MIC811/812

Microprocessor Reset Circuits

Final Information

General Description

The MIC811 and MIC812 are inexpensive microprocessor supervisory circuit that monitors 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, 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 1.4V
- <15μA supply current
- 140ms minimum reset pulse width available
- Manual reset input
- Available in 4-pin SOT-143 package

Applications

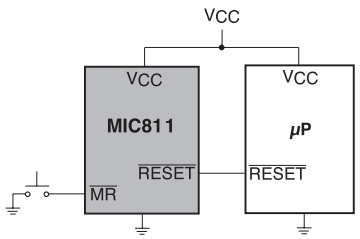
- Portable equipment
- Intelligent instruments
- Critical microprocessor power monitoring
- Printers/computers
- Embedded controllers

Ordering Information

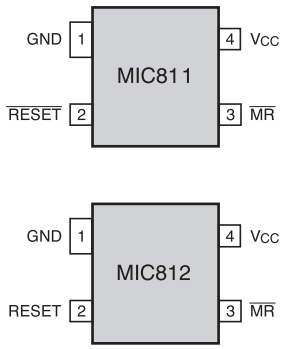
Standard Part Number	Standard Marking	Pb-Free Part Number	Pb-Free Marking	Threshold Voltage	Operating Temp. Range	Package
MIC811LU	KL	MIC811LUY	KL	4.63	–40°C to +85°C	4-lead SOT-143
MIC811MU	KM	MIC811MUY	KM	4.38	–40°C to +85°C	4-lead SOT-143
MIC811JU	KJ	MIC811JUY	KJ	4.00	–40°C to +85°C	4-lead SOT-143
MIC811UU	KU	MIC811UUY	KU	3.00	–40°C to +85°C	4-lead SOT-143
MIC811TU	KT	MIC811TUY	KT	3.08	–40°C to +85°C	4-lead SOT-143
MIC811SU	KS	MIC811SUY	KS	2.93	–40°C to +85°C	4-lead SOT-143
MIC811RU	KR	MIC811RUY	KR	2.63	–40°C to +85°C	4-lead SOT-143
MIC812LU	LL	MIC812LUY	LL	4.63	–40°C to +85°C	4-lead SOT-143
MIC812MU	LM	MIC812MUY	LM	4.38	–40°C to +85°C	4-lead SOT-143
MIC812JU	LJ	MIC812JUY	LJ	4.00	–40°C to +85°C	4-lead SOT-143
MIC812UU	LU	MIC812UUY	LU	3.00	–40°C to +85°C	4-lead SOT-143
MIC812TU	LT	MIC812TUY	LT	3.08	–40°C to +85°C	4-lead SOT-143
MIC812SU	LS	MIC812SUY	LS	2.93	–40°C to +85°C	4-lead SOT-143
MIC812RU	LR	MIC812RUY	LR	2.63	–40°C to +85°C	4-lead SOT-143

*Under bar symbol (_) may not be to scale.

Typical Application



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/μs
ESD Rating, **Note 3**

Operating Ratings(Note 2)

Operating Temperature Range
MIC811 ..... –40°C to 85°C
MIC812 ..... –40°C to 85°C
Power Dissipation (T_A = +70°C) 320mW

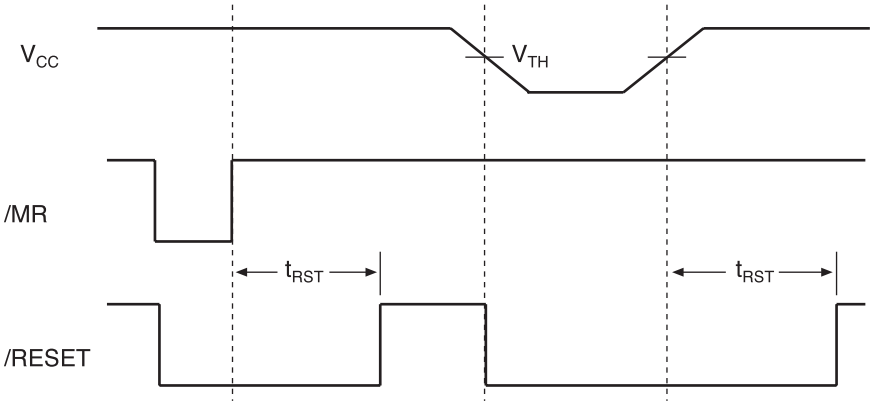
Electrical Characteristics

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°C ≤ T_A ≤ +85°C; unless noted

Symbol	Parameter	Condition	Min	Typ	Max	Units
V_{CC}	Operating Voltage Range	T_A = 0°C to 70°C	**1.4**		**5.5**	V
		T_A = –40°C to 85°C	**1.6**		**5.5**	V
I_{CC}	Supply Current	MIC811L/M/J, MIC812L/M/J: V_{CC} = 5.0V, no load		9	**15**	μA
		MIC811S/T, MIC812S/T V_{CC} = 3.3V, no load		6	**10**	μA
		MIC811R, MIC812R: V_{CC} = 3.0V, no load		6	**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	**V_{CC}–1.5V**			V
		I_{SOURCE} = 500μA, MIC811R/S/T	**0.8×V_{CC}**			V
V_{OL}	/RESET Output Voltage	V_{CC} = V_{TH} min., I_{SINK} = 3.2mA, MIC811L/M/J			**0.4**	V
		V_{CC} = V_{TH} min., I_{SINK} = 1.2mA, MIC811R/S/T			**0.3**	V
		V_{CC} > 1.4V, I_{SINK} = 50μA, T_A = 0°C to +70°C			**0.3**	V
		V_{CC} > 1.6V, I_{SINK} = 50μA, T_A = –40° to +85°C			**0.3**	V
V_{OH}	RESET Output Voltage	1.8V < V_{CC} < V_{TH} min., I_{SOURCE} = 150μA	**0.8×V_{CC}**			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
	/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×V_{CC}**			V
V_{IL}	/MR Input Threshold	V_{CC} . V_{TH} max., MIC81-L/M/_			0.8	V
		MIC81_R/S/T			**0.25×V_{CC}**	
	/MR Pull-Up Resistance		**10**	20	**30**	kΩ
	/MR Glitch Immunity			100		ns

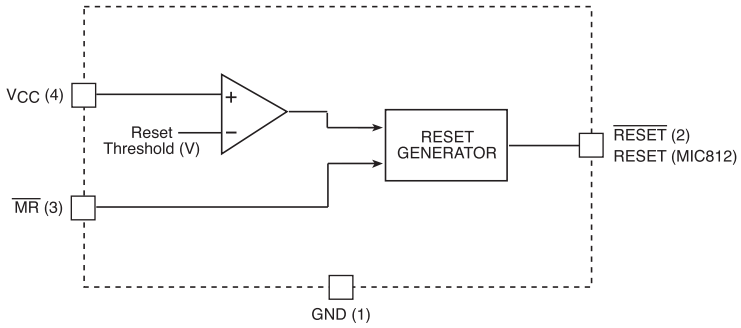
Note 1. Exceeding the absolute maximum rating may damage the device.
Note 2. The device is not guaranteed to function outside its operating rating.
Note 3. Devices are ESD sensitive. Handling precautions recommended. Human body model, 1.5k in series with 100pF.

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 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 1.4V.

V_{CC} Transients

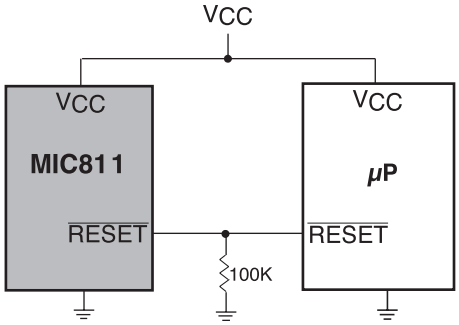
The MIC811/812 are relatively immune to negative-going V_{CC} glitches below the reset threshold. Typically, a negative-going transient 125mV below the reset threshold with a duration of 50μs (25μs for MIC8_R/S/T) or less will not cause a reset.

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.

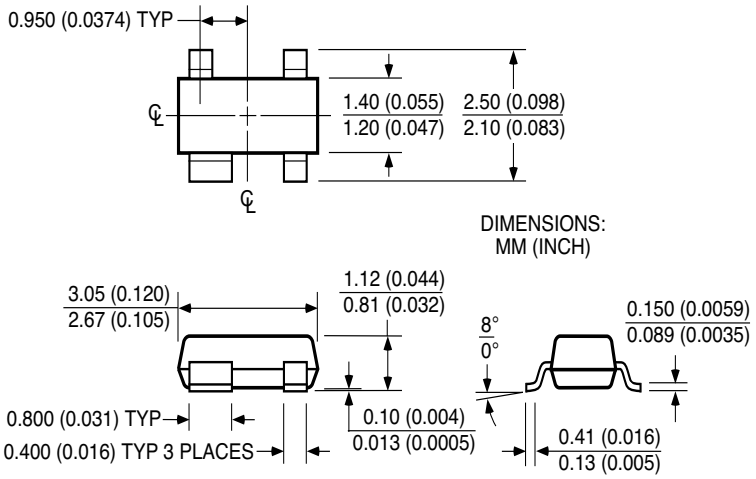
/RESET Valid at Low Voltage

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 V_{CC} = 0V

Package Information



4-lead SOT-143 (M3)

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