Overview
Freescale Semiconductor’s HCS12 Family of microcontrollers (MCUs) is the next generation of the highly successful 68HC12 architecture. Using Freescale’s industry-leading 0.25 µs Flash, the MC9S12DG128 is part of a pin-compatible family that scales from 32 KB to 512 KB of Flash memory. The MC9S12DG128 provides an upward migration path from Freescale’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 electronic control units (ECUs), its multiple network modules support this environment by enabling highly efficient communications between different network buses.

Target Applications
> Automotive applications
> Industrial control

Features

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<th>Features</th>
<th>Benefits</th>
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| High-Performance 16-bit HCS12 CPU Core | > 25 MHz bus operation at 5V for 40 ns 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 | > Two 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 reprogrammable  
> Self-timed, fast programming  
> Fast Flash page erase—20 ms (512 bytes)  
> Can program 16 bits in 20 µs while in burst mode  
> 5V Flash program/erase/read  
> Flash granularity—512 byte Flash erase/2 byte Flash program  
> Two 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 128 KB code is less than five seconds  
> 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 |
| 2 KB Integrated EEPROM | > Flexible protection scheme for protection against accidental program or erase  
> EEPROM can be programmed in 46 µs  
> Can erase 4 bytes at a time and program 2 bytes at a time for calibration, security, personality and diagnostic information |
Evaluation kit for development and CodeWarrior™ Special Edition for HC08/HCS08/HC12/HCS12 HCS12 MCUs; includes integrated °C emulator, debugger, and Flash Universal HCS08/HCS12 in-circuit stand-alone Flash programmer or technology licensed from SST.

Learn More: For more information about Freescale products, please visit www.freescale.com.

Cost-Effective Development Tools
For more information on development tools, please refer to the Freescale Development Tool Selector Guide (SG1011).

M68KT912DP256 $495* Evaluation kit for development and evaluation of HCS12 application code that includes the M68EVB912DP256 and USBMULTILINKBDM

M68CYCLONEPRO $499* HCS08/HCS12256 stand-alone Flash programmer or in-circuit emulator, debugger, Flash programmer; USB, serial or Ethernet interface options

USBMULTILINKBDM $99* Universal HCS08/HCS12 in-circuit emulator, debugger, and Flash programmer; USB PC interface

CWX-H12-SE Free* CodeWarrior™ Special Edition for HCS12 MCUs; includes integrated development environment (IDE), linker, debugger, unlimited assembler, Processor Expert™ auto-code generator, full-chip simulation and limited C compiler

Part Number Package Temp. Range
MC9S12DG128BDFU 80 QFP -40°C to +105°C
MC9S12DG128BDFU 80 QFP -40°C to +125°C
MC9S12DG128BDFU 112 QFP -40°C to +105°C
MC9S12DG128BDFU 112 QFP -40°C to +125°C

Application Notes and Engineering Bulletins
AN2206 Security and Protection on the HCS12 Family
AN2213 Using Cosmic Software’s M68HC12 Compiler for MC9S12DP256
AN2216 MC9S12DP256 Software Development Using Metrowerks CodeWarrior™
AN2250 Audio Reproduction on HCS12 Microcontrollers
BCANPSV2.0 Bosch Controller Area Network (CAN) Version 2.0 Protocol Standard
BDLCRM Byte Data Link Controller Reference Manual
EB386 HCS12 D-Family Compatibility

*Price indicated is MSRP.
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