

# POWER SUPPLY CONTROL WITH BUILT-IN WATCHDOG TIMER

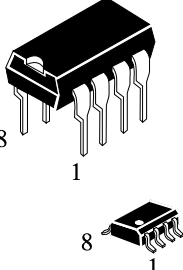
IN1232

IN1232 is designed to monitor power supply within the system of reset signal generation for microprocessors. It is used in monitor systems for controlling various processes and entities.

Packaged in 8-pin SOP or DIP.

### Features:

- Rated supply voltage 5.0 V
- Accurate 5% or 10% microprocessor power supply monitoring
- Programming of watchdog timer overflow time
- Generation of reset signals at power on for correct microprocessor start.



N SUFFIX  
PLASTIC

D SUFFIX  
SOIC

**ORDERING INFORMATION**  
 IL1232N Plastic  
 IL1232D SOIC  
 T<sub>A</sub> = -40° to 85° C for all packages.

The chip contains reference voltage source, analog comparator, Watchdog timer, circuit for monitoring power supply deviation accuracy.

### Functions:

- Reset signal generation after power failure/ error
- Reset signal generation from external “RESET” pushbutton
- Reset signal generation from watchdog timer

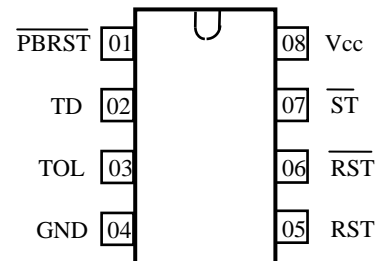


Fig 1 – PIN ASSIGNMENT

Table 1 – Absolute maximum ratings

Symbol	Parameter	Typical		Units
		Min	Max	
V <sub>CC</sub>	Supply voltage	-	7.0	V
V <sub>IH</sub>	Input voltage, high level	-	7.0	V
V <sub>IL</sub>	Input voltage, low level	-1.0	-	V
T <sub>A</sub>	Operating temperature range	-40	+85	°C
T <sub>stg</sub>	Storage temperature	-60	+125	°C

\* 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 under “recommended operating conditions” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

Table 2 – Recommended operating conditions

Symbol	Parameter	Typical		Units
		Min	Max	
$V_{CC}$	Supply voltage	4.5	5.5	V
$V_{IH}$	Input voltage, high level	2.0	$U_{CC}+0.3$	V
$V_{IL}$	Input voltage, low level	-0.3	0.8	V
$T_A$	Operating temperature range	-20	+70	°C

Table 3 DC electrical characteristics ( $T_{Amb} = -40^{\circ}$  to  $+85^{\circ}$ C)

Symbol	Parameter	Test conditions	Typical		Units
			min	max	
$I_{LIL1}$	Input leakage current, low level, ST, TOL	$V_{CC}=5\text{ V}\pm 10\%$ , $V_{IL}=0\text{ V}$	-	-1	$\mu\text{A}$
$I_{LIL2}$	Input leakage current, low level, TD	$V_{CC}=5\text{ V}\pm 10\%$ , $V_{IL}=0\text{ V}$	-	-300	$\mu\text{A}$
$I_{LIL3}$	Input leakage current, low level, PBRST	$V_{CC}=5\text{ V}\pm 10\%$ , $V_{IL}=0\text{ V}$	-	-1000	$\mu\text{A}$
$I_{LIH1}$	Input leakage current, high level, ST, TOL	$V_{CC}=5\text{ V}\pm 10\%$ , $V_{IH}=V_{CC}$	-	1	$\mu\text{A}$
$I_{LIH2}$	Input leakage current, high level, TD	$V_{CC}=5\text{ V}\pm 10\%$ , $V_{IH}=V_{CC}$	-	300	$\mu\text{A}$
$I_{OH}$	Output current, high level, RST	$V_{CC}=5\text{ V}\pm 10\%$ , $V_{OH}=2.4\text{ V}$	-8	-	$\mu\text{A}$
$I_{OL}$	Output current, low level, RST, RST	$V_{CC}=5\text{ V}\pm 10\%$ , $V_{OL}=0.4\text{ V}$	8	-	mA
$V_{OH}$	Output voltage, high level, RST	$V_{CC}=5\text{ V}\pm 10\%$ , $I_{OH}=-500\text{ }\mu\text{A}$	$V_{CC}-0.5$	-	V
$V_{OH1}$	Output voltage, high level, - RST	$V_{CC}=2\text{ V}$ , $I_{OH}=-500\text{ }\mu\text{A}$	$V_{CC}-0.5$	-	V
$V_{OL}$	Output voltage, low level, RST	$V_{CC}=2\text{ V}$ , $I_{OL}=1\text{ mA}$	-	0.4	V
$I_{CC}$	Operating current	$V_{CC}=5\text{ V}\pm 10\%$	-	2	mA
$V_{CC\text{ TP1}}$	$V_{CC}$ trip point	TOL = GND	4.5	4.74	V
$V_{CC\text{ TP2}}$	$V_{CC}$ trip point	TOL = $V_{CC}$	4.25	4.49	V

**Table 4 – AC electrical characteristics** ( $T_{amb}$  = from -40 to +85 °C)

Symbol	Parameter	Test conditions	Typical		Units
			min	max	
$t_{TD1}$	Watchdog timer overflow time	$V_{CC} = 5.0 V \pm 10\%$ $t_{ST} \geq 20$ ns TD = GND	62.5	250	ms
$t_{TD2}$		TD disconnected	250	1000	ms
$t_{TD3}$		TD = $V_{CC}$	500	2000	ms
$t_{PDLY}$	$\overline{PBRST}$ stable low to RST and RST	$V_{CC} = 5.0 V \pm 10\%$ $t_{PB} \geq 20$ ms	-	20	ms
$t_{RST}$	Reset active time	$V_{CC} = 5.0 V \pm 10\%$ $t_{PB} \geq 20$ ms	250	1000	ms
$t_{RPD}$	$V_{CC}$ fail detect to RST and RST	$V_{CC}$ = from 5.0 to 4.0 V $t_F \geq 10$ $\mu$ s	-	175	$\mu$ s
$t_{RPU}$	$V_{CC}$ detect to RST and RST transition	$V_{CC}$ = from 5.0 to 4.0 V $t_R \geq 1$ $\mu$ s	250	1000	ms

**Table 5 – Pin description**

Pin	Symbol	Description
01	$\overline{PBRST}$	Pushbutton reset input
02	TD	Time Delay Set
03	TOL	Selects 5% or 10% $V_{CC}$ Detect
04	GND	Ground
05	RST	Reset output (Active High)
06	$\overline{RST}$	Reset output (Active Low, open drain)
07	$\overline{ST}$	Strobe Input
08	$V_{CC}$	Supply output from voltage source

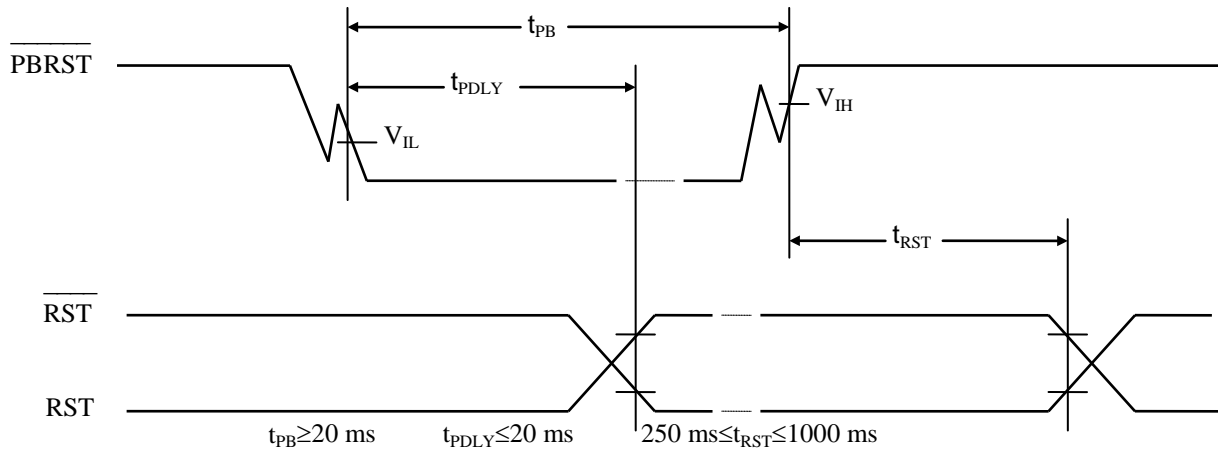


Fig. 2 – Timing diagram of forming reset signal from external PBRST control button

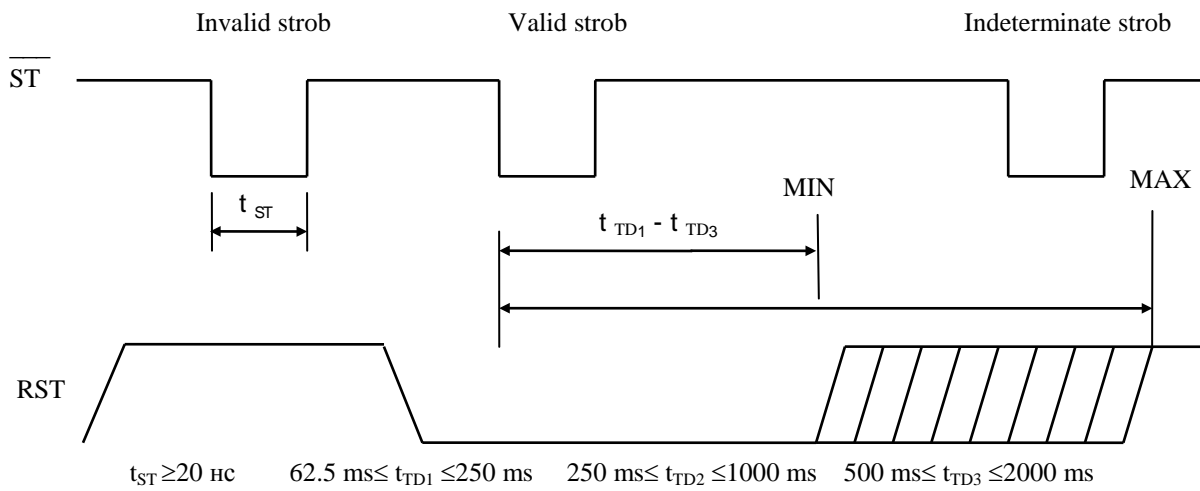


Fig. 3 – Timing diagram : Strobe input

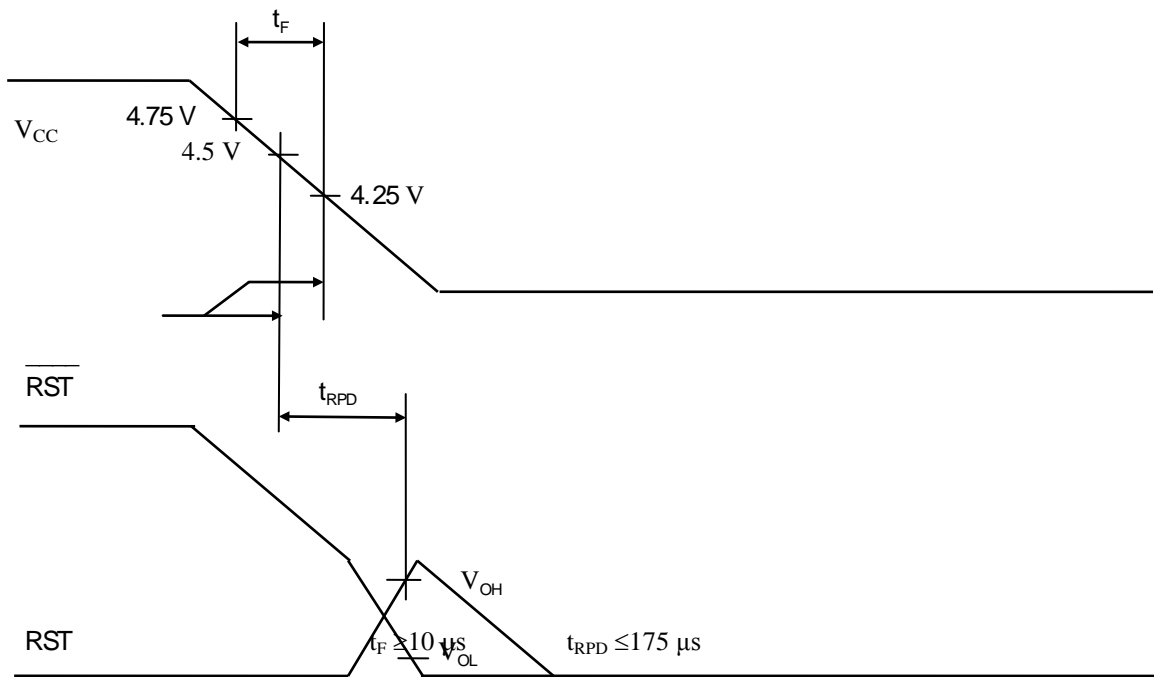


Fig. 4 – Timing diagram: power error / down to  $V_{CCTP}$

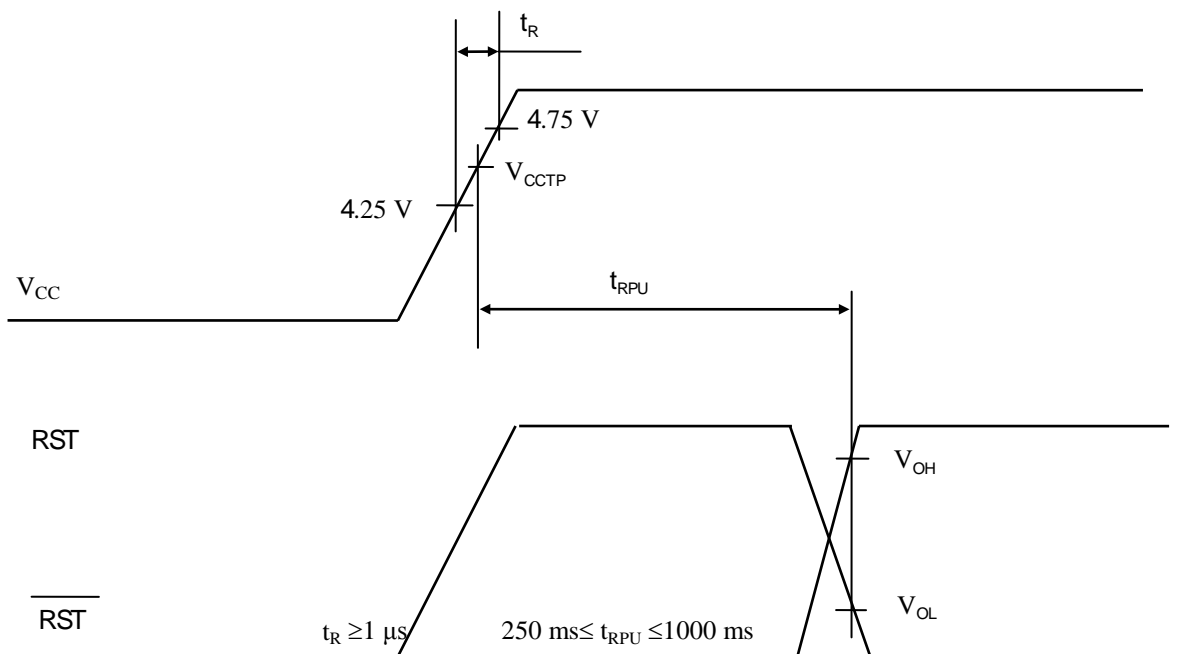


Fig. 5 – Timing diagram: Power-Up/ Stable

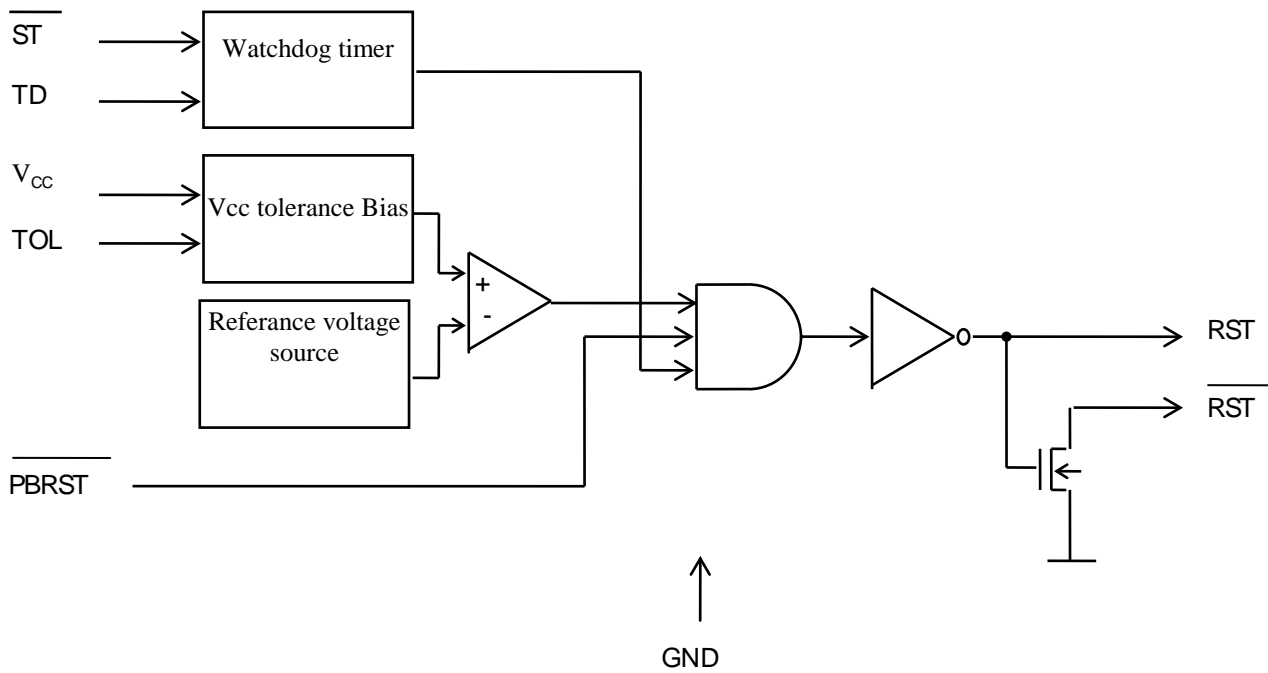


Fig.6 Block diagram

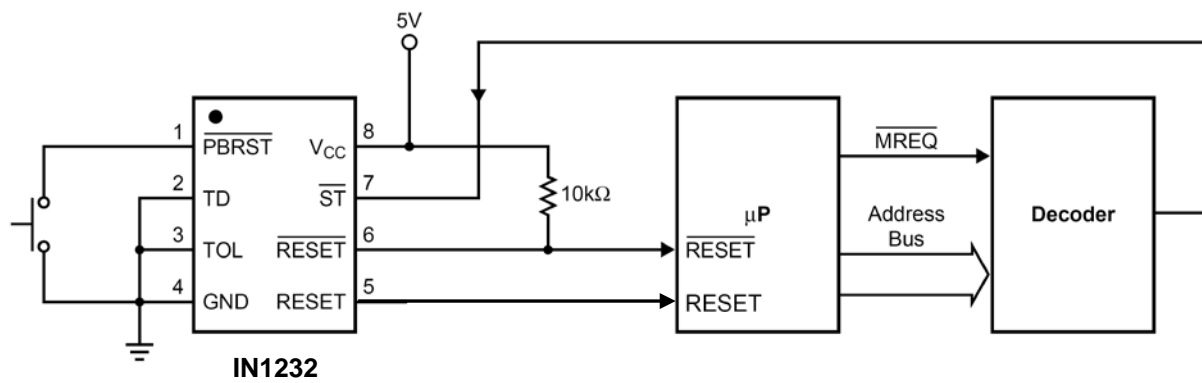
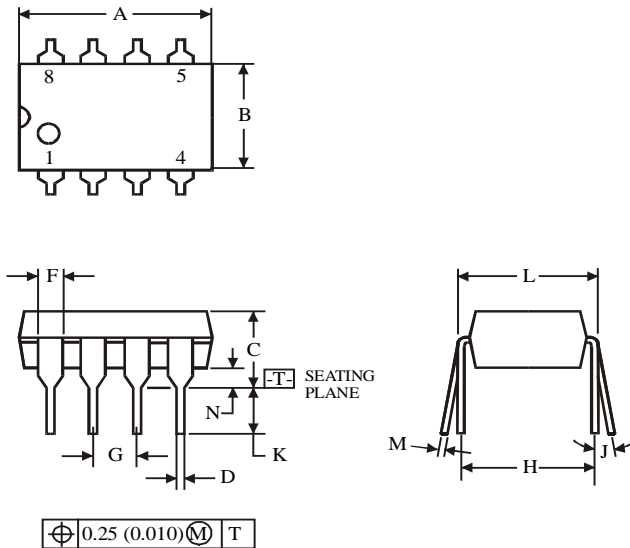
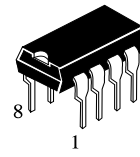


Fig.7 Application Circuit : Watchdog Timer

**N SUFFIX PLASTIC DIP  
(MS - 001BA)**

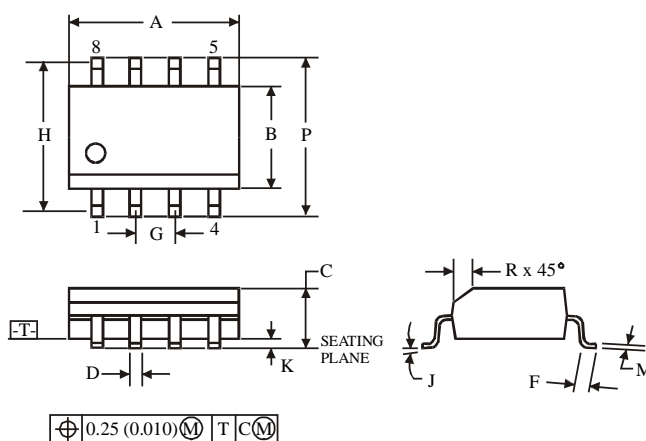
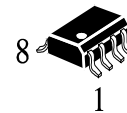


Symbol	Dimension, mm	
	MIN	MAX
A	8.51	10.16
B	6.1	7.11
C		5.33
D	0.36	0.56
F	1.14	1.78
G	2.54	
H	7.62	
J	0°	10°
K	2.92	3.81
L	7.62	8.26
M	0.2	0.36
N	0.38	

**NOTES:**

- Dimensions "A", "B" do not include mold flash or  
Maximum mold flash or protrusions 0.25 mm (0.010) per side.

**D SUFFIX SOIC  
(MS - 012AA)**



Symbol	Dimension, mm	
	MIN	MAX
A	4.8	5
B	3.8	4
C	1.35	1.75
D	0.33	0.51
F	0.4	1.27
G	1.27	
H	5.72	
J	0°	8°
K	0.1	0.25
M	0.19	0.25
P	5.8	6.2
R	0.25	0.5

**NOTES:**

- Dimensions A and B do not include mold flash or protrusion.
- Maximum mold flash or protrusion 0.15 mm (0.006) per side  
for A; for B - 0.25 mm (0.010) per side.