3SK296

Silicon N-Channel Dual Gate MOS FET

REJ03G0815-0300
(Previous ADE-208-388A)
Rev.3.00
Aug.10.2005

Application

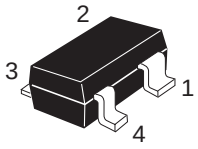
UHF RF amplifier

Features

- Low noise figure.
  NF = 2.0 dB Typ. at f = 900 MHz
- Capable of low voltage operation

Outline

RENESAS Package code: PTSP0004ZA-A
(Package name: CMPAK–4)



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

Note: Marking is “ZQ–”

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)

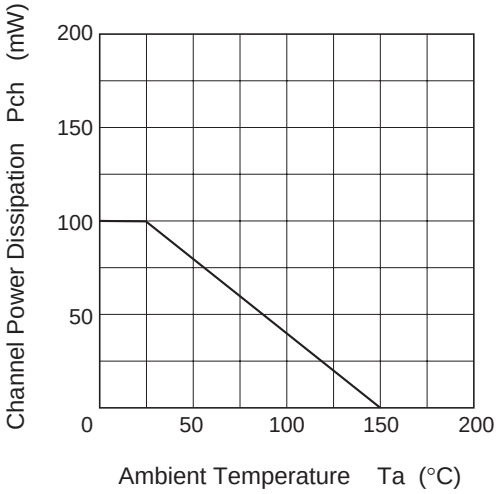
Item	Symbol	Ratings	Unit
Drain to source voltage	V_{DS}	12	V
Gate 1 to source voltage	V_{G1S}	±8	V
Gate 2 to source voltage	V_{G2S}	±8	V
Drain current	I_D	25	mA
Channel power dissipation	Pch	100	mW
Channel temperature	Tch	150	°C
Storage temperature	Tstg	–55 to +150	°C

Electrical Characteristics

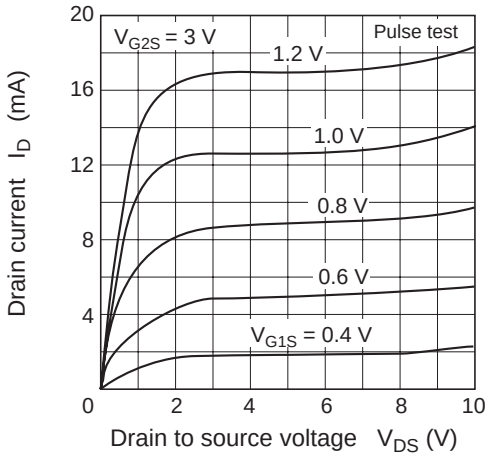
(Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSX}$	12	—	—	V	I_D = 200 µA , V_{G1S} = –3 V, V_{G2S} = –3 V
Gate 1 to source breakdown voltage	$V_{(BR)G1SS}$	±8	—	—	V	I_{G1} = ±10 µA, V_{G2S} = V_{DS} = 0
Gate 2 to source breakdown voltage	$V_{(BR)\ G2SS}$	±8	—	—	V	I_{G2} = ±10 µA, V_{G1S} = V_{DS} = 0
Gate 1 cutoff current	I_{G1SS}	—	—	±100	nA	V_{G1S} = ±6 V, V_{G2S} = V_{DS} = 0
Gate 2 cutoff current	I_{G2SS}	—	—	±100	nA	V_{G2S} = ±6 V, V_{G1S} = V_{DS} = 0
Drain current	$I_{DS(on)}$	0.5	—	10	mA	V_{DS} = 6 V, V_{G1S} = 0.5V, V_{G2S} = 3 V
Gate 1 to source cutoff voltage	$V_{G1S(off)}$	–0.5	—	+0.5	V	V_{DS} = 10 V, V_{G2S} = 3V, I_D = 100 µA
Gate 2 to source cutoff voltage	$V_{G2S(off)}$	0	—	+1.0	V	V_{DS} = 10 V, V_{G1S} = 3V, I_D = 100 µA
Forward transfer admittance	$\|y_{fs}\|$	16	20.8	—	mS	V_{DS} = 6 V, V_{G2S} = 3V, I_D = 10 mA, f = 1 kHz
Input capacitance	Ciss	1.2	1.5	2.2	pF	V_{DS} = 6 V, V_{G2S} = 3V, I_D = 10 mA, f = 1 MHz
Output capacitance	Coss	0.6	0.9	1.2	pF	
Reverse transfer capacitance	Crss	—	0.01	0.03	pF	
Power gain	PG	16	19.5	—	dB	V_{DS} = 4 V, V_{G2S} = 3V, I_D = 10 mA, f = 900 MHz
Noise figure	NF	—	2.0	3	dB	

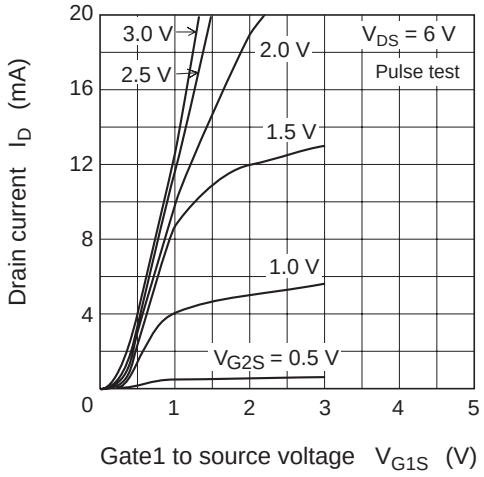
Maximum Channel Power Dissipation Curve



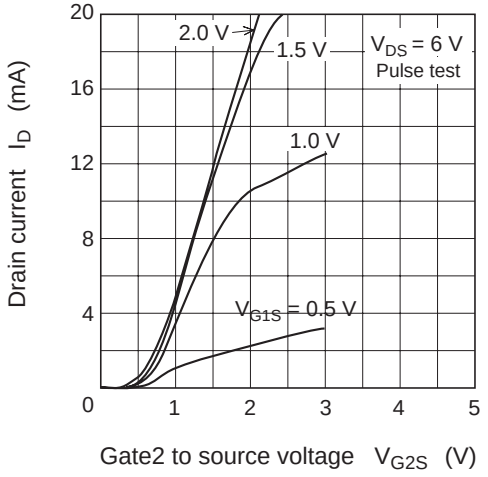
Typical Output Characteristics



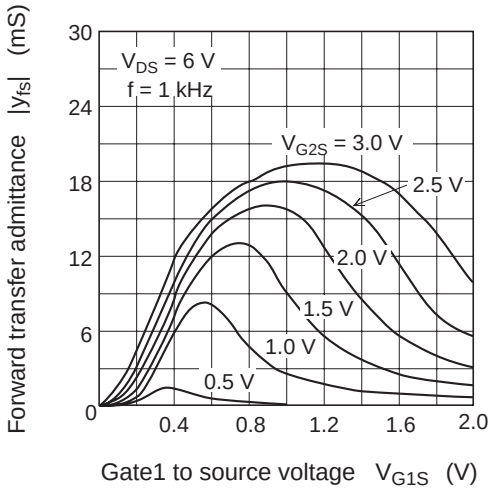
Drain Current vs. Gate1 to Source Voltage



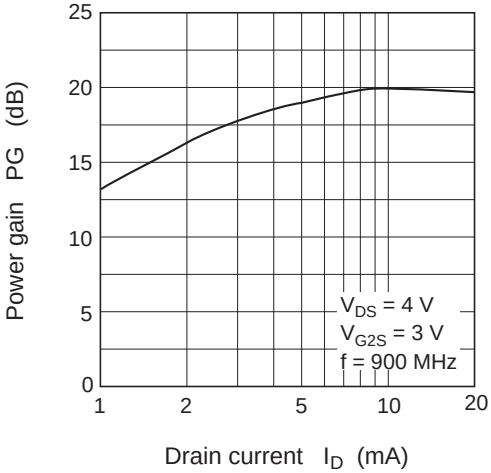
Drain Current vs. Gate2 to Source Voltage



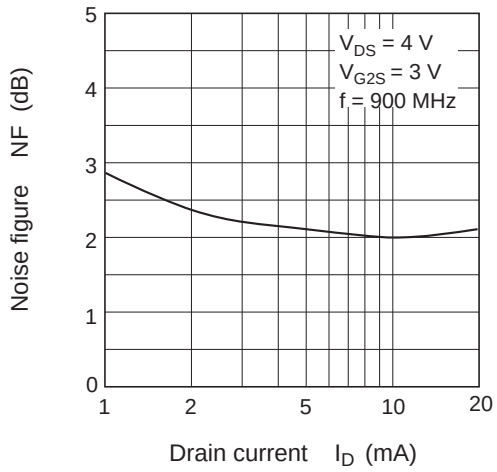
Forward Transfer Admittance vs. Gate1 to Source Voltage



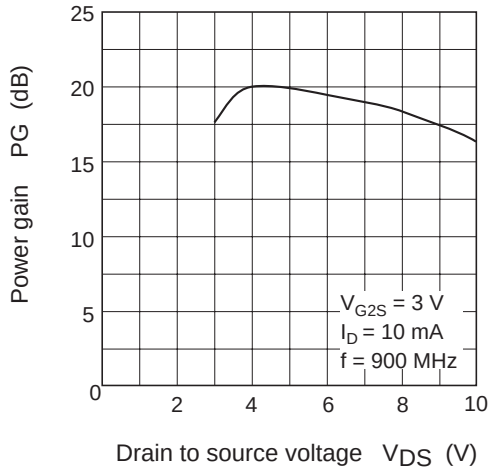
Power Gain vs. Drain Current



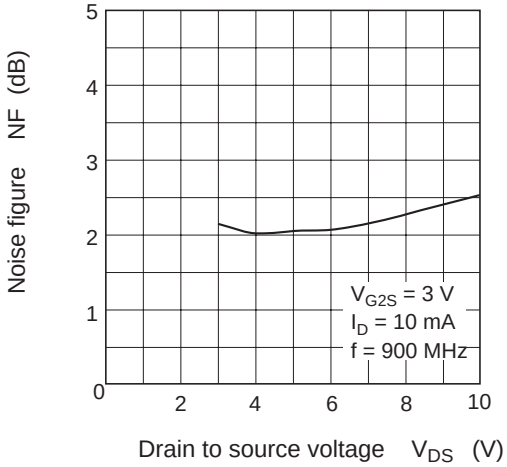
Noise Figure vs. Drain Current



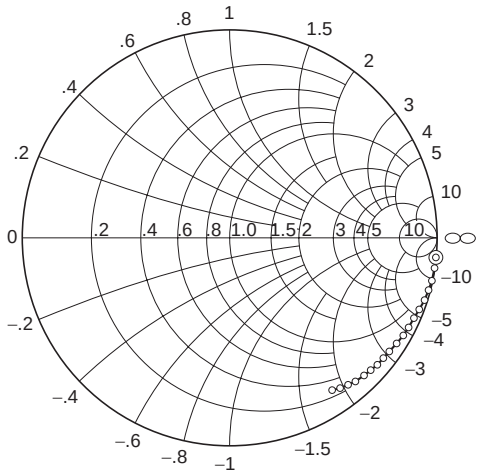
Power Gain vs. Drain to Source Voltage



Noise Figure vs. Drain to Source Voltage

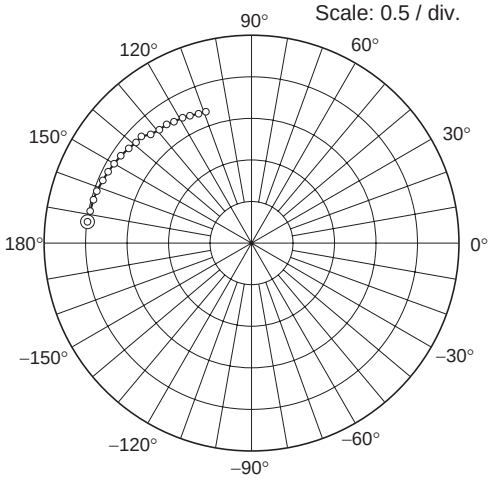


S11 Parameter vs. Frequency



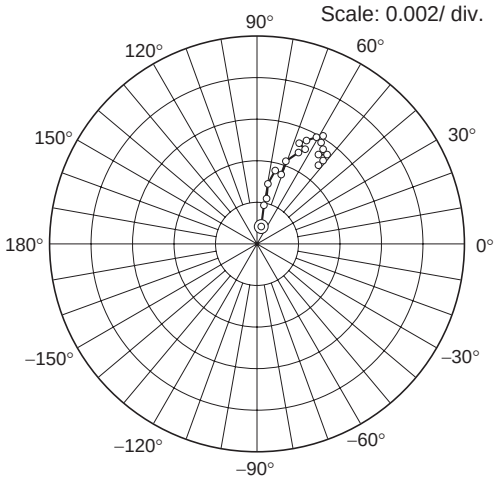
Condition: V_{DS}= 4 V , V_{G2S} = 3 V
I_D = 10 mA , Zo = 50 Ω
100 to 1000 MHz (50 MHz step)

S21 Parameter vs. Frequency



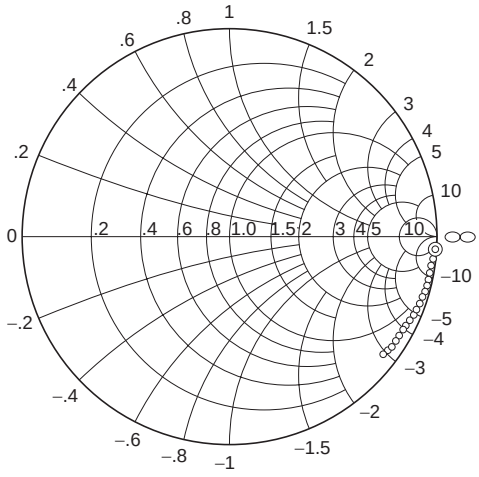
Condition: V_{DS}= 4 V , V_{G2S} = 3 V
I_D = 10 mA , Zo = 50 Ω
100 to 1000 MHz (50 MHz step)

S12 Parameter vs. Frequency



Condition: V_{DS}= 4 V , V_{G2S} = 3 V
I_D = 10 mA , Zo = 50 Ω
100 to 1000 MHz (50 MHz step)

S22 Parameter vs. Frequency



Condition: V_{DS}= 4 V , V_{G2S} = 3 V
I_D = 10 mA , Zo = 50 Ω
100 to 1000 MHz (50 MHz step)

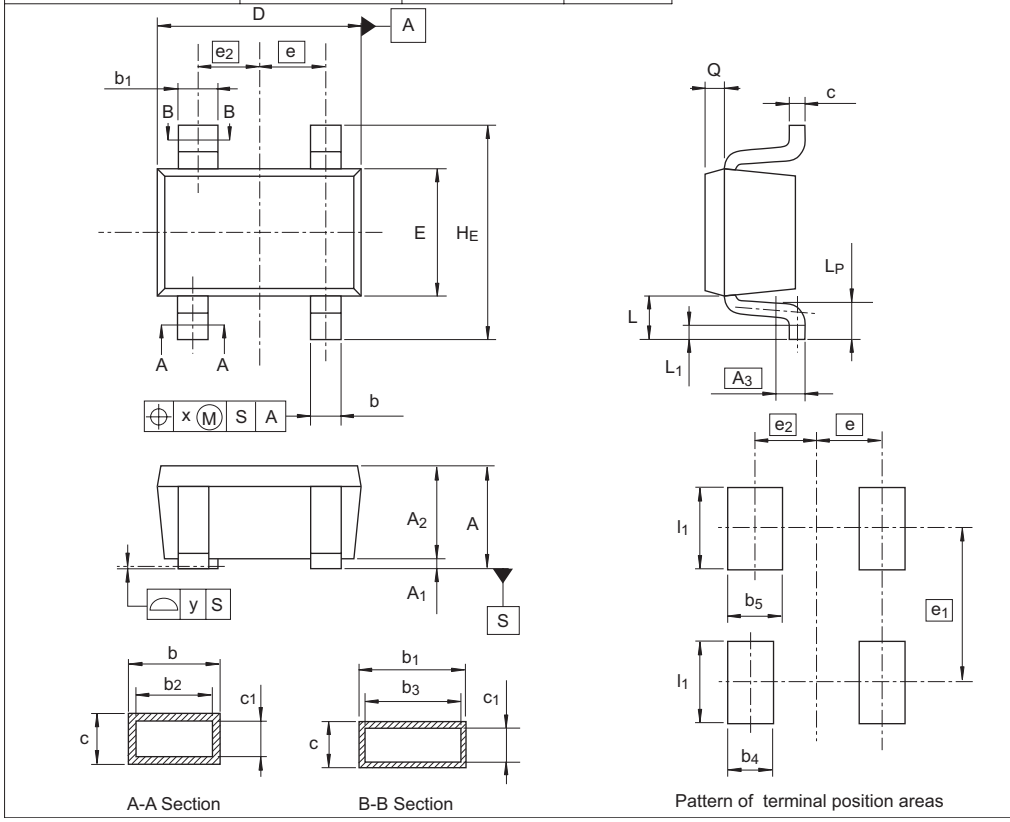
S Parameter

(V_{DS} = 4 V, V_{G2S} = 3 V, I_D = 10 mA, Z_O = 50 Ω)

Freq. (MHz)	S11		S21		S12		S22	
	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
100	0.999	–6.1	1.98	172.2	0.00094	79.2	0.989	–4.2
150	0.998	–9.1	1.97	168.4	0.00189	80.4	0.987	–6.1
200	0.992	–11.9	1.96	165.0	0.00230	79.5	0.986	–7.9
250	0.988	–14.8	1.96	161.0	0.00286	79.9	0.984	–9.8
300	0.985	–17.9	1.94	157.1	0.00364	75.2	0.981	–11.5
350	0.976	–20.6	1.92	153.7	0.00353	71.8	0.978	–13.4
400	0.971	–23.2	1.91	149.9	0.00419	70.7	0.975	–15.2
450	0.964	–26.3	1.88	146.8	0.00495	65.5	0.972	–17.2
500	0.961	–29.1	1.87	142.8	0.00509	62.7	0.968	–19.1
550	0.951	–32.2	1.86	139.4	0.00530	66.6	0.963	–20.8
600	0.949	–35.0	1.86	136.1	0.00550	63.8	0.960	–22.8
650	0.935	–37.6	1.81	132.9	0.00601	58.2	0.956	–24.5
700	0.933	–40.5	1.78	129.4	0.00582	60.6	0.950	–26.3
750	0.923	–42.9	1.77	125.7	0.00572	58.5	0.945	–28.0
800	0.916	–45.8	1.75	122.6	0.00553	56.3	0.941	–29.9
850	0.908	–49.0	1.72	119.1	0.00514	56.3	0.936	–31.7
900	0.900	–51.2	1.70	115.8	0.00543	52.9	0.930	–33.4
950	0.890	–54.0	1.67	112.6	0.00506	52.4	0.924	–35.2
1000	0.876	–56.4	1.65	109.3	0.00469	51.9	0.919	–37.0

Package Dimensions

JEITA Package Code	RENESAS Code	Package Name	MASS[Typ.]
SC-82A	PTSP0004ZA-A	CMPAK-4(T) / CMPAK-4(T)V	0.006g



Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
A	0.8	—	1.1
A_1	0	—	0.1
A_2	0.8	0.9	1.0
A_3	—	0.25	—
b	0.25	0.32	0.4
b_1	0.35	0.42	0.5
b_2	—	0.3	—
b_3	—	0.4	—
c	0.1	0.13	0.15
c_1	—	0.11	—
D	1.8	2.0	2.2
E	1.15	1.25	1.35
e	—	0.65	—
e_2	—	0.6	—
H_E	1.8	2.1	2.4
L	0.3	—	0.7
L_1	0.1	—	0.5
L_P	0.2	—	0.6
x	—	—	0.05
y	—	—	0.05
b_4	—	—	0.45
b_5	—	—	0.55
e_1	—	1.5	—
l_1	—	—	0.9
Q	—	0.2	—

Ordering Information

Part Name	Quantity	Shipping Container
3SK296ZQ-TL-E	3000	ϕ 178 mm Reel, 8 mm Emboss Taping

Note: For some grades, production may be terminated. Please contact the Renesas sales office to check the state of production before ordering the product.

Renesas Technology Corp. Sales Strategic Planning Div. Nippon Bldg., 2-6-2, Ohte-machi, Chiyoda-ku, Tokyo 100-0004, Japan

RENESAS SALES OFFICES

http://www.renesas.com

Refer to "**http://www.renesas.com/en/network**" for the latest and detailed information.

Renesas Technology America, Inc.
450 Holger Way, San Jose, CA 95134-1368, U.S.A
Tel: <1> (408) 382-7500, Fax: <1> (408) 382-7501

Renesas Technology Europe Limited
Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K.
Tel: <44> (1628) 585-100, Fax: <44> (1628) 585-900

Renesas Technology Hong Kong Ltd.
7th Floor, North Tower, World Finance Centre, Harbour City, 1 Canton Road, Tsimshatsui, Kowloon, Hong Kong
Tel: <852> 2265-6688, Fax: <852> 2730-6071

Renesas Technology Taiwan Co., Ltd.
10th Floor, No.99, Fushing North Road, Taipei, Taiwan
Tel: <886> (2) 2715-2888, Fax: <886> (2) 2713-2999

Renesas Technology (Shanghai) Co., Ltd.
Unit2607 Ruijing Building, No.205 Maoming Road (S), Shanghai 200020, China
Tel: <86> (21) 6472-1001, Fax: <86> (21) 6415-2952

Renesas Technology Singapore Pte. Ltd.
1 Harbour Front Avenue, #06-10, Keppel Bay Tower, Singapore 098632
Tel: <65> 6213-0200, Fax: <65> 6278-8001

Renesas Technology Korea Co., Ltd.
Kukje Center Bldg. 18th Fl., 191, 2-ka, Hangang-ro, Yongsan-ku, Seoul 140-702, Korea
Tel: <82> 2-796-3115, Fax: <82> 2-796-2145

Renesas Technology Malaysia Sdn. Bhd.
Unit 906, Block B, Menara Amcorp, Amcorp Trade Centre, No.18, Jalan Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia
Tel: <603> 7955-9390, Fax: <603> 7955-9510

Colophon .3.0