

Features

- Operate from 1.65V to 5.5V
- Inputs accept voltages to 5.5V
- High Noise Immunity
- Low power dissipation
- 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

General Description

The 74LVC1G00 is a 2-input NAND gate device which provides the Function $Y = \overline{A \cdot B}$ or $Y = \overline{A} + \overline{B}$ in positive logic.

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

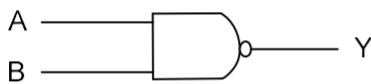
Applications

- 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

Ordering Information

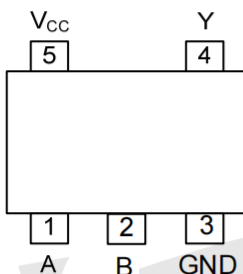
| ORDER NUMBER | PACKAGE DESCRIPTION | PACKAGE OPTION |
|--------------|---------------------|--------------------|
| 74LVC1G00GV | SOT23-5 | Tape and Reel,3000 |
| 74LVC1G00GW | SOT353 | Tape and Reel,3000 |

Logic Diagram



Logic symbol

Pin Configuration



SOT-23-5
SOT-353

Marking

74LVC1G00GV Marking:V00

74LVC1G00GW Marking:VA

Function Table

| INPUT(A) | INPUT(B) | OUTPUT(Y) |
|----------|----------|-----------|
| H | H | L |
| H | L | H |
| L | H | H |
| L | L | H |

Note: H: HIGH voltage level; L: LOW voltage level.

Absolute Maximum Ratings

| PARAMETER | SYMBOL | 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 Power-off state | -0.5 ~ +6.5 | V |
| | | Output in the High or Low state | -0.5 ~ $V_{CC}+0.5$ | V |
| V_{CC} or GND Current | I_{CC} | Output in the Power-off state | ±100 | mA |
| Continuous Output Current | I_{OUT} | $V_{OUT}=0\sim V_{CC}$ | ±50 | mA |
| Input Clamp Current | I_{IK} | $V_{IN}<0$ | -50 | mA |
| Output Clamp Current | I_{OK} | $V_{OUT}<0$ | -50 | mA |
| Storage Temperature Range | T_{STG} | | -65 ~ +150 | °C |

Note: 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.

Thermal Data

| PARAMETER | SYMBOL | RATINGS | UNIT |
|---------------------|----------|---------|------|
| Junction to Ambient | SOT-23-5 | 280 | °C/W |
| | SOT-353 | 350 | |

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 |
| High-level Output Current | I_{OH} | $V_{CC}=1.65V$ | | | -4 | mA |
| | | $V_{CC}=2.3V$ | | | -8 | mA |
| | | $V_{CC}=3V$ | | | -16 | mA |
| | | $V_{CC}=3V$ | | | -24 | mA |
| | | $V_{CC}=4.5V$ | | | -32 | mA |
| Low-level Output Current | I_{OL} | $V_{CC}=1.65V$ | | | 4 | mA |
| | | $V_{CC}=2.3V$ | | | 8 | mA |
| | | $V_{CC}=3V$ | | | 16 | mA |
| | | $V_{CC}=3V$ | | | 24 | mA |
| | | $V_{CC}=4.5V$ | | | 32 | mA |
| Input Transition Rise or Fall Rate | t_r / t_f | $V_{CC}=1.8V\pm 0.15V, 2.5V\pm 0.2V$ | | | 20 | ns/V |
| | | $V_{CC}=3.3V\pm 0.3V$ | | | 10 | ns/V |
| | | $V_{CC}=5V\pm 0.5V$ | | | 5 | ns/V |
| Operating Temperature | T_A | | -40 | | +125 | °C |



Electrical Characteristics

| PARAMETER | SYMBOL | TEST CONDITIONS | T _A =25°C | | | T _A =-40~+125°C | | | UNIT |
|---|----------------------|---|----------------------|-----|------|----------------------------|-----|------|------|
| | | | MIN | TYP | MAX | MIN | TYP | MAX | |
| High-Level Input Voltage | V _{IH} | V _{CC} =1.65V~1.95V | 0.65 | | | 0.65 | | | V |
| | | V _{CC} =2.3V~2.7V | 1.7 | | | 1.7 | | | V |
| | | V _{CC} =3V~3.6V | 2 | | | 2 | | | V |
| | | V _{CC} =4.5V~5.5V | 0.7 | | | 0.7 | | | V |
| Low-Level Input Voltage | V _{IL} | V _{CC} =1.65V~1.95V | | | 0.35 | | | 0.35 | V |
| | | V _{CC} =2.3V~2.7V | | | 0.7 | | | 0.7 | V |
| | | V _{CC} =3V~3.6V | | | 0.8 | | | 0.8 | V |
| | | V _{CC} =4.5V~5.5V | | | 0.3 | | | 0.3 | V |
| High-Level Output Voltage | V _{OH} | V _{CC} =1.65~5.5V, I _{OH} =-100μA | V _{CC} -0.1 | | | V _{CC} -0.1 | | | V |
| | | V _{CC} =1.65V, I _{OH} =-4mA | 1.2 | | | 0.95 | | | V |
| | | V _{CC} =2.3V, I _{OH} =-8mA | 1.9 | | | 1.7 | | | V |
| | | V _{CC} =3.0V, I _{OH} =-16mA | 2.4 | | | 1.9 | | | V |
| | | V _{CC} =3.0V, I _{OH} =-24mA | 2.3 | | | 2.0 | | | V |
| | | V _{CC} =4.5V, I _{OH} =-32mA | 3.8 | | | 3.4 | | | V |
| Low-Level Output Voltage | V _{OL} | V _{CC} =1.65~5.5V, I _{OL} =100μA | | | 0.1 | | | 0.1 | V |
| | | V _{CC} =1.65V, I _{OL} =4mA | | | 0.45 | | | 0.7 | V |
| | | V _{CC} =2.3V, I _{OL} =8mA | | | 0.3 | | | 0.45 | V |
| | | V _{CC} =3.0V, I _{OL} =16mA | | | 0.4 | | | 0.6 | V |
| | | V _{CC} =3.0V, I _{OL} =24mA | | | 0.55 | | | 0.80 | V |
| | | V _{CC} =4.5V, I _{OL} =32mA | | | 0.55 | | | 0.80 | V |
| Input Leakage Current | I _{I(LEAK)} | V _{IN} =5.5V or GND, V _{CC} =0 ~ 5.5V | | | ±5 | | | ±5 | μA |
| Power OFF Leakage Current | I _{OFF} | V _{IN} or V _{OUT} =5.5V, V _{CC} =0V | | | ±10 | | | ±10 | μA |
| Quiescent Supply Current | I _Q | V _{IN} =V _{CC} or GND, I _{OUT} =0, V _{CC} =1.65~5.5V | | | 10 | | | 10 | μA |
| Additional Quiescent Supply Current Per Input Pin | ΔI _Q | V _{CC} =3~5.5V, One input at V _{CC} -0.6V, Other inputs at V _{CC} or GND | | | 500 | | | 500 | μA |

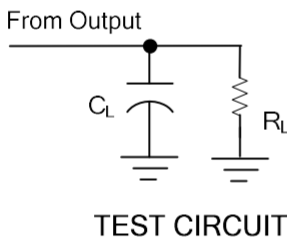
Dynamic Characteristics (Input: t_r, t_f≤3ns; P_{RR}≤1MHz)

| PARAMETER | SYMBOL | TEST CONDITIONS | T _A =25°C | | | T _A =-40~+125°C | | | UNIT | | |
|--|-------------------------------------|---|----------------------|----------------------|-----|----------------------------|-----|-----|------|-----|----|
| | | | MIN | TYP | MAX | MIN | TYP | MAX | | | |
| Propagation delay from input (A or B) to output(Y) | t _{PLH} / t _{PHL} | V _{CC} =1.8±0.15V | C _L =15pF | R _L =1MΩ | 1.0 | | 8.2 | 1.0 | | 9.7 | ns |
| | | V _{CC} =2.5±0.2V | | | 0.5 | | 5.4 | 0.5 | | 6.9 | ns |
| | | V _{CC} =3.3±0.3V | | | 0.5 | | 4.8 | 0.5 | | 6.3 | ns |
| | | V _{CC} =5±0.5V | | | 0.5 | | 4.4 | 0.5 | | 5.9 | ns |
| | | V _{CC} =1.8±0.15V, R _L =1KΩ | C _L =30pF | R _L =500Ω | 1.0 | | 11 | 1.0 | | 12 | ns |
| | | V _{CC} =2.5±0.2V, R _L =500Ω | | | 0.5 | | 7 | 0.5 | | 9 | ns |
| | | V _{CC} =3.3±0.3V, R _L =500Ω | | | 0.5 | | 6.2 | 0.5 | | 8.2 | ns |
| | | V _{CC} =5±0.5V, R _L =500Ω | | | 0.5 | | 5.1 | 0.5 | | 6.5 | ns |

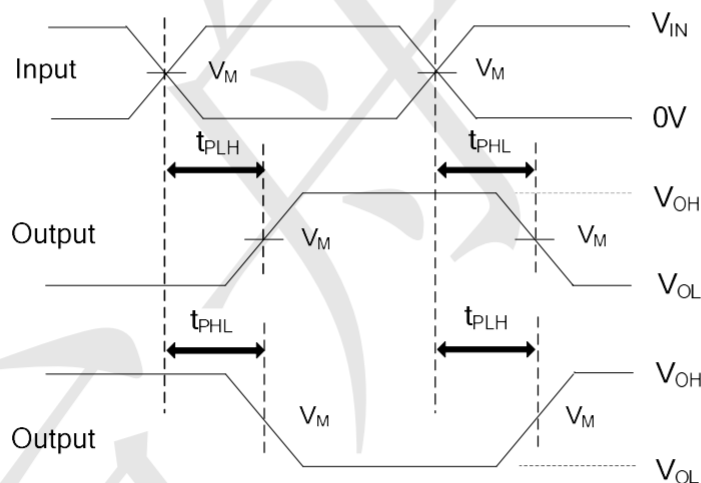
Operating Characteristics

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|-------------------------------|----------|-------------------------------------|-----|-----|-----|------|
| Input Capacitance | C_I | $V_{CC}=3.3V, V_{IN}=V_{CC}$ or GND | | 4 | | pF |
| Power Dissipation Capacitance | C_{PD} | $V_{CC}=1.8V$ | | 22 | | pF |
| | | $V_{CC}=2.5V$ | | 22 | | pF |
| | | $V_{CC}=3.3V$ | | 23 | | pF |
| | | $V_{CC}=5.0V$ | | 25 | | pF |

Test Circuit And Waveforms



| V_{CC} | Inputs | | V_M | C_L | R_L |
|------------------|----------|--------------|------------|-------|-------------|
| | V_{IN} | t_R, t_F | | | |
| $1.8V \pm 0.15V$ | V_{CC} | $\leq 2ns$ | $V_{CC}/2$ | 15pF | 1M Ω |
| $2.5V \pm 0.2V$ | V_{CC} | $\leq 2ns$ | $V_{CC}/2$ | 15pF | 1M Ω |
| $3.3V \pm 0.3V$ | 3V | $\leq 2.5ns$ | 1.5V | 15pF | 1M Ω |
| $5V \pm 0.5V$ | V_{CC} | $\leq 2.5ns$ | $V_{CC}/2$ | 15pF | 1M Ω |



PROPAGATION DELAY TIMES

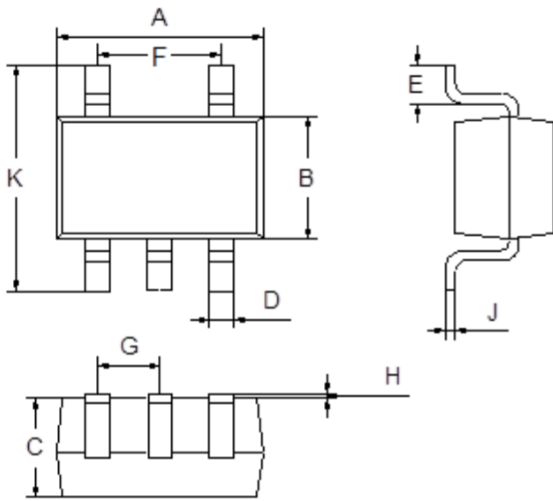
Note: C_L includes probe and jig capacitance.

All input pulses are supplied by generators having the following characteristics: $P_{RR} \leq 10MHz, Z_O = 50\Omega$.



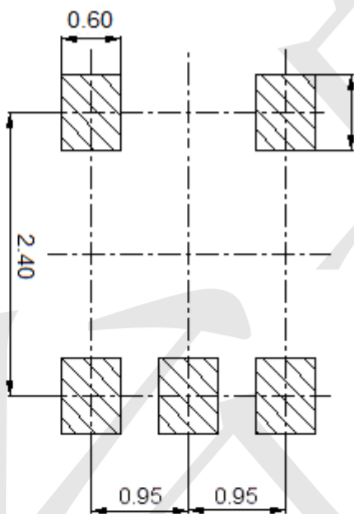
Package Outline Dimensions (Unit: mm)

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 |

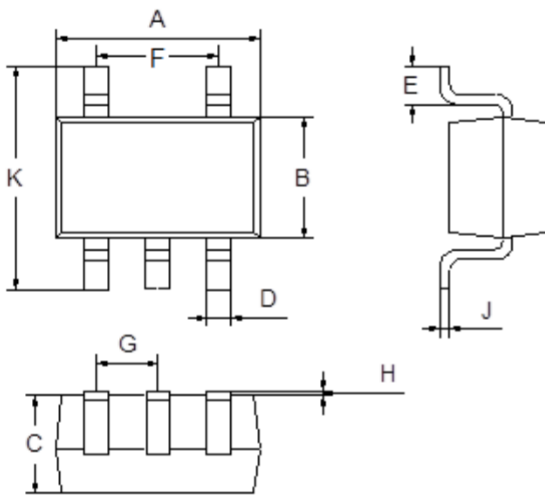
Mounting Pad Layout (Unit: mm)





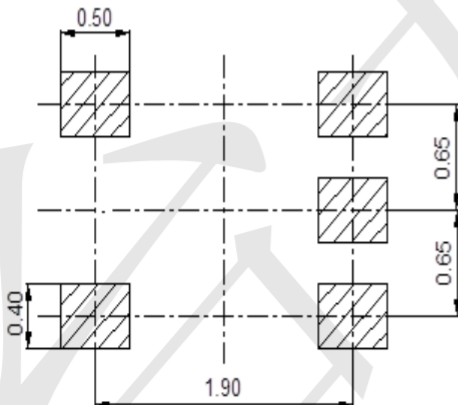
Package Outline Dimensions (Unit: mm)

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)



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