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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)

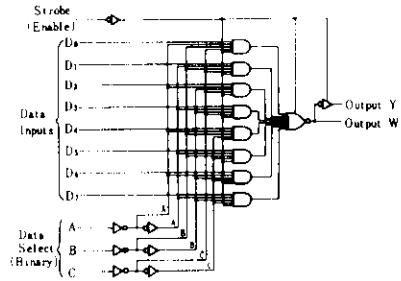
This data selector/multiplexer contains full on-chip binary decoding to select one-of-eight data sources and features a strobe-controlled 3-state output.

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.

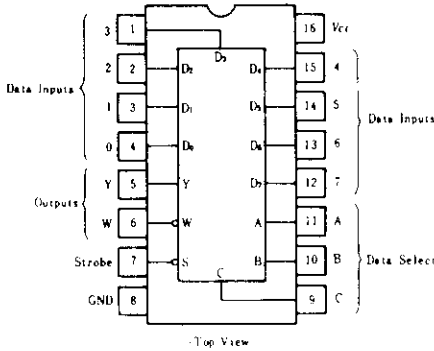
When the strobe input is high, both outputs are in a high-impedance state in which both the upper and lower transistors of each totem-pole output are off, and the output neither drives nor loads the bus significantly. When the strobe is low, the outputs are activated and operate as standard TTL totem-pole 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		
X	X	X	H	Z	Z
L	L	L	L	D ₀	\bar{D}_0
L	L	H	L	D ₁	\bar{D}_1
L	H	L	L	D ₂	\bar{D}_2
L	H	H	L	D ₃	\bar{D}_3
H	L	L	L	D ₄	\bar{D}_4
H	L	H	L	D ₅	\bar{D}_5
H	H	L	L	D ₆	\bar{D}_6
H	H	H	L	D ₇	\bar{D}_7

- Notes) 1. H; high level, L; low level, X; irrelevant
 2. Z; high impedance (off-state)
 3. D₀ through D₇; 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	

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

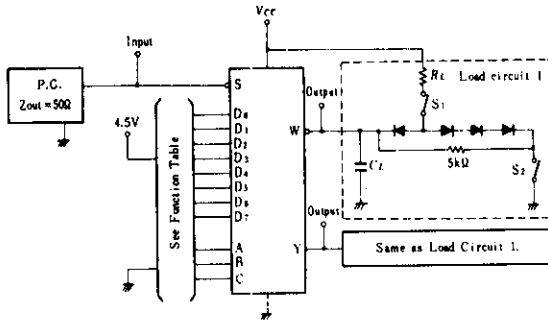
** I_{CC} is measured with the outputs open and all data and select inputs at 4.5V under the following conditions:
 A. Strobe grounded, B. Strobe at 4.5V

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

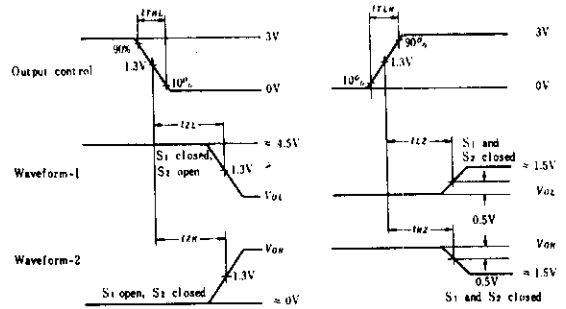
Item	Inputs	Outputs	Symbol	Test Conditions	min	typ	max	Unit
Propagation delay time	A, B, C (4 level)	Y	t_{PLH}	$C_L = 15pF$ $R_L = 2k\Omega$	—	29	45	ns
			t_{PHL}		—	28	45	
	A, B, C (3 level)	W	t_{PLH}		—	20	33	
			t_{PHL}		—	21	33	
	Data	Y	t_{PLH}		—	17	28	
			t_{PHL}		—	18	28	
	Data	W	t_{PLH}		—	10	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

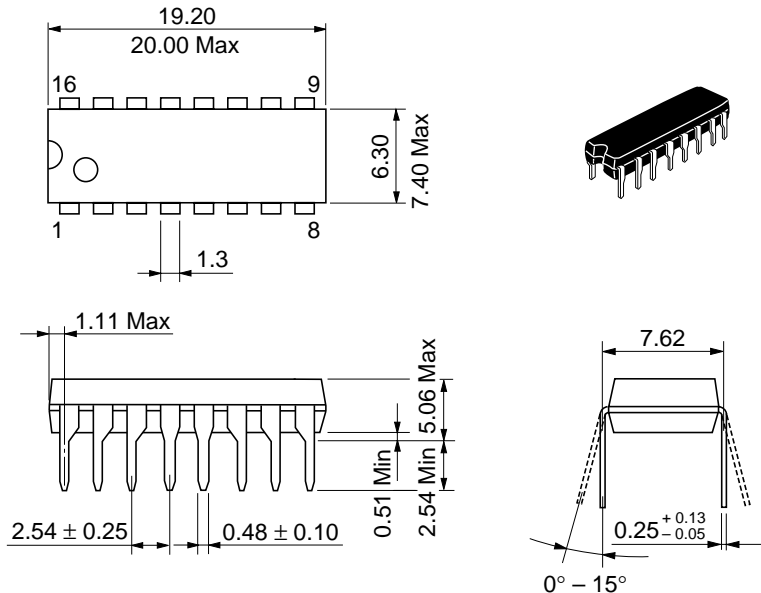
1) Test Circuit



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 (Ⓜ).
 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.

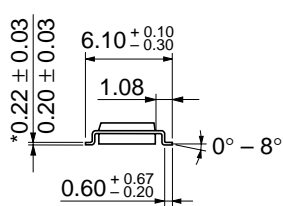
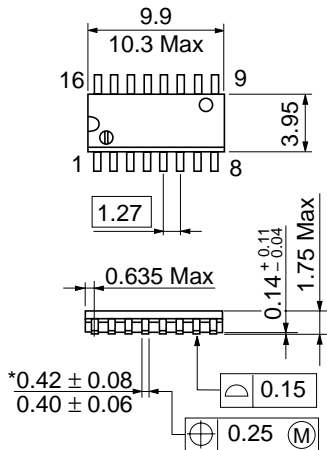


Hitachi Code	DP-16
JEDEC	Conforms
EIAJ	Conforms
Weight (reference value)	1.07 g



*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
JEDEC	Conforms
EIAJ	Conforms
Weight (reference value)	0.15 g

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