a3520 general features

The a3520 is a DC motor controller IC, providing a single chip solution for a wide range of tasks including power supply, motor control and high level system control. The IC's components enable parallel execution of system functions such as PWM input capture, current limit monitoring, bridge clock generation, etc., while reducing the IC's MCU's load and memory requirements.

IC Features

❑ Operating VCC range from 5-18V
❑ On-chip 25MHz ±1% oscillator
❑ 10bit AD Converter with 8-channel multiplexer
❑ On-chip 3.3V/5mA regulator
❑ On-chip programmable 0.7V to 2.7V/10mA regulator, suitable for driving passive hall elements
❑ VCC monitor
❑ On-chip temperature sensor
❑ 6 gate driver outputs with pull and dump resistors
❑ PWM input capture unit to decode duty cycles of external signals
❑ Open drain signal output, over current protected
❑ Two wire interface
❑ 0-VCC high voltage PWM-output ready to drive inrush current protection transistors
❑ Up to 10 pins usable as GPIO
❑ Spread spectrum PWM support via software
❑ Non-overlapping bridge clock generator with programmable dead-time
❑ Programmable current limit
❑ analog comparator with programmable hysteresis (Hall sensor, Phase voltage feedback)

MCU Features

❑ Standard compatible MCU
❑ Powerful single cycle instruction set (only RAM access and branches need two cycles)
❑ 25MHz MCU clock
❑ 12 prioritized interrupt levels
❑ 256Byte RAM
❑ 4kByte Pseudo-MTP program memory
❑ Four 16bit timers with pre-scaler
❑ Two 8 bit timers with pre-scaler
❑ Hardware watchdog timer
❑ On-chip debugging support
❑ Fast RAM-based development support
❑ Two wire programming and debugging interface

Package: QFN28
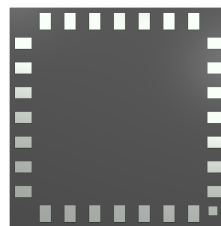
The 28 pin 4x4mm QFN package option is best suited for small board designs.

— **example application schematics** —

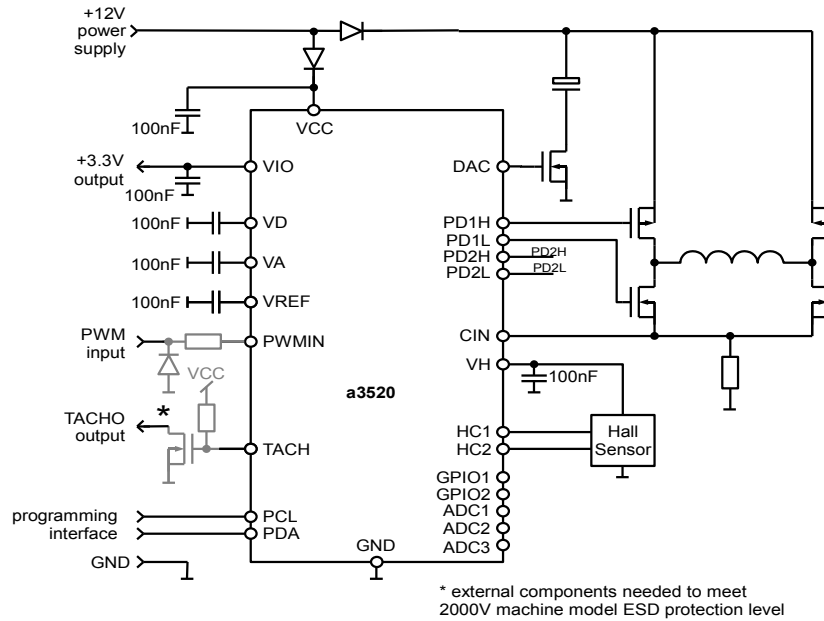Only a few external components are needed to build a simple motor application:

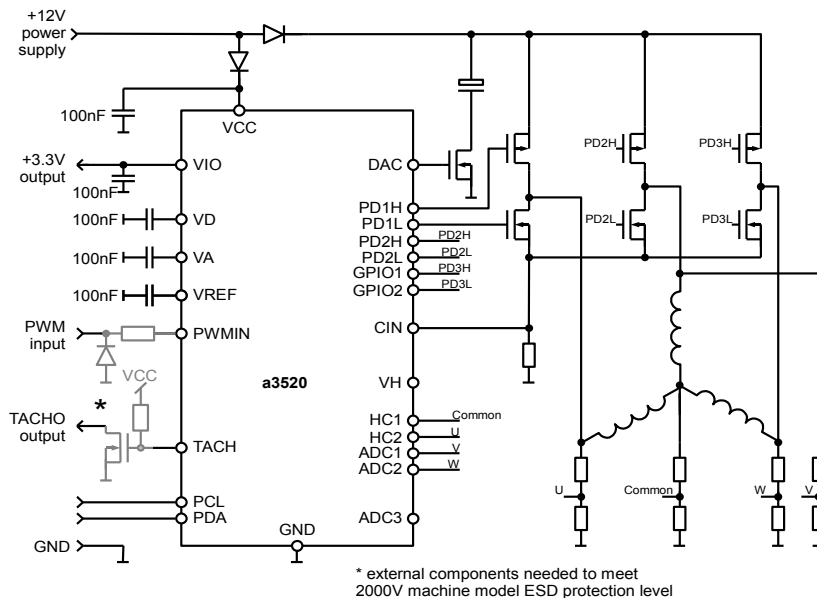**Fig.1** Simplified single phase application schematic

Fig. 2 Simplified sensorless three phase application schematic

Control algorithms for different types of motors single phase, three phase with and without sensors are implemented as MCU programs. All six high voltage outputs can be used to drive bridge transistors directly. The on chip bridge driving logic includes dead time and shout through protection for each bridge transistor pair.