



钲地半导体
Tudi Semiconductor

Product Specification

TUDI-MAX705/706/707/708/813L

Power management chip

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用芯智造 · 卓越品质

**semiconductor device
manufacturer**

- Design
- research and development
- production
- and sales



Features

- Supervisory-Function Integration Significantly Improves System Reliability While Reducing Board Space
- Guaranteed RESET Valid at VCC = 1V
 - 200ms Reset Pulse Width
 - Debounced TTL/CMOS-Compatible Manual
- Reset Input
 - Active-High Reset Output (MAX707/MAX708/MAX813L)
- Precision-Supply Voltage Monitor
 - 4.65V (MAX705/MAX707/MAX813L)
 - 4.40V (MAX706/MAX708)
- Voltage Monitor for Power-Fail or Low-Battery Warning

Explanation

The MAX705 – MAX708/MAX813L microprocessor (μ P) supervisory circuits reduce the complexity and number of components required to monitor power-supply and battery functions in μ P systems. These devices significantly improve system reliability and accuracy compared to separate ICs or discrete components.

The MAX705/MAX706/MAX813L provide 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 1.6 seconds.
- 3) A 1.25V threshold detector for power-fail warning, lowbattery detection, or for monitoring a power supply other than +5V.
- 4) An active-low manual-reset input.

The MAX707/MAX708 are the same as the MAX705/ MAX706, except an active-high reset is substituted for the watchdog timer. The MAX813L is the same as the MAX705, except RESET is provided instead of RESET.

Two supply-voltage monitor levels are available: The MAX705/MAX707/MAX813L generate a reset pulse when

the supply voltage drops below 4.65V, while the MAX706/ MAX708 generate a reset pulse below 4.40V. All four parts are available in 8-pin DIP, SOP, and MSOP8 packages.

Applications

- Computers
- Intelligent Instruments
- Critical μ P Power Monitoring



Block Diagram

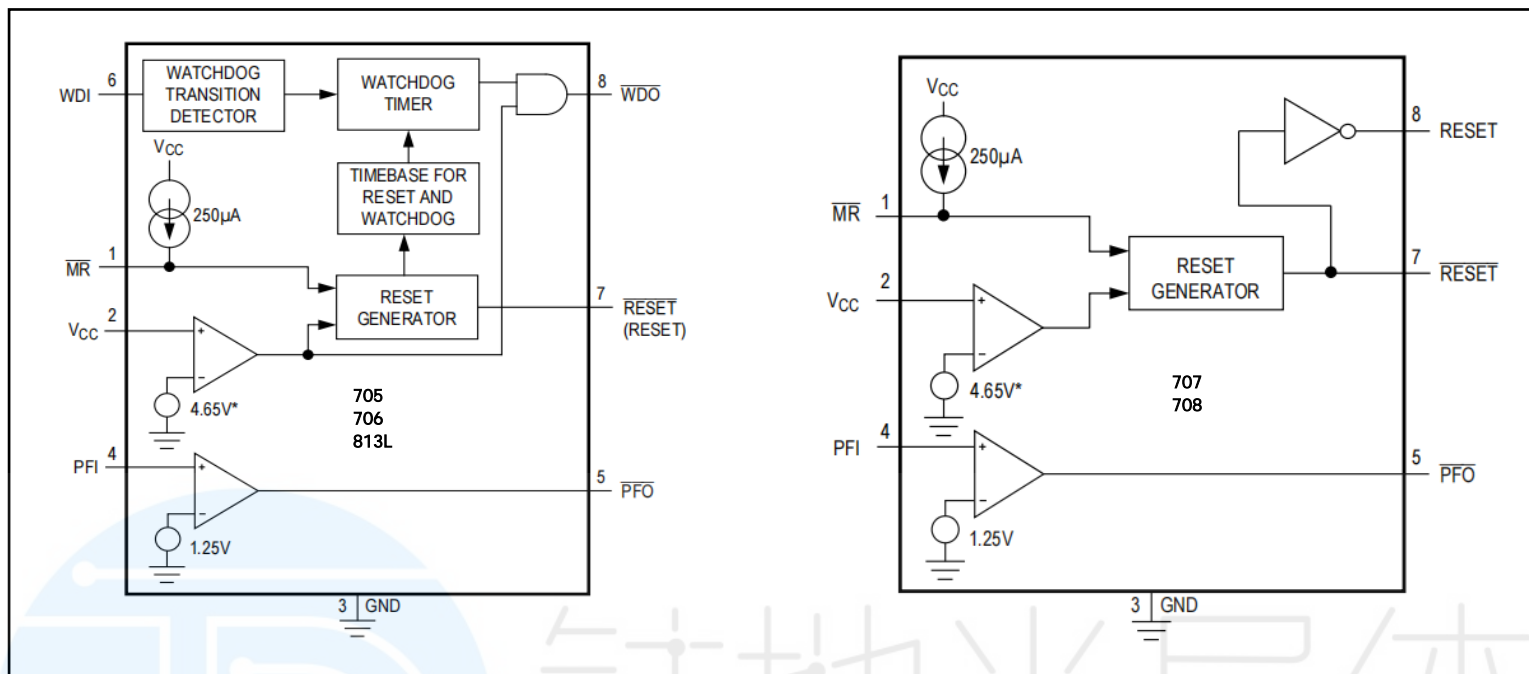


Figure 1: MAX705/6/7/8, and 813L Block Diagram

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 705/6/7/8, and 813L



Pin Diagram

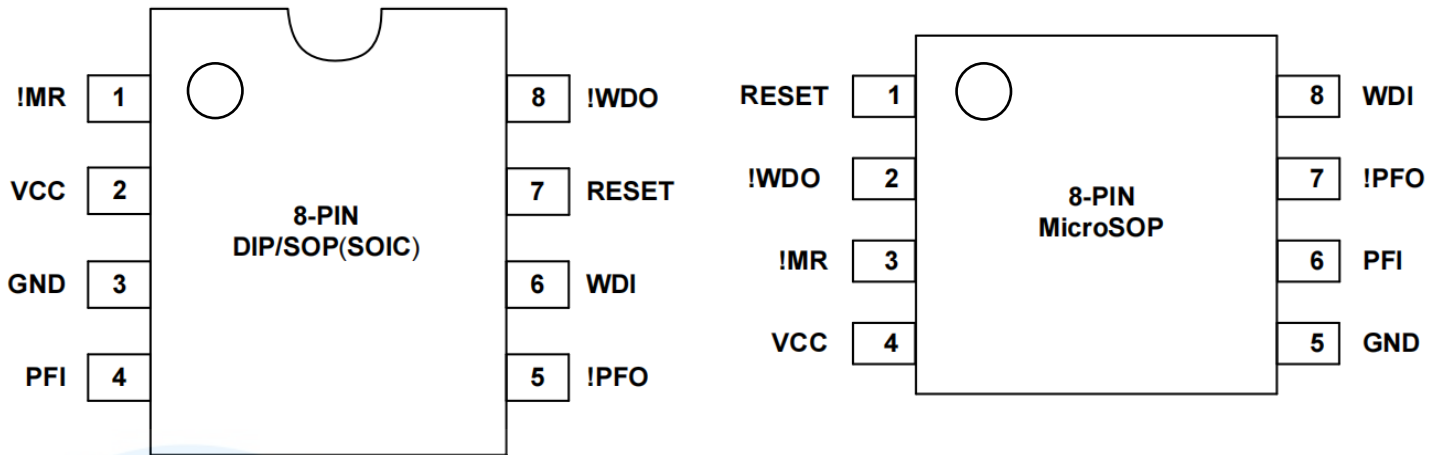


Figure 2: Pin Layout Diagram of 813L

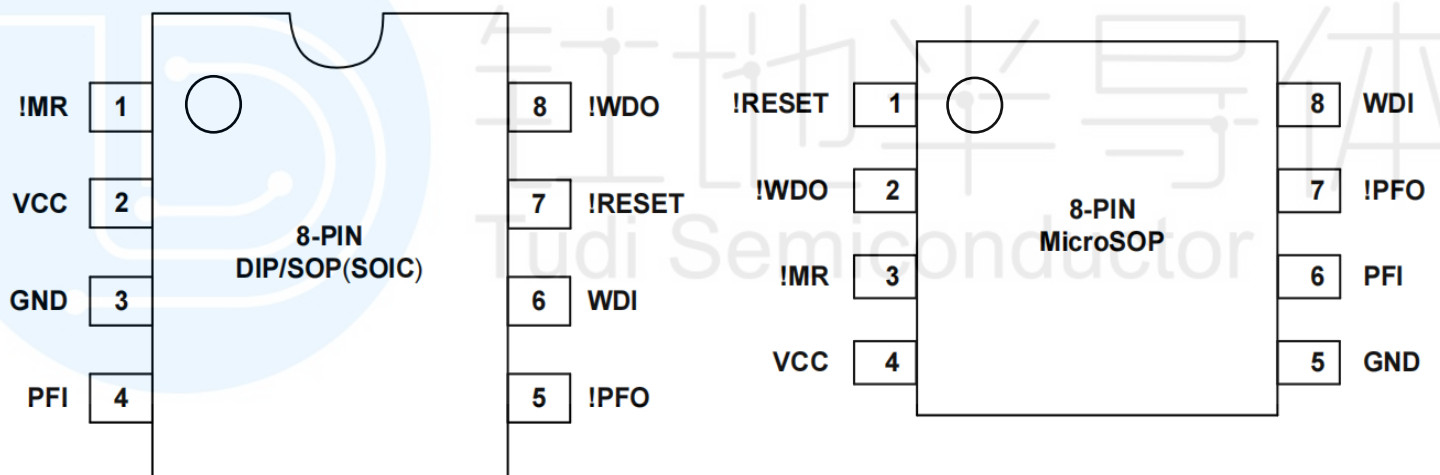


Figure 3: Pin Layout Diagram of 705 and 706

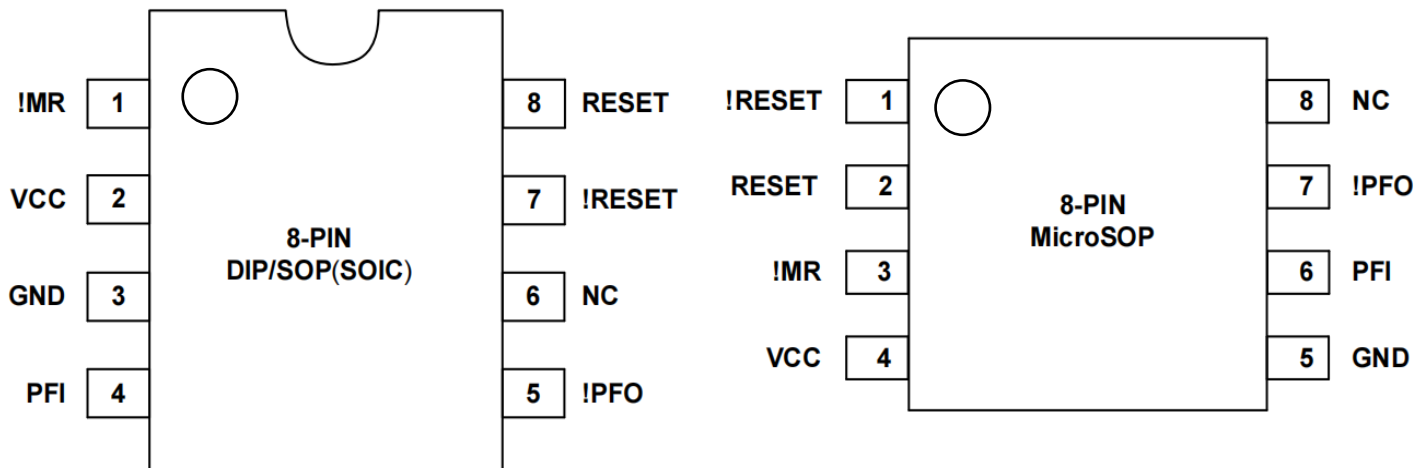


Figure 4: Pin Layout Diagram 707 and 708



Electrical Parameters

(VCC = 4.75V to 5.5V for 705/707/813L, VCC = 4.5V to 5.5V for 706/708, TA = TMIN to TMAX, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS		MIN	TYP	MAX	UNITS	
Operating Voltage Range	Vcc	70_C		1.0		5.5	V	
		813LC		1.1		5.5		
		70_E,813LE		1.2		5.5		
Supply Current	SUPPLY	705C,706C,813LC		150	350		μA	
		705E,706E,813LE		150	500			
		707C,708C		50	350			
		707E,708E		50	500			
Reset Threshold(Note 2)	VRT	705,707,813L		4.50	4.65	4.75	V	
		706,708		4.25	4.40	4.50		
Reset Threshold Hysteresis(Note 2)					40		mV	
Reset Pulse Width (Note 2)	tRS			140	200	280	ms	
RESET Output Voltage		ISOURCE=800μA		Vcc-1.5			V	
		ISINK=3.2mA		0.4				
		70_C,Vcc=1V,ISINK=50μA		0.3				
		70_E,Vcc=1.2V,ISINK=100μA		0.3				
RESET Output Voltage		707,708,IsOURCE=800μA		Vcc-1.5			V	
		707,708,ISINK=1.2mA		0.4				
		813LC,IsOURCE=4μA,Vcc=1.1V		0.8				
		813LE,ISOURCE=4μA,Vcc=1.2V		0.9				
		813L	IsOURCE=800μA		Vcc-1.5			
			ISINK=3.2mA		0.4			

Table 3 Electrical Characteristics of 705/6/7/8, and 813L (continued)



Electrical Parameters

(VCC = 4.75V to 5.5V for 705/707/813L, VCC = 4.5V to 5.5V for 706/708, TA = TMIN to TMAX, unless otherwise noted.)

PARAMETER		SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Watchdog Timeout Period		twD	705,706,813L	1.00	1.60	2.25	S
WDI Pulse Width		twP	VIL=0.4V, VIH=(Vcc)(0.8)		50		ns
WDI Input Threshold	Low		705,706,813L,Vcc=5V		0.8		V
	High				3.5		
WDI Input Current			705,706,813L,Vcc=5V	50	150		μA
			705,706,813L,WDI=0V	-150	-50		
WDO Output Voltage			705,706,813L, IsOURCE=800μA		Vcc-1.5		V
			705,706,813L, ISINK=1.2mA		0.4		
MR Pull-Up Current			MR=0V	100	250	600	μA
MR Pulse Width		tMR			150		ns
MR Input Threshold	Low				0.8		V
	High				2.0		
MR to Reset Out Delay(Note 2)		tMD			250		ns
PFI Input Threshold			Vcc=5V	1.20	1.25	1.30	V
PFI Input Current				-25.00	+0.01	+25.00	nA
PFO Output Voltage			IsOURCE=800μA		Vcc-1.5		V
			ISINK=3.2mA		0.4		

Table 3 Electrical Characteristics of 705/6/7/8, and 813L (continued)

Note 1: The input-voltage limits on PFI and MR can be exceeded if the input current is less than 10mA. Stresses beyond those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Note 2: Applies to both RESET in the 705 – 708 and RESET in the 707/708/813L.

Typical Performance Parameters

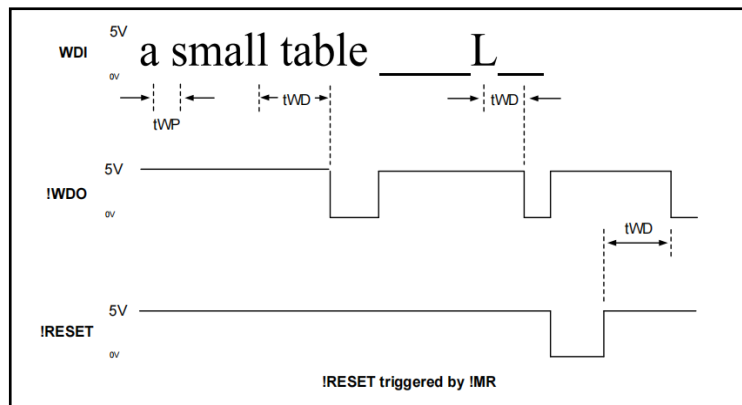


Figure 5 : Watchdog Timing Diagram

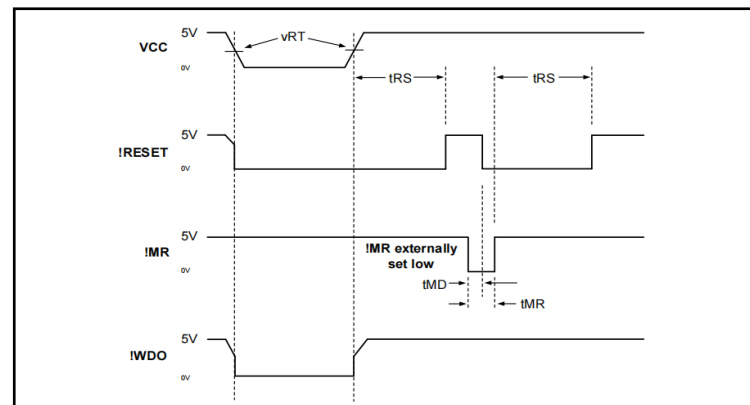


Figure 6: Reset Signal Timing Diagrams for 705/6/7/8, and 813L



Key Performance Parameters (continued)

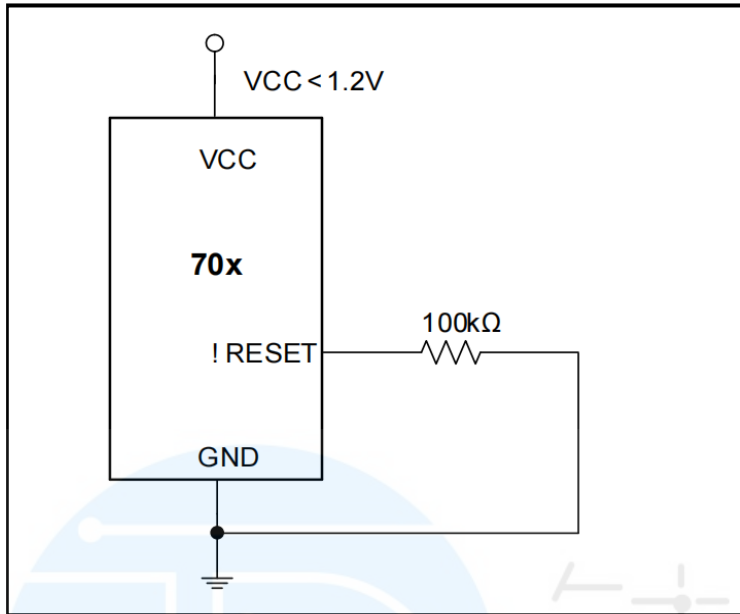


Figure 7 Ensure the RESET Circuit Is Functioning Properly

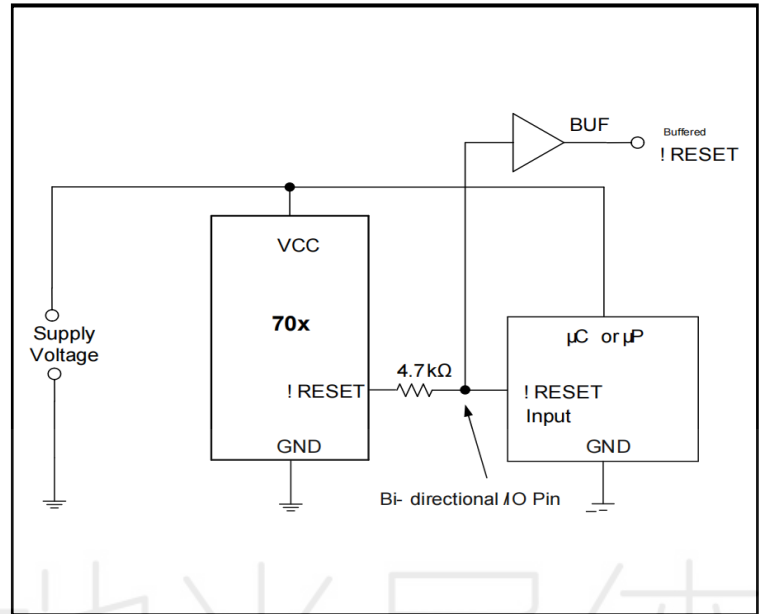


Figure 8 Schematic Diagram of a Bidirectional Reset Port Connection

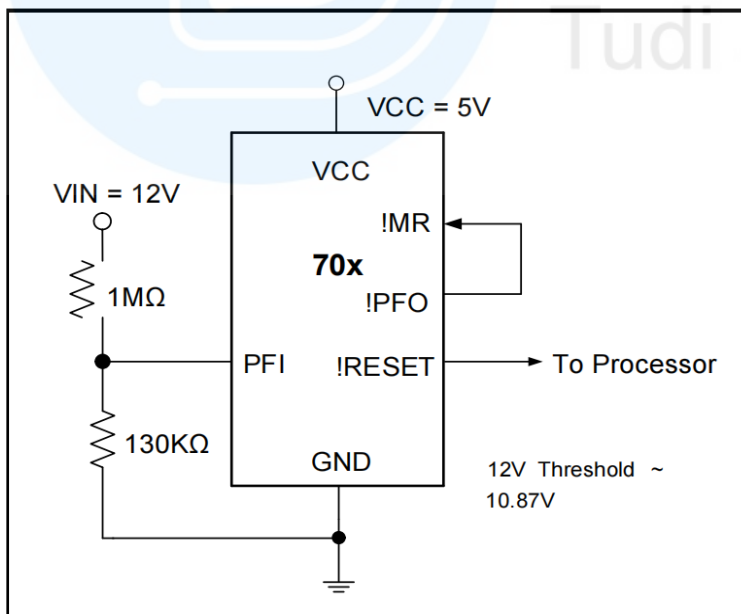


Figure 9 Diagram of Voltage Monitoring Outside VCC

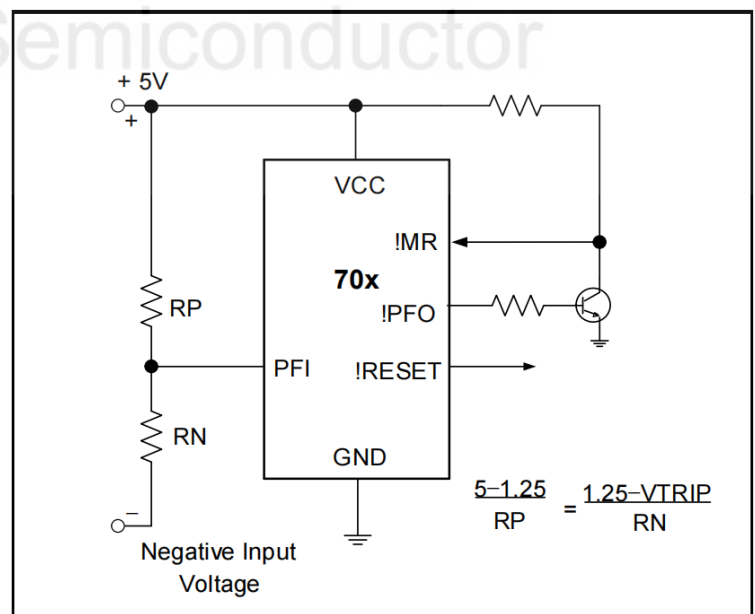
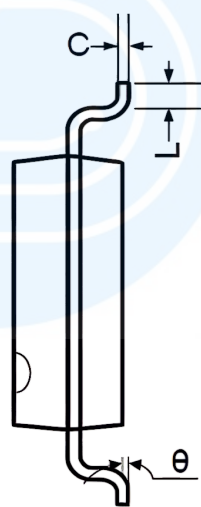
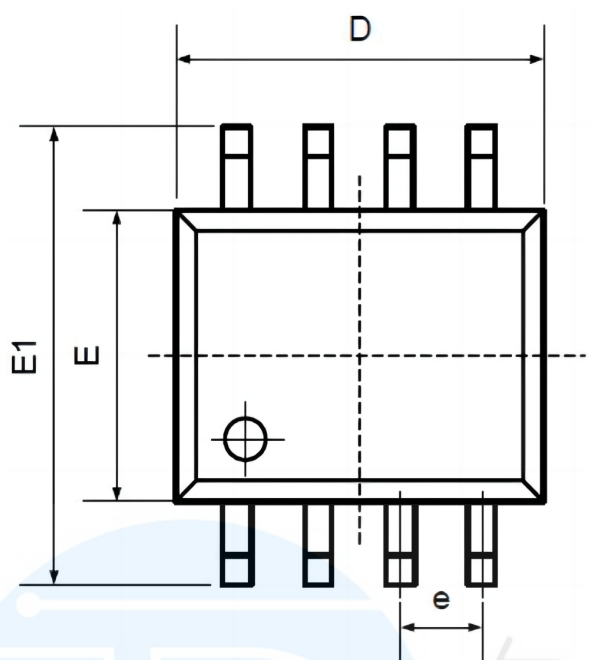


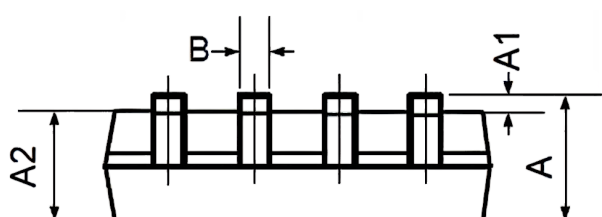
Figure 10 Negative Voltage Monitoring Circuit



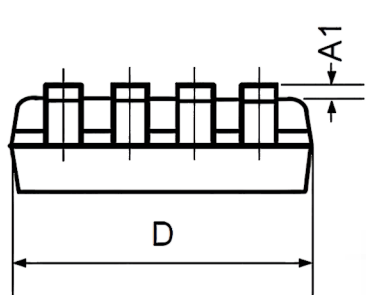
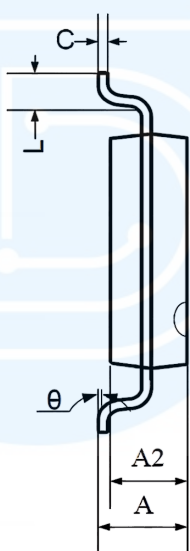
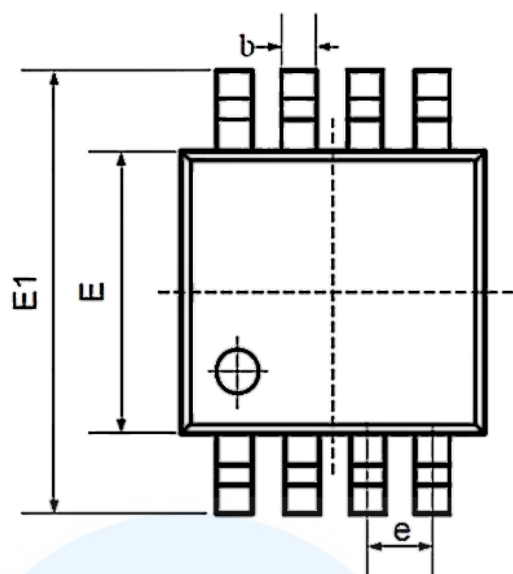
Package SOP8



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°



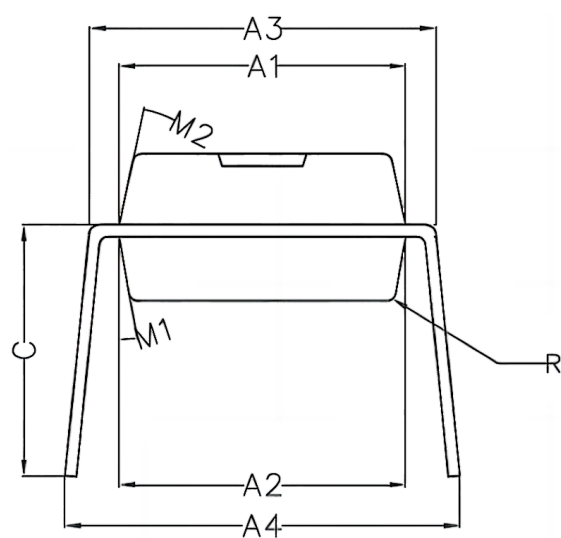
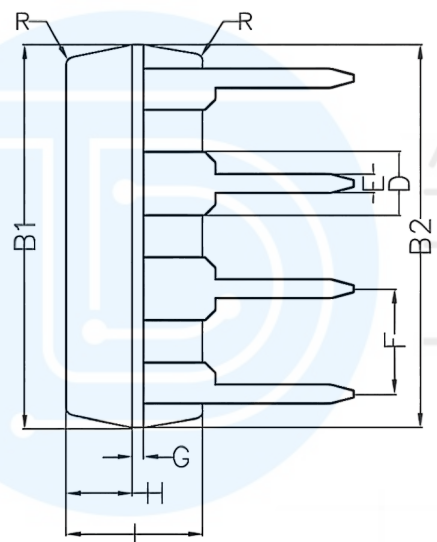
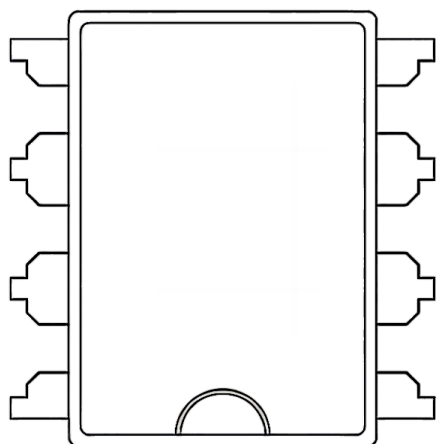
Package MSOP8



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
I	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
MAX705CPA-TUDI	DIP8	Tube,50,A box of 2000	MAX705CPA	0°C to 70°C	4.65V
MAX705CSA-TUDI	SOP8	Tape,Reel,2500	MAX705CSA		
MAX705CUA-TUDI	MSOP8	Tape,Reel,2500	705CUA		
MAX705EPA-TUDI	DIP8	Tube,50,A box of 2000	MAX705EPA	- 40°C to 85°C	
MAX705ESA-TUDI	SOP8	Tape,Reel,2500	MAX705ESA		
MAX705EUA-TUDI	MSOP8	Tape,Reel,2500	705EUA		
MAX706CPA-TUDI	DIP8	Tube,50,A box of 2000	MAX706CPA	0°C to 70°C	4.4V
MAX706CSA-TUDI	SOP8	Tape,Reel,2500	MAX706CSA		
MAX706CUA-TUDI	MSOP8	Tape,Reel,2500	706CUA		
MAX706EPA-TUDI	DIP8	Tube,50,A box of 2000	MAX706EPA	- 40°C to 85°C	
MAX706ESA-TUDI	SOP8	Tape,Reel,2500	MAX706ESA		
MAX706EUA-TUDI	MSOP8	Tape,Reel,2500	706EUA		
MAX707CPA-TUDI	DIP8	Tube,50,A box of 2000	MAX707CPA	0°C to 70°C	4.65V
MAX707CSA-TUDI	SOP8	Tape,Reel,2500	MAX707CSA		
MAX707CUA-TUDI	MSOP8	Tape,Reel,2500	707CUA		
MAX707EPA-TUDI	DIP8	Tube,50,A box of 2000	MAX707EPA	- 40°C to 85°C	
MAX707ESA-TUDI	SOP8	Tape,Reel,2500	MAX707ESA		
MAX707EUA-TUDI	MSOP8	Tape,Reel,2500	707EUA		
MAX708CPA-TUDI	DIP8	Tube,50,A box of 2000	MAX708CPA	0°C to 70°C	4.4V
MAX708CSA-TUDI	SOP8	Tape,Reel,2500	MAX708CSA		
MAX708CUA-TUDI	MSOP8	Tape,Reel,2500	708CUA		
MAX708EPA-TUDI	DIP8	Tube,50,A box of 2000	MAX708EPA	- 40°C to 85°C	
MAX708ESA-TUDI	SOP8	Tape,Reel,2500	MAX708ESA		
MAX708EUA-TUDI	MSOP8	Tape,Reel,2500	708EUA		



Order information

Order Number	Package	Package Quantity	Marking On The park	Temperature	Operating Voltage
MAX813LCPA-TUDI	DIP8	Tube,50,A box of 2000	MAX813LCPA	0°C to 70°C	4.65V
MAX813LCSA-TUDI	SOP8	Tape,Reel,2500	MAX813LCSA		
MAX813LCUA-TUDI	MSOP8	Tape,Reel,2500	813LCUA		
MAX813LEPA-TUDI	DIP8	Tube,50,A box of 2000	MAX813LEPA	- 40°C to 85°C	
MAX813LESA-TUDI	SOP8	Tape,Reel,2500	MAX813LESA		
MAX813LEUA-TUDI	MSOP8	Tape,Reel,2500	813LEUA		



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