



rev 1.4

## Low Power 5V $\mu$ P Reset Active HIGH, Push-Pull Output

### General Description

The ASM1812 is a voltage supervisory device with low-power, 5V  $\mu$ P Reset, active HIGH, Push-Pull output. Maximum supply current over temperature is a low 20 $\mu$ A.

The ASM1812 issues an active HIGH 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 HIGH 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 ASM1812 is designed with a push-pull output stage and operates over the extended industrial temperature range. Devices are available in TO-92 and compact surface mount SOT-23 packages.

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

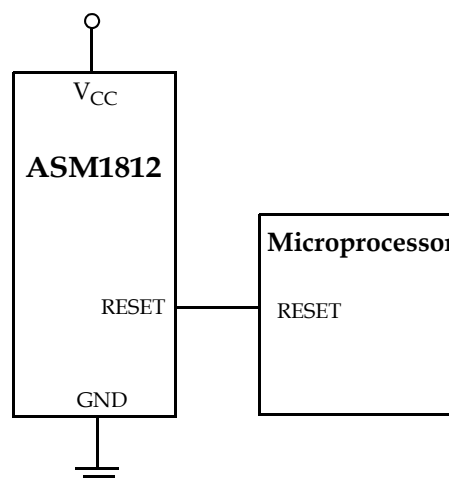
### Key Features

- Low Supply Current
  - 20  $\mu$ A maximum (5.5 V)
- Automatically restarts a microprocessor after power failure
- 150ms reset delay after  $V_{CC}$  returns to an in-tolerance condition
- Active HIGH power-up reset
- Precision temperature-compensated voltage reference and comparator
- Eliminates external components
- TO-92 and compact surface mount SOT-23 package
- Push-Pull output for minimum current drain
- Operating temperature -40°C to +85°C

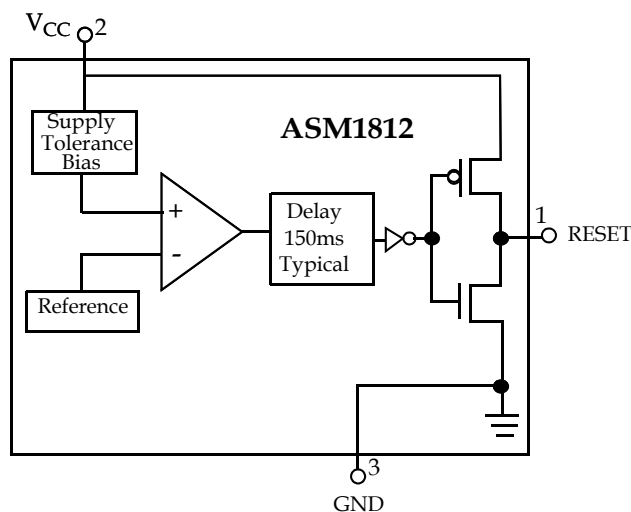
### Applications

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

### Typical Operating Circuit



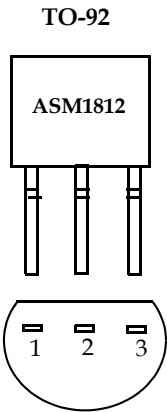
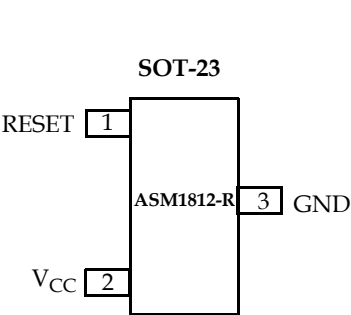
### Block Diagram





rev 1.4

Pin Configuration



Pin Description

| TO-92 | SOT-23 | Pin Name        | Description              |
|-------|--------|-----------------|--------------------------|
| Pin # | Pin #  |                 |                          |
| 1     | 1      | RESET           | Active HIGH reset output |
| 2     | 2      | V <sub>CC</sub> | Power supply input       |
| 3     | 3      | GND             | Ground                   |



rev 1.4

## Application Information

### Operation - Power Monitor

The ASM1812 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 RESET signal is asserted. On power-up, RESET is kept active (HIGH) for approximately 150ms after the power supply voltage has reached the selected tolerance. This allows the power supply and microprocessor to stabilize before RESET is released.

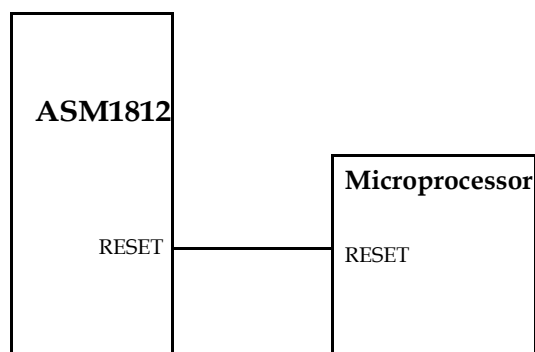


Figure 1: Typical Application

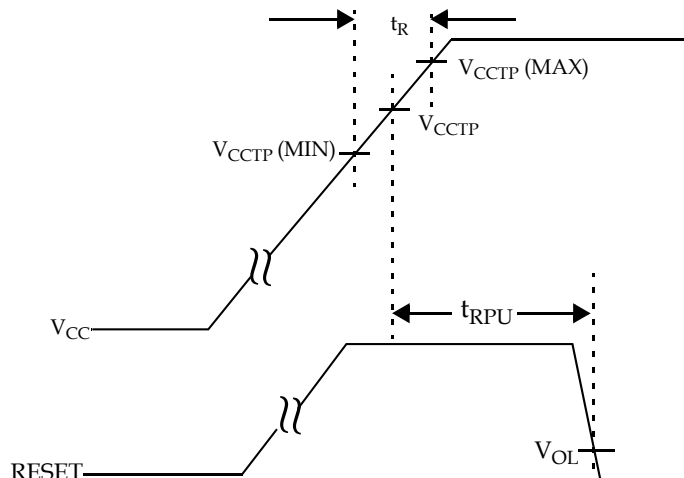


Figure 2: Timing Diagram: Power-Up

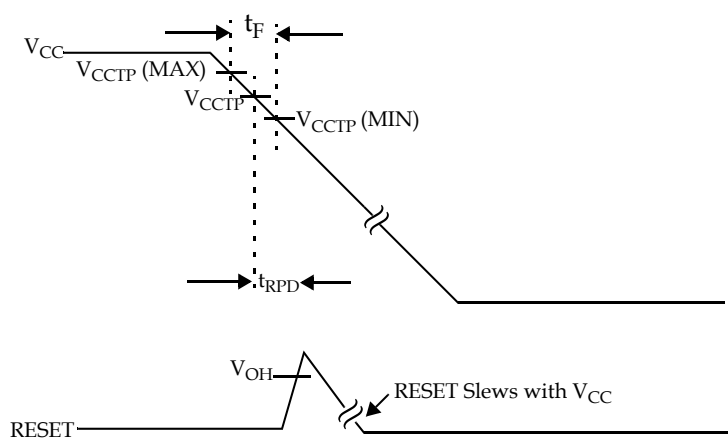


Figure 3: Timing Diagram: Power-Down



rev 1.4

**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   |
| ESD rating                                                                                                                                                               |      |                |      |
| HBM                                                                                                                                                                      |      | 2              | KV   |
| MM                                                                                                                                                                       |      | 200            | 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  $-40^{\circ}C$  to  $+85^{\circ}C$ . All voltages are referenced to ground

| Parameter                                                                                                                         | Symbol      | Conditions                        | Min             | Typ             | Max  | Unit    |
|-----------------------------------------------------------------------------------------------------------------------------------|-------------|-----------------------------------|-----------------|-----------------|------|---------|
| Supply Voltage                                                                                                                    | $V_{CC}$    |                                   | 1.2             |                 | 5.5  | V       |
| Output Voltage                                                                                                                    | $V_{OH}$    | $I_{OUT} < 500 \mu A$             | $V_{CC} - 0.5V$ | $V_{CC} - 0.1V$ |      | V       |
| Output Current                                                                                                                    | $I_{OH}$    | Output = 2.4V, $V_{CC} \geq 2.7V$ |                 | 350             |      | $\mu A$ |
| Output Current                                                                                                                    | $I_{OL}$    | Output = 0.4V, $V_{CC} \geq 2.7V$ | +10             |                 |      | mA      |
| Operating Current                                                                                                                 | $I_{CC}$    | $V_{CC} < 5.5V$ , RESET output    |                 | 8               | 20   | $\mu A$ |
| $V_{CC}$ Trip Point (ASM1812R-5)                                                                                                  | $V_{CCTP}$  |                                   | 4.50            | 4.62            | 4.75 | V       |
| $V_{CC}$ Trip Point (ASM1812R-10)                                                                                                 | $V_{CCTP}$  |                                   | 4.25            | 4.35            | 4.49 | V       |
| $V_{CC}$ Trip Point (ASM1812R-15)                                                                                                 | $V_{CCTP}$  |                                   | 4.00            | 4.13            | 4.24 | V       |
| Output Capacitance                                                                                                                | $C_{OUT}$   |                                   |                 |                 | 10   | pF      |
| RESET Active Time                                                                                                                 | $t_{RESET}$ |                                   | 100             | 150             | 250  | ms      |
| $V_{CC}$ Detect to RESET HIGH                                                                                                     | $t_{RPD}$   |                                   |                 | 2               | 5    | $\mu s$ |
| $V_{CC}$ Slew Rate                                                                                                                | $t_F$       |                                   | 300             |                 |      | $\mu s$ |
| $V_{CC}$ Slew Rate                                                                                                                | $t_R$       |                                   | 0               |                 |      | ns      |
| $V_{CC}$ Detect to RESET LOW                                                                                                      | $t_{RPU}$   | $t_r = 5\mu s$                    | 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. |             |                                   |                 |                 |      |         |



rev 1.4

## Family Selection Guide

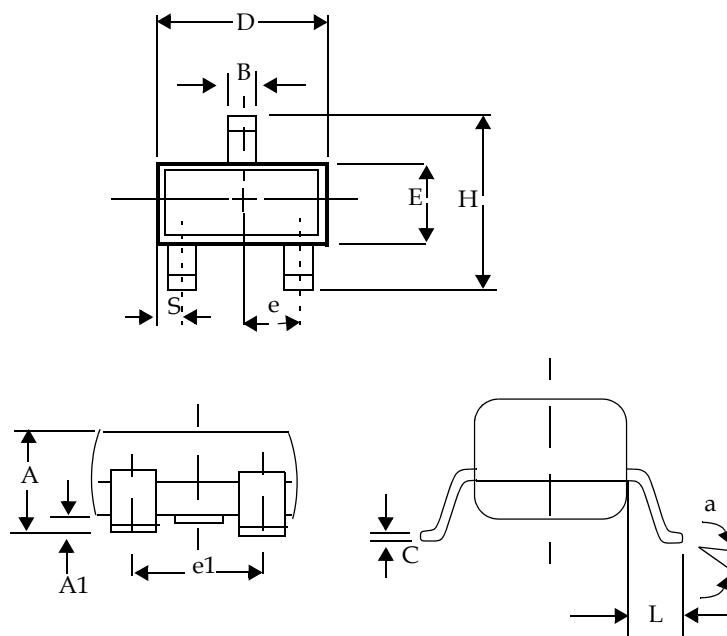
| Part #   | RESET Voltage (V)   | RESET Time (ms) | Output Stage | RESET Polarity |
|----------|---------------------|-----------------|--------------|----------------|
| ASM1810  | 4.620, 4.370, 4.120 | 150             | Push-Pull    | LOW            |
| ASM1811  | 4.620, 4.350, 4.130 | 150             | 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 1.4

## Package Dimension

## Plastic SOT-23 (3-Pin)

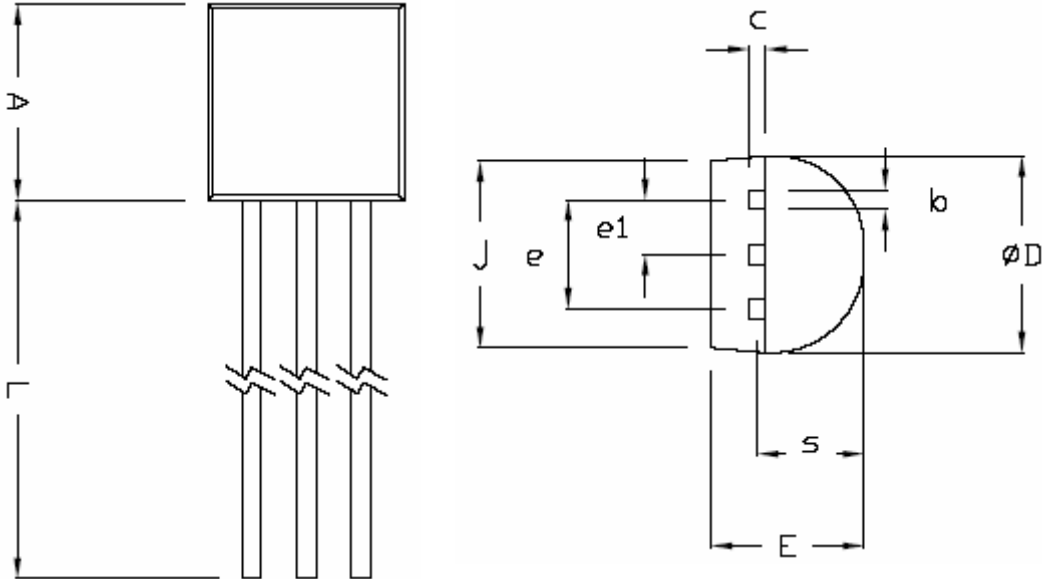


|                               | Inches    |       | Millimeters |      |
|-------------------------------|-----------|-------|-------------|------|
|                               | Min       | Max   | Min         | Max  |
| <b>Plastic SOT-23 (3-Pin)</b> |           |       |             |      |
| 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          |      |



rev 1.4

## To-92 (3-Pin)



|              | Dimensions in Inches |       | Dimensions in Millimeters |       |
|--------------|----------------------|-------|---------------------------|-------|
|              | Min                  | Max   | Min                       | Max   |
| <b>TO-92</b> |                      |       |                           |       |
| 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 |
| $\phi D$     | 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 |



rev 1.4

## Ordering Codes

| Device Summary                                                               |                          |                     |                 |                        |                |                |                 |
|------------------------------------------------------------------------------|--------------------------|---------------------|-----------------|------------------------|----------------|----------------|-----------------|
| Part ** Number                                                               | RESET Output Voltage (V) | RESET Tolerance (%) | RESET Time (ms) | Push-Pull Output Stage | SOT-23 Package | RESET Polarity | Package Marking |
| <b>TIN - LEAD DEVICES</b>                                                    |                          |                     |                 |                        |                |                |                 |
| ASM1812R-5                                                                   | 4.62                     | 5                   | 150             | ◆                      | ◆              | HIGH           | RGLL            |
| ASM1812R-10                                                                  | 4.35                     | 10                  | 150             | ◆                      | ◆              | HIGH           | RHLL            |
| ASM1812R-15                                                                  | 4.13                     | 15                  | 150             | ◆                      | ◆              | HIGH           | RILL            |
| <b>LEAD FREE DEVICES</b>                                                     |                          |                     |                 |                        |                |                |                 |
| ASM1812R-5F                                                                  | 4.62                     | 5                   | 150             | ◆                      | ◆              | HIGH           | KGLL            |
| ASM1812R-10F                                                                 | 4.35                     | 10                  | 150             | ◆                      | ◆              | HIGH           | KHLL            |
| ASM1812R-15F                                                                 | 4.13                     | 15                  | 150             | ◆                      | ◆              | HIGH           | KILL            |
| Part ** Number                                                               | RESET Output Voltage (V) | RESET Tolerance (%) | RESET Time (ms) | Push-Pull Output Stage | TO-92 Package  | RESET Polarity | Package Marking |
| <b>TIN - LEAD DEVICES</b>                                                    |                          |                     |                 |                        |                |                |                 |
| ASM1812-5                                                                    | 4.62                     | 5                   | 150             | ◆                      | ◆              | HIGH           | ASM1812-5       |
| ASM1812-10                                                                   | 4.35                     | 10                  | 150             | ◆                      | ◆              | HIGH           | ASM1812-10      |
| ASM1812-15                                                                   | 4.13                     | 15                  | 150             | ◆                      | ◆              | HIGH           | ASM1812-15      |
| <b>LEAD FREE DEVICES</b>                                                     |                          |                     |                 |                        |                |                |                 |
| ASM1812-5F                                                                   | 4.62                     | 5                   | 150             | ◆                      | ◆              | HIGH           | ASM1812-5F      |
| ASM1812-10F                                                                  | 4.35                     | 10                  | 150             | ◆                      | ◆              | HIGH           | ASM1812-10F     |
| ASM1812-15F                                                                  | 4.13                     | 15                  | 150             | ◆                      | ◆              | HIGH           | ASM1812-15F     |
| ** Add /T to Part Number for Tape and Reel (i.e ASM18xx-x/T)<br>LL- Lot Code |                          |                     |                 |                        |                |                |                 |





# ASM1812



Alliance Semiconductor Corporation  
2575, Augustine Drive,  
Santa Clara, CA 95054  
Tel: 408 - 855 - 4900  
Fax: 408 - 855 - 4999  
[www.alsc.com](http://www.alsc.com)

Copyright © Alliance Semiconductor  
All Rights Reserved  
Part Number: ASM1812  
Document Version: 1.4

© Copyright 2003 Alliance Semiconductor Corporation. All rights reserved. Our three-point logo, our name and Intelliwatt are trademarks or registered trademarks of Alliance. All other brand and product names may be the trademarks of their respective companies. Alliance reserves the right to make changes to this document and its products at any time without notice. Alliance assumes no responsibility for any errors that may appear in this document. The data contained herein represents Alliance's best data and/or estimates at the time of issuance. Alliance reserves the right to change or correct this data at any time, without notice. If the product described herein is under development, significant changes to these specifications are possible. The information in this product data sheet is intended to be general descriptive information for potential customers and users, and is not intended to operate as, or provide, any guarantee or warrantee to any user or customer. Alliance does not assume any responsibility or liability arising out of the application or use of any product described herein, and disclaims any express or implied warranties related to the sale and/or use of Alliance products including liability or warranties related to fitness for a particular purpose, merchantability, or infringement of any intellectual property rights, except as express agreed to in Alliance's Terms and Conditions of Sale (which are available from Alliance). All sales of Alliance products are made exclusively according to Alliance's Terms and Conditions of Sale. The purchase of products from Alliance does not convey a license under any patent rights, copyrights; mask works rights, trademarks, or any other intellectual property rights of Alliance or third parties. Alliance does not authorize its products for use as critical components in life-supporting systems where a malfunction or failure may reasonably be expected to result in significant injury to the user, and the inclusion of Alliance products in such life-supporting systems implies that the manufacturer assumes all risk of such use and agrees to indemnify Alliance against all claims arising from such use.