Industrial digital output expansion board based on IPS2050H-32 for STM32 Nucleo

Features
• Based on IPS2050H-32 dual high-side switch, which features:
  – Operating range up to 60 V/5.7 A
  – Low power dissipation ($R_{ON(MAX)} = 50 \text{ m}\Omega$)
  – Fast decay for inductive loads
  – Smart driving of capacitive load
  – Under-voltage lock-out
  – Per-channel overload and over-temperature protection
  – PSSO24 package
• Application board operating range: 8 to 33 V/0 to 5.7 A
• Extended voltage operating range (J3 open) up to 60 V
• Green LEDs for output on/off status
• Red LEDs for per-channel diagnostic (overload and overheating)
• 5 kV galvanic isolation
• Supply rail reverse polarity protection
• EMC compliance with IEC61000-4-2, IEC61000-4-3, IEC61000-4-5
• Compatible with STM32 Nucleo development boards
• Equipped with Arduino UNO R3 connectors
• CE certified
• RoHS and China RoHS compliant

Description
The X-NUCLEO-OUT04A1 industrial digital output expansion board for STM32 Nucleo provides a powerful and flexible environment for the evaluation of the driving and diagnostic capabilities of the IPS2050H-32 (dual high-side smart power solid state relay) in a digital output module connected to 5.7 A (max.) industrial loads.

The X-NUCLEO-OUT04A1 interfaces with the microcontroller on the STM32 Nucleo via 5 kV optocouplers driven by GPIO pins, Arduino UNO R3 (default configuration) and ST morpho (optional, not mounted) connectors.

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

It is also possible to evaluate a system composed by up to four stacked X-NUCLEO-OUT04A1 expansion boards. As an example, a system with four X-NUCLEO-OUT04A1 expansion boards allows you to evaluate an eight-channel digital output module with 5.7 A (max.) capability each.
Figure 1. X-NUCLEO-OUT04A1 circuit schematic (1 of 2)

ST morpho connectors (N.M.)

Arduino connectors

Analog supply
8 V - 60 V

Alternate Nucleo supply
7 V - 12 V

(7V-12V Nucleo supply voltage)

Arduino connectors
Figure 2. X-NUCLEO-OUT04A1 circuit schematic (2 of 2)
## Revision history

**Table 1. Document revision history**

<table>
<thead>
<tr>
<th>Date</th>
<th>Version</th>
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<tbody>
<tr>
<td>04-Aug-2021</td>
<td>1</td>
<td>Initial release.</td>
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