## MIC811/812



### **Microprocessor Reset Circuits**

### **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  $V_{\rm CC}$  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.

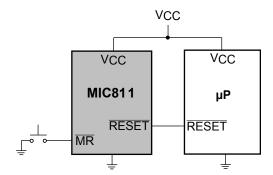
#### **Features**

- Precision voltage monitor for 3V, 3.3V or 5V power supplies
- /RESET remains valid with V<sub>CC</sub> as low as 1V
- 5µA 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
- · Embedded controllers

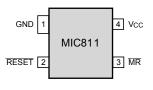
## **Typical Application**

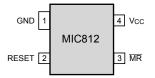


# **Ordering Information**

Part Number		Marking		Threshold	Operating Temp.	Package	
Standard	Pb-Free	Standard	Pb-Free	Voltage	Range		
MIC811LU	MIC811LUY	KL	<u>K</u> L	4.63	–40°C to +85°C	4-lead SOT-143	
MIC811MU	MIC811MUY	KM	<u>K</u> M	4.38	–40°C to +85°C	4-lead SOT-143	
MIC811JU	MIC811JUY	KJ	<u>K</u> J	4.00	–40°C to +85°C	4-lead SOT-143	
MIC811TU	MIC811TUY	KT	<u>K</u> T	3.08	–40°C to +85°C	4-lead SOT-143	
MIC811SU	MIC811SUY	KS	<u>K</u> S	2.93	–40°C to +85°C	4-lead SOT-143	
MIC811RU	MIC811RUY	KR	<u>K</u> R	2.63	–40°C to +85°C	4-lead SOT-143	
MIC812LU	MIC812LUY	LL	<u>L</u> L	4.63	–40°C to +85°C	4-lead SOT-143	
MIC812MU	MIC812MUY	LM	<u>L</u> M	4.38	–40°C to +85°C	4-lead SOT-143	
MIC812JU	MIC812JUY	LJ	<u>L</u> J	4.00	–40°C to +85°C	4-lead SOT-143	
MIC812TU	MIC812TUY	LT	<u>L</u> T	3.08	–40°C to +85°C	4-lead SOT-143	
MIC812SU	MIC812SUY	LS	<u>L</u> S	2.93	–40°C to +85°C	4-lead SOT-143	
MIC812RU	MIC812RUY	LR	<u>L</u> R	2.63	–40°C to +85°C	4-lead SOT-143	

# **Pin Configuration**





MIC811 4-Lead SOT-143 MIC812 4-Lead SOT-143

**Pin Description** 

Pin Number MIC811	Pin Number MIC812	Pin Name	Pin Function
1	1	GND	IC Ground Pin
2	N/A	/RESET	/RESET goes low if $V_{CC}$ falls below the reset threshold and remains asserted for one reset timeout period (140ms min.) after $V_{CC}$ exceeds the reset threshold
N/A	2	RESET	RESET goes high if $V_{CC}$ falls below the reset threshold and remains asserted for one reset timeout period (140ms min.) after $V_{CC}$ exceeds the reset threshold
3	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 (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(Note 1)

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# Operating Ratings(Note 2)

Operating Temperature Range	
MIC811	–40°C to 85°0
MIC812	–40°C to 85°0
Power Dissipation ( $T_{\Delta} = +70^{\circ}$ C)	320mV

#### **Electrical Characteristics**

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°C, **bold** values indicate  $-40^{\circ}$ C  $\leq T_A \leq +85^{\circ}$ C; unless noted

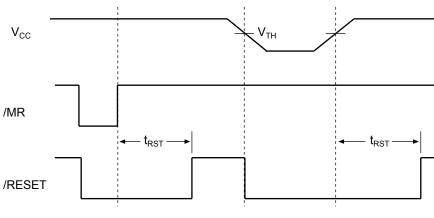
Symbol	Parameter	Condition	Min	Тур	Max	Units
$\overline{V_{CC}}$	Operating Voltage Range	$T_A = -40^{\circ}\text{C to } 85^{\circ}\text{C}$	1		5.5	V
I <sub>cc</sub>	Supply Current	MIC811L/M/J, MIC812L/M/J: V <sub>CC</sub> = 5.0V, no load		5	15	μA
		MIC811S/T, MIC812S/T V <sub>CC</sub> = 3.3V, no load		5	10	μA
		MIC811R, MIC812R: V <sub>CC</sub> = 3.0V, no load		5	10	μΑ
V <sub>TH</sub>	Reset Voltage Threshold	MIC811L, MIC812L	4.50	4.63	4.75	V
		MIC811M, MIC812M	4.25	4.38	4.50	V
		MIC811J, MIC812J	3.89	4.00	4.10	V
		MIC811T, MIC812T	3.00	3.08	3.15	V
		MIC811S, MIC812S	2.85	2.93	3.00	V
		MIC811R, MIC812R	2.55	2.63	2.70	V
t <sub>RST</sub>	Reset Timeout Period		140	240	560	ms
V <sub>OH</sub>	/RESET Output Voltage	I <sub>SOURCE</sub> = 800μA, MIC811L/M/J	V <sub>CC</sub> -1.5V			V
		I <sub>SOURCE</sub> = 500μA, MIC811R/S/T	0.8×V <sub>CC</sub>			V
V <sub>OL</sub>	/RESET Output Voltage	$V_{CC} = V_{TH} \text{ min., } I_{SINK} = 3.2 \text{mA, MIC811L/M/J}$			0.4	V
		$V_{CC} = V_{TH} \text{ min., } I_{SINK} = 1.2\text{mA, MIC811R/S/T}$			0.3	V
		$V_{CC} > 1V$ , $I_{SINK} = 50\mu A$ , $T_A = -40^{\circ}$ to $+85^{\circ}C$			0.3	V
$\overline{V_{OH}}$	RESET Output Voltage	1.8V < V <sub>CC</sub> < V <sub>TH</sub> min., I <sub>SOURCE</sub> = 150μA	0.8×V <sub>CC</sub>			V
V <sub>OL</sub>	RESET Output Voltage	I <sub>SINK</sub> = 3.2mA, MIC812L/M/J			0.4	V
		I <sub>SINK</sub> = 1.2mA, MIC812R/S/T			0.3	V
	/MR Minimum Pulse Width		10			μs
	/MR to Reset Delay			0.5		μs
$V_{IH}$	/MR Input Threshold	V <sub>CC</sub> > V <sub>TH</sub> max., MIC81_L/M/J	2.3			V
		MIC81_R/S/T	0.7×V <sub>CC</sub>			V
V <sub>IL</sub>	/MR Input Threshold	V <sub>CC</sub> . V <sub>TH</sub> max., MIC81-L/M/J			0.8	V
		MIC81-R/S/T			0.25×V <sub>CC</sub>	
	/MR Pull-Up Resistance		10	20	30	kΩ
	/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.

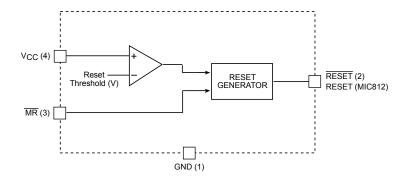
Note 3. Devices are ESD sensitive. Handling precautions recommended. Human body model, 1.5k in series with 100pF.

# **Timing Diagram**



**Reset Timing Diagram** 

# **Functional Diagram**



### **Applications Information**

#### **Microprocessor Reset**

The /RESET (or RESET) pin is asserted whenever  $V_{CC}$  falls below the reset threshold voltage. The /RESET pin remains asserted for a period of 140ms after  $V_{CC}$  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  $V_{CC}$  as low as 1V.

### **V<sub>CC</sub>** Transients

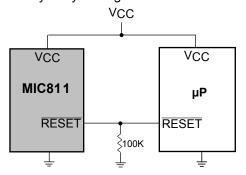
The MIC811/812 are relatively immune to negative-going  $V_{CC}$  glitches below the reset threshold. Typically, a negative-going transient 125mV below the reset threshold with a duration of 20µs or less will not cause a reset.

#### **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.

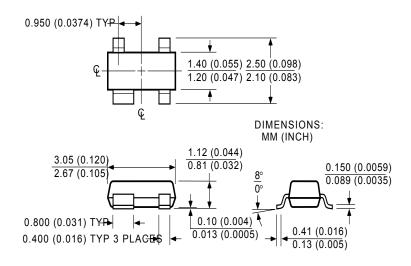
#### /RESET Valid at Low Voltage

A resistor can be added from the /RESET pin to ground to ensure the /RESET output remains low with  $V_{CC}$  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 V<sub>CC</sub> = 0V

### Package Information



4-lead SOT-143 (M3)

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