

## SN74LS42N

### ■ Product Introduction

The SN74LS42N is a decimal BCD decoder. The monolithic decimal decoder consists of eight inverters and ten sets of four input NAND gates..

### ■ Product Features

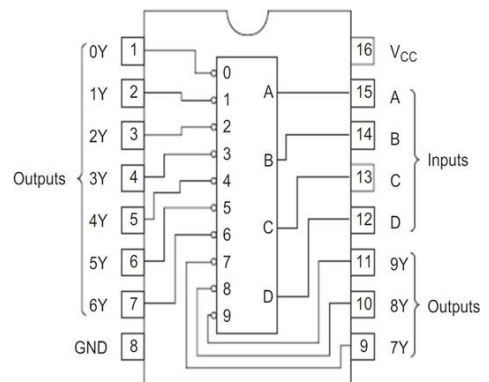
- Decimal decoder
- Fully compatible with TTL input and output logic level
- Input Clamp Diodes Limit High Speed Termination Effects
- Package : DIP16, SOP16

### ■ Product Applications

- Signal decoding processing
- Industrial control applications
- Other application areasBattery-powered equipment

### ■ Package and Pin Assignment

SOP16 or DIP16			
Pin NO	Pin Definition	Pin NO	Pin Definition
1	Output 0Y	16	Supply VCC
2	Output 1Y	15	Input A
3	Output 2Y	14	Input B
4	Output 3Y	13	Input C
5	Output 4Y	12	Input D
6	Output 5Y	11	Output 9Y
7	Output 6Y	10	Output 8Y
8	Supply GND	9	Output 7Y

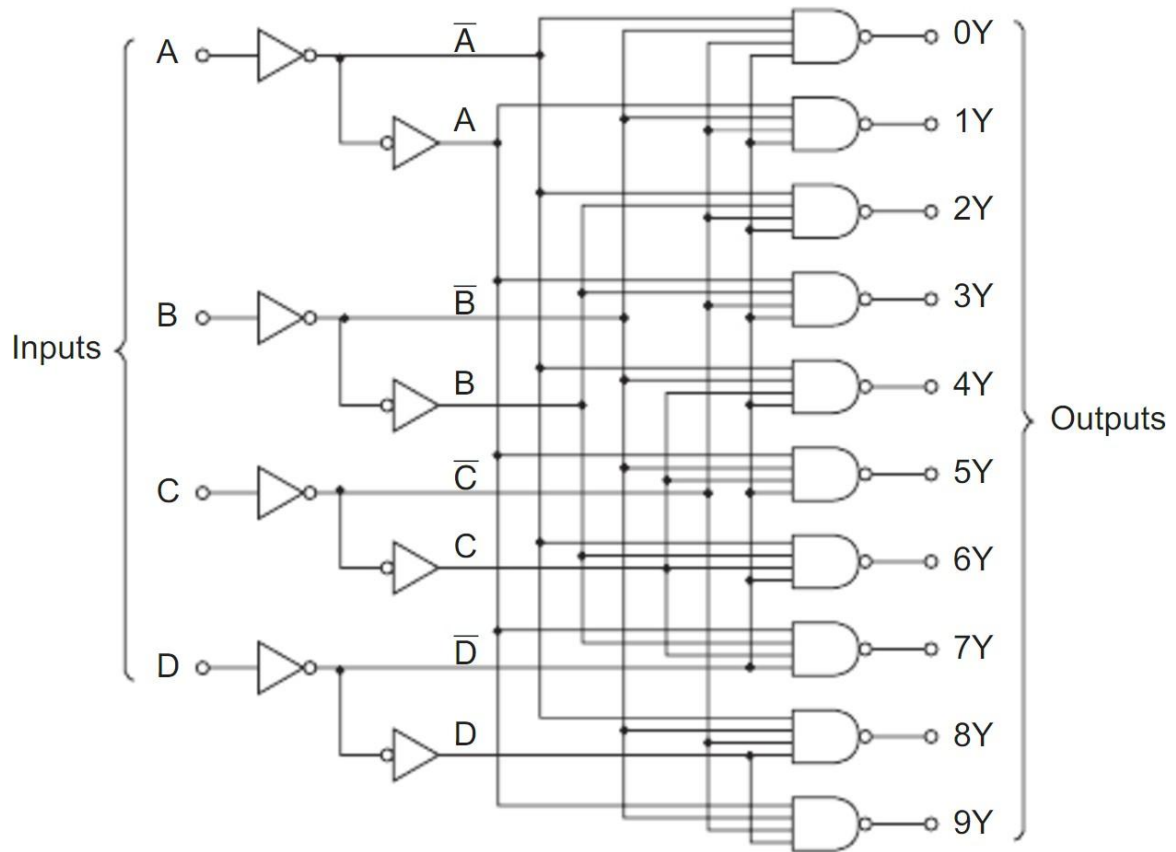


### ■ Absolute Maximum Ratings

Item	Symbol	Maximum Ratings	Unit
Supply voltage	$V_{CC}$	7	V
Input voltage	$V_I$	7	V
Power dissipation	$P_D$	500	mW
Operating temperature	$T_A$	0-70	°C
Storage temperature	$T_S$	-65-150	°C
welding temperature	$T_W$	260	°C, 10s

Note: the limit parameter is the limit value that cannot be exceeded under any condition. Once this limit is exceeded, it may cause physical damage such as deterioration of the product. At the same time, the chip can not be guaranteed to work properly when it is close to the limit parameters.

#### ■ 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
1	L	L	L	H	H	L	H	H	H	H	H	H	H	H
2	L	L	H	L	H	H	L	H	H	H	H	H	H	H
3	L	L	H	H	H	H	H	L	H	H	H	H	H	H
4	L	H	L	L	H	H	H	H	L	H	H	H	H	H
5	L	H	L	H	H	H	H	H	H	L	H	H	H	H
6	L	H	H	L	H	H	H	H	H	H	L	H	H	H
7	L	H	H	H	H	H	H	H	H	H	H	L	H	H
8	H	L	L	L	H	H	H	H	H	H	H	H	L	H
9	H	L	L	H	H	H	H	H	H	H	H	H	H	L
Invalid	H	L	H	L	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	L	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	L	H	H	H	H	H	H	H	H	H	H
	H	H	H	H	H	H	H	H	H	H	H	H	H	H

H = high logic level, L = low logic level,

### ■ Recommended Operating Conditions

Item	Symbol	Min	Tpy	Max	Unit
Supply voltage	$V_{CC}$	4.75	5	5.25	V
Input voltage	$V_{IH}$	2	—	—	V
	$V_{IL}$	—	—	0.7	V
Output current	$I_{OH}$	—	—	-400	$\mu$ A
	$I_{OL}$	—	—	8	mA
Operating temperature	$T_A$	0	—	60	$^{\circ}$ C

### ■ Electrical Characteristics

( $T_A=25^{\circ}$ C, Unless specified)

Item	Symbol	Min	Tpy	Max	Unit	Conditions	
Output voltage	$V_{OH}$	2.7	3.5	—	V	$I_{OH}=-400\mu$ A	$V_{CC}=4.75V, V_{IL}=0.7V$
	$V_{OL}$	—	0.14	0.4	V	$I_{OL}=4mA$	$V_{CC}=4.75V, V_{IH}=2V$
		—	0.23	0.5			
Input current	$I_I$	—	0.1	100	$\mu$ A	$V_{CC}=5.25V, V_I=7V$	
	$I_{IH}$	—	0.1	20	$\mu$ A	$V_{CC}=5.25V, V_I=2.7V$	
	$I_{IL}$	—	0.27	0.4	mA	$V_{CC}=5.25V, V_I=0.4V$	
Short-circuit output current	$I_{OS(Notes1)}$	-8	-35	-100	mA	$V_{CC}=5.25V$	
Supply current	$I_{CC}$	—	7	13	mA	$V_{CC}=5.25V$ , all inputs=GND, all outputs open	
Input clamp voltage	$V_{IK}$	—	0.9	-1.5	V	$V_{CC}=4.75V, I_I = -18mA$	

Note1: only one output port is short circuited each time, and the short circuit time is not more than one second.

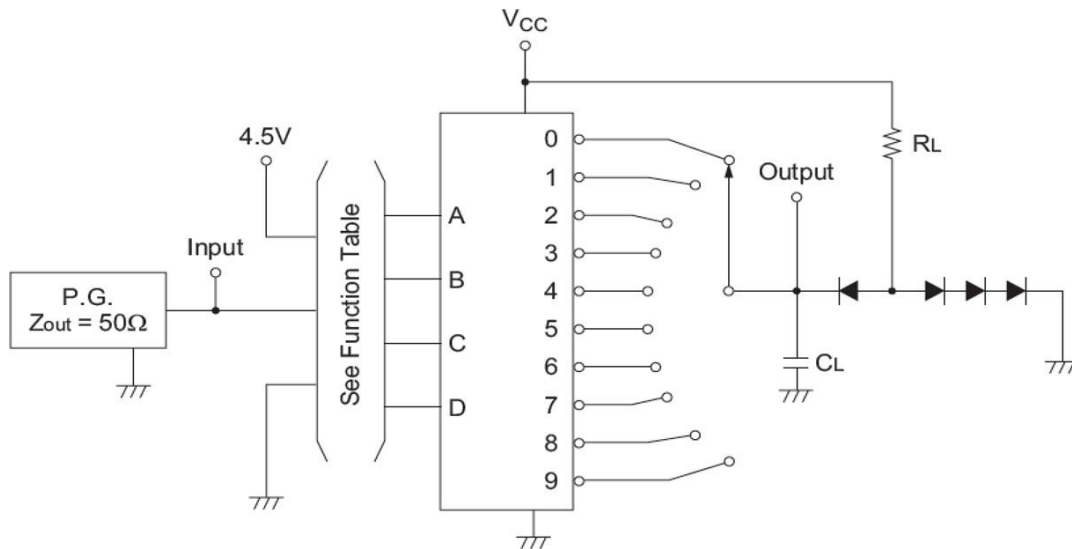
### ■ Switching Characteristics

( $T_A=25^{\circ}$ C, Unless specified)

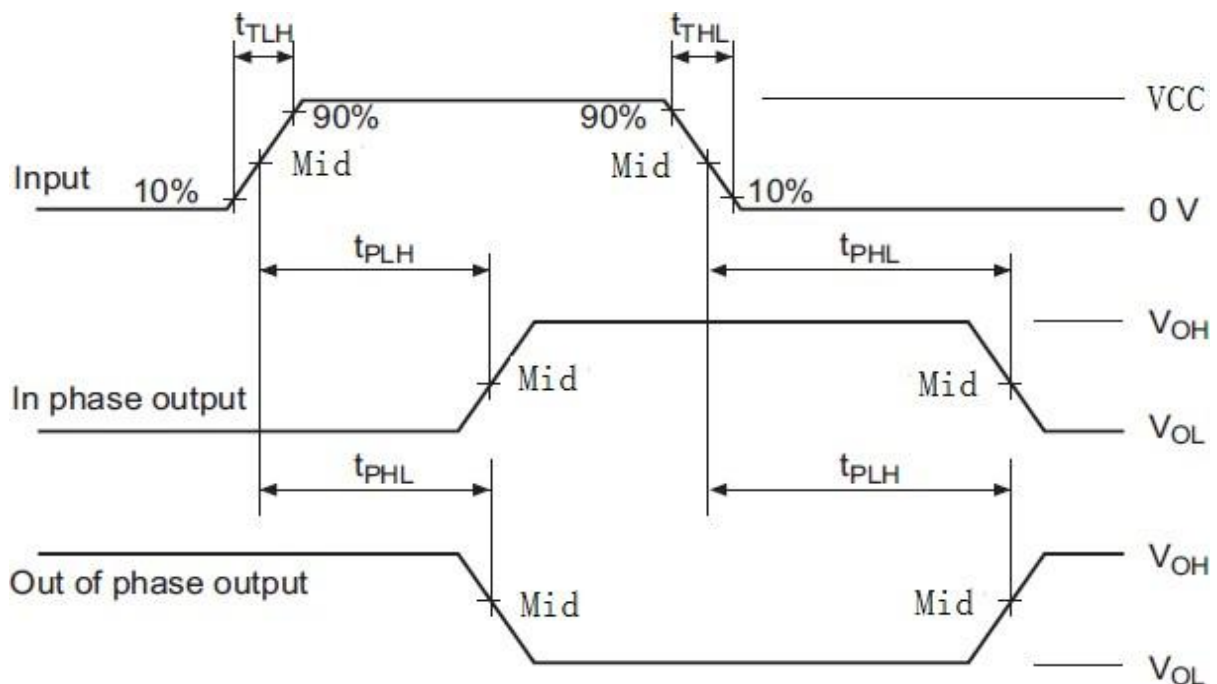
Item	Symbol	Min	Tpy	Max	Unit	Conditions
Propagation delay time Data Inputs (A, B, C, D) to Outputs (0 to 9)	$t_{PLH}$	—	25	—	ns	$V_{CC}=5V, CL=16pF,$ $RL=2K\ \Omega$
	$t_{PHL}$	—	20	—	ns	

## ■ Testing Method

### 1、Test Circuit



### 2、Waveform



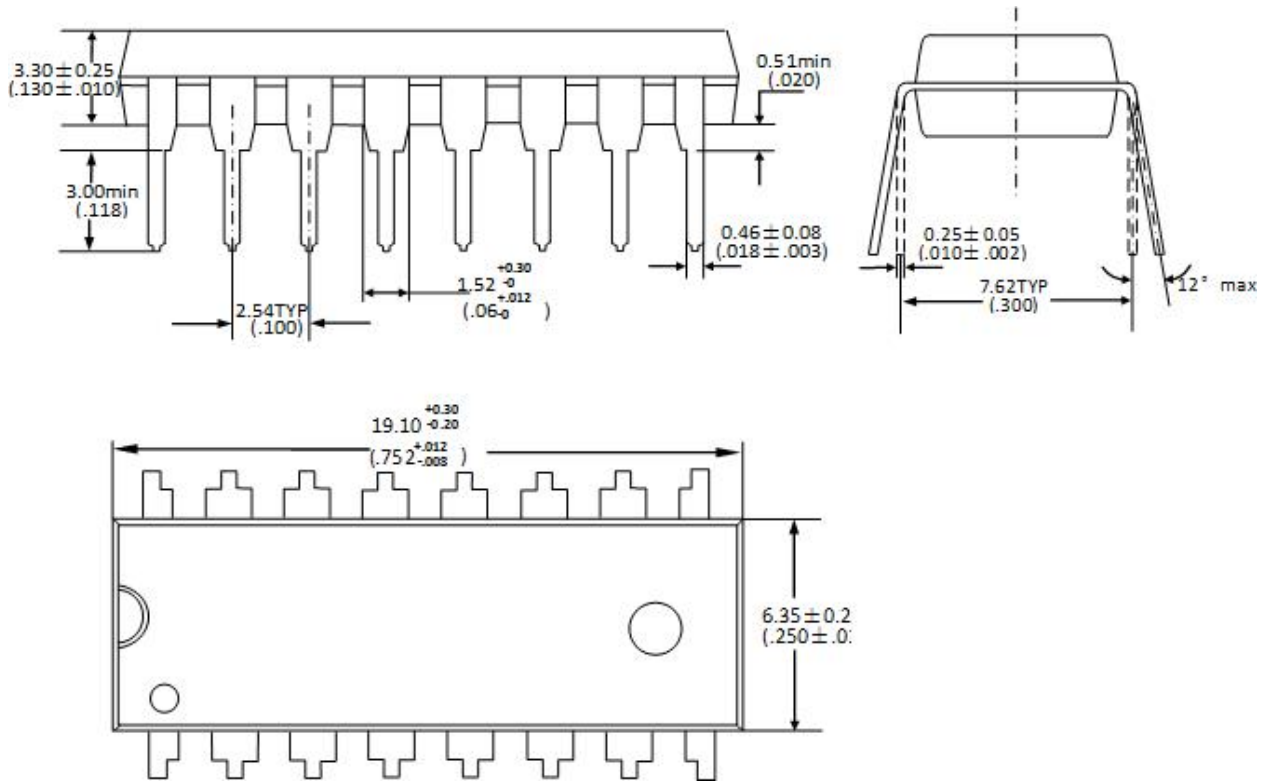
Note:

1. See Testing Table refers to the corresponding test items in the switch characteristic table.
2. the CL capacitor is an external patch capacitor (0603), which is connected to the output pin and the capacitor is near the chip GND. All diode models are 1S2074 (H).
3. Input: port input level,  $f=1\text{MHz}$ ,  $D=50\%$ ,  $t_{TLH}=t_{THL}$  or less 20ns;
4. Output: Y output test port (Out of Phase Output, In Phase Output)

#### ■ Package Dimensions

Unit : mm / inch

#### DIP16



#### SOP16

