

## Industrial digital output expansion board based on IPS161HF for STM32 Nucleo



## Features

- Based on **IPS161HF** single high-side switch with the following main features:
  - Operating range up to 60 V/0.7 A
  - Low power dissipation ( $R_{ON(MAX)} = 120\text{ m}\Omega$ )
  - Fast decay for inductive loads
  - Open load detection and diagnostics
  - Overload and overheating protections with thermal shut-down and cut-off
  - PowerSSO-12L package
- Application board operating range: 12 - 33 V, 0 to 0.7 A
- Extended voltage operating range (J1 open) up to 60 V
- Green LED for output ON/OFF status
- Red LED for diagnostics (open load, cut-off and overheating)
- 3 kV galvanic isolation
- Supply rail reverse polarity protection
- Ready for Safety Digital Output Architecture
- Wide application development potential in **STM32 Nucleo** development environment
- Equipped with Arduino™ UNO R3 connectors
- CE certified
- RoHS and China RoHS compliant

Product summary	
Industrial digital output expansion board based on IPS161HF for STM32 Nucleo	X-NUCLEO-OUT10A1
Single high-side switch	IPS161HF
Software expansion for STM32Cube driving industrial digital output based on intelligent power switch (IPS)	X-CUBE-IPS
Applications	Industrial Safety Industrial Tools

## Description

The **X-NUCLEO-OUT10A1** industrial digital output expansion board for **STM32 Nucleo** provides an affordable and easy-to-use solution for the development of 0.5 A (typ.) digital output modules, letting you easily evaluate the **IPS161HF** driving and diagnostic capabilities with industrial loads.

The **X-NUCLEO-OUT10A1** interfaces with the microcontroller on the **STM32 Nucleo** via 3 kV optocouplers driven by GPIO pins and Arduino™ UNO R3 (default configuration) and ST morpho (optional, not mounted) connectors.

The expansion board should be connected to either a **NUCLEO-F401RE** or **NUCLEO-G431RB** development board, and can be stacked with another **X-NUCLEO-OUT10A1** or an **X-NUCLEO-OUT08A1**.

Up to four **X-NUCLEO-OUT10A1** expansion boards can be stacked to evaluate up to a quad channel digital output module with 0.5 A (typ.) capability each.

It is also possible to evaluate the typical cascade architecture of a single channel digital output module for safety applications: in this scenario, the first shield output is connected to the supply of the second one.

Dedicated on-board hardware can be enabled or disabled to activate fast discharge of high capacitive loads, output voltage sensing, and an additional surge pulse output line protection.

# 1 Schematic diagrams

Figure 1. X-NUCLEO-OUT10A1 circuit schematic (1 of 2)

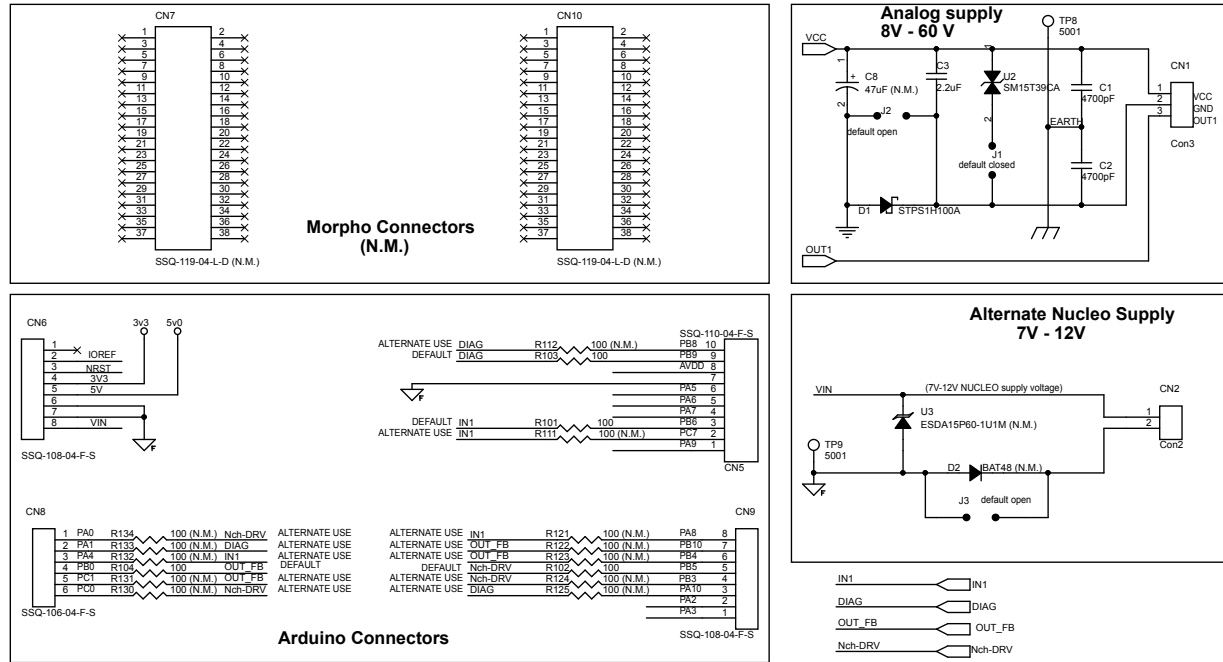
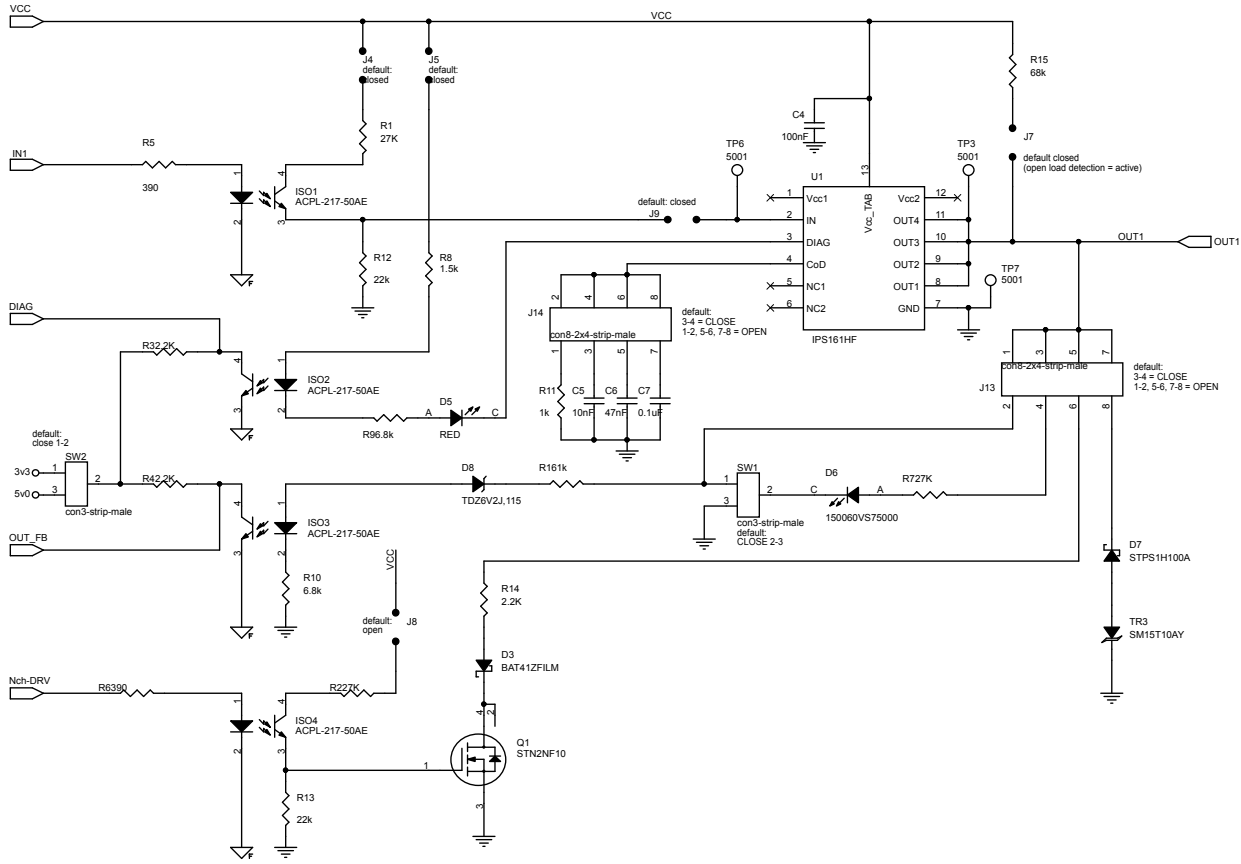


Figure 2. X-NUCLEO-OUT10A1 circuit schematic (2 of 2)



## Revision history

**Table 1. Document revision history**

Date	Version	Changes
12-Jun-2020	1	Initial release.
24-Nov-2022	2	Updated Product summary and Description.

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