

MEC1308

Keyboard and Embedded Controller for Notebook PC

Features

- 3.3V Operation with 5V Tolerant Buffers on PS/2 pins
- ACPI 1.0/2.0 PC99/PC2001 Compliant
- LPC Interface with Clock Run Support
 - Serial IRQ Interface Compatible with Serialized IRQ Support for PCI Systems
 - 15 Direct IRQs
 - ACPI SCI Interface
 - nSMI output and supporting PM registers
 - Shadowed write only registers
- Internal 64K SRAM
 - Loaded at VCC1 power from the HOST/8051 SPI Memory Interface
 - Provides 64KB of 8051 program space
 - 32k-Byte region shared with 8051data space
- HOST/8051 SPI Memory Interface
 - 3-pin Full Duplex serial communication interface.
 - Two Chip Select Pins
 - Fully 8051 Controlled
 - Hardware Support for two SPI Flash Configurations:
 - Switched SPI Flash Configuration
 - Parallel Shared SPI Flash Configuration
- Two Power Planes
 - Low Standby Current in Sleep Mode
- ACPI Embedded Controller Interface
- Configuration Register Set Compatible with ISA Plug-and-Play Standard (Version 1.0a)
- High-Performance Embedded 8051 Keyboard and System Controller
 - Provides System Power Management
 - System Watch Dog Timer (WDT)
 - 8042 Style Host Interface
 - Supports Interrupt and Polling Access
 - 1024 Boot /ROM
 - 256 Bytes Data RAM
 - On-Chip Memory-Mapped Control Registers
 - Access to VCC0 Backed Registers
 - Up to 18x8 Keyboard Scan Matrix
 - Two 16-Bit Timer/Counters
 - Integrated Full-Duplex Serial Port Interface
 - Seventy-Three 8051 Interrupt Sources

- Thirty-Two 8-Bit, Host/8051 Mailbox Registers
- Sixty-Four Maskable Hardware Wake-Up Events
- Fast GATEA20
- Fast CPU_RESET
- Multiple Clock Sources and Operating Frequencies
- IDLE and SLEEP Modes
- Accurate Fail-Safe Ring Oscillator
 - Single Clock source for most 8051 and SIO functions
 - Provides 2% frequency accuracy
 - Lock Bit provides status
- Integrated Standby Power Reset Generator
 - VCC1_RST# output
- VCC0 Backed Resources
 - 16 Byte VCC0 Backed Registers
 - VCC0 Backed Status Register
 - 32.768KHz-input clock
 - <2µA Standby Current (typ)
- Two 8584-Style I²C/SMBus Controllers
 - 8051 Controlled Logic Allows I²C/SMBus Master or Slave Operation
 - I²C/SMBus Controllers are Fully Operational on Standby Power
 - 2 Sets of Dedicated Pins per I²C/SMBus Controller
- Four independent Hardware Driven PS/2 Ports
- 48 General Purpose I/O Pins
 - Maskable Hardware Wake-Event Capable
 - Programmable Open-Drain/Push-Pull Outputs
- 7 General-Purpose Outputs
- Four Programmable Pulse-Width Modulator Outputs
 - Independent Clock Rates
 - 6-Bit Duty Cycle Granularity
 - Operational in both Full on and Standby modes
- Consumer Infrared Receiver for Vista (CIRV)
 - Consumer Infrared Remote Control Receiver Interface
 - Support of all common CIR formats in S0 power state, per Vista standard mechanism.

- Hardware matching of Microsoft Remote input frames, with PME Wake (S3/S4/S5 power states).
- Programmable High-Speed Synchronous Communications Engine (SCE) with a 32-Byte FIFO and Programmable Threshold
- LED Control for Activity Indication
- Dual Fan Tachometer Inputs
- Debug Port (UART)
 - High-Speed 16550A-Compatible UART with 16-Byte Send/Receive FIFOs
 - Programmable Baud Rate Generator
 - Relocatable to 480 Different Base I/O Addresses
 - 15 IRQ Options
- BC-Link Interconnection Bus
 - Combined High Speed/Low Speed Bus Master Controller
- General Purpose Analog to Digital Converter (GP-ADC)
 - 10-bit conversion precision
 - 10-bit conversion per channel is completed in 10.91us
 - 4 ADC general purpose channels
 - Channel 0 has a 5 volt tolerant input
 - 10-bit Conversion with 3.22 mV resolution
 - 0 to 3.3 VDC Conversion Range
 - Channel 1, 2, & 3 has a 3.3 volt tolerant input with a 10-bit, 3.22 mV resolution
 - Optional continuous sampling at a programmable rate
 - Integral Non-Linearity of ±0.5 LSB; Dynamic Non-Linearity of ±0.5 LSB

Description

The MEC1308 is a 128-pin 3.3V LPC-based ACPI 2.0 and PC99/PC2001 compliant Notebook I/O Controller. See Figure 1, "MEC1308 Block Diagram".

The MEC1308 incorporates a high-performance 8051based keyboard and system controller with internal 64k byte RAM; a 1K byte Boot ROM, and 16-bytes battery backed registers. The 64K RAM is loaded via HOST/ 8051 SPI Memory Interface. The HOST/8051 SPI Memory Interface can be configured in Switched SPI Flash Configuration or Parallel Shared SPI Flash Configuration.

The MEC1308 has four PS/2 ports; an 16C550A-compatible 2 pin UART for Debug Port; a Consumer Infrared Receiver for Vista (CIRV), two 8584-style I²C/ SMBus controllers with two selectable ports per controller; a Serial IRQ peripheral agent interface; an ACPI Embedded Controller Interface; forty-eight General Purpose I/O pins and seven General Purpose Outputs; four independently programmable pulse width modulators; dual fan control through the implementation of two fan tachometer input pins; hardware monitoring of a PWM input and maskable hardware wake-up events; one BC-Link Combined High Speed/Low Speed Bus Master Controller; 4 channel Analog to Digital Converter.

The MEC1308 has two separate power planes to provide "instant on" and system power management functions. Additionally, the MEC1308 incorporates sophisticated power control circuitry (PCC). The PCC supports multiple low power down modes. Wake-up events and ACPI-related functions are supported through the SCI Interface.

The MEC1308 supports the ISA Plug-and-Play Standard (Version 1.0a) and provides all the functionality for current Windows O/S's. The I/O Address and Hardware IRQ of each logical device in the MEC1308 may be reprogrammed through the internal configuration registers. There are 480 I/O address location options and 15 IRQs for each logical device.

TO OUR VALUED CUSTOMERS

It is our intention to provide our valued customers with the best documentation possible to ensure successful use of your Microchip products. To this end, we will continue to improve our publications to better suit your needs. Our publications will be refined and enhanced as new volumes and updates are introduced.

If you have any questions or comments regarding this publication, please contact the Marketing Communications Department via E-mail at docerrors@microchip.com. We welcome your feedback.

Most Current Data Sheet

To obtain the most up-to-date version of this data sheet, please register at our Worldwide Web site at:

http://www.microchip.com

You can determine the version of a data sheet by examining its literature number found on the bottom outside corner of any page. The last character of the literature number is the version number, (e.g., DS30000000A is version A of document DS30000000).

Errata

An errata sheet, describing minor operational differences from the data sheet and recommended workarounds, may exist for current devices. As device/documentation issues become known to us, we will publish an errata sheet. The errata will specify the revision of silicon and revision of document to which it applies.

To determine if an errata sheet exists for a particular device, please check with one of the following:

- Microchip's Worldwide Web site; http://www.microchip.com
- Your local Microchip sales office (see last page)

When contacting a sales office, please specify which device, revision of silicon and data sheet (include -literature number) you are using.

Customer Notification System

Register on our web site at www.microchip.com to receive the most current information on all of our products.

BLOCK DIAGRAM

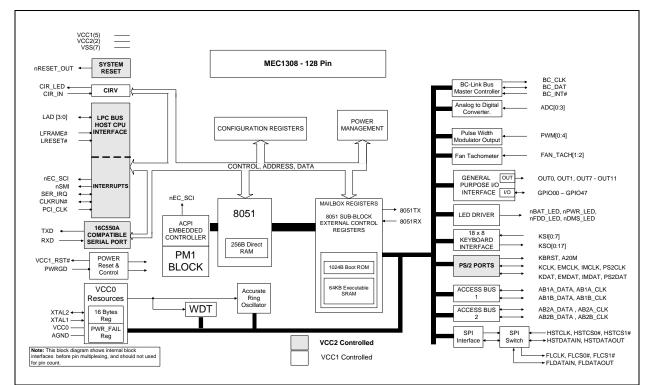


FIGURE 1: MEC1308 BLOCK DIAGRAM

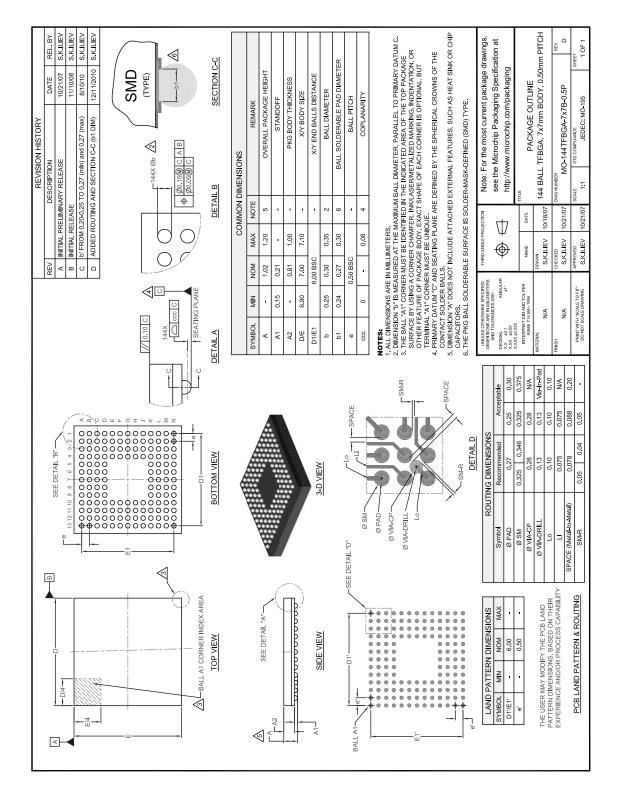
PACKAGE OUTLINES

REVISION HISTORY DESCRIPTION DATE RELEASE BY BY OF MO SPEC OF MO SPEC CHANGES - IN FRONT PAGE 122804 S.K.LILEV	NSIONS	IE REMARK	OVERALL PACKAGE HEIGHT		8		"X"/"Y" BODY SIZE	LEAD FOOT LENGTH	_		LEAD FOOT THICKNESS		LEAD SHOULDER RADIUS	LEAD FOOT RADIUS	COPLANARITY	NOTES: 1. ALL DIMENSIONS ARE IN MILLIMETER. 2. TRUE POSTTOTO SAFE IN MILLIMETER. 2. DIMENSIONS OF SAFE DOLERANCE OF EACH LEAD IS ± 0.036mm MAXIMUM. 2. DIRENSIONS OF AND "ET" DO NOT TOLUDE MOLD PROTRUSIONS. MAXIMUM ALLOWED PROTRUSION IS 0.25 mm PER SIDE. PROTRUSION IS 0.25 mm PER SIDE. NORCATED. NDICATED. NDICATED.	Note: For the most current package drawings, see the Microchip Packaging Specification at http://www.microchip.com/packaging	пе РАСКАGE OUTLINE 128 VTQFP-14X14X1.0mm BODY, 0.4mm PITCH	ER MO-128-VTQFP-14x14x1.0 C T STD COMPLIANCE SHEET
DESID DESID	COMMON DIMENSIONS	MAX NOTE	1.20 -	0.15 -	1.05 -	16.20 -	14.20 3	0.75 4	1	0.23 2	0.20	'		0.20	0.08	OF EACH I CLUDE MC SAUGE PL TIONAL BL		F	04 DWG NUMBER 054 DWG NUMBER
	COMI		7	ō				_	EF	_		sc	-	3		LIMETER. DLERANCE DO NOT IN ER SIDE. ED AT THE (ER ARE OP"		ME DATE LIEV 12/17/04	1 1
C LEEN		MON	T	I	I	I	14.00	0.60	1.00 REF	0.18	I	0.40 BSC	1	ı	1	ARE IN MIL SPREAD TC AND "E1" I AND "E1" I MEASURE IDENTIFIE	<u> </u>	R NAME DRAWN S.K.ILIEV	o ∢
		MIN	T	0.05	0.95	15.80	13.80	0.45		0.13	0.09		0.08	0.08	ı	MENSIONS POSITION S SIONS "D1' RUSION IS (SION "L" IS SION "L" IS S ON PIN 1	UNLESS OTHERWASE SPECIFIED DMENSIONS ARE IN MILLIMETERS AND TOLERANCES ARE: DECIMAL ANGULAR XXX ±0.1 ±1° XXX ±0.5	INTERPRET DIM AND TOL PER ASME Y14.3M - 1994 FERIAL N/A	N/A
GAUGE PLANE 		SYMBOL	A	A1	A2	D/E	D1/E1	_	5	q	U	e	R	R2	222	NOTES 1 ALL DIN 2 TRUE F 3 DIMEN PROTF 5 DETAIL 1 NDICA	UNLESS OTH DIMENSIONS / AND TOLE XX ±0.1 XX ±0.1 XXX ±0.05	A JOON BUILDER	FINISH
													- 						

FIGURE 2: 128-PIN VTQFP PACKAGE

MEC1308





APPENDIX A: PRODUCT BRIEF REVISION HISTORY

TABLE A-1: REVISION HISTORY

Revision	Section/Figure/Entry	Correction
DS00001753A (05-21-14)	Document release	

THE MICROCHIP WEB SITE

Microchip provides online support via our WWW site at www.microchip.com. This web site is used as a means to make files and information easily available to customers. Accessible by using your favorite Internet browser, the web site contains the following information:

- **Product Support** Data sheets and errata, application notes and sample programs, design resources, user's guides and hardware support documents, latest software releases and archived software
- General Technical Support Frequently Asked Questions (FAQ), technical support requests, online discussion groups, Microchip consultant program member listing
- Business of Microchip Product selector and ordering guides, latest Microchip press releases, listing of seminars and events, listings of Microchip sales offices, distributors and factory representatives

CUSTOMER CHANGE NOTIFICATION SERVICE

Microchip's customer notification service helps keep customers current on Microchip products. Subscribers will receive e-mail notification whenever there are changes, updates, revisions or errata related to a specified product family or development tool of interest.

To register, access the Microchip web site at www.microchip.com. Under "Support", click on "Customer Change Notification" and follow the registration instructions.

CUSTOMER SUPPORT

Users of Microchip products can receive assistance through several channels:

- Distributor or Representative
- Local Sales Office
- Field Application Engineer (FAE)
- Technical Support

Customers should contact their distributor, representative or field application engineer (FAE) for support. Local sales offices are also available to help customers. A listing of sales offices and locations is included in the back of this document.

Technical support is available through the web site at: http://www.microchip.com/support

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 Device	. [X] - XXX - [X] ⁽¹⁾ │ │ │ │ Temperature Package Tape and Reel Range Option	Examples: a) MEC1308-NU for 128-pin VTQFP RoHS Compliant package b) MEC1308-PZV for 144 ball TFBGA
Device:	MEC1308	(7mm x 7mm) RoHS Compliant package
Temperature Range:	Blank = 0° C to +85°C (Extended Commercial) i = -40°C to +85°C (Industrial)	
Package:	NU = 128-pin VTQFP PZV = 144 ball TFBGA	
Tape and Reel Option:	Blank = Standard packaging (tray) TR = Tape and Reel ⁽¹⁾	Note 1: Tape and Reel identifier only appears in the catalog part number description. This identifier is used for ordering purposes and is not printed on the device package. Check with your Microchip Sales Office for package availability with the Tape and Reel option. Reel size is 4,000.

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.

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.

flexPWR, JukeBlox, Kleer, KleerNet, MediaLB, and MOST

The preceding is a non-exhaustive list of trademarks in use in the US and other countries. For a complete list of trademarks, email a request to legal.department@microchip.com. The absence of a trademark (name, logo, etc.) from the list does not constitute a waiver of any intellectual property rights that SMSC has established in any of its trademarks.

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

© 2014, Microchip Technology Incorporated, Printed in the U.S.A., All Rights Reserved.

ISBN: 9781632762368

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

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

Austin, TX Tel: 512-257-3370

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 Novi, MI Tel: 248-848-4000

Houston, TX Tel: 281-894-5983

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

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

New York, NY Tel: 631-435-6000

San Jose, CA Tel: 408-735-9110

Canada - Toronto 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: 852-2943-5100 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: 86-571-8792-8115 Fax: 86-571-8792-8116

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: 91-20-3019-1500

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: 886-7-213-7830

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 - Dusseldorf

Tel: 49-2129-3766400 Germany - Munich Tel: 49-89-627-144-0 Fax: 49-89-627-144-44

Germany - Pforzheim Tel: 49-7231-424750

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

Italy - Venice Tel: 39-049-7625286

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

Poland - Warsaw Tel: 48-22-3325737

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

Sweden - Stockholm Tel: 46-8-5090-4654

UK - Wokingham Tel: 44-118-921-5800 Fax: 44-118-921-5820

03/25/14

Mouser Electronics

Authorized Distributor

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

Microchip: MEC1308-NU