

---

# HD74LV2G126A

Dual Bus Buffer with 3-state Output

## HITACHI

ADE-205-348 (Z)  
1st. Edition  
May 2000

---

### Description

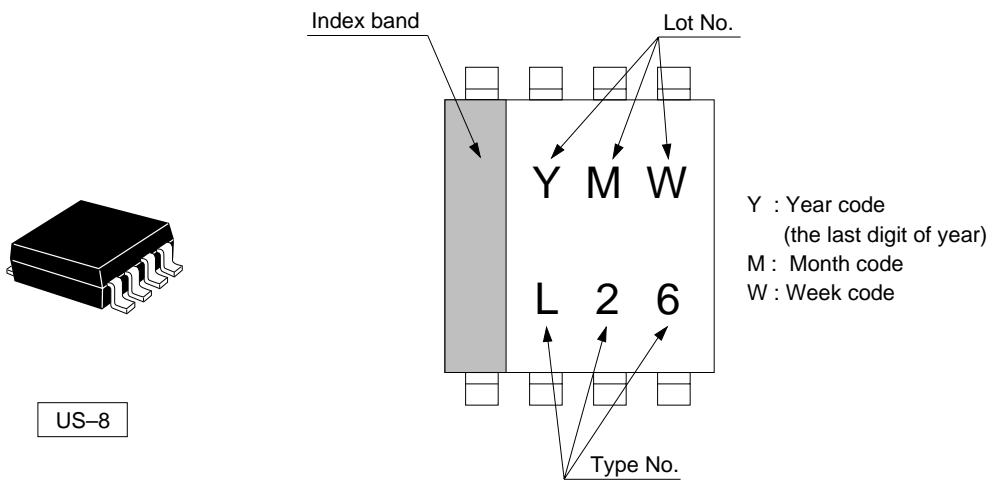
The HD74LV2G126A has dual bus buffer with 3-state output in a 8 pin package. Output is disabled when the associated output enable (OE) input is low. To ensure the high impedance state during power up or power down, OE should be connected to  $V_{CC}$  through a pull-down resistor; the minimum value of the resistor is determined by the current sourcing capability of the driver. Low voltage and high speed operation is suitable for the battery powered products (e.g., notebook computers), and the low power consumption extends the battery life.

### Features

- The basic gate function is lined up as hitachi uni logic series.
- Supplied on emboss taping for high speed automatic mounting.
- Electrical characteristics equivalent to the HD74LV126A  
Supply voltage range : 1.65 to 5.5 V  
Operating temperature range : -40 to +85°C
- All inputs  $V_{IH}$  (Max.) = 5.5 V (@  $V_{CC}$  = 0 V to 5.5 V)  
All outputs  $V_O$  (Max.) = 5.5 V (@  $V_{CC}$  = 0 V)
- Output current  $\pm 6$  mA (@  $V_{CC}$  = 3.0 V to 3.6 V),  $\pm 12$  mA (@  $V_{CC}$  = 4.5 V to 5.5 V)
- All the logical input has hysteresis voltage for the slow transition.

Outline and Article Indication

• HD74LV2G126A

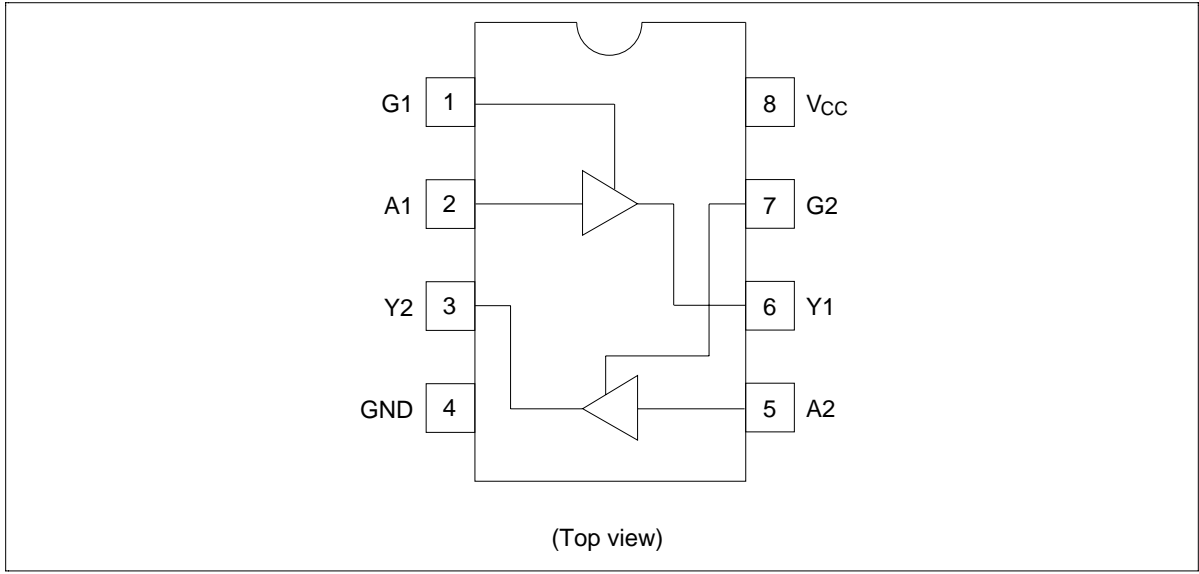


Function Table

Inputs		Output Y
OE	A	
H	H	H
H	L	L
L	X	Z

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

Pin Arrangement



Absolute Maximum Ratings

Item	Symbol	Ratings	Unit	Test Conditions
Supply voltage	$V_{CC}$	-0.5 to 7.0	V	
Input voltage	$V_{IN}$	-0.5 to 7.0	V	
Output voltage	$V_{OUT}$	-0.5 to $V_{CC} + 0.5$ -0.5 to 7.0	V	Output : H or L $V_{CC}$ : OFF or Output : Z
Input diode current	$I_{IK}$	-20	mA	
Output diode current	$I_{OK}$	$\pm 50$	mA	
Output current	$I_{OUT}$	$\pm 25$	mA	
$V_{CC}$ , GND current	$I_{CC}$ or $I_{GND}$	$\pm 50$	mA	
Power dissipation	$P_T$	200	mW	
Storage temperature	Tstg	-65 to 150	°C	

Recommended Operating Conditions

Item	Symbol	Ratings	Unit
Supply voltage	$V_{CC}$	1.65 to 5.5	V
Input voltage	$V_{IN}$	0 to 5.5	V
Output voltage	$V_{OUT}$	0 to $V_{CC}$	V
Operating temperature	$T_{opr}$	−40 to +85	°C
Input rise / fall time	$t_r, t_f$	0 to 300 ( $V_{CC} = 1.65$ to $1.95$ V)	ns
		0 to 200 ( $V_{CC} = 2.3$ to $2.7$ V)	
		0 to 100 ( $V_{CC} = 3.0$ to $3.6$ V)	
		0 to 20 ( $V_{CC} = 4.5$ to $5.5$ V)	

## Electrical Characteristic

• Ta = -40 to 85°C

Item	Symbol	V <sub>CC</sub> (V) *	Min	Typ	Max	Unit	Test condition
Input voltage	V <sub>IH</sub>	1.65 to 1.95	V <sub>CC</sub> ×0.75	—	—	V	
		2.3 to 2.7	V <sub>CC</sub> ×0.7	—	—		
		3.0 to 3.6	V <sub>CC</sub> ×0.7	—	—		
		4.5 to 5.5	V <sub>CC</sub> ×0.7	—	—		
	V <sub>IL</sub>	1.65 to 1.95	—	—	V <sub>CC</sub> ×0.25		
		2.3 to 2.7	—	—	V <sub>CC</sub> ×0.3		
		3.0 to 3.6	—	—	V <sub>CC</sub> ×0.3		
		4.5 to 5.5	—	—	V <sub>CC</sub> ×0.3		
Hysteresis voltage	V <sub>H</sub>	1.8	—	0.25	—	V	V <sub>T</sub> <sup>+</sup> - V <sub>T</sub> <sup>-</sup>
		2.5	—	0.30	—		
		3.3	—	0.35	—		
		5.0	—	0.45	—		
Output voltage	V <sub>OH</sub>	Min to Max	V <sub>CC</sub> -0.1	—	—	V	I <sub>OH</sub> = -50 μA
		1.65	1.4	—	—		I <sub>OH</sub> = -1 mA
		2.3	2.0	—	—		I <sub>OH</sub> = -2 mA
		3.0	2.48	—	—		I <sub>OH</sub> = -6 mA
		4.5	3.8	—	—		I <sub>OH</sub> = -12 mA
	V <sub>OL</sub>	Min to Max	—	—	0.1		I <sub>OL</sub> = 50 μA
		1.65	—	—	0.3		I <sub>OL</sub> = 1 mA
		2.3	—	—	0.4		I <sub>OL</sub> = 2 mA
		3.0	—	—	0.44		I <sub>OL</sub> = 6 mA
		4.5	—	—	0.55		I <sub>OL</sub> = 12 mA
Input current	I <sub>IN</sub>	0 to 5.5	—	—	±1	μA	V <sub>IN</sub> = 5.5 V or GND
Off state output current	I <sub>OZ</sub>	5.5	—	—	±5	μA	V <sub>O</sub> = V <sub>CC</sub> or GND
Quiescent supply current	I <sub>CC</sub>	5.5	—	—	10	μA	V <sub>IN</sub> = V <sub>CC</sub> or GND, I <sub>O</sub> = 0
Output leakage current	I <sub>OFF</sub>	0	—	—	5	μA	V <sub>O</sub> = 5.5 V
Input capacitance	C <sub>IN</sub>	3.3	—	3.0	—	pF	V <sub>IN</sub> = V <sub>CC</sub> or GND

Note: For conditions shown as Min or Max, use the appropriate values under recommended operating conditions.

Switching Characteristics

•  $V_{CC} = 1.8 \pm 0.15\text{ V}$

Item	Symbol	T <sub>a</sub> = 25°C			T <sub>a</sub> = -40 to 85°C		Unit	Test Conditions	FROM (Input)	TO (Output)
		Min	Typ	Max	Min	Max				
Propagation delay time	t <sub>PLH</sub>	—	13.5	23.5	1.0	26.0	ns	C <sub>L</sub> = 15 pF	A	Y
	t <sub>PHL</sub>	—	19.0	33.0	1.0	36.0		C <sub>L</sub> = 50 pF		
Enable time	t <sub>ZH</sub>	—	13.7	26.5	1.0	29.0	ns	C <sub>L</sub> = 15 pF	OE	Y
	t <sub>ZL</sub>	—	20.5	36.0	1.0	38.0		C <sub>L</sub> = 50 pF		
Disable time	t <sub>HZ</sub>	—	8.3	20.0	1.0	22.5	ns	C <sub>L</sub> = 15 pF	OE	Y
	t <sub>LZ</sub>	—	13.0	29.5	1.0	32.0		C <sub>L</sub> = 50 pF		

•  $V_{CC} = 2.5 \pm 0.2\text{ V}$

Item	Symbol	T <sub>a</sub> = 25°C			T <sub>a</sub> = -40 to 85°C		Unit	Test Conditions	FROM (Input)	TO (Output)
		Min	Typ	Max	Min	Max				
Propagation delay time	t <sub>PLH</sub>	—	7.1	13.0	1.0	15.5	ns	C <sub>L</sub> = 15 pF	A	Y
	t <sub>PHL</sub>	—	9.2	16.5	1.0	18.5		C <sub>L</sub> = 50 pF		
Enable time	t <sub>ZH</sub>	—	7.4	13.0	1.0	15.5	ns	C <sub>L</sub> = 15 pF	OE	Y
	t <sub>ZL</sub>	—	9.5	16.5	1.0	18.5		C <sub>L</sub> = 50 pF		
Disable time	t <sub>HZ</sub>	—	5.7	14.7	1.0	17.0	ns	C <sub>L</sub> = 15 pF	OE	Y
	t <sub>LZ</sub>	—	8.1	18.2	1.0	20.5		C <sub>L</sub> = 50 pF		

•  $V_{CC} = 3.3 \pm 0.3\text{ V}$

Item	Symbol	T <sub>a</sub> = 25°C			T <sub>a</sub> = -40 to 85°C		Unit	Test Conditions	FROM (Input)	TO (Output)
		Min	Typ	Max	Min	Max				
Propagation delay time	t <sub>PLH</sub>	—	5.0	8.0	1.0	9.5	ns	C <sub>L</sub> = 15 pF	A	Y
	t <sub>PHL</sub>	—	6.4	11.5	1.0	13.0		C <sub>L</sub> = 50 pF		
Enable time	t <sub>ZH</sub>	—	5.1	8.0	1.0	9.5	ns	C <sub>L</sub> = 15 pF	OE	Y
	t <sub>ZL</sub>	—	6.6	11.5	1.0	13.0		C <sub>L</sub> = 50 pF		
Disable time	t <sub>HZ</sub>	—	4.4	9.7	1.0	11.5	ns	C <sub>L</sub> = 15 pF	OE	Y
	t <sub>LZ</sub>	—	6.1	13.2	1.0	15.0		C <sub>L</sub> = 50 pF		

Switching Characteristics (cont)

•  $V_{CC} = 5.0 \pm 0.5\text{ V}$

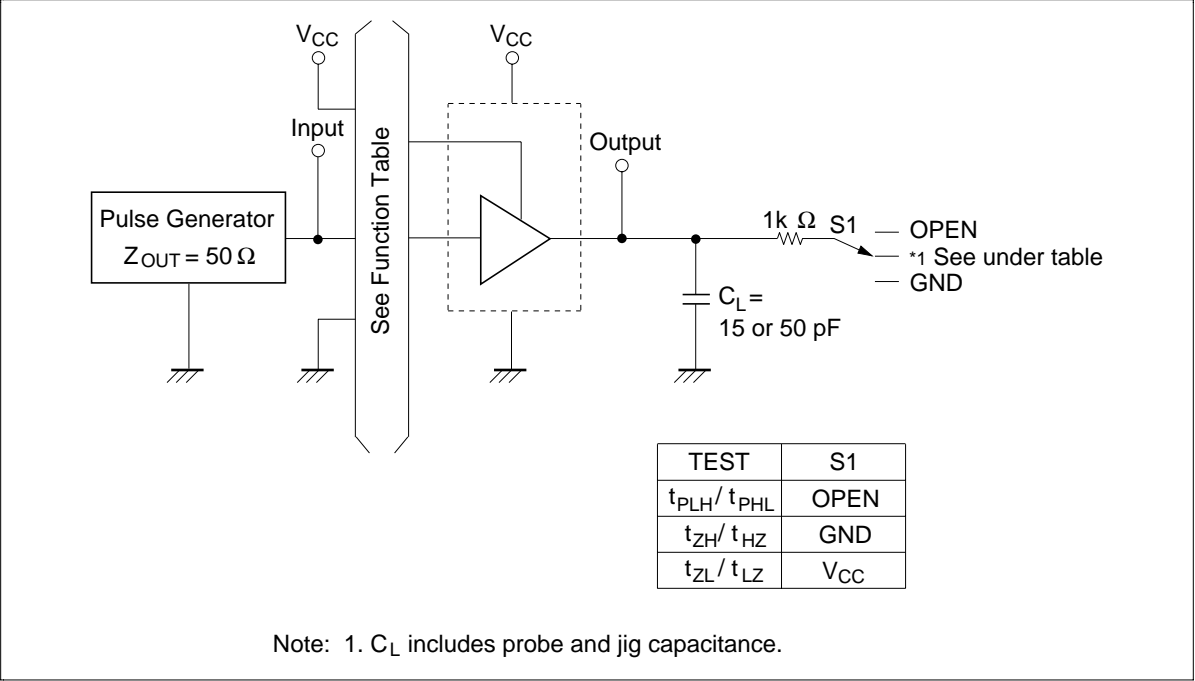
Item	Symbol	T <sub>a</sub> = 25°C			T <sub>a</sub> = -40 to 85°C		Unit	Test Conditions	FROM (Input)	TO (Output)
		Min	Typ	Max	Min	Max				
Propagation delay time	t <sub>PLH</sub>	—	3.5	5.5	1.0	6.5	ns	C <sub>L</sub> = 15 pF	A	Y
	t <sub>PHL</sub>	—	4.6	7.5	1.0	8.5		C <sub>L</sub> = 50 pF		
Enable time	t <sub>ZH</sub>	—	3.6	5.1	1.0	6.0	ns	C <sub>L</sub> = 15 pF	OE	Y
	t <sub>ZL</sub>	—	4.6	7.1	1.0	8.0		C <sub>L</sub> = 50 pF		
Disable time	t <sub>HZ</sub>	—	3.3	6.8	1.0	8.0	ns	C <sub>L</sub> = 15 pF	OE	Y
	t <sub>LZ</sub>	—	4.3	8.8	1.0	10.0		C <sub>L</sub> = 50 pF		

Operating Characteristics

•  $C_L = 50\text{ pF}$

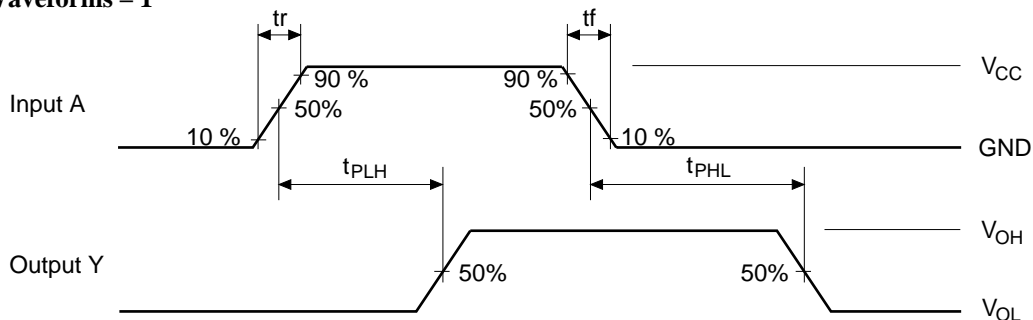
Item	Symbol	V <sub>CC</sub> (V)	T <sub>a</sub> = 25°C			Unit	Test Conditions
			Min	Typ	Max		
Power dissipation capacitance	C <sub>PD</sub>	3.3	—	10.5	—	pF	f = 10 MHz
		5.0	—	11.5	—		

Test Circuit

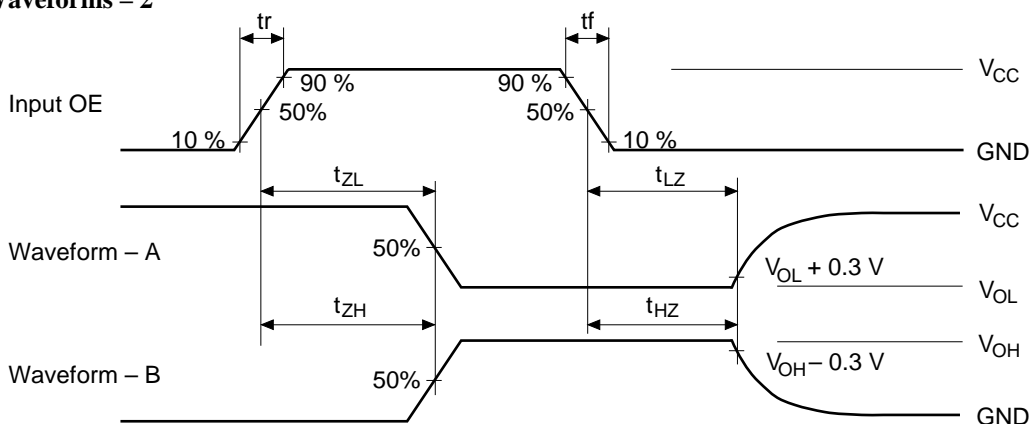




• Waveforms – 1



• Waveforms – 2



Notes: 1.  $t_r \leq 3 \text{ ns}$ ,  $t_f \leq 3 \text{ ns}$

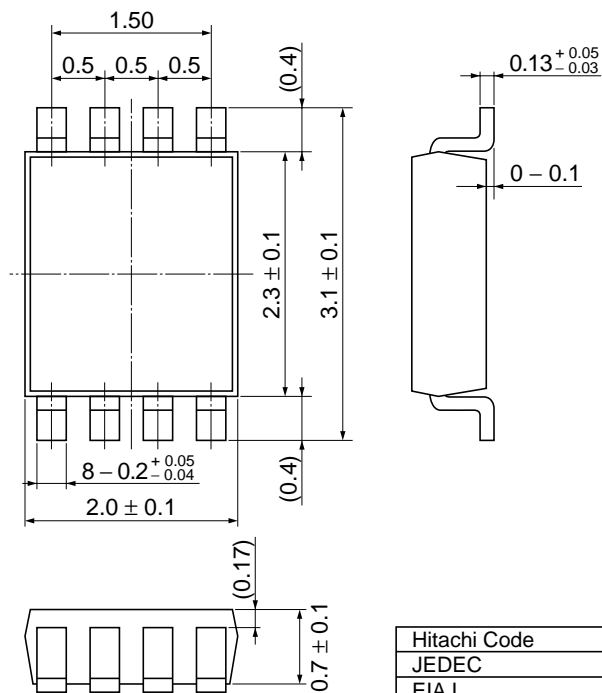
2. Input waveform :  $\text{PRR} \leq 1 \text{ MHz}$ , duty cycle 50%

3. Waveform – A is for an output with internal conditions such that the output is low except when disabled by the output control.

4. Waveform – B is for an output with internal conditions such that the output is high except when disabled by the output control.

## Package Dimensions

Unit : mm



Hitachi Code	US-8
JEDEC	SSOP-8
EIAJ	—
Mass (reference value)	—

## Cautions

1. Hitachi neither warrants nor grants licenses of any rights of Hitachi's or any third party's patent, copyright, trademark, or other intellectual property rights for information contained in this document. Hitachi bears no responsibility for problems that may arise with third party's rights, including intellectual property rights, in connection with use of the information contained in this document.
2. Products and product specifications may be subject to change without notice. Confirm that you have received the latest product standards or specifications before final design, purchase or use.
3. Hitachi makes every attempt to ensure that its products are of high quality and reliability. However, contact Hitachi's sales office before using the product in an application that demands especially high quality and reliability or where its failure or malfunction may directly threaten human life or cause risk of bodily injury, such as aerospace, aeronautics, nuclear power, combustion control, transportation, traffic, safety equipment or medical equipment for life support.
4. Design your application so that the product is used within the ranges guaranteed by Hitachi particularly for maximum rating, operating supply voltage range, heat radiation characteristics, installation conditions and other characteristics. Hitachi bears no responsibility for failure or damage when used beyond the guaranteed ranges. Even within the guaranteed ranges, consider normally foreseeable failure rates or failure modes in semiconductor devices and employ systemic measures such as fail-safes, so that the equipment incorporating Hitachi product does not cause bodily injury, fire or other consequential damage due to operation of the Hitachi product.
5. This product is not designed to be radiation resistant.
6. No one is permitted to reproduce or duplicate, in any form, the whole or part of this document without written approval from Hitachi.
7. Contact Hitachi's sales office for any questions regarding this document or Hitachi semiconductor products.

# HITACHI

## Hitachi, Ltd.

Semiconductor & Integrated Circuits.  
Nippon Bldg., 2-6-2, Ohte-machi, Chiyoda-ku, Tokyo 100-0004, Japan  
Tel: Tokyo (03) 3270-2111 Fax: (03) 3270-5109

URL	NorthAmerica	:	<a href="http://semiconductor.hitachi.com/">http://semiconductor.hitachi.com/</a>
	Europe	:	<a href="http://www.hitachi-eu.com/hel/ecg">http://www.hitachi-eu.com/hel/ecg</a>
	Asia	:	<a href="http://www.hitachi.com.sg/grp3/sicd">http://www.hitachi.com.sg/grp3/sicd</a>
	Japan	:	<a href="http://www.hitachi.co.jp/Sicd/indx.htm">http://www.hitachi.co.jp/Sicd/indx.htm</a>

### For further information write to:

Hitachi Semiconductor (America) Inc. 179 East Tasman Drive, San Jose, CA 95134 Tel: <1> (408) 433-1990 Fax: <1> (408) 433-0223	Hitachi Europe GmbH Electronic Components Group Dornacher StraÙe 3 D-85622 Feldkirchen, Munich Germany Tel: <49> (89) 9 9180-0 Fax: <49> (89) 9 29 30 00
--	--

Hitachi Europe Ltd. Electronic Components Group. Whitebrook Park Lower Cookham Road Maidenhead Berkshire SL6 8YA, United Kingdom Tel: <44> (1628) 585000 Fax: <44> (1628) 585160	Hitachi Asia Ltd. 16 Collyer Quay #20-00 Hitachi Tower Singapore 049318 Tel: 535-2100 Fax: 535-1533
---	--

Hitachi Asia (Hong Kong) Ltd. Group III (Electronic Components) 7th Flr, North Tower, World Finance Centre, Harbour City, Canton Road, Tsim Sha Tsui, Kowloon, Hong Kong Tel: <852> (2) 735 9218 Fax: <852> (2) 730 0281 Telex: 40815 HITEC HX	Hitachi Asia Ltd. Taipei Branch Office 3rd Flr, Hung Kuo Building, No.167, Tun Hwa North Road, Taipei (105) Taiwan Tel: <886> (2) 2718-3666 Fax: <886> (2) 2718-8180 Telex: 23222 HAS-TP
---	---

Copyright ' Hitachi, Ltd., 2000. All rights reserved. Printed in Japan.  
Colophon 1.0