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

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Keep safety first in your circuit designs!

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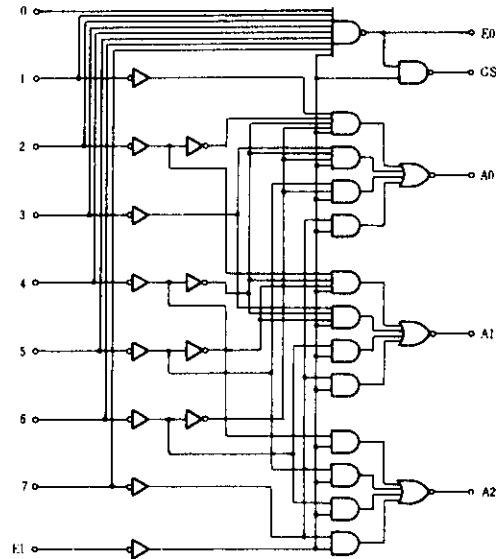
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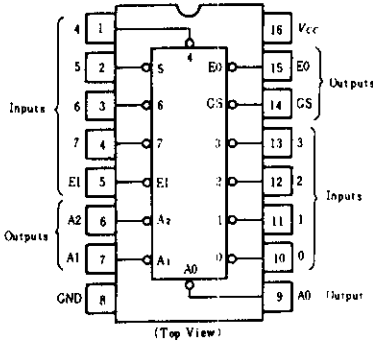
HD74LS148 ● 8-line-to-3-line Octal Priority Encoders

The HD74LS148 encodes eight data lines to three-line (4-2-1) binary (octal). Cascading circuitry (enable input EI and enable output EO) has been provided to allow octal expansion without the need for external circuitry. The data inputs and outputs are active at the low logic level.

■ BLOCK DIAGRAM



■ PIN ARRANGEMENT



■ FUNCTION TABLE

EI	Inputs								Outputs				
	0	1	2	3	4	5	6	7	A2	A1	A0	GS	EO
H	X	X	X	X	X	X	X	X	H	H	H	H	H
L	H	H	H	H	H	H	H	H	H	H	H	H	L
L	X	X	X	X	X	X	X	L	L	L	L	L	H
L	X	X	X	X	X	X	L	H	L	L	L	L	H
L	X	X	X	X	L	H	H	H	L	H	L	L	H
L	X	X	L	H	H	H	H	H	H	L	L	L	H
L	X	L	H	H	H	H	H	H	H	L	L	L	H
L	L	H	H	H	H	H	H	H	H	H	L	L	H

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	
Output voltage	V_{OH}	$V_{CC}=4.75\text{V}, V_{IH}=2\text{V}, V_{IL}=0.8\text{V}, I_{OH}=-400\mu\text{A}$	2.7	—	—	V	
	V_{OL}	$V_{CC}=4.75\text{V}, V_{IH}=2\text{V}, I_{OL}=4\text{mA}$	—	—	0.4	V	
		$V_{CC}=4.75\text{V}, V_{IH}=2\text{V}, I_{OL}=8\text{mA}$	—	—	0.5	V	
Input current	I_{IH}	1~7 Inputs	—	—	40	μA	
		Other inputs	—	—	20	μA	
	I_{IL}	1~7 Inputs	—	—	-0.8	mA	
		Other inputs	—	—	-0.4	mA	
	I_I	1~7 Inputs	—	—	0.2	mA	
Other inputs	—	—	—	0.1	mA		
Short-circuit output current	I_{OS}	$V_{CC}=5.25\text{V}$	-20	—	-100	mA	
Supply current **	I_{CC}	$V_{CC}=5.25\text{V}$	Condition 1	—	12	20	mA
			Condition 2	—	10	17	mA
Input clamp voltage	V_{IK}	$V_{CC}=4.75\text{V}, I_{IH}=-18\text{mA}$	—	—	-1.5	V	

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

** The condition 1 is measured with inputs 7 and EI grounded, other inputs and outputs open, the condition 2 is measured with all inputs and outputs open.

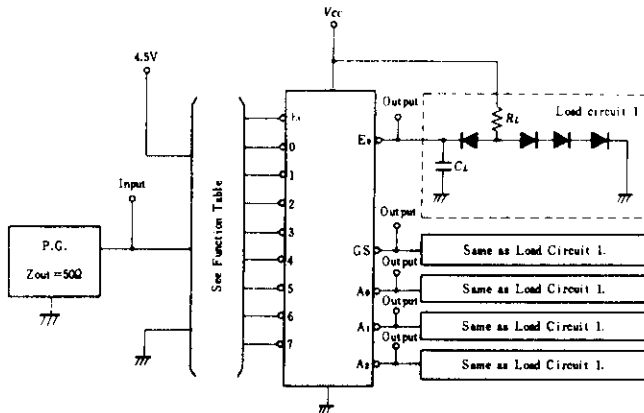
HD74LS148

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

Item	Symbol	Inputs	Outputs	Output Waveforms	Test Conditions	min	typ	max	Unit
Propagation delay time	t_{PLH}	0~7	A_0, A_1 or A_2	In-phase	$C_L = 15pF$ $R_L = 2k\Omega$	—	14	18	ns
	t_{PHL}			Output		—	15	25	
	t_{PLH}	0~7	A_0, A_1 or A_2	Out-of-phase		—	20	36	ns
	t_{PHL}			Output		—	16	29	
	t_{PLH}	0~7	EO	Out-of-phase		—	7	18	ns
	t_{PHL}			Output		—	25	40	
	t_{PLH}	0~7	GS	In phase		—	35	55	ns
	t_{PHL}			Output		—	9	21	
	t_{PLH}	EI	A_0, A_1 or A_2	In-phase		—	16	25	ns
	t_{PHL}			Output		—	12	25	
	t_{PLH}	EI	GS	In-phase		—	12	17	ns
	t_{PHL}			Output		—	14	36	
	t_{PLH}	EI	EO	In phase		—	12	21	ns
	t_{PHL}			Output		—	23	35	

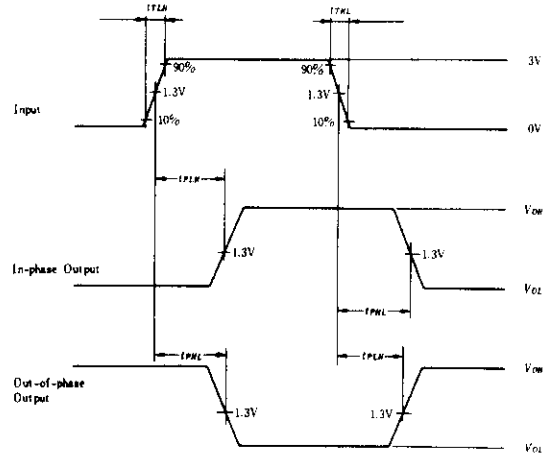
TESTING METHOD

1) Test Circuit

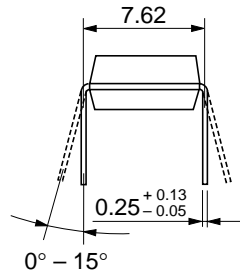
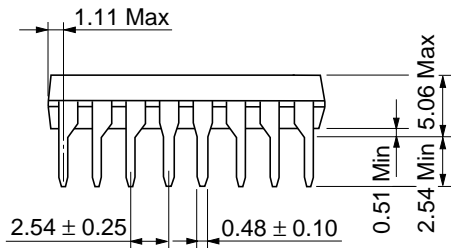
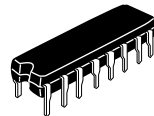
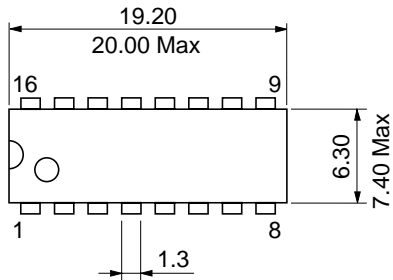


- Notes) 1. C_L includes probe and jig capacitance.
2. All diodes are 1S2074 (H).

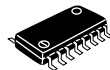
Waveform



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



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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