



## Hex Inverting Schmitt Trigger

# CJ74ACT14 Logic

## 1 Introduction

The CJ74ACT14 is a hex schmitt-trigger inverter.

## 2 Available Packages

| PART NUMBER | PACKAGE |
|-------------|---------|
| CJ74ACT14   | SOP14   |
|             | TSSOP14 |

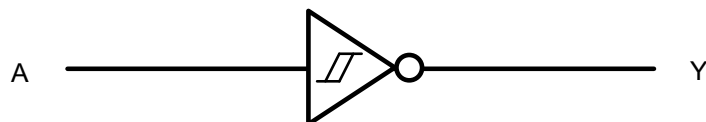
**Note:** For all available packages, please refer to the part Orderable Information.

## 3 Features

- Supply voltage range: 4.5V to 5.5V
- Temperature range: -40°C to +125°C

## 4 Applications

- Synchronize inverted clock inputs
- Debounce a switch
- Invert a digital signal



Logic diagram

## 5 Orderable Information

| DEVICE       | PACKAGE | OP TEMP   | ECO PLAN     | MSL              | PACKING OPTION                     | SORT   |
|--------------|---------|-----------|--------------|------------------|------------------------------------|--------|
| CJ74ACT14ADN | SOP14   | -40~125°C | RoHS & Green | Level 3<br>168HR | Tape and Reel<br>4000 Units / Reel | Active |
| CJ74ACT14BDN | TSSOP14 | -40~125°C | RoHS & Green | Level 3<br>168HR | Tape and Reel<br>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.

## 6 Pin Configuration and Marking Information

### 6.1 Pin Configuration

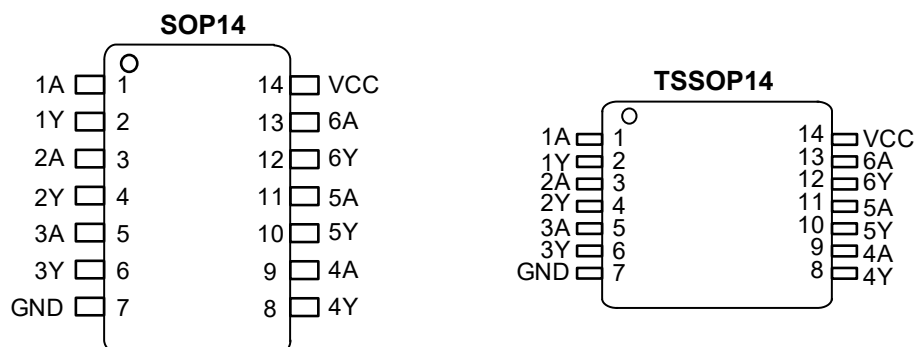


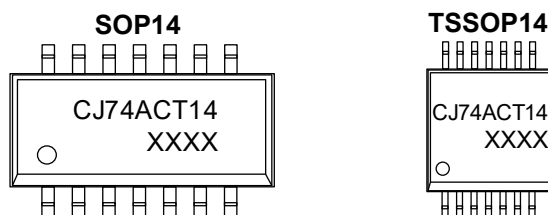
Figure 6-1 Pin configuration

### 6.2 Pin Function

| PIN |      | I/O <sup>(1)</sup> | DESCRIPTION    |
|-----|------|--------------------|----------------|
| No. | NAME |                    |                |
| 1   | 1A   | I                  | Data input     |
| 2   | 1Y   | O                  | Data output    |
| 3   | 2A   | I                  | Data input     |
| 4   | 2Y   | O                  | Data output    |
| 5   | 3A   | I                  | Data input     |
| 6   | 3Y   | O                  | Data output    |
| 7   | GND  | G                  | Ground (0V)    |
| 8   | 4Y   | O                  | Data output    |
| 9   | 4A   | I                  | Data input     |
| 10  | 5Y   | O                  | Data output    |
| 11  | 5A   | I                  | Data input     |
| 12  | 6Y   | O                  | Data output    |
| 13  | 6A   | I                  | Data input     |
| 14  | VCC  | P                  | Supply voltage |

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

### 6.3 Marking Information



XXXX: Code, indicates weekly record information.

## 7 Specifications

### 7.1 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       | V    |
| $I_{CC}$  | Continuous supply current | -                            |           | -    | 200      | mA   |
| $I_{GND}$ | Continuous ground current | -                            |           | -200 | -        | mA   |
| $I_{IK}$  | Input clamping current    | $V_I < 0V$ or $V_I > V_{CC}$ |           | -    | $\pm 20$ | mA   |
| $I_{OK}$  | Output clamping current   | $V_O < 0V$ or $V_O > V_{CC}$ |           | -    | $\pm 20$ | mA   |
| $I_O$     | Continuous output current | $V_O = 0$ to $V_{CC}$        |           | -    | $\pm 50$ | mA   |
| $T_{stg}$ | Storage temperature       | -                            |           | -65  | +150     | °C   |
| $T_L$     | 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.

### 7.2 Recommended Operating Conditions

| SYMBOL    | PARAMETER                 | CONDITIONS | MIN. | TYP. | MAX.     | UNIT |
|-----------|---------------------------|------------|------|------|----------|------|
| $V_{CC}$  | Supply voltage            | -          | 4.5  | -    | 5.5      | V    |
| $V_I$     | Input voltage             | -          | 0    | -    | $V_{CC}$ | V    |
| $V_O$     | Output voltage            | -          | 0    | -    | $V_{CC}$ | V    |
| $I_{OH}$  | High-level output current | -          | -    | -    | -24      | mA   |
| $I_{OL}$  | Low-level output current  | -          | -    | -    | 24       | mA   |
| $T_{amb}$ | Ambient temperature       | -          | -40  | -    | +125     | °C   |

### 7.3 ESD Ratings

| SYMBOL        | ESD RATINGS             |                                       | VALUE      | UNIT |
|---------------|-------------------------|---------------------------------------|------------|------|
| $V_{ESD-HBM}$ | Electrostatic discharge | Human body model (HBM) <sup>(1)</sup> | $\pm 2000$ | V    |

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

## 7.4 Electrical Characteristics

### 7.4.1 DC Characteristics

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

| SYMBOL          | PARAMETER                        | CONDITIONS                                                                                                         | MIN. | TYP. | MAX.    | UNIT          |
|-----------------|----------------------------------|--------------------------------------------------------------------------------------------------------------------|------|------|---------|---------------|
| $V_{T+}$        | Positive-going threshold voltage | $V_{CC}=4.5\text{V}$                                                                                               | 1.6  | 1.9  | 2.3     | V             |
|                 |                                  | $V_{CC}=5.5\text{V}$                                                                                               | 1.8  | 2.1  | 2.5     | V             |
| $V_{T-}$        | Negative-going threshold voltage | $V_{CC}=4.5\text{V}$                                                                                               | 0.7  | 1.1  | 1.4     | V             |
|                 |                                  | $V_{CC}=5.5\text{V}$                                                                                               | 0.8  | 1.2  | 1.6     | V             |
| $V_H$           | Hysteresis voltage               | $V_{CC}=4.5\text{V}$                                                                                               | 0.4  | 0.8  | 1.4     | V             |
|                 |                                  | $V_{CC}=5.5\text{V}$                                                                                               | 0.4  | 0.9  | 1.5     | V             |
| $V_{OH}$        | HIGH-level output voltage        | $I_O=-50\mu\text{A}; V_{CC}=4.5\text{V}$                                                                           | 4.4  | -    | -       | V             |
|                 |                                  | $I_O=-24\text{mA}; V_{CC}=4.5\text{V}$                                                                             | 3.76 | -    | -       | V             |
|                 |                                  | $I_O=-50\mu\text{A}; V_{CC}=5.5\text{V}$                                                                           | 5.4  | -    | -       | V             |
|                 |                                  | $I_O=-24\text{mA}; V_{CC}=5.5\text{V}$                                                                             | 4.76 | -    | -       | V             |
|                 |                                  | $I_O=-75\text{mA}; V_{CC}=5.5\text{V}$                                                                             | 3.85 | -    | -       | V             |
| $V_{OL}$        | LOW-level output voltage         | $I_O=50\mu\text{A}; V_{CC}=4.5\text{V}$                                                                            | -    | -    | 0.1     | V             |
|                 |                                  | $I_O=24\text{mA}; V_{CC}=4.5\text{V}$                                                                              | -    | -    | 0.44    | V             |
|                 |                                  | $I_O=50\mu\text{A}; V_{CC}=5.5\text{V}$                                                                            | -    | -    | 0.1     | V             |
|                 |                                  | $I_O=24\text{mA}; V_{CC}=5.5\text{V}$                                                                              | -    | -    | 0.44    | V             |
|                 |                                  | $I_O=75\text{mA}; V_{CC}=5.5\text{V}$                                                                              | -    | -    | 1.65    | V             |
| $I_I$           | Input leakage current            | $V_I=V_{CC}$ or GND; $V_{CC}=5.5\text{V}$                                                                          | -    | -    | $\pm 1$ | $\mu\text{A}$ |
| $I_{CC}$        | Supply current                   | $V_I=V_{CC}$ or GND; $I_O=0\text{A}; V_{CC}=5.5\text{V}$                                                           | -    | -    | 20      | $\mu\text{A}$ |
| $\Delta I_{CC}$ | Additional supply current        | One input at $V_I=V_{CC}-2.1\text{V}$ ;<br>Other inputs at $V_{CC}$ or GND;<br>$I_O=0\text{A}; V_{CC}=5.5\text{V}$ | -    | -    | 1.5     | mA            |

### 7.4.2 AC Characteristics

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

| SYMBOL    | PARAMETER                | CONDITIONS     |                                                           | MIN. | TYP. | MAX. | UNIT |
|-----------|--------------------------|----------------|-----------------------------------------------------------|------|------|------|------|
| $t_{PLH}$ | A to Y propagation delay | See Figure 8-3 | $C_L=50\text{pF}; R_L=50\Omega$ ;<br>$V_{CC}=5.5\text{V}$ | -    | -    | 15   | ns   |
| $t_{PHL}$ |                          |                |                                                           | -    | -    | 13.2 | ns   |

## 8 Detailed Description

### 8.1 Overview

The CJ74ACT14 is a hex schmitt-trigger inverter.

### 8.2 Functional Block Diagram

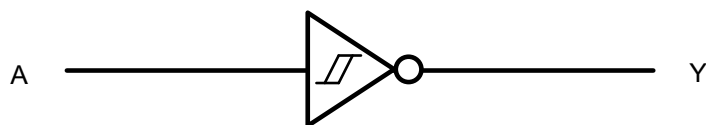


Figure 8-1 Logic symbol

### 8.3 Function Table<sup>(1)</sup>

| INPUT | OUTPUT |
|-------|--------|
| H     | L      |
| L     | H      |

(1) H=HIGH voltage level; L=LOW voltage level.

## 8.4 Testing Circuit

### 8.4.1 AC Testing Circuit

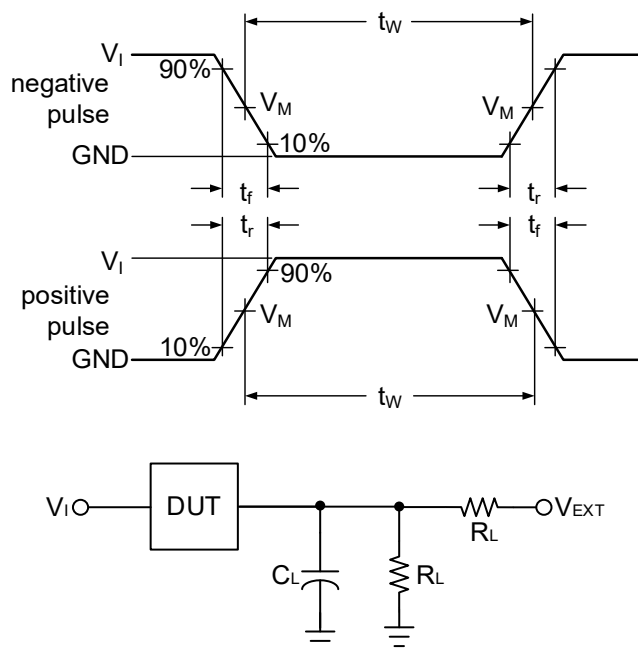


Figure 8-2 Test circuit for measuring switching times

Definitions for test circuit:

$C_L$  includes probe and jig capacitance.

### 8.4.2 AC Testing Waveforms

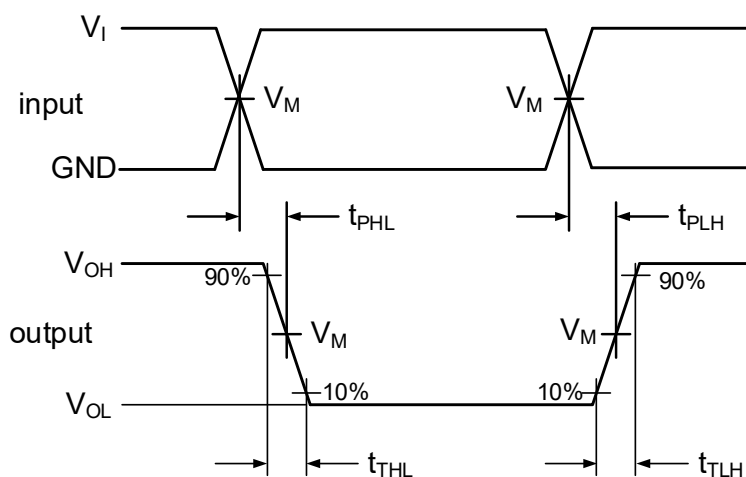


Figure 8-3 The data input (A) to output (Y) propagation delays

## 8.4.3 Measurement Points

| SUPPLY VOLTAGE | INPUT               | OUTPUT              |
|----------------|---------------------|---------------------|
| $V_{CC}$       | $V_M$               | $V_M$               |
| 4.5V to 5.5V   | $0.5 \times V_{CC}$ | $0.5 \times V_{CC}$ |

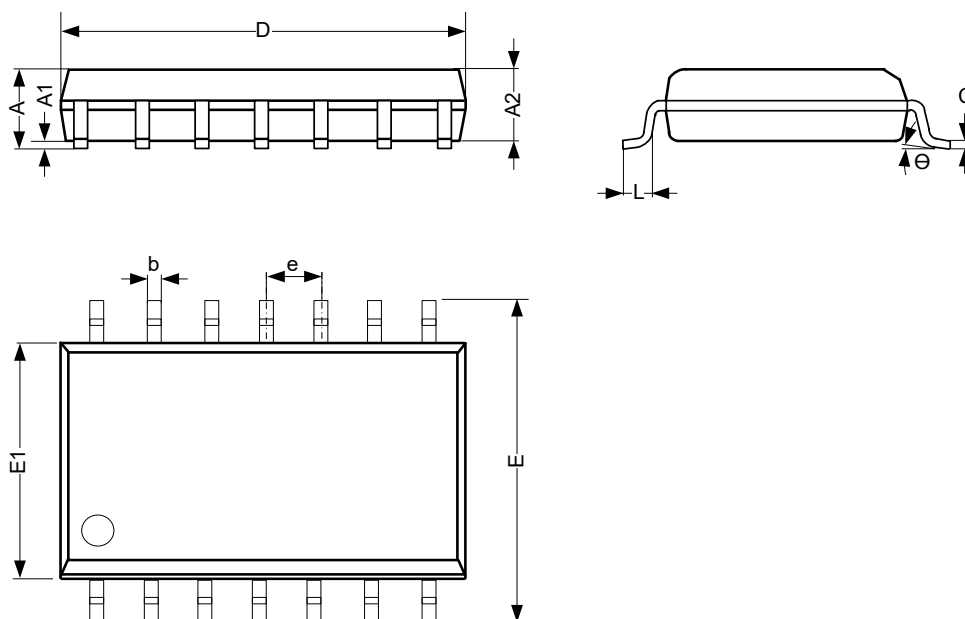
## 8.4.4 Test Data

| SUPPLY VOLTAGE | INPUT    |             | LOAD  |       | $V_{EXT}$         |                   |                   |
|----------------|----------|-------------|-------|-------|-------------------|-------------------|-------------------|
| $V_{CC}$       | $V_I$    | $t_r = t_f$ | $C_L$ | $R_L$ | $t_{PLH}/t_{PHL}$ | $t_{PLZ}/t_{PZL}$ | $t_{PHZ}/t_{PZH}$ |
| 4.5V to 5.5V   | $V_{CC}$ | 3.0ns       | 50pF  | 500Ω  | Open              | $2 \times V_{CC}$ | GND               |

## 9 Mechanical Information

### 9.1 SOP14 Mechanical Information

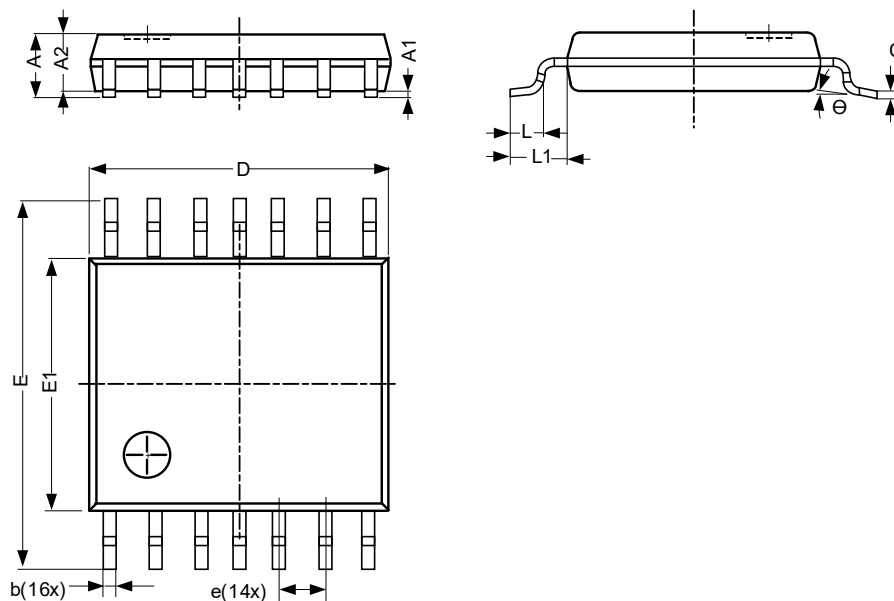
#### 9.1.1 SOP14 Outline Dimensions



| SYMBOL   | Dimensions In Millimeters |      |      |
|----------|---------------------------|------|------|
|          | Min.                      | Typ. | Max. |
| A        | 1.50                      | -    | 1.75 |
| A1       | 0.05                      | -    | 0.25 |
| A2       | 1.30                      | -    | -    |
| b        | 0.33                      | -    | 0.50 |
| c        | 0.19                      | -    | 0.25 |
| D        | 8.43                      | -    | 8.76 |
| E        | 5.80                      | -    | 6.25 |
| E1       | 3.75                      | -    | 4.00 |
| e        | 1.27 BSC                  |      |      |
| L        | 0.40                      | -    | 0.89 |
| Θ        | 0°                        | -    | 8°   |
| Unit: mm |                           |      |      |

## 9.2 TSSOP14 Mechanical Information

### 9.2.1 TSSOP14 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 |
| L1       | -                         | 1.00 | -    |
| $\theta$ | 0°                        | -    | 8°   |
| Unit: mm |                           |      |      |

## **10 Notes and Revision History**

### **10.1 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.

### **10.2 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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