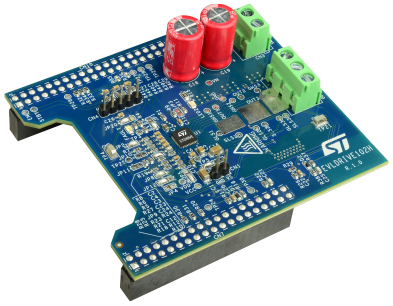
EVLDRIVE102H

Data brief

STDRIVE102H evaluation board for three-phase brushless motors



Product status link
EVLDRIVE102H
STDRIVE102H
STL220N6F7

Features

- Operating voltage from 6 V to 50 V
- Output current up to 12 A_{rms}: power stage based on STL220N6F7 60 V, 1.2 mΩ N-channel power MOSFETs
- Single shunt configuration
- STDRIVE102H triple half-bridge gate driver:
  - Programmable gate current (up to 1 A source / 2 A sink)
  - Charge pump for 100 % duty cycle operation
  - One embedded operational amplifier and one comparator for current sensing and overcurrent detection
  - One additional comparator for hardware thermal protection based on external NTC
  - Full set of protections: UVLO, thermal shutdown, VDS monitoring
- Input connector for Hall-effect based sensors and encoder
- Motor BEMF sensing network
- Bus voltage sensing
- Morpho connectors compatible with a wide range of STM32 NUCLEO boards

Applications

- Battery supplied power tools
- Portable vacuum cleaners
- E-bikes
- Industrial automation
- Robotics
- Pumps and fans

Description

The EVLDRIVE102H evaluation board is a three-phase inverter based on the STL220N6F7 power MOSFETs. This evaluation board allows a full evaluation of the features of the STDRIVE102H, a triple half-bridge gate driver.

The power stage uses a single shunt topology: the current sensing and the overcurrent protections are implemented using one operational amplifier and one comparator embedded in the STDRIVE102H.

The embedded protections of the STDRIVE102H, such as the UVLO on the driving voltage and the VDS monitoring for each power MOSFET, ensure a safe driving operation of the power stage.

The EVLDRIVE102H evaluation board is thermally protected by exploiting both the hardware thermal shutdown protection embedded in the STDRIVE102H and also an onboard NTC sensor placed close to the power stage. The NTC is connected to the second comparator embedded in the STDRIVE102H, thus implementing a second hardware protection according to the power stage temperature.

The nFAULT diagnostic pin of the STDRIVE102H, is connected to the control board and to an LED indicator, which lights on whenever a protection is triggered.

The EVLDRIVE102H evaluation board can support FOC and six-step motion control algorithms. In case the motor is equipped with positioning sensors, they can be connected to the connector for Hall-effect based sensors and for the encoder, in order to increase the precision of the control algorithms. Nevertheless, sensorless control algorithms can be implemented as well: each output phase of the inverter has a read-out network, which allows the sensing of the phase voltage/BEMF of the motor. In addition, the bus voltage sensing present on the board ensures that the control algorithms are properly implemented.

The EVLDRIVE102H evaluation board is compatible with a wide range of Nucleo control boards, thus allowing the evaluation of the STDRIVE102H together with different STM32 microcontrollers.

1 Specifications

Ratings of the board can be found in Table 1.

Table 1. EVLDRIVE102H - specifications

Parameter		Value
Supply voltage	Nominal	From 6 V to 50 V
Maximum current	Continuous (1)	12 A_{rms}
	Peak	25 A
Maximum power	Continuous (1)	350 W

1. *At 25 °C ambient temperature*

Revision history

Table 2. **Document revision history**

Date	Version	Changes
24-Mar-2025	1	Initial release.

Contents

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