Motor Control
Made Easy with S12
MagniV Solutions

S12ZML-MINIBRD and S12ZVML-MINIKIT 3-phase PMSM and BLDC motor control development board and kit

The S12ZML-MINIBRD and S12ZVML-MINIKIT demonstrate the advantages of the NXP S12ZVM MCU for 3-phase brushless DC motor (BLDC) and permanent magnet synchronous motor (PMSM) control applications.

OVERVIEW

The S12ZVML-MINIBRD and S12ZVML-MINIKIT are a motor control board and development kit optimized for automotive and industrial applications.

Both S12ZML-MINIBRD and S12ZVML-MINIKIT are based on 16-bit S12 MagniV® S12Z core and integrate an automotive voltage regulator, a LIN physical interface, and a gate driver unit able to drive up to six external MOSFETs.

KEY FEATURES

▸ **S12ZVM MCU** — 16-bit S12Z based MCUs with integrated high-voltage capabilities targeted for automotive and high reliability industrial motor control applications

▸ **Integrated solution** — Integrated 6-channel Gate Driver Unit to control six power MOSFETs, 12V to 5V voltage regulator and LIN physical layer

▸ **Automotive Motor Control Algorithm** — Sensorless control of the PMSM motor based on Field Oriented Control (FOC) and Sensorless control of the BLDC motor based on Six-step commutation control technique allowing torque/speed control with low CPU load

▸ **Automotive Math and Motor Control Library Set** — control algorithm built on blocks of precompiled software library

▸ **FreeMASTER and MCAT** — Application tuning and variable tracking

TARGET AUTOMOTIVE APPLICATIONS

▸ Actuators and valve controls

▸ Blower fan in HVAC systems

▸ Electric fuel, water and oil pumps

▸ Engine cooling fans

▸ Wind shield wipers

Runtime Software:

▸ S12ZVML-MINIBRD_BLDC: Complete BLDC motor control application software package for S12ZVML-MINIBRD

▸ S12ZVML-MINIBRD_PMSM: Complete PMSM motor control application software package for S12ZVML-MINIBRD

▸ AUTOMATH_MCL: Automotive Math and Motor Control Library Set

▸ FreeMASTER Run-Time Debugging Tool

▸ MCATSW: Motor Control Application Tuning (MCAT) Tool

▸ CodeWarrior® for MCUs (Eclipse IDE)

▸ MCU peripherals initialization generated by Processor Expert

S12ZVML128 AND S12ZML-MINIBRD SPECIFICATIONS

Flash	128 KB	PMF	6 ch, 15-bit PWM
RAM	8 KB	12 V VREG	120 V / 70 mA, 170 mA with ballast
Core	S12Z	ADC	2x16 ch., 12-bit
Speed	50 MHz	PTU	2 trigger input sources / 2 trigger output
Package	64LQFP	GDU	3/3
LIN-PHY	1	Temp	Up to +150°C
Comms	2 SCI, 1 SPI	EVDD	1 ch. 5 V / 20 mA (source)

Part Number	Motor	Kit Contains
S12ZVML-MINIBRD	BLDC, PMSM	Board, Cables
S12ZVML-MINIKIT	BLDC, PMSM	Board, Cables, Power Supply, Motor

S12ZVML-MINIKIT BLDC/PMSM DEVELOPMENT KIT

MOTOR CONTROL ALGORITHM CONCEPT