To our customers,

Old Company Name in Catalogs and Other Documents

On April 1st, 2010, NEC Electronics Corporation merged with Renesas Technology Corporation, and Renesas Electronics Corporation took over all the business of both companies. Therefore, although the old company name remains in this document, it is a valid Renesas Electronics document. We appreciate your understanding.

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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H5N1503P

Silicon N Channel MOS FET
High Speed Power Switching

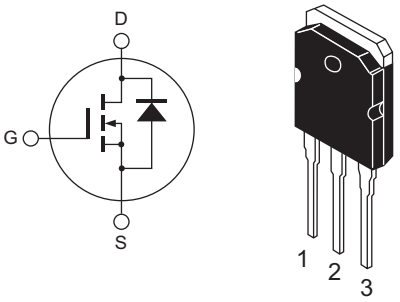
REJ03G0186-0100Z
Rev.1.00
Mar.10.2004

Features

- Low on-resistance
- Low leakage current
- High speed switching

Outline

TO-3P



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

Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Ratings	Unit
Drain to Source voltage	V_{DSS}	150	V
Gate to Source voltage	V_{GSS}	±30	V
Drain current	I_D	70	A
Drain peak current	$I_{D\ (pulse)}$ Note1	210	A
Body-Drain diode reverse Drain current	I_{DR}	70	A
Avalanche current	I_{AP} Note3	35	A
Avalanche energy	E_{AR} Note3	91.8	mJ
Channel dissipation	Pch Note2	150	W
Channel to case thermal impedance	θch-c	0.833	°C/W
Channel temperature	Tch	150	°C
Storage temperature	Tstg	–55 to +150	°C

Notes: 1. PW ≤ 10 µs, duty cycle ≤ 1%
2. Value at Tc = 25°C
3. STch = 25°C, Tch ≤ 150°C

Electrical Characteristics

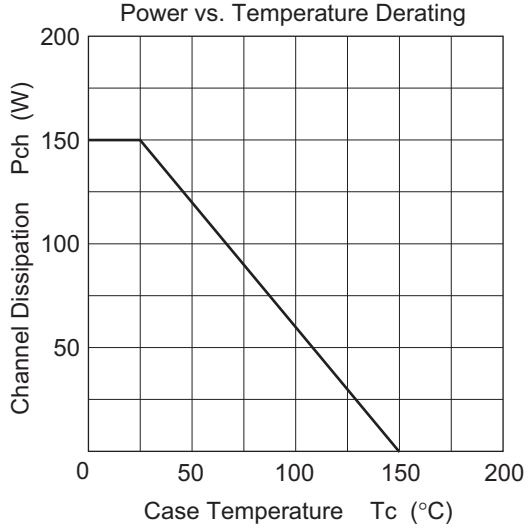
(Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to Source breakdown voltage	$V_{(BR)DSS}$	150	—	—	V	I_D = 10 mA, V_{GS} = 0
Zero Gate voltage drain current	I_{DSS}	—	—	1	µA	V_{DS} = 150 V, V_{GS} = 0
Gate to Source leak current	I_{GSS}	—	—	±0.1	µA	V_{GS} = ±30 V, V_{DS} = 0
Gate to Source cutoff voltage	$V_{GS(off)}$	3.0	—	4.0	V	V_{DS} = 10 V, I_D = 1 mA
Forward transfer admittance	|yfs|	27	46	—	S	I_D = 35 A, V_{DS} = 10 V [Note4]
Static Drain to Source on state resistance	$R_{DS(on)}$	—	0.022	0.027	Ω	I_D = 35 A, V_{GS} = 10 V [Note4]
Input capacitance	Ciss	—	5100	—	pF	V_{DS} = 25 V
Output capacitance	Coss	—	770	—	pF	V_{GS} = 0
Reverse transfer capacitance	Crss	—	140	—	pF	f = 1 MHz
Turn-on delay time	td(on)	—	60	—	ns	I_D = 35 A
Rise time	tr	—	290	—	ns	V_{GS} = 10 V
Turn-off delay time	td(off)	—	200	—	ns	R_L = 2.14 Ω
Fall time	tf	—	190	—	ns	Rg = 10 Ω
Total Gate charge	Qg	—	135	—	nC	V_{DD} = 120 V
Gate to Source charge	Qgs	—	30	—	nC	V_{GS} = 10 V
Gate to Drain charge	Qgd	—	60	—	nC	I_D = 70 A
Body-Drain diode forward voltage	V_{DF}	—	1.1	1.7	V	I_F = 70 A, V_{GS} = 0 [Note4]
Body-Drain diode reverse recovery time	trr	—	180	—	ns	I_F = 70 A, V_{GS} = 0
Body-Drain diode reverse recovery charge	Qrr	—	1.2	—	µC	diF/dt = 100 A/µs

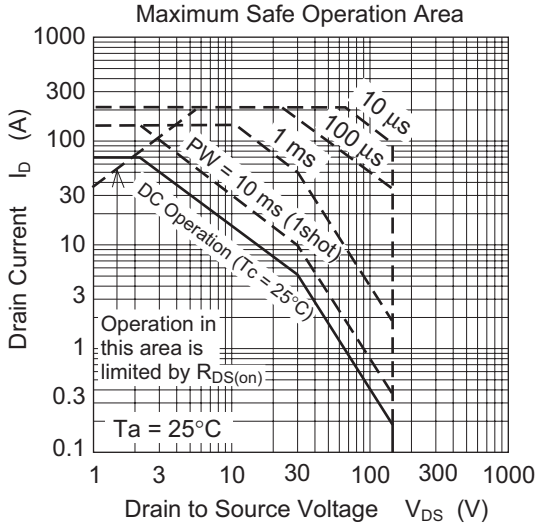
Notes: 4. Pulse test

Main Characteristics

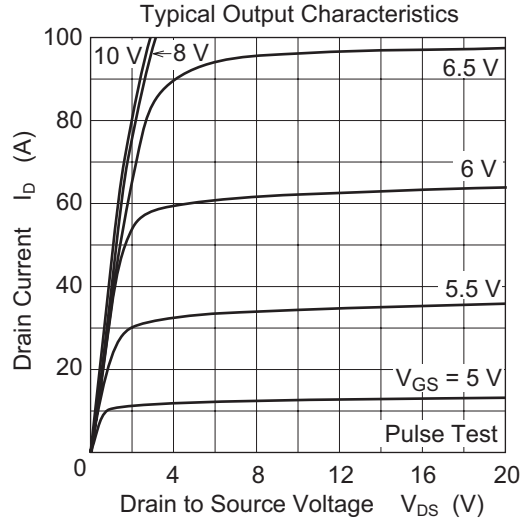
Power vs. Temperature Derating



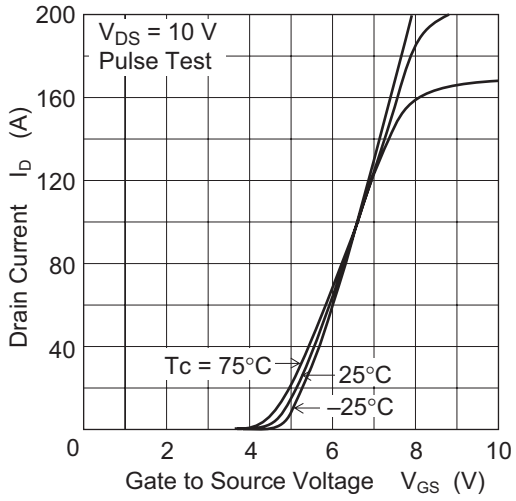
Maximum Safe Operation Area



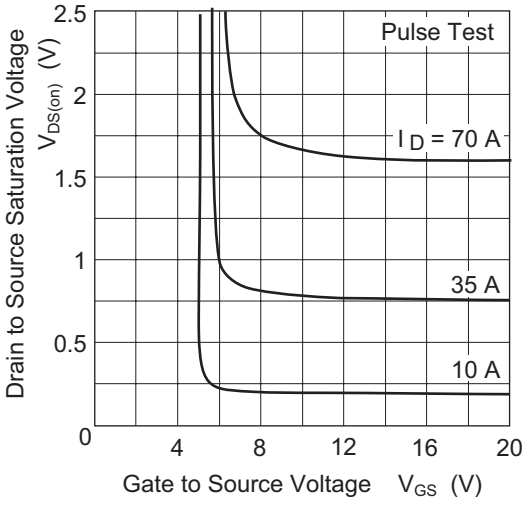
Typical Output Characteristics



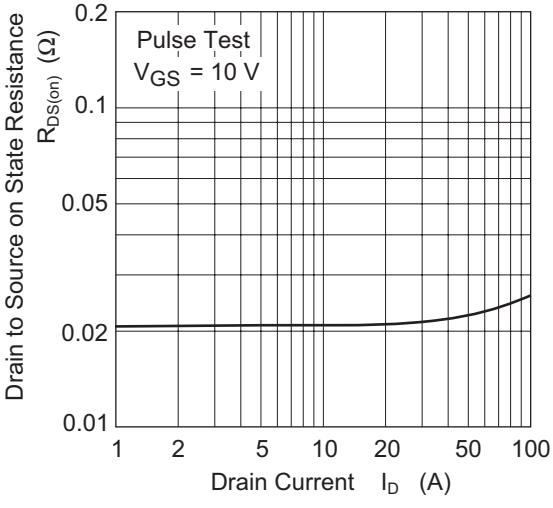
Typical Transfer Characteristics



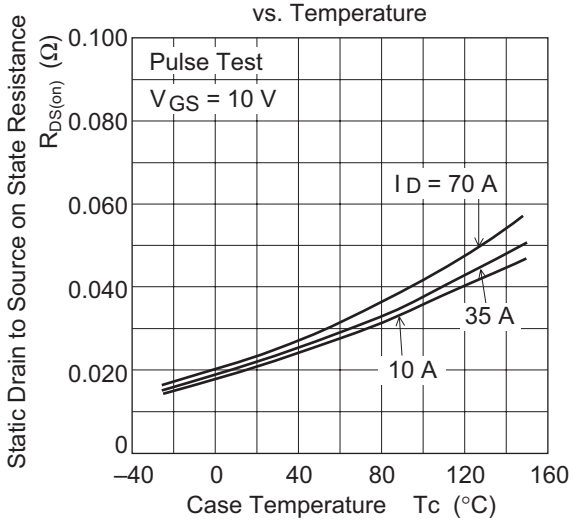
Drain to Source Saturation Voltage vs. Gate to Source Voltage



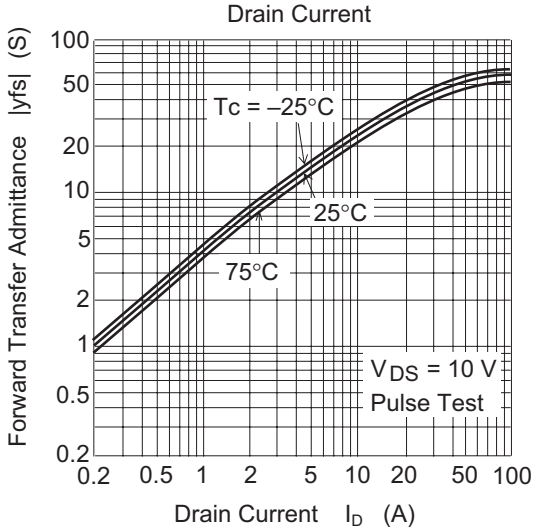
Static Drain to Source on State Resistance vs. Drain Current



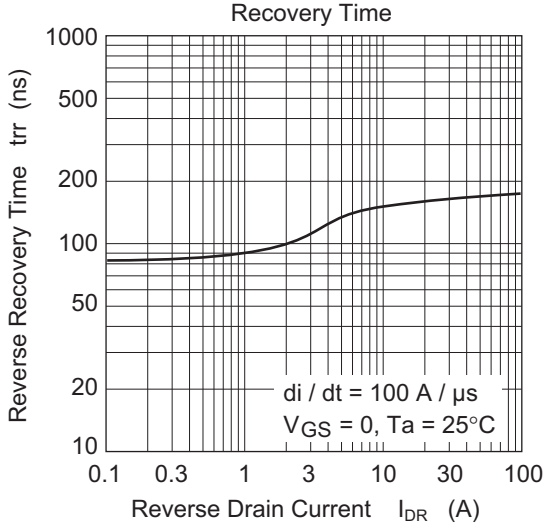
Static Drain to Source on State Resistance vs. Temperature



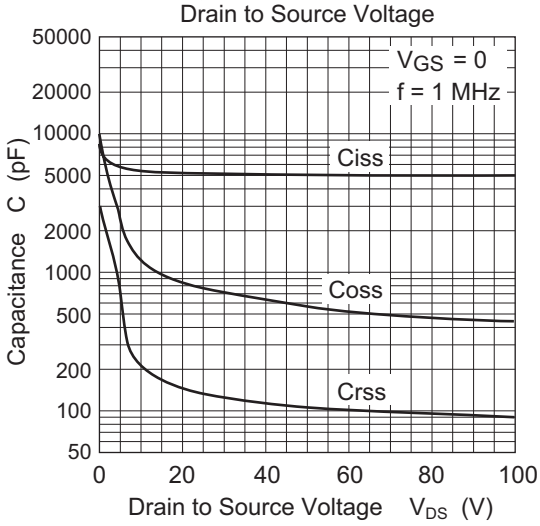
Forward Transfer Admittance vs. Drain Current



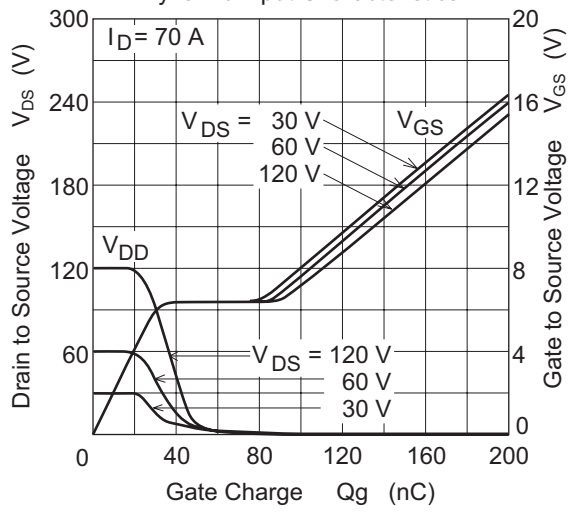
Body-Drain Diode Reverse Recovery Time



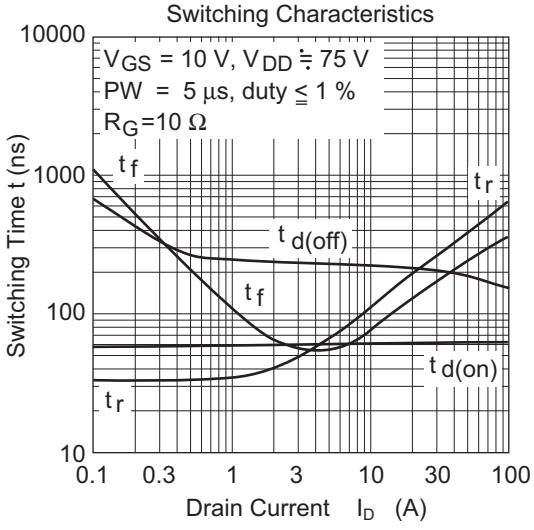
Typical Capacitance vs. Drain to Source Voltage



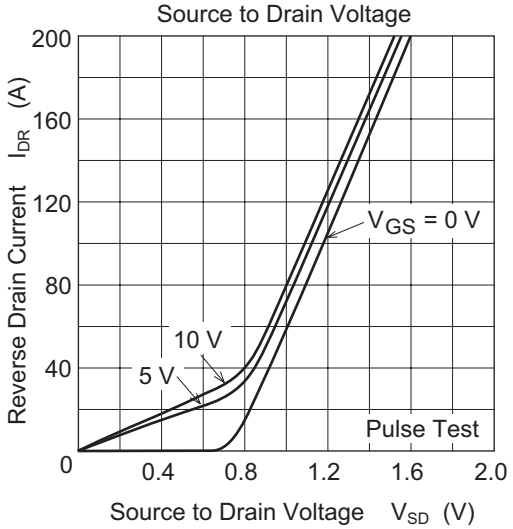
Dynamic Input Characteristics



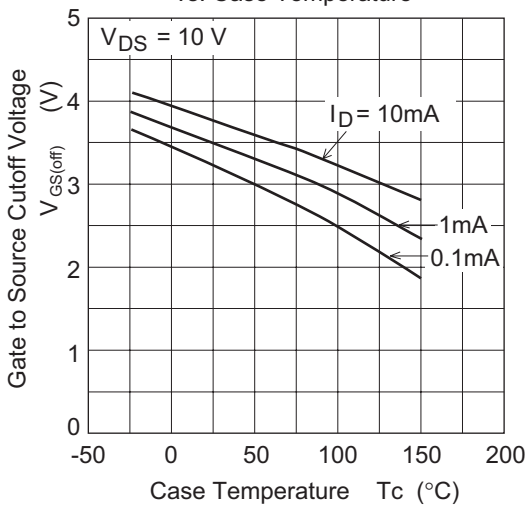
Switching Characteristics



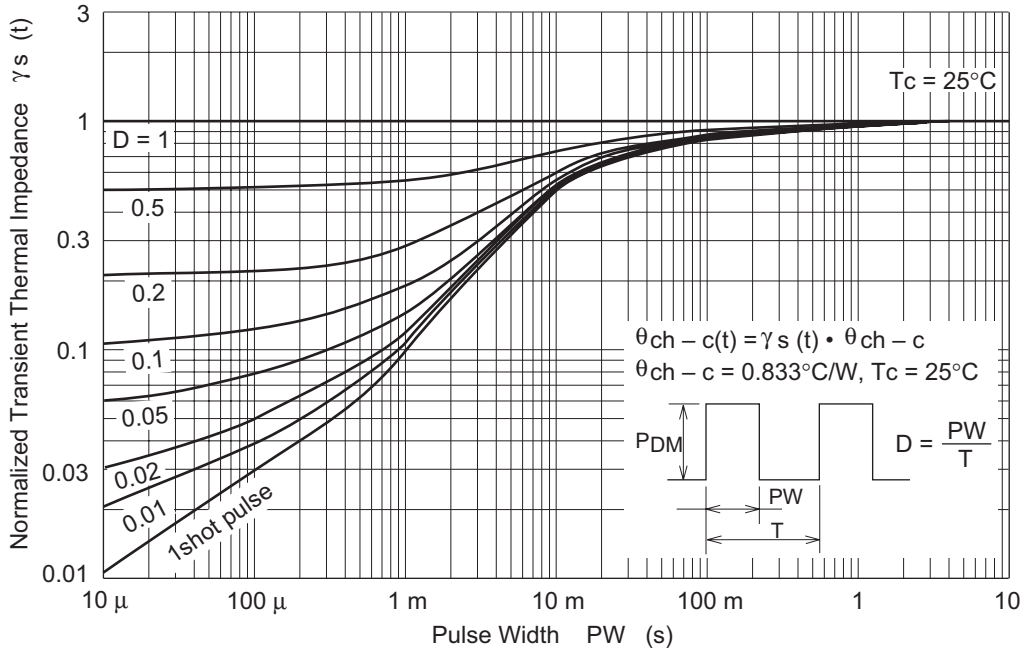
Reverse Drain Current vs. Source to Drain Voltage



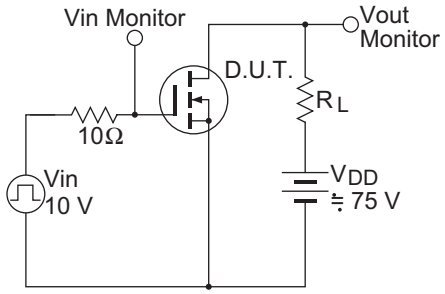
Gate to Source Cutoff Voltage vs. Case Temperature



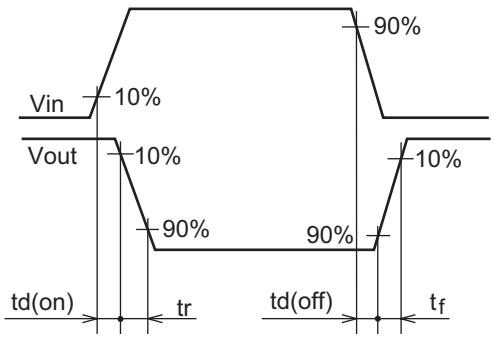
Normalized Transient Thermal Impedance vs. Pulse Width



Switching Time Test Circuit



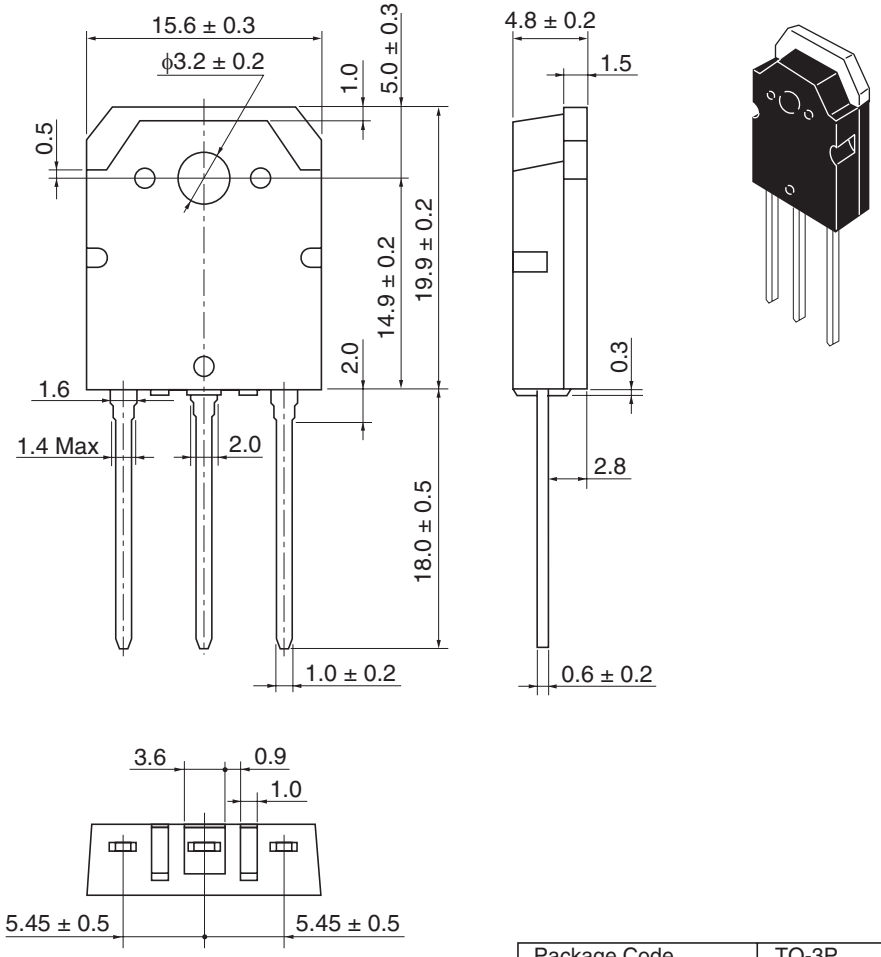
Waveform



Package Dimensions

As of January, 2003

Unit: mm



Package Code	TO-3P
JEDEC	—
JEITA	Conforms
Mass (reference value)	5.0 g

Ordering Information

Part Name	Quantity	Shipping Container
H5N1503P-E	30 pcs	Plastic magazine

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

Renesas Technology Corp. Sales Strategic Planning Div. Nippon Bldg., 2-6-2, Ohte-machi, Chiyoda-ku, Tokyo 100-0004, Japan

RENESAS SALES OFFICES

http://www.renesas.com

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, United Kingdom
Tel: <44> (1628) 585 100, Fax: <44> (1628) 585 900

Renesas Technology Europe GmbH
Dornacher Str. 3, D-85622 Feldkirchen, Germany
Tel: <49> (89) 380 70 0, Fax: <49> (89) 929 30 11

Renesas Technology Hong Kong Ltd.
7/F., North Tower, World Finance Centre, Harbour City, Canton Road, Hong Kong
Tel: <852> 2265-6688, Fax: <852> 2375-6836

Renesas Technology Taiwan Co., Ltd.
FL 10, #99, Fu-Hsing N. Rd., Taipei, Taiwan
Tel: <886> (2) 2715-2888, Fax: <886> (2) 2713-2999

Renesas Technology (Shanghai) Co., Ltd.
26/F., Ruijin 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

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