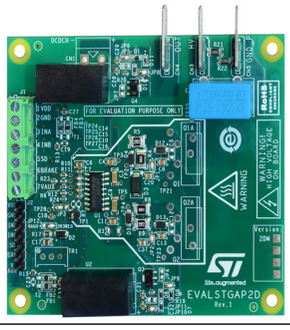
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EVALSTGAP2DM

Demonstration board for the STGAP2DM isolated half-bridge gate driver

Data brief



Features

- High voltage rail up to 1700 V
- Driver current capability:
  4 A source/sink @ 25 °C
- Short propagation delay: 80 ns
- UVLO function
- Interlocking function
- Dedicated SD and BRAKE pins
- Gate driving voltage up to 26 V
- Negative gate driving
- Onboard isolated DC-DC converters to supply high-side and low-side gate drivers, fed by VAUX = 5 V
- 3.3 V VDD logic supply generated onboard or 5 V (externally applied)
- 3.3 V, 5 V TTL/CMOS inputs with hysteresis
- Easy jumper selection of driving voltage configuration:
  +15/0 V; +15/-3 V; +19/0 V; +19/-3 V
- Temperature shutdown protection
- Standby function

Description

The STGAP2DM is an isolated half-bridge 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 applications such as motor drivers in industrial applications equipped with MOSFET, IGBT or SiC power switches.

The device integrates protection functions: dedicated SD and BRAKE pins are available, UVLO and thermal shutdown are included to easily design high reliability systems, and the interlocking function prevents outputs from being high at the same time.

The device allows to implement negative gate driving, and the onboard isolated DC-DC converters allow working with optimized driving voltage for MOSFET, IGBT or SiC.

The EVALSTGAP2DM board allows to evaluate all the STGAP2DM features while driving a half-bridge power stage with voltage rating up to 1700 V in a TO-220 or TO-247 package.

The board allows to easily select and modify the values of relevant external components in order to ease driver performance evaluation under different applicative conditions and fine pre-tuning of final application components.

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1 Schematic diagram

Figure 1. EVALSTGAP2DM schematic - gate driver

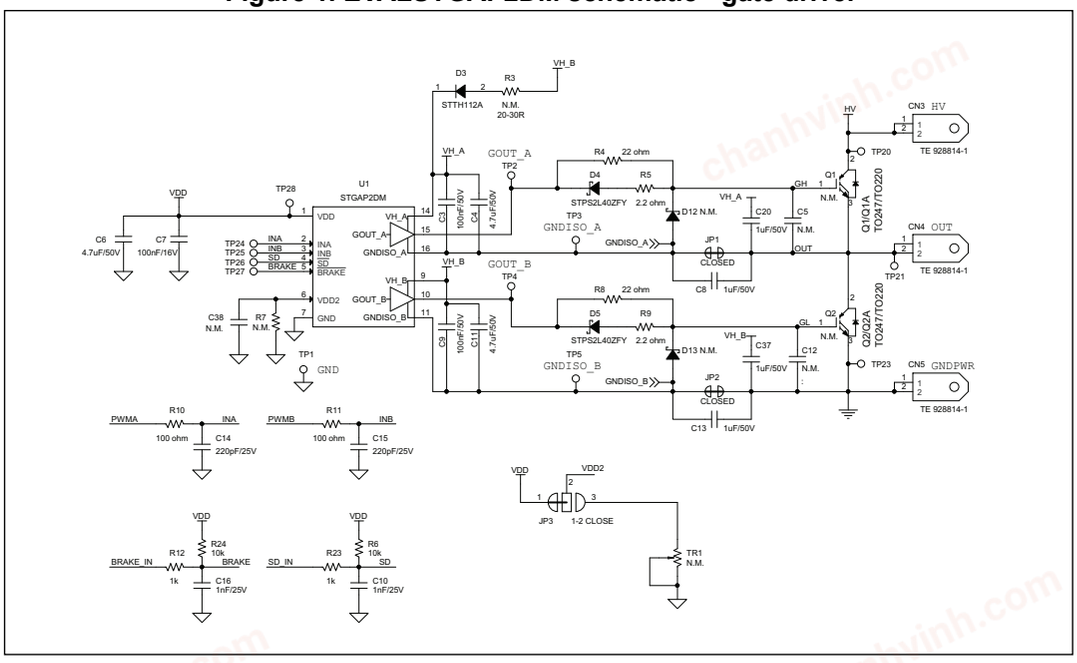
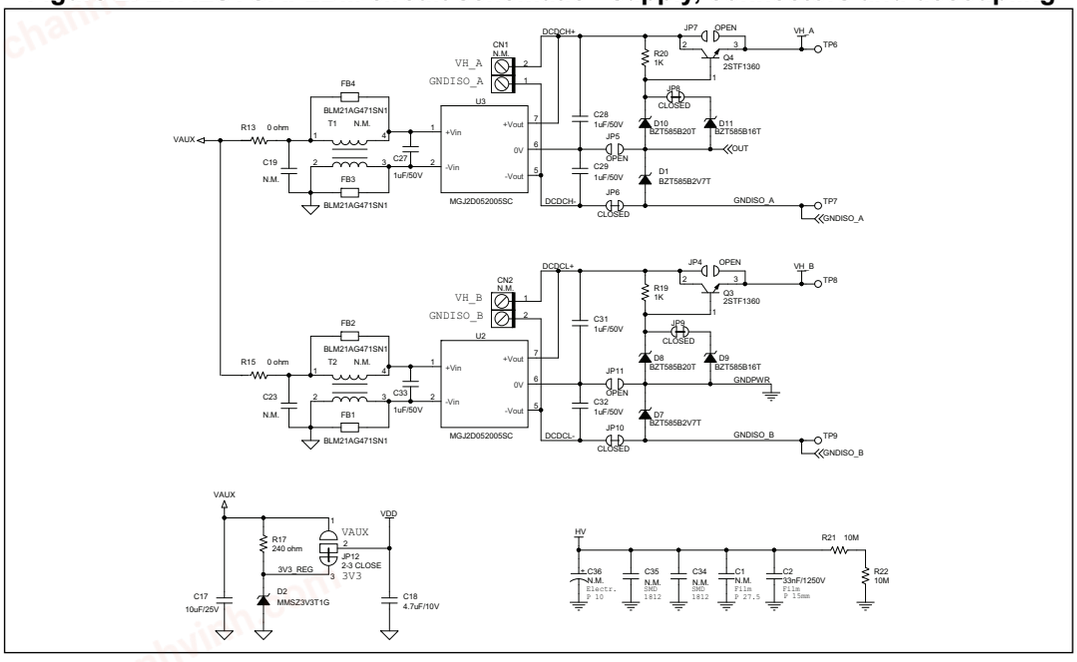


Figure 2. EVALSTGAP2DM circuit schematic - supply, connectors and decoupling



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2 Bill of materials

Table 1. Bill of materials - components common to all device variants

Part reference	Part value	Description
CN1, CN2	N.M.	Conn. term. block T.H. 2 POS 5.0 mm
CN3, CN4, CN5	TE 928814-1	Tab FASTON 250 horizontal
C1	N.M.	MKP film capacitor P 27.5 mm
C2	33 nF/1250 V	MKP film capacitor P 15 mm
C3, C9	100 nF/50 V	SMT ceramic capacitor
C4, C6, C11	4.7 µF/50 V	SMT ceramic capacitor
C5, C12	N.M.	SMT ceramic capacitor
C7	100 nF/16 V	SMT ceramic capacitor
C8, C13, C20, C37	1 µF/50 V	SMT ceramic capacitor
C10, C16	1 nF/25 V	SMT ceramic capacitor
C14, C15	220 pF/25 V	SMT ceramic capacitor
C17	10 µF/25 V	SMT ceramic capacitor
C18	4.7 µF/10 V	SMT ceramic capacitor
C19, C23, C38	N.M.	SMT ceramic capacitor
C27, C28, C29, C31, C32, C33	1 µF/50 V	SMT ceramic capacitor
C34, C35	N.M.	SMT ceramic capacitor
C36	N.M.	Electrolitic Capacitor Diam 22 mm, pitch 10 mm
D1, D7	BZT585B2V7T	Zener diode 2.7 V
D2	MMSZ3V3T1G	3.3 V 500 mW, Zener diode
D3	STTH112A	Diode Ultrafast 1200 V, 1 A
D4, D5	STPS2L40ZFY	Diode Schottky 40 V, 2 A
D8, D10	BZT585B20T	Zener diode 20 V
D9, D11	BZT585B16T	Zener diode 16 V
D12, D13	N.M.	Diode Schottky 40 V, 2 A
FB1, FB2, FB3, FB4	BLM21AG471SN1	Ferrite Beads
JP1, JP2	CLOSED	Jumper to solder
JP3	1-2 CLOSED	Jumper to solder
JP4, JP5, JP7, JP11	OPEN	Jumper to solder
JP6, JP8, JP9, JP10	CLOSED	Jumper to solder
JP12	2-3 CLOSED	Jumper to solder
J1	MORSV-350-7P_screw	Conn. term. block T.H. 7 POS 3.5 mm

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Table 1. Bill of materials - components common to all device variants (continued)

Part reference	Part value	Description
J2	STRIP 1x7	Strip conn. header 7 POS, 2.54 mm
Q1A, Q2A	N.M.	TO220 footprint for MOS/IGBT high voltage
Q1, Q2	N.M.	TO247 footprint for MOS/IGBT high voltage
Q3, Q4	2STF1360	Low voltage fast-switching NPN power transistors
R3	N.M.	SMT resistor
R4, R8	22 Ω	SMT resistor
R5, R9	2.2 Ω	SMT resistor
R6, R24	10 k	SMT resistor
R7	N.M.	SMT resistor
R10, R11	100 Ω	SMT resistor
R12, R19, R20, R23	1 k	SMT resistor
R13, R15	0 Ω	SMT resistor
R17	240 Ω	SMT resistor
R21, R22	10 M	SMT resistor
TP1, TP2, TP3, TP4, TP5, TP20, TP21, TP23, TP24, TP25, TP26, TP27, TP28	N.M.	TP for Probe
TP6, TP7, TP8, TP9	N.M.	Test pad SMD, 1.5 mm
TR1	N.M.	Multi turn Cermet Trimmer, 5 x 10 mm, Top Adjust
T1, T2	N.M.	Common mode choke, SMD 4.7x4.5 mm
U1	STGAP2DM	gapLITE: galvanically isolated 4 A,dual gate driver
U2, U3	MGJ2D051509SC	5 V to +15/-9 V isolated DC-DC converter, Murata
VP1	FULL	PCB assembly version solder dot
VP2, VP3, VP4	EMPTY	PCB assembly version solder dot

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3 Layout and component placements

Figure 3. EVALSTGAP2DM - layout (component placement top view)

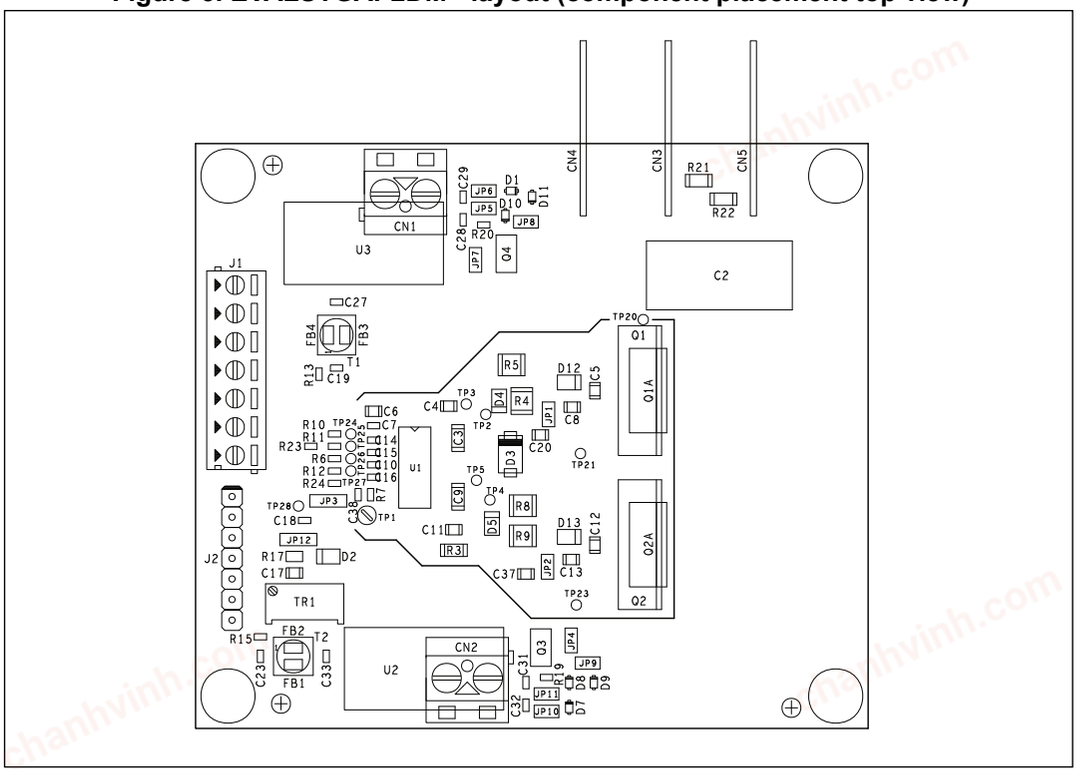
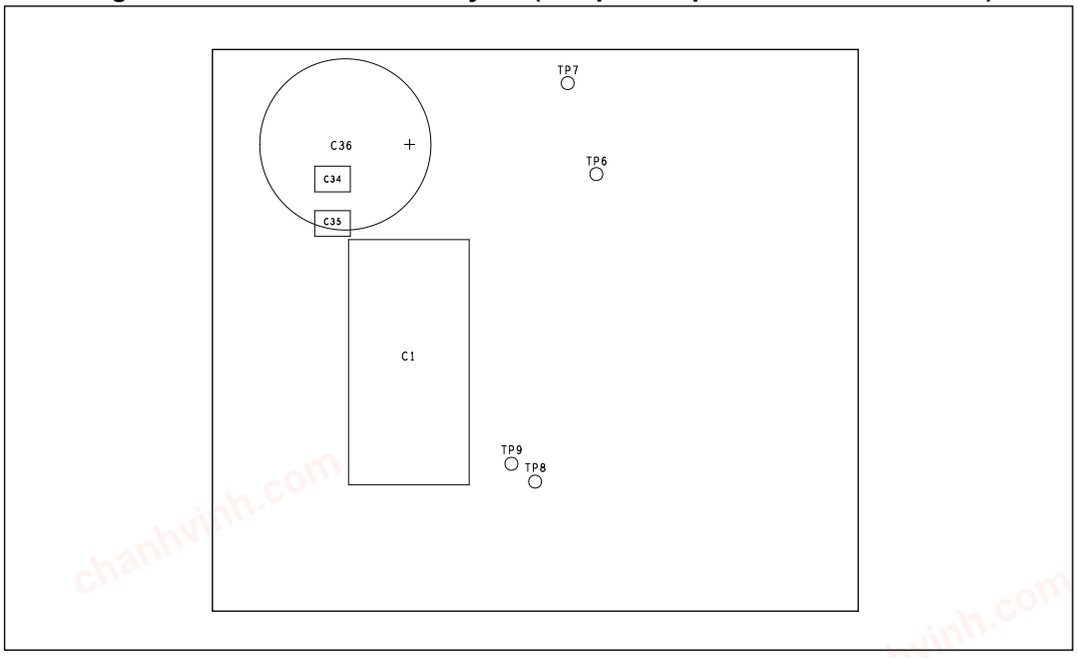


Figure 4. EVALSTGAP2DM - layout (component placement bottom view)



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Figure 5. EVALSTGAP2DM - layout (top layer)

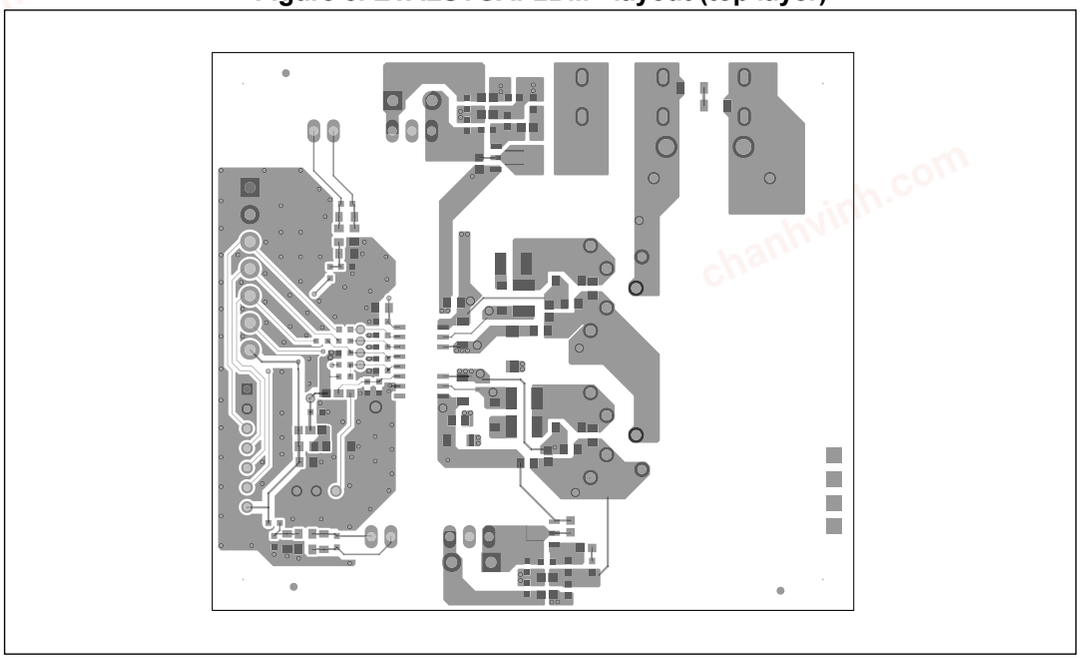
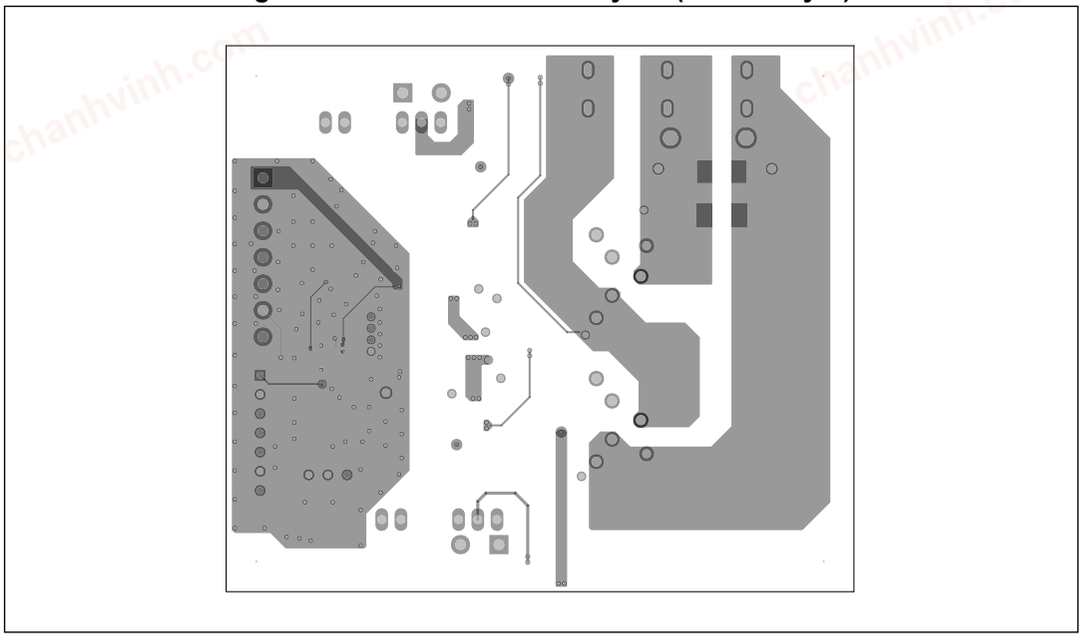


Figure 6. EVALSTGAP2DM - layout (bottom layer)



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4 Revision history

Table 2. Document revision history

Date	Revision	Changes
6-Sept-2018	1	Initial release
19-Nov-2018	2	Updated *Table 1* (Bill of material)

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