

# MOS FIELD EFFECT TRANSISTOR

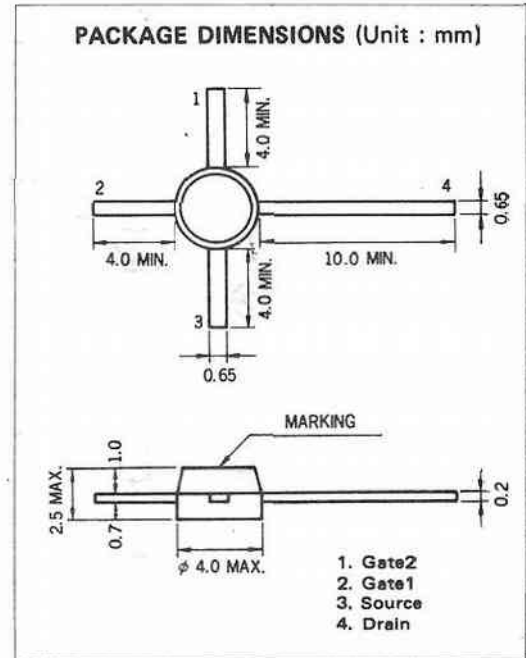
## 3SK161A

- FEATURES**
- Suitable for use as RF amplifier in UHF TV tuner. (RF Amp. for half wave length resonator :  $\lambda/2$ )
  - Low  $C_{rss}$  : 0.02 pF TYP.
  - High  $G_{ps}$  : 22.5 dB TYP.
  - Low NF : 2.5 dB TYP.

**ABSOLUTE MAXIMUM RATINGS ( $T_a = 25^\circ\text{C}$ )**

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

\* $R_L \geq 10\text{ k}\Omega$



**ELECTRICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )**

SYMBOL	CHARACTERISTIC	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
$BV_{DSX}$	Drain to Source Breakdown Voltage	18	22		V	$V_{G1S} = V_{G2S} = -2\text{ V}, I_D = 10\ \mu\text{A}$
$I_{DSX}$	Drain Current	0.5		8	mA	$V_{DS} = 5\text{ V}, V_{G2S} = 4\text{ V}, V_{G1S} = 0.5\text{ V}$
$V_{G1S(off)}$	Gate1 to Source Cutoff Voltage			-2.0	V	$V_{DS} = 10\text{ V}, V_{G2S} = 4\text{ V}, I_D = 10\ \mu\text{A}$
$V_{G2S(off)}$	Gate2 to Source Cutoff Voltage			-0.7	V	$V_{DS} = 10\text{ V}, V_{G1S} = 4\text{ V}, I_D = 10\ \mu\text{A}$
$I_{G1SS}$	Gate1 Reverse Current			$\pm 20$	nA	$V_{DS} = 0, V_{G1S} = \pm 8\text{ V}, V_{G2S} = 0$
$I_{G2SS}$	Gate2 Reverse Current			$\pm 20$	nA	$V_{DS} = 0, V_{G2S} = \pm 8\text{ V}, V_{G1S} = 0$
$ y_{fs} $	Forward Transfer Admittance	24.0	27.5		mS	$V_{DS} = 5\text{ V}, V_{G2S} = 4\text{ V}, I_D = 10\text{ mA}$ $f = 1.0\text{ kHz}$
$C_{iss}$	Input Capacitance	1.5	2.5	3.5	pF	$V_{DS} = 10\text{ V}, V_{G2S} = 4\text{ V}, I_D = 10\text{ mA}$ $f = 1\text{ MHz}$
$C_{oss}$	Output Capacitance	0.5	1.3	2.5	pF	
$C_{rss}$	Reverse Transfer Capacitance		0.02	0.03	pF	
$G_{ps}^{**}$	Power Gain	20.0	22.5		dB	$V_{DS} = 10\text{ V}, V_{G2S} = 4\text{ V}, I_D = 10\text{ mA}$
NF**	Noise Figure		2.5	4.5	dB	$f = 900\text{ MHz}$

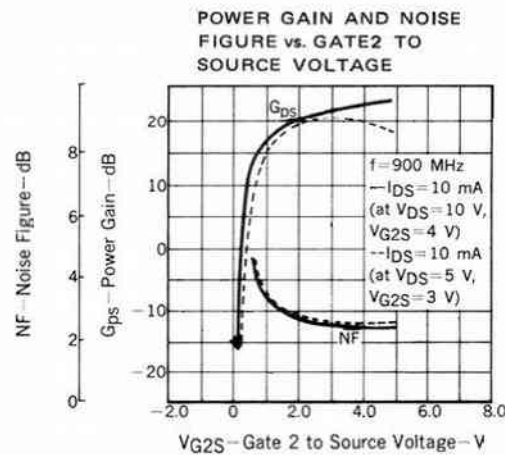
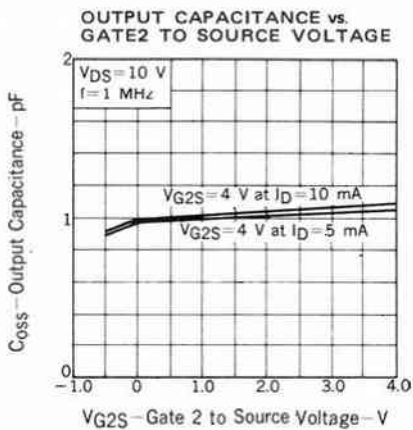
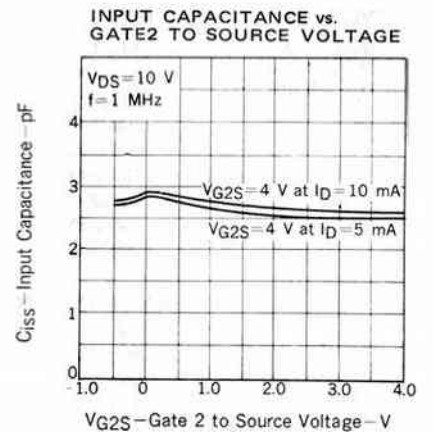
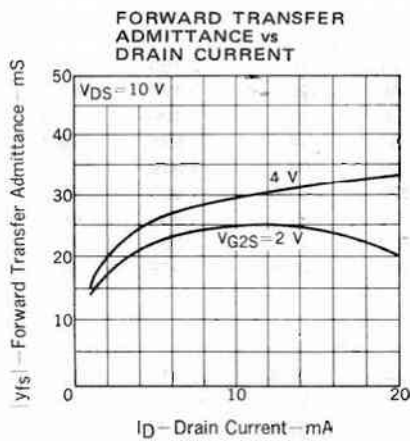
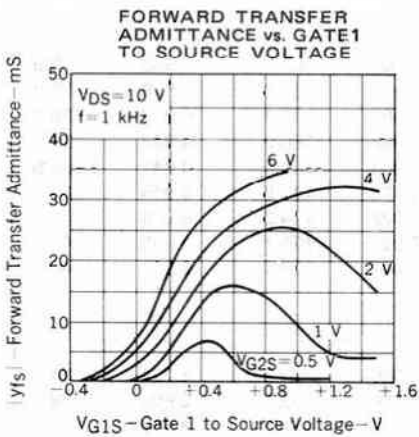
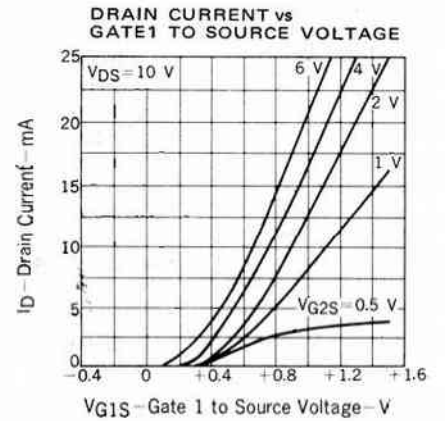
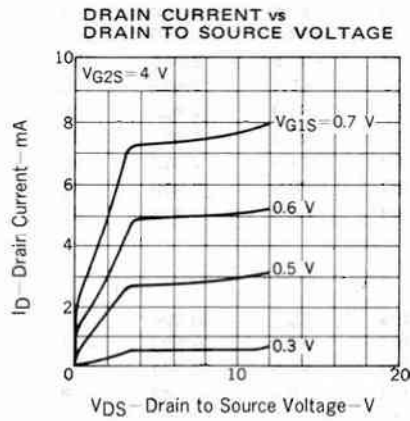
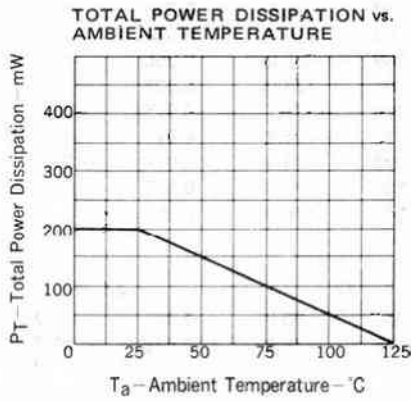
**$I_{DSX}$  Classification**

Marking	L	K
$I_{DSX}$	0.5 to 5	3 to 8

UNIT: mA

\*\*See Test Circuit

TYPICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )



S-PARAMETER, Y-PARAMETER

S1, Y1

S-MAGN AND ANGLES :

CONDITION	FREQ	11		21		12		22	
$V_{DS} = 10\text{ V}$ $V_{G2S} = 4\text{ V}$ $I_{DS} = 10\text{ mA}$	200.000	0.975	-19.7	2.702	154.8	0.002	71.5	0.976	-9.9
	300.000	0.939	-29.7	2.650	140.8	0.003	79.7	0.968	-14.9
	400.000	0.917	-38.5	2.614	129.4	0.002	125.3	0.955	-20.3
	500.000	0.877	-47.1	2.483	118.3	0.003	176.0	0.926	-24.8
	600.000	0.858	-55.9	2.462	106.9	0.008	-174.7	0.925	-28.6
	700.000	0.817	-63.9	2.377	96.9	0.015	-175.2	0.927	-33.7
	800.000	0.797	-71.5	2.313	86.4	0.023	-174.5	0.918	-38.2
	900.000	0.767	-78.9	2.316	75.5	0.033	178.4	0.920	-43.6
	1000.000	0.743	-86.3	2.415	65.6	0.046	176.8	0.955	-48.9

Y-MAGN AND ANGLES :

FREQ	11		21		12		22	
200.000	3.454	85.9	28.204	-10.6	0.026	-93.9	1.721	82.2
300.000	5.285	82.7	28.923	-17.6	0.036	-78.8	2.579	82.9
400.000	7.022	81.9	30.061	-22.3	0.018	-26.4	3.603	82.2
500.000	8.823	79.4	30.743	-28.1	0.038	29.7	4.452	78.8
600.000	10.726	78.6	32.286	-34.0	0.104	44.5	5.155	79.1
700.000	12.673	75.7	33.758	-38.9	0.211	48.9	6.075	79.7
800.000	14.582	74.2	35.422	-45.0	0.346	54.1	6.881	78.5
900.000	16.513	71.5	38.596	-51.9	0.554	51.0	7.772	78.2
1000.000	18.619	68.4	43.298	-57.8	0.826	53.5	8.531	80.2

S2, Y2

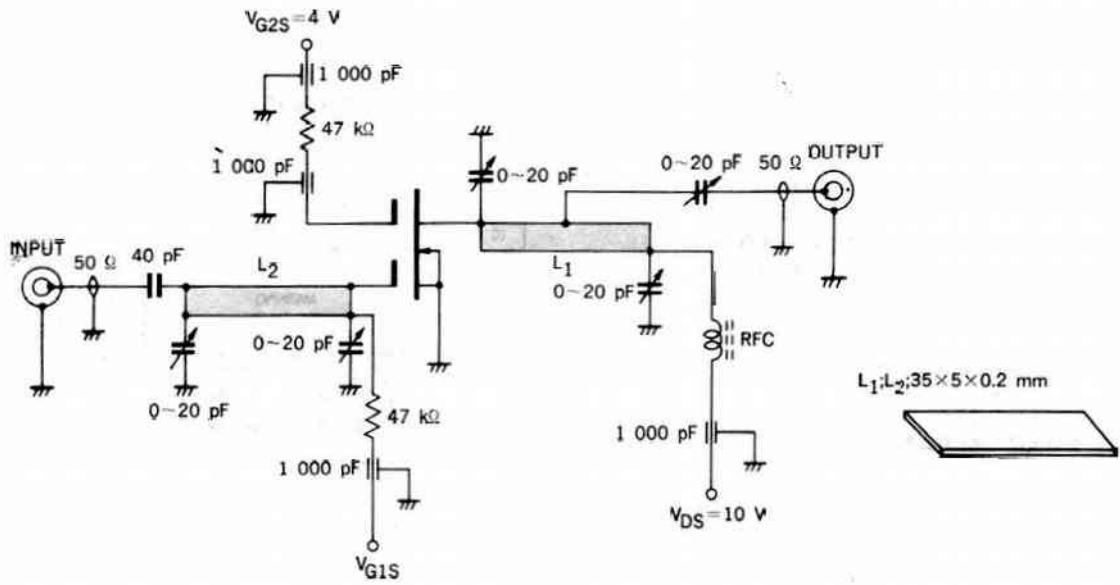
S-MAGN AND ANGLES :

CONDITION	FREQ	11		21		12		22	
$V_{DS} = 10\text{ V}$ $V_{G2S} = 4\text{ V}$ $I_{DS} = 5\text{ mA}$	200.000	0.974	-19.3	2.150	154.7	0.002	80.8	0.983	-9.9
	300.000	0.948	-29.1	2.127	140.5	0.003	86.6	0.976	-15.0
	400.000	0.925	-37.9	2.100	128.6	0.002	97.4	0.972	-20.2
	500.000	0.890	-46.6	1.991	117.3	0.003	180.0	0.943	-24.8
	600.000	0.869	-55.3	1.979	105.8	0.008	-164.5	0.941	-29.0
	700.000	0.835	-63.5	1.920	95.3	0.015	-173.5	0.945	-34.2
	800.000	0.812	-71.2	1.864	84.5	0.022	-174.3	0.934	-38.7
	900.000	0.782	-79.0	1.864	73.7	0.032	-179.1	0.939	-44.2
	1000.000	0.763	-86.6	1.958	63.5	0.047	178.1	0.967	-49.8

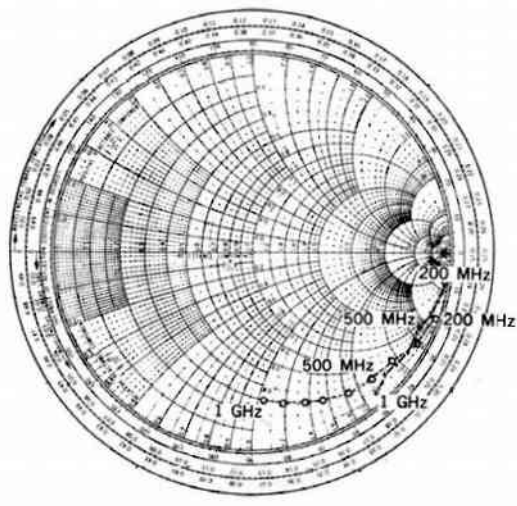
Y-MAGN AND ANGLES :

FREQ	11		21		12		22	
200.000	3.394	85.4	22.312	-10.9	0.020	-84.8	1.721	84.5
300.000	5.180	83.7	23.013	-18.1	0.035	-72.0	2.600	84.8
400.000	6.885	82.6	23.726	-23.4	0.019	-54.5	3.552	85.2
500.000	8.698	80.5	24.205	-28.9	0.037	33.7	4.431	81.5
600.000	10.581	79.6	25.547	-34.8	0.098	54.9	5.212	81.6
700.000	12.524	77.3	26.668	-39.9	0.208	51.4	6.143	82.2
800.000	14.458	75.8	27.981	-46.2	0.333	55.1	6.967	81.1
900.000	16.573	73.3	30.497	-52.3	0.530	54.9	7.939	81.1
1000.000	18.728	70.8	34.649	-58.0	0.829	56.7	8.826	82.5

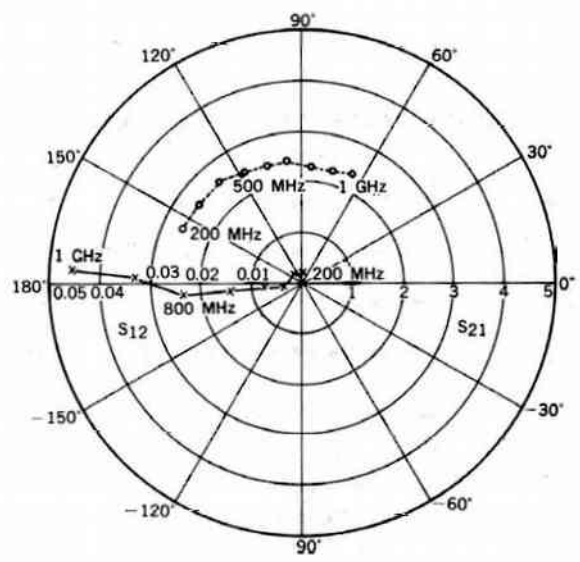
900 MHz  $G_{ps}$  & FN TEST CIRCUIT



$V_{DS} = 10\text{ V}$ ,  $V_{G2S} = 4\text{ V}$ ,  $I_D = 10\text{ mA}$



O: S11 X: S22



O: S21 X: S12