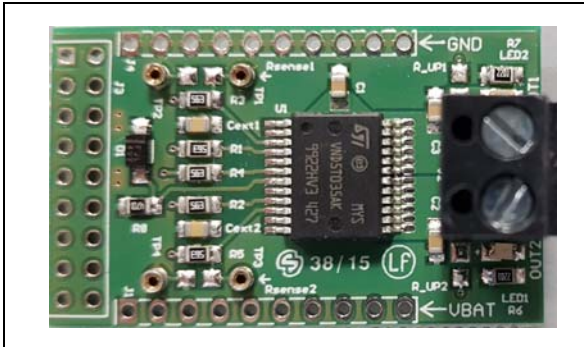


## VND5T035AK-E Evaluation board

Data brief



### Features

Parameter	Symbol	Value	Unit
Max transient supply voltage	$V_{CC}$	58	V
Operating voltage range	$V_{CC}$	8 to 36	V
Typ.on-state resistance	$R_{ON}$	35	m $\Omega$
Current limitation (typ)	$I_{LIMH}$	42	A
Off state supply current	$I_s$	2	$\mu A$ <sup>(1)</sup>

1. Typical value with all loads connected

- General device features
  - Very low standby current
  - 3.0 V CMOS compatible input
  - Optimized electromagnetic emission
  - Very low electromagnetic susceptibility
  - Compliant with 2002/95/EC European directive
  - Fault reset standby pin (FR\_Stby)
- Diagnostic functions
  - Proportional load current sense
  - Current sense precision for wide range currents

- Off-state open-load detection
- Output short to  $V_{CC}$  detection
- Overload and short to ground latch-off
- Thermal shutdown latch-off
- Very low current sense leakage
- Protection
  - Undervoltage shutdown
  - Overvoltage clamp
  - Load current limitation
  - Self limiting of fast thermal transients
  - Protection against loss of ground and loss of  $V_{CC}$
  - Thermal shutdown
  - Reverse battery protected with self switch of the PowerMOS
  - Electrostatic discharge protection

### Applications

- All types of Automotive resistive, inductive and capacitive loads.

### Description

This board provides you an easy way to connect STMicroelectronics® VIPower® technology into your existing system.

**Table 1. Device summary**

Order code	Reference
EV-VND5T035AK	VND5T035AK-E Evaluation board

# Contents

1	Overview .....	5
2	Board connections .....	6
3	Thermal data .....	10
4	Revision history .....	11

## List of tables

Table 1.	Device summary . . . . .	1
Table 2.	J3 connector: pin functions . . . . .	6
Table 3.	EV-VND5T035AK thermal data . . . . .	10
Table 4.	Pcb specifications . . . . .	10
Table 5.	Document revision history . . . . .	11

## List of figures

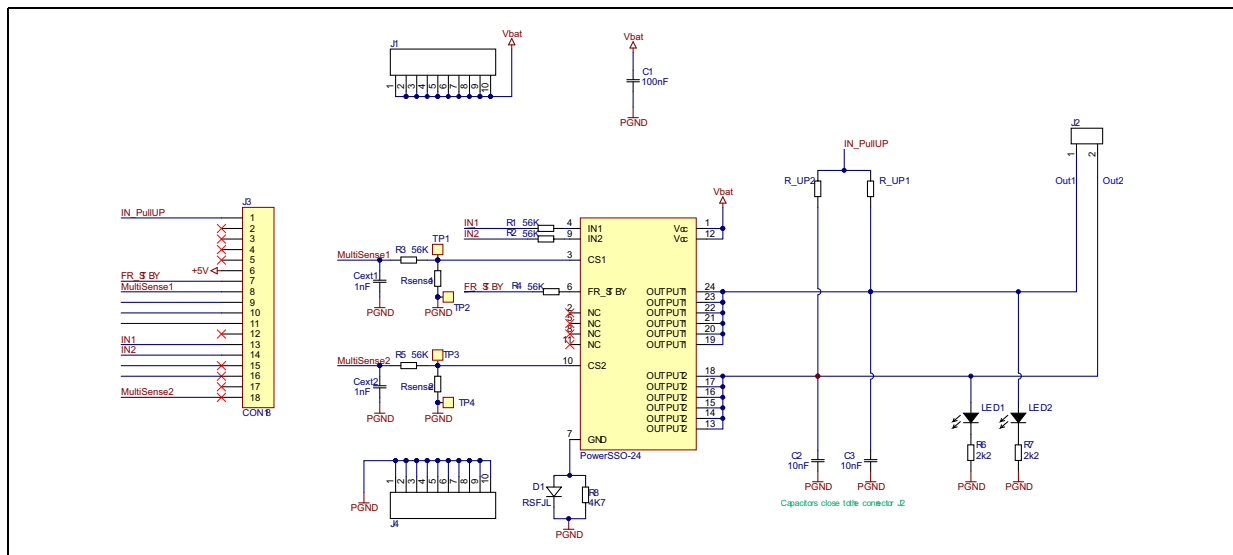
Figure 1.	VND5T035AK-E Evaluation board schematic . . . . .	5
Figure 2.	Evaluation board connection . . . . .	6
Figure 3.	No sense resistor . . . . .	8
Figure 4.	Mounting through-hole sense resistor . . . . .	8
Figure 5.	Pads for soldering SMD resistor . . . . .	9

# 1 Overview

The board comes pre-assembled with VND5T035AK-E High Side driver. On board minimum set of electrical components (as for device datasheet recommendation) is enabling the user to directly connect the load, the power supply and the microcontroller without any additional effort in external component design and connection. The VND5T035AK-E is a device made using STMicroelectronics® VIPower® technology, intended for driving resistive or inductive loads with one side connected to ground. Active  $V_{CC}$  pin voltage clamp protects the device against low energy spikes. This device integrates an analog current sense which delivers a current proportional to the load current. Fault conditions such as overload, overtemperature or short to  $V_{CC}$  are reported via the current sense pin.

Output current limitation protects the device in overload condition. The device latches off in case of overload or thermal shutdown. The device is reset by a low level pass on the fault reset standby pin. A permanent low level on the inputs and fault reset standby pin disables all outputs and sets the device in standby mode.

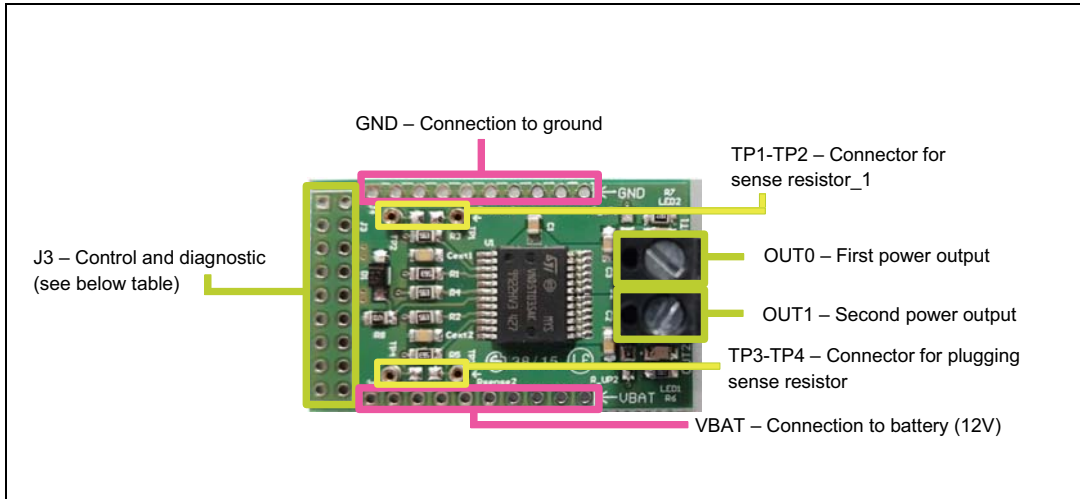
**Figure 1. VND5T035AK-E Evaluation board schematic**



## 2 Board connections

Below [Figure 2: Evaluation board connection](#) shows the placement of the connectors to be used for supplying the evaluation board, connecting the load and controlling the functionality and diagnostic of the device.

**Figure 2. Evaluation board connection**



**Table 2. J3 connector: pin functions**

Connector	Pin number	Pin name	Pin function
J3	1	IN_PullUP	Connection to optional external pull-up resistor for open load detection in off-state.
J3	2...5	N/A	Not connected
J3	6	+5V	5V Power Supply
J3	7	FR_STBY	In case of latch-off for overtemperature/overcurrent condition, a low pulse on the FR_Stby pin is needed to reset the channel. The device enters in standby mode if all inputs and the FR_Stby pin are low
J3	8	MultiSense 1	Analog current sense pin, it delivers a current proportional to the load current.
J3	9...12	N/A	Not connected

**Table 2. J3 connector: pin functions (continued)**

Connector	Pin number	Pin name	Pin function
J3	13	IN0	Voltage controlled input pin with hysteresis, compatible with 3V and 5 V CMOS outputs. It controls OUT0 switch state.
J3	14	IN1	Voltage controlled input pin with hysteresis, compatible with 3V and 5 V CMOS outputs. It controls OUT1 switch state. (Input not available for single channel)
J3	15...17	N/A	Not connected
J3	18	Multisense 2	Analog current sense output pin delivers a current proportional to the load current.

In case the user wishes to utilize the Current Sense / MultiSense function of the device, it is necessary to plug a sense resistor in Rsense.

The package includes a through-hole resistor, to be mounted on TP1-TP2 - see [Figure 4: Mounting through-hole sense resistor](#). Different Rsense values can be adopted based on user preference.

Different Rsense values can be adopted based on user preference.

Another option is soldering an SMD resistor on the dedicated PCB pad, as shown in [Figure 5: Pads for soldering SMD resistor](#).

Figure 3. No sense resistor



Figure 4. Mounting through-hole sense resistor

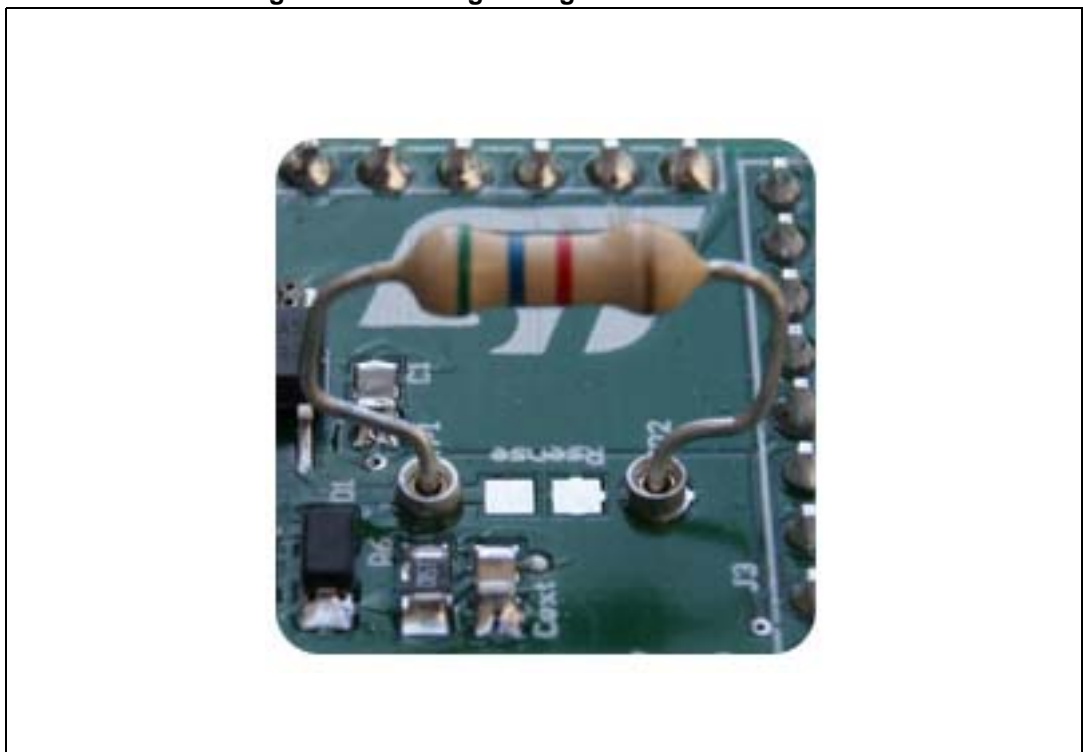




Figure 5. Pads for soldering SMD resistor



### 3 Thermal data

**Table 3. EV-VND5T035AK thermal data**

Symbol	Parameter	Max	Unit
$R_{thj-amb}$	Thermal resistance junction-ambient (Max)	39 °	° C/W

**Table 4. Pcb specifications**

Parameter	Value
Board dimensions	25 mm X 41.5 mm
Number of CU layer	2
Layer Cu thickness	35 $\mu$ m
Board finish	1.6 mm $\pm$ 10 %
Thickness	
Board Material	FR4
Thermal vias separation	1.1 mm
Thermal vias diameter	0.5

## 4 Revision history

Table 5. Document revision history

Date	Revision	Changes
25-May-2018	1	Initial release.