3-PIN MICROPROCESSOR RESET CIRCUITS AZ809/AZ810

General Description

The AZ809/810 microprocessor supervisory circuits can be used to monitor the power supplies in microprocessor and digital systems. They provide a reset to the microprocessor in power-up, power-down and brown-out conditions. The function of the AZ809/810 is to monitor the V_{CC} supply voltage, and assert a reset signal whenever this voltage declines below the factory-programmed reset threshold. The reset signal remains asserted for 240ms after V_{CC} rises above the threshold. The AZ809 has an active-low RESET output, while the AZ810 has an active-high RESET output. Seven standard reset voltage options are available, suitable for monitoring 5V, 3.3V and 2.5V supply voltages. With a typical supply current of only 8μA when V_{CC} is 3.3V, the AZ809/810 are ideal for use in portable equipment.

These ICs are available in SOT-23-3 package.

Features

- Precise Monitoring of 2.5V, 3.0V, 3.3V and 5.0V Supply Voltages
- Improved Maxim MAX809/MAX810 Replacement
- 140ms Min. Reset Pulse Width
  Active-low Reset Output (AZ809)
  Active-high Reset Output (AZ810)
- No External Components
- Specified Over Full Temperature Range: -40 to 105°C

Applications

- Embedded Controllers
- Battery Operated Systems
- Intelligent Instruments
- Wireless Communication Systems
- PDAs and Handheld Equipment

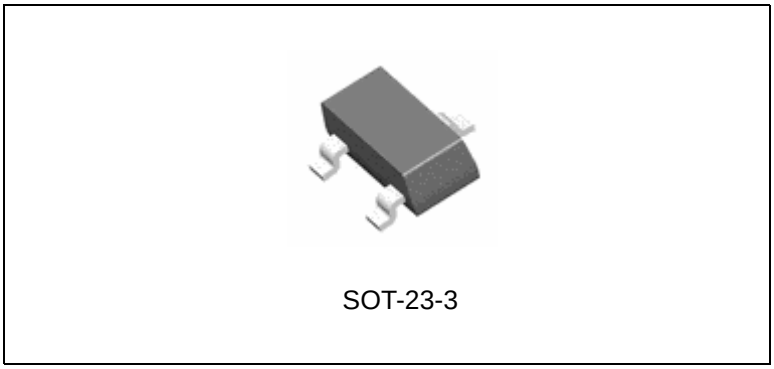


Figure 1. Package Type of AZ809/810

Pin Configuration

N Package
(SOT-23-3)

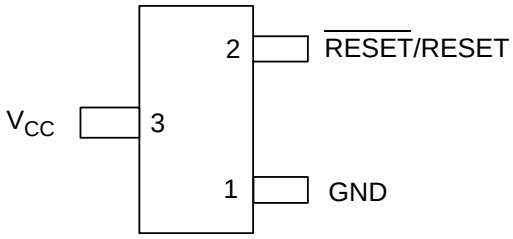


Figure 2. Pin Configuration of AZ809/810 (Top View)

Pin Description

Pin Number		Pin Name	Function
AZ809	AZ810		
1	1	GND	Ground pin.
2		$\overline{\text{RESET}}$	$\overline{\text{RESET}}$ is asserted LOW if V_{CC} falls below the reset threshold and remains LOW for the 240ms typical reset timeout period (140ms minimum) after V_{CC} exceeds the threshold.
	2	RESET	RESET is asserted HIGH if V_{CC} falls below the reset threshold.
3	3	V_{CC}	Power supply input voltage (2.5V, 3.0V, 3.3V, 5.0V).

Functional Block Diagram

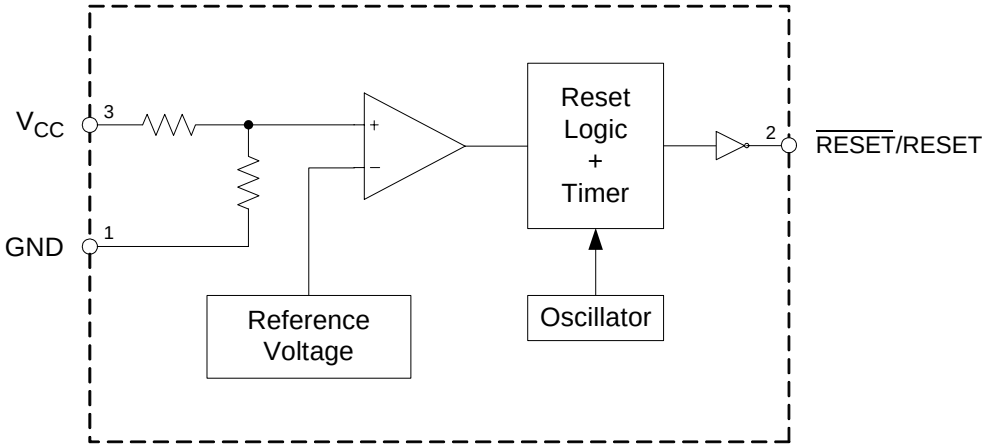
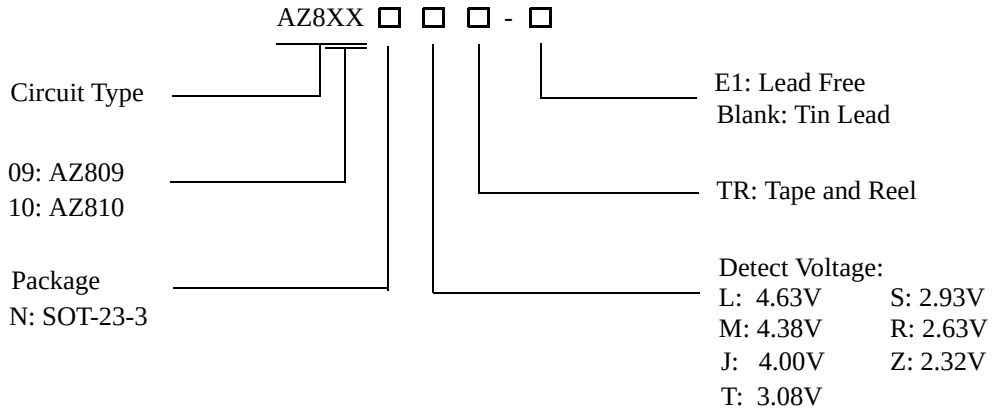


Figure 3. Functional Block Diagram of AZ809/810

Ordering Information



Ordering Information (Continued)

Package	Temperature Range	Part Number		Marking ID		Packing Type
		Tin Lead	Lead Free	Tin Lead	Lead Free	
SOT-23-3	-40 to 105°C	AZ809NLTR	AZ809NLTR-E1	N1C	EC1	Tape & Reel
		AZ809NMTR	AZ809NMTR-E1	N2C	EC2	Tape & Reel
		AZ809NJTR	AZ809NJTR-E1	N3C	EC3	Tape & Reel
		AZ809NTTR	AZ809NTTR-E1	N4C	EC4	Tape & Reel
		AZ809NSTR	AZ809NSTR-E1	N5C	EC5	Tape & Reel
		AZ809NRTR	AZ809NRTR-E1	N6C	EC6	Tape & Reel
		AZ809NZTR	AZ809NZTR-E1	N7C	EC7	Tape & Reel
	-40 to 105°C	AZ810NLTR	AZ810NLTR-E1	N1D	ED1	Tape & Reel
		AZ810NMTR	AZ810NMTR-E1	N2D	ED2	Tape & Reel
		AZ810NJTR	AZ810NJTR-E1	N3D	ED3	Tape & Reel
		AZ810NTTR	AZ810NTTR-E1	N4D	ED4	Tape & Reel
		AZ810NSTR	AZ810NSTR-E1	N5D	ED5	Tape & Reel
		AZ810NRTR	AZ810NRTR-E1	N6D	ED6	Tape & Reel
		AZ810NZTR	AZ810NZTR-E1	N7D	ED7	Tape & Reel

BCD Semiconductor's Pb-free products, as designated with "E1" suffix in the part number, are RoHS compliant.

Absolute Maximum Ratings (Note 1)

Parameter	Symbol	Value	Unit
Supply Voltage	V_{CC}	-0.3 to 6	V
$\overline{\text{RESET}}$, RESET		-0.3 to V_{CC}+0.3	V
Input Current, V_{CC} Pin		20	mA
Output Current, $\overline{\text{RESET}}$, RESET Pin		20	mA
Rate of Rise, V_{CC}		100	V/μs
Continuous Power Dissipation		320	mW
Junction Temperature	T_J	125	°C
Lead Temperature (Soldering, 10sec)	T_{LEAD}	300	°C
ESD (Human Body Model)		2000	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
Operating Junction Temperature Range	T_J	-40	105	°C

Electrical Characteristics

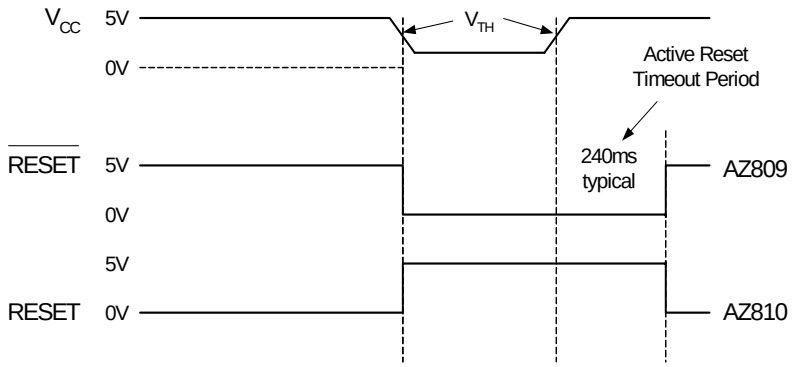
(Unless otherwise noted, V_{CC} is over the full voltage range, T_A=-40°C to 105°C.
Typical values at T_A=25°C, V_{CC}=5V for L/M/J devices, V_{CC}=3.3V for T/S devices and V_{CC}=3V for R devices, V_{CC}=2.5V for Z devices.)

Parameter	Symbol	Conditions		Min	Typ	Max	Unit
Input Voltage (V_{CC}) Range	V_{CC}	T_A=0°C to 70°C		1.1		5.5	V
		T_A=-40°C to 105°C		1.2		5.5	
Supply Current	I_{CC}	T_A=-40°C to 85°C, V_{CC}<5.5V, L/M/J			11	20	μA
		T_A=-40°C to 85°C, V_{CC}<3.6V, R/S/T/Z			8	16	
		T_A=85°C to 105°C, V_{CC}<5.5V, L/M/J				25	
		T_A=85°C to 105°C, V_{CC}<3.6V, R/S/T/Z				20	
Detect Voltage	V_{TH}	L Devices L: 4.63V	T_A=25°C	4.56	4.63	4.70	V
			T_A=-40°C to 85°C	4.50		4.75	
			T_A=85°C to 105°C	4.40		4.86	
		M Devices M: 4.38V	T_A=25°C	4.31	4.38	4.45	
			T_A=-40°C to 85°C	4.25		4.50	
			T_A=85°C to 105°C	4.16		4.56	
		J Devices J: 4.00V	T_A=25°C	3.93	4.00	4.06	
			T_A=-40°C to 85°C	3.89		4.10	
			T_A=85°C to 105°C	3.80		4.20	
		T Devices T: 3.08V	T_A=25°C	3.04	3.08	3.11	
			T_A=-40°C to 85°C	3.00		3.15	
			T_A=85°C to 105°C	2.92		3.23	
		S Devices S: 2.93V	T_A=25°C	2.89	2.93	2.96	
			T_A=-40°C to 85°C	2.85		3.00	
			T_A=85°C to 105°C	2.78		3.08	
		R Devices R: 2.63V	T_A=25°C	2.59	2.63	2.66	
			T_A=-40°C to 85°C	2.55		2.70	
			T_A=85°C to 105°C	2.50		2.76	
		Z Devices Z: 2.32V	T_A=25°C	2.28	2.32	2.35	
			T_A=-40°C to 85°C	2.24		2.39	
			T_A=85°C to 105°C	2.20		2.45	

Electrical Characteristics (Continued)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Detect Voltage Temperature Coefficient				± 0.003		%/°C
V_{CC} to Reset Delay		V_{CC}=V_{TH} to V_{TH}-100mV		20		μs
Reset Active Timeout Period		T_A=-40°C to 85°C	140	240	560	ms
		T_A=85°C to 105°C	100		840	
Low $\overline{\text{RESET}}$ Output Voltage (AZ809)	V_{OL}	V_{CC}=V_{TH} min, I_{SINK}=1.2mA, AZ809R/S/T/Z			0.3	V
		V_{CC}=V_{TH} min, I_{SINK}=3.2mA, AZ809L/M/J			0.4	
		V_{CC}>1.1V, I_{SINK}=50μA			0.3	
High $\overline{\text{RESET}}$ Output Voltage (AZ809)		V_{CC}>V_{TH} max, I_{SOURCE}=500μA, AZ809R/S/T/Z	0.8V_{CC}			V
		V_{CC}>V_{TH} max, I_{SOURCE}=800μA, AZ809L/M/J	V_{CC}-1.5			
Low RESET Output Voltage (AZ810)	V_{OL}	V_{CC}=V_{TH} max, I_{SINK}=1.2mA, AZ810R/S/T/Z			0.3	V
		V_{CC}=V_{TH} max, I_{SINK}=3.2mA, AZ810L/M/J			0.4	
High RESET Output Voltage (AZ810)	V_{OH}	1.8V<V_{CC}<V_{TH} min, I_{SOURCE}=150μA	0.8V_{CC}			V

Operating Diagram



Note: The reset signal is asserted LOW for the AZ809 and HIGH for the AZ810 when the V_{CC} signal falls below the threshold trip voltage and remains asserted for 240ms typical after the V_{CC} has risen above the threshold.

Figure 4. Reset Timing Diagram of AZ809/810

Typical Application

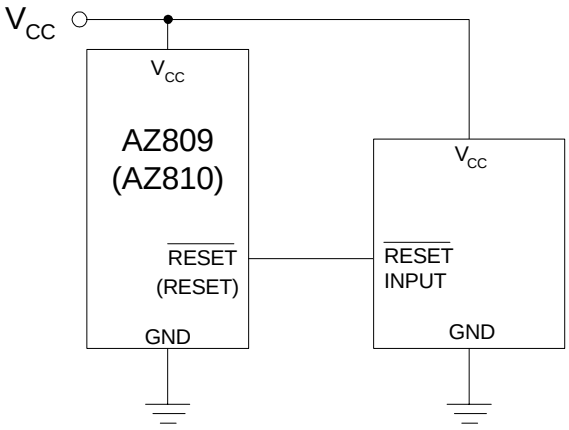
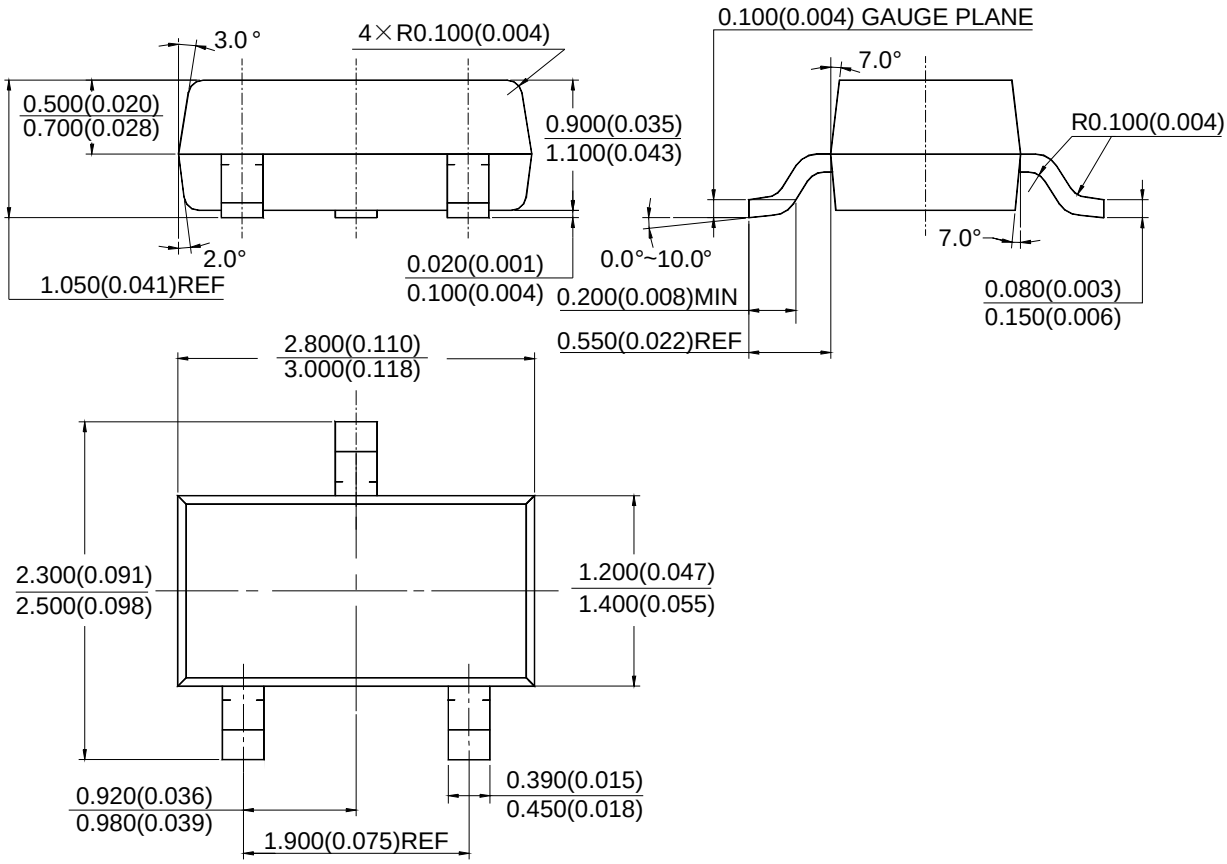


Figure 5. Typical Application of AZ809/810

Mechanical Dimensions

SOT-23-3 **Unit: mm(inch)**



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