

## General Description

The MIC811 and MIC812 are inexpensive microprocessor supervisory circuits that monitor power supplies in microprocessor based systems.

The function of this device is to assert a reset if either the power supply drops below a designated reset threshold level or /MR is forced low. Several different reset threshold levels are available to accommodate 3V, 3.3V or 5V powered systems.

The MIC811 has an active low /RESET output, while the MIC812 offers an active high RESET output. The reset output is guaranteed to remain asserted for a minimum of 140ms after VCC has risen above the designed reset threshold level. Having a push-pull output stage, the MIC811/812 does not require a pull-up resistor at the output. The MIC811/812 comes in a 4-pin SOT-143 package.

If a microprocessor voltage supervisor with an open-drain output stage is needed, see MIC6315.

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

## Features

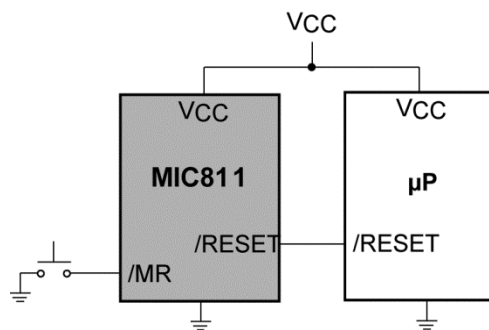
- Precision voltage monitor for 3V, 3.3V or 5V power supplies
- /RESET remains valid with VCC as low as 1V
- 5 $\mu$ A typical supply current
- 140ms minimum reset pulse width available
- Manual reset input
- Available in 4-pin SOT-143 package

## Applications

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

---

## Typical Application



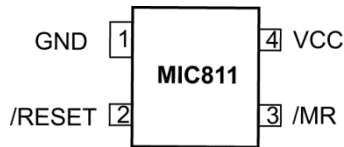
## Ordering Information

Part Number Pb-Free	Marking <sup>(1)</sup>	Threshold Voltage	Operating Temp. Range	Package
MIC811LUY	<u>KL</u>	4.63	-40°C to +85°C	4-pin SOT-143
MIC811MUJ	<u>KM</u>	4.38	-40°C to +85°C	4-pin SOT-143
MIC811JUJ	<u>KJ</u>	4.00	-40°C to +85°C	4-pin SOT-143
MIC811TUJ	<u>KT</u>	3.08	-40°C to +85°C	4-pin SOT-143
MIC811SUJ	<u>KS</u>	2.93	-40°C to +85°C	4-pin SOT-143
MIC811RUJ	<u>KR</u>	2.63	-40°C to +85°C	4-pin SOT-143
MIC812LUJ	<u>LL</u>	4.63	-40°C to +85°C	4-pin SOT-143
MIC812MUJ	<u>LM</u>	4.38	-40°C to +85°C	4-pin SOT-143
MIC812JUJ	<u>LJ</u>	4.00	-40°C to +85°C	4-pin SOT-143
MIC812TUJ	<u>LT</u>	3.08	-40°C to +85°C	4-pin SOT-143
MIC812SUJ	<u>LS</u>	2.93	-40°C to +85°C	4-pin SOT-143
MIC812RUJ	<u>LR</u>	2.63	-40°C to +85°C	4-pin SOT-143

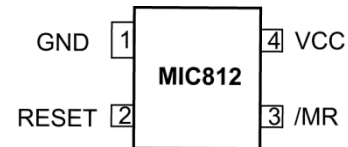
### Note:

1. “\_” underbar symbol not to scale

## Pin Configuration



MIC811 4-Pin SOT-143 (U)



MIC812 4-Pin SOT-143 (U)

## Pin Description

MIC811	MIC812	Pin Name	Pin Name
1	1	GND	IC Ground Pin.
2	N/A	/RESET	/RESET goes low if VCC falls below the reset threshold and remains asserted for one reset timeout period (140ms min.) after VCC exceeds the reset threshold.
N/A	2	RESET	RESET goes high if VCC falls below the reset threshold and remains asserted for one reset timeout period (140ms min.) after VCC exceeds the reset threshold.
3	3	/MR	Manual Reset Input. A logic low on /MR will force a reset. The reset will remain asserted as long as /MR is held low and for one reset timeout period (140ms min.) after /MR goes high. This input can be shorted to ground via a switch or driven from CMOS or TTL logic. Float if unused.
4	4	VCC	Power Supply Input.

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

Terminal Voltage (VCC) .....	-0.3V to +6.0V
Input Current (VCC, /MR).....	20mA
Output Current (/RESET, RESET) .....	20mA
Lead Temperature (soldering, 10s).....	300°C
Storage Temperature (Ts).....	5°C to 150°C
Rate of Rise (VCC) .....	100V/μs
ESD Rating <sup>(4)</sup> .....	3kV

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

Operating Temperature Range	
MIC811 .....	-40°C to +85°C
MIC812 .....	-40°C to +85°C
Power Dissipation (T <sub>A</sub> = +70°C) .....	320mW
Thermal Resistance	
SOT-143 (θ <sub>JA</sub> ) .....	265°C/W

**Electrical Characteristics<sup>(5)</sup>**

For typical values, VCC = 5V for MIC8\_L/M/J, VCC = 3.3V for MIC8\_S/T, VCC = 3V for MIC8\_R; T<sub>A</sub> = 25°C, **bold** values indicate -40°C to ≤ T<sub>A</sub> ≤ +85°C; unless noted.

Symbol	Parameter	Condition	Min	Typ	Max	Units
VCC	Operating Voltage Range	T <sub>A</sub> = -40°C to 85°C	<b>1</b>		<b>5.5</b>	V
I <sub>VCC</sub>	Supply Current	MIC811L/M/J, MIC812L/M/J: VCC = 5.0V, no load		5	<b>15</b>	μA
		MIC811S/T, MIC812S/T: VCC = 3.3V, no load		5	<b>10</b>	μA
		MIC811R, MIC812R: VCC = 3.0V, no load		5	<b>10</b>	μA
V <sub>TH</sub>	Reset Voltage Threshold	MIC811L, MIC812L	<b>4.50</b>	4.63	<b>4.75</b>	V
		MIC811M, MIC812M	<b>4.25</b>	4.38	<b>4.50</b>	V
		MIC811J, MIC812J	<b>3.89</b>	4.00	<b>4.10</b>	V
		MIC811T, MIC812T	<b>3.00</b>	3.08	<b>3.15</b>	V
		MIC811S, MIC812S	<b>2.85</b>	2.93	<b>3.00</b>	V
		MIC811R, MIC812R	<b>2.55</b>	2.63	<b>2.70</b>	V
t <sub>RST</sub>	Reset Timeout Period		<b>140</b>	240	<b>560</b>	ms
V <sub>OH</sub>	/RESET Output Voltage	I <sub>SOURCE</sub> = 800μA, MIC811L/M/J	<b>VCC-1.5V</b>			V
		I <sub>SOURCE</sub> = 500μA, MIC811R/S/T	<b>0.8xVCC</b>			V
V <sub>OL</sub>	/RESET Output Voltage	VCC = V <sub>TH</sub> min., I <sub>SINK</sub> = 3.2mA, MIC811L/M/J			<b>0.4</b>	V
		VCC = V <sub>TH</sub> min., I <sub>SINK</sub> = 1.2mA, MIC811R/S/T			<b>0.3</b>	V
		VCC > 1V, I <sub>SINK</sub> = 50μA, T <sub>A</sub> = -40°C to +85°C			<b>0.3</b>	V
V <sub>OH</sub>	RESET Output Voltage	1.8V < VCC < V <sub>TH</sub> min., I <sub>SOURCE</sub> = 150μA	<b>0.8xVCC</b>			V
V <sub>OL</sub>	RESET Output Voltage	I <sub>SINK</sub> = 3.2mA, MIC812L/M/J			<b>0.4</b>	V
		I <sub>SINK</sub> = 1.2mA, MIC812R/S/T			<b>0.3</b>	V

**Notes:**

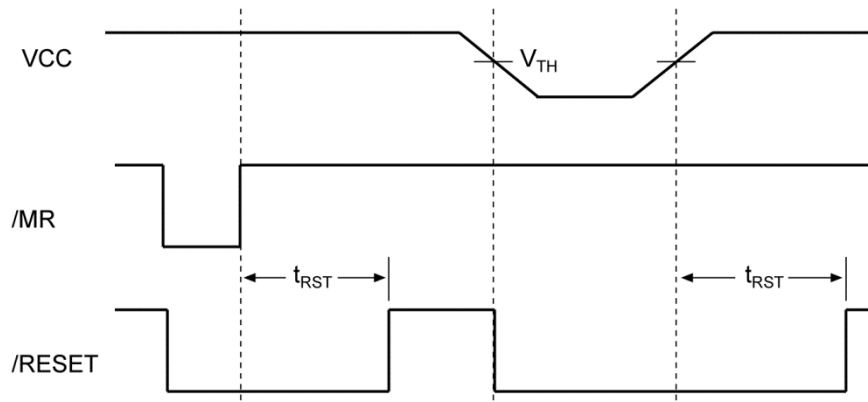
- Exceeding the absolute maximum ratings may damage the device.
- The device is not guaranteed to function outside its operating ratings.
- Devices are ESD sensitive. Handling precautions are recommended. Human body model, 1.5kΩ in series with 100pF.
- Specification for packaged product only

## Electrical Characteristics (Continued)<sup>(5)</sup>

For typical values,  $V_{CC} = 5V$  for MIC8\_L/M/J,  $V_{CC} = 3.3V$  for MIC8\_S/T,  $V_{CC} = 3V$  for MIC8\_R;  $T_A = 25^\circ C$ , **bold** values indicate  $-40^\circ C$  to  $\leq T_A \leq +85^\circ C$ ; unless noted.

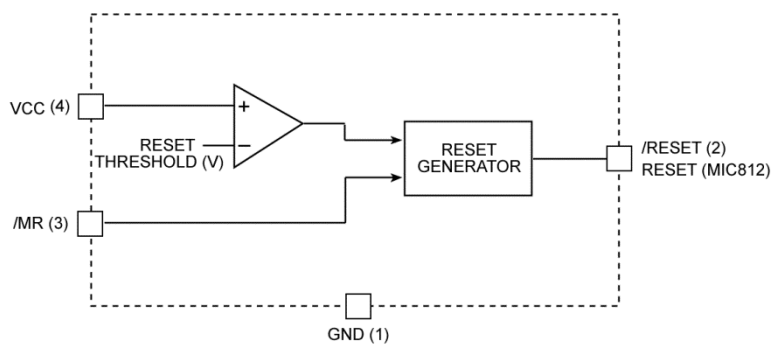
Symbol	Parameter	Condition	Min	Typ	Max	Units
	/MR Minimum Pulse Width		<b>10</b>			$\mu s$
	/MR to Reset Delay			0.5		$\mu s$
$V_{IH}$	/MR Input Threshold	$V_{CC} > V_{TH \text{ max.}}$ , MIC81_L/M/J	<b>2.3</b>			V
		MIC81_R/S/T	<b><math>0.7 \times V_{CC}</math></b>			V
$V_{IL}$	/MR Input Threshold	$V_{CC} > V_{TH \text{ max.}}$ , MIC81-L/M/J			<b>0.8</b>	V
		MIC81_R/S/T			<b><math>0.25 \times V_{CC}</math></b>	V
	/MR Pull-Up Resistance		<b>10</b>	20	<b>30</b>	$k\Omega$
	/MR Glitch Immunity			100		ns

## Timing Diagram



Reset Timing Diagram

## Functional Diagram



## Application Information

### Microprocessor Reset

The /RESET (or RESET) pin is asserted whenever VCC falls below the reset threshold voltage. The /RESET pin remains asserted for a period of 140ms after VCC has risen above the reset threshold voltage. The reset function ensures that the microprocessor is properly reset and powers up in a known condition after a power failure. /RESET will remain valid with VCC as low as 1V.

### VCC Transients

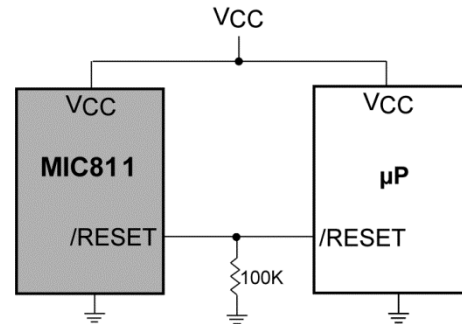
The MIC811/812 are relatively immune to negative-going VCC glitches below the reset threshold. Typically, a negative-going transient 125mV below the reset threshold with a duration of 20 $\mu$ s or less will not cause a reset.

### Interfacing to Bidirectional Reset Pins

The MIC811/812 can interface with  $\mu$ Ps with bidirectional reset pins by connecting a 4.7k $\Omega$  resistor in series with the MIC811/812 output and the  $\mu$ P reset pin.

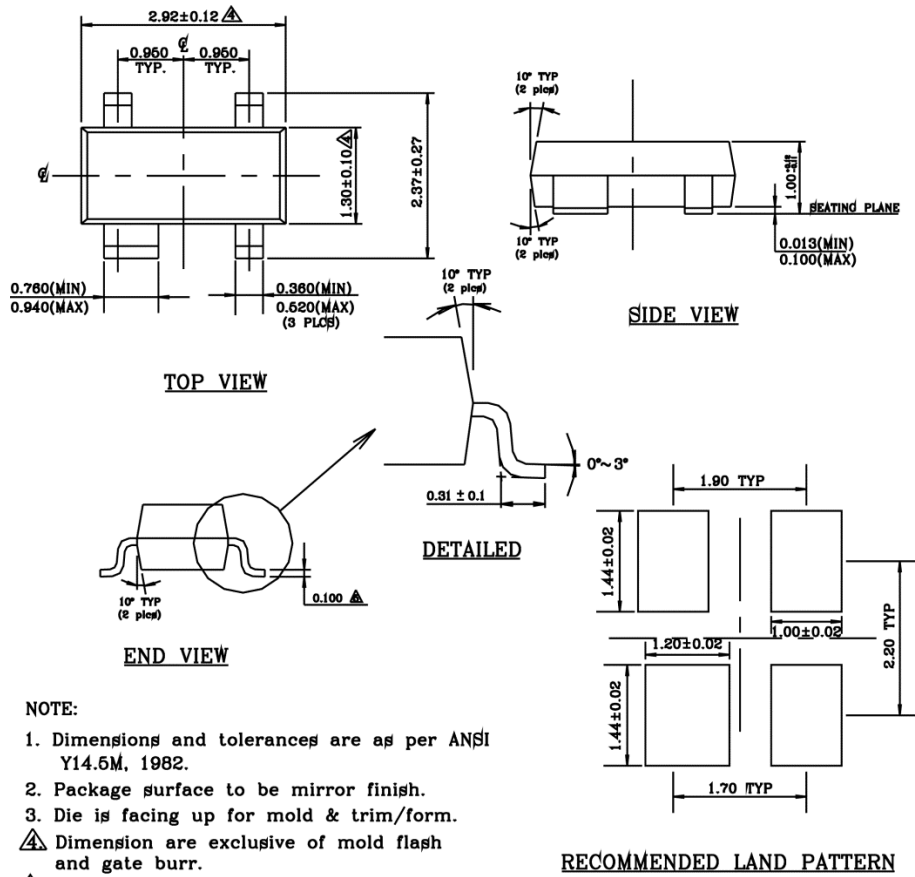
### /RESET Valid at Low Voltage

A resistor can be added from the /RESET pin to ground to ensure the /RESET output remains low with V<sub>CC</sub> down to 0V. A 100k $\Omega$  resistor connected from the /RESET to ground is recommended. The size of the resistor should be large enough not to load the output excessively and small enough to pull-down any stray leakage currents.



Reset Valid to VCC = 0V

# Package Information



- 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 (U)

**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>

Micrel, Inc. is a leading global manufacturer of IC solutions for the worldwide high performance linear and power, LAN, and timing & communications markets. The Company's products include advanced mixed-signal, analog & power semiconductors; high-performance communication, clock management, MEMs-based clock oscillators & crystal-less clock generators, Ethernet switches, and physical layer transceiver ICs. Company customers include leading manufacturers of enterprise, consumer, industrial, mobile, telecommunications, automotive, and computer products. Corporation headquarters and state-of-the-art wafer fabrication facilities are located in San Jose, CA, with regional sales and support offices and advanced technology design centers situated throughout the Americas, Europe, and Asia. Additionally, the Company maintains an extensive network of distributors and reps worldwide.

Micrel makes no representations or warranties with respect to the accuracy or completeness of the information furnished in this datasheet. This information is not intended as a warranty and Micrel does not assume responsibility for its use. Micrel reserves the right to change circuitry, specifications and descriptions at any time without notice. No license, whether express, implied, arising by estoppel or otherwise, to any intellectual property rights is granted by this document. Except as provided in Micrel's terms and conditions of sale for such products, Micrel assumes no liability whatsoever, and Micrel disclaims any express or implied warranty relating to the sale and/or use of Micrel products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright, or other intellectual property right.

Micrel Products are not designed or authorized for use as components in life support appliances, devices or systems where malfunction of a product can 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 a Purchaser's own risk and Purchaser agrees to fully indemnify Micrel for any damages resulting from such use or sale."

© 2014 Micrel, Incorporated.