

rev 1.0

Low Power, 5V/3.0V, µP Reset, Active LOW, Open-Drain Output

General Description

The ASM1233M is a voltage supervisor with low-power, 5V μ P Reset, with an active LOW, open-drain output. Maximum supply current over temperature is a low 20 μ A.

The ASM1233M 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. Tolerance level options are 5% ,and 10% for a 5V power supply. The tolerance is 15% for the 3.3V, ASM1233M. 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 ASM1233M is designed with a open-drain output stage and operates over the extended industrial temperature range. Devices are available in compact surface mount SO-8 packages and 3-lead TO-92 packages.

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

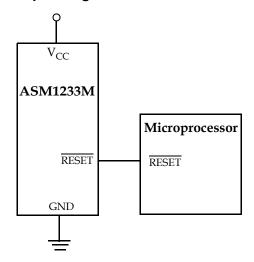
Key Features

- Low Supply Current
 - •20 µA maximum (5.5 V)
 - •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 TO-92 package
- Compact surface mount SO-8 package
- Operating temperature -40°C to +85°C

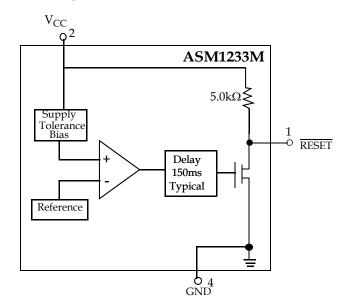
Applications

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

Typical Operating Circuit

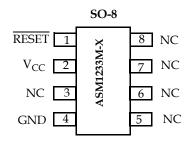


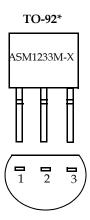
Block Diagram





Pin Configuration





Pin Description

Pin#		Pin Name	Description	
SO-8	TO-92	Fill Name	Description	
1	1	RESET	Active LOW reset output	
2	2	V _{CC}	Power supply input	
3, 5, 6, 7 and 8	-	NC	No Connection.	
4	3	GND	Ground.	

^{*} See Ordering Information

rev 1.0

Application Information Operation - Power Monitor

The ASM1233M 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.

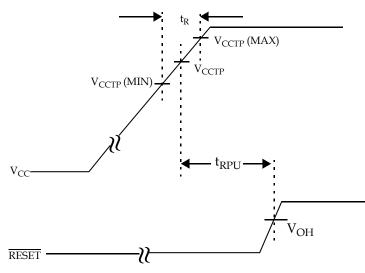


Figure 1: Timing Diagram: Power-Up

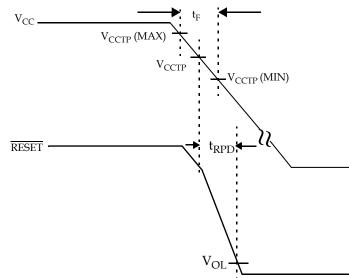


Figure 2: Timing Diagram: Power-Down

rev 1.0 Absolute Maximum Ratings

Parameter	Min	Max	Unit
Voltage on V _{CC}	-0.5	7	V
Voltage on 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.

rev 1.0

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	Тур	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} < 5.5V, RESET output open		8	20	μA	
Operating Current	I _{CC}	V _{CC} < =3.6V, RESET output open		6	15	μΑ	
V _{CC} Trip Point (ASM1233M-5)	V _{CCTP}		4.25	4.375	4.49	V	
V _{CC} Trip Point (ASM1233M-55)	V _{CCTP}		4.5	4.625	4.75	V	
V _{CC} Trip Point (ASM1233M-3)	V _{CCTP}		2.64	2.72	2.8	V	
Voltage High Trip Level ASM1233M-5 ASM1233M-55	V _{HTL}				4.75	V	
Voltage Low Trip Level ASM1233M-5 ASM1233M-55	V _{LTL}				4.00	V	
Voltage High Trip Level ASM1233M-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 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 RESET High	t _{RPU}	t _r = 5μs	200	350	500	ms	
Note: A $1k\Omega$ resistor maybe required in some applications for proper operation of the microprocessor reset control circuit.							

rev 1.0

Family Selection Guide

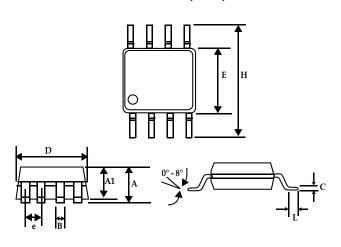
Part #	RESET Voltage (V)	RESET Time (ms)	Output Stage	RESET Polarity	
ASM1810	4.620, 4.370, 4.120	150	Push-Pull	LOW	
ASM1811	4.620, 4.350, 4.130	150	Open-Drain	LOW	
ASM1812	4.620, 4.350, 4.130	150	Push-Pull	HIGH	
ASM1815	3.060, 2.880, 2.550	150	Push-Pull	LOW	
ASM1816	3.060, 2.880, 2.550	150	Open-Drain	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	



rev 1.0

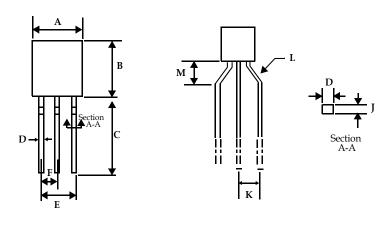
Package Information

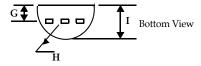
Plastic SO-8 (8-Pin)



	Inches		Millimeters				
	Min	Max	Min	Max			
	Plastic SO-8 (8-Pin)						
Α	0.053	0.069	1.35	1.75			
A1	0.004	0.010	0.10	0.25			
В	0.013	0.020	0.33	0.51			
С	0.007	0.010	0.19	0.25			
е	0.0)50	1.:	27			
Е	0.150	0.157	3.80	4.00			
Н	0.228	0.244	5.80	6.20			
L	0.016	0.050	0.40	1.27			
D	0.189	0.197	4.80	2.00			

TO-92 (3-Pin)





	Inc	hes	Millimeters				
	Min	Max	Min	Max			
	Plastic SO-8 (8-Pin)						
	TO-92* (3-Pin)						
Α	0.175	0.195	4.45	4.95			
В	0.170	0.192	4.32	4.96			
С	0.500	0.610	12.70	15.49			
D	0.016	0.022	0.406	0.559			
Е	0.095	0.105	2.41	2.67			
F	0.045	0.60	1.14	1.52			
G	0.45	0.060	1.14	1.52			
Н	0.085	0.095	2.16	2.41			
ı	0.130	0.155	3.30	3.94			
J	0.014	0.020	0.35	0.51			
K	0.093	0.115	2.36	2.92			
L	45°	60°	45°	60°			
М	0.118	Typical	3.0	00			

rev 1.0

Ordering Information

Device Summary							
Part Number	RESET Output Voltage (V)	RESET Tolerance (%)	RESET Time (ms)	Open-Drain Output Stage**	TO-92 Package*	SO-8 Package	RESET Polarity
ASM1233M-55	4.625	5	350	*	•		LOW
ASM1233M-5	4.375	10	350	•	•		LOW
ASM1233M-3	2.720	15	350	•	•		LOW
ASM1233MS-55	4.625	5	350	•		•	LOW
ASM1233MS-5	4.375	10	350	•		*	LOW
ASM1233MS-3	2.720	15	350	•		•	LOW

^{*} Add /S to Part Number for straight (unformed) leads. (i.e. ASM1233xx-x/S)

^{**} Internal $5k\Omega$ resistor pull-up





Alliance Semiconductor Corporation 2575, Augustine Drive, Santa Clara, CA 95054 Tel: 408 - 855 - 4900

Fax: 408 - 855 - 4999

www.alsc.com

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