

HD74LS373

Octal D-type Transparent Latches (with three-state outputs)

The HD74LS373, 8-bit register features totem-pole three-state outputs designed specifically for driving highly-capacitive or relatively low-impedance loads. The high-impedance third state and increased high-logic-level drive provide this register with the capacity of being connected directly to and driving the bus lines in a bus-organized system without need for interface or pull-up components. They are particularly attractive for implementing buffer registers, I/O ports, bidirectional bus drivers, and working registers.

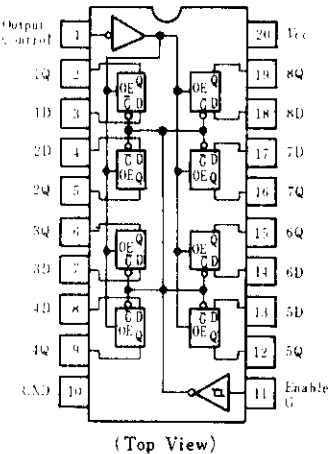
The eight latches are transparent D-type latches meaning that while the enable (G) is high the Q outputs will follow the data (D) inputs. When the enable is taken low the output will be latched at the level of the data that was setup.

FUNCTION TABLE

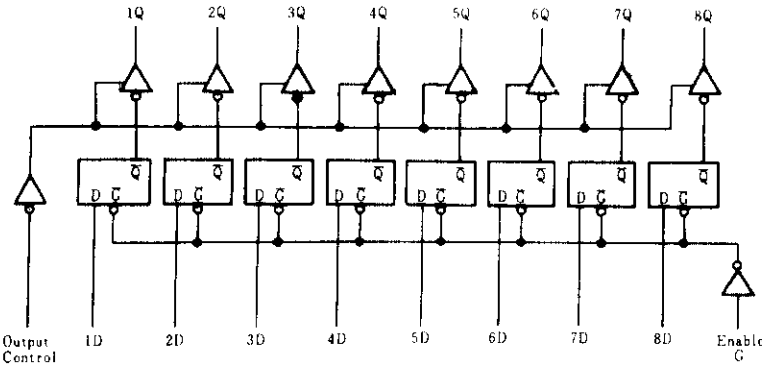
Inputs			Output
Output control	Enable G	D	Q
L	H	H	H
L	H	L	L
L	L	X	Q ₀
H	X	X	Z

Notes: H = high level, L = low level,
X = irrelevant
Q₀ = level of Q before the indicated steady-state input conditions were established.
Z = off (high-impedance) state of a three-state output

PIN ARRANGEMENT



BLOCK DIAGRAM



RECOMMENDED OPERATING CONDITIONS

Item	Symbol	min	typ	max	Unit
Supply voltage	V _{CC}	4.75	5.00	5.25	V
Output voltage	V _{OH}	—	—	5.5	V
Output current	I _{OH}	—	—	—2.6	mA
	I _{OL}	—	—	24	mA
Enable pulse width	t _w	15	—	—	ns
		15	—	—	ns
Data setup time	t _{su}	5 ↓	—	—	ns
Data hold time	t _h	25 ↓	—	—	ns

Note) ↓ : The arrow indicates the falling edge of clock pulse.

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}	Data inputs	—	—	0.7	V	
		G, Output control inputs	—	—	0.8		
Output voltage	V_{OH}	$V_{CC}=4.75\text{V}$, $V_{IH}=2\text{V}$, $V_{IL}=V_{IL\text{ max}}$, $I_{OH}=-2.6\text{mA}$	2.4	—	—	V	
	V_{OL}	$V_{CC}=4.75\text{V}$, $V_{IH}=2\text{V}$, $V_{IL}=V_{IL\text{ max}}$	$I_{OL}=12\text{mA}$	—	—	0.4	V
			$I_{OL}=24\text{mA}$	—	—	0.5	
	Off-state output current	I_{OZH}	$V_{CC}=5.25\text{V}$, $V_{IH}=2\text{V}$	$V_O=2.7\text{V}$	—	—	20
I_{OZL}		$V_O=0.4\text{V}$		—	—	—20	
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	
Short-circuit output current	I_{OS}	$V_{CC}=5.25\text{V}$	—30	—	—130	mA	
Supply current	I_{CC}	$V_{CC}=5.25\text{V}$, $V_I=4.5\text{V}$ (Output control)	—	24	40	mA	
Input clamp voltage	V_{IK}	$V_{CC}=4.75\text{V}$, $I_{IN}=-18\text{mA}$	—	—	—1.5	V	

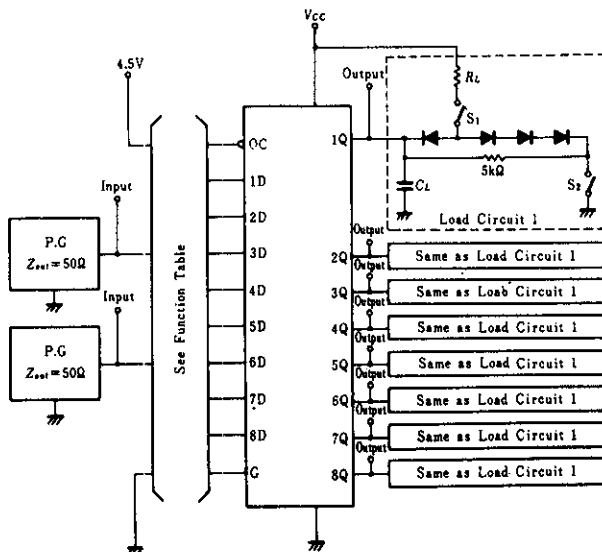
* $V_{CC}=5\text{V}$, $T_a=25^\circ\text{C}$

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

Item	Symbol	Input	Output	Test Conditions	min	typ	max	Unit	
Propagation delay time	t_{PLH}	D	Q	$C_L=45\text{pF}$ $R_L=667\Omega$	—	12	18	ns	
	t_{PHL}				—	12	18		
	t_{PLH}	G	Q		—	20	30		
	t_{PHL}				—	18	30		
Output enable time	t_{ZH}	OC	Q		—	15	28		
	t_{ZL}				—	25	36		
Output disable time	t_{HZ}	OC	Q		$C_L=5\text{pF}$	—	12		20
	t_{LZ}				$R_L=667\Omega$	—	15		25

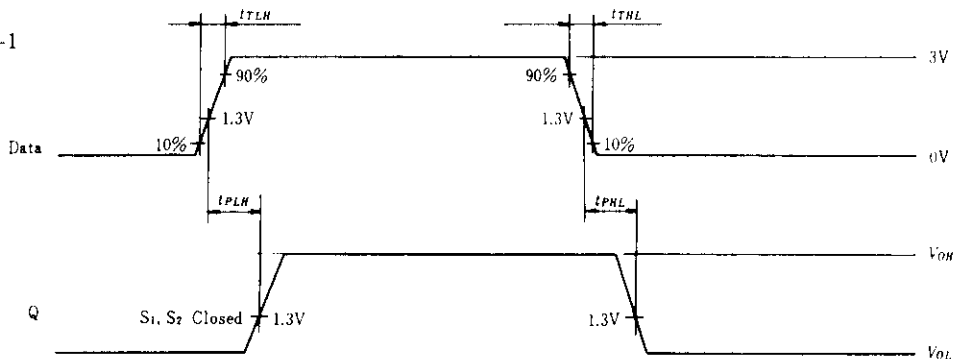
TESTING METHOD

Test Circuit



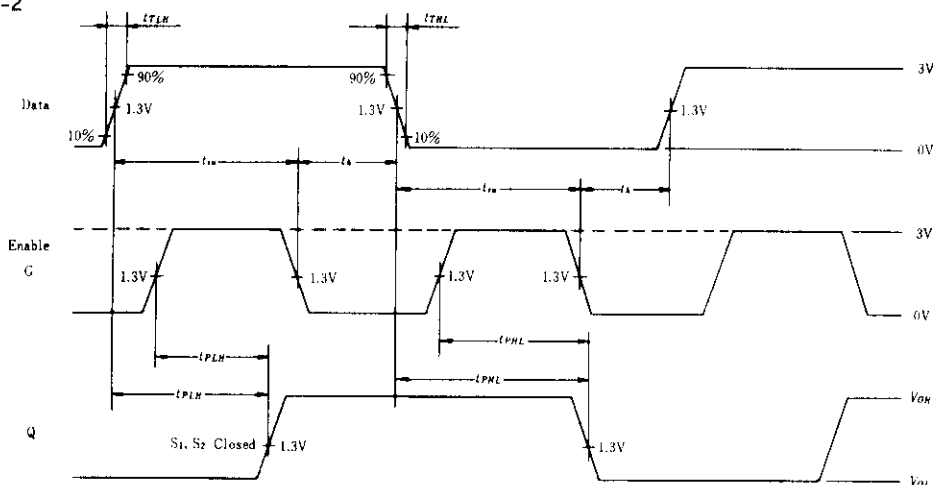
- Notes: 1. C_L includes probe jig capacitance.
2. All diodes are 1S2074 (H).

Waveform-1



Notes: Input pulse; $t_{TLH} \leq 15\text{ns}$, $t_{THL} \leq 6\text{ns}$, $PRR = 1\text{MHz}$, duty cycle 50%

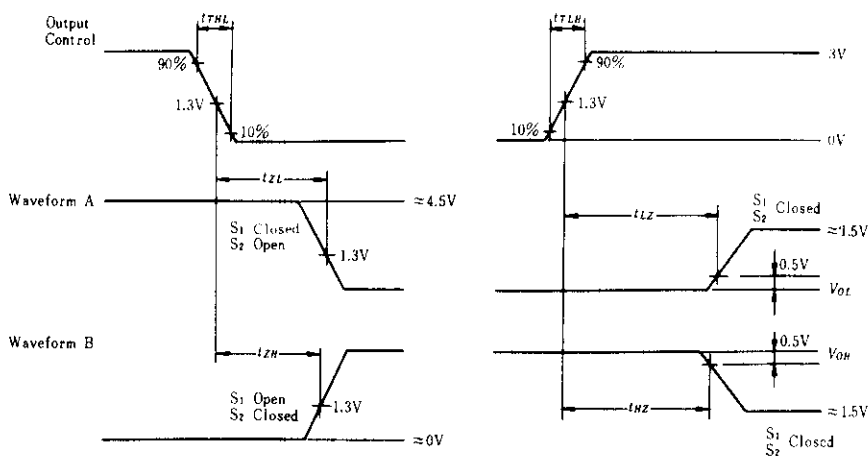
Waveform-2



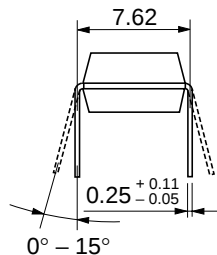
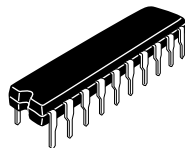
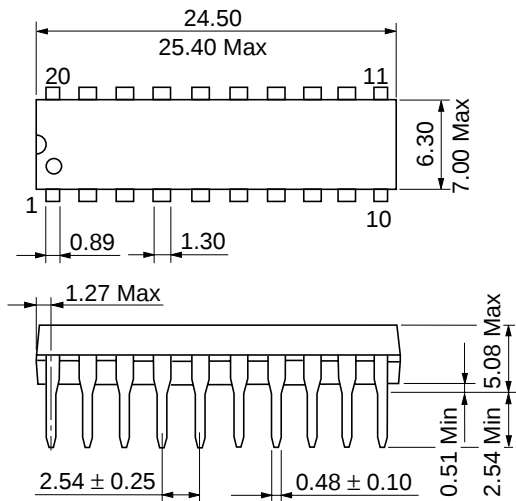
Note: Enable input pulse; $t_{TLH} \leq 15\text{ns}$, $t_{THL} \leq 6\text{ns}$, $PRR = 1\text{MHz}$

Data input pulse; $t_{TLH} \leq 15\text{ns}$, $t_{THL} \leq 6\text{ns}$, $PRR = 1\text{MHz}$, G input is high.

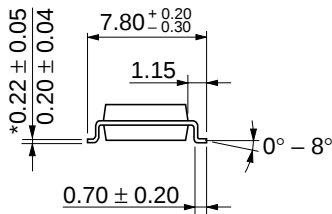
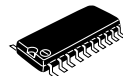
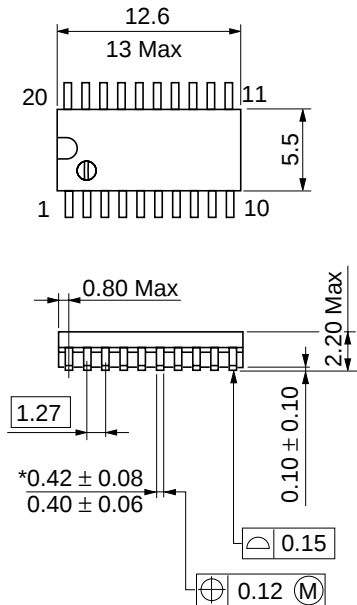
Waveform-3



Notes: 1. Input pulse; $t_{TLH} \leq 15\text{ns}$, $t_{THL} \leq 6\text{ns}$, $PRR = 1\text{MHz}$, duty cycle 50%
2. Waveform A is for an output with internal conditions such that the output is low except when disabled by the output control. Waveform B is for an output with internal conditions such that the output is high except when disabled by the output control.



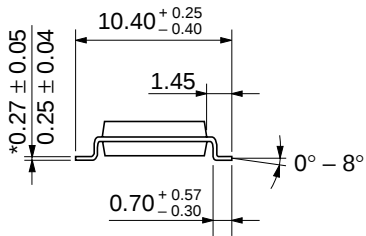
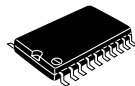
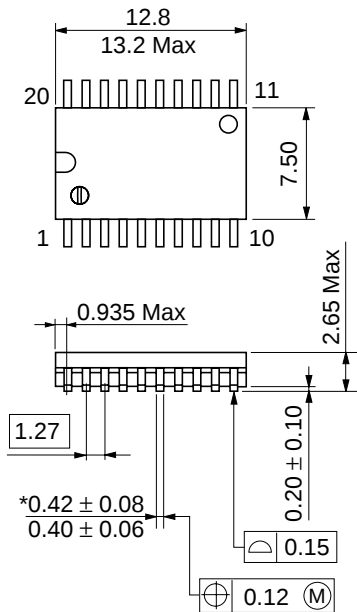
Hitachi Code	DP-20N
JEDEC	—
EIAJ	Conforms
Weight (reference value)	1.26 g



*Dimension including the plating thickness
Base material dimension

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

Unit: mm



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

$$\frac{\text{*Dimension including the plating thickness}}{\text{Base material dimension}}$$

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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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