3SK319

Silicon N-Channel Dual Gate MOS FET
UHF RF Amplifier

HITACHI

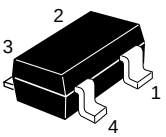
ADE-208-602(Z)
1st. Edition
February 1998

Features

- Low noise characteristics;
  (NF= 1.4 dB typ. at f= 900 MHz)
- Excellent cross modulation characteristics
- Capable low voltage operation; +B= 5V

Outline

MPAK-4



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

Note: Marking is “YB–”.

Hitachi semiconductor

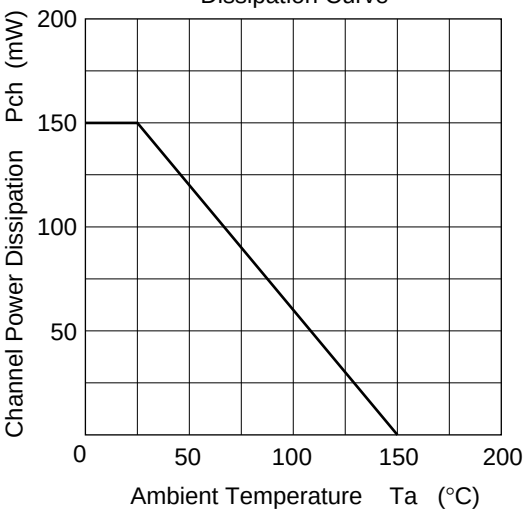
Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings	Unit
Drain to source voltage	V_{DS}	6	V
Gate1 to source voltage	V_{G1S}	±6	V
Gate2 to source voltage	V_{G2S}	±6	V
Drain current	I_D	20	mA
Channel power dissipation	Pch	150	mW
Channel temperature	Tch	150	°C
Storage temperature	Tstg	–55 to +150	°C

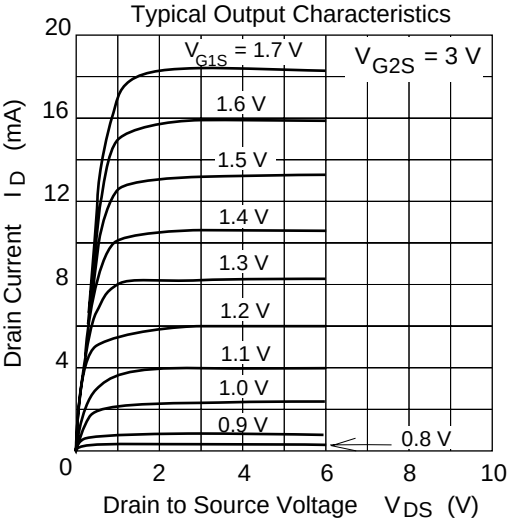
Electrical Characteristics (Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	6	—	—	V	I_D = 200µA, V_{G1S} = V_{G2S} = 0
Gate1 to source breakdown voltage	$V_{(BR)G1SS}$	±6	—	—	V	I_{G1} = ±10µA, V_{G2S} = V_{DS} = 0
Gate2 to source breakdown voltage	$V_{(BR)G2SS}$	±6	—	—	V	I_{G2} = ±10µA, V_{G1S} = V_{DS} = 0
Gate1 to source cutoff current	I_{G1SS}	—	—	±100	nA	V_{G1S} = ±5V, V_{G2S} = V_{DS} = 0
Gate2 to source cutoff current	I_{G2SS}	—	—	±100	nA	V_{G2S} = ±5V, V_{G1S} = V_{DS} = 0
Gate1 to source cutoff voltage	$V_{G1S(off)}$	0.5	0.7	1.0	V	V_{DS} = 5V, V_{G2S} = 3V, I_D = 100µA
Gate2 to source cutoff voltage	$V_{G2S(off)}$	0.5	0.7	1.0	V	V_{DS} = 5V, V_{G1S} = 3V, I_D = 100µA
Drain current	$I_{DS(op)}$	0.5	4	10	mA	V_{DS} = 3.5V, V_{G1S} = 1.1V, V_{G2S} = 3V
Forward transfer admittance	$\|y_{fs}\|$	18	24	32	mS	V_{DS} = 3.5V, V_{G2S} = 3V I_D = 10mA , f=1kHz
Input capacitance	C_{iss}	1.3	1.6	1.9	pF	V_{DS} = 3.5V, V_{G2S} = 3V
Output capacitance	C_{oss}	0.9	1.2	1.5	pF	I_D = 10mA , f= 1MHz
Reverse transfer capacitance	C_{rss}	—	0.019	0.03	pF	
Power gain	PG	18	21	—	dB	V_{DS} = 3.5V, V_{G2S} = 3V
Noise figure	NF	—	1.4	2.2	dB	I_D = 10mA , f=900MHz

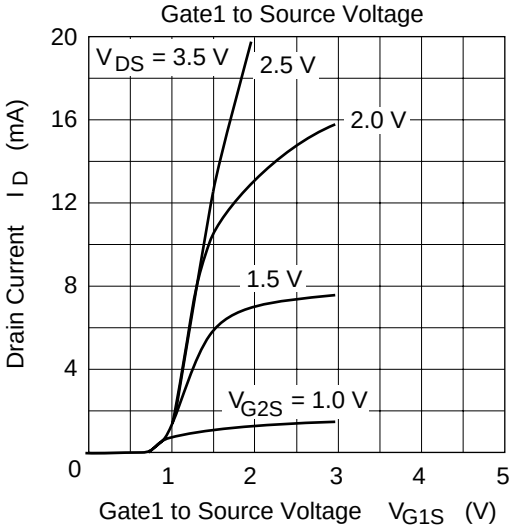
Maximum Channel Power Dissipation Curve



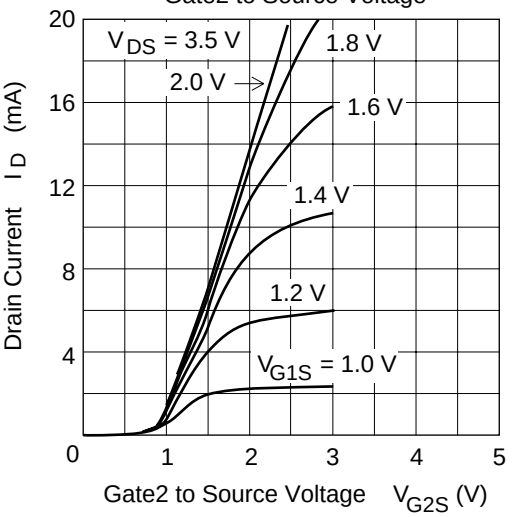
Typical Output Characteristics



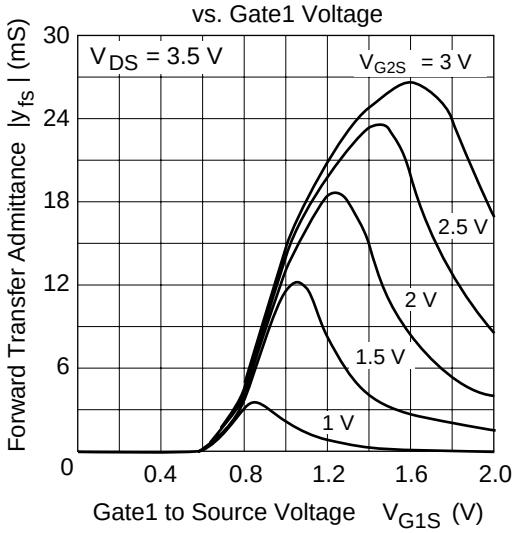
Drain Current vs. Gate1 to Source Voltage



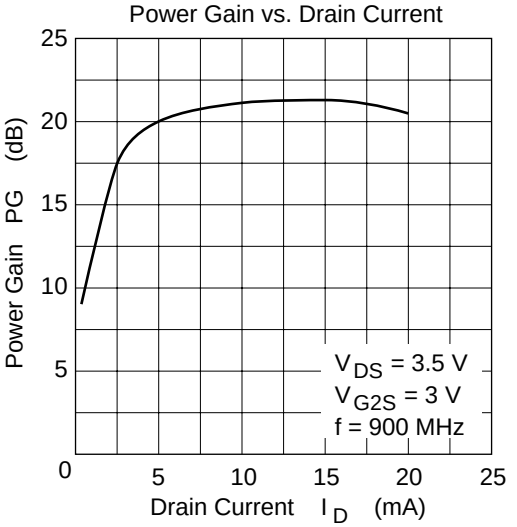
Drain Current vs. Gate2 to Source Voltage



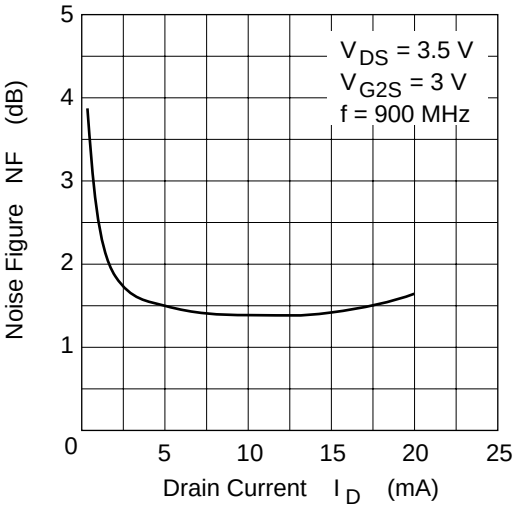
Forward Transfer Admittance vs. Gate1 Voltage



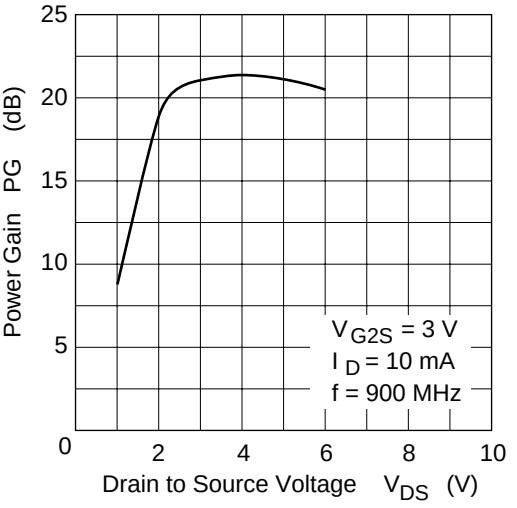
Power Gain vs. Drain Current



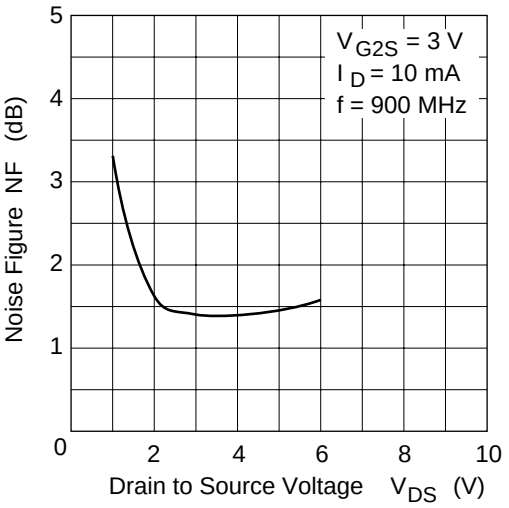
Noise Figure vs. Drain Current



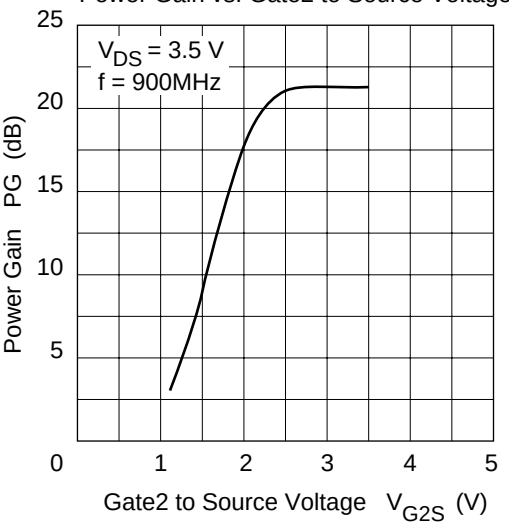
Power Gain vs. Drain to Source Voltage



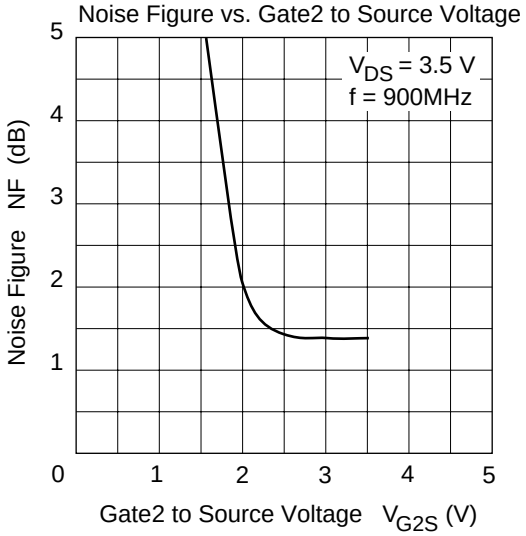
Noise Figure vs. Drain to Source Voltage



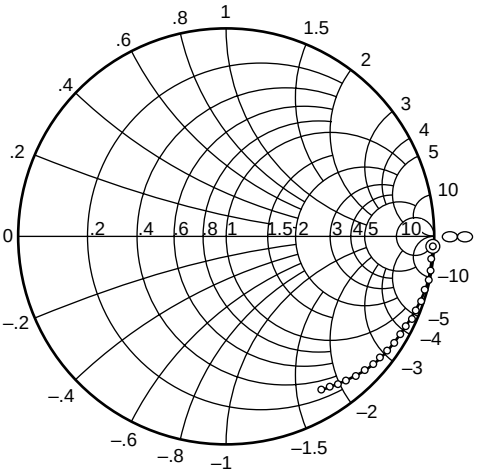
Power Gain vs. Gate2 to Source Voltage



Noise Figure vs. Gate2 to Source Voltage

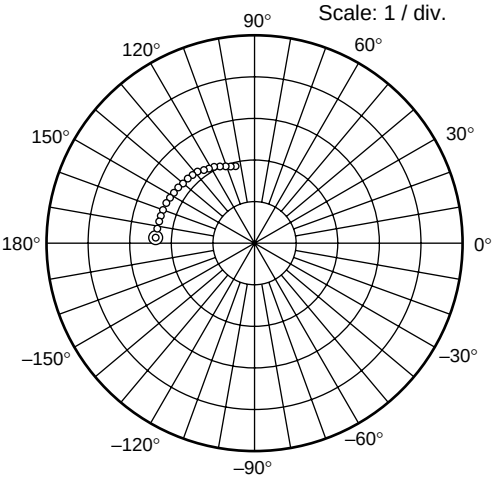


S11 Parameter vs. Frequency



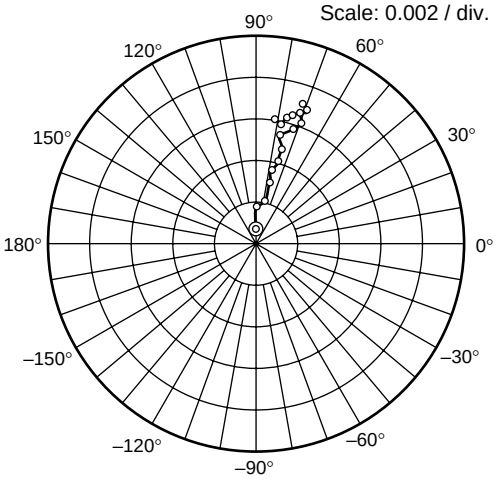
Test Condition : V_{DS}= 3.5 V , V_{G2S} = 3 V
I_D = 10mA
50 to 1000 MHz (50 MHz step)

S21 Parameter vs. Frequency



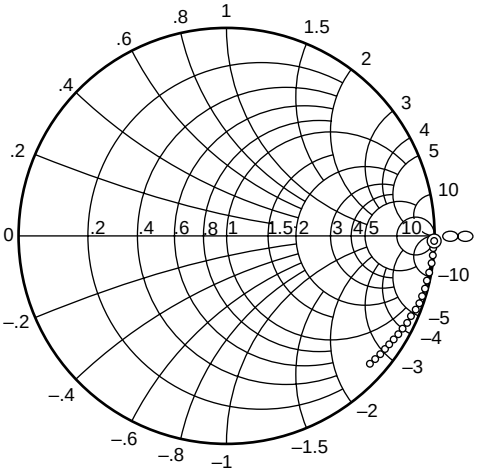
Test Condition : V_{DS}= 3.5 V , V_{G2S} = 3 V
I_D = 10mA
50 to 1000 MHz (50 MHz step)

S12 Parameter vs. Frequency



Test Condition : V_{DS}= 3.5 V , V_{G2S} = 3 V
I_D= 10mA
50 to 1000 MHz (50 MHz step)

S22 Parameter vs. Frequency



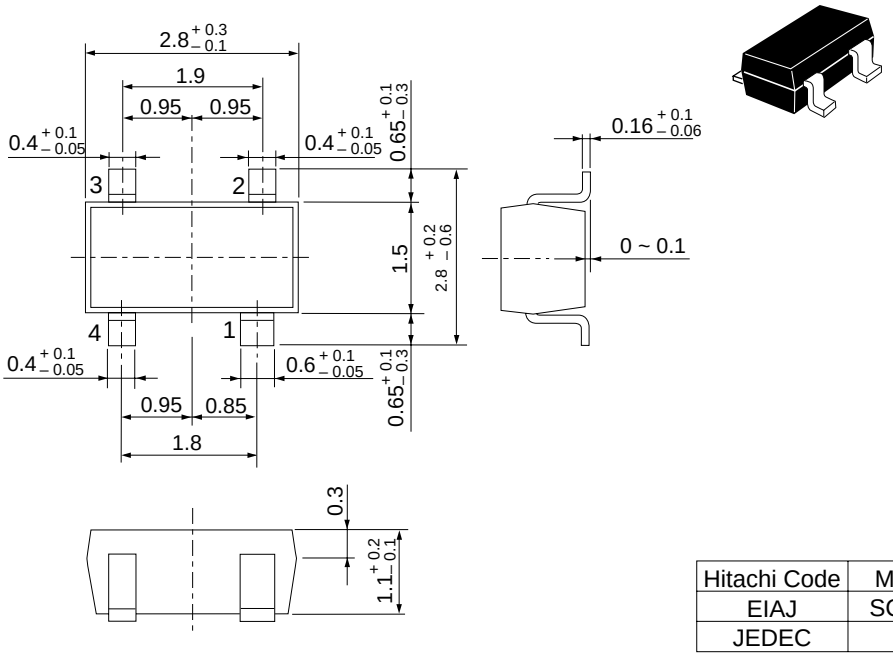
Test Condition : V_{DS}= 3.5 V , V_{G2S} = 3 V
I_D = 10mA
50 to 1000 MHz (50 MHz step)

Sparameter (V_{DS} = 3.5V, V_{G2S} = 3V, I_D = 10mA, Zo = 50Ω)

	S11		S21		S12		S22	
f (MHz)	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
50	1.000	–2.8	2.41	176.3	0.00068	89.1	0.999	–2.2
100	0.998	–5.8	2.41	171.9	0.00176	88.5	0.996	–4.5
150	0.997	–9.1	2.39	167.6	0.00223	80.7	0.996	–6.7
200	0.994	–12.2	2.38	163.7	0.00303	76.6	0.994	–8.7
250	0.994	–15.1	2.37	159.8	0.00365	79.1	0.991	–11.0
300	0.986	–18.5	2.35	155.5	0.00414	75.4	0.988	–13.2
350	0.978	–21.3	2.30	151.4	0.00484	75.0	0.983	–15.3
400	0.972	–24.1	2.28	147.6	0.00533	78.0	0.980	–17.4
450	0.969	–27.0	2.26	143.6	0.00588	71.6	0.976	–19.6
500	0.954	–29.7	2.23	140.0	0.00617	69.5	0.971	–21.7
550	0.955	–32.8	2.19	135.9	0.00666	71.5	0.966	–23.7
600	0.941	–35.7	2.17	132.2	0.00672	70.6	0.960	–25.6
650	0.932	–38.3	2.14	128.6	0.00694	69.0	0.955	–27.8
700	0.924	–41.3	2.09	125.0	0.00709	71.4	0.948	–29.9
750	0.919	–44.1	2.07	121.5	0.00689	69.0	0.942	–31.8
800	0.905	–46.9	2.03	117.9	0.00699	68.9	0.937	–33.8
850	0.896	–49.2	2.00	114.7	0.00644	74.2	0.930	–35.8
900	0.884	–52.4	1.96	110.4	0.00633	75.5	0.923	–37.6
950	0.880	–54.7	1.93	107.1	0.00585	77.8	0.917	–39.8
1000	0.866	–57.7	1.89	103.8	0.00605	82.1	0.910	–41.9

Package Dimensions

Unit: mm



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