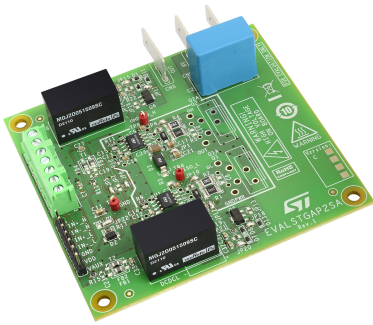


Demonstration board for STGAP2SAC automotive grade isolated 4 A single gate driver



Product status link

[EVALSTGAP2SAC](#)

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
 - 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
 - Short propagation delay: 60 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

Description

The [EVALSTGAP2SAC](#) is an automotive grade 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 EVALSTGAP2SAC board allows evaluating all the STGAP2SAC 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.

1 Schematic diagram

Figure 1. EVALSTGAP2SAC circuit schematic - gate drivers

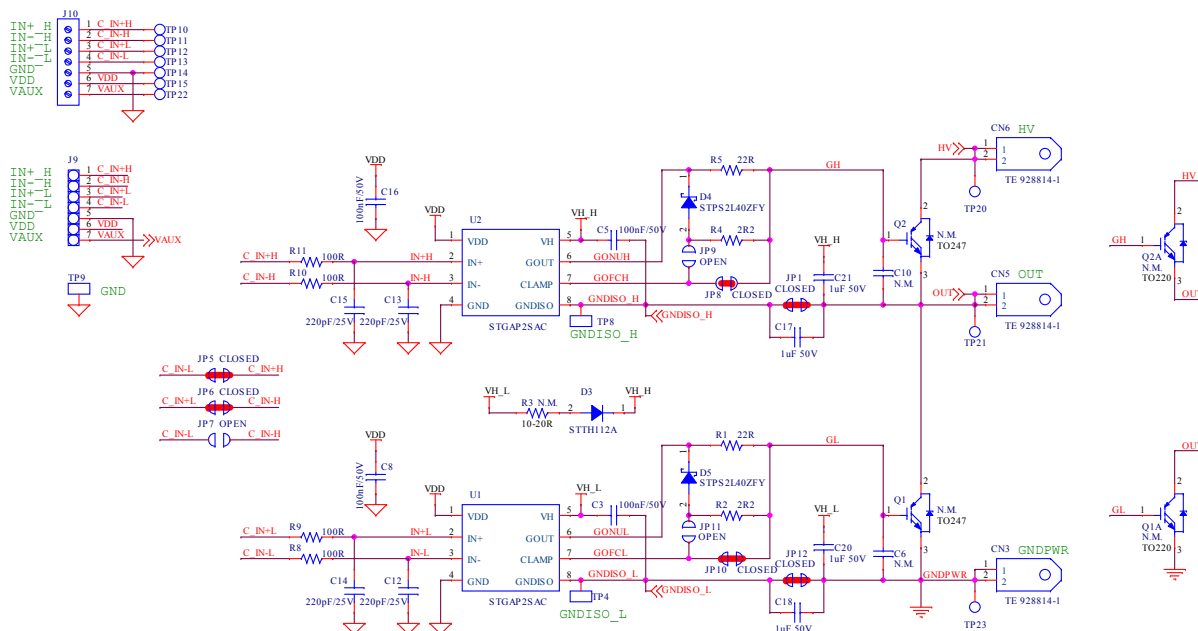
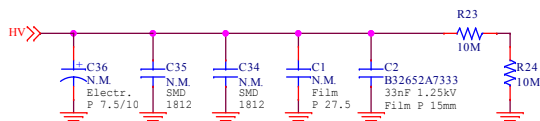
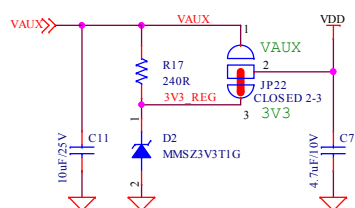
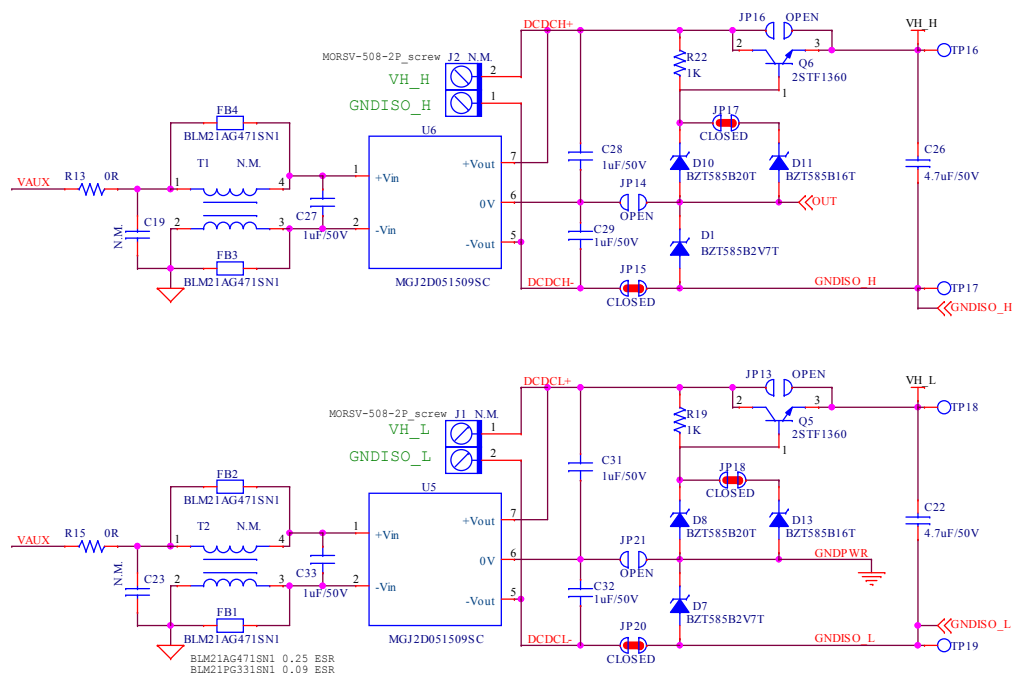


Figure 2. EVALSTGAP2SAC circuit schematic - supply, connectors and decoupling



2 Bill of material

Table 1. Bill of Material

Part reference	Part description	Part value	Package / Manufacturer' code
CN3, CN5, CN6	Tab FASTON	TE 928814-1	Pitch 6.35 mm TE Connectivity
C1	Film capacitor	N.M.	Pitch 25.
C2	Film capacitor	33 nF / 1.25 kV	Pitch 15 mm TDK
C3, C5, C8, C16	SMT ceramic capacitor	100 nF / 50 V	Size 0603
C6, C10	SMT ceramic capacitor	N.M.	Size 0805
C7	SMT ceramic capacitor	4.7 μ F / 16 V	Size 0603
C11	SMT ceramic capacitor	10 μ F / 25 V	Size 0805
C12, C13, C14, C15	SMT ceramic capacitor	220 pF / 25 V	Size 0603
C17, C18, C20, C21	SMT ceramic capacitor	1 μ F / 50 V	Size 0805
C19, C23	SMT ceramic capacitor	N.M.	Size 0603
C22, C26	SMT ceramic capacitor	4.7 μ F / 50 V	Size 1206
C27, C28, C29, C31, C32, C33	SMT ceramic capacitor	1 μ F / 50 V	Size 0603
C34, C35	SMT ceramic capacitor	N.M.	Size 1812
C36	THT electrolytic capacitor	N.M.	Radial p7.5/10 mm, d22 mm
D1, D7	2.7 V Zener diode	BZT585B2V7T	SOD523
D2	3.3 V Zener diode	MMSZ3V3T1G	SOD123
D3	High voltage ultrafast rectifier	STTH112A	SMA STMicroelectronics
D4, D5	Automotive low drop power Schottky rectifier	STPS2L40ZFY	SOD123Flat STMicroelectronics
D8, D10	20 V Zener diode	BZT585B20T	SOD523
D11, D13	16 V Zener diode	BZT585B16T	SOD523 Diodes incorporated
JP1, JP5, JP6, JP8, JP10, JP12, JP15, JP17, JP18, JP20	SMT jumper	Closed	Soldering pads
JP7, JP9, JP11, JP13, JP14, JP16, JP21	SMT jumper	Open	Soldering pads
JP22	SMT jumper	Closed 2-3	Soldering pads
J1, J2	Screw connector	N.M.	2 poles, pitch 5.08 mm
J9	Strip connector	1x7 pins	Pitch 2.54 mm Amphenol FCI
J10	Screw connector	MORSV-350-7P_screw	7 poles, pitch 3.5 mm Würth Elektronik
Q1, Q2	N-channel IGBT or MOSFET up to 1200 V	N.M.	TO-247
Q1A, Q2A	N-channel IGBT or MOSFET up to 1200 V	N.M.	TO-220

Part reference	Part description	Part value	Package / Manufacturer' code
Q5, Q6	NPN transistors	BCX56	SOT-89 Diodes
R1, R5	SMT resistor	22 Ω	Size 1210
R2, R4	SMT resistor	2.2 Ω	Size 1210
R3	SMT resistor	N.M.	Size 1206
R8, R9, R10, R11	SMT resistor	100 Ω	Size 0603
R13, R15	SMT resistor	0 Ω	Size 0603
R17	SMT resistor	240 Ω	Size 0805
R19, R22	SMT resistor	1 k Ω	Size 0603
R23, R24	SMT resistor	10 M Ω	Size 1206
TP4, TP8, TP9	THT ring test point	-	1 mm
TP10, TP11, TP12, TP13, TP14, TP15, TP16, TP17, TP18, TP19, TP20, TP21, TP22, TP23	Test point for probe	-	Metallized hole - 0.8 mm diameter
T1, T2	Common mode choke SMD	N.M.	4.7 x 4.5 mm
U1, U2	Automotive grade galvanically isolated 4 A single gate driver	STGAP2SAC	SO-8N STMicroelectronics
U5, U6	5.2 kVDC isolated 2W gate driver DC-DC converters	MGJ2D051509SC	Murata

3 Layout and component placements

Figure 3. EVALSTGAP2SAC layout - component placement top view

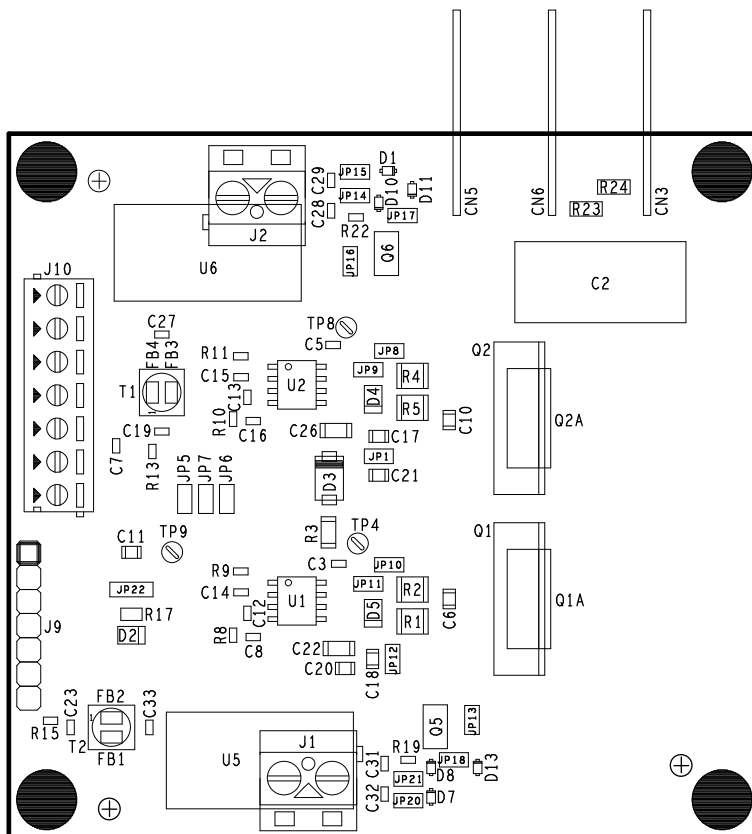


Figure 4. EVALSTGAP2SAC layout - component placement bottom view

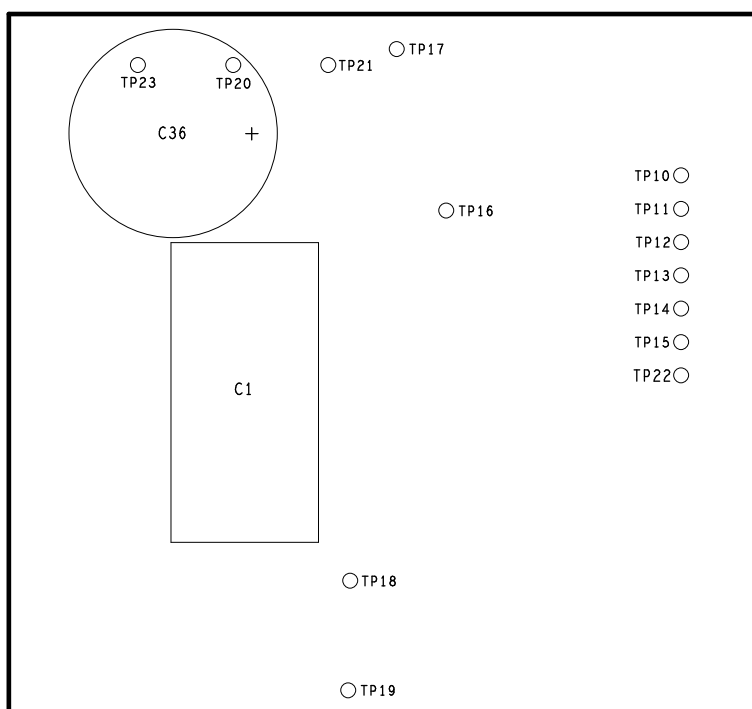


Figure 5. EVALSTGAP2SAC layout - top layer

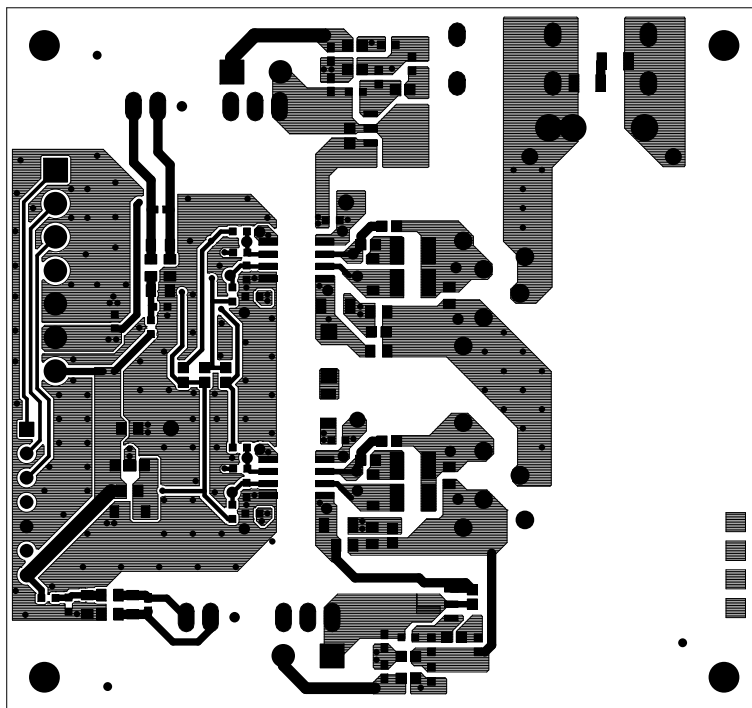
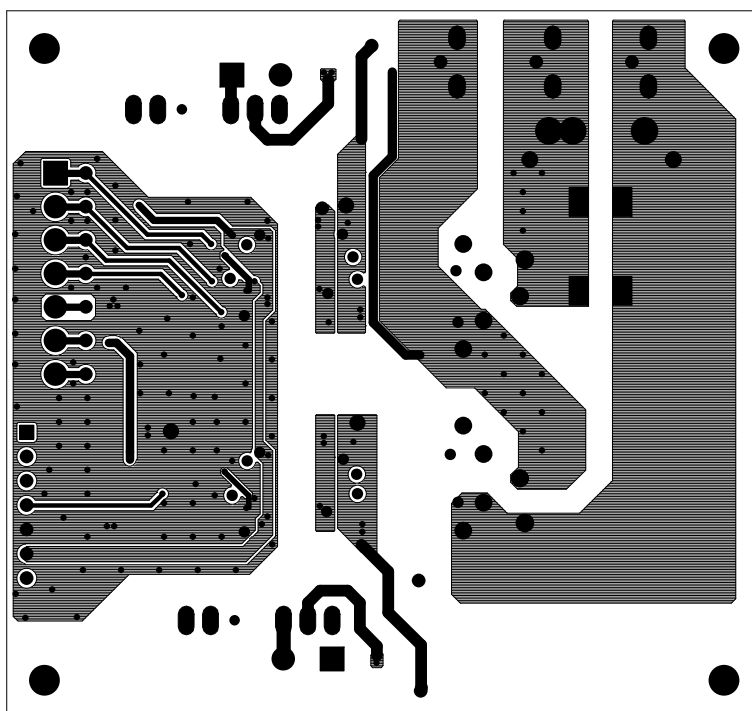


Figure 6. EVALSTGAP2SAC layout - bottom layer



Revision history

Table 2. Document revision history

Date	Version	Changes
09-Sep-2025	1	Initial release.

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