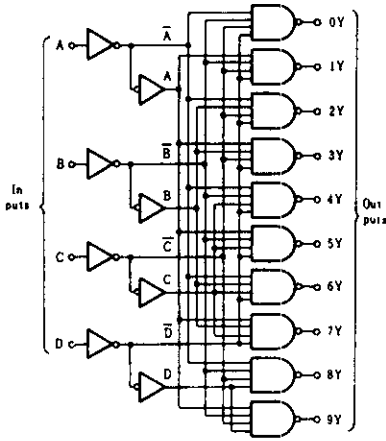


HD74LS42 ●BCD-to-Decimal Decoder

This monolithic decimal decoder consists of eight inverters and ten four-input NAND gates. The inverters are connected in pairs to make BCD input data available for decoding by NAND gates. Full decoding of valid input logic ensures that all outputs remain off for all invalid input conditions.

■BLOCK DIAGRAM

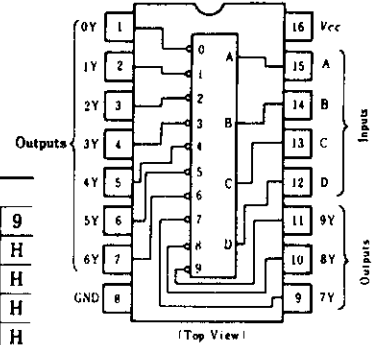


■FUNCTION TABLE

No.	BCD Input				Decimal Output										
	D	C	B	A	0	1	2	3	4	5	6	7	8	9	
0	L	L	L	L	L	H	H	H	H	H	H	H	H	H	H
1	L	L	L	H	H	L	H	H	H	H	H	H	H	H	H
2	L	L	H	L	H	H	L	H	H	H	H	H	H	H	H
3	L	L	H	H	H	H	H	L	H	H	H	H	H	H	H
4	L	H	L	L	H	H	H	H	L	H	H	H	H	H	H
5	L	H	L	H	H	H	H	H	H	L	H	H	H	H	H
6	L	H	H	L	H	H	H	H	H	H	L	H	H	H	H
7	L	H	H	H	H	H	H	H	H	H	H	L	H	H	H
8	H	L	L	L	H	H	H	H	H	H	H	H	L	H	H
9	H	L	L	H	H	H	H	H	H	H	H	H	H	L	L
INVALID	H	L	H	L	H	H	H	H	H	H	H	H	H	H	H
	H	L	H	H	H	H	H	H	H	H	H	H	H	H	H
	H	H	L	L	H	H	H	H	H	H	H	H	H	H	H
	H	H	L	H	H	H	H	H	H	H	H	H	H	H	H
	H	H	H	L	H	H	H	H	H	H	H	H	H	H	H
	H	H	H	H	L	H	H	H	H	H	H	H	H	H	H

H; high level, L; low level

■PIN ARRANGEMENT



■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}	$V_{CC}=4.75\text{V}, V_{IH}=2\text{V}, V_{IL}=0.8\text{V}$	$I_{OL}=8\text{mA}$	—	—	0.5	V
			$I_{OL}=4\text{mA}$	—	—	0.4	
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}	$V_{CC}=5.25\text{V}$	-20	—	-100	mA	
Supply current	I_{CC}^{**}	$V_{CC}=5.25\text{V}$	—	7	13	mA	
Input clamp voltage	V_{IK}	$V_{CC}=4.75\text{V}, I_{IN}=-18\text{mA}$	—	—	-1.5	V	

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

** I_{CC} is measured with all outputs open and all inputs grounded.

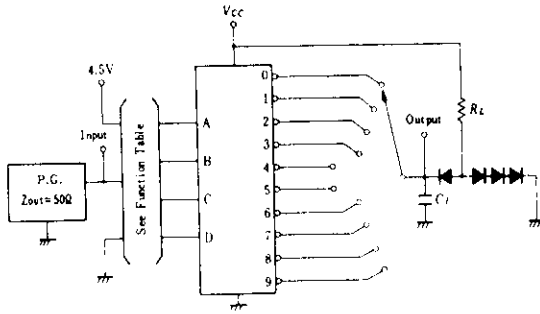
HD74LS42

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

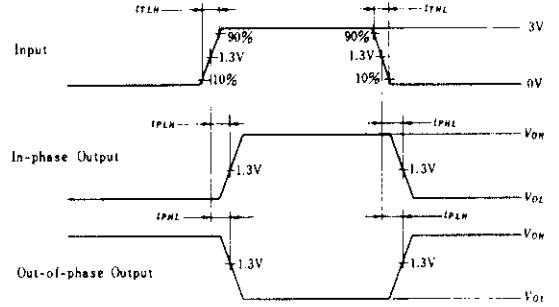
Item	Symbol	Test Conditions	min	typ	max	Unit
Propagation delay time	2 Stage	$C_L=15pF$, $R_L=2k\Omega$	—	15	25	ns
	3 Stage		—	20	30	
	2 Stage		—	15	25	ns
	3 Stage		—	20	30	

TESTING METHOD

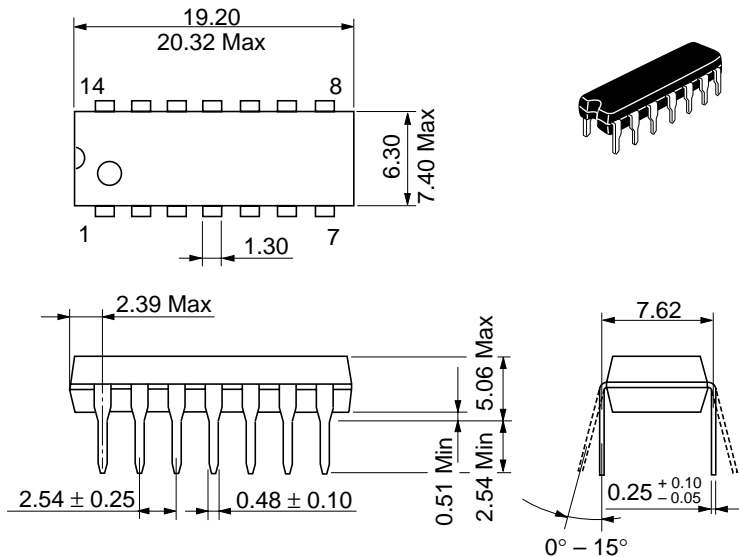
1) Test Circuit



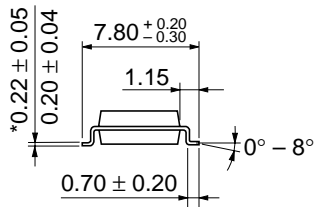
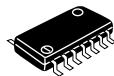
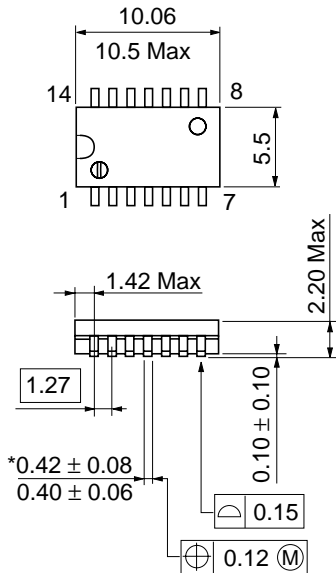
Waveform



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

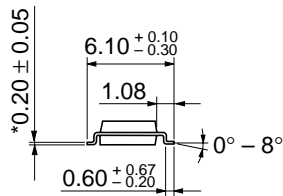
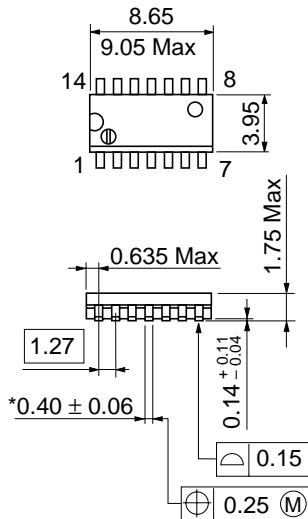


Hitachi Code	DP-14
JEDEC	Conforms
EIAJ	Conforms
Weight (reference value)	0.97 g



Hitachi Code	FP-14DA
JEDEC	—
EIAJ	Conforms
Weight (reference value)	0.23 g

*Dimension including the plating thickness
Base material dimension



Hitachi Code	FP-14DN
JEDEC	Conforms
EIAJ	Conforms
Weight (reference value)	0.13 g

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