

RJK1002DPN-A0

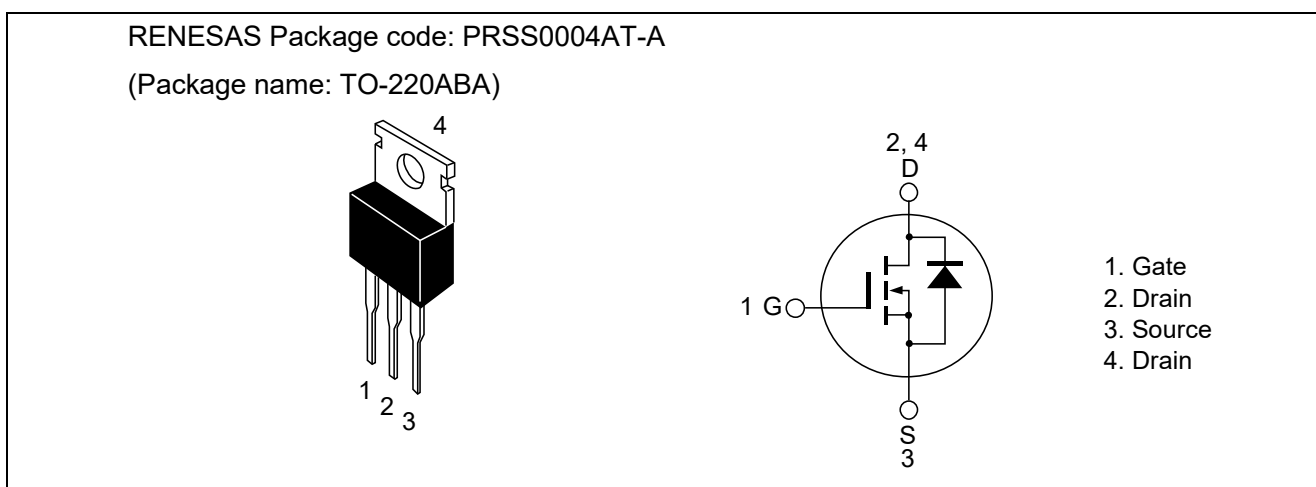
N-Channel MOSFET
100 V, 70 A, 7.6 mΩ

R07DS1449EJ0101
Rev.1.01
2020.1.9

Features

- High speed switching
- Low drive current
- Low on-resistance $R_{DS(on)} = 6.0 \text{ m}\Omega$ typ. (at $V_{GS} = 10 \text{ V}$)
- Package TO-220ABA
- Quality Grade : Standard

Outline



Absolute Maximum Ratings

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

Item	Symbol	Ratings	Unit
Drain to source voltage	V_{DSS}	100	V
Gate to source voltage	V_{GSS}	± 20	V
Drain current	I_D ^{Note1}	70	A
Drain peak current	$I_{D(pulse)}$ ^{Note2}	210	A
Body-drain diode reverse drain current	I_{DR}	70	A
Avalanche current	I_{AP} ^{Note3}	35	A
Avalanche energy	E_{AS} ^{Note3}	123	mJ
Channel dissipation	P_{ch} ^{Note1}	150	W
Channel temperature	T_{ch}	150	$^\circ\text{C}$
Storage temperature	T_{stg}	-55 to +150	$^\circ\text{C}$

Note: Continuous heavy condition (e.g. high temperature/voltage/current or high variation of temperature) may affect a reliability even if it is within the absolute maximum ratings. Please consider derating condition for appropriate reliability in reference Renesas Semiconductor Reliability Handbook (Recommendation for Handling and Usage of Semiconductor Devices) and individual reliability data.

- Notes: 1. $T_c = 25^\circ\text{C}$
 2. $PW \leq 10 \mu\text{s}$, duty cycle $\leq 1\%$
 3. Value at $L = 100 \mu\text{H}$, $T_{ch} = 25^\circ\text{C}$, $R_g \geq 50 \Omega$,

Thermal Impedance

Item	Symbol	Max. Value ^{Note4}	Unit
Channel to case thermal impedance	θ_{ch-c}	0.83	°C/W

Notes: 4. This data is the designed target maximum value on Renesas's measurement condition. (Not tested)

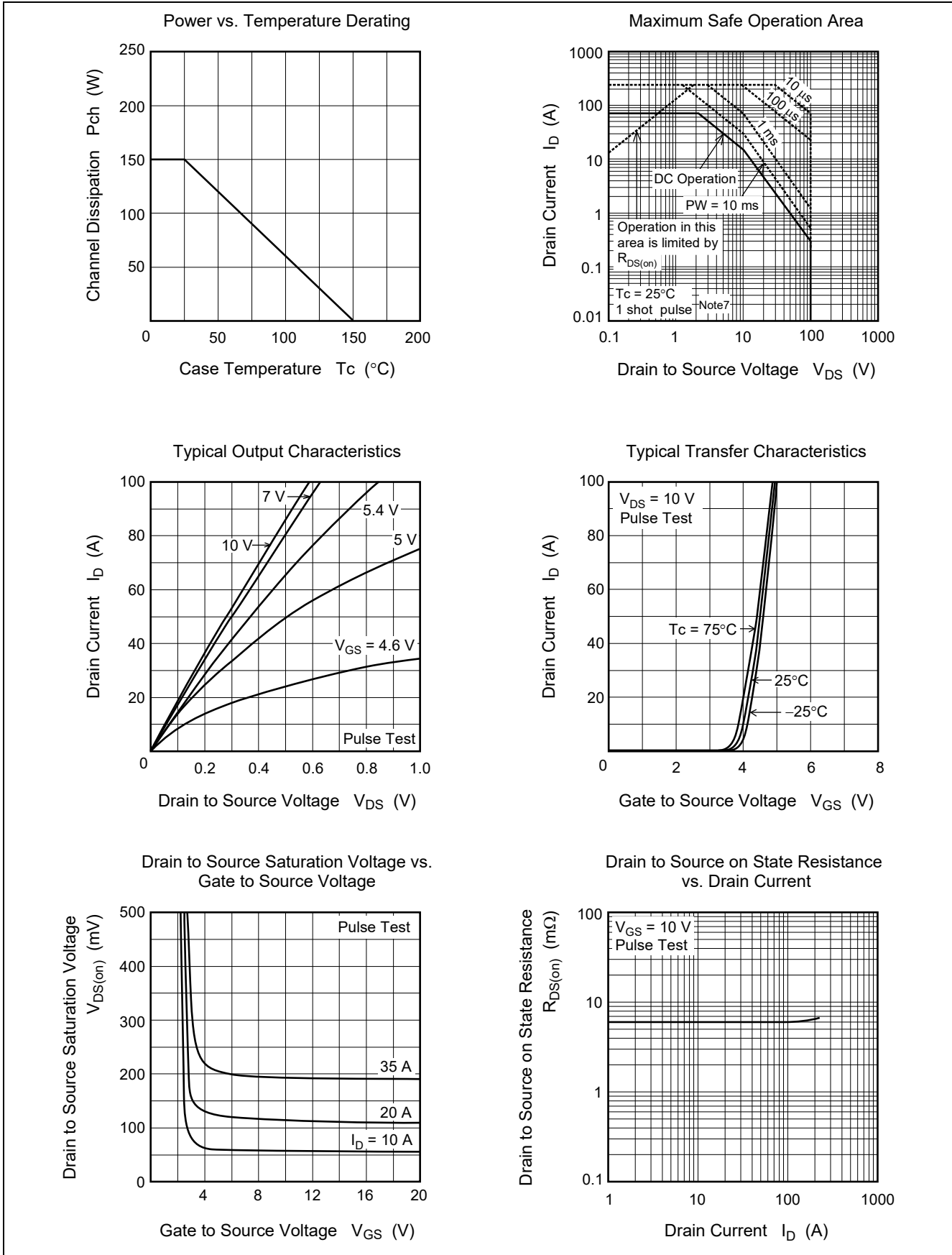
Electrical Characteristics

(Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	100	—	—	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	$V_{DS} = 100\text{V}$, $V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	2.0	—	4.0	V	$V_{DS} = 10\text{V}$, $I_D = 1\text{mA}$
Static drain to source on state resistance	$R_{DS(on)}$	—	6.0	7.6	m Ω	$I_D = 35\text{A}$, $V_{GS} = 10\text{V}$ ^{Note5}
Forward transfer admittance	$ y_{fs} $	—	135	—	S	$I_D = 35\text{A}$, $V_D = 10\text{V}$ ^{Note5}
Input capacitance	C_{iss}	—	6450	—	pF	$V_{DS} = 10\text{V}$ $V_{GS} = 0$ $f = 1\text{MHz}$
Output capacitance	C_{oss}	—	1000	—	pF	
Reverse transfer capacitance	C_{rss}	—	240	—	pF	
Gate Resistance	R_g	—	1.5	—	Ω	
Total gate charge	Q_g	—	94	—	nC	$V_{DD} = 50\text{V}$
Gate to source charge	Q_{gs}	—	33	—	nC	$V_{GS} = 10\text{V}$,
Gate to drain charge	Q_{gd}	—	19	—	nC	$I_D = 35\text{A}$
Turn-on delay time	$t_{d(on)}$	—	40	—	ns	$V_{GS} = 10\text{V}$
Rise time	t_r	—	13	—	ns	$I_D = 35\text{A}$
Turn-off delay time	$t_{d(off)}$	—	80	—	ns	$V_{DD} \cong 30\text{V}$
Fall time	t_f	—	13	—	ns	$R_g = 4.7\ \Omega$
Body-drain diode forward voltage	V_{DF}	—	0.85	1.5	V	$I_F = 70\text{A}$, $V_{GS} = 0$ ^{Note5}
Body-drain diode reverse recovery time	t_{rr}	—	65	—	ns	$I_F = 70\text{A}$, $V_{GS} = 0$ $di_F/dt = 100\text{A}/\mu\text{s}$

Notes: 5. Pulse test

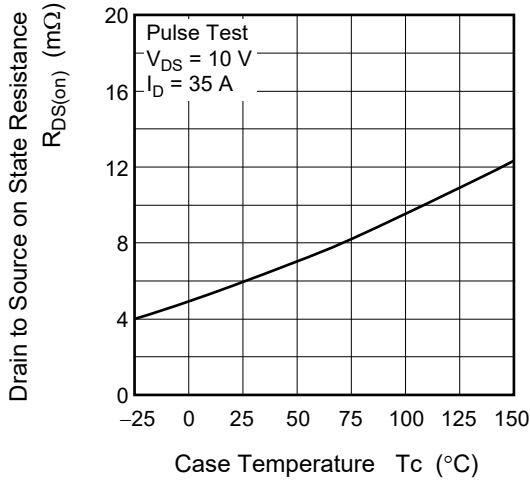
Typical Characteristics ^{Note6}



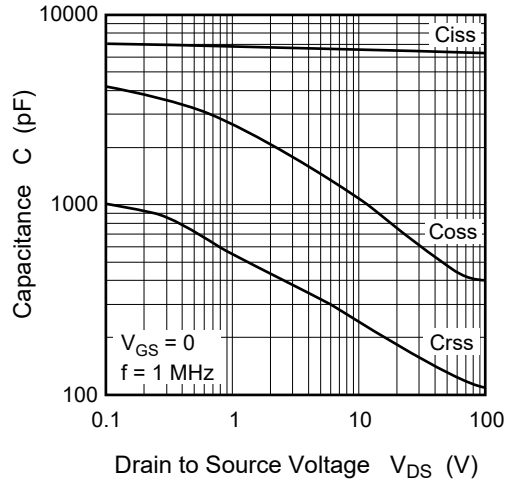
Notes: 6. Designed target value on Renesas measurement condition.

7. This data is the designed value on Renesas's measurement condition. Renesas recommends that operating conditions are designed according to a document "Power MOSFET/IGBT Attention of Handling Semiconductor Devices (R07ZZ0010)".

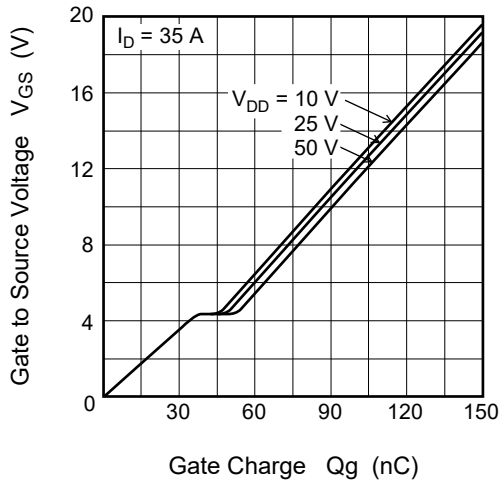
Drain to Source on State Resistance vs. Temperature



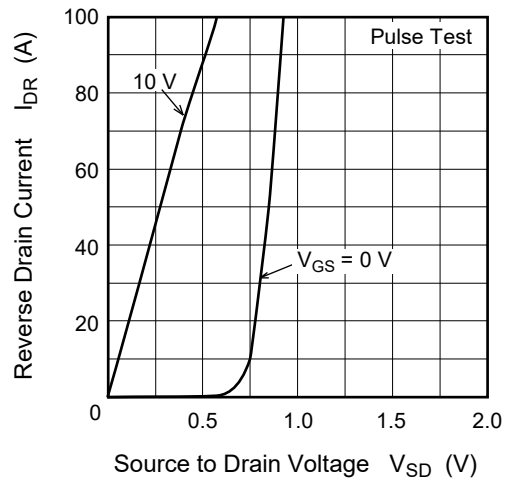
Typical Capacitance vs. Drain to Source Voltage



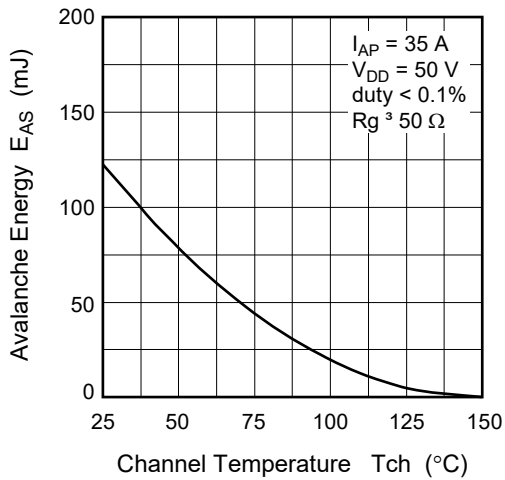
Dynamic Input Characteristics



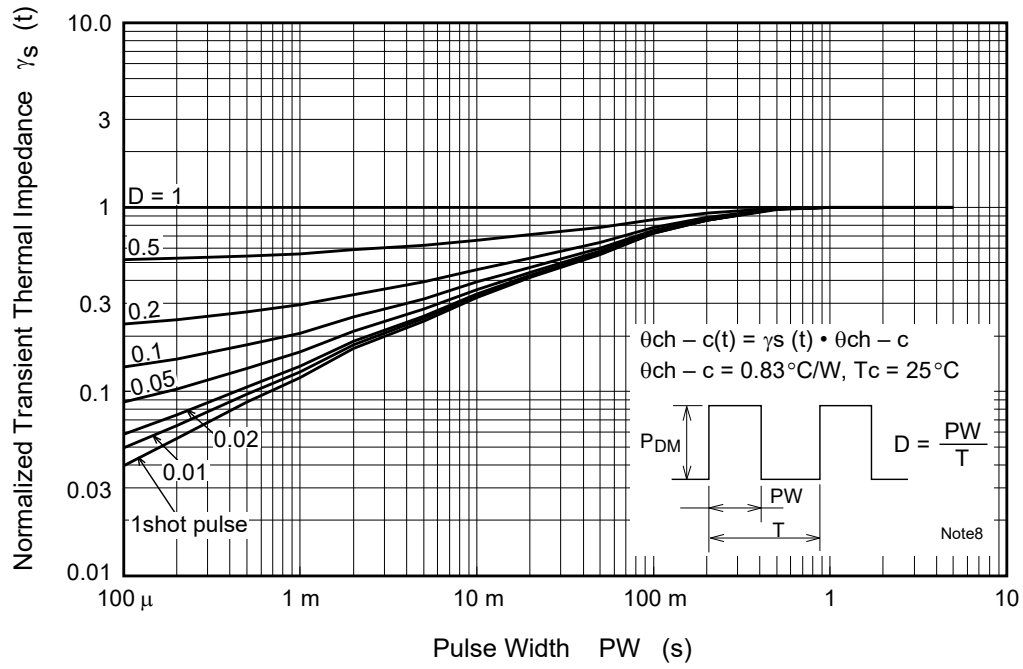
Reverse Drain Current vs. Source to Drain Voltage



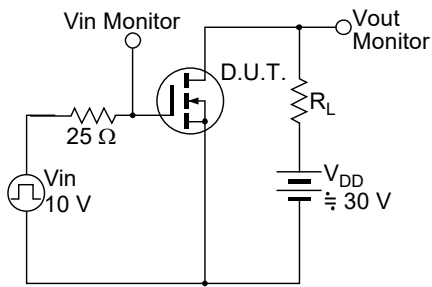
Maximum Avalanche Energy vs. Channel Temperature Derating



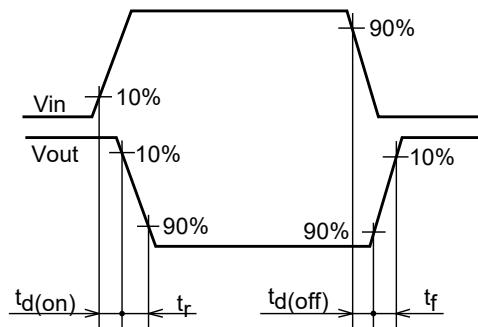
Normalized Transient Thermal Impedance vs. Pulse Width



Switching Time Test Circuit



Waveform

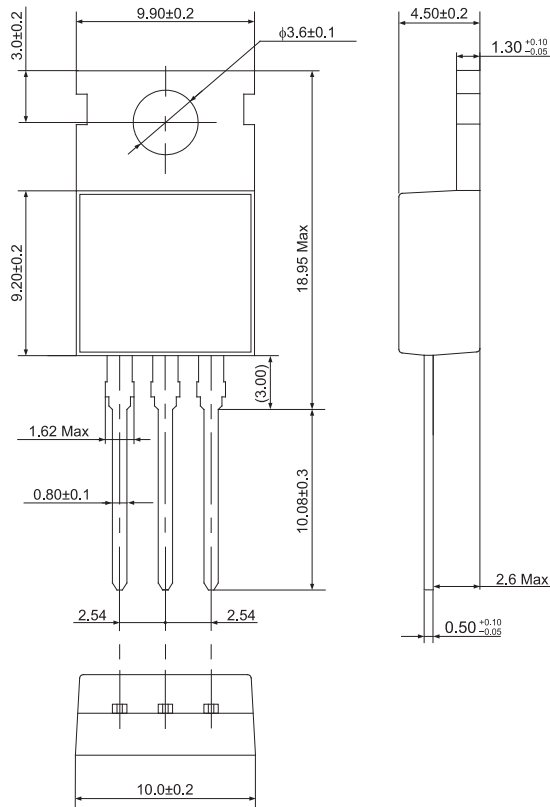


Notes: 8. This data is the designed target maximum value on Renesas's measurement condition.

Package Dimensions

Package Name	JEDEC Package Code	RENESAS Code	Previous Code	MASS (Typ) [g]
TO-220ABA	TO-220AB	PRSS0004AT-A	TO-220ABA	2.1

Unit: mm



Ordering Information

Orderable Part Number	Quantity	Shipping Container
RJK1002DPN-A0-T2	50 pcs	Magazine (Tube)

Note: The symbol of 2nd "-" is occasionally presented as "#".

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Renesas Electronics Corporation
TOYOSU FORESIA, 3-2-24 Toyosu, Koto-ku, Tokyo 135-0061, Japan

Renesas Electronics America Inc.
1001 Murphy Ranch Road, Milpitas, CA 95035, U.S.A.
Tel: +1-408-432-8888, Fax: +1-408-434-5351

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

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

Renesas Electronics (China) Co., Ltd.
Room 101-101, Floor 1, Building 7, Yard No. 7, 8th Street, Shangdi, Haidian District, Beijing 100085, China
Tel: +86-10-8235-1155, Fax: +86-10-8235-7679

Renesas Electronics (Shanghai) Co., Ltd.
Unit 301, Tower A, Central Towers, 555 Lango Road, Putuo District, Shanghai 200333, China
Tel: +86-21-2226-0695, Fax: +86-21-2226-0599

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 #03-02 Hyflux Innovation Centre, Singapore 339949
Tel: +65-6213-0200, Fax: +65-6213-0300

Renesas Electronics Malaysia Sdn.Bhd.
Unit No 3A-1 Level 3A Tower 8 UOA Business Park, No 1 Jalan Pengaturcara U1/51A, Seksyen U1, 40150 Shah Alam, Selangor, Malaysia
Tel: +60-3-5022-1298, Fax: +60-3-5022-1290

Renesas Electronics India Pvt. Ltd.
No.777C, 100 Feet Road, HAL 2nd Stage, Indiranagar, Bangalore 560 038, India
Tel: +91-80-67208700

Renesas Electronics Korea Co., Ltd.
17F, KAMCO Yangjae Tower, 262, Gangnam-daero, Gangnam-gu, Seoul, 06265 Korea
Tel: +82-2-558-3737, Fax: +82-2-558-9338

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Colophon 8.0