

General Description

The operating voltage range of the SN74LVC1G17 single Schmitt-trigger buffer is 1.65 V to 5.5 V. The SN74LVC1G17 device contains one buffer and performs the Boolean function $Y=A$. Because of the Schmitt-Trigger inputs, the device may have different input threshold levels for positive-going (V_{T+}) and negative-going (V_{T-}) signals, to provide hysteresis (ΔV_T) which makes the device tolerant to slow or noisy input 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.


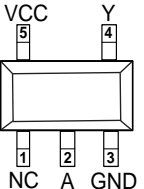

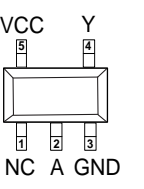
Features

- Schmitt-Trigger inputs provide hysteresis
- Supports 5 V V_{CC} Operation
- Inputs Accept Voltages to 5.5 V
- Max t_{pd} of 5.4 ns at 3.3 V
- ± 24 -mA Output Drive at 3.3 V
- I_{off} Supports Partial-Power-Down Mode

Applications

- AV Receivers
- Audio Docks: Portable
- Blu-ray Players and Home Theater
- MP3 Players/Recorders
- Personal Digital Assistants (PDAs)
- Power: Telecom/Server AC/DC Supply
- Solid State Drives (SSDs): Client and Enterprise
- TVs: LCD/Digital and High-Definition (HDTVs)
- Tablets: Enterprise
- Wireless Headsets, Keyboards, and Mice

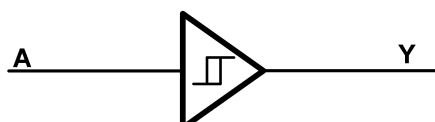
Pinning and Package

SOT23-5		SC70-5	
			

Order information

Package	Orderable Device	Packing Option
SOT23-5	SN74LVC1G17DBVRW	3000/盘
SC70-5	SN74LVC1G17DCKRW	

Functional Block Diagram



Pin Functions

Pin		Type	Description
Name	SOT23-5/SC70-5		
NC	1	—	No internal connection
A	2	I	Input
GND	3	—	Ground
Y	4	O	Output
VCC	5	—	Positive Supply

Absolute Maximum Ratings

Parameters		Min	Max.	Unit
V _{CC}	Supply voltage range	-0.5	6.5	V
V _I	Input voltage range	-0.5	6.5	V
V _O	Voltage range applied to any output in the high-impedance or power-off state	-0.5	6.5	V
V _O	Voltage range applied to any output in the high or low state	-0.5	V _{CC} +0.5	V
I _{IK}	Input clamp current	V _I <0	-50	mA
I _{OK}	Output clamp current	V _O <0	-50	mA
I _O	Continuous output current		±50	mA
	Continuous current through V _{CC} or GND		±100	mA
T _J	Junction temperature under bias		150	°C
T _{stg}	Storage temperature range	-65	150	°C

(1) Stresses beyond those listed under Absolute Maximum Ratings 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 input negative-voltage and output voltage ratings may be exceeded if the input and output current ratings are observed.

Recommended Operating Conditions

Over operating free-air temperature range (unless otherwise noted)

Symbol	Parameter	Min	Max	Unit
V _{CC}	Supply voltage	1.65	5.5	V
V _I	Input voltage	0	5.5	V
V _O	Output voltage	0	V _{CC}	V
I _{OH}	High-level output current	V _{CC} =1.65V	-4	mA
		V _{CC} =2.3V	-8	
		V _{CC} =3V	-16	
			-24	
		V _{CC} =4.5V	-32	
I _{OL}	Low-level output current	V _{CC} =1.65V	4	mA
		V _{CC} =2.3V	8	
		V _{CC} =3V	16	
			24	
		V _{CC} =4.5V	32	
T _A	Operating free-air temperature	-40	125	°C

Electrical Characteristics

over recommended operating free-air temperature range (unless otherwise noted)

Parameter	Test Conditions	V _{CC}	-40°C to 85°C			-40°C to 125°C			Unit
			Min	Typ	Max	Min	Typ	Max	
V _{T+} Positive-going input threshold voltage		1.65 V	0.7		1.4	0.7		1.4	V
		2.3 V	1		1.7	1		1.7	
		3 V	1.3		2	1.3		2	
		4.5 V	1.9		3.1	1.9		3.1	
		5.5 V	2.2		3.7	2.2		3.7	
V _{T-} Negative-going input threshold voltage		1.65 V	0.25		0.7	0.25		0.7	V
		2.3 V	0.4		1	0.4		1	
		3 V	0.8		1.3	0.8		1.3	
		4.5 V	1.1		2	1.1		2	
		5.5 V	1.4		2.5	1.4		2.5	
ΔV_T Hysteresis (V _{T+} - V _{T-})		1.65 V	0.3		1	0.3		1	V
		2.3 V	0.4		1	0.4		1	
		3 V	0.5		1	0.5		1	
		4.5 V	0.6		1	0.6		1	
		5.5 V	0.7		1.1	0.7		1.1	
V _{OH}	I _{OH} =-100 μ A	1.65 V to 5.5 V	V _{CC} -0.1			V _{CC} -0.1			V
	I _{OH} =-4 mA	1.65 V	1.2			1.2			
	I _{OH} =-8 mA	2.3 V	1.9			1.9			
	I _{OH} =-16 mA	3 V	2.4			2.4			
	I _{OH} =-24 mA		2.3			2.3			
	I _{OH} =-32 mA	4.5 V	3.8			3.8			
V _{OL}	I _{OL} =100 μ A	1.65 V to 5.5 V			0.1			0.1	V
	I _{OL} =4 mA	1.65 V			0.45			0.45	
	I _{OL} =8 mA	2.3 V			0.3			0.3	
	I _{OL} =16 mA	3 V			0.4			0.4	
	I _{OL} =24 mA				0.55			0.55	
	I _{OL} =32 mA	4.5 V			0.55			0.55	
I _I	A _{input}	V _I =5.5 V or GND	0 to 5.5 V		± 5			± 5	μ A
I _{off}		V _I or V _O =5.5 V			± 10			± 10	μ A
I _{CC}		V _I =5.5 V or GND, I _O =0			10			10	μ A
ΔI_{CC}		One input at V _{CC} - 0.6 V, Other inputs at V _{CC} or GND			500			500	μ A
C _i		V _I =V _{CC} or GND		5			5		pF

(1) All unused digital inputs of the device must be held at V_{CC} or GND to ensure proper device operation.

Electrical Characteristics

V_{CC}=5.0V or 3.3V, Typical values are at T_A=+25°C. (unless otherwise noted)

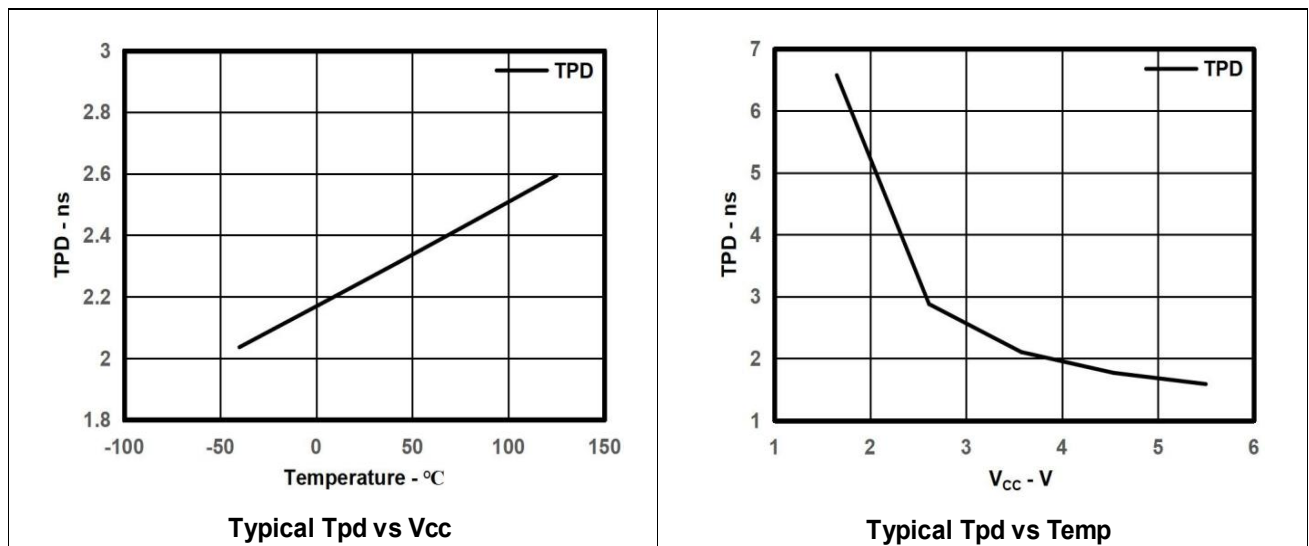
Parameter	From (Input)	To (Output)	-40°C to 125°C								Unit
			V _{CC} =1.8 V ± 0.15 V		V _{CC} =2.5 V ± 0.2 V		V _{CC} =3.3 V ± 0.3 V		V _{CC} =5 V ± 0.5 V		
			Min	Max	Min	Max	Min	Max	Min	Max	
t _{pd}	A	Y	3.9	10.5	1.9	6.2	2.2	5.9	1.5	4.8	ns

T_A=25°C

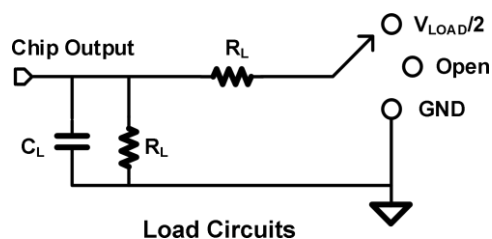
Parameter		Test Conditions	V _{CC} =1.8 V	V _{CC} =2.5 V	V _{CC} =3.3 V	V _{CC} =5 V	Unit
			Typ	Typ	Typ	Typ	
C _{pd}	Power dissipation capacitance	f=10 MHz	20	30	35	50	pF

Typical Characteristics

Over recommended operating free-air temperature range, C_L=30 pF or 50 pF (unless otherwise noted).



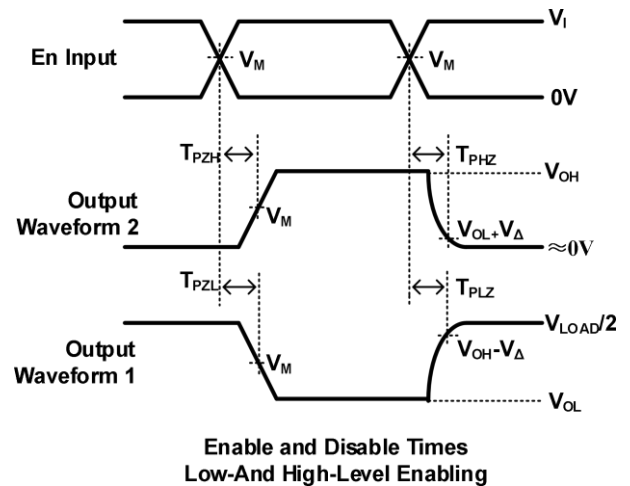
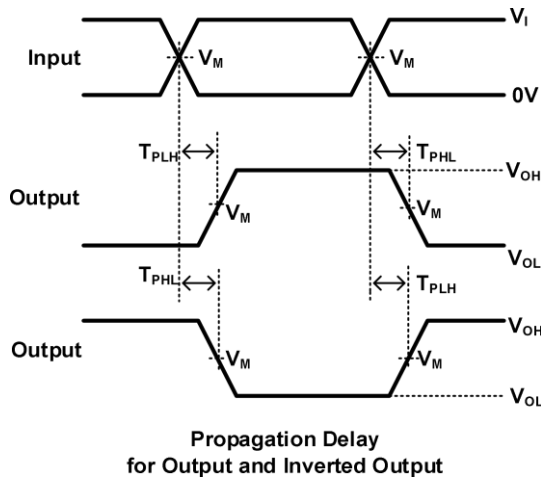
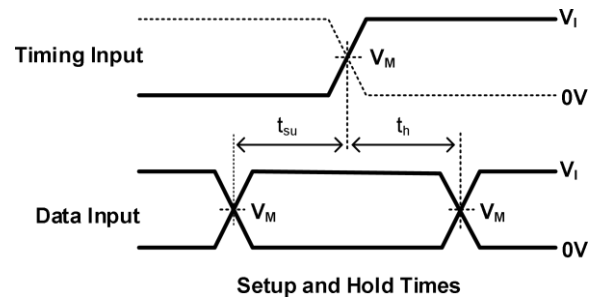
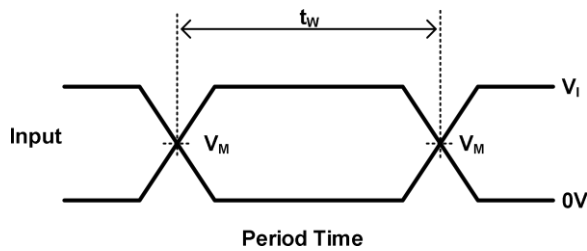
Parameter Measurement Information



TEST	S1
T _{PHL} /T _{PLH}	OPEN
T _{PLZ} /T _{PZL}	V _{LOAD}
T _{PHZ} /T _{PZH}	GND

Parameter Measurement Information(Continued)

V_{CC}	INPUTS		V_M	V_{LOAD}	C_L	R_L	V_{Δ}
	V_I	T_r/T_f					
1.8V±0.15V	V_{CC}	≤2ns	$V_{CC}/2$	$2 \times V_{CC}$	30pF	1kΩ	0.15V
2.5V±0.15V	V_{CC}	≤2ns	$V_{CC}/2$	$2 \times V_{CC}$	30pF	500Ω	0.15V
3.3V±0.15V	3V	≤2.5ns	1.5V	6V	50pF	500Ω	0.3V
5V±0.15V	V_{CC}	≤2.5ns	$V_{CC}/2$	$2 \times V_{CC}$	50pF	500Ω	0.3V



Notes: A. C_L includes probe and jig capacitance.

B. Waveform 1 is for an output with internal conditions such that the output is low, except when disabled by the output control.

Waveform 2 is for an output with internal conditions such that the output is high, except when disabled by the output control.

C. All input pulses are supplied by generators having the following characteristics: PRR 10 MHz, $Z = 50$.

D. The outputs are measured one at a time, with one transition per measurement.

E. t_{PLZ} and t_{PHZ} are the same as t_{ds} .

F. t_{PZL} and t_{PZH} are the same as t_{en} .

G. t_{PLH} and t_{PHL} are the same as t_{pd} .

H. All parameters and waveforms are not applicable to all device.

Feature Description

The device is designed for 1.65V to 5.5V V_{CC} operation and it allows down voltage translation from 5V to 3.3V, or 3.3V to 1.8V. The input voltage of SN74LVC1G17 accepts to 5.5V.

The SN74LVC1G17 has power-down protection (off) and Schmitt-trigger input.

I_{off} feature allows voltage on the inputs and outputs when V_{CC} is 0V, and is able to reduce leakage when V_{CC} is 0V.

Schmitt-Trigger input can improve the noise immunity capability

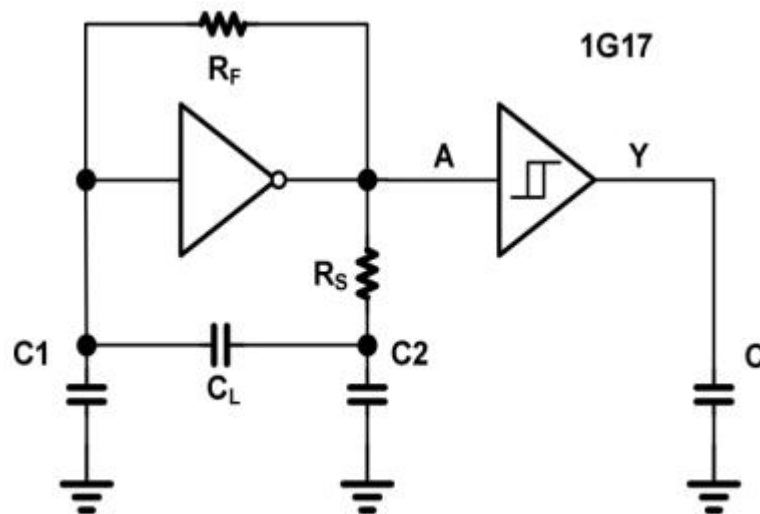
Device Functional Modes

Input A	Output Y
H	H
L	L

Application Information

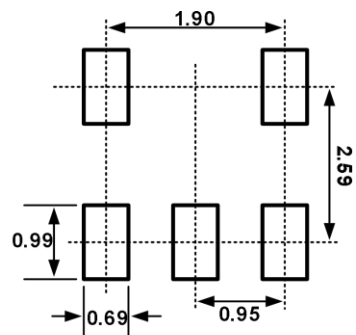
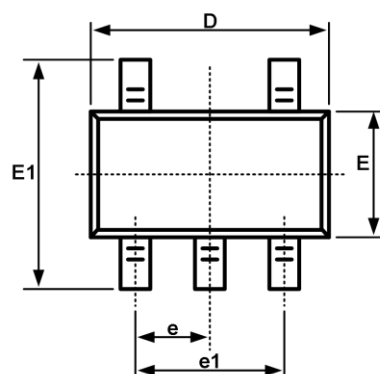
The SN74LVC1G17 is a high drive CMOS device that can be used for a multitude of buffer type functions where the input is slow or noisy. It can produce 24 mA of drive current at 3.3 V making it Ideal for driving multiple outputs and good for high-speed applications up to 100 MHz. The inputs are 5.5 V tolerant allowing it to translate down to VCC. channel input elements, such as push buttons or rotary knobs, offer simple ways to interact with electronic systems. Typically, these elements have recoil or bouncing, where the mechanical element makes and breaks contact multiple times during human interaction. This bouncing can cause one or more repeated signals to be passed, triggering multiple actions when only a single input was intended. One potential solution to mitigating these multiple inputs is by utilizing a Schmitt-trigger to create a debounce circuit.

Typical Power Button Circuit

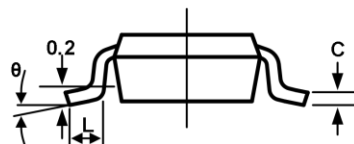
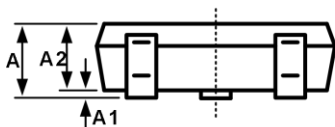


Package Outline

SOT23-5

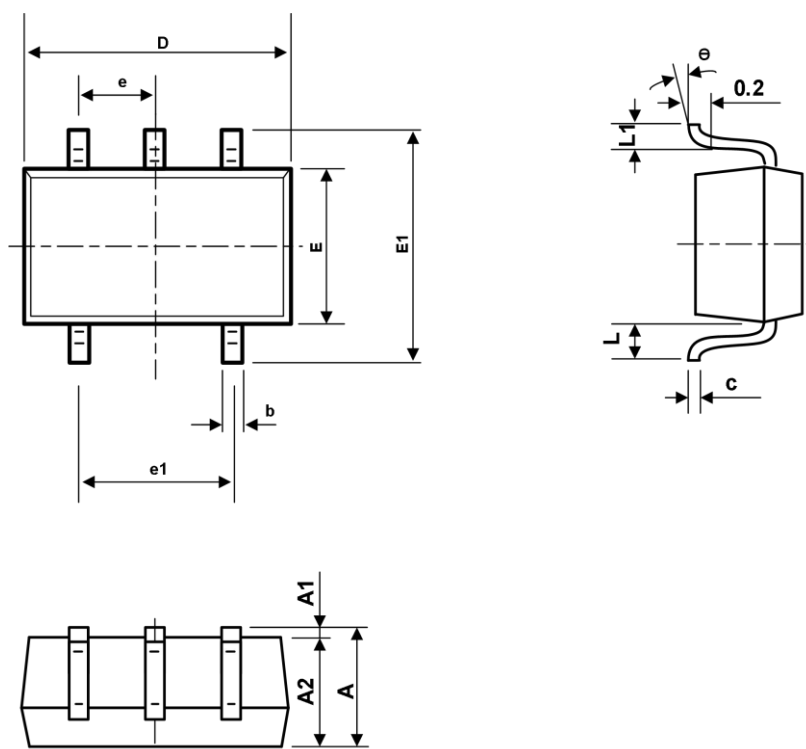


Recommended Land Pattern (Unit: mm)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950BSC		0.037BSC	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
L1	0.600REF		0.024REF	
θ	0°	8°	0°	8°

Package Outline SC70-5



symbol	Dimension In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.150	0.350	0.006	0.014
c	0.110	0.175	0.004	0.007
D	2.000	2.200	0.079	0.087
E	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.650TYP		0.026TYP	
e1	1.200	1.400	0.047	0.055
L	0.525REF		0.021REF	
L1	0.260	0.460	0.010	0.018
θ	0°	8°	0°	8°

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