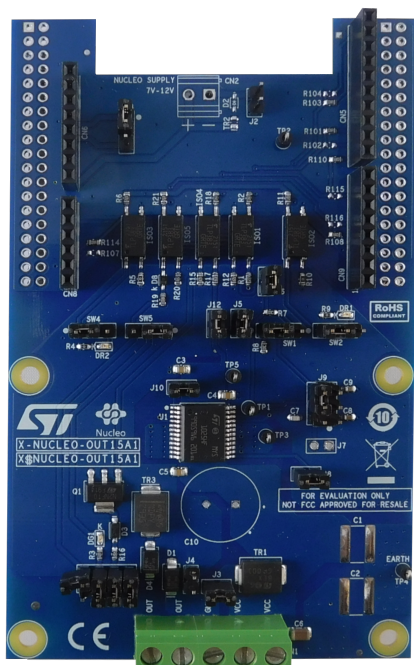


## Industrial digital output expansion board based on IPS1025HF for STM32 Nucleo



### 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  $< 60\text{ }\mu\text{s}$
  - 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.

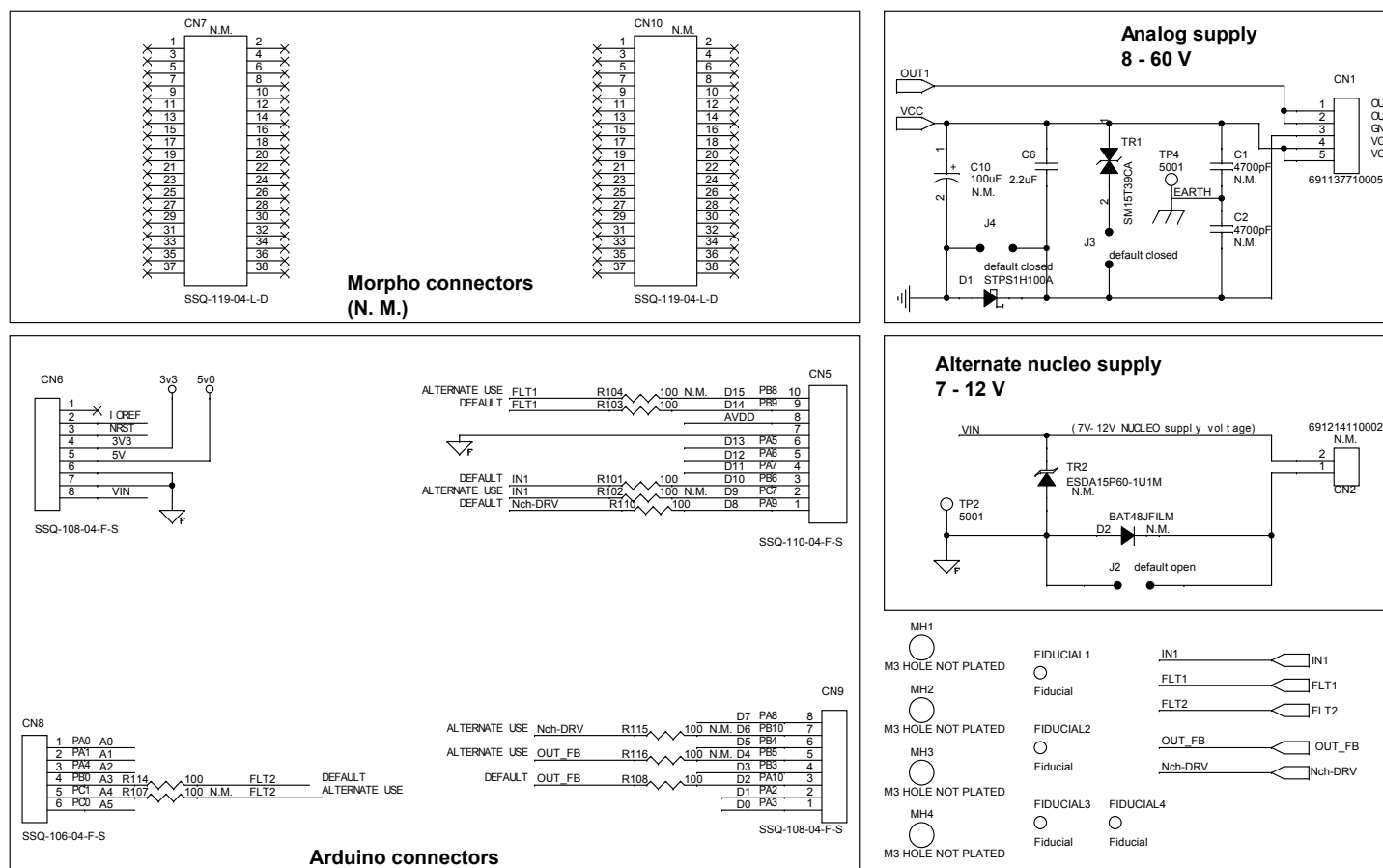
You can also evaluate a system consisting of an **X-NUCLEO-OUT05A1** stacked on an **X-NUCLEO-OUT15A1** expansion board.

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                                                            | <b>X-NUCLEO-OUT15A1</b>        |
| Software expansion for STM32Cube driving industrial digital output based on intelligent power switch (IPS)                               | <b>X-CUBE-IPS</b>              |
| High efficiency, high-side switch with extended diagnostics, smart driving for capacitive loads, and short propagation delay at power-on | <b>IPS1025HF</b>               |
| Applications                                                                                                                             | Programmable Logic Controllers |

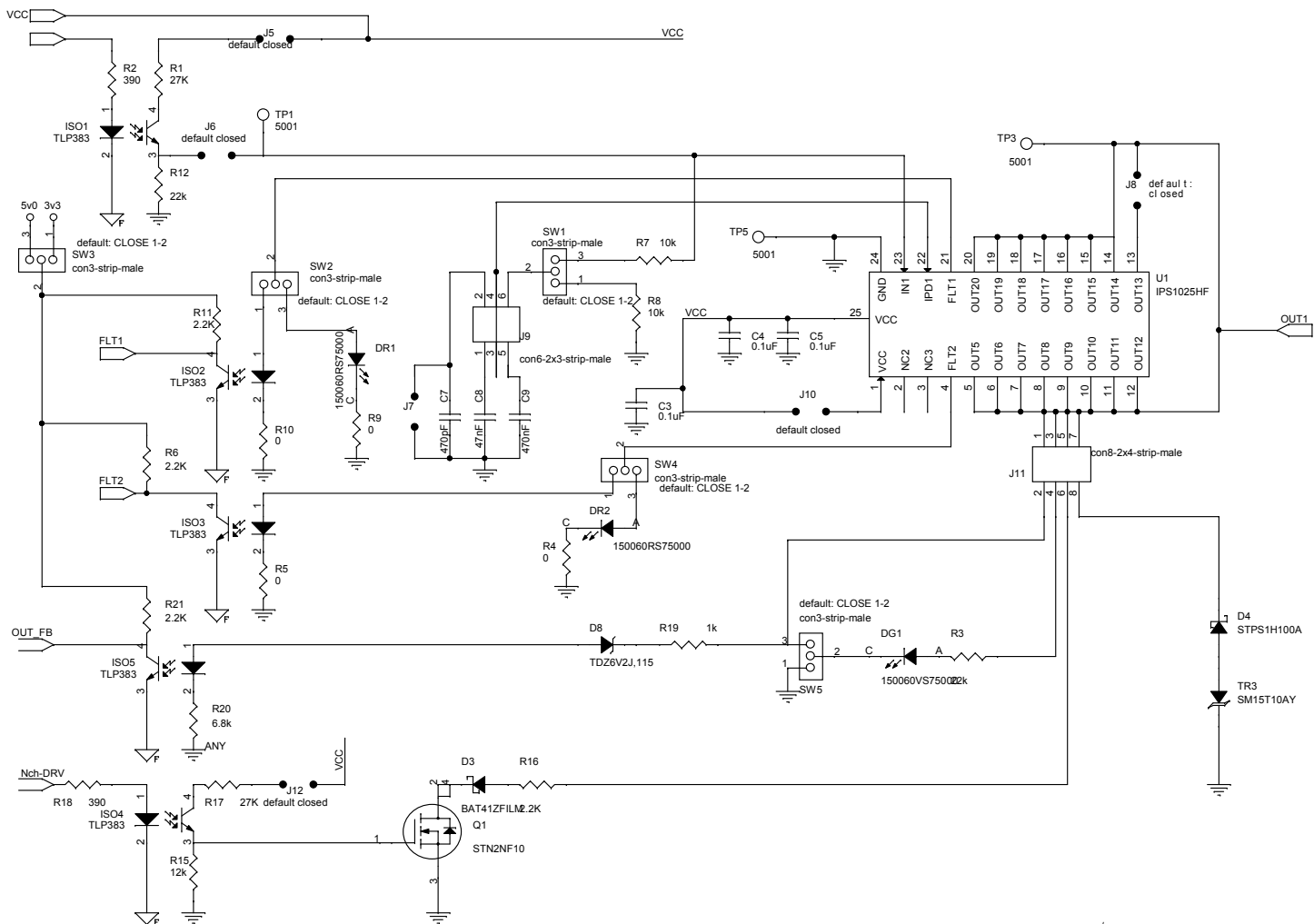
## Schematic diagrams

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



## X-NUCLEO-OUT15A1

### Schematic diagrams



## 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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