



# MIC8114

## Microprocessor Reset Circuit

### General Description

The MIC8114 is an inexpensive microprocessor supervisory circuit that monitors the power supply in microprocessor based systems.

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

The MIC8114 has an active low /RESET output. The reset output is guaranteed to remain asserted for a minimum of 790ms after  $V_{CC}$  has risen above the designated reset threshold level. The MIC8114 comes in a 4-pin SOT-143 package.

### Features

- Precision voltage monitor for 3.3V power supplies
- **Specifically tailored to the AMD Elan SC400/410**
- /RESET remains valid with  $V_{CC}$  as low as 1V
- 5 $\mu$ A typical supply current
- 790ms minimum reset pulse width
- Manual reset input
- Available in 4-Pin SOT-143 Package

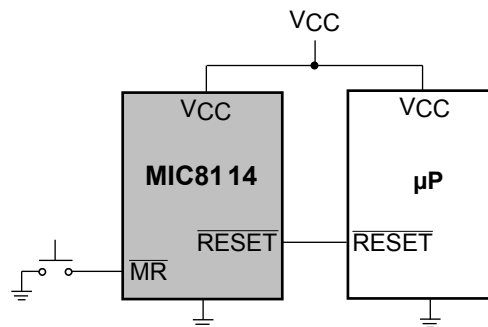
### Applications

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

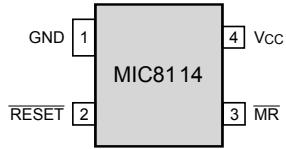
### Ordering Information

Part Number	Marking	Operating Temp. Range	Package	Pb-Free
MIC8114TU	NV	-40°C to +85°C	4-lead SOT-143	No
MIC8114TUY	<u>NV</u>	-40°C to +85°C	4-lead SOT-143	Yes

### Typical Application



## Pin Configuration



**4-Lead SOT-143**

## Pin Description

Pin Number	Pin Name	Pin Function
1	GND	IC Ground Pin
2	/RESET	/RESET goes low if either $V_{CC}$ falls below the supply reset threshold voltage or if /MR is asserted. /RESET remains asserted for one reset timeout period after both $V_{CC}$ 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 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 20k $\Omega$ resistor. Float if unused.
4	$V_{CC}$	Power supply Input.

**Absolute Maximum Ratings**(Note 1)

Terminal Voltage	
( $V_{CC}$ ).....	-0.3V to +6.0V
(/MR).....	-0.3V ( $V_{CC} + 0.3V$ )
Input Current ( $V_{CC}$ , /MR).....	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.....	3kV

**Operating Ratings**(Note 2)

Operating Temperature Range	
MIC8114TU .....	-40°C to +85°C
Power Dissipation ( $T_A = +70^\circ\text{C}$ ) .....	320mW

**Electrical Characteristics**

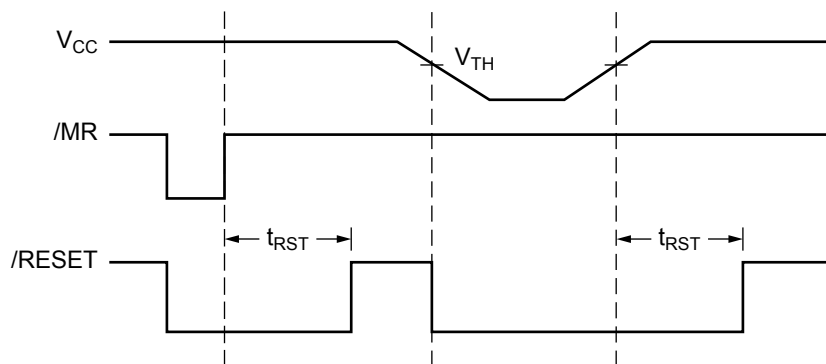
For typical values,  $V_{CC} = 3.3V$ ;  $T_A = 25^\circ\text{C}$ , **bold** values indicate  $-40^\circ\text{C} \leq T_A \leq +85^\circ\text{C}$ ; unless noted

Symbol	Parameter	Condition	Min	Typ	Max	Units
$V_{CC}$	Operating Voltage Range	$T_A = -40^\circ\text{C}$ to $85^\circ\text{C}$	<b>1</b>		<b>5.5</b>	V
$I_{CC}$	Supply Current			5	<b>15</b>	$\mu\text{A}$
$V_{TH}$	Reset Voltage Threshold		<b>3.00</b>	3.08	<b>3.15</b>	V
$t_{RST}$	Reset Timeout Period		<b>790</b>	1200	<b>1800</b>	ms
$V_{OH}$	/RESET Output Voltage	$I_{SOURCE} = 500\mu\text{A}$	<b><math>0.8 \times V_{CC}</math></b>			V
$V_{OL}$	/RESET Output Voltage, $V_{OL}$	$V_{CC} = V_{TH}$ min, $I_{SINK} = 1.2\text{mA}$			<b>0.3</b>	V
		$V_{CC} = 1V$ , $I_{SINK} = 50\mu\text{A}$ , $T_A = -40^\circ\text{C}$ to $+85^\circ\text{C}$			<b>0.3</b>	V
	/MR Minimum Pulse Width		<b>10</b>			$\mu\text{s}$
	/MR to Reset Delay			0.5		$\mu\text{s}$
	/MR Input Threshold, $V_{IH}$		<b><math>0.7 \times V_{CC}</math></b>			V
	/MR Input Threshold, $V_{IL}$				<b><math>0.25 \times V_{CC}</math></b>	
	/MR Pull-Up Resistance		<b>10</b>	20	<b>30</b>	k $\Omega$
	/MR Glitch Immunity			100		ns

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

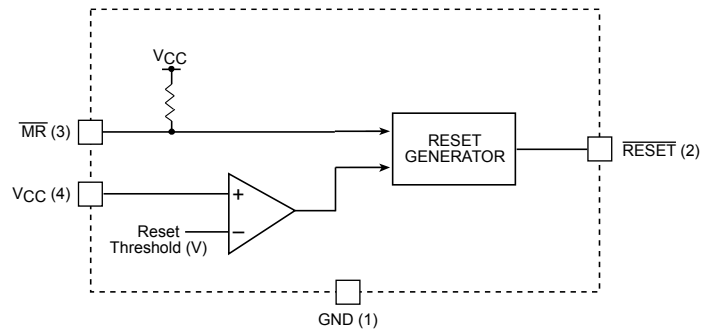
**Note 2.** The device is not guaranteed to function outside its operating rating.

**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

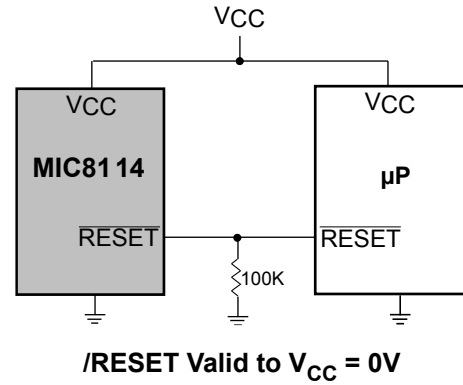
The /RESET pin is asserted whenever  $V_{CC}$  falls below the reset threshold voltage. The reset pin remains asserted for a period of 790ms after  $V_{CC}$  has risen above the reset threshold voltage. The reset function ensures the microprocessor is properly reset and powers up into a known condition after a power failure. /RESET will remain valid with  $V_{CC}$  as low as 1V.

### $V_{CC}$ Transients

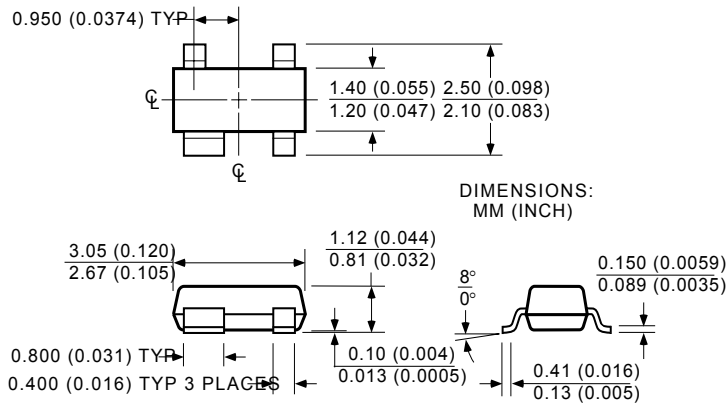
The MIC8114 is relatively immune to the negative-going  $V_{CC}$  glitches below the reset threshold. Typically, a negative-going transient 125mV below the reset threshold with a duration of 20 $\mu$ s or less will not cause a reset.

### /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



## Package Information



**4-Lead SOT-143 (UT)**

**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>

The information furnished by Micrel in this datasheet is believed to be accurate and reliable. However, no responsibility is assumed by Micrel for its use. Micrel reserves the right to change circuitry and specifications at any time without notification to the customer.

Micrel Products are not

reasonably be expected to result in personal injury. Life support devices or systems are devices or systems that (a) are intended for surgical implant into the body or (b) support or sustain life, and whose failure to perform can be reasonably expected to result in a significant injury to the user. A Purchaser's use or sale of Micrel Products for use in life support appliances, devices or systems is at Purchaser's own risk and Purchaser agrees to fully indemnify

Micrel for any damages resulting from such use or sale.

© 2005 Micrel, Incorporated.