To our customers,

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

April 1st, 2010
Renesas Electronics Corporation



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# 3SK295

## Silicon N-Channel Dual Gate MOS FET

REJ03G0814-0300
(Previous ADE-208-387A)
Rev.3.00
Aug. 10, 2005

### Application

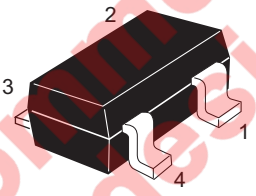
- UHF RF amplifier

### Features

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

### Outline

RENESAS Package code: PLSP0004ZA-A
(Package name: MPAK-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 | 150 | mW |
| Channel temperature | Tch | 150 | °C |
| Storage temperature | Tstg | –55 to +150 | °C |

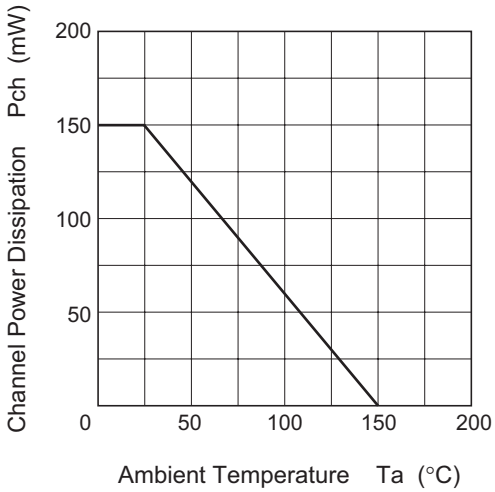
## Electrical Characteristics

(Ta = 25°C)

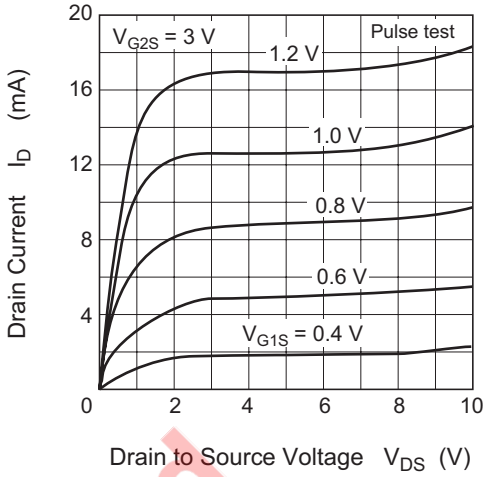
| Item | Symbol | Min | Typ | Max | Unit | Test conditions |
|---|---|---|---|---|---|---|
| Drain to source breakdown voltage | $V_{(BR)DSX}$ | 12 | — | — | V | $I_D$ = 200 µA , $V_{G1S}$ = –3 V, $V_{G2S}$ = –3 V |
| Gate 1 to source breakdown voltage | $V_{(BR)G1SS}$ | ±8 | — | — | V | $I_{G1}$ = ±10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

## Main Characteristics

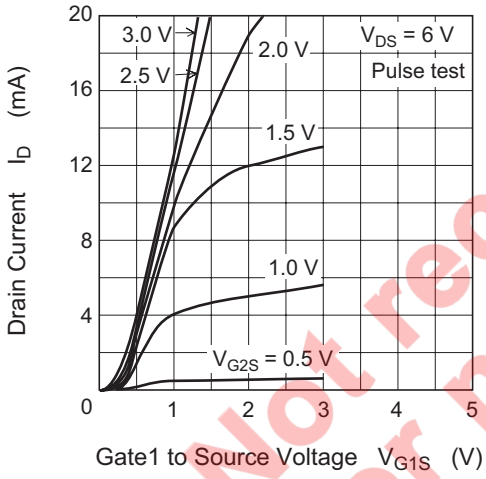
Maximum Channel Power Dissipation Curve



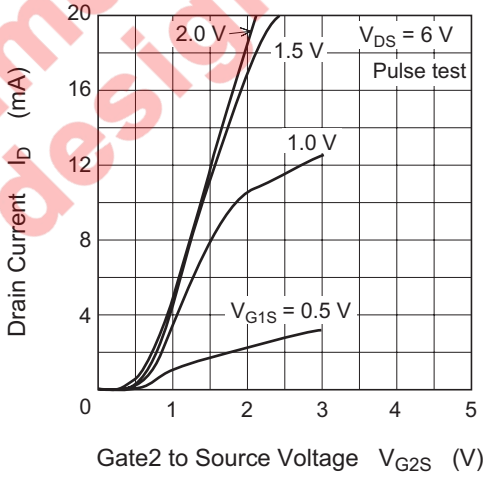

Typical Output Characteristics



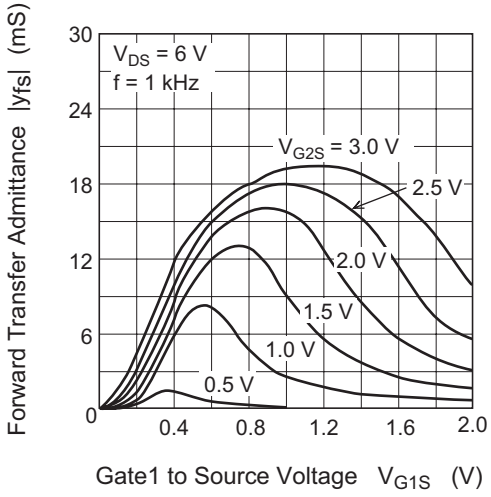

Drain Current vs. Gate1 to Source Voltage



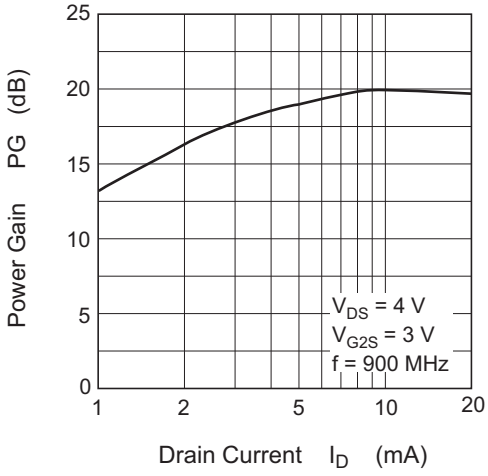

Drain Current vs. Gate2 to Source Voltage



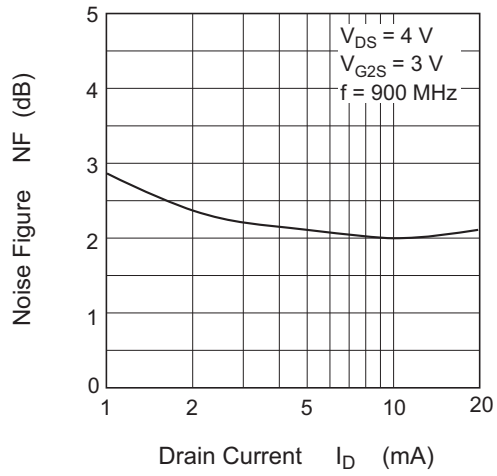

Forward Transfer Admittance vs. Gate1 to Source Voltage



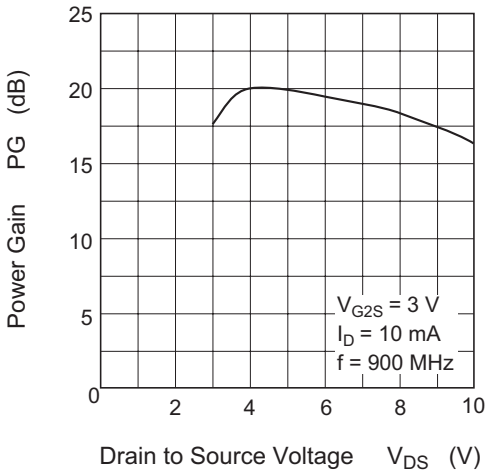

Power Gain vs. Drain Current



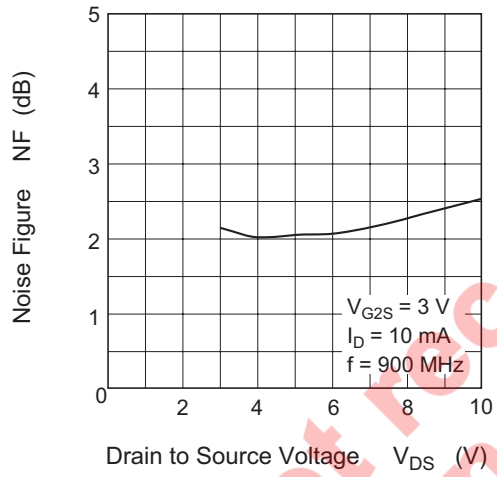
Noise Figure vs. Drain Current



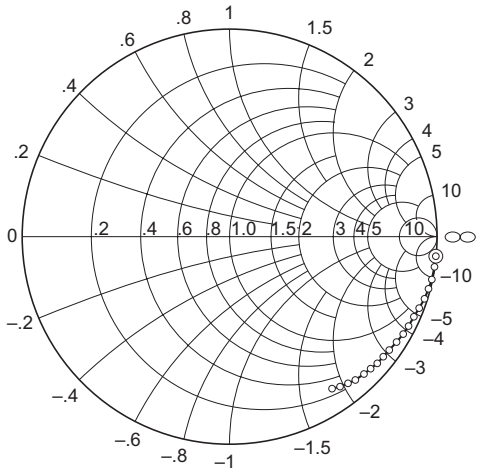

Power Gain vs. Drain to Source Voltage




Noise Figure vs. Drain to Source Voltage

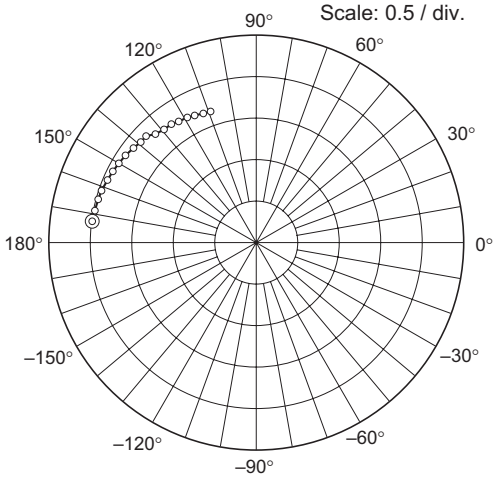


S11 Parameter vs. Frequency



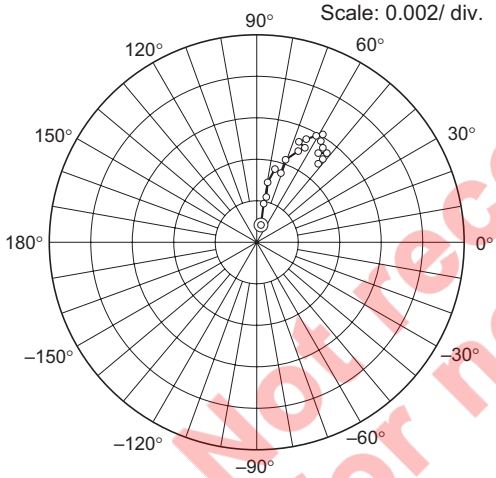

Condition: $V_{DS}$ = 4 V, $V_{G2S}$ = 3 V
$I_D$ = 10 mA, Zo = 50 Ω
100 to 1000 MHz (50 MHz step)

S21 Parameter vs. Frequency



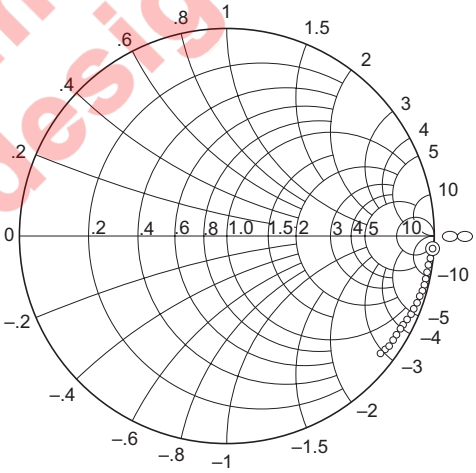

Condition: $V_{DS}$ = 4 V, $V_{G2S}$ = 3 V
$I_D$ = 10 mA, Zo = 50 Ω
100 to 1000 MHz (50 MHz step)

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)

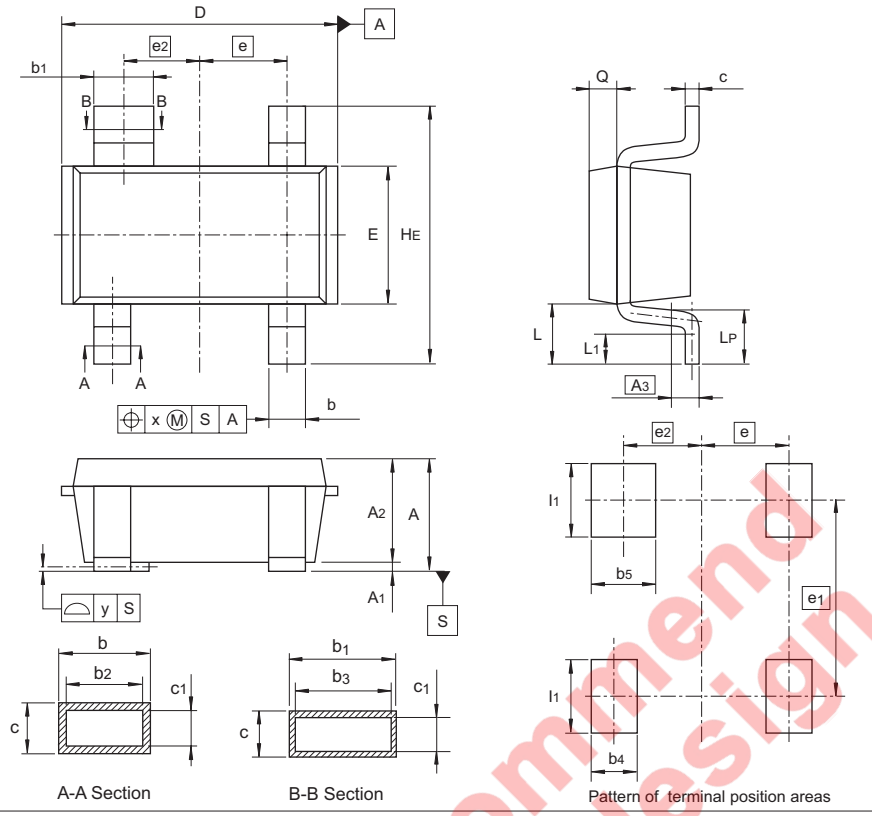
S22 Parameter vs. Frequency




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

## Package Dimensions

| JEITA Package Code | RENESAS Code | Package Name | MASS[Typ.] |
|---|---|---|---|
| SC-61AA | PLSP0004ZA-A | MPAK-4 / MPAK-4V | 0.013g |




| Reference Symbol | Dimension in Millimeters | | |
|---|---|---|---|
| | Min | Nom | Max |
| A | 1.0 | – | 1.3 |
| $A_1$ | 0 | – | 0.1 |
| $A_2$ | 1.0 | 1.1 | 1.2 |
| $A_3$ | – | 0.25 | – |
| b | 0.35 | 0.42 | 0.5 |
| $b_1$ | 0.55 | 0.62 | 0.7 |
| $b_2$ | – | 0.4 | – |
| $b_3$ | – | 0.6 | – |
| c | 0.1 | 0.13 | 0.15 |
| $c_1$ | – | 0.11 | – |
| D | 2.7 | – | 3.1 |
| E | 1.35 | 1.5 | 1.65 |
| e | – | 0.95 | – |
| $e_2$ | – | 0.85 | – |
| $H_E$ | 2.2 | 2.8 | 3.0 |
| L | 0.35 | – | 0.75 |
| $L_1$ | 0.15 | – | 0.55 |
| $L_P$ | 0.25 | – | 0.65 |
| x | – | – | 0.05 |
| y | – | – | 0.05 |
| $b_4$ | – | – | 0.55 |
| $b_5$ | – | – | 0.75 |
| $e_1$ | – | 1.95 | – |
| $I_1$ | – | – | 1.05 |
| Q | – | 0.3 | – |



## Ordering Information

| Part Name | Quantity | Shipping Container |
|---|---|---|
| 3SK295ZQ-TL-E | 3000 | ϕ178 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.

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