Freescale Semiconductor, Inc.

A FLASH MCU SOLUTION

68HC908AZ60A
8-bit Microcontroller

MOTOROLA
intelligence everywhere

digital dna

TARGET APPLICATIONS

- Automotive applications
- Industrial controls
- Medical electronics
- Sensors/measurement devices

A highly integrated, high-performance microcontroller with integrated controller area network (CAN), the 68HC908AZ60A creates new opportunities for cost-effective product design. The 68HC908AZ60A uses the proven 68HC08 architecture and embedded FLASH memory for enhanced speed, power and functionality. Upwardly compatible with 68HC05 architecture, this microcontroller family reduces operating and programming costs through low-power usage and by eliminating the need for external serial EEPROM. Features include an analog-to-digital converter (ADC), Motorola scalable controller area network (msCAN), synchronous serial peripheral interface (SPI), asynchronous serial communications interface (SCI) and keyboard interrupts (KBI).

HC08 CPU	KBI
60K Flash	15-ch 8-bit ADC
2K RAM	SCI
1K EEPROM	SPI
CAN 2.0a/2.0b	6-ch + 2-ch 16-Bit Timer
LVI	50 GPIO
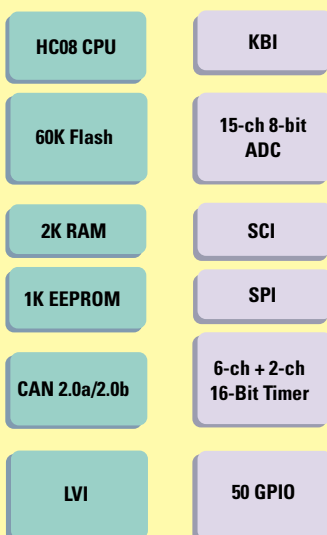
FEATURES	BENEFITS

HIGH-PERFORMANCE 68HC08 CPU CORE

- 8 MHz bus operation at 5V operation for 125 nsec minimum instruction cycle time
- Efficient instruction set including multiply and divide
- 16 flexible addressing modes including stack relative with 16-bit stack pointer
- Fully static low-voltage, low-power design with wait and stop modes

- Object code compatible with the 68HC05
- Easy to learn and use architecture
- C optimized architecture provides compact code

INTEGRATED SECOND GENERATION FLASH MEMORY

- In-application re-programmable
- Extremely fast programming, encoding 64 bytes in as fast as 2 msec
- FLASH programming across the 68HC08's full operating supply voltage with no extra programming voltage
- 10K write/erase cycles minimum over temperature
- Flexible block protection and security

- Cost-effective programming changes and field software upgrades via in-application programmability and re-programmability
- Reduces production programming costs through ultra-fast programming
- Byte-writable for data as well as program memory
- Protects code from unauthorized reading and to guard against unintentional erasing/writing of user-programmable segments of code

INTEGRATED EEPROM

- Byte erasable

8-BIT ANALOG-TO-DIGITAL CONVERTER

- 15 channels
- Single conversion in 17 μsec

- Fast, easy conversion from analog inputs like temperature, pressure and fluid levels to digital values for CPU processing

CLOCK GENERATION MODULE WITH PLL

- Programmable clock frequency in integer multiples of external crystal reference
- Crystal reference of 1 MHz to 16 MHz
- External clock option with or without PLL

- Provides high performance using low-cost, low-frequency reference crystals
- Reduces generated noise while still providing high performance (up to 32 MHz internal clock)

EIGHT PROGRAMMABLE 16-BIT TIMER CHANNELS

- 125 nsec resolution at 8 MHz bus
- Free-running counter or modulo up-counter

- Each channel independently programmable for input capture, output compare or unbuffered PWM
- Pairing timer channels provides a buffered PWM function

Freescale Semiconductor, Inc. *(vertical, left margin)*

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68HC908AZ60A

PART NUMBER	DESCRIPTION	RESALE*
EASY-TO-ORDER DEVELOPMENT TOOL KITS		
M68ICS08ASAZ	Programmer/in-circuit debug kit	$295
KITMMEVS08ASAZ	Cost-effective real-time in-circuit emulator kit	$1450
KITMMDS08ASAZ	High-performance real-time in-circuit emulator kit	$3950
INDIVIDUAL DEVELOPMENT TOOL COMPONENTS		
M68MMDS0508	High-performance MMDS0508 emulator system	$2950
M68MMPFB0508	Cost-effective MMEVS modular evaluation system	$395
M68EM08AS/AZ60A	Emulation module daughter board	$495
M68CBL05C	Low-noise flex cable	$120
X68TC08AX48FU64	64-Lead QFP target head adapter	$250
M68TQS064SAG1	64-Lead TQ socket with guides	$50
M68TQP064SA1	64-Lead TQPACK	$70

APPLICATION NOTES

- AN1828/D FLASH Programming Via CAN
- AN1798/D CAN Bit Timing Requirements
- AN2093/D Creating Efficient C Code for the MC68HC08
- AN1752/D Data Structures for 8-Bit MCUs
- AN1219/D M68HC08 Integer Math Routines
- AN1218/D HC05 to HC08 Optimization
- AN1837/D Non-Volatile Memory Technology Review
- AN1705/D Noise Reduction Techniques for MCU-Based Systems
- AN1259/D System Design and Layout Techniques for Noise Reduction in MCU-Based Systems
- AN1263/D Designing for Electromagnetic Compatibility with Single-Chip Microcontrollers
- AN1050/D Designing for Electromagnetic Compatibility (EMC) with HCMOS Microcontrollers
- AN1705/D Noise Reduction Techniques for Microcontroller-Based Systems

And many more—see our Web site at http://www.motorola.com/mcu

FEATURES	BENEFITS

PERIODIC INTERRUPT TIMER

	• Provides periodic interrupts

SERIAL COMMUNICATIONS INTERFACE

• UART asynchronous communications system • Flexible baud rate generator • Double buffered transmit and receive • Optional hardware parity checking and generation	• Asynchronous communication between the MCU and a terminal, computer or a network of microcontrollers

SERIAL PERIPHERAL INTERFACE

• Full-duplex 3-wire synchronous transfers • Maximum master bit rate of 4 MHz for 8 MHz system clock	• High-speed synchronous communication between multiple MCUs or between MCU and serial peripherals • Cost-effective serial peripheral expansion to EEPROM, high precision A/D and D/A converters, real-time clocks, etc.

COMPUTER OPERATING PROPERLY WATCHDOG TIMER

	• Provides system protection in the event of runaway code by resetting the MCU to a known state

LOW-VOLTAGE INHIBIT

|	
	• Improves reliability by resetting the MCU when voltage drops below trip point • Integration reduces system cost

UP TO 51 BIDIRECTIONAL INPUT/OUTPUT (I/O) LINES

• 10 mA sink/source capability on all I/O pins • Keyboard scan with selectable interrupts on five I/O pins	• High-current capable I/O allows direct drive of LED and other circuits to eliminate external drivers and reduce system costs • Keyboard scan with programmable pullups eliminates external glue logic when interfacing to simple keypads

PACKAGE OPTIONS

PART NUMBER	PACKAGE	TEMPERATURE RANGE
MC908AZ60ACFU	64 QFP	-40 to 85°C
MC908AZ60AVFU	64 QFP	-40 to 105°C
MC908AZ60AMFU	64 QFP	-40 to 125°C

SAMPLE PACKS	PACKAGE	TEMPERATURE RANGE
KMC908AZ60ACFU	64 QFP	-40 to 85°C

64-Lead QFP
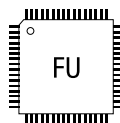
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* All prices are manufacturer's suggested resale for North America.