

RQK0202RGDQA

Silicon N Channel MOS FET
Power Switching

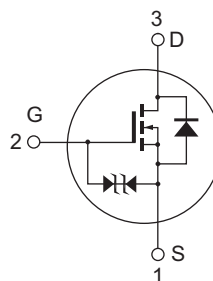
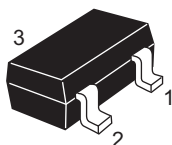
R07DS0302EJ0500
Rev.5.00
Jan 10, 2014

Features

- Low on-resistance
 $R_{DS(on)} = 42 \text{ m}\Omega$ typ ($V_{GS} = 4.5 \text{ V}$, $I_D = 1.9 \text{ A}$)
- Low drive current
- High speed switching
- 2.5 V gate drive

Outline

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



1. Source
2. Gate
3. Drain

Note: Marking is "RG".

Absolute Maximum Ratings

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

| Item | Symbol | Ratings | Unit |
|--|---------------------------------|-------------|------------------|
| Drain to source voltage | V_{DSS} | 20 | V |
| Gate to source voltage | V_{GSS} | ± 12 | V |
| Drain current | I_D | 3.8 | A |
| Drain peak current | $I_{D(pulse)}$ ^{Note1} | 12 | A |
| Body - drain diode reverse drain current | I_{DR} | 3.8 | A |
| Channel dissipation | P_{ch} ^{Note2} | 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 x 40 x 1 mm)

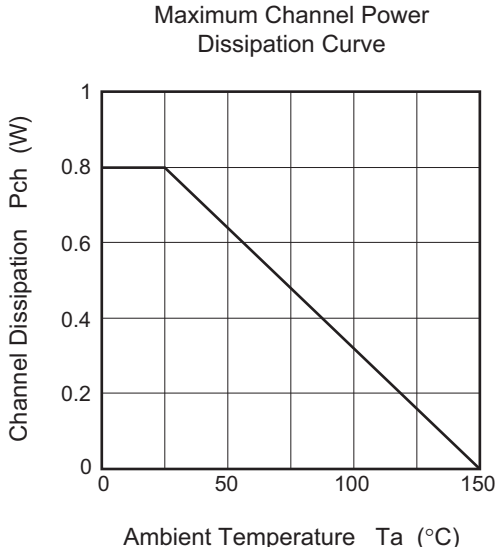
Electrical Characteristics

(Ta = 25°C)

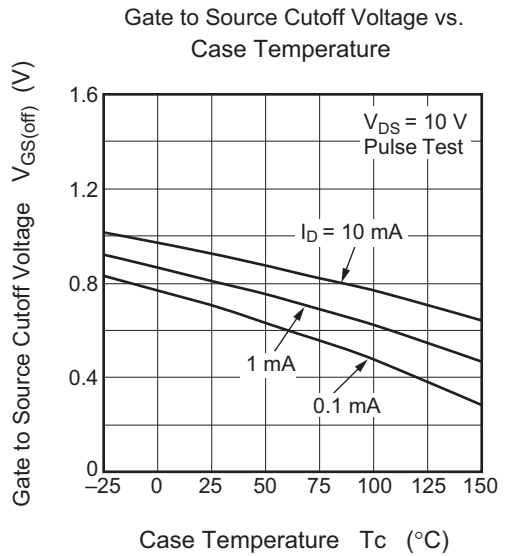
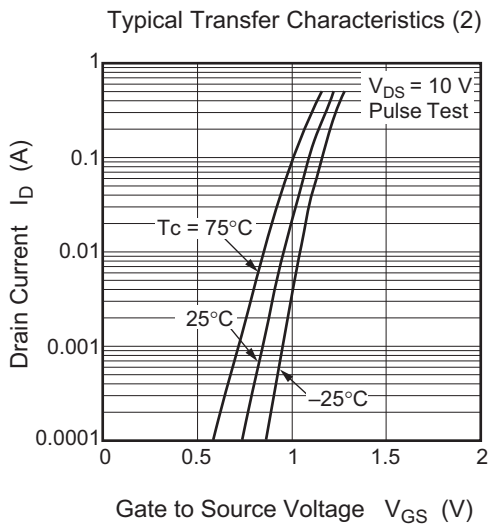
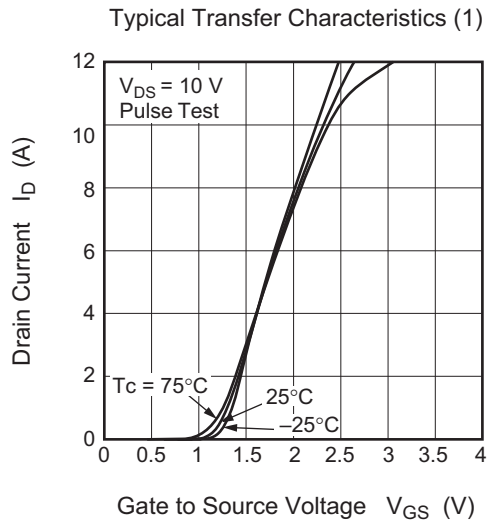
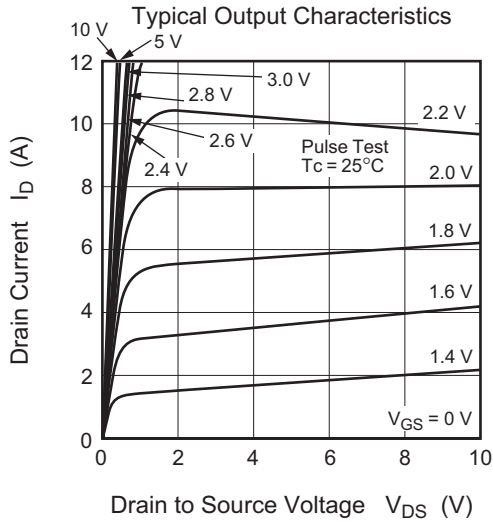
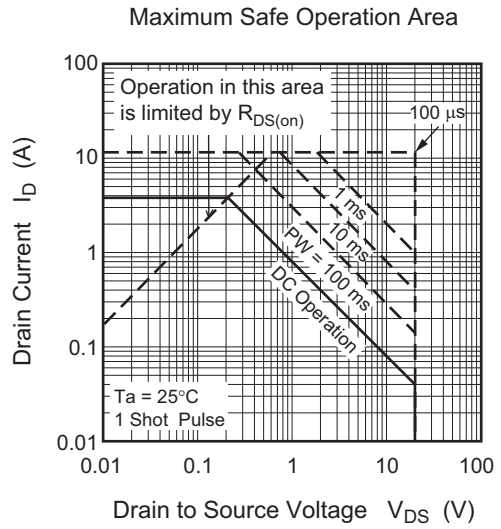
| Item | Symbol | Min | Typ | Max | Unit | Test conditions |
|-------------------------------------|---------------|----------|------|----------|---------------|---|
| Drain to source breakdown voltage | $V_{(BR)DSS}$ | 20 | — | — | V | $I_D = 10 \text{ mA}$, $V_{GS} = 0$ |
| Gate to source breakdown voltage | $V_{(BR)GSS}$ | ± 12 | — | — | V | $I_G = \pm 100 \text{ }\mu\text{A}$, $V_{DS} = 0$ |
| Gate to source leak current | I_{GSS} | — | — | ± 10 | μA | $V_{GS} = \pm 10 \text{ V}$, $V_{DS} = 0$ |
| Drain to source leak current | I_{DSS} | — | — | 1 | μA | $V_{DS} = 20 \text{ V}$, $V_{GS} = 0$ |
| 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 | $R_{DS(on)}$ | — | 42 | 55 | m Ω | $I_D = 1.9 \text{ A}$, $V_{GS} = 4.5 \text{ V}$ ^{Note3} |
| | $R_{DS(on)}$ | — | 62 | 85 | m Ω | $I_D = 1.9 \text{ A}$, $V_{GS} = 2.5 \text{ V}$ ^{Note3} |
| Forward transfer admittance | $ y_{fs} $ | 6 | 8.5 | — | S | $I_D = 1.9 \text{ A}$, $V_{DS} = 10 \text{ V}$ ^{Note3} |
| Input capacitance | C_{iss} | — | 293 | — | pF | $V_{DS} = 10 \text{ V}$ $V_{GS} = 0$ $f = 1 \text{ MHz}$ |
| Output capacitance | C_{oss} | — | 74 | — | pF | |
| Reverse transfer capacitance | C_{rss} | — | 37 | — | pF | |
| Turn - on delay time | $t_{d(on)}$ | — | 13 | — | ns | $I_D = 1.9 \text{ A}$ $V_{GS} = 4.5 \text{ V}$ $R_L = 5.2 \text{ }\Omega$ $R_g = 4.7 \text{ }\Omega$ |
| Rise time | t_r | — | 88 | — | ns | |
| Turn - off delay time | $t_{d(off)}$ | — | 35 | — | ns | |
| Fall time | t_f | — | 7 | — | ns | |
| Total gate charge | Q_g | — | 3.7 | — | nC | $V_{DD} = 10 \text{ V}$ $V_{GS} = 4.5 \text{ V}$ $I_D = 3.8 \text{ A}$ |
| Gate to source charge | Q_{gs} | — | 0.5 | — | nC | |
| Gate to drain charge | Q_{gd} | — | 0.8 | — | nC | |
| Body - drain diode forward voltage | V_{DF} | — | 0.85 | 1.1 | V | $I_F = 3.8 \text{ A}$, $V_{GS} = 0$ ^{Note3} |

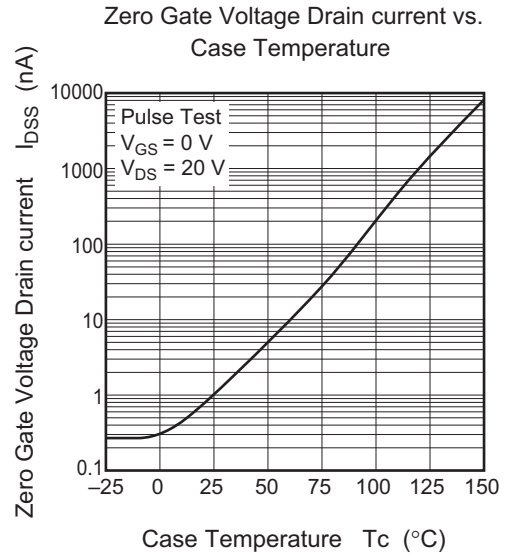
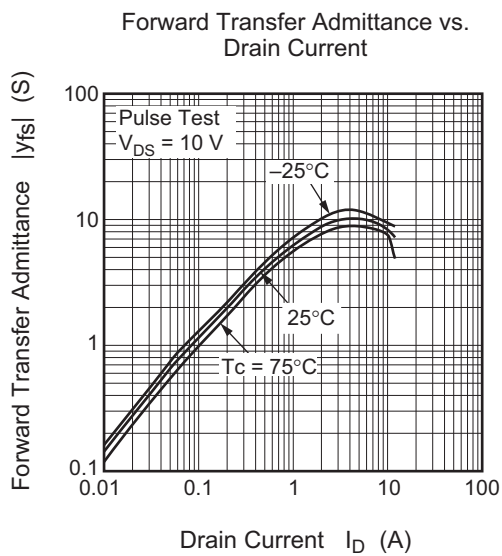
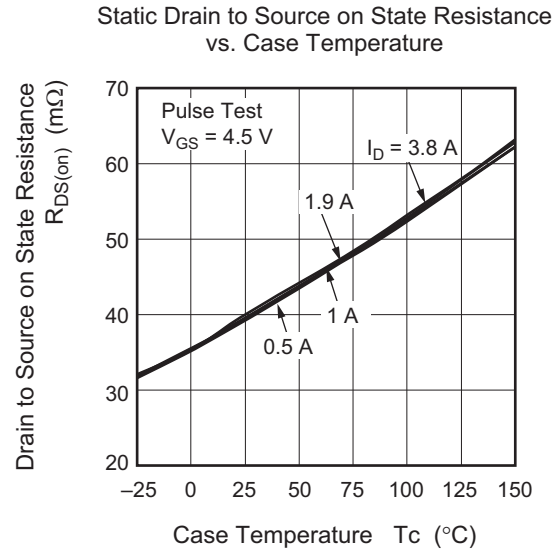
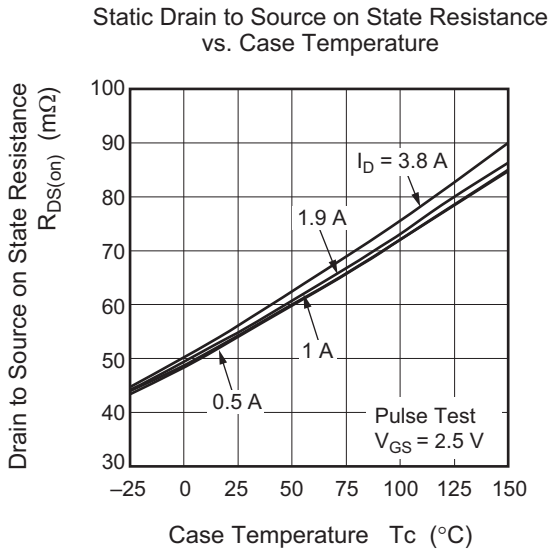
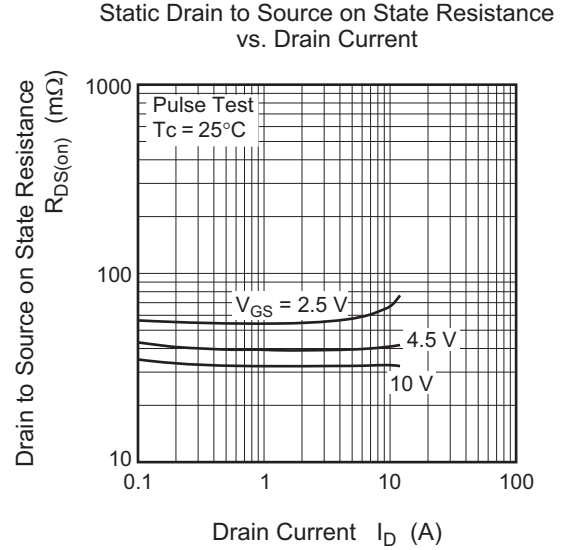
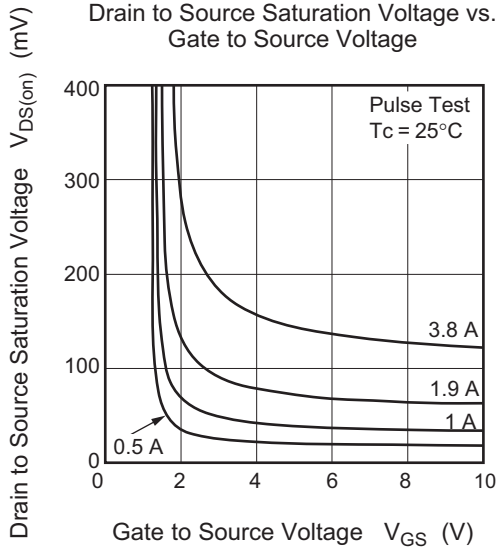
Notes: 3. Pulse test

Main Characteristics

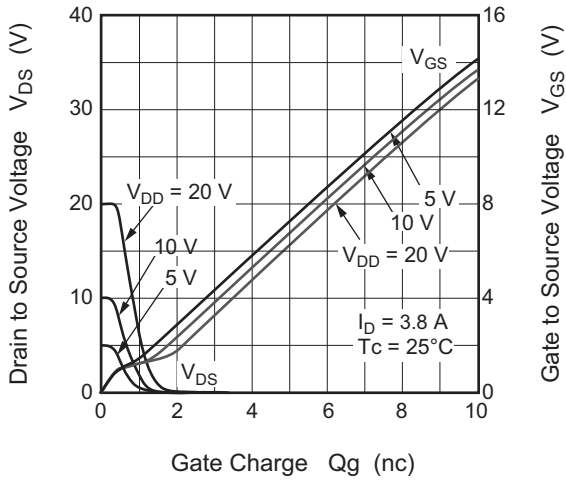


*When using the glass epoxy board (FR-4: 40 × 40 × 1 mm)

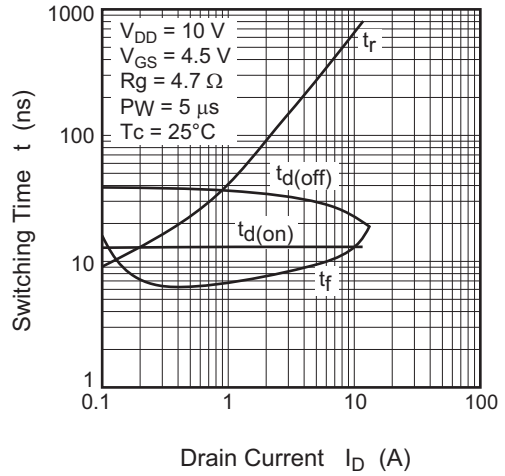




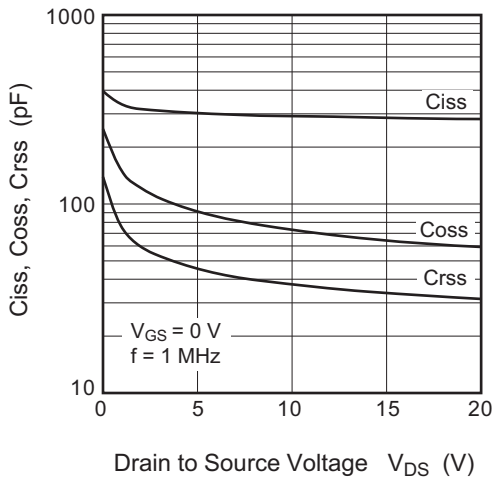
Dynamic Input Characteristics



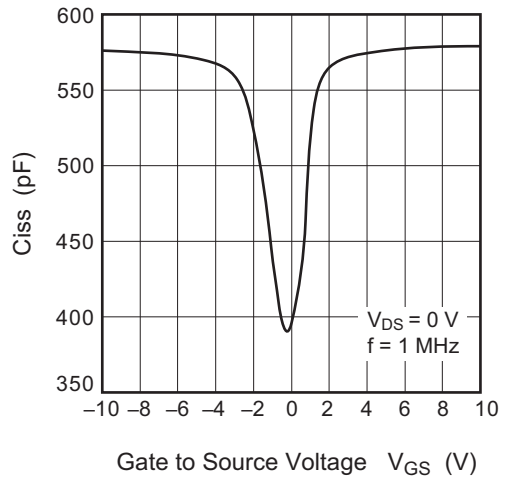
Switching Characteristics



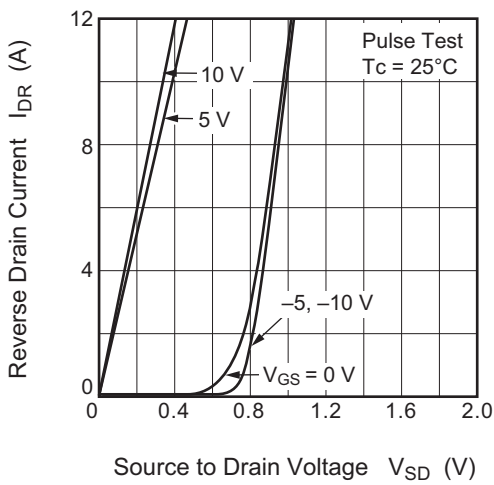
Typical Capacitance vs. Drain to Source Voltage



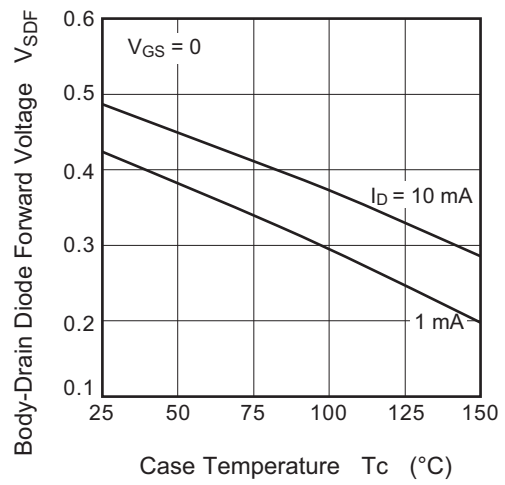
Input Capacitance vs. Gate to Source Voltage



Reverse Drain Current vs. Source to Drain Voltage

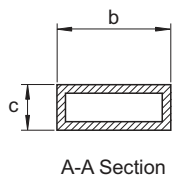
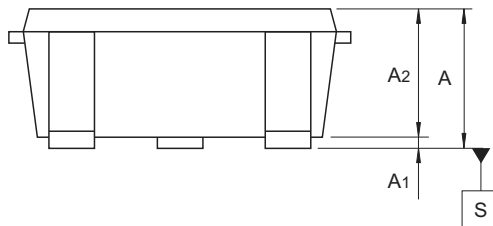
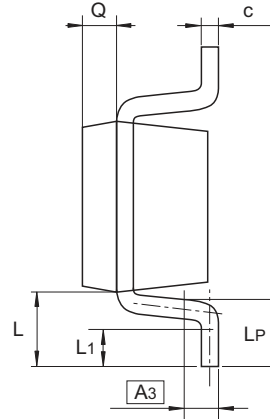
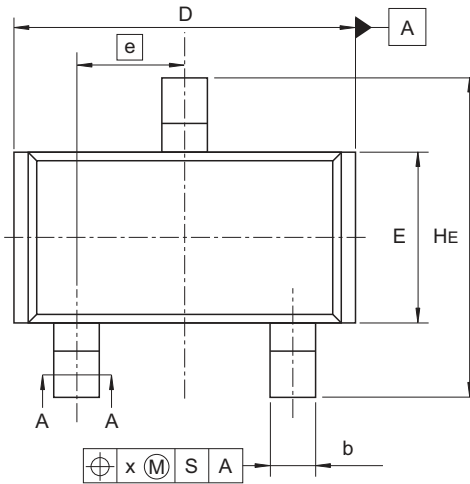


Body-Drain Diode Forward Voltage vs. Case Temperature



Package Dimensions

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



| Reference Symbol | Dimensions in millimeters | | |
|------------------|---------------------------|------|------|
| | Min | Nom | Max |
| A | 1.0 | — | 1.3 |
| A1 | 0 | — | 0.1 |
| A2 | 1.0 | 1.1 | 1.2 |
| A3 | — | 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 |
| L1 | 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 |
|-----------------------|-----------|----------------------------------|
| RQK0202RGDQATL-H | 3000 pcs. | φ178 mm reel, 8 mm Emboss taping |

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