

## DS1831C, DS1831D, DS1831E

3.3V/2.5V Multisupply Micromonitor

### Description

The DS1831C multisupply monitor and reset monitors up to four system voltages: 2.5V supply, 3.3V (or 3V) supply, and two additional user configurable voltage monitors. DS1831 power for internal operation comes from the higher voltage level of the 3.3V input or the 2.5V input. One of these inputs must be greater than 1V for device operation. Pushbutton (manual reset) functionality is provided for the 2.5V reset, the 3.3V reset or for all reset outputs by the master pushbutton. The DS1831D replaces one reference comparator and the master pushbutton with watchdog and the DS1831E replaces the 3.3V with a last reset status output.

TOL and TD inputs allow user configuration of the DS1831 for multiple applications. The TOL inputs configure the tolerance for the specified output and the TD inputs configure the reset time delays.

### Key Features

- 2.5V power-on reset
- 3.3V (or 3V) power-on reset
- Two referenced comparators with separate outputs for monitoring additional supplies
- Internal power is drawn from higher of either the  $IN_{2.5V}$  input or the  $IN_{3.3V}$  input
- Excellent for systems designed to operate with multiple power supplies
- Asserts resets during power transients
- Pushbutton reset input for system override
- Maintains reset for user configurable times of 10ms, 100ms, or 1s
- Watchdog timer for software monitoring (DS1831D)
- Precision temperature-compensated voltage reference and voltage sensor
- 16-pin DIP and 16-pin, 150mil SO available
- Operating temperature of  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$

Part Number	Interface	Reset Threshold Range (V)	Active-Low Reset Output	Min. Reset Timeout Range	Watchdog Feature	Nom. Watchdog Timeout Range	Supervisor Features	Reset Thresh. Acc. (% @+25°C)	Max. I <sub>CC</sub> (µA)	
DS1831C	Factory Fixed R/C Adjustable	2.5 to 3.3 3.3 to 5.5	Open Drain	15ms to 85ms 85ms to 300ms 300ms to 1s	No Watchdog	-	Manual Reset	2.5	100	
DS1831D					Input/Output (WDI/WDO) Pin Selectable	1s to 2s <1s				
DS1831E					No Watchdog	-				
<b>See All Supervisors (4 Monitored Voltages) (21)</b>										

**Notes:**

\*\*This pricing is BUDGETARY, for comparing similar parts. Prices are in U.S. dollars and subject to change. Quantity pricing may vary substantially and international prices may differ due to local duties, taxes, fees, and exchange rates. For volume-specific prices and delivery, please see the [price and availability page](#) or contact an authorized distributor.

**Application Notes**

- Application Note 245: Adding Hysteresis to CPU Supervisor Voltage Sense Inputs Monitoring Upstream Voltage Supplies for Power-Fail Warnings - DS1831C, DS1831D, DS1831E
- Application Note 3316: Dallas Semiconductor Microprocessor Supervisor Selection Guide - DS1831C, DS1831D, DS1831E

**Evaluation Kits**

none

**Design Guides**

- Microprocessor Supervisory (PDF)

**Reliability Reports**

Request Reliability Report for:

**Software/Models**

none

**Ordering Information**

## Notes:

1. Other options and links for purchasing parts are listed at:
2. [Didn't Find What You Need?](#) Ask our applications engineers. Expert assistance in finding parts, usually within one business day.
3. Part number suffixes: T or T&R = tape and reel; + = RoHS/lead-free; # = RoHS/lead-exempt. More: See [Full Data Sheet](#) or [Part Naming Conventions](#).
4. \* Some packages have variations, listed on the drawing. "PkgCode/Variation" tells which variation the product uses. Note that "+", "#", "-" in the part number suffix describes RoHS status. Package drawings may show a different suffix character.

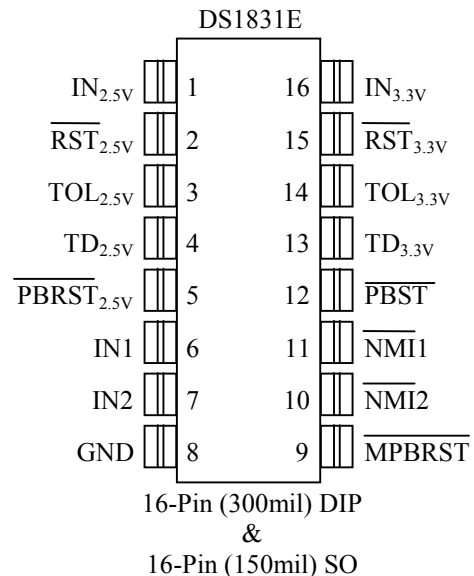
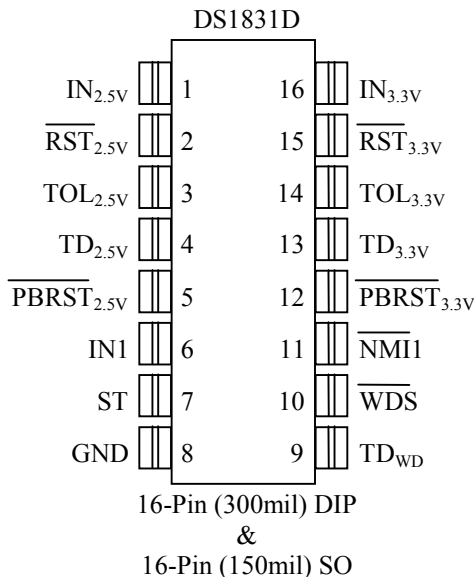
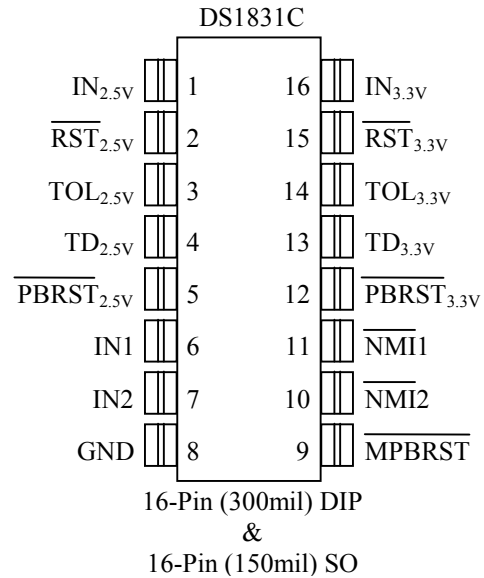
## Devices: 1-18 of 18

DS1831C	Notes	Free Sample	Buy	Package: TYPE PINS FOOTPRINT DRAWING CODE/VAR *	Temp	RoHS/Lead-Free? Materials Analysis
DS1831C+				PDIP; 16 pin; Dwg: <a href="#">21-0043</a> (PDF) Use pkgcode/variation: P16+10*	-40°C to +85° C	RoHS/Lead-Free: <a href="#">Lead Free</a> <a href="#">Materials Analysis</a>
DS1831C	2.5V and 3V			PDIP; 16 pin; Dwg: <a href="#">21-0043</a> (PDF) Use pkgcode/variation: P16-10*	-40°C to +85° C	RoHS/Lead-Free: <a href="#">No</a> <a href="#">Materials Analysis</a>
DS1831CS+T&R				SOIC; 16 pin; Dwg: <a href="#">21-0041</a> (PDF) Use pkgcode/variation: S16+2*	-40°C to +85° C	RoHS/Lead-Free: <a href="#">Lead Free</a> <a href="#">Materials Analysis</a>
DS1831CS+				SOIC; 16 pin; Dwg: <a href="#">21-0041</a> (PDF) Use pkgcode/variation: S16+2*	-40°C to +85° C	RoHS/Lead-Free: <a href="#">Lead Free</a> <a href="#">Materials Analysis</a>
DS1831CS	2.5V and 3V			SOIC; 16 pin; Dwg: <a href="#">21-0041</a> (PDF) Use pkgcode/variation: S16-2*	-40°C to +85° C	RoHS/Lead-Free: <a href="#">No</a> <a href="#">Materials Analysis</a>
DS1831CS/T&R	2.5V and 3.0V			SOIC; 16 pin; Dwg: <a href="#">21-0041</a> (PDF) Use pkgcode/variation: S16-2*	-40°C to +85° C	RoHS/Lead-Free: <a href="#">No</a> <a href="#">Materials Analysis</a>
DS1831D	Notes	Free Sample	Buy	Package: TYPE PINS FOOTPRINT DRAWING CODE/VAR *	Temp	RoHS/Lead-Free? Materials Analysis
DS1831D+				PDIP; 16 pin; Dwg: <a href="#">21-0043</a> (PDF) Use pkgcode/variation: P16+10*	-40°C to +85° C	RoHS/Lead-Free: <a href="#">Lead Free</a> <a href="#">Materials Analysis</a>

**FEATURES**

- 2.5V power-on reset
- 3.3V power-on reset
- Two referenced comparators with separate outputs for monitoring additional supplies
- Internal power is drawn from higher of either the IN<sub>2.5V</sub> input or the IN<sub>3.3V</sub> input
- Excellent for systems designed to operate with multiple power supplies
- Asserts resets during power transients
- Pushbutton reset input for system override
- Maintains reset for user configurable times of 10ms, 100ms, or 1s
- Watchdog timer for software monitoring (DS1831D)
- Precision temperature-compensated voltage reference and voltage sensor
- 16-pin DIP and 16-pin 150mil SO available
- Operating Temperature of -40°C to +85°C

**PIN ASSIGNMENT**



**DESCRIPTION**

The DS1831C multisupply monitor and reset monitors up to four system voltages: 2.5V supply, 3.3V (or 3V) supply, and two additional user configurable voltage monitors. DS1831 power for internal operation comes from the higher voltage level of the 3.3V input or the 2.5V input. One of these inputs must be greater than 1V for device operation. Pushbutton (manual reset) functionality is provided for the 2.5V

reset, the 3.3V reset or for all reset outputs by the master pushbutton. The DS1831D replaces one reference comparator and the master pushbutton with watchdog and the DS1831E replaces the 3.3V  $\overline{\text{PBRST}}$  with a last reset status output.

TOL and TD inputs allow user configuration of the DS1831 for multiple applications. The TOL inputs configure the tolerance for the specified output and the TD inputs configure the reset time delays.

## PIN DESCRIPTION

$\text{IN}_{2.5\text{V}}$	2.5V Power Supply Input	$\text{MPBRST}$	Master Pushbutton (DS1831C/E)
$\overline{\text{RST}}_{2.5\text{V}}$	2.5V Reset Open Drain Output	$\text{TD}_{\text{WD}}$	Watchdog Time Delay Select (DS1831D)
$\text{TOL}_{2.5\text{V}}$	Selects 2.5V Input Tolerance	$\overline{\text{NMI}}_2$	Non-maskable Interrupt 2 (DS1831C/E)
$\text{TD}_{2.5\text{V}}$	Selects 2.5V Reset Time Delay	$\overline{\text{WDS}}$	Watchdog Status Output (DS1831D)
$\overline{\text{PBRST}}_{2.5\text{V}}$	2.5V Reset Pushbutton	$\overline{\text{NMI}}_1$	Non-maskable Interrupt 1
$\text{IN}_1$	Sense Input 1	$\overline{\text{PBRST}}_{3.3\text{V}}$	3.3V Reset Pushbutton (DS1831C/E)
$\text{IN}_2$	Sense Input 2 (DS1831C/E)	$\overline{\text{PBST}}$	Pushbutton Status Output (DS1831E)
$\text{ST}$	Watchdog Strobe Inputs (DS1831D)	$\text{TD}_{3.3\text{V}}$	Select 3.3V Reset Time Delay
$\text{GND}$	Ground	$\text{TOL}_{3.3\text{V}}$	Selects 3.3V Input Tolerance
		$\overline{\text{RST}}_{3.3\text{V}}$	3.3V Reset Open Drain Output
		$\text{IN}_{3.3\text{V}}$	3.3V Power Supply Input

**ABSOLUTE MAXIMUM RATINGS\***

Voltage on $\overline{IN}_{2.5V}$ or $\overline{IN}_{3.3V}$	-0.5V to +6.0V
Pins Relative to Ground	
Voltage on either $\overline{RST}$ Relative to Ground	-0.5V to the greater of $\overline{IN}_{2.5V} + 0.5V$ or $\overline{IN}_{3.3V} + 0.5V$
Voltage on $\overline{PBRST}_{3.3V}$ Relative to Ground	-0.5V to $\overline{IN}_{3.3V} + 0.5V$
Voltage on $\overline{PBRST}_{2.5V}$ Relative to Ground	-0.5V to $\overline{IN}_{2.5V} + 0.5V$
Voltage on $\overline{MPBRST}$ , $\overline{IN}_1$ , $\overline{IN}_2$	
Relative to Ground	-0.5V to the greater of $\overline{IN}_{2.5V} + 0.5V$ or $\overline{IN}_{3.3V} + 0.5V$
Operating Temperature Range	-40°C to +85°C
Storage Temperature Range	-55°C to +125°C
Soldering Temperature	See IPC/JEDEC J-STD-020A specification

\* 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.

**RECOMMENDED DC OPERATING CONDITIONS** (-40°C to +85°C)

PARAMETER	SYMBOL	MIN	MAX	UNITS	NOTES
$\overline{IN}_{2.5V}$ (Supply Voltage)	$V_{IN}$	1.0	5.5	V	1
$\overline{IN}_{3.3V}$ (Supply Voltage)	$V_{IN}$	1.0	5.5	V	1
$\overline{PBRST}_{2.5V}$ , $\overline{PBRST}_{3.3V}$ , $\overline{MPBRST}$ , ST input High Level	$V_{IH}$	$0.7 \times V_{INT}$	$V_{INT} + 0.3$	V	1*
$\overline{PBRST}_{3.3V}$ , $\overline{PBRST}_{5V}$ , $\overline{MPBRST}$ , ST input Low Level	$V_{IL}$	-0.3	$0.3 \times V_{INT}$	V	1*

\*  $V_{INT}$  is the greater voltage level of the  $\overline{IN}_{2.5V}$  or  $\overline{IN}_{3.3V}$ .

**DC ELECTRICAL CHARACTERISTICS**

(-40°C to 85°C;  $\overline{IN}_{2.5V}$ ,  $\overline{IN}_{3.3V} = 1.0V$  to  $5.5V$ )

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	NOTES
Input Leakage	$I_{IL}$	-1.0		+1.0	$\mu A$	2
Output Current @ 2.4V	$I_{OH}$					3
Output Current @ 0.4V	$I_{OL}$	+10			mA	4
Operating Current @ $\leftarrow 5.5V$	$I_{CC}$		80	100	$\mu A$	5
Operating Current @ $\leftarrow 3.6V$	$I_{CC}$		60	85	$\mu A$	6
$\overline{IN}_{3.3V}$ Trip Point ( $TOL_{3.3V} = \overline{IN}_{3.3V}$ )	$V_{INTP}$	2.98	3.06	3.15	V	
$\overline{IN}_{3.3V}$ Trip Point ( $TOL_{3.3V} = GND$ )	$V_{INTP}$	2.80	2.88	2.97	V	
$\overline{IN}_{3.3V}$ Trip Point ( $TOL_{3.3V} = \text{Float}$ )	$V_{INTP}$	2.47	2.55	2.64	V	
$\overline{IN}_{2.5V}$ Trip Point ( $TOL_{2.5V} = \overline{IN}_{2.5V}$ )	$V_{INTP}$	2.250	2.312	2.375	V	
$\overline{IN}_{2.5V}$ Trip Point ( $TOL_{2.5V} = GND$ )	$V_{INTP}$	2.125	2.187	2.250	V	
$\overline{IN}_{2.5V}$ Trip Point ( $TOL_{2.5V} = \text{Float}$ )	$V_{INTP}$	2.000	2.062	2.125	V	
IN Input Trip Points	$V_{TP}$	1.15	1.25	1.30	V	

**CAPACITANCE** $(t_A = +25^\circ\text{C})$ 

PARAMETER	SYMBOL	MAX	UNITS	NOTES
Input Capacitance	$C_{IN}$	5	pF	
Input Capacitance	$C_{OUT}$	7	pF	

**AC ELECTRICAL CHARACTERISTICS** $(-40^\circ \text{ to } 85^\circ\text{C}; I_{N_{2.5V}}, I_{N_{3.3V}} = 1.0\text{V to } 5.5\text{V})$ 

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	NOTES
RESET Active Time (TD=Low)	$t_{RST}$	10	16	20	ms	6
RESET Active Time (TD=Float)	$t_{RST}$	100	160	200	ms	6
RESET Active Time (TD=High)	$t_{RST}$	1000	1600	2000	ms	6
$V_{CC}$ Detect to $\overline{RST}$	$t_{RPU}$	See RESET Active Time			ms	6
$V_{CC}$ Detect to $\overline{RST}$	$t_{RPD}$		2	10	$\mu\text{s}$	7
$V_{IN}$ Detect to $\overline{NMI}$	$t_{IPD}$		2	10	$\mu\text{s}$	7
NMI Active Time	$t_{NMI}$	20			$\mu\text{s}$	
$\overline{PBRST} = V_{IL}$	$t_{PB}$	20			$\mu\text{s}$	
$\overline{PBRST}$ Stable Low to Reset Active	$t_{PDLY}$			50	$\mu\text{s}$	
Watchdog Timeout (TD <sub>WD</sub> =Low)	$t_{TD}$	10	16	20	ms	
Watchdog Timeout (TD <sub>WD</sub> =Float)	$t_{TD}$	100	160	200	ms	
Watchdog Timeout (TD <sub>WD</sub> =High)	$t_{TD}$	1000	1600	2000	ms	
ST Pulse Width	$t_{ST}$	10			ns	
$V_{in}$ Slew Rate ( $V_{INTP(MAX)}$ to $V_{INTP(MIN)}$ )	$t_F$	300			$\mu\text{s}$	
$V_{in}$ Slew Rate ( $V_{INTP(MAX)}$ to $V_{INTP(MIN)}$ )	$t_R$	0			ns	

**NOTES:**

- 1) All voltages are referenced to ground.
- 2) All Pushbutton inputs are internally pulled to the associated Supply IN input or the greatest Supply IN input for the  $\overline{MPBRST}$  with an internal Impedance of 100k $\Omega$ .
- 3) All outputs are Open Drain and output  $I_{OH}$  would be determined by the external pull-up resistor.
- 4) Measured with outputs open and  $I_{N_{3.3V}}$  or  $I_{N_{2.5V}} \leq 5.5\text{V}$ .
- 5) Measured with outputs open and  $I_{N_{3.3V}}$  or  $I_{N_{2.5V}} \leq 3.6\text{V}$ .
- 6) Measured using  $t_R = 5\mu\text{s}$ .
- 7) Noise immunity - pulses  $< 2\mu\text{s}$  at a trip level will not cause a  $\overline{RST}$  or  $\overline{NMI}$ .

**ORDERING INFORMATION**

<b>Ordering Part Number</b>	<b>Package Type</b>	<b>Description</b>
DS1831C	16-Pin DIP 300mil	2.5V/3.3V Multisupply Monitor
DS1831CS	16-Pin SO 150mil	2.5V/3.3V Multisupply Monitor
DS1831D	16-Pin DIP 300mil	2.5V/3.3V Multisupply Monitor w/Watchdog
DS1831DS	16-Pin SO 150mil	2.5V/3.3V Multisupply Monitor w/Watchdog
DS1831E	16-Pin DIP 300mil	2.5V/3.3V Multisupply Monitor w/Pushbutton Status
DS1831ES	16-Pin SO 150mil	2.5V/3.3V Multisupply Monitor w/Pushbutton Status

\* Add "/T&R" for tape and reeling of surface mount packages.