

# RQK0301FGDQS

Silicon N Channel MOS FET  
Power Switching

REJ03G1269-0300

Rev.3.00

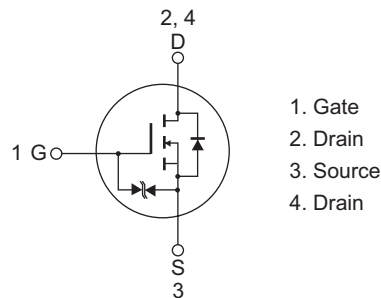
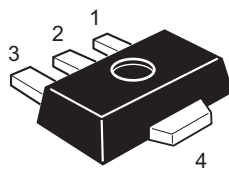
Jun 22, 2006

## Features

- Low on-resistance  
 $R_{DS(on)} = 28 \text{ m}\Omega$  typ ( $V_{GS} = 10 \text{ V}$ ,  $I_D = 3 \text{ A}$ )
- Low drive current
- High speed switching
- 4.5 V gate drive

## Outline

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



Note: Marking is "FG".

\*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                  | $V_{DSS}$                        | 30          | V                |
| Gate to source voltage                   | $V_{GSS}$                        | $\pm 20$    | V                |
| Drain current                            | $I_D$                            | 6           | A                |
| Drain peak current                       | $I_{D(pulse)}$ <sup>Note1</sup>  | 8.8         | A                |
| Body - drain diode reverse drain current | $I_{DR}$                         | 6           | 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)

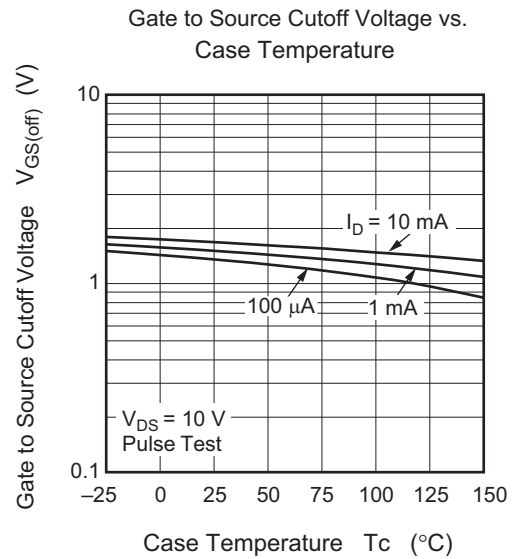
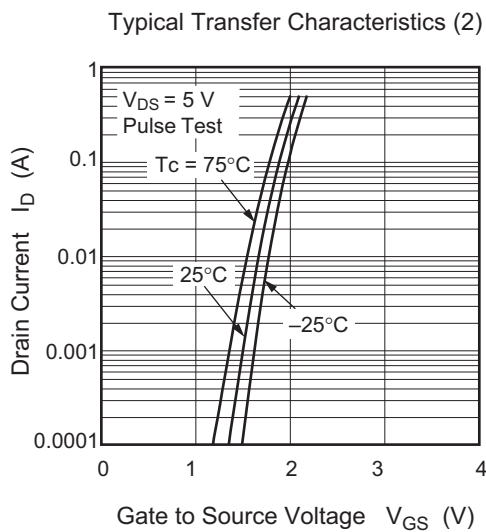
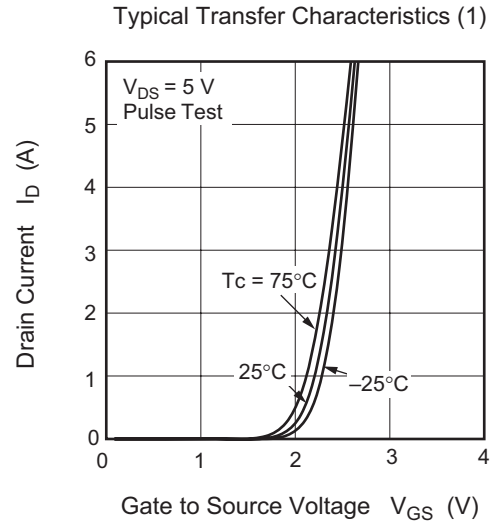
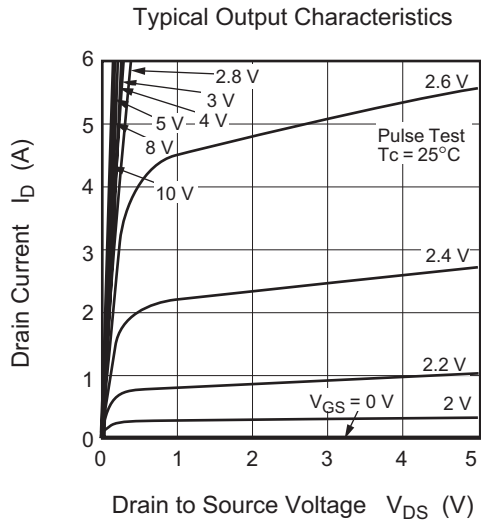
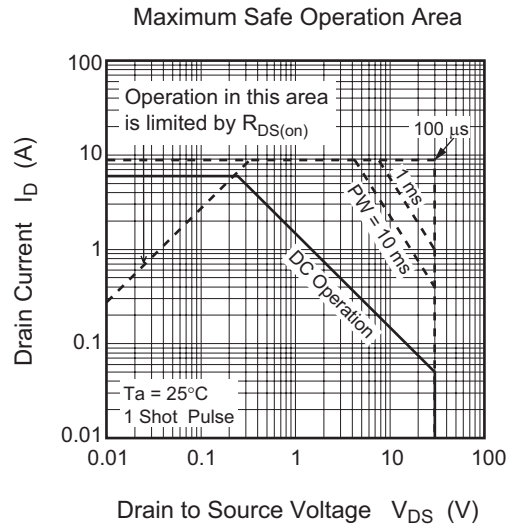
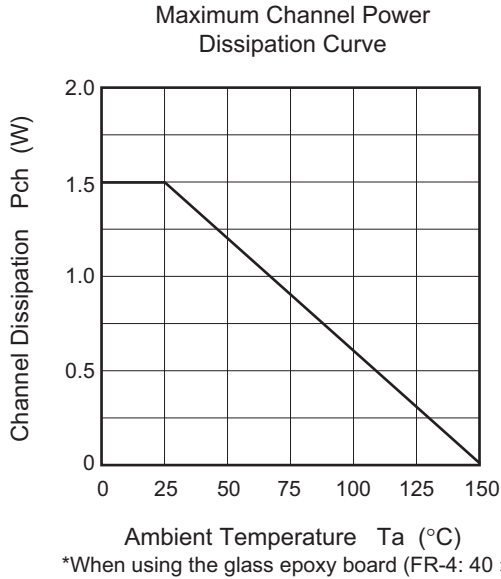
## Electrical Characteristics

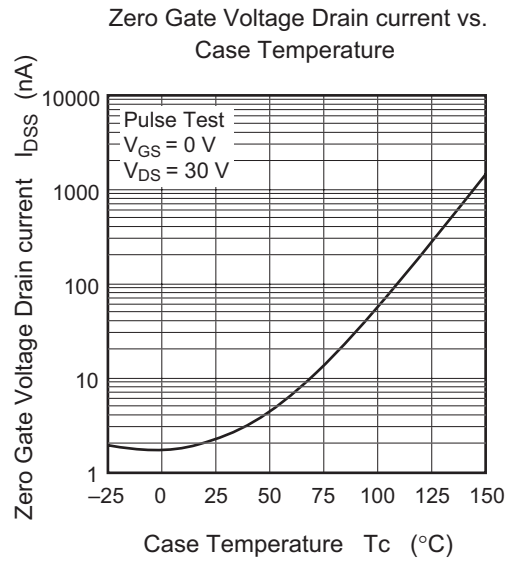
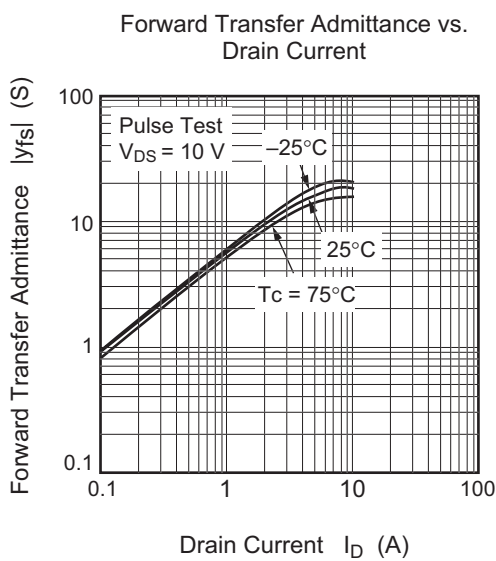
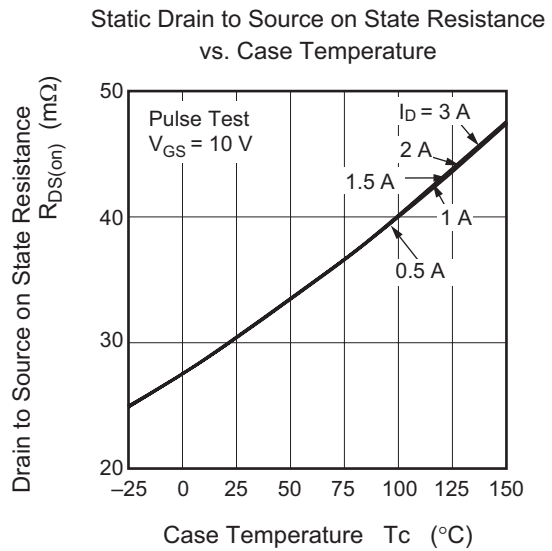
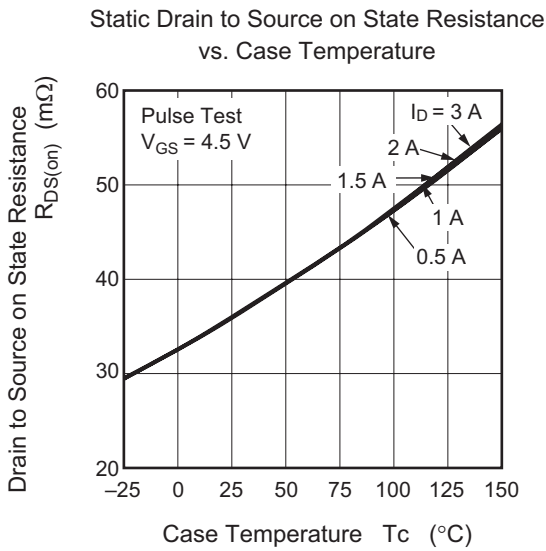
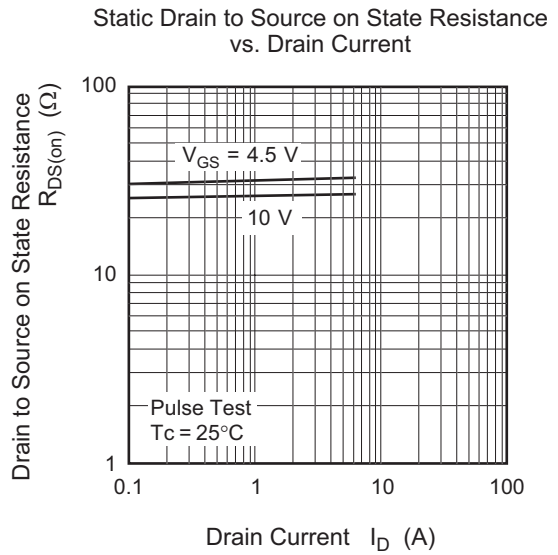
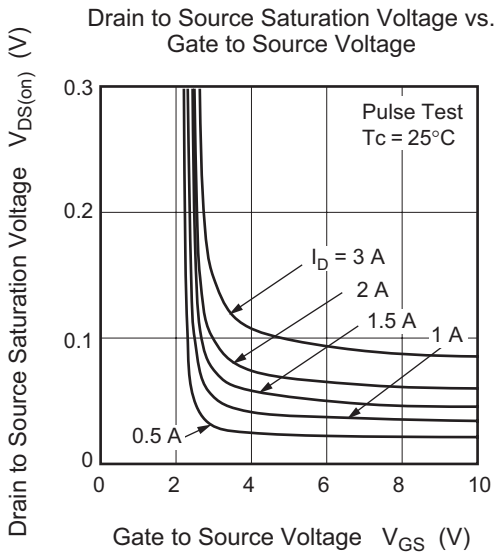
(Ta = 25°C)

| Item                                | Symbol        | Min      | Typ  | Max      | Unit             | Test conditions  |
|-------------------------------------|---------------|----------|------|----------|------------------|--|
| Drain to source breakdown voltage   | $V_{(BR)DSS}$ | 30       | —    | —        | V                | $I_D = 10 \text{ mA}, V_{GS} = 0$  |
| Gate to source breakdown voltage    | $V_{(BR)GSS}$ | $\pm 20$ | —    | —        | V                | $I_G = \pm 100 \mu\text{A}, V_{DS} = 0$  |
| Gate to source leak current         | $I_{GSS}$     | —        | —    | $\pm 10$ | $\mu\text{A}$    | $V_{GS} = \pm 16 \text{ V}, V_{DS} = 0$  |
| Drain to source leak current        | $I_{DSS}$     | —        | —    | 1        | $\mu\text{A}$    | $V_{DS} = 30 \text{ V}, V_{GS} = 0$  |
| 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 | $R_{DS(on)}$  | —        | 28   | 35       | $\text{m}\Omega$ | $I_D = 3 \text{ A}, V_{GS} = 10 \text{ V}^{\text{Note3}}$                          |
|                                     | $R_{DS(on)}$  | —        | 35   | 49       | $\text{m}\Omega$ | $I_D = 3 \text{ A}, V_{GS} = 4.5 \text{ V}^{\text{Note3}}$                         |
| Forward transfer admittance         | $ y_{fs} $    | 6.9      | 11.5 | —        | S                | $I_D = 3 \text{ A}, V_{DS} = 10 \text{ V}^{\text{Note3}}$                          |
| Input capacitance                   | $C_{iss}$     | —        | 750  | —        | pF               | $V_{DS} = 10 \text{ V}, V_{GS} = 0,$<br>$f = 1 \text{ MHz}$                        |
| Output capacitance                  | $C_{oss}$     | —        | 112  | —        | pF               |  |
| Reverse transfer capacitance        | $C_{rss}$     | —        | 61   | —        | pF               |  |
| Turn - on delay time                | $t_{d(on)}$   | —        | 13   | —        | ns               | $I_D = 1 \text{ A}, V_{GS} = 10 \text{ V},$<br>$R_L = 10 \Omega, R_g = 4.7 \Omega$ |
| Rise time                           | $t_r$         | —        | 39   | —        | ns               |  |
| Turn - off delay time               | $t_{d(off)}$  | —        | 51   | —        | ns               |  |
| Fall time                           | $t_f$         | —        | 4.0  | —        | ns               |  |
| Total gate charge                   | $Q_g$         | —        | 12   | —        | nC               | $V_{DD} = 10 \text{ V}, V_{GS} = 10 \text{ V},$<br>$I_D = 6 \text{ A}$             |
| Gate to Source charge               | $Q_{gs}$      | —        | 1.8  | —        | nC               |  |
| Gate to drain charge                | $Q_{gd}$      | —        | 2.1  | —        | nC               |  |
| Body - drain diode forward voltage  | $V_{DF}$      | —        | 0.75 | —        | V                | $I_F = 1.5 \text{ A}, V_{GS} = 0^{\text{Note3}}$                                   |

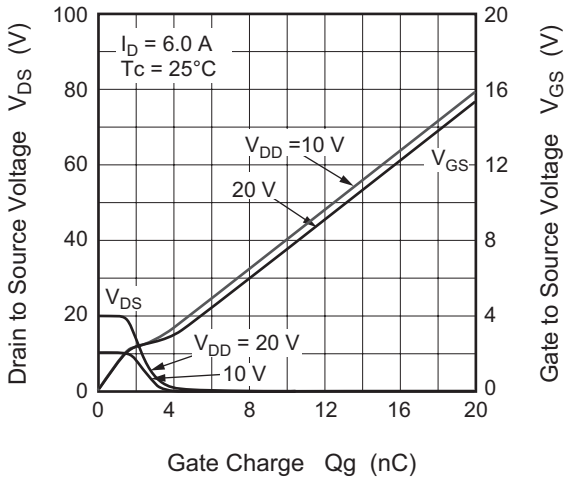
Notes: 3. Pulse test

Main Characteristics

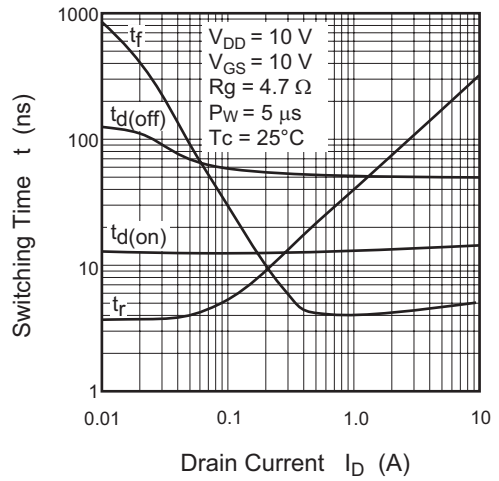




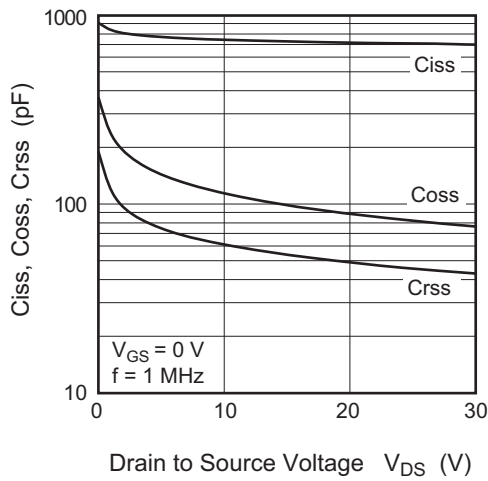
Dynamic Input Characteristics



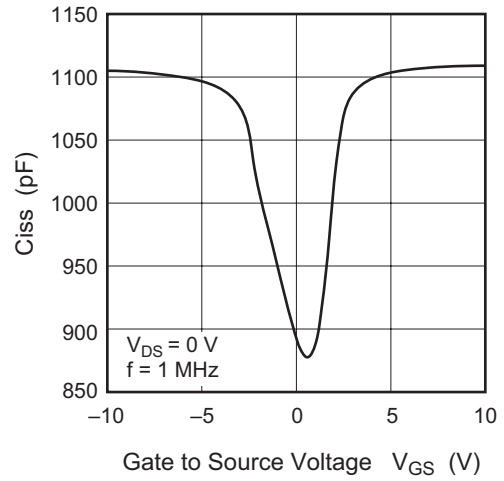
Switching Characteristics



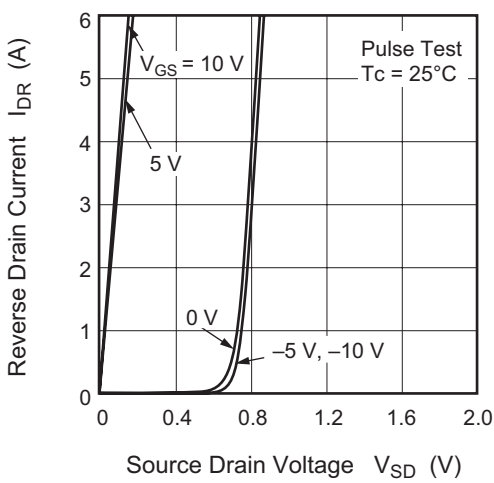
Typical Capacitance vs. Drain to Source Voltage



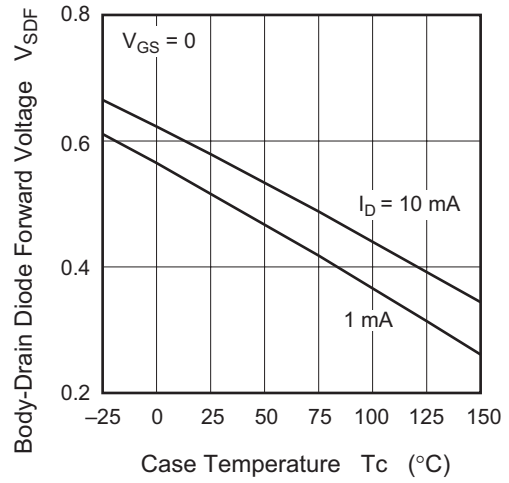
Input Capacitance vs. Gate to Source Voltage



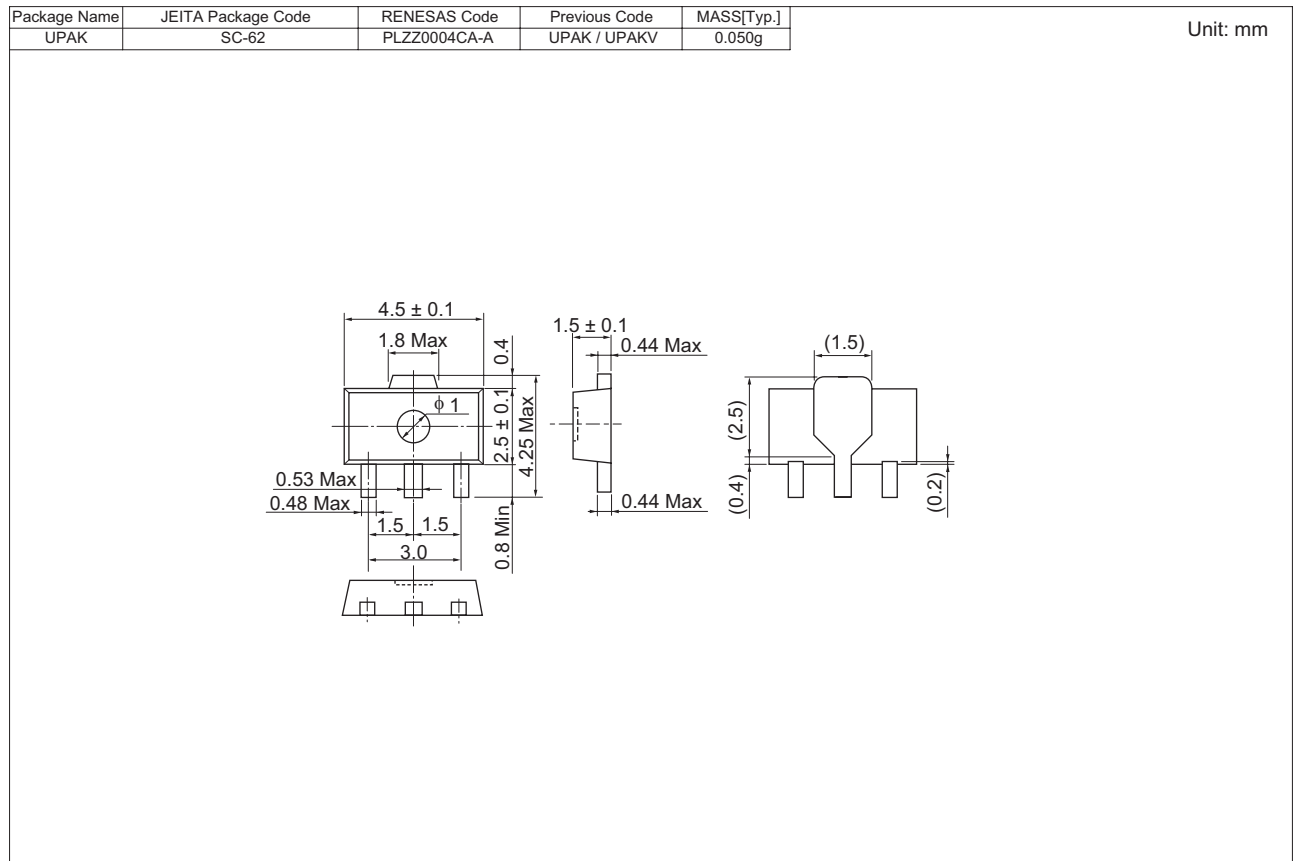
Reverse Drain Current vs. Source to Drain Voltage



Body-Drain Diode Forward Voltage vs. Case Temperature



### Package Dimensions



### Ordering Information

| Part Name        | Quantity  | Shipping Container             |
|------------------|-----------|--------------------------------|
| RQK0301FGDQSTL-E | 1000 pcs. | φ178 reel, 12 mm Emboss taping |

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