DS1813
5V EconoReset with Pushbutton

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GENERAL DESCRIPTION

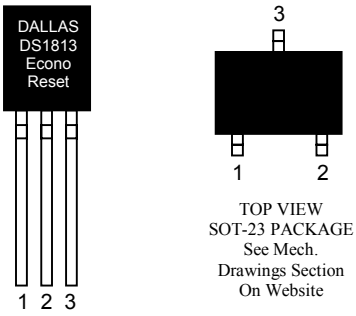
The DS1813 EconoReset uses a precision temperature reference and comparator circuit to monitor the status of the power supply (V_{CC}). When an out-of-tolerance condition is detected, an internal power-fail signal is generated which forces reset to the active state. When V_{CC} returns to an in-tolerance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

FEATURES

- Automatically Restarts a Microprocessor After Power Failure
- Monitors Pushbutton for External Override
- Maintains Reset for Typically 150ms 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 5.5kΩ Pullup Resistor
- -40°C to +85°C Operating Temperature

PIN CONFIGURATIONS



BOTTOM VIEW
TO-92 PACKAGE
See Mech.
Drawings Section
On Website

TOP VIEW
SOT-23 PACKAGE
See Mech.
Drawings Section
On Website

PIN DESCRIPTION

PIN		NAME	FUNCTION
TO-92	SOT-23		
1	1	$\overline{RST}$	Active-Low Reset Output
2	2	V_{CC}	Power Supply
3	3	GND	Ground

REV: 022306

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 150ms 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 1µs. When the pushbutton is held low, the $\overline{RST}$ is forced active low and will remain active low for about 150ms after the pushbutton is released. See Figure 2 for an application example and Figure 3 for the timing diagram.

Figure 1. Block Diagram (Open-Drain Output)

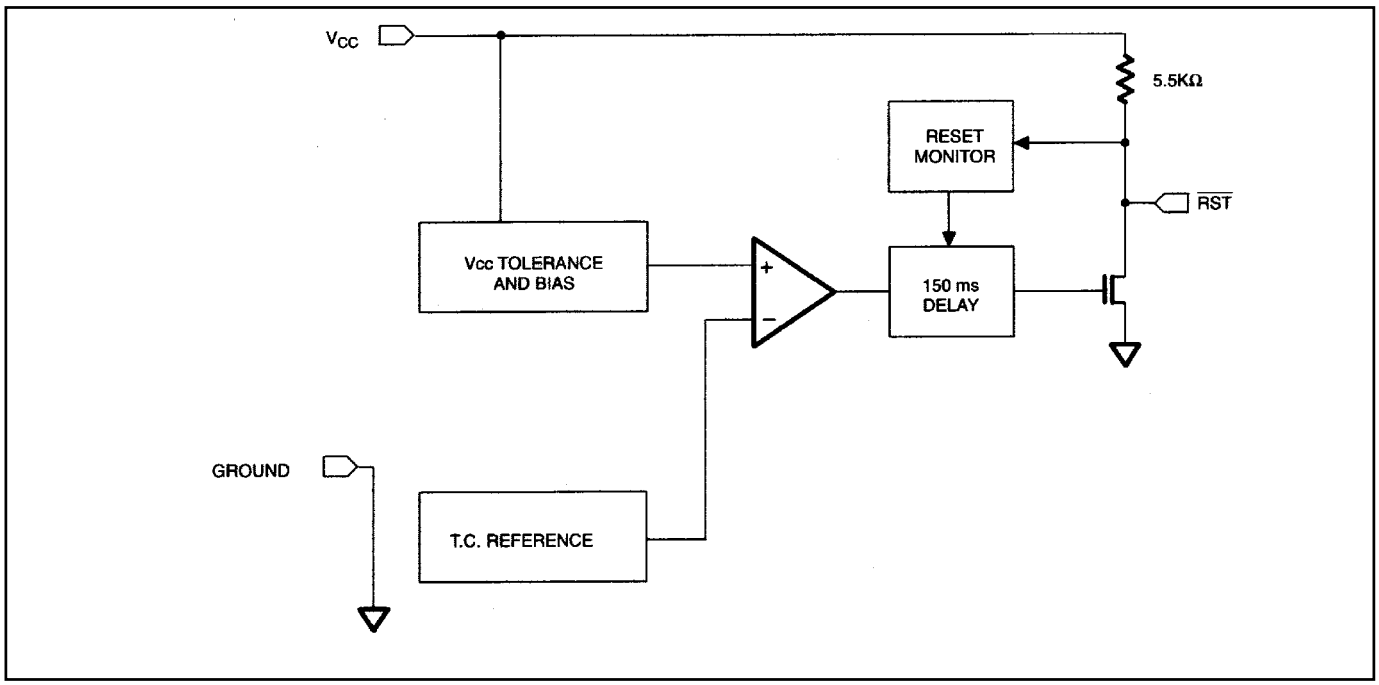


Figure 2. Application Example

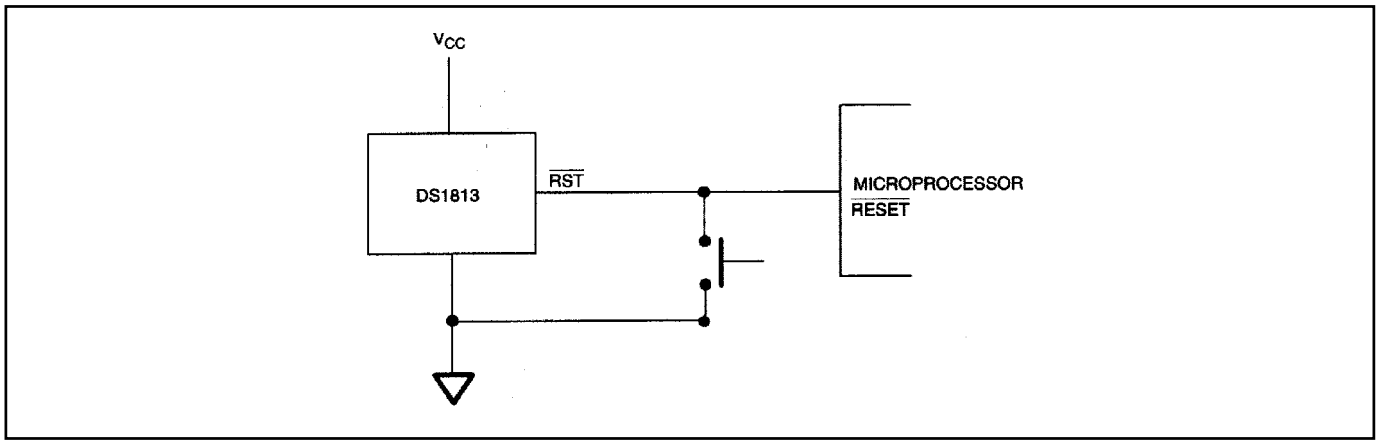


Figure 3. Timing Diagram: Pushbutton Reset

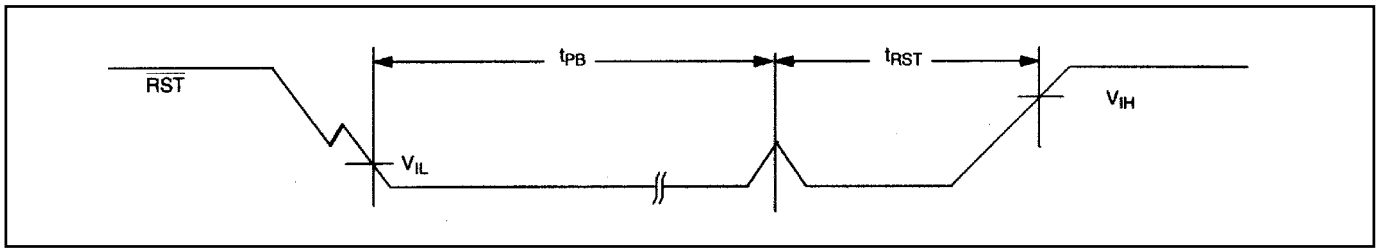


Figure 4. Timing Diagram: Power-Up

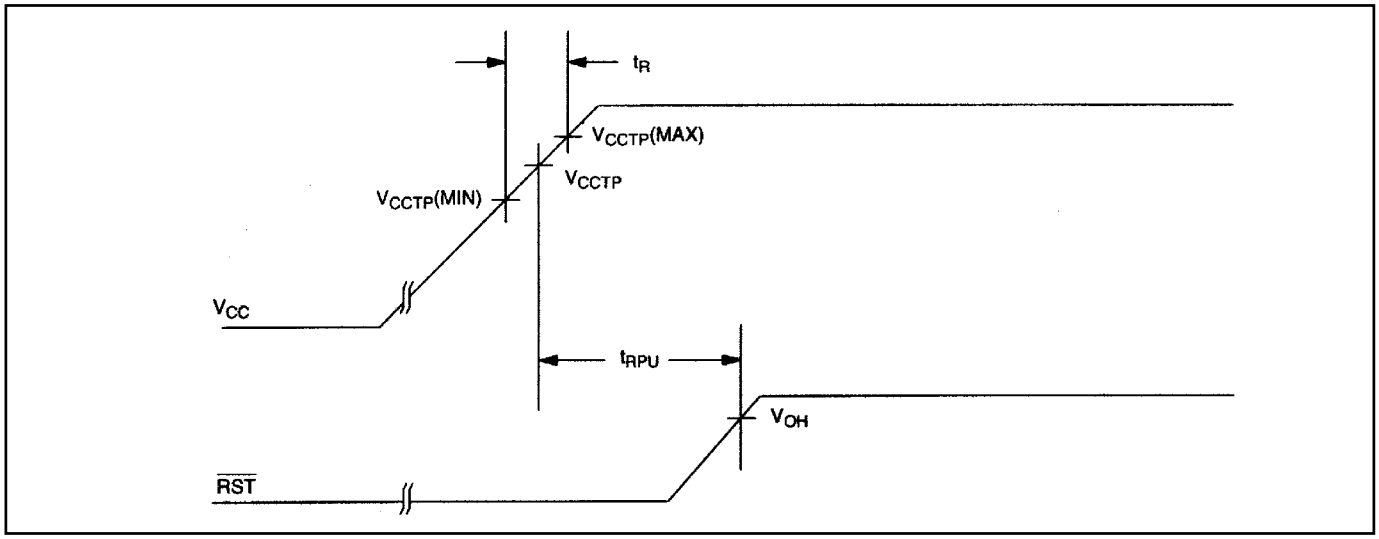
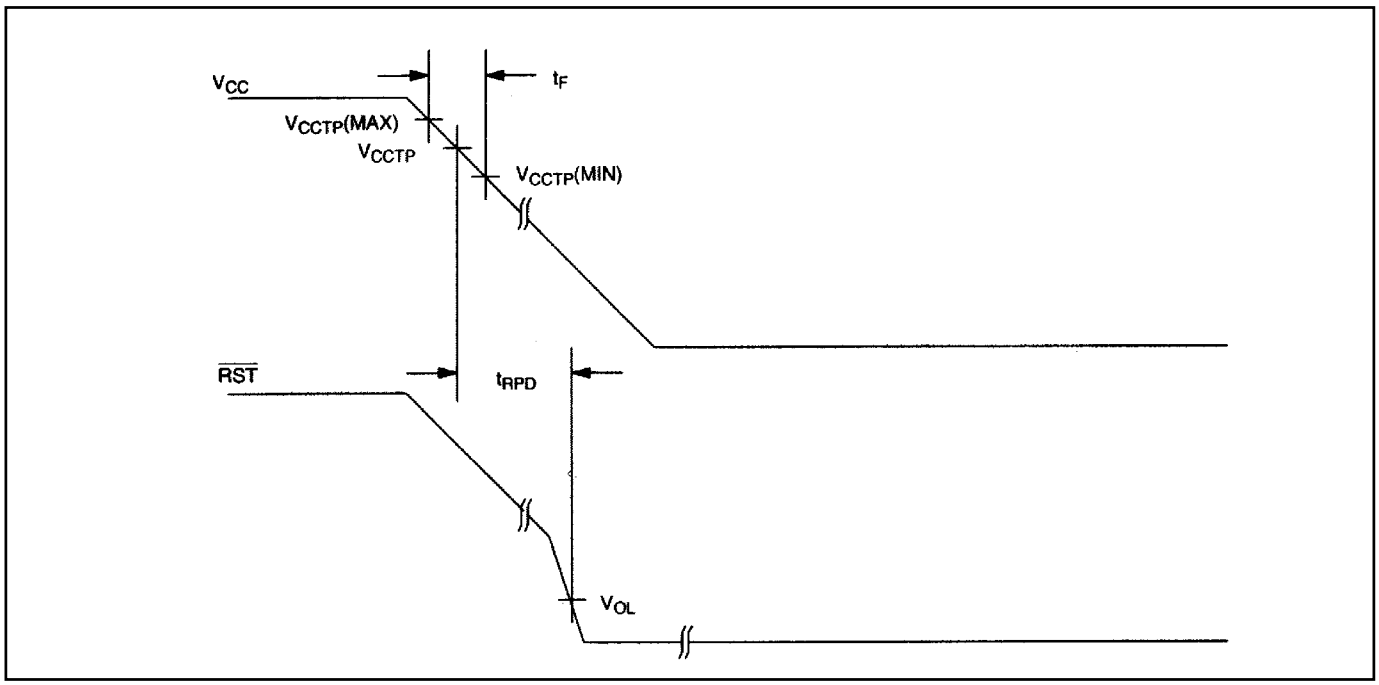


Figure 5. Timing Diagram: Power-Down



ABSOLUTE MAXIMUM RATINGS

Voltage Range on V_{CC} Pin Relative to Ground……...-0.5V to +7.0V
Voltage Range on $\overline{RST}$ Relative to Ground……..……-0.5V to (V_{CC} +0.5V)
Operating Temperature Range……-40°C to +85°C
Storage Temperature Range……-55°C to +125°C
Soldering Temperature……See IPC/JEDEC J-STD-020 Specification

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

(T_A = -40°C to +85°C)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	NOTES
Supply Voltage	V_{CC}	0		5.5	V	1

DC ELECTRICAL CHARACTERISTICS

(V_{CC} = 1.2V to 5.5V, T_A = -40°C to +85°C.)

PARAMETER		SYMBOL	MIN	TYP	MAX	UNITS	NOTES
Output Current at 0.4V		I_{OL}	10			mA	2, 3
Voltage Input Low		V_{IL}			0.4	V	1
Voltage Input High		V_{IH}	0.7 x 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
	DS1813-10		4.25	4.35	4.49		
	DS1813-15		4.00	4.13	4.24		
Internal Pullup Resistor		R_P	3.50	5.5	7.5	kΩ	6
Output Capacitance		C_{OUT}			10	pF	

AC ELECTRICAL CHARACTERISTICS

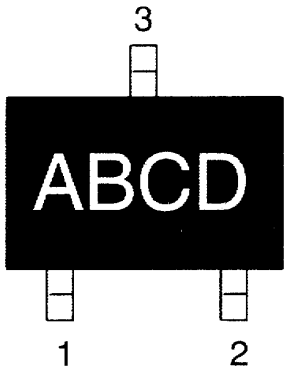
(V_{CC} = 1.2V to 5.5V, T_A = -40°C to +85°C.)

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 $V_{CC} \geq 2.7V$.
3) A 1kΩ 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," and "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%

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