

VNF9D3Q evaluation board



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 STi²Fuse 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 (STi²Fuse)
 - Load peak current latch-off
 - Overtemperature shutdown (latch-off)
 - Overvoltage clamp
 - Load dumps protected
 - Protection against loss of ground

Description

The [EV-VNF9D3Q](#) board provides an easy way to connect an ST VIPower technology device into an existing system.

Product status link

[EV-VNF9D3Q](#)

Product summary

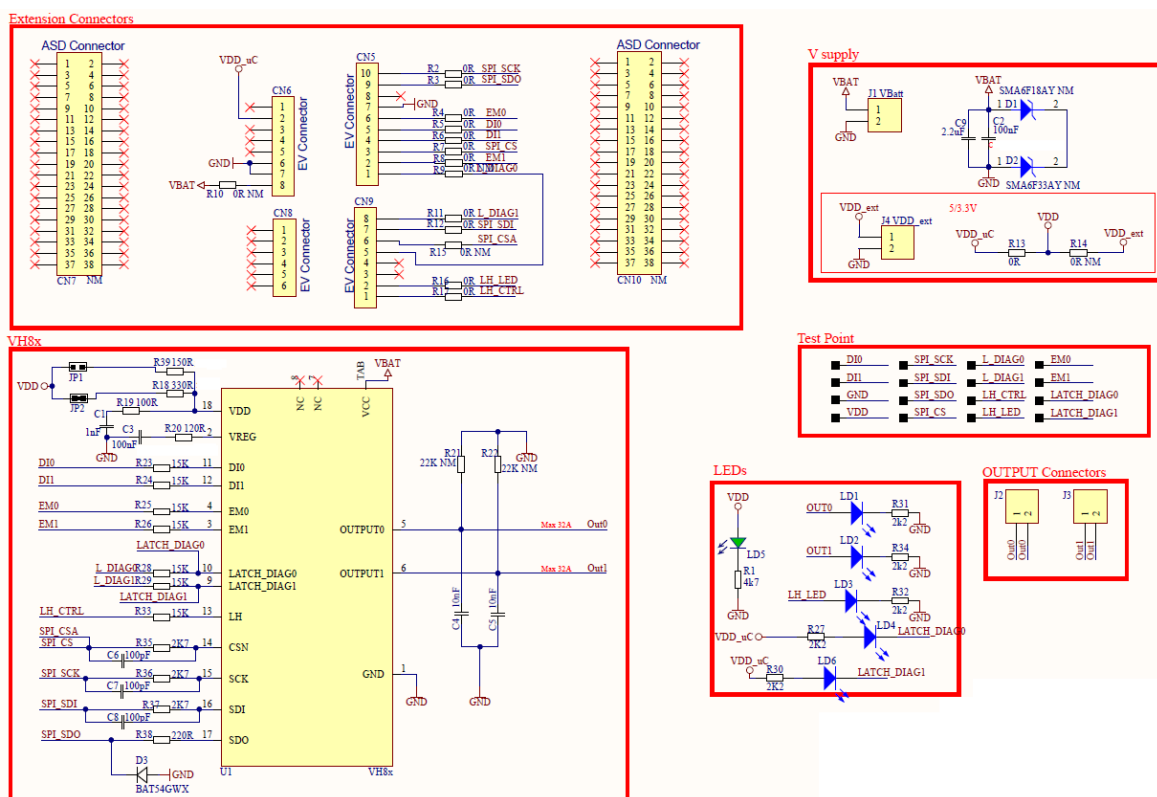
Order code	EV-VNF9D3Q

1 Overview

The board comes preassembled with a **VNF9D3Q** 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 **VNF9D3Q** 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 STi²Fuse 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 two 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

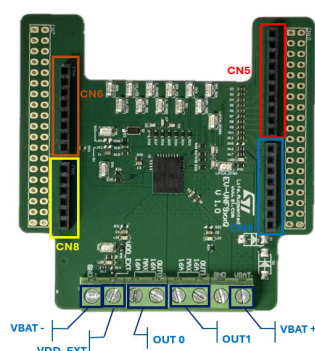


Table 1. CN connectors: pin functions

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	5 V
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.)	42.5	°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
15-Sep-2026	1	Initial release.

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