



COMPATIBILITY

ULTRA-LOW POWER

EASY TO USE

FlexisTM QE

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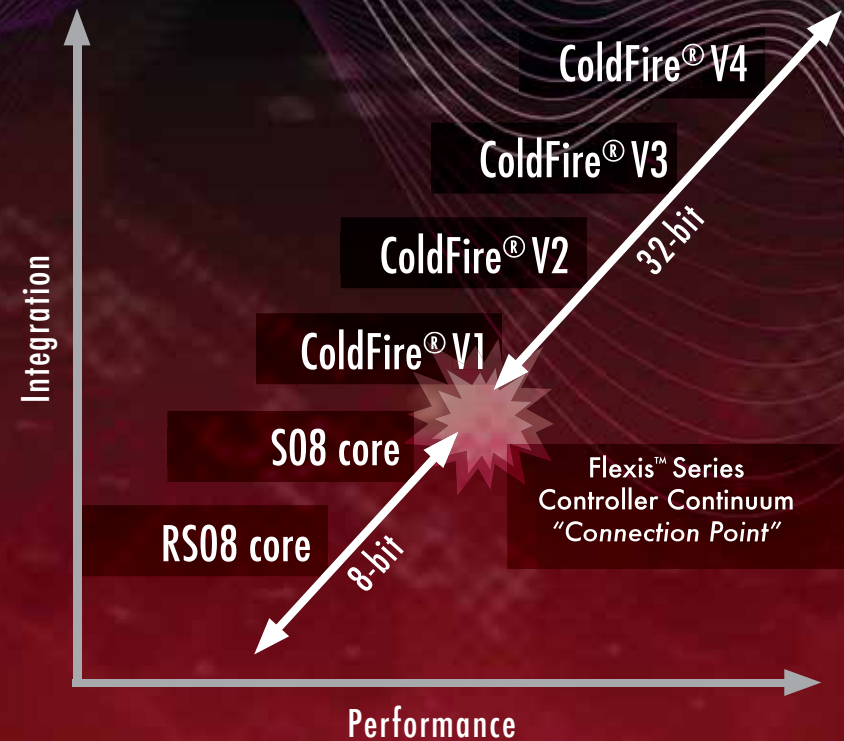
WHERE 8-BIT MEETS 32-BIT

 **freescale**TM
semiconductor

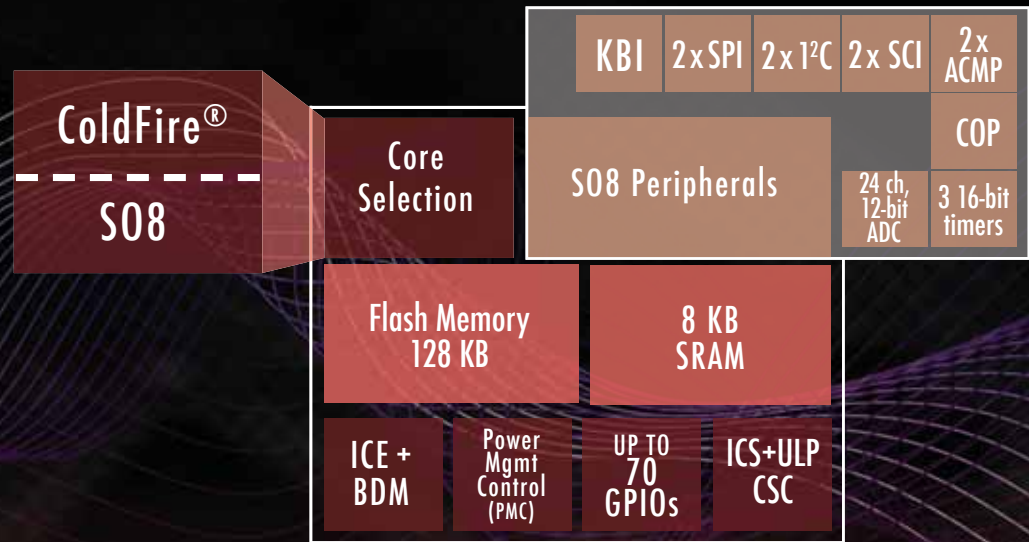
FLEXIS™ SERIES OF MICROCONTROLLERS

Freescale's revolutionary 8- to 32-bit compatibility story comes to life with the Flexis series of MCUs. This series is the 8- to 32-bit connection point of the Freescale Controller Continuum where S08 and ColdFire® V1 microcontroller duos share a common set of peripherals and development tools to deliver the ultimate in migration flexibility. You can quickly move from an 8-bit design to a 32-bit design in just a handful of clicks, perfect for developing a portfolio of products that span the performance spectrum.

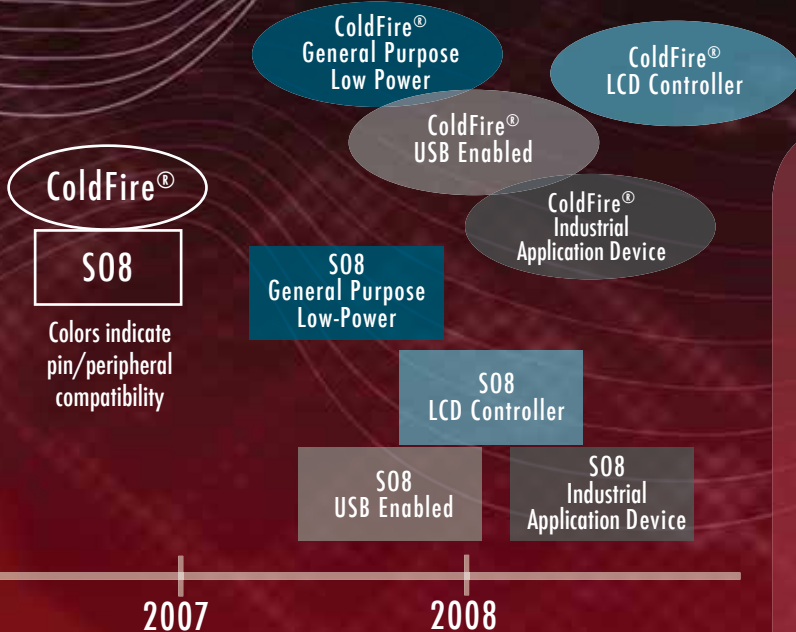
The 8- and 32-bit QE devices are the first products of the Flexis series. Used collectively or individually, the QE128 controllers are making other compatibility schemes obsolete. The next few pages will show you how the unique features of these devices can expand your range of design possibilities.



CONTROLLER CONTINUUM ROADMAP



QE128 COMBINED BLOCK DIAGRAM



Roadmap designates planned devices and tentative timelines

FLEXIS™ SERIES ROADMAP

QE128 FEATURES

50MHz S08 or ColdFire® V1 core
 25MHz bus frequency
 1.8-3.6V operating range

MEMORY

- Up to 8K bytes SRAM
- Up to 128K bytes flash

ULTRA-LOW POWER

- Internal Clock Source (ICS)
- Vreg with fast start up and low regulation voltage
- Low power 32 kHz oscillator
- Optimized clock tree and clock gating techniques

FEATURES

- 2x SCI, 2x I²C, 2x SPI
- 2x KBI – 8 channels each
- 16-bit timers: 1 x 6 ch, 2 x 3 ch
- 12-bit 24 channel A-to-D converter
- 2 analog comparators
- Up to 70 general purpose I/Os
- System integration (PLL, SW Watchdog)
- Integrated 1-pin BDM interface

ULTRA-LOW POWER

Through optimized peripherals that provide lower operating voltage and current, these Flexis devices offer industry-leading ultra-low power benefits to minimize operating costs and extend battery life.

EASY TO USE

Freescale has significantly reduced the learning curves normally associated with migrating between 8- and 32-bit technologies. With a new version of CodeWarrior® and a wide selection of software and hardware development tools, you can get on the design fast track and simplify your development cycle. Extensive training and documentation are also offered to make the process even easier. To learn more about the tools and training available to you, visit www.futureelectronics.com/flexis.

QE 128 Low Power Specifications

	MCF51QE128	MC9S08QE128
Run mode at 50 MHz CPU/25 MHz bus	27 mA	11 mA
Low power run mode at 32 KHz CPU/ 16 KHz bus	50 μ A	22 μ A
Stop 2-Lowest power mode; partial power-down of circuits	370 nA	370 nA
Stop 3-Internal circuits loosely regulated; clocks at low frequency	520 nA	450 nA
Stop 3-Wake up time from trigger to code execution	6 μ s	6 μ s
Preliminary typical measurements, $v_{DD} = 3V$, Temperature = 25°C Run and low power run mode supply currents measured when executing software from flash		

Power-Saving Features

Low Power Modes

- Two ultra-low power stop modes, one of which allows limited use of peripherals
- Reduce power wait mode
- 6 μ s typical wake up time from Stop 3 mode

Internal voltage regulator

Internal Clock Source (ICS) module containing a frequency-locked-loop (FLL) controlled by internal or external reference

Oscillator (OSC)-Loop-control pierce oscillator; crystal or ceramic resonator range of 31.25 kHz to 38.4 kHz to 16 MHz

Support for up to 32 interrupt/reset sources

Low power run and wait modes

Clock gating

Ultra-low power real-time counter

COMPATIBILITY

The QE family is comprised of a pin and peripheral compatible 8-bit and 32-bit device duo. You can use one or both QE128 MCUs in your designs, depending on your product requirements.

MC9S08QE128

Use the MC9S08QE128 when:

- Absolute minimum power consumption is required
- Low-pin-count options are desired
- There are no requirements for higher performance calculations or peripherals
- Cost sensitivity is a primary issue

MCF51QE128

Use the MCF51QE128 when:

- There is an immediate or near-term requirement for higher mathematical processing performance and/or faster throughput communication interfaces, such as Ethernet or USB
- You are interested in generating a low-cost and low-overhead link to future 32-bit designs
- The application requires a path to higher flash densities (>128 KB)

Both can be used for scalable applications that require a low-end and high-end version.

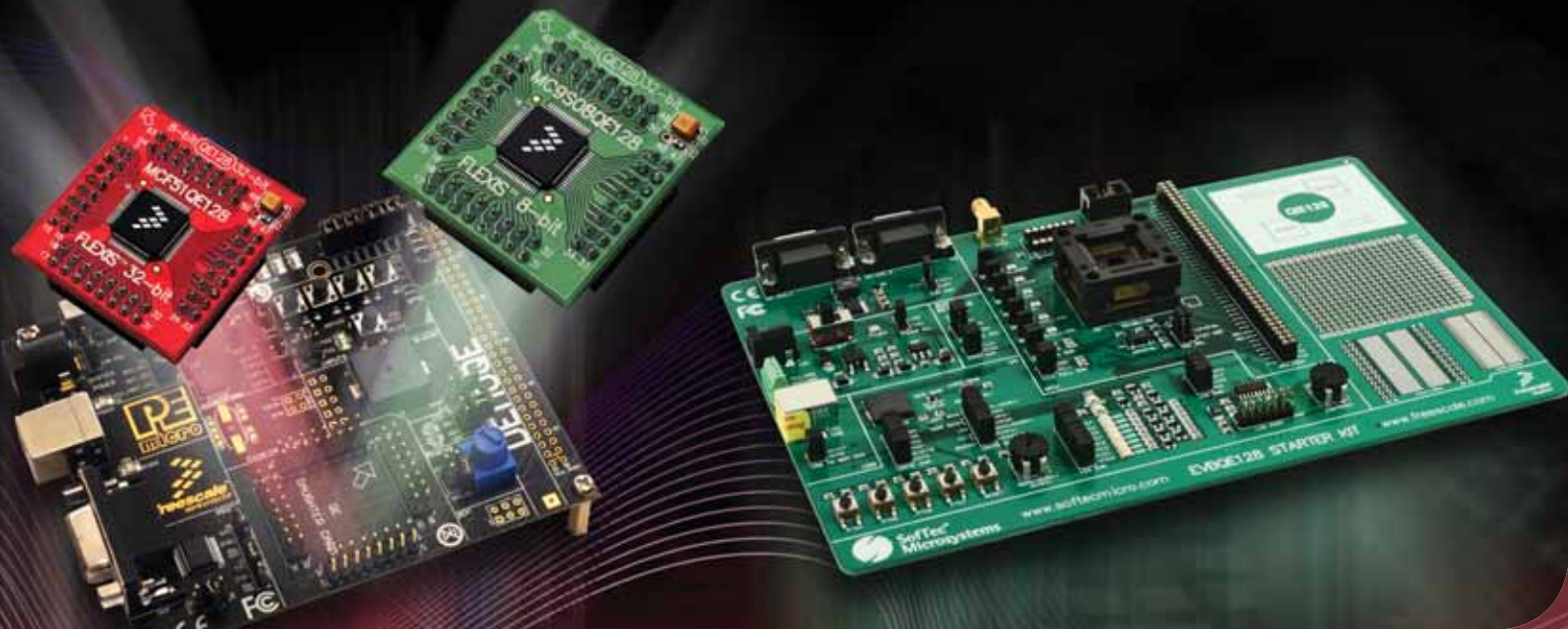
CODE WARRIOR[®] DEVELOPMENT STUDIO FOR MICROCONTROLLERS 6.0

A single, integrated tool suite designed to get you on the design fast track with RS08, HC(S)08 and ColdFire[®] V1 members of the Freescale Controller Continuum. The award-winning CodeWarrior[®] IDE goes well beyond basic code generation and debugging—it provides built-in features and utilities, so you can deliver better quality products to market faster.



CODEWARRIOR® DEVELOPMENT STUDIO PROVIDES THE CAPABILITIES REQUIRED BY EVERY ENGINEER IN THE DEVELOPMENT CYCLE: FROM BOARD BRING-UP TO FIRMWARE DEVELOPMENT TO FINAL APPLICATION DEVELOPMENT.

FEATURES	BENEFITS	SPECIAL EDITION	STANDARD EDITION	PROFESSIONAL EDITION
IDE				
PROJECT WIZARD	GETS YOU UP AND PROGRAMMING FAST.	YES	YES	YES
PROGRAM MANAGER <ul style="list-style-type: none"> • PROJECTS • SUB PROJECTS 	ELIMINATES CONFUSING AND OFTEN COMPLEX MAKE-FILES WITH VISUAL PREFERENCE PANELS.	UNLIMITED YES	UNLIMITED YES	UNLIMITED YES
BUILD TOOLS				
MACRO ASSEMBLER FOR HC(S)08, RS08 AND COLDFIRE V1 MCUs	FOR SPECIFIC OPTIMIZATIONS ONLY YOU CAN PROVIDE.	UNLIMITED	UNLIMITED	UNLIMITED
OPTIMIZING COMPILER FOR HC(S) AND COLDFIRE® V1 MCUs	REDUCES CODE SIZE AND MAXIMIZES THE CAPABILITIES OF THE MICROCONTROLLER TO ACHIEVE TOP PERFORMANCE.	HC(S)08: C - 32K COLDFIRE® V1: C - 64K	C - UNLIMITED	C - UNLIMITED C++ - UNLIMITED
LIBMAKER	ALLOWS REUSE AND MAINTENANCE OF CODE THROUGH LIBRARIES.	YES	YES	YES
DEBUG TOOLS				
SOURCE-LEVEL DEBUGGER	SPEEDS DEBUG CYCLES BY VIEWING THE SOURCE CODE AS IT EXECUTES.	ASM - UNLIMITED HC(S)08: C - 32K COLDFIRE® V1: C - 64K	ASM - UNLIMITED C - UNLIMITED	ASM - UNLIMITED C - UNLIMITED C++ - UNLIMITED
FLASH PROGRAMMING	FULLY INTEGRATED FLASH PROGRAMMING IMPROVES THE BUILD-DEBUG CYCLE BECAUSE IT AUTOMATES YOUR DOWNLOADS.	YES	YES	YES
SIMULATOR	REDUCES COSTS AND ELIMINATES POSSIBLE HARDWARE ISSUES DURING DEVELOPMENT.	YES	YES	YES
DECODER	ALLOWS YOU TO CREATE LISTINGS OF ELF FILES.	YES	YES	YES
DATA VISUALIZATION AND VO STIMULATION	LETS YOU SEE HOW YOUR PROGRAM AFFECTS PERIPHERALS AND RESPONDS TO OUTSIDE INPUT.	1 COMPONENTS/3 ELEMENTS	UNLIMITED	UNLIMITED
OSEK AWARENESS	READY TO WORK WITH OSEK, FOR RTOS-AWARE DEBUG CAPABILITIES.			YES
SESSION RECORD AND PLAY	AUTOMATE REPETITIVE DEBUG CYCLES DURING PROGRAM VALIDATION.			YES
ADVANCED TOOLS				
DEVICE INITIALIZATION FOR HC(S)08/RS08 AND COLDFIRE V1 MCUs	ALLOWS YOU TO GRAPHICALLY SET UP THE CPU PERIPHERAL REGISTERS AND GENERATE INITIALIZATION CODE (ASM OR C) TAILORED TO YOUR APPLICATION.	YES	YES	YES
PROCESSOR EXPERT FOR HC(S)08 AND COLDFIRE® V1 MCUs <ul style="list-style-type: none"> > BASIC BEANS > SOFTWARE BEANS > ADVANCED BEANS 	ABSTRACTS THE HARDWARE LAYER AND GENERATES OPTIMIZED, MICROCONTROLLER-SPECIFIC CODE (C) TAILORED TO YOU APPLICATION, SO YOU CAN CONCENTRATE ON DESIGN.	YES	YES YES	YES YES YES
BEAN WIZARD	ALLOWS YOU TO CREATE REUSABLE SOFTWARE COMPONENTS, WHICH CAN EASILY BE RETARGETED TO ANY FREESCALE HYBRID, HC(S)12 MICROCONTROLLER.			YES
PROFILE ANALYSIS AND CODE COVERAGE	GIVES YOU VISIBILITY INTO YOUR RUNNING PROGRAM TO ALLOW FINE TUNING AND BETTER QUALITY METRICS.			YES
PC-LINT PLUG-IN	ENSURES COMPLIANCE WITH MISRA AND OTHER CODE QUALITY AND STYLE GUIDELINES.			YES



DEMOQE128 Low-COST DEMONSTRATION BOARD

Supports S08 and ColdFire® V1 QE128 devices through plug-in daughter cards. It also supports plug-in RF daughter cards for SMAC and 802.15.4. Features include:

- Built-in BDM eliminates need for external BDM cable
- One RS232 COM port plus optional SCI via USB
- Virtual logic analyzer through two TPM channels via USB
- Three-axis accelerometer
- Operates from battery pack with two “AAA” batteries

Order DEMOQE128 for US\$99.00

Includes S08 and ColdFire® V1 daughter cards, serial port and built-in USB-BDM cable for debugging and programming.

EVBQE128 FULL-FEATURED EVALUATION BOARD

Supports S08 and ColdFire® V1 QE128 devices with an integrated open-top socket for an 80-pin LQFP. It supports plug-in RF daughter cards for simple media access controller (SMAC) and 802.15.4 (wireless personal area network), and includes such features as:

- Built-in BDM eliminates need for external BDM cable
- Jumpers for measuring MCU power consumption
- Multiple clock source options
- Two RS232 COM ports plus optional SCI via USB
- LCD port with contrast
- Temperature sensor, light sensor and potentiometer featuring ATD

Order EVBQE128 for US\$325.00

Includes socket to enable full evaluation of both MC9S08QE128 and MCF51QE128 devices.

TO ORDER VISIT:

WWW.FUTUREELECTRONICS.COM/FLEXIS

ORDERABLE PART NUMBERS

CODEWARRIOR®

PRODUCT	PART NUMBER
CODEWARRIOR® FOR MICROCONTROLLERS, STANDARD EDITION	CWS-H08-STDED-CX
CODEWARRIOR® FOR MICROCONTROLLERS, PROFESSIONAL EDITION	CWS-H08-PROED-CX
SUPPORT	
CODEWARRIOR® FOR MICROCONTROLLERS, STANDARD EDITION	CWT-H08-STDED-TX
CODEWARRIOR® FOR MICROCONTROLLERS, PROFESSIONAL EDITION	CWT-H08-PROED-TX
UPGRADES	
C COMPILER UPGRADE FOR SPECIAL EDITION	CWS-H08-CUPG-CX
MICROCONTROLLERS UPGRADE TO STANDARD EDITION	CWX-H08-STDED-UX
MICROCONTROLLERS UPGRADE STANDARD TO PROFESSIONAL EDITION	CWX-H08-PROED-UX

QE128 BOARD OPTIONS

PRODUCT	PART NUMBER
LOW-COST DEMONSTRATION BOARD	DEMOQE128
FULL-FEATURED EVALUATION BOARD	EVBQE128

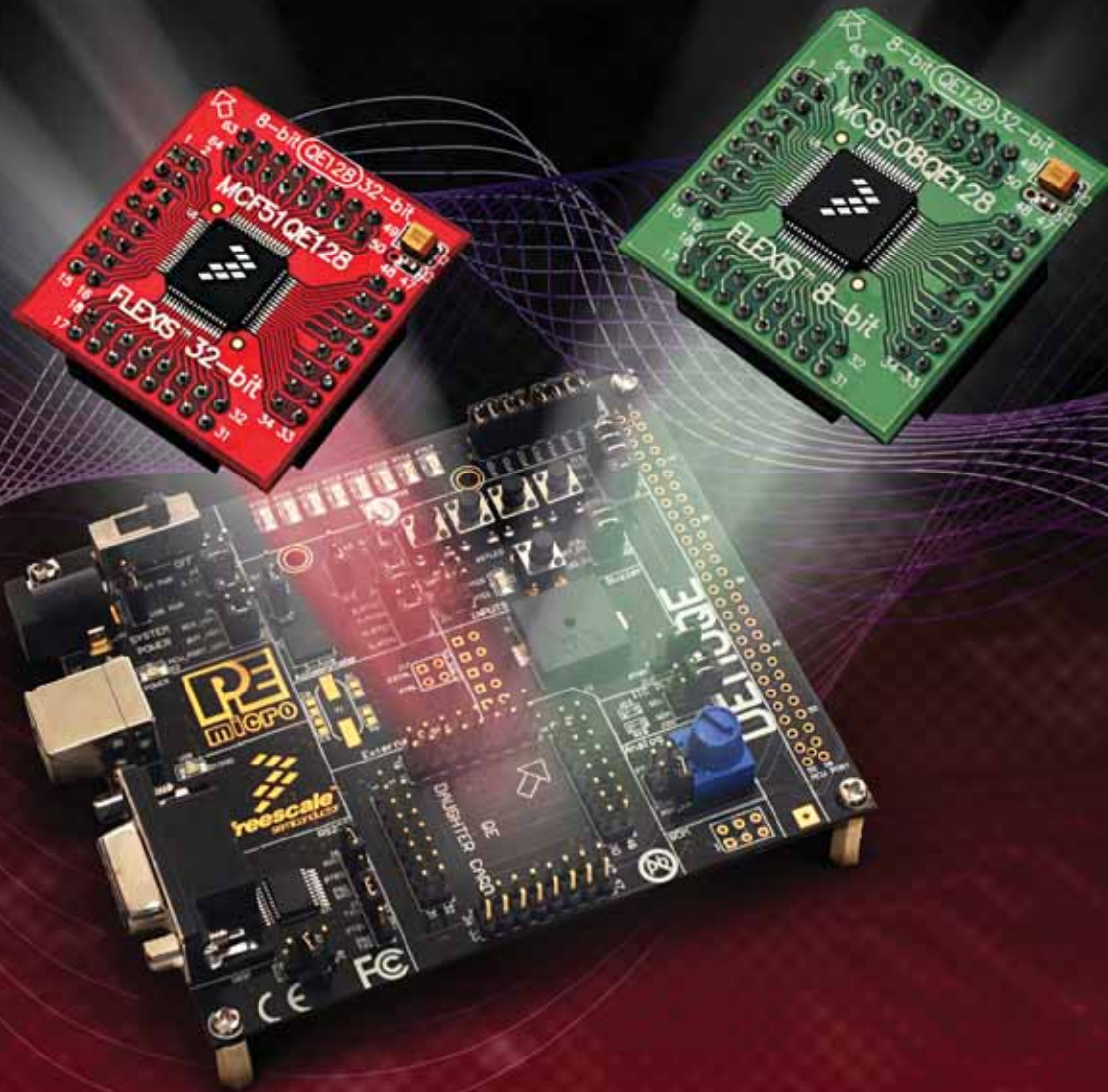
PACKAGE OPTIONS

PART NUMBER	MEMORY		PACKAGE
	FLASH	SRAM	
8-BIT			
MC9S08QE128CLK MC9S08QE128CLH	128 KB	8 KB	80LQFP 64LQFP
MC9S08QE128CFT MC9S08QE128CQD	128 KB	8 KB	48QFN* 44QFN*
MC9S08QE128CLC MC9S08QE64CLH	128 KB 64 KB	8 KB 4 KB	32LQFP* 64LDFP
32-BIT			
MCF51QE128CLK MCF51QE128CLH	128 KB	8 KB	80LQFP 64LQFP
MCF51QE64CLH	64 KB	4 KB	64LQFP

Temperature range for parts listed is -40° C to +85° C.

*44/48QFN and 32LQFP will be available Q1 2008.

Order PC nomenclature, until MC qualification is completed (November 2007)



DEMONSTRATION AND EVALUATION BOARDS AVAILABLE
FOR MORE INFORMATION OR TO ORDER BOARDS VISIT:
WWW.FUTUREELECTRONICS.COM/FLEXIS

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