

# RQK2501YGDQA

Silicon N Channel MOS FET  
Power Switching

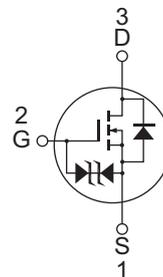
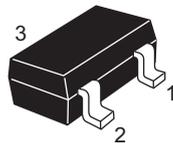
R07DS0312EJ0400  
Rev.4.00  
Jan 10, 2014

## Features

- High drain to source voltage and Low gate drive  
 $V_{DSS}$  : 250 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

## Absolute Maximum Ratings

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

Item	Symbol	Ratings	Unit
Drain to source voltage	$V_{DSS}$	250	V
Gate to source voltage	$V_{GSS}$	$\pm 10$	V
Drain current	$I_D$	0.4	A
Drain peak current	$I_{D(pulse)}$ <sup>Note1</sup>	1.6	A
Body - drain diode reverse drain current	$I_{DR}$	0.4	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 × 40 × 1 mm)

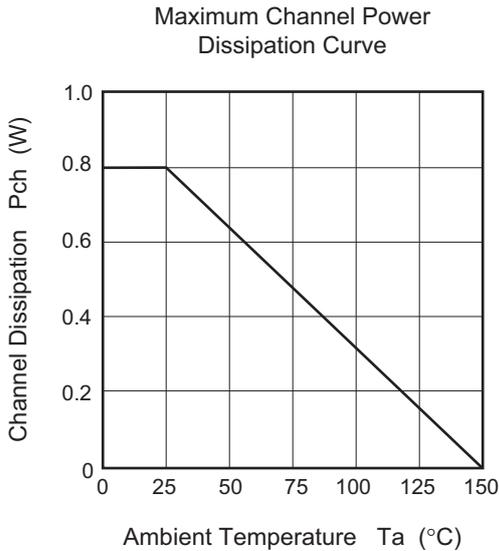
## Electrical Characteristics

(Ta = 25°C)

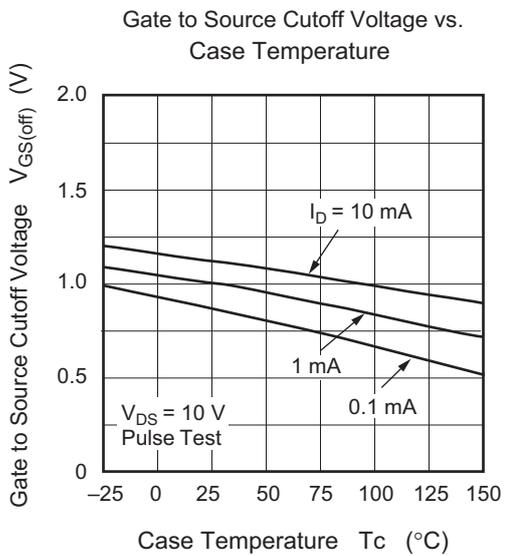
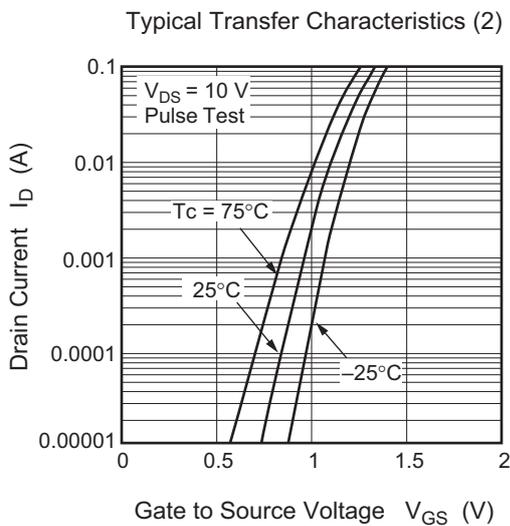
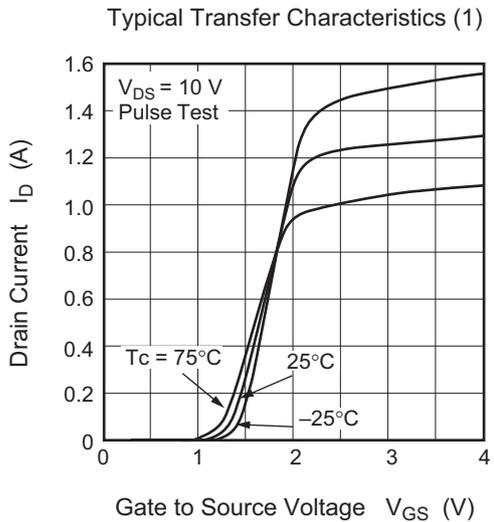
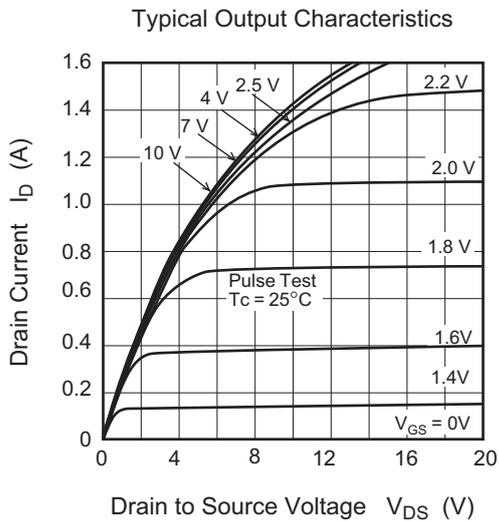
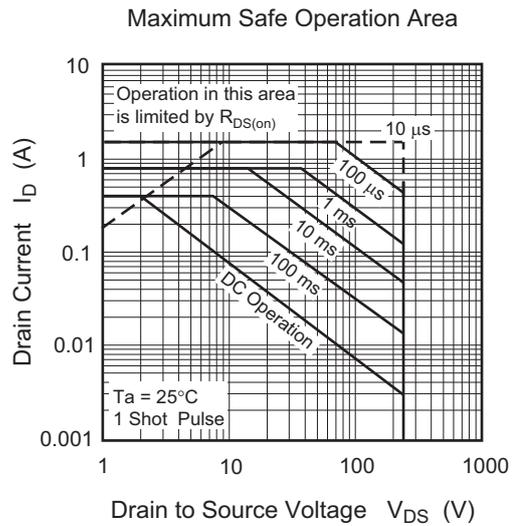
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	250	—	—	V	$I_D = 10 \text{ mA}, V_{GS} = 0$
Gate to source breakdown voltage	$V_{(BR)GSS}$	+10	—	—	V	$I_G = +100 \text{ } \mu\text{A}, V_{DS} = 0$
Gate to source breakdown voltage	$V_{(BR)GSS}$	-10	—	—	V	$I_G = -100 \text{ } \mu\text{A}, V_{DS} = 0$
Gate to source leak current	$I_{GSS}$	—	—	+10	$\mu\text{A}$	$V_{GS} = +8 \text{ V}, V_{DS} = 0$
Gate to source leak current	$I_{GSS}$	—	—	-10	$\mu\text{A}$	$V_{GS} = -8 \text{ V}, V_{DS} = 0$
Zero gate voltage drain current	$I_{DSS}$	—	—	1	$\mu\text{A}$	$V_{DS} = 250 \text{ V}, V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	0.5	—	1.5	V	$V_{DS} = 10 \text{ V}, I_D = 1 \text{ mA}$
Drain to source on state resistance	$R_{DS(on)}$	—	4.0	5.4	$\Omega$	$I_D = 0.2 \text{ A}, V_{GS} = 4 \text{ V}$ <sup>Note3</sup>
Drain to source on state resistance	$R_{DS(on)}$	—	4.1	5.6	$\Omega$	$I_D = 0.2 \text{ A}, V_{GS} = 2.5 \text{ V}$ <sup>Note3</sup>
Forward transfer admittance	$ y_{fs} $	0.6	0.95	—	S	$I_D = 0.2 \text{ A}, V_{DS} = 10 \text{ V}$ <sup>Note3</sup>
Input capacitance	$C_{iss}$	—	80	—	pF	$V_{DS} = 25 \text{ V}$ $V_{GS} = 0$ $f = 1 \text{ MHz}$
Output capacitance	$C_{oss}$	—	10	—	pF	
Reverse transfer capacitance	$C_{rss}$	—	3	—	pF	
Turn - on delay time	$t_{d(on)}$	—	15	—	ns	$V_{DD} = 125 \text{ V}, V_{GS} = 4 \text{ V}$ $I_D = 0.2 \text{ A}$ $R_L = 625 \text{ } \Omega$ $R_g = 10 \text{ } \Omega$
Rise time	$t_r$	—	16	—	ns	
Turn - off delay time	$t_{d(off)}$	—	40	—	ns	
Fall time	$t_f$	—	38	—	ns	
Total gate charge	$Q_g$	—	4.0	—	nC	$V_{DD} = 200 \text{ V}$ $V_{GS} = 4 \text{ V}$ $I_D = 0.4 \text{ A}$
Gate to Source charge	$Q_{gs}$	—	0.5	—	nC	
Gate to drain charge	$Q_{gd}$	—	2.6	—	nC	
Body - drain diode forward voltage	$V_{DF}$	—	0.8	1.2	V	$I_F = 0.4 \text{ A}, V_{GS} = 0$ <sup>Note3</sup>

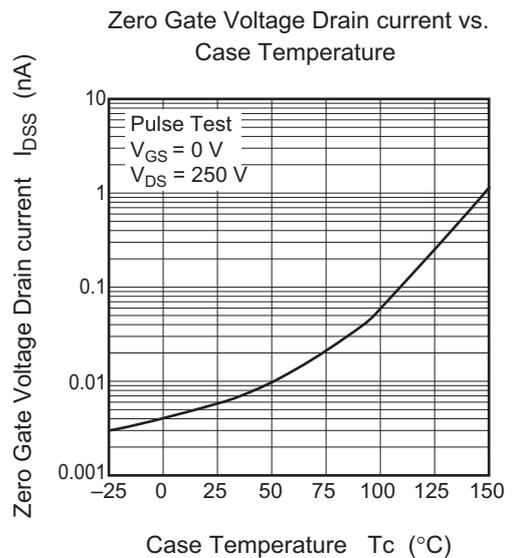
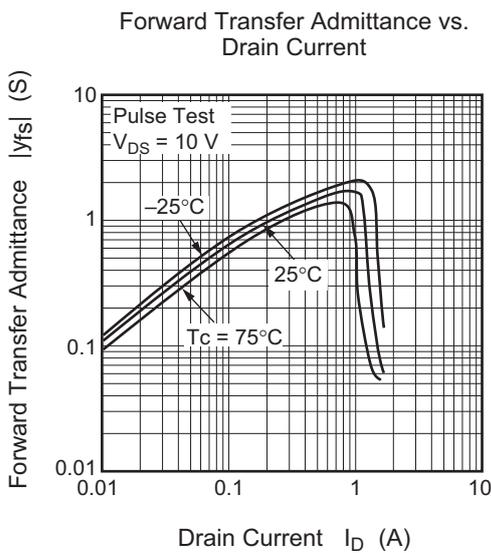
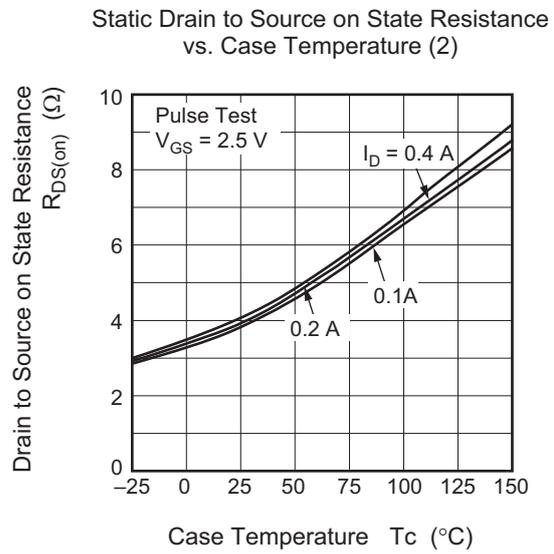
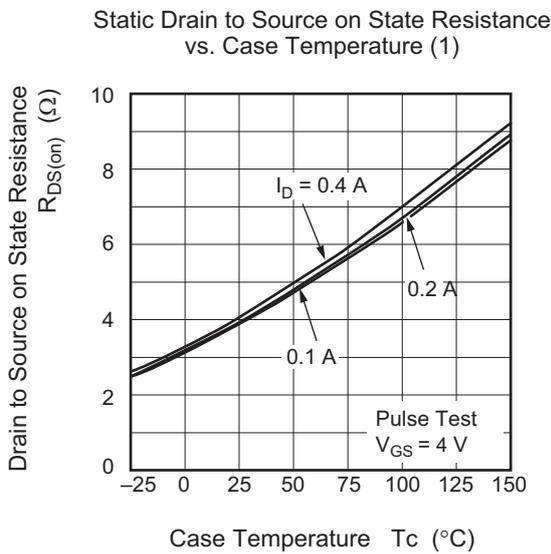
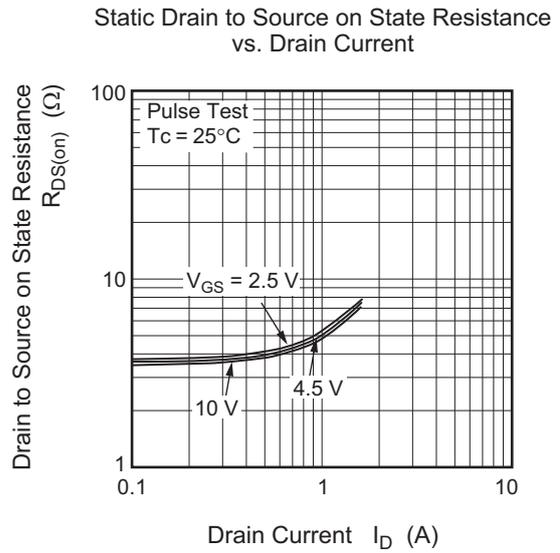
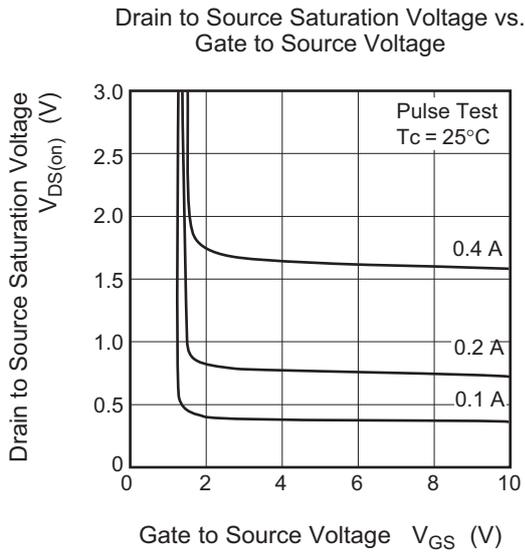
Notes: 3. Pulse test

### Main Characteristics

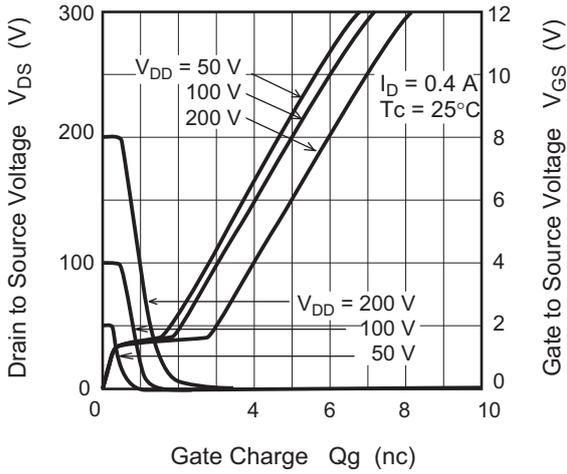


\*When using the glass epoxy board (FR-4 40 x 40 x 1 mm)

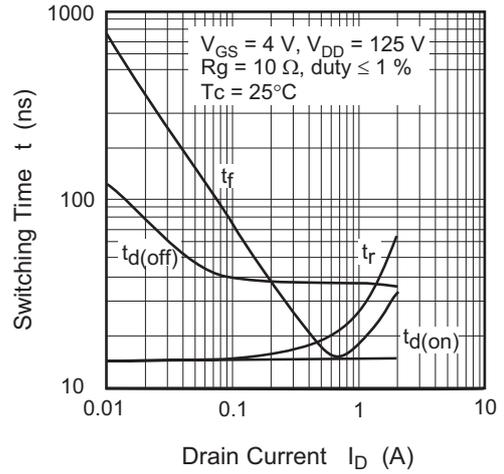




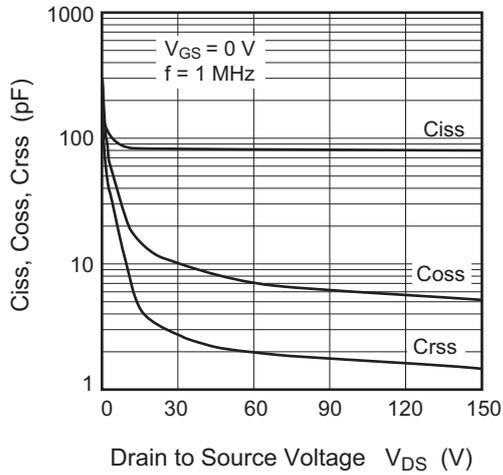
Dynamic Input Characteristics



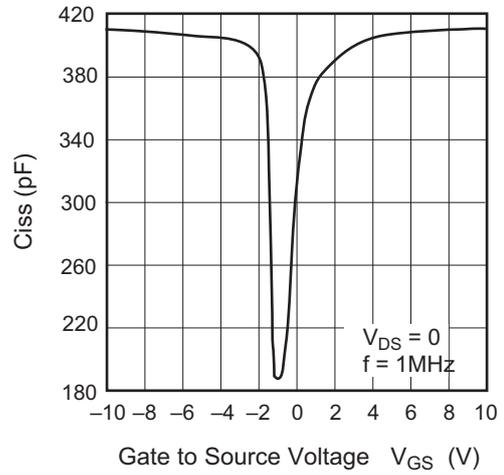
Switching Characteristics



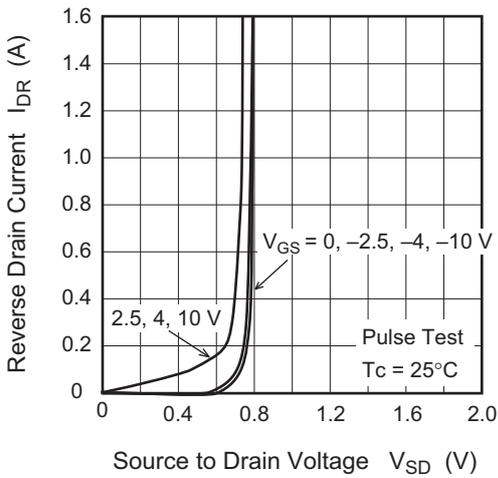
Typical Capacitance vs. Drain to Source Voltage



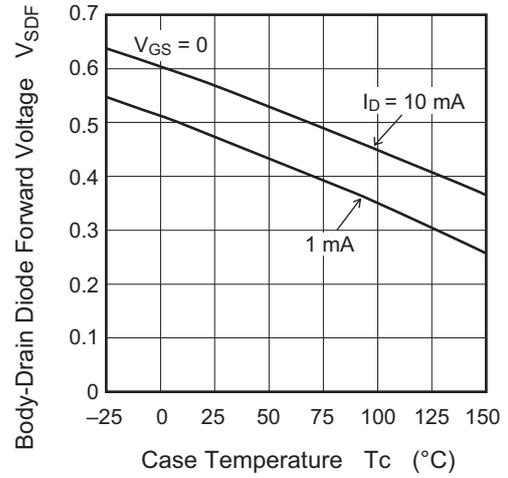
Input Capacitance vs. Gate to Source Voltage



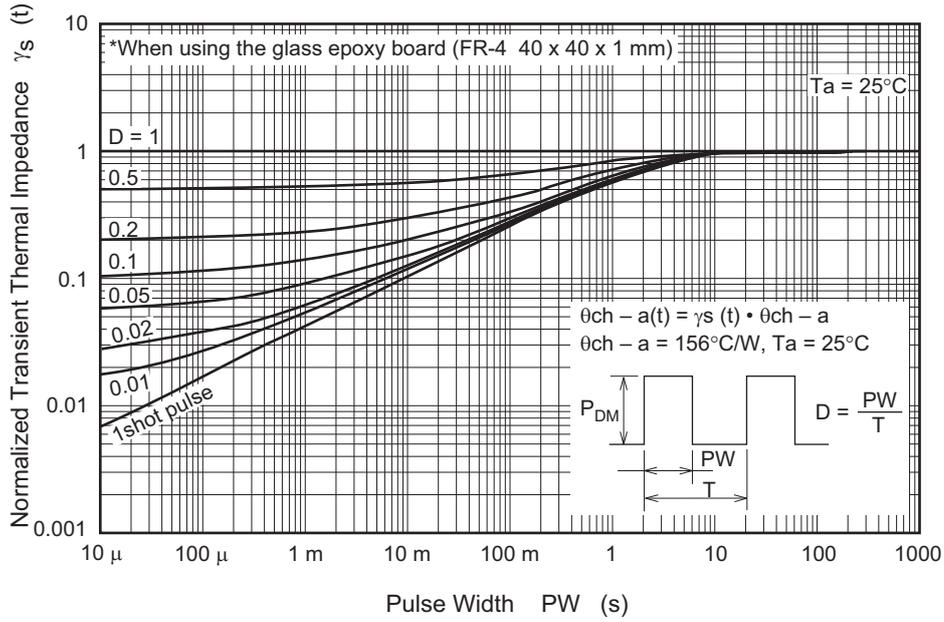
Reverse Drain Current vs. Source to Drain Voltage



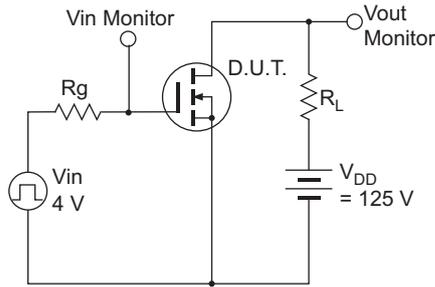
Body-Drain Diode Forward Voltage vs. Case Temperature



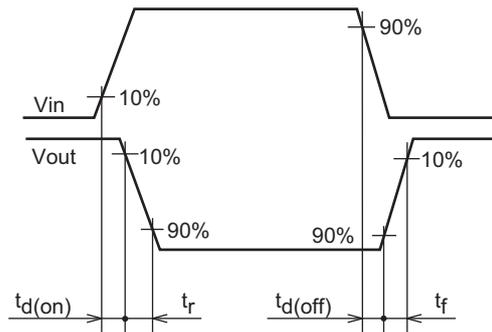
Normalized Transient Thermal Impedance vs. Pulse Width



Switching Time Test Circuit

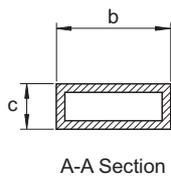
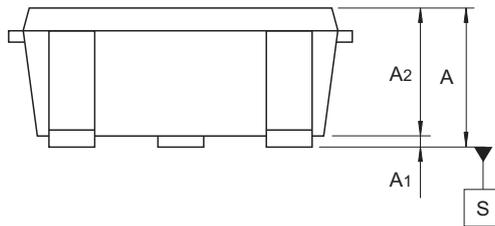
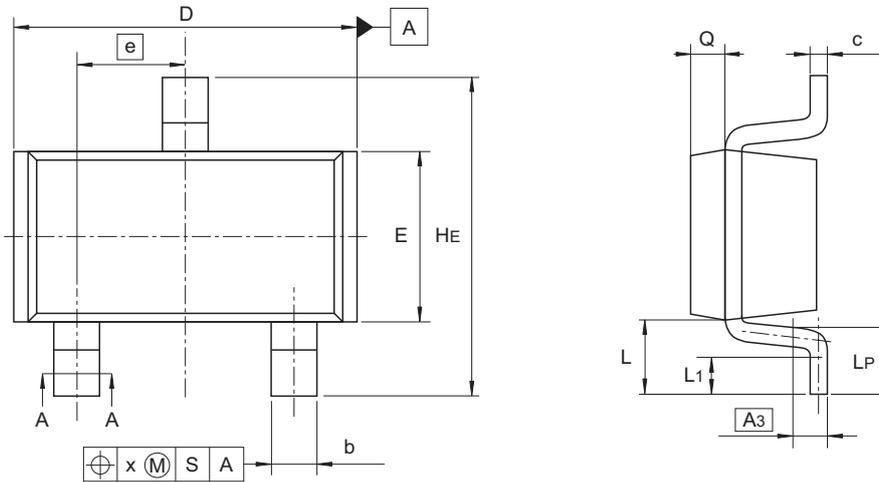


Switching Time Waveform



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
RQK2501YGDQATL-E RQK2501YGDQATL-H	3000 pcs.	φ178 mm reel, 8 mm Emboss taping

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