

**SINGLE GENERAL PURPOSE LOW VOLTAGE COMPARATOR****AZV331****General Description**

The AZV331 is a low voltage 2.5V to 5.5V, single comparator, which has a very low supply current of 60 μ A, making the part an excellent choice for portable electronic systems. The device is pin-for-pin compatible replacement of the LMV331.

The AZV331 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 AZV331 is available in space saving SC-70-5 and SOT-23-5 packages, the SC-70-5 is approximately half the size of the SOT-23-5.

Features

- Guaranteed 2.5V to 5.5V Performance.
- Industrial Temperature Range: -40°C to 85°C
- Low Supply Current: 60 μ A Typical
- Input Common Mode Voltage Range Includes Ground
- Low Output Saturation Voltage 200 mV Typical
- Open Collector Output for Maxima Flexibility
- Space Saving SC-70-5 and SOT-23-5 Packages

Applications

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

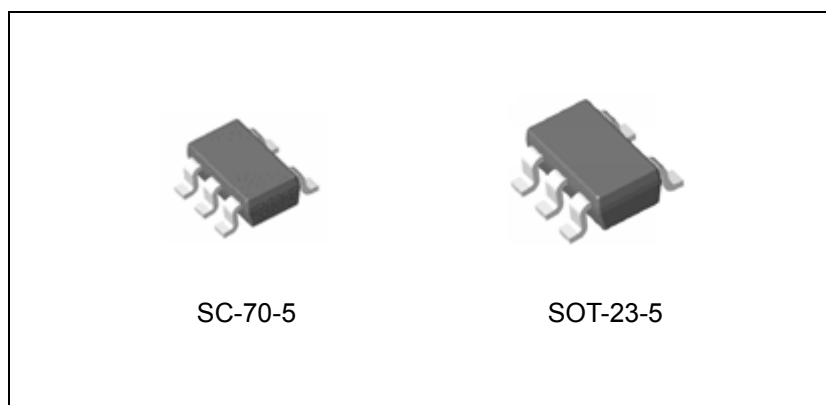


Figure 1. Package Types of AZV331

SINGLE GENERAL PURPOSE LOW VOLTAGE COMPARATOR

AZV331

Pin Configuration

KS/K Package
(SC-70-5/SOT-23-5)

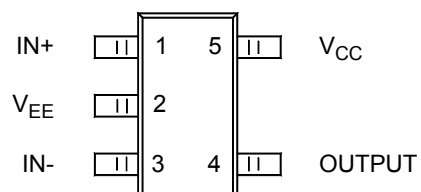


Figure 2. Pin Configuration of AZV331 (Top View)

Functional Block Diagram

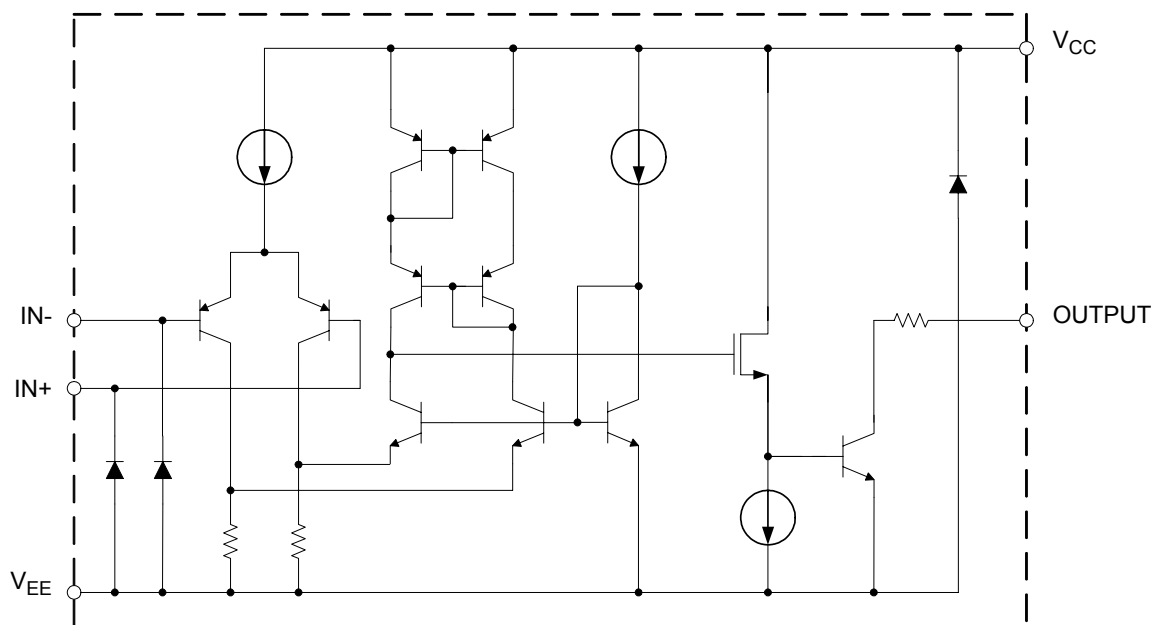
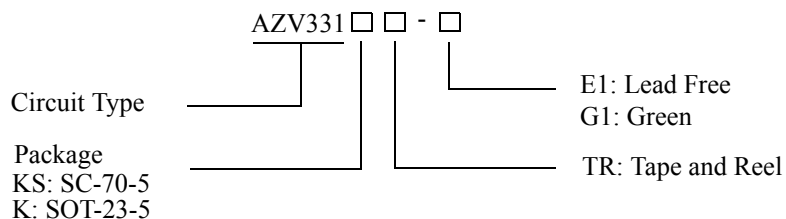


Figure 3. Functional Block Diagram of AZV331

**SINGLE GENERAL PURPOSE LOW VOLTAGE COMPARATOR****AZV331****Ordering Information**

Package	Temperature Range	Part Number		Marking ID		Packing Type
		Lead Free	Green	Lead Free	Green	
SC-70-5	-40 to 85°C	AZV331KSTR-E1	AZV331KSTR-G1	22	B2	Tape & Reel
SOT-23-5	-40 to 85°C	AZV331KTR-E1	AZV331KTR-G1	E6S	G6S	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.

Absolute Maximum Ratings (Note 1)

Parameter	Symbol	Value	Unit
Power Supply Voltage	V_{CC}	6	V
Operation Junction Temperature	T_J	150	°C
Storage Temperature Range	T_{STG}	-65 to 150	°C
Lead Temperature (Soldering, 10 Seconds)	T_{LEAD}	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

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

**SINGLE GENERAL PURPOSE LOW VOLTAGE COMPARATOR****AZV331****2.7V DC Electrical Characteristics**

Limits in standard typeface are guaranteed for $T_A=25^{\circ}\text{C}$, $V_{CC}=2.7\text{V}$, $V_{EE}=0\text{V}$, $R_L=5.1\text{k}\Omega$ connected to V_{CC} and $V_{CM}=0$, **bold** typeface applies over full temperature ranges, unless otherwise specified.

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Input Offset Voltage	V_{OS}			1.7	7	mV
					9	
Input Offset Voltage Average Drift	TCV_{OS}			5		$\mu\text{V}/^{\circ}\text{C}$
Input Bias Current	I_B	I_{IN+} or I_{IN-} with output in linear range, $V_{CM}=0\text{V}$		10	250	nA
					400	
Input Offset Current	I_{IO}	$I_{IN+} - I_{IN-}$, $V_{CM}=0\text{V}$		5	50	nA
					150	
Saturation Voltage	V_{SAT}	$I_{SINK} \leq 1\text{mA}$		200		mV
					500	
Output Sink Current	I_{SINK}	$V_O \leq 1.5\text{V}$	5	23		mA
Input Common-Mode Voltage Range	V_{CM}		-0.1		2	V
Supply Current	I_{CC}			40	100	μA
					150	
Output Leakage Current	$I_{LEAKAGE}$			0.003		μA

2.7V AC Electrical Characteristics

All limits are guaranteed for $T_A=25^{\circ}\text{C}$, $V_{CC}=2.7\text{V}$, $V_{EE}=0\text{V}$, $R_L=5.1\text{k}\Omega$ connected to V_{CC} and $V_{CM}=0$, unless otherwise specified.

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

**SINGLE GENERAL PURPOSE LOW VOLTAGE COMPARATOR****AZV331****5V DC Electrical Characteristics**

Limits in standard typeface are guaranteed for $T_A=25^{\circ}\text{C}$, $V_{CC}=5\text{V}$, $V_{EE}=0\text{V}$, $R_L=5.1\text{k}\Omega$ connected to V_{CC} and $V_{CM}=0$, **bold** typeface applies over full temperature ranges, unless otherwise specified.

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Input Offset Voltage	V_{OS}			1.7	7	mV
					9	
Input Offset Voltage Average Drift	TCV_{OS}			5		$\mu\text{V}/^{\circ}\text{C}$
Input Bias Current	I_B	I_{IN+} or I_{IN-} with output in linear range, $V_{CM}=0\text{V}$		25	250	nA
					400	
Input Offset Current	I_{IO}	$I_{IN+} - I_{IN-}$, $V_{CM}=0\text{V}$		2	50	nA
					150	
Saturation Voltage	V_{SAT}	$I_{SINK} \leq 4\text{mA}$		200	400	mV
					500	
Output Sink Current	I_{SINK}	$V_O \leq 1.5\text{V}$	10	84		mA
Input Common-Mode Voltage Range	V_{CM}		-0.1		4.2	V
Voltage Gain	A_V		20	50		V/mV
Supply Current	I_{CC}			60	120	μA
					150	
Output Leakage Current	$I_{LEAKAGE}$			0.003		μA

5V AC Electrical Characteristics

All limits are guaranteed for $T_A=25^{\circ}\text{C}$, $V_{CC}=5\text{V}$, $V_{EE}=0\text{V}$, $R_L=5.1\text{k}\Omega$ connected to V_{CC} and $V_{CM}=0$, unless otherwise specified.

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

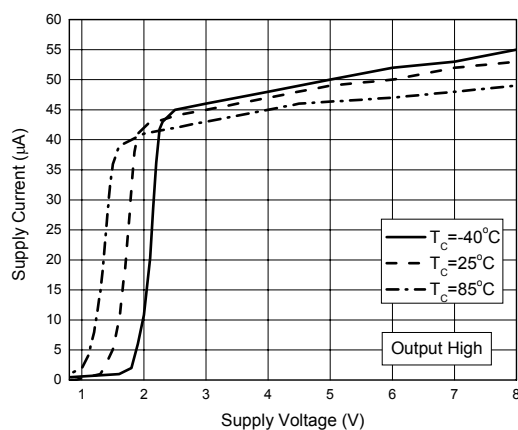
**SINGLE GENERAL PURPOSE LOW VOLTAGE COMPARATOR****AZV331****Typical Performance Characteristics** $T_A = 25^\circ\text{C}$, unless otherwise specified.

Figure 4. Supply Current vs. Supply Voltage

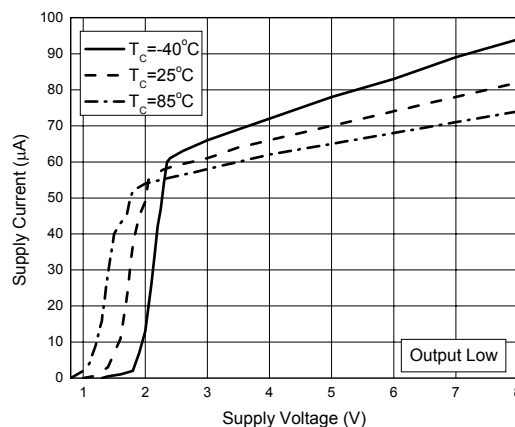


Figure 5. Supply Current vs. Supply Voltage

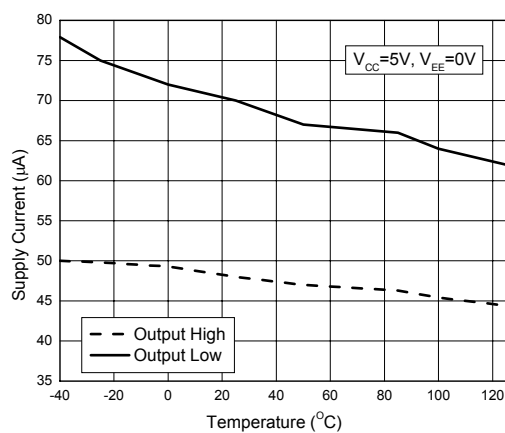


Figure 6. Supply Current vs. Temperature

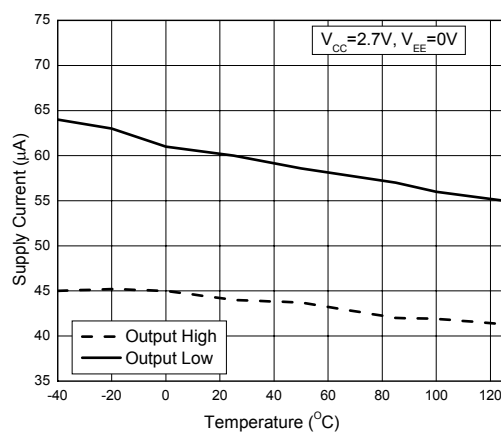


Figure 7. Supply Current vs. Temperature

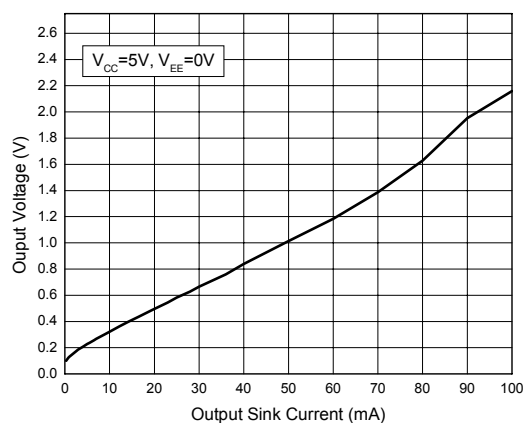
**SINGLE GENERAL PURPOSE LOW VOLTAGE COMPARATOR****AZV331****Typical Performance Characteristics (Continued)** $T_A = 25^\circ\text{C}$, unless otherwise specified.

Figure 8. Output Voltage vs. Output Sink Current

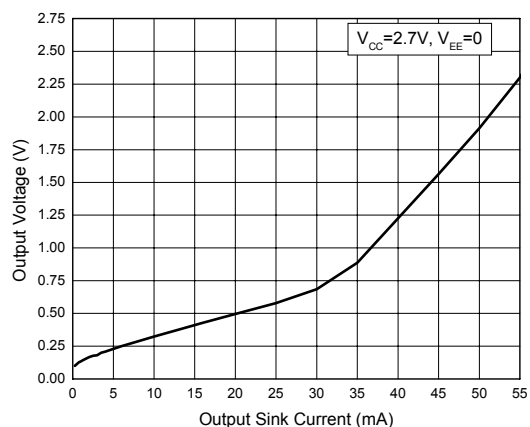


Figure 9. Output Voltage vs. Output Sink Current

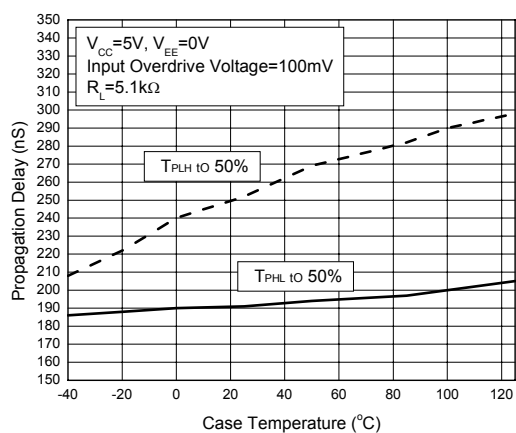


Figure 10. Propagation Delay vs. Temperature

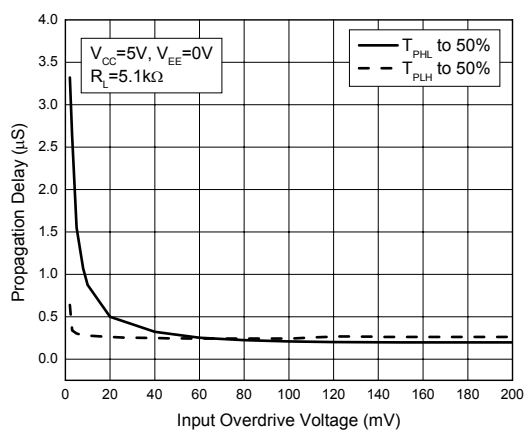


Figure 11. Propagation Delay vs. Input Overdrive Voltage

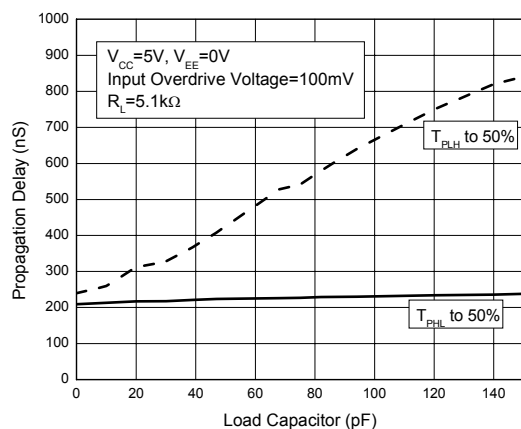
**SINGLE GENERAL PURPOSE LOW VOLTAGE COMPARATOR****AZV331****Typical Performance Characteristics (Continued)** $T_A = 25^\circ\text{C}$, unless otherwise specified.

Figure 12. Propagation Delay vs. Load Capacitors

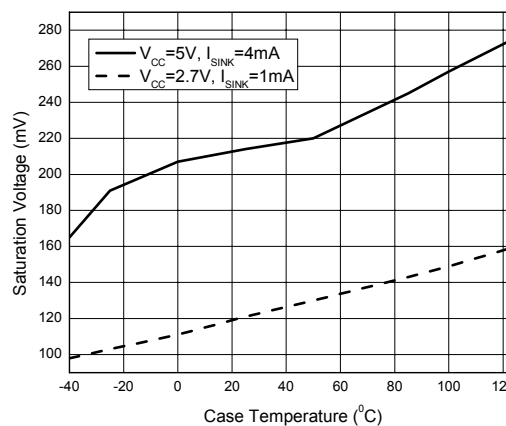


Figure 13. Saturation Voltage vs. Case Temperature

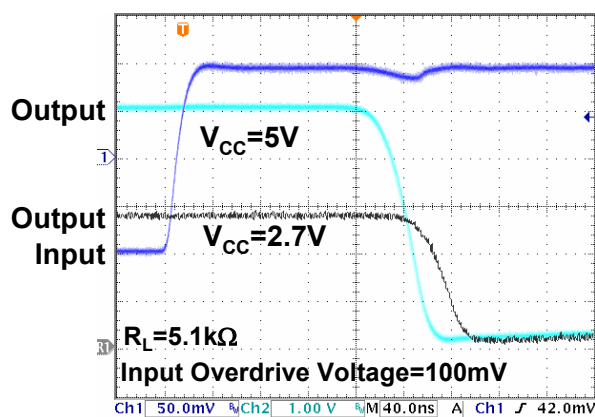


Figure 14. Response Time for Positive Transition

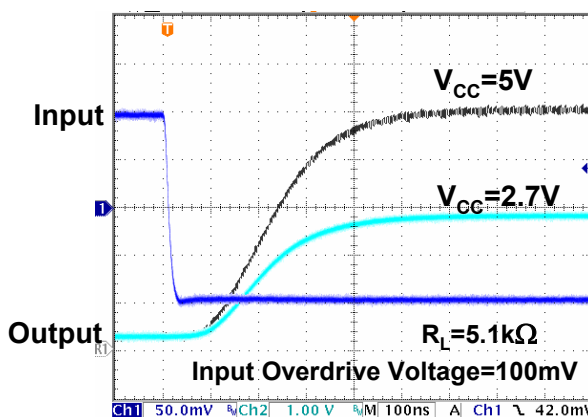


Figure 15. Response Time for Negative Transition

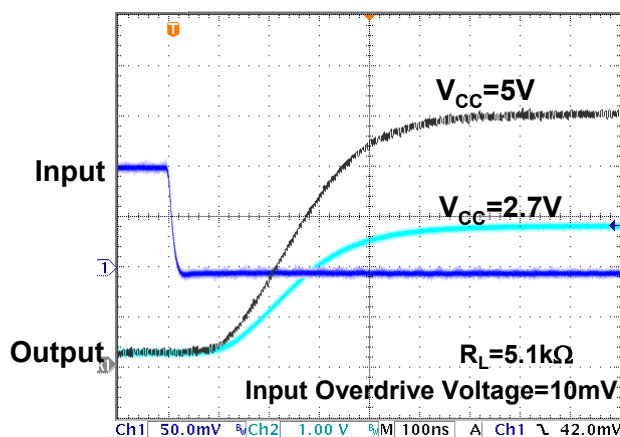
**SINGLE GENERAL PURPOSE LOW VOLTAGE COMPARATOR****AZV331****Typical Performance Characteristics (Continued)** $T_A = 25^\circ\text{C}$, unless otherwise specified.

Figure 16. Response Time for Negative Transition

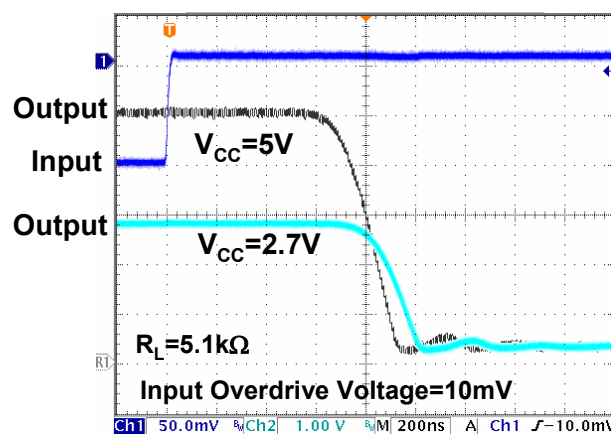


Figure 17. Response Time for Positive Transition

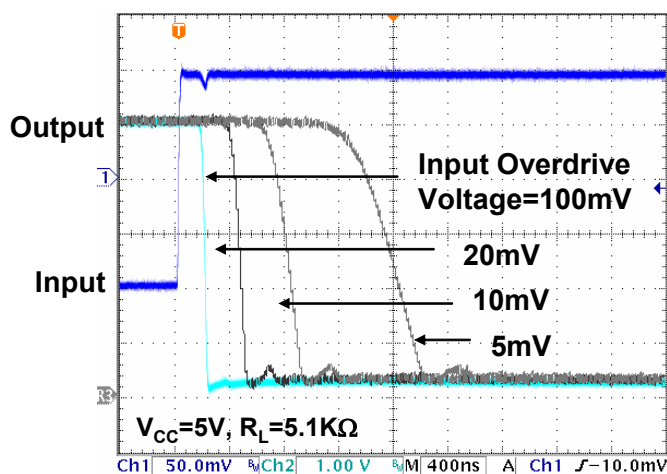


Figure 18. Response Time for Positive Transition

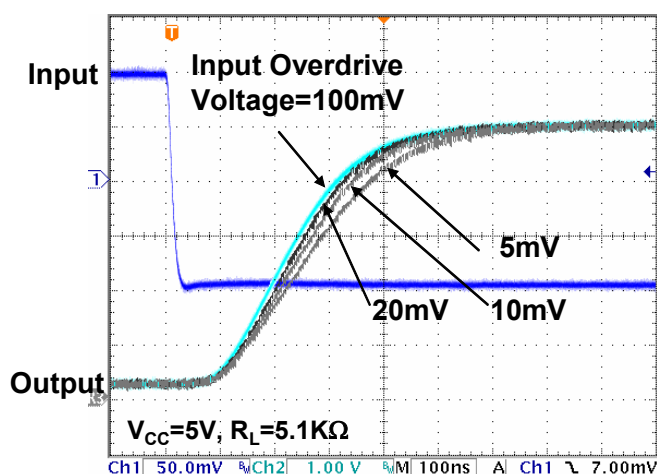


Figure 19. Response Time for Negative Transition

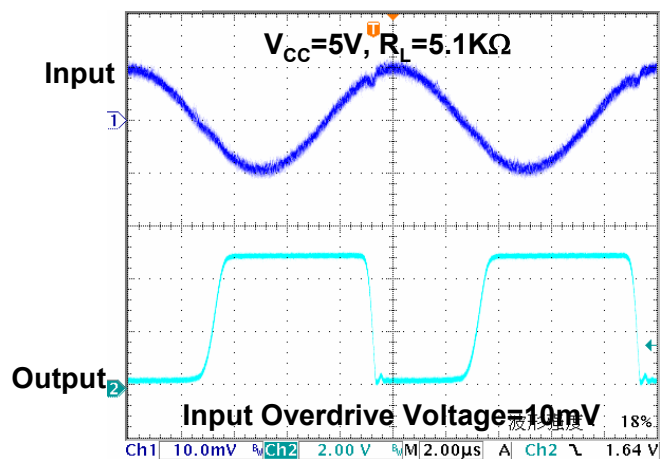
**SINGLE GENERAL PURPOSE LOW VOLTAGE COMPARATOR****AZV331****Typical Performance Characteristics (Continued)** $T_A=25^{\circ}\text{C}$, unless otherwise specified.

Figure 20. 100kHz Response

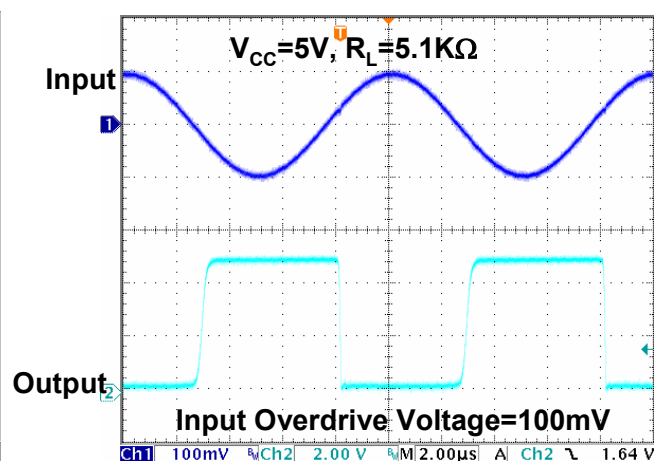


Figure 21. 100kHz Response

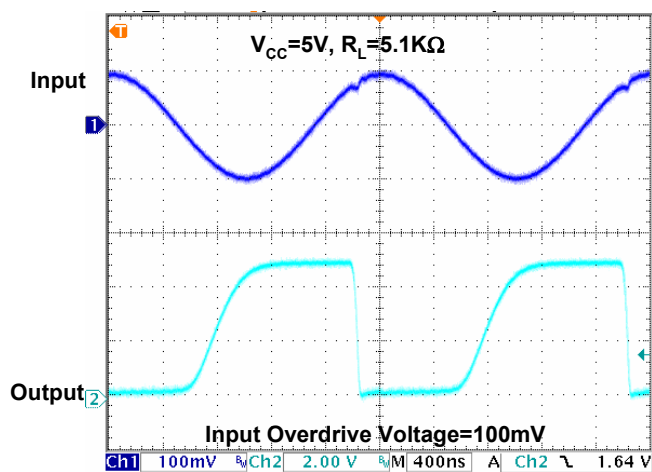


Figure 22. 500kHz Response

Typical Application

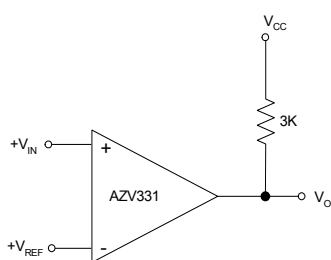


Figure 23. Basic Comparator

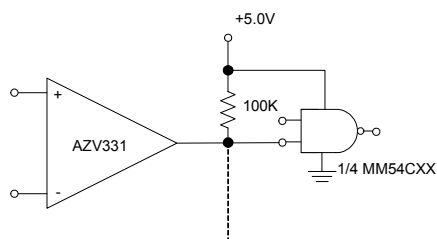


Figure 24. Driving CMOS/TTL

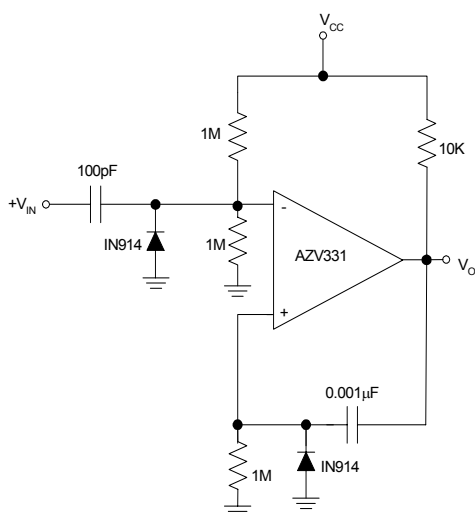


Figure 25. One Shot Multivibrator

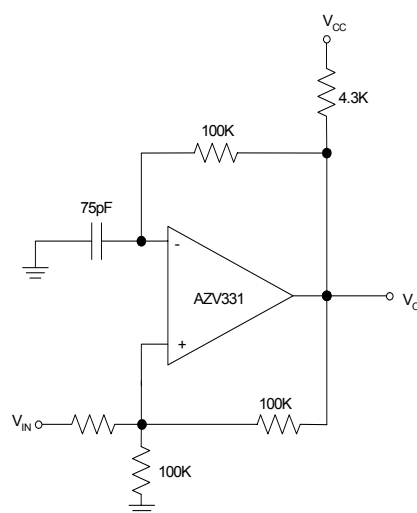
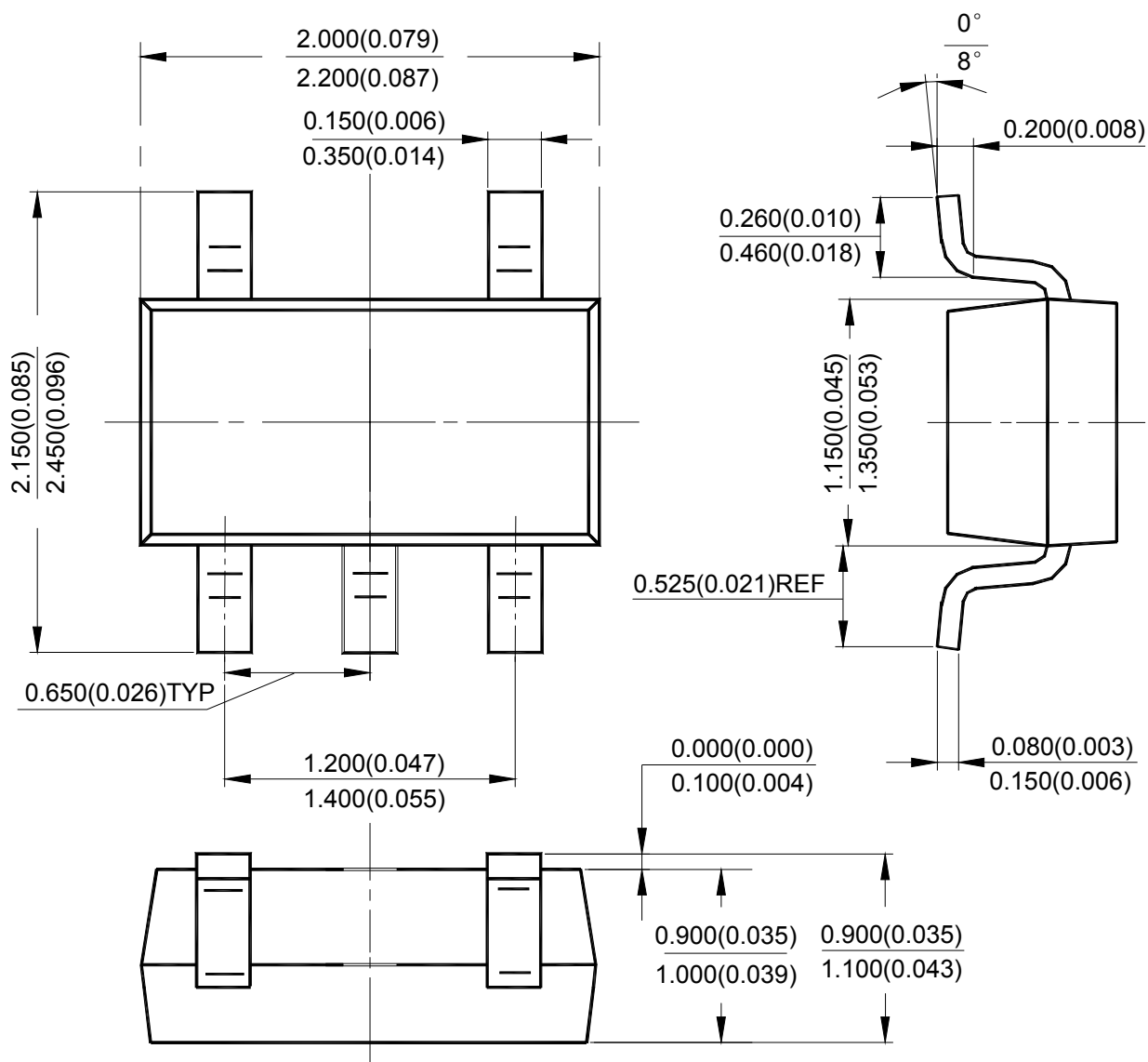
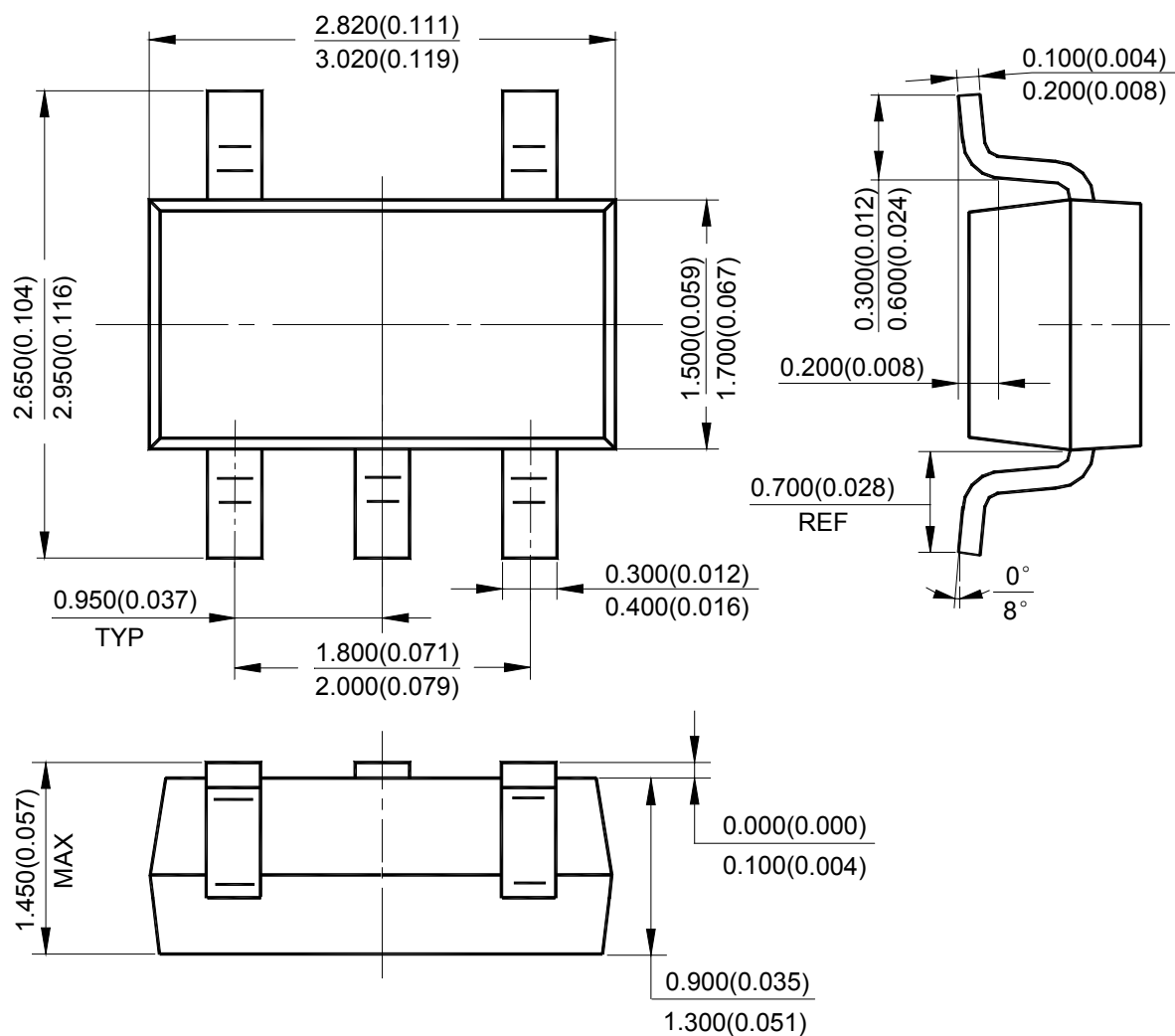


Figure 26. Squarewave Oscillator

**SINGLE GENERAL PURPOSE LOW VOLTAGE COMPARATOR****AZV331****Mechanical Dimensions****SC-70-5****Unit: mm(inch)**

**SINGLE GENERAL PURPOSE LOW VOLTAGE COMPARATOR****AZV331****Mechanical Dimensions****SOT-23-5****Unit: mm(inch)**



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MAIN SITE

- Headquarters

BCD Semiconductor Manufacturing Limited

No. 1600, Zi Xing Road, Shanghai ZiZhu Science-based Industrial Park, 200241, China
Tel: +86-21-24162266, Fax: +86-21-24162277

- Wafer Fab

Shanghai SIM-BCD Semiconductor Manufacturing Co., Ltd.

800 Yi Shan Road, Shanghai 200233, China
Tel: +86-21-6485 1491, Fax: +86-21-5450 0008

REGIONAL SALES OFFICE

Shenzhen Office

Shanghai SIM-BCD Semiconductor Manufacturing Co., Ltd., Shenzhen Office

Unit A Room 1203, Skyworth Bldg., Gaoxin Ave. I.S., Nanshan District, Shenzhen, China
Tel: +86-755-8826 7951
Fax: +86-755-8826 7865

Taiwan Office

BCD Semiconductor (Taiwan) Company Limited

4F, 298-1, Rui Guang Road, Nei-Hu District, Taipei, Taiwan
Tel: +886-2-2656 2808
Fax: +886-2-2656 2806

USA Office

BCD Semiconductor Corp.

30920 Huntwood Ave. Hayward, CA 94544, USA
Tel : +1-510-324-2988
Fax: +1-510-324-2788

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Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:

moschip.ru

moschip.ru_4

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