Advanced Monolithic Systems

AMS23

ADJUSTABLE VOLTAGE MONITOR

RoHS compliant

FEATURES

- **±2% Voltage Threshold Accuracy**
- **Operating Voltage 1.4V to 15V**
- **Open collector output**
- **Low supply current – 0.9µA (typ)**
- **Guaranteed out assertion down to VCC = 0.7V**
- **Power Supply Transient Immunity**
- **Adjustable threshold voltage from 1.25V to 12V**

APPLICATIONS

- **CPU and Logic Circuit Reset**
- **Portable and Battery Powered Equipment**
- **Memory Battery Back-Up Circuit**
- **Window Comparator**
- **Cellular Phones**
- **Pagers**

GENERAL DESCRIPTION

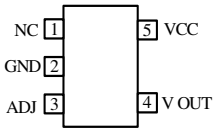
The AMS23 low power voltage detector provides monitoring of battery, power-supply, and regulated system voltages. A precision voltage reference and comparator monitors the V_{CC} input and compares it with a specified voltage threshold condition. When V_{CC} falls below a specified trip point threshold, the output (OUT) is forced low and remains asserted as long as the V_{CC} input remains below V_{TH-} + hysteresis (V_{HYST}). The AMS23 device is guaranteed to output the correct logic state for V_{CC} down to 0.7V. They are also designed to ignore fast transients on V_{CC}. This small, low power device is ideal for portable applications and is available in space-saving SOT23-5 package.

ORDERING INFORMATION

OUTPUT TYPE	PACKAGE TYPE	OPERATING TEMPERATURE RANGE
	5 LEAD SOT-23	
OPEN COLLECTOR	AMS23M1	-40 to +85° C

PIN CONNECTIONS

5L SOT-23
(M)



Top View

ABSOLUTE MAXIMUM RATINGS

Supply Voltage	0.7 to 15	Storage Temperature	-55ºC to 150ºC
Output Current	20mA	Lead Solder Temperature for 25 secs.	265ºC
Input or Output Voltage	-0.3 to VCC +0.3	Power Dissipation	320mW

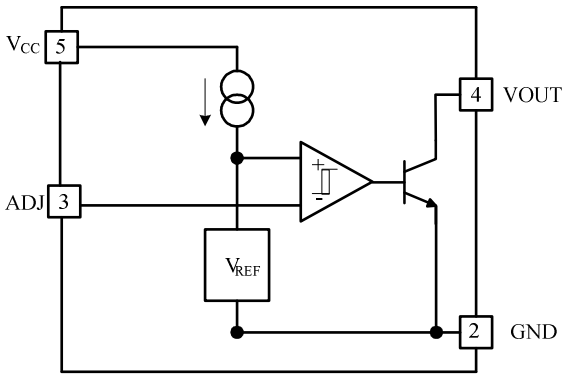
DC AND AC ELECTRICAL CHARACTERISTICS

Electrical Characteristics at T_A=25°C and V_{CC}= 3.3V, unless otherwise noted.

PARAMETER	CONDITIONS (Note 2)	AMS23 Min.	AMS23 Typ.	AMS23 Max.	Units
Operating Voltage		1.25		15	V
VCC Supply Current	V_{CC} = 3.0V, No load V_{CC}= 5.5V, No load		0.9 1.1	3.0 3.6	µA
Output Current, NPN Collector	V_{CC} = 1.5V V_{CC} =2.5V	1.0 3.0	3 14		mA mA
Voltage Thresholds					
Detect Voltage		V_{TH} -2%	V_{TH}-	V_{TH}- +2%	V
Release Voltage			V_{TH}- +V_{HYST}		V
Threshold Hysteresis		0.2V_{TH}-	0.05V_{TH}-	0.08V_{TH}-	V
V_{CC} to OUT Detect Delay	V_{CC} falling from (V_{TH}- + 100mV) to (V_{TH}- - 100mV) at 10mV/µs		2		µs
Threshold Temperature Coefficient			±100		ppm/ºC

Note 1: Valid for Ambient Operating Temperature: T_A= 25ºC.

BLOCK DIAGRAM



PIN DESCRIPITIONS

AMS23		
PIN NUMBERS	NAME	DESCRIPTION
1	NC	Not Connect
2	GND	Ground is the reference for the power supply. It must be connected to the system ground.
3	ADJ	Adjustable input pin. Using two resistor dividers the voltage threshold could be set between 1.25V to 12V.
4	V OUT	Open Collector. This is the open collector output. It goes low when VCC drops below V_{TH-} and remains low as long as V_{CC} is below $V_{TH-} + V_{HYST}$.
5	VCC	This is the Supply Voltage for the Voltage Detector.

OPERATION

OUTPUT

The AMS23 Voltage Detector monitors system voltage from 1.25V to 12V. The detector is designed to ignore fast transients on VCC and has a voltage hysteresis (V_{HYST}). The AMS23 asserts an output signal (OUT) whenever VDETECT goes below the Voltage Detect Threshold (V_{TH-}). The output signal (OUT) stays asserted until VDETECT goes above the Voltage Detect Release (V_{TH+}). Output voltage (V_{OUT}) is guaranteed valid down to V_{CC} = 0.7V at 25ºC.

The AMS23 has an Open Collector active-low output which will sink current when output is asserted. Connect a pull-up resistor from OUT to any supply voltage up to 15V. Select a resistor value large enough to register logic low, and small enough to register logic high while all of the input current and leakage paths connected to the reset output line are being supplied. A 10k pull-up is sufficient in most applications.

The advantages of Open Collector Output is the ability to connect more open drain outputs in parallel (wired OR connections) as well as connect the output to a power supply voltage different from V_{CC}.

Negative-Going V_{CC} Transients and Undershoot

The AMS23 device is relatively immune to negative-going VCC transients (glitches). 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.

PACKAGE DIMENSIONS inches (millimeters) unless otherwise noted.

5 LEAD SOT-23 PLASTIC PACKAGE (M1)