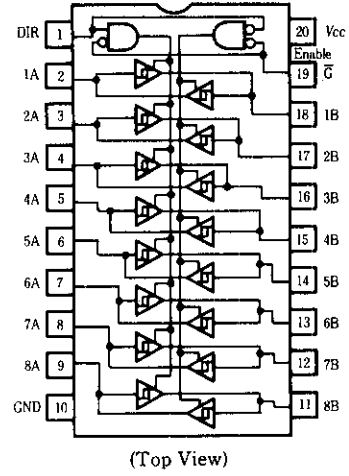


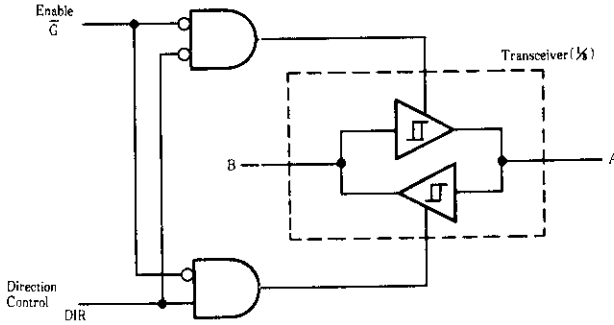
# HD74LS645 ● Octal Bus Transceivers (non-inverted 3-state outputs)

This octal bus transceiver is designed for asynchronous two-way communication between data buses. The devices transmit data from the A bus to the B bus or from the B bus to the A bus depending upon the level at the direction control (DIR) input. The enable input ( $\bar{G}$ ) can be used to disable the device so that the buses are effectively isolated.

## ■ 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 current	$I_{OH}$	—	—	-15	mA
Output current	$I_{OL}$	—	—	24	mA
Operating temperature range	$T_{opr}$	-20	25	75	°C

## ■ FUNCTIONAL TABLE

Enable $\bar{G}$	Direction Control DIR	Operation
L	L	B data to A bus
L	H	A data to B bus
H	X	Isolation

H; high level,  
L; low level,  
X; irrelevant

# HD74LS645

## ■ 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	
Hysteresis	$V_T^+ - V_T^-$	$V_{CC} = 4.75\text{V}$		0.2	—	—	V
Output voltage	$V_{OH}$	$V_{CC} = 4.75\text{V}, V_{IH} = 2\text{V}, V_{IL} = 0.8\text{V}$	$I_{OH} = -3\text{mA}$	2.4	—	—	V
			$I_{OH} = -15\text{mA}$	2	—	—	
	$V_{OL}$	$V_{CC} = 4.75\text{V}, V_{IH} = 2\text{V}, V_{IL} = 0.8\text{V}$	$I_{OL} = 12\text{mA}$	—	—	0.4	V
			$I_{OL} = 24\text{mA}$	—	—	0.5	
Output current	$I_{OZH}$	$V_{CC} = 5.25\text{V}$	$V_O = 2.7\text{V}$	—	—	20	$\mu\text{A}$
	$I_{OZL}$	$\bar{G}$ input = 2V	$V_O = 0.4\text{V}$	—	—	-400	
Input current	$I_{IH}$	$V_{CC} = 5.25\text{V}, V_I = 2.7\text{V}$		—	—	20	$\mu\text{A}$
	$I_{IL}$	$V_{CC} = 5.25\text{V}, V_I = 0.4\text{V}$		—	—	-400	$\mu\text{A}$
	A or B DIR or $\bar{G}$	$I_I$	$V_{CC} = 5.25\text{V}$	$V_I = 5.5\text{V}$	—	—	0.1
$V_I = 7\text{V}$				—	—	0.1	
Short-circuit output current	$I_{OS}^{***}$	$V_{CC} = 5.25\text{V}$		-40	—	-225	mA
Supply current **	$I_{CCH}$	$V_{CC} = 5.25\text{V}, \text{OUTPUT OPEN}$		—	48	70	mA
	$I_{CCL}$			—	62	90	
	$I_{CCZ}$			—	64	95	
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 all outputs open.

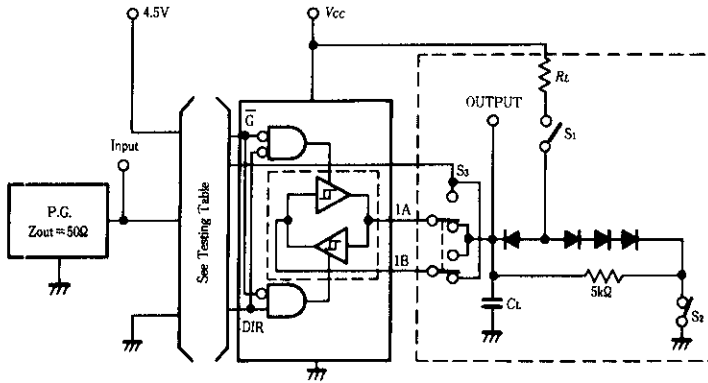
\*\*\* Not more than one output should be shorted at a time, duration of short-circuit should not exceed one second.

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

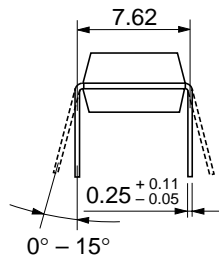
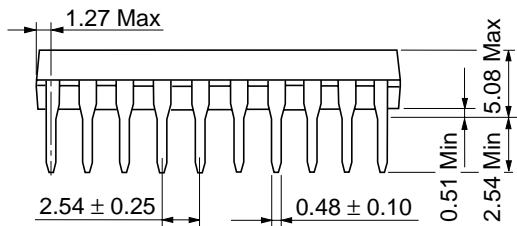
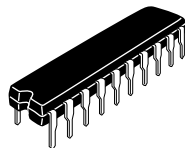
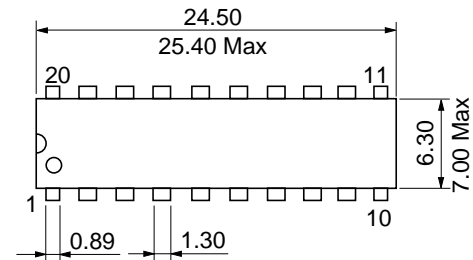
Item	Symbol	Input	Output	Test Condition	min	typ	max	Unit
Propagation delay time	$t_{PLH}$	A	B	$C_L = 45\text{pF}, R_L = 667\ \Omega$	—	8	15	ns
		B	A		—	8	15	ns
	$t_{PHL}$	A	B		—	11	15	ns
		B	A		—	11	15	ns
Output enable time	$t_{ZL}$	$\bar{G}$	A		—	31	40	ns
		$\bar{G}$	B		—	31	40	ns
	$t_{ZH}$	$\bar{G}$	A		—	26	40	ns
		$\bar{G}$	B		—	26	40	ns
Output disable time	$t_{LZ}$	$\bar{G}$	A	$C_L = 5\text{pF}, R_L = 667\ \Omega$	—	15	25	ns
		$\bar{G}$	B		—	15	25	ns
	$t_{HZ}$	$\bar{G}$	A		—	15	25	ns
		$\bar{G}$	B		—	15	25	ns

## TESTING METHOD

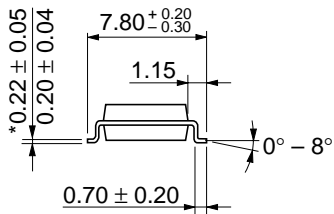
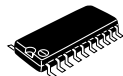
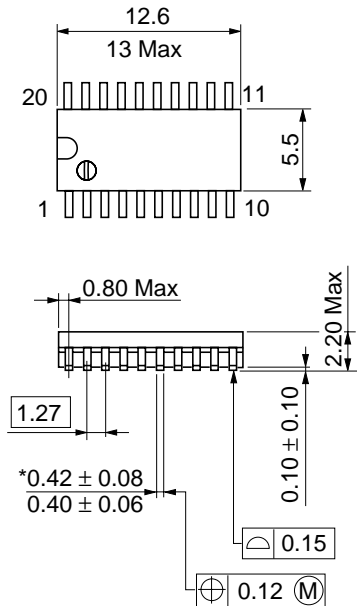
### Test Circuit



- Notes)
1.  $C_L$  includes probe and jig capacitance.
  2. All diodes are 1S2074  $\text{Ⓢ}$ .
  3. 2A-2B, 3A-3B, 4A-4B, 5A-5B, 6A-6B, 7A-7B, 8A-8B are identical to above load circuit.
  4.  $S_2$  is an input-output switch.

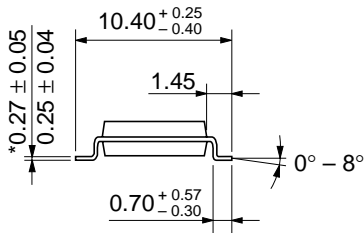
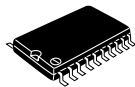
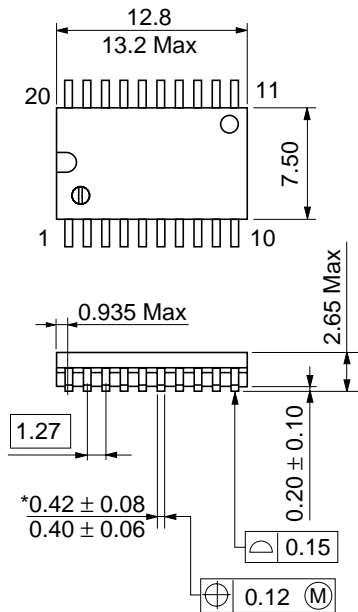


Hitachi Code	DP-20N
JEDEC	—
EIAJ	Conforms
Weight (reference value)	1.26 g



\*Dimension including the plating thickness  
Base material dimension

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



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

\*Dimension including the plating thickness  
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

URL      North America      : <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  
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