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

General Description

The ASM1811 is a voltage supervisory device with a low-power, 5V µP Reset, active LOW, open-drain output. Maximum supply current over temperature is a low 20µA.

The ASM1811 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%, 10% and 15%. 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 150ms to allow the power supply and system microprocessor to stabilize.

The ASM1811 is designed with a open-drain output stage and operates over the extended industrial temperature range. Devices are available in low cost TO-92 and compact surface mount SOT-23 packages.

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

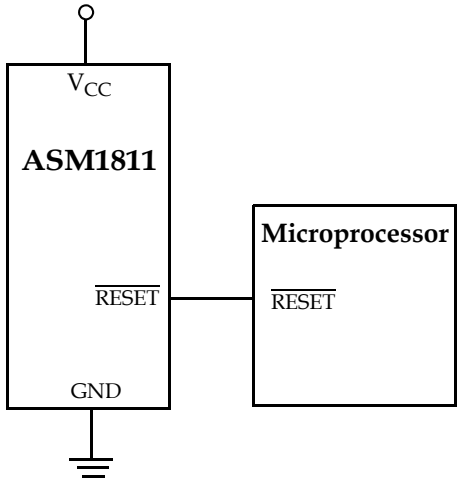
Key Features

- Low Supply Current
  •20 µA maximum (5.5 V)
- Automatically restarts a microprocessor after power failure
- 150ms 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
- Low cost TO-92 and compact surface mount SOT-23 packages
- Operating temperature -40°C to +85°C

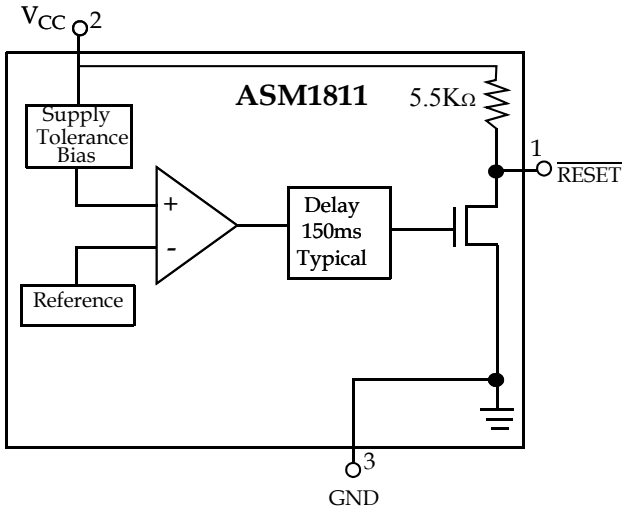
Applications

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

Typical Operating Circuit

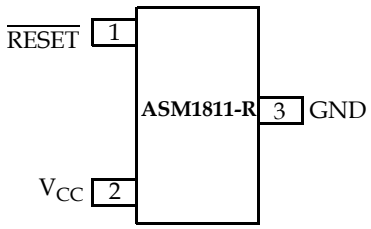


Block Diagram

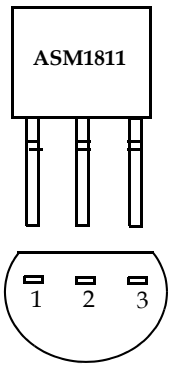


Pin Configuration

SOT-23



TO-92



Pin Description

SOT-23 Pin #	TO-92 Pin #	Pin Name	Description
1	1	$\overline{\text{RESET}}$	Active LOW reset output
2	2	V_{CC}	Power supply input
3	3	GND	Ground

Application Information

Operation - Power Monitor

The ASM1811 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 150ms after the power supply voltage has reached the selected tolerance. This allows the power supply and microprocessor to stabilize before $\overline{RESET}$ is released.

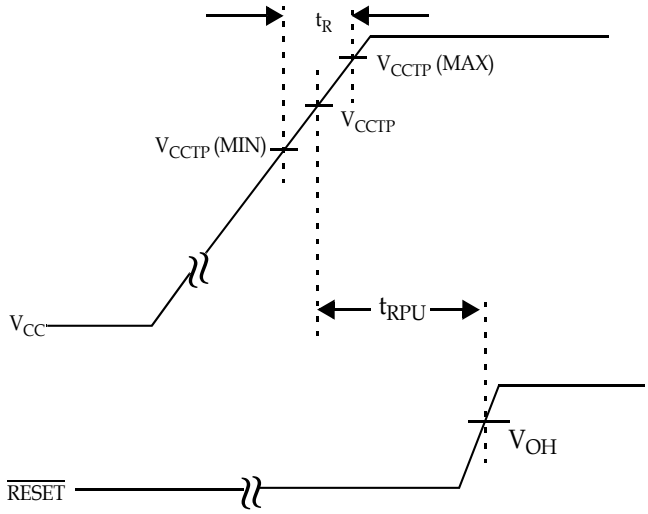


Figure 1: Timing Diagram: Power-Up

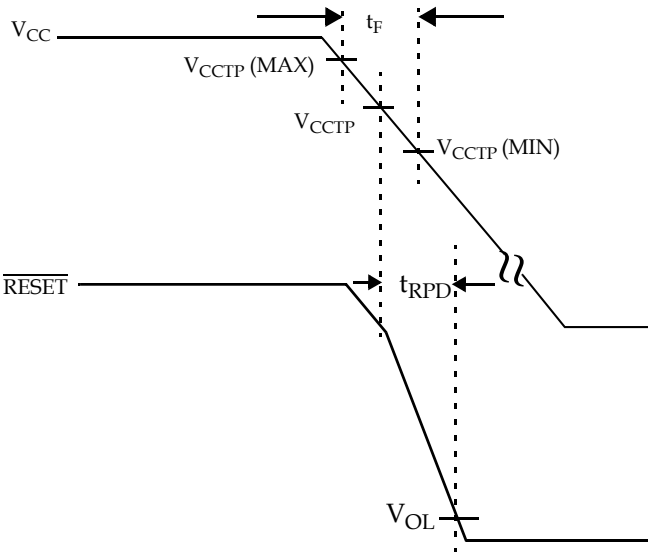


Figure 2: Timing Diagram: Power-Down

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
ESD rating HBM MM		 2 200	 KV V
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

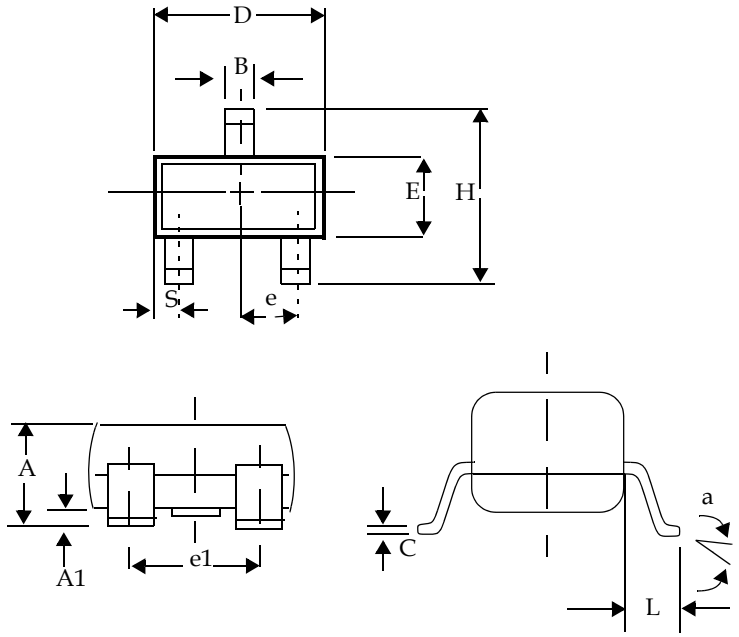
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Supply Voltage	V_{CC}		1.2		5.5	V
Operating Current	I_{CC}	V_{CC} < 5.5V, $\overline{RESET}$ output open		8	20	µA
V_{CC} Trip Point (ASM1811R-5)	V_{CCTP}		4.50	4.62	4.75	V
V_{CC} Trip Point (ASM1811R-10)	V_{CCTP}		4.25	4.35	4.49	V
V_{CC} Trip Point (ASM1811R-15)	V_{CCTP}		4.00	4.13	4.24	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}		100	150	250	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	100	150	300	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.						

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

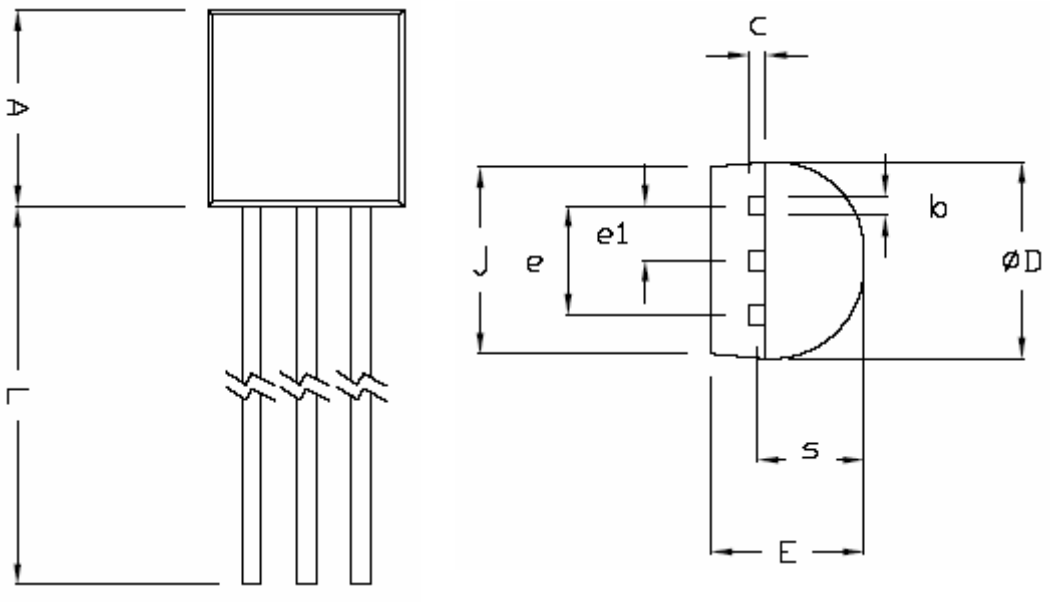
Package Dimension

Plastic SOT-23 (3-Pin)



	Inches		Millimeters	
	Min	**Max**	**Min**	**Max**
Plastic SOT-23 (3-Pin)				
A	0.030	0.046	0.75	1.17
A1	0.002	0.006	0.05	0.15
B	0.012	0.020	0.30	0.50
C	0.003	0.008	0.08	0.20
D	0.110	0.120	2.80	3.04
E	0.047	0.055	1.20	1.40
e	0.037 BSC		0.95 BSC	
e1	0.075 BSC		1.9 BSC	
H	0.083	0.104	2.10	2.64
L	0.016	0.024	0.40	0.60
a	0°	8°	0°	8°
S	NA		NA	

To-92 (3-Pin)



	Dimensions in Inches		Dimensions in Millimeters	
	Min	Max	Min	Max
TO-92				
A	0.175	0.185	4.445	4.699
b	0.016	0.020	0.406	0.508
C	0.014	0.016	0.356	0.406
ϕD	0.175	0.185	4.445	4.699
E	0.138	0.144	3.505	3.658
e	0.098	0.102	2.489	2.591
e1	0.045	0.055	1.143	1.397
j	0.168	0.174	4.269	4.420
L	0.500	0.585	12.7	14.86
s	0.095	0.099	2.413	2.515

Ordering Information

Device Summary							
Part * Number**	**RESET Output Voltage (V)**	**RESET Tolerance (%)**	**RESET Time (ms)**	**Open-Drain ** Output Stage**	**SOT-23 Package**	**RESET Polarity**	**Package Marking**
TIN - LEAD DEVICES							
ASM1811R-5	4.62	5	150	◆	◆	LOW	RDLL
ASM1811R-10	4.35	10	150	◆	◆	LOW	RELL
ASM1811R-15	4.13	15	150	◆	◆	LOW	RFLL
LEAD FREE DEVICES							
ASM1811R-5F	4.62	5	150	◆	◆	LOW	KDLL
ASM1811R-10F	4.35	10	150	◆	◆	LOW	KELL
ASM1811R-15F	4.13	15	150	◆	◆	LOW	KFLL
Part * Number**	**RESET Output Voltage (V)**	**RESET Tolerance (%)**	**RESET Time (ms)**	**Open-Drain ** Output Stage**	**TO-92 Package**	**RESET Polarity**	**Package Marking**
TIN - LEAD DEVICES							
ASM1811-5	4.62	5	150	◆	◆	LOW	ASM1811-5
ASM1811-10	4.35	10	150	◆	◆	LOW	ASM1811-10
ASM1811-15	4.13	15	150	◆	◆	LOW	ASM1811-15
LEAD FREE DEVICES							
ASM1811-5F	4.62	5	150	◆	◆	LOW	ASM1811-5F
ASM1811-10F	4.35	10	150	◆	◆	LOW	ASM1811-10F
ASM1811-15F	4.13	15	150	◆	◆	LOW	ASM1811-15F

** Internal 5.5kΩ resistor pull-up
** *Add /T to Part Number for Tape and Reel (i.e ASM18xx-x/T)
LL- Lot Code

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Part Number: ASM1811
Document Version: 1.4