



Low Voltage CMOS Logic – 74LVC1G34

Single Buffer Gate in bare die form

Rev 1.0
29/06/19

Description

The 74LVC1G34 single buffer gate performs the Boolean function $Y = A$. The inverter can be driven by either 3.3V or 5V inputs enabling use of this device in a mixed 3.3V and 5V environment. The 74LVC1G34 operates over a 1.65V to 5.5V supply range with low power consumption and is fully specified for partial power-down applications using I_{OFF} . The I_{OFF} circuitry disables the output, preventing damaging backflow current through the device when it is powered down. The device suits level translation and interfacing TTL to CMOS logic applications at low power.

Features:

- Inputs directly interface TTL
- Inputs accept up to 5.5V enabling level translation down to V_{CC}
- Wide Supply Voltage: V_{CC} 1.65V - 5.5V
- Output Drive capability: $\pm 24mA$, $V_{CC} = 3.3V$
- Low Quiescent Current: $4\mu A$ max
- High speed: t_{pd} 4.1ns max, $V_{CC} = 3.3V$
- Tiny die size.

Ordering Information

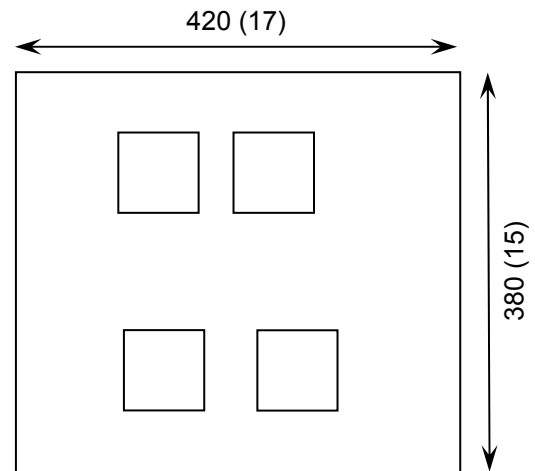
The following part suffixes apply:

- No suffix - MIL-STD-883 /2010B Visual Inspection

For High Reliability versions of this product please see

[54LVC1G34](#)

Die Dimensions in μm (mils)



Supply Formats:

- Default – Die in Waffle Pack (400 per tray capacity)
- Sawn Wafer on Tape – On request
- Unsawn Wafer – On request
- Die Thickness \leftrightarrow $280\mu m$ (11 Mils) – On request
- Assembled into Ceramic Package – On request

Mechanical Specification

Die Size (Unsawn)	420 x 380 17 x 15	μm mils
Minimum Bond Pad Size	76 x 76 2.99 x 2.99	μm mils
Die Thickness	280 (± 20) 11.02 (± 0.79)	μm mils
Top Metal Composition	Al-Si-Cu 3 μm	
Back Metal Composition	N/A – Bare Si	

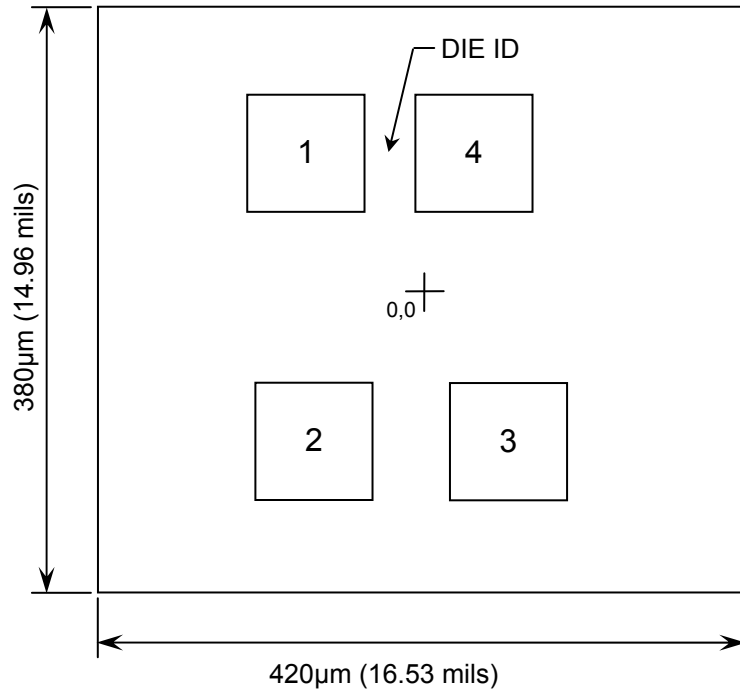




Low Voltage CMOS Logic – 74LVC1G34

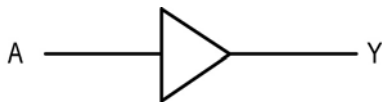
Rev 1.0
29/06/19

Pad Layout and Functions



PAD	FUNCTION	COORDINATES (µm)	
		X	Y
1	GND	-70.4	95.2
2	A	-65.9	-95.2
3	V _{CC}	62.6	-95.2
4	Y	39.6	95.2
CONNECT CHIP BACK TO V _{CC} OR FLOAT			

Logic Diagram

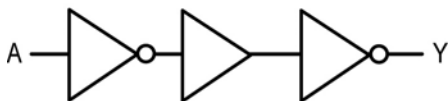


Function Table

INPUT	OUTPUT
A	Y
H	L
L	H

H = High level (steady state)
L = Low level (steady state)

Expanded Logic Diagram





Low Voltage CMOS Logic – 74LVC1G34

Rev 1.0
29/06/19

Absolute Maximum Ratings²

PARAMETER	SYMBOL	VALUE	UNIT
DC Supply Voltage (Referenced to GND)	V_{CC}	-0.5 to +6.5	V
DC Input Voltage (Referenced to GND)	V_{IN}	-0.5 to +6.5	V
DC Output Voltage – Active Mode	V_{OUT}	-0.5 to $V_{CC} + 0.5$	V
DC Output Voltage – Power-Down Mode $V_{CC} = 0V$		-0.5 to +6.5	V
DC Input Clamp Current, $V_{IN} < 0$	I_{IK}	-50	mA
DC Output Clamp Current, $V_{OUT} < 0$	I_{OK}	-50	mA
DC Output Current	I_{OUT}	± 50	mA
DC V_{CC} or GND Current	I_{CC}	± 100	mA
Power Dissipation in Still Air ³	P_D	250	mW
Storage Temperature Range	T_{STG}	-65 to 150	$^{\circ}C$

2. Operation above the absolute maximum rating may cause device failure. Operation at the absolute maximum ratings, for extended periods, may reduce device reliability. 3. Measured in plastic TSSOP package, results in die form are dependent on die attach and assembly method.

Recommended Operating Conditions⁴ (Voltages referenced to GND)

PARAMETER	SYMBOL	MIN	MAX	UNITS	
DC Supply Voltage	V_{CC}	1.65	5.5	V	
DC Supply Voltage – Data retention only	V_{CC}	1.5	-	V	
DC Input Voltage	V_{IN}	0	5.5	V	
DC Output Voltage	V_{OUT}	0	V_{CC}	V	
High-Level Output Current	I_{OH}	$V_{CC} = 1.65V$	-	-4	mA
		$V_{CC} = 2.3V$	-	-8	
		$V_{CC} = 2.7V$	-	-12	
		$V_{CC} = 3V$	-	-24	
		$V_{CC} = 4.5V$	-	-32	
Low-Level Output Current	I_{OL}	$V_{CC} = 1.65V$	-	4	mA
		$V_{CC} = 2.3V$	-	8	
		$V_{CC} = 2.7V$	-	12	
		$V_{CC} = 3V$	-	24	
		$V_{CC} = 4.5V$	-	32	
Operating Temperature Range	T_J	-40	+85	$^{\circ}C$	
Input Transition Rise & Fall Rate	$\Delta t / \Delta V$	$V_{CC} = 1.65V - 2.7V$	0	20	ns/V
		$V_{CC} = 2.7V - 5.5V$	0	10	ns/V

4. This device contains protection circuitry to guard against damage due to high static voltages or electric fields. However, precautions must be taken to avoid applications of any voltage higher than maximum rated voltages to this high-impedance circuit. For proper operation, V_{IN} and V_{OUT} should be constrained to the range $GND \leq (V_{IN} \text{ or } V_{OUT}) \leq V_{CC}$. Unused inputs must always be tied to an appropriate logic voltage level (e.g., either GND or V_{CC}). Unused outputs must be left open.





Low Voltage CMOS Logic – 74LVC1G34

Rev 1.0
29/06/19

DC Electrical Characteristics (Voltages Referenced to GND)

PARAMETER	SYMBOL	V _{CC}	CONDITIONS	LIMITS			UNITS
				25°C	85°C	FULL RANGE ⁵	
Minimum High-Level Input Voltage	V _{IH}	1.65 - 1.95V		0.65 x V _{CC}	0.65 x V _{CC}	0.65 x V _{CC}	V
		2.3 - 2.7V		1.7	1.7	1.7	
		2.7 - 3.6V		2.0	2.0	2.0	
		4.5 - 5.5V		0.7 x V _{CC}	0.7 x V _{CC}	0.7 x V _{CC}	
Maximum Low-Level Input Voltage	V _{IL}	1.65 - 1.95V		0.35 x V _{CC}	0.35 x V _{CC}	0.35 x V _{CC}	V
		2.3 - 2.7V		0.7	0.7	0.7	
		2.7 - 3.6V		0.8	0.8	0.8	
		4.5 - 5.5V		0.3 x V _{CC}	0.3 x V _{CC}	0.3 x V _{CC}	
Minimum High-Level Output Voltage	V _{OH}	1.65 - 5.5V	V _{IN} = V _{IH} or V _{IL} , I _{OUT} = -100µA	V _{CC} - 0.1	V _{CC} - 0.1	V _{CC} - 0.1	V
		1.65V	V _{IN} = V _{IH} or V _{IL} , I _{OUT} = -4mA	1.2	1.2	1.2	
		2.3V	V _{IN} = V _{IH} or V _{IL} , I _{OUT} = -8mA	1.9	1.9	1.9	V
		2.7V	V _{IN} = V _{IH} or V _{IL} , I _{OUT} = -12mA	2.2	2.2	2.2	
		3.0V	V _{IN} = V _{IH} or V _{IL} , I _{OUT} = -24mA	2.3	2.3	2.3	
		4.5V	V _{IN} = V _{IH} or V _{IL} , I _{OUT} = -32mA	3.8	3.8	3.8	
Maximum Low-Level Output Voltage	V _{OL}	1.65 - 5.5V	V _{IN} = V _{IH} or V _{IL} , I _{OUT} = 100µA	0.1	0.1	0.1	V
		1.65V	V _{IN} = V _{IH} or V _{IL} , I _{OUT} = 4mA	0.45	0.45	0.45	
		2.3V	V _{IN} = V _{IH} or V _{IL} , I _{OUT} = 8mA	0.3	0.3	0.3	V
		2.7V	V _{IN} = V _{IH} or V _{IL} , I _{OUT} = 12mA	0.4	0.4	0.4	
		3.0V	V _{IN} = V _{IH} or V _{IL} , I _{OUT} = 24mA	0.55	0.55	0.55	
		4.5V	V _{IN} = V _{IH} or V _{IL} , I _{OUT} = 32mA	0.55	0.55	0.55	
Input Leakage Current	I _{IN}	0V - 5.5V	V _{IN} = 5.5V or GND	±1	±1	±1	µA
Power-Off Leakage Current	I _{OFF}	0V	V _{IN} or V _{OUT} = 5.5V	±2	±4	±4	µA

5. -40°C ≤ T_J ≤ +85°C





Low Voltage CMOS Logic – 74LVC1G34

Rev 1.0
29/06/19

DC Electrical Characteristics Continued (Voltages Referenced to GND)

PARAMETER	SYMBOL	V _{CC}	CONDITIONS	LIMITS			UNITS
				25°C	85°C	FULL RANGE ⁵	
Supply Current	I _{CC}	1.65 - 5.5V	V _{IN} = 5.5V or GND, I _{OUT} = 0A	2	4	4	μA
Additional Supply Current	ΔI _{CC}	2.3 - 5.5V	V _{IN} = V _{CC} - 0.6V, I _{OUT} = 0A, Per pad	500	500	500	μA

AC Electrical Characteristics⁶

PARAMETER	SYMBOL	V _{CC}	CONDITIONS	LIMITS			UNITS
				25°C	85°C	FULL RANGE ⁵	
Propagation Delay Input A to Output Y (Figure 1,2)	t _{PD}	1.65 - 1.95V	C _L = 30pF, Input t _r = t _f ≤ 2ns, R _L = 1kΩ, V _{IN} = V _{CC}	8.6	8.6	8.6	ns
		2.3 - 2.7V	C _L = 30pF, Input t _r = t _f ≤ 2ns, R _L = 500Ω, V _{IN} = V _{CC}	4.4	4.4	4.4	
		2.7V	C _L = 50pF, Input t _r = t _f ≤ 2.5ns, R _L = 500Ω, V _{IN} = 2.7V	4.5	4.5	4.5	
		3.0 - 3.6V	C _L = 50pF, Input t _r = t _f ≤ 2.5ns, R _L = 500Ω, V _{IN} = 2.7V	4.1	4.1	4.1	
		4.5 - 5.5V	C _L = 50pF, Input t _r = t _f ≤ 2.5ns, R _L = 500Ω, V _{IN} = V _{CC}	3.2	3.2	3.2	
Input Capacitance	C _{IN}	3.3V	V _{IN} = GND to V _{CC} , T _J = 25°C	TYPICAL 3.5			pF
Power Dissipation Capacitance ⁷	C _{PD}	3.3V	V _{IN} = GND to V _{CC} , T _J = 25°C	TYPICAL 16			pF

6. Not production tested in die form, characterized by chip design and tested in package. 7. Used to determine the no-load dynamic power consumption: P_D = C_{PD} × V_{CC}² × f_i × N + Σ(C_L × V_{CC}² × f_o) in microwatts.

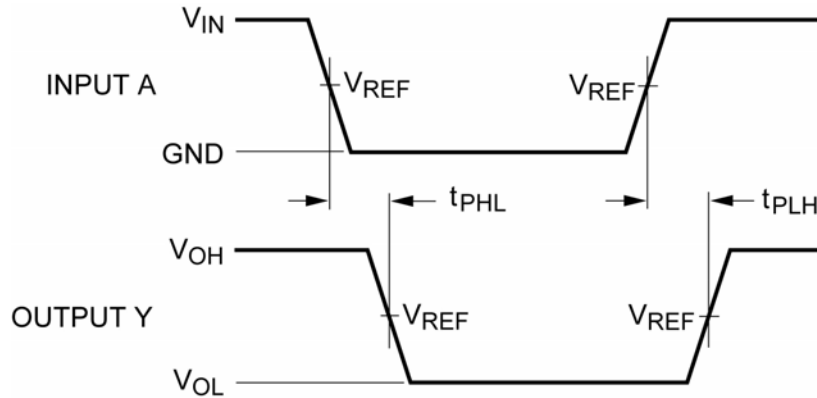




Low Voltage CMOS Logic – 74LVC1G34

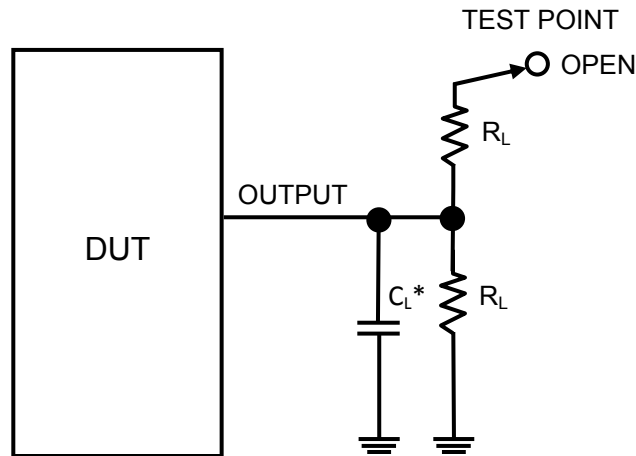
Rev 1.0
29/06/19

Switching Waveform



MEASUREMENT POINTS		
V_{CC}	V_{IN}	V_{REF}
1.65 - 1.95V	V_{CC}	$0.5 \times V_{CC}$
2.3 - 2.7V	V_{CC}	$0.5 \times V_{CC}$
2.7V	2.7V	1.5V
3.0 - 3.6V	2.7V	1.5V
4.5 - 5.5V	V_{CC}	$0.5 \times V_{CC}$

Test Circuit



* Includes all probe and jig capacitance

Figure 2 – Test Setup

DISCLAIMER: The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics. With respect to any examples or hints given herein, any typical values stated herein and/or any information regarding the application of the device, Silicon Supplies Ltd hereby disclaims any and all warranties and liabilities of any kind.

LIFE SUPPORT POLICY: Silicon Supplies Ltd components may be used in life support devices or systems only with the express written approval of Silicon Supplies Ltd, if a failure of such components can reasonably be expected to cause the failure of that life support device or system or to affect the safety or effectiveness of that device or system. Life support devices or systems are intended to be implanted in the human body or to support and/or maintain and sustain and/or protect human life. If they fail, it is reasonable to assume that the health of the user or other persons may be endangered.

