

# RQK0302GGDQA

Silicon N Channel MOS FET  
Power Switching

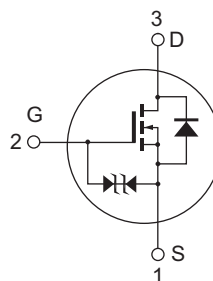
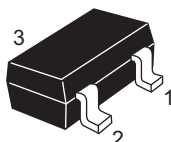
R07DS0305EJ0600  
Rev.6.00  
Jan 10, 2014

## Features

- Low on-resistance  
 $R_{DS(on)} = 92 \text{ m}\Omega$  typ ( $V_{GS} = 10 \text{ V}$ ,  $I_D = 1.3 \text{ A}$ )
- Low drive current
- High speed switching
- 4.5 V gate drive

## Outline

RENESAS Package code: PLSP0003ZB-A  
(Package name: MPAK)



1. Source
2. Gate
3. Drain

Note: Marking is "GG".

## 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                            | $I_D$                           | 2.7         | A                |
| Drain peak current                       | $I_{D(Pulse)}$ <sup>Note1</sup> | 5           | A                |
| Body - drain diode reverse drain current | $I_{DR}$                        | 2.7         | A                |
| Channel dissipation                      | $P_{ch}$ <sup>Note2</sup>       | 0.8         | 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:  $40 \times 40 \times 1 \text{ mm}$ )

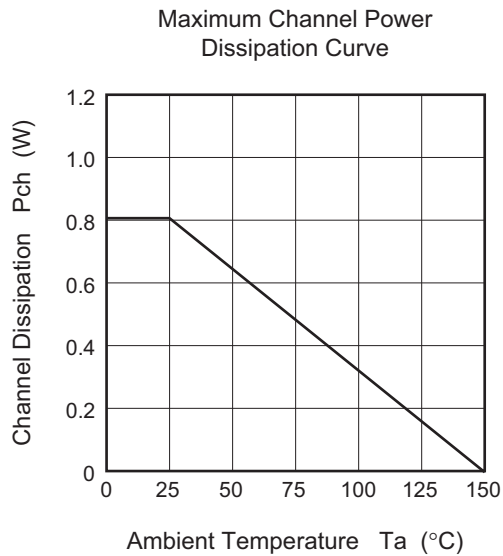
## Electrical Characteristics

(Ta = 25°C)

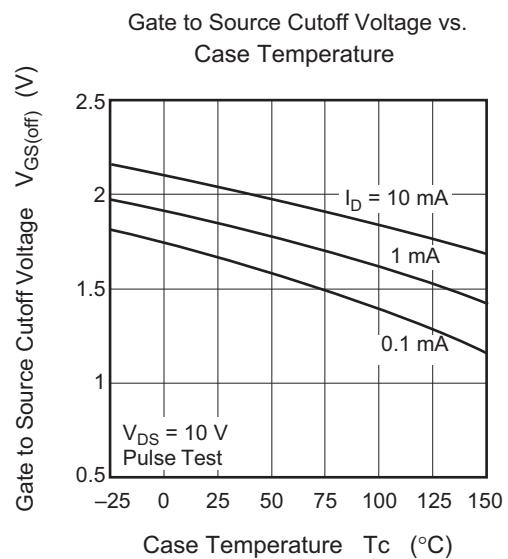
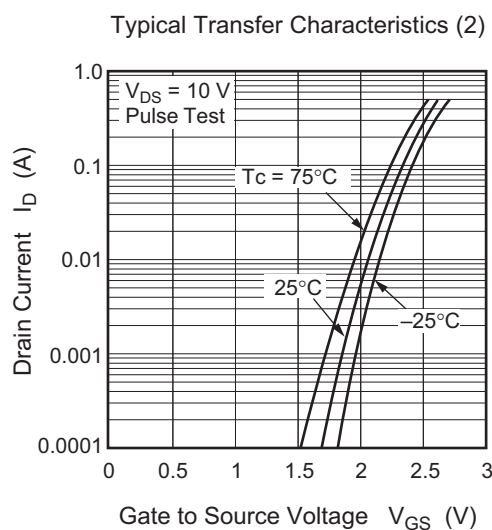
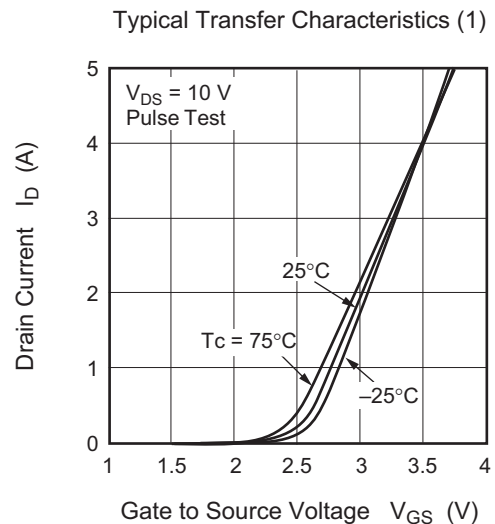
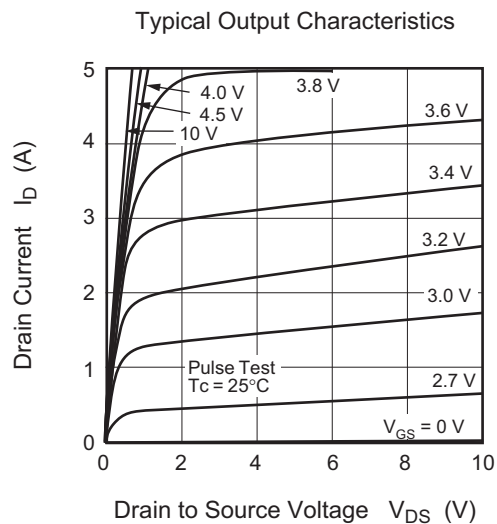
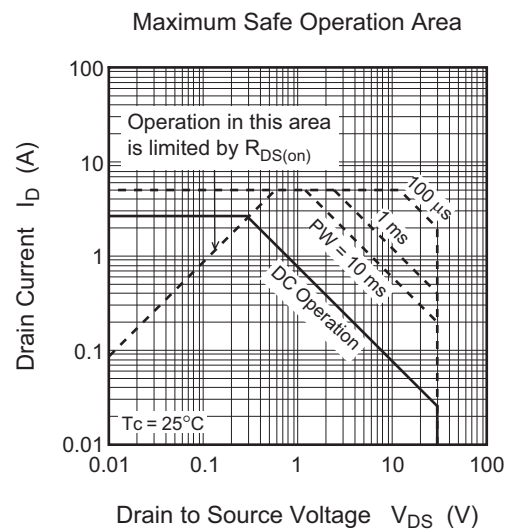
| Item                                | Symbol        | Min      | Typ | Max      | Unit             | Test conditions                                                                           |
|-------------------------------------|---------------|----------|-----|----------|------------------|-------------------------------------------------------------------------------------------|
| 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 | $R_{DS(on)}$  | —        | 92  | 115      | $\text{m}\Omega$ | $I_D = 1.3 \text{ A}$ , $V_{GS} = 10 \text{ V}$ <sup>Note3</sup>                          |
|                                     | $R_{DS(on)}$  | —        | 122 | 171      | $\text{m}\Omega$ | $I_D = 1.3 \text{ A}$ , $V_{GS} = 4.5 \text{ V}$ <sup>Note3</sup>                         |
| Forward transfer admittance         | $ y_{fs} $    | 2.1      | 3.5 | —        | S                | $I_D = 1.3 \text{ A}$ , $V_{DS} = 10 \text{ V}$ <sup>Note3</sup>                          |
| Input capacitance                   | $C_{iss}$     | —        | 175 | —        | pF               | $V_{DS} = 10 \text{ V}$ , $V_{GS} = 0$ ,<br>$f = 1 \text{ MHz}$                           |
| Output capacitance                  | $C_{oss}$     | —        | 34  | —        | pF               |                                                                                           |
| Reverse transfer capacitance        | $C_{rss}$     | —        | 15  | —        | pF               |                                                                                           |
| Turn - on delay time                | $t_{d(on)}$   | —        | 9.5 | —        | ns               | $I_D = 1 \text{ A}$ , $V_{GS} = 10 \text{ V}$ ,<br>$R_L = 10 \Omega$ , $R_g = 4.7 \Omega$ |
| Rise time                           | $t_r$         | —        | 37  | —        | ns               |                                                                                           |
| Turn - off delay time               | $t_{d(off)}$  | —        | 38  | —        | ns               |                                                                                           |
| Fall time                           | $t_f$         | —        | 8.2 | —        | ns               |                                                                                           |
| Total gate charge                   | $Q_g$         | —        | 3.3 | —        | nC               | $V_{DD} = 10 \text{ V}$ , $V_{GS} = 10 \text{ V}$ ,<br>$I_D = 2.7 \text{ A}$              |
| Gate to source charge               | $Q_{gs}$      | —        | 0.6 | —        | nC               |                                                                                           |
| Gate to drain charge                | $Q_{gd}$      | —        | 0.5 | —        | nC               |                                                                                           |
| Body - drain diode forward voltage  | $V_{DF}$      | —        | 0.9 | —        | V                | $I_F = 1.5 \text{ A}$ , $V_{GS} = 0$ <sup>Note3</sup>                                     |

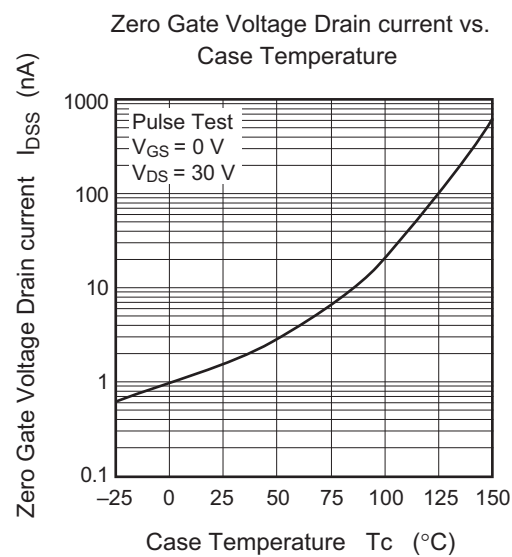
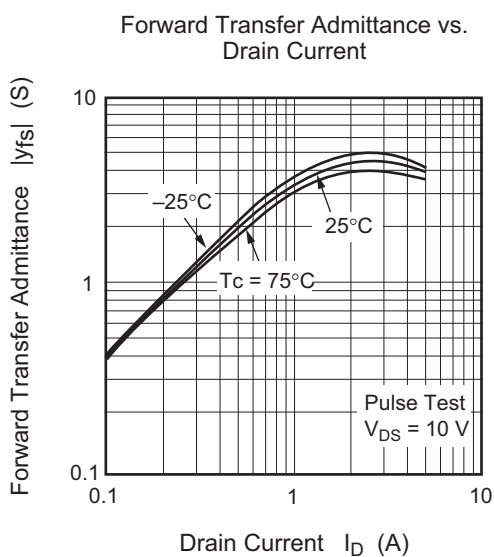
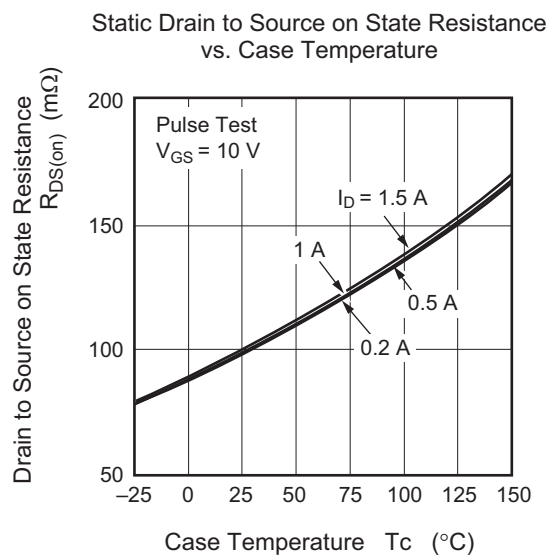
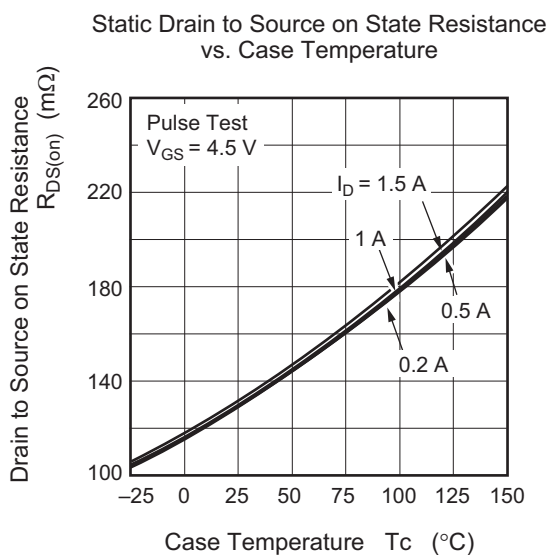
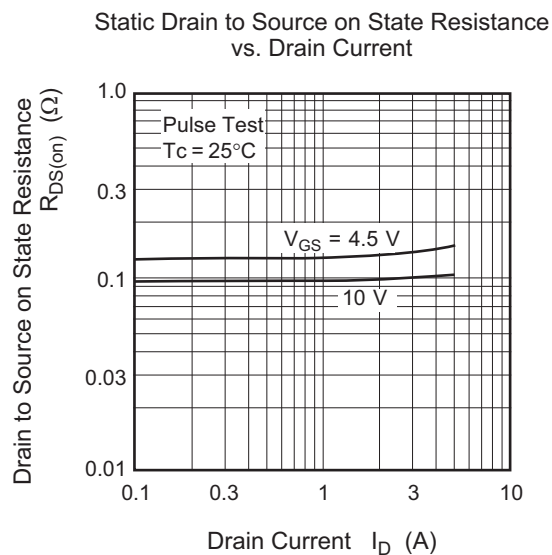
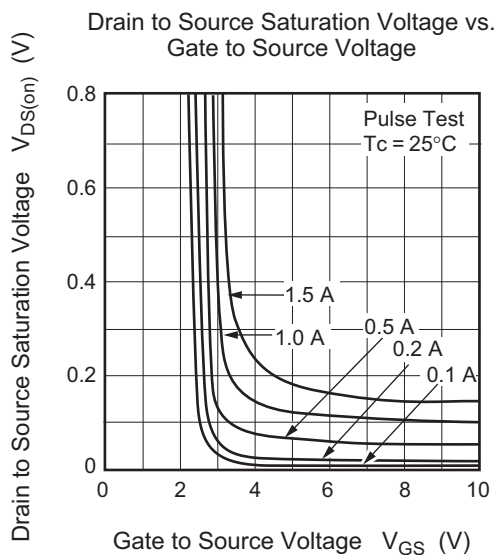
Notes: 3. Pulse test

## Main Characteristics

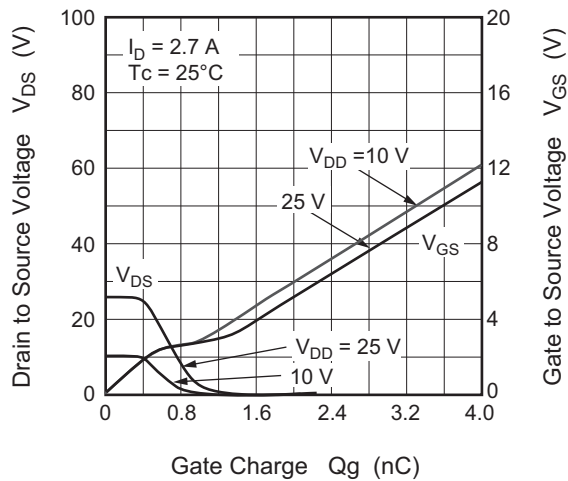


\*When using the glass epoxy board (FR-4: 40 × 40 × 1 mm)

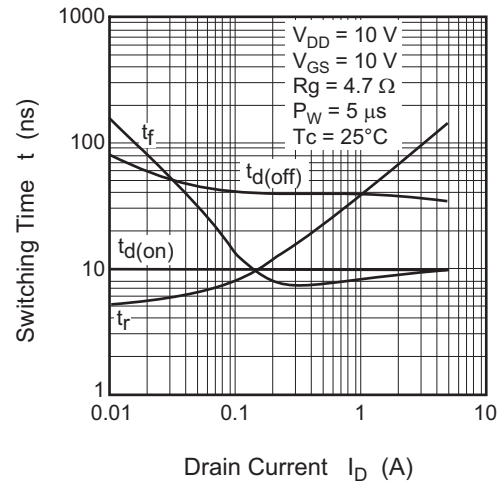




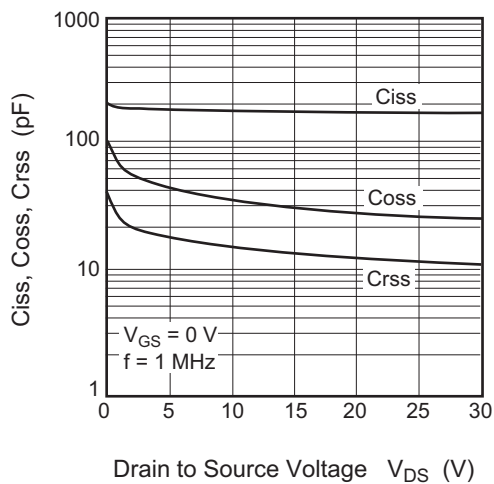
Dynamic Input Characteristics



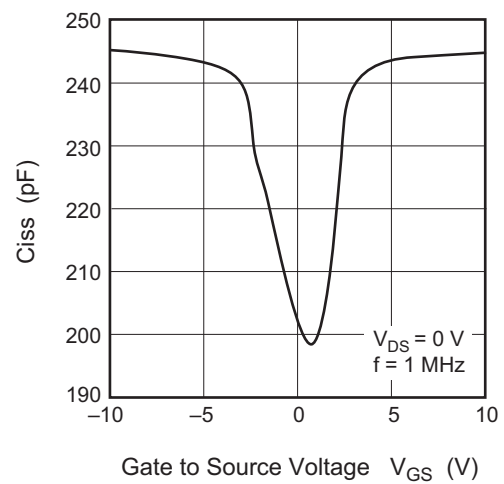
Switching Characteristics



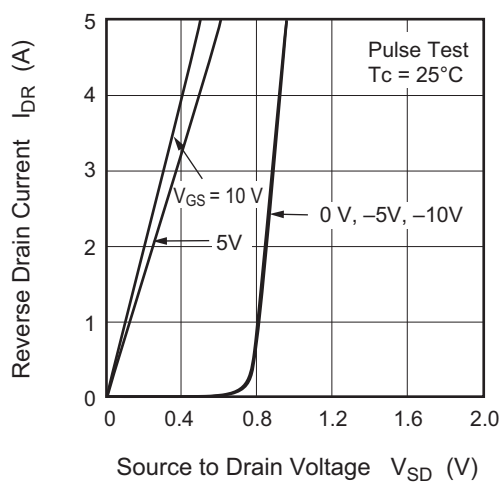
Typical Capacitance vs. Drain to Source Voltage



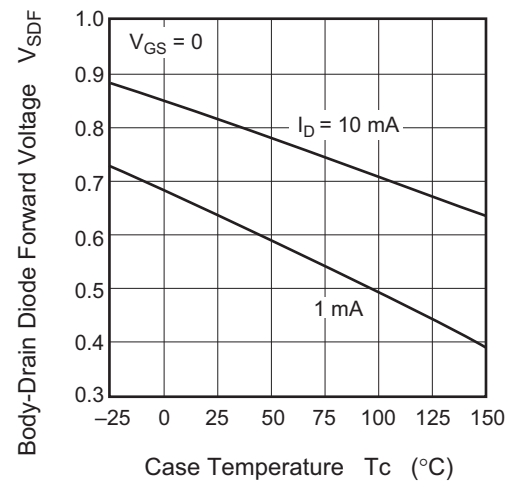
Input Capacitance vs. Gate to Source Voltage



Reverse Drain Current vs. Source to Drain Voltage

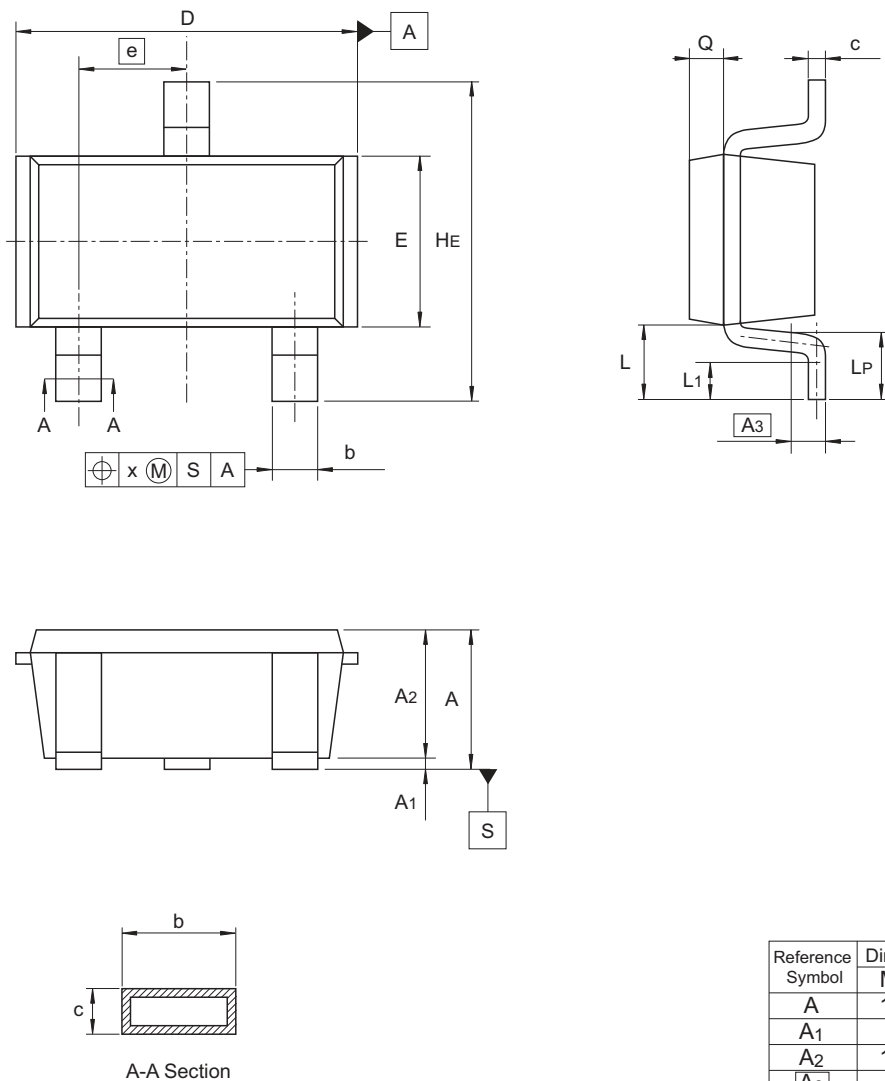


Body-Drain Diode Forward Voltage vs. Case Temperature



Package Dimensions

| JEITA Package Code | RENESAS Code | Previous Code      | MASS (Typ) [g] |
|--------------------|--------------|--------------------|----------------|
| SC-59A             | PLSP0003ZB-A | MPAK(T) / MPAK(T)V | 0.011          |



| Reference<br>Symbol | Dimensions in millimeters |      |      |
|---------------------|---------------------------|------|------|
|                     | Min                       | Nom  | Max  |
| A                   | 1.0                       | —    | 1.3  |
| A <sub>1</sub>      | 0                         | —    | 0.1  |
| A <sub>2</sub>      | 1.0                       | 1.1  | 1.2  |
| A <sub>3</sub>      | —                         | 0.25 | —    |
| b                   | 0.35                      | 0.4  | 0.5  |
| c                   | 0.1                       | 0.16 | 0.26 |
| D                   | 2.7                       | —    | 3.1  |
| E                   | 1.35                      | 1.5  | 1.65 |
| e                   | —                         | 0.95 | —    |
| HE                  | 2.2                       | 2.8  | 3.0  |
| L                   | 0.35                      | —    | 0.75 |
| L <sub>1</sub>      | 0.15                      | —    | 0.55 |
| LP                  | 0.25                      | —    | 0.65 |
| x                   | —                         | —    | 0.05 |
| Q                   | —                         | 0.3  | —    |

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**Ordering Information**

| Orderable Part Number | Quantity  | Shipping Container               |
|-----------------------|-----------|----------------------------------|
| RQK0302GGDQATL-H      | 3000 pcs. | φ178 mm reel, 8 mm Emboss taping |

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2880 Scott Boulevard Santa Clara, CA 95050-2554, U.S.A.  
Tel: +1-408-588-6000, Fax: +1-408-588-6130

**Renesas Electronics Canada Limited**  
1101 Nicholson Road, Newmarket, Ontario L3Y 9C3, Canada  
Tel: +1-905-898-5441, Fax: +1-905-898-3220

**Renesas Electronics Europe Limited**  
Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K.  
Tel: +44-1628-651-700, Fax: +44-1628-651-804

**Renesas Electronics Europe GmbH**  
Arcadiastrasse 10, 40472 Düsseldorf, Germany  
Tel: +49-211-65030, Fax: +49-211-6503-1327

**Renesas Electronics (China) Co., Ltd.**  
7th Floor, Quantum Plaza, No.27 ZhiChunLu Haidian District, Beijing 100083, P.R.China  
Tel: +86-10-8235-1155, Fax: +86-10-8235-7679

**Renesas Electronics (Shanghai) Co., Ltd.**  
Unit 301, Tower A, Central Towers, 555 LanGao Rd., Putuo District, Shanghai, China  
Tel: +86-21-2226-0888, Fax: +86-21-2226-0999

**Renesas Electronics Hong Kong Limited**  
Unit 1601-1613, 16/F., Tower 2, Grand Century Place, 193 Prince Edward Road West, Mongkok, Kowloon, Hong Kong  
Tel: +852-2886-9318, Fax: +852 2886-9022/9044

**Renesas Electronics Taiwan Co., Ltd.**  
13F, No. 363, Fu Shing North Road, Taipei, Taiwan  
Tel: +886-2-8175-9600, Fax: +886 2-8175-9670

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80 Bendemeer Road, Unit #06-02 Hyflux Innovation Centre Singapore 339949  
Tel: +65-6213-0200, Fax: +65-6213-0300

**Renesas Electronics Malaysia Sdn.Bhd.**  
Unit 906, Block B, Menara Amcorp, Amcorp Trade Centre, No. 18, Jln Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia  
Tel: +60-3-7955-9390, Fax: +60-3-7955-9510

**Renesas Electronics Korea Co., Ltd.**  
12F., 234 Teheran-ro, Gangnam-Gu, Seoul, 135-080, Korea  
Tel: +82-2-558-3737, Fax: +82-2-558-5141