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Renesas Technology Corp.
Customer Support Dept.
April 1, 2003

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Keep safety first in your circuit designs!

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Remember to give due consideration to safety when making your circuit designs, with appropriate measures such as (i) placement of substitutive, auxiliary circuits, (ii) use of nonflammable material or (iii) prevention against any malfunction or mishap.

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2SK2685

GaAs HEMT

RENESAS

ADE-208-400A (Z)
2nd. Edition
Mar. 2001

Application

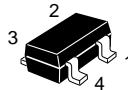
- UHF low noise amplifier

Features

- Excellent low noise characteristics. $F_{min} = 0.83\text{dB Typ (3V, 10mA, 2GHz)}$
- High associated gain. $G_a = 17\text{ dB Typ (3V, 10mA, 2GHz)}$
- High voltage. $V_{DS} = 6$ or more voltage.
- Small package. (CMPAK-4)

Outline

CMPAK-4



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

Note: Marking is "ZT-".

Attention This device is very sensitive to electro static discharge. It is recommended to adopt appropriate cautions when handling this transistor.

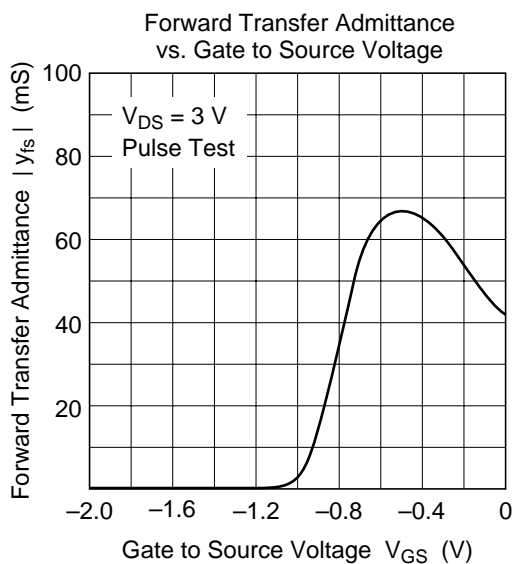
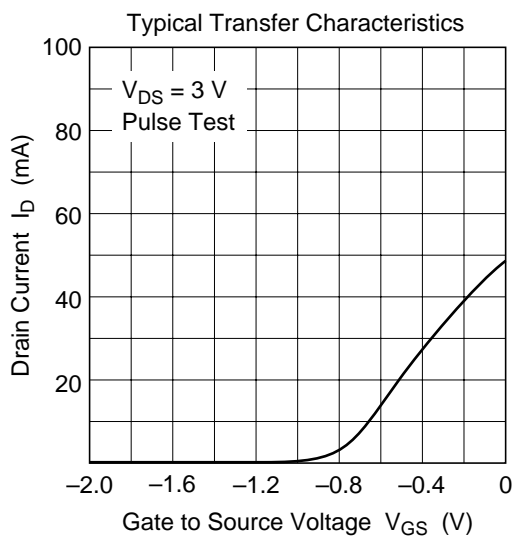
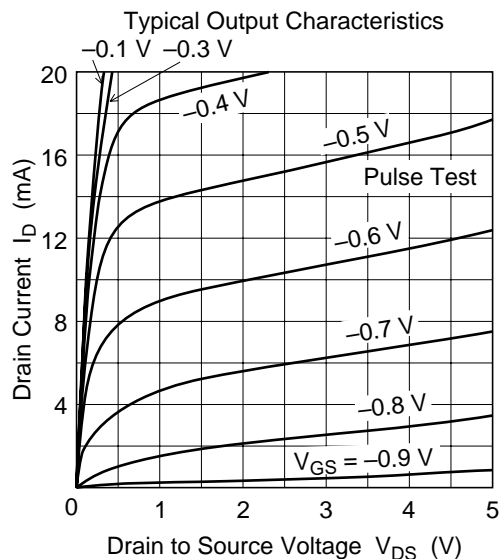
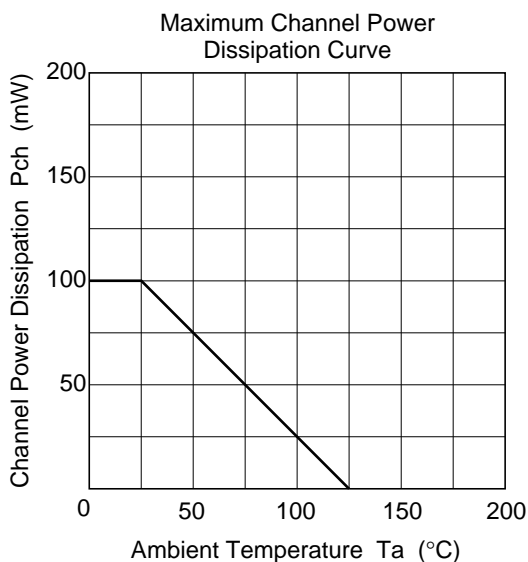
Absolute Maximum Ratings (Ta = 25°C)

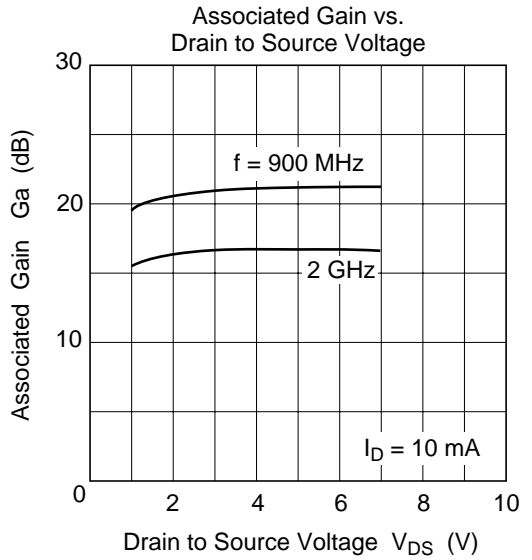
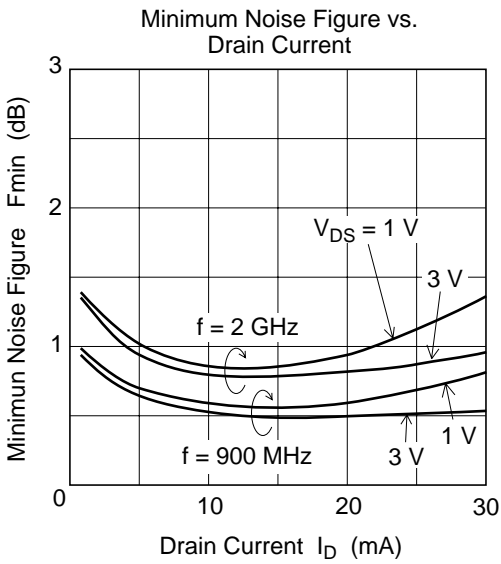
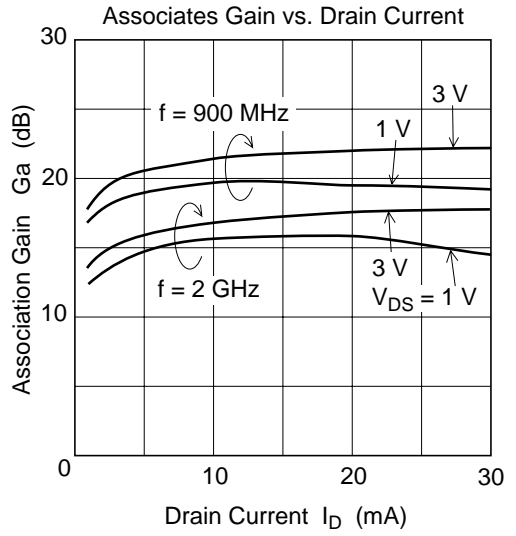
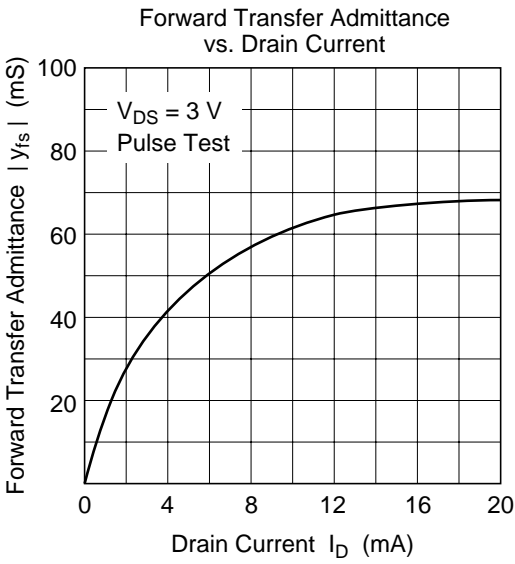
Item	Symbol	Ratings	Unit
Drain to source voltage	V_{DSS}	6	V
Gate to source voltage	V_{GSO}	-6	V
Gate to drain voltage	V_{GDO}	-7	V
Drain current	I_D	20	mA
Channel Power dissipation	Pch	100	mW
Channel temperature	Tch	125	°C
Storage temperature	Tstg	-55 to +125	°C

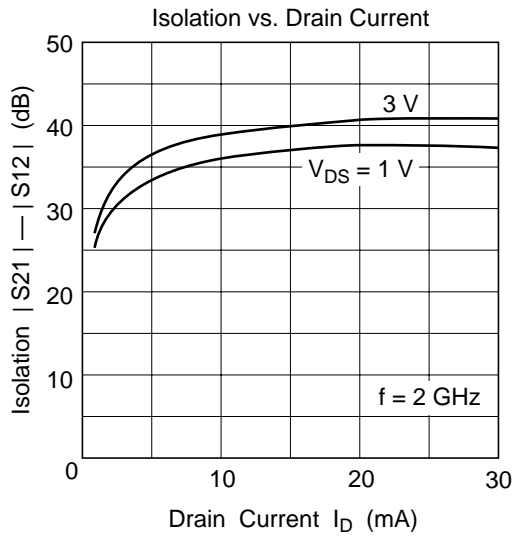
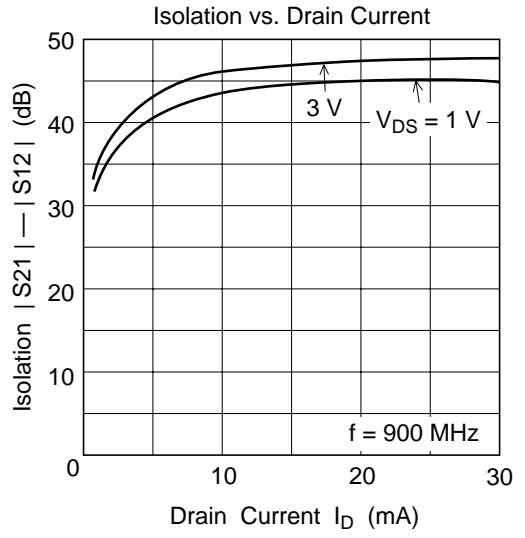
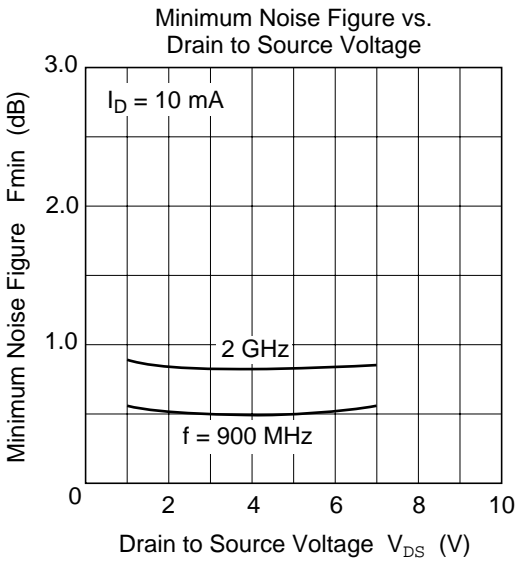
Electrical Characteristics (Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Gate to source leak current	I_{GSS}	—	—	-20	μ A	$V_{GS} = -6V, V_{DS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	-0.3	—	-2.0	V	$V_{DS} = 3V, I_D = 100\mu A$
Drain to source leak current	I_{DSS}	35	50	70	mA	$V_{DS} = 3V, V_{GS} = 0, \text{Pulse Test}$
Forward transfer admittance	$ y_{fs} $	40	60	—	mS	$V_{DS} = 3V, I_D = 10mA, f = 1kHz$
Associated gain	Ga	—	17.0	—	dB	$V_{DS} = 3V, I_D = 10mA, f = 2GHz$
Associated gain	Ga	—	15.2	—	dB	$V_{DS} = 3V, I_D = 3mA, f = 2GHz$
Associated gain	Ga	16	21.4	—	dB	$V_{DS} = 3V, I_D = 10mA, f = 900MHz$
Associated gain	Ga	—	19.7	—	dB	$V_{DS} = 3V, I_D = 3mA, f = 900MHz$
Minimum noise figure	Fmin	—	0.83	—	dB	$V_{DS} = 3V, I_D = 10mA, f = 2GHz$
Minimum noise figure	Fmin	—	1.08	—	dB	$V_{DS} = 3V, I_D = 3mA, f = 2GHz$
Minimum noise figure	Fmin	—	0.52	1.0	dB	$V_{DS} = 3V, I_D = 10mA, f = 900MHz$
Minimum noise figure	Fmin	—	0.74	—	dB	$V_{DS} = 3V, I_D = 3mA, f = 900MHz$

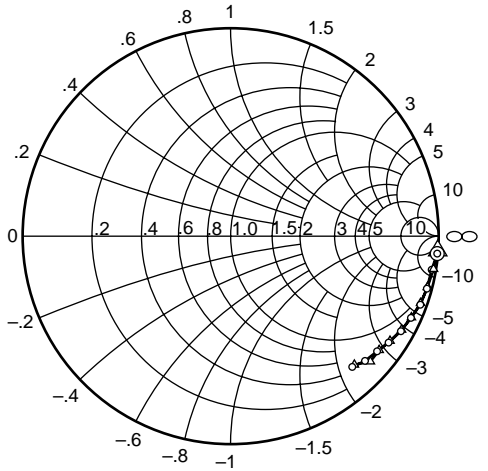
Main Characteristics





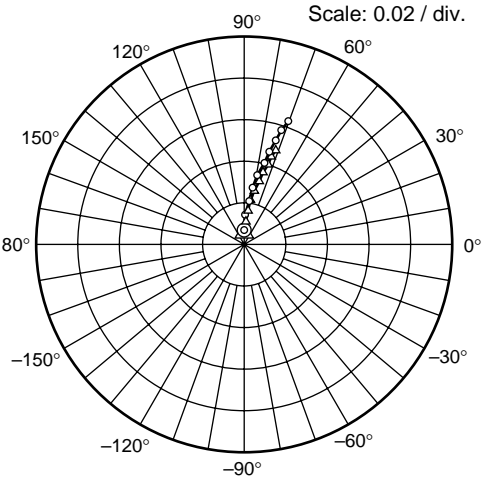


S11 Parameter vs. Frequency



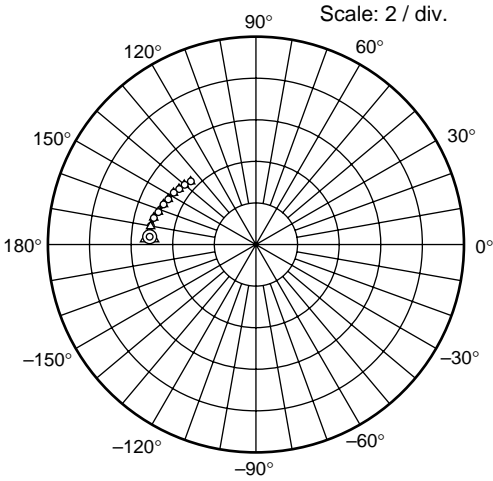
Condition: $I_D = 10 \text{ mA}$, $Z_o = 50 \Omega$
 200 to 2000 MHz (200 MHz step)
 ○ — ○ ($V_{DS} = 1 \text{ V}$)
 △ — △ ($V_{DS} = 3 \text{ V}$)

S12 Parameter vs. Frequency



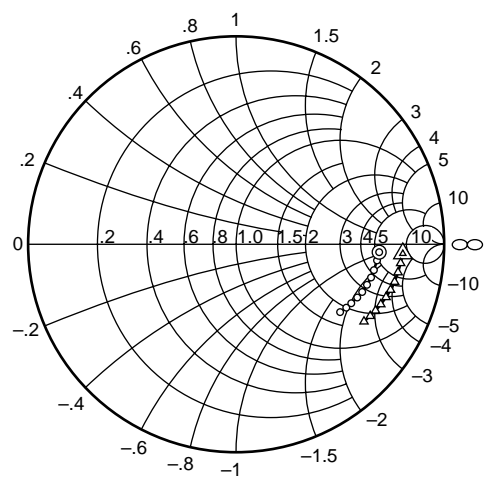
Condition: $I_D = 10 \text{ mA}$, $Z_o = 50 \Omega$
 200 to 2000 MHz (200 MHz step)
 ○ — ○ ($V_{DS} = 1 \text{ V}$)
 △ — △ ($V_{DS} = 3 \text{ V}$)

S21 Parameter vs. Frequency



Condition: $I_D = 10 \text{ mA}$, $Z_o = 50 \Omega$
 200 to 2000 MHz (200 MHz step)
 ○ — ○ ($V_{DS} = 1 \text{ V}$)
 △ — △ ($V_{DS} = 3 \text{ V}$)

S22 Parameter vs. Frequency



Condition: $I_D = 10 \text{ mA}$, $Z_o = 50 \Omega$
 200 to 2000 MHz (200 MHz step)
 ○ — ○ ($V_{DS} = 1 \text{ V}$)
 △ — △ ($V_{DS} = 3 \text{ V}$)

S Parameter ($V_{DS} = 1V$, $I_D = 10mA$, $Z_O = 50\Omega$)

f (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
200	0.996	-4.8	5.12	175.8	0.00691	89.8	0.688	-3.2
400	0.980	-9.5	5.13	169.9	0.0143	88.2	0.682	-6.5
600	0.977	-15.0	5.07	165.4	0.0210	83.3	0.674	-10.6
800	0.970	-19.9	4.94	161.6	0.0276	81.5	0.668	-13.8
1000	0.952	-24.4	4.84	156.5	0.0399	79.3	0.658	-17.2
1200	0.938	-29.2	4.74	152.7	0.0404	76.0	0.648	-20.7
1400	0.916	-34.0	4.67	147.7	0.0462	74.8	0.636	-23.7
1600	0.896	-38.2	4.55	144.1	0.0523	73.1	0.622	-27.1
1800	0.882	-42.9	4.47	140.0	0.0578	72.0	0.611	-29.9
2000	0.859	-47.1	4.36	135.8	0.0630	70.3	0.597	-33.1

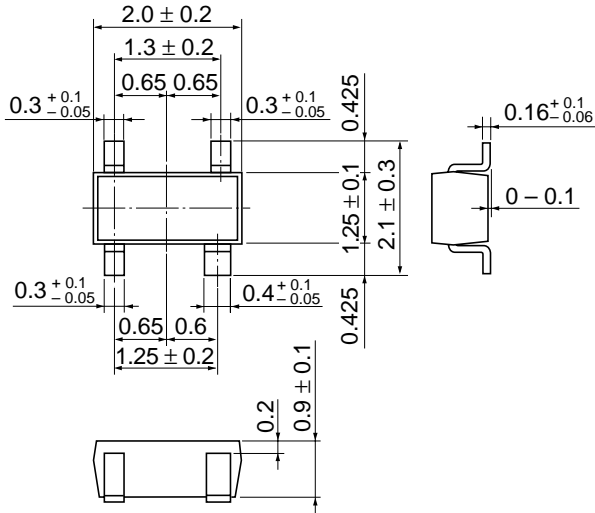
S Parameter ($V_{DS} = 3V$, $I_D = 10mA$, $Z_O = 50\Omega$)

f (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
200	0.998	-4.0	5.13	175.8	0.00581	89.8	0.802	-3.2
400	0.988	-9.2	5.14	170.1	0.0110	85.5	0.796	-6.5
600	0.978	-14.5	5.08	165.2	0.0163	83.3	0.790	-9.8
800	0.968	-19.4	4.95	161.4	0.0216	82.0	0.783	-13.3
1000	0.953	-24.2	4.85	156.4	0.0363	79.2	0.774	-16.4
1200	0.937	-28.7	4.75	152.5	0.0312	76.5	0.764	-19.4
1400	0.917	-33.3	4.68	147.8	0.0358	75.3	0.753	-22.5
1600	0.900	-37.5	4.57	144.0	0.0401	73.2	0.742	-25.4
1800	0.883	-41.9	4.49	140.1	0.0442	72.8	0.731	-28.1
2000	0.858	-46.1	4.37	135.9	0.0477	71.4	0.718	-31.1

Package Dimensions

As of January, 2001

Unit: mm



Hitachi Code	CMPAK-4(T)
JEDEC	—
EIAJ	Conforms
Mass (reference value)	0.006 g

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