General Description

The SN74LVC2G14 is a high performance dual inverter with Schm itt−Trigge r inputs operating from a 1.65 to 5.5 V supply. Pin configuration and function are the same as the SN74LVC2G04, but the inputs ha ve hysteresis and, with its Schmitt trigger function, the SN74LVC2G14 can be used as a line receiver which will receive slow input signals.

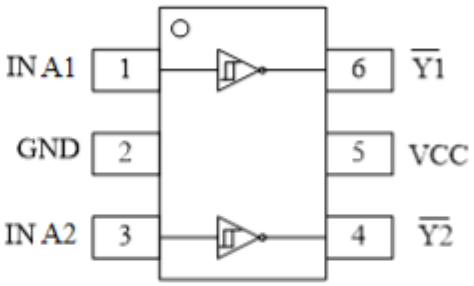
The SN74LVC2G14 is capable of transforming slowly changing input signals into sharply defined, jitter−freeoutput signals. In addition, it has a greater noise margin than conventional inverters.

The SN74LVC2G14 has hysteresis between the positive−going and the negativ e−going input thresholds (typically 1V) which is determined internally by transistor radios and is essentially insensitive to temperature and supply voltage variations.

Features

- Designed for 1.65V to 5.5V V_{CC} Operation
- Over Voltage Tolerant Inputs and Outputs
- LVTTL Compatibl− Interface Capability with 5V TTL Logic with V_{CC} = 3V
- LVCMOS Compatible
- 24 mA Balanced Output Sink and Source Capability
- Near Zero Static Supply Current Substantially Reduces System Power Requirements
- CurrentDrive Capability is 24 mA at the Outputs
- Chip Complexity: FET = 72
- These Devices are Pb−Free and are RoHS Compliant

Pin Configuration



SC70-6 /SOT23-6

Figure1. Pinouts (Top View)

Pin Function

PIN	ASSIGNMENT
1	IN A1
2	GND
3	IN A2
4	$\overline{Y2}$
5	VCC
6	$\overline{Y1}$

Block Diagram

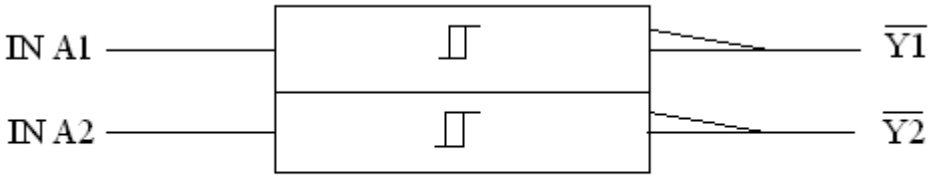


Figure2.Logic symbol

Functional Description

Function Table

A Input	Y Output
L	H
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	$-0.5 \le V_I \le +7.0$	V
V_O	DC Output Voltage Output in Higher or Low State (Note 1)	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 Currentper Supply Pin	±100	mA
T_{STG}	Storage Temperature Range	65 to 150	°C
T_L	Lead Temperature, 1 mm from Case for 10 Seconds	260	°C
T_J	Junction Temperature Under Bias	150	°C
$_{JA}$	Thermal Resistance	333	°C/W
P_D	Power Dissipation in Still Air at 85°C	200	mW
MSL	Moisture Sensitivity	Level 1	
F_R	Flammability Rating Oxygen Index:28 to 34	UL94V−0@0.12in	
ESD	ESD Classification Human Body Model (Note 2) Machine Model (Note3) Charged Device Model (Note 4)	2000 200 N/A	V
$I_{Latchup}$	Latchup Performance Above VCC and Below GND at 125° C (Note 5)	±100	mA

Stresses exceeding those listed in the Maximum Ratings 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.

1. IO absolute maximum rating must be observed.
2. Tested to EIA/JESD22−A114−A, rated to EIA/JESD22−A114−B.
3. Tested to EIA/JESD22−A115−A, rated to EIA/JESD22−A115−A.
4. Tested to JESD22−C101−A.
5. Tested to EIA/JESD78.

Recommended OperatingConditions

Symbol	Parameter	Min	Max	Unit
V_{CC}	DC Supply Voltage Operating Date Retention	1.65 1.5	5.5 5.5	V
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	-55	125	°C
t_r,t_f	Input Rise and Fall Time V_{CC} = 2.5 V ±0.2 V V_{CC} = 3.0 V ±0.3 V V_{CC} = 5.0 V ±0.5 V	0 0 0	20 10 5	ns/V

Functional operation above the stresses listed in the Recommended Operating Ranges is not implied. Extended exposure to stresses beyond the Recommended

Electrical Characteristics

DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Condition	VCC(V)	TA = 25 °C			−55°C ≤TA≤125°C		Unit
				Min	Typ	Max	Min	Max	
V_{IH}	High−Level Input Voltage		1.65to1.95 2.3 to 5.5	0.75Vcc 0.7Vcc			0.75Vcc 0.7Vcc		V
V_{IL}	Low−Level Input Voltage		1.65to1.95 2.3 to 5.5			0.25Vcc 0.3Vcc		0.25Vcc 0.3Vcc	V
V_{OH}	High−Level Output Voltage V_{IN} = V_{IL}	I_{OH} =−100uA	1.65to5.5	Vcc−0.1	Vcc		Vcc−0.1		V
		I_{OH} =−3mA	1.65	1.29	1.52		1.29		
		I_{OH} =−8mA	2.3	1.9	2.1		1.9		
		I_{OH} =−12mA	2.7	2.2	2.4		2.2		
		I_{OH} =−16mA	3.0	2.4	2.7		2.4		
		I_{OH} =−24mA	3.0	2.3	2..5		2.3		
		I_{OH} =-32mA	4.5	3.8	4.0		3.8		
V_{OL}	Low−Level Output Voltage V_{IN} = V_{IH}	I_{OH} =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} = 5.5V or GND	0 to 5.5		±0.1			±1.0	uA
I_{OFF}	Power Off Leakage Current	V_{IN} = 5.5V or V_{OUT} = 5.5V	0			1		10	uA
I_{CC}	Quiescent Supply Current	V_{IN} = 5.5V or GND	5.5					10	uA

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

AC ELECTRICAL CHARACT ERISTICS tr=tf= 2.5ns; C_L= 50pF; R_L = 500 Ω

Symbol	Parameter	Condition	V_{CC}(V)	TA = 25 °C			−55°C ≤TA≤125°C		Unit
				Min	Typ	Max	Min	Max	
t_{PLH} t_{PHL}	Propagation Delay (Figure3and4)	R_L= 1MΩ C_L= 15 pF	1.65	2.0	5.3	11.4	2.0	12.0	ns
			1.8	2.0	4.4	9.5	2.0	10.0	
		R_L= 1MΩ C_L= 15 pF	2.5±0.2	0.2	3.5	6.5	0.8	4.1	
		R_L= 1MΩ C_L= 15 pF	3.3±0.3	0.8	2.1	4.5	0.5	3.7	
		R_L= 500Ω C_L=50 pF		1.2	2.9	5.5	1.5	5.2	
		R_L= 1MΩ C_L= 15 pF	5.0±0.5	0.5	1.8	3.9	0.5	4.1	
		R_L= 500Ω C_L=50 pF		0.8	2.4	4.3	0.8	4.5	

CAPACITIVE CHARACTERISTICS

Symbol	Parameter	Condition	Typical	Unit
C_{IN}	Input Capacitance	V_{CC}= 5.5 V,V_I = 0 V orV_{CC}	>2.5	pF
C_{PD}	Power Dissipation Capacitance (Note 6)	10MHz,V_{CC} = 3.3 V,V_I = 0 V orV_{CC} 10MHz, V_{CC} = 5.5 V,V_I = 0 V orV_{CC}	4 4	pF

6. C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load. Average operating current can be obtained by the equation:$I_{CC(OPR)}$=C_{PD}*V_{CC}*fin+I_{CC}*C_{PD} is used to determine the no−load dynamic power consumption; P_D=C_{PD}*V_{CC}^2*fin+I_{CC}*V_{CC}*Fig.

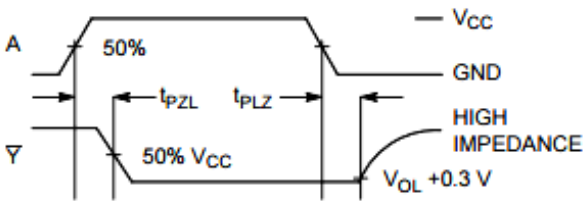


Figure 3. Switching Waveforms

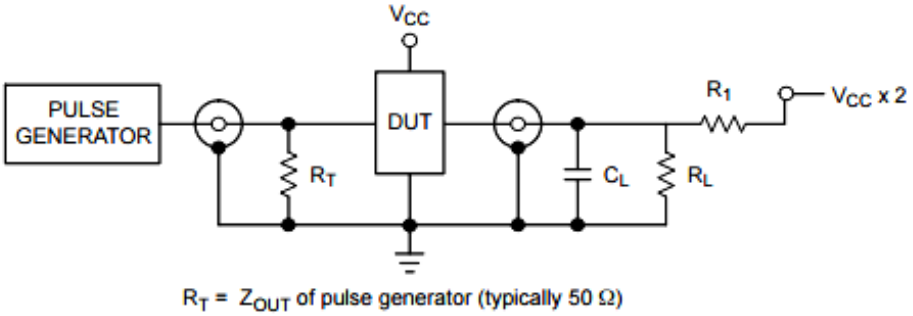
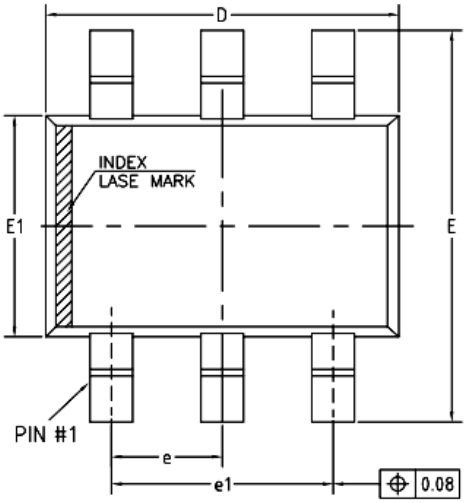
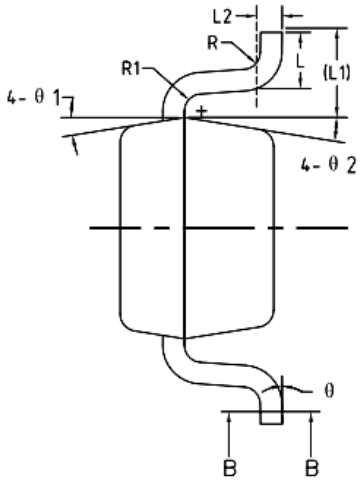


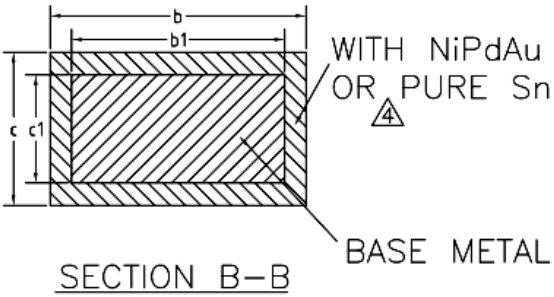
Figure 4. Test Circuit

Package Dimension

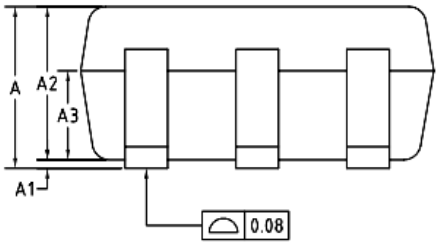
SC70-6







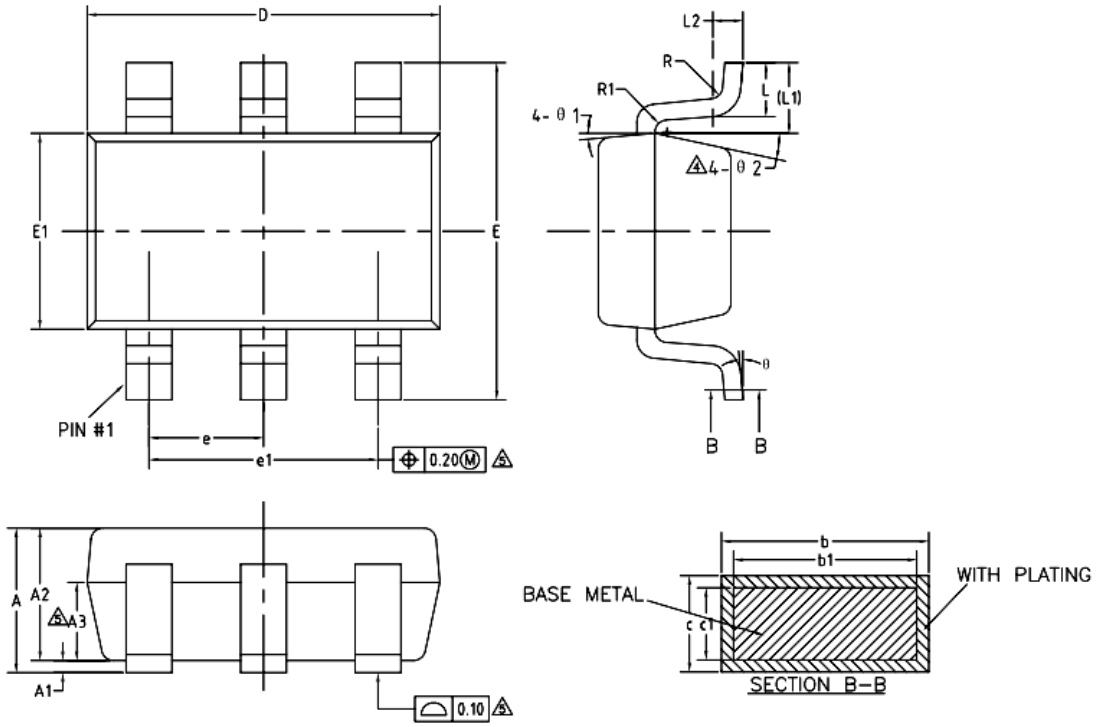
SECTION B–B



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	NiPdAu	0.22	–	0.29
	PURE Sn	0.23	–	0.33
b1		0.22	0.25	0.28
c	NiPdAu	0.115	–	0.15
	PURE Sn	0.12	–	0.18
c1		0.115	0.13	0.14
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
e1		1.20	1.30	1.40
L		0.28	0.33	0.38
L1		0.50REF		
L2		0.15BSC		
R		0.10	–	–
R1		0.10	–	0.25
θ		0°	–	8°
θ1		6°	9°	12°
θ2		6°	9°	12°

SOT23-6



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

	SYMBOL	MIN	NOM	MAX
	A	–	–	1.25
	A1	0	–	0.15
	A2	1.00	1.10	1.20
	A3	0.60	0.65	0.70
	b	0.36	–	0.50
	b1	0.36	0.38	0.45
	c	0.14	–	0.20
	c1	0.14	0.15	0.16
	D	2.826	2.926	3.026
	E	2.60	2.80	3.00
	E1	1.526	1.626	1.726
4	e	0.90	0.95	1.00
4	e1	1.80	1.90	2.00
	L	0.35	0.45	0.60
	L1	0.59REF		
	L2	0.25BSC		
5	R	0.10	–	–
5	R1	0.10	–	0.20
	θ	0°	–	8°
	θ 1	3°	5°	7°
4	θ 2	6°	–	14°

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