IMP809, IMP810

POWER MANAGEMENT

General Description

The IMP809/IMP810 are 2.5V,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 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. Seven voltage thresholds are available to support 2.5V 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
Z	2.32

Key Features

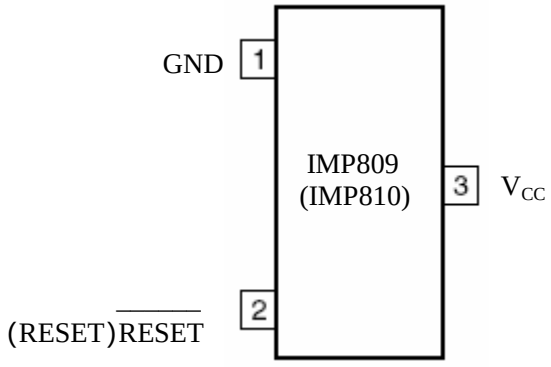
- Improved Maxim MAX809/MAX810 replacement
  - —Lower supply current…6µA
  - —80% lower maximum supply current
- Monitor 5V, 3.3V , 3V and 2.5V supplies
- 140ms min. reset pulse width
- Active-low reset valid with 1.1V supply (IMP809)
- Small 3-pin SOT-23 package
- No external components
- Specified over full temperature range
  - — -40°C to 125°C

Applications

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

Pin Assignments

SOT23



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 t he threshold.
3	V_{CC}	Power supply input voltage (3.0V, 3.3V, 5.0V)

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/µs

Power Dissipation (T_A= 70°C) 320mW

(Derate 4mW/°C above 70°C)

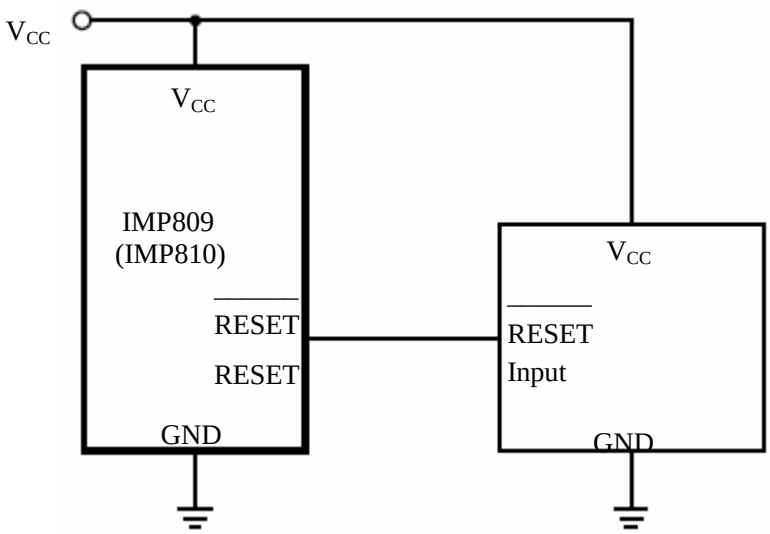
Operating Temperature Range . . . . . –40°C to 125°C

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.

Block Diagram



Electrical Characteristic

Unless otherwise noted V_{CC} is over the full voltage range, T_A = –40°C to 125°C.

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

V_{CC}=2.5V for Z devices

Parameter	Symbol	Conditions		Min	Typ	Ma	Units
Input Voltage (VCC) Range	V_{CC}	T_A = 0°C to 70°C T_A = –40°C to 125°C		1.1 1.2		5.5 5.5	V
Supply Current	I_{CC}	T_A = –40°C to 85°C T_A = –40°C to 85°C T_A = 85°C to 125°C T_A = 85°C to 125°C	V_{CC} < 5.5V, L/M/J V_{CC} < 3.6V, R/S/T/Z V_{CC} < 5.5V, L/M/J V_{CC} < 3.6V, R/S/T/Z		9 6	15 10 25 20	µA
Reset Threshold	V_{TH}	L devices	T_A = 25°C T_A = –40°C to 85°C T_A = 85°C to 125°C	4.56 4.50 4.40	4.63	4.70 4.75 4.86	V
		M devices	T_A = 25°C T_A = –40°C to 85°C T_A = 85°C to 125°C	4.31 4.25 4.16	4.38	4.45 4.50 4.56	
		J devices	T_A = 25°C T_A = –40°C to 85°C T_A = 85°C to 125°C	3.93 3.89 3.80	4.00	4.06 4.10 4.20	
		T devices	T_A = 25°C T_A = –40°C to 85°C T_A = 85°C to 125°C	3.04 3.00 2.92	3.08	3.11 3.15 3.23	
		S devices	T_A = 25°C T_A = –40°C to 85°C T_A = 85°C to 125°C	2.89 2.85 2.78	2.93	2.96 3.00 3.08	
		R devices	T_A = 25°C T_A = –40°C to 85°C T_A = 85°C to 125°C	2.59 2.55 2.50	2.63	2.66 2.70 2.76	
		Z devices	T_A = 25°C T_A = –40°C to 85°C T_A = 85°C to 125°C	2.27 2.24 2.22	2.32	2.37 2.39 2.42	
Reset Threshold Stability					30		ppm/°C
VCC to Reset Delay		V_{CC} = V_{TH} to V_{TH} - 100mV			20		µs
Reset Active Timeout Period		T_A = –40°C to 85°C		140	240	560	ms
		T_A = 85°C to 125°C		100		840	
Low RESET Output Voltage (IMP809)	V_{OL}	V_{CC} = V_{TH} min., I_{SINK} = 1.2mA, IMP809R/S/T/Z				0.3	V
		V_{CC} = V_{TH} min., I_{SINK} = 3.2mA, IMP809L/M/J				0.4	
		V_{CC} > 1.1V, I_{SINK} = 50µA				0.3	
High RESET Output Voltage (IMP809)	V_{OH}	V_{CC} > V_{TH} max., I_{SOURCE} = 500µA, IMP809R/S/T/Z		0.8V_{CC}			V
		V_{CC} > V_{TH} max., I_{SOURCE} = 800µA, IMP809L/M/J		V_{CC} -1.5			
Low RESET Output Voltage (IMP810)	V_{OL}	V_{CC} = V_{TH} max., I_{SINK} = 1.2mA, IMP810R/S/T/Z				0.3	V
		V_{CC} = V_{TH} max., I_{SINK} = 3.2mA, IMP810L/M/J				0.4	
High RESET Output Voltage (IMP810)	V_{OH}	1.8V < V_{CC} < V_{TH} min., I_{SOURCE} = 150µA		0.8V_{CC}			V

Typical Performance Characteristics

Reset Timing

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

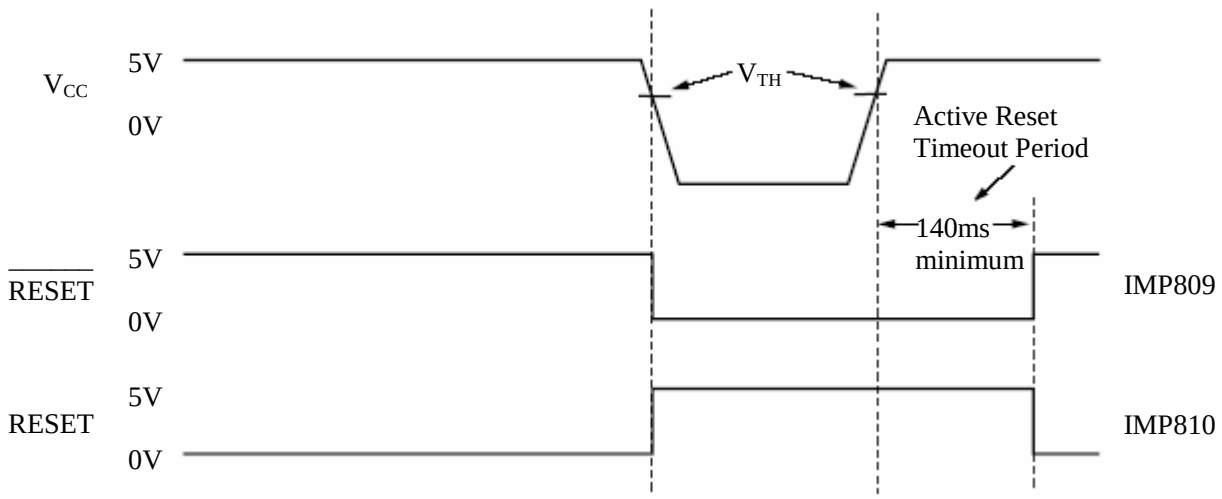


Figure 1. Reset Timing Diagram

Negative V_{CC} Transients

The IMP809/810 protect µPs from brownouts and low V_{CC}. Short duration transients of 100mV amplitude and 20µs 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 $\overline{RESET}$ pin are in a known state when VCC is under 1.1V, a 100kΩ pull -down resistor at $\overline{RESET}$ is needed. The value is not critical. A pull-up resistor to VCC is needed with the IMP810.

Typical Performance Characteristics (Continued)

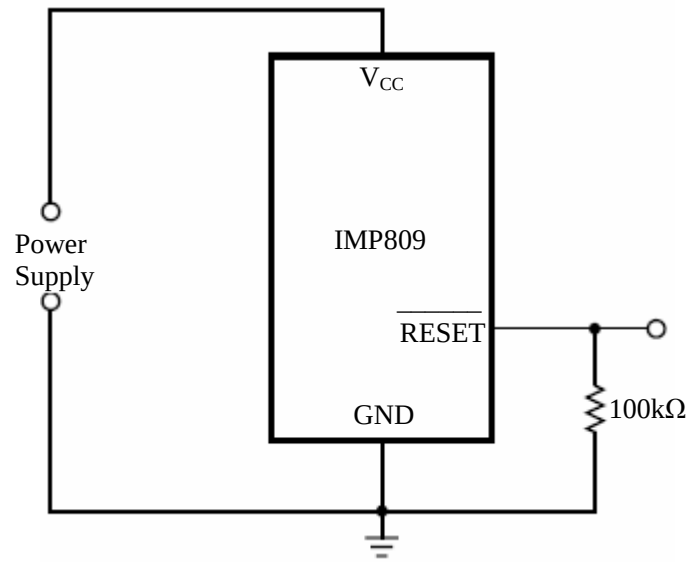


Figure 2. RESET Valid with VCC Under 1.1V

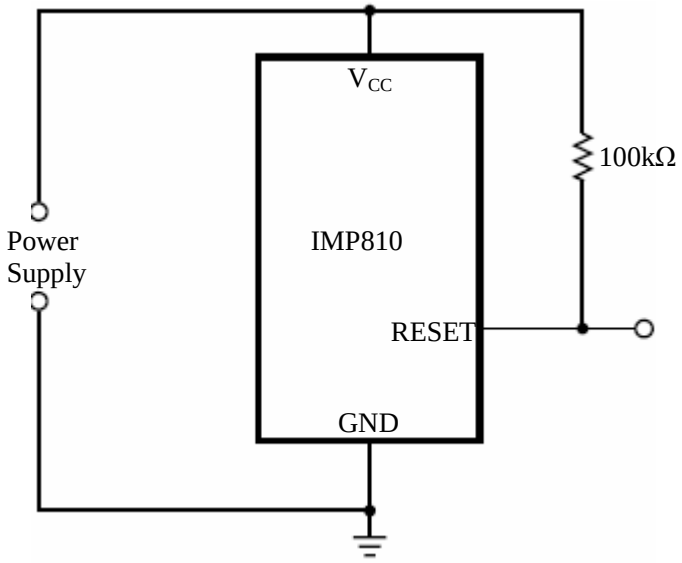


Figure 3. RESET Valid with V_{CC} Under 1.1V

Bi-directional Reset Pin Interfacing

The IMP809/810 can interface with µP/µC bi-directional reset pins by connecting a 4.7kΩ resistor in series with the IMP809/810 reset output and the µP/µC bi-directional reset pin.

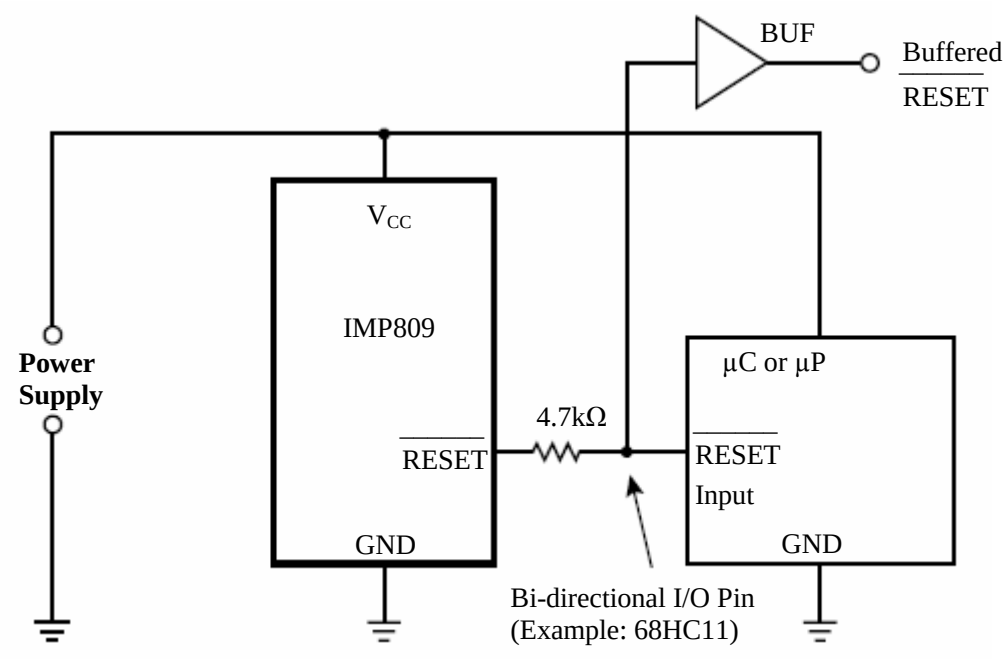


Figure 4. Bi-directional Reset Pin Interfacing

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 +125°C	3-SOT23	AAXXX
IMP809MEUR/T	4.38	−40°C to +125°C	3-SOT23	ABXXX
IMP809JEUR/T	4.00	−40°C to +125°C	3-SOT23	CWXXX
IMP809TEUR/T	3.08	−40°C to +125°C	3-SOT23	ACXXX
IMP809SEUR/T	2.93	−40°C to +125°C	3-SOT23	ADXXX
IMP809REUR/T	2.63	−40°C to +125°C	3-SOT23	AFXXX
IMP809ZEUR/T	2.32	−40°C to +125°C	3-SOT23	ZAXXX
IMP810 Active HIGH Reset				
IMP809LEUR/T	4.63	−40°C to +125°C	3-SOT23	AGXXX
IMP810MEUR/T	4.38	−40°C to +125°C	3-SOT23	AHXXX
IMP810JEUR/T	4.00	−40°C to +125°C	3-SOT23	AIXXX
IMP810TEUR/T	3.08	−40°C to +125°C	3-SOT23	AJXXX
IMP810SEUR/T	2.93	−40°C to +125°C	3-SOT23	AKXXX
IMP810REUR/T	2.63	−40°C to +125°C	3-SOT23	ALXXX
IMP810ZEUR/T	2.32	−40°C to +125°C	3-SOT23	ZBXXX

Notes: 1. Tape and Reel packaging is indicated by the /T designation.

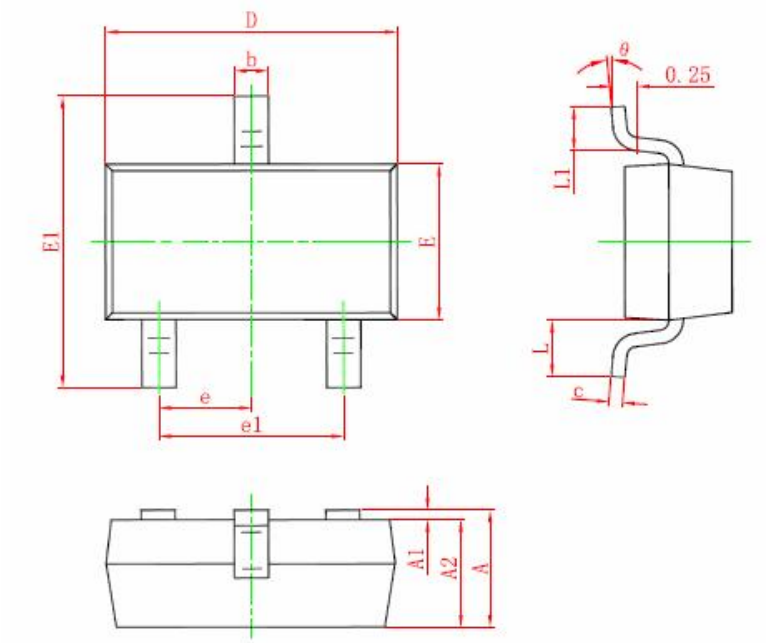
2. Devices may also be marked with full part number: 809L, 810M etc. XXX refers to lot.

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	■		■	

Mechanical Dimensions

Plastic SOT-23 (3-Pin)



Symbol	Dimensions In Inches		Dimensions In Millimeters	
	Min	Max	Min	Max
A	0.035	0.045	0.900	1.150
A1	0.000	0.004	0.000	0.100
A2	0.035	0.041	0.900	1.050
b	0.012	0.020	0.300	0.500
c	0.003	0.006	0.080	0.150
D	0.110	0.118	2.800	3.000
E	0.047	0.055	1.200	1.400
E1	0.089	0.100	2.250	2.550
e	0.035	0.040	0.900	1.030
e1	0.071	0.079	1.800	2.000
L	0.022 REF		0.550 REF	
L1	0.012	0.020	0.300	0.500
θ	0°	8°	0°	8°

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