Quad 2-Input NAND Schmitt Trigger

Product Features

- PI74FCT132T is pin compatible with bipolar FAST™ Series at a higher speed and lower power consumption
- TTL input and output levels
- Extremely low static power
- Hysteresis on all inputs
- Industrial operating temperature range: –40°C to +85°C
- Packages available:
  – 14-pin 150 mil wide plastic SOIC (W)

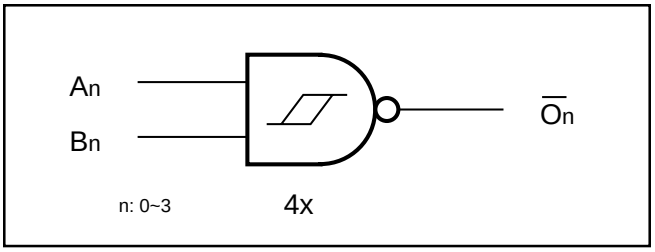
Product Description

Pericom Semiconductor's PI74FCT series of logic circuits are produced using the Company's advanced 0.8 micron CMOS technology, achieving industry leading speed grades.

PI74FCT132 consists of four 2-input NAND gates that are able to transform slowly changing input signals into highly defined, jitter-free output signals.

Each gate contains a 2-input Schmitt trigger which uses positive feedback to speed-up slow input transitions, and offer different input threshold voltages for positive and negative-going transitions. Resistor-ratios are used to determine this hysteresis between the positive-going and negative-going input threshold.

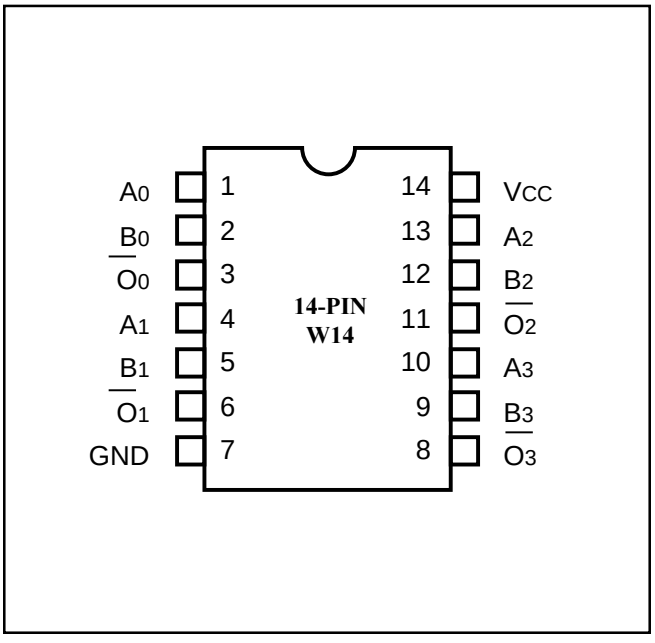
Logic Block Diagram



Product Pin Description

Pin Name	Description
A0-A3	Inputs
B0-B3	Inputs
$\overline{O}$0-$\overline{O}$3	Outputs
GND	Ground
VCC	Power

Product Pin Configuration



Truth Table (1)

Inputs		Outputs
An	Bn	$\overline{O}$n
L	L	H
L	H	H
H	L	H
H	H	L

Note:
1. H = HIGH Voltage Level
   L = LOW Voltage Level

Maximum Ratings

(Above which the useful life may be impaired. For user guidelines, not tested.)

Storage Temperature	–65°C to +150°C
Ambient Temperature with Power Applied	-40°C to +85°C
Supply Voltage to Ground Potential (Inputs & Vcc Only)	–0.5V to +7.0V
Supply Voltage to Ground Potential (Outputs & D/O Only)	–0.5V to +7.0V
DC Input Voltage	–0.5V to +7.0V
DC Output Current	120 mA
Power Dissipation	0.5W

Note:
Stresses greater than those listed under MAXIMUM RATINGS may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

DC Electrical Characteristics (Over the Operating Range, T_A = –40°C to +85°C, V_{CC} = 5.0V ± 5%)

Parameters	Description	Test Conditions[1]		Min.	Typ[2]	Max.	Units
V_{OH}	Output HIGH Voltage	V_{CC} = Min., V_{IN} = V_{IH} or V_{IL}	I_{OH} = –15.0 mA	2.4	3.0		V
V_{OL}	Output LOW Current	V_{CC} = Min., V_{IN} = V_{IH} or V_{IL}	I_{OL} = 48 mA		0.3	0.50	V
V_{IH}	Input HIGH Voltage	Guaranteed Logic HIGH Level		2.0			V
V_{IL}	Input LOW Voltage	Guaranteed Logic LOW Level				0.8	V
I_{IH}	Input HIGH Current	V_{CC} = Max.	V_{IN} = V_{CC}			1	µA
I_{IL}	Input LOW Current	V_{CC} = Max.	V_{IN} = GND			–1	µA
V_{T+}	Positive-going Threshold	V_{CC} = 5.0V		1.5		2.0	V
V_{T-}	Negative-going Threshold	V_{CC} = 5.0V		0.7		1.1	V
ΔV_T	Hysteresis (V_{T+} – V_{T-})	V_{CC} = 5.0V		0.4			V
V_{IK}	Clamp Diode Voltage	V_{CC} = Min., I_{IN} = –18 mA				–1.2	V
I_{OS}	Short Circuit Current	V_{CC} = Max.[3], V_{OUT} = GND		–60	–120	–150	mA
I_{CCH}	Power Supply Current	V_{CC} = Max.	V_O = HIGH			17.0	mA
I_{CCL}	Power Supply Current	V_{CC} = Max.	V_O = LOW			18.0	mA

Notes:
1. For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device type.
2. Typical values are at Vcc = 5.0V, +25°C ambient and maximum loading.
3. Not more than one output should be shorted at one time. Duration of the test should not exceed one second.

Capacitance (T_A = 25°C, f = 1 MHz)

Parameters[1]	Description	Test Conditions	Typ	Max.	Units
C_{IN}	Input Capacitance	V_{IN} = 0V	6	10	pF
C_{OUT}	Output Capacitance	V_{OUT} = 0V	8	12	pF

Note:
1. This parameter is determined by device characterization but is not production tested.

Power Supply Characteristics

Parameters	Description	Test Conditions[1]		Min.	Typ[2]	Max.	Units
I_{CC}	Quiescent Power Supply Current	V_{CC} = Max.	V_{IN} = GND or V_{CC}		0.1	500	µA
ΔI_{CC}	Supply Current per Input @ TTL HIGH	V_{CC} = Max.	V_{IN} = 3.4V[3]		0.5	2.0	mA
I_{CCD}	Supply Current per Input per MHz[4]	V_{CC} = Max., Outputs Open One Input Toggling 50% Duty Cycle	V_{IN} = V_{CC} V_{IN} = GND		0.15	0.3	mA/ MHz
I_C	Total Power Supply Current[6]	V_{CC} = Max., Outputs Open f_{CP} = 10 MHz, 50% Duty Cycle	V_{IN} = V_{CC} V_{IN} = GND		1.7	4.5[5]	mA
		Toggle A_N or B_N One Bit toggling	V_{IN} = 3.4V V_{IN} = GND		2.0	5.5[5]	

Notes:

1. For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device.
2. Typical values are at Vcc = 5.0V, +25°C ambient.
3. Per TTL driven input (V_{IN} = 3.4V); all other inputs at Vcc or GND.
4. This parameter is not directly testable, but is derived for use in Total Power Supply Calculations.
5. Values for these conditions are examples of the Icc formula. These limits are guaranteed but not tested.
6. $I_C = I_{QUIESCENT} + I_{INPUTS} + I_{DYNAMIC}$
   $I_C = I_{CC} + \Delta I_{CC} \Delta_H N_T + I_{CCD} (f_{CP}/2 + f_i N_i)$
   I_{CC} = Quiescent Current
   DI_{CC} = Power Supply Current for a TTL High Input (V_{IN} = 3.4V)
   D_H = Duty Cycle for TTL Inputs High
   N_T = Number of TTL Inputs at D_H
   I_{CCD} = Dynamic Current Caused by an Input Transition Pair (HLH or LHL)
   f_{CP} = Clock Frequency for Register Devices (Zero for Non-Register Devices)
   fo = Output Frequency
   No = Number of Outputs at fo
   All currents are in milliamps and all frequencies are in megahertz.

PI74FCT132 Switching Characteristics over Operating Range

			132T		132AT		132CT		132DT		
			Com.		Com.		Com.		Com.		
Parameters	Description	Conditions[1]	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Units
t_{PLH} t_{PHL}	Propagation Delay A_N, B_N to $\overline{O}_N$	C_L = 50 pF R_L = 500Ω	3.0	10.0	3.0	8.0	3.0	6.0	3.0	5.0	ns