Flexis™ Microcontroller Series

Low-Power Solutions with the QE Family
Fact Sheet

Target Applications
- Handheld instruments
- Water and gas meters
- Electricity meters
- Electronic keys and locks
- Electronic toys
- Thermostats
- Remote controls
- Cordless telephones
- Digital cameras and camcorders
- Security systems
- Smoke detectors
- Portable health care devices
- Wireless PC peripherals
- Portable audio devices

Overview

The QE family of microcontrollers provides unprecedented design freedom and flexibility across S08 and ColdFire® V1 architectures while meeting you low-power needs. Featuring Eterna technology for extended life in battery-powered applications, the QE family utilizes ultra-low-power methodologies and optimized peripherals to deliver energy-efficient performance.

The MC9S08QE (8-bit) and MCF51QE (32-bit) microcontrollers have a 25 MHz bus speed and low supply voltages from 1.8V–3.6V and an internal voltage regulator for fast start up from stop modes. They feature up to 128 KB of flash memory and share a rich peripheral library including a 24-channel, 12-bit analog-to-digital converter (ADC) with enhanced low-power technology for longer battery life.

The QE family are the first members of the Flexis™ MCU series. The Flexis series is the "connection point" on the Freescale Controller Continuum which includes complementary families of 8-bit S08 and 32-bit ColdFire V1 microcontrollers that share a common set of peripherals and development tools to deliver the ultimate in migration flexibility.

QE128 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 µA	22 µA
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 µs	6 µs

Preliminary typical measurements, V_{DD} = 3V, Temperature = 25°C
Run and low-power run mode supply currents measured when executing software from flash.

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Power-Saving Features	Benefits
Low-Power Modes • Two ultra-low-power stop modes, one of which allows limited use of peripherals • Reduced power wait mode • 6 µs typical wake up time from Stop 3 mode	• Allows continued application sampling in a reduced-power state that helps extends battery life
Internal voltage regulator	• Maintains constant internal voltage as external power supply changes • Fast start-up from stop modes, typically 6–7 µs
Internal Clock Source (ICS)—Internal clock source module containing a frequency-locked-loop (FLL) controlled by internal or external reference	• Eliminates use of an external clock source, which reduces the system costs associated with development
Oscillator (OSC)—Loop-control pierce oscillator; crystal or ceramic resonator range of 31.25 kHz to 38.4 kHz or 1 MHz to 16 MHz	• New low-power crystal oscillator consumes less than 1µA • Supports low frequency operations which lowers power in system
Support for up to 32 interrupt/reset sources	• Makes code more efficient by using stop and wait modes instead of polling flags • Interrupts can be used to wake the device from low-power modes
Low-power run and wait modes	• CPU and peripherals run with voltage regulator in low-power mode • Allows full functionality at reduced frequency for lower power operation • Enables reduced current and reduced speed modes for peripherals
Clock gating	• Reduces overall run and wait mode current by turning clocks off to unused peripherals
Ultra-low-power real-time counter	• Use in run, wait and stop modes • Use with low-power oscillator, internal or external clock sources • Ultra-low-power external oscillator can be used in stop modes to provide accurate clock source to real-time counter (RTC) module

Package Options

Part Number	Memory		Package
	Flash	RAM	
MC9S08QE128CLK	128 KB	8 KB	80LQFP
MC9S08QE128CLH			64LQFP
MCF51QE128CLK	128 KB	8 KB	80LQFP
MCF51QE128CLH			64LQFP
MC9S08QE64CLH	64 KB	4 KB	64LQFP
MCF51QE64CLH	64 KB	4 KB	64LQFP

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

Low-Power Benefits

With low voltage (1.8V) flash programming, EEPROM emulation capability and a high-performance, low-power ADC, the QE family combines optimum performance and functionality with minimum power consumption. In addition, the internal voltage regulator minimizes voltage variation to logic and keeps VDD lower, while the flash is reprogrammable across the entire voltage range.

Cost-Effective Development Tools

DEMOQE128

$99

Cost-effective demonstration kit, including the S08 and ColdFire V1 daughter cards, as well as a serial port and built-in USB-BDM cable for debugging and programming.

EVBQE128

$325*

Full-featured evaluation system for the QE128 device family. This evaluation system enables full evaluation of both the MC9S08QE128 and MCF51QE128 devices.

Learn More: For more information about how to design a low-power solution using the Flexis QE family, please visit **www.freescale.com/flexis.**