

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

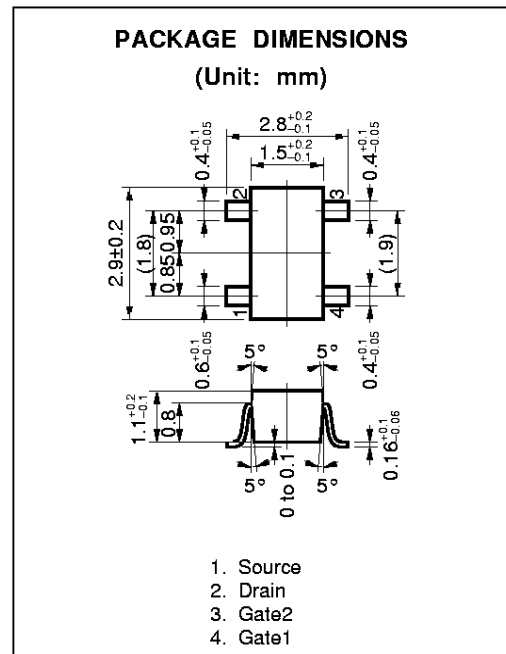
**ABSOLUTE MAXIMUM RATINGS ( $T_A = 25$  °C)**

Drain to Source Voltage	$V_{DSX}$	18	V
Gate1 to Source Voltage	$V_{G1S}$	$\pm 8$ ( $\pm 10$ )*	V
Gate2 to Source Voltage	$V_{G2S}$	$\pm 8$ ( $\pm 10$ )*	V
Drain Current	$I_D$	25	mA
Total Power Dissipation	$P_D$	200	mW
Channel Temperature	$T_{ch}$	125	°C
Storage Temperature	$T_{sig}$	-55 to +125	°C

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

**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, $I_D = 10$ $\mu$ A
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, $I_D = 10$ $\mu$ A
Gate2 to Source Cutoff Voltage	$V_{G2S(off)}$	0		+1.0	V	$V_{DS} = 6$ V, $V_{G1S} = 3$ V, $I_D = 10$ $\mu$ A
Gate1 Reverse Current	$I_{G1SS}$			$\pm 20$	nA	$V_{DS} = 0$ , $V_{G2S} = 0$ , $V_{G1S} = \pm 10$ V
Gate2 Reverse Current	$I_{G2SS}$			$\pm 20$	nA	$V_{DS} = 0$ , $V_{G1S} = 0$ , $V_{G2S} = \pm 10$ V
Forward Transfer Admittance	$ y_{fs} $	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
Noise Figure 1	NF1		2.0	3.5	dB	$f = 470$ MHz
Noise Figure 2	NF2		1.0	2.5	dB	$V_{DS} = 6$ V, $V_{G2S} = 3$ V, $I_D = 10$ mA $f = 55$ MHz



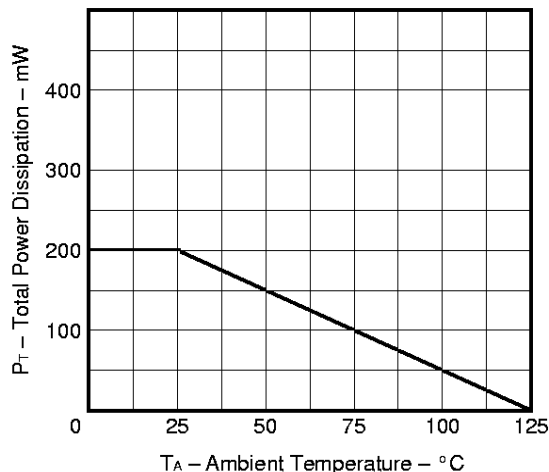
**Idsx Classification**

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

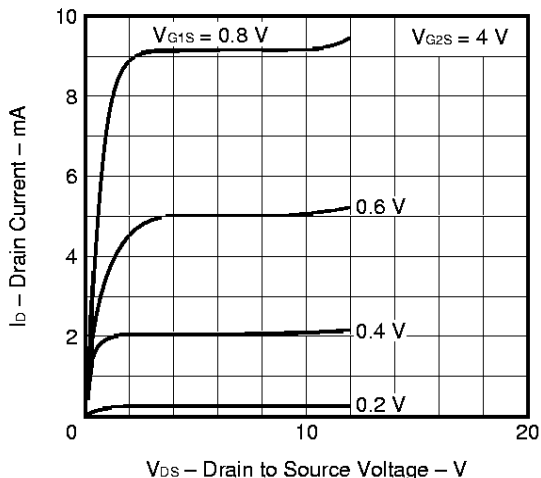
\* Old Specification/New Specification

TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25 °C)

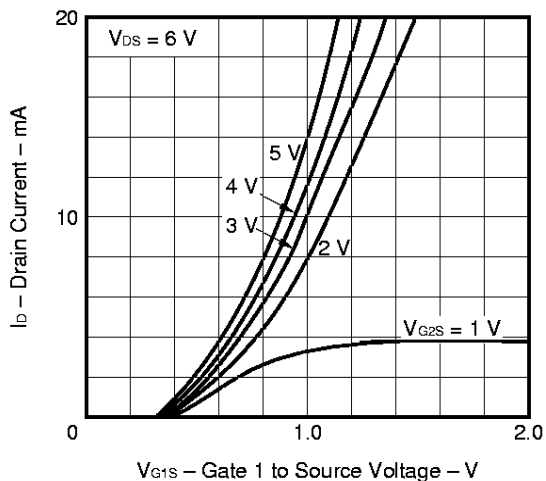
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



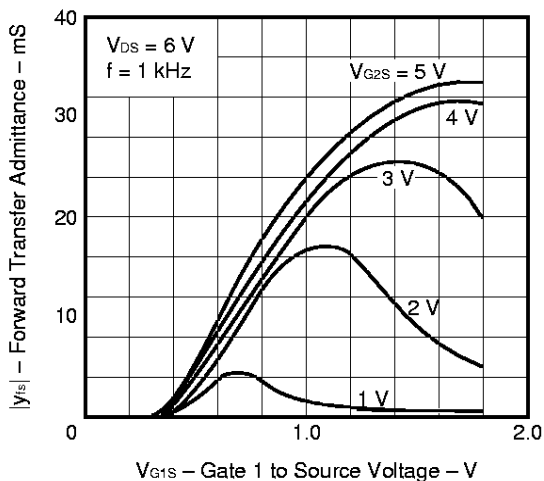
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



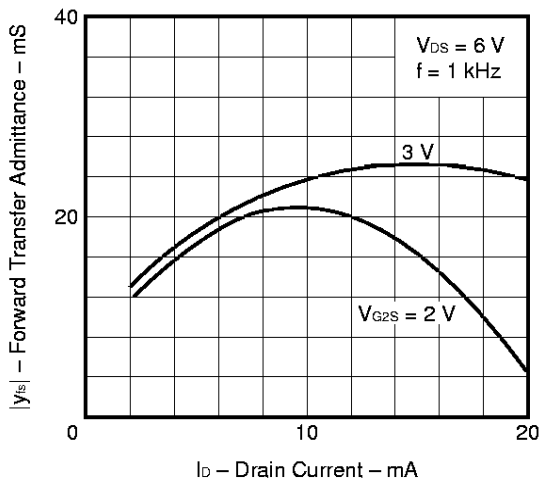
DRAIN CURRENT vs. GATE1 TO SOURCE VOLTAGE



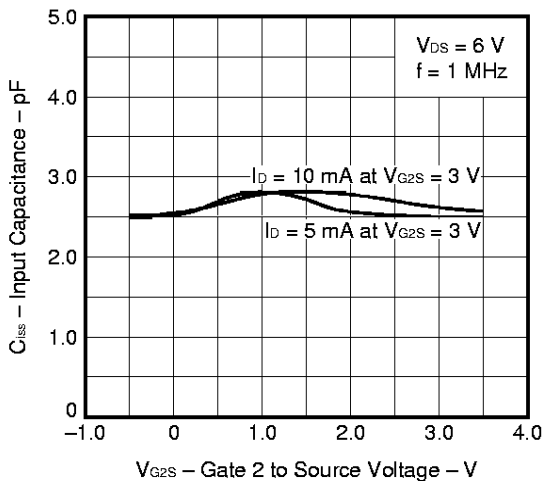
FORWARD TRANSFER ADMITTANCE vs. GATE1 TO SOURCE VOLTAGE



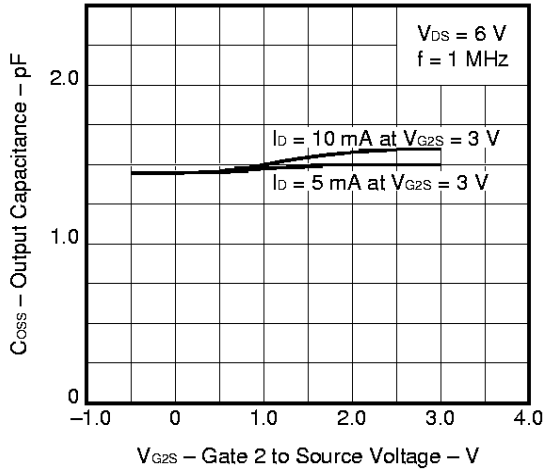
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



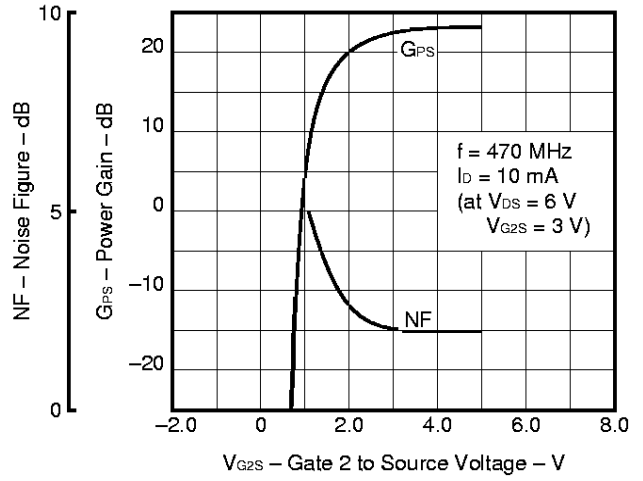
INPUT CAPACITANCE vs. GATE2 TO SOURCE VOLTAGE



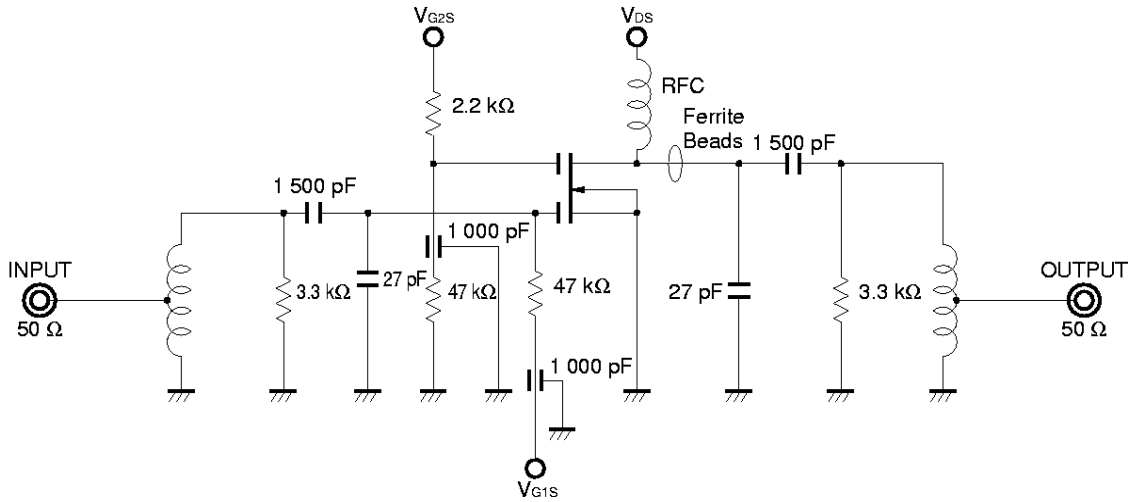
OUTPUT CAPACITANCE vs. GATE2 TO SOURCE VOLTAGE



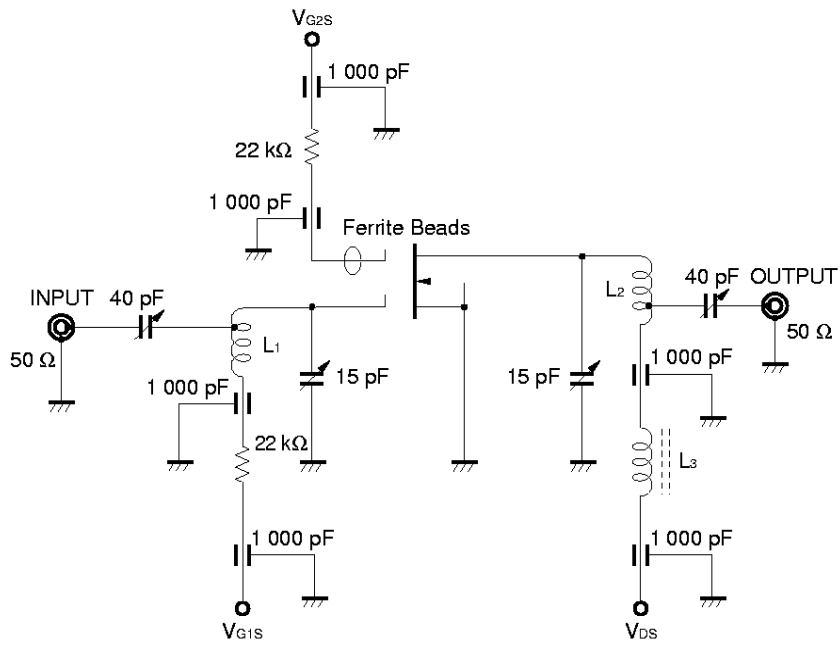
POWER GAIN AND NOISE FIGURE vs. GATE2 TO SOURCE VOLTAGE



NF TEST CIRCUIT AT  $f = 55 \text{ MHz}$



GPS AND NF TEST CIRCUIT AT  $f = 470 \text{ MHz}$



- L1:  $\phi 1.2 \text{ mm U.E.W } \phi 5 \text{ mm 1T}$
- L2:  $\phi 1.2 \text{ mm U.E.W } \phi 5 \text{ mm 1T}$
- L3: REC 2.2  $\mu\text{H}$

[MEMO]

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Anti-radioactive design is not implemented in this product.