

Hex Buffer with Open-drain Outputs

**CJ74LVC07**      Logic

**1 Introduction**

The CJ74LVC07 provides six non-inverting buffers. The outputs are open-drain and can be connected to other open-drain outputs to implement active-LOW wired-OR or active-HIGH wired-AND functions.

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
CJ74LVC07	SOP14
	TSSOP14
	QFN3.5x3.5-14L

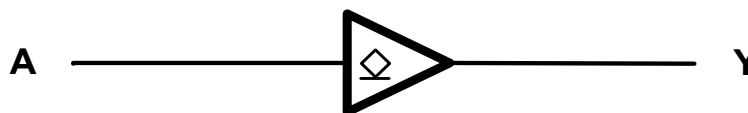
**Note:** For all available packages, please refer to the part Orderable Information.

**3 Features**

- 5V tolerant inputs and outputs (open-drain) for interfacing with 5V logic
- Wide supply voltage range from 1.2V to 5.5V
- CMOS low power consumption
- Direct interface with TTL levels
- Inputs accept voltages up to 5V
- Specified from -40°C to +125°C

**4 Applications**

- AV Receiver
- Audio Dock: Portable
- Blu-ray Player and Home Theater
- MP3 Player or Recorder
- Personal Digital Assistant (PDA)
- Power: Telecom/Server AC/DC Supply: Single Controller: Analog and Digital
- Solid State Drive (SSD): Client and Enterprise
- TV: LCD, Digital, and High-Definition (HDTV)
- Tablet: Enterprise
- Video Analytics: Server
- Wireless Headset, Keyboard, and Mouse



Simplified schematic

**5 Orderable Information**

DEVICE	PACKAGE	OP TEMP	ECO PLAN	MSL	PACKING OPTION	SORT
CJ74LVC07ADN	SOP14	-40~125°C	RoHS & Green	Level 3 168HR	Tape and Reel 4000 Units / Reel	Active
CJ74LVC07BDN	TSSOP14	-40~125°C	RoHS & Green	Level 3 168HR	Tape and Reel 5000 Units / Reel	Active
CJ74LVC07QIN	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

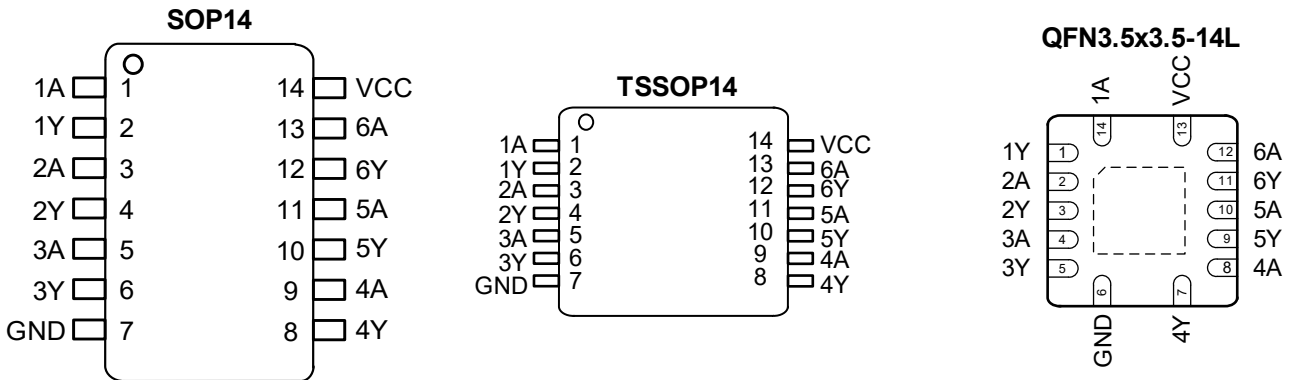


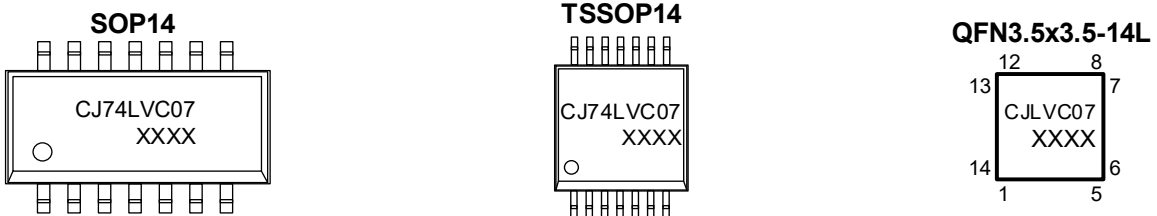
Figure 6-1 Pin configuration

### 6.2 Pin Function

PIN			I/O <sup>(1)</sup>	DESCRIPTION
No.		NAME		
SOP14/TSSOP14	QFN3.5x3.5-14L			
1	14	1A	I	Data input
2	1	1Y	O	Data output
3	2	2A	I	Data input
4	3	2Y	O	Data output
5	4	3A	I	Data input
6	5	3Y	O	Data output
7	6	GND	G	Ground (0V)
8	7	4Y	O	Data output
9	8	4A	I	Data input
10	9	5Y	O	Data output
11	10	5A	I	Data input
12	11	6Y	O	Data output
13	12	6A	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	$V_O < 0V$	-50	-	mA
$V_O$	Output voltage	Active mode	-0.5	+6.5	V
		High-impedance mode	-0.5	+6.5	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	-	5.5	V
		Functional	1.2	-	-	V
$V_I$	Input voltage	-	0	-	5.5	V
$V_O$	Output voltage	Active mode	0	-	$V_{CC}$	V
		High-impedance mode	0	-	5.5	V
$T_{amb}$	Ambient temperature	-	-40	-	+125	°C
$\Delta t/\Delta V$	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 Electrical Characteristics**
**7.3.1 DC Characteristics 1**
 $T_{amb} = -40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$ , voltages are referenced to GND (ground=0V), unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT	
$V_{IH}$	HIGH-level input voltage	$V_{CC}=1.2\text{V}$	1.08	-	-	V	
		$V_{CC}=1.65\text{V}$ to $1.95\text{V}$	$0.65 \times V_{CC}$	-	-	V	
		$V_{CC}=2.3\text{V}$ to $2.7\text{V}$	1.7	-	-	V	
		$V_{CC}=2.7\text{V}$ to $3.6\text{V}$	2.0	-	-	V	
		$V_{CC}=4.5\text{V}$ to $5.5\text{V}$	$0.7 \times V_{CC}$	-	-	V	
$V_{IL}$	LOW-level input voltage	$V_{CC}=1.2\text{V}$	-	-	0.12	V	
		$V_{CC}=1.65\text{V}$ to $1.95\text{V}$	-	-	$0.35 \times V_{CC}$	V	
		$V_{CC}=2.3\text{V}$ to $2.7\text{V}$	-	-	0.7	V	
		$V_{CC}=2.7\text{V}$ to $3.6\text{V}$	-	-	0.8	V	
		$V_{CC}=4.5\text{V}$ to $5.5\text{V}$	-	-	$0.30 \times V_{CC}$	V	
$V_{OL}$	LOW-level output voltage	$V_I = V_{IH}$ or $V_{IL}$	$I_O=100\mu\text{A}$ ; $V_{CC}=1.65\text{V}$ to $5.5\text{V}$	-	-	0.20	V
			$I_O=4\text{mA}$ ; $V_{CC}=1.65\text{V}$	-	-	0.45	V
			$I_O=8\text{mA}$ ; $V_{CC}=2.3\text{V}$	-	-	0.3	V
			$I_O=12\text{mA}$ ; $V_{CC}=2.7\text{V}$	-	-	0.4	V
			$I_O=24\text{mA}$ ; $V_{CC}=3.0\text{V}$	-	-	0.55	V
			$I_O=32\text{mA}$ ; $V_{CC}=4.5\text{V}$	-	-	0.55	V
$I_I$	Input leakage current	$V_I=5.5\text{V}$ or GND; $V_{CC}=1.65\text{V}$ to $5.5\text{V}$	-	-	$\pm 5$	$\mu\text{A}$	
$I_{OZ}$	OFF-state output current	$V_I=V_{IH}$ ; $V_O=5.5\text{V}$ or GND; $V_{CC}=1.65\text{V}$ to $5.5\text{V}$	-	-	$\pm 10$	$\mu\text{A}$	
$I_{OFF}$	Power-off leakage current	$V_I$ or $V_O=5.5\text{V}$ ; $V_{CC}=0\text{V}$	-	-	$\pm 10$	$\mu\text{A}$	
$I_{CC}$	Supply current	$V_I=V_{CC}$ or GND; $I_O=0\text{A}$ ; $V_{CC}=5.5\text{V}$	-	-	10	$\mu\text{A}$	
$\Delta I_{CC}$	Additional supply current	Per input pin; $V_I=V_{CC}-0.6\text{V}$ ; $I_O=0\text{A}$ ; $V_{CC}=2.7\text{V}$ to $5.5\text{V}$	-	-	500	$\mu\text{A}$	
$C_I$	Input capacitance	$V_{CC}=0\text{V}$ to $5.5\text{V}$ ; $V_I=$ GND to $V_{CC}$	-	5.0	-	pF	

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

**7.3.2 DC Characteristics 2**

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT	
$V_{IH}$	HIGH-level input voltage	$V_{CC}=1.2\text{V}$	1.08	-	-	V	
		$V_{CC}=1.65\text{V}$ to $1.95\text{V}$	$0.65 \times V_{CC}$	-	-	V	
		$V_{CC}=2.3\text{V}$ to $2.7\text{V}$	1.7	-	-	V	
		$V_{CC}=2.7\text{V}$ to $3.6\text{V}$	2.0	-	-	V	
		$V_{CC}=4.5\text{V}$ to $5.5\text{V}$	$0.7 \times V_{CC}$	-	-	V	
$V_{IL}$	LOW-level input voltage	$V_{CC}=1.2\text{V}$	-	-	0.12	V	
		$V_{CC}=1.65\text{V}$ to $1.95\text{V}$	-	-	$0.35 \times V_{CC}$	V	
		$V_{CC}=2.3\text{V}$ to $2.7\text{V}$	-	-	0.7	V	
		$V_{CC}=2.7\text{V}$ to $3.6\text{V}$	-	-	0.8	V	
		$V_{CC}=4.5\text{V}$ to $5.5\text{V}$	-	-	$0.30 \times V_{CC}$	V	
$V_{OL}$	LOW-level output voltage	$V_I = V_{IH}$ or $V_{IL}$	$I_O=100\mu\text{A}$ ; $V_{CC}=1.65\text{V}$ to $5.5\text{V}$	-	-	0.30	V
			$I_O=4\text{mA}$ ; $V_{CC}=1.65\text{V}$	-	-	0.6	V
			$I_O=8\text{mA}$ ; $V_{CC}=2.3\text{V}$	-	-	0.75	V
			$I_O=12\text{mA}$ ; $V_{CC}=2.7\text{V}$	-	-	0.6	V
			$I_O=24\text{mA}$ ; $V_{CC}=3.0\text{V}$	-	-	0.8	V
			$I_O=32\text{mA}$ ; $V_{CC}=4.5\text{V}$	-	-	0.8	V
$I_I$	Input leakage current	$V_I=5.5\text{V}$ or GND; $V_{CC}=1.65\text{V}$ to $5.5\text{V}$	-	-	$\pm 20$	$\mu\text{A}$	
$I_{OZ}$	OFF-state output current	$V_I=V_{IH}$ ; $V_O=5.5\text{V}$ or GND; $V_{CC}=1.65\text{V}$ to $5.5\text{V}$	-	-	$\pm 20$	$\mu\text{A}$	
$I_{OFF}$	Power-off leakage current	$V_I$ or $V_O=5.5\text{V}$ ; $V_{CC}=0\text{V}$	-	-	$\pm 20$	$\mu\text{A}$	
$I_{CC}$	Supply current	$V_I=V_{CC}$ or GND; $I_O=0\text{A}$ ; $V_{CC}=5.5\text{V}$	-	-	40	$\mu\text{A}$	
$\Delta I_{CC}$	Additional supply current	Per input pin; $V_I=V_{CC}-0.6\text{V}$ ; $I_O=0\text{A}$ ; $V_{CC}=2.7\text{V}$ to $5.5\text{V}$	-	-	5000	$\mu\text{A}$	

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

7.3.3 AC Characteristics 1

T<sub>amb</sub>=-40°C to +85°C, voltages are referenced to GND (ground=0V), unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT	
t <sub>PZL</sub>	nA to nY OFF-state to LOW propagation delay	See Figure 8-5	V <sub>CC</sub> =1.2V	-	8.0	-	ns
			V <sub>CC</sub> =1.65V to 1.95V	0.5	1.7	5.5	ns
			V <sub>CC</sub> =2.3V to 2.7V	0.5	1.2	2.8	ns
			V <sub>CC</sub> =2.7V	0.5	1.8	3.3	ns
			V <sub>CC</sub> =3.0V to 3.6V	0.5	1.2	3.6	ns
			V <sub>CC</sub> =4.5V to 5.5V	0.5	1.6	2.6	ns
t <sub>PLZ</sub>	nA to nY LOW to OFF-state propagation delay	See Figure 8-5	V <sub>CC</sub> =1.2V	-	10	-	ns
			V <sub>CC</sub> =1.65V to 1.95V	0.5	3.0	5.5	ns
			V <sub>CC</sub> =2.3V to 2.7V	0.5	1.7	2.8	ns
			V <sub>CC</sub> =2.7V	0.5	2.1	3.3	ns
			V <sub>CC</sub> =3.0V to 3.6V	0.5	2.5	3.6	ns
			V <sub>CC</sub> =4.5V to 5.5V	0.5	1.6	2.6	ns
C <sub>PD</sub>	Power dissipation capacitance	Per buffer; V <sub>I</sub> = GND to V <sub>CC</sub>	V <sub>CC</sub> =1.65V to 1.95V	-	6.5	-	pF
			V <sub>CC</sub> =2.3V to 2.7V	-	6.9	-	pF
			V <sub>CC</sub> =3.0V to 3.6V	-	7.2	-	pF

Note:

(1) Typical values are measured at T<sub>amb</sub>=25°C and V<sub>CC</sub>=1.2V, 1.8V, 2.5V, 2.7V, 3.3V and 5.0V respectively.

(2) C<sub>PD</sub> is used to determine the dynamic power dissipation (P<sub>D</sub> 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<sub>i</sub>=input frequency in MHz;

f<sub>o</sub>=output frequency in MHz;

C<sub>L</sub>=output load capacitance in pF;

V<sub>CC</sub>=supply voltage in V;

N=number of inputs switching;

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

**7.3.4 AC Characteristics 2**

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT	
$t_{PZL}$	nA to nY OFF-state to LOW propagation delay	See Figure 8-5	$V_{CC}=1.65\text{V}$ to $1.95\text{V}$	0.5	-	6.5	ns
			$V_{CC}=2.3\text{V}$ to $2.7\text{V}$	0.5	-	3.5	ns
			$V_{CC}=2.7\text{V}$	0.5	-	4.5	ns
			$V_{CC}=3.0\text{V}$ to $3.6\text{V}$	0.5	-	4.5	ns
			$V_{CC}=4.5\text{V}$ to $5.5\text{V}$	0.5	-	3.5	ns
$t_{PLZ}$	nA to nY LOW to OFF-state propagation delay	See Figure 8-5	$V_{CC}=1.65\text{V}$ to $1.95\text{V}$	0.5	-	6.5	ns
			$V_{CC}=2.3\text{V}$ to $2.7\text{V}$	0.5	-	3.5	ns
			$V_{CC}=2.7\text{V}$	0.5	-	4.5	ns
			$V_{CC}=3.0\text{V}$ to $3.6\text{V}$	0.5	-	4.5	ns
			$V_{CC}=4.5\text{V}$ to $5.5\text{V}$	0.5	-	3.5	ns

**Note:** Typical values are measured at  $T_{amb}=25^{\circ}\text{C}$  and  $V_{CC}=1.2\text{V}$ ,  $1.8\text{V}$ ,  $2.5\text{V}$ ,  $2.7\text{V}$ ,  $3.3\text{V}$  and  $5.0\text{V}$  respectively.

## 8 Detailed Description

### 8.1 Overview

The CJ74LVC07 provides six non-inverting buffers. The outputs are open-drain and can be connected to other open-drain outputs to implement active-LOW wired-OR or active-HIGH wired-AND functions.

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

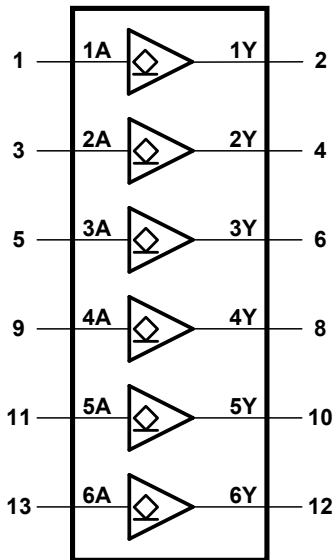


Figure 8-1 Logic symbol

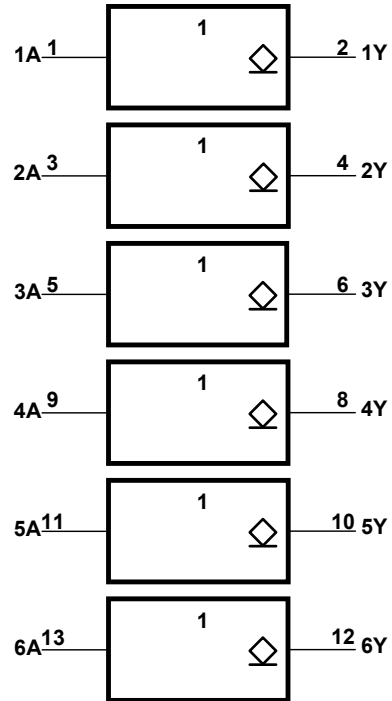


Figure 8-2 IEC logic symbol

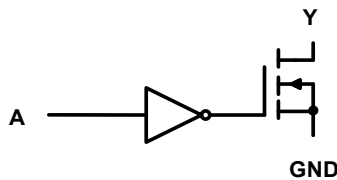


Figure 8-3 Logic diagram for one gate

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

INPUT	OUTPUT
nA	nY
L	L
H	Z

(1) H=HIGH voltage level; L=LOW voltage level; X=don't care; Z=high-impedance OFF-state.

8.4 Testing Circuit

8.4.1 AC Testing Circuit

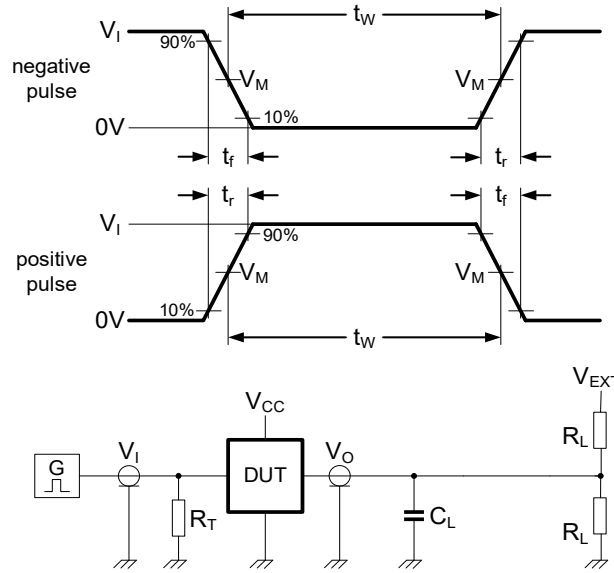


Figure 8-4 Load circuitry for switching times

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.

$V_{EXT}$ =External voltage for measuring switching times.

8.4.2 AC Testing Waveforms

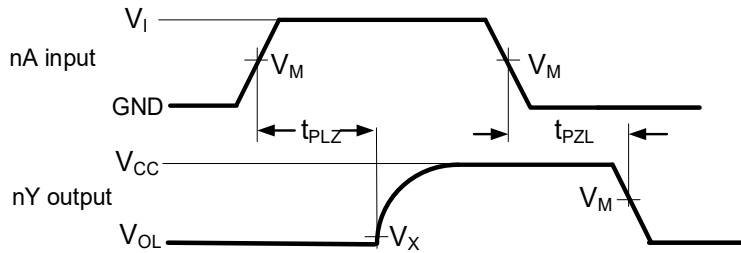


Figure 8-5 The input (nA) to output (nY) propagation delays

8.4.3 Measurement Points

SUPPLY VOLTAGE	INPUT	OUTPUT
$V_{CC}$	$V_M$	$V_X$
< 2.7V	$0.5 \times V_{CC}$	$V_{OL} + 0.15V$
$\geq 2.7V$ to 3.6V	1.5V	$V_{OL} + 0.3V$
$\geq 4.5V$ to 5.5V	$0.5 \times V_{CC}$	$V_{OL} + 0.3V$

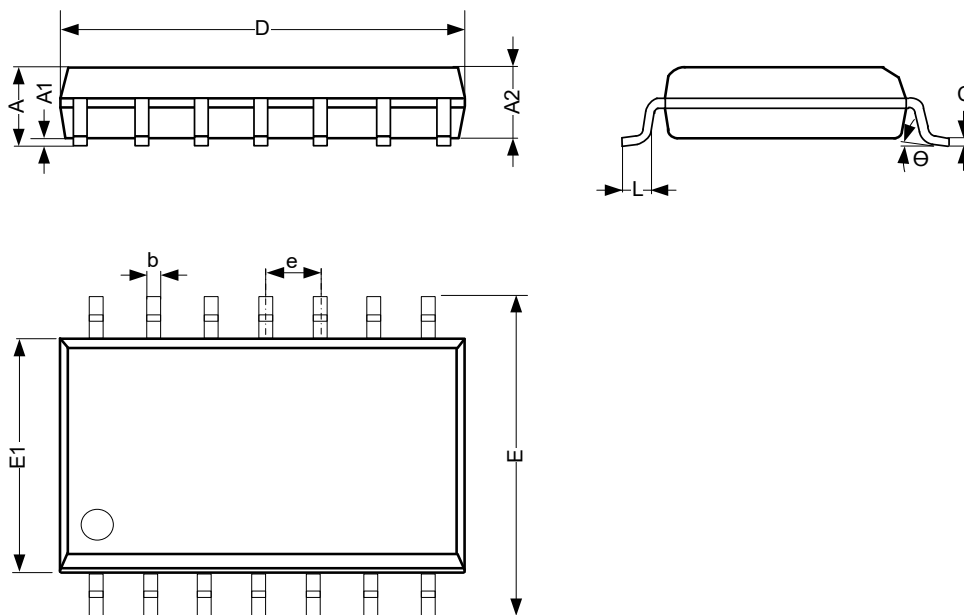
**8.4.4 Test Data**

SUPPLY VOLTAGE	INPUT		LOAD		V <sub>EXT</sub>		
V <sub>CC</sub>	V <sub>I</sub>	t <sub>r</sub> , t <sub>f</sub>	C <sub>L</sub>	R <sub>L</sub>	t <sub>PLH</sub> , t <sub>PHL</sub>	t <sub>PLZ</sub> , t <sub>PZL</sub>	t <sub>PHZ</sub> , t <sub>PZH</sub>
1.2V	V <sub>CC</sub>	≤ 2.0ns	30pF	1kΩ	Open	2xV <sub>CC</sub>	GND
1.65V to 1.95V	V <sub>CC</sub>	≤ 2.0ns	30pF	1kΩ	Open	2xV <sub>CC</sub>	GND
2.3V to 2.7V	V <sub>CC</sub>	≤ 2.0ns	30pF	500Ω	Open	2xV <sub>CC</sub>	GND
2.7V	2.7V	≤ 2.5ns	50pF	500Ω	Open	2xV <sub>CC</sub>	GND
3.0V to 3.6V	2.7V	≤ 2.5ns	50pF	500Ω	Open	2xV <sub>CC</sub>	GND
4.5V to 5.5V	V <sub>CC</sub>	≤ 2.5ns	50pF	500Ω	Open	2xV <sub>CC</sub>	GND

9 Mechanical Information

9.1 SOP14 Mechanical Information

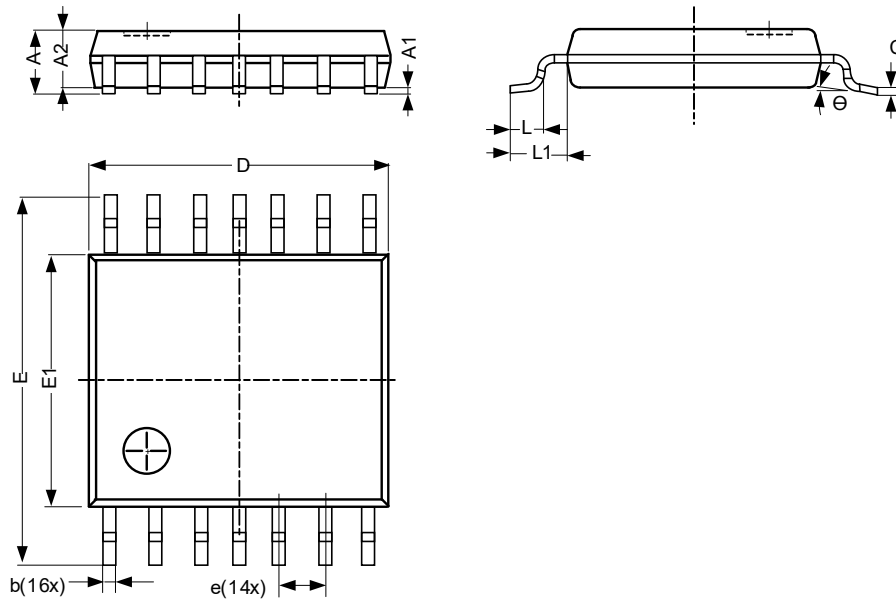
9.1.1 SOP14 Outline Dimensions



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
$\theta$	0°	-	8°
Unit: mm			

9.2 TSSOP14 Mechanical Information

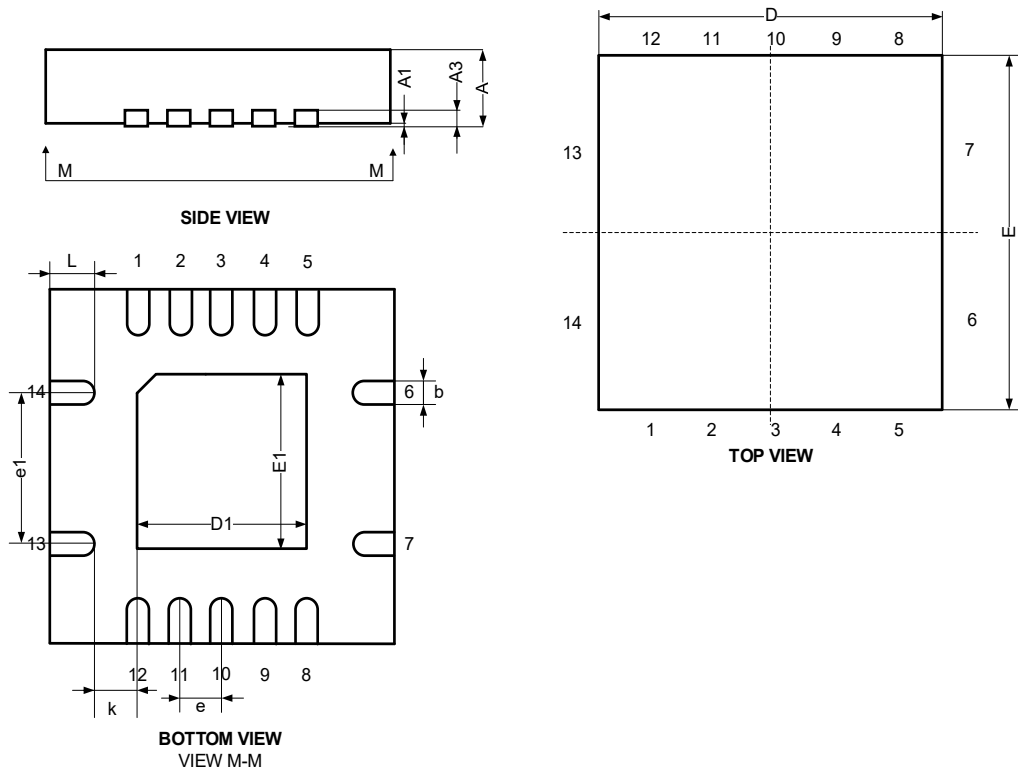
9.2.1 TSSOP14 Outline Dimensions



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.

# DISCLAIMER

## IMPORTANT NOTICE, PLEASE READ CAREFULLY

The information in this data sheet is intended to describe the operation and characteristics of our products. JSCJ has the right to make any modification, enhancement, improvement, correction or other changes to any content in this data sheet, including but not limited to specification parameters, circuit design and application information, without prior notice.

Any person who purchases or uses JSCJ products for design shall: 1. Select products suitable for circuit application and design; 2. Design, verify and test the rationality of circuit design; 3. Procedures to ensure that the design complies with relevant laws and regulations and the requirements of such laws and regulations. JSCJ makes no warranty or representation as to the accuracy or completeness of the information contained in this data sheet and assumes no responsibility for the application or use of any of the products described in this data sheet.

Without the written consent of JSCJ, this product shall not be used in occasions requiring high quality or high reliability, including but not limited to the following occasions: medical equipment, military facilities and aerospace. JSCJ shall not be responsible for casualties or property losses caused by abnormal use or application of this product.

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