

RJK60S5DPK-M0

600V - 20A - SJ MOS FET
High Speed Power Switching

R07DS0245EJ0400

Rev.4.00

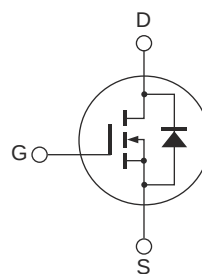
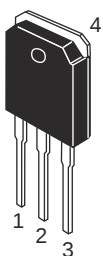
Apr 23, 2012

Features

- Superjunction MOSFET
- Low on-resistance
 $R_{DS(on)} = 0.150 \Omega$ typ. (at $I_D = 10 \text{ A}$, $V_{GS} = 10 \text{ V}$, $T_a = 25^\circ\text{C}$)
- High speed switching
 $t_f = 23 \text{ ns}$ typ. (at $I_D = 10 \text{ A}$, $V_{GS} = 10 \text{ V}$, $R_L = 30 \Omega$, $R_g = 10 \Omega$, $T_a = 25^\circ\text{C}$)

Outline

RENESAS Package code: PRSS0004ZH-A
(Package name:TO-3PSG)



1. Gate
2. Drain
3. Source
4. Drain

Absolute Maximum Ratings

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

Item	Symbol	Ratings	Unit
Drain to source voltage	V_{DSS}	600	V
Gate to source voltage	V_{GSS}	+30, -20	V
Drain current	I_D ^{Note1}	20	A
	I_D ^{Note1}	12.6	A
Drain peak current	$I_{D(pulse)}$ ^{Note1}	40	A
Body-drain diode reverse drain current	I_{DR} ^{Note1}	20	A
Body-drain diode reverse drain peak current	$I_{DR(pulse)}$ ^{Note1}	40	A
Avalanche current	I_{AP} ^{Note3}	5	A
Avalanche energy	E_{AR} ^{Note3}	1.36	mJ
Channel dissipation	P_{ch} ^{Note2}	192.3	W
Channel to case thermal impedance	θ_{ch-c}	0.65	$^\circ\text{C/W}$
Channel temperature	T_{ch}	150	$^\circ\text{C}$
Storage temperature	T_{stg}	-55 to +150	$^\circ\text{C}$

- Notes: 1. Limited by T_{ch} max.
2. Value at $T_c = 25^\circ\text{C}$
3. $ST_{ch} = 25^\circ\text{C}$, $T_{ch} \leq 150^\circ\text{C}$

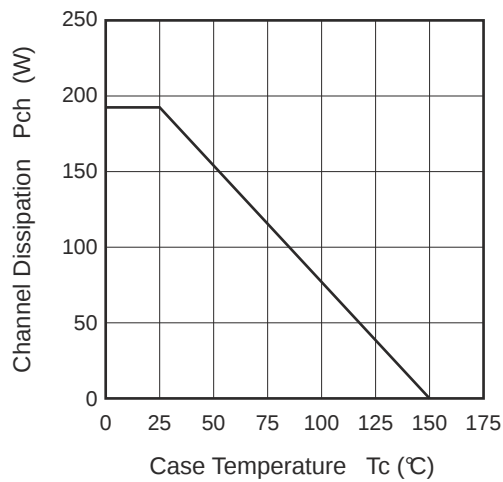
Electrical Characteristics

(Ta = 25°C)

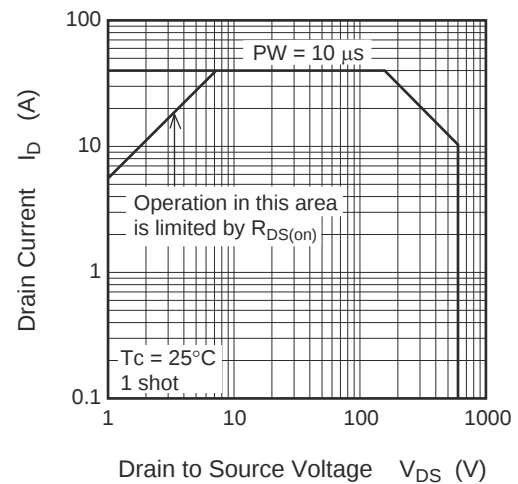
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	600	—	—	V	$I_D = 10 \text{ mA}$, $V_{GS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	1	mA	$V_{DS} = 600 \text{ V}$, $V_{GS} = 0$
Gate to source leak current	I_{GSS}	—	—	± 0.1	μA	$V_{GS} = +30\text{V}$, -20 V , $V_{DS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	3	—	5	V	$V_{DS} = 10 \text{ V}$, $I_D = 1 \text{ mA}$
Static drain to source on state resistance	$R_{DS(on)}$	—	0.150	0.178	Ω	$I_D = 10 \text{ A}$, $V_{GS} = 10 \text{ V}$ ^{Note4}
	$R_{DS(on)}$	—	0.375	—	Ω	Ta = 150°C $I_D = 10 \text{ A}$, $V_{GS} = 10 \text{ V}$ ^{Note4}
Gate resistance	Rg	—	2.5	—	Ω	f = 1 MHz $V_{DS} = 25 \text{ V}$, $V_{GS} = 0$
Input capacitance	Ciss	—	1600	—	pF	$V_{DS} = 25 \text{ V}$ $V_{GS} = 0$ f = 100kHz
Output capacitance	Coss	—	2160	—	pF	
Reverse transfer capacitance	Crss	—	8.2	—	pF	
Turn-on delay time	$t_{d(on)}$	—	23	—	ns	$I_D = 10 \text{ A}$ $V_{GS} = 10 \text{ V}$ $R_L = 30 \Omega$ Rg = 10 Ω ^{Note4}
Rise time	t_r	—	25	—	ns	
Turn-off delay time	$t_{d(off)}$	—	49	—	ns	
Fall time	t_f	—	23	—	ns	
Total gate charge	Qg	—	27	—	nC	$V_{DD} = 480 \text{ V}$ $V_{GS} = 10 \text{ V}$ $I_D = 20 \text{ A}$ ^{Note4}
Gate to source charge	Qgs	—	10.5	—	nC	
Gate to drain charge	Qgd	—	8.5	—	nC	
Body-drain diode forward voltage	V_{DF}	—	0.96	1.60	V	$I_F = 20 \text{ A}$, $V_{GS} = 0$ ^{Note4}
Body-drain diode reverse recovery time	t_{rr}	—	400	—	ns	$I_F = 20 \text{ A}$ $V_{GS} = 0$ $di_F/dt = 100 \text{ A}/\mu\text{s}$ ^{Note4}
Body-drain diode reverse recovery current	I_{rr}	—	25	—	A	
Body-drain diode reverse recovery charge	Q_{rr}	—	5.6	—	μC	

Notes: 4. Pulse test

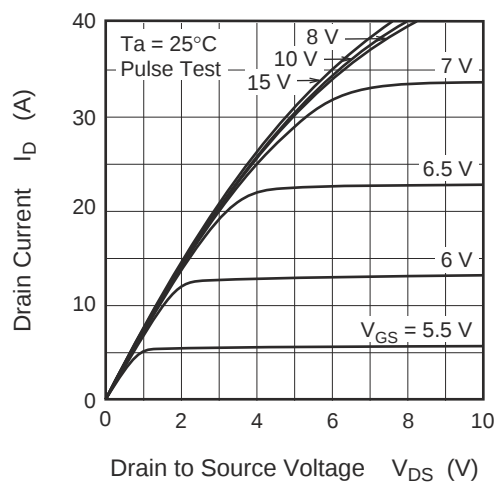
Main Characteristics

Channel Dissipation vs.
Case Temperature

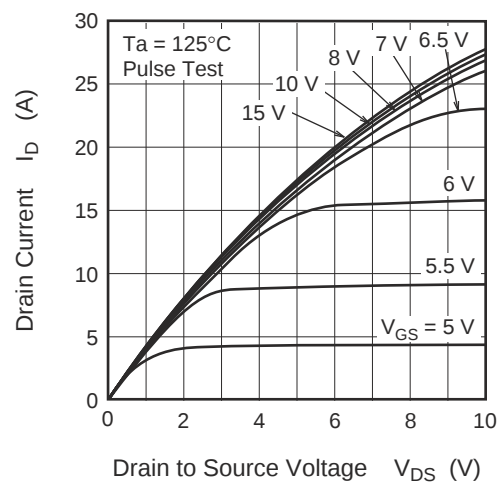
Maximum Safe Operation Area



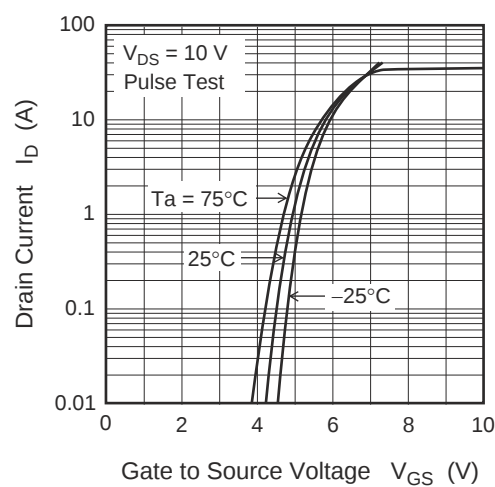
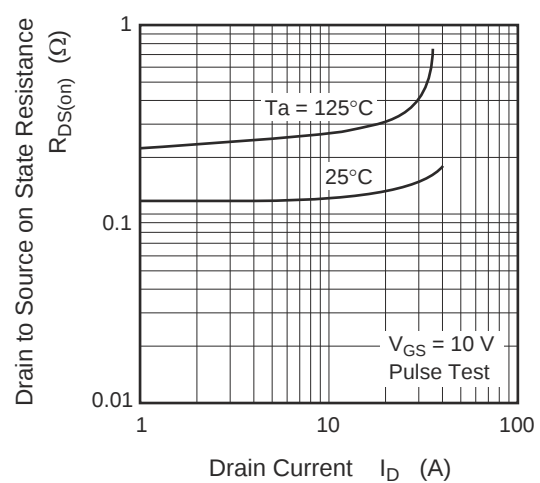
Typical Output Characteristics

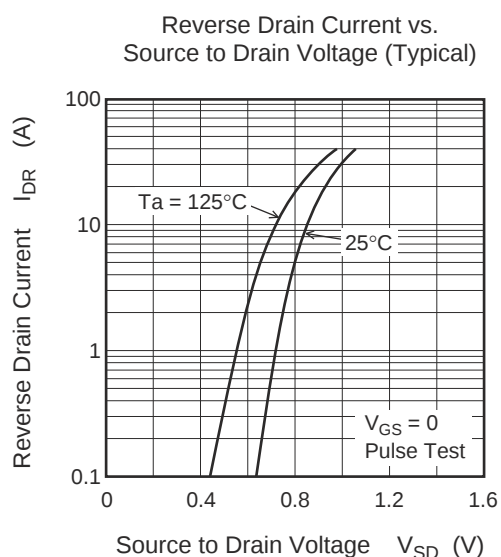
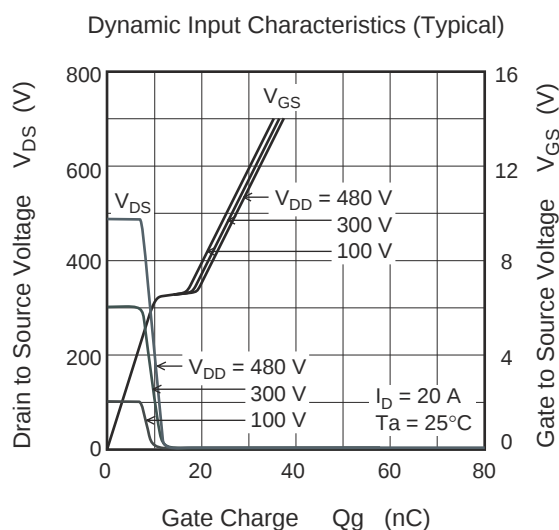
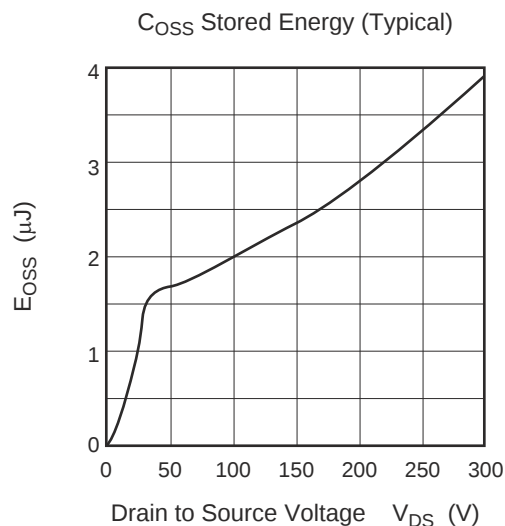
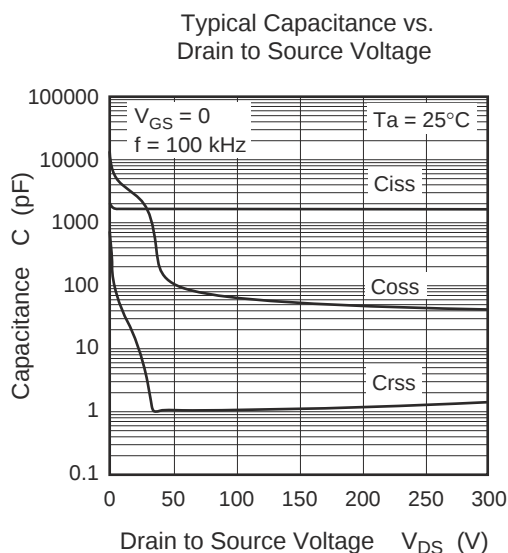
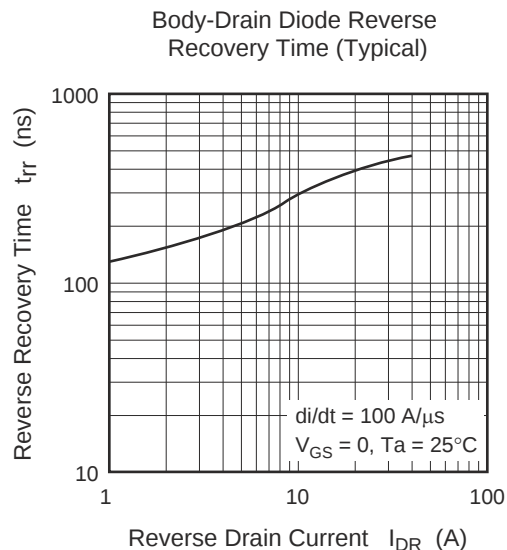
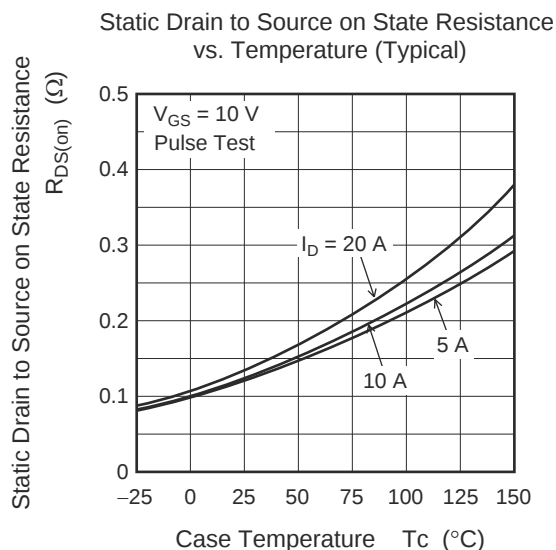


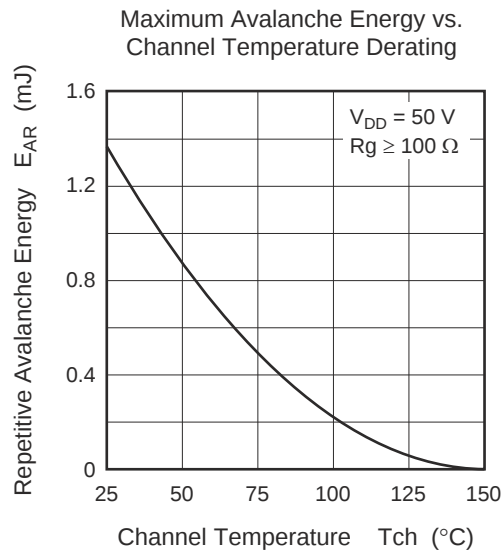
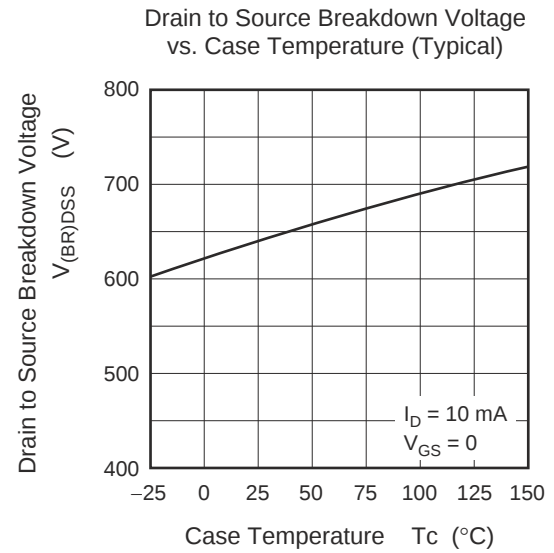
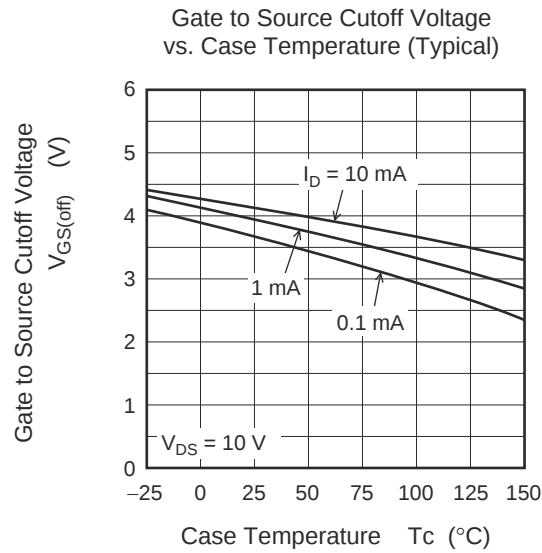
Typical Output Characteristics

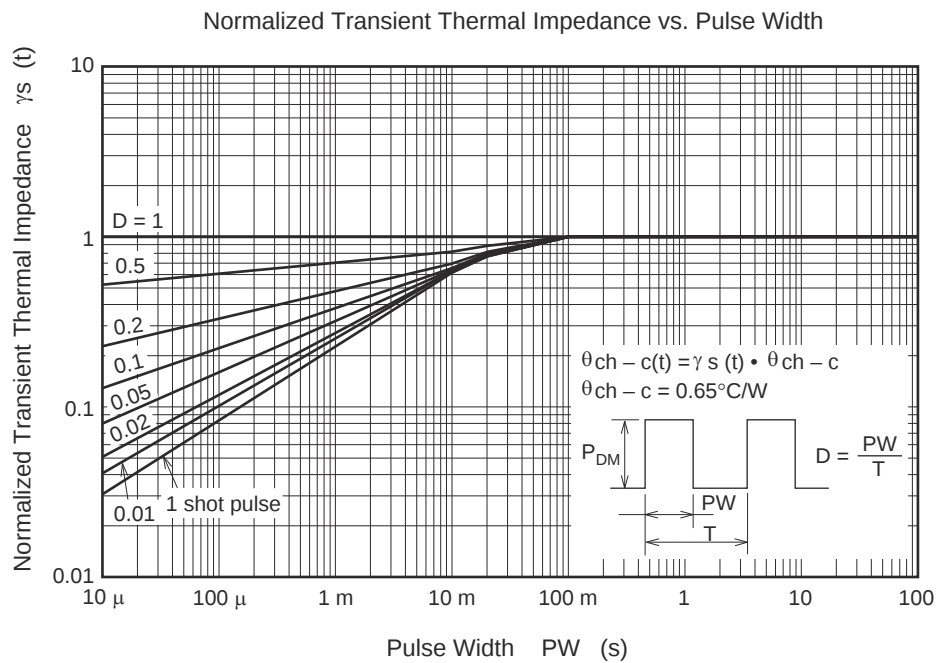


Typical Transfer Characteristics

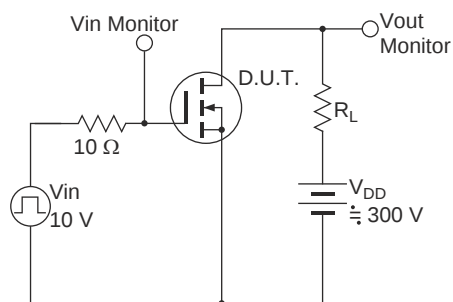
Static Drain to Source on State Resistance
vs. Drain Current (Typical)



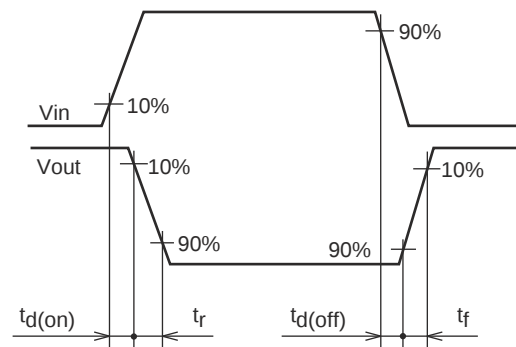




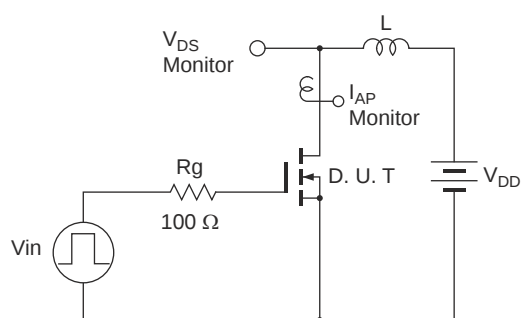
Switching Time Test Circuit



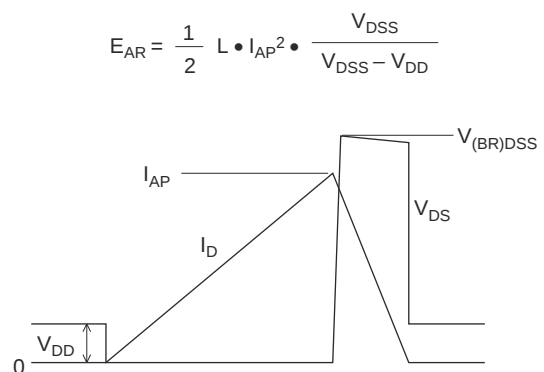
Waveform



Avalanche Test Circuit



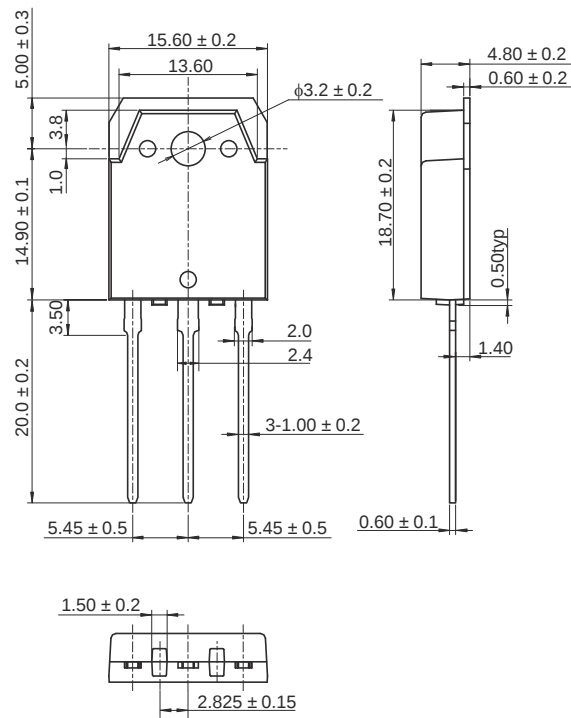
Avalanche Waveform



Package Dimension

Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
TO-3PSG	—	PRSS0004ZH-A	TO-3PSG/TO-3PSGV	3.7g

Unit: mm



Ordering Information

Orderable Part Number	Quantity	Shipping Container
RJK60S5DPK-M0#T0	360 pcs	Box (Tube)

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Renesas Electronics America Inc.
2880 Scott Boulevard Santa Clara, CA 95050-2554, U.S.A.
Tel: +1-408-588-6000, 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: +44-1628-585-100, Fax: +44-1628-585-900

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 204, 205, AZIA Center, No.1233 Lujiazui Ring Rd., Pudong District, Shanghai 200120, China
Tel: +86-21-5877-1818, Fax: +86-21-6887-7858 / -7898

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.
1 harbourFront Avenue, #06-10, keppel Bay Tower, Singapore 098632
Tel: +65-6213-0200, Fax: +65-6278-8001

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.
11F., Samik Laved' or Bldg., 720-2 Yeoksam-Dong, Kangnam-Ku, Seoul 135-080, Korea
Tel: +82-2-558-3737, Fax: +82-2-558-5141