Features

- Precision supply-voltage monitor
  - 4.63V (RS809L)
  - 4.38V (RS809M)
  - 4.00V (RS809J)
  - 3.08V (RS809T)
  - 2.93V (RS809S)
  - 2.63V (RS809R)
  - 2.32V (RS809Z)
  - 1.63V (RS809X)
- 200ms(min) reset pulse width
- Push-Pull /RESET Output Configurations for RS809
- 9μA Supply Current
- Guaranteed Reset(/Reset) Valid to V_{CC} = +1.0V
- Power Supply Transient Immunity
- No External Components

Ordering Information

Part Number	Package
RS809xTE	Lead free and Green SOT23-3

Note: "x" refers to voltage range, see below table.
"T" stands for SOT23 Package
"E" stands for Lead free and Green

Description

The RS809 are microprocessor (μP) supervisory circuits used to monitor the power supplies in μP and digital systems. They provide excellent circuit reliability and low cost by eliminating external components and adjustments when used with +3.3V, +3.0V, or 2.5V, 1.8V powered circuits.

These circuits perform a single function: they assert a reset signal whenever the VCC supply voltage declines below a preset threshold, keeping it asserted for at least 200ms after VCC has risen above the reset threshold. Reset thresholds suitable for operation with a variety of supply voltages are available.

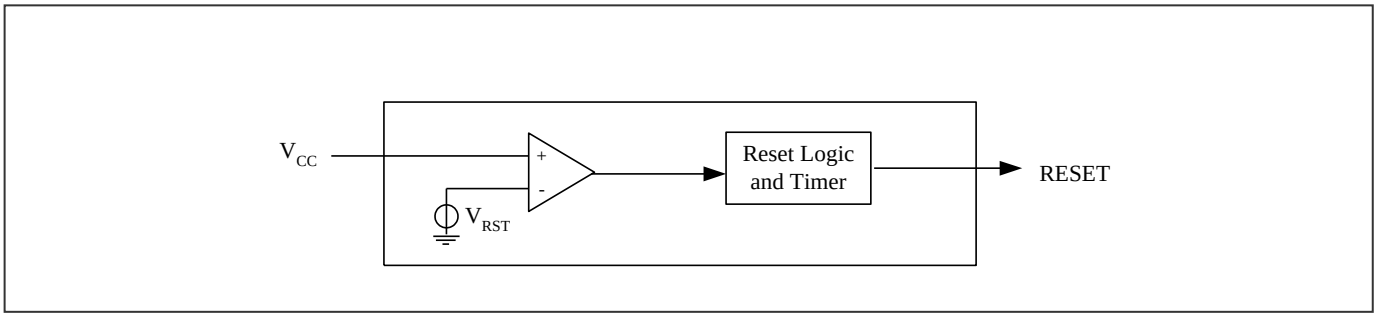
The RS809 have push-pull outputs and have an active-low /RESET output. The reset comparator is designed to ignore fast transients on V_{CC}, and the outputs are guaranteed to be in the correct logic state for V_{CC} down to 1V.

Low supply current makes the RS809 ideal for use in portable equipment. The ICs are available in 3 pin SOT23 packages.

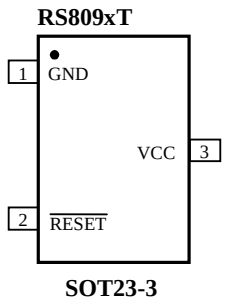
Suffix: x—Monitored Voltage

x	L	M	J	T	S	R	Z	X
Reset Threshold (V)	4.63	4.38	4.0	3.08	2.93	2.63	2.32	1.63

Block Diagram



Pin Configuration



Pin Description

Pin	Type	Description
VCC	-	**Supply Voltage.** Reset is asserted when V_{CC} drops below the Reset Threshold Voltage (V_{RST}). Reset remains asserted until V_{CC} rises above V_{RST} and keep asserted for the duration of the Reset Timeout Period (t_{RS}) once V_{CC} rises above V_{RST}.
GND	-	**Ground**
$\overline{\text{RESET}}$	O	**Active-Low Reset Output (Push-Pull).** It goes low when Vcc is below the reset threshold. It remains low for about 240ms after Vcc rises above the reset threshold (V_{RST}).

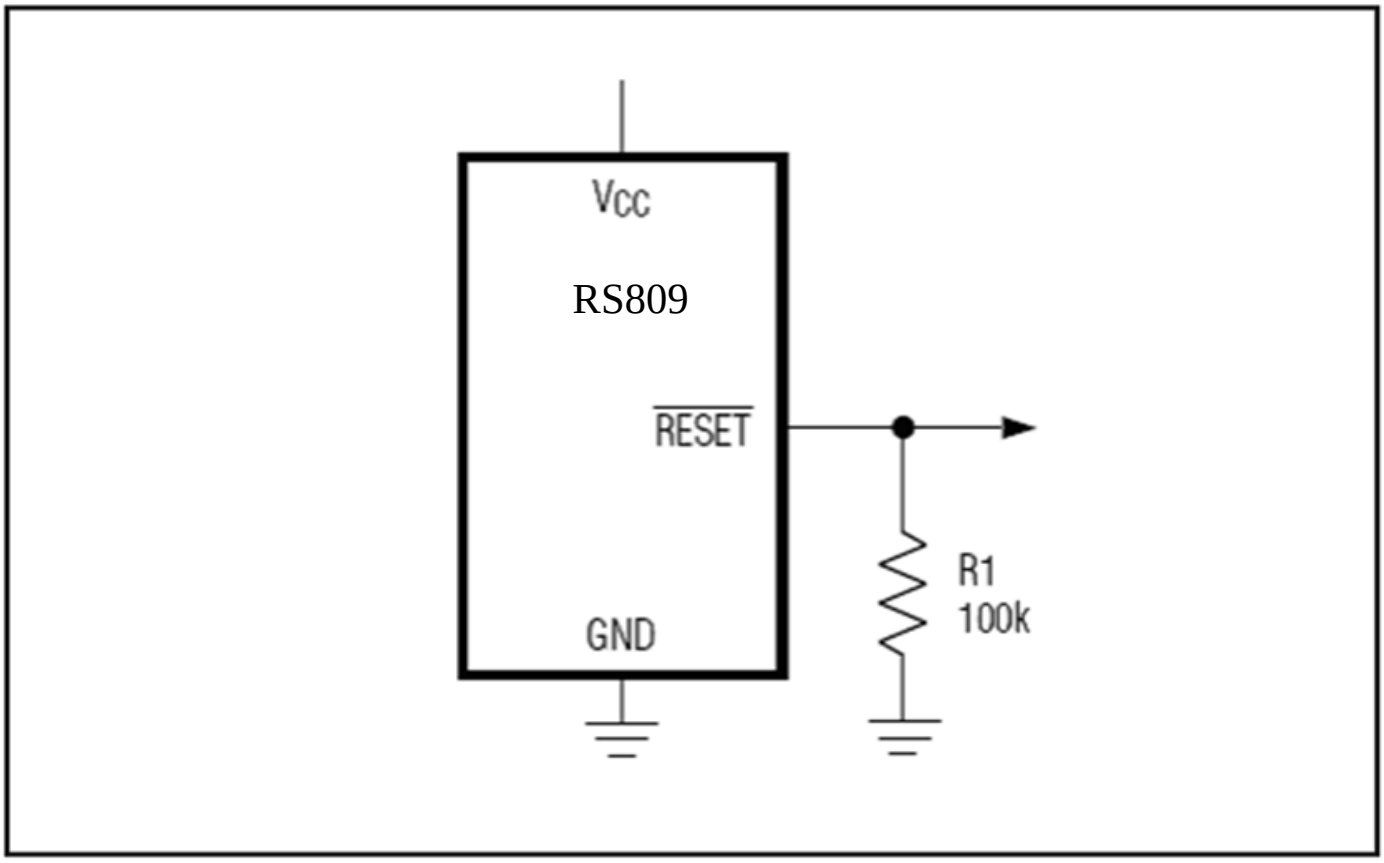
Functional Description

Reset Output

A microprocessor (μP) reset input starts the μP in a known state. Whenever the μP is in an unknown state, it should be held in reset. The supervisory circuits assert reset during power-up and prevent code execution errors during power-down or brownout conditions.

On power-up, once Vcc reaches about 1.0V, /RESET is a guaranteed logic low of 0.4V or less. As Vcc rises, /RESET stays low. When Vcc rises above the reset threshold, an internal timer releases /RESET after about 240ms. /RESET pulses low whenever Vcc drops below the reset threshold, i.e. brownout condition. If brownout occurs in the middle of a previously initiated reset pulse, the pulse continues for at least another 240ms. On power-down, once Vcc falls below the reset threshold, /RESET stays low and is guaranteed to be 0.4V or less until Vcc drops below 1.0V. R*eset Timing Diagram* shows the timing relationship.

Typical Application Circuit



Maximum Ratings

Storage Temperature .....-55°C to +150°C
Ambient Temperature with Power Applied..... -40°C to +85°C
Supply Voltage to Ground Potential (Vcc to GND) .....-0.3V to +6.0V
DC Input Voltage (All inputs except Vcc and GND).....-0.3V to V_{CC}+0.3V
DC Output Current (All outputs) 20mA
Power Dissipation 320mW

Note:
Stresses greater than those listed under MAXIMUM RATINGS may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

Recommended Operation Conditions

Sym	Description	Test Conditions	Min	Typ	Max	Unit
V_{CC}	Supply Voltage for RS809(L/M)	-	4.5	5.0	5.5	V
	Supply Voltage for RS809(T/S)	-	3.0	3.3	5.5	V
	Supply Voltage for RS809(R)	-	2.8	3.0	5.5	V
	Supply for RS809(Z)	-	2.5	-	5.5	V
	Supply for RS809(X)		1.8			
T_A	Operating Temperature	-	-40	-	85	℃

DC Electrical Characteristics

(V_{CC} = V_{RN} + 5% to 5.5V, T_A= -40~85℃, unless otherwise noted.)(Note 1)

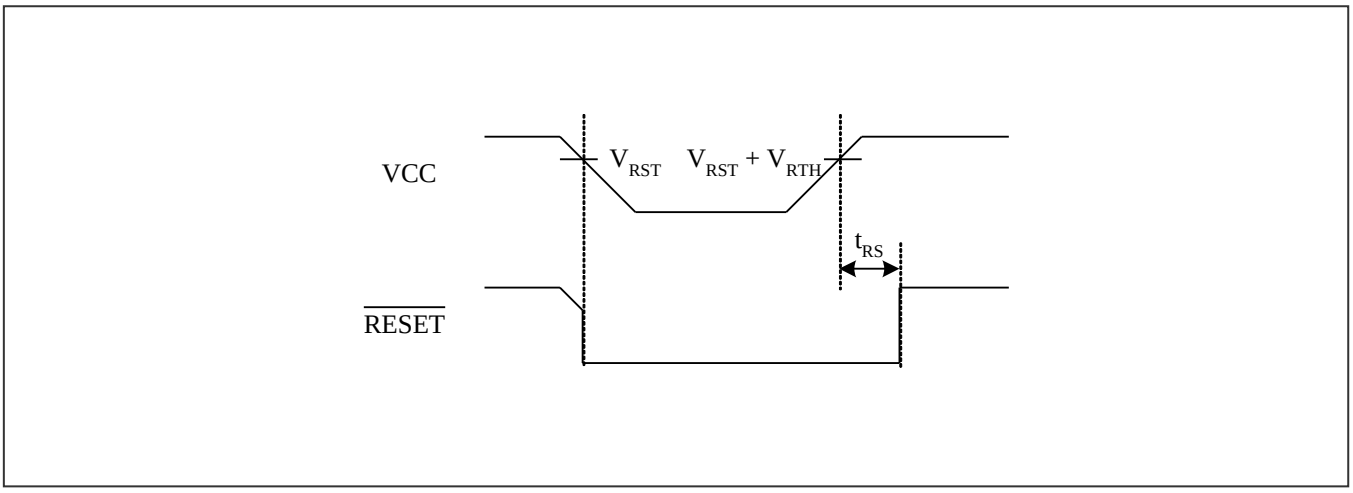
Symbol	Description	Test Conditions		Min	Typ	Max	Unit
V_{CC}	Operating Voltage Range	-		1.0	-	5.5	V
I_{CC}	Supply Current	Vcc < 5.5V, RS8xxL/M		-	10	30	μA
I_{CC}	Supply Current	Vcc < 3.6V, RS8xxR/S/T/Z		-	10	30	
Vrst	Threshold voltage(Falling Edge) Note 2	T_A= 25℃	RS809L~Z	V_{RN} - 1.5%	V_{RN}	V_{RN} + 1.5%	V
		T_A= -40 ~ 85℃	RS809L~X	V_{RN} - 2.5%	V_{RN}	V_{RN} + 2.5%	
V_{OH}	Output High Voltage	Vcc ≥ 4.5V Isource=800μA		Vcc-1.5	-	-	V
		Vcc ≥ 2.7V Isource=500μA		0.8×Vcc	-	-	
		Vcc ≥ 1.8V Isource=150μA		0.8×Vcc	-	-	
		Vcc ≥ 1.0V Isource=4μA		0.8×Vcc	-	-	
V_{OL}	Output Low Voltage	Vcc ≥ 4.5V Isink=3.2mA		-	-	0.4	V
		Vcc ≥ 2.7V Isink=1.2mA		-	-	0.3	
		Vcc ≥ 1.0V Isink=100μA		-	-	0.3	

Note: 1. Parameters of room temperature guaranteed by production test and parameters of full-temperature guaranteed by design.
2. V_{RST} is Reset threshold voltage when V_{CC} falls from high to low level. V_{RN} is nominal reset threshold voltage.

AC Electrical Characteristics

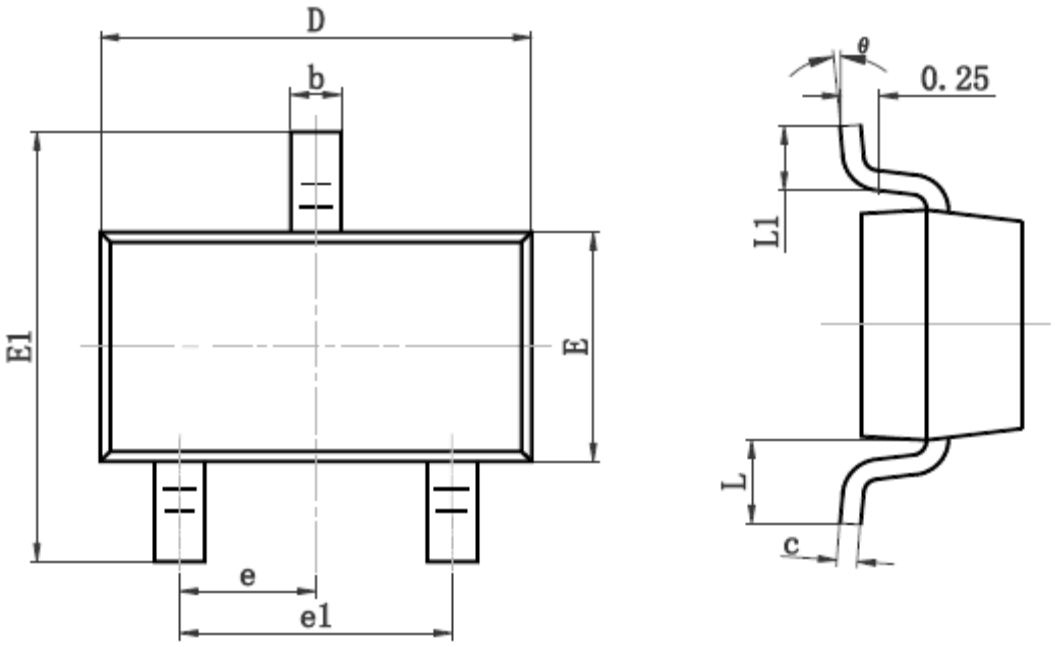
Symbol	Description	Test Conditions		Min	Typ	Max	Unit
Trs	Reset Time	T_A= -40~85℃	RS809L~X	200	240	400	ms

Reset Timing Diagram



Mechanical Information

TE (Lead free and Green SOT23-3)



X.XX
X.XX

DENOTES DIMENSIONS IN MILLIMETERS

Note:

1) Controlling dimensions in millimeters.
2) Ref: JEDEC TO-236H

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°

Notes