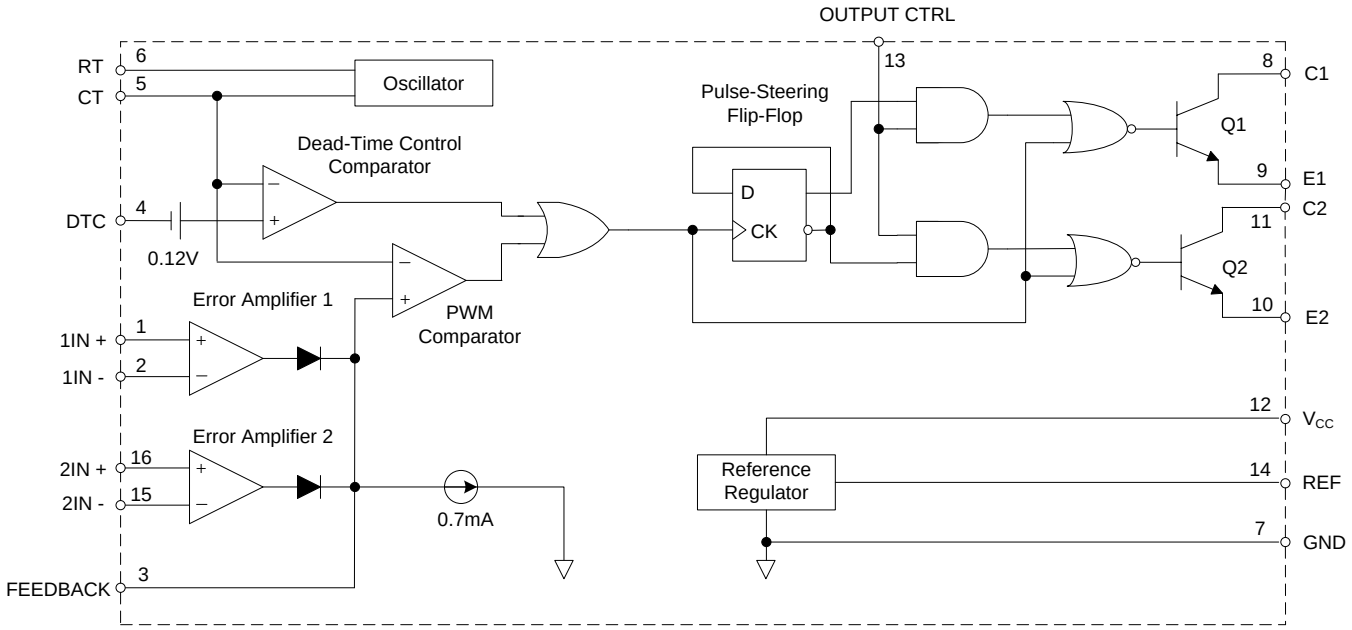
Output Function Table

Signal for Output Control	Output Function
V_I = GND	Single-ended or parallel output
V_I = V_{REF}	Normal push-pull operation

Functional Block Diagram



Absolute Maximum Ratings (Note 3)

Symbol	Parameter	Rating	Unit
V_{CC}	Supply Voltage (Note 4)	40	V
V_I	Amplifier Input Voltage	-0.3 to V_{CC} + 0.3	V
V_O	Collector Output Voltage	40	V
I_O	Collector Output Current	250	mA
$R_{\theta JA}$	Package Thermal Impedance (Note 5)	73	°C/W
–	Lead Temperature 1.6mm from case for 10 seconds	+260	°C
T_{STG}	Storage Temperature Range	-65 to +150	°C
–	ESD Rating (Machine Model)	200	V

Notes: 3. Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "Recommended Operating Conditions" is not implied. Exposure to "Absolute Maximum Ratings" for extended periods may affect device reliability.

4. All voltage values are with respect to the network ground terminal.

5. Maximum power dissipation is a function of $T_J(max)$, $R_{\theta JA}$ and T_A. The maximum allowable power dissipation at any allowable ambient temperature is $P_D = (T_J(max) - T_A)/R_{\theta JA}$. Operating at the absolute maximum T_J of +150°C can affect reliability.

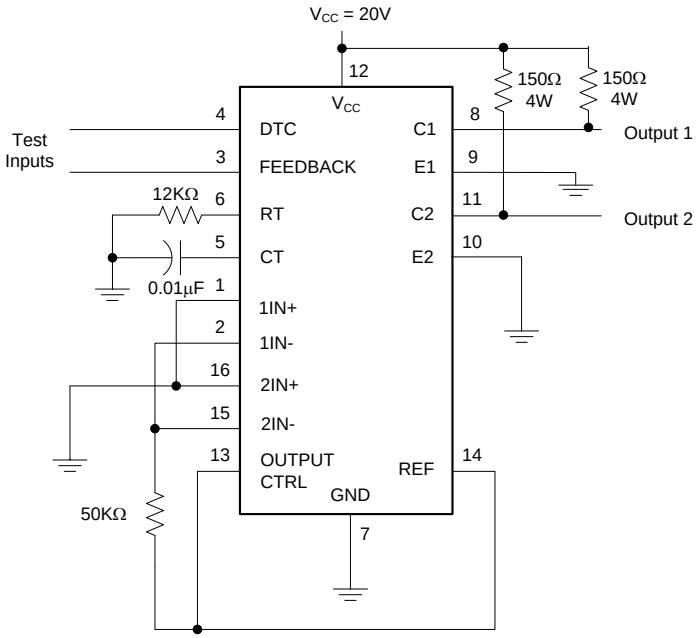
Recommended Operating Conditions

Symbol	Parameter	Min	Typ	Max	Unit
V_{CC}	Supply Voltage	7	15	36	V
V_{C1}, V_{C2}	Collector Output Voltage	–	30	36	V
I_{C1}, I_{C2}	Collector Output Current (Each Transistor)	–	–	200	mA
V_I	Amplifier Input Voltage	0.3	–	V_{CC}-2	V
I_{FB}	Current Into Feedback Terminal	–	–	0.3	mA
I_{REF}	Reference Output Current	–	–	10	mA
C_T	Timing Capacitor	0.00047	0.001	10	µF
R_T	Timing Resistor	1.8	30	500	kΩ
f_{OSC}	Oscillator Frequency	1.0	40	200	kHz
–	PWM Input Voltage (Pin 3, 4, 14)	0.3	–	5.3	V
T_A	Operating Free-Air Temperature	-40	–	+85	°C

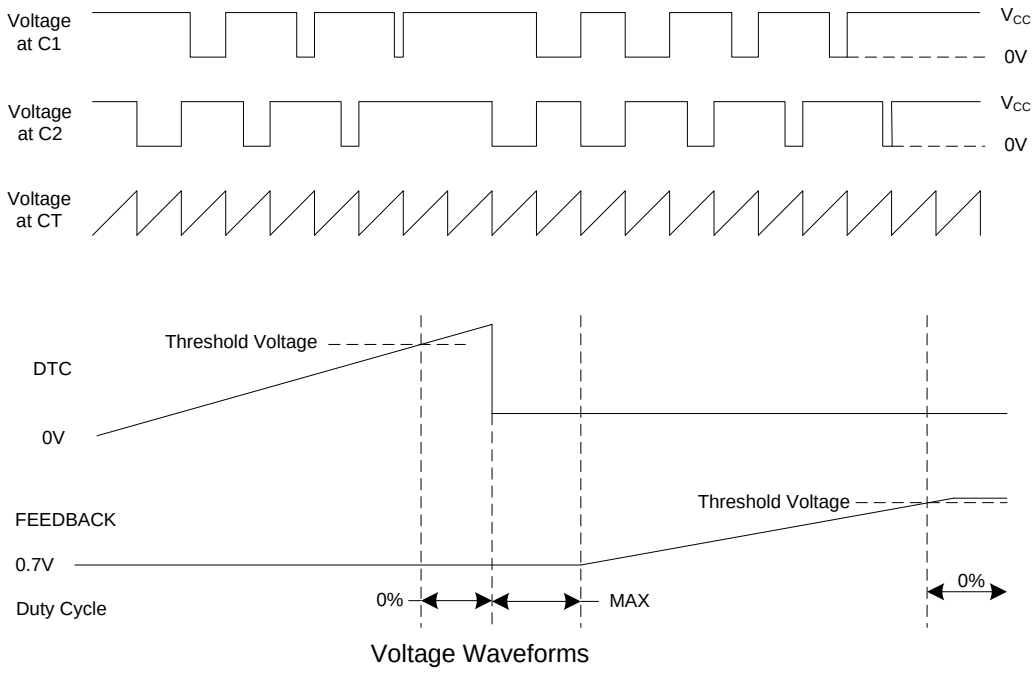
Electrical Characteristics (@V_{CC}=20V, T_A= +25°C, f=10kHz, unless otherwise specified.)

Symbol	Parameters		Conditions	Min	Typ	Max	Unit
Reference Section							
V_{REF}	Output Reference Voltage		I_{REF}=1mA	4.90	4.95	5.0	V
			I_{REF}=1mA, T_A= -40 to +85°C	4.85	4.95	5.05	V
R_{LINE}	Line Regulation		V_{CC} = 7V to 36V	–	2	25	mV
R_{LOAD}	Load Regulation		I_{REF}=1mA to 10mA	–	1	15	mV
I_{SC}	Short-Circuit Output Current		V_{REF} = 0V	10	35	50	mA
Oscillator Section							
f_{OSC}	Oscillator Frequency		C_T=0.001µF, R_T=30KΩ	–	40	–	kHz
			C_T=0.01µF, R_T=12KΩ	9.2	10	10.8	
			C_T=0.01µF, R_T=12KΩ, T_A= -40 to +85°C	9.0	–	12	
Δf /ΔT	Frequency Change with Temperature		C_T=0.01µF, R_T=12KΩ, T_A= -40 to +85°C	–	–	1	%
Dead-Time Control Section							
I_{BIAS}	Input Bias Current		V_{CC}=15V, V4= 0 to 5.25V	–	-2	-10	µA
D(MAX)	Maximum Duty Cycle		V_{CC}=15V, V4= 0V, Pin 13= V_{REF}	45	–	–	%
V_{ITH}	Input Threshold Voltage		Zero Duty Cycle	–	3	3.3	V
			Maximum Duty Cycle	0	–	–	
Error-Amplifier Section							
V_{IO}	Input Offset Voltage		V3 = 2.5V	–	2	10	mV
I_{IO}	Input Offset Current		V3 = 2.5V	–	25	250	nA
I_{BIAS}	Input Bias Current		V3 = 2.5V	–	0.2	1	µA
V_{CM}	Common-Mode Input Voltage Range		V_{CC}=7V to 36V	-0.3	–	V_{CC}-2	V
G_{VO}	Open-Loop Voltage Gain		V_O =0.5V to 3.5V	70	95	–	dB
BW	Unity-Gain Bandwidth		–	–	650	–	kHz
CMRR	Common-Mode Rejection Ratio		–	65	80	–	dB
I_{SINK}	Output Sink Current (Feedback)		V_{ID} = -15mV to -5V, V3 = 0.7V	-0.3	-0.7	–	mA
I_{SOURCE}	Output Source Current (Feedback)		V_{ID}=15mV to 5V, V3 = 3.5V	2	–	–	mA
PWM Comparator Section							
V_{ITH}	Input Threshold Voltage		Zero duty cycle	–	4	4.5	V
I_{SINK}	Input Sink Current		V3 = 0.7V	-0.3	-0.7	–	mA
Output Section							
V_{CE}(SAT)	Output Saturation Voltage	Common Emitter	V_E = 0V, I_C =200mA	–	1.1	1.3	V
V_{CC}(SAT)		Emitter Follower	V_{CC} = 15V, I_E = -200mA	–	1.5	2.5	
I_C (OFF)	Collector Off-State Current		V_{CE} = 36V, V_{CC}=36V	–	2	100	µA
I_E(OFF)	Emitter Off-State Current		V_{CC} = V_C = 36V, V_E = 0	–	–	-100	µA
Total Device							
I_{CC}	Supply Current		Pin 6 = V_{REF}, V_{CC}=15V	–	6	10	mA
Output Switching Characteristics							
t_R	Rise Time		Common Emitter Common Collector	–	100	200	ns
t_F	Fall Time		Common Emitter Common Collector	–	25	100	ns

Parameter Measurement Information



Test Circuit



Voltage Waveforms

Figure 1. Operational Test Circuit and Waveforms

Parameter Measurement Information (Cont.)

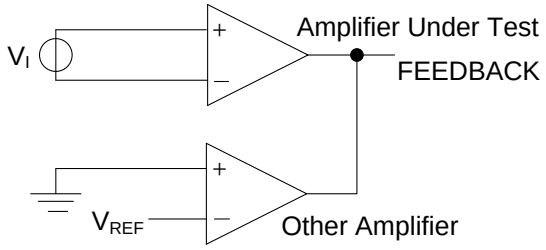
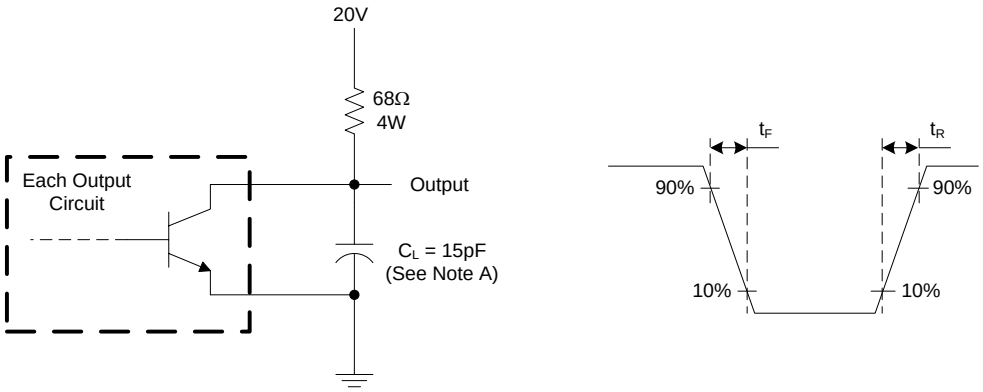
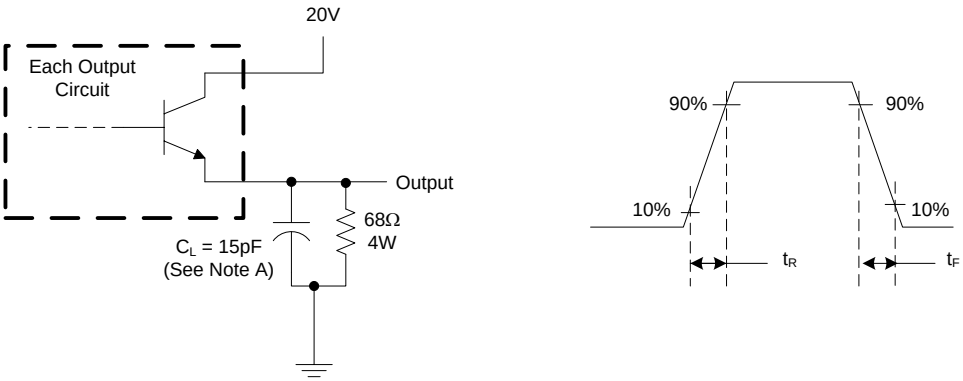


Figure 2. Error Amplifier Characteristics



Note A: C_L includes probe and jig capacitance.

Figure 3. Common-Emitter Configuration

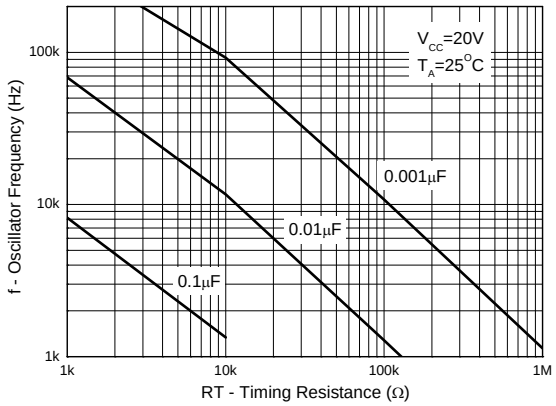


Note A: C_L includes probe and jig capacitance.

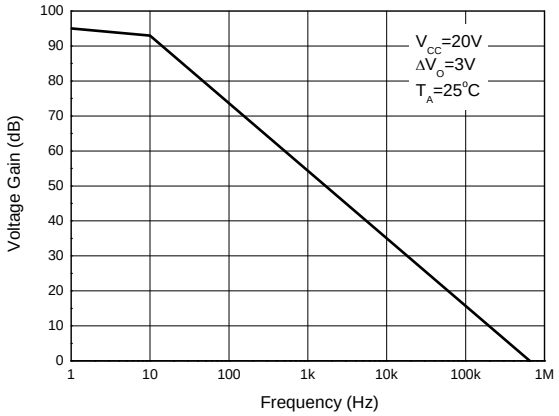
Figure 4. Emitter-Follower Configuration

Performance Characteristics

Oscillator Frequency vs. RT and CT



Error Amplifier Small-Signal Voltage Gain vs. Frequency



Ordering Information

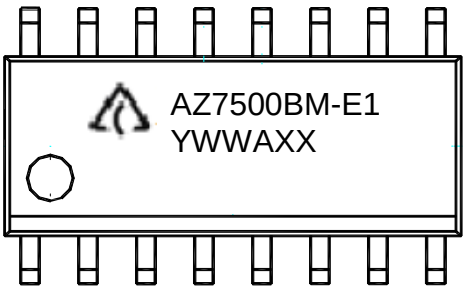
AZ7500B X XX - XX

Product Name	Package	Packing	E1
	M: SO-16	TR: Tape & Reel	E1: RoHS Compliant

Package	Temperature Range	Part Number	Marking ID	Packing
SO-16	-40 to +85°C	AZ7500BMTR-E1	AZ7500BM-E1	4000/Tape and Reel

Marking Information

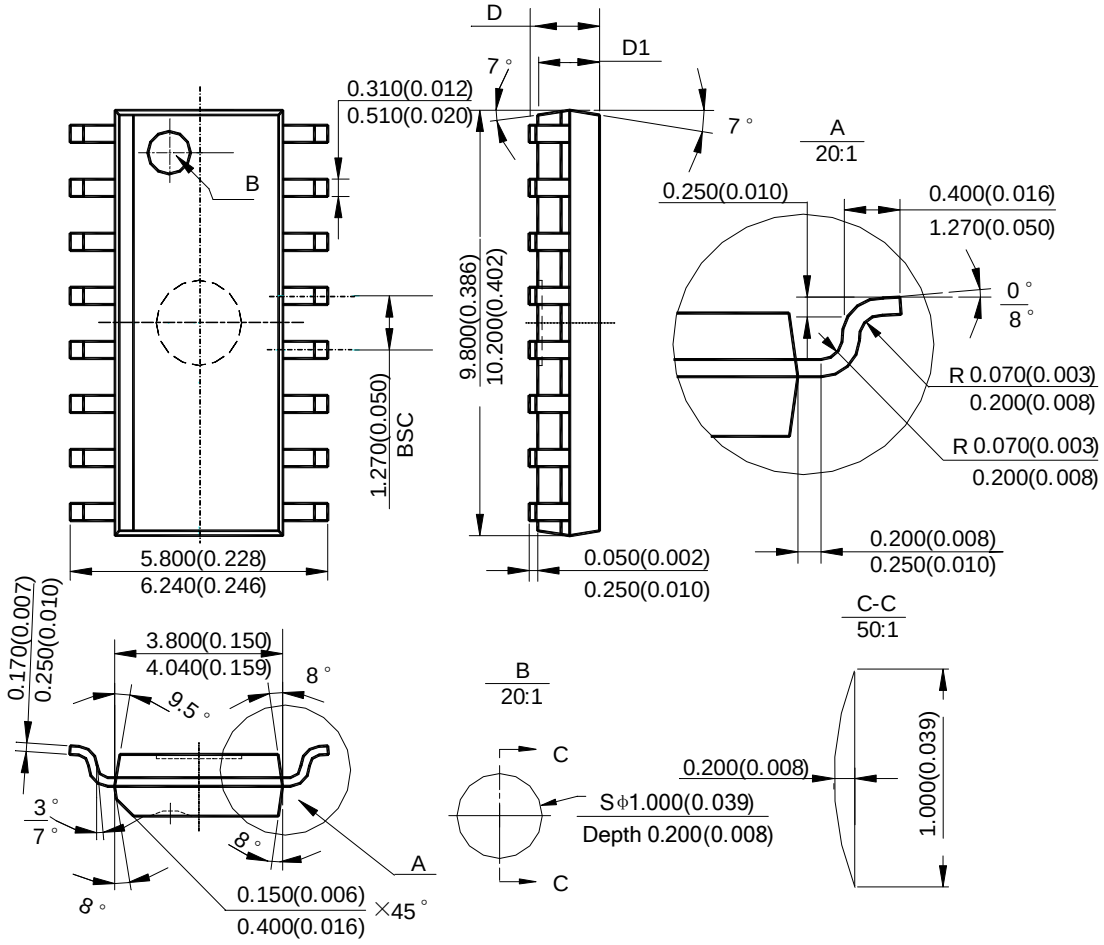
(Top View)



First Line: Logo and Marking ID
(See Ordering Information)
Second Line: Date Code
Y: Year
WW: Work Week of Molding
A: Assembly House Code
XX: 7th and 8th Digits of Batch No.

Package Outline Dimensions (All dimensions in mm(inch).)

(1) Package Type: SO-16

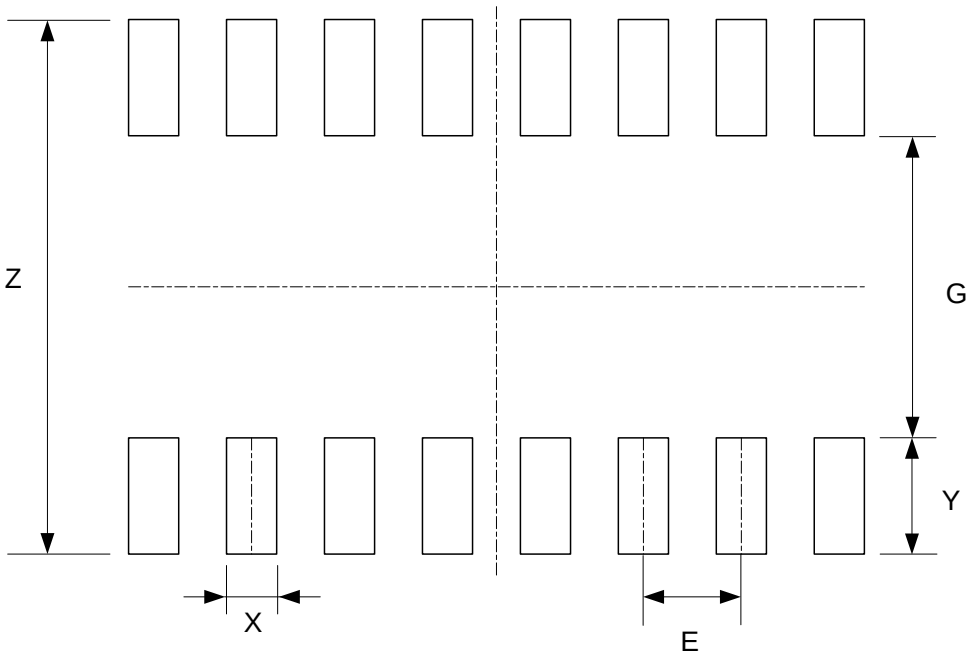


Note: Eject hole, oriented hole and mold mark is optional.

Symbol	D				D1			
	min(mm)	max(mm)	min(inch)	max(inch)	min(mm)	max(mm)	min(inch)	max(inch)
Option1	1.350	1.750	0.053	0.069	1.250	1.650	0.049	0.065
Option2	-	1.260	-	0.050	1.020	-	0.040	-

Suggested Pad Layout

(1) Package Type: SO-16



Dimensions	Z (mm)/(inch)	G (mm)/(inch)	X (mm)/(inch)	Y (mm)/(inch)	E (mm)/(inch)
Value	6.900/0.272	3.900/0.154	0.650/0.026	1.500/0.059	1.270/0.050

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.

www.diodes.com