

MOS FIELD EFFECT TRANSISTOR

3SK135A

RF AMP. FOR UHF TV TUNER

N-CHANNEL SILICON DUAL-GATE MOS FIELD-EFFECT TRANSISTOR

4PIN MINI MOLD

FEATURES

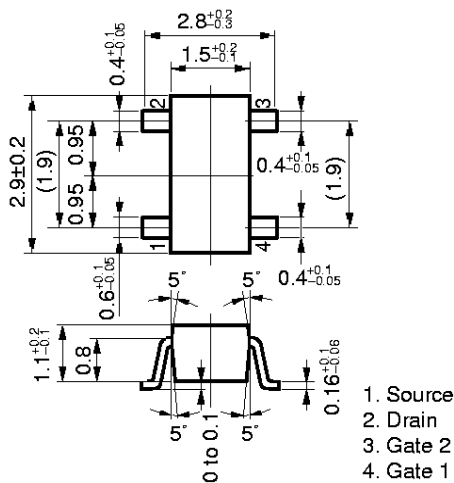
- Suitable for use as RF amplifier in UHF TV tuner.
- Low C_{rss} : 0.02 pF TYP.
- High G_{ps} : 18 dB TYP.
- Low NF : 2.7 dB TYP.

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

Drain to Source Voltage	V_{DSX}	20	V
Gate1 to Source Voltage	V_{G1S}^*	± 10	V
Gate2 to Source Voltage	V_{G2S}^*	± 10	V
Drain Current	I_D	25	mA
Total Power Dissipation	P_T	200	mW
Channel Temperature	T_{ch}	150	$^\circ\text{C}$
Storage Temperature	T_{sig}	-65 to +150	$^\circ\text{C}$

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

in millimeters

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

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Drain to Source Breakdown Voltage	BV_{DSX}	20			V	$V_{G1S} = V_{G2S} = -2\text{ V}$, $I_D = 10\text{ }\mu\text{A}$
Drain Current	I_{DSS}	0.01		6	mA	$V_{DS} = 5\text{ V}$, $V_{G2S} = 4\text{ V}$, $V_{G1S} = 0$
Gate1 to Source Cutoff Voltage	$V_{G1S(off)}$			-2.0	V	$V_{DS} = 10\text{ V}$, $V_{G2S} = 4\text{ V}$, $I_D = 10\text{ }\mu\text{A}$
Gate2 to Source Cutoff Voltage	$V_{G2S(off)}$			-0.7	V	$V_{DS} = 10\text{ V}$, $V_{G1S} = 4\text{ V}$, $I_D = 10\text{ }\mu\text{A}$
Gate1 Reverse Current	I_{G1SS}			± 20	nA	$V_{DS} = 0$, $V_{G1S} = \pm 8\text{ V}$, $V_{G2S} = 0$
Gate2 Reverse Current	I_{G2SS}			± 20	nA	$V_{DS} = 0$, $V_{G2S} = \pm 8\text{ V}$, $V_{G1S} = 0$
Forward Transfer Admittance	$ y_{fs} $	14	18		ms	$V_{DS} = 5\text{ V}$, $V_{G2S} = 4\text{ V}$, $I_D = 10\text{ mA}$, $f = 1\text{ kHz}$
Input Capacitance	C_{iss}	1.5		2.5	pF	$V_{DS} = 10\text{ V}$, $V_{G2S} = 4\text{ V}$, $I_D = 10\text{ mA}$, $f = 1\text{ MHz}$
Output capacitance	C_{oss}	0.5	1.0	1.5	pF	
Reverse Transfer Capacitance	C_{rss}		0.02	0.03	pF	
Power Gain	G_{ps}^*	16	18		dB	$V_{DS} = 10\text{ V}$, $V_{G2S} = 4\text{ V}$, $I_D = 10\text{ mA}$, $f = 900\text{ MHz}$
Noise Figure	NF*		2.7	4.5	dB	

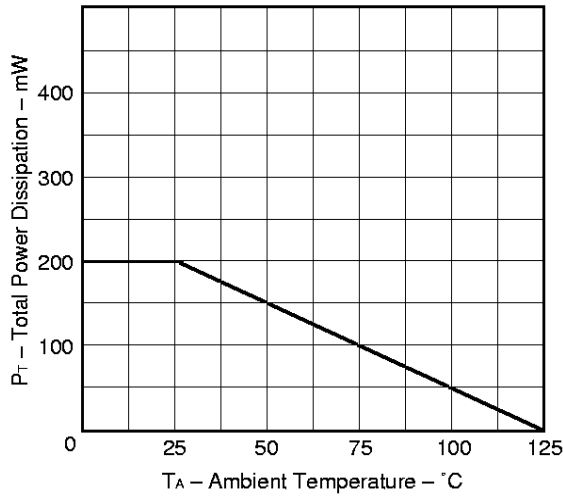
I_{DSS} Classification

Class	L/LS*	K/KS*
Marking	U65	U66
I _{DSS}	0.01 to 2	1 to 6

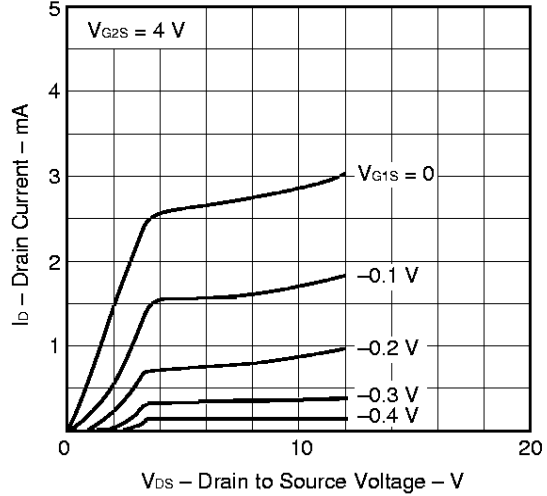
* Old specification/New specification

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

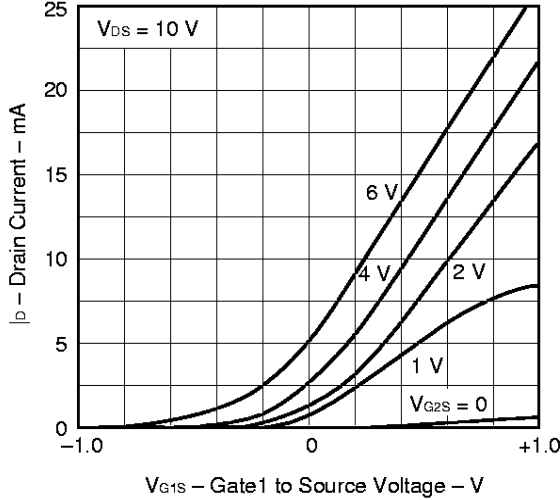
TOTAL POWER DISSIPATION vs.
AMBIENT TEMPERATURE



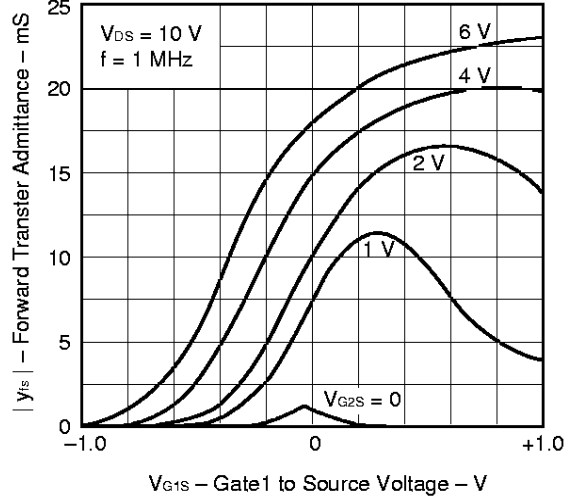
DRAIN CURRENT vs.
DRAIN TO SOURCE VOLTAGE



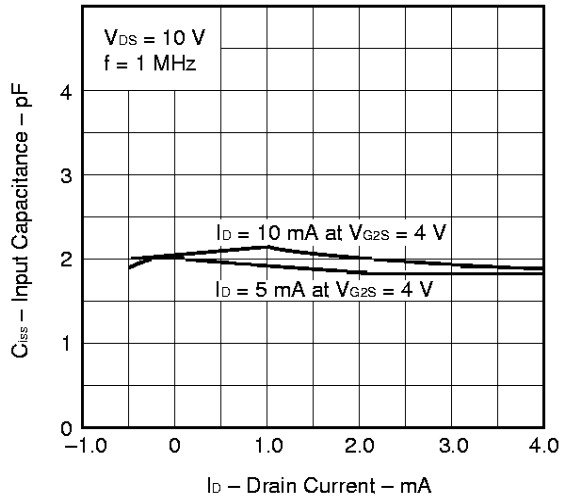
DRAIN CURRENT vs.
GATE 1 TO SOURCE VOLTAGE



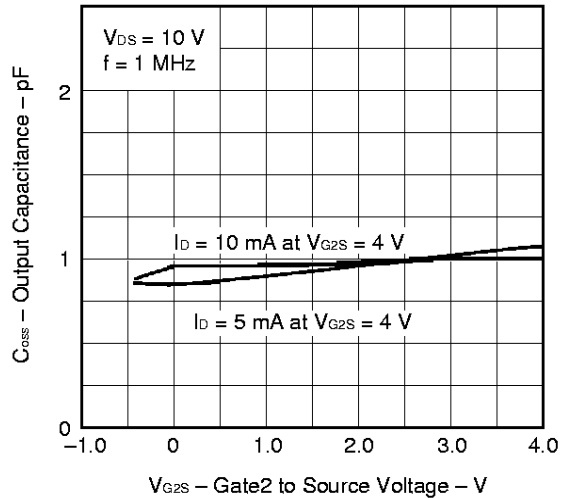
FORWARD TRANSFER ADMITTANCE vs.
GATE 1 TO SOURCE VOLTAGE

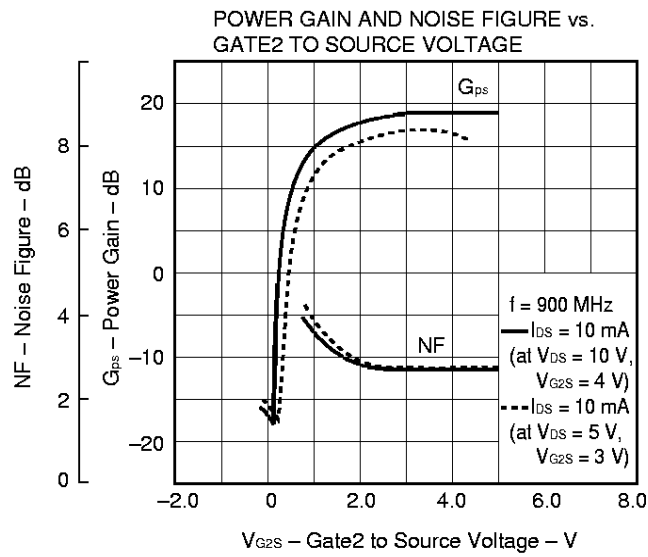


INPUT CAPACITANCE vs.
DRAIN CURRENT



OUTPUT CAPACITANCE vs.
GATE 2 TO SOURCE VOLTAGE





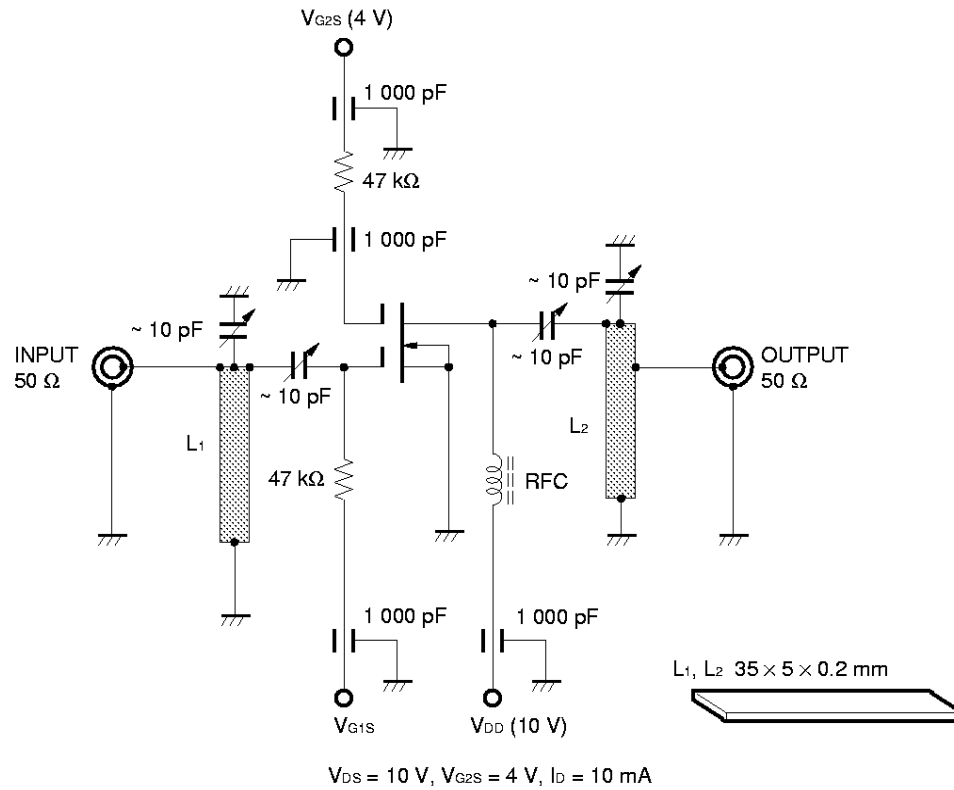
S-PARAMETER, Y-PARAMETER

S1, Y1 CONDITION	S1-MAG & ANGL		11		21		12		22	
	FREQ.									
$V_{DS} = 10\text{ V}$ $V_{GS} = 4\text{ V}$ $I_{DS} = 10\text{ mA}$	50	1.023	-2	1.820	173	0.002	86	1.023	0	
	100	0.989	-8	1.758	165	0.002	102	0.977	-4	
	200	0.966	-11	1.778	153	0.003	56	0.977	-7	
	300	0.923	-22	1.758	139	0.003	167	0.966	-10	
	400	0.871	-23	1.758	128	0.008	-153	0.933	-11	
	500	0.841	-33	1.718	113	0.017	-160	0.912	-15	
	600	0.776	-34	1.738	101	0.034	-166	0.902	-15	
	700	0.676	-41	1.718	88	0.058	-178	0.891	-18	
	800	0.631	-43	1.698	76	0.089	173	0.881	-21	
	900	0.575	-47	1.660	64	0.130	160	0.881	-20	
	1000	0.537	-49	1.567	48	0.172	142	0.891	-34	

Y1-MAG & ANGL		11		21		12		22	
	FREQ.								
	50	0.405	125	17.780	-6	0.020	-93	0.234	-176
	100	1.382	85	17.940	-9	0.024	-72	0.715	71
	200	1.937	80	18.399	-18	0.027	-115	1.226	80
	300	3.962	77	19.044	-26	0.033	2	1.773	78
	400	4.327	69	20.003	-36	0.086	43	2.069	68
	500	6.197	71	20.688	-45	0.205	42	2.801	67
	600	6.589	62	21.986	-58	0.434	35	2.754	60
	700	8.151	53	23.697	-69	0.803	25	2.973	58
	800	8.287	47	24.190	-81	1.269	16	2.985	59
	900	8.404	44	23.916	-94	1.878	2	2.079	65
	1000	8.085	46	22.726	-103	2.492	-9	4.327	90

S2, Y2 CONDITION	S2-MAG & ANGL		11		21		12		22	
	FREQ.									
$V_{DS} = 10\text{ V}$ $V_{GS} = 4\text{ V}$ $I_{DS} = 5\text{ mA}$	50	1.023	-2	1.567	174	0.002	64	1.035	0	
	100	0.989	-8	1.531	166	0.003	118	0.989	-4	
	200	0.966	-11	1.549	153	0.003	49	0.977	-7	
	300	0.933	-22	1.531	140	0.003	177	0.977	-10	
	400	0.891	-23	1.567	129	0.008	-148	0.944	-11	
	500	0.851	-34	1.531	114	0.017	-157	0.923	-15	
	600	0.794	-35	1.567	102	0.035	-161	0.912	-16	
	700	0.684	-43	1.549	88	0.062	-174	0.902	-19	
	800	0.624	-46	1.549	76	0.095	176	0.891	-22	
	900	0.556	-51	1.531	64	0.143	163	0.891	-22	
	1000	0.501	-52	1.462	48	0.191	144	0.891	-35	

Y2-MAG & ANGL		11		21		12		22	
	FREQ.								
	50	0.411	126	15.215	-5	0.022	-115	0.354	-178
	100	1.385	85	15.540	-8	0.027	-56	0.690	80
	200	1.940	80	16.026	-18	0.028	-122	1.229	80
	300	3.946	79	16.402	-24	0.032	13	1.759	82
	400	4.259	73	17.533	-35	0.087	48	2.034	71
	500	6.358	72	18.279	-43	0.207	46	2.770	69
	600	6.724	64	19.600	-56	0.444	41	2.914	64
	700	8.534	55	21.366	-67	0.851	31	3.157	62
	800	8.961	48	22.388	-79	1.380	21	3.168	61
	900	9.289	43	22.717	-92	2.120	7	2.336	67
	1000	8.676	43	21.911	-103	2.855	-7	4.332	90

900 MHz G_{ps} AND NF TEST CIRCUIT

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