



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_{CC} 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_{CC} 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

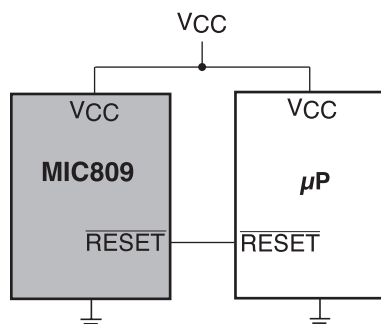
Applications

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

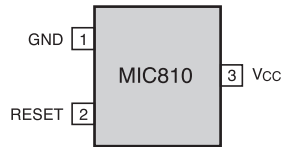
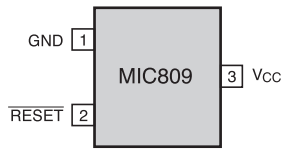
Ordering Information

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/ μ s
ESD Rating, Note 3	

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

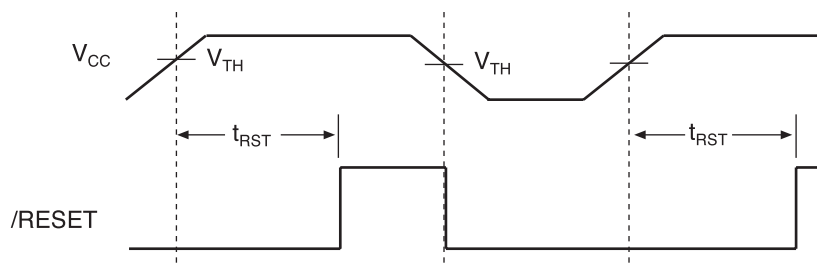
For typical values, $V_{CC} = 5\text{V}$ for MIC8_L/M/J, $V_{CC} = 3.3\text{V}$ for MIC8_S/T, $V_{CC} = 3\text{V}$ for MIC8_R; $T_A = 25^\circ\text{C}$, **bold** values indicate $-40^\circ\text{C} \leq T_A \leq +85^\circ\text{C}$; unless noted

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

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

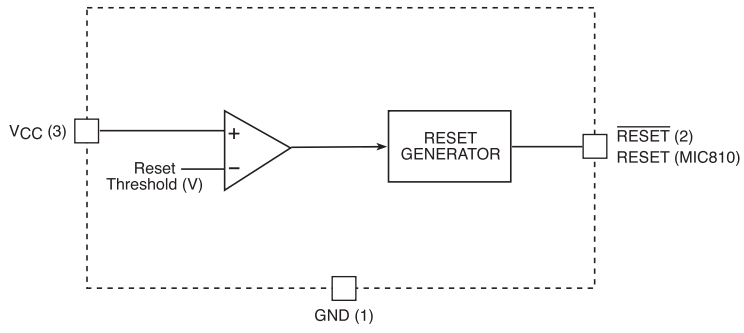
Note 2. The device is not guaranteed to function outside its operating rating.

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

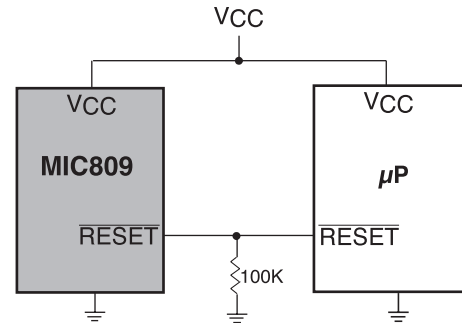
The MIC809/810 are relatively immune to negative-going V_{CC} glitches below the reset threshold. Typically, a negative-going transient 125mV below the reset threshold with a duration of 50 μ s (25 μ s for MIC8_R/S/T) or less will not cause a reset.

Interfacing to Bidirectional Reset Pins

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

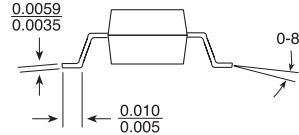
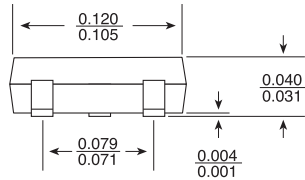
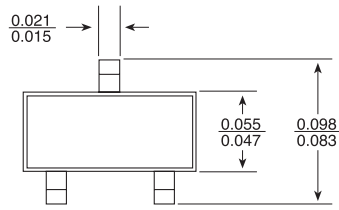
/RESET Valid at Low Voltage

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 Ω 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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