

### Features

Parameter	Symbol	Value	Unit
Max supply voltage	$V_{CC}$	41	V
Operating voltage range	$V_{CC}$	4.5 to 28	V
Max On-State resistance	$R_{ON}$	50	m $\Omega$
Current limitation (typ)	$I_{LIMH}$	27	A
Off state supply current	$I_S$	2	$\mu A^{(1)}$

1. Typical value with all loads connected.

- Simple single IC application board dedicated for VN5E050J-E
- Provides thermal heat-sinking for ease of use in prototyping.
- Provides electrical connectivity for easy prototyping

### Description

EV-VN5E050J provides you an easy way to connect ST's surface mounted VIPower<sup>®</sup> drivers into your existing prototype circuitry. This evaluation board comes pre-assembled with VN5E050J-E high-side driver.

The VN5E050J-E is a single channel high-side driver manufactured using ST proprietary VIPower M0-5 technology and housed in PowerSSO-12 package. The VN5E050J-E is designed to drive automotive grounded loads, providing protection, diagnostics and easy 3 V and 5 V CMOS-compatible interface with any microcontroller.

The device integrates advanced protective functions such as load current limitation, inrush and overload active management by power limitation, overtemperature shut-off with auto-restart and overvoltage active clamp. A dedicated analog current sense pin is associated with every

output channel provides enhanced diagnostic functions including fast detection of overload and short-circuit to ground, overtemperature indication, short-circuit to  $V_{CC}$  diagnosis and ON-state and OFF-state open-load detection.

The diagnostic feedback of the whole device can be disabled by pulling the STAT\_DIS pin up, thus allowing wired-ORing with similar devices.

Figure 1. VN5E050J evaluation board

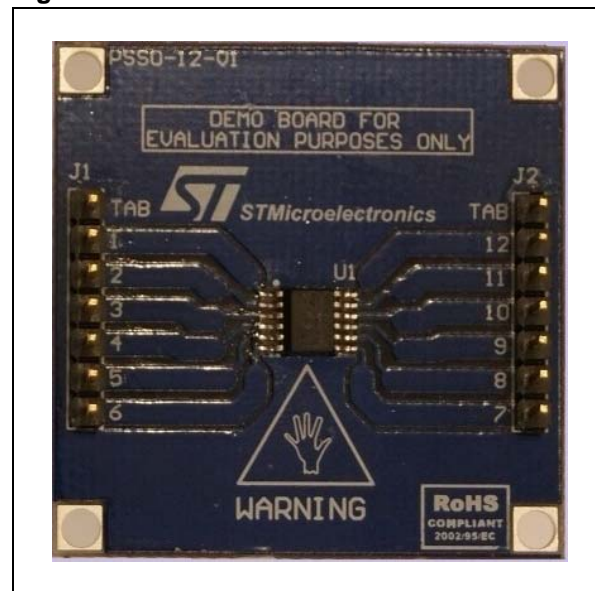


Table 1. Device summary

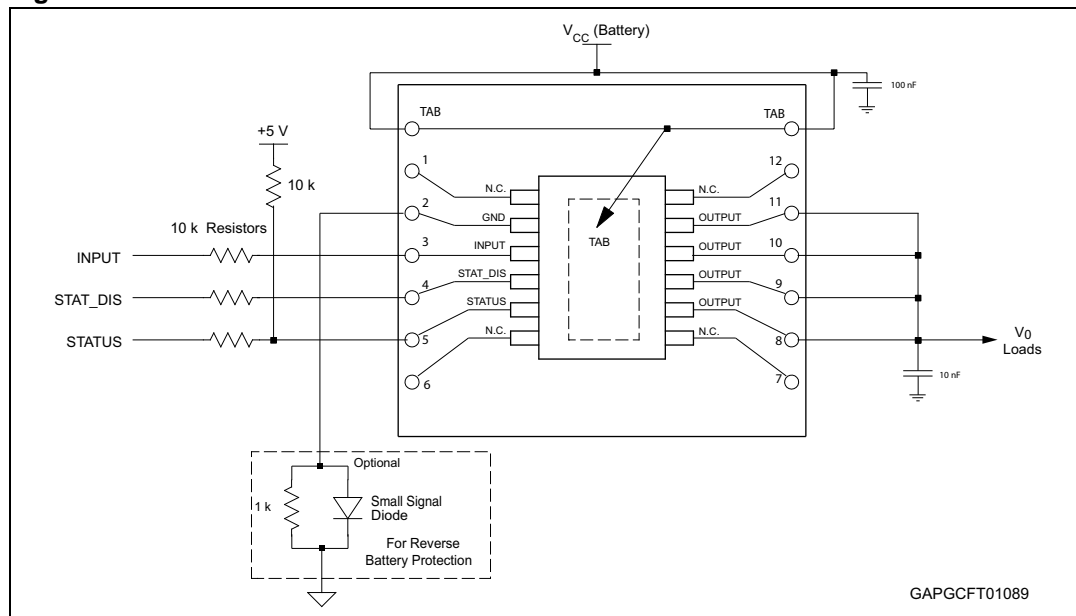
Order code	Reference
EV-VN5E050J	VN5E050J evaluation board

# 1 Design recommendations

This evaluation board provides mounting solution 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. For further information on how the evaluation board has to be used you can refer to the AN4210 (see [Appendix A: Reference documents](#)).

[Figure 2](#) illustrates the necessary components for any application.

**Figure 2. VN5E050J evaluation board**



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

All designs have different needs and requirements. Whatever design you decide to use, it will still need to be verified in order to meet your application specifications. ST implies no guarantee or warranty (see [Appendix A: Reference documents](#)).

## 2 Thermal data

**Table 2. VN5E050J-E thermal data**

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

**Table 3. PCB specifications**

Parameter	Value	Unit
Board dimensions	38 x 38	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 3. Board layout



Table 4. Board connector specification

Connector	Board lead number	Device pin function <sup>(1)</sup>
J1	TAB	V <sub>CC</sub>
J1	1	N.C.
J1	2	GND
J1	3	INPUT
J1	4	STAT_DIS
J1	5	STATUS
J1	6	N.C.
J2	TAB	V <sub>CC</sub>
J2	7	N.C.
J2	8	OUTPUT
J2	9	OUTPUT
J2	10	OUTPUT
J2	11	OUTPUT
J2	12	N.C.

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

## 4 Package information

### 4.1 ECOPACK<sup>®</sup> packages

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK<sup>®</sup> packages, depending on their level of environmental compliance. ECOPACK<sup>®</sup> specifications, grade definitions and product status are available at: [www.st.com](http://www.st.com).

ECOPACK<sup>®</sup> is an ST trademark.

## Appendix A Reference documents

1. Single channel high side driver for automotive applications (VN5E050J-E, DocID 13625)
2. VIPower M0-5 and M0-5Enhanced high-side drivers (UM1556, DocID 023520)
3. PowerSSO-12 devices evaluation board (AN4210, DocID 023963)
4. Evaluation Product Licence Agreement on [www.st.com](http://www.st.com)

## Revision history

**Table 5. Document revision history**

Date	Revision	Changes
26-Nov-2012	1	Initial release.
28-Nov-2012	2	Updated <a href="#">Figure 2: VN5E050J evaluation board</a>
17-Sep-2013	3	Updated disclaimer.

**Please Read Carefully:**

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST's terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

**UNLESS OTHERWISE SET FORTH IN ST'S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.**

**ST PRODUCTS ARE NOT DESIGNED OR AUTHORIZED FOR USE IN: (A) SAFETY CRITICAL APPLICATIONS SUCH AS LIFE SUPPORTING, ACTIVE IMPLANTED DEVICES OR SYSTEMS WITH PRODUCT FUNCTIONAL SAFETY REQUIREMENTS; (B) AERONAUTIC APPLICATIONS; (C) AUTOMOTIVE APPLICATIONS OR ENVIRONMENTS, AND/OR (D) AEROSPACE APPLICATIONS OR ENVIRONMENTS. WHERE ST PRODUCTS ARE NOT DESIGNED FOR SUCH USE, THE PURCHASER SHALL USE PRODUCTS AT PURCHASER'S SOLE RISK, EVEN IF ST HAS BEEN INFORMED IN WRITING OF SUCH USAGE, UNLESS A PRODUCT IS EXPRESSLY DESIGNATED BY ST AS BEING INTENDED FOR "AUTOMOTIVE, AUTOMOTIVE SAFETY OR MEDICAL" INDUSTRY DOMAINS ACCORDING TO ST PRODUCT DESIGN SPECIFICATIONS. PRODUCTS FORMALLY ESCC, QML OR JAN QUALIFIED ARE DEEMED SUITABLE FOR USE IN AEROSPACE BY THE CORRESPONDING GOVERNMENTAL AGENCY.**

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners.

© 2013 STMicroelectronics - All rights reserved

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Philippines - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

[www.st.com](http://www.st.com)