RQK2501YGDQA

Silicon N Channel MOS FET
Power Switching

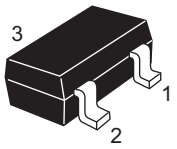
R07DS0312EJ0400
Rev.4.00
Jan 10, 2014

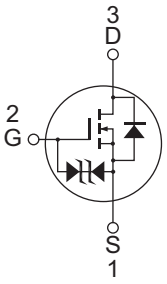
Features

- 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

(Ta = 25°C)

Item	Symbol	Ratings	Unit
Drain to source voltage	V_{DSS}	250	V
Gate to source voltage	V_{GSS}	±10	V
Drain current	I_D	0.4	A
Drain peak current	$I_{D(pulse)}$ Note1	1.6	A
Body - drain diode reverse drain current	I_{DR}	0.4	A
Channel dissipation	Pch Note2	0.8	W
Channel temperature	Tch	150	°C
Storage temperature	Tstg	–55 to +150	°C

Notes: 1. PW ≤ 10 µs, Duty cycle ≤ 1%
2. When using the glass epoxy board (FR-4 40 × 40 × 1 mm)

Electrical Characteristics

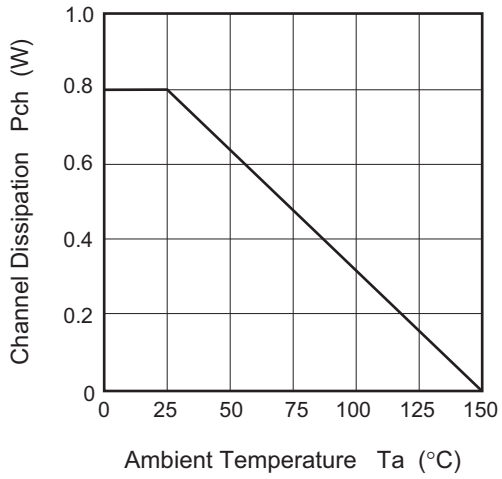
(Ta = 25°C)

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

Notes: 3. Pulse test

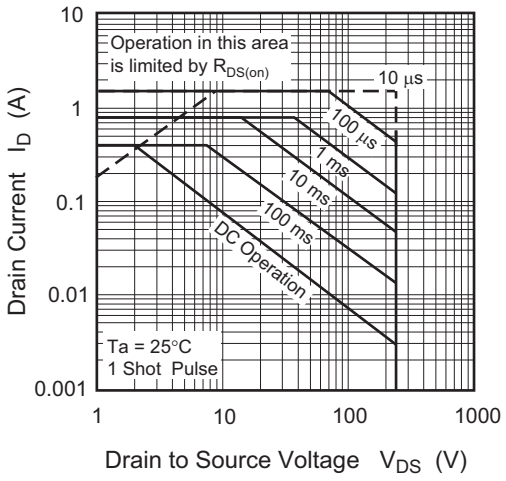
Main Characteristics

Maximum Channel Power Dissipation Curve

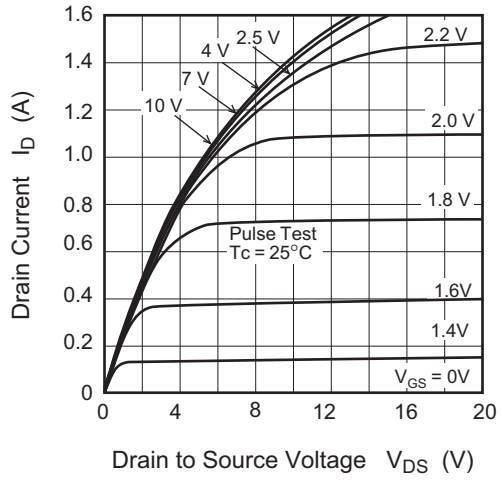


*When using the glass epoxy board (FR-4 40 x 40 x 1 mm)

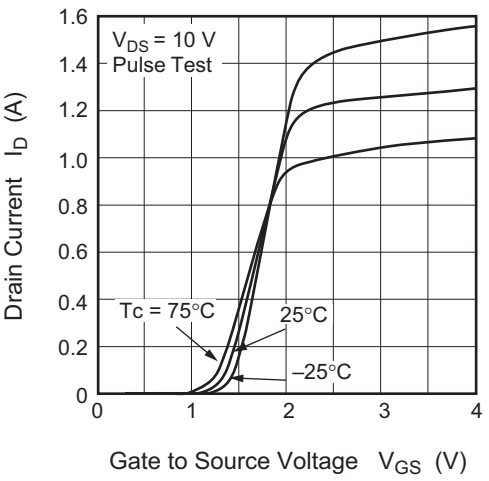
Maximum Safe Operation Area



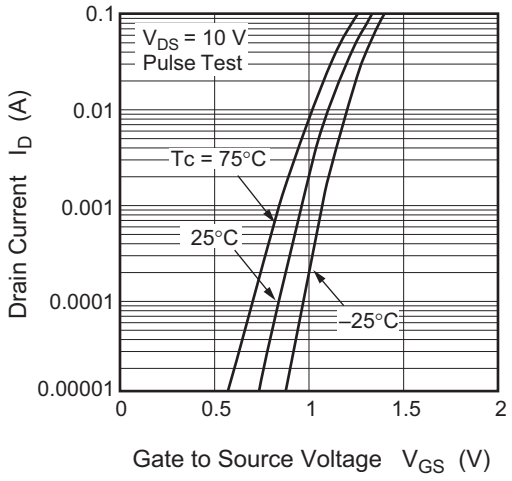
Typical Output Characteristics



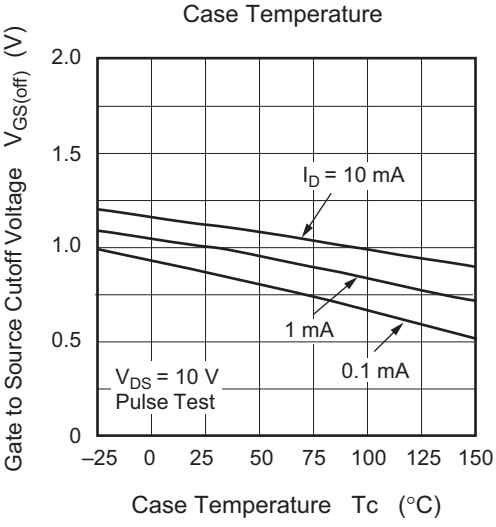
Typical Transfer Characteristics (1)



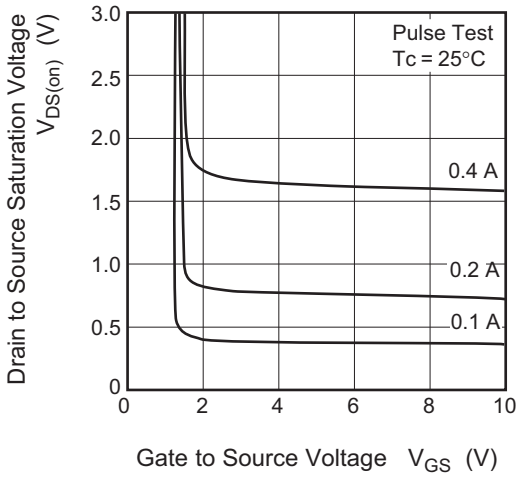
Typical Transfer Characteristics (2)



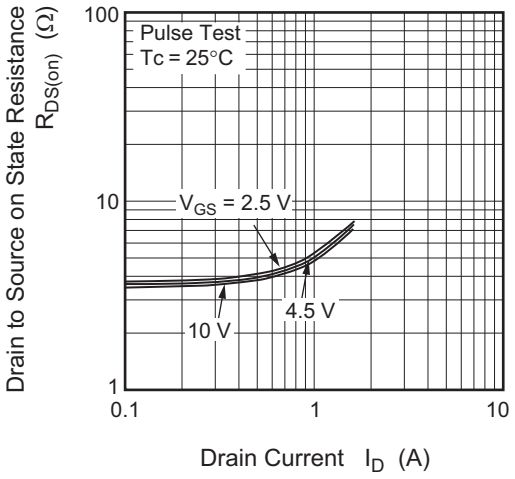
Gate to Source Cutoff Voltage vs. Case Temperature



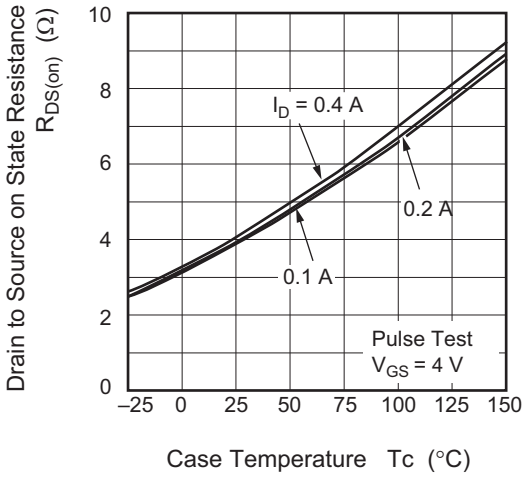
Drain to Source Saturation Voltage vs. Gate to Source Voltage



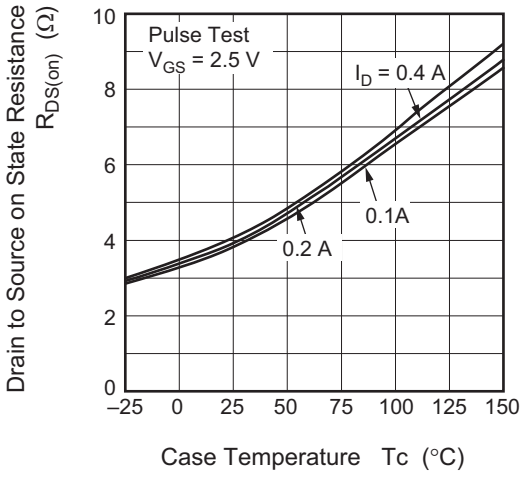
Static Drain to Source on State Resistance vs. Drain Current



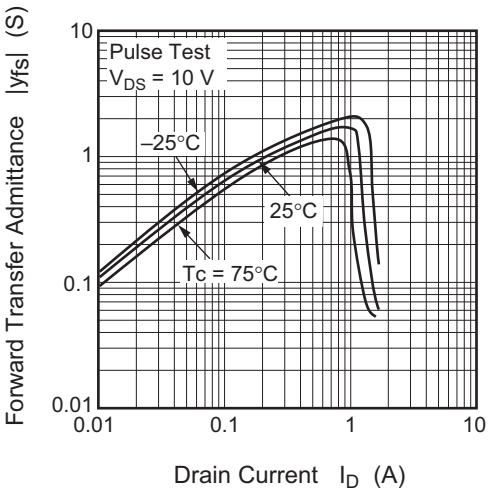
Static Drain to Source on State Resistance vs. Case Temperature (1)



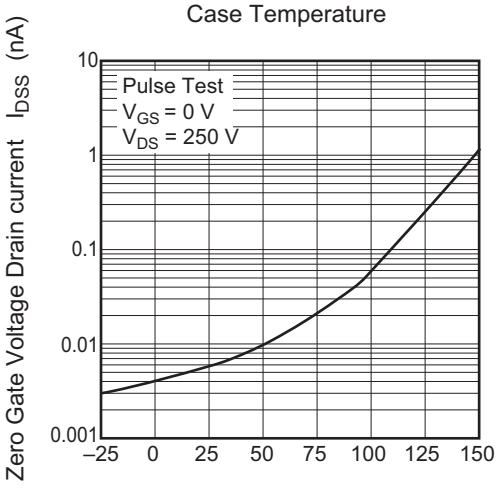
Static Drain to Source on State Resistance vs. Case Temperature (2)



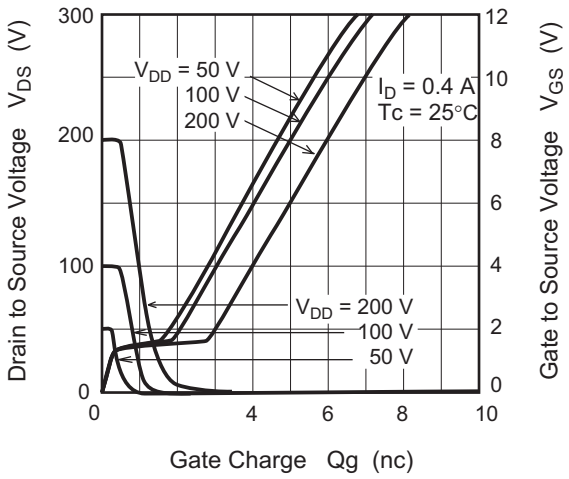
Forward Transfer Admittance vs. Drain Current



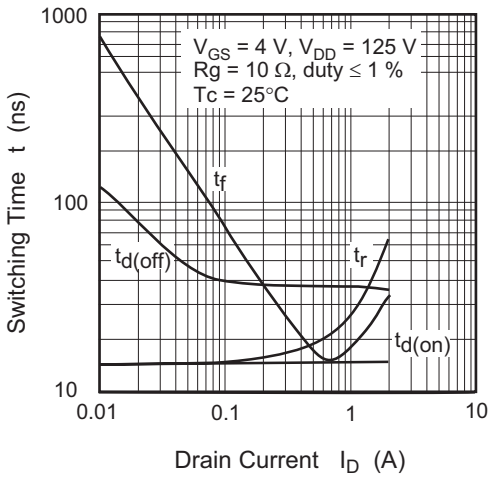
Zero Gate Voltage Drain current vs. Case Temperature



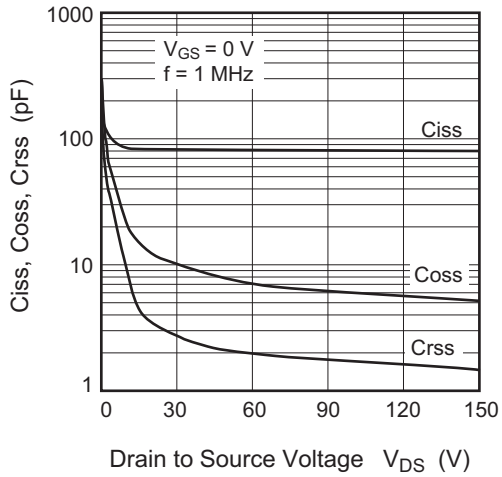
Dynamic Input Characteristics



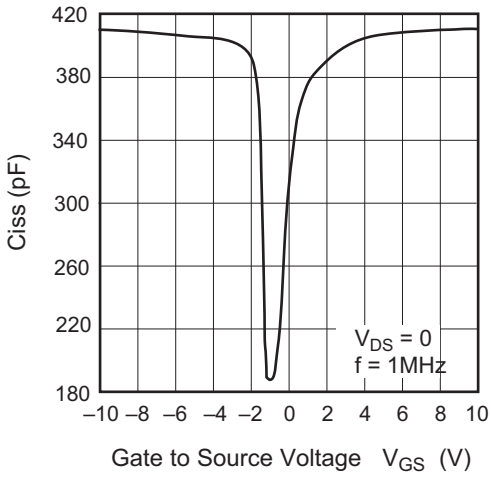
Switching Characteristics



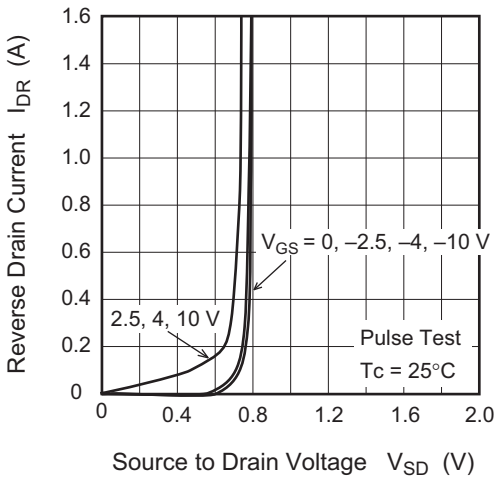
Typical Capacitance vs.
Drain to Source Voltage



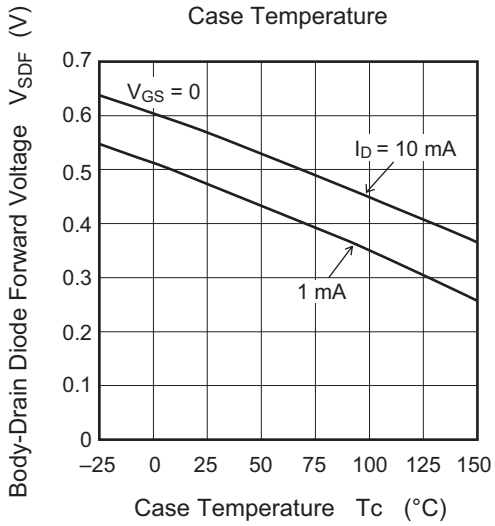
Input Capacitance vs.
Gate to Source Voltage



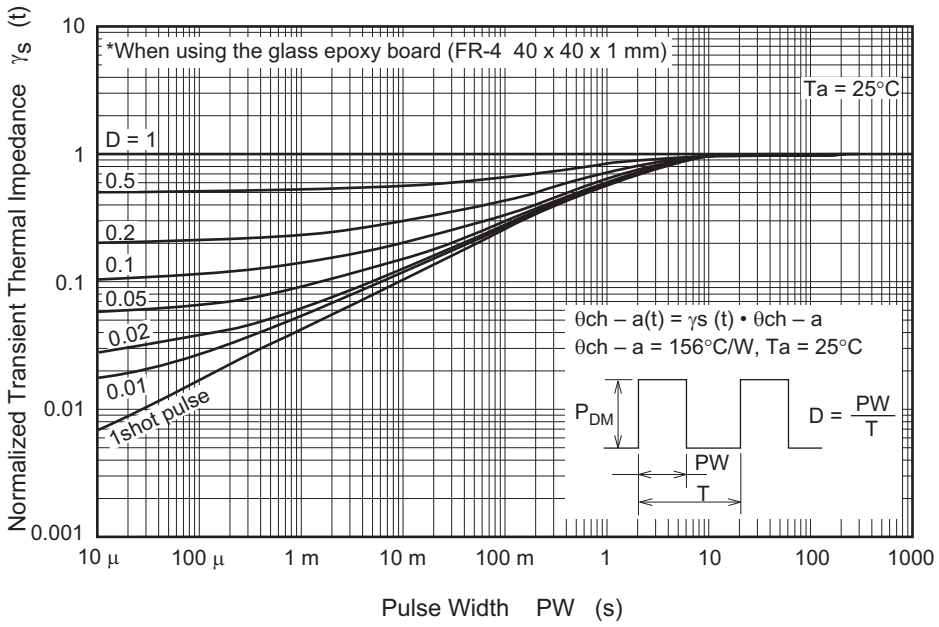
Reverse Drain Current vs.
Source to Drain Voltage



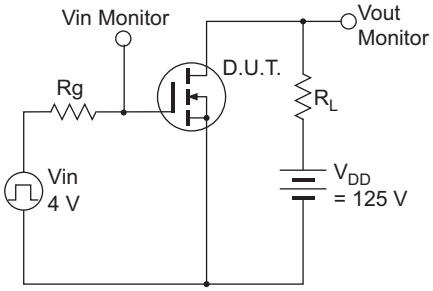
Body-Drain Diode Forward Voltage vs.
Case Temperature



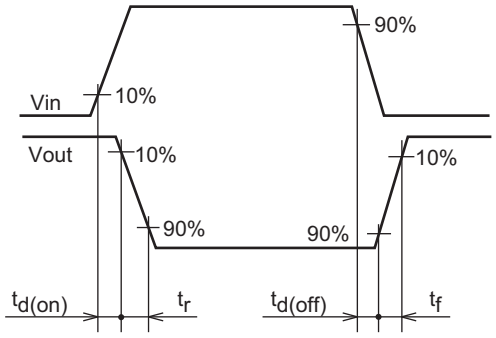
Normalized Transient Thermal Impedance vs. Pulse Width



Switching Time Test Circuit

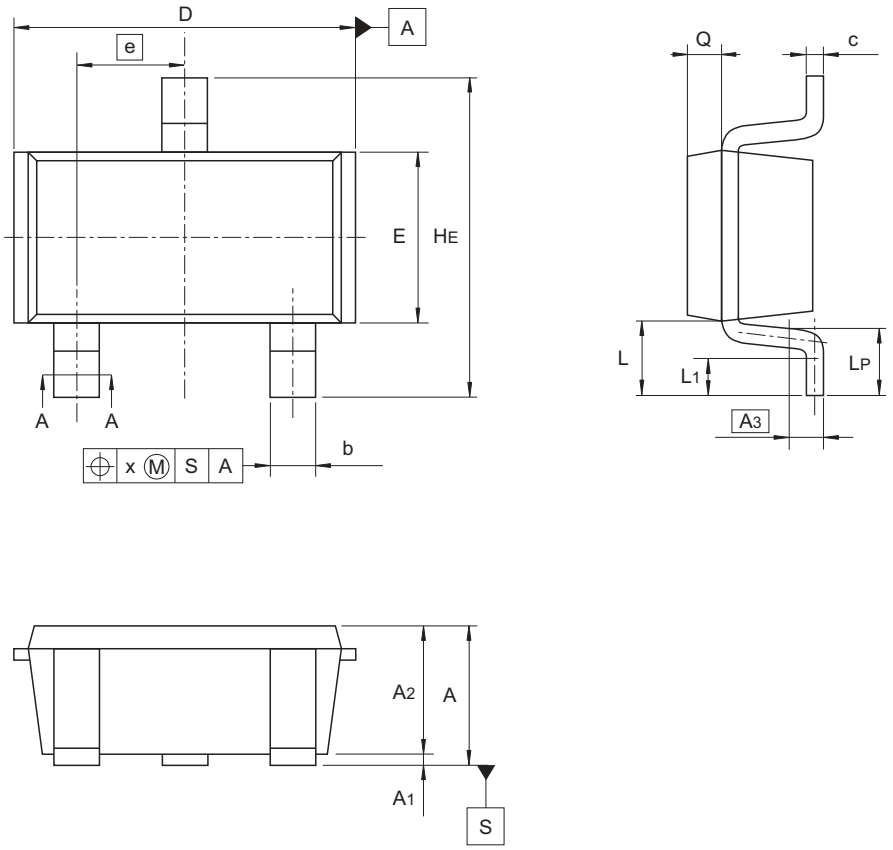


Switching Time Waveform



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
A_1	0	—	0.1
A_2	1.0	1.1	1.2
$\boxed{A_3}$	—	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
$\boxed{e}$	—	0.95	—
H_E	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	—

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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