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## Getting started with EV-VNF1248F easy board based on Intelligent High-Side Switch VNF1248F

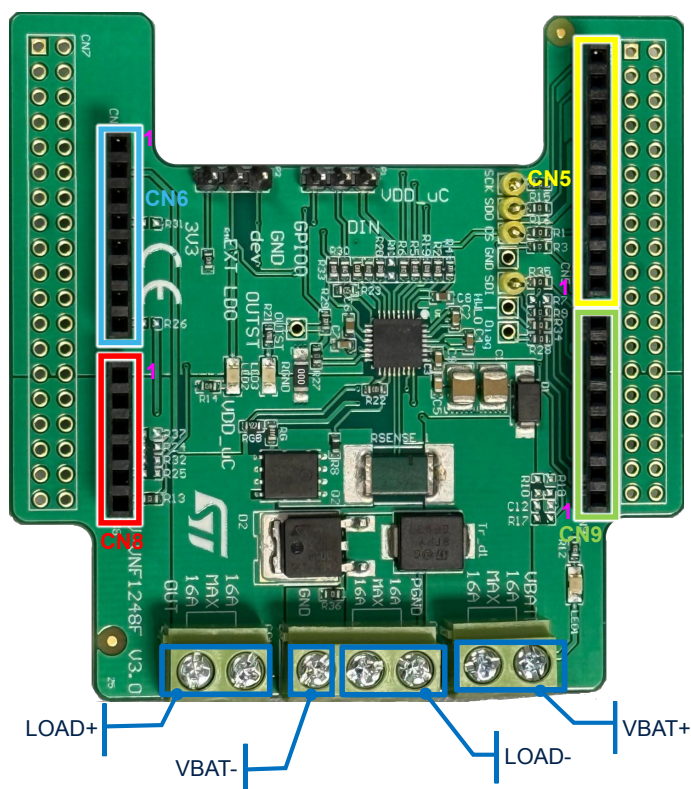
### Introduction

This document describes the specifications of the [EV-VNF1248F](#) easy board which can operate connected to the [EV-SPC582B](#) to create an intelligent high-side switch for 12 V, 24 V and 48 V automotive applications. The [VNF1248F](#) is an advanced controller for a power MOSFET in a high-side configuration and it interfaces with a host microcontroller through a 3.3 V and 5 V CMOS-compatible SPI interface, providing protection and diagnostics to the system.

## 1 Quick start

EV-VNF1248F is a user-friendly board available at a budget price. Paired with the dedicated GUI and firmware (STSW-EV-VNF1248F) and used in combination with EV-SPC582B microcontroller board, it becomes a tool for evaluating VNF1248F drivers.

Figure 1. EV-VNF1248F board



### 1.1 Getting started

Follow the steps below to configure the system and launch the application:

1. Check the jumper position of the EV-SPC582B board in its user manual.
2. Connect the EV-SPC582B board to a PC through a USB cable (Type A to mini-USB).
3. Download the STSW-EV-VNF1248F firmware and program the board as described in the EV-SPC582B user manual.
4. Disconnect the USB cable.
5. Stack the EV-VNF1248F on top of the EV-SPC582B.
6. Install the GUI as described in the STSW-EV-VNF1248F user manual.
7. Power supply
  - a. Supply MCU as described in the EV-SPC582B user manual.
  - b. Apply  $V_S < V_{S_{max}}$  between  $V_{BAT+}$  and  $V_{BAT-}$  on the EV-VNF1248F board.
8. Connect the USB cable between the PC and the EV-SPC582B.
9. Launch the GUI application. (For more details, refer to the STSW-EV-VNF1248F user manual).

## 2 Hardware, schematics and layout

The power supply is provided through the CON1 connector (12 V, 24 V, 48 V  $V_{BAT+}$  battery voltage) and the CON3 ( $V_{BAT-}$ ) in EV-VNF1248F board. The power source must provide sufficient current to meet the requirements of the connected load.

The load must be connected between the CON2 (LOAD+) and the CON3 (LOAD- / PGND) on the EV-VNF1248F board.

Some hardware features are reported here below:

- Green LED1 and LED2 turn on when the supply voltages on VBAT and VCC\_uC rails are provided.
- Red LED3 turns on when the diagnostic signal OUT\_ST is activated.
- By default, JP1 (= close 1-2) allows the control of DIN pin by the MCU through the signal GPIO0. Alternatively, (JP1 = close 2-3) DIN can be forced permanently to high level.
- By default, the internal 3.3 V supply of the VNF1248F is generated by the embedded voltage regulator (supplied from VS). Alternatively, to reduce the power dissipation, it is possible to provide the internal 3.3 V from the +3V3 rail on the EV-VNF1248F; in this case, it is necessary to replace R40 by a 470 nF / 10 V capacitor and mount the R31 resistor.

The board schematics and layer layout are provided below.

**Figure 2. EV-VNF1248F schematics**

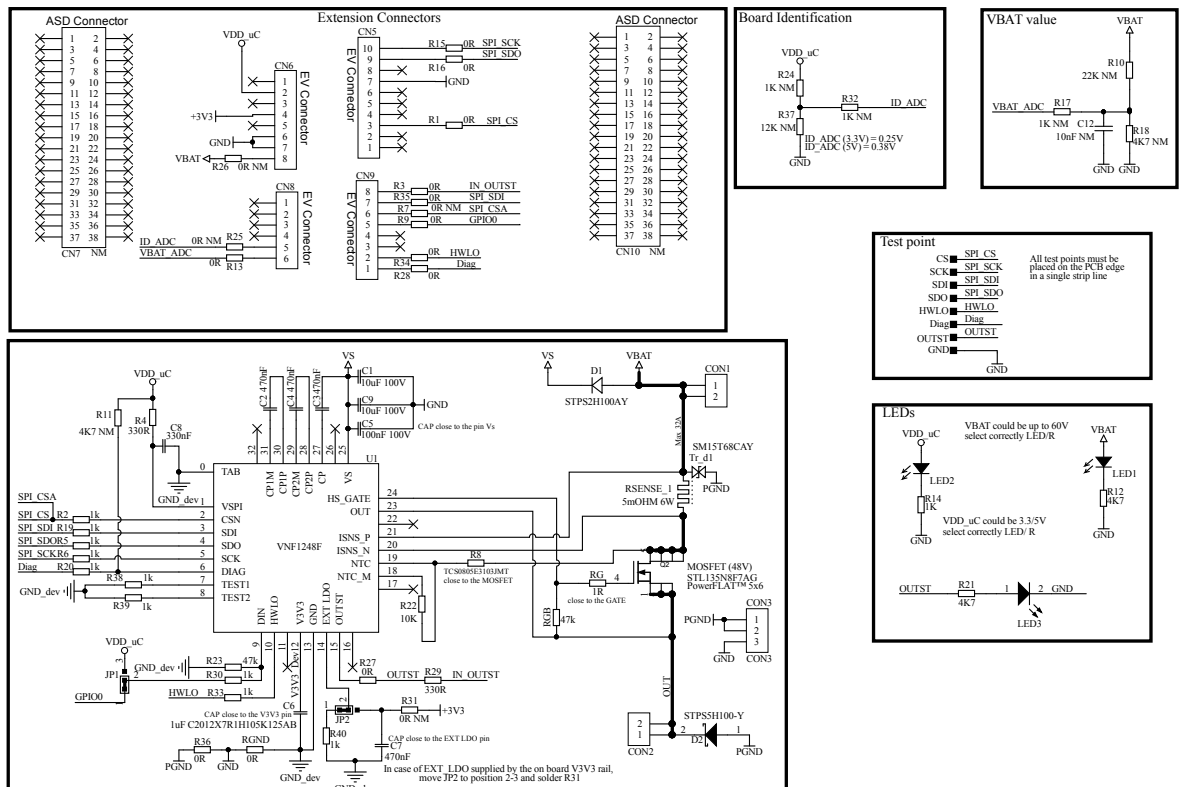


Figure 3. EV-VNF1248F TOP layer

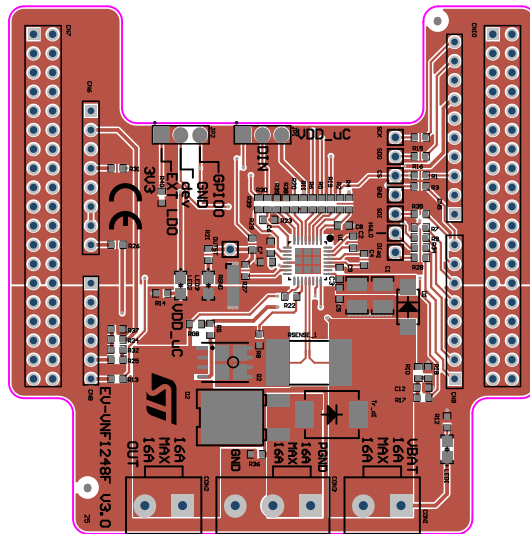
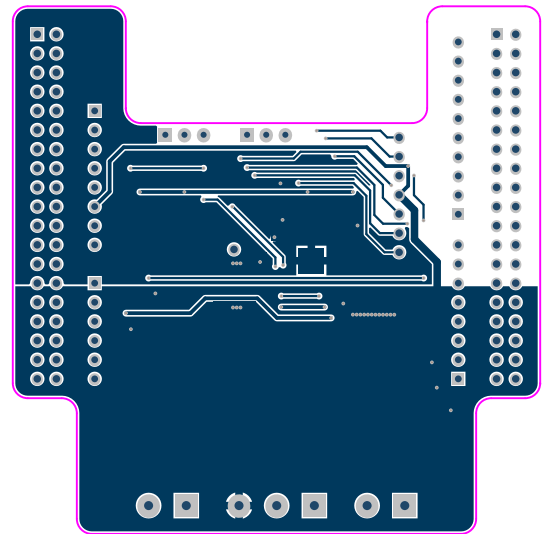


Figure 4. EV-VNF1248F BOTTOM layer



## 2.1 VNF1248F device

The device is an advanced controller for a power MOSFET in a high-side configuration, designed to implement an intelligent high-side switch for 12 V, 24 V and 48 V automotive applications with intelligent fuse protection. The Control IC interfaces with a host microcontroller via a 3.3 V and 5 V CMOS-compatible SPI interface, providing protection and diagnostics to the system. The device is intended for automotive power distribution applications and specifically as an intelligent high-current fuse replacement.

Below is a short description of the most important features of the VNF1248F device:

- General:
  - High-side switch Control IC with e-fuse protection for automotive 12 V, 24 V and 48 V applications
  - SPI slave interface for host control
  - 32-bit ST-SPI interface compatible with 3.3 V and 5 V CMOS level
  - 2-stage charge pump
  - Gate drive for an external MOSFET in a high-side configuration
  - High precision uni-directional digital current sense via SPI through an external high side shunt resistor
  - Input for an NTC resistor to monitor the external MOSFET temperature
  - Very low standby current
  - Emergency stop and limp-home pins for advanced safety features
  - Device configuration lock out by a dedicated digital input pin
  - Integrated ADC for TJ, VNTC, VOUT and VDS conversion
  - CCM: capacitive charging mode
  - Few times programmable non-volatile memory (FTP NVM) embedded for customer sector program/erase/read
- Protections
  - Direct input for hardware control of external MOSFET gate pin
  - Battery undervoltage shut-down
  - External MOSFET desaturation shutdown configurable via SPI
  - Hard short circuit latch-off configurable via SPI
  - Current vs time latch-off configurable via SPI (fuse-emulation)
  - Device overtemperature shutdown
  - External MOSFET overtemperature shutdown
  - Reverse battery with external component loss of GND
- Intelligent high-current fuse replacement for automotive applications
- Especially intended for automotive power distribution applications

## 2.2 Easy board connectors (Arduino Uno R3)

The following figure shows the Arduino UNO R3® connector pins on the [EV-VNF1248F](#) easy board, and the corresponding pins used for their management on the [EV-SPC582B](#) board:

**Figure 5. Arduino UNO R3® connectors**

[illegible]

## 2.3 Graphical User Interface

For more information, refer to the [STSW-EV-VNF1248F](#) user manual.

## Revision history

**Table 1. Document revision history**

| Date        | Revision | Changes                                                                                      |
|-------------|----------|----------------------------------------------------------------------------------------------|
| 23-Jul-2025 | 1        | Initial release.                                                                             |
| 28-Nov-2025 | 2        | Board connections, schematic and layout layers upgraded to rev. 3.0 of the evaluation board. |

## Contents

|          |                                        |           |
|----------|----------------------------------------|-----------|
| <b>1</b> | <b>Quick start</b>                     | <b>2</b>  |
| 1.1      | Getting started                        | 2         |
| <b>2</b> | <b>Hardware, schematics and layout</b> | <b>3</b>  |
| 2.1      | VNF1248F device                        | 5         |
| 2.2      | Easy board connectors (Arduino Uno R3) | 6         |
| 2.3      | Graphical User Interface               | 6         |
|          | <b>Revision history</b>                | <b>7</b>  |
|          | <b>List of figures</b>                 | <b>9</b>  |
|          | <b>List of tables</b>                  | <b>10</b> |



## List of figures

|                  |                                      |   |
|------------------|--------------------------------------|---|
| <b>Figure 1.</b> | EV-VNF1248F board . . . . .          | 2 |
| <b>Figure 2.</b> | EV-VNF1248F schematics . . . . .     | 3 |
| <b>Figure 3.</b> | EV-VNF1248F TOP layer . . . . .      | 4 |
| <b>Figure 4.</b> | EV-VNF1248F BOTTOM layer . . . . .   | 4 |
| <b>Figure 5.</b> | Arduino UNO R3® connectors . . . . . | 6 |

## List of tables

|          |                                     |   |
|----------|-------------------------------------|---|
| Table 1. | Document revision history . . . . . | 7 |
|----------|-------------------------------------|---|

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