

General Description

The 74LVC1G06 is a high performance single inverter with open drain outputs operating from a 1.65V to 5.5V supply. The Output stage is open drain with Over Voltage Tolerance. This allows the 74LVC1G06 to be used to interface 5.0V circuits to circuits of any voltage between 0 and +7.0V.

Features

- Extremely High Speed: $t_{PD} = 2.5ns$ (typical) at $V_{CC} = 5.0V$
- Designed for 1.65V to 5.5V V_{CC} Operation, CMOS Compatible
- Over Voltage Tolerant Inputs V_{IN} may be Between 0 and 7.0V for V_{CC} Between 0.5 and 5.5V
- 24mA Output Sink Capability, Pull-up may be between 0 and 7.0V
- Near Zero Static Supply Current Substantially Reduces System Power Requirements
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant in Configuration
- Tiny SC70-5, SOT23-5 and DFN6 Packages
- MSL1 (DFN6) , MSL3(SC70-5,SOT23-5)

Pin configuration

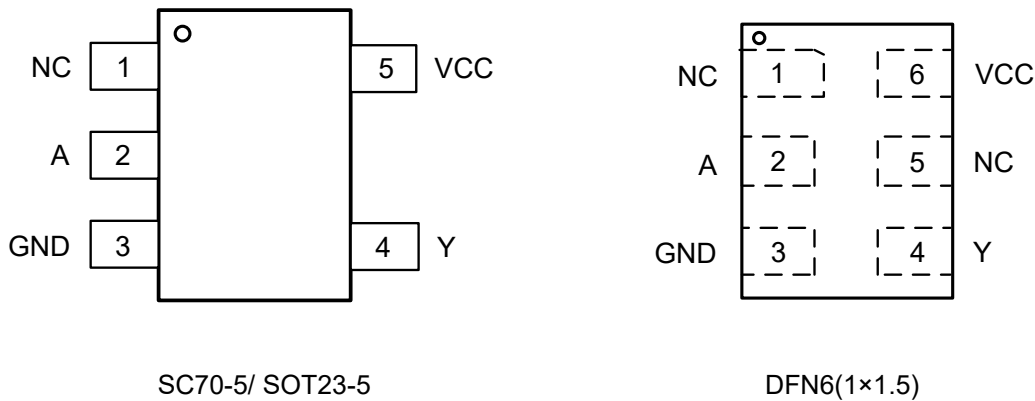


Figure1. Top View

Pin Function

(SC70-5/ SOT23-5)

Pin No.	Pin Name	Function
1	NC	No connect
2	A	Input
3	GND	Ground
4	Y	Output
5	VCC	Supply Voltage

DFN6

Pin No.	Pin Name	Function
1	NC	No connect
2	A	Input
3	GND	Ground
4	Y	Output
5	NC	No connect
6	VCC	Supply Voltage

Block Diagram

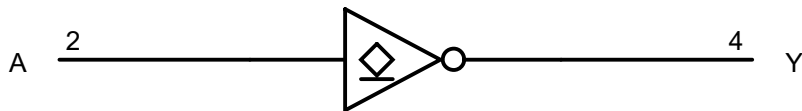


Figure2. Logic Symbol

Functional Description

Function Table

Input A	Output Y
L	Z
H	L

Absolute Maximum Ratings

Symbol	Parameter		Value	Unit
V _{CC}	DC Supply Voltage		-0.5 to 7.0	V
V _I	DC Input Voltage ⁽¹⁾		-0.5 ≤ V _I ≤ +7.0	V
V _O	DC Output Voltage Output in Higher or Low State		-0.5 to V _{CC} + 0.5	V
I _{IK}	DC Input Diode Current	V _I < GND	-50	mA
I _{OK}	DC Output Diode Current	V _O < GND, V _O > V _{CC}	±50	mA
I _O	DC Output Sink Current		±50	mA
I _{CC}	DC Supply Current per Supply Pin		±100	mA
I _{GND}	DC Ground Current per Supply Pin		±100	mA
T _{STG}	Storage Temperature Range		-65 to 150	°C
T _L	Lead Temperature, Soldering 10 Seconds		260	°C
T _J	Max Junction Temperature		150	°C
V _{ESD}	ESD Classification	Human Body Model	±4000	V
		Charged Device Model	±1000	
I _{LU}	Max Latch up Current Above V _{CC} and GND at 125°C		±100	mA

Stresses exceeding those listed in this table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

Note1. IO absolute maximum rating must be observed.

Thermal Characteristics

Symbol	Package	Ratings	Value	Unit
R _{θJA}	SC70-5	Thermal Characteristics, Thermal Resistance, Junction-to-Air	300	°C/W
	SOT23-5		250	
	DFN6(1.0×1.5)		440	
P _D	SC70-5	Power Dissipation in Still Air at 85°C	215	mW
	SOT23-5		260	
	DFN6(1.0×1.5)		150	

Recommended Operating Conditions

Symbol	Parameter	Min	Max	Unit
V _{CC}	DC Supply Voltage	1.65	5.5	V
	Operating Date Retention	1.5	5.5	
V _{IN}	DC Input Voltage	0	5.5	V
V _{OUT}	DC Output Voltage(High or Low State)	0	5.5	V
T _A	Operating Temperature Range	-40	125	°C

Electrical Characteristics
DC Electrical Characteristics

 (R_{PULL}=1KΩ, Connect V_{OUT} to V_{CC})

Symbol	Parameter	Condition	V _{CC} (V)	T _A = 25 °C			-40°C ≤ T _A ≤ 125°C		Unit
				Min	Typ	Max	Min	Max	
V _{IH}	High-Level Input Voltage		1.65to1.95 2.3 to 5.5	0.75V _{CC} 0.7V _{CC}			0.75V _{CC} 0.7V _{CC}		V
V _{IL}	Low-Level Input Voltage		1.65to1.95 2.3 to 5.5			0.25V _{CC} 0.29V _{CC}		0.25V _{CC} 0.29V _{CC}	V
V _{OL}	Low-Level Output Voltage V _{IN} = V _{IH}	I _{OL} =100uA	1.65to5.5		0.0	0.1		0.1	V
		I _{OL} =3mA	1.65		0.08	0.24		0.24	
		I _{OL} =8mA	2.3		0.20	0.3		0.3	
		I _{OL} =12mA	2.7		0.22	0.4		0.4	
		I _{OL} =16mA	3.0		0.28	0.4		0.4	
		I _{OL} =24mA	3.0		0.38	0.55		0.55	
		I _{OL} =32mA	4.5		0.42	0.55		0.55	
I _{IN}	Input Leakage Current	V _{IN} = 5.5 V or GND	0 to 5.5		±0.1			±1.0	uA
I _{OFF}	Power Off Leakage Current	V _{IN} = 5.5 V or V _{OUT} =5.5 V	0			1		10	uA
I _{CC}	Quiescent Supply Current	V _{IN} = 5.5 V or GND	5.5					10	uA

AC Electrical Characteristics

$t_r = t_f = 5.0\text{ns}$;

Symbol	Parameter	Condition	V _{CC} (V)	T _A = 25 °C			-40°C ≤ T _A ≤ 125°C		Unit
				Min	Typ	Max	Min	Max	
t _{PHL}	Propagation Delay (Figure3and4)	R _L =1KΩ, C _L =15pF	1.65	3.0	9.5	12	3.0	16.0	ns
			1.8	3.0	8.0	11	3.0	15.0	
		R _L =1KΩ, C _L =15pF	2.5±0.2	1.0	5.0	7.5	1.0	11.0	
		R _L =1KΩ, C _L =15pF	3.3±0.3	1.0	3.5	6.5	1.0	9.0	
		R _L =500Ω, C _L =50pF		1.5	4.5	7.5	1.5	10.0	
		R _L =1KΩ, C _L =15pF	5.0±0.5	0.5	2.5	5.0	0.5	7.5	
		R _L =500Ω, C _L =50pF		0.8	3.2	6.0	0.8	8.5	

Capacitive Characteristics

Symbol	Parameter	Condition	Typical	Unit
C _{IN}	Input Capacitance	V _{CC} = 5.5 V, V _I = 0 V or V _{CC}	2.8	pF
C _{PD}	Power Dissipation Capacitance ⁽²⁾	10 MHz, V _{CC} = 3.3 V, V _I = 0 V or V _{CC}	2.5	pF
		10 MHz, V _{CC} = 5.5 V, V _I = 0 V or V _{CC}	3.0	

Note2. C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.

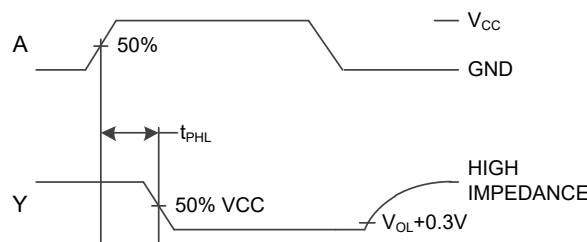


Figure3. Switching Waveforms

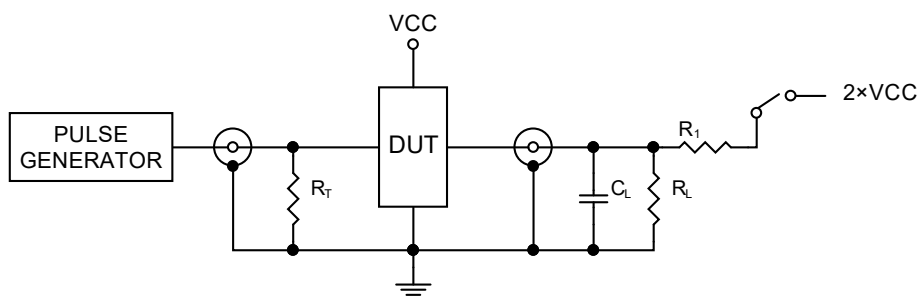
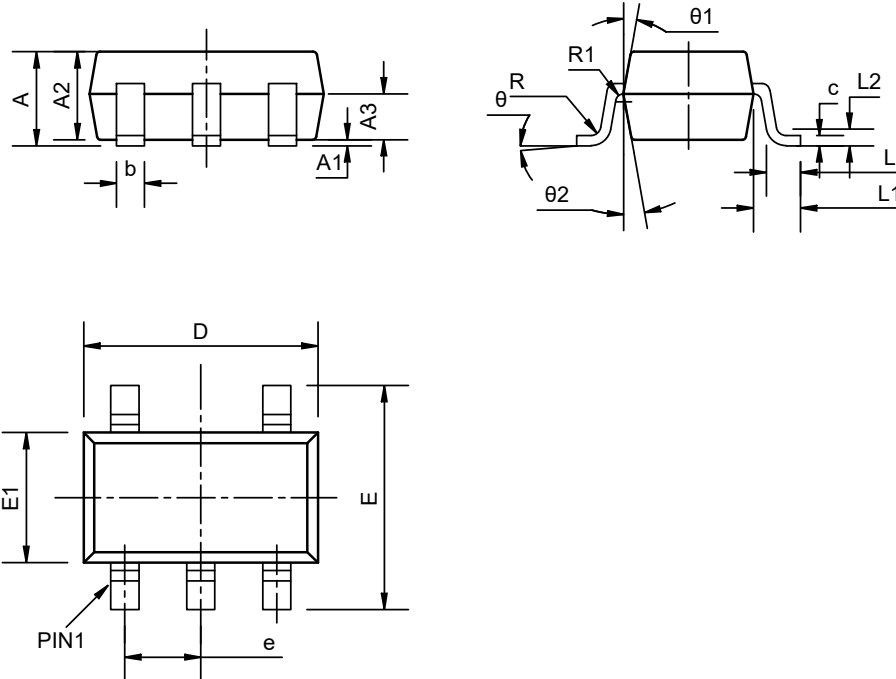


Figure4. Test Circuit

Package Dimension

SC70-5



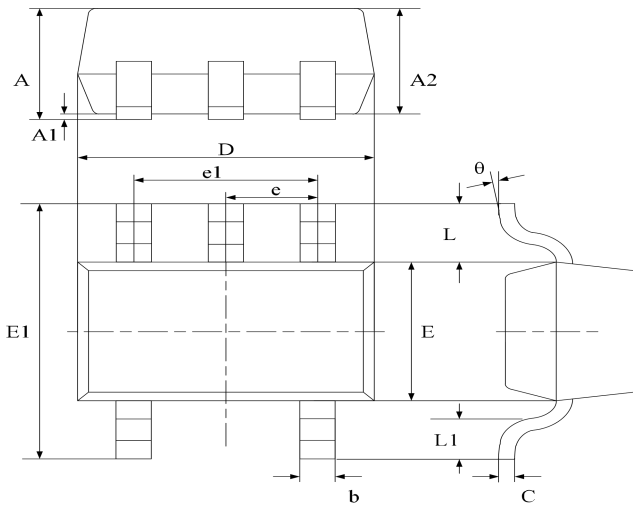
COMMON DIMENSIONS

(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	0.85	--	1.05
A1	0	--	0.10
A2	0.80	0.90	1.00
A3	0.47	0.52	0.57
b	0.23	--	0.33
c	0.12	--	0.18
D	2.02	2.07	2.12
E	2.20	2.30	2.40
E1	1.25	1.30	1.35
e	0.60	0.65	0.70
L	0.28	0.33	0.38
L1	0.50REF		
L2	0.15BSC		
R	0.10	--	--
R1	0.10	--	0.25
θ	0°	--	8°
$\theta1$	6°	9°	12°
$\theta2$	6°	9°	12°

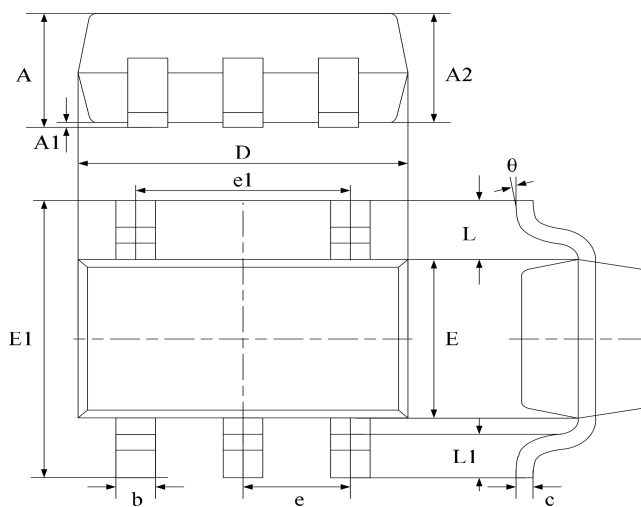
Package Dimension

SC70-5 (SOT353)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.800	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.800	0.900	0.035	0.039
b	0.150	0.350	0.006	0.014
C	0.080	0.150	0.003	0.006
D	1.8500	2.150	0.079	0.087
E	1.100	1.400	0.045	0.053
E1	1.950	2.200	0.085	0.096
e	0.850 typ.		0.026 typ.	
e1	1.200	1.400	0.047	0.055
L	0.42 ref.		0.021 ref.	
L1	0.260	0.460	0.010	0.018
θ	0°	8°	0°	8°

SOT23-5



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.040	1.350	0.042	0.055
A1	0.040	0.150	0.002	0.006
A2	1.000	1.200	0.041	0.049
b	0.380	0.480	0.015	0.020
c	0.110	0.210	0.004	0.009
D	2.720	3.120	0.111	0.127
E	1.400	1.800	0.057	0.073
E1	2.600	3.000	0.106	0.122
e	0.950 typ.		0.037 typ.	
e1	1.900 typ.		0.078 typ.	
L	0.700 ref.		0.028 ref.	
L1	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

Ordering information

Order code	Package	Baseqty	Deliverymode	Marking code
UMW SN74LVC1G06DBVR	SOT23-5	3000	Tape and reel	C06J U
UMW SN74LVC1G06DCKR	SC70- 5	3000	Tape and reel	CT5 U
UMW SN74LVC1G06DRYR	DFN6	5000	Tape and reel	CT U