

To our customers,

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## Old Company Name in Catalogs and Other Documents

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

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# RQJ0601DGDQS

Silicon P Channel MOS FET  
Power Switching

REJ03G1266-0300

Rev.3.00

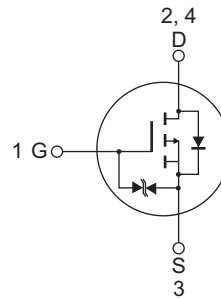
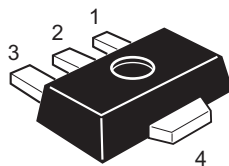
Jun 05, 2006

## Features

- Low on-resistance  
 $R_{DS(on)} = 124 \text{ m}\Omega$  typ ( $V_{GS} = -10 \text{ V}$ ,  $I_D = -1.4 \text{ A}$ )
- Low drive current
- High speed switching
- 4.5 V gate drive

## Outline

RENESAS package code: PLZZ0004CA-A  
(Package name: UPAK®)



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

Note: Marking is "DG".

\*UPAK is a trademark of Renesas Technology Corp.

## Absolute Maximum Ratings

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

| Item                                     | Symbol                           | Ratings     | Unit             |
|--|----------------------------------|-------------|------------------|
| Drain to source voltage                  | $V_{DSS}$                        | -60         | V                |
| Gate to source voltage                   | $V_{GSS}$                        | +10 / -20   | V                |
| Drain current                            | $I_D$                            | -2.8        | A                |
| Drain peak current                       | $I_{D(pulse)}$ <sup>Note1</sup>  | -4.2        | A                |
| Body - drain diode reverse drain current | $I_{DR}$                         | -2.8        | A                |
| Channel dissipation                      | $P_{ch}$ <sup>Note2</sup>        | 1.5         | W                |
| Channel dissipation                      | $P_{ch(pulse)}$ <sup>Note1</sup> | 5           | W                |
| Channel temperature                      | $T_{ch}$                         | 150         | $^\circ\text{C}$ |
| Storage temperature                      | $T_{stg}$                        | -55 to +150 | $^\circ\text{C}$ |

Notes: 1.  $PW \leq 1 \text{ s}$ , duty cycle  $\leq 1\%$

2. When using the glass epoxy board (FR-4: 40 x 40 x 1 mm)

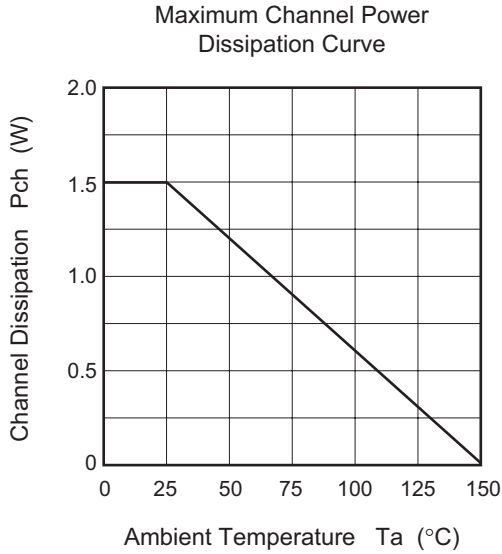
## Electrical Characteristics

(Ta = 25°C)

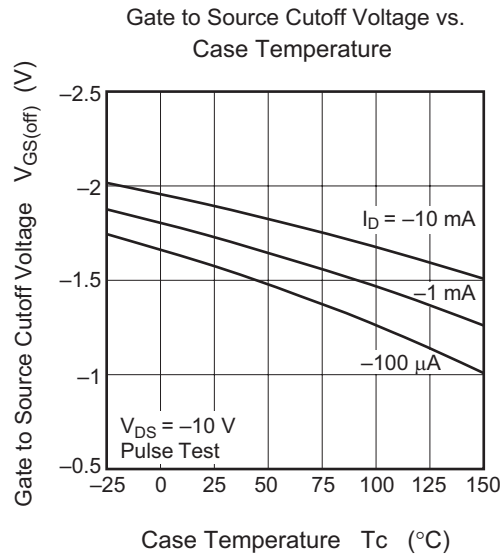
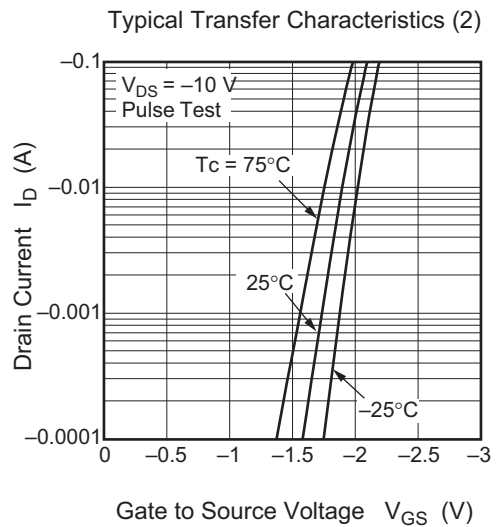
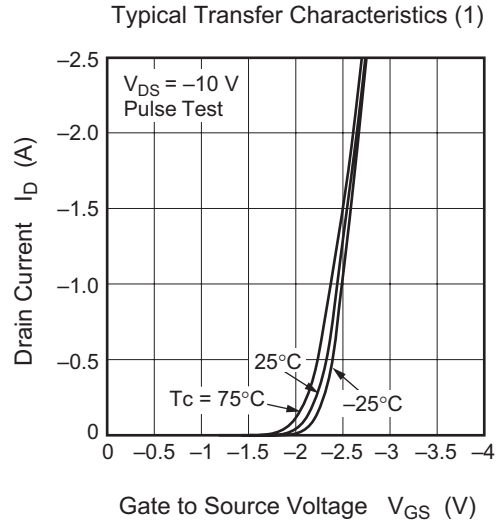
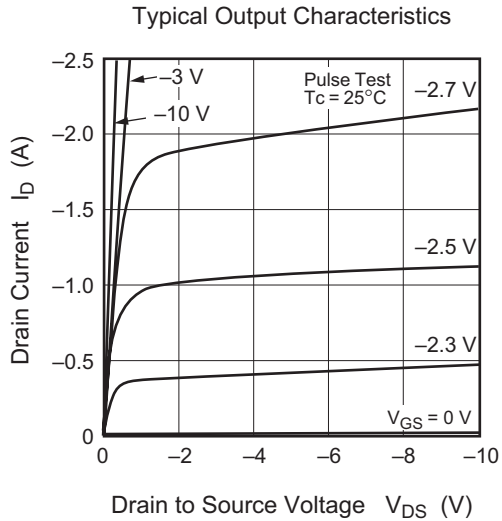
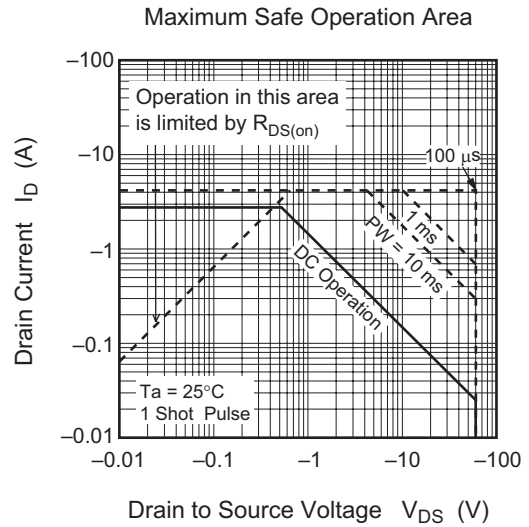
| Item                                | Symbol        | Min  | Typ  | Max  | Unit             | Test conditions   |
|-------------------------------------|---------------|------|------|------|------------------|---|
| Drain to source breakdown voltage   | $V_{(BR)DSS}$ | -60  | —    | —    | V                | $I_D = -10 \text{ mA}$ , $V_{GS} = 0$   |
| Gate to source breakdown voltage    | $V_{(BR)GSS}$ | +10  | —    | —    | V                | $I_G = +100 \text{ } \mu\text{A}$ , $V_{DS} = 0$  |
| Gate to source breakdown voltage    | $V_{(BR)GSS}$ | -20  | —    | —    | V                | $I_G = -100 \text{ } \mu\text{A}$ , $V_{DS} = 0$  |
| Gate to source leak current         | $I_{GSS}$     | —    | —    | +10  | $\mu\text{A}$    | $V_{GS} = +8 \text{ V}$ , $V_{DS} = 0$  |
| Gate to source leak current         | $I_{GSS}$     | —    | —    | -10  | $\mu\text{A}$    | $V_{GS} = -16 \text{ V}$ , $V_{DS} = 0$   |
| Drain to source leak current        | $I_{DSS}$     | —    | —    | -1   | $\mu\text{A}$    | $V_{DS} = -60 \text{ V}$ , $V_{GS} = 0$   |
| Gate to source cutoff voltage       | $V_{GS(off)}$ | -1.0 | —    | -2.0 | V                | $V_{DS} = -10 \text{ V}$ , $I_D = -1 \text{ mA}$  |
| Drain to source on state resistance | $R_{DS(on)}$  | —    | 124  | 155  | $\text{m}\Omega$ | $I_D = -1.4 \text{ A}$ , $V_{GS} = -10 \text{ V}^{\text{Note3}}$  |
|                                     | $R_{DS(on)}$  | —    | 150  | 210  | $\text{m}\Omega$ | $I_D = -1.4 \text{ A}$ , $V_{GS} = -4.5 \text{ V}^{\text{Note3}}$   |
| Forward transfer admittance         | $ y_{fs} $    | 2.5  | 4.1  | —    | S                | $I_D = -1.4 \text{ A}$ , $V_{DS} = -10 \text{ V}^{\text{Note3}}$  |
| Input capacitance                   | $C_{iss}$     | —    | 590  | —    | pF               | $V_{DS} = -10 \text{ V}$ , $V_{GS} = 0$ ,<br>$f = 1 \text{ MHz}$  |
| Output capacitance                  | $C_{oss}$     | —    | 75   | —    | pF               |   |
| Reverse transfer capacitance        | $C_{rss}$     | —    | 36   | —    | pF               |   |
| Turn - on delay time                | $t_{d(on)}$   | —    | 20   | —    | ns               | $I_D = -1 \text{ A}$ , $V_{GS} = -10 \text{ V}$ ,<br>$R_L = 10 \text{ } \Omega$ , $R_g = 4.7 \text{ } \Omega$ |
| Rise time                           | $t_r$         | —    | 41   | —    | ns               |   |
| Turn - off delay time               | $t_{d(off)}$  | —    | 43   | —    | ns               |   |
| Fall time                           | $t_f$         | —    | 78   | —    | ns               |   |
| Total gate charge                   | $Q_g$         | —    | 9.6  | —    | nC               | $V_{DD} = -10 \text{ V}$ , $V_{GS} = -10 \text{ V}$ ,<br>$I_D = -2.8 \text{ A}$                               |
| Gate to source charge               | $Q_{gs}$      | —    | 1.3  | —    | nC               |   |
| Gate to drain charge                | $Q_{gd}$      | —    | 1.5  | —    | nC               |   |
| Body - drain diode forward voltage  | $V_{DF}$      | —    | -0.8 | —    | V                | $I_F = -1.5 \text{ A}$ , $V_{GS} = 0^{\text{Note3}}$  |

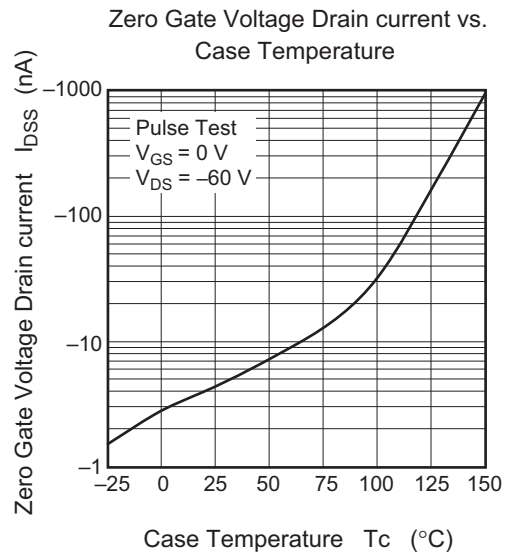
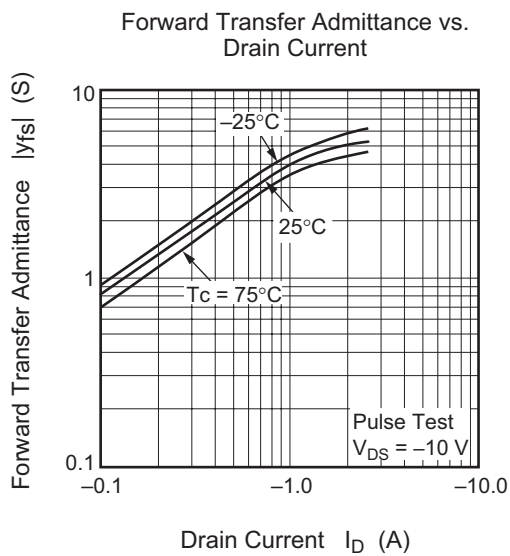
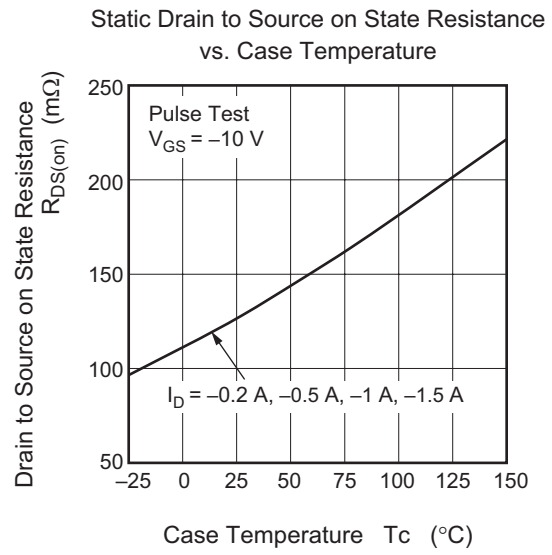
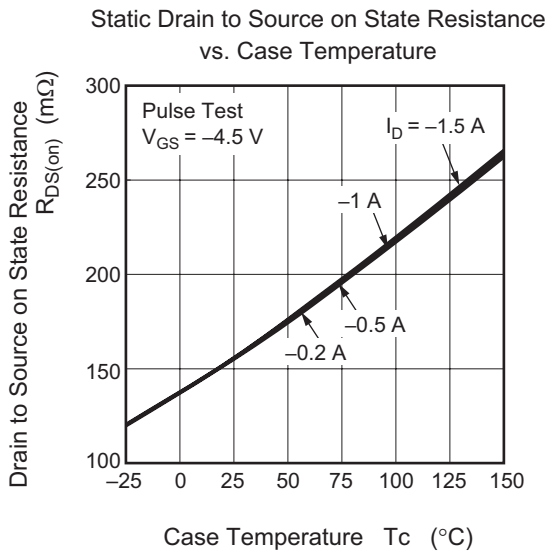
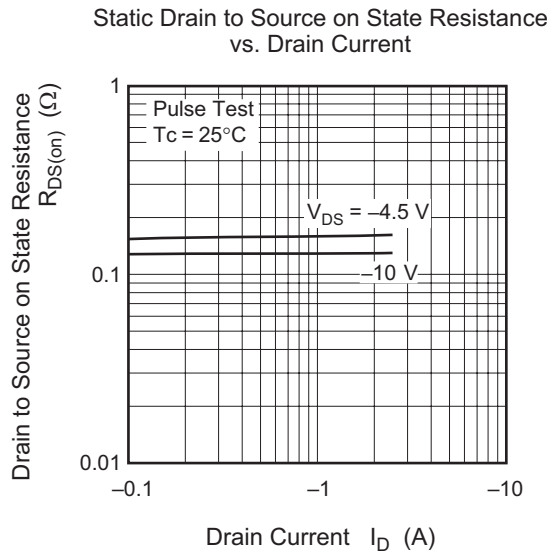
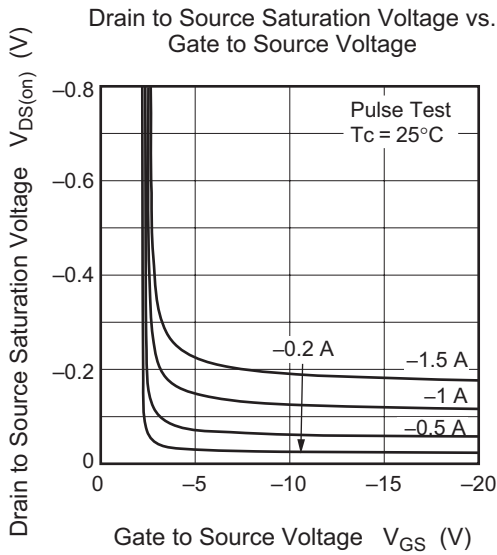
Notes: 3. Pulse test

Main Characteristics

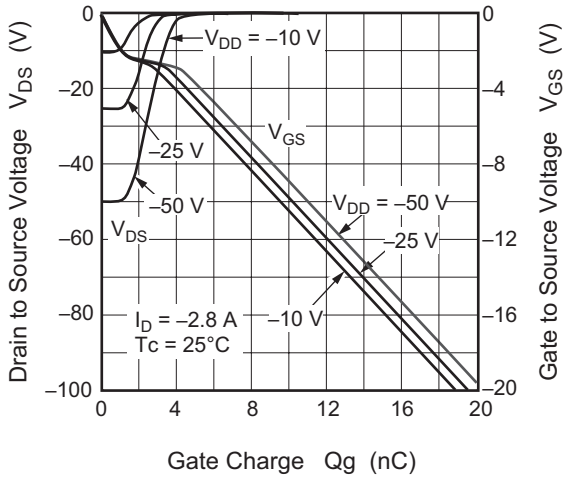


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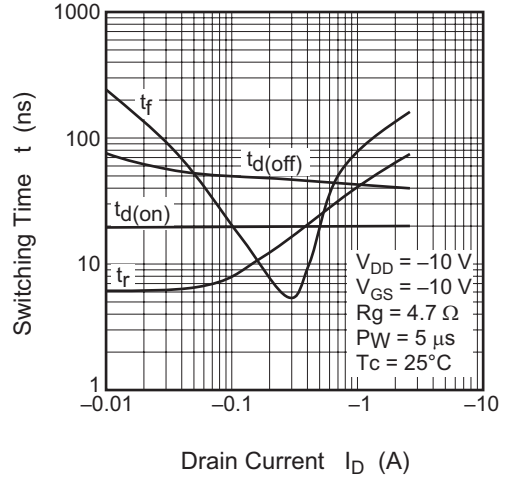




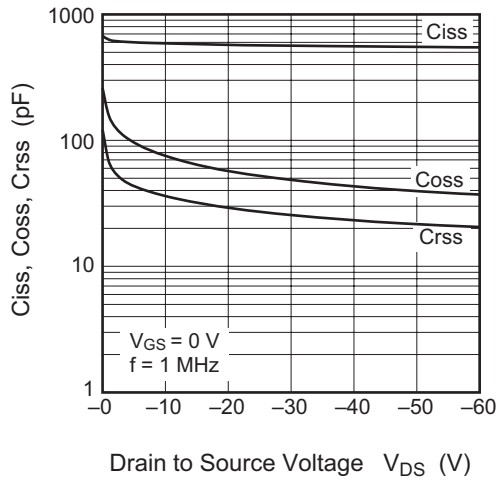
Dynamic Input Characteristics



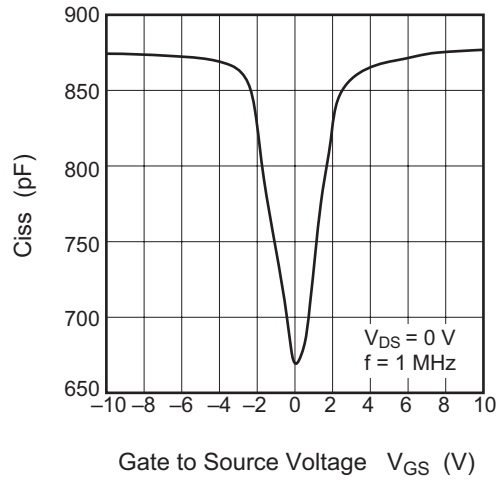
Switching Characteristics



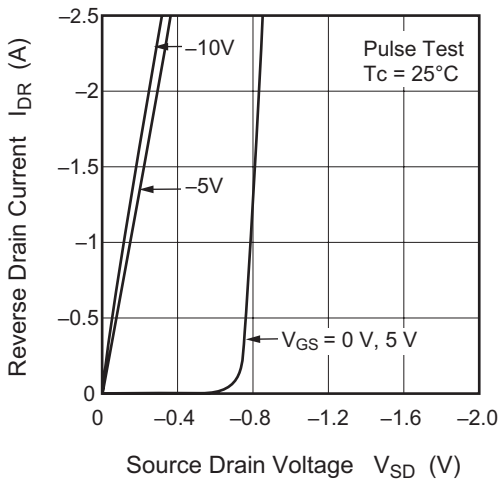
Typical Capacitance vs. Drain to Source Voltage



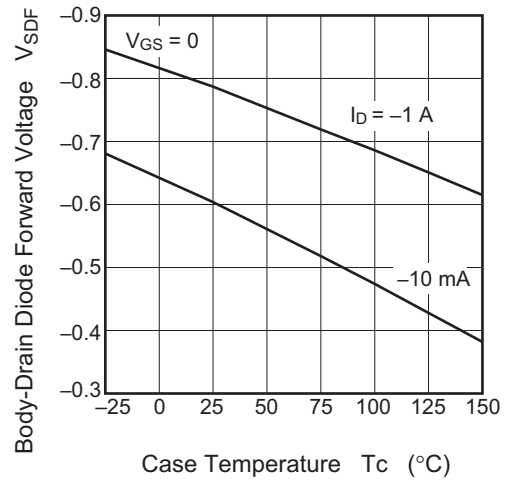
Input Capacitance vs. Gate to Source Voltage



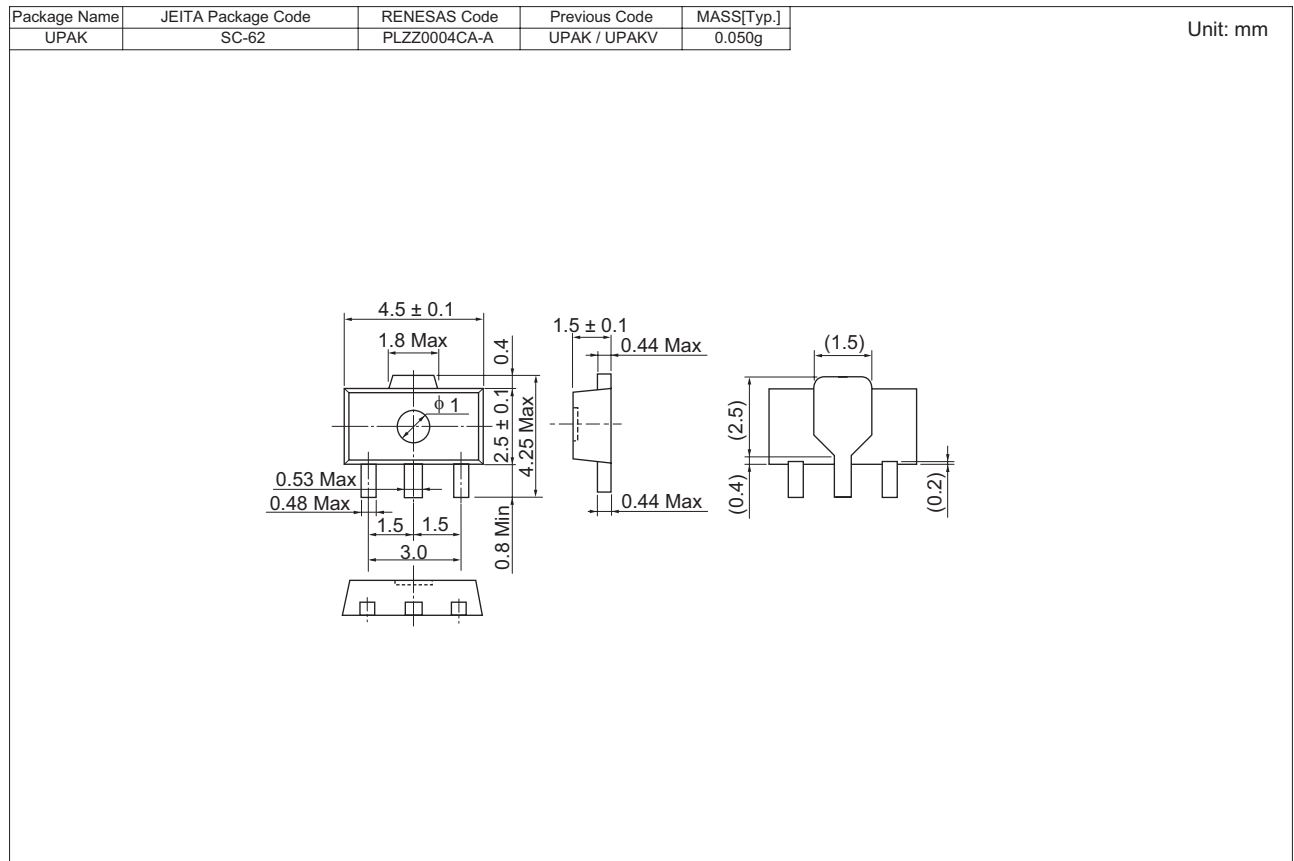
Reverse Drain Current vs. Source to Drain Voltage



Body-Drain Diode Forward Voltage vs. Case Temperature



### Package Dimensions



### Ordering Information

| Part Name        | Quantity  | Shipping Container                   |
|------------------|-----------|--------------------------------------|
| RQJ0601DGDQSTL-E | 1000 pcs. | $\phi$ 178 reel, 12 mm Emboss taping |



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450 Holger Way, San Jose, CA 95134-1368, U.S.A  
Tel: <1> (408) 382-7500, Fax: <1> (408) 382-7501

**Renesas Technology Europe Limited**

Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K.  
Tel: <44> (1628) 585-100, Fax: <44> (1628) 585-900

**Renesas Technology (Shanghai) Co., Ltd.**

Unit 204, 205, AZIACenter, No.1233 Lujiazui Ring Rd, Pudong District, Shanghai, China 200120  
Tel: <86> (21) 5877-1818, Fax: <86> (21) 6887-7898

**Renesas Technology Hong Kong Ltd.**

7th Floor, North Tower, World Finance Centre, Harbour City, 1 Canton Road, Tsimshatsui, Kowloon, Hong Kong  
Tel: <852> 2265-6688, Fax: <852> 2730-6071

**Renesas Technology Taiwan Co., Ltd.**

10th Floor, No.99, Fushing North Road, Taipei, Taiwan  
Tel: <886> (2) 2715-2888, Fax: <886> (2) 2713-2999

**Renesas Technology Singapore Pte. Ltd.**

1 Harbour Front Avenue, #06-10, Keppel Bay Tower, Singapore 098632  
Tel: <65> 6213-0200, Fax: <65> 6278-8001

**Renesas Technology Korea Co., Ltd.**

Kukje Center Bldg. 18th Fl., 191, 2-ka, Hangang-ro, Yongsan-ku, Seoul 140-702, Korea  
Tel: <82> (2) 796-3115, Fax: <82> (2) 796-2145

**Renesas Technology Malaysia Sdn. Bhd**

Unit 906, Block B, Menara Amcorp, Amcorp Trade Centre, No.18, Jalan Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia  
Tel: <603> 7955-9390, Fax: <603> 7955-9510