

Supervisors and Reset ICs

Quick Reference Guide



Overview

Supply voltage supervisors, also known as reset ICs or voltage monitors, are used to monitor the system power supply. These devices supervise voltage rails in order to ensure proper power on, detect fault conditions, and perform a system hand-shake with embedded processors. For more information on the various supervisor specifications, see the [design factor glossary](#). To learn more and view our complete portfolio, visit: www.ti.com/supervisors.

Fixed delay time

Device	# of Channels Monitored	Monitored Voltages (V)								Package (s)	V _{DD} Range (V)	I _{DD} (typ) (µA)	Time Delay (ms)	Reset Threshold Accuracy [§] (max) (%)	Manual Reset/Enable	Active-Low Reset/Output	Active-High Reset/Output	Reset Output Topology	Automotive
		1.2	1.8	2.5	3	3.3	5	12	Other										
TPS3831	1	✓	✓	—	✓	✓	✓	—	✓	SON-4	0.9 to 6.5	0.15	200	±1.6	✓	✓	—	PP	—
TPS3839	1	✓	✓	—	✓	✓	✓	—	✓	SON-4, SOT-23-3	0.9 to 6.5	0.15	200	±1.6	—	✓	—	PP	—
TLV803	1	—	—	✓	✓	✓	✓	—	—	SOT23-3	1.1 to 6	9	200	±2.2	—	✓	—	OD	—
TLV809	1	—	—	✓	✓	✓	✓	—	—	SOT23-3	2 to 6	9	200	±2.2	—	✓	—	PP	—
TLV810	1	—	—	✓	✓	✓	✓	—	—	SOT23-3	1.1 to 6	9	200	±2.2	—	—	✓	PP	—
LM809	1	—	—	—	✓	✓	✓	—	—	SOT23-3	1 to 5.5	15	240	±2.8	—	✓	—	PP	—
LM810	1	—	—	—	—	—	✓	—	—	SOT23-3	1 to 5.5	15	240	±2.8	—	—	✓	PP	—
TPS3847	1	—	—	—	—	—	—	✓	—	SOT-23-5	4.5 to 18	0.38	20	±2.5	✓	✓	—	PP	—

Programmable delay time

Device	# of Channels Monitored	Monitored Voltages (V)								Package (s)	V _{DD} Range (V)	I _{DD} (typ) (µA)	Time Delay	Reset Threshold Accuracy [§] (max) (%)	Manual Reset/Enable	Active-Low Reset/Output	Active-High Reset/Output	Reset Output Topology	Automotive
		Adj.	1.2	1.8	2.5	3	3.3	5	Other										
TPS3808	1	✓†	✓	✓	✓	✓	✓	✓	✓	SOT-23-6 SON-6	1.7 to 6.5	2.4	1.25ms to 10s	±2	✓	✓	—	OD	✓
TPS3890	1	✓†	✓	✓	✓	✓	✓	✓	✓	SON-6	1.5 to 5.5	2.1	40µs to 30s	±1	✓	✓	—	OD	✓
TPS3895/7	1	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	SON-6	1.7 to 6.5	6	40µs to 10s	±1	✓	—	✓	PP/OD	—
TPS3896/8	1	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	SON-6	1.7 to 6.5	6	40µs to 10s	±1	✓	✓	—	PP/OD	—
LP3470	1	—	—	—	—	✓	✓	✓	✓	SOT-23-5	0.5 to 5.5	16	200µs to 60s	±1.5	—	✓	—	OD	—
LM8365	1	—	—	—	—	✓	—	✓	—	SOT-23-5	1 to 6	0.62	—	±2.5 (typ)	—	✓	—	OD	—
TPS3860x0	4	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	QFN-20	1.8 to 6.5	9	1.4ms to 10s	±1	✓	✓	✓	PP + OD	✓

No delay time (voltage detector)

Device	# of Channels Monitored	Monitored Voltages (V)													Package (s)	V _{DD} Range (V)	I _{DD} (typ) (µA)	Propagation Delay (typ) (µs)	Reset Threshold Accuracy [§] (max) (%)	Manual Reset/Enable	Active-Low Reset/Output	Active-High Reset/Output	Reset Output Topology	Automotive						
		Adj.	1.2	1.5	1.8	2.5	3	3.3	5	12	15	19	24	Other																
TPS3803	1	✓†	✓†	✓	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	SC70-5	1.3 to 6	3	—	±1.5	—	✓	—	OD	✓
TPS3710	1	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	ThinSOT23-6, SON-6	1.8 to 18	7	18	±1	—	✓	—	OD	—
TPS3711	1	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	ThinSOT23-6	1.8 to 36	7	9.9	±0.75	—	✓	—	OD	—
LMP7300	1	✓†	—	—	—	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	SOIC-8, VSSOP-8	2.7 to 12	13	5	—	—	Configurable		OD	—
TLV3011	1	✓†	—	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	SOT23-6, SC70-6	1.8 to 5.5	2.8	8	+1.75/-2	—	Configurable		OD	—
TLV3012	1	✓†	—	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	SOT23-6, SC70-6	1.8 to 5.5	2.8	8	+1.75/-2	—	Configurable		PP	✓
LMS33460	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	SC70-5	0.8 to 7	130	—	±5 (typ)	—	✓	—	OD	—	
TPS3779	2	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	SON-6	1.5 to 6.5	1.8	5.5	±1	—	✓	—	PP	✓
TPS3780	2	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	SON-6	1.5 to 6.5	1.8	5.5	±1	—	✓	—	OD	✓

†Not a fixed voltage threshold

§Does not factor in external resistor divider tolerance

*Device can monitor but cannot operate off of rail

Window comparator + internal reference

Device	# of Channels Monitored	Monitored Voltages (V)													Package (s)	V _{DD} Range (V)	I _{DD} (typ) (μA)	Propagat-ion Delay (typ) (μs)	Reset Threshold Accuracy [§] (max) (%)	Manual Reset/ Enable	Active-Low Reset/ Output	Active-High Reset/ Output	Reset Output Topology	Automotive
		Adj.	1.2	1.5	1.8	2.5	3	3.3	5	12	15	19	24	Other										
TPS3700	1	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†*	✓†*	✓†	ThinSOT23-6, SON-6	1.8 to 18	5.5	18	±1	—	✓	✓	OD	✓	
TPS3701	1	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	ThinSOT23-6	1.8 to 36	7	9.9	±0.75	—	✓	✓	OD	—	
TPS3702	1	✓†	✓	—	✓	✓	✓	✓	✓	✓†	✓†	✓†*	✓†*	ThinSOT23-6	1.8 to 18	7	19	±0.9	—	✓	✓	OD	✓	
LMV7231	6	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†*	✓†*	✓†*	✓†*	QFN-24	2.2 to 5	7.7/ch	2.6	+2.34/-2.47	—	✓	✓	OD	—	

Supervisor + watchdog timer

Device	# of Channels Monitored	Monitored Voltages (V)										Package (s)	V _{DD} Range (V)	I _{DD} (typ) (μA)	Time Delay (typ) (ms)	Watchdog Timer WDI (sec)	Reset Threshold Accuracy [§] (max) (%)	Manual Reset/ Enable	Active-Low Reset/ Output	Active-High Reset/ Output	Reset Output Topology	Automotive
		Adj.	1.2	1.5	1.8	2.5	3	3.3	5	Other												
TPS3850	1	✓†	✓	—	✓	—	✓	✓	✓	—	DFN-10	1.6 to 6.5	10	Prog.	Adj. window	±0.8	—	✓	—	OD	✓	
TPS3851	1	—	—	—	✓	✓	✓	✓	✓	—	DFN-8	1.6 to 6.5	10	200	Adj.	±0.8	✓	✓	—	OD	✓	
TPS3852	1	—	—	—	—	—	—	✓	—	—	DFN-8	1.6 to 6.5	10	200	Adj. window	±0.8	✓	✓	—	OD	✓	
TPS3123/4	1	—	✓	✓	✓	—	—	—	—	—	SOT-23-5	0.75 to 3.3	14	180	1.4	±3.6	✓/—	✓	—/✓	PP	—	
TPS3128	1	—	✓	✓	✓	—	—	—	—	—	SOT-23-5	0.75 to 3.3	14	180	1.4	±3.5	✓	✓	—	OD	—	
TPS3813	1	—	—	—	—	✓	✓	✓	✓	—	SOT-23-6	2 to 6	9	25	Adj. window	±2.2	—	✓	—	OD	✓	
TPS3820/8	1	—	—	—	—	—	—	✓	✓	—	SOT-23-5	1.1 to 5.5	15	25/200	0.2/1.6	±2.4	✓	✓	—	PP	✓ / ✓	
TPS3823/4	1	—	—	—	—	✓	✓	✓	✓	—	SOT-23-5	1.1 to 5.5	15	200	1.6	±2.4	✓/—	✓	—/✓	PP	✓ / ✓	
TPS3110	2	✓†	✓	✓	—	—	—	✓	—	✓	SOT-23-6	0.9 to 3.3	1.2	130	1.1	±0.75 (typ)	✓	✓	—	PP	—	
TPS3305	2	—	—	—	✓	✓	—	✓	✓	—	SO-8, MSOP-8	2.7 to 6	15	200	1.6	±3	✓	✓	✓	PP	—	
TPS3705	2	✓†	—	—	—	—	—	✓	✓	—	SO-8, MSOP-8	2 to 6	30	200	1.6	±4	✓	✓	—	PP	—	
TPS3306	3	✓†	—	✓	✓	✓	—	✓	✓	✓	SO-8, MSOP-8	2.7 to 6	15	100	0.8	±3.2	—	✓	—	OD	✓	
TPS3860x0	4	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	✓†	QFN-20	1.8 to 6.5	9	Prog.	0.6	±1	✓	✓	✓	OD	✓	

Push-button reset IC

Device	# of Channels Monitored	Input Delay (s)	Reset Pulse Width (ms)	Package (s)	V _{DD} Range (V)	I _{DD} (typ) (μA)	Active-Low Reset/ Output	Active-High Reset/ Output	Reset Output Topology	Automotive
TPS3420	2	7.5/12.5	Input dependent	SON-6	1.6 to 6.5	0.35	✓	—	OD	—
TPS3421	2	0/7.5	80	SON-6	1.6 to 6.5	0.25	✓	—	OD	—
TPS3422	1	0/7.5	400	SON-6	1.6 to 6.5	0.25	✓	—	OD	—

†Not a fixed voltage threshold

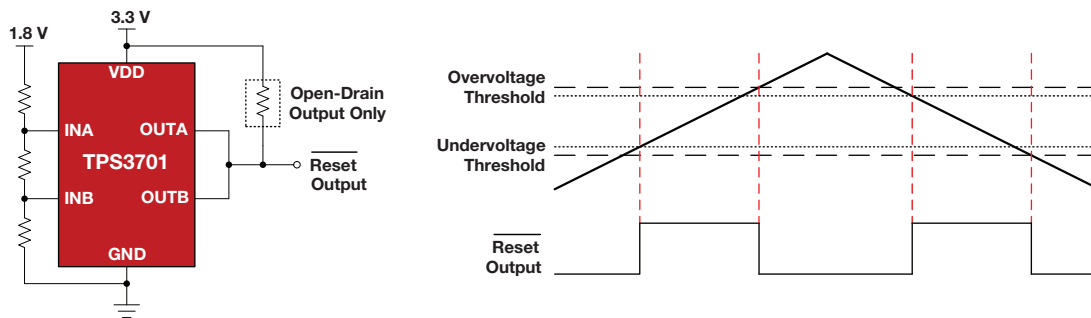
§Does not factor in external resistor divider tolerance

*Device can monitor but cannot operate off of rail

Why supervisors and reset ICs?

Window Comparator with Integrated Reference

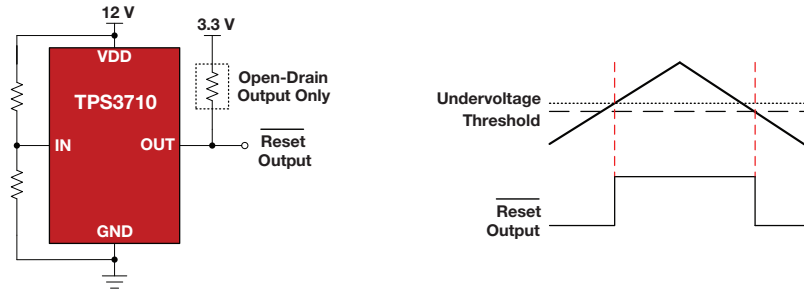
Detect overvoltage fault events in addition to undervoltage fault events to alert a system if a voltage rail deviated from its permissible tolerance.



Why supervisors and reset ICs? (continued)

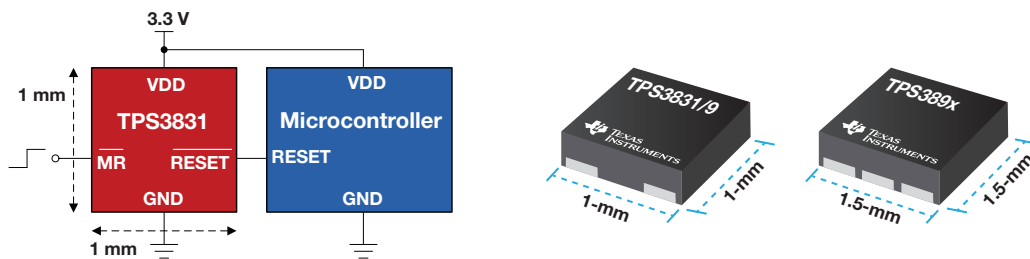
Wide input voltage

For voltage rails greater than 5 V, TI's family of wide-input voltage detectors can both operate from *and* monitor 12-V, 15-V, 24-V rails and more.



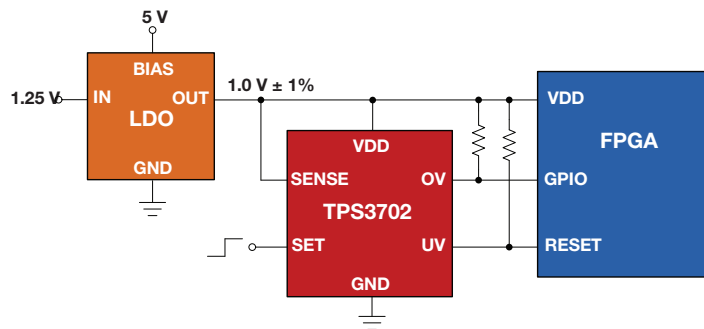
Low power + small size

TI's family of small-size, low-power supervisors help address PCB size constraints, improve system efficiency and extend battery life.



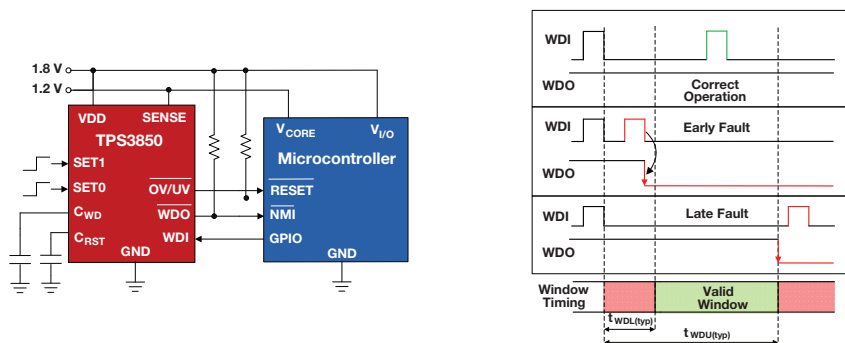
Accurate voltage detection

For supply rails with tight tolerance specifications, such as those found in processors and FPGAs, TI's high accuracy voltage supervisors detect fault events and notify the system to ensure proper operation.



Integrated supervisor + watchdog timer

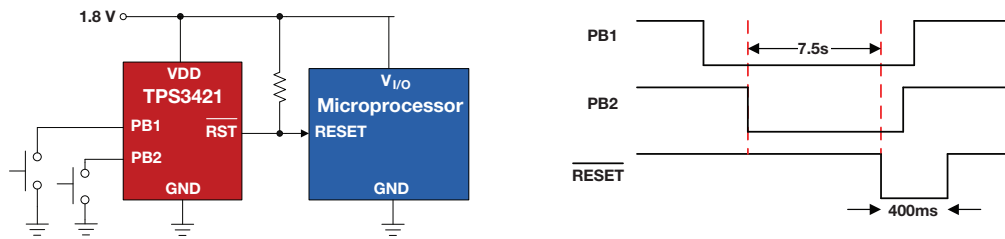
Coupling a voltage supervisor with a watchdog timer allows supply voltage monitoring of the processor as well as internal fault detection. The watchdog timer adds critical redundancy to systems where a processor may freeze or hang.



Why supervisors and reset ICs? (continued)

Push-button reset IC

Being able to reset a system by holding down a button or two is critical to applications where it is not easy access to toggle the power supply or remove the battery. In such cases, a push-button reset IC can monitor these user presses and provides a reset after a given time period has been met.



Design factors

- **Reset delay time** — Time delay between the fault event and the reset output asserting. Delays range between 10 μ s and 30s, and can either be fixed or programmed via an external capacitor.
- **Reset output polarity** — The reset output can assert high (Active-High) or low (Active-Low) in the event of a fault.
- **Reset output topology** — The reset output comes in two flavors: open-drain (OD) and push-pull (PP). An open-drain (or open-collector) output requires the output be tied to an external voltage via a pull-up resistor. A push-pull (or CMOS) output both sinks and sources current without needing to be tied to an external voltage.
- **Package** — TI's Reset ICs are available in leaded (ex. SOT23-3) and unlead packages (ex. X2SON). The smallest voltage supervisors in TI's portfolio are 1 mm².
- **Watchdog Timer (WDT)** — Monitors a periodic pulse from a processor and provides a reset signal to the processor when that pulse has not been received within a designated time period. This increases redundancy in systems that can't afford an undetected processor hang or freeze.
- **Supply Current (I_{DD})** — Voltage supervisor current draw. Minimizing the supply current is critical in extending battery life and ensuring more efficient system operation.
- **Manual Reset (MR) / Enable (EN)** — Allows manual intervention to assert the reset output.
- **Voltage threshold accuracy** — Determines how close the actual threshold voltage is to the target threshold voltage.
- **AEC-Q100 Qualification** — Many of TI's voltage supervisors are qualified for use in automotive applications. This is indicated by a "-Q1" suffix. Other devices can be qualified upon request.

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