4-bit Bus Switch

CJ74CBTLV3126 Logic

1 Introduction

CJ74CBTLV3126 is a 4-Bit bus switch circuit. Each bit is controlled by the separate enable port (1OE~4OE) and enable ports are all Schmitt design. To ensure the high-impedance OFF-state during power-up or power-down, it is recommended that nOE connect an external drop-down resistor to GND. When the circuit is in power down state (V_{CC}=0V), the control port and the switch port are in high resistance state, which can effectively prevent backflow and circuit damage.

2 Available Packages

PART NUMBER	PACKAGE
CJ74CBTLV3126	SOP14
	TSSOP14
	SSOP16

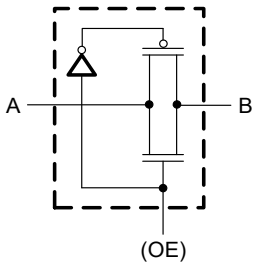
Note: For all available packages, please refer to the part Orderable Information.

3 Features

- Power supply voltage: 2.3V to 3.6V
- ON resistance typical: 2.8Ω (V_{CC}=3.3V).
- Rail-to-rail analog switch
- Power down (V_{CC}=0V) anti-backflow function
- Operating Temperature: -40°C to +125°C

4 Applications

- Datacenter and enterprise computing
- Broadband fixed line access
- Building automation
- Wired networking
- Motor drives



Simplified schematic

5 Orderable Information

DEVICE	PACKAGE	OP TEMP	ECO PLAN	MSL	PACKING OPTION	SORT
CJ74CBTLV3126ADN	SOP14	-40~125°C	RoHS & Green	Level 3 168HR	Tape and Reel 4000 Units / Reel	Active
CJ74CBTLV3126BDN	TSSOP14	-40~125°C	RoHS & Green	Level 3 168HR	Tape and Reel 5000 Units / Reel	Active
CJ74CBTLV3126SEA	SSOP16	-40~125°C	RoHS & Green	Level 3 168HR	Tape and Reel 4000 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

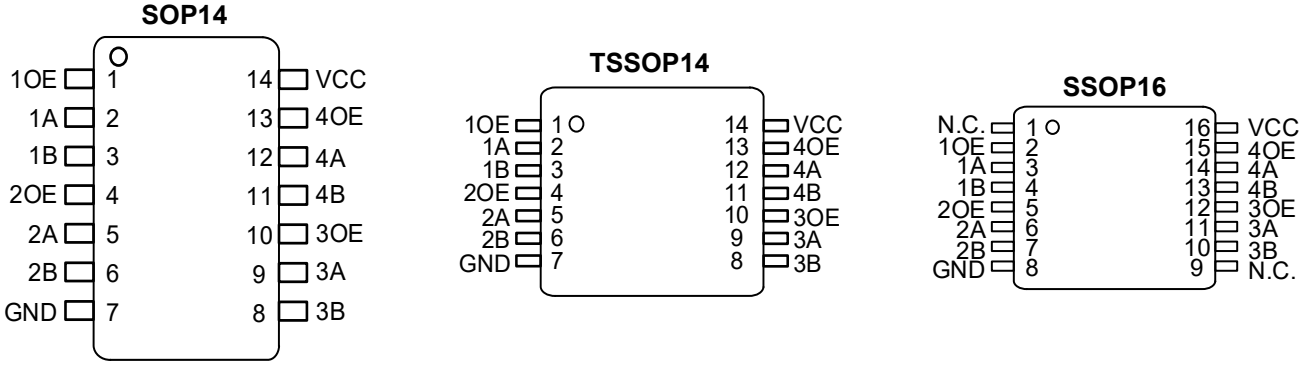


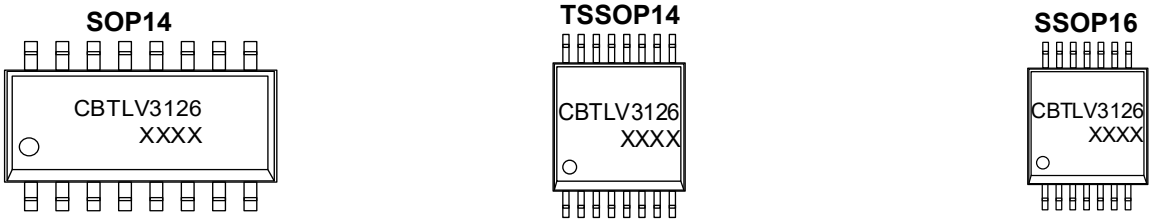
Figure 6-1 Pin configuration

6.2 Pin Function

PIN		NAME	I/O(1)	DESCRIPTION
No.				
SOP14/TSSOP14	SSOP16			
-	1	N.C.	-	Not connected
1	2	1OE	I	Output enable input
2	3	1A	I/O	A input / output
3	4	1B	I/O	B output / input
4	5	2OE	I	Output enable input
5	6	2A	I/O	A input / output
6	7	2B	I/O	B output / input
7	8	GND	G	Ground (0V)
-	9	N.C.	-	Not connected
8	10	3B	I/O	B output / input
9	11	3A	I/O	A input / output
10	12	3OE	I	Output enable input
11	13	4B	I/O	B output / input
12	14	4A	I/O	A input / output
13	15	4OE	I	Output enable input
14	16	VCC	P	Power 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

T_{amb}=25°C, All voltage referenced to Vss, unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{CC}	Power supply voltage	-	-0.5	+4.6	V
V_I	Input voltage	Control input port	-0.5	+4.6	V
V_{SW}	Switch voltage	Enable configuration and disable configuration	-0.5	V_{CC}+0.5	V
I_{IK}	Input clamping current	V_I<-0.5V	-50	-	mA
I_{SK}	Switch clamping current	V_I<-0.5V	-50	-	mA
I_{SW}	Switch current	V_{SW}=0 to V_{CC}	-	±128	mA
I_{CC}	Supply current	-	-	±100	mA
I_{GND}	Ground current	-	-100	-	mA
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}	Power supply voltage	-	2.3	-	3.6	V
V_I	Input voltage	-	0	-	3.6	V
V_{SW}	Switch voltage	Enable configuration and disable configuration	0	-	V_{CC}	V
T_{amb}	Ambient temperature	-	-40	-	+125	°C

7.3 Electrical Characteristics

7.3.1 DC Characteristics 1

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

SYMBOL	PARAMETER	CONDITIONS		MIN.	TYP.	MAX.	UNIT
V_{IH}	HIGH-level input voltage	V_{CC}=2.3V to 2.7V		1.7	-	-	V
		V_{CC}=3.0V to 3.6V		2.0	-	-	V
V_{IL}	LOW-level input voltage	V_{CC}=2.3V to 2.7V		-	-	0.7	V
		V_{CC}=3.0V to 3.6V		-	-	0.9	V
I_I	Input leakage current	Pin nOE; V_I=GND to V_{CC};V_{CC}= 3.6V		-	-	±1	uA
$I_{S(OFF)}$	OFF-state leakage current	V_{CC}=3.6V		-	-	±1	uA
$I_{S(ON)}$	ON-state leakage current	V_{CC}=3.6V		-	-	±1	uA
I_{OFF}	Power outage leakage current	V_I or V_O=0 V to 3.6 V; V_{CC}=0V		-	-	±10	uA
I_{CC}	Quiescent current	V_I= V_{CC} or GND; I_O=0 A; V_{SW}=GND or V_{CC}; V_{CC}=3.6V		-	-	10	uA
ΔI_{CC}	Crosstalk current	Pin nOE; V_I=V_{CC} - 0.6V; V_{SW}=GND or V_{CC};V_{CC}=3.6V		-	-	300	uA
R_{ON}	ON resistance	V_{CC}=2.3V to 2.7V; See Figure 8-2 to 8-4	I_{SW}=64mA; V_I=0V	-	3.3	8	Ω
			I_{SW}=24mA; V_I=0V	-	3.2	8	Ω
			I_{SW}=15mA; V_I=1.7V	-	10.8	40	Ω
		V_{CC}=3.0V to 3.6V; See Figure 8-5 to 8-7	I_{SW}=64mA; V_I=0V	-	2.8	7	Ω
			I_{SW}=24mA; V_I=0V	-	2.8	7	Ω
			I_{SW}=15mA; V_I=2.4V	-	7.1	15	Ω

Note: All typical values are measured at V_{CC}=2.5V, 3.3V (unless otherwise specified) and T_{amb}=25°C.

7.3.2 DC Characteristics 2

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

SYMBOL	PARAMETER	CONDITIONS		MIN.	TYP.	MAX.	UNIT
V_{IH}	HIGH-level input voltage	V_{CC}=2.3V to 2.7V		1.7	-	-	V
		V_{CC}=3.0V to 3.6V		2.0	-	-	V
V_{IL}	LOW-level input voltage	V_{CC}=2.3V to 2.7V		-	-	0.7	V
		V_{CC}=3.0V to 3.6V		-	-	0.9	V
I_I	Input leakage current	Pin nOE; V_I = GND to V_{CC}; V_{CC}= 3.6V		-	-	±20	uA
$I_{S(OFF)}$	OFF-state leakage current	V_{CC}= 3.6V		-	-	±20	uA
$I_{S(ON)}$	ON-state leakage current	V_{CC}= 3.6V		-	-	±20	uA
I_{OFF}	Power outage leakage current	V_I or V_O = 0 V to 3.6 V; V_{CC} = 0V		-	-	±50	uA
I_{CC}	Quiescent current	V_I = V_{CC} or GND; I_O = 0 A; V_{SW} = GND or V_{CC}; V_{CC} = 3.6V		-	-	50	uA
ΔI_{CC}	Crosstalk current	Pin nOE; V_I = V_{CC} - 0.6V; V_{SW} = GND or V_{CC}; V_{CC}= 3.6V		-	-	2000	uA
R_{ON}	ON resistance	V_{CC}=2.3V to 2.7V; See Figure 8-2 to 8-4	I_{SW} = 64mA; V_I = 0V	-	-	15	Ω
			I_{SW} = 24mA; V_I = 0V	-	-	15	Ω
			I_{SW} = 15mA; V_I = 1.7V	-	-	60	Ω
		V_{CC}=3.0V to 3.6V; See Figure 8-5 to 8-7	I_{SW} = 64mA; V_I = 0V	-	-	11	Ω
			I_{SW} = 24mA; V_I = 0V	-	-	11	Ω
			I_{SW} = 15mA; V_I = 2.4V	-	-	25.5	Ω

7.3.3 AC Characteristics 2

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

SYMBOL	PARAMETER	CONDITIONS		MIN.	TYP.	MAX.	UNIT
t_{PLH}, t_{PHL}	Transmission Delay	nA to nB; nB to nA; See Figure 8-9	V_{CC}=2.3V to 2.7V	-	-	0.20	ns
			V_{CC}=3.0V to 3.6V	-	-	0.31	ns
t_{PZH}, t_{PZL}	Enable time	nOE to nA/nB; See Figure 8-10	V_{CC}=2.3V to 2.7V	-	-	6.0	ns
			V_{CC}=3.0V to 3.6V	-	-	6.0	ns
t_{PLZ}, t_{PHZ}	Disable time	nOE to nA/nB; See Figure 8-10	V_{CC}=2.3V to 2.7V	-	-	6.5	ns
			V_{CC}=3.0V to 3.6V	-	-	6.5	ns

7.3.4 AC Characteristics 1

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

SYMBOL	PARAMETER	CONDITIONS		MIN.	TYP.(1)	MAX.	UNIT
t_{PLH}, t_{PHL}	Transmission Delay	nA to nB; nB to nA; See Figure 8-9	V_{CC}=2.3V to 2.7V	-	-	0.13	ns
			V_{CC}=3.0V to 3.6V	-	-	0.20	ns
t_{PZH}, t_{PZL}	Enable time	nOE to nA/nB; See Figure 8-10	V_{CC}=2.3V to 2.7V	-	2.5	4.5	ns
			V_{CC}=3.0V to 3.6V	-	2.2	4.2	ns
t_{PLZ}, t_{PHZ}	Disable time	nOE to nA/nB; See Figure 8-10	V_{CC}=2.3V to 2.7V	-	2.6	4.7	ns
			V_{CC}=3.0V to 3.6V	-	3.4	4.8	ns

(1) All typical values are measured at V_{CC} = 2.5V/3.3V (unless otherwise specified), and T_{amb}=25°C.

8 Detailed Description

8.1 Overview

CJ74CBTLV3126 is a 4-Bit bus switch circuit. Each bit is controlled by the separate enable port (1OE~4OE) and enable ports are all Schmitt design. To ensure the high-impedance OFF-state during power-up or power-down, it is recommended that nOE connect an external drop-down resistor to GND. When the circuit is in power down state (V_{CC}=0V), the control port and the switch port are in high resistance state, which can effectively prevent backflow and circuit damage.

8.2 Functional Block Diagram

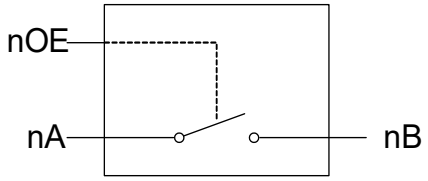


Figure 8-1 Block diagram

8.3 Function Table

INPUT nOE	SWITCH CONDITION
L	Off
H	On

Note: H=HIGH voltage level; L=LOW voltage level.

8.4 Testing Circuit

8.4.1 ON Resistance Testing Waveform

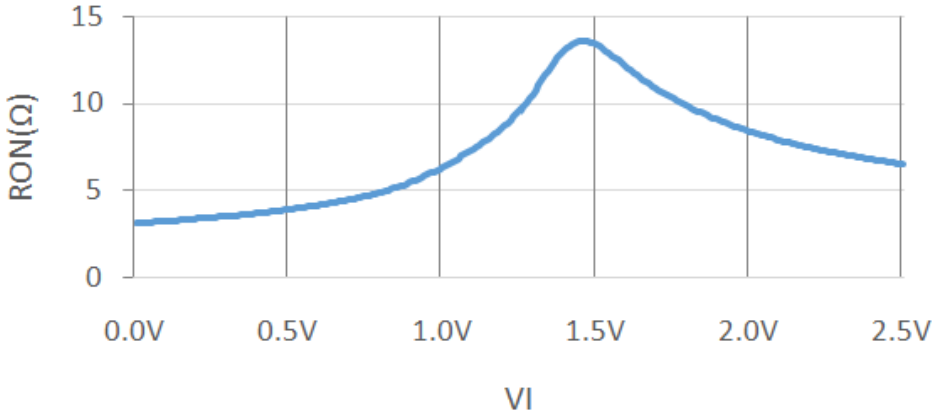


Figure 8-2 The relation between on-resistance and input voltage (V_{CC}=2.5V, I_{SW}=15mA, T_{amb}=25°C)

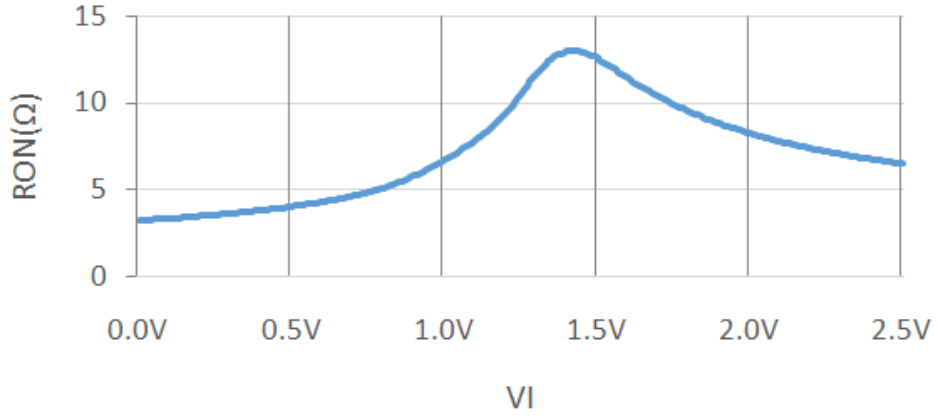


Figure 8-3 The relation between on-resistance and input voltage (V_{CC}=2.5V, I_{SW}=24mA, T_{amb}=25°C)

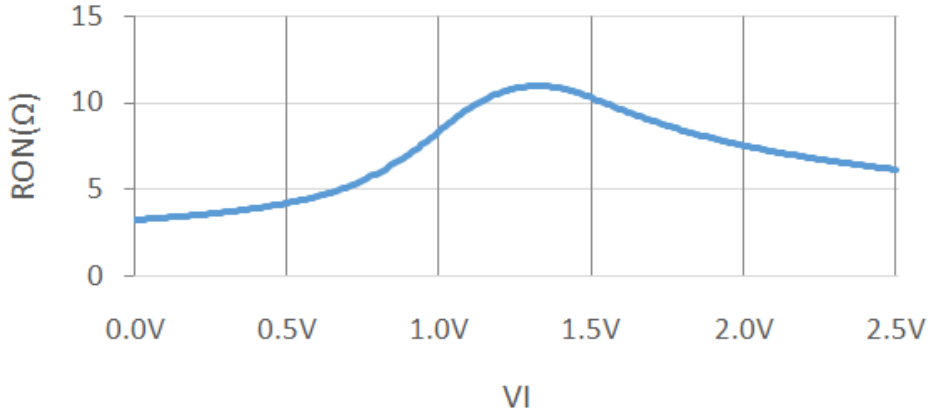


Figure 8-4 The relation between on-resistance and input voltage (V_{CC}=2.5V, I_{SW}=64mA, T_{amb}=25°C)

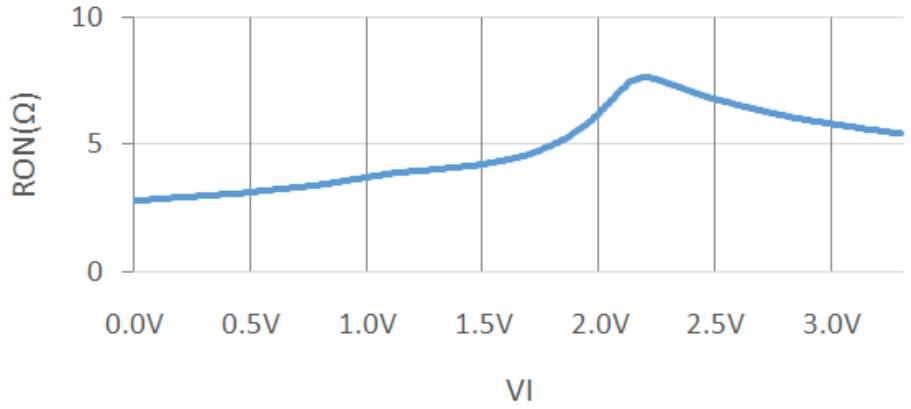


Figure 8-5 The relation between on-resistance and input voltage (V_{CC}=3.3V, I_{SW}=15mA, T_{amb}=25°C)

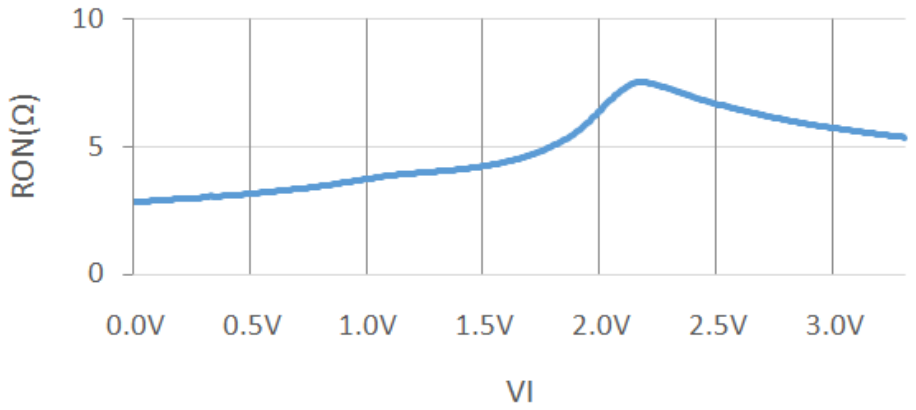


Figure 8-6 The relation between on-resistance and input voltage (V_{CC}=3.3V, I_{SW}=24mA, T_{amb}=25°C)

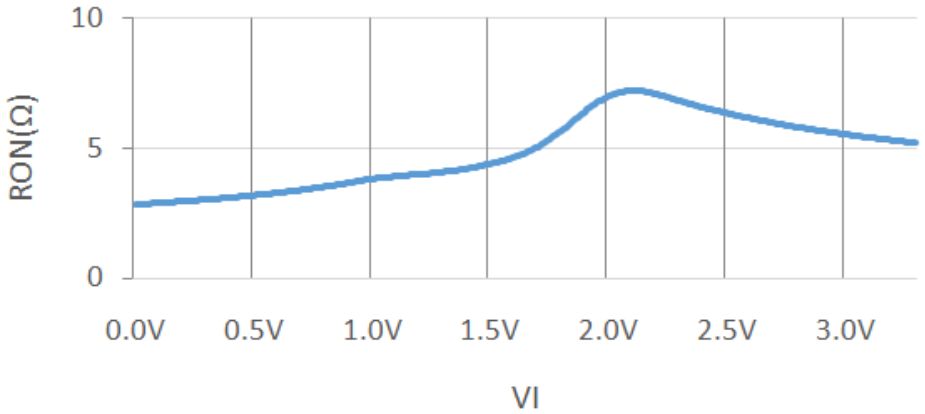


Figure 8-7 The relation between on-resistance and input voltage (V_{CC}=3.3V, I_{SW}=64mA, T_{amb}=25°C)

8.4.2 AC Testing Circuit

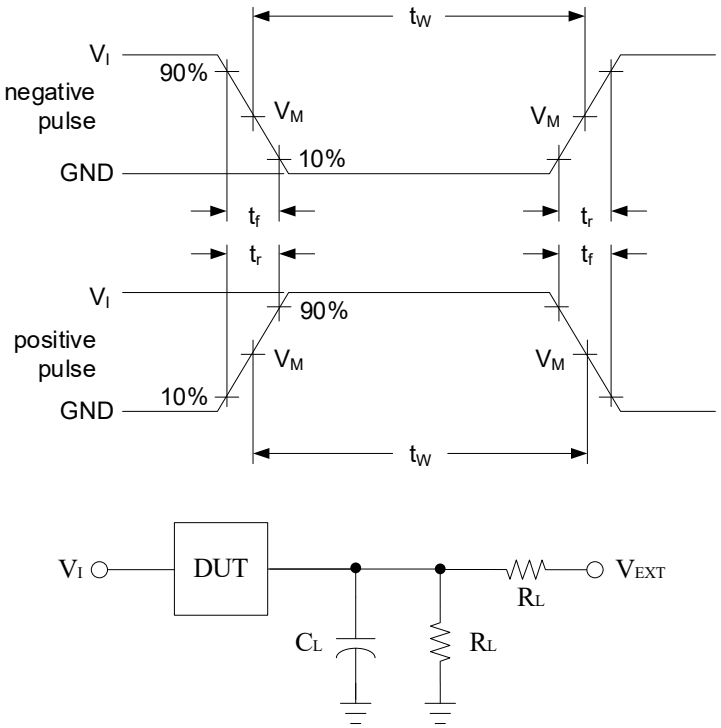


Figure 8-8 Peripheral load circuit

Definitions for test circuit:

R_L=Load resistance.

C_L=Load capacitance including capacitors on the probe and clip.

8.4.3 AC Testing Waveforms

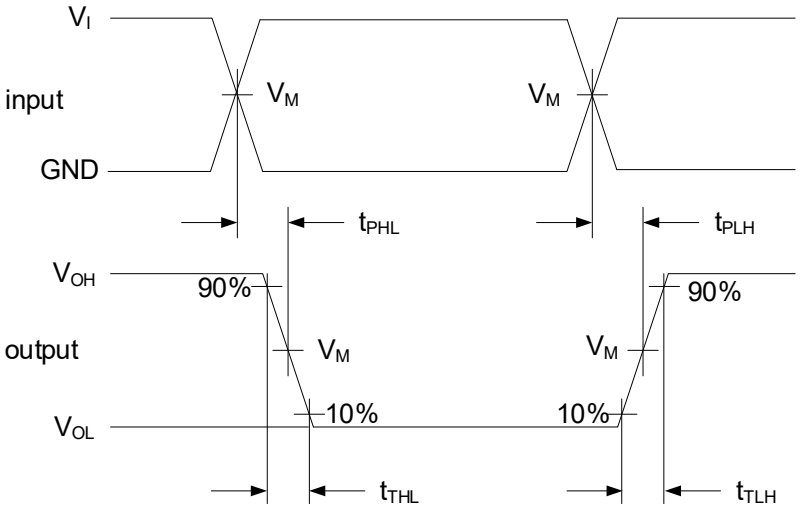


Figure 8-9 Input (nA/nB) to output (nB/nA) transmission delay testing waveform

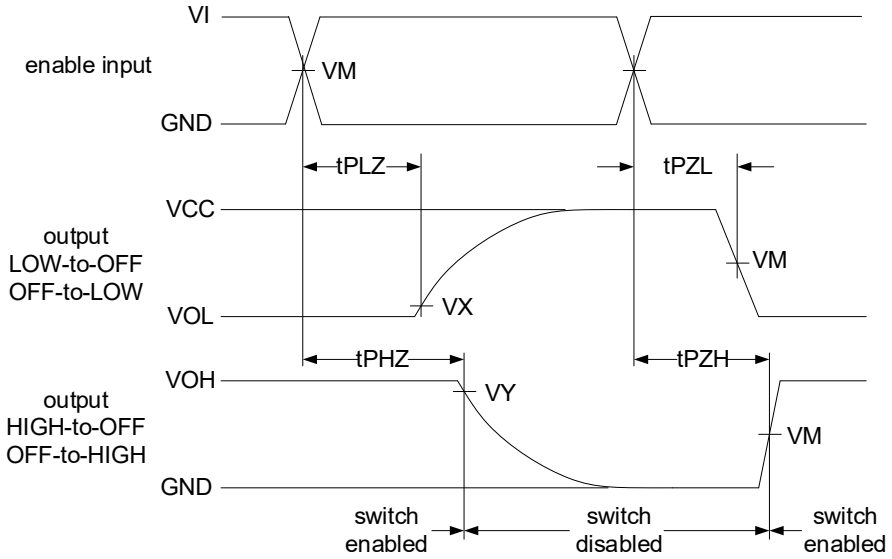


Figure 8-10 Enabling and disabling time testing waveform

8.4.4 Measurement Points

SUPPLY VOLTAGE	INPUT		OUTPUT		
V_{CC}	V_I	V_M	V_M	V_X	V_Y
2.3V to 2.7V	V_{CC}	0.5xV_{CC}	0.5xV_{CC}	V_{OL}+0.15V	V_{OH}-0.15V
3.0V to 3.6V	V_{CC}	0.5xV_{CC}	0.5xV_{CC}	V_{OL}+0.3V	V_{OH}-0.3V

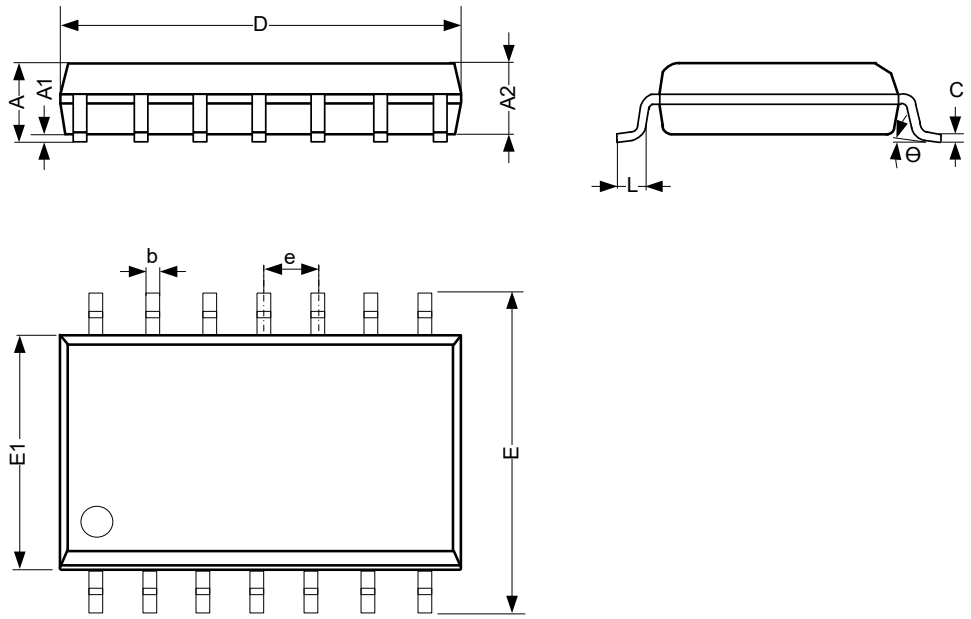
8.4.5 Test Data

SUPPLY VOLTAGE	INPUT		LOAD		V_{EXT}		
V_{CC}	V_I	t_r , t_f	C_L	R_L	t_{PLH},t_{PHL}	t_{PHZ},t_{PZH}	t_{PLZ} ,t_{PZL}
2.3V to 2.7V	V_{CC}	≤ 3.0ns	30pF	500Ω	Open	GND	2xV_{CC}
3.0V to 3.6V	V_{CC}	≤ 3.0ns	50pF	500Ω	Open	GND	2xV_{CC}

9 Mechanical Information

9.1 SOP14 Mechanical Information

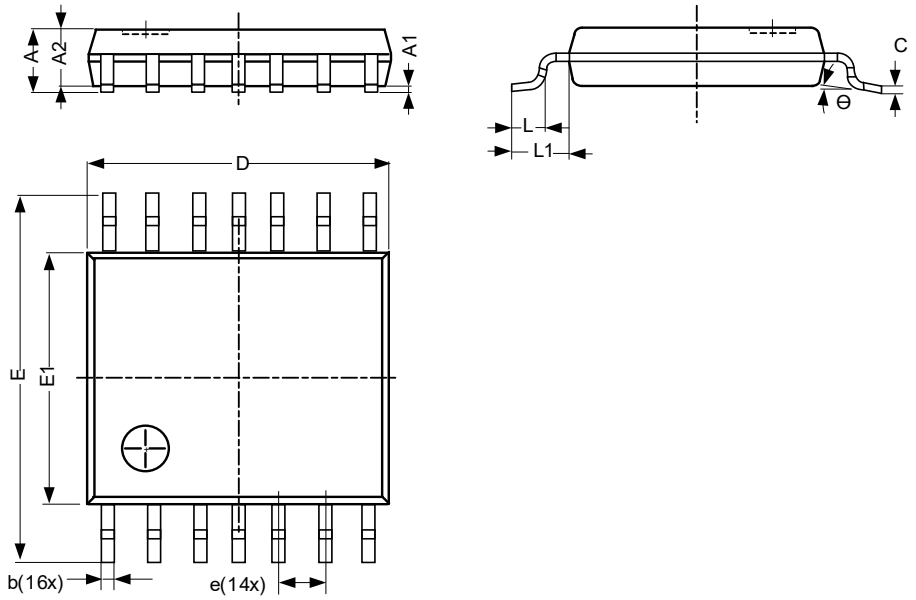
9.1.1 SOP14 Outline Dimensions



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

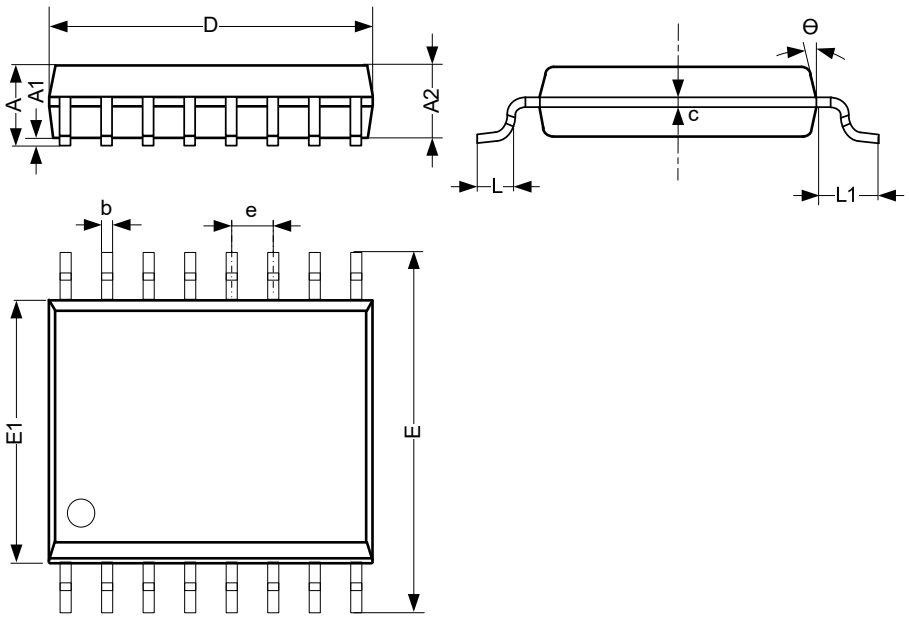
9.2.1 TSSOP14 Outline Dimensions



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
E1	4.30	-	4.50
E	6.20	-	6.60
e	0.65 BSC		
L	0.45	-	0.75
L1	-	1.00	-
Θ	0°	-	8°
Unit: mm			

9.3 SSOP16 Mechanical Information

9.3.1 SSOP16 Outline Dimensions



SYMBOL	Dimensions In Millimeters		
	Min.	Typ.	Max.
A	-	-	1.75
A1	0.02	-	0.23
A2	1.30	-	1.50
b	0.23	-	0.31
c	0.20	-	0.24
D	4.70	-	5.10
E	5.80	-	6.25
E1	3.80	-	4.02
e	0.635 BSC		
L	0.45	-	0.80
L1	1.05 BSC		
Θ	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.

DISCLAIMER

IMPORTANT NOTICE, PLEASE READ CAREFULLY

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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.

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