



ILC811/ILC812

October 1999

Microprocessor Reset Circuits

Preliminary

General Description

The ILC811/ILC812 is a low cost microprocessor supervisory circuit that asserts a reset if the power supply drops below a designated threshold or the manual reset pin is forced low. Several different reset thresholds are available to accommodate systems operating at 3 V, 3.3 V or 5 V.

The ILC811 has an active low $\overline{\text{RESET}}$ output, while the ILC812 offers an active high RESET output. The reset output is guaranteed to remain asserted for a minimum of 140 ms after V_{CC} has risen above the designated reset threshold. The ILC811/ILC812 is available in a 4-pin SOT-143 package.

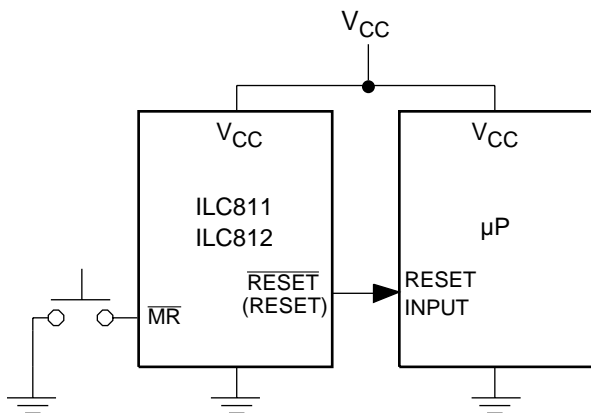
Features

- ◆ Precision Voltage Monitor for 3 V, 3.3 V or 5 V Power Supplies
- ◆ 6 μA Supply Current
- ◆ 140 ms Minimum Reset Pulse Width
- ◆ $\overline{\text{RESET}}$ Remains Valid with V_{CC} as Low as 1.4V
- ◆ Active Low Manual Reset Input
- ◆ No External Components
- ◆ 4-Pin SOT-143 Package

Applications

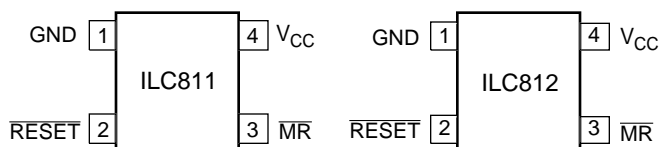
- ◆ Critical Microprocessor Power Monitoring
- ◆ Portable Equipment
- ◆ Intelligent Instruments
- ◆ Computers & Printers
- ◆ Controllers

Typical Circuit



Pin - Package Configurations

Top View



Ordering Information

Part	Package	Temp. Range
ILC811_U	4-Lead SOT-143	-40°C to +85°C
ILC812_U	4-Lead SOT-143	-40°C to +85°C

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

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



Absolute Maximum Ratings

Parameter	Symbol	Ratings	Units
Terminal Voltage	V_{CC}	-0.3 to 6.0	V
	\overline{MR}	-0.3 to ($V_{CC} + 0.3$)	V
Input Current	V_{CC}, \overline{MR}	20	mA
Output Current	RESET, \overline{RESET}	20	mA
Rate of Rise	V_{CC}	100	V/ μ s
Operating Temperature Range	T_A	-40 to +85	$^{\circ}$ C
Storage Temperature Range		-65 to +150	$^{\circ}$ C
Lead Temperature (Soldering - 10 sec.)		300	$^{\circ}$ C
Power Dissipation ($T_A = +70^{\circ}$ C)		320	mW

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

$V_{CC} = 5V$ for ILC81_L/M/J, $V_{CC} = 3.3V$ for ILC81_S/T, $V_{CC} = 3V$ for ILC81_R, $T_A =$ Operating Temperature Range, unless otherwise noted.

Parameter	Conditions	Min	Typ	Max	Units
Operating Voltage Range, V_{CC}	$T_A = 0^{\circ}\text{C to } 70^{\circ}\text{C}$ $T_A = -40^{\circ}\text{C to } 85^{\circ}\text{C}$	1.4 1.6		5.5 5.5	V
Supply Current, I_{CC}	ILC811L/M/J, ILC812L/M/J $V_{CC} < 3.6V$, ILC811R/S/T, ILC812R/S/T		9 6	15 10	μ A
Reset Voltage Threshold, V_{TH}	ILC811L, ILC812L ILC811M, ILC812M ILC811J, ILC812J ILC811T, ILC812T ILC811S, ILC812S ILC811R, ILC812R	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, t_R		140	240	560	ms
RESET Output Voltage, V_{OH}	$I_{Source} = 800 \mu A$, ILC811L/M/J $I_{Source} = 500 \mu A$, ILC811R/S/T	$V_{CC} - 1.5$ $0.8 \times V_{CC}$			V
RESET Output Voltage, V_{OL}	$V_{CC} = V_{TH} \text{ Min.}$, $I_{Sink} = 3.2 \text{ mA}$, ILC811L/M/J $V_{CC} = V_{TH} \text{ Min.}$, $I_{Sink} = 1.2 \text{ mA}$, ILC811R/S/T $V_{CC} > 1.4 \text{ V}$, $I_{Sink} = 50 \mu A$, $T_A = 0^{\circ}\text{C to } 70^{\circ}\text{C}$ $V_{CC} > 1.6 \text{ V}$, $I_{Sink} = 50 \mu A$, $T_A = -40^{\circ}\text{C to } 85^{\circ}\text{C}$			0.4 0.3 0.3 0.3	V
RESET Output Voltage, V_{OH}	$1.8V < V_{CC} < V_{TH} \text{ Min.}$, $I_{Source} = 150 \mu A$	$0.8 \times V_{CC}$			V
RESET Output Voltage, V_{OL}	$I_{Sink} = 3.2 \text{ mA}$, ILC812L/M/J $I_{Sink} = 1.2 \text{ mA}$, ILC812R/S/T			0.4 0.3	V
\overline{MR} Minimum Pulse Width		10			μ s
\overline{MR} to Reset Delay			0.5		μ s
\overline{MR} Input Threshold, V_{IH}	$V_{CC} > V_{TH} \text{ Max.}$, ILC81_L/M/J ILC81_R/S/T	2.3 $0.7 \times V_{CC}$			V
\overline{MR} Input Threshold, V_{IL}	$V_{CC} > V_{TH} \text{ Max.}$, ILC81_L/M/J ILC81_R/S/T			0.8 $0.25 \times V_{CC}$	V
\overline{MR} Pull-Up Resistance		10	20	30	k Ω
\overline{MR} Glitch Immunity			100		ns

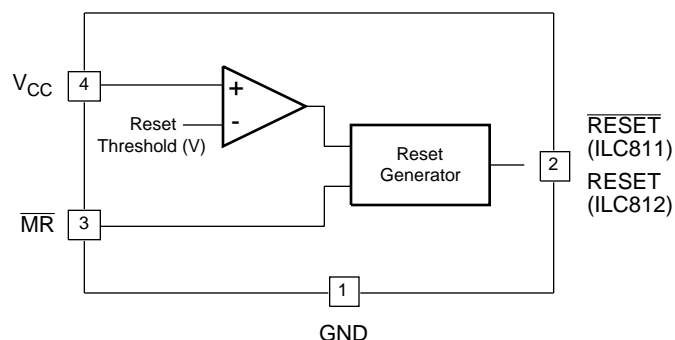
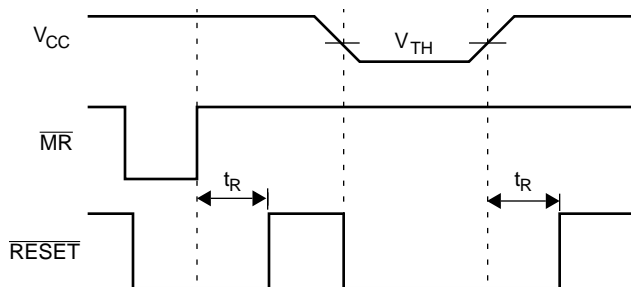
Pin Functions

Pin Name	Pin Number		Description
	ILC811	ILC812	
GND	1	1	Ground Pin.
$\overline{\text{RESET}}$	2	N/A	$\overline{\text{RESET}}$ goes low if V_{CC} falls below the reset threshold and remains asserted for one reset timeout period (140 ms min.) after V_{CC} exceeds the reset threshold.
RESET	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.
$\overline{\text{MR}}$	3	3	Manual reset input. A logic low on $\overline{\text{MR}}$ forces a reset. The reset will remain asserted as long as MR is held low and for one reset timeout period (140 ms 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.
V_{CC}	4	4	Power supply input, 3 V, 3.3 V or 5 V.

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 240 ms 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.



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 100 k Ω resistor connected from $\overline{\text{RESET}}$ to ground is recommended. The size of the resistor should be large enough to not load the RESET output and small enough to pull-down any stray leakage currents.

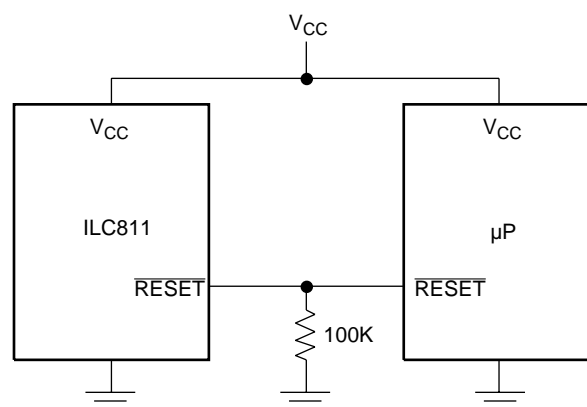


Figure 3: RESET Valid to $V_{CC} = 0$ V

V_{CC} Transients

The ILC811/ILC812 are relatively immune to negative-going V_{CC} glitches below the reset threshold. Typically, a negative-going transient 125 mV below the reset threshold with a duration of 50 μ s (25 μ s for ILC81_R/S/T) or less will not cause an unwanted reset.

Interfacing to Bidirectional Reset Pins

The ILC811/ILC812 can interface with μ Ps with bidirectional reset pins by connecting a 4.7 k Ω resistor in series with the ILC811/ILC812 output and the μ P reset pin.

Alternate Source Cross Reference Guide

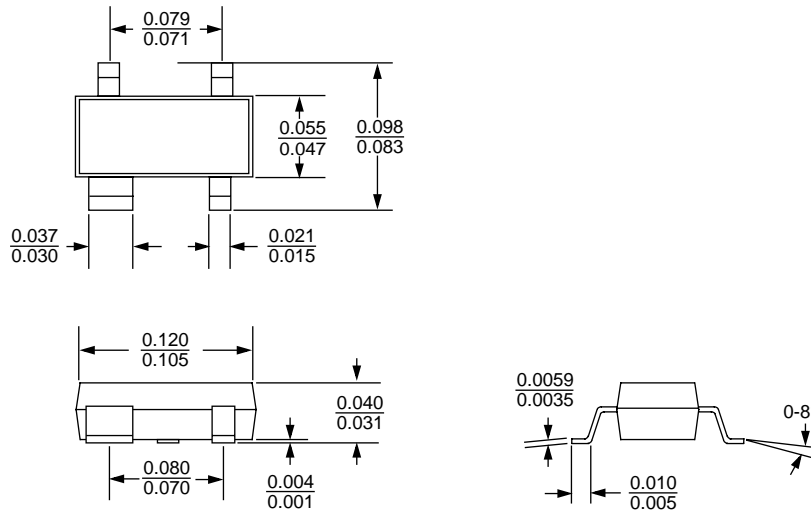
Industry P/N	ILC Direct Replacement
MAX811JEUS-T	ILC811JU
MAX811LEUS-T	ILC811LU
MAX811MEUS-T	ILC811MU
MAX811REUS-T	ILC811RU
MAX811SEUS-T	ILC811SU
MAX811TEUS-T	ILC811TU
MAX812JEUS-T	ILC812JU
MAX812LEUS-T	ILC812LU
MAX812MEUS-T	ILC812MU
MAX812REUS-T	ILC812RU
MAX812SEUS-T	ILC812SU
MAX812TEUS-T	ILC812TU

Device Marking information

KJXX	ILC811J
KLXX	ILC811L
KMXX	ILC811M
KRXX	ILC811R
KSXX	ILC811S
KTXX	ILC811T
LJXX	ILC812J
LLXX	ILC812L
LMXX	ILC812M
LRXX	ILC812R
LSXX	ILC812S
LTXX	ILC812T
XX = Lot Code	

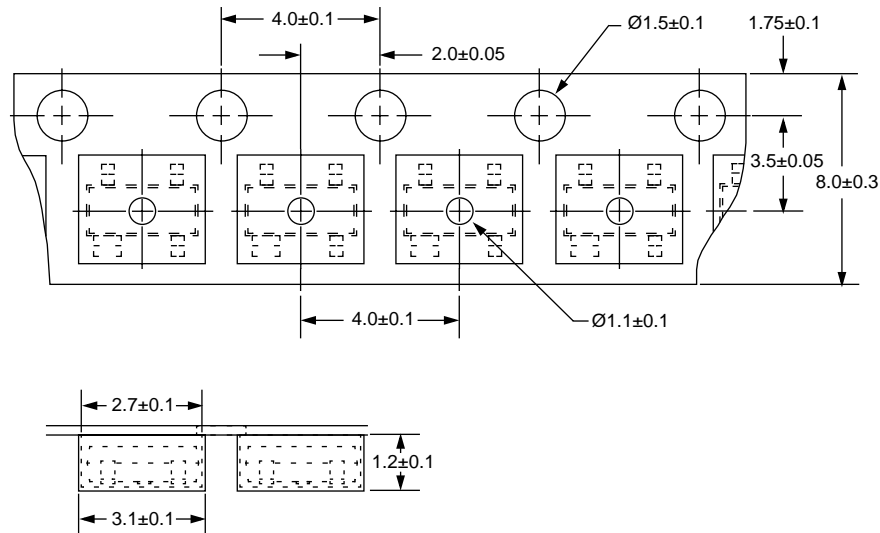
Packaging Information

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



Dimensions are in inches.

Tape and Reel Information



Dimensions are in millimeters.

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