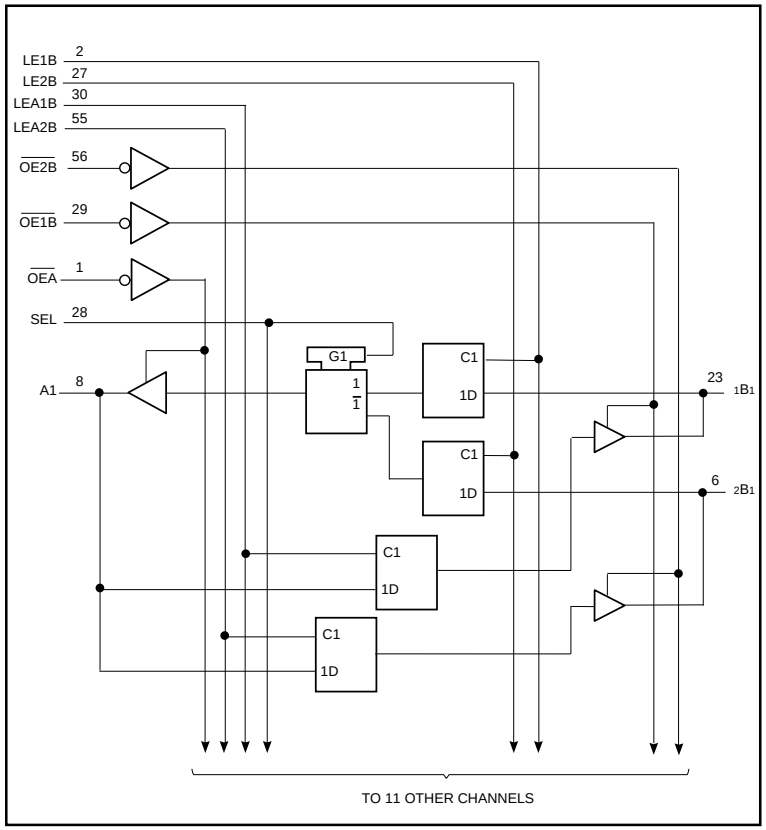
PI74ALVCH162260

12-Bit To 24-Bit Multiplexed D-Type Latch with 3-STATE Outputs

Product Features

- PI74ALVCH162260 is designed for low voltage operation
- V_{CC} = 2.3V to 3.6V
- Hysteresis on all inputs
- Typical V_{OLP} (Output Ground Bounce)
  < 0.8V at V_{CC} = 3.3V, T_A = 25°C
- Typical V_{OHV} (Output V_{OH} Undershoot)
  > 2.0V at V_{CC} = 3.3V, T_A = 25°C
- Bus Hold retains last active bus state during 3-STATE, eliminating the need for external pullup resistors
- Industrial operation at –40°C to +85°C
- Packages available:
  – 56-pin 240 mil wide plastic TSSOP (A)
  – 56-pin 300 mil wide plastic SSOP (V)

Logic Block Diagram



Product Description

Pericom Semiconductor's PI74ALVCH series of logic circuits are produced in the Company's advanced 0.5 micron CMOS technology, achieving industry leading speed.

The PI74ALVCH162260 is a 12-bit to 24-bit multiplexed D-type latch designed for 2.3V to 3.6 V_{CC} operation. It is used in applications where two separate datapaths must be multiplexed onto, or demultiplexed from, a single data path.

Typical applications include multiplexing and/or demultiplexing address and data information in microprocessor or bus-interface applications. This device is also useful in memory-interleaving applications.

Three 12-bit I/O ports (A1-A12, 1B1-1B12, and 2B1-2B12) are available for address and/or data transfer. The output-enable ($\overline{OE1B}$, $\overline{OE2B}$, and $\overline{OEA}$) inputs control the bus transceiver functions. The $\overline{OE1B}$ and $\overline{OE2B}$ control signals also allow bank control in the A-to-B direction.

Address and/or data information can be stored using the internal storage latches. The latch-enable (LE1B, LE2B, LEA1B, and LEA2B) inputs are used to control data storage. When the latch-enable input is HIGH, the latch is transparent. When the latch-enable input goes LOW, the data present at the inputs is latched and remains latched until the latch-enable input is returned HIGH.

To reduce overshoot and undershoot, the B-port outputs include 26Ω series resistors.

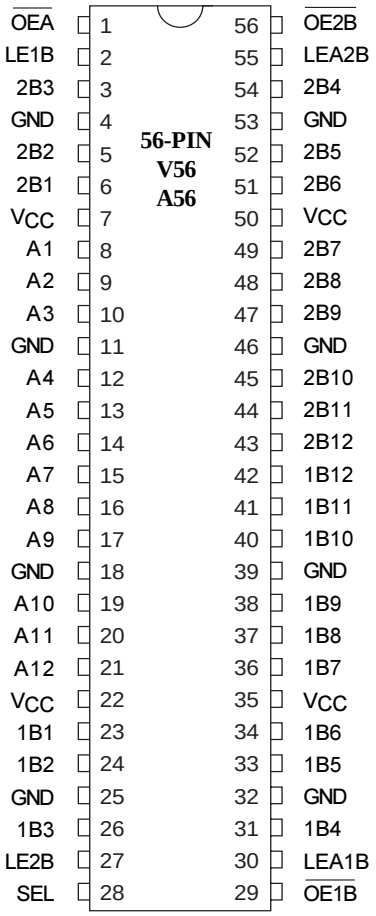
To ensure the high-impedance state during power up or power down, $\overline{OE}$ should be tied to Vcc through a pullup resistor, the minimum value of the resistor is determined by the current-sinking capability of the driver.

Active bus-hold circuitry is provided to hold unused or floating data inputs at a valid logic level.

Product Pin Description

Pin Name	Description
$\overline{OE}$	Output Enable Input (Active LOW)
SEL	Select
LE	Latch Enable
A,1B,2B	Data Inputs
A,1B,2B	3-State Outputs
GND	Ground
VCC	Power

Product Pin Configuration



Truth Tables[1]

B to A ($\overline{OEB}$ = H)

Inputs						Output
1B	2B	SEL	LE1B	LE2B	OEA	A
H	X	H	H	X	L	H
L	X	H	H	X	L	L
X	X	H	L	X	L	A0
X	H	L	X	H	L	H
X	L	L	X	H	L	L
X	X	L	X	L	L	A0
X	X	X	X	X	H	Z

A to B ($\overline{OEA}$ = H)

INPUTS					OUTPUTS	
A	LEA1B	LEA2B	$\overline{OE1B}$	$\overline{OE2B}$	1B	2B
H	H	H	L	L	H	H
L	H	H	L	L	L	L
H	H	L	L	L	H	2B0
L	H	L	L	L	L	2B0
H	L	H	L	L	1B0	H
L	L	H	L	L	1B0	L
X	L	L	L	L	1B0	2B0
X	X	X	H	H	Z	Z
X	X	X	L	H	Active	Z
X	X	X	H	L	Z	Active
X	X	X	L	L	Active	Active

Note:
1. H = High Signal Level
   L = Low Signal Level
   X = Irrelevant
   Z = High Impedance

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
Input Voltage Range, V_{IN}	–0.5V to V_{CC} +0.5V
Output Voltage Range, V_{OUT}	–0.5V to V_{CC} +0.5V
DC Input Voltage	–0.5V to +5.0V
DC Output Current	100 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.

Parameters	Description	Test Conditions	Min.	Typ.	Max.	Units
V_{CC}	Supply Voltage		2.3		3.6	V
V_{IH}	Input HIGH Voltage	V_{CC} = 2.7V to 3.6V	2.0			
		V_{CC} = 2.3V to 2.7V	1.7			
V_{IL}	Input LOW Voltage	V_{CC} = 2.7V to 3.6V			0.8	
		V_{CC} = 2.3V to 2.7V			0.7	
V_{IN}	Input Voltage		0		V_{CC}	
V_{OUT}	Output Voltage		0		V_{CC}	
I_{OH}	High-level output current (A Port)	V_{CC} = 2.3V			-12	mA
		V_{CC} = 2.7V			-12	
		V_{CC} = 3.0V			-24	
I_{OL}	Low-level output current (A Port)	V_{CC} = 2.3V			12	
		V_{CC} = 2.7V			12	
		V_{CC} = 3.0V			24	
I_{OH}	High-level output current (B Port)	V_{CC} = 2.3V			-6	
		V_{CC} = 2.7V			-8	
		V_{CCC} = 3.0V			-12	
I_{OL}	Low-level output current (B Port)	V_{CC} = 2.3V			6	
		V_{CC} = 2.7V			8	
		V_{CC} = 3.0V			12	
T_A	Operating free-air temperature		-40		85	°C

Note:
1. Unused control inputs must be held HIGH or LOW to prevent them from floating.

DC Electrical Characteristics (Over the Operating Range, T_A = –40°C to +85°C, V_{CC} = 3.3V ± 10%)

Parameters	Test Conditions		V_{CC}[1]	Min.	Typ.[2]	Max.	Units
V_{OH} (A PORT)	I_{OH} = -100µA		Min. to Max.	V_{CC} -0.2			V
	I_{OH} = -6mA	V_{IH} = 1.7V	2.3 V	2.0			
	I_{OH} = -12mA	V_{IH} = 1.7V	2.3 V	1.7			
		V_{IH} = 2.0V	2.7 V	2.2			
		V_{IH} = 2.0V	3.0 V	2.4			
	I_{OH} = -24mA	V_{IH} = 2.0V	3.0 V	2.0			
V_{OH} (B PORT)	I_{OH} = -100µA		Min. to Max.	V_{CC} -0.2			
	I_{OH} = -4mA	V_{IH} = 1.7V	2.3 V	1.9			
	I_{OH} = -6mA	V_{IH} = 1.7V	2.3 V	1.7			
		V_{IH} = 2.0V	3.0 V	2.4			
	I_{OH} = -8mA	V_{IH} = 2.0V	2.7 V	2.0			
	I_{OH} = -12mA	V_{IH} = 2.0V	3.0 V	2.0			
V_{OL} (A PORT)	I_{OL} = 100µA		Min. to Max.			0.2	
	I_{OL} = 6mA	V_{IL} = 0.7V	2.3V			0.4	
	I_{OL} = 12mA	V_{IL} = 0.7V	2.3V			0.7	
		V_{IL} = 0.8V	2.7V			0.4	
	I_{OL} = 24mA	V_{IL} = 0.8V	3.0V			0.55	
V_{OL} (B PORT)	I_{OL} = -100µA		Min. to Max.			0.2	
	I_{OL} = 4µA	V_{IL} = 0.7V	2.3V			0.4	
	I_{OL} = 6mA	V_{IL} = 0.7V	2.3V			0.55	
		V_{IL} = 0.8V	3.0V			0.55	
	I_{OL} = 8mA	V_{IL} = 0.8V	2.7V			0.6	
	I_{OL} = 12mA	V_{IL} = 0.8V	3.0V			0.8	
I_I	V_I = V_{CC} or GND		3.6V			±5	µA
I_I (Hold)	V_{IN} = 0.7V		2.3V	45			
	V_{IN} = 1.7V			-45			
	V_{IN} = 0.8V		3.0V	75			
	V_{IN} = 2.0V			-75			
	V_{IN} = 0 to 3.6V		3.6V			±500	
I_{OZ}[3]	V_O = V_{CC} or GND		3.6V			±10	
I_{CC}	V_I = V_{CC} or GND		3.6V			40	
ΔI_{CC}	One input at V_{CC} = 0.6V. Other inputs at V_{CC} or GND		3.3V to 3.6V			750	
C_I Control Inputs	V_{IN} = V_{CC} or GND		3.3V		3.5		pF
C_{IO} A or B ports	V_O = V_{CC} or GND		3.3V		4.5		

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 = 3.3V, +25°C ambient and maximum loading.
3. This is the bus-hold maximum dynamic current required to swtich the input from one state to another.

Timing Requirements over Operating Range

Parameters	Description	V_{CC} = 2.5V ± 0.2V		V_{CC} = 2.7V		V_{CC} = 3.3V ± 0.3V		Units
		Min.	Max.	Min.	Max.	Min.	Max.	
f_{CLOCK}	Clock Frequency		150		150		150	MHz
t_W	Pulse duration, LE1B, LE2B, LEA1B, or LEA2B High	3.3		3.3		3.3		ns
t_{SU}	Setup time, data before LE1B, LE2B, LEA1B, or LEA2B	1.4		1.1		1.1		ns
t_H	Hold time, data after LE1B, LE2B, LEA1B or LEA2B	1.6		1.9		1.5		ns
$\Delta t/\Delta^{(1)}$	Input Transition Rise or Fall					0	10	ns/V

Note:
1. Unused control inputs must be held HIGH or LOW to prevent them from floating.

Switching Characteristics over Operating Range[1]

Parameters	From (INPUT)	To (OUTPUT)	V_{CC} = 2.5V ± 0.2V		V_{CC} = 2.7V		V_{CC} = 3.3V ± 0.3V		Units
			Min.[2]	Max.	Min.[2]	Max.	Min.[2]	Max.[2]	
f_{MAX}			150		150		150		MHz
t_{PD}	A	B	1.2	6.5		5.8	1.2	4.9	ns
	B	A	1.2	6.0		5.1	1.2	4.3	
	LE	A	1.0	6.2		5.2	1.0	4.4	
	LE	B	1.0	6.7		5.9	1.0	5.0	
	SEL	A	1.2	7.5		6.6	1.1	5.6	
t_{EN}	$\overline{OE}$	A	1.0	7.2		6.4	1.0	5.4	
	$\overline{OE}$	B	1.0	7.7		7.1	1.0	6.0	
t_{DIS}	$\overline{OE}$	A	1.7	5.9		5.0	1.3	4.6	
	$\overline{OE}$	B	1.7	6.4		5.5	1.3	5.1	

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

Operating Characteristics, $T_A = 25^oC$

Parameter		Test Conditions	V_{CC} = 2.5V ± 0.2V	V_{CC} = 3.3V ± 0.3V	Units
			Typical		
C_{PD} Power Dissipation Capacitance	Outputs Enabled	C_L = 50pF, f = 10 MHz	62	46	pF
	Outputs Disabled		29	24	