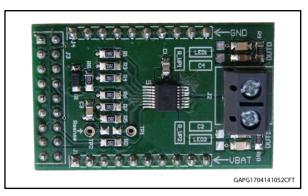


# EV-VND7050AJ

# VND7050AJ evaluation board

Data brief



## Features

Max transient supply voltage	V <sub>cc</sub>	40 V
Operating voltage range	Vcc	4 to 28 V
Typ. on-state resistance (per Ch)	R <sub>ON</sub>	50 mΩ
Current limitation (typ)	ILIMH	30 A
Stand-by current (max)	I <sub>STBY</sub>	0.5 µA

- Simple single IC application board dedicated for VND7050AJ
- Provides electrical connectivity and thermal heat-sinking for easy prototyping
- General device features
  - Double channel smart high-side driver with MultiSense analog feedback
  - Very low standby current
  - Compatible with 3 V and 5 V CMOS outputs

- Diagnostic functions
  - Multiplexed analog feedback of: load current with high precision proportional current mirror, V<sub>CC</sub> supply voltage and T<sub>CHIP</sub> device temperature
  - Overload and short to ground (power limitation) indication
  - Thermal shutdown indication
  - OFF-state open-load detection
  - Output short to V<sub>CC</sub> detection
  - Sense enable/disable
- Protections
  - Undervoltage shutdown
  - Overvoltage clamp
  - Load current limitation
  - Self limiting of fast thermal transients
  - Configurable latch-off on overtemperature or power limitation with dedicated fault reset pin
  - Loss of ground and loss of V<sub>CC</sub>
    Boverse better with external
  - Reverse battery with external components
  - Electrostatic discharge protection

### **Applications**

Typical applications are all types of automotive resistive, inductive and capacitive loads.

Table 1: Device summary		
Order code	Reference	
EV-VND7050AJ	VND7050AJ evaluation board	

# 1 Description

This board provides you an easy way to connect STMicroelectronics<sup>®</sup> VIPower<sup>®</sup> M0-7 technology into your existing system.

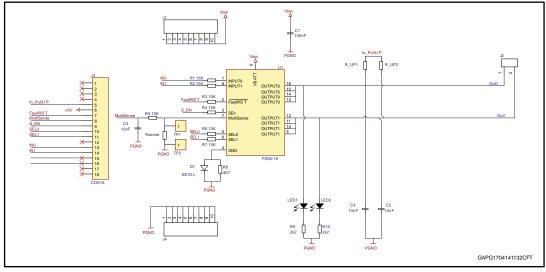
The board comes pre-assembled with VND7050AJ high-side driver. On board minimum set of electrical components (as for device datasheet recommendation) is enabling the user to directly connect the load, the power supply and the microcontroller without any additional effort in external component design and connection.

The VND7050AJ is a double channel high-side driver manufactured using ST proprietary VIPower technology and housed in PowerSSO-16 package. The device is designed to drive 12 V automotive grounded loads through a 3 V and 5 V CMOS-compatible interface and to provide protection and diagnostics.

The device integrates advanced protective functions such as load current limitation, overload active management by power limitation and overtemperature shutdown with configurable latch-off.

A FaultRST pin unlatches the output in case of fault or disables the latch-off functionality.

A dedicated multifunction multiplexed analog output pin delivers sophisticated diagnostic functions including high precision proportional load current sense, supply voltage feedback and chip temperature sense, in addition to the detection of overload and short circuit to ground, short to  $V_{CC}$  and OFF-state open-load. A sense enable pin allows OFF-state diagnosis to be disabled during the module low-power mode as well as external sense resistor sharing among similar devices.







### 2 Board connections

*Figure 2: "Evaluation board connections"* 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.

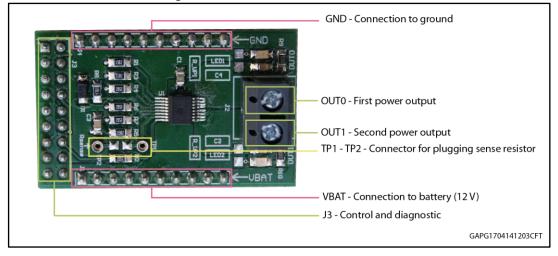


Figure	2:	Evaluation	board	connections
riguic	<b>-</b> -	Lvaluation	bourd	connections

Connector	Pin number	Pin name	Pin function
J3	14	N/A	Not connected
J3	5	IN_PullUP	Connection to optional external pull-up resistor for open load detection in off-state.
J3	6	+5V	5 V Power Supply
J3	7	FaultRSTActive low compatible with 3 V and 5 V CMOS outputs unlatches the output in case of fault; If kept low, sets th outputs in auto-restart	
J3	8	MultiSense	Multiplexed analog sense output pin; it delivers a current proportional to the selected diagnostic: load current, supply voltage or chip temperature
J3	9	S_ENActive high compatible with 3 V and 5 V CMOS outputs it enables the MultiSense diagnostic pin.	
J3	10	SEL0Active high compatible with 3 V and 5 V CMOS outputs together with SEL1, it addresses the MultiSense multip	
J3	11	SEL1      Active high compatible with 3 V and 5 V CMOS outputs together with SEL0, it addresses the MultiSense multip	
J3	12	N/A	Not connected
J3	13	IN0 Voltage controlled input pin with hysteresis, compatible 3 V and 5 V CMOS outputs. It controls OUT0 switch st	
J3	14	IN1	Voltage controlled input pin with hysteresis, compatible with 3 V and 5 V CMOS outputs. It controls OUT1 switch state
J3	1518	N/A	Not connected



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

The package includes a through-hole resistor, to be mounted on TP1-TP2 (see *Figure 4: "Mounting through-hole sense resistor"*).

Different  $R_{\text{SENSE}}$  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



GAPG0904141657CFT

Figure 4: Mounting through-hole sense resistor



GAPG1004141007CFT

#### Figure 5: Pads for soldering SMD resistor



GAPG1004141008CFT



# 3 Thermal data

	Table	3:	Thermal	data
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Symbol	Parameter	Max	Unit
R <sub>thj-amb</sub>	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 µm	
Board finish thickness	1.6 mm +/- 10%	
Board Material	FR4	
Thermal vias separation	1.1 mm	
Thermal vias diameter	0.5 mm	



#### **Revision history** 4

Table 5: Revision history	
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Date	Revision	Changes
15-May-2014	1	Initial release.
21-Jul-2014	2	Updated Figure 1: "Evaluation board schematic"
02-Sep-2015	3	Updated Section "Features" and Section 1: "Description"



### EV-VND7050AJ

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