3SK194

Silicon N-Channel Dual Gate MOS FET

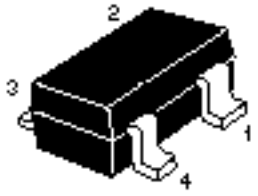
HITACHI

Application

VHF/UHF TV tuner RF amplifier

Outline

MPAK-4



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

Hitachi semiconductor

Absolute Maximum Ratings (Ta = 25°C)

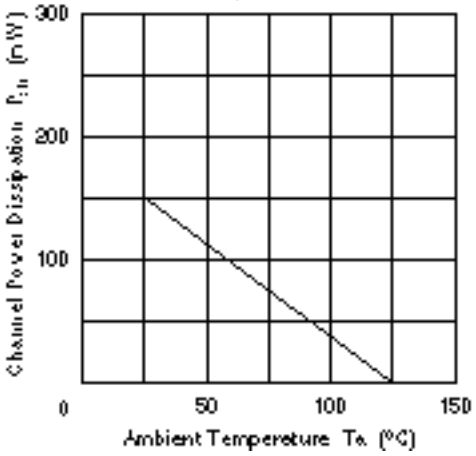
Item	Symbol	Ratings	Unit
Drain to source voltage	V_{DS}	15	V
Gate 1 to source voltage	V_{G1S}	±10	V
Gate 2 to source voltage	V_{G2S}	±10	V
Drain current	I_D	35	mA
Channel power dissipation	Pch	150	mW
Channel temperature	Tch	125	°C
Storage temperature	Tstg	–55 to +125	°C

Electrical Characteristics (Ta = 25°C)

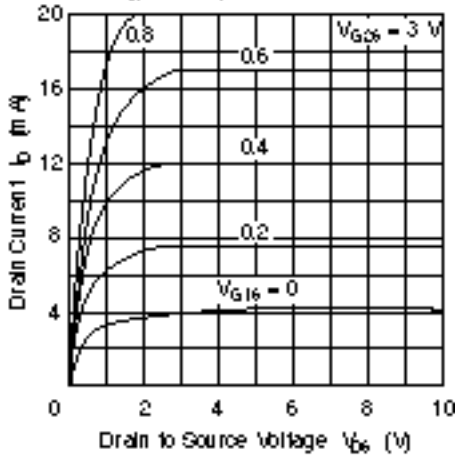
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSX}$	15	—	—	V	I_D = 200 µA, $V_{G1S} = V_{G2S}$ = –5 V
Gate 1 to source breakdown voltage	$V_{(BR)G1SS}$	±10	—	—	V	I_{G1} = ±10 µA, $V_{G2S} = V_{DS}$ = 0
Gate 2 to source breakdown voltage	$V_{(BR)G2SS}$	±10	—	—	V	I_{G2} = ±10 µA, $V_{G1S} = V_{DS}$ = 0
Gate 1 cutoff current	I_{G1SS}	—	—	±100	nA	V_{G1S} = ±8 V, $V_{G2S} = V_{DS}$ = 0
Gate 2 cutoff current	I_{G2SS}	—	—	±100	nA	V_{G2S} = ±8 V, $V_{G1S} = V_{DS}$ = 0
Gate 1 to source cutoff voltage	$V_{G1S(off)}$	—	—	–1.0	V	V_{DS} = 10 V, V_{G2S} = 3 V, I_D = 100 µA
Gate 2 to source cutoff voltage	$V_{G2S(off)}$	—	—	–1.5	V	V_{DS} = 10 V, V_{G1S} = 3 V, I_D = 100 µA
Drain current	I_{DSS}	0	—	10	mA	V_{DS} = 6 V, V_{G1S} = 0, V_{G2S} = 3 V
Forward transfer admittance	$\|y_{fs}\|$	17	—	—	mS	V_{DS} = 6 V, V_{G2S} = 3 V, I_D = 10 mA, f = 1 kHz
Input capacitance	Ciss	—	2.8	3.5	pF	V_{DS} = 6 V, V_{G2S} = 3 V, I_D = 10 mA, f = 1 MHz
Output capacitance	Coss	—	1.8	2.5	pF	
Reverse transfer capacitance	Crss	—	0.02	—	pF	
Power gain	PG	12	15	—	dB	V_{DS} = 6 V, V_{G2S} = 3 V, I_D = 10 mA, f = 900 MHz
Noise figure	NF	—	3.0	4.5	dB	
Noise figure	NF	—	3.0	4.0	dB	V_{DD} = 12 V, V_{AGC} = 10.5 V, f = 60 MHz
Power gain	PG	27	30	—	dB	V_{DS} = 6 V, V_{G2S} = 3 V, I_D = 10 mA, f = 200 MHz
Noise figure	NF	—	1.0	2.5	dB	

Note: Marking is “IY–”.

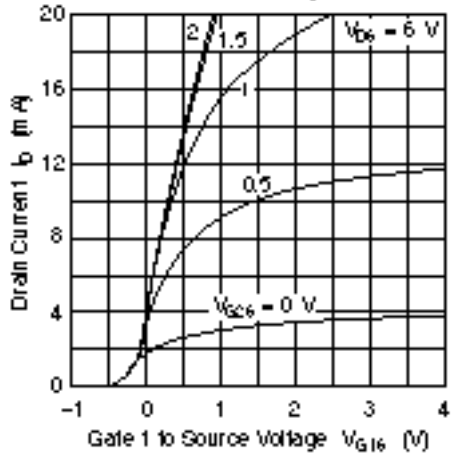
Maximum Channel Power Dissipation Curve



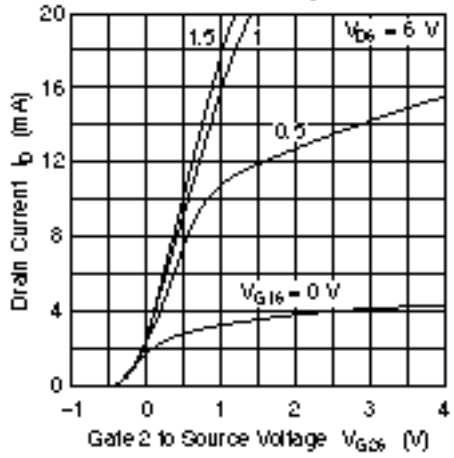
Typical Output Characteristics

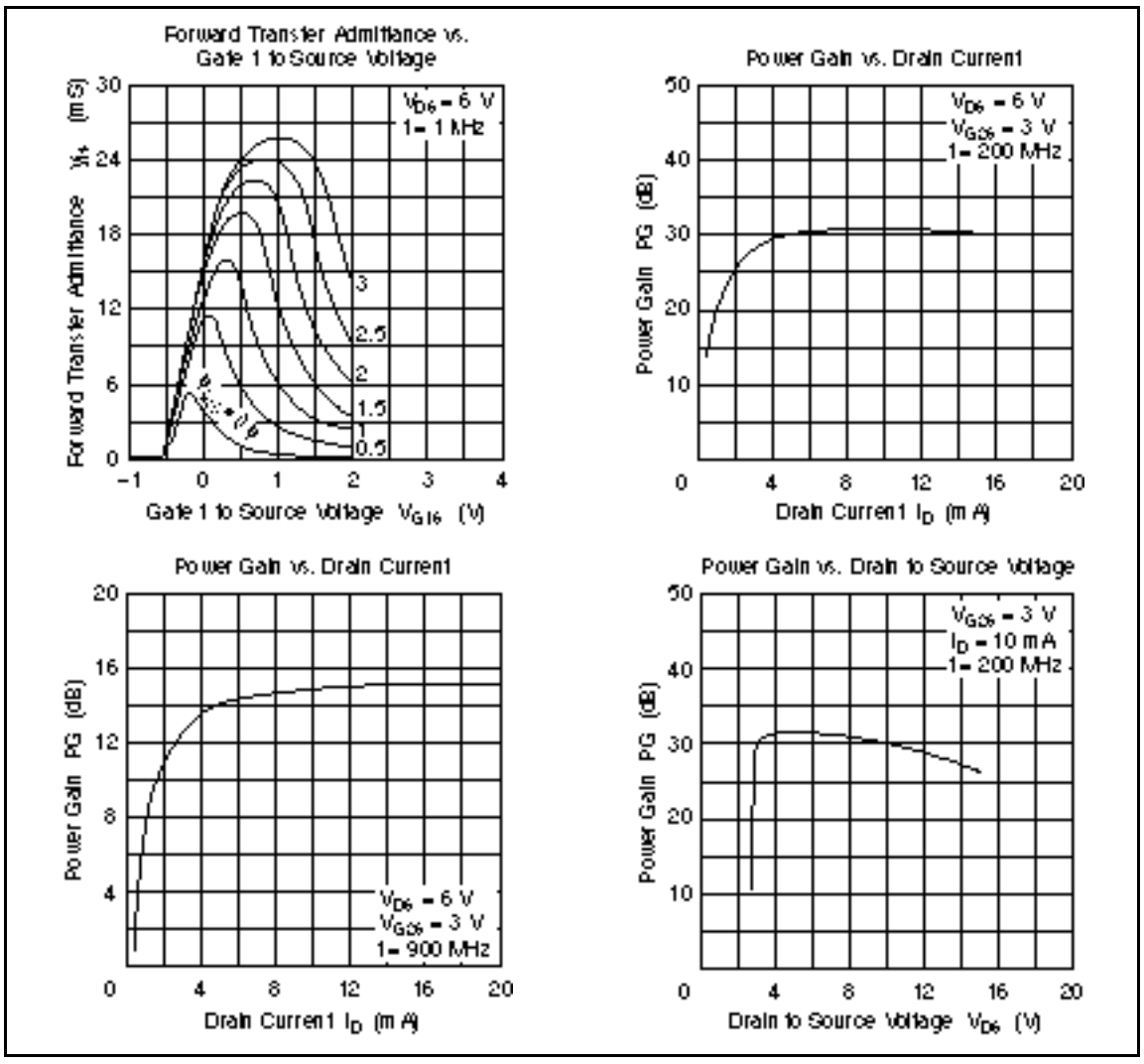


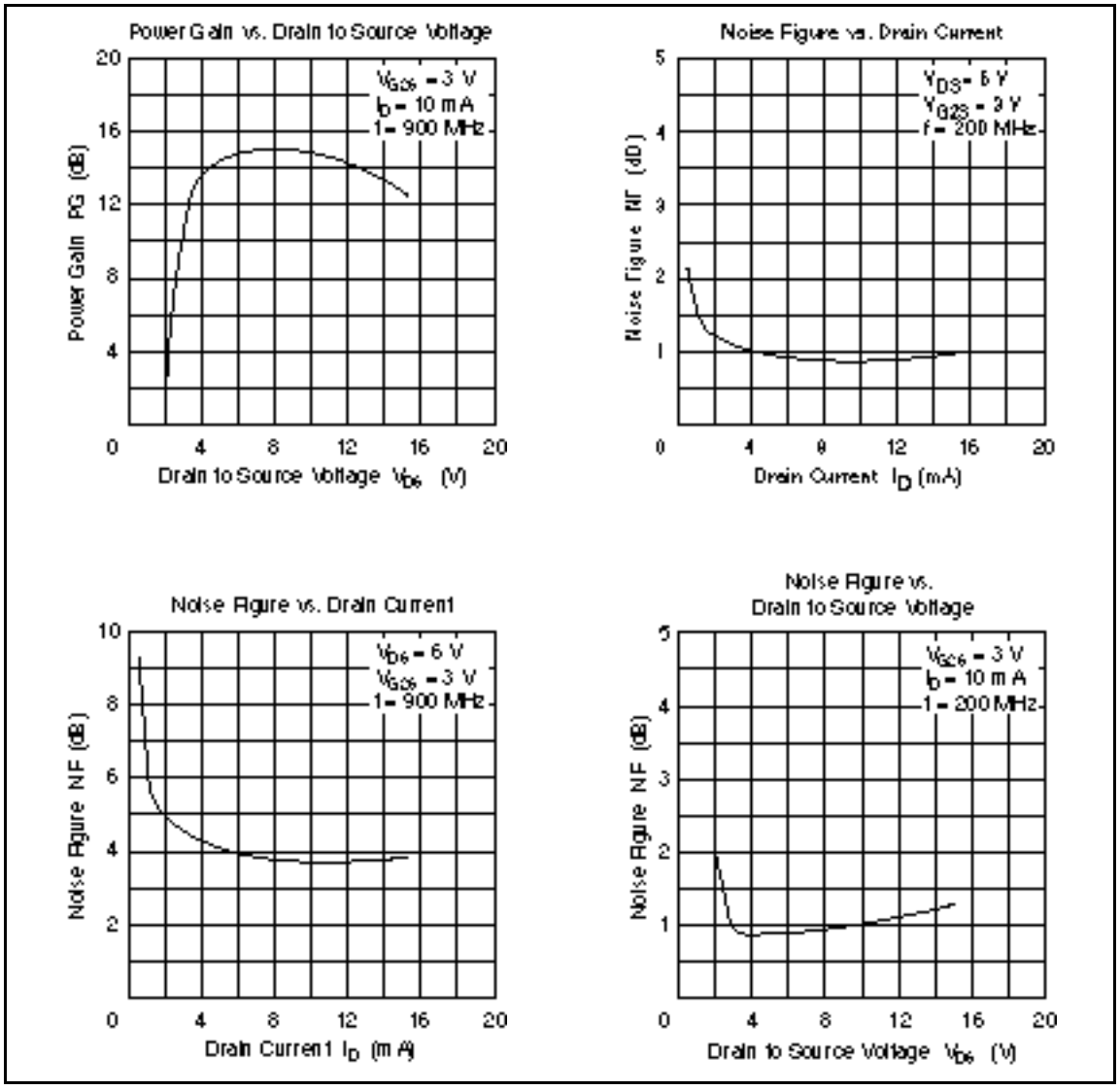
Drain Current vs. Gate 1 to Source Voltage

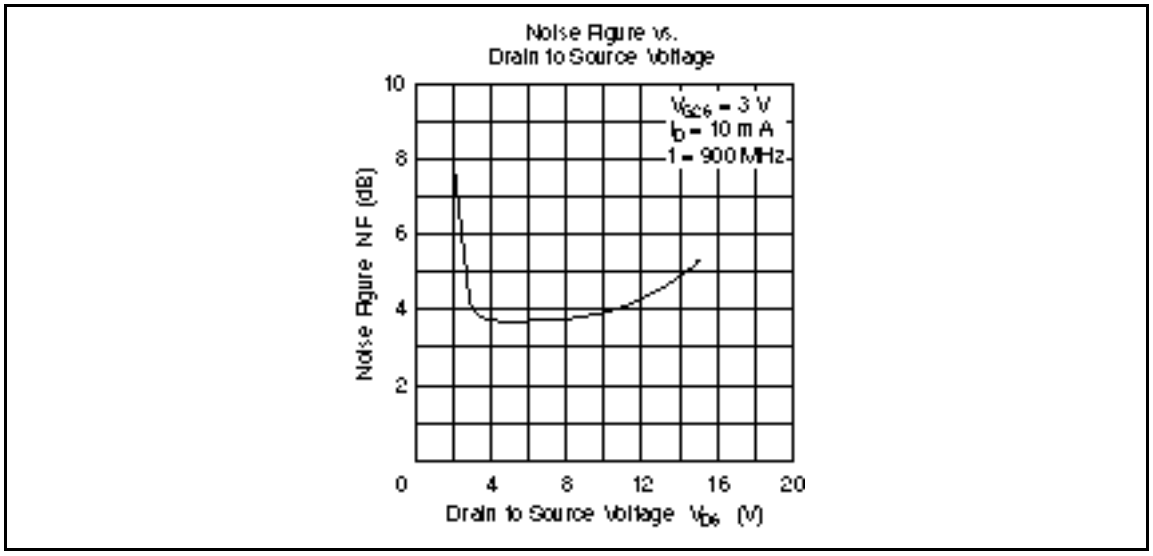


Drain Current vs. Gate 2 to Source Voltage




Forward Transfer Admittance vs.
Gate 1 to Source Voltage
Forward Transfer Admittance |Yfs| (mS)
Gate 1 to Source Voltage VG1S (V)
VDS = 6 V
f = 1 kHz
3
2.5
2
1.5
1
0.5
Power Gain vs. Drain Current
Power Gain PG (dB)
Drain Current ID (mA)
VDS = 6 V
VGG = 3 V
f = 200 MHz
Power Gain vs. Drain Current
Power Gain PG (dB)
Drain Current ID (mA)
VDS = 6 V
VGG = 3 V
f = 900 MHz
Power Gain vs. Drain to Source Voltage
Power Gain PG (dB)
Drain to Source Voltage VDS (V)
VGG = 3 V
ID = 10 mA
f = 200 MHz


Power Gain vs. Drain to Source Voltage
Power Gain PG (dB)
Drain to Source Voltage V_{DS} (V)
V_{GS} = 3 V
I_D = 10 mA
f = 900 MHz
Noise Figure vs. Drain Current
Noise Figure NF (dB)
Drain Current I_D (mA)
V_{DS} = 5 V
V_{GS} = 3 V
f = 200 MHz
Noise Figure vs. Drain Current
Noise Figure NF (dB)
Drain Current I_D (mA)
V_{DS} = 6 V
V_{GS} = 3 V
f = 900 MHz
Noise Figure vs.
Drain to Source Voltage
Noise Figure NF (dB)
Drain to Source Voltage V_{DS} (V)
V_{GS} = 3 V
I_D = 10 mA
f = 200 MHz


Noise Figure vs.
Drain to Source Voltage
V_{GS} = 3 V
I_D = 10 mA
f = 900 MHz
Noise Figure NF (dB)
10
8
6
4
2
0
4
8
12
16
20
Drain to Source Voltage V_{DS} (V)

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