# THE DATASHEET OF

# MK61FN1M0VMJ12

www.win-source.net 0086-755-83957316

# Low-power MCUs with Ethernet and USB On-The-Go

# Kinetis K6x MCU Family

The Kinetis K series MCU portfolio offers the broadest selection of pin-, peripheral- and software-compatible MCU families based on the ARM® Cortex®-M4 core.

## TARGET APPLICATIONS

- Building control
- Factory automation
- Home automation
- Industrial drivers
- IoT data concentrators
- Medical monitoring

These families are performance efficient and offer industry-leading low power while providing significant BOM savings through smart on-chip integration. The Kinetis K series is supported by a comprehensive set of development tools, software and enablement.

The Kinetis K6x MCU family offers IEEE® 1588 Ethernet, full and optional high-speed USB 2.0 On-The-Go (OTG), including options for crystal-less device functionality. Devices range from 256 KB to 2 MB of flash, with 256 KB of SRAM; packages include BGA, LQFP and WLCSP, which span from 100 to 256 pins.

The Kinetis K6x MCU family is a scalable portfolio with various levels of integration, offering a rich suite of analog, communication, timing and control peripherals to accommodate a wide range of requirements.

## COMPREHENSIVE ENABLEMENT SOLUTIONS

Kinetis Software Development Kit (SDK)

- Extensive suite of robust peripheral drivers, stacks and middleware
- Includes software examples demonstrating the usage of the HAL, peripheral drivers, middleware and RTOSes
- Operating system abstraction (OSA) for our proprietary MQX™ RTOS, FreeRTOS, and Micrium µC/OS kernels and baremetal (no RTOS) applications

Processor Expert Software Configuration Tool

- Complimentary software configuration tool providing I/O allocation and pin initialization and configuration of hardware abstraction and peripheral drivers

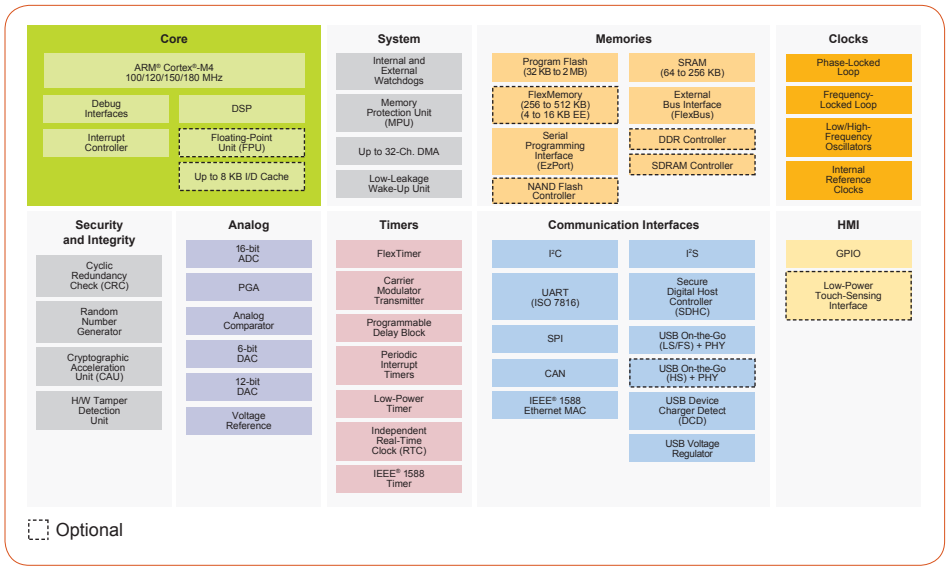
Integrated Development Environments (IDE)

- Atollic® TrueSTUDIO® **atollic.com/index.php/partnerfreescale**
- Green Hill® Software MULTI **ghs.com/products/freescale_kinetis.html**
- IAR Embedded Workbench® **iar.com/kinetis**
- ARM Keil® Microcontroller Development Kit **keil.com/freescale**
- Kinetis Design Studio IDE
- No-cost integrated development environment (IDE) for Kinetis MCUs
- Eclipse and GCC-based IDE for C/C++ editing, compiling and debugging
- Broad ARM ecosystem support through Connect Partners

Online Enablement with ARM mbed™ Development Platform

- Rapid and easy Kinetis MCU prototyping and development
- Online mbed SDK, developer community
- Free software libraries

## KINETIS K6x MCU FAMILY BLOCK DIAGRAM




### Proprietary MQX RTOS

- Commercial-grade MCU software platform at no cost with optional add-on software and support packages

### Bootloader

- Common bootloader for all Kinetis MCUs
- In-system flash programming over a serial connection: erase, program, verify
- ROM or flash-based bootloader with open source software and host-side programming utilities

### Development Hardware

- Tower® System modular development platform
  - Rapid prototyping and evaluation
  - Low cost, interchangeable modules
- Freedom development platforms
  - Low cost (<$30 USD)
  - Arduino R3 compatible
  - mbed-enabled on select boards

## KINETIS K6x MCU BENEFITS

- IEEE 1588 Ethernet MAC with hardware time stamping provides for precision clock synchronization for real-time industrial control
- Hardware acceleration block helps to optimize the performance of network controllers providing TCP/IP, UDP and ICMP protocol services
- Up to 180 MHz Cortex-M4 core supporting a broad range of processing bandwidth requirements while maintaining excellent cost-effectiveness, easy-to-use packages and a wide range of memory densities
- Featuring digital signal processing capabilities with floating-point unit, offering outstanding computational power for control algorithms, sensor data processing and audio processing, among others, while increasing math accuracy and reducing code size
- Hardware encryption coprocessor for secure data transfer and storage with faster (than software) implementations and minimal CPU loading
- Secure digital host controller supports SD, SDIO, MMC or CE-ATA cards for in-application software upgrades, media files or adding Wi-Fi® support
- Outstanding low-power operation with dynamic currents down to 250 µA/MHz, state retention stop mode down to 5.8 µA with 4.5 µS wake-up time and lowest power mode down to 340 nA
- Smart integration supporting applications requiring higher performance, low power and reduction of BOM cost
- Highly reliable, fast access flash memory with four levels of protection for code security/protection
- Faster time-to-market with comprehensive enablement solutions, including SDK (drivers, libraries, stacks), IDE, bootloader, RTOS, online community and more

## KINETIS K6x MCUs: 10/100 ETHERNET MAC WITH FULL-SPEED USB

| Kinetis K6x MCU Sub-Family | Kinetis K66 MCUs High Performance | Kinetis K65 MCUs High Performance w/ Security | Kinetis K64 MCUs High SRAM | Kinetis K63 MCUs High SRAM w/ Security | Kinetis K61 MCUs High Mixed-Signal Integration w/ Security | | Kinetis K60 MCUs High Mixed-Signal Integration | | |
|---|---|---|---|---|---|---|---|---|---|
| **CPU Performance** | 180 MHz w/ FPU | 180 MHz w/ FPU | 120 MHz w/ FPU | 120 MHz w/ FPU | 120 MHz w/ FPU | 150 MHz w/ FPU | 100 MHz | 120 MHz w/ FPU | 150 MHz w/ FPU |
| **Embedded Memory (Flash, SRAM)** | Up to 2048 KB, 256 KB | Up to 2048 KB, 256 KB | 640–1024 KB, 192–256 KB | 1024 KB, 256 KB | 1024 KB, 128 KB | 1024 KB, 128 KB | 256–512 KB, 64–128 KB | 1024 KB, 128 KB | 1024 KB, 128 KB |
| **Analog** | 2x 16-bit ADC, 2x 12-bit DAC | 2x 16-bit ADC, 2x 12-bit DAC | 2x 16-bit ADC, 2x 12-bit DAC | 2x 16-bit ADC, 2x 12-bit DAC | PGA, 4x 16-bit ADC, 2x 12-bit DAC | PGA, 4x 16-bit ADC, 2x 12-bit DAC | PGA, 2x 16-bit ADC, 2x 12-bit DAC | PGA, 4x 16-bit ADC, 2x 12-bit DAC | PGA, 4x 16-bit ADC, 2x 12-bit DAC |
| **Security** | Hardware Encryption | Hardware Encryption and Tamper Detection | Hardware Encryption | Hardware Encryption and Tamper Detection | Hardware Encryption and Tamper Detection | | Hardware Encryption | | |
| **Other Features** | HS USB w/ PHY, CAN, FlexBus, SDRAM Controller | HS USB w/ PHY, CAN, FlexBus, SDRAM Controller | CAN, FlexBus | CAN, FlexBus | CAN, FlexBus, NAND Flash Controller, HS USB, DDR Controller | | CAN, FlexBus | CAN, FlexBus, NAND Flash Controller, HS USB | |
| **Package Options** | MAP144, LQFP144 | WLCSP169, MAP169 | LQFP100, LQFP144, MAP144, XFBGA121 | MAP144, LQFP144 | MAP144, MAP256 | MAP144, MAP256 | MAP121, MAP144, LQFP100, LQFP144 | MAP144, LQFP144 | MAP144, LQFP144 |
| **Development Board** | TWR-K65F180M, FRDM-K66F | TWR-K65F180M | FRDM-K64F TWR-K64F120M | FRDM-K64F TWR-K64F120M | TWR-K60F120M | TWR-K60F120M | TWR-K60D100M | TWR-K60F120M | TWR-K60F120M |

***Note**: Not all features present on each device or development board. Check technical documentation to confirm feature availability per package.

**www.nxp.com/Kinetis**

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