

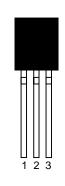
# DS1813 5V EconoReset with Pushbutton

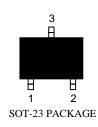
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## **FEATURES**

- Automatically restarts a microprocessor after power failure
- Monitors pushbutton for external override
- Maintains reset for typically 150 ms after V<sub>CC</sub> 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 surfacemount SOT-23 packages available
- Efficient open-drain output with internal
   5.5 kΩ pull-up resistor
- Operating temperature -40°C to +85°C

## **PIN ASSIGNMENT**







#### PIN DESCRIPTION

## TO-92

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

## SOT-23

1	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.

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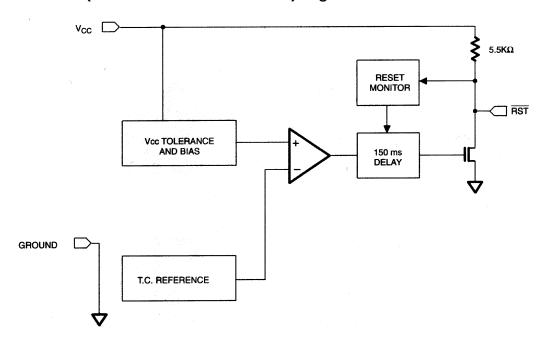
#### **OPERATION - POWER MONITOR**

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  $\mu$ s after the power supply has reached the selected tolerance. This allows the power supply and microprocessor to stabilize before  $\overline{RST}$  is released.

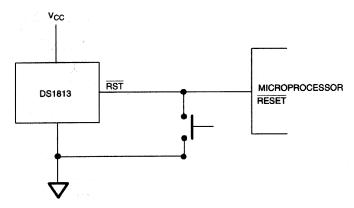
#### **OPERATION - PUSHBUTTON RESET**

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 RST pin low for at least 1 ms. When the pushbutton is held low, the 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.

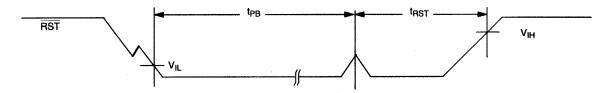
## **BLOCK DIAGRAM (OPEN-DRAIN OUTPUT)** Figure 1



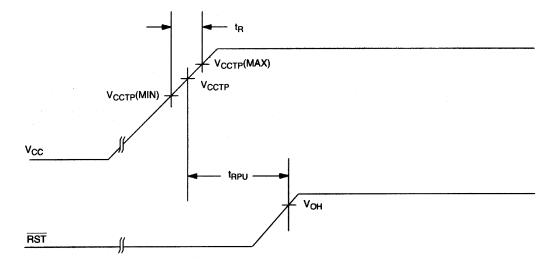
## **APPLICATION EXAMPLE** Figure 2



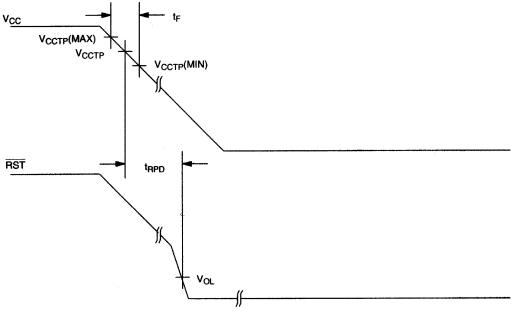
# TIMING DIAGRAM: PUSHBUTTON RESET Figure 3



# TIMING DIAGRAM: POWER-UP Figure 4



# TIMING DIAGRAM: POWER-DOWN Figure 5



## **ABSOLUTE MAXIMUM RATINGS\***

Voltage on  $V_{CC}$  Pin Relative to Ground -0.5V to +7.0V

Voltage on RST Relative to Ground -0.5V to  $+5V_{CC} +0.5V$ 

Operating Temperature  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$ Storage Temperature  $-55^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$ Soldering Temperature  $260^{\circ}\text{C}$  for 10 seconds

## RECOMMENDED DC OPERATING CONDITIONS

 $(-40^{\circ}C \text{ to } +85^{\circ}C)$ 

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	1
		$*V_{CC}$				
Operating Current $V_{CC} < 5.5$	$I_{CC}$		30	40	μΑ	4
V <sub>CC</sub> Trip Point (DS1813-5)	V <sub>CCTP</sub>	4.50	4.62	4.75	V	1
V <sub>CC</sub> Trip Point (DS1813-10)	V <sub>CCTP</sub>	4.25	4.35	4.49	V	1
V <sub>CC</sub> 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 <sub>OUT</sub>			10	pF	

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

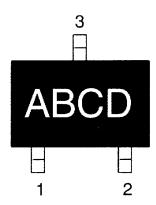
PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	NOTES
RESET Active Time	t <sub>RST</sub>	100	150	300	ms	
V <sub>CC</sub> Detect to RST	$t_{RPD}$		2	5	μs	
V <sub>CC</sub> Slew Rate	$t_{\mathrm{F}}$	300			μs	7
$(V_{CCTP}(MAX) - V_{CCTP}(MIN))$						
V <sub>CC</sub> Slew Rate	$t_R$	0			ns	
$(V_{CCTP} (MIN) - V_{CCTP} (MAX))$						
V <sub>CC</sub> Detect to RST	$t_{ m RPU}$	100	150	300	ms	5
Pushbutton Detect to RST	$t_{PB}$	1			μs	
Pushbutton Reset	t <sub>PBRST</sub>	100	150	300	ms	

<sup>\*</sup> 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.

## **NOTES:**

- 1. All voltages are referenced to ground.
- 2. Measured with  $V_{CC} \ge 2.7$  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 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%