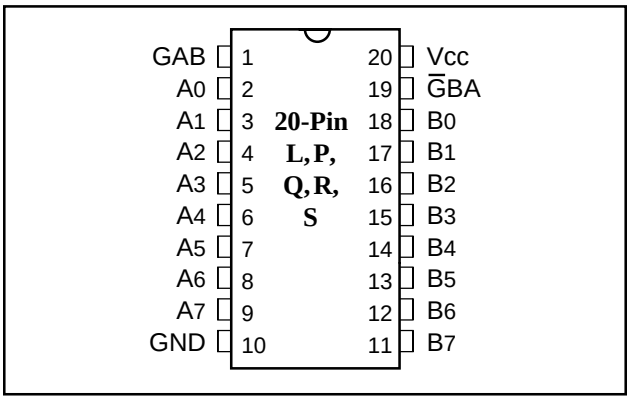
Fast CMOS Octal Bus Transceiver (3-State)

Product Features

- PI74FCT623T 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:
  – 20-pin 173 mil wide plastic TSSOP (L)
  – 20-pin 300 mil wide plastic DIP (P)
  – 20-pin 150 mil wide plastic QSOP (Q)
  – 20-pin 150 mil wide plastic TQSOP (R)
  – 20-pin 300 mil wide plastic SOIC (S)

Product Pin Configuration



Product Pin Description

Pin Name	Description
$\overline{G}$BA, GAB	Enable Outputs
A0-A7	A Bus Inputs or 3-State Outputs
B0-B7	B Bus Inputs or 3-State Outputs
GND	Ground
VCC	Power

Truth Table[1]

Inputs		
$\overline{G}$BA	GAB	Outputs
L	L	B Data to A Bus
H	H	A Data to B Bus
H	L	Z
L	H	B Data to A Bus A Data to B Bus

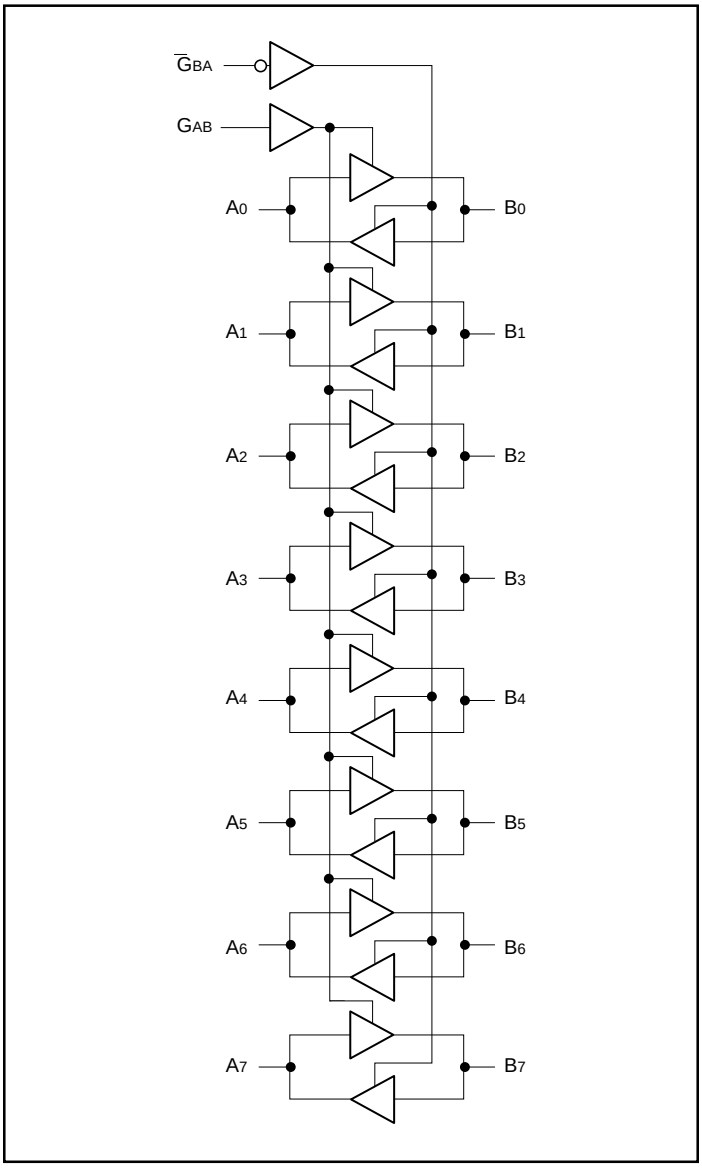
1. H = High Voltage Level
   L = Low Voltage Level
   Z = High Impedance (OFF) State

Product Description

Pericom Semiconductor's PI74FCT series of logic circuits are produced in the Company's advanced 0.6/0.8 micron CMOS technology, achieving industry leading speed grades.

The PI74FCT623T is an 8-bit wide non-inverting octal transceiver designed with 3-state bus-driving outputs in both the send and receive directions. Designed for asynchronous two-way operation between data buses, the control function allows for maximum flexibility in timing.

Logic Block Diagram



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	120mA
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} = 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} = 64 mA		0.3	0.55	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
I_{OZH}	High Impedance	V_{CC} = Max.	V_{OUT} = 2.7V			1	µA
I_{OZL}	Output Current		V_{OUT} = 0.5V			–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

Capacitance (T_A = 25°C, f = 1 MHz)

Parameters[4]	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. 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.
4. 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 Vcc		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 $\overline{G}BA$ = GAB = GND, One Input Toggling, 50% Duty Cycle	V_{IN} = V_{CC} V_{IN} = GND		0.15	0.25	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		1.5	3.5[5]	mA
		$\overline{G}BA$ = GAB = GND, 50% Duty Cycle One Bit toggling at f_i = 5 MHz	V_{IN} = 3.4V V_{IN} = GND		1.8	4.5[5]	
		V_{CC} = Max., Outputs Open f_{CP} = 10 MHz, 50% Duty Cycle	V_{IN} = V_{CC} V_{IN} = GND		3.0	6.0[5]	
		$\overline{G}BA$ = GAB = GND, 50% Duty Cycle Eight Bits toggling at f_i = 2.5 MHz 50% Duty Cycle	V_{IN} = 3.4V V_{IN} = GND		5.0	14.0[5]	

Notes:
1. For conditions shown as Max. or Min., 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.

Switching Characteristics over Operating Range

			623T		623AT		623CT		
			Com.		Com.		Com.		
Parameters	Description	Conditions[1]	Min	Max	Min	Max	Min	Max	Units
t_{PLH} t_{PHL}	Propagation Delay A_N to B_N	C_L = 50 pF R_L = 500Ω	1.5	7.5	1.5	5.5	1.5	4.8	ns
t_{PLH} t_{PHL}	Propagation Delay B_N to A_N		1.5	7.5	1.5	5.5	1.5	4.8	ns
t_{PZH} t_{PZL}	Output Enable Time $\overline{G}BA$ to A_N		1.5	9.0	1.5	7.0	1.5	6.1	ns
t_{PZH} t_{PZL}	Output Disable Time[3] $\overline{G}BA$ to A_N		1.5	8.0	1.5	6.5	1.5	5.6	ns
t_{PZH} t_{PZL}	Output Enable Time GAB to B_N		1.5	9.0	1.5	7.0	1.5	6.1	ns
t_{PZH} t_{PZL}	Output Disable Time[3] GAB to B_N		1.5	8.0	1.5	6.5	1.5	5.6	ns

Notes:
1. See test circuit and wave forms.
2 Minimum limits are guaranteed but not tested on Propagation Delays.
3. This parameter is guaranteed but not production tested.