

## 1、General Description

The SN74LVC1G08 provides one 2-input AND function. 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.

### Features:

- Wide supply voltage range from 1.65V to 5.5V
- $\pm 24\text{mA}$  output drive ( $V_{DD}=3.0\text{V}$ )
- CMOS low power consumption
- 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

## 2、Block Diagram And Pin Description

### 2.1、Block Diagram

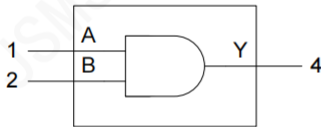


Figure 1. Logic symbol



Figure 2. IEC logic symbol

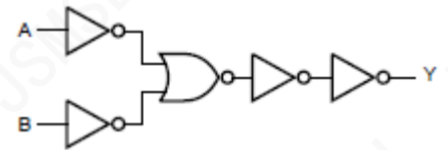
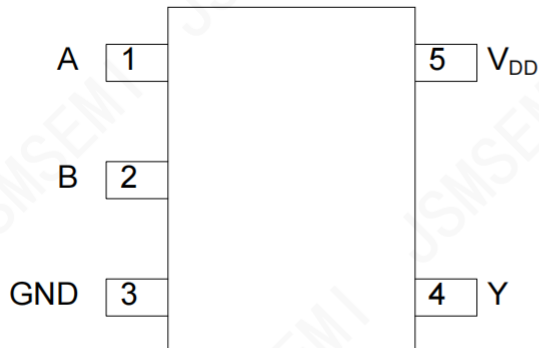


Figure 3. Logic diagram

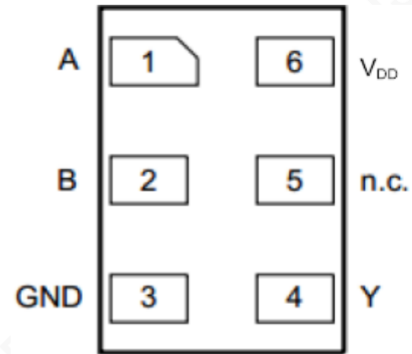
### Ordering Information

Order number	Package	Marking	Operation Temperature Range	MSL Grade	Ship, Quantity	Green
SN74LVC1G08DBVR	SOT-23-5	AEXX	-40 to 125°C	3	T&R,3000	Rohs
SN74LVC1G08DCKR	SOT-353	CE5	-40 to 125°C	3	T&R,3000	Rohs
SN74LVC1G08QDCKRQ1	SOT-353	CE5	-40 to 125°C	3	T&R,3000	Rohs
SN74LVC1G08DSFR	XSON6	**	-40 to 125°C	3	T&R,5000	Rohs

## 2.2、Pin Configurations



SOT-23-5/SOT-353



XSON6

## 2.3、Pin Description

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

## 2.4、Function Table

Input		Output
A	B	Y
L	L	L
L	H	L
H	L	L
H	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	$V_{DD}$	-	-0.5	+6.5	V
input clamping current	$I_{IK}$	$V_I < 0V$	-50	-	mA
input voltage	$V_I$	-	-0.5	+6.5	V
output clamping current	$I_{OK}$	$V_O > V_{DD}$ or $V_O < 0V$	-	$\pm 50$	mA
output voltage	$V_O$	Active mode	-0.5	$V_{DD}+0.5$	V
		Power-down mode	-0.5	+6.5	V
output current	$I_O$	$V_O=0V$ to $V_{DD}$	-	$\pm 50$	mA
supply current	$I_{DD}$	-	-	100	mA
ground current	$I_{GND}$	-	-100	-	mA
storage temperature	$T_{stg}$	-	-65	+150	°C
total power dissipation	$P_{tot}$	-	-	250	mW
soldering temperature	$T_L$	10s	260		°C

#### 3.2、Recommended Operating Conditions

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

### 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 input voltage	$V_{IH}$	$V_{DD}=1.65\text{V}$ to $1.95\text{V}$	$0.65 \times V_{DD}$	-	-	V	
		$V_{DD}=2.3\text{V}$ to $2.7\text{V}$	1.7	-	-	V	
		$V_{DD}=2.7\text{V}$ to $3.6\text{V}$	2.0	-	-	V	
		$V_{DD}=4.5\text{V}$ to $5.5\text{V}$	$0.7 \times V_{DD}$	-	-	V	
LOW-level input voltage	$V_{IL}$	$V_{DD}=1.65\text{V}$ to $1.95\text{V}$	-	-	$0.35 \times V_{DD}$	V	
		$V_{DD}=2.3\text{V}$ to $2.7\text{V}$	-	-	0.7	V	
		$V_{DD}=2.7\text{V}$ to $3.6\text{V}$	-	-	0.8	V	
		$V_{DD}=4.5\text{V}$ to $5.5\text{V}$	-	-	$0.3 \times V_{DD}$	V	
HIGH-level output voltage	$V_{OH}$	$V_I = V_{IH}$ or $V_{IL}$	$I_O=-100\mu\text{A}$ ; $V_{DD}=1.65\text{V}$ to $5.5\text{V}$	$V_{DD}-0.1$	-	-	V
			$I_O=-4\text{mA}$ ; $V_{DD}=1.65\text{V}$	1.2	-	-	V
			$I_O=-8\text{mA}$ ; $V_{DD}=2.3\text{V}$	1.9	-	-	V
			$I_O=-12\text{mA}$ ; $V_{DD}=2.7\text{V}$	2.2	-	-	V
			$I_O=-24\text{mA}$ ; $V_{DD}=3.0\text{V}$	2.3	-	-	V
			$I_O=-32\text{mA}$ ; $V_{DD}=4.5\text{V}$	3.8	-	-	V
LOW-level output voltage	$V_{OL}$	$V_I = V_{IH}$ or $V_{IL}$	$I_O=100\mu\text{A}$ ; $V_{DD}=1.65\text{V}$ to $5.5\text{V}$	-	-	0.1	V
			$I_O=4\text{mA}$ ; $V_{DD}=1.65\text{V}$	-	-	0.45	V
			$I_O=8\text{mA}$ ; $V_{DD}=2.3\text{V}$	-	-	0.3	V
			$I_O=12\text{mA}$ ; $V_{DD}=2.7\text{V}$	-	-	0.4	V
			$I_O=24\text{mA}$ ; $V_{DD}=3.0\text{V}$	-	-	0.55	V
			$I_O=32\text{mA}$ ; $V_{DD}=4.5\text{V}$	-	-	0.55	V
input leakage current	$I_I$	$V_I=5.5\text{V}$ or GND; $V_{DD}=0\text{V}$ to $5.5\text{V}$	-	-	$\pm 1$	$\mu\text{A}$	
power-off leakage current	$I_{OFF}$	$V_I$ or $V_O=5.5\text{V}$ ; $V_{DD}=0\text{V}$	-	-	$\pm 2$	$\mu\text{A}$	
supply current	$I_{DD}$	$V_I=5.5\text{V}$ or GND; $I_O=0\text{A}$ ; $V_{DD}=1.65\text{V}$ to $5.5\text{V}$	-	-	4	$\mu\text{A}$	
additional supply current	$\Delta I_{DD}$	per pin; $V_I=V_{DD}-0.6\text{V}$ ; $I_O=0\text{A}$ ; $V_{DD}=2.3\text{V}$ to $5.5\text{V}$	-	-	500	$\mu\text{A}$	
input capacitance	$C_I$	$V_{DD}=3.3\text{V}$ ; $V_I=\text{GND}$ to $V_{DD}$	-	5	-	pF	

Note: All typical values are measured at  $V_{DD}=3.3\text{V}$  and  $T_{amb}=25^{\circ}\text{C}$ .

**3.3.2、DC Characteristics 2**

 (T<sub>amb</sub> = -40°C to +125°C, voltages are referenced to GND (ground=0V), unless otherwise specified.)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
HIGH-level input voltage	V <sub>IH</sub>	V <sub>DD</sub> =1.65V to 1.95V	0.65× V <sub>DD</sub>	-	-	V	
		V <sub>DD</sub> =2.3V to 2.7V	1.7	-	-	V	
		V <sub>DD</sub> =2.7V to 3.6V	2.0	-	-	V	
		V <sub>DD</sub> =4.5V to 5.5V	0.7× V <sub>DD</sub>	-	-	V	
LOW-level input voltage	V <sub>IL</sub>	V <sub>DD</sub> =1.65V to 1.95V	-	-	0.35× V <sub>DD</sub>	V	
		V <sub>DD</sub> =2.3V to 2.7V	-	-	0.7	V	
		V <sub>DD</sub> =2.7V to 3.6V	-	-	0.8	V	
		V <sub>DD</sub> =4.5V to 5.5V	-	-	0.3× V <sub>DD</sub>	V	
HIGH-level output voltage	V <sub>OH</sub>	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>	I <sub>O</sub> = -100μA; V <sub>DD</sub> = 1.65V to 5.5V	V <sub>DD</sub> - 0.1	-	-	V
			I <sub>O</sub> = -4mA; V <sub>DD</sub> = 1.65V	0.95	-	-	V
			I <sub>O</sub> = -8mA; V <sub>DD</sub> = 2.3V	1.7	-	-	V
			I <sub>O</sub> = -12mA; V <sub>DD</sub> = 2.7V	1.9	-	-	V
			I <sub>O</sub> = -24mA; V <sub>DD</sub> = 3.0V	2.0	-	-	V
			I <sub>O</sub> = -32mA; V <sub>DD</sub> = 4.5V	3.4	-	-	V
LOW-level output voltage	V <sub>OL</sub>	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>	I <sub>O</sub> = 100μA; V <sub>DD</sub> = 1.65V to 5.5V	-	-	0.1	V
			I <sub>O</sub> = 4mA; V <sub>DD</sub> = 1.65V	-	-	0.70	V
			I <sub>O</sub> = 8mA; V <sub>DD</sub> = 2.3V	-	-	0.45	V
			I <sub>O</sub> = 12mA; V <sub>DD</sub> = 2.7V	-	-	0.60	V
			I <sub>O</sub> = 24mA; V <sub>DD</sub> = 3.0V	-	-	0.80	V
			I <sub>O</sub> = 32mA; V <sub>DD</sub> = 4.5V	-	-	0.80	V
input leakage current	I <sub>I</sub>	V <sub>I</sub> = 5.5V or GND; V <sub>DD</sub> = 0V to 5.5V	-	-	±1	μA	
power-off leakage current	I <sub>OFF</sub>	V <sub>I</sub> or V <sub>O</sub> = 5.5V; V <sub>DD</sub> = 0V	-	-	±2	μA	
supply current	I <sub>DD</sub>	V <sub>I</sub> = 5.5V or GND; I <sub>O</sub> = 0A; V <sub>DD</sub> = 1.65V to 5.5V	-	-	4	μA	
additional supply current	ΔI <sub>DD</sub>	per pin; V <sub>I</sub> = V <sub>DD</sub> - 0.6V; I <sub>O</sub> = 0A; V <sub>DD</sub> = 2.3V to 5.5V	-	-	500	μA	

**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, B 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 $2.7\text{V}$	-	10.5	15.8	ns
			$V_{CC}=2.7\text{V}$	-	10	15	ns
			$V_{CC}=3.0\text{V}$ to $3.6\text{V}$	-	9.5	14.3	ns
			$V_{CC}=4.5\text{V}$ to $5.5\text{V}$	-	9	13.5	ns
A, B 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
			$V_{CC}=2.7\text{V}$	-	9.5	14.3	ns
			$V_{CC}=3.0\text{V}$ to $3.6\text{V}$	-	8.5	12.8	ns
			$V_{CC}=4.5\text{V}$ to $5.5\text{V}$	-	7.5	11.3	ns

Note:

 [1] Typical values are measured at  $T_{amb}=25^{\circ}\text{C}$  and  $V_{DD}=1.8\text{V}$ ,  $2.5\text{V}$ ,  $2.7\text{V}$ ,  $3.3\text{V}$  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, B to Y propagation delay	$t_{PHL}$	see Figure 5	$V_{CC}=1.65\text{V}$ to $1.95\text{V}$	-	-	20.8	ns
			$V_{CC}=2.3\text{V}$ to $2.7\text{V}$	-	-	17.8	ns
			$V_{CC}=2.7\text{V}$	-	-	17	ns
			$V_{CC}=3.0\text{V}$ to $3.6\text{V}$	-	-	16.3	ns
			$V_{CC}=4.5\text{V}$ to $5.5\text{V}$	-	-	15.5	ns
A, B to Y propagation delay	$t_{PLH}$	see Figure 5	$V_{CC}=1.65\text{V}$ to $1.95\text{V}$	-	-	23	ns
			$V_{CC}=2.3\text{V}$ to $2.7\text{V}$	-	-	17	ns
			$V_{CC}=2.7\text{V}$	-	-	16.3	ns
			$V_{CC}=3.0\text{V}$ to $3.6\text{V}$	-	-	14.8	ns
			$V_{CC}=4.5\text{V}$ to $5.5\text{V}$	-	-	13.3	ns

## 4、Testing Circuit

### 4.1、AC Testing Circuit

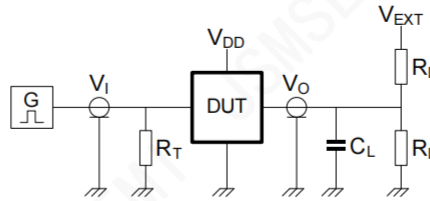


Figure 4. Test circuit for measuring switching times

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

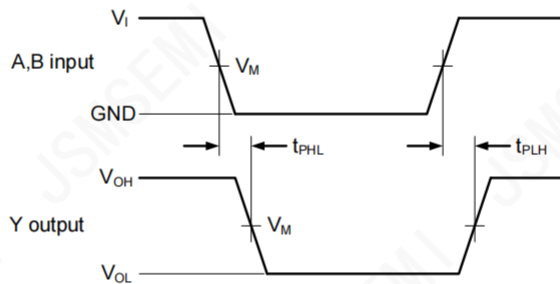


Figure 5. The input A, B to output Y propagation delays

### 4.3、Measurement Points

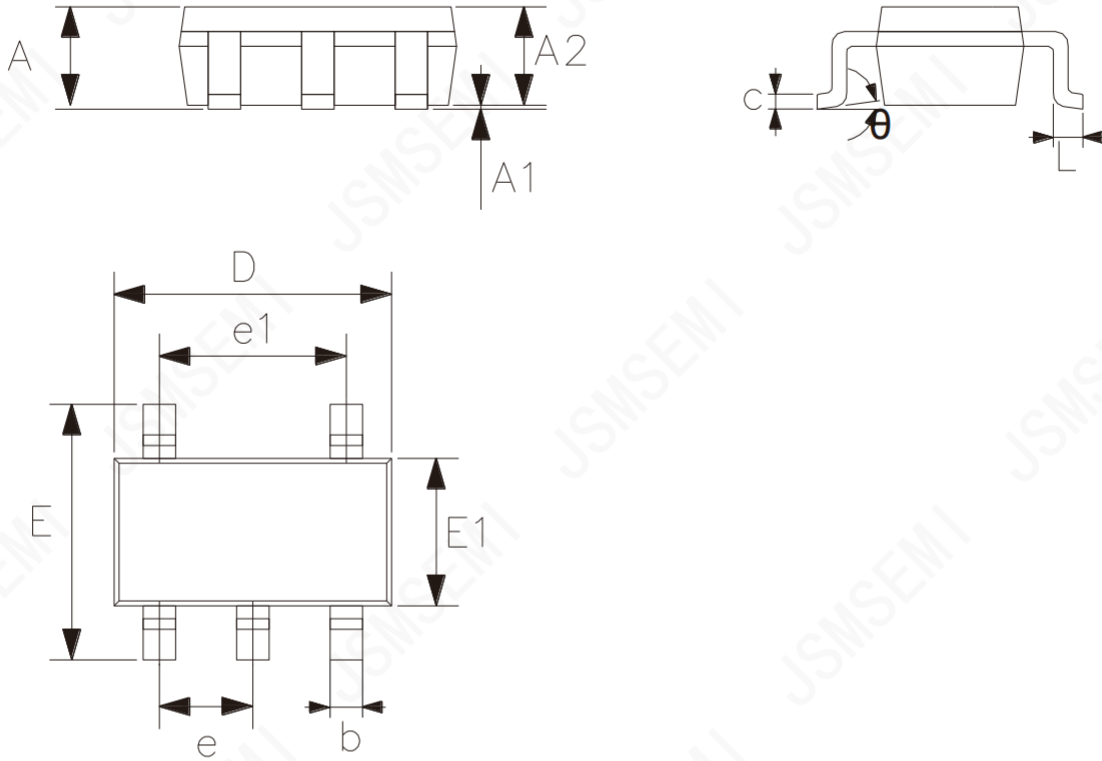
Supply voltage	Input	Output
$V_{DD}$	$V_M$	$V_M$
1.65V to 1.95V	$0.5 \times V_{DD}$	$0.5 \times V_{DD}$
2.3V to 2.7V	$0.5 \times V_{DD}$	$0.5 \times V_{DD}$
2.7V	1.5V	1.5V
3.0V to 3.6V	1.5V	1.5V
4.5V to 5.5V	$0.5 \times V_{DD}$	$0.5 \times V_{DD}$

### 4.4、Test Data

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

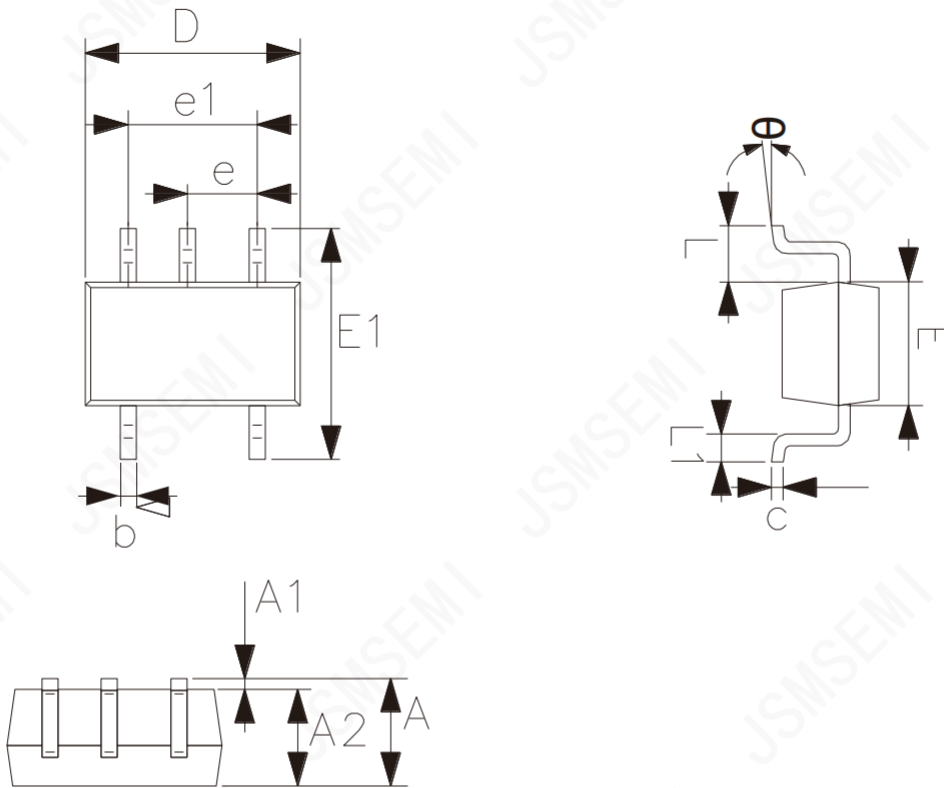
## 5、Package Information

### 5.1、SOT23-5



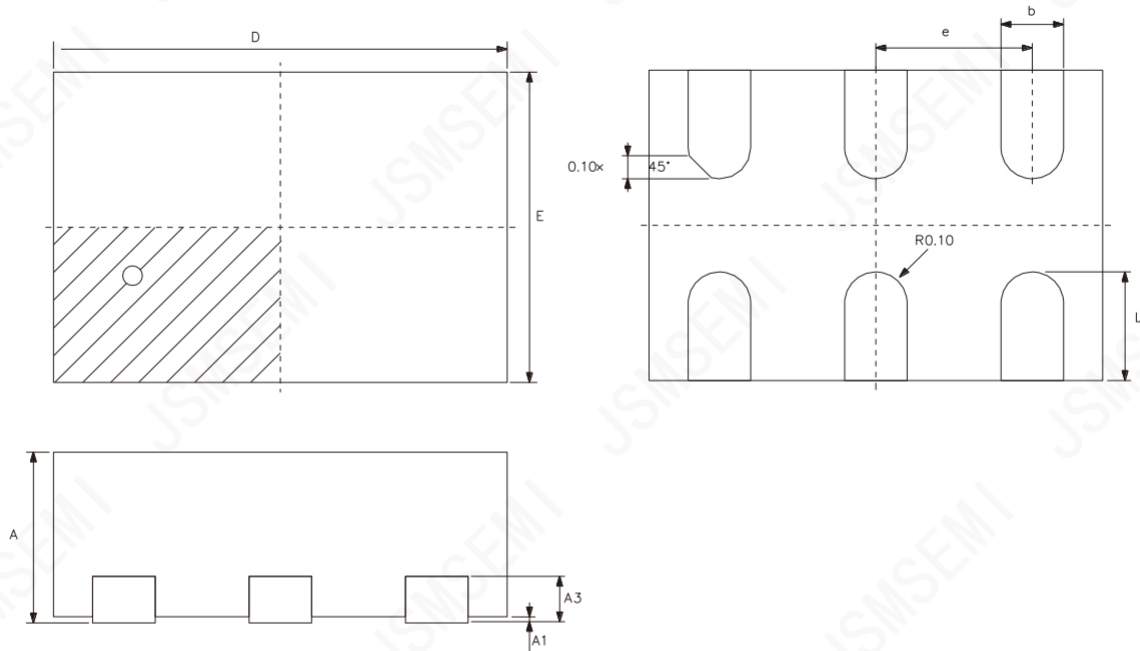
2023/12/A	Dimensions In Millimeters	
Symbol	Min.	Max.
A	—	1.26
A1	0.00	0.12
A2	1.00	1.20
b	0.30	0.50
c	0.10	0.20
D	2.82	3.02
E	2.60	3.00
E1	1.50	1.70
e	0.95	
e1	1.80	2.00
L	0.30	0.60
θ	0°	8°

5.2 SOT353



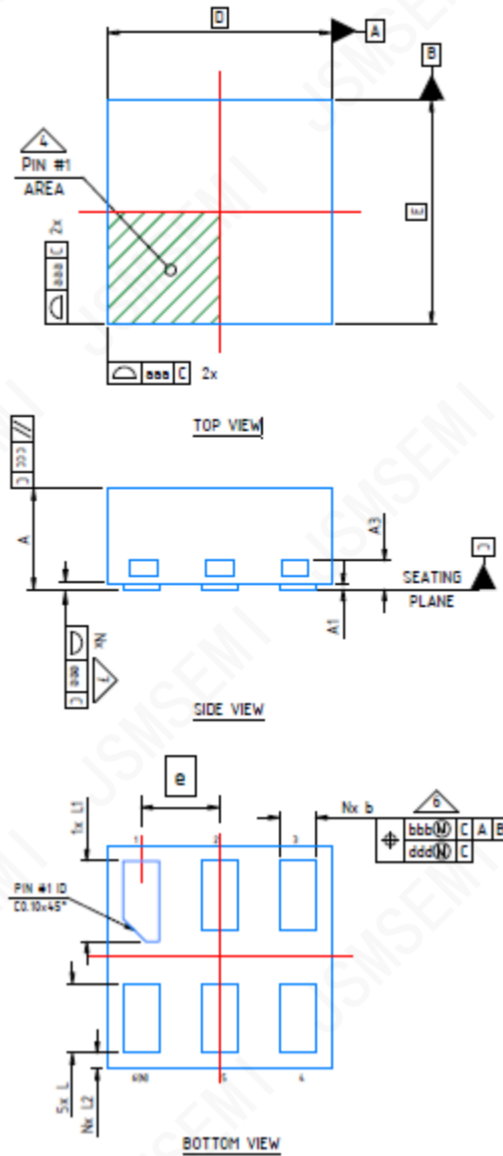
Symbol	Dimensions (mm)	
	Min.	Max.
A	0.90	1.10
A1	0.00	0.10
A2	0.90	1.00
b	0.15	0.35
c	0.11	0.175
D	2.00	2.20
E	1.15	1.35
E1	2.15	2.45
e	0.65	
e1	1.20	1.40
L	0.525	
L1	0.26	0.46
θ	0°	8°

5.3、XSON6(1\*1.45\*0.55-0.5)



Symbol	Dimensions (mm)	
	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)



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
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.									

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