Fast CMOS 3.3V 20-Bit Buffers

Product Features

- Functionally compatible with FCT3, LVT, and 74 series 16827 families of products
- Tri-State outputs
- 5V Tolerant inputs and outputs
- 2.0V-3.6V V_{CC} supply operation
- Balanced sink and source output drives (24 mA)
- Low ground bounce outputs
- Power Down High Impedance inputs and outputs
- Supports live insertion
- ESD Protection exceeds 2000V, Human Body Model
  200V, Machine Model
- Packages available:
  – 56-pin 240-mil wide plastic TSSOP (A)
  – 56-pin 300-mil wide plastic SSOP (V)

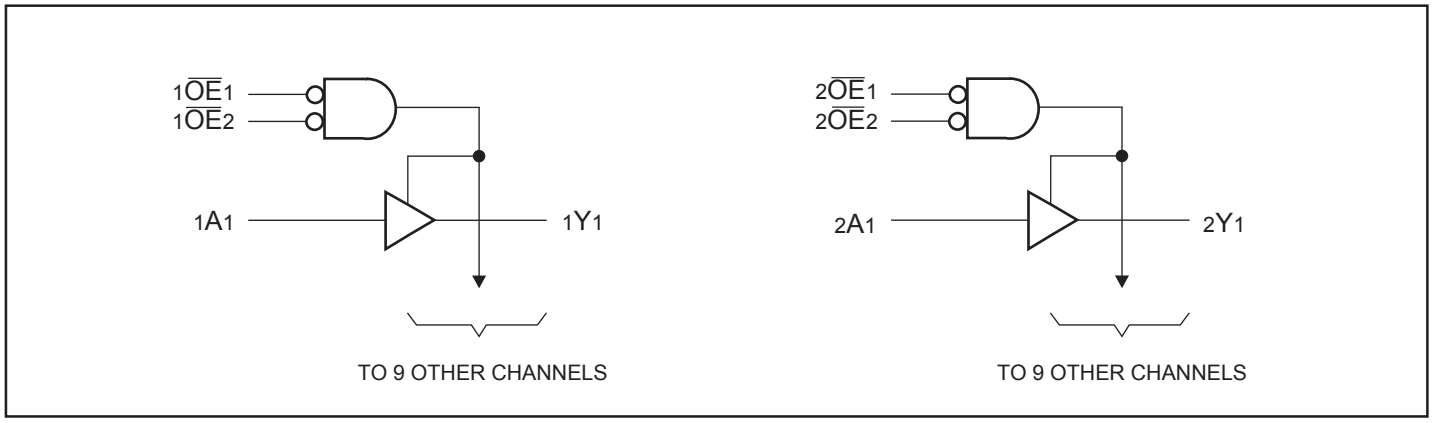
Product Description

Pericom Semiconductor's PI74LCX series of logic circuits are produced using the Company's advanced 0.6 micron CMOS technology, achieving industry leading speed grades.

The PI74LCX16827 is a 20-bit wide bus driver designed to provide buffering and high-performance bus interfacing for wide data/address paths or busses with parity. Two pairs of nanded output enable controls allow the device to be operated as two 10-bit buffers or as one 20-bit buffer. Signal pins are arranged in a flow-through organization for ease of layout and hysteresis is designed into all inputs to improve noise margin.

The PI74LCX16827 can be driven from either 3.3V or 5.0V devices allowing this device to be used as a translator in a mixed 3.3V/5.0V system.

Logic Block Diagram



Product Pin Description

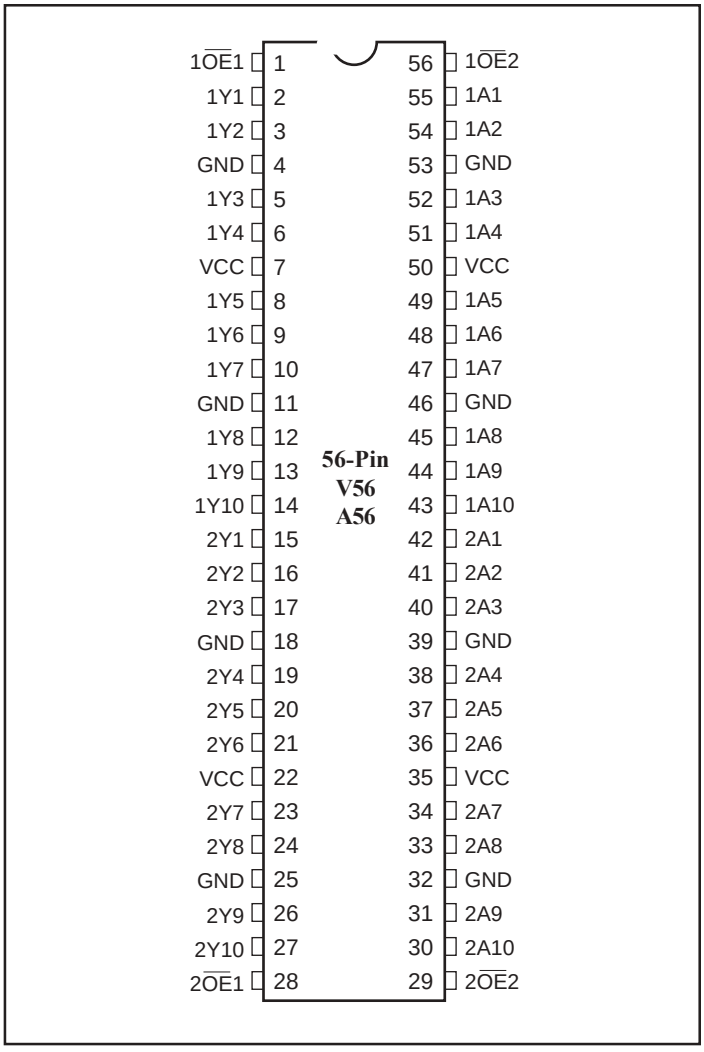
Pin Name	Description
x$\overline{OE}$x	Output Enable Inputs (Active LOW)
xAx	Data Inputs
xYx	3-State Outputs

Truth Table[1]

Inputs			Outputs
x$\overline{OE}$1	x$\overline{OE}$2	xAx	xYx
L	L	L	L
L	L	H	H
H	X	X	Z
X	H	X	Z

Note:
1. H = High Voltage Level, X = Don't Care,
   L = Low Voltage Level, Z = High Impedance

Product Pin Configuration



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	1.0W

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.

Recommended Operating Conditions

Symbol	Parameter		Min.	Max.	Units
V_{CC}	Supply Voltage	Operating	2.0	3.6	V
		Data Retention	1.5	3.6	
V_I	Input Voltage		0	5.5	
V_O	Output Voltage	HIGH or LOW State	0	V_{CC}	
		TRI-State	0	5.5	
I_{OH}/I_{OL}	Output Current	V_{CC} = 3.0V-3.6V	—	±24	mA
		V_{CC} = 2.7V	—	±12	
T_A	Free-Air Operating Temperature		–40	+85	°C
$\Delta t/\Delta V$	Input Edge Rate	V = 0.8V-2.0V, V_{CC} = 3.0V	0	10	ns/V

DC Electrical Characteristics (Over the Operating Range, T_A = –40°C to +85°C, V_{CC} = 2.7V to 3.6V)

Parameters	Description	Test Conditions[1]		Min.	Typ[2]	Max.	Units
V_{IH}	Input HIGH Voltage	Guaranteed Logic HIGH Level		2.0	—	—	V
V_{IL}	Input LOW Voltage	Guaranteed Logic LOW Level		—	—	0.8	
V_{OH}	Output HIGH Voltage	V_{CC} = 2.7-3.6	I_{OH} = –0.1mA	V_{CC}-0.2	—	—	
		V_{CC} = 2.7	I_{OH} = –12mA	2.2	—	—	
		V_{CC} = 3.0	I_{OH} = –18mA	2.4	—	—	
			I_{OH} = –24mA	2.2	—	—	
V_{OL}	Output LOW Voltage	V_{CC} = 2.7-3.6	I_{OL} = 0.1mA	—	—	0.2	
		V_{CC} = 2.7	I_{OL} = 12mA	—	—	0.4	
		V_{CC} = 3.0	I_{OL} = 16mA	—	—	0.4	
			I_{OL} = 24mA	—	—	0.55	
V_{IK}	Clamp Diode Voltage	V_{CC} = Min., I_{IN} = –18mA		—	–0.7	–1.2	
I_I	Input Leakage Current	0 ≤ V_I ≤ 5.5V	Vcc = 2.7-3.6	—	—	±5	µA
I_{OZ}	Tri-State Output Leakage	0 ≤ V_O ≤ 5.5V V_I = V_{IH} or V_{IL}	V_{CC} = 2.7-3.6	—	—	±5	
I_{OFF}	Power Down Disable	V_{CC} = 0V, V_{IN} or V_{OUT} ≤ 5.5V		—	—	10	
I_{CC}	Quiescent Power Supply Current	V_{CC} = Max.	V_{IN} = GND or V_{CC}	—	0.1	10	
ΔI_{CC}	Quiescent Power Supply Current TTL Inputs HIGH	V_{CC} = Max.	V_{IN} = V_{CC} – 0.6V[3]	—	—	500	

Notes:
1. For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device type.
2. Typical values are at V_{CC} = 3.3V, +25°C ambient.
3. Per TTL driven input; all other inputs at Vcc or GND.

Capacitance

Parameters	Description	Test Conditions	Typ.	Units
C_{IN}	Input Capacitance	V_{CC} = Open, V_I = 0V or V_{CC}	7	pF
C_{OUT}	Output Capacitance	V_{CC} = 3.3V, V_I = 0V or V_{CC}	8	
C_{PD}	Power Dissipation Capacitance	V_{CC} = 3.3V, V_I = 0V or V_{CC}, F = 10 MHz	20	

Switching Characteristics over Operating Range

Parameters	Description	Conditions	V_{CC} = 3.3V ± 0.3V		V_{CC} = 2.7V		Units
			Min.	Max.	Min.	Max.	
t_{PHL} t_{PHL}	Propagation Delay Dxx to Oxx	C_L = 50pF R_L = 500Ω	1.5	5.0	1.5	5.6	ns
t_{PZH} t_{PZH}	Output Enable Time		1.5	8.0	1.5	8.6	
t_{PHZ} t_{PLZ}	Output Disable Time		1.5	6.0	1.5	6.3	
$t_{SK(O)}$	Output Skew[1]		—	1.0	—	—	

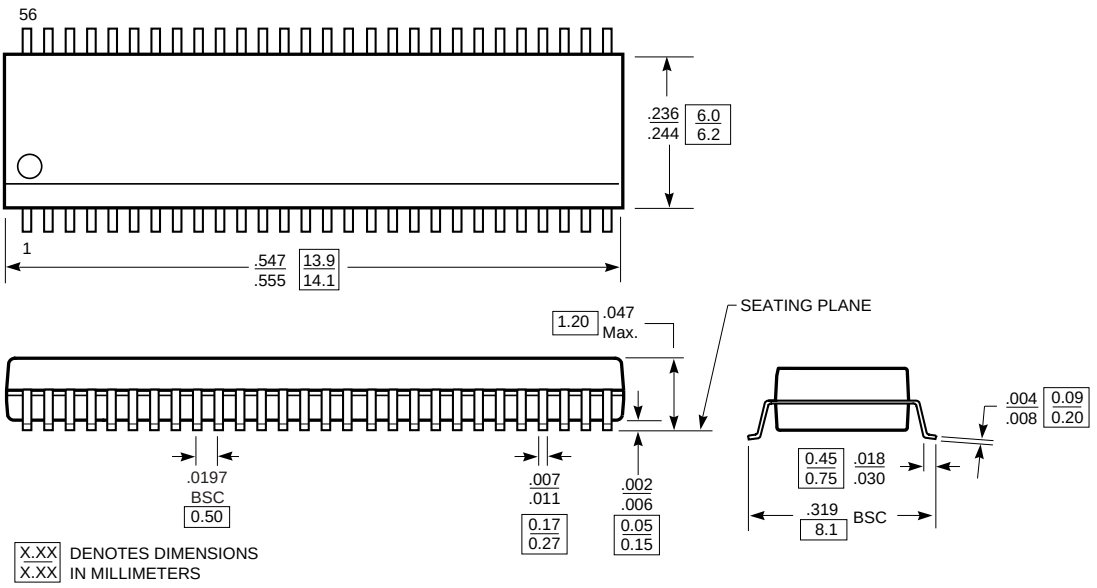
Note:
1. Skew between any two outputs, of the same package, switching in the same direction.

Dynamic Switching Characteristics (T_A = +25°C)

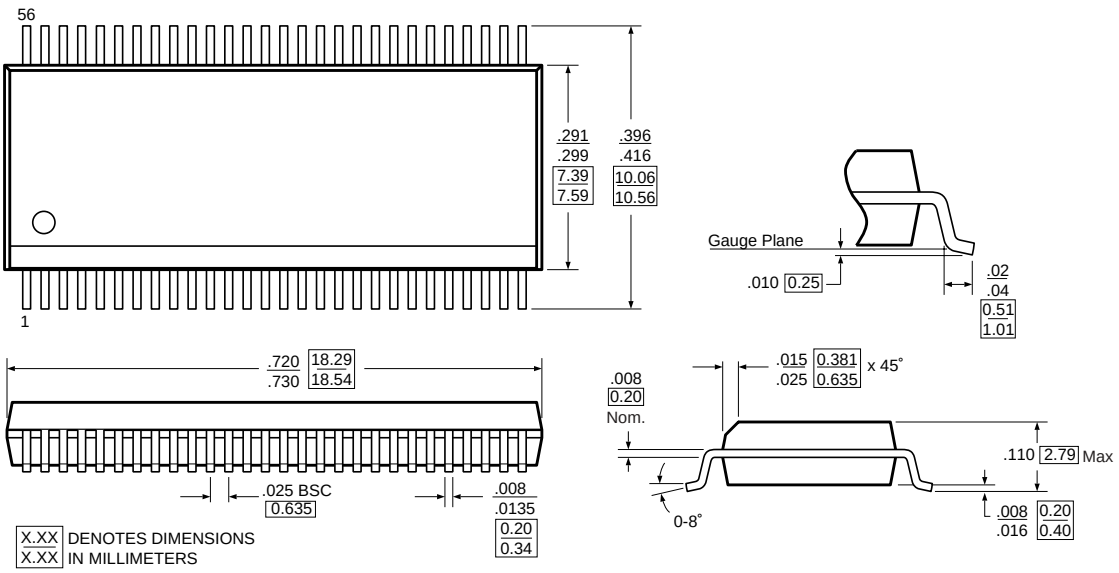
Parameters	Description	Test Conditions[1]	Typical	Units
V_{OLP}	Dynamic LOW Peak Voltage	V_{CC} = 3.3V, C_L = 50pF V_{IH} = 3.3V, V_{IL} = 0V	0.8	V
V_{OLV}	Dynamic LOW Valley Voltage	V_{CC} = 3.3V, C_L = 50pF V_{IH} = 3.3V, V_{IL} = 0V	0.8	

Note:
1. Measured with n–1 outputs switching from HIGH-to-LOW or LOW-to-HIGH. The remaining output is measured in the LOW state.

Packaging Mechanical: 56-Pin TSSOP (A) Package



Packaging Mechanical: 56-Pin SSOP (V) Package



Ordering Information

Part Number	Description	Operating Range
PI74LCX16827A	56-pin, 240-mil wide plastic TSSOP	–40°C to 85°C
PI74LCX16827V	56-pin, 300-mil wide plastic SSOP	