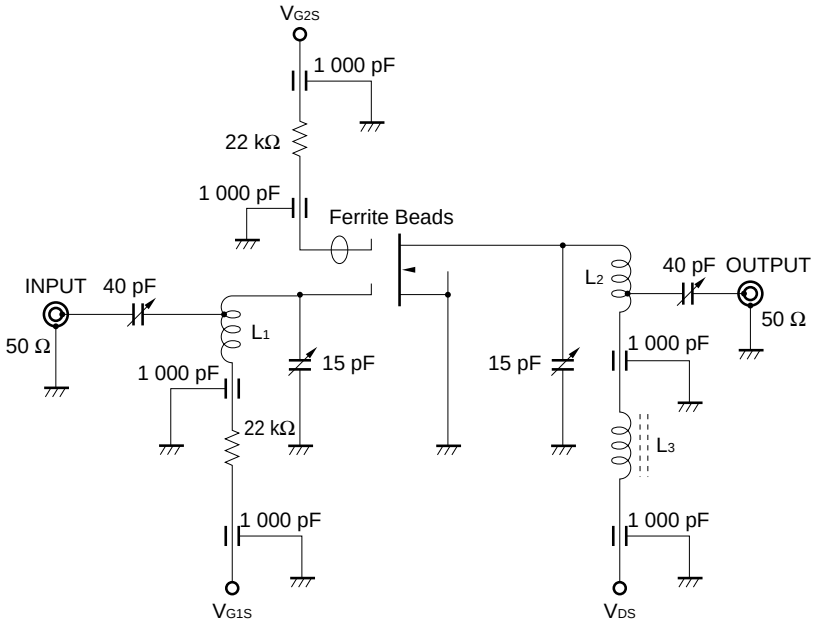
POWER GAIN AND NOISE FIGURE vs.
GATE2 TO SOURCE VOLTAGE



NF TEST CIRCUIT AT f = 55 MHz



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



L1: ϕ1.2 mm U.E.W ϕ5 mm 1T
L2: ϕ1.2 mm U.E.W ϕ5 mm 1T
L3: REC 2.2 μH

[MEMO]