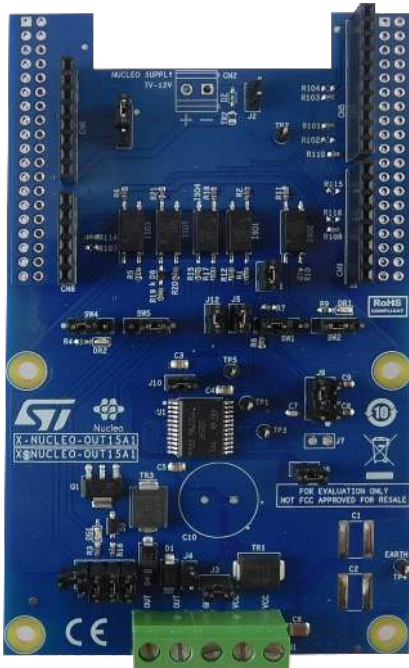


## Industrial digital output expansion board based on IPS1025HF for STM32 Nucleo



### Features

- Based on the **IPS1025HF** single high-side switch, which features:
  - Operating range up to 60 V
  - Low-power dissipation ( $R_{ON(MAX)} = 25\text{ m}\Omega$ )
  - Propagation delay at startup  $< 60\ \mu\text{s}$
  - Fast decay for inductive loads
  - Smart driving of capacitive load
  - Under-voltage lock-out
  - Overload and overtemperature protection
  - PowerSSO 24 package
- Application board operating range: 8-33 V/0-2.5 A
- Extended voltage operating range (J3 open) up to 60 V
- Green LED for output on/off status (J11 close 3-4 and SW5 close 1-2)
- Red LEDs for overload and overheating diagnostics (SW2 and SW4 close 2-3)
- Output voltage on/off status feedback (J11 close 1-2)
- Control signal for fast discharge of output voltage (J11 close 5-6, J12 close)
- External fast discharge circuitry for huge inductive loads (J11 close 7-8)
- 5 kV galvanic isolation
- Supply rail reverse polarity protection
- Compatible with **STM32 Nucleo** development boards
- Equipped with Arduino® UNO R3 connectors
- CE certified
- Not FCC approved for resale
- RoHS and China RoHS compliant

### Description

The **X-NUCLEO-OUT15A1** is an industrial digital output expansion board for **STM32 Nucleo**. It provides a powerful and flexible environment for the evaluation of the driving and diagnostic capabilities of the **IPS1025HF** single high-side, smart power, solid-state relay in a digital output module connected to 2.5 A industrial loads.

The **X-NUCLEO-OUT15A1** interfaces with the microcontroller on the **STM32 Nucleo** via 5 kV optocouplers driven by the GPIO pins and Arduino® UNO R3 connectors.

The expansion board can be connected to either a **NUCLEO-F401RE** or a **NUCLEO-G431RB** development board.

You can also evaluate a system consisting of an **X-NUCLEO-OUT05A1** stacked on an **X-NUCLEO-OUT15A1** expansion board.

Supplying the **X-NUCLEO-OUT05A1** through the main supply rail and the **X-NUCLEO-OUT15A1** through the output of the **X-NUCLEO-OUT05A1**, you can achieve the typical architecture of a single channel digital output for safety systems. The process stages of the two expansion boards result cascaded. The load connected to the **X-NUCLEO-OUT15A1** output can be supplied only when both cascaded systems are properly working.

Product summary	
Industrial digital output expansion board based on IPS1025HF for STM32 Nucleo	X-NUCLEO-OUT15A1
Software expansion for STM32Cube driving industrial digital output based on intelligent power switch (IPS)	X-CUBE-IPS
High efficiency, high-side switch with extended diagnostics, smart driving for capacitive loads, and short propagation delay at power-on	IPS1025HF
Applications	Programmable Logic Controllers

# 1 Schematic diagrams

Figure 1. X-NUCLEO-OUT15A1 circuit schematic (1 of 2)

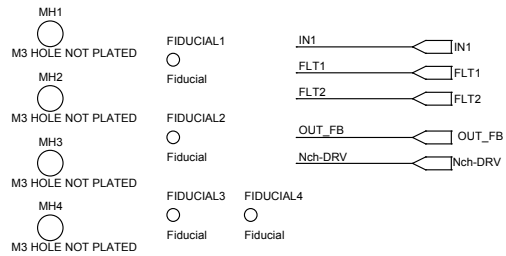
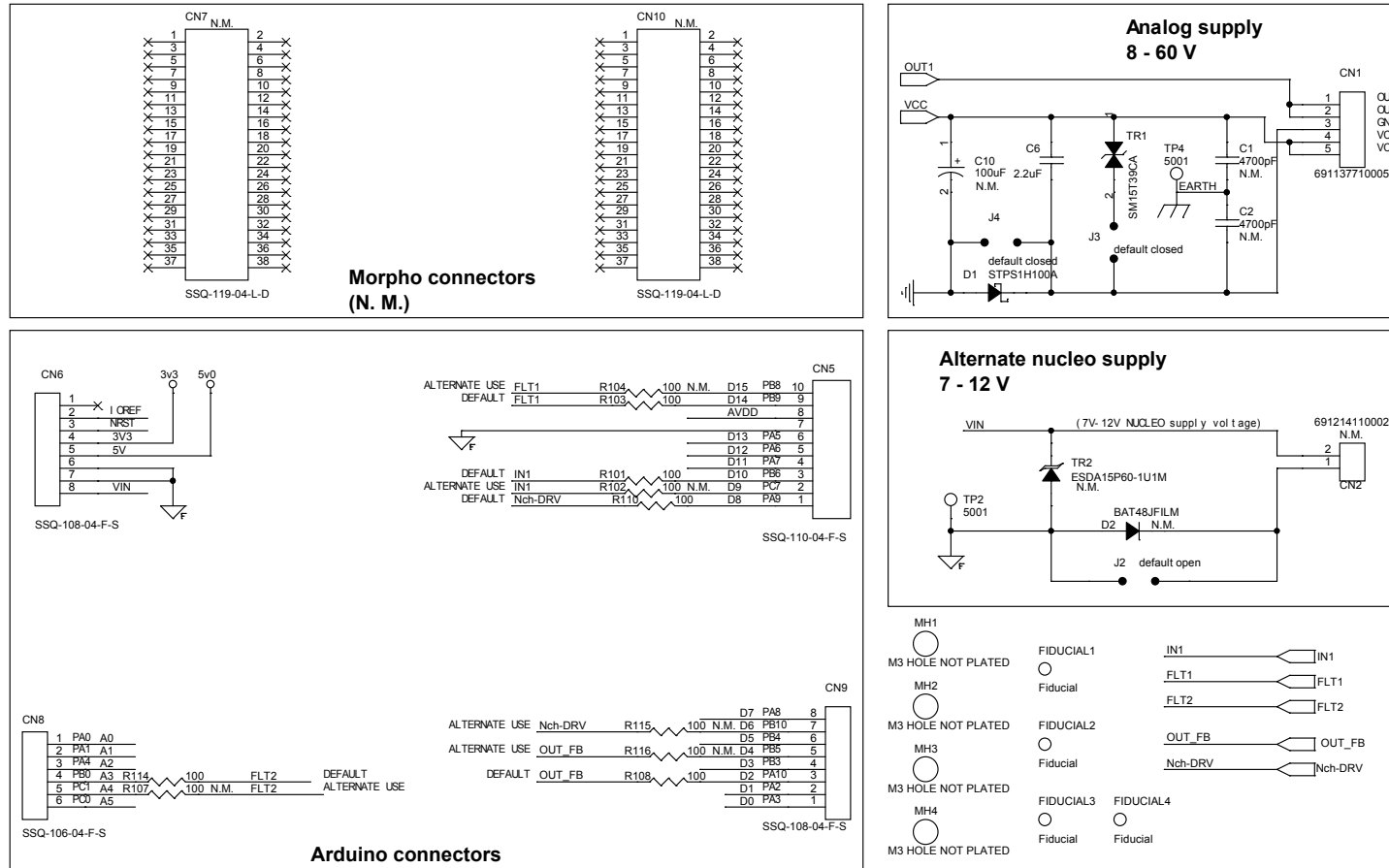
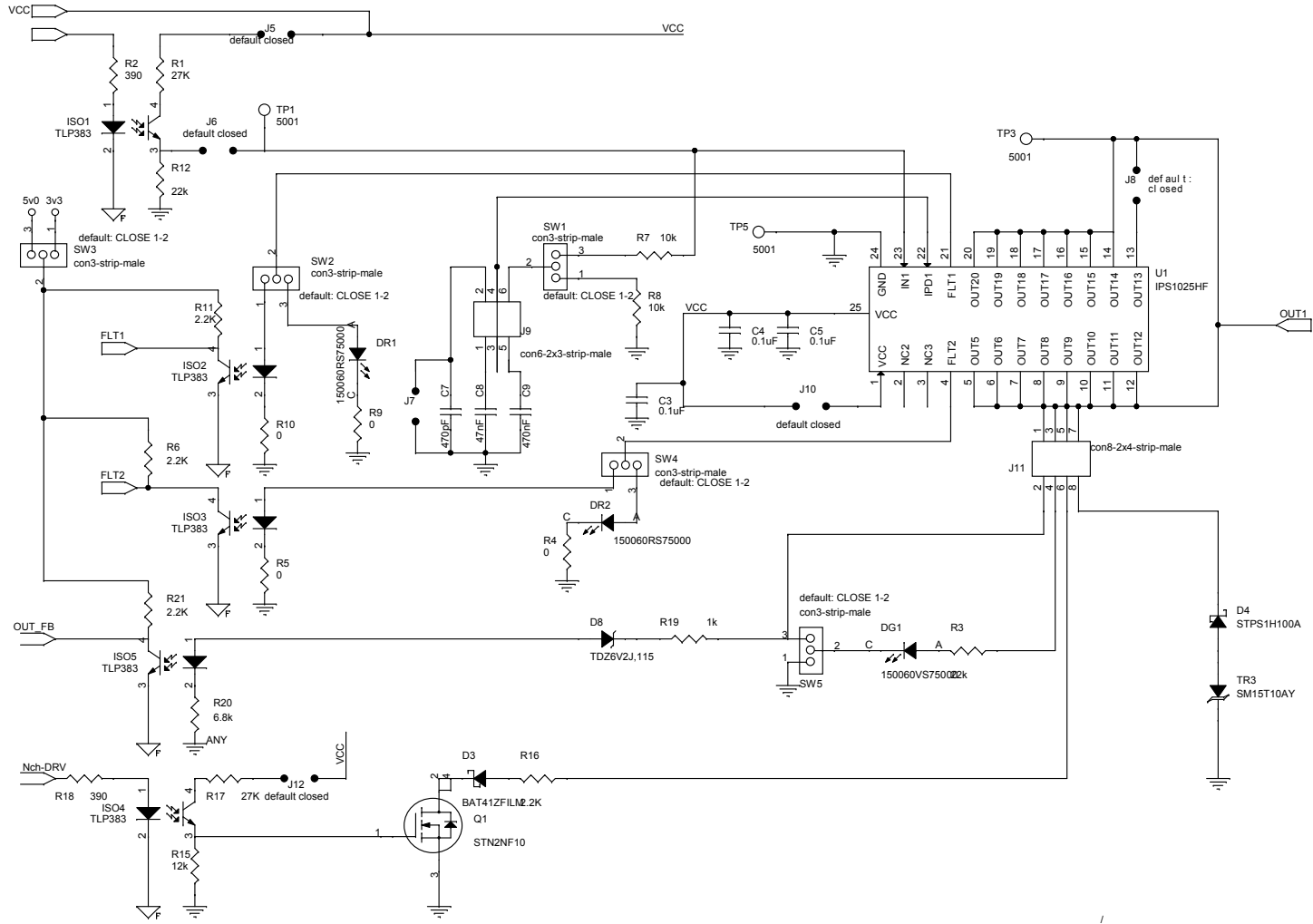


Figure 2. X-NUCLEO-OUT15A1 circuit schematic (2 of 2)



## 2 Board versions

**Table 1. X-NUCLEO-OUT15A1 versions**

PCB version	Schematic diagrams	Bill of materials
X\$NUCLEO-OUT15A1 <sup>(1)</sup>	X\$NUCLEO-OUT15A1 schematic diagrams	X\$NUCLEO-OUT15A1 bill of materials

1. This code identifies the X-NUCLEO-OUT15A1 evaluation board first version. It is printed on the board PCB.

## Revision history

**Table 2. Document revision history**

Date	Revision	Changes
09-Jun-2022	1	Initial release.
15-Jun-2022	2	Minor text changes.
16-Jun-2022	3	Updated cover page features.

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