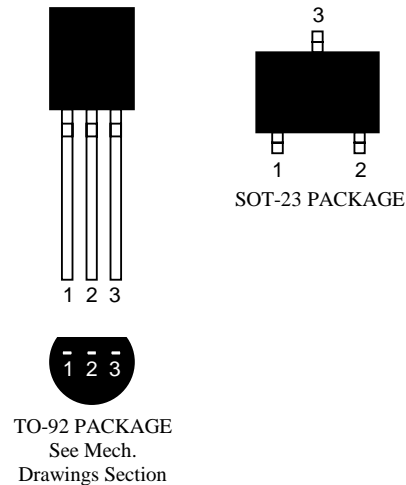


FEATURES

- Automatically restarts a microprocessor after power failure
- Monitors pushbutton for external override
- Maintains reset for typically 150 ms after V_{CC} returns to an in-tolerance condition
- Reduces need for discrete components
- Precision temperature-compensated voltage reference and voltage sensor
- Low-cost TO-92 or space saving surface-mount SOT-23 packages available
- Efficient open-drain output with internal 5.5 k Ω pull-up resistor
- Operating temperature -40°C to +85°C

PIN ASSIGNMENT



PIN DESCRIPTION

TO-92

| | | |
|---|------------------|-------------------------|
| 1 | \overline{RST} | Active Low Reset Output |
| 2 | V_{CC} | Power Supply |
| 3 | GND | Ground |

SOT-23

| | | |
|---|------------------|-------------------------|
| 1 | \overline{RST} | Active Low Reset Output |
| 2 | V_{CC} | Power Supply |
| 3 | GND | Ground |

DESCRIPTION

The DS1813 EconoReset uses a precision temperature reference and comparator circuit to monitor the status of the power supply (V_{CC}). When an out-of-tolerance condition is detected, an internal power-fail signal is generated which forces reset to the active state. When V_{CC} returns to an in-tolerance condition, the reset signal is kept in the active state for approximately 150 ms to allow the power supply and processor to stabilize.

The DS1813 also monitors a pushbutton on the reset output. If the reset line is pulled low, a reset is generated upon release and will be held in reset output low for typically 150 ms.

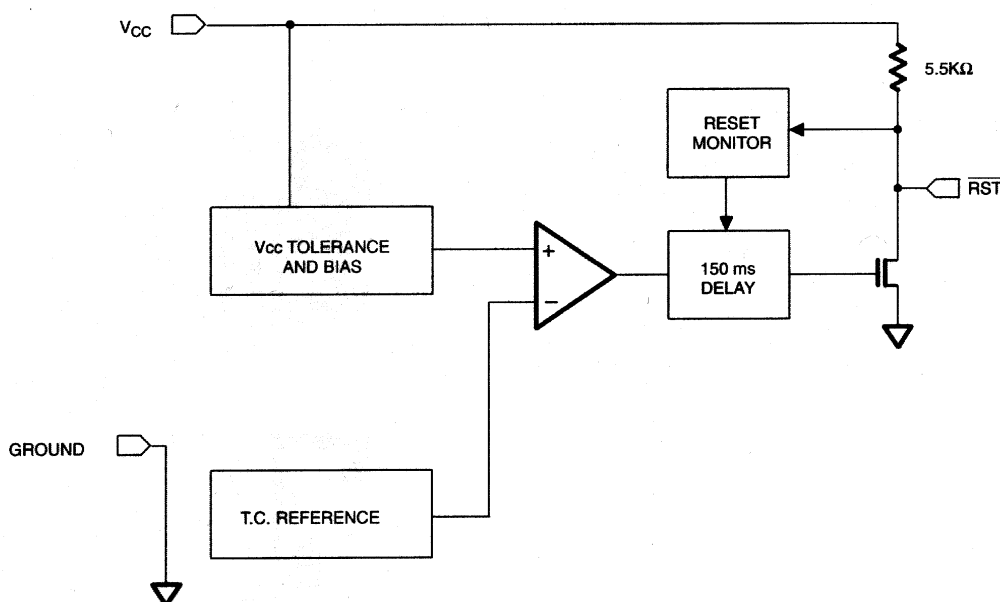
OPERATION - POWER MONITOR

The DS1813 provides the functions of detecting out-of-tolerance power supply conditions and warning a processor-based system of impending power failure. When V_{CC} is detected as out-of-tolerance, the \overline{RST} signal is asserted. On power-up, \overline{RST} is kept active for approximately 150 μs after the power supply has reached the selected tolerance. This allows the power supply and microprocessor to stabilize before \overline{RST} is released.

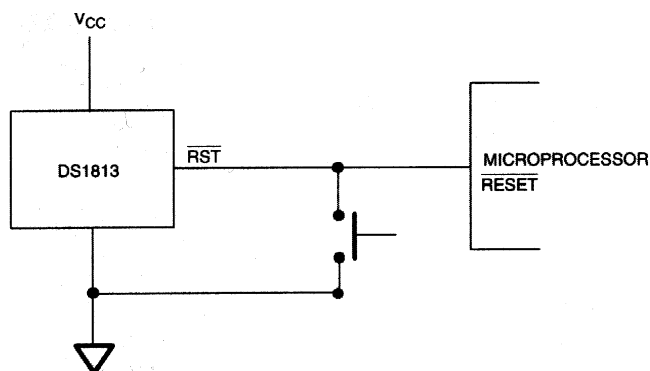
OPERATION - PUSHBUTTON RESET

The DS1813 provides for a pushbutton switch for manual reset control. When the DS1813 is not in a reset cycle, a pushbutton reset can be generated by pulling the \overline{RST} pin low for at least 1 ms. When the pushbutton is held low, the \overline{RESET} is forced active low and will remain active low for about 150 ms after the pushbutton is released. See Figure 2 for an application example and Figure 3 for the timing diagram.

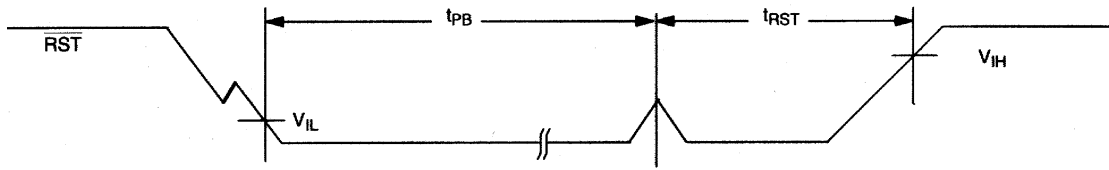
BLOCK DIAGRAM (OPEN-DRAIN OUTPUT) Figure 1



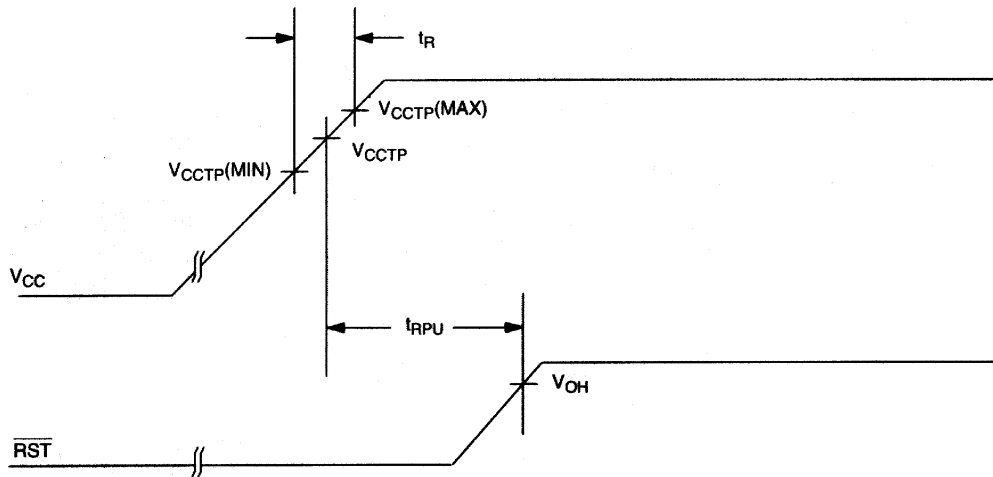
APPLICATION EXAMPLE Figure 2



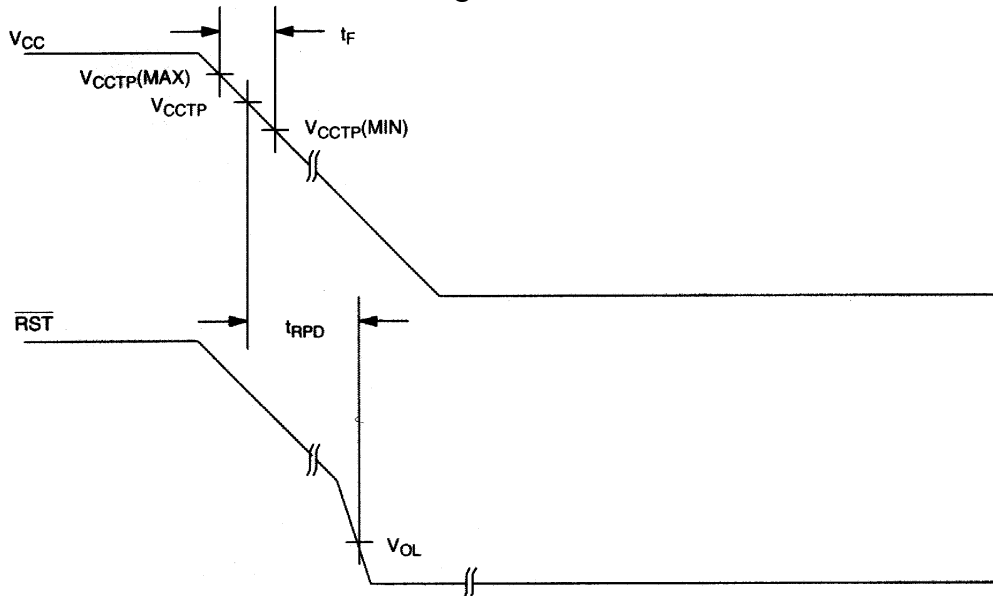
TIMING DIAGRAM: PUSHBUTTON RESET Figure 3



TIMING DIAGRAM: POWER-UP Figure 4



TIMING DIAGRAM: POWER-DOWN Figure 5



ABSOLUTE MAXIMUM RATINGS*

| | |
|---|----------------------------|
| Voltage on $\overline{V_{CC}}$ Pin Relative to Ground | -0.5V to +7.0V |
| Voltage on \overline{RST} Relative to Ground | -0.5V to +5 V_{CC} +0.5V |
| Operating Temperature | -40°C to +85°C |
| Storage Temperature | -55°C to +125°C |
| Soldering Temperature | 260°C for 10 seconds |

* This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operation sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods of time may affect reliability.

RECOMMENDED DC OPERATING CONDITIONS (-40°C to +85°C)

| PARAMETER | SYMBOL | MIN | TYP | MAX | UNITS | NOTES |
|----------------|----------|-----|-----|-----|-------|-------|
| Supply Voltage | V_{CC} | 0.0 | | 5.5 | V | 1 |

DC ELECTRICAL CHARACTERISTICS (-40°C to +85°C; $V_{CC}=1.2V$ to 5.5V)

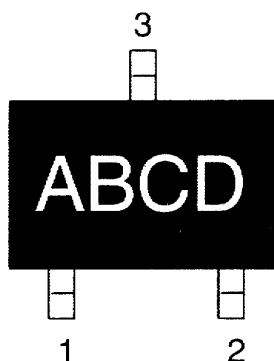
| PARAMETER | SYMBOL | MIN | TYP | MAX | UNITS | NOTES |
|----------------------------------|------------|-------------------|------|------|---------|-------|
| Output Current @ 0.4 volts | I_{OL} | +10 | | | mA | 2, 3 |
| Voltage Input Low | V_{IL} | | | 0.4 | V | 1 |
| Voltage Input High | V_{IH} | 0.7 * V_{CC} | | | V | 1 |
| Operating Current $V_{CC} < 5.5$ | I_{CC} | | 30 | 40 | μA | 4 |
| V_{CC} Trip Point (DS1813-5) | V_{CCTP} | 4.50 | 4.62 | 4.75 | V | 1 |
| V_{CC} Trip Point (DS1813-10) | V_{CCTP} | 4.25 | 4.35 | 4.49 | V | 1 |
| V_{CC} Trip Point (DS1813-15) | V_{CCTP} | 4.00 | 4.13 | 4.24 | V | 1 |
| Internal Pull-Up Resistor | R_P | 3.50 | 5.5 | 7.5 | k | 6 |
| Output Capacitance | C_{OUT} | | | 10 | pF | |

AC ELECTRICAL CHARACTERISTICS (-40°C to +85°C; $V_{CC}=1.2V$ to 5.5V)

| PARAMETER | SYMBOL | MIN | TYP | MAX | UNITS | NOTES |
|---|-------------|-----|-----|-----|---------|-------|
| RESET Active Time | t_{RST} | 100 | 150 | 300 | ms | |
| V_{CC} Detect to \overline{RST} | t_{RPD} | | 2 | 5 | μs | |
| V_{CC} Slew Rate ($V_{CCTP} (MAX) - V_{CCTP} (MIN)$) | t_F | 300 | | | μs | 7 |
| V_{CC} Slew Rate ($V_{CCTP} (MIN) - V_{CCTP} (MAX)$) | t_R | 0 | | | ns | |
| V_{CC} Detect to \overline{RST} | t_{RPU} | 100 | 150 | 300 | ms | 5 |
| Pushbutton Detect to \overline{RST} | t_{PB} | 1 | | | μs | |
| Pushbutton Reset | t_{PBRST} | 100 | 150 | 300 | ms | |

NOTES:

1. All voltages are referenced to ground.
2. Measured with $V_{CC} \geq 2.7$ volts.
3. A $1k\Omega$ external resistor may be required in some applications for proper operation of the microprocessor reset control circuit.
4. Measured with \overline{RST} output open.
5. $t_R = 5 \mu s$.
6. V_{OH} and I_{OH} are a function of the value of R_P and the associated output load conditions.
7. This value is for reference in defining values for T_{RPD} and should not be considered a requirement for proper operation or use of the device.

PART MARKING CODES

“A”, “B”, & “C” represent the device type.

810 DS1810
 811 DS1811
 812 DS1812
 813 DS1813
 815 DS1815
 816 DS1816
 817 DS1817
 818 DS1818

“D” represents the device tolerance.

A 5%
 B 10%
 C 15%
 D 20%