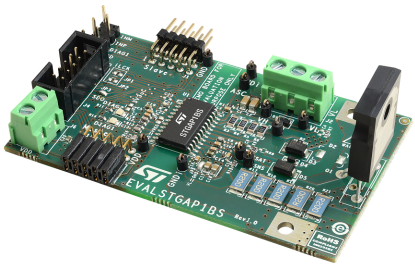
EVALSTGAP1BS

Data brief

Demonstration board for STGAP1BS galvanically isolated single gate driver



Features

- **Board**:
  - High voltage rail up to 960 V
  - STGW30NC120HD: 1200 V / 30 A PowerMESH™ IGBT
  - Negative gate driving
  - Suitable to be used in combination with STEVAL-PCC009V2 and configuration GUI
  - Fault LED indicators
  - RoHS compliant
- **Device**:
  - Driver current capability: 5 A sink/source @ 25 °C
  - 5 A active Miller clamp
  - Gate driving voltage up to 36 V
  - Negative gate driving ability
  - Desaturation detection
  - Overcurrent protection
  - Output 2-level turn-off (2LTO)
  - UVLO on each supply voltage
  - Overtemperature warning and shut-down protection
  - 3.3/5 V logic input interface
  - SPI with daisy chain feature for parameters programming and diagnostic

Product status link
EVALSTGAP1BS

Description

The EVALSTGAP1BS is a galvanically isolated single gate driver for N-channel MOSFETs and IGBTs with advanced protection, configuration and diagnostic features. The architecture of the STGAP1B1S isolates the channel from the control and the low voltage interface circuitry through true galvanic isolation.

The EVALSTGAP1B1S board allows evaluating all of the STGAP1B1S features while driving a power switch with a voltage rating up to 1500 V. Power switches in both TO-220 or TO-247 packages can be evaluated, and the board allows the connection of a heatsink in order to exploit the ability of the STGAP1B1S to handle very high power applications.

In combination with the STEVAL-PCC009V2 communication board and the STGAP1B1S evaluation software, the board allows to easily enable, configure or disable all of the driver's protection and control features through the SPI interface. Advanced diagnostic is also available thanks to the driver's status registers that can be accessed through the SPI.

Multiple boards can be connected together and share the same logic supply voltage and control signals in order to evaluate half-bridge, interleaved or even more complex topologies. The board allows implementing the SPI daisy chain when more than one device is used.

1 Schematic diagrams

Figure 1. **EVALSTGAP1BS circuit schematic – connectors and configuration jumpers**

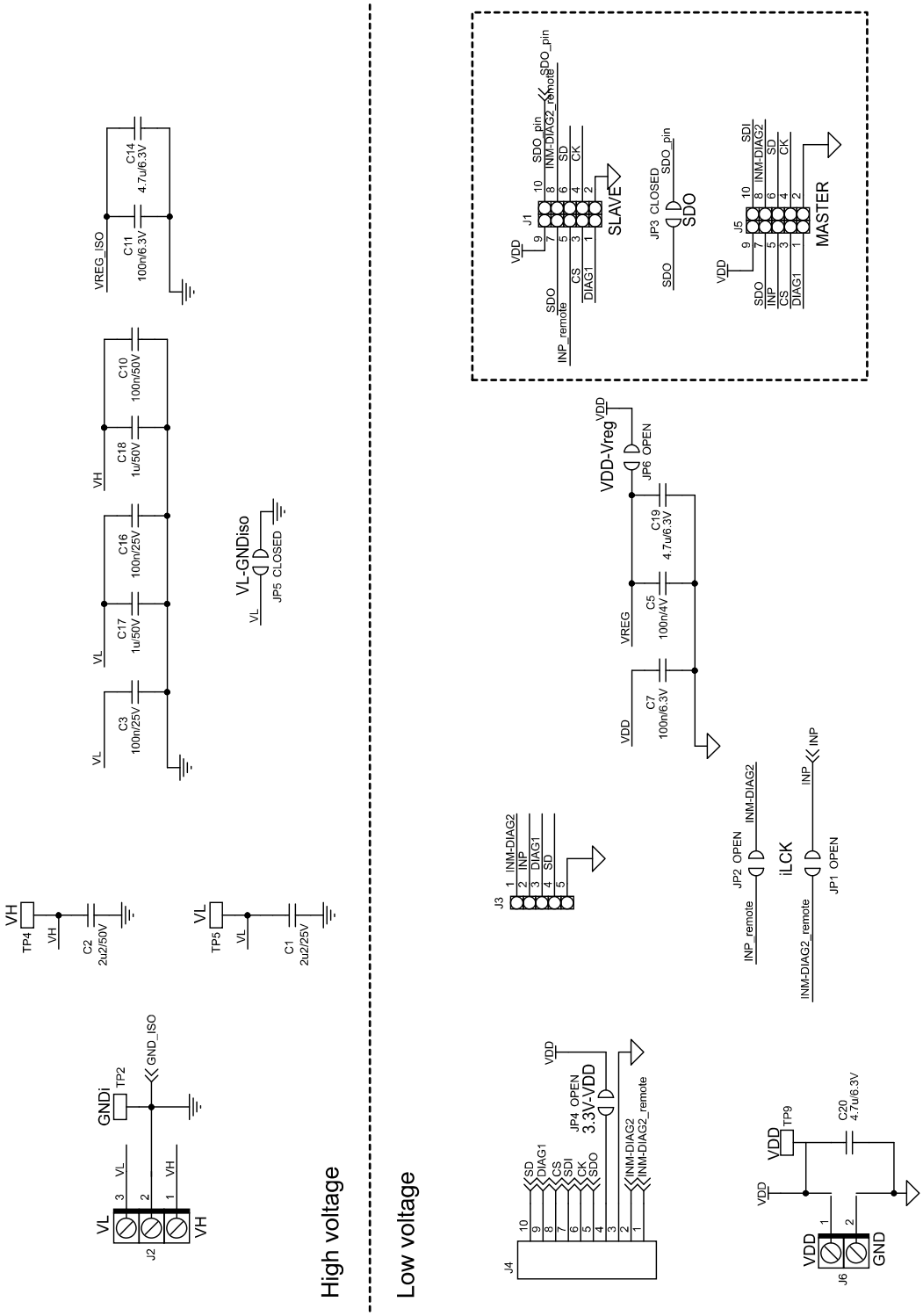
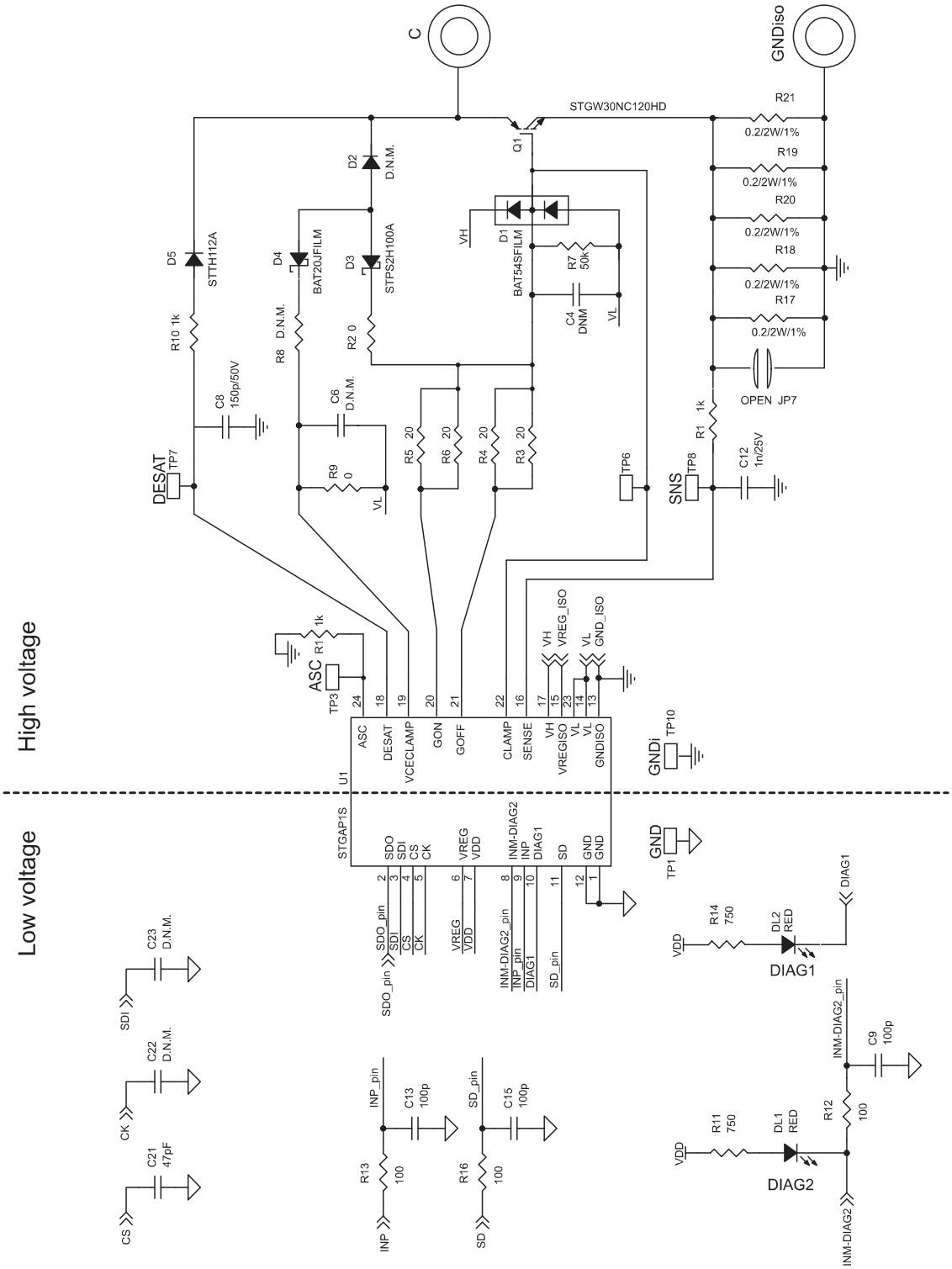


Figure 2. **EVALSTGAP1BS circuit schematic – power stage**



2 Bill of material

Table 1. **STGAP1BS - Bill of material**

Part reference	Part value	Part description
C1	2.2 µF, 25 V	Ceramic capacitor, SMT 1206
C2	2.2 µF, 50 V	Ceramic capacitor, SMT 1206
C3, C16	100 nF, 25 V	Ceramic capacitor, SMT 0603
C4, C6, C22, C23	D. N. M.	Ceramic capacitor, SMT 0603
C5	100 nF, 4 V	Ceramic capacitor, SMT 0603
C7, C11	100 nF, 6.3 V	Ceramic capacitor, SMT 0603
C8	150 pF, 50 V	Ceramic capacitor, SMT 0603
C9, C13, C15	100 pF, 6.3 V	Ceramic capacitor, SMT 0603
C10	100 nF, 50 V	Ceramic capacitor, SMT 0603
C12	1 nF, 25 V	Ceramic capacitor, SMT 0603
C14, C19	4.7 µF, 6.3 V	Ceramic capacitor, SMT 0603
C17,C18	1 µF, 50 V	Ceramic capacitor, SMT 0805
C20	4.7 µF, 6.3 V	Ceramic capacitor, SMT 0603
C21	47 pF, 6.3 V	Ceramic capacitor, SMT 0603
DL1, DL2	Red LED	LED, SMT 0805
D1	BAT54SFILM	Small signal Schottky diodes, SOT-23
D2	N. M.	SMB
D3	STPS2H100A	Schottky rectifier, SMA
D4	BAT20JFILM	Schottky diode, SOD323
D5	STTH112A	High voltage ultrafast rectifier, SMA
JP1, JP2, JP4, JP6, JP7	Open	SMT jumper
JP3, JP5	Closed	SMT jumper
J1	Pin strip	Strip connector 5x2 pos right-angle, 2.54 mm
J2	Screw connector	Connector terminal block T.H. 3 pos 5.08 mm
J3	Pin strip	Strip connector 5 pos, 2.54 mm
J4	DIL Male connector	Straight PCB mount male flat cable connector 5x2 pos
J5	Pin strip	Strip connector female 5x2 pos right-angle, 2.54 mm
J6	Screw connector	Connector terminal block T.H. 2 pos 5.08 mm
Q1	STGW30NC120HD	1200 V, 30 A N-Ch IGBT, TO-247
Q3A1	N. M.	N-channel IGBT or MOSFET up to 1200 V, TO-220
R10, R15	1 kΩ	Chip resistor, SMT 0603
R2	0 Ω	Chip resistor, SMT 0805
R3, R4, R5, R6	20 Ω	Chip resistor, SMT 1206
R7	50 kΩ	Chip resistor, SMT 0603
R8	N. M.	Chip resistor, SMT 0603
R1, R9	0 Ω	Chip resistor, SMT 0603
R11, R14	750 Ω	Chip resistor, SMT 0603

Part reference	Part value	Part description
R12, R13, R16	100 Ω	Chip resistor, SMT 0603
R17, R18, R19, R20, R21	0.2 Ω, 2 W, 1 %	Chip resistor, SMT 2512
U1	STGAP1BS	Automotive galvanically isolated single gate driver, SO24W

3 Layout and components placement

Figure 3. **STGAP1BS – Layout (component placement view)**

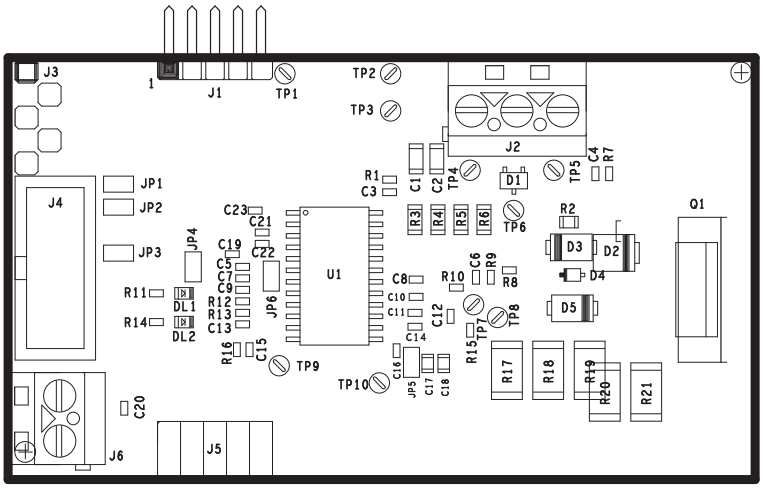


Figure 4. **STGAP1BS – Layout (top layer)**

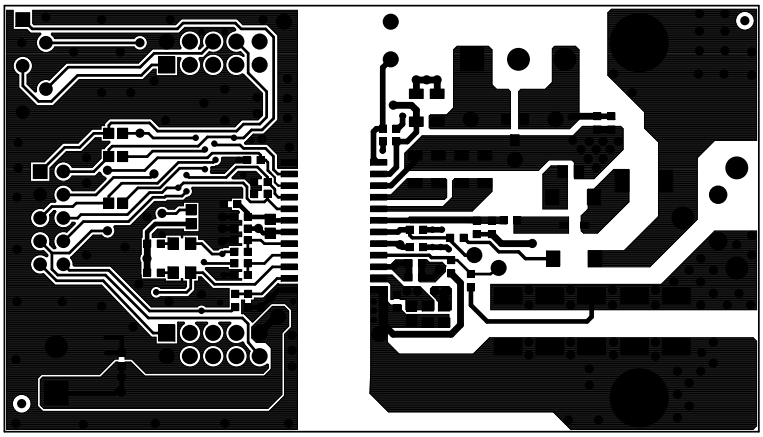
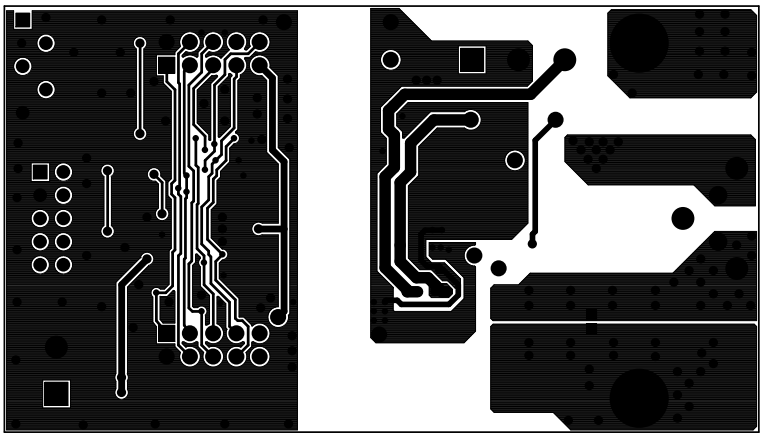


Figure 5. **STGAP1BS – Layout (bottom layer)**



Revision history

Table 2. **Document revision history**

Date	Version	Changes
21-Dec-2021	1	Initial release.

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