



# MIC811/MIC812

## Microprocessor Reset Circuits

### Description

The MIC811/MIC812 are inexpensive microprocessor supervisory circuits that monitor power supplies in microprocessor based systems.

The function of these devices is to assert a reset if either the power supply drops below a designated reset threshold level or  $\overline{MR}$  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  $\overline{RESET}$  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 designated reset threshold level. The MIC811/MIC812 come in a 4-pin SOT-143 package.

### Typical Applications

- Portable Equipment
- Intelligent Instruments
- Critical Microprocessor Power Monitoring
- Printers/Computers
- Controllers

Reset Threshold Voltage (V)	Device Suffix
4.63	L
4.38	M
4.00	J
3.08	T
2.93	S
2.63	R

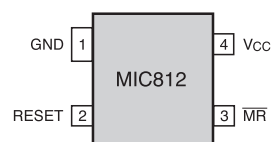
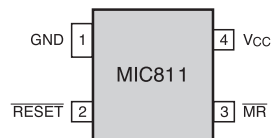
### Ordering Information

Part	Package	Temp. Range
MIC811_U	4-Lead SOT-143	-40°C to +85°C
MIC812_U	4-Lead SOT-143	-40°C to +85°C

Place the device suffix of desired reset threshold voltage from table above in blank to complete the part number.

### Pin Configuration

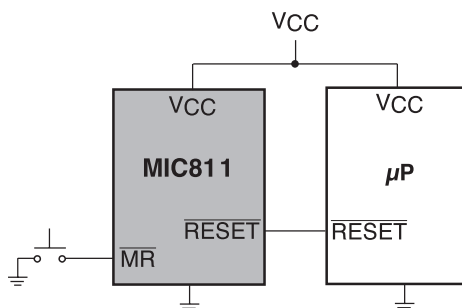
Top View



### Features

- $\overline{RESET}$  Remains Valid with  $V_{CC}$  as Low as 1.4V
- Precision Voltage Monitor for 3V, 3.3V or 5V Power Supplies
- Available in 4-Pin SOT-143 Package
- <math>15\mu\text{A}</math> Supply Current
- 140ms Minimum Reset Pulse Width
- Manual Reset Input

### Typical Operating Circuit



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## Absolute Maximum Ratings

Terminal Voltage	
V <sub>CC</sub>	-0.3V to 6.0V
MR	-0.3V to (V <sub>CC</sub> + 0.3V)
Input Current, V <sub>CC</sub> , MR	20mA
Output Current, RESET, RESET	20mA
Rate of Rise, V <sub>CC</sub>	100V/μs

Operating Temperature Range	
MIC81__U	-40°C to 85°C
Storage Temperature Range	-65°C to 150°C
Lead Temperature (Soldering - 10 sec.)	300°C
Power Dissipation (T <sub>A</sub> = +70°C)	320mW

Stresses above those listed under ABSOLUTE MAXIMUM RATINGS may cause permanent device failure. Functionality at or above these limits is not implied. Exposure to absolute maximum ratings for extended periods may affect device reliability. Operating ranges define those limits between which the functionality of the device is guaranteed.

## Electrical Characteristics

V<sub>CC</sub> = 5V for MIC81\_L/M/J, V<sub>CC</sub> = 3.3V for MIC81\_S/T, V<sub>CC</sub> = 3V for MIC81\_R, T<sub>A</sub> = Operating Temperature Range, unless otherwise noted.

Parameter	Conditions	Min	Typ	Max	Units
Operating Voltage Range, V <sub>CC</sub>	T <sub>A</sub> = 0°C to 70°C T <sub>A</sub> = -40°C to 85°C	1.4 1.6		5.5 5.5	V
Supply Current, I <sub>CC</sub>	MIC811L/M/J, MIC812L/M/J V <sub>CC</sub> < 3.6V, MIC811R/S/T, MIC812R/S/T		9 6	15 10	μA
Reset Voltage Threshold, V <sub>TH</sub>	MIC811L, MIC812L MIC811M, MIC812M MIC811J, MIC812J MIC811T, MIC812T MIC811S, MIC812S MIC811R, MIC812R	4.50 4.25 3.89 3.00 2.85 2.55	4.63 4.38 4.00 3.08 2.93 2.63	4.75 4.50 4.10 3.15 3.00 2.70	V
Reset Timeout Period		140	240	560	ms
RESET Output Voltage, V <sub>OH</sub>	I <sub>Source</sub> = 800μA, MIC811L/M/J I <sub>Source</sub> = 500μA, MIC811R/S/T	V <sub>CC</sub> - 1.5V 0.8 X V <sub>CC</sub>			V
RESET Output Voltage, V <sub>OL</sub>	V <sub>CC</sub> =V <sub>TH</sub> Min., I <sub>Sink</sub> =3.2mA, MIC811L/M/J V <sub>CC</sub> =V <sub>TH</sub> Min., I <sub>Sink</sub> =1.2mA, MIC811R/S/T V <sub>CC</sub> >1.4V, I <sub>Sink</sub> =50μA, T <sub>A</sub> = 0°C to 70°C V <sub>CC</sub> >1.6V, I <sub>Sink</sub> =50μA, T <sub>A</sub> = -40°C to 85°C			0.4 0.3 0.3 0.3	V
RESET Output Voltage, V <sub>OH</sub>	1.8V < V <sub>CC</sub> < V <sub>TH</sub> Min., I <sub>Source</sub> = 150μA	0.8 X V <sub>CC</sub>			V
RESET Output Voltage, V <sub>OL</sub>	I <sub>Sink</sub> =3.2mA, MIC812L/M/J I <sub>Sink</sub> =1.2mA, MIC812R/S/T			0.4 0.3	V
MR Minimum Pulse Width		10			μs
MR to Reset Delay			0.5		μs
MR Input Threshold, V <sub>IH</sub>	V <sub>CC</sub> > V <sub>TH</sub> Max., MIC81_L/M/J MIC81_R/S/T	2.3 0.7 X V <sub>CC</sub>			V
MR Input Threshold, V <sub>IL</sub>	V <sub>CC</sub> > V <sub>TH</sub> Max., MIC81_L/M_ MIC81_R/S/T			0.8 0.25 X V <sub>CC</sub>	V
MR Pull-Up Resistance		10	20	30	kΩ
MR Glitch Immunity			100		ns

# MIC811/MIC812 Microprocessor Reset Circuits

## Pin Functions

Pin Name	Pin No.		Description
	MIC811	MIC812	
<b>GND</b>	1	1	IC Ground Pin.
<b><math>\overline{\text{RESET}}</math></b>	2	N/A	$\overline{\text{RESET}}$ 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.
<b>RESET</b>	N/A	2	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.
<b><math>\overline{\text{MR}}</math></b>	3	3	Manual reset input. A logic low on $\overline{\text{MR}}$ forces a reset. The reset will remain asserted as long as $\overline{\text{MR}}$ is held low and for one reset timeout period (140ms min.) after $\overline{\text{MR}}$ goes high. This input can be shorted to ground via a switch or driven from CMOS or TTL logic. Float if unused.
<b>V<sub>CC</sub></b>	4	4	Power supply input, 3V, 3.3V or 5V.

# MIC811/MIC812 Microprocessor Reset Circuits

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## Block Diagram

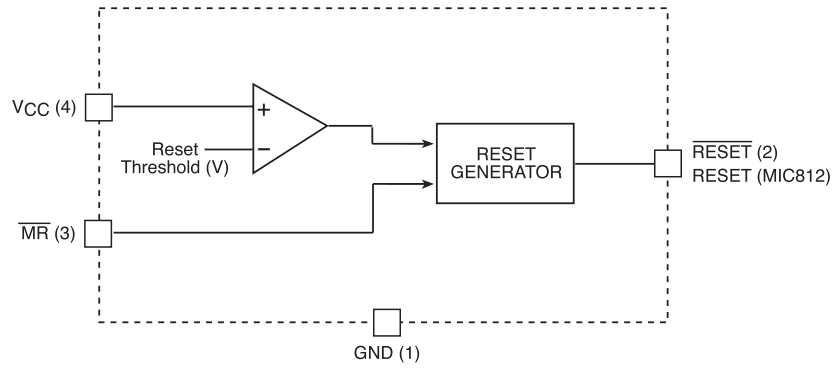


Figure 1. MIC811/812 Block Diagram

## Circuit Description

### Microprocessor Reset

The  $\overline{\text{RESET}}$  pin is asserted whenever  $V_{CC}$  falls below the reset threshold voltage or if  $\overline{\text{MR}}$  (manual reset) is forced low. The reset pin remains asserted for a period of 240ms after  $V_{CC}$  has risen above the reset threshold voltage or  $\overline{\text{MR}}$  has returned high. The reset function ensures the microprocessor is properly reset and powers up into a known condition after a power failure.  $\overline{\text{RESET}}$  will remain valid with  $V_{CC}$  as low as 1.4V.

### VCC Transients

The MIC811/MIC812 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 50 $\mu\text{s}$  (25 $\mu\text{s}$  for MIC81\_R/S/T) or less will not cause an unwanted reset.

### Interfacing to Bidirectional Reset Pins

The MIC811/MIC812 can interface with  $\mu\text{Ps}$  with bidirectional reset pins by connecting a 4.7K $\Omega$  resistor in series with the MIC811/MIC812 output and the  $\mu\text{P}$  reset pin.

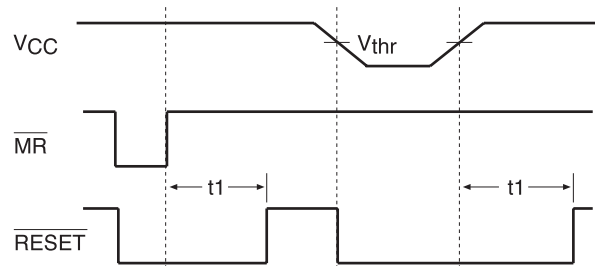


Figure 2. Reset Timing Diagram

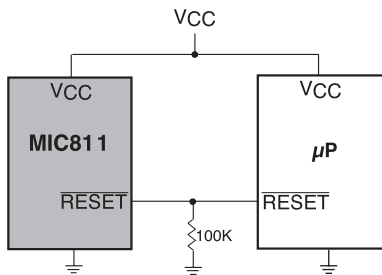


Figure 3. RESET Valid to  $V_{CC} = 0\text{V}$ .

### RESET Valid to 0V

A resistor can be added from the  $\overline{\text{RESET}}$  pin to ground to ensure the  $\overline{\text{RESET}}$  output remains low with  $V_{CC}$  down to 0V. A 100K $\Omega$  resistor connected from  $\overline{\text{RESET}}$  to ground is recommended. The size of the resistor should be large enough to not load the  $\overline{\text{RESET}}$  output and small enough to pull-down any stray leakage currents.

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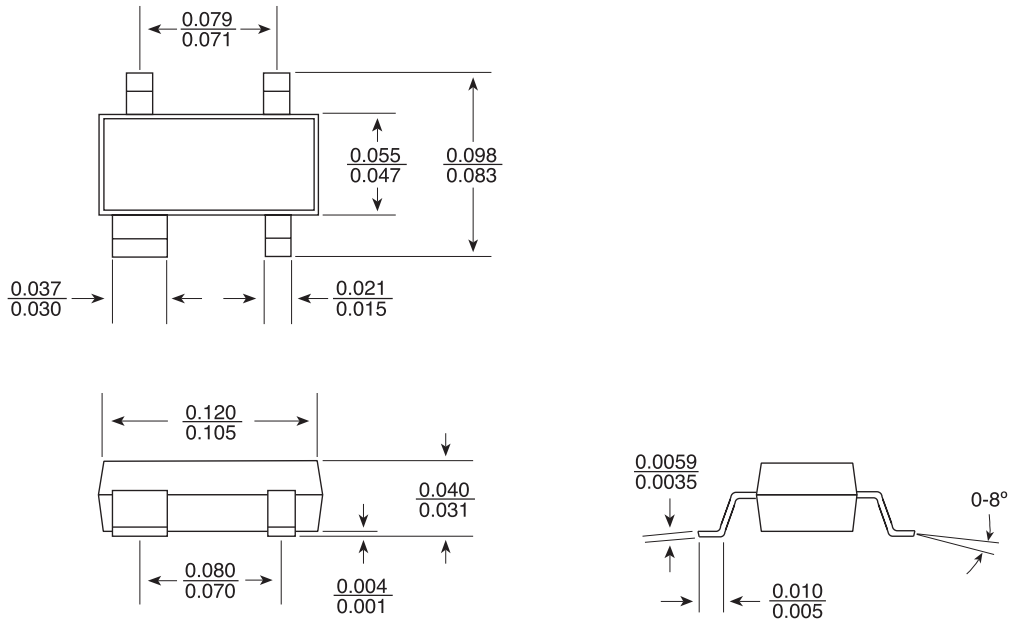
## Alternate Source Cross Reference Guide

<u>Industry P/N</u>	<u>MIC Direct Replacement</u>
MAX811JEUS-T	MIC811JU
MAX811LEUS-T	MIC811LU
MAX811MEUS-T	MIC811MU
MAX811REUS-T	MIC811RU
MAX811SEUS-T	MIC811SU
MAX811TEUS-T	MIC811TU
MAX812JEUS-T	MIC812JU
MAX812LEUS-T	MIC812LU
MAX812MEUS-T	MIC812MU
MAX812REUS-T	MIC812RU
MAX812SEUS-T	MIC812SU
MAX812TEUS-T	MIC812TU

# MIC811/MIC812 Microprocessor Reset Circuits

## Packaging Information

### U Package, 4-Pin SOT-143 Small-Outline Transistor Package



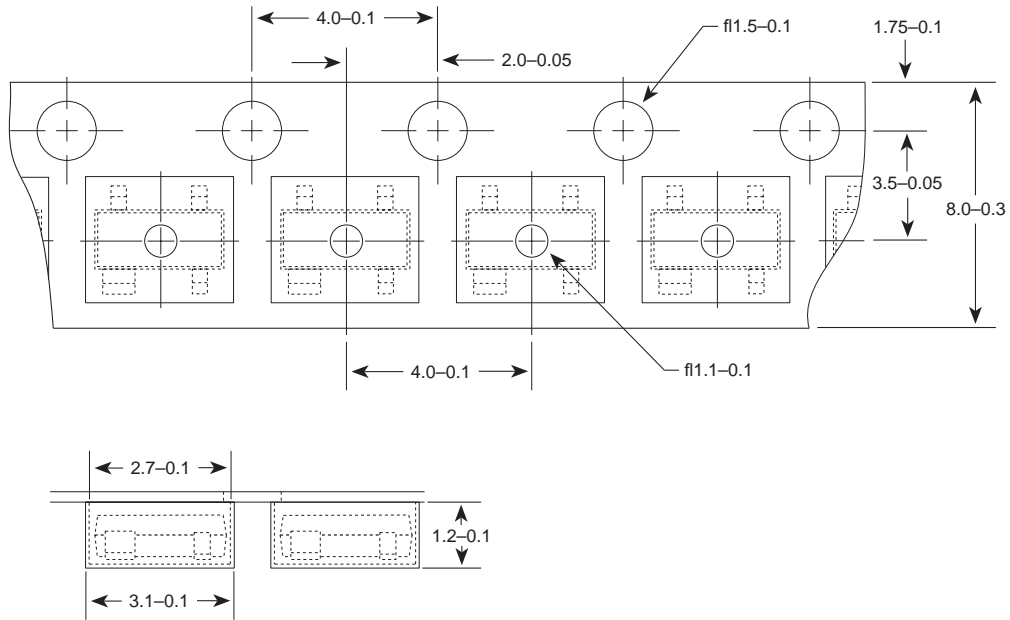
Dimensions are in inches.

### Device Marking Information

Lot Code	
KJXX	= MIC811J
KLXX	= MIC811L
KMXX	= MIC811M
KRXX	= MIC811R
KSXX	= MIC811S
KTXX	= MIC811T
LJXX	= MIC812J
LLXX	= MIC812L
LMXX	= MIC812M
LRXX	= MIC812R
LSXX	= MIC812S
LTXX	= MIC812T

## Packaging Information

### Tape and Reel Information



Dimensions are in millimeters.