

## 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

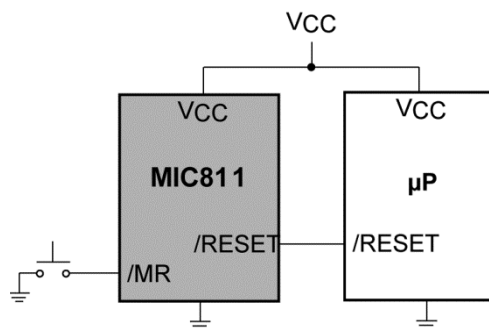
- Precision voltage monitor for 3V, 3.3V or 5V power supplies
- /RESET remains valid with VCC as low as 1V
- 5 $\mu$ A typical supply current
- 140ms minimum reset pulse width available
- Manual reset input
- Available in 4-pin SOT-143 package

## Applications

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

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## Typical Application



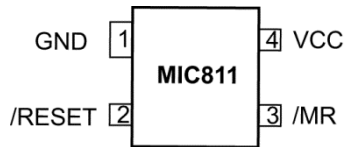
## Ordering Information

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
MIC811JUY	<u>KJ</u>	4.00	-40°C to +85°C	4-pin SOT-143
MIC811TUY	<u>KT</u>	3.08	-40°C to +85°C	4-pin SOT-143
MIC811SUY	<u>KS</u>	2.93	-40°C to +85°C	4-pin SOT-143
MIC811RUY	<u>KR</u>	2.63	-40°C to +85°C	4-pin SOT-143
MIC812LUY	<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
MIC812JUY	<u>LJ</u>	4.00	-40°C to +85°C	4-pin SOT-143
MIC812TUY	<u>LT</u>	3.08	-40°C to +85°C	4-pin SOT-143
MIC812SUY	<u>LS</u>	2.93	-40°C to +85°C	4-pin SOT-143
MIC812RUY	<u>LR</u>	2.63	-40°C to +85°C	4-pin SOT-143

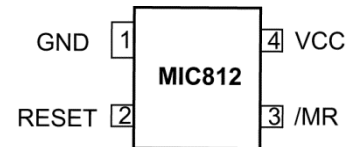
### Note:

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:**

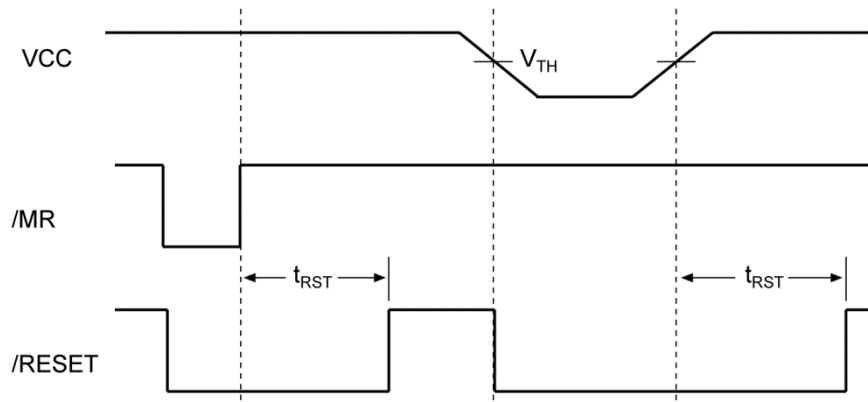
- Exceeding the absolute maximum ratings may damage the device.
- The device is not guaranteed to function outside its operating ratings.
- Devices are ESD sensitive. Handling precautions are recommended. Human body model, 1.5kΩ in series with 100pF.
- Specification for packaged product only

## 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.

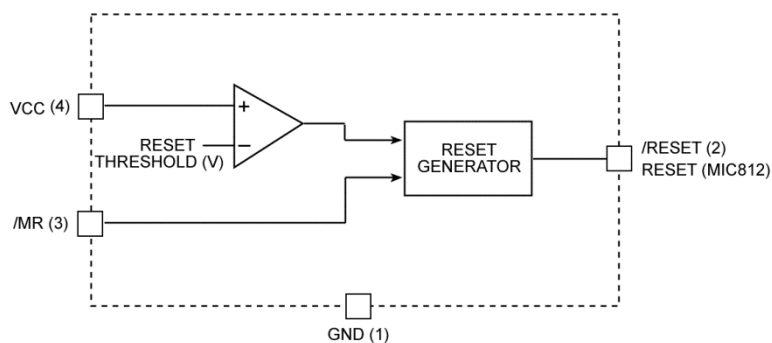
Symbol	Parameter	Condition	Min	Typ	Max	Units
	/MR Minimum Pulse Width		<b>10</b>			$\mu s$
	/MR to Reset Delay			0.5		$\mu s$
$V_{IH}$	/MR Input Threshold	$V_{CC} > V_{TH \text{ max.}}$ , MIC81_L/M/J	<b>2.3</b>			V
		MIC81_R/S/T	<b><math>0.7 \times V_{CC}</math></b>			V
$V_{IL}$	/MR Input Threshold	$V_{CC} > V_{TH \text{ max.}}$ , 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

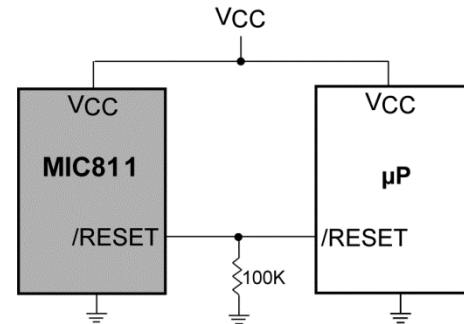
The MIC811/812 are relatively immune to negative-going VCC glitches below the reset threshold. Typically, a negative-going transient 125mV below the reset threshold with a duration of 20 $\mu$ s or less will not cause a reset.

### 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.

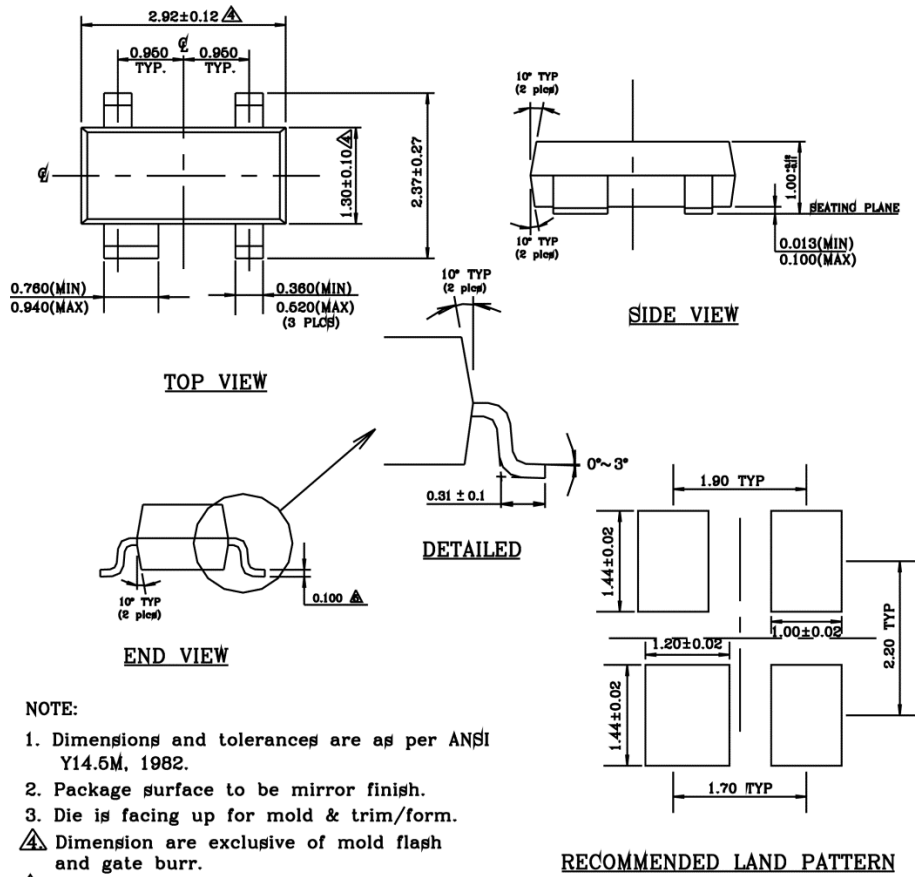
### /RESET Valid at Low Voltage

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)**

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