

# RQJ0302NGDQA

Silicon P Channel MOS FET  
Power Switching

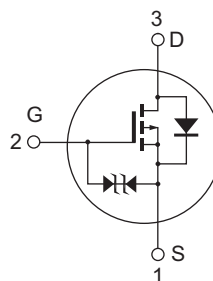
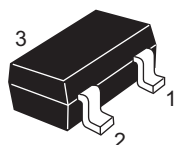
R07DS0294EJ0600  
Rev.6.00  
Jan 10, 2014

## Features

- Low on-resistance  
 $R_{DS(on)} = 138 \text{ m}\Omega$  typ ( $V_{GS} = -10 \text{ V}$ ,  $I_D = -1.1 \text{ A}$ )
- 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 "NG".

## 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	$V_{GSS}$	+10 / -20	V
Drain current	$I_D$	-2.2	A
Drain peak current	$I_{D(Pulse)}$ <sup>Note1</sup>	-5	A
Body - drain diode reverse drain current	$I_{DR}$	-2.2	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

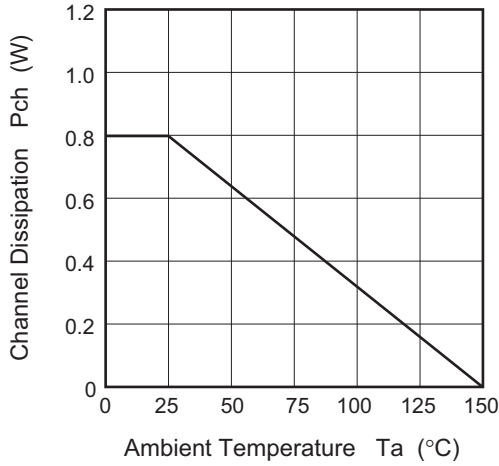
(Ta = 25°C)

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	$V_{(BR)GSS}$	+10	—	—	V	$I_G = +100 \mu\text{A}$ , $V_{DS} = 0$
Gate to source breakdown voltage	$V_{(BR)GSS}$	-20	—	—	V	$I_G = -100 \mu\text{A}$ , $V_{DS} = 0$
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	$\mu\text{A}$	$V_{GS} = -16 \text{ V}$ , $V_{DS} = 0$
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	$R_{DS(on)}$	—	138	173	$\text{m}\Omega$	$I_D = -1.1 \text{ A}$ , $V_{GS} = -10 \text{ V}$ <sup>Note3</sup>
	$R_{DS(on)}$	—	216	303	$\text{m}\Omega$	$I_D = -1.1 \text{ A}$ , $V_{GS} = -4.5 \text{ V}$ <sup>Note3</sup>
Forward transfer admittance	$ y_{fs} $	1.2	2.1	—	S	$I_D = -1.1 \text{ A}$ , $V_{DS} = -10 \text{ V}$ <sup>Note3</sup>
Input capacitance	$C_{iss}$	—	195	—	pF	$V_{DS} = -10 \text{ V}$ , $V_{GS} = 0$ , $f = 1 \text{ MHz}$
Output capacitance	$C_{oss}$	—	42	—	pF	
Reverse transfer capacitance	$C_{rss}$	—	29	—	pF	
Turn - on delay time	$t_{d(on)}$	—	19	—	ns	$I_D = -0.5 \text{ A}$ , $V_{GS} = -10 \text{ V}$ , $R_L = 20 \Omega$ , $R_g = 4.7 \Omega$
Rise time	$t_r$	—	25	—	ns	
Turn - off delay time	$t_{d(off)}$	—	30	—	ns	
Fall time	$t_f$	—	4.6	—	ns	
Total gate charge	$Q_g$	—	4.2	—	nC	$V_{DD} = -10 \text{ V}$ , $V_{GS} = -10 \text{ V}$ , $I_D = -2.2 \text{ A}$
Gate to source charge	$Q_{gs}$	—	0.7	—	nC	
Gate to drain charge	$Q_{gd}$	—	1.0	—	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

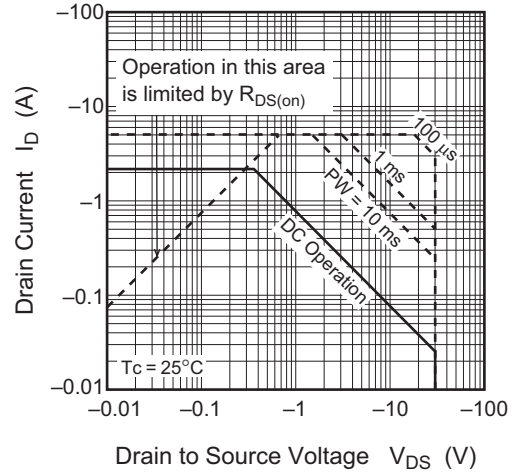
### Main Characteristics

Maximum Channel Power Dissipation Curve

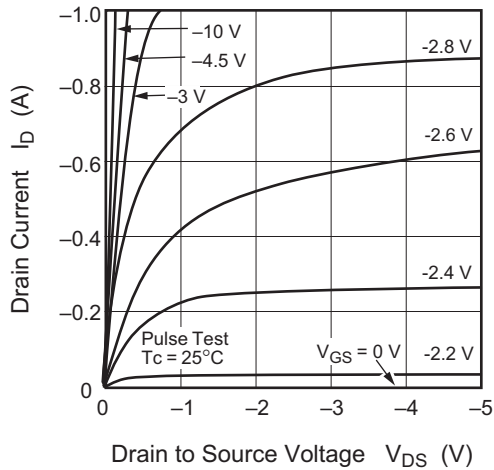


\*When using the glass epoxy board (FR-4: 40 × 40 × 1 mm)

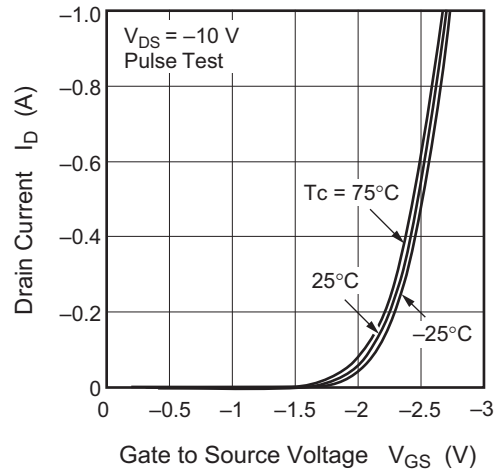
Maximum Safe Operation Area



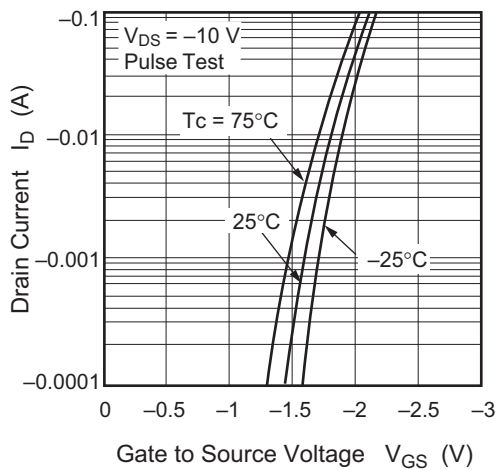
Typical Output Characteristics



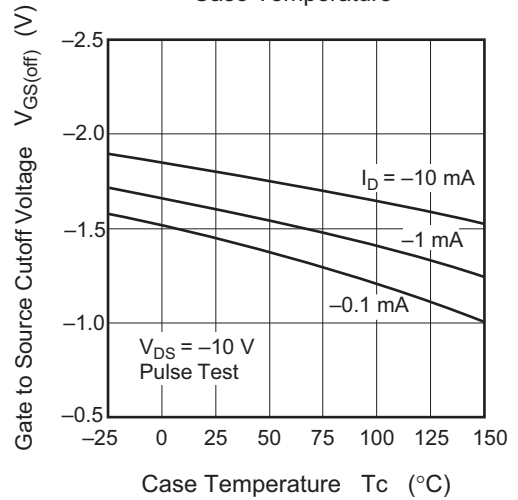
Typical Transfer Characteristics (1)

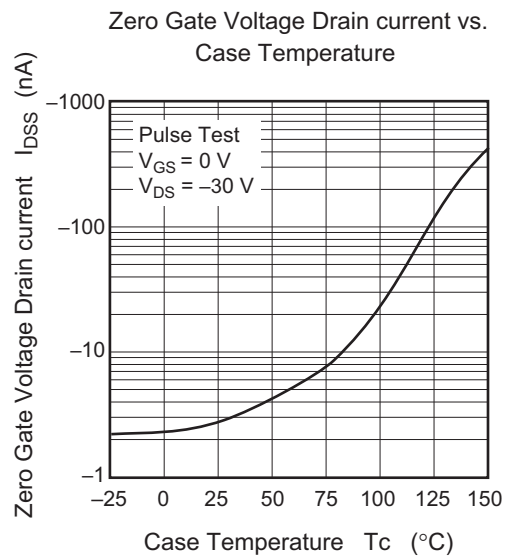
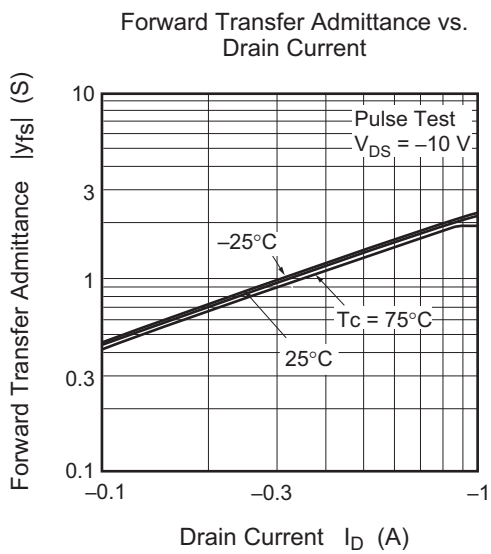
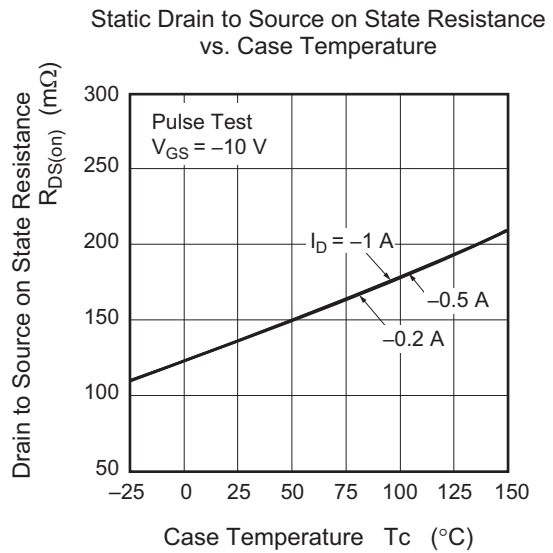
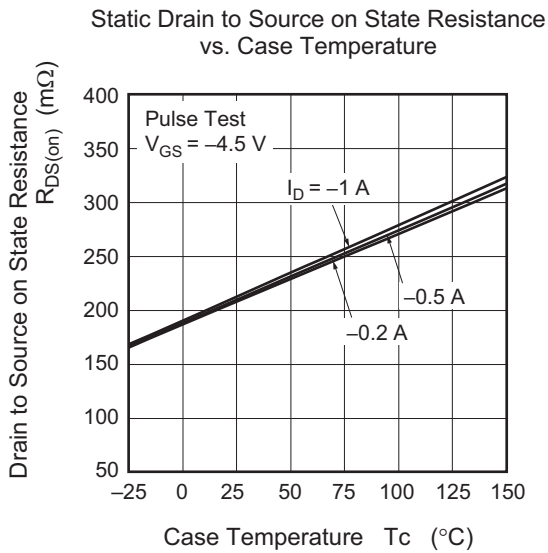
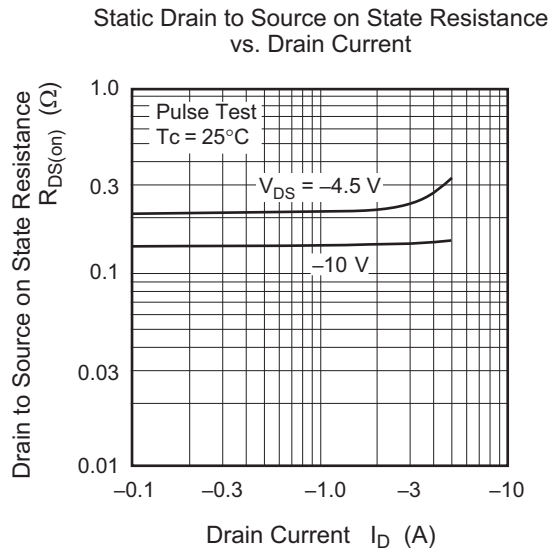
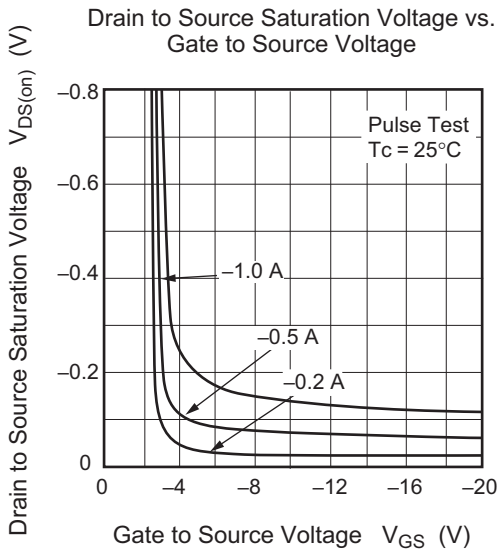


Typical Transfer Characteristics (2)

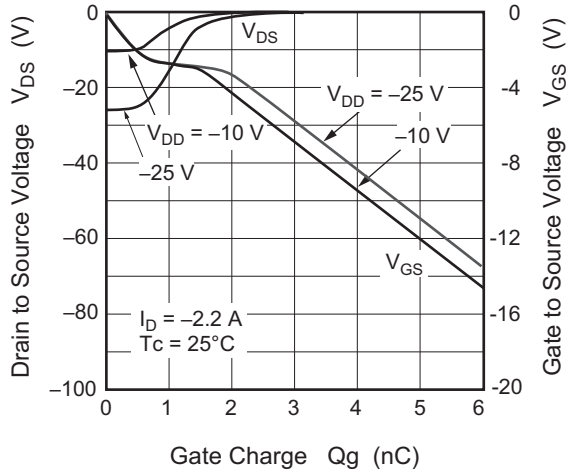


Gate to Source Cutoff Voltage vs. Case Temperature

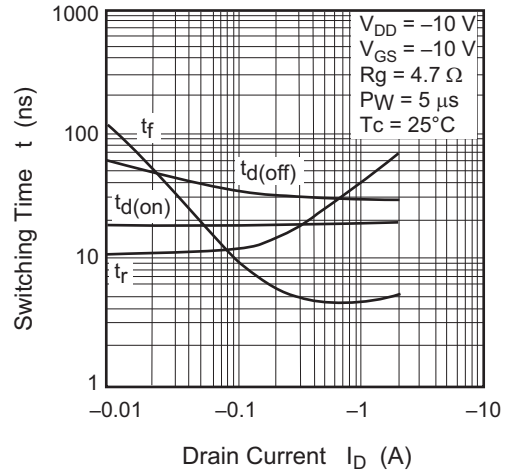




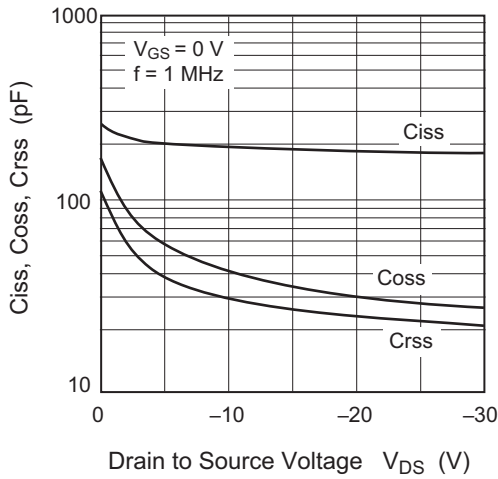
Dynamic Input Characteristics



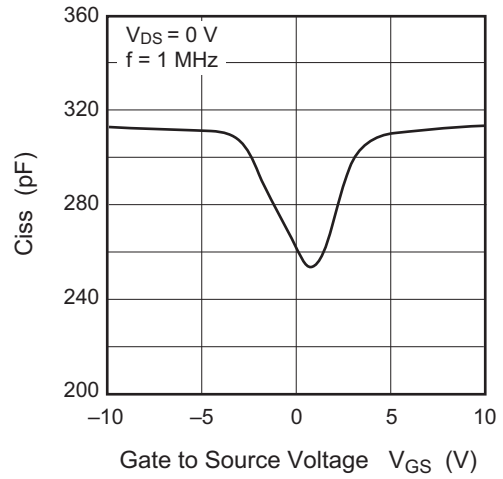
Switching Characteristics



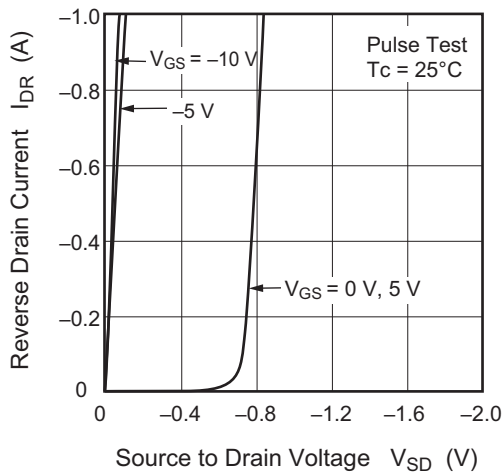
Typical Capacitance vs. Drain to Source Voltage



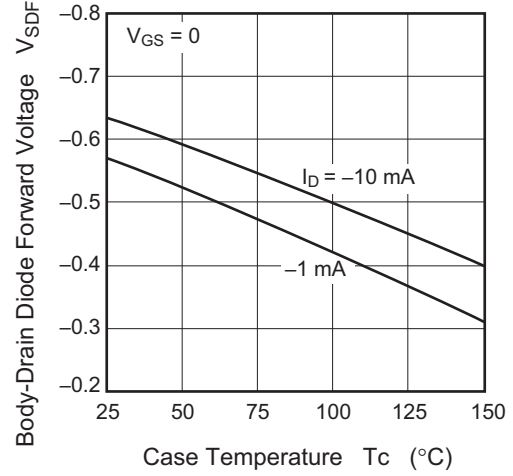
Input Capacitance vs. Gate to Source Voltage



Reverse Drain Current vs. Source to Drain Voltage

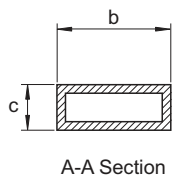
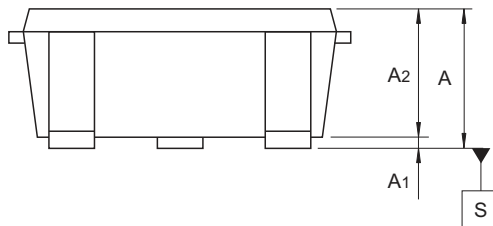
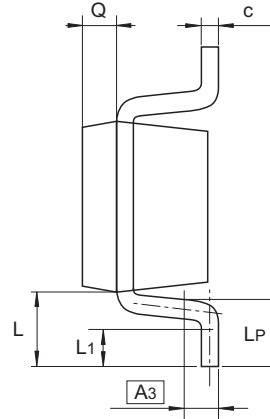
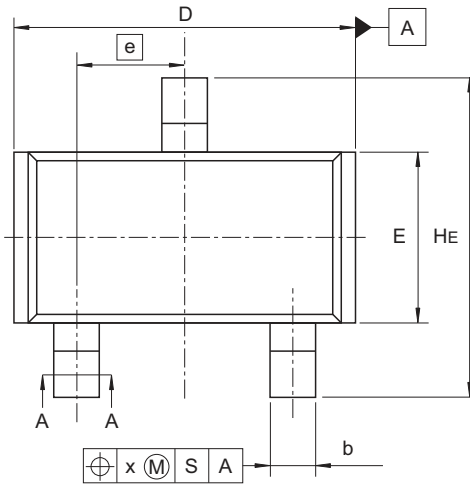


Body-Drain Diode Forward Voltage vs. Case Temperature



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
RQJ0302NGDQATL-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: +1-408-586-6000, 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

**Renesas Electronics Singapore Pte. Ltd.**  
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