

POWER MANAGEMENT

3-Pin Microcontroller Power Supply Supervisor

The IMP6303 is a 4.0V power supply supervisor circuits optimized for low-power microprocessor (μP), microcontroller (μC) and digital systems.

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 IMP6303 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 reset comparator is designed to ignore fast transients on V_{CC} .

Low supply current makes the IMP6303 ideal for use in portable and battery operated equipment. The IMP6303 is available in a compact 3-pin SOT23, TO-92 and 5 pin SOT23-5 packages.

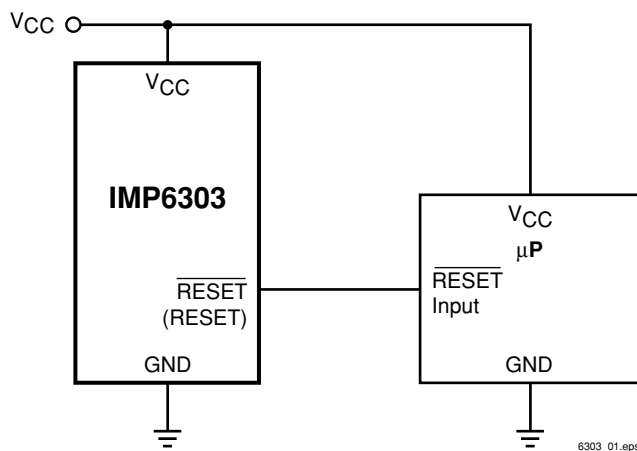
Key Features

- ◆ Monitor 4.0V supply
- ◆ 140ms min. reset pulse width
- ◆ Active-low reset valid with 1.1V supply
- ◆ Small 3-pin SOT-23 package
- ◆ Small 3-pin TO-92 package
- ◆ Small 5-pin SOT-23-5 package
- ◆ No external components
- ◆ Specified over full temperature range
— -40°C to 105°C

Applications

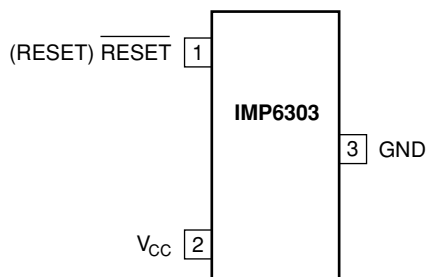
- ◆ Embedded controllers
- ◆ Battery operated systems
- ◆ Intelligent instruments
- ◆ Wireless communication systems
- ◆ PDAs and handheld equipment

Block Diagrams



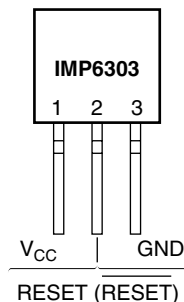
Pin Configuration

SOT-23



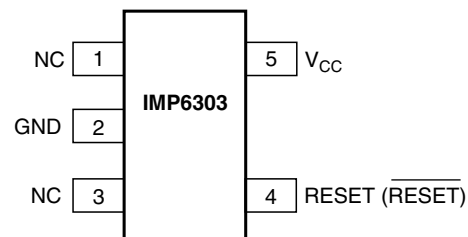
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TO-92



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SOT-23-5



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Ordering Information

Part Number ¹	Reset Threshold (V)	Temperature Range	Pin-Package	Package Marking ² (XX Lot Code)
IMP6303 Active LOW Reset				
IMP6303JEUR-T	4.00	-40°C to +105°C	3-SOT23	CWXX

Notes: 1. Tape and Reel packaging is indicated by the -T designation.
2. Devices may also be marked with full part number: 6303L, 6303M etc. XX refers to lot.

Related Products

	IM6303	IMP6303	IMP6303
Max. Supply Current	15µA	15µA	15µA
Package Pins	3	3	5
Package Type	SOT-23	TO-92	SOT-23-5
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.

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 $V_{CC} < 4.0V$		9	15	μA
Reset Threshold	V_{TH}	$T_A = 25^\circ\text{C}$ $T_A = -40^\circ\text{C}$ to 85°C $T_A = 85^\circ\text{C}$ to 105°C	3.93 3.89 3.80	4.00	4.06 4.10 4.20	
Reset Threshold Stability				30		ppm/ $^\circ\text{C}$
V_{CC} to Reset Delay		$V_{CC} = V_{TH}$ to $V_{TH} - 100mV$		20		μs
Reset Active Timeout Period	V_{OL}	$T_A = -40^\circ\text{C}$ to 85°C $T_A = 85^\circ\text{C}$ to 105°C	140 100	240	560 840	ms
Low RESET Output Voltage	V_{OL}	$V_{CC} = V_{TH}$ min., $I_{SINK} = 1.2mA$ $V_{CC} = V_{TH}$ min., $I_{SINK} = 3.2mA$ $V_{CC} > 1.1V$, $I_{SINK} = 50\mu\text{A}$		0.3	V 0.4 0.3	
High RESET Output Voltage	V_{OH}	$V_{CC} > V_{TH}$ max., $I_{SOURCE} = 500\mu\text{A}$ $V_{CC} > V_{TH}$ max., $I_{SOURCE} = 800\mu\text{A}$	0.8 V_{CC} $V_{CC} - 1.5$			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 IMP6303.

Pin Descriptions

Name	Function
GND	Ground
RESET	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.
V_{CC}	Power supply input voltage.

Detailed Descriptions

Reset Timing

The reset signal is asserted-LOW 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.

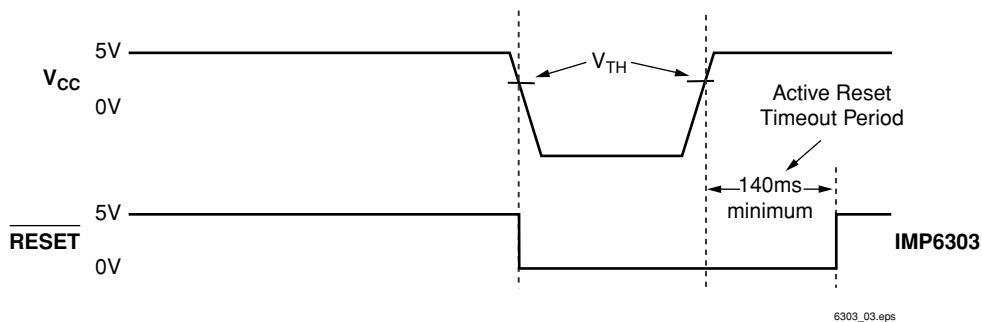


Figure 1. Reset Timing Diagram

Application Information

Negative V_{CC} Transients

The IMP6303 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 IMP6303 $\overline{\text{RESET}}$ 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.

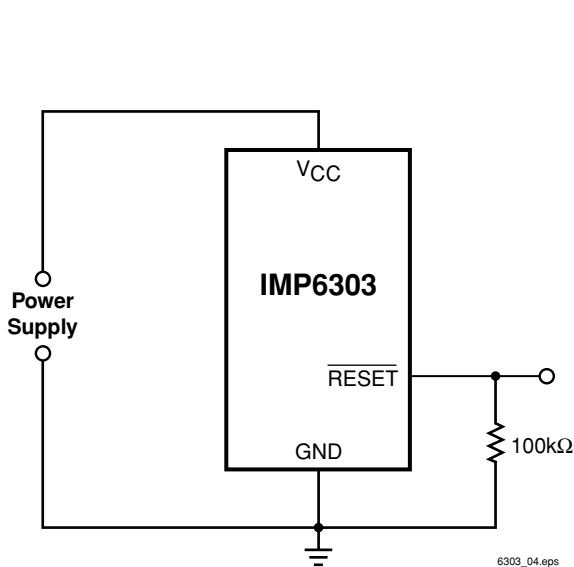


Figure 2. $\overline{\text{RESET}}$ Valid with V_{CC} Under 1.1V

Bi-directional Reset Pin Interfacing

The IMP6303 can interface with μ P/ μ C bi-directional reset pins by connecting a 4.7k Ω resistor in series with the IMP6303 reset output and the μ P/ μ C bi-directional reset pin.

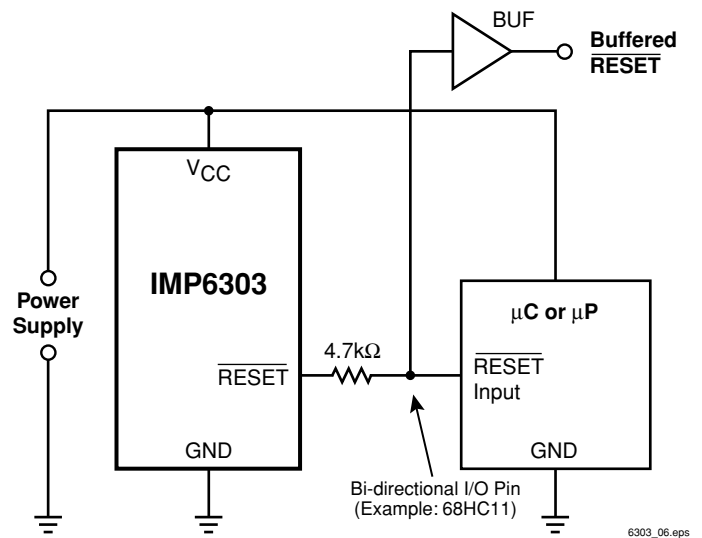
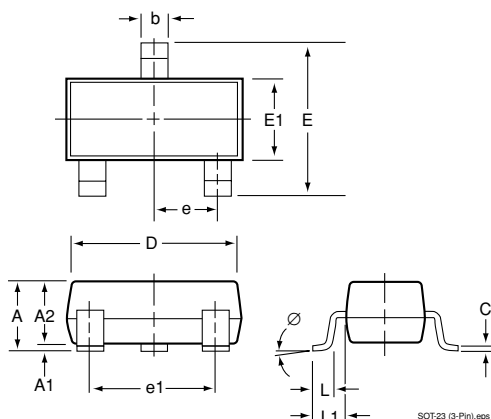


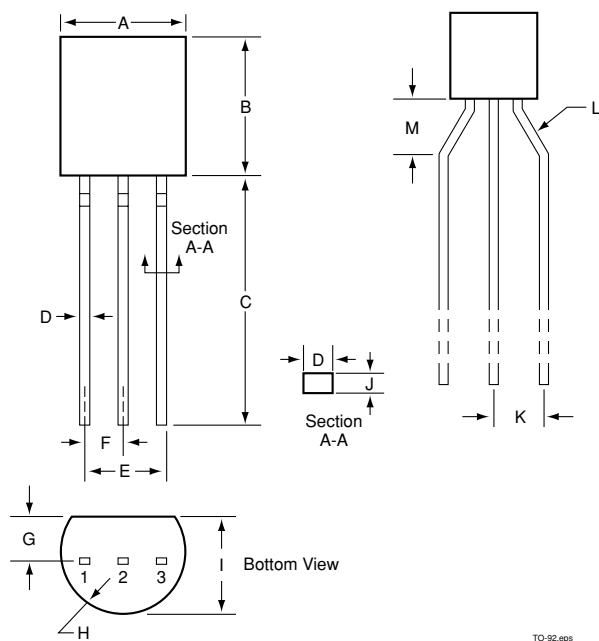
Figure 3. Bi-directional Reset Pin Interfacing

Package Dimensions

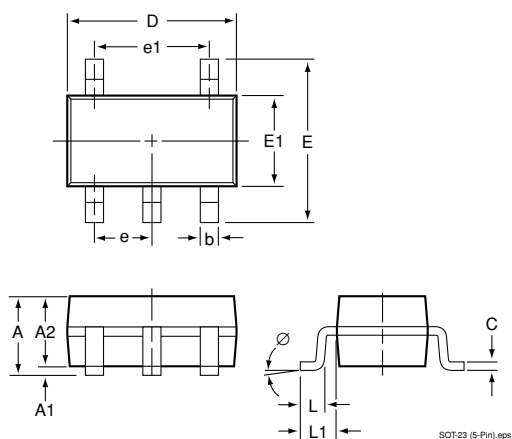
Plastic SOT-23 (3-Pin)



Plastic TO-92 (3-Pin)



Plastic SOT-23 (5-Pin)



	Inches		Millimeters	
	Min	Max	Min	Max
Plastic SOT-23* (3-Pin)				
A	0.035	0.044	0.89	1.12
A1	0.0004	0.004	0.01	0.10
A2	0.035	0.040	0.88	1.02
b	0.012	0.020	0.30	0.50
c	0.003	0.008	0.08	0.20
D	0.110	0.120	2.80	3.04
E	0.083	0.104	2.10	2.64
E1	0.047	0.055	1.20	1.40
e	0.37 BSC		0.95 BSC	
e1	0.07 BSC		1.90 BSC	
L	0.016	0.024	0.40	0.60
L1	0.021 REF		0.54 REF	
∅	0°	8°	0°	8°
TO-92 (3-Pin)				
A	0.175	0.195	4.45	4.95
B	0.170	0.192	4.32	4.96
C	0.500	0.610	12.70	15.49
D	0.016	0.022	0.406	0.559
E	0.095	0.105	2.41	2.67
F	0.045	0.60	1.14	1.52
G	0.45	0.060	1.14	1.52
H	0.085	0.095	2.16	2.41
I	0.130	0.155	3.30	3.94
J	0.014	0.020	0.35	0.51
K	0.093	0.115	2.36	2.92
L	45°	60°	45°	60°
M	0.118 Typical		3.00	
Plastic SOT-23** (5-Pin)				
A	0.037	0.057	0.95	1.45
A1	0.001	0.005	0.05	0.15
A2	0.035	0.050	0.90	1.30
b	0.011	0.019	0.30	0.50
c	0.003	0.007	0.08	0.20
D	0.109	0.117	2.80	3.00
E	0.101	0.117	2.60	3.00
E1	0.058	0.066	1.50	1.70
e	0.037 BSC		0.95 BSC	
e1	0.074 BSC		1.90 BSC	
L	0.013	0.021	0.35	0.55
L1	0.002 REF		0.60 REF	
∅	0°	8°	0°	8°

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