

PIC16F18446 Family of Microcontrollers

Hardware-based Sensor Filtering with 12-bit ADC with Computation

Summary

The PIC16(L)F18446 8-bit product family combines high resolution, intelligent analog and Core Independent Peripherals (CIPs) for sensor end node applications. The family offers a 12-bit ADC with computation (ADC²) in a variety of packages including a 14-pin option and multiple communication interfaces. The eight-member family includes memory features like Memory Access Partition (MAP) and Device Information Area (DIA). Additionally, the product family has power management features such as CPU IDLE/DOZE modes, Peripheral Module Disable (PMD) and Peripheral Pin Select (PPS). The family is available in 14 to 28 pins packages to support customers in a broad range of applications from IoT sensor end nodes, motor control, industrial processing control, medical, home appliances, touch sensing and automotive systems.



High-Resolution Analog

The 12-bit ADC with computation (ADC²) automates signal analysis and data acquisition functions simplifying real-time control and capacitive sensing designs. The ADC² contains built-in computational features that provide input and sensor interface functions including low-pass filtering, oversampling, averaging and accumulation. This allows the CPU to sleep or execute other tasks, thereby decreasing power consumption.

Enhanced System Features

Memory Access Partition (MAP) is a customizable Flash memory area that supports bootloader write-protection to prevent accidental over-write for data protection. Device Information Area (DIA) offers protected storage for unique device identification and contains calibration data for the internal temperature sensor module and the Fixed Voltage Reference (FVR) reading.

Low-Power Features

Power saving functions such as IDLE and DOZE low-power modes allow you to optimize device performance and power consumption. IDLE mode is a power saving mode that puts the CPU core to sleep while the internal peripherals continue to operate from the system clock and DOZE mode enables the CPU core to run at a slower speed compared to the system clock used by the internal peripherals. The Peripheral Module Disable (PMD) allows unused peripherals to be turned off individually, further reducing power consumption which is a key

requirement in battery-powered applications. Additionally, sleep currents are as low as 50 nA. With these low power features, battery life is extended which is necessary in battery-powered applications.

Faster Time to Market

The PIC16F18446 family of MCUs feature Core Independent Peripherals that provide you with the ability to accomplish tasks in hardware while freeing up the CPU to do other tasks or go to sleep. The hardware-based peripherals offload timing-critical and core-intensive functions from the CPU, allowing it to focus on other critical tasks within the system. This decreases system complexity by eliminating additional code and external components, reduces power consumption, allowing for deterministic response time and decreased validation time.

Free Automated Code Generation Tool

To further reduce your time to market, the PIC16F18446 family offers a comprehensive, easy-to-use development experience with Microchip's MPLAB[®] Xpress with MPLAB Code Configurator (MCC). MCC is a free, graphical programming environment that generates seamless, easy-to-understand C code to be inserted into your project. Using an intuitive interface, it enables and configures a rich set of peripherals and functions specific to your application. Find out more at www.microchip.com/Xpress.

Key Features

- High-precision 32 MHz internal oscillator
- Up to 28 KB Flash program memory
- Up to 2 KB of SRAM
- 12-bit ADC with computation (ADC²), up to 24 channels
- eXtreme Low Power (XLP) with sleep currents down to 50 nA
- IDLE and DOZE low-power modes
- Memory Access Partition (MAP)
- Device Information Area (DIA)
- Signal Measurement Timer (SMT)
- Hardware Limit Timer (HLT)
- Windowed Watch Dog Timer (WWDT)
- Peripheral Pin Select (PPS)
- Peripheral Model Disable (PMD)
- Configurable Logic Cell (CLC)
- Two comparators
- Numerically Controlled Oscillator (NCO)
- 5-bit DAC
- Zero Cross Detect (ZCD)
- On-chip temperature sensor
- 10-bit PWMs
- Complementary Waveform Generator (CWG)
- Data Signal Modulator (DSM)
- EUSART, SPI and I²C
- Broad range of packages in 14 to 28 pins

Development Made Easy



The family is also supported by the Curiosity Development Board – a fully integrated MCU development platform targeted at first-time users, makers and those seeking a feature-rich rapid prototyping board. The Curiosity platform includes an integrated programmer/debugger, requires no additional hardware to get started and seamlessly integrates with our MPLAB Xpress IDE, MPLAB X IDE and MPLAB Code Configurator. Curiosity Development Boards support the product family, as well as other Microchip's 8- to 40-pin PIC[®] MCUs with low-voltage programming.

www.microchip.com/curiosity

Products

Part Number	Program Flash Memory (KB)	Program Flash (KB)	Data Memory (B)	Data SRAM (B)	I/O Pins	12-bit ADC ² (ch)	5-bit DAC	Comps	8-bit (with HLT)/16-bit Timers	SMT	Window Watchdog Timer	CCP/10-bit PWM	CWG/NCO	CLC	Temp Sensor and Low Power	EUSART/I ² C-SPI	PPS/PMD/MAP	Packages
PIC16(L)F18424	4	7	256	512	12	11	1	2	3/4	1	Y	4/2	2/1	4	Y	1/1	Y/Y/Y	PDIP, SOIC, TSSOP, UQFN
PIC16(L)F18425	8	14	256	1,024	12	11	1	2	3/4	1	Y	4/2	2/1	4	Y	1/2	Y/Y/Y	PDIP, SOIC, TSSOP, UQFN
PIC16(L)F18426	16	28	256	2,048	12	11	1	2	3/4	1	Y	4/2	2/1	4	Y	1/2	Y/Y/Y	PDIP, SOIC, TSSOP, UQFN
PIC16(L)F18444	4	7	256	512	18	17	1	2	3/4	1	Y	4/2	2/1	4	Y	1/1	Y/Y/Y	PDIP, SOIC, SSOP, UQFN
PIC16(L)F18445	8	14	256	1024	18	17	1	2	3/4	1	Y	4/2	2/1	4	Y	1/2	Y/Y/Y	PDIP, SOIC, SSOP, UQFN
PIC16(L)F18446	16	28	256	2,048	18	17	1	2	3/4	1	Y	4/2	2/1	4	Y	1/2	Y/Y/Y	PDIP, SOIC, SSOP, UQFN
PIC16(L)F18455	8	14	256	1,024	26	24	1	2	3/4	2	Y	5/2	3/1	4	Y	2/2	Y/Y/Y	SPDIP, SOIC, SSOP, UQFN
PIC16(L)F18456	16	28	256	2,048	26	24	1	2	3/4	2	Y	5/2	3/1	4	Y	2/2	Y/Y/Y	SPDIP, SOIC, SSOP, UQFN

The Microchip name and logo, the Microchip logo, MPLAB and PIC are registered trademarks of Microchip Technology Incorporated in the U.S.A. and other countries. All other trademarks mentioned herein are property of their respective companies. © 2018, Microchip Technology Incorporated. All Rights Reserved. 2/18 DS30010166B