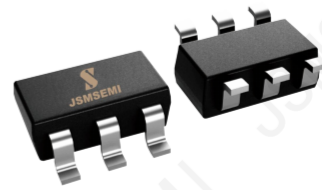


1、 General Description

The 74LVC2GU04 provides two unbuffered inverters. Each inverter is a single stage with unbuffered output. The inputs 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
- 5V tolerant inputs for interfacing with 5V logic
- $\pm 24\text{mA}$ output drive ($V_{CC}=3.0\text{V}$)
- CMOS low power consumption
- Specified from -40°C to $+125^{\circ}\text{C}$
- Packaging information: SOT-23-6/SOT-363

2、 Block Diagram And Pin Description

2.1、 Block Diagram

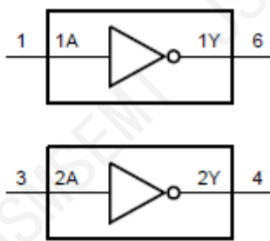


Figure 1. Logic symbol

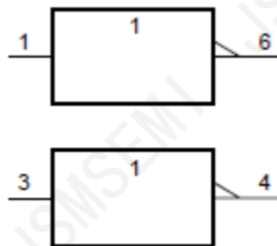


Figure 2. IEC logic symbol

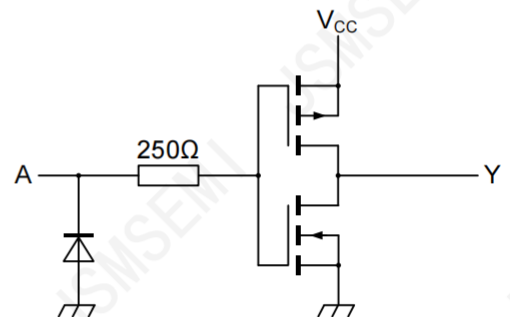
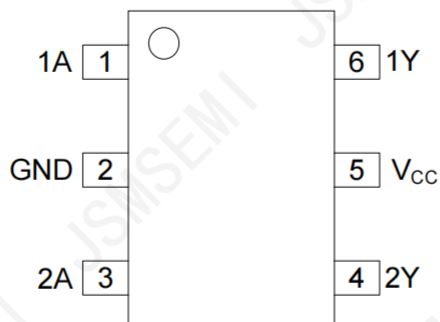


Figure 3. Logic diagram (one gate)

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

Input	Output
nA	nY
L	H
H	L

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_{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	-0.5	$V_{CC}+0.5$	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
total power dissipation	P_{tot}	-	-	250	mW
storage temperature	T_{stg}	-	-65	+150	°C
soldering temperature	T_L	10s	260		°C

Note: 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	Active mode	0	-	V_{CC}	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}	$V_{CC} = 1.65\text{V to } 5.5\text{V}$		$0.75 \times V_{CC}$	-	-	V
LOW-level input voltage	V_{IL}	$V_{CC} = 1.65\text{V to } 5.5\text{V}$		-	-	$0.25 \times V_{CC}$	V
HIGH-level output voltage	V_{OH}	$V_I = V_{IH} \text{ or } V_{IL}$	$I_O = -100\mu\text{A}; V_{CC} = 1.65\text{V to } 5.5\text{V}$	$V_{CC} - 0.1$	-	-	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}	$V_I = V_{IH} \text{ or } V_{IL}$	$I_O = 100\mu\text{A}; V_{CC} = 1.65\text{V to } 5.5\text{V}$	-	-	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	$V_I = 5.5\text{V or GND}; V_{CC} = 0\text{V to } 5.5\text{V}$		-	-	± 1	μA
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	μA
input capacitance	C_I	$V_{CC} = 3.3\text{V}; V_I = \text{GND to } V_{CC}$		-	5	-	pF

Note: All typical values are measured at $V_{CC} = 3.3\text{V}$ 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 input voltage	V _{IH}	V _{CC} =1.65V to 5.5V		0.75× V _{CC}	-	-	V
LOW-level input voltage	V _{IL}	V _{CC} =1.65V to 5.5V		-	-	0.25× V _{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
supply current	I _{CC}	V _I =5.5V or GND; I _O =0A; V _{CC} =1.65V to 5.5V		-	-	4	uA

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. ^[1]	Max.	Unit
nA to nY propagation delay	t_{PLH}, t_{PHL}	see Figure 5	$V_{CC}=1.65\text{V}$ to 1.95V	-	4.6	ns
			$V_{CC}=2.3\text{V}$ to 2.7V	-	3.6	ns
			$V_{CC}=2.7\text{V}$	-	5.2	ns
			$V_{CC}=3.0\text{V}$ to 3.6V	-	4.6	ns
			$V_{CC}=4.5\text{V}$ to 5.5V	-	3.4	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 5.0V 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
nA to nY propagation delay	t_{pd}	see Figure 5	$V_{CC}=1.65V$ to $1.95V$	-	-	8.7	ns
			$V_{CC}=2.3V$ to $2.7V$	-	-	6.8	ns
			$V_{CC}=2.7V$	-	-	9.7	ns
			$V_{CC}=3.0V$ to $3.6V$	-	-	8.4	ns
			$V_{CC}=4.5V$ to $5.5V$	-	-	6.5	ns

4、Testing Circuit

4.1、AC Testing Circuit

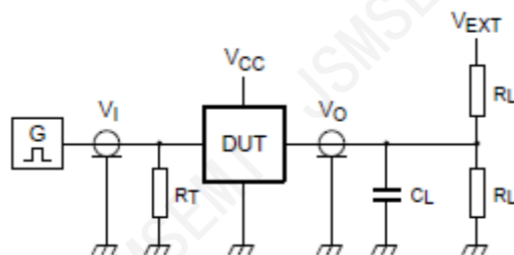


Figure 4. Test circuit for measuring switching times

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

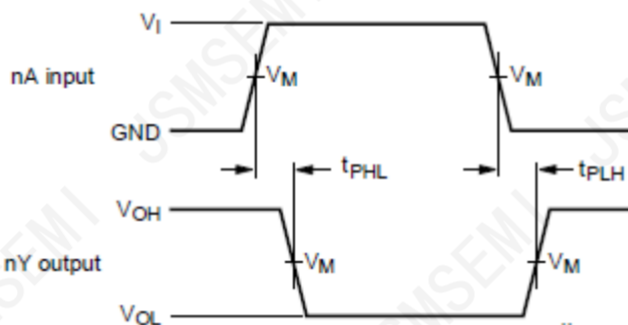


Figure 5. The input (nA) to output (nY) propagation delay times

4.3、Measurement Points

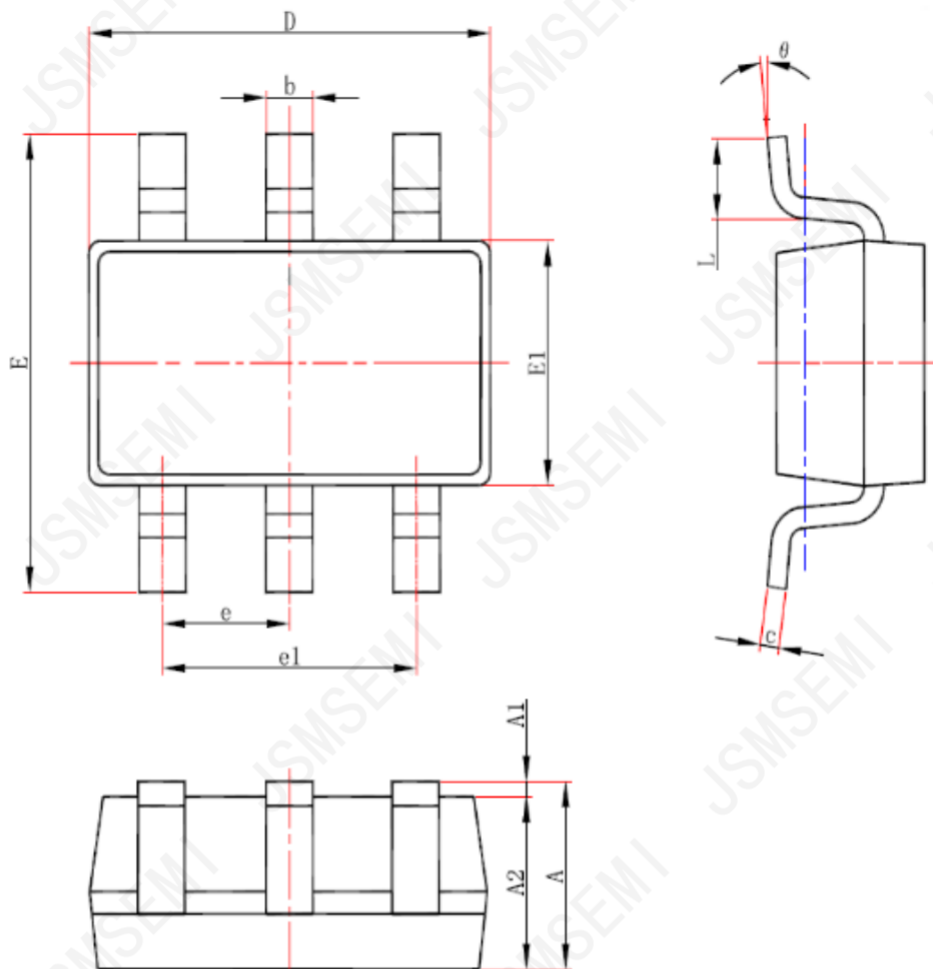
Supply voltage	Input	Output
V_{CC}	V_M	V_M
1.65V to 1.95V	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$
2.3V to 2.7V	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$
2.7V	1.5V	1.5V
3.0V to 3.6V	1.5V	1.5V
4.5V to 5.5V	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$

4.4、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}	$\leq 3ns$	30pF	1k Ω	open
2.3V to 2.7V	V_{CC}	$\leq 3ns$	30pF	500 Ω	open
2.7V	2.7V	$\leq 3ns$	50pF	500 Ω	open
3.0V to 3.6V	2.7V	$\leq 3ns$	50pF	500 Ω	open
4.5V to 5.5V	V_{CC}	$\leq 3ns$	50pF	500 Ω	open

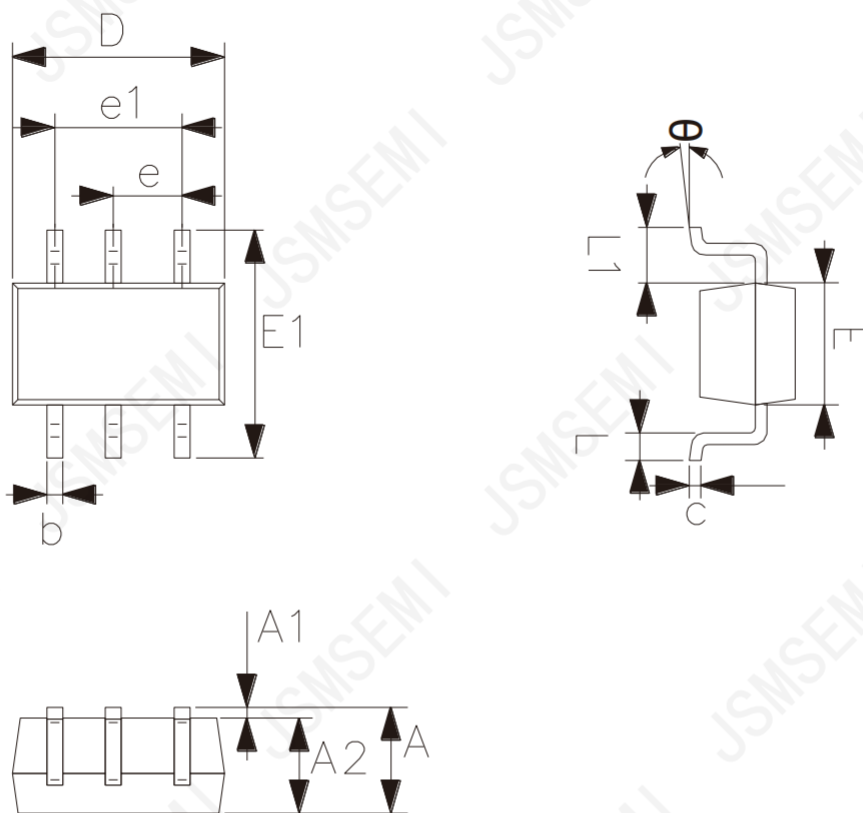
5、Package Information

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.									