

**2.5V/3.3V, High Bandwidth, Hot Insertion 8-Bit, 2-Port, Bus Switch**

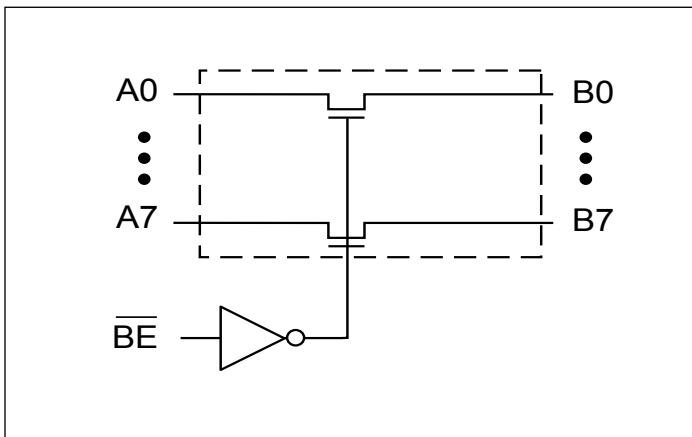
**Features**

- Near-Zero propagation delay
- 5-ohm switches connect inputs to outputs
- High Bandwidth Operation (>400 MHz)
- Permits Hot Insertion
- 5V I/O Tolerant
- Rail-to-Rail 3.3V or 2.5V Switching
- 2.5V Supply Voltage Operation
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. “Green” Device (Note 3)
- Packaging (Pb-free & Green):
  - 20-pin 173 mil wide plastic TSSOP (L)
  - 20-pin 150mil Wide plastic QSOP (Q)

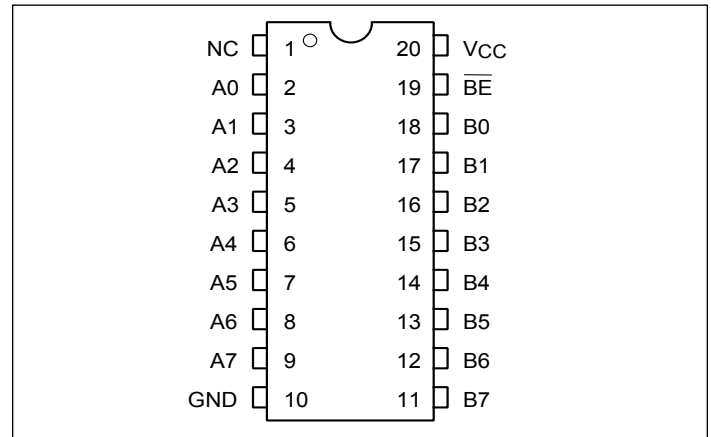
**Description**

Diodes' PI3C3245 is a 2.5 volt or 3.3 volt 8-bit, 2-port bus switch designed with a low On-Resistance (5-ohm) allowing inputs to be connected directly to outputs. The bus switch creates no additional propagational delay or additional ground bounce noise. The switches are turned ON by the Bus Enable ( $\overline{BE}$ ) input signal. It is very useful in switching signals that have high bandwidth (>400 MHz).

**Block Diagram**



**Pin Configuration**



**Truth Table<sup>(1)</sup>**

Function	$\overline{BE}$	A0-7
Disconnect	H	Hi-Z
Connect	L	B0-7

Note: H = High Voltage Level  
L = Low Voltage Level  
Hi-Z = High Impedance

**Pin Description**

Pin Name	Description
$\overline{BE}$	Bus Enable Input (Active LOW)
A0-7	Bus A
B0-7	Bus B
GND	Ground
V <sub>CC</sub>	Power

**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.

## Maximum Ratings

(Above which 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 <sub>CC</sub> Only) ..	-0.5V to 4.6V
Supply Voltage to Ground Potential (Outputs&D/O Only)	-0.5V to 4.6V
DC Input 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<sub>A</sub> = -40°C to +85°C, V<sub>CC</sub> = 3.3V ±10%)

Parameters	Description	Test Conditions <sup>(1)</sup>	Min.	Typ. <sup>(2)</sup>	Max.	Units
V <sub>IH</sub>	Input HIGH Voltage	Guaranteed Logic HIGH Level	2.0			V
V <sub>IL</sub>	Input LOW Voltage	Guaranteed Logic LOW Level	-0.5		0.8	V
I <sub>IH</sub>	Input HIGH Current	V <sub>CC</sub> = Max., V <sub>IN</sub> = V <sub>CC</sub>			±1	μA
I <sub>IL</sub>	Input LOW Current	V <sub>CC</sub> = Max., V <sub>IN</sub> = GND			±1	
I <sub>OZH</sub> <sup>(3)</sup>	High Impedance Output Current	0 ≤ A, B ≤ V <sub>CC</sub>			±1	
V <sub>IK</sub>	Clamp Diode Voltage	V <sub>CC</sub> = Min., I <sub>IN</sub> = -18 mA		-0.73	-1.2	V
R <sub>ON</sub>	Switch On Resistance <sup>(4)</sup>	V <sub>CC</sub> = Min., V <sub>IN</sub> = 0.0V, I <sub>ON</sub> = 48mA		5	7	Ω
		V <sub>CC</sub> = Min., V <sub>IN</sub> = 2.4V, I <sub>ON</sub> = 15mA		8	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<sub>CC</sub> = 3.3V, T<sub>A</sub> = 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.

## Capacitance (T<sub>A</sub> = 25°C, f = 1 MHz)

Parameters <sup>(1)</sup>	Description	Test Conditions	Typ.	Units
C <sub>IN</sub>	Input Capacitance	V <sub>IN</sub> = 0V	3.5	pF
C <sub>OFF</sub>	A/B Capacitance, Switch Off	V <sub>IN</sub> = 0V	5.0	pF
C <sub>ON</sub>	A/B Capacitance, Switch On	V <sub>IN</sub> = 0V	10.0	pF

**Notes:**

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

### Power Supply Characteristics

Parameters	Description	Test Conditions <sup>(1)</sup>		Min.	Typ. <sup>(2)</sup>	Max.	Units
I <sub>CC</sub>	Quiescent Power Supply Current	V <sub>CC</sub> = Max.	V <sub>IN</sub> = GND or V <sub>CC</sub>		260	500	μA
ΔI <sub>CC</sub>	Supply Current per Input HIGH	V <sub>CC</sub> = Max.	V <sub>IN</sub> = 3.0V <sup>(3)</sup>			750	

Notes:

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

### Switching Characteristics over 3.3V Operating Range

Parameters	Description	Test Conditions <sup>(1)</sup>	PI3C3245		Units
			Com.		
			Min.	Max.	
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay <sup>(1,2)</sup> Ax to Bx	C <sub>L</sub> = 50 pF R <sub>L</sub> = 500Ω		0.25	ns
t <sub>PZH</sub> t <sub>PZL</sub>	Bus Enable Time $\overline{\text{BE}}$ to Ax or Bx	C <sub>L</sub> = 50 pF R <sub>L</sub> = 500Ω	1.5	6.5	
t <sub>PHZ</sub> t <sub>PLZ</sub>	Bus Disable Time $\overline{\text{BE}}$ to Ax or Bx	R = 500Ω	1.5	5.5	

Notes:

- This parameter is guaranteed but not tested on Propagation Delays.
- 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 0.25 ns for 50 pF 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.

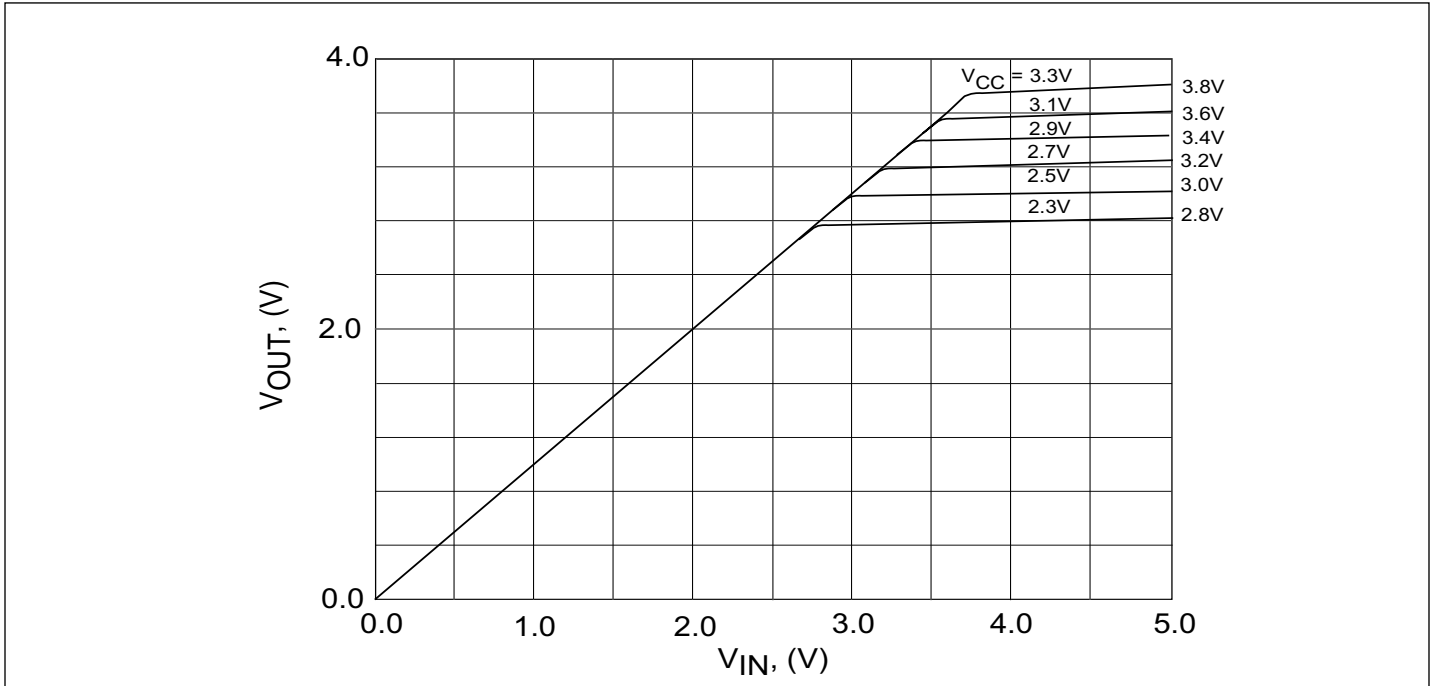
### Switching Characteristics over 2.5V Operating Range

Parameters	Description	Test Conditions <sup>(1)</sup>	PI3C3245		Units
			Com.		
			Min.	Max.	
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay <sup>(1,2)</sup> Ax to Bx	C <sub>L</sub> = 50 pF R <sub>L</sub> = 500Ω		0.25	ns
t <sub>PZH</sub> t <sub>PZL</sub>	Bus Enable Time $\overline{\text{BE}}$ to Ax or Bx	C <sub>L</sub> = 50 pF R <sub>L</sub> = 500Ω	1.5	9.8	
t <sub>PHZ</sub> t <sub>PLZ</sub>	Bus Disable Time $\overline{\text{BE}}$ to Ax or Bx	R = 500Ω	1.5	8.3	

Notes:

- This parameter is guaranteed but not tested on Propagation Delays.
- 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 0.25 ns for 50 pF 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.

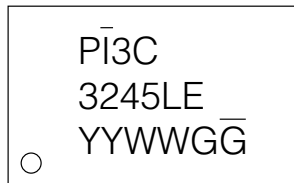
**PI3C3245**



**Output Voltage vs. Input Voltage over Various Supply Voltages**

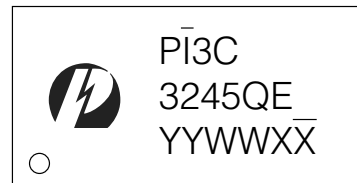
**Part Marking**

L Package



YYWW: Date Code (Year & Workweek)  
 1st G: Assembly Site Code  
 2nd G: Wafer Fab Site Code  
 The Bar above 2nd "G" means Cu wire  
 The Bar above "L" means Fab3 of MGN

Q Package



YY: Year  
 WW: Workweek  
 1st X: Assembly Site Code  
 2nd X: Fab Site Code  
 The Bar above "E" means Fab3 of MGN  
 The Bar above fab code means Cu wire

**PI3C3245**

**Packaging Mechanical: 20-TSSOP (L)**

SYMBOLS	MIN.	NOM.	MAX.
A	—	—	1.20
A1	0.05	—	0.15
A2	0.80	1.00	1.05
b	0.19	—	0.30
C	0.09	—	0.20
D	6.40	6.50	6.60
E1	4.30	4.40	4.50
E	6.20	6.40	6.60
e	0.65 BSC		
L1	1.00 REF		
L	0.45	0.60	0.75
S	0.20	—	—
$\theta$	0°	—	8°

**NOTES:**  
 1. ALL DIMENSIONS IN MILLIMETERS. ANGLES IN DEGREES.  
 2. JEDEC MO-153F  
 3. DIMENSIONS DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.

**PERICOM**  
Enabling Serial Connectivity

DATE: 03/31/16

DESCRIPTION: 20-Pin, 173mil Wide TSSOP

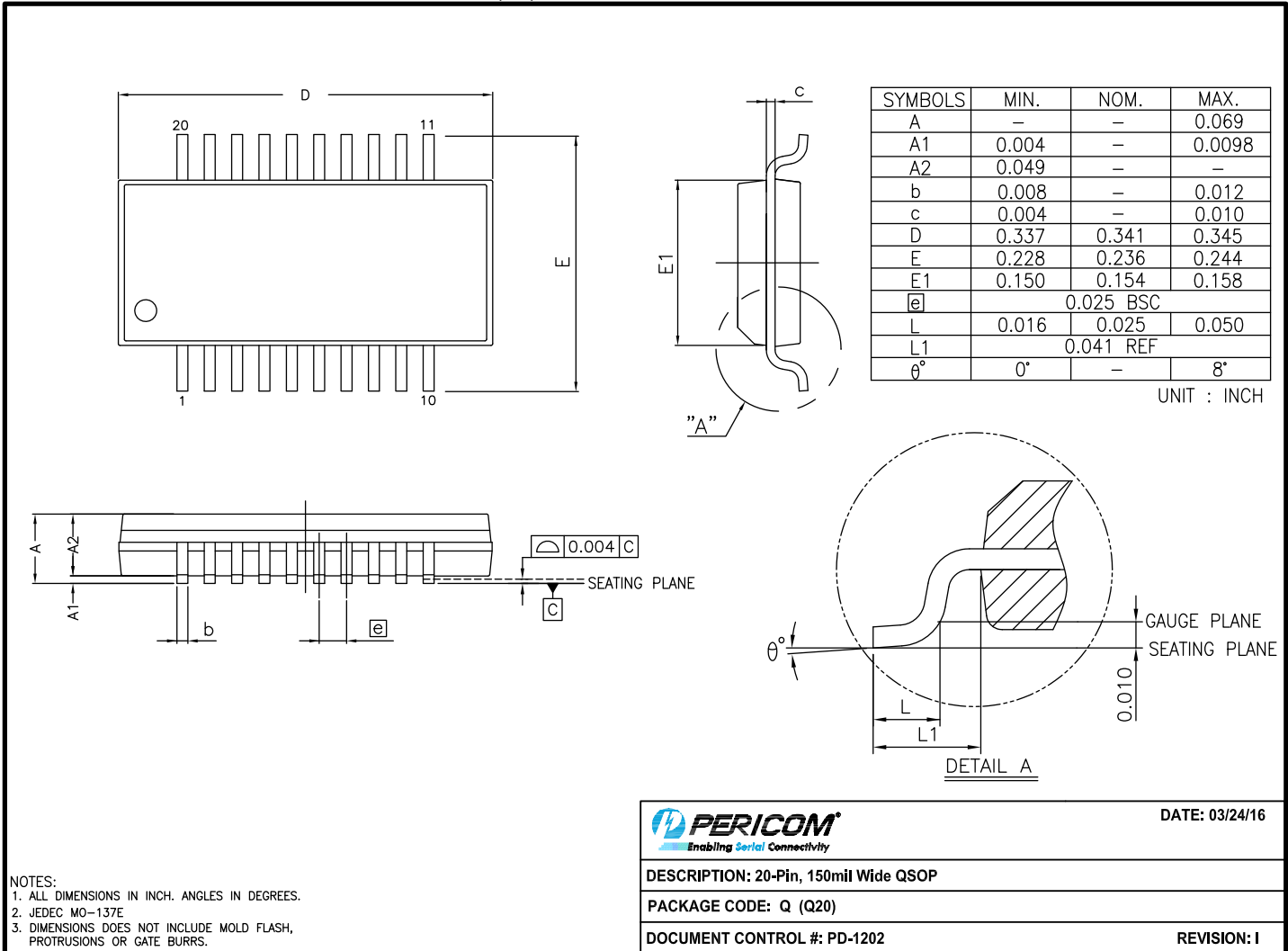
PACKAGE CODE: L (L20)

DOCUMENT CONTROL #: PD-1311

REVISION: G

16-0074

**Packaging Mechanical: 20-QSOP (Q)**



**PERICOM**  
Enabling Serial Connectivity

DATE: 03/24/16

DESCRIPTION: 20-Pin, 150mil Wide QSOP

PACKAGE CODE: Q (Q20)

DOCUMENT CONTROL #: PD-1202

REVISION: I

For latest package info.  
 please check: <http://www.diodes.com/design/support/packaging/pericom-packaging/packaging-mechanicals-and-thermal-characteristics/>

**Ordering Information**

Ordering Code	Package Code	Package Type
PI3C3245LEX	L	20-Pin, 173mil Wide (TSSOP)
PI3C3245QEX	Q	20-Pin, 150mil 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

**IMPORTANT NOTICE**

DIODES INCORPORATED MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARDS TO THIS DOCUMENT, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION).

Diodes Incorporated and its subsidiaries reserve the right to make modifications, enhancements, improvements, corrections or other changes without further notice to this document and any product described herein. Diodes Incorporated does not assume any liability arising out of the application or use of this document or any product described herein; neither does Diodes Incorporated convey any license under its patent or trademark rights, nor the rights of others. Any Customer or user of this document or products described herein in such applications shall assume all risks of such use and will agree to hold Diodes Incorporated and all the companies whose products are represented on Diodes Incorporated website, harmless against all damages.

Diodes Incorporated does not warrant or accept any liability whatsoever in respect of any products purchased through unauthorized sales channel.

Should Customers purchase or use Diodes Incorporated products for any unintended or unauthorized application, Customers shall indemnify and hold Diodes Incorporated and its representatives harmless against all claims, damages, expenses, and attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized application.

Products described herein may be covered by one or more United States, international or foreign patents pending. Product names and markings noted herein may also be covered by one or more United States, international or foreign trademarks.

This document is written in English but may be translated into multiple languages for reference. Only the English version of this document is the final and definitive format released by Diodes Incorporated.

**LIFE SUPPORT**

Diodes Incorporated products are specifically not authorized for use as critical components in life support devices or systems without the express written approval of the Chief Executive Officer of Diodes Incorporated. As used herein:

A. Life support devices or systems are devices or systems which:

1. are intended to implant into the body, or

2. support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in significant injury to the user.

B. A critical component is any component in a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or to affect its safety or effectiveness.

Customers represent that they have all necessary expertise in the safety and regulatory ramifications of their life support devices or systems, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of Diodes Incorporated products in such safety-critical, life support devices or systems, notwithstanding any devices- or systems-related information or support that may be provided by Diodes Incorporated. Further, Customers must fully indemnify Diodes Incorporated and its representatives against any damages arising out of the use of Diodes Incorporated products in such safety-critical, life support devices or systems.

Copyright © 2016, Diodes Incorporated

[www.diodes.com](http://www.diodes.com)