NEC

MES FIELD EFFECT TRANSISTOR

3SK177

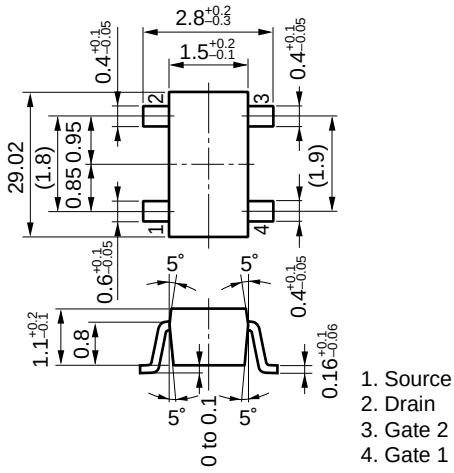
RF AMP. FOR UHF TV TUNER
N-CHANNEL GaAs DUAL-GATE MES FIELD-EFFECT TRANSISTOR
4 PIN MINI MOLD

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.

PACKAGE DIMENSIONS

in millimeters



1. Source
2. Drain
3. Gate 2
4. Gate 1

ABSOLUTE MAXIMUM RATINGS (T_A = 25 ˚C)

Drain to Source Voltage	V_{DSX}	13	V
Gate 1 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	200	mW
Channel Temperature	T_{ch}	125	˚C
Storage Temperature	T_{stg}	–55 to +125	˚C

ELECTRICAL CHARACTERISTICS (T_A = 25 ˚C)

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

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

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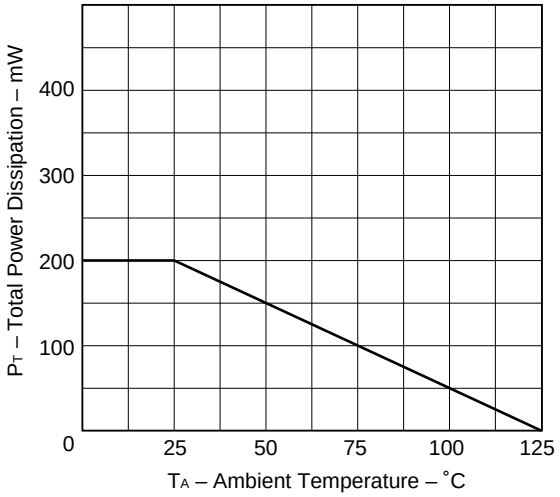
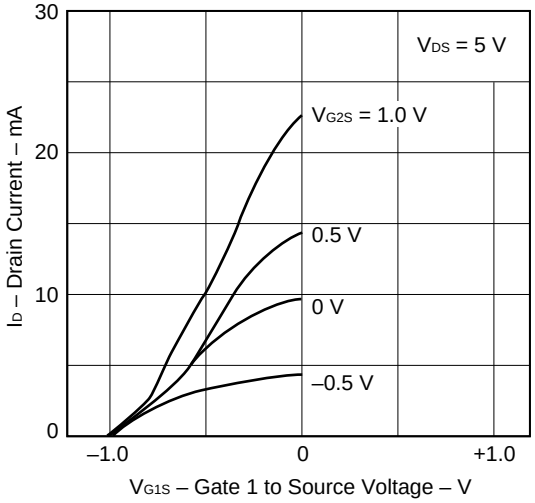
TYPICAL CHARACTERISTICS (T_A = 25 °C)

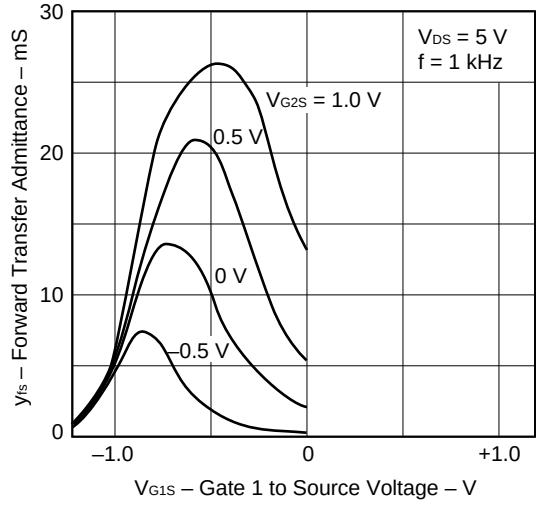
TOTAL POWER DISSIPATION vs.
AMBIENT TEMPERATURE



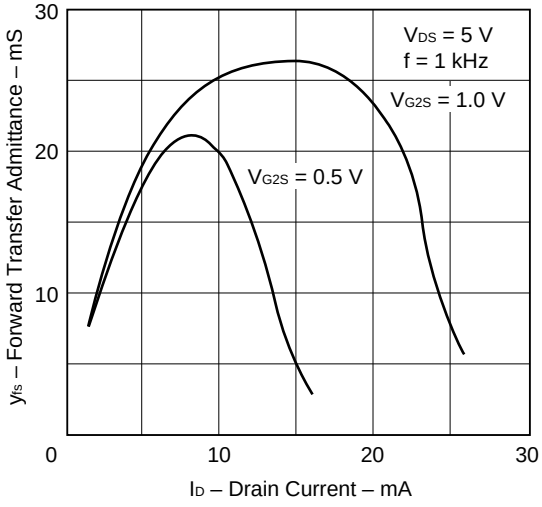
DRAIN CURRENT vs.
GATE1 TO SOURCE VOLTAGE



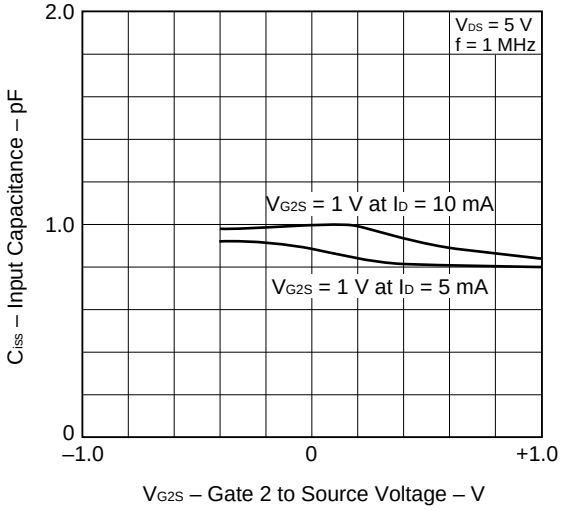
FORWARD TRANSFER ADMITTANCE vs.
GATE1 TO SOURCE VOLTAGE



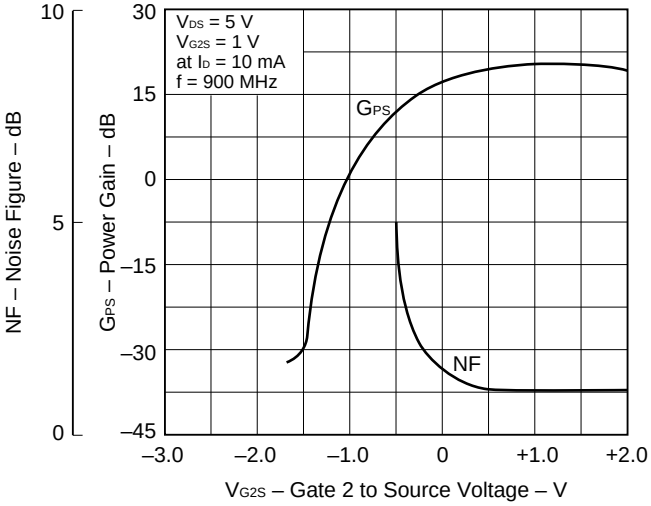
FORWARD TRANSFER ADMITTANCE vs.
DRAIN CURRENT



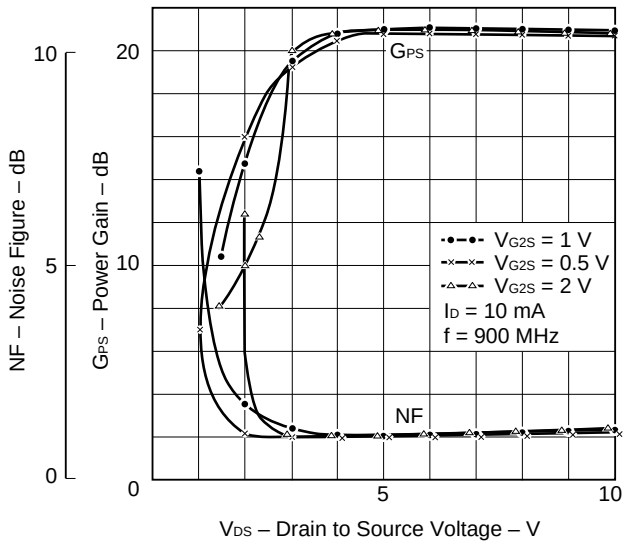
INPUT CAPACITANCE vs.
GATE2 TO SOURCE VOLTAGE



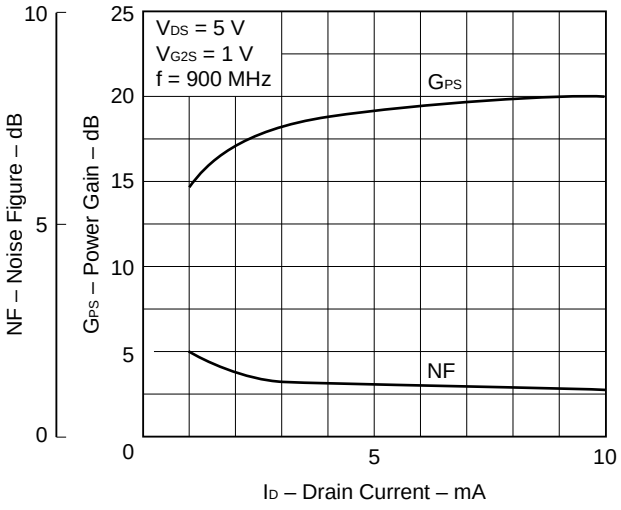
FOWER GAIN AND NOISE FIGURE vs.
GATE2 TO SOURCE VOLTAGE



POWER GAIN AND NOISE FIGURE vs.
DRAIN TO SOURCE VOLTAGE



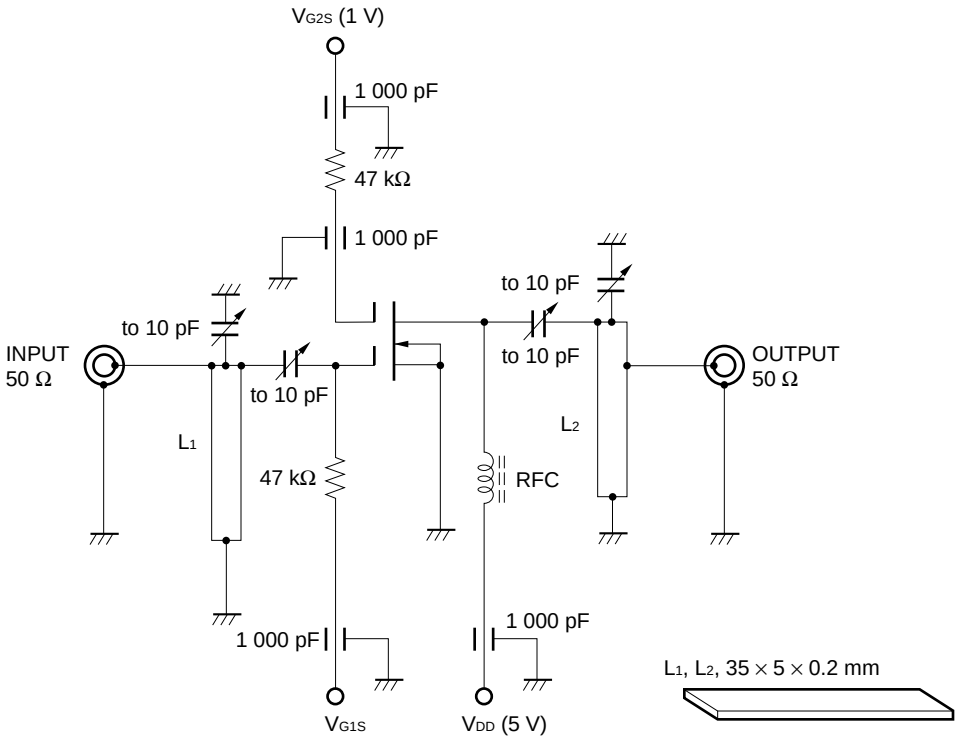
POWER GAIN AND NOISE FIGURE vs.
DRAIN CURRENT



S-PARAMETER (V_{DS} = 5 V, V_{G2S} = 1 V, I_D = 10 mA)

FREQUENCY	S11		S21		S12		S22	
MHz	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	l58.4	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_{PS} AND NF TEST CIRCUIT



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

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