

# RQK0608BQDQS

Silicon N Channel MOS FET  
Power Switching

REJ03G1621-0100

Rev.1.00

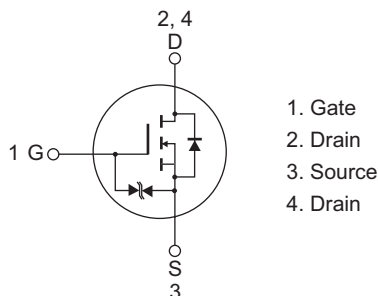
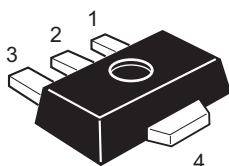
Mar 03, 2008

## Features

- Low on-resistance  
 $R_{DS(on)} = 120 \text{ m}\Omega$  typ.(at  $V_{GS} = 4.5 \text{ V}$ ,  $I_D = 1.6 \text{ A}$ )
- Low drive current
- High speed switching
- $V_{DSS} : 60 \text{ V}$  and capable of 2.5 V gate drive

## Outline

RENESAS package code: PLZZ0004CA-A  
(Package name: UPAK<sup>®</sup>)



Note: Marking is "BQ".

## 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                   | $V_{GSS}$                       | $\pm 12$    | V                |
| Drain current                            | $I_D$                           | 3.2         | A                |
| Drain peak current                       | $I_{D(pulse)}$ <sup>Note1</sup> | 10          | A                |
| Body - drain diode reverse drain current | $I_{DR}$                        | 3.2         | A                |
| Channel dissipation                      | $P_{ch}$ <sup>Note2</sup>       | 1.5         | W                |
| Channel temperature                      | $T_{ch}$                        | 150         | $^\circ\text{C}$ |
| Storage temperature                      | $T_{stg}$                       | -55 to +150 | $^\circ\text{C}$ |

Notes: 1.  $PW \leq 10 \mu\text{s}$ , Duty cycle  $\leq 1\%$

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

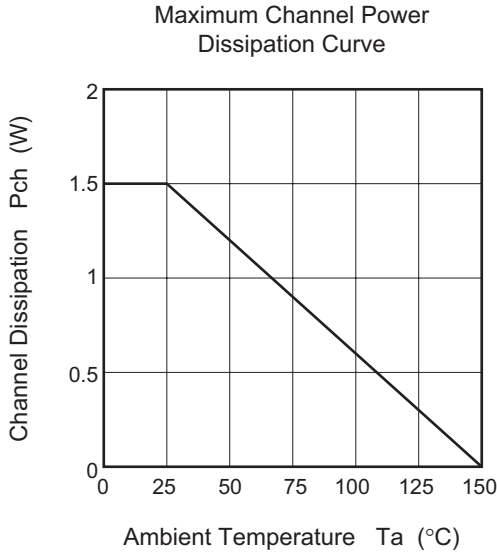
## Electrical Characteristics

(Ta = 25°C)

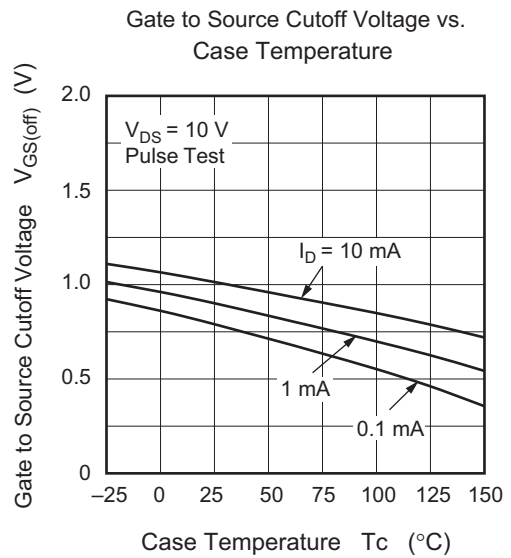
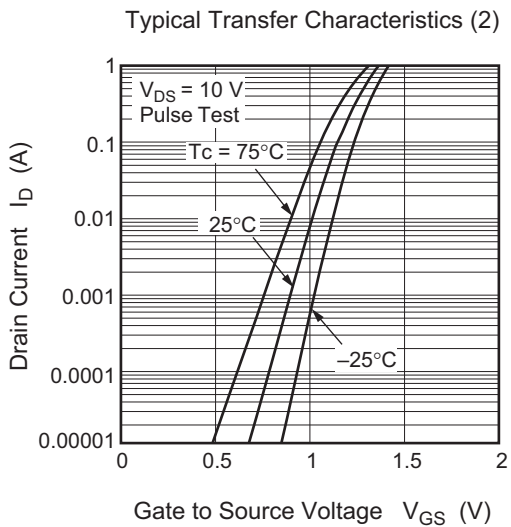
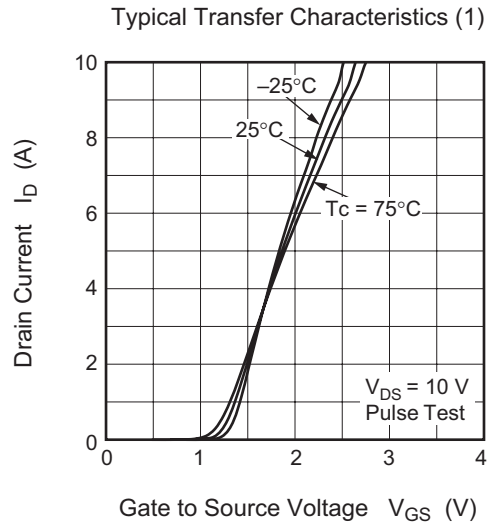
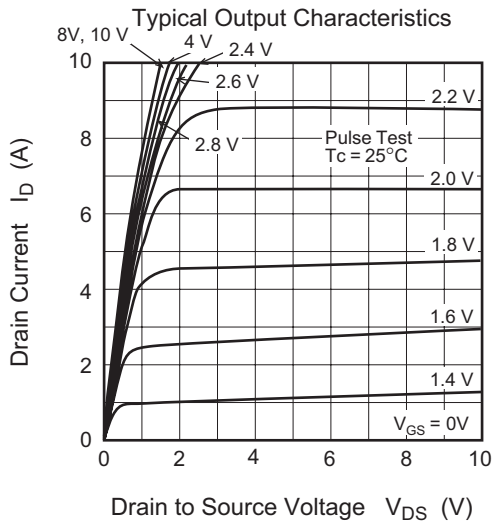
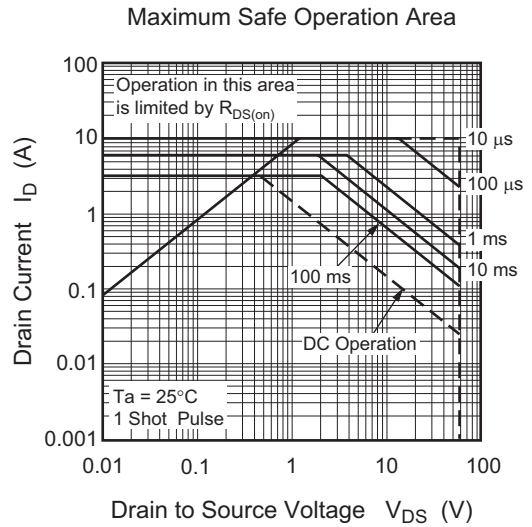
| Item                                | Symbol        | Min | Typ | Max | Unit             | Test conditions   |
|-------------------------------------|---------------|-----|-----|-----|------------------|---|
| Drain to source breakdown voltage   | $V_{(BR)DSS}$ | 60  | —   | —   | V                | $I_D = 10 \text{ mA}$ , $V_{GS} = 0$                              |
| Gate to source breakdown voltage    | $V_{(BR)GSS}$ | +12 | —   | —   | V                | $I_G = +100 \text{ }\mu\text{A}$ , $V_{DS} = 0$                   |
| Gate to source breakdown voltage    | $V_{(BR)GSS}$ | -12 | —   | —   | V                | $I_G = -100 \text{ }\mu\text{A}$ , $V_{DS} = 0$                   |
| Gate to source leak current         | $I_{GSS}$     | —   | —   | +10 | $\mu\text{A}$    | $V_{GS} = +10 \text{ V}$ , $V_{DS} = 0$                           |
| Gate to source leak current         | $I_{GSS}$     | —   | —   | -10 | $\mu\text{A}$    | $V_{GS} = -10 \text{ V}$ , $V_{DS} = 0$                           |
| Zero gate voltage drain current     | $I_{DSS}$     | —   | —   | 1   | $\mu\text{A}$    | $V_{DS} = 60 \text{ V}$ , $V_{GS} = 0$                            |
| Gate to source cutoff voltage       | $V_{GS(off)}$ | 0.4 | —   | 1.4 | V                | $V_{DS} = 10 \text{ V}$ , $I_D = 1 \text{ mA}$                    |
| Drain to source on state resistance | $R_{DS(on)}$  | —   | 120 | 155 | $\text{m}\Omega$ | $I_D = 1.6 \text{ A}$ , $V_{GS} = 4.5 \text{ V}$ <sup>Note3</sup> |
| Drain to source on state resistance | $R_{DS(on)}$  | —   | 140 | 195 | $\text{m}\Omega$ | $I_D = 1.6 \text{ A}$ , $V_{GS} = 2.5 \text{ V}$ <sup>Note3</sup> |
| Forward transfer admittance         | $ y_{fs} $    | 5   | 7.5 | —   | S                | $I_D = 1.6 \text{ A}$ , $V_{DS} = 10 \text{ V}$ <sup>Note3</sup>  |
| Input capacitance                   | $C_{iss}$     | —   | 300 | —   | pF               | $V_{DS} = 10 \text{ V}$   |
| Output capacitance                  | $C_{oss}$     | —   | 36  | —   | pF               | $V_{GS} = 0$  |
| Reverse transfer capacitance        | $C_{rss}$     | —   | 20  | —   | pF               | $f = 1 \text{ MHz}$   |
| Turn - on delay time                | $t_{d(on)}$   | —   | 12  | —   | ns               | $I_D = 1.6 \text{ A}$   |
| Rise time                           | $t_r$         | —   | 64  | —   | ns               | $V_{GS} = 4.5 \text{ V}$  |
| Turn - off delay time               | $t_{d(off)}$  | —   | 32  | —   | ns               | $R_L = 6.2 \text{ }\Omega$  |
| Fall time                           | $t_f$         | —   | 4   | —   | ns               | $R_g = 4.7 \text{ }\Omega$  |
| Total gate charge                   | $Q_g$         | —   | 3   | —   | nC               | $V_{DD} = 10 \text{ V}$   |
| Gate to Source charge               | $Q_{gs}$      | —   | 0.6 | —   | nC               | $V_{GS} = 4.5 \text{ V}$  |
| Gate to drain charge                | $Q_{gd}$      | —   | 1   | —   | nC               | $I_D = 3.2 \text{ A}$   |
| Body - drain diode forward voltage  | $V_{DF}$      | —   | 0.8 | —   | V                | $I_F = 3.2 \text{ A}$ , $V_{GS} = 0$ <sup>Note3</sup>             |

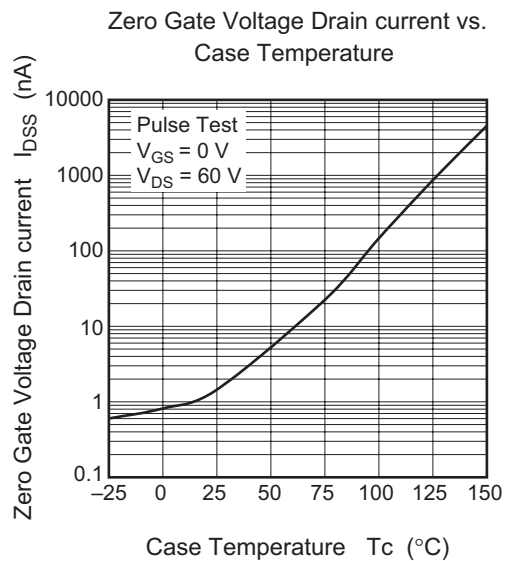
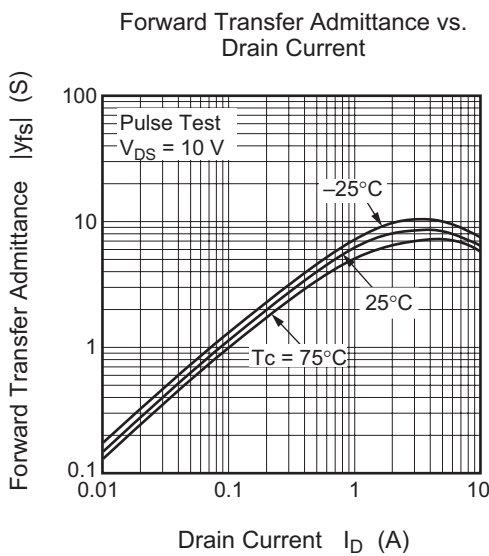
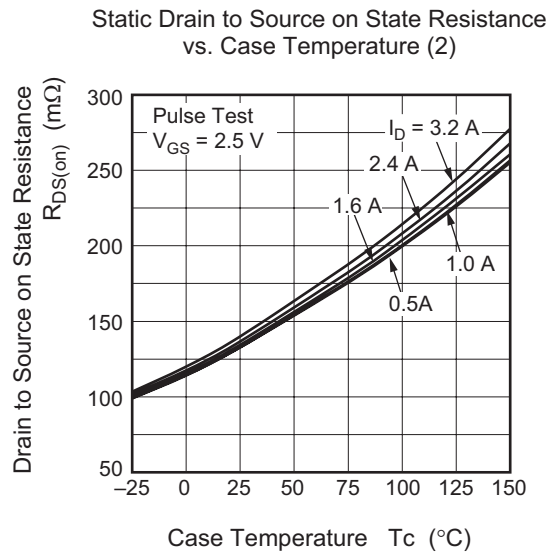
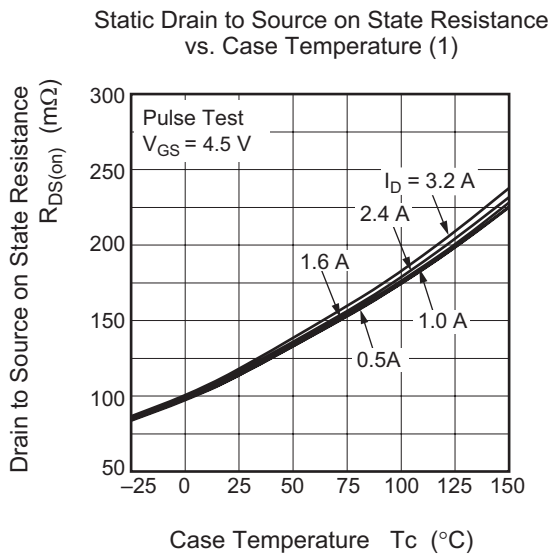
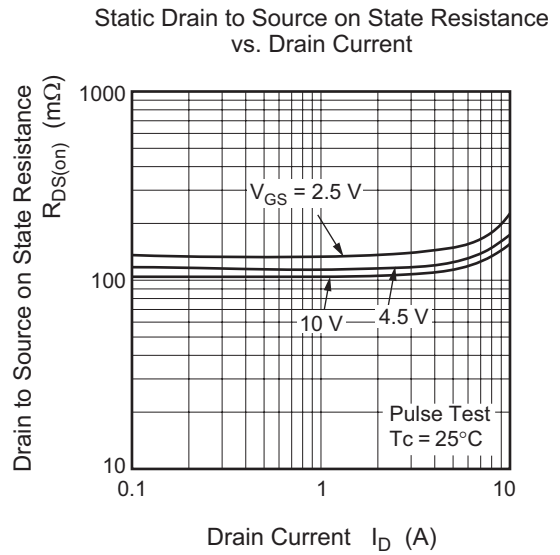
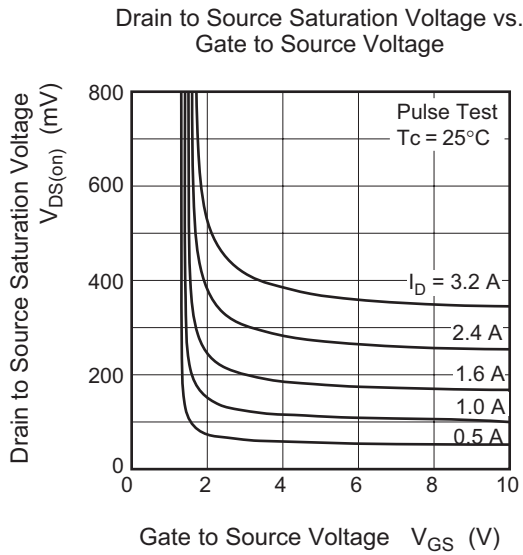
Notes: 3. Pulse test

Main Characteristics

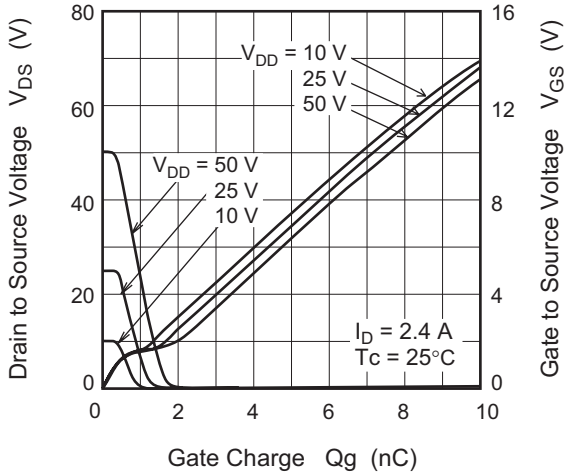


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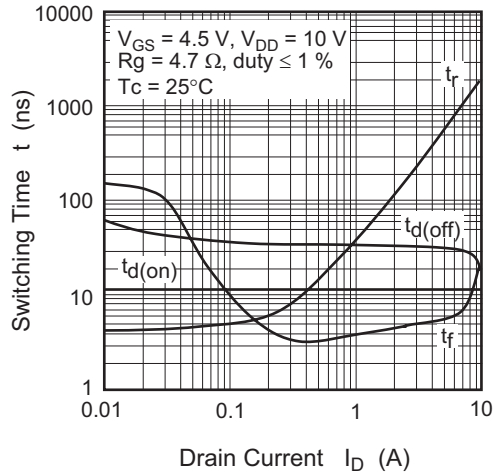




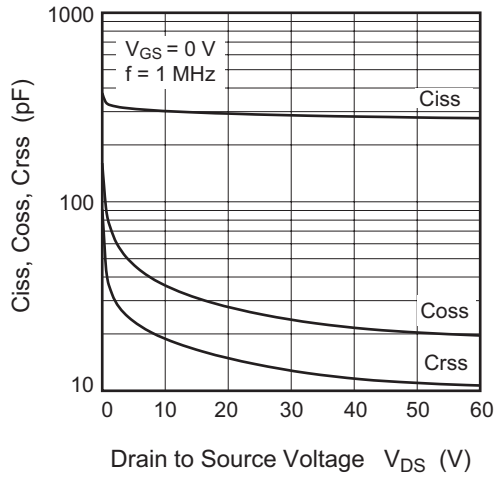
Dynamic Input Characteristics



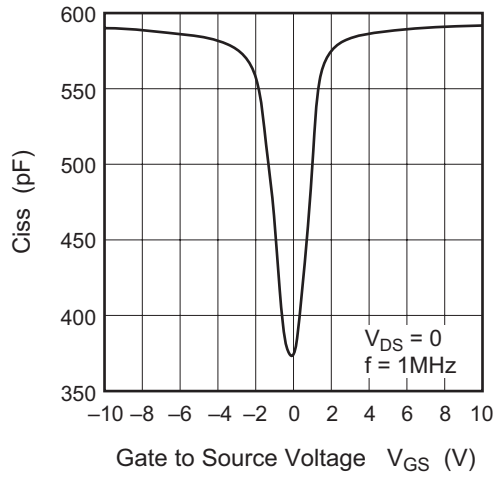
Switching Characteristics



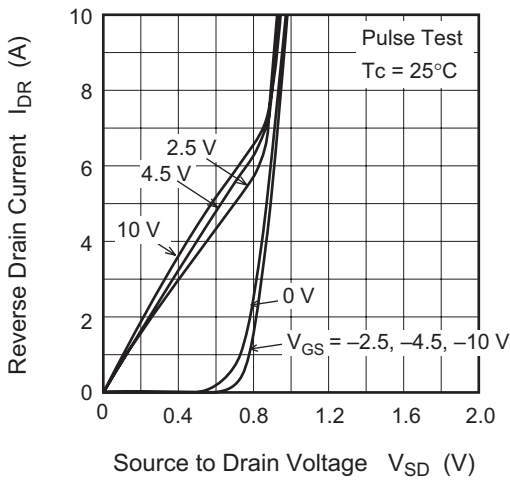
Typical Capacitance vs. Drain to Source Voltage



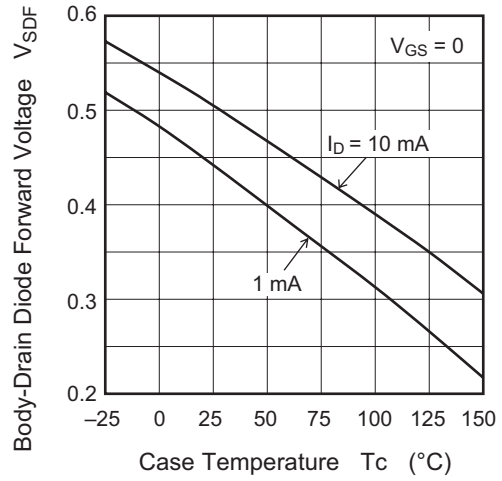
Input Capacitance vs. Gate to Source Voltage

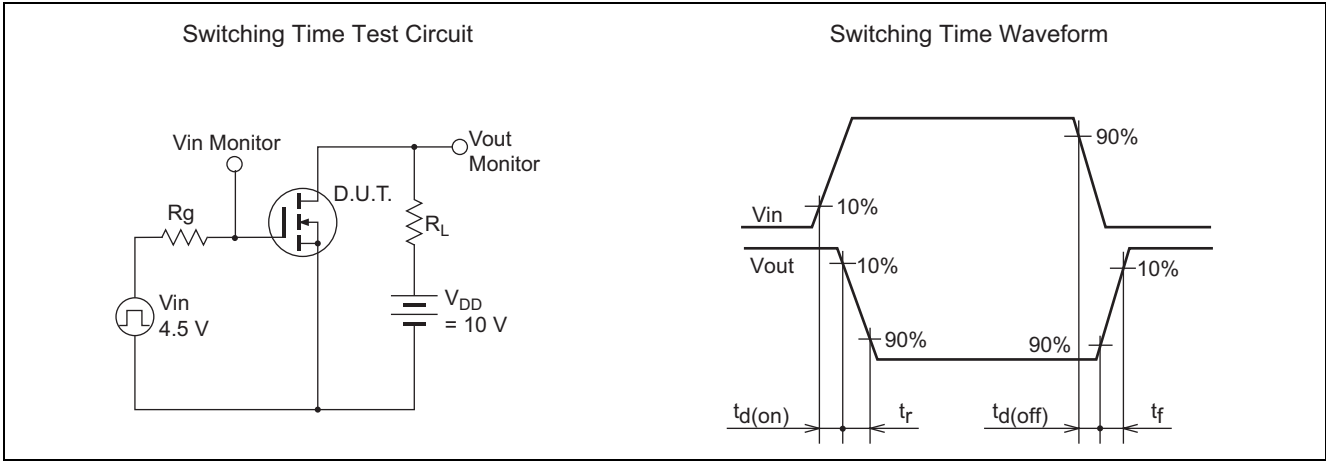


Reverse Drain Current vs. Source to Drain Voltage

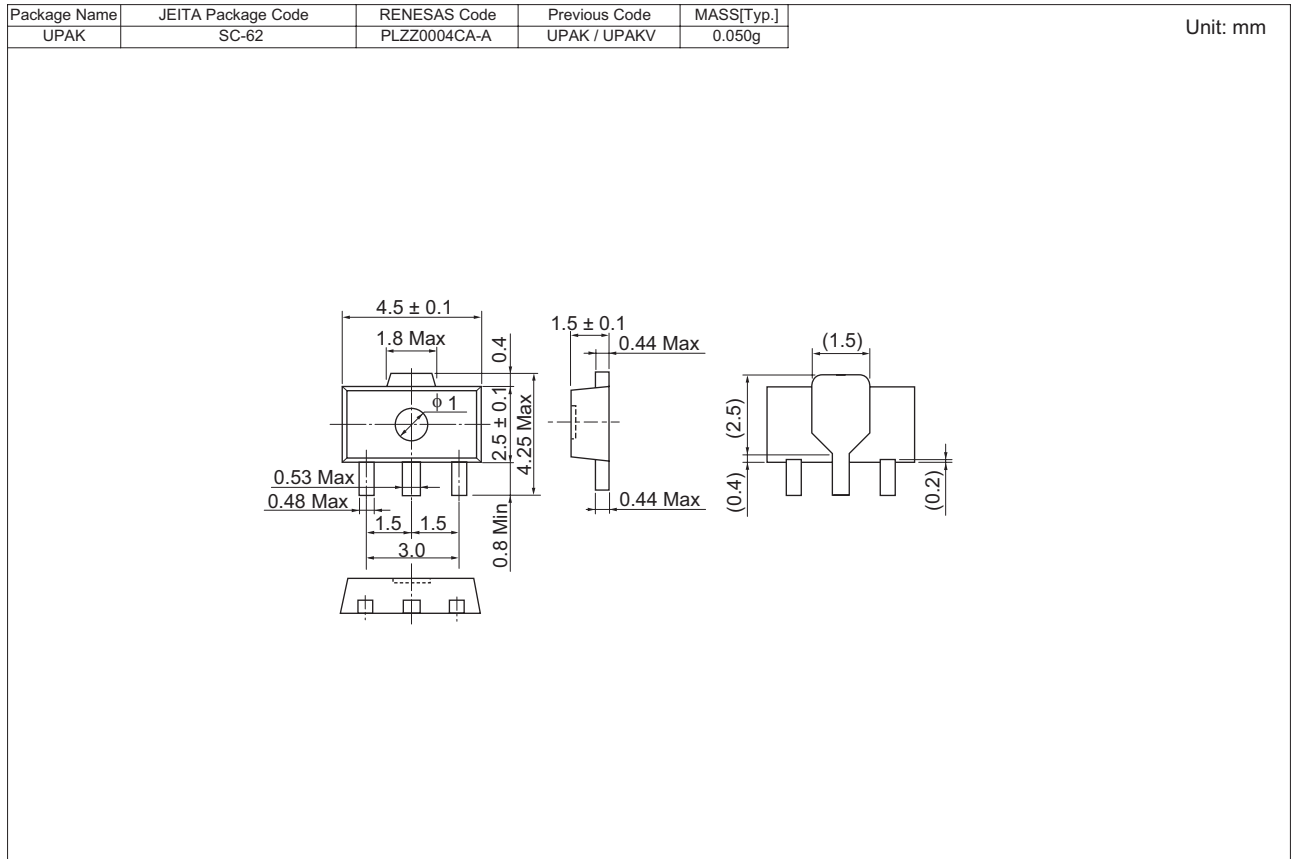


Body-Drain Diode Forward Voltage vs. Case Temperature





### Package Dimensions



### Ordering Information

| Part No.         | Quantity  | Shipping Container                      |
|------------------|-----------|---|
| RQK0608BQDQSTL-E | 1000 pcs. | $\phi 178$ mm reel, 12 mm Emboss taping |

Notes:

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