## General Description

The SN74HC/HCT238 decodes three binary weighted address inputs (A0, A1 and A2) to eight mutually exclusive outputs (Y0 to Y7). The device features three enable inputs ($\overline{E}1$ and $\overline{E}2$ and E3). Every output will be LOW unless $\overline{E}1$ and $\overline{E}2$ are LOW and E3 is HIGH. This multiple enable function allows easy parallel expansion to a 1-of-32 (5 to 32 lines) decoder with just four SN74HC/HCT238 ICs and one inverter. The SN74HC/HCT238 can be used as an eight output demultiplexer by using one of the active LOW enable inputs as the data input and the remaining enable inputs as strobes. Inputs include clamp diodes. This enables the use of current limiting resistors to interface inputs to voltages in excess of $V_{CC}$.

## Features

- Input levels:
  For SN74HC238: CMOS level
  For SN74HCT238: TTL level
- Demultiplexing capability
- Multiple input enable for easy expansion
- Ideal for memory chip select decoding
- Active HIGH mutually exclusive outputs
- Specified from -40℃ to +105℃
- Packaging information: DIP16/SOP16/TSSOP16

## Ordering Information

| 型号 | 封装 | 丝印 | 包装 | 包装数量 |
|---|---|---|---|---|
| SN74HC238N | DIP-16 | 74HC238N | 管装 | 1000/ 盒 |
| SN74HC238DTR | SOP-16 | 74HC238 | 编带 | 2500/ 盘 |
| SN74HC238TDTR | TSSOP-16 | 74HC238 | 编带 | 3000/ 盘 |
| SN74HCT238DTR | SOP-16 | 74HCT238 | 编带 | 2500/ 盘 |
| SN74HCT238TDTR | TSSOP-16 | 74HCT238 | 编带 | 3000/ 盘 |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

# 2 Block Diagram And Pin Description

## 2.1、Block Diagram

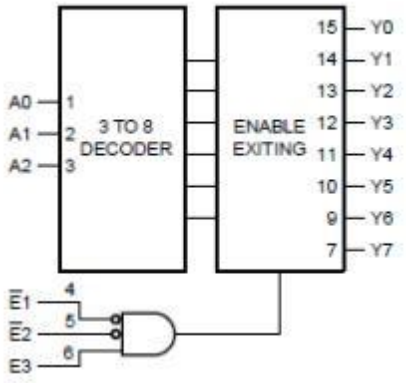



Figure 1. Logic symbol

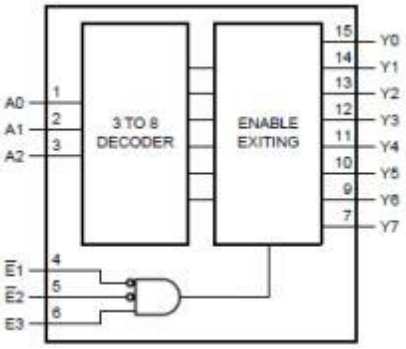



Figure 2. Functional diagram

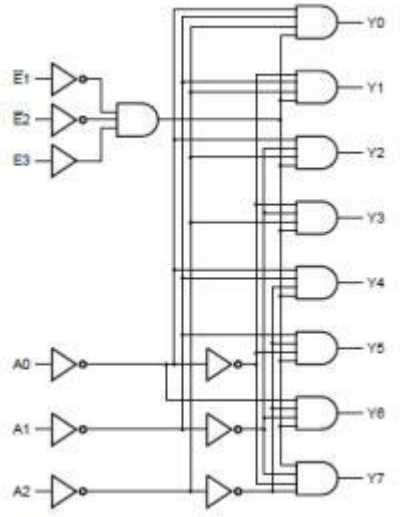
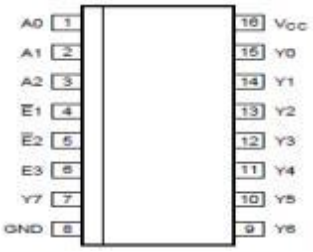



Figure 3. Logic diagram

## 2.2、Pin Configurations




## 2.3、Pin Description

| Pin No. | Pin Name | Description |
|---|---|---|
| 1 | A0 | address input |
| 2 | A1 | address input |
| 3 | A2 | address input |
| 4 | $\overline{E}1$ | enable input (active LOW) |
| 5 | $\overline{E}2$ | enable input (active LOW) |
| 6 | E3 | enable input (active HIGH) |
| 7 | Y7 | output (active HIGH) |
| 8 | GND | ground (0V) |
| 9 | Y6 | output (active HIGH) |
| 10 | Y5 | output (active HIGH) |
| 11 | Y4 | output (active HIGH) |
| 12 | Y3 | output (active HIGH) |
| 13 | Y2 | output (active HIGH) |
| 14 | Y1 | output (active HIGH) |
| 15 | Y0 | output (active HIGH) |
| 16 | $V_{CC}$ | supply voltage |

## 2.4、Function Table

| Input | | | | | | Output | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $\overline{E}1$ | $\overline{E}2$ | E3 | A0 | A1 | A2 | Y0 | Y1 | Y2 | Y3 | Y4 | Y5 | Y6 | Y7 |
| H | X | X | X | X | X | L | L | L | L | L | L | L | L |
| X | H | X | X | X | X | L | L | L | L | L | L | L | L |
| X | X | L | X | X | X | L | L | L | L | L | L | L | L |
| L | L | H | L | L | L | H | L | L | L | L | L | L | L |
| L | L | H | H | L | L | L | H | L | L | L | L | L | L |
| L | L | H | L | H | L | L | L | H | L | L | L | L | L |
| L | L | H | H | H | L | L | L | L | H | L | L | L | L |
| L | L | H | L | L | H | L | L | L | L | H | L | L | L |
| L | L | H | H | L | H | L | L | L | L | L | H | L | L |
| L | L | H | L | H | H | L | L | L | L | L | L | H | L |
| L | L | H | H | H | H | L | L | L | L | L | L | L | H |

Note: H=HIGH voltage level; L=LOW voltage level; X=don't care.

# 3 Electrical Parameter

## 3.1、Absolute Maximum Ratings

| Parameter | Symbol | Conditions | | Min. | Max. | Unit |
|---|---|---|---|---|---|---|
| supply voltage | $V_{CC}$ | - | | -0.5 | +7.0 | V |
| input clamping current | $I_{IK}$ | $V_I$ < -0.5V or $V_I$ > $V_{CC}$+0.5V | | - | ±20 | mA |
| output clamping current | $I_{OK}$ | $V_O$ < -0.5V or $V_O$ > $V_{CC}$+0.5V | | - | ±20 | mA |
| output current | $I_O$ | -0.5V < $V_O$ < $V_{CC}$+0.5V | | - | ±25 | mA |
| supply current | $I_{CC}$ | - | | - | +50 | mA |
| ground current | $I_{GND}$ | - | | -50 | - | mA |
| storage temperature | $T_{stg}$ | - | | -65 | +150 | C |
| total power dissipation | $P_{tot}$ | - | | - | 500 | mW |
| Soldering temperature | $T_L$ | 10s | DIP | 245 | | C |
| | | | SOP | 250 | | C |

(Voltages are referenced to GND(ground=0V), unless otherwise specified.)

Note:

[1] For DIP16 packages: above 70C the value of $P_{tot}$ derates linearly with 12mW/K.

[2] For SOP16 packages: above 70C the value of $P_{tot}$ derates linearly with 8mW/K.

[3] For (T)SSOP16 packages: above 60C the value of $P_{tot}$ derates linearly with 5.5mW/K.

## 3.2、Recommended Operating Conditions

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| **SN74HC238** | | | | | | |
| supply voltage | $V_{CC}$ | - | 2.0 | 5.0 | 6.0 | V |
| input voltage | $V_I$ | - | 0 | - | $V_{CC}$ | V |
| output voltage | $V_O$ | - | 0 | - | $V_{CC}$ | V |
| input transition rise and fall rate | Δt/ΔV | $V_{CC}$=2.0V | - | - | 625 | ns/V |
| | | $V_{CC}$=4.5V | - | 1.67 | 139 | ns/V |
| | | $V_{CC}$=6.0V | - | - | 83 | ns/V |
| ambient temperature | $T_{amb}$ | - | -40 | - | +105 | C |
| **SN74HCT238** | | | | | | |
| supply voltage | $V_{CC}$ | - | 4.5 | 5.0 | 5.5 | V |
| input voltage | $V_I$ | - | 0 | - | $V_{CC}$ | V |
| output voltage | $V_O$ | - | 0 | - | $V_{CC}$ | V |
| input transition rise and fall rate | Δt/ΔV | $V_{CC}$=4.5V | - | 1.67 | 139 | ns/V |
| ambient temperature | $T_{amb}$ | - | -40 | - | +105 | C |

### 3.3、Electrical Characteristics

#### 3.3.1、DC Characteristics 1

($T_{amb}$=25℃, voltages are referenced to GND (ground=0V), unless otherwise specified.)

| Parameter | Symbol | Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| **SN74HC238** | | | | | | | |
| HIGH-level input voltage | $V_{IH}$ | $V_{CC}$=2.0V | | 1.5 | 1.2 | - | V |
| | | $V_{CC}$=4.5V | | 3.15 | 2.4 | - | V |
| | | $V_{CC}$=6.0V | | 4.2 | 3.2 | - | V |
| LOW-level input voltage | $V_{IL}$ | $V_{CC}$=2.0V | | - | 0.8 | 0.5 | V |
| | | $V_{CC}$=4.5V | | - | 2.1 | 1.35 | V |
| | | $V_{CC}$=6.0V | | - | 2.8 | 1.8 | V |
| HIGH-level output voltage | $V_{OH}$ | $V_I$ = $V_{IH}$ or $V_{IL}$ | $I_O$=-20uA; $V_{CC}$=2.0V | 1.9 | 2.0 | - | V |
| | | | $I_O$=-20uA; $V_{CC}$=4.5V | 4.4 | 4.5 | - | V |
| | | | $I_O$=-20uA; $V_{CC}$=6.0V | 5.9 | 6.0 | - | V |
| | | | $I_O$=-4.0mA; $V_{CC}$=4.5V | 3.98 | 4.32 | - | V |
| | | | $I_O$=-5.2mA; $V_{CC}$=6.0V | 5.48 | 5.81 | - | V |
| LOW-level output voltage | $V_{OL}$ | $V_I$ = $V_{IH}$ or $V_{IL}$ | $I_O$=20uA; $V_{CC}$=2.0V | - | 0 | 0.1 | V |
| | | | $I_O$=20uA; $V_{CC}$=4.5V | - | 0 | 0.1 | V |
| | | | $I_O$=20uA; $V_{CC}$=6.0V | - | 0 | 0.1 | V |
| | | | $I_O$=4.0mA; $V_{CC}$=4.5V | - | 0.15 | 0.26 | V |
| | | | $I_O$=5.2mA; $V_{CC}$=6.0V | - | 0.16 | 0.26 | V |
| input leakage current | $I_I$ | $V_I$=$V_{CC}$ or GND; $V_{CC}$=6.0V | | - | - | ±0.1 | uA |
| supply current | $I_{CC}$ | $V_I$=$V_{CC}$ or GND; $I_O$=0A; $V_{CC}$=6.0V | | - | - | 8.0 | uA |
| input capacitance | $C_I$ | - | | - | 3.5 | - | pF |
| **SN74HCT238** | | | | | | | |
| HIGH-level input voltage | $V_{IH}$ | $V_{CC}$=4.5V to 5.5V | | 2.0 | 1.6 | - | V |
| LOW-level input voltage | $V_{IL}$ | $V_{CC}$=4.5V to 5.5V | | - | 1.2 | 0.8 | V |
| HIGH-level output voltage | $V_{OH}$ | $V_I$ = $V_{IH}$ or $V_{IL}$; $V_{CC}$=4.5V | $I_O$=-20uA | 4.4 | 4.5 | - | V |
| | | | $I_O$=-4.0mA | 3.98 | 4.32 | - | V |
| LOW-level output voltage | $V_{OL}$ | $V_I$ = $V_{IH}$ or $V_{IL}$; $V_{CC}$=4.5V | $I_O$=20uA | - | 0 | 0.1 | V |
| | | | $I_O$=4.0mA | - | 0.16 | 0.26 | V |
| input leakage current | $I_I$ | $V_I$=$V_{CC}$ or GND; $V_{CC}$=5.5V | | - | - | ±0.1 | uA |
| supply current | $I_{CC}$ | $V_I$=$V_{CC}$ or GND; $I_O$=0A; $V_{CC}$=5.5V | | - | - | 8.0 | uA |
| additional supply current | $\Delta I_{CC}$ | $V_I$=$V_{CC}$-2.1V; other inputs at $V_{CC}$ or GND; $I_O$=0A; $V_{CC}$=4.5V to 5.5V | An inputs | - | 70 | 252 | uA |
| | | | $\bar{E}1$, $\bar{E}2$ inputs | - | 40 | 144 | uA |
| | | | E3 input | - | 145 | 522 | uA |
| input capacitance | $C_I$ | - | | - | 3.5 | - | pF |

### 3.3.2、DC Characteristics 2

($T_{amb}$=-40C to +85C, voltages are referenced to GND (ground=0V), unless otherwise specified.)

| Parameter | Symbol | Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| **SN74HC238** | | | | | | | |
| HIGH-level input voltage | $V_{IH}$ | $V_{CC}$=2.0V | | 1.5 | - | - | V |
| | | $V_{CC}$=4.5V | | 3.15 | - | - | V |
| | | $V_{CC}$=6.0V | | 4.2 | - | - | V |
| LOW-level input voltage | $V_{IL}$ | $V_{CC}$=2.0V | | - | - | 0.5 | V |
| | | $V_{CC}$=4.5V | | - | - | 1.35 | V |
| | | $V_{CC}$=6.0V | | - | - | 1.8 | V |
| HIGH-level output voltage | $V_{OH}$ | $V_I$ = $V_{IH}$ or $V_{IL}$ | $I_O$=-20uA; $V_{CC}$=2.0V | 1.9 | - | - | V |
| | | | $I_O$=-20uA; $V_{CC}$=4.5V | 4.4 | - | - | V |
| | | | $I_O$=-20uA; $V_{CC}$=6.0V | 5.9 | - | - | V |
| | | | $I_O$=-4.0mA; $V_{CC}$=4.5V | 3.84 | - | - | V |
| | | | $I_O$=-5.2mA; $V_{CC}$=6.0V | 5.34 | - | - | V |
| LOW-level output voltage | $V_{OL}$ | $V_I$ = $V_{IH}$ or $V_{IL}$ | $I_O$=20uA; $V_{CC}$=2.0V | - | - | 0.1 | V |
| | | | $I_O$=20uA; $V_{CC}$=4.5V | - | - | 0.1 | V |
| | | | $I_O$=20uA; $V_{CC}$=6.0V | - | - | 0.1 | V |
| | | | $I_O$=4.0mA; $V_{CC}$=4.5V | - | - | 0.33 | V |
| | | | $I_O$=5.2mA; $V_{CC}$=6.0V | - | - | 0.33 | V |
| input leakage current | $I_I$ | $V_I$=$V_{CC}$ or GND; $V_{CC}$=6.0V | | - | - | ±1.0 | uA |
| supply current | $I_{CC}$ | $V_I$=$V_{CC}$ or GND; $I_O$=0A; $V_{CC}$=6.0V | | - | - | 80 | uA |
| **SN74HCT238** | | | | | | | |
| HIGH-level input voltage | $V_{IH}$ | $V_{CC}$=4.5V to 5.5V | | 2.0 | - | - | V |
| LOW-level input voltage | $V_{IL}$ | $V_{CC}$=4.5V to 5.5V | | - | - | 0.8 | V |
| HIGH-level output voltage | $V_{OH}$ | $V_I$ = $V_{IH}$ or $V_{IL}$; $V_{CC}$=4.5V | $I_O$=-20uA | 4.4 | - | - | V |
| | | | $I_O$=-4.0mA | 3.84 | - | - | V |
| LOW-level output voltage | $V_{OL}$ | $V_I$ = $V_{IH}$ or $V_{IL}$; $V_{CC}$=4.5V | $I_O$=20uA | - | - | 0.1 | V |
| | | | $I_O$=4.0mA | - | - | 0.33 | V |
| input leakage current | $I_I$ | $V_I$=$V_{CC}$ or GND; $V_{CC}$=5.5V | | - | - | ±1.0 | uA |
| supply current | $I_{CC}$ | $V_I$=$V_{CC}$ or GND; $I_O$=0A; $V_{CC}$=5.5V | | - | - | 80 | uA |
| additional supply current | $\Delta I_{CC}$ | $V_I$=$V_{CC}$-2.1V; other inputs at $V_{CC}$ or GND; $I_O$=0A; $V_{CC}$=4.5V to 5.5V | An inputs | - | - | 315 | uA |
| | | | $\bar{E}1$, $\bar{E}2$ inputs | - | - | 180 | uA |
| | | | E3 input | - | - | 653 | uA |

### 3.3.4、AC Characteristics 1

($T_{amb}$=25℃, voltages are referenced to GND (ground=0V), unless otherwise specified.)

| Parameter | Symbol | Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| **SN74HC238** | | | | | | | |
| propagation delay | $t_{pd}$ | An to Yn; see Figure 5 | $V_{CC}$=2.0V | - | 47 | 150 | ns |
| | | | $V_{CC}$=4.5V | - | 17 | 30 | ns |
| | | | $V_{CC}$=5.0V; $C_L$=15pF | - | 14 | - | ns |
| | | | $V_{CC}$=6.0V | - | 14 | 26 | ns |
| | | E3 to Yn; see Figure 5 | $V_{CC}$=2.0V | - | 52 | 160 | ns |
| | | | $V_{CC}$=4.5V | - | 19 | 32 | ns |
| | | | $V_{CC}$=5.0V; $C_L$=15pF | - | 16 | - | ns |
| | | | $V_{CC}$=6.0V | - | 15 | 27 | ns |
| | | $\overline{E}$n to Yn; see Figure 6 | $V_{CC}$=2.0V | - | 50 | 155 | ns |
| | | | $V_{CC}$=4.5V | - | 18 | 31 | ns |
| | | | $V_{CC}$=5.0V; $C_L$=15pF | - | 17 | - | ns |
| | | | $V_{CC}$=6.0V | - | 14 | 26 | ns |
| transition time | $t_t$ | see Figure 5, 6 | $V_{CC}$=2.0V | - | 19 | 75 | ns |
| | | | $V_{CC}$=4.5V | - | 7 | 15 | ns |
| | | | $V_{CC}$=6.0V | - | 6 | 13 | ns |
| power dissipation capacitance | $C_{PD}$ | per package; $V_I$=GND to $V_{CC}$ | | - | 72 | - | pF |
| **SN74HCT238** | | | | | | | |
| propagation delay | $t_{pd}$ | An to Yn; see Figure 5 | $V_{CC}$=4.5V | - | 19 | 35 | ns |
| | | | $V_{CC}$=5.0V; $C_L$=15pF | - | 18 | - | ns |
| | | E3 to Yn; see Figure 5 | $V_{CC}$=4.5V | - | 20 | 37 | ns |
| | | | $V_{CC}$=5.0V; $C_L$=15pF | - | 20 | - | ns |
| | | $\overline{E}$n to Yn; see Figure 6 | $V_{CC}$=4.5V | - | 20 | 35 | ns |
| | | | $V_{CC}$=5.0V; $C_L$=15pF | - | 21 | - | ns |
| transition time | $t_t$ | $V_{CC}$=4.5V; see Figure 5, 6 | | - | 7 | 15 | ns |
| power dissipation capacitance | $C_{PD}$ | per package; $V_I$=GND to $V_{CC}$- 1.5V | | - | 76 | - | pF |

Note:

[1] $t_{pd}$ is the same as $t_{PLH}$ and $t_{PHL}$.

[2] $t_t$ is the same as $t_{THL}$ and $t_{TLH}$ .

[3] $C_{PD}$ is used to determine the dynamic power dissipation ($P_D$ in uW).

$P_D=C_{PD}\times V_{CC}^2\times f_i\times N+\sum(C_L\times V_{CC}^2\times f_o)$ where:

$f_i$=input frequency in MHz;

$f_o$=output frequency in MHz;

$C_L$=output load capacitance in pF;

$V_{CC}$=supply voltage in V;

N=number of inputs switching;

$\sum(C_L\times V_{CC}^2\times f_o)$=sum ofoutputs.

### 3.3.5、AC Characteristics 2

($T_{amb}$=-40℃ to +85℃, voltages are referenced to GND (ground=0V), unless otherwise specified.)

| Parameter | Symbol | Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| **SN74HC238** | | | | | | | |
| propagation delay | $t_{pd}$ | An to Yn; see Figure 5 | $V_{CC}$=2.0V | - | - | 190 | ns |
| | | | $V_{CC}$=4.5V | - | - | 38 | ns |
| | | | $V_{CC}$=6.0V | - | - | 33 | ns |
| | | E3 to Yn; see Figure 5 | $V_{CC}$=2.0V | - | - | 200 | ns |
| | | | $V_{CC}$=4.5V | - | - | 40 | ns |
| | | | $V_{CC}$=6.0V | - | - | 34 | ns |
| | | $\overline{En}$ to Yn; see Figure 6 | $V_{CC}$=2.0V | - | - | 195 | ns |
| | | | $V_{CC}$=4.5V | - | - | 39 | ns |
| | | | $V_{CC}$=6.0V | - | - | 33 | ns |
| transition time | $t_t$ | see Figure 5, 6 | $V_{CC}$=2.0V | - | - | 95 | ns |
| | | | $V_{CC}$=4.5V | - | - | 19 | ns |
| | | | $V_{CC}$=6.0V | - | - | 16 | ns |
| **SN74HCT238** | | | | | | | |
| propagation delay | $t_{pd}$ | An to Yn; see Figure 5 | $V_{CC}$=4.5V | - | - | 44 | ns |
| | | E3 to Yn; see Figure 5 | $V_{CC}$=4.5V | - | - | 46 | ns |
| | | $\overline{En}$ to Yn; see Figure 6 | $V_{CC}$=4.5V | - | - | 44 | ns |
| transition time | $t_t$ | $V_{CC}$=4.5V; see Figure 5, 6 | | - | - | 19 | ns |

Note:

[1] $t_{pd}$ is the same as $t_{PLH}$ and $t_{PHL}$.

[2] $t_t$ is the same as $t_{THL}$ and $t_{TLH}$ .

### 3.3.6、AC Characteristics 3

($T_{amb}$=-40℃ to +105℃, voltages are referenced to GND (ground=0V), unless otherwise specified.)

| Parameter | Symbol | Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| **SN74HC238** | | | | | | | |
| propagation delay | $t_{pd}$ | An to Yn; see Figure 5 | $V_{CC}$=2.0V | - | - | 225 | ns |
| | | | $V_{CC}$=4.5V | - | - | 45 | ns |
| | | | $V_{CC}$=6.0V | - | - | 38 | ns |
| | | E3 to Yn; see Figure 5 | $V_{CC}$=2.0V | - | - | 240 | ns |
| | | | $V_{CC}$=4.5V | - | - | 48 | ns |
| | | | $V_{CC}$=6.0V | - | - | 41 | ns |
| | | $\overline{En}$ to Yn; see Figure 6 | $V_{CC}$=2.0V | - | - | 235 | ns |
| | | | $V_{CC}$=4.5V | - | - | 47 | ns |
| | | | $V_{CC}$=6.0V | - | - | 40 | ns |
| transition time | $t_t$ | see Figure 5, 6 | $V_{CC}$=2.0V | - | - | 110 | ns |
| | | | $V_{CC}$=4.5V | - | - | 22 | ns |
| | | | $V_{CC}$=6.0V | - | - | 19 | ns |
| **SN74HCT238** | | | | | | | |
| propagation delay | $t_{pd}$ | An to Yn; see Figure 5 | $V_{CC}$=4.5V | - | - | 53 | ns |
| | | E3 to Yn; see Figure 5 | $V_{CC}$=4.5V | - | - | 56 | ns |
| | | $\overline{En}$ to Yn; see Figure 6 | $V_{CC}$=4.5V | - | - | 53 | ns |
| transition time | $t_t$ | $V_{CC}$=4.5V; see Figure 5, 6 | | - | - | 22 | ns |

Note:

[1] $t_{pd}$ is the same as $t_{PLH}$ and $t_{PHL}$.

[2] $t_t$ is the same as $t_{THL}$ and $t_{TLH}$ .

# 4 Testing Circuit

## 4．1 AC Testing Circuit 1

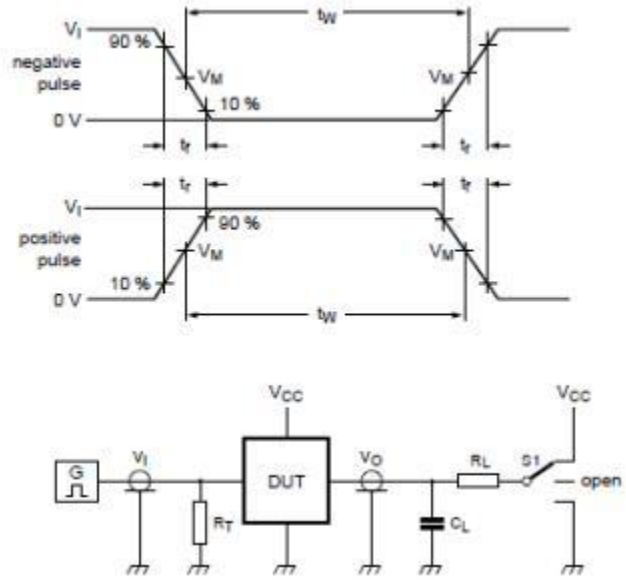



Figure 4. Test circuit for measuring switching times

Definitions for test circuit:
$C_L$=Load capacitance including jig and probe capacitance.
$R_T$=Termination resistance should be equal to the output impedance $Z_o$ of the pulse generator. $R_L$=Load resistance.
S1=Test selection switch.

## 4.2、AC Testing Waveform

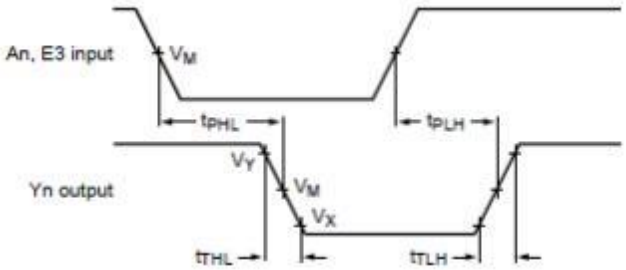



Figure 5. Input (An, E3) to output (Yn) propagation delays and output transition times

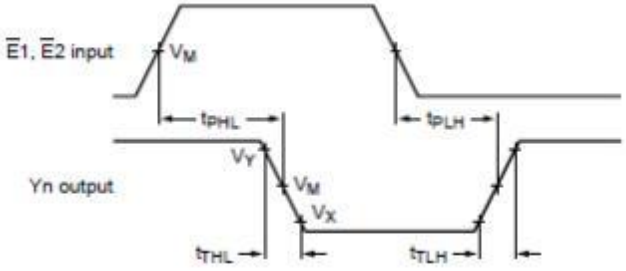



Figure 6. Input ($\overline{E}1$, $\overline{E}2$) to output (Yn) propagation delays and output transition times

### 4.3、Measurement Points

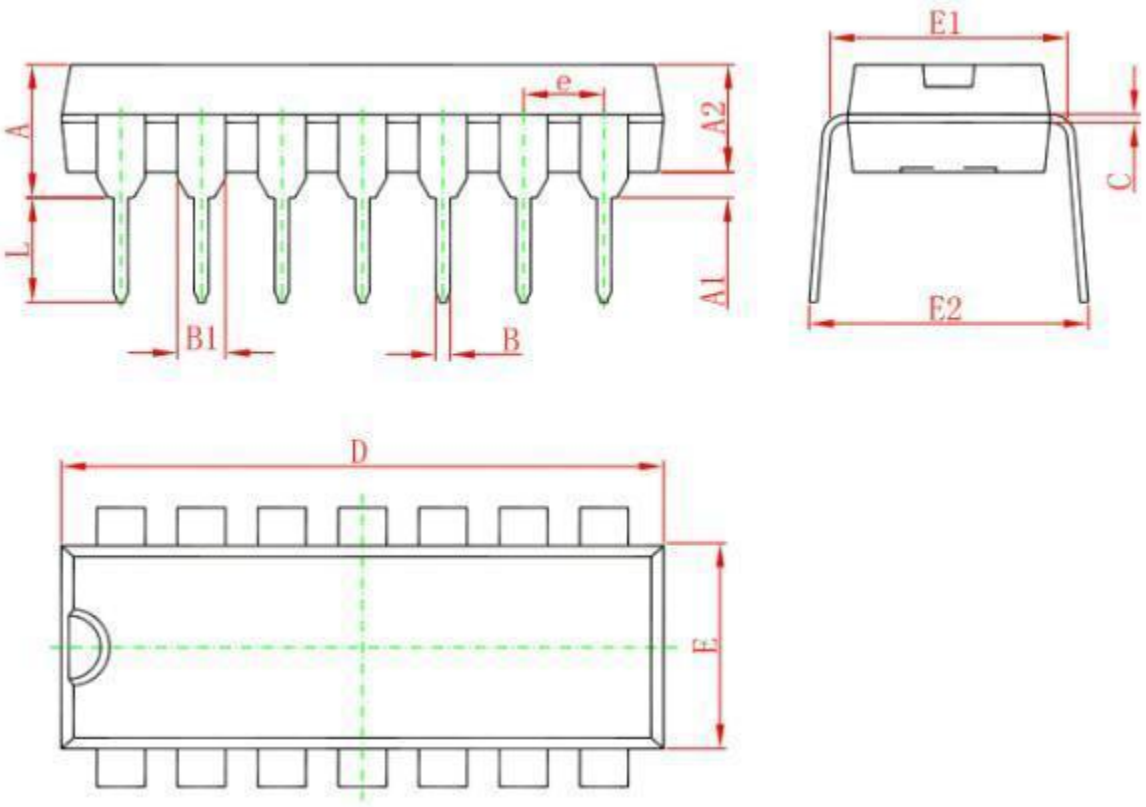
| Type | Input | Output | | |
|---|---|---|---|---|
| | $V_M$ | $V_M$ | $V_X$ | $V_Y$ |
| SN74HC238 | $0.5\times V_{CC}$ | $0.5\times V_{CC}$ | $0.1\times V_{CC}$ | $0.9\times V_{CC}$ |
| SN74HCT238 | 1.3V | 1.3V | $0.1\times V_{CC}$ | $0.9\times V_{CC}$ |

### 4.4、Test Data

| Type | Input | | Load | | S1 position |
|---|---|---|---|---|---|
| | $V_I$ | $t_r$, $t_f$ | $C_L$ | $R_L$ | $t_{PHL}$, $t_{PLH}$ |
| SN74HC238 | $V_{CC}$ | 6ns | 15pF, 50pF | 1kΩ | open |
| SN74HCT238 | 3V | 6ns | 15pF, 50pF | 1kΩ | open |

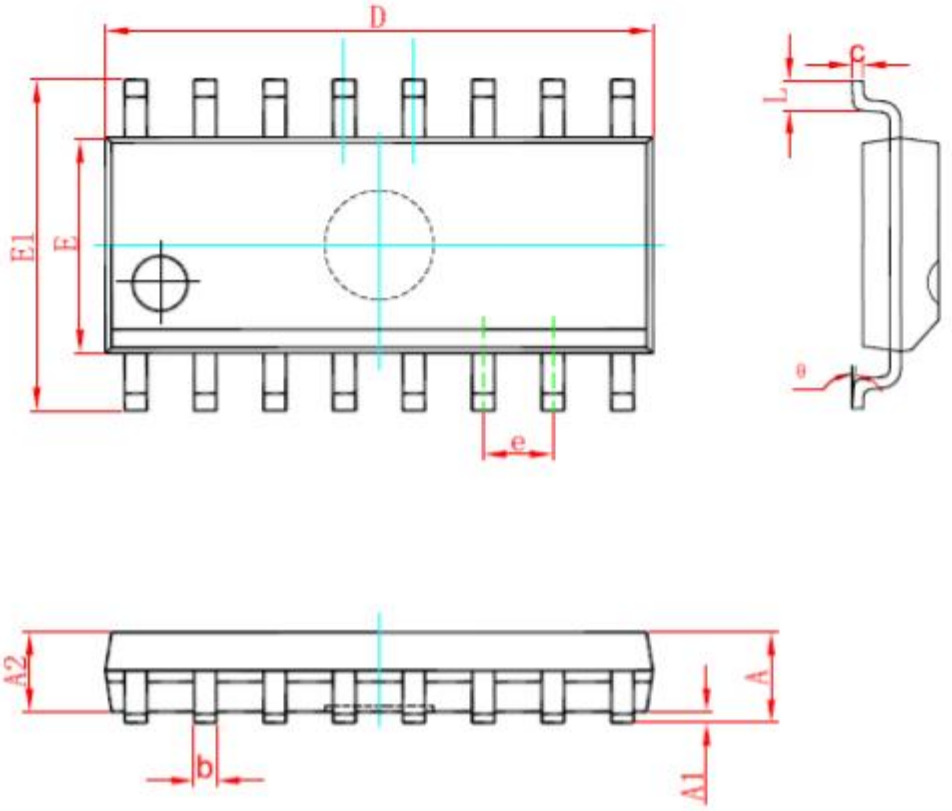
## 5 Package Information

### 5.1 DIP14



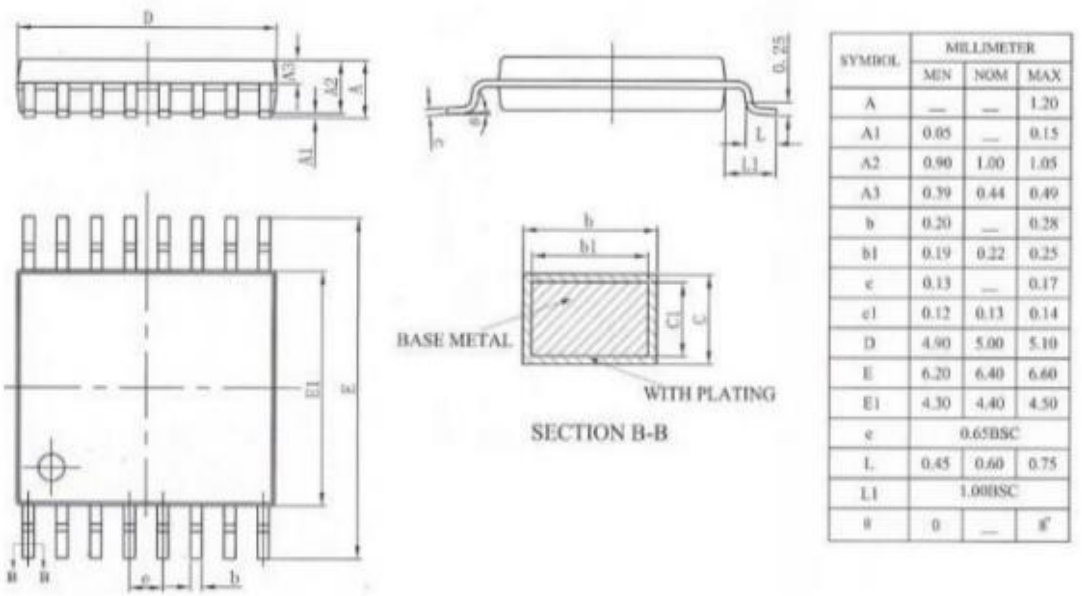

| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min | Max | Min | Max |
| A | 3.710 | 4.310 | 0.146 | 0.170 |
| A1 | 0.510 | | 0.020 | |
| A2 | 3.200 | 3.600 | 0.126 | 0.142 |
| B | 0.380 | 0.570 | 0.015 | 0.022 |
| B1 | 1.524 (BSC) | | 0.060 (BSC) | |
| C | 0.204 | 0.360 | 0.008 | 0.014 |
| D | 18.800 | 19.200 | 0.740 | 0.756 |
| E | 6.200 | 6.600 | 0.244 | 0.260 |
| E1 | 7.320 | 7.920 | 0.288 | 0.312 |
| e | 2.540 (BSC) | | 0.100 (BSC) | |
| L | 3.000 | 3.600 | 0.118 | 0.142 |
| E2 | 8.400 | 9.000 | 0.331 | 0.354 |

5.2、SOP16




| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min | Max | Min | Max |
| A | 1.350 | 1.750 | 0.053 | 0.069 |
| A1 | 0.100 | 0.250 | 0.004 | 0.010 |
| A2 | 1.350 | 1.550 | 0.053 | 0.061 |
| b | 0.330 | 0.510 | 0.013 | 0.020 |
| c | 0.170 | 0.250 | 0.007 | 0.010 |
| D | 9.800 | 10.200 | 0.386 | 0.402 |
| E | 3.800 | 4.000 | 0.150 | 0.157 |
| E1 | 5.800 | 6.200 | 0.228 | 0.244 |
| e | 1.270(BSC) | | 0.050(BSC) | |
| L | 0.400 | 1.270 | 0.016 | 0.050 |
| θ | 0° | 8° | 0° | 8° |

**5.3、TSSOP16**




| SYMBOL | MILLIMETER | | |
|---|---|---|---|
| | MIN | NOM | MAX |
| A | — | — | 1.20 |
| A1 | 0.05 | — | 0.15 |
| A2 | 0.90 | 1.00 | 1.05 |
| A3 | 0.39 | 0.44 | 0.49 |
| b | 0.20 | — | 0.28 |
| b1 | 0.19 | 0.22 | 0.25 |
| c | 0.13 | — | 0.17 |
| c1 | 0.12 | 0.13 | 0.14 |
| D | 4.90 | 5.00 | 5.10 |
| E | 6.20 | 6.40 | 6.60 |
| E1 | 4.30 | 4.40 | 4.50 |
| e | 0.65BSC | | |
| L | 0.45 | 0.60 | 0.75 |
| L1 | 1.00BSC | | |
| θ | 0 | — | 8° |

Statement：

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