November 2003

ASM1233A

rev 1.0

Low Power, 3.3V, µP Reset, Active LOW, Open-Drain Output

General Description

The ASM1233A is a voltage supervisor with low-power, 3.3V µP Reset, with an active LOW, open-drain output. Maximum supply current over temperature is a low 15µA.

The ASM1233A generates an active LOW reset signal whenever the monitored supply is out of tolerance. A precision reference and comparator circuit monitor power supply (V_{CC}) level. The tolerance is 15% for the 3.3V, ASM1233A. When an out-of-tolerance condition is detected, an internal power-fail signal is generated which forces an active LOW reset signal. After V_{CC} returns to an in-tolerance condition, the reset signal remains active for 350ms to allow the power supply and system microprocessor to stabilize.

The ASM1233A is designed with a open-drain output stage and operates over the extended industrial temperature range. Devices are available in compact SOT-223 packages.

Other low power products in this family include the ASM1810/11/12/15/16/17, ASM1233D, and ASM1233M

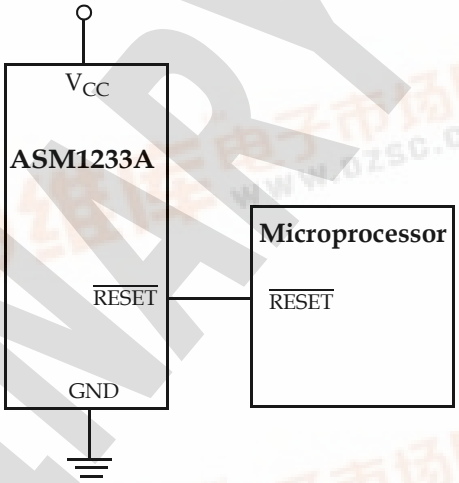
Key Features

- Low Supply Current
  •15µA maximum (3.6 V)
- Automatically restarts a microprocessor after power failure
- 350ms reset delay after V_{CC} returns to an in-tolerance condition
- Active LOW power-up reset, 5kΩ internal pull-up
- Precision temperature-compensated voltage reference and comparator
- Eliminates external components
- Low-cost SOT-223 package
- Operating temperature -40°C to +85°C

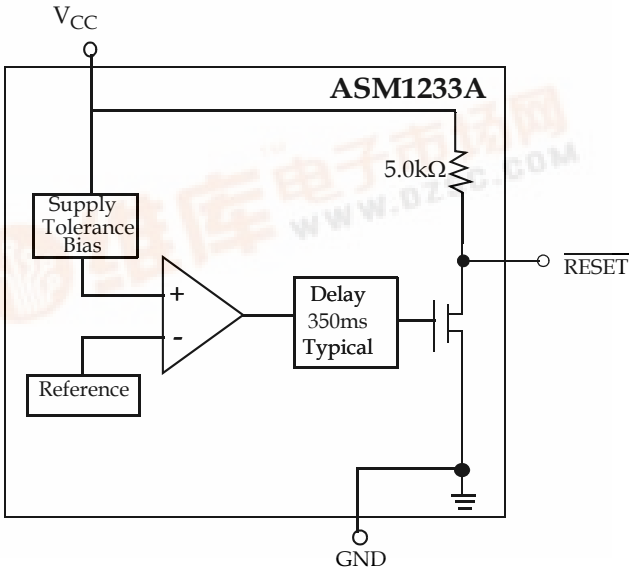
Applications

- Set-top boxes
- Cellular phones
- PDAs
- Energy management systems
- Embedded control systems
- Printers
- Single board computers

Typical Operating Circuit

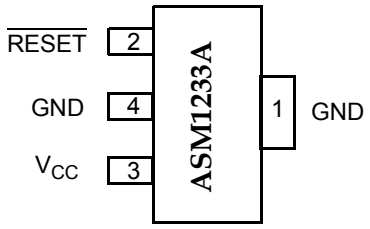


Block Diagram



Pin Configuration

SOT-223



Pin Description

Pin#	Pin Name	Description
1	GND	Ground.
2	$\overline{\text{RESET}}$	Active LOW reset output.
3	V_{CC}	Power supply input.
4	GND	Ground.

Application Information

Operation - Power Monitor

The ASM1233A detects out-of-tolerance power supply conditions. It resets a processor during power-up, power-down and generates a reset to the system processor when the monitored power supply voltage is below the reset threshold. When an out-of-tolerance V_{CC} voltage is detected, the $\overline{RESET}$ signal is asserted. On power-up, $\overline{RESET}$ is kept active (LOW) for approximatley 350ms after the power supply voltage has reached the selected tolerance. This allows the power supply and microprocessor to stablize before $\overline{RESET}$ is released.

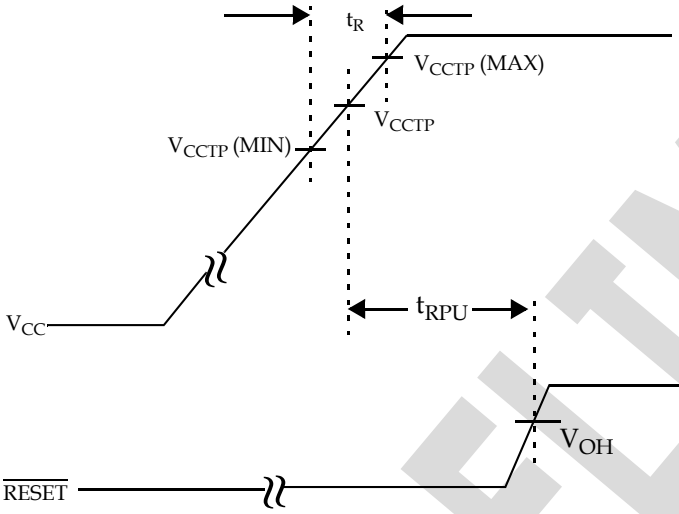


Figure 1: Timing Diagram: Power-Up

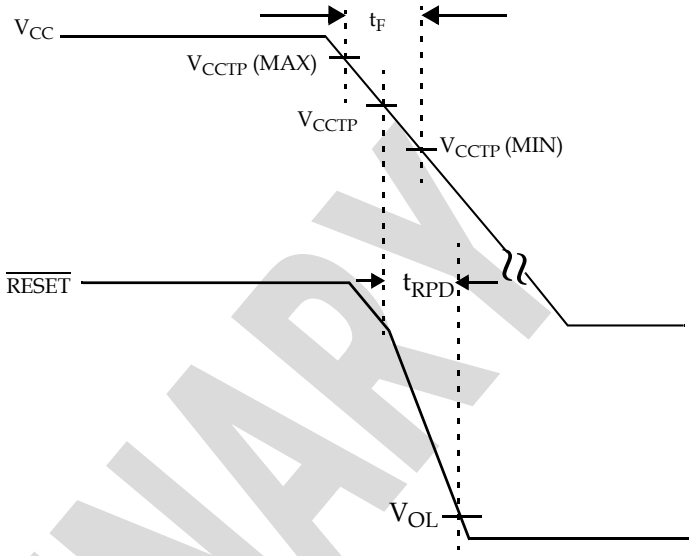


Figure 2: Timing Diagram: Power-Down

Absolute Maximum Ratings

Parameter	Min	Max	Unit
Voltage on V_{CC}	-0.5	7	V
Voltage on $\overline{RESET}$	-0.5	V_{CC} + 0.5	V
Operating Temperature Range	-40	85	°C
Soldering Temperature (for 10 sec)		260	°C
Storage Temperature	-55	125	°C

NOTE: These are stress ratings only and functional use is not implied. Exposure to absolute maximum ratings for prolonged periods of time may affect device reliability.

Electrical Characteristics

Unless otherwise noted, V_{CC} = 1.2V to 5.5V and specifications are over the operating temperature range of -40°C to +85°C.
All voltages are referenced to ground.

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Supply Voltage	V_{CC}		1.2		5.5	V
Output Voltage	V_{OH}	I_{OUT} < 500 µA	V_{CC} - 0.5V	V_{CC} - 0.1V		V
Output Current	I_{OL}	Output = 0.4V, V_{CC} >= 2.7V	+8			mA
Operating Current	I_{CC}	V_{CC} < =3.6V, $\overline{\text{RESET}}$ output open		6	15	µA
V_{CC} Trip Point (ASM1233A-3)	V_{CCTP}		2.64	2.72	2.8	V
Voltage High Trip Level ASM1233A-3	V_{HTL}				3.14	V
Internal Pull-up Resistor	R_P		3.5	5.0	7.5	kΩ
Output Capacitance	C_{OUT}				10	pF
V_{CC} Detect to $\overline{\text{RESET}}$ Low	t_{RPD}			2	10	µs
V_{CC} Slew Rate (V_{HTL} - V_{LTL})	t_F		300			µs
V_{CC} Slew Rate (V_{LTL} - V_{HTL})	t_R		0			ns
V_{CC} Detect to $\overline{\text{RESET}}$ High	t_{RPU}	t_r = 5µs	200	350	500	ms
Note: A 1kΩ resistor maybe required in some applications for proper operation of the microprocessor reset control circuit.						

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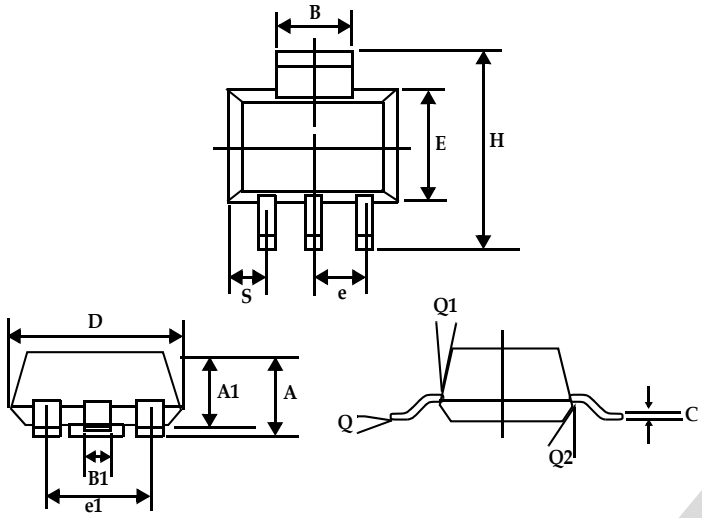
Family Selection Guide

Part #	RESET Voltage (V)	RESET Time (ms)	Output Stage	RESET Polarity
ASM1810	4.620, 4.370, 4.120	150	Push-Pull	LOW
ASM1811	4.620, 4.350, 4.130	150	Open-Drain	LOW
ASM1812	4.620, 4.350, 4.130	150	Push-Pull	HIGH
ASM1815	3.060, 2.880, 2.550	150	Push-Pull	LOW
ASM1816	3.060, 2.880, 2.550	150	Open-Drain	LOW
ASM1817	3.060, 2.880, 2.550	150	Push-Pull	HIGH
ASM1233D	4.625, 4.375, 4.125	350	Open-Drain	LOW
ASM1233M	4.625, 4.375, 2.720	350	Open-Drain	LOW
ASM1233A	2.720	350	Open-Drain	LOW

Package Information

SOT-223



Symbol	Dimensions in millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	0.067	0.060	1.70	1.50
A1	0.004	0.0008	0.10	0.02
B	0.124	0.116	3.15	2.95
B1	0.033	0.026	0.85	0.65
C	0.014	0.010	0.35	0.25
D	0.264	0.248	6.70	6.30
e	0.0905 NOM		2.30 NOM	
e1	0.181 NOM		4.50 NOM	
E	0.146	0.130	3.70	3.30
h	0.287	0.264	7.30	6.70
s	0.041	0.033	1.05	0.85
Q	10 ° MAX		10 ° MAX	
Q1	16°	10°	16°	10°
Q2	16°	10°	16°	10°

Ordering Information

Part Number	RESET Output Voltage	RESET Tolerance	RESET Time	Open-Drain Output Stage*	RESET Polarity
ASM1233AZ-15	2.720 V	15%	350 ms	◆	LOW
* Internal 5kΩ resistor pull-up					

ASM1233A

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Preliminary Information
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