Features

- Qualified for automotive applications
- AEC-Q100 Qualified.
- Precision supply-voltage monitor
  - 4.63V (RS809QL)
  - 4.38V (RS809QM)
  - 4.00V (RS809QJ)
  - 3.08V (RS809QT)
  - 2.93V (RS809QS)
  - 2.63V (RS809QR)
  - 2.32V (RS809QZ)
  - 1.63V (RS809QX)
- 200ms(min) reset pulse width
- Push-Pull /RESET Output Configurations
- 9µA Supply Current
- Guaranteed Reset(/Reset) Valid to $V_{CC} = +1.0V$
- Power Supply Transient Immunity
- No External Components
- 3-Pin SOT23 Packages

Description

The RS809Q 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 V_{CC} supply voltage declines below a preset threshold, keeping it asserted for at least 200ms after V_{CC} has risen above the reset threshold. Reset thresholds suitable for operation with a variety of supply voltages are available.

The RS809Q 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 RS809Q ideal for use in portable equipment. The ICs are available in 3 pin SOT23 packages

Ordering Information

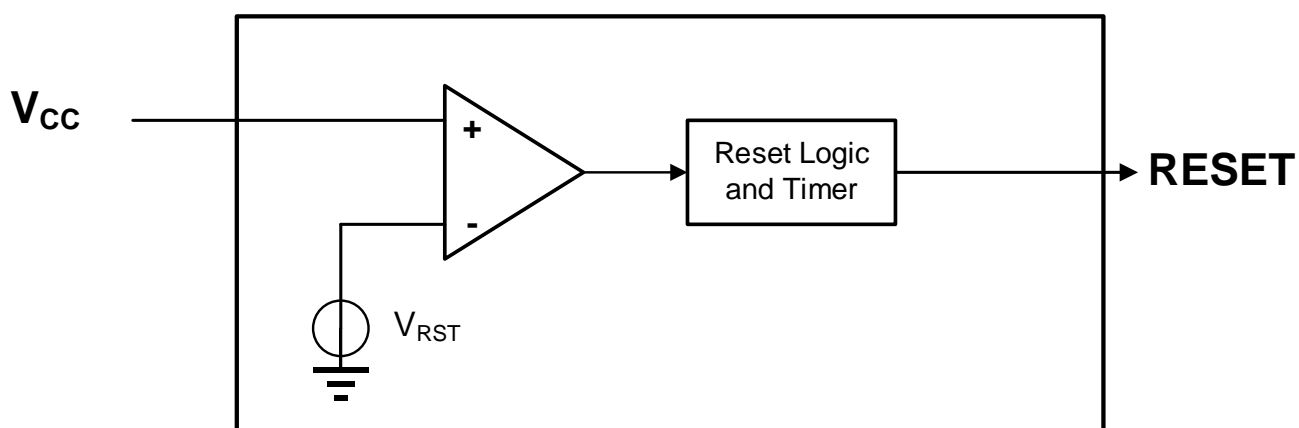| Part Number	Package
RS809QXTE	Lead free and Green SOT23-3

Note:

1. "X" refers to voltage range, see below table.
2. "T" stands for SOT23 Package
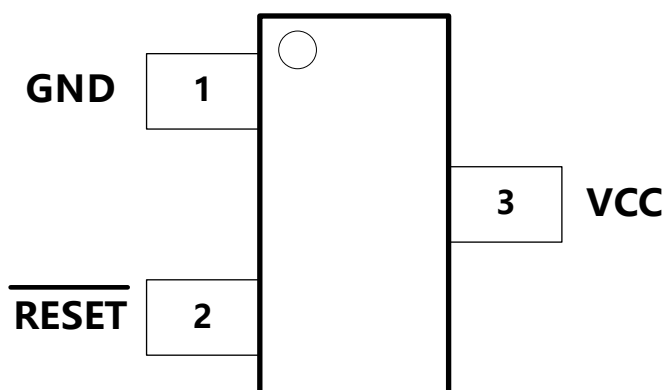3. "E" Stands for Pb Free.

Suffix: X—Monitored Voltage

X	L	M	J	T	S	R	Z	X
Reset Threshold (V)	4.63	4.38	4.00	3.08	2.93	2.63	2.32	1.63

Block Diagram

Pin Configuration

RS809Q
SOT23-3 Top View

Table 1. Pin Functions: RS3SW211U

Pin Name	Type	Description
VCC	-	**Supply Voltage.** Reset is asserted when V_{CC} drops below the Reset Threshold Voltage (V_{RST}). Reset remains asserted until VRST and keep asserted for the duration of the Reset Timeout Period (t_{RS}) once VCC rises above V_{RST}.
GND	-	**Ground**
$\overline{RESET}$	O	**Active-Low Reset Output (Push-Pull).** It goes low when V_{cc} 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 (uP) reset input starts the uP in a known state. Whenever the uP 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 V_{CC} reaches about 1.0V, /RESET is a guaranteed logic low of 0.4V or less. As V_{CC} rises, /RESET stays low. When V_{CC} rises above the reset threshold, an internal timer releases /RESET after about 240ms. /RESET pulses low whenever V_{CC} 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 V_{CC} falls below the reset threshold, /RESET stays low and is guaranteed to be 0.4V or less until Vcc drops below 1.0V. Reset Timing Diagram shows the timing relationship.

Absolute Maximum Ratings

Symbol	Parameter	Min	Max	Unit
V_{CC}	Supply Voltage	-0.3	6.0	V
	DC Input Voltage (All inputs except Vcc and GND)	-0.3	(V_{CC})+0.3	
	DC Output Current (All outputs)		20	mA
T_J	Ambient Temperature with Power Applied	-40	105	°C
T_{stg}	Storage temperature	-55	+150	

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 condi-tions above those indicated in the operational sec-tions of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

Recommended Operation Conditions

Symbol	Description	Test Conditions	MIN	TYP	MAX	Unit
V_{CC}	Supply Voltage for 809Q(L/M)	-	4.5	5.0	5.5	V
	Supply Voltage for 809Q(T/S)	-	3.0	3.3	5.5	V
	Supply Voltage for 809Q(R)	-	2.8	3.0	5.5	V
	Supply Voltage for 809Q(Z)		2.5	-	5.5	V
	Supply Voltage for 809Q(X)		1.8	-	-	V
T_A	Operating Temperature	-	-40	-	105	℃

DC Electrical Characteristics

(V_{CC} = V_{RN} + 5% to 5.5V, T_A= -40~105ºC, 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, RS809Q L/M		-	10	30	μA
I_{CC}	Supply Current	Vcc < 3.6V, RS809Q R/S/T/Z		-	10	30	
V_{RST}	Threshold Voltage (Falling-edge) (**Note 2**)	T_A= 25ºC	RS809Q L~Z	V_{RN} - 1.5%	V_{RN}	V_{RN} + 1.5%	V
		T_A= -40 ~ 105ºC	RS809Q L~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
t_{RS}	Reset Tim	T_A= 25ºC	RS809Q L~X	200	240	400	ms

Reset Timing Diagram
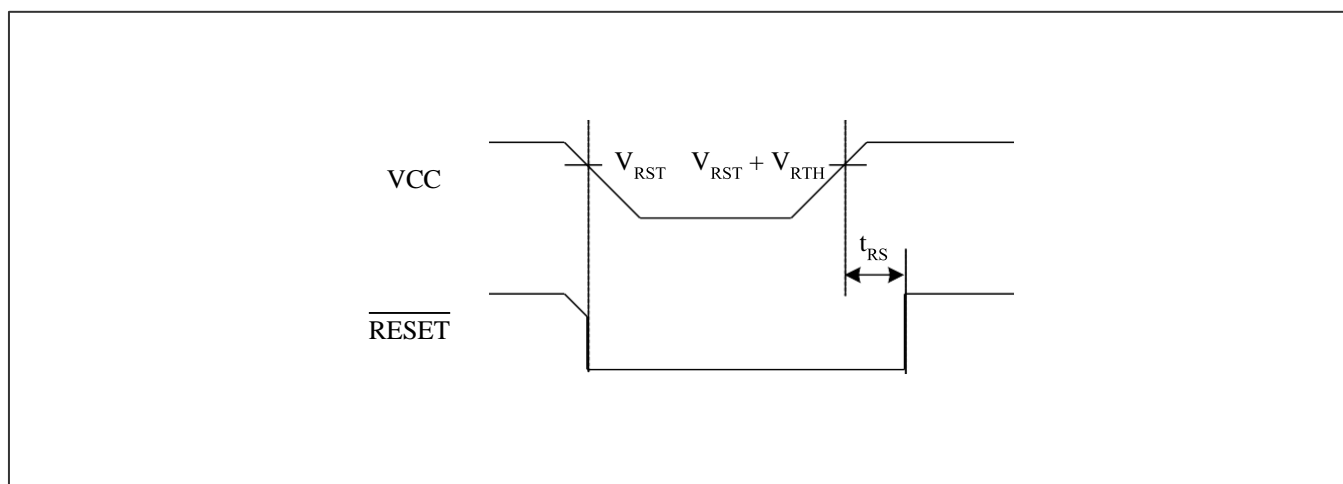
Package Information

TBE (Lead free and Green SOT23-3)
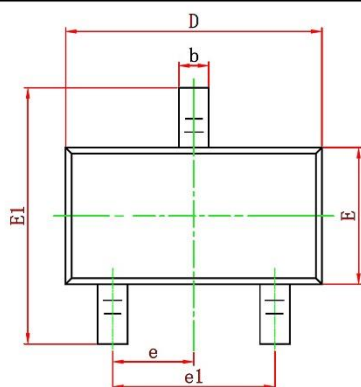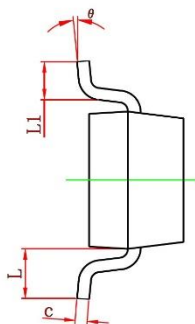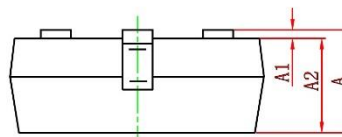
TOP VIEW   SIDE VIEW   BOTTOM VIEW

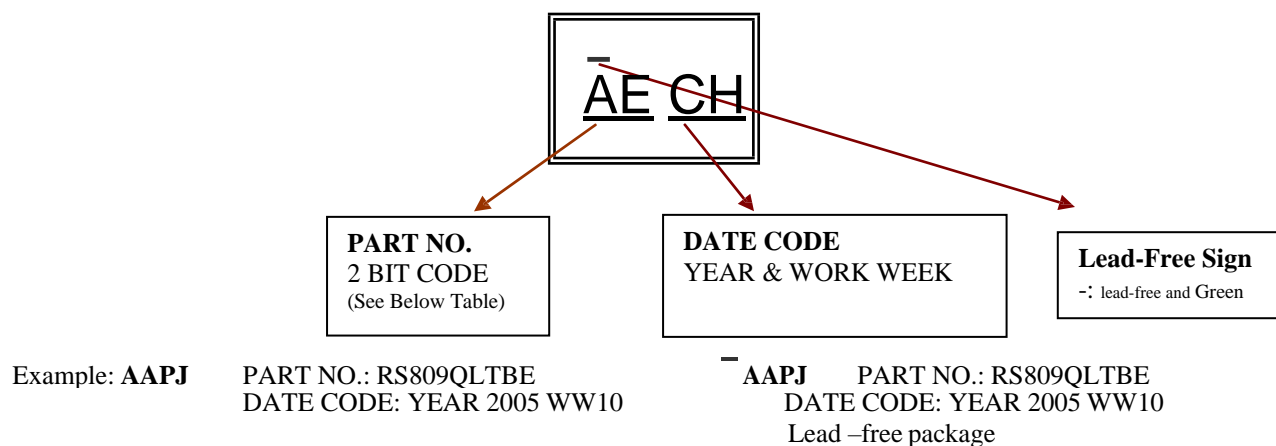| Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.150	0.000	0.006
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP		0.037 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:

1. All dimensions are in mm. Angels in degrees.
2. Refer to Jedec MO-187.
3. Dimensions exclude burrs, mold flash or protrusions.

SOT23-3L(T03) POD
Raystar Microelectronics Technology Inc.

Marking Information

$\overline{AE}$ $\underline{CH}$

| PART NO. |
| 2 BIT CODE |
| (See Below Table) |

DATE CODE
YEAR & WORK WEEK

Lead-Free Sign
-: lead-free and Green

Example: **AAPJ**   PART NO.: RS809QLTBE
DATE CODE: YEAR 2005 WW10

$\overline{}$**AAPJ**   PART NO.: RS809QLTBE
DATE CODE: YEAR 2005 WW10
Lead –free package

No.	Part No.	Code
1	RS809QL	AO
2	RS809QM	AP
3	RS809QT	AQ
4	RS809QS	AR
5	RS809QR	AS

Revision History

Revision	Description	Date
V1.0	Initial release	2025/04/21