

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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# 2SK1862, 2SK1863

Silicon N-Channel MOS FET

**RENESAS**

ADE-208-1329 (Z)  
1st. Edition  
Mar. 2001

## Application

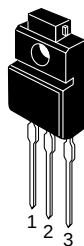
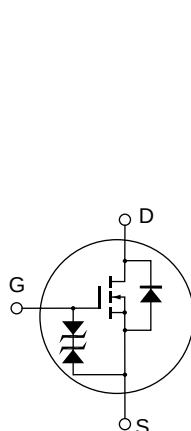
High speed power switching

## Features

- Low on-resistance
- High speed switching
- Low drive current
- No secondary breakdown
- Suitable for Switching regulator

## Outline

TO-220FM



1. Gate
2. Drain
3. Source

2SK1862, 2SK1863

Absolute Maximum Ratings (Ta = 25°C)

| Item                                      |         | Symbol              | Ratings     | Unit |
|-------------------------------------------|---------|---------------------|-------------|------|
| Drain to source voltage                   | 2SK1862 | $V_{DSS}$           | 450         | V    |
|                                           | 2SK1863 | $V_{DSS}$           | 500         |      |
| Gate to source voltage                    |         | $V_{GSS}$           | ±30         | V    |
| Drain current                             |         | $I_D$               | 3           | A    |
| Drain peak current                        |         | $I_{D(pulse)}^{*1}$ | 12          | A    |
| Body to drain diode reverse drain current |         | $I_{DR}$            | 3           | A    |
| Channel dissipation                       |         | $P_{ch}^{*2}$       | 25          | W    |
| Channel temperature                       |         | Tch                 | 150         | °C   |
| Storage temperature                       |         | Tstg                | −55 to +150 | °C   |

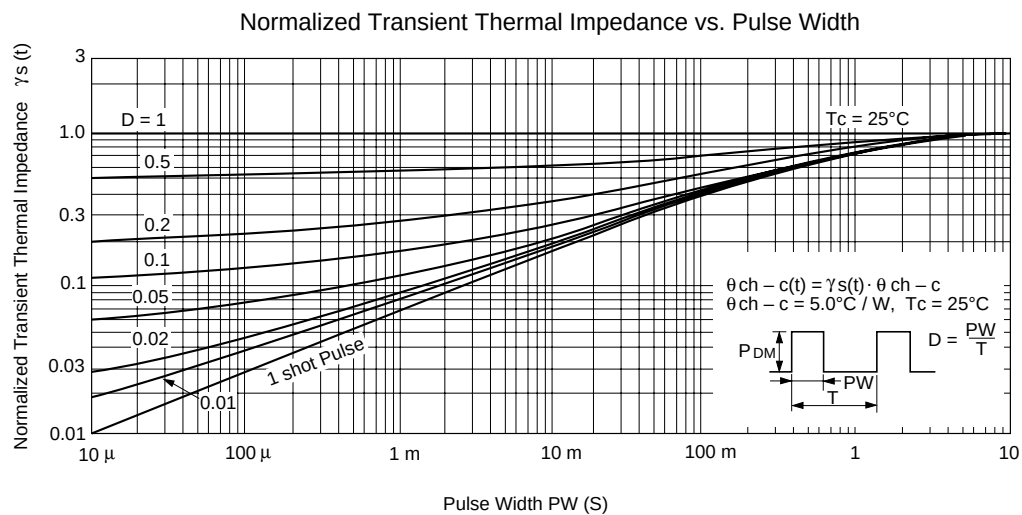
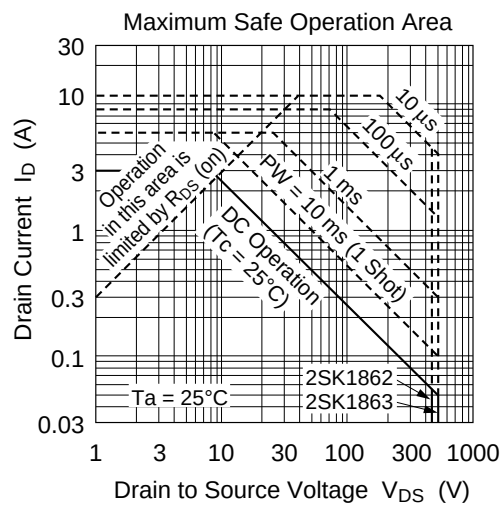
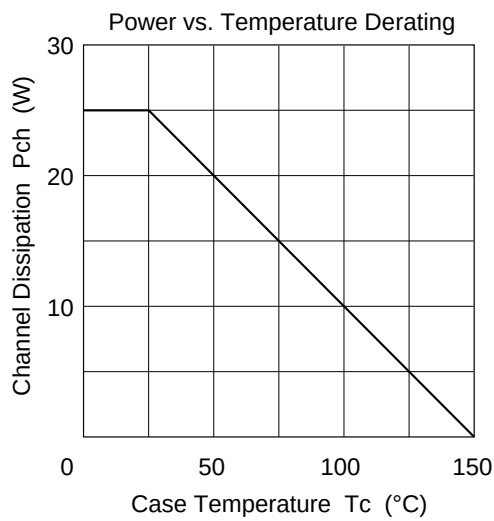
Notes 1.  $PW \leq 10 \mu s$ , duty cycle  $\leq 1 \%$   
2. Value at Tc = 25 °C

**Electrical Characteristics** (Ta = 25°C)

| Item                                       |                    | Symbol        | Min        | Typ        | Max        | Unit          | Test conditions                                                                    |
|--------------------------------------------|--------------------|---------------|------------|------------|------------|---------------|------------------------------------------------------------------------------------|
| Drain to source breakdown voltage          | 2SK1862<br>2SK1863 | $V_{(BR)DSS}$ | 450<br>500 | —          | —          | V             | $I_D = 10 \text{ mA}$ , $V_{GS} = 0$                                               |
| Gate to source breakdown voltage           |                    | $V_{(BR)GSS}$ | $\pm 30$   | —          | —          | V             | $I_G = \pm 100 \text{ }\mu\text{A}$ , $V_{DS} = 0$                                 |
| Gate to source leak current                |                    | $I_{GSS}$     | —          | —          | $\pm 10$   | $\mu\text{A}$ | $V_{GS} = \pm 25 \text{ V}$ , $V_{DS} = 0$                                         |
| Zero gate voltage drain current            | 2SK1862<br>2SK1863 | $I_{DSS}$     | —          | —          | 250        | $\mu\text{A}$ | $V_{DS} = 360 \text{ V}$ , $V_{GS} = 0$<br>$V_{DS} = 400 \text{ V}$ , $V_{GS} = 0$ |
| Gate to source cutoff voltage              |                    | $V_{GS(off)}$ | 2.0        | —          | 3.0        | V             | $I_D = 1 \text{ mA}$ , $V_{DS} = 10 \text{ V}$                                     |
| Static drain to source on state resistance | 2SK1862<br>2SK1863 | $R_{DS(on)}$  | —<br>—     | 2.0<br>2.2 | 2.8<br>3.0 | $\Omega$      | $I_D = 2 \text{ A}$ , $V_{GS} = 10 \text{ V}^{*1}$                                 |
| Forward transfer admittance                |                    | $ y_{fs} $    | 1.5        | 2.5        | —          | S             | $I_D = 2 \text{ A}$<br>$V_{DS} = 10 \text{ V}^{*1}$                                |
| Input capacitance                          |                    | $C_{iss}$     | —          | 330        | —          | pF            | $V_{DS} = 10 \text{ V}$                                                            |
| Output capacitance                         |                    | $C_{oss}$     | —          | 90         | —          | pF            | $V_{GS} = 0$                                                                       |
| Reverse transfer capacitance               |                    | $C_{rss}$     | —          | 15         | —          | pF            | $f = 1 \text{ MHz}$                                                                |
| Turn-on delay time                         |                    | $t_{d(on)}$   | —          | 7          | —          | ns            | $I_D = 2 \text{ A}$                                                                |
| Rise time                                  |                    | $t_r$         | —          | 20         | —          | ns            | $V_{GS} = 10 \text{ V}$                                                            |
| Turn-off delay time                        |                    | $t_{d(off)}$  | —          | 30         | —          | ns            | $R_L = 15 \text{ }\Omega$                                                          |
| Fall time                                  |                    | $t_f$         | —          | 20         | —          | ns            |                                                                                    |
| Body to drain diode forward voltage        |                    | $V_{DF}$      | —          | 0.9        | —          | V             | $I_F = 3 \text{ A}$ , $V_{GS} = 0$                                                 |
| Body to drain diode reverse recovery time  |                    | $t_{rr}$      | —          | 300        | —          | ns            | $I_F = 3 \text{ A}$ , $V_{GS} = 0$ ,<br>$di_F / dt = 100 \text{ A} / \mu\text{s}$  |

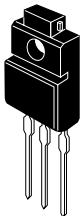
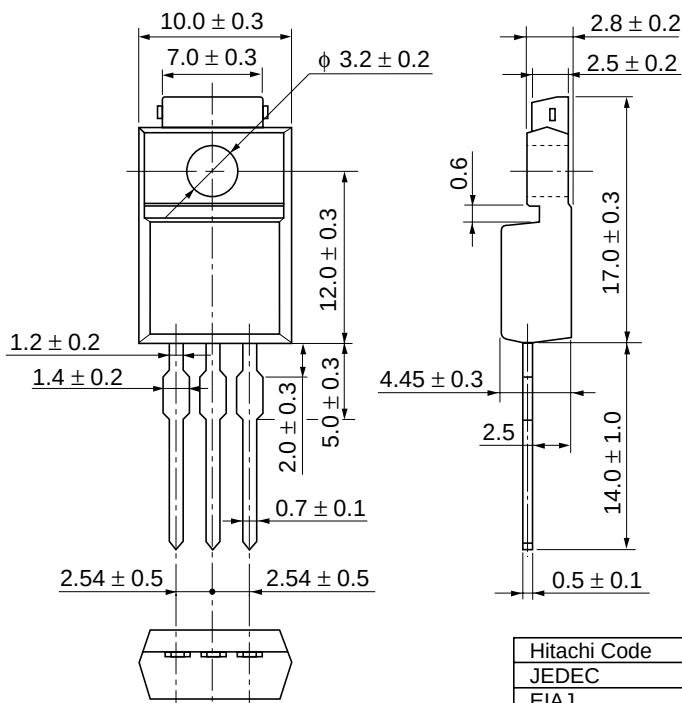
Note 1. Pulse Test

See characteristic curves of 2SK1153, 2SK1154



Package Dimensions

As of January, 2001  
Unit: mm



|                        |          |
|------------------------|----------|
| Hitachi Code           | TO-220FM |
| JEDEC                  | —        |
| EIAJ                   | Conforms |
| Mass (reference value) | 1.8 g    |

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# HITACHI

## Hitachi, Ltd.

Semiconductor & Integrated Circuits.

Nippon Bldg., 2-6-2, Ohte-machi, Chiyoda-ku, Tokyo 100-0004, Japan

Tel: Tokyo (03) 3270-2111 Fax: (03) 3270-5109

|     |              |   |                                                                                             |
|-----|--------------|---|---------------------------------------------------------------------------------------------|
| URL | NorthAmerica | : | <a href="http://semiconductor.hitachi.com/">http://semiconductor.hitachi.com/</a>           |
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## For further information write to:

Hitachi Semiconductor  
(America) Inc.

179 East Tasman Drive,  
San Jose, CA 95134

Tel: <1> (408) 433-1990

Fax: <1> (408) 433-0223

Hitachi Europe GmbH  
Electronic Components Group

Dornacher Straße 3  
D-85622 Feldkirchen, Munich

Germany

Tel: <49> (89) 9 9180-0

Fax: <49> (89) 9 29 30 00

Hitachi Europe Ltd.

Electronic Components Group.

Whitebrook Park

Lower Cookham Road

Maidenhead

Berkshire SL6 8YA, United Kingdom

Tel: <44> (1628) 585000

Fax: <44> (1628) 585160

Hitachi Asia Ltd.

Hitachi Tower

16 Collyer Quay #20-00,

Singapore 049318

Tel: <65>-538-6533/538-8577

Fax: <65>-538-6933/538-3877

URL: <http://www.hitachi.com.sg>

Hitachi Asia Ltd.

(Taipei Branch Office)

4/F, No. 167, Tun Hwa North Road,

Hung-Kuo Building,

Taipei (105), Taiwan

Tel: <886>-(2)-2718-3666

Fax: <886>-(2)-2718-8180

Telex: 23222 HAS-TP

URL: <http://www.hitachi.com.tw>

Hitachi Asia (Hong Kong) Ltd.

Group III (Electronic Components)

7/F., North Tower,

World Finance Centre,

Harbour City, Canton Road

Tsim Sha Tsui, Kowloon,

Hong Kong

Tel: <852>-(2)-735-9218

Fax: <852>-(2)-730-0281

URL: <http://www.hitachi.com.hk>