

3-Pin Microcontroller Reset Monitors

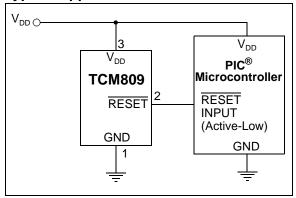
Features

- 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



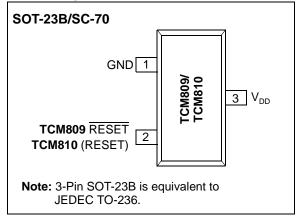
General Description

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 <u>RESET</u> output, while the TCM809 has an active-low <u>RESET</u> 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 μ A (typ., V_{DD} = 3.3V) make these devices suitable for battery-powered applications.

Pin Configurations



1.0 ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings†

Supply Voltage (V _{DD} to GND)6.0V
RESET, RESET0.3V to (V _{DD} +0.3V)
Input Current, V _{DD} 20 mA
Output Current, RESET, RESET
dV/dt (V _{DD})100V/µsec
Operating Temperature Range40°C to +125°C
Power Dissipation ($T_A = 70^{\circ}$ C):
3-Pin SOT-23B (derate 4 mW/°C above +70°C)
3-Pin SC-70 (derate 2.17 mW/°C above +70°C)174 mW
Storage Temperature Range65°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

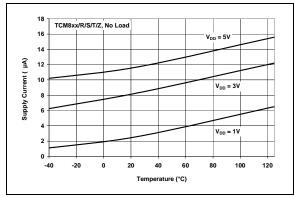
Parameter	Sym	Min	Тур	Max	Units	Test Conditions
V _{DD} Range		1.0	_	5.5	V	$T_A = 0^{\circ}C$ to +70°C
		1.2		5.5		$T_{A} = -40^{\circ}C \text{ to } +125^{\circ}C$
Supply Current	I _{CC}	_	12	30	μA	TCM8xx L/M/J: V _{DD} < 5.5V
		_	9	25		TCM8xx R/S/T/Z: V _{DD} < 3.6V
Reset Threshold (Note 2)	V _{TH}	4.56	4.63	4.70	V	TCM8xxL : $T_A = +25^{\circ}C$
		4.50	—	4.75		$T_A = -40^{\circ}C \text{ to } +125^{\circ}C$
		4.31	4.38	4.45	V	TCM8xx M: $T_A = +25^{\circ}C$
		4.25	—	4.50	V	$T_A = -40^{\circ}C \text{ to } +125^{\circ}C$
		3.93	4.00	4.06	V	TCM809 J: T _A = +25°C
		3.89	_	4.10	V	$T_A = -40^{\circ}C \text{ to } +125^{\circ}C$
		3.04	3.08	3.11	V	TCM8xx T: $T_A = +25^{\circ}C$
		3.00	_	3.15	V	$T_A = -40^{\circ}C \text{ to } +125^{\circ}C$
		2.89	2.93	2.96	V	TCM8xx S: $T_A = +25^{\circ}C$
		2.85	—	3.00	V	$T_A = -40^{\circ}C \text{ to } +125^{\circ}C$
		2.59	2.63	2.66	V	TCM8xx R: $T_A = +25^{\circ}C$
		2.55	_	2.70	V	$T_A = -40^{\circ}C \text{ to } +125^{\circ}C$
		2.28	2.32	2.35	V	TCM8xxZ : $T_A = +25^{\circ}C$
		2.25	—	2.38	V	$T_A = -40^{\circ}C \text{ to } +125^{\circ}C$
Reset Threshold Tempco		—	30	—	ppm/°C	
V _{DD} to Reset Delay,		—	65	_	µsec	$V_{DD} = V_{TH}$ to (V _{TH} – 100 mV) (Note 2)
Reset Active Time Out Period		140	320	560	msec	
RESET Output Voltage	V _{OL}	—		0.3	V	TCM809R/S/T/Z: V _{DD} = V _{TH} min, I _{SINK} = 1.2 mA
Low (TCM809)		_	_	0.4		TCM809L/M/J: V _{DD} = V _{TH} min, I _{SINK} = 3.2 mA
		_	_	0.3		V _{DD} > 1.0V, I _{SINK} = 50 μA
RESET Output Voltage	V _{OH}	0.8 V _{DD}			V	TCM809 R/S/T/Z: V _{DD} > V _{TH} max, I _{SOURCE} = 500 µ
High (TCM809)		V _{DD} – 1.5	_	—		TCM809 L/M/J: $V_{DD} > V_{TH} \max$, $I_{SOURCE} = 800 \mu$ A
RESET Output Voltage	V _{OL}	—	—	0.3	V	TCM810R/S/T/Z:V _{DD} = V _{TH} max, I _{SINK} = 1.2 mA
Low (TCM810)			_	0.4		TCM810 L/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, $I_{SOURCE} = 150 \ \mu A$

Note 1: <u>Production</u> testing done at $T_A = +25^{\circ}C$, overtemperature limits ensured by QC screen.

2: RESET output for TCM809, RESET output for TCM810.

2.0 TYPICAL PERFORMANCE CHARACTERISTICS

Note: The graphs and tables provided following this note are a statistical summary based on a limited number of samples and are provided for informational purposes only. The performance characteristics listed herein are not tested or guaranteed. In some graphs or tables, the data presented may be outside the specified operating range (e.g., outside specified power supply range) and therefore outside the warranted range.





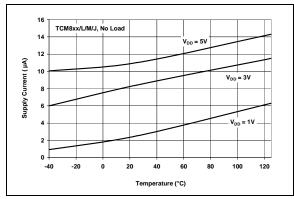


FIGURE 2-2: Supply Current vs. Temperature.

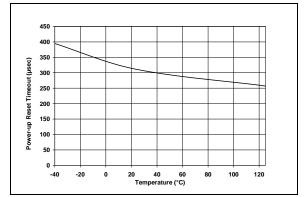


FIGURE 2-3: Power-up Reset Time Out vs. Temperature.

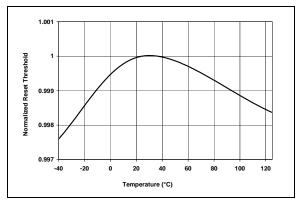


FIGURE 2-4: Normalized Reset Threshold vs. Temperature.

3.0 PIN DESCRIPTIONS

The descriptions of the pins are given in Table 3-1.

TABLE 3-1: PIN FUNCTION TABLE

NAME	FUNCTION
GND	Ground
RESET (TCM809)	RESET push-pull output
RESET (TCM810)	RESET push-pull output
V _{DD}	Supply voltage (+2.5V, +3.0V, +3.3V, +5.0V).

3.1 Ground (GND)

Ground terminal.

3.2 **RESET** Output (TCM809)

The $\overrightarrow{\text{RESET}}$ push-pull output remains low while V_{DD} is below the reset voltage threshold, and for 240 msec (140 msec min.) after V_{DD} rises above reset threshold.

3.3 RESET Output (TCM810)

The RESET push-pull output remains high while V_{DD} is below the reset voltage threshold, and for 240 msec (140 msec min.) after V_{DD} rises above reset threshold.

3.4 Supply Voltage (V_{DD})

 $V_{DD}\!\!:+\!2.5V\!,+\!3.0V\!,+\!3.3V$ and $+\!5.0V\!$

4.0 APPLICATIONS INFORMATION

4.1 V_{DD} Transient Rejection

The TCM809/TCM810 provides accurate V_{DD} monitoring and reset timing during power-up, power-down and brown-out/sag conditions. These devices also reject negative-going transients (glitches) on the power supply line. Figure 4-1 shows the maximum transient duration vs. maximum negative excursion (overdrive) for glitch rejection. Any combination of duration and overdrive that lies under the curve will not generate a reset signal.

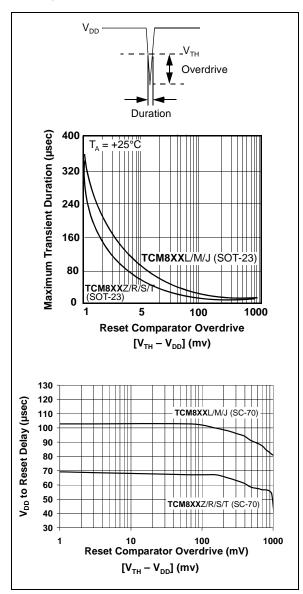


FIGURE 4-1: Maximum Transient Duration vs. Overdrive for Glitch Rejection at +25°C.

Combinations above the curve are detected as a brown-out or power-down condition. Transient immunity can be improved by adding a capacitor in close proximity to the V_{DD} pin of the TCM809/TCM810.

4.2 RESET Signal Integrity During Power-Down

The TCM809 RESET output is valid to $V_{DD} = 1.0V$. Below this voltage the output becomes an "open circuit" and does not sink current. This means CMOS logic inputs to the microcontroller will be floating at an undetermined voltage. Most digital systems are completely shut down well above this voltage. However, in situations where RESET must be maintained valid to $V_{DD} = 0V$, a pull-down resistor must be connected from RESET to ground to discharge stray capacitances and hold the output low (Figure 4-2). This resistor value, though not critical, should be chosen such that it does not appreciably load RESET under normal operation (100 k Ω will be suitable for most applications). Similarly, a pull-up resistor to V_{DD} is required for the TCM810 to ensure a valid high RESET for V_{DD} below 1.0V.

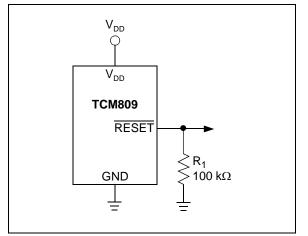


FIGURE 4-2: The addition of R_1 at the <u>RESET</u> output of the TCM809 ensures that the RESET output is valid to $V_{DD} = 0V$.

4.3 Controllers and Processors With Bidirectional I/O Pins

Some microcontrollers have bidirectional reset pins. Depending on the current drive capability of the controller pin, an indeterminate logic level may result if there is a logic conflict. This can be avoided by adding a 4.7 k Ω resistor in series with the output of the TCM809/TCM810 (Figure 4-3). If there are other components in the system that require a reset signal, they should be buffered so as not to load the reset line. If the other components are required to follow the reset I/O of the microcontroller, the buffer should be connected as shown with the solid line.

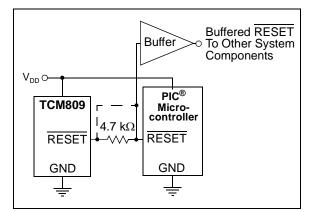
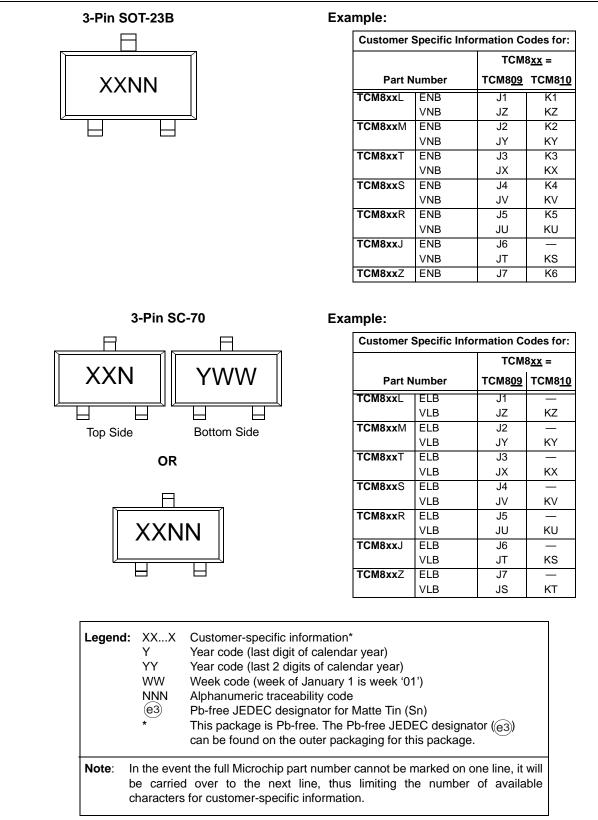


FIGURE 4-3: Interfacing the TCM809 to a Bidirectional RESET I/O.

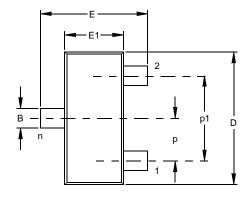
5.0 PACKAGING INFORMATION

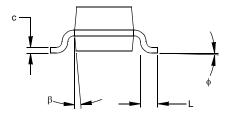
5.1 Package Marking Information

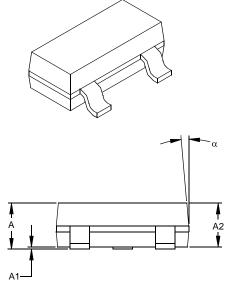


3-Lead Plastic Small Outline Transistor (NB) (SOT-23)

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging







MILLIMETERS			
NOM N	MAX		
3			
0.96			
1.92			
1.01	1.12		
0.95	1.02		
0.06	0.10		
2.37	2.64		
1.30	1.40		
2.92	3.04		
0.45	0.55		
5	10		
0.14	0.18		
0.44	0.51		
5	10		
5	10		
	0.44 5		

* Controlling Parameter

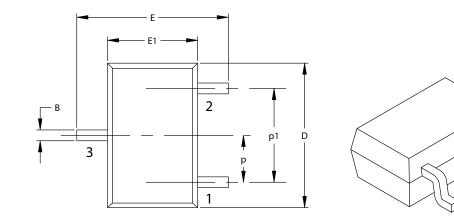
§ Significant Characteristic

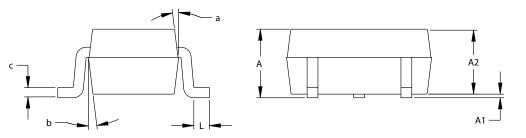
Notes:

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

3-Lead Plastic Small Outline Transistor (LB) (SC-70)

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging





	Units	INCH	IES	MILLIMETERS*		
Dimension Lim	its	MIN	MAX	MIN	MAX	
Number of Pins			3	3		
Pitch	р	.026 BS	SC.	0.65 BSC.		
Outside lead pitch (basic)	p1	.051 BS	.051 BSC.		1.30 BSC.	
Overall Height	Α	.031	.043	0.80	1.10	
Molded Package Thickness	A2	.031	.039	0.80	1.00	
Standoff	A1	.000	.0004	0.00	.010	
Overall Width	E	.071	.094	1.80	2.40	
Molded Package Width	E1	.045	.053	1.15	1.35	
Overall Length	D	.071	.089	1.80	2.25	
Foot Length	L	.004	.016	0.10	0.41	
Lead Thickness	с	.003	.010	0.08	0.25	
Lead Width	В	.006	.016	0.15	0.40	
Mold Draft Angle Top	а	8°	12°	8°	12°	
Mold Draft Angle Bottom	b	8°	12°	8°	12°	

*Controlling Parameter

Notes:

Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .005" (0.127mm) per side.

JEITA (EIAJ) Equivalent: SC70 Drawing No. C04-104

5.2 Product Tape and Reel Specifications

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

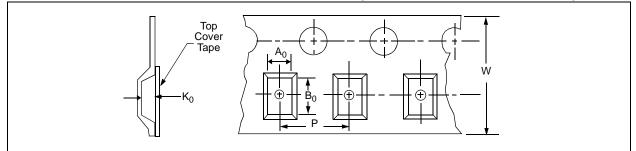
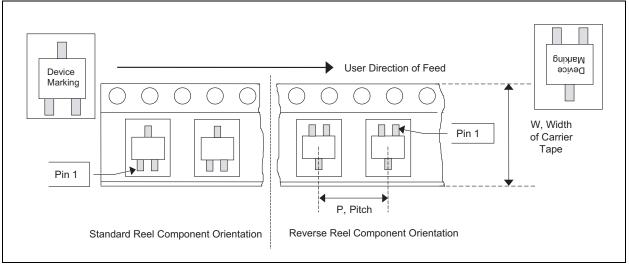


TABLE 1: CARRIER TAPE/CAVITY DIMENSIONS

Case	Case Package Outline Type		Carrier Dimensions		Cavity Dimensions			Output	Reel Diameter in
Outline			W mm	P mm	A0 mm	B0 mm	K0 mm	Quantity Units	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



APPENDIX A: REVISION HISTORY

Revision E (December 2012)

• Added a note to each package outline drawing.

Revision D (March 2005)

- Updated **6.0 "Packaging Information"** to include old and new packaging examples.
- Applied new template and rearranged sections to be consistent with current documentation.

Revision C (April 2004)

Revision B (January 2002)

Revision A (May 2001)

Initial release of data sheet.

NOTES:

PRODUCT IDENTIFICATION SYSTEM

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

PART NO.	<u>×</u>	<u>×</u>	<u>XXXXX</u>	Exa	amples:	
	│ V _{DD} Reset areshold	 Temperature Range	Package	a)	TCM809LENB713:	SOT-23B-3-TR, Microcontroller 4.63V Reset Monitor, -40°C to +85°C, Tape and Reel.
Device:	TCM810:	Supervisor circuit w	ith active-low RESET or ith active-low RESET or ith active-high RESET or ith active-high RESET or iteration of the second s		TCM809LVLB713:	SC-70-3-TR, Microcontroller 4.63V Reset Monitor, -40°C to +125°C, Tape and Reel.
V _{DD} Reset Threshold:		38V 00V 08V 93V 63V		c)	TCM809LVNB713:	SOT-23B-3-TR, Microcontroller 4.63V Reset Monitor, -40°C to +125°C, Tape and Reel.
Temperature Range:	E = -4	32V 0°C to +85°C 0°C to +125°C		a)	TCM810MENB713:	SOT-23B-3-TR, Microcontroller 4.38V Reset Monitor, -40°C to +85°C, Tape and Reel.
Package:		SOT-23B, 3-pin (Ta SC-70, 3-pin (Tape		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.

Sales and Support

Data Sheets

Products supported by a preliminary Data Sheet may have an errata sheet describing minor operational differences and recommended workarounds. To determine if an errata sheet exists for a particular device, please contact one of the following:

1. Your local Microchip sales office

2. The Microchip Worldwide Site (www.microchip.com)

Please specify which device, revision of silicon and Data Sheet (include Literature #) you are using.

Customer Notification System

Register on our web site (www.microchip.com) to receive the most current information on our products.

NOTES:

Note the following details of the code protection feature on Microchip devices:

- Microchip products meet the specification contained in their particular Microchip Data Sheet.
- Microchip believes that its family of products is one of the most secure families of its kind on the market today, when used in the intended manner and under normal conditions.
- There are dishonest and possibly illegal methods used to breach the code protection feature. All of these methods, to our knowledge, require using the Microchip products in a manner outside the operating specifications contained in Microchip's Data Sheets. Most likely, the person doing so is engaged in theft of intellectual property.
- Microchip is willing to work with the customer who is concerned about the integrity of their code.
- Neither Microchip nor any other semiconductor manufacturer can guarantee the security of their code. Code protection does not mean that we are guaranteeing the product as "unbreakable."

Code protection is constantly evolving. We at Microchip are committed to continuously improving the code protection features of our products. Attempts to break Microchip's code protection feature may be a violation of the Digital Millennium Copyright Act. If such acts allow unauthorized access to your software or other copyrighted work, you may have a right to sue for relief under that Act.

Information contained in this publication regarding device applications and the like is provided only for your convenience and may be superseded by updates. It is your responsibility to ensure that your application meets with your specifications. MICROCHIP MAKES NO REPRESENTATIONS OR WARRANTIES OF ANY KIND WHETHER EXPRESS OR IMPLIED, WRITTEN OR ORAL, STATUTORY OR OTHERWISE, RELATED TO THE INFORMATION, INCLUDING BUT NOT LIMITED TO ITS CONDITION, QUALITY, PERFORMANCE, MERCHANTABILITY OR FITNESS FOR PURPOSE. Microchip disclaims all liability arising from this information and its use. Use of Microchip devices in life support and/or safety applications is entirely at the buyer's risk, and the buyer agrees to defend, indemnify and hold harmless Microchip from any and all damages, claims, suits, or expenses resulting from such use. No licenses are conveyed, implicitly or otherwise, under any Microchip intellectual property rights.

QUALITY MANAGEMENT SYSTEM CERTIFIED BY DNV = ISO/TS 16949=

Trademarks

The Microchip name and logo, the Microchip logo, dsPIC, FlashFlex, KEELOQ, KEELOQ logo, MPLAB, PIC, PICmicro, PICSTART, PIC³² logo, rfPIC, SST, SST Logo, SuperFlash and UNI/O are registered trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

FilterLab, Hampshire, HI-TECH C, Linear Active Thermistor, MTP, SEEVAL and The Embedded Control Solutions Company are registered trademarks of Microchip Technology Incorporated in the U.S.A.

Silicon Storage Technology is a registered trademark of Microchip Technology Inc. in other countries.

Analog-for-the-Digital Age, Application Maestro, BodyCom, chipKIT, chipKIT logo, CodeGuard, dsPICDEM, dsPICDEM.net, dsPICworks, dsSPEAK, ECAN, ECONOMONITOR, FanSense, HI-TIDE, In-Circuit Serial Programming, ICSP, Mindi, MiWi, MPASM, MPF, MPLAB Certified logo, MPLIB, MPLINK, mTouch, Omniscient Code Generation, PICC, PICC-18, PICDEM, PICDEM.net, PICkit, PICtail, REAL ICE, rfLAB, Select Mode, SQI, Serial Quad I/O, Total Endurance, TSHARC, UniWinDriver, WiperLock, ZENA and Z-Scale are trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

SQTP is a service mark of Microchip Technology Incorporated in the U.S.A.

GestIC and ULPP are registered trademarks of Microchip Technology Germany II GmbH & Co. & KG, a subsidiary of Microchip Technology Inc., in other countries.

All other trademarks mentioned herein are property of their respective companies.

© 2001-2012, Microchip Technology Incorporated, Printed in the U.S.A., All Rights Reserved.

Rinted on recycled paper.

ISBN: 9781620768877

Microchip received ISO/TS-16949:2009 certification for its worldwide headquarters, design and wafer fabrication facilities in Chandler and Tempe, Arizona; Gresham, Oregon and design centers in California and India. The Company's quality system processes and procedures are for its PIC® MCUs and dsPIC® DSCs, KEELOQ® code hopping devices, Serial EEPROMs, microperipherals, nonvolatile memory and analog products. In addition, Microchip's quality system for the design and mulfacture of development systems is ISO 9001:2000 certified.



Worldwide Sales and Service

AMERICAS

Corporate Office 2355 West Chandler Blvd. Chandler, AZ 85224-6199 Tel: 480-792-7200 Fax: 480-792-7277 Technical Support: http://www.microchip.com/ support

Web Address: www.microchip.com

Atlanta Duluth, GA Tel: 678-957-9614 Fax: 678-957-1455

Boston Westborough, MA Tel: 774-760-0087 Fax: 774-760-0088

Chicago Itasca, IL Tel: 630-285-0071 Fax: 630-285-0075

Cleveland Independence, OH Tel: 216-447-0464 Fax: 216-447-0643

Dallas Addison, TX Tel: 972-818-7423 Fax: 972-818-2924

Detroit Farmington Hills, MI Tel: 248-538-2250 Fax: 248-538-2260

Indianapolis Noblesville, IN Tel: 317-773-8323 Fax: 317-773-5453

Los Angeles Mission Viejo, CA Tel: 949-462-9523 Fax: 949-462-9608

Santa Clara Santa Clara, CA Tel: 408-961-6444 Fax: 408-961-6445

Toronto Mississauga, Ontario, Canada Tel: 905-673-0699 Fax: 905-673-6509

ASIA/PACIFIC

Asia Pacific Office Suites 3707-14, 37th Floor Tower 6, The Gateway Harbour City, Kowloon Hong Kong Tel: 852-2401-1200 Fax: 852-2401-3431 Australia - Sydney

Tel: 61-2-9868-6733 Fax: 61-2-9868-6755

China - Beijing Tel: 86-10-8569-7000 Fax: 86-10-8528-2104

China - Chengdu Tel: 86-28-8665-5511 Fax: 86-28-8665-7889

China - Chongqing Tel: 86-23-8980-9588 Fax: 86-23-8980-9500

China - Hangzhou Tel: 86-571-2819-3187 Fax: 86-571-2819-3189

China - Hong Kong SAR Tel: 852-2943-5100

Fax: 852-2401-3431 China - Nanjing

Tel: 86-25-8473-2460 Fax: 86-25-8473-2470 **China - Qingdao** Tel: 86-532-8502-7355 Fax: 86-532-8502-7205

China - Shanghai Tel: 86-21-5407-5533 Fax: 86-21-5407-5066

China - Shenyang Tel: 86-24-2334-2829 Fax: 86-24-2334-2393

China - Shenzhen Tel: 86-755-8864-2200 Fax: 86-755-8203-1760

China - Wuhan Tel: 86-27-5980-5300 Fax: 86-27-5980-5118

China - Xian Tel: 86-29-8833-7252 Fax: 86-29-8833-7256

China - Xiamen Tel: 86-592-2388138 Fax: 86-592-2388130

China - Zhuhai Tel: 86-756-3210040 Fax: 86-756-3210049

ASIA/PACIFIC

India - Bangalore Tel: 91-80-3090-4444 Fax: 91-80-3090-4123

India - New Delhi Tel: 91-11-4160-8631 Fax: 91-11-4160-8632

India - Pune Tel: 91-20-2566-1512 Fax: 91-20-2566-1513

Japan - Osaka Tel: 81-6-6152-7160 Fax: 81-6-6152-9310

Japan - Tokyo Tel: 81-3-6880- 3770 Fax: 81-3-6880-3771

Korea - Daegu Tel: 82-53-744-4301 Fax: 82-53-744-4302

Korea - Seoul Tel: 82-2-554-7200 Fax: 82-2-558-5932 or 82-2-558-5934

Malaysia - Kuala Lumpur Tel: 60-3-6201-9857 Fax: 60-3-6201-9859

Malaysia - Penang Tel: 60-4-227-8870 Fax: 60-4-227-4068

Philippines - Manila Tel: 63-2-634-9065 Fax: 63-2-634-9069

Singapore Tel: 65-6334-8870 Fax: 65-6334-8850

Taiwan - Hsin Chu Tel: 886-3-5778-366 Fax: 886-3-5770-955

Taiwan - Kaohsiung Tel: 886-7-213-7828 Fax: 886-7-330-9305

Taiwan - Taipei Tel: 886-2-2508-8600 Fax: 886-2-2508-0102

Thailand - Bangkok Tel: 66-2-694-1351 Fax: 66-2-694-1350

EUROPE

Austria - Wels Tel: 43-7242-2244-39 Fax: 43-7242-2244-393 Denmark - Copenhagen Tel: 45-4450-2828 Fax: 45-4485-2829

France - Paris Tel: 33-1-69-53-63-20 Fax: 33-1-69-30-90-79

Germany - Munich Tel: 49-89-627-144-0 Fax: 49-89-627-144-44

Italy - Milan Tel: 39-0331-742611 Fax: 39-0331-466781

Netherlands - Drunen Tel: 31-416-690399 Fax: 31-416-690340

Spain - Madrid Tel: 34-91-708-08-90 Fax: 34-91-708-08-91

UK - Wokingham Tel: 44-118-921-5869 Fax: 44-118-921-5820

11/29/12

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

Microchip: TCM809ZENB713