

## SN74LS145N

### Product Introduction

The SN74LS145N is a BCD-to-Decimal Decoder / Driver, with open drain output structure (with 15 V outputs). It consists of eight inverters and ten four-input NAND gates.

### Product Features

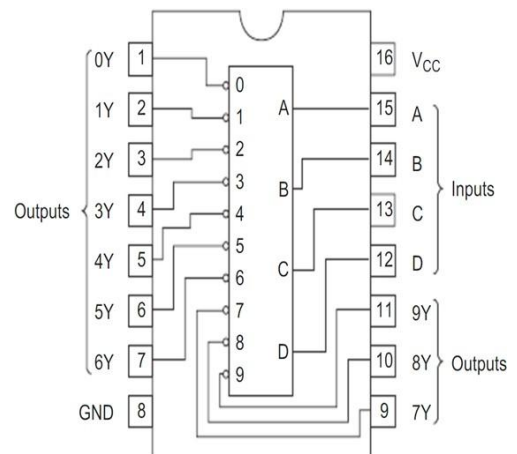
- BCD-to-Decimal Decoder / Driver.
- Open drain output structure (with 15 V outputs).
- Fully compatible with TTL input and output logic level
- Package : DIP16, SOP16

### Product Applications

- Signal decoding processing.
- Industrial control applications
- Other application areas Battery-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

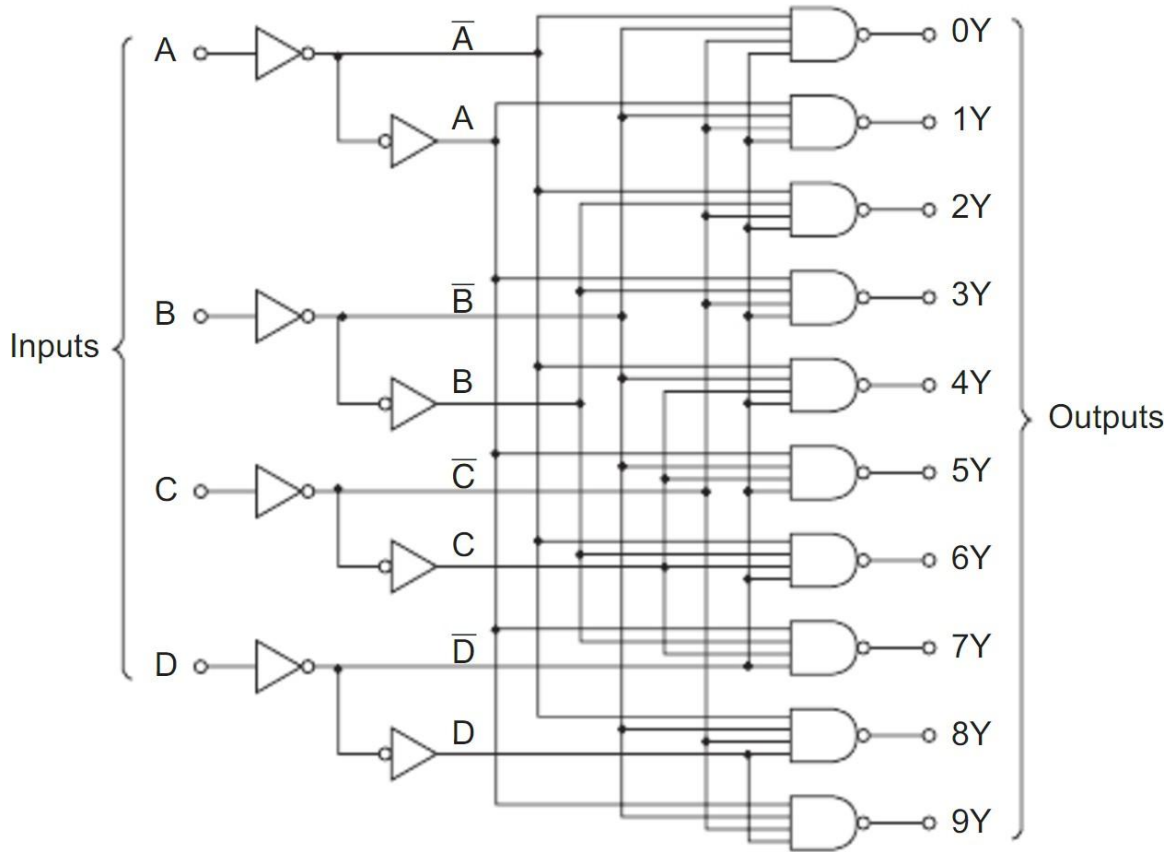


### Absolute Maximum Ratings

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 = 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
	$V_{IL}$	—	—	0.8	V
Output current	$I_{OH}$	—	—	-400	uA
	$I_{OL}$	—	—	8	mA
Operating temperature	$T_A$	0	—	60	°C

### Electrical Characteristics ( $T_A=25^\circ\text{C}$ , Unless specified)

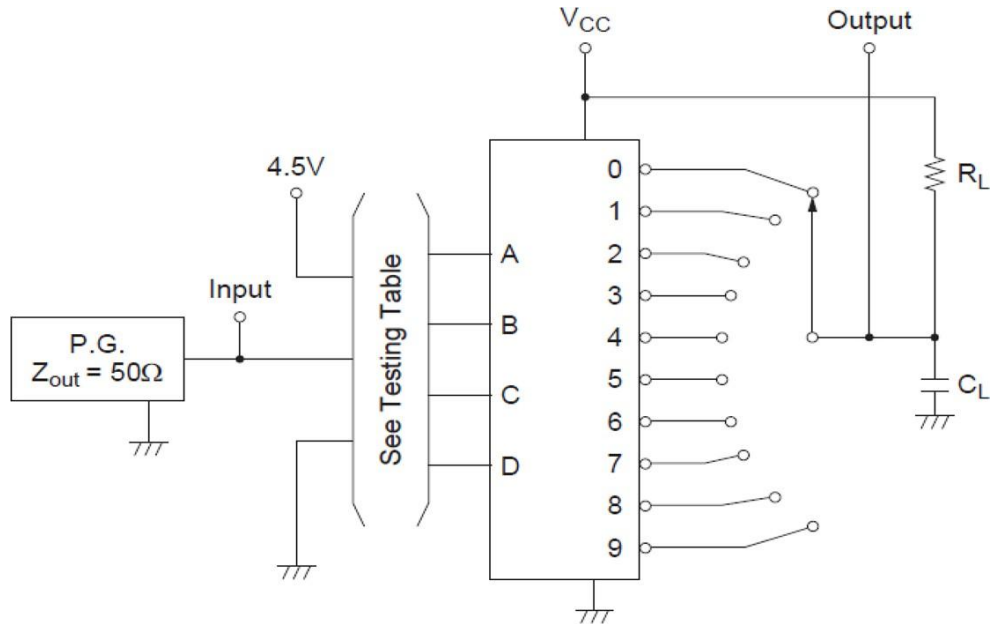
Item	Symbol	Min	Tpy	Max	Unit	Conditions
Output current	$I_{O(OFF)}$	0	0.01	250	uA	$V_{OFF}=15V$ , $V_{CC}=4.75V$ , $V_{IL}=0.8V$ , $V_{IH}=2V$
Output voltage	$V_{OL(ON)}$	—	0.25	0.4	V	$V_{CC}=4.75V$ , $V_{IL}=0.8V$ , $V_{IH}=2V$
		—	0.45	0.5		
		—	2.9	3.3		
Input current	$I_I$	—	0.1	100	uA	$V_{CC}=5.25V$ , $V_I=7V$
	$I_{IH}$	—	0.1	20	uA	$V_{CC}=5.25V$ , $V_I=2.7V$
	$I_{IL}$	—	0.23	0.4	mA	$V_{CC}=5.25V$ , $V_I=0.4V$
Supply current	$I_{CC}$	—	7	13	mA	$V_{CC}=5.25V$ , all inputs=GND, outputs open
Input clamp voltage	$V_{IK}$	—	0.9	-1.5	V	$V_{CC}=4.75V$ , $I_I = -18mA$

### Switching Characteristics ( $T_A=25^\circ\text{C}$ , Unless specified)

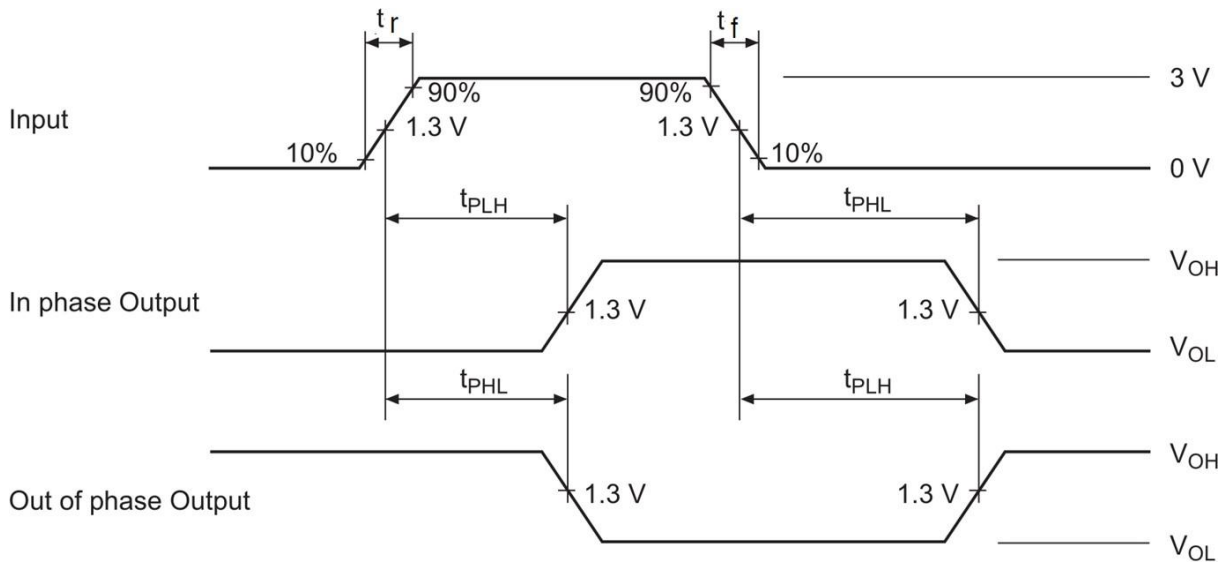
Item	Symbol	Min	Tpy	Max	Unit	Conditions
Propagation delay time A, B, C, D to Outputs (0 to 9)	$t_{PHL}$	—	25	—	ns	$V_{CC}=5V$ , $C_L=45pF$ , $R_L=665\ \Omega$
	$t_{PLH}$	—	20	—	ns	

### ■ Testing Method

#### 1、Test Circuit



#### 2、Waveform



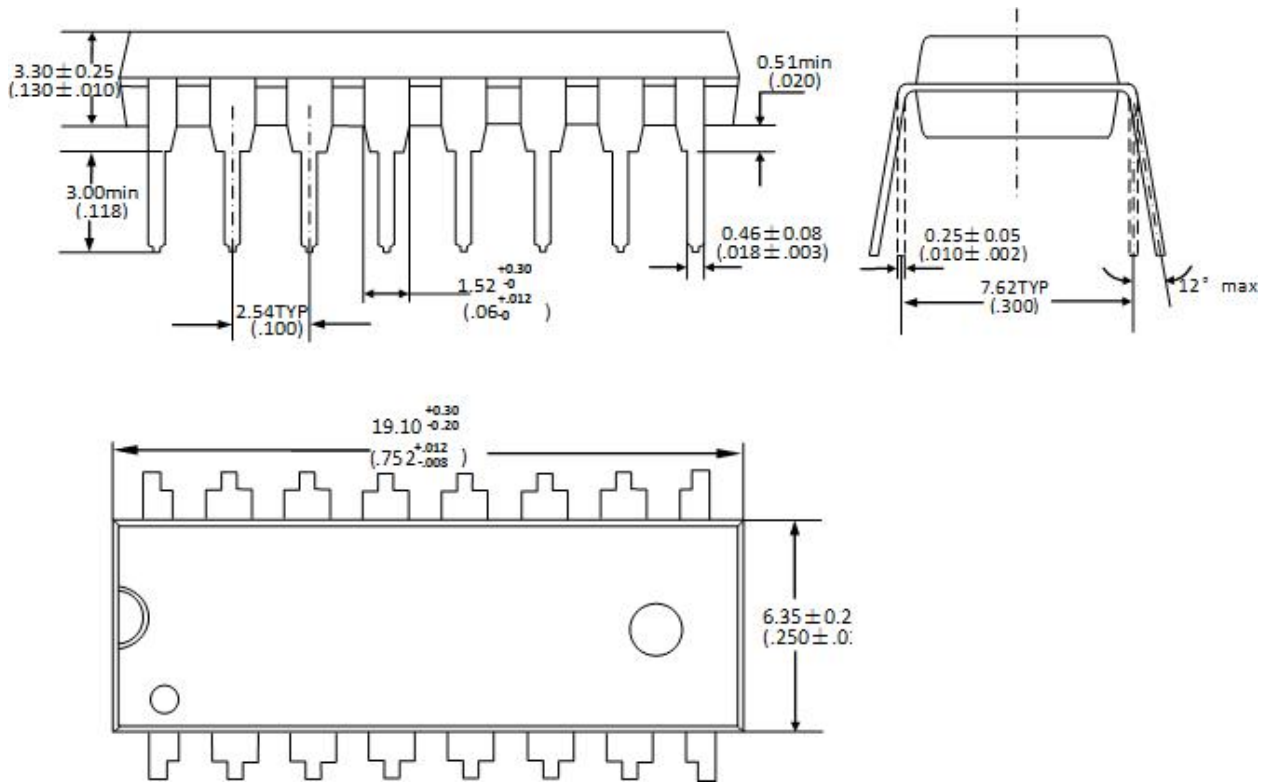
#### Note:

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

### ■ Package Dimensions

Unit : mm / inch

#### DIP16



#### SOP16

