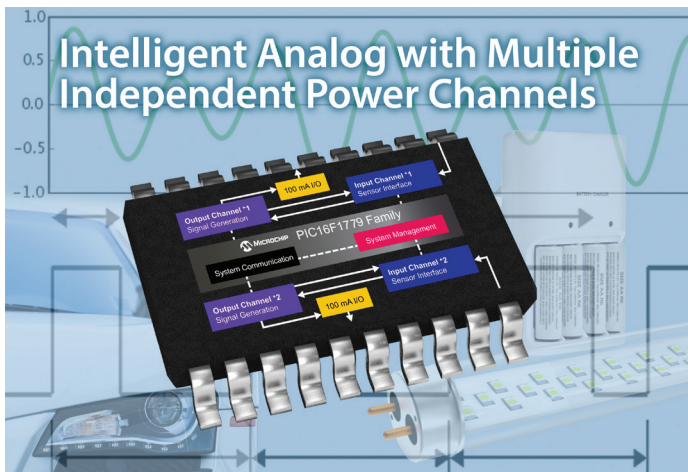


PIC16(L)F176X/7X Microcontrollers

LED Dimming Engine Control, Multiple Independent Closed-Loop Channels



Summary

The PIC16(L)F1779 product family is purpose-built to support the demands of highly integrated, low-wattage power conversion applications. These devices offer multiple independent closed-loop power channels and system management capabilities, while providing an 8-bit platform that simplifies design and helps eliminate many discrete components in power conversion systems. This family includes the Programmable Ramp Generator (PRG) peripheral which eliminates the CPU burden related to slope and ramp compensation in power conversion applications, improving frequency stability and system efficiency.

The family enables the ability to interconnect the on-chip peripherals to create custom functions specific to each application. The combination of these peripherals creates an LED dimming engine that synchronizes switching control and faster turn off, thus eliminating LED current overshoot and decay. This synchronization of the output switching helps smooth visible dimming, minimizes color shift and reduces heat, which increases LED life. The family includes four devices, available in pin counts ranging from 14 to 40 pins and program memory sizes up to 28 KB.

Features

- 32 MHz internal oscillator
- High-endurance Flash (HEF)
 - 100 K erase/write cycles (128 B non-volatile)
- Up to four op amps
- Up to four 5- and 10-bit Digital-to-Analog Converters (DACs)
- Up to eight high-speed comparators
- eXtreme Low Power (XLP) technology
- Up to four Programmable Ramp Generators (PRG)
- EUSART, SPI/I²C

Product Highlights

Intelligent Analog

Intelligent Analog peripherals significantly help reduce BOM cost, PCB size and system noise. On-chip op amps, high-speed comparators and Analog-to-Digital Converter (ADC) peripherals allow you to significantly reduce the component count in your analog signal chain.

Op Amps

General-purpose op amps provide internal and external signal conditioning with tri-state operation.

Programmable Ramp Generation (PRG)

The Programmable Ramp Generator (PRG) automates slope and ramp compensation and increases stability and efficiencies in hybrid power conversion applications. The PRG provides real-time, down-to-the-nanosecond, responses to a system change, without CPU interaction, for multiple independent power channels.

10- and 16-bit Pulse-Width Modulation (PWM)

On-chip PWMs offer high resolution with independent time bases to help simplify drive control.

Complementary Output Generator (COG)

This automated complementary output controls key parameters such as programmable rising/falling edge events, polarity, phase, precision dead-band, blanking and auto shut-down.

High-Current Drive IOs

The 100 mA IOs help eliminate the need for MOSFET driver, reducing system BOM cost.

Zero Cross Detect (ZCD)

Ideal for AC dimming control, ZCD simplifies TRIAC control by providing the ability to measure AC periods and by eliminating the need for additional external components.

Configurable Logic Cell (CLC)

The CLC integrates hardware functions and increases on-chip interconnections of peripherals and I/Os, saving board space and program code.

Communications

Support for SPI, I²C, LIN, DALI, DMX as well as Bluetooth® LE, LoRa® and others using external modules.

Hardware Limit Timers (HLTs)

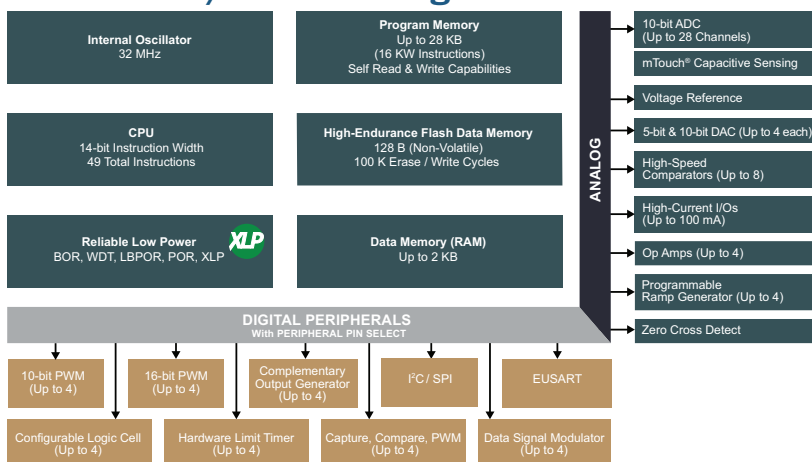
The HLTs can detect faults in motor, power supplies and other external devices. It can automatically notify the system to make provisions to shutdown and/or safely restart. These modes are available in standard 8-bit timer/counters.



MICROCHIP

PIC16(L)F176X/7X Product Family																							
Device	Channels	Program Memory Flash (KB)	Program Flash Memory (KW)	High-Endurance Flash (B)	Data SRAM (Bytes)	I/O Pins	8-bit with HLT Timer	16-bit Timer	Comparator	10-bit ADC (ch)	5-/10-bit DAC	Capture/ Compare/PWM	10-/16-bit PWM	COG	CLC	Op Amp	ZCD	PRG	Data Signal Modulator	High-Current I/O (100 mA)	Peripheral Pin Select	EUSART	I ² C/SPI
PIC16(L)F1764 	1	7	4	128	512	12	1/3	3	2	8	1/1	1	1/1	1	3	1	1	1	1	2	✓	1	1
PIC16(L)F1765 	1	14	8	128	1K	12	1/3	3	2	8	1/1	1	1/1	1	3	1	1	1	1	2	✓	1	1
PIC16(L)F1768 	2	7	4	128	512	18	1/3	3	4	12	2/2	2	2/2	2	3	2	1	2	2	2	✓	1	1
PIC16(L)F1769 	2	14	8	128	1K	18	1/3	3	4	12	2/2	2	2/2	2	3	2	1	2	2	2	✓	1	1
PIC16(L)F1773 	3	7	4	128	512	25	1/3	3	6	17	3/3	3	3/4	3	4	3	1	3	3	2	✓	1	1
PIC16(L)F1776 	3	14	8	128	1K	25	1/3	3	6	17	3/3	3	3/3	3	4	3	1	3	3	2	✓	1	1
PIC16(L)F1777 	4	14	8	128	1K	36	1/4	3	8	28	4/4	4	4/4	4	4	4	1	4	4	2	✓	1	1
PIC16(L)F1778 	3	28	16	128	2K	25	1/3	3	6	17	3/3	3	3/3	3	4	3	1	3	3	2	✓	1	1
PIC16(L)F1779 	4	28	16	128	2K	35	1/4	3	8	28	4/4	4	4/4	4	4	4	1	4	4	2	✓	1	1

PIC16F176X/7X Block Diagram



Additional Resources

- PIC16(L)F176X Data Sheet, DS40001775
- 8-bit PIC® Microcontroller Solutions Brochure, DS30009630
- PIC16(L)F1773/6 Data Sheet, DS40001810
- PIC16(L)F1777/8/9 Data Sheet, DS40001819
- Focus Product Selector Guide, DS00001308
- Quick Guide to Microchip Development Tools, DS50001894

Links

- Online sampling: www.microchip.com/samples
- Online purchasing: www.microchipdirect.com
- Product family information: www.microchip.com/PIC16F176X
www.microchip.com/PIC16F177X

Application Examples

- Switch-mode power supplies (DC-to-DC/AC-to-DC)
- Lighting (professional lighting, street lights, automotive and industrial)
- TRIAC control and lighting dimming
- Motor/fan control

Development Made Easy

The PIC16F176X/7X family provides an easy and low-cost development solution from code creation to integration into your end application.

Develop your Code

MPLAB® Code Configurator, which is a plug-in for Microchip's free MPLAB X Integrated Development Environment (IDE), provides a graphical method to configure 8-bit systems and peripheral features. By automatically generating efficient and easily modified C code, it can take your application from concept to prototype in minutes.

Development Tools From Microchip

- PICKit™ 3 In-Circuit Debugger (PG164130)
- PICDEM™ Lab Development Kit with PICKit 3 (DM163045)
- PICKit Low Pin Count Demonstration Board (DM164130-9)



Visit our web site for additional product information and to locate your local sales office.

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