

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

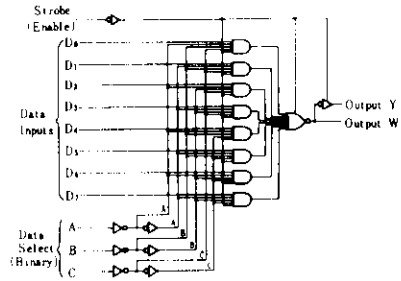
This data selector/multiplexer contains full on-chip binary decoding to select one-of-eight data sources and features a strobe-controlled 3-state output.

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.

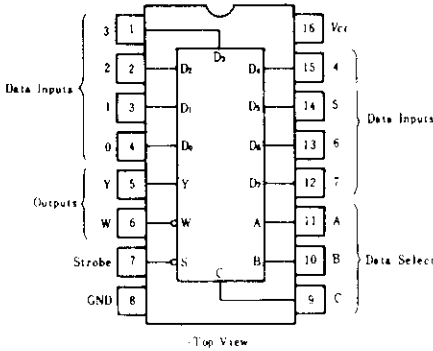
When the strobe input is high, both outputs are in a high-impedance state in which both the upper and lower transistors of each totem-pole output are off, and the output neither drives nor loads the bus significantly. When the strobe is low, the outputs are activated and operate as standard TTL totem-pole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

- Notes) 1. H; high level, L; low level, X; irrelevant  
 2. Z; high impedance (off-state)  
 3. D<sub>0</sub> through D<sub>7</sub>; 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	$\mu\text{A}$	
	$I_{IL}$	$V_{CC}=5.25\text{V}, V_I=0.4\text{V}$	—	—	-0.4	$\text{mA}$	
	$I_i$	$V_{CC}=5.25\text{V}, V_I=7\text{V}$	—	—	0.1	$\text{mA}$	
Output current	$I_{OZ}$	$V_{CC}=5.25\text{V}, V_{IH}=2\text{V}$	$V_O=2.7\text{V}$	—	—	20	$\mu\text{A}$
			$V_O=0.4\text{V}$	—	—	-20	$\mu\text{A}$
Short-circuit output current	$I_{OS}$	$V_{CC}=5.25\text{V}$	-30	—	-130	$\text{mA}$	
Supply current**	$I_{CC}$	$V_{CC}=5.25\text{V}$	Condition A	—	6.1	10	$\text{mA}$
			Condition B	—	7.1	12	$\text{mA}$
Input clamp voltage	$V_{IK}$	$V_{CC}=4.75\text{V}, I_{IN}=-18\text{mA}$	—	—	-1.5	V	

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

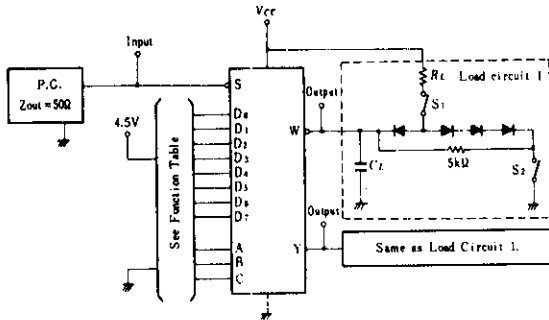
\*\*  $I_{CC}$  is measured with the outputs open and all data and select inputs at 4.5V under the following conditions:  
 A. Strobe grounded, B. Strobe at 4.5V

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

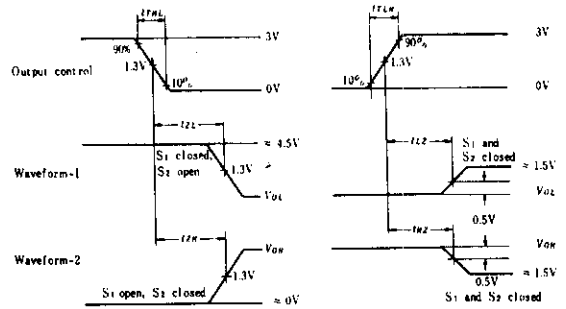
Item	Inputs	Outputs	Symbol	Test Conditions	min	typ	max	Unit
Propagation delay time	A, B, C (4 level)	Y	$t_{PLH}$	$C_L = 15pF$ $R_L = 2k\Omega$	—	29	45	ns
			$t_{PHL}$		—	28	45	
	A, B, C (3 level)	W	$t_{PLH}$		—	20	33	
			$t_{PHL}$		—	21	33	
	Data	Y	$t_{PLH}$		—	17	28	
			$t_{PHL}$		—	18	28	
	Data	W	$t_{PLH}$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

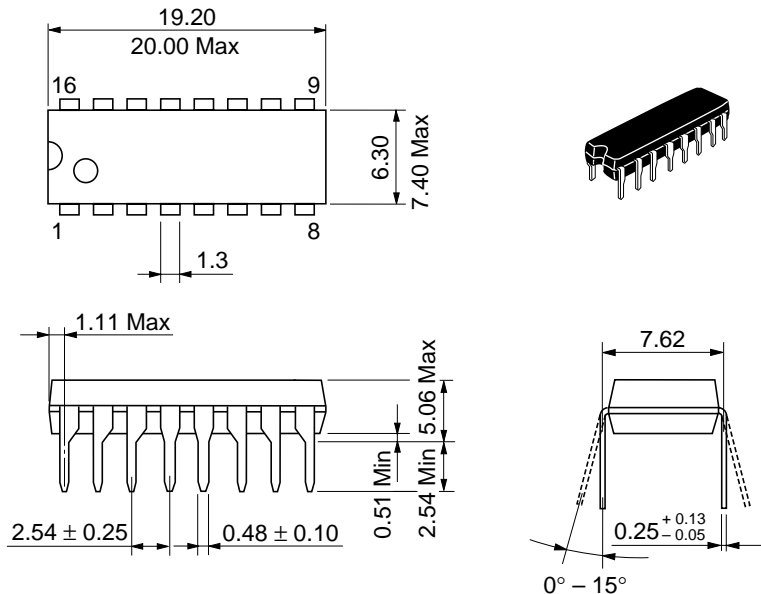
### 1) Test Circuit



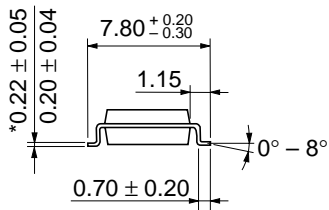
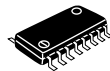
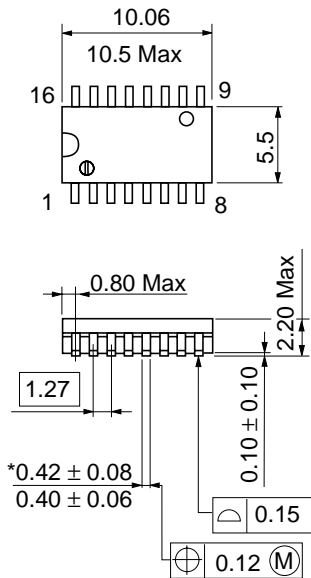
### Waveform



- 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.

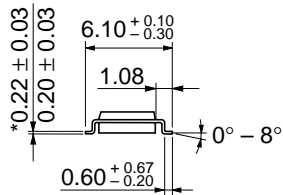
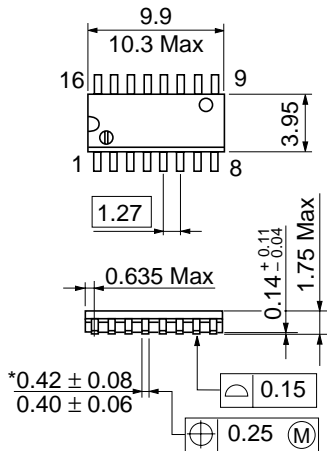


Hitachi Code	DP-16
JEDEC	Conforms
EIAJ	Conforms
Weight (reference value)	1.07 g



\*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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