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TPS3823-xxDBVR Series

Voltage Supervisory Circuits with Watchdog Timer and Manual Reset Input

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Features

- Wide Operation Voltage Range of 1V to 7V
- Correct Logic Output Guaranteed to V_{CC}=1.0V
- 200ms Reset Pulse Width
- Independent Watchdog Timer-1.6s Timeout
- Power-Supply Transient Immunity
- 4μA Supply Current

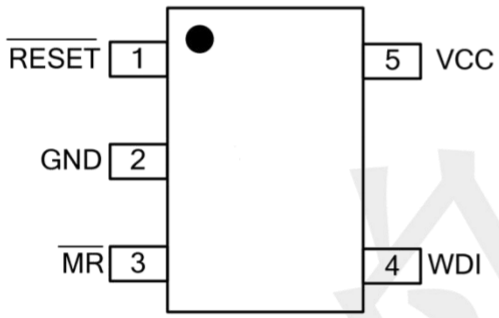
Applications

- Computers
- Embedded Systems
- Industrial Equipments
- Intelligent Instruments

General Description

The series are cost effective system power supply supervisory circuits designed to monitor the power supplies in digital systems. This family provides circuit initialization and timing supervision. Independent watchdog monitoring circuitry and manual reset input are included. They significantly improve system reliability and accuracy compared to separate ICs or discrete components.

Pin Definition



SOT23-5

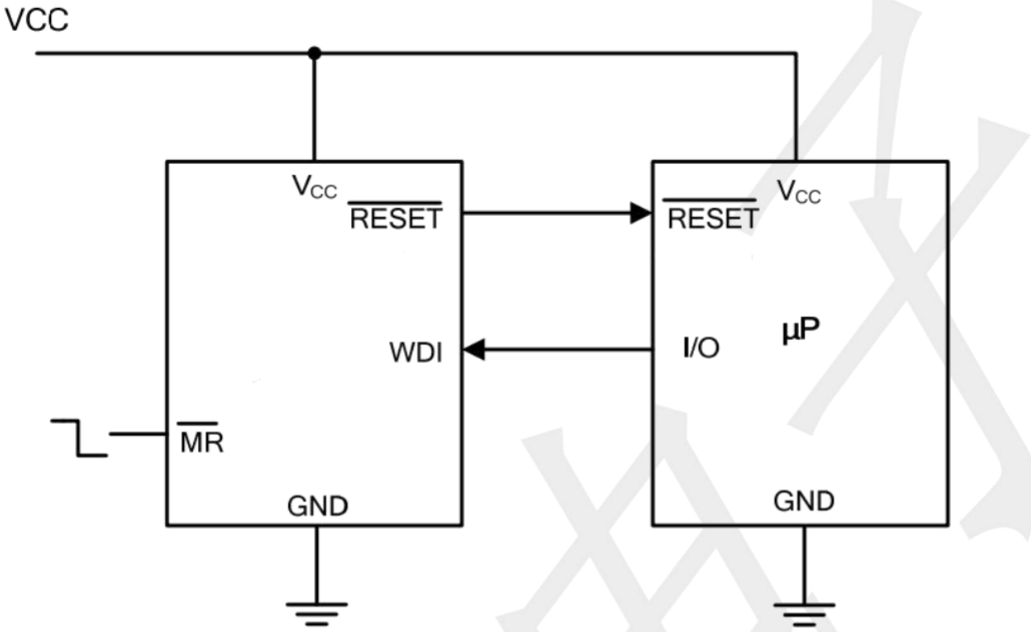
Ordering Information

Device Model	Marking
TPS3823-25DBVR-TP	PAPI
TPS3823-30DBVR-TP	PAQI
TPS3823-33DBVR-TP	PARI
TPS3823-50DBVR-TP	PASI

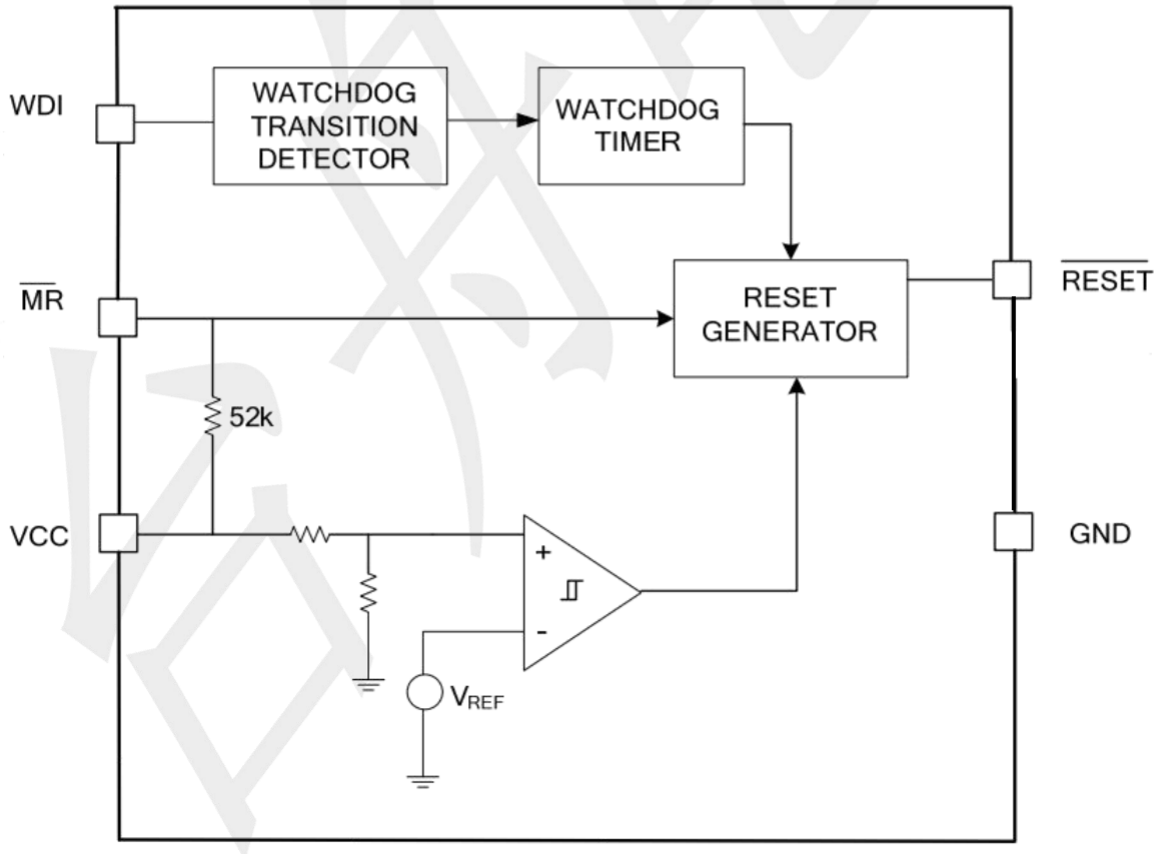
PIN CONFIGURATION

PIN	NAME	FUNCTION
1	$\overline{\text{RESET}}$	Active-Low Reset Output. Pulses low for 200ms when triggered, and remains low whenever VCC is below the reset threshold or when $\overline{\text{MR}}$ is a logic low. It remains low for 200ms after one of the following occurs: VCC rises above the reset threshold, the watchdog triggers a reset, or $\overline{\text{MR}}$ goes low to high.
2	GND	Ground
3	$\overline{\text{MR}}$	Manual-Reset Input triggers a reset pulse when pulled below 0.3VCC. The active-low input has an internal 52kΩ pull-up resistor. It can be driven from a TTL or CMOS logic line as well as shorted to ground with a switch. Leave open or connect to VCC if unused.
4	WDI	Watchdog Input. If WDI remains either high or low for longer than the watchdog timeout period, the internal watchdog timer runs out and a reset is triggered. The internal watchdog timer clears whenever reset is asserted, or whenever WDI sees a rising or falling edge. If WDI is left unconnected or is connected to a three-stated buffer output, the watchdog feature is disabled.
5	VCC	Supply Voltage

TYPICAL APPLICATIN CIRCUIT



FUNCTIONAL BLOCK DIAGRAM



Absolute Maximum Ratings （Note 1）

Symbol	Parameter		Value	Unit
V_{CC}	Supply Voltage		-0.3 to +8.0	V
	$\overline{RESET}$, $\overline{MR}$, WDI		-0.3 to (V_{CC}+0.3)	
I_{CC}	Input Current, V_{CC}, $\overline{MR}$, WDI		20	mA
I_O	Output Current, $\overline{RESET}$		20	mA
P_D	Continuous Power Dissipation	SOT23-5	300	mW
T_A	Operating Temperature Range		-40 to +85	°C
T_{STG}	Storage Temperature Range		-65 to +150	°C
	Lead Temperature (Soldering, 10s)		+300	°C

Note 1: 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 are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.Note 1: 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 are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

ESD Ratings

Symbol	ESD Mode	Value	Unit
HBM	Human Body Mode	±2000	V
CDM	Charged Device Mode	±500	

Electrical Characteristics

(TA=-40°C to +85°C,unless otherwise noted.) (Note 2)

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{CC}	Supply Voltage Range	T_A=0°C to +85°C		1.0	--	7	V
		T_A=T_{MIN} to T_{MAX}		1.2	--	7	V
I_{CC}	Supply Current	WDI and MR unconnected		--	4	6	μA
V_{TH-}	Reset Threshold	TPS3823-50 DBVR-TP	T_A= 0°C ~ +85°C	4.49	4.55	4.64	V
			T_A= -40°C ~ +85°C	4.46	4.55	4.64	
		TPS3823-33 DBVR-TP	T_A= 0°C ~ +85°C	2.88	2.93	3.00	
			T_A= -40°C ~ +85°C	2.86	2.93	3.00	
		TPS3823-30 DBVR-TP	T_A= 0°C ~ +85°C	2.59	2.63	2.69	
			T_A= -40°C ~ +85°C	2.57	2.63	2.69	
		TPS3823-25 DBVR-TP	T_A= 0°C ~ +85°C	2.21	2.25	2.30	
			T_A= -40°C ~ +85°C	2.20	2.25	2.30	
	Reset Threshold Hysteresis			--	20	--	mV
	Reset Threshold Tempco			--	100	--	ppm/°C
t_{RP}	Reset Timeout Period			140	200	280	ms
	V_{CC} to RESET Delay	V_{RST}-V_{CC}=100mV		--	20	--	μs

Electrical Characteristics

(TA=-40°C to +85°C,unless otherwise noted.) (Note 2)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{OH}	$\overline{RESET}$ Output Voltage	$V_{CC}=V_{RST}$ max I_{SOURCE}=1mA	0.8V_{CC}	--	--	V
V_{OL}		$V_{CC}=V_{RST}$ min I_{SINK}=4mA	--	--	0.3	
WATCHDOG INPUT						
t_{WD}	Watchdog Timeout Period		1.12	1.60	2.40	s
t_{WDI}	WDI Pulse Width	V_{IL}<0.15V_{CC} , V_{IH}>0.85V_{CC}	50	--	--	ns
V_{IL}	WDI Input Voltage (Note 4)		--	--	0.15V_{CC}	V
V_{IH}			0.85V_{CC}	--	--	
	WDI Input Current	WDI=V_{CC}	1	--	20	μA
		WDI=GND	-20	--	-1	
MANUAL RESET INPUT						
V_{IL}	$\overline{MR}$ Input Voltage		--	--	0.15V_{CC}	V
V_{IH}			0.85V_{CC}	--	--	
	$\overline{MR}$ Pulse Width		1.0	--	--	μs
	$\overline{MR}$ Noise Immunity(Pulse width with no reset)		--	100	--	ns
	$\overline{MR}$ to Reset Delay		--	500	--	ns
	$\overline{MR}$ Pullup Resistamce(internal)		35	52	75	kΩ

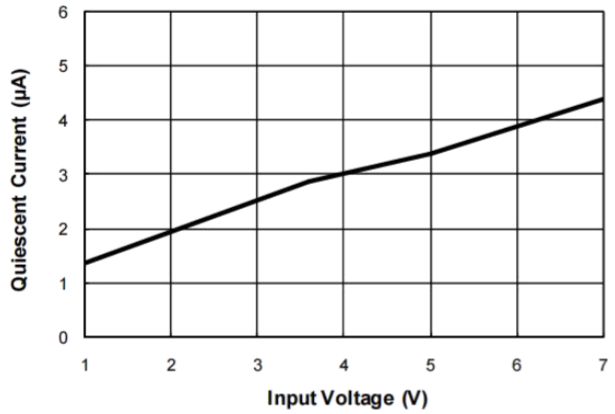
Note 2: Over temperature limits are guaranteed by design and not production tested.

Note 3: The $\overline{RESET}$ short-circuit current is the maximum pullup current when $\overline{RESET}$ is driven low by a μP bidirectional reset pin.

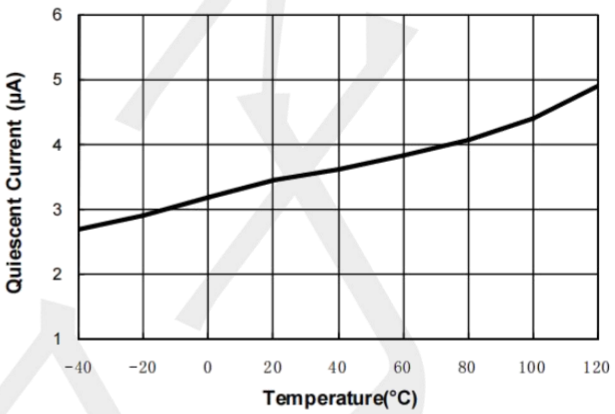
Note 4: WDI is internally serviced within the watchdog period if WDI is left unconnected.

Typical Operating Characteristics

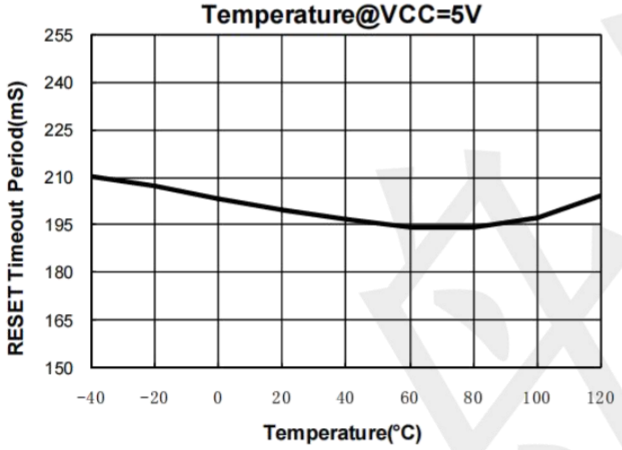
Quiescent Current vs. Input Voltage@Ta=20°C



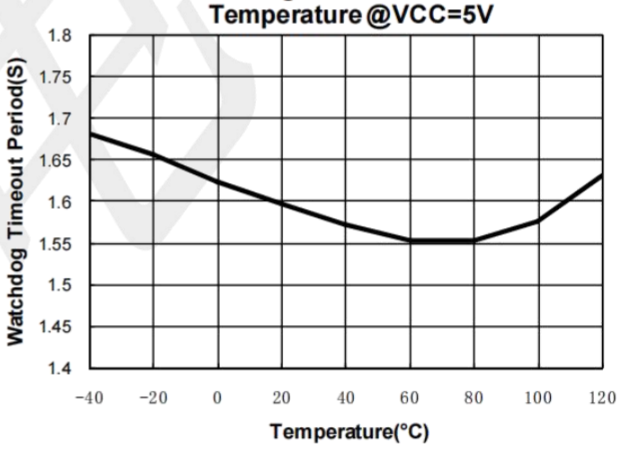
Quiescent Current vs. Temperature @VCC=5V



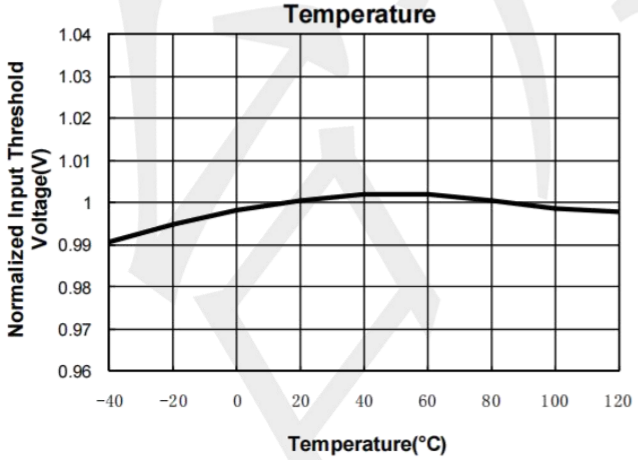
RESET Timeout Period vs. Temperature@VCC=5V



Watchdog Timeout Period vs. Temperature @VCC=5V



Normalized Input Threshold Voltage vs. Temperature



Package Outline Dimensions (unit: mm)

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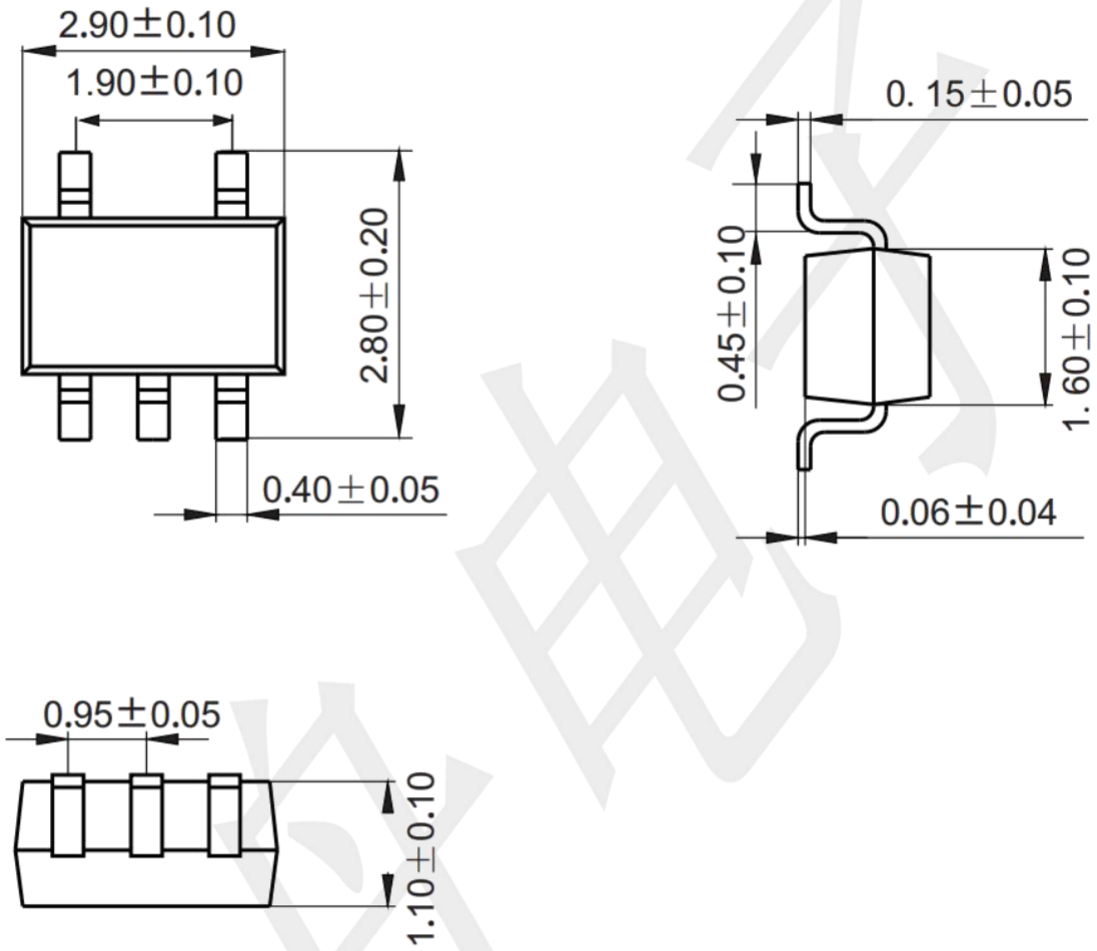

Mounting Pad Layout (unit: mm)