PERICOM

PI3C16226

3.3V, High-Bandwidth, 12-Bit to 24-Bit, Mux/Demux Bus Switch

Product Features

- R_{ON} is 9Ω typical
- Pulldown on B ports
- Low Power: 1mW
- Industrial Operation Temperature: −40°C to +85°C
- Near Zero propagation delay
- Switching speed: 4.5ns max.
- Channel on capacitance: 9pF max. (3.3V operation)
- V_{CC} Operating Range: +2V to +3.6V
- >100 MHz bandwidth
- Package available: 40-pin BQSOP (B)
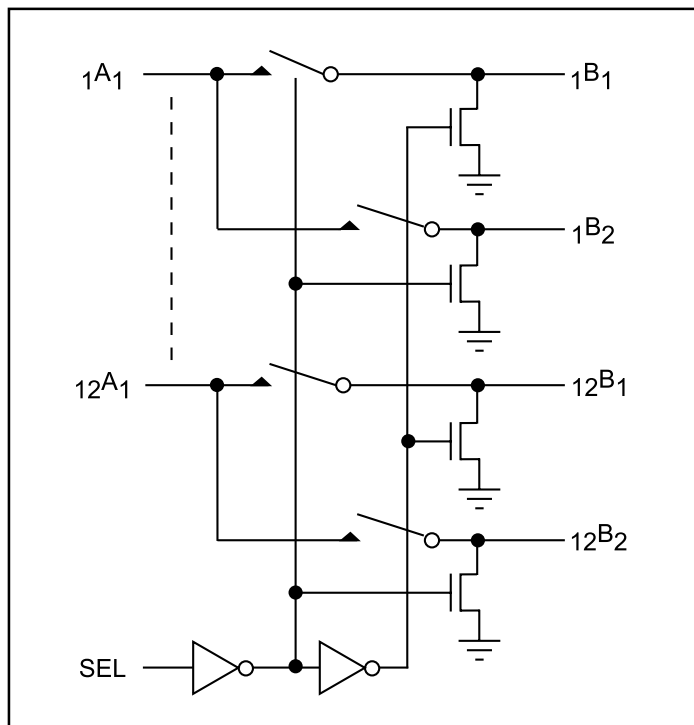
Product Description

Pericom Semiconductor's PI3C series of bus switch circuits are produced using the Company's advanced submicron CMOS technology, achieving industry leading performance.

The PI3C16226 is a 12- to 24-bit multiplexer/demultiplexer bus switch. Industry leading advantages include a zero propagation delay of 500ps, resulting from 8Ω channel resistance and low I/O capacitance. A1 port demultiplexes to either 1B and 2B or to both. The switch is bidirectional and has undershoot protection for up to −0.8V.
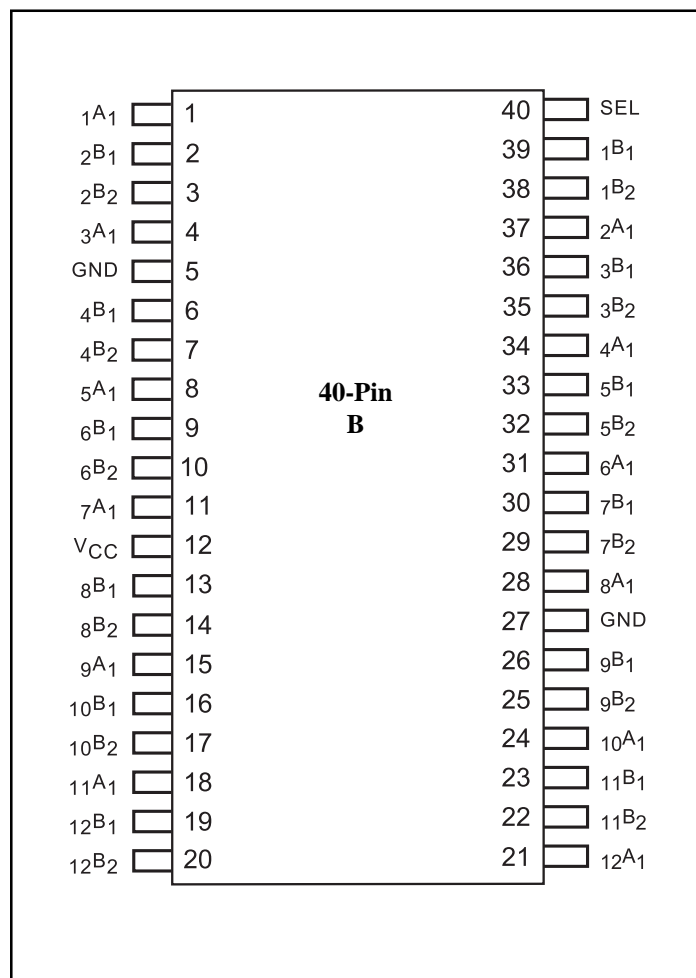
Application

Provides Memory Module switching.

Logic Block Diagram

Function	SEL
nA_1 to nB_1	L
nA_1 to nB_2	H

Pin Description

Pin	#	#	Pin
$1A_1$	1	40	SEL
$2B_1$	2	39	$1B_1$
$2B_2$	3	38	$1B_2$
$3A_1$	4	37	$2A_1$
GND	5	36	$3B_1$
$4B_1$	6	35	$3B_2$
$4B_2$	7	34	$4A_1$
$5A_1$	8	33	$5B_1$
$6B_1$	9	32	$5B_2$
$6B_2$	10	31	$6A_1$
$7A_1$	11	30	$7B_1$
V_{CC}	12	29	$7B_2$
$8B_1$	13	28	$8A_1$
$8B_2$	14	27	GND
$9A_1$	15	26	$9B_1$
$10B_1$	16	25	$9B_2$
$10B_2$	17	24	$10A_1$
$11A_1$	18	23	$11B_1$
$12B_1$	19	22	$11B_2$
$12B_2$	20	21	$12A_1$

40-Pin B

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 I/O Voltage .... –0.5V to +5.5V	
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} = 3.3V ±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	
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	
V_{IK}	Clamp Diode Voltage	V_{CC} = Min., I_{IN} = –18	—	—	–1.8	V
I_O	B port pulldown Current	V_{CC} = Min., V_O = V_{CC} SEL = High for B1 SEL = Low for B2	2.5	3.8	—	mA
R_{ON}	Switch On Resistance[4]	V_{CC} = Min., V_{IN} = 0.0V I_{ON} = 48mA or 64mA	—	9	12	Ω
		V_{CC} = Min., V_{IN} = 2.4V I_{ON} = 15mA	—	16	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		9.3	11	

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, 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 pin 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}	—	260	500	μA
ΔI_{CC}	Supply Current per Input @ TTL HIGH	V_{CC} = Max., V_{IN} = 3.0V[3]	—	—	750	

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

PI3C16226 Switching Characteristics Over Operating Range

Parameters	Description	Conditions[1]	Com. Min.	Com. Max.	Units
t_{PLH} t_{PHL}	Propogation Delay[2,3] Ax to Bx, Bx to Ax	C_L = 25pF R_L = 500Ω	—	0.5	ns
t_{PZH} t_{PZL}	Bus Enable Time SEL to Ax or Bx	C_L = 25pF R_L = 500Ω R = 500Ω	1.3	6.5	
t_{PHZ} t_{PLZ}	Bus Disable Time SEL to Ax or Bx		1.3	5.5	

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 0.5ns 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.

PS8457A   03/09/00