

RJP65T54DPM-A0

650V - 30A - IGBT

Application: Partial switching circuit

R07DS1365EJ0110

Rev.1.10

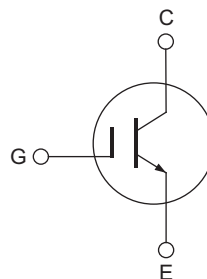
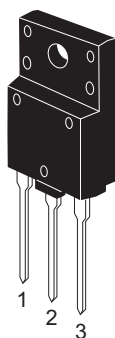
Dec 19, 2016

Features

- Low collector to emitter saturation voltage
 $V_{CE(sat)} = 1.35 \text{ V typ. (at } I_C = 30 \text{ A, } V_{GE} = 15 \text{ V, } T_a = 25^\circ\text{C)}$
- Isolated package
- Trench gate and thin wafer technology (G7H series)
- High speed switching
- Operation frequency ($50\text{Hz} \leq f < 20\text{kHz}$)
- Not guarantee short circuit withstand time

Outline

RENESAS Package code: PRSS0003ZP-A
(Package name: TO-3PFP)



1. Gate
2. Collector
3. Emitter

Absolute Maximum Ratings

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

Item		Symbol	Ratings	Unit
Collector to emitter voltage		V_{CES}	650	V
Gate to emitter voltage		V_{GES}	± 30	V
Collector current	$T_c = 25^\circ\text{C}$	I_C	60	A
	$T_c = 100^\circ\text{C}$	I_C	30	A
Collector peak current		$i_{c(peak)}$ ^{Note1}	225	A
Collector dissipation		P_C	63.5	W
Junction to case thermal resistance		θ_{j-c}	2.35	$^\circ\text{C/W}$
Junction temperature		T_j ^{Note2}	175	$^\circ\text{C}$
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 are 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.

Electrical Characteristics

(Ta = 25°C)

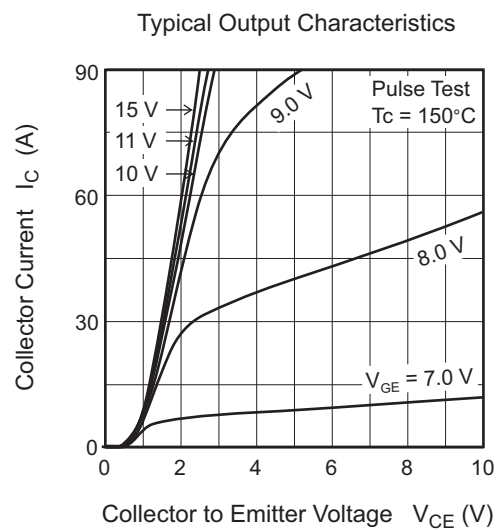
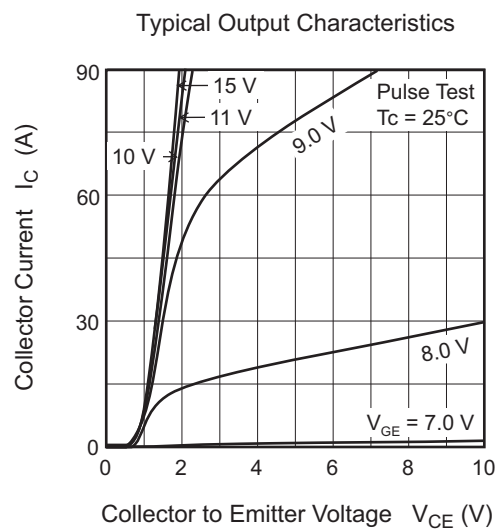
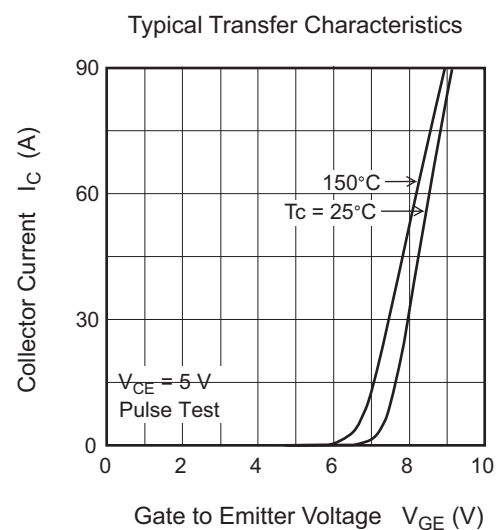
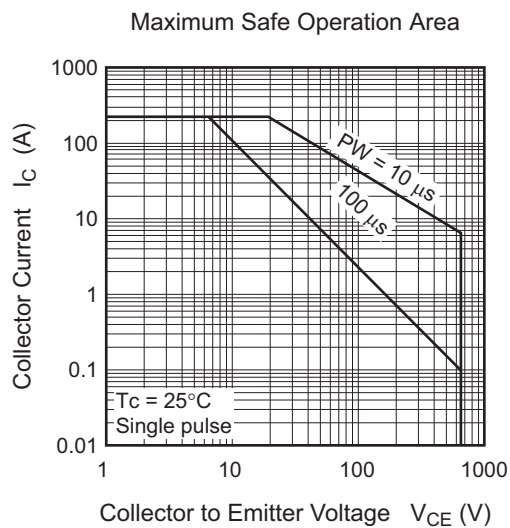
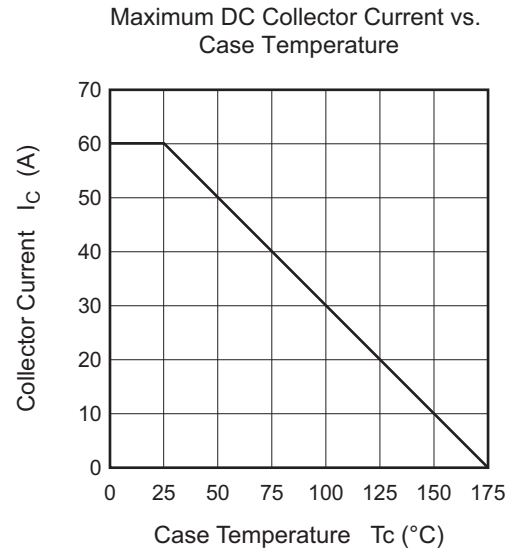
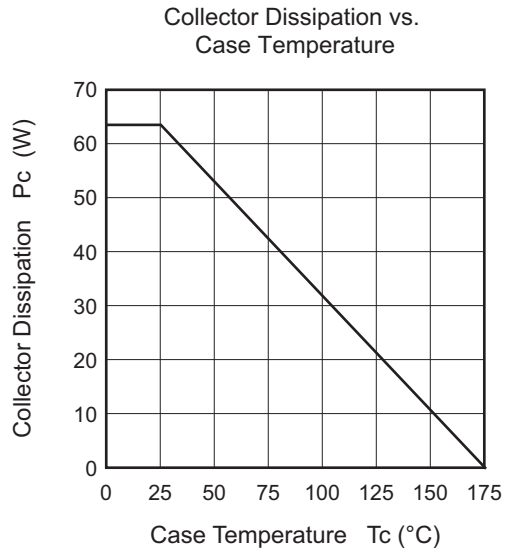
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Zero gate voltage collector current	I_{CES}	—	—	10	μA	$V_{CE} = 650 V, V_{GE} = 0$
Gate to emitter leak current	I_{GES}	—	—	± 1	μA	$V_{GE} = \pm 30 V, V_{CE} = 0$
Gate to emitter cutoff voltage	$V_{GE(off)}$	5	—	7	V	$V_{CE} = 10V, I_C = 1.0 mA$
Collector to emitter saturation voltage	$V_{CE(sat)}$	—	1.35	1.68	V	$I_C = 30 A, V_{GE} = 15V$ ^{Note3}
Total gate charge	Q_g		72		nC	$V_{CE} = 400 V$ $V_{GE} = 15V$ $I_C = 30A$
Gate to emitter charge	Q_{ge}		10		nC	
Gate to collector charge	Q_{gc}		30		nC	
Input capacitance	C_{ies}	—	1400	—	pF	$V_{CE} = 25 V$ $V_{GE} = 0$ $f = 1 MHz$
Output capacitance	C_{oes}	—	42	—	pF	
Reveres transfer capacitance	C_{res}	—	30	—	pF	
Turn-on delay time	$t_{d(on)}$	—	35	—	ns	$V_{CC} = 400 V$ $V_{GE} = 15 V, I_C = 30 A$ $R_g = 10 \Omega, T_C = 25 ^\circ C$ Inductive load ^{Note4}
Rise time	t_r	—	20	—	ns	
Turn-off delay time	$t_{d(off)}$	—	120	—	ns	
Fall time	t_f	—	130	—	ns	
Turn-on loss energy	E_{on}	—	0.33	—	mJ	
Turn-off loss energy	E_{off}	—	0.76	—	mJ	$V_{CC} = 400 V$ $V_{GE} = 15 V, I_C = 30 A$ $R_g = 10 \Omega, T_C = 150^\circ C$ Inductive load ^{Note4}
Turn-on delay time	$t_{d(on)}$	—	31	—	ns	
Rise time	t_r	—	22	—	ns	
Turn-off delay time	$t_{d(off)}$	—	128	—	ns	
Fall time	t_f	—	156	—	ns	
Turn-on loss energy	E_{on}	—	0.47	—	mJ	
Turn-off loss energy	E_{off}	—	1.04	—	mJ	

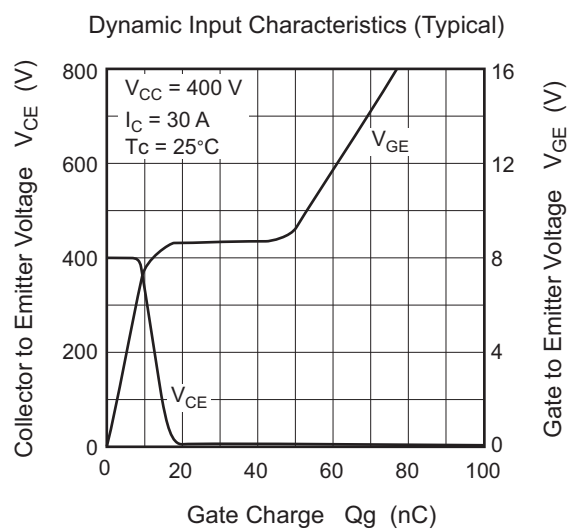
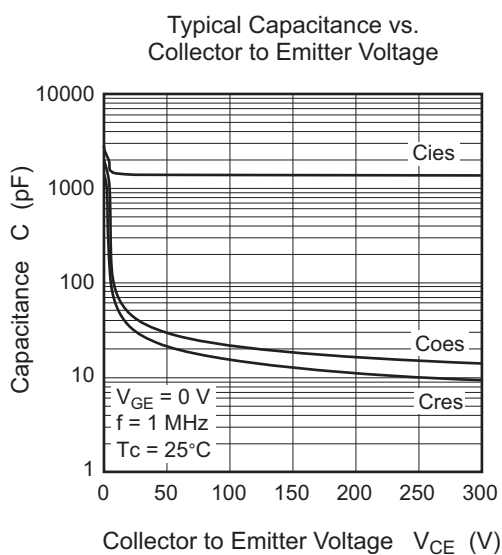
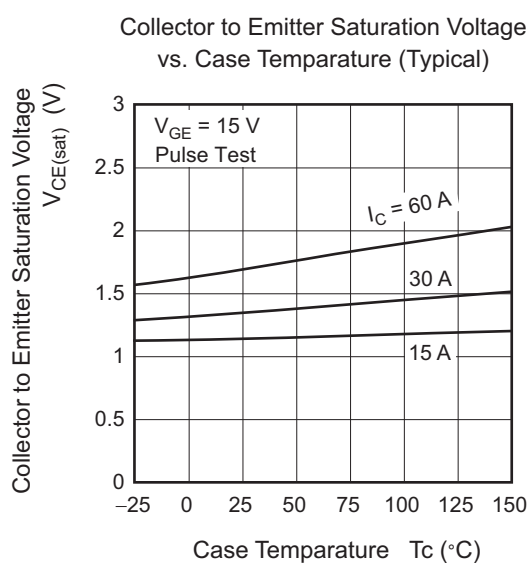
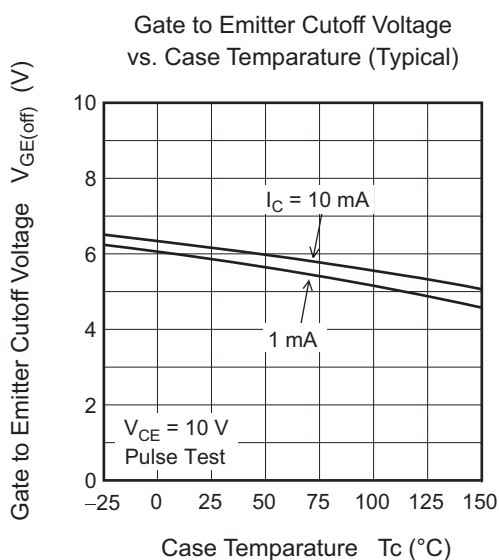
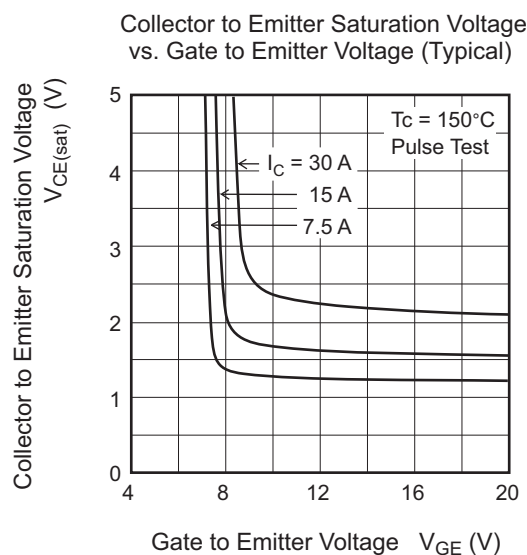
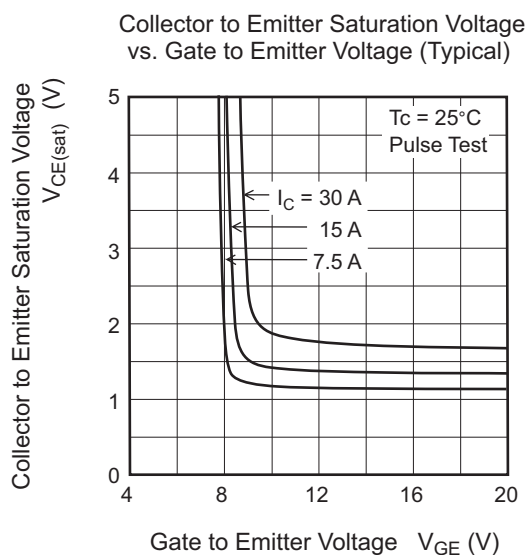
Notes: 1. $PW \leq 10 \mu s$, duty cycle $\leq 1\%$ 2. Please use this device in the thermal conditions which the junction temperature does not exceed 175°C.
Renesas IGBT Application Note is disclosed about reliability test and application condition up to 175°C.

3. Pulse test

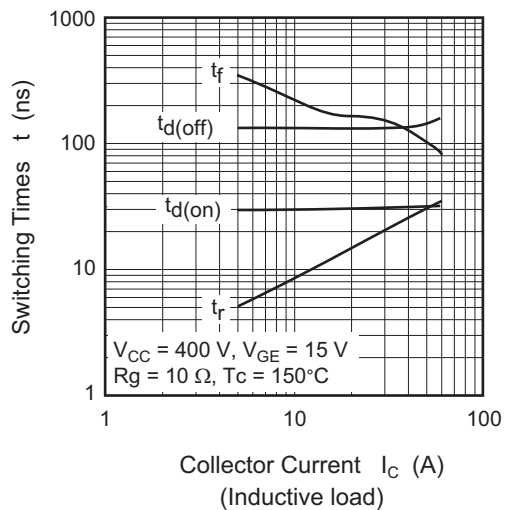
4. Switching time test circuit and waveform are shown below.

Main Characteristics

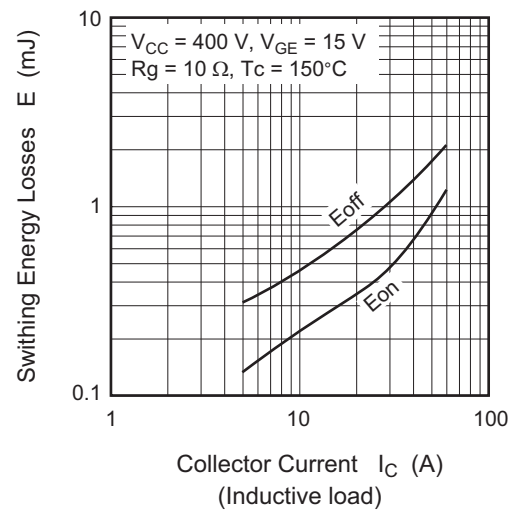




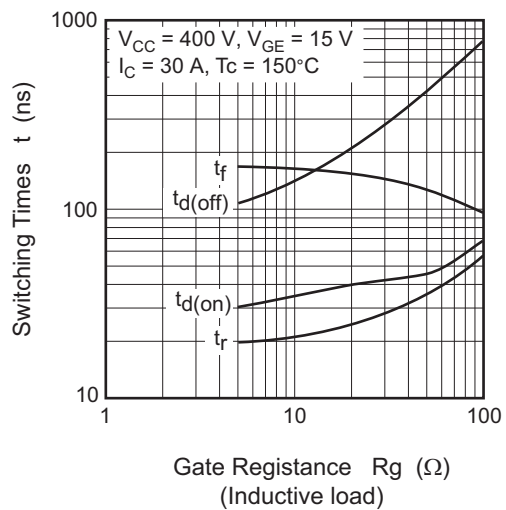
Switching Characteristics (Typical) (1)



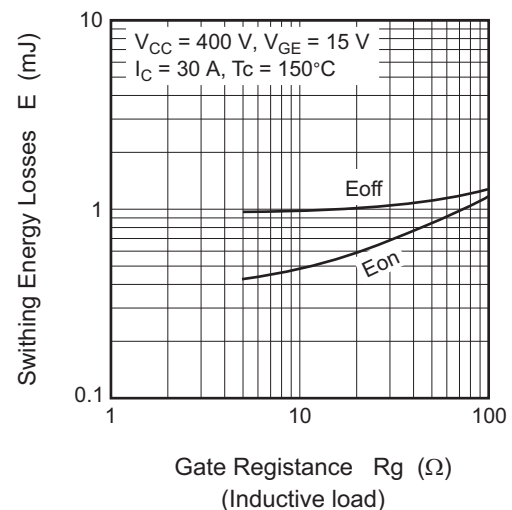
Switching Characteristics (Typical) (2)



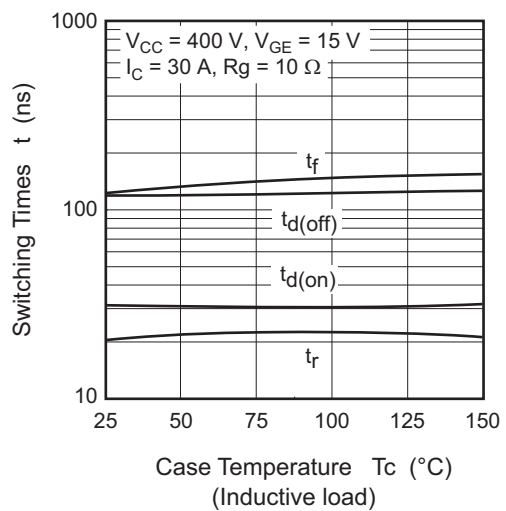
Switching Characteristics (Typical) (3)



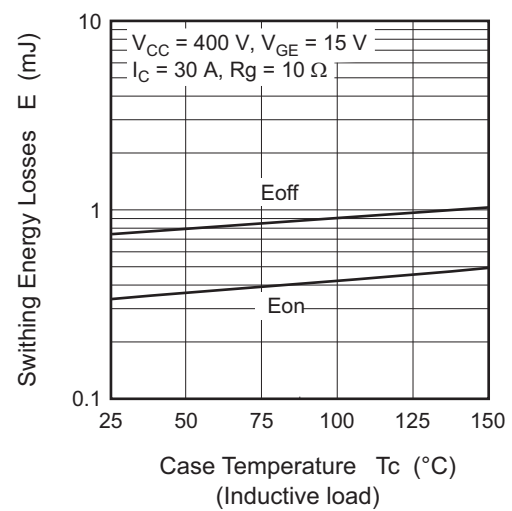
Switching Characteristics (Typical) (4)

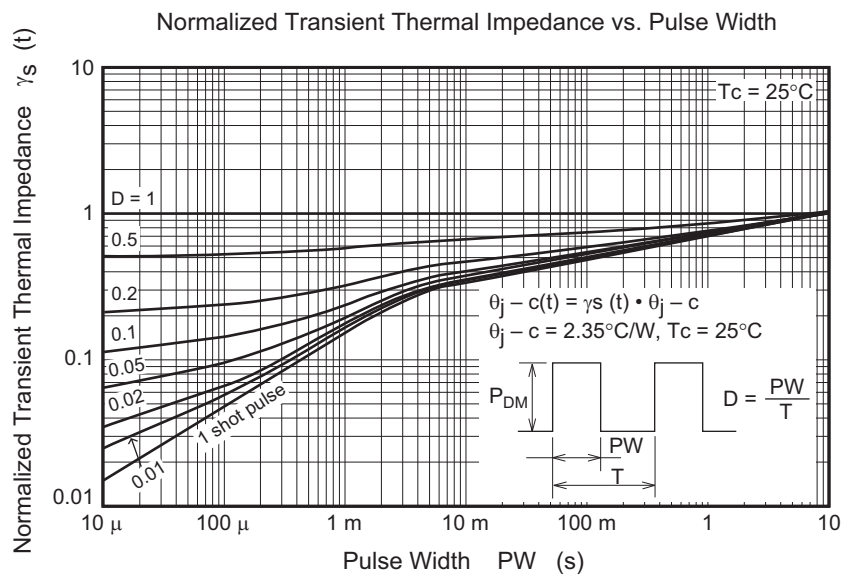


Switching Characteristics (Typical) (5)

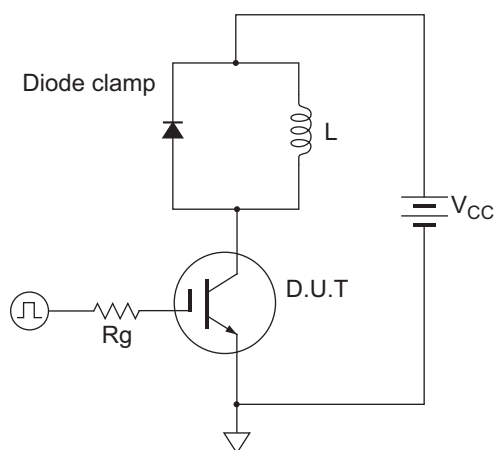


Switching Characteristics (Typical) (6)

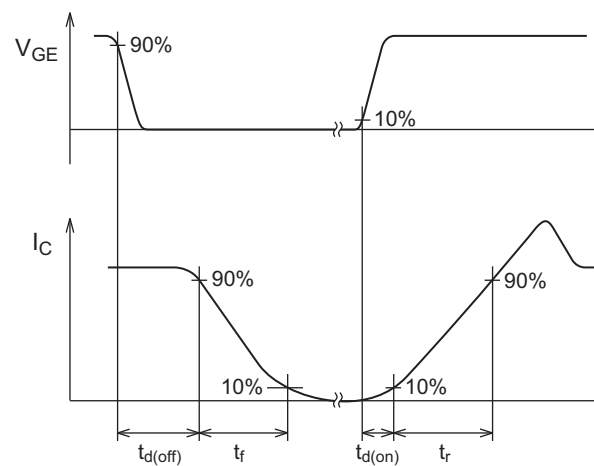




Switching Time Test Circuit



Waveform



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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 Düsseldorf, 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 Langao 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

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Tel: +65-6213-0200, Fax: +65-6213-0300

Renesas Electronics Malaysia Sdn.Bhd.
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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.
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