

High power stepper motor driver mounting the L6480

Data brief

Features

- Voltage range from 10.5 V to 85 V
- Low $R_{ds(ON)}$ MOSFETs in DPAK package
- SPI with daisy chain feature
- FLAG and BUSY LED indicators
- Adjustable supply voltage compensation
- Flexible supply voltage management
- Suitable for use in combination with the STEVAL-PCC009V2

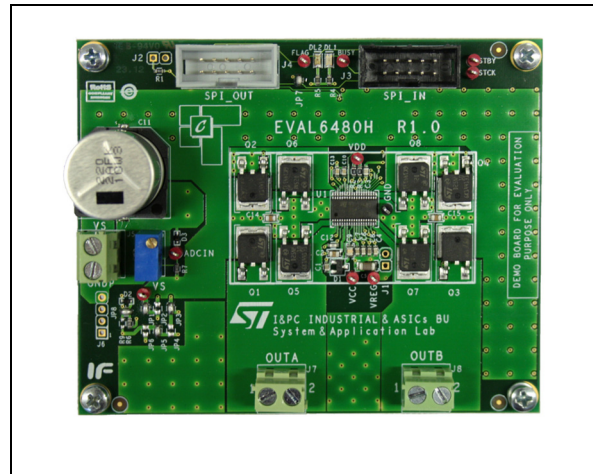
Applications

- High power bipolar stepper motor driving

Description

The EVAL6480H demonstration board is a high power microstepping motor driver. In combination with the STEVAL-PCC009V2 communication board and the evaluation software, the board allows the user to investigate all the features of the L6480 device. In particular, the board can be used to check the voltage mode driving and to regulate the L6480 parameters in order to fit the application requirements.

The EVAL6480H supports the daisy chain configuration making it suitable for the evaluation of the L6480 in multi-motor applications.



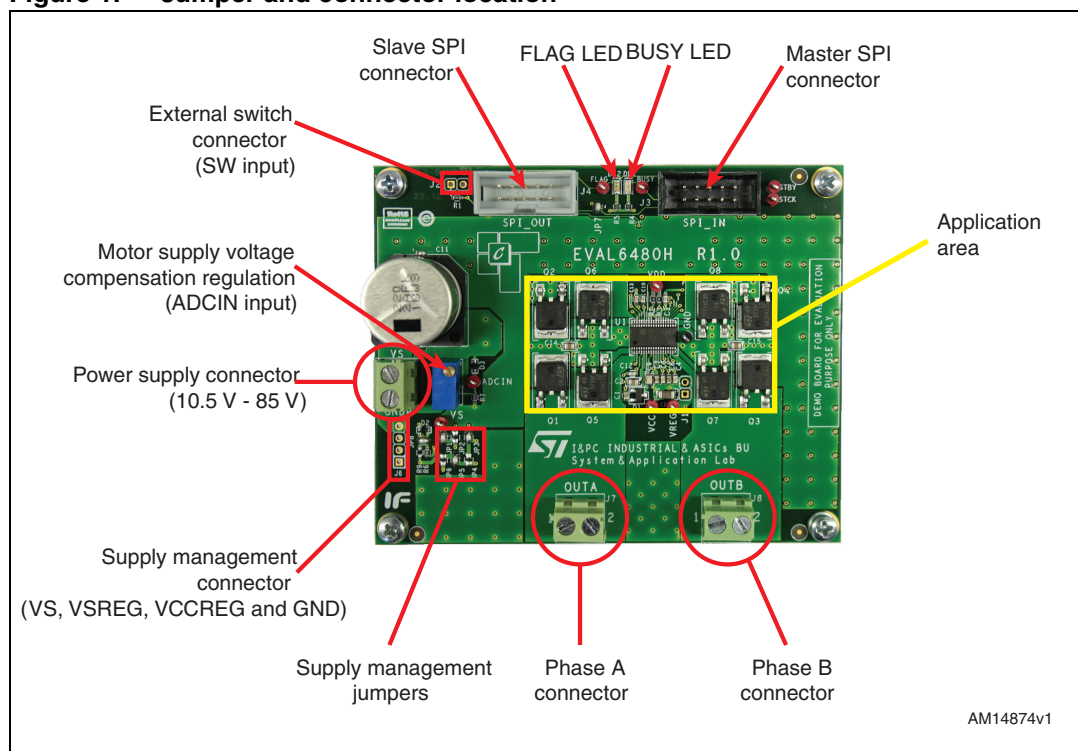
1 Board description

Table 1. EVAL6480H electrical specifications

Parameter	Value
Supply voltage (VS)	10.5 to 85 V
Maximum output current (each phase)	25 A _{r.m.s.} at 25 °C ⁽¹⁾
External MOSFET R _{ds(ON)}	33 mΩ typical at 25 °C ⁽¹⁾
Gate driver supply voltage (VCC)	7.5 V to 15 V
Logic supply voltage	3.3 V
Logic interface supply voltage	3.3 V or 5 V
Low level logic inputs	0 V
High level logic input	VDD ⁽²⁾
Operating temperature	-25 °C to +125 °C

1. Refer to STD25F10 datasheet for details.
2. All logic inputs are 5 V tolerant.

Figure 1. Jumper and connector location



AM14874v1

Table 2. Jumper and connector description

Name	Type	Function
J5	Power supply	Main supply voltage
J7	Power output	Power bridge A outputs
J8	Power output	Power bridge B outputs
J6	Power supply	Integrated voltage regulator inputs
J3	SPI	Master SPI connector
J4	SPI	Slave SPI connector
JP1	Jumper	VS to VSREG jumper
JP2	Jumper	VSREG to VCC jumper
JP3	Jumper	VCC to VCCREG jumper
JP4	Jumper	VCCREG to VREG jumper
JP5	Jumper	VREG to VDD jumper
JP6	Jumper	VDD to 3.3 V from SPI connector jump
JP7	Jumper	Daisy chain termination jumper
JP8	Jumper	STBY to VS pull-up jumper
TP8 (BUSY/SYNC)	Jumper	BUSY/SYNC output test point

Table 3. Master SPI connector pinout (J3)

Pin number	Type	Description
1	Open drain output	L6480 BUSY output
2	Open drain output	L6480 FLAG output
3	Ground	Ground
4	Supply	EXT_VDD (can be used as external logic power supply)
5	Digital output	SPI master IN slave OUT signal (connected to the L6480 SDO output through daisy chain termination jumper JP7)
6	Digital input	SPI serial clock signal (connected to L6480 CK input)
7	Digital input	SPI master Out slave IN signal (connected to L6480 SDI input)
8	Digital input	SPI slave select signal (connected to L6480 CS input)
9	Digital input	L6480 step-clock input
10	Digital input	L6480 standby/reset input

Table 4. Slave SPI connector pinout (J4)

Pin number	Type	Description
1	Open drain output	L6480 BUSY output
2	Open drain output	L6480 FLAG output

Table 4. Slave SPI connector pinout (J4) (continued)

Pin number	Type	Description
3	Ground	Ground
4	Supply	EXT_VDD (can be used as external logic power supply)
5	Digital output	SPI master In slave Out signal (connected to pin 5 of J3)
6	Digital input	SPI serial clock signal (connected to L6480 CK input)
7	Digital input	SPI master Out slave In signal (connected to L6480 SDO output)
8	Digital input	SPI slave select signal (connected to L6480 CS input)
9	Digital input	L6480 step-clock input
10	Digital input	L6480 standby/reset input

Figure 2. EVAL6480H schematic part 1/2

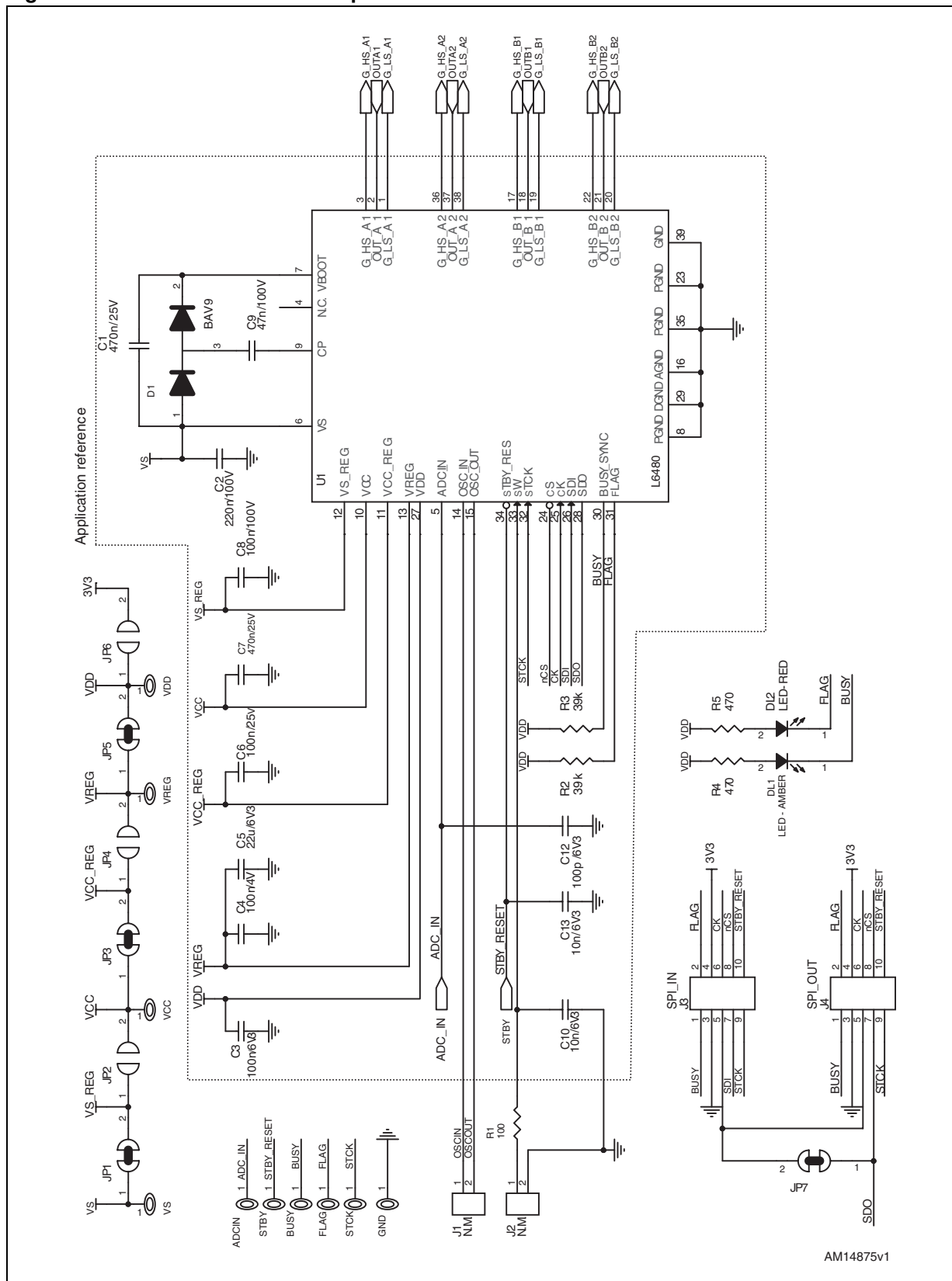


Figure 3. EVAL6480H schematic part 2/2

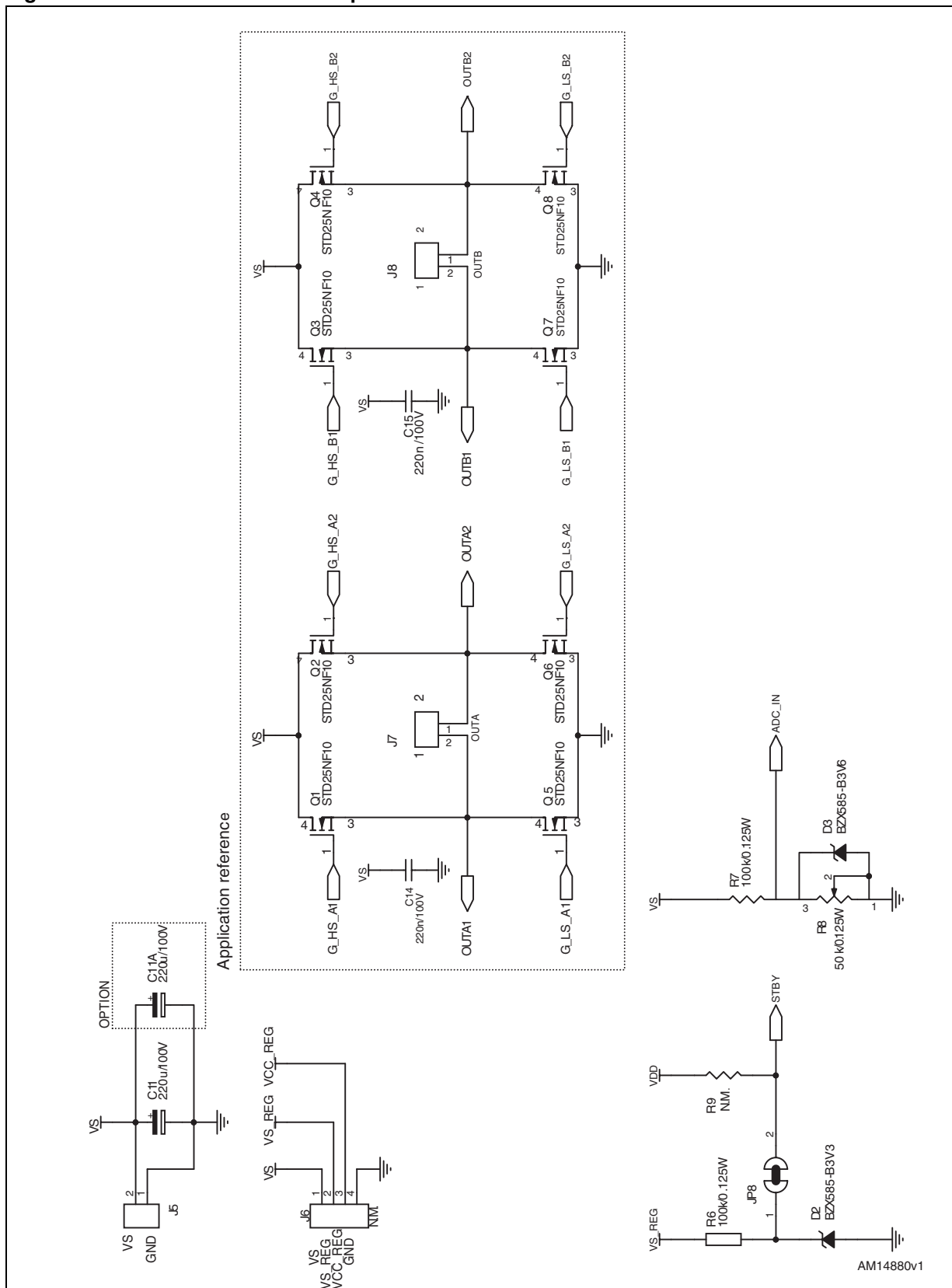


Table 5. EVAL6480H - bill of material

Item	Quantity	Reference	Value	Package
1	9	VS, VREG, VDD, VCC, STCK, STBY, FLAG, BUSY, ADCIN	TPTH-RING-1MM (red)	TPTH-RING-1MM
2	2	C1,C7	470 nF/25 V	CAPC-0603
3	1	C2	220 nF/100 V	CAPC-0805
4	1	C3	100 nF/6.3 V	CAPC-0603
5	1	C4	100 nF/4 V	CAPC-0603
6	1	C5	22 μ F/6.3 V	CAPC-1206
7	1	C6	100 nF/25 V	CAPC-0603
8	1	C8	100 nF/100 V	CAPC-0603
9	1	C9	47 nF/100 V	CAPC-0805
10	2	C10, C13	10 nF/6.3 V	CAPC-0603
11	1	C11	220 μ F/100 V	CAPE-R18H17
12	1	C11A	220 μ F/100 V	CAPE-R16H21-P75
13	1	C12	100 pF/6.3 V	CAPC-0603
14	1	DL1	LED amber	LEDC-0805
15	1	DL2	LED red	LEDC-0805
16	1	D1	BAV99	SOT-23
17	1	D2	BZX585-B3V3	SOD523
18	1	D3	BZX585-B3V6	SOD523
19	1	GND	TPTH-RING-1MM (black)	TPTH-RING-1MM
20	5	JP1, JP3, JP5, JP7, JP8	Jumper CLOSED	JP2SO
21	3	JP2, JP4, JP6	Jumper OPEN	JP2SO
22	2	J1, J2	N.M.	STRIP254P-M-2
23	1	J3	Pol. IDC male header vertical 10 poles (black)	CON-FLAT-5X2-180M
24	1	J4	Pol. IDC male header vertical 10 poles (gray)	CON-FLAT-5X2-180M
25	3	J5, J7, J8	Screw connector 2 poles	MORSV-508-2P
26	1	J6	N.M.	STRIP254P-M-4
27	8	Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8	STD25NF10	DPAK
28	1	R1	100 Ω	RESC-0603
29	2	R2, R3	39 k Ω	RESC-0603
30	2	R4, R5	470 Ω	RESC-0603

Table 5. EVAL6480H - bill of material (continued)

Item	Quantity	Reference	Value	Package
31	2	R6, R7	100 k Ω / 0.125 W	RESC-0603
32	1	R8	33 k Ω / 0.125 W	TRIMM-100X50X110-64W
33	1	R9	N.M.	RESC-0603
34	1	U1	L6480	HTSSOP050P-660X110-38-EP

Figure 4. EVAL6480H - layout (top layer)

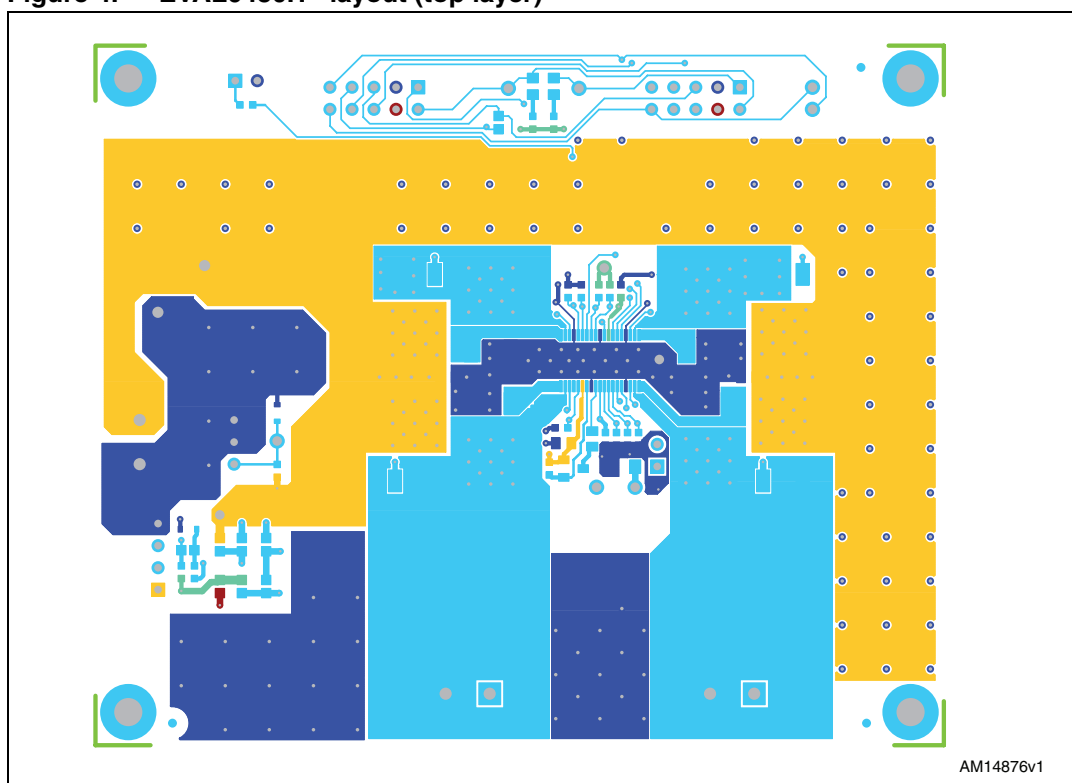


Figure 5. EVAL6480H - layout (inner layer 2)

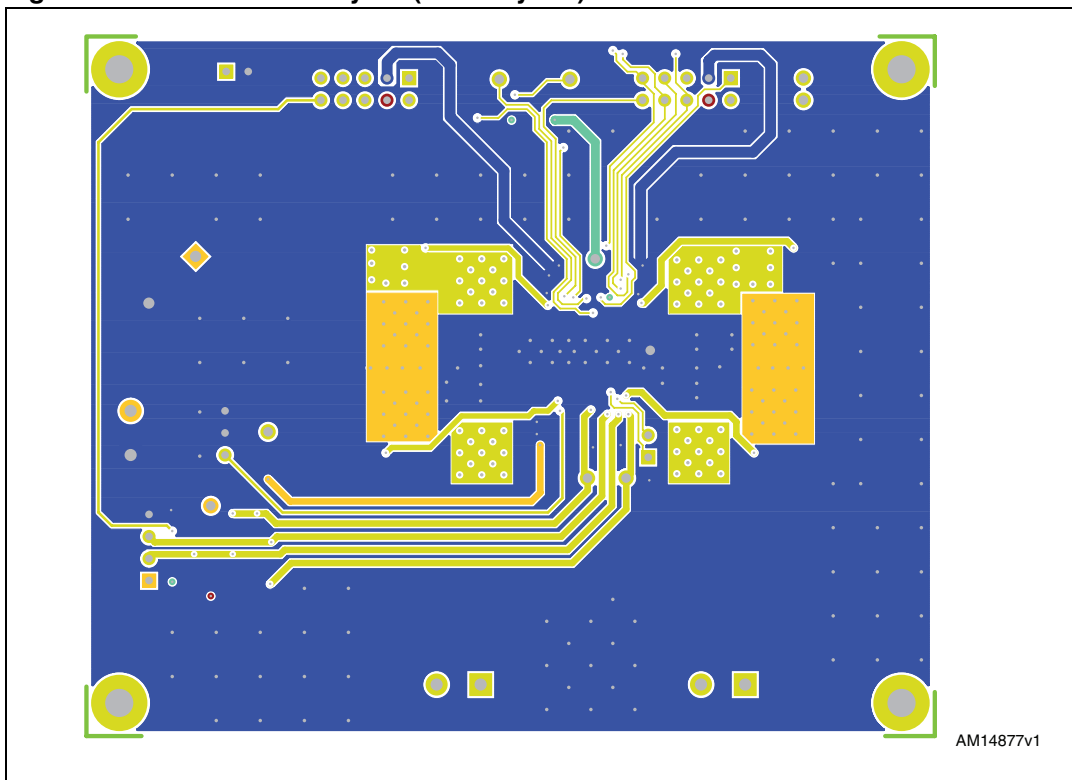


Figure 6. EVAL6480H - layout (inner layer 3)

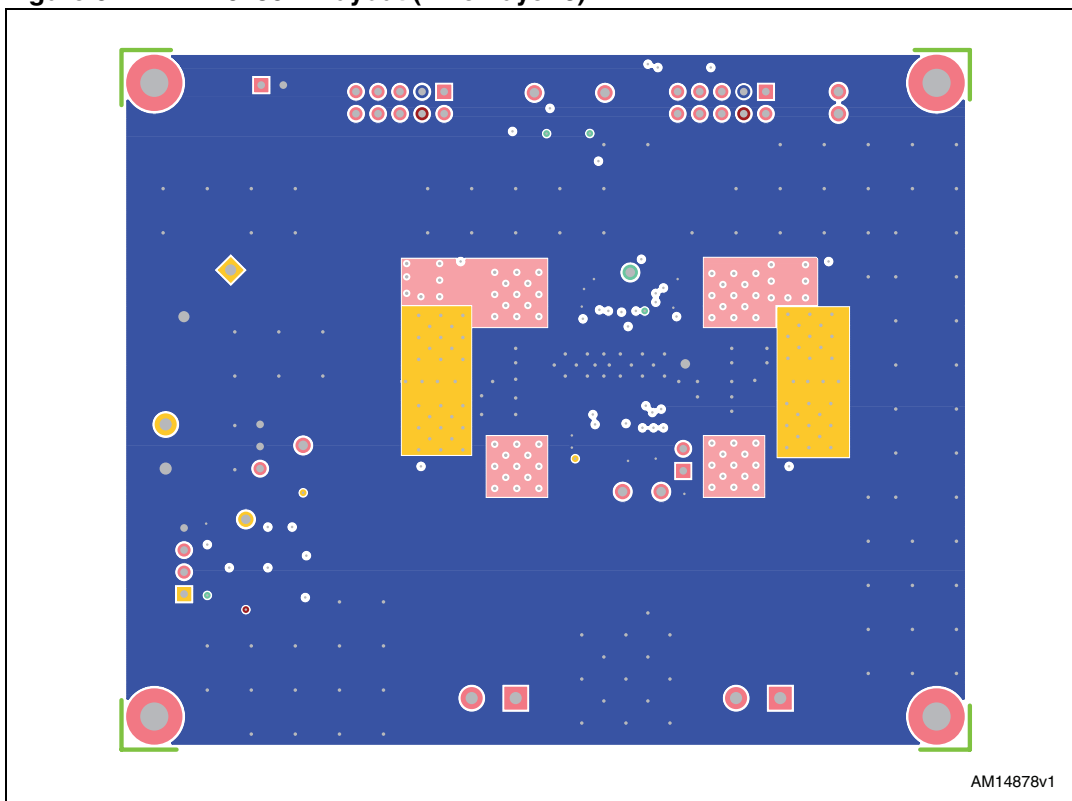
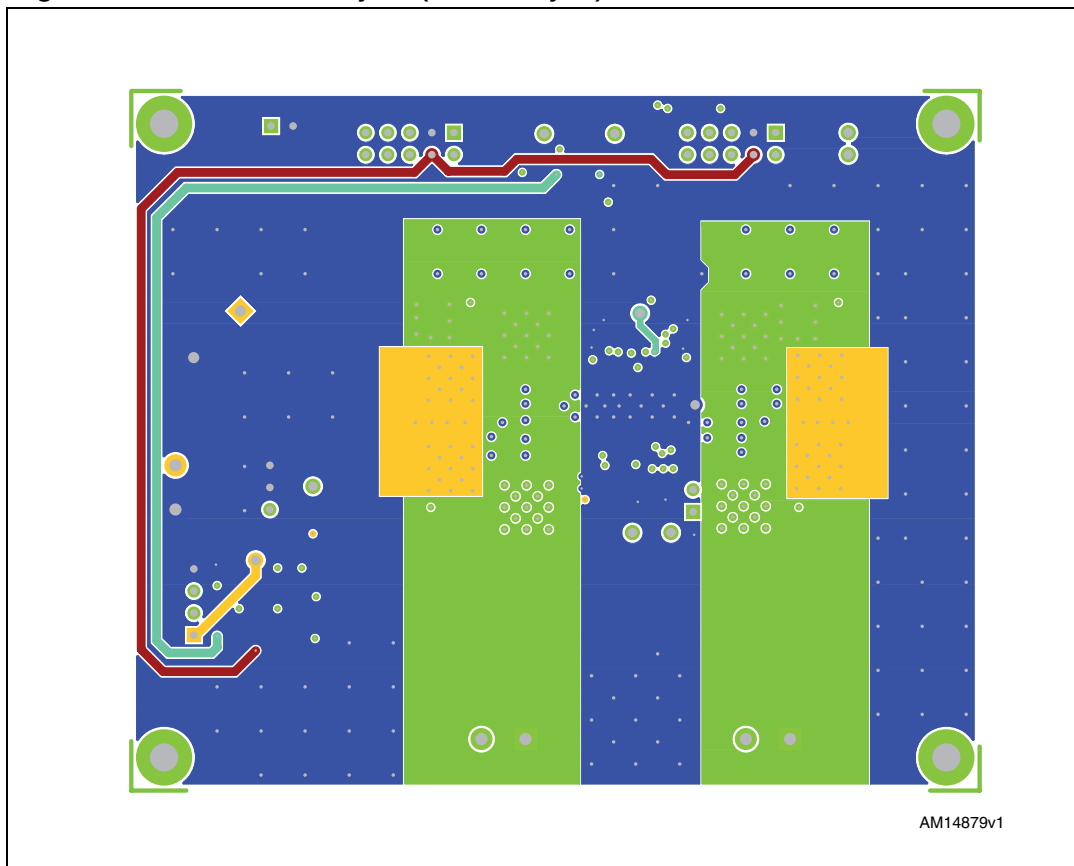


Figure 7. EVAL6480H - layout (bottom layer)



2 Revision history

Table 6. Document revision history

Date	Revision	Changes
14-Sep-2012	1	Initial release.