GSR809

Reset IC

Product Description

The GSR809 is microprocessor (μP) supervisory circuit used to monitor the power supplies in μP and digital systems. It provides excellent circuit reliability and low cost by eliminating external components and adjustments when used with +5V, +3.3V, +3.0V, or 2.5V powered circuits.

The circuit perform a single function: it asserts a reset signal whenever the V_{CC} supply voltage declines below a preset threshold, keeping it asserted for at least 140ms after V_{CC} has risen above the reset threshold. Reset thresholds suitable for operation with a variety of supply voltages are available.

The GSR809 has push-pull output and has an active-low $\overline{\text{RESET}}$ output. The reset comparator is designed to ignore fast transients on V_{CC}, and the output is guaranteed to be in the correct logic state for V_{CC} down to 1.15V within the range of the operating temperature .

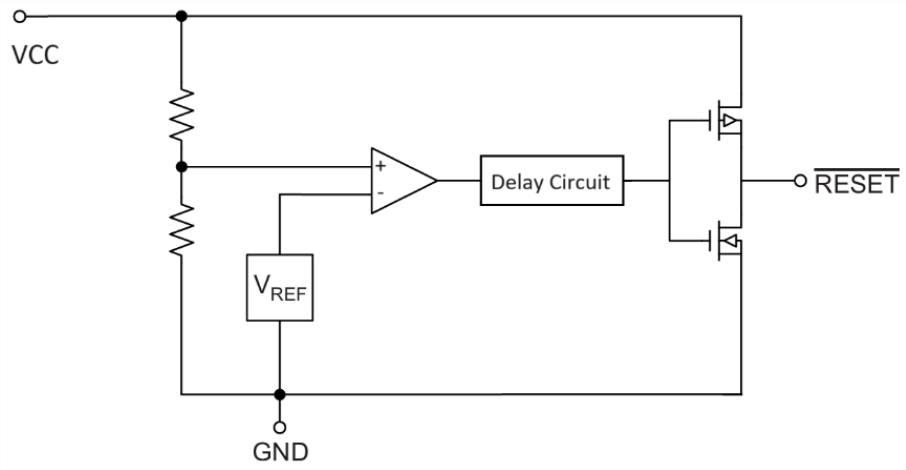
Features

- Precision monitoring of Supply Voltages
  – Available Threshold Options:
  - 4.63V (GSR809L)
  - 4.38V (GSR809M)
  - 4.00V (GSR809J)
  - 3.08V (GSR809T)
  - 2.93V (GSR809S)
  - 2.63V (GSR809R)
  - 2.32V (GSR809Z)
- 140ms Minimum Reset Pulse Width
- Push-Pull Configurations for $\overline{\text{RESET}}$ Output
- 10μA Supply Current Typically
- Power Supply Transient Immunity
- RoHS Compliant

Applications

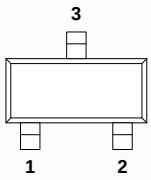
- Computers
- Controllers
- Intelligent Instruments
- Embedded Control Systems
- Battery-powered Equipment

Block Diagram



Packages & Pin Assignments

GSR809xZF (SOT-23)



Pin No.	Name
1	GND
2	$\overline{\text{RESET}}$
3	Vcc

Pin Description

Name	Type	Description
Vcc	I	Supply Voltage.
GND	-	Ground Pin.
$\overline{\text{RESET}}$	O	Active-Low Reset Output (Push-Pull). $\overline{\text{RESET}}$ Output remains low while Vcc is below the reset threshold, and for at least 140ms after Vcc rises above the reset threshold.

Ordering and Marking Information

GS P/N	Package	Marking	Reset Threshold
*GSR809LZF	SOT-23	AAAA	4.63V
*GSR809MZF	SOT-23	ABAA	4.38V
*GSR809JZF	SOT-23	JAAA	4.00V
*GSR809TZF	SOT-23	ACAA	3.08V
GSR809SZF	SOT-23	ADAA	2.93V
GSR809RZF	SOT-23	AFAA	2.63V
*GSR809ZZF	SOT-23	AEAA	2.32V

★ Please contact a GS sales representative to inquire about production status.

Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage	-0.3 to +6.0	V
$\overline{RESET}$	Output Pin	-0.3 to V_{CC}+0.3	V
I_{OUT}	Output Current	20	mA
$T_{J(MAX)}$	Maximum Junction Temperature	125	ºC
T_{STG}	Storage Temperature Range	-65 to +150	ºC
$R_{\theta JA}$	Junction-to-ambient thermal resistance	300	°C/W
P_D	Power Dissipation	320	mW
T_{SOD}	Lead temperature (Soldering, 10 s)	300	ºC
V_{ESD}	Human-body model (HBM)	2000	V
	Charged-device model (CDM)	200	V

Note: Stresses beyond those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Recommended Operating Conditions

Symbol	Parameter	Value	Unit
T_A	Operating Temperature Range	-40 to +85	ºC

Electrical Characteristics

Over operating free-air temperature range (unless otherwise noted) (Note 1)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{CC}	Operating Voltage Range	T_A=0℃ ~ +70℃	1.0	-	5.5	V
		T_A=-40℃ ~ +85℃	1.15	-	5.5	
I_{CC}	Supply Current (T_A=-40℃ ~ +85℃)	V_{CC}<5.5V, GSR809(L/M/J)	-	10	25	μA
		V_{CC}<3.6V, GSR809(T/S/R/Z)	-	8	25	μA
V_{TH}	GSR809L Reset Threshold Voltage	T_A=25ºC	4.54	4.63	4.72	V
		T_A=-40 to 85ºC	4.50	-	4.75	
	GSR809M Reset Threshold Voltage	T_A=25ºC	4.29	4.38	4.47	V
		T_A=-40 to 85ºC	4.25	-	4.50	
	GSR809J Reset Threshold Voltage	T_A=25ºC	3.92	4.00	4.08	V
		T_A=-40 to 85ºC	3.89	-	4.10	

Electrical Characteristics (Continued)

V_{TH}	GSR809T Reset Threshold Voltage	T_A=25ºC	3.01	3.08	3.15	V
		T_A=-40 to 85ºC	3.00	-	3.17	
	GSR809S Reset Threshold Voltage	T_A=25ºC	2.86	2.93	3.00	V
		T_A=-40 to 85ºC	2.85	-	3.01	
	GSR809R Reset Threshold Voltage	T_A=25ºC	2.56	2.63	2.69	V
		T_A=-40 to 85ºC	2.55	-	2.70	
	GSR809Z Reset Threshold Voltage	T_A=25ºC	2.26	2.32	2.37	V
		T_A=-40 to 85ºC	2.25	-	2.38	
-	Reset Threshold Temp Coefficient			30		ppm/ºC
-	V_{CC} to Reset Delay	V_{CC}= V_{TH} ~ (V_{TH}-100mV)		20		µs
t_{RS}	Reset Active Timeout Period	T_A=-40 to 85ºC	140	240	560	ms
V_{OH}	GSR809(L/M/J) Output High Voltage	V_{CC} > V_{TH} (max), I_{SOURCE} = 800µA	V_{CC}-1.5	-	-	V
	GSR809(T/S/R/Z) Output High Voltage	V_{CC} > V_{TH} (max), I_{SOURCE} = 500µA	0.8xV_{CC}	-	-	
V_{OL}	GSR809(L/M/J) Output Low Voltage	V_{CC} = V_{TH} (min), I_{SINK} = 3.2mA	-	-	0.4	V
	GSR809(T/S/R/Z) Output Low Voltage	V_{CC} = V_{TH} (min), I_{SOURCE} = 1.2mA	-	-	0.3	

Note 1: Production testing done at T_A = 25°C, over temperature limits specified by design only.

Application Information

Typical Application Circuit

The GSR809 is a supervisor circuit for microprocessor and digital systems. With a low supply current of only 10 µA is ideal for use in portable equipment.

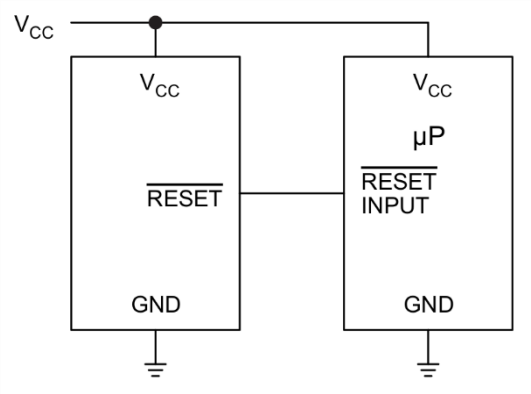


Figure. 1

Negative-Going VCC Transients

GSR809 is relatively immune to short negative-going transients or glitches on VCC. Figure 2 shows the maximum pulse width a negative-going VCC transient can have without causing a reset pulse. In general, as the magnitude of the transient increases, going further below the threshold, the maximum allowable pulse width decreases. Typically, for the 4.63V and 4.38V version of the GSR809, a VCC transient that goes 100 mV below the reset threshold and lasts 20 µs or less will not cause a reset pulse. A 0.1µF bypass capacitor mounted as close as possible to the VCC pin will provide additional transient rejection.

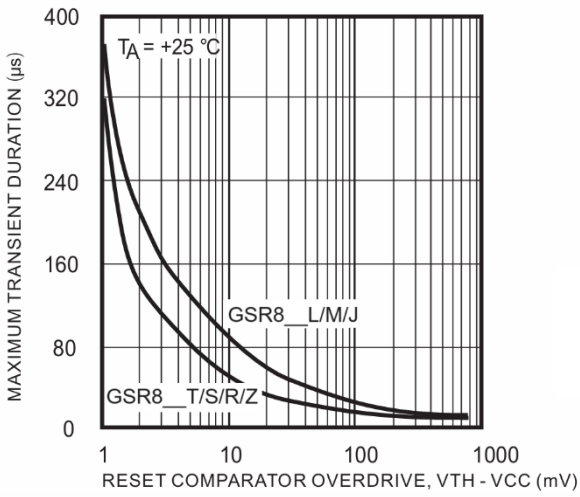


Figure. 2

Ensuring a Valid Reset Output Down to VCC = 0 V

When VCC falls below 1.15V, the GSR809 $\overline{\text{RESET}}$ output no longer sinks current—it becomes an open circuit. Therefore, high-impedance CMOS logic inputs connected to $\overline{\text{RESET}}$ can drift to undetermined voltages. This presents no problem in most applications since most µP and other circuitry is inoperative with VCC below 1.15V. However, in applications where $\overline{\text{RESET}}$ must be valid down to 0V, adding a pull-down resistor to $\overline{\text{RESET}}$ causes

any stray leakage currents to flow to ground, holding $\overline{\text{RESET}}$ low (Figure 3).

R1's value is not critical; 100kΩ is large enough not to load $\overline{\text{RESET}}$ and small enough to pull $\overline{\text{RESET}}$ to ground.

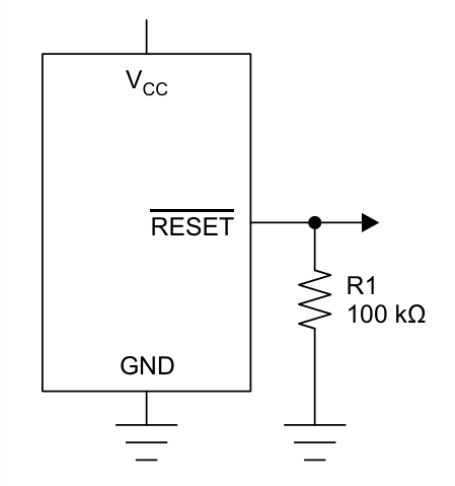


Figure. 3

Reference of Reset Curve

When Vcc supply voltage declines below the reset threshold, the active-low $\overline{\text{RESET}}$ output is Low.

When the Vcc supply voltage rises above the reset threshold, the active-low $\overline{\text{RESET}}$ output rises High after 240 ms typically.

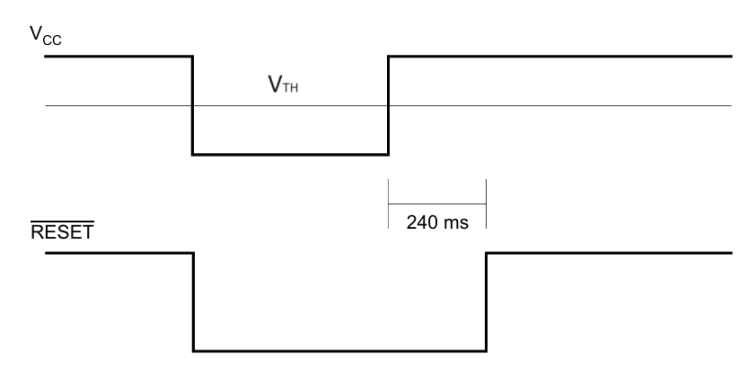
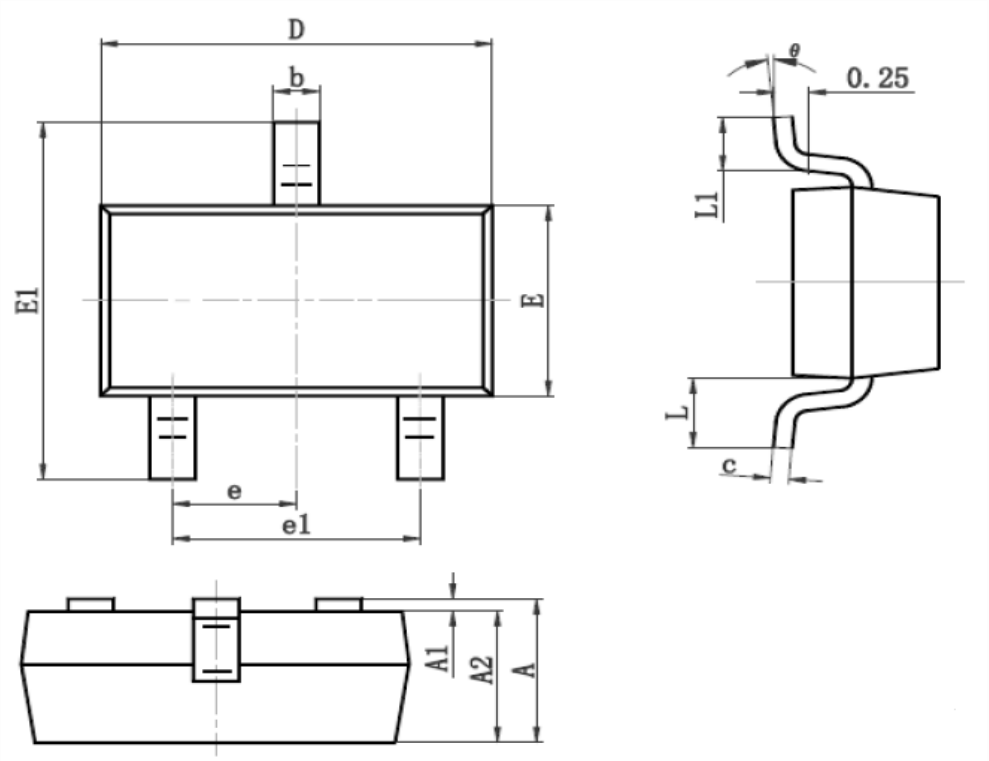


Figure. 4

Package Dimension

SOT-23



Dimensions				
SYMBOL	Millimeters		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°	8°

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