

3.3V, Synchronous 16-Bit to 32-Bit FET Mux/DeMux NanoSwitch™

Features

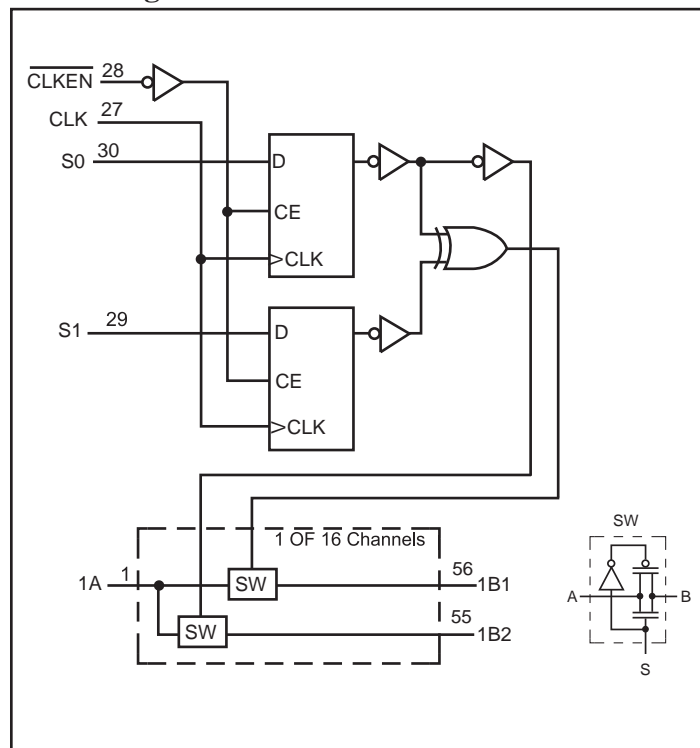
- Near-Zero propagation delay.
- 5-ohm Switches Connect Between Two Ports
- Packaging (Pb-free & Green available):
 - 56-pin 240mil Wide Thin Plastic TSSOP (A)

Description

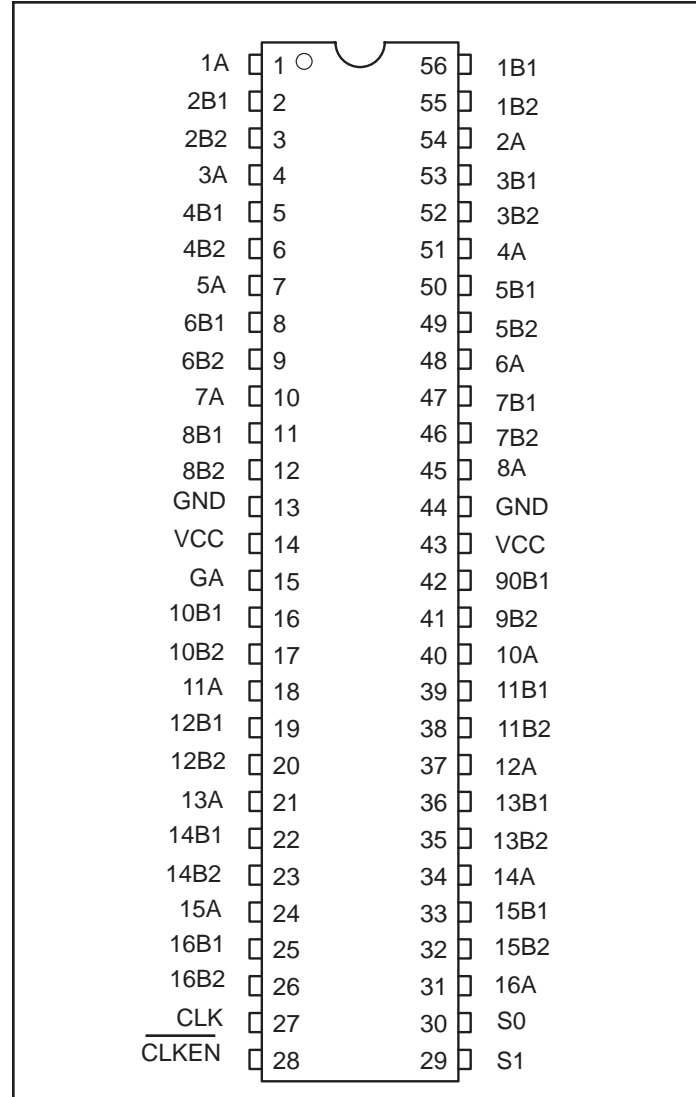
The PI3B16232 is a 3.3 volt, 16-bit to 32-bit synchronous switch.

Two select inputs (S0 and S1) control the data flow. A clock (CLK) and a clock enable (CLKEN) synchronize the device operation. When CLKEN is high, the bus switch remains in the last clocked function.

Block Diagram



Pin Configuration



Truth Table

S1	S0	CLK	CLKEN	Function
X	X	X	H	Last State
L	L	↑	L	Disconnect
L	H	↑	L	A = B1 and A = B2
H	L	↑	L	A = B1
H	H	↑	L	A = B2

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	-0.5V to +4.6V
DC Input Voltage	-0.5V to +4.6V
DC Output Current.....	120 mA
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, $T_A = -40^\circ\text{C}$ to $+85^\circ\text{C}$, $V_{CC} = 3.0\text{V}$ 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	-0.5		0.8	
I_{IH}	Input HIGH Current	$V_{CC} = \text{Max.}, V_{IN} = V_{CC}$			± 1	μA
I_{IL}	Input LOW Current	$V_{CC} = \text{Max.}, V_{IN} = \text{GND}$			± 1	
I_{OZ}	High Impedance Output Current	$0 \leq A, B \leq V_{CC}$			± 1	
V_{IK}	Clamp Diode Voltage	$V_{CC} = \text{Min.}, V_{IN} = -18\text{mA}$		-0.7	-1.2	V
R_{ON}	Switch On-Resistance ⁽³⁾	$V_{CC} = \text{Min.}, I_{IN} = 0.0\text{V},$ $I_{ON} = 48\text{mA}$ or 64mA		5	8	Ω
		$V_{CC} = \text{Min.}, V_{IN} = 2.4\text{V}, I_{ON} = 15\text{mA}$		10	15	

Notes:

- For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device.
- Typical values are at $V_{CC} = 3.3\text{V}$, $T_A = 25^\circ\text{C}$ ambient and maximum loading.
- 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.

Capacitance ($T_A = 25^\circ\text{C}$, $f = 1\text{ MHz}$)

Parameters ⁽¹⁾	Description	Test Conditions	Typ.	Units
C_{IN}	Input Capacitance	$V_{IN} = 0\text{V}$	3.0	pF
C_{ON}	A/B Capacitance, Switch ON		25.0	

Notes:

- 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}			10	μA
ΔI _{CC}	Supply Current per Input @ TTL HIGH	V _{CC} = Max.	V _{IN} = 3.0V ⁽³⁾			750	
I _{CCD}	Supply Current per Input per MHz ⁽⁴⁾	V _{CC} = Max. A & B pins open Control Input toggling 50% Duty Cycle				0.25	mA/ MHz

Notes:

- For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for applicable device.
- Typical values are at V_{CC} = 3.3V, +25°C ambient.
- Per TTL driven input (control inputs only); A and B pins do not contribute to I_{CC}.
- 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.

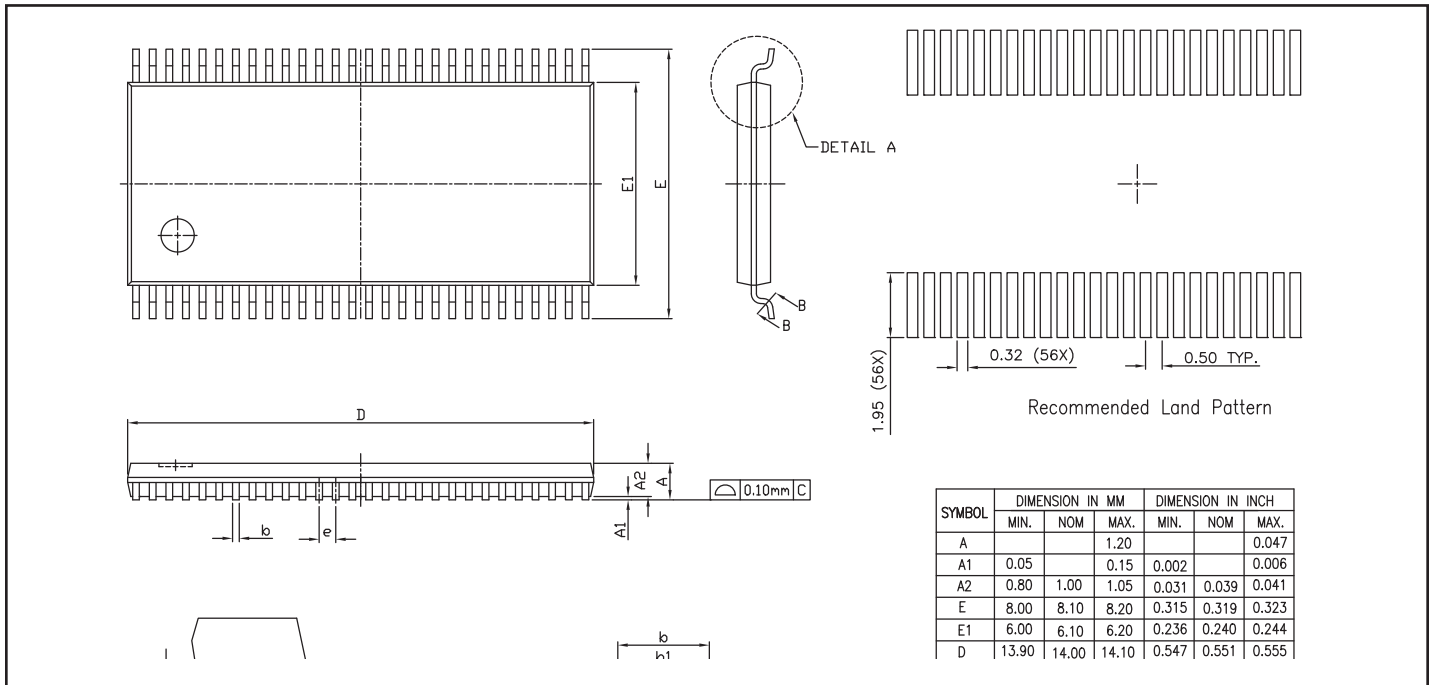
Switching Characteristics over Operating Range

Parameters	Description	Test Condiditons	V _{CC} = 3.0 to 3.6V		Units
			Min.	Max.	
f _{CLK}	Clock Frequency		0	150	MHz
t _w	Pulse Duration	CLK high or low	3.3		ns
t _s	Setup Time	S0, S1 before CLK↑	1.9		
		$\overline{\text{CLKEN}}$ before CLK↑	1.9		
t _h	Hold Time	S0, S1 after CLK↑	1		
		$\overline{\text{CLKEN}}$ after CLK↑	1.8		
t _{en}	Enable Time	CLK to B1, B2	1	5	
t _{dis}	Disable Time	CLK to B1, B2	1	6	
tpd ₁ ^(1,2)	Propagraion Delay	A to B		0.25	
tpd ₂	Propagraion Delay	CLK to A	1	4.5	

Notes:

- This parameter is guaranteed by design but not tested.
- The bus switch contributes no propagational delay other than the RC delay of On-Resistance of the switch and the load capacitance.

Packaging Mechanical: 56-pin TSSOP (A)



Applications Information

Logic Inputs

The logic control inputs can be driven up to +3.6V regardless of the supply voltage. For example, given a + 3.3V supply, IN may be driven low to 0V and high to 3.6V. Driving IN Rail-to-Rail® minimizes power consumption.

Power-Supply Sequencing and Hot-Plug Information

Proper power-supply sequencing is recommended for all CMOS devices. Always apply V_{CC} and GND before applying signals to input/output or control pins.

Ordering Information

Ordering Code	Package Code	Package Description
PI3B16232A	A	240-mil TSSOP
PI3B16232AE	A	Pb-free & Green, 240-mil TSSOP

Notes:

- Thermal characteristics can be found on the company web site at www.pericom.com/packaging/
- E = Pb-free & Green
- Adding an X suffix = Tape/Reel