## General Description

The operating voltage range of the SN74LVC1G17 single Schmitt-trigger buffer is 1.65 V to 5.5V。
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 (VT+)and negative-going (VT-) signals,to provide hysteresis (△Vr)which makes the device tolerant to slow or noisy input signals.
This device is fully specified for partial-power-down applications using lof.The loff circuitry disables the outputs,preventing damaging current backlow through the device when it is powered down.

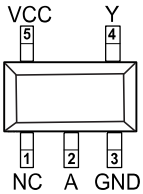
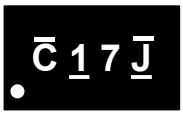
## Features

- Schmitt-Trigger inputs provide hysteresis
- Supports 5V Vcc Operation
- Inputs Accept Voltages to 5.5V
- Max tpd of 5.4 ns at 3.3 V
- ±24-mA Output Drive at 3.3 V
- loff Supports Partial -Power-Down Mode

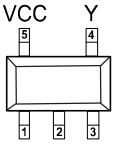
## Applications

- 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 Marking

| Pin Configurations | Marking |
|---|---|
|   |   |

SOT-23-5

| Pin Configurations | Marking |
|---|---|
|   |   |

SC70-5

## 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 |

## Order information

| Orderable Device | Package | Packing Option |
|---|---|---|
| SN74LVC1G17DBVR | SOT23-5 | 3000PCS |
| SN74LVC1G17DCKR | SC70-5 | 3000PCS |

## 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 | ℃ |
| $T_{stg}$ | Storage temperature range | | -65 | 150 | ℃ |

(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 | ℃ |

## 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 | |
| $\Delta V_T$ 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 µA | 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 µA | 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 | µA |
| $I_{off}$ | $V_I$ or $V_O$=5.5 V | | | | ±10 | | | ±10 | µA |
| $I_{CC}$ | $V_I$=5.5 V or GND, $I_O$=0 | | | | 10 | | | 10 | µA |
| $\Delta I_{CC}$ | One input at $V_{CC}$– 0.6 V, Other inputs at $V_{CC}$ or GND | | | | 500 | | | 500 | µA |
| $C_i$ | $V_I$=$V_{CC}$ 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

Vcc=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).

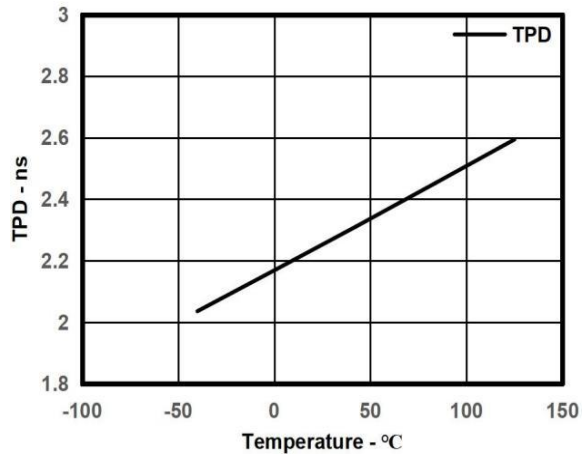



Fig.8-1. Typical Tpd vs Vcc

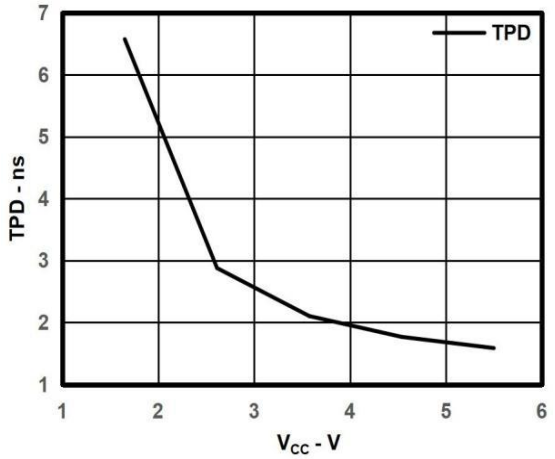
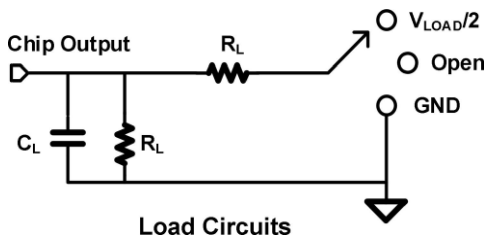



Fig.8-2. Typical Tpd vs Temp

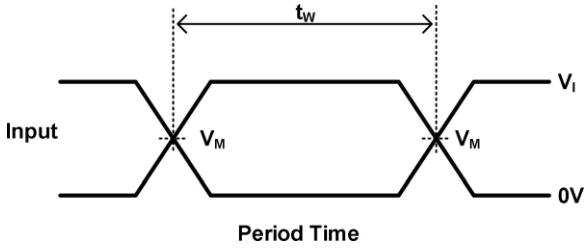
## Parameter Measurement Information



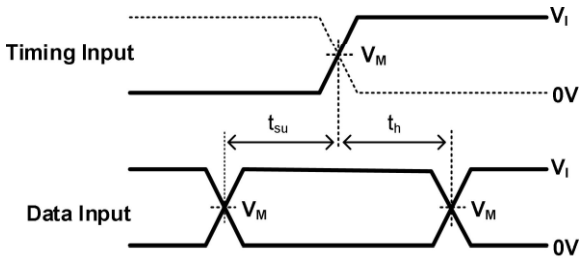

| TEST | S1 |
|---|---|
| $T_{PHL}/T_{PLH}$ | OPEN |
| $T_{PLZ}/T_{PZL}$ | $V_{LOAD}$ |
| $T_{PHZ}/T_{PZH}$ | GND |

## Parameter Measurement Information(Continued)

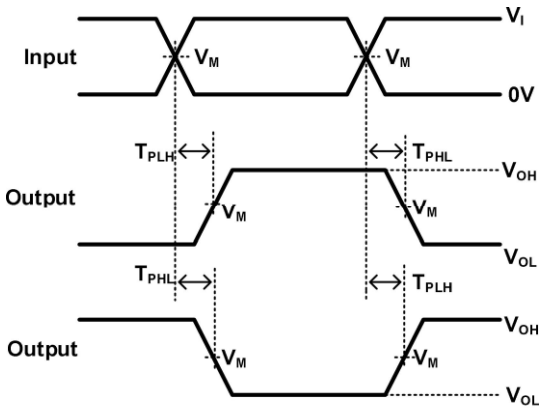
| $V_{CC}$ | INPUTS | | $V_M$ | $V_{LOAD}$ | $C_L$ | $R_L$ | $V_\Delta$ |
|---|---|---|---|---|---|---|---|
| | $V_I$ | $T_r/T_f$ | | | | | |
| 1.8V±0.15V | $V_{CC}$ | ≤2ns | $V_{CC}/2$ | $2\times V_{CC}$ | 30pF | 1kΩ | 0.15V |
| 2.5V±0.15V | $V_{CC}$ | ≤2ns | $V_{CC}/2$ | $2\times V_{CC}$ | 30pF | 500Ω | 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 |



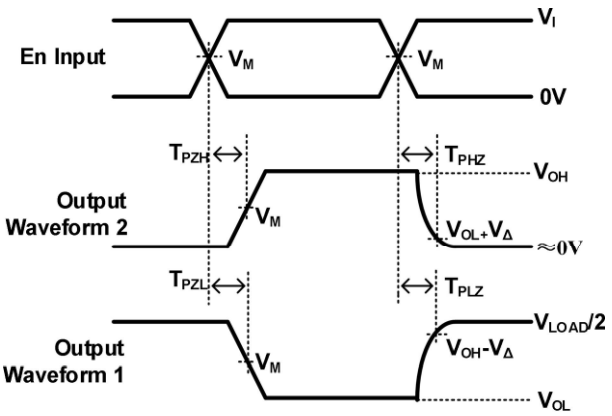

Period Time




Setup and Hold Times




Propagation Delay
for Output and Inverted Output




Enable and Disable Times
Low-And High-Level Enabling

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 $t_{dis}$.
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 0 V, and is able to reduce leakage when $V_{CC}$ is 0V. Schmitt-Trigger input can improve the noise immunity capability.

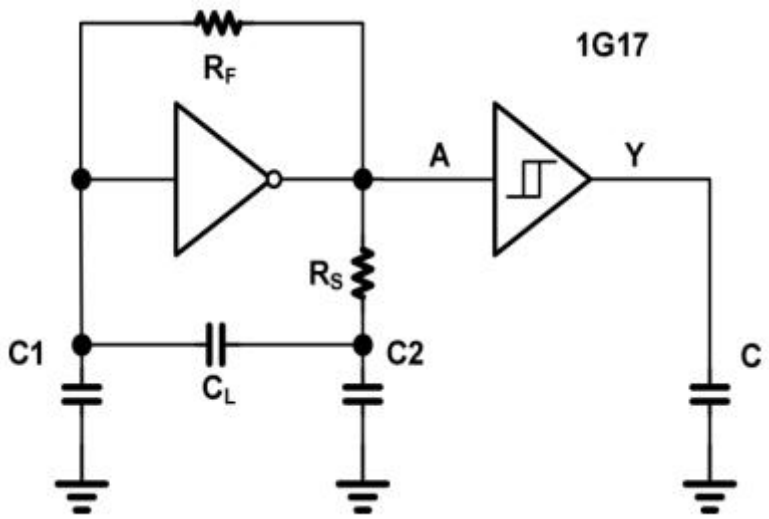
## Device Functional Modes

| Input A | Output Y |
|---|---|
| H | H |
| L | L |

## Application Information

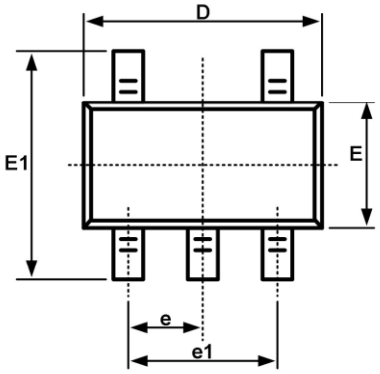
The SN74LVC1G17 is a high drive CMOS device that can be used for a multitude of buffer type functions where the input is slow or noisy. It can produce 24 mA of drive current at 3.3 V making it Ideal for driving multiple outputs and good for high-speed applications up to 100 MHz. The inputs are 5.5 V 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.

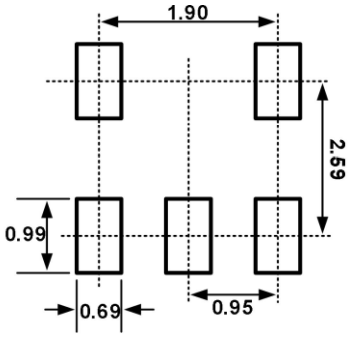
## Typical Power Button Circuit



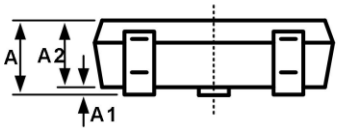
## Package Outline

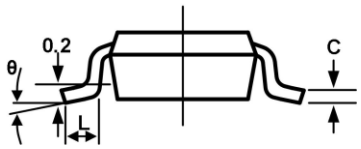
**SOT23-5**



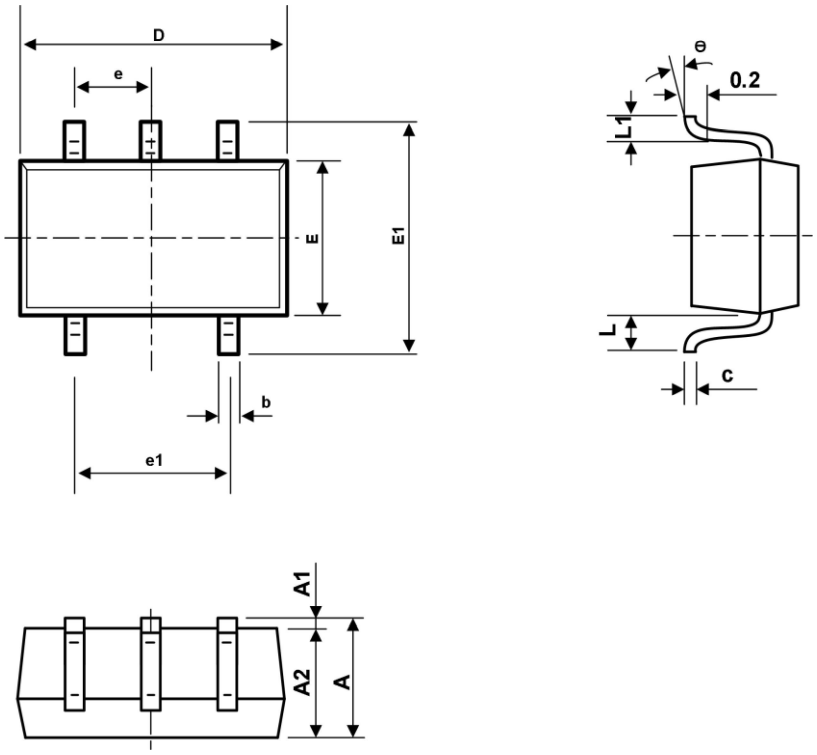

Recommended Land Pattern (Unit: mm)




| 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° |