



# MIC1815

## Microprocessor Reset Circuit

### General Description

The MIC1815 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 10% or 20% drop in 3.3V powered systems.

The MIC1815 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 MIC1815 comes in a 3-pin SOT-23 package.

### Features

- Precision voltage monitor for 10% or 20% drop in 3.3V power supplies
- /RESET remains valid with  $V_{CC}$  as low as 1V
- 5 $\mu$ A supply current
- 100ms minimum reset pulse width
- No external components required
- Available in 3-pin SOT-23 package

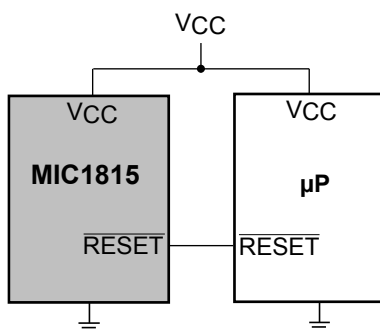
### Applications

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

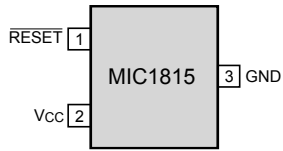
### Ordering Information

Part Number	Marking	Threshold Voltage	Operating Temp. Range	Package	Pb-Free
MIC1815-10U	ND	2.88V	-40°C to +85°C	SOT-23	No
MIC1815-20U	NE	2.55V	-40°C to +85°C	SOT-23	No
MIC1815-10UY	<u>ND</u>	2.88V	-40°C to +85°C	SOT-23	Yes
MIC1815-20UY	<u>NE</u>	2.55V	-40°C to +85°C	SOT-23	Yes

### Typical Application



## Pin Configuration



**3-Lead SOT23**

## 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/ $\mu$ 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  
 MIC1815-10U ..... -40°C to +85°C  
 MIC1815-20U ..... -40°C to +85°C  
 Power Dissipation ( $T_A = +70^\circ\text{C}$ ) ..... 320mW

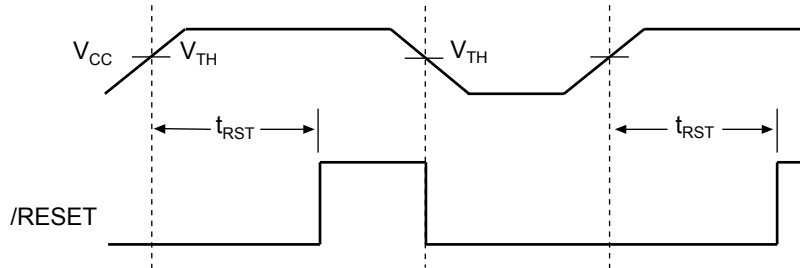
**Electrical Characteristics**

For typical values,  $V_{CC} = 3.3\text{V}$ ,  $T_A = 25^\circ\text{C}$ ; **bold** values indicate  $-40^\circ\text{C} \leq T_A \leq +85^\circ\text{C}$ ; unless noted

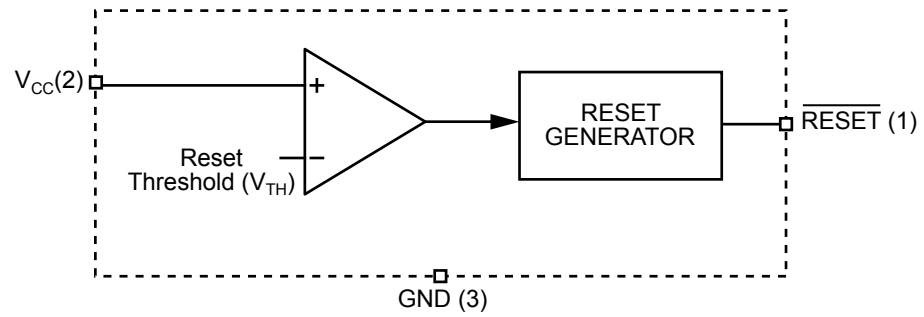
Symbol	Parameter	Condition	Min	Typ	Max	Units
$V_{CC}$	Operating Temperature Range	$T_A = -40^\circ\text{C}$ to $+85^\circ\text{C}$	<b>1</b>		<b>5.5</b>	V
$I_{CC}$	Supply Current			5	<b>20</b>	$\mu\text{A}$
$V_{TH}$	Reset Voltage Threshold	MIC1815-10U	<b>2.80</b>	2.88	<b>2.97</b>	V
		MIC1815-20U	<b>2.47</b>	2.55	<b>2.64</b>	V
$t_{RST}$	Reset Timeout Period		<b>100</b>	150	<b>250</b>	ms
$V_{OH}$	/RESET Output Voltage	$I_{SOURCE} = 800\mu\text{A}$	<b>1.5</b>			V
$V_{OL}$	/RESET Output Voltage	$V_{CC} = V_{TH}$ min., $I_{SINK} = 10\text{mA}$			<b>0.4</b>	V
		$V_{CC} > 1\text{V}$ , $I_{SINK} = 50\mu\text{A}$			<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

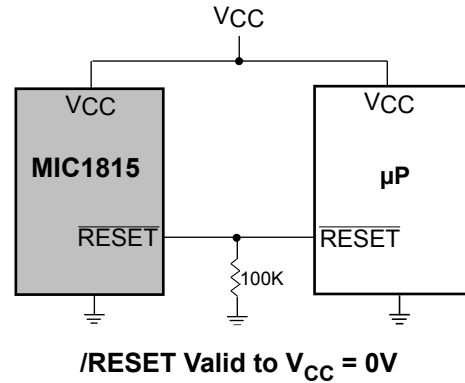
The /RESET pin is asserted whenever  $V_{CC}$  falls below the reset threshold voltage. The reset pin remains asserted for a period of  $t_{RST}$  after  $V_{CC}$  has risen above the reset threshold voltage. The reset function ensures the microprocessor is properly reset and powers up into a known condition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

### $V_{CC}$ Transients

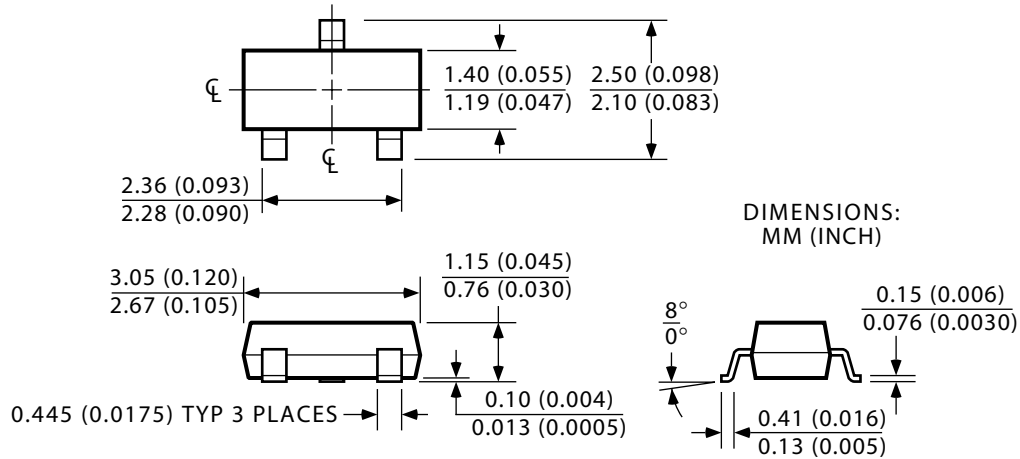
The MIC1815 is relatively immune to negative-going  $V_{CC}$  glitches below the reset threshold. Typically, a negative-going transient 125mV below the reset threshold with a duration of 20 $\mu$ s or less will not cause an unwanted reset.

### /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 $\Omega$  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**

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