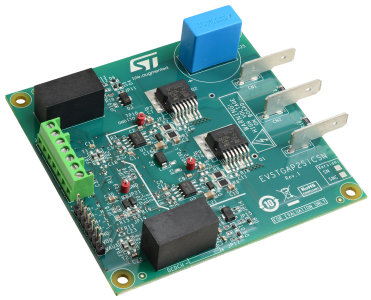
EVSTGAP2SICSN

Data brief

Demonstration board for STGAP2SICSN isolated 4 A single gate driver



Features

- **Board**
  - Half bridge configuration, high voltage rail up to 520 V
  - SCT35N65: 650 V, 55 mΩ SiC MOSFET
  - Negative gate driving
  - On-board isolated DC-DC converters to supply high-side and low-side gate drivers, fed by VAUX = 5 V, with 5.2 kV maximum isolation
  - 3.3 V VDD logic supply generated on-board or 5 V (externally applied)
  - Easy jumper selection of driving voltage configuration: +17/0 V; +17/-3 V; +19/0 V; +19/-3 V
- **Device**
  - Driver current capability: 4 A source/sink @ 25 °C
  - Separate sink and source output for easy gate driving configuration
  - Short propagation delay: 75 ns
  - UVLO function
  - Gate driving voltage up to 26 V
  - 3.3 V, 5 V TTL/CMOS inputs with hysteresis
  - Temperature shutdown protection
  - Standby function

Product status link
EVSTGAP2SICSN

Description

The EVSTGAP2SICSN is a half-bridge evaluation board designed to evaluate the STGAP2SICSN isolated single gate driver.

The gate driver is characterized by 4 A current capability and rail-to-rail outputs, making the device suitable also for high power inverter applications such as motor drivers in industrial applications equipped with SiC power switch.

The separated source and sink outputs allow to independently optimize turn-on and turn-off by using dedicated gate resistors.

The device integrates protection functions: UVLO and thermal shutdown are included to easily design high reliability systems. Dual input pins allow choosing the control signal polarity and implementing HW interlocking protection to avoid cross-conduction in case of controller's malfunction.

The device allows implementing negative gate driving, and the on-board isolated DC-DC converters allow working with optimized driving voltage for SiC.

The EVSTGAP2SICSN board allows evaluating all the STGAP2SICSN features while driving a half-bridge power stage with voltage rating up to 520 V. It is possible to increase bus voltage by replacing the power switches with appropriate devices in H2PACK-7L or H2PACK-2L package and the C29 capacitance if needed.

The board components are easy to access and modify to make driver performance evaluation easier under different application conditions and fine adjustment of final application components.

1 Schematic diagram

Figure 1. **EVSTGAP2SICSN circuit schematic – gate drivers**

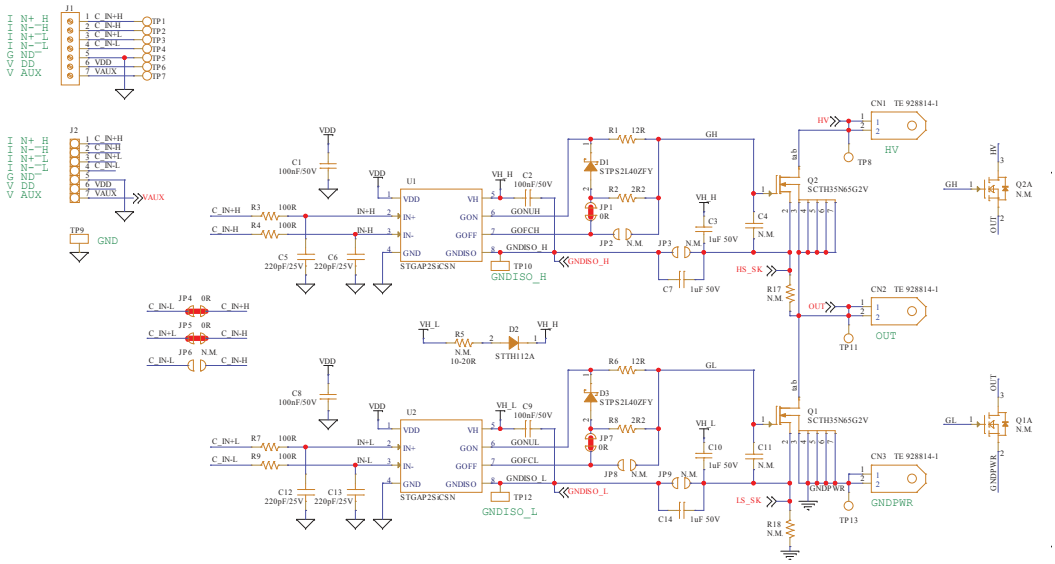
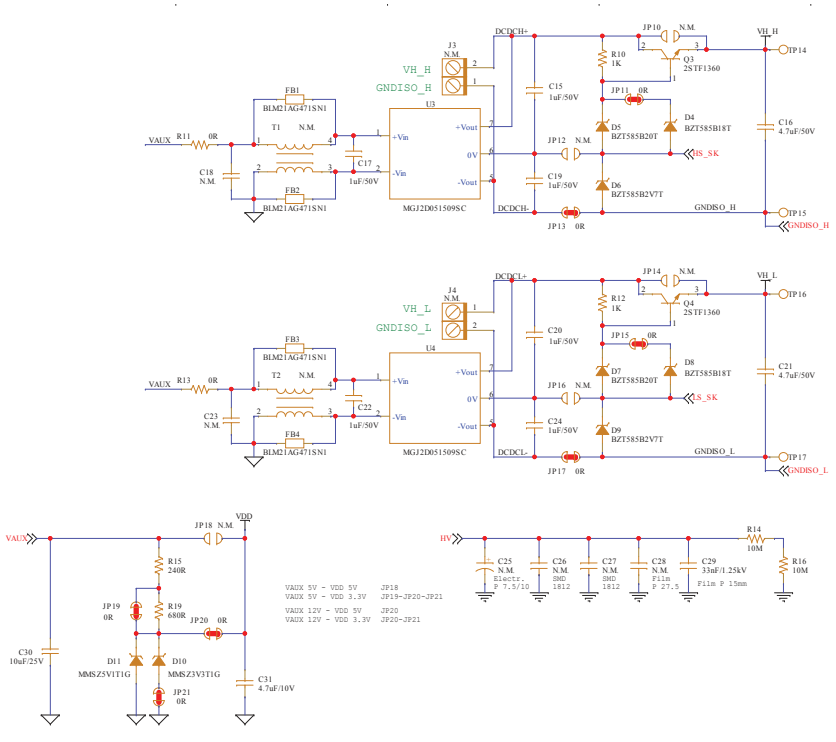


Figure 2. **EVSTGAP2SICSN circuit schematic – supply, connectors and decoupling**



2 Bill of material

Table 1. **EVSTGAP2SICSN bill of material**

Reference	Description	Value / generic part number
CN1, CN2, CN3	Tab FASTON 250 Horizontal	TE 928814-1
C1, C2, C8, C9	SMT ceramic capacitor	100 nF / 50 V
C3, C7, C10, C14	SMT ceramic capacitor	1 µF / 50 V
C4, C11	SMT ceramic capacitor	N.M.
C5, C6, C12, C13	SMT ceramic capacitor	220 pF / 25 V
C15, C17, C19, C20, C22, C24	SMT ceramic capacitor	1 µF / 50 V
C16, C21	SMT ceramic capacitor	4.7 µF / 50 V
C18, C23	SMT ceramic capacitor	N.M.
C25	THT electrolytic capacitor	N.M.
C26, C27	SMT ceramic capacitor	N.M.
C28	Film capacitor	N.M.
C29	Film capacitor	33 nF / 1.25 kV
C30	SMT ceramic capacitor	10 µF / 25 V
C31	SMT ceramic capacitor	4.7 µF / 10 V
D1, D3	Automotive low drop power Schottky rectifier	STPS2L40ZFY
D2	High voltage ultrafast rectifier	STTH112A
D4, D8	Surface mount precision Zener diode	BZT585B18T
D5, D7	Surface mount precision Zener diode	BZT585B20T
D6, D9	Surface mount precision Zener diode	BZT585B2V7T
D10	Zener Voltage Regulator 500 mW	MMSZ3V3T1G
D11	5.1 V 500 mW, Zener Voltage Regulator	MMSZ5V1T1G
FB1, FB2, FB3, FB4	Ferrite Beads	BLM21AG471SN1
JP1, JP7	SMT resistor	0 Ω
JP2, JP3, JP8, JP9	SMT resistor	N.M.
JP4, JP5, JP11, JP13, JP15, JP17, JP19, JP20, JP21	SMT resistor	0 Ω
JP6, JP10, JP12, JP14, JP16, JP18	SMT resistor	N.M.
J1	Connector terminal block T.H. 7 POS 3.5 mm	MORSV-350-7P_screw
J2	Strip connector 7 pos, 2.54 mm	STRIP 1x7
J3, J4	Connector terminal block T.H. 2 POS 5.08 mm	N.M.
Q1A, Q2A	Alternative footprint for HPACK or DPACK	N.M.
Q1, Q2	Silicon carbide Power MOSFET 650 V, 55 mΩ typ., 45 A	SCTH35N65G2V
Q3, Q4	Low voltage fast-switching NPN power transistors	2STF1360
R1, R6	SMT resistor	12 Ω
R2, R8	SMT resistor	2.2 Ω

Reference	Description	Value / generic part number
R3, R4, R7, R9	SMT resistor	100 Ω
R5	SMT resistor	N.M.
R10, R12	SMT resistor	1 kΩ
R11, R13	SMT resistor	0 Ω
R14, R16	SMT resistor	10 MΩ
R15	SMT resistor	240 Ω
R17, R18	SMT resistor	N.M.
R19	SMT resistor	680 Ω
T1, T2	Common mode choke, SMD 4.7x4.5 mm	N.M.
U1, U2	Galvanically isolated 4 A single gate driver for SiC MOSFETs	STGAP2SICSN
U3, U4	5.2 kVDC Isolated 2W Gate Drive DC/DC Converters	MGJ2D051509SC

3 Layout and component placements

Figure 3. **EVSTGAP2SICSN – Layout (component placement top view)**

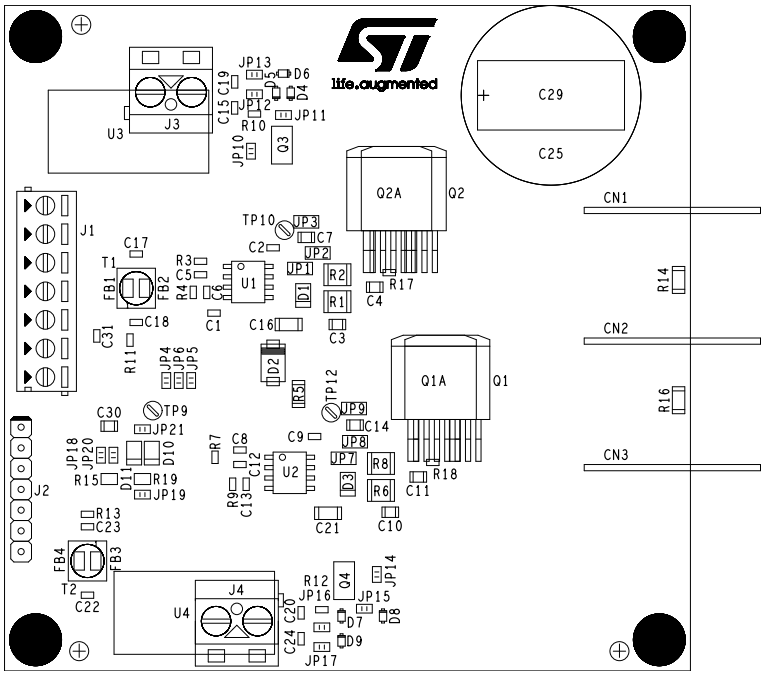


Figure 4. **EVSTGAP2SICSN – Layout (component placement bottom view)**

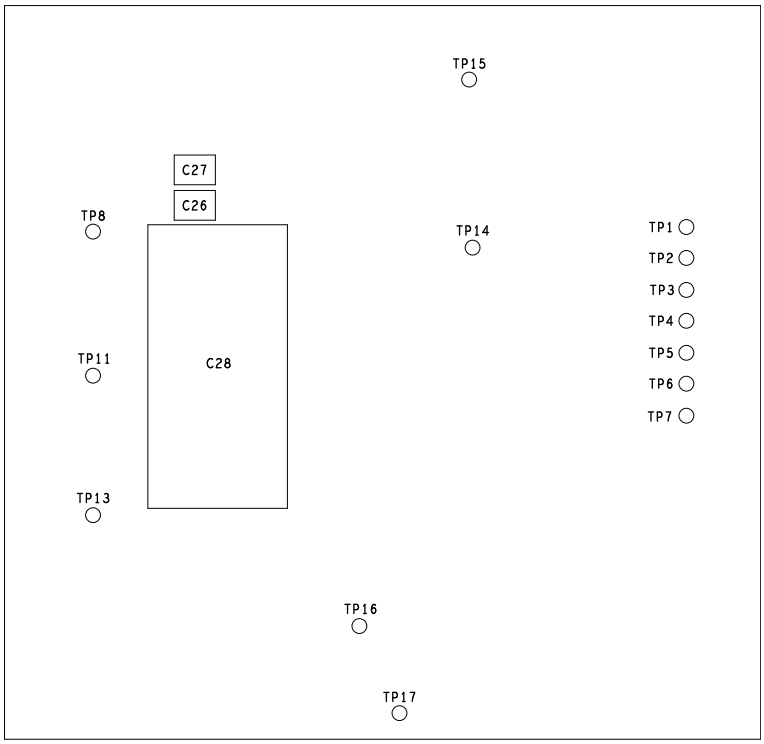


Figure 5. **EVSTGAP2SICSN – Layout (top layer)**

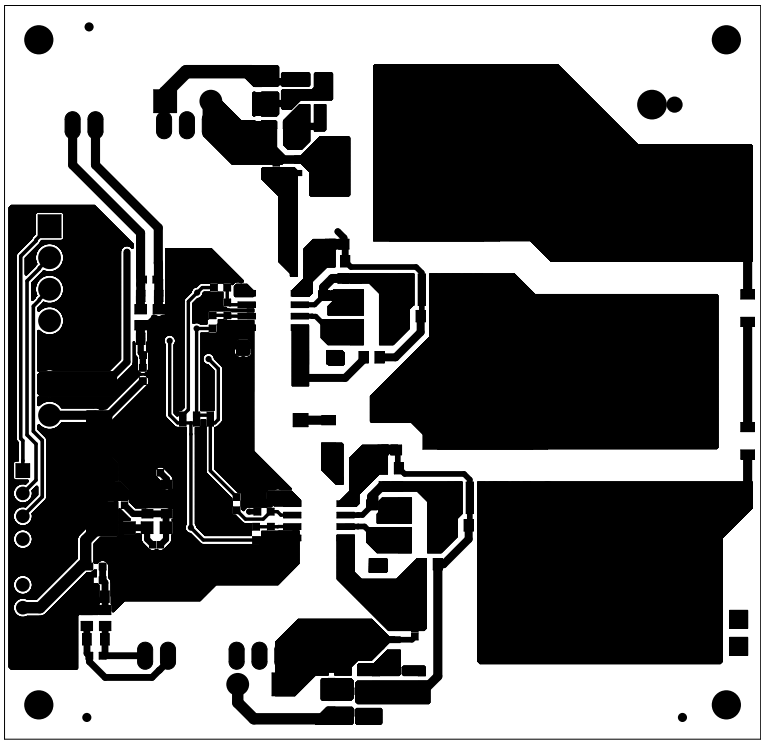
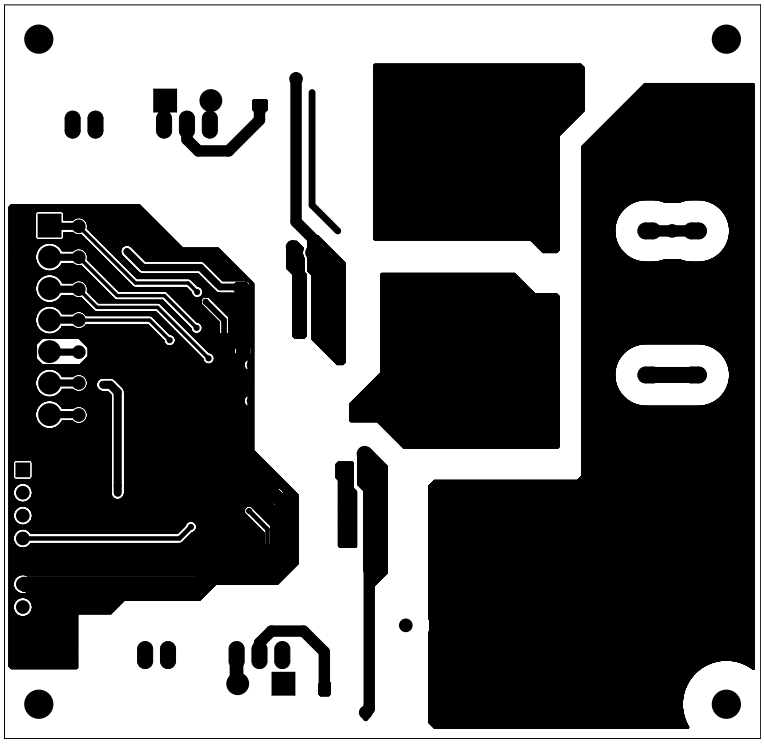


Figure 6. **EVSTGAP2SICSN – Layout (bottom layer)**



Revision history

Table 2. **Document revision history**

Date	Version	Changes
13-Aug-2021	1	Initial release.

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