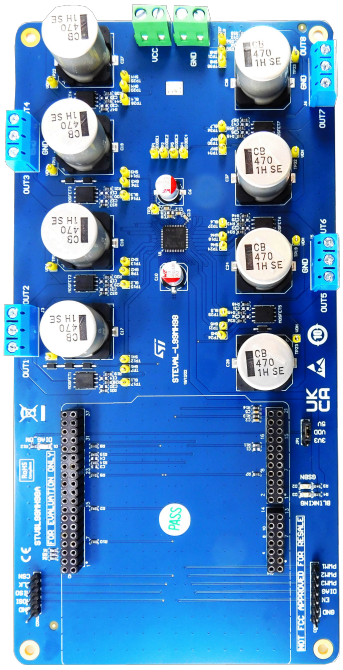
STEVAL-L99MH98

Data brief

L99MH98 configurable octal half-bridge pre-driver board



Product summary	
L99MH98 configurable octal half-bridge pre-driver board	STEVAL-L99MH98
Octal half-bridge pre-driver	L99MH98-TR
Applications	Seat control Steering column adjustment, gas pedal adjustment Sunroof, sliding doors, window lift, seat-belt pre-tensioners, cargo cover, washer pump

Features

- Operating input voltage: VDH 6 V to 28 V, Vdd 5 V/3.3 V
- Octal half-bridge, or quad H-bridge, pre-driver
- SPI communication interface for control and diagnostics
- Programmable gate current up to 120 mA
- Fully configurable half-bridge driver in case of fault occurrence
- Evaluation board design with optimized bill of materials
- Vds monitoring
- Drain-source monitoring for short circuit detection
- Three PWM inputs
- High-side and low-side PWM capable
- Configurable overvoltage threshold
- L99MH98 hosted in VFQFPN48L package
- 4-layer 200x100 mm PCB

Description

The STEVAL-L99MH98 is a low-cost tool designed to evaluate the L99MH98, a smart power device designed by STMicroelectronics in a VFQFN48L package with an exposed pad. The L99MH98 is an integrated octal half-bridge pre-driver dedicated to controlling up to sixteen N-channel MOSFETs. It is intended for DC motor control applications such as automotive power seat control or other applications.

A 24-bit serial peripheral interface (SPI) is used for configuring and controlling the eight half-bridges or four H-bridges. SPI status registers provide high-level diagnostic information such as supply voltage monitoring, charge pump voltage monitoring, temperature warning, and overtemperature shutdown. Each gate driver independently monitors its external MOSFET drain-source voltage for fault conditions. The L99MH98 supports indirect current measurement on external MOSFETs, allowing cost savings and lower system complexity, avoiding the usage of shunt resistors.

A more efficient gate current control of the external MOSFETs, called “three stages gate current,” decreases and optimizes electromagnetic interference (EMI). Protection features (drain-source monitoring for short circuit detection, overtemperature warning and shutdown, timeout watchdog for MCU control, detailed off-state diagnostic via SPI) ensure the ASIL-B achievement according to the ISO 26262 standard. Thanks to the expansion connectors, the STEVAL-L99MH98 allows the complete control of the L99MH98 communication interface (SPI) and parallel input/output. The evaluation board can also be controlled using a graphical user interface.

1 Electrical characteristics

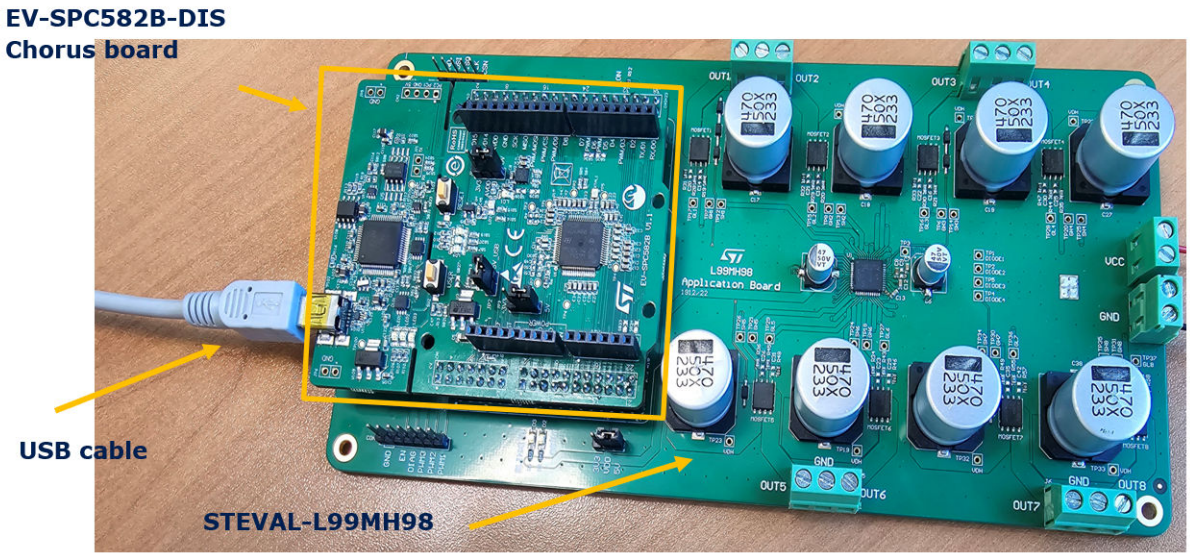
- Operative input Voltage: 6 V - 28 V, Vdd 5 V/3.3 V
- Output:
  - 8 half-bridge/4 full bridge pre-driver
  - 8 channel to drive upto 8 high/low side mosfet 10 A
  - DIAGN pin output
- EN input
- 3 PWM input
- SPI communication interface
- 80x65 mm 4 layers PCB

2 System requirements

- 6 V to 28 V power supply with current capability up to 10 A
- Loads: DC motor 2 A, 20 kHz, Duty: 50%
- Oscilloscope and/or multimeter

3 External connection

Figure 1. **PC connected through USB cable that connects app kit**



Note: The Graphical User Interface is available on PC connected to the evaluation board via USB cable.

4 Schematic diagrams

Figure 2. **STEVAL-L99MH98 schematic diagram - [1 of 3]**

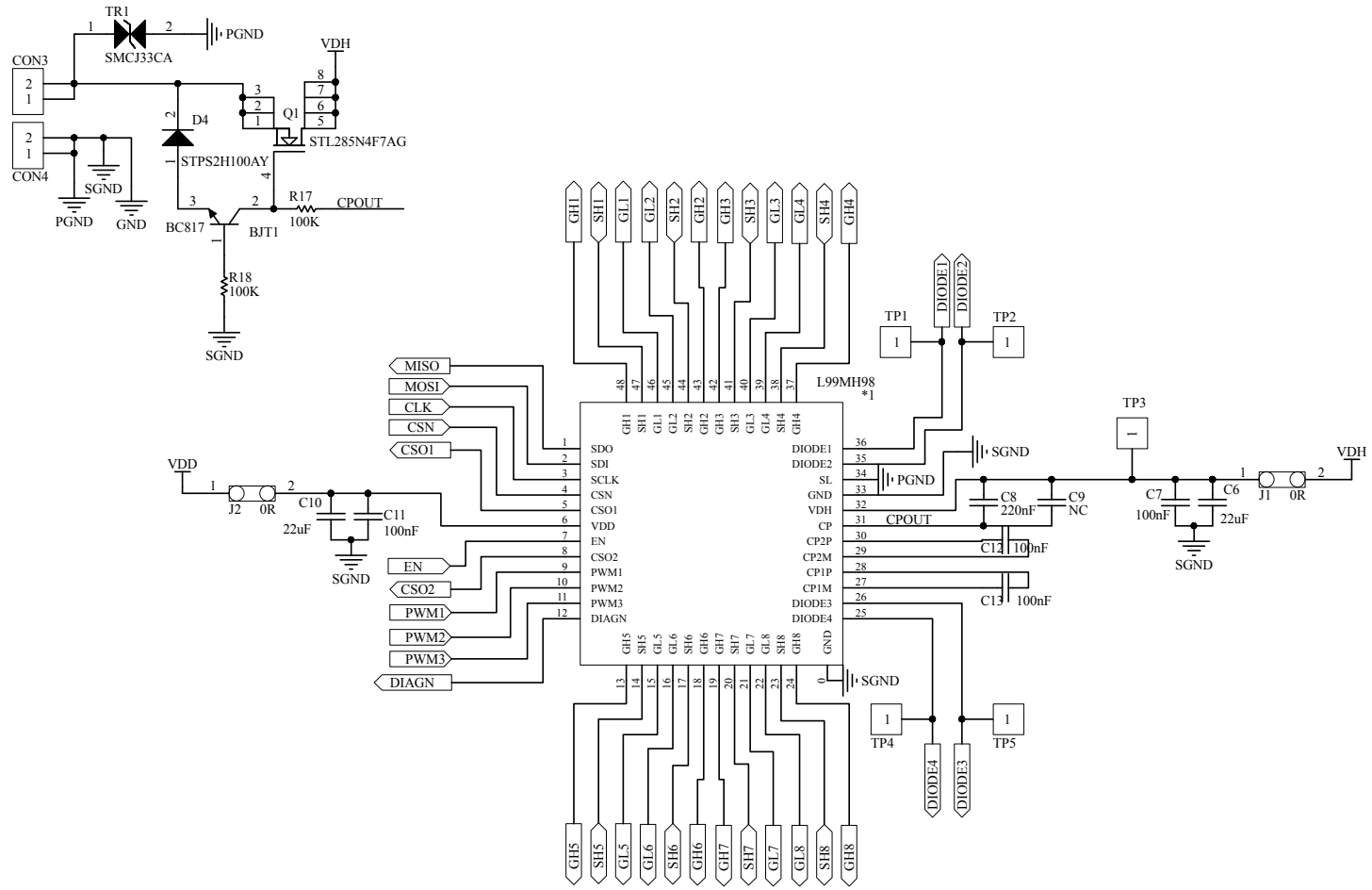


Figure 3. STEVAL-L99MH98 schematic diagram - [2 of 3]

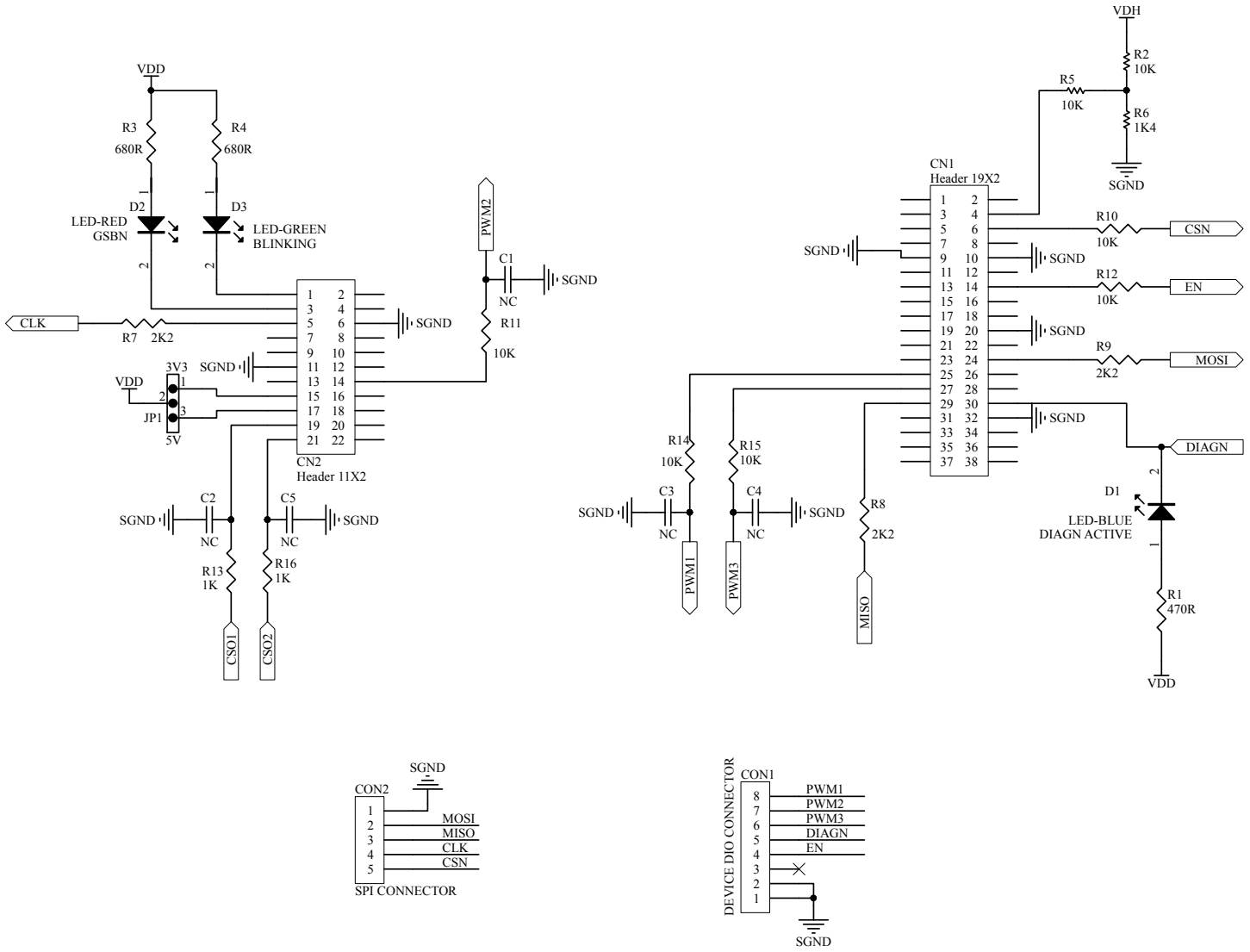
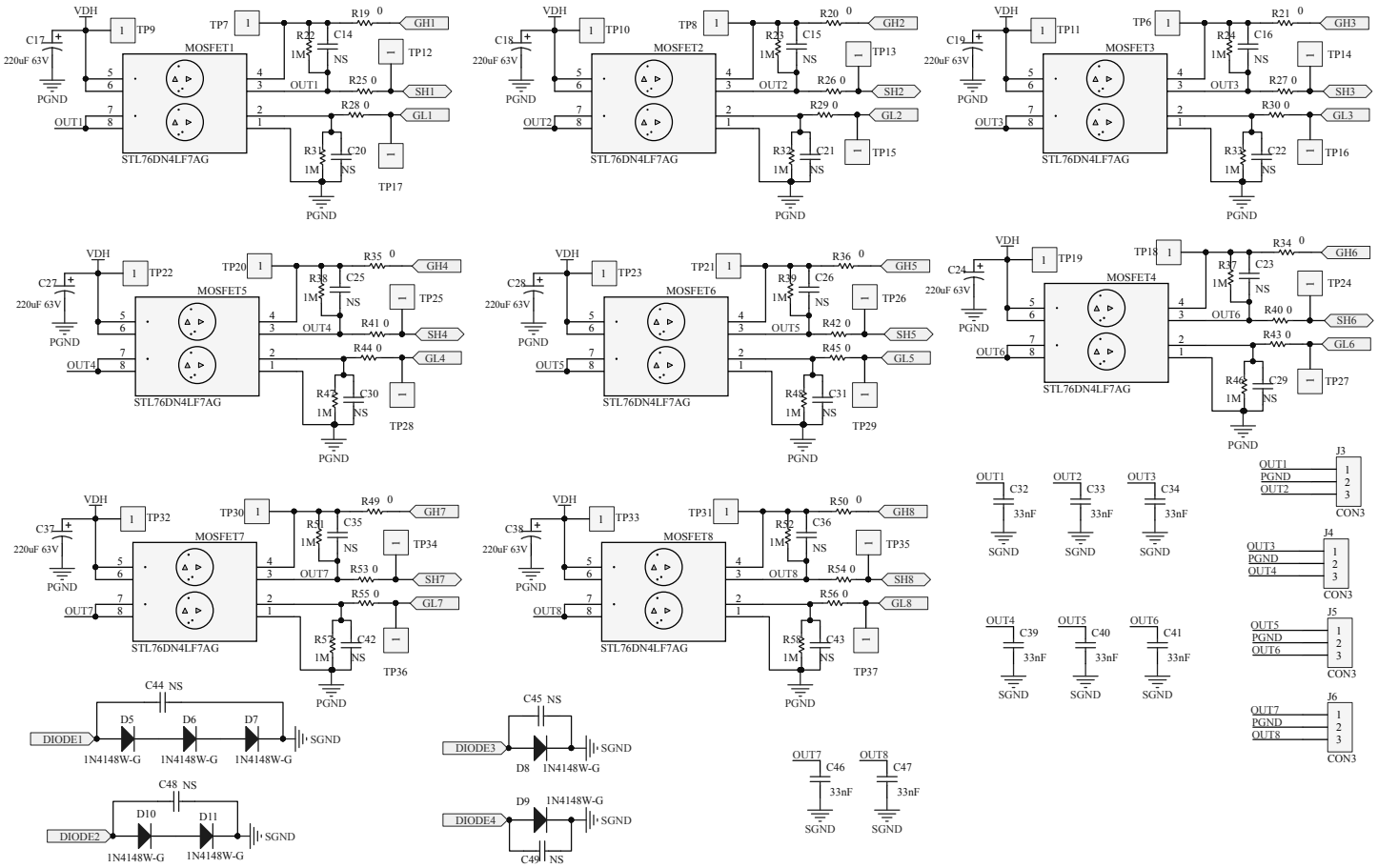


Figure 4. STEVAL-L99MH98 schematic diagram - [3 of 3]



5 Bill of materials

Table 1. **STEVAL-L99MH98 bill of materials**

Item	Q.ty	Ref.	Part / Value	Description	Manufacturer	Order code
1	1	BJT1	BC817	NPN Bipolar Transistor	Onsemi	BC817-16LT1G
2	4	C1, C3, C4, C9	NC	Not Connected		
3	2	C2, C5	1nF	CSO filtering	Samsung	CL10B102KB8WPNC
4	2	C6, C10	22uF	Capacitor	Wurth Elektronik	865060745003
5	4	C7, C11, C12, C13	100nF	Capacitor	Samsung	CL10B104KB8WPNC
6	1	C8	220nF	Capacitor	Murata	GRM188R71H224KAC4D
7	20	C14, C15, C16, C20, C21, C22, C23, C25, C26, C29, C30, C31, C35, C36, C42, C43, C44, C45, C48, C49	NC	Capacitor		
8	8	C32, C33, C34, C39, C40, C41, C46, C47	33nF	Capacitor (Semiconductor SIM Model)	Multicomp PRO	MC0603B333K500CT
9	8	C17, C18, C19, C24, C27, C28, C37, C38	470uF	Polarized Capacitor (Surface Mount)	Multicomp PRO	MCVFZ050M471JB7L
10	1	CN1	Header 7X2	Header, 7-Pin, Dual row	Preci-Dip	803-87-014-10-001101
11	2	CON3, CON4	CON2	Connector	Wurth Elektronik	691213510002
12	1	CN7	Header 11X2	Header, 11-Pin, Dual row	Preci-Dip	803-87-022-10-001101
13	1	CN10	Header 19X2	Header, 19-Pin, Dual row	Preci-Dip	803-87-038-10-001101
14	1	CON1	Header 8X1	Header, 8-Pin, Single row	Molex	22-28-4082
15	1	CON2	Header 5X1	Header, 5-Pin, Single row	Molex	22-28-4051
16	1	D1	LED-BLUE		Dialight	5988191107F
17	1	D2	LED-RED		Dialight	5988130107F
18	1	D3	LED-GREEN		Lumex	SML-LX0805SGC-TR.
19	1	D4	STPS1H100AY, SMA	Default Diode	ST	STPS1H100AY
20	7	D5, D6, D7, D8, D9, D10, D11	1N4148W+	Default Diode	Vishay	1N4148W+
21	4	J3, J4, J5, J6	CON3	Connector	Camdenboss	CTBP0500/3
22	7	R1, R2, R5, R10, R11, R14, R15	10K		TE connectivity	1622829-2
23	1	R6	1K4		Vishay	CRCW06031K40FKEA
24	2	R3, R4	680R	Resistor	Multicomp PRO	MCWR06X6800FTL
25	3	R7, R8, R9	2K2		Walsin	WF06P2201FTL

Item	Q.ty	Ref.	Part / Value	Description	Manufacturer	Order code
26	2	R13, R16	1K		TE connectivity	CRG0603F1K0
27	1	R12	470R	Resistor	TE connectivity	CRGH0603J470R
28	2	R17, R18	100K	Resistor	TE connectivity	1622827-1
29	24	R19, R20, R21, R25, R26, R27, R28, R29, R30, R34, R35, R36, R40, R41, R42, R43, R44, R45, R49, R50, R53, R54, R55, R56	0R	Resistor	Vishay	WSL251200000ZEA9
30	16	R22, R23, R24, R31, R32, R33, R37, R38, R39, R46, R47, R48, R51, R52, R57, R58	1M	Resistor	TE connectivity	CRGH0603J1M0
31	37	TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8, TP9, TP10, TP11, TP12, TP13, TP14, TP15, TP16, TP17, TP18, TP19, TP20, TP21, TP22, TP23, TP24, TP25, TP26, TP27, TP28, TP29, TP30, TP31, TP32, TP33, TP34, TP35, TP36, TP37	CON1	Connector	Vero	20-313143
32	1	TR1	SMCJ33CA		Littelfuse	SMCJ33CA
33	1	Q1	STL285N4F7AG, PowerFLAT 5x6 WF	Reverse battery mosfet	ST	STL285N4F7AG
34	1	JP1	Header 3x1	JUMPER 3CH	Molex	22-28-4031
35	8	Mosfet1, Mosfet2, Mosfet3, Mosfet4, Mosfet5, Mosfet6, Mosfet7, Mosfet8	STL76DN4LF7AG, PowerFLAT 5x6 double island WF		ST	STL76DN4LF7AG
36	1	Pre Driver	L99MH98, VFQFN 7X7X0.9 48L WETT. FLANKS	Octal Half-bridge Pre Driver	ST	L99MH98-TR

6 Board versions

Table 2. **STEVAL-L99MH98 versions**

Finished good	Schematic diagrams	Bill of materials
STV$L99MH98A (1)	STV$L99MH98A schematic diagrams	STV$L99MH98A bill of materials

1. *This code identifies the STEVAL-L99MH98 evaluation board first version.*

Revision history

Table 3. **Document revision history**

Date	Version	Changes
03-Dec-2024	1	Initial release.