

3-Pin Microcontroller Power Supply Supervisor

The IMP809/IMP810 are 3.0V, 3.3V and 5.0V power supply supervisor circuits optimized for low-power microprocessor (μP), microcontroller (μC) and digital systems. The IMP809/810 are improved drop-in replacements for the Maxim MAX809/810 and feature 60% lower supply current.

A reset signal is issued if the power supply voltage drops below a preset reset threshold and is asserted for at least 140ms after the supply has risen above the reset threshold. The IMP809 has an active-low $\overline{\text{RESET}}$ output that is guaranteed to be in the correct state for V_{CC} down to 1.1V. The IMP810 has an active-high RESET output. The reset comparator is designed to ignore fast transients on V_{CC} .

Low supply current makes the IMP809/IMP810 ideal for use in portable and battery operated equipment. The IMP809/IMP810 are available in a compact 3-pin SOT23 package.

Six voltage thresholds are available to support 3V to 5V systems:

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

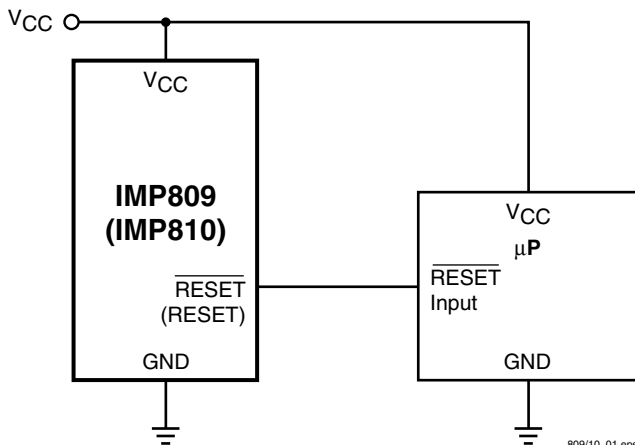
Key Features

- ◆ Improved Maxim MAX809/MAX810 replacement
 - Lower supply current...6 μA
 - 80% lower maximum supply current
- ◆ Monitor 5V, 3.3V and 3V supplies
- ◆ 140ms min. reset pulse width
- ◆ Active-low reset valid with 1.1V supply (IMP809)
- ◆ Small 3-pin SOT-23 package
- ◆ No external components
- ◆ Specified over full temperature range -40°C to 105°C

Applications

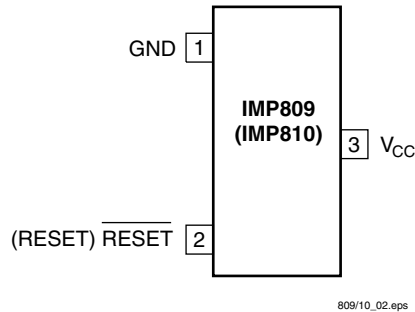
- ◆ Embedded controllers
- ◆ Battery operated systems
- ◆ Intelligent instruments
- ◆ Wireless communication systems
- ◆ PDAs and handheld equipment

Block Diagrams



Pin Configuration

SOT23



Ordering Information

Part Number ¹	Reset Threshold (V)	Temperature Range	Pin-Package	Package Marking ² (XXX Lot Code)
IMP809 Active LOW Reset				
IMP809LEUR/T	4.63	-40°C to +105°C	3-SOT23	AAXXX
IMP809MEUR/T	4.38	-40°C to +105°C	3-SOT23	ABXXX
IMP809JEUR/T	4.00	-40°C to +105°C	3-SOT23	CWXXX
IMP809TEUR/T	3.08	-40°C to +105°C	3-SOT23	ACXXX
IMP809SEUR/T	2.93	-40°C to +105°C	3-SOT23	ADXXX
IMP809REUR/T	2.63	-40°C to +105°C	3-SOT23	AFXXX
IMP810 Active HIGH Reset				
IMP810LEUR/T	4.63	-40°C to +105°C	3-SOT23	AGXXX
IMP810MEUR/T	4.38	-40°C to +105°C	3-SOT23	AHXXX
IMP810JEUR/T	4.00	-40°C to +105°C	3-SOT23	AIXXX
IMP810TEUR/T	3.08	-40°C to +105°C	3-SOT23	AJXXX
IMP810SEUR/T	2.93	-40°C to +105°C	3-SOT23	AKXXX
IMP810REUR/T	2.63	-40°C to +105°C	3-SOT23	ALXXX

Notes: 1. Tape and Reel packaging is indicated by the /T designation.
 2. Devices may also be marked with full part number: 809L, 810M etc. XXX refers to lot.

Related Products

	IMP809	IMP810	IMP811	IMP812
Max. Supply Current	15µA	15µA	15µA	15µA
Package Pins	3	3	4	4
Manual RESET input			■	■
Package Type	SOT-23	SOT-23	SOT-143	SOT-143
Active-HIGH RESET output		■		■
Active-LOW RESET output	■		■	

Absolute Maximum Ratings

Pin Terminal Voltage with Respect to Ground

V_{CC}	-0.3V to 6.0V
RESET, $\overline{\text{RESET}}$	-0.3V to ($V_{CC} + 0.3V$)
Input Current at V_{CC}	20mA
Output Current: RESET, $\overline{\text{RESET}}$	20mA
Rate of Rise at V_{CC}	100V/ μ s

Power Dissipation ($T_A = 70^\circ\text{C}$)	320mW
(Derate 4mW/ $^\circ\text{C}$ above 70°C)	
Operating Temperature Range	-40°C to 105°C
Storage Temperature Range	-65°C to 160°C
Lead Temperature (soldering, 10 sec)	300°C

These are stress ratings only and functional operation is not implied.
 Exposure to absolute maximum ratings for prolonged time periods may affect device reliability

Electrical Characteristics

Unless otherwise noted V_{CC} is over the full voltage range, $T_A = -40^\circ\text{C}$ to 105°C .

Typical values at $T_A = 25^\circ\text{C}$, $V_{CC} = 5V$ for L/M/J devices, $V_{CC} = 3.3V$ for T/S devices and $V_{CC} = 3V$ for R devices.

Parameter	Symbol	Conditions	Min	Typ	Max	Units	
Input Voltage (V_{CC}) Range	V_{CC}	$T_A = 0^\circ\text{C}$ to 70°C $T_A = -40^\circ\text{C}$ to 105°C	1.1 1.2		5.5 5.5	V	
Supply Current	I_{CC}	$T_A = -40^\circ\text{C}$ to 85°C $T_A = -40^\circ\text{C}$ to 85°C $T_A = 85^\circ\text{C}$ to 105°C $T_A = 85^\circ\text{C}$ to 105°C	$V_{CC} < 5.5V$, L/M/J $V_{CC} < 3.6V$, R/S/T $V_{CC} < 5.5V$, L/M/J $V_{CC} < 3.6V$, R/S/T	9 6	15 10 25 20	μ A	
Reset Threshold	V_{TH}	L devices M devices J devices T devices S devices R devices	$T_A = 25^\circ\text{C}$ $T_A = -40^\circ\text{C}$ to 85°C $T_A = 85^\circ\text{C}$ to 105°C $T_A = 25^\circ\text{C}$ $T_A = -40^\circ\text{C}$ to 85°C $T_A = 85^\circ\text{C}$ to 105°C $T_A = 25^\circ\text{C}$ $T_A = -40^\circ\text{C}$ to 85°C $T_A = 85^\circ\text{C}$ to 105°C $T_A = 25^\circ\text{C}$ $T_A = -40^\circ\text{C}$ to 85°C $T_A = 85^\circ\text{C}$ to 105°C $T_A = 25^\circ\text{C}$ $T_A = -40^\circ\text{C}$ to 85°C $T_A = 85^\circ\text{C}$ to 105°C	4.56 4.50 4.40 4.31 4.25 4.16 3.93 3.89 3.80 3.04 3.00 2.92 2.89 2.85 2.78 2.59 2.55 2.50	4.63 4.38 4.00 3.08 2.93 2.63	4.70 4.75 4.86 4.45 4.50 4.56 4.06 4.10 4.20 3.11 3.15 3.23 2.96 3.00 3.08 2.66 2.70 2.76	V
Reset Threshold Stability				30		ppm/ $^\circ\text{C}$	
V_{CC} to Reset Delay		$V_{CC} = V_{TH}$ to $V_{TH} - 100mV$		20		μ s	
Reset Active Timeout Period		$T_A = -40^\circ\text{C}$ to 85°C $T_A = 85^\circ\text{C}$ to 105°C	140 100	240	560 840	ms	
Low RESET Output Voltage (IMP809)	V_{OL}	$V_{CC} = V_{TH}$ min., $I_{SINK} = 1.2mA$, IMP809R/S/T $V_{CC} = V_{TH}$ min., $I_{SINK} = 3.2mA$, IMP809L/M/J $V_{CC} > 1.1V$, $I_{SINK} = 50\mu A$			0.3 0.4 0.3	V	
High $\overline{\text{RESET}}$ Output Voltage (IMP809)	V_{OH}	$V_{CC} > V_{TH}$ max., $I_{SOURCE} = 500\mu A$, IMP809R/S/T $V_{CC} > V_{TH}$ max., $I_{SOURCE} = 800\mu A$, IMP809L/M/J	0.8 V_{CC} $V_{CC} - 1.5$			V	
Low RESET Output Voltage (IMP810)	V_{OL}	$V_{CC} = V_{TH}$ max., $I_{SINK} = 1.2mA$, IMP810R/S/T $V_{CC} = V_{TH}$ max., $I_{SINK} = 3.2mA$, IMP810L/M/J			0.3 0.4	V	
High RESET Output Voltage (IMP810)	V_{OH}	$1.8V < V_{CC} < V_{TH}$ min., $I_{SOURCE} = 150\mu A$	0.8 V_{CC}			V	

Notes: 1. Production testing done at $T_A = 25^\circ\text{C}$. Over-temperature specifications guaranteed by design only.
 2. RESET output is active LOW for the IMP809 and RESET output is active HIGH for the IMP810

Pin Descriptions

Pin Number	Name	Function
1	GND	Ground
2 (IMP809)	$\overline{\text{RESET}}$	$\overline{\text{RESET}}$ is asserted LOW if V_{CC} falls below the reset threshold and remains LOW for the 240ms typical reset timeout period (140ms minimum) after V_{CC} exceeds the threshold.
2 (IMP810)	RESET	RESET is asserted HIGH if V_{CC} falls below the reset threshold and remains HIGH for the 240ms typical reset timeout period (140ms minimum) after V_{CC} exceeds the threshold.
3	V_{CC}	Power supply input voltage (3.0V, 3.3V, 5.0V)

Detailed Descriptions

Reset Timing

The reset signal is asserted–LOW for the IMP809 and HIGH for the IMP810–when the V_{CC} signal falls below the threshold trip voltage and remains asserted for 140ms minimum after the V_{CC} has risen above the threshold.

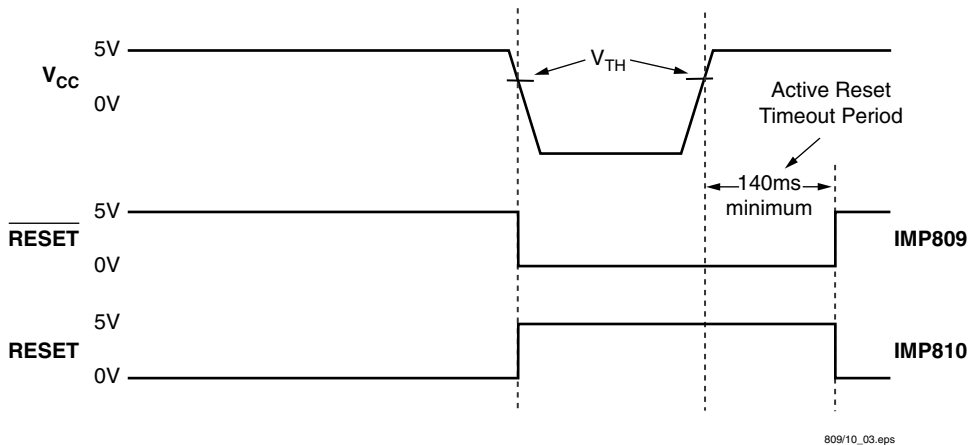


Figure 1. Reset Timing Diagram

Application Information

Negative V_{CC} Transients

The IMP809/810 protect μ Ps from brownouts and low V_{CC}. Short duration transients of 100mV amplitude and 20 μ s or less duration typically do not cause a false RESET.

Valid Reset with V_{CC} under 1.1V

To ensure logic inputs connected to the IMP809 RESET pin are in a known state when V_{CC} is under 1.1V, a 100k Ω pull-down

resistor at RESET is needed. The value is not critical. A pull-up resistor to V_{CC} is needed with the IMP810.

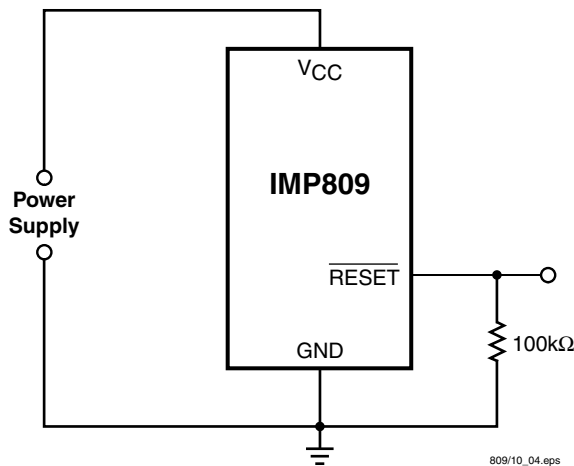


Figure 2. $\overline{\text{RESET}}$ Valid with V_{CC} Under 1.1V

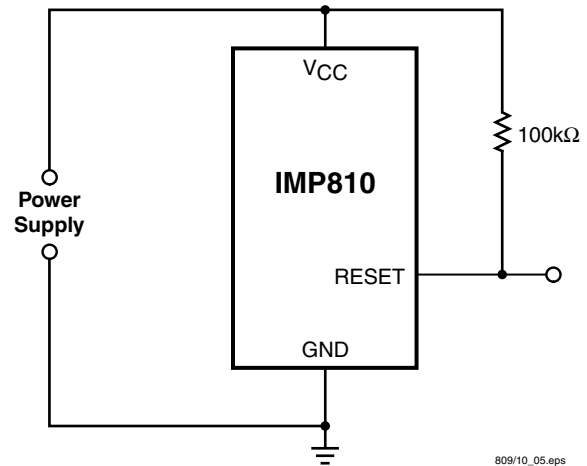


Figure 3. RESET Valid with V_{CC} Under 1.1V

Bi-directional Reset Pin Interfacing

The IMP809/810 can interface with μ P/ μ C bi-directional reset pins by connecting a 4.7k Ω resistor in series with the IMP809/810 reset output and the μ P/ μ C bi-directional reset pin.

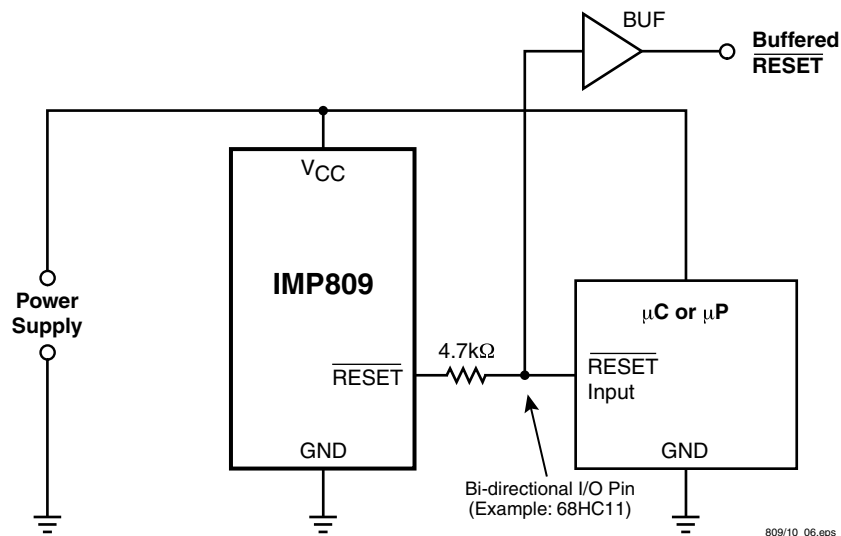
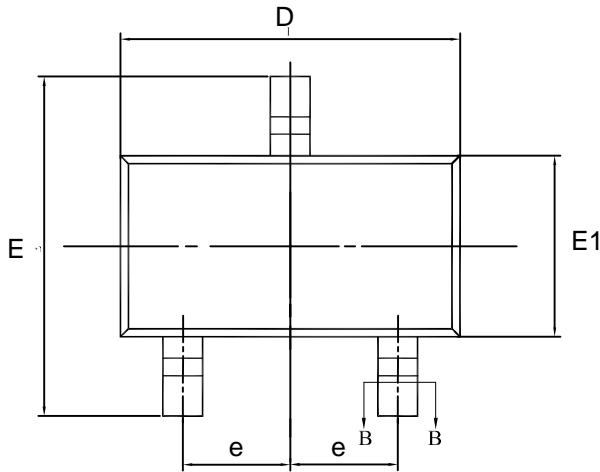


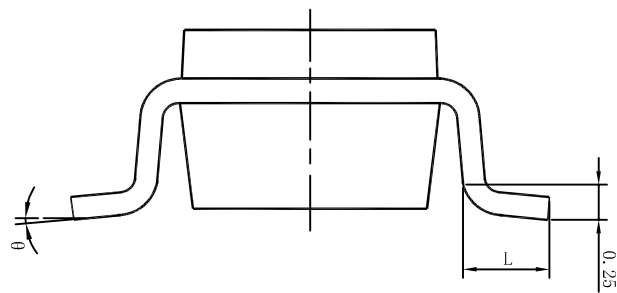
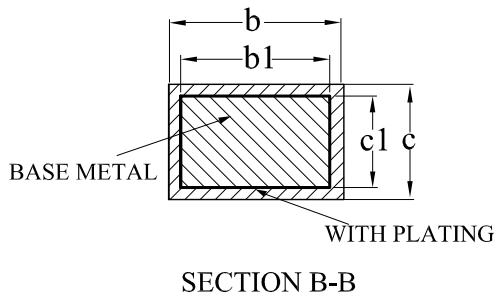
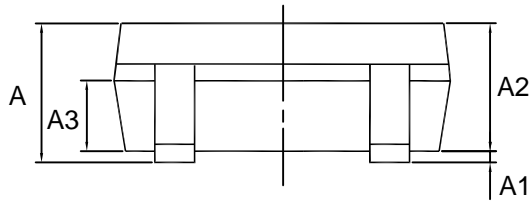
Figure 4. Bi-directional Reset Pin Interfacing

Package Dimensions

Plastic SOT-23 (3-Pin)



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	—	—	1.35
A1	0.04	—	0.15
A2	1.00	1.10	1.20
A3	0.60	0.65	0.70
b	0.34	—	0.43
b1	0.33	0.35	0.38
c	0.15	—	0.21
c1	0.14	0.15	0.16
D	2.72	2.92	3.12
E	2.60	2.80	3.00
E1	1.40	1.60	1.80
e	0.95BSC		
L	0.30	—	0.60
θ	0	—	8°





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