



MIC1810

Microprocessor Reset Circuit

General Description

The MIC1810 is an inexpensive microprocessor supervisory circuit that monitors 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 5%, 10%, or 15% drop in 5V powered systems.

The MIC1810 has an active low /RESET output. The reset output is guaranteed to remain asserted for a minimum of 100ms after V_{CC} has risen above the designated reset threshold level. The MIC1810 comes in a 3-pin SOT-23 package.

Features

- Precision voltage monitor for 5%, 10%, or 15% drop in 5V power supplies
- /RESET remains valid with V_{CC} as low as 1V
- 5 μ A supply current (typical)
- 100ms minimum reset pulse width
- No external components required
- Available in 3-pin SOT-23 package

Applications

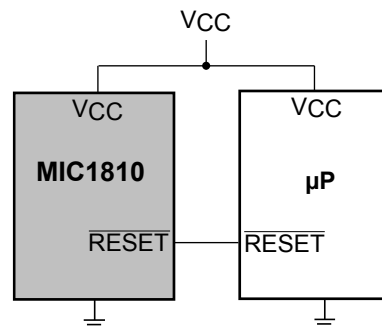
- Portable equipment
- Intelligent instruments
- Critical microprocessor power monitoring
- Printers/computers
- Embedded controllers

Ordering Information

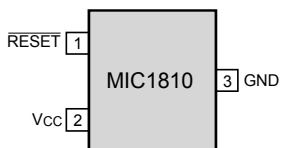
| Part Number | Marking* | Threshold Voltage | Operating Temp. Range | Package | Pb-Free |
|--------------|-----------|-------------------|-----------------------|---------|---------|
| MIC1810-5U | NA | 4.62V | -40°C to +85°C | SOT-23 | No |
| MIC1810-10U | NB | 4.37V | -40°C to +85°C | SOT-23 | No |
| MIC1810-15U | NC | 4.12V | -40°C to +85°C | SOT-23 | No |
| MIC1810-5UY | <u>NA</u> | 4.62V | -40°C to +85°C | SOT-23 | Yes |
| MIC1810-10UY | <u>NB</u> | 4.37V | -40°C to +85°C | SOT-23 | Yes |
| MIC1810-15UY | <u>NC</u> | 4.12V | -40°C to +85°C | SOT-23 | Yes |

* Underbar symbol may not be to scale

Typical Application



Pin Configuration



3-Lead SOT-23

Pin Description

| Pin Number | Pin Name | Pin Function |
|------------|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | /RESET | /RESET goes low if V_{CC} falls below the reset threshold and remains asserted for one reset timeout period (100ms min) after V_{CC} exceeds the reset threshold. |
| 2 | VCC | Power supply input. |
| 3 | GND | IC ground pin |

Absolute Maximum Ratings(Note 1)

| | |
|--------------------------------------------|----------------|
| Terminal Voltage (V_{CC})..... | -0.3V to +6V |
| Input Current (V_{CC})..... | 20mA |
| Output Current, /RESET..... | 20mA |
| Rate of Rise (V_{CC})..... | 100V/ μ s |
| Lead Temperature (soldering, 10 sec.)..... | 300°C |
| Storage Temperature (T_S)..... | -65°C to 150°C |
| ESD Rating, Note 3 | 3kV |

Operating Ratings(Note 2)

| | |
|------------------------------------------------------|----------------|
| Operating Temperature Range | |
| MIC1810-5U..... | -40°C to +85°C |
| MIC1810-10U..... | -40°C to +85°C |
| MIC1810-15U..... | -40°C to +85°C |
| Power Dissipation ($T_A = +70^\circ\text{C}$)..... | 320mW |

Electrical Characteristics

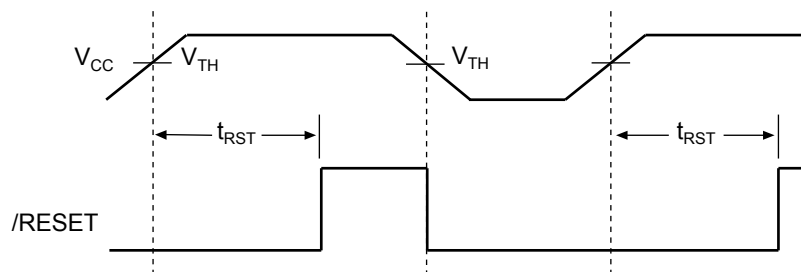
For typical values $V_{CC} = 5\text{V}$, $T_A = 25^\circ\text{C}$; **bold** values indicate $-40^\circ\text{C} \leq T_A \leq +85^\circ\text{C}$; unless noted

| Symbol | Parameter | Condition | Min | Typ | Max | Units |
|-----------|-----------------------------|------------------------------------------------------|----------------|------|-------------|---------------|
| | Operating Voltage Range | $T_A = -40^\circ\text{C}$ to $+85^\circ\text{C}$ | 1 | | 5.5 | V |
| I_{CC} | Supply Current | | | 5 | 20 | μA |
| V_{TH} | Reset Voltage Threshold | MIC1810-5 | 4.50 | 4.62 | 4.75 | V |
| | | MIC1810-10 | 4.25 | 4.37 | 4.50 | V |
| | | MIC1810-15 | 4.00 | 4.12 | 4.24 | V |
| t_{RST} | Reset Timeout Period | | 100 | 150 | 250 | ms |
| V_{OH} | /RESET Output Voltage, High | $I_{SOURCE} = 800\mu\text{A}$ | $V_{CC} - 1.5$ | | | V |
| V_{OL} | /RESET Output Voltage, Low | $V_{CC} = V_{TH}$ min., $I_{SINK} = 10\text{mA}$ | | | 0.4 | V |
| | | $V_{CC} \geq 1\text{V}$, $I_{SINK} = 50\mu\text{A}$ | | | 0.3 | V |

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

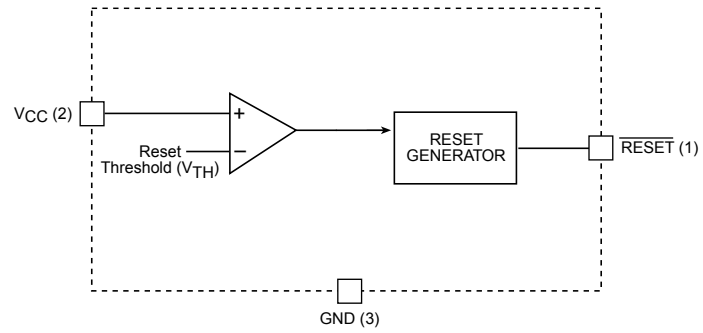
Note 2. The device is not guaranteed to function outside its operating rating.

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

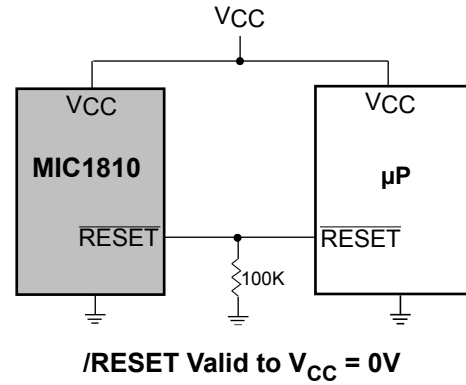
The /RESET pin is asserted whenever V_{CC} falls below the reset threshold voltage. The reset pin remains asserted for a period of t_{RST} after V_{CC} has risen above the reset threshold voltage. The reset function ensures the microprocessor is properly reset and powers up into a known condition after a power failure. /RESET will remain valid with V_{CC} as low as 1V.

V_{CC} Transients

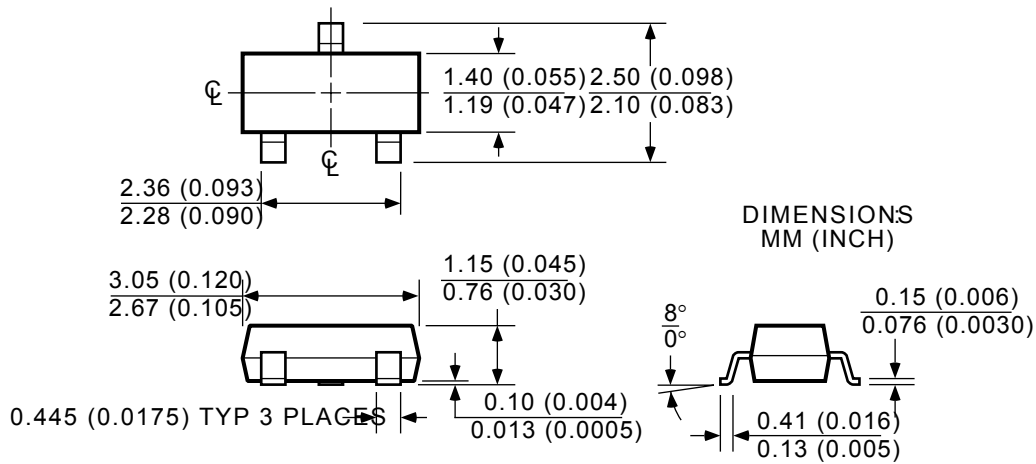
The MIC1810 is relatively immune to negative-going V_{CC} glitches below the reset threshold. Typically, a negative-going transient 125mV below the reset threshold with a duration of 20 μ s or less will not cause an unwanted reset.

/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 /RESET-to-ground is recommended. The resistor should be large enough not to load the /RESET output and small enough to pull-down any stray leakage currents. See Figure below.



Package Information



3-Pin SOT-23 Small Outline Transistor

MICREL, INC. 2180 FORTUNE DRIVE SAN JOSE, CA 95131 USA
TEL + 1 (408) 944-0800 FAX + 1 (408) 474-1000 WEB <http://www.micrel.com>

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