**Quad 2-input AND Gate**

# CJ74LVC08 Logic

## 1 Introduction

The CJ74LVC08 provides four 2-input AND gates.

Inputs can be driven from either 3.3V or 5V devices. This feature allows the use of these devices as translators in mixed 3.3V and 5V applications.

## 2 Available Packages

| PART NUMBER | PACKAGE |
|---|---|
| CJ74LVC08 | SOP14 |
| | TSSOP14 |
| | QFN3.5x3.5-14L |

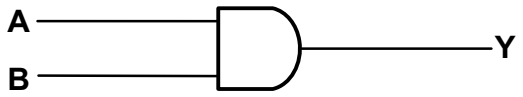
**Note:** For all available packages, please refer to the part Orderable Information.

## 3 Features

- 5V tolerant inputs for interfacing with 5V logic
- Wide supply voltage range from 1.2V to 3.6V
- CMOS low power consumption
- Direct interface with TTL levels
- Specified from -40°C to +125°C

## 4 Applications

- Servers
- LED Displays
- Network Switches
- I/O Expanders
- Base Station Processor Board




Logic diagram

## 5 Orderable Information

| DEVICE | PACKAGE | OP TEMP | ECO PLAN | MSL | PACKING OPTION | SORT |
|---|---|---|---|---|---|---|
| CJ74LVC08ADN | SOP14 | -40~125°C | RoHS & Green | Level 3 168HR | Tape and Reel 4000 Units / Reel | Active |
| CJ74LVC08BDN | TSSOP14 | -40~125°C | RoHS & Green | Level 3 168HR | Tape and Reel 5000 Units / Reel | Active |
| CJ74LVC08QIN | QFN3.5x3.5-14L | -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.

# 6 Pin Configuration and Marking Information

## 6.1 Pin Configuration

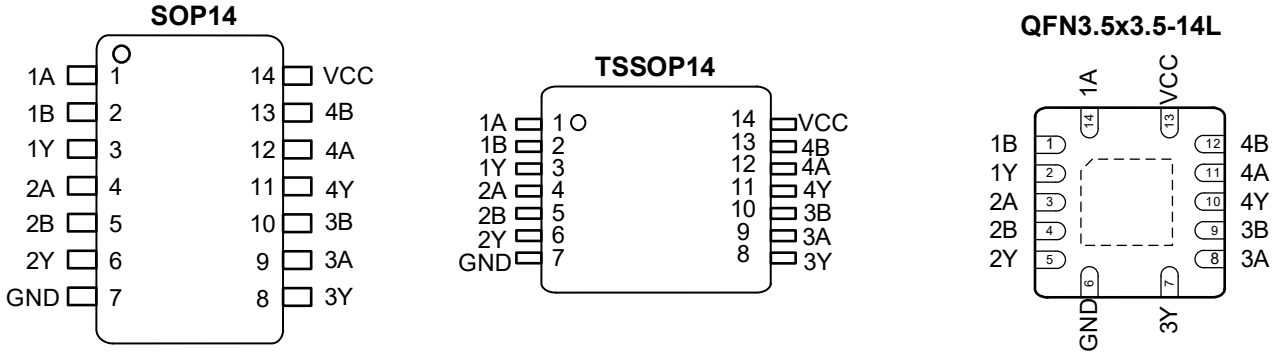


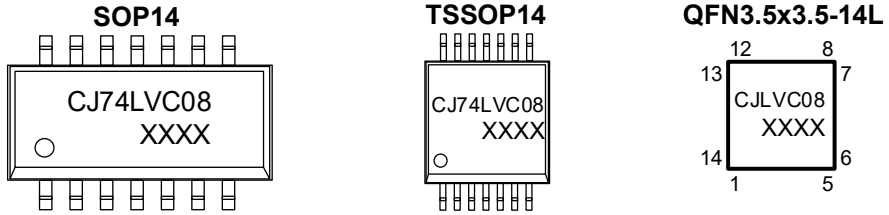

**Figure 6-1 Pin configuration**

## 6.2 Pin Function

| PIN | | NAME | I/O(1) | DESCRIPTION |
|---|---|---|---|---|
| No. | | | | |
| SOP14/TSSOP14 | QFN3.5x3.5-14L | | | |
| 1 | 14 | 1A | I | Data input |
| 2 | 1 | 1B | I | Data input |
| 3 | 2 | 1Y | O | Data output |
| 4 | 3 | 2A | I | Data input |
| 5 | 4 | 2B | I | Data input |
| 6 | 5 | 2Y | O | Data output |
| 7 | 6 | GND | G | Ground (0V) |
| 8 | 7 | 3Y | O | Data output |
| 9 | 8 | 3A | I | Data input |
| 10 | 9 | 3B | I | Data input |
| 11 | 10 | 4Y | O | Data output |
| 12 | 11 | 4A | I | Data input |
| 13 | 12 | 4B | I | Data input |
| 14 | 13 | 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 | +6.5 | V |
| $I_{IK}$ | Input clamping current | $V_I$ < 0V | -50 | - | mA |
| $V_I$ | Input voltage | - | -0.5 | +6.5 | V |
| $I_{OK}$ | Output clamping current | $V_O$ > $V_{CC}$ or $V_O$ < 0V | - | ±50 | mA |
| $V_O$ | Output voltage | Output in HIGH or LOW-state | -0.5 | $V_{CC}$+0.5 | V |
| $I_O$ | Output current | $V_O$=0V to $V_{CC}$ | - | ±50 | mA |
| $I_{CC}$ | Supply current | - | - | 100 | mA |
| $I_{GND}$ | Ground current | - | -100 | - | mA |
| $P_{tot}$ | Total power dissipation | - | - | 500 | mW |
| $T_{stg}$ | Storage temperature | - | -65 | +150 | °C |
| $T_L$ | Soldering Temperature | 10s | - | 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 | - | 1.65 | - | 3.6 | V |
| | | Functional | 1.2 | - | - | V |
| $V_I$ | Input voltage | - | 0 | - | 5.5 | V |
| $V_O$ | Output voltage | Output HIGH or LOW state | 0 | - | $V_{CC}$ | V |
| $T_{amb}$ | Ambient temperature | - | -40 | - | +125 | °C |
| Δt/ΔV | Input transition rise and fall rate | $V_{CC}$=1.65V to 2.7V | 0 | - | 20 | ns/V |
| | | $V_{CC}$=2.7V to 3.6V | 0 | - | 10 | ns/V |

## 7.3 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.

## 7.4 Electrical Characteristics

### 7.4.1 DC Characteristics 1

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

| SYMBOL | PARAMETER | CONDITIONS | | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|---|
| $V_{IH}$ | HIGH-level input voltage | $V_{CC}$=1.2V | | 1.08 | - | - | V |
| | | $V_{CC}$=1.65V to 1.95V | | 0.65x$V_{CC}$ | - | - | V |
| | | $V_{CC}$=2.3V to 2.7V | | 1.7 | - | - | V |
| | | $V_{CC}$=2.7V to 3.6V | | 2.0 | - | - | V |
| $V_{IL}$ | LOW-level input voltage | $V_{CC}$=1.2V | | - | - | 0.12 | V |
| | | $V_{CC}$=1.65V to 1.95V | | - | - | 0.35x$V_{CC}$ | V |
| | | $V_{CC}$=2.3V to 2.7V | | - | - | 0.7 | V |
| | | $V_{CC}$=2.7V to 3.6V | | - | - | 0.8 | V |
| $V_{OH}$ | HIGH-level output voltage | $V_I$ = $V_{IH}$ or $V_{IL}$ | $I_O$=-100uA; $V_{CC}$=1.65V to 3.6V | $V_{CC}$-0.2 | - | - | V |
| | | | $I_O$=-4mA; $V_{CC}$=1.65V | 1.2 | - | - | V |
| | | | $I_O$=-8mA; $V_{CC}$=2.3V | 1.8 | - | - | V |
| | | | $I_O$=-12mA; $V_{CC}$=2.7V | 2.2 | - | - | V |
| | | | $I_O$=-18mA; $V_{CC}$=3.0V | 2.4 | - | - | V |
| | | | $I_O$=-24mA; $V_{CC}$=3.0V | 2.2 | - | - | V |
| $V_{OL}$ | LOW-level output voltage | $V_I$ = $V_{IH}$ or $V_{IL}$ | $I_O$=100uA; $V_{CC}$=1.65V to 3.6V | - | - | 0.2 | V |
| | | | $I_O$=4mA; $V_{CC}$=1.65V | - | - | 0.45 | V |
| | | | $I_O$=8mA; $V_{CC}$=2.3V | - | - | 0.6 | V |
| | | | $I_O$=12mA; $V_{CC}$=2.7V | - | - | 0.4 | V |
| | | | $I_O$=24mA; $V_{CC}$=3.0V | - | - | 0.55 | V |
| $I_I$ | Input leakage current | $V_I$=5.5V or GND;$V_{CC}$=3.6V | | - | - | ±5 | uA |
| $I_{CC}$ | Supply current | $V_I$=$V_{CC}$ or GND; $I_O$=0A; $V_{CC}$=3.6V | | - | - | 15 | uA |
| $\Delta I_{CC}$ | Additional supply current | Per input pin; $V_I$=$V_{CC}$-0.6V; $I_O$=0A; $V_{CC}$=2.7V to 3.6V | | - | - | 500 | uA |
| $C_I$ | Input capacitance | $V_{CC}$=0V to 3.6V; $V_I$= GND to $V_{CC}$ | | - | 4.0 | - | pF |

**Note:** All typical values are measured at $V_{CC}$=3.3V (unless stated otherwise) and $T_{amb}$=25°C.

### 7.4.2 DC Characteristics 2

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

| SYMBOL | PARAMETER | CONDITIONS | | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|---|
| $V_{IH}$ | HIGH-level input voltage | $V_{CC}$=1.2V | | 1.08 | - | - | V |
| | | $V_{CC}$=1.65V to 1.95V | | 0.65x$V_{CC}$ | - | - | V |
| | | $V_{CC}$=2.3V to 2.7V | | 1.7 | - | - | V |
| | | $V_{CC}$=2.7V to 3.6V | | 2.0 | - | - | V |
| $V_{IL}$ | LOW-level input voltage | $V_{CC}$=1.2V | | - | - | 0.12 | V |
| | | $V_{CC}$=1.65V to 1.95V | | - | - | 0.35x$V_{CC}$ | V |
| | | $V_{CC}$=2.3V to 2.7V | | - | - | 0.7 | V |
| | | $V_{CC}$=2.7V to 3.6V | | - | - | 0.8 | V |
| $V_{OH}$ | HIGH-level output voltage | $V_I$ = $V_{IH}$ or $V_{IL}$ | $I_O$=-100uA; $V_{CC}$=1.65V to 3.6V | $V_{CC}$-0.3 | - | - | V |
| | | | $I_O$=-4mA; $V_{CC}$=1.65V | 1.05 | - | - | V |
| | | | $I_O$=-8mA; $V_{CC}$=2.3V | 1.65 | - | - | V |
| | | | $I_O$=-12mA; $V_{CC}$=2.7V | 2.05 | - | - | V |
| | | | $I_O$=-18mA; $V_{CC}$=3.0V | 2.25 | - | - | V |
| | | | $I_O$=-24mA; $V_{CC}$=3.0V | 2.0 | - | - | V |
| $V_{OL}$ | LOW-level output voltage | $V_I$ = $V_{IH}$ or $V_{IL}$ | $I_O$=100uA; $V_{CC}$=1.65V to 3.6V | - | - | 0.3 | V |
| | | | $I_O$=4mA; $V_{CC}$=1.65V | - | - | 0.65 | V |
| | | | $I_O$=8mA; $V_{CC}$=2.3V | - | - | 0.8 | V |
| | | | $I_O$=12mA; $V_{CC}$=2.7V | - | - | 0.6 | V |
| | | | $I_O$=24mA; $V_{CC}$=3.0V | - | - | 0.8 | V |
| $I_I$ | Input leakage current | $V_I$=5.5V or GND;$V_{CC}$=3.6V | | - | - | ±20 | uA |
| $I_{CC}$ | Supply current | $V_I$=$V_{CC}$ or GND; $I_O$=0A; $V_{CC}$=3.6V | | - | - | 200 | uA |
| $\Delta I_{CC}$ | Additional supply current | Per input pin; $V_I$=$V_{CC}$-0.6V; $I_O$=0A; $V_{CC}$=2.7V to 3.6V | | - | - | 5000 | uA |

**Note:** All typical values are measured at $V_{CC}$=3.3V (unless stated otherwise) and $T_{amb}$=25°C.

### 7.4.3 AC Characteristics 1

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

| SYMBOL | PARAMETER | CONDITIONS | | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|---|
| $t_{pd}$ | nA, nB to nY propagation delay | See Figure 8-5 | $V_{CC}$=1.2V | - | 11.0 | - | ns |
| | | | $V_{CC}$=1.65V to 1.95V | 0.5 | 4.2 | 9.0 | ns |
| | | | $V_{CC}$=2.3V to 2.7V | 1.0 | 2.5 | 6.9 | ns |
| | | | $V_{CC}$=2.7V | 1.5 | 2.5 | 4.8 | ns |
| | | | $V_{CC}$=3.0V to 3.6V | 1.0 | 2.3 | 4.1 | ns |
| $t_{sk(o)}$ | Output skew time | $V_{CC}$=3.0V to 3.6V | | - | - | 1.0 | ns |
| $C_{PD}$ | Power dissipation capacitance | Per gate; $V_I$= GND to $V_{CC}$ | $V_{CC}$=1.65V to 1.95V | - | 4.4 | - | pF |
| | | | $V_{CC}$=2.3V to 2.7V | - | 7.7 | - | pF |
| | | | $V_{CC}$=3.0V to 3.6V | - | 10.5 | - | pF |

**Note:**

(1) Typical values are measured at $T_{amb}$=25°C and $V_{CC}$=1.2V, 1.8V, 2.5V, 2.7V and 3.3V respectively.

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

(3) Skew between any two outputs of the same package switching in the same direction. This parameter is guaranteed by design.

(4) $C_{PD}$ 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.

### 7.4.4 AC Characteristics 2

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

| SYMBOL | PARAMETER | CONDITIONS | | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|---|
| $t_{pd}$ | nA, nB to nY propagation delay | See Figure 8-5 | $V_{CC}$=1.65V to 1.95V | 0.5 | - | 10.4 | ns |
| | | | $V_{CC}$=2.3V to 2.7V | 1.0 | - | 8.0 | ns |
| | | | $V_{CC}$=2.7V | 1.5 | - | 5.6 | ns |
| | | | $V_{CC}$=3.0V to 3.6V | 1.0 | - | 4.8 | ns |
| $t_{sk(o)}$ | Output skew time | $V_{CC}$=3.0V to 3.6V | | - | - | 1.5 | ns |

**Note:**

(1) Typical values are measured at $T_{amb}$=25°C and $V_{CC}$=1.2V, 1.8V, 2.5V, 2.7V and 3.3V respectively.

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

(3) Skew between any two outputs of the same package switching in the same direction. This parameter is guaranteed by design.

# 8 Detailed Description

## 8.1 Overview

The CJ74LVC08 provides four 2-input AND gates.

Inputs can be driven from either 3.3V or 5V devices. This feature allows the use of these devices as translators in mixed 3.3V and 5V applications.

## 8.2 Functional Block Diagram

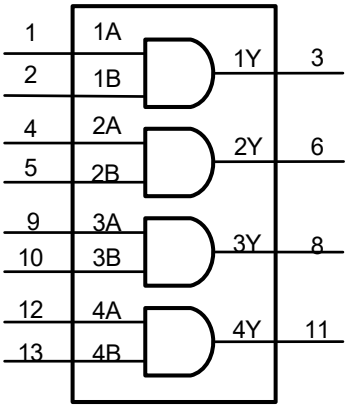



**Figure 8-1 Logic symbol**

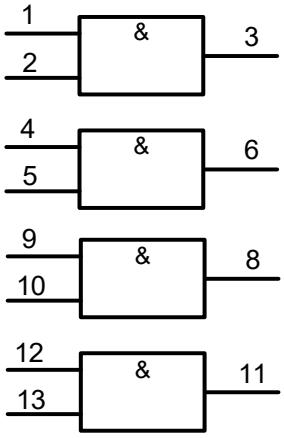



**Figure 8-2 IEC Logic symbol**

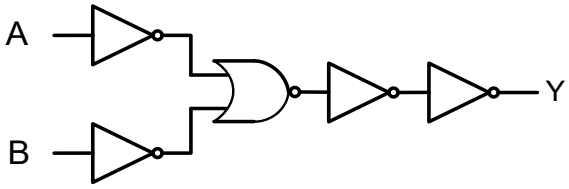



**Figure 8-3 Logic diagram for one gate**

## 8.3 Function Table

| INPUT | | OUTPUT |
|---|---|---|
| **nA** | **nB** | **nY** |
| L | X | L |
| X | L | L |
| H | H | H |

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

## 8.4 Testing Circuit

### 8.4.1 AC Testing Circuit

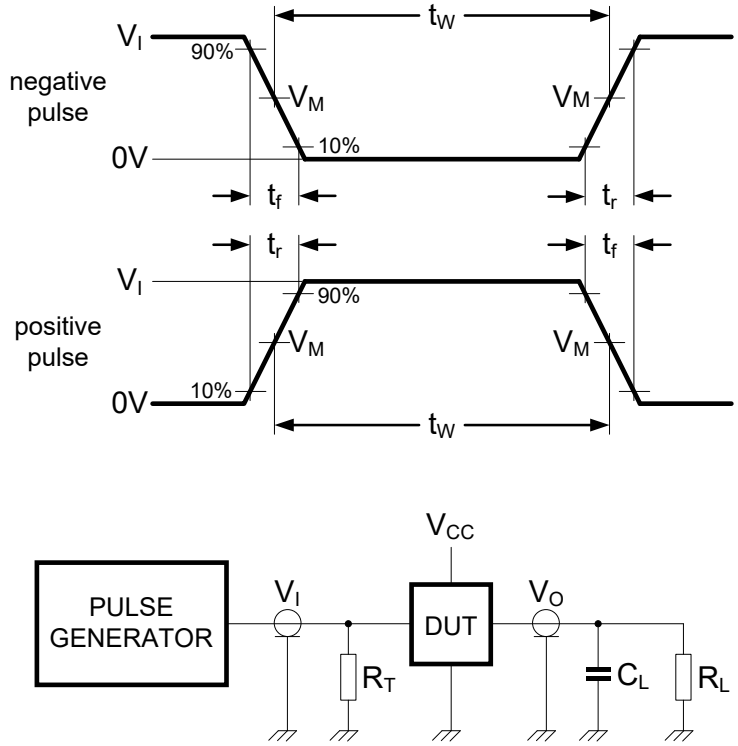



**Figure 8-4 Test circuit for measuring switching times**

Definitions for test circuit:

$R_L$=Load resistance.

$C_L$=Load capacitance including jig and probe capacitance.

$R_T$=Termination resistance should be equal to the output impedance $Z_o$ of the pulse generator.

### 8.4.2 AC Testing Waveforms

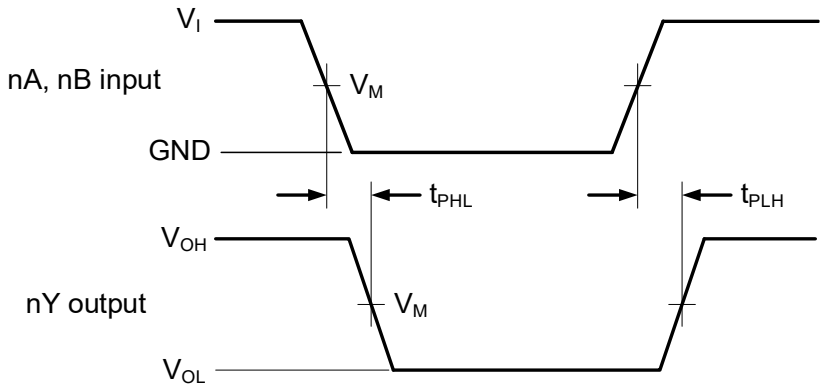



**Figure 8-5. The input (nA, nB) to output (nY) propagation delays**

### 8.4.3 Measurement Points

| SUPPLY VOLTAGE | INPUT | OUTPUT |
|---|---|---|
| $V_{CC}$ | $V_M$ | $V_M$ |
| < 2.7V | 0.5x$V_{CC}$ | 0.5x$V_{CC}$ |
| ≥ 2.7V | 1.5V | 1.5V |

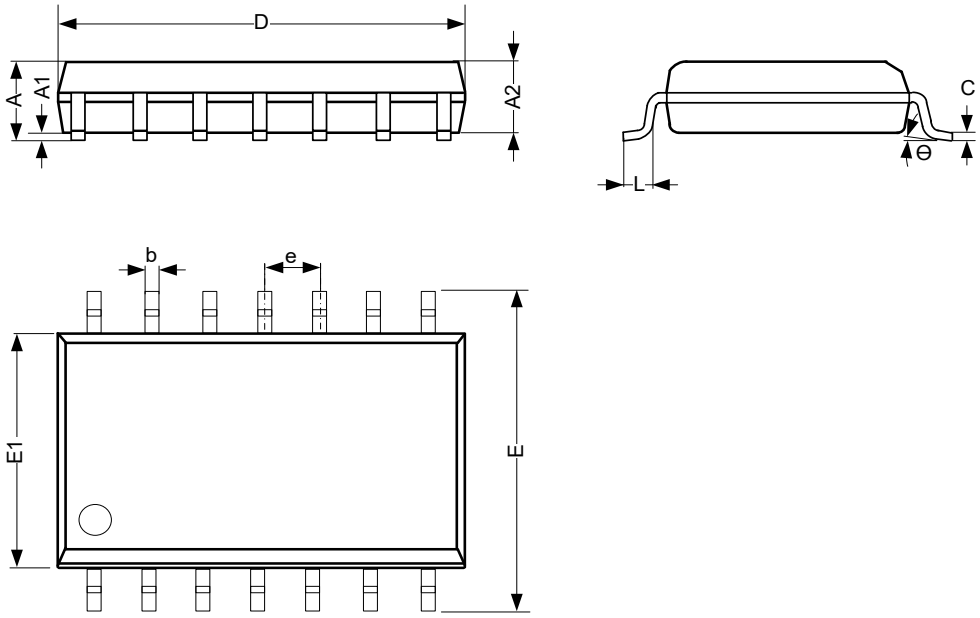
### 8.4.4 Test Data

| SUPPLY VOLTAGE | INPUT | | LOAD | |
|---|---|---|---|---|
| $V_{CC}$ | $V_I$ | $t_r$, $t_f$ | $C_L$ | $R_L$ |
| 1.2V | $V_{CC}$ | ≤ 2.0ns | 30pF | 1kΩ |
| 1.65V to 1.95V | $V_{CC}$ | ≤ 2.0ns | 30pF | 1kΩ |
| 2.3V to 2.7V | $V_{CC}$ | ≤ 2.0ns | 30pF | 500Ω |
| 2.7V | 2.7V | ≤ 2.5ns | 50pF | 500Ω |
| 3.0V to 3.6V | 2.7V | ≤ 2.5ns | 50pF | 500Ω |

# 9 Mechanical Information

## 9.1 SOP14 Mechanical Information

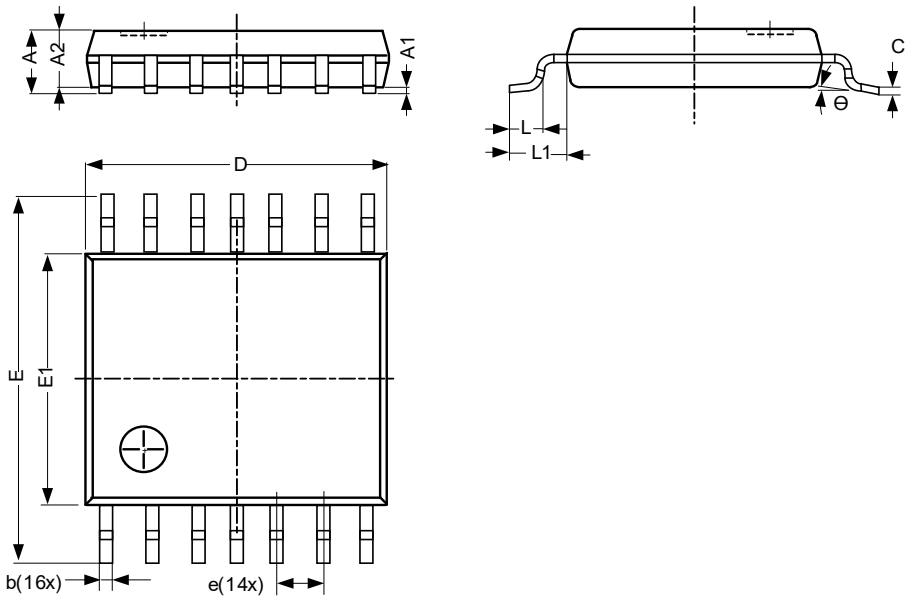
### 9.1.1 SOP14 Outline Dimensions




| 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

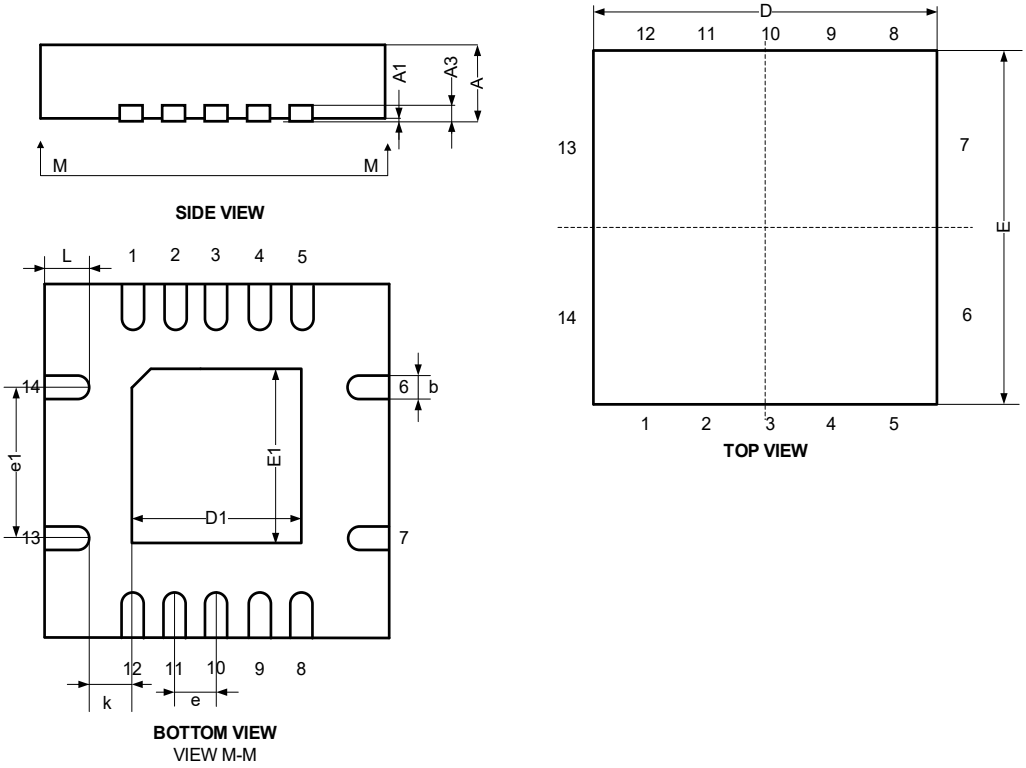
### 9.2.1 TSSOP14 Outline Dimensions




| 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 | - |
| θ | 0° | - | 8° |
| Unit: mm | | | |

## 9.3 QFN3.5x3.5-14L Mechanical Information

### 9.3.1 QFN3.5x3.5-14L Outline Dimensions




| SYMBOL | Dimensions In Millimeters | | |
|---|---|---|---|
| | Min. | Typ. | Max. |
| A | 0.70 | - | 0.90 |
| A1 | 0 | - | 0.05 |
| A3 | 0.203 REF | | |
| D | 3.424 | - | 3.576 |
| E | 3.424 | - | 3.576 |
| D1 | 1.95 | - | 2.15 |
| E1 | 1.95 | - | 2.15 |
| k | 0.20 | - | - |
| b | 0.20 | - | 0.30 |
| e | 0.50 BSC | | |
| e1 | 1.50 BSC | | |
| L | 0.324 | - | 0.476 |
| 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.

## 10.3 Revision History

**August, 2025: rev - 1.1, Correct symbol from $V_{OL}$ to $I_I$ in 7.4.2.**

# DISCLAIMER

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