A FLASH MCU SOLUTION

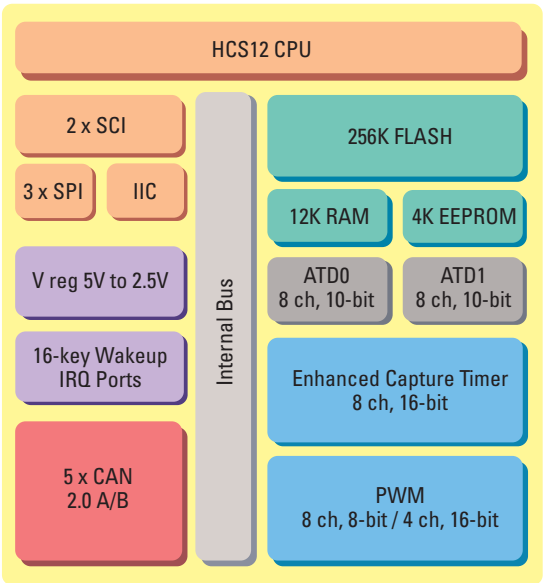
MC9S12DP256

16-bit Microcontroller

TARGET APPLICATIONS

- Automotive Applications
- Industrial Control

The HCS12 Family of microcontrollers is the next generation of the highly successful 68HC12 architecture. Utilizing Motorola's industry-leading 0.25µ FLASH, the DP256 is part of a pin-compatible family that is planned to scale from 32 Kbytes to 512 Kbytes of FLASH memory. The DP256 provides an upward migration path from Motorola's 68HC08, 68HC11 and 68HC12 architectures for applications that need larger memory, more peripherals and higher performance. Also, with the increasing number of CAN-based ECUs, its multiple network modules support this environment by enabling highly efficient communications between different network buses.



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FEATURES	*BENEFITS*

HIGH-PERFORMANCE 16-BIT HCS12 CPU CORE

- 25 MHz bus operation at 5V for 40 nsec minimum instruction cycle time
- Opcode compatible with the 68HC11 and 68HC12
- C optimized architecture produces extremely compact code

ON-CHIP DEBUG INTERFACE

- Dedicated serial debug interface
- On-chip breakpoints
- Real-time in-circuit emulation and debug without expensive and cumbersome "box" emulators
- Read/write memory and registers while running at full speed

NETWORK MODULES

- Five msCAN Modules implementing the CAN 2.0 A/B protocol
  - Five receive buffers per module with FIFO storage scheme
  - Three transmit buffers per module with internal prioritization
- Ability to link modules for higher buffer count
- Programmable bit rate up to 1 Mbps
- FIFO receive approach superior for event-driven networks

INTEGRATED THIRD-GENERATION FLASH MEMORY

- In-application re-programmable
- Self-timed, fast programming
  - Fast FLASH Page Erase – 20 msec (512 Bytes)
  - Can program 16 bits in 20 µsec while in burst mode
- 5V FLASH program/erase/read
- FLASH Granularity – 512 byte FLASH erase / 2 byte FLASH program
- Four independently programmable FLASH arrays
- Flexible block protection and security
- Flexibility to change code in the field
- Efficient end-of-line programming
- Total program time for 256 Kbyte code is less than 10 sec
- Reduces production programming cost through ultra-fast programming
- No external high voltage or charge pump required
- Virtual EEPROM implementation, FLASH array usable for EE extension
- Can erase one array while executing code from another

4 KBYTES INTEGRATED EEPROM

- Flexible protection scheme for protection against accidental program or erase
- EEPROM can be programmed in 46 µsec
- Can erase 4 bytes at a time and program 2 bytes at a time for calibration, security, personality and diagnostic information

10-BIT ANALOG-TO-DIGITAL CONVERTER

- Two 8-channel A/D converters
- 7 µsec, 10-bit single conversion time, scan mode available
- Fast, easy conversion from analog inputs like temperature, pressure and fluid levels to digital values for CPU processing
- Can effectively have 3.5 µsec conversion time by sampling same signal with both A/D converters

CLOCK GENERATION MODULE WITH PLL

- Clock monitor with self clock mode in case of no external clock
- Programmable clock frequency with 1024 options ranging from divide by 16 to multiply by 64 from base oscillator
- Real-time interrupt
- Watchdog
- Reliable, robust operation
- Provides high performance using low-cost reference crystals
- Reduces generated noise
- Reduces power consumption
- Easily able to implement real-time clock

A FLASH MCU SOLUTION

MC9S12DP256

DATA SHEETS

9S12DP256BDGV2/D	MC9S12DP256 Device \ Guide
S12DP256PIMV2/D	MC9S12DP256 Port Integration Module Block \ Guide
CPU12RM/AD	CPU12 Reference Manual
S12MSCANV2/D	HCS12 Motorola Scalable Controller Area Network Block \ Guide
S12ATD10B8CV2/D	HCS12 10-bit 8-channel Analog to Digital Block \ Guide
S12CRGV3/D	HCS12 Clock Reset Generator Block Guide
S12ECT16B8CV1/D	HCS12 16-bit 8-channel Enhanced Capture Timer Block Guide
S12EETS4KV2/D	HCS12 4K EEPROM Block Guide
S12FTS256KV2/D	HCS12 256K FLASH Block Guide
S12IICV2/D	HCS12 IIC Block Guide
S12PWM8B8CV1/D	HCS12 8-bit 8-channel Pulse-Width Modulator Block Guide
S12SCIV2/D	HCS12 Serial Communications Interface Block Guide
S12SPIV2/D	HCS12 Serial Peripheral Interface Block Guide
S12VREGV1/D	HCS12 Voltage Regulator Block Guide

DEVELOPMENT TOOLS

M68MULTILINK12	Universal HC12 / HCS12 in-circuit emulator; debugger, and FLASH programming through BDM interface
M68KIT912DP256	Includes M68MULTILINK12 and a MC9S12DP256 evaluation board

FEATURES	BENEFITS

ENHANCED CAPTURE TIMER

- 8-channel 16-bit with input capture, output compare and pulse accumulator
- 16-bit modulus down counter

- Flexible, programmable timer system

8-BIT OR 16-BIT PULSE-WIDE MODULATION

- 8-channel 8-bit or 4-channel 16-bit PWM
- PWM supports “center aligned operation”

- Efficiently implement motor control, battery charging or digital to analog functions

TWO SERIAL COMMUNICATIONS INTERFACES

- 8192 Prescalar option

- Asynchronous communication between the MCU and a terminal, computer or a network of microcontrollers
- Exact baud rate matching

THREE SERIAL PERIPHERAL INTERFACES

- Up to 6.25 Mbps

- High-speed synchronous communication between multiple MCUs or between MCU and serial peripherals

INTER IC BUS (I^2C)

- 256 clock rate options

- Provides a simple, efficient method of data exchange between devices
- Minimizes the need for large numbers of connections between devices and eliminates the need for an address decoder

UP TO 91 INPUT/OUTPUT (I/O) LINES

- Programmable pull-ups / pull-downs
- Dual drive capability

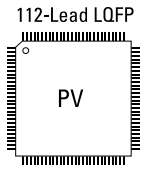
- Reduce system cost
- Able to tailor application for minimum EMC or high current loads

APPLICATION NOTES

AN2206/D	Security and Protection on the HCS12 Family	EB386/D	HCS12 D-Family Compatibility
AN2213/D	Using Cosmic Software’s M68HC12 Compiler for MC9S12DP256	EB376/D	A comparison of the MC9S12DP256 (mask set 0K36N) versus the HC12
AN2216/D	MC9S12DP256 Software Development Using Metrowerks CodeWarrior™	EB377/D	EB377 Change Summary of the MC9S12DP256 mask set 0K79X versus 0K36N Engineering Brief
AN2250/D	Audio Reproduction on HCS12 Microcontrollers		

PACKAGE OPTIONS

PART NUMBER	PACKAGE	TEMPERATURE RANGE
MC9S12DP256BCPV	112 LQFP	-40 to 85° C
MC9S12DP256BVPV	112 LQFP	-40 to 105° C
MC9S12DP256BMPV	112 LQFP	-40 to 125° C



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MC9S12DP256PB/D
Rev. 1