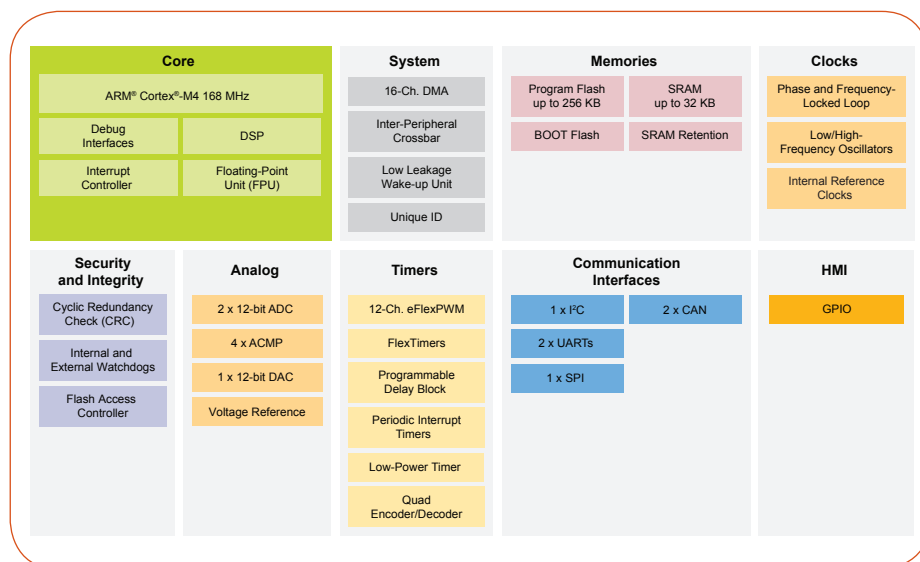- Up to 12 channel eFlexPWM—up to 312ps resolution for demanding digital power conversion applications

- Up to 2 x 8-channel and 1 x 2-channel programmable FlexTimers—High-accuracy PWM generation with integrated power factor correction or speed sensor decoder (incremental decoder/hall sensor)

- Up to 2 FlexCAN modules—High-speed, high reliability industrial communication

- Broad family scalability with hardware and software compatibility—Easy migration to more performance, memory and feature integration within the Kinetis V series

## KINETIS KV4x MCU FAMILY BLOCK DIAGRAM

| Core | System | Memories | | Clocks |
|---|---|---|---|---|
| ARM® Cortex®-M4 168 MHz | 16-Ch. DMA | Program Flash up to 256 KB | SRAM up to 32 KB | Phase and Frequency-Locked Loop |
| Debug Interfaces / DSP | Inter-Peripheral Crossbar | BOOT Flash | SRAM Retention | Low/High-Frequency Oscillators |
| Interrupt Controller / Floating-Point Unit (FPU) | Low Leakage Wake-up Unit | | | Internal Reference Clocks |
| | Unique ID | | | |

| Security and Integrity | Analog | Timers | Communication Interfaces | | HMI |
|---|---|---|---|---|---|
| Cyclic Redundancy Check (CRC) | 2 x 12-bit ADC | 12-Ch. eFlexPWM | 1 x I²C | 2 x CAN | GPIO |
| Internal and External Watchdogs | 4 x ACMP | FlexTimers | 2 x UARTs | | |
| Flash Access Controller | 1 x 12-bit DAC | Programmable Delay Block | 1 x SPI | | |
| | Voltage Reference | Periodic Interrupt Timers | | | |
| | | Low-Power Timer | | | |
| | | Quad Encoder/Decoder | | | |

## DEVELOPMENT TOOLS

### TWR-KV46F168M

The TWR-KV46F168M board is a cost-effective, modular development module that features the Kinetis KV4x MCU in a 100 LQFP package, integrated OpenSDA debug adapter (requires no external debug interface) and is compatible with the Tower System peripheral cards, including TWR-MC-LV3PH 3-phase motor peripheral module.

### HVP-MC3PH

The HVP-MC3PH platform enables development of 3-phase PMSM, BLDC and ACIM motor control and power factor correction (PFC) solutions in a safe high-voltage environment.

Compatible with the Kinetis KV4x MCU (and several other of our controllers), input voltage is 85–240 V AC, with output power of the motor stage up to 1 KW, with the ability to drive a 1.2 Hp motor, and 800 watts when utilizing the PFC stage.

### TWR-MC-LV3PH

The TWR-MC-LV3PH low-voltage, 3-phase motor control Tower System peripheral module provides a complete motor control reference design kit for developing BLDC and PMSM motor solutions. Compatible with the Kinetis KV4x MCU (and several other of our controllers), it includes a 3-phase BLDC motor and motor drive circuitry.

### Integrated Development Environment (IDE)

Kinetis KV4x MCUs are supported by Kinetis Design Studio IDE, IAR Embedded Workbench® for ARM and ARM Keil Microcontroller Development Kit. All IDEs support the Processor Expert auto code generator—a GUI-based, device-aware software configuration tool that automatically generates peripheral start-up code and device drivers to dramatically reduce application development time.

### FreeMASTER

FreeMASTER is a free, simple, yet highly customizable real-time debug monitor and data visualization tool designed for software development that requires real-time data access.

### Motor Control Toolbox

Our motor control development toolbox is a comprehensive collection of tools that plug into the MATLAB™/Simulink™ model-based design environment to support rapid application development targeting our MCUs.

### Embedded Motor Control and Power Conversion Libraries

- Extensive suite of complimentary software libraries for motor and power control applications

- A group of algorithms, ranging from basic mathematics operations to advanced transformations and observers, which can easily be incorporated into complex real-time control applications

- Core self-test libraries for simpler IEC 60730 certification

# KINETIS KV4x MCU FAMILY

| Part Number | Freq. (MHz) | Pins | Flash / SRAM | ADC | | PWM eFlexPWM | | PWM Nano-Edge | PWM FlexTimers | | | DAC | FlexCAN | |
| | | | | ADCA | ADCB | PWMA PWMB | PWMX | | FTM0 | FTM3 | FTM1 | | CAN0 | CAN1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MKV46F256VLL16 | 168 | 100 | 256 / 32 | 18ch | 20ch | 1x8ch | 1x4ch | Yes | 1x8ch | 1x8ch | 1x2ch | 1 | 1 | 1 |
| MKV46F256VLH16 | 168 | 64 | 256 / 32 | 13ch | 16ch | 1x8ch | - | Yes | 1x8ch | 1x8ch | 1x2ch | 1 | 1 | 1 |
| MKV46F128VLL16 | 168 | 100 | 128 / 24 | 18ch | 20ch | 1x8ch | 1x4ch | Yes | 1x8ch | 1x8ch | 1x2ch | 1 | 1 | 1 |
| MKV46F128VLH16 | 168 | 64 | 128 / 24 | 13ch | 16ch | 1x8ch | - | Yes | 1x8ch | 1x8ch | 1x2ch | 1 | 1 | 1 |
| MKV44F256VLL16 | 168 | 100 | 256 / 32 | 18ch | 20ch | 1x8ch | 1x4ch | Yes | - | - | - | 1 | 1 | 1 |
| MKV44F256VLH16 | 168 | 64 | 256 / 32 | 13ch | 16ch | 1x8ch | - | Yes | - | - | - | 1 | 1 | 1 |
| MKV44F128VLL16 | 168 | 100 | 128 / 24 | 18ch | 20ch | 1x8ch | 1x4ch | Yes | - | - | - | 1 | 1 | 1 |
| MKV44F128VLH16 | 168 | 64 | 128 / 24 | 13ch | 16ch | 1x8ch | - | Yes | - | - | - | 1 | 1 | 1 |
| MKV44F128VLF16* | 168 | 48 | 128 / 24 | 11ch | 10ch | 1x8ch | - | Yes | - | - | - | 1 | 1 | - |
| MKV44F64VLH16 | 168 | 64 | 64 / 16 | 13ch | 16ch | 1x8ch | - | Yes | - | - | - | 1 | 1 | 1 |
| MKV44F64VLF16* | 168 | 48 | 64 / 16 | 11ch | 10ch | 1x8ch | - | Yes | - | - | - | 1 | 1 | - |
| MKV42F256VLL16 | 168 | 100 | 256 / 32 | 18ch | 20ch | - | - | - | 1x8ch | 1x8ch | 1x2ch | - | 1 | 1 |
| MKV42F256VLH16 | 168 | 64 | 256 / 32 | 13ch | 16ch | - | - | - | 1x8ch | 1x8ch | 1x2ch | - | 1 | 1 |
| MKV42F128VLL16 | 168 | 100 | 128 / 24 | 18ch | 20ch | - | - | - | 1x8ch | 1x8ch | 1x2ch | - | 1 | 1 |
| MKV42F128VLH16 | 168 | 64 | 128 / 24 | 13ch | 16ch | - | - | - | 1x8ch | 1x8ch | 1x2ch | - | 1 | 1 |
| MKV42F128VLF16* | 168 | 48 | 128 / 24 | 11ch | 10ch | - | - | - | 1x8ch | 1x8ch | 1x2ch | - | 1 | - |
| MKV42F64VLH16 | 168 | 64 | 64 / 16 | 13ch | 16ch | - | - | - | 1x8ch | 1x8ch | 1x2ch | - | 1 | 1 |
| MKV42F64VLF16* | 168 | 48 | 64 / 16 | 11ch | 10ch | - | - | - | 1x8ch | 1x8ch | 1x2ch | - | 1 | - |

* This package is included in the Package Your Way program for Kinetis MCUs. For more details, please visit **www.nxp.com/KPYW**

## www.nxp.com/Kinetis/Vseries