钍地半导体
Tudi Semiconductor

Product Specification

TUDI-UM706

Supply Voltage Supervisor w/Watchdog Input and Manual Reset

网址 www.sztdbdt.com

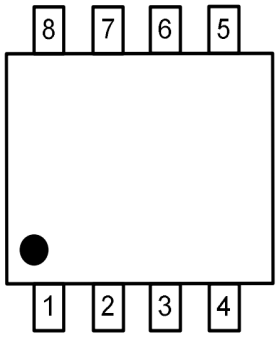
用芯智造·卓越品质

semiconductor device manufacturer

- Design
- research and development
- production
- and sales

Features

- Wide Operation Voltage Range of 1V to 5.5V
- Correct Logic Output Guaranteed to V_{CC}=1.0V
- Precision Supply-Voltage Monitor: 2.63V, 2.93V, 3.08V, 4.38V, 4.63V
- 200ms Reset Pulse Width
- Independent Watchdog Timer-1.6s Timeout (UM706xS, UM813xS)
- Active-High Reset Output (UM708xS, UM813xS)
- Voltage Monitor for Power-Fail or Low-Battery Warning
- Temperature Range: -40°C to +85°C
- Supply Current of 80μA (Typ)



SOP8

Applications

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

General Description

The UM706xS/UM708xS/UM813xS series are cost effective system power supply supervisory circuits designed to monitor the power supplies in digital systems.
The UM706xS provides power-supply monitoring circuitry that generates a reset output during power-up, power-down, and brownout conditions. The reset output remains operational with V_{CC} 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 UM708xS is the same as the UM706xS, except an active-high reset is substituted for the watchdog timer. The UM813xS is the same as the UM706xS, except RESET is provided instead of RESET _____ . All parts are available in a small outline SOP8 package.

Typical Application Circuits

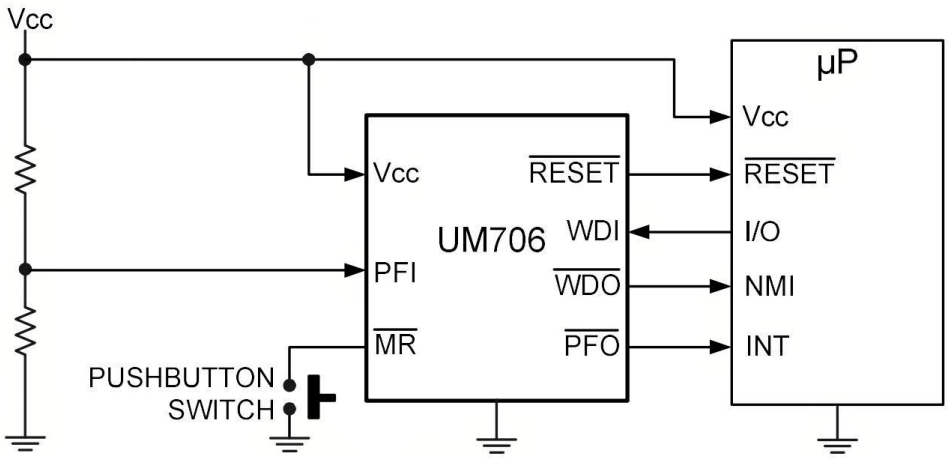


Figure 1. UM706xS Application Circuit

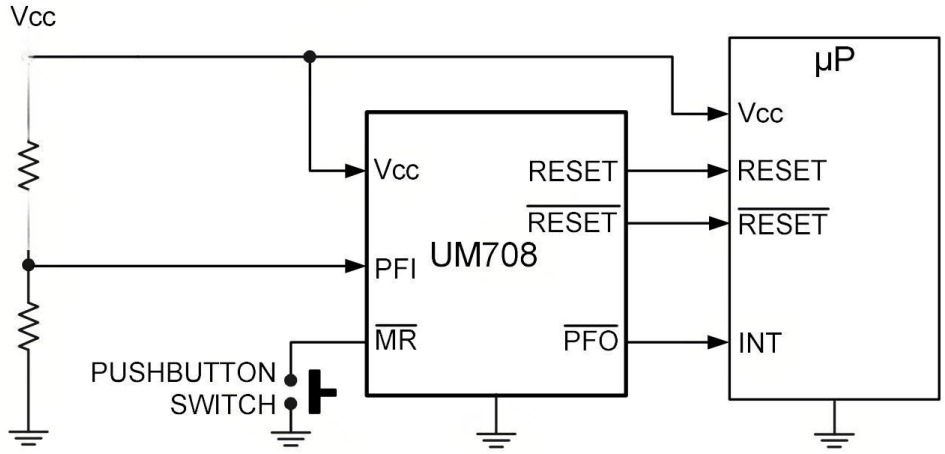


Figure 2. UM708xS Application Circuit

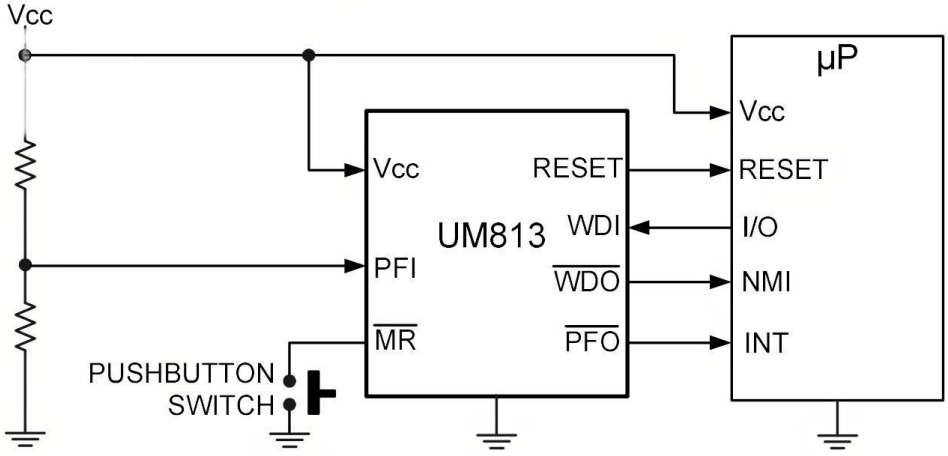


Figure 3. UM813xS Application Circuit

Pin Description

Pin Number	Pin Name		Function
1	$\overline{MR}$		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, $\overline{PFO}$ goes low. Connect PFI to GND or V_{CC} when not used.
5	$\overline{PFO}$		Power-Fail Output goes low and sinks current when PFI is less than 1.25V; otherwise $\overline{PFO}$ stays high.
6	UM706, UM813	WDI	Watchdog Input. If WDI remains either high or low for 1.6sec, the internal watchdog timer runs out and the $\overline{WDO}$ 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.
	UM708	NC	Not Connected.
7	UM706, UM708	$\overline{RESET}$	Active-Low Reset Output pulses low for 200ms when trigged, 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 $\overline{MR}$ goes from Low to High.
	UM813	RESET	Active-High Reset Output is the inverse of $\overline{RESET}$. Whenever RESET is high, $\overline{RESET}$ is low, and vice versa.
8	UM706, UM813	$\overline{WDO}$	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. $\overline{WDO}$ also goes low during low-line conditions. Whenever V_{CC} is below the reset threshold, $\overline{WDO}$ stays low; however, unlike $\overline{RESET}$, $\overline{WDO}$ does not have a minimum pulse width. As soon as V_{CC} rises above the reset threshold, $\overline{WDO}$ goes high with no delay.
	UM708	RESET	Active-High Reset Output is the inverse of $\overline{RESET}$. Whenever RESET is high, $\overline{RESET}$ is low, and vice versa.

Absolute Maximum Ratings (Note 1)

Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage	-0.3 to +6.0	V
	RESET, $\overline{RESET}$ (Push-Pull)	-0.3 to V_{CC}+0.3	V
I_{CC}	Input Current, V_{CC}	20	mA
I_O	Output Current, RESET, $\overline{RESET}$	20	mA
	Rate of Rise, V_{CC}	100	V/μs
P_D	Continuous Power Dissipation	471	mW
T_J	Operating Junction Temperature	-40 to +105	°C
T_{STG}	Storage Temperature Range	-65 to +150	°C
	Lead Temperature (Soldering, 10s)	300	°C

Note 1: Stresses beyond those listed under "Absolute maximum Ratings" may cause permanent damage to the device.

Electrical Characteristics

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

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{CC}	V_{CC} Range	T_A=0°C to +70°C		1.0		5.5	V
		T_A=-40°C to +85°C		1.2		5.5	
I_{CC}	Supply Current	T_A=-40°C to +85°C			80	150	μA
V_{TH}	Reset Threshold	UM706L/ UM708L/UM813L	T_A=+25°C	4.53	4.63	4.73	V
			T_A=-40°C to +85°C	4.50		4.75	
		UM706M/ UM708M/UM813M	T_A=+25°C	4.29	4.38	4.47	
			T_A=-40°C to +85°C	4.25		4.50	
		UM706T/ UM708T/UM813T	T_A=+25°C	3.01	3.08	3.15	
			T_A=-40°C to +85°C	3.00		3.16	
		UM706S/ UM708S/UM813S	T_A=+25°C	2.87	2.93	2.99	
			T_A=-40°C to +85°C	2.85		3.00	
		UM706R/ UM708R/UM813R	T_A=+25°C	2.57	2.63	2.69	
			T_A=-40°C to +85°C	2.55		2.70	
	Reset Threshold Hysteresis				40		mV
t_{RS}	Reset Pulse Width			140	200	280	ms

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

Electrical Characteristics (Continued)

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{OL}	RESET/$\overline{\text{RESET}}$ Output Voltage Low	I_{SINK}=1.2mA (for R/S/T versions)			0.3	V
		I_{SINK}=3.2mA (for L/M versions)			0.4	
		V_{CC}=1.2V, I_{SINK}=100μA			0.3	
V_{OH}	RESET/$\overline{\text{RESET}}$ Output Voltage High	I_{SOURCE}=800μA	0.7V_{CC}			V
	$\overline{\text{MR}}$ Pull-Up Current	$\overline{\text{MR}}$=0V			600	μA
t_{MR}	$\overline{\text{MR}}$ Pulse Width		150			ns
	$\overline{\text{MR}}$ Input Threshold, Low				0.8	V
	$\overline{\text{MR}}$ Input Threshold, High		2.0			V
t_{MD}	$\overline{\text{MR}}$ to Reset Out Delay				250	ns
	PFI Input Threshold	V_{CC}=5V	1.20	1.25	1.30	V
	PFI Input Current		-25	0.01	+25	nA
	$\overline{\text{PFO}}$ Output Voltage	I_{SOURCE}=800μA	0.7V_{CC}			V
		I_{SINK}=3.2mA			0.4	
Watchdog Function for UM706/UM813						
t_{WD}	Watchdog Timeout Period		1.0	1.6	2.25	s
t_{WP}	WDI Pulse Width	V_{IL}=0.4V, V_{IH}=0.8V_{CC}	50			ns
	WDI Input Threshold Low	V_{CC}=5V			0.8	V
	WDI Input Threshold High	V_{CC}=5V	3.5			V
	WDI Input Current	WDI=V_{CC}			10	μA
		WDI=0V	-10			
	WDO Output Voltage High	I_{SOURCE}=800μA	0.7V_{CC}			V
	WDO Output Voltage Low	I_{SINK}=1.2mA			0.4	V

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

Block Diagram

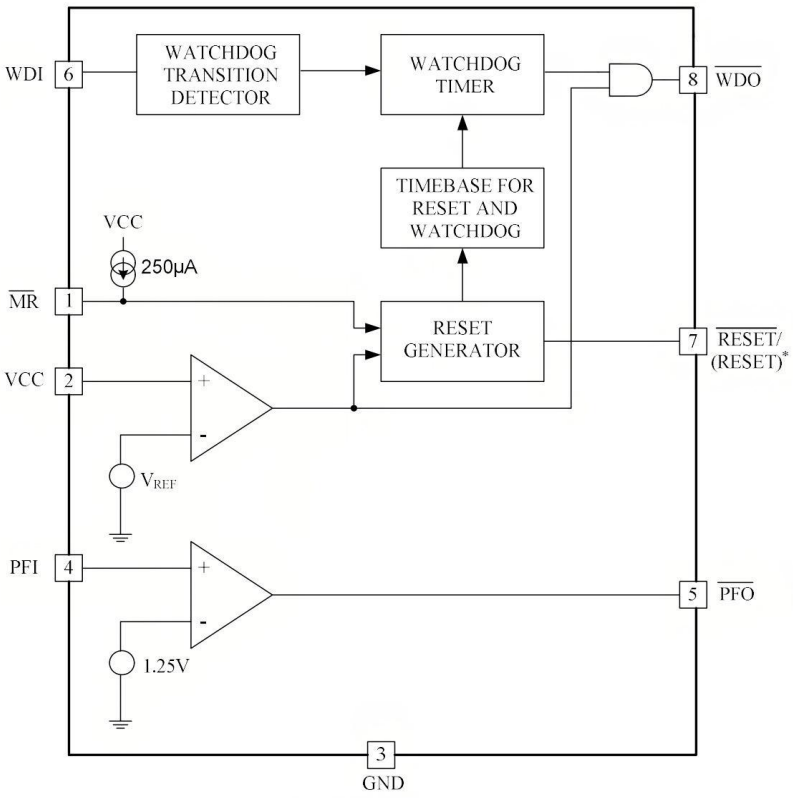


Figure 4. UM706xS/UM813xS Block Diagram
(RESET)* for UM813xS

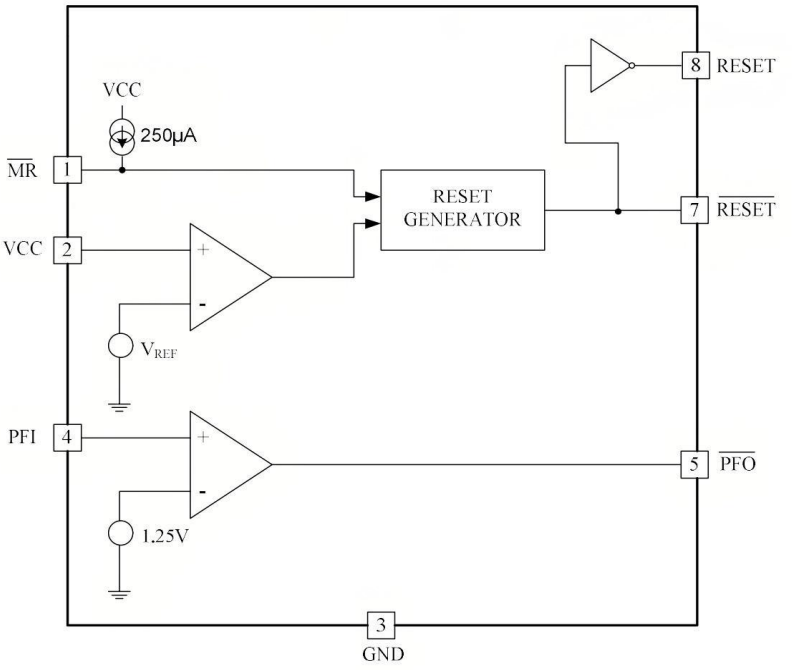


Figure 5. UM708xS Block Diagram

Detailed Description

Power-Fail Reset

The reset output provides a reset signal to the microprocessor whenever the V_{CC} input is below the threshold. An internal timer holds the reset output active for 200ms after the voltage on V_{CC} rises above the threshold. This is intended as a power-on reset signal for the microprocessor. It allows time for both the power supply and the microprocessor to stabilize after power-up. If a power supply brownout or interruption occurs, the reset line is similarly activated and remains active for 200ms after the supply recovers. If another interruption occurs during an active reset period, the reset timeout period continues for an additional 200ms.
The reset output is guaranteed to remain valid with V_{CC} as low as 1V. This ensures that the microprocessor is held in a stable shutdown condition as the power supply starts up.
The UM706xS provides an active low $\overline{\text{RESET}}$ signal while the UM813xS provides an active high RESET signal. The UM708xS has both an active high RESET output and an active low $\overline{\text{RESET}}$ output.

Power-Fail Comparator

The power-fail comparator can be used for various purposes because its output and non-inverting input are not internally connected. The inverting input is internally connected to a 1.25V reference.
To build an early-warning circuit for power failure, connect the PFI pin to a voltage driver, choose the voltage divider ratio so that the voltage at PFI falls below 1.25V just before the regulator drops out. Use $\overline{\text{PFO}}$ to interrupt the µP so it can prepare for an orderly power-down.

Manual Reset

The Manual-Reset input ($\overline{\text{MR}}$) allows reset to be trigged by a pushbutton switch. The switch is effectively debounced by the 140ms minimum reset pulse width. $\overline{\text{MR}}$ is TTL/CMOS logic compatible, so it can be driven by an external logic line. If unused, $\overline{\text{MR}}$ input can be tied high or left floating.

Watchdog Timer

The UM706xS/UM813xS watchdog circuit monitors the µP's activity. If the µP does not toggle the watchdog input (WDI) within 1.6sec and WDI is not three-stated, $\overline{\text{WDO}}$ goes low. As long as $\overline{\text{RESET}}$ is asserted or the WDI input is three-stated, the watchdog timer will stay cleared and will not count. As soon as reset is released and WDI is driven high or low, the timer will start counting. Pulses as short as 50ns can be detected.
Typically, $\overline{\text{WDO}}$ will be connected to the non-maskable interrupt input (NMI) of a µP. When V_{CC} drops below the reset threshold, $\overline{\text{WDO}}$ will go low whether or not the watchdog timer has timed out yet. Normally this would trigger an NMI interrupt, but $\overline{\text{RESET}}$ goes low simultaneously, and thus overrides the NMI interrupt.
If WDI is left unconnected, $\overline{\text{WDO}}$ can be used as a low-line output. Since floating WDI disables the internal timer, $\overline{\text{WDO}}$ goes low only when V_{CC} falls below the reset threshold, thus functioning as a low-line output.
The UM706xS has a watchdog timer and a $\overline{\text{RESET}}$ output. The UM708xS has both active-high and active-low reset outputs. The UM813xS has both an active-high reset output and a watchdog timer.

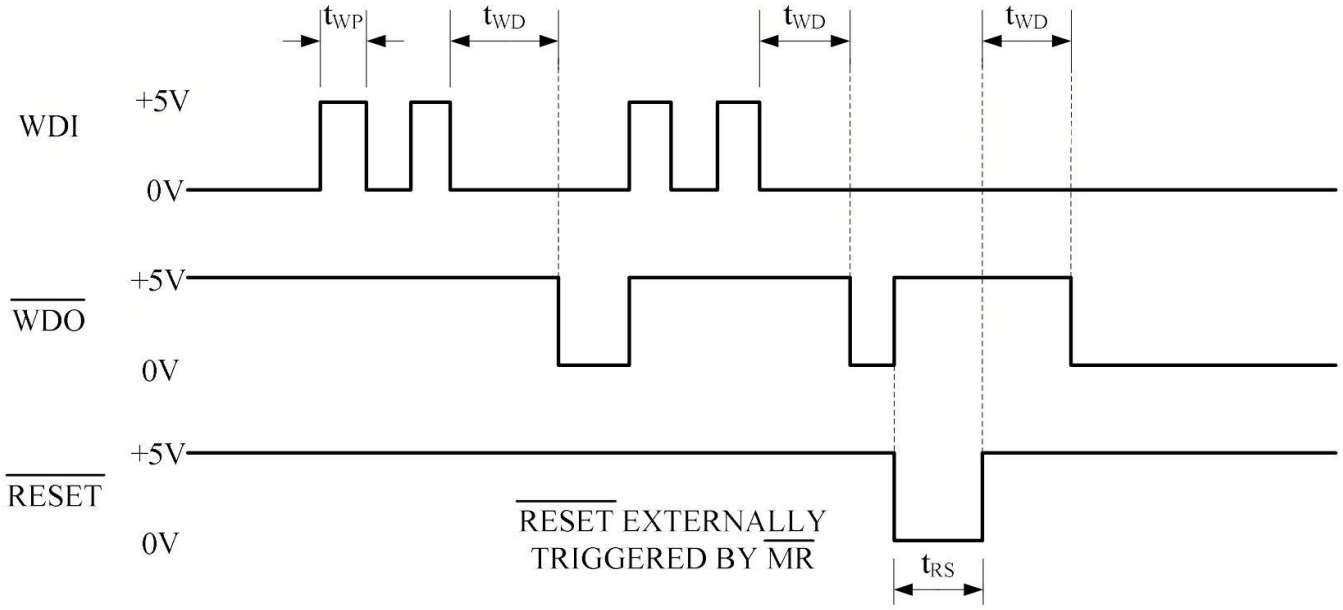


Figure 6. Watchdog and Reset Timing

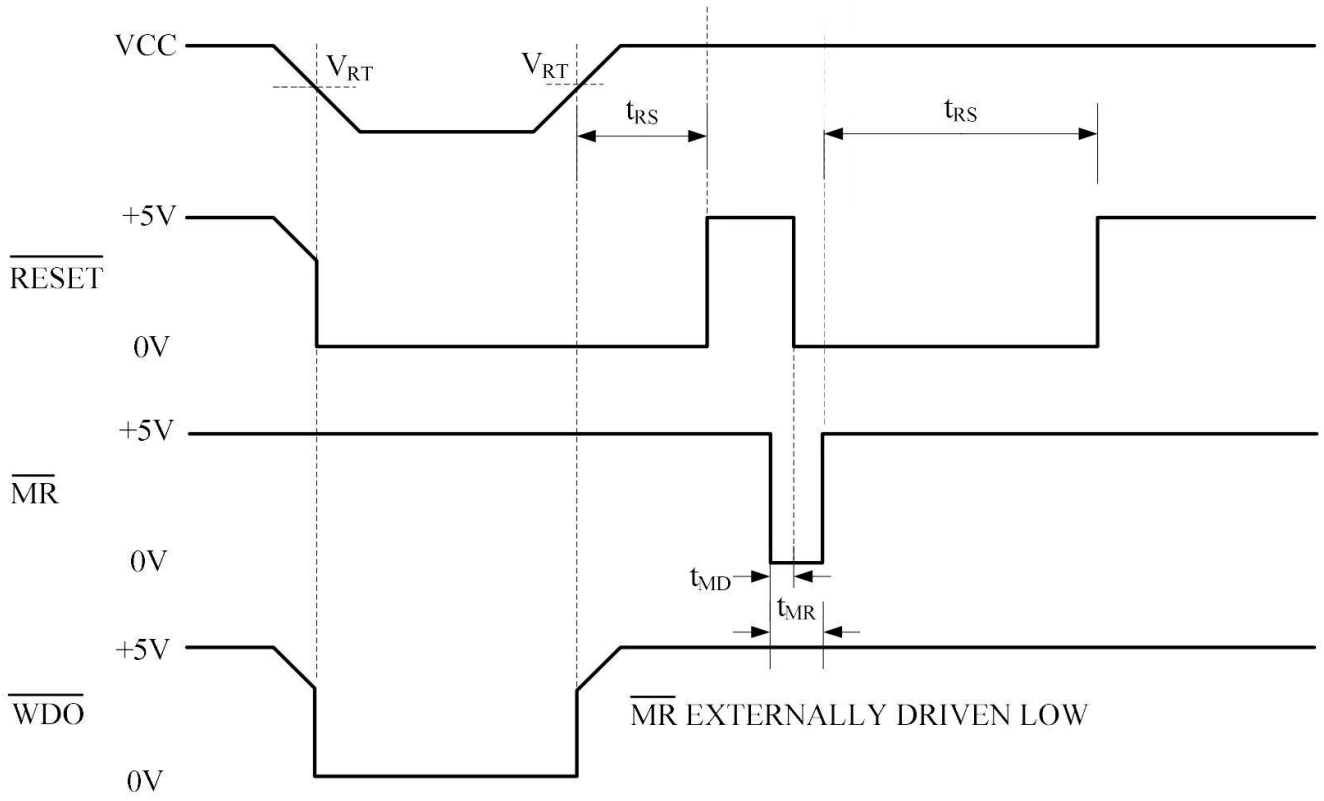


Figure 7. Reset, Manual Reset and Watchdog Timing

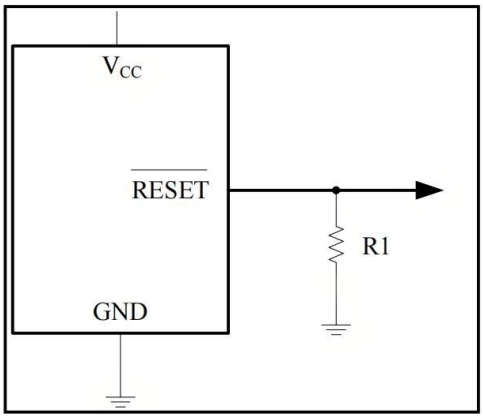


Figure 8. Reset Valid to Ground Circuit

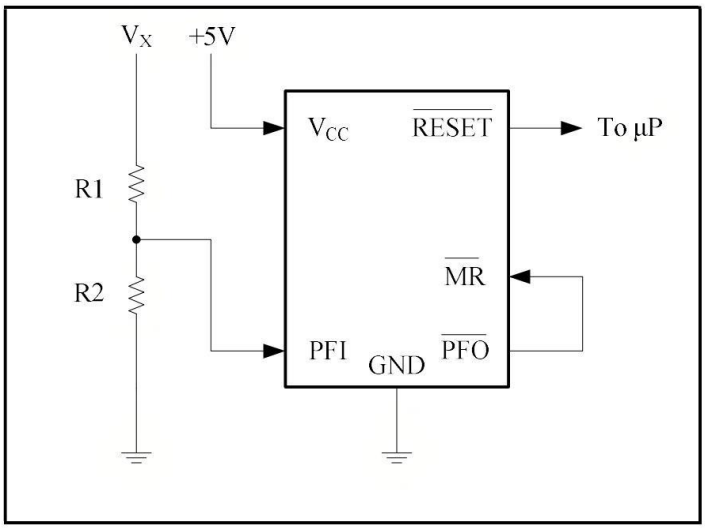


Figure 9. Monitoring an Additional Supply V_X

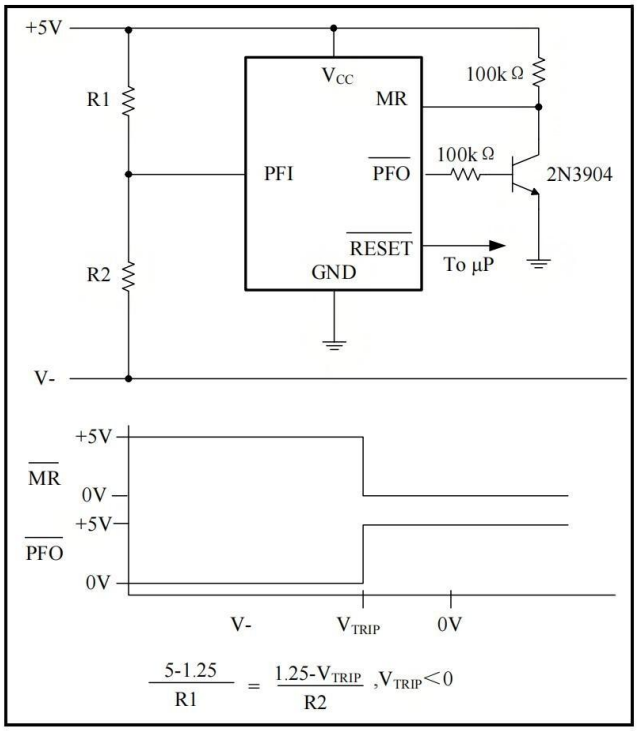


Figure 10. Monitoring a Negative Voltage

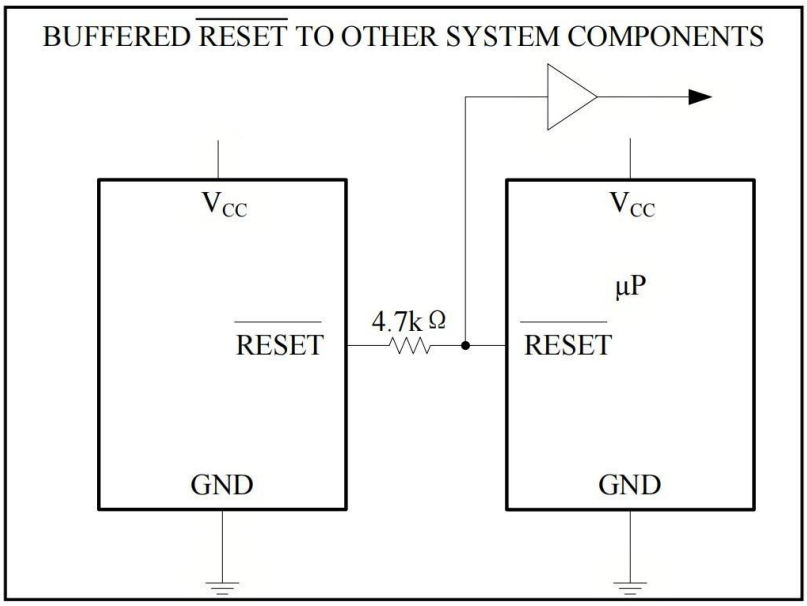
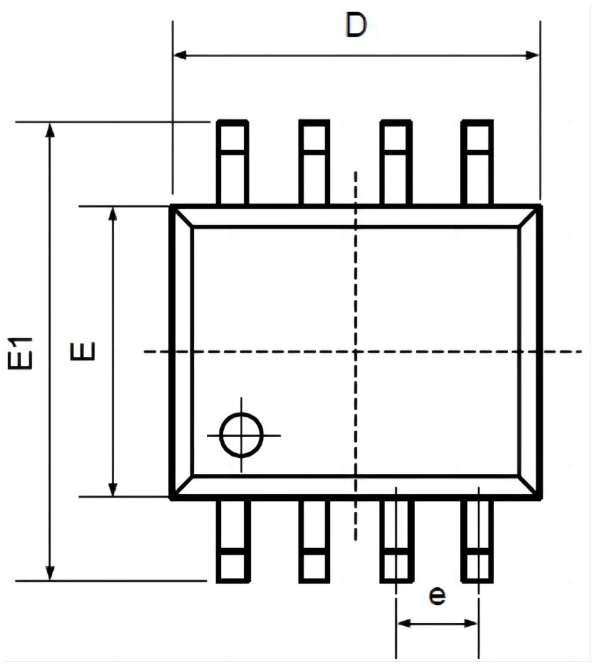


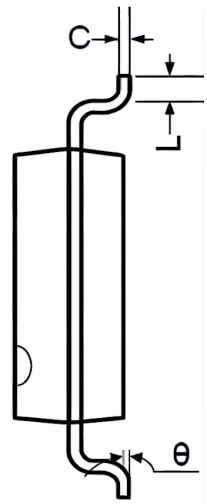
Figure 11. Bidirectional Reset I/O

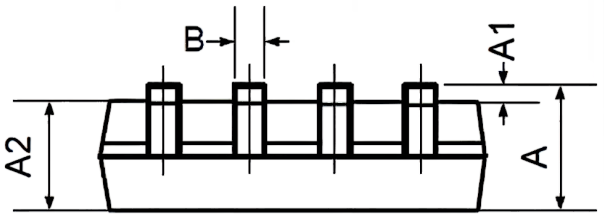
Order information

Order Number	Package	Package Quantity	Marking On The park
UM706RS-TUDI	SOP8	Tape,Reel,2500	UM706RS
UM706SS-TUDI	SOP8	Tape,Reel,2500	UM706SS
UM706TS-TUDI	SOP8	Tape,Reel,2500	UM706TS

Package SOP8







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	0.190	0.250	0.007	0.010
D	4.780	5.000	0.188	0.197
E	3.800	4.000	0.150	0.157
E1	5.800	6.300	0.228	0.248
e	1.270TYP		0.050TYP	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

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