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NTE74C74

Integrated Circuit

TTL– CMOS Dual D–Type Positive Edge

Triggered Flip–Flop with Preset & Clear

14–Lead DIP

Description:

The NTE74C74 dual D–type flip–flop is a monolithic complementary MOS (CMOS) integrated circuit in a 14–Lead DIP type package constructed with N– and P–channel enhancement transistors. Each flip–flop has independent data, preset, clear and clock inputs and Q and $\bar{Q}$ outputs. The logic level present at the data input is transferred to the output during the positive going transition of the clock pulse. Preset or clear is independent of the clock and accomplished by a low level at the preset or clear.

Features:

- Wide Supply Range: 3V to 15V
- Tenth Power TTL Compatible: Drive 2 LPT²L Loads
- High Noise Immunity: 0.45 V_{CC} (typ)
- Low Power: 50nW (typ)
- Medium Speed Operation: 10Mhz (typ) with 10V Supply

Applications:

- Automotive
- Data Terminals
- Instrumentation
- Medical Electronics
- Alarm Systems
- Industrial Electronics
- Remote Metering
- Computers

Absolute Maximum Ratings: (Note 1)

Voltage at Any Pin	–0.3V to V _{CC} +0.3V
Power Dissipation, P _D	700mW
Operating V _{CC} Range	3V to 15V
Maximum V _{CC} Voltage	18V
Operating Temperature Range, T _A	–55° to +125°C
Storage Temperature Range, T _{stg}	–65° to +150°C
Lead Temperature (During Soldering, 10sec), T _L	+260°C

Note 1. “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: ($T_A = -55^\circ$ to $+125^\circ\text{C}$ unless otherwise specified)

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	$V_{OUT(1)}$	$V_{CC} = 5V$	4.5	–	–	V	
		$V_{CC} = 10V$	9.0	–	–	V	
Logical “0” Output Voltage	$V_{OUT(0)}$	$V_{CC} = 5V$	–	–	0.5	V	
		$V_{CC} = 10V$	–	–	1.0	V	
Logical “1” Input Current	$I_{IN(1)}$	$V_{CC} = 15V$	–	–	1.0	μA	
Logical “0” Input Current	$I_{IN(0)}$	$V_{CC} = 15V$	–1.0	–	–	μA	
Supply Current	I_{CC}	$V_{CC} = 15V$	–	0.05	60	μA	
CMOS/LPTTL Interface							
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	$V_{OUT(1)}$	$V_{CC} = 4.75V, I_O = -360\mu A$	2.4	–	–	V	
Logical “0” Output Voltage	$V_{OUT(0)}$	$V_{CC} = 4.75V, I_O = 360\mu A$	–	–	0.4	V	
Output Drive							
Output Source Current (P–Channel)	I_{SOURCE}	$V_{CC} = 5V$	$V_{IN(0)} = 0,$ $V_{OUT} = 0,$ $T_A = +25^{\circ}C$	–1.75	–	–	mA
		$V_{CC} = 10V$		–8	–	–	mA
Output Sink Current (N–Channel)	I_{SINK}	$V_{CC} = 5V$	$V_{IN(0)} = 0,$ $V_{OUT} = V_{CC},$ $T_A = +25^{\circ}C$	1.75	–	–	mA
		$V_{CC} = 10V$		8	–	–	mA

AC Electrical Characteristics: ($T_A = +25^\circ$, $C_L = 50\text{pF}$, Note 2 unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Propagation Delay Time to a Logical "0" t_{pd0} or Logical "1" t_{pd1} from Clock to Q or $\bar{Q}$	t_{pd}	$V_{CC} = 5V$	–	180	300	ns
		$V_{CC} = 10V$	–	70	110	ns
Propagation Delay Time to a Logical "0" from Preset or Clear	t_{pd}	$V_{CC} = 5V$	–	180	300	ns
		$V_{CC} = 10V$	–	70	110	ns
Propagation Delay Time to a Logical "1" from Preset or Clear	t_{pd}	$V_{CC} = 5V$	–	250	400	ns
		$V_{CC} = 10V$	–	100	150	ns
Time Prior to Clock Pulse that Data Must be Present, t_{SETUP}	t_{S0}, t_{S1}	$V_{CC} = 5V$	100	50	–	ns
		$V_{CC} = 10V$	40	20	–	ns
Time after Clock Pulse that Data Must be Held	t_{H0}, t_{H1}	$V_{CC} = 5V$	–	–20	0	ns
		$V_{CC} = 10V$	–	–8.0	0	ns
Minimum Clock Pulse Width ($t_{WL} = t_{WH}$)	t_{PW1}	$V_{CC} = 5V$	–	100	250	ns
		$V_{CC} = 10V$	–	40	100	ns
Minimum Preset and Clear Pulse Width	t_{PW2}	$V_{CC} = 5V$	–	100	160	ns
		$V_{CC} = 10V$	–	40	70	ns
Maximum Clock Rise and Fall Time	t_r, t_f	$V_{CC} = 5V$	15	–	–	μs
		$V_{CC} = 10V$	5	–	–	μs

Note 2. AC Parameters are guaranteed by DC correlated testing.

AC Electrical Characteristics (Cont'd): ($T_A = +25^{\circ}$, $C_L = 50\text{pF}$, Note 2 unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Maximum Clock Frequency	f_{MAX}	$V_{\text{CC}} = 5\text{V}$	2.0	3.5	–	MHz
		$V_{\text{CC}} = 10\text{V}$	5.0	8.0	–	MHz
Input Capacitance	C_{IN}	Any Input, Note 3	–	5.0	–	pF
Power Dissipation Capacitance	C_{PD}	Note 4	–	40	–	pF

- Note 2. AC Parameters are guaranteed by DC correlated testing.
Note 3. Capacitance is guaranteed by periodic testing.
Note 4. C_{PD} determines the no load AC power consumption of any CMOS device.

Truth Table:

Preset	Clear	Q_n	$\overline{Q}_n$
0	0	0	0
0	1	1	0
1	0	0	1
1	1	NC	NC

NC = No change in output from previous status

Pin Connection Diagram



