To our customers,

Old Company Name in Catalogs and Other Documents

On April 1st, 2010, NEC Electronics Corporation merged with Renesas Technology Corporation, and Renesas Electronics Corporation took over all the business of both companies. Therefore, although the old company name remains in this document, it is a valid Renesas Electronics document. We appreciate your understanding.

Renesas Electronics website: http://www.renesas.com

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (http://www.renesas.com)

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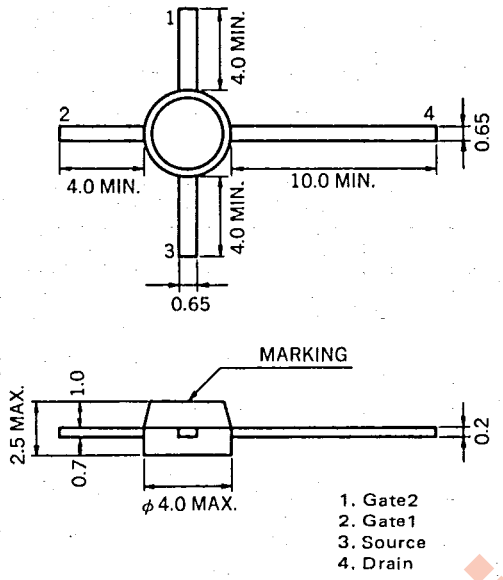
RENESAS

MES FIELD EFFECT TRANSISTOR

3SK203

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

PACKAGE DIMENSIONS
in millimeters



1. Gate2
2. Gate1
3. Source
4. Drain

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.

ABSOLUTE MAXIMUM RATINGS (T_a = 25°C)

Drain to Source Voltage	V_{DSX}	10	V
Gate1 to Source Voltage	V_{G1S}	−4.5	V
Gate2 to Source Voltage	V_{G2S}	−4.5	V
Drain Current	I_D	60	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}	10			V	V_{G1S} = −4 V, V_{G2S} = 0, I_D = 20 μA
Drain Current	I_{DSS}	8.0		60	mA	V_{DS} = 5 V, V_{G1S} = 0, V_{G2S} = 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 Transfer Admittance	$\|y_{fs}\|$	22	30		mS	V_{DS} = 5 V, V_{G2S} = 1 V, I_D = 10 mA, f = 1.0 kHz
Input Capacitance	C_{iss}	0.7	1.2	1.7	pF	V_{DS} = 5 V, V_{G2S} = 1 V, I_D = 10 mA, f = 1.0 MHz
Reverse Transfer Capacitance	C_{rss}		0.02	0.035	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	

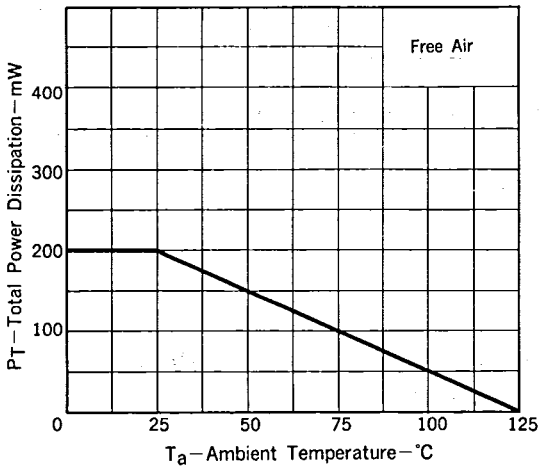
I_{DSS} Classificaiton (Unit: mA)

Marking	N	M	L	K
I_{DSS}	8 to 25	20 to 35	30 to 50	45 to 60

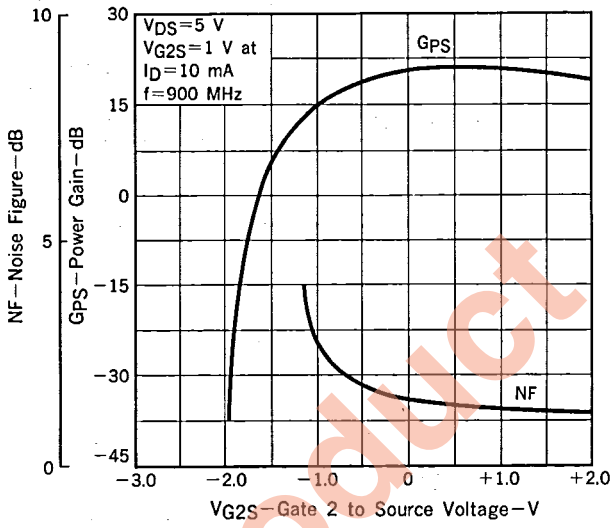
PRECAUTION: Avoid high static voltages or electric fields so that this device would not suffer from any damage due to those voltage or fields.

TYPICAL CHARACTERISTICS (T_a = 25°C)

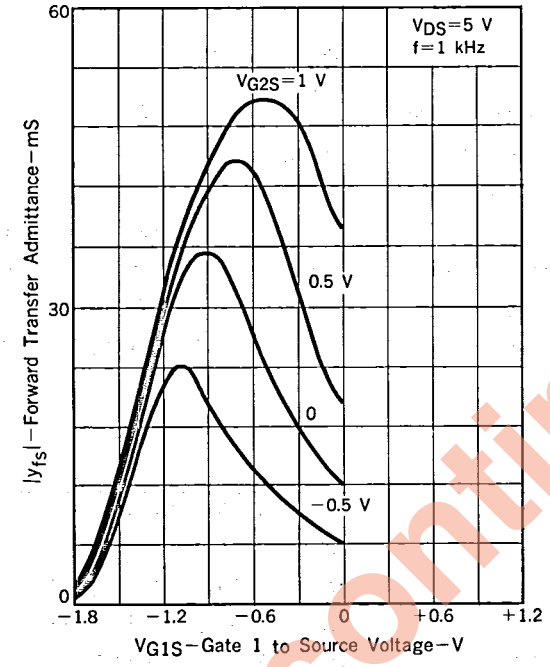
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



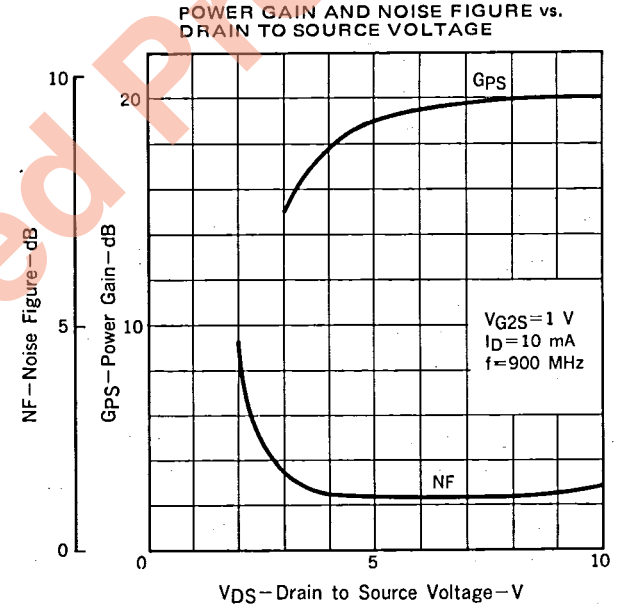
POWER GAIN AND NOISE FIGURE vs. GATE2 TO SOURCE VOLTAGE



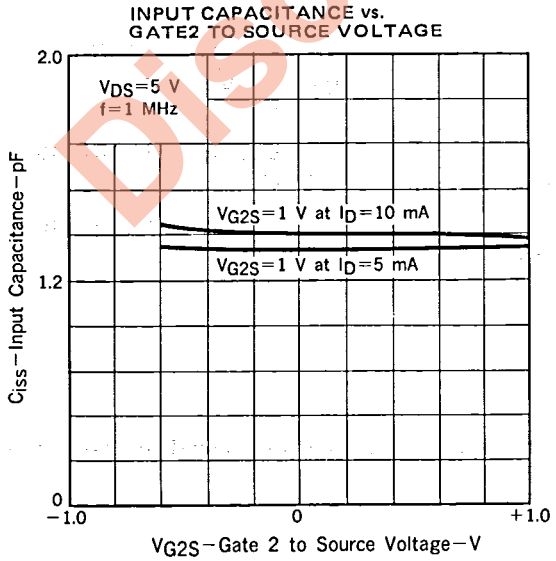
FORWARD TRANSFER ADMITTANCE vs. GATE1 TO SOURCE VOLTAGE



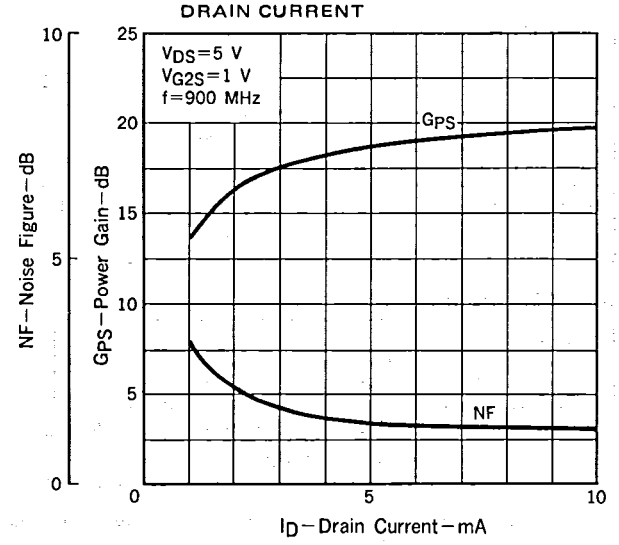
POWER GAIN AND NOISE FIGURE vs. DRAIN TO SOURCE VOLTAGE



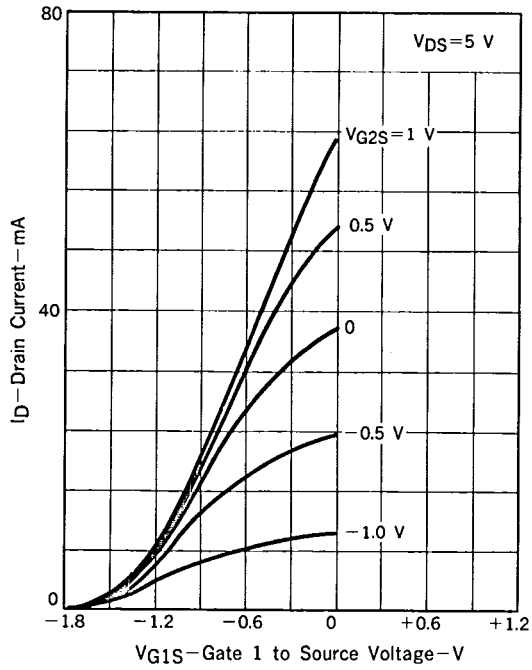
INPUT CAPACITANCE vs. GATE2 TO SOURCE VOLTAGE



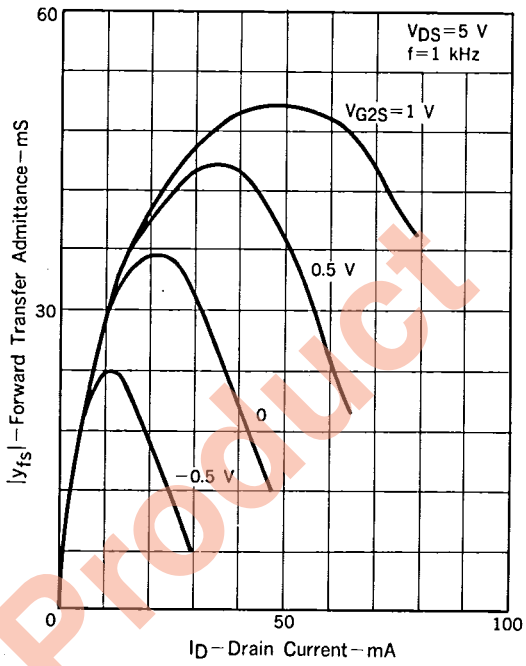
POWER GAIN AND NOISE FIGURE vs. DRAIN CURRENT



DRAIN CURRENT vs.
GATE1 TO SOURCE VOLTAGE



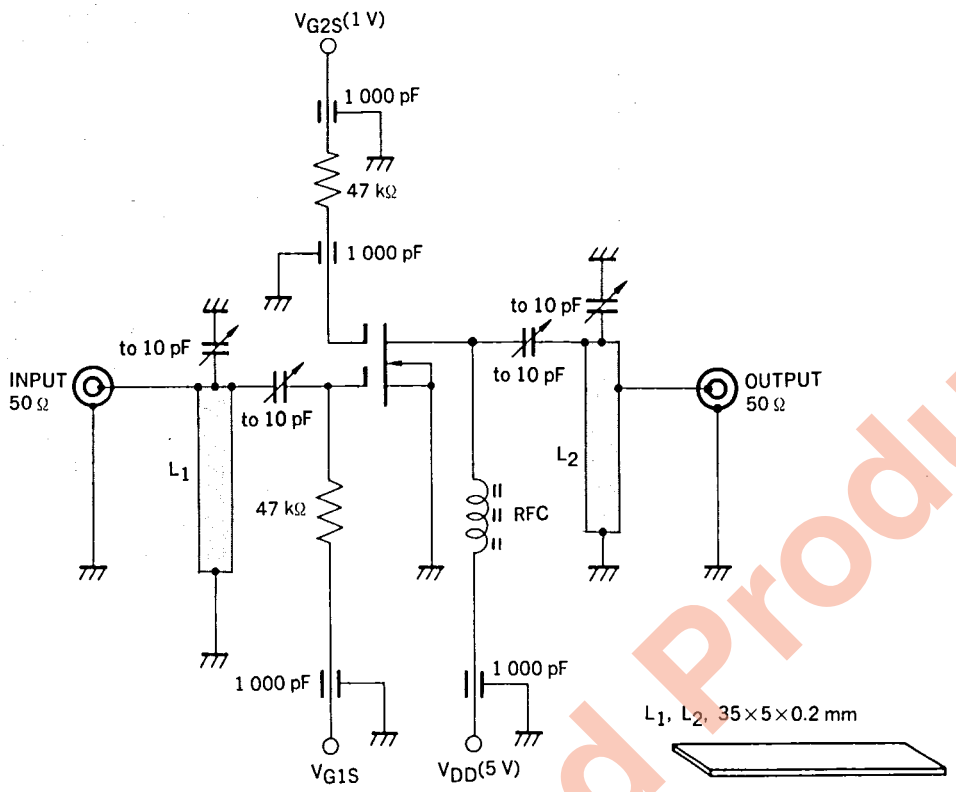
FORWARD TRANSFER ADMITTANCE vs.
DRAIN CURRENT



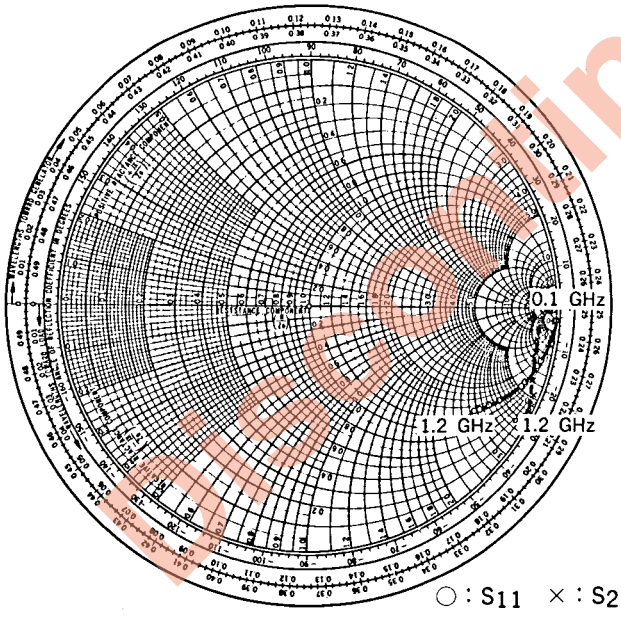
S-PARAMETER (V_{DS} = 5 V, V_{G2S} = 1 V, I_D = 10 mA)

FREQUENCY (MHz)	S_{11}		S_{21}		S_{12}		S_{22}	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	1.002	−2.6	2.671	176.4	0.006	111.8	0.942	−1.5
200.00	0.985	−7.2	2.714	166.2	0.003	105.3	0.932	−4.2
300.00	0.989	−8.8	2.628	161.4	0.004	92.2	0.941	−5.1
400.00	0.966	−13.2	2.578	155.0	0.006	104.0	0.938	−8.3
500.00	0.944	−14.3	2.567	154.0	0.006	85.9	0.930	−8.6
600.00	0.934	−19.7	2.712	144.4	0.008	71.5	0.948	−12.9
700.00	0.886	−19.9	2.557	138.0	0.006	94.8	0.923	−12.6
800.00	0.886	−24.9	2.598	131.8	0.010	86.3	0.943	−16.5
900.00	0.837	−26.0	2.525	128.1	0.007	86.9	0.921	−17.5
1000.00	0.840	−29.9	2.720	121.6	0.009	118.2	0.964	−21.4
1100.00	0.771	−30.4	2.560	113.3	0.004	120.0	0.926	−22.6
1200.00	0.788	−32.4	2.606	107.9	0.004	−178.7	0.992	−25.4

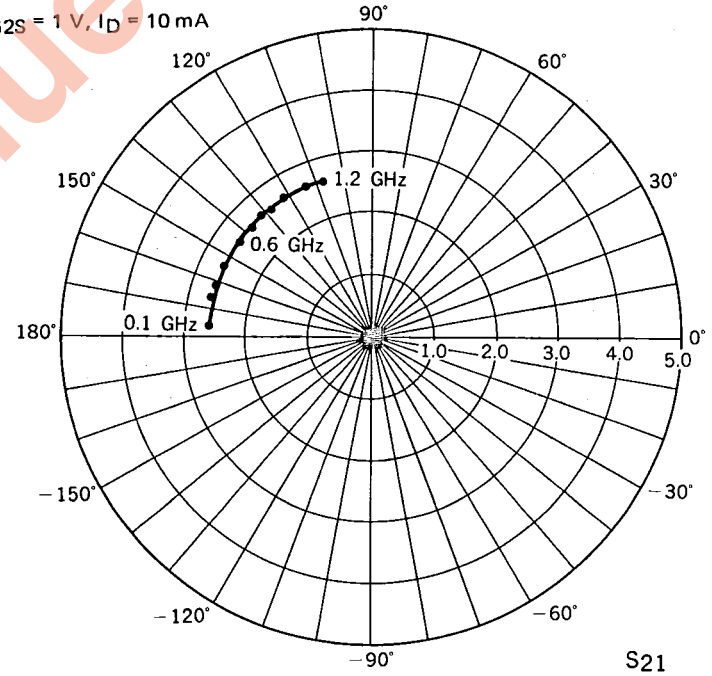
900 MHz G_{PS} AND NF TEST CIRCUIT



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



○ : S_{11} × : S_{22}



S_{21}