**Quad 2-input Multiplexer**

# CJ74HC/HCT157 Logic

## 1 Introduction

The CJ74HC/HCT157 are quad 2-input multiplexers which select 4 bits of data from two sources under the control of a common data select input (S). The enable input (/E) is active LOW. When /E is HIGH, all of the outputs (1Y to 4Y) are forced LOW regardless of all other input conditions.

Moving the data from two groups of registers to four common output buses is a common use of the CJ74HC/HCT157. The state of the common data select input (S) determines the particular register from which the data comes. It can also be used as function generator. The device is useful for implementing highly irregular logic by generating any four of the 16 different functions of two variables with one variable common. The CJ74HC/HCT157 is logic implementation of a 4-pole, 2-position switch, where the position of the switch is determined by the logic levels applied to S.

The CJ74HC/HCT157 is identical to the CJ74HC/HCT158 but has non-inverting (true) outputs.

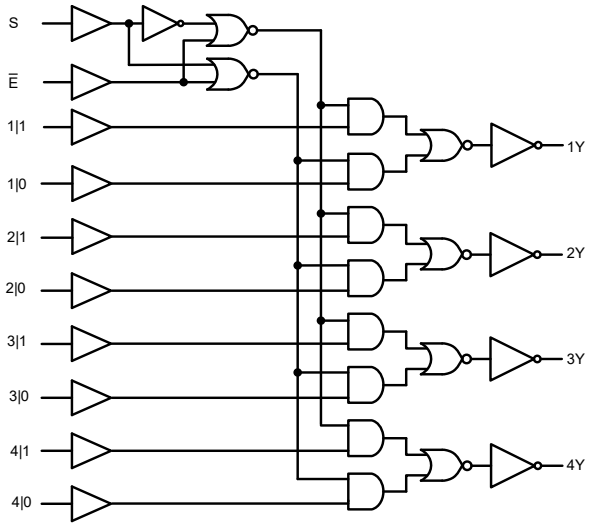
## 2 Available Packages

| PART NUMBER | PACKAGE |
|---|---|
| CJ74HC157 | SOP16 |
| | TSSOP16 |
| CJ74HCT157 | SOP16 |
| | TSSOP16 |

**Note:** For all available packages, please refer to the part Orderable Information.

## 3 Features

- Input levels:
  - For CJ74HC157: CMOS level
  - For CJ74HCT157: TTL level
- Low-power dissipation
- Non-inverting data path
- Specified from -40°C to +125°C




Functional block diagram

## 4 Orderable Information

| DEVICE | PACKAGE | OP TEMP | ECO PLAN | MSL | PACKING OPTION | SORT |
|---|---|---|---|---|---|---|
| CJ74HC157AEN | SOP16 | -40~125°C | RoHS & Green | Level 3 168HR | Tape and Reel 4000 Units / Reel | Active |
| CJ74HCT157AEN | SOP16 | -40~125°C | RoHS & Green | Level 3 168HR | Tape and Reel 4000 Units / Reel | Active |
| CJ74HC157BEN | TSSOP16 | -40~125°C | RoHS & Green | Level 3 168HR | Tape and Reel 5000 Units / Reel | Active |
| CJ74HCT157BEN | TSSOP16 | -40~125°C | RoHS & Green | Level 3 168HR | Tape and Reel 5000 Units / Reel | Active |

**Note:**

**ECO PLAN:** For the RoHS and Green certification standards of this product, please refer to the official report provided by JSCJ.

**MSL:** Moisture Sensitivity Level. Determined according to JEDEC industry standard classification.

**SORT:** Specifically defined as follows:
Active: Recommended for new products;
Customized: Products manufactured to meet the specific needs of customers;
Preview: The device has been released and has not been fully mass produced. The sample may or may not be available;
NoRD: It is not recommended to use the device for new design. The device is only produced for the needs of existing customers;
Obsolete: The device has been discontinued.

# 5 Pin Configuration and Marking Information

## 5.1 Pin Configuration

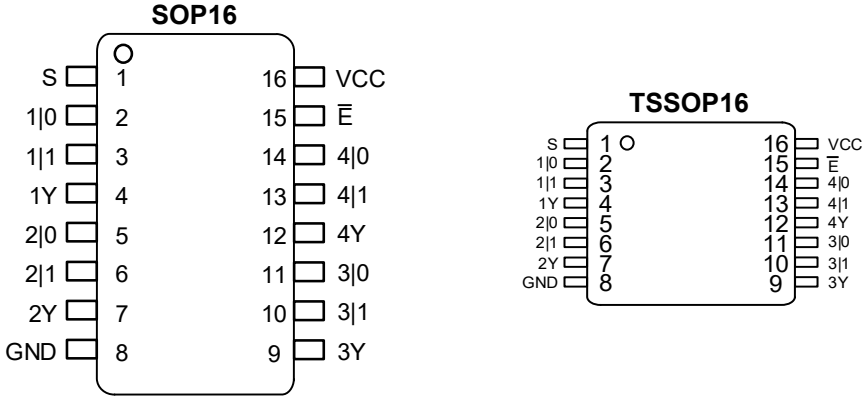



**Figure 5-1 Pin configuration**

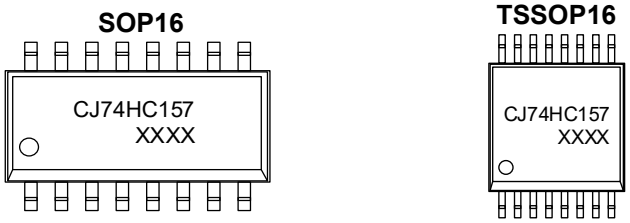
## 5.2 Pin Function

| PIN | | I/O(1) | DESCRIPTION |
|---|---|---|---|
| No. | NAME | | |
| 1 | S | I | Common data select input |
| 2 | 1I0 | I | Data input from source 0 |
| 3 | 1I1 | I | Data input from source 1 |
| 4 | 1Y | O | Multiplexer output |
| 5 | 2I0 | I | Data input from source 0 |
| 6 | 2I1 | I | Data input from source 1 |
| 7 | 2Y | O | Multiplexer output |
| 8 | GND | G | Ground (0V) |
| 9 | 3Y | O | Multiplexer output |
| 10 | 3I1 | I | Data input from source 1 |
| 11 | 3I0 | I | Data input from source 0 |
| 12 | 4Y | O | Multiplexer output |
| 13 | 4I1 | I | Data input from source 1 |
| 14 | 4I0 | I | Data input from source 0 |
| 15 | $\overline{E}$ | I | Enable input (active LOW) |
| 16 | VCC | P | Supply voltage |

(1) I-Input, O-Output, P-Power, G-Ground

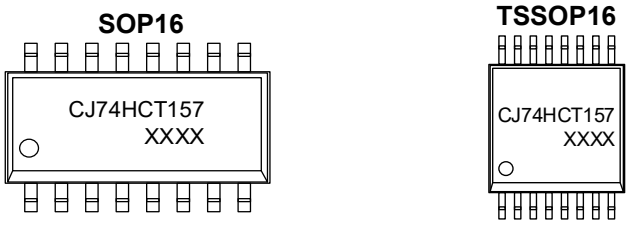
## 5.3 Marking Information

### 5.3.1 CJ74HC157




XXXX: Code, indicates weekly record information.

### 5.3.2 CJ74HCT157




XXXX: Code, indicates weekly record information.

# 6 Specifications

## 6.1 Absolute Maximum Ratings

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

| SYMBOL | PARAMETER | CONDITIONS | | MIN. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $V_{CC}$ | Supply voltage | - | | -0.5 | +7.0 | V |
| $I_{IK}$ | Input clamping current | $V_I$ < -0.5V or $V_I$ > $V_{CC}$+0.5V | | - | ±20 | mA |
| $I_{OK}$ | Output clamping current | $V_O$ < -0.5V or $V_O$ > $V_{CC}$+0.5V | | - | ±20 | mA |
| $I_O$ | Output current | $V_O$= -0.5V to ($V_{CC}$+0.5V) | | - | ±25 | mA |
| $I_{CC}$ | Supply current | - | | - | +50 | mA |
| $I_{GND}$ | Ground current | - | | -50 | - | mA |
| $T_{stg}$ | Storage temperature | - | | -65 | +150 | °C |
| $P_{tot}$ | Total power dissipation | - | | - | 500 | mW |
| $T_L$ | Soldering temperature | 10s | SOP/TSSOP | - | 260 | °C |

**Note:** Absolute maximum ratings indicate sustained limits beyond which damage to the device may occur. All voltage parameters are absolute voltages referenced to GND. The thermal resistance and power dissipation ratings are measured under board mounted and still air conditions.

## 6.2 Recommended Operating Conditions

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| **CJ74HC157** | | | | | | |
| $V_{CC}$ | Supply voltage | - | 2.0 | 5.0 | 6.0 | V |
| $V_I$ | Input voltage | - | 0 | - | $V_{CC}$ | V |
| $V_O$ | Output voltage | - | 0 | - | $V_{CC}$ | V |
| Δt/ΔV | Input transition rise and fall rate | $V_{CC}$=2.0V | - | - | 625 | ns/V |
| | | $V_{CC}$=4.5V | - | 1.67 | 139 | ns/V |
| | | $V_{CC}$=6.0V | - | - | 83 | ns/V |
| $T_{amb}$ | Ambient temperature | - | -40 | - | +125 | °C |
| **CJ74HCT157** | | | | | | |
| $V_{CC}$ | Supply voltage | - | 4.5 | 5.0 | 5.5 | V |
| $V_I$ | Input voltage | - | 0 | - | $V_{CC}$ | V |
| $V_O$ | Output voltage | - | 0 | - | $V_{CC}$ | V |
| Δt/ΔV | Input transition rise and fall rate | $V_{CC}$=4.5V | - | 1.67 | 139 | ns/V |
| $T_{amb}$ | Ambient temperature | - | -40 | - | +125 | °C |

## 6.3 ESD Ratings

| SYMBOL | ESD RATINGS | | VALUE | UNIT |
|---|---|---|---|---|
| $V_{ESD-HBM}$ | Electrostatic discharge | Human body model (HBM)(1) | ±4000 | V |

(1) JEDEC document JEP155 states that 500-V HBM allows safe manufacturing with a standard ESD control process.

## 6.4 Electrical Characteristics

### 6.4.1 DC Characteristics 1

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

| SYMBOL | PARAMETER | CONDITIONS | | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|---|
| **CJ74HC157** | | | | | | | |
| $V_{IH}$ | HIGH-level input voltage | $V_{CC}$=2.0V | | 1.5 | - | - | V |
| | | $V_{CC}$=4.5V | | 3.15 | - | - | V |
| | | $V_{CC}$=6.0V | | 4.2 | - | - | V |
| $V_{IL}$ | LOW-level input voltage | $V_{CC}$=2.0V | | - | - | 0.5 | V |
| | | $V_{CC}$=4.5V | | - | - | 1.35 | V |
| | | $V_{CC}$=6.0V | | - | - | 1.8 | V |
| $V_{OH}$ | HIGH-level output voltage | $V_I$=$V_{IH}$ 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 |
| $V_{OL}$ | LOW-level output voltage | $V_I$=$V_{IH}$ 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 |
| $I_I$ | Input leakage current | $V_I$=$V_{CC}$ or GND; $V_{CC}$=6.0V | | - | - | ±1.0 | uA |
| $I_{CC}$ | Supply current | $V_I$=$V_{CC}$ or GND; $I_O$=0A; $V_{CC}$=6.0V | | - | - | 8.0 | uA |
| $C_I$ | Input capacitance | - | | - | 3.5 | - | pF |
| **CJ74HCT157** | | | | | | | |
| $V_{IH}$ | HIGH-level input voltage | $V_{CC}$=4.5V to 5.5V | | 2.0 | - | - | V |
| $V_{IL}$ | LOW-level input voltage | $V_{CC}$=4.5V to 5.5V | | - | - | 0.8 | V |
| $V_{OH}$ | HIGH-level output voltage | $V_I$=$V_{IH}$ or $V_{IL}$; | $I_O$=-20uA; $V_{CC}$=4.5V | 4.4 | 4.5 | - | V |
| | | | $I_O$=-4.0mA; $V_{CC}$=4.5V | 3.98 | 4.32 | - | V |
| $V_{OL}$ | LOW-level output voltage | $V_I$=$V_{IH}$ or $V_{IL}$; | $I_O$=20uA; $V_{CC}$=4.5V | - | 0 | 0.1 | V |
| | | | $I_O$=4.0mA; $V_{CC}$=4.5V | - | 0.15 | 0.26 | V |
| $I_I$ | Input leakage current | $V_I$=$V_{CC}$ or GND; $V_{CC}$=5.5V | | - | - | ±1.0 | uA |
| $I_{CC}$ | Supply current | $V_I$=$V_{CC}$ or GND; $I_O$=0A; $V_{CC}$=5.5V | | - | - | 8.0 | uA |
| $\Delta I_{CC}$ | Additional supply current | $V_I$=$V_{CC}$-2.1V; Other inputs at $V_{CC}$ or GND; $I_O$=0A; $V_{CC}$=4.5V to 5.5V | Per input pin; nI0, nI1 inputs | - | - | 360 | uA |
| | | | Per input pin; $\overline{E}$ input | - | - | 216 | uA |
| | | | Per input pin; S input | - | - | 360 | uA |
| $C_I$ | Input capacitance | - | | - | 3.5 | - | pF |

### 6.4.2 DC Characteristics 2

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

| SYMBOL | PARAMETER | CONDITIONS | | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|---|
| **CJ74HC157** | | | | | | | |
| $V_{IH}$ | HIGH-level input voltage | $V_{CC}$=2.0V | | 1.5 | - | - | V |
| | | $V_{CC}$=4.5V | | 3.15 | - | - | V |
| | | $V_{CC}$=6.0V | | 4.2 | - | - | V |
| $V_{IL}$ | LOW-level input voltage | $V_{CC}$=2.0V | | - | - | 0.5 | V |
| | | $V_{CC}$=4.5V | | - | - | 1.35 | V |
| | | $V_{CC}$=6.0V | | - | - | 1.8 | V |
| $V_{OH}$ | HIGH-level output voltage | $V_I$=$V_{IH}$ 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 |
| $V_{OL}$ | LOW-level output voltage | $V_I$=$V_{IH}$ 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 |
| $I_I$ | Input leakage current | $V_I$=$V_{CC}$ or GND; $V_{CC}$=6.0V | | - | - | ±1.0 | uA |
| $I_{CC}$ | Supply current | $V_I$=$V_{CC}$ or GND; $I_O$=0A; $V_{CC}$=6.0V | | - | - | 80 | uA |
| **CJ74HCT157** | | | | | | | |
| $V_{IH}$ | HIGH-level input voltage | $V_{CC}$=4.5V to 5.5V | | 2.0 | - | - | V |
| $V_{IL}$ | LOW-level input voltage | $V_{CC}$=4.5V to 5.5V | | - | - | 0.8 | V |
| $V_{OH}$ | HIGH-level output voltage | $V_I$=$V_{IH}$ or $V_{IL}$; | $I_O$=-20uA; $V_{CC}$=4.5V | 4.4 | - | - | V |
| | | | $I_O$=-4.0mA; $V_{CC}$=4.5V | 3.84 | - | - | V |
| $V_{OL}$ | LOW-level output voltage | $V_I$=$V_{IH}$ or $V_{IL}$; | $I_O$=20uA; $V_{CC}$=4.5V | - | - | 0.1 | V |
| | | | $I_O$=4.0mA; $V_{CC}$=4.5V | - | - | 0.33 | V |
| $I_I$ | Input leakage current | $V_I$=$V_{CC}$ or GND; $V_{CC}$=5.5V | | - | - | ±1.0 | uA |
| $I_{CC}$ | Supply current | $V_I$=$V_{CC}$ or GND; $I_O$=0A; $V_{CC}$=5.5V | | - | - | 80 | uA |
| $\Delta I_{CC}$ | Additional supply current | $V_I$=$V_{CC}$-2.1V; Other inputs at $V_{CC}$ or GND; $I_O$=0A; $V_{CC}$=4.5V to 5.5V | Per input pin; nI0, nI1 inputs | - | - | 450 | uA |
| | | | Per input pin; $\overline{E}$ input | - | - | 270 | uA |
| | | | Per input pin; S input | - | - | 450 | uA |

### 6.4.3 DC Characteristics 3

$T_{amb}$=-40°C to +125°C, voltages are referenced to GND (ground=0V), unless otherwise specified.

| SYMBOL | PARAMETER | CONDITIONS | | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|---|
| **CJ74HC157** | | | | | | | |
| $V_{IH}$ | HIGH-level input voltage | $V_{CC}$=2.0V | | 1.5 | - | - | V |
| | | $V_{CC}$=4.5V | | 3.15 | - | - | V |
| | | $V_{CC}$=6.0V | | 4.2 | - | - | V |
| $V_{IL}$ | LOW-level input voltage | $V_{CC}$=2.0V | | - | - | 0.5 | V |
| | | $V_{CC}$=4.5V | | - | - | 1.35 | V |
| | | $V_{CC}$=6.0V | | - | - | 1.8 | V |
| $V_{OH}$ | HIGH-level output voltage | $V_I$=$V_{IH}$ 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 | 3.7 | - | - | V |
| | | | $I_O$=-5.2mA; $V_{CC}$=6.0V | 5.2 | - | - | V |
| $V_{OL}$ | LOW-level output voltage | $V_I$=$V_{IH}$ 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 | - | - | 0.4 | V |
| | | | $I_O$=5.2mA; $V_{CC}$=6.0V | - | - | 0.4 | V |
| $I_I$ | Input leakage current | $V_I$=$V_{CC}$ or GND; $V_{CC}$=6.0V | | - | - | ±1.0 | uA |
| $I_{CC}$ | Supply current | $V_I$=$V_{CC}$ or GND; $I_O$=0A; $V_{CC}$=6.0V | | - | - | 160 | uA |
| **CJ74HCT157** | | | | | | | |
| $V_{IH}$ | HIGH-level input voltage | $V_{CC}$=4.5V to 5.5V | | 2.0 | - | - | V |
| $V_{IL}$ | LOW-level input voltage | $V_{CC}$=4.5V to 5.5V | | - | - | 0.8 | V |
| $V_{OH}$ | HIGH-level output voltage | $V_I$=$V_{IH}$ or $V_{IL}$; | $I_O$=-20uA; $V_{CC}$=4.5V | 4.4 | - | - | V |
| | | | $I_O$=-4.0mA; $V_{CC}$=4.5V | 3.7 | - | - | V |
| $V_{OL}$ | LOW-level output voltage | $V_I$=$V_{IH}$ or $V_{IL}$; | $I_O$=20uA; $V_{CC}$=4.5V | - | - | 0.1 | V |
| | | | $I_O$=4.0mA; $V_{CC}$=4.5V | - | - | 0.4 | V |
| $I_I$ | Input leakage current | $V_I$=$V_{CC}$ or GND; $V_{CC}$=5.5V | | - | - | ±1.0 | uA |
| $I_{CC}$ | Supply current | $V_I$=$V_{CC}$ or GND; $I_O$=0A; $V_{CC}$=5.5V | | - | - | 160 | uA |
| $\Delta I_{CC}$ | Additional supply current | $V_I$=$V_{CC}$-2.1V; Other inputs at $V_{CC}$ or GND; $I_O$=0A; $V_{CC}$=4.5V to 5.5V | Per input pin; nI0, nI1 inputs | - | - | 490 | uA |
| | | | Per input pin; $\overline{E}$ input | - | - | 294 | uA |
| | | | Per input pin; S input | - | - | 490 | uA |

### 6.4.4 AC Characteristics 1

$T_{amb}$=25°C, GND =0V, $C_L$=50pF, unless otherwise specified.

| SYMBOL | PARAMETER | CONDITIONS | | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|---|
| **CJ74HC157** | | | | | | | |
| $t_{pd}$ | Propagation delay | nI0, nI1 to nY; See Figure 7-6(1) | $V_{CC}$=2.0V | - | 36 | 125 | ns |
| | | | $V_{CC}$=4.5V | - | 13 | 25 | ns |
| | | | $V_{CC}$=5.0V; $C_L$=15pF | - | 11 | - | ns |
| | | | $V_{CC}$=6.0V | - | 10 | 21 | ns |
| | | S to nY; See Figure 7-6(1) | $V_{CC}$=2.0V | - | 41 | 125 | ns |
| | | | $V_{CC}$=4.5V | - | 15 | 25 | ns |
| | | | $V_{CC}$=5.0V; $C_L$=15pF | - | 12 | - | ns |
| | | | $V_{CC}$=6.0V | - | 12 | 21 | ns |
| | | $\overline{E}$ to nY; See Figure 7-7(1) | $V_{CC}$=2.0V | - | 39 | 115 | ns |
| | | | $V_{CC}$=4.5V | - | 14 | 23 | ns |
| | | | $V_{CC}$=5.0V; $C_L$=15pF | - | 11 | - | ns |
| | | | $V_{CC}$=6.0V | - | 11 | 20 | ns |
| $t_t$ | Transition time | nY; See Figure 7-6(2) | $V_{CC}$=2.0V | - | 19 | 75 | ns |
| | | | $V_{CC}$=4.5V | - | 7 | 15 | ns |
| | | | $V_{CC}$=6.0V | - | 6 | 13 | ns |
| $C_{PD}$ | Power dissipation capacitance | $C_L$=50pF; f=1MHz; $V_I$=GND to $V_{CC}$(3) | | - | 70 | - | pF |
| **CJ74HCT157** | | | | | | | |
| $t_{pd}$ | Propagation delay | nI0, nI1 to nY; See Figure 7-6(1) | $V_{CC}$=4.5V | - | 16 | 27 | ns |
| | | | $V_{CC}$=5.0V; $C_L$=15pF | - | 13 | - | ns |
| | | S to nY; See Figure 7-6(1) | $V_{CC}$=4.5V | - | 22 | 37 | ns |
| | | | $V_{CC}$=5.0V; $C_L$=15pF | - | 19 | - | ns |
| | | $\overline{E}$ to nY; See Figure 7-7(1) | $V_{CC}$=4.5V | - | 15 | 26 | ns |
| | | | $V_{CC}$=5.0V; $C_L$=15pF | - | 12 | - | ns |
| $t_t$ | Transition time | nY; $V_{CC}$=4.5V; See Figure 7-6(2) | | - | 7 | 15 | ns |
| $C_{PD}$ | Power dissipation capacitance | $C_L$=50pF; f=1MHz; $V_I$=GND to $V_{CC}$-1.5V(3) | | - | 70 | - | pF |

(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).

$P_D=C_{PD}xV_{CC}^2xf_ixN+\sum(C_LxV_{CC}^2xf_o)$ 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;

$\sum(C_LxV_{CC}^2xf_o)$=sum of outputs.

### 6.4.5 AC Characteristics 2

$T_{amb}$=-40°C to +85°C, GND=0V, $C_L$=50pF, unless otherwise specified.

| SYMBOL | PARAMETER | CONDITIONS | | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|---|
| **CJ74HC157** | | | | | | | |
| $t_{pd}$ | Propagation delay | nI0, nI1 to nY; See Figure 7-6(1) | $V_{CC}$=2.0V | - | - | 155 | ns |
| | | | $V_{CC}$=4.5V | - | - | 31 | ns |
| | | | $V_{CC}$=6.0V | - | - | 26 | ns |
| | | S to nY; See Figure 7-6(1) | $V_{CC}$=2.0V | - | - | 155 | ns |
| | | | $V_{CC}$=4.5V | - | - | 31 | ns |
| | | | $V_{CC}$=6.0V | - | - | 26 | ns |
| | | $\overline{E}$ to nY; See Figure 7-7(1) | $V_{CC}$=2.0V | - | - | 145 | ns |
| | | | $V_{CC}$=4.5V | - | - | 29 | ns |
| | | | $V_{CC}$=6.0V | - | - | 25 | ns |
| $t_t$ | Transition time | nY; See Figure 7-6(2) | $V_{CC}$=2.0V | - | - | 95 | ns |
| | | | $V_{CC}$=4.5V | - | - | 19 | ns |
| | | | $V_{CC}$=6.0V | - | - | 16 | ns |
| **CJ74HCT157** | | | | | | | |
| $t_{pd}$ | Propagation delay | nI0, nI1 to nY; See Figure 7-6(1) | $V_{CC}$=4.5V | - | - | 34 | ns |
| | | S to nY; See Figure 7-6(1) | $V_{CC}$=4.5V | - | - | 46 | ns |
| | | $\overline{E}$ to nY; See Figure 7-7(1) | $V_{CC}$=4.5V | - | - | 33 | ns |
| $t_t$ | Transition time | nY; $V_{CC}$=4.5V; See Figure 7-6(2) | | - | - | 19 | ns |

(1) $t_{pd}$ is the same as $t_{PLH}$ and $t_{PHL}$.

(2) $t_t$ is the same as $t_{THL}$ and $t_{TLH}$.

### 6.4.6 AC Characteristics 3

$T_{amb}$=-40°C to +125°C, GND=0V, $C_L$=50pF, unless otherwise specified.

| SYMBOL | PARAMETER | CONDITIONS | | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|---|
| **CJ74HC157** | | | | | | | |
| $t_{pd}$ | Propagation delay | nI0, nI1 to nY; See Figure 7-6(1) | $V_{CC}$=2.0V | - | - | 190 | ns |
| | | | $V_{CC}$=4.5V | - | - | 38 | ns |
| | | | $V_{CC}$=6.0V | - | - | 32 | ns |
| | | S to nY; See Figure 7-6(1) | $V_{CC}$=2.0V | - | - | 190 | ns |
| | | | $V_{CC}$=4.5V | - | - | 38 | ns |
| | | | $V_{CC}$=6.0V | - | - | 32 | ns |
| | | $\overline{E}$ to nY; See Figure 7-7(1) | $V_{CC}$=2.0V | - | - | 175 | ns |
| | | | $V_{CC}$=4.5V | - | - | 35 | ns |
| | | | $V_{CC}$=6.0V | - | - | 30 | ns |
| $t_t$ | Transition time | nY; See Figure 7-6(2) | $V_{CC}$=2.0V | - | - | 110 | ns |
| | | | $V_{CC}$=4.5V | - | - | 22 | ns |
| | | | $V_{CC}$=6.0V | - | - | 19 | ns |
| **CJ74HCT157** | | | | | | | |
| $t_{pd}$ | Propagation delay | nI0, nI1 to nY; See Figure 7-6(1) | $V_{CC}$=4.5V | - | - | 41 | ns |
| | | S to nY; See Figure 7-6(1) | $V_{CC}$=4.5V | - | - | 56 | ns |
| | | $\overline{E}$ to nY; See Figure 7-7(1) | $V_{CC}$=4.5V | - | - | 39 | ns |
| $t_t$ | Transition time | nY; $V_{CC}$=4.5V; See Figure 7-6(2) | | - | - | 22 | ns |

(1) $t_{pd}$ is the same as $t_{PLH}$ and $t_{PHL}$.

(2) $t_t$ is the same as $t_{THL}$ and $t_{TLH}$.

# 7 Detailed Description

## 7.1 Overview

The CJ74HC/HCT157 are quad 2-input multiplexers which select 4 bits of data from two sources under the control of a common data select input (S). The enable input (/E) is active LOW. When /E is HIGH, all of the outputs (1Y to 4Y) are forced LOW regardless of all other input conditions.

Moving the data from two groups of registers to four common output buses is a common use of the CJ74HC/HCT157. The state of the common data select input (S) determines the particular register from which the data comes. It can also be used as function generator. The device is useful for implementing highly irregular logic by generating any four of the 16 different functions of two variables with one variable common. The CJ74HC/HCT157 is logic implementation of a 4-pole, 2-position switch, where the position of the switch is determined by the logic levels applied to S.

The CJ74HC/HCT157 is identical to the CJ74HC/HCT158 but has non-inverting (true) outputs.

## 7.2 Functional Block Diagram

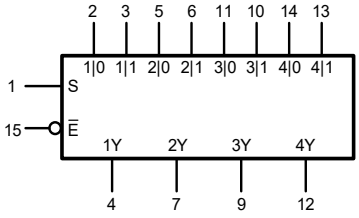



**Figure 7-1 Logic symbol**

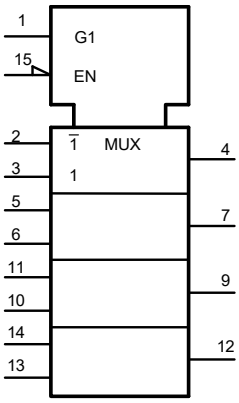



**Figure 7-2 IEC logic symbol**

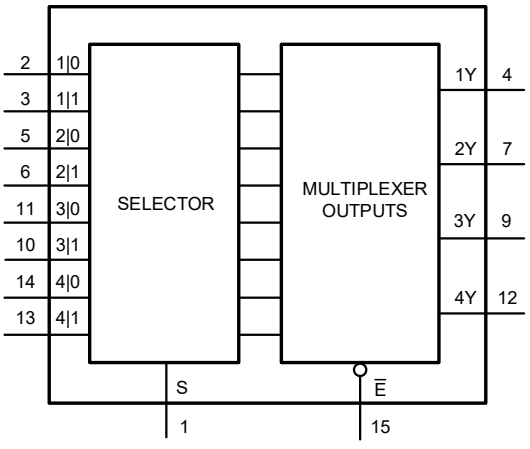



**Figure 7-3 Functional diagram**

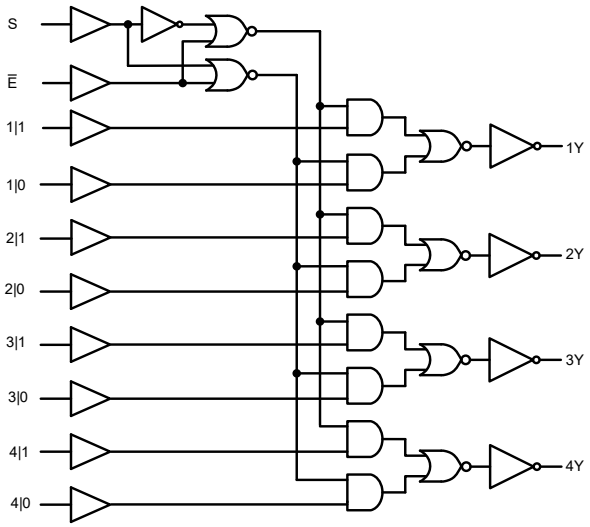



**Figure 7-4 Logic diagram**

## 7.3 Function Table

| INPUT | | | | OUTPUT |
|---|---|---|---|---|
| $\overline{E}$ | S | nI0 | nI1 | nY |
| H | X | X | X | L |
| L | L | L | X | L |
| L | L | H | X | H |
| L | H | X | L | L |
| L | H | X | H | H |

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

## 7.4 Testing Circuit

### 7.4.1 AC Testing Circuit

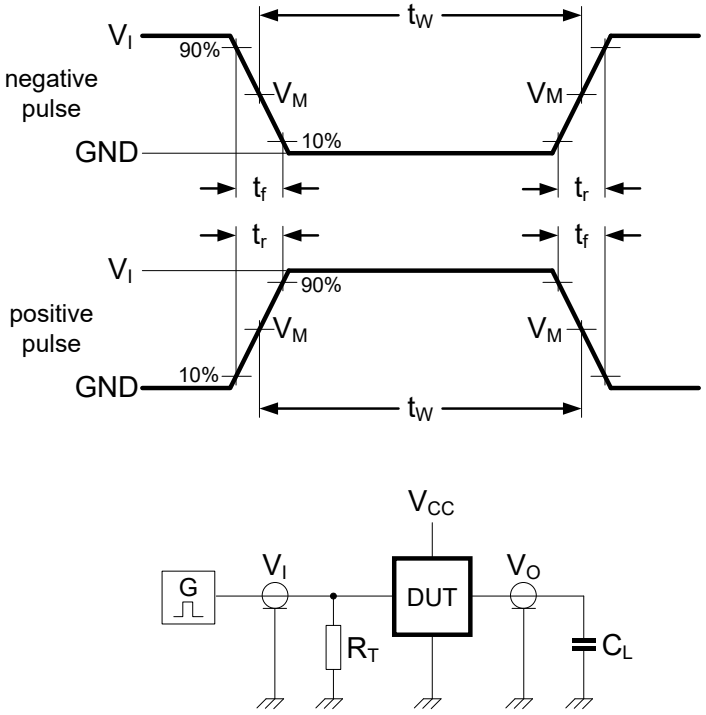



**Figure 7-5 Test circuit for measuring switching times**

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.

### 7.4.2 AC Testing Waveforms

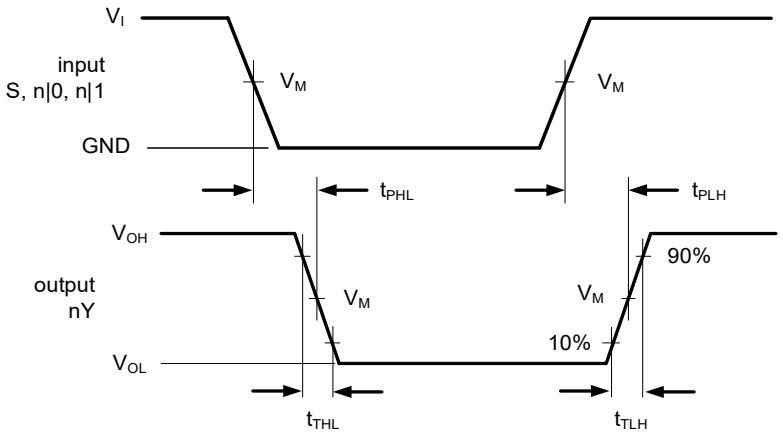



**Figure 7-6 Propagation delay input (nI0, nI1, S) to output (nYn)**

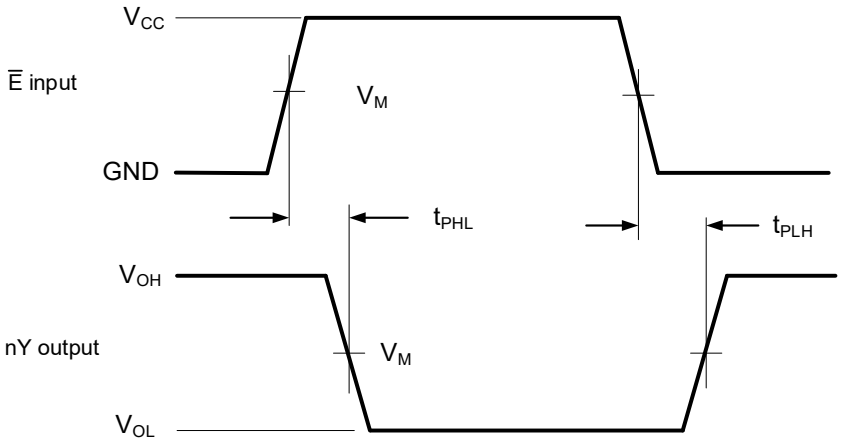



**Figure 7-7 Propagation delay input ($\overline{E}$) to output (nY)**

### 7.4.3 Measurement Points

| TYPE | INPUT | OUTPUT |
|---|---|---|
| | $V_M$ | $V_M$ |
| CJ74HC157 | 0.5x$V_{CC}$ | 0.5x$V_{CC}$ |
| CJ74HCT157 | 1.3V | 1.3V |

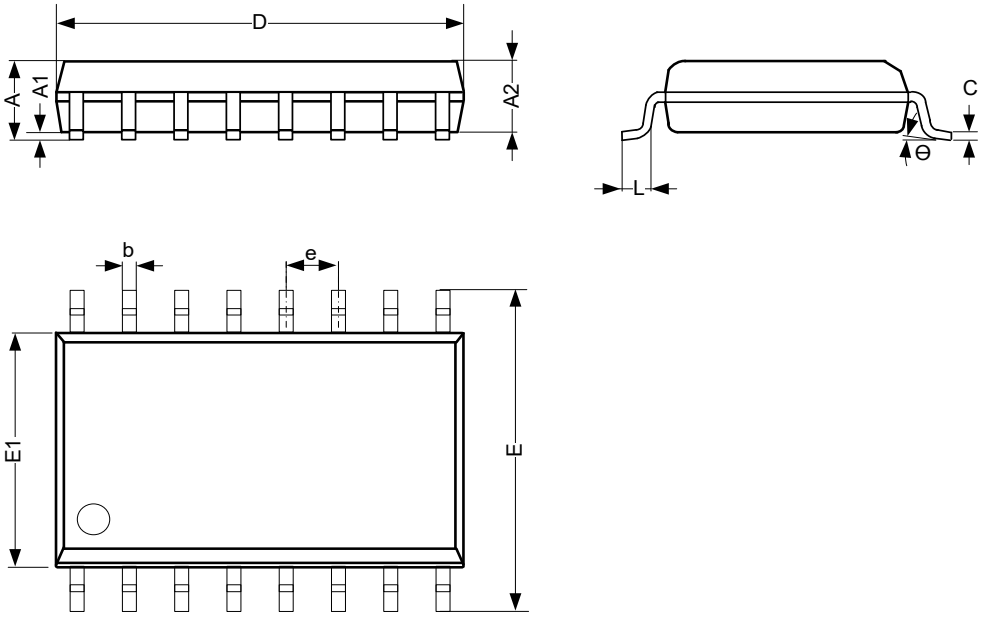
### 7.4.4 Test Data

| TYPE | INPUT | | LOAD | TEST |
|---|---|---|---|---|
| | $V_I$ | $t_r$ , $t_f$ | $C_L$ | |
| CJ74HC157 | $V_{CC}$ | 6ns | 15pF, 50pF | $t_{PHL}$, $t_{PLH}$ |
| CJ74HCT157 | 3V | 6ns | 15pF, 50pF | $t_{PHL}$, $t_{PLH}$ |

# 8 Mechanical Information

## 8.1 SOP16 Mechanical Information

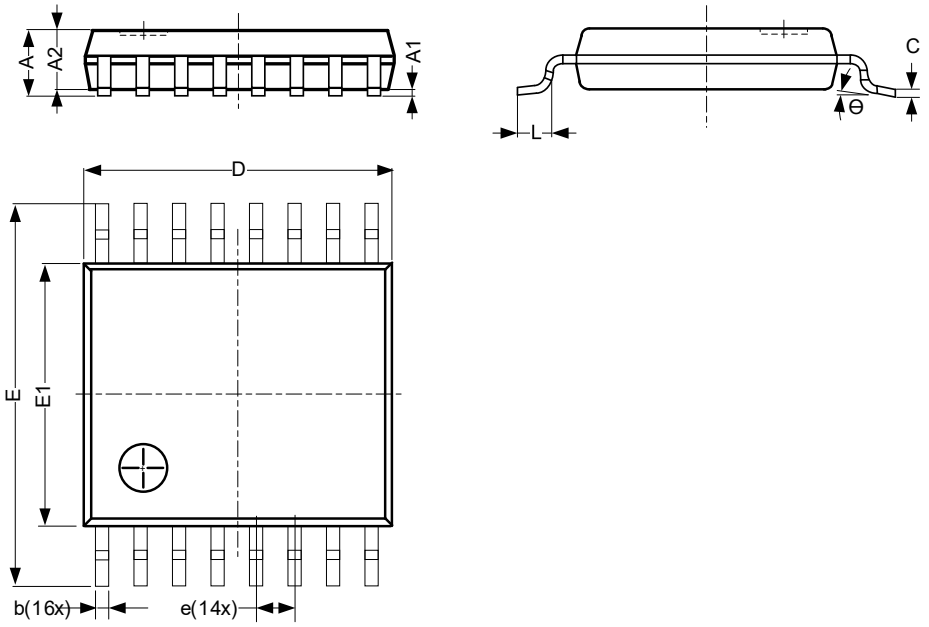
### 8.1.1 SOP16 Outline Dimensions




| SYMBOL | Dimensions In Millimeters | | |
|---|---|---|---|
| | Min. | Typ. | Max. |
| A | 1.35 | - | 1.80 |
| A1 | 0.10 | - | 0.25 |
| A2 | 1.25 | - | 1.55 |
| b | 0.33 | - | 0.51 |
| c | 0.19 | - | 0.25 |
| D | 9.50 | - | 10.10 |
| E | 5.80 | - | 6.30 |
| E1 | 3.70 | - | 4.10 |
| e | 1.27 BSC | | |
| L | 0.35 | - | 0.89 |
| θ | 0° | - | 8° |
| Unit: mm | | | |

## 8.2 TSSOP16 Mechanical Information

### 8.2.1 TSSOP16 Outline Dimensions




| SYMBOL | Dimensions In Millimeters | | |
|---|---|---|---|
| | Min. | Typ. | Max. |
| A | - | - | 1.20 |
| A1 | 0.05 | - | 0.15 |
| A2 | 0.80 | - | 1.05 |
| b | 0.19 | - | 0.30 |
| c | 0.09 | - | 0.20 |
| D | 4.90 | - | 5.10 |
| E | 6.20 | - | 6.60 |
| E1 | 4.30 | - | 4.50 |
| e | 0.65 BSC | | |
| L | 0.45 | - | 0.75 |
| θ | 0° | - | 8° |
| Unit: mm | | | |

# 9 Notes and Revision History

## 9.1 Associated Product Family and Others

To view other products of the same type or IC products of other types, click the official website of JSCJ -- ***https:www.jscj-elec.com*** for more details.

## 9.2 Notes

**Electrostatic Discharge Caution**

This IC may be damaged by ESD. Relevant personnel shall comply with correct installation and use specifications to avoid ESD damage to the IC. If appropriate measures are not taken to prevent ESD damage, the hazards caused by ESD include but are not limited to degradation of integrated circuit performance or complete damage of integrated circuit. For some precision integrated circuits, a very small parameter change may cause the whole device to be inconsistent with its published specifications.

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