Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832
Email & Skype: info@chipsmall.com Web: www.chipsmall.com
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

Freescale Semiconductor, Inc.
User's Guide

Document Number: FRDMLVPMSMUG
0, 02/2016

Freedom FRDM-MC-LVPMSM 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-LVPMSM 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-LVPMSM shield board implements a 3-phase Permanent Magnet Synchronous Motor (PMSM) interface platform that adds Field Oriented Control (FOC) motor control capabilities, such as rotational or linear motion, to your design applications.

Contents

1. Introduction 1
2. FRDM-MC-LVPMSM Hardware Overview 2
3. FRDM-MC-LVPMSM Hardware Description 4
   3.1. Low Voltage 3-Phase PMSM Driver Board (24V/48V) 4
4. References 4
5. Revision History 4

© 2016 Freescale Semiconductor, Inc. All rights reserved.

2. FRDM-MC-LVPMSM Hardware Overview

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

- Power Supply Input voltage DC: 24-48VDC, 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 VDC 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-LVPMSM 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-LVPMSM design.

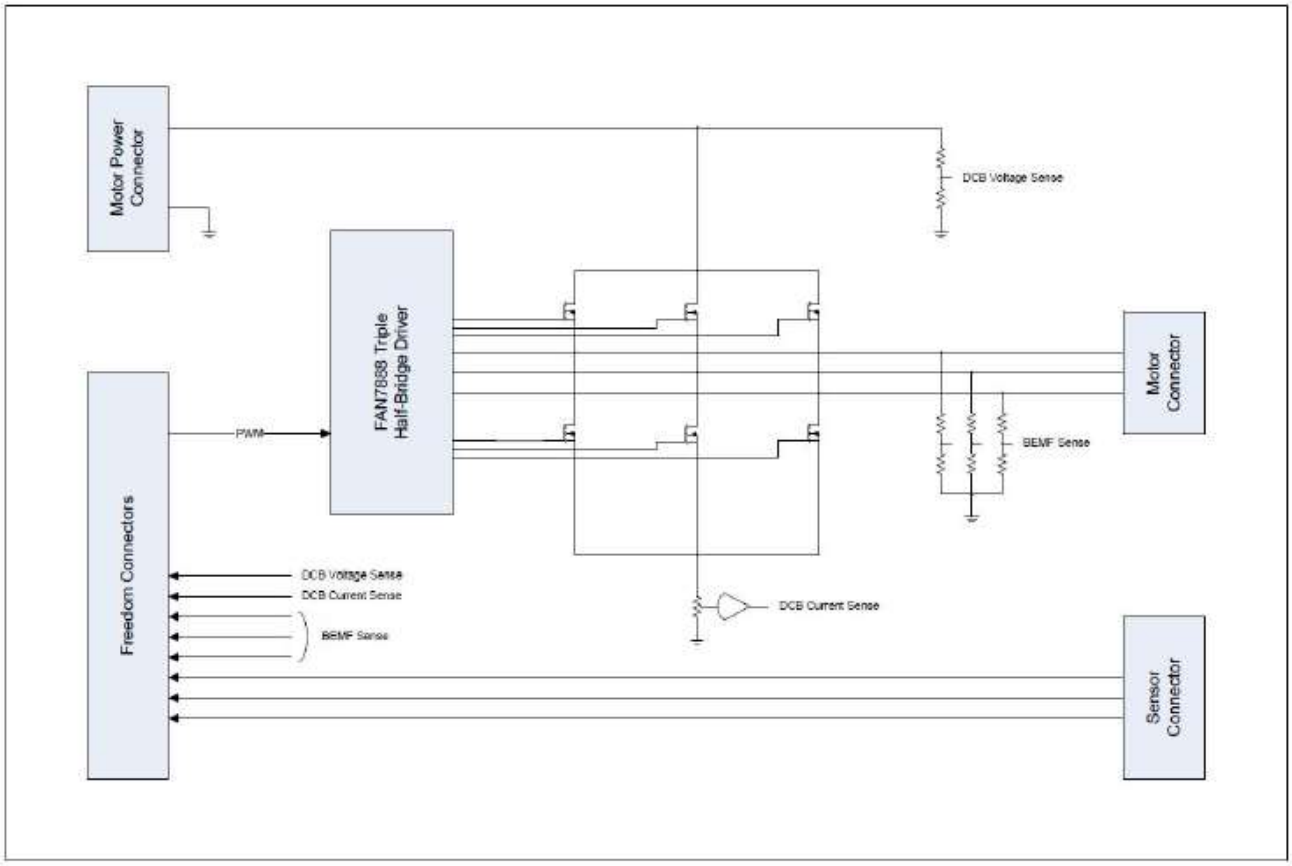

Figure 1. FRDM-MC-LVPMSM platform block diagram

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

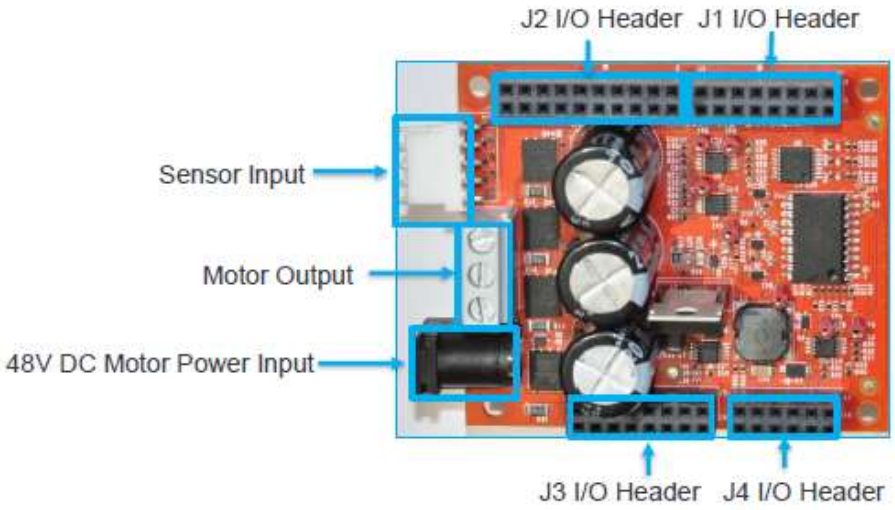

Figure 2. FRDM-MC-LVPMSM main components placement

3. FRDM-MC-LVPMSM Hardware Description

3.1. Low Voltage 3-Phase PMSM Driver Board (24 V/48 V)

- Suitable for sinusoidal control algorithms (FOC).
- Fairchild half-bridge gate drivers & power MOSFETs:
  - FAN7888MX 3ch half bridge gate driver
  - FDMS8090 100 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-LVPMSM Pinouts
- FRDM-MC-LVPMSM Schematic
- FRDM-MC-LVPMSM Design Package

5. Revision History

Table 1. **Revision history**

Revision number	Date	Substantive changes
0	02/2016	Initial release

How to Reach Us:

Home Page:
freescale.com

Web Support:
freescale.com/support

Information in this document is provided solely to enable system and software implementers to use Freescale products. There are no express or implied copyright licenses granted hereunder to design or fabricate any integrated circuits based on the information in this document.

Freescale reserves the right to make changes without further notice to any products herein. Freescale makes no warranty, representation, or guarantee regarding the suitability of its products for any particular purpose, nor does Freescale assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation consequential or incidental damages. “Typical” parameters that may be provided in Freescale data sheets and/or specifications can and do vary in different applications, and actual performance may vary over time. All operating parameters, including “typicals,” must be validated for each customer application by customer's technical experts. Freescale does not convey any license under its patent rights nor the rights of others. Freescale sells products pursuant to standard terms and conditions of sale, which can be found at the following address: freescale.com/SalesTermsandConditions.

Freescale, the Freescale logo, and Kinetis, are trademarks of Freescale Semiconductor, Inc., Reg. U.S. Pat. & Tm. Off. ARM and Cortex are registered trademarks of ARM Limited (or its subsidiaries) in the EU and/or elsewhere. All rights reserved.

© 2016 Freescale Semiconductor, Inc.

Document Number: FRDMLVPMSMUG
0
02/2016