Fast CMOS 9-Bit Parity Generator/Checker

Product Features:

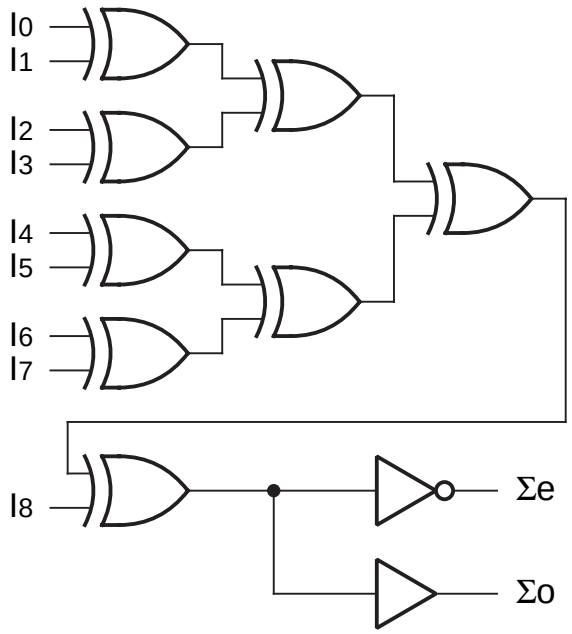
- PI74FCT280T is pin compatible with bipolar FAST™ Series at a higher speed and lower power consumption
- TTL input and output levels
- Extremely low static power
- Hysteresis on all inputs
- Industrial operating temperature range: –40°C to +85°C
- Packages available:
  - 14-pin 150 mil wide SOIC (W)
  - 16-pin 150 mil wide QSOP (Q)

Product Description:

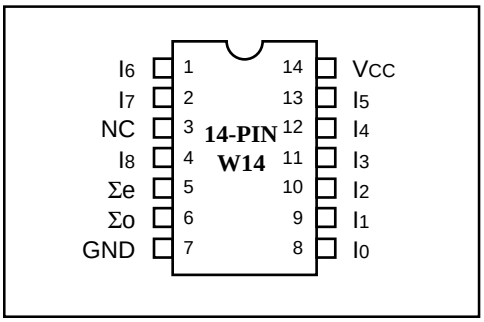
Pericom Semiconductor's PI74FCT series of logic circuits are produced in the Company's advanced 0.8 micron CMOS technology, achieving industry leading speed grades.

The PI74FCT280T is a high-speed CMOS TTL-compatible 9-bit parity generator-checkers. Both odd and even parity outputs are available for generating or checking odd or even parity.

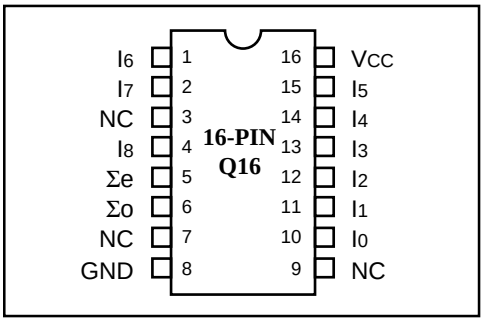
Logic Block Diagram



PI74FCT280T 14-Pin SOIC Configuration



PI74FCT280T 16-Pin QSOP Configuration



Product Pin Description

Pin Name	Description
I_8–I_0	Data In
Σe	Even Parity Out
Σo	Odd Parity Out
GND	Ground
V_{CC}	Power

Truth Table[1]

Function	Inputs	Outputs	
	I_8-I_0	Σe	Σo
Even Parity	No. of Bits at TTL High = 0, 2, 4, 6, 8	H	L
Odd Parity	No. of Bits at TTL High = 1, 3, 5, 7, 9	L	H

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 +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.

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

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

DC Electrical Characteristics (Over the Operating Range, T_A = –40°C to +85°C, V_{CC} = 5V ± 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_{IK}	Clamp Diode Voltage	V_{CC} = Min., I_{IN} = –18 mA			–0.7	–1.2	V
I_{OS}	Short Circuit Current	V_{CC} = Max.[3], V_{OUT} = GND		–60	–120		mA
I_{OFF}	Power Down Disable	V_{CC} = GND, V_{OUT} = 4.5V		—	—	100	µA
V_H	Input Hysteresis				200		mV

Notes:
1. For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for 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.

Switching Characteristics over Operating Range

Parameters	Description	Conditions[1]	280T Com. Min	280T Com. Max	280AT Com. Min	280AT Com. Max	280BT Com. Min	280BT Com. Max	280CT Com. Min	280CT Com. Max	Unit
t_{PHLE} t_{PLHE}	Propagation Delay I0 – I8 to ∑even	C_L = 50 pF R_L = 500Ω	3.0	10.0	3.0	7.5	3.0	6.3	3.0	5.3	ns
t_{PHLO} t_{PLHO}	Propagation Delay I0 – I8 to ∑odd		3.0	10.0	3.0	7.5	3.0	6.3	3.0	5.3	ns

Notes:
1. See test circuit and waveforms.
2. Minimum limits are guaranteed but not tested on Propagation Delays.

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]			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			0.25	mA/ MHz
I_C	Total Power Supply Current[6]	V_{CC} = Max., Outputs Open f_{CP} = 10 MHz 50% Duty Cycle f_I = 5 MHz One Bit Toggling	V_{IN} = V_{CC} V_{IN} = GND		1.7	4.0[5]	mA
			V_{IN} = 3.4V V_{IN} = GND		2.2	6.0[5]	
		V_{CC} = Max., Outputs Open f_{CP} = 10 MHz 50% Duty Cycle Nine Bits Toggling f_I = 2.5 MHz 50% Duty Cycle	V_{IN} = V_{CC} V_{IN} = GND		4.0	7.8[5]	
			V_{IN} = 3.4V V_{IN} = GND		6.2	16.8[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. $I_C = I_{QUIESCENT} + I_{INPUTS} + I_{DYNAMIC}$
   $I_C = I_{CC} + \Delta I_{CC} D_H N_T + I_{CCD} (f_{CP}/2 + f_I N_I)$
   I_{CC} = Quiescent Current
   ΔI_{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)
   f_I = Input Frequency
   N_I = Number of Inputs at f_I
   All currents are in milliamps and all frequencies are in megahertz.