MCF5407

Performance of 32-bit ColdFire® Microprocessors Gain Success in the Market

Freescale Semiconductor has led the 32-bit embedded processors market for many years and is taking significant measures to ensure this success continues in the future. Freescale's 32-bit experience is defined by a broad array of customers and applications, which have provided a solid foundation for further development of intelligent products such as the ColdFire Family. The performance level gains of the MCF5407 microprocessor over other ColdFire devices have provided entry points into new markets, thanks to outstanding price/performance, integration and time to market advantages.

Balanced for Improved System Performance

RISC architectures have traditionally embraced performance at the expense of code density. Despite front-end add-ons designed to support compressed instruction formats, performance generally suffered.

The superb code density of the MCF5407's Version 4 (V4) ColdFire core strikes a balance between reduced processor bus bandwidth requirements and the demand for improved system performance. It delivers more than three times the performance and up to twice the system efficiency of any previous ColdFire product. For MC68EC040 and MC68EC060 users, the MCF5407 product offers more than twice the performance of the MC68EC060 at a fraction of the cost.

Advanced Technologies Equal Advanced Performance

Freescale's ColdFire MCF5407 32-bit integrated microprocessor combines the best features of the award-winning MCF5307 with the high-performance V4 ColdFire core operating at an impressive 316 (Dhrystone 2.1) MIPS at 220 MHz. The MCF5407 features the industry-standard Harvard memory architecture, branch cache acceleration logic and limited superscalar dual-instruction issue capabilities. This combination of advanced technologies boosts the performance of this highly integrated device.

It is performance that sets the MCF5407 apart in the market. It offers the capabilities of a single pipeline at an amazingly efficient 1.4 MIPS/MHz without the additional cost of a second pipeline. With an outstanding price/performance ratio, code compatibility and a wide array of integrated peripherals, the MCF5407 helps you build maximum value into a broad range of embedded applications, such as mediaweb boxes, digital video recorders, Internet TV, set-top boxes and telecommunications cards.

A Seamless Migration Path Helps Protect Your Technology Investment

The MCF5407 provides a seamless, fully compatible upgrade path for 68K and ColdFire microprocessor users. For example, users moving from 68K to ColdFire can use code translation and emulation tools, free of charge to registered owners, to facilitate, modify and reuse 68K assembly code. The MCF5407 also leverages the development tools and software you're already familiar with so your time to market is not jeopardized.

The 100-percent synthesizable ColdFire Family helps protect your investment in technology and training into the future. Even better, the ColdFire Family, including the MCF5407, maintains performance levels to enable innovative applications without sacrificing system costs.

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MCF5407 Features

> V4 ColdFire processor core with Harvard memory architecture and branch cache acceleration logic

- Limited superscalar design
- Fully code-compatible with V2 and V3 ColdFire processor cores
- Enhanced instruction set

> 16 KB I-Cache, 8 KB D-Cache

> 4 KB SRAM

> Multiply-Accumulate (MAC) unit with integer and fractional capabilities

> Industry-leading debug module offering both background and real-time capability

> Hardware integer divide unit

> Integrated processor

- DRAM controller (glueless interface to SDRAM or ADRAM)
- One universal asynchronous receiver/transmitter (UART)
- One universal synchronous/asynchronous receiver/transmitter (USART)
- Four fully programmable direct memory access (DMA) channels
- Eight chip selects provide external memory controller—glueless interfacing to volatile and nonvolatile memory-mapped I/O peripherals (i.e., ROM, Flash, SRAM)

- 16-bit general-purpose input/output (GPIO) pins
- Two 16-bit timers
- I²C module
- System integration (Phase-Lock Loop, software watchdog)
- User-defined bus speed at 1/2, 1/3, 1/4, 1/5, 1/6 of processor clock

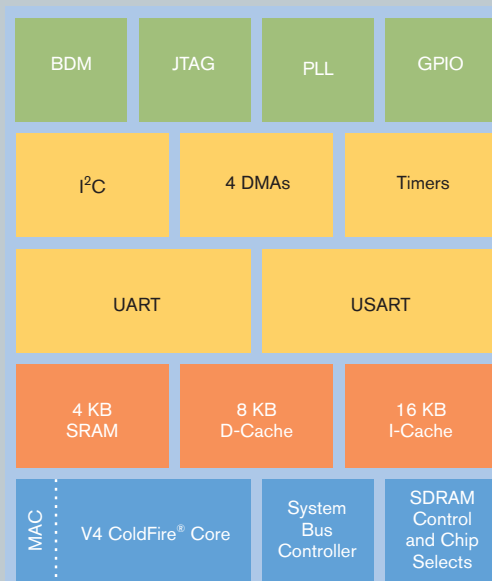> Doze mode and variable frequency operation

Product Specifications

> 316 (Dhrystone 2.1) MIPS at 220 MHz

> Available at 162 MHz and 220 MHz

> 0°C to +70°C operating temperature

> -40°C to +85°C operating temperature (162 MHz)

> Implemented in .22 µm quad layer metal (QLM)

> Requires a 1.8V core and 3.3V I/O power supply

> 208-pin plastic quad flat package (QFP)

> Pin-compatible with MCF5307

MCF5407 BLOCK DIAGRAM

The Road to Advanced Performance

The MCF5407 incorporates advanced technologies that are designed to allow you to build greater performance into your products and still get them to market faster than your competition.

The innovative ColdFire microprocessor family has been a key member of Freescale's 32-bit family of products for more than eight years. And the ColdFire Family development roadmap ensures your creativity, time and resources are protected into the future.

The Feature-Rich Solution That Makes Your Job Easier

The MCF5407 includes a rich array of memory and integrated peripheral features that help accelerate system design time and reduce system cost. For example, two programmable, full-duplex UARTs provide serial communications channels. Four channels of DMA enable fast data transfer using a programmable burst mode independent of processor execution. Two 16-bit multimode timers provide separate input and output signals. Other features include chip selects, interrupt control, bus arbitration, a background debug module (BDM) and an IEEE® 1149.1 JTAG module. Available in a 208-pin QFP, this device is pin-compatible with the MCF5307 and requires a 1.8-volt and 3.3-volt power supply. It's available right now, along with the recommended M5407C3 evaluation board.

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

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