钛地半导体
Tudi Semiconductor

Product Specification

TUDI-MAX706P/R/S/T/AP/AR/AS/AT MAX708R/S/T

+3V Voltage Monitoring, Low-Cost μP Supervisory Circuits

网址 www.sztdbdt.com

用芯智造 · 卓越品质

semiconductor device manufacturer

- Design
- research and development
- production
- and sales

Features

●Precision Supply-Voltage Monitors
-2.63V (706P/R, 706AP/AR, and 708R)
-2.93V (706S, MAX706AS, and 708S)
-3.08V (706T, 706AT, and 708T)
●200ms Reset Time Delay
●Debounced TTL/CMOS-Compatible Manual Reset Input
●100μ A Quiescent Current
●WDI Disable Feature (706AP/AR/AS/AT)
●Watchdog Timer: 1.6s Timeout

●Reset Output Signal:
-Active-High Only (706P, 706AP)
-Active-Low Only (706R/S/T, 706AR/AS/AT)
-Active-High and Active-Low (708R/S/T)
●Voltage Monitor for Power-Fail or Low-Battery Warning
●8-Pin Surface-Mount Package
●Guaranteed RESET Assertion to VCC = 1V

Explanation

The MAX706P/R/S/T, MAX706AP/AR/AS/AT, and MAX708R/S/T microprocessor (μ P) supervisory circuits reduce the complexity and number of components required to monitor +3V power-supply levels in +3V to +5V μ P systems. These devices significantly improve system reliability and accuracy compared to separate ICs or discrete components.
The MAX706P/R/S/T and MAX706AP/AR/AS/AT supervisory circuits provide the following four functions:
1) A reset output during power-up, power-down, and brownout conditions.
2) An independent watchdog output that goes low if the watchdog input has not been toggled within 1.6s.
3) A 1.25V threshold detector for power-fail warning, low-battery detection, or for monitoring a power supply other than the main supply.
4) An active-low, manual-reset input.
The only difference between the MAX706R/AR, MAX706S/AS, and MAX706T/AT is the reset-threshold voltage levels, which are 2.63V, 2.93V, and 3.08V, respectively. All have active-low reset output signals.
The MAX706P/AP are identical to the MAX706R/AR, except the reset output signal is active-high. The watch dog timer function for the MAX706AP/AR/AS/AT disables when the WDI input is left open or connected to a
high-impedance state of a low-leakage tri-state output.
The MAX708R/S/T provide the same functions as the MAX706R/S/T and MAX706AR/AS/AT except they do not have a watchdog timer. Instead, they provide both RESET and RESET outputs. As with the MAX706, devices with R, S, and T suffixes have reset thresholds of 2.63V, 2.93V, and 3.08V, respectively.

Applications

●Battery-Powered Equipment
●Portable Instruments
●Computers
●Intelligent Instruments
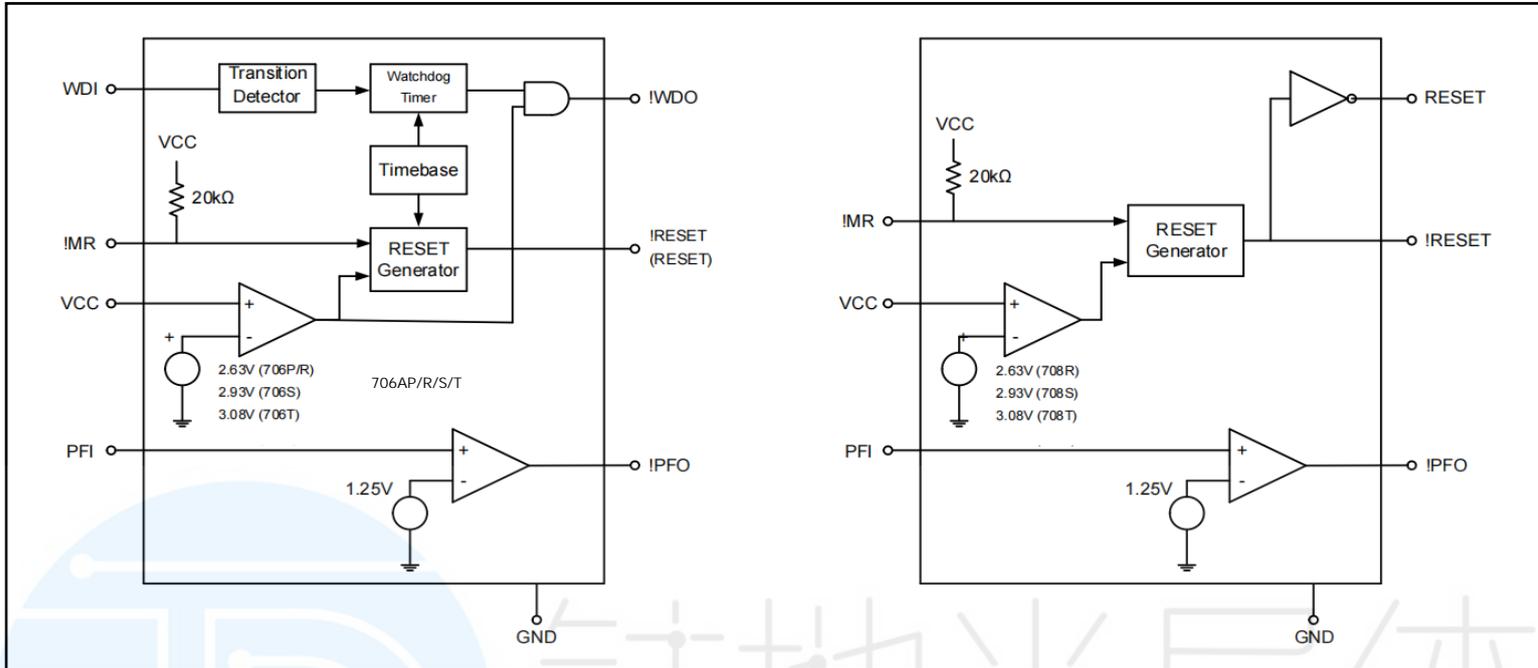●Critical μ P Power Monitoring

Functional Diagram

Figure 1: 706P/R/S/T, 708R/S/T, 706AP/AR/AS/AT functional diagram

Pin Function

Pin	symbol	description
1	VCC	Source
2	GND	The earth
3	!MR	Manual reset input
4	PFI	1.25V internal comparator reverse input
5	!PFO	1.25V output of built-in comparator
6	WDI	Set this pin to high to disable the watchdog function.
7	!WDO	Watchdog output
8	RESET	Output a high-level reset signal,with RESET and!RESET inverted.
9	!RESET	Low level reset signal output
10	NC	Not have

Table 1 Pin Function Descriptions for 706P/R/S/T/J, 708R/S/T/J, 705/6/7/8, and 813L
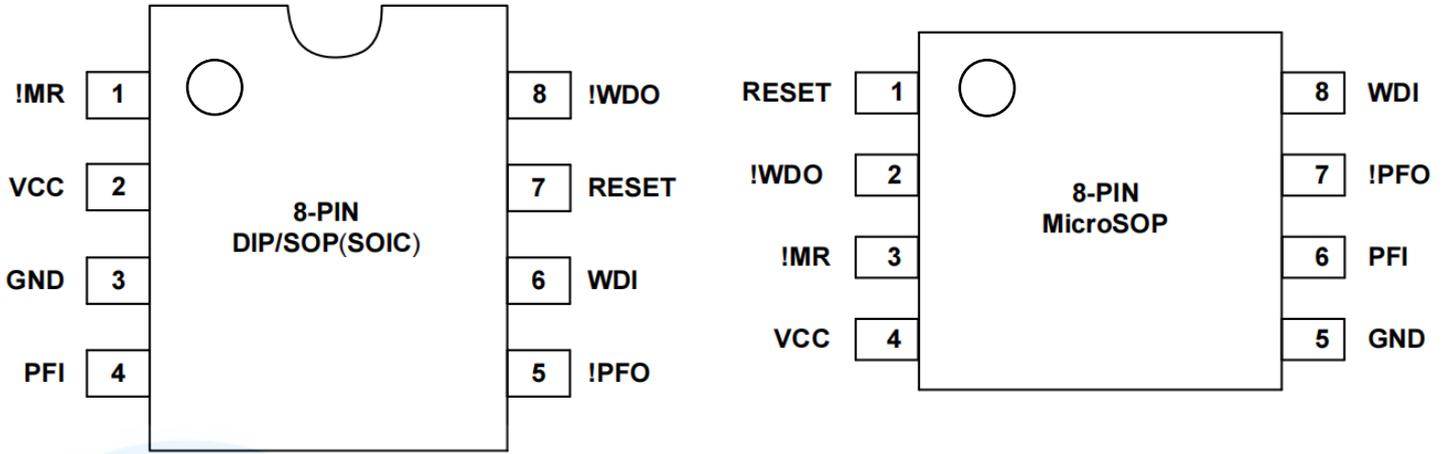
Pin Diagram

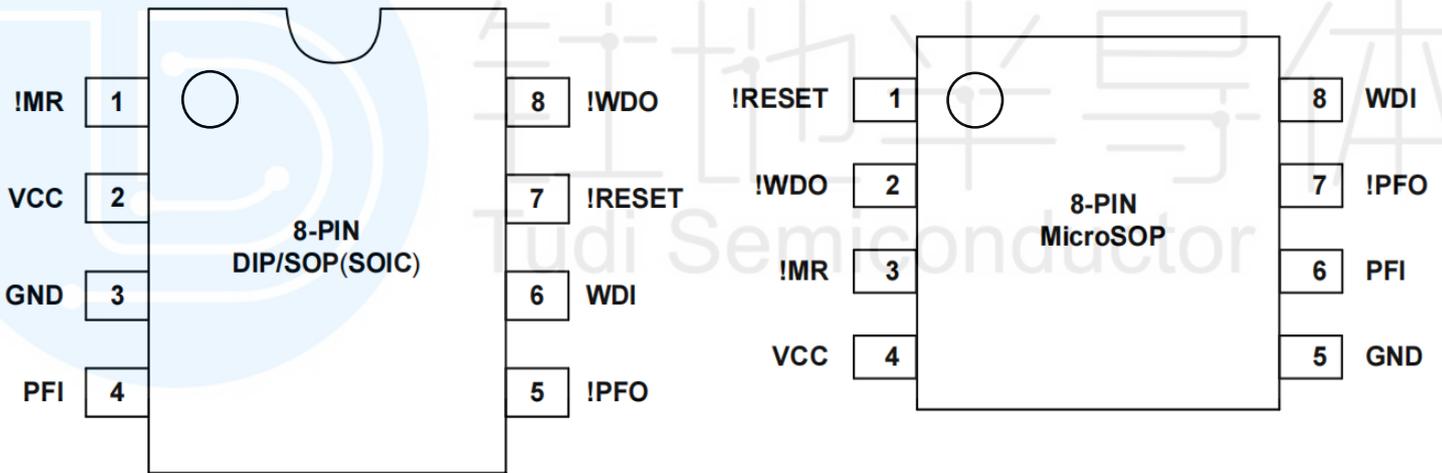Figure 2: Pin Layout Diagram of 706P/AP

Figure 3: Pin Layout Diagram of 706R/S/T/AR/AS/AT
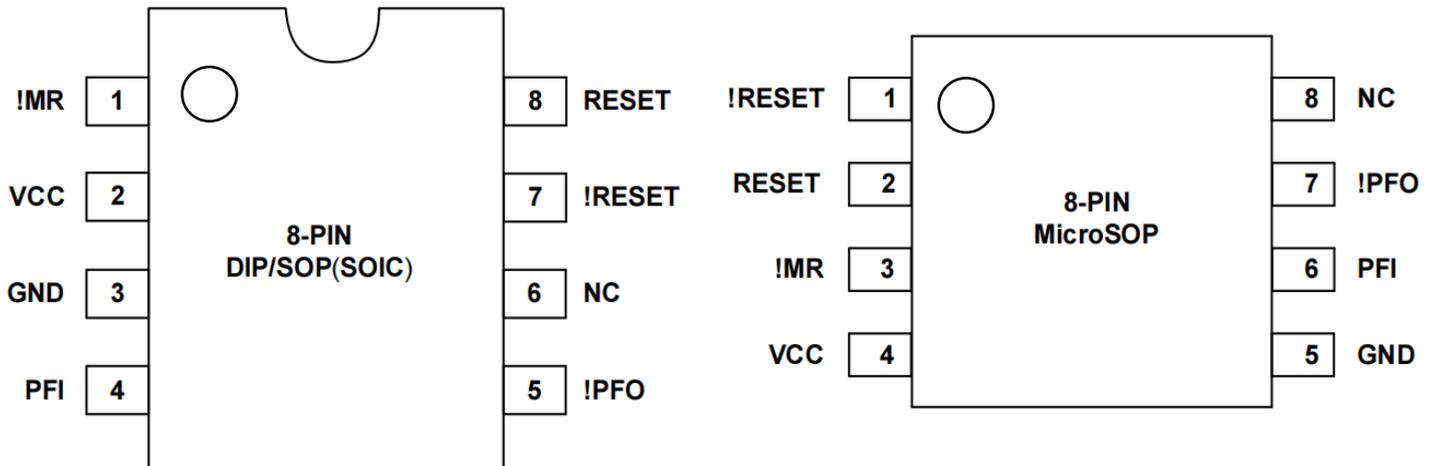

Figure 4: Pin Layout Diagram of 708R/S/T

Electrical Parameters

(70_P/R, 706AP/AR: VCC = 2.7V to 5.5V; 70_S, 706AS: VCC = 3.0V to 5.5V; 70_T, 706AT: VCC = 3.15V to 5.5V; TJ = TA = TMIN to TMAX, unless otherwise noted. Typical values are at TJ = TA = +25°C.)

symbol	description	Test condition	Parameter			Unit
			Least value	Representative value	Crest value	
tMD	!MR to RESET output delay	J-type device 3.6V<VCC<4.5V	-	-	750	ns
		P/R/S/T type devices VRST(MAX)<VCC<3.6V				
		4.5V<VCC<5.5V	-	-	250	
VIH	!MR Input threshold voltage	VRST(MAX)<VCC<4.5V	0.7VCC	-	-	V
VIL		VRST(MAX)<VCC<4.5V	-	-	0.6	
VIH		4.5V<VCC<5.5V	2.0	-	-	
VIL		4.5V<VCC<5.5V	-	-	0.8	
RP	!MR pull-up resistor	-	10	20	40	kΩ
VOH	Reset output voltage	ISOURCE =800µA, 4.5V<VCC<5.5V	VCC-1.5V	-	-	V
VOL		ISINK=3.2mA,4.5 V<VCC<5.5V	-	-	0.4	
VOH		ISOURCE=500µA, VRST(MAX)<VCC<4.5V	0.8VCC	-		
VOL		ISINK=1.2mA, VRST(MAX)<VCC<4.5V	-	-	0.3	
VOL		706*C,708*C, SINK=50µA,VCC=1.1V	-	-	0.3	
		706*E,708*E,705/6/7/8 ISINK=100µA,VCC=1.2V	-	-	0.3	
VOH	RESET output voltage,706P device	ISOURCE =800µA, 4.5V<VCC<5.5V	VCC-1.5V	-		V
VOL		ISINK=3.2mA,4.5 V<VCC<5.5V	-	-	0.4	
VOH		ISOURCE=500µA, VRST(MAX)<VCC<3.6V	0.8VCC	-		
VOL		ISINK=1.2mA, VRST(MAX)<VCC<3.6V	-	-	0.3	

Table 2 Electrical Characteristics of 706P/R/S/T, 708R/S/T, 705/6/7/8, and 813L

Electrical Parameters

(70_P/R, 706AP/AR: VCC = 2.7V to 5.5V; 70_S, 706AS: VCC = 3.0V to 5.5V; 70_T, 706AT: VCC = 3.15V to 5.5V; TJ = TA = TMIN to TMAX, unless otherwise noted. Typical values are at TJ = TA = +25°C.)

PARAMETER	SYMBOL	CONDITIONS		MIN TYP MAX	UNITS
Supply Voltage Range	Vcc		70_C	1.0 5.5	V
			70_E	1.2 5.5	
Supply Current	ISUPPLY	Vcc<3.6V	706_C	90 200	µA
			706_E	90 300	
			708_C	50 200	
			708_E	50 300	
		Vcc<5.5V	706_C	135 350	
			706_E	135 500	
			708_C	65 350	
			708_E	65 500	
Reset Threshold (Vcc Falling)	VRST	70_P/R,706AP/AR		2.55 2.63 2.70	V
		70_S,706AS		2.85 2.93 3.00	
		70_T,706AT		3.00 3.08 3.15	
Reset Threshold Hysteresis	VHYS			20	mV
Reset Pulse Width	tRST	70_P/R,706AP/AR Vcc=3.0V		140 200 280	ms
		70_S,706AS,Vcc=3.3V		140 200 280	
		Vcc=5V		200	
RESET OUTPUT					
Output-Voltage High (70_R/S/T) (706AR/AS/AT)	VoH	VRST(MAX)<Vcc<3.6V	ISOURCE=500µA	0.8×Vcc	V
	VoL	VRST(MAX)<Vcc<3.6V	ISINK =1.2mA	0.3	
	VOH	4.5V<Vcc<5.5V	IRSOURCE = 800µA	Vcc- 1.5	
	VoL	4.5V<Vcc<5.5V	ISINK=3.2mA	0.4	
	VoL	70_C Vcc=1.0V,ISINK=50µA		0.3	
		70_E:Vcc=1.2V,ISINK =100µA		0.3	

Table 3 Electrical characteristics of 706P/R/S/T, 708R/S/T,706AP/AR/AS/AT (continued)

Electrical Parameters

(7O_P/R, 7O6AP/AR: VCC = 2.7V to 5.5V; 7O_S, 706AS: VCC = 3.0V to 5.5V; 7O_T, 706AT: VCC = 3.15V to 5.5V; TJ = TA = TMIN to TMAX, unless otherwise noted. Typical values are at TJ = TA = +25° C.)

PARAMETER	SYMBOL	CONDITIONS		MIN TYP MAX	UNITS
WATCHDOG OUTPUT					
WDO Output Voltage (706_,706A_)	VOH	VRST(MAX)<Vcc<3.6V	ISOURCE=500μA	0.8×Vcc	V
	VoL	VRST(MAX)<Vcc<3.6V	ISINK=500μA	0.3	
	VoH	4.5V<Vcc<5.5V	ISOURCE=800μA	Vcc- 1.5	
	VoL	4.5V<Vcc<5.5V	ISINK =1.2mA	0.4	
MANUAL RESET INPUT					
MR Pullup Current		MR=0	VRST(MAX)<Vcc<3.6V	25 70 250	μA
			4.5V<Vcc<5.5V	100 250 600	
MR Pulse Width	tMR	VRST(MAX)<Vcc<3.6V		500	ns
		4.5V<Vcc<5.5V		150	
MR Input Threshold	VIL	VRST(MAX)<Vcc<3.6V		0.6	V
	VIH	VRST(MAX)<Vcc<3.6V		0.7×Vcc	
	VIL	4.5V<Vcc<5.5V		0.8	
	VIH	4.5V<Vcc<5.5V		2.0	
MR to Reset Output Delay	tMD	VRST(MAX)<Vcc<3.6V		750	ns
		4.5V<Vcc<5.5V		250	
POWER-FAILURE COMPARATOR					
PFI Input Threshold		(70_P/R,706APAR)PFI falling Vcc=3.0V		1.2 1.25 1.3	V
		(70_S/T,706AS/AT)PFI falling, Vcc=3.3V		1.2 1.25 1.3	
PFI Input Current				-25 +0.01 +25	nA
PFO Output Voltage	VoH	VRST(MAX)<Vcc<3.6V	ISOURCE=500μA	0.8×Vcc	V
	VoL	VRST(MAX)<Vcc<3.6V	ISINK=1.2mA	0.3	
	VoH	4.5V<Vcc<5.5V	ISOURCE=800μA	Vcc-1.5	
	VoL	4.5V<Vcc<5.5V	ISINK =3.2mA	0.4	

Table 4 Electrical Characteristics of 706P/R/S/T, 708R/S/T,706AP/AR/AS/AT (continued)

Electrical Parameters

(7O_P/R, 706AP/AR: VCC = 2.7V to 5.5V; 7O_S, 706AS: VCC = 3.0V to 5.5V; 7O_T, 706AT: VCC = 3.15V to 5.5V; TJ = TA = TMIN to TMAX, unless otherwise noted. Typical values are at TJ = TA = +25° C.)

PARAMETER	SYMBOL	CONDITIONS		MIN TYP MAX	UNITS
Output-Voltage High (706P)(706AP)	VOH	VRST(MAX)<Vcc<3.6V	ISOURCE=215µA	Vcc-0.6	V
	VoL	VRST(MAX)<Vcc<3.6V	ISINK =1.2mA	0.3	
	VOH	4.5<Vcc<5.5V	ISOURCE=800µA	Vcc-1.5	
	VoL	4.5V<Vcc<5.5V	ISINK =3.2mA	0.4	
Output-Voltage High (708_)	VoH	VRST(MAX)<Vcc<3.6V	ISOURCE=500µA	0.8×Vcc	V
	VoL	VRST(MAX)<Vcc<3.6V	ISINK=500µA	0.3	
	VOH	4.5V<Vcc<5.5V	ISOURCE=800µA	Vcc-1.5	
	VoL	4.5V<Vcc<5.5V	ISINK=1.2mA	0.4	
WATCHDOG INPUT					
Watchdog Timeout Period	twD	706P/R,706AP/AR,VCc=3.0V		1.00 1.6 2.25	S
		706S/T,706AS/AT,Vcc=3.3V		1.00 1.6 2.25	
WDI Pulse Width (706_,706A_)	twP	VIL=0.4V	VRST(MAX)<Vcc 3.6V	100	ns
		VIH=0.8V×Vcc	4.5V<Vcc< 5.5V	50	
Watchdog Input Threshold (706_,706A_)	VIL	VRST(MAX)<Vcc<3.6V		0.6	V
	VIH	VRST(MAX)<Vcc<3.6V		0.7×Vcc	
	VIL	Vcc=5.0V		0.8	
	VIH	VCc=5.0V		3.5	
WDI Input Current		WDI=OV or Vcc	706_	-1.0 +0.02 +1.0	µA
			706A_	-5 +5	

Table 5 Electrical Characteristics of 706P/R/S/T, 708R/S/T,706AP/AR/AS/AT (continued)
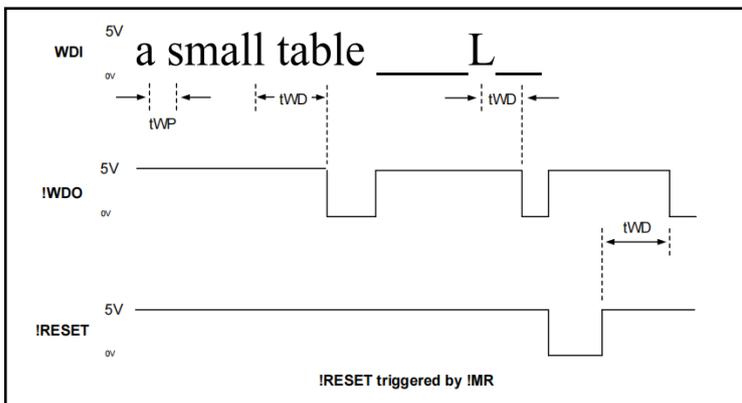
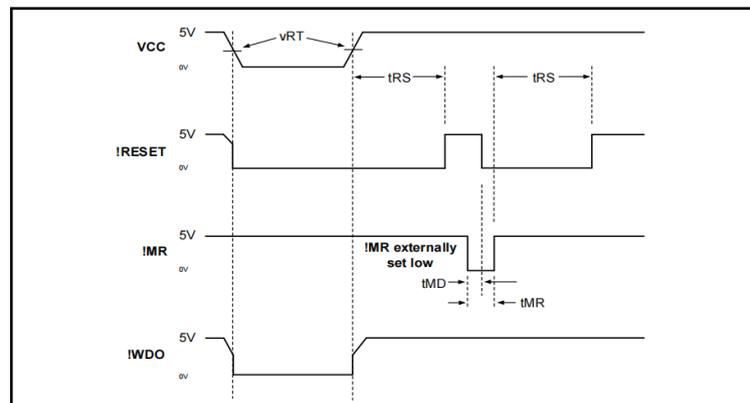# Typical Performance Parameters

Figure 5   Watchdog Timing Diagram

Figure 6: Reset Signal Timing Diagrams for 706P/R/S/T, 708R/S/T, 705/6/7/8, and 813L

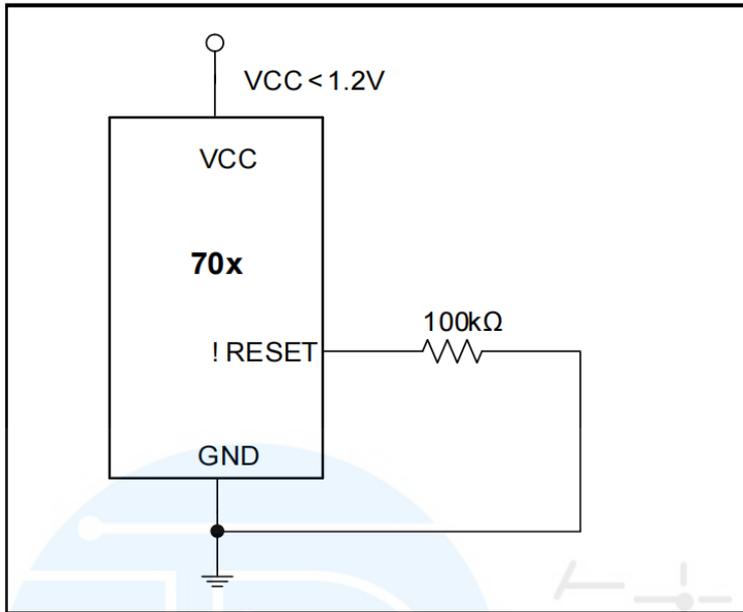# Key Performance Parameters (continued)

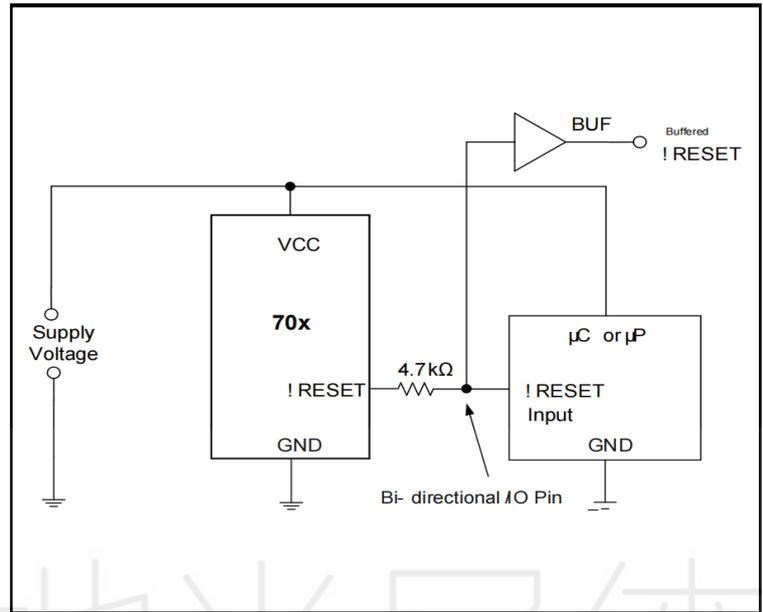Figure 7 Ensure the RESET Circuit Is Functioning Properly

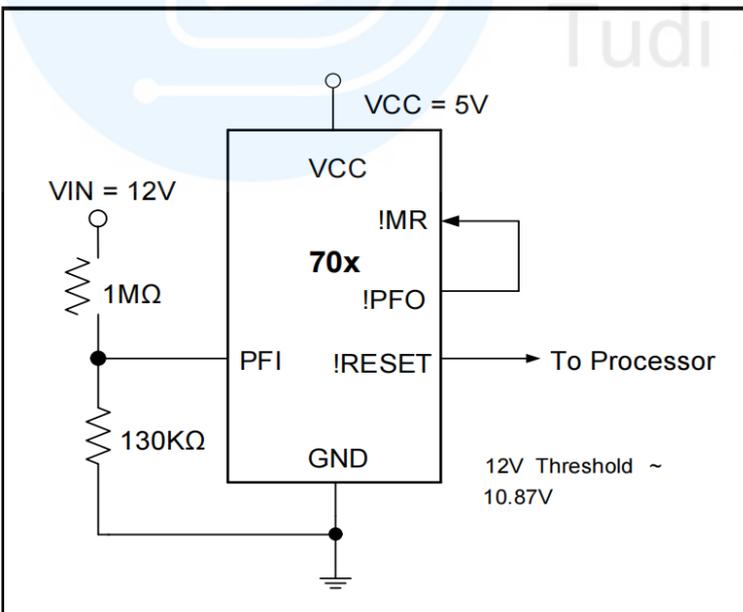Figure 8 Schematic Diagram of a Bidirectional Reset Port Connection
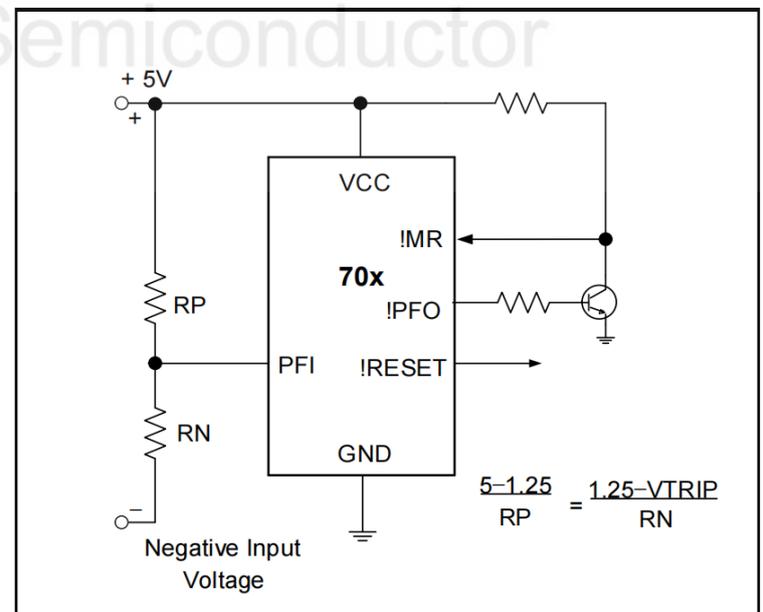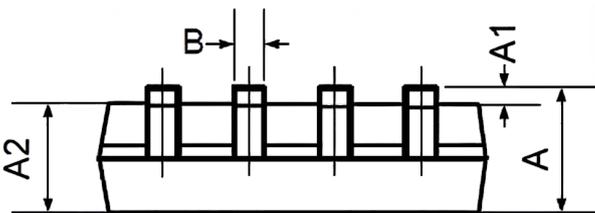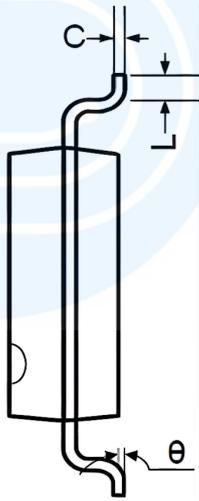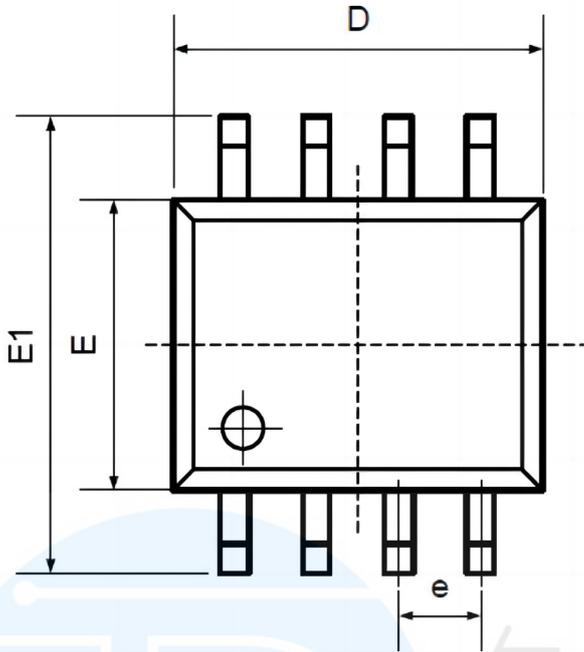

Figure 9 Diagram of Voltage Monitoring Outside VCC

Figure 10 Negative Voltage Monitoring Circuit

钛地半导体
Tudi Semiconductor

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°

Package MSOP8
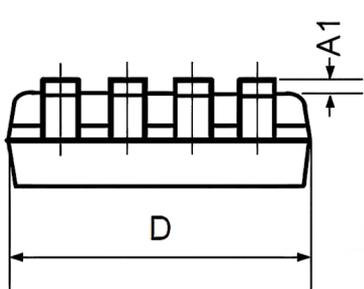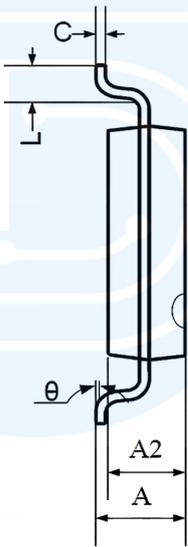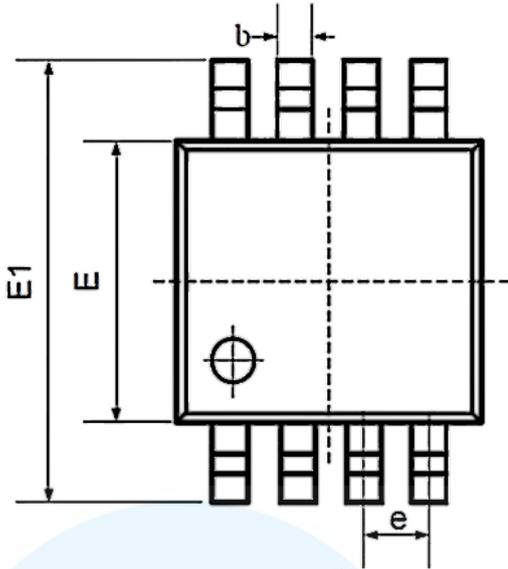
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.800	1.200	0.031	0.047
A1	0.000	0.200	0.000	0.008
A2	0.760	0.970	0.030	0.038
b	0.30 TYP		0.012 TYP	
C	0.15 TYP		0.006 TYP	
D	2.900	3.100	0.114	0.122
e	0.65 TYP		0.026 TYP	
E	2.900	3.100	0.114	0.122
E1	4.700	5.100	0.185	0.201
L	0.410	0.650	0.016	0.026
θ	0°	6°	0°	6°

Package DIP8
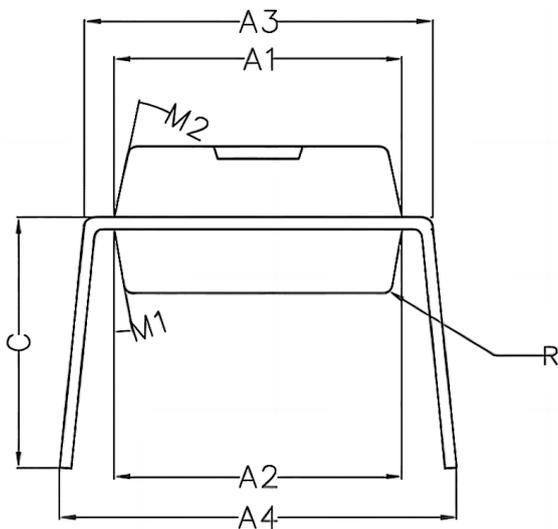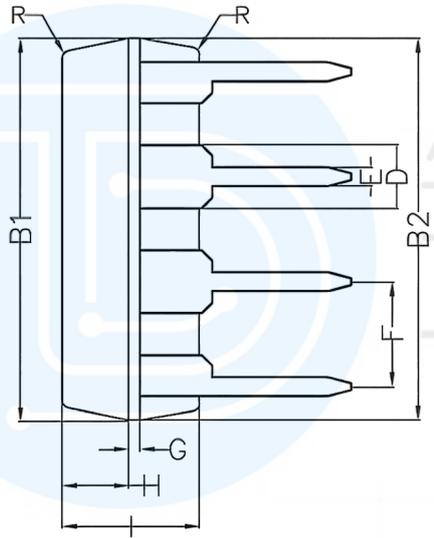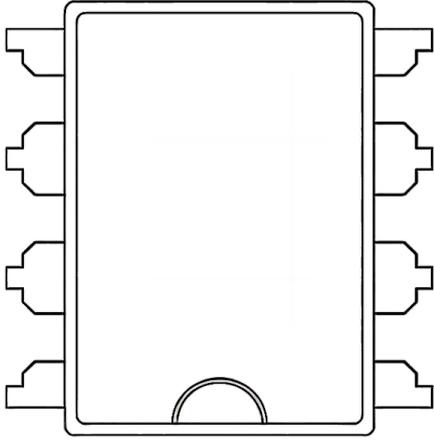
Symbol	Min	Non	Max
A1	6.28	6.33	6.38
A2	6.33	6.38	6.43
A3	7.52	7.62	7.72
A4	7.80	8.40	9.00
B1	9.15	9.20	9.25
B2	9.20	9.25	9.30
C		5.57	
D		1.52	
E	0.43	0.45	0.47
F		2.54	
G		0.25	
H	1.54	1.59	1.64
工	3.22	3.27	3.32
R		0.20	
M1	9°	10°	11°
M2	11°	12°	13°

Order information

Order Number	Package	Package Quantity	Marking On The park	Temperature	Operating Voltage
MAX706PCPA-TUDI	DIP8	Tube,50,A box of 2000	MAX706PCPA	0℃ to 70℃	2.63V
MAX706PCSA-TUDI	SOP8	Tape,Reel,2500	MAX706PCSA		
MAX706PCUA-TUDI	MSOP8	Tape,Reel,2500	706PCUA		
MAX706PEPA-TUDI	DIP8	Tube,50,A box of 2000	MAX706PEPA	- 40℃ to 85℃	
MAX706PESA-TUDI	SOP8	Tape,Reel,2500	MAX706PESA		
MAX706PEUA-TUDI	MSOP8	Tape,Reel,2500	706PEUA		
MAX706RCPA-TUDI	DIP8	Tube,50,A box of 2000	MAX706RCPA	0℃ to 70℃	2.63V
MAX706RCSA-TUDI	SOP8	Tape,Reel,2500	MAX706RCSA		
MAX706RCUA-TUDI	MSOP8	Tape,Reel,2500	706RCUA		
MAX706REPA-TUDI	DIP8	Tube,50,A box of 2000	MAX706REPA	- 40℃ to 85℃	
MAX706RESA-TUDI	SOP8	Tape,Reel,2500	MAX706RESA		
MAX706REUA-TUDI	MSOP8	Tape,Reel,2500	706REUA		
MAX706SCPA-TUDI	DIP8	Tube,50,A box of 2000	MAX706SCPA	0℃ to 70℃	2.93V
MAX706SCSA-TUDI	SOP8	Tape,Reel,2500	MAX706SCSA		
MAX706SCUA-TUDI	MSOP8	Tape,Reel,2500	706SCUA		
MAX706SEPA-TUDI	DIP8	Tube,50,A box of 2000	MAX706SEPA	- 40℃ to 85℃	
MAX706SESA-TUDI	SOP8	Tape,Reel,2500	MAX706SESA		
MAX706SEUA-TUDI	MSOP8	Tape,Reel,2500	706SEUA		
MAX706TCPA-TUDI	DIP8	Tube,50,A box of 2000	MAX706TCPA	0℃ to 70℃	3.08V
MAX706TCSA-TUDI	SOP8	Tape,Reel,2500	MAX706TCSA		
MAX706TCUA-TUDI	MSOP8	Tape,Reel,2500	706TCUA		
MAX706TEPA-TUDI	DIP8	Tube,50,A box of 2000	MAX706TEPA	- 40℃ to 85℃	
MAX706TESA-TUDI	SOP8	Tape,Reel,2500	MAX706TESA		
MAX706TEUA-TUDI	MSOP8	Tape,Reel,2500	706TEUA		

Order information

Order Number	Package	Package Quantity	Marking On The park	Temperature	Operating Voltage
MAX706APCPA-TUDI	DIP8	Tube,50,A box of 2000	MAX706APCPA	0℃ to 70℃	2.63V
MAX706APCSA-TUDI	SOP8	Tape,Reel,2500	MAX706APCSA		
MAX706APCUA-TUDI	MSOP8	Tape,Reel,2500	706APCUA		
MAX706APEPA-TUDI	DIP8	Tube,50,A box of 2000	MAX706APEPA	- 40℃ to 85℃	
MAX706APESA-TUDI	SOP8	Tape,Reel,2500	MAX706APESA		
MAX706APEUA-TUDI	MSOP8	Tape,Reel,2500	706APEUA		
MAX706ARCPA-TUDI	DIP8	Tube,50,A box of 2000	MAX706ARCPA	0℃ to 70℃	2.63V
MAX706ARCSA-TUDI	SOP8	Tape,Reel,2500	MAX706ARCSA		
MAX706ARCUA-TUDI	MSOP8	Tape,Reel,2500	706ARCUA		
MAX706AREPA-TUDI	DIP8	Tube,50,A box of 2000	MAX706AREPA	- 40℃ to 85℃	
MAX706ARESA-TUDI	SOP8	Tape,Reel,2500	MAX706ARESA		
MAX706AREUA-TUDI	MSOP8	Tape,Reel,2500	706AREUA		
MAX706ASCPA-TUDI	DIP8	Tube,50,A box of 2000	MAX706ASCPA	0℃ to 70℃	2.93V
MAX706ASCSA-TUDI	SOP8	Tape,Reel,2500	MAX706ASCSA		
MAX706ASCUA-TUDI	MSOP8	Tape,Reel,2500	706ASCUA		
MAX706ASEPA-TUDI	DIP8	Tube,50,A box of 2000	MAX706ASEPA	- 40℃ to 85℃	
MAX706ASESA-TUDI	SOP8	Tape,Reel,2500	MAX706ASESA		
MAX706ASEUA-TUDI	MSOP8	Tape,Reel,2500	706ASEUA		
MAX706ATCPA-TUDI	DIP8	Tube,50,A box of 2000	MAX706ATCPA	0℃ to 70℃	3.08V
MAX706ATCSA-TUDI	SOP8	Tape,Reel,2500	MAX706ATCSA		
MAX706ATCUA-TUDI	MSOP8	Tape,Reel,2500	706ATCUA		
MAX706ATEPA-TUDI	DIP8	Tube,50,A box of 2000	MAX706ATEPA	- 40℃ to 85℃	
MAX706ATESA-TUDI	SOP8	Tape,Reel,2500	MAX706ATESA		
MAX706ATEUA-TUDI	MSOP8	Tape,Reel,2500	706ATEUA		

Order information

Order Number	Package	Package Quantity	Marking On The park	Temperature	Operating Voltage
MAX708RCPA-TUDI	DIP8	Tube,50,A box of 2000	MAX708RCPA	0℃ to 70℃	2.63V
MAX708RCSA-TUDI	SOP8	Tape,Reel,2500	MAX708RCSA		
MAX708RCUA-TUDI	MSOP8	Tape,Reel,2500	708RCUA		
MAX708REPA-TUDI	DIP8	Tube,50,A box of 2000	MAX708REPA	- 40°C to 85°C	
MAX708RESA-TUDI	SOP8	Tape,Reel,2500	MAX708RESA		
MAX708REUA-TUDI	MSOP8	Tape,Reel,2500	708REUA		
MAX708SCPA-TUDI	DIP8	Tube,50,A box of 2000	MAX708SCPA	0℃ to 70℃	2.93V
MAX708SCSA-TUDI	SOP8	Tape,Reel,2500	MAX708SCSA		
MAX708SCUA-TUDI	MSOP8	Tape,Reel,2500	708SCUA		
MAX708SEPA-TUDI	DIP8	Tube,50,A box of 2000	MAX708SEPA	- 40°C to 85°C	
MAX708SESA-TUDI	SOP8	Tape,Reel,2500	MAX708SESA		
MAX708SEUA-TUDI	MSOP8	Tape,Reel,2500	708SEUA		
MAX708TCPA-TUDI	DIP8	Tube,50,A box of 2000	MAX708TCPA	0℃ to 70℃	3.08V
MAX708TCSA-TUDI	SOP8	Tape,Reel,2500	MAX708TCSA		
MAX708TCUA-TUDI	MSOP8	Tape,Reel,2500	708TCUA		
MAX708TEPA-TUDI	DIP8	Tube,50,A box of 2000	MAX708TEPA	- 40°C to 85°C	
MAX708TESA-TUDI	SOP8	Tape,Reel,2500	MAX708TESA		
MAX708TEUA-TUDI	MSOP8	Tape,Reel,2500	708TEUA		

Important statement:

●TUDI Semiconductor reserves the right to modify the product manual without prior notice! Before placing an order, customers need to confirm whether the obtained information is the latest version and verify the completeness of the relevant information.

●Any semi-guide product is subject to failure or malfunction under specified conditions. It is the buyer's responsibility to comply with safety standards when using TUDI Semiconductor products for system design and whole machine manufacturing.And take the appropriate safety measures to avoid the potential in the risk of loss of personal injury or loss of property situation!

●TUDI Semiconductor products have not been licensed for life support, military, and aerospace applications,and therefore TUDI Semiconductor is not responsible for any consequences arising from the use of this product in these areas.

●If any or all TUDI Semiconductor products (including technical data, services) described or contained in this document are subject to any applicable local export control laws and regulations, they may not be exported without an export license from the relevant authorities in accordance with such laws.

●The specifications of any and all TUDI Semiconductor products described or contained in this document specify the performance, characteristics, and functionality of said products in their standalone state, but do not guarantee the performance, characteristics, and functionality of said products installed in Customer's products or equipment. In order to verify symptoms and conditions that cannot be evaluated in a standalone device, the Customer should ultimately evaluate and test the device installed in the Customer's product device.

●TUDI Semiconductor documentation is only allowed to be copied without any alteration of the content and with the relevant authorization.TUDI Semiconductor assumes no responsibility or liability for altered documents.

●TUDI Semiconductor is committed to becoming the preferred semiconductor brand for customers, and TUDI Semiconductor will strive to provide customers with better performance and better quallity products.