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Renesas Electronics website: <http://www.renesas.com>

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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H5N2503P

Silicon N Channel MOS FET High Speed Power Switching

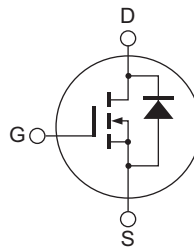
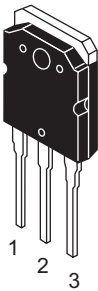
REJ03G1105-0200
(Previous: ADE-208-1374A)
Rev.2.00
Sep 07, 2005

Features

- Low on-resistance: $R_{DS(on)} = 0.04 \Omega$ typ.
- Low leakage current: $I_{DSS} = 1 \mu A$ max (at $V_{DS} = 250 V$)
- High speed switching: $t_f = 190 ns$ typ (at $V_{GS} = 10 V$, $V_{DD} = 125 V$, $I_D = 25 A$)
- Low gate charge: $Q_g = 140 nC$ typ (at $V_{DD} = 200 V$, $V_{GS} = 10 V$, $I_D = 50 A$)
- Avalanche ratings

Outline

RENESAS Package code: PRSS0004ZE-A
(Package name: TO-3P)



1. Gate
2. Drain (Flange)
3. Source

Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Value	Unit
Drain to source voltage	V_{DS}	250	V
Gate to source voltage	V_{GS}	± 30	V
Drain current	I_D	50	A
Drain peak current	$I_{D(pulse)}$ ^{Note 1}	200	A
Body-drain diode reverse drain current	I_{DR}	50	A
Body-drain diode reverse drain peak current	$I_{DR(pulse)}$ ^{Note 1}	200	A
Avalanche current	I_{AP} ^{Note 3}	50	A
Channel dissipation	P_{ch} ^{Note 2}	150	W
Channel to case thermal Impedance	θ_{ch-c}	0.833	°C/W
Channel temperature	T_{ch}	150	°C
Storage temperature	T_{stg}	-55 to +150	°C

Notes: 1. $PW \leq 10 \mu s$, duty cycle $\leq 1\%$ 2. Value at $T_c = 25^\circ C$ 3. $T_{ch} \leq 150^\circ C$

Electrical Characteristics

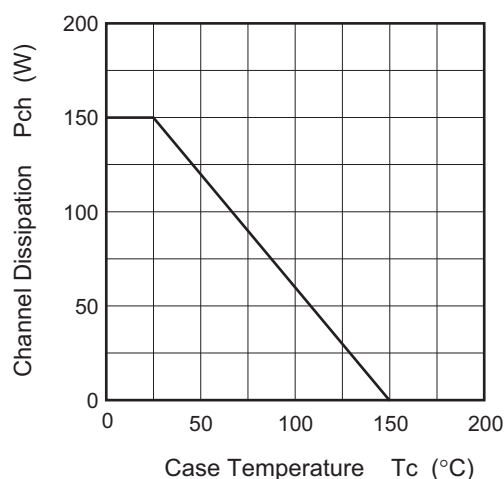
(Ta = 25°C)

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 leak current	I_{GSS}	—	—	± 0.1	μA	$V_{GS} = \pm 30 \text{ V}$, $V_{DS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	1	μA	$V_{DS} = 250 \text{ V}$, $V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	3.0	—	4.0	V	$V_{DS} = 10 \text{ V}$, $I_D = 1 \text{ mA}$
Static drain to source on state resistance	$R_{DS(on)}$	—	0.040	0.055	Ω	$I_D = 25 \text{ A}$, $V_{GS} = 10 \text{ V}$ ^{Note 4}
Forward transfer admittance	$ y_{fs} $	25	40	—	S	$I_D = 25 \text{ A}$, $V_{DS} = 10 \text{ V}$ ^{Note 4}
Input capacitance	C_{iss}	—	5150	—	pF	$V_{DS} = 25 \text{ V}$
Output capacitance	C_{oss}	—	620	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	C_{rss}	—	105	—	pF	$f = 1 \text{ MHz}$
Turn-on delay time	$t_{d(on)}$	—	58	—	ns	$I_D = 25 \text{ A}$
Rise time	t_r	—	210	—	ns	$V_{GS} = 10 \text{ V}$
Turn-off delay time	$t_{d(off)}$	—	220	—	ns	$R_L = 5 \Omega$
Fall time	t_f	—	190	—	ns	$R_g = 10 \Omega$
Total gate charge	Q_g	—	140	—	nC	$V_{DD} = 200 \text{ V}$
Gate to source charge	Q_{gs}	—	25	—	nC	$V_{GS} = 10 \text{ V}$
Gate to drain charge	Q_{gd}	—	60	—	nC	$I_D = 50 \text{ A}$
Body-drain diode forward voltage	V_{DF}	—	1.0	1.5	V	$I_F = 50 \text{ A}$, $V_{GS} = 0$
Body-drain diode reverse recovery time	t_{rr}	—	210	—	ns	$I_F = 50 \text{ A}$, $V_{GS} = 0$
Body-drain diode reverse recovery charge	Q_{rr}	—	1.8	—	μC	$di_F/dt = 100 \text{ A}/\mu s$

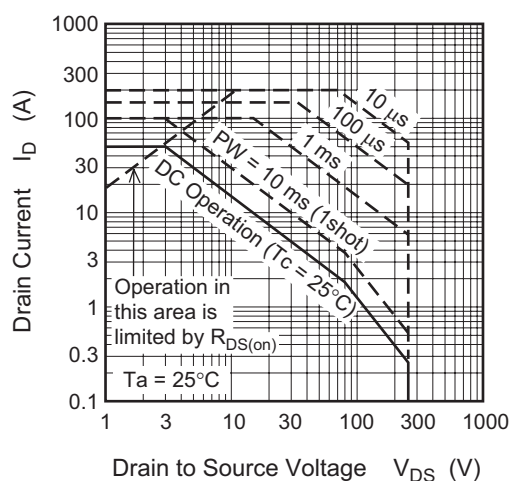
Note: 4. Pulse test

Main Characteristics

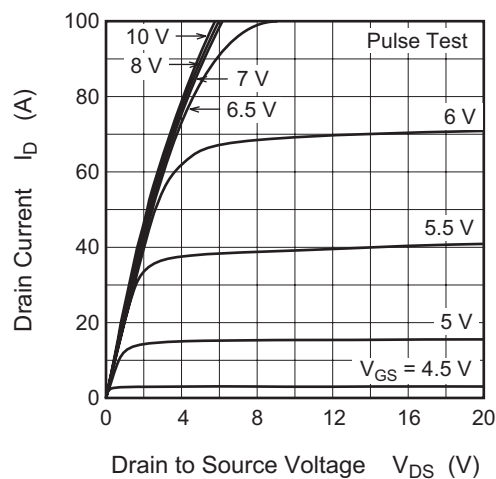
Power vs. Temperature Derating



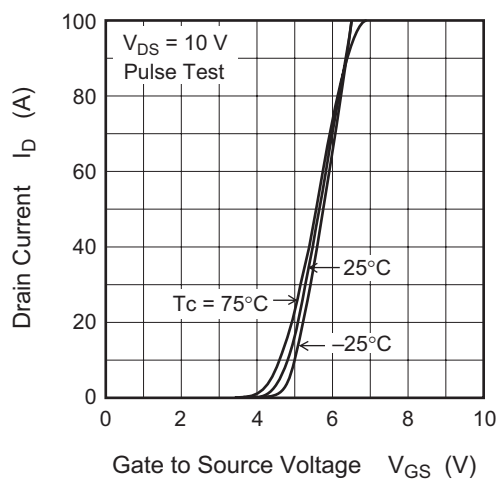
Maximum Safe Operation Area



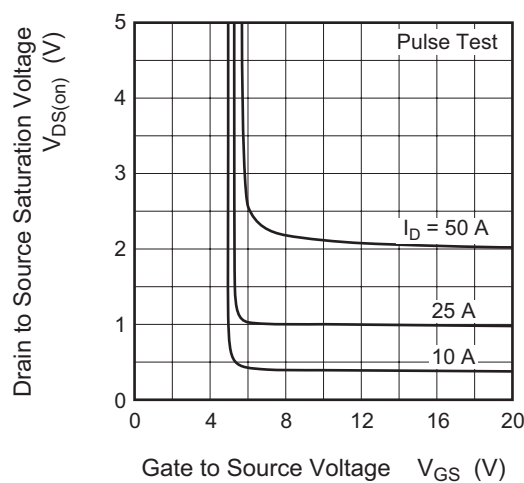
Typical Output Characteristics



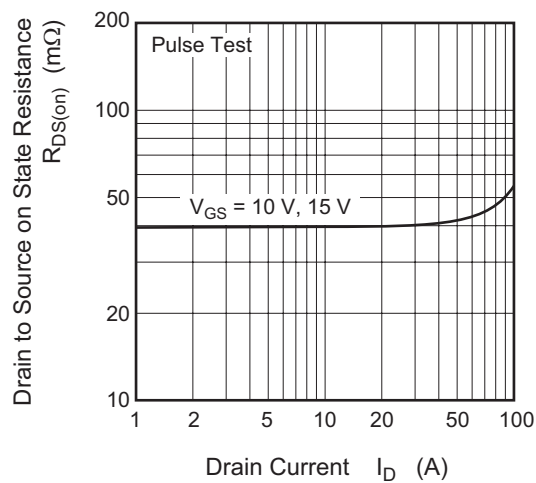
Typical Transfer Characteristics



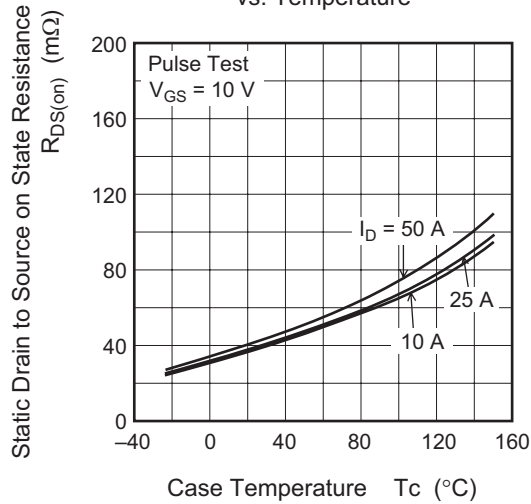
Drain to Source Saturation Voltage vs. Gate to Source Voltage



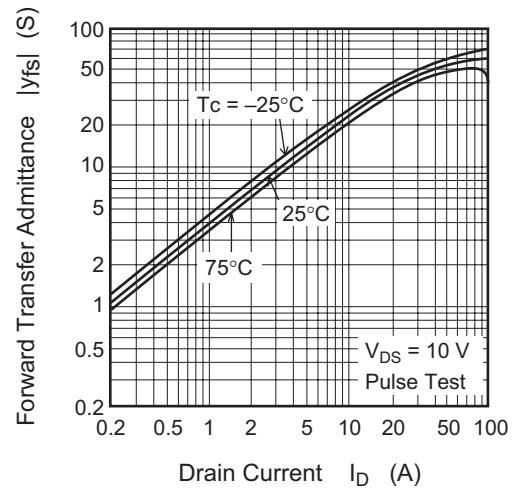
Static Drain to Source on State Resistance vs. Drain Current



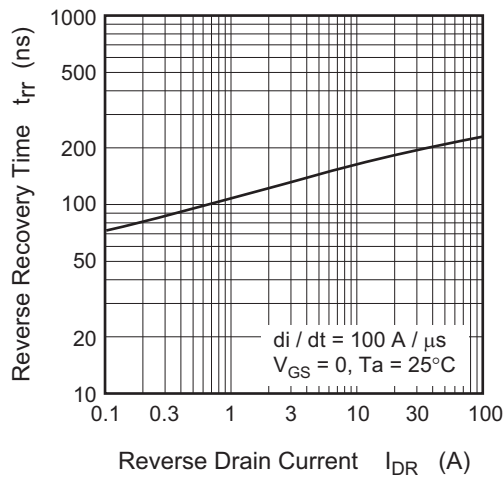
Static Drain to Source on State Resistance vs. Temperature



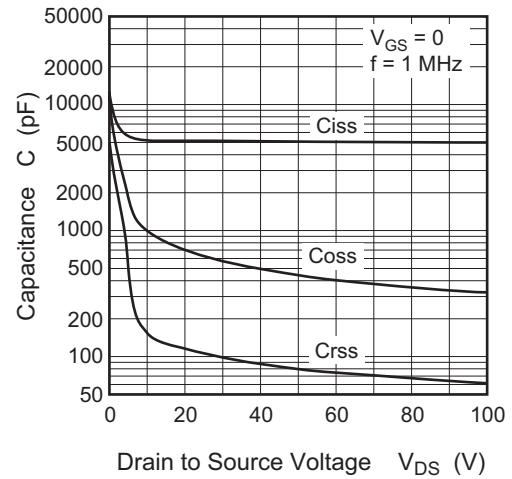
Forward Transfer Admittance vs. Drain Current



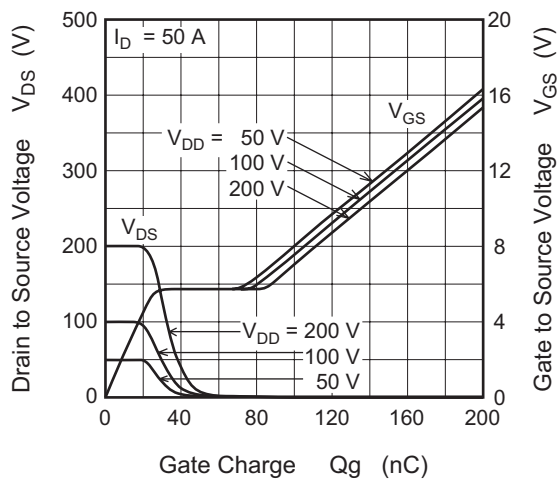
Body-Drain Diode Reverse Recovery Time



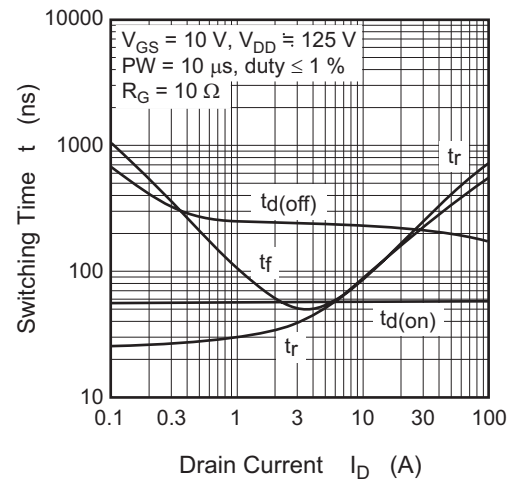
Typical Capacitance vs. Drain to Source Voltage

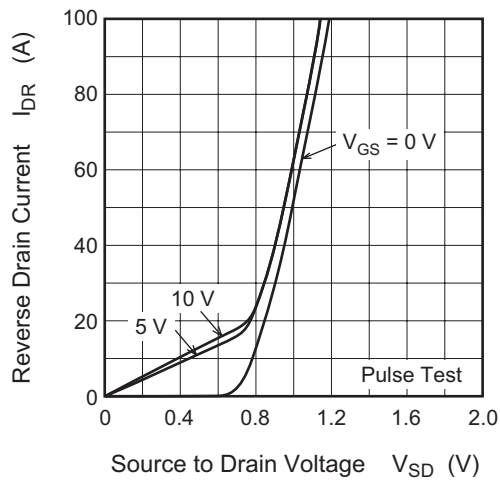
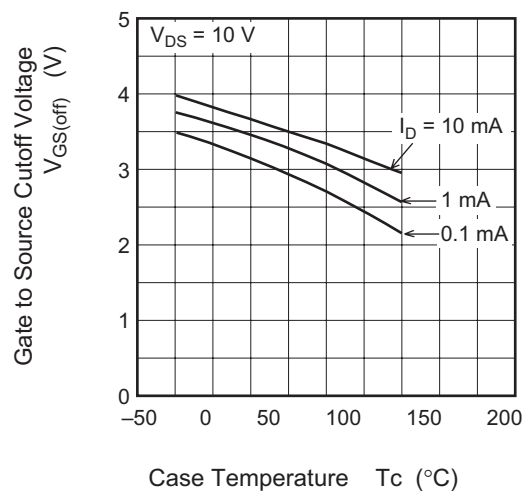


Dynamic Input Characteristics

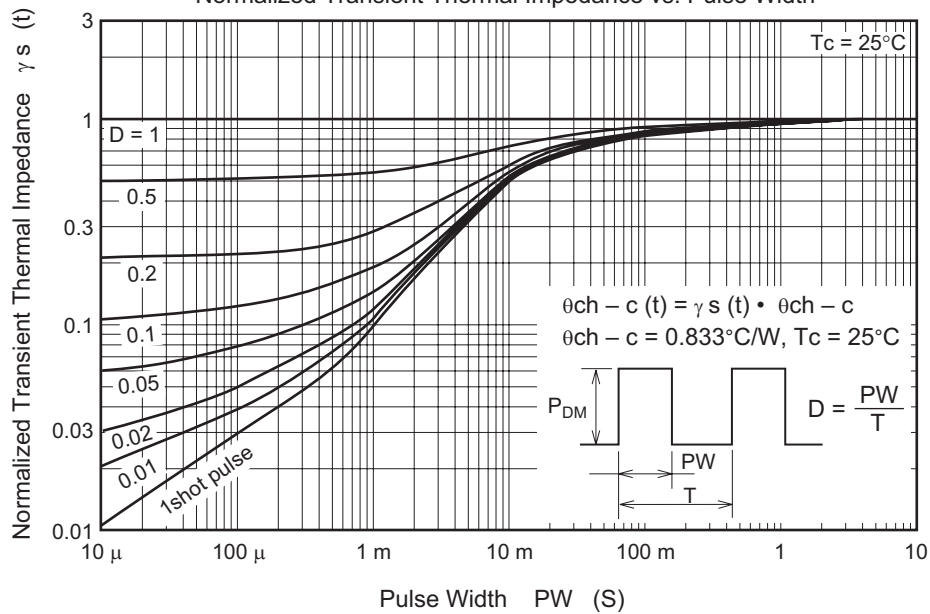


Switching Characteristics

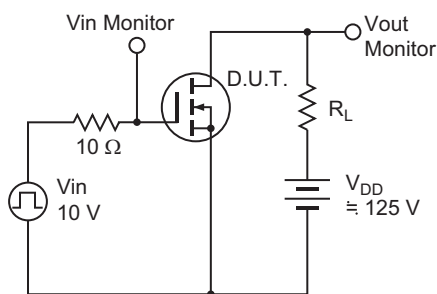


Reverse Drain Current vs.
Source to Drain VoltageGate to Source Cutoff Voltage
vs. Case Temperature

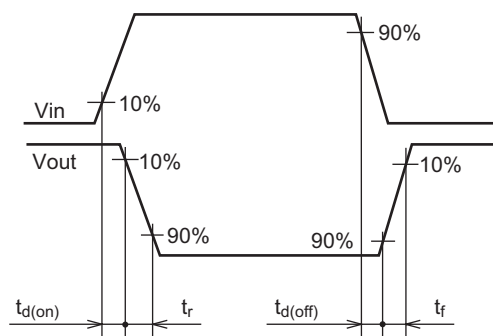
Normalized Transient Thermal Impedance vs. Pulse Width



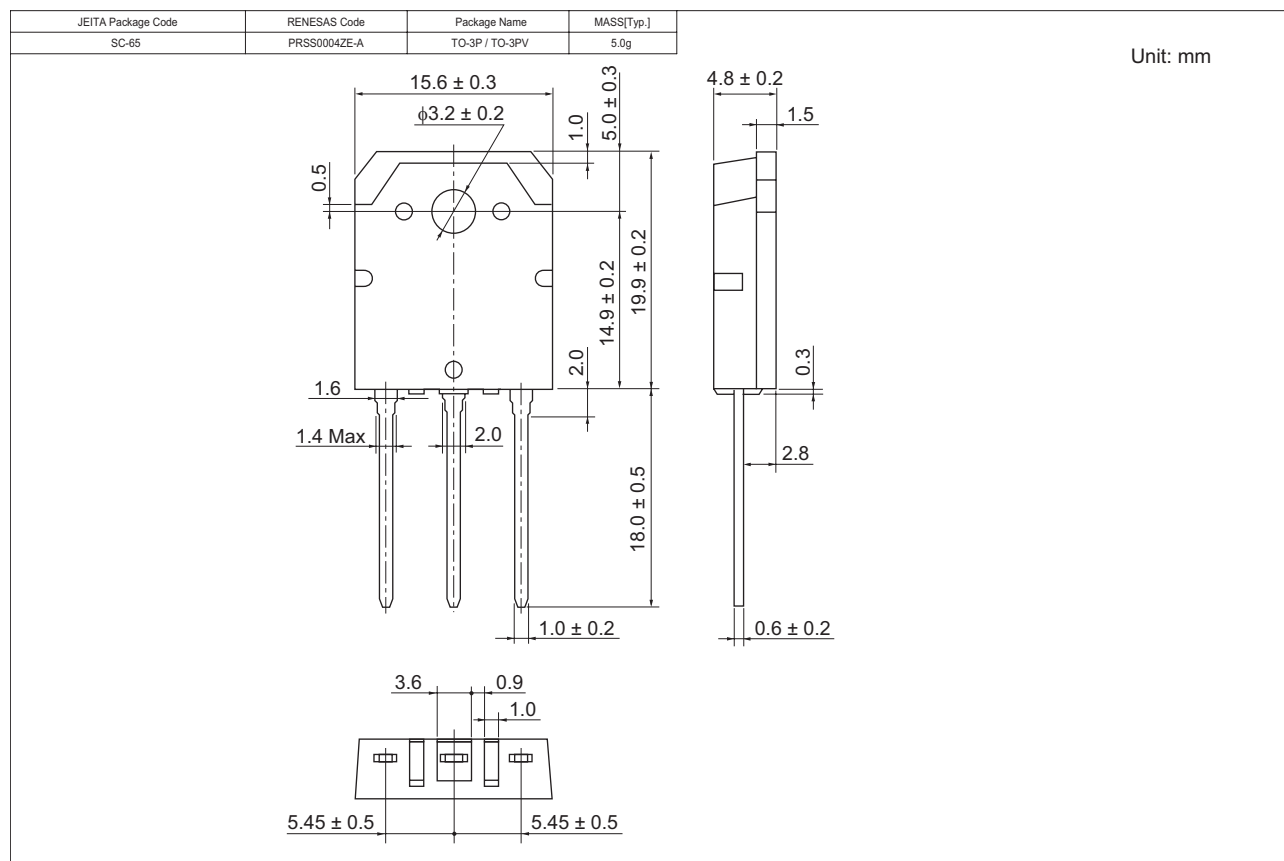
Switching Time Test Circuit



Waveform



Package Dimensions



Ordering Information

Part Name	Quantity	Shipping Container
H5N2503P-E	360 pcs	Box (Tube)

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Renesas Technology America, Inc.

450 Holger Way, San Jose, CA 95134-1368, U.S.A
Tel: <1> (408) 382-7500, Fax: <1> (408) 382-7501

Renesas Technology Europe Limited

Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K.
Tel: <44> (1628) 585-100, Fax: <44> (1628) 585-900

Renesas Technology Hong Kong Ltd.

7th Floor, North Tower, World Finance Centre, Harbour City, 1 Canton Road, Tsimshatsui, Kowloon, Hong Kong
Tel: <852> 2265-6688, Fax: <852> 2730-6071

Renesas Technology Taiwan Co., Ltd.

10th Floor, No.99, Fushing North Road, Taipei, Taiwan
Tel: <886> (2) 2715-2888, Fax: <886> (2) 2713-2999

Renesas Technology (Shanghai) Co., Ltd.

Unit2607 Ruijing Building, No.205 Maoming Road (S), Shanghai 200020, China
Tel: <86> (21) 6472-1001, Fax: <86> (21) 6415-2952

Renesas Technology Singapore Pte. Ltd.

1 Harbour Front Avenue, #06-10, Keppel Bay Tower, Singapore 098632
Tel: <65> 6213-0200, Fax: <65> 6278-8001

Renesas Technology Korea Co., Ltd.

Kukje Center Bldg. 18th Fl., 191, 2-ka, Hangang-ro, Yongsan-ku, Seoul 140-702, Korea
Tel: <82> 2-796-3115, Fax: <82> 2-796-2145

Renesas Technology Malaysia Sdn. Bhd.

Unit 906, Block B, Menara Amcorp, Amcorp Trade Centre, No.18, Jalan Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia
Tel: <603> 7955-9390, Fax: <603> 7955-9510