

DS1816 3.3V EconoReset with **Open Drain Output**

3

TOP VIEW

See Mech.

On Website

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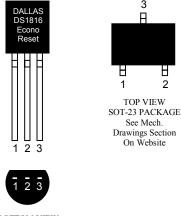
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FEATURES

- Automatically restarts a microprocessor after power failure
- Maintains reset for 150ms after V_{CC} returns to . an in-tolerance condition
- Reduces need for discrete components
- Precision temperature-compensated voltage reference and voltage sensor
- Accurate 5%, 10% or 20% power monitoring
- 20% tolerance for use with 3V systems
- Low-cost TO-92 or space saving SOT-23 packages available
- Efficient open-drain output with internal $5k\Omega$ pull-up resistor
- Operating temperature -40°C to +85°C

PIN ASSIGNMENT



BOTTOM VIEW TO-92 PACKAGE See Mech. Drawings Section

On Website

PIN DESCRIPTION

TO-92

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

SOT-23

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

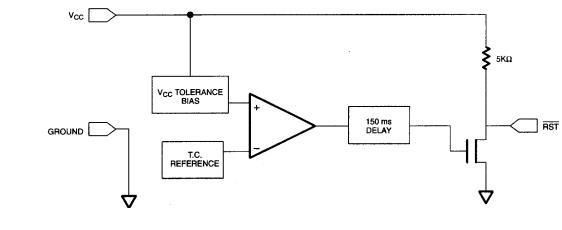
DESCRIPTION

The DS1816 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 150ms to allow the power supply and processor to stabilize.

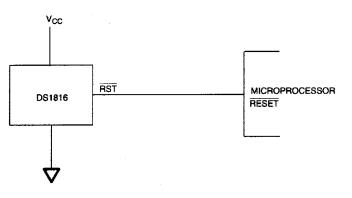
OPERATION — POWER MONITOR

The DS1816 provides the function 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 150ms after the power supply has reached the selected tolerance. This allows the power supply and microprocessor to stabilize before \overline{RST} is released.

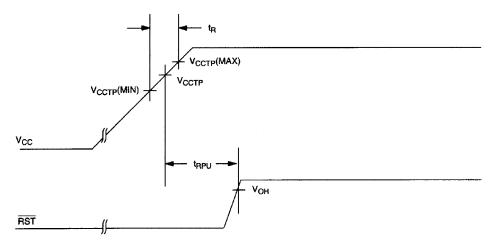
BLOCK DIAGRAM (OPEN-DRAIN OUTPUT) Figure 1



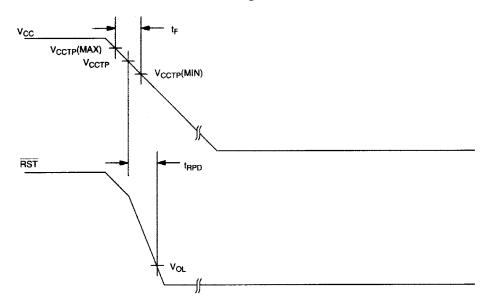
APPLICATION EXAMPLE Figure 2



TIMING DIAGRAM: POWER-UP Figure 3



TIMING DIAGRAM: POWER-DOWN Figure 4



ABSOLUTE MAXIMUM RATINGS*

-0.5V to +7.0V -0.5V to V_{CC} + 0.5V -40°C to +85°C -55°C to +125°C 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 | ТҮР | MAX | UNITS | NOTES |
| Supply Voltage | V _{CC} | 0.0 | | 5.5 | V | 1 |

DC ELECTRICAL CHARACTERISTICS

 $(-40^{\circ}C \text{ to } +85^{\circ}C; V_{CC} = 1.2V \text{ to } 5.5V)$

| PARAMETER | SYMBOL | MIN | ТҮР | MAX | UNITS | NOTES |
|--|-------------------|------|------|------|-------|-------|
| Output Current @ 0.4V | I _{OL} | +10 | | | mA | 2, 3 |
| Operating Current $V_{CC} < 5.5V$ | I _{CC} | | 28 | 35 | μA | 4 |
| V _{CC} Trip Point (DS1816-5) | V _{CCTP} | 2.98 | 3.06 | 3.15 | V | 1 |
| V _{CC} Trip Point (DS1816-10) | V _{CCTP} | 2.80 | 2.88 | 2.97 | V | 1 |
| V _{CC} Trip Point (DS1816-20) | V _{CCTP} | 2.47 | 2.55 | 2.64 | V | 1 |
| Internal Pull-Up Resistor | R _P | 3.5 | 5.5 | 7.5 | kΩ | 7 |
| Output Capacitance | C _{OUT} | | | 10 | pF | |

AC ELECTRICAL CHARACTERISTICS

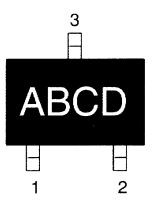
 $(-40^{\circ}C \text{ to } +85^{\circ}C; V_{CC} = 1.2V \text{ to } 5.5V)$

| PARAMETER | SYMBOL | MIN | ТҮР | MAX | UNITS | NOTES | |
|---|------------------|-----|-----|-----|-------|-------|--|
| RESET Active Time | t _{RST} | 100 | 150 | 250 | ms | 5 | |
| V _{CC} Detect to RST | t _{RPD} | | 2 | 5 | μs | | |
| V _{CC} Slew Rate | t _F | 300 | | | μs | 8 | |
| $(V_{CCTP} (MAX) \text{ to } V_{CCTP} (MIN))$ | | | | | | | |
| V _{CC} Slew Rate | t _R | 0 | | | ns | | |
| $(V_{CCTP} (MIN) \text{ to } V_{CCTP} (MAX))$ | | | | | | | |
| V _{CC} Detect to RST | t _{RPU} | 100 | 150 | 250 | ms | 5, 6 | |

NOTES:

- 1. All voltages are referenced to ground.
- 2. Measured with $V_{CC} \ge 2.7 V$.
- 3. A $1k\Omega$ external pull-up resistor may be required in some applications for proper operation of the microprocessor reset control circuit.
- 4. Measured with \overline{RST} output open.
- 5. Measured with $2.7V \le V_{CC} \le 3.3V$.
- 6. $t_R = 5\mu s$
- 7. V_{OH} and I_{OH} are a function of the value of R_P and the associated output load conditions.
- 8. The t_F 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.

| · 1 |
|------------|
| 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% | , |
| | |