

3-Pin Microcontroller Reset Monitors

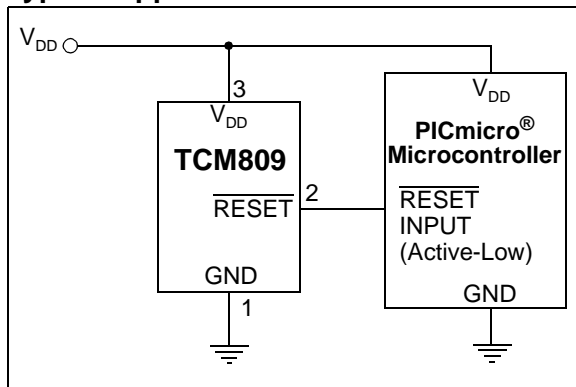
Features

- Precision V_{DD} Monitor for 2.5V, 3.0V, 3.3V, 5.0V Nominal System Voltage Supplies
- 140 msec Minimum RESET Time-Out Period
- RESET Output to $V_{DD} = 1.0V$ (**TCM809**)
- Low Supply Current, 9 μA (typ.)
- V_{DD} Transient Immunity
- Small 3-Pin SC-70 and SOT-23B Packages
- No External Components
- Push-Pull RESET Output
- Temperature Ranges:
 - Industrial: SC-70 (E): -40°C to +85°C
 - Extended: SOT-23, SC-70 (V): -40°C to +125°C

Applications

- Computers
- Embedded Systems
- Battery-powered Equipment
- Critical Microcontroller Power Supply Monitoring
- Automotive

Typical Application Circuit



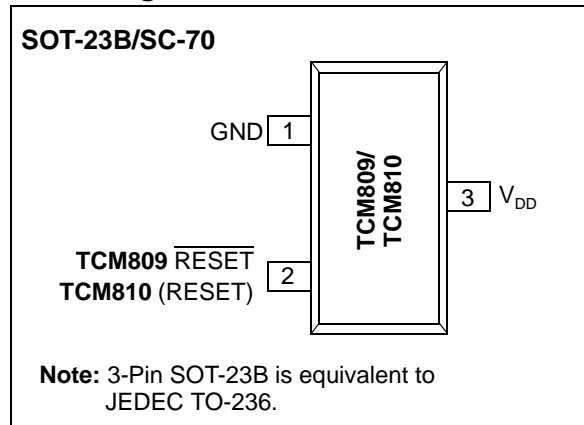
General Description

The TCM809 and TCM810 are cost-effective system supervisor circuits designed to monitor V_{DD} in digital systems; providing a reset signal to the host processor, when necessary. No external components are required.

The RESET output is typically driven active within 65 μsec of V_{DD} falling through the reset voltage threshold. RESET is maintained active for a minimum of 140 msec after V_{DD} rises above the reset threshold. The TCM810 has an active-high RESET output, while the TCM809 has an active-low RESET output. The output of the TCM809/TCM810 is valid down to $V_{DD} = 1V$. Both devices are available in 3-Pin SC-70 and SOT-23B packages.

The TCM809/TCM810 are optimized to reject fast transient glitches on the V_{DD} line. A low supply current of 9 μA (typ., $V_{DD} = 3.3V$) make these devices suitable for battery-powered applications.

Pin Configurations



TCM809/TCM810

1.0 ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings†

Supply Voltage (V_{DD} to GND)	6.0V
RESET, RESET	-0.3V to ($V_{DD} + 0.3V$)
Input Current, V_{DD}	20 mA
Output Current, RESET, RESET.....	20 mA
dV/dt (V_{DD}).....	100V/ μ sec
Operating Temperature Range	-40°C to +125°C
Power Dissipation ($T_A = 70^\circ\text{C}$):	
3-Pin SOT-23B (derate 4 mW/ $^\circ\text{C}$ above +70°C)	320 mW
3-Pin SC-70 (derate 2.17 mW/ $^\circ\text{C}$ above +70°C).....	174 mW
Storage Temperature Range	-65°C to +150°C
Maximum Junction Temperature, T_J	150°C

† **Notice:** Stresses above those listed under “Maximum Ratings” may cause permanent damage to the device. This is a stress rating only and functional operation of the device at those or any other conditions above those indicated in the operational listings of this specification is not implied. Exposure to maximum rating conditions for extended periods may affect device reliability.

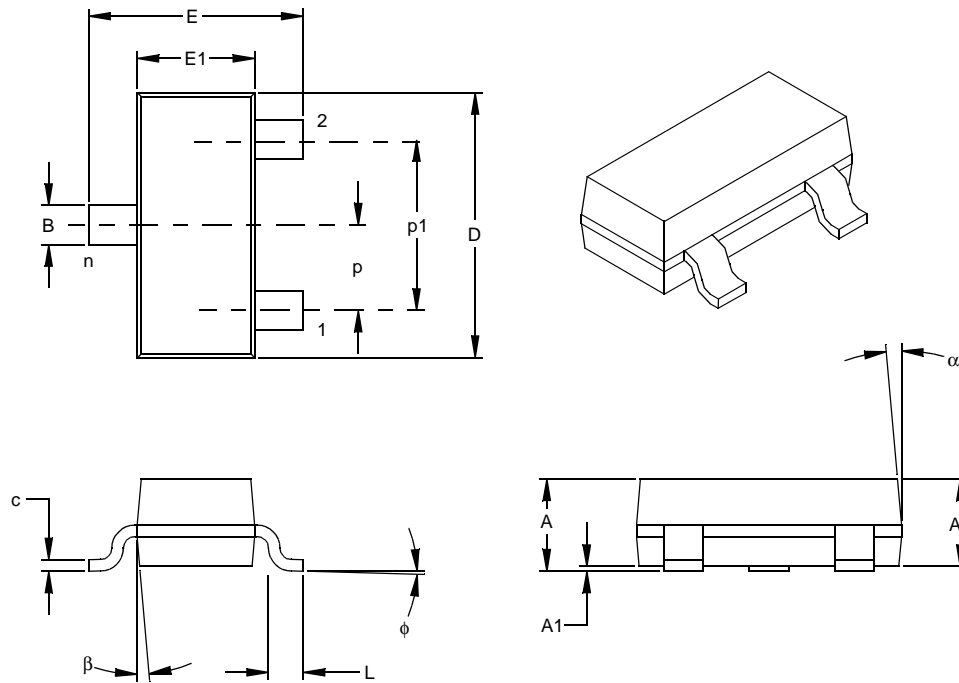
ELECTRICAL CHARACTERISTICS

V_{DD} = Full Range, T_A = Operating Temperature Range, unless otherwise noted. Typical values are at $T_A = +25^\circ\text{C}$, $V_{DD} = 5V$ for L/M/J, 3.3V for T/S, 3.0V for R and 2.5V for Z (Note 1).						
Parameter	Sym	Min	Typ	Max	Units	Test Conditions
V_{DD} Range		1.0	—	5.5	V	$T_A = 0^\circ\text{C}$ to $+70^\circ\text{C}$
		1.2	—	5.5		$T_A = -40^\circ\text{C}$ to $+125^\circ\text{C}$
Supply Current	I_{CC}	—	12	30	μA	TCM8xxL/M/J: $V_{DD} < 5.5V$
		—	9	25		TCM8xxR/S/T/Z: $V_{DD} < 3.6V$
Reset Threshold (Note 2)	V_{TH}	4.56	4.63	4.70	V	TCM8xxL: $T_A = +25^\circ\text{C}$
		4.50	—	4.75		$T_A = -40^\circ\text{C}$ to $+125^\circ\text{C}$
		4.31	4.38	4.45	V	TCM8xxM: $T_A = +25^\circ\text{C}$
		4.25	—	4.50	V	$T_A = -40^\circ\text{C}$ to $+125^\circ\text{C}$
		3.93	4.00	4.06	V	TCM809J: $T_A = +25^\circ\text{C}$
		3.89	—	4.10	V	$T_A = -40^\circ\text{C}$ to $+125^\circ\text{C}$
		3.04	3.08	3.11	V	TCM8xxT: $T_A = +25^\circ\text{C}$
		3.00	—	3.15	V	$T_A = -40^\circ\text{C}$ to $+125^\circ\text{C}$
		2.89	2.93	2.96	V	TCM8xxS: $T_A = +25^\circ\text{C}$
		2.85	—	3.00	V	$T_A = -40^\circ\text{C}$ to $+125^\circ\text{C}$
		2.59	2.63	2.66	V	TCM8xxR: $T_A = +25^\circ\text{C}$
		2.55	—	2.70	V	$T_A = -40^\circ\text{C}$ to $+125^\circ\text{C}$
		2.28	2.32	2.35	V	TCM8xxZ: $T_A = +25^\circ\text{C}$
		2.25	—	2.38	V	$T_A = -40^\circ\text{C}$ to $+125^\circ\text{C}$
Reset Threshold Tempco		—	30	—	ppm/ $^\circ\text{C}$	
V_{DD} to Reset Delay,		—	65	—	μsec	$V_{DD} = V_{TH}$ to ($V_{TH} - 100\text{ mV}$) (Note 2)
Reset Active Time Out Period		140	320	560	msec	
RESET Output Voltage Low (TCM809)	V_{OL}	—	—	0.3	V	TCM809R/S/T/Z: $V_{DD} = V_{TH}$ min, $I_{SINK} = 1.2\text{ mA}$
		—	—	0.4		TCM809L/M/J: $V_{DD} = V_{TH}$ min, $I_{SINK} = 3.2\text{ mA}$
		—	—	0.3		$V_{DD} > 1.0V$, $I_{SINK} = 50\ \mu\text{A}$
RESET Output Voltage High (TCM809)	V_{OH}	0.8 V_{DD}	—	—	V	TCM809R/S/T/Z: $V_{DD} > V_{TH}$ max, $I_{SOURCE} = 500\ \mu\text{A}$
		$V_{DD} - 1.5$	—	—		TCM809L/M/J: $V_{DD} > V_{TH}$ max, $I_{SOURCE} = 800\ \mu\text{A}$
RESET Output Voltage Low (TCM810)	V_{OL}	—	—	0.3	V	TCM810R/S/T/Z: $V_{DD} = V_{TH}$ max, $I_{SINK} = 1.2\text{ mA}$
		—	—	0.4		TCM810L/M: $V_{DD} = V_{TH}$ max, $I_{SINK} = 3.2\text{ mA}$
RESET Output Voltage High (TCM810)	V_{OH}	0.8 V_{DD}	—	—	V	$1.8 < V_{DD} < V_{TH}$ min, $I_{SOURCE} = 150\ \mu\text{A}$

- Note 1:** Production testing done at $T_A = +25^\circ\text{C}$, overtemperature limits ensured by QC screen.
Note 2: RESET output for **TCM809**, RESET output for **TCM810**.

TCM809/TCM810

3-Lead Plastic Small Outline Transistor (NB) (SOT-23)



Dimension Limits	Units	INCHES*			MILLIMETERS		
		MIN	NOM	MAX	MIN	NOM	MAX
Number of Pins	n		3			3	
Pitch	p		.038			0.96	
Outside lead pitch (basic)	p1		.076			1.92	
Overall Height	A	.035	.040	.044	0.89	1.01	1.12
Molded Package Thickness	A2	.035	.037	.040	0.88	0.95	1.02
Standoff §	A1	.000	.002	.004	0.01	0.06	0.10
Overall Width	E	.083	.093	.104	2.10	2.37	2.64
Molded Package Width	E1	.047	.051	.055	1.20	1.30	1.40
Overall Length	D	.110	.115	.120	2.80	2.92	3.04
Foot Length	L	.014	.018	.022	0.35	0.45	0.55
Foot Angle	φ	0	5	10	0	5	10
Lead Thickness	c	.004	.006	.007	0.09	0.14	0.18
Lead Width	B	.015	.017	.020	0.37	0.44	0.51
Mold Draft Angle Top	α	0	5	10	0	5	10
Mold Draft Angle Bottom	β	0	5	10	0	5	10

* Controlling Parameter
 § Significant Characteristic

Notes:

Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" (0.254mm) per side.
 JEDEC Equivalent: TO-236
 Drawing No. C04-104

TCM809/TCM810

5.2 Product Tape and Reel Specifications

FIGURE 5-1: EMBOSSED CARRIER DIMENSIONS (8, 12, 16 AND 24 MM TAPE ONLY)

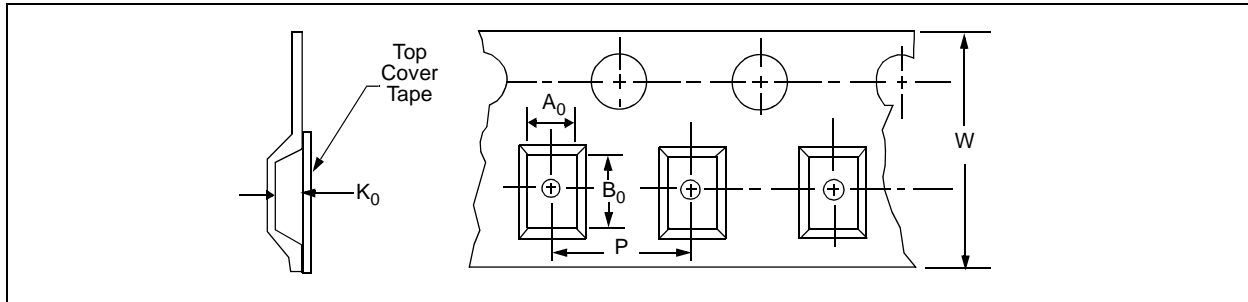
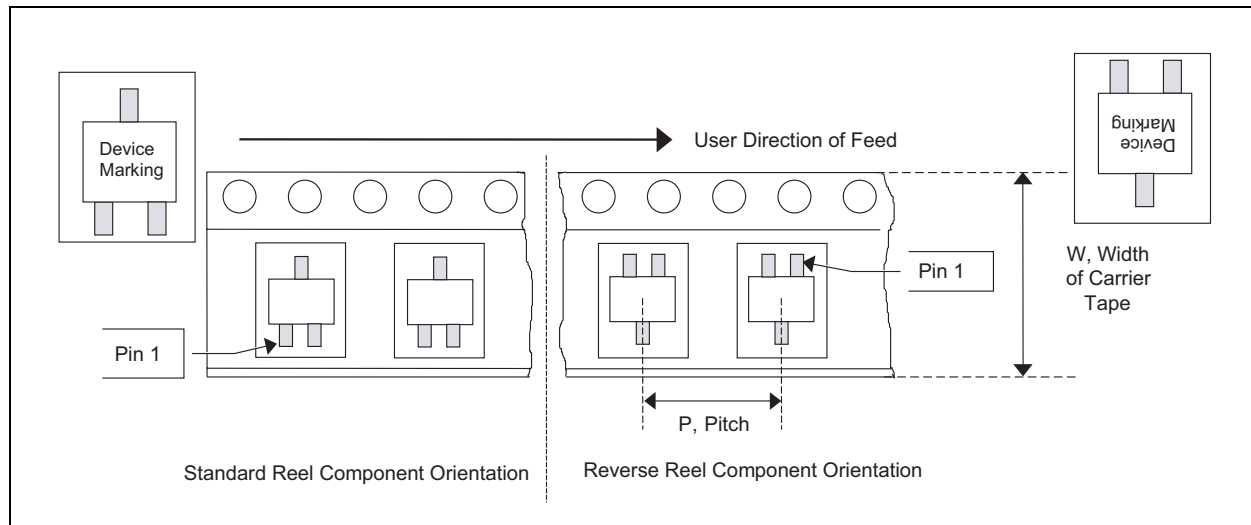


TABLE 1: CARRIER TAPE/CAVITY DIMENSIONS

Case Outline	Package Type		Carrier Dimensions		Cavity Dimensions			Output Quantity Units	Reel Diameter in mm
			W mm	P mm	A0 mm	B0 mm	K0 mm		
NB	SOT-23	3L	8	4	3.15	2.77	1.22	3000	180
LB	SC-70	3L	8	4	2.4	2.4	1.19	3000	180

FIGURE 5-2: 3-LEAD SOT-23/SC70 DEVICE TAPE AND REEL SPECIFICATIONS



PRODUCT IDENTIFICATION SYSTEM

To order or obtain information, e.g., on pricing or delivery, refer to the factory or the listed sales office.

<u>PART NO.</u>	<u>X</u>	<u>X</u>	<u>XXXXX</u>	Examples:
Device	V _{DD} Reset Threshold	Temperature Range	Package	
Device:	TCM809: Supervisor circuit with active-low $\overline{\text{RESET}}$ output TCM810: Supervisor circuit with active-high RESET output			a) TCM809LENB713: SOT-23B-3-TR, Microcontroller 4.63V Reset Monitor, -40°C to +85°C, Tape and Reel.
V _{DD} Reset Threshold:	L = 4.63V M = 4.38V J = 4.00V T = 3.08V S = 2.93V R = 2.63V Z = 2.32V			b) TCM809LVLB713: SC-70-3-TR, Microcontroller 4.63V Reset Monitor, -40°C to +125°C, Tape and Reel.
Temperature Range:	E = -40°C to +85°C V = -40°C to +125°C			c) TCM809LVNB713: SOT-23B-3-TR, Microcontroller 4.63V Reset Monitor, -40°C to +125°C, Tape and Reel.
Package:	NB713 = SOT-23B, 3-pin (Tape and Reel) LB713 = SC-70, 3-pin (Tape and Reel)			a) TCM810MENB713: SOT-23B-3-TR, Microcontroller 4.38V Reset Monitor, -40°C to +85°C, Tape and Reel.
				b) TCM810RVLB713: SOT-23B-3-TR, Microcontroller 2.63V Reset Monitor, -40°C to +125°C, Tape and Reel.
				c) TCM810TVLB713: SC-70-3-TR, Microcontroller 4.38V Reset Monitor, -40°C to +125°C, Tape and Reel.