

To our customers,

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## Old Company Name in Catalogs and Other Documents

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

April 1<sup>st</sup>, 2010  
Renesas Electronics Corporation

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

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## P-CHANNEL MOS FIELD EFFECT TRANSISTOR FOR HIGH SPEED SWITCHING

### DESCRIPTION

The 2SJ559 is a switching device which can be driven directly by a 2.5 V power source.

The 2SJ559 has excellent switching characteristics, and is suitable for use as a high-speed switching device in digital circuits.

### FEATURES

- Can be driven by a 2.5 V power source.
- Low gate cut-off voltage.

### ★ ORDERING INFORMATION

| PART NUMBER | PACKAGE     |
|-------------|-------------|
| 2SJ559      | SC-75 (USM) |

Marking: C1

### ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = 25°C)

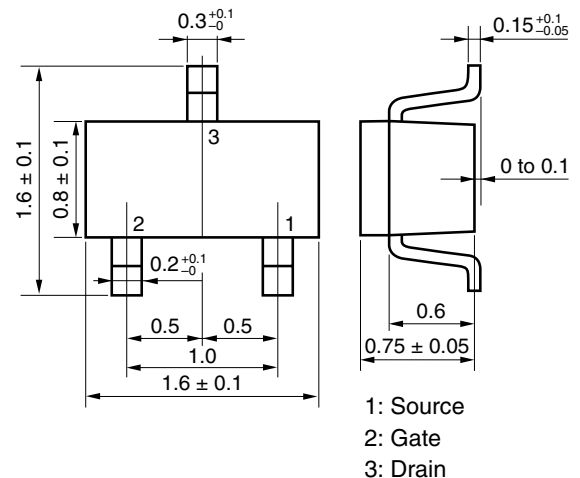
|                                          |                       |             |    |
|------------------------------------------|-----------------------|-------------|----|
| Drain to Source Voltage                  | V <sub>DSS</sub>      | −30         | V  |
| Gate to Source Voltage                   | V <sub>GSS</sub>      | ±20         | V  |
| Drain Current (DC)                       | I <sub>D(DC)</sub>    | ±0.1        | A  |
| Drain Current (pulse) <sup>Note1</sup>   | I <sub>D(pulse)</sub> | ±0.4        | A  |
| Total Power Dissipation <sup>Note2</sup> | P <sub>T</sub>        | 200         | mW |
| Channel Temperature                      | T <sub>ch</sub>       | 150         | °C |
| Storage Temperature                      | T <sub>stg</sub>      | −55 to +150 | °C |

**Notes** 1. PW ≤ 10 μs, Duty Cycle ≤ 1%

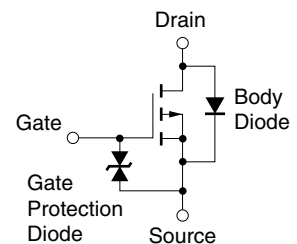
2. Mounted on ceramic substrate of 3.0 cm<sup>2</sup> x 0.64 mm

**Remark** The diode connected between the gate and source of the transistor serves as a protector against ESD. When this device actually used, an additional protection circuit is externally required if a voltage exceeding the rated voltage may be applied to this device.

### ★ PACKAGE DRAWING (Unit: mm)



### EQUIVALENT CIRCUIT



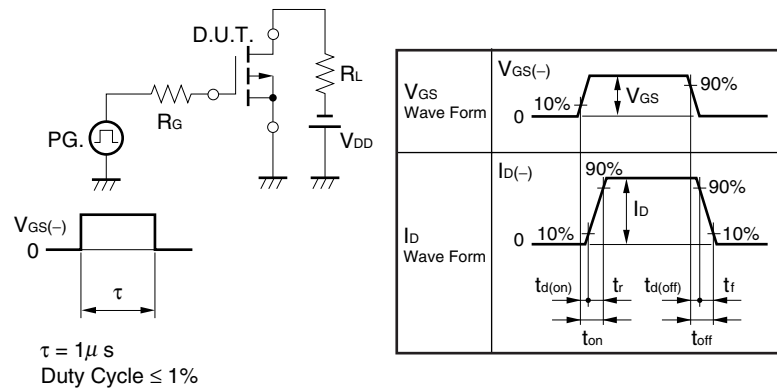
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ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)

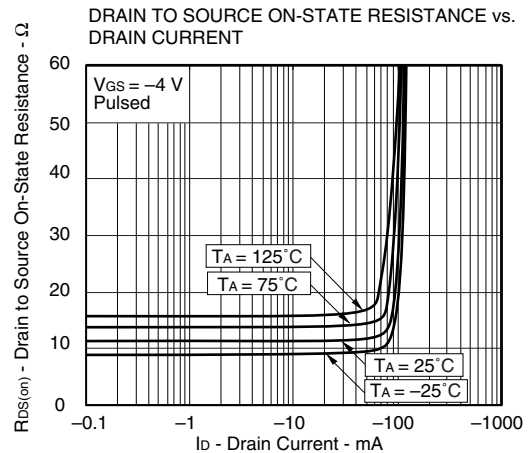
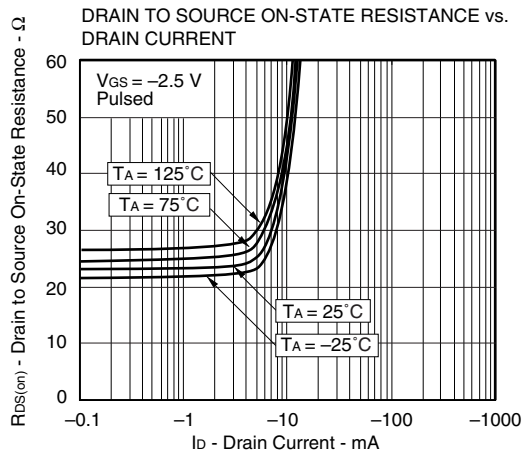
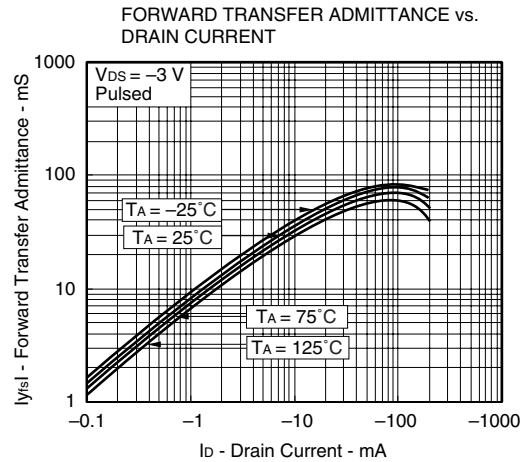
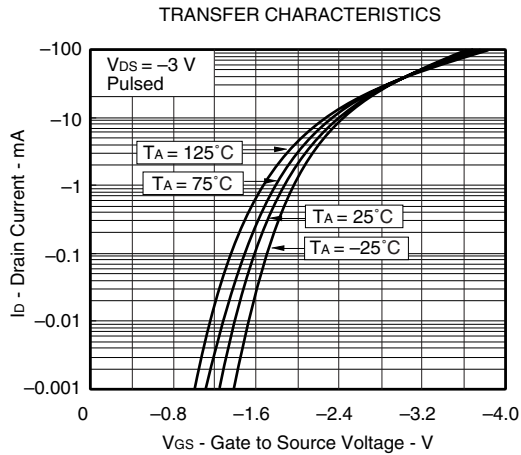
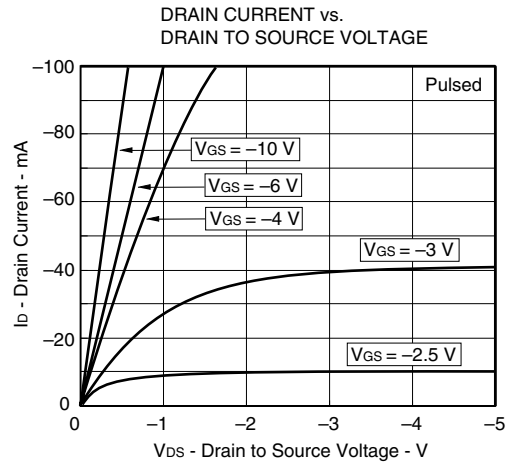
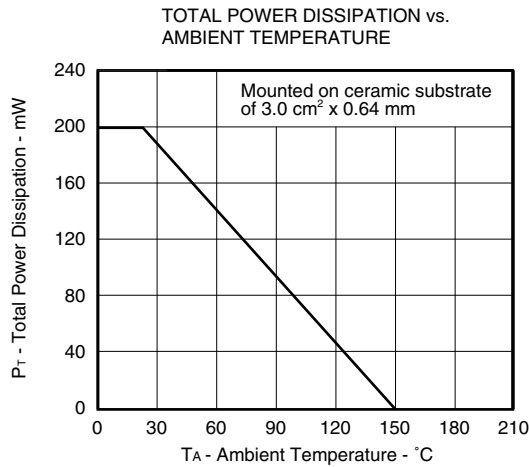
| CHARACTERISTICS                                     | SYMBOL               | TEST CONDITIONS                                    | MIN. | TYP. | MAX. | UNIT |
|-----------------------------------------------------|----------------------|----------------------------------------------------|------|------|------|------|
| Zero Gate Voltage Drain Current                     | I <sub>DSS</sub>     | V <sub>DS</sub> = -30 V, V <sub>GS</sub> = 0 V     |      |      | -1.0 | μA   |
| Gate Leakage Current                                | I <sub>GSS</sub>     | V <sub>GS</sub> = ±20 V, V <sub>DS</sub> = 0 V     |      |      | ±10  | μA   |
| Gate Cut-off Voltage                                | V <sub>GS(off)</sub> | V <sub>DS</sub> = -3.0 V, I <sub>D</sub> = -10 μA  | -1.0 | -1.4 | -1.7 | V    |
| Forward Transfer Admittance <sup>Note</sup>         | y <sub>fs</sub>      | V <sub>DS</sub> = -3.0 V, I <sub>D</sub> = -10 mA  | 20   |      |      | mS   |
| Drain to Source On-state Resistance <sup>Note</sup> | R <sub>DS(on)1</sub> | V <sub>GS</sub> = -2.5 V, I <sub>D</sub> = -1.0 mA |      | 23   | 60   | Ω    |
|                                                     | R <sub>DS(on)2</sub> | V <sub>GS</sub> = -4.0 V, I <sub>D</sub> = -10 mA  |      | 11   | 23   | Ω    |
|                                                     | R <sub>DS(on)3</sub> | V <sub>GS</sub> = -10 V, I <sub>D</sub> = -10 mA   |      | 6.0  | 13   | Ω    |
| Input Capacitance                                   | C <sub>iss</sub>     | V <sub>DS</sub> = -3.0 V                           |      | 5.0  |      | pF   |
| Output Capacitance                                  | C <sub>oss</sub>     | V <sub>GS</sub> = 0 V                              |      | 15   |      | pF   |
| Reverse Transfer Capacitance                        | C <sub>rss</sub>     | f = 1 MHz                                          |      | 1.3  |      | pF   |
| Turn-on Delay Time                                  | t <sub>d(on)</sub>   | V <sub>DD</sub> = -3.0 V                           |      | 140  |      | ns   |
| Rise Time                                           | t <sub>r</sub>       | I <sub>D</sub> = -10 mA                            |      | 330  |      | ns   |
| Turn-off Delay Time                                 | t <sub>d(off)</sub>  | V <sub>GS</sub> = -4.0 V                           |      | 220  |      | ns   |
| Fall Time                                           | t <sub>f</sub>       | R <sub>G</sub> = 10 Ω                              |      | 320  |      | ns   |

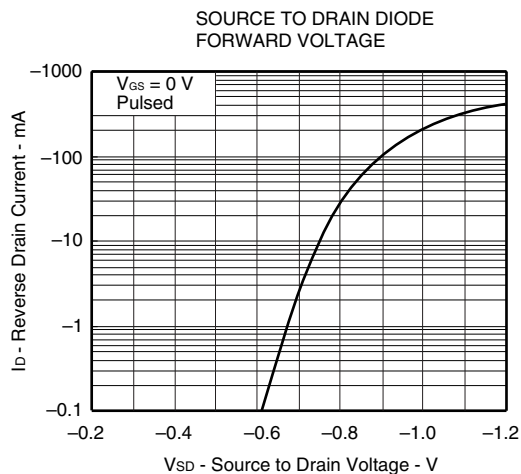
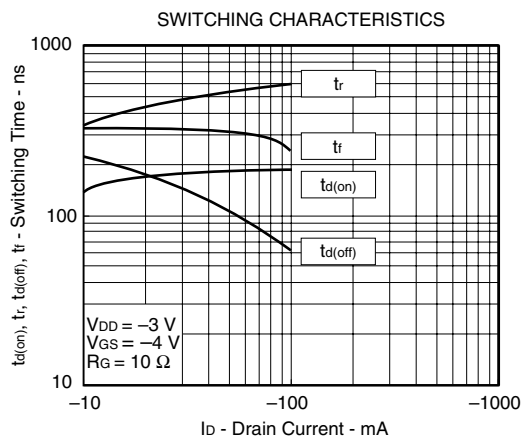
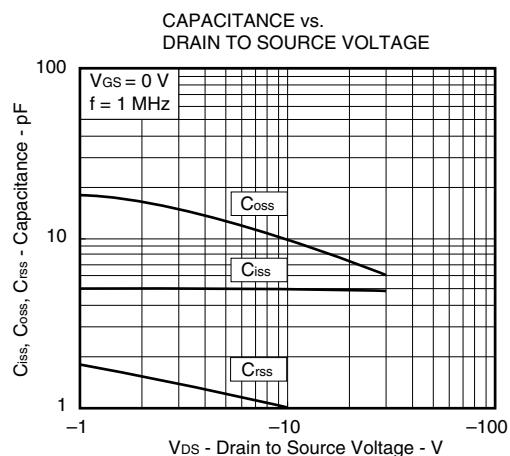
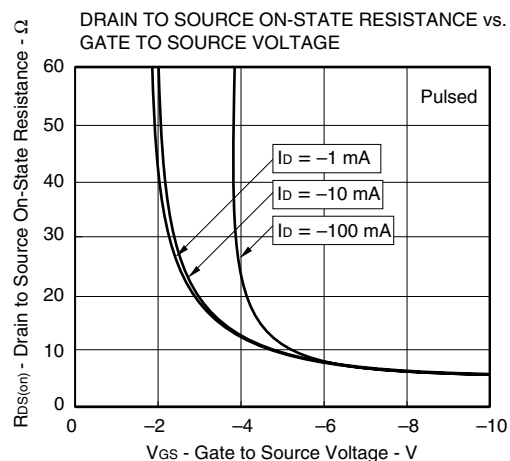
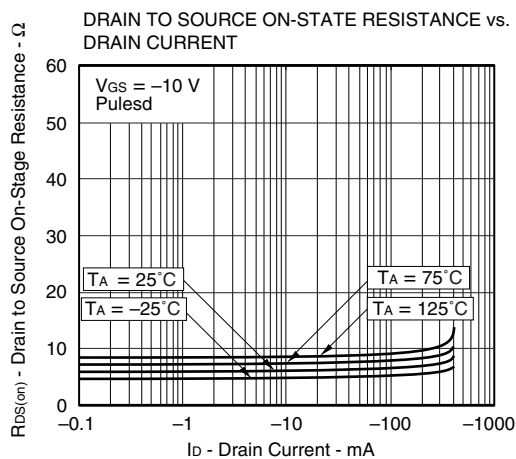
Note Plused

★ TEST CIRCUIT SWITCHING TIME



TYPICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ )





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