



# MIC809/MIC810

Microprocessor Reset Circuits

## Description

The MIC809/MIC810 are inexpensive microprocessor supervisory circuits that monitor power supplies in microprocessor based systems.

The function of these devices is to assert a reset if 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  $\overline{\text{RESET}}$  output, while the MIC810 offers an active high RESET output. The reset output is guaranteed to remain asserted for a minimum of 140ms after VCC has risen above the designated reset threshold level. The MIC809/MIC810 come in a 3-pin SOT-23 package.

## Typical Applications

- Portable Equipment
- Intelligent Instruments
- Critical Microprocessor Power Monitoring
- Printers/Computers
- Controllers

Reset Threshold Voltage (V)	Device Suffix
4.63	L
4.38	M
4.00	J
3.08	T
2.93	S
2.63	R

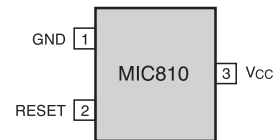
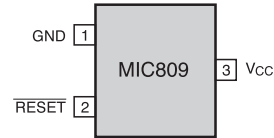
## Ordering Information

Part	Package	Temp. Range
MIC809_U	3-Lead SOT23	-40°C to +85°C
MIC810_U	3-Lead SOT23	-40°C to +85°C

Place the device suffix of desired reset threshold voltage from table above in blank to complete the part number.

## Pin Configuration

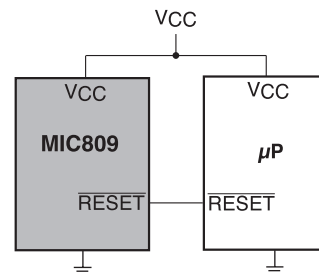
Top View



## Features

- $\overline{\text{RESET}}$  Remains Valid with VCC as Low as 1.4V
- Precision Voltage Monitor for 3V, 3.3V or 5V Power Supplies
- Available in 3-Pin SOT23 Package
- <math><15\mu\text{A}</math> Supply Current
- 140ms Minimum Reset Pulse Width
- No External Components Required

## Typical Operating Circuit



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## Absolute Maximum Ratings

Terminal Voltage  
 $V_{CC}$  ..... -0.3V to 6.0V

Input Current,  $V_{CC}$  ..... 20mA  
 Output Current, RESET,  $\overline{\text{RESET}}$  ..... 20mA  
 Rate of Rise,  $V_{CC}$  ..... 100V/ $\mu$ s

Operating Temperature Range  
 MIC809\_U, MIC810\_U ..... -40°C to 85°C  
 Storage Temperature Range ..... -65°C to 150°C  
 Lead Temperature (Soldering - 10 sec.) ..... 300°C  
 Power Dissipation ( $T_A = +70^\circ\text{C}$ ) ..... 320mW

Stresses above those listed under ABSOLUTE MAXIMUM RATINGS may cause permanent device failure. Functionality at or above these limits is not implied. Exposure to absolute maximum ratings for extended periods may affect device reliability. Operating ranges define those limits between which the functionality of the device is guaranteed.

## Electrical Characteristics

$V_{CC} = 5V$  for MIC8\_\_L/M/J,  $V_{CC} = 3.3V$  for MIC8\_\_S/T,  $V_{CC} = 3V$  for MIC8\_\_R,  $T_A =$  Operating Temperature Range, unless otherwise noted.

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

# MIC809/MIC810 Microprocessor Reset Circuits

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## Pin Functions

Pin Name	Pin No.		
	MIC809	MIC810	
<b>GND</b>	1	1	IC Ground Pin.
<b><math>\overline{\text{RESET}}</math></b>	2	N/A	$\overline{\text{RESET}}$ 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.
<b>RESET</b>	N/A	2	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.
<b>V<sub>CC</sub></b>	3	3	Power supply input, 3V, 3.3V or 5V.

# MIC809/MIC810 Microprocessor Reset Circuits

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## Block Diagram

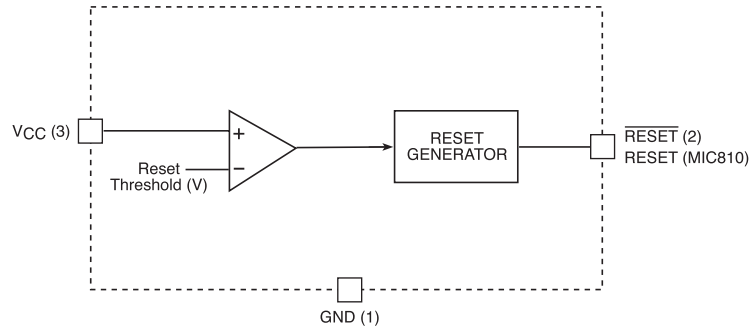


Figure 1. MIC809/810 Block Diagram

## Circuit Description

### Microprocessor Reset

The  $\overline{\text{RESET}}$  pin is asserted whenever  $V_{CC}$  falls below the reset threshold voltage. The reset pin remains asserted for a period of 240ms after  $V_{CC}$  has risen above the reset threshold voltage. The reset function ensures the microprocessor is properly reset and powers up into a known condition after a power failure.  $\overline{\text{RESET}}$  will remain valid with  $V_{CC}$  as low as 1.4V.

### $V_{CC}$ Transients

The MIC809/MIC810 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 $\mu\text{s}$  (25 $\mu\text{s}$  for MIC8\_\_R/S/T) or less will not cause an unwanted reset.

### Interfacing to Bidirectional Reset Pins

The MIC809/MIC810 can interface with  $\mu\text{Ps}$  with bidirectional reset pins by connecting a 4.7K $\Omega$  resistor in series with the MIC809/MIC810 output and the  $\mu\text{P}$  reset pin.

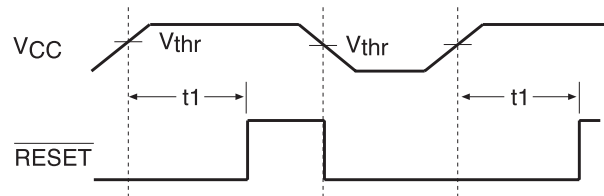


Figure 2. Reset Timing Diagram

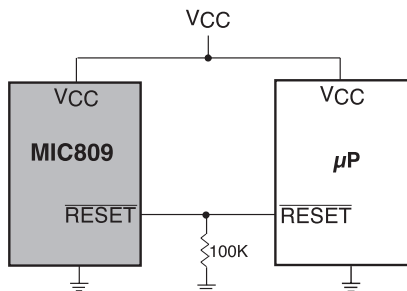


Figure 3.  $\overline{\text{RESET}}$  Valid to  $V_{CC} = 0\text{V}$

### $\overline{\text{RESET}}$ Valid to 0V

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

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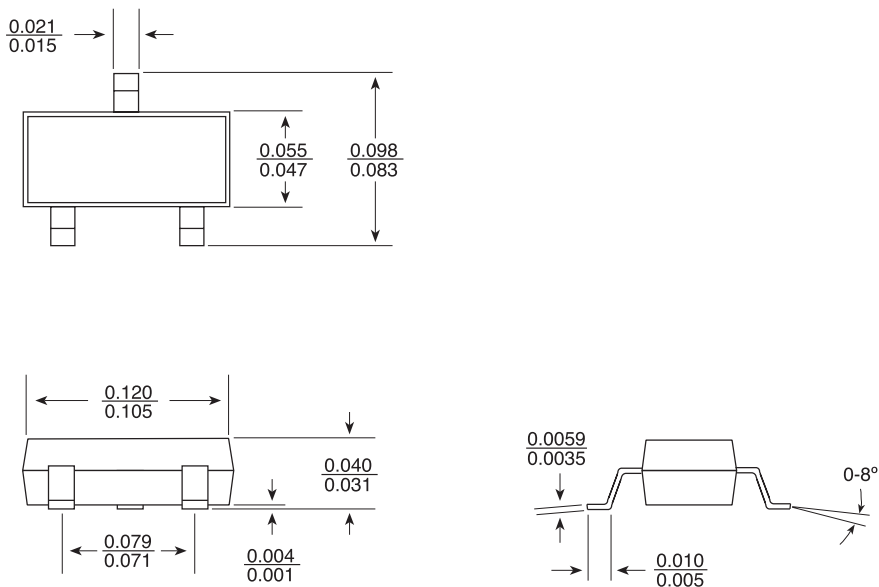
## Alternate Source Cross Reference Guide

<u>Industry P/N</u>	<u>MIC Direct Replacement</u>
MAX809JEUR-T	MIC809JU
MAX809LEUR-T	MIC809LU
MAX809MEUR-T	MIC809MU
MAX809REUR-T	MIC809RU
MAX809SEUR-T	MIC809SU
MAX809TEUR-T	MIC809TU
MAX810JEUR-T	MIC810JU
MAX810LEUR-T	MIC810LU
MAX810MEUR-T	MIC810MU
MAX810REUR-T	MIC810RU
MAX810SEUR-T	MIC810SU
MAX810TEUR-T	MIC810TU

# MIC809/MIC810 Microprocessor Reset Circuits

## Packaging Information

### U Package, 3-Pin SOT-23 Small-Outline Transistor Package



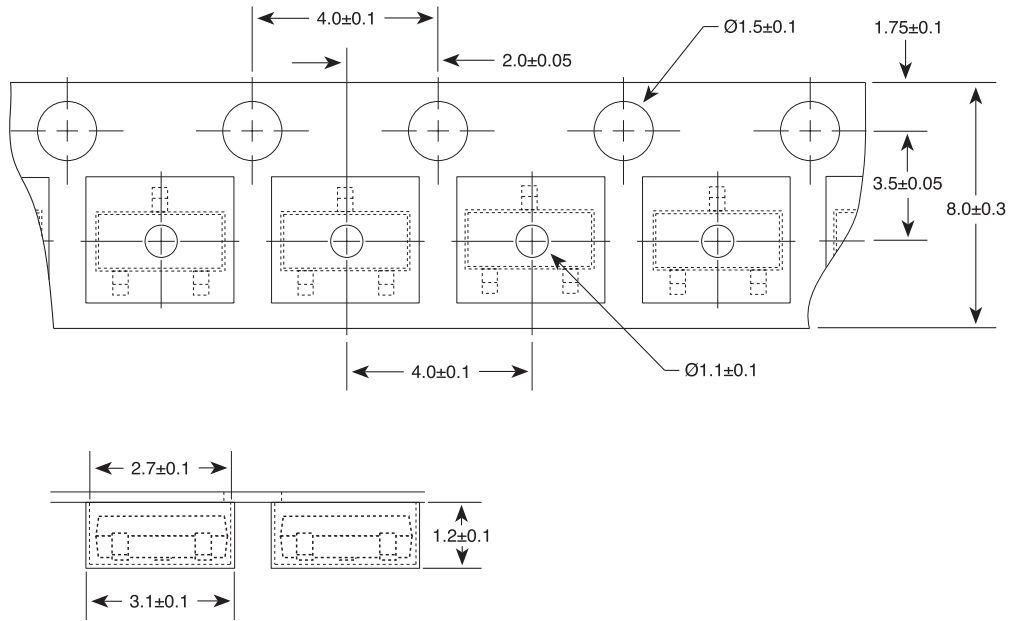
Dimensions are in inches.

### Device Marking Information

Lot Code	
IJXX	= MIC809J
ILXX	= MIC809L
IMXX	= MIC809M
IRXX	= MIC809R
ISXX	= MIC809S
ITXX	= MIC809T
JJXX	= MIC810J
JLXX	= MIC810L
JMXX	= MIC810M
JRXX	= MIC810R
JSXX	= MIC810S
JTXX	= MIC810T

## Packaging Information

### Tape and Reel Information



Dimensions are in millimeters.