



DESCRIPTION

A4089 is a series of high precision voltage detector with ultra-low current consumption (4.5uA typ. at $V_{IN}=3.0V$) and a built-in delay circuit. It can work at very low voltage, which makes it perfect for system reset.

A4089 is composed of high precision voltage reference, comparator, delay circuit, output driver and resistor array. Internally preset detect voltage has a low temperature drift and requires no external trimming. Only CMOS type is available.

A4809 is available in SOT-23S package.

ORDERING INFORMATION

Package Type	Part Number	
SOT-23S	E3S	A4809E3SR-XXXDZY
		A4809E3SVR-XXXDZY
Note	XXX: Detector Voltage 263=2.63V; 293=2.93V D: Delay Time; 200ms Z: C=CMOS Y: Pin Type Non: Type A B: Type B V: Halogen Free Package R: Tape & Reel SPQ: 3,000pcs/Reel	
AiT provides all RoHs products Suffix " V " means Halogen Free Package		

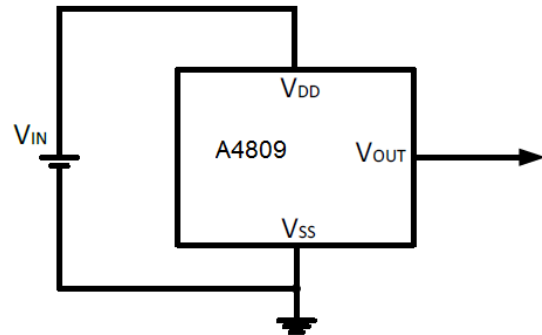
FEATURES

- High-Precision Detection Voltage: $\pm 3\%$
- Detection Voltage : 2.63V and 2.93V
- Built-in Power on Reset Delay time circuit: Refer to Selection Guide
- Operating Voltage Range: 1.2V~6V
- Ultra-low current consumption: 4.5uA typ. (at $V_{IN} = 3.0V$)
- Output Forms: CMOS (Active Low)
- Available in SOT-23S package

APPLICATION

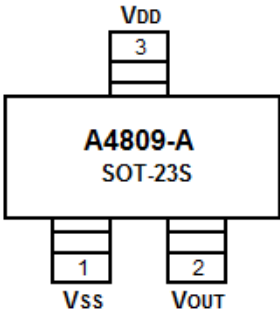
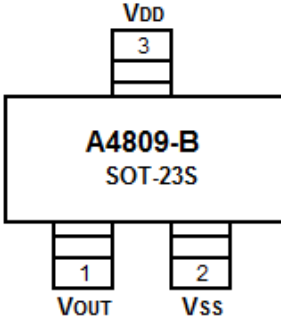
- Power monitor for portable equipment such as PDA, DSC, Mobile phone, Notebook, MP3
- CPU and Logic Circuit Reset
- Battery Checker
- Battery Back-up Circuit
- Power Failure Detector

TYPICAL APPLICATION





PIN DESCRIPTION

			
Top View		Top View	
Pin #		Symbol	Function
SOT-23S-A	SOT-23S-B		
1	2	V_{SS}	Ground Pin
2	1	V_{OUT}	Voltage detection output pin
3	3	V_{DD}	Supply Voltage Input

ABSOLUTE MAXIMUM RATINGS

Input Voltage	-0.3V~8V
Output Voltage Range	-0.3V~8V
Maximum Output Current	70mA
T_A , Ambient Temperature	-40°C~+85°C
Power Dissipation	250mW
T_s , Storage Temperature	-40°C~+105°C
Lead Temperature & Time	260°C, 10s

Stress beyond above listed "Absolute Maximum Ratings" may lead permanent damage to the device. These are stress ratings only and operations of the device at these or any other conditions beyond those indicated in the operational sections of the specifications are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.



RECOMMENDED WORK CONDITIONS

Parameter	Min.	Recommended	Max.	Unit
Input Voltage Range	1.2		6	V
Ambient Temperature	-40	25	85	°C

ELECTRICAL CHARACTERISTICS

A4809xR-263DZx (2.63V)

T_{opt} = 25°C, unless otherwise specified.

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Detector Threshold	-V _{DET}		2.551	2.63	2.709	V
Current Consumption	I _{SS}	V _{DD} =4.63V		4.5	10	μA
Maximum Operating Voltage	V _{DDH}				10	V
Minimum Operating Voltage	V _{DDL}			0.5		V
Output Current	I _{OUT}	Pch V _{DS} =-2.1V , V _{DD} =4.5V	1.0	2.0		mA

A4809xR-293DZx (2.93V)

T_{opt} = 25°C, unless otherwise specified.

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Detector Threshold	-V _{DET}		2.842	2.93	3.018	V
Current Consumption	I _{SS}	V _{DD} =4.93V		4.5	10	μA
Maximum Operating Voltage	V _{DDH}				10	V
Minimum Operating Voltage	V _{DDL}			0.5		V
Output Current	I _{OUT}	Pch V _{DS} =-2.1V , V _{DD} =4.5V	1.0	2.0		mA

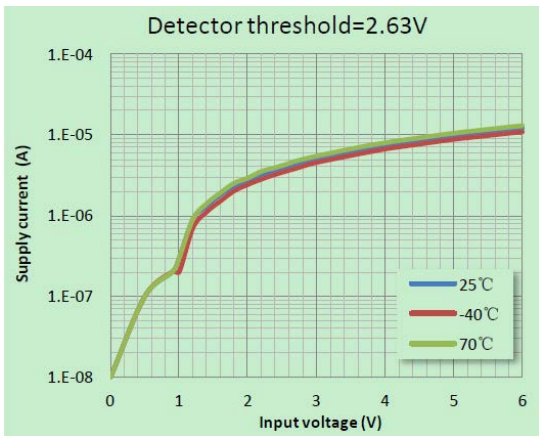
ELECTRICAL CHARACTERISTICS BY OUTPUT DELAY TIME

Parameter	Conditions	Output Delay Time			Unit
		Min.	Typ.	Max.	
Delay time	V _{DD} =1.0V to V _{det} +1.0V	140	200	300	ms

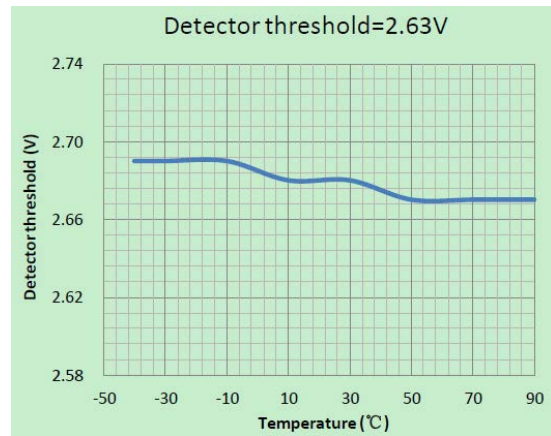


TYPICAL PERFORMANCE CHARACTERISTICS

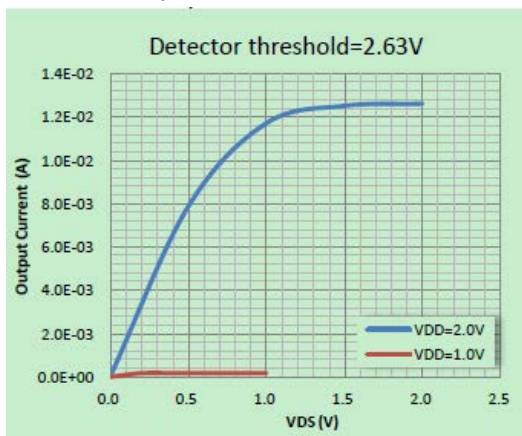
1. Supply current vs. Input voltage



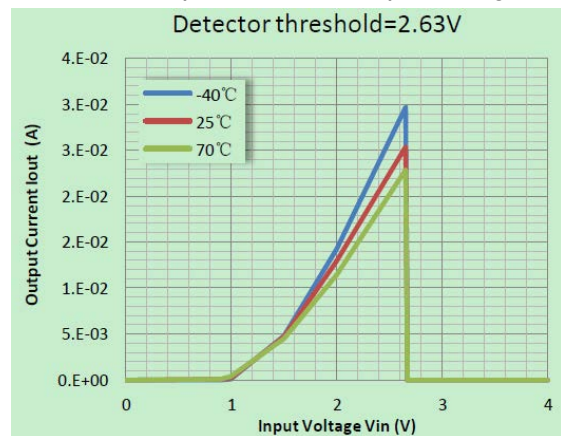
2. Detector Threshold vs. Temperature



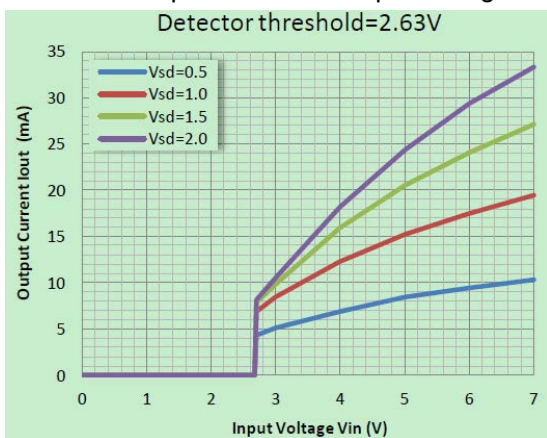
3. Nch Driver Output Current vs. V_{DS}



4. Nch Driver Output Current vs. Input Voltage



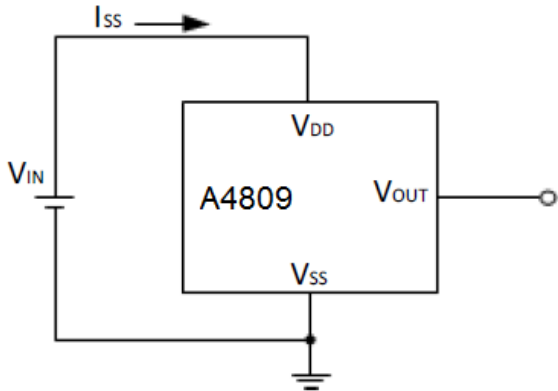
5. Pch Driver Output Current vs. Input Voltage



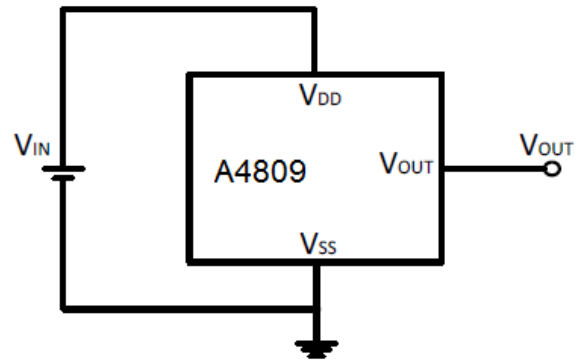


TEST CIRCUITS

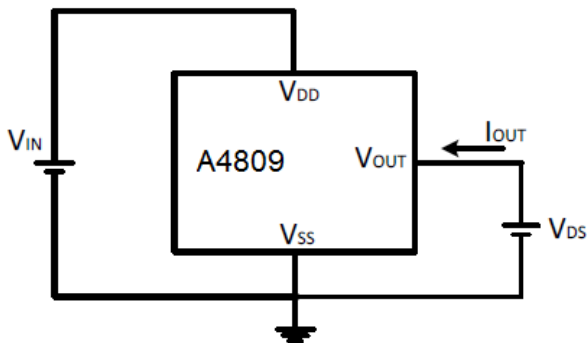
1. Supply current test circuit



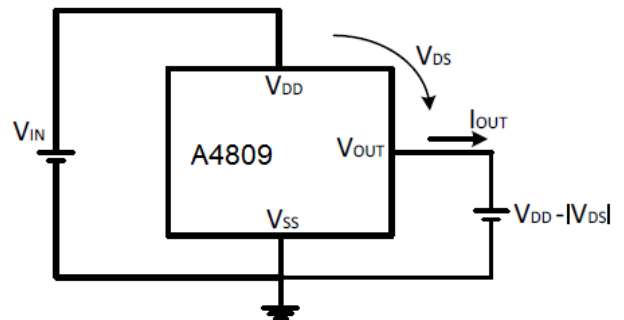
2. Detector threshold test circuit



3. Nch Drive Output Current Test Circuit

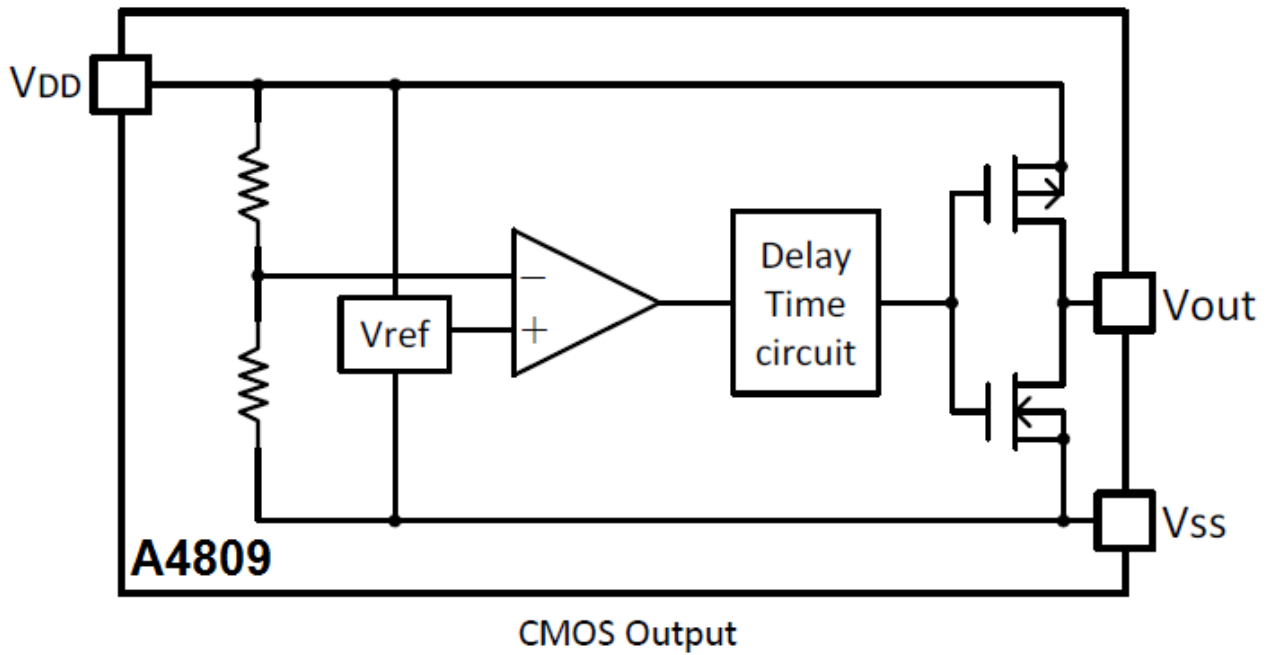


4. Pch Drive Output Current Test Circuit



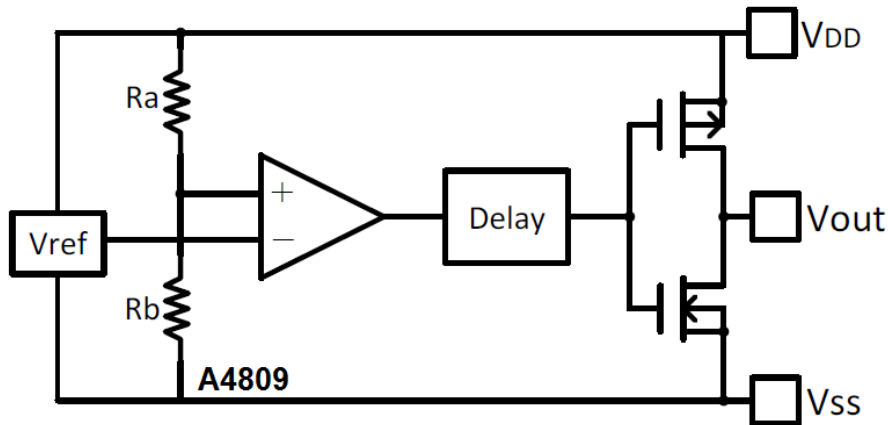


BLOCK DIAGRAM



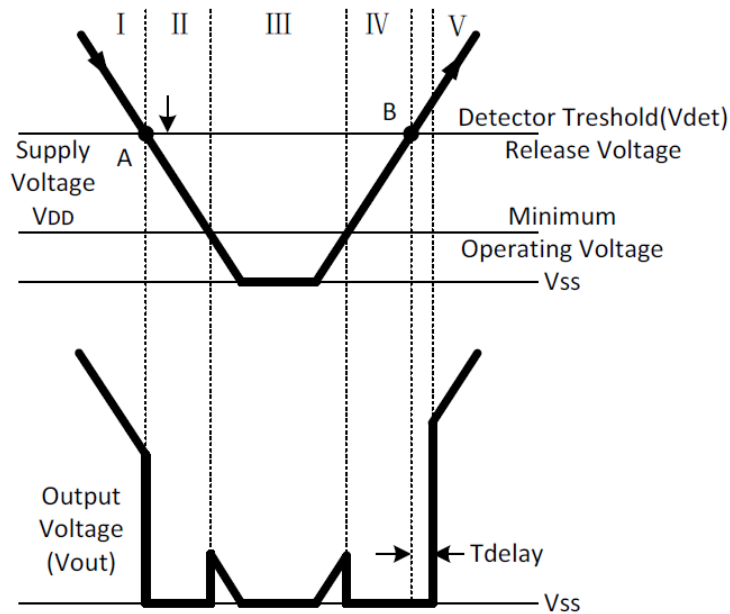


FUNCTION DESCRIPTION



High precision low temperature co-efficiency reference voltage is applied to the negative input of a comparator. Input voltage, divided by resistor array of Ra and Rb, is applied to the positive input of the comparator. Output of the comparator passes a delay circuit and a series of buffer to drive the output CMOS pair.

$$V_{DET} = V_{REF} * (1 + R_a/R_b)$$

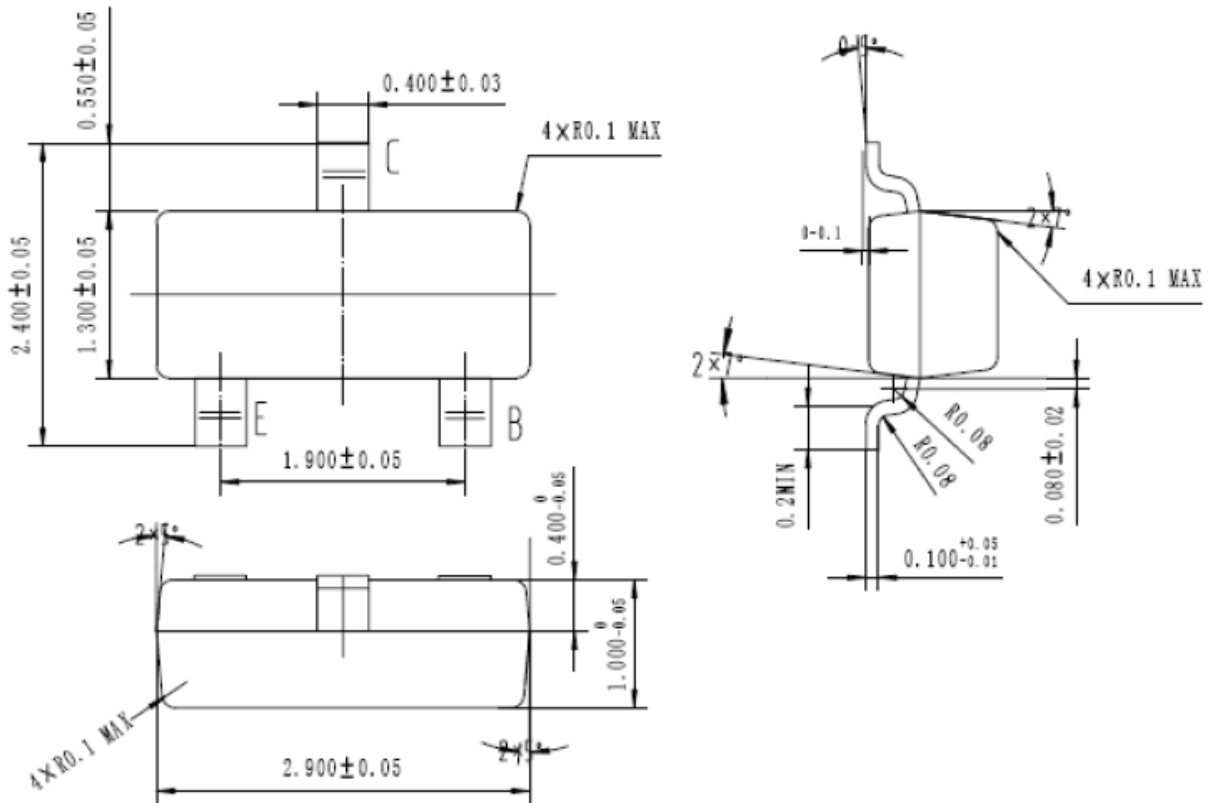


No.	Operation status	Output status
I	$V_{DD} > V_{det}$	Output voltage is equal to the supply voltage
II	V_{DD} drops below V_{det}	Output voltage equals to GND level
III	V_{DD} drops further below V_{DDL}	Output voltage is undefined
IV	V_{DD} rises above V_{DDL}	Output voltage equals to GND level
V	V_{DD} rises above V_{det}	Output voltage equals to supply voltage after T_{delay}



PACKAGE INFORMATION

Dimension in SOT-23S Package (Unit: mm)





IMPORTANT NOTICE

AiT Semiconductor Inc. (AiT) reserves the right to make changes to any its product, specifications, to discontinue any integrated circuit product or service without notice, and advises its customers to obtain the latest version of relevant information to verify, before placing orders, that the information being relied on is current.

AiT Semiconductor Inc.'s integrated circuit products are not designed, intended, authorized, or warranted to be suitable for use in life support applications, devices or systems or other critical applications. Use of AiT products in such applications is understood to be fully at the risk of the customer. As used herein may involve potential risks of death, personal injury, or severe property, or environmental damage. In order to minimize risks associated with the customer's applications, the customer should provide adequate design and operating safeguards.

AiT Semiconductor Inc. assumes to no liability to customer product design or application support. AiT warrants the performance of its products of the specifications applicable at the time of sale.