To our customers,

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

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (http://www.renesas.com)

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# 2SK2220, 2SK2221

## Silicon N Channel MOS FET

REJ03G1004-0200
(Previous: ADE-208-1352)
Rev.2.00
Sep 07, 2005

### Application

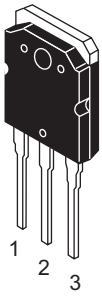
Low frequency power amplifier
Complementary pair with 2SJ351, 2SJ352

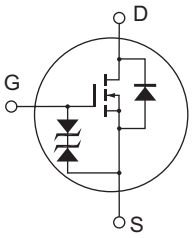
### Features

- High power gain
- Excellent frequency response
- High speed switching
- Wide area of safe operation
- Enhancement-mode
- Good complementary characteristics
- Equipped with gate protection diodes

### Outline

RENESAS Package code: PRSS0004ZE-A
(Package name: TO-3P)




1. Gate
2. Source
   (Flange)
3. Drain

## Absolute Maximum Ratings

(Ta = 25°C)

| Item | | Symbol | Ratings | Unit |
|---|---|---|---|---|
| Drain to source voltage | 2SK2220 | $V_{DSX}$ | 180 | V |
| | 2SK2221 | | 200 | |
| Gate to source voltage | | $V_{GSS}$ | ±20 | V |
| Drain current | | $I_D$ | 8 | A |
| Body to drain diode reverse drain current | | $I_{DR}$ | 8 | A |
| Channel dissipation | | Pch*[1] | 100 | W |
| Channel temperature | | Tch | 150 | °C |
| Storage temperature | | Tstg | –55 to +150 | °C |

Note: 1. Value at Tc = 25°C

## Electrical Characteristics

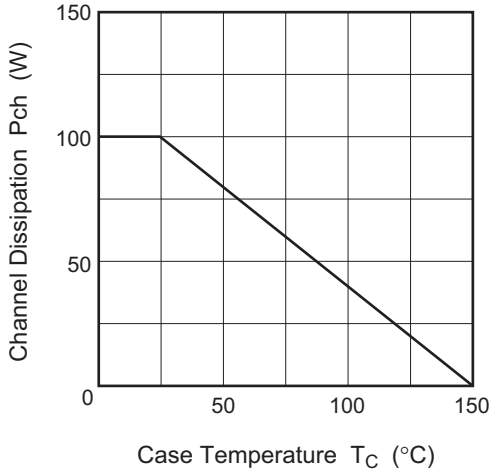
(Ta = 25°C)

| Item | | Symbol | Min | Typ | Max | Unit | Test conditions |
|---|---|---|---|---|---|---|---|
| Drain to source breakdown voltage | 2SK2220 | $V_{(BR)DSX}$ | 180 | — | — | V | $I_D$ = 10 mA, $V_{GS}$ = –10 V |
| | 2SK2221 | | 200 | — | — | | |
| Gate to source breakdown voltage | | $V_{(BR)GSS}$ | ±20 | — | — | V | $I_G$ = ±100 µA, $V_{DS}$ = 0 |
| Gate to source cutoff voltage | | $V_{GS(off)}$ | 0.15 | — | 1.45 | V | $I_D$ = 100 mA, $V_{DS}$ = 10 V |
| Drain to source saturation voltage | | $V_{DS(sat)}$ | — | — | 12 | V | $I_D$ = 8 A, $V_{GD}$ = 0 V*[2] |
| Forward transfer admittance | | $\|y_{fs}\|$ | 0.7 | 1.0 | 1.4 | S | $I_D$ = 3 A, $V_{DS}$ = 10 V*[2] |
| Input capacitance | | Ciss | — | 600 | — | pF | $V_{GS}$ = –5 V, $V_{DS}$ = 10 V, f = 1 MHz |
| Output capacitance | | Coss | — | 800 | — | pF | |
| Reverse transfer capacitance | | Crss | — | 8 | — | pF | |
| Turn-on time | | $t_{on}$ | — | 250 | — | ns | $V_{DD}$ = 30 V, $I_D$ = 4 A |
| Turn-off time | | $t_{off}$ | — | 90 | — | ns | |

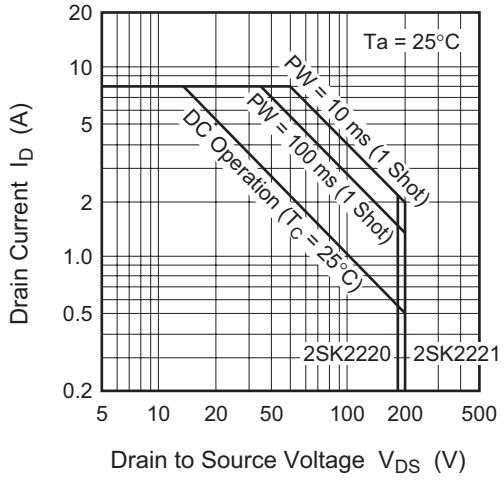
Note: 2. Pulse Test

## Main Characteristics

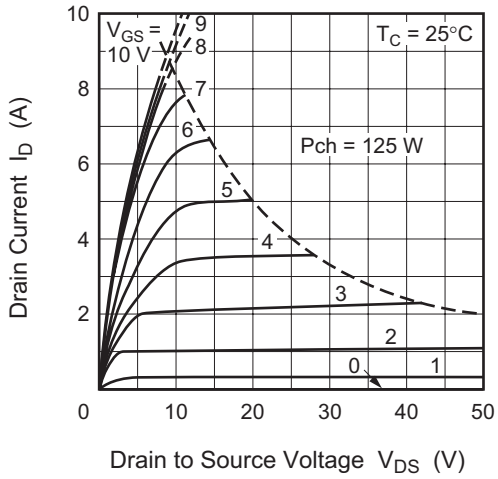
Power vs. Temperature Derating



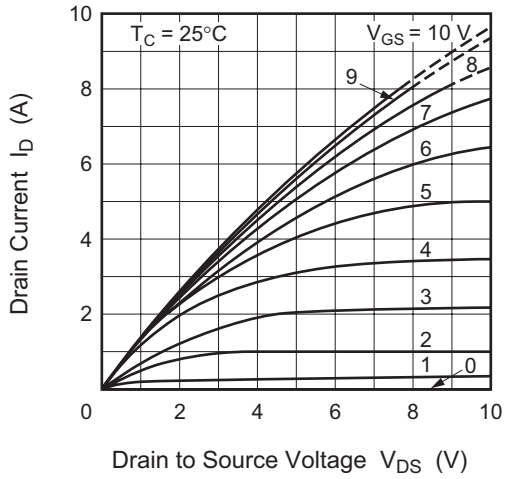

Maximum Safe Operation Area



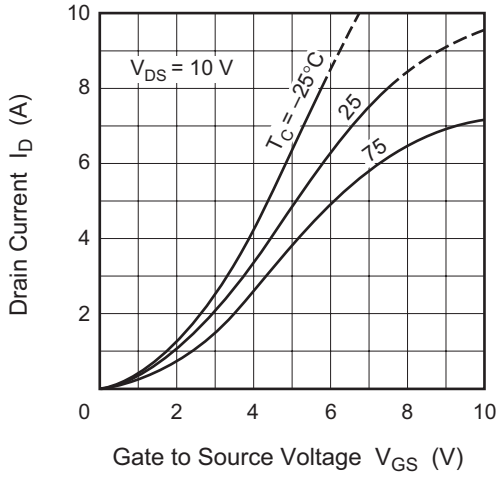

Typical Output Characteristics



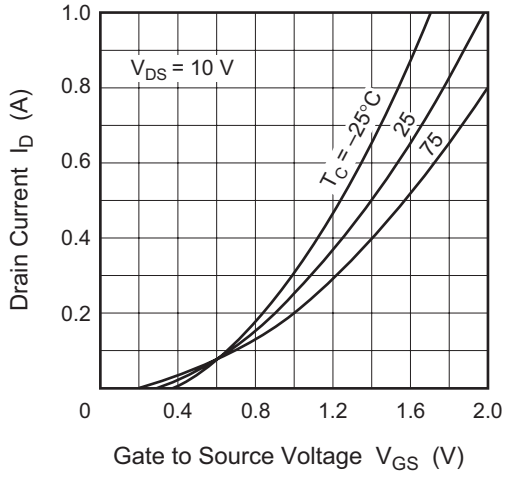

Typical Output Characteristics



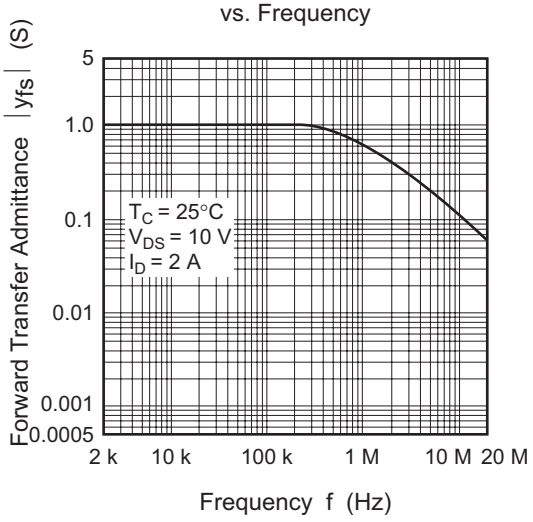

Typical Transfer Characteristics



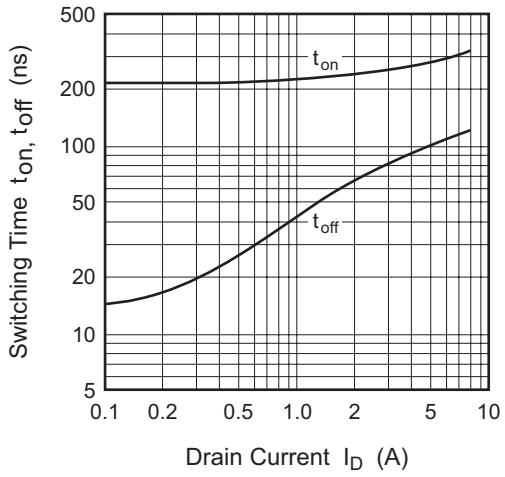

Typical Transfer Characteristics



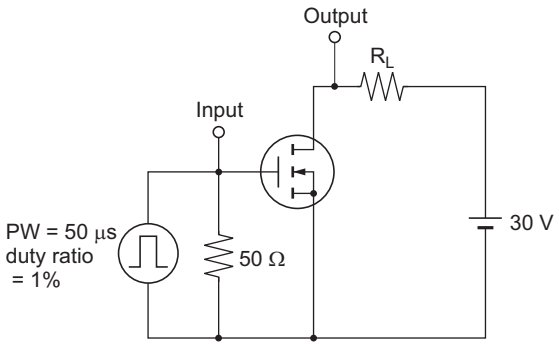
Forward Transfer Admittance vs. Frequency



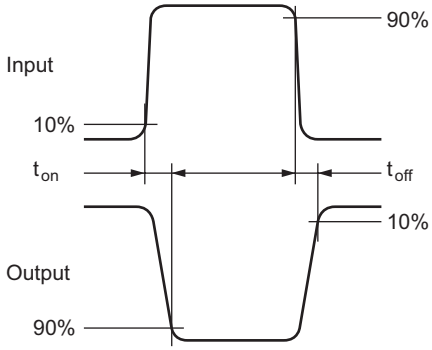

Switching Time vs. Drain Current




Switching Time Test Circuit



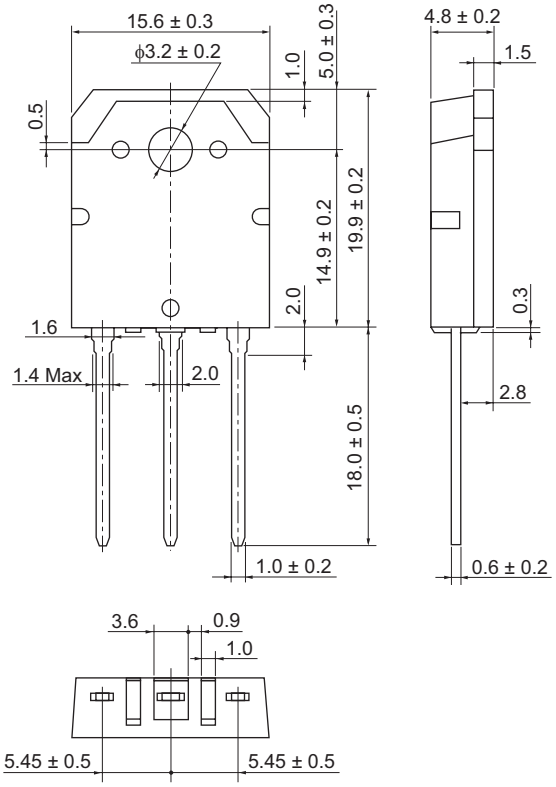

Waveforms



## Package Dimensions

| JEITA Package Code | RENESAS Code | Package Name | MASS[Typ.] |
|---|---|---|---|
| SC-65 | PRSS0004ZE-A | TO-3P / TO-3PV | 5.0g |

Unit: mm




## Ordering Information

| Part Name | Quantity | Shipping Container |
|---|---|---|
| 2SK2220-E | 360 pcs | Box (Tube) |
| 2SK2221-E | 360 pcs | Box (Tube) |

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