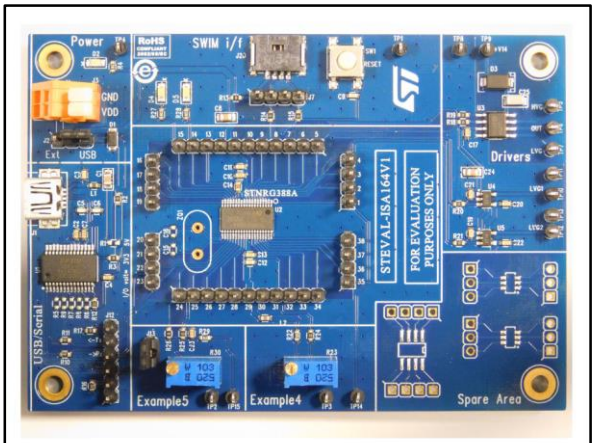
STEVAL-ISA164V1

STNRG388A evaluation board

Data brief



Features

- All STNRG388A pins available on connectors
- Convenient tool for validating SMED algorithms
- Graphical interface for SMED configuration
- On-board components for tutorial
- Micro-USB port for PC connectivity
- USB, external or SWIM power supply
- SWIM interface with STLINK or RLINK connectors
- Four extra footprint areas for SOT23-6 and one for SO8
- One external clock (HSE) footprint area

Description

The STEVAL-ISA164V1 evaluation board is designed to help familiarize the user with the STNRG family of digital controllers and their innovative SMED (state machine, event driven) architecture. A convenient GUI enables the user to quickly generate the optimal SMED configuration for the application. The external pins make it easy to inject SMED events and capture the SMED-controlled PWM clock, thereby helping the user to validate the SMED configuration. Alternatively, the application circuit can be driven directly from the evaluation board. The board provides a micro-USB connector to allow programming, GUI connectivity and configuration via a terminal utility running on a PC. STNRG controllers integrate a serial interface which can be used to extend the STNRG388A communication capabilities via Bluetooth, WiFi or powerline modems. The STEVAL-ISA164V1 evaluation board can be powered in three different ways: by external power supply, USB or via the SWIM interface. The board features several free footprint areas which are ideal for connecting power drivers or amplifiers. An additional free PCB footprint allows the user to connect a quartz clock, which can be used in place of the STNRG388A internal clock.

1 Board details

Table 1: STEVAL-ISA164V1 electrical specifications

Parameter	Value
J3, Voltage	3.0 V min. to 5.5 V max
J3, Current	100 mA
J1, Voltage	5 V typ.
J1, Current	100 mA

The user must close the applicable jumper to select the correct power supply.

Table 2: STEVAL-ISA164V1 power input selection

Jumper	Power source
J2 - EXT	External power supply via J3 (VDD)
J2 - USB	Power supply via USB cable (J1) - default

Table 3: STNRG388A pinout

Pin number	Connector	Type	Pin name	Main function	Alternate function 1	Alternate function 2	Alternate function 3
1	PIN1	I/O	GPIO1[0]/ PWM[0]	SMED PWM channel 0	General purpose I/O 10	-	-
2	PIN2	I/O	DIGIN[0]/CCO_clk	Digital input 0	Configurable clock output signal (CCO)	-	-
3	PIN3	I	DIGIN[1]/ GPIO1 [6]	Digital input 1	General purpose I/O 16	-	-
4	PIN4	I/O	GPIO1[1]/ PWM[1]	SMED PWM channel 1	General purpose I/O 11	-	-
5	PIN5	I/O	GPIO1[2]/ PWM[2]	SMED PWM channel 2	General purpose I/O 12	-	-
6	PIN6	I	DIGIN[2]	Digital input 2	-	-	-
7	PIN7	I	DIGIN[3]	Digital input 3	-	-	-
8	PIN8	I/O	GPIO1[5]/ PWM[5]	SMED PWM channel 5	General purpose I/O 15	-	-
9	PIN9	I/O	SWIM/GPIO0 [6]	SWIM data interface	General purpose I/O 06	-	-

Pin number	Connector	Type	Pin name	Main function	Alternate function 1	Alternate function 2	Alternate function 3
10	PIN10	I/O	NRST	Reset	-	-	-
11	PIN11	PS	VDD	Digital and I/O power supply	-	-	-
12	PIN12	PS	VSS	Digital and I/O ground	-	-	-
13	PIN13	PS	VOUT	1.8 V regulator capacitor	-	-	-
14	PIN14	I/O	GPIO0[4]/ Dali_tx/ I²C_sda/Uart_TX	General purpose I/O 04	DALI data transmit	I²C data	UART data transmit
15	PIN15	I/O	GPIO0[5]/ Dali_rx/ I²C_scl/Uart_RX	General purpose I/O 05	DALI data receive	I²C clock	UART data receive
16	PIN16	I/O	GPIO1[4]/ PWM[4]	SMED PWM channel 4	General purpose I/O 14	-	-
17	PIN17	I	DIGIN[4]/I²C_sda/ GPIO1[6]	Digital input 4	I²C data	General purpose I/O 16	-
18	PIN18	I	DIGIN[5]/I2C_scl/ GPIO1[7]	Digital input 5	I²C clock	General purpose I/O 17	-
19	PIN19	I/O	GPIO1[3]/ PWM[3]	SMED PWM channel 3	General purpose I/O 13	-	-
20	PIN20	I/O	GPIO0[2]/I2C_sda/ HseOscout /Uart_tx	General purpose I/O 02	I²C data	output crystal oscillator signal	UART data transmit
21	PIN21	I/O	GPIO0[3]/I2C_scl/ HseOscin/ Uart_rx	General purpose I/O 03	I²C clock	Input crystal oscillator signal /input clock signal	UART data receive
22	PIN22	I/O	GPIO0[0]/ Uart_tx/ I²C_sda/CPM0	General purpose I/O 00	UART data transmit	I²C data	Negative analog input comparator input 0

Pin number	Connector	Type	Pin name	Main function	Alternate function 1	Alternate function 2	Alternate function 3
23	PIN23	I/O	GPIO0[1]/ Uart_rx/ I²C_scl/CPM1	General purpose I/O 01	UART data receive	I²C clock	Negative analog input comparator input 1
24	PIN24	I	CPP[3]	Positive analog comparator input 3	-	-	-
25	PIN25	I	CPP[2]	Positive analog comparator input 2	-	-	-
26	PIN26	I	CPM32	Negative analog comparator input 3,2	-	-	-
27	PIN27	I	CPP[1]	Positive analog comparator input 1	-	-	-
28	PIN28	I	CPP[0]	Positive analog comparator input 0	-	-	-
29	PIN29	PS	VDDA	Analog power supply	-	-	-
30	PIN30	PS	VSSA	Analog ground	-	-	-
31	PIN31	I	ADCIN[7]	Analog input 7	-	-	-
32	PIN32	I	ADCIN[6]	Analog input 6	-	-	-
33	PIN33	I	ADCIN[5]	Analog input 5	-	-	-
34	PIN34	I	ADCIN[4]	Analog input 4	-	-	-
35	PIN35	I	ADCIN[3]	Analog input 3	-	-	-
36	PIN36	I	ADCIN[2]	Analog input 2	-	-	-
37	PIN37	I	ADCIN[1]	Analog input 1	-	-	-
38	PIN38	I	ADCIN[0]	Analog input 0	-	-	-

Table 4: Connector J3 pinout

Name	Type	Function
VDD	Positive power	Power the board if J2-EXT is closed
GND	Positive power	Directly connected to GND

Table 5: Connector J1 pinout

Name	Type	Function
1	USB-VCC	Power supply
2	USB-DM	USB signal
3	USB-DP	USB signal
4	Not connected	
5	GND	Directly connected to GND

Table 6: Connector J7-J20 pinout

Name	Type	Function
1	VCC_SWIM	SWIM power sensing
2	SWIM	SWIM signal to/from STLUX
3	GND_SWIM	Directly connected to GND
4	RESn	Connected to STLUX NRST pin

2 Schematic diagrams

Figure 1: STEVAL-ISA164V1 circuit schematic (1 or 5)

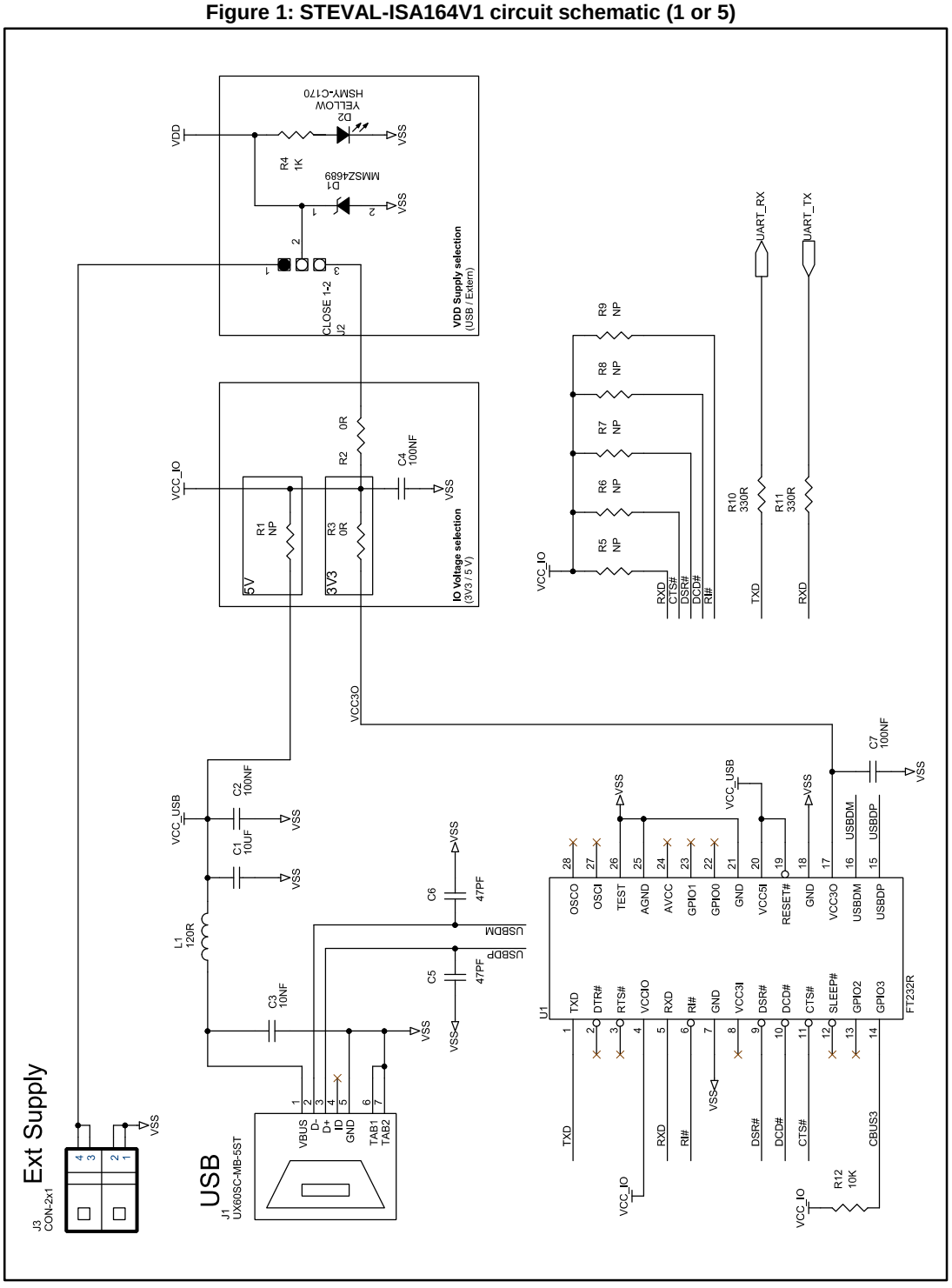


Figure 2: STEVAL-ISA164V1 circuit schematic (2 or 5)

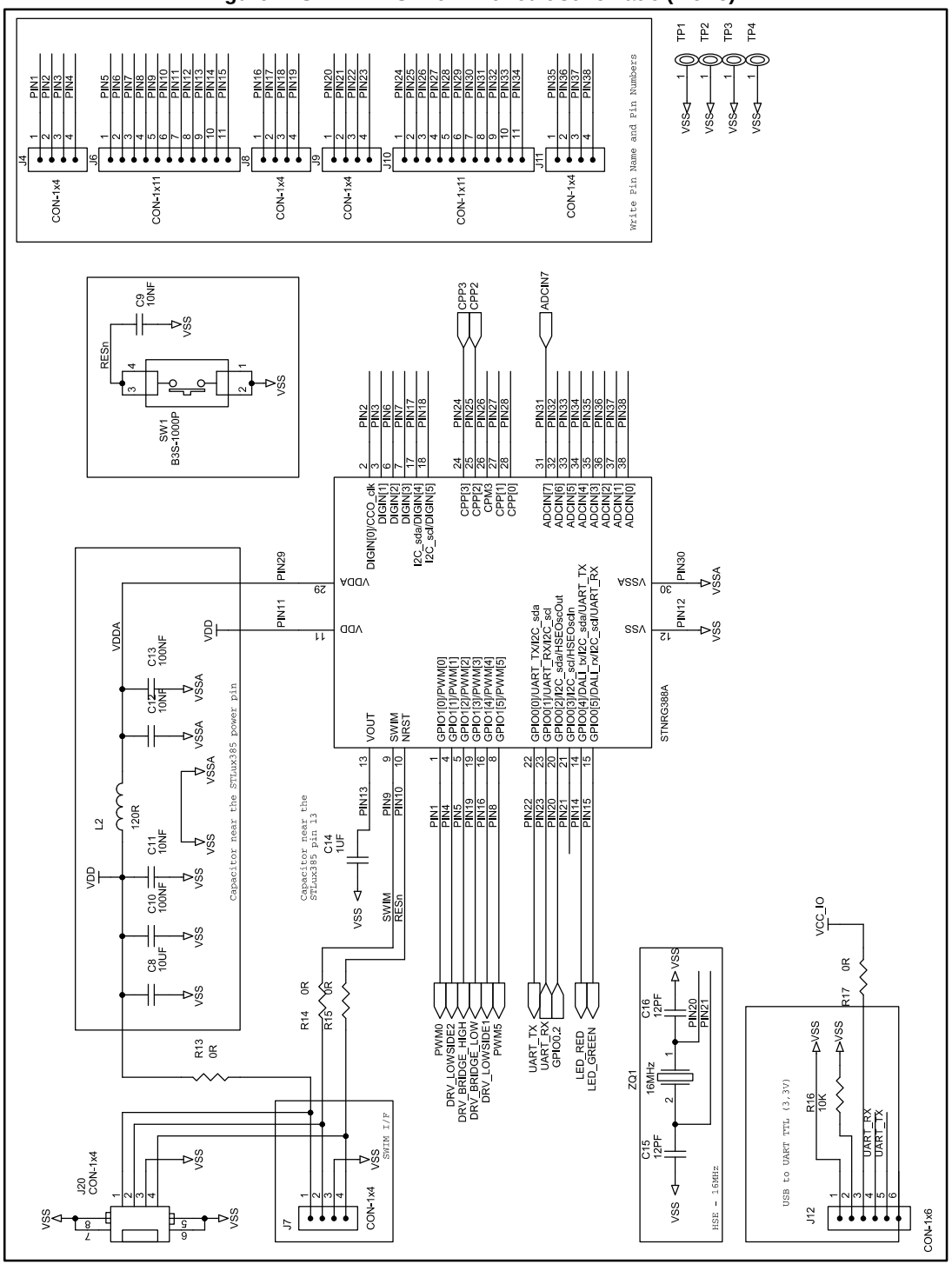


Figure 3: STEVAL-ISA164V1 circuit schematic (3 or 5)

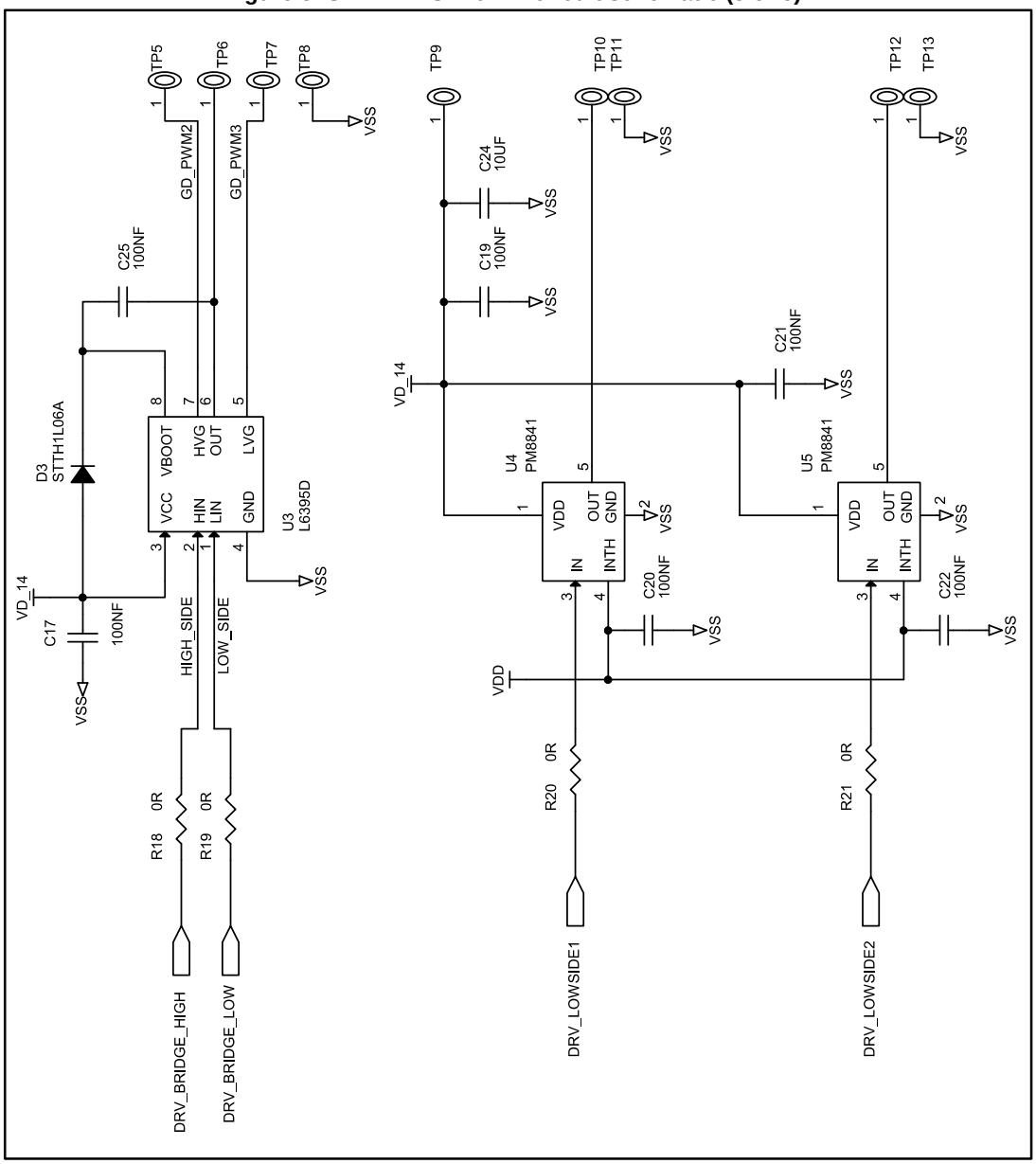


Figure 4: STEVAL-ISA164V1 circuit schematic (4 or 5)

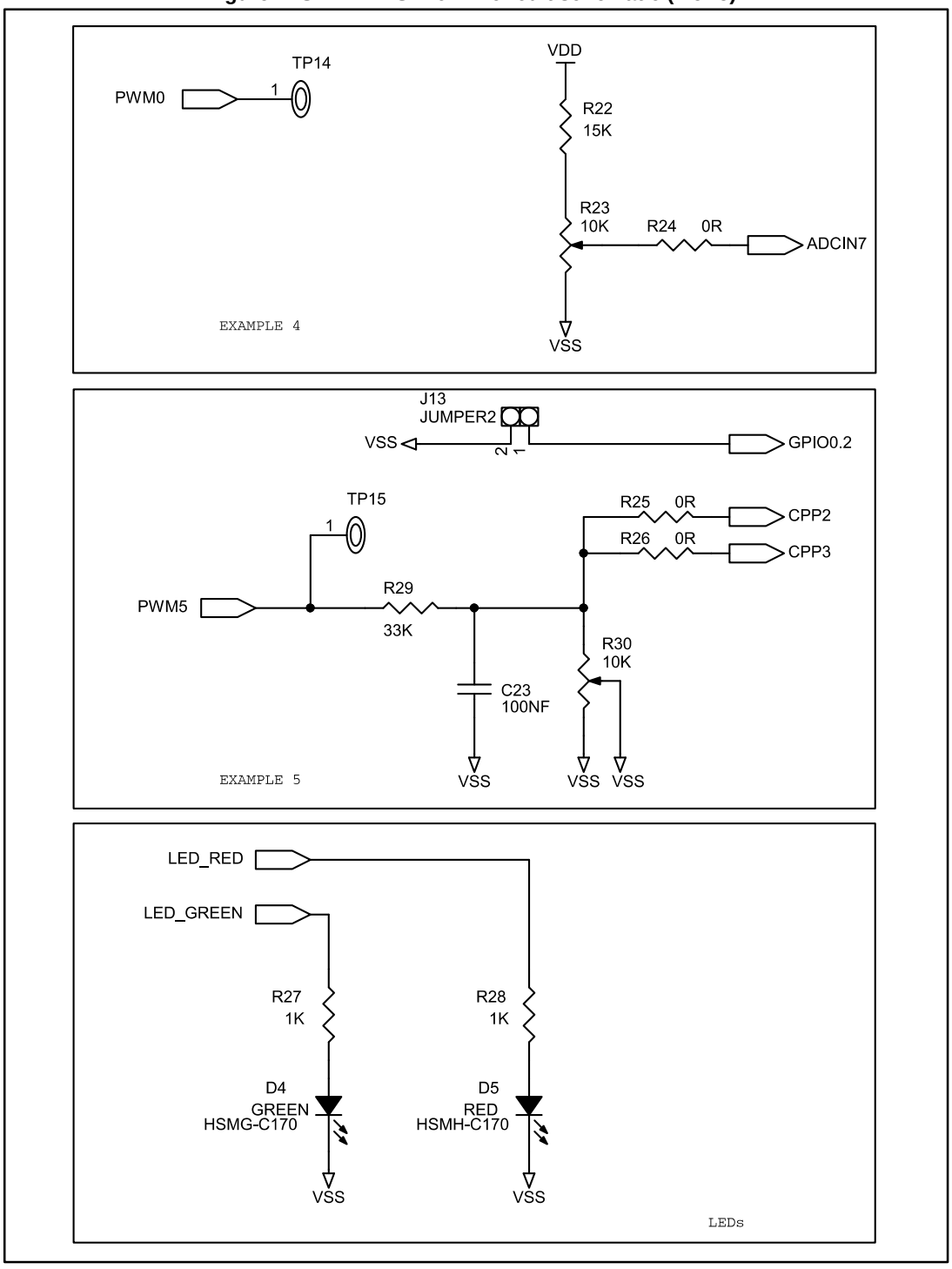
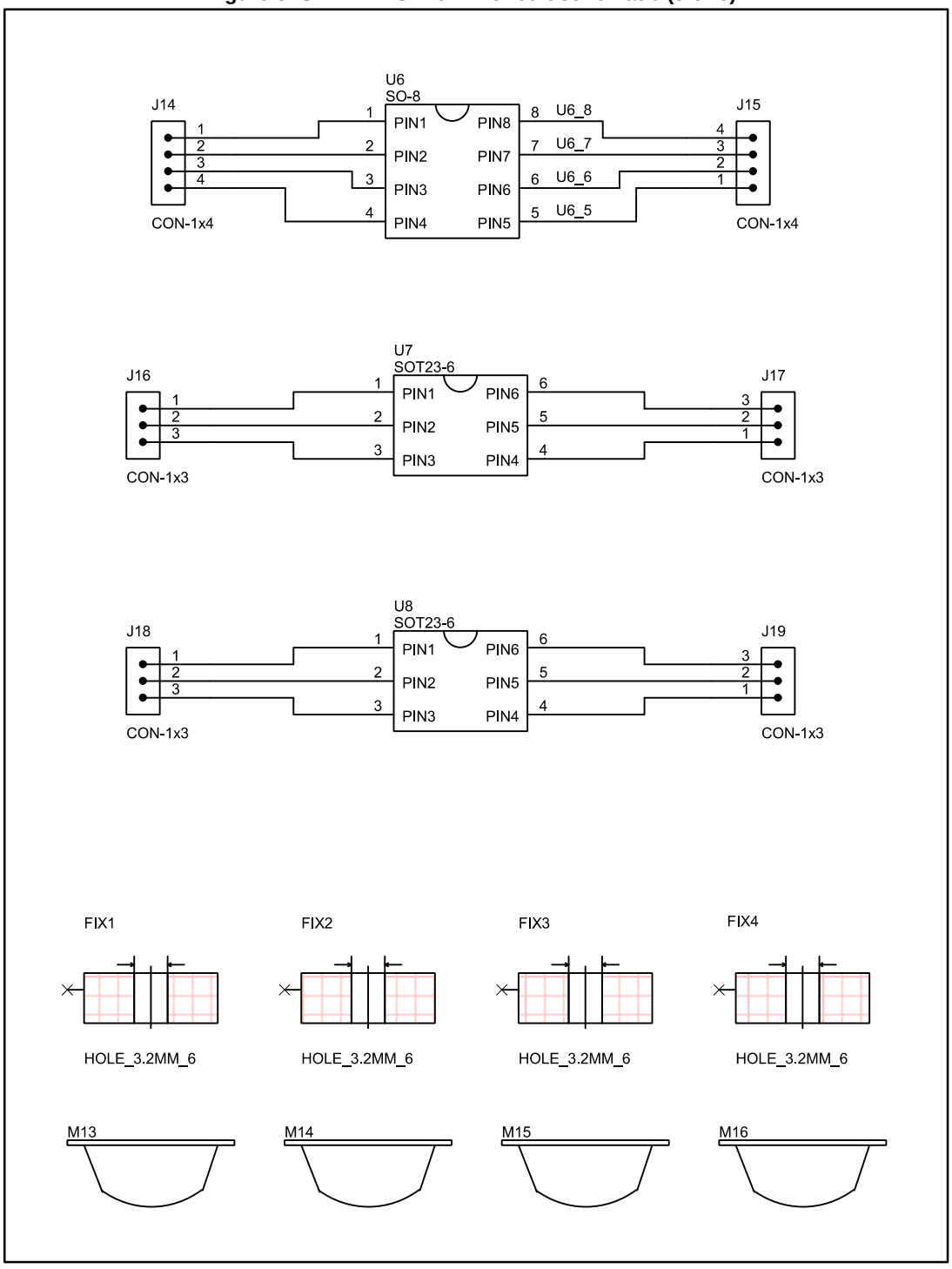


Figure 5: STEVAL-ISA164V1 circuit schematic (5 or 5)



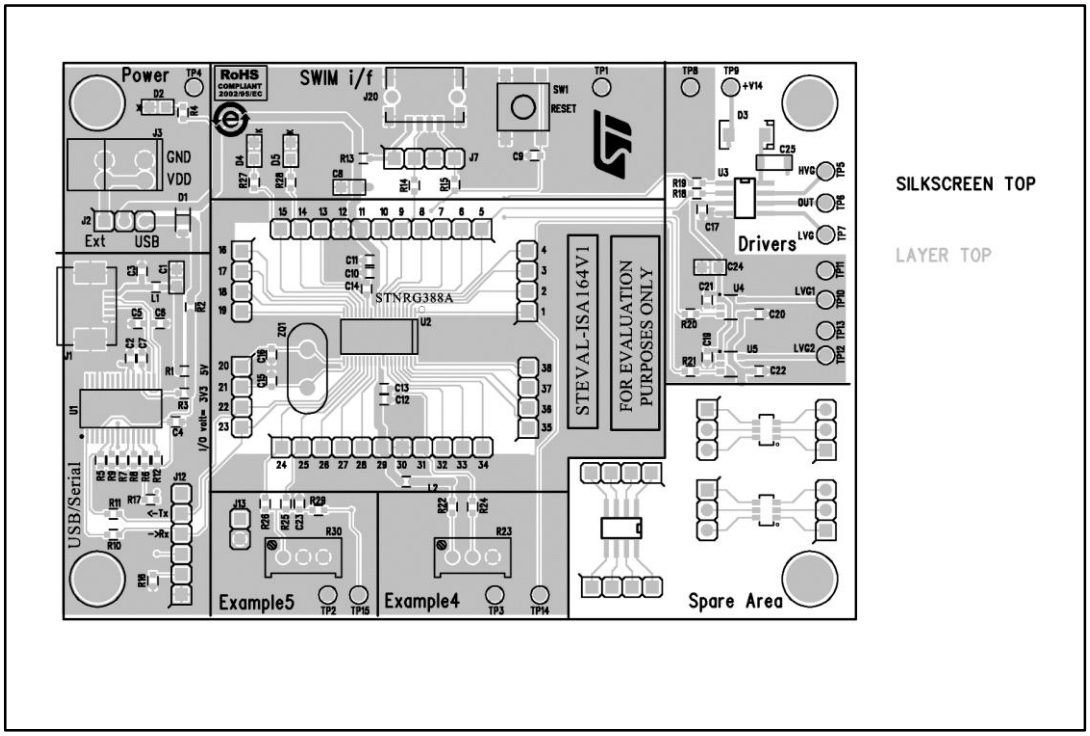
3 Bill of material

Table 7: STEVAL-ISA164V1 - Bill of material

Reference	Part / Value	Type / technology information	Package
C1, C8, C24	10 µF	CAP CER 10 µF 10V X7R 0805	0805
C2, C4, C7, C10, C13, C17, C19, C20, C21, C22, C23	100 nF	CAP CER 100 nF 50V X7R 0603	0603
C3, C9, C11, C12	10 nF	CAP CER 10 nF 50V X7R 0603	0603
C5, C6	47 pF	CAP CER 47 pF 25V X5R 0603	0603
C14	1 µF	CAP CER 1 uF 25V X7R 0603	0603
C25	100 nF	CAP CER 100 nF 50 V +/-5% 1206	1206
D1	MMSZ4689	Zener 5.1V 0.5 W SOD123	SOD-123
D2	Yellow	LED Yellow - 0805	LED-0805
D3	STTH1L06A	600 V Turbo 2 Ultrafast high voltage rectifier	SMA
D4	Green	LED Green - 0805	LED-0805
D5	Red	LED Red - 0805	LED-0805
J1	UX60SC-MB-5ST	Conn mini USB2.0 SMT	UX60SC-MB-5ST
J2	CLOSE 1-2	JUMP254P-M-3	22-28-4033
J3	CON-2x1	Cage clamp connector, 2 pin	233-502
J4, J7, J8, J9, J11, J14, J15	CON-1x4	Through-hole-1x4-pin height 10.92 body 5.8 mm - pitch 2.54 mm	1x4 - pitch 2.54
J6, J10	CON-1x11	Through-hole-1x11-pin height 10.92 body 5.8 mm - pitch 2.54 mm	1x6 - pitch 2.54
J12	CON-1x6	Through-hole-1x6-pin height 10.92 body 5.8 mm - pitch 2.54 mm	1x6 - pitch 2.54
J13	JUMPER2	STRIP254P-M-2	22-28-4023
J16, J17, J18, J19	CON-1x3	Through-hole-1x3-Pin height 10.92 Body 5.8 mm - pitch 2.54 mm	1x3 - pitch 2.54
J20	CON-1x4	Conn 4 way, 1.27 mm used by Raisonnance Debugger, SIDE access	ERNI_214012
L1, L2	120R	Ferrite bead,120 Ω/500 mA,0603,WE-CBF series	0603
R2, R3, R13, R14, R15, R17, R18, R19, R20, R21, R24, R25, R26	0R	RES 0 Ω 5% 1/10 W 0603	0603

Reference	Part / Value	Type / technology information	Package
R4, R27, R28	1K	RES 1K Ω 5% 1/10 W 0603 SMD	0603
R10, R11	330R	330R Ω 5% 1/10W	0603
R12, R16	10K	RES 10K Ω 5% 1/10 W 0603 SMD	0603
R22, R29	33K	33K Ω 5% 1/10W	0603
R23, R30	10K	Trimmer 10 kΩ MultiTurn / size 9.6x5x10 mm / leaded / top adjustment	LEADED
SW1	B3S-1000P	SMT tactile switch	B3S-1000P
U1	FT232R	UART over USB bridge, SSOP28	SSOP-28
U2	STNRG388A	Digital controller	TSSOP38_0_5 mm
U3	L6395D	High-voltage high and low side driver 600 V SO-8	SO-8
U4, U5	PM8841	High-voltage high and low side driver 600 V SOT23-5	SOT23-5
U6	SO-8	SO-8 PCF footprint provision	SO-8
U7, U8	SOT23-6	SOT23-6 PCF footprint provision	SOT23-6

Figure 6: STEVAL-ISA164V1 layout (top layer)



4 Revision history

Table 8: Document revision history

Date	Version	Changes
29-Oct-2015	1	Initial release.