AZV393

DUAL GENERAL PURPOSE LOW VOLTAGE COMPARATOR

Description

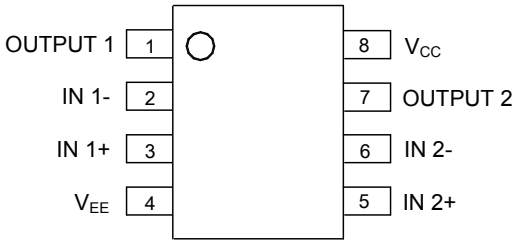
The AZV393 is a low voltage 2.5V to 5.5V, dual comparator, which has a very low supply current of 100µA, making the part an excellent choice for portable electronic systems. The device is pin-for-pin compatible replacement of the LMV393.

The AZV393 is built with BiCMOS process with bipolar input and output stages for improved noise performance. It is a cost-effective solution for portable consumer products where space, low voltage, low power and price are the primary specification in circuit design.

The AZV393 is available in standard SOIC-8 and space saving TSSOP-8 and MSOP-8 packages.

Pin Assignments

M/G/MM Package
(SOIC-8/TSSOP-8/MSOP-8)



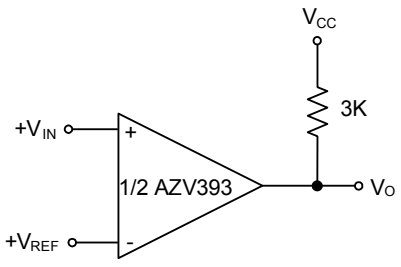
Features

- Guaranteed 2.5V to 5.5V Performance
- Industrial Temperature Range: -40°C to +85°C
- Low Supply Current: 100µA Typical
- Input Common Mode Voltage Range Includes Ground
- Low Output Saturation Voltage: 200mV Typical
- Open Collector Output for Maximal Flexibility

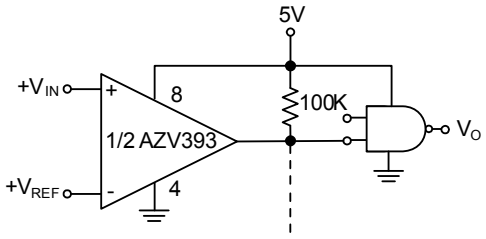
Applications

- Notebook and PDA
- Low Power, Low Voltage Applications
- General Purpose Portable Devices
- Mobile Communications
- Battery Powered Electronics

Typical Applications Circuit

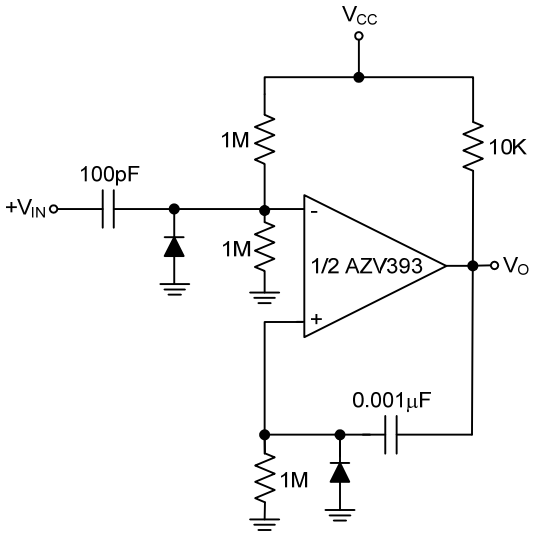


Basic Comparator

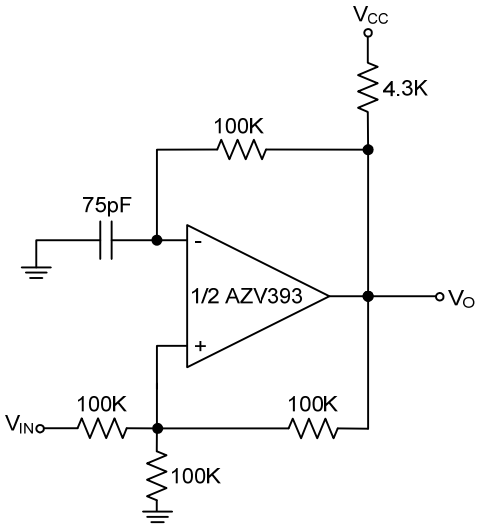


Driving CMOS

Typical Applications Circuit (Cont.)

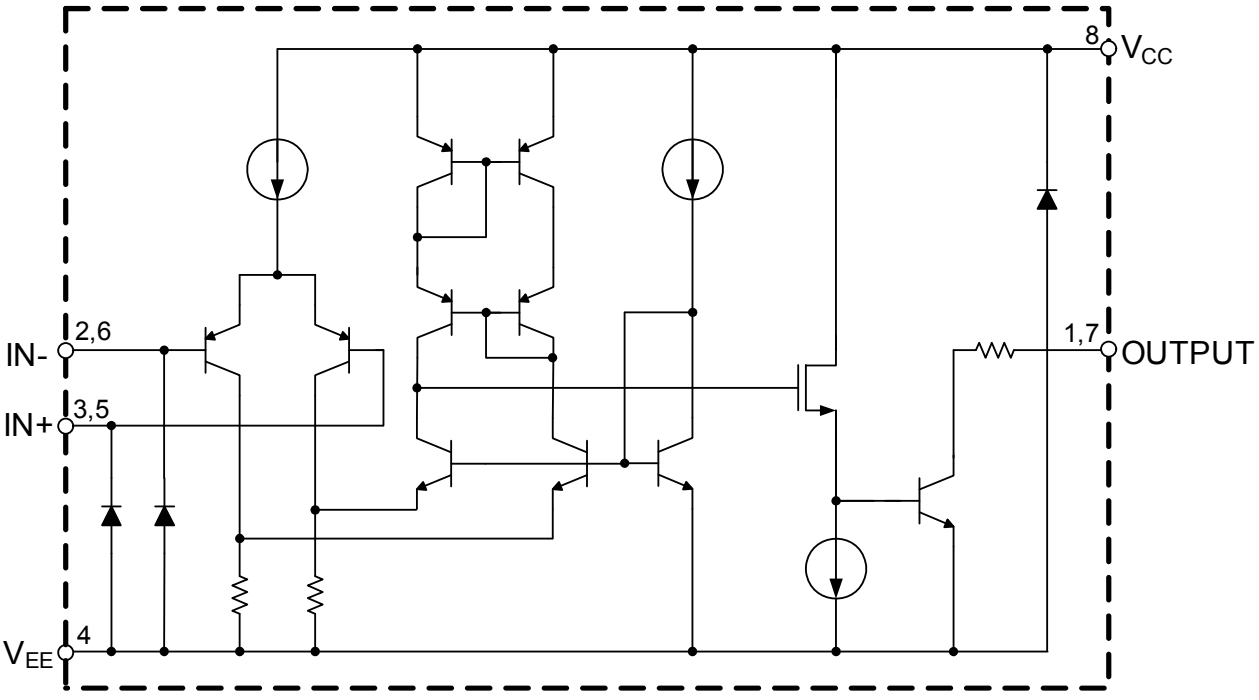


One Shot Multivibrator



Squarewave Oscillator

Functional Block Diagram



Absolute Maximum Ratings (Note 1)

Symbol	Parameter	Rating	Unit
V_{CC}	Power Supply Voltage	6	V
T_J	Operation Junction Temperature	+150	°C
T_{STG}	Storage Temperature Range	-65 to +150	°C
T_{LEAD}	Lead Temperature (Soldering, 10 seconds)	+260	°C
–	ESD (Machine Model)	300	V
–	ESD (Human Body Model)	4000	V

Note 1: 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.

Recommended Operating Conditions

Symbol	Parameter	Min	Max	Unit
V_{CC}	Supply Voltage	2.5	5.5	V
T_A	Ambient Operating Temperature Range	-40	+85	°C

2.7V DC Electrical Characteristics (@T_A = +25°C, V_{CC} = 2.7V, V_{EE} = 0V, R_L = 5.1kΩ connected to V_{CC} and V_{CM} = 0, **bold** typeface applies over full temperature ranges, unless otherwise specified.)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{OS}	Input Offset Voltage	–	–	1.7	7	mV
		–	–	–	**9**	
TCV_{OS}	Input Offset Voltage Average Drift	–	–	5	–	µV/°C
I_B	Input Bias Current	I_{IN}+ or I_{IN}- with output in linear range, V_{CM} = 0V	–	10	250	nA
			–	–	**400**	
I_{IO}	Input Offset Current	I_{IN}+ - I_{IN}-, V_{CM} = 0V	–	5	50	nA
			–	–	**150**	
V_{SAT}	Saturation Voltage	I_{SINK} ≤ 1mA	–	200	–	mV
			–	–	**500**	
I_{SINK}	Output Sink Current	V_O ≤ 1.5V	5	23	–	mA
V_{CM}	Input Common Mode Voltage Range	–	-0.1	–	2	V
I_{CC}	Supply Current	–	–	70	150	µA
			–	–	**200**	
$I_{LEAKAGE}$	Output Leakage Current	–	–	0.003	–	µA

2.7V AC Electrical Characteristics (@T_A = +25°C, V_{CC} = 2.7V, V_{EE} = 0V, R_L = 5.1kΩ connected to V_{CC} and V_{CM} = 0, unless otherwise specified.)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
T_{PHL}	Propagation Delay (High to Low)	Input Overdrive = 10mV	–	1000	–	ns
		Input Overdrive = 100mV	–	350	–	
T_{PLH}	Propagation Delay (Low to High)	Input Overdrive = 10mV	–	500	–	ns
		Input Overdrive = 100mV	–	400	–	

5V DC Electrical Characteristics (@T_A = +25°C, V_{CC} = 5V, V_{EE} = 0V, R_L = 5.1kΩ connected to V_{CC} and V_{CM} = 0, **bold** typeface applies over full temperature ranges, unless otherwise specified.)

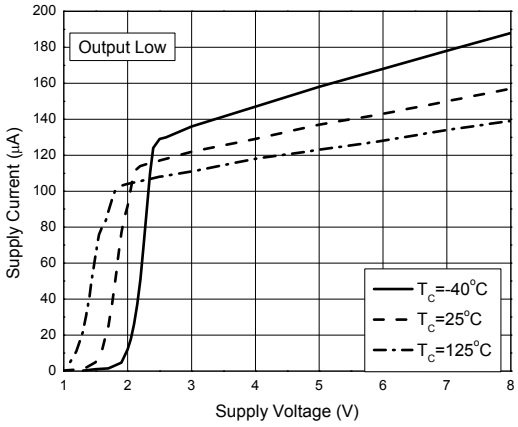
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{OS}	Input Offset Voltage	–	–	1.7	7	mV
		–	–	–	**9**	
TCV_{OS}	Input Offset Voltage Average Drift	–	–	5	–	µV/°C
I_B	Input Bias Current	I_{IN}+ or I_{IN}- with output in linear range, V_{CM}=0V	–	25	250	nA
			–	–	**400**	
I_{IO}	Input Offset Current	I_{IN}+ - I_{IN}-, V_{CM}=0V	–	2	50	nA
			–	–	**150**	
V_{SAT}	Saturation Voltage	I_{SINK}≤4mA	–	200	400	mV
			–	–	**500**	
I_{SINK}	Output Sink Current	V_O≤1.5V	10	84	–	mA
V_{CM}	Input Common Mode Voltage Range	–	-0.1	–	4.2	V
A_V	Voltage Gain	–	20	50	–	V/mV
I_{CC}	Supply Current	–	–	100	200	µA
			–	–	**250**	
$I_{LEAKAGE}$	Output Leakage Current	–	–	0.003	–	µA

5V AC Electrical Characteristics (@T_A = +25°C, V_{CC} = 5V, V_{EE} = 0V, R_L = 5.1kΩ connected to V_{CC} and V_{CM} = 0, unless otherwise specified.)

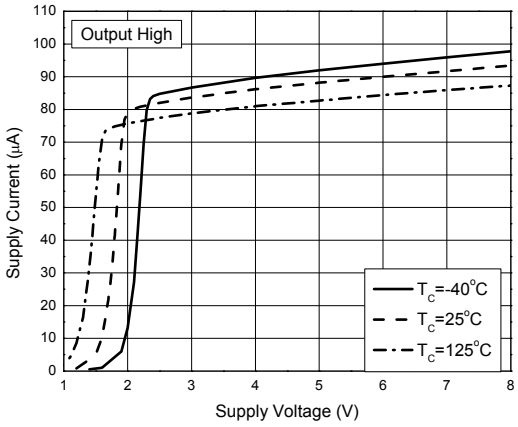
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
T_{PHL}	Propagation Delay (High to Low)	Input Overdrive=10mV	–	600	–	ns
		Input Overdrive=100mV	–	200	–	
T_{PLH}	Propagation Delay (Low to High)	Input Overdrive=10mV	–	450	–	ns
		Input Overdrive=100mV	–	300	–	

Performance Characteristics (@T_A = +25°C, unless otherwise specified.)

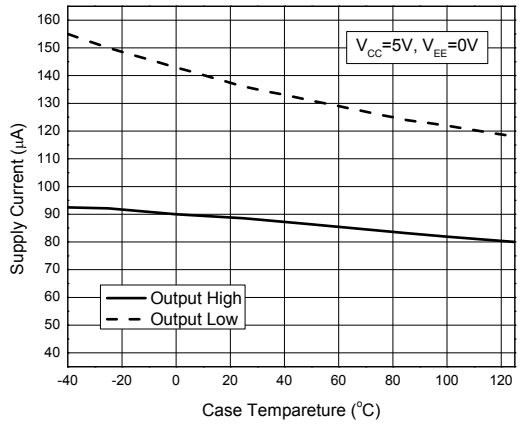
Supply Current vs. Supply Voltage



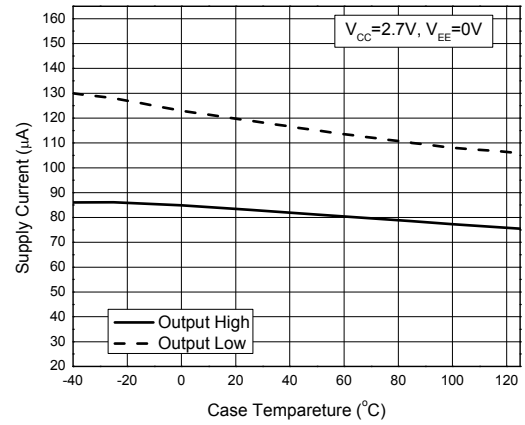
Supply Current vs. Supply Voltage



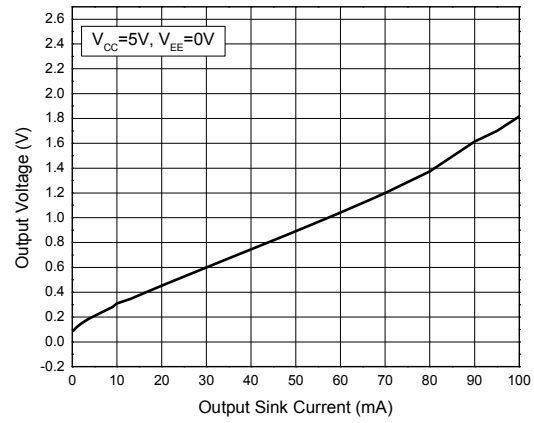
Supply Current vs. Case Temperature



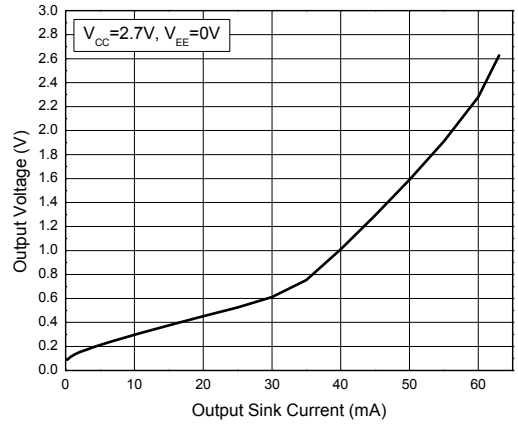
Supply Current vs. Case Temperature



Output Voltage vs. Output Sink Current

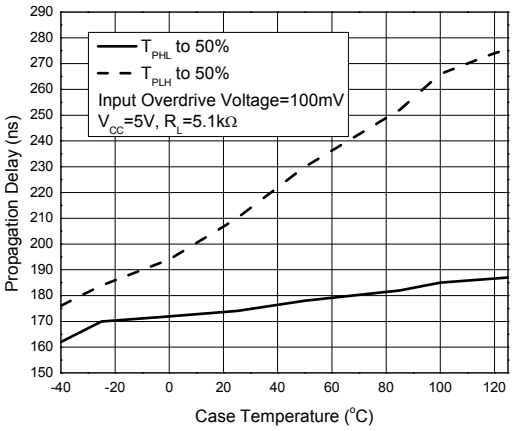


Output Voltage vs. Output Sink Current

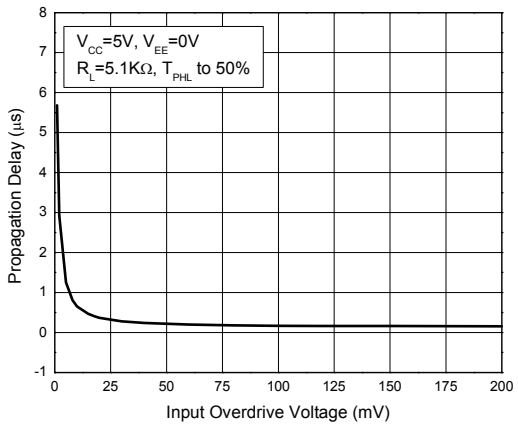


Performance Characteristics (@T_A = +25°C, unless otherwise specified.) (Cont.)

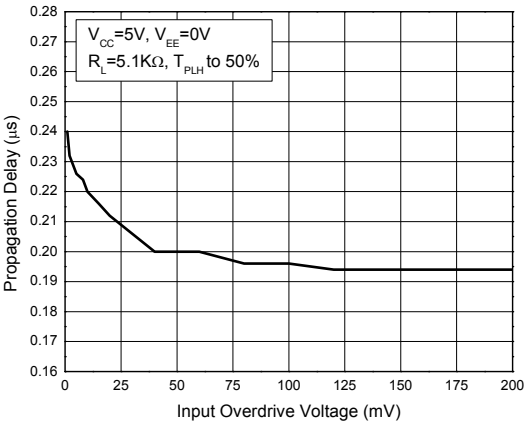
Propagation Delay vs. Temperature



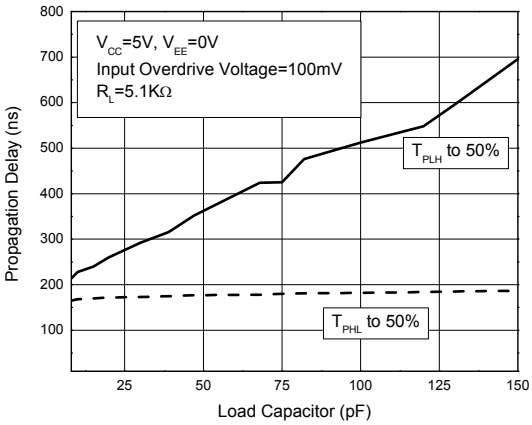
Propagation Delay vs. Input Overdrive Voltage



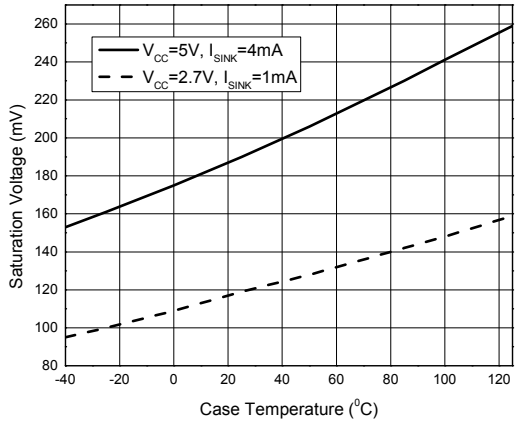
Propagation Delay vs. Input Overdrive Voltage



Propagation Delay vs. Load Capacitor

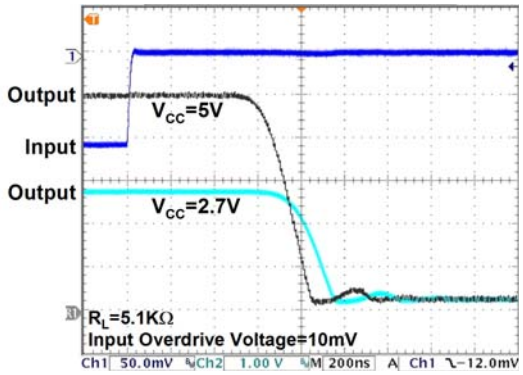


Saturation Voltage vs. Case Temperature

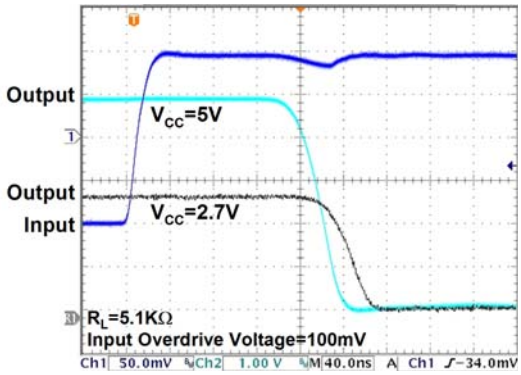


Performance Characteristics (@T_A = +25°C, unless otherwise specified.) (Cont.)

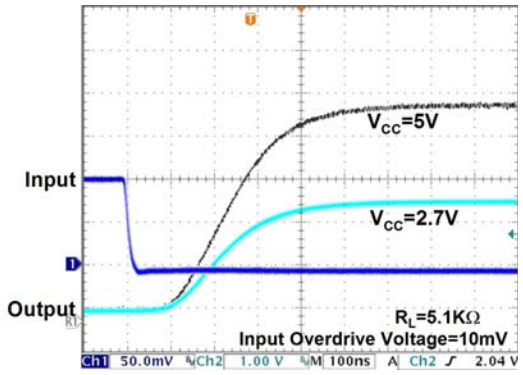
Response Time for Positive Transition



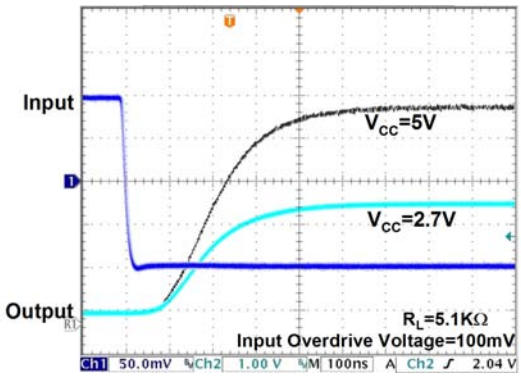
Response Time for Positive Transition



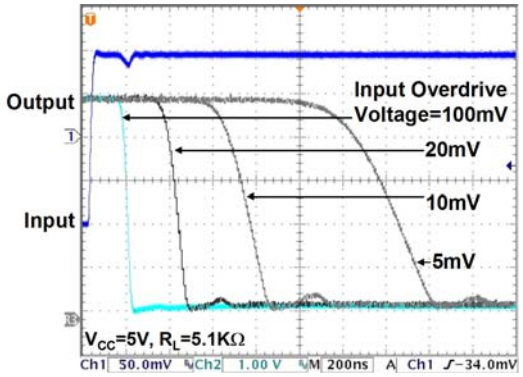
Response Time for Negative Transition



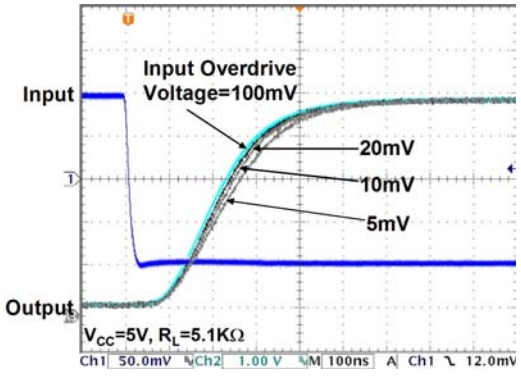
Response Time for Negative Transition



Response Time for Positive Transition

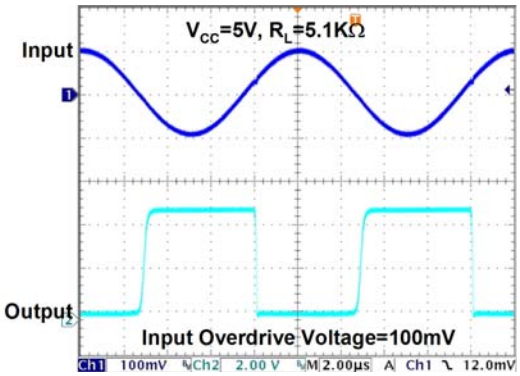


Response Time for Negative Transition

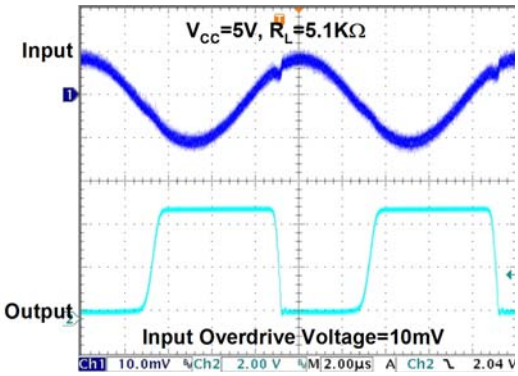


Performance Characteristics (@T_A = +25°C, unless otherwise specified.) (Cont.)

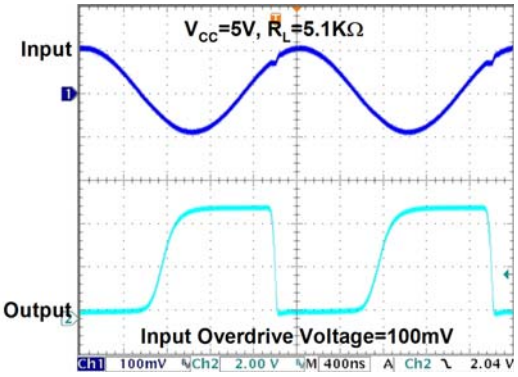
100kHz Response



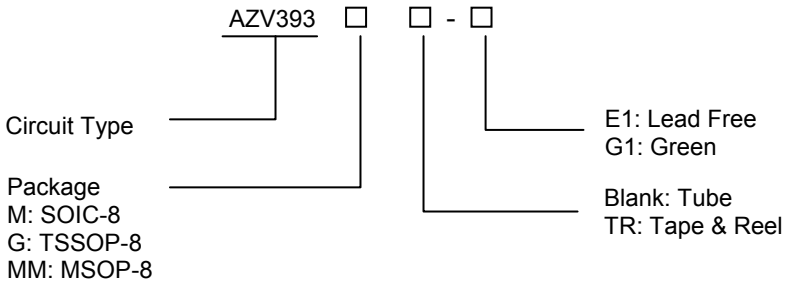
100kHz Response



500kHz Response



Ordering Information

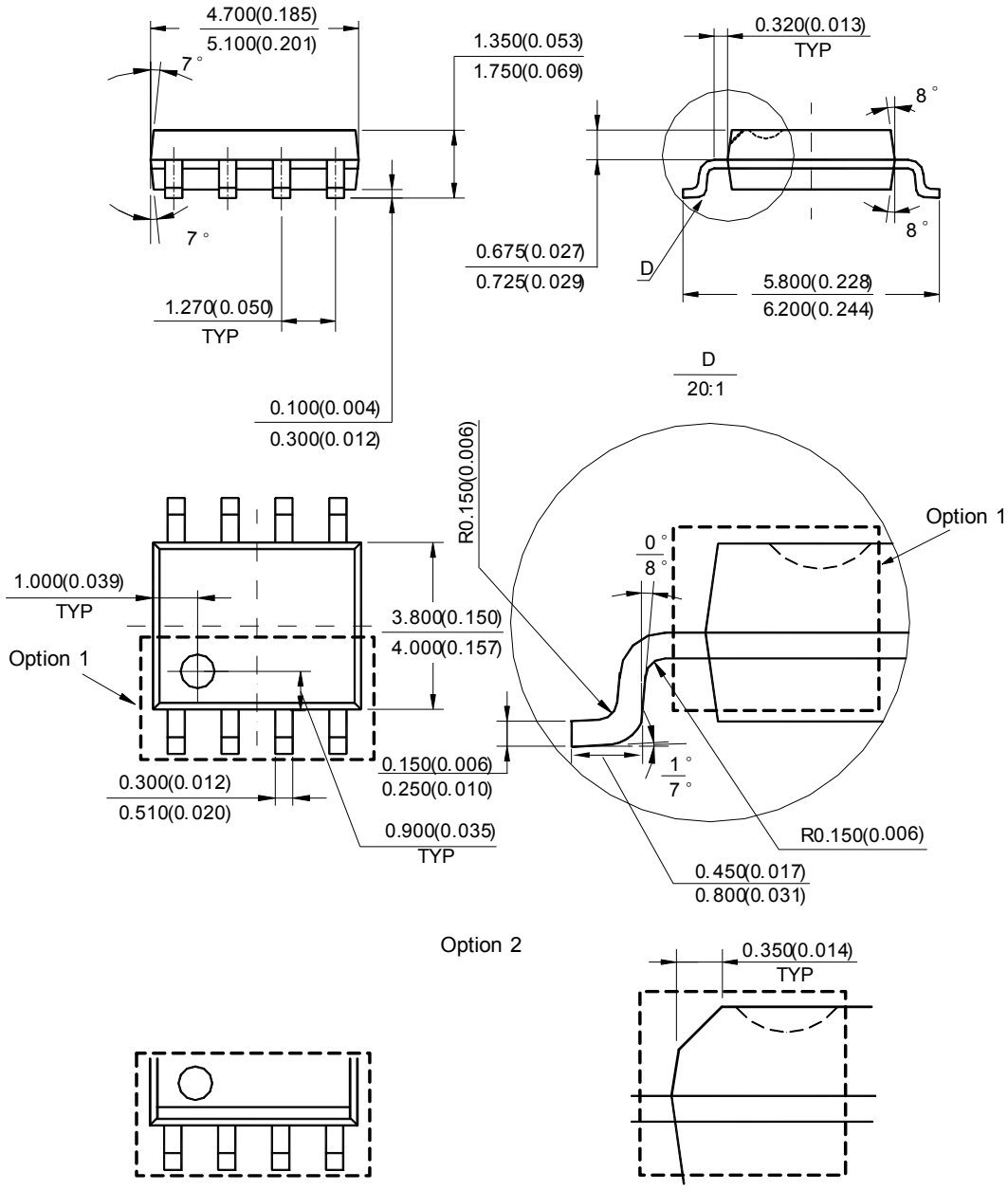


Package	Temperature Range	Part Number		Marking ID		Packing Type
		Lead Free	Green	Lead Free	Green	
SOIC-8	-40 to +85°C	AZV393M-E1	AZV393M-G1	AZV393M-E1	AZV393M-G1	Tube
		AZV393MTR-E1	AZV393MTR-G1	AZV393M-E1	AZV393M-G1	Tape & Reel
TSSOP-8	-40 to +85°C	AZV393G-E1	AZV393G-G1	EG3D	GG3D	Tube
		AZV393GTR-E1	AZV393GTR-G1	EG3D	GG3D	Tape & Reel
MSOP-8	-40 to +85°C	AZV393MM-E1	AZV393MM-G1	AZV393MM-E1	AZV393MM-G1	Tube
		AZV393MMTR-E1	AZV393MMTR-G1	AZV393MM-E1	AZV393MM-G1	Tape & Reel

BCD Semiconductor's Pb-free products, as designated with "E1" suffix in the part number, are RoHS compliant. Products with “G1” suffix are available in green packages.

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

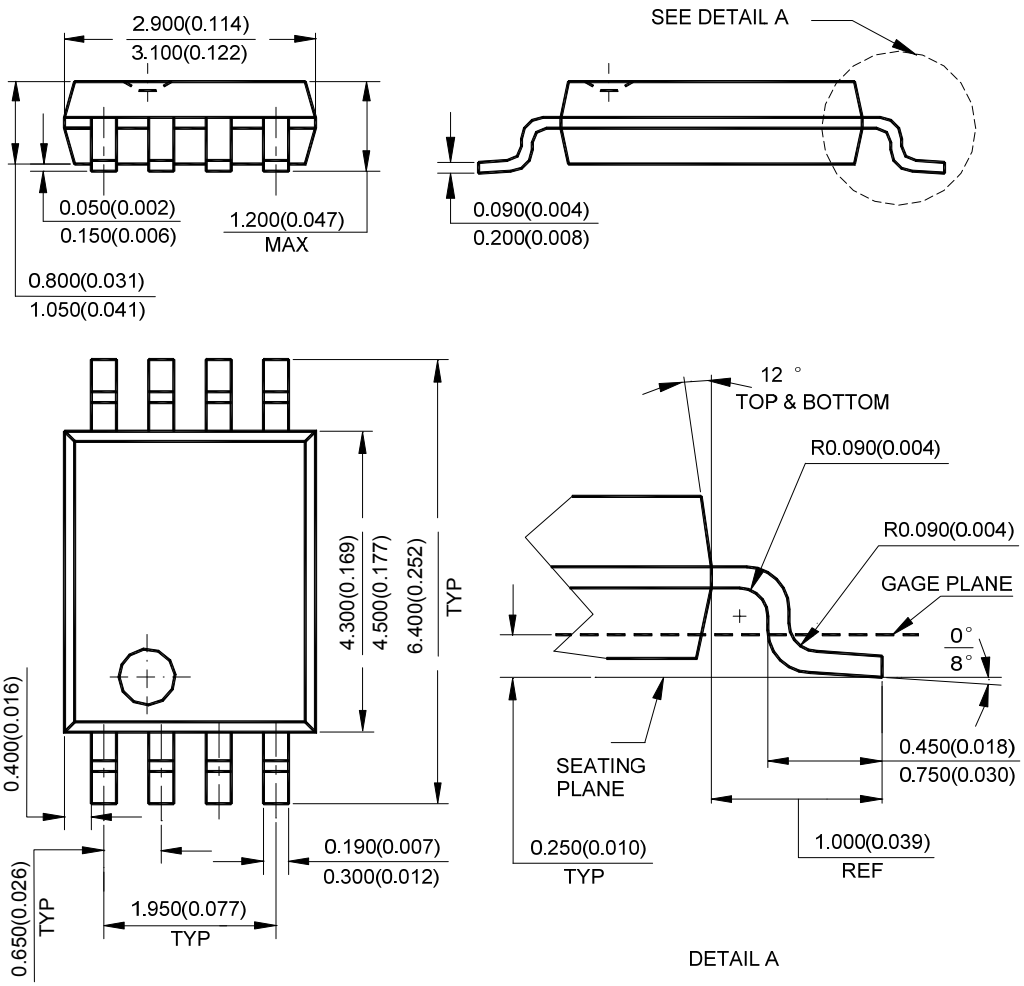
SOIC-8



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

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

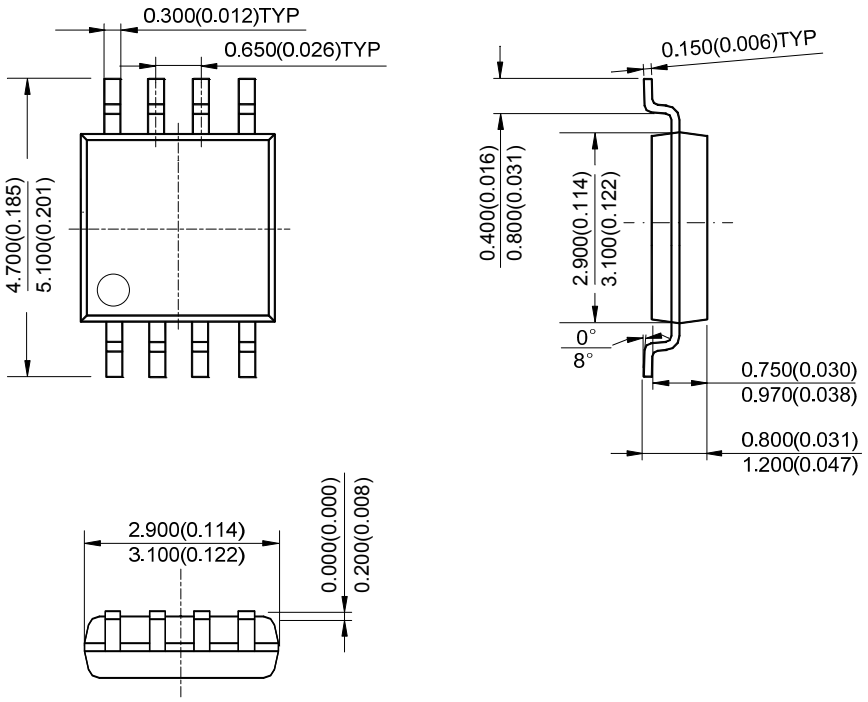
TSSOP-8



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

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

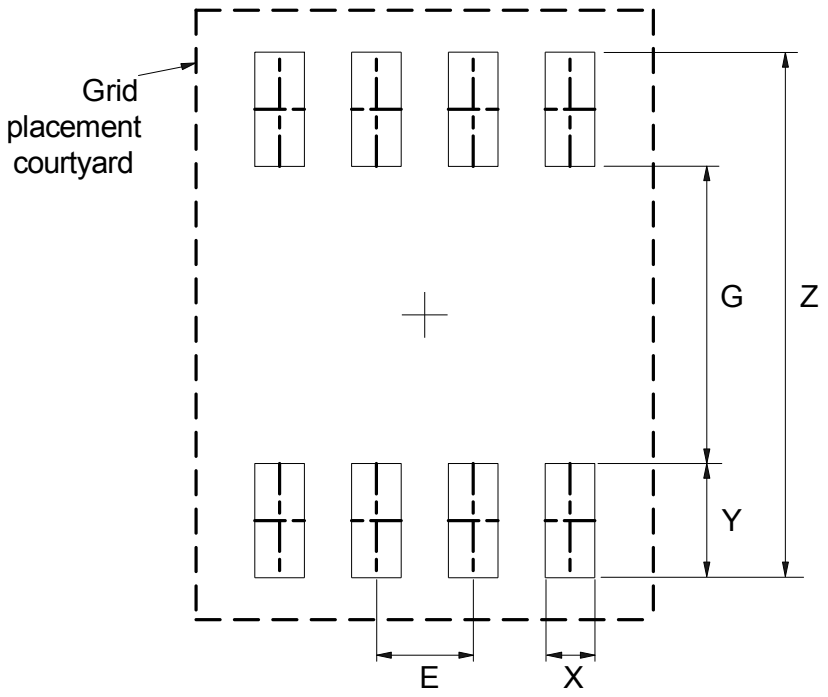
MSOP-8



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

Suggested Pad Layout

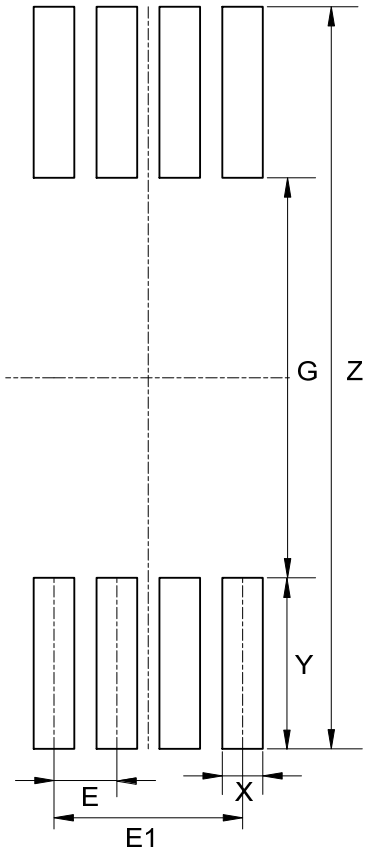
SOIC-8



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

Suggested Pad Layout (Cont.)

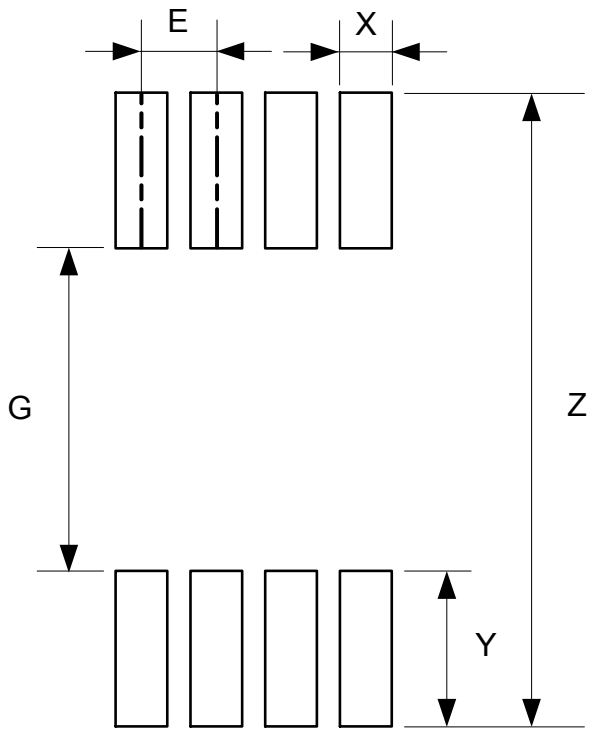
TSSOP-8



Dimensions	Z (mm)/(inch)	G (mm)/(inch)	X (mm)/(inch)	Y (mm)/(inch)	E (mm)/(inch)	E1 (mm)/(inch)
Value	7.720/0.304	4.160/0.164	0.420/0.017	1.780/0.070	0.650/0.026	1.950/0.077

Suggested Pad Layout (Cont.)

MSOP-8



Dimensions	Z (mm)/(inch)	G (mm)/(inch)	X (mm)/(inch)	Y (mm)/(inch)	E (mm)/(inch)
Value	5.500/0.217	2.800/0.110	0.450/0.018	1.350/0.053	0.650/0.026

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