AiP74LVC2G17
Dual Buffer Schmitt Trigger

Product Specification

Specification Revision History:

Version	Date	Description
2017-05-A1	2017-05	New
2023-04-B1	2023-04	Update the template

Contents

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1、General Description

The AiP74LVC2G17 provides two non-inverting buffers with Schmitt trigger input. It is capable of transforming slowly changing input signals into sharply defined, jitter-free output signals.

Inputs can be driven from either 3.3V or 5V devices. This feature allows the use of these devices as translators in a mixed 3.3V and 5V environment.

Features:

- Wide supply voltage range from 1.65V to 5.5V
- 5V tolerant inputs for interfacing with 5V logic
- ±24mA output drive (V_{CC}=3.0V)
- CMOS low power consumption
- Specified from -40℃ to +125℃
- Packaging information: SOT-23-6/SOT-363

Ordering Information:

Reel packing specifications:

Part number	Packaging form	Marking code	Reel quantity	Boxed reel quantity	Notes
AiP74LVC2G17GB236.TR	SOT-23-6	BIXX	3000 PCS/reel	30000 PCS/box	Dimensions of plastic enclosure: 2.9mm×1.6mm Pin spacing: 0.95mm
AiP74LVC2G17GC363.TR	SOT-363	BIXX	3000 PCS/reel	30000 PCS/box	Dimensions of plastic enclosure: 2.1mm×1.3mm Pin spacing: 0.65mm

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.

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2、Block Diagram And Pin Description

2.1、Block Diagram

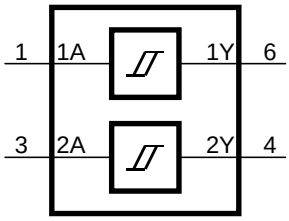


Figure 1. Logic symbol

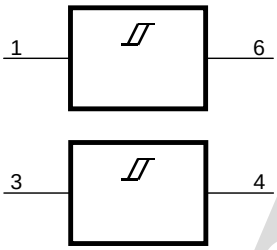


Figure 2. IEC logic symbol

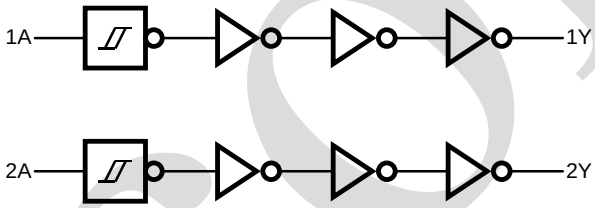
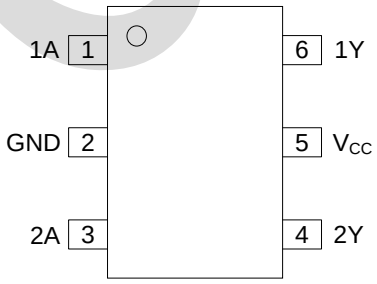


Figure 3. Logic diagram

2.2、Pin Configurations



2.3、Pin Description

Pin No.	Pin Name	Description
1	1A	data input
2	GND	ground (0V)
3	2A	data input
4	2Y	data output
5	V_{CC}	supply voltage
6	1Y	data output

2.4、Function Table[1]

Input	Output
nA	**nY**
L	L
H	H

Note: [1] 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_{CC}	-	-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}	$V_O < 0V$	-	-50	mA
output voltage	V_O	Active mode[1]	-0.5	V_{CC}+0.5	V
		Power-down mode[1]	-0.5	+6.5	V
output current	I_O	V_O=0V to V_{CC}	-	±50	mA
supply current	I_{CC}	-	-	100	mA
ground current	I_{GND}	-	-	-100	mA
storage temperature	T_{stg}	-	-65	+150	℃
total power dissipation	P_{tot}	-	-	300	mW
Soldering temperature	T_L	10s	260		℃

Note: [1] When V_{CC}=0V (Power-down mode), the output voltage can be 5.5V in normal operation.

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	-	0	-	V_{CC}	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.)[1]

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
HIGH-level output voltage	V_{OH}	$V_I = V_{T+}$ or V_{T-}	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}	$V_I = V_{T+}$ or V_{T-}	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}=5.5V		-	-	±1	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=V_{CC} or GND; I_O=0A; V_{CC}=5.5V		-	-	4	uA
additional supply current	ΔI_{CC}	V_I=V_{CC}-0.6V; I_O=0A; V_{CC}=2.3V to 5.5V		-	-	500	uA
input capacitance	C_I	-		-	3.5	-	pF

3.3.2、DC Characteristics 2

(T_{amb}=-40℃ to +125℃, voltages are referenced to GND (ground=0V), unless otherwise specified.)[1]

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
HIGH-level output voltage	V_{OH}	$V_I = V_{T+}$ or V_{T-}	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}	$V_I = V_{T+}$ or V_{T-}	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}=5.5V		-	-	±1	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=V_{CC} or GND; I_O=0A; V_{CC}=5.5V		-	-	4	uA
additional supply current	ΔI_{CC}	V_I=V_{CC}-0.6V; I_O=0A; V_{CC}=2.3V to 5.5V		-	-	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	Conditions		Min.	Typ.[1]	Max.	Unit
nA to nY propagation delay	t_{PLH}	see Figure 5	V_{CC}=1.65V to 1.95V	-	14	21	ns
			V_{CC}=2.3V to 2.7V	-	10	15	ns
			V_{CC}=2.7V	-	9	13.5	ns
			V_{CC}=3.0V to 3.6V	-	8	12	ns
			V_{CC}=4.5V to 5.5V	-	7	10.5	ns
nA to nY propagation delay	t_{PHL}	see Figure 5	V_{CC}=1.65V to 1.95V	-	12.5	18.8	ns
			V_{CC}=2.3V to 2.7V	-	11	16.5	ns
			V_{CC}=2.7V	-	11	16.5	ns
			V_{CC}=3.0V to 3.6V	-	11	16.5	ns
			V_{CC}=4.5V to 5.5V	-	10	15	ns

Note:

[1] 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	Conditions		Min.	Typ.	Max.	Unit
nA to nY propagation delay	t_{PLH}	see Figure 5	V_{CC}=1.65V to 1.95V	-	-	23	ns
			V_{CC}=2.3V to 2.7V	-	-	17	ns
			V_{CC}=2.7V	-	-	15.5	ns
			V_{CC}=3.0V to 3.6V	-	-	14	ns
			V_{CC}=4.5V to 5.5V	-	-	12.5	ns
nA to nY propagation delay	t_{PHL}	see Figure 5	V_{CC}=1.65V to 1.95V	-	-	20.8	ns
			V_{CC}=2.3V to 2.7V	-	-	18.5	ns
			V_{CC}=2.7V	-	-	18.5	ns
			V_{CC}=3.0V to 3.6V	-	-	18.5	ns
			V_{CC}=4.5V to 5.5V	-	-	17	ns

3.3.5、Transfer Characteristics 1

(T_{amb}=-40℃ to +85℃, 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}=1.8V	0.82	1.02	1.2	V
			V_{CC}=2.3V	1.03	1.25	1.45	V
			V_{CC}=3.0V	1.29	1.5	1.71	V
			V_{CC}=4.5V	1.84	2.15	2.41	V
			V_{CC}=5.5V	2.19	2.6	2.91	V
negative-going threshold voltage	V_{T-}	see Figure 6 and Figure 7	V_{CC}=1.8V	0.45	0.6	0.75	V
			V_{CC}=2.3V	0.64	0.8	0.96	V
			V_{CC}=3.0V	0.86	1.1	1.34	V
			V_{CC}=4.5V	1.35	1.75	2.09	V
			V_{CC}=5.5V	1.61	2.15	2.59	V
hysteresis voltage	V_H	(V_{T+} - V_{T-}); see Figure 6 and Figure 7	V_{CC}=1.8V	-	0.4	-	V
			V_{CC}=2.3V	-	0.4	-	V
			V_{CC}=3.0V	-	0.42	-	V
			V_{CC}=4.5V	-	0.45	-	V
			V_{CC}=5.5V	-	0.47	-	V

3.3.6、Transfer Characteristics 2

(T_{amb}=-40℃ to +125℃, 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}=1.8V	0.79	-	1.2	V
			V_{CC}=2.3V	1.00	-	1.45	V
			V_{CC}=3.0V	1.26	-	1.71	V
			V_{CC}=4.5V	1.81	-	2.41	V
			V_{CC}=5.5V	2.16	-	2.91	V
negative-going threshold voltage	V_{T-}	see Figure 6 and Figure 7	V_{CC}=1.8V	0.45	-	0.78	V
			V_{CC}=2.3V	0.64	-	0.99	V
			V_{CC}=3.0V	0.86	-	1.37	V
			V_{CC}=4.5V	1.35	-	2.12	V
			V_{CC}=5.5V	1.61	-	2.62	V
hysteresis voltage	V_H	(V_{T+} - V_{T-}); see Figure 6 and Figure 7	V_{CC}=1.8V	-	0.4	-	V
			V_{CC}=2.3V	-	0.4	-	V
			V_{CC}=3.0V	-	0.42	-	V
			V_{CC}=4.5V	-	0.45	-	V
			V_{CC}=5.5V	-	0.47	-	V

4、Testing Circuit

4.1、AC Testing Circuit

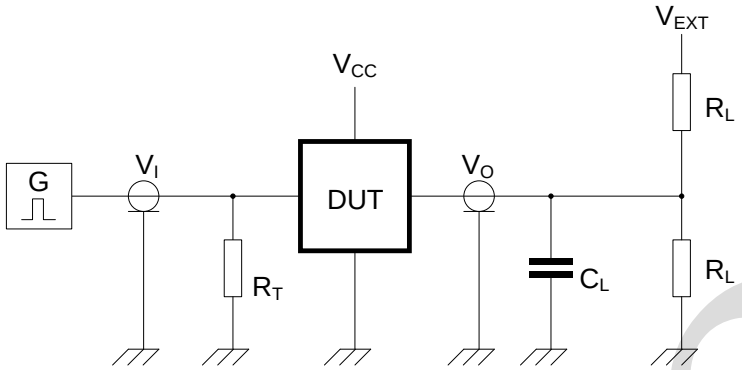


Figure 4. Test circuit for measuring switching times

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

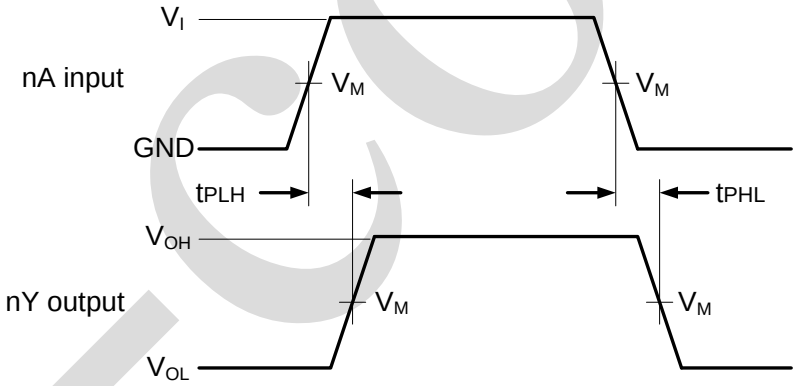


Figure 5. The input nA to output nY propagation delays and the output transition times

4.3、Transfer Characteristics Waveforms

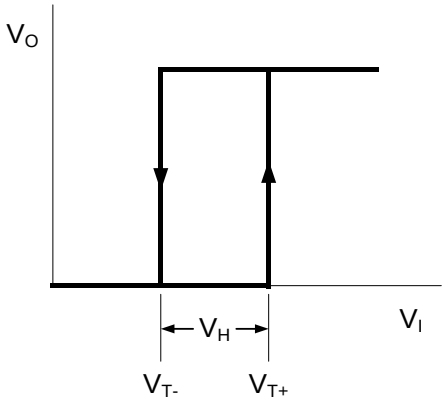


Figure 6. Transfer characteristic

V_{T+} and V_{T-} limits at 70% and 20%:

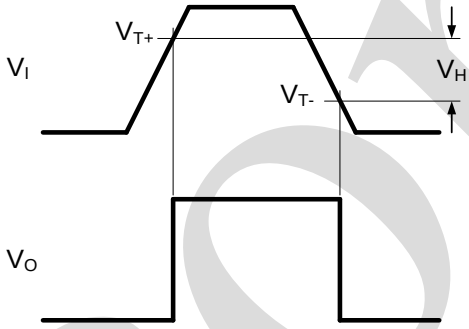


Figure 7. Definition of V_{T+}, V_{T-} and V_H

4.4、Measurement Points

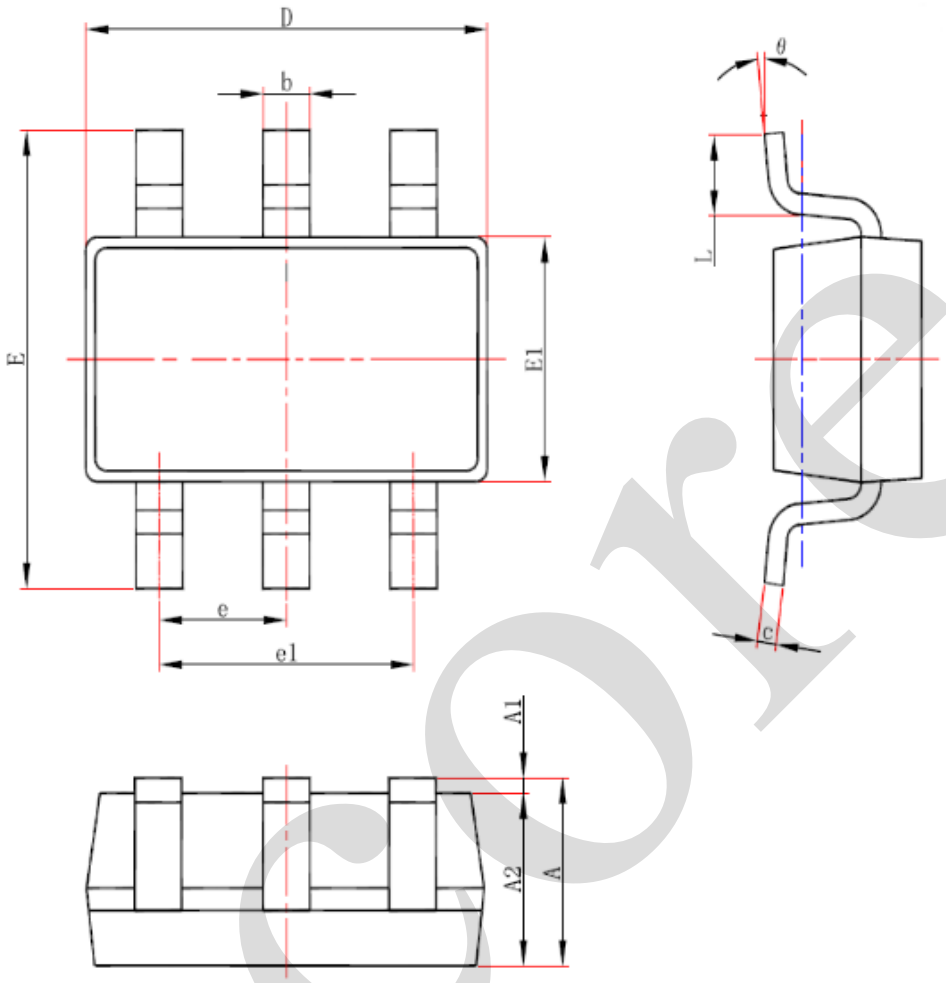
Supply voltage	Input	Output
V_{CC}	**V_M**	**V_M**
1.65V to 1.95V	$0.5\times V_{CC}$	$0.5\times V_{CC}$
2.3V to 2.7V	$0.5\times V_{CC}$	$0.5\times V_{CC}$
2.7V	1.5V	1.5V
3.0V to 3.6V	1.5V	1.5V
4.5V to 5.5V	$0.5\times V_{CC}$	$0.5\times V_{CC}$

4.5、Test Data

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

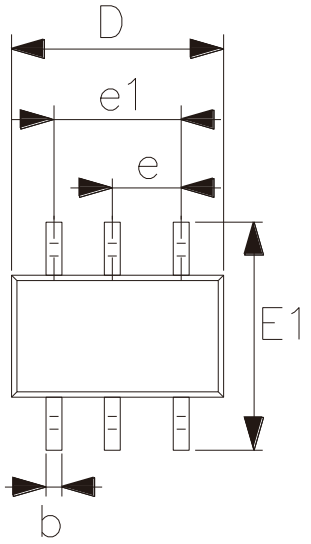
5、Package Information

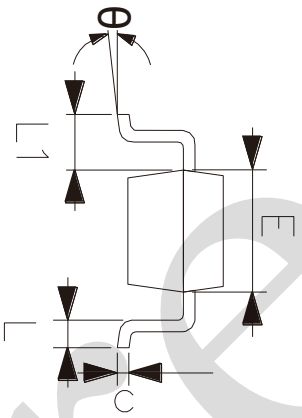
5.1、SOT-23-6

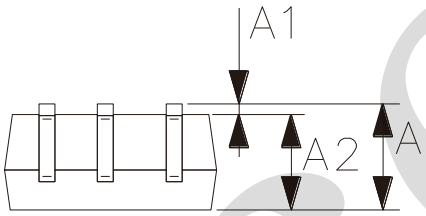


Symbol	Dimensions (mm)	
	Min.	Max.
A	-	1.25
A1	0.00	0.12
A2	1.00	1.20
b	0.30	0.50
c	0.10	0.20
D	2.82	3.02
E	2.60	3.00
E1	1.50	1.70
e	0.95	
e1	1.80	2.00
L	0.30	0.60
θ	0°	8°

5.2、SOT-363







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
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°

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

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