

## Features

- Operation voltage range: 1.65~5.5V
- Low power current:  $I_{CC}=10\mu A(\text{Max})$
- $\pm 24\text{mA}$  output drive ( $V_{CC}=3.3\text{V}$ )
- High noise immunity
- 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
- SOT553 Package Available

## General Description

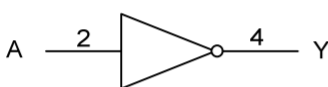
The SN74LVC1G04 is a single inverter gate, it provides the function  $Y = \bar{A}$ .

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

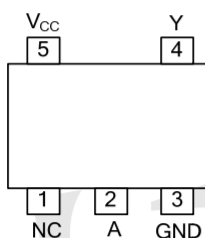
## Ordering Information

ORDER NUMBER	PACKAGE DESCRIPTION	PACKAGE OPTION
SN74LVC1G04DBVR	SOT23-5	Tape and Reel,3000
SN74LVC1G04DCKR	SOT353	Tape and Reel,3000
SN74LVC1G04DRLR	SOT553	Tape and Reel,4000

## Logic Diagram



## Pin Configuration



SOT23-5  
SOT353  
SOT553

## Function Table

INPUT	OUTPUT
A	Y
H	L
L	H

## 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

## Marking

SN74LVC1G04DBVR Marking:C04F  
SN74LVC1G04DCKR Marking:CC5  
SN74LVC1G04DRLR Marking:CC7

### Absolute Maximum Ratings

PARAMETER		SYMBOL	RATINGS	UNIT
Supply Voltage		$V_{CC}$	-0.5 ~ 6.5	V
Input Voltage		$V_{IN}$	-0.5 ~ 6.5	V
Output Voltage(Active Mode)		$V_{OUT}$	-0.5 ~ $V_{CC}+0.5$	V
Output Voltage(Power-Down Mode)		$V_{OUT}$	-0.5 ~ 6.5	V
Input Clamp Current( $V_{IN}<0$ )		$I_{IK}$	-50	mA
Output Clamp Current( $V_{OUT}<0$ )		$I_{OK}$	-50	mA
Output Current		$I_{OUT}$	±50	mA
$V_{CC}$ or GND Current		$I_{CC}$	±100	mA
Power Dissipation ( $T_A=-40\sim+125^{\circ}C$ )	SOT-23-5	$P_D$	300	mW
	SOT-353		250	mW
Junction Temperature		$T_J$	+150	°C
Storage Temperature		$T_{STG}$	-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.

### Thermal Data

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Case	SOT-23-5	$\theta_{JC}$	75	°C/W
	SOT-353		145	

### Recommended Operating Conditions

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	$V_{CC}$	Operating	1.65		5.5	V
		Data retention only	1.5			
Input Voltage	$V_{IN}$		0		5.5	V
Output Voltage	$V_{OUT}$		0		$V_{CC}$	V
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 <sub>A</sub> =25°C			T <sub>A</sub> =-40°C~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Input Voltage High-Level	V <sub>IH</sub>	V <sub>CC</sub> = 1.65V~1.95V	0.65× V <sub>CC</sub>			0.65× V <sub>CC</sub>			V
		V <sub>CC</sub> = 2.3V~2.7V	1.7			1.7			
		V <sub>CC</sub> = 2.7V~3.6V	2			2			
		V <sub>CC</sub> = 4.5V~5.5V	0.7× V <sub>CC</sub>			0.7× V <sub>CC</sub>			
Input Voltage Low-Level	V <sub>IL</sub>	V <sub>CC</sub> = 1.65V~1.95V			0.35× V <sub>CC</sub>			0.35× V <sub>CC</sub>	V
		V <sub>CC</sub> = 2.3V~2.7V			0.7			0.7	
		V <sub>CC</sub> = 2.7V~3.6V			0.8			0.8	
		V <sub>CC</sub> = 4.5V~5.5V			0.3× V <sub>CC</sub>			0.3× V <sub>CC</sub>	
Output Voltage High-Level	V <sub>OH</sub>	V <sub>CC</sub> = 1.65V~5.5V, I <sub>OH</sub> =-100μA	V <sub>CC</sub> -0.1			V <sub>CC</sub> -0.1			V
		V <sub>CC</sub> = 1.65V, I <sub>OH</sub> =-4mA	1.2			0.95			
		V <sub>CC</sub> = 2.3V, I <sub>OH</sub> =-8mA	1.9			1.7			
		V <sub>CC</sub> = 3V, I <sub>OH</sub> =-16mA	2.2			1.9			
		V <sub>CC</sub> = 3V, I <sub>OH</sub> =-24mA	2.3			2.0			
		V <sub>CC</sub> = 4.5V, I <sub>OH</sub> =-32mA	3.8			3.4			
Output Voltage Low-Level	V <sub>OL</sub>	V <sub>CC</sub> = 1.65V~5.5V, I <sub>OL</sub> =100μA			0.1			0.1	V
		V <sub>CC</sub> = 1.65V, I <sub>OL</sub> =4mA			0.45			0.7	
		V <sub>CC</sub> = 2.3V, I <sub>OL</sub> =8mA			0.3			0.45	
		V <sub>CC</sub> = 3V, I <sub>OL</sub> =16mA			0.4			0.6	
		V <sub>CC</sub> = 3V, I <sub>OL</sub> =24mA			0.55			0.8	
		V <sub>CC</sub> = 4.5V, I <sub>OL</sub> =32mA			0.55			0.8	
Input Leakage Current	I <sub>I(LEAK)</sub>	V <sub>CC</sub> = 0~5.5V, V <sub>IN</sub> =5.5V or GND		±0.1	±5			±5	μA
Power OFF Leakage Current	I <sub>OFF</sub>	V <sub>CC</sub> = 0V, V <sub>IN</sub> or V <sub>OUT</sub> =5.5V		±0.1	±10			±10	μA
Quiescent Supply Current	I <sub>Q</sub>	V <sub>CC</sub> = 1.65V~5.5V, V <sub>IN</sub> =5.5 or GND, I <sub>OUT</sub> =0		0.1	10			10	μA
Additional Quiescent Supply Current	Δ I <sub>Q</sub>	V <sub>CC</sub> = 3V~5.5V, One input at V <sub>CC</sub> - 0.6V, other inputs at V <sub>CC</sub> or GND		5	500			500	μA

Note: All typical values are measured at V<sub>CC</sub>=3.3V and T<sub>A</sub>=25°C.

### Dynamic Characteristics (Input: t<sub>R</sub>, t<sub>F</sub>≤3ns; P<sub>RR</sub>≤1MHz)

PARAMETER	SYMBOL	TEST CONDITIONS	T <sub>A</sub> =25°C			T <sub>A</sub> =-40°C~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Propagation Delay From Input (A or B) to Output (Y)	t <sub>PLH</sub> / t <sub>PHL</sub>	V <sub>CC</sub> = 1.8V±0.15V, C <sub>L</sub> =15 pF	1.0		11			14	ns
		V <sub>CC</sub> = 2.5V±0.2V, C <sub>L</sub> =15 pF	0.5		8			10.5	ns
		V <sub>CC</sub> = 3.3V±0.3V, C <sub>L</sub> =15 pF	0.5		6			8	ns
		V <sub>CC</sub> = 5V±0.5V, C <sub>L</sub> =15 pF	0.5		5			6	ns
		V <sub>CC</sub> = 1.8V±0.15V, C <sub>L</sub> =30pF	1.0		12			15	ns
		V <sub>CC</sub> = 2.5V±0.2V, C <sub>L</sub> =30pF	0.5		9			11.5	ns
		V <sub>CC</sub> = 3.3V±0.3V, C <sub>L</sub> =50 pF	0.5		7			9	ns
		V <sub>CC</sub> = 5V±0.5V, C <sub>L</sub> =50 pF	0.5		6			7	ns

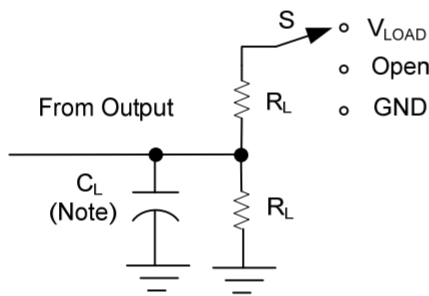


**Operating Characteristics**

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Capacitance	$C_{IN}$	$V_{CC} = 3.3V, V_{IN} = V_{CC}$ or GND		3.5		pF
Power Dissipation Capacitance	$C_{PD}$	$V_{CC} = 1.8V, f = 10MHz$		16		pF
		$V_{CC} = 2.5V, f = 10MHz$		18		pF
		$V_{CC} = 3.3V, f = 10MHz$		18		pF
		$V_{CC} = 5V, f = 10MHz$		20		pF

Note: All typical values are measured at  $T_A = 25^\circ C$ .

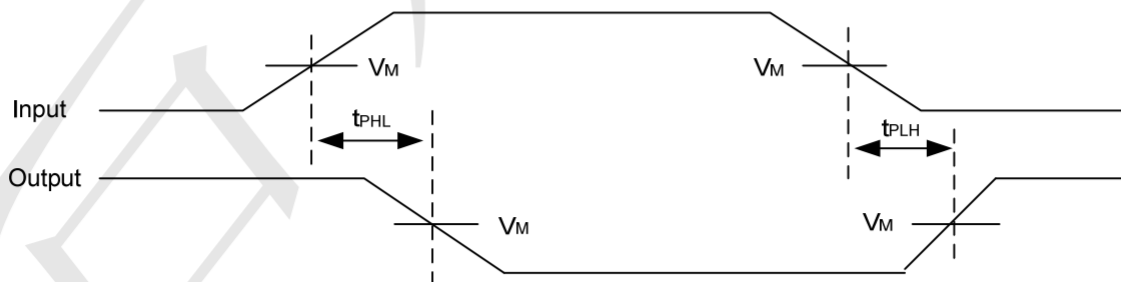
**Test Circuit And Waveforms**



TEST	S
$t_{PLH}/t_{PHL}$	Open
$t_{PLZ}/t_{PZL}$	$V_{LOAD}$
$t_{PHZ}/t_{PZH}$	GND

Note:  $C_L$  includes probe and jig capacitance.

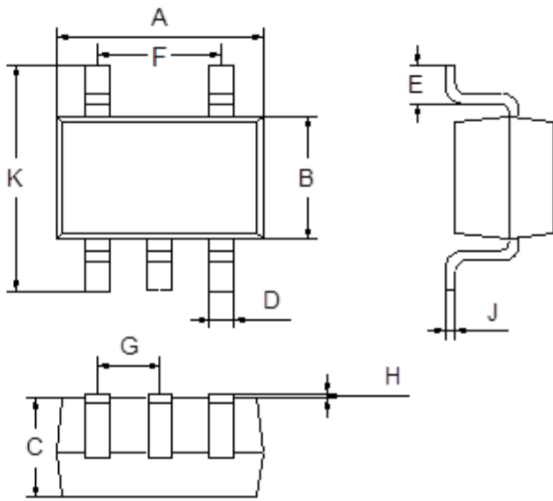
$V_{CC}$	$V_{IN}$	$t_r, t_f$	$V_M$	$V_{LOAD}$	$C_L$	$R_L$	$V_{\Delta}$
$1.8V \pm 0.15V$	$V_{CC}$	$\leq 2ns$	$V_{CC}/2$	$2 \times V_{CC}$	15pF	1M $\Omega$	0.15V
$2.5V \pm 0.2V$	$V_{CC}$	$\leq 2ns$	$V_{CC}/2$	$2 \times V_{CC}$	15pF	1M $\Omega$	0.15V
$3.3V \pm 0.3V$	3 V	$\leq 2.5ns$	1.5V	6V	15pF	1M $\Omega$	0.3V
$5V \pm 0.5V$	$V_{CC}$	$\leq 2.5ns$	$V_{CC}/2$	$2 \times V_{CC}$	15pF	1M $\Omega$	0.3V
$1.8V \pm 0.15V$	$V_{CC}$	$\leq 2ns$	$V_{CC}/2$	$2 \times V_{CC}$	30pF	1k $\Omega$	0.15V
$2.5V \pm 0.2V$	$V_{CC}$	$\leq 2ns$	$V_{CC}/2$	$2 \times V_{CC}$	30pF	500 $\Omega$	0.15V
$3.3V \pm 0.3V$	3 V	$\leq 2.5ns$	1.5V	6V	50pF	500 $\Omega$	0.3V
$5V \pm 0.5V$	$V_{CC}$	$\leq 2.5ns$	$V_{CC}/2$	$2 \times V_{CC}$	50pF	500 $\Omega$	0.3V





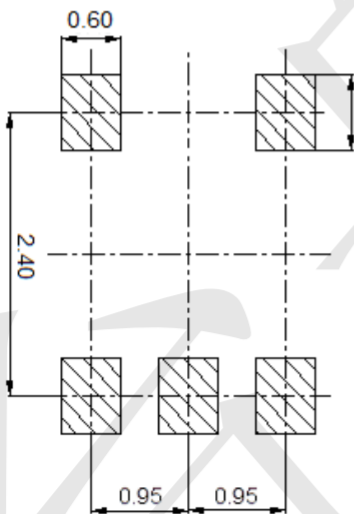
**Package Outline Dimensions** (Unit: mm)

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)





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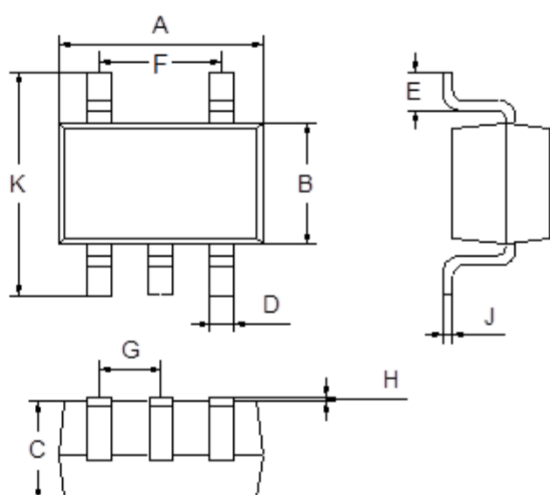
SN74LVC1G04

Single Inverter Gate

[www.sot23.com.tw](http://www.sot23.com.tw)

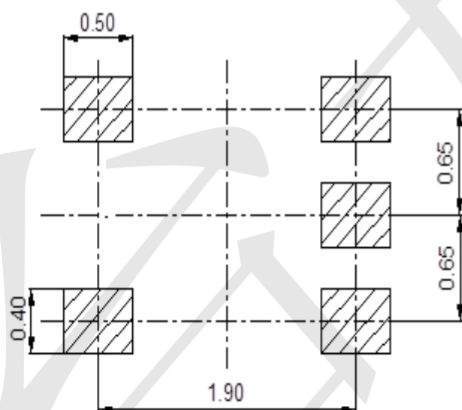
Package Outline Dimensions (Unit: mm)

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

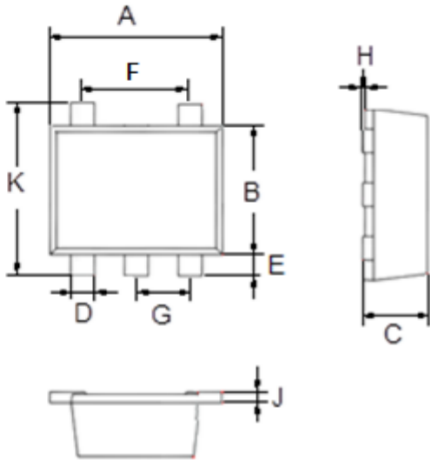
Mounting Pad Layout (Unit: mm)





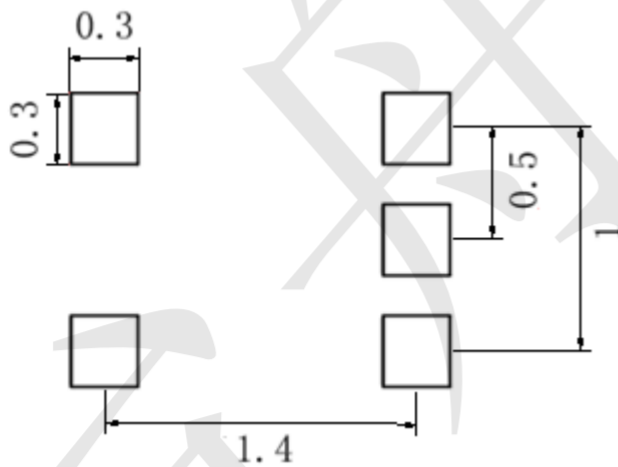
**Package Outline Dimensions** (Unit: mm)

SOT553



Dimension	Min.	Max.
A	1.500	1.700
B	1.100	1.300
C	0.525	0.600
D	0.170	0.270
E	0.100	0.300
F	0.400	0.600
G	0.450	0.550
H	0.000	0.050
J	0.090	0.160
K	1.500	1.700

**Mounting Pad Layout** (Unit: mm)



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