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

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Remember to give due consideration to safety when making your circuit designs, with appropriate measures such as (i) placement of substitutive, auxiliary circuits, (ii) use of nonflammable material or (iii) prevention against any malfunction or mishap.

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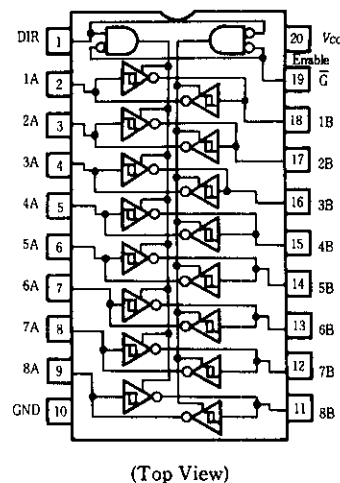
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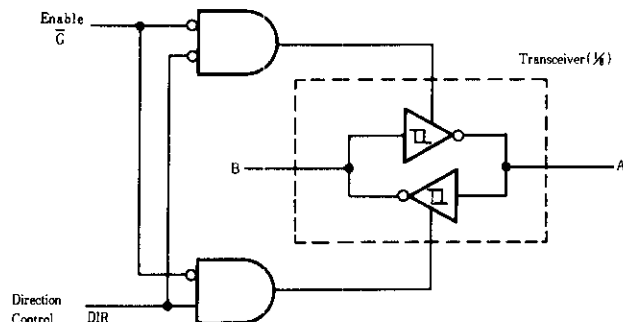
HD74LS640 ● Octal Bus Transceivers (inverted 3-state outputs)

This octal bus transceivers is designed for asynchronous two-way communication between data buses. The device 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

FUNCTION TABLE

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

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

■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
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
	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	V
Output current	I_{OZH}	$V_{CC} = 5.25\text{V}, \bar{G} \text{ INPUT} = 2\text{V}$	$V_O = 2.7\text{V}$	---		20	μA
	I_{OZL}		$V_O = 0.4\text{V}$	---		-400	μA
Input current	I_{IH}	$V_{CC} = 5.25\text{V}, V_I = 2.7\text{V}$		---		20	μA
		$V_{CC} = 5.25\text{V}, V_I = 0.4\text{V}$		---		-400	μA
	I_I	$V_{CC} = 5.25\text{V}$	$V_I = 5.5\text{V}$	---		0.1	mA
			$V_I = 7\text{V}$	---		0.1	mA
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	mA
	I_{CCZ}			---	64	95	mA
Input clamp voltage	V_{IK}	$V_{CC} = 4.75\text{V}, I_{IN} = -18\text{mA}$		---		-1.5	V

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

** Not more than one output shall be shorted at a time.

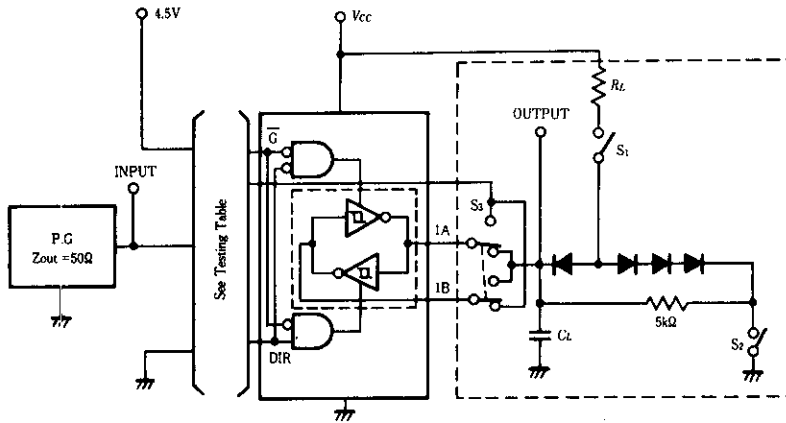
The duration of the short circuit shall not exceed one second.

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

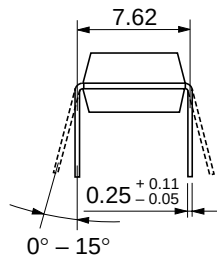
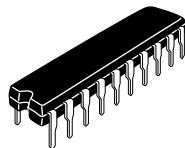
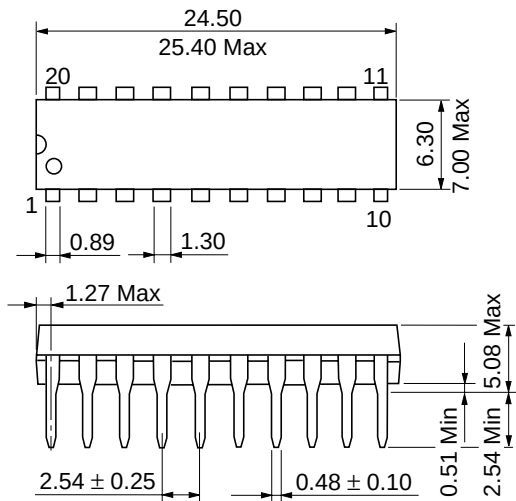
Item	Symbol	INPUT	OUTPUT	Test Conditions	min	typ	max	Unit
Propagation delay time	t_{PLH}	A	B	$C_L = 45\text{pF}, R_L = 667\ \Omega$	---	6	10	ns
		B	A		---	6	10	ns
	t_{PHL}	A	B		---	8	15	ns
		B	A		---	8	15	ns
Output enable time	t_{ZL}	$\bar{G}$	A		---	31	40	ns
		$\bar{G}$	B		---	31	40	ns
	t_{ZH}	$\bar{G}$	A		---	23	40	ns
		$\bar{G}$	B		---	23	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

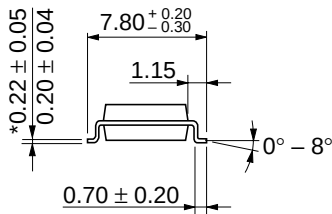
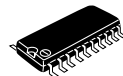
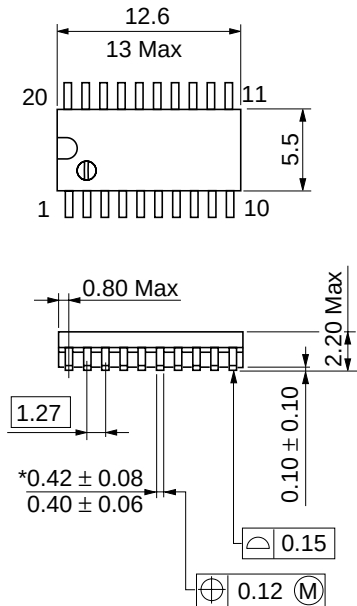
Test Circuit



- Notes)
1. C_L includes probe and jig capacitance.
 2. All diodes are 1S2074 $\oplus$.
 3. 2A-2B, 3A-3B, 4A-4B, 5A-5B, 6A-6B, 7A-7B, 8A-8B are identical to above load circuit.
 4. S_1 is a input-output switch.

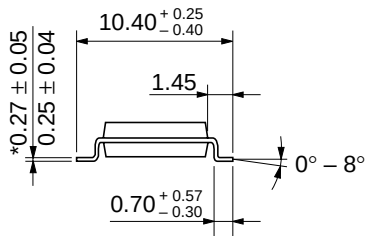
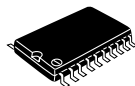
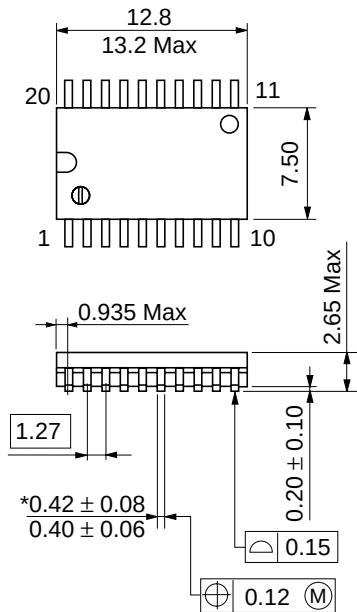


Hitachi Code	DP-20N
JEDEC	—
EIAJ	Conforms
Weight (reference value)	1.26 g



*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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