

To all our customers

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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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# 2SK1337

Silicon N-Channel MOS FET

**RENESAS**

ADE-208-1274 (Z)  
1st. Edition  
Mar. 2001

## Application

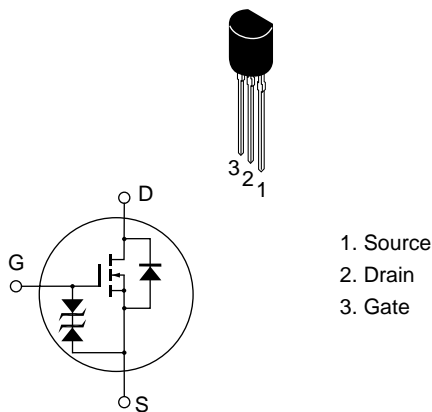
High speed power switching

## Features

- Low on-resistance
- High speed switching
- Low drive current
- 4 V gate drive device
  - Can be driven from 5 V source
- Suitable for motor drive, DC-DC converter, power switch and solenoid drive

## Outline

TO-92



## Absolute Maximum Ratings (Ta = 25°C)

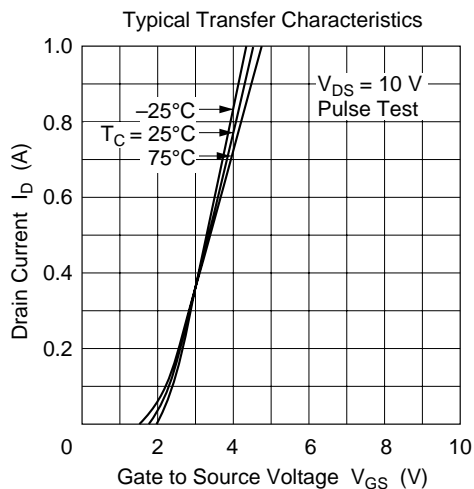
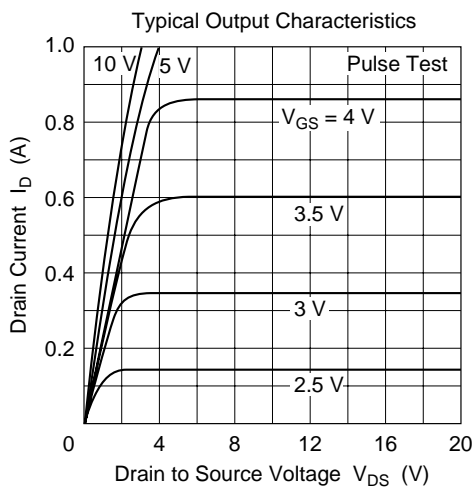
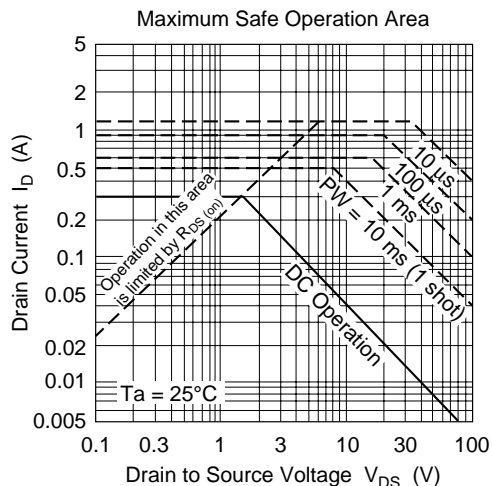
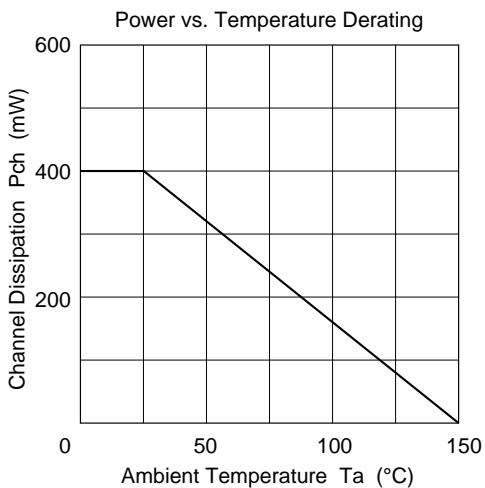
| Item                                      | Symbol              | Ratings     | Unit |
|---|---------------------|-------------|------|
| Drain to source voltage                   | $V_{DSS}$           | 100         | V    |
| Gate to source voltage                    | $V_{GSS}$           | ±20         | V    |
| Drain current                             | $I_D$               | 0.3         | A    |
| Drain peak current                        | $I_{D(pulse)}^{*1}$ | 1.2         | A    |
| Body to drain diode reverse drain current | $I_{DR}$            | 0.3         | A    |
| Channel dissipation                       | Pch                 | 400         | mW   |
| Channel temperature                       | Tch                 | 150         | °C   |
| Storage temperature                       | Tstg                | -55 to +150 | °C   |

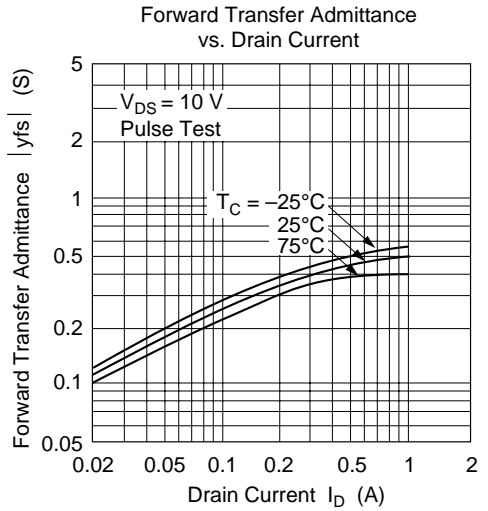
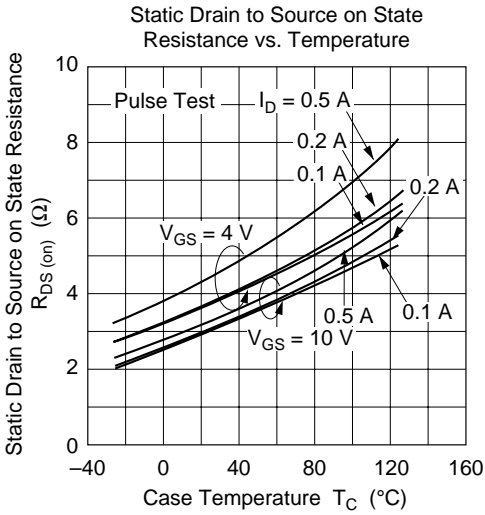
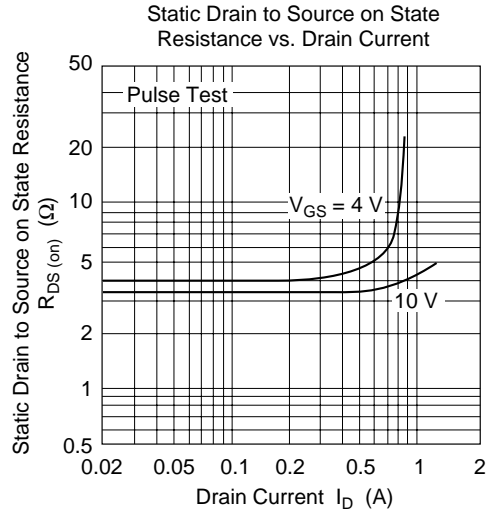
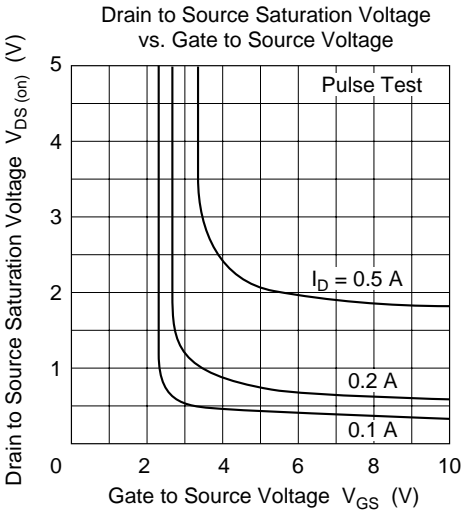
Note: 1. PW ≤ 10 μs, duty cycle ≤ 1%

## Electrical Characteristics (Ta = 25°C)

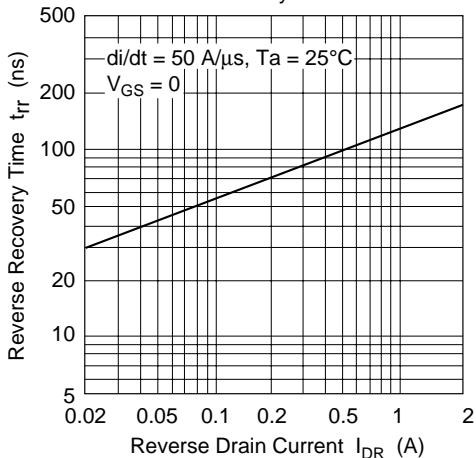
| Item                                       | Symbol        | Min  | Typ  | Max | Unit | Test conditions  |
|--|---------------|------|------|-----|------|--|
| Drain to source breakdown voltage          | $V_{(BR)DSS}$ | 100  | —    | —   | V    | $I_D = 10 \text{ mA}, V_{GS} = 0$  |
| Gate to source breakdown voltage           | $V_{(BR)GSS}$ | ±20  | —    | —   | V    | $I_G = \pm 100 \text{ } \mu\text{A}, V_{DS} = 0$                           |
| Gate to source leak current                | $I_{GSS}$     | —    | —    | ±10 | μA   | $V_{GS} = \pm 16 \text{ V}, V_{DS} = 0$                                    |
| Zero gate voltage drain current            | $I_{DSS}$     | —    | —    | 50  | μA   | $V_{DS} = 80 \text{ V}, V_{GS} = 0$  |
| Gate to source cutoff voltage              | $V_{GS(off)}$ | 1.0  | —    | 2.0 | V    | $I_D = 1 \text{ mA}, V_{DS} = 10 \text{ V}$                                |
| Static drain to source on state resistance | $R_{DS(on)}$  | —    | 3.5  | 4.5 | Ω    | $I_D = 0.2 \text{ A}, V_{GS} = 10 \text{ V}^{*1}$                          |
|  |               | —    | 4.0  | 6.5 | Ω    | $I_D = 0.2 \text{ A}, V_{GS} = 4 \text{ V}^{*1}$                           |
| Forward transfer admittance                | yfs           | 0.22 | 0.35 | —   | S    | $I_D = 0.2 \text{ A}, V_{DS} = 10 \text{ V}^{*1}$                          |
| Input capacitance                          | Ciss          | —    | 35   | —   | pF   | $V_{DS} = 10 \text{ V}, V_{GS} = 0,$                                       |
| Output capacitance                         | Coss          | —    | 14   | —   | pF   | f = 1 MHz  |
| Reverse transfer capacitance               | Crss          | —    | 3.5  | —   | pF   |  |
| Turn-on delay time                         | $t_{d(on)}$   | —    | 2    | —   | ns   | $I_D = 0.2 \text{ A}, V_{GS} = 10 \text{ V},$                              |
| Rise time                                  | $t_r$         | —    | 4    | —   | ns   | $R_L = 150 \text{ } \Omega$  |
| Turn-off delay time                        | $t_{d(off)}$  | —    | 17   | —   | ns   |  |
| Fall time                                  | $t_f$         | —    | 15   | —   | ns   |  |
| Body to drain diode forward voltage        | $V_{DF}$      | —    | 0.9  | —   | V    | $I_F = 0.3 \text{ A}, V_{GS} = 0$  |
| Body to drain diode reverse recovery time  | $t_{rr}$      | —    | 80   | —   | ns   | $I_F = 0.3 \text{ A}, V_{GS} = 0,$<br>$di_F/dt = 50 \text{ A}/\mu\text{s}$ |

Note: 1. Pulse test

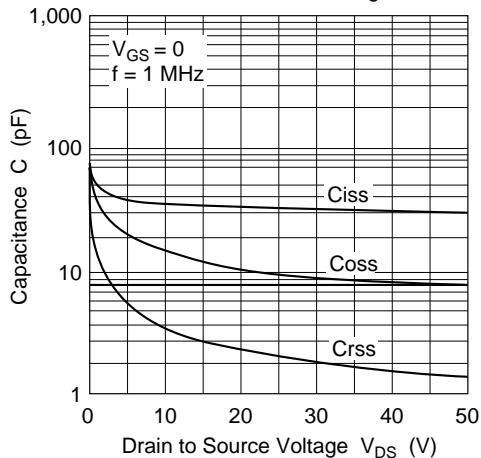




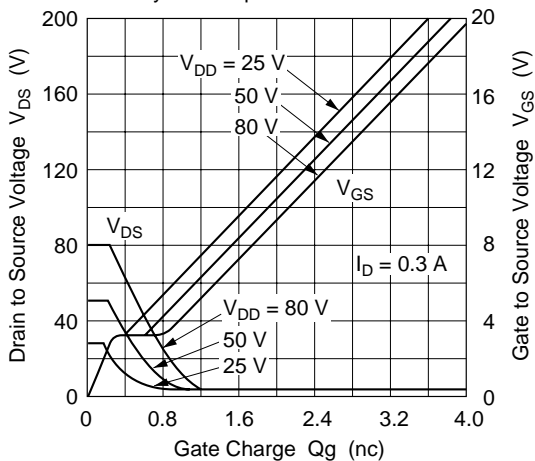
Body to Drain Diode Reverse Recovery Time



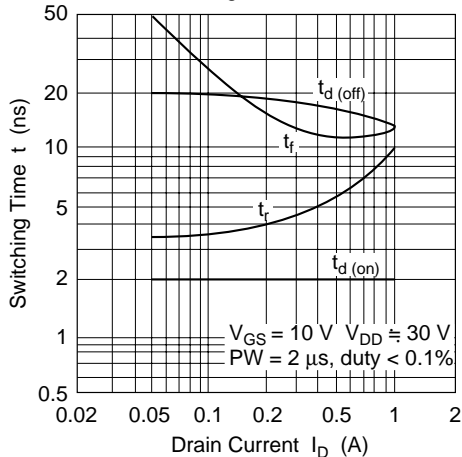
Typical Capacitance vs. Drain to Source Voltage

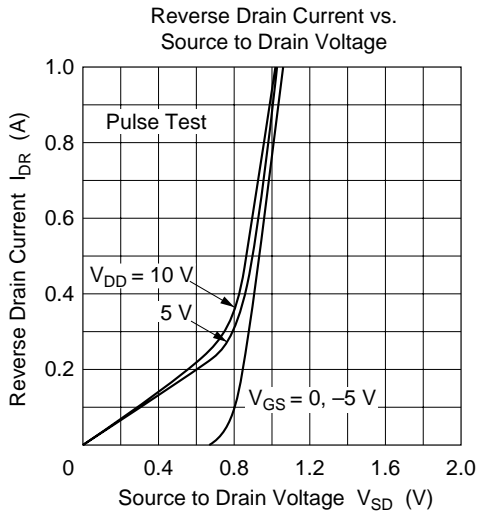


Dynamic Input Characteristics



Switching Characteristics



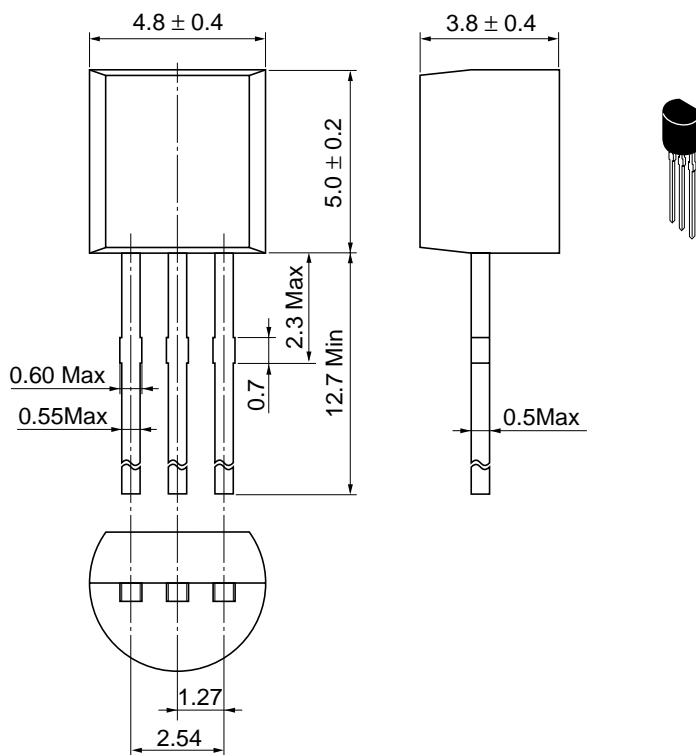




## Package Dimensions

As of January, 2001

Unit: mm



|                        |           |
|------------------------|-----------|
| Hitachi Code           | TO-92 (1) |
| JEDEC                  | Conforms  |
| EIAJ                   | Conforms  |
| Mass (reference value) | 0.25 g    |

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