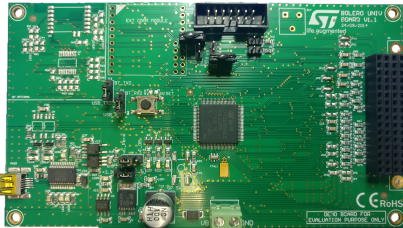
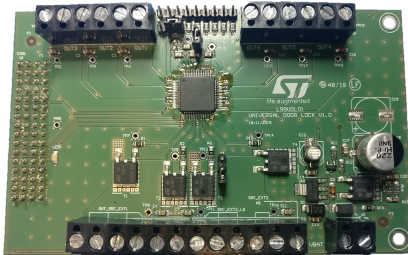


Universal door lock demonstration board based on L99UDL01


EVAL-L99UDL01 motherboard

EVAL-L99UDL01 daughterboard

Features

- Board functionality based on L99UDL01, universal door lock for automotive applications:
 - 6 integrated fully protected 0.09 Ω half bridges
 - PWM current regulation up to 25 kHz
 - integrated half bridges can be fully independent or paralleled up to three in parallel
 - 2 stage charge pump for low-voltage operation
 - 2 external half-bridge drivers
 - 10-bit digital current feedback (via SPI) for load integrity check
 - TQFP64L exposed pad package
- Board reverse battery protection with STD95N4F3 Power MOSFET
- Input operating voltage range through mother board connector: from 6 V to 26 V for microcontroller powered by 5V LDO motherboard; from 6 V to 18 V for microcontroller powered by 3.3V LDO motherboard
- Output current up to 24 A DC
- Motherboard size: 144 mm length x 81 mm width
- Daughterboard size: 113.4 mm length x 69.7 mm
- All ST components are automotive-grade qualified
- The referenced device L99UDL01 can be adapted to most central door lock configurations.

Applications

- Central door lock systems from body control modules driving all door lock actuators

Description

The **EVAL-L99UDL01** evaluation board is designed to demonstrate the centralized control of all the locks available in a car by means of the L99UDL01 device.

The board is composed by a motherboard and a daughterboard. The motherboard, which is based on the SPC560B54 microcontroller, provides the logic section for monitoring and driving the L99UDL01 device assembled on the daughterboard.

With the aim of facilitating the use and configuration of the board, STMicroelectronics provides a dedicated user-friendly software with a graphic user interface (GUI). This GUI enables the user to set the L99UDL01 control parameters and at the same time shows real time diagnostics information as current output and battery voltage monitoring.

Product status link

[EVAL-L99UDL01](#)

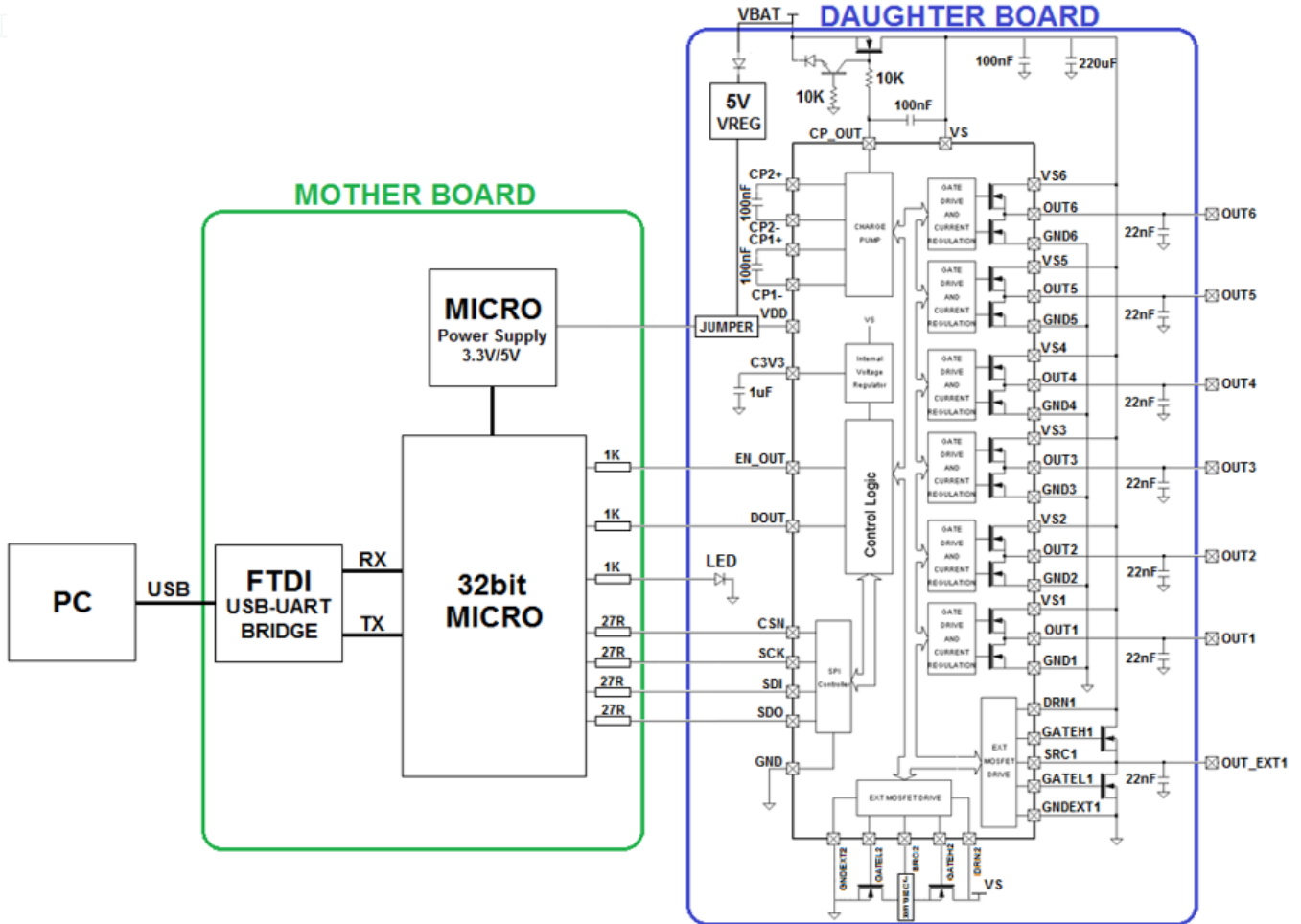
Product summary

Order code	EVAL-L99UDL01
Related devices	L99UDL01 motherboard and daughterboard

1 Application schematics and layout

1.1 Overall application diagram

Figure 1. L99UDL01 evaluation board overall application diagram



1.2 EVAL-L99UDL01 motherboard

Figure 2. EVAL-L99UDL01 motherboard top layer

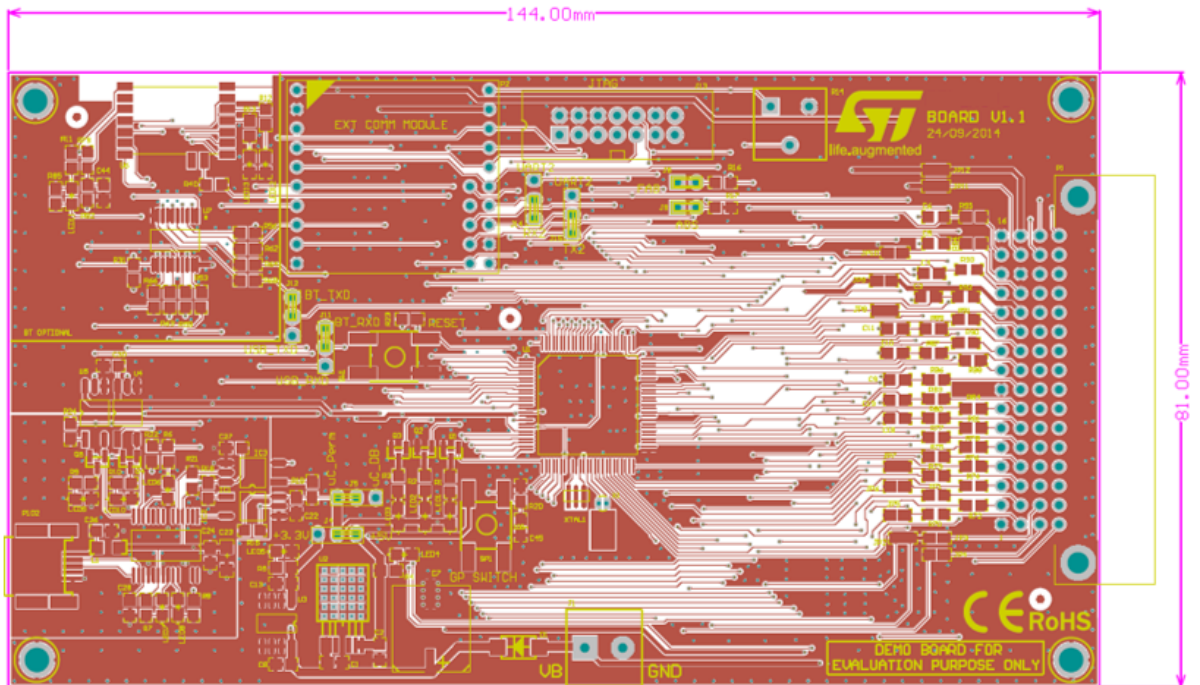


Figure 3. EVAL-L99UDL01 motherboard bottom layer

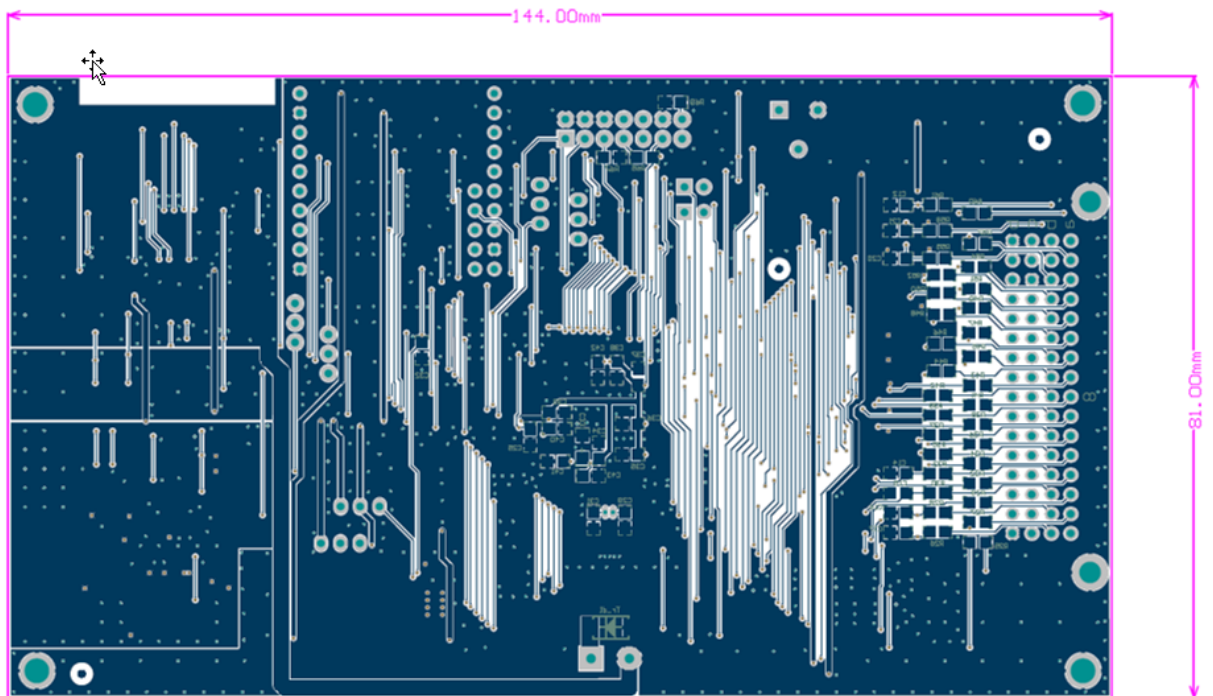
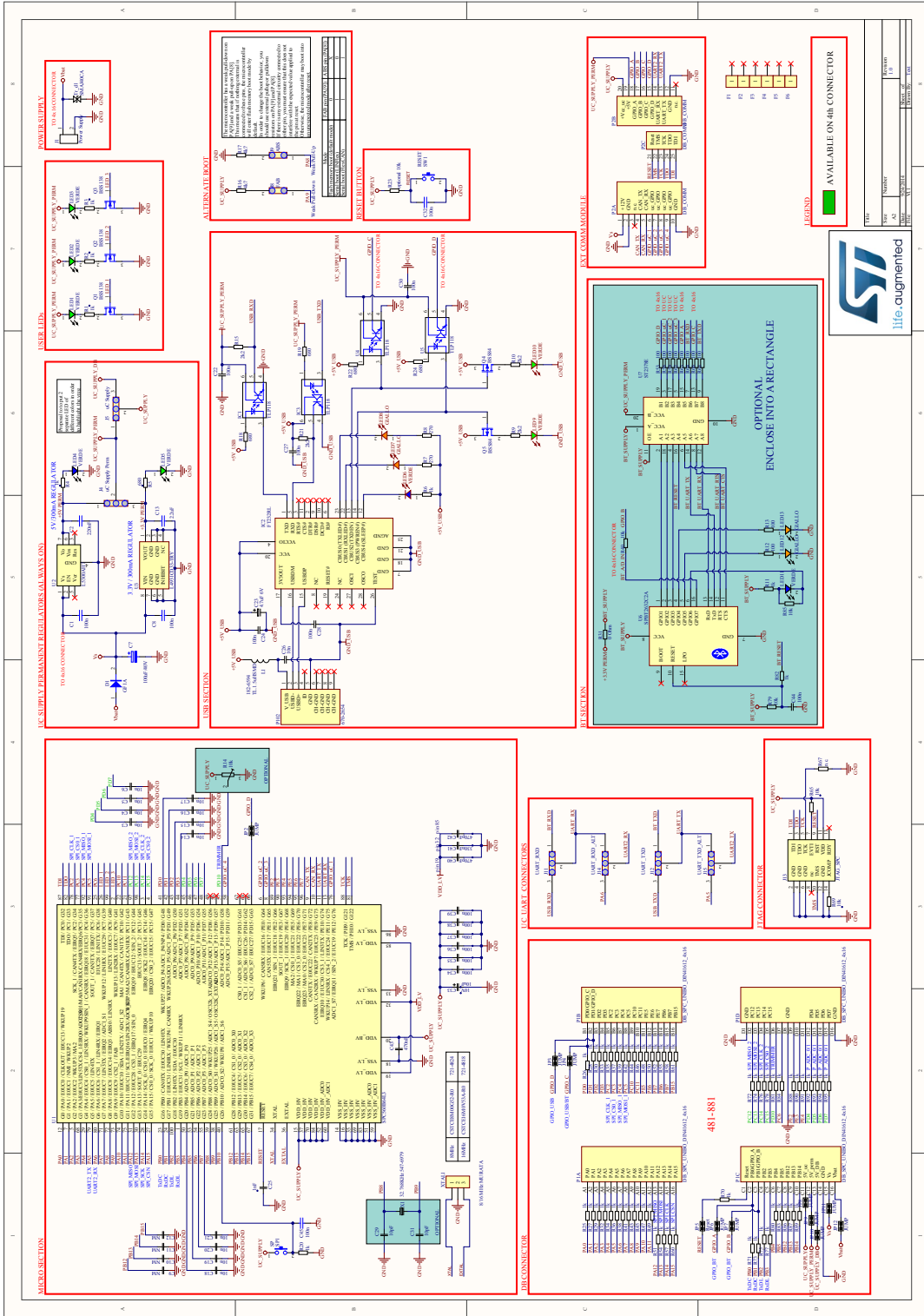


Figure 4. Motherboard schematic



1.3 EVAL-L99UDL01 daughterboard

Figure 5. EVAL-L99UDL01 daughterboard top layer

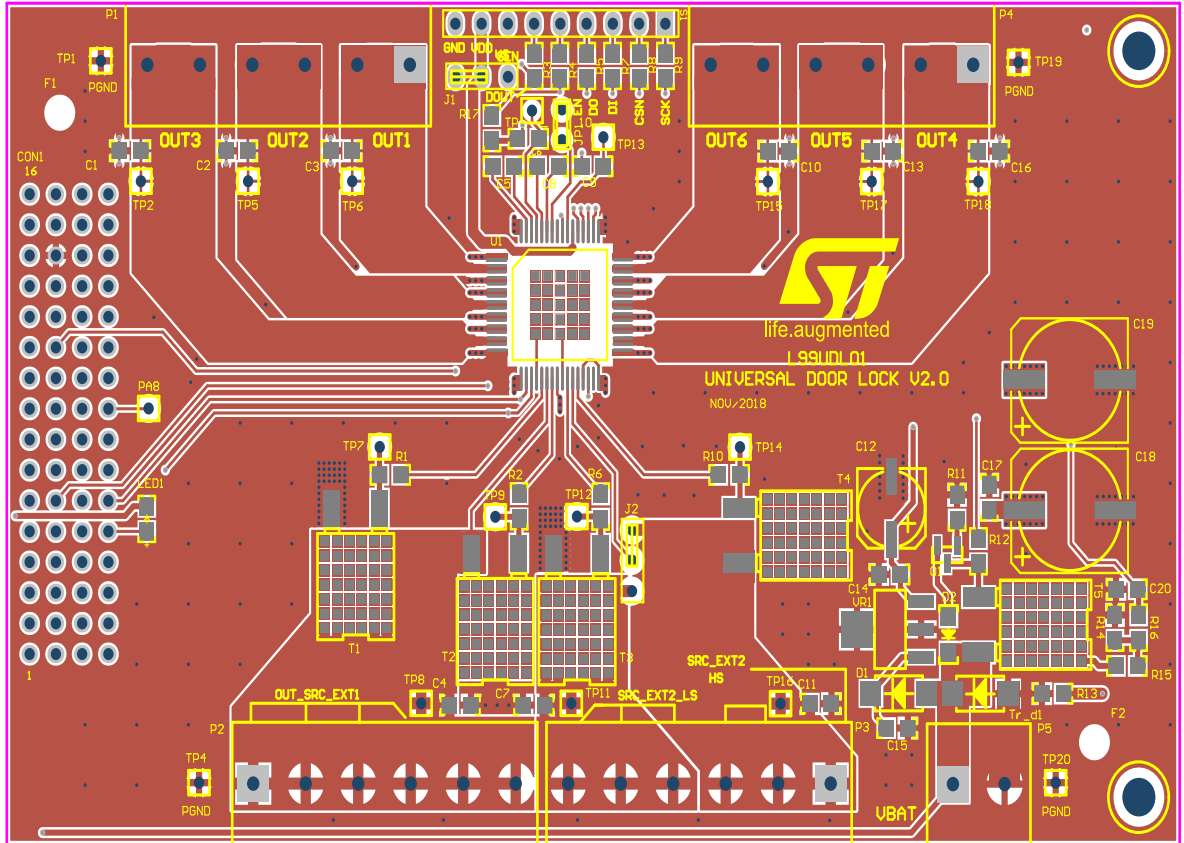


Figure 6. EVAL-L99UDL01 daughterboard bottom layer

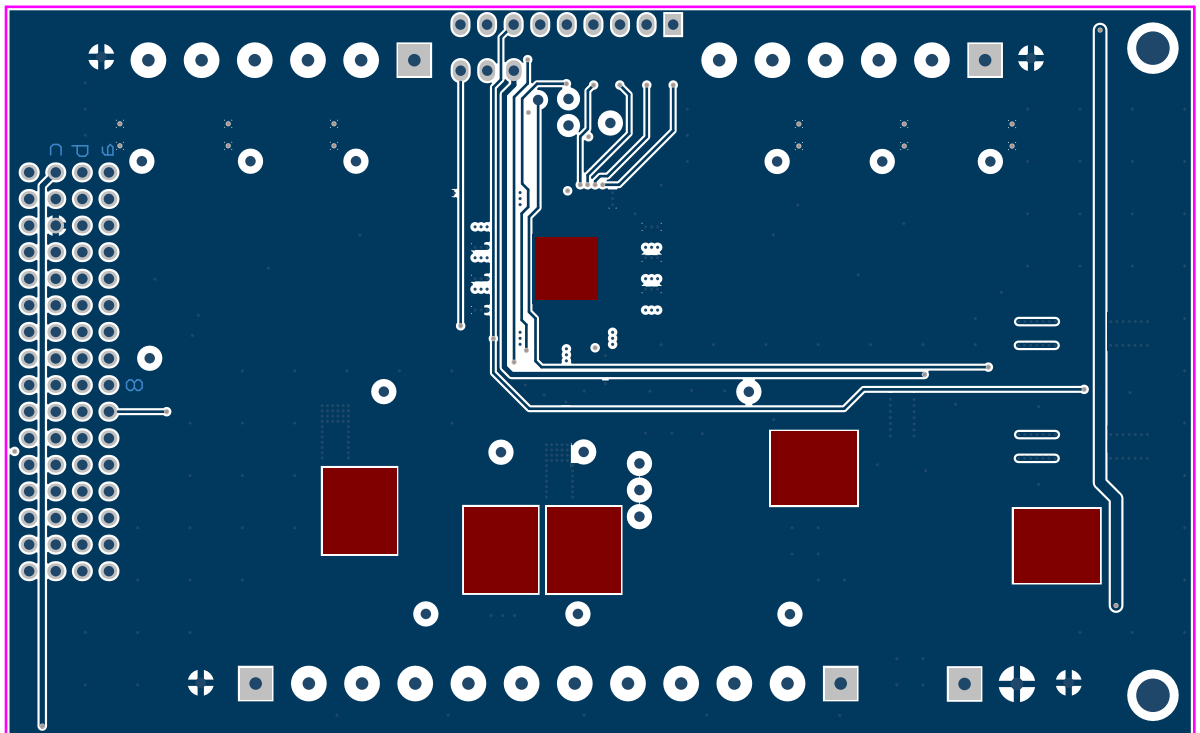
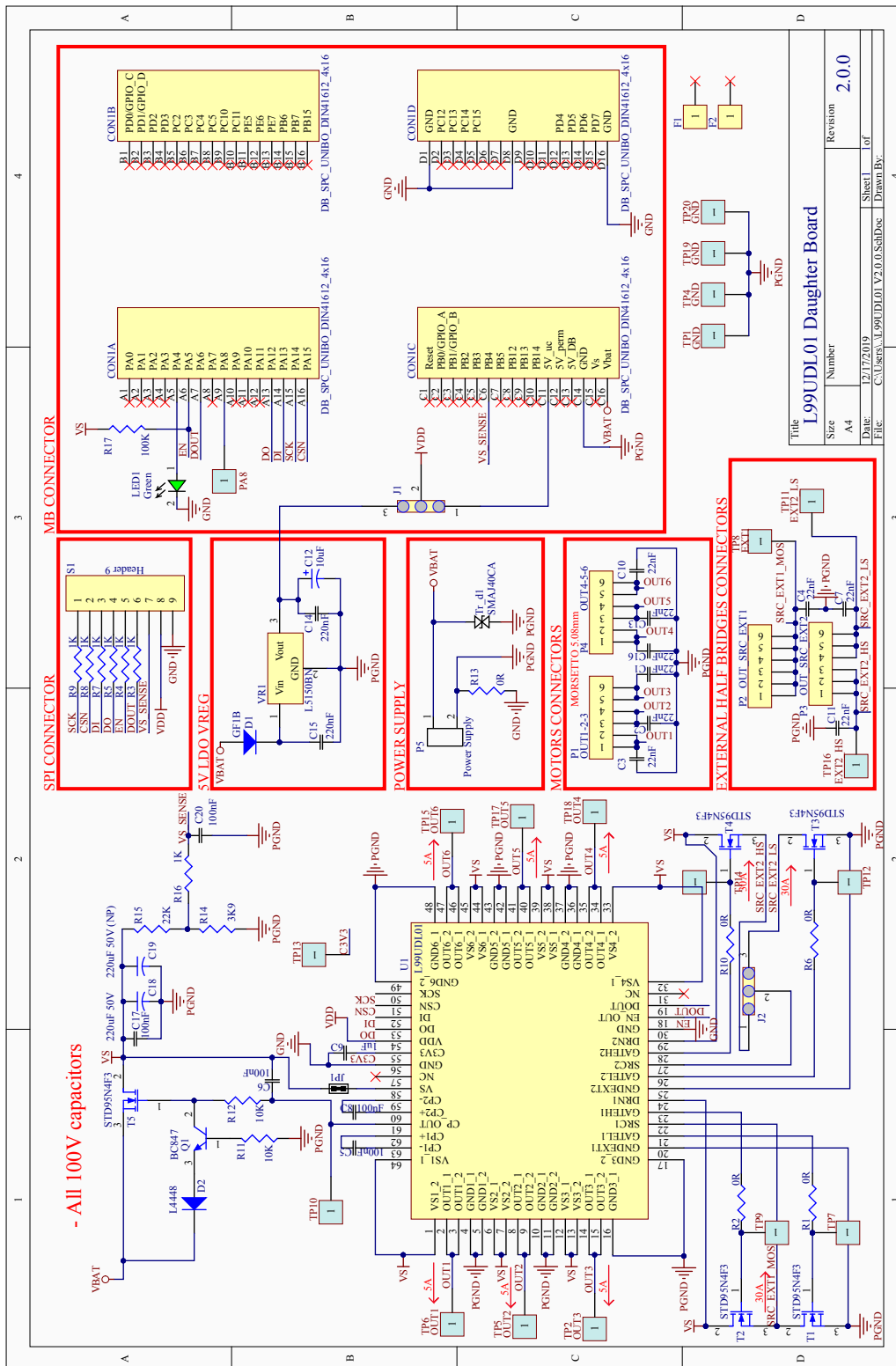


Figure 7. Daughterboard schematic



2 Demonstration software

A software graphical user interface (GUI) used for an easy demonstration of the L99UDL01 features is delivered upon customer request.

Figure 8. Main window of EVAL-L99UDL01 graphical user interface

The screenshot displays the L99UDL01 Evaluation Board GUI with the following sections:

- Board Status:** Shows VBat as '???' and Device Status as 'NORMAL'. Buttons for 'Go To NORMAL' and 'Go To STDBY' are present.
- Communication:** TX and RX status indicators, both showing '0'.
- Integrated Hall Bridge Outputs Control:**
 - GROUP 1 MASTER:** Includes OUT 1, OUT 2, and OUT 3. Each output has HS and LS channels with control options like 'Disable during Braking' and 'Force OUT ON'.
 - GROUP 2 MASTER:** Includes OUT 4, OUT 5, and OUT 6, with similar control options.
 - Current Graphs:** Visual indicators for 'OC Detected' (red) and 'Regulated Current Not Reached' (blue).
- OFF State Diagnostic:**
 - Driving Mode:** Shows 'Current' and 'PWM' waveforms for each output.
 - Regulated Current:** Displays '1.0 A' for each output.
 - PWM Frequency:** Set to '10 KHz'.
 - PWM Duty Cycle:** Set to '6.25%'.
- Diagnostic:**
 - Global Status Byte:** GSNB, RSTB, SPIE, FE2, FE1, DE, GW.
 - General Faults:** CPL0W, VSLVI, VSDVSD, V3V3UV, VDDUV.
 - SPI Faults:** SPI_FAIL, WRT_FAIL, RD_FAIL.
 - HBridge Faults:** TSD6, TSD5, TSD4, TSD3, TSD2, TSD1, FLT6_1, FLT6_0, FLT5_1, FLT5_0, FLT4_1, FLT4_0, FLT3_1, FLT3_0, FLT2_1, FLT2_0, FLT1_1, FLT1_0.
 - External Hbridge Faults:** EXTF2_1, EXTF2_0, EXTF1_1, EXTF1_0.
 - Warnings:** Tw6, Tw5, Tw4, Tw3, Tw2, Tw1.
 - Buttons:** 'READY', 'Reset Status', and 'Clear all error flags'.
- External Half Bridge Outputs Control:**
 - EXT 1 and EXT 2:** HS and LS channels with 'Disable during Braking' and 'Force EXT ON' options.
 - VDS Fault Detected:** Indicator for VDS fault.
 - VDSth:** Threshold settings for EXT1 and EXT2, set to 'OFF'.
 - VDS blanking time:** Set to '1 us'.
- Thermal Shutdown Action:** Set to 'Single Output'. Includes 'DOUT Pin' (OFF) and 'DITHN' (checkbox).
- Actuation:**
 - Actuation ON Time:** 100 ms.
 - Actuation Braking Time:** 0 ms.
 - Buttons:** 'EMERGENCY OVERRIDE', 'EMGCY MODE', 'ACTUATION TRIGGER', 'EN OUT HIGH', and 'SPI Trigger'.

3 System requirements

- Windows OS (XP, 7, 8, 10)
- USB type B

Revision history

Table 1. Document revision history

Date	Version	Changes
11-Dec-2019	1	First release.

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