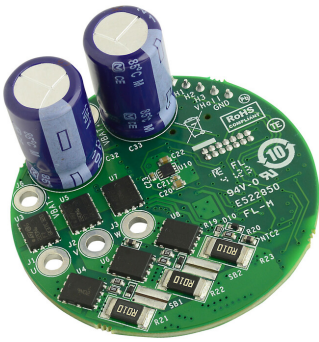


Circular and extremely compact motor control reference design for high-current brushless motors based on STDRIVE101



| Product status link |
|---------------------------------|
| EVLDRIVE101-HPD |
| STDRIVE101 |
| STM32G071KB |
| STL220N6F7 |
| L7983 |
| LDL112 |
| TSV991 |

Features

- Operating voltage from 18 V to 52 V
- STDRIVE101 triple half-bridge gate driver
- STM32G071KB microcontroller based on Arm® Cortex®-M0+ with 36 Kbytes of SRAM and 128 Kbytes of Flash
- Power stage based on STL220N6F7 60 V, 1.2 mΩ N-channel power MOSFETs with output current up to 15 Arms
- External turn-on/off trigger providing very low consumption standby
- Input connector for Hall-effect based sensors and encoder
- BEMF sensing circuitry and current limiter with adjustable reference
- Bus and temperature sensing
- Thermal shutdown, UVLO, protection against overcurrent and reverse biasing from power stage outputs
- Reliable and redundant overcurrent protection thanks to VDS monitoring
- Extremely compact footprint (50 mm diameter)
- STDC14 debug connector and direct firmware update through UART

Applications

- Battery-powered home appliances
- Power tools
- Fans
- Industrial automation
- Drones
- Robotics

Description

The **EVLDRIVE101-HPD** is a three-phase extremely compact inverter for brushless motors based on the STDRIVE101 device in conjunction with the STM32G071KB microcontroller. It can be used with an extremely wide variety of driving techniques, with FOC and trapezoidal control, sensed and sensor-less. The board is a ready-to-use and flexible solution ideal for battery-powered three-phase applications requiring high output currents. The EVLDRIVE101-HPD embeds a fast power-on circuit that connects/disconnects the battery, significantly extending its duration. The low $R_{ds(on)}$ STL220N6F7 MOSFETs allow operation at very high load current up to 750 W. The whole design is done in a compact circular layout of 50 mm diameter.

Debug support and programming capability are possible thanks to the provided SWD interface and the direct firmware update is also available.

1 EVLDRIIVE101-HPD schematic diagram

Figure 1. EVLDRIIVE101-HPD schematic: STM32G071 and STDRIVE101

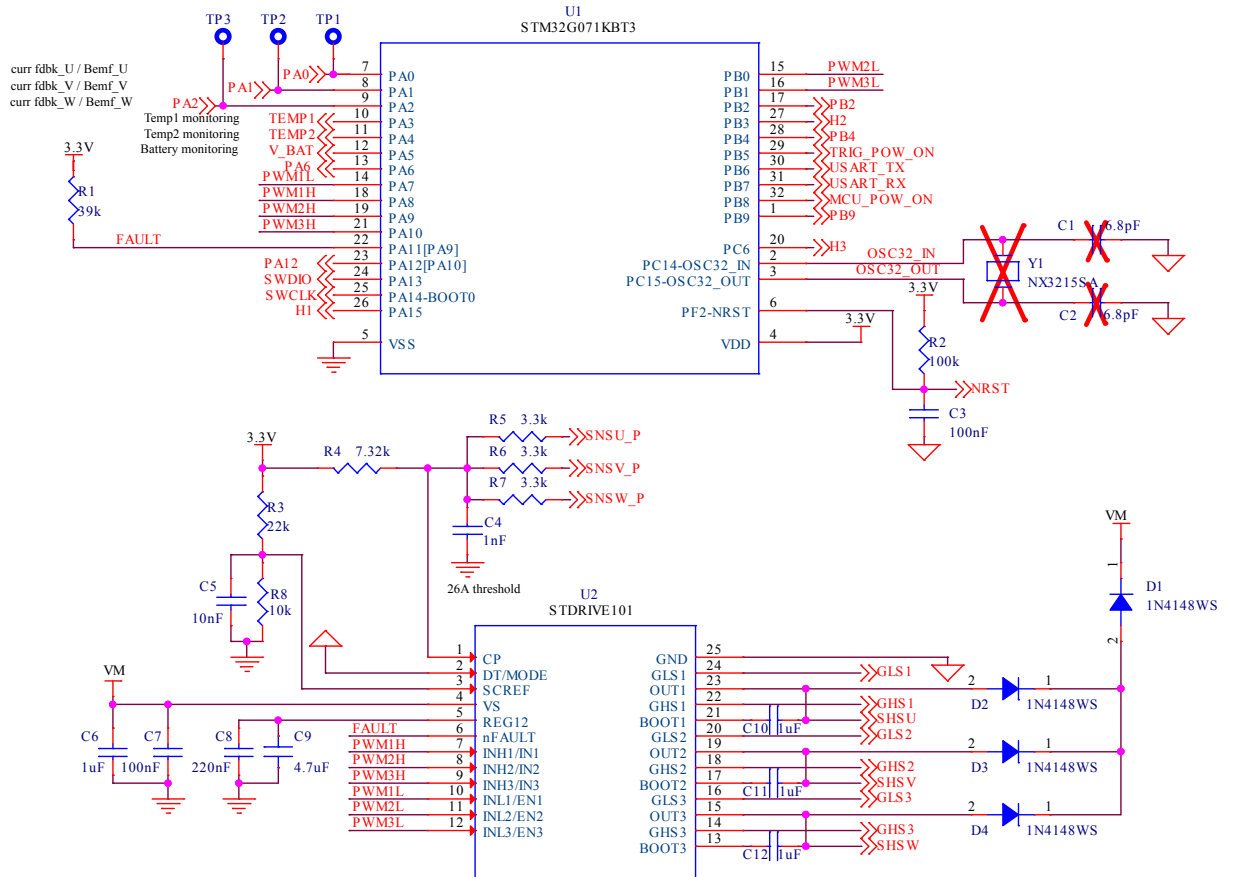


Figure 2. EVLDRIVE101-HPD schematic: power stage

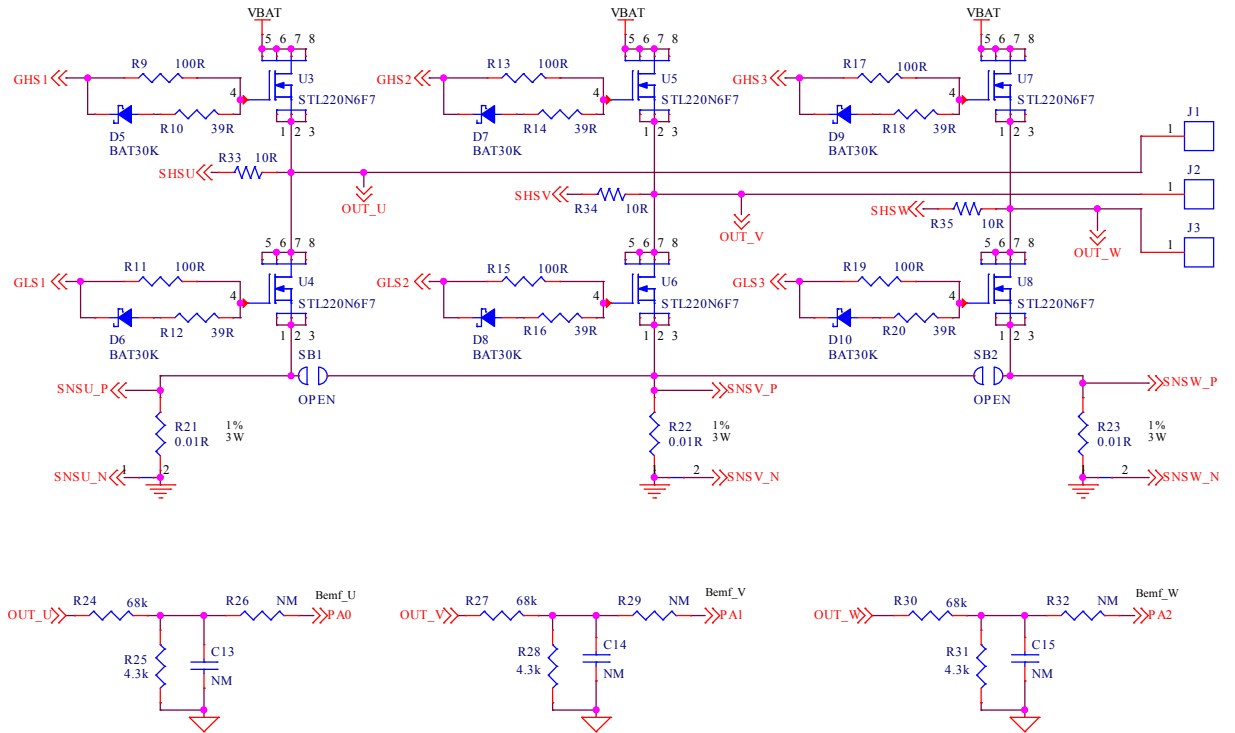


Figure 3. EVLDRIVE101-HPD schematic: power supply conversion

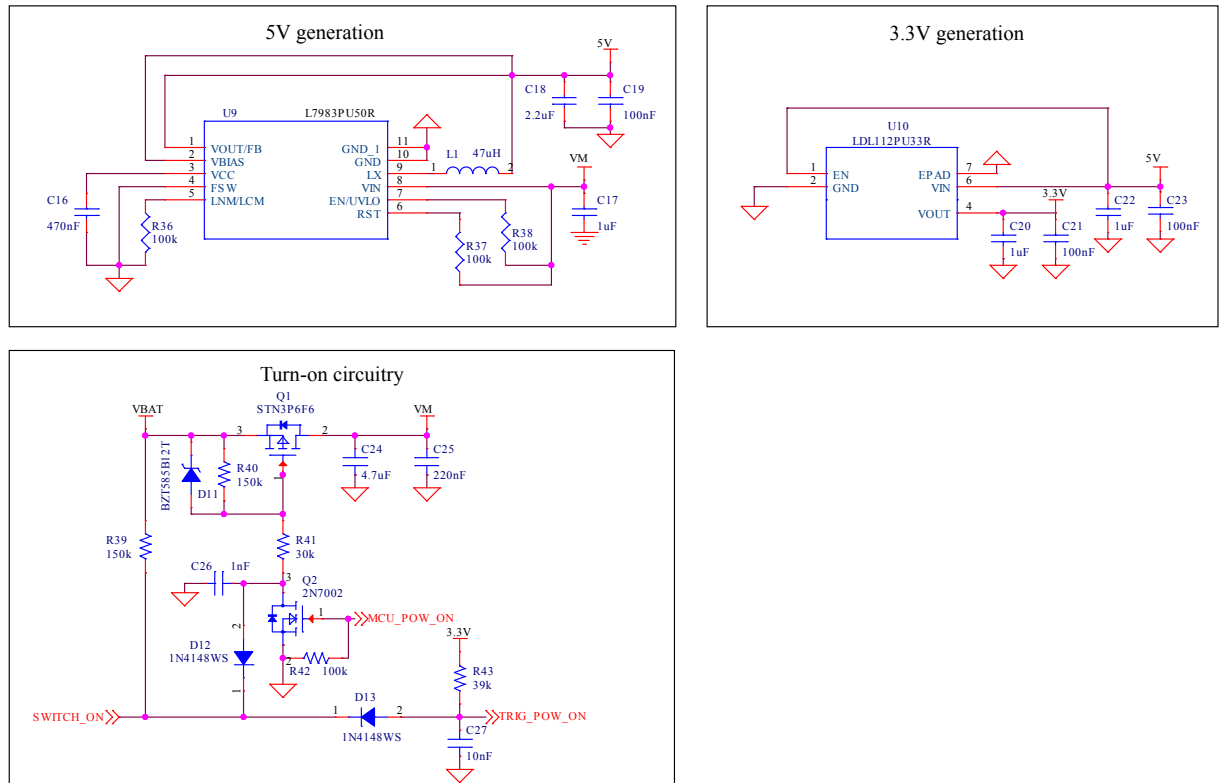


Figure 4. EVLDRIIVE101-HPD schematic: inputs and outputs

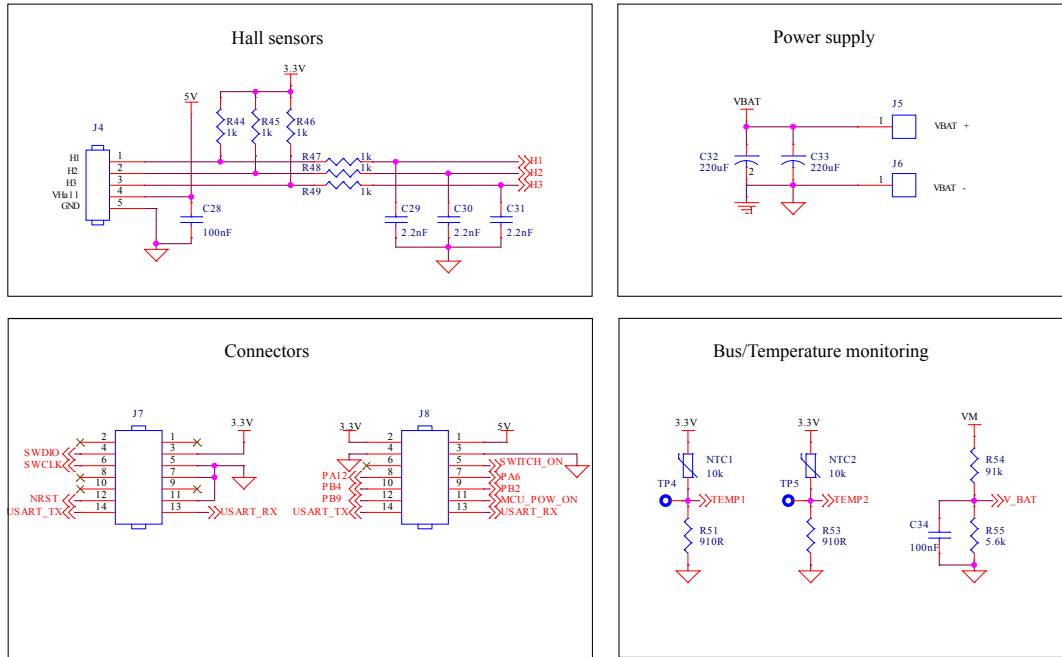
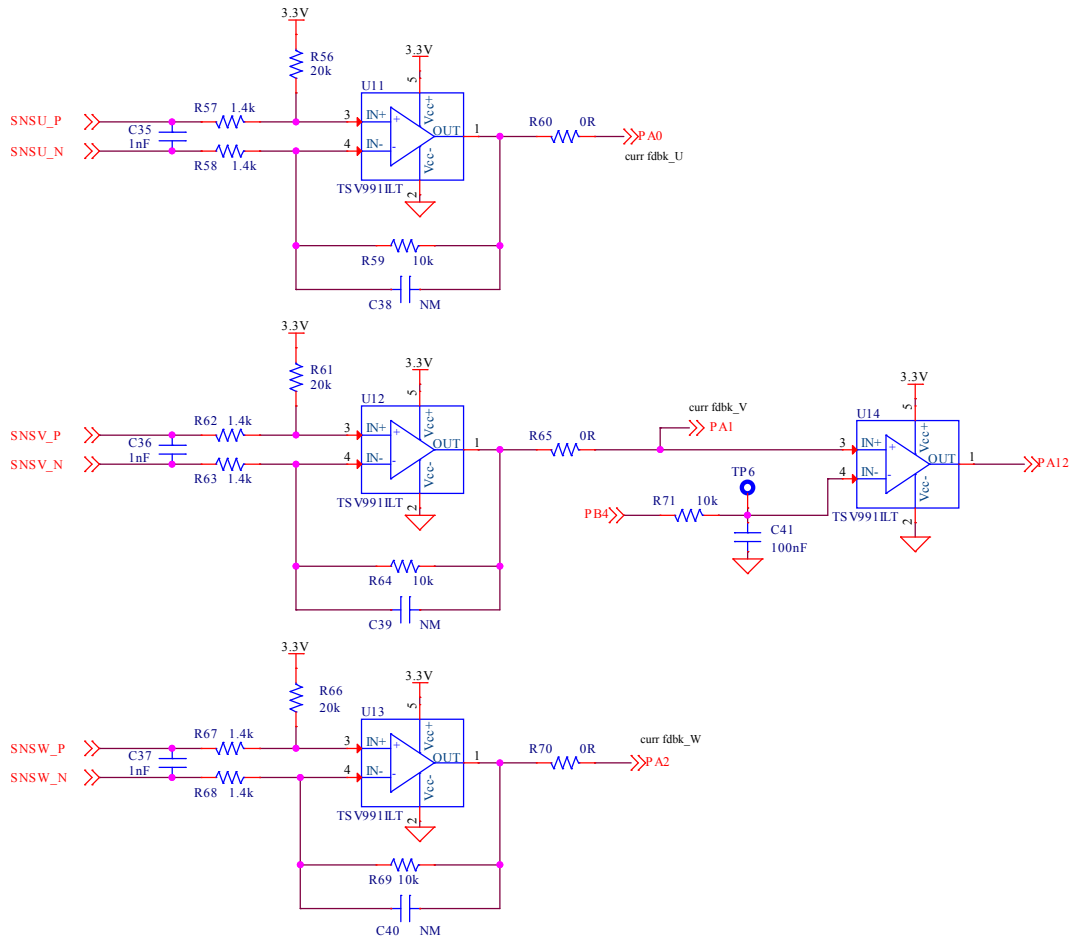


Figure 5. EVLDRIIVE101-HPD schematic: current sensing



Revision history

Table 1. Document revision history

| Date | Version | Changes |
|-------------|---------|------------------|
| 11-Dec-2023 | 1 | Initial release. |
| 27-Mar-2024 | 2 | Updated title. |



Contents

| | | |
|----------|--|----------|
| 1 | EVLDRIVE101-HPD schematic diagram | 2 |
| | Revision history | 5 |
| | List of tables | 7 |
| | List of figures..... | 8 |



List of tables

Table 1. Document revision history 5

List of figures

| | | |
|------------------|---|---|
| Figure 1. | EVLDRIVE101-HPD schematic: STM32G071 and STDRIVE101 | 2 |
| Figure 2. | EVLDRIVE101-HPD schematic: power stage | 3 |
| Figure 3. | EVLDRIVE101-HPD schematic: power supply conversion | 3 |
| Figure 4. | EVLDRIVE101-HPD schematic: inputs and outputs. | 4 |
| Figure 5. | EVLDRIVE101-HPD schematic: current sensing | 4 |

IMPORTANT NOTICE – READ CAREFULLY

STMicroelectronics NV and its subsidiaries (“ST”) reserve the right to make changes, corrections, enhancements, modifications, and improvements to ST products and/or to this document at any time without notice. Purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST’s terms and conditions of sale in place at the time of order acknowledgment.

Purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of purchasers’ products.

No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.

ST and the ST logo are trademarks of ST. For additional information about ST trademarks, refer to www.st.com/trademarks. All other product or service names are the property of their respective owners.

Information in this document supersedes and replaces information previously supplied in any prior versions of this document.

© 2024 STMicroelectronics – All rights reserved