

**Quick Start Guide** 

# S12ZVM-EFP Reference Design Board

Enabling BLDC or PMSM fuel pump applications



## GET TO KNOW THE S12ZVM-EFP BOARD

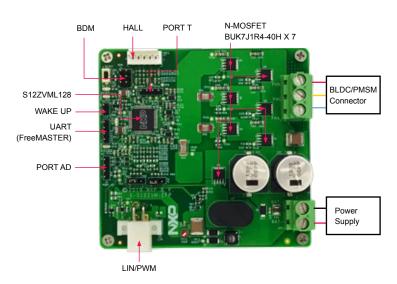


Figure 1: Front side of S12ZVM-EFP RDB



Figure 2: Back side of S12ZVM-EFP RDB

### **Quick Start Guide**

### S12ZVM-FFP RDB FEATURES

- 12 V system application; supply voltage range from 8 V to 16 V
- Up to 250 W input power at 13 V supply voltage
- Supports BLDC/PMSM sensorless FOC control, both dual shunt and single shunt
- Robust and fast start up, meets the strict start up condition < 150 ms from standstill to the rated speed for fuel pump motor
- Supports speed command from LIN/PWM/FreeMASTER (default setting is FreeMASTER)
- Supports multiple diagnose and protection covering UV, OV, OT, OC, short, stall detection, etc.
- Not only supports fuel pumps, but also suitable for other automotive BLDC/PMSM applications

### STEP-BY-STEP INSTRUCTIONS

Firstly, install CodeWarrior® Development Studio V11 or a newer version for the S12Z MagniV® device.

Secondly, install FreeMASTER Run-time debugging tool used to tune the motor.

# 1 Download Software



Download installation software and documentation at nxp.com/S12ZVM-EFP.

# 2 Connect the cable and a debugger like PE Multilink

Connect power supply cables and fuel pump or other 3-phase BLDC/ PMSM cables to the board. Connect the PE Multilink debugger to BDM port (J1) onboard and another end to the PC. Connect an SCI to USB wire (FreeMASTER) to UART port (J4) PIN2, PIN3 and PIN4 and another end to the PC USB port.

### STEP-BY-STEP INSTRUCTIONS CONTINUED

# 3 Set Up DC Power Supply

Connect power supply wires to the DC power supply. Set the voltage at 12 V and the current limit to 20 A. Check and make sure all connections are right.

# Multilink J7 J5 SCI TO TO USB J1 J1 Power Supply DC:12 V Current limit: 20.0 A

# 4 Program Example Codes

Open CodeWarrior and load example projects. Power up the board. Open FreeMASTER in the S12ZVM-EFP Software Quick Start Package. Configure the connected motor parameters and other parameters in MCAT and generate the "PMSM\_appconfig.h" file. Compile and program the project and then connect the FreeMASTER with the S12ZVM-EFP board. After that, you can run the motor by using FreeMASTER. For more details, refer to S12ZVM-EFP Software User Guide (SWUG).

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# **HEADERS AND CONNECTORS LIST**

HEADER/CONNECTOR	DESCRIPTION		
J1	For BDM, PIN1-BKGD, PIN2-GND, PIN3-NC, PIN4-RESET, PIN5-NC, PIN6-VDDX		
J3	For LIN and PWM, PIN1-GND, PIN2-GND, PIN3-NC, PIN4-LIN/PWM		
J4	For UART TTL FreeMASTER, PIN1-VDDX, PIN2-TXD1, PIN3-RXD1, PIN4-GND		
J5	For PORTT and external SPI, PIN1-PT3/SS0, PIN2-PT2/SCK0, PIN3-PT1/MOSI0, PIN4-PT0/MISO0		
J6	For external ADC, PIN1-PAD3, PIN2-PAD4, PIN3-PAD8, PIN4-GND		
J7	For hall sensor, PIN1-EVDD, PIN2-GND, PIN3-HALL_A, PIN4-HALL_B, PIN5-HALL_C, PIN6-NC		
J10	For power supply, PIN1-VBAT+, PIN2-VBAT-		
J11	For motor connector, PIN1-PHA, PIN2-PHC, PIN3-PHB		
J12	For dual-shunt and single-shunt jumper		
J13	For dual-shunt and single-shunt jumper		
J14	For K15 line to wake up, PIN1-K15 line, PIN2-GND		

# nxp.com/S12ZVM-EFP

# **HEADERS AND CONNECTORS LIST**

JUMPER	OPTION	SETTING	DESCRIPTION
J12	Current sampling routine	1-2	For single-shunt current sampling
		2-3	Default setting; for dual-shunt current sampling
J13	Current sampling routine	1-2	For single shunt-current sampling
		2-3	Default setting; for dual-shunt current sampling

#### **SUPPORT**

Visit www.nxp.com/support for a list of phone numbers within your region.

## WARRANTY

Visit **www.nxp.com/warranty** for complete warranty information.



## www.nxp.com/S12ZVM-EFP

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