

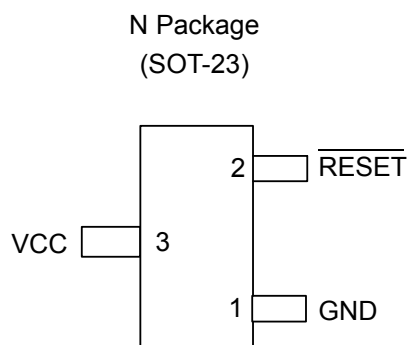
**3-PIN MICROPROCESSOR RESET CIRCUIT****AZ809A****Pin Configuration**

Figure 2. Pin Configuration of AZ809A (Top View)

**Pin Description**

| Pin Number | Pin Name                  | Function                                                                                                                                                                                                                     |
|------------|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1          | GND                       | Ground pin                                                                                                                                                                                                                   |
| 2          | $\overline{\text{RESET}}$ | Active low output. The $\overline{\text{RESET}}$ 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 |
| 3          | VCC                       | Power supply input voltage (3.0V, 3.3V, 5.0V)                                                                                                                                                                                |

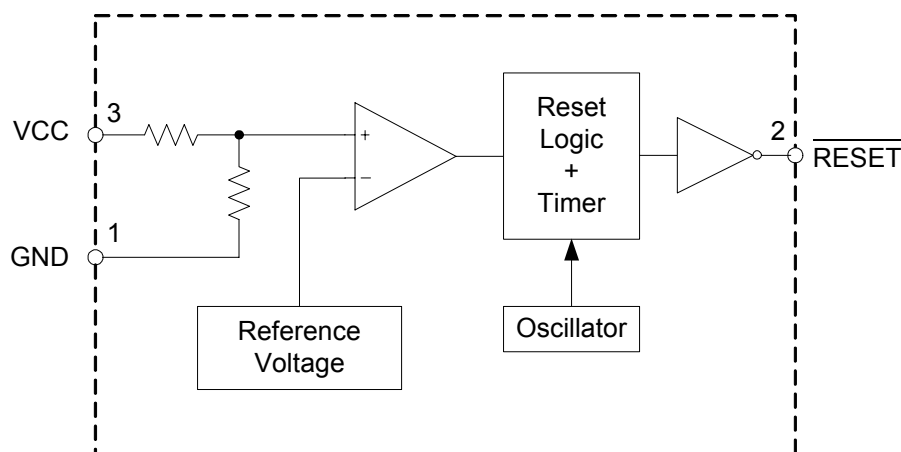
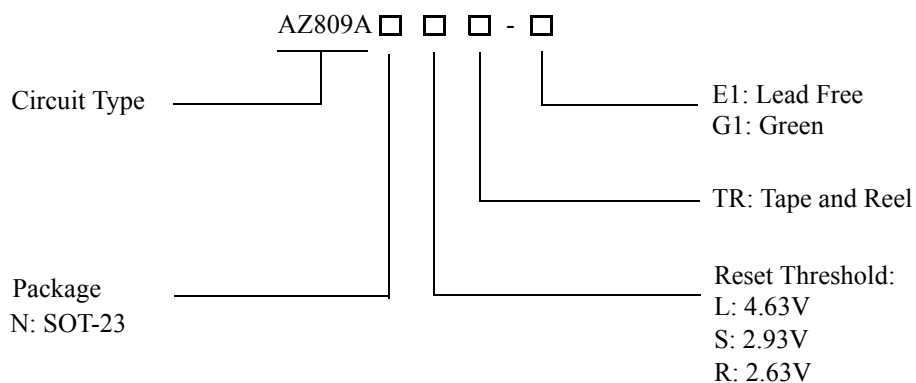
**3-PIN MICROPROCESSOR RESET CIRCUIT****AZ809A****Functional Block Diagram**

Figure 3. Functional Block Diagram of AZ809A

**Ordering Information**

| Package | Temperature Range | Reset Threshold | Part Number   |               | Marking ID |       | Packing Type |
|---------|-------------------|-----------------|---------------|---------------|------------|-------|--------------|
|         |                   |                 | Lead Free     | Green         | Lead Free  | Green |              |
| SOT-23  | -40 to 105°C      | 4.63V           | AZ809ANLTR-E1 | AZ809ANLTR-G1 | EH7        | GH7   | Tape & Reel  |
|         |                   | 2.93V           | AZ809ANSTR-E1 | AZ809ANSTR-G1 | EH1        | GH1   |              |
|         |                   | 2.63V           | AZ809ANRTR-E1 | AZ809ANRTR-G1 | EH6        | GH6   |              |

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 package.

**3-PIN MICROPROCESSOR RESET CIRCUIT****AZ809A****Absolute Maximum Ratings (Note 1)**

| Parameter                                     | Symbol     | Value                | Unit               |
|-----------------------------------------------|------------|----------------------|--------------------|
| Supply Voltage                                | $V_{CC}$   | -0.3 to 6            | V                  |
| $\overline{\text{RESET}}$                     |            | -0.3 to $V_{CC}+0.3$ | V                  |
| Input Current, $V_{CC}$ Pin                   |            | 20                   | mA                 |
| Output Current, $\overline{\text{RESET}}$ Pin |            | 20                   | mA                 |
| Rate of Rise, $V_{CC}$                        |            | 100                  | V/ $\mu$ s         |
| Continuous Power Dissipation                  |            | 320                  | mW                 |
| Junction Temperature                          | $T_J$      | 150                  | $^{\circ}\text{C}$ |
| Storage Temperature                           | $T_{STG}$  | -65 to 150           | $^{\circ}\text{C}$ |
| Lead Temperature (Soldering, 10sec)           | $T_{LEAD}$ | 260                  | $^{\circ}\text{C}$ |
| ESD (Human Body Model)                        |            | 6000                 | V                  |
| ESD (Machine Model)                           |            | 400                  | 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                      | $V_{CC}$ | 1   | 5.5 | V                  |
| Operating Ambient Temperature Range | $T_A$    | -40 | 105 | $^{\circ}\text{C}$ |



## 3-PIN MICROPROCESSOR RESET CIRCUIT

AZ809A

### Electrical Characteristics

( $V_{CC}$  is over the full voltage range,  $T_A = -40^\circ\text{C}$  to  $105^\circ\text{C}$ , unless otherwise noted.

Typical values at  $T_A = 25^\circ\text{C}$ ,  $V_{CC} = 5\text{V}$  for L device,  $V_{CC} = 3.3\text{V}$  for S device and  $V_{CC} = 3\text{V}$  for R device.)(Note 2)

| Parameter                               | Symbol   | Conditions                                       | Min                                                                       | Typ            | Max  | Unit                        |
|-----------------------------------------|----------|--------------------------------------------------|---------------------------------------------------------------------------|----------------|------|-----------------------------|
| Input Voltage ( $V_{CC}$ ) Range        | $V_{CC}$ | $T_A = 0^\circ\text{C}$ to $85^\circ\text{C}$    | 1.0                                                                       |                | 5.5  | V                           |
|                                         |          | $T_A = -40^\circ\text{C}$ to $105^\circ\text{C}$ | 1.2                                                                       |                | 5.5  |                             |
| Supply Current                          | $I_{CC}$ | L Devices                                        | $T_A = -40^\circ\text{C}$ to $85^\circ\text{C}$ , $V_{CC} < 5.5\text{V}$  | 7              | 11   | $\mu\text{A}$               |
|                                         |          |                                                  | $T_A = -40^\circ\text{C}$ to $105^\circ\text{C}$ , $V_{CC} < 5.5\text{V}$ |                | 12   |                             |
|                                         |          | R/S Devices                                      | $T_A = -40^\circ\text{C}$ to $85^\circ\text{C}$ , $V_{CC} < 3.6\text{V}$  | 6              | 10   |                             |
|                                         |          |                                                  | $T_A = -40^\circ\text{C}$ to $105^\circ\text{C}$ , $V_{CC} < 3.6\text{V}$ |                | 11   |                             |
| Reset Threshold                         | $V_{TH}$ | L Devices                                        | $T_A = 25^\circ\text{C}$                                                  | 4.56           | 4.63 | V                           |
|                                         |          |                                                  | $T_A = -40^\circ\text{C}$ to $85^\circ\text{C}$                           | 4.50           | 4.75 |                             |
|                                         |          |                                                  | $T_A = -40^\circ\text{C}$ to $105^\circ\text{C}$                          | 4.40           | 4.86 |                             |
|                                         |          | S Devices                                        | $T_A = 25^\circ\text{C}$                                                  | 2.89           | 2.93 |                             |
|                                         |          |                                                  | $T_A = -40^\circ\text{C}$ to $85^\circ\text{C}$                           | 2.85           | 3.00 |                             |
|                                         |          |                                                  | $T_A = -40^\circ\text{C}$ to $105^\circ\text{C}$                          | 2.78           | 3.08 |                             |
|                                         |          | R Devices                                        | $T_A = 25^\circ\text{C}$                                                  | 2.59           | 2.63 |                             |
|                                         |          |                                                  | $T_A = -40^\circ\text{C}$ to $85^\circ\text{C}$                           | 2.55           | 2.70 |                             |
|                                         |          |                                                  | $T_A = -40^\circ\text{C}$ to $105^\circ\text{C}$                          | 2.50           | 2.76 |                             |
| Reset Threshold Temperature Coefficient |          | $T_A = -40^\circ\text{C}$ to $105^\circ\text{C}$ |                                                                           | 30             |      | $\text{ppm}/^\circ\text{C}$ |
| VCC to Reset Delay                      |          | $V_{CC} = V_{TH}$ to $V_{TH} - 100\text{mV}$     |                                                                           | 20             |      | $\mu\text{s}$               |
| Reset Active Timeout Period             |          | $T_A = -40^\circ\text{C}$ to $85^\circ\text{C}$  | 140                                                                       | 240            | 560  | ms                          |
|                                         |          | $T_A = -40^\circ\text{C}$ to $105^\circ\text{C}$ | 100                                                                       |                | 840  |                             |
| Low RESET Output Voltage                | $V_{OL}$ | R/S Devices                                      | $V_{CC} = V_{TH}(\text{min})$ , $I_{SINK} = 1.2\text{mA}$                 | 0.3            |      | V                           |
|                                         |          | L Devices                                        | $V_{CC} = V_{TH}(\text{min})$ , $I_{SINK} = 3.2\text{mA}$                 | 0.4            |      |                             |
|                                         |          |                                                  | $V_{CC} > 1.1\text{V}$ , $I_{SINK} = 50\mu\text{A}$                       | 0.3            |      |                             |
| High RESET Output Voltage               | $V_{OH}$ | R/S Devices                                      | $V_{CC} > V_{TH}(\text{max})$ , $I_{SOURCE} = 500\mu\text{A}$             | $0.8V_{CC}$    |      | V                           |
|                                         |          | L Devices                                        | $V_{CC} > V_{TH}(\text{max})$ , $I_{SOURCE} = 800\mu\text{A}$             | $V_{CC} - 1.5$ |      |                             |

Note 2. Production testing done at  $T_A = 25^\circ\text{C}$ . Over temperature specifications guaranteed by design only.

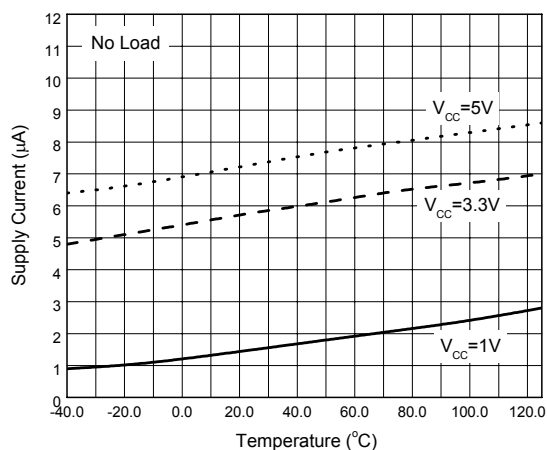
**3-PIN MICROPROCESSOR RESET CIRCUIT****AZ809A****Typical Performance Characteristics**

Figure 4. Supply Current vs. Temperature

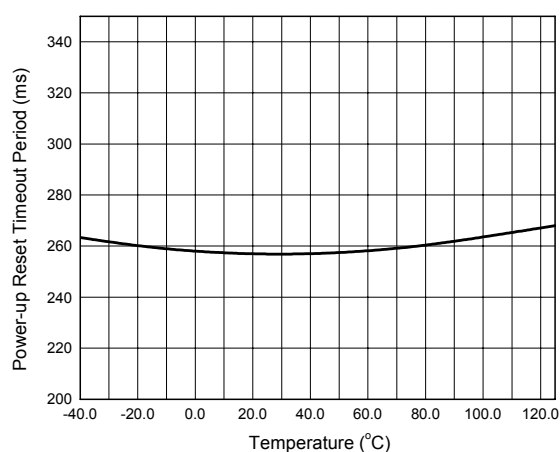


Figure 5. Power-up Reset Timeout vs. Temperature

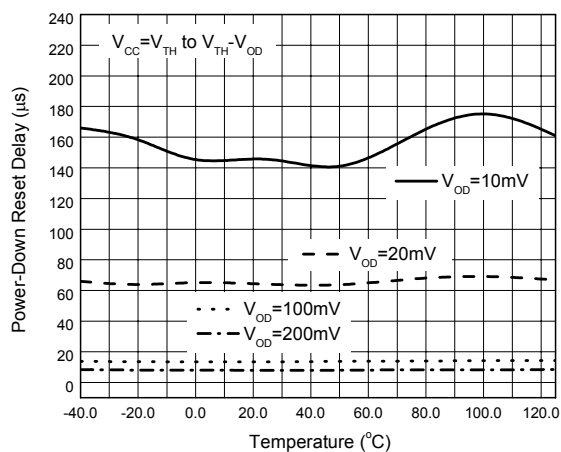


Figure 6. Power-down Reset Delay vs. Temperature

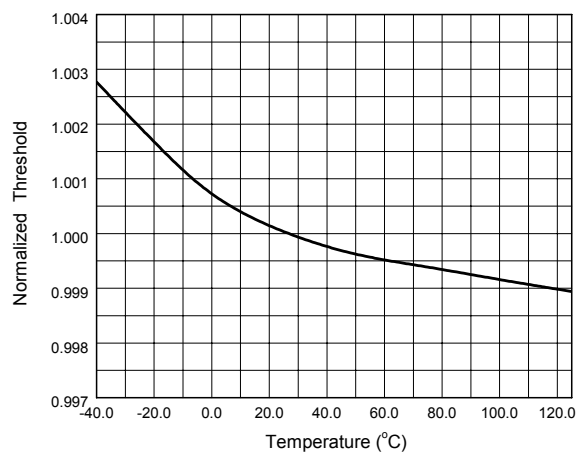


Figure 7. Normalized Reset Threshold vs. Temperature

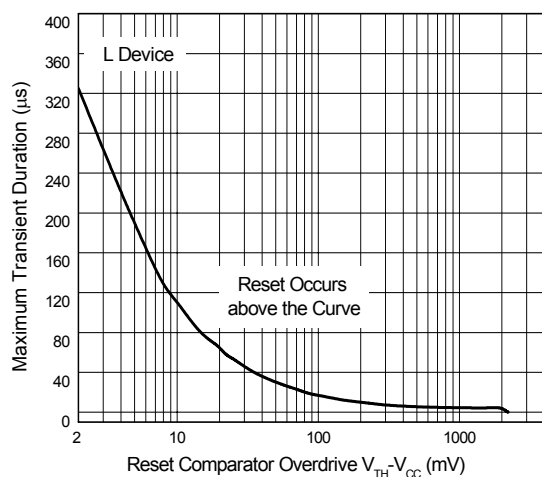
**3-PIN MICROPROCESSOR RESET CIRCUIT****AZ809A****Typical Performance Characteristics (Continued)**

Figure 8. Maximum Transient Duration NOT Causing a Reset Pulse vs. Reset Comparator Overdrive

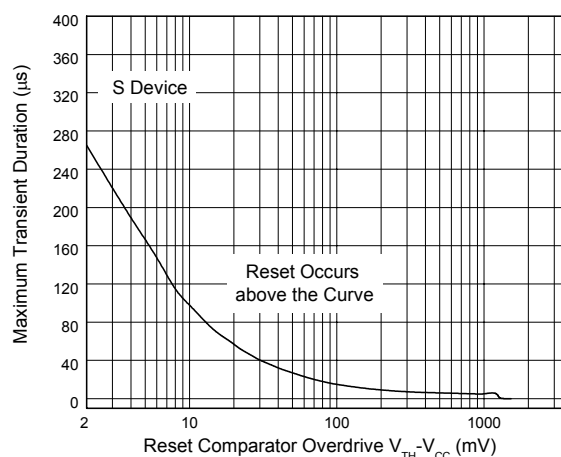


Figure 9. Maximum Transient Duration NOT Causing a Reset Pulse vs. Reset Comparator Overdrive

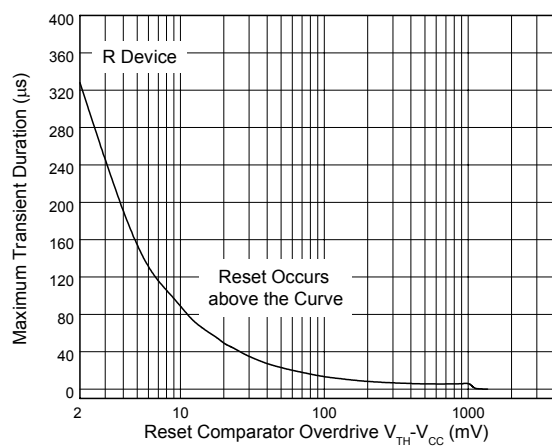
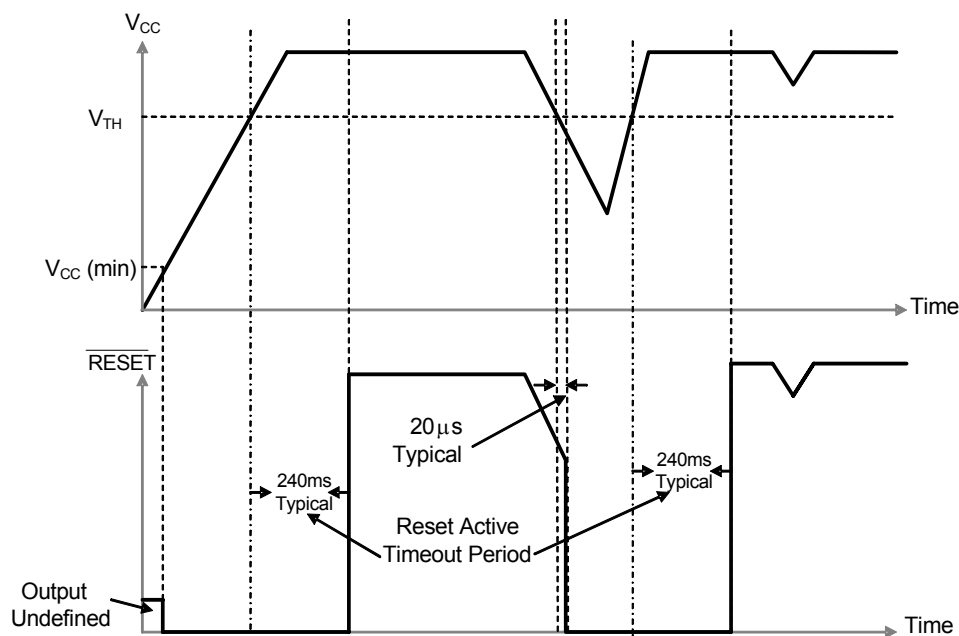


Figure 10. Maximum Transient Duration NOT Causing a Reset Pulse vs. Reset Comparator Overdrive

**3-PIN MICROPROCESSOR RESET CIRCUIT****AZ809A****Operating Diagram**

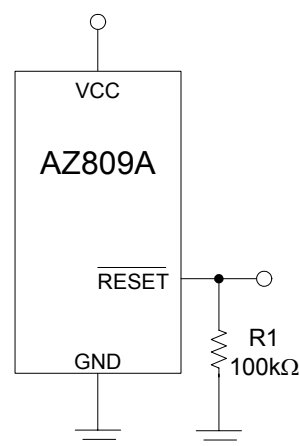
The AZ809A asserts a reset signal LOW whenever the VCC supply voltage is below the threshold voltage and remains asserted for 240ms typically after the VCC has risen above the threshold.

Figure 11. Reset Timing Diagram of AZ809A

**Application Information****Valid  $\overline{\text{RESET}}$  with  $V_{CC}$  under 1.0 V**

The AZ809A  $\overline{\text{RESET}}$  output is valid to  $V_{CC}=1.0\text{V}$ . Below this voltage, the output becomes an open circuit and doesn't sink current. Therefore, high-impedance CMOS logic input connected to  $\overline{\text{RESET}}$  can drift to undetermined voltages.

To ensure that the AZ809A  $\overline{\text{RESET}}$  is in a known state when  $V_{CC}$  is under 1.0V, a 100K $\Omega$  pull-down resistor between the  $\overline{\text{RESET}}$  pin and GND is recommended to discharge stray capacitances and maintain the output low.

Figure 12.  $\overline{\text{RESET}}$  Valid to  $V_{CC}=0\text{V}$

## 3-PIN MICROPROCESSOR RESET CIRCUIT

**AZ809A**

### Application Information (Continued)

#### Negative Going $V_{CC}$ Transient

The AZ809A is optimized to immune fast negative-going transients or glitches on the  $V_{CC}$  line, and the sensitivity depends on the duration of the transient and the magnitude of the undershoot below the reset threshold (reset comparator overdrive). Figure 13 shows the maximum pulse width of a negative-going  $V_{CC}$  transient that will not cause a reset pulse. As the magnitude of the transient increases (goes farther below the reset threshold), the maximum allowable pulse width decreases. Any combination of duration and overdrive that lies under the curve will not generate a reset signal, typically, a  $V_{CC}$  transient that goes 100mV below the reset threshold and lasts about 20 $\mu$ s or less will not cause a reset pulse.

A 0.1 $\mu$ F bypass capacitor mounted as close as possible to the  $V_{CC}$  pin will provide additional transient rejection.

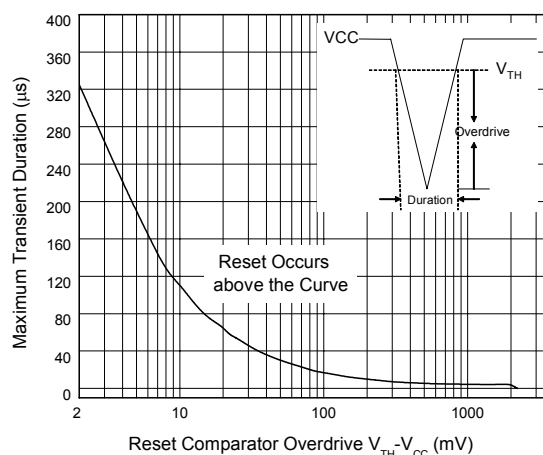


Figure 13. Maximum Transient Duration NOT Causing a Reset Pulse vs. Reset Comparator Overdrive

### Typical Application

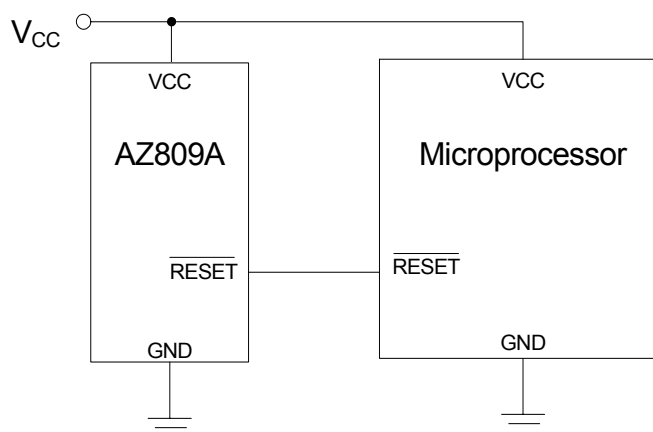
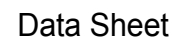


Figure 14. Typical Application of AZ809A



# AZ809A

## Unit: mm(inch)





## BCD Semiconductor Manufacturing Limited

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