

芯伯乐®
X I N B O L E

Product Specification

XBLW SN74LVC1G126

Single Bus Buffer Gate With 3-State Output

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Description

The 74LVC1G126 is a single buffer/line driver with 3-state output. Inputs can be driven from either 3.3 V or 5 V devices. This feature allows the use of these devices as translators in mixed 3.3 V and 5 V environments. Schmitt-trigger action at all inputs makes the circuit tolerant of slower input rise and fall times. This device is fully specified for partial power down applications using I OFF. The I OFF circuitry disables the output, preventing the potentially damaging backflow current through the device when it is powered down.

Features

- ± 24 mA output drive ($V_{CC} = 3.0$ V)
- CMOS low power consumption
- Direct interface with TTL levels
- Latch-up performance exceeds 250 mA
- Overvoltage tolerant inputs to 5.5 V
- Wide supply voltage range from 1.65 V to 5.5 V
- Spec'ed from -40 °C to $+105$ °C
- Packaging information: SOT-23-5/SOT-353

Applications

- SSDs: Internal or External
- Power Line Communication Modems
- Motor Controls: High-Voltage
- Military: Radars and Sonars
- High-Speed Data Acquisition and Generation
- Cable Modem Termination Systems
- Video Communication Systems
- Video Broadcasting: IP-Based Multi-Format Transcoders
- Video Broadcasting and Infrastructure: Scalable Platforms

Ordering Information

Product Model	Package Type	Marking	Packing	Packing Qty
XBLW SN74LVC1G126T235	SOT-23-5	AGXX	Tape	3000Pcs/Reel
XBLW SN74LVC1G126T353	SOT-353	AGXX	Tape	3000Pcs/Reel

Block Diagram

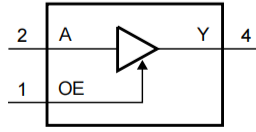


Figure 1. Logic symbol



Figure 2. IEC logic symbol

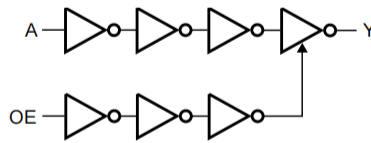
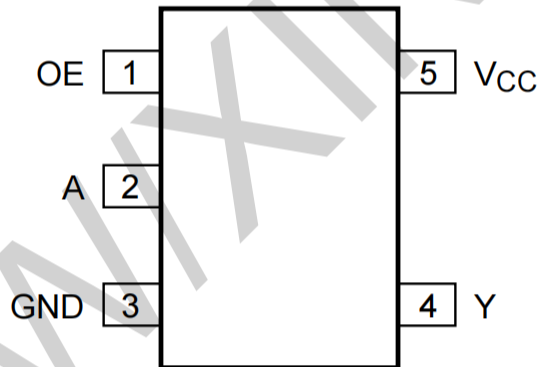


Figure 3. Logic diagram

Pin Configurations



Pin Description

Pin No.	Pin Name	Description
1	OE	output enable input
2	A	data input
3	GND	ground (0V)
4	Y	data output
5	V _{CC}	supply voltage

Function Table

Input		Output
OE	A	Y
H	L	L
H	H	H
L	X	Z

Note: H=HIGH voltage level; L=LOW voltage level; X=don't care; Z=high-impedance OFF-state.

Electrical Parameter

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
output voltage	V_O	Active mode	-0.5	$V_{CC}+0.5$	V
		Power-down mode	-0.5	6.5	V
input voltage	V_i	-	-0.5	6.5	V
input clamping current	I_{IK}	$V_i < 0V$	-50	-	mA
Output clamping current	I_{OK}	$V_o > V_{CC}$ or $V_o < 0V$	-	± 50	mA
output current	I_O	$V_o=0V$ to V_{CC}	-	± 50	mA
supply current	I_{CC}	-	-	100	mA
ground current	I_{GND}	-	-100	-	mA
total power dissipation	P_{tot}	-	-	250	mW
storage temperature	T_{stg}	-	-65	150	°C
Soldering temperature	T_L	10s	-	250	°C

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
ambient temperature	T_{amb}	-	-40	-	105	°C
input transition rise and fall rate	$\Delta t/\Delta V$	$V_{CC}=1.65V$ to $2.7V$	-	-	20	ns/V
		$V_{CC}=2.7V$ to $5.5V$	-	-	10	ns/V

ESD Ratings

Parameter	Definition	Value	Unit
$V_{(ESD)}$	Human body model (HBM), per ANSI/ESDA/JEDEC JS-001, all pins (1)	± 2000	V
	Charged device model (CDM), per JEDEC specification JESD22-C101, all pins (2)	± 1000	

(1) JEDEC document JEP155 states that 500-V HBM allows safe manufacturing with a standard ESD control process.

(2) JEDEC document JEP157 states that 250-V CDM allows safe manufacturing with a standard ESD control process.

Electrical Characteristics

DC Characteristics 1

(Tamb=-40°C to +85°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 _{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 _{CC} =4.5V to 5.5V	0.7xV _{CC}	-	-	V	
LOW-level input voltage	V _{IL}	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 _{CC} =4.5V to 5.5V	-	-	0.3xV _{CC}	V	
HIGH-level output voltage	V _{OH}	V _I = V _{IH} or V _{IL}	I _O =-100uA; V _{CC} =1.65V to 5.5V	V _{CC} 0.1	-	-	V
			I _O =-4mA; V _{CC} =1.65V	1.2	-	-	V
			I _O =-8mA; V _{CC} =2.3V	1.9	-	-	V
			I _O =-12mA; V _{CC} =2.7V	2.2	-	-	V
			I _O =-24mA; V _{CC} =3.0V	2.3	-	-	V
			I _O =-32mA; V _{CC} =4.5V	3.8	-	-	V
LOW-level output voltage	V _{OL}	V _I = V _{IH} or V _{IL}	I _O =100uA; V _{CC} =1.65V to 5.5V	-	-	0.10	V
			I _O =4mA; V _{CC} =1.65V	-	-	0.45	V
			I _O =8mA; V _{CC} =2.3V	-	-	0.30	V
			I _O =12mA; V _{CC} =2.7V	-	-	0.40	V
			I _O =24mA; V _{CC} =3.0V	-	-	0.55	V
			I _O =32mA; V _{CC} =4.5V	-	-	0.55	V
input leakage current	I _i	V _I =5.5V or GND; V _{CC} =0V to 5.5V	-	±0.1	±1	uA	
OFF-state output current	I _{OZ}	V _I =V _{IH} or V _{IL} ; V _O =5.5V or GND; V _{CC} =3.6V	-	±0.1	±2	uA	
power-off leakage current	I _{OFF}	V _I or V _O =5.5V; V _{CC} =0V	-	±0.1	±2	uA	
supply current	I _{CC}	V _I =5.5V or GND; I _O =0A; V _{CC} =1.65V to 5.5V	-	0.1	4	uA	
additional supply current	ΔI _{CC}	per pin; V _I =V _{CC} -0.6V; I _O =0A; V _{CC} =2.3V to 5.5V	-	5	500	uA	
input capacitance	C _i	-	-	5	-	pF	

Note: All typical values are measured at V_{CC}=3.3V and Tamb=25°C.

DC Characteristics 2

(Tamb=-40°C to +105°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 _{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 _{CC} =4.5V to 5.5V	0.7xV _{CC}	-	-	V	
LOW-level input voltage	V _{IL}	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 _{CC} =4.5V to 5.5V	-	-	0.3xV _{CC}	V	
HIGH-level output voltage	V _{OH}	V _I = V _{IH} or V _{IL}	I _O =-100uA; V _{CC} =1.65V to 5.5V	V _{CC} -0.1	-		V
			I _O =-4mA; V _{CC} =1.65V	0.95			V
			I _O =-8mA; V _{CC} =2.3V	1.7			V
			I _O =-12mA; V _{CC} =2.7V	1.9			V
			I _O =-24mA; V _{CC} =3.0V	2.0			V
			I _O =-32mA; V _{CC} =4.5V	3.4			V
LOW-level output voltage	V _{OL}	V _I = V _{IH} or V _{IL}	I _O =100uA; V _{CC} =1.65V to 5.5V	-	-	0.10	V
			I _O =4mA; V _{CC} =1.65V			0.70	V
			I _O =8mA; V _{CC} =2.3V			0.45	V
			I _O =12mA; V _{CC} =2.7V			0.60	V
			I _O =24mA; V _{CC} =3.0V			0.80	V
			I _O =32mA; V _{CC} =4.5V			0.80	V
input leakage current	I _I	V _I =5.5V or GND; V _{CC} =0V to 5.5V	-	-	±1	uA	
OFF-state output current	I _{OZ}	V _I =V _{IH} or V _{IL} ; V _O =5.5V or GND; V _{CC} =3.6V	-	-	±2	uA	
power-off leakage current	I _{OFF}	V _I or V _O =5.5V; V _{CC} =0V	-	-	±2	uA	
supply current	I _{CC}	V _I =5.5V or GND; I _O =0A; V _{CC} =1.65V to 5.5V	-	-	4	uA	
additional supply current	ΔI _{CC}	per pin; V _I =V _{CC} -0.6V; I _O =0A; V _{CC} =2.3V to 5.5V	-	-	500	uA	

 Note: All typical values are measured at V_{CC}=3.3V and Tamb=25°C.

AC Characteristics 1

(Tamb=-40°C to +85°C, voltages are referenced to GND (ground=0V), unless otherwise specified.)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
A to Y propagation delay	t _{pd}	see Figure 5	V _{cc} =1.65V to 1.95 V	1.0	3.3	8.0	ns
			V _{cc} =2.3V to 2.7V	0.5	2.2	5.5	ns
			V _{cc} =2.7V	0.5	2.5	5.5	ns
			V _{cc} =3.0V to 3.6V	0.5	2.1	4.5	ns
			V _{cc} =4.5V to 5.5V	0.5	1.7	4.0	ns
OE to Y enable time	t _{en}	see Figure 6	V _{cc} =1.65V to 1.95 V	1.0	3.2	9.4	ns
			V _{cc} =2.3V to 2.7V	0.5	2.2	6.6	ns
			V _{cc} =2.7V	0.5	2.4	6.6	ns
			V _{cc} =3.0V to 3.6V	0.5	2.1	5.3	ns
			V _{cc} =4.5V to 5.5V	0.5	1.6	5.0	ns
OE to Y disable time	t _{dis}	see Figure 6	V _{cc} =1.65V to 1.95 V	1.0	4.3	9.2	ns
			V _{cc} =2.3V to 2.7V	0.5	2.7	5.5	ns
			V _{cc} =2.7V	0.5	3.4	5.5	ns
			V _{cc} =3.0V to 3.6V	0.5	3.0	5.5	ns
			V _{cc} =4.5V to 5.5V	0.5	2.2	4.2	ns
Power dissipation capacitance	C _{PD}	output enabled	-	25	-	pF	
		output disabled	-	6	-	pF	

Note:

- [1] Typical values are measured at Tamb=25°C. and V_{cc}=1.8V, 2.5V, 2.7V, 3.3V and 5.0V respectively.
- [2] t_{pd} is the same as t_{PLH} and t_{PHL}.
- [3] t_{en} is the same as t_{PZH} and t_{PZL}.
- [4] t_{dis} is the same as t_{PLZ} and t_{PHZ}.
- [5] C_{PD} is used to determine the dynamic power dissipation (PD in uW).

$$PD=(CPD \times V_{cc}^2 \times f_i \times N)+X(C_L \times V_{cc}^2 \times f_o) \text{ where:}$$

f_i=input frequency in MHz;

f_o=output frequency in MHz;

C_L=output load capacitance in pF;

V_{cc}=supply voltage in V;

N=number of inputs switching.

∑(C_L × V_{cc}² × f_o)=sum of outputs.

AC Characteristics 2

(Tamb=-40°C to +105°C, voltages are referenced to GND (ground=0V), unless otherwise specified.)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
A to Y propagation delay	t _{pd}	see Figure 5	V _{cc} =1.65V to 1.95 V	1.0		10.5	ns
			V _{cc} =2.3V to 2.7V	0.5		7.0	ns
			V _{cc} =2.7V	0.5		7.0	ns
			V _{cc} =3.0V to 3.6V	0.5		6.0	ns
			V _{cc} =4.5V to 5.5V	0.5		5.5	ns
OE to Y enable time	t _{en}	see Figure 6	V _{cc} =1.65V to 1.95 V	1.0		12.0	ns
			V _{cc} =2.3V to 2.7V	0.5		8.5	ns
			V _{cc} =2.7V	0.5		8.5	ns
			V _{cc} =3.0V to 3.6V	0.5		7.0	ns
			V _{cc} =4.5V to 5.5V	0.5		6.5	ns
OE to Y disable time	t _{dis}	see Figure 6	V _{cc} =1.65V to 1.95 V	1.0		12.0	ns
			V _{cc} =2.3V to 2.7V	0.5		7.0	ns
			V _{cc} =2.7V	0.5		7.0	ns
			V _{cc} =3.0V to 3.6V	0.5		7.0	ns
			V _{cc} =4.5V to 5.5V	0.5		5.5	ns

Note:

- [1] Typical values are measured at Tamb=25°C. and V_{cc}=1.8V, 2.5V, 2.7V, 3.3V and 5.0V respectively.
- [2] t_{pd} is the same as t_{PLH} and t_{PHL}.
- [3] t_{en} is the same as t_{PZH} and t_{PZL}.
- [4] t_{dis} is the same as t_{PLZ} and t_{PHZ}.

Testing Circuit

AC Testing Circuit

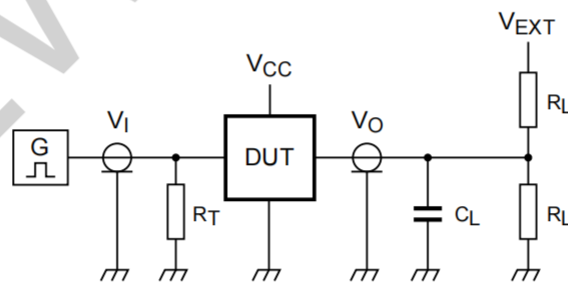


Figure 4. Test circuit for measuring switching times

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.

AC Testing Waveforms

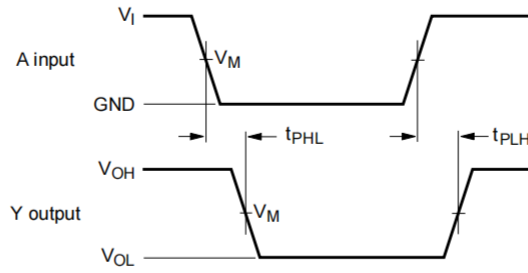


Figure 5. The input A to output Y propagation delay times

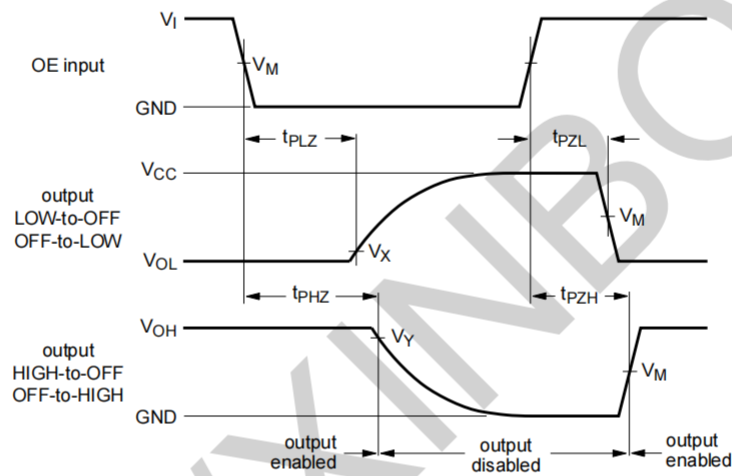


Figure 6. 3-state enable and disable times

Measurement Points

Supply voltage	Input	Output		
V _{CC}	V _M	V _M	V _X	V _Y
1.65V to 1.95 V	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
2.7V	1.5V	1.5V	V _{OL} +0.3V	V _{OH} -0.3V
3.0V to 3.6V	1.5V	1.5V	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

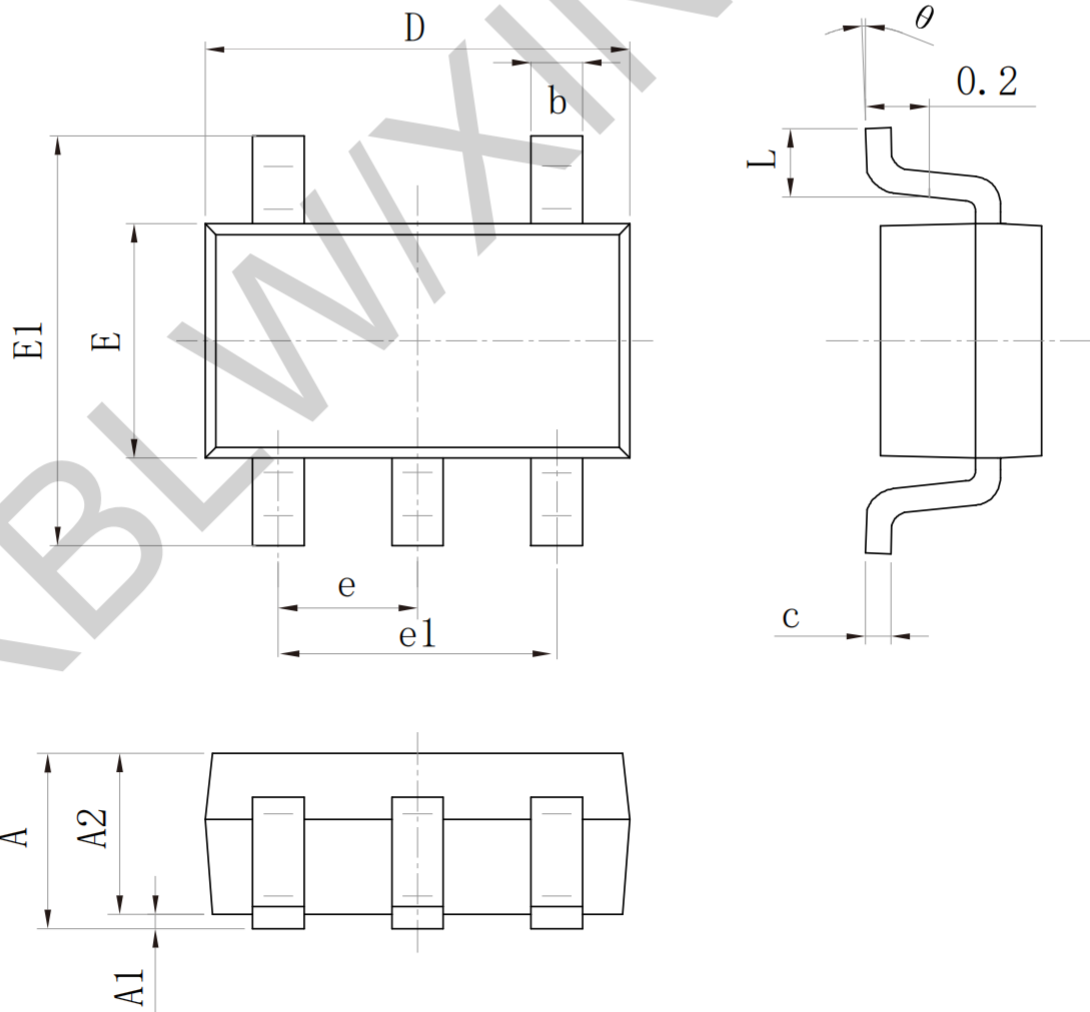
Test Data

Supply voltage	Input		Load		V _{EXT}		
V _{CC}	V _I	T _r , t _f	C _L	R _L	t _{PLH} , t _{PHL}	t _{PZH} , t _{PHZ}	t _{PZL} , t _{PLZ}
1.65V to 1.95 V	V _{CC}	≤ 2.0ns	30pF	1kQ	open	GND	2 × V _{CC}
2.3V to 2.7V	V _{CC}	≤ 2.0ns	30pF	500Q	open	GND	2 × V _{CC}
2.7V	2.7V	≤ 2.5ns	50pF	500Q	open	GND	6V
3.0V to 3.6V	2.7V	≤ 2.5ns	50pF	500Q	open	GND	6V
4.5V to 5.5V	V _{CC}	≤ 2.5ns	50pF	500Q	open	GND	2 × V _{CC}

Package Information

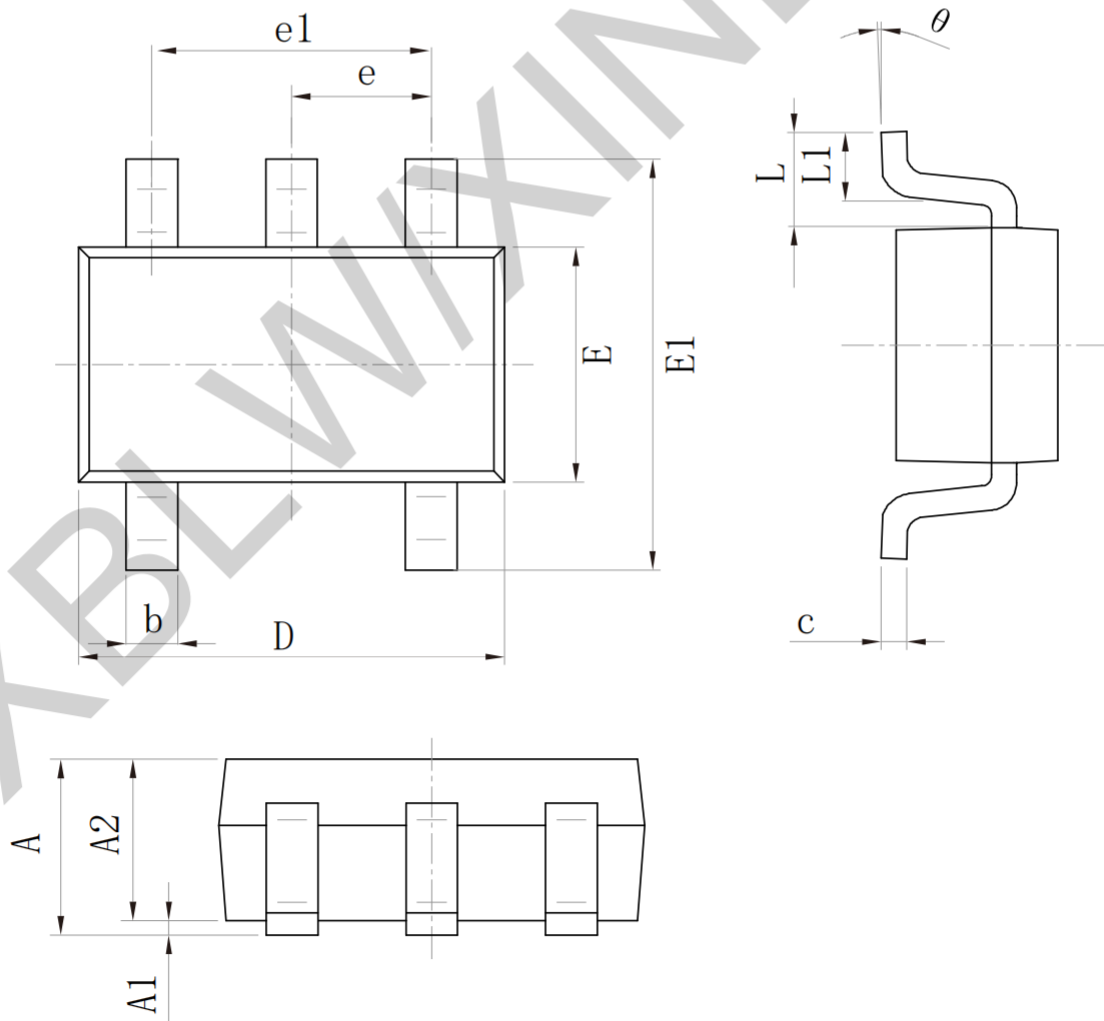
- SOT23-5

SIZE SYMBOL	Dimensions In Millimeters		SIZE SYMBOL	Dimensions In Inches	
	MIN (mm)	MAX (mm)		MIN (in)	MAX (in)
A	1.050	1.250	A	0.041	0.049
A1	0.000	0.100	A1	0.000	0.004
A2	1.050	1.150	A2	0.041	0.045
b	0.300	0.500	b	0.012	0.020
c	0.100	0.200	c	0.004	0.008
D	2.820	3.020	D1	0.111	0.119
E	1.500	1.700	E	0.059	0.067
E1	2.650	2.950	E1	0.104	0.116
e	0.95 (BSC)		e	0.037 (BSC)	
E1	1.800	2.000	E1	0.071	0.079
L	0.300	0.600	L	0.012	0.024
θ	0°	8°	θ	0°	8°



• SOT-353

Size Symbol	Dimensions In Millimeters		Size Symbol	Dimensions In Inches	
	Min (mm)	Max (mm)		Min (in)	Max (in)
A	0.900	1.100	A	0.035	0.043
A1	0.000	0.100	A1	0.000	0.004
A2	0.900	1.000	A2	0.035	0.039
b	0.150	0.350	b	0.006	0.014
c	0.080	0.150	C	0.003	0.006
D	2.000	2.200	D	0.079	0.087
E	1.150	1.350	E	0.045	0.053
E1	2.150	2.450	E1	0.085	0.096
e	0.650 (TYP)		e	0.026 (TYP)	
e1	1.200	1.400	e1	0.047	0.055
L	0.525 (REF)		L	0.021 (REF)	
L1	0.260	0.460	L1	0.010	0.018
θ	0°	8°	θ	0°	8°



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