



ELECTRONICS, INC.
 44 FARRAND STREET
 BLOOMFIELD, NJ 07003
 (973) 748-5089
<http://www.nteinc.com>

NTE74HCT04 Integrated Circuit TTL – High Speed CMOS, Hex Inverter

Description:

The NTE74HCT04 is a logic function hex inverter in a 14-Lead plastic DIP type package fabricated using advanced silicon-gate CMOS technology which provides the inherent benefits of CMOS – low quiescent power and wide power supply range. This device is input and output characteristic and pinout compatible with standard NTE74LS logic families. The NTE74HCT04 triple buffered, hex inverter features low power dissipation and fast switching times. All inputs are protected from static discharge damage by internal diodes to V_{CC} and ground.

The NTE74HCT04 is intended to interface between TTL and NMOS components and standard CMOS devices. This device is also a plug-in replacement for LS-TTL devices and can be used to reduce power consumption in existing designs.

Features:

- TTL, LS Pinout and Threshold Compatible
- Fast Switching: $t_{PLH}, t_{PLH} = 12\text{ns}$ (typ)
- Low Power: $10\mu\text{W}$ at DC, 3.7mW at 5Mhz
- High Fanout: ≥ 10 LS Loads
- Inverting, Triple Buffered

Absolute Maximum Ratings: (Note 1, Note 2)

Supply Voltage, V_{CC}	-0.5 to +7.0V
DC Input Voltage, V_{IN}	-1.5 to $V_{CC} + 1.5\text{V}$
DC Output Voltage, V_{OUT}	-0.5 to $V_{CC} + 0.5\text{V}$
Clamp Diode Current, I_{IK}, I_{OK}	$\pm 20\text{mA}$
DC Output Current (Per Pin), I_{OUT}	$\pm 25\text{mA}$
DC V_{CC} or GND Current (Per Pin), I_{CC}	$\pm 50\text{mA}$
Power Dissipation (Note 3), P_D	600mW
Storage Temperature Range, T_{stg}	-65°C to $+150^{\circ}\text{C}$
Lead Temperature (During Soldering, 10sec), T_L	$+260^{\circ}\text{C}$

Note 1. Stresses exceeding the Absolute Maximum Ratings may damage the device. The device may not function or be operable above the Recommended Operating Conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the Recommended Operating Conditions may effect device reliability. The Absolute Maximum Ratings are stress ratings only.

Note 2. Unless otherwise specified, all voltages are referenced to GND.

Note 3. Power Dissipation temperature derating: $12\text{mW}/^{\circ}\text{C}$ from $+65^{\circ}\text{C}$ to $+85^{\circ}\text{C}$.

Recommended Operating Conditions:

Parameter	Symbol	Min	Typ	Max	Unit
Supply Voltage	V_{CC}	4.5	–	5.5	V
DC Input or Output Voltage	V_{IN}, V_{OUT}	0	–	V_{CC}	V
Operating Temperature Range	T_A	–40	–	+85	°C
Input Rise or Fall Times	t_r, t_f	–	–	500	ns

DC Electrical Characteristics: ($V_{CC} = 5V \pm 10\%$ unless otherwise specified)

Parameter	Symbol	Test Conditions	$T_A = +25^\circ\text{C}$		$T_A = -40^\circ\text{ to } +85^\circ\text{C}$		Unit
			Typ	Guaranteed Limits			
Minimum High Level Input Voltage	V_{IH}		–	2.0	2.0		V
Maximum Low Level Input Voltage	V_{IL}		–	0.8	0.8		V
Minimum High Level Output Voltage	V_{OH}	$V_{IN} = V_{IH}$ or V_{IL}	$ I_{OUT} = 20\mu\text{A}$	V_{CC}	$V_{CC}^{-0.1}$	$V_{CC}^{-0.1}$	V
			$ I_{OUT} = 4.0\text{mA}, V_{CC} = 4.5\text{V}$	4.2	3.98	3.84	V
			$ I_{OUT} = 4.8\text{mA}, V_{CC} = 5.5\text{V}$	5.2	4.98	4.84	V
Minimum Low Level Output Voltage	V_{OL}	$V_{IN} = V_{IH}$	$ I_{OUT} = 20\mu\text{A}$	0	0.1	0.1	V
			$ I_{OUT} = 4.0\text{mA}, V_{CC} = 4.5\text{V}$	0.2	0.26	0.33	V
			$ I_{OUT} = 4.8\text{mA}, V_{CC} = 5.5\text{V}$	0.2	0.26	0.33	V
Maximum Input Current	I_{IN}	$V_{IN} = V_{CC}$ or GND, V_{IH} or V_{IL}	–	± 0.1	± 1.0		μA
Maximum Quiescent Supply Current	I_{CC}	$V_{IN} = V_{CC}$ or GND, $I_{OUT} = 0\mu\text{A}$	–	2.0	20		μA
		$V_{IN} = 2.4\text{V}$ or 0.5V , Note 4	–	0.3	0.4		mA

Note 4. This is measured per input with all other inputs held at V_{CC} or GND.

AC Electrical Characteristics: ($V_{CC} = 5V$, $t_r = t_f = 6\text{ns}$, $C_L = 15\text{pF}$, $T_A = +25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Typ	Guaranteed Limits	Unit
Maximum Propagation Delay	t_{PLH}, t_{PHL}		10	18	ns

AC Electrical Characteristics: ($V_{CC} = 5V \pm 10\%$, $t_r = t_f = 6\text{ns}$, $C_L = 50\text{pF}$ unless otherwise specified)

Parameter	Symbol	Test Conditions	$T_A = +25^\circ\text{C}$		$T_A = -40^\circ\text{ to } +85^\circ\text{C}$		Unit
			Typ	Guaranteed Limits			
Maximum Propagation Delay	t_{PLH}, t_{PHL}		14	20	25		ns
Maximum Output Rise and Fall Time	t_{THL}, t_{TLH}		8	15	19		ns
Power Dissipation Capacitance	C_{PD}	Note 5	20	–	–		pF
Input Capacitance	C_{IN}		5	10	10		pF

Note 5. C_{PD} determines the no load dynamic power consumption, $P_D = C_{PD} V_{CC}^2 f + I_{CC} V_{CC}$, and the no load dynamic current consumption, $I_S = C_{PD} V_{CC} f + I_{CC}$.

Pin Connection Diagram

