# UMW MAX809

Microprocessor Voltage Detection Reset Chip

## 1.Description

UMW MAX809 is aThe voltage detection chip used for digital system power supply voltage monitoring can operate within the industrial standard temperature range. UMW MAX809 generates a reset signal. When the system power supply voltage drops to the set value, the reset signal becomes low.When the system power supply voltage returns to the set value, the chip will set the reset signal high after a delay of at least 140ms. UMW MAX809 series products can provide any set detection voltage value required by customers. At present, we will provide 7 standard industrial voltage monitoring values for four types of power supply voltages: 5.0V, 3.3V, 3.0V and 2.5V.

## 2.Application

- Computer, server, laptop, modem
- Wireless Switch
- Embedded Systems
- Home appliances, electric meters
- PDAs and Handheld Devices
- UMW MAX809 in SOT-23

## 3.Characteristic

- Can work in industrial temperature range: -40°C to +85°C
- Can work normally as low as 1V

- Power glitch interference shielding function
- Available in SOT-23 package
- Lead-free and RoHS compliant

# UMW MAX809

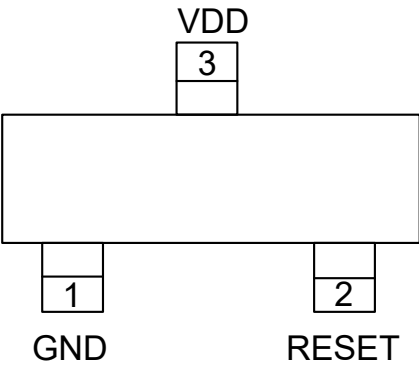## 4.Typical Applications

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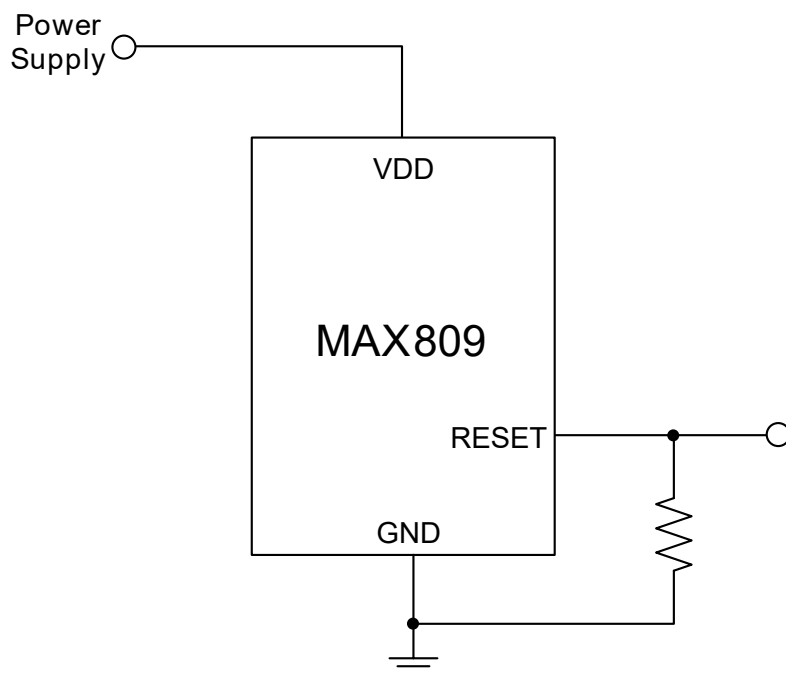
## 5.Pinning Information



## 6.Pin Description

| Number | Number | Illustrate |
|--------|--------|------------|
| 1 | GND | Ground pin. |
| 2 | RESET | Reset output pin. RESET will become low level when VDD is lower than the reset threshold voltage, and will become high level after at least 140ms delay after VDD rises to the reset threshold voltage. |
| 3 | VDD | Chip power supply and voltage input pin to be detected. |

## 7.Model Selection

| Model | Maximum input voltage(V) | Reset voltage(V) | Tolerance | Silkscreen | Package |
|-------|--------------------------|------------------|-----------|------------|---------|
| UMW MAX809T | 5.5 | 3.08 | ±2% | ACAA | SOT23 SOT89-3 |
| UMW MAX809S | 5.5 | 2.93 | ±2% | ADAA | |
| UMW MAX809R | 5.5 | 2.63 | ±2% | AFAA | |

## 8.Block Diagram
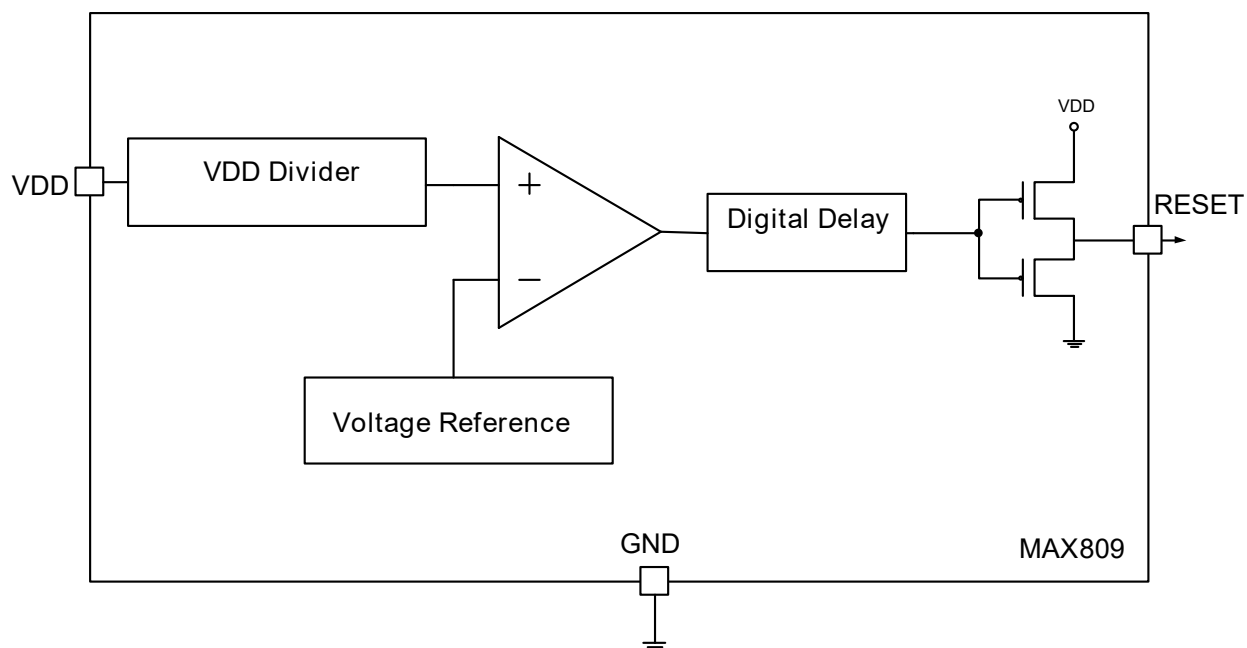
## 9.Maximum Ratings (Note)

| Parameter | | Symbol | Max | Units |
|---|---|---|---|---|
| All pins to ground pin | | | -0.3 to +6.0 | V |
| VDD Input Current | | | 20 | mA |
| RESET Output Current | | | 20 | mA |
| VDD Rise Rate | | | 100 | V/s |
| Continuous power dissipation.ambient temperature 25°C,above 70°C reduce by 4mW/°C | SOT-23 | $P_D$ | 320 | mW |
| Thermal resistance, junction to air | SOT-23 | $R_{\theta JA}$ | 270 | °C/W |
| Operating temperature range | | $T_J$ | -40 ~ +125 | °C |
| Storage temperature range | | $T_{STG}$ | -65 ~ +150 | °C |
| Soldering temperature (10seconds) | | $T_{SOL}$ | 300 | °C |
| Reflow temperature | | | | °C |
| Gas phase heating (60 seconds) | | $T_{VAP}$ | 215 | °C |
| Infrared heating (15 seconds) | | $T_{INF}$ | 220 | °C |
| ESD Protection | Human Body Model (HBM):  According to JESD22-A114 standards | | 4000 | V |
| | Machine Mode (MM): According to JESD22 -A115 standard | | 400 | |
| Maximum rated latchupcurrent: According to JESD78Class ll standard | Positive | $I_{Latchu}$p | 200 | mA |
| | Reverse | | 200 | mA |

Note: Application conditions exceeding the "absolute maximum ratings" listed in the table above may permanently damage the chip. This only refers to the rated limit indicators and does not imply that customers can use this chip under these conditions or any other conditions exceeding the "recommended operating conditions". All applications exceeding the "absolute maximum ratings" will affect the reliability of this chip.

# 10.Electrical Characteristic

(Unless otherwise specified, ambient temperature $T_A$ = 25°C)

| Parameter | Symbol | Conditions | | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|---|
| Input voltage | $V_{DD}$ | | | 1 | | 5.5 | V |
| Working current | $I_{VDD}$ | $V_{DD}$=2.0V | | | 8 | | µA |
| | | $V_{DD}$=3.0V | | | 10 | | µA |
| | | $V_{DD}$=5.0V | | | 14 | | µA |
| Reset threshold voltage ($V_{DD}$ rises) | $V_{RST}$ | L-type | $T_A$=25°C | 4.537 | 4.63 | 4.723 | V |
| | | | $T_A$=-40°C ~ 125°C | 4.4 | | 4.86 | V |
| | | M-type | $T_A$=25°C | 4.292 | 4.38 | 4.468 | V |
| | | | $T_A$=-40°C ~ 125°C | 4.16 | | 4.56 | V |
| | | J-type | $T_A$=25°C | 3.92 | 4.0 | 4.08 | V |
| | | | $T_A$=-40°C ~ 125°C | 3.8 | | 4.2 | V |
| | | T-type | $T_A$=25°C | 3.003 | 3.08 | 3.157 | V |
| | | | $T_A$=-40°C ~ 125°C | 2.92 | | 3.23 | V |
| | | S-type | $T_A$=25°C | 2.857 | 2.93 | 3.003 | V |
| | | | $T_A$=-40°C ~ 125°C | 2.78 | | 3.08 | V |
| | | R-type | $T_A$=25°C | 2.564 | 2.63 | 2.696 | V |
| | | | $T_A$=-40°C ~ 125°C | 2.5 | | 2.76 | V |
| | | Z-type | $T_A$=25°C | 2.262 | 2.32 | 2.378 | V |
| | | | $T_A$=-40°C ~ 125°C | 2.22 | | 2.42 | V |
| Reset voltage temperature coefficient | TC | | | | 30 | | ppm |
| Reset recovery delay time | TR | $V_{DD}$ rises | | 150 | 240 | 560 | ms |
| Reset voltage hysteresis range | $V_{HYST}$ | $V_{DD}$ drops | | | 95%$V_{RST}$ | | V |
| Reset shutdown delay time | TD | $V_{DD}$ from $V_{RST}$ to($V_{RST}$-100mV) | | | 20 | | µs |

| Parameter | Symbol | Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| Reset pin low level | $V_{OL}$ | $V_{DD}$=2V, $V_{RST}$>2V, 1.5mA inflow | | | 0.3 | V |
| | | $V_{DD}$=3V, $V_{RST}$>3V, Flow 3.2mA | | | 0.3 | V |
| | | $V_{DD}$=4V, $V_{RST}$>4V, Flow 5mA | | | 0.3 | V |
| Reset pin high level | $V_{OH}$ | $V_{DD}$=3V, $V_{RST}$>3V, Flow 1.2mA | $V_{DD}$-0.4 | | | V |
| | | $V_{DD}$=4V, $V_{RST}$>4V, Flow 2mA | $V_{DD}$-0.4 | | | V |
| | | $V_{DD}$=5V, $V_{RST}$>5V, Outflow 2.5mA | $V_{DD}$-0.4 | | | V |

# UMW MAX809

## 11.Instructions

The reset signal will give the microThe UMW MAX809 will give such a reset signal to prevent the microprocessor from having code execution errors during power-on, power-off or power-off. The MAX809 will give a reset clear signal (low level) after the VDD supply voltage drops to a preset threshold voltage. The signal level will be maintained for at least 140ms even after the VDD supply voltage is higher than the preset threshold voltage.

The UMW MAX809 series microprocessor reset detection chip is used to monitor the power supply voltage of the digital system. It can provide a reset signal to the processor without any external devices. The figure below shows a typical application timing diagram.Initially, it is assumed that the input VDD is at a normal voltage value higher than the preset reset recovery voltage (VRST). At this time, the RESET pin (pin 2) is at a high level. If there is an interruption in the input power supply that causes the VDD voltage to drop significantly and is lower than the reset shutdown voltage (VHYST), the RESET pin will output a low level. After the power interruption ends, VDD returns to a normal voltage value higher than the reset recovery voltage (VRST), which triggers the internal delay response counter. When the counting time (TR) ends, the RESET pin (pin 2) will output a high level again.

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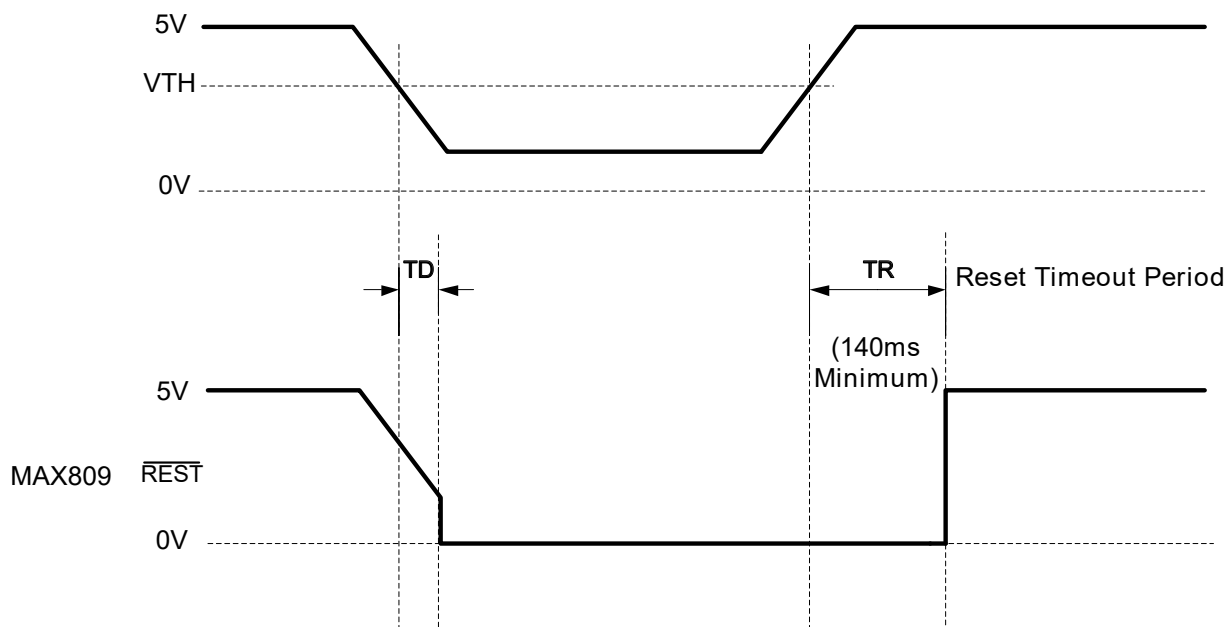
# 12.Application Information

## ●VDD Glitch Shielding Function

MAX809 provides accurate VDD voltage detection and reset delay function to shield VDD transient jitter when power is on, off, brownout and power spike undershoot. The shielding function of power glitch can be effectively improved by adding capacitors as close to the VDD pin as possible.

## ●Ensure That the RESET Output Is Normal When VDD Drops to 0V

The RESET output of MAX809 can work normally when the power supply is as low as 1V. When it is lower than 1V, RESET will be open circuit because it no longer pulls down the current. This means that the CMOS logic input to the microprocessor will be at a suspended and uncertain voltage.

Most digital systems will be completely shut down when the voltage is above 1V. Even so, the RESET pin should still remain valid when VDD=0V. At this time, a pull-down resistor is needed to discharge the residual charge on the stray capacitance to keep the output low. The pull-down resistor value, although not critical, should still ensure that it does not affect the operation of RESET under normal circumstances (100 kΩ is large enough not to increase the load requirement when RESET is high, and small enough to pull it down to ground when RESET is low).

## ●Advantages of High Threshold Accuracy

The reset threshold voltage of most microprocessor detection ICs is between 5% and 10%, which ensures that the reset action will not occur within the 5% power supply voltage drop range, but will occur within the 10% power supply voltage drop range.

When using an IC with a rated power supply voltage of ±5%, there is an uncertain area when the power supply voltage is 5% to 10% below the normal value, and the reset action may or may not occur. The MAX809 uses a high-precision circuit to ensure that the reset action occurs near the 5% power supply voltage under-floating window and away from the 10% power supply voltage under☐floating window.
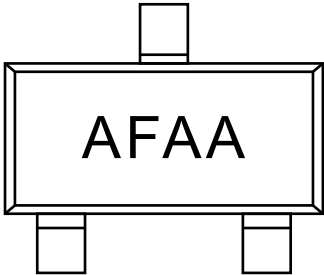
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## 13.SOT-23 Package Outline Dimensions
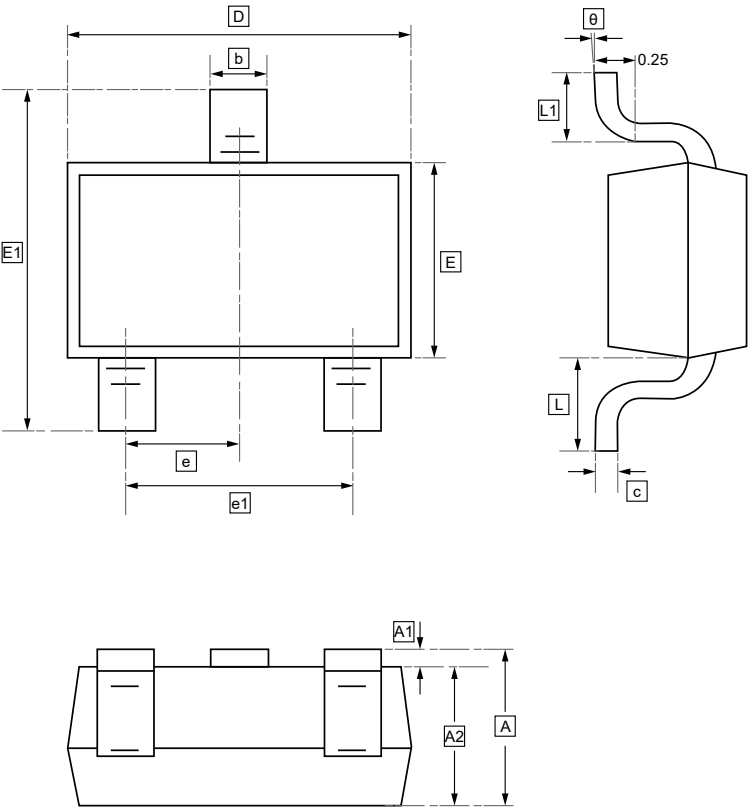


**DIMENSIONS (mm are the original dimensions)**

| Symbol | A | A1 | A2 | b | c | D | E | E1 | e | e1 | L | L1 |
|--------|-----|-------|-------|-------|-------|-------|-------|-------|------|------|-------|-------|
| Min | 0.9 | 0.000 | 0.900 | 0.300 | 0.080 | 2.800 | 1.200 | 2.250 | 0.95 | 1.80 | 0.550 | 0.300 |
| Max | 1.15 | 0.1 | 1.050 | 0.500 | 0.150 | 3.000 | 1.400 | 2.550 | TYP. | 2.00 | 0.550 | 0.500 |

| Symbol | θ |
|--------|-----|
| Min | 0° |
| Max | 8° |

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## 14.Ordering information

AFAA

| Order Code | Marking | Package | Base QTY | Delivery Mode |
|------------|---------|---------|----------|---------------|
| UMW MAX809R | AFAA | SOT-23 | 3000 | Tape and reel |
| UMW MAX809S | ADAA | SOT-23 | 3000 | Tape and reel |
| UMW MAX809T | ACAA | SOT-23 | 3000 | Tape and reel |

## 15.Disclaimer

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