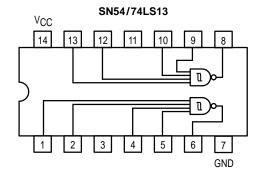


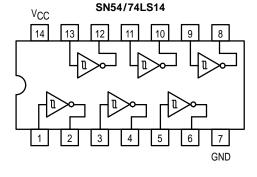
SCHMITT TRIGGERS DUAL GATE/HEX INVERTER

The SN54LS/74LS13 and SN54LS/74LS14 contain logic gates/inverters which accept standard TTL input signals and provide standard TTL output levels. They are capable of transforming slowly changing input signals into sharply defined, jitter-free output signals. Additionally, they have greater noise margin than conventional inverters.

Each circuit contains a Schmitt trigger followed by a Darlington level shifter and a phase splitter driving a TTL totem pole output. The Schmitt trigger uses positive feedback to effectively speed-up slow input transitions, and provide different input threshold voltages for positive and negative-going transitions. This hysteresis between the positive-going and negative-going input thresholds (typically 800 mV) is determined internally by resistor ratios and is essentially insensitive to temperature and supply voltage variations.

LOGIC AND CONNECTION DIAGRAMS

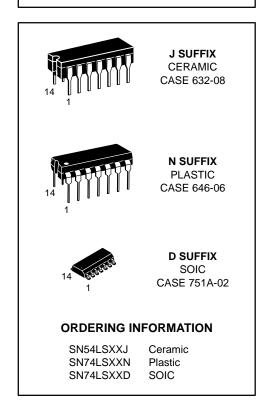




SN54/74LS13 SN54/74LS14

SCHMITT TRIGGERS DUAL GATE/HEX INVERTER

LOW POWER SCHOTTKY



GUARANTEED OPERATING RANGES

Symbol	Parameter		Min	Тур	Max	Unit
VCC	Supply Voltage	54 74	4.5 4.75	5.0 5.0	5.5 5.25	V
T _A	Operating Ambient Temperature Range	54 74	-55 0	25 25	125 70	°C
loн	Output Current — High	54, 74			-0.4	mA
lOL	Output Current — Low	54 74			4.0 8.0	mA

SN54/74LS13 • SN54/74LS14

DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE (unless otherwise specified)

			Limits					
Symbol	Parameter		Min	Тур	Max	Unit	Test Conditions	
V _{T+}	Positive-Going Threshold Voltage		1.5		2.0	V	V _{CC} = 5.0 V	
V _T _	Negative-Going Threshold Voltage		0.6		1.1	V	V _{CC} = 5.0 V	
$V_{T+}-V_{T-}$	Hysteresis		0.4	0.8		V	V _{CC} = 5.0 V	
VIK	Input Clamp Diode Voltage			-0.65	-1.5	V	$V_{CC} = MIN, I_{IN} = -18 \text{ mA}$	
VOH	Output HIGH Voltage	54	2.5	3.4		V	V MIN I 400 0A V V	
		74	2.7	3.4		V	$V_{CC} = MIN, I_{OH} = -400 \mu A, V_{IN} = V_{IL}$	
VOL	Output LOW Voltage	54, 74		0.25	0.4	V	V_{CC} = MIN, I_{OL} = 4.0 mA, V_{IN} = 2.0 V	
		74		0.35	0.5	V	V_{CC} = MIN, I_{OL} = 8.0 mA, V_{IN} = 2.0 V	
I _{T+}	Input Current at Positive-Going Threshold			-0.14		mA	V _{CC} = 5.0 V, V _{IN} = V _{T+}	
I _T _	Input Current at Negative-Going Threshold			-0.18		mA	V _{CC} = 5.0 V, V _{IN} = V _T _	
ΊΗ	Input HIGH Current			1.0	20	μΑ	V _{CC} = MAX, V _{IN} = 2.7 V	
					0.1	mA	V _{CC} = MAX, V _{IN} = 7.0 V	
I _{IL}	Input LOW Current				-0.4	mA	V _{CC} = MAX, V _{IN} = 0.4 V	
los	Short Circuit Current (Note 1)		-20		-100	mA	V _{CC} = MAX, V _{OUT} = 0 V	
Icc	Power Supply Current	1.040						
	Total, Output HIGH	LS13		2.9	6.0	mA	V _{CC} = MAX	
		LS14		8.6	16			
	Tatal Cutavit I CM	LS13		4.1	7.0			
	Total, Output LOW	LS14		12	21			

Note 1: Not more than one output should be shorted at a time, nor for more than 1 second.

AC CHARACTERISTICS $(T_A = 25^{\circ}C)$

		Max			
Symbol	Parameter	LS13	LS14	Unit	Test Conditions
^t PLH	Propagation Delay, Input to Output	22	22	ns	V _{CC} = 5.0 V
^t PHL	Propagation Delay, Input to Output	27	22	ns	C _L = 15 pF

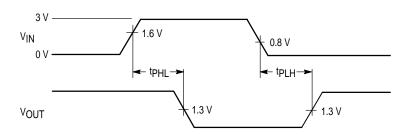


Figure 1. AC Waveforms

SN54/74LS13 • SN54/74LS14

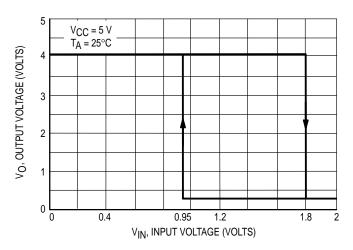


Figure 2. VIN versus VOUT Transfer Function

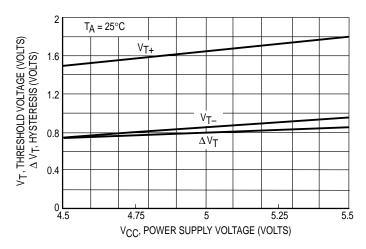


Figure 3. Threshold Voltage and Hysteresis versus Power Supply Voltage

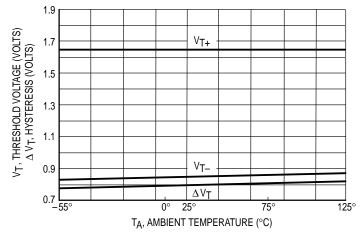


Figure 4. Threshold Voltage Hysteresis versus Temperature