



# MIC1810

## Microprocessor Reset Circuit

### Description

The MIC1810 is an 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 5%, 10%, or 15% drop in 5V powered systems.

The MIC1810 has an active low  $\overline{\text{RESET}}$  output. The reset output is guaranteed to remain asserted for a minimum of 100ms after VCC has risen above the designated reset threshold level. The MIC1810 comes 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 |
|-----------------------------|---------------|
| 4.62                        | -5            |
| 4.37                        | -10           |
| 4.12                        | -15           |

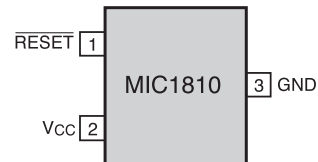
### Ordering Information

| Part      | Package      | Temp. Range    |
|-----------|--------------|----------------|
| MIC1810_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

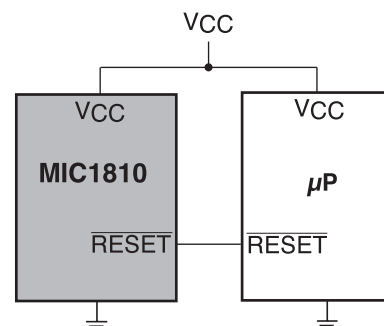
Top View



### Features

- $\overline{\text{RESET}}$  Remains Valid with VCC as Low as 1.4V
- Precision Voltage Monitor for 5%, 10%, or 15% drop in 5V Power Supplies
- Available in 3-Pin SOT23 Package
- 9 $\mu$ A Supply Current (typical)
- 100ms Minimum Reset Pulse Width
- No External Components Required

### Typical Operating Circuit



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## Absolute Maximum Ratings

Terminal Voltage  
 VCC ..... -0.3V to 6.0V

Input Current, VCC, ..... 20mA  
 Output Current, RESET ..... 20mA  
 Rate of Rise, VCC ..... 100V/ $\mu$ s

Operating Temperature Range  
 MIC1810\_U ..... -40°C to 85°C  
 Storage Temperature Range ..... -65°C to 150°C  
 Lead Temperature (Soldering - 10 sec.) ..... 300°C  
 Power Dissipation (T<sub>A</sub> = +70°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<sub>CC</sub> = 5V, T<sub>A</sub> = Operating Temperature Range, unless otherwise noted.

| Parameter                                | Conditions  | Min                    | Typ                  | Max                  | Units   |
|--|---|------------------------|----------------------|----------------------|---------|
| Operating Voltage Range, V <sub>CC</sub> | T <sub>A</sub> = 0°C to 70°C<br>T <sub>A</sub> = -40°C to 85°C  | 1.4<br>1.6             |                      | 5.5<br>5.5           | V       |
| Supply Current, I <sub>CC</sub>          |   |                        | 9                    | 20                   | $\mu$ A |
| Reset Voltage Threshold, V <sub>TH</sub> | MIC1810-5<br>MIC1810-10<br>MIC1810-15   | 4.50<br>4.25<br>4.00   | 4.62<br>4.37<br>4.12 | 4.75<br>4.50<br>4.24 | V       |
| Reset Timeout Period                     |   | 100                    | 150                  | 250                  | ms      |
| RESET Output Voltage, V <sub>OH</sub>    | I <sub>Source</sub> = 800 $\mu$ A   | V <sub>CC</sub> - 1.5V |                      |                      | V       |
| RESET Output Voltage, V <sub>OL</sub>    | V <sub>CC</sub> =V <sub>TH</sub> Min., I <sub>Sink</sub> =3.2mA<br>V <sub>CC</sub> >1.4V, I <sub>Sink</sub> =50 $\mu$ A |                        |                      | 0.4<br>0.3           | V       |

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## Pin Functions

| Pin Name                                    | Pin No. |   |
|---|---------|---|
| <b><math>\overline{\text{RESET}}</math></b> | 1       | $\overline{\text{RESET}}$ 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. |
| <b><math>V_{CC}</math></b>                  | 2       | Power supply input, 5V.   |
| <b>GND</b>                                  | 3       | IC Ground Pin.  |

# MIC1810 Microprocessor Reset Circuit

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## Block Diagram

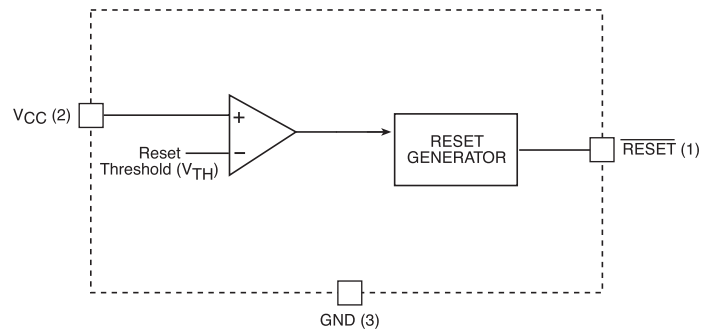


Figure 1. MIC1810 Block Diagram

## 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 150ms 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 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 50 $\mu$ s or less will not cause an unwanted reset.

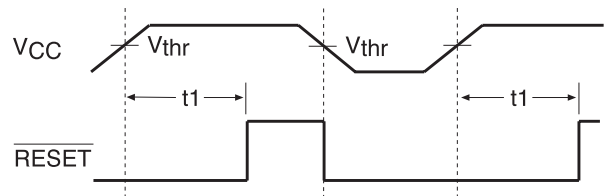


Figure 2. Reset Timing Diagram

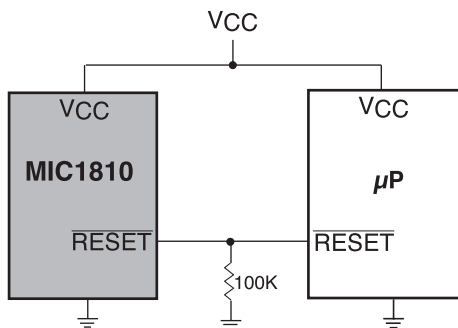


Figure 3.  $\overline{\text{RESET}}$  Valid to  $V_{CC} = 0V$

### $\overline{\text{RESET}}$ 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.

# MIC1810 Microprocessor Reset Circuit

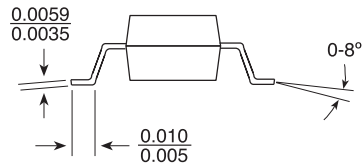
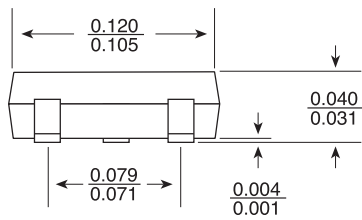
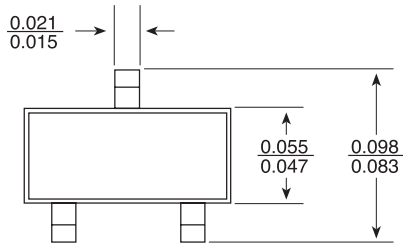
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## Alternate Source Cross Reference Guide

| <u>Industry P/N</u> | <u>MIC Direct Replacement</u> |
|---------------------|-------------------------------|
| DS1810R-5           | MIC1810-5U                    |
| DS1810R-10          | MIC1810-10U                   |
| DS1810R-15          | MIC1810-15U                   |

## Packaging Information

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



Dimensions are in inches.

### Device Marking Information

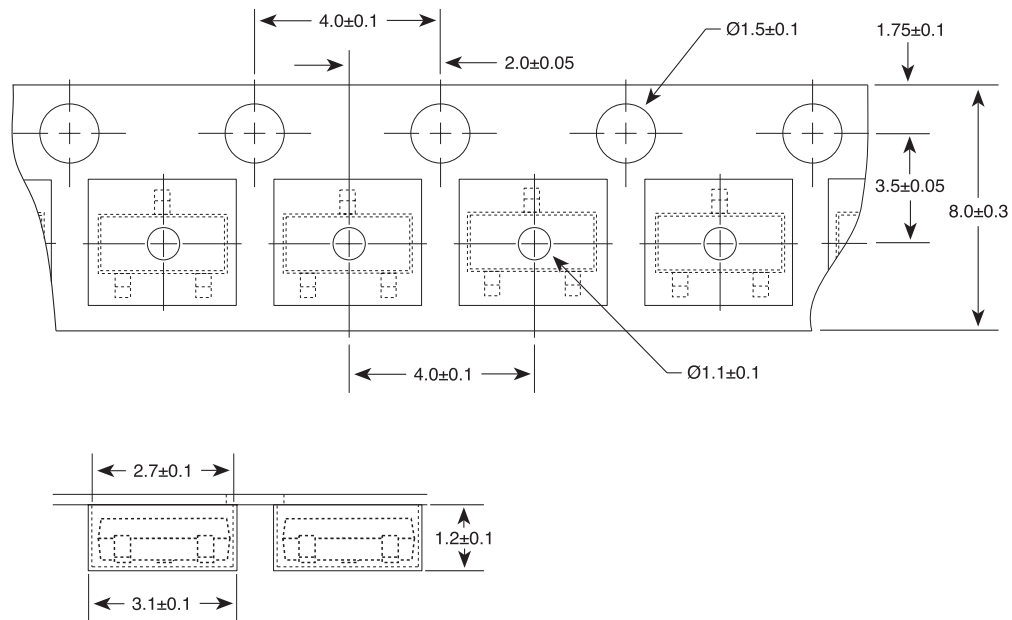
#### Lot Code

XXXX = MIC1810-5U  
XXXX = MIC1810-10U  
XXXX = MIC1810-15U

# MIC1810 Microprocessor Reset Circuit

## Packaging Information

### Tape and Reel Information



Dimensions are in millimeters.