Low Quiescent & High-Precision Voltage Detector

General Description

The DS9809 series is a series of high-precision voltage detectors developed using CMOS process. The detection voltage is fixed internally with an accuracy of ± 2.0%. Output forms, Active Low output, are available. And two output type forms, Open Drain and Push-Pull output , Super-low current consumption and miniature package lineup can meet demand from the portable device applications.

Features

- Super-low current consumption to 2uA
- High-precision detection voltage ± 2.0%
- Output form Open-Drain & Push-Pull
- Guaranteed $\overline{\text{Reset}}$ Assertion Down to VCC = 1.0V
- SOT-23-3 & SSOT-23 Package Available

Applications

- Battery checkers
- Power failure detectors
- Power monitor for portable equipment's
- Constant voltage power monitor for cameras, video equipments and communication devices
- Power monitor for microcomputers and reset for CPUs

Pin Configurations
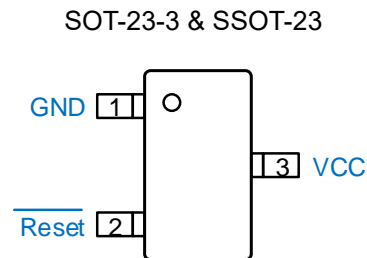
SOT-23-3 & SSOT-23

Description of Functional Pins

Pin No SOT23-3 & SSOT-23	Pin Name	Pin Function
1	GND	Ground Pin .
2	$\overline{\text{Reset}}$	Voltage Detection Output Pin .
3	VCC	Voltage Input Pin.

Ordering Information

DS9809-ABCC

Designator	Description	Symbol	Description
A	Output type	O	Open Drain
		P	Push-Pull
B	Voltage type	R	2.63V
		S	2.93V
		T	3.08V
		A	4.00V
		M	4.38V
		L	4.63V
CC	Package type	S3	SOT-23-3
		SS3	SSOT-23

Example: Push-Pull / 2.93V / SOT-23-3 Package . Part no = DS9809PSS3

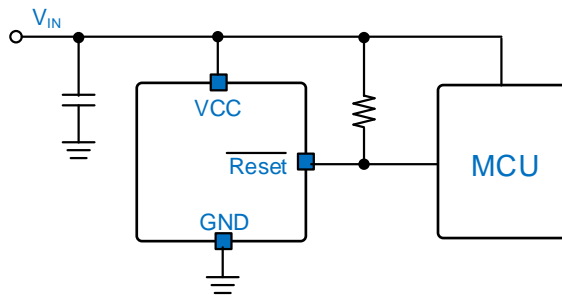## Typical Application Circuits
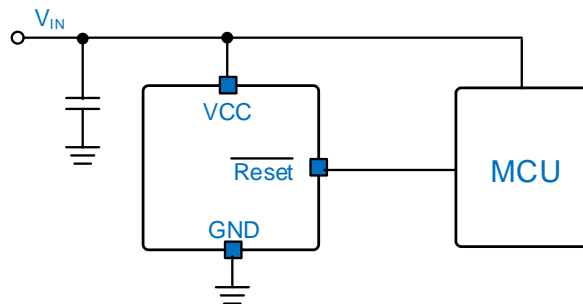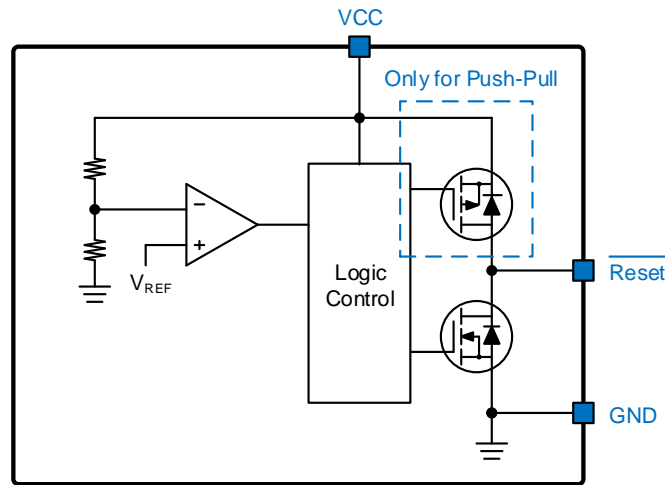

Figure 1 : Application Circuit of Open-Drain Type

Figure 2 : Application Circuit of Push-Pull Type

Function Block Diagram

Absolute Maximum Ratings (Note 1)

VCC to GND -- -0.3V to 6V

Other to GND -- -0.3V to 6V

Package Thermal Resistance (Note 2)

      SOT-23-3 , θ_{JA} -- 200 ^{o}C /W

      SSOT-23 , θ_{JA} -- 250 ^{o}C /W

Lead Temperature (Soldering, 10 sec.) -- 260 ^{o}C

Junction Temperature -- 150 ^{o}C

Storage Temperature Range -- -40 ^{o}C to 150 ^{o}C

ESD Susceptibility

      HBM --- 2KV

Recommended Operating Conditions

Input Voltage VIN -- 1.0V to 5.5V

Junction Temperature Range -- -40 ^{o}C to 125 ^{o}C

Ambient Temperature Range -- -40 ^{o}C to 85 ^{o}C

Electrical Characteristics

(V_{IN} =5V, T_A=25°C unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Input Voltage Range	V_{CC}		1.0		5.5	V
Input Supply Current	I_{SS}	V_{CC} < 3.0V		1.5		uA
		3.0V < V_{CC} < 5.5V		2.0		
Reset Voltage	V_{RST}	Voltage Type = R		2.63		V
		Voltage Type = S		2.93		
		Voltage Type = T		3.08		
		Voltage Type = A		4.00		
		Voltage Type = M		4.38		
		Voltage Type = L		4.63		
Temperature Coefficient		V_{CC} = 3.3V		100		ppm / °C
$\overline{\text{Reset}}$ Response Time	T_{RP}				60	uS
$\overline{\text{Reset}}$ Pules Width	T_{REC}			210		mS

Note 1. Stresses beyond those listed "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 may affect device reliability.

Note 2. θ_{JA} is measured at T_A = 25°C on a DSTECH EVB board.

Typical Characteristics
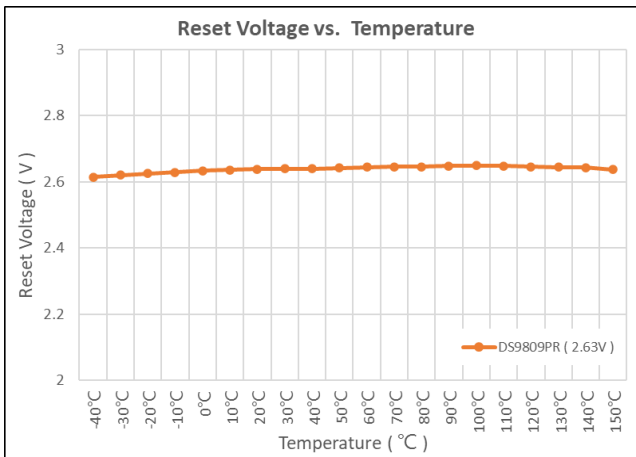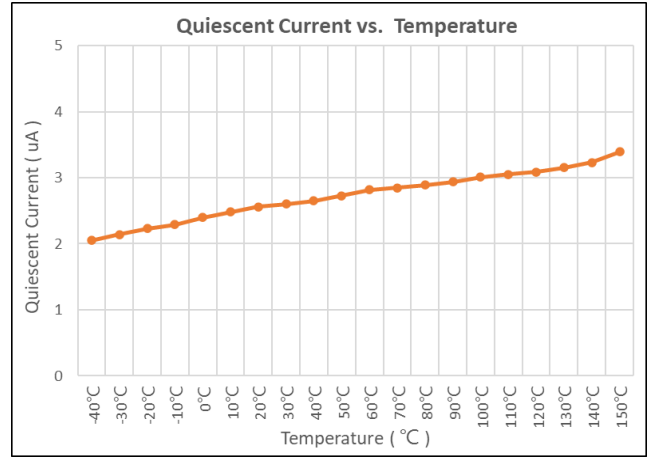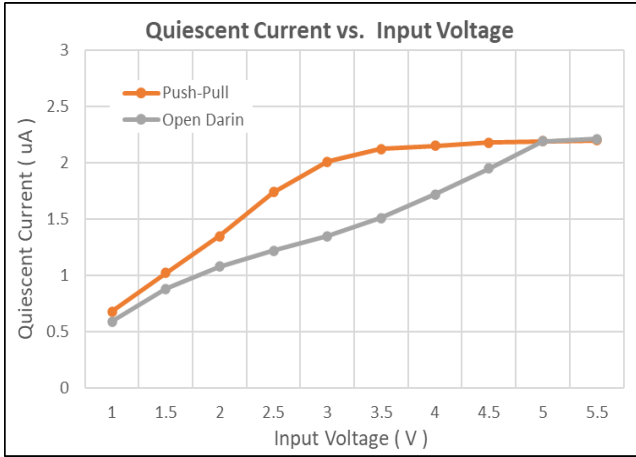
Application Guideline

Reset Output

The DS9809 Microprocessor Reset Circuit asserts a reset signal to the MCU whenever VCC goes below the reset thresh old (VRST) . RST is guaranteed valid down to VCC = 1V (0° to 70°C).

During power-up, once VCC exceeds the reset threshold an internal timer keeps RST low for the reset time-out period (T_{REC}) . After this interval, RST returns high.

If VCC drops below the reset threshold, RST goes low. Each time RST is asserted, it stays low for at least the reset time-out period. Any time VCC goes below the reset threshold, the internal timer clears. The reset timer starts when VCC returns above the reset threshold. The active-low reset (RST) both source and sink current.

Negative-Going VCC Transients

The DS9809 are relatively immune to negative-going VCC transients (glitches).The maximum pulse width a negative VCC transient can have without causing a reset pulse. As the magnitude of the transient increases (further below the threshold), the maximum allowable pulse width decreases. Any combination of duration and overdrive which lies under the curve will NOT generate a reset signal. Typically, a VCC transient that goes 100mV below the reset threshold and lasts 20µs or less will not cause a reset pulse. A 0.1µF bypass capacitor mounted as close as possible to the VCC pin provides additional transient immunity.

Valid / RST Output Down to VCC = 0V

When VCC falls below 1V, the RST output no longer sinks current, but becomes an open circuit. In most systems this is not a problem, as most MCUs do not operate below 1V. However, in applications where RST output must be valid down to 0V, a pull-down resistor may be added to hold the RST output low. This resistor must be large enough to not load the RST output, and still be small enough to pull the output to ground. A 100KΩ resistor is recommended.

Package Information:
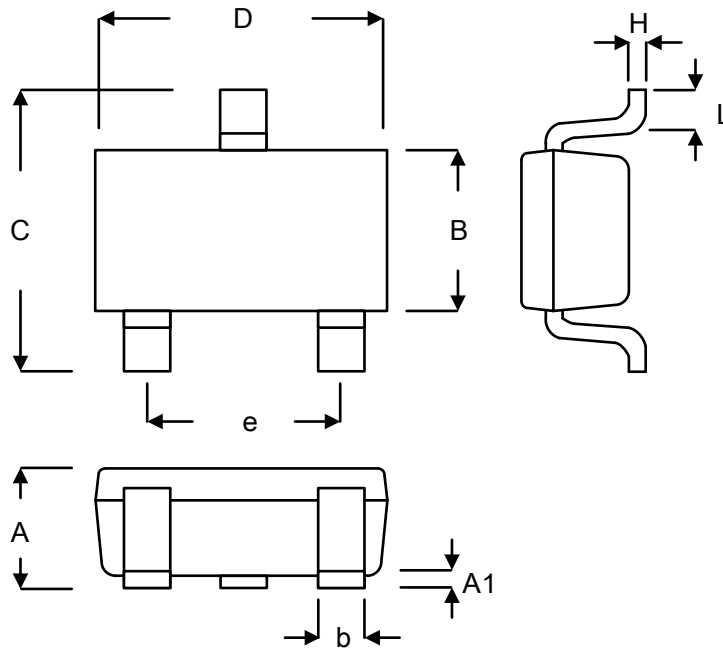
Symbol	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	0.889	1.295	0.035	0.051
A1	0.000	0.152	0.000	0.006
B	1.397	1.803	0.055	0.071
b	0.250	0.560	0.010	0.022
C	2.591	3.000	0.102	0.118
D	2.692	3.099	0.106	0.122
e	1.803	2.007	0.071	0.079
H	0.080	0.254	0.003	0.010
L	0.300	0.610	0.012	0.024

SOT-23-3L
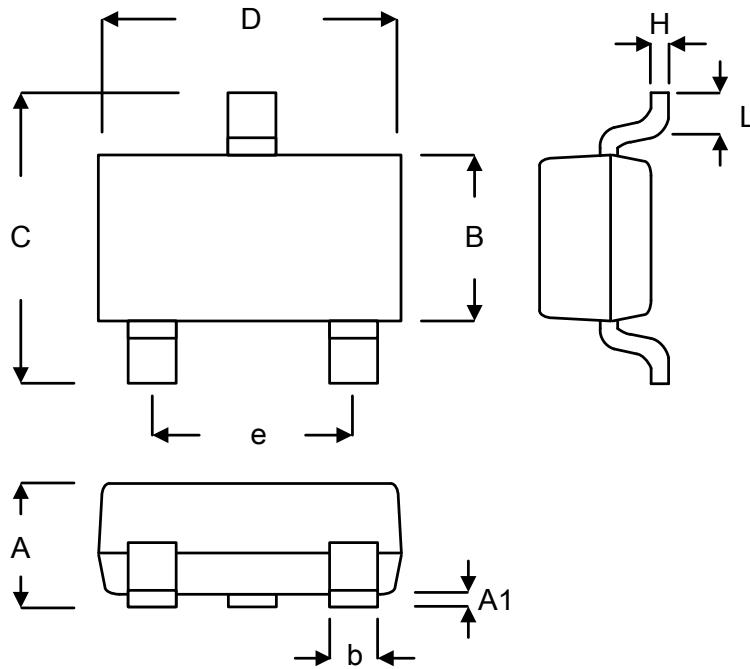
Symbol	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
B	1.200	1.400	0.047	0.055
b	0.300	0.500	0.012	0.020
C	2.250	2.550	0.089	0.100
D	2.800	3.000	0.110	0.118
e	1.900		0.075	
H	0.080	0.150	0.003	0.006
L	0.300	0.500	0.012	0.020

SSOT-23