

### FEATURES

- Precision 2.5V to 5V Power Supply Monitor
- 7 Reset Threshold Options:
  - 2.19V to 4.63V
- 140ms (Min) Reset Timeout
- Watchdog Timer with 1.6s Timeout (ADM823, ADM824)
- Manual Reset Input (ADM823, ADM825)
- Push-Pull Output Stages
  - RESET (ADM823)
  - RESET, RESET (ADM824/ADM825)
- Low Power Consumption (3µA)
- Guaranteed Reset Output valid to  $V_{CC}=1V$
- Power Supply Glitch Immunity
- Specified Over Industrial Temperature Range
- 5-Lead SC70 and SOT-23 Packages

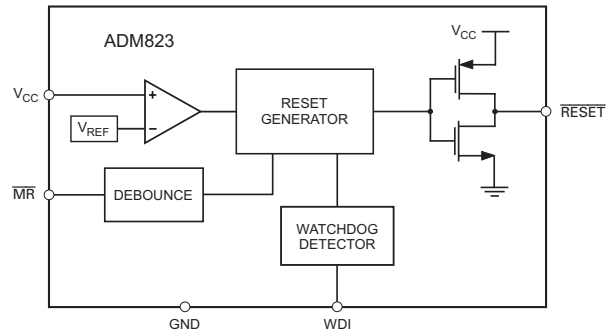
### APPLICATIONS

- Microprocessor Systems
- Computers
- Controllers
- Intelligent Instruments
- Portable Equipment

### GENERAL DESCRIPTION

The ADM823-ADM825 are supervisory circuits which monitor power supply voltage levels and code execution integrity in microprocessor-based systems. As well as providing power on reset signals, an on-chip watchdog timer can reset the microprocessor if it fails to strobe within a preset timeout period. A reset signal can also be asserted by means of an external push-button, through a manual reset input. The three parts feature different combinations of watchdog input, manual reset input and output stage configuration, as shown in table 1.

### FUNCTIONAL BLOCK DIAGRAM



Each part is available in a choice of 7 reset threshold options ranging from 2.19V to 4.63V. The reset and watchdog timeout periods are fixed at 140ms (min) and 1.6s (typ), respectively.

The ADM823-ADM825 are available in 5-lead SC70 and SOT-23 packages and typically consume only 3µA, making them suitable for use in low power portable applications.

Table 1. Selection Table

Part No.	Watchdog Timer	Manual Reset	Output Stage	
			RESET	RESET
ADM823	Yes	Yes	Push-Pull	-
ADM824	Yes	-	Push-Pull	Push-Pull
ADM825	-	Yes	Push-Pull	Push-Pull

### Rev. PrA

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## ADM823-ADM825—SPECIFICATIONS

Table 2.  $V_{CC}=4.75V$  to  $5.5V$  for ADM82\_L,  $V_{CC}=4.5V$  to  $5.5V$  for ADM82\_M,  $V_{CC}=3.15V$  to  $3.6V$  for ADM82\_T,  $V_{CC}=3V$  to  $3.6V$  for ADM82\_S,  $V_{CC}=2.7V$  to  $3.6V$  for ADM82\_R,  $V_{CC}=2.38V$  to  $2.75V$  for ADM82\_Z,  $V_{CC}=2.25V$  to  $2.75V$  for ADM82\_Y,  $T_A=T_{MIN}$  to  $T_{MAX}$ , unless otherwise noted

Parameter	Min	Typ	Max	Units	Test Conditions/Comments
SUPPLY					
$V_{CC}$ Operating Voltage Range	1		5.5	V	$T_A=0^{\circ}C$ to $+70^{\circ}C$
	1.2			V	$T_A=T_{MIN}$ to $T_{MAX}$
Supply Current (SOT-23 only)		10	24	$\mu A$	WDI and $\overline{MR}$ unconnected ADM823L/M, ADM824L/M
		5	12	$\mu A$	WDI and $\overline{MR}$ unconnected ADM823T/S/R/Z/Y, ADM824T/S/R/Z/Y
		4.5	12	$\mu A$	$\overline{MR}$ unconnected ADM825L/M
Supply Current (SC70 only)		3	8	$\mu A$	$\overline{MR}$ unconnected ADM825T/S/R/Z/Y
		6	17	$\mu A$	WDI and $\overline{MR}$ unconnected ADM823L/M, ADM824L/M
		4	12	$\mu A$	WDI and $\overline{MR}$ unconnected ADM823T/S/R/Z/Y, ADM824T/S/R/Z/Y
		3	8	$\mu A$	$\overline{MR}$ unconnected ADM825L/M
	2	6	$\mu A$	$\overline{MR}$ unconnected ADM825T/S/R/Z/Y	
RESET THRESHOLD VOLTAGE					
ADM82_L	4.56	4.63	4.70	V	$T_A=+25^{\circ}C$
	4.50		4.75	V	$T_A=T_{MIN}$ to $T_{MAX}$
ADM82_M	4.31	4.38	4.45	V	$T_A=+25^{\circ}C$
	4.25		4.50	V	$T_A=T_{MIN}$ to $T_{MAX}$
ADM82_T	3.04	3.08	3.11	V	$T_A=+25^{\circ}C$
	3.00		3.15	V	$T_A=T_{MIN}$ to $T_{MAX}$
ADM82_S	2.89	2.93	2.96	V	$T_A=+25^{\circ}C$
	2.85		3.00	V	$T_A=T_{MIN}$ to $T_{MAX}$
ADM82_R	2.59	2.63	2.66	V	$T_A=+25^{\circ}C$
	2.55		2.70	V	$T_A=T_{MIN}$ to $T_{MAX}$
ADM82_Z (SC70 only)	2.28	2.32	2.35	V	$T_A=+25^{\circ}C$
	2.25		2.38	V	$T_A=T_{MIN}$ to $T_{MAX}$
ADM82_Y (SC70 only)	2.16	2.19	2.22	V	$T_A=+25^{\circ}C$
	2.13		2.25	V	$T_A=T_{MIN}$ to $T_{MAX}$
RESET THRESHOLD TEMPERATURE COEFFICIENT		40		ppm/ $^{\circ}C$	
RESET THRESHOLD HYSTERESIS		10		mV	ADM82_L/M
		5		mV	ADM82_T/S/R/Z/Y
RESET TIMEOUT PERIOD	140	200	280	ms	
$V_{CC}$ TO RESET DELAY		40		$\mu s$	$V_{TH}-V_{CC}=100mV$
RESET Output Voltage	$V_{CC}-1.5$		0.4	V	$V_{CC}=V_{TH}$ min, $I_{SINK}=3.2mA$ , ADM82_L/M
			0.3	V	$V_{CC}=V_{TH}$ min, $I_{SINK}=1.2mA$ , ADM82_T/S/R/Z/Y
			0.3	V	$T_A=0^{\circ}C$ to $+70^{\circ}C$ , $V_{CC}=1V$ , $V_{CC}$ falling, $I_{SINK}=50\mu A$
				V	$V_{CC}=V_{TH}$ max, $I_{SOURCE}=120\mu A$ , ADM82_L/M

Parameter	Min	Typ	Max	Units	Test Conditions/Comments
	$0.8 \times V_{CC}$			V	$V_{CC}=V_{TH} \text{ max, } I_{SOURCE}=30\mu\text{A,}$ ADM82_T/S/R/Z/Y
RESET Output Short Circuit Current			800	$\mu\text{A}$	$\overline{\text{RESET}}=0\text{V, } V_{CC}=5.5\text{V,}$ ADM82_L/M
			400	$\mu\text{A}$	$\overline{\text{RESET}}=0\text{V, } V_{CC}=5.5\text{V,}$ ADM82_T/S/R/Z/Y
RESET Output Voltage			0.4	V	$V_{CC}=V_{TH} \text{ max, } I_{SINK}=3.2\text{mA,}$ ADM824L/M, ADM825L/M
			0.3	V	$V_{CC}=V_{TH} \text{ max, } I_{SINK}=1.2\text{mA,}$ ADM824T/S/R/Z/Y, ADM825T/S/R/Z/Y
	$0.8 \times V_{CC}$			V	$V_{CC}>=1.8\text{V, } I_{SOURCE}=150\mu\text{A}$
WATCHDOG INPUT (ADM823, ADM824)					
Watchdog Timeout Period	1.12	1.6	2.40	s	$V_{IL}=0.4\text{V, } V_{IH}=0.8 \times V_{CC}$
WDI Pulse Width	50			ns	
WDI Input Threshold					
$V_{IL}$			$0.3 \times V_{CC}$	V	
$V_{IH}$	$0.7 \times V_{CC}$			V	
WDI Input Current		120	160	$\mu\text{A}$	
	-20	-15		$\mu\text{A}$	$V_{WDI}=V_{CC}$ , time average $V_{WDI}=0$ , time average
MANUAL RESET INPUT (ADM823, ADM825)					
$\overline{\text{MR}}$ Input Threshold			$0.3 \times V_{CC}$	V	
	$0.7 \times V_{CC}$			V	
$\overline{\text{MR}}$ Input Pulse Width	1			$\mu\text{s}$	
$\overline{\text{MR}}$ Glitch Rejection		100		ns	
$\overline{\text{MR}}$ Pull-up Resistance	35	52	75	$\text{k}\Omega$	
$\overline{\text{MR}}$ to Reset Delay		500		ns	

## ABSOLUTE MAXIMUM RATINGS

Table 3.  $T_A = 25^\circ\text{C}$  unless otherwise noted.

Parameter	Rating
$V_{CC}$	-0.3V to +6V
Output Current (RESET, $\overline{\text{RESET}}$ )	20mA
Operating Temperature Range	
SC70	-40°C to +85°C
SOT-23	-40°C to +125°C
Storage Temperature Range	-65°C to +150°C
$\theta_{JA}$ Thermal Impedance	
SC70	146°C/W
SOT-23	270°C/W
Lead Temperature	
Soldering (10 sec)	300°C
Vapour Phase (60 sec)	215°C
Infrared (15 sec)	220°C

Stresses above those listed under Absolute 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 conditions above those indicated in the operational section of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

## PIN CONFIGURATIONS AND FUNCTIONAL DESCRIPTIONS

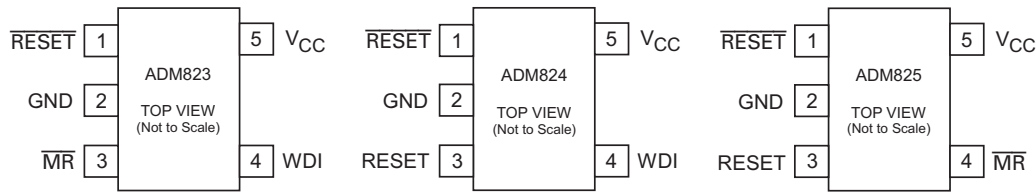


Table 4. Pin Functional Descriptions

Pin No.	Name	Description
1	RESET	Push-Pull Active-Low Reset Output, which is asserted whenever $V_{CC}$ is below the reset.threshold, $V_{TH}$ .
2	GND	Ground
3	$\overline{MR}$ (ADM823)	Manual Reset Input. This is an active-low input which, when forced low for at least 1 $\mu$ s, generates a reset. Features a 52k $\Omega$ internal pull-up.
	RESET (ADM824/ADM825)	Active-High, Push-Pull Reset Output.
4	WDI (ADM823/ADM824)	Watchdog Input. Generates a reset if the voltage on the pin remains low or high for the duration of the watchdog timeout. The timer is cleared if a logic transition occurs on this pin or if a reset is generated.
	$\overline{MR}$ (ADM825)	Manual Reset Input.
5	$V_{CC}$	Power Supply Voltage being Monitored

## ESD 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 this product 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.



**ORDERING GUIDE (ADM823, ADM824)**

Model	Reset Threshold (V)	Temperature Range	Quantity	Package Type	Branding
ADM823LAKS-RL	4.63	-40°C to +85°C	10k	SC70-5	N07
ADM823LAKS-R7	4.63	-40°C to +85°C	3k	SC70-5	N07
ADM823LART-RL	4.63	-40°C to +125°C	10k	SOT-23-5	N07
ADM823LART-R7	4.63	-40°C to +125°C	3k	SOT-23-5	N07
ADM823MAKS-RL	4.38	-40°C to +85°C	10k	SC70-5	N07
ADM823MAKS-R7	4.38	-40°C to +85°C	3k	SC70-5	N07
ADM823MART-RL	4.38	-40°C to +125°C	10k	SOT-23-5	N07
ADM823MART-R7	4.38	-40°C to +125°C	3k	SOT-23-5	N07
ADM823TAKS-RL	3.08	-40°C to +85°C	10k	SC70-5	N07
ADM823TAKS-R7	3.08	-40°C to +85°C	3k	SC70-5	N07
ADM823TART-RL	3.08	-40°C to +125°C	10k	SOT-23-5	N07
ADM823TART-R7	3.08	-40°C to +125°C	3k	SOT-23-5	N07
ADM823SAKS-RL	2.93	-40°C to +85°C	10k	SC70-5	N07
ADM823SAKS-R7	2.93	-40°C to +85°C	3k	SC70-5	N07
ADM823SART-RL	2.93	-40°C to +125°C	10k	SOT-23-5	N07
ADM823SART-R7	2.93	-40°C to +125°C	3k	SOT-23-5	N07
ADM823RAKS-RL	2.63	-40°C to +85°C	10k	SC70-5	N07
ADM823RAKS-R7	2.63	-40°C to +85°C	3k	SC70-5	N07
ADM823RART-RL	2.63	-40°C to +125°C	10k	SOT-23-5	N07
ADM823RART-R7	2.63	-40°C to +125°C	3k	SOT-23-5	N07
ADM823ZAKS-RL	2.32	-40°C to +85°C	10k	SC70-5	N07
ADM823ZAKS-R7	2.32	-40°C to +85°C	3k	SC70-5	N07
ADM823YAKS-RL	2.19	-40°C to +85°C	10k	SC70-5	N07
ADM823YAKS-R7	2.19	-40°C to +85°C	3k	SC70-5	N07
ADM824LAKS-RL	4.63	-40°C to +85°C	10k	SC70-5	N08
ADM824LAKS-R7	4.63	-40°C to +85°C	3k	SC70-5	N08
ADM824LART-RL	4.63	-40°C to +125°C	10k	SOT-23-5	N08
ADM824LART-R7	4.63	-40°C to +125°C	3k	SOT-23-5	N08
ADM824MAKS-RL	4.38	-40°C to +85°C	10k	SC70-5	N08
ADM824MAKS-R7	4.38	-40°C to +85°C	3k	SC70-5	N08
ADM824MART-RL	4.38	-40°C to +125°C	10k	SOT-23-5	N08
ADM824MART-R7	4.38	-40°C to +125°C	3k	SOT-23-5	N08
ADM824TAKS-RL	3.08	-40°C to +85°C	10k	SC70-5	N08
ADM824TAKS-R7	3.08	-40°C to +85°C	3k	SC70-5	N08
ADM824TART-RL	3.08	-40°C to +125°C	10k	SOT-23-5	N08
ADM824TART-R7	3.08	-40°C to +125°C	3k	SOT-23-5	N08
ADM824SAKS-RL	2.93	-40°C to +85°C	10k	SC70-5	N08
ADM824SAKS-R7	2.93	-40°C to +85°C	3k	SC70-5	N08
ADM824SART-RL	2.93	-40°C to +125°C	10k	SOT-23-5	N08
ADM824SART-R7	2.93	-40°C to +125°C	3k	SOT-23-5	N08
ADM824RAKS-RL	2.63	-40°C to +85°C	10k	SC70-5	N08
ADM824RAKS-R7	2.63	-40°C to +85°C	3k	SC70-5	N08
ADM824RART-RL	2.63	-40°C to +125°C	10k	SOT-23-5	N08
ADM824RART-R7	2.63	-40°C to +125°C	3k	SOT-23-5	N08
ADM824ZAKS-RL	2.32	-40°C to +85°C	10k	SC70-5	N08
ADM824ZAKS-R7	2.32	-40°C to +85°C	3k	SC70-5	N08
ADM824YAKS-RL	2.19	-40°C to +85°C	10k	SC70-5	N08
ADM824YAKS-R7	2.19	-40°C to +85°C	3k	SC70-5	N08

**ORDERING GUIDE (ADM825)**

<b>Model</b>	<b>Reset Threshold (V)</b>	<b>Temperature Range</b>	<b>Quantity</b>	<b>Package Type</b>	<b>Branding</b>
ADM825LAKS-RL	4.63	-40°C to +85°C	10k	SC70-5	N09
ADM825LAKS-R7	4.63	-40°C to +85°C	3k	SC70-5	N09
ADM825LART-RL	4.63	-40°C to +125°C	10k	SOT-23-5	N09
ADM825LART-R7	4.63	-40°C to +125°C	3k	SOT-23-5	N09
ADM825MAKS-RL	4.38	-40°C to +85°C	10k	SC70-5	N09
ADM825MAKS-R7	4.38	-40°C to +85°C	3k	SC70-5	N09
ADM825MART-RL	4.38	-40°C to +125°C	10k	SOT-23-5	N09
ADM825MART-R7	4.38	-40°C to +125°C	3k	SOT-23-5	N09
ADM825TAKS-RL	3.08	-40°C to +85°C	10k	SC70-5	N09
ADM825TAKS-R7	3.08	-40°C to +85°C	3k	SC70-5	N09
ADM825TART-RL	3.08	-40°C to +125°C	10k	SOT-23-5	N09
ADM825TART-R7	3.08	-40°C to +125°C	3k	SOT-23-5	N09
ADM825SAKS-RL	2.93	-40°C to +85°C	10k	SC70-5	N09
ADM825SAKS-R7	2.93	-40°C to +85°C	3k	SC70-5	N09
ADM825SART-RL	2.93	-40°C to +125°C	10k	SOT-23-5	N09
ADM825SART-R7	2.93	-40°C to +125°C	3k	SOT-23-5	N09
ADM825RAKS-RL	2.63	-40°C to +85°C	10k	SC70-5	N09
ADM825RAKS-R7	2.63	-40°C to +85°C	3k	SC70-5	N09
ADM825RART-RL	2.63	-40°C to +125°C	10k	SOT-23-5	N09
ADM825RART-R7	2.63	-40°C to +125°C	3k	SOT-23-5	N09
ADM825ZAKS-RL	2.32	-40°C to +85°C	10k	SC70-5	N09
ADM825ZAKS-R7	2.32	-40°C to +85°C	3k	SC70-5	N09
ADM825YAKS-RL	2.19	-40°C to +85°C	10k	SC70-5	N09
ADM825YAKS-R7	2.19	-40°C to +85°C	3k	SC70-5	N09

# OUTLINE DIMENSIONS

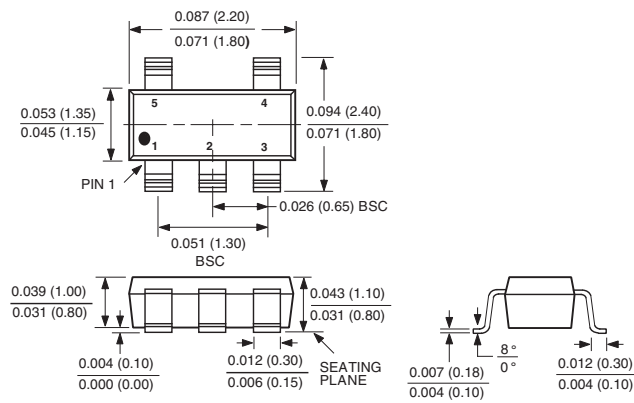


Figure 1. 5-Lead Plastic Surface Mount Package [SC-70]

(KS-5)

Dimensions shown in millimeters

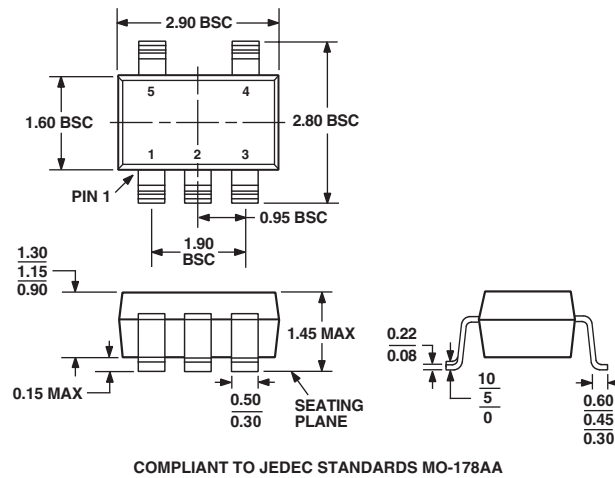


Figure 1. 5-Lead Small Outline Transistor Package [SOT-23]

(RT-5)

Dimensions shown in millimeters