Description
The BLDC motor sensorless control demo deals with a 3-phase Brushless DC (BLDC) motor sensorless drive for fans, pumps, and compressors. It is based on the Freescale’s cost-effective MC56F8013 hybrid controller.

The concept of the application is a speed-closed loop Brushless DC drive without any position or speed sensor needs. The application uses a sensorless control based on back-EMF sensing using dedicated low voltage (automotive 12-volt) power stage boards and controller board of MC56F8013 hybrid controller.

The demo setup is controlled via FreeMASTER control page utilizing RS232 communication.

Application Usage
- BLDC Motor Applications
- Fan, Pump and Compressor Applications
- Automotive

Application Features
- 3-phase BLDC motor sensorless control, based on trapezoidal control with back-EMF sensing
- Designed to fit into fan, pump, and compressor applications
- Both direction of rotation
- Speed closed loop with current closed loop at alignment
- Adjustable DC bus current limitation by software
- Automatic pre-calibration of phase back-EMF measurements
- Overvoltage, undervoltage, and overcurrent fault protection
- Manual interface and FreeMASTER control page for monitoring, control and tuning
- Easy to tune for different power stages and motors

Target Devices/Platforms
- Brushless DC Motor
- Freescale MC56F8013 Hybrid Controller
- Freescale MC33395 Three-Phase Gate Driver IC
- Motor Control Application
BLDC MOTOR SENSORLESS CONTROL USING MC56F8013 DEMO SETUP

Available from Freescale Semiconductor
> Reference Design
> Demo setup with 3-phase BLDC Motor, Micro Power Stage and MC56F8013 Evaluation Board
> Application software in C (CodeWarrior™ Development Studio)
> Application support from motor control experts from Freescale Semiconductor, Roznov Czech System Center (Roznov CSC)

Online Resources
> Reference Design at Freescale homepage: www.freescale.com
> Freescale Motor Control web page: www.freescale.com/motorcontrol

MC56F8013 Features
> DSP core
  • Up to 32 MIPS at 32 MHz execution frequency
  • DSP and MCU functionality in a unified, C-efficient architecture
> Internal memory
  • 16 KB program Flash
  • 4 KB Data RAM
> Clock generation
  • On-chip relaxation oscillator operating at 8 MHz
  • Fixed PLL operating at 192 MHz
> On-chip peripherals
  • One SCI, one SPI and one I2C
  • 6 input 12 bit A/D converter
  • 6 output PWM module
  • One 16-bit quad timer
  • All pins are muxed with GPIO
  • COP and integrated power-on reset
> JTAG/EOnCE for unobtrusive, real-time debugging