8:1 Mux/DeMux Bus Switch

Description

The PI5C3251 is a Dual 8:1 Multiplexer/Demultiplexer with three-state outputs that is pinout compatible with the PI74FCT251T, 74F251, and 74ALS/AS/LS 251. Inputs can be connected to outputs with low on resistance (5Ω) with no additional ground bounce noise or propagation delay.

Block Diagram

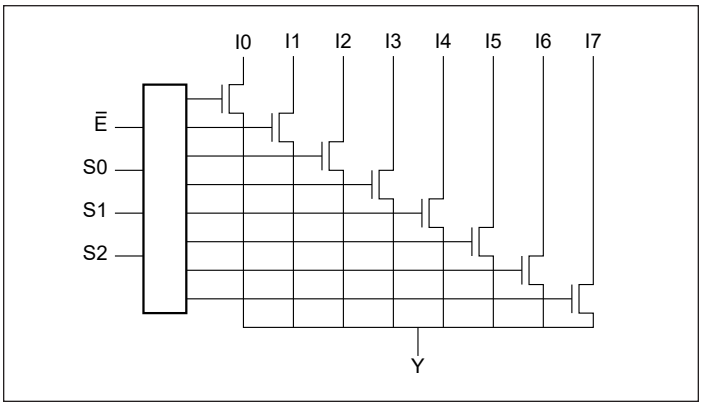


Table 1. Truth Table

Select					Function
E	S2	S1	S0	Y	
H	X	X	X	Hi-Z	Disable
L	L	L	L	I0	S2-S0 = 0
L	L	L	H	I1	S2-S0 = 1
L	L	H	L	I2	S2-S0 = 2
L	L	H	H	I3	S2-S0 = 3
L	H	L	L	I4	S2-S0 = 4
L	H	L	H	I5	S2-S0 = 5
L	H	H	L	I6	S2-S0 = 6
L	H	H	H	I7	S2-S0 = 7

Note:
1. H = High Voltage Level, L = Low Voltage Level

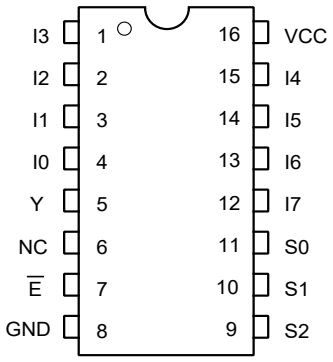
Features

- Near-Zero propagation delay
- 5Ω switches connect inputs to outputs
- Direct bus connection when switches are ON
- Ultra Low Quiescent Power (0.2µA typical)
  - Ideally suited for notebook applications
- Pin compatible with 74 series 251 logic devices
- Packaging (Pb-free & Green):
  - 16-pin, 150-mil wide plastic, QSOP (Q)
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)
- For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please contact us or your local Diodes representative.
  https://www.diodes.com/quality/product-definitions/

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
2. See https://www.diodes.com/quality/lead-free/ for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.

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Pin Configuration



Pin Description

Pin Number	Pin Name	Description
4	I0	Data Input
3	I1	Data Input
2	I2	Data Input
1	I3	Data Input
15	I4	Data Input
14	I5	Data Input
13	I6	Data Input
12	I7	Data Input
11	S0	Select Input
10	S1	Select Input
9	S2	Select Input
7	$\overline{E}$	Enable
5	Y	Data Outputs
8	GND	Ground
16	V_{CC}	Power

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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	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°C to +85°C, V_{CC} = 5V ±5%

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	
I_{OZH}	High Impedance Output Current	0 ≤ I, Y ≤ V_{CC}			±1	
V_{IK}	Clamp Diode Voltage	V_{CC} = Min., I_{IN} = –18mA		–0.7	–1.2	V
I_{OS}	Short Circuit Current[3]	I (Y) = 0V, Y (I) = V_{CC}	100			mA
V_H	Input Hysteresis at Control Pins			150		mV
R_{ON}	Switch On-Resistance[4]	V_{CC} = Min., V_{IN} = 0.0V, I_{ON} = 48mA		5	7	Ω
		V_{CC} = Min., V_{IN} = 2.4V, I_{ON} = 15mA		10	15	

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 I and Y pin at indicated current through the switch. On-Resistance is determined by the lower of the voltages on the two (I,Y) pins.

Capacitance

T_A = 25°C, f = 1MHz

Parameters[1]	Description	Test Conditions	Typ.	Max.	Units
C_{IN}	Input Capacitance	V_{IN} = 0V		6	pF
$C_{I(OFF)}$	I_o - I_7 Capacitance, Switch Off			6	
$C_{Y(OFF)}$	Y Capacitance, Switch Off			48	
$C_{I(ON)}$	I_o - I_7 Capacitance, Switch On		35	54	

Notes:

1. This parameter is determined by device characterization but is not production tested.

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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}		0.1	3.0	µA
ΔI_{CC}	Supply Current per Input @ TTL HIGH	V_{CC} = Max.	V_{IN} = 3.4V[3]			2.5	mA
I_{CCD}	Supply Current per Input per MHz[4]	V_{CC} = Max., I and Y Pins Open $\overline{E}$ = GND, 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 Vcc = 5.0V, +25°C ambient.
3. Per TTL driven input (V_{IN} = 3.4V, control inputs only); I and Y pins do not contribute to Icc.
4. This current applies to the control inputs only and represent the current required to switch internal capacitance at the specified frequency. The I and Y 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

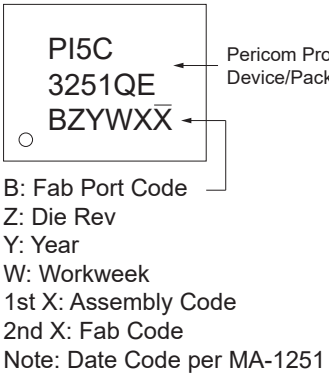
Parameters	Description	Conditions	Com.		Unit
			Min.	Max.	
t_{IY}	Propagation Delay,[1,2] In to Y	C_L = 50pF R_L = 500Ω		0.25	ns
t_{SY}	Bus Select Time, Sn to Y		0.5	6.6	
t_{PZH} t_{PZL}	Bus Enable Time, $\overline{E}$ to Y		0.5	6.0	
t_{PHZ} t_{PLZ}	Bus Disable Time, $\overline{E}$ to Y		0.5	6.0	

Notes:

1. This parameter is guaranteed but not tested on Propagation Delays.
2. 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 50pF 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.

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Part Marking

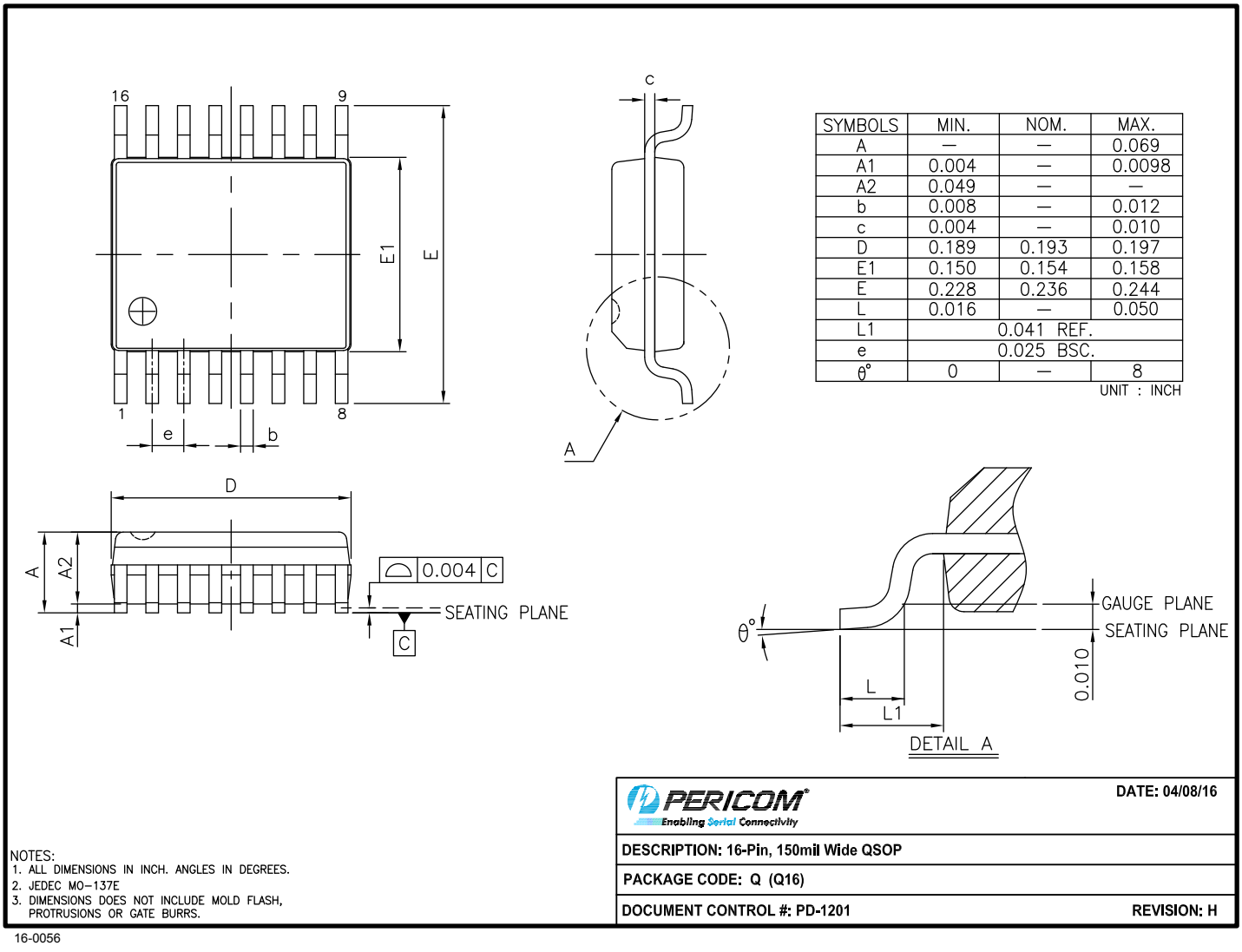


Note: Date Code per MA-1251

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Packaging Mechanical

16-QSOP (Q)



SYMBOLS	MIN.	NOM.	MAX.
A	—	—	0.069
A1	0.004	—	0.0098
A2	0.049	—	—
b	0.008	—	0.012
c	0.004	—	0.010
D	0.189	0.193	0.197
E1	0.150	0.154	0.158
E	0.228	0.236	0.244
L	0.016	—	0.050
L1		0.041 REF.	
e		0.025 BSC.	
θ°	0	—	8

UNIT : INCH

NOTES:
1. ALL DIMENSIONS IN INCH. ANGLES IN DEGREES.
2. JEDEC MO–137E
3. DIMENSIONS DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.

PERICOM Enabling Serial Connectivity

DATE: 04/08/16

DESCRIPTION: 16-Pin, 150mil Wide QSOP

PACKAGE CODE: Q (Q16)

DOCUMENT CONTROL #: PD-1201 REVISION: H

16-0056

For latest package info.

please check: http://www.diodes.com/design/support/packaging/pericom-packaging/packaging-mechanicals-and-thermal-characteristics/

Mechanical Data

- Surface Mount Package
- Case Material: Molded Plastic, UL Flammability Rating 94V-0
- Terminals: Finish - Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.0813 grams (Approximate)
- Max Soldering Temperature 260°C for 30secs as per JEDEC J-STD-020

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Ordering Information

Orderable Part Number	Package Code	Package Description
PI5C3251QEX	Q	16-pin, 150-mil Wide (QSOP)

Notes:

1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
2. See https://www.diodes.com/quality/lead-free/ for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
4. E = Pb-free and Green
5. X suffix = Tape/Reel

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