

NEC

MES FIELD EFFECT TRANSISTOR

3SK299

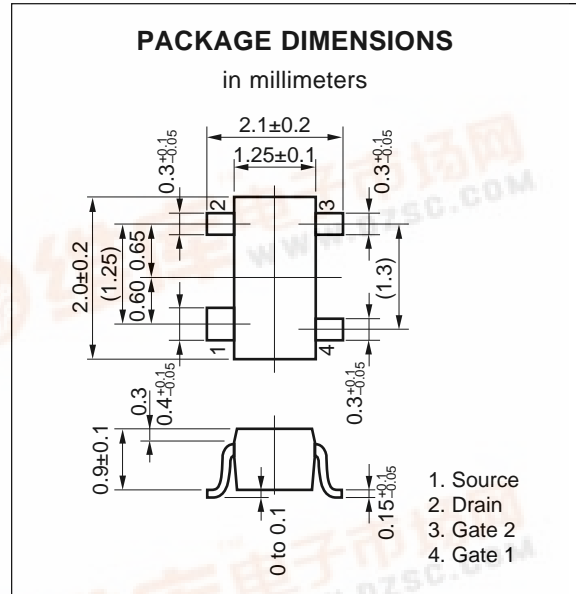
RF AMP. FOR UHF TV TUNER  
N-CHANNEL GaAs DUAL-GATE MES FIFLD-EFFECT TRANSISTOR  
4 PIN SMALL MINI MOLD

FEATURES

- Suitable for use as RF amplifier in UHF TV tuner.
- Low  $C_{rss}$  : 0.02 pF TYP.
- High  $G_{ps}$  : 20 dB TYP.
- Low NF : 1.1 dB TYP.
- 4 PIN SMALL MINI MOLD PACKAGE

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

Drain to Source Voltage	$V_{DSX}$	13	V
Gate1 to Source Voltage	$V_{G1S}$	-4.5	V
Gate2 to Source Voltage	$V_{G2S}$	-4.5	V
Drain Current	$I_D$	40	mA
Total Power Dissipation	$P_T$	120	mW
Channel Temperature	$T_{ch}$	125	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-55 to +125	$^\circ\text{C}$



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

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Drain Current	$I_{DSX}$			10	$\mu\text{A}$	$V_{DS} = 13\text{ V}, V_{G1S} = -4\text{ V}, V_{G2S} = 0$
Drain Current	$I_{DSS}$	5	20	40	mA	$V_{DS} = 5\text{ V}, V_{G2S} = 0, V_{G1S} = 0$
Gate1 to Source Cutoff Voltage	$V_{G1S(off)}$			-3.5	V	$V_{DS} = 5\text{ V}, V_{G2S} = 0, I_D = 100\text{ }\mu\text{A}$
Gate2 to Source Cutoff Voltage	$V_{G2S(off)}$			-3.5	V	$V_{DS} = 5\text{ V}, V_{G1S} = 0, I_D = 100\text{ }\mu\text{A}$
Gate1 Reverse Current	$I_{G1SS}$			10	$\mu\text{A}$	$V_{DS} = 0, V_{G1S} = -4\text{ V}, V_{G2S} = 0$
Gate2 Reverse Current	$I_{G2SS}$			10	$\mu\text{A}$	$V_{DS} = 0, V_{G2S} = -4\text{ V}, V_{G1S} = 0$
Forward Transfer Admittance	$ y_{fs} $	18	25	35	ms	$V_{DS} = 5\text{ V}, V_{G2S} = 1\text{ V}, I_D = 10\text{ mA}$ $f = 1.0\text{ kHz}$
Input Capacitance	$C_{iss}$	0.5	1.0	1.5	pF	$V_{DS} = 5\text{ V}, V_{G2S} = 1\text{ V}, I_D = 10\text{ mA}$ $f = 1\text{ MHz}$
Reverse Transfer Capacitance	$C_{rss}$		0.02	0.03	pF	
Power Gain	$G_{ps}$	16.0	20.0		dB	$V_{DS} = 5\text{ V}, V_{G2S} = 1\text{ V}, I_D = 10\text{ mA}$
Noise Figure	NF		1.1	2.5	dB	$f = 900\text{ MHz}$

$I_{DSS}$  Classification

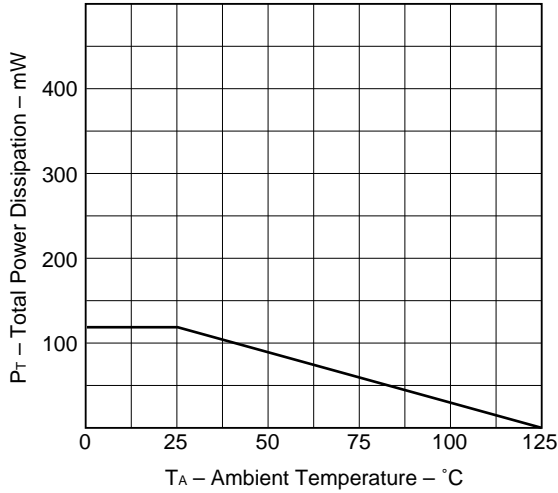
Unit: mA

Class	U71	U72	U73	U74
Marking	U71	U72	U73	U74
$I_{DSS}$	5 to 15	10 to 25	20 to 35	30 to 40

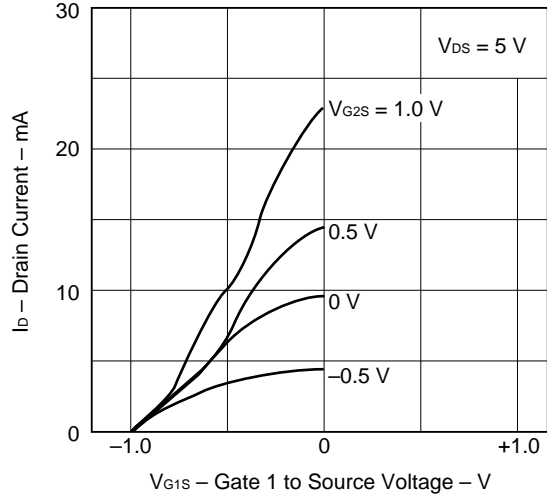


TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25 °C)

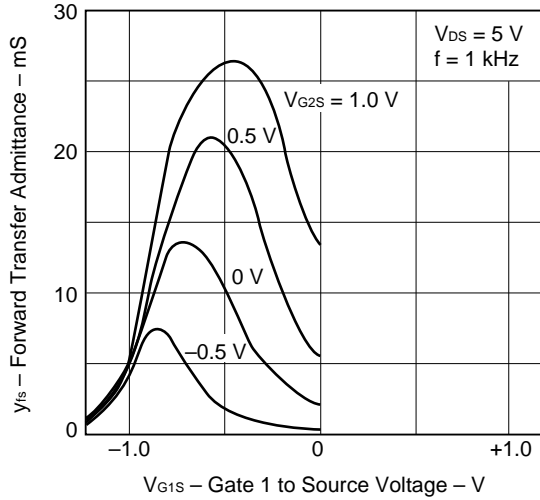
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



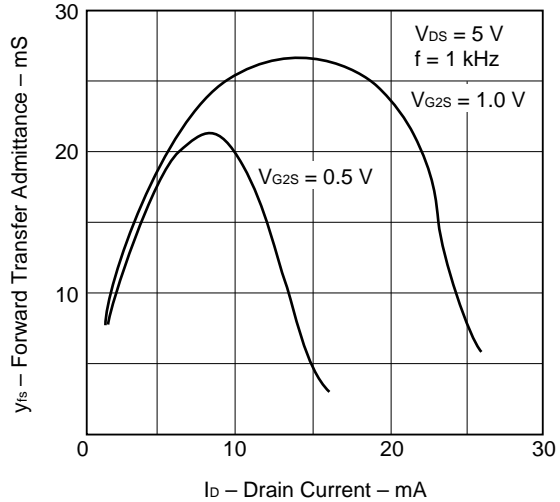
DRAIN CURRENT vs. GATE1 TO SOURCE VOLTAGE



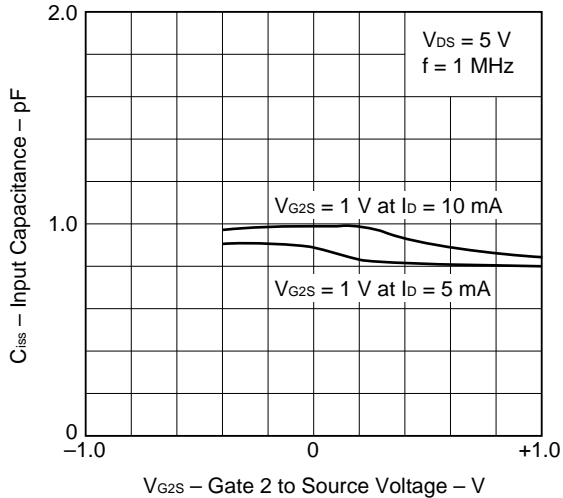
FORWARD TRANSFER ADMITTANCE vs. GATE1 TO SOURCE VOLTAGE



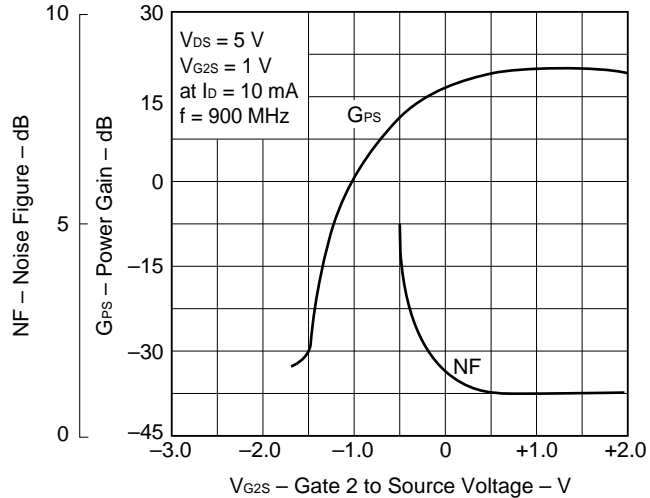
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT

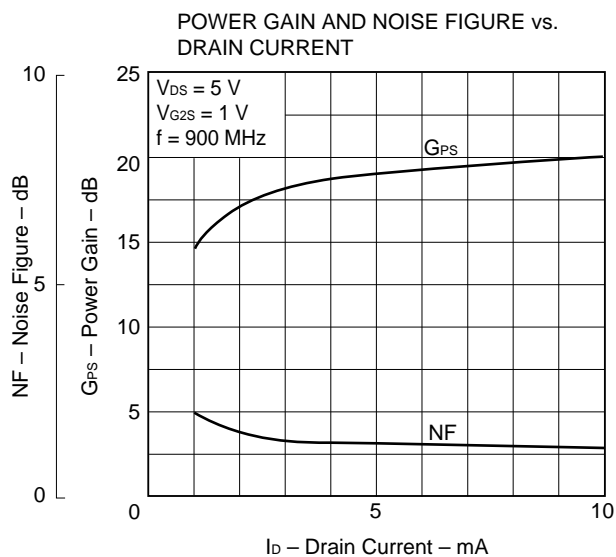
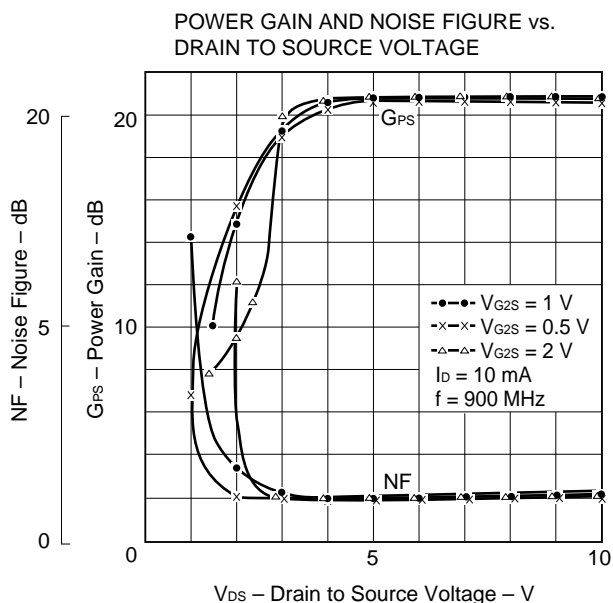


INPUT CAPACITANCE vs. GATE2 TO SOURCE VOLTAGE



POWER GAIN AND NOISE FIGURE vs. GATE2 TO SOURCE VOLTAGE

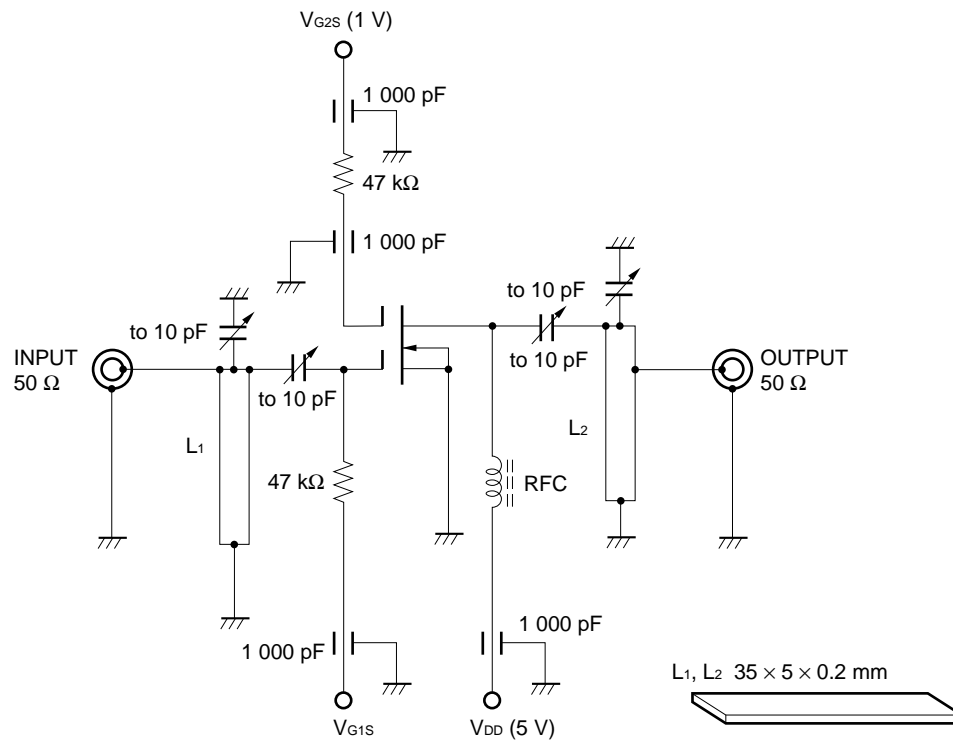




**S-PARAMETER (V<sub>DS</sub> = 5 V, V<sub>G2S</sub> = 1 V, I<sub>D</sub> = 10 mA)**

FREQUENCY MHz	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.0000	0.999	-3.3	2.359	177.2	0.006	-122.3	0.969	-1.3
200.0000	1.000	-7.2	2.389	169.3	0.004	123.0	0.981	-2.9
300.0000	0.998	-9.3	2.313	164.4	0.000	-145.0	0.979	-3.3
400.0000	0.974	-13.4	2.233	160.0	0.004	79.2	0.967	5.6
500.0000	1.005	-15.7	2.420	158.4	0.007	29.7	0.999	-5.8
600.0000	0.942	-19.1	2.300	150.0	0.003	65.0	0.958	-7.7
700.0000	0.968	-22.2	2.332	145.5	0.004	45.5	0.997	-8.5
800.0000	0.920	-25.2	2.229	141.5	0.008	80.1	0.957	-9.4
900.0000	0.952	28.9	2.447	136.8	0.004	8.3	0.999	-12.5
1000.0000	0.898	-29.4	2.303	131.1	0.001	50.9	0.968	-11.1
1100.0000	0.915	-35.1	2.348	125.8	0.004	71.4	0.984	-14.8
1200.0000	0.879	-35.2	2.367	123.5	0.000	91.1	0.989	-13.0

900 MHz G<sub>PS</sub> AND NF TEST CIRCUIT



$V_{DS} = 5 \text{ V}$ ,  $V_{G2S} = 1 \text{ V}$ ,  $I_D = 10 \text{ mA}$

[MEMO]

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Anti-radioactive design is not implemented in this product.