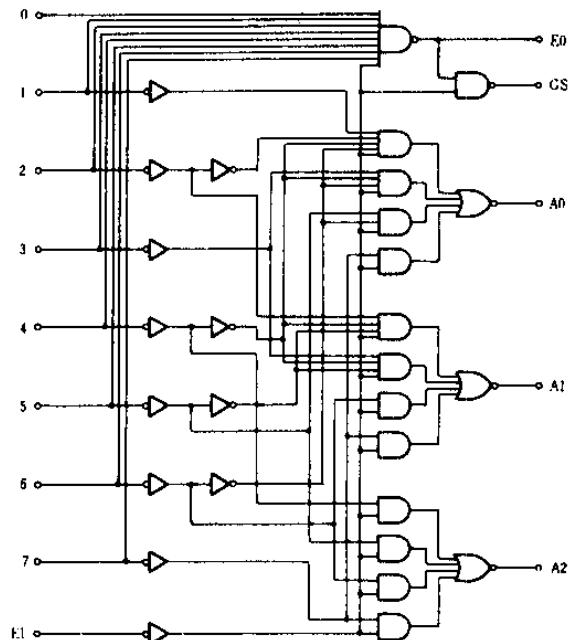


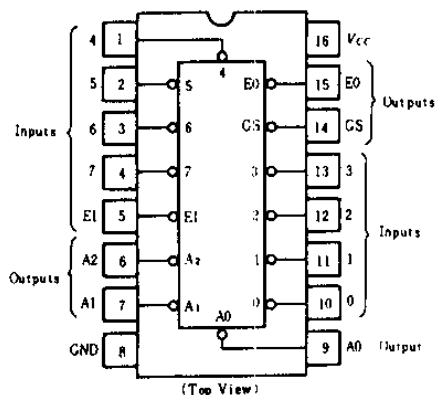
# HD74LS148 • 8-line-to-3-line Octal Priority Encoders

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

Inputs									Outputs				
EI	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	H	L	H
L	X	X	X	X	L	H	H	H	L	H	L	L	H
L	X	X	X	L	H	H	H	H	H	L	L	L	H
L	X	L	H	H	H	H	H	H	H	H	L	L	H
L	L	H	H	H	H	H	H	H	H	H	H	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	
		$V_{IL}=0.8\text{V}, I_{OL}=8\text{mA}$	—	—	0.5		
Input current	$I_{IH}$	1~7 Inputs	—	—	40	$\mu\text{A}$	
		Other inputs	—	—	20		
	$I_{IL}$	1~7 Inputs	—	—	-0.8	mA	
		Other inputs	—	—	-0.4		
	$I_I$	1~7 Inputs	—	—	0.2	mA	
Other inputs	—	—	0.1				
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	
Input clamp voltage	$V_{IK}$	$V_{CC}=4.75\text{V}, I_{IN}=-18\text{mA}$	—	—	-1.5	V	

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

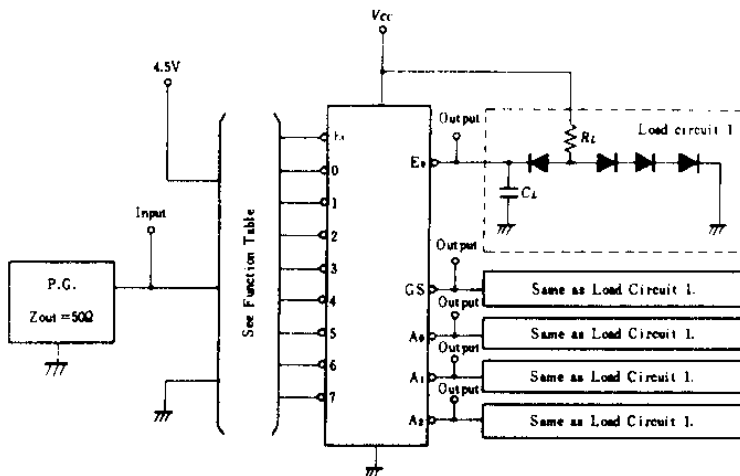
\*\* The condition 1 is measured with inputs 7 and EI grounded, other inputs and outputs open, the condition 2 is measured with all inputs and outputs open.

## 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 <sub>0</sub> , A <sub>1</sub> or A <sub>2</sub>	In-phase Output	$C_L = 15pF$ $R_L = 2k\Omega$	—	14	18	ns
	$t_{PHL}$					—	15	25	
	$t_{PLH}$	0~7	A <sub>0</sub> , A <sub>1</sub> or A <sub>2</sub>	Out-of-phase Output		—	20	36	ns
	$t_{PHL}$					—	16	29	
	$t_{PLH}$	0~7	EO	Out-of-phase Output		—	7	18	ns
	$t_{PHL}$					—	25	40	
	$t_{PLH}$	0~7	GS	In phase Output		—	35	55	ns
	$t_{PHL}$					—	9	21	
	$t_{PLH}$	EI	A <sub>0</sub> , A <sub>1</sub> or A <sub>2</sub>	In-phase Output		—	16	25	ns
	$t_{PHL}$					—	12	25	
	$t_{PLH}$	EI	GS	In-phase Output		—	12	17	ns
	$t_{PHL}$					—	14	36	
	$t_{PLH}$	EI	EO	In phase Output		—	12	21	ns
	$t_{PHL}$					—	23	35	

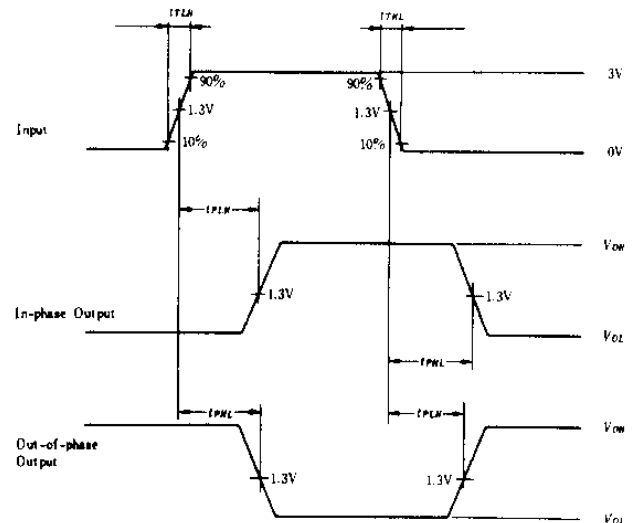
## TESTING METHOD

### 1) Test Circuit



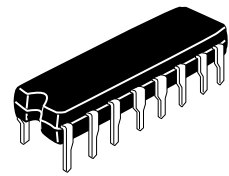
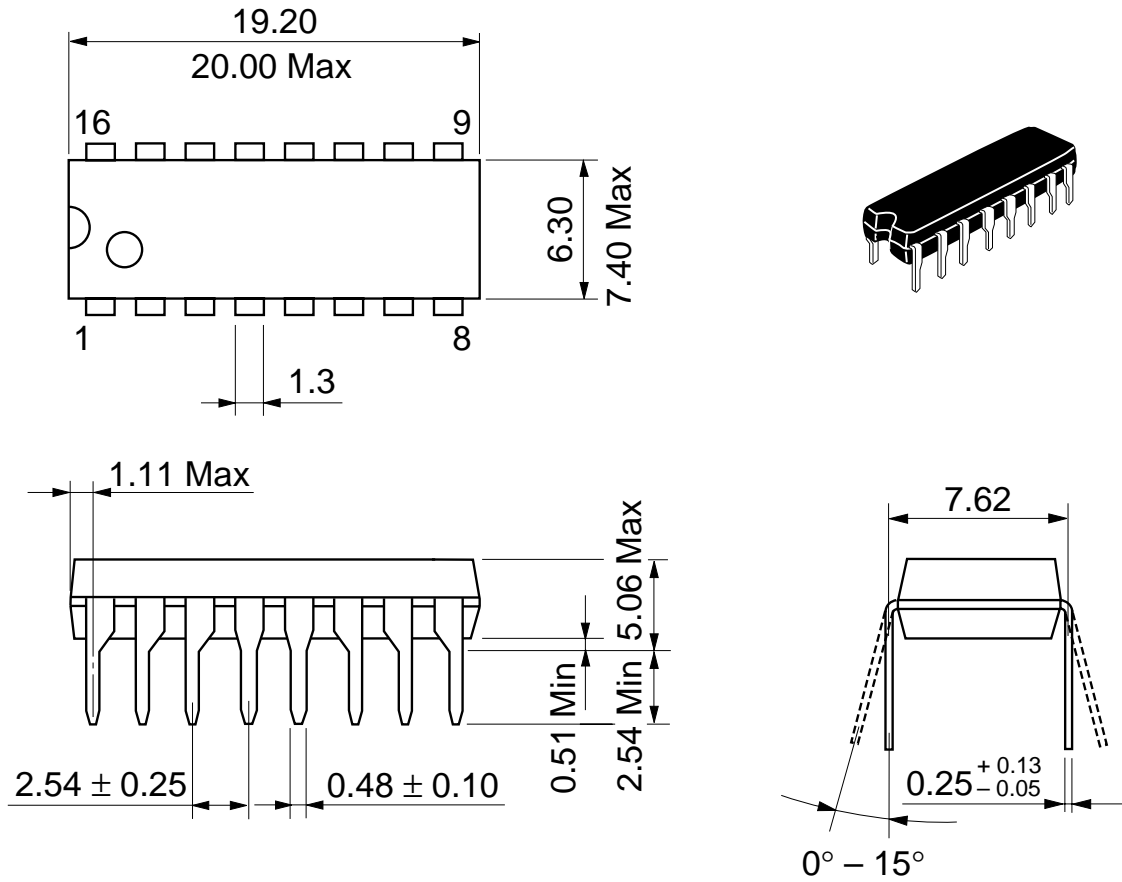
- Notes) 1.  $C_L$  includes probe and jig capacitance.  
2. All diodes are 1S2074 (H).

### Waveform



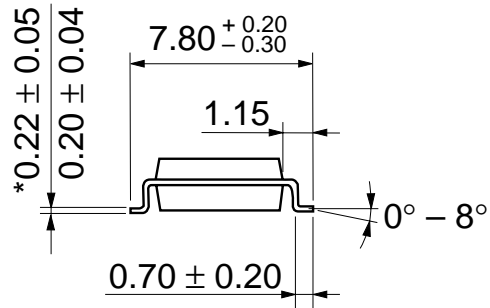
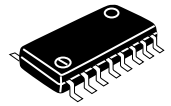
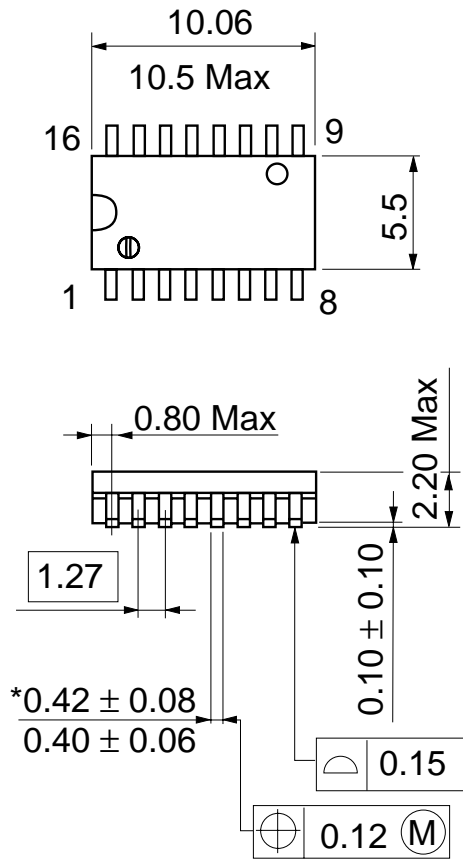
Input pulse;  $t_{TLH} \leq 15ns$ ,  $t_{THL} \leq 6ns$ ,  
 $PRR=1MHz$ , duty cycle 50%.

Unit: mm



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

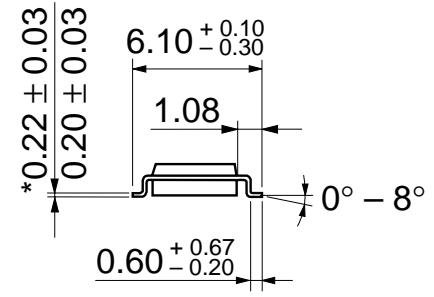
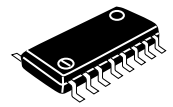
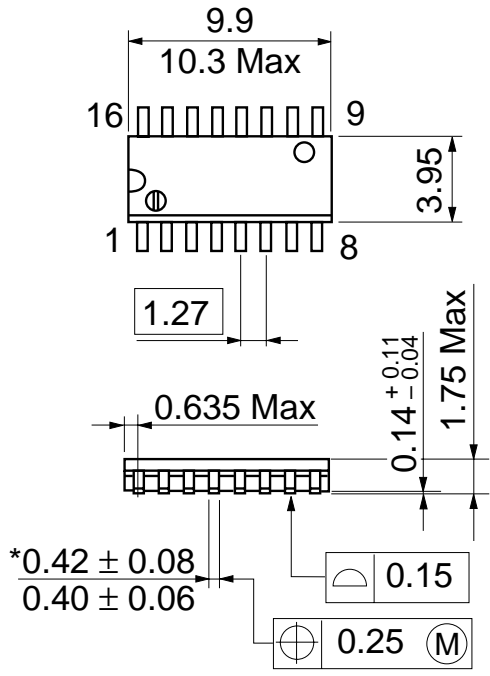
Unit: mm



\*Dimension including the plating thickness  
Base material dimension

Hitachi Code	FP-16DA
JEDEC	—
EIAJ	Conforms
Weight (reference value)	0.24 g

Unit: mm



\*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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