EV-VNH5050A

VNH5050A evaluation board

Data brief

Features

Parameter	Symbol	Value	Unit
Max supply voltage	V_{cc}	41	V
Operating voltage range	V_{cc}	5.5 to 18	V
Max on-state resistance (per leg)	R_{ON}	50	mΩ
High-side current limitation (typ)	I_{UMH}	42	A
Off-state supply current	I_s	3	µA

- Simple single IC application board dedicated for VNH5050-E
- Provides thermal heat-sinking for ease of use in prototyping
- Provides electrical connectivity for easy prototyping

Description

EV-VNH5050A provides you an easy way to connect ST's surface mounted VIPower® HBridge drivers into your existing prototype circuitry. This evaluation board comes preassembled with VNH5050A-E H-Bridge.

The VNH5050A-E is a system in package H-Bridge manufactured in the ST proprietary VIPower® M0- 5 technology and housed in the PowerSSO-36 package. The VNH5050A-E is designed to drive 12 V automotive bidirectional load such as a PMDC motor. The VNH5050A-E provides protection, diagnostics and easy 3 V and 5 V CMOS compatible interface with any microcontroller.

The device integrates advanced protection functions such as load current limitation, inrush and active overload management by power limitation, overtemperature shut-off with autorestart and overvoltage active clamp. A dedicated analog current sense pin is associated with every output channel in order to provide Enhanced diagnostic functions including fast detection of overload and short-circuit to ground through power limitation indication, over-temperature indication, short-circuit to V_{CC} protection and diagnosis as well as on-state and off-state open-load detection.

The current sensing and diagnostic feedback of the whole device can be disabled by pulling the CS_DIS pin high to allow sharing of the external sense resistor with other similar devices.

Table 1. Device summary

Order codes	Reference
EV-VNH5050A	EV-VNH5050A evaluation board

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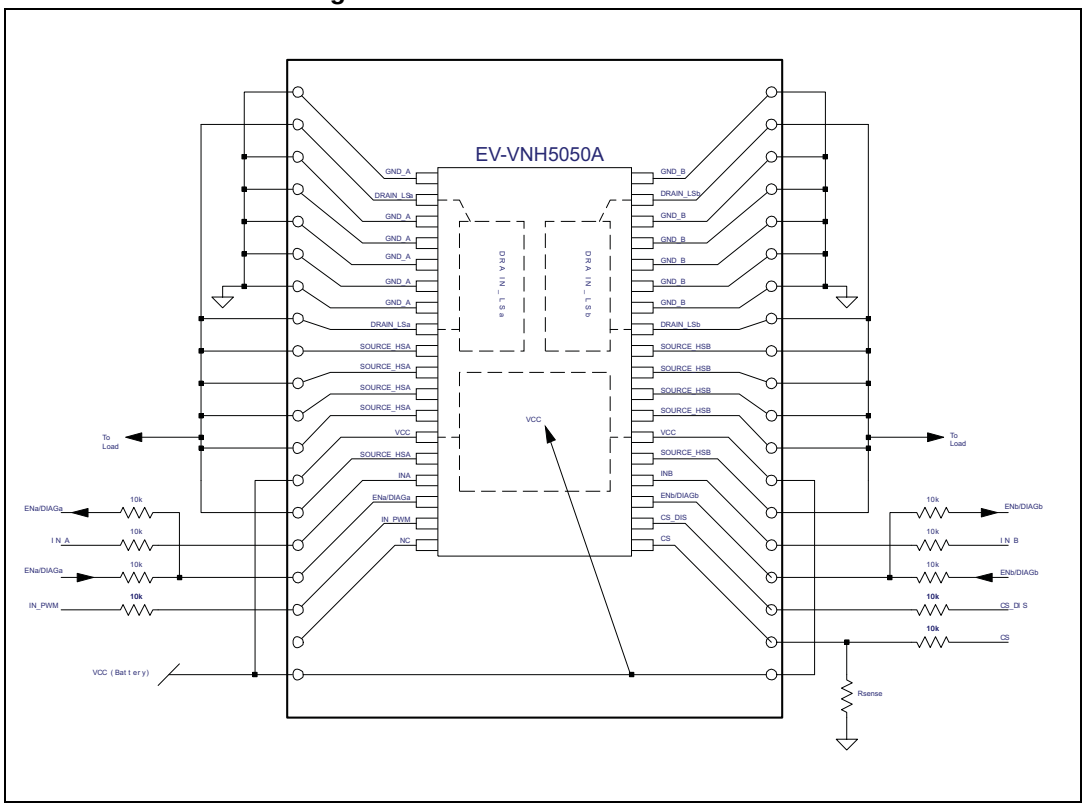
1 Design recommendations

This evaluation board provides mounting and some heat sinking capability for prototype development, but there are still external components that are required to make these devices work in any application.

Figure 1 illustrates the necessary components for any application.

Figure 1. VNH5050A evaluation board



Please note that the high side drains and the low side sources are not tied together internally. To make the H-Bridge the SOURCE_HSa pins must be electrically connected to the DRAIN_LSa pins. The same applies for the SOURCE_HSb and DRAIN_LSb pins.

ST has produced a user manual for safe designs using ST's VIPower devices. This is UM1556 (see *Section Appendix A: Reference documents*). UM1556 is a VIPower Hardware design guide that provides all of the necessary information to successfully design your circuit using our VIPower drivers.

All designs have different needs and requirements. Whatever design you decide to use you will still need to verify that it meets your application needs. ST implies no guarantee or warranty (see *Section Appendix A: Reference documents*).

2 Thermal data

Table 2. VNH5050A thermal data

Symbol	Parameter	Max. value	Unit
$R_{thj-amb}$ HSD	Thermal resistance junction-ambient (MAX)	31	°C/W
$R_{thj-amb}$ LSD	Thermal resistance junction-ambient (MAX)	40	°C/W

Table 3. PCB specifications

Parameter	Value	Unit
Board dimensions	51 x 58	mm
Number of Cu layer	2	—
Layer Cu thickness	70	µm
Board finish thickness	1.6 +/- 10%	mm
Board Material	FR4	—
Thermal vias separation	1.2	mm
Thermal vias diameter	0.3 +/- 0.08	mm

3 Board connector reference

Figure 2. Board layout

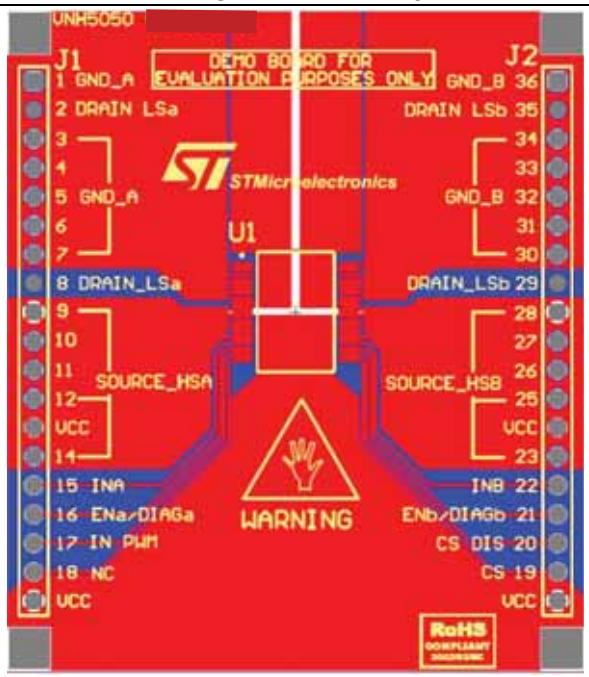


Table 4. Board connector specification

Connector	Board lead number	Device pin function[1]
J1	1	GND_A
J1	2	Drain_LSa
J1	3	GND_A
J1	4	GND_A
J1	5	GND_A
J1	6	GND_A
J1	7	GND_A
J1	8	Drain_LSa
J1	9	SOURCE_HSa
J1	10	SOURCE_HSa
J1	11	SOURCE_HSa
J1	12	SOURCE_HSa
J1	13	V_{CC}
J1	14	SOURCE_HSa
J1	15	INA
J1	16	ENa/DIAGa

Table 4. Board connector specification (continued)

Connector	Board lead number	Device pin function[1]
J1	17	IN_PWM
J1	18	NC
J1	V_{CC}	V_{CC}
J2	V_{CC}	V_{CC}
J2	19	CS
J2	20	CS_DIS
J2	21	ENb/DIAGb
J2	22	INB
J2	23	SOURCE_HSb
J2	24	V_{CC}
J2	25	SOURCE_HSb
J2	26	SOURCE_HSb
J2	27	SOURCE_HSb
J2	28	SOURCE_HSb
J2	29	Drain_LSb
J2	30	GND_B
J2	31	GND_B
J2	32	GND_B
J2	33	GND_B
J2	34	GND_B
J2	35	DRAIN_LSb
J2	36	GND_B

1. For further clarification on pin functions please refer to the related datasheet (see *Appendix A: Reference documents*).

4 Package information

4.1 ECOPACK® packages

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: *www.st.com*.
ECOPACK® is an ST trademark.

Appendix A Reference documents

- VIPower M0-5 and M0-5Enhanced high-side drivers (UM1556, DocID 023520)
- Evaluation Product Licence Agreement on *www.st.com*

Revision history

Table 5. Document revision history

Date	Revision	Changes
29-Jul-2013	1	Initial release.
17-Sep-2013	2	Updated disclaimer.
11-Feb-2014	3	Updated *Description*.

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