Low Power 5V / 3.3V µP Reset Active LOW, Open - Drain Output

General Description

The ASM8500 is a voltage supervisory device with a low-power, 5V/3.3V µP Reset, active LOW, open-drain output. Maximum supply current over temperature is a low 6µA.

The ASM8500 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. Reset threshold tolerance level is ±1.5%. 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 1.5ms to allow the power supply and system microprocessor to stabilize.

The ASM8500 is designed with a open-drain output stage and operates over the extended industrial temperature range. Devices are available in compact surface mount SOT-89 packages.

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

Key Features

- Low Supply Current
  - 6 µA maximum (5.5 V)
- Automatically restarts a microprocessor after power failure
- 1.5ms reset delay after V_{CC} returns to an in-tolerance condition
- Active LOW power-up reset
- Precision temperature-compensated voltage reference and comparator
- Eliminates external components
- Compact surface mount SOT-89 package
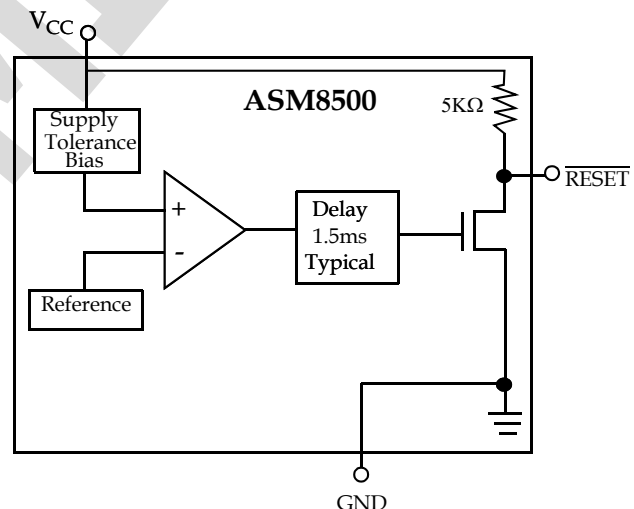- Operating temperature -40°C to +85°C

Applications

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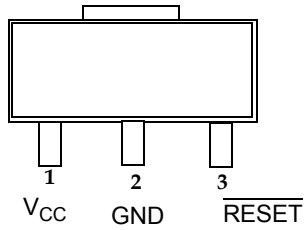- Single board computers

Typical Operating Circuit

Block Diagram

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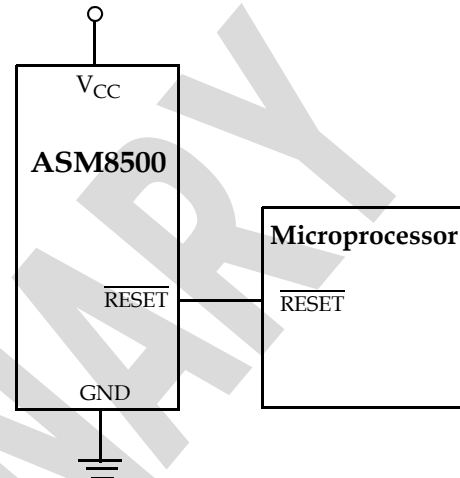
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Pin Configuration

1	2	3
V_{CC}	GND	$\overline{RESET}$

Pin Description

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

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Application Information

Operation - Power Monitor

The ASM8500 detects out-of-tolerance power supply conditions. It resets a processor during power-up, power-down and issues 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 approximately 1.5ms after the power supply voltage has reached the selected tolerance. This allows the power supply and microprocessor to stabilize before $\overline{RESET}$ is released.

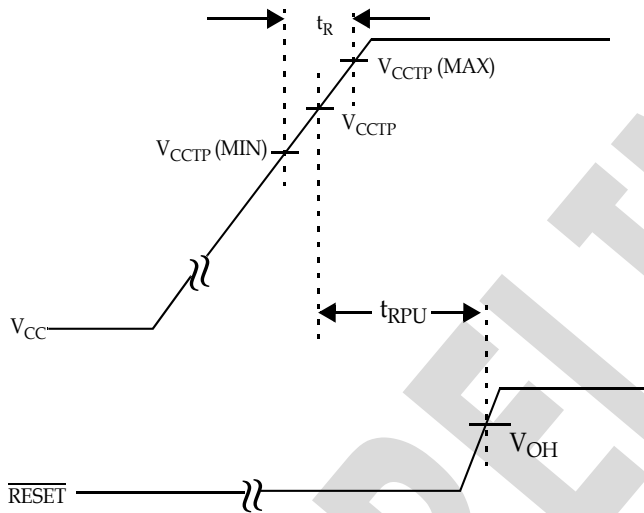Figure 2: Timing Diagram: Power-Down

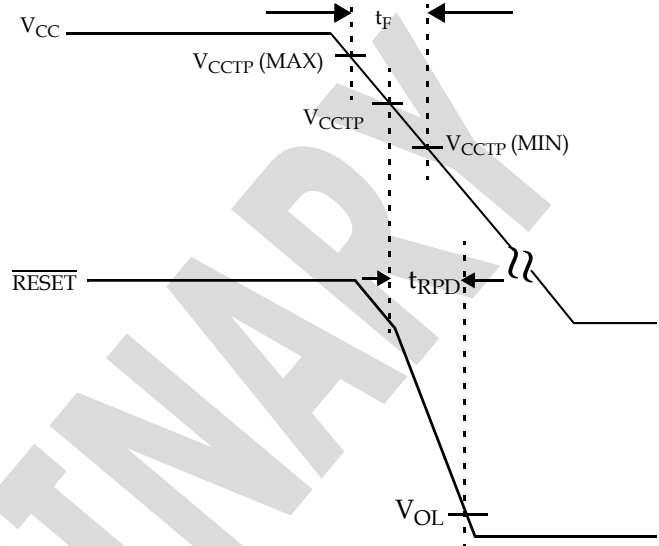Figure 1: Timing Diagram: Power-Up

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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		5.5	V
Output Voltage	V_{OH}	I_{OUT} < 500 µA	V_{CC} - 0.5V	V_{CC} - 0.1V		V
Output Current	I_{OH}	Output = 0.4V, $V_{CC} \geq$ 2.7V	+10			mA
Operating Current	I_{CC}	V_{CC} < 5.5V, $\overline{RESET}$ output open		6		µA
V_{CC} Trip Point (ASM8500-42)	V_{CCTP}			4.2		V
V_{CC} Trip Point (ASM8500-29)	V_{CCTP}			2.9		V
V_{CC} Trip Point (ASM8500-27)	V_{CCTP}			2.7		V
Internal Pull-up Resistor	R_P		3.5	5.5	7.5	kΩ
Output Capacitance	C_{OUT}				10	pF
RESET Active Time	t_{RESET}		0.5	1.5	5	ms
V_{CC} Detect to $\overline{RESET}$ Low	t_{RPD}			2	5	µs
V_{CC} Slew Rate (V_{CCTP} (MAX) to V_{CCTP} (MIN))	t_F		300			µs
V_{CC} Slew Rate (V_{CCTP} (MIN) to V_{CCTP} (MAX))	t_R		0			ns
V_{CC} Detect to $\overline{RESET}$ High	t_{RPU}	t_r = 5µs	0.5	1.5	5	ms
Note: The t_F value is for reference in defining values for t_{RPD} and should not be considered for proper operation or use.						

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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
ASM8500	4.2, 2.9, 2.7	1.5	Open-Drain	LOW

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Package Dimensions

Plastic SOT-89
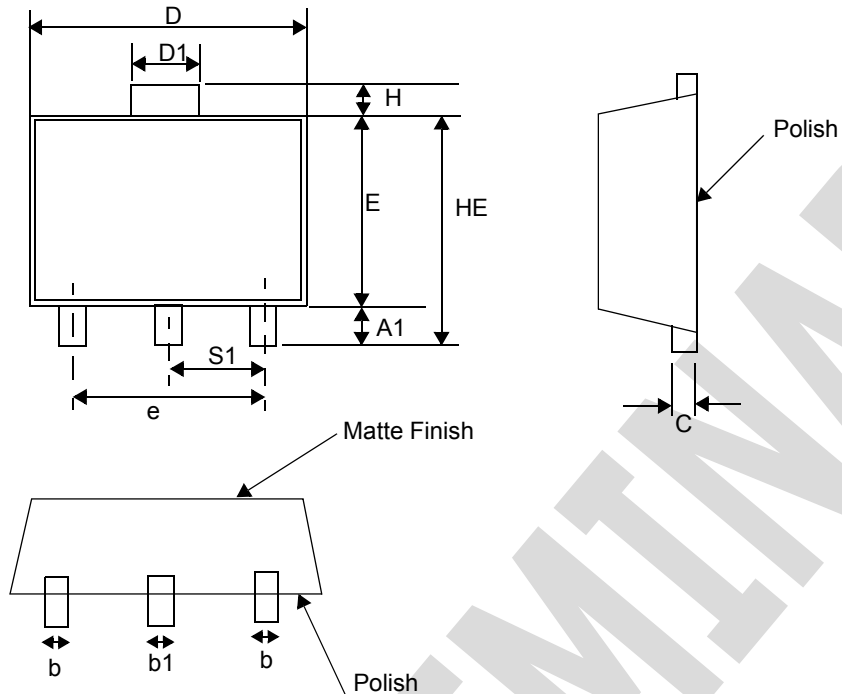
Symbol	Dimension in Millimeters		Dimensions in Inches	
	Min	**Max**	**Min**	**Max**
A	1.40	1.60	0.0551	0.0630
A1	0.89	-	0.0350	-
b	0.36	0.52	0.0142	0.0205
b1	0.41	0.56	0.0161	0.0220
C	0.35	0.44	0.0138	0.0173
D	4.40	4.60	0.1732	0.1811
D1	1.35	1.83	0.0531	0.0720
HE	-	4.25	-	0.1673
E	2.29	2.60	0.0902	0.1024
e	2.90	3.10	0.1142	0.1220
H	0.35	0.70	0.0138	0.0276
S1	1.40	1.60	0.0551	0.0630

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ASM8500

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