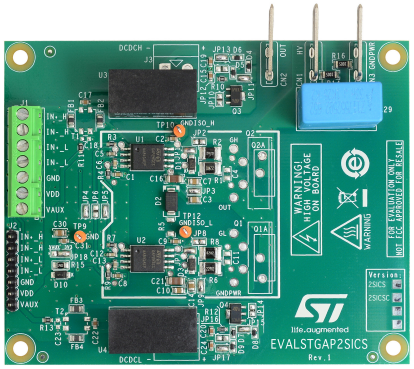
EVALSTGAP2SiCSC

Data brief

Demonstration board for STGAP2SiCSC isolated 4 A single gate driver



Features

- Board
  - High voltage rail up to 1200 V
  - Negative gate driving
  - Onboard 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 onboard 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
  - 6000 V Galvanic isolation
  - 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 shut down protection
  - Stand-by function
  - 4 A Miller CLAMP

Product status link
EVALSTGAP2SiCSC

Description

The STGAP2SiCS is an isolated single gate driver.

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

The configuration featuring single output pin and Miller CLAMP function allow avoiding gate spikes during fast commutations in half-bridge topologies.

The device integrates protection functions: UVLO and thermal shut down are included to easily design highly reliable systems. Dual input pins allow choosing the control signal polarity and also implementing HW interlocking protection in order to avoid cross-conduction in case of controller malfunction.

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

The EVALSTGAP2SiCSC board allows evaluation of all the STGAP2SiCSC features while driving a half-bridge power stage with voltage rating up to 1200 V in TO-220 or TO-247 packages.

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

1 Schematic diagrams

Figure 1. **EVALSTGAP2SiCSC circuit schematic – gate drivers**

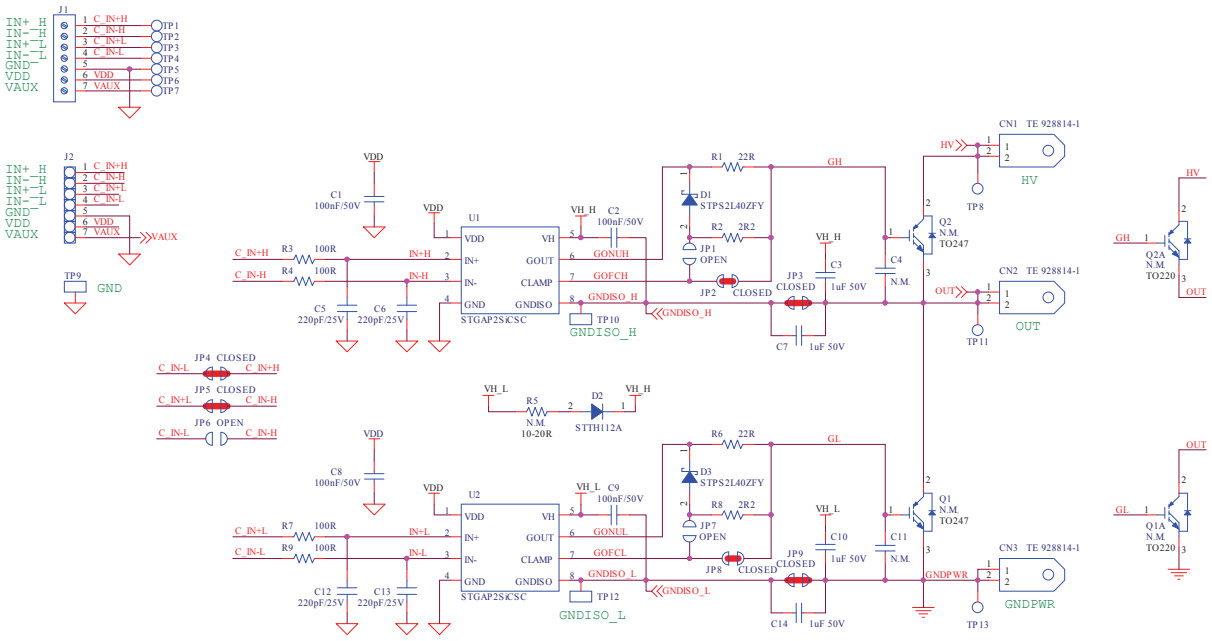
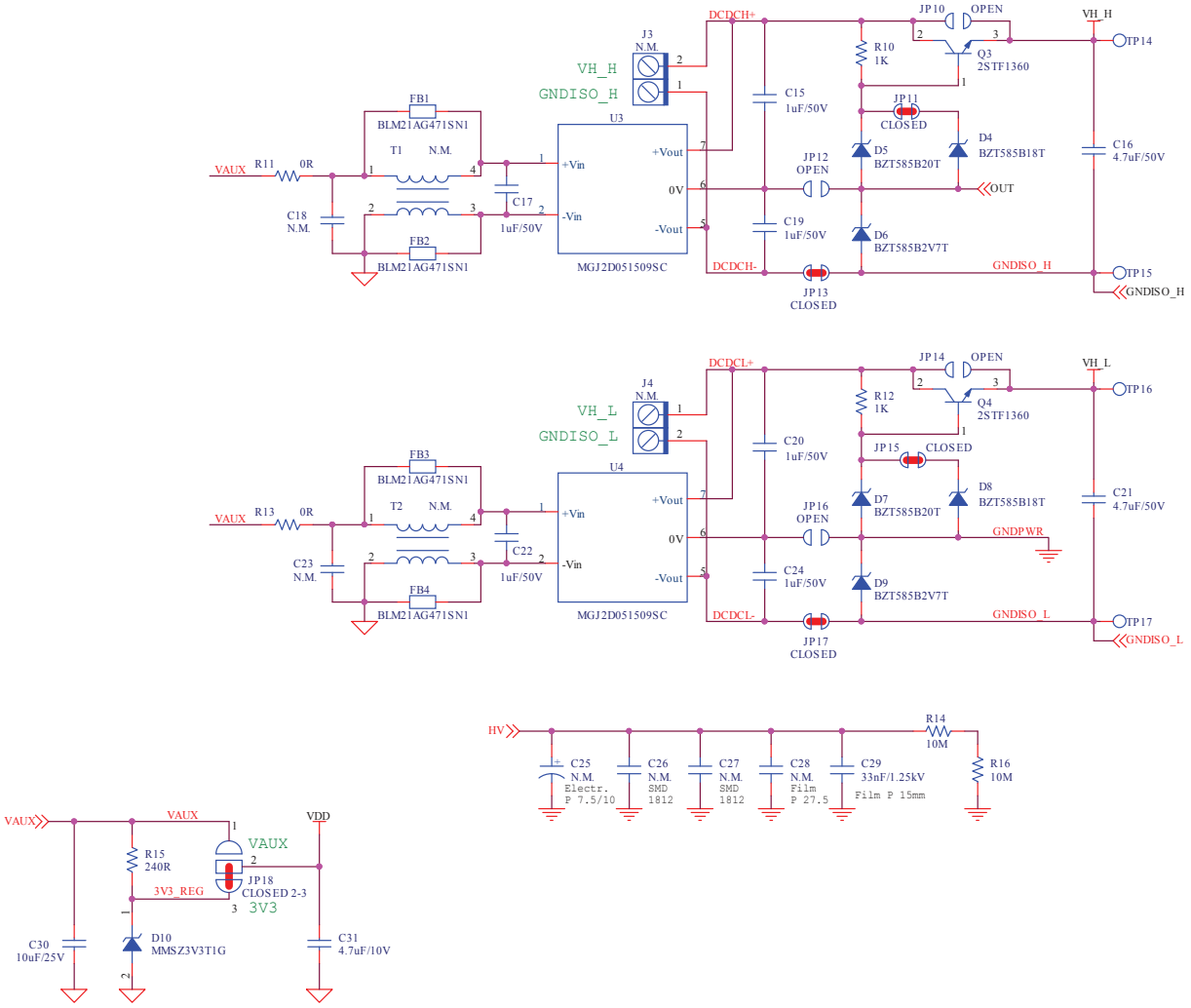


Figure 2. EVALSTGAP2SiCSC circuit schematic – supply, connectors and decoupling



2 Bill of material

Table 1. Bill of Material – components common to all device variants

Reference	Description	Value / Generic Part Number
CN1, CN2, CN3	TE 928814-1	Tab FASTON 250 Horizontal
C1, C2, C8, C9	100nF/50V	SMT Ceramic capacitor
C3, C7, C10, C14	1uF/50V	SMT Ceramic capacitor
C4, C11	N.M.	SMT Ceramic capacitor
C5, C6, C12, C13	220pF/25V	SMT Ceramic capacitor
C15, C17, C19, C20, C22, C24	1uF/50V	SMT Ceramic capacitor
C16, C21	4.7uF/50V	SMT Ceramic capacitor
C18, C23	N.M.	SMT Ceramic capacitor
C25	N.M.	THT Electrolitic capacitor
C26, C27	N.M.	SMT Ceramic capacitor
C28	N.M.	Film capacitor
C29	33nF/1.25kV	Film capacitor
C30	10uF/25V	SMT Ceramic capacitor
C31	4.7uF/10V	SMT Ceramic capacitor
D1, D3	STPS2L40ZFY	Automotive low drop power Schottky rectifier
D2	STTH112A	High voltage ultrafast rectifier
D4, D8	BZT585B18T	SURFACE MOUNT PRECISION ZENER DIODE
D5, D7	BZT585B20T	SURFACE MOUNT PRECISION ZENER DIODE
D6, D9	BZT585B2V7T	SURFACE MOUNT PRECISION ZENER DIODE
D10	MMSZ3V3T1G	Zener Voltage Regulator 500mW
FB1, FB2, FB3, FB4	BLM21AG471SN1	Ferrite Beads
JP1, JP3, JP4, JP5, JP7, JP9, JP11, JP13, JP15, JP17	CLOSED	SMT jumper
JP2, JP6, JP8, JP10, JP12, JP14, JP16	OPEN	SMT jumper
JP18	CLOSED 2-3	SMT jumper
J1	MORSV-350-7P_screw	Connector terminal block T.H. 7 POS 3.5 mm
J2	STRIP 1x7	Strip connector 7 pos, 2.54 mm
J3, J4	N.M.	Connector terminal block T.H. 2 POS 5.08 mm
Q1, Q2	N.M.	N-channel MOSFET up to 1700 V
Q1A, Q2A	N.M.	N-channel MOSFET up to 1700 V
Q3, Q4	2STF1360	Low voltage fast-switching NPN power transistors
R1, R6	22R	SMT Resistor
R2, R8	2R2	SMT Resistor
R3, R4, R7, R9	100R	SMT Resistor
R5	N.M.	SMT Resistor
R10, R12	1K	SMT Resistor

Reference	Description	Value / Generic Part Number
R11, R13	0R	SMT Resistor
R14, R16	10M	SMT Resistor
R15	240R	SMT Resistor
TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8, TP11, TP13, TP14, TP15, TP16, TP17	T POINT R	Test point - PCB 1.5 mm diameter
TP9, TP10, TP12	TPTH-ANELLO-1MM	THT Ring Test Point
T1, T2	N.M.	Common mode choke, SMD 4.7x4.5 mm
U1, U2	STGAP2SiCSC	Galvanically isolated 4 A single gate driver for SIC MOSFETs
U3, U4	MGJ2D051509SC	5.2KVDC Isolated 2W Gate Drive DC/DC Converters
		P.C.B. EVALSTGAP2SiC Rev.1

3 Layout and component placements

Figure 3. **EVALSTGAP2SiCSC – Layout (component placement top view)**

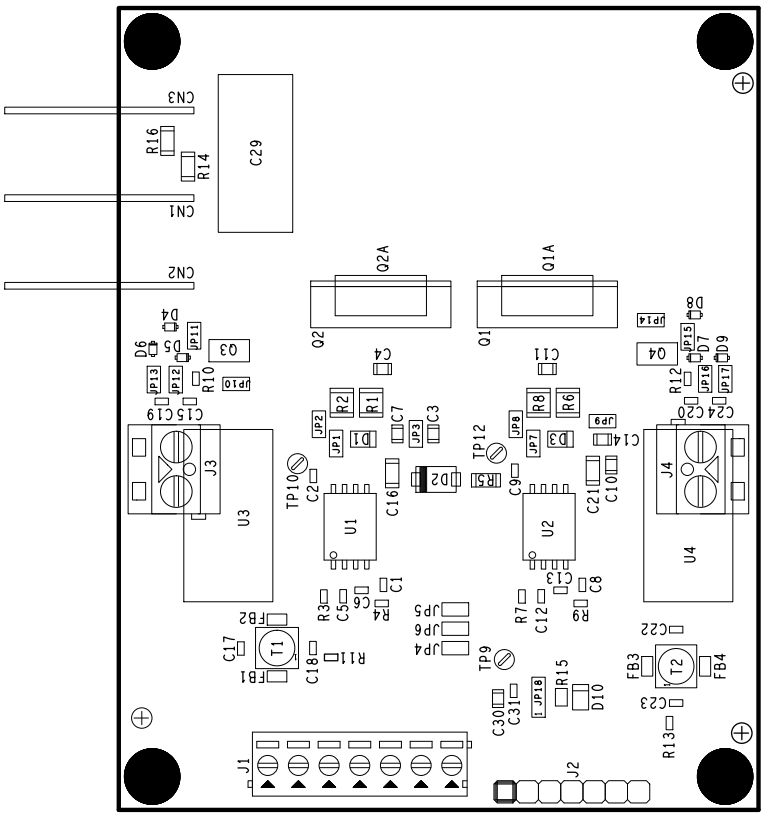


Figure 4. **EVALSTGAP2SiCSC – Layout (component placement bottom view)**

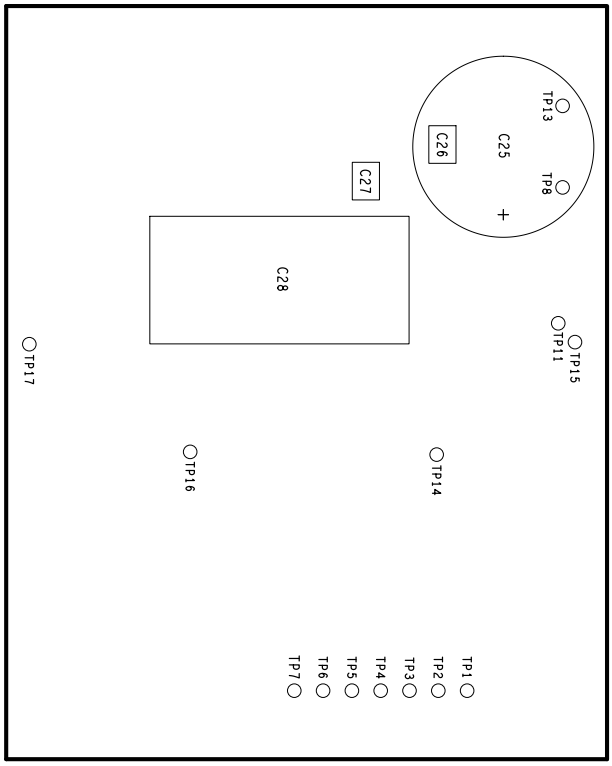


Figure 5. **EVALSTGAP2SiCSC – Layout (top layer)**

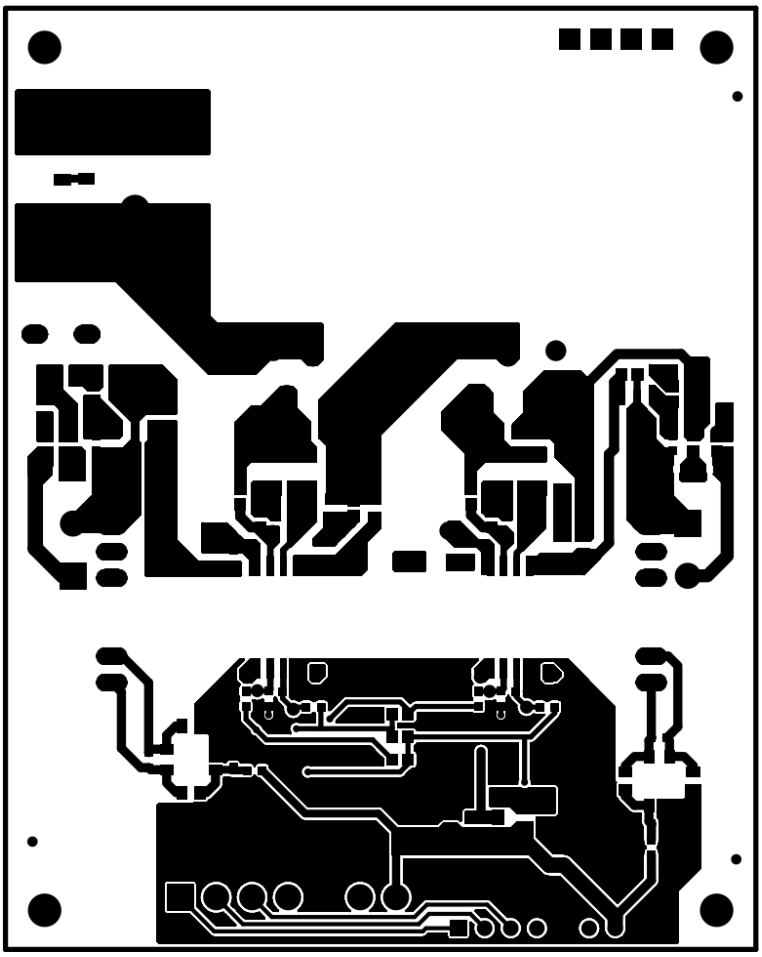
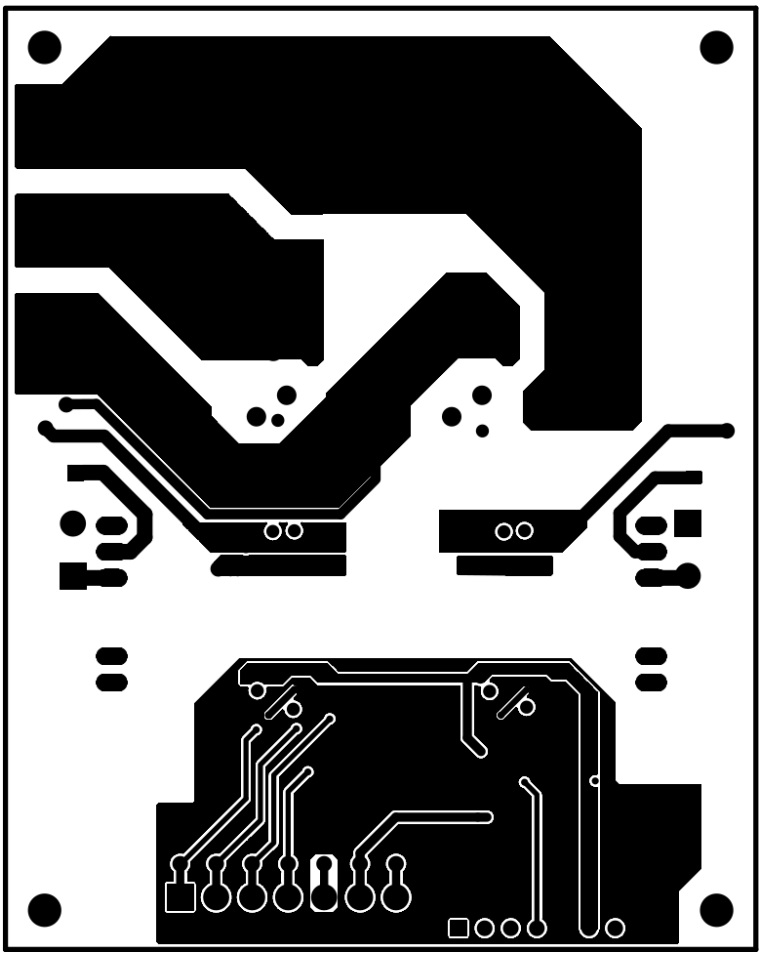


Figure 6. **EVALSTGAP2SiCSC – Layout (bottom layer)**



Revision history

Table 2. Document revision history

Date	Version	Changes
01-Oct-2020	1	Initial release.

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