

DESCRIPTION

The AP62200 is a 2A, synchronous buck converter with a wide input voltage range of 4.2V to 18V. The device fully integrates a 90mΩ high-side power MOSFET and a 65mΩ low-side power MOSFET to provide high-efficiency step-down DC/DC conversion.

The AP62200 device is easily used by minimizing the external component count due to its adoption of Constant On-Time (COT) control to achieve fast transient response, easy loop stabilization, and low output voltage ripple.

The AP62200 design is optimized for Electromagnetic Interference (EMI) reduction. It has a proprietary gate driver scheme to resist switching node ringing without sacrificing MOSFET turn-on and turn-off times, which reduces high-frequency radiated EMI noise caused by MOSFET switching.

The AP62200 requires a minimal number of external components and are available in a space-saving SOT563 package.

FEATURES

- V_{IN} Range: 4.2V -18V
- Output Voltage range: 0.8V to 7V
- 740kHz Switching Frequency
- Fully Integrated High-side/Low-side Power MOSFETs: 90mΩ/65mΩ
- Low Quiescent Current 135μA
- Cycle-by-Cycle Current Limiting
- Internal Soft-Start Limits the inrush current: 2.5mS
- Available in a SOT563 package
- Totally Lead-Free & Fully RoHS Compliant
- Halogen and Antimony Free. "Green" Device

APPLICATIONS

- Flat Screen TV Sets and Monitors
- Set Top Boxes
- Consumer Electronics
- Network Systems
- General Purposes

TYPICAL APPLICATIONS CIRCUIT

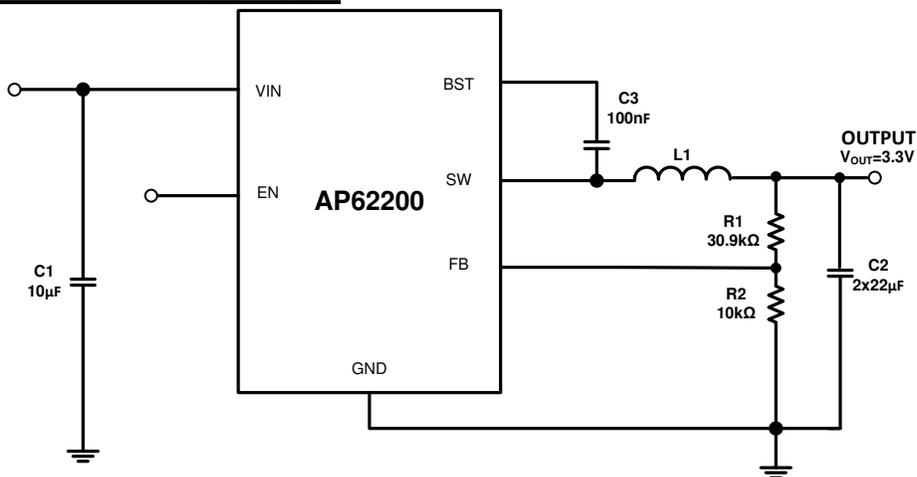


Figure 1. Typical Application Circuit

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Rating	Unit
V_{IN}	Supply Voltage	-0.3 to +20	V
V_{SW}	Switch Node Voltage	-1.0 to $V_{IN}+0.3$	V
V_{BST}	Bootstrap Voltage	$V_{SW}-0.3$ to $V_{SW}+6.0$	V
V_{FB}	Feedback Voltage	-0.3V to +6.0	V
V_{EN}	Enable/UVLO Voltage	-0.3V to +6.0	V
T_{ST}	Storage Temperature	-65 to +150	°C
T_J	Junction Temperature	+125	°C
T_L	Lead Temperature	+260	°C
ESD Susceptibility			
HBM	Human Body Mode	2000	V
CDM	Device Charged Model	500	V

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Rating	Unit
V_{IN}	Supply Voltage	4.2 to 18	V
V_{OUT}	Output Voltage Range	0.8 to 7	V
T_A	Operating Ambient Temperature	-40 to +85	°C
T_J	Operating Junction Temperature	-40 to +125	°C

SETTING OUTPUT VOLTAGE:

Table 1 shows a list of recommended component selections for common output voltages.

V _{OUT}	R1	R2	L1
1.0V	5.5KΩ	22.1KΩ	2.2μH
1.2V	11.0KΩ	22.1KΩ	2.2μH
1.5V	19.1KΩ	22.1KΩ	2.2μH
1.8V	27.4KΩ	22.1KΩ	3.3μH
2.5V	47.5KΩ	22.1KΩ	3.3μH
3.3V	69.8KΩ	22.1KΩ	3.3μH
5.0V	115KΩ	22.1KΩ	4.7μH

Table 1. Common Output Voltages

EVALUATION BOARD

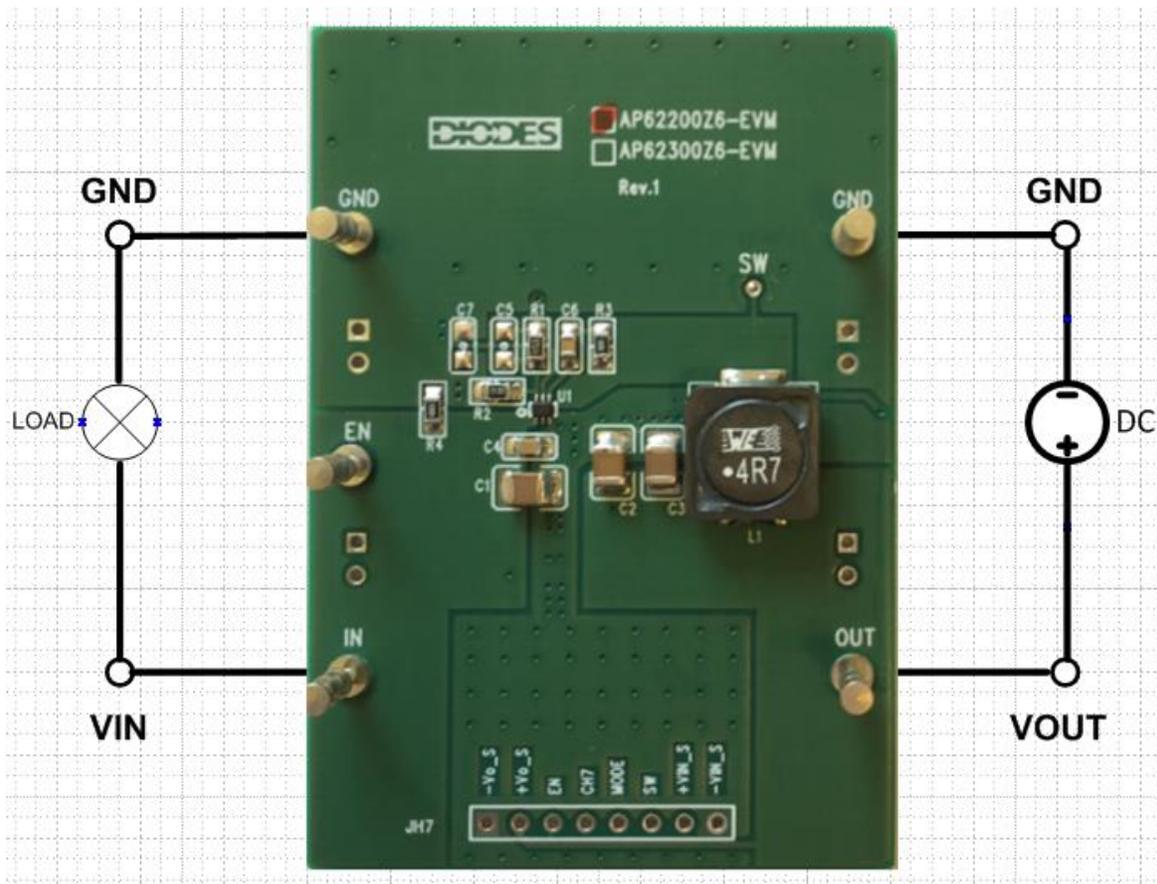


Figure 2. AP62200Z6-EVM

QUICK START GUIDE

The AP62200Z6-EVM has a simple layout and allows access to the appropriate signals through test points. To evaluate the performance of the AP62200Z6, follow the procedure below:

1. Connect a power supply to the input terminals V_{IN} and GND. Set V_{IN} to 12V.
2. Connect the positive terminal of the electronic load to V_{OUT} and negative terminal to GND.
3. EN has a positive voltage through a 100K pull-up to V_{IN} . No supply input is required for EN.
4. The evaluation board should now power up with a 5.0V output voltage.
5. Check for the proper output voltage of 5.0V ($\pm 1\%$) at the output terminals V_{OUT} and GND. Measurement can also be done with a multimeter with the positive and negative leads between V_{OUT} and GND.
6. Set the load to 2A through the electronic load. Check for the stable operation of the SW signal on the oscilloscope. Measure the switching frequency.

MEASUREMENT/PERFORMANCE GUIDELINES:

- 1) When measuring the output voltage ripple, maintain the shortest possible ground lengths on the oscilloscope probe. Long ground leads can erroneously inject high frequency noise into the measured ripple.
- 2) For efficiency measurements, connect an ammeter in series with the input supply to measure the input current. Connect an electronic load to the output for output current.

EVALUATION BOARD SCHEMATIC

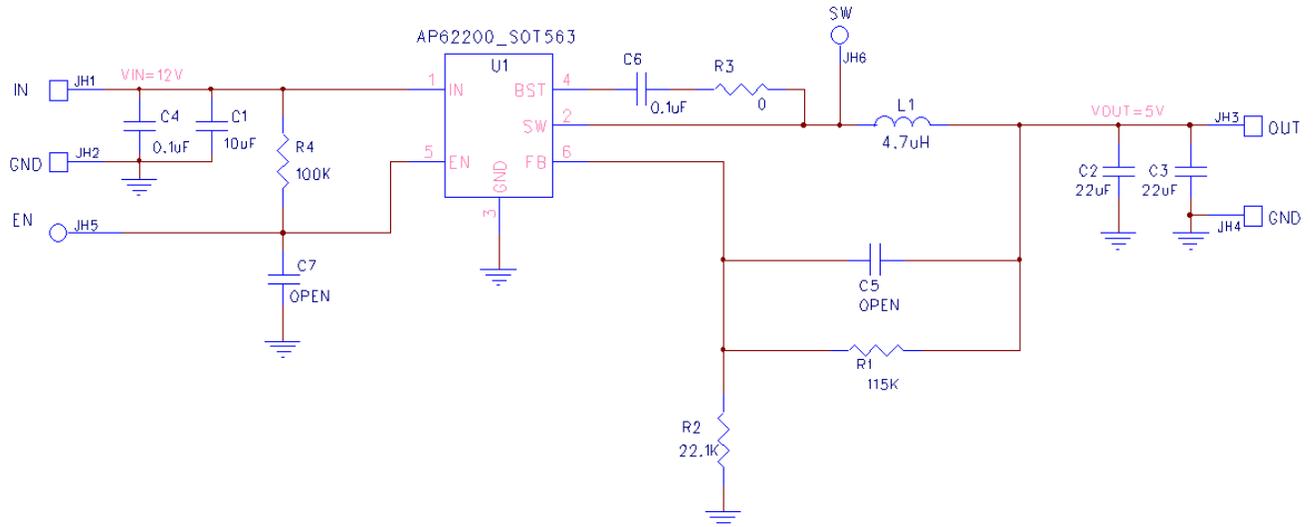


Figure 3. AP62200Z6-EVM Schematic

PCB TOP LAYOUT

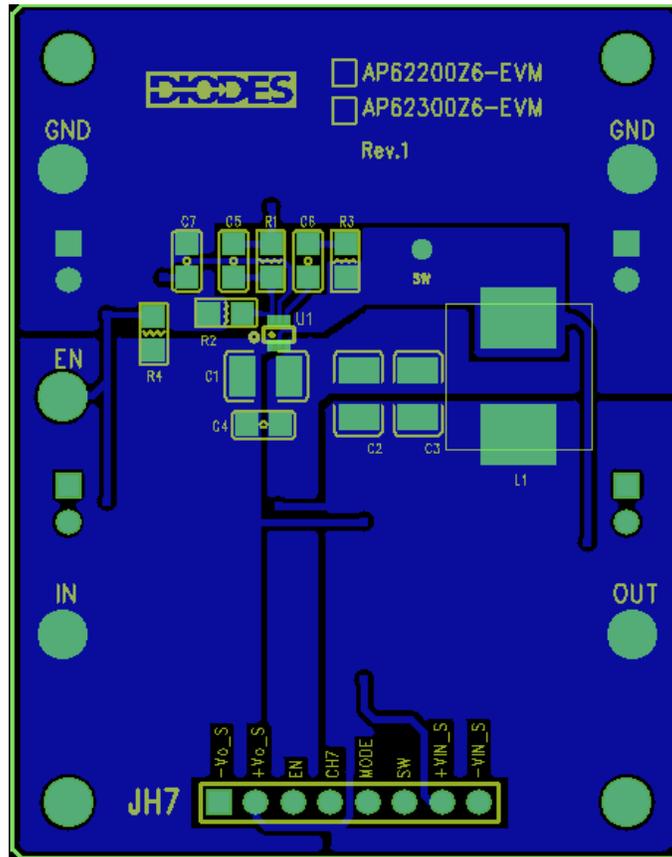


Figure 4. AP62200Z6-EVM – Top Layer

PCB BOTTOM LAYOUT

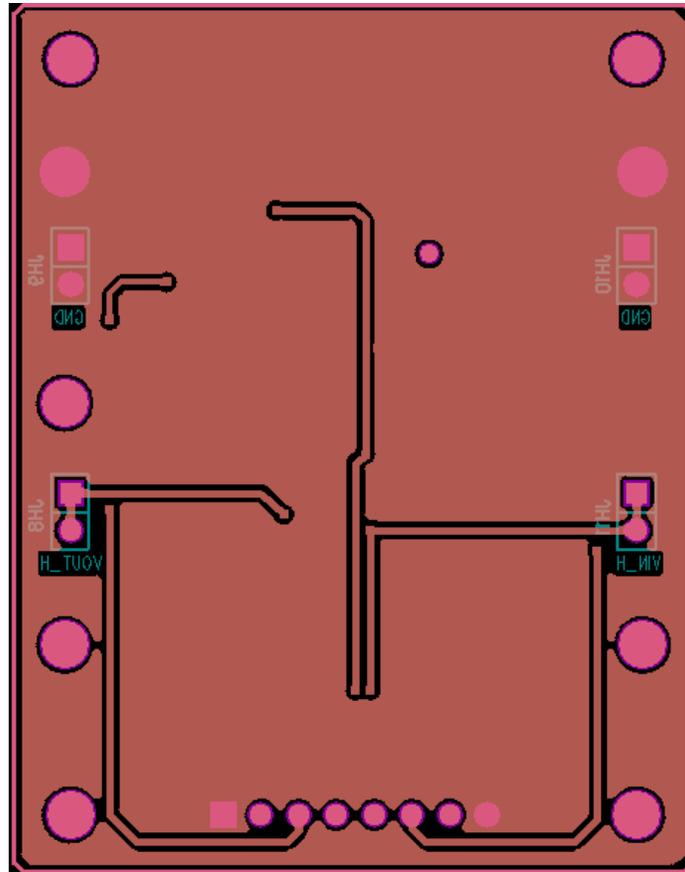
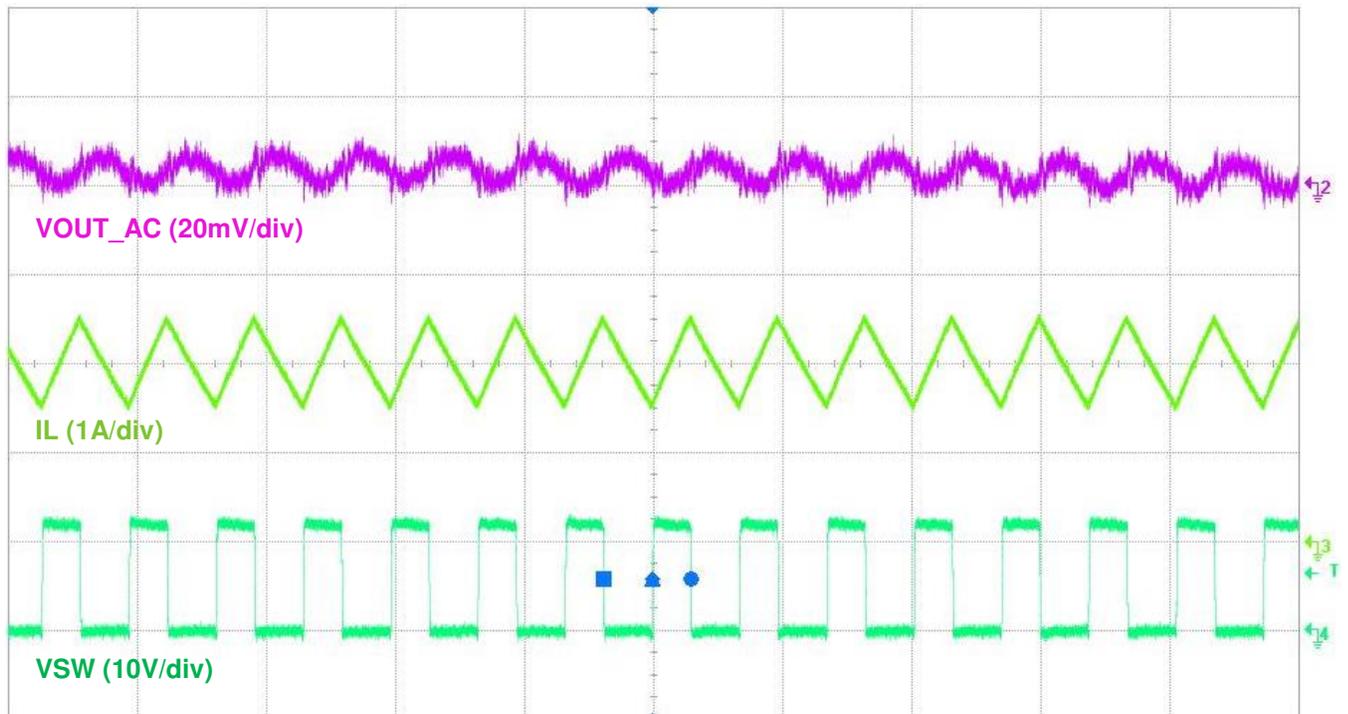
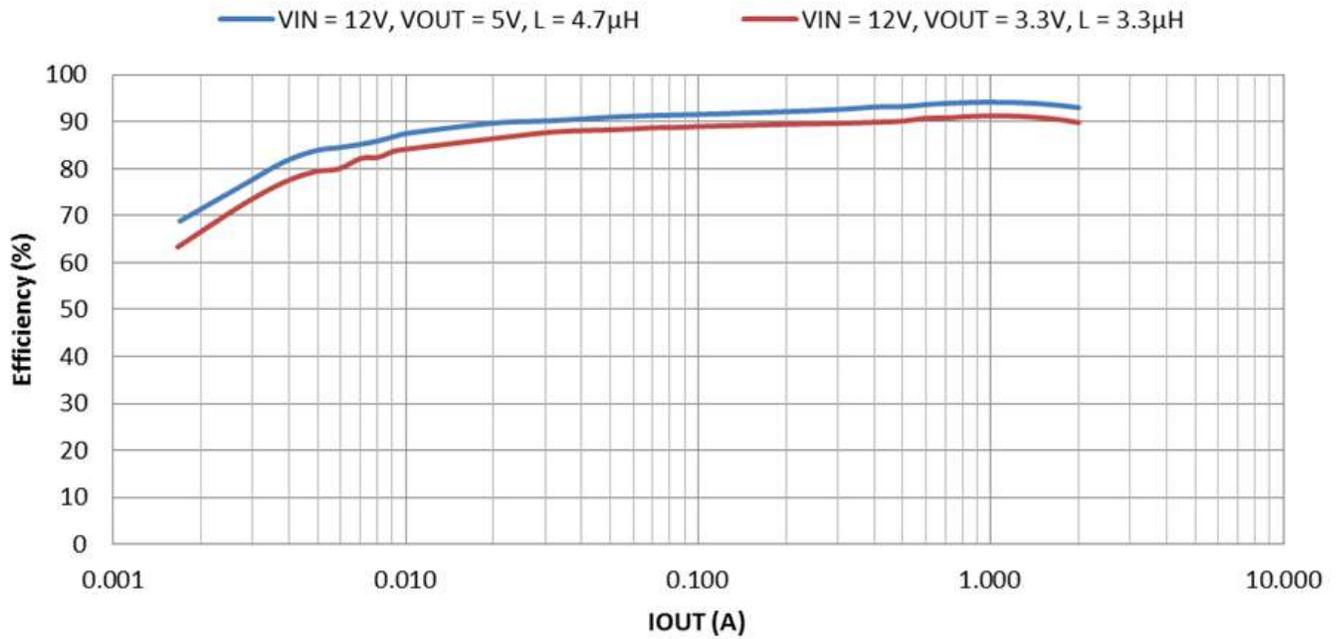


Figure 5. AP62200Z6-EVM – Bottom Layer

BILL OF MATERIALS for AP62200Z6-EVM for V_{OUT}=5V

Ref	Value	Description	Qty	Size	Vendor Name	Manufacturer PN
C1	10 μ F	Ceramic Capacitor, 25V, X5R	1	1210	Murata	GRM32DR61E106KA12L
C2, C3	22 μ F	Ceramic Capacitor, 25V, X5R	2	1210	AVX	12103D226KAT2A
C4, C6	0.1 μ F	Ceramic Capacitor, 25V, X7R, 10%	2	0805	Samsung	CL21B104KACNNNC
L1	4.7 μ H	DCR=19.5m Ω , Ir=6.2A	1	10.2X10.2x4.5mm	Würth Electronics	744779747
R1	115K Ω	Film Resistor, 1%	1	0805	Panasonic	ERJ-6ENF1153V
R2	22.1K Ω	Film Resistor, 1%	1	0805	Panasonic	ERJ-6ENF2212V
R3	0 Ω	Film Resistor, 1%	1	0805	Panasonic	ERJ-6GEY0R00V
R4	100K Ω	Film Resistor, 1%	1	0805	Panasonic	ERJ-6ENF1003V
JH8, JH9, JH10, JH11,	1598	Terminal Turret Triple 0.094" L (Test Points)	4	Through-Hole	Keystone Circuit	1598-2
U1	AP62200	DC/DC converter	1	SOT563	Diodes Inc	AP62200Z6

TYPICAL PERFORMANCE CHARACTERISTICS



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 determinative 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 © 2019, Diodes Incorporated

www.diodes.com