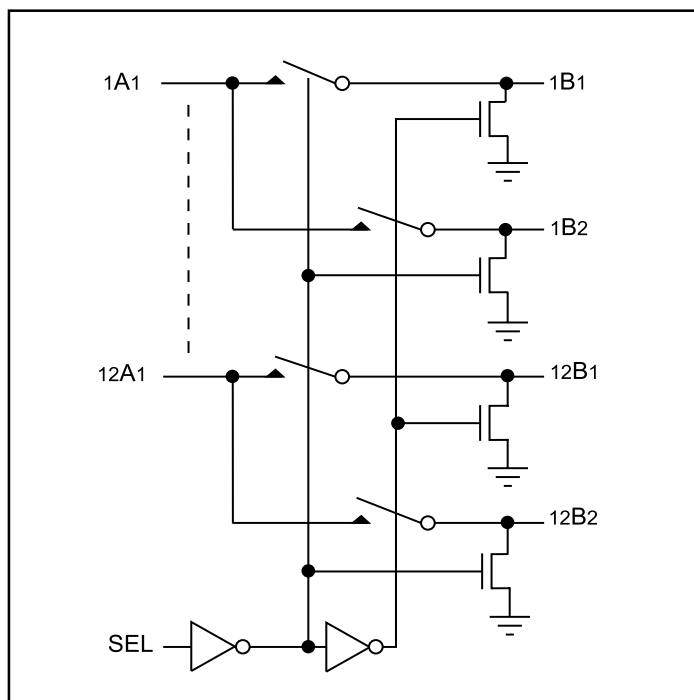


Low Capacitance 12-Bit-to-24-Bit Mux/Demux Bus Switch

Product Features

- R_{ON} is 8Ω typical
- Pulldown on B ports
- Low Power: 1mW typical
- Industrial Operation Temperature: -40°C to $+85^{\circ}\text{C}$
- Near Zero propagation delay
- Switching speed: 4.5ns max.
- Channel on capacitance: 9.0pF (typ.)
- V_{CC} Operating Range: +4.5V to +5.5V
- ESD>2000V . . . Human Body Model
- >100 MHz bandwidth (or clock rate)
at 25pF load capacitance
- Packages available: 56-pin TSSOP (A)

Logic Block Diagram



Function	SEL
nA1 to nB1	L
nA1 to nB2	H

Note:

1. H = High Voltage Level
L = Low Voltage Level
n = 1 to 12

Product Description

Pericom Semiconductor's PI5C series of logic circuits are produced using the Company's advanced submicron CMOS technology, achieving industry leading performance.

The PI5C16225C is a 12-bit-to-24-bit multiplexer/demultiplexer bus switch. Industry leading advantages include a propagation delay of 0.5ns, resulting from 7Ω channel resistance, and low I/O capacitance. A port demultiplexes to either B1 and B2. The switch is bidirectional.

Application

Provides Memory Module Switching.

Pin Description

SEL	1	56	NC
1A1	2	55	NC
NC	3	54	1B1
2A1	4	53	1B2
NC	5	52	2B1
3A1	6	51	2B2
NC	7	50	3B1
GND	8	49	GND
4A1	9	48	3B2
NC	10	47	4B1
5A1	11	46	4B2
NC	12	45	5B1
6A1	13	44	5B2
NC	14	43	6B1
7A1	15	42	6B2
NC	16	41	7B1
VCC	17	40	7B2
8A1	18	39	8B1
GND	19	38	GND
NC	20	37	8B2
9A1	21	36	9B1
NC	22	35	9B2
10A1	23	34	10B1
NC	24	33	10B2
11A1	25	32	11B1
NC	26	31	11B2
12A1	27	30	12B1
NC	28	29	12B2

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 & V _{CC} 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 ±10%)

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	–0.5	—	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 _{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	Ω

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 I_{CC} formula. These limits are guaranteed but not tested.

Switching Characteristics over Operating Range

Parameters	Description	Conditions ⁽¹⁾	PI516225C			Units
			Com.			
			Min.	Typ.	Max.	
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
PI5C16225CA	56-TSSOP (A56)	240-mil	−40°C to +85°C