

PIC18-Q40 Product Family

Robust MCUs for Compact Embedded Designs

Summary

The PIC18-Q40 family of Microcontrollers (MCUs) makes it easy for you to customize your next space-constrained design with powerful, highly configurable Core Independent Peripherals (CIPs) and award-winning development tools. The MCUs combine these versatile peripherals with advanced interconnection capabilities to allow the creation of custom application functions—packing a high level of sophistication in a small space. With our comprehensive development tool suite, you can quickly and easily generate application code and customize combinations of CIPs in a Graphical User Interface (GUI) environment. The 14- and 20-pin products are well suited for a wide range of embedded applications including remote medical care, wearables, consumer, automotive, industrial and Internet of Things (IoT). If you need the same level of MCU performance with additional analog features, the PIC18-Q41 MCUs are an ideal solution.



Responsive Operation

These CIPs enable the MCU to accomplish tasks in hardware while freeing up the CPU to do other tasks or go to sleep to save power. Because they offload timing-critical and core-intensive functions from the CPU, they eliminate the need for additional code and external components, reduce power consumption and allow for deterministic response time and decreased validation time.

Improved System Response

The PIC18-Q41 family is equipped with four Direct Memory Access (DMA) controllers for data transfers between all memory spaces and peripherals independent of the CPU, thereby enhancing system performance and improving power consumption.

Reduce Costs and Board Space

The PIC18-Q40 provides four Configurable Logic Cells (CLC) which is a user-configurable peripheral for creating custom hardware-based logic functions. The CLC peripheral lets you specify combinations of signals as inputs to a logic function and internally connects peripherals such as timers, Pulse-Width Modulators (PWMs), serial ports and I/O pins for hardware customization with unprecedented ease. The CLC enables a higher level of integration without any external components, thus reducing PCB footprint and system costs.

Furthermore, the small 3 × 3 mm VQFN package option enables you to create extremely compact designs which reduces board space.

Flexibility

The integrated 16-bit PWMs deliver advanced capabilities beyond those found on standard PWM modules. These innovative features allow you to easily vary phase, duty cycle and offset event count with greater precision. The high-resolution PWMs offer dual independent outputs on the same time base, which helps simplify drive control and offers the flexibility to be used in many applications. Additionally, the PIC18-Q40 family of MCUs has improved and flexible serial communications interfaces, including a UART with support for Asynchronous, DMX, DALI and LIN protocols along with higher-speed, standalone I²C and SPI serial communication interfaces.

Intelligent Analog

The PIC18-Q40 family offer intelligent analog peripherals including a Zero Cross Detect (ZCD) module, comparators, two 8-bit Digital-to-Analog Converter (DACs) and a 12-bit Analog-to-Digital Converter with Computation (ADCC) that automates Capacitive Voltage Divider (CVD) techniques for implementing advanced touch sensing, averaging, filtering, oversampling and automatic threshold comparison.

Key Features

- 64 MHz internal oscillator
- Up to 64 KB Flash program memory
- 512B data EEPROM
- Up to 4 KB data SRAM
- Four Direct Memory Access (DMA)
- Three 16-bit dual PWMs
- Four Configurable Logic Cells
- 32-bit Cyclic Redundancy Check (CRC) for reliable data/program memory monitoring
- Two 8-bit buffered DAC
- 12-bit ADC with Computation (ADCC)
- Hardware Capacitive Voltage Divider (CVD) for touch sensing applications
- Two Analog comparators
- Peripheral Pin Select (PPS)
- Three UART (one UART supports LIN/DMX/DALI protocols), SPI, I²C interfaces

Free Automated Code Configurator Tool

The PIC18-Q40 family has been designed to integrate with MPLAB® Code Configurator (MCC) for a seamless embedded development experience. MCC is a free, graphical programming environment that quickly generates application code. Using an intuitive interface, it enables and configures a rich set of peripherals and functions specific to your application. www.microchip.com/MPLAB.

Development Made Easy



With full programming and debugging capabilities, the PIC18F16Q40 Curiosity Nano Evaluation Kit (EV70C97A) is a compact, cost-effective development board that offers complete support for your next design. www.microchip.com/curiositynano

Curiosity Development Boards are fully integrated MCU development platforms targeted at first-time users, Makers, and those seeking a feature-rich rapid prototyping board. Designed from the ground-up to take full advantage of Microchip's MPLAB X Integrated Development Environments (IDE), Curiosity includes an integrated programmer/debugger and requires no additional hardware to get started.

The Curiosity Development Board (DM164137) supports the PIC18-Q40 family, as well as a number of other low-voltage, programming-enabled 8-bit PIC® MCUs from 8- to 20-pins. www.microchip.com/curiosity

| Part Number | Pin Count | Program Flash (KB) | Data EEPROM (B) | RAM (B) | I/O Pins | Operational Amplifier | 12 bit ADCC (ch) | 8-bit with HLT/16-bit Timers | Complimentary Waveform Generator | SMT | 16-bit dual PWM/CCP | Comparator/ZCD | NCO/DSM | CLC | 32-bit CRC w/ Scanner | SPI/I ² C | UART/UART with Protocol Support | DMA (ch) | VI | PPS/PMD/MAP | Packages |
|-------------|-----------|--------------------|-----------------|---------|----------|-----------------------|------------------|------------------------------|----------------------------------|-----|---------------------|----------------|---------|-----|-----------------------|----------------------|---------------------------------|----------|----|-------------|------------------------|
| PIC18F04Q40 | 14 | 16 | 512 | 1,024 | 12 | - | 11 | 2/3 | 1 | Y | 3/1 | 2/1 | 1/1 | 4 | Y | 2/1 | 2/1 | 4 | Y | Y/Y/Y | SOIC, TSSOP |
| PIC18F05Q40 | 14 | 32 | 512 | 2,048 | 12 | - | 11 | 2/3 | 1 | Y | 3/1 | 2/1 | 1/1 | 4 | Y | 2/1 | 2/1 | 4 | Y | Y/Y/Y | SOIC, TSSOP |
| PIC18F06Q40 | 14 | 64 | 512 | 4,096 | 12 | - | 11 | 2/3 | 1 | Y | 3/1 | 2/1 | 1/1 | 4 | Y | 2/1 | 2/1 | 4 | Y | Y/Y/Y | SOIC, TSSOP |
| PIC18F14Q40 | 20 | 16 | 512 | 1,024 | 18 | - | 17 | 2/3 | 1 | Y | 3/1 | 2/1 | 1/1 | 4 | Y | 2/1 | 2/1 | 4 | Y | Y/Y/Y | PDIP, SOIC, SSOP, VQFN |
| PIC18F15Q40 | 20 | 32 | 512 | 2,048 | 18 | - | 17 | 2/3 | 1 | Y | 3/1 | 2/1 | 1/1 | 4 | Y | 2/1 | 2/1 | 4 | Y | Y/Y/Y | PDIP, SOIC, SSOP, VQFN |
| PIC18F16Q40 | 20 | 64 | 512 | 4,096 | 18 | - | 17 | 2/3 | 1 | Y | 3/1 | 2/1 | 1/1 | 4 | Y | 2/1 | 2/1 | 4 | Y | Y/Y/Y | PDIP, SOIC, SSOP, VQFN |
| PIC18F04Q41 | 14 | 16 | 512 | 1,024 | 12 | 1 | 11 | 2/3 | 1 | Y | 3/1 | 2/1 | 1/1 | 4 | Y | 2/1 | 2/1 | 4 | Y | Y/Y/Y | SOIC, TSSOP |
| PIC18F05Q41 | 14 | 32 | 512 | 2,048 | 12 | 1 | 11 | 2/3 | 1 | Y | 3/1 | 2/1 | 1/1 | 4 | Y | 2/1 | 2/1 | 4 | Y | Y/Y/Y | SOIC, TSSOP |
| PIC18F06Q41 | 14 | 64 | 512 | 4,096 | 12 | 1 | 11 | 2/3 | 1 | Y | 3/1 | 2/1 | 1/1 | 4 | Y | 2/1 | 2/1 | 4 | Y | Y/Y/Y | SOIC, TSSOP |
| PIC18F14Q41 | 20 | 16 | 512 | 1,024 | 18 | 1 | 17 | 2/3 | 1 | Y | 3/1 | 2/1 | 1/1 | 4 | Y | 2/1 | 2/1 | 4 | Y | Y/Y/Y | PDIP, SOIC, SSOP, VQFN |
| PIC18F15Q41 | 20 | 32 | 512 | 2,048 | 18 | 1 | 17 | 2/3 | 1 | Y | 3/1 | 2/1 | 1/1 | 4 | Y | 2/1 | 2/1 | 4 | Y | Y/Y/Y | PDIP, SOIC, SSOP, VQFN |
| PIC18F16Q41 | 20 | 64 | 512 | 4,096 | 18 | 1 | 17 | 2/3 | 1 | Y | 3/1 | 2/1 | 1/1 | 4 | Y | 2/1 | 2/1 | 4 | Y | Y/Y/Y | PDIP, SOIC, SSOP, VQFN |

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