AiP74LVC1G373
Single D-Type Latch With 3-State Output

Product Specification

Specification Revision History：

Version	Date	Description
2024-07-A0	2024-07	New
2024-09-A1	2024-09	Modify the parameters

Contents

1、General Description

The AiP74LVC1G373 provides a D-type latch with 3-state output.

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.

Features:

- Supply voltage range:1.65V to 5.5V
- Inputs accept voltages to 5.5 V
- ±24mA output drive at 3.0V
- High-impedance when V_{CC}=0V
- Temperature range:-40℃ to +125℃
- Packaging information: SOT23-6/SOT363/XSON6

Ordering Information:

Reel packing specifications:

Part number	Packaging form	Marking code	Reel quantity	Boxed reel quantity	Notes
AiP74LVC1G373GB236.TR	SOT23-6	GPXX	3000 PCS/reel	30000 PCS/box	Dimensions of plastic enclosure: 2.9mm×1.6mm Pin spacing: 0.95mm
AiP74LVC1G373GC363.TR	SOT363	GPXX	3000 PCS/reel	30000 PCS/box	Dimensions of plastic enclosure: 2.1mm×1.3mm Pin spacing: 0.65mm
AiP74LVC1G373EA6.TR	XSON6	GPXX	5000 PCS/reel	25000 PCS/box	Dimensions of plastic enclosure: 1.45mm×1.0mm Pin spacing: 0.5mm
AiP74LVC1G373ED6.TR	XSON6	GPXX	5000 PCS/reel	25000 PCS/box	Dimensions of plastic enclosure: 1.0mm×1.0mm Pin spacing: 0.35mm

Note 1: “XX” refers to variable content, meaning year and package batch serial number.

Note 2: If the physical information is inconsistent with the ordering information, please refer to the actual product.

2、Block Diagram And Pin Description

2.1、Block Diagram

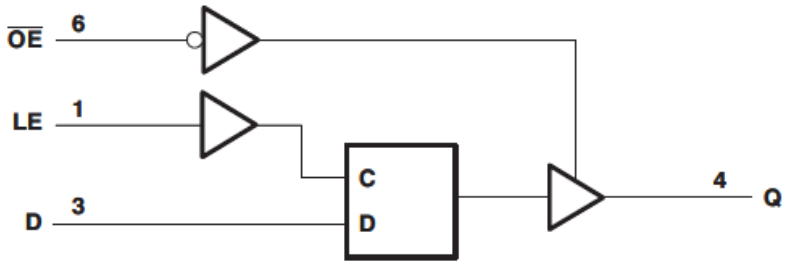
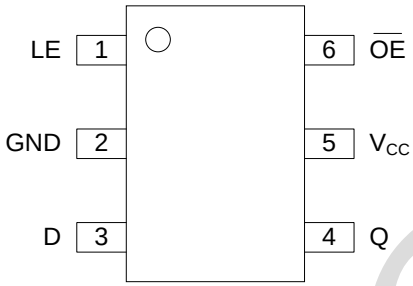
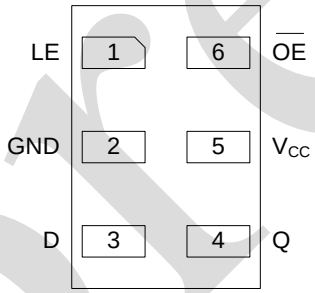


Figure 1. Block Diagram

2.2、Pin Configurations



SOT23-6/SOT363



XSON6

2.3、Pin Description

Pin No.	Pin Name	Description
1	LE	latch enable; output follows D input when high
2	GND	ground (0V)
3	D	data input
4	Q	data output
5	V_{CC}	supply voltage
6	$\overline{OE}$	active low output enable; Z output when high

2.4、Function Table

Input			Output
$\overline{OE}$	LE	D	Q
L	H	L	L
L	H	H	H
L	L	X	Q0
H	X	X	Z

Note: H=HIGH voltage level; L=LOW voltage level level; Z=high-impedance OFF-state.

3、Electrical Parameter

3.1、Absolute Maximum Ratings

(Voltages are referenced to GND (ground=0V), unless otherwise specified.)

Parameter	Symbol	Conditions	Min.	Max.	Unit
supply voltage	V_{CC}	-	-0.5	+6.5	V
input voltage	V_I	-	-0.5	+6.5	V
output voltage	V_O	Active mode	-0.5	V_{CC}+0.5	V
		Power-down mode; V_{CC}=0V	-0.5	+6.5	V
		output 3-state	-0.5	+6.5	V
supply current	I_{CC}	-	-	100	mA
ground current	I_{GND}	-	-100	-	mA
input clamping current	I_{IK}	V_I < 0V	-50	-	mA
output current	I_O	V_O=0V to V_{CC}	-	±50	mA
output clamping current	I_{OK}	V_O > V_{CC} or V_O < 0V	-	±50	mA
storage temperature	T_{stg}	-	-65	+150	℃
soldering temperature	T_L	10s	260		℃

3.2、Recommended Operating Conditions

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
supply voltage	V_{CC}	-	1.65	-	5.5	V
input voltage	V_I	-	0	-	5.5	V
output voltage	V_O	Active mode	0	-	V_{CC}	V
		Power-down mode; V_{CC}=0V	0	-	5.5	V
		output 3-state	0	-	5.5	V
ambient temperature	T_{amb}	-	-40	-	+125	℃

3.3、Electrical Characteristics

3.3.1、DC Characteristics 1

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

Parameter	Sym	V_{CC}	Conditions	Min.	Typ.	Max.	Unit
HIGH-level input voltage	V_{IH}	1.65V to 1.95V	-	0.65×V_{CC}	-	-	V
		2.3V to 2.7V	-	1.7	-	-	V
		3V to 3.6V	-	2.0	-	-	V
		4.5V to 5.5V	-	0.7×V_{CC}	-	-	V
LOW-level input voltage	V_{IL}	1.65V to 1.95V	-	-	-	0.35×V_{CC}	V
		2.3V to 2.7V	-	-	-	0.7	V
		3V to 3.6V	-	-	-	0.8	V
		4.5V to 5.5V	-	-	-	0.3×V_{CC}	V
HIGH-level output voltage	V_{OH}	1.65V to 5.5V	I_O=-100uA	V_{CC} - 0.1	-	-	V
		1.65V	I_O =-4mA	1.2	-	-	V
		2.3V	I_O =-8mA	1.9	-	-	V
		3.0V	I_O =-16mA	2.4	-	-	V
		3.0V	I_O =-24mA	2.3	-	-	V
		4.5V	I_O =-32mA	3.8	-	-	V
LOW-level output voltage	V_{OL}	1.65V to 5.5V	I_O=100uA	-	-	0.10	V
		1.65V	I_O =4mA	-	-	0.45	V
		2.3V	I_O =8mA	-	-	0.30	V
		3.0V	I_O =16mA	-	-	0.40	V
		3.0V	I_O =24mA	-	-	0.55	V
		4.5V	I_O =32mA	-	-	0.55	V
input leakage current	I_I	0V to 5.5V	V_I=5.5V or GND	-	-	±1	uA
OFF-state output current	I_{OZ}	3.6V	V_I=V_{IH} or V_{IL}; V_O= 0V to 5.5V	-	-	±5	uA
power-off leakage current	I_{OFF}	0V	V_I or V_O=5.5V	-	-	±10	uA
supply current	I_{CC}	1.65V to 5.5V	V_I=5.5V or GND; I_O=0A	-	-	10	uA
additional supply current	ΔI_{CC}	2.3V to 5.5V	per input pin; V_I= V_{CC}-0.6V; I_O=0A	-	-	500	uA

3.3.2、DC Characteristics 2

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

Parameter	Sym	V_{CC}	Conditions	Min.	Typ.	Max.	Unit
HIGH-level input voltage	V_{IH}	1.65V to 1.95V	-	0.65×V_{CC}	-	-	V
		2.3V to 2.7V	-	1.7	-	-	V
		3V to 3.6V	-	2.0	-	-	V
		4.5V to 5.5V	-	0.7×V_{CC}	-	-	V
LOW-level input voltage	V_{IL}	1.65V to 1.95V	-	-	-	0.35×V_{CC}	V
		2.3V to 2.7V	-	-	-	0.7	V
		3V to 3.6V	-	-	-	0.8	V
		4.5V to 5.5V	-	-	-	0.3×V_{CC}	V
HIGH-level output voltage	V_{OH}	1.65V to 5.5V	I_O=-100uA	V_{CC}-0.1	-	-	V
		1.65V	I_O =-4mA	1.2	-	-	V
		2.3V	I_O =-8mA	1.9	-	-	V
		3.0V	I_O =-16mA	2.4	-	-	V
		3.0V	I_O =-24mA	2.3	-	-	V
		4.5V	I_O =-32mA	3.8	-	-	V
LOW-level output voltage	V_{OL}	1.65V to 5.5V	I_O=100uA	-	-	0.10	V
		1.65V	I_O =4mA	-	-	0.45	V
		2.3V	I_O =8mA	-	-	0.30	V
		3.0V	I_O =16mA	-	-	0.40	V
		3.0V	I_O =24mA	-	-	0.65	V
		4.5V	I_O =32mA	-	-	0.65	V
input leakage current	I_I	0V to 5.5V	V_I=5.5V or GND	-	-	±1	uA
OFF-state output current	I_{OZ}	3.6V	V_I=V_{IH} or V_{IL}; V_O= 0V to 5.5V	-	-	±5	uA
power-off leakage current	I_{OFF}	0V	V_I or V_O=5.5V	-	-	±10	uA
supply current	I_{CC}	1.65V to 5.5V	V_I=5.5V or GND; I_O=0A	-	-	10	uA
additional supply current	ΔI_{CC}	2.3V to 5.5V	per input pin; V_I= V_{CC}-0.6V; I_O=0A	-	-	500	uA

3.3.3、AC Characteristics 1

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

Parameter	Symbol	V_{CC}	Conditions	Min.	Typ.	Max.	Unit
D to Q propagation delay	t_{PLH}, t_{PHL}	1.65V to 1.95V	see Figure 3	-	-	16	ns
		2.3V to 2.7V		-	-	7.3	ns
		3V to 3.6V		-	-	5.4	ns
		4.5V to 5.5V		-	-	4	ns
LE to Q propagation delay		1.65V to 1.95V	see Figure 3	-	-	16.3	ns
		2.3V to 2.7V		-	-	7.3	ns
		3V to 3.6V		-	-	5.5	ns
		4.5V to 5.5V		-	-	4	ns
$n\overline{OE}$ to Q enable time	t_{PZH}, t_{PZL}	1.65V to 1.95V	see Figure 4	-	-	13	ns
		2.3V to 2.7V		-	-	6.3	ns
		3V to 3.6V		-	-	5.1	ns
		4.5V to 5.5V		-	-	3.7	ns
$n\overline{OE}$ to Q disable time	t_{PLZ}, t_{PHZ}	1.65V to 1.95V	see Figure 4	-	-	17.4	ns
		2.3V to 2.7V		-	-	5.9	ns
		3V to 3.6V		-	-	6.5	ns
		4.5V to 5.5V		-	-	4.6	ns
pulse duration, LE high	t_w	1.65V to 1.95V	see Figure 2	3	-	-	ns
		2.3V to 2.7V		3	-	-	ns
		3V to 3.6V		3	-	-	ns
		4.5V to 5.5V		3	-	-	ns
setup time	t_{su}	1.65V to 1.95V	see Figure 5	2.4	-	-	ns
		2.3V to 2.7V		2	-	-	ns
		3V to 3.6V		1.5	-	-	ns
		4.5V to 5.5V		1.5	-	-	ns
hold time	t_h	1.65V to 1.95V	see Figure 5	2.5	-	-	ns
		2.3V to 2.7V		1.5	-	-	ns
		3V to 3.6V		1.5	-	-	ns
		4.5V to 5.5V		1.5	-	-	ns

Note: Typical values are measured at T_{amb}=25℃ and V_{CC}=1.8V, 2.5V, 2.7V, 3.3V and 5.0V respectively.

3.3.4、AC Characteristics 2

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

Parameter	Symbol	V_{CC}	Conditions	Min.	Typ.	Max.	Unit
D to Q propagation delay	t_{PLH}, t_{PHL}	1.65V to 1.95V	see Figure 3	-	-	17	ns
		2.3V to 2.7V		-	-	8	ns
		3V to 3.6V		-	-	6	ns
		4.5V to 5.5V		-	-	4.5	ns
LE to Q propagation delay		1.65V to 1.95V	see Figure 3	-	-	17	ns
		2.3V to 2.7V		-	-	8	ns
		3V to 3.6V		-	-	6	ns
		4.5V to 5.5V		-	-	4.5	ns
$n\overline{OE}$ to Q enable time	t_{PZH}, t_{PZL}	1.65V to 1.95V	see Figure 4	-	-	13.5	ns
		2.3V to 2.7V		-	-	7	ns
		3V to 3.6V		-	-	5.5	ns
		4.5V to 5.5V		-	-	4	ns
$n\overline{OE}$ to Q disable time	t_{PLZ}, t_{PHZ}	1.65V to 1.95V	see Figure 4	-	-	18.4	ns
		2.3V to 2.7V		-	-	6.2	ns
		3V to 3.6V		-	-	6.8	ns
		4.5V to 5.5V		-	-	5	ns
pulse duration, LE high	t_w	1.65V to 1.95V	see Figure 2	3	-	-	ns
		2.3V to 2.7V		3	-	-	ns
		3V to 3.6V		3	-	-	ns
		4.5V to 5.5V		3	-	-	ns
setup time	t_{su}	1.65V to 1.95V	see Figure 5	2.9	-	-	ns
		2.3V to 2.7V		2.1	-	-	ns
		3V to 3.6V		1.5	-	-	ns
		4.5V to 5.5V		1.5	-	-	ns
hold time	t_h	1.65V to 1.95V	see Figure 5	3	-	-	ns
		2.3V to 2.7V		1.5	-	-	ns
		3V to 3.6V		1.5	-	-	ns
		4.5V to 5.5V		1.5	-	-	ns

4、Testing Circuit

4.1、AC Testing Circuit

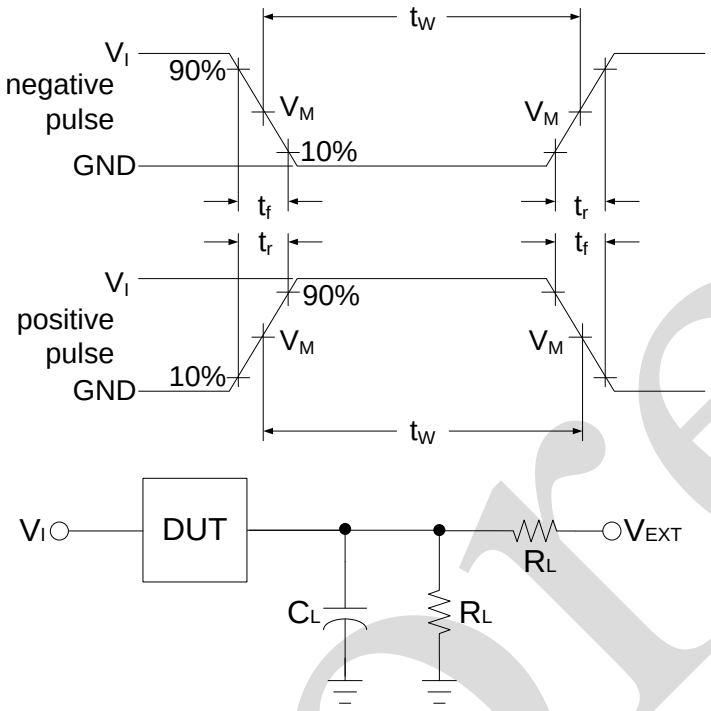


Figure 2. AC Testing Circuit

Definitions for test circuit:

R_L=Load resistance.

C_L=Load capacitance including jig and probe capacitance.

4.2、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}
1.65V to 1.95V	V_{CC}	≤ 2ns	30pF	1kΩ	Open	2×V_{CC}	GND
2.3V to 2.7V	V_{CC}	≤ 2ns	30pF	500Ω	Open	2×V_{CC}	GND
3V to 3.6V	V_{CC}	≤ 2.5ns	50pF	500Ω	Open	2×V_{CC}	GND
4.5V to 5.5V	V_{CC}	≤ 2.5ns	50pF	500Ω	Open	2×V_{CC}	GND

4.3、AC Testing Waveforms

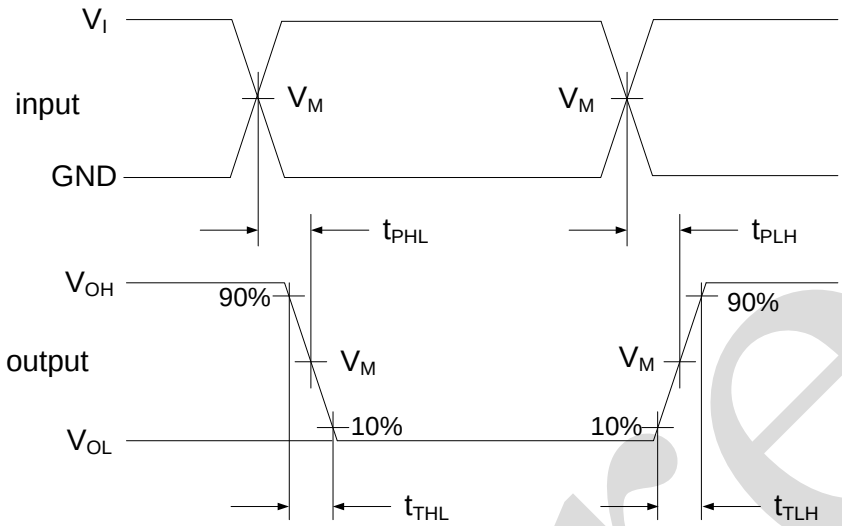


Figure 3. The data input (D) to output(Q) propagation delays

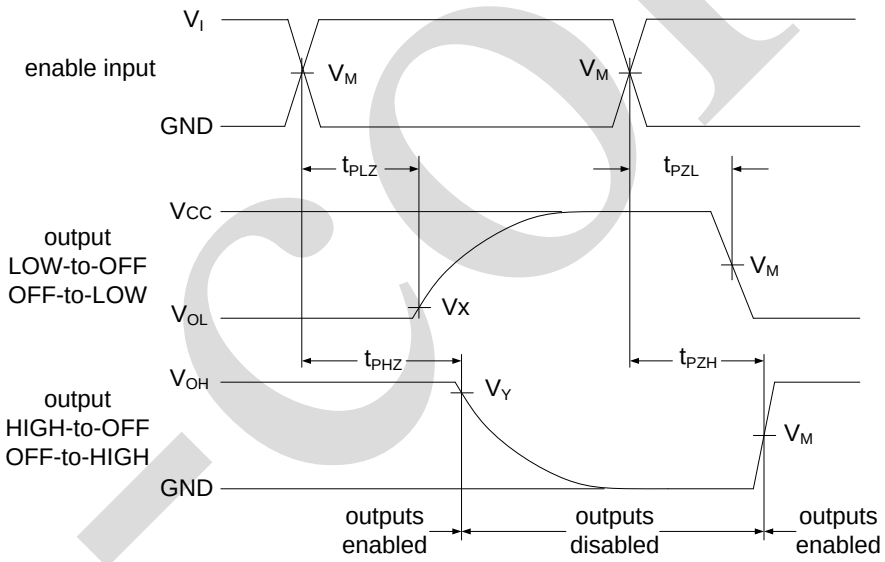


Figure 4. 3-state enable and disable times

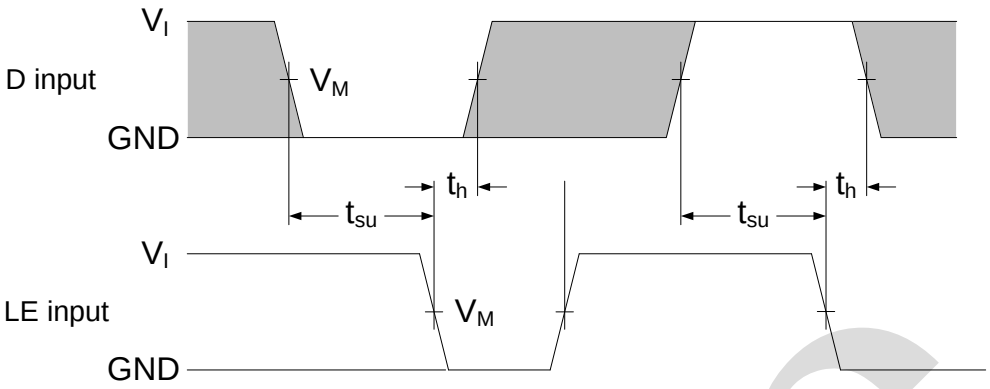


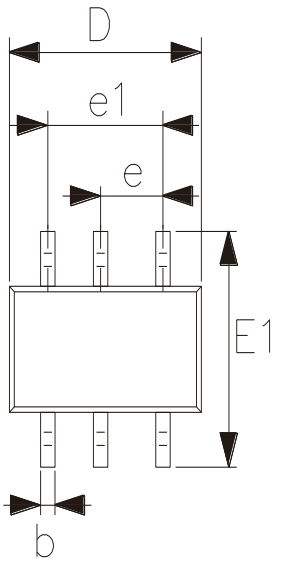
Figure 5. data setup and hold times for D input to the LE

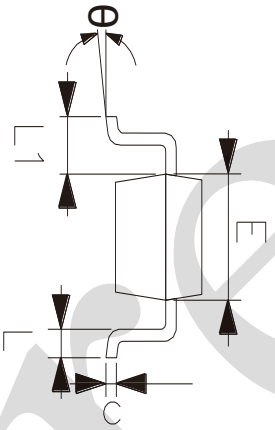
4.4、Measurement Points

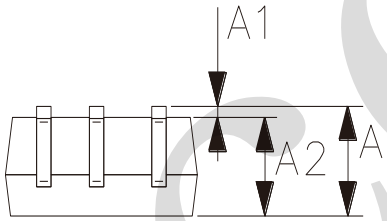
Supply voltage	Input	Output		
V_{CC}	V_M	V_M	V_X	V_Y
1.65V to 1.95V	0.5×V_{CC}	0.5×V_{CC}	V_{OL}+0.15V	V_{OH}-0.15V
2.3V to 2.7V	0.5×V_{CC}	0.5×V_{CC}	V_{OL}+0.15V	V_{OH}-0.15V
3V to 3.6V	0.5×V_{CC}	0.5×V_{CC}	V_{OL}+0.3V	V_{OH}-0.3V
4.5V to 5.5V	0.5×V_{CC}	0.5×V_{CC}	V_{OL}+0.3V	V_{OH}-0.3V

5、Package Information

5.1、SOT363

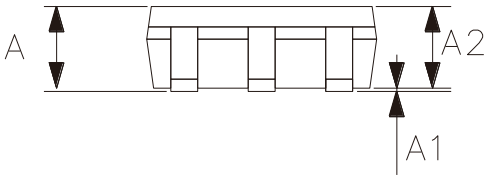


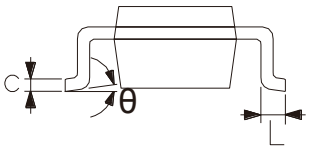


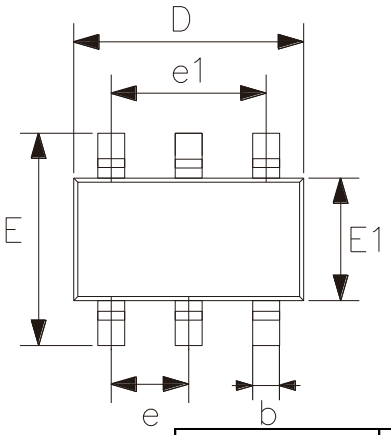


2023/12/A	Dimensions In Millimeters	
Symbol	Min.	Max.
A	0.90	1.10
A1	0.00	0.10
A2	0.90	1.00
b	0.15	0.35
c	0.11	0.175
D	2.00	2.20
E1	2.15	2.45
E	1.15	1.35
e	0.65	
e1	1.20	1.40
L	0.26	0.46
L1	0.525	
θ	0°	8°

5.2、SOT23-6

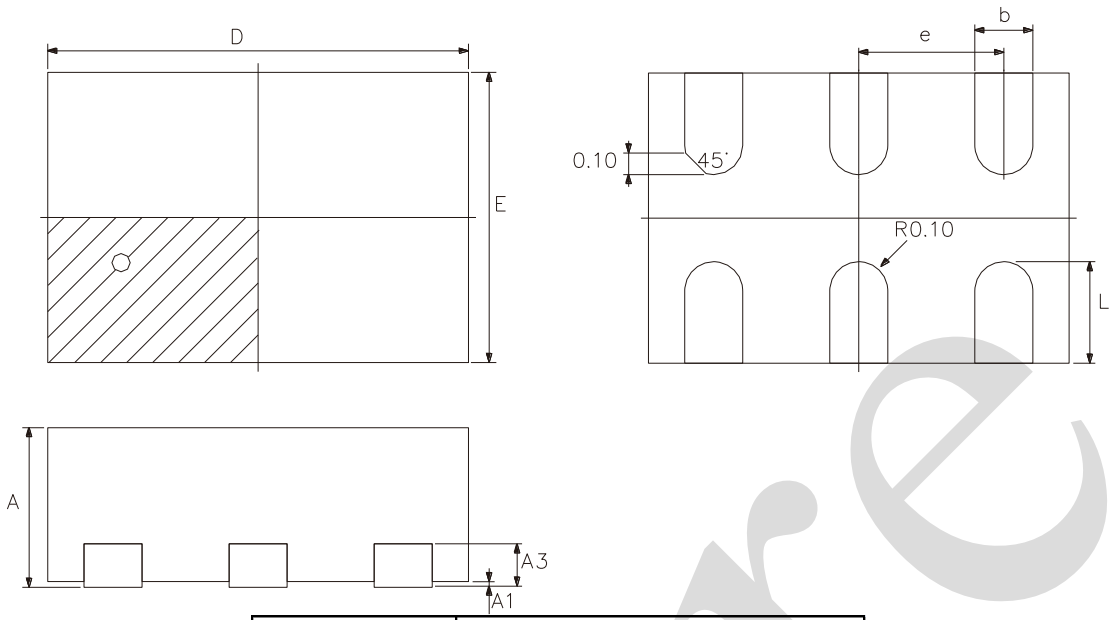






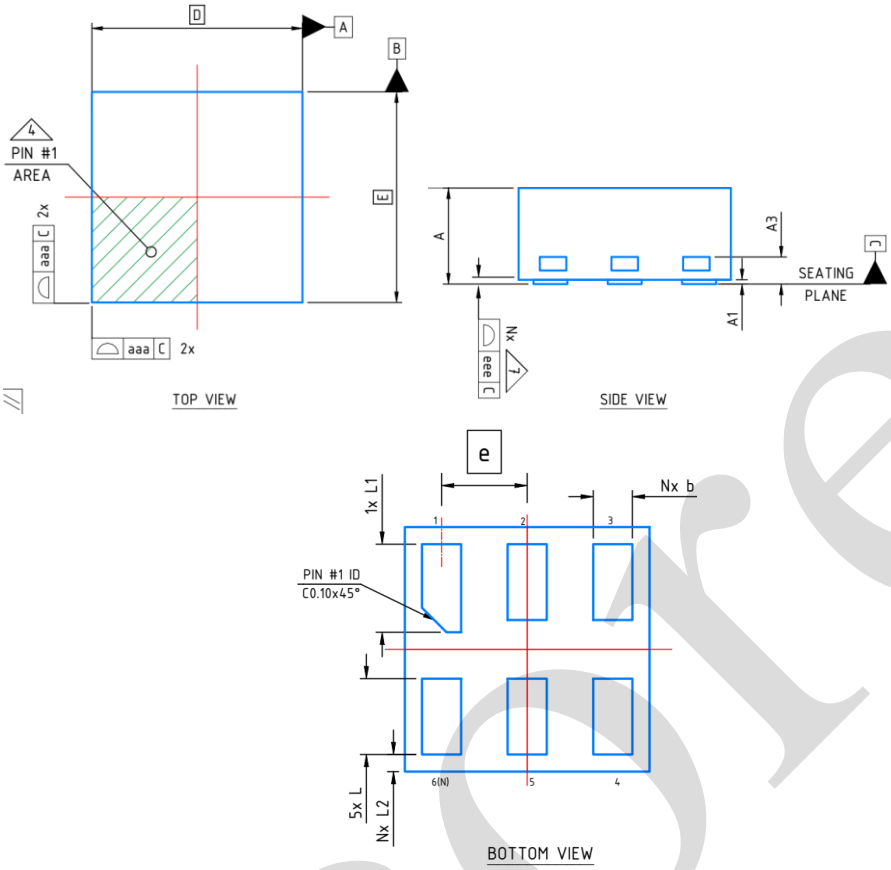
2023/12/A	Dimensions In Millimeters	
Symbol	**Min.**	**Max.**
A	—	1.25
A1	0.00	0.12
A2	1.00	1.20
b	0.30	0.50
c	0.10	0.20
D	2.82	3.02
E	2.60	3.00
E1	1.50	1.70
e	0.95	
e1	1.80	2.00
L	0.30	0.60
θ	0°	8°

5.3、XSON6(1*1.45*0.55)-0.5



2023/12/A	Dimensions In Millimeters	
Symbol	**Min**	**Max**
A	0.51	0.60
A1	0.00	0.05
A3	0.15	
b	0.15	0.25
D	1.45	
E	1.00	
e	0.50	
L	0.25	0.45

5.4、XSON6(1*1*0.45)-0.35



2023/12/A	Dimensions In Millimeters	
Symbol	Min	Max
A	0.41	0.50
A1	0.00	0.05
A3	0.127	
b	0.11	0.21
D	1.00	
E	1.00	
e	0.35	
L	0.26	0.36
L1	0.31	0.41
L2	0.02	0.12

6、Statements And Notes

6.1、The name and content of Hazardous substances or Elements in the product

Part name	Hazardous substances or Elements									
	Lead and lead compounds	Mercury and mercury compounds	Cadmium and cadmium compounds	Hexavalent chromium compounds	Polybrominated biphenyls	Polybrominated biphenyl ethers	Dibutyl phthalate	Butylbenzyl phthalate	Di-2-ethylhexyl phthalate	Diisobutyl phthalate
Lead frame	○	○	○	○	○	○	○	○	○	○
Plastic resin	○	○	○	○	○	○	○	○	○	○
Chip	○	○	○	○	○	○	○	○	○	○
The lead	○	○	○	○	○	○	○	○	○	○
Plastic sheet installed	○	○	○	○	○	○	○	○	○	○
explanation	○：Indicates that the content of hazardous substances or elements in the detection limit of the following the SJ/T11363-2006 standard. ×：Indicates that the content of hazardous substances or elements exceeding the SJ/T11363-2006 Standard limit requirements.									

6.2、Notes

We recommend you to read this chapter carefully before using this product.

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