Freescale Semiconductor, Inc.
User's Guide

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Freedom FRDM-MC-LVBLDC Development Platform User's Guide

1. Introduction

The Freedom development platform is a set of software and hardware tools for evaluation and development. It is ideal for rapid prototyping of microcontroller-based applications.

The FRDM-MC-LVBLDC low-voltage evaluation board, in a shield form factor, effectively turns a Freedom development platform into a complete motor control reference design, compatible with existing Freedom development platforms, FRDM-KV31F and FRDM-KV10Z, and the low-cost motor FRDM-MC-LVMTR.

The FRDM-MC-LVBLDC shield board implements a 3-phase Brushless DC (BLDC) interface platform that adds BLDC motor control capabilities, such as rotational or linear motion, to your design applications.

Contents

2. FRDM-MC-LVBLDC Hardware Overview

The features of the FRDM-MC-LVBLDC hardware are as follows:

- Power Supply Input voltage DC: 10-15 V DC via 5.5x2.1mm barrel connector.
- Output current up to 5 amps RMS.
- Power supply reverse polarity protection circuitry.
- 3-phase bridge inverter (6-MOSFET's).
- 3-phase MOSFET gate driver with over current and under voltage protection.
- Analog sensing (DC bus voltage, DC bus current, 3-phase back-EMF voltage).
- 5.5 V DC auxiliary power supply providing FRDM MCU board supplying.
- Motor speed/position sensors interface (Encoder, Hall).
- Freedom motor control headers compatible with Arduino™ R3 pin layout.
- The FRDM-MC-LVBLDC board does not require any hardware configuration or jumpers setting. It contains no jumpers.

The following figure shows the block diagram of the FRDM-MC-LVBLDC design.

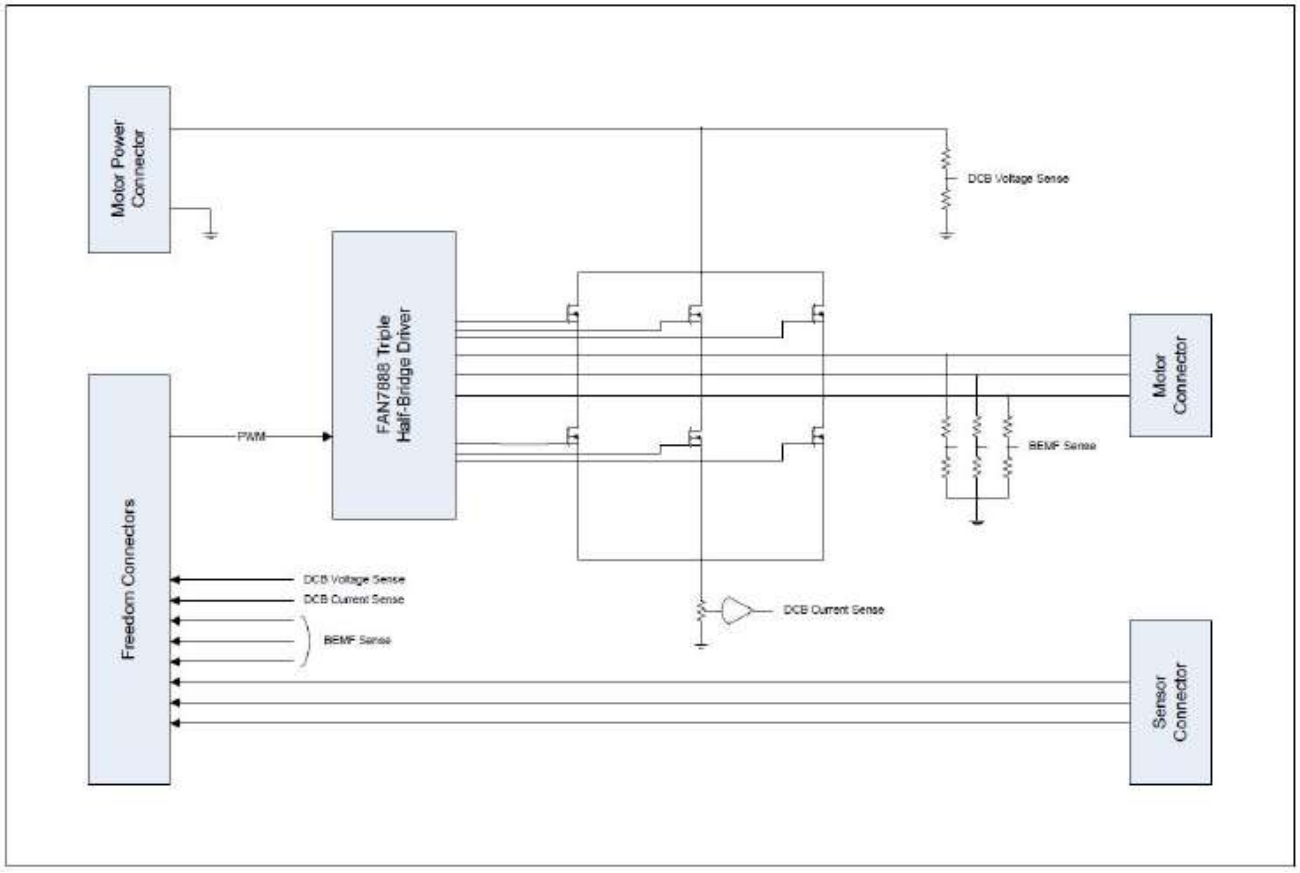

Figure 1. FRDM-MC-LVBLDC platform block diagram

The primary components and their placement on the hardware assembly are explained in the below figure.

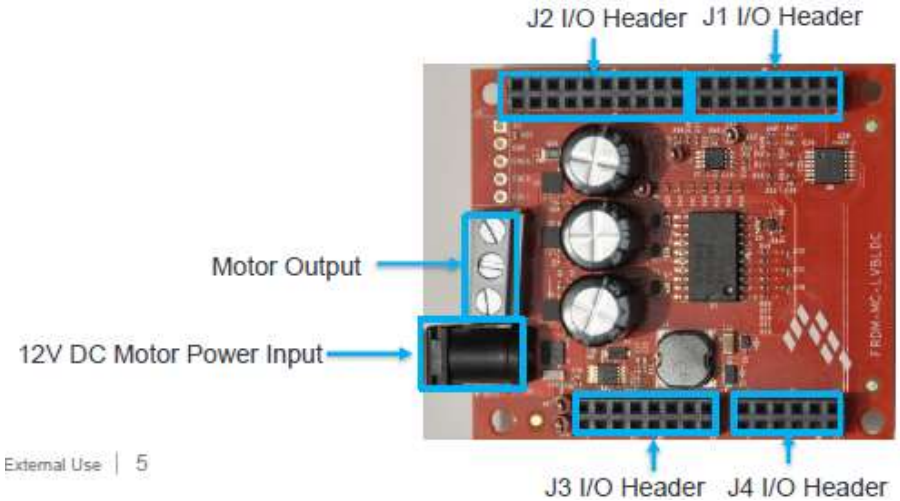

Figure 2. FRDM-MC-LVBLDC main components placement

3. FRDM-MC-LVBLDC Hardware Description

3.1. Low Voltage 3-Phase BLDC Driver Board (12 V)

- Suitable for trapezoidal control algorithm.
- Fairchild half-bridge gate drivers & power MOSFETs:
  - FAN7888MX 3ch half bridge gate driver
  - FDMC8030 40 V dual N-channel power MOSFETs
  - FAN4852IMU8X low power amplifier

4. References

The following references are available on www.nxp.com:

- FRDM-KV10Z Quick Reference Guide
- FRDM-KV31F Quick Reference Guide
- FRDM-MC-LVBLDC Pinouts
- FRDM-MC-LVBLDC Schematic
- FRDM-MC-LVBLDC Design Package

5. Revision History

Table 1. **Revision history**

Revision number	Date	Substantive changes
0	02/2016	Initial release

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