



# MIC8115

## Microprocessor Reset Circuit

### General Description

The MIC8115 is an inexpensive microprocessor supervisory circuit that monitors power supplies in microprocessor-based systems.

The function of the MIC8115 is to assert a reset if the power supply drops below a designated reset threshold level or /MR is forced low.

The MIC8115 has an active low /RESET output. The reset output is guaranteed to remain asserted for a minimum of 1100ms after  $V_{CC}$  has risen above the designated reset threshold level. The MIC8115 comes in a 4-pin SOT-143 package.

Datasheets and support documentation are available on Micrel's web site at: [www.micrel.com](http://www.micrel.com).

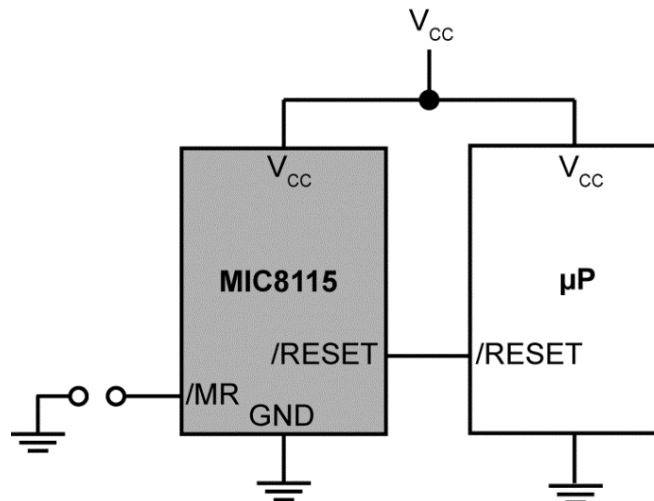
### Features

- Precision voltage monitor for 3.3V power supplies
- Specifically-tailored to the AMD Elan SC500 Series
- /RESET remains valid with  $V_{CC}$  as low as 1.4V
- $<15\mu A$  supply current
- 1100ms minimum reset pulse width
- Manual reset input
- Available in 4-Pin SOT-143 Package

### Applications

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

### Typical Application



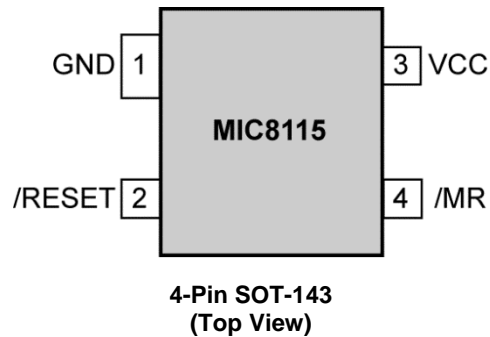
## Ordering Information

Part Number <sup>(1)</sup>	Marking	Junction Temperature Range	Package	Lead Finish
MIC8115-TUY	<u>NT</u>	-40°C to +85°C	4-Pin SOT-143	Pb-Free

### Note:

- Underbar (⏟) may not be to scale.

## Pin Configuration



## Pin Description

Pin Number	Pin Name	Pin Function
1	GND	IC Ground Pin.
2	/RESET	/RESET goes low if either VCC falls below the supply reset threshold voltage or if /MR is asserted. /RESET remains asserted for one reset timeout period 1100ms (minimum) after both VCC exceeds the supply reset threshold voltage and /MR is deasserted.
3	/MR	Manual Reset Input. A logic low on /MR forces a reset. The reset will remain asserted as long as /MR is held low and for one reset timeout period (1100ms, minimum) after /MR goes high. This input can be shorted to ground via a switch or driven from CMOS or TTL logic. Pulled high internally through a 20kΩ resistor. Float if unused.
4	VCC	Power Supply Input.

**Absolute Maximum Ratings<sup>(2)</sup>**

Terminal Voltage	
(V <sub>CC</sub> ).....	-0.3V to 6.0V
(/MR) .....	-0.3V (V <sub>CC</sub> + 0.3V)
Input Current (V <sub>CC</sub> , /MR).....	20mA
Output Current (/RESET) .....	20mA
Rate of Rise (V <sub>CC</sub> ) .....	100V/μs
Lead Temperature (soldering, 10s).....	300°C
Storage Temperature (T <sub>S</sub> ).....	-65°C to +150°C
ESD Rating <sup>(4)</sup> .....	3kV

**Operating Ratings<sup>(3)</sup>**

Operating Temperature Range .....	-40°C to +85°C
Power Dissipation (T <sub>A</sub> = +70°C).....	320mW

**Electrical Characteristics**

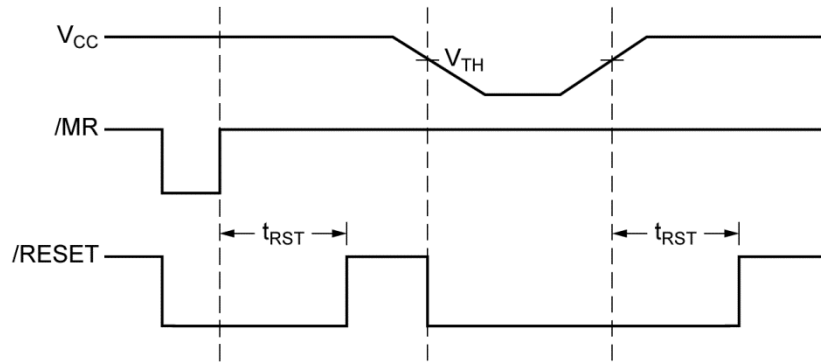
For typical values, V<sub>CC</sub> = 3.3V; T<sub>A</sub> = 25°C, **bold** values indicate -40°C ≤ T<sub>A</sub> ≤ +85°C, unless noted.

Symbol	Parameter	Condition	Min.	Typ.	Max.	Units
V <sub>CC</sub>	Operating Voltage Range	T <sub>A</sub> = -40°C to +85°C	<b>1</b>		<b>5.5</b>	V
I <sub>CC</sub>	Supply Current			5	<b>15</b>	μA
V <sub>TH</sub>	Reset Voltage Threshold		<b>3.00</b>	3.08	<b>3.15</b>	V
I <sub>RST</sub>	Reset Timeout Period		<b>1100</b>	1700	<b>2500</b>	ms
V <sub>OH</sub>	/RESET Output Voltage	I <sub>SOURCE</sub> = 500μA	<b>0.8 × V<sub>CC</sub></b>			V
V <sub>OL</sub>	/Reset Output Voltage	V <sub>CC</sub> = V <sub>TH(MIN)</sub> , I <sub>SINK</sub> = 1.2mA			<b>0.3</b>	V
		V <sub>CC</sub> = 1V, I <sub>SINK</sub> = 50μA, T <sub>A</sub> = -40°C to +85°C			<b>0.3</b>	
	/MR Minimum Pulse Width		<b>10</b>			μs
	/MR to Reset Delay			0.5		μs
V <sub>IH</sub>	/MR Input Threshold		<b>0.7 × V<sub>CC</sub></b>			V
V <sub>IL</sub>	/MR Input Threshold				<b>0.25 × V<sub>CC</sub></b>	
	/MR Pull-Up Resistance		<b>10</b>	20	<b>30</b>	kΩ
	/MR Glitch Immunity			100		ns

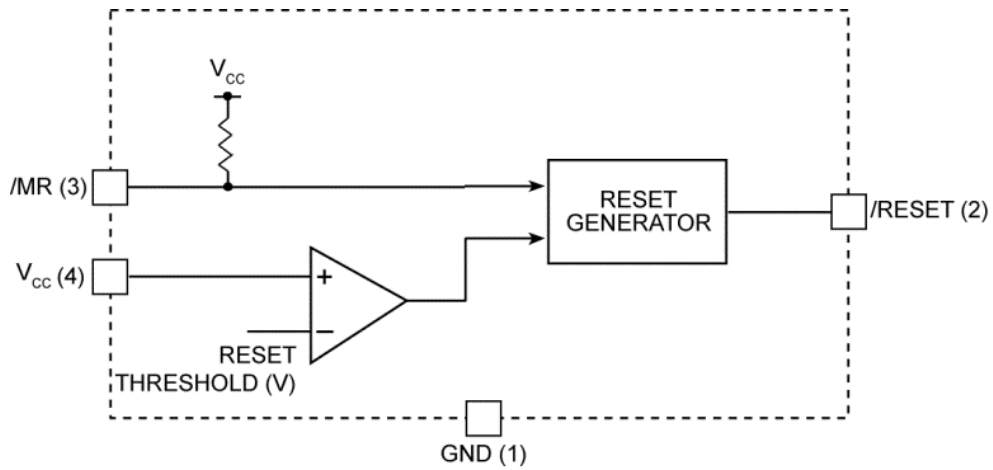
**Notes:**

- Exceeding the absolute maximum ratings may damage the device.
- The device is not guaranteed to function outside its operating ratings.
- Devices are ESD sensitive. Handling precautions are recommended. Human body model, 1.5kΩ in series with 100pF.

### Timing Diagram



### Functional Diagram



## Application Information

### Microprocessor Reset

The  $\overline{\text{RESET}}$  pin is asserted whenever  $V_{\text{CC}}$  falls below the reset threshold voltage. The reset pin remains asserted for a period of 1100ms after  $V_{\text{CC}}$  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  $V_{\text{CC}}$  as low as 1.4V.

### $V_{\text{CC}}$ Transients

The MIC8115 is relatively immune to the negative-going  $V_{\text{CC}}$  glitches below the reset threshold. Typically, a negative-going transient 125mV below the reset threshold with duration of 20 $\mu\text{s}$  or less will not cause a reset.

### $\overline{\text{RESET}}$ Valid at Low Voltage

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

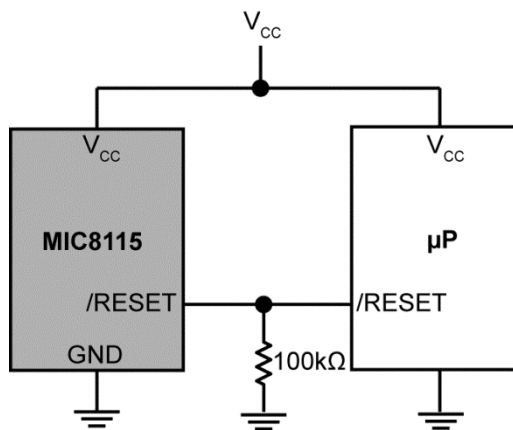
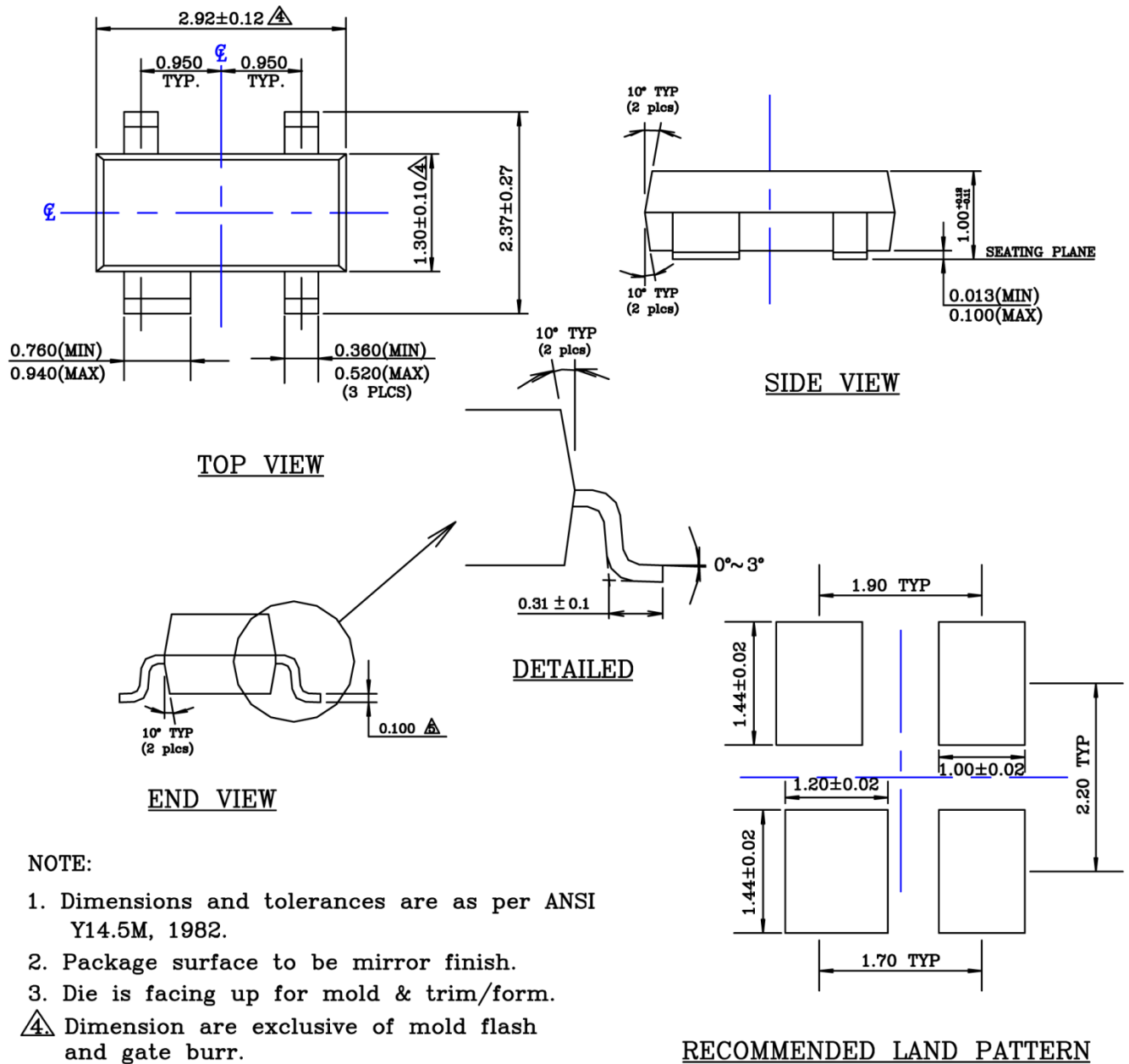


Figure 1.  $\overline{\text{RESET}}$  Valid to  $V_{\text{CC}} = 0\text{V}$

Package Information and Recommended Landing Pattern<sup>(5)</sup>



NOTE:

1. Dimensions and tolerances are as per ANSI Y14.5M, 1982.
2. Package surface to be mirror finish.
3. Die is facing up for mold & trim/form.
- Ⓐ Dimension are exclusive of mold flash and gate burr.
- Ⓑ Dimension are exclusive of solder plating.

4-Pin SOT-143 (TU)

Note:

5. Package information is correct as of the publication date. For updates and most current information, go to [www.micrel.com](http://www.micrel.com).

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