



# PIC18F2539 MC EVAL KIT

## PIC18F2539 Motor Control Evaluation Kit

Single phase induction motors are widely used in home appliances, industrial fans, blowers, pumps, etc. When these motors are connected to the specified supply, they run at a constant speed. However, varying the motor speed is desired in most of the applications. Using power electronics and control systems, induction motor speed can be varied. In addition to variable speed, these drives are easy to control, provide energy efficiency, and reduce noise.

Microchip Technology Inc. and Anacon Systems, Inc. have jointly developed a motor control evaluation kit used to demonstrate the PIC18F2539 motor control microcontroller. The PIC18F2539 Motor Control Evaluation Kit (PIC18F2539 MC Eval Kit) provides great flexibility for the user to develop applications that work directly with the motor control kernel that resides in the PIC18F2539. The kit uses Programmable Motor Control Processor Technology (ProMPT™). The ProMPT board is a compact module containing proprietary circuits and a sophisticated firmware kernel required for single phase induction motor control. The motor control is based on open loop variable voltage and variable frequency (VF) technology.

The PIC18F2539 MC Eval Kit includes the following items:

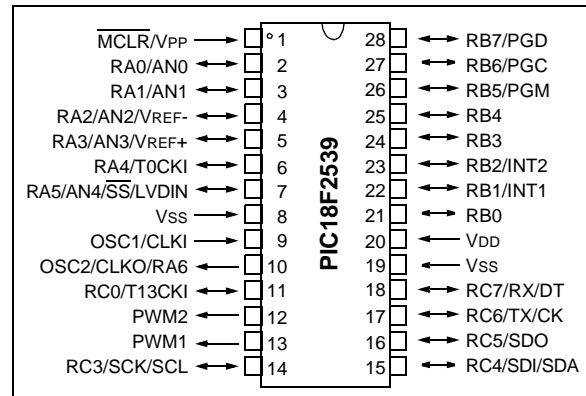
- ProMPT Evaluation Board (EVB) with heat sink: This is the single phase induction motor control board.
- ProMPT-Eye board
- Control and display board
- Motor Control Evaluation Configuration CD:
  - DashDriveMP™ V1.0 for Windows® 98, Windows® Me, Windows® 2000 and Windows® XP
  - DashDriveMP User's Guide
  - PIC18F2539 Motor Control Evaluation Kit User's Guide
  - Demo programs
- Input power cable
- Shaded pole induction motor

The DashDriveMP software is the Graphical User Interface (GUI) that allows the user to configure the drive parameters with ease and flexibility. The ProMPT EVB with the ProMPT-Eye board, communicates with the DashDriveMP software over the wireless media on infrared. The ProMPT EVB includes default motor parameters and VF curves. The user can command a frequency using the graphical interface and see the status on the ProMPT EVB, such as motor current, bus voltage, and heat sink temperature. The user can also modify the parameters, including the acceleration rate, deceleration rate and the VF curve using the DashDriveMP GUI.

The motor control circuit is built around Microchip's FLASH microcontroller, PIC18F2539. This microcontroller has a powerful 8-bit RISC core with 24 Kbytes of on-chip program memory, 1.4 Kbytes of data memory and 256 bytes of EEPROM. The peripherals include up to 5 channels of 10-bit Analog-to-Digital Converters (ADC), PWMs, USART, I<sup>2</sup>C™, SPI™ and up to 21 digital I/Os.

The motor control kernel is embedded in the microcontroller before shipping the kit. The user can develop their own application around this kernel. A set of Application Program Interface (API) methods are defined. These methods are used to communicate between the motor control kernel and application software. The application program can be developed, debugged and executed using MPLAB® IDE (Integrated Development Environment). Microchip Technology also provides a low cost In-Circuit Debugger, MPLAB® ICD 2, and the C compiler, MPLAB® C18. The MPLAB ICD 2 debugging tool allows the user to single-step, break and watch required memory locations in the application program while connected to the circuit. MPLAB ICD 2 can also be used as a programmer for PICmicro® microcontrollers with FLASH program memory.

**FIGURE 1: PIC18F2539 PIN DIAGRAM**

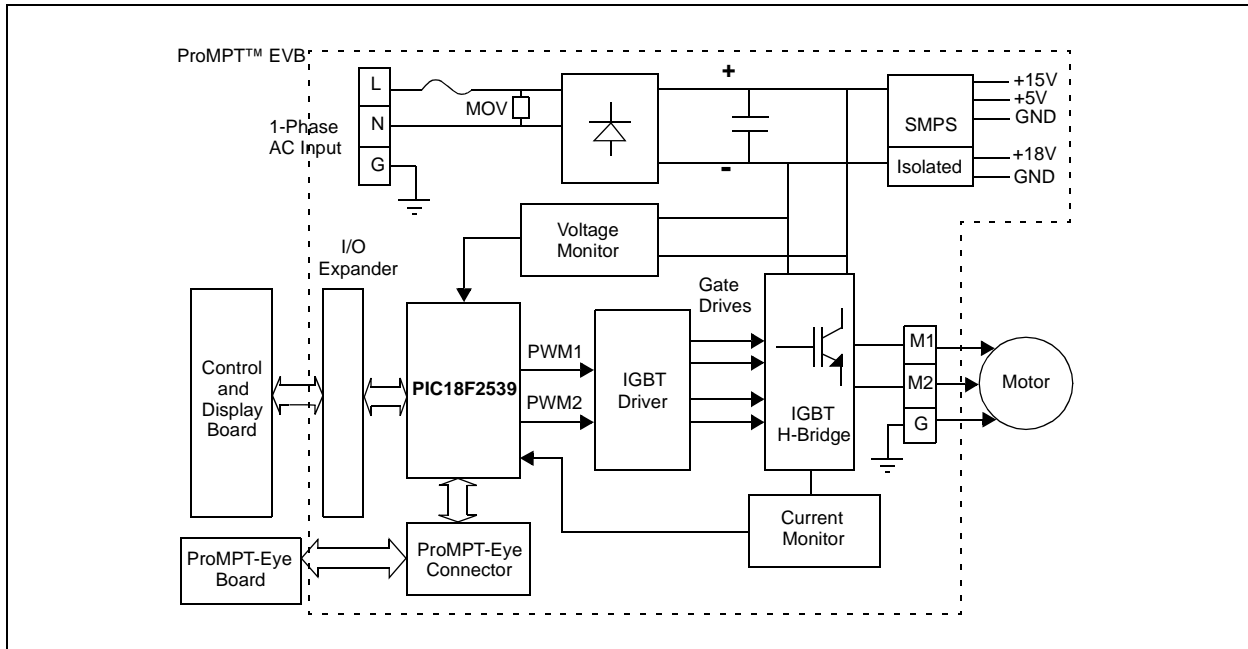


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Most of the I/O pins are brought out to the I/O expander connector on the ProMPT EVB board. This enables the user to develop hardware required for the application.

**Note:** This control is suitable for Permanent Series Capacitor (PSC) and shaded pole single phase induction motors, to 230 volts and 5 amps. Connecting other types of motors may damage the PIC18F2539 MC Eval Kit, the motor, or both. Additionally, the drive may not function as intended.

**FIGURE 2: HARDWARE BLOCK DIAGRAM**



# PIC18F2539 MC EVAL KIT

FIGURE 3: SOFTWARE ARCHITECTURE

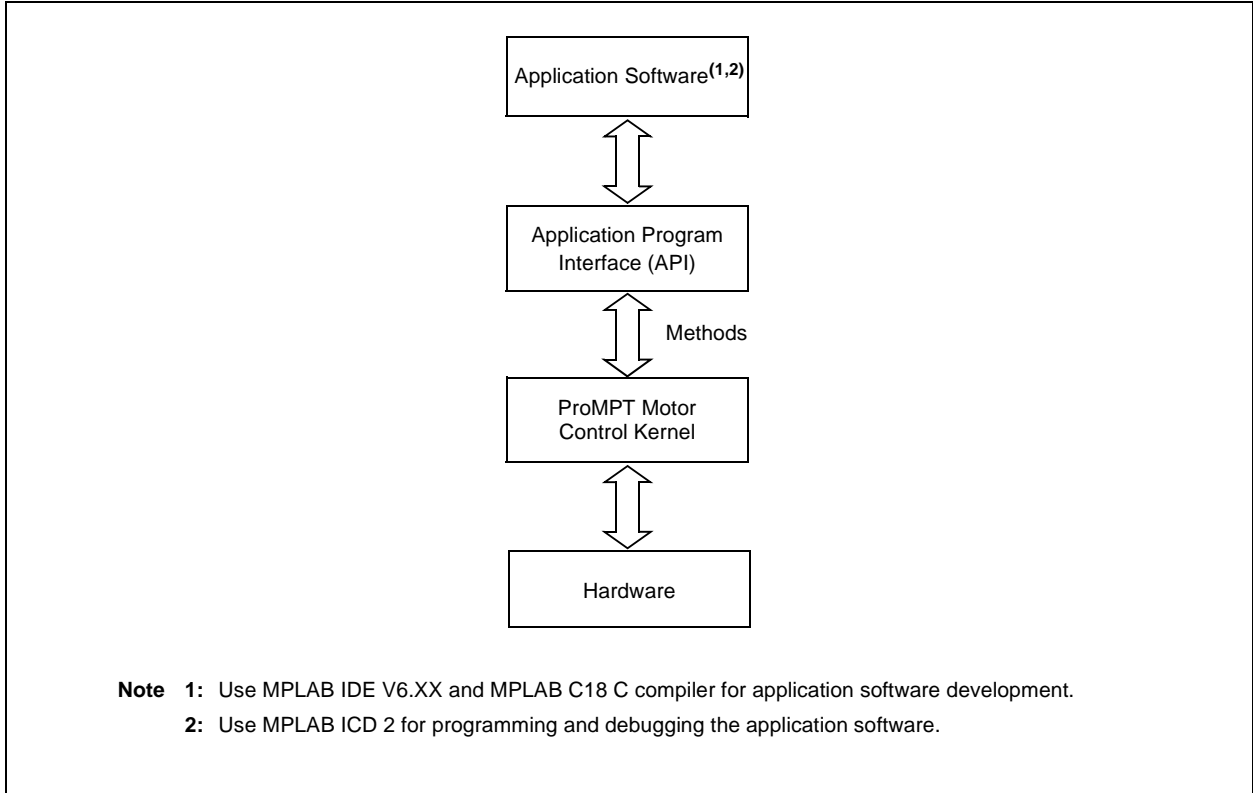
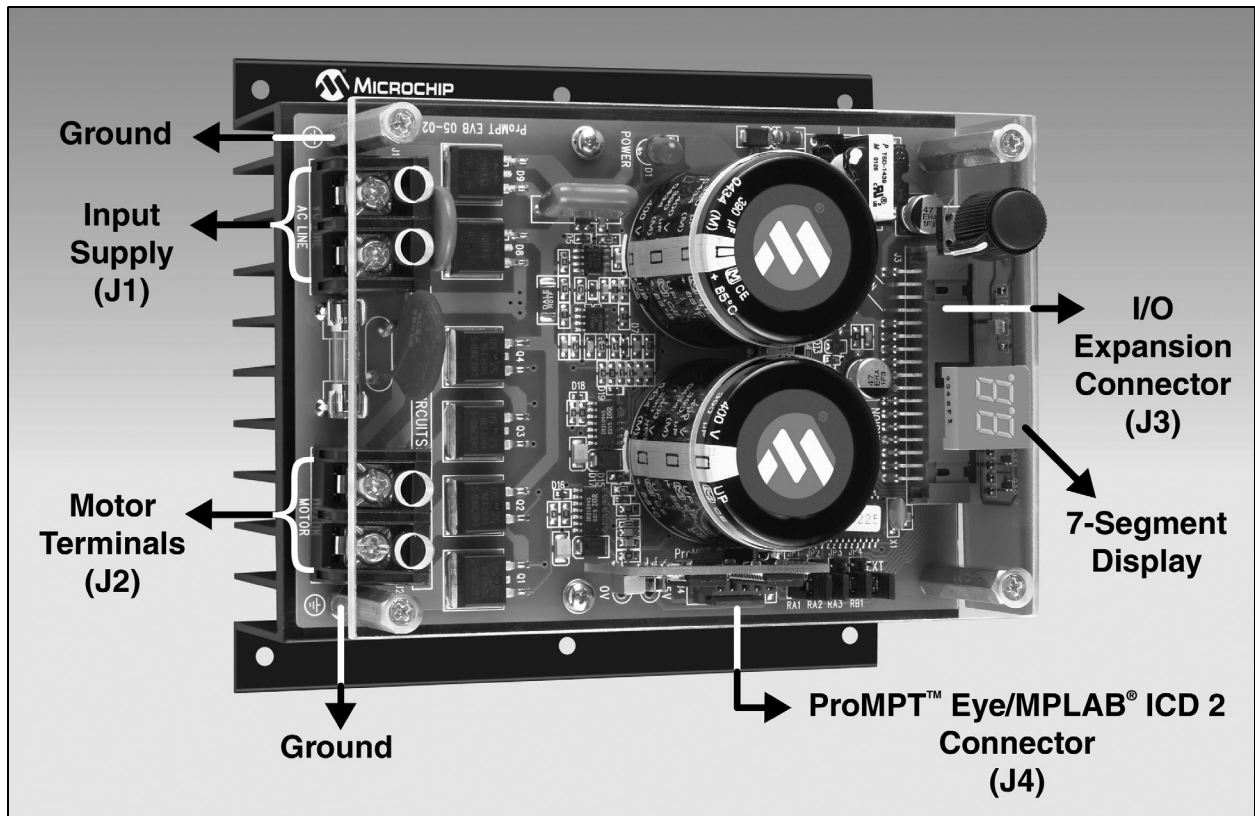


FIGURE 4: ProMPT EVB



# PIC18F2539 MC EVAL KIT

The electrical characteristics of the drive are given below:

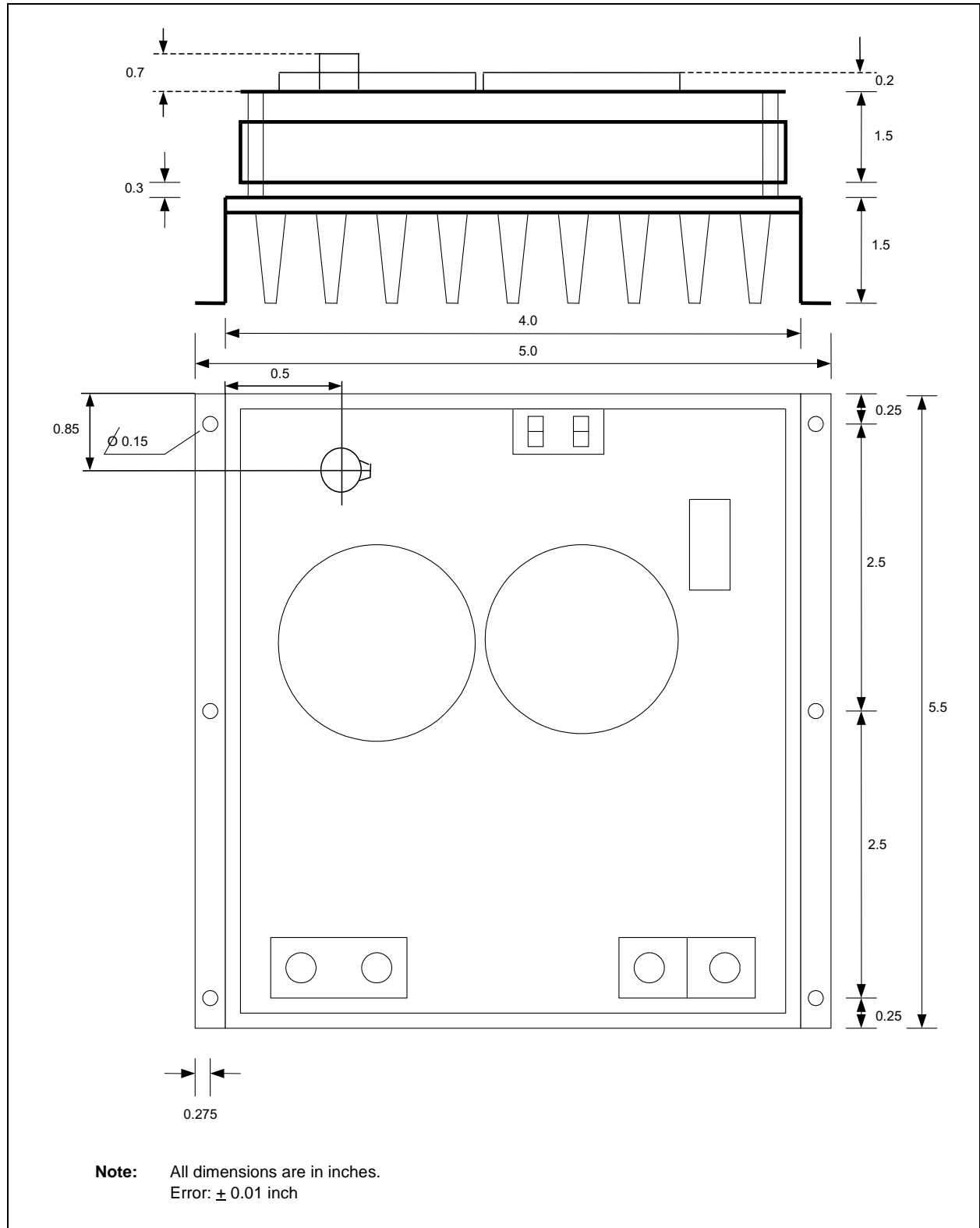
**TABLE 1: ELECTRICAL CHARACTERISTICS**

Parameter	Typical	Min	Max	Units	Note
<b>AC Input</b>					
Supply Voltage	115/230	85	275	Vrms	Single Phase
Start-up Supply Voltage	70	60	80	Vrms	Line Voltage required for ProMPT drive power supply to start
Dropout Supply Voltage	30	—	—	Vrms	Low Line Voltage before ProMPT drive power supply enters shutdown
Standby Current	42			mA	With 115V supply
Standby Power	1.0	0.9	1.2	Watts	With 115V supply
Supply Frequency	50/60	DC	400	Hz	
<b>Motor Output</b>					
Output Voltage	—	0	275	Vrms	Single Phase
Output Frequency	—	1	127	Hz	Sine Wave Simulated
Output Current	—	—	5.0	Amps	Continuous rating
Output Current	—	—	6.25	Amps	30 seconds overload rating
<b>Isolated Power Output</b>					
Isolation Voltage	—	2500	—	VAC	
Creepage	—	6.5	—	mm	Meets UL, CSA and IEC requirements for reinforced isolation
DC Voltage Output	16.5	18.0	18.5	VDC	Fully isolated and available for external circuits
DC Supply Current	—	—	200	mA	Fully isolated and available for external circuit
<b>Thermal</b>					
Base Plate Temperature	—	—	75°	°C	
Thermal Shutdown	75°	—	—	°C	
Ambient Operating Temperature	—	0°	40°	°C	

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Mechanical dimensions for the PIC18F2539 Motor  
Control Evaluation Kit:

**FIGURE 5: ProMPT EVB PHYSICAL DIMENSIONS**



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NOTES:

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