



钛地半导体
Tudi Semiconductor

Product Specification

TUDI-LTC1232

Microprocessor Supervisory Circuits

网址 www.sztbdbdt.com Q

用芯智造·卓越品质

**semiconductor device
manufacturer**

- Design
- research and development
- production
- and sales

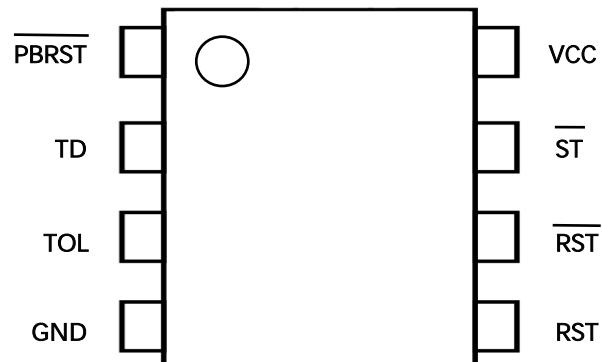


Features

- Guaranteed Reset Assertion at VCC = 1V
- 8-Pin SO Plastic Package
- 2.0mA Maximum Supply Current
- 4.62V/4.37V Precision Voltage Monitor
- Power OK/Reset Time Delay: 600ms
- Minimum External Component Count

Applications

- Critical μ P Power Monitoring
- Intelligent Instruments
- Computers and Controllers
- Automotive Systems



Pin Diagram

Description

The LTC1232 provides power supply monitoring, watchdog timing and external reset for microprocessor systems. A precise internal voltage reference and comparator circuit monitor the power supply line. When an out-of-tolerance condition occurs, the reset outputs are forced to active states. The RST output is guaranteed to remain logic low even with VCC as low as 1V. The LTC1232 has an internal watchdog timer which forces the reset outputs to active states when the Strobe input is not forced low prior to a preset time-out period. The watchdog timing can be set to operate on time-out periods of typically 150ms, 600ms or 1.2 seconds.

The LTC1232 performs push-button reset control.

The LTC1232 debounces the push-button input and guarantees an active reset pulse width of 250ms minimum.

Pin description

1	PBRST	Pushbutton Reset Input				
2	TD	Time Delay Set				
3	TOL	Selects	5%or 10%Vcc	Detect		
4	GND	Ground				
5	RST	Reset Output(Active High)				
6	RST	Reset Output(Active Low,opendrain)				
7	ST	Strobe Input				
8	Vcc	+5 Volt	Power			

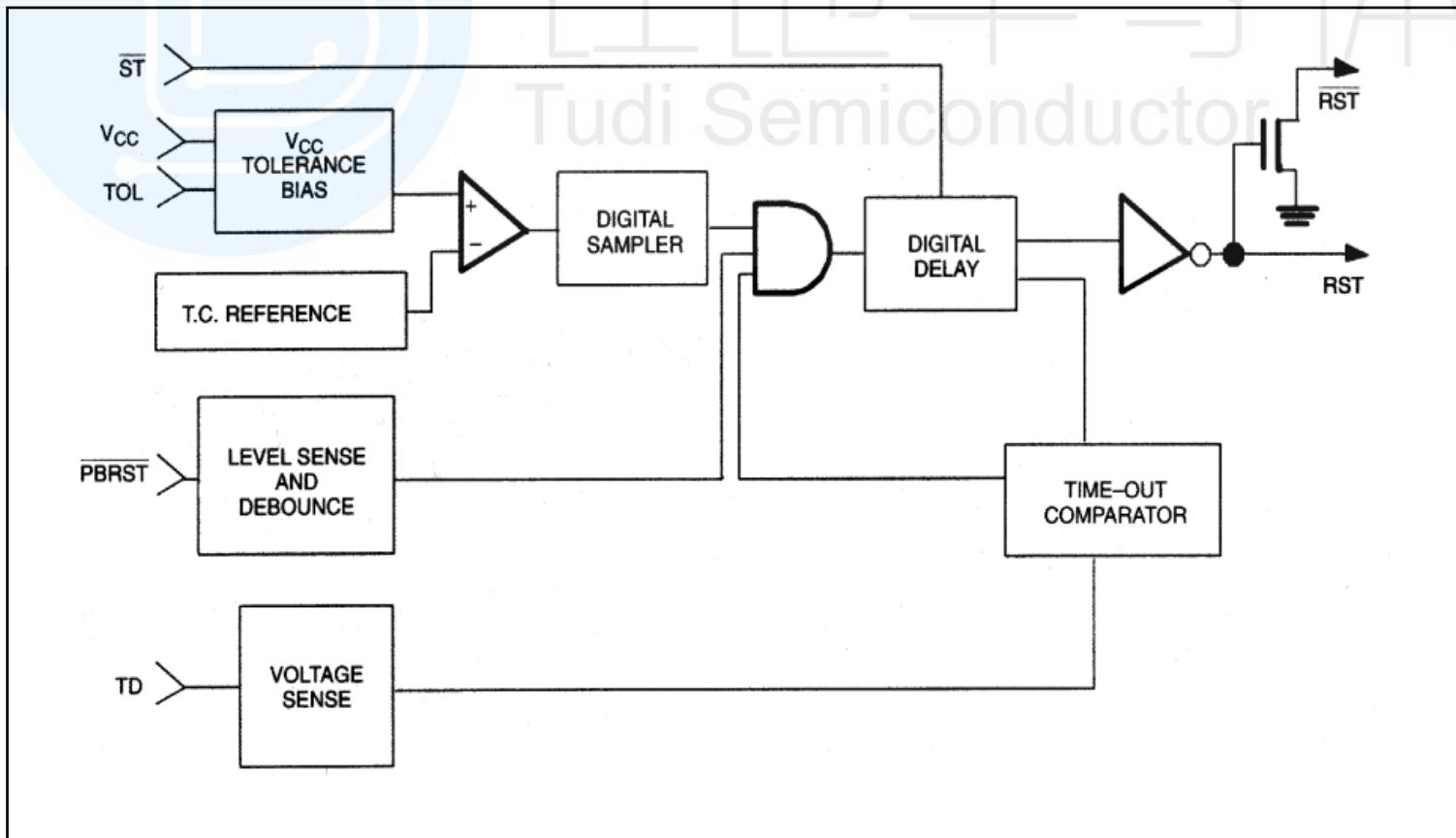


Parameter limit

Voltage on Vcc Pin Relative to Ground	-0.5V to +7.0V
Voltage on I/O Relative to Ground	-0.5V to Vcc+0.5V
Operating Temperature	0°C to 70°C
Operating Temperature (Industrial Version)	-40°C to 85°C
Storage Temperature	-55°C to +125°C
Soldering Temperature	260°C for 10 seconds

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.

Micro-detector block diagram





Operation - Power monitoring

The 1232 detects out-of-tolerance power supply conditions and warns a processor-based system of impending power failure. When Vcc falls below a preset level as defined by TOL, the Vcc comparator outputs the signals RST and RST. When TOL is connected to ground, the RST and RST signals become active as Vcc falls below 4.75 volts. When TOL is connected to Vcc, the RST and RST signals become active as Vcc falls below 4.5 volts. The RST and RST are excellent control signals for a microprocessor, as processing is stopped at the last possible moments of valid Vcc. On power-up, RST and RST are kept active for a minimum of 250 ms to allow the power supply and processor to stabilize.

Operation - Button reset

The 1232 provides an input pin for direct connection to a pushbutton (Figure 1). The pushbutton reset input requires an active low signal. Internally, this input is debounced and timed such that RST and RST signals of at least 250 ms minimum are generated. The 250 ms delay starts as the pushbutton reset input is released from low level.

Operation - Watchdog timer

The watchdog timer function forces RST and RST signals to the active state when the ST input is not stimulated for a predetermined time period. The time period is set by the TD input to be typically 150 ms with TD connected to ground, 600 ms with TD left unconnected, and 1.2 seconds with TD connected to Vcc. The watchdog timer starts timing out from the set time period as soon as RST and RST are inactive. If a high-to-low transition occurs on the ST input pin prior to timeout, the watchdog timer is reset and begins to timeout again. If the watchdog timer is allowed to timeout, then the RST and RST signals are driven to the active state for 250 ms minimum. The ST input can be derived from microprocessor address signals, data signals, and/or control signals. When the microprocessor is functioning normally, these signals would, as a matter of routine, cause the watchdog to be reset prior to timeout. To guarantee that the watchdog timer does not timeout, a high-to-low transition must occur at or less than the minimum shown in Table 1. A typical circuit example is shown in Figure 2.

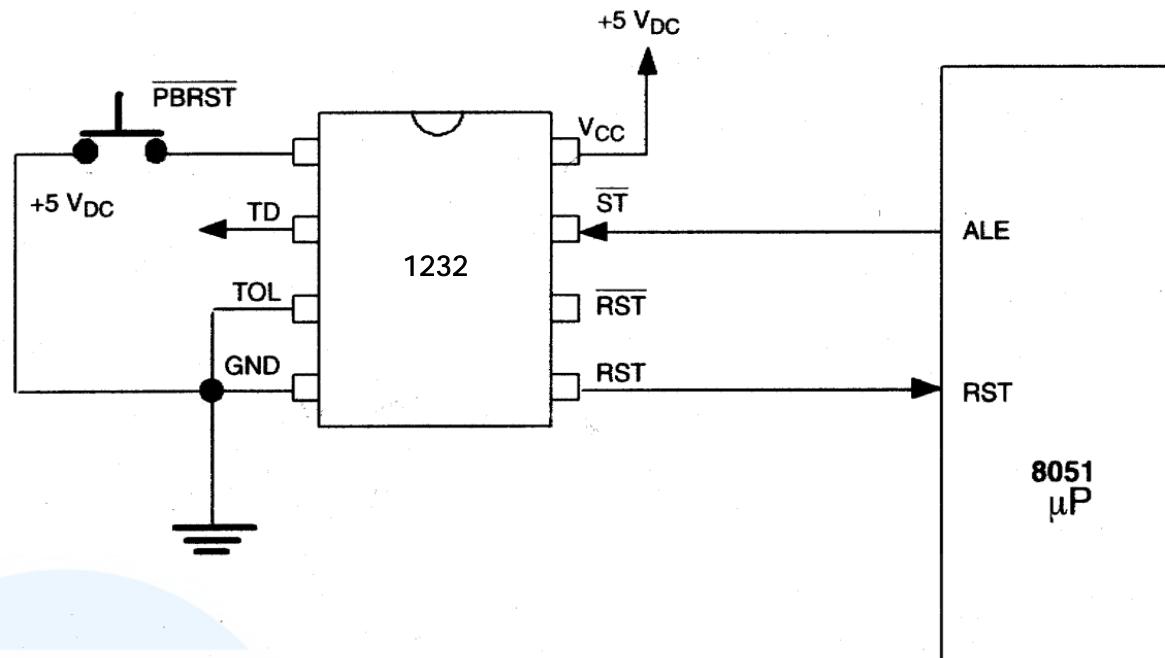


Figure 1 Button reset

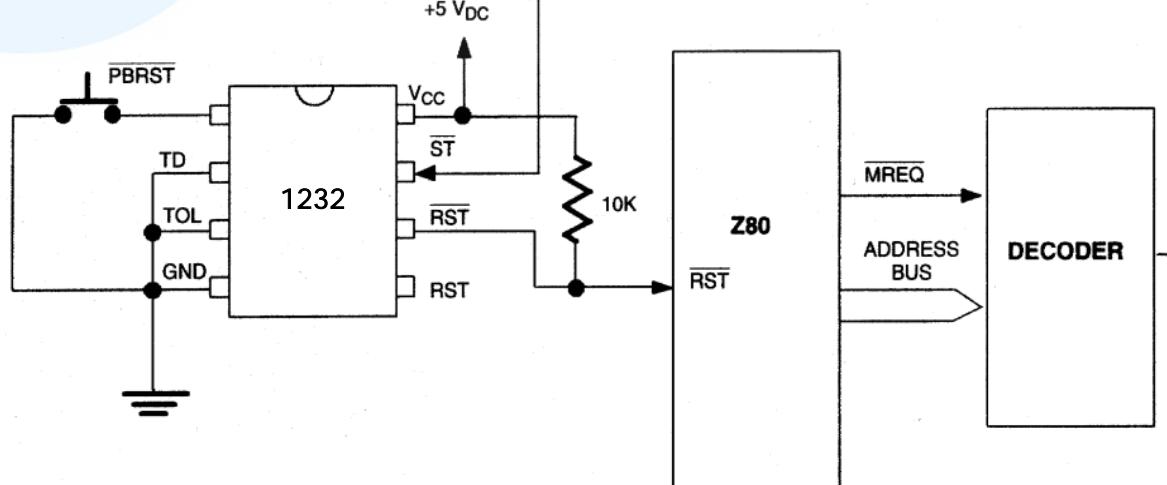


Figure 2 Watchdog timer

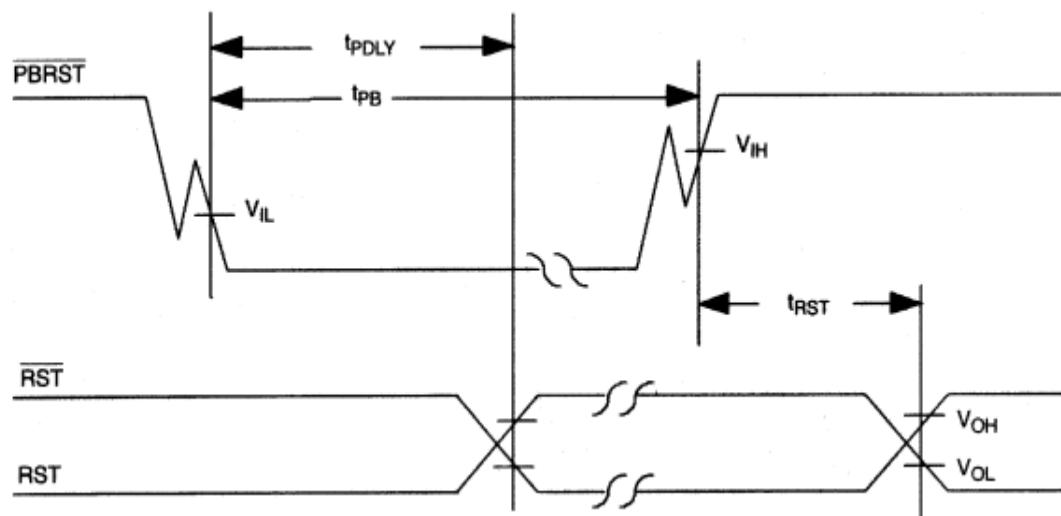


Figure 3 Timing diagram: button reset

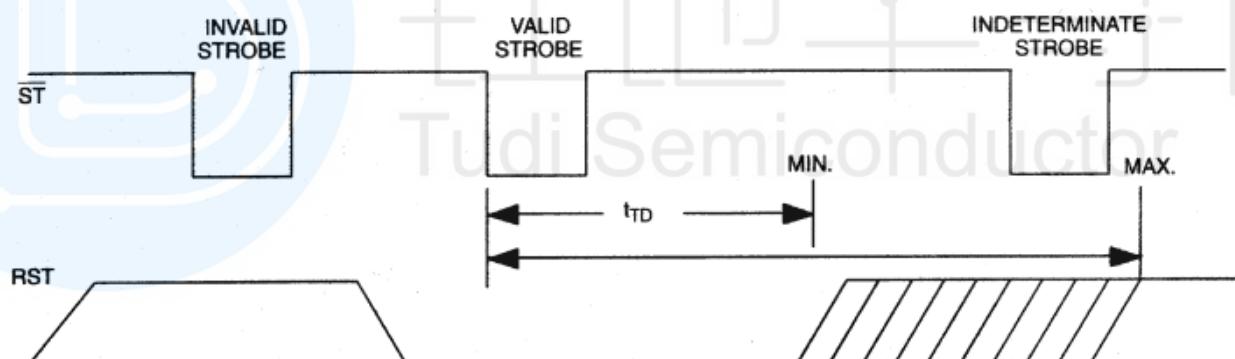


Figure 4 Timing diagram: pulse input

TD	Time-out		
	MIN	TYP	MAX
GND	62.5 ms	150 ms	250 ms
Float	250 ms	600 ms	1000 ms
Vcc	500 ms	1200 ms	2000 ms

Table 1 Watchdog timeout

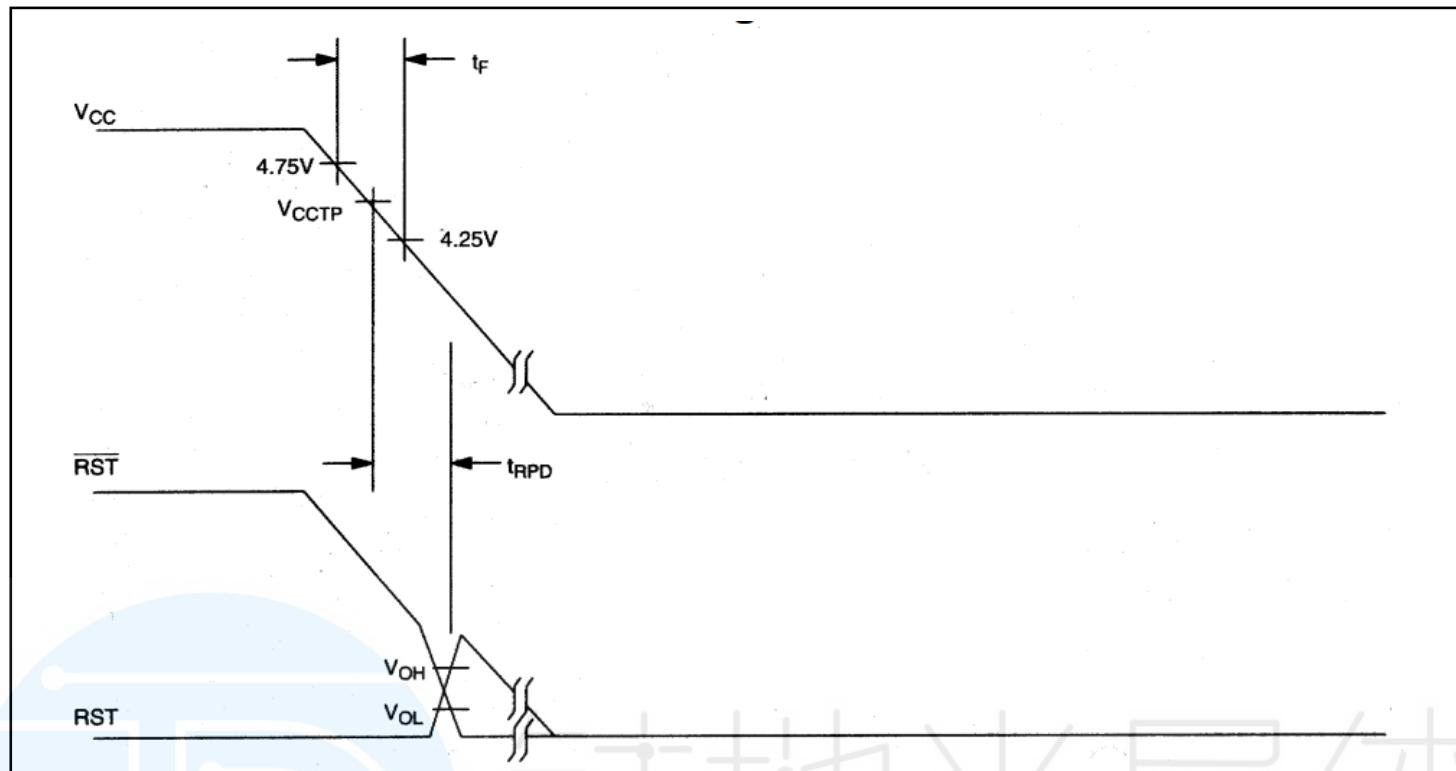


Figure 5 Timing diagram: power off

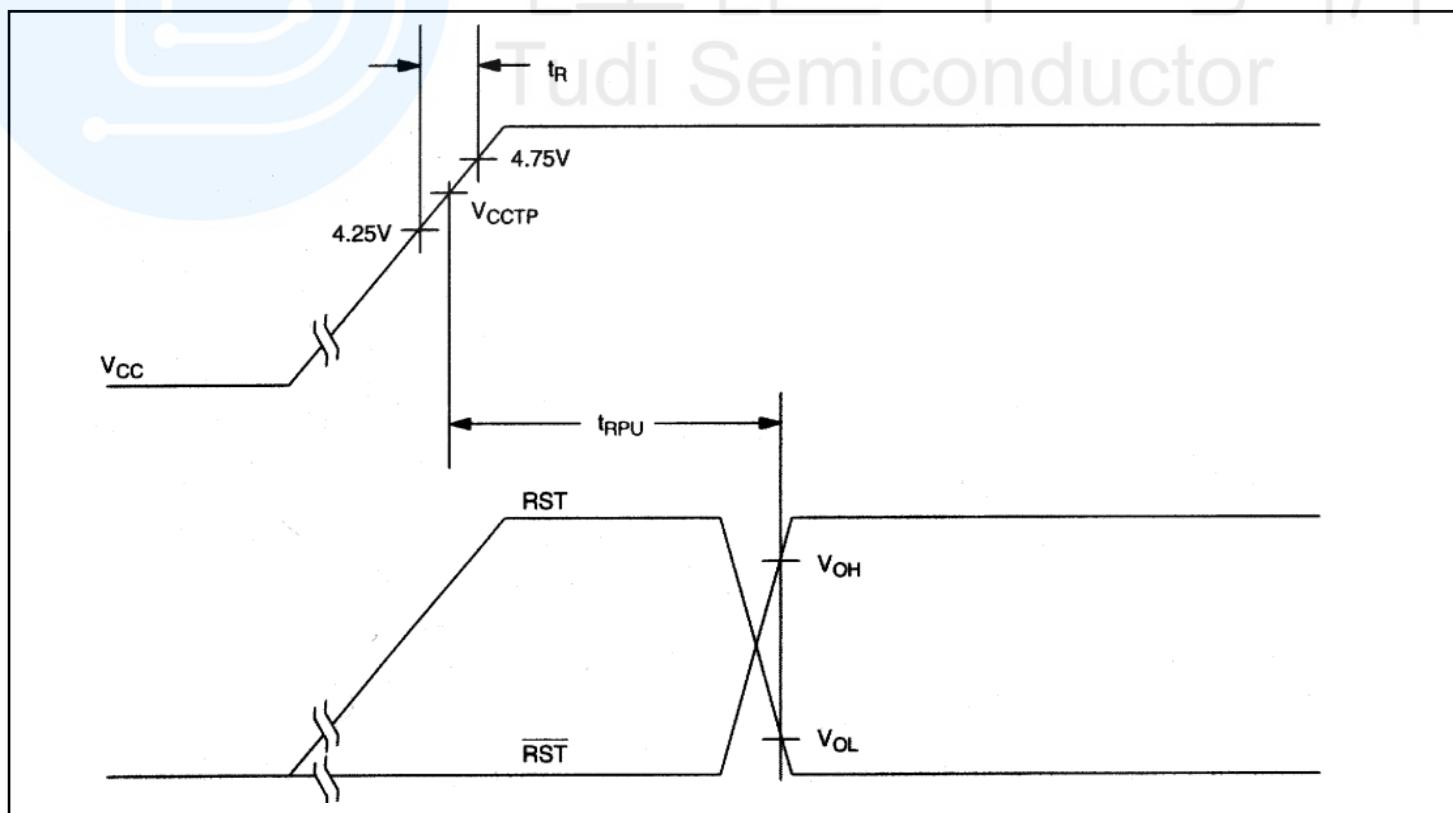


Figure 6 Timing diagram: power up



Recommended DC operating conditions (0°C to 70°C)						
Parameter	Symbols	Min	Typ	Max	Units	Notes
Supply Voltage	Vcc	4.5	5.0	5.5	V	1
\overline{ST} and \overline{PBRST} Input High Level	VH	2.0		Vcc+0.3	V	1
\overline{ST} and \overline{PBRST} Input Low Level	V	-0.3		+0.8	V	1
Direct current electrical characteristics (0°C to 70°C; Vcc=4.5 to 5.5V)						
Parameter	Symbols	Min	Typ	Max	Units	Notes
Input Leakage	IL	-1.0		+1.0	μ A	3
Output Current @2.4V	IoH	-8	-10		mA	5
Output Current @0.4V	IoL	10			mA	
Low Level @RST	VoL			0.4	V	1
Output Voltage @-500 uA	VoH	Vcc-0.5V	Vcc-0.1V		V	17
Output Current(CMOS)	Icc1			50	μ A	2
Operating Current(TTL)	Icc2		200	500	μ A	8
Vcc Trip Point (TOL=GND)	VcCTP	4.50	4.62	4.74	V	1
Vcc Trip Point (TOL=Vcc)	VcCTP	4.25	4.37	4.49	V	1
Capacitance (tA=25°C)						
Parameter	Symbols	Min	Typ	Max	Units	Notes
Input Capacitance	CIN			5	pF	
Output Capacitance	CoUT			7	pF	
AC electrical characteristics (0°C to 70°C; Vcc=5V±10%)						
Parameter	Symbols	Min	Typ	Max	Units	Notes
$\overline{PBRST}=VI$	tpB	20			ms	
RESET Active Time	tRST	250	610	1000	ms	
\overline{ST} Pulse Width	tsT	20			ns	69
Vcc Fail Detect to RST and \overline{RST}	tRPD		50	175	μ s	
Vcc Slew Rate 4.75V to 4.25V	tp	300			μ s	
Vcc Detect to RST and \overline{RST} Inactive	tRPU	250	610	1000	ms	4
Vcc Slew Rate 4.25V to 4.75V	tr	0			ns	
\overline{PBRST} Stable Low to \overline{RST} and RST	tpDLY			20	ms	



Notes:

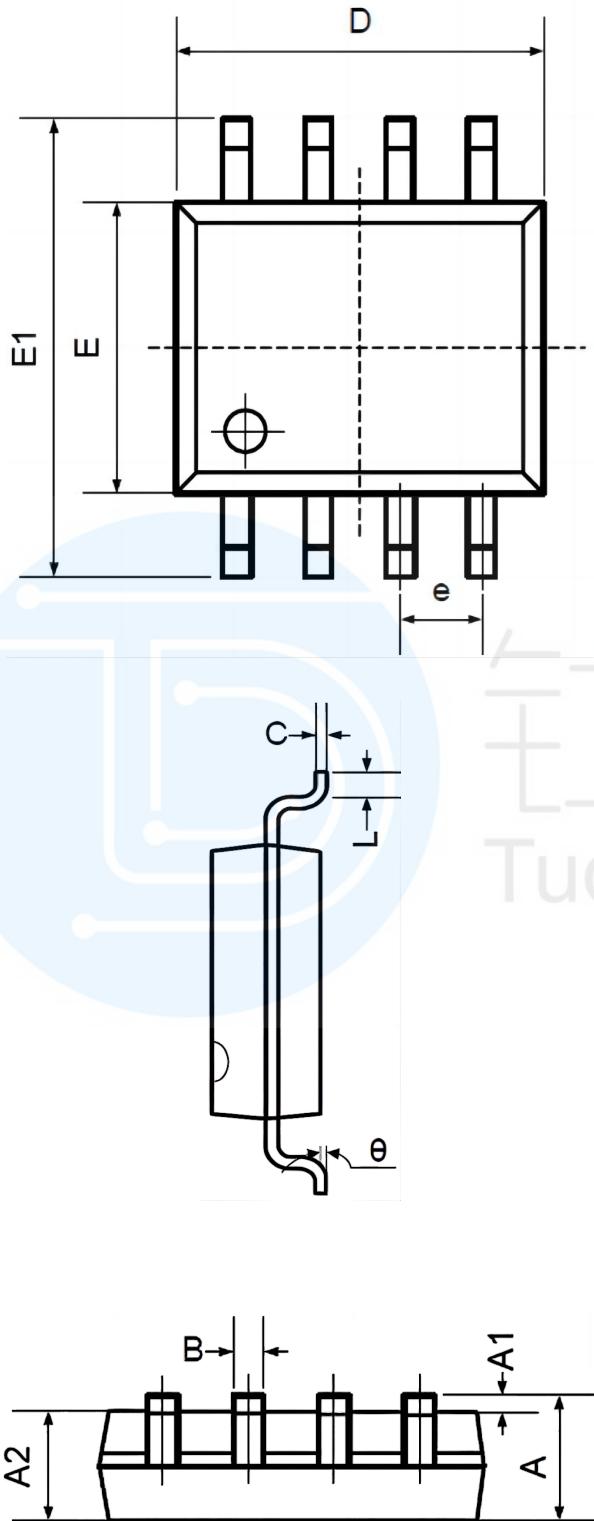
1. All voltages referenced to ground.
2. Measured with outputs open and \overline{ST} and \overline{PBRST} within 0.5V of supply rails.
3. \overline{PBRST} is internally pulled up to V_{CC} with an internal impedance of 40k typical.
4. $t_{R} = 5 \mu s$.
5. \overline{RST} is an open-drain output.
6. Must not exceed t_{TD} minimum. See Table 1.
7. \overline{RST} remains within 0.5V of V_{CC} on power-down until V_{CC} drops below 2.0V. \overline{RST} remains within 0.5V of GND on power-down until V_{CC} drops below 2.0V.
8. Measured with outputs open and \overline{ST} and \overline{PBRST} at TTL levels.
9. Watchdog can not be disabled. It must be strobed to avoid resets.

Order information

Order Number	Package	Package Quantity	Marking On The park	Temperature
LTC1232CN8-TUDI	DIP8	Tube,50,A box of 2000	LTC1232CN8	0°C to 70°C
LTC1232CS8-TUDI	SOP8	Tape,Reel,2500	1232	
LTC1232IN8-TUDI	DIP8	Tube,50,A box of 2000	LTC1232IN8	- 40°C to 85°C
LTC1232IS8-TUDI	SOP8	Tape,Reel,2500	1232I	



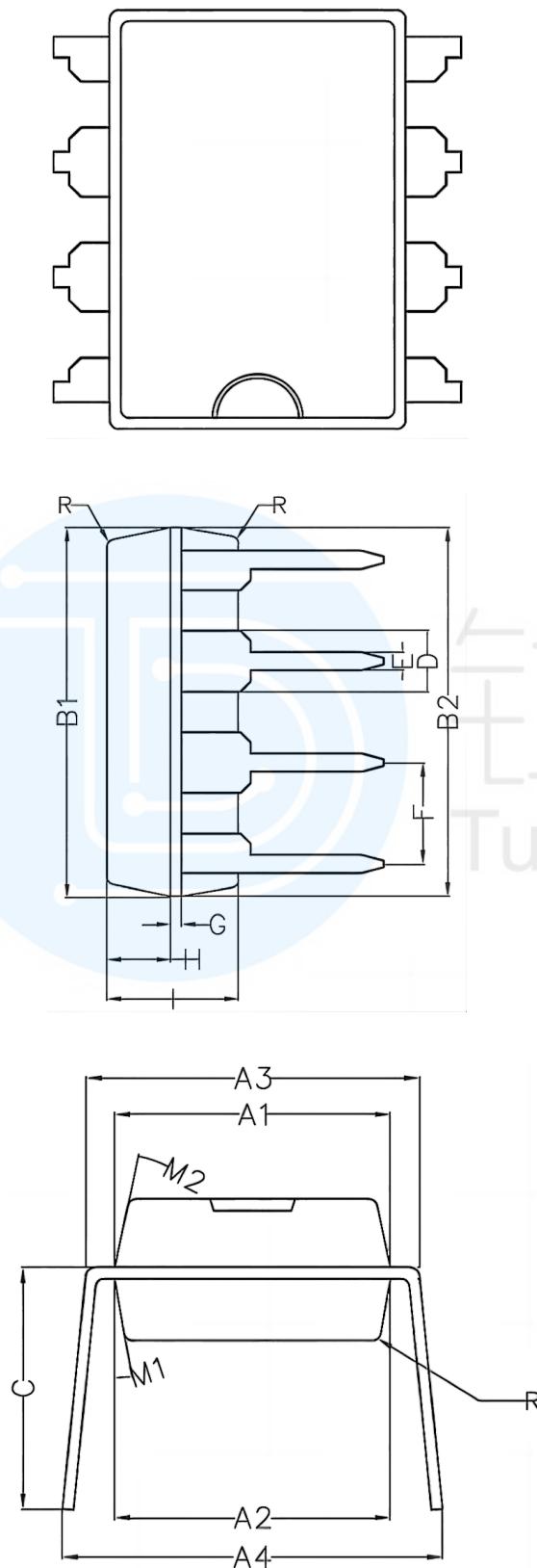
Package SOP8



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 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°



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 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 quality products.