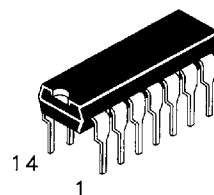


Hex Schmitt-Trigger Inverter

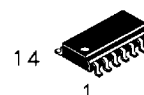
The DV74HC14A inverter is identical in pinout to the LS14, LS04, and HC04. The inputs are compatible with standard CMOS outputs. With pullup resistors, they are compatible with TTL FAMILY outputs. This device is used in applications to "square up" slow input rise and fall times. Excellent in noisy environments due to the hysteresis voltage of the Schmitt trigger.

- **Output Drive Capability: 10 LSTTL Loads**
- **Outputs Directly Interface to CMOS, NMOS, and TTL**
- **Operating Voltage Range: 2 to 6 V for HC devices**
- **Low Input Current: 1 μ A**
- **DC, AC parameters guaranteed from -55°C to 125°C**

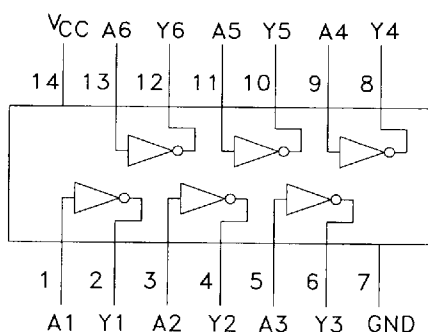
DV74HC14A DV74HCT14A



N Suffix
Plastic DIP
AVG-001 Case



D Suffix
Plastic SOP
AVG-002 Case



TRUTH TABLE
 $Y = \bar{A}$

Inputs	Outputs
A	Y
L	H
H	L

H = High Logic Level
L = Low Logic Level

ABSOLUTE MAXIMUM RATINGS

Maximum ratings are those values beyond which damage to the device may occur.

Symbol	Parameter	Value	Unit
V_{CC}	DC Supply Voltage (Referenced to GND)	-0.5 to +7.0	V
V_{IN}	DC Input Voltage (Referenced to GND)	-1.5 to $V_{CC} + 1.5$	V
V_{OUT}	DC Output Voltage (Referenced to GND)	-0.5 to $V_{CC} + 0.5$	V
I_{IN}	DC Input Current, per Pin	± 20	mA
I_{OUT}	DC Output Current, per Pin	± 25	mA
I_{CC}	DC Supply Current, V_{CC} and GND Pins	± 50	mA
P_D	Power Dissipation in Still Air, Plastic DIP SOP Package	750 500	mW
T_{STG}	Storage Temperature Range	-65 to +150	°C
T_L	Lead Temperature, 1mm from Case for 10 Seconds	260	°C

GUARANTEED OPERATING CONDITIONS

Symbol	Parameter	Min	Max	Unit
V_{CC}	DC Supply Voltage (Referenced to GND)	2.0	6.0	V
V_{IN}, V_{OUT}	DC Input Voltage, Output Voltage (Referenced to GND)	0	V_{CC}	V
T_A	Ambient Temperature	-55	+125	°C
$t_r - t_f$	Input Rise and Fall Time		No limit*	ns

*When $V_{IN} \approx 50\% V_{CC}$, $I_{CC} > 1mA$

DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Conditions	V _{CC} V	Guaranteed Limits			Unit
				25°C to –55°C	≤85°C	≤125°C	
V _{T+} MAX	Maximum Positive-Going Input Threshold Voltage	V _{OUT} = 0.1 V I _{OUT} ≤ 20 μA	2.0 4.5 6.0	1.5 3.15 4.2	1.5 3.15 4.2	1.5 3.15 4.2	V
V _{T+} Min	Minimum Positive-Going Input Threshold Voltage	V _{OUT} = 0.1 V I _{OUT} ≤ 20 μA	2.0 4.5 6.0	1.0 2.3 3.0	0.95 2.25 2.95	0.95 2.25 2.95	V
V _{T–} MAX	Maximum Negative-Going Input Threshold Voltage	V _{OUT} = V _{CC} –0.1 V I _{OUT} < 20 μA	2.0 4.5 6.0	0.9 2.0 2.6	0.95 2.05 2.65	0.95 2.05 2.65	V
V _{T–} Min	Minimum Negative-Going Input Threshold Voltage	V _{OUT} = V _{CC} –0.1 V I _{OUT} ≤ 20 μA	2.0 4.5 6.0	0.3 0.9 1.2	0.3 0.9 1.2	0.3 0.9 1.2	V
V _H MAX	Maximum Hysteresis Voltage	V _{OUT} = 0.1 or V _{CC} –0.1 V I _{OUT} ≤ 20 μA	2.0 4.5 6.0	1.2 2.25 3.0	1.2 2.25 3.0	1.2 2.25 3.0	V
V _H Min	Minimum Hysteresis Voltage	V _{OUT} = 0.1 or V _{CC} –0.1 V I _{OUT} ≤ 20 μA	2.0 4.5 6.0	0.2 0.4 0.5	0.2 0.4 0.5	0.2 0.4 0.5	V
V _{OH}	Minimum High Level Output Voltage	V _{IN} ≤ V _{T–} –min I _{OUT} ≤ 20 μA	2.0 4.5 6.0	1.9 4.4 5.9	1.9 4.4 5.9	1.9 4.4 5.9	V
		V _{IN} ≤ V _{T–} –min I _{OUT} < 4.0 mA I _{OUT} < 5.2 mA	4.5 6.0	3.98 5.48	3.84 5.34	3.7 5.2	
V _{OL}	Maximum Low Level Output Voltage	V _{IN} ≥ V _{T+} + max I _{OUT} ≤ 20 μA	2.0 4.5 6.0	0.1 0.1 0.1	0.1 0.1 0.1	0.1 0.1 0.1	V
		V _{IN} ≥ V _{T+} + max I _{OUT} ≤ 4.0 mA I _{OUT} ≤ 5.2 mA	4.5 6.0	0.26 0.26	0.33 0.33	0.40 0.40	V
I _{IN}	Maximum Input Leakage Current	V _{IN} = V _{CC} or GND	6.0	± 0.1	± 1.0	± 1.0	μA
I _{CC}	Maximum Quiescent Supply Current	V _{IN} = V _{CC} or GND I _{OUT} = 0 μA	6.0	1	10	40	μA

SWITCHING CHARACTERISTICS over full operating conditions (C_L=50 pF, Input t_r=t_f=6ns)

Symbol	Parameter	V _{CC} V	Guaranteed Limit			Unit
			25°C to –55°C	≤85°C	≤125°C	
t _{PLH} , t _{PHL}	Propagation Delay Time, Input A To Output Y	2.0 4.5 6.0	95 19 16	120 24 20	145 29 25	ns
t _{TLH} , t _{THL}	Output Transition Time, Any Output	2.0 4.5 6.0	75 15 13	95 19 16	110 22 19	ns
C _{IN}	Maximum Input Capacitance	—	10	10	10	pF
C _{PD}	Power Dissipation Capacitance (Per Inverter) Used to determine the no-load dynamic power consumption: P _D =C _{PD} V _{CC} ² f + I _{CC} V _{CC}	Typical @ 25°C, V _{CC} =5V				pF
		22				

DC ELECTRICAL CHARACTERISTICS

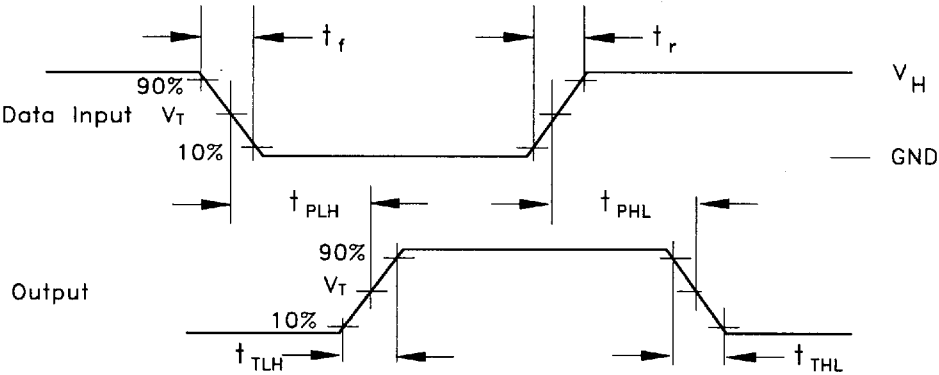
Symbol	Parameter	Conditions	V _{CC} V	25°C to –55°C		≤85°C		≤125°C		Unit
				Min	Max	Min	Max	Min	Max	
V _{T+} MAX	Maximum Positive-Going Input Threshold Voltage	V _{OUT} = 0.1 V or V _{CC} –0.1V I _{OUT} ≤ 20 μA	4.5 5.5		1.9 2.1		1.9 2.1		1.9 2.1	V
V _{T+} Min	Minimum Positive-Going Input Threshold Voltage	V _{OUT} = 0.1 V or V _{CC} –0.1V I _{OUT} ≤ 20 μA	4.5 5.5	1.2 1.4		1.2 1.4		1.2 1.4		V
V _{T–} MAX	Maximum Negative-Going Input Threshold Voltage	V _{OUT} = V _{CC} –0.1 V I _{OUT} < 20 μA	4.5 5.5		1.2 1.4		1.2 1.4		1.2 1.4	V
V _{T–} Min	Minimum Negative-Going Input Threshold Voltage	V _{OUT} = 0.1 V or V _{CC} –0.1 V I _{OUT} ≤ 20 μA	4.5 5.5	0.5 0.6		0.5 0.6		0.5 0.6		V
V _H MAX	Maximum Hysteresis Voltage	V _{OUT} = 0.1 or V _{CC} –0.1 V I _{OUT} ≤ 20 μA	4.5 5.5		1.4 1.5		1.4 1.5		1.4 1.5	V
V _H Min	Minimum Hysteresis Voltage	V _{OUT} = 0.1 or V _{CC} –0.1 V I _{OUT} ≤ 20 μA	4.5 5.5	0.4 0.4		0.4 0.4		0.4 0.4		V
V _{OH}	Minimum High Level Output Voltage	V _{IN} ≤ V _{T–} –min I _{OUT} ≤ 20 μA	4.5 5.5	4.4 5.4		4.4 5.4		4.4 5.4		V
		V _{IN} ≤ V _{T–} –min I _{OUT} ≤ 4mA	4.5	3.98		3.84		3.7		
V _{OL}	Maximum Low Level Output Voltage	V _{IN} ≥ V _{T–} –min I _{OUT} ≤ 20 μA	4.5 5.5		0.1 0.1		0.1 0.1		0.1 0.1	V
		V _{IN} ≥ V _{T–} –min I _{OUT} ≤ 4.0 mA	4.5		0.26		0.33		0.40	V
I _{IN}	Maximum Input Leakage Current	V _{IN} = V _{CC} or GND	5.5		± 0.1		± 1.0		± 1.0	μA
I _{CC}	Maximum Quiescent Supply Current	V _{IN} = V _{CC} or GND I _{OUT} = 0 μA	5.5		1.0		10		40	μA
ΔI _{CC}	Additional Quiescent Supply Current	V _{IN} =2.4V, Any One Input V _{IN} =V _{CC} or GND, Other Inputs I _{OUT} =0μA	5.5		≥ –55°C		25°C to 125°C			mA
					2.9		2.4			

SWITCHING CHARACTERISTICS over full operating conditions

Symbol	Parameter	Test Conditions	TemperatureLimits						Unit
			25°C to – 55°C		≤85°C		≤125°C		
			Min	Max	Min	Max	Min	Max	
tPLH, tPHL	Propagation Delay Time, Input A To Output Y	VCC=5.0V ± 10% CL=50pF, Input tr = tf = 6.0 ns		32		40		48	ns
tTLH, tTHL	Output Transition Time, Any Output	VCC=5.0V ± 10% CL=50pF, Input tr = tf = 6.0 ns		15		19		22	ns

CPD	Power Dissipation Capacitance (Per Inverter) Used to determine the no-load dynamic power consumption: PD=CPD VCC ² f + ICC VCC	Typical @ 25°C, VCC=5V	pF
		32	

SWITCHING WAVEFORMS



Input and Output Threshold Voltage: $V_T = 50\% V_{CC}$ for HC,
1.3V for HCT, $V_H = V_{CC}$ for HC, 3V for HCT