

Features

- High Efficiency: 84% Typical
- 36V High Output Voltage
- Fast 1MHz Switching Frequency
- Low Profile SOT25 Pb-Free Packaging
- SOT25: Available in "Green" Molding Compound (No Br, Sb)
- Lead Free Finish/RoHS Compliant for Lead Free and "Green" products (Note 1)

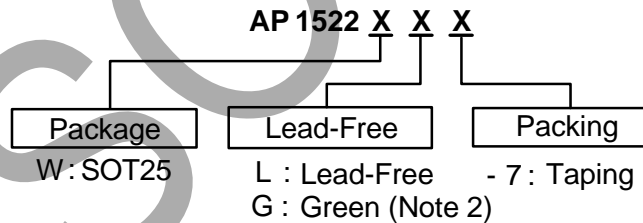
General Description

The AP1522 is a step-up DC/DC converter in a 5-Lead low profile SOT25 package. The AP1522 switches at 1MHz that allows the use of tiny external components. A low 1.25V feedback voltage minimizes power loss in the current setting resistor for better efficiency.


Applications

- Cellular Phones
- PDA's, Hand-held Computers
- Digital Cameras
- LCD Bias Voltage, Battery Backup

Ordering Information



Note: 1. RoHS revision 13.2.2003. Glass and High Temperature Solder Exemptions Applied, see *EU Directive Annex Notes 5 and 7*.
2. Green is for SOT25.

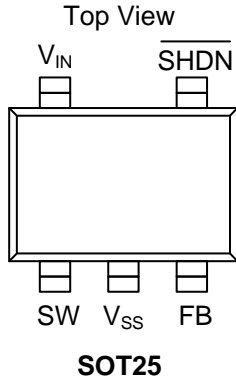
Device (Note 3)	Package Code	Packaging	Tube		-7" Tape and Reel	
			Quantity	Part Number Suffix	Quantity	Part Number Suffix
 AP1522W	W	SOT25	5000	-B	3000/Tape & Reel	-7

Note: 3. Pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be found on our website at <http://www.diodes.com/datasheets/ap02001.pdf>.

OBSOLETE - PART DISCONTINUED

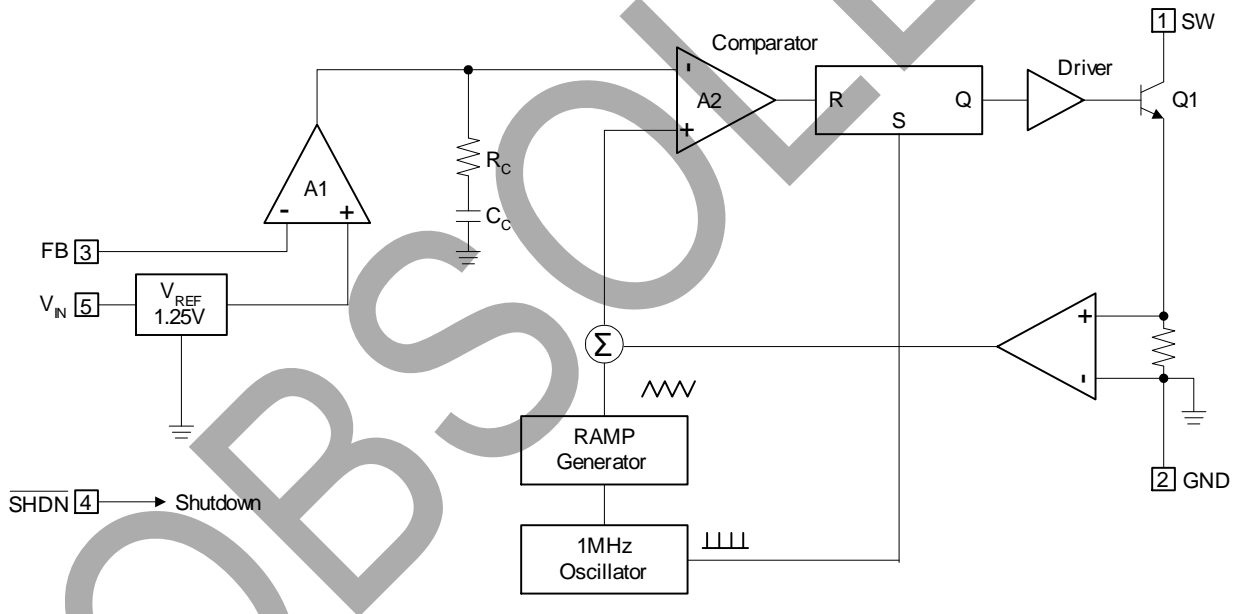
Pin Assignments

Pin Descriptions



Name	Description
SW	Switch Pin. Connect inductor/diode here. Minimize trace area at this pin to reduce EMI.
V _{SS}	GND pin
FB	Feedback Pin. Reference voltage is 1.25V.
$\overline{\text{SHDN}}$	Shutdown Pin. Tie to 0.6V or higher to enable device; 0.5V or less to disable device.
V _{IN}	Input Supply Pin. Must be locally bypassed.

Block Diagram



OBSOLETE - PART DISCONTINUED

Absolute Maximum Ratings

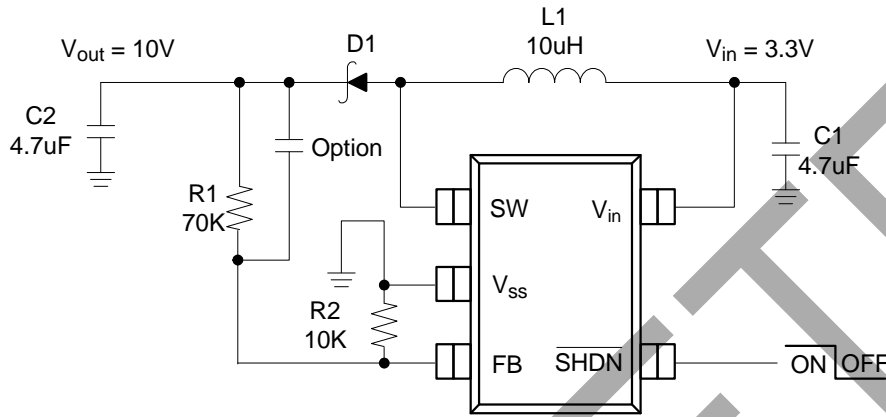
Symbol	Parameter	Rating	Unit
V _{IN}	V _{IN} Pin Voltage	10	V
V _{SW}	SW Voltage	36	V
V _{FB}	Feedback Pin Voltage	10	V
V _{SHDN}	SHDN Pin Voltage	10	V
T _J	Maximum Junction Temperature	125	°C
T _{LEAD}	Lead Temperature (Soldering for 10s.)	300	°C
T _{OPR}	Operating Ambient Temperature Range	0 to +85	°C
T _{STG}	Storage Temperature Range	-40 to +125	°C

Caution: The absolute maximum ratings are rated values exceeding which the product could suffer physical damage. These values must therefore not be exceeded under any conditions.

Electrical Characteristics (T_a = 25°C, V_{IN} = 5V, V_{SHDN} = 5V, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V _{IN}	Minimum Operation Voltage	-	2.5	-	-	V
V _{IN}	Maximum Operation Voltage	-	-	-	10	V
V _{FB}	Feedback Pin Voltage	-	1.225	1.25	1.275	V
I _{FB}	Feedback Pin Bias Current	-	10	45	100	nA
I _{IN}	Supply Current	Operation Current	-	2	3	mA
		V _{SHDN} = 0V	-	0.1	1.0	µA
F _{SW}	Switching Frequency	-	0.75	1.0	1.25	MHz
Duty	PWM Maximum Duty Cycle	-	85	90	-	%
I _{SW}	Switch Current	-	280	320	360	mA
V _{SAT}	Switch V _{SAT}	I _{SW} = 250mA	-	350	-	mV
	Switch Leakage Current	V _{SW} = 5V	-	0.1	5	µA
V _{SHDN}	SHDN Pin Voltage High	Enable	0.6	-	-	V
V _{SHDN}	SHDN Pin Voltage Low	Disable	-	-	0.5	V
I _{SHDN}	SHDN Pin Bios Current	-	-	10	-	µA

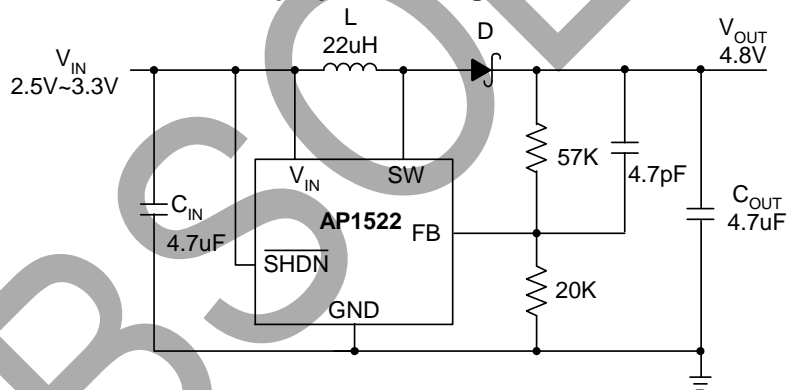
Typical Application Circuit



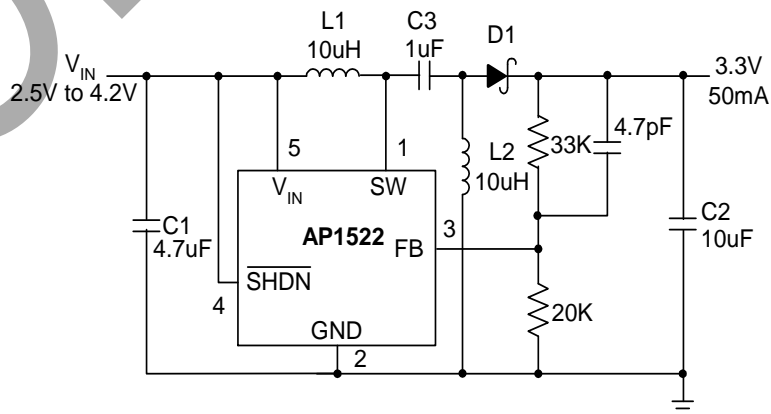
$$V_{OUT} = V_{FB} \left(1 + \frac{R1}{R2} \right)$$

$$1K \leq R2 \leq 50K$$

Step Up DC-DC Regulator

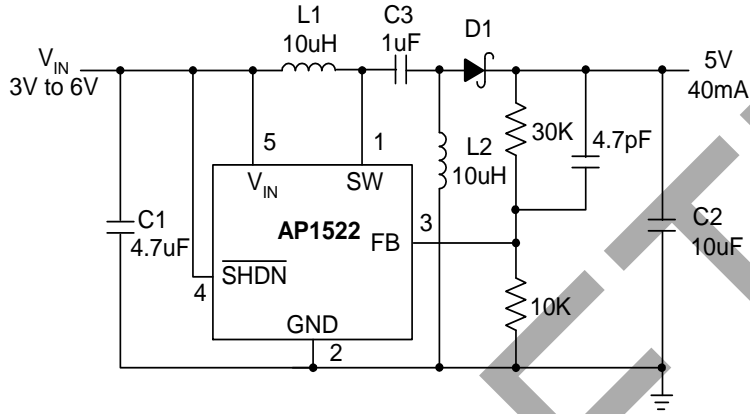


1-Cell Li-Ion to 3.3V SEPIC Converter

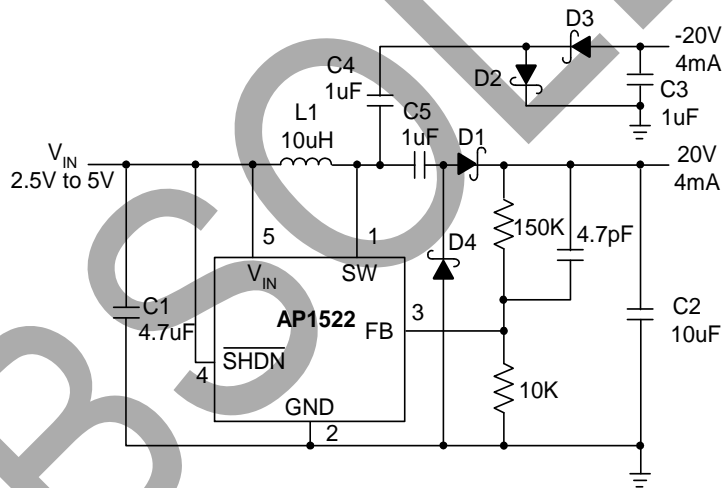


Typical Application Circuit (Continued)

4-Cell to 5V SEPIC Converter



±20V Dual Output Converter with Output Disconnect



OBSOLETE - PART DISCONTINUED

Applications Information

Inductor Selection

A 10 μ H inductor is recommended for most AP1522 applications. Although small size and high efficiency are major concerns, the inductor should have low core losses at 1MHz and low DCR (copper wire resistance).

Capacitor Selection

The small size of ceramic capacitors makes them ideal for AP1522 applications. X5R and X7R types are recommended because they retain their capacitance over wider voltage and temperature ranges than other types such as Y5V or Z5U. A 4.7 μ F input capacitor and a 4.7 μ F output capacitor are sufficient for most AP1522 applications.

Diode Selection

Schottky diodes, with their low forward voltage drop and fast reverse recovery, are the ideal choices for AP1522 applications. The forward voltage drop of a Schottky diode represents the conduction losses in the diode, while the diode capacitance (C_T or C_D) represents the switching losses. For diode selection, both forward voltage drop and diode capacitance need to be considered. Schottky diodes with higher current ratings usually have lower forward voltage drop and larger diode capacitance, which can cause significant switching losses at the 1MHz switching frequency of the AP1522. A Schottky diode rated at 100mA to 200mA is sufficient for most AP1522 applications.

Open-Circuit Protection

In the cases of output open circuit, when the R1 are disconnected from the circuit, the feedback voltage will be zero. The AP1522 will then switch at a high duty cycle resulting in a high output voltage, which may cause the SW pin voltage to exceed its maximum 36V rating. A Zener diode can be used at the output to limit the voltage on the SW pin (Figure 1). The Zener voltage should be larger than the maximum forward voltage of the V_{OUT} . The current rating of the Zener should be larger than 0.1mA.

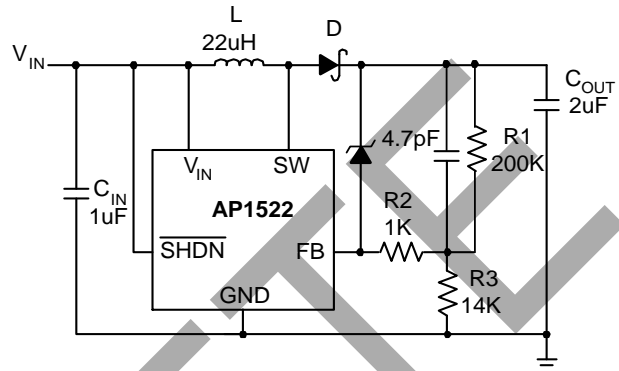


Figure 1. With Open-Circuit Protection

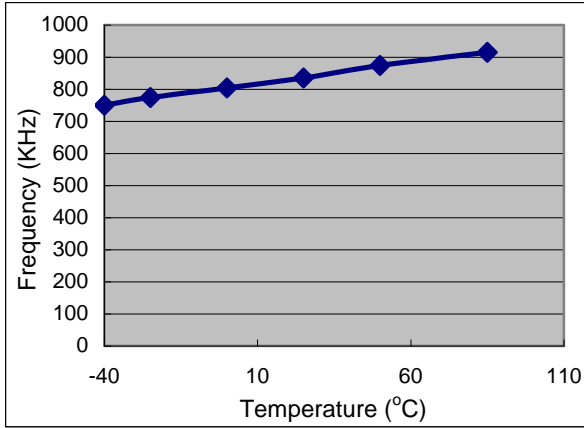
OBSOLETE - PART DISCONTINUED

OBSOLETE

Typical Performance Characteristics

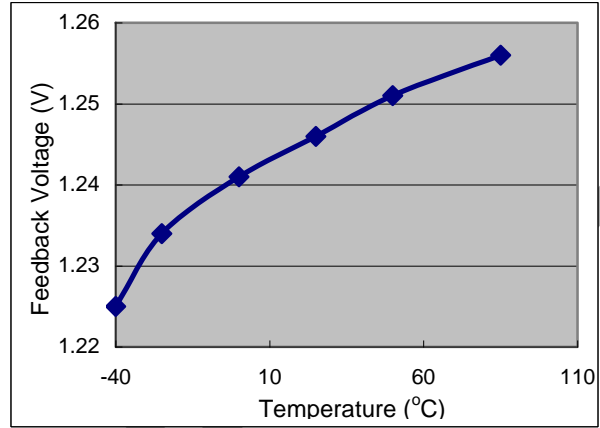
Frequency vs. Temperature

$V_{in} = 5V; V_{out} = 15V$



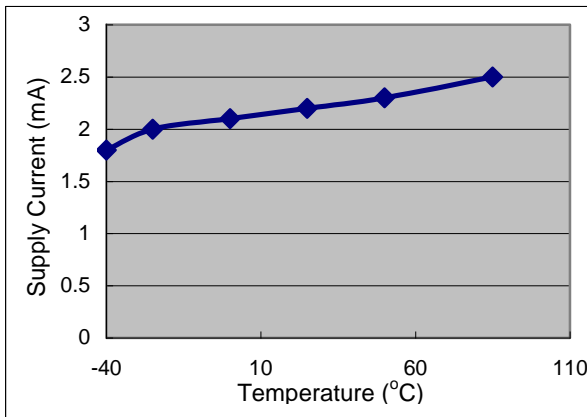
Feedback Voltage vs. Temperature

$V_{in} = 5V; V_{out} = 15V$



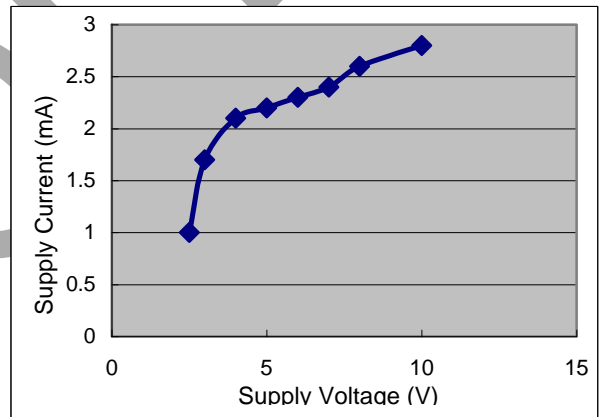
Supply Current vs. Temperature

$V_{in} = 5V; V_{out} = 15V; I_{out} = 0A$



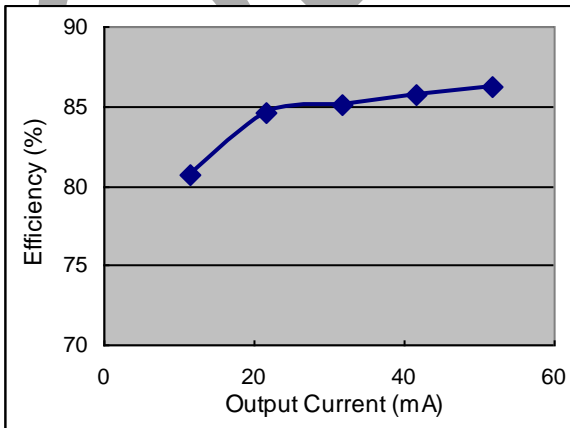
Supply Current vs. Supply Voltage

$V_{out} = 15V; I_{out} = 0A$



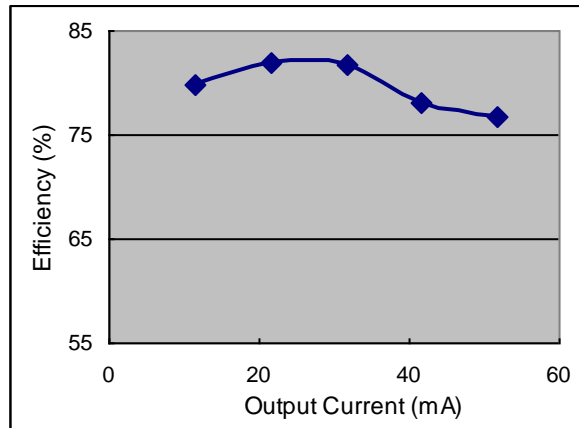
Efficiency vs. Output Current

$V_{in} = 5V; V_{out} = 15V$



Efficiency vs. Output Current

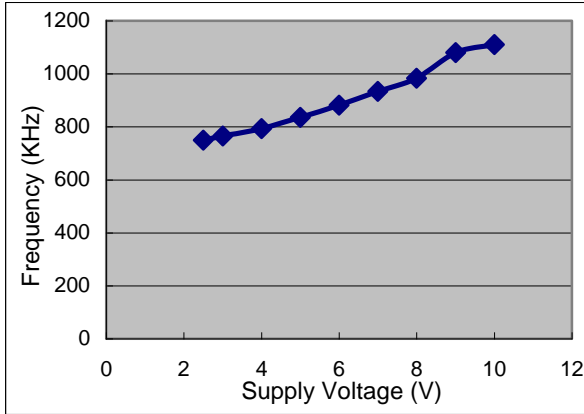
$V_{in} = 3.3V; V_{out} = 15V$



OBSOLETE - PART DISCONTINUED

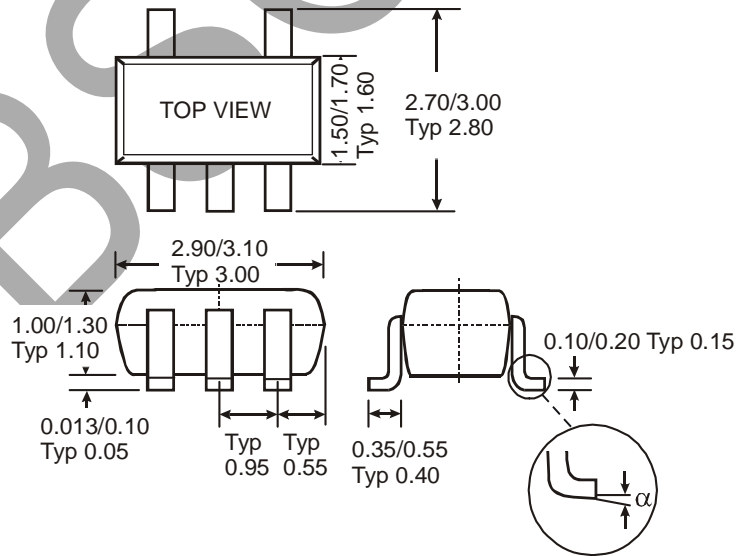
Typical Performance Characteristics (Continued)

Frequency vs. Supply Voltage
 $V_{out} = 15V$



Package Diagrams (All Dimensions in mm)

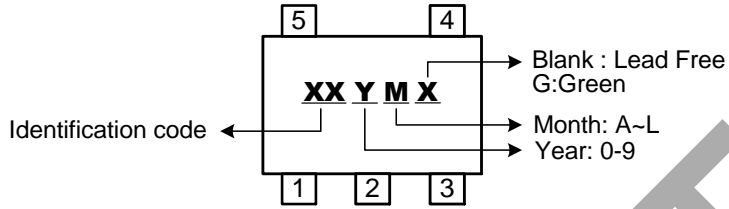
(1) SOT25



OBSOLETE - PART DISCONTINUED

Marking Information

(1) SOT25



Device	Package (Note 4)	Identification Code
AP1522W	SOT25	FA

Note: 4. For Packaging Details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

OBSOLETE - PART DISCONTINUED

OBSOLETE

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 © 2017, Diodes Incorporated

www.diodes.com