

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 SILICON POWER MOS FET  
FOR HIGH SPEED SWITCHING

FEATURES

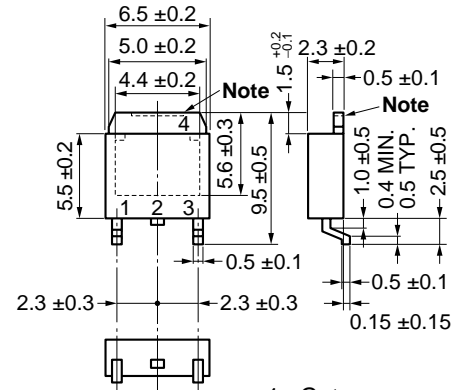
- Suitable for switching power supplies, actuator controls, and pulse circuits.
- Low  $R_{DS(on)}$
- No second breakdown
- 4 V gate drive (Logic level)
- Designed for Hybrid Integrated Circuits

ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ )

|  |                |             |                  |
|--|----------------|-------------|------------------|
| Drain to Source Voltage  | $V_{DS}$       | -100        | V                |
| Gate to Source Voltage   | $V_{GS}$       | $\pm 20$    | V                |
| Continuous Drain Current (DC)  | $I_{D(DC)}$    | $\mp 2$     | A                |
| Peak Drain Current (pulse) <sup>Note 1</sup>                           | $I_{D(pulse)}$ | $\mp 8$     | A                |
| Total Power Dissipation ( $T_c = 25^\circ\text{C}$ )                   | $P_T$          | 20          | W                |
| Total Power Dissipation ( $T_A = 25^\circ\text{C}$ ) <sup>Note 2</sup> | $P_T$          | 2.0         | W                |
| Channel Temperature  | $T_{ch}$       | 150         | $^\circ\text{C}$ |
| Storage Temperature  | $T_{stg}$      | -55 to +150 | $^\circ\text{C}$ |

- Notes 1.  $PW \leq 300 \mu\text{s}$ , Duty Cycle  $\leq 10\%$   
 2. When mounted on ceramic substrate of  $2.5 \text{ cm}^2 \times 0.7 \text{ mm}$

<R> PACKAGE DRAWING (Unit: mm)



TO-252 (MP-3Z)

1. Gate
2. Drain
3. Source
4. Drain Fin

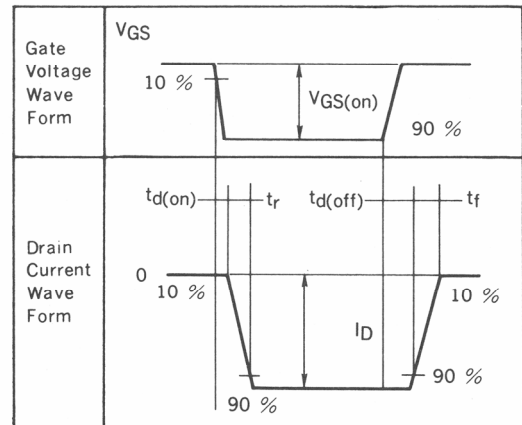
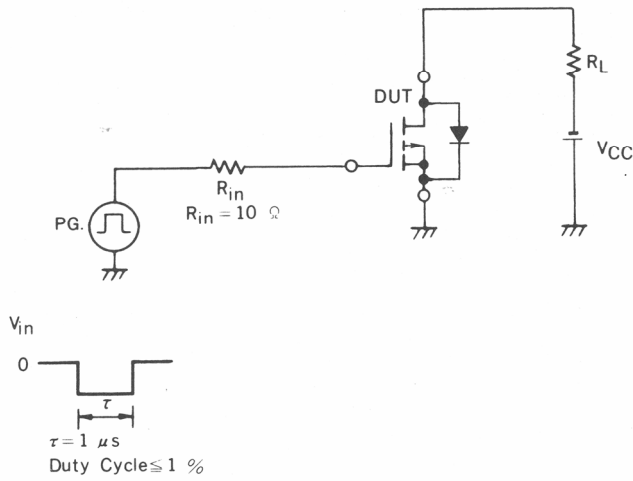
Note The depth of notch at the top of the fin is from 0 to 0.2 mm.

ELECTRICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )

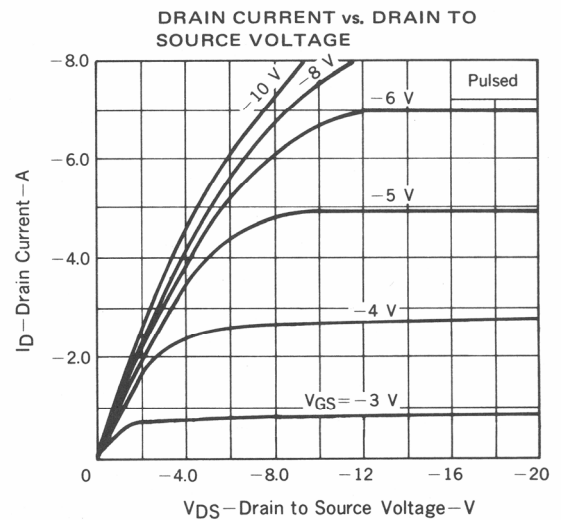
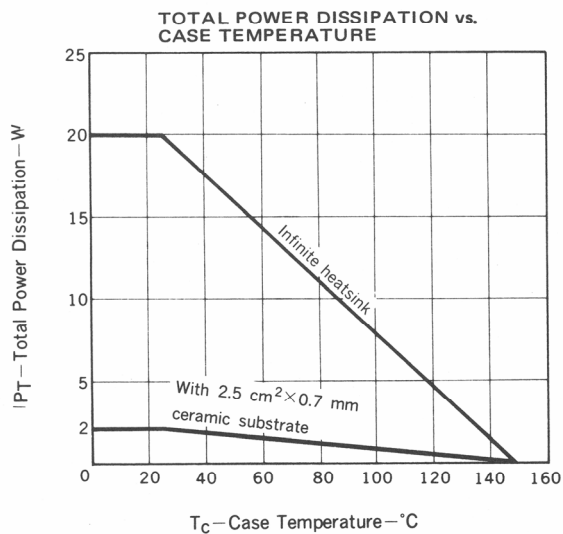
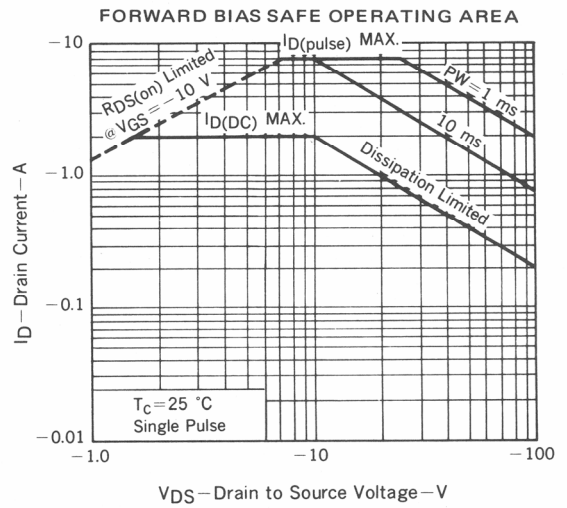
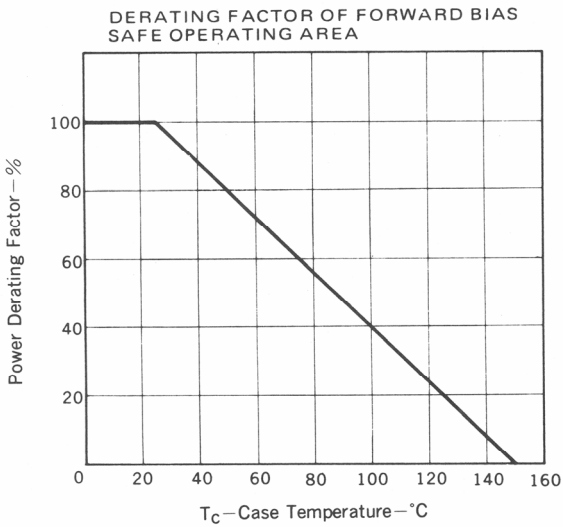
| CHARACTERISTIC                      | SYMBOL        | MIN. | TYP. | MAX.      | UNIT          | TEST CONDITIONS  |
|-------------------------------------|---------------|------|------|-----------|---------------|--|
| Drain Leakage Current               | $I_{DSS}$     |      |      | -10       | $\mu\text{A}$ | $V_{DS} = -100 \text{ V}$ , $V_{GS} = 0$   |
| Gate to Source Leakage Current      | $I_{GSS}$     |      |      | $\mp 100$ | nA            | $V_{GS} = -20 \text{ V}$ , $V_{DS} = 0$  |
| Gate to Source Cutoff Voltage       | $V_{GS(off)}$ | -1.0 |      | -3.0      | V             | $V_{DS} = -10 \text{ V}$ , $I_D = -1 \text{ mA}$   |
| Forward Transfer Admittance         | $ y_{fs} $    | 1.0  |      |           | S             | $V_{DS} = -10 \text{ V}$ , $I_D = -1 \text{ A}$  |
| Drain to Source On-State Resistance | $R_{DS(on)}$  |      | 0.8  | 1.0       | $\Omega$      | $V_{GS} = -10 \text{ V}$ , $I_D = -1 \text{ A}$  |
| Drain to Source On-State Resistance | $R_{DS(on)}$  |      | 1.1  | 1.5       | $\Omega$      | $V_{GS} = -4 \text{ V}$ , $I_D = -0.8 \text{ A}$   |
| Input Capacitance                   | $C_{iss}$     |      | 1000 |           | pF            | $V_{DS} = -10 \text{ V}$ , $V_{GS} = 0$<br>$f = 1 \text{ MHz}$   |
| Output Capacitance                  | $C_{oss}$     |      | 200  |           | pF            |  |
| Reverse Transfer Capacitance        | $C_{rss}$     |      | 25   |           | pF            |  |
| Turn-On Delay Time                  | $t_{d(on)}$   |      | 30   |           | ns            | $I_D = -1 \text{ A}$ , $V_{CC} \approx -50 \text{ V}$<br>$V_{GS(on)} = -10 \text{ V}$<br>$R_L = 10 \Omega$<br>$R_{in} = 10 \Omega$ |
| Rise Time                           | $t_r$         |      | 30   |           | ns            |  |
| Turn-Off Delay Time                 | $t_{d(off)}$  |      | 110  |           | ns            |  |
| Fall Time                           | $t_f$         |      | 40   |           | ns            |  |

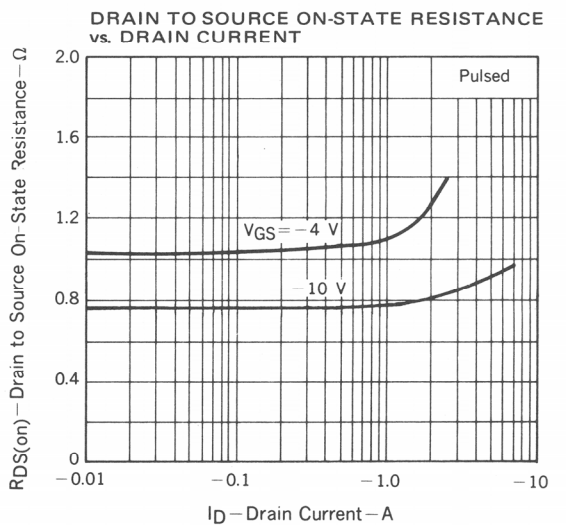
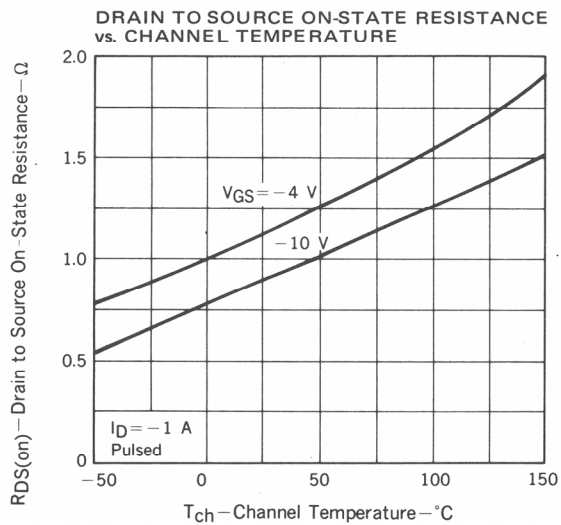
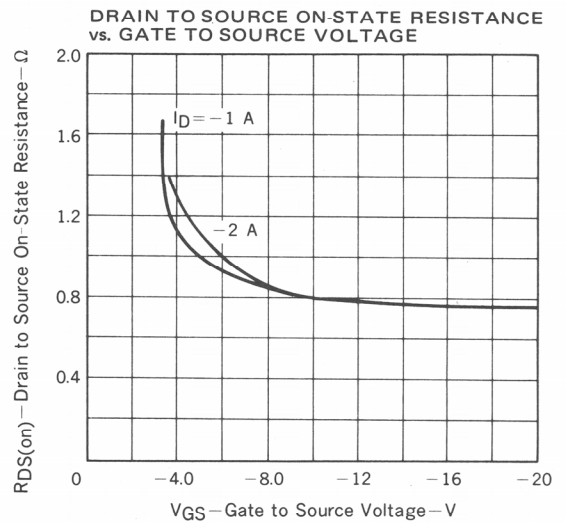
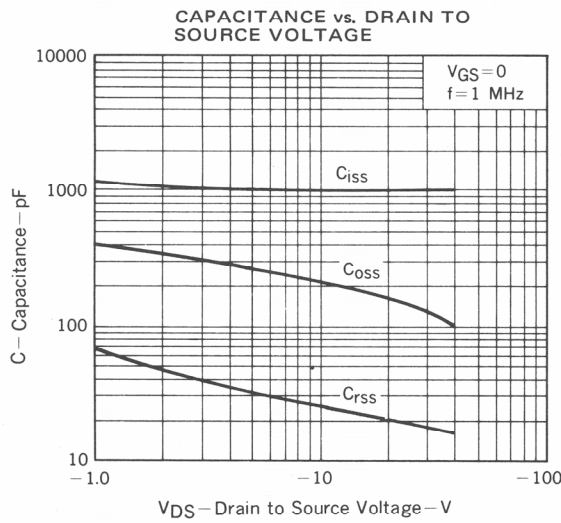
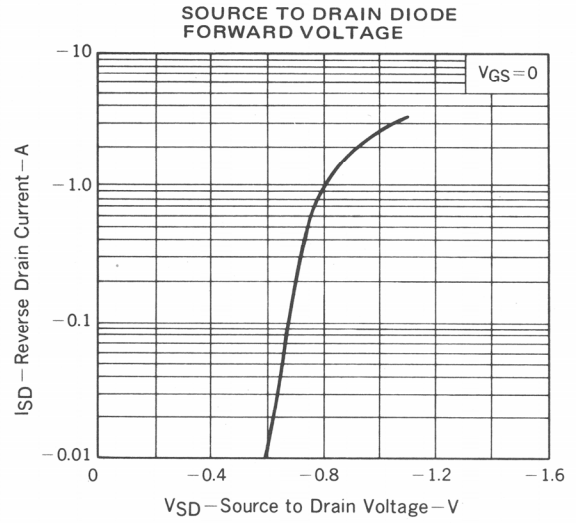
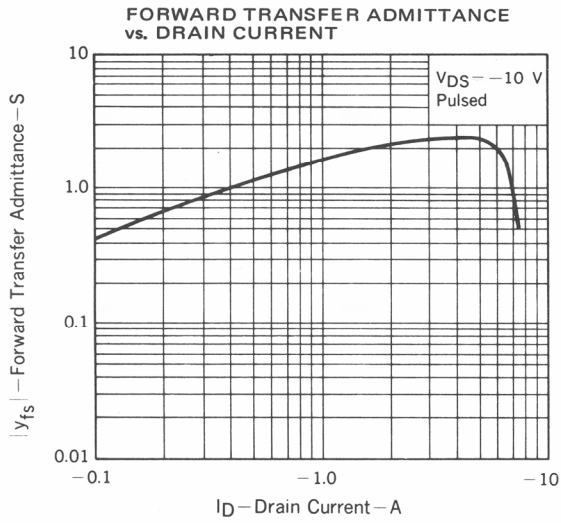
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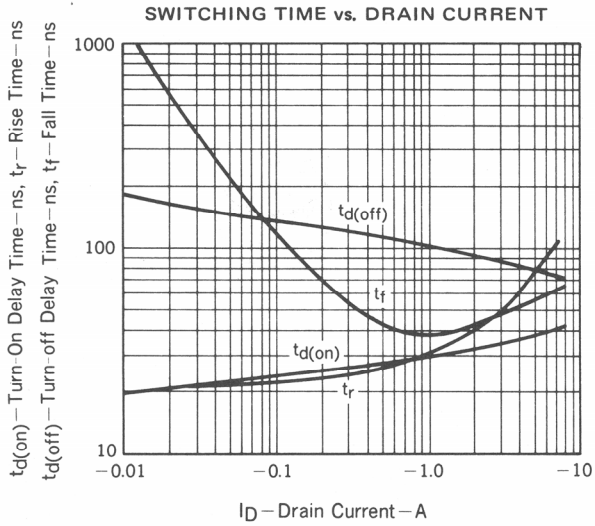
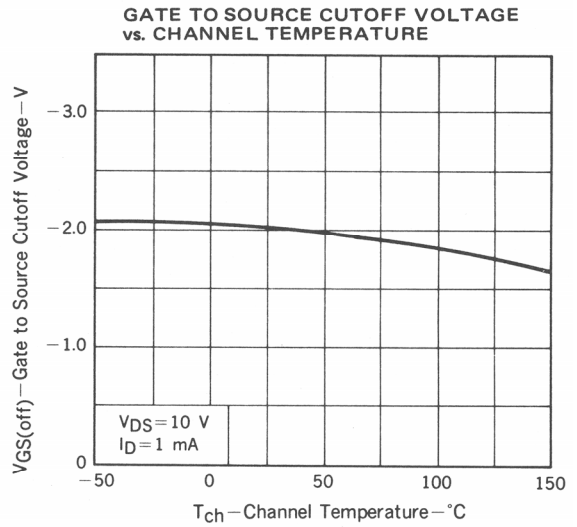
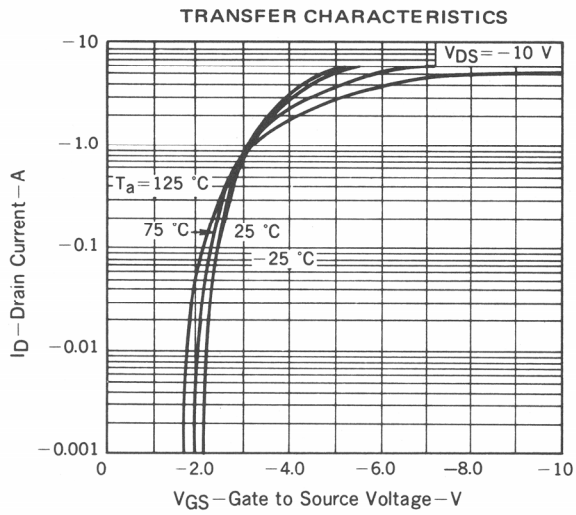
TURN-ON AND TURN-OFF TIME TEST CIRCUIT



TYPICAL CHARACTERISTICS (Ta = 25 °C)







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