



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_{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.

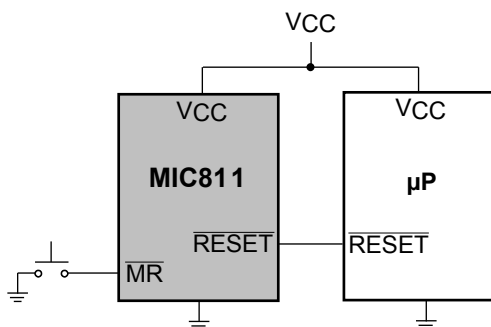
Features

- Precision voltage monitor for 3V, 3.3V or 5V power supplies
- /RESET remains valid with V_{CC} as low as 1V
- 5 μ 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
- Embedded controllers

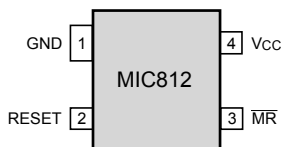
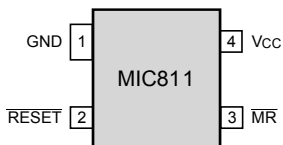
Typical Application



Ordering Information

Part Number		Marking		Threshold Voltage	Operating Temp. Range	Package
Standard	Pb-Free	Standard	Pb-Free			
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)

Terminal Voltage (V_{CC}).....	-0.3V to +6.0V
Input Current (V_{CC} , /MR).....	20mA
Output Current (/RESET, RESET).....	20mA
Lead Temperature (soldering, 10 sec.).....	300°C
Storage Temperature (T_S).....	-65°C to 150°C
Rate of Rise (V_{CC}).....	100V/ μ s
ESD Rating, Note 3	3kV

Operating Ratings(Note 2)

Operating Temperature Range	
MIC811	-40°C to 85°C
MIC812	-40°C to 85°C
Power Dissipation ($T_A = +70^\circ\text{C}$)	320mW

Electrical Characteristics

For typical values, $V_{CC} = 5\text{V}$ for MIC8_L/M/J, $V_{CC} = 3.3\text{V}$ for MIC8_S/T, $V_{CC} = 3\text{V}$ for MIC8_R; $T_A = 25^\circ\text{C}$, **bold** values indicate $-40^\circ\text{C} \leq T_A \leq +85^\circ\text{C}$; unless noted

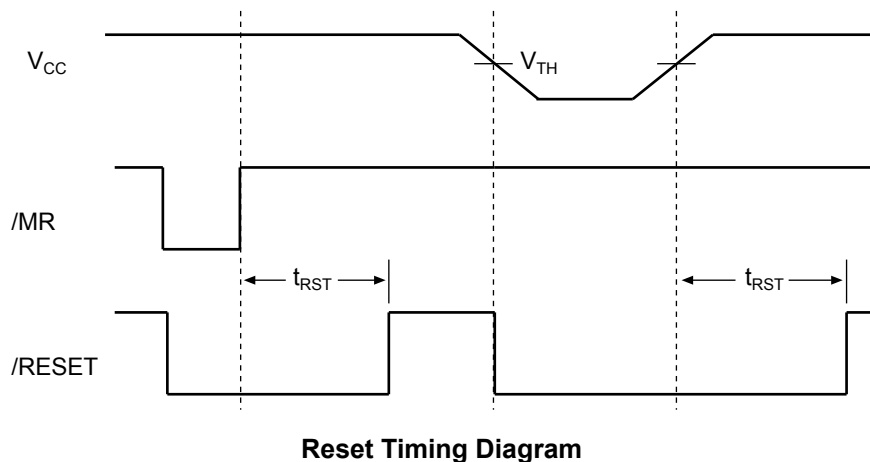
Symbol	Parameter	Condition	Min	Typ	Max	Units
V_{CC}	Operating Voltage Range	$T_A = -40^\circ\text{C}$ to 85°C	1		5.5	V
I_{CC}	Supply Current	MIC811L/M/J, MIC812L/M/J: $V_{CC} = 5.0\text{V}$, no load		5	15	μA
		MIC811S/T, MIC812S/T $V_{CC} = 3.3\text{V}$, no load		5	10	μA
		MIC811R, MIC812R: $V_{CC} = 3.0\text{V}$, no load		5	10	μA
V_{TH}	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_{RST}	Reset Timeout Period		140	240	560	ms
V_{OH}	/RESET Output Voltage	$I_{SOURCE} = 800\mu\text{A}$, MIC811L/M/J	$V_{CC} - 1.5\text{V}$			V
		$I_{SOURCE} = 500\mu\text{A}$, MIC811R/S/T	$0.8 \times V_{CC}$			V
V_{OL}	/RESET Output Voltage	$V_{CC} = V_{TH}$ min., $I_{SINK} = 3.2\text{mA}$, MIC811L/M/J			0.4	V
		$V_{CC} = V_{TH}$ min., $I_{SINK} = 1.2\text{mA}$, MIC811R/S/T			0.3	V
		$V_{CC} > 1\text{V}$, $I_{SINK} = 50\mu\text{A}$, $T_A = -40^\circ$ to $+85^\circ\text{C}$			0.3	V
V_{OH}	RESET Output Voltage	$1.8\text{V} < V_{CC} < V_{TH}$ min., $I_{SOURCE} = 150\mu\text{A}$	$0.8 \times V_{CC}$			V
V_{OL}	RESET Output Voltage	$I_{SINK} = 3.2\text{mA}$, MIC812L/M/J			0.4	V
		$I_{SINK} = 1.2\text{mA}$, MIC812R/S/T			0.3	V
	/MR Minimum Pulse Width		10			μs
	/MR to Reset Delay			0.5		μs
V_{IH}	/MR Input Threshold	$V_{CC} > V_{TH}$ max., MIC81_L/M/J	2.3			V
		MIC81_R/S/T	$0.7 \times V_{CC}$			V
V_{IL}	/MR Input Threshold	$V_{CC} \cdot V_{TH}$ max., MIC81-L/M/J			0.8	V
		MIC81-R/S/T			$0.25 \times V_{CC}$	V
	/MR Pull-Up Resistance		10	20	30	k Ω
	/MR Glitch Immunity			100		ns

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

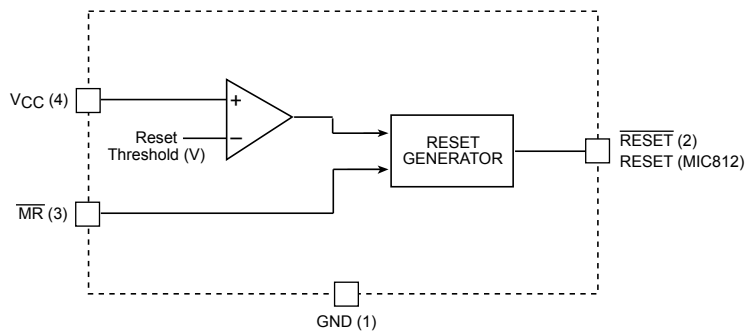
Note 2. The device is not guaranteed to function outside its operating rating.

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

Timing Diagram



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_{CC} Transients

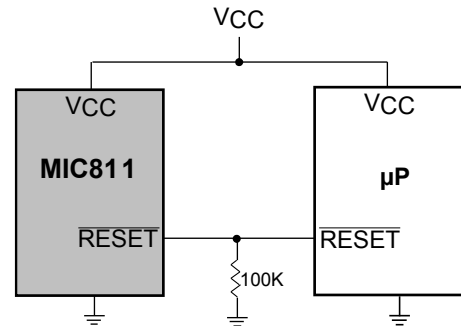
The MIC811/812 are relatively immune to negative-going V_{CC} glitches below the reset threshold. Typically, a negative-going transient 125mV below the reset threshold with a duration of 20 μ s or less will not cause a reset.

Interfacing to Bidirectional Reset Pins

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

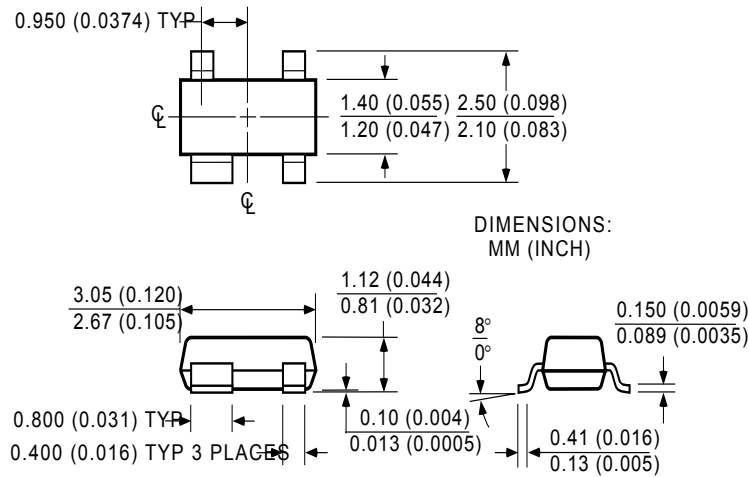
/RESET Valid at Low Voltage

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 Ω 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 $V_{CC} = 0V$

Package Information



4-lead SOT-143 (M3)

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.