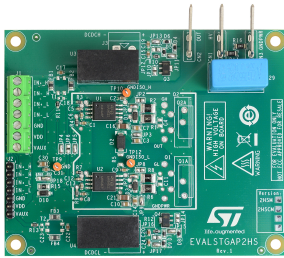# Demonstration board for STGAP2HSCM isolated 4 A single gate driver

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: +15/0 V; +15/-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 shutdown protection
  - Standby function
  - 4 A Miller CLAMP

Product status link
EVALSTGAP2HSCM

Description

The EVALSTGAP2HSCM is an 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 MOSFET / IGBT power switch.

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

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 also implementing HW interlocking protection in order to avoid cross-conduction in case of controller's malfunction.

The device allows implementing negative gate driving, and the onboard isolated DC-DC converters allow working with optimized driving voltage for MOSFET/IGBT.

The EVALSTGAP2HSCM board allows evaluating all the STGAP2HSCM features while driving a half-bridge power stage with voltage rating up to 1200 V in TO-220 or TO-247 package.
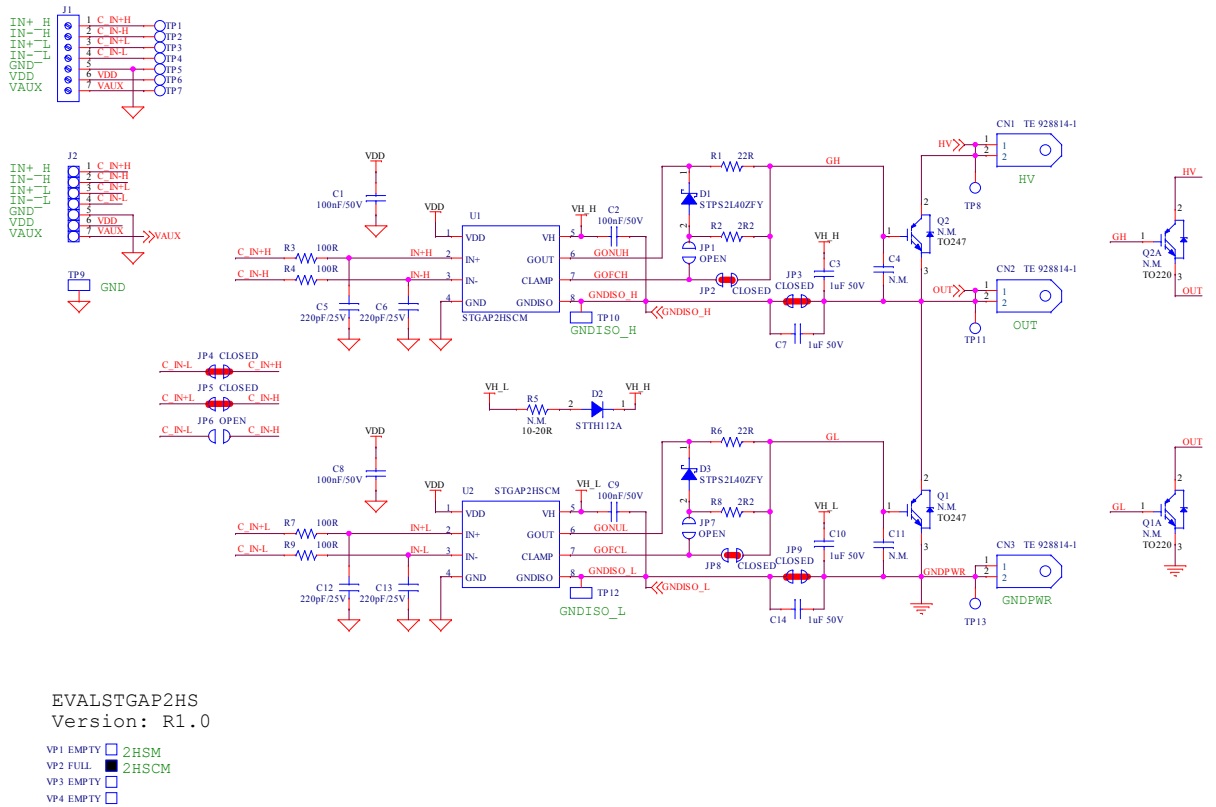
The board allows easily selecting and modifying the values of relevant external components in order to ease driver performance evaluation under different applicative conditions and fine pre-tuning of the final application's components.

DB4268 - Rev 1 - September 2020
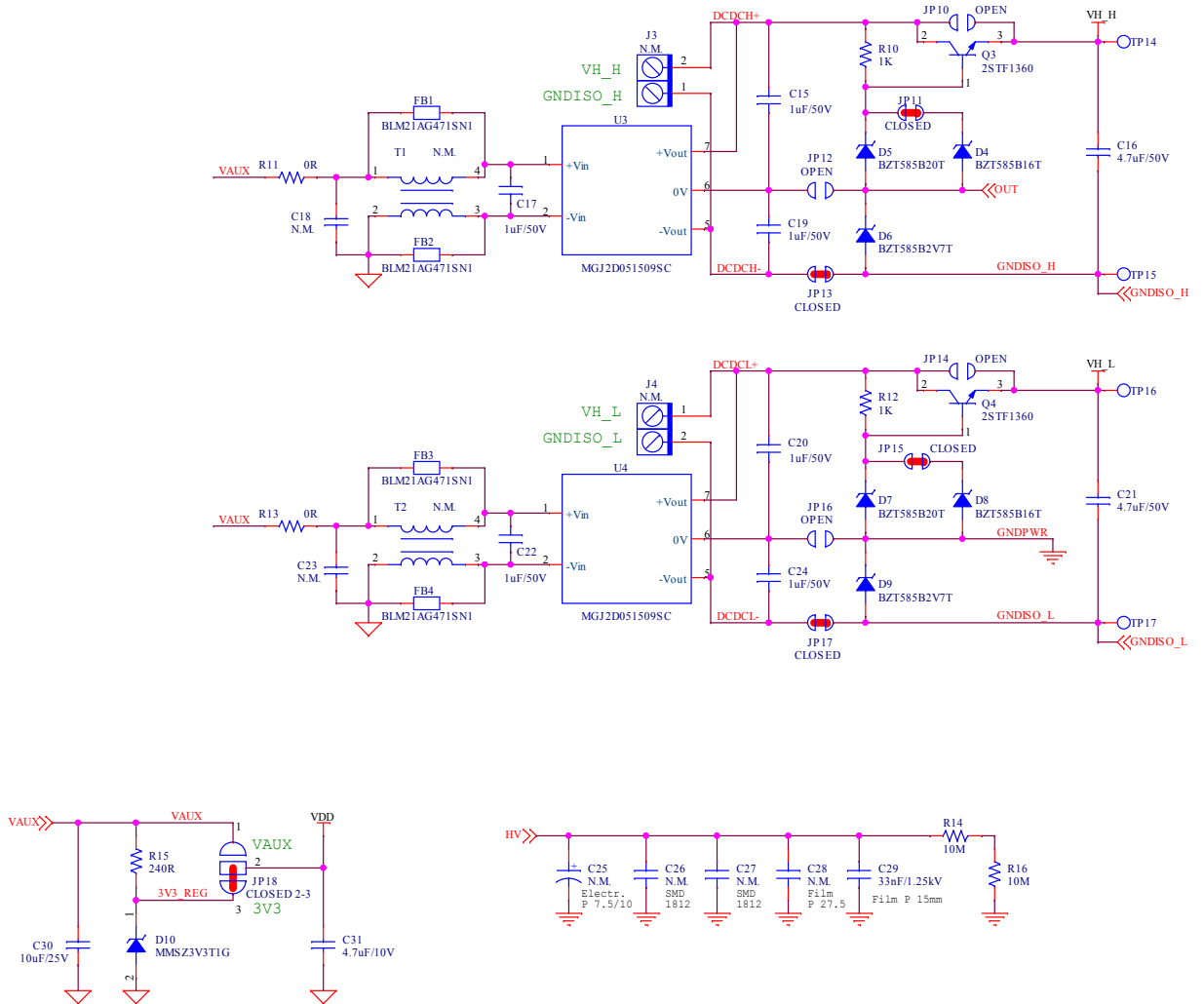For further information contact your local STMicroelectronics sales office.

www.st.com

1 Schematic diagram

Figure 1. EVALSTGAP2HSCM circuit schematic – gate drivers

Figure 2. EVALSTGAP2HSCM 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	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 uF/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 uF/50 V
C16,C21	SMT ceramic capacitor	4.7 uF/50 V
C18,C23	SMT ceramic capacitor	N.M.
C25	THT electrolitic capacitor	N.M.
C26,C27	SMT ceramic capacitor	N.M.
C28	Film capacitor	N.M.
C29	Film capacitor	33 nF/1.25k V
C30	SMT ceramic capacitor	10 uF/25 V
C31	SMT ceramic capacitor	4.7 uF/10 V
D1,D3	Automotive low drop power Schottky rectifier	STPS2L40ZFY
D2	High voltage ultrafast rectifier	STTH112A
D4,D8	Surface mount precision Zener diode	BZT585B16T
D5,D7	Surface mount precision Zener diode	BZT585B20T
D6,D9	Surface mount precision Zener diode	BZT585B2V7T
D10	Zener Voltage Regulator 500 mW	MMSZ3V3T1G
FB1,FB2,FB3,FB4	Ferrite beads	BLM21AG471SN1
JP2,JP3,JP4,JP5,JP8,JP9,JP11,JP13, JP15,JP17	SMT jumper	Closed
JP1,JP6,JP7,JP10,JP12,JP14,JP16	SMT jumper	Open
JP18	SMT jumper	Closed 2-3
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.
Q1,Q2	N-channel IGBT or MOSFET up to 1700 V	N.M.
Q1A,Q2A	N-channel IGBT or MOSFET up to 1700 V	N.M.
Q3,Q4	Low voltage fast-switching NPN power transistors	2STF1360
R1,R6	SMT resistor	22R
R2,R8	SMT resistor	2R2
R3,R4,R7,R9	SMT resistor	100R
R5	SMT resistor	N.M.
R10,R12	SMT resistor	1K

Reference	Description	Value / Generic Part Number
R11,R13	SMT resistor	0R
R14,R16	SMT resistor	10M
R15	SMT resistor	240R
TP1,TP2,TP3,TP4,TP5,TP6,TP7,TP8, TP11,TP13,TP14,TP15,TP16,TP17	Test point - PCB 1.5 mm diameter	T POINT R
TP9,TP10,TP12	THT ring test point	TPTH-ANELLO-1MM
T1,T2	Common mode choke, SMD 4.7x4.5 mm	N.M.
U1,U2	Galvanically isolated 4 A single gate driver	STGAP2HSCM
U3,U4	5.2KVDC isolated 2W gate drive DC-DC converters	MGJ2D051509SC
VP2	PCB assembly version solder dot	Full
VP1,VP3,VP4	PCB assembly version solder dot	Empty
	P.C.B. EVALSTGAP2HS Rev.1	

3 Layout and component placements
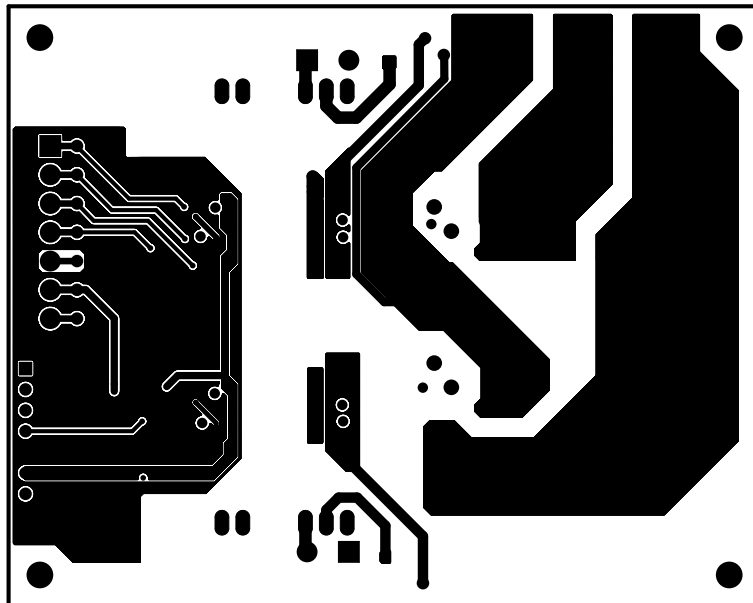
Figure 3. EVALSTGAP2HSCM – Layout (component placement top view)
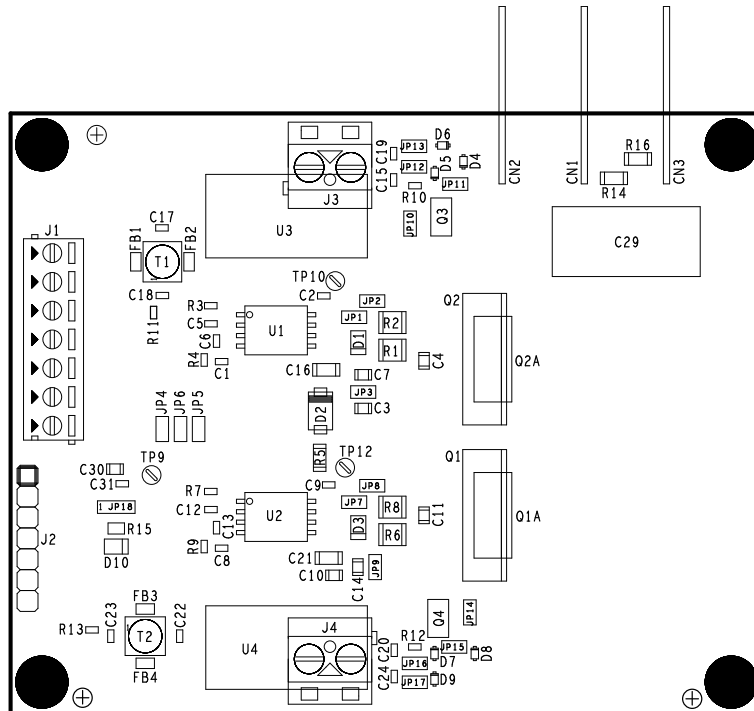
Figure 4. EVALSTGAP2HSCM – Layout (component placement bottom view)
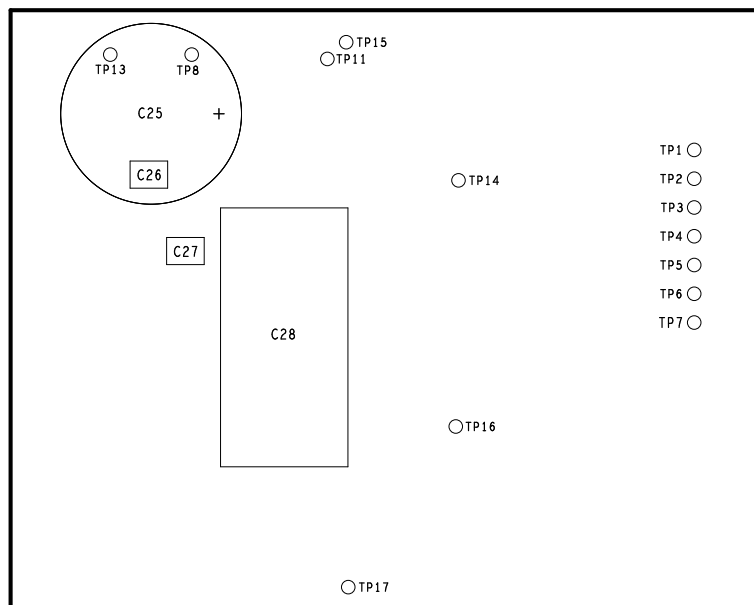
Figure 5. EVALSTGAP2HSCM – Layout (top layer)
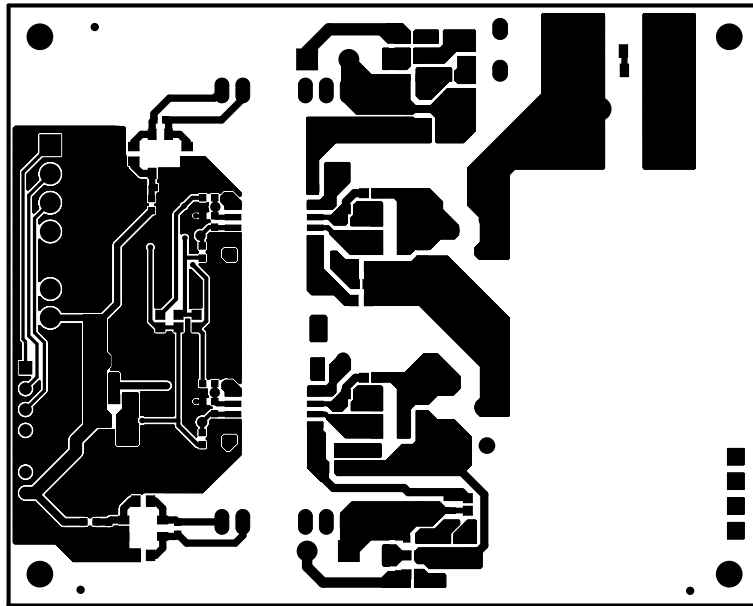
Figure 6. EVALSTGAP2HSCM – Layout (bottom layer)

Revision history

Table 2. Document revision history

Date	Version	Changes
08-Sep-2020	1	Initial release.

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