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°C
Storage Temperature Range . . . . –65° to +150°C
Lead Temperature (During Soldering, 10sec) . . . . +300°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°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°C, C_L = 50pF 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} = 5V	–	60	100	ns
		V_{CC} = 10V	–	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} = 5V	–	70	115	ns
		V_{CC} = 10V	–	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.

Pin Connection Diagram

NTE74C00

1A	1	14	V_{CC}
1B	2	13	4B
1Y	3	12	4A
2A	4	11	4Y
2B	5	10	3B
2Y	6	9	3A
GND	7	8	3Y

NTE74C02

1Y	1	14	V_{CC}
1A	2	13	4Y
1B	3	12	4B
2Y	4	11	4A
2A	5	10	3Y
2B	6	9	3B
GND	7	8	3A

NTE74C04

1A	1	14	V_{CC}
1Y	2	13	6A
2A	3	12	6Y
2Y	4	11	5A
3A	5	10	5Y
3Y	6	9	4A
GND	7	8	4Y

NTE74C10

1A	1	14	V_{CC}
1B	2	13	1C
2A	3	12	1Y
2B	4	11	3C
2C	5	10	3B
2Y	6	9	3A
GND	7	8	3Y

NTE74C20

1A	1	14	V_{CC}
1B	2	13	2D
N.C.	3	12	2C
1C	4	11	N.C.
1D	5	10	2B
1Y	6	9	2A
GND	7	8	2Y

14   8

1   7

.785 (19.95) Max

.300 (7.62)

.200
(5.08)
Max

.100 (2.45)

.099 (2.5) Min

.600 (15.24)