Triple- Power Supply Monitor

ADM9261

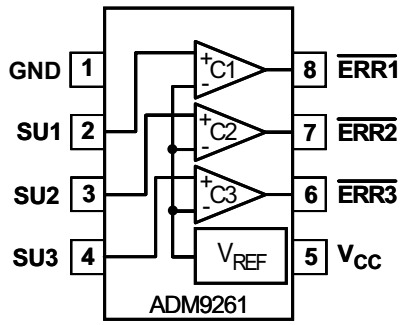
FEATURES

Simultaneous Monitoring of 9 V, and two 3.3 V Supplies
Low Power: 10 µA Typical
Internal Comparator Hysteresis
Power Supply Glitch Immunity
V_{CC} from 2.5 V to 3.6 V
Guaranteed from –10°C to +60°C
No External Components
8-Pin µSOIC Package

APPLICATIONS

Pagers
Portable Instruments

FUNCTIONAL BLOCK DIAGRAM



GENERAL DESCRIPTION

The ADM9261 is a Multi-Supply Monitor IC which simultaneously monitors the three power supply voltages of a pager system and outputs error signals if any of the supply voltages falls below an acceptable minimum value. Analog Devices' experience in the design of power supply supervisory circuits is used to provide an optimum solution for the overall circuit in terms of cost, performance and power consumption. Key features of the design include the incorporation of hysteresis and glitch immunity into the comparators, which minimizes the possibility of spurious triggering by noise spikes on the supplies being monitored. Power supply voltages outside V_{CC} can be monitored without the need for input attenuators or other components, and the current drain (including input currents of the monitoring circuits) is typically only 10µA, which imposes very little additional burden on the pager's battery.

The ADM9261 is manufactured on one of Analog Devices' proprietary BiCMOS processes, which also includes high performance thin film resistors to achieve the accuracy required for the precision voltage reference and comparator trip points.
The ADM9261 is packaged in a space-saving µSOIC package.

REV. 0

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ADM9261–SPECIFICATIONS (V_{CC} = Full Operating Range, $T_A = T_{MIN}$ to T_{MAX} unless otherwise noted)

Parameter	Min	Typ	Max	Units	Test Conditions/Comments
OPERATING TEMPERATURE RANGE	–10		60	°C	
V_{CC} SUPPLY VOLTAGE	2.5		3.6	V	
TOTAL SUPPLY CURRENT		10	20	µA	Total Current into V_{CC} and SU1 - SU3. Typ. is measured with V_{CC} = 3.3 V, SU1 = 6 V, SU2 = SU3 = 3.3 V. Max is measured with V_{CC} = 3.6 V, SU1 = 9 V, SU2 = SU3 = 3.6 V
V_{CC} SUPPLY CURRENT		4	10	µA	Current from SU1 - SU3 not included
SU1 INPUT RESISTANCE		3		MΩ	I_{IN} ~ 2 µA when SU1 = 6 V
SU2 INPUT RESISTANCE		1.65		MΩ	I_{IN} ~ 2 µA when SU2 = 3.3 V
SU3 INPUT RESISTANCE		1.65		MΩ	I_{IN} ~ 2 µA when SU3 = 3.3 V
SU1 LOW TRIP POINT	3.808	3.904	4.00	V	Measured with SU1 Falling
SU2 LOW TRIP POINT	2.856	2.928	3.00	V	Measured with SU2 Falling
SU3 LOW TRIP POINT	2.666	2.733	2.80	V	Measured with SU3 Falling
HYSTERESIS		3		%	
GLITCH IMMUNITY		20		µs	100 mV Glitch on V_{CC} or SU1-3
PROPAGATION DELAY		20		µs	Delay from Supply Going Out side Tolerance until Output Changes
OPEN DRAIN OUTPUT LOW			0.4	V	10 kΩ External to Positive Supply V_{CC}
OPEN DRAIN OUTPUT HIGH	V+ –0.25			V	10 kΩ External to Positive Supply V_{CC}

Specifications subject to change without notice.

ABSOLUTE MAXIMUM RATINGS*
(T_A = +25°C unless otherwise noted)

V_{CC} ..... –0.3 V to +6 V
SU1, SU2, SU3 ..... –0.3 V to +15 V
All Other Inputs ..... –0.3 V to V_{CC} + 0.3 V
All Outputs ..... –0.3 V to +6 V
Output Sink Current ERR1-3, ... 20 mA
Operating Temperature Range
  Industrial (A Version) ..... –40°C to +85°C
  Power Dissipation, RM-8 ..... TBD mW
    θ_{JA} Thermal Impedance ..... TBD°C/W
Lead Temperature (Soldering, 10 secs) ..... +300°C
  Vapor Phase (60 secs) ..... +215°C
  Infrared (15 secs) ..... +220°C
Storage Temperature Range ..... –65°C to +150°C

*Stresses above those listed under Absolute Maximum Ratings may cause permanent damage to the device. This is a stress rating only; functional operation of the device at these or any other conditions above those listed in the operational sections of this specification is not implied. Exposure to absolute maximum ratings for extended periods of time may affect device reliability.

ORDERING GUIDE

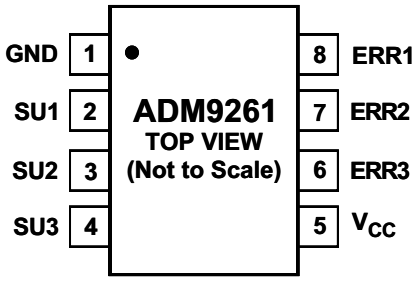
Model	Temperature Range	Package Option[1]
ADM9261ARM	–40°C to +85°C	RM-8
ADM9261ARM-REEL[2]	–40°C to +85°C	RM-8
ADM9261ARM-REEL7[3]	–40°C to +85°C	RM-8

NOTES
[1]RM = Thin Small Outline IC.
[2]2500 devices per reel.
[3]1000 devices per reel.

CAUTION

ESD (electrostatic discharge) sensitive device. Electrostatic charges as high as 4000 V readily accumulate on the human body and test equipment and can discharge without detection. Although the ADM9261 features proprietary ESD protection circuitry, permanent damage may occur on devices subjected to high energy electrostatic discharges. Therefore, proper ESD precautions are recommended to avoid performance degradation or loss of functionality.

PIN CONFIGURATION



PIN FUNCTION DESCRIPTIONS

Pin No.	Mnemonic	Function
1	GND	Ground.
2	SU1	Supply to Be Monitored. 9 V battery supply - comparator trips when supply voltage falls below 4 V.
3	SU2	Supply to Be Monitored. 3.3 V supply - comparator trips when supply voltage falls below 3.0 V
4	SU3	Supply to Be Monitored. 3.3 V supply. - comparator trips when supply voltage falls below 2.8 V.
5	V_{CC}	Supply Monitor IC Power Supply. Can be powered from any power supply between 2.5 V and 3.6 V including one of the supplies being monitored (except for SU1).
6	ERR3	Open Drain Output. Low when SU3 is below its minimum value. Otherwise pulls high through an external 10 kΩ resistor to a positive supply.
7	ERR2	Open Drain Output. Low when SU2 is below its minimum value. Otherwise pulls high through an external 10 kΩ resistor to a positive supply.
8	ERR1	Open Drain Output. Low when SU1 is below its minimum value. Otherwise pulls high through an external 10 kΩ resistor to a positive supply.

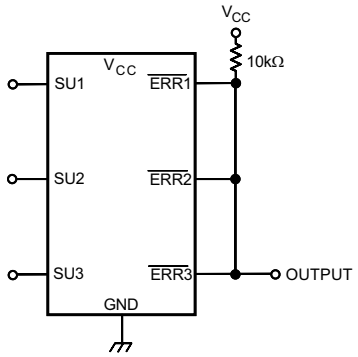
CIRCUIT INFORMATION

Monitor Inputs SU1 to SU3

The ADM9621 is provided with three analog inputs, SU1 to SU3, to monitor supply voltages of +9 V and two +3.3 V supplies. Each input is connected to a voltage comparator whose trip point is set by an on-chip voltage reference and on-chip precision thin-film resistors. On-chip attenuators reduce the input voltage to the comparators, so that voltages greater than the supply voltage can be monitored without the need for external resistors. As the ADM9261 is intended for battery-powered systems, the input attenuators are high resistance to minimise current drawn from the supplies. This, coupled with the low-pwer design of the comparators themselves, gives a typical current consumption of 10μA, including the input currents of SU1 to SU3.

Error Outputs

Error outputs ERR1 to ERR3 are open-drain outputs that are OFF when the corresponding supply voltage SU1 to SU3 is greater than its minimum value and ON when the corresponding supply voltage falls below its minimum value. Each output requires a 10kΩ pullup resistor to a positive supply, which is normally the system logic supply, but can be different if required. The open-drain construction allows two or more of these outputs to be wire ANDed together if required, as shown in figure 1.



Truth Table for Wired AND

SU1	SU2	SU3	Output
< min	< min	< min	0
< min	< min	> min	0
< min	> min	< min	0
< min	> min	> min	0
> min	< min	< min	0
> min	< min	> min	0
> min	> min	< min	0
> min	> min	> min	1

Power Supply V_{CC}

The ADM9261 can be powered from any supply voltage between 2.5 V and 6 V. This includes any of the supply voltages apart from that connected to SU1, since this is greater than 6 V. It will usually be powered from one of the 3.3 V supplies.

The logic outputs are open-drain and take their output high level from the voltage connected to the pull-up resistor. They will normally be connected to V_{CC}, but can be connected to any voltage up to 15V if a different logic swing is required.

APPLICATIONS

The ADM9261 is designed for use in pagers and other portable devices that use 3.3V logic systems derived from a 9V battery. Interfacing of the ADM9261 to the system will vary with the application, if a microcontroller is used, the outputs of the ADM9261 may be connected to one or more I/O lines. If a microprocessor is used with a separate ASIC or other chip for I/O then the ADM9261 can be interfaced to this. In either case the ADM9261 is very simple to use. Inputs SU1 to SU3 are simply connected to the supplies to be monitored and the outputs are connected to the devices logic system, either separately or to a single input using wired AND. The ADM9261 will derive its power supply from one of the 3.3V supplies.

Figure 14 shows a typical application of the ADM9261.

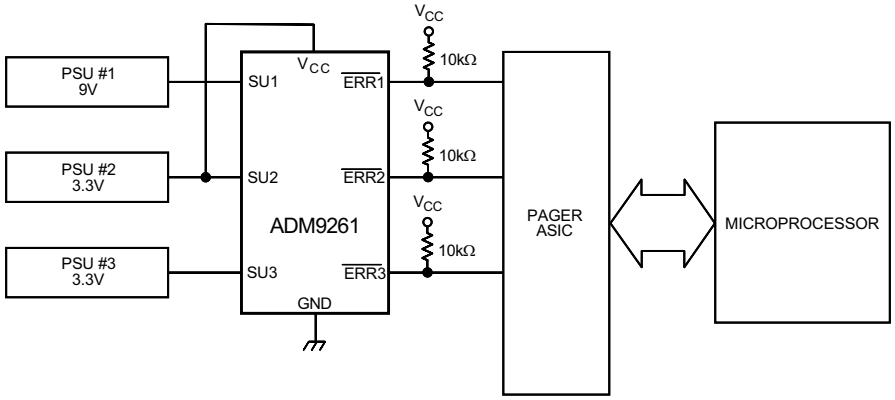


Figure 14. Typical Application of ADM9261

OUTLINE DIMENSIONS

Dimensions shown in inches and (mm).

8-Lead Micro SOIC
(R-8A)