



AiP74LVT2244

Octal Buffer/Line Driver with Termination Resistors; 3-state

Product Specification

Specification Revision History:

Version	Date	Description
2017-12-A1	2017-12	New
2023-04-B1	2023-04	Update the template



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1、General Description

This device is an octal buffer that is ideal for driving bus lines. The device features two output enables ($\overline{1OE}$, $\overline{2OE}$), each controlling four of the 3-state outputs.

The AiP74LVT2244 is designed with series resistance in both the HIGH and LOW states of the output. This design reduces line noise in applications such as memory address drivers, clock drivers, and bus receivers/transmitters.

Features:

- Octal bus interface
- 3-state buffers
- Output capability: +12mA and -12mA
- TTL input and output switching levels
- Input and output interface capability to systems at 5V supply
- Bus hold data inputs eliminate need for external pull-up resistors to hold unused inputs
- Power-up 3-state
- Live insertion and extraction permitted
- No bus current loading when output is tied to 5V bus
- Packaging information: SOP20/TSSOP20

**Ordering Information:****Tube packing specifications:**

Part number	Packaging form	Marking code	Tube quantity	Boxed tube quantity	Boxed quantity	Notes
AiP74LVT2244SA20.TB	SOP20	74LVT2244	35 PCS/tube	80 tube/box	2800 PCS/box	Dimensions of plastic enclosure: 12.8mm×7.5mm Pin spacing: 1.27mm
AiP74LVT2244TA20.TB	TSSOP20	74LVT2244	70 PCS/tube	200 tube/box	14000 PCS/box	Dimensions of plastic enclosure: 6.5mm×4.4mm Pin spacing: 0.65mm

Reel packing specifications:

Part number	Packaging form	Marking code	Reel quantity	Boxed reel quantity	Notes
AiP74LVT2244SA20.TR	SOP20	74LVT2244	2000 PCS/reel	2000 PCS/box	Dimensions of plastic enclosure: 12.8mm×7.5mm Pin spacing: 1.27mm
AiP74LVT2244TA20.TR	TSSOP20	74LVT2244	4000 PCS/reel	8000 PCS/box	Dimensions of plastic enclosure: 6.5mm×4.4mm Pin spacing: 0.65mm

Note: 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

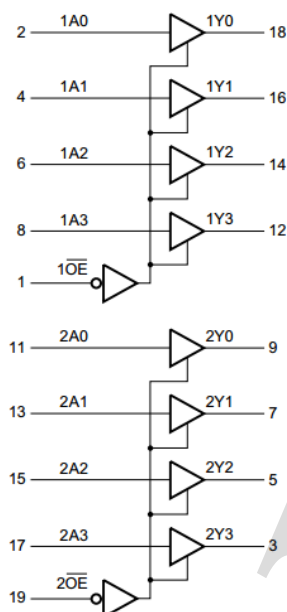


Figure 1. Logic symbol

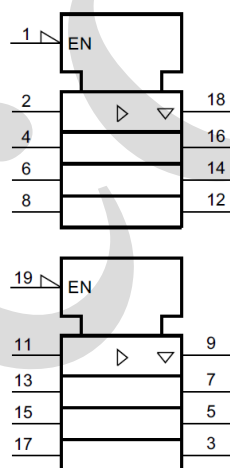
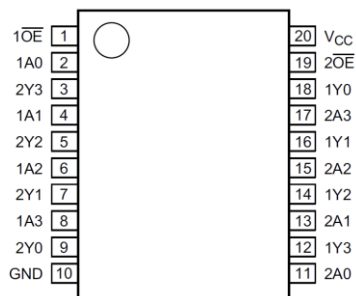


Figure 2. IEC logic symbol

2.2、Pin Configurations





2.3、Pin Description

Pin No.	Pin Name	Description
1,19	$\overline{1OE}, \overline{2OE}$	output enable input (active low)
2,4,6,8	1A0, 1A1, 1A2, 1A3	data input
9,7,5,3	2Y0, 2Y1, 2Y2, 2Y3	data output
10	GND	ground (0V)
11,13,15,17	2A0, 2A1, 2A2, 2A3	data input
18,16,14,12	1Y0, 1Y1, 1Y2, 1Y3	data output
20	V _{CC}	supply voltage

2.4、Function Table

Control	Input	Output
$\overline{nOE}$	nAn	nYn
L	L	L
L	H	H
H	X	Z

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

3、Electrical Parameter

3.1、Absolute Maximum Ratings

(Voltages are referenced to GND(ground=0V), unless otherwise specified.)^{[1][2]}

Parameter	Symbol	Conditions	Min.	Max.	Unit
supply voltage	V _{CC}	-	-0.5	+4.6	V
input voltage	V _I	- ^[3]	-0.5	+7.0	V
output voltage	V _O	output in OFF-state or HIGH-state ^[3]	-0.5	+7.0	V
input clamping current	I _{IK}	V _I <0V	-50	-	mA
output clamping current	I _{OK}	V _O <0V	-50	-	mA
output current	I _O	output in LOW-state	-	128	mA
		output in HIGH-state	-64	-	mA
storage temperature	T _{stg}	-	-65	+150	°C
junction temperature	T _j	- ^[2]	-	+150	°C
total power dissipation	P _{tot}	-	-	500	mW
Soldering temperature	T _L	10s	260		°C

Note:

[1] Stresses beyond those listed may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

[2] The performance capability of a high-performance integrated circuit in conjunction with its thermal



environment can create junction temperatures which are detrimental to reliability. The maximum junction temperature of this integrated circuit should not exceed 150°C.

[3] The input and output negative voltage ratings may be exceeded if the input and output clamp current ratings are observed.

3.2、Recommended Operating Conditions

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
supply voltage	V_{CC}	-	2.7	-	3.6	V
input voltage	V_I	-	0	-	5.5	V
HIGH-level output current	I_{OH}	-	-	-	-12	mA
LOW-level output current	I_{OL}	-	-	-	12	mA
ambient temperature	T_{amb}	in free-air	-40	-	+125	°C
input transition rise and fall rate	$\Delta t/\Delta V$	outputs enabled	-	-	10	ns/V

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. ^[1]	Max.	Unit
input clamping voltage	V_{IK}	$V_{CC}=2.7\text{V}; I_{IK}=-18\text{mA}$		-1.2	-0.9	-	V
HIGH-level input voltage	V_{IH}	-		2.0	-	-	V
LOW-level input voltage	V_{IL}	-		-	-	0.8	V
HIGH-level output voltage	V_{OH}	$V_{CC}=3.0\text{V}; I_{OH}=-12\text{mA}$		2.0	2.5	-	V
LOW-level output voltage	V_{OL}	$V_{CC}=3.0\text{V}; I_{OL}=12\text{mA}$		-	-	0.8	V
input leakage current	I_I	all input pins	$V_{CC}=0\text{V}$ or $3.6\text{V}; V_I=5.5\text{V}$	-	-	10	uA
		control pins	$V_{CC}=3.6\text{V}; V_I=V_{CC}$ or GND	-	-	±1	uA
		data pins ^[2]	$V_{CC}=3.6\text{V}; V_I=V_{CC}$	-	-	1	uA
			$V_{CC}=3.6\text{V}; V_I=0\text{V}$	-5	-	-	uA
power-off leakage current	I_{OFF}	$V_{CC}=0\text{V}; V_I$ or $V_O=0\text{V}$ to 4.5V		-	-	±100	uA
bus hold LOW current	I_{BHL}	$V_{CC}=3\text{V}; V_I=0.8\text{V}^{[3]}$		75	150	-	uA
bus hold HIGH current	I_{BHH}	$V_{CC}=3\text{V}; V_I=2.0\text{V}$		-	-150	-75	uA
bus hold LOW overdrive current	I_{BHLO}	nAn input; $V_{CC}=0\text{V}$ to $3.6\text{V}; V_I=3.6\text{V}$		500	-	-	uA



bus hold HIGH overdrive current	$I_{BH\overline{H}O}$	nAn input; $V_{CC}=0V$ to $3.6V$; $V_I=3.6V$		-	-	-500	uA
external current	I_{EX}	nYn output in HIGH-state when $V_O > V_{CC}$; $V_O = 5.5V$; $V_{CC} = 3.0V$		-	-	125	uA
power-up/ power-down output current	$I_{O(pu/pd)}$	$V_{CC}\leq 1.2V$; $V_O=0.5V$ to V_{CC} ; $V_I=GND$ or V_{CC} ; $\overline{nOE} = don't\ care^{[4]}$		-	-	± 100	uA
OFF-state output current	I_{OZ}	$V_{CC}=3.6V$; $V_I=V_{IH}$ or V_{IL}	$V_O=3.0V$	-	-	5	uA
			$V_O=0.5V$	-5	-	-	uA
supply current	I_{CC}	$V_{CC}=3.6V$; $V_I=GND$ or V_{CC} ; $I_O=0A$	output HIGH	-	-	0.19	mA
			output LOW	-	-	0.19	mA
			outputs disabled ^[5]	-	-	0.19	mA
additional supply current	ΔI_{CC}	per input pin; $V_{CC}=3.0V$ to $3.6V$; one input at $V_{CC}-0.6V$ and other inputs at V_{CC} or GND ^[6]		-	-	0.2	mA
input capacitance	C_I	$V_I=0V$ or $3.0V$		-	4	-	pF
output capacitance	C_O	outputs disabled; $V_O=0V$ or $3.0V$		-	7	-	pF

Note:

[1] All typical values are at $T_{amb}=25^{\circ}C$.

[2] Unused pins at V_{CC} or GND .

[3] This is the bus hold overdrive current required to force the input to the opposite logic state.

[4] This parameter is valid for any V_{CC} between $0V$ and $1.2V$ with a transition time of up to $10ms$. From $V_{CC}=1.2V$ to $V_{CC}=3.3V \pm 0.3V$ a transition time of $100\mu s$ is permitted. This parameter is valid for $T_{amb}=25^{\circ}C$ only.

[5] I_{CC} is measured with outputs pulled to V_{CC} or GND .

[6] This is the increase in supply current for each input at the specified voltage level other than V_{CC} or GND .



3.3.2、DC Characteristics 2

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

Parameter	Symbol	Conditions		Min.	Typ. ^[1]	Max.	Unit
input clamping voltage	V _{IK}	V _{CC} =2.7V; I _{IK} = -18mA		-1.2	-	-	V
HIGH-level input voltage	V _{IH}	-		2.0	-	-	V
LOW-level input voltage	V _{IL}	-		-	-	0.8	V
HIGH-level output voltage	V _{OH}	V _{CC} =3.0V; I _{OH} = -12mA		2.0	-	-	V
LOW-level output voltage	V _{OL}	V _{CC} =3.0V; I _{OL} =12mA		-	-	0.8	V
input leakage current	I _I	all input pins	V _{CC} =0V or 3.6V; V _I =5.5V	-	-	10	uA
		control pins	V _{CC} =3.6V; V _I =V _{CC} or GND	-	-	±1	uA
		data pins ^[2]	V _{CC} =3.6V; V _I =V _{CC}	-	-	1	uA
			V _{CC} =3.6V; V _I =0V	-5	-	-	uA
power-off leakage current	I _{OFF}	V _{CC} =0V; V _I or V _O =0V to 4.5V		-	-	±100	uA
bus hold LOW current	I _{BHL}	V _{CC} =3V; V _I =0.8V ^[3]		75	-	-	uA
bus hold HIGH current	I _{BHH}	V _{CC} =3V; V _I =2.0V		-	-	-75	uA
bus hold LOW overdrive current	I _{BHLO}	nAn input; V _{CC} =0V to 3.6V; V _I =3.6V		500	-	-	uA
bus hold HIGH overdrive current	I _{BHHO}	nAn input; V _{CC} =0V to 3.6V; V _I =3.6V		-	-	-500	uA
external current	I _{EX}	nYn output in HIGH-state when V _O > V _{CC} ; V _O = 5.5V; V _{CC} = 3.0V		-	-	125	uA
power-up/ power-down output current	I _{O(pu/pd)}	V _{CC} ≤1.2V; V _O =0.5V to V _{CC} ; V _I =GND or V _{CC} ; nOE = don't care ^[4]		-	-	±100	uA
OFF-state output current	I _{OZ}	V _{CC} =3.6V; V _I =V _{IH} or V _{IL}	V _O =3.0V	-	-	5	uA
			V _O =0.5V	-5	-	-	uA
supply current	I _{CC}	V _{CC} =3.6V; V _I =GND or V _{CC} ; I _O =0A	output HIGH	-	-	0.19	mA
			output LOW	-	-	0.19	mA
			outputs disabled ^[5]	-	-	0.19	mA
additional supply current	ΔI _{CC}	per input pin; V _{CC} =3.0V to 3.6V; one input at V _{CC} -0.6V and other inputs at V _{CC} or GND ^[6]		-	-	0.2	mA

Note:

[1] All typical values are at T_{amb}=25°C.[2] Unused pins at V_{CC} or GND.



[3] This is the bus hold overdrive current required to force the input to the opposite logic state.

[4] This parameter is valid for any V_{CC} between 0V and 1.2V with a transition time of up to 10ms. From $V_{CC}=1.2V$ to $V_{CC}=3.3V \pm 0.3V$ a transition time of 100us is permitted. This parameter is valid for $T_{amb}=25^{\circ}C$ only.

[5] I_{CC} is measured with outputs pulled to V_{CC} or GND.

[6] This is the increase in supply current for each input at the specified voltage level other than V_{CC} or GND.

3.3.3、AC Characteristics 1

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

Parameter	Symbol	Conditions	Min.	Typ. ^[1]	Max.	Unit
LOW to HIGH propagation delay	t_{PLH}	nAn to nYn; see Figure 4	$V_{CC}=2.7V$	-	-	7.4 ns
			$V_{CC}=3.0V$ to $3.6V$	1	4.1	6.2 ns
HIGH to LOW propagation delay	t_{PHL}	nAn to nYn; see Figure 4	$V_{CC}=2.7V$	-	-	6.2 ns
			$V_{CC}=3.0V$ to $3.6V$	1	4.1	5.7 ns
OFF-state to HIGH propagation delay	t_{PZH}	$\overline{nOE}$ to nYn; see Figure 5	$V_{CC}=2.7V$	-	-	10.8 ns
			$V_{CC}=3.0V$ to $3.6V$	1	5.2	8.3 ns
OFF-state to LOW propagation delay	t_{PZL}	$\overline{nOE}$ to nYn; see Figure 5	$V_{CC}=2.7V$	-	-	8.7 ns
			$V_{CC}=3.0V$ to $3.6V$	1.1	5.2	7.7 ns
HIGH to OFF-state propagation delay	t_{PHZ}	$\overline{nOE}$ to nYn; see Figure 5	$V_{CC}=2.7V$	-	-	9.5 ns
			$V_{CC}=3.0V$ to $3.6V$	1.9	6.0	8.5 ns
LOW to OFF-state propagation delay	t_{PLZ}	$\overline{nOE}$ to nYn; see Figure 5	$V_{CC}=2.7V$	-	-	6.3 ns
			$V_{CC}=3.0V$ to $3.6V$	1.8	4.6	6.3 ns

Note:

[1] All typical values are at $V_{CC}=3.3V$ and $T_{amb}=25^{\circ}C$.



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. ^[1]	Max.	Unit
LOW to HIGH propagation delay	t_{PLH}	$\overline{nA_n}$ to nY_n ; see Figure 4	$V_{CC}=2.7\text{V}$	-	-	9.0 ns
			$V_{CC}=3.0\text{V}$ to 3.6V	-	-	7.4 ns
HIGH to LOW propagation delay	t_{PHL}	$\overline{nA_n}$ to nY_n ; see Figure 4	$V_{CC}=2.7\text{V}$	-	-	7.4 ns
			$V_{CC}=3.0\text{V}$ to 3.6V	-	-	6.9 ns
OFF-state to HIGH propagation delay	t_{PZH}	$\overline{\overline{nOE}}$ to nY_n ; see Figure 5	$V_{CC}=2.7\text{V}$	-	-	12.9 ns
			$V_{CC}=3.0\text{V}$ to 3.6V	-	-	9.9 ns
OFF-state to LOW propagation delay	t_{PZL}	$\overline{\overline{nOE}}$ to nY_n ; see Figure 5	$V_{CC}=2.7\text{V}$	-	-	10.4 ns
			$V_{CC}=3.0\text{V}$ to 3.6V	-	-	9.2 ns
HIGH to OFF-state propagation delay	t_{PHZ}	$\overline{\overline{nOE}}$ to nY_n ; see Figure 5	$V_{CC}=2.7\text{V}$	-	-	11.5 ns
			$V_{CC}=3.0\text{V}$ to 3.6V	-	-	10.2 ns
LOW to OFF-state propagation delay	t_{PLZ}	$\overline{\overline{nOE}}$ to nY_n ; see Figure 5	$V_{CC}=2.7\text{V}$	-	-	7.6 ns
			$V_{CC}=3.0\text{V}$ to 3.6V	-	-	7.6 ns

Note:

[1] All typical values are at $V_{CC}=3.3\text{V}$ and $T_{amb}=25^{\circ}\text{C}$.



4、Testing Circuit

4.1、AC Testing Circuit

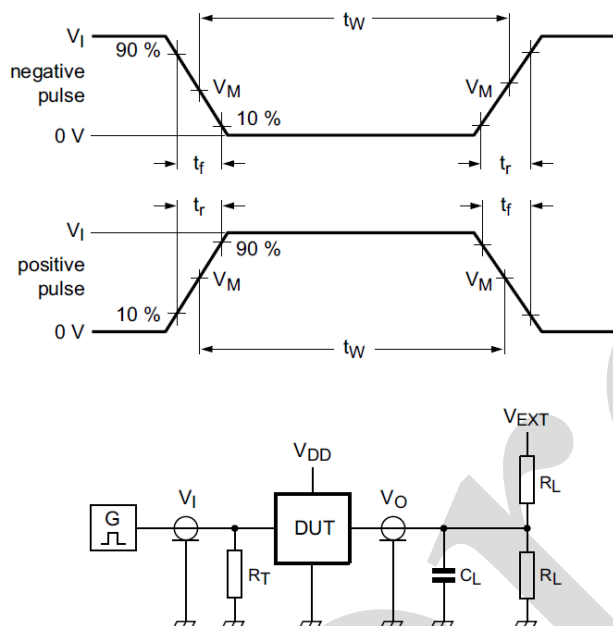


Figure 3. Load circuitry for switching times

Definitions test circuit:

R_L =Load resistance.

C_L =Load capacitance including jig and probe capacitance.

R_T =Termination resistance should be equal to output impedance Z_o of the pulse generator.

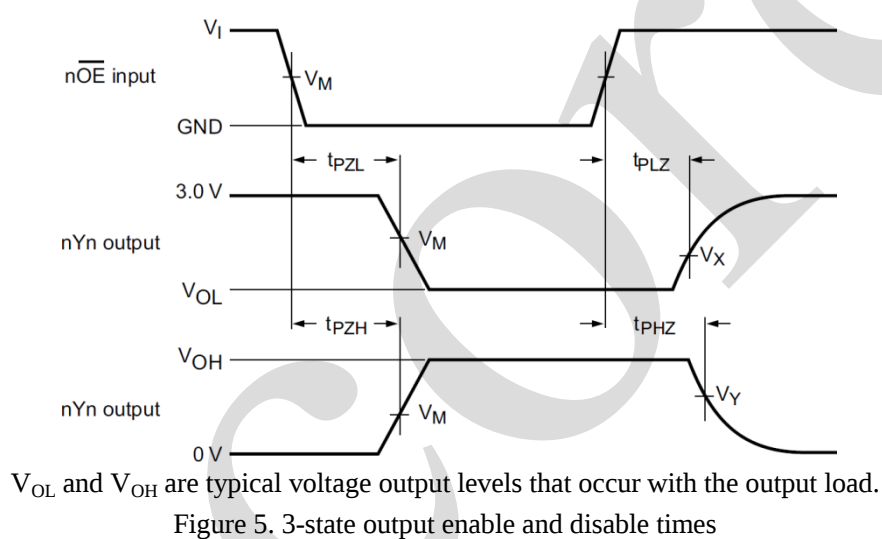
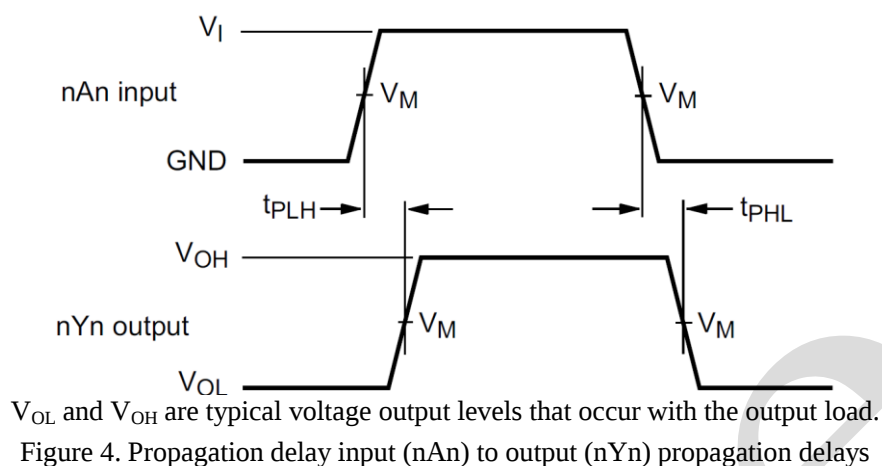
V_{EXT} =Test voltage for switching times.

4.2、Test Data

Input				Load		V_{EXT}		
V_I	f_i	t_W	t_r, t_f	C_L	R_L	t_{PHZ}, t_{PZH}	t_{PZH}, t_{PLZ}	t_{PZL}, t_{PLH}
2.7V	$\leq 10\text{MHz}$	500ns	$\leq 2.5\text{ns}$	50pF	500 Ω	GND	6V	open



4.3、AC Testing Waveforms



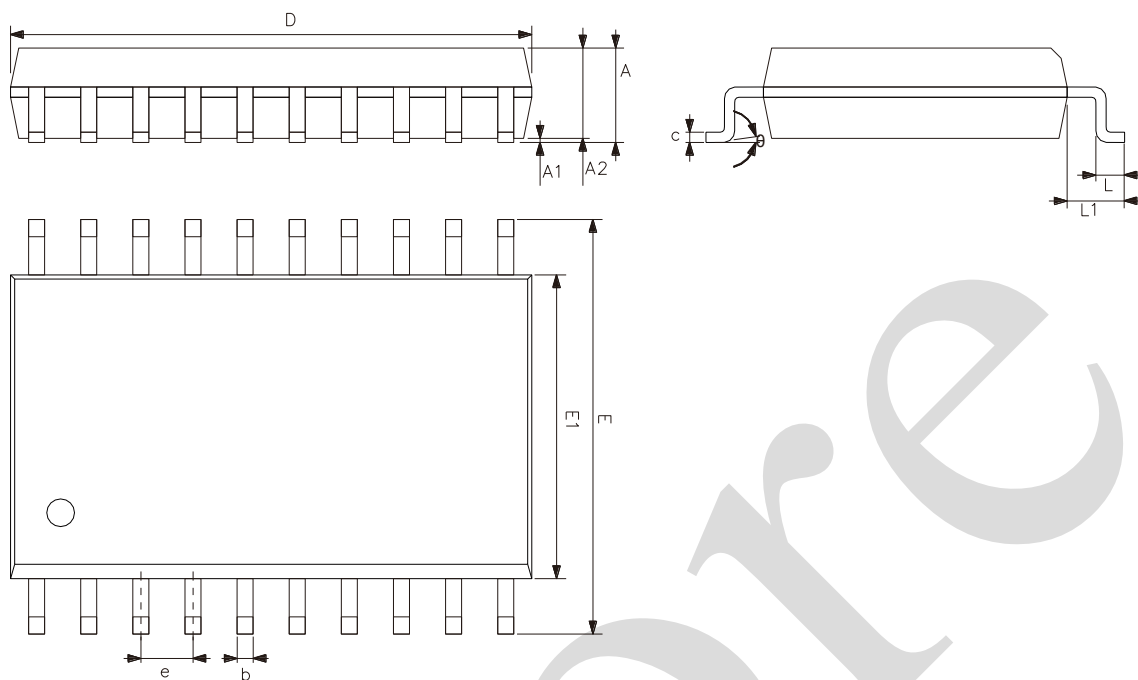
4.4、Measurement Points

Input	Output		
V_M	V_M	V_X	V_Y
1.5V	1.5V	$V_{OL}+0.3V$	$V_{OH}-0.3V$



5、Package Information

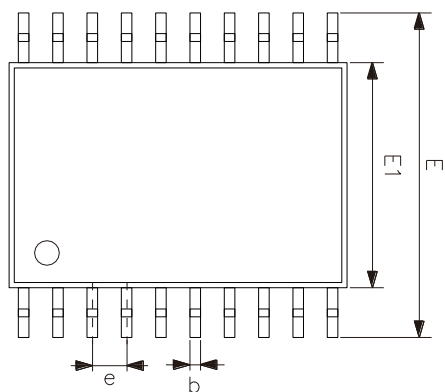
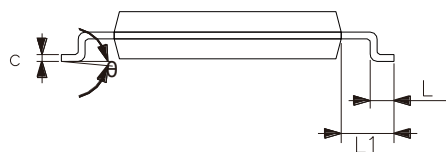
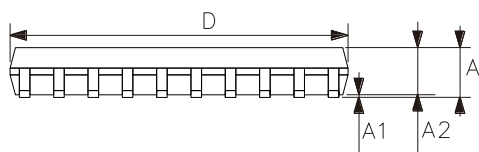
5.1、SOP20



Symbol	Dimensions (mm)	
	Min.	Max.
A	2.47	2.65
A1	0.05	0.30
A2	2.20	2.44
b	0.35	0.50
c	0.15	0.30
D	12.54	12.94
E	10.00	10.60
E1	7.30	7.70
e	1.27	
L	0.40	1.05
L1	1.30	1.50
θ	0°	8°



5.2、TSSOP20



Symbol	Dimensions (mm)	
	Min.	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	6.40	6.60
E1	4.30	4.50
E	6.20	6.60
e	0.65	
L	0.45	0.75
L1	1.00	
θ	0°	8°



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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