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 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.

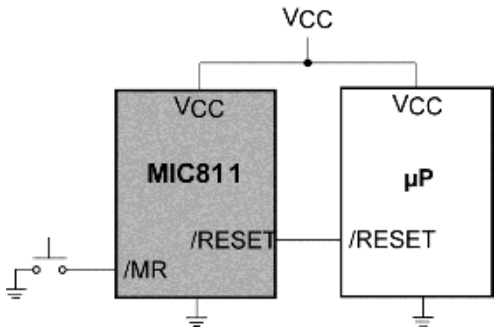
Features

- Precision voltage monitor for 3V, 3.3V or 5V power supplies
- /RESET remains valid with VCC 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
- Controllers

Typical Application



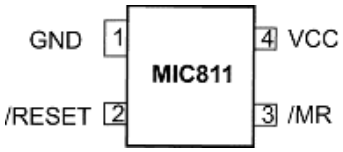
Ordering Information

Part Number Pb-Free	Marking[1]	Threshold Voltage	Operating Temp. Range	Package
MIC811LUY	KL	4.63	–40°C to +85°C	4-pin SOT-143
MIC811MUY	KM	4.38	–40°C to +85°C	4-pin SOT-143
MIC811JUY	KJ	4.00	–40°C to +85°C	4-pin SOT-143
MIC811TUY	KT	3.08	–40°C to +85°C	4-pin SOT-143
MIC811SUY	KS	2.93	–40°C to +85°C	4-pin SOT-143
MIC811RUY	KR	2.63	–40°C to +85°C	4-pin SOT-143
MIC812LUY	LL	4.63	–40°C to +85°C	4-pin SOT-143
MIC812MUY	LM	4.38	–40°C to +85°C	4-pin SOT-143
MIC812JUY	LJ	4.00	–40°C to +85°C	4-pin SOT-143
MIC812TUY	LT	3.08	–40°C to +85°C	4-pin SOT-143
MIC812SUY	LS	2.93	–40°C to +85°C	4-pin SOT-143
MIC812RUY	LR	2.63	–40°C to +85°C	4-pin SOT-143

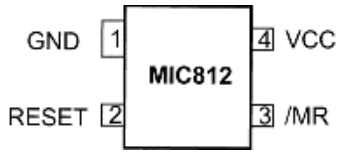
Note:

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[2]

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[4] 3kV

Operating Ratings[3]

Operating Temperature Range
MIC811 ..... –40°C to +85°C
MIC812 ..... –40°C to +85°C
Power Dissipation (T_A = +70°C) 320mW
Thermal Resistance
SOT-143 (θ_{JA}) ..... 265°C/W

Electrical Characteristics[5]

For typical values, VCC = 5V for MIC8_L/M/J, VCC = 3.3V for MIC8_S/T, VCC = 3V for MIC8_R; T_A = 25°C, **bold** values indicate –40°C to ≤ T_A ≤ +85°C; unless noted.

Symbol	Parameter	Condition	Min	Typ	Max	Units
VCC	Operating Voltage Range	T_A = –40°C to 85°C	**1**		**5.5**	V
I_{VCC}	Supply Current	MIC811L/M/J, MIC812L/M/J: VCC = 5.0V, no load		5	**15**	µA
		MIC811S/T, MIC812S/T: VCC = 3.3V, no load		5	**10**	µA
		MIC811R, MIC812R: VCC = 3.0V, 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} = 800µA, MIC811L/M/J	**VCC–1.5V**			V
		I_{SOURCE} = 500µA, MIC811R/S/T	**0.8xVCC**			V
V_{OL}	/RESET Output Voltage	VCC = V_{TH} min., I_{SINK} = 3.2mA, MIC811L/M/J			**0.4**	V
		VCC = V_{TH} min., I_{SINK} = 1.2mA, MIC811R/S/T			**0.3**	V
		VCC >1V, I_{SINK} = 50µA, T_A = –40°C to +85°C			**0.3**	V
V_{OH}	RESET Output Voltage	1.8V <VCC <V_{TH} min., I_{SOURCE} = 150µA	**0.8xVCC**			V
V_{OL}	RESET Output Voltage	I_{SINK} = 3.2mA, MIC812L/M/J			**0.4**	V
		I_{SINK} = 1.2mA, MIC812R/S/T			**0.3**	V

Notes:

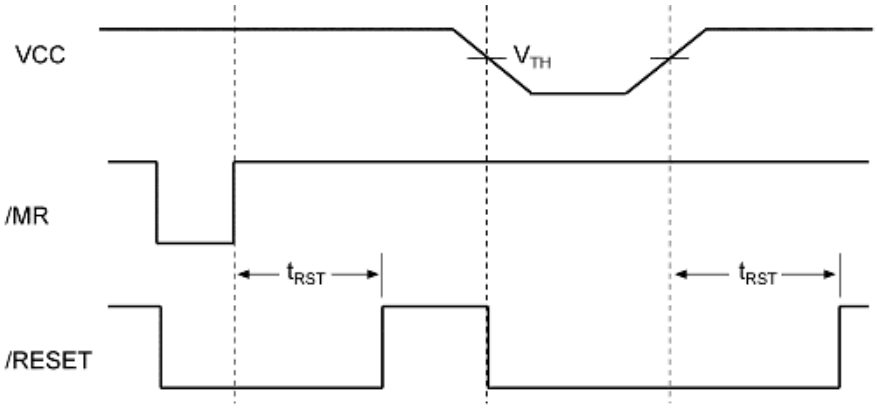
2. Exceeding the absolute maximum ratings may damage the device.
3. The device is not guaranteed to function outside its operating ratings.
4. Devices are ESD sensitive. Handling precautions are recommended. Human body model, 1.5kΩ in series with 100pF.
5. Specification for packaged product only

Electrical Characteristics (Continued)[5]

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°C to ≤ T_A ≤ +85°C; unless noted.

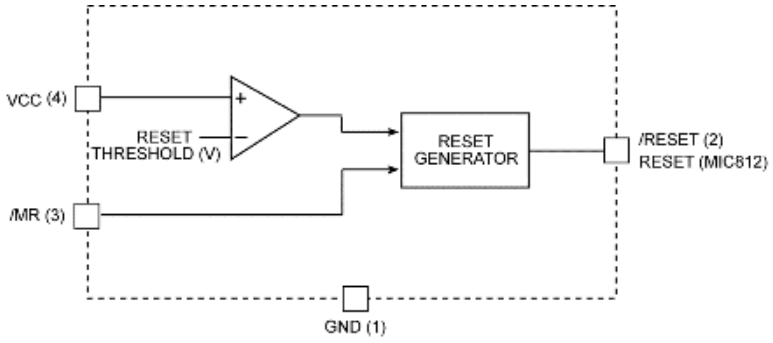
Symbol	Parameter	Condition	Min	Typ	Max	Units
	/MR Minimum Pulse Width		**10**			µs
	/MR to Reset Delay			0.5		µs
V_{IH}	/MR Input Threshold	VCC > V_{TH} max., MIC81_L/M/J	**2.3**			V
		MIC81_R/S/T	**0.7xVCC**			V
V_{IL}	/MR Input Threshold	VCC > V_{TH} max., MIC81-L/M/J			**0.8**	V
		MIC81_R/S/T			**0.25xVCC**	V
	/MR Pull-Up Resistance		**10**	20	**30**	kΩ
	/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

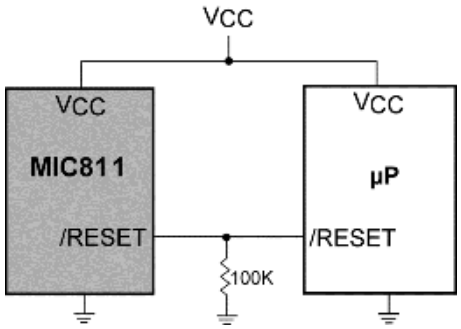
The MIC811/812 are relatively immune to negative-going VCC glitches below the reset threshold. Typically, a negative-going transient 125mV below the reset threshold with a duration of 20µs or less will not cause a reset.

Interfacing to Bidirectional Reset Pins

The MIC811/812 can interface with µPs with bidirectional reset pins by connecting a 4.7kΩ resistor in series with the MIC811/812 output and the µP reset pin.

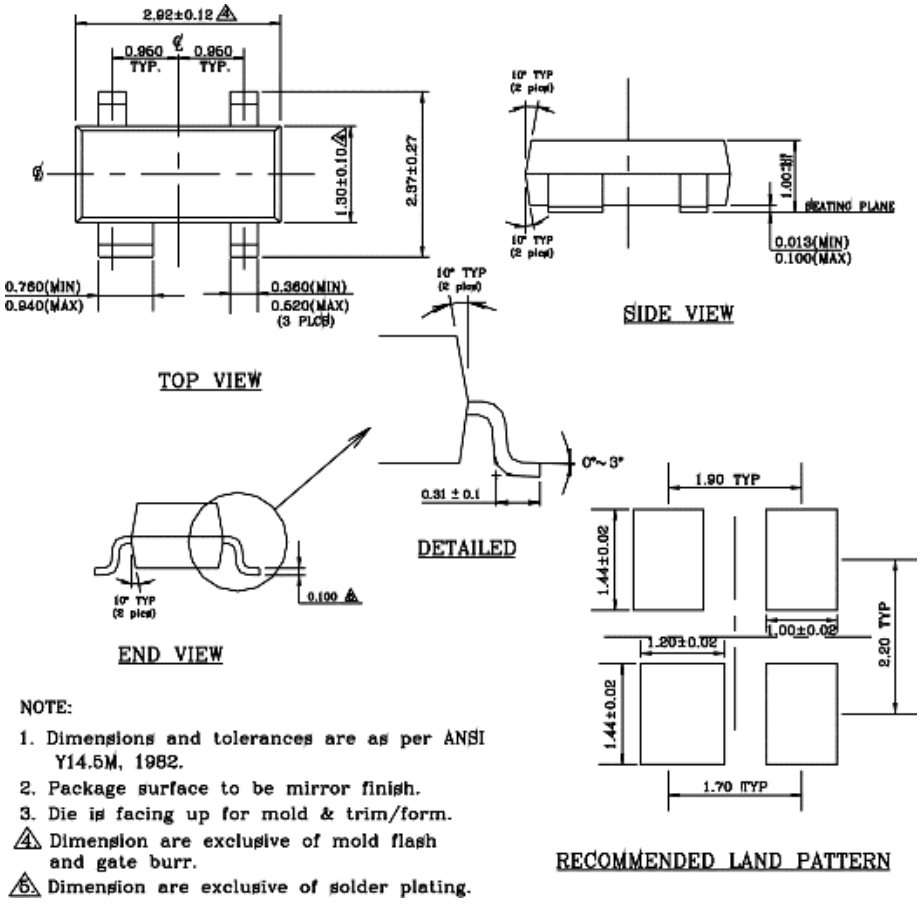
/RESET Valid at Low Voltage

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 100kΩ 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



4-Pin SOT-143 (U)

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