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NTE74C00, NTE74C02, NTE74C04, NTE74C10, NTE74C20 Integrated Circuit TTL– CMOS Logic Gates 14–Lead DIP

Description:

These NTE logic gates employ complementary MOS (CMOS) to achieve wide power supply operating range, low power consumption, high noise immunity, and symmetric controlled rise and fall times. With features such as this, the NTE74C logic family is close to ideal for use in digital systems. Function and pin-out compatibility with series 74 devices minimizes design time for those designers already familiar with standard 74 logic family. All Inputs are protected from damage due to static discharge by diode clamps to V_{CC} and GND.

Features:

- Wide Supply Voltage Range: 3V to 15V
- Guaranteed Noise margin: 1V
- High Noise Immunity: $0.45 V_{CC}$ (Typ)
- Low Power Consumption: 10nW/Package (Typ)
- Low Power TTL Compatibility: Fan Out of 2 Driving 74L

Function:

- NTE74C00 – Quad 2–Input NAND Gate
- NTE74C02 – Quad 2–Input NOR Gate
- NTE74C04 – Hex Inverter
- NTE74C10 – Triple 3–Input NAND Gate
- NTE74C20 – Dual 4–Input NAND Gate

Absolute Maximum Ratings: (Note 2)

Voltage at Any Pin	$-0.3V$ to $V_{CC} + 0.3V$
Operating V_{CC} Range	3V to 15V
Maximum V_{CC} Voltage	18V
Package Dissipation	500mW
Operating Temperature Range	-40° to $+85^{\circ}C$
Storage Temperature Range	-65° to $+150^{\circ}C$
Lead Temperature (During Soldering, 10sec)	$+300^{\circ}C$

Note 1. **NTE74C10** is a **discontinued** device and **no longer available**.

Note 2. “Absolute Maximum Ratings” are those values beyond which the safety of the device cannot be guaranteed. Except for “Operating Temperature Range” they are not meant to imply that the devices should be operated at these limits. The table of “Electrical Characteristics” provides conditions for actual device operation.

DC Electrical Characteristics: (Note 3)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit	
CMOS to CMOS							
Logical “1” Input Voltage	V _{IN(1)}	V _{CC} = 5V	3.5	–	–	V	
		V _{CC} = 10V	8.0	–	–	V	
Logical “0” Input Voltage	V _{IN(0)}	V _{CC} = 5V	–	–	1.5	V	
		V _{CC} = 10V	–	–	2.0	V	
Logical “1” Output Voltage	V _{OUT(1)}	V _{CC} = 5V, I _O = –10μA	4.5	–	–	V	
		V _{CC} = 10V, I _O = –10μA	9.0	–	–	V	
Logical “0” Output Voltage	V _{OUT(0)}	V _{CC} = 5V, I _O = +10μA	–	–	0.5	V	
		V _{CC} = 10V, I _O = +10μA	–	–	1.0	V	
Logical “1” Input Current	I _{IN(1)}	V _{CC} = 15V, V _{IN} = 15V	–	0.005	1.0	μA	
Logical “0” Input Current	I _{IN(0)}	V _{CC} = 15V, V _{IN} = 0	–1.0	–0.005	–	μA	
Supply Current	I _{CC}	V _{CC} = 15V	–	0.01	15.0	μA	
Low Power to CMOS							
Logical “1” Input Voltage	V _{IN(1)}	V _{CC} = 4.75V	V _{CC} –1.5	–	–	V	
Logical “0” Input Voltage	V _{IN(0)}	V _{CC} = 4.75V	–	–	0.8	V	
Logical “1” Output Voltage	V _{OUT(1)}	V _{CC} = 4.75V, I _O = –10μA	4.4	–	–	V	
Logical “0” Output Voltage	V _{OUT(0)}	V _{CC} = 4.75V, I _O = +10μA	–	–	0.4	V	
CMOS to Low Power							
Logical “1” Input Voltage	V _{IN(1)}	V _{CC} = 4.75V	4.0	–	–	V	
Logical “0” Input Voltage	V _{IN(0)}	V _{CC} = 4.75V	–	–	1.0	V	
Logical “1” Output Voltage	V _{OUT(1)}	V _{CC} = 4.75V, I _O = –360μA	2.4	–	–	V	
Logical “0” Output Voltage	V _{OUT(0)}	V _{CC} = 4.75V, I _O = +360μA	–	–	0.4	V	
Output Drive (Short Circuit Current)							
Output Source Current	I _{SOURCE}	T _A = +25°C, V _{IN(0)} = 0V, V _{OUT} = 0V	V _{CC} = 5V	–1.75	–	–	mA
			V _{CC} = 10V	–8.0	–	–	mA
Output Sink Current	I _{SINK}	V _{CC} = 5V, V _{IN(1)} = 5V	T _A = +25°C, V _{OUT} = V _{CC}	1.75	–	–	mA
		V _{CC} = 10V, V _{IN(1)} = 10V		8.0	–	–	mA

Note 3. Min/Max limits apply across the guaranteed temperature range unless otherwise specified.

AC Electrical Characteristics: ($T_A = +25^\circ C$, $C_L = 50pF$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
NTE74C00, NTE74C02, NTE74C04						
Propagation Delay Time to Logical "1" or "0"	t_{pd0}, t_{pd1}	$V_{CC} = 5V$	–	50	90	ns
		$V_{CC} = 10V$	–	30	60	ns
Input Capacitance	C_{IN}	Note 4	–	6.0	–	pF
Power Dissipation Capacitance	C_{PD}	Note 5, Per gate or Inverter	–	12	–	pF

Note 4. Capacitance is guaranteed by periodic testing.

Note 5. C_{PD} determines the no load AC power consumption of any CMOS device.

AC Electrical Characteristics (Cont'd): ($T_A = +25^{\circ}\text{C}$, $C_L = 50\text{pF}$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
NTE74C10						
Propagation Delay Time to Logical "1" or "0"	t_{pd0}, t_{pd1}	$V_{CC} = 5\text{V}$	–	60	100	ns
		$V_{CC} = 10\text{V}$	–	35	70	ns
Input Capacitance	C_{IN}	Note 4	–	7.0	–	pF
Power Dissipation Capacitance	C_{PD}	Note 5, Per gate or Inverter	–	18	–	pF
NTE74C20						
Propagation Delay Time to Logical "1" or "0"	t_{pd0}, t_{pd1}	$V_{CC} = 5\text{V}$	–	70	115	ns
		$V_{CC} = 10\text{V}$	–	40	80	ns
Input Capacitance	C_{IN}	Note 4	–	9.0	–	pF
Power Dissipation Capacitance	C_{PD}	Note 5, Per gate or Inverter	–	30	–	pF

Note 4. Capacitance is guaranteed by periodic testing.

Note 5. C_{PD} determines the no load AC power consumption of any CMOS device.



