

DS1813 5V EconoReset with Pushbutton

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GENERAL DESCRIPTION

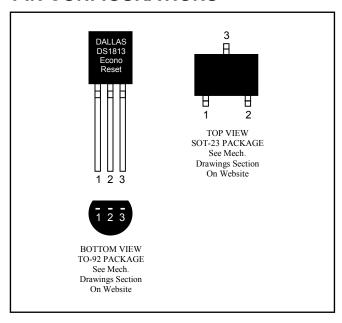
The DS1813 EconoReset uses a precision temperature reference and comparator circuit to monitor the status of the power supply $(V_{\rm CC})$. When an out-of-tolerance condition is detected, an internal power-fail signal is generated which forces reset to the active state. When $V_{\rm CC}$ returns to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



PIN DESCRIPTION

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

1 of 5 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 1 μ s. 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)

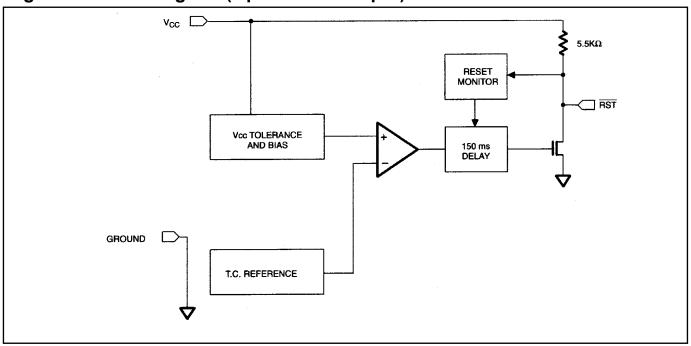


Figure 2. Application Example

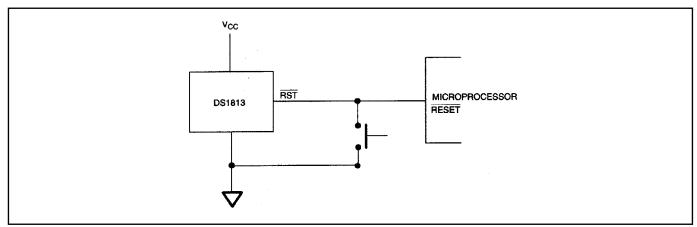


Figure 3. Timing Diagram: Pushbutton Reset

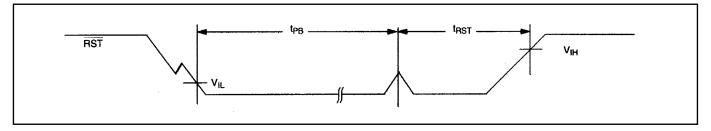


Figure 4. Timing Diagram: Power-Up

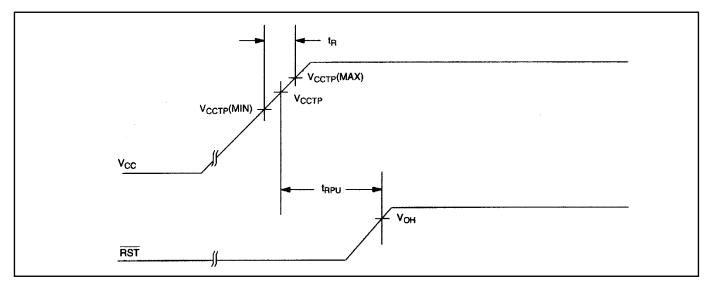
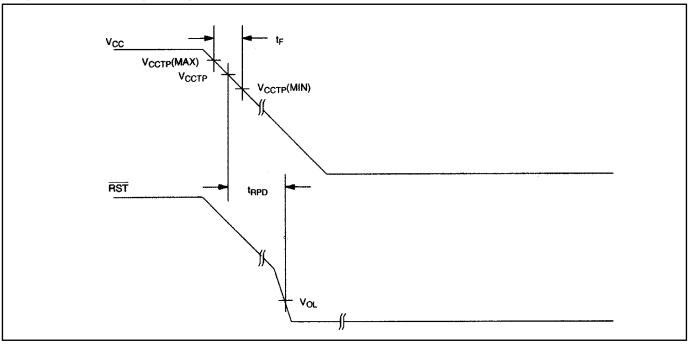


Figure 5. Timing Diagram: Power-Down



ABSOLUTE MAXIMUM RATINGS

Voltage Range on V _{CC} Pin Relative to Ground	0.5V to +7.0V
Voltage Range on 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

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

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

DC ELECTRICAL CHARACTERISTICS

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

PARAMETER		SYMBOL	MIN	TYP	MAX	UNITS	NOTES
Output Current at 0.4V		I_{OL}	10			mA	2, 3
Voltage Input Low		$V_{ m IL}$			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
	DS1813-5		4.50	4.62	4.75	V	1
V _{CC} Trip Point	DS1813-10	V_{CCTP}	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

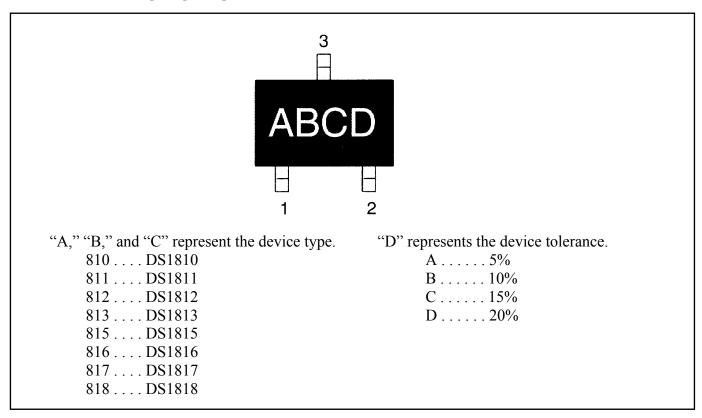
 $(V_{CC} = 1.2V \text{ to } 5.5V, T_A = -40^{\circ}C \text{ to } +85^{\circ}C.)$

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}	$t_{ m RPU}$	100	150	300	ms	5
Pushbutton Detect to RST	t_{PB}	1			μs	
Pushbutton Reset	t _{PBRST}	100	150	300	ms	

NOTES:

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



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