

## VNF9D1M5Q evaluation board



### Product status link

[EV-VNF9D1M5Q](#)

### Product summary

| Order code | EV-VNF9D1M5Q |
|------------|--------------|
|            |              |

## Features

- AEC-Q100 qualified
- General
  - 24-bit ST-SPI for full diagnostic and digital current sense feedback
  - Integrated 10-bit ADC for digital current sense
  - Integrated 10-bit ADC for STi<sup>2</sup>Fuse digital current sense
  - Advanced limp-home functions for robust fail-safe system
  - Very low standby current for parking mode functionality
  - Control through direct inputs and/or SPI
  - Emergency stop and limp-home pins for advanced safety features
  - Capacitive loads charging mode
  - PQFN 7x8.5 package with wettable flanks
  - Compliant with European directive 2002/95/EC
- Diagnostic functions
  - Digital proportional load current sense
  - Diagnostic of overload and short to GND, harness protection
  - VCC and output voltage digital feedback
  - Case temperature monitoring
  - Overtemperature shutdown, undervoltage, and overvoltage prewarning
- Protection
  - Full programmable wire harness protection (STi<sup>2</sup>Fuse)
  - Load peak current latch-off
  - Overtemperature shutdown (latch-off)
  - Overvoltage clamp
  - Load dump protected
  - Protection against loss of ground

## Description

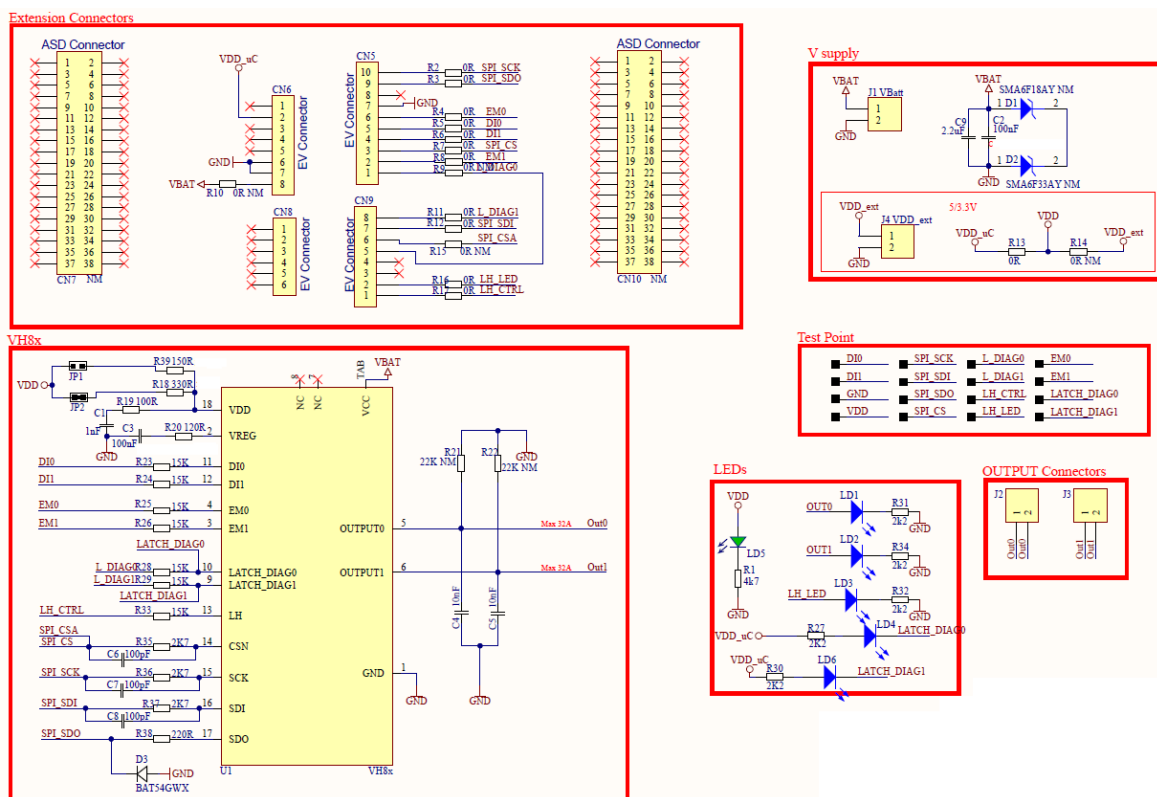
The [EV-VNF9D1M5Q](#) board provides an easy way to connect an ST VIPower technology device into an existing system.

# 1 Overview

The board comes pre-assembled with a **VNF9D1M5Q** high-side driver. It includes a minimum set of electrical components (as recommended in the device datasheet), enabling the user to connect the load directly, the power supply, and the microcontroller without any additional effort in external component design and connection. The **VNF9D1M5Q** is a device made using STMicroelectronics VIPower technology. It is intended for driving resistive, inductive, or capacitive loads directly connected to the ground.

The device is protected against voltage transient on VCC pin. Programming, control, and diagnostics are implemented via the SPI bus. A digital current sense feedback and an ST<sup>2</sup>Fuse digital current sense feedback for each channel are provided through two independent integrated 10-bit ADCs per channel. Dedicated trimming bits adjust the ADC reference current. The device is equipped with 2 outputs controllable via SPI and/or with two dedicated direct inputs.

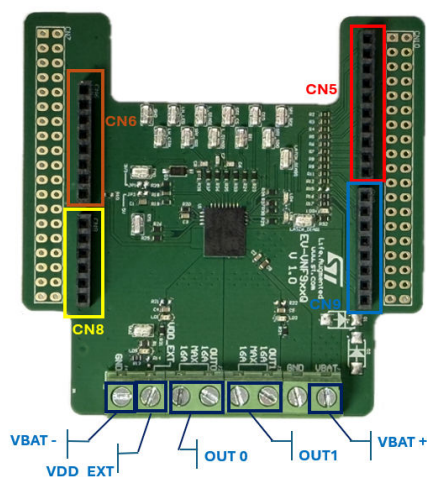
**Figure 1. Board schematic**



## 2 Board connections

Figure 2 shows the placement of the connectors to be used for supplying the evaluation board, connecting the load, and controlling the functionality and diagnostics of the device.

**Figure 2. Evaluation board connections**



**Table 1. CN connectors: pin functions**

| Connector | Pin Number | Pin function |
|-----------|------------|--------------|
| CN5       | 1          | L_DIAG0      |
| CN5       | 2          | EM1          |
| CN5       | 3          | SPI_CS       |
| CN5       | 4          | DI1          |
| CN5       | 5          | DI0          |
| CN5       | 6          | EM0          |
| CN5       | 7          | GND          |
| CN5       | 9          | SPI_SDO      |
| CN5       | 10         | SPI_SCK      |
| CN6       | 4          | 3V3          |
| CN6       | 5          | 5V           |
| CN6       | 6          | GND          |
| CN6       | 7          | GND          |
| CN8       | 5          | ID_ADC       |
| CN8       | 6          | VBAT_ADC     |
| CN9       | 1          | LH_CTRL      |
| CN9       | 2          | LH_LED       |
| CN9       | 6          | SPI_CSA      |
| CN9       | 7          | SPI_SDI      |
| CN9       | 8          | L_DIAG1      |

### 3 Thermal data

**Table 2. Thermal data**

| Symbol        | Parameter                                     | Max | Unit |
|---------------|-----------------------------------------------|-----|------|
| $R_{thj-amb}$ | Thermal resistance junction-to-ambient (max.) | 41  | °C/W |

**Table 3. PCB specifications**

| Parameter              | Value          |
|------------------------|----------------|
| Board dimensions       | 70 mm x 70 mm  |
| Number of Cu layers    | 2              |
| Cu Layer thickness     | 70 µm          |
| Board finish thickness | 1.6 mm +/- 10% |
| Board material         | FR4            |
| Thermal vias diameter  | 0.3 mm         |

## Revision history

**Table 4. Document revision history**

| Date        | Version | Changes          |
|-------------|---------|------------------|
| 12-Aug-2026 | 1       | Initial release. |

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