HD74HC442/HD74HC443/HC74HC444

Quad. Tridirectional Bus Transceiver
(with noninverted 3-state outputs)
Quad. Tridirectional Bus Transceiver
(with inverted 3-state outputs)
Quad Tridirectional Bus Transceiver
(with noninverted/inverted 3-state outputs)

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Description

These bus transceivers are designed for a synchronous three-way communication between four-line data buses. They give the designer a choice of selecting inverting, noninverting or a combination of inverting and noninverting data paths with 3-state outputs.

The S_0 and S_1 inputs select the bus from which data are to be transferred. The $\overline{G}$ inputs enable the bus or buses to which data are to be transferred. The port for any bus selected for input and any other bus not enabled for output will be at high impedance.

Features

- High Speed Operation
- High Output Current: Fanout of 15 LSTTL Loads
- Wide Operating Voltage: V_{CC} = 2 to 6 V
- Low Input Current: 1 µA max
- Low Quiescent Supply Current: I_{CC} (static) = 4 µA max (Ta = 25°C)

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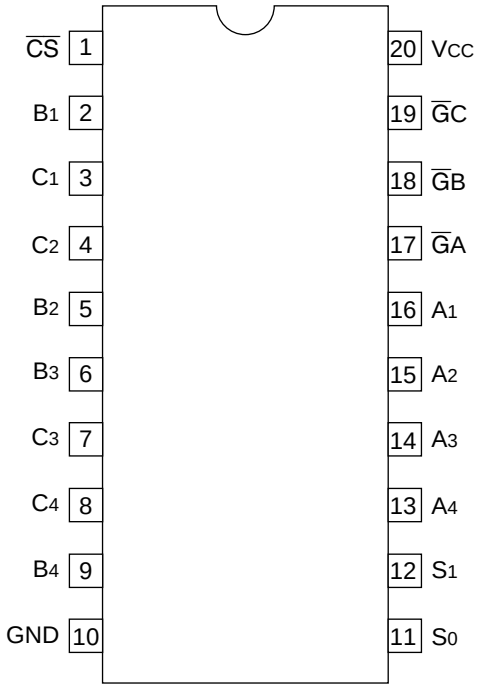
Function Table

Inputs						Transfers Between Buses		
$\overline{CS}$	S_1	S_0	$\overline{G}A$	$\overline{G}B$	$\overline{G}C$	HD74HC442	HD74HC443	HD74HC444
H	X	X	X	X	X	None	None	None
X	H	H	X	X	X	None	None	None
X	X	X	H	H	H	None	None	None
X	L	L	X	H	H	None	None	None
X	L	H	H	X	H	None	None	None
X	H	L	H	H	X	None	None	None
L	L	L	X	L	L	A → B, A → C	$\overline{A}$ → B, $\overline{A}$ → C	$\overline{A}$ → B, $\overline{A}$ → C
L	L	H	L	X	L	B → C, B → A	$\overline{B}$ → C, $\overline{B}$ → A	B → C, $\overline{B}$ → A
L	H	L	L	L	X	C → A, C → B	$\overline{C}$ → A, $\overline{C}$ → B	$\overline{C}$ → A, C → B
L	L	L	X	L	H	A → B	$\overline{A}$ → B	$\overline{A}$ → B
L	L	H	H	X	L	B → C	$\overline{B}$ → C	B → C
L	H	L	L	H	X	C → A	$\overline{C}$ → A	$\overline{C}$ → A
L	L	L	X	H	L	A → C	$\overline{A}$ → C	$\overline{A}$ → C
L	L	H	L	X	H	B → A	$\overline{B}$ → A	$\overline{B}$ → A
L	H	L	H	L	X	C → B	$\overline{C}$ → B	C → B

Pin Arrangement



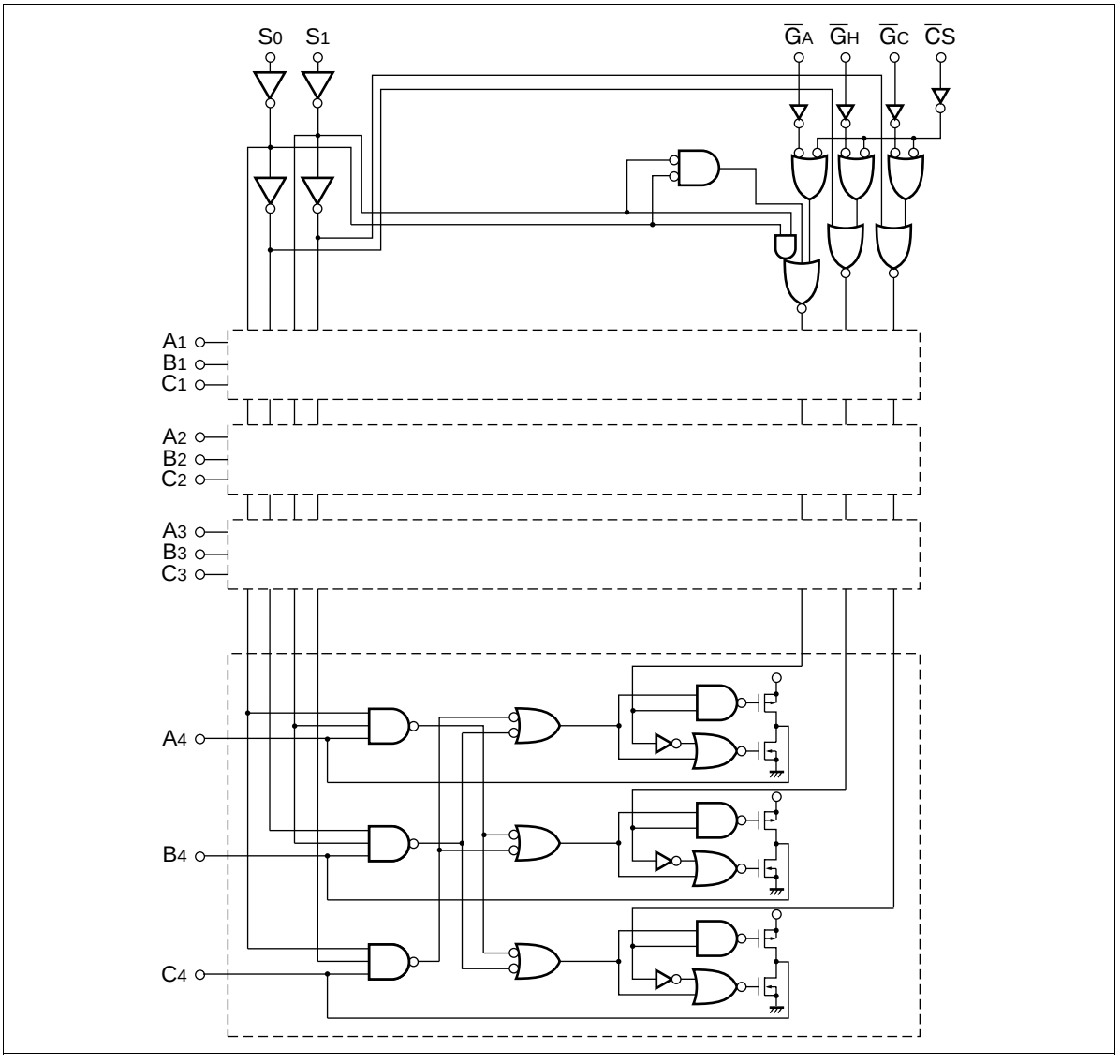
(Top view)

Absolute Maximum Ratings

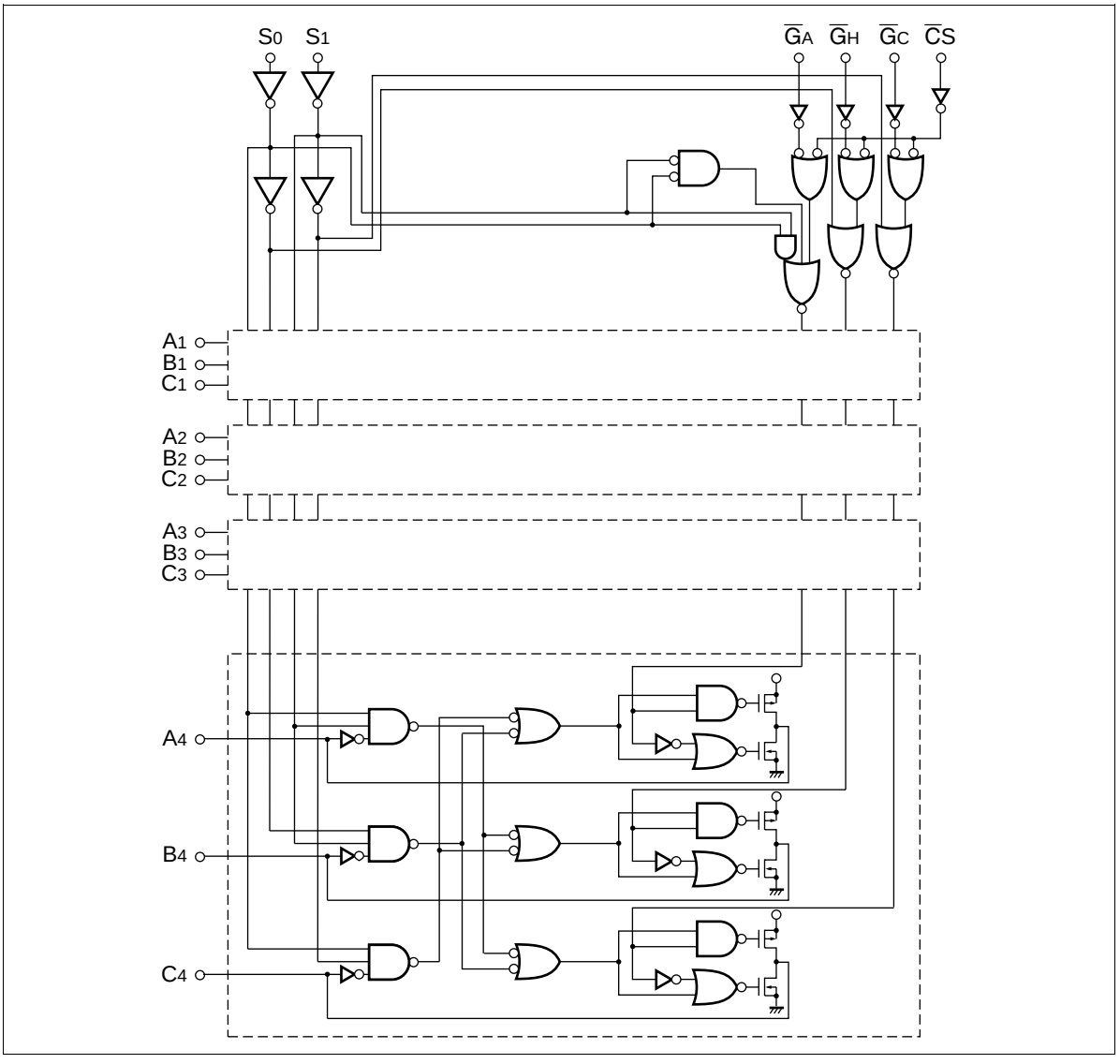
Item	Symbol	Rating	Unit
Supply voltage range	V_{CC}	–0.5 to +7.0	V
Input voltage	V_{IN}	–0.5 to V_{CC} + 0.5	V
Output voltage	V_{OUT}	–0.5 to V_{CC} + 0.5	V
Output current	I_{OUT}	±35	mA
DC current drain per V_{CC} GND	I_{CC}, I_{GND}	±75	mA
DC input diode current	I_{IK}	±20	mA
DC output diode current	I_{OK}	±20	mA
Power Dissipation per package	P_T	500	mW
Storage temperature	Tstg	–65 to +150	°C

Logic Diagram

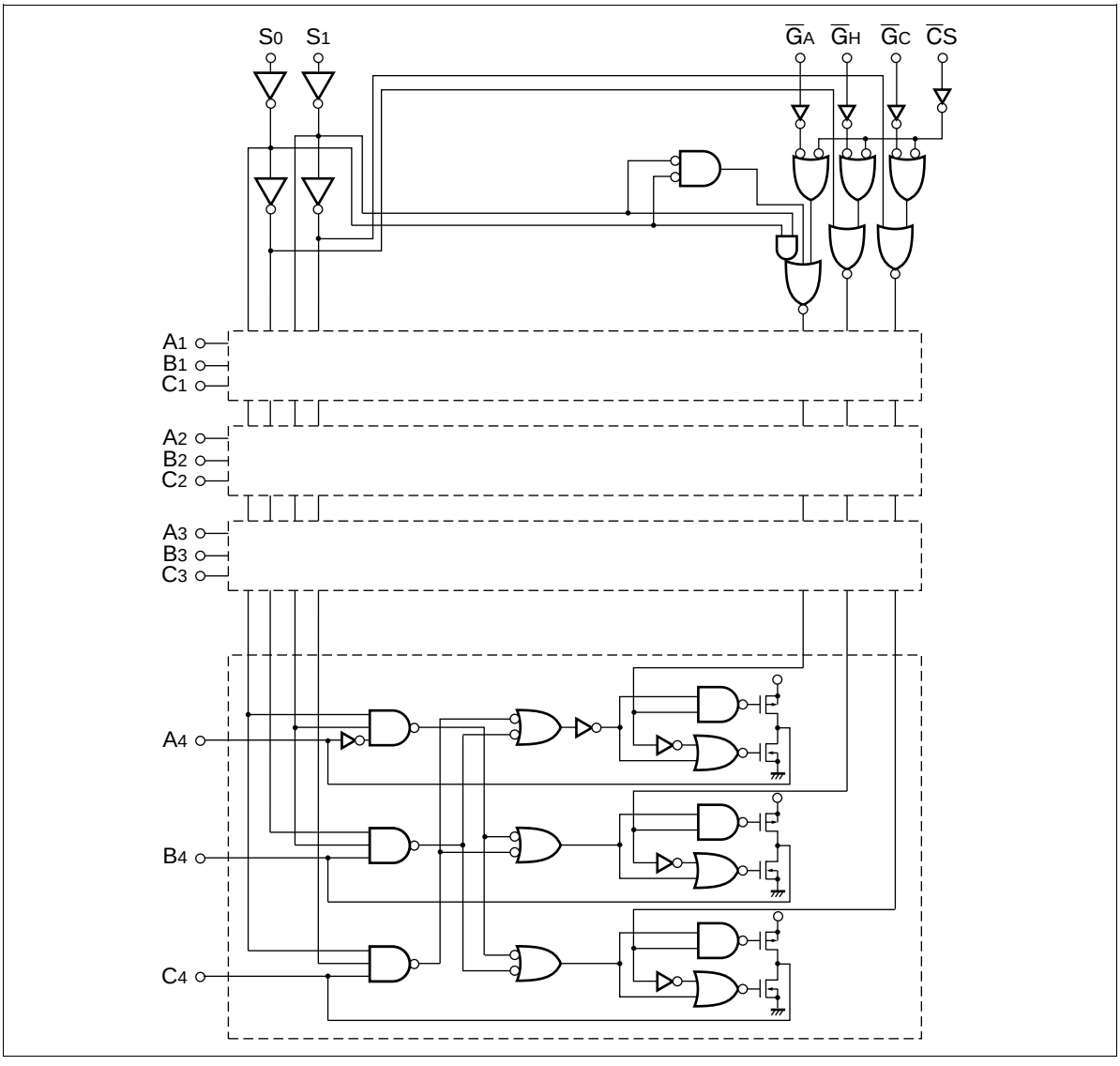
HD74HC442



HD74HC443



HD74HC444



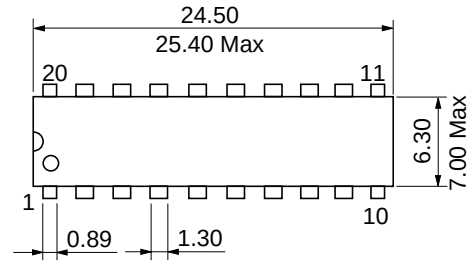
DC Characteristics

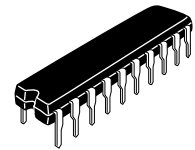
Item	Symbol	V_{CC} (V)	Ta = 25°C Min	Typ	Max	Ta = –40 to +85°C Min	Max	Unit	Test Conditions	
Input voltage	V_{IH}	2.0	1.5	—	—	1.5	—	V		
		4.5	3.15	—	—	3.15	—			
		6.0	4.2	—	—	4.2	—			
	V_{IL}	2.0	—	—	0.5	—	0.5	V		
		4.5	—	—	1.35	—	1.35			
		6.0	—	—	1.8	—	1.8			
Output voltage	V_{OH}	2.0	1.9	2.0	—	1.9	—	V	Vin = V_{IH} or V_{IL}	I_{OH} = –20 µA
		4.5	4.4	4.5	—	4.4	—			
		6.0	5.9	6.0	—	5.9	—			
		4.5	4.18	—	—	4.13	—			I_{OH} = –6 mA
		6.0	5.68	—	—	5.63	—			I_{OH} = –7.8 mA
	V_{OL}	2.0	—	0.0	0.1	—	0.1	V	Vin = V_{IH} or V_{IL}	I_{OL} = 20 µA
		4.5	—	0.0	0.1	—	0.1			
		6.0	—	0.0	0.1	—	0.1			
		4.5	—	—	0.26	—	0.33			I_{OL} = 6 mA
		6.0	—	—	0.26	—	0.33			I_{OL} = 7.8 mA
Off-state output current	I_{OZ}	6.0	—	—	±0.5	—	±5.0	µA	Vin = V_{IH} or V_{IL}, Vout = V_{CC} or GND	
Input current	Iin	6.0	—	—	±0.1	—	±1.0	µA	Vin = V_{CC} or GND	
Quiescent supply current	I_{CC}	6.0	—	—	4.0	—	40	µA	Vin = V_{CC} or GND, Iout = 0 µA	

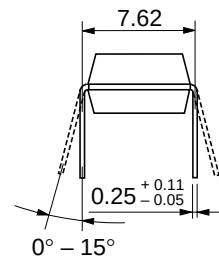
AC Characteristics (C_L = 50 pF, Input $t_r = t_f$ = 6 ns)

			Ta = 25°C			Ta = –40 to +85°C			
Item	**Symbol**	**V_{cc} (V)**	**Min**	**Typ**	**Max**	**Min**	**Max**	**Unit**	**Test Conditions**
Propagation delay	t_{PLH}	2.0	—	—	200	—	250	ns	
time	t_{PHL}	4.5	—	—	40	—	50		
		6.0	—	—	34	—	43		
Output enable	t_{ZH}	2.0	—	—	150	—	190	ns	
time	t_{ZL}	4.5	—	—	30	—	38		
		6.0	—	—	26	—	33		
Output disable	t_{HZ}	2.0	—	—	150	—	190	ns	
time	t_{LZ}	4.5	—	—	30	—	38		
		6.0	—	—	26	—	33		
Output rise/fall	t_{TLH}	2.0	—	—	60	—	75	ns	
time	t_{THL}	4.5	—	—	12	—	15		
		6.0	—	—	10	—	13		
Input capacitance	Cin	—	—	5	10	—	10	pF	

Unit: mm

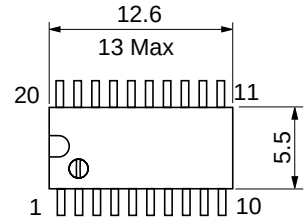


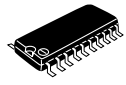


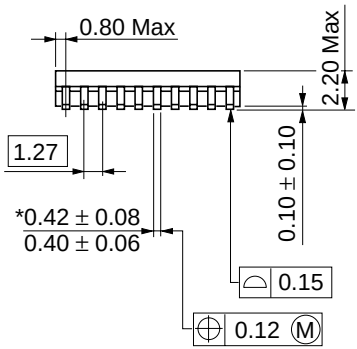


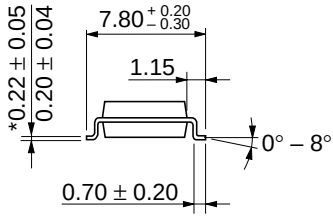
Hitachi Code	DP-20N
JEDEC	—
EIAJ	Conforms
Weight (reference value)	1.26 g

Unit: mm





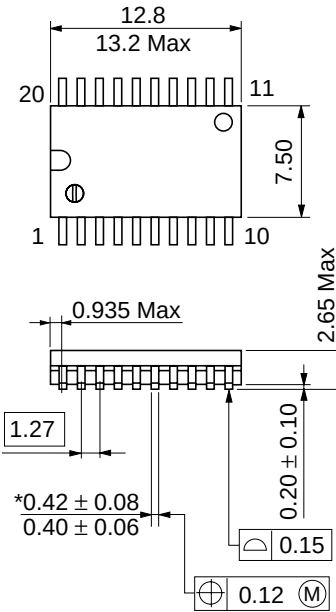


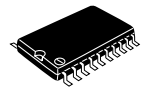


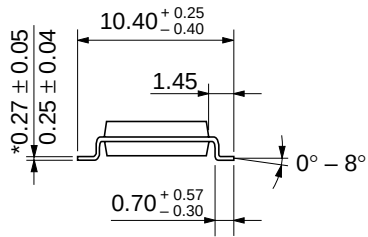
*Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-20DA
JEDEC	—
EIAJ	Conforms
Weight (reference value)	0.31 g

Unit: mm







*Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-20DB
JEDEC	Conforms
EIAJ	—
Weight (reference value)	0.52 g

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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 : http:semiconductor.hitachi.com/
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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 Straße 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) 778322

Hitachi Asia Pte. Ltd.
16 Collyer Quay #20-00
Hitachi Tower
Singapore 049318
Tel: 535-2100
Fax: 535-1533

Hitachi Asia Ltd.
Taipei Branch Office
3F, Hung Kuo Building. No.167,
Tun-Hwa North Road, Taipei (105)
Tel: <886> (2) 2718-3666
Fax: <886> (2) 2718-8180

Hitachi Asia (Hong Kong) Ltd.
Group III (Electronic Components)
7/F., 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