BM809/BM810 **Series**

Reset IC

Description

The BM809/BM810 are microprocessor resets used to monitor supply voltages in microprocessor and other logic systems. The reset signal is asserted when the supply voltage drops below the preset threshold, and the signal is released in a set time after the supply voltage has risen above the preset threshold

The BM809 has an active-LOW reset output while the BM810 has an active-HIGH reset output. The low supply current of typically 1.79uA makes the BM809/BM810 ideal for use in portable, battery operated equipment. They are available in the SOT-23 or SOT-23-3L package.

Features

- Monitors 5.0V, 3.3V and 3V supplies
- 350ms reset delay time
- Active-LOW $\overline{\text{RESET}}$ output (BM809)
- Active-HIGH RESET output (BM810)
- Power supply transient immunity
- Available in small 3-pin SOT-23 or SOT-23-3L package
- No external components needs
- Specified over full temperature range -40℃ to +85℃

Applications

- Embedded controllers
- Battery operated system
- Wireless communication
- PDAs and handheld equipment

Typical Application Circuits

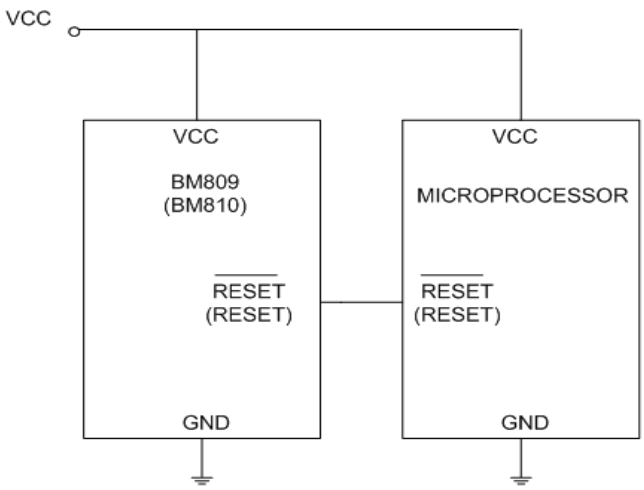


Figure 1. BM809/810 simplified system diagram

Pin Description

BM809 pin description

pin	symbol	description
P1	GND	Device ground
P2	$\overline{\text{RESET}}$	Active-LOW reset signal
P3	VCC	Supply voltage input

BM810 pin description

pin	symbol	description
P1	GND	Device ground
P2	RESET	Active-HIGH reset signal
P3	VCC	Supply voltage input

Package Type

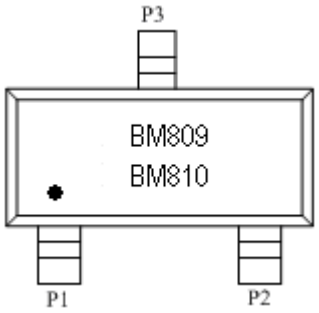


Figure 2. SOT-23

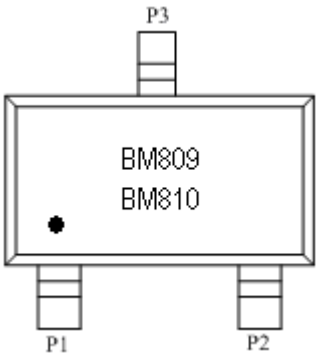


Figure 3. SOT-23-3L

Selection Guide

- Type number：

  BM809XXXX-XX
  BM810XXXX-XX

- Type number option：

  The first X stands for editions.
  The second, third and fourth Xs stand for preset thresholds.
  The fifth and sixth Xs stand for package informations.

- Type of the productions：

Part number	Reset threshold voltage（TYP）	Sign	Part number	Reset threshold voltage（TYP）	Sign
BM809A463	4.63 V	RLH	BM810A463	4.63 V	RHH
BM809A438	4.38 V	RLG	BM810A438	4.38 V	RHG
BM809A400	4.00 V	RLF	BM810A400	4.00 V	RHF
BM809A308	3.08 V	RLE	BM810A308	3.08 V	RHE

BM809A293	2.93 V	RLD	BM810A293	2.93 V	RHD
BM809A263	2.63 V	RLC	BM810A263	2.63 V	RHC
BM809A245	2.45 V	RLB	BM810A245	2.45 V	RHB
BM809A232	2.32 V	RLA	BM810A232	2.32 V	RHA

Part number	Package
Z	SOT-23
Y3	SOT-23-3L

Electrical Characteristics

Parameter	Symbol	Conditions		Min.	TYP.	Max.	Unit
Supply voltage	VCC	TA=-40℃~+85℃		1.50	—	5.00	V
Supply current	Icc	TA=-40℃~+85℃		—	1.59	4.42	uA
RESET threshold voltage	Vth	BM809A232 BM810A232	TA=+25℃	2.28	2.32	2.35	V
			TA=-40℃ ~+85℃	2.25		2.38	
		BM809A245 BM810A245	TA=+25℃	2.41	2.45	2.49	
			TA=-40℃ ~+85℃	2.38		2.52	
		BM809A263 BM810A263	TA=+25℃	2.59	2.63	2.66	
			TA=-40℃ ~+85	2.55		2.70	
		BM809A293 BM810A293	TA=+25℃	2.89	2.93	2.96	
			TA=-40℃ ~+85℃	2.85		3.00	
		BM809A308 BM810A308	TA=+25℃	3.04	3.08	3.11	
			TA=-40℃ ~+85℃	3.00		3.15	
		BM809A400 BM810A400	TA=+25℃	3.93	4.00	4.06	
			TA=-40℃ ~+85℃	3.89		4.10	
		BM809A438 BM810A438	TA=+25℃	4.31	4.38	4.45	
			TA=-40℃ ~+85℃	4.25		4.50	
		BM809A463	TA=+25℃	4.56	4.63	4.70	

		BM810A463	TA=-40℃ ~+85℃	4.50		4.75	
Delay time	Trd	VCC=Vth~（Vth-100mV）		—	22	—	us
Release time	Trel	TA=-40℃~+85℃		200	400	600	ms
LOW-level output voltage on $\overline{\text{RESET}}$ pin（BM809）	V_{lo}	1.50V<VCC<Vth min,Isink=100uA		—	—	0.05	V
HIGH-level output voltage on $\overline{\text{RESET}}$ pin（BM809）	Vho	VCC>Vth max, Isource=100uA		VCC-0.05	— —	— —	V
LOW-level output voltage on RESET pin（BM810）	V_{lo}	VCC>Vth max, Isink=100uA		—	—	0.05	V
HIGH-level output voltage on RESET pin（BM810）	Vho	1.50V<VCC<Vth min,Isource=100uA		VCC-0.05	—	—	V

Temperature characteristics

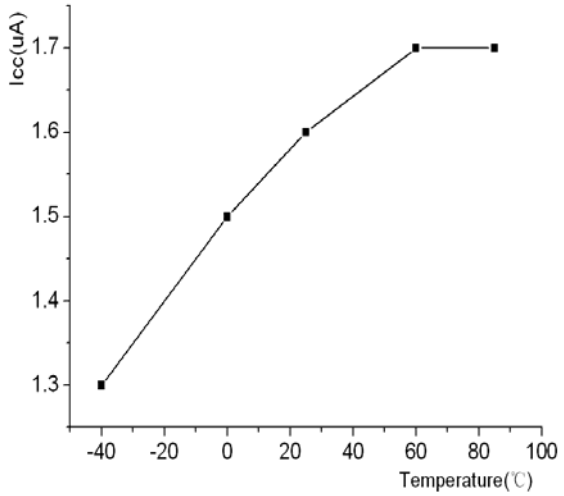


Figure 4. Icc-temperature graph

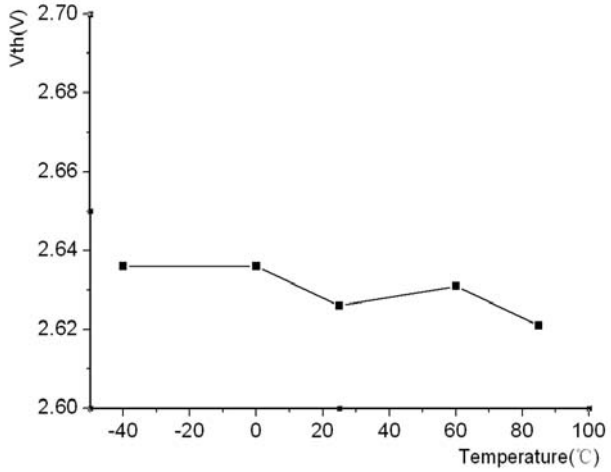


Figure 5. Vth-temperature graph

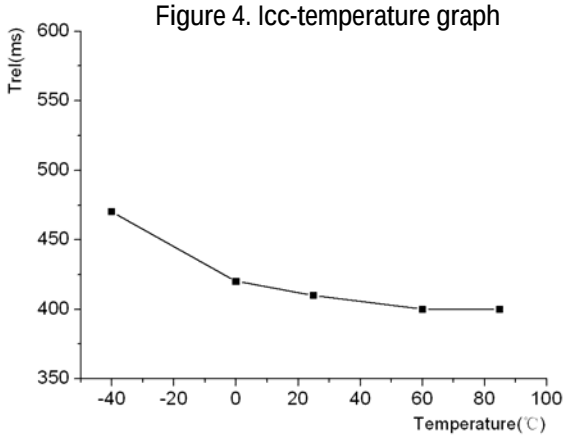


Figure 6. Trel-temperature graph

Maximum Ratings

Symbol	Parameter	Min.	Max.	Unit
VCC	Supply voltage	-0.3	6.0	V
Vi（$\overline{\text{RESET}}$）	input voltage at $\overline{\text{RESET}}$（BM809）pin	-0.3	VCC+0.3	V
Vi（RESET）	Input voltage at RESET（BM810）pin	-0.3	VCC+0.3	V
Icc	Input current at VCC pin	—	20	mA
Topr	Operation ambient temperature	-40	85	℃
Tstg	Storage temperature	-55	125	℃
P	Power dissipation	—	150	mW

Function Description

Reset signal is used to start or restart the MPU/CPU, making them work in or drawing them back into the predictable loop so that they can work in order. If MPU/CPM work in an unknown state, they will be reset forcibly. The BM809/810 are the devices to monitor power supply and send the reset signal when the supply voltage drops below or rises above the preset threshold.

Ex. for BM809, the $\overline{\text{RESET}}$ asserts a LOW-level reset signal when VCC falls below Vth during power up, power down or brownout conditions. The $\overline{\text{RESET}}$ would keep in LOW-level until VCC rises above Vth. It remains asserted for at least 350ms after the supply voltage rises above the threshold. Then $\overline{\text{RESET}}$ turns to HIGH-level. Whenever the supply voltage falls below the reset threshold, the $\overline{\text{RESET}}$ turns to LOW-level at once.

The effective reset signal of BM810 is HIGH-level, and BM810 has the same function as BM809. As the reset signal is usually LOW-level, BM809 is selected more. But there are some SCMs,such as intel 80c51, have the requirement of the HIGH-level effective reset signal. BM810 will be your choice for these deveices.

Operation Timing Charts

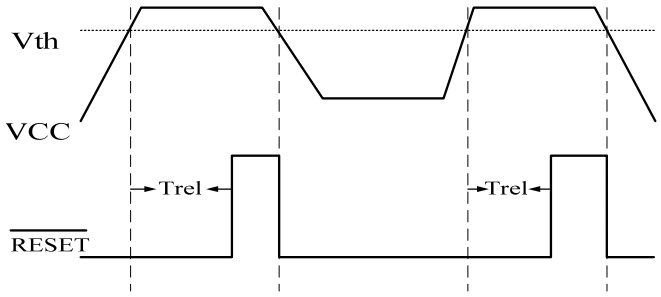


Figure 7. BM809 operation timing chart

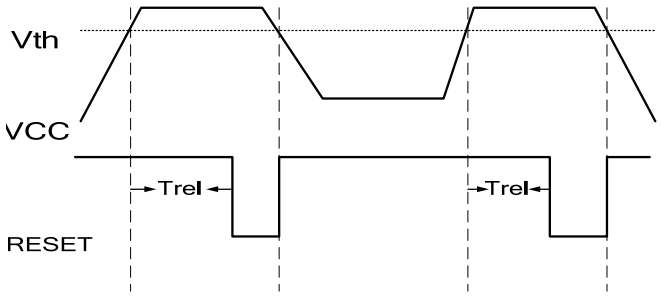


Figure 8. BM810 operation timing chart

Ensuring a valid reset output down to VCC=0V

When VCC falls below 1V, the BM809 $\overline{\text{RESET}}$ no longer sinks current (i.e., it becomes open circuit). A high impedance CMOS logic input connected to $\overline{\text{RESET}}$ can drift to undetermined voltages. In most applications in which the microprocessor circuitry is inoperative below 1V, this will not represent a problem. However, in applications in which $\overline{\text{RESET}}$ must be valid down to 0V, use a relatively large resistor from $\overline{\text{RESET}}$ to ground. 100KΩ is small enough to provide a path for any leakage currents to flow to ground(holding $\overline{\text{RESET}}$ LOW); while it is large enough not to load $\overline{\text{RESET}}$. Conversely, a 100KΩ pull-up resistor is recommended for BM810 if RESET is required to remain valid for VCC＜1V.

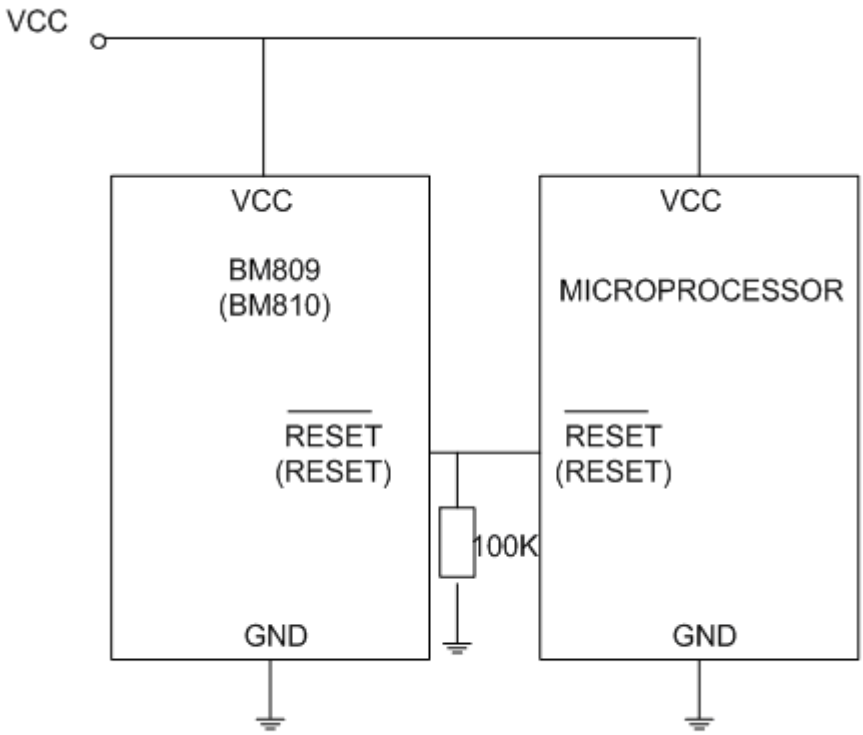
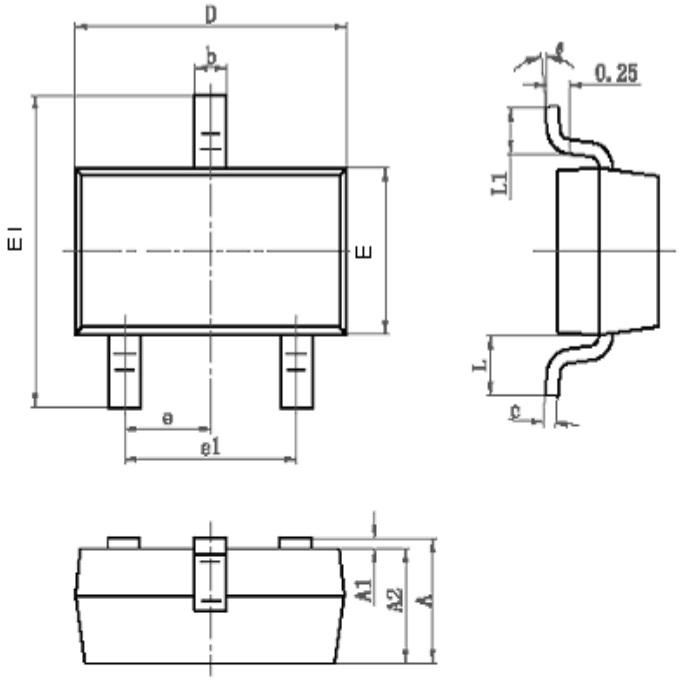


Figure 9. $\overline{\text{RESET}}$ valid to VCC=0 V circuit

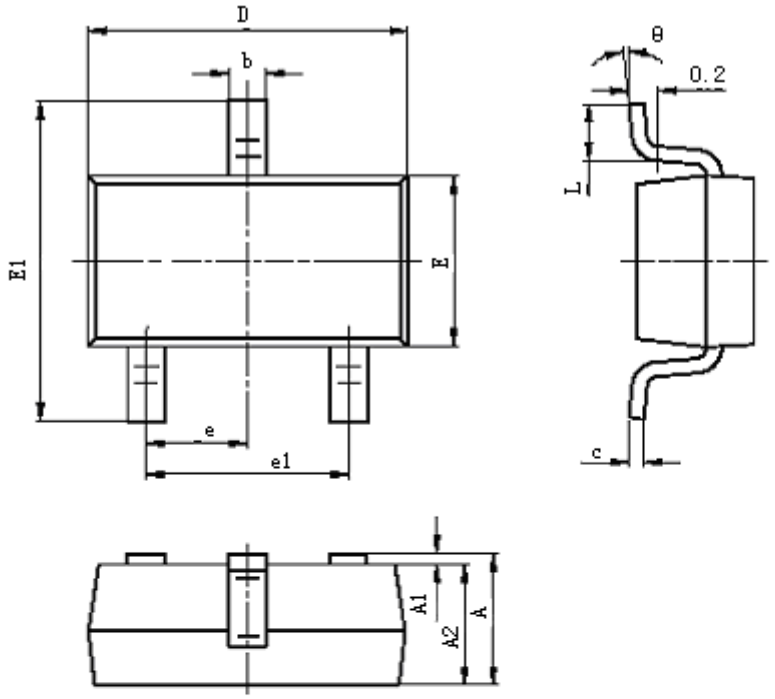
Package

SOT-23



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.550 REF		0.022 REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	6°

SOT-23-3



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

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