AZV331

SINGLE GENERAL PURPOSE LOW VOLTAGE COMPARATOR

Description

The AZV331 is a low voltage 2.5V to 5.5V, single comparator, which has a very low supply current of 60µA, 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.

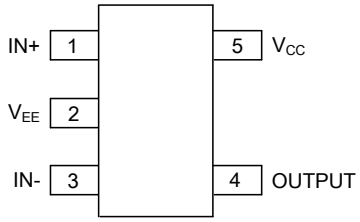
The AZV331 is available in space saving SC-70-5 and SOT-23-5 packages, the SC-70-5 is approximately half the size of the SOT-23-5.

Features

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

Pin Assignments

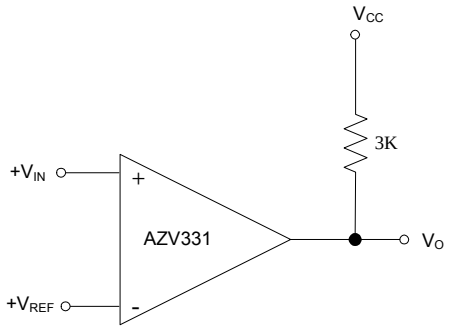
KS/K Package
(SC-70-5/SOT-23-5)



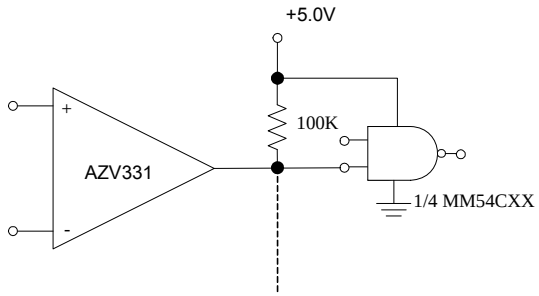
Applications

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

Typical Applications Circuit

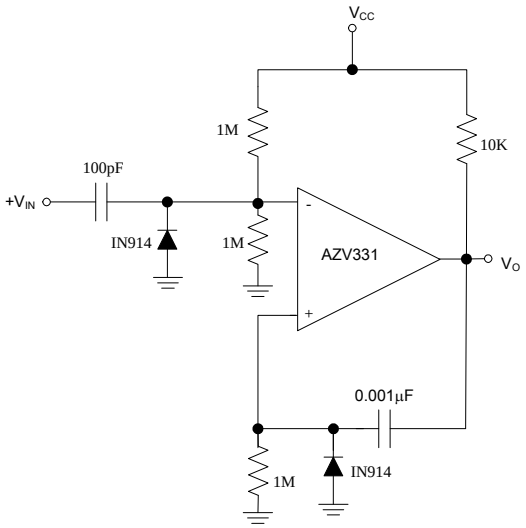


Basic Comparator

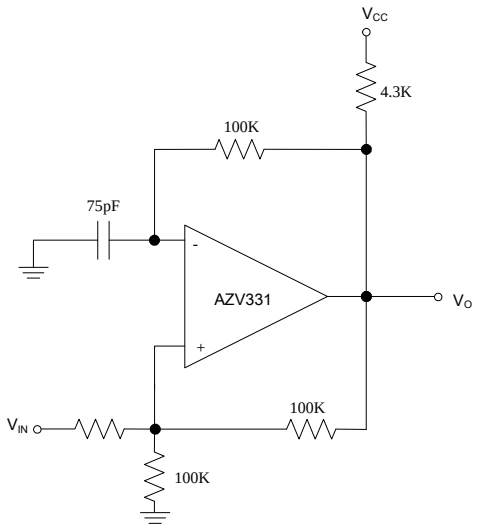


Driving CMOS/TTL

Typical Applications Circuit (Cont.)

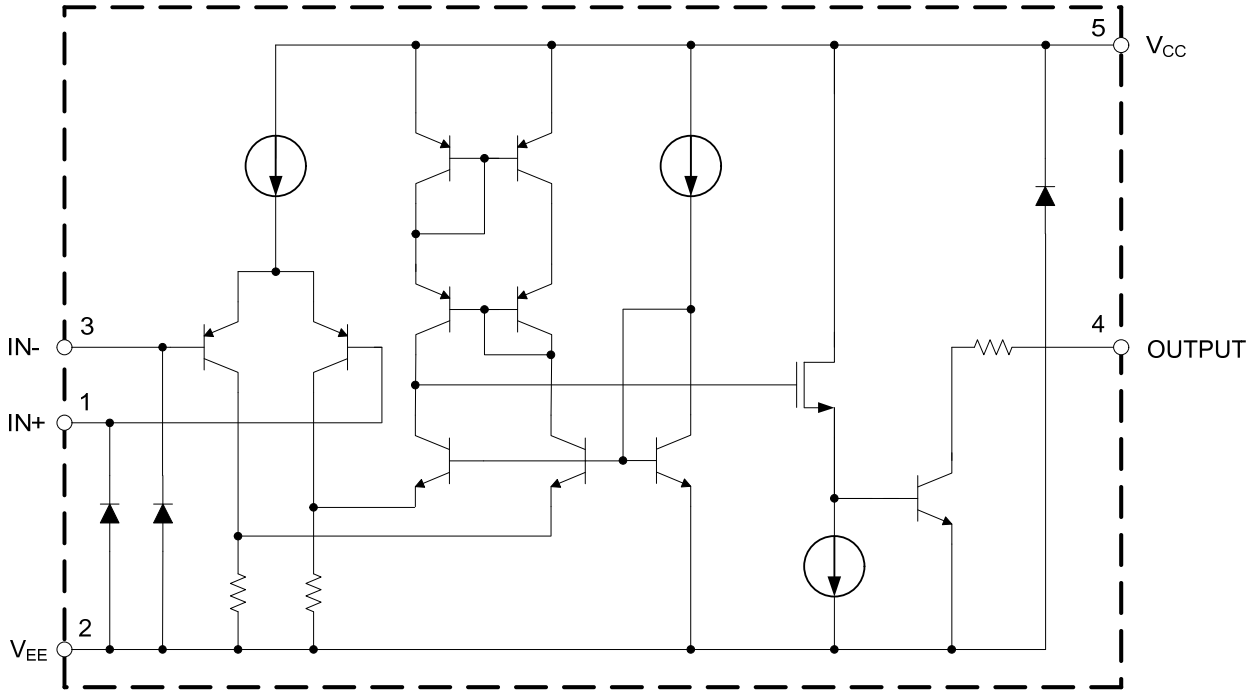


One Shot Multivibrator



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	ºC
T_{STG}	Storage Temperature Range	-65 to 150	ºC
T_{LEAD}	Lead Temperature (Soldering, 10 Seconds)	260	ºC
	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	ºC

Electrical Characteristics

AZV331-2.7V DC Electrical Characteristics

(Limits in standard typeface are guaranteed for T_A=25ºC, 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/ºC
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			40	100	µA
					150	
$I_{LEAKAGE}$	Output Leakage Current			0.003		µA

AZV331-2.7V AC Electrical Characteristics

(All limits are guaranteed for T_A=25ºC, 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		

Electrical Characteristics (Cont.)

AZV331-5V DC Electrical Characteristics (Limits in standard typeface are guaranteed for T_A=25ºC, 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.)

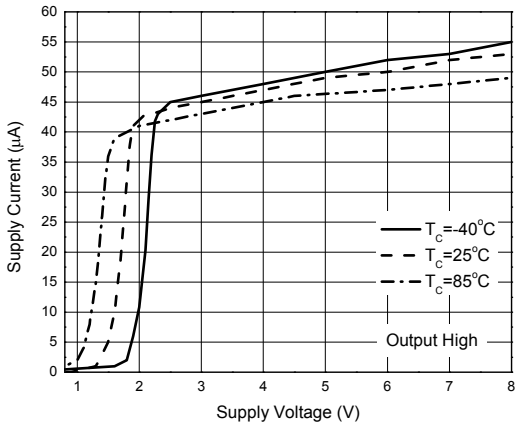
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{OS}	Input Offset Voltage			1.7	7	mV
					9	
TCV_{OS}	Input Offset Voltage Average Drift			5		µV/ºC
I_B	Input Bias Current	I_{IN}+ or I_{IN}- with output in linear range, V_{CM}=0V		25	250	nA
					400	
I_{IO}	Input Offset Current	I_{IN}+ - I_{IN}-, V_{CM}=0V		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			60	120	µA
					150	
$I_{LEAKAGE}$	Output Leakage Current			0.003		µA

AZV331-5V AC Electrical Characteristics (All limits are guaranteed for T_A=25ºC, V_{CC}=5V, V_{EE}=0V, R_L=5.1kΩ connected to V_{CC} and V_{CM}=0, unless otherwise specified.)

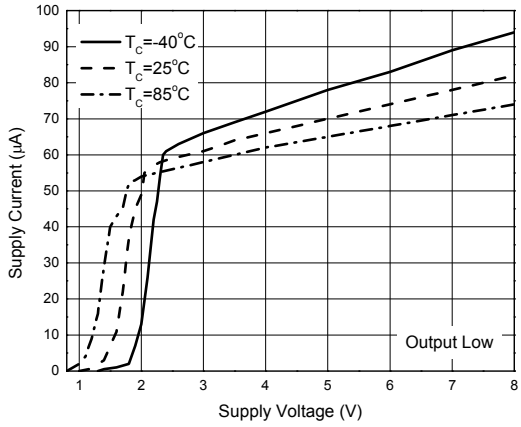
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
T_{PHL}	Propagation Delay (High to Low)	Input Overdrive=10mV		600		ns
		Input Overdrive=100mV		200		
T_{PLH}	Propagation Delay (Low to High)	Input Overdrive=10mV		450		ns
		Input Overdrive=100mV		300		

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

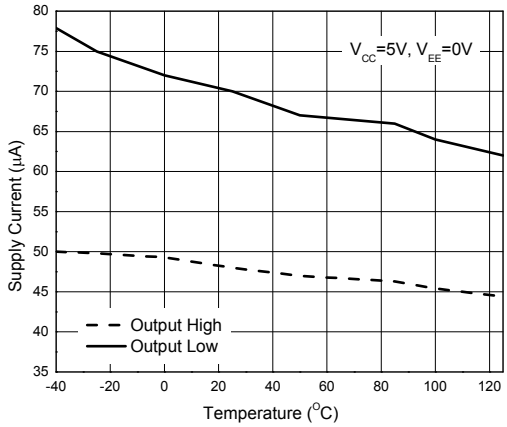
Supply Current vs. Supply Voltage



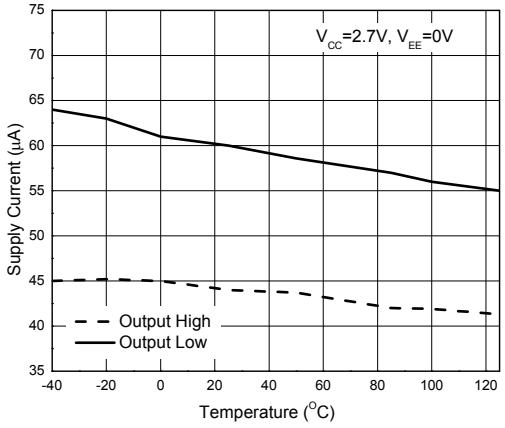
Supply Current vs. Supply Voltage



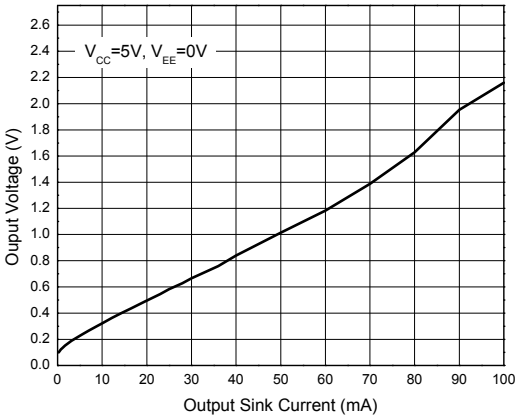
Supply Current vs. Temperature



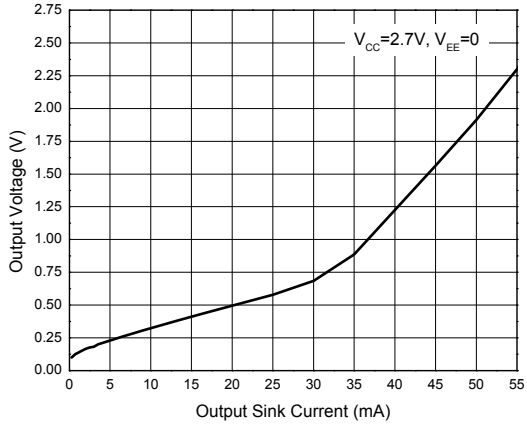
Supply Current vs. Temperature



Output Voltage vs. Output Sink Current

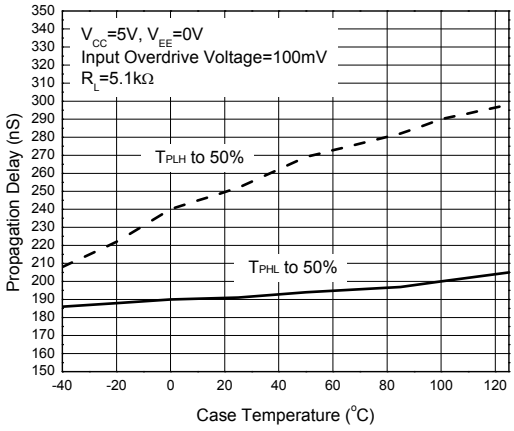


Output Voltage vs. Output Sink Current

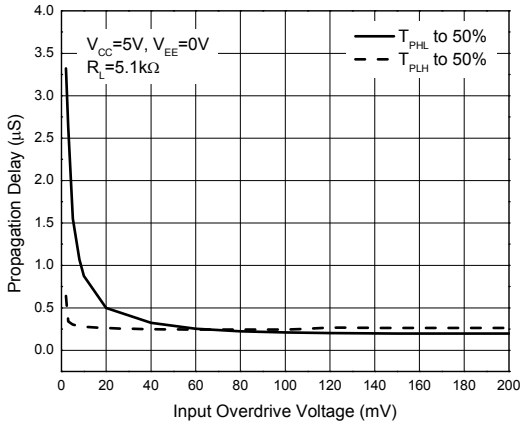


Performance Characteristics (Cont. @T_A=25ºC, unless otherwise specified.)

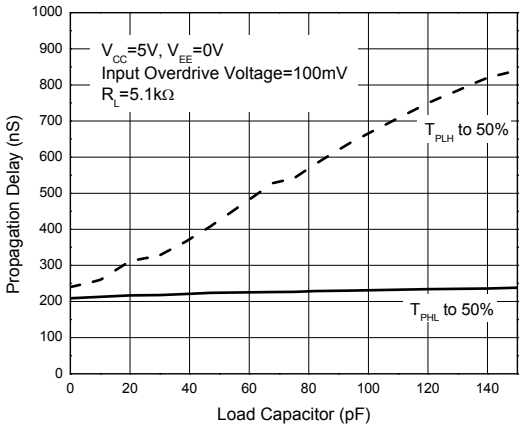
Propagation Delay vs. Temperature



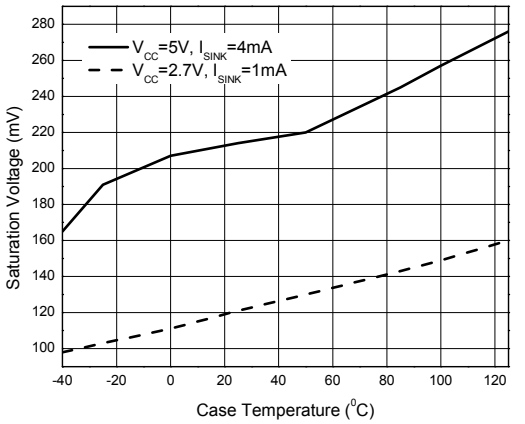
Propagation Delay vs. Input Overdrive Voltage



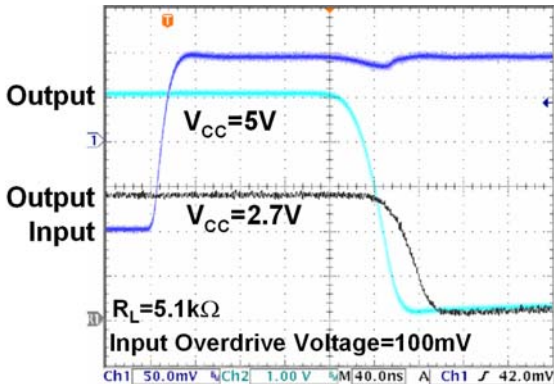
Propagation Delay vs. Load Capacitors



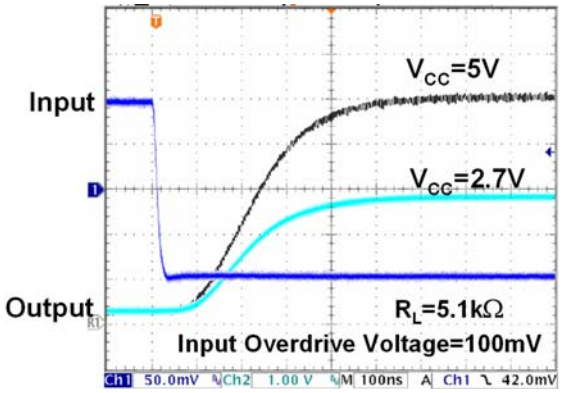
Saturation Voltage vs. Case Temperature



Response Time for Positive Transition

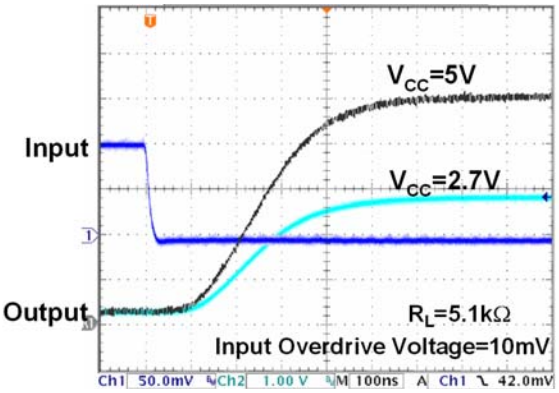


Response Time for Negative Transition

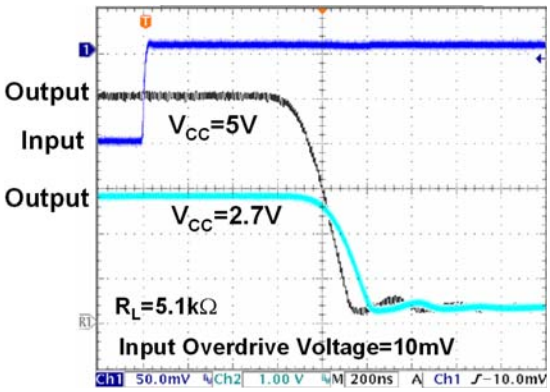


Performance Characteristics (Cont. @T_A=25°C, unless otherwise specified.)

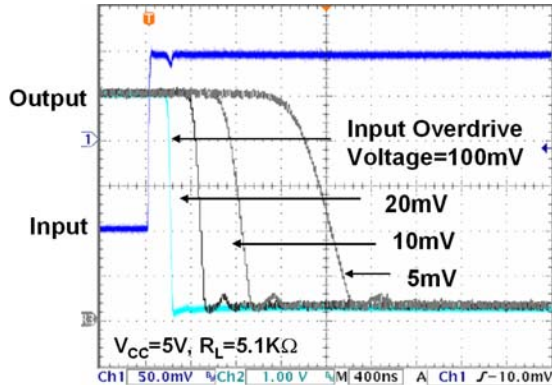
Response Time for Negative Transition



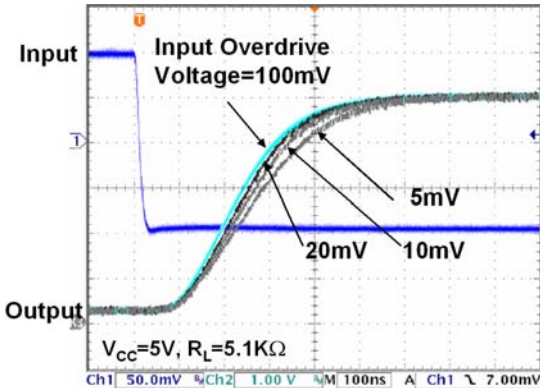
Response Time for Positive Transition



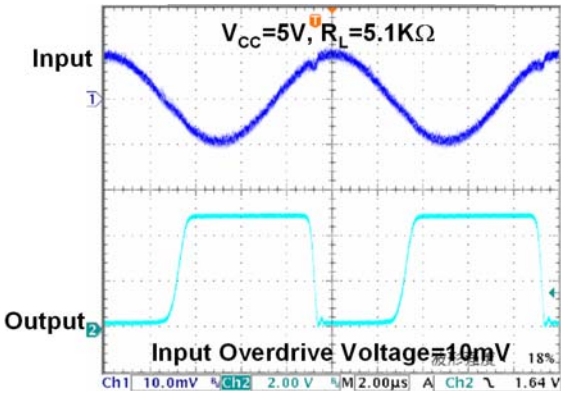
Response Time for Positive Transition



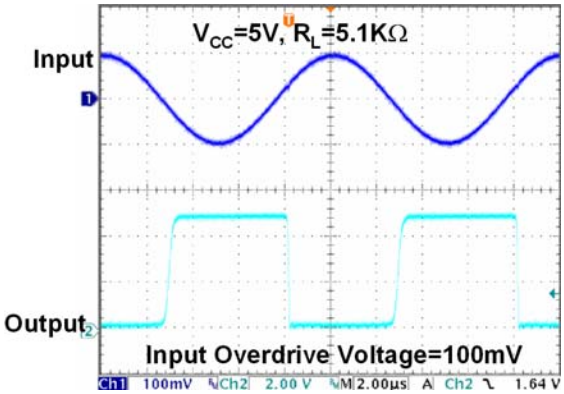
Response Time for Negative Transition



100kHz Response

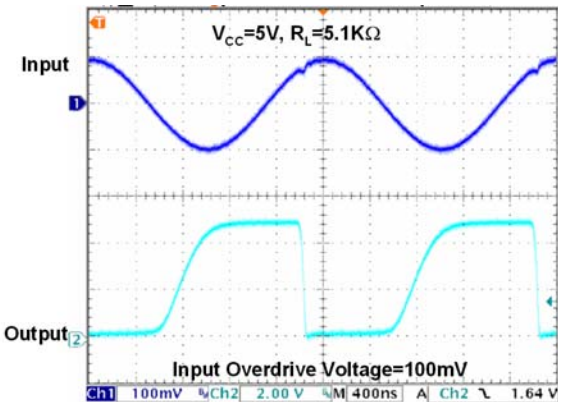


100kHz Response

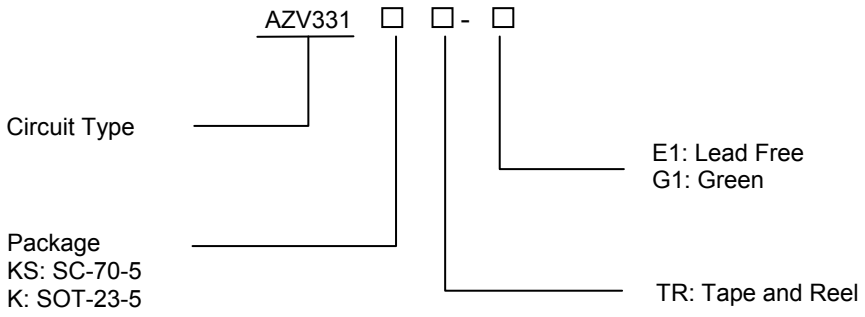


Performance Characteristics (Cont. @T_A=25°C, unless otherwise specified.)

500kHz Response



Ordering Information

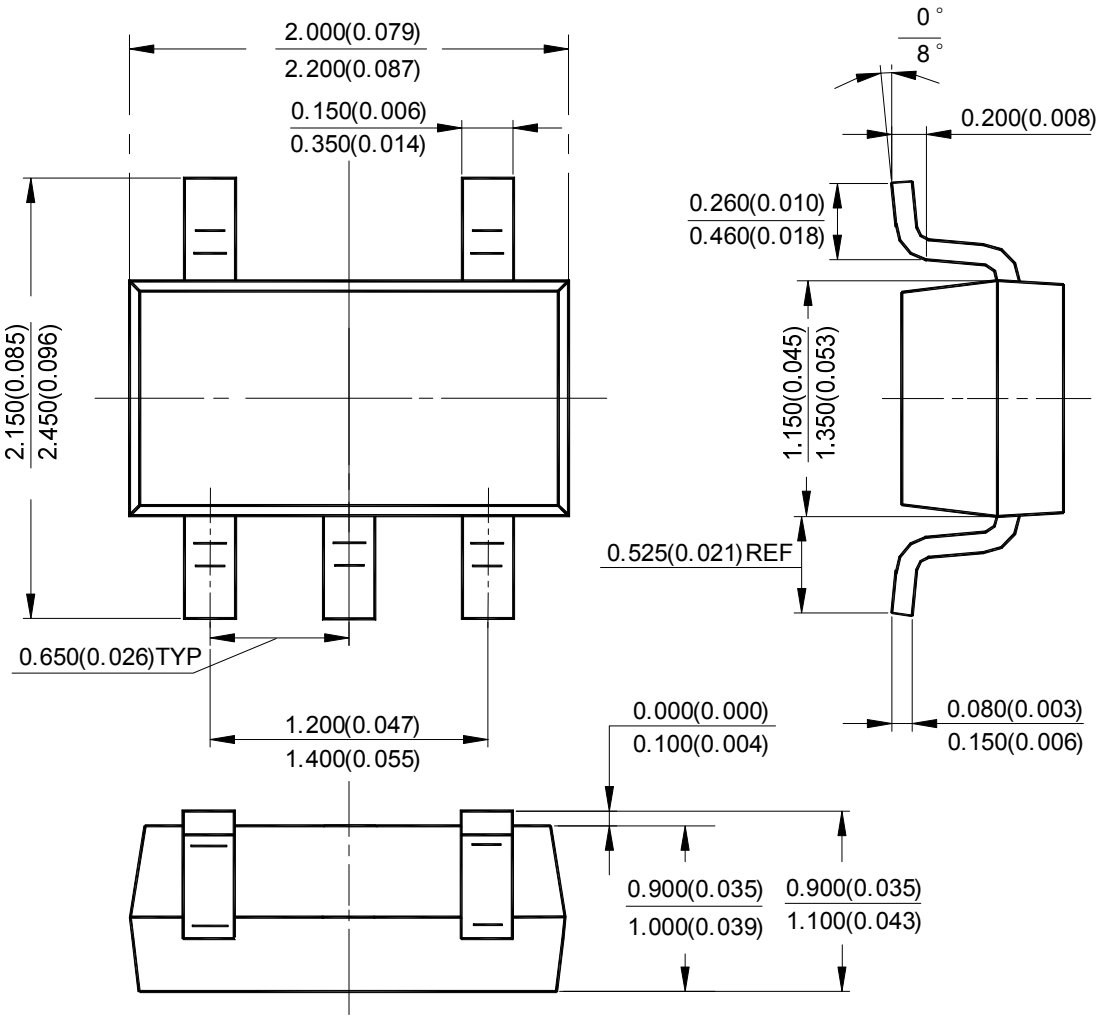


Package	Temperature Range	Part Number		Marking ID		Packing Type
		Lead Free	Green	Lead Free	Green	
SC-70-5	-40 to 85°C	AZV331KSTR-E1	AZV331KSTR-G1	22	B2	Tape & Reel
SOT-23-5		AZV331KTR-E1	AZV331KTR-G1	E6S	G6S	Tape & Reel

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.

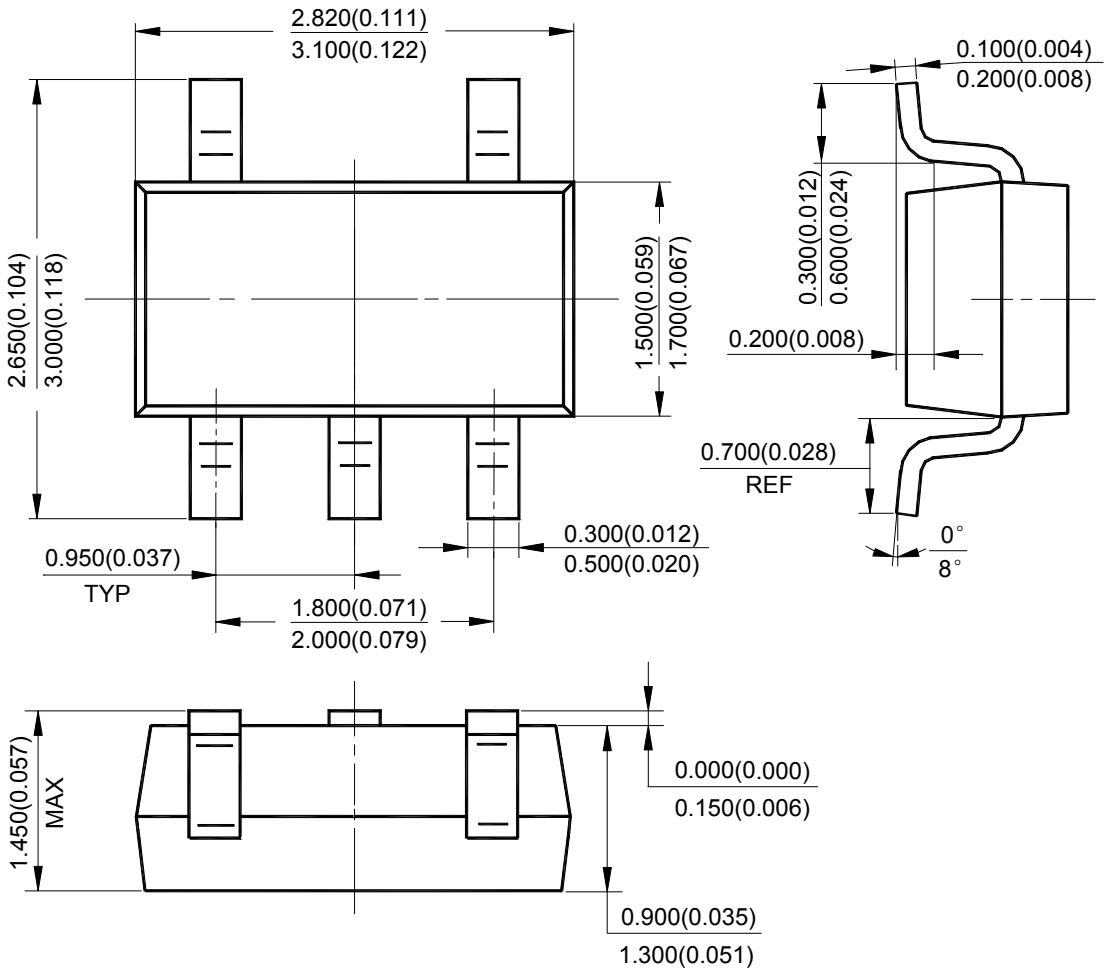
Package Outline Dimensions (All dimensions in mm(inch).)

SC-70-5



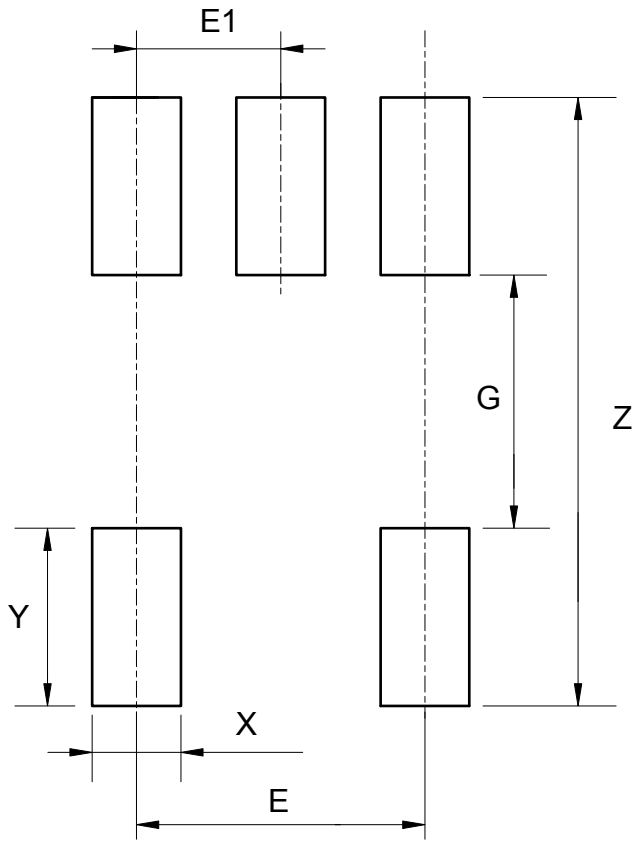
Package Outline Dimensions (Cont. All dimensions in mm(inch).)

SOT-23-5



Suggested Pad Layout

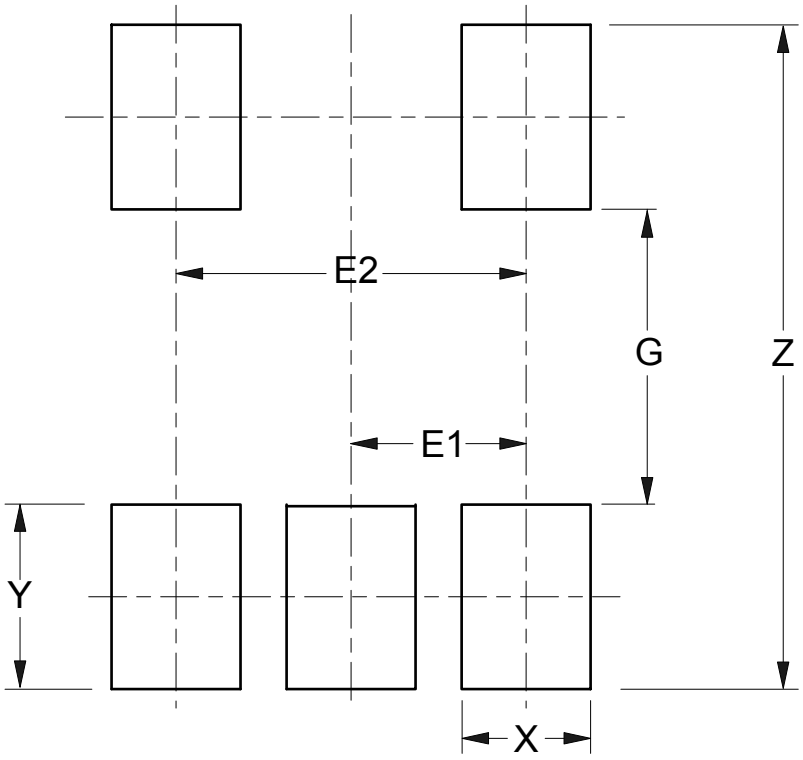
SC-70-5



Dimensions	Z (mm)/(inch)	G (mm)/(inch)	X (mm)/(inch)	Y (mm)/(inch)	E (mm)/(inch)	E1 (mm)/(inch)
Value	2.740/0.108	1.140/0.045	0.400/0.016	0.800/0.031	1.300/0.051	0.650/0.026

Suggested Pad Layout (Cont.)

SOT-23-5



Dimensions	Z (mm)/(inch)	G (mm)/(inch)	X (mm)/(inch)	Y (mm)/(inch)	E1 (mm)/(inch)	E2 (mm)/(inch)
Value	3.600/0.142	1.600/0.063	0.700/0.028	1.000/0.039	0.950/0.037	1.900/0.075

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