

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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# 4AK25

## Silicon N-Channel Power MOS FET Array

# RENESAS

ADE-208-1207 (Z)

1st. Edition

Mar. 2001

### Application

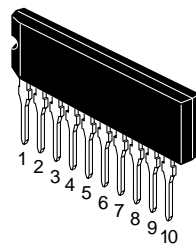
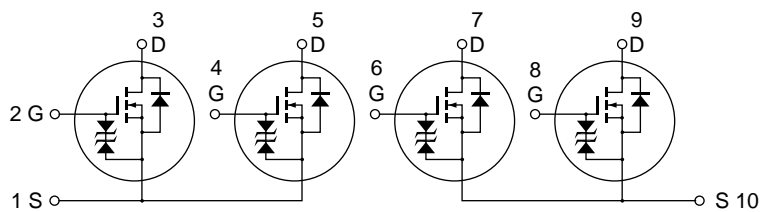
High speed power switching

### Features

- Low on-resistance  
 $R_{DS(on)} = 0.45 \Omega$ ,  $V_{GS} = 10 \text{ V}$ ,  $I_D = 1 \text{ A}$
- Low drive current
- High speed switching
- High density mounting

### Outline

SP-10



1, 10. Source  
2, 4, 6, 8. Gate  
3, 5, 7, 9. Drain

Absolute Maximum Ratings (Ta = 25°C)

| Item                                      | Symbol                              | Ratings     | Unit |
|---|-------------------------------------|-------------|------|
| Drain to source voltage                   | V <sub>DSS</sub>                    | 60          | V    |
| Gate to source voltage                    | V <sub>GSS</sub>                    | ±20         | V    |
| Drain current                             | I <sub>D</sub>                      | 1.5         | A    |
| Drain peak current                        | I <sub>D(pulse)</sub> <sup>*1</sup> | 4.5         | A    |
| Body to drain diode reverse drain current | I <sub>DR</sub>                     | 1.5         | A    |
| Channel dissipation                       | Pch (Tc = 25°C) <sup>*2</sup>       | 24          | W    |
| Channel dissipation                       | Pch <sup>*2</sup>                   | 3.6         | W    |
| Channel temperature                       | Tch                                 | 150         | °C   |
| Storage temperature                       | Tstg                                | −55 to +150 | °C   |

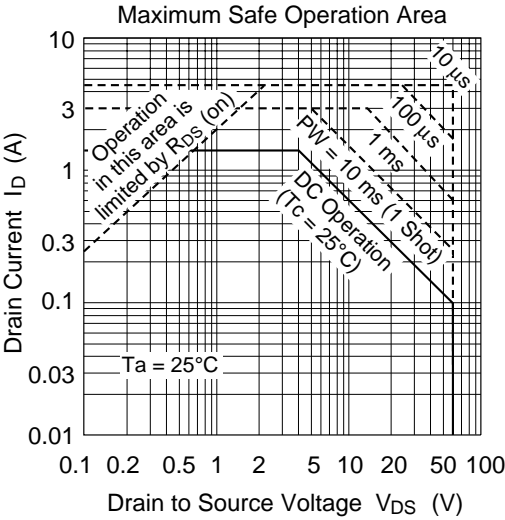
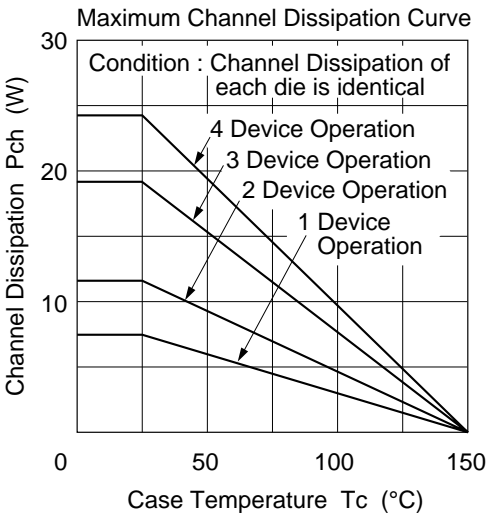
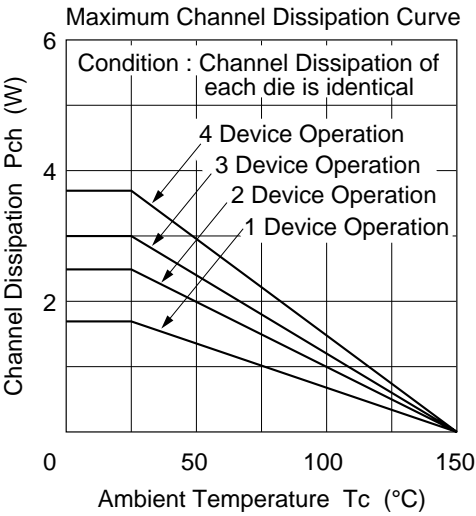
Notes: 1. PW 10 μs, duty cycle 1%  
2. 4 Devices operation

## Electrical Characteristics (Ta = 25°C)

| Item                                       | Symbol        | Min | Typ  | Max  | Unit | Test conditions  |
|--|---------------|-----|------|------|------|--|
| Drain to source breakdown voltage          | $V_{(BR)DSS}$ | 60  | —    | —    | 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            | $I_{DSS}$     | —   | —    | 250  | μA   | $V_{DS} = 50 \text{ V}$ , $V_{GS} = 0$   |
| 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 | $R_{DS(on)}$  | —   | 0.35 | 0.45 |      | $I_D = 1 \text{ A}$<br>$V_{GS} = 10 \text{ V}^{*1}$                            |
|  |               |     | 0.47 | 0.65 |      | $I_D = 1 \text{ A}$<br>$V_{GS} = 4 \text{ V}^{*1}$                             |
| Forward transfer admittance                | $ y_{fs} $    | 0.9 | 1.5  | —    | S    | $I_D = 1 \text{ A}$<br>$V_{DS} = 10 \text{ V}^{*1}$                            |
| Input capacitance                          | $C_{iss}$     | —   | 140  | —    | pF   | $V_{DS} = 10 \text{ V}$  |
| Output capacitance                         | $C_{oss}$     | —   | 70   | —    | pF   | $V_{GS} = 0$   |
| Reverse transfer capacitance               | $C_{rss}$     | —   | 20   | —    | pF   | $f = 1 \text{ MHz}$  |
| Turn-on delay time                         | $t_{d(on)}$   | —   | 3    | —    | ns   | $I_D = 1 \text{ A}$  |
| Rise time                                  | $t_r$         | —   | 12   | —    | ns   | $V_{GS} = 10 \text{ V}$  |
| Turn-off delay time                        | $t_{d(off)}$  | —   | 50   | —    | ns   | $R_L = 30$   |
| Fall time                                  | $t_f$         | —   | 30   | —    | ns   |  |
| Body to drain diode forward voltage        | $V_{DF}$      | —   | 1.1  | —    | V    | $I_F = 1.5 \text{ A}$ , $V_{GS} = 0$   |
| Body to drain diode reverse recovery time  | $t_{rr}$      | —   | 70   | —    | μs   | $I_F = 1.5 \text{ A}$ , $V_{GS} = 0$ ,<br>$dI_F/dt = 50 \text{ A}/\mu\text{s}$ |

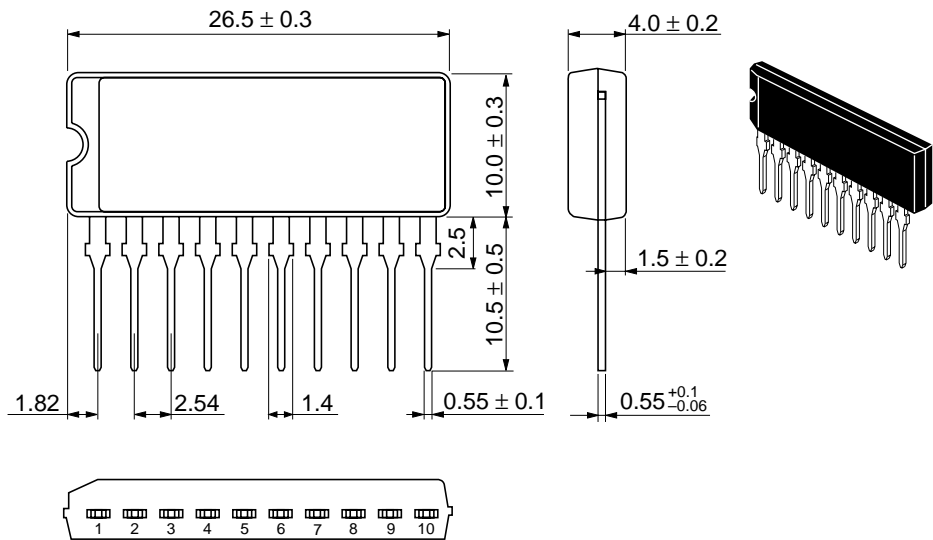
Note: 1. Pulse Test

See characteristic curves of 2SK975



Package Dimensions

As of January, 2001  
Unit: mm



|                        |       |
|------------------------|-------|
| Hitachi Code           | SP-10 |
| JEDEC                  | —     |
| EIAJ                   | —     |
| Mass (reference value) | 2.9 g |

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