Low Capacitance 12-Bit to 24-Bit Mux/Demux BusSwitch

Product Features

- R_{ON} is 8Ω Typical
- Pulldown on B Ports
- Low Power: 1mW
- Industrial Operation Temperature: –40ºC to 85ºC
- Near Zero Propagation Delay
- Switching Speed: 4.5ns max.
- Channel on capacitance: 9pF (typ.)
- V_{CC} Operating Range: +4.5V to 5.5V
- >100 MHz bandwidth
- Packages Available:
  - 40-pin BQSOP (B)

Product Description

Pericom Semiconductor's PI5C series of logic circuits are produced using the Company's advanced submicron CMOS technology.

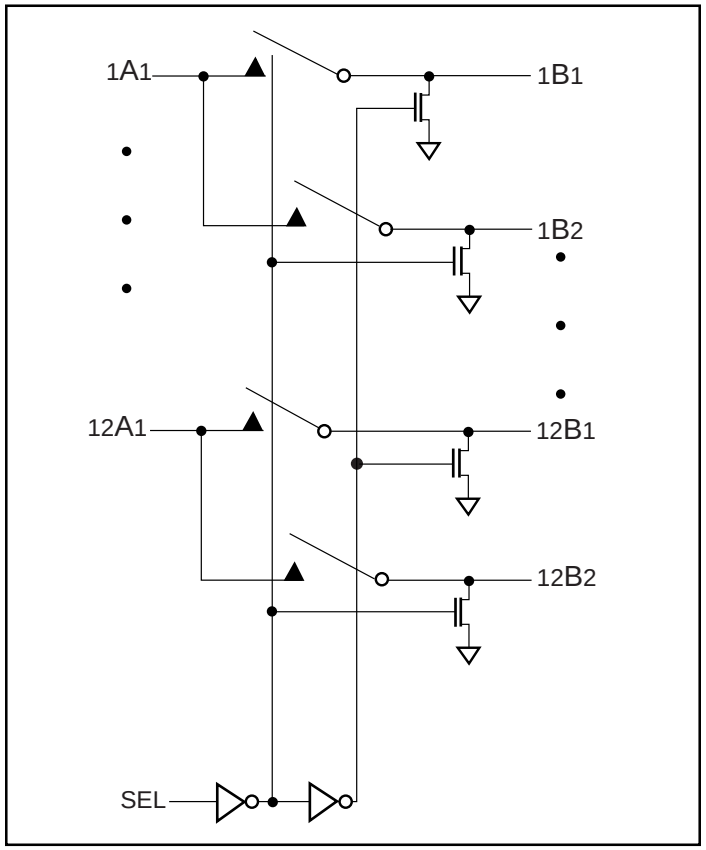
The PI5C16226C is a 12-bit to 24-bit mux/demux switch. Industry leading advantages include almost zero propagation delay of 500ps because of the 8Ω channel resistance and low I/O capacitance.

A1 port demultiplexes to either port B1 or B2. The switch is bidirectional.

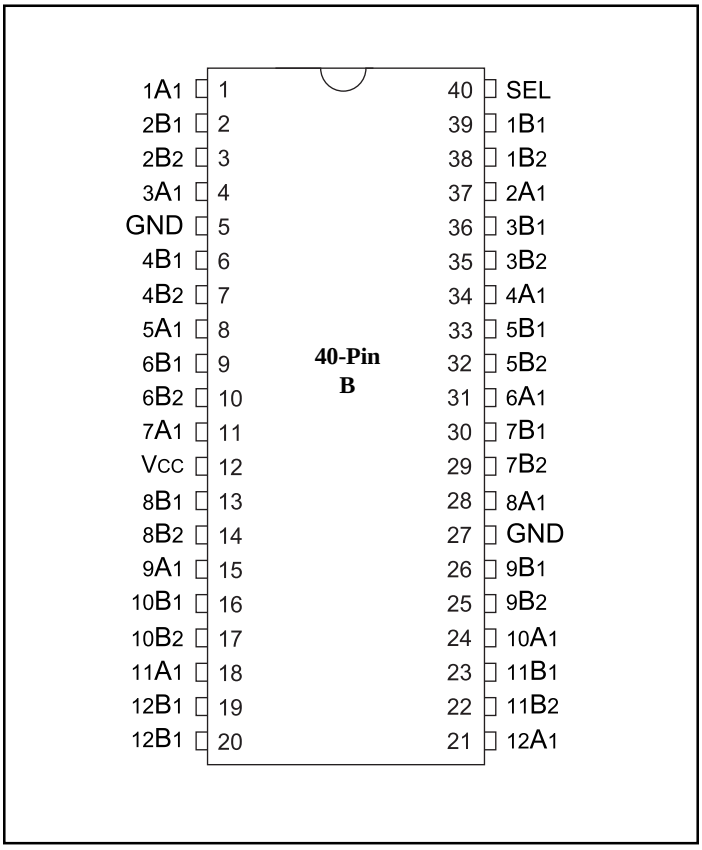
Application

Memory Switching

Logic Block Diagram



Product Pin Configuration



Function Table

SEL	FUNCTION
L	nAl to nBl
H	nAl to nB2

Note: n = 1–12

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 Range	–0.3V to +4.6V
DC Input Voltage	–0.5V to +4.6V
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 Opreating Range, T_A = –40ºC to 85ºC, V_{CC} = 5V ±10%)

Parameters	Description	Test Conditions(1)	Min.	Typ(1)	Max.	Units
V_{IH}	Input HIGH Voltage	Guaranteed Logic HIGH Level	2.0	–	–	V
V_{IL}	Input LOW Voltage	Guaranteed Logic LOW Level	–0.5	–	0.8	
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	
I_{OZ}	High Impedance Output Current	B = V_{CC} Min., V_{CC} = Min	2.5	–	–	mA
R_{ON}	Switch On Resistance(4)	V_{CC} = Min., V_{IN} = 0.0V, I_{ON} = 12mA	–	7	12	Ω
		V_{CC} = Min., V_{IN} = 2.4V, I_{ON} = 8mA	–	12	23	

Capacitance (T_A = 25°C, f = 1 MHz)

Parameters(5)	Description	Test Conditions	Typ.	Max.	Units
C_{IN}	Input Capacitance	V_{IN} = 0V	3	—	pF
C_{ON}	A/B Capacitance, Switch On	V_{IN} = 0V	9	11	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 V_{CC} = 5.0V, T_A = 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. Measured by the voltage drop between A and B pins at indicated current through the switch. ON resistance is determined by the lower of the voltages on the two (A & B) pins.
5. 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}	—	—	200	µA
ΔI_{CC}	Supply Current per Input @ TTL HIGH	V_{CC} = Max.	V_{IN} = 3.4V[3] other pin = V_{CC} or GND	—	—	2.5	mA
I_{CCD}	Supply Current per Input per MHz[4]	V_{CC} = Max., A and B Pins Open Control Input Toggling 50% Duty Cycle		—	—	0.25	mA/ MHz

Notes:
1. For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device.
2. Typical values are at V_{CC} = 5.0V, +25°C ambient.
3. Per TTL driven input (V_{IN} = 3.4V, control inputs only); A and B pins do not contribute to I_{CC}.
4. This current applies to the control inputs only and represent the current required to switch internal capacitance at the specified frequency. The A and B inputs generate no significant AC or DC currents as they transition. This parameter is not tested, but is guaranteed by design.
5. Values for these conditions are examples of the Icc formula. These limits are guaranteed but not tested.

Switching Characteristics over Operating Range

Parameters	Description	Conditions[1]	PI516226C Com. Min.	Com. Typ.	Com. Max.	Units
t_{PLH} t_{PHL}	Propagation Delay[2,3] A to B	C_L = 25pF R_L = 500Ω	—	—	0.5	ns
t_{PZH} t_{PZL}	Bus Enable Time SEL TO A,B		1.3	3.0	4.5	
t_{PHZ} t_{PLZ}	Bus Disable Time SEL to A,B		1.3	3.0	4.5	

Notes:
1. See test circuit and waveforms.
2. This parameter is guaranteed but not tested on Propagation Delays.
3. The bus switch contributes no propagational delay other than the RC delay of the ON resistance of the switch and the load capacitance. The time constant for the switch alone is of the order of 0.25ns for 25pF load. Since this time constant is much smaller than the rise/fall times of typical driving signals, it adds very little propagational delay to the system. Propagational delay of the bus switch when used in a system is determined by the driving circuit on the driving side of the switch and its interaction with the load on the driven side.

Ordering Information

Part	Pin - Package	Width	Temperature
PI5C16226CB	40-BQSOP (B40)	150-mil	–40°C to +85°C