

RQJ0305EQDQA

Silicon P Channel MOS FET
Power Switching

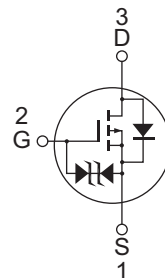
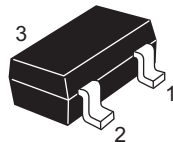
R07DS0297EJ0300
Rev.3.00
Jan 10, 2014

Features

- Low gate drive
 V_{DSS} : -30 V and 2.5 V gate drive
- Low drive current
- High speed switching
- Small traditional package (MPAK)

Outline

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



1. Source
2. Gate
3. Drain

Notes: Marking is "EQ".

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} | +8 / -12 | V |
| Drain current | I_D | -2.4 | A |
| Drain peak current | $I_{D(pulse)}$ ^{Note1} | -10 | A |
| Body - drain diode reverse drain current | I_{DR} | 2.4 | 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 × 40 × 1 mm)

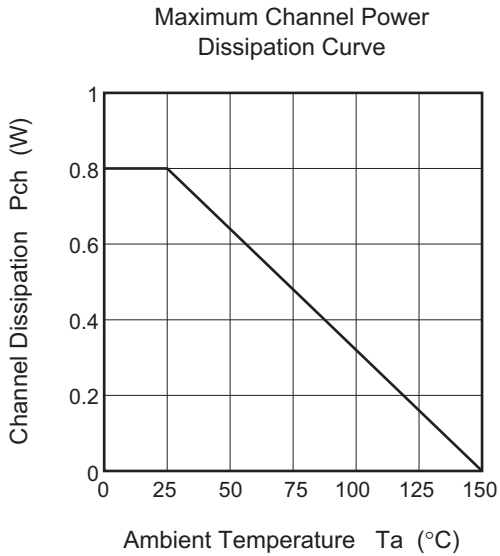
Electrical Characteristics

(Ta = 25°C)

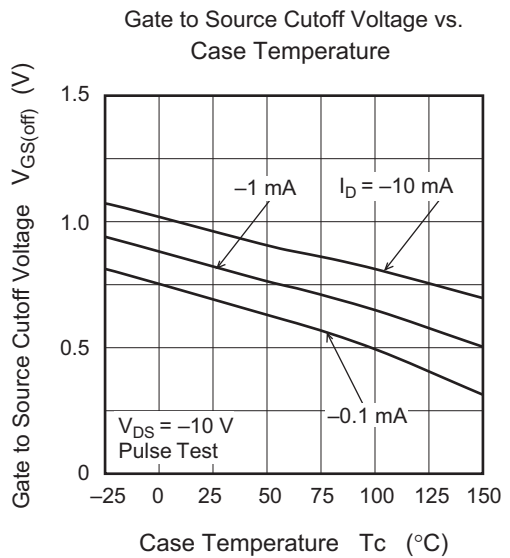
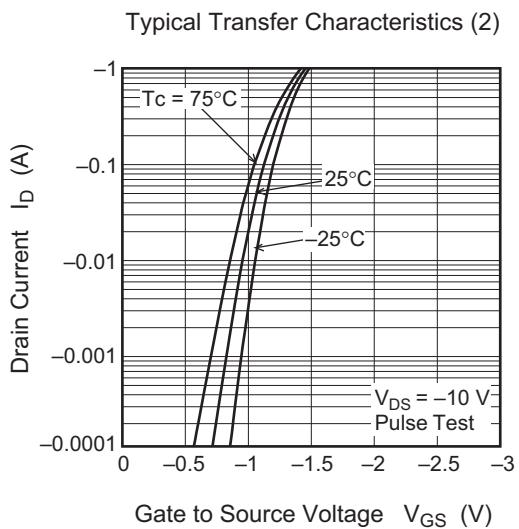
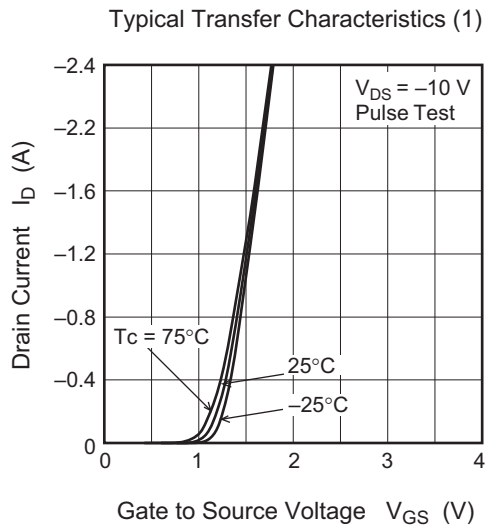
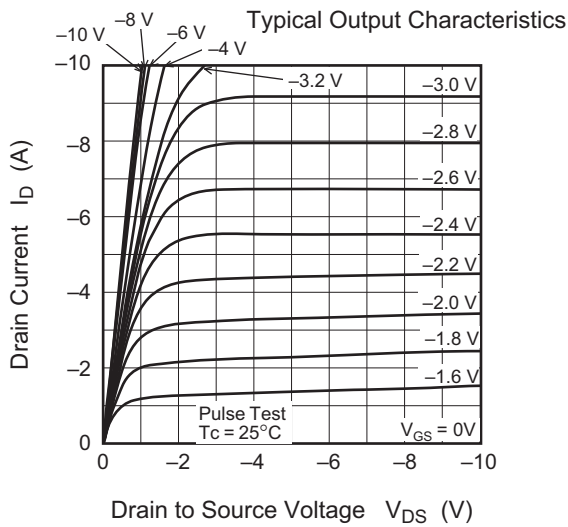
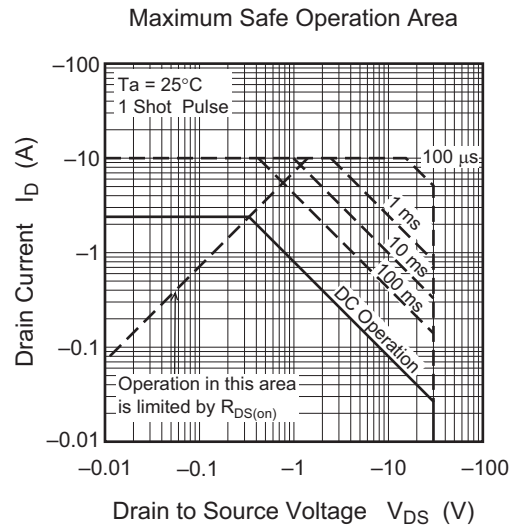
| Item | Symbol | Min | Typ | Max | Unit | Test conditions |
|-------------------------------------|---------------|------|-------|------|------------------|---|
| Drain to source breakdown voltage | $V_{(BR)DSS}$ | -30 | — | — | V | $I_D = -10 \text{ mA}$, $V_{GS} = 0$ |
| Gate to source breakdown voltage | $V_{(BR)GSS}$ | +8 | — | — | 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 | μA | $V_{GS} = +6 \text{ V}$, $V_{DS} = 0$ |
| Gate to source leak current | I_{GSS} | — | — | -10 | μA | $V_{GS} = -10 \text{ V}$, $V_{DS} = 0$ |
| Drain to source leak current | I_{DSS} | — | — | -1 | μA | $V_{DS} = -30 \text{ V}$, $V_{GS} = 0$ |
| 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 | $R_{DS(on)}$ | — | 110 | 140 | $\text{m}\Omega$ | $I_D = -1.3 \text{ A}$, $V_{GS} = -4.5 \text{ V}$ ^{Note3} |
| Drain to source on state resistance | $R_{DS(on)}$ | — | 165 | 230 | $\text{m}\Omega$ | $I_D = -1.3 \text{ A}$, $V_{GS} = -2.5 \text{ V}$ ^{Note3} |
| Forward transfer admittance | $ y_{fs} $ | 2.6 | 3.9 | — | S | $I_D = -1.3 \text{ A}$, $V_{DS} = -10 \text{ V}$ ^{Note3} |
| Input capacitance | C_{iss} | — | 330 | — | pF | $V_{DS} = -10 \text{ V}$, $V_{GS} = 0$, $f = 1 \text{ MHz}$ |
| Output capacitance | C_{oss} | — | 70 | — | pF | |
| Reverse transfer capacitance | C_{rss} | — | 40 | — | pF | |
| Turn - on delay time | $t_{d(on)}$ | — | 17 | — | ns | $I_D = -1.3 \text{ A}$ $V_{GS} = -4.5 \text{ V}$ |
| Rise time | t_r | — | 37 | — | ns | |
| Turn - off delay time | $t_{d(off)}$ | — | 39 | — | ns | $R_L = 7.7 \text{ }\Omega$ $R_g = 4.7 \text{ }\Omega$ |
| Fall time | t_f | — | 10 | — | ns | |
| Total gate charge | Q_g | — | 3.0 | — | 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} | — | 1.3 | — | nC | $I_D = -2.4 \text{ A}$ |
| Body - drain diode forward voltage | V_{DF} | — | -0.85 | -1.2 | V | $I_F = -2.4 \text{ A}$, $V_{GS} = 0$ ^{Note3} |

Notes: 3. Pulse test

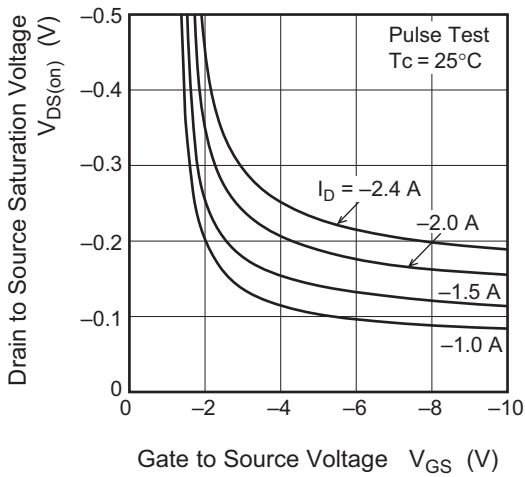
Main Characteristics



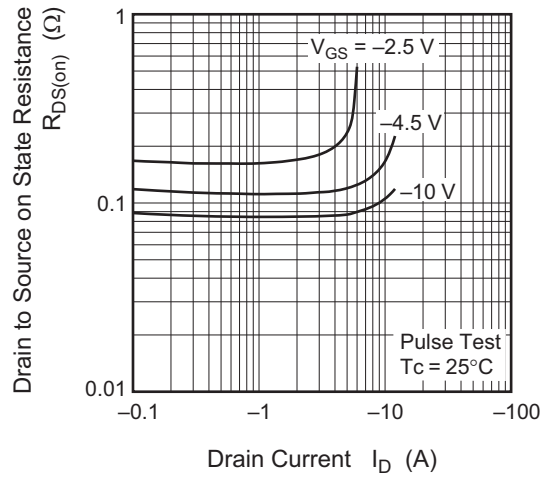
*When using the glass epoxy board (FR-4 40 x 40 x 1 mm)



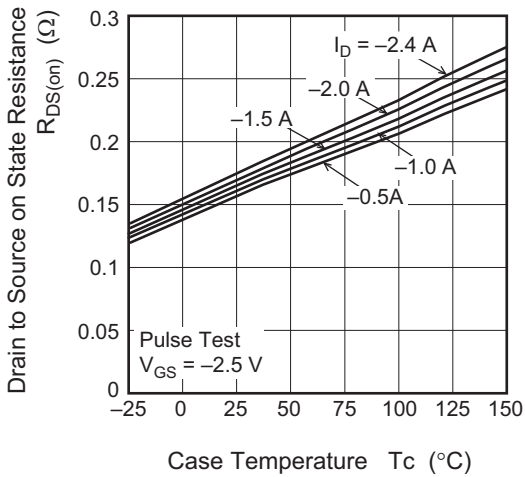
Drain to Source Saturation Voltage vs. Gate to Source Voltage



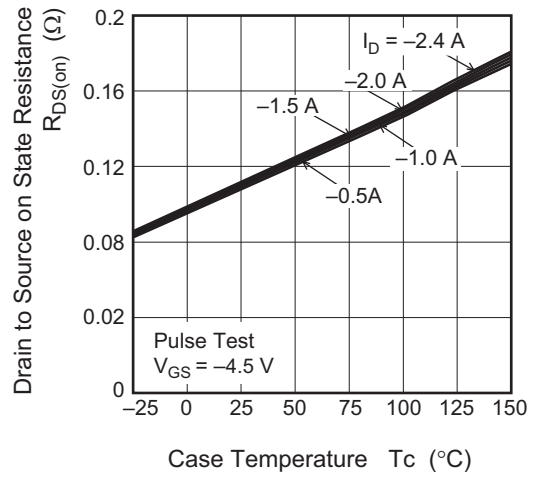
Static Drain to Source on State Resistance vs. Drain Current



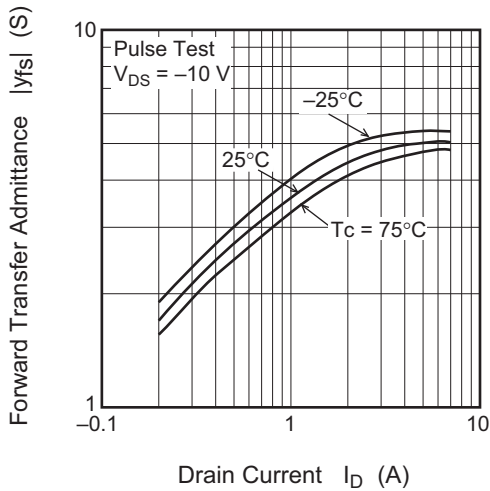
Static Drain to Source on State Resistance vs. Case Temperature (1)



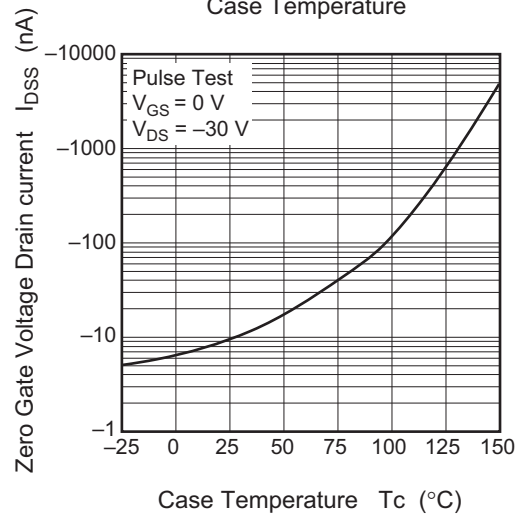
Static Drain to Source on State Resistance vs. Case Temperature (2)



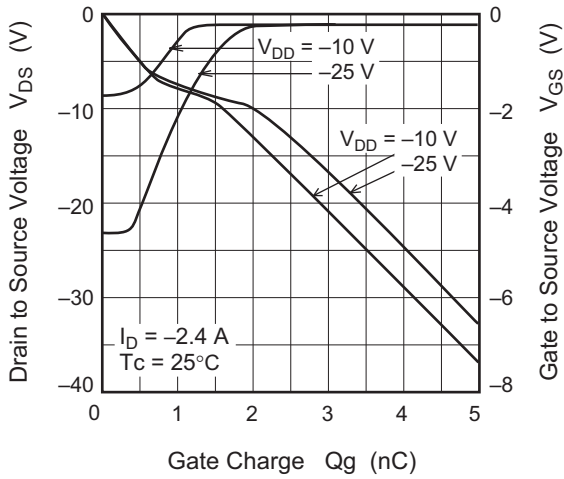
Forward Transfer Admittance vs. Drain Current



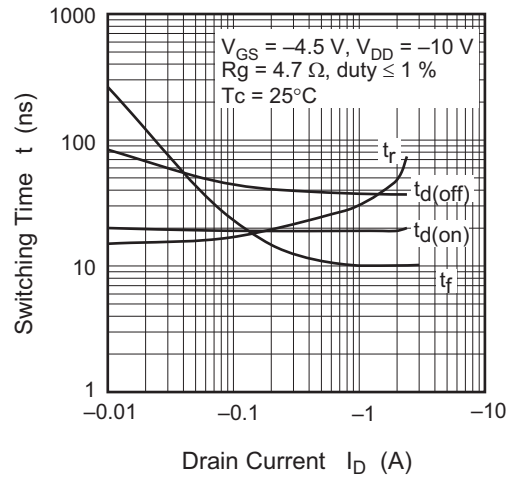
Zero Gate Voltage Drain current vs. Case Temperature



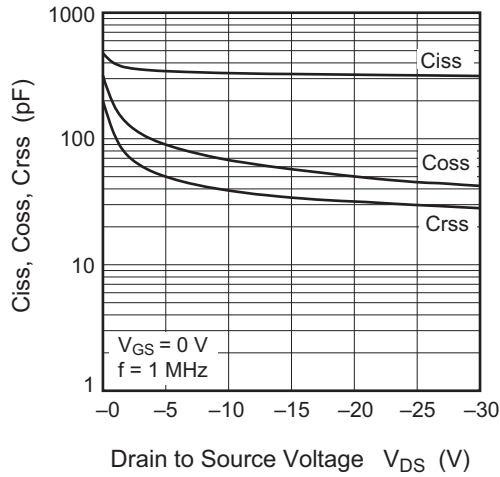
Dynamic Input Characteristics



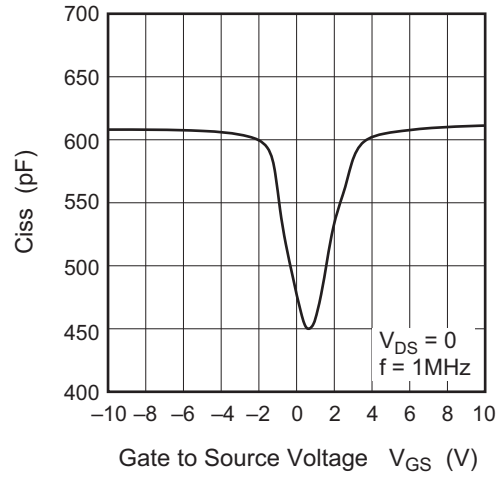
Switching Characteristics



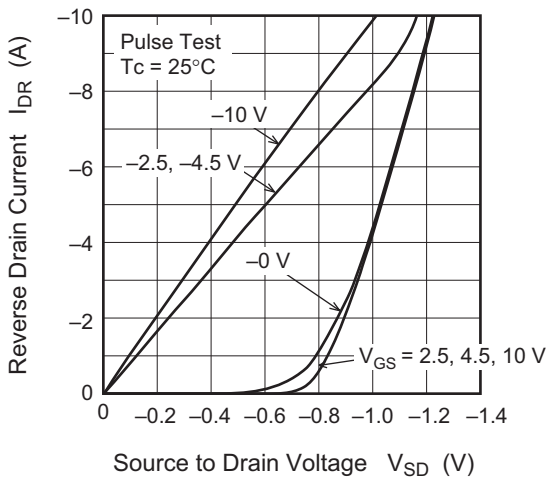
Typical Capacitance vs. Drain to Source Voltage



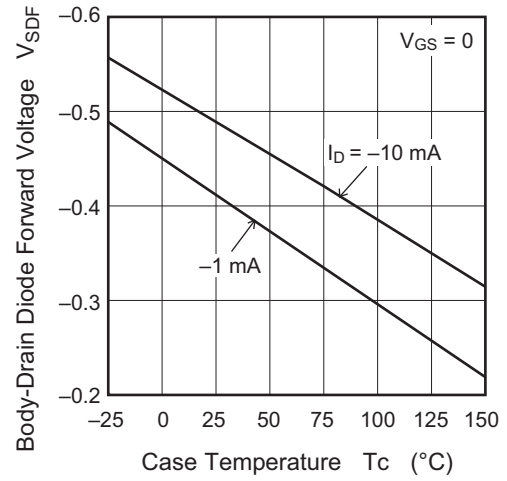
Input Capacitance vs. Gate to Source Voltage

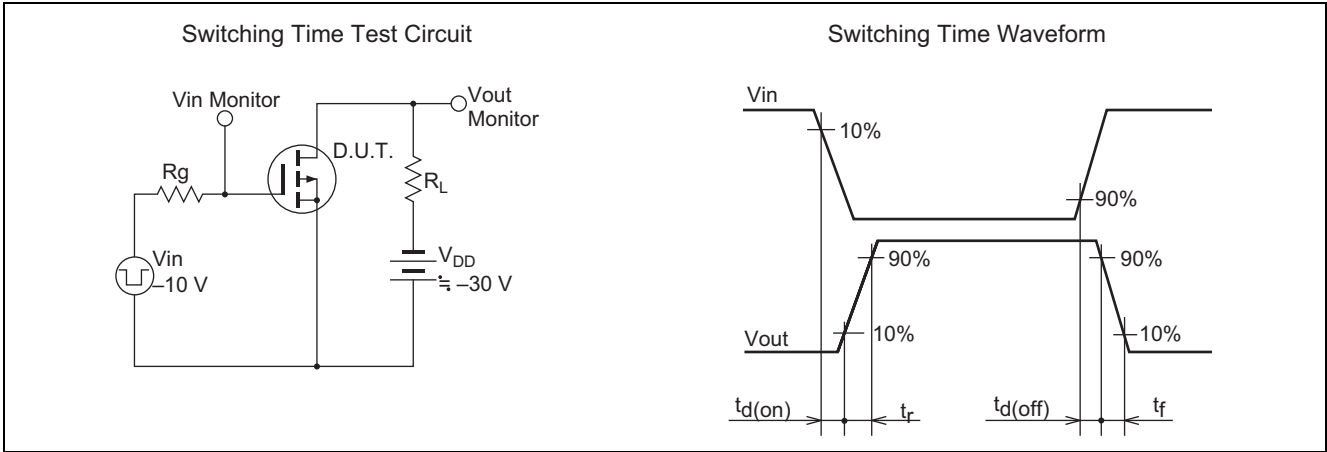


Reverse Drain Current vs. Source to Drain Voltage



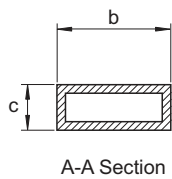
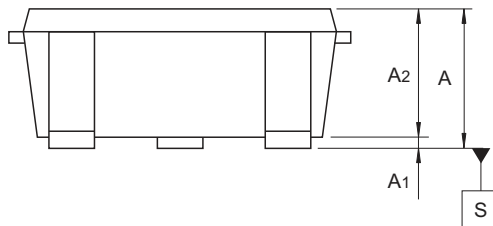
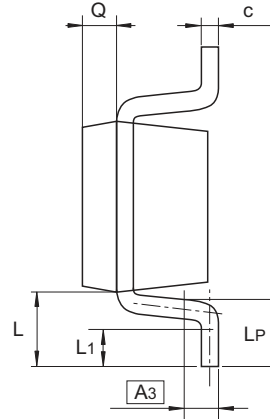
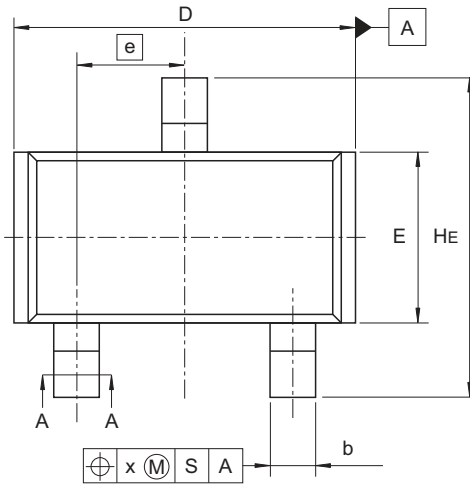
Body-Drain Diode Forward Voltage vs. Case Temperature





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 |
| A ₁ | 0 | — | 0.1 |
| A ₂ | 1.0 | 1.1 | 1.2 |
| A ₃ | — | 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 ₁ | 0.15 | — | 0.55 |
| L _P | 0.25 | — | 0.65 |
| x | — | — | 0.05 |
| Q | — | 0.3 | — |

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Ordering Information

| Orderable Part Number | Quantity | Shipping Container |
|-----------------------|-----------|----------------------------------|
| RQJ0305EQDQATL-H | 3000 pcs. | φ178 mm reel, 8 mm Emboss taping |

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