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Renesas Technology Corp.
Customer Support Dept.
April 1, 2003

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HD74LS251.1 of 8 Data Selectors/Multiplexers(with strobe and three-state outputs)

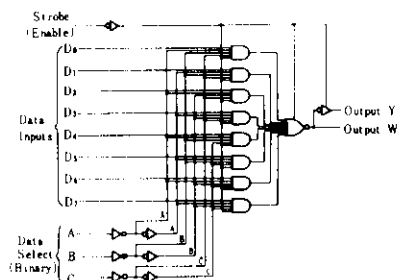
This data selector/multiplexer contains full on-chip binary decoding to select one-of-eight data sources and features a strobe-controlled 3-state output.

The strobe must be at a low logic level to enable this device. The 3-state outputs permit a number of outputs to be connected to a common bus.

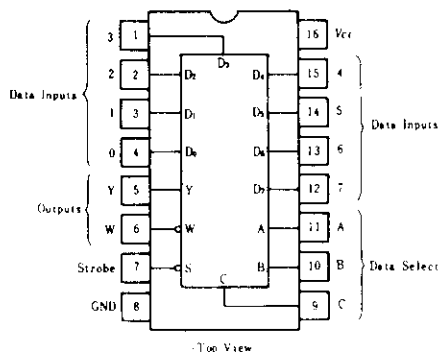
When the strobe input is high, both outputs are in a high-impedance state in which both the upper and lower transistors of each totem-pole output are off, and the output neither drives nor loads the bus significantly. When the strobe is low, the outputs are activated and operate as standard TTL totem-pole outputs.

To minimize the possibility that two outputs will attempt to take a common bus to opposite logic levels, the output control circuitry is designed so that the average output disable time is shorter than the average output enable time.

BLOCK DIAGRAM



PIN ARRANGEMENT



ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Ratings	Unit
Supply voltage	V_{CC}	7.0	V
Input voltage	V_{IN}	7.0	V
Output voltage (off-state)	$V_{O(off)}$	5.5	V
Operating temperature range	T_{opr}	-20 ~ +75	°C
Storage temperature range	T_{stg}	-65 ~ +150	°C

FUNCTION TABLE

Inputs				Outputs	
SELECT			STROBE	Y	W
C	B	A	S	Y	W
X	X	X	H	Z	Z
L	L	L	L	$\bar{D}_0$	$\bar{D}_0$
L	L	H	L	$\bar{D}_1$	$\bar{D}_1$
L	H	L	L	$\bar{D}_2$	$\bar{D}_2$
L	H	H	L	$\bar{D}_3$	$\bar{D}_3$
H	L	L	L	$\bar{D}_4$	$\bar{D}_4$
H	L	H	L	$\bar{D}_5$	$\bar{D}_5$
H	H	L	L	$\bar{D}_6$	$\bar{D}_6$
H	H	H	L	$\bar{D}_7$	$\bar{D}_7$

- Notes) 1. H; high level, L; low level, X; irrelevant
 2. Z; high impedance (off-state)
 3. $\bar{D}_0$ through $\bar{D}_7$; the level of the respective D input.

ELECTRICAL CHARACTERISTICS ($T_a = -20 \sim +75^\circ\text{C}$)

Item	Symbol	Test Conditions	min	typ*	max	Unit
Input voltage	V_{IH}		2.0	—	—	V
	V_{IL}		—	—	0.8	V
Output voltage	V_{OH}	$V_{CC}=4.75\text{V}, V_{IH}=2\text{V}, V_{IL}=0.8\text{V}, I_{OH}=-2.6\text{mA}$	2.4	—	—	V
	V_{OL}	$V_{CC}=4.75\text{V}, V_{IH}=2\text{V}, V_{IL}=0.8\text{V}, I_{OL}=4\text{mA}$	—	—	0.4	V
		$I_{OL}=8\text{mA}$	—	—	0.5	V
Input current	I_{IH}	$V_{CC}=5.25\text{V}, V_I=2.7\text{V}$	—	—	20	μA
	I_{IL}	$V_{CC}=5.25\text{V}, V_I=0.4\text{V}$	—	—	-0.4	mA
	I_i	$V_{CC}=5.25\text{V}, V_I=7\text{V}$	—	—	0.1	mA
Output current	I_{OZ}	$V_{CC}=5.25\text{V}, V_{IH}=2\text{V}, V_O=2.7\text{V}$	—	—	20	μA
		$V_O=0.4\text{V}$	—	—	-20	μA
Short-circuit output current	I_{OS}	$V_{CC}=5.25\text{V}$	-30	—	-130	mA
Supply current**	I_{CC}	$V_{CC}=5.25\text{V}$	Condition A	6.1	10	mA
			Condition B	7.1	12	mA
Input clamp voltage	V_{IK}	$V_{CC}=4.75\text{V}, I_{IN}=-18\text{mA}$	—	—	-1.5	V

* $V_{CC}=5\text{V}, T_a=25^\circ\text{C}$

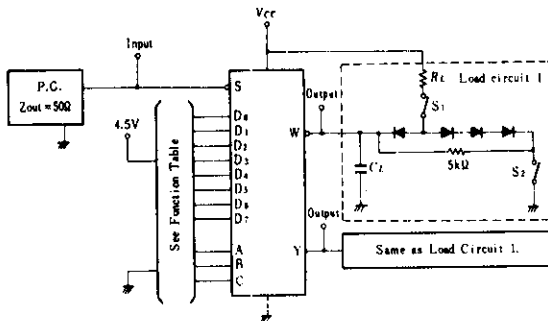
** I_{CC} is measured with the outputs open and all data and select inputs at 4.5V under the following conditions:
 A. Strobe grounded, B. Strobe at 4.5V

SWITCHING CHARACTERISTICS ($V_{CC}=5V$, $T_a=25^{\circ}C$)

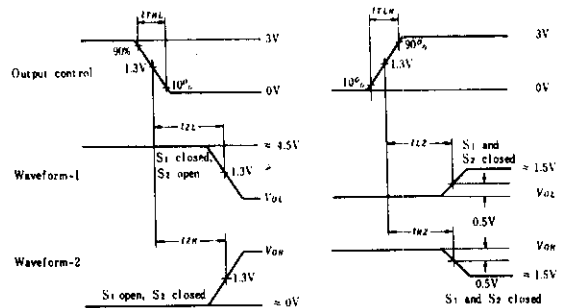
Item	Inputs	Outputs	Symbol	Test Conditions	min	typ	max	Unit
Propagation delay time	A, B, C (4 level)	Y	t_{PLH}	$C_L = 15pF$ $R_L = 2k\Omega$	—	29	45	ns
			t_{PHL}		—	28	45	
	A, B, C (3 level)	W	t_{PLH}		—	20	33	
			t_{PHL}		—	21	33	
	Data	Y	t_{PLH}		—	17	28	
			t_{PHL}		—	18	28	
	Data	W	t_{PLH}		—	10	15	
			t_{PHL}		—	9	15	
Output enable time	Strobe	Y	t_{ZH}	$C_L = 5pF$ $R_L = 2k\Omega$	—	30	45	ns
			t_{ZL}		—	26	40	
	Strobe	W	t_{ZH}		—	17	27	
			t_{ZL}		—	24	40	
Output disable time	Strobe	Y	t_{HZ}	$C_L = 5pF$ $R_L = 2k\Omega$	—	30	45	ns
			t_{LZ}		—	15	25	
	Strobe	W	t_{HZ}		—	37	55	
			t_{LZ}		—	15	25	

TESTING METHOD

1) Test Circuit

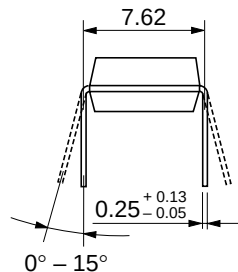
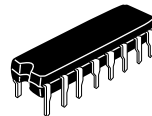
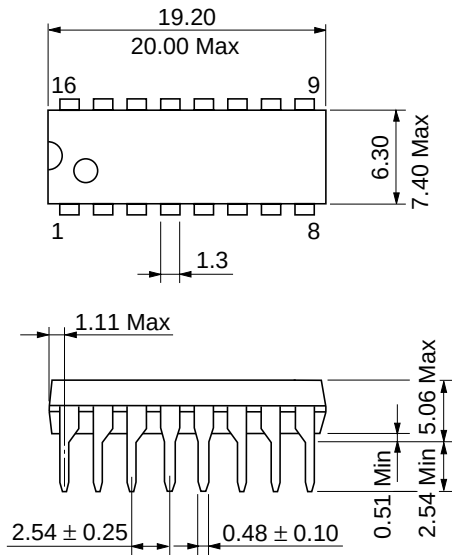


Waveform

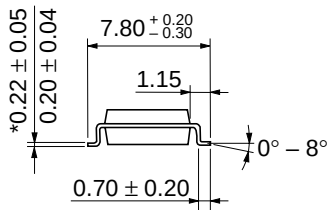
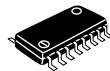
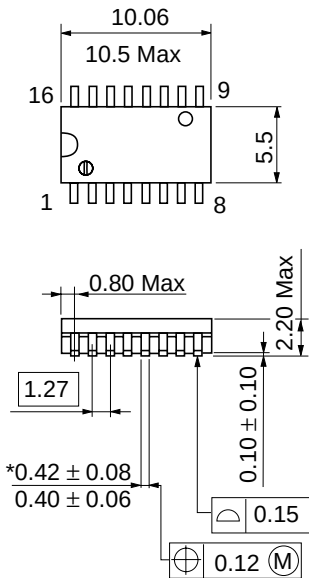


- Notes)
1. Input pulse: $t_{TLH} \leq 15ns$, $t_{THL} \leq 6ns$, $PRR=1MHz$, duty cycle = 50%.
 2. C_L includes probe and jig capacitance.
 3. All diodes are 1S2074 $\text{\textcircled{H}}$.
 4. Waveform-1 is for an output with internal conditions such that the output is low except when disabled by the output control.
 5. Waveform-2 is for an output with internal conditions such that the output is high except when disabled by the output control.

Unit: mm

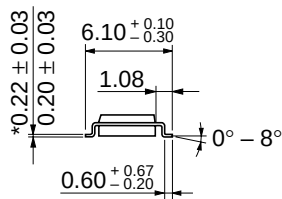
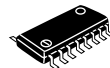
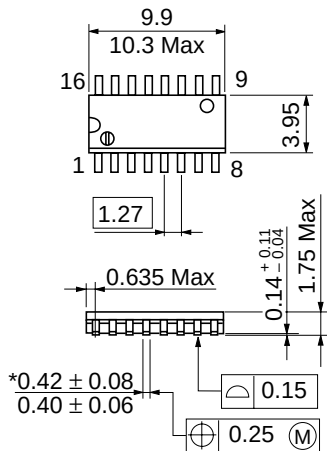


Hitachi Code	DP-16
JEDEC	Conforms
EIAJ	Conforms
Weight (reference value)	1.07 g



*Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-16DA
JEDEC	—
EIAJ	Conforms
Weight (reference value)	0.24 g



*Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-16DN
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EIAJ	Conforms
Weight (reference value)	0.15 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

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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
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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
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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
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