



The Infinite Bandwidth Company™

# MIC809/810

## Microprocessor Reset Circuits

### Final Information

### General Description

The MIC809 and MIC810 are inexpensive microprocessor supervisory circuit that monitors power supplies in microprocessor based systems.

The function of this device is to assert a reset if either the power supply drops below a designated reset threshold level. Several different reset threshold levels are available to accommodate 3V, 3.3V or 5V powered systems.

The MIC809 has an active low /RESET output, while the MIC810 offers an active high RESET output. The reset output is guaranteed to remain asserted for a minimum of 140ms after V<sub>CC</sub> has risen above the designated reset threshold level. The MIC809/810 comes in a 3-pin SOT-23 package.

The MIC809 is also available with a shorter reset timeout (30ms min.). See the MIC809-5.

### Features

- Precision voltage monitor for 3V, 3.3V or 5V power supplies
- /RESET remains valid with V<sub>CC</sub> as low as 1.4V
- <15µA supply current
- 20ms, 40ms, or 1100ms minimum reset pulse widths available
- Manual reset input
- Available in 3-pin SOT-23 package

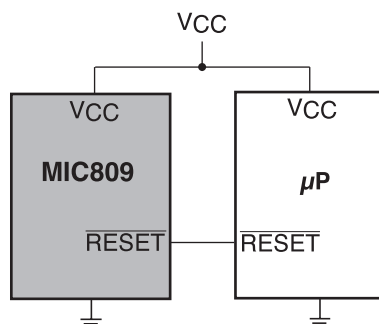
### Applications

- Portable equipment
- Intelligent instruments
- Critical microprocessor power monitoring
- Printers/computers
- Controllers

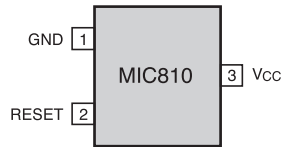
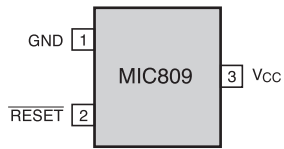
### Ordering Information

Part Number	Marking	Threshold Voltage	Operating Temp. Range	Package
MIC809LU	IL	4.63	-40°C to +85°C	3-lead SOT-23
MIC809MU	IM	4.38	-40°C to +85°C	3-lead SOT-23
MIC809JU	IJ	4.00	-40°C to +85°C	3-lead SOT-23
MIC809TU	IT	3.08	-40°C to +85°C	3-lead SOT-23
MIC809SU	IS	2.93	-40°C to +85°C	3-lead SOT-23
MIC809RU	IR	2.63	-40°C to +85°C	3-lead SOT-23
MIC810LU	JL	4.63	-40°C to +85°C	3-lead SOT-23
MIC810MU	JM	4.38	-40°C to +85°C	3-lead SOT-23
MIC810JU	JJ	4.00	-40°C to +85°C	3-lead SOT-23
MIC810TU	JT	3.08	-40°C to +85°C	3-lead SOT-23
MIC810SU	JS	2.93	-40°C to +85°C	3-lead SOT-23
MIC810RU	JR	2.63	-40°C to +85°C	3-lead SOT-23

### Typical Application



## Pin Configuration



**MIC809 3-Lead SOT23**  
**MIC810 3-Lead SOT23**

## Pin Description

Pin Number MIC809	Pin Number MIC810	Pin Name	Pin Function
1	1	GND	IC Ground Pin
2	N/A	/RESET	/RESET goes low if $V_{CC}$ falls below the reset threshold and remains asserted for one reset timeout period (140ms min.) after $V_{CC}$ exceeds the reset threshold
N/A	2	RESET	RESET goes high if $V_{CC}$ falls below the reset threshold and remains asserted for one reset timeout period (140ms min.) after $V_{CC}$ exceeds the reset threshold
3	3	VCC	Power Supply Input.

**Absolute Maximum Ratings**(Note 1)

Terminal Voltage ( $V_{CC}$ )	-0.3V to 6.0V
Input Current ( $V_{CC}$ )	20mA
Output Current (RESET, /RESET)	20mA
Lead Temperature (soldering, 10 sec.)	300°C
Storage Temperature ( $T_S$ )	-65°C to 150°C
Rate of Rise ( $V_{CC}$ )	100V/ $\mu$ s
ESD Rating, <b>Note 3</b>	

**Operating Ratings**(Note 2)

Operating Temperature Range	
MIC809	-40°C to 85°C
MIC810	-40°C to 85°C
Power Dissipation ( $T_A = +70^\circ\text{C}$ )	320mW

**Electrical Characteristics**

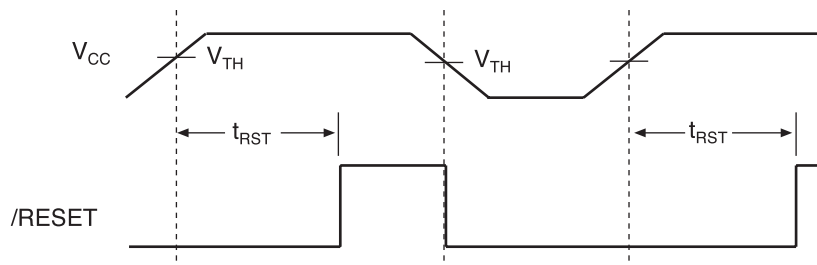
For typical values,  $V_{CC} = 5\text{V}$  for MIC8\_L/M/J,  $V_{CC} = 3.3\text{V}$  for MIC8\_S/T,  $V_{CC} = 3\text{V}$  for MIC8\_R;  $T_A = 25^\circ\text{C}$ , **bold** values indicate  $-40^\circ\text{C} \leq T_A \leq +85^\circ\text{C}$ ; unless noted

Symbol	Parameter	Condition	Min	Typ	Max	Units
$V_{CC}$	Operating Voltage Range	$T_A = 0^\circ\text{C}$ to $70^\circ\text{C}$	<b>1.4</b>		<b>5.5</b>	V
		$T_A = -40^\circ\text{C}$ to $85^\circ\text{C}$	<b>1.6</b>		<b>5.5</b>	V
$I_{CC}$	Supply Current	MIC809L/M/J, MIC810L/M/J		9	<b>15</b>	$\mu\text{A}$
		$V_{CC} < 3.6\text{V}$ , MIC809R/S/T, MIC810R/S/T		6	<b>10</b>	$\mu\text{A}$
$V_{TH}$	Reset Voltage Threshold	MIC809L, MIC810L	<b>4.50</b>	4.63	<b>4.75</b>	V
		MIC809M, MIC810M	<b>4.25</b>	4.38	<b>4.50</b>	V
		MIC809J, MIC810J	<b>3.89</b>	4.00	<b>4.10</b>	V
		MIC809T, MIC810T	<b>3.00</b>	3.08	<b>3.15</b>	V
		MIC809S, MIC810S	<b>2.85</b>	2.93	<b>3.00</b>	V
		MIC809R, MIC810R	<b>2.55</b>	2.63	<b>2.70</b>	V
$t_{RST}$	Reset Timeout Period		140	240	<b>560</b>	ms
$V_{OH}$	/RESET Output Voltage	$I_{SOURCE} = 800\mu\text{A}$ , MIC809L/M/J	<b><math>V_{CC} - 1.5\text{V}</math></b>			V
		$I_{SOURCE} = 500\mu\text{A}$ , MIC809R/S/T	<b><math>0.8 \times V_{CC}</math></b>			V
$V_{OL}$	/RESET Output Voltage	$V_{CC} = V_{TH}$ min., $I_{SINK} = 3.2\text{mA}$ , MIC809L/M/J			<b>0.4</b>	V
		$V_{CC} = V_{TH}$ min., $I_{SINK} = 1.2\text{mA}$ , MIC809R/S/T			<b>0.3</b>	V
		$V_{CC} > 1.4\text{V}$ , $I_{SINK} = 50\mu\text{A}$ , $T_A = 0^\circ\text{C}$ to $+70^\circ\text{C}$			<b>0.3</b>	V
		$V_{CC} > 1.6\text{V}$ , $I_{SINK} = 50\mu\text{A}$ , $T_A = -40^\circ$ to $+85^\circ\text{C}$			<b>0.3</b>	V
$V_{OH}$	RESET Output Voltage	$1.8\text{V} < V_{CC} < V_{TH}$ min., $I_{SOURCE} = 150\mu\text{A}$	<b><math>0.8 \times V_{CC}</math></b>			V
$V_{OL}$	RESET Output Voltage	$I_{SINK} = 3.2\text{mA}$ , MIC810L/M/J			<b>0.4</b>	V
		$I_{SINK} = 1.2\text{mA}$ , MIC810R/S/T			<b>0.3</b>	V

**Note 1.** Exceeding the absolute maximum rating may damage the device.

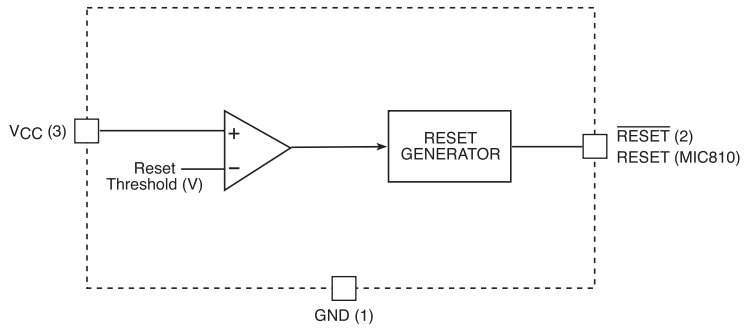
**Note 2.** The device is not guaranteed to function outside its operating rating.

**Note 3.** Devices are ESD sensitive. Handling precautions recommended. Human body model, 1.5k in series with 100pF.

**Timing Diagram**

**Reset Timing Diagram**

# Functional Diagram



## Applications Information

### Microprocessor Reset

The /RESET (or RESET) pin is asserted whenever  $V_{CC}$  falls below the reset threshold voltage. The /RESET pin remains asserted for a period of 140ms after  $V_{CC}$  has risen above the reset threshold voltage. The reset function ensures the microprocessor is properly reset and powers up in a known condition after a power failure. /RESET will remain valid with  $V_{CC}$  as low as 1.4V.

### $V_{CC}$ Transients

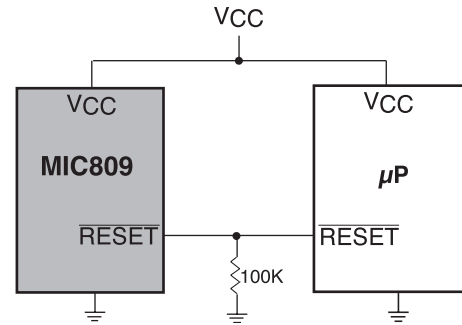
The MIC809/810 are relatively immune to negative-going  $V_{CC}$  glitches below the reset threshold. Typically, a negative-going transient 125mV below the reset threshold with a duration of 50 $\mu$ s (25 $\mu$ s for MIC8\_R/S/T) or less will not cause a reset.

### Interfacing to Bidirectional Reset Pins

The MIC809/810 can interface with  $\mu$ Ps with bidirectional reset pins by connecting a 4.7k $\Omega$  resistor in series with the MIC809/810 output and the  $\mu$ P reset pin.

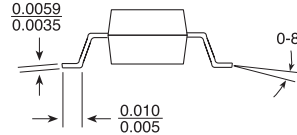
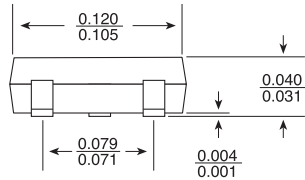
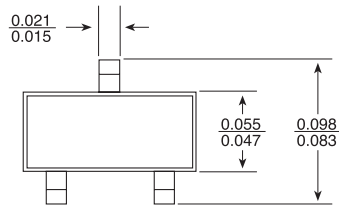
### /RESET Valid at Low Voltage

A resistor can be added from the /RESET pin to ground to ensure the /RESET output remains low with  $V_{CC}$  down to 0V. A 100k $\Omega$  resistor connected from the /RESET to ground is recommended. The resistor should be small enough to pull-down any stray leakage currents and large enough not to load the reset output. See Figure below.



**Reset Valid to  $V_{CC} = 0V$**

## Package Information



**3-lead SOT-23 (M3)**

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