3-Pin Microprocessor Reset Circuits

Description

The JY809 microprocessor supervisory circuit can be used to monitor the power supplies in microprocessor and digital systems. It provides a reset to the microprocessor during power-up, power-down, and brown-out conditions.

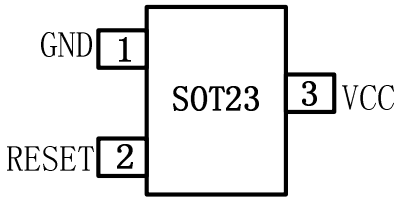
The function of the JY809 is to monitor the V_{CC} supply voltage, and assert a reset signal whenever this voltage declines below the factory-programmed reset threshold. The reset signal remains asserted for 250ms after V_{CC} rises above the threshold. The JY809 has an active-low $\overline{RESET}$ output.

With a low supply current of only 2µA (Typ.), the JY809 are ideal for use in portable equipment. The JY809 is available in the 3-pin SOT23 package.

Features

- Precise monitoring of 2.7V, 3.0V, 3.3V and 5.0V supplies
- 140ms min. Power-On Reset pulse width, 250ms typical, has an active-low $\overline{RESET}$ Output
- Guaranteed $\overline{RESET}$ Output valid for V_{CC} ů 1.1 V
- Low Supply Current, 2µA Typ.
- Available in small SOT23 package
- No external components needed
- Specified over full temperature range -40°Cto+105°C

Package



Applications

- Microprocessor Systems
- Computers
- Controllers
- Intelligent Instruments
- Portable/Battery-Powered Equipment
- Automotive

Pb
Lead-free

Typical Application

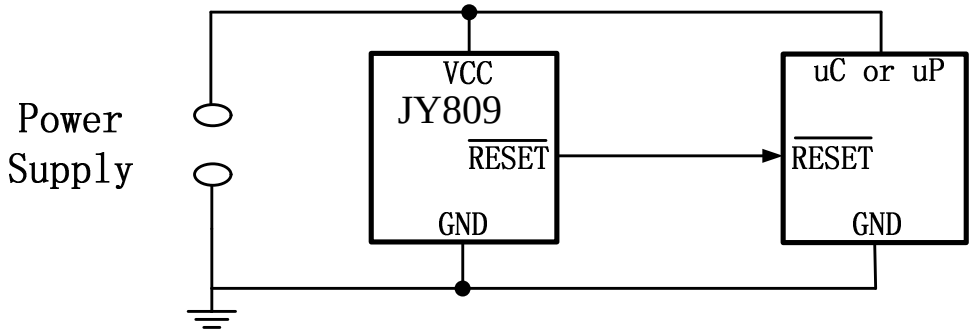


Figure 1 Typical Application

Function Diagram

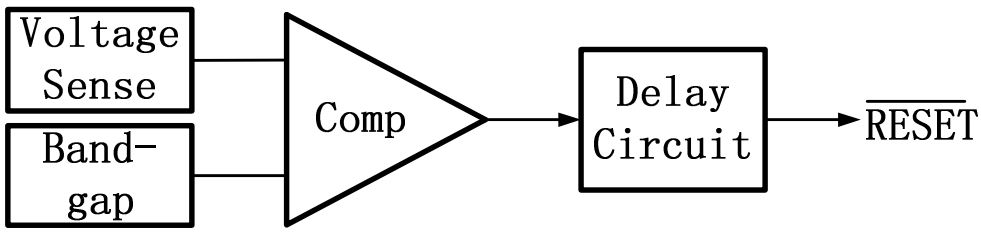


Figure 2 Function Digram

PIN Description

Pin No.	Pin Name	Description
1	GND	Ground reference
2	$\overline{\text{RESET}}$	Active-low output. $\overline{\text{RESET}}$ remains low while V_{CC} is below the reset threshold, and for 250ms after V_{CC} rises above the reset threshold.
3	V_{CC}	Supply Voltage

Absolute Maximum Ratings

V_{CC}…….…... –0.3V to 6.0V
$\overline{\text{RESET}}$ ……...–0.3V to (VCC + 0.3V)
Input Current at V_{CC}……..……..20mA
Output Current: $\overline{\text{RESET}}$…….…….... 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 105°C
Storage Temperature Range…….–65°C to 160°C
Lead Temperature (soldering, 10 sec) ……... 260°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°C to 105°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.

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Input Voltage (V_{CC}) Range	Vcc	T_A = 0°C to 70°C T_A = –40°C to 105°C	1.1 1.2		5.5 5.5	V
Supply Current	Icc	T_A = –40°C to 85°C VCC < 5.5V, L/M/J T_A = –40°C to 85°C VCC < 3.6V, R/S/T T_A = 85°C to 105°C VCC < 5.5V, L/M/J T_A = 85°C to 105°C VCC < 3.6V, R/S/T		2.5 1.5	5 4 10 8	uA
Reset Threshold	V_{TH}	L devices T_A = 25°C T_A = –40°C to 85°C T_A = 85°C to 105°C	4.56 4.50 4.4	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 105°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 105°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 105°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 105°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 105°C	2.59 2.55 2.50	2.63	2.66 2.70 2.76	
Reset Threshold Stability				30		ppm/°C
V_{CC} to Reset Delay		V_{CC} = V_{TH} to (V_{TH} - 100mV)		20		uS
Reset Active Timeout Period	T_{OL}	T_A = –40°C to 85°C T_A = 85°C to 105°C	140 100	250	560 840	mS
RESET Output Voltage Low	V_{OL}	V_{CC}=V_{TH} min., I_{SINK} = 1.2mA, R/S/T V_{CC}=V_{TH} min., I_{SINK} = 3.2mA, L/M/J V_{CC} > 1.1V, I_{SINK} = 50µA			0.1 0.2 0.1	V
RESET Output Voltage High	V_{OH}	V_{CC}=V_{TH} max, Isource=500uA, R/S/T V_{CC}=V_{TH} max, Isource=800uA, L/M/J	0.9Vcc Vcc-1.5			V

Detailed Descriptions

Reset Timing

The reset signal is asserted–low for the JY809 –when the V_{CC} signal falls below the threshold trip voltage and remains asserted for 140ms minimum after the VCC has risen above the threshold.

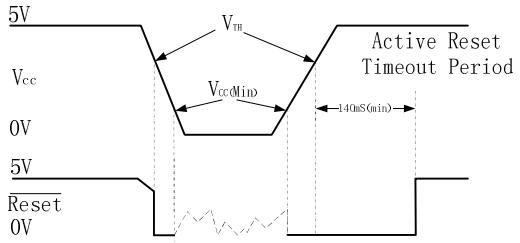


Figure 3 Reset Timing Diagram

Negative V_{CC} Transients

The JY809 protects 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 JY809 RESET pin are in a known state when V_{CC} is under 1.1V, a 100kΩ pull-down resistor at RESET is needed. The value is not critical.

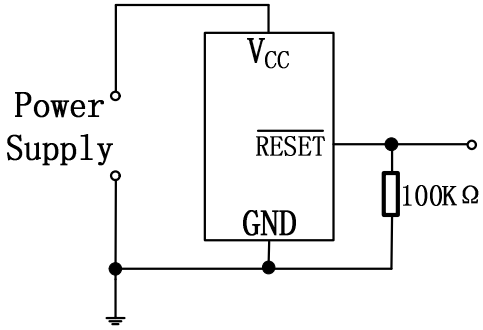


Figure 4 RESET Valid with V_{CC} Under 1.1V

Bi-directional Reset Pin Interfacing

The JY809 can interface with µP/µC bi-directional reset pins by connecting a 4.7kΩ resistor in series with the JY809 reset output and the µP/µC bi-directional reset pin.

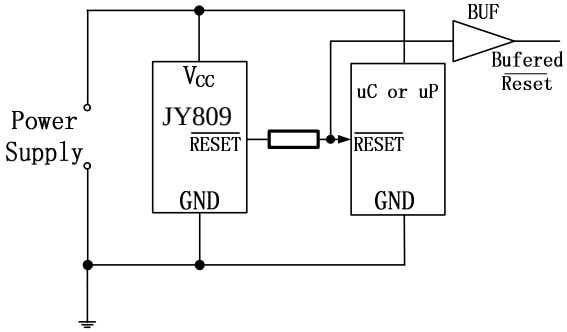


Figure 5 Bi-directional Reset Pin Interfacing

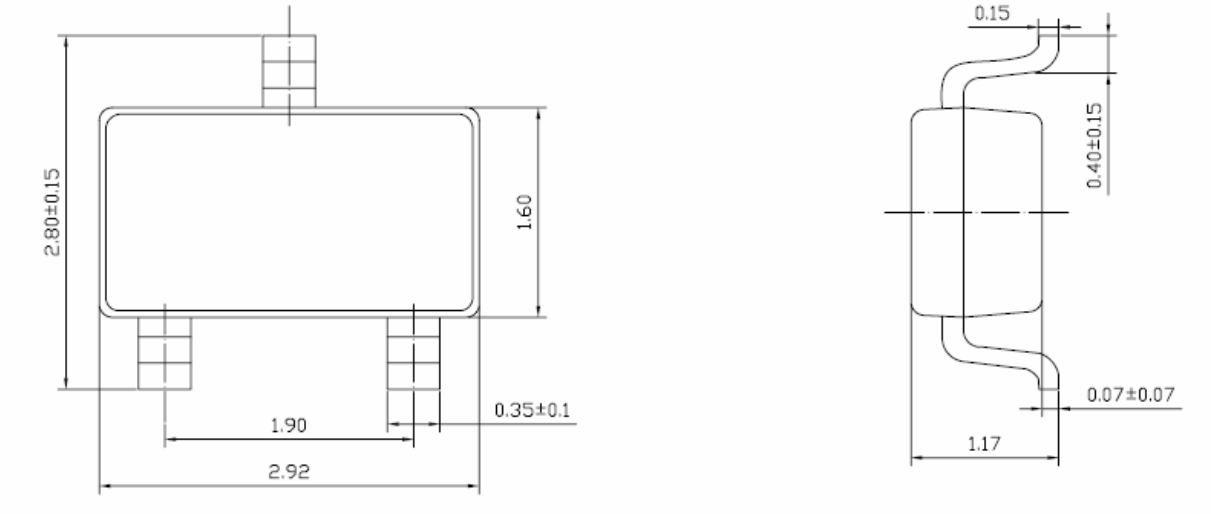
Order Information

Part Number	Top Mark	Package	Description
JY809ES3 -R	9R/09R/09R.	SOT23-3L	2.63V
JY809ES3 -S	9S/09S/09S.	SOT23-3L	2.93V
JY809ES3 -T	09T/09T.	SOT23-3L	3.08V
JY809ES3 -M	09M	SOT23-3L	4.38V

Packaging Information

SOT23-3L

MSL-3



All dimensions in millimeters

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Carrier Dimensions

SOT23-3L

PKG TYPE	W	P	E	F	D	D1	Po
SOT-23	8.00	4.00	1.75	3.50	1.50	1.00	4.00
Tolerance	+0.3/-0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1

Po10	P2	A0	B0	K0	T
40.00	2.00	3.15	2.77	1.22	0.20
±0.2	±0.05	±0.1	±0.1	±0.1	±0.02