Summary

Designing the simplest solution to a complex problem such as fan/motor control on a system board can often be challenging. Microchip has simplified both the design and implementation of such applications by introducing the new PIC12F609/HV609, PIC12F615/HV615, PIC16F610/HV610 and PIC16F616/HV616. The first PIC microcontrollers of their kind, the 14-pin PIC16F616 provide an increased feature set inclusive of an enhanced full bridge Enhanced Capture/Compare Pulse Width Modulation (ECCP), eight 10-bit ADC channels, 2 comparators with selectable hysteresis, 4/8 MHz internal oscillator and 2K words of Flash program memory. The 8-pin PIC12F615, provides a half bridge ECCP, four 10-bit ADC channels, 1 comparator with selectable hysteresis, 4/8 MHz internal oscillator and 1K words of Flash program memory. The simplified PIC16F610 and PIC12F609 provide similar features without the ADC and ECCP. All of these PIC microcontrollers are available with high voltage variants and provide an integrated shunt voltage regulator allowing high voltage VDD support. The PIC12HV609, PIC12HV615, PIC16HV610 and PIC16HV616 provide the ability to run as low as 2.0V, up to an unspecified user-defined maximum voltage. The shunt regulator is active when the external VDD input is greater than 5V and disabled otherwise. These high voltage variations are ideal for cost sensitive applications with high voltage power rails.

Features

- High Voltage VDD Support (available only on the HV variants)
  - Any application with native high voltage rails
  - Saves external component cost
- PWM
  - Full ECCP with dead band control
  - Steerable
  - Provides auto shut-down for overcurrent conditions
- Comparator with hysteresis
  - Direct interface to Hall Effect element
  - Ideal for fan/motor control and monitoring
  - Any application requiring the ability to monitor speed and/or position
  - Better performance in electrically noisy environments
- TMR1 with Gate
  - Running directly from 4/8 MHz internal oscillator
  - Ideal for power supplies and battery chargers
  - Ideal for any application requiring conditional event or error counting
  - Applications needing pulse width measurements

Comparator with Hysteresis

As with most PIC microcontrollers, the PIC12F609, PIC12F615, PIC16F610, PIC16F616, and High Voltage variants PIC12HV609, PIC16HV615, PIC16HV610 and PIC16HV616, can easily be utilized in a wide array of general purpose applications. Additional unique features make them particularly well suited for focused applications such as motor or fan control. The comparator on all variants is steerable and designed with greater hysteresis to provide the ability to use a Hall Effect element for speed monitoring of a fan or motor. Due to the differential signaling of the Hall Effect element, traditional comparators do not always provide the ability to accurately translate the varying frequency of the Hall Effect element into a manageable digital signal. With the addition of hysteresis, these newly designed comparators will in effect provide a trigger window and ultimately greater ease in such translations. This, paired with the integrated PWM, makes these products a robust fan-control solution that is more cost effective and flexible than traditional dedicated fan control methods.
Additional Information
- PIC16F616/16HV616 Data Sheet, DS41288
- PIC12F615/12HV615, PIC16F616/16HV616 Product Brief, DS41272
- AN1035 - Designing with HV Microcontrollers, DS01035
- 8-bit PIC Microcontroller Solutions Brochure, DS39630
- Low Cost Development Tools Guide, DS51560
- Corporate Product Line Card, DS00890
- Microchip Product Selector Guide, DS00148

Links/Sample/Purchasing Information
- Web Link: www.microchip.com/fancontrol
- Web Link: www.microchip.com/motorcontrol
- Web Link: www.microchip.com/startnow
- Online Sampling: www.sample.microchip.com
- Online Purchasing: www.microchipdirect.com

Microchip Fan Control Solution
Component Cost Savings:
- Voltage Regulator
- Input Signal Conditioning
- Hall Effect Sensor

Improvements:
- Hardware PWM
- Greater control and response
- Meets latest industry fan control specifications

High Voltage and Fan Control 8-bit PIC® Microcontrollers

<table>
<thead>
<tr>
<th>Product</th>
<th>Flash Program Memory Words</th>
<th>RAM Bytes</th>
<th>I/O Pins</th>
<th>Panel (ECCP, ADC, Comp)</th>
<th>Internal Oscillator</th>
<th>Timers/WDT</th>
<th>High Voltage Support</th>
<th>Packages</th>
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<tbody>
<tr>
<td>PIC12F609</td>
<td>1K</td>
<td>64</td>
<td>6</td>
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<td>1</td>
<td>4/8 MHz</td>
<td>1 16-bit, 1 8-bit, 1 WDT</td>
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<td>64</td>
<td>6</td>
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<td>PIC12F615</td>
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<td>Half Bridge 4 x 10-bit</td>
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<td>4/8 MHz</td>
<td>1 16-bit, 2 8-bit, 1 WDT</td>
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<td>4/8 MHz</td>
<td>1 16-bit, 2 8-bit, 1 WDT</td>
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</table>

Package Key:
- MD = DFN, ML = QFN, P = PDIP, SL = SOIC (14-lead .150"), SN = (8-lead .150"), ST = TSSOP
- Tape & reel as well as extended temperature options are available.
- Enhanced Capture/Compare Pulse Width Modulation
- Comparator hysteresis can be disabled and used like a typical comparator.

Microchip Technology Inc. • 2355 W. Chandler Blvd. • Chandler, AZ 85224-6199

Microcontrollers • Digital Signal Controllers • Analog • Serial EEPROMs

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