

HAT2208R

Silicon N Channel Power MOS FET Power Switching

REJ03G1595-0201

Rev.2.01

Nov.25.2016

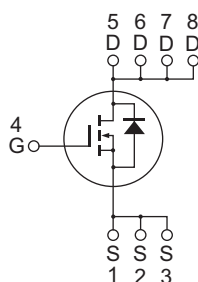
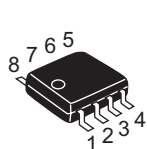
Features

- High speed switching
- Capable of 4.5 V gate drive
- Low drive current
- High density mounting
- Low on-resistance

$R_{DS(on)} = 19.0 \text{ m}\Omega$ typ. (at $V_{GS} = 10 \text{ V}$)

Outline

RENESAS Package code: PRSP0008DD-D
(Package name: SOP-8<FP-8DAV>)



1, 2, 3 Source
4 Gate
5, 6, 7, 8 Drain

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}	± 20	V
Drain current	I_D	9	A
Drain peak current	$I_{D(pulse)}$ ^{Note 1}	72	A
Body-drain diode reverse drain current	I_{DR}	9	A
Avalanche current	I_{AP} ^{Note 2}	9	A
Avalanche energy	E_{AR} ^{Note 2}	8.1	mJ
Channel dissipation	P_{ch} ^{Note 3}	2.0	W
Channel to ambient thermal impedance	θ_{ch-a} ^{Note 3}	62.5	$^\circ\text{C}/\text{W}$
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. Value at $T_{ch} = 25^\circ\text{C}$, $R_g \geq 50 \Omega$

3. When using the glass epoxy board (FR4 40 x 40 x 1.6 mm), $PW \leq 10\text{s}$

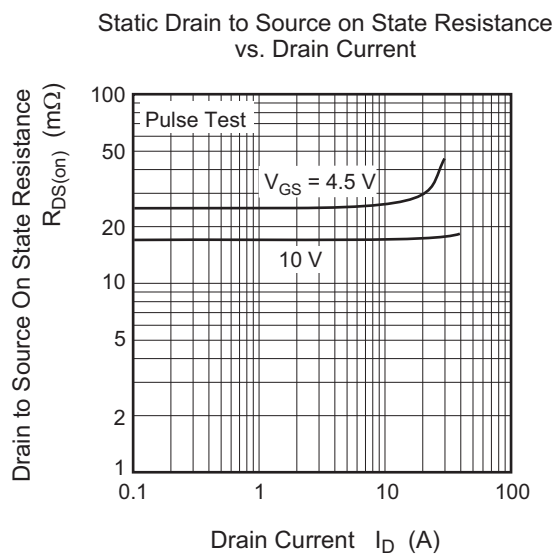
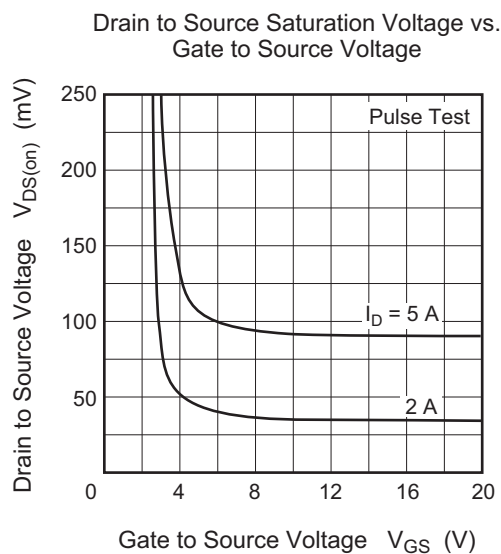
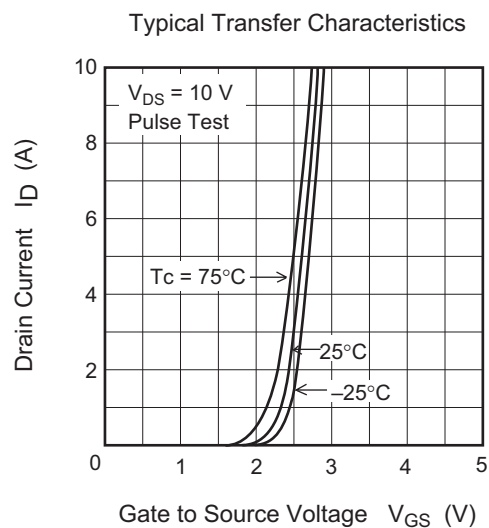
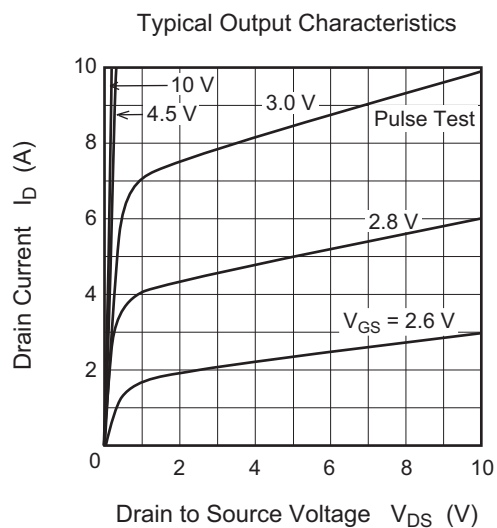
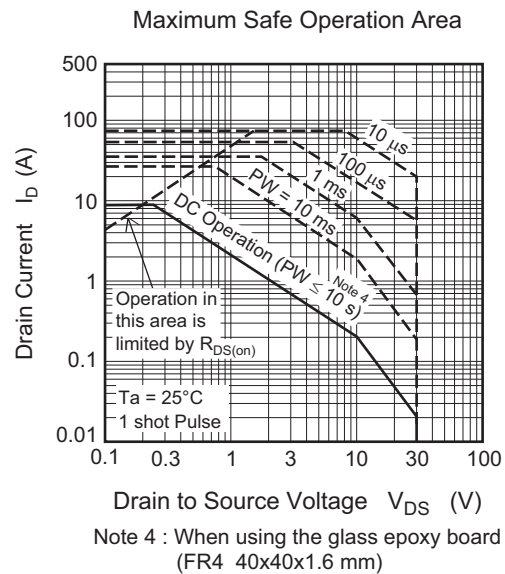
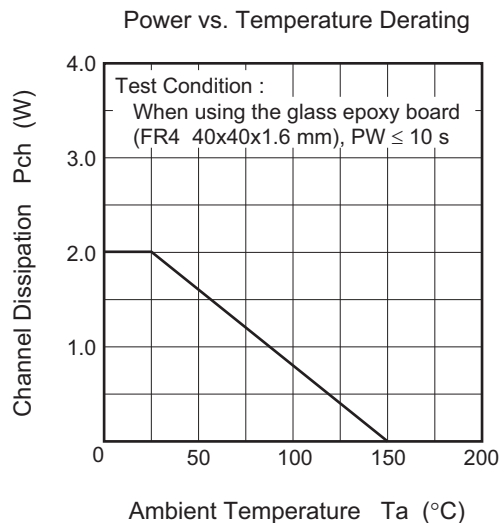
Electrical Characteristics

(Ta = 25°C)

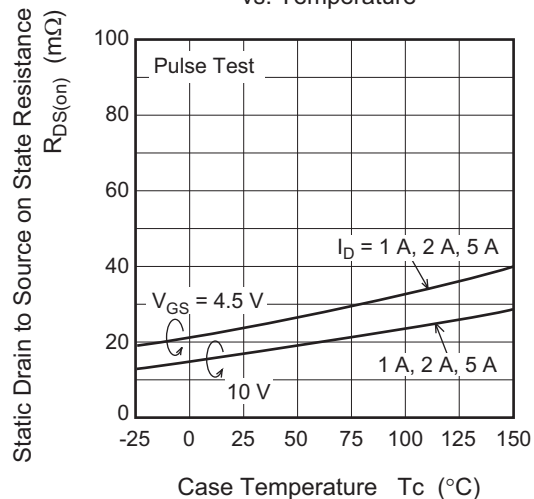
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	30	—	—	V	$I_D = 10 \text{ mA}$, $V_{GS} = 0$
Gate to source leak current	I_{GSS}	—	—	± 0.1	μA	$V_{GS} = \pm 20 \text{ V}$, $V_{DS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	1	μA	$V_{DS} = 30 \text{ V}$, $V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	1.0	—	2.5	V	$V_{DS} = 10 \text{ V}$, $I_D = 1 \text{ mA}$
Static drain to source on state resistance	$R_{DS(on)}$	—	19	24	$\text{m}\Omega$	$I_D = 4.5 \text{ A}$, $V_{GS} = 10 \text{ V}$ ^{Note4}
	$R_{DS(on)}$	—	24	35	$\text{m}\Omega$	$I_D = 4.5 \text{ A}$, $V_{GS} = 4.5 \text{ V}$ ^{Note4}
Forward transfer admittance	$ y_{fs} $	9.5	16	—	S	$I_D = 4.5 \text{ A}$, $V_{DS} = 10 \text{ V}$ ^{Note4}
Input capacitance	C_{iss}	—	630	—	pF	$V_{DS} = 10 \text{ V}$
Output capacitance	C_{oss}	—	160	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	C_{rss}	—	56	—	pF	$f = 1 \text{ MHz}$
Gate Resistance	R_g	—	1.1	—	Ω	
Total gate charge	Q_g	—	4.4	—	nC	$V_{DD} = 10 \text{ V}$
Gate to source charge	Q_{gs}	—	2.2	—	nC	$V_{GS} = 4.5 \text{ V}$
Gate to drain charge	Q_{gd}	—	1.4	—	nC	$I_D = 9 \text{ A}$
Turn-on delay time	$t_{d(on)}$	—	5.8	—	ns	$V_{GS} = 10 \text{ V}$, $I_D = 4.5 \text{ A}$
Rise time	t_r	—	15	—	ns	$V_{DD} \cong 10 \text{ V}$
Turn-off delay time	$t_{d(off)}$	—	34	—	ns	$R_L = 2.22 \Omega$
Fall time	t_f	—	3.5	—	ns	$R_g = 4.7 \Omega$
Body-drain diode forward voltage	V_{DF}	—	0.84	1.10	V	$I_F = 9 \text{ A}$, $V_{GS} = 0$ ^{Note4}
Body-drain diode reverse recovery time	t_{rr}	—	18	—	ns	$I_F = 9 \text{ A}$, $V_{GS} = 0$ $di_F/dt = 100 \text{ A}/\mu\text{s}$

Notes: 4. Pulse test

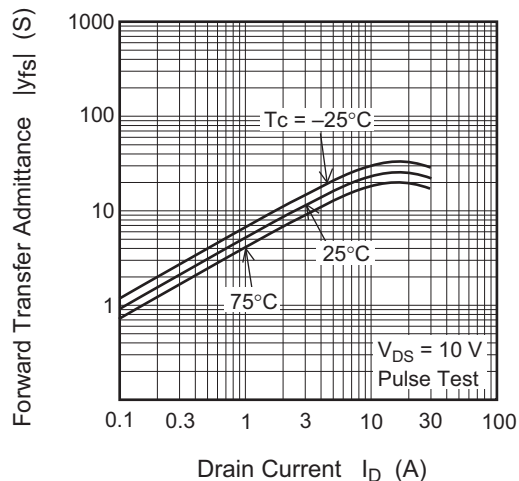
Main Characteristics



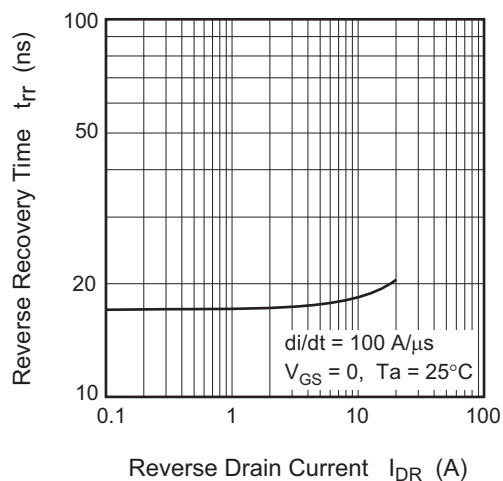
Static Drain to Source on State Resistance vs. Temperature



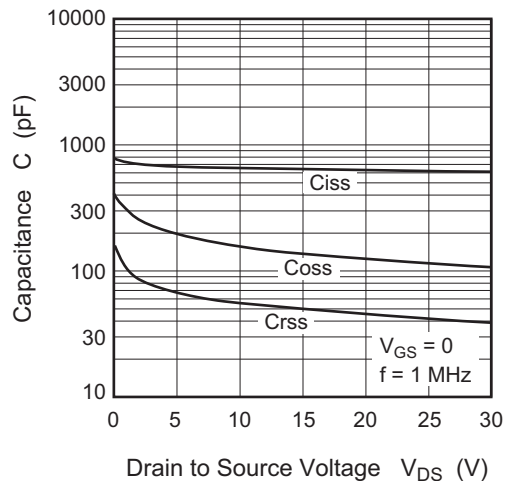
Forward Transfer Admittance vs. Drain Current



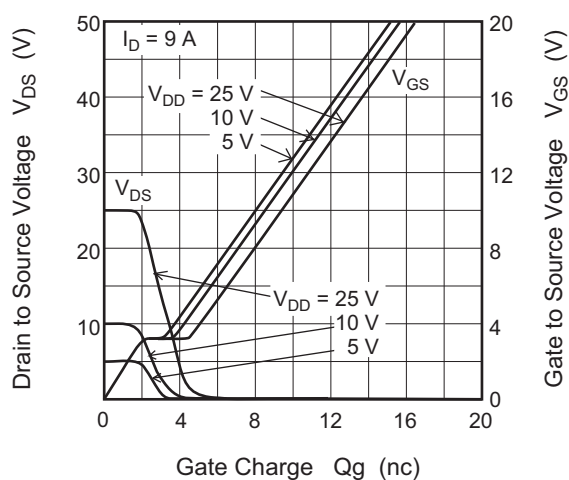
Body-Drain Diode Reverse Recovery Time



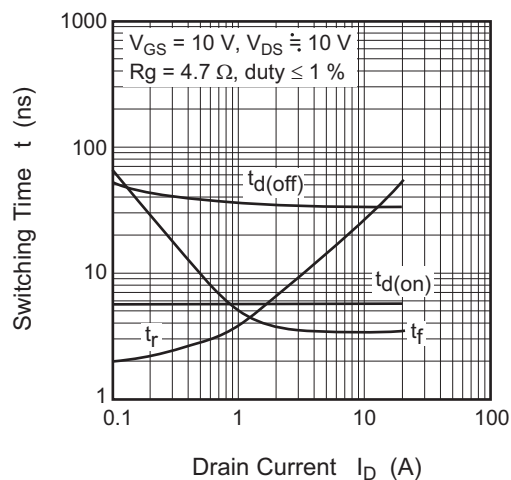
Typical Capacitance vs. Drain to Source Voltage

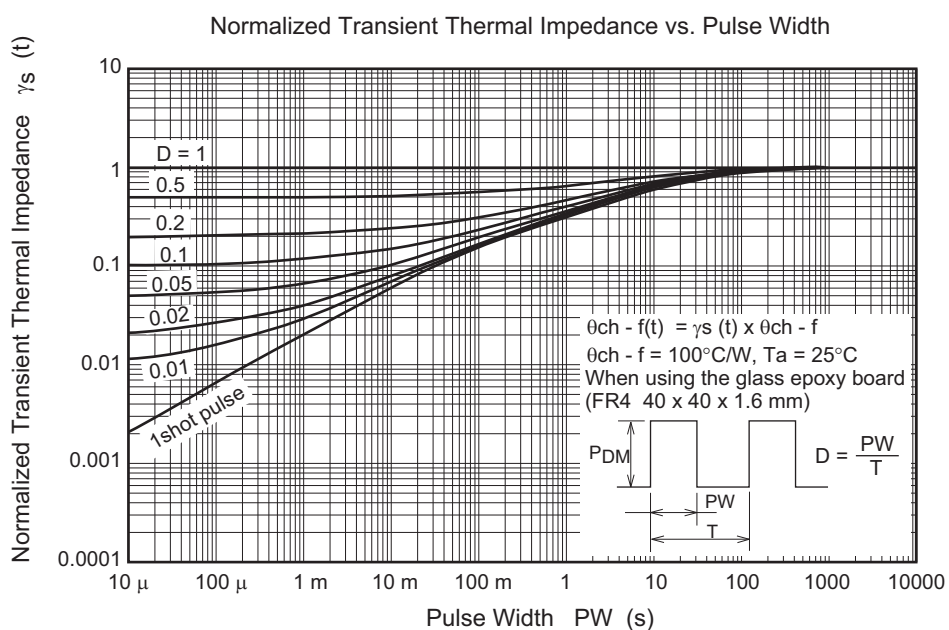
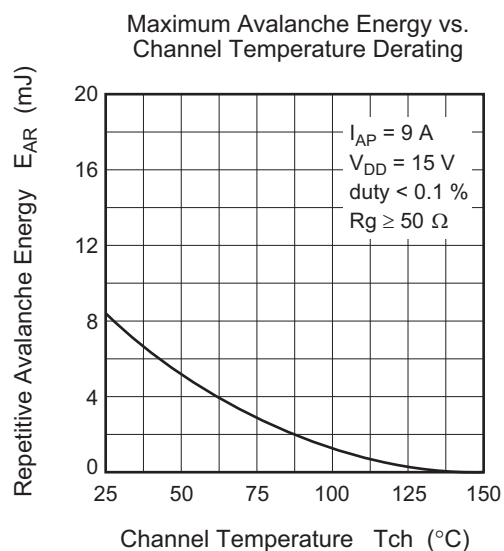
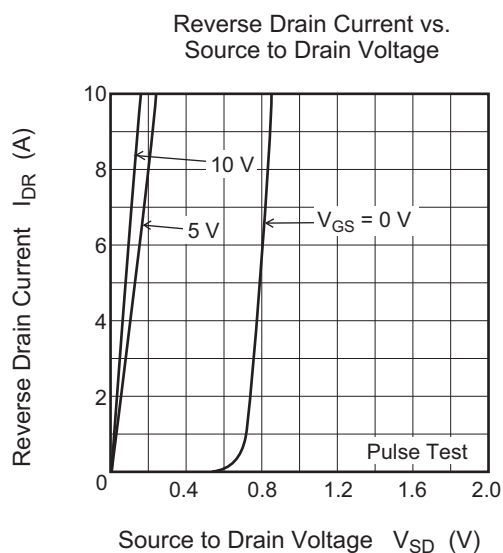


Dynamic Input Characteristics

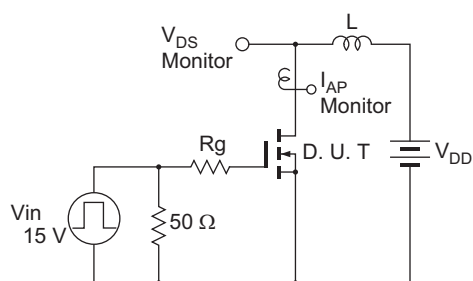


Switching Characteristics

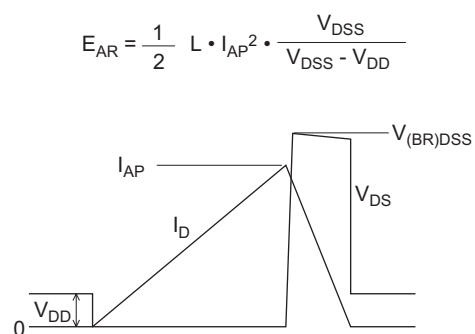




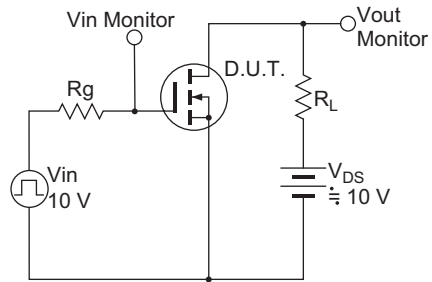
Avalanche Test Circuit



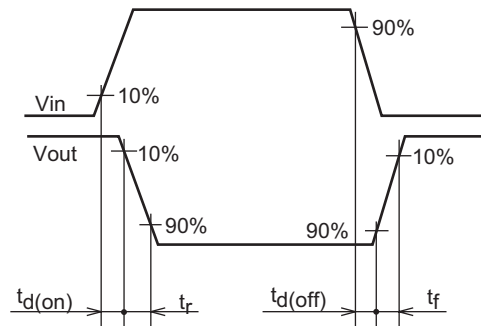
Avalanche Waveform



Switching Time Test Circuit

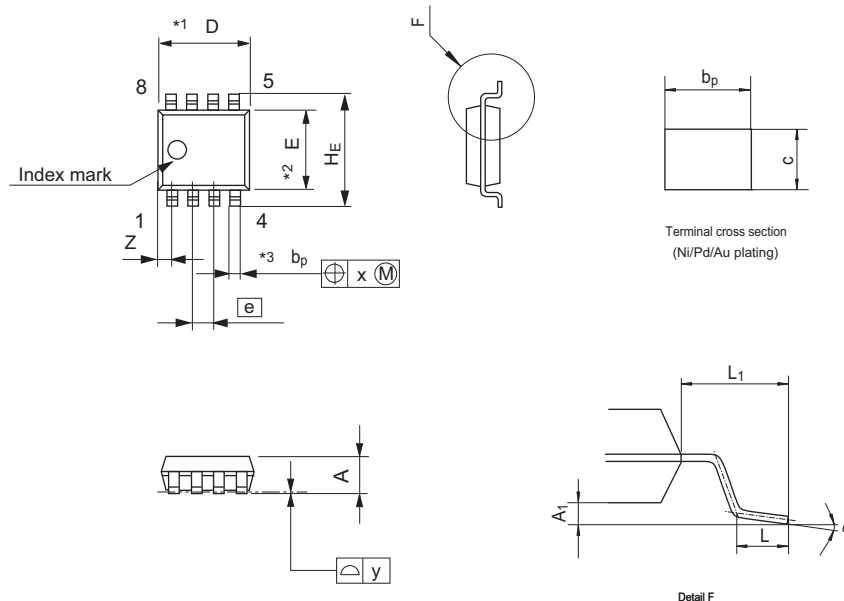


Switching Time Waveform



Package Dimensions

Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
SOP-8	P-SOP8-3.95 × 4.9-1.27	PRSP0008DD-D	FP-8DAV	0.085g



NOTE)
 1. DIMENSIONS **1(Nom)" AND **2"
 DO NOT INCLUDE MOLD FLASH.
 2. DIMENSION **3" DOES NOT
 INCLUDE TRIM OFFSET.

Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
D	—	4.90	5.3
E	—	3.95	—
A ₂	—	—	—
A ₁	0.10	0.14	0.25
A	—	—	1.75
b _p	0.34	0.40	0.46
b ₁	—	—	—
c	0.15	0.20	0.25
c ₁	—	—	—
θ	0°	—	8°
H _E	5.80	6.10	6.20
e	—	1.27	—
x	—	—	0.25
y	—	—	0.1
z	—	—	0.75
L	0.40	0.60	1.27
L ₁	—	1.08	—

Ordering Information

Orderable Part Number	Quantity	Shipping Container
HAT2208R-EL-E	2500 pcs	Taping

Note: For some grades, production may be terminated. Please contact the Renesas sales office to check the state of production before ordering the product.

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2801 Scott Boulevard Santa Clara, CA 95050-2549, U.S.A.
Tel: +1-408-588-6000, Fax: +1-408-588-6130

Renesas Electronics Canada Limited
9251 Yonge Street, Suite 8309 Richmond Hill, Ontario Canada L4C 9T3
Tel: +1-905-237-2004

Renesas Electronics Europe Limited
Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K
Tel: +44-1628-585-100, Fax: +44-1628-585-900

Renesas Electronics Europe GmbH
Arcadiastrasse 10, 40472 Dusseldorf, Germany
Tel: +49-211-6503-0, Fax: +49-211-6503-1327

Renesas Electronics (China) Co., Ltd.
Room 1709, Quantum Plaza, No.27 ZhichunLu Haidian District, Beijing 100191, 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 Lianqiao Road, Putuo District, Shanghai, P. R. China 200333
Tel: +86-21-2226-0888, Fax: +86-21-2226-0999

Renesas Electronics Hong Kong Limited
Unit 1601-1611, 16/F., Tower 2, Grand Century Place, 193 Prince Edward Road West, Mongkok, Kowloon, Hong Kong
Tel: +852-2265-6688, Fax: +852-2886-9022

Renesas Electronics Taiwan Co., Ltd.
13F, No. 363, Fu Shing North Road, Taipei 10543, Taiwan
Tel: +886-2-8175-9600, Fax: +886-2-8175-9670

Renesas Electronics Singapore Pte. Ltd.
80 Bendemeer Road, Unit #05-02 Hyflux Innovation Centre, Singapore 339949
Tel: +65-6213-0200, Fax: +65-6213-0300

Renesas Electronics Malaysia Sdn.Bhd.
Unit 1207, Block B, Menara Amcorp, Amcorp Trade Centre, No. 18, Jin Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia
Tel: +60-3-7955-9390, Fax: +60-3-7955-9510

Renesas Electronics India Pvt. Ltd.
No.777C, 100 Feet Road, HAL II Stage, Indiranagar, Bangalore, India
Tel: +91-80-67208700, Fax: +91-80-67208777

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