CL74LVC2G17 Dual Schmitt-Trigger Buffer

General Description

This dual Schmitt-Trigger buffer is designed for 1.65-V to5.5-V VCC operation.

The CL74LVC2G17 device contains two buffers and performs the Boolean function Y = A. The device functions as two independent buffers, but because of Schmitt action, it may have different input threshold levels for positive-going(V_{T+}) and negative-going(V_{T-}) signals.

This device is fully specified for partial-power-down applications using I_{off}. The I_{off} circuitry disables the outputs, preventing damaging current backflow through the device when it is powered down.

Ordering Information

Part Number	Package	
CL74LVC2G17	SOT-23- SOT-25 SOT-353 SOT-553	

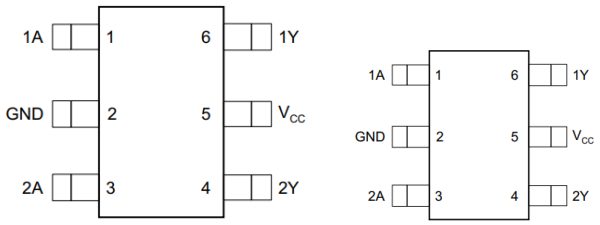
Features

- Schmitt-Trigger inputs provide hysteresis
- Supports 5-V Vcc operation
- Inputs Accept Voltages to 5.5 V
- Max Tpd of 5.4 ns at 3.3 V
- Low Power Consumption, 10-μA Max I_{CC}
- ±24-mA Output Drive at 3.3 V
- Typical V_{OLP}(Output Ground Bounce)<0.8V at Vcc = 3.3V, T_A = =25℃
- Typical V_{OHV}(Output V_{OH} Undershoot)>2V at Vcc = 3.3V, T_A = =25℃
- Ioff Supports Live Insertion, Patial-Power-Down Mode, and Back-Drive Protection
- Latch-Up Performance Exceeds 100 mA Per JESD 78, Class II
- ESD Protection Exceeds JESD 22
  - 2000-V Human-Body Model (A114-A)
  - 1000-V Charged-Device Model (C101)

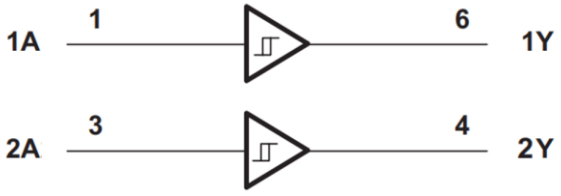
Applications

- AV Receiver
- Audio Dock: Portable
- Blu-ray Player and Home Theater
- MP3 Player/Recorder (Portable Audio)
- Personal Digital Assistant (PDA)
- Power: Telecom/Server AC/DC Supply: Single Controller: Analog and Digital
- Solid State Drive (SSD): Client and Enterprise
- TVs: LCD/Digital and High-Definition (HDTV)
- Tablet: Enterprise
- Video Analytics: Server
- Wireless Headset, Keyboard, and Mice

Pin Configuration



Simplified Schematic



Pin Assignment

Pin Name	Pin No.	Pin Function
GND	2	Ground
1A	1	Input 1
2A	3	Input 2
1Y	6	Open-drain output 1
2Y	4	Open-drain output 2
Vcc	5	Power pin

Absolute Maximum Ratings (Note1)

- V_{CC} ---------- -0.5V to +6.5V
- V_I ---------- -0.5V to +6.5V
- V_O (Voltage range applied to any output in the high-impedance or power-off state) ---------- -0.5V to +6.5V
- V_O (Voltage range applied to any output in the high or slow state) ---------- -0.5V to V_{CC}+0.5V
- Input clamp current ---------- -50mA
- Output clamp current ---------- -50mA
- Continuous output current ---------- ±50mA
- Storage Temperature ---------- –65°C to 150°C

Recommended Operating Conditions

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Supply voltage	V_{CC}	Operating	1.65		5.5	V
Input voltage	V_I		0		5.5	V
Output voltage	V_O		0		VCC	V
High- level output current	I_{OH}	V_{CC} = 1.65V			-4	mA
		V_{CC} = 2.3V			-8	
		V_{CC} = 3V			-16	
		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} = 3V			16	
		V_{CC} = 3V			24	
		V_{CC} = 4.5V			32	
Operating temperature	T_A		-40		125	℃

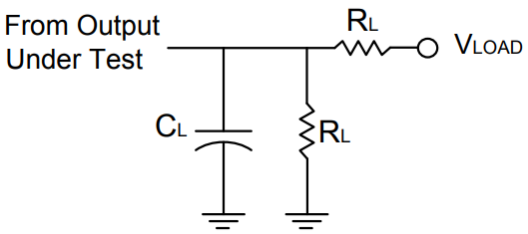
Electrical Characteristics

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Positive-going input threshold voltage	V_{T+}	V_{CC} = 1.65V	0.7		1.4	V
		V_{CC} = 2.3V	1.0		1.7	
		V_{CC} = 3V	1.3		2.0	
		V_{CC} = 4.5V	1.9		3.1	
		V_{CC} = 5.5V	2.2		3.7	
Negative-going input threshold voltage	V_{T-}	V_{CC} = 1.65V	0.3		0.7	V
		V_{CC} = 2.3V	0.4		1	
		V_{CC} = 3V	0.8		1.3	
		V_{CC} = 4.5V	1.1		2	
		V_{CC} = 5.5V	1.4		2.5	
Hysteresis voltage	$\triangle V_T$	V_{CC} = 1.65V	0.3		0.8	V
		V_{CC} = 2.3V	0.4		0.9	
		V_{CC} = 3V	0.4		1.1	
		V_{CC} = 4.5V	0.6		1.3	
		V_{CC} = 5.5V	0.7		1.4	
High- level output voltage	V_{OH}	V_{CC} = 1.65~5.5V, I_{OH}= 100uA	VCC-0.1			V
		V_{CC} = 1.65V, I_{OH}= 4mA	1.2			
		V_{CC} = 2.3V, I_{OH}= 8mA	1.9			
		V_{CC} = 3V, I_{OH}= 16mA	2.4			
		V_{CC} = 3V, I_{OH}= 24mA	2.3			
		V_{CC} = 4.5V, I_{OH}= 32mA	3.8			
Low- level output voltage	V_{OL}	V_{CC} = 1.65~5.5V, I_{OL}= 100uA			0.1	V
		V_{CC} = 1.65V, I_{OL}= 4mA			0.45	
		V_{CC} = 2.3V, I_{OL}= 8mA			0.3	
		V_{CC} = 3V, I_{OL}= 16mA			0.4	
		V_{CC} = 3V, I_{OL}= 24mA			0.55	
		V_{CC} = 4.5V, I_{OL}= 32mA			0.55	
Input leakage current	I_I	V_{IN}= 5.5V or GND, V_{CC}= 0~5.5V			±5	uA
Power off leakage current	I_{OFF}	V_I or V_O = 5.5V, V_{CC}=0V			±10	uA
Supply current	I_{CC}	V_{IN}= V_{CC} or GND, I_{OUT}=0, V_{CC}=1.65~5.5V			10	uA
Additional supply current per input pin	$\triangle I_{CC}$	V_{CC}=3~5.5V, one input ate V_{CC}-0.6V, other input at V_{CC} or GND			500	uA

Switching Characteristics

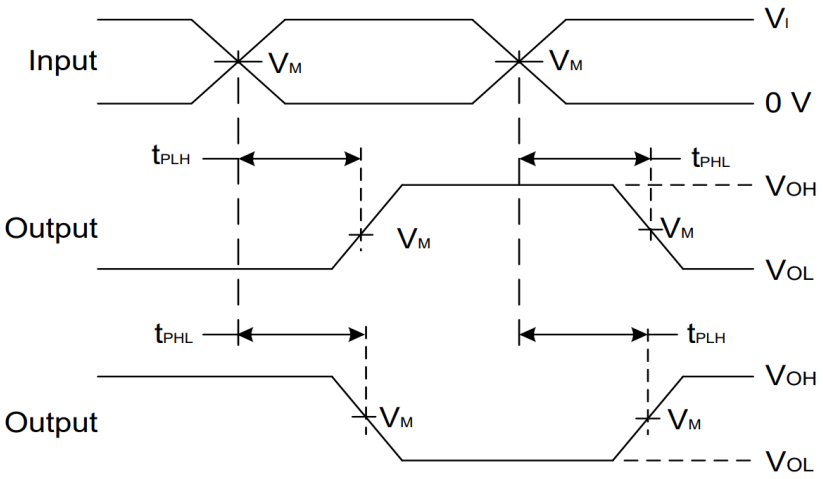
Parameter	Symbol	Test Conditions		Min	Typ	Max	Units
Propagation delay from input(A or B) to output(Y)	T_{PD}	V_{CC} = 1.8V±0.15V, R_L=1KΩ	C_L=30pF	3.9		9.3	ns
		V_{CC} = 2.5V±0.2V , R_L=500Ω		1.9		5.7	
		V_{CC} = 3.3V±0.3V, R_L=500Ω	C_L=50pF	2.2		5.4	
		V_{CC} = 5V±0.5V, R_L=500Ω		1.5		4.3	

Parameter Measurement Information



TEST	Condition
t_{PLZ}	V_{LOAD}
t_{PZL}	V_{LOAD}

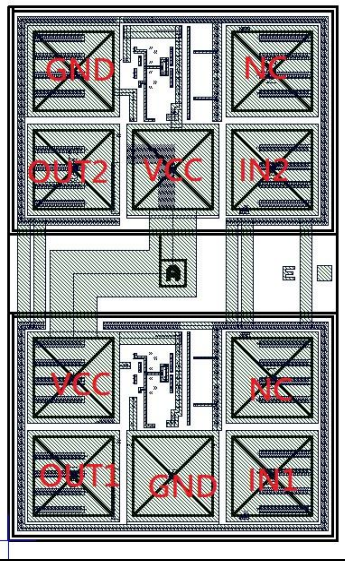
VCC	INPUTS		V_M	V_{LOAD}	C_L	R_L	$V_\triangle$
	V_I	t_r/t_f					
1.8V ± 0.15V	V_{CC}	≦2ns	$V_{CC}/2$	2 X V_{CC}	30pF	1kΩ	0.15V
2.5V ± 0.2V	V_{CC}	≦2ns	$V_{CC}/2$	2 X V_{CC}	30pF	500Ω	0.15V
3.3V ± 0.3V	3V	≦2.5ns	1.5V	6V	50pF	500Ω	0.3V
5V ± 0.5V	V_{CC}	≦2.5ns	$V_{CC}/2$	2 X V_{CC}	50pF	500Ω	0.3V



Voltage Waveform Propagation Delay Times
Inverting and Non Inverting Outputs

Notes:
A. C_L includes probe and jig capacitance
B. All pulses and supplied at pulse repetition rate≦10MHz
C. The Inputs are measured separately one transition per measurement
D. t_{PLH} and t_{PHL} are the same as t_{PD}

PAD Location and Coordinates

PHYSICAL CHARACTERISTICS		UNIT	CHIP DRAWING
Wafer Size	200	mm	
Die Size (with S/L)	0.308 * 0.466	mm^2	
Scribe line width	60	um	
TOP Metal thickness	3	µm	
Top Metallization	Al-Cu		
Wafer Thickness	726	µm	
CUP (circuit under PAD) or not	YES		
Bonding Wire Diameter	20	um	

PAD NAME	PAD SIZE (µm²)	Coordinate
IN2	60*60	(199,282)
GND	60*60	(49,357)
GND	60*60	(124,49)
IN1	60*60	(199,49)
OUT1	60*60	(49,49)
VCC	60*60	(49,124)
OUT2	60*60	(49,282)

Bonding Diagram Example