HD74BC373A

Octal D Type Transparent Latches With 3 State Outputs

REJ03D0283–0300Z
(Previous ADE-205-009A (Z))
Rev.3.00
Jul.16.2004

Description

The HD74BC373A provides high drivability and operation equal to or better than high speed bipolar standard logic IC by using Bi-CMOS process. The device features low power dissipation that is about 1/5 of high speed bipolar logic IC, when the frequency is 10 MHz. The device has eight D type latches with three state outputs in a 20 pin package. When the latch enable input is high, the Q outputs will follow the D inputs. When the latch enable goes low, data at the D inputs will be retained at the outputs until latch enable returns high again. When a high logic level is applied to the output control input, all outputs go to a high impedance state, regardless of what signals are present at the other inputs and the state of the storage elements.

Features

- Input/Output are at high impedance state when power supply is off.
- Built in input pull up circuit can make input pins be open, when not used.
- TTL level input
- Wide operating temperature range input pins
  Ta = –40 to + 85°C
- Ordering Information

Part Name	Package Type	Package Code	Package Abbreviation	Taping Abbreviation (Quantity)
HD74BC373AFPEL	SOP-20 pin (JEITA)	FP-20DAV	FP	EL (2,000 pcs/reel)
HD74BC373ATELL	TSSOP-20 pin	TTP-20DAV	T	ELL (2,000 pcs/reel)

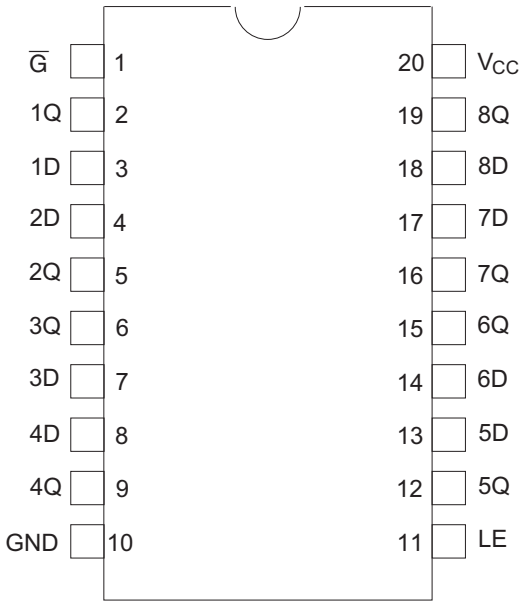
Note: Please consults the sales office for the above package availability.

Function Table

Inputs			Output Q
$\overline{G}$	LE	D	
H	X	X	Z
L	H	L	L
L	H	H	H
L	L	X	No change

H : High level
L : Low level
X : Immaterial
Z : High impedance

Pin Arrangement



(Top view)

Absolute Maximum Ratings

Item	Symbol	Rating	Unit
Supply voltage	V_{CC}	–0.5 to +7.0	V
Input diode current	I_{IK}	±30	mA
Input voltage	V_{IN}	–0.5 to +7.5	V
Output voltage	V_{OUT}	–0.5 to +7.5	V
Off state output voltage	$V_{OUT(off)}$	–0.5 to +5.5	V
Storage temperature	Tstg	–65 to +150	°C

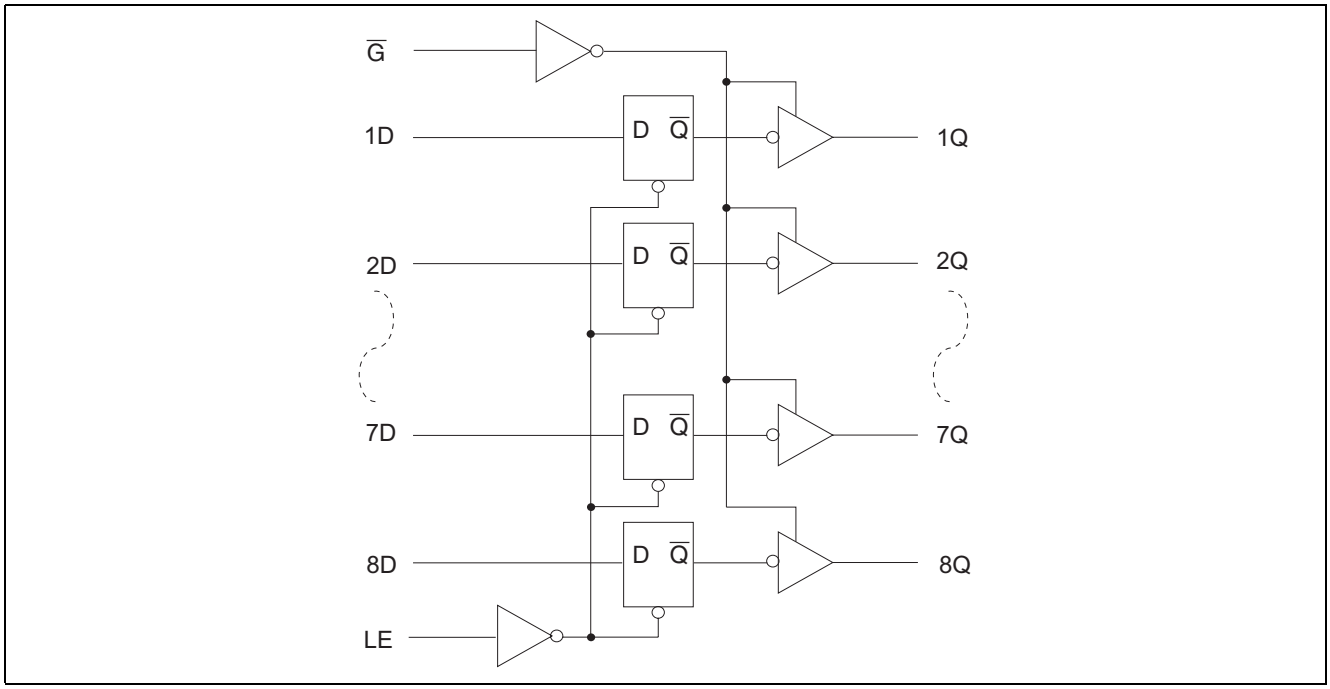
Note: 1. The absolute maximum ratings are values which must not individually be exceeded, and furthermore, no two of which may be realized at the same time.

Recommended Operating Conditions

Item	Symbol	Min	Typ	Max	Unit
Supply voltage	V_{CC}	4.5	5.0	5.5	V
Input voltage	V_{IN}	0	—	V_{CC}	V
Output voltage	V_{OUT}	0	—	V_{CC}	V
Operating temperature	Topr	–40	—	85	°C
Input rise/fall time*[1]	t_r, t_f	0	—	8	ns/V

Note: 1. This item guarantees maximum limit when one input switches.
Waveform: Refer to test circuit of switching characteristics.

Logic Diagram



Electrical Characteristics (Ta = –40°C to +85°C)

Item	Symbol	V_{CC}(V)	Min	Max	Unit	Test Conditions
Input voltage	V_{IH}		2.0	—	V	
	V_{IL}		—	0.8	V	
Output voltage	V_{OH}	4.5	2.4	—	V	I_{OH} = –3 mA
		4.5	2.0	—	V	I_{OH} = –15 mA
	V_{OL}	4.5	—	0.4	V	I_{OL} = 24 mA
		4.5	—	0.5	V	I_{OL} = 48 mA
Input diode voltage	V_{IK}	4.5	—	–1.2	V	I_{IN} = –18 mA
Input current	I_I	5.5	—	–250	µA	V_{IN} = 0 V
		5.5	—	1.0	µA	V_{IN} = 5.5 V
		5.5	—	100	µA	V_{IN} = 7.0 V
Short circuit output current*1	I_{OS}	5.5	–100	–225	mA	V_{IN} = 0 or 5.5 V
Off state output current	I_{OZH}	5.5	—	50	µA	V_O = 2.7 V
	I_{OZL}	5.5	—	–50	µA	V_O = 0.5 V
Supply current	I_{CCL}	5.5	—	29.5	mA	V_{IN} = 0 or 5.5 V All outputs is “L”
	I_{CCH}	5.5	—	2.5	mA	V_{IN} = 0 or 5.5 V All outputs is “H”
	I_{CCZ}	5.5	—	2.5	mA	V_{IN} = 0 or 5.5 V All outputs is “Z”
	I_{CCT}*2	5.5	—	1.5	mA	V_{IN} = 3.4 or 0.5 V

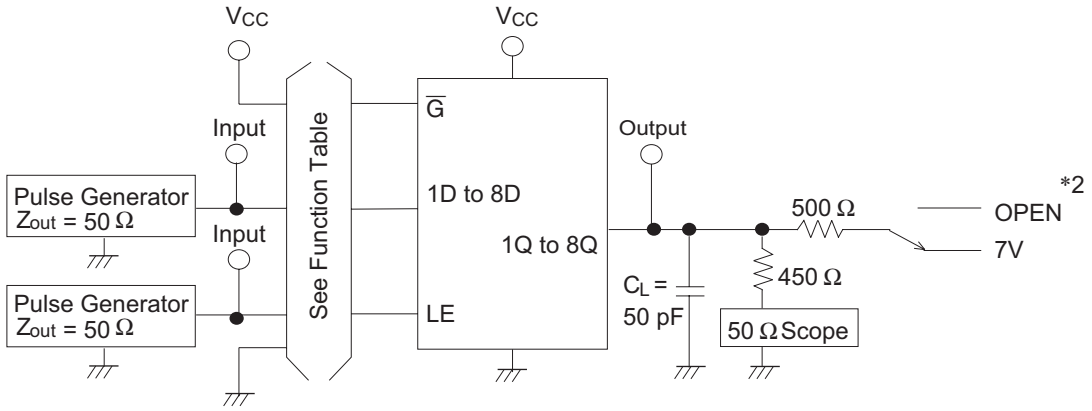
Notes : 1. Not more than one output should be shorted at a time and duration of the short circuit should not exceed one second.

2. When input by the TTL level, it shows I_{CC} increase at per one input pin.

Switching Test Method (C_L = 50 pF)

Item		Symbol	Ta = 25°C V_{CC} = 5.0 V		Ta = –40 to 85°C V_{CC} = 5.0 V ±10%		Unit	Test Conditions
			Min	Max	Min	Max		
Propagation delay time	D → Q	t_{PLH}	3.0	8.0	3.0	10.0	ns	See under figure
		t_{PHL}	3.0	8.0	3.0	10.0		
	LE → Q	t_{PLH}	3.0	8.0	3.0	10.0	ns	
		t_{PHL}	3.0	8.0	3.0	10.0		
Output enable time		t_{ZH}	3.0	9.0	3.0	11.0	ns	
		t_{ZL}	3.0	9.0	3.0	11.0		
Output disable time		t_{HZ}	3.0	8.0	3.0	10.0	ns	
		t_{LZ}	3.0	8.0	3.0	10.0		
Setup time		t_S(H)	2.0	—	2.0	—	ns	
		t_S(L)	2.0	—	2.0	—		
Hold time		t_h(H)	2.0	—	2.0	—	ns	
		t_h(L)	2.0	—	2.0	—		
Pulse width		t_w	6.0	—	6.0	—	ns	
Input capacitanse		C_{IN}	3.0(Typ)		—		pF	V_{IN} = V_{CC} or GND
Output capacitance		C_O	15.0(Typ)		—		pF	V_O = V_{CC} or GND

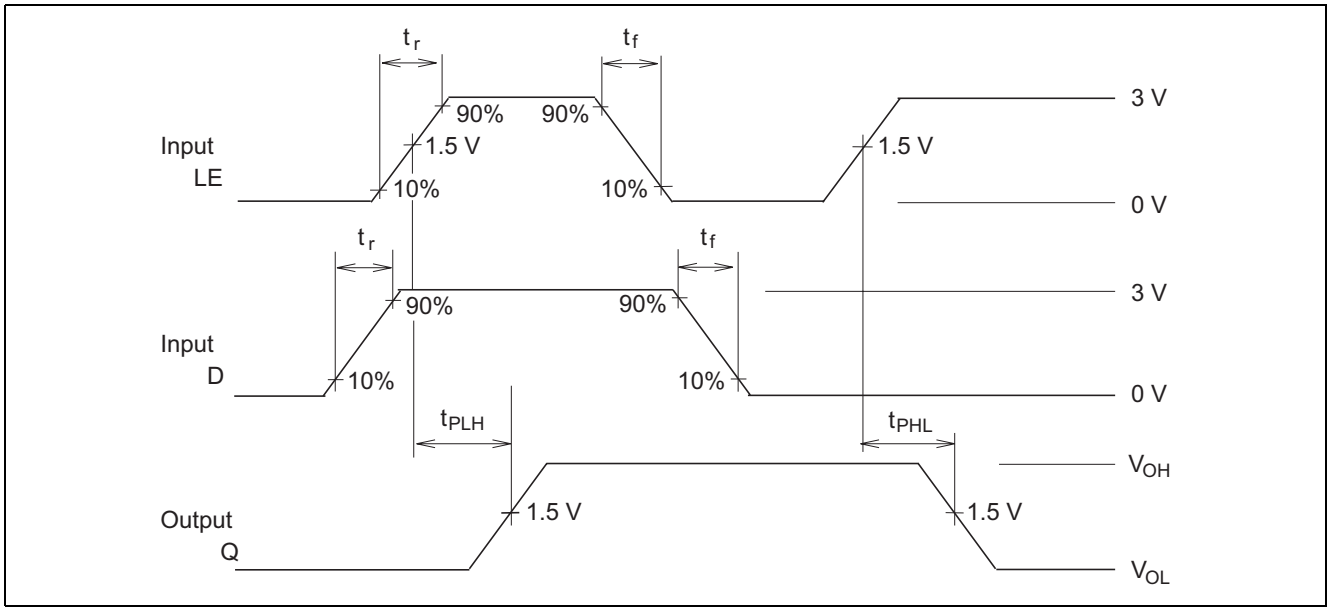
Test Circuit



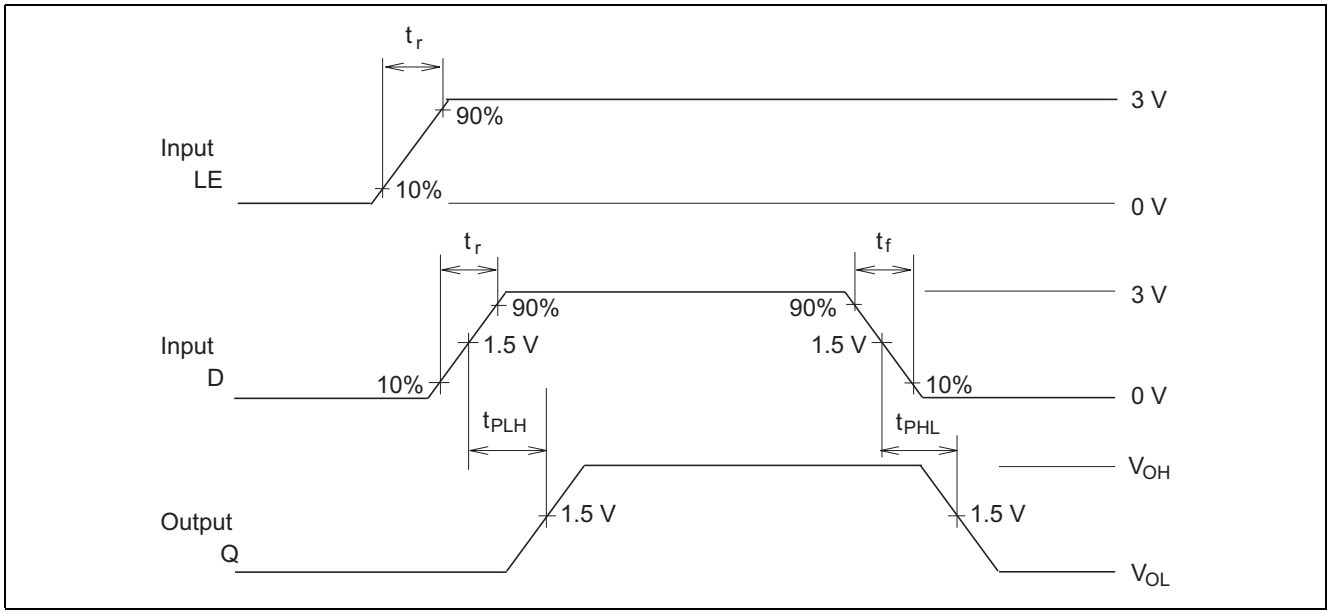
Notes: 1. C_L includes probe and jig capacitance.

2. Open: t_{PLH}, t_{PHL}, t_{ZH}, t_{HZ}, t_h, t_{SU}, t_w
   7 V: t_{ZL}, t_{LZ}

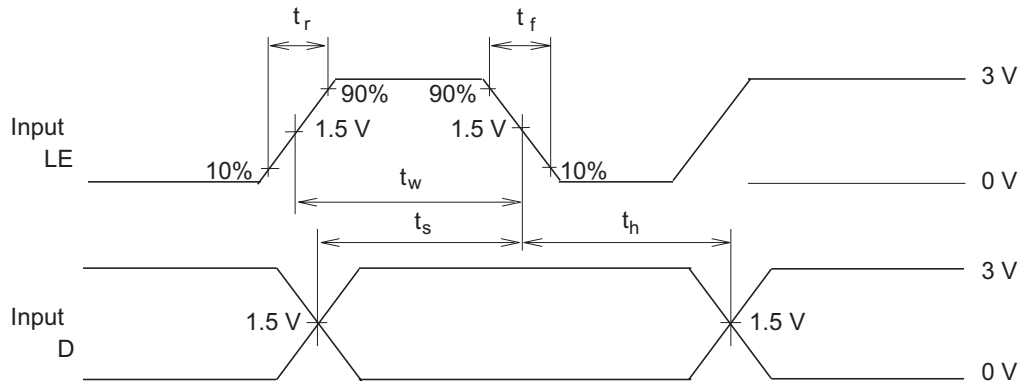
Waveforms-1



Waveforms-2

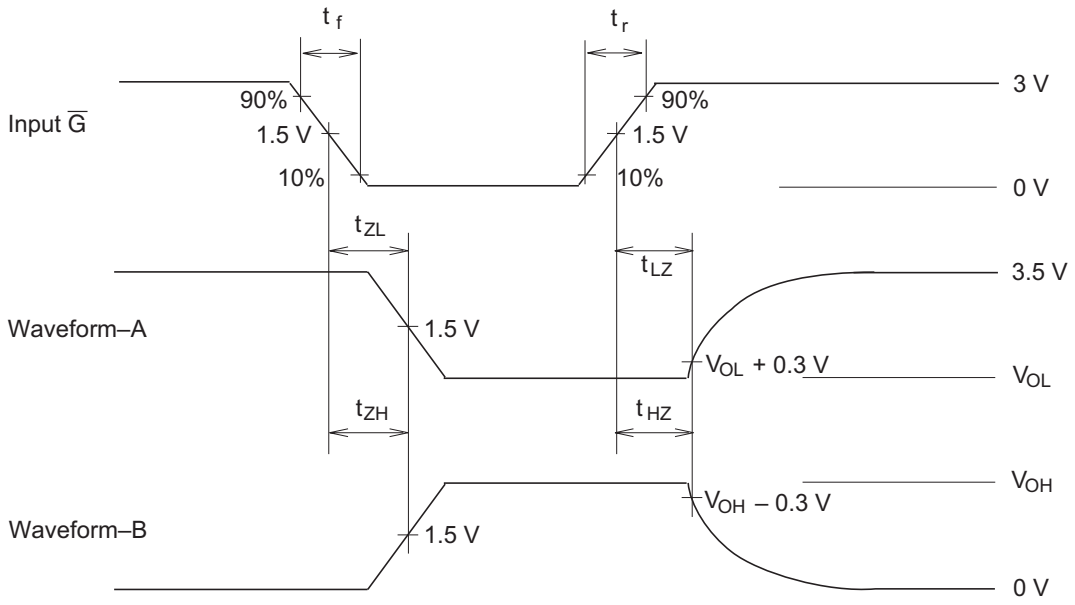


Waveforms-3



Notes:
1. t_r = 2.5 ns, t_f = 2.5 ns
2. Input waveform: PRR =1 MHz, duty cycle 50%

Waveforms-4

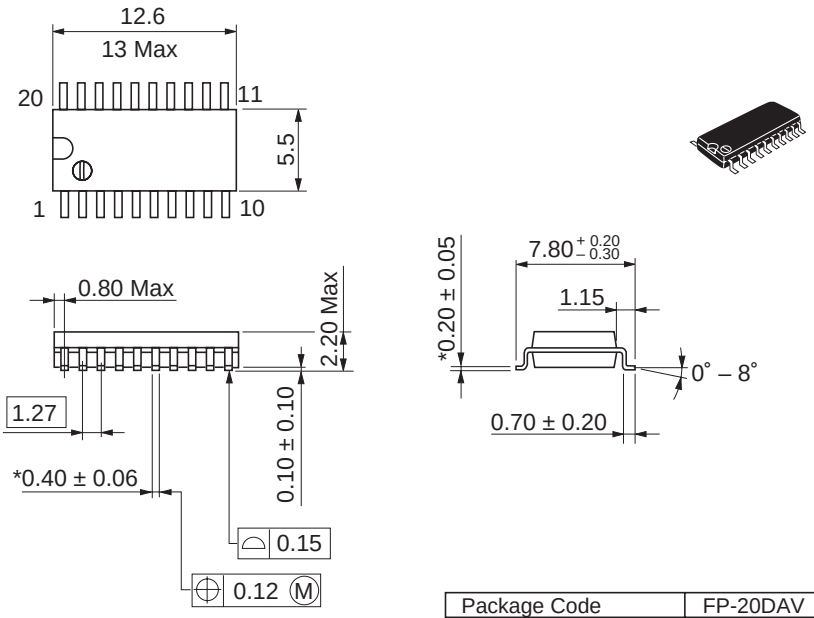


Notes:
1. t_r = 2.5 ns, t_f = 2.5 ns
2. Input waveform: PRR = 1 MHz, duty cycle 50%
3. Waveform-A shows input conditions such that the output is “L” level when enable by the output control.
4. Waveform-B shows input conditions such that the output is “H” level when enable by the output control.

Package Dimensions

As of January, 2003

Unit: mm

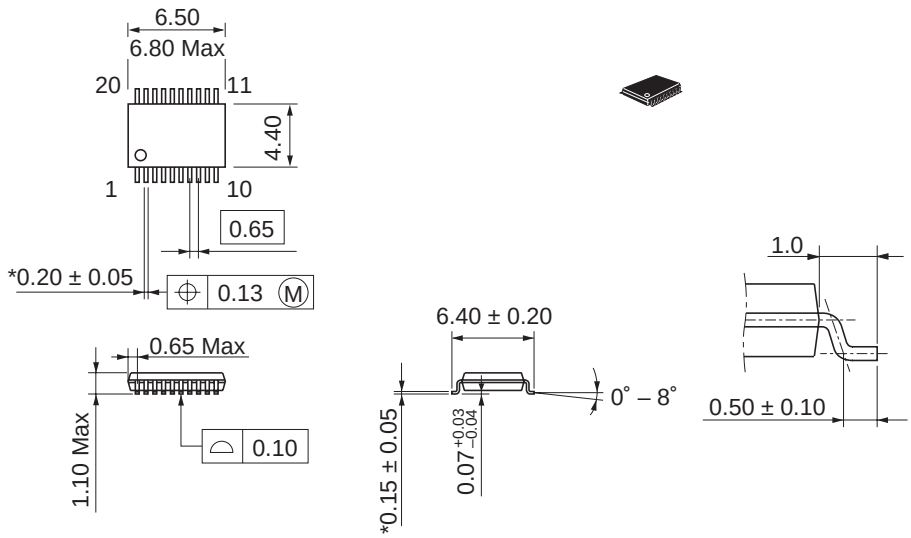


*Ni/Pd/Au plating

Package Code	FP-20DAV
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.31 g

As of January, 2003

Unit: mm



*Ni/Pd/Au plating

Package Code	TTP-20DAV
JEDEC	—
JEITA	—
Mass (reference value)	0.07 g

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

Colophon .1.0