

Features

- Wide Operation Voltage Range of 1V to 5.5V
- Correct Logic Output Guaranteed to $V_{CC}=1.0V$
- 200ms Reset Pulse Width
- Independent Watchdog Timer-1.6s Timeout
- Power-Supply Transient Immunity
- 80 μ A (Typ) Supply Current

Applications

- Computers
- Embedded Systems
- Industrial Equipments
- Intelligent Instruments
- Programmable Controls
- Wireless Communications Systems
- Applications Using DSPs, Microcontrollers or Microprocessors

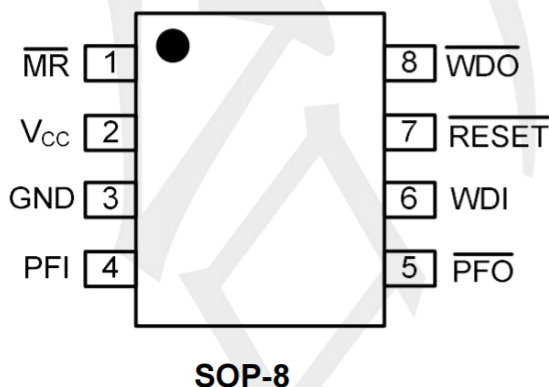
General Description

The series are cost effective system power supply supervisory circuits designed to monitor the power supplies in digital systems.

The provides power-supply monitoring circuitry that generates a reset output during power-up, power-down, and brownout conditions. The reset output remains operational with VCC as low as 1V. Independent watchdog monitoring circuitry is also provided. This is activated if the watchdog input has not been toggled within 1.6 seconds. In addition, there is a 1.25V threshold detector for power-fail warning, low battery detection, or to monitor an additional power supply. An active low debounced manual reset input is also included.

The except an active-high reset is substituted for the watchdog timer. The except RESET is provided instead of RESET. All parts are available in a small outline SOP-8 package.

Pin Definition



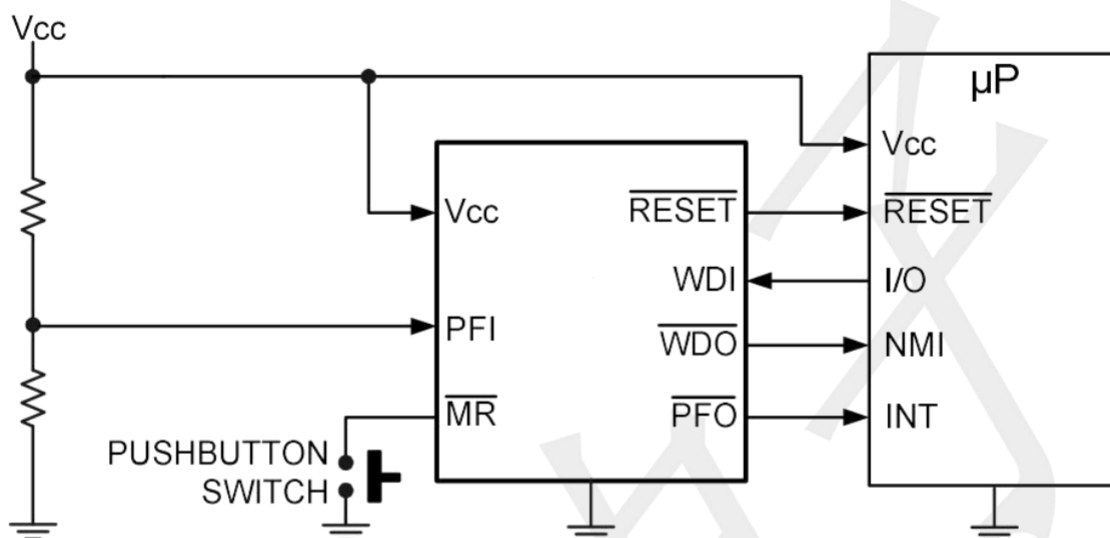
Ordering Information

SP706REN-L-TP	
	PACKAGE TYPE
RESET VOLTAGE:	SOP-8
L=4.63V	
M=4.38V	
T=3.08V	
S=2.93V	
R=2.63V	

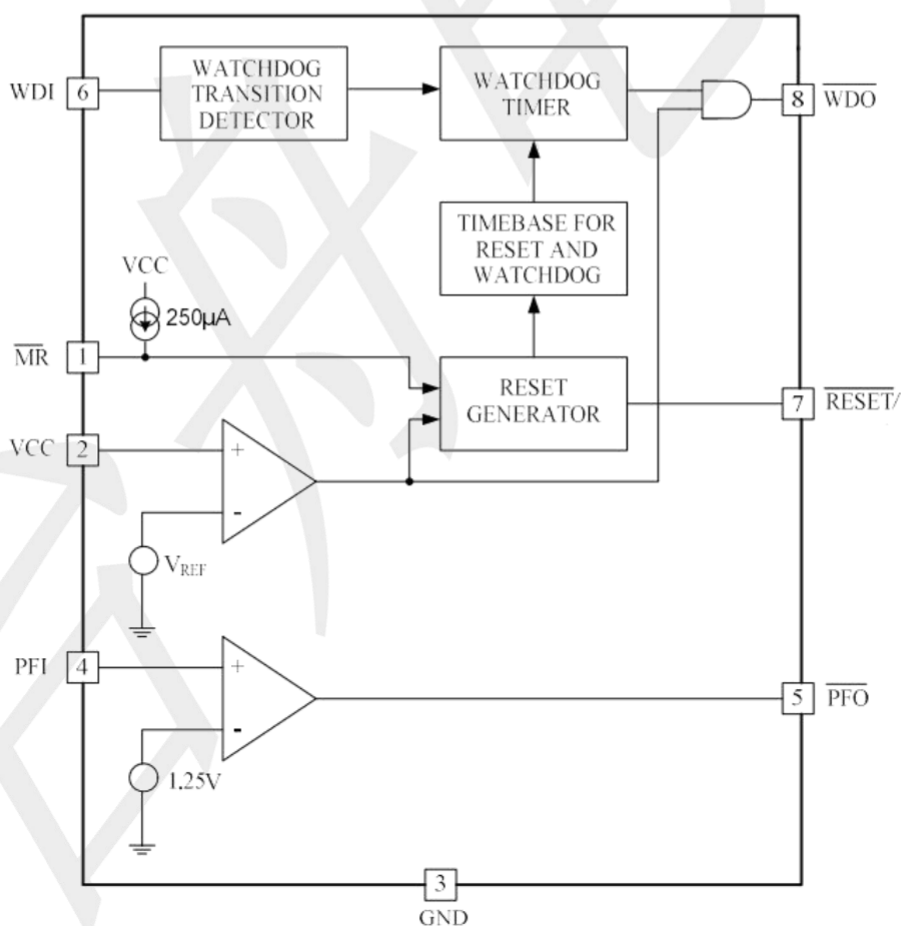
PIN CONFIGURATION

Pin Number	Pin Name	Function
1	 MR	Manual-Reset Input triggers a reset pulse when pulled below 0.8V. This active-low input has an internal 250μA pull-up current. It can be driven from a TTL or CMOS logic line as well as shorted to ground with a switch.
2	V _{CC}	Supply Input.
3	GND	Ground Reference for all signals.
4	PFI	Power-Fail Voltage Monitor Input. When PFI is less than 1.25V, PFO goes low. Connect PFI to GND or V _{CC} when not used.
5	 PFO	Power-Fail Output goes low and sinks current when PFI is less than 1.25V; otherwise PFO stays high.
6	WDI	Watchdog Input. If WDI remains either high or low for 1.6sec, the internal watchdog timer runs out and the WDO goes low. Floating WDI or connecting WDI to a high-impedance three-state buffer disables the watchdog feature. The internal watchdog timer clears whenever reset is asserted, WDI is three-stated, or WDI sees a rising or falling edge.
7	 RESET	Active-Low Reset Output pulses low for 200ms when triggered, and stays low whenever V _{CC} is below the reset threshold. It remains low for 200ms after V _{CC} rises above the reset threshold or MR goes from Low to High.
8	 WDO	Watchdog Output pulls low when the internal watchdog timer finishes its 1.6sec count and does not go high again until the watchdog is cleared. WDO also goes low during low-line conditions. Whenever V_{CC} is below the reset threshold, WDO stays low; however, unlike RESET, WDO does not have a minimum pulse width. As soon as V_{CC} rises above the reset threshold, WDO goes high with no delay.

TYPICAL APPLICATION CIRCUIT



FUNCTIONAL BLOCK DIAGRAM



Absolute Maximum Ratings (Note 1)

Symbol	Parameter	Value	Unit
VCC	Supply Voltage	-0.3 to +6.0	V
ICC	Input Current, VCC	20	mA
IO	Output Current, $\overline{\text{RESET}}$	20	mA
	Rate of Rise, VCC	100	V/ μ s
PD	Continuous Power Dissipation	471	mW
TJ	Operating Junction Temperature	-40 to +105	°C
TSTG	Storage Temperature Range	-65 to +150	°C
	Lead Temperature (Soldering, 10s)	300	°C

Note1: Stresses beyond those listed under “Absolute maximum Ratings” may cause permanent damage to the device.

Electrical Characteristics

(VCC=full range, TA=-40°C to +85°C, unless otherwise noted. Typical values are at TA=+25°C, VCC=5V for L/M versions, VCC=3.3V for T/S versions and VCC=3V for R version). (Note 2)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
VCC	Supply Voltage Range	TA=0°C to +70°C	1.0	--	5.5	V
		TA=-40°C to +85°C	1.2	--	7	V
ICC	Supply Current	WDI and MR unconnected	--	80	150	μ A
VTH+	Reset Threshold	L Version	TA=+25°C	4.56	4.63	4.70
			TA=-40°C to +85°C	4.50	--	4.75
		M Version	TA=+25°C	4.31	4.38	4.45
			TA=-40°C to +85°C	4.25	--	4.50
		T Version	TA=+25°C	3.04	3.08	3.11
			TA=-40°C to +85°C	3.00	--	3.15
		S Version	TA=+25°C	2.89	2.93	2.96
			TA=-40°C to +85°C	2.85	--	3.00
		R Version	TA=+25°C	2.59	2.63	2.66
			TA=-40°C to +85°C	2.55	--	2.70
	Reset Threshold Hysteresis		--	40	--	mV
tRS	Reset Pulse Width		140	200	280	ms

Electrical Characteristics

(VCC=full range, TA=-40°C to +85°C, unless otherwise noted. Typical values are at TA=+25°C, VCC=5V for L/M versions, VCC=3.3V for T/S versions and VCC=3V for R version). (Note 2)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
VOL	RESET Output Voltage Low	ISINK=1.2mA (for R/S/T versions)	--	--	0.3	V
		ISINK=3.2mA (for L/M versions)	--	--	0.4	
		VCC=1.2V, ISINK=100μA	--	--	0.3	
	MR Pull-Up Current	MR=0V	--	--	600	μA
tMR	MR Pulse Width		150	--	--	ns
	MR Input Threshold, Low		--	--	0.8	V
	MR Input Threshold, High		2.0	--	--	V
tMD	MR to Reset Out Delay		--	--	250	ns
	PFI Input Threshold	VCC=5V	1.20	1.25	1.30	V
	PFI Input Current		-25	0.01	+25	nA
	PFO Output Voltage	ISOURCE=800μA	0.7VCC	--	--	V
		ISINK=3.2mA	--	--	0.4	

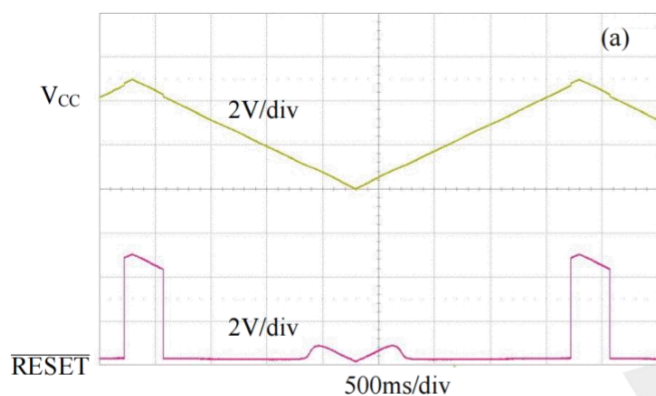
Watchdog Function for

tWD	Watchdog Timeout Period		1.0	1.6	2.25	S
tWP	WDI Pulse Width	VIL=0.4V, VIH=0.8VCC	50	--	--	ns
	WDI Input Threshold Low	VCC=5V	--	--	0.8	V
	WDI Input Threshold High	VCC=5V	3.5	--	--	V
	WDI Input Current	WDI=VCC	--	--	10	μA
		WDI=0V	-10	--	--	
	WDO Output Voltage High	ISOURCE=800μA	0.7VCC	--	--	V
	WDO Output Voltage Low	ISINK=1.2mA	--	--	0.4	V

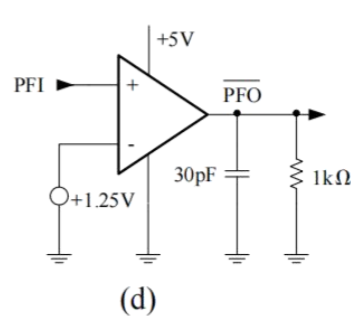
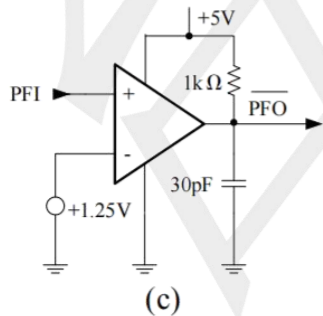
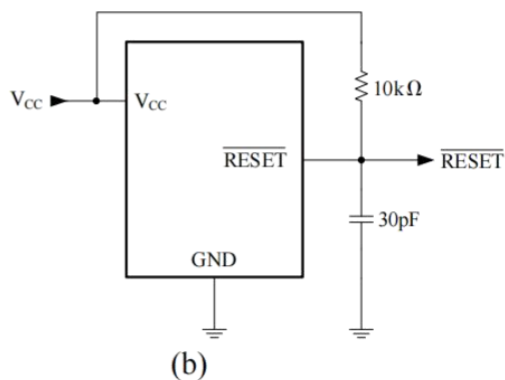
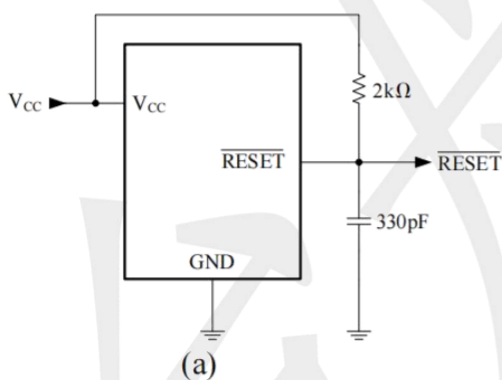
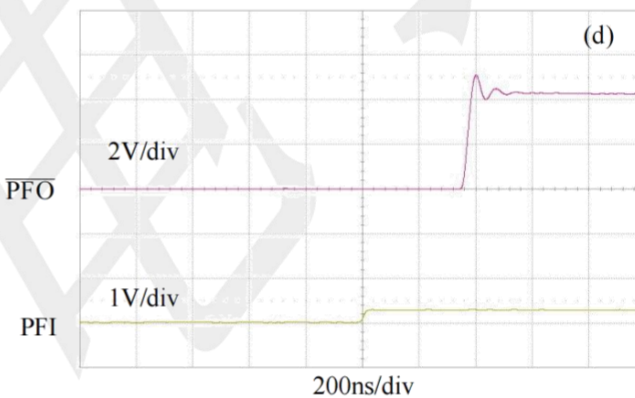
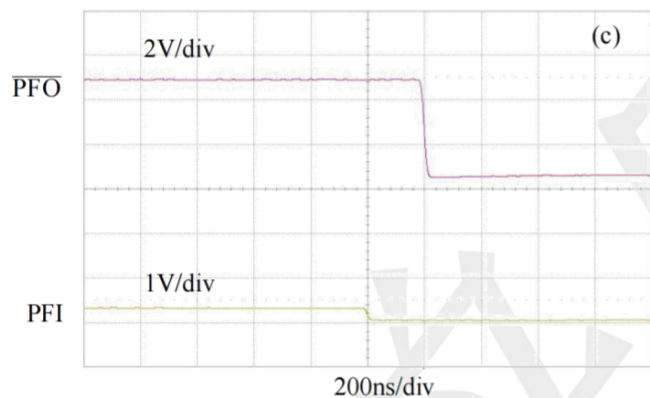
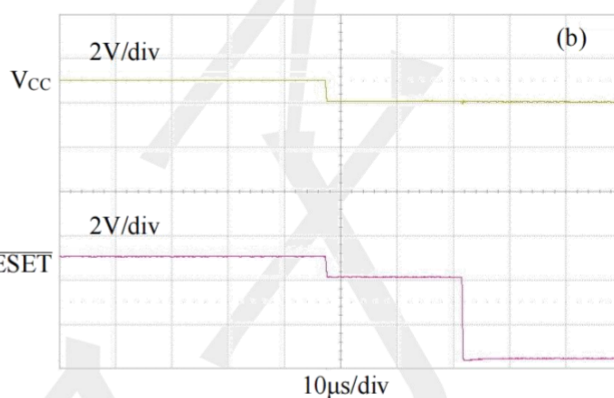
Note 2: Production testing done at TA=+25°C; limits over temperature guaranteed by design only.

Typical Operating Characteristics

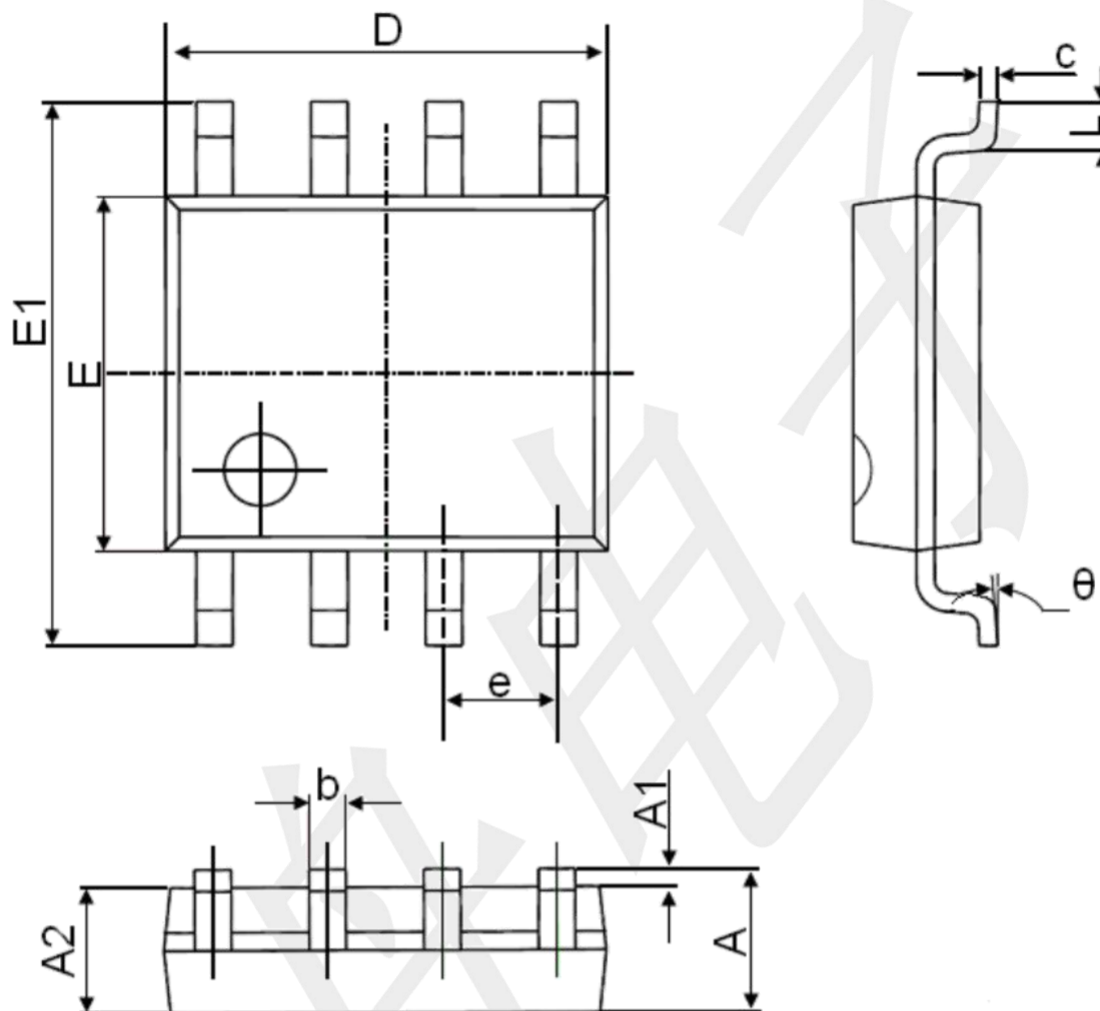
RESET Output Voltage vs. Supply Voltage



RESET Response Time



Package Outline Dimensions SOP-8



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°