HM74LVC1G14

Single Schmitt-Trigger Inverter

Features

- Inputs Accept Voltages to 5.5 V
- Max t_{pd} of 4.6 ns at 3.3 V
- Low Power Consumption, 10-μA Max I_{CC}
- ±24-mA Output Drive at 3.3V
- Latch-Up Performance Exceeds 100 mA Per JESD 78, Class II
- ESD Protection Exceeds JESD 22
  - 2000-V Human-Body Model (A114-A)
  - 1000-V Charged-Device Model (C101)

General Description

This single Schmitt-trigger inverter is designed for 1.65-V to 5.5-V V_{CC} operation.

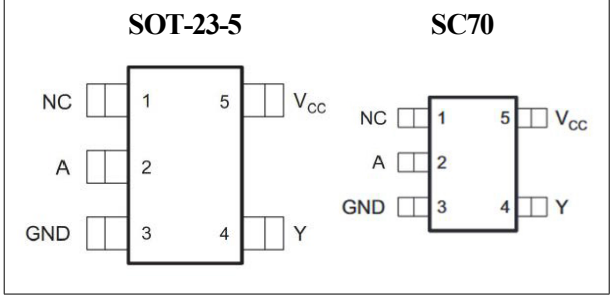
The HM74LVC1G14 device contains one inverter and performs the Boolean function Y= A. The device functions as an independent inverter with Schmitt- trigger inputs, so the device has different input threshold levels for positive-going (V_{T+}) and negative- going (V_{T-}) signals to provide hysteresis (ΔV_T) which makes the device tolerant to slow or noisy input signals.

This device is fully specified for partial-power-down applications using I_{off}. The I_{off} circuitry disables the outputs when the device is powered down. This inhibits current backflow into the device which prevents damage to the device.

Applications

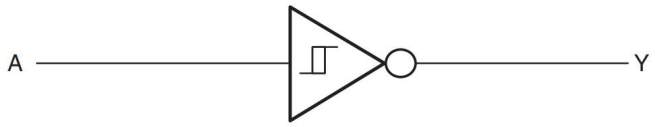
- AV Receiver
- Audio Dock: Portable
- Blu-ray Player and Home Theater
- Embedded PC
- MP3 Player/Recorder (Portable Audio)
- Personal Digital Assistant (PDA)
- Power: Telecom/Server AC/DC Supply: Single Controller: Analog and Digital
- Solid State Drive (SSD): Client and Enterprise
- TV: LCD/Digital and High-Definition (HDTV)
- Tablet: Enterprise
- Video Analytics: Server
- Wireless Headset, Keyboard, and Mouse

Pin Connections



Pin Name	Pin No.	Pin Function
NC	1	Not Connected
A	2	Input
GND	3	Ground
Y	4	Output
VCC	5	Power pin

Simplified Schematic



Absolute Maximum Ratings

		Min	Max	Unit
VCC	Supply voltage range	–0.5	6.5	V
VI	Input voltage range	–0.5	6.5	V

VO	Voltage range applied to any output in the high-impedance or power-off state	–0.5	6.5	V
VO	Voltage range applied to any output in the high or low state	–0.5	VCC + 0.5	V
IIK	Input clamp current		–50	mA
IOK	Output clamp current		–50	mA
IO	Continuous output current		±50	mA
Tstg	Storage temperature	–65	150	◦ C

Recommended Operating Conditions

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Supply voltage	V_{CC}	Operating	1.65		5.5	V
		Data retention only	1.5			
Input voltage	V_I		0		5.5	V
Output voltage	V_O				VCC	V
High- level output current	I_{OH}	V_{CC} = 1.65V			-4	mA
		V_{CC} = 2.3V			-8	
		V_{CC} = 3V			-16	
		V_{CC} = 3V			-24	
		V_{CC} = 4.5V			-32	
Low- level output current	I_{OL}	V_{CC} = 1.65V			4	mA
		V_{CC} = 2.3V			8	
		V_{CC} = 3V			16	
		V_{CC} = 3V			24	
		V_{CC} = 4.5V			32	
Operating temperature	T_A		-40		125	℃

Electrical Characteristics

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Positive-going input threshold voltage	V_{T+}	V_{CC} = 1.65V	0.79		1.16	V
		V_{CC} = 2.3V	1.11		1.56	

		V_{CC} = 3V	1.5		1.87	
		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	0.39		0.62	V
		V_{CC} = 2.3V	0.58		0.87	
		V_{CC} = 3V	0.84		1.14	
		V_{CC} = 4.5V	1.41		1.79	
		V_{CC} = 5.5V	1.87		2.29	
Hysteresis voltage	ΔV_T	V_{CC} = 1.65V	0.37		0.62	V
		V_{CC} = 2.3V	0.48		0.77	
		V_{CC} = 3V	0.56		0.87	
		V_{CC} = 4.5V	0.71		1.04	
		V_{CC} = 5.5V	0.71		1.11	
High- level output voltage	V_{OH}	V_{CC} = 1.65~5.5V, I_{OH}= 100uA	VCC-0.1			V
		V_{CC} = 1.65V, I_{OH}= 4mA	1.2			
		V_{CC} = 2.3V, I_{OH}= 8mA	1.9			
		V_{CC} = 3V, I_{OH}= 16mA	2.4			
		V_{CC} = 3V, I_{OH}= 24mA	2.3			
		V_{CC} = 4.5V, I_{OH}= 32mA	3.8			
Low- level output voltage	V_{OL}	V_{CC} = 1.65~5.5V, I_{OL}= 100uA			0.1	V
		V_{CC} = 1.65V, I_{OL}= 4mA			0.45	
		V_{CC} = 2.3V, I_{OL}= 8mA			0.3	
		V_{CC} = 3V, I_{OL}= 16mA			0.4	
		V_{CC} = 3V, I_{OL}= 24mA			0.55	
		V_{CC} = 4.5V, I_{OL}= 32mA			0.55	
Input leakage current	I_I	V_{IN}= 5.5V or GND, V_{CC}= 0~5.5V			±5	uA
Power off leakage current	I_{OFF}	V_{IN} or GND, V_{CC}=0~5.5V			±10	uA
Quiescent supply current	I_Q	V_{IN}= V_{CC} or GND, I_{OUT}=0, V_{CC}=1.65~5.5V			10	uA
Additional quiescent supply current per input pin	ΔI_Q	V_{CC}=3~5.5V, one input ate V_{CC}-0.6V, other input at V_{CC} or GND			500	uA

Switching Characteristics

over recommended operating free-air temperature range, C_L = 15 pF ，R_L=1MΩ

PARAMETER	FROM (INPUT)	TO (OUTPUT)	VCC = 1.8 V ± 0.15 V		VCC = 2.5 V ± 0.2 V		VCC = 3.3 V ± 0.3 V		VCC = 5 V ± 0.5 V		UNIT
			MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
tpd	A	Y	2.8	9.9	1.6	5.5	1.5	4.6.8	0.9	4.4	ns