# 74LVC1G17 Series

SINGLE SCHMITT-TRIGGER BUFFER



## Features

- Operation Voltage Range: 1.65V ~ 5.5V
- Low power current: $I_{CC}$=10μA(Max)
- ±24mA output drive ($V_{CC}$=3.0V)
- Power down protection
- ESD Protection Exceeds JESD 22
  - 2000-V Human-Body Model (A114-A)
  - 1000-V Charged-Device Model (C101)
- SOT23-5 Package Available
- SOT353 Package Available

## Applications

- Voltage Level Shifting
- General Purpose Logic
- Power Down Signal Isolation
- Wide array of products such as:
  - PCs, Networking, Notebooks, Netbooks, PDAs
  - Tablet Computers, E-readers
  - Computer Peripherals, Hard Drives, CD/DVD ROM
  - TV, DVD, DVR, Set-Top Box
  - Cell Phones, Personal Navigation / GPS
  - MP3 Players, Cameras, Video Recorders

## General Descrition

The 74LVC1G17 is a single Schmitt-trigger buffer, it provides the function Y=A.

The device have different input threshold levels for positive-going ($V_{T+}$) and negative-going($V_{T-}$) signals because of the Schmitt-trigger action in the input.

This device has power-down protective circuit, preventing device destruction when it is powered down.

## Ordering Information

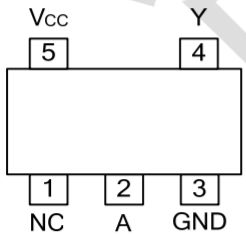
| ORDER NUMBER | PACKAGE DESCRIPTION | PACKAGE OPTION |
|---|---|---|
| 74LVC1G17W5-TP | SOT23-5 | Tape and Reel,3000 |
| 74LVC1G17SE-TP | SOT353 | Tape and Reel,3000 |

## Logic Diagram




Logic symbol

## Pin Configuration




SOT-23-5
SOT-353

## Function Table

| INPUT | OUTPUT |
|---|---|
| A | Y |
| L | H |
| H | L |

## Absolute Maximum Ratings

| PARAMETER | SYMBOL | TEST CONDITIONS | RATINGS | UNIT |
|---|---|---|---|---|
| Supply Voltage | $V_{CC}$ | | -0.5 ~ 6.5 | V |
| Input Voltage | $V_{IN}$ | | -0.5 ~ 6.5 | V |
| Output Voltage | $V_{OUT}$ | Output in the high or low state | -0.5 ~ $V_{CC}$+0.5 | V |
| | | Output in the power-off state | -0.5 ~ 6.5 | V |
| Continuous $V_{CC}$ or GND Current | $I_{CC}$ | | ±100 | mA |
| Continuous Output Current | $I_{OUT}$ | | ±50 | mA |
| Input Clamp Current | $I_{IK}$ | $V_{IN}$<0 | -50 | mA |
| Output Clamp Current | $I_{OK}$ | $V_{OUT}$<0 | -50 | mA |
| Junction Temperature | $T_J$ | | +150 | °C |
| Storage Temperature Range | $T_{STG}$ | | -65 ~ +150 | °C |

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.
2. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

## Recommended Operating Conditions

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| Supply Voltage | $V_{CC}$ | Operating | 1.65 | | 5.5 | V |
| | | Data retention only | 1.5 | | | V |
| Input Voltage | $V_{IN}$ | | 0 | | 5.5 | V |
| Output Voltage | $V_{OUT}$ | High or low state | 0 | | $V_{CC}$ | V |
| Operating Temperature | $T_A$ | | -40 | | +125 | °C |

## Thermal Data

| PARAMETER | | SYMBOL | RATINGS | UNIT |
|---|---|---|---|---|
| Junction to Case | SOT-23-5 | $\theta_{JC}$ | 100 | °C/W |
| | SOT-353 | | 120 | |

## Electrical Characteristics

| PARAMETER | SYMBOL | TEST CONDITIONS | | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|---|
| Positive-going Input Threshold Voltage | $V_{T+}$ | $V_{CC}$=1.65V | | 0.76 | | 1.16 | V |
| | | $V_{CC}$=2.3V | | 1.08 | | 1.56 | |
| | | $V_{CC}$=3.0V | | 1.48 | | 1.92 | |
| | | $V_{CC}$=4.5V | | 2.16 | | 2.74 | |
| | | $V_{CC}$=5.5V | | 2.61 | | 3.33 | |
| Negative-going Input Threshold Voltage | $V_{T-}$ | $V_{CC}$=1.65V | | 0.35 | | 0.62 | V |
| | | $V_{CC}$=2.3V | | 0.56 | | 0.88 | |
| | | $V_{CC}$=3.0V | | 0.84 | | 1.2 | |
| | | $V_{CC}$=4.5V | | 1.41 | | 1.97 | |
| | | $V_{CC}$=5.5V | | 1.87 | | 2.4 | |
| Hysteresis Voltage ($V_{T+}$-$V_{T-}$) | $\triangle V_T$ | $V_{CC}$=1.65V | | 0.36 | | 0.64 | |
| | | $V_{CC}$=2.3V | | 0.45 | | 0.78 | |
| | | $V_{CC}$=3.0V | | 0.51 | | 0.87 | |
| | | $V_{CC}$=4.5V | | 0.58 | | 1.04 | |
| | | $V_{CC}$=5.5V | | 0.69 | | 1.11 | |
| High-Level Output Voltage | $V_{OH}$ | $V_{CC}$=1.65V~5.5V, $I_{OH}$=-100μA | | $V_{CC}$-0.1 | | | V |
| | | $V_{CC}$= 1.65V, $I_{OH}$=-4mA | | 1.2 | | | |
| | | $V_{CC}$= 2.3V, $I_{OH}$=-8mA | | 1.9 | | | |
| | | $V_{CC}$= 3.0V | $I_{OH}$=-16mA | 2.4 | | | |
| | | | $I_{OH}$=-24mA | 2.3 | | | |
| | | $V_{CC}$= 4.5V, $I_{OH}$=-32mA | | 3.8 | | | |
| Low-Level Output Voltage | $V_{OL}$ | $V_{CC}$= 1.65V~5.5V, $I_{OL}$=100μA | | | | 0.1 | V |
| | | $V_{CC}$= 1.65V, $I_{OL}$=4mA | | | | 0.45 | |
| | | $V_{CC}$= 2.3V, $I_{OL}$=8mA | | | | 0.3 | |
| | | $V_{CC}$= 3.0V | $I_{OL}$=16mA | | | 0.4 | |
| | | | $I_{OL}$=24mA | | | 0.55 | |
| | | $V_{CC}$= 4.5V, $I_{OL}$=32mA | | | | 0.55 | |
| Input Leakage Current | $I_{I(LEAK)}$ | $V_{CC}$= 0~5.5V, $V_{IN}$=$V_{CC}$ or GND | | | | ±5 | μA |
| Power OFF Leakage Current | $I_{OFF}$ | $V_{CC}$= 0V, $V_{IN}$ or $V_{OUT}$=5.5V | | | | ±10 | μA |
| Quiescent Supply Current | $I_Q$ | $V_{CC}$= 1.65V~5.5V, $V_{IN}$=$V_{CC}$ or GND $I_{OUT}$=0 | | | | 10 | μA |
| Additional Quiescent Supply Current | $\Delta I_Q$ | $V_{CC}$= 3V~5.5V, One input at $V_{CC}$-0.6V, other inputs at $V_{CC}$ or GND | | | | 500 | μA |
| Input Capacitance | $C_{IN}$ | $V_{CC}$= 3.3V, $V_{IN}$=$V_{CC}$ or GND | | | 4.5 | | pF |

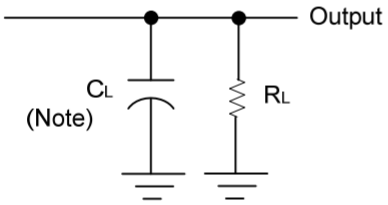
## Dynamic Characteristics (Input: $t_R$, $t_F$≤3ns; $P_{RR}$≤1MHz)

| PARAMETER | SYMBOL | TEST CONDITIONS | | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|---|
| Propagation delay from input (A) to output (Y) | $t_{PLH}$ / $t_{PHL}$ | $C_L$=15pF | $V_{CC}$=1.8±0.15V | 2.8 | | 13 | ns |
| | | | $V_{CC}$=2.5±0.2V | 1.6 | | 9.1 | ns |
| | | | $V_{CC}$=3.3±0.3V | 1.5 | | 8.2 | ns |
| | | | $V_{CC}$=5±0.5V | 0.9 | | 6.8 | ns |
| | | $C_L$=30 or 50pF | $V_{CC}$=1.8±0.15V | 3.8 | | 14.5 | ns |
| | | | $V_{CC}$=2.5±0.2V | 2 | | 11.1 | ns |
| | | | $V_{CC}$=3.3±0.3V | 1.8 | | 10.2 | ns |
| | | | $V_{CC}$=5±0.5V | 1.2 | | 8.3 | ns |

## Operating Characteristics

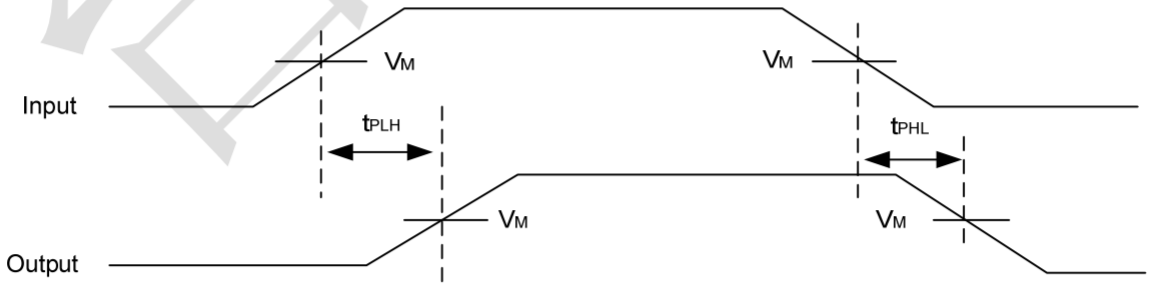
| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| Power Dissipation Capacitance | $C_{PD}$ | $V_{CC}$=1.8V | | 20 | | pF |
| | | $V_{CC}$=2.5V | | 21 | | pF |
| | | $V_{CC}$=3.3V | | 22 | | pF |
| | | $V_{CC}$=5V | | 25 | | pF |

## Test Circuit And Waveforms



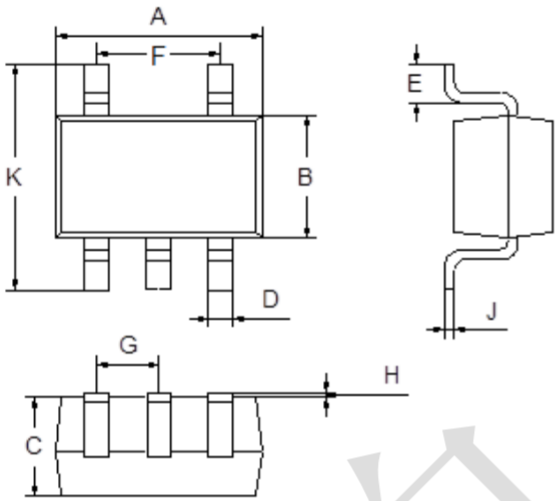

Note: $C_L$ includes probe and jig capacitance.

| $V_{CC}$ | $V_{IN}$ | $t_R$, $t_F$ | $V_M$ | $C_L$ | $R_L$ |
|---|---|---|---|---|---|
| 1.8V±0.15V | $V_{CC}$ | ≤2ns | $V_{CC}$/2 | 15pF | 1MΩ |
| 2.5V±0.2V | $V_{CC}$ | ≤2ns | $V_{CC}$/2 | 15pF | 1MΩ |
| 3.3V±0.3V | 3V | ≤2.5ns | 1.5V | 15pF | 1MΩ |
| 5V±0.5V | $V_{CC}$ | ≤2.5ns | $V_{CC}$/2 | 15pF | 1MΩ |
| 1.8V±0.15V | $V_{CC}$ | ≤2ns | $V_{CC}$/2 | 30pF | 1KΩ |
| 2.5V±0.2V | $V_{CC}$ | ≤2ns | $V_{CC}$/2 | 30pF | 500Ω |
| 3.3V±0.3V | 3V | ≤2.5ns | 1.5V | 50pF | 500Ω |
| 5V±0.5V | $V_{CC}$ | ≤2.5ns | $V_{CC}$/2 | 50pF | 500Ω |



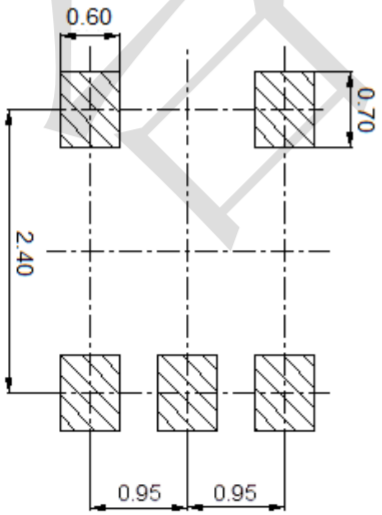
## Package Outline Dimensions (Unit: mm)

**SOT23-5**



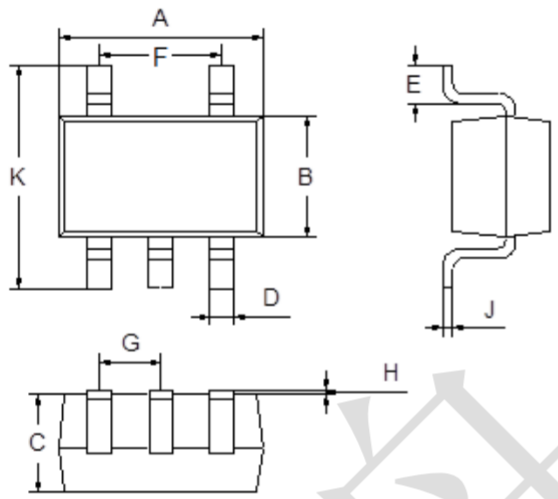

| Dimension | Min. | Max. |
|---|---|---|
| A | 2.80 | 3.00 |
| B | 1.50 | 1.70 |
| C | 1.00 | 1.20 |
| D | 0.35 | 0.45 |
| E | 0.35 | 0.55 |
| F | 1.80 | 2.00 |
| G | 0.90 | 1.00 |
| H | 0.02 | 0.10 |
| J | 0.10 | 0.20 |
| K | 2.60 | 3.00 |

## Mounting Pad Layout (Unit: mm)



## Package Outline Dimensions (Unit: mm)

**SOT353**




| Dimension | Min. | Max. |
|---|---|---|
| A | 2.00 | 2.20 |
| B | 1.15 | 1.35 |
| C | 0.85 | 1.05 |
| D | 0.15 | 0.35 |
| E | 0.25 | 0.40 |
| F | 1.20 | 1.40 |
| G | 0.60 | 0.70 |
| H | 0.02 | 0.10 |
| J | 0.05 | 0.15 |
| K | 2.20 | 2.40 |

## Mounting Pad Layout (Unit: mm)

