



# SN74LVC1G17 (LX) Single Buffer Schmitt Trigger

## Product Specification

### Specification Revision History:

Version	Date	Description
2021-07-A1	2021-07	New
2023-04-B1	2023-04	Update the template
2023-10-B2	2023-10	Additional package



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## 1、 General Description

The SN74LVC1G17 provides a buffer function with Schmitt trigger input. It is capable of transforming slowly changing input signals into sharply defined outputs.

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:

- Wide supply voltage range from 1.65V to 5.5V
- $\pm 24\text{mA}$  output drive ( $V_{CC}=3.0\text{V}$ )
- CMOS low power consumption
- Direct interface with TTL levels
- Unlimited rise and fall times
- Input accepts voltages up to 5V
- Specified from  $-40^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$
- Packaging information: SOT-23-5/SOT-353/XSON6

### Ordering Information:

#### Reel packing specifications:

Part number	Packaging form	Marking code	Reel quantity	Boxed reel quantity	Notes
SN74LVC1G17DB (LX)	SOT-23-5	AFXX	3000 PCS/reel	30000 PCS/box	Dimensions of plastic enclosure: 2.9mm×1.6mm Pin spacing: 0.95mm
SN74LVC1G17DC (LX)	SOT-353	AFXX	3000 PCS/reel	30000 PCS/box	Dimensions of plastic enclosure: 2.1mm×1.3mm Pin spacing: 0.65mm
SN74LVC1G17DS (LX)	XSON6	AFXX	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

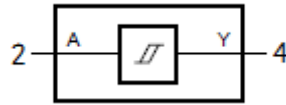


Figure 1. Logic symbol



Figure 2. IEC logic symbol

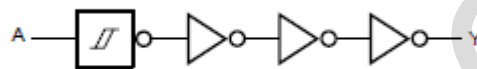
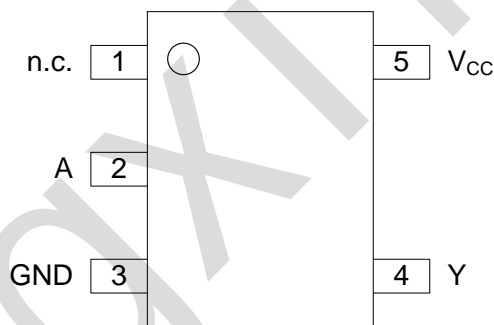
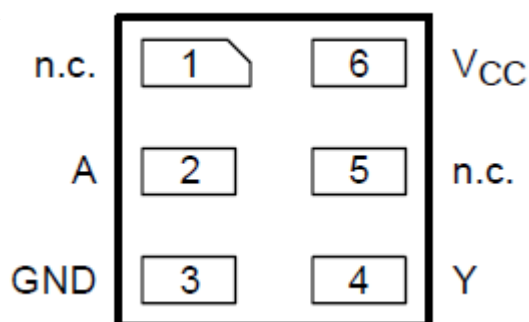


Figure 3. Logic diagram

### 2.2、Pin Configurations



SOT23-5/SOT353



XSON6



### 2.3、Pin Description

Pin No. SOT23-5/SO T353	Pin No. XSON6	Pin Name	Description
1	1,5	n.c.	not connected
2	2	A	data input
3	3	GND	ground (0V)
4	4	Y	data output
5	6	V <sub>CC</sub>	supply voltage

### 2.4、Function Table

Input	Output
A	Y
L	L
H	H

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

## 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 <sub>CC</sub>	-	-0.5	+6.5	V
input voltage	V <sub>I</sub>	-	-0.5	+6.5	V
output voltage	V <sub>O</sub>	Active mode	-0.5	V <sub>CC</sub> +0.5	V
		Power-down mode; V <sub>CC</sub> =0V	-0.5	+6.5	V
input clamping current	I <sub>IK</sub>	V <sub>I</sub> < 0V	-50	-	mA
output clamping current	I <sub>OK</sub>	V <sub>O</sub> > V <sub>CC</sub> or V <sub>O</sub> < 0V	-	±50	mA
output current	I <sub>O</sub>	V <sub>O</sub> =0V to V <sub>CC</sub>	-	±50	mA
supply current	I <sub>CC</sub>	-	-	+100	mA
ground current	I <sub>GND</sub>	-	-100	-	mA
storage temperature	T <sub>stg</sub>	-	-65	+150	°C
total power dissipation	P <sub>tot</sub>	-	-	250	mW
soldering temperature	T <sub>L</sub>	10s	260		°C

### 3.2、Recommended Operating Conditions

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
supply voltage	V <sub>CC</sub>	-	1.65	-	5.5	V
input voltage	V <sub>I</sub>	-	0	-	5.5	V
output voltage	V <sub>O</sub>	Active mode	0	-	V <sub>CC</sub>	V



		Power-down mode; $V_{CC}=0V$	0	-	5.5	V
ambient temperature	$T_{amb}$	-	-40	-	+125	°C

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### 3.3、Electrical Characteristics

#### 3.3.1、DC Characteristics 1

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
HIGH-level output voltage	$V_{OH}$	$V_I = V_{T+}$ or $V_{T-}$	$I_O=-100\mu\text{A}; V_{CC}=1.65\text{V to }5.5\text{V}$	$V_{CC}-0.1$	-	-	V
			$I_O=-4\text{mA}; V_{CC}=1.65\text{V}$	1.2	-	-	V
			$I_O=-8\text{mA}; V_{CC}=2.3\text{V}$	1.9	-	-	V
			$I_O=-12\text{mA}; V_{CC}=2.7\text{V}$	2.2	-	-	V
			$I_O=-24\text{mA}; V_{CC}=3.0\text{V}$	2.3	-	-	V
			$I_O=-32\text{mA}; V_{CC}=4.5\text{V}$	3.8	-	-	V
LOW-level output voltage	$V_{OL}$	$V_I = V_{T+}$ or $V_{T-}$	$I_O=100\mu\text{A}; V_{CC}=1.65\text{V to }5.5\text{V}$	-	-	0.10	V
			$I_O=4\text{mA}; V_{CC}=1.65\text{V}$	-	-	0.45	V
			$I_O=8\text{mA}; V_{CC}=2.3\text{V}$	-	-	0.30	V
			$I_O=12\text{mA}; V_{CC}=2.7\text{V}$	-	-	0.40	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
input leakage current	$I_I$	$V_I=5.5\text{V}$ or GND; $V_{CC}=0\text{V to }5.5\text{V}$	-	-	$\pm 1$	$\mu\text{A}$	
power-off leakage current	$I_{OFF}$	$V_I$ or $V_O=5.5\text{V}; V_{CC}=0\text{V}$	-	-	$\pm 2$	$\mu\text{A}$	
supply current	$I_{CC}$	$V_I=5.5\text{V}$ or GND; $I_O=0\text{A}; V_{CC}=1.65\text{V to }5.5\text{V}$	-	-	4	$\mu\text{A}$	
additional supply current	$\Delta I_{CC}$	per pin; $V_I=V_{CC}-0.6\text{V}; I_O=0\text{A}; V_{CC}=2.3\text{V to }5.5\text{V}$	-	-	500	$\mu\text{A}$	
input capacitance	$C_I$	-	-	5.0	-	pF	

Note: All typical values are measured at maximum  $V_{CC}$  and  $T_{amb}=25^{\circ}\text{C}$ .



### 3.3.2、DC Characteristics 2

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
HIGH-level output voltage	$V_{OH}$	$V_I = V_{T+}$ or $V_{T-}$	$I_O=-100\mu\text{A}; V_{CC}=1.65\text{V to }5.5\text{V}$	$V_{CC}-0.1$	-	-	V
			$I_O=-4\text{mA}; V_{CC}=1.65\text{V}$	0.95	-	-	V
			$I_O=-8\text{mA}; V_{CC}=2.3\text{V}$	1.7	-	-	V
			$I_O=-12\text{mA}; V_{CC}=2.7\text{V}$	1.9	-	-	V
			$I_O=-24\text{mA}; V_{CC}=3.0\text{V}$	2.0	-	-	V
			$I_O=-32\text{mA}; V_{CC}=4.5\text{V}$	3.4	-	-	V
LOW-level output voltage	$V_{OL}$	$V_I = V_{T+}$ or $V_{T-}$	$I_O=100\mu\text{A}; V_{CC}=1.65\text{V to }5.5\text{V}$	-	-	0.10	V
			$I_O=4\text{mA}; V_{CC}=1.65\text{V}$	-	-	0.70	V
			$I_O=8\text{mA}; V_{CC}=2.3\text{V}$	-	-	0.45	V
			$I_O=12\text{mA}; V_{CC}=2.7\text{V}$	-	-	0.60	V
			$I_O=24\text{mA}; V_{CC}=3.0\text{V}$	-	-	0.80	V
			$I_O=32\text{mA}; V_{CC}=4.5\text{V}$	-	-	0.80	V
input leakage current	$I_I$	$V_I=5.5\text{V or GND}; V_{CC}=0\text{V to }5.5\text{V}$	-	-	$\pm 1$	$\mu\text{A}$	
power-off leakage current	$I_{OFF}$	$V_I$ or $V_O=5.5\text{V}; V_{CC}=0\text{V}$	-	-	$\pm 2$	$\mu\text{A}$	
supply current	$I_{CC}$	$V_I=5.5\text{V or GND}; I_O=0\text{A}; V_{CC}=1.65\text{V to }5.5\text{V}$	-	-	4	$\mu\text{A}$	
additional supply current	$\Delta I_{CC}$	per pin; $V_I=V_{CC}-0.6\text{V}; I_O=0\text{A}; V_{CC}=2.3\text{V to }5.5\text{V}$	-	-	500	$\mu\text{A}$	

### 3.3.3、AC Characteristics 1

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

Parameter	Symbol	Conditions	Min.	Typ. <sup>[1]</sup>	Max.	Unit	
A to Y propagation delay	$t_{PLH}$	see Figure 5	$V_{CC}=1.65\text{V to }1.95\text{V}$	-	14	21	ns
			$V_{CC}=2.3\text{V to }2.7\text{V}$	-	10	15	ns
			$V_{CC}=2.7\text{V}$	-	9	13.5	ns
			$V_{CC}=3.0\text{V to }3.6\text{V}$	-	8	12	ns
			$V_{CC}=4.5\text{V to }5.5\text{V}$	-	7	10.5	ns
A to Y propagation delay	$t_{PHL}$	see Figure 5	$V_{CC}=1.65\text{V to }1.95\text{V}$	-	12.5	18.8	ns
			$V_{CC}=2.3\text{V to }2.7\text{V}$	-	11	16.5	ns
			$V_{CC}=2.7\text{V}$	-	11	16.5	ns
			$V_{CC}=3.0\text{V to }3.6\text{V}$	-	11	16.5	ns
			$V_{CC}=4.5\text{V to }5.5\text{V}$	-	10	15	ns

Note:

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





### 3.3.4、AC Characteristics 2

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
A to Y propagation delay	t <sub>PLH</sub>	see Figure 5	V <sub>CC</sub> =1.65V to 1.95V	-	-	23	ns
			V <sub>CC</sub> =2.3V to 2.7V	-	-	17	ns
			V <sub>CC</sub> =2.7V	-	-	15.5	ns
			V <sub>CC</sub> =3.0V to 3.6V	-	-	14	ns
			V <sub>CC</sub> =4.5V to 5.5V	-	-	12.5	ns
A to Y propagation delay	t <sub>PHL</sub>	see Figure 5	V <sub>CC</sub> =1.65V to 1.95V	-	-	20.8	ns
			V <sub>CC</sub> =2.3V to 2.7V	-	-	18.5	ns
			V <sub>CC</sub> =2.7V	-	-	18.5	ns
			V <sub>CC</sub> =3.0V to 3.6V	-	-	18.5	ns
			V <sub>CC</sub> =4.5V to 5.5V	-	-	17	ns

### 3.3.5、Transfer Characteristics 1

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
positive-going threshold voltage	V <sub>T+</sub>	see Figure 6 and Figure 7	V <sub>CC</sub> =1.8V	0.82	1.02	1.2	V
			V <sub>CC</sub> =2.3V	1.03	1.25	1.45	V
			V <sub>CC</sub> =3.0V	1.29	1.5	1.71	V
			V <sub>CC</sub> =4.5V	1.84	2.15	2.41	V
			V <sub>CC</sub> =5.5V	2.19	2.6	2.91	V
negative-going threshold voltage	V <sub>T-</sub>	see Figure 6 and Figure 7	V <sub>CC</sub> =1.8V	0.45	0.6	0.75	V
			V <sub>CC</sub> =2.3V	0.64	0.8	0.96	V
			V <sub>CC</sub> =3.0V	0.86	1.1	1.34	V
			V <sub>CC</sub> =4.5V	1.35	1.75	2.09	V
			V <sub>CC</sub> =5.5V	1.61	2.15	2.59	V
hysteresis voltage	V <sub>H</sub>	see Figure 6 and Figure 7	V <sub>CC</sub> =1.8V	-	0.4	-	V
			V <sub>CC</sub> =2.3V	-	0.4	-	V
			V <sub>CC</sub> =3.0V	-	0.42	-	V
			V <sub>CC</sub> =4.5V	-	0.45	-	V
			V <sub>CC</sub> =5.5V	-	0.47	-	V



### 3.3.6、 Transfer Characteristics 2

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
positive-going threshold voltage	$V_{T+}$	see Figure 6 and Figure 7	$V_{CC}=1.8\text{V}$	0.79	-	1.2	V
			$V_{CC}=2.3\text{V}$	1.00	-	1.45	V
			$V_{CC}=3.0\text{V}$	1.26	-	1.71	V
			$V_{CC}=4.5\text{V}$	1.81	-	2.41	V
			$V_{CC}=5.5\text{V}$	2.16	-	2.91	V
negative-going threshold voltage	$V_{T-}$	see Figure 6 and Figure 7	$V_{CC}=1.8\text{V}$	0.45	-	0.78	V
			$V_{CC}=2.3\text{V}$	0.64	-	0.99	V
			$V_{CC}=3.0\text{V}$	0.86	-	1.37	V
			$V_{CC}=4.5\text{V}$	1.35	-	2.12	V
			$V_{CC}=5.5\text{V}$	1.61	-	2.62	V
hysteresis voltage	$V_H$	see Figure 6 and Figure 7	$V_{CC}=1.8\text{V}$	-	0.4	-	V
			$V_{CC}=2.3\text{V}$	-	0.4	-	V
			$V_{CC}=3.0\text{V}$	-	0.42	-	V
			$V_{CC}=4.5\text{V}$	-	0.45	-	V
			$V_{CC}=5.5\text{V}$	-	0.47	-	V

## 4、 Testing Circuit

### 4.1、 AC Testing Circuit

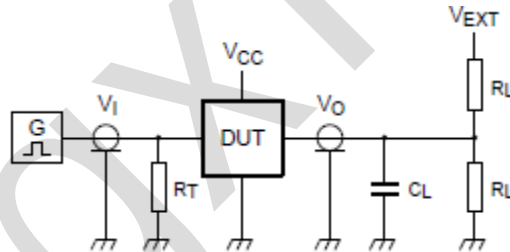


Figure 4. Test circuit for measuring switching times

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.

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



## 4.2、AC Testing Waveforms

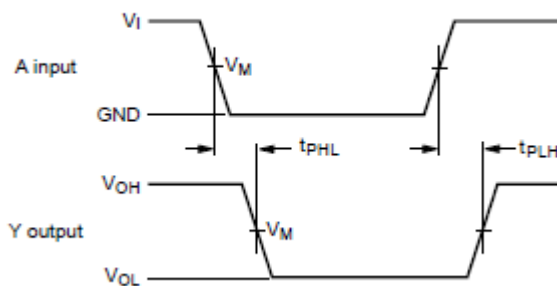


Figure 5. The data input (A) to output (Y) propagation delays

## 4.3、Transfer Characteristics Waveforms

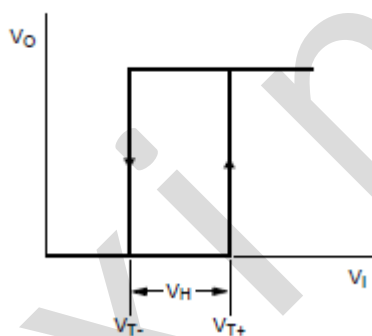


Figure 6. Transfer characteristic

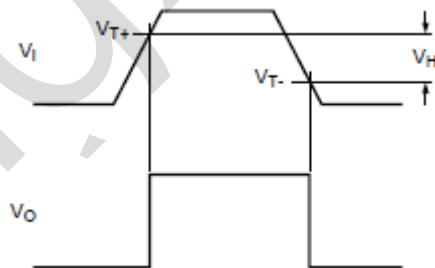


Figure 7. Definition of  $V_{T+}$ ,  $V_{T-}$  and  $V_H$



#### 4.4、Measurement Points

Supply voltage	Input	Output
$V_{CC}$	$V_M$	$V_M$
1.65V to 1.95V	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$
2.3V to 2.7V	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$
2.7V	1.5V	1.5V
3.0V to 3.6V	1.5V	1.5V
4.5V to 5.5V	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$

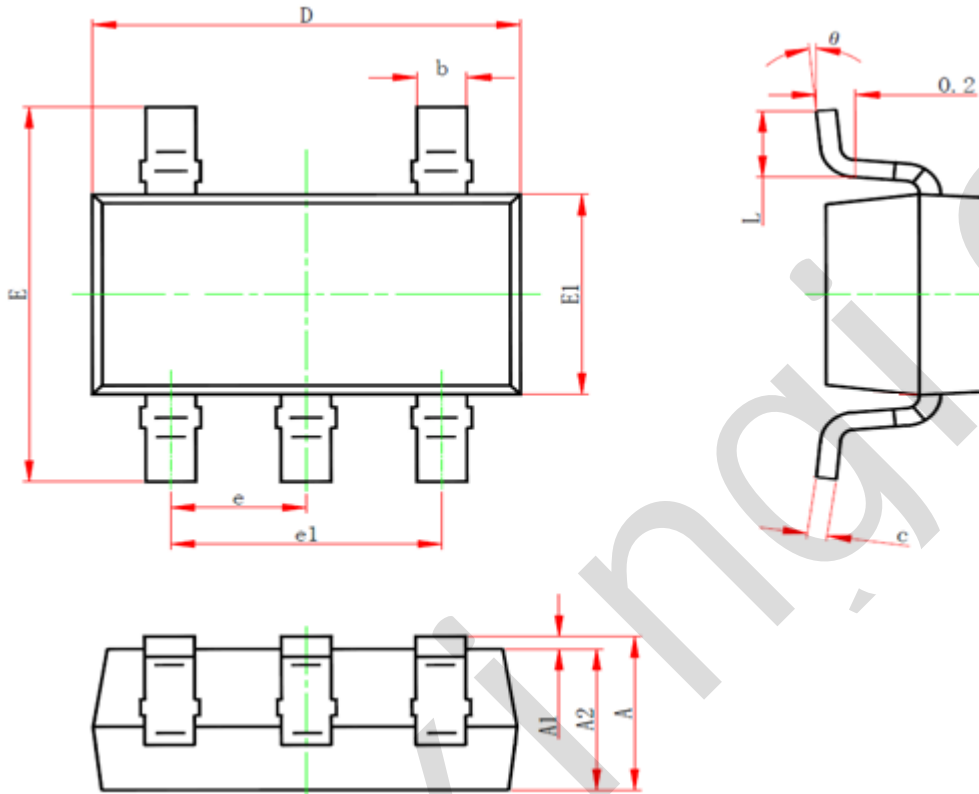
#### 4.5、Test Data

Supply voltage	Input		Load		$V_{EXT}$
	$V_I$	$t_r = t_f$	$C_L$	$R_L$	$t_{PLH}, t_{PHL}$
1.65V to 1.95V	$V_{CC}$	$\leq 3ns$	30pF	1k $\Omega$	open
2.3V to 2.7V	$V_{CC}$	$\leq 3ns$	30pF	500 $\Omega$	open
2.7V	2.7V	$\leq 3ns$	50pF	500 $\Omega$	open
3.0V to 3.6V	2.7V	$\leq 3ns$	50pF	500 $\Omega$	open
4.5V to 5.5V	$V_{CC}$	$\leq 3ns$	50pF	500 $\Omega$	open



## 5、Package Information

### 5.1、SOT23-5

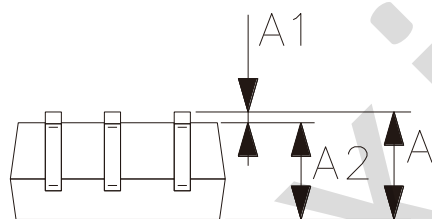
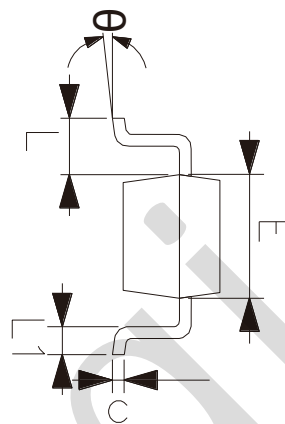
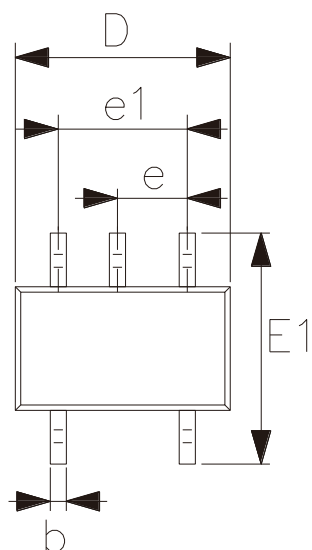


Symbol	Dimensions (mm)	
	Min.	Max.
A	-	1.26
A1	0.00	0.12
A2	1.00	1.20
b	0.30	0.50
c	0.10	0.20
D	2.82	3.02
E	2.60	3.00
E1	1.50	1.70
e	0.95	
e1	1.80	2.00
L	0.30	0.60
$\theta$	0°	8°



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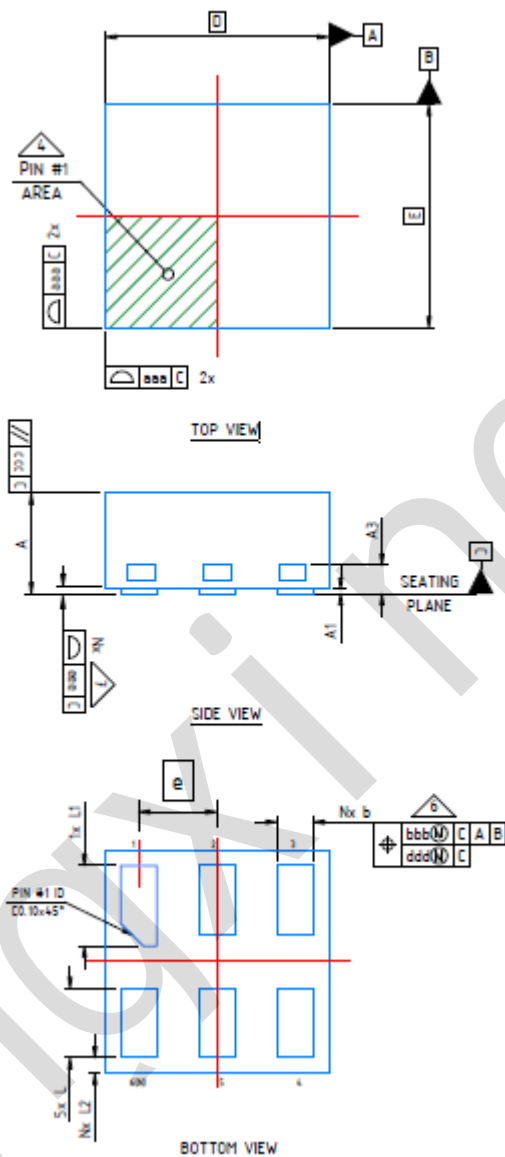
5.2、SOT353



Symbol	Dimensions (mm)	
	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
E	1.15	1.35
E1	2.15	2.45
e	0.65	
e1	1.20	1.40
L	0.525	
L1	0.26	0.46
$\theta$	0°	8°



5.3、XSON6(1\*1\*0.45-0.35)



Symbol	Dimensions (mm)	
	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



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L1	0.31	0.41
L2	0.02	0.12

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## 6、Statements

### 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	<p>○: Indicates that the content of hazardous substances or elements in the detection limit of the following the SJ/T11363-2006 standard.</p> <p>×: Indicates that the content of hazardous substances or elements exceeding the SJ/T11363-2006 Standard limit requirements.</p>									

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