Dual 2-to-4 Line Decoder/Demultiplexer

CJ74LVC139 Logic

1 Introduction

The CJ74LVC139 is a dual 2-to-4 line decoder/ demultiplexer.

The input can be driven from either 3.3V or 5V devices. This feature allows the use of this device in a mixed 3.3V and 5V environment.

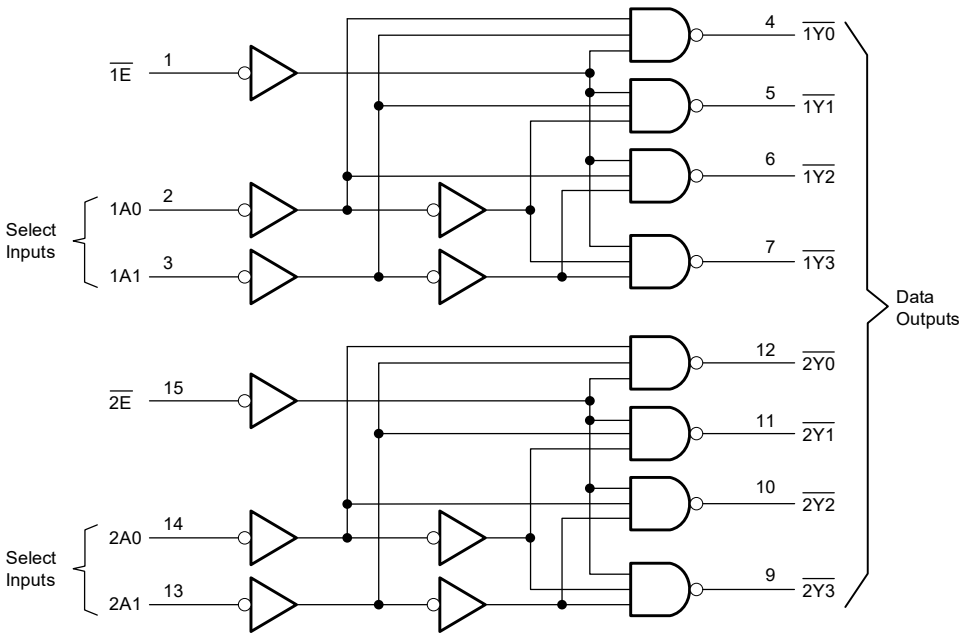
2 Available Packages

PART NUMBER	PACKAGE
CJ74LVC139	SOP16
	TSSOP16

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

3 Features

- Supply voltage range: 1.2V to 3.6V
- Inputs accept voltages up to 5.5V
- ±24mA output drive at 3.0V
- High-impedance when V_{CC}=0V
- Temperature range: -40°C to +125°C



Logic diagram

4 Orderable Information

DEVICE	PACKAGE	OP TEMP	ECO PLAN	MSL	PACKING OPTION	SORT
CJ74LVC139AEN	SOP16	-40~125°C	RoHS & Green	Level 3 168HR	Tape and Reel 4000 Units / Reel	Active
CJ74LVC139BEN	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

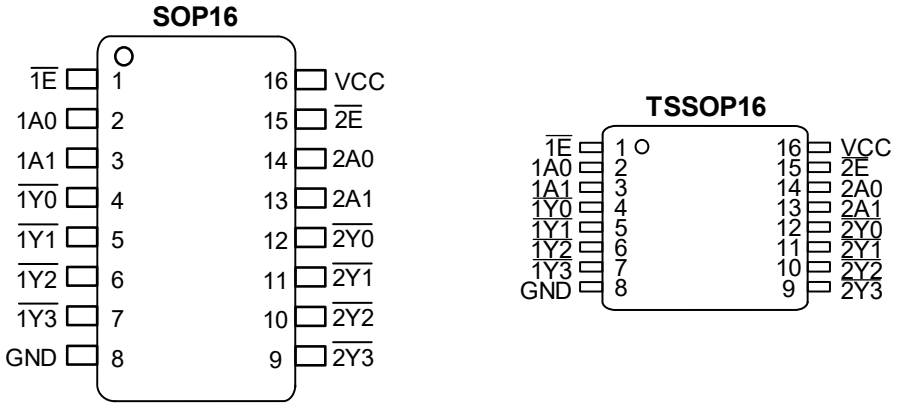


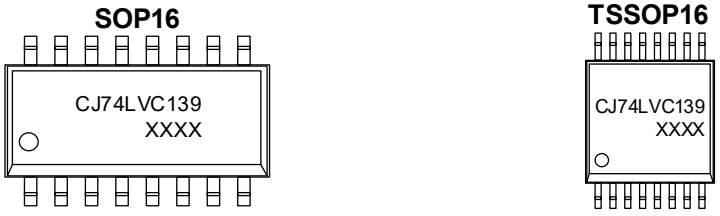
Figure 5-1 Pin configuration

5.2 Pin Function

PIN		I/O(1)	DESCRIPTION
No.	NAME		
1	$\overline{1E}$	I	Enable input (active LOW)
2	1A0	I	Address input
3	1A1	I	Address input
4	$\overline{1Y0}$	O	Data output
5	$\overline{1Y1}$	O	Data output
6	$\overline{1Y2}$	O	Data output
7	$\overline{1Y3}$	O	Data output
8	GND	G	Ground (0V)
9	$\overline{2Y3}$	O	Data output
10	$\overline{2Y2}$	O	Data output
11	$\overline{2Y1}$	O	Data output
12	$\overline{2Y0}$	O	Data output
13	2A1	I	Address input
14	2A0	I	Address input
15	$\overline{2E}$	I	Enable input (active LOW)
16	VCC	P	Supply voltage

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

5.3 Marking Information



XXXX: Code, indicates weekly record information.

6 Specifications

6.1 Absolute Maximum Ratings

T_{amb}=25°C, all voltage referenced to GND, unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS		MIN.	MAX.	UNIT
V_{CC}	Supply voltage	-		-0.5	+6.5	V
V_I	Input voltage	-		-0.5	+6.5	V
V_O	Output voltage	Active mode		-0.5	V_{CC}+0.5	V
		Power-down mode; V_{CC}=0V		-0.5	+6.5	V
I_{CC}	Supply current	-		-	100	mA
I_{GND}	Ground current	-		-100	-	mA
I_{IK}	Input clamping current	V_I < 0V		-50	-	mA
I_O	Output current	V_O=0V to V_{CC}		-	±50	mA
I_{OK}	Output clamping current	V_O > V_{CC} or V_O < 0V		-	±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.

6.2 Recommended Operating Conditions

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{CC}	Supply voltage	-	1.2	-	3.6	V
V_I	Input voltage	-	0	-	5.5	V
V_O	Output voltage	Active mode	0	-	V_{CC}	V
		Power-down mode; V_{CC}=0V	0	-	5.5	V
T_{amb}	Ambient temperature	-	-40	-	+125	°C

6.3 Electrical Characteristics

6.3.1 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	0.65xV_{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	-	-	0.35xV_{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_{CC}=1.65V to 3.6V; I_O=-100uA	V_{CC}-0.2	-	-	V
		V_{CC}=1.65V; I_O =-4mA	1.2	-	-	V
		V_{CC}=2.3V; I_O =-8mA	1.8	-	-	V
		V_{CC}=2.7V; I_O =-12mA	2.2	-	-	V
		V_{CC}=3.0V; I_O =-18mA	2.4	-	-	V
		V_{CC}=3.0V; I_O =-24mA	2.2	-	-	V
V_{OL}	LOW-level output voltage	V_{CC}=1.65V to 3.6V; I_O=100uA	-	-	0.2	V
		V_{CC}=1.65V; I_O=4mA	-	-	0.45	V
		V_{CC}=2.3V; I_O =8mA	-	-	0.6	V
		V_{CC}=2.7V; I_O =12mA	-	-	0.4	V
		V_{CC}=3.0V; I_O =24mA	-	-	0.55	V
I_I	Input leakage current	V_{CC}=3.6V; V_I=5.5V or GND	-	-	±5	uA
I_{CC}	Supply current	V_{CC}=3.6V; V_I=V_{CC} or GND; I_O=0A	-	-	10	uA
ΔI_{CC}	Additional supply current	V_{CC}=2.7V to 3.6V; Per input pin; V_I=V_{CC}-0.6V; I_O=0A	-	-	500	uA

6.3.2 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	0.65xV_{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	-	-	0.35xV_{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_{CC}=1.65V to 3.6V; I_O=-100uA	V_{CC}-0.3	-	-	V
		V_{CC}=1.65V; I_O =-4mA	1.05	-	-	V
		V_{CC}=2.3V; I_O =-8mA	1.65	-	-	V
		V_{CC}=2.7V; I_O =-12mA	2.05	-	-	V
		V_{CC}=3.0V; I_O =-18mA	2.25	-	-	V
		V_{CC}=3.0V; I_O =-24mA	2.0	-	-	V
V_{OL}	LOW-level output voltage	V_{CC}=1.65V to 3.6V; I_O=100uA	-	-	0.3	V
		V_{CC}=1.65V; I_O=4mA	-	-	0.65	V
		V_{CC}=2.3V; I_O =8mA	-	-	0.8	V
		V_{CC}=2.7V; I_O =12mA	-	-	0.6	V
		V_{CC}=3.0V; I_O =24mA	-	-	0.8	V
I_I	Input leakage current	V_{CC}=3.6V; V_I=5.5V or GND	-	-	±20	uA
I_{CC}	Supply current	V_{CC}=3.6V; V_I=V_{CC} or GND; I_O=0A	-	-	40	uA
ΔI_{CC}	Additional supply current	V_{CC}=2.7V to 3.6V; Per input pin; V_I=V_{CC}-0.6V; I_O=0A	-	-	5000	uA

6.3.3 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.(1)	MAX.	UNIT
t_{PLH}, t_{PHL}	nAn to $\overline{Y}$n propagation delay	See Figure 7-3	V_{CC}=1.2V	-	14.0	-	ns
			V_{CC}=1.65V to 1.95V	0.5	4.7	10.4	ns
			V_{CC}=2.3V to 2.7V	1.0	2.8	5.9	ns
			V_{CC}=2.7V	1.0	3.0	6.3	ns
			V_{CC}=3.0V to 3.6V	1.0	2.5	5.3	ns
	$\overline{nE}$ to $\overline{Y}$n propagation delay	See Figure 7-3	V_{CC}=1.2V	-	14	-	ns
			V_{CC}=1.65V to 1.95V	1.5	4.5	9.8	ns
			V_{CC}=2.3V to 2.7V	2.1	2.7	5.6	ns
			V_{CC}=2.7V	1.0	2.8	5.4	ns
			V_{CC}=3.0V to 3.6V	1.0	2.4	5.0	ns

(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.

6.3.4 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_{PLH}, t_{PHL}	nAn to $\overline{Y}$n propagation delay	See Figure 7-3	V_{CC}=1.65V to 1.95V	-	-	11.3	ns
			V_{CC}=2.3V to 2.7V	-	-	6.5	ns
			V_{CC}=2.7V	-	-	8.0	ns
			V_{CC}=3.0V to 3.6V	-	-	9.5	ns
	$\overline{nE}$ to $\overline{Y}$n propagation delay	See Figure 7-3	V_{CC}=1.65V to 1.95V	-	-	10.7	ns
			V_{CC}=2.3V to 2.7V	-	-	6.1	ns
			V_{CC}=2.7V	-	-	7.0	ns
			V_{CC}=3.0V to 3.6V	-	-	6.5	ns

7 Detailed Description

7.1 Overview

The CJ74LVC139 is a dual 2-to-4 line decoder/demultiplexer.

The input can be driven from either 3.3V or 5V devices. This feature allows the use of this device in a mixed 3.3V and 5V environment.

7.2 Functional Block Diagram

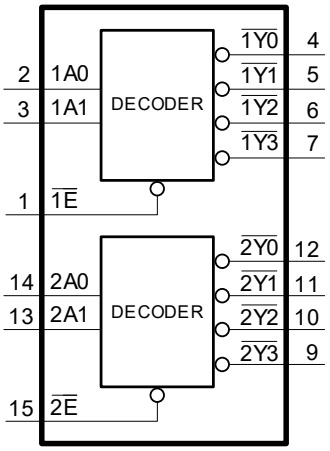


Figure 7-1 Block diagram

7.3 Function Table

INPUT			OUTPUT			
$\overline{nE}$	nA0	nA1	$\overline{nY0}$	$\overline{nY1}$	$\overline{nY2}$	$\overline{nY3}$
H	X	X	H	H	H	H
L	L	L	L	H	H	H
L	H	L	H	L	H	H
L	L	H	H	H	L	H
L	H	H	H	H	H	L

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

7.4 Testing Circuit

7.4.1 AC Testing Circuit

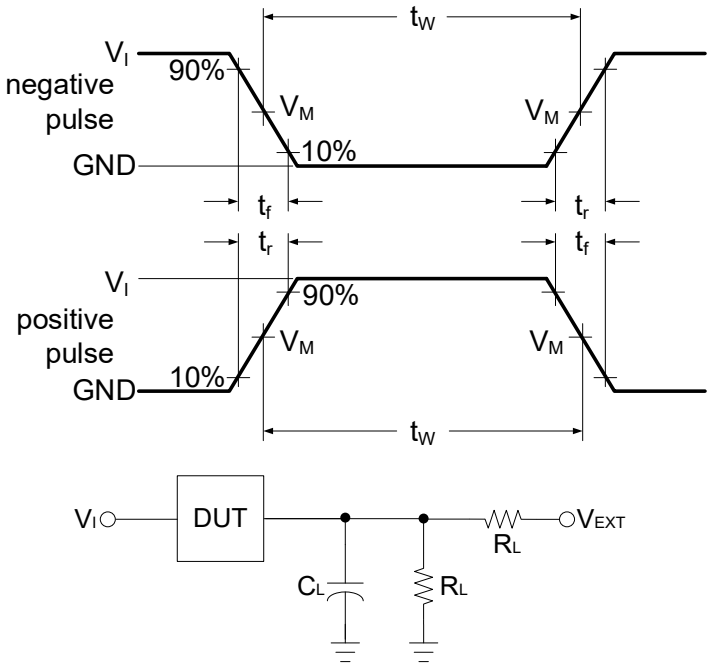


Figure 7-2 Test circuit for switching times

Definitions for test circuit:

R_L=Load resistance.

C_L=Load capacitance including jig and probe capacitance.

7.4.2 AC Testing Waveforms

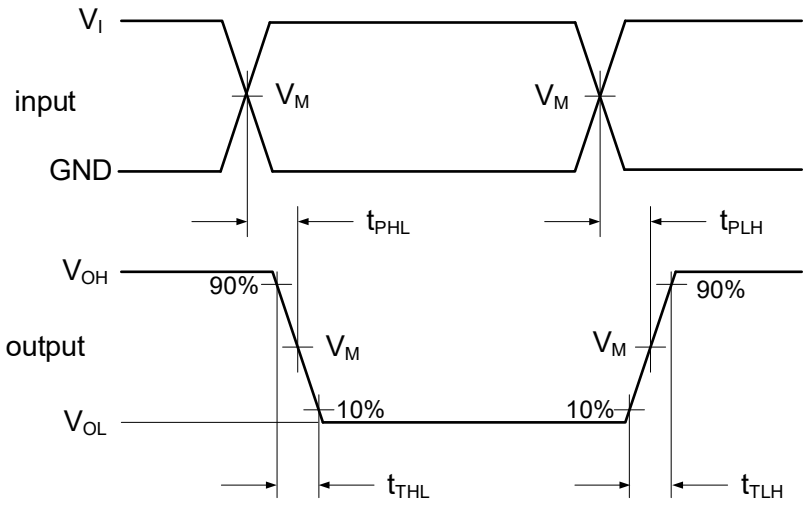


Figure 7-3 Propagation delay

7.4.3 Measurement Points

SUPPLY VOLTAGE	INPUT	OUTPUT
V_{CC}	V_M	V_M
1.2V	0.5xV_{CC}	0.5xV_{CC}
1.65V to 1.95V	0.5xV_{CC}	0.5xV_{CC}
2.3V to 2.7V	0.5xV_{CC}	0.5xV_{CC}
2.7V	0.5xV_{CC}	0.5xV_{CC}
3.0V to 3.6V	0.5xV_{CC}	0.5xV_{CC}

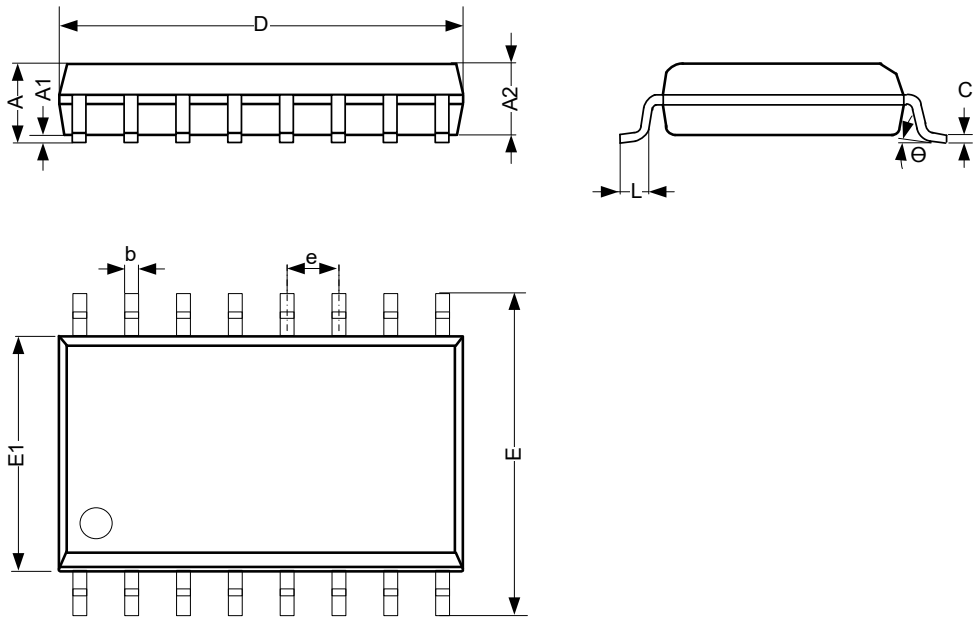
7.4.4 Test Data

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}
1.2V	V_{CC}	≤ 3ns	30pF	1kΩ	Open	2xV_{CC}	GND
1.65V to 1.95V	V_{CC}	≤ 3ns	30pF	1kΩ	Open	2xV_{CC}	GND
2.3V to 2.7V	V_{CC}	≤ 3ns	30pF	500Ω	Open	2xV_{CC}	GND
2.7V	V_{CC}	≤ 3ns	50pF	500Ω	Open	2xV_{CC}	GND
3.0V to 3.6V	V_{CC}	≤ 3ns	50pF	500Ω	Open	2xV_{CC}	GND

8 Mechanical Information

8.1 SOP16 Mechanical Information

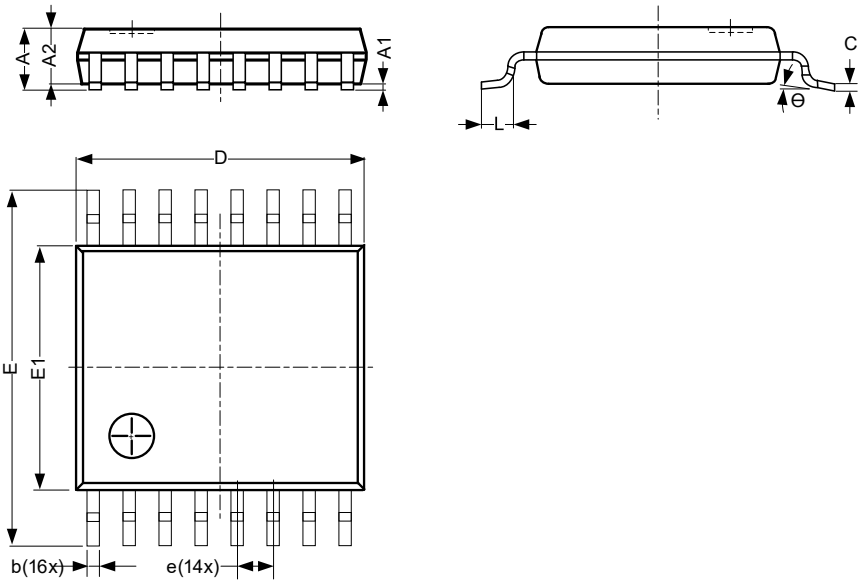
8.1.1 SOP16 Outline Dimensions



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.

DISCLAIMER

IMPORTANT NOTICE, PLEASE READ CAREFULLY

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