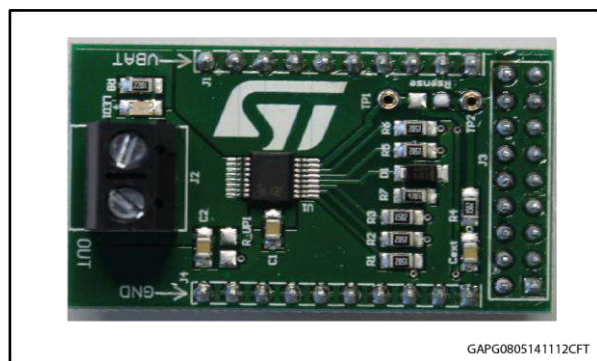


## VN7020AJ evaluation board

Data brief



### Features

Max transient supply voltage	$V_{CC}$	40 V
Operating voltage range	$V_{CC}$	4 to 28 V
Typ. on-state resistance (per Ch)	$R_{ON}$	20 m $\Omega$
Current limitation (typ)	$I_{LIMH}$	63 A
Stand-by current (max)	$I_{STBY}$	0.5 $\mu$ A

- Simple single IC application board dedicated for VN7020AJ
- Provides electrical connectivity and thermal heat-sinking for easy prototyping
- General device features
  - Single 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,  $V_{CC}$  supply voltage and  $T_{CHIP}$  device temperature
  - Overload and short to ground (power limitation) indication
  - Thermal shutdown indication
  - OFF-state open-load detection
  - Output short to  $V_{CC}$  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  $V_{CC}$
  - 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-VN7020AJ	VN7020AJ evaluation board



## 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

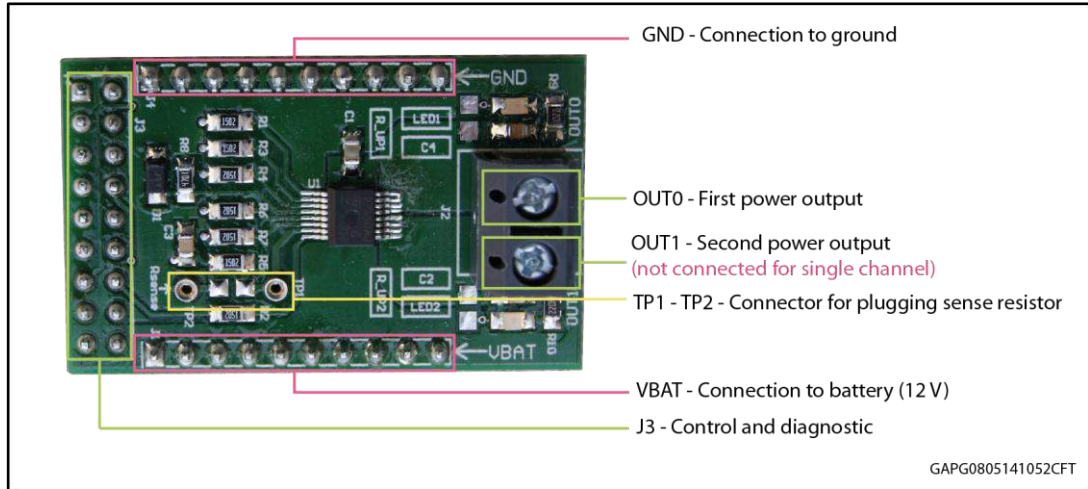


Table 2: J3 connector: pin functions

Connector	Pin number	Pin name	Pin function
J3	1...4	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	FaultRST	Active low compatible with 3 V and 5 V CMOS outputs pin; it unlatches the output in case of fault; If kept low, sets the 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_EN	Active high compatible with 3 V and 5 V CMOS outputs pin; it enables the MultiSense diagnostic pin.
J3	10	SEL0	Active high compatible with 3 V and 5 V CMOS outputs pin; together with SEL1, it addresses the MultiSense multiplexer
J3	11	SEL1	Active high compatible with 3 V and 5 V CMOS outputs pin; together with SEL0, it addresses the MultiSense multiplexer
J3	12	N/A	Not connected
J3	13	IN0	Voltage controlled input pin with hysteresis, compatible with 3 V and 5 V CMOS outputs. It controls OUT0 switch state
J3	14	IN1	Voltage controlled input pin with hysteresis, compatible with 3 V and 5 V CMOS outputs. It controls OUT1 switch state. <sup>(1)</sup>
J3	15...18	N/A	Not connected

**Notes:**

<sup>(1)</sup>Input not available for single channel.

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"](#)).

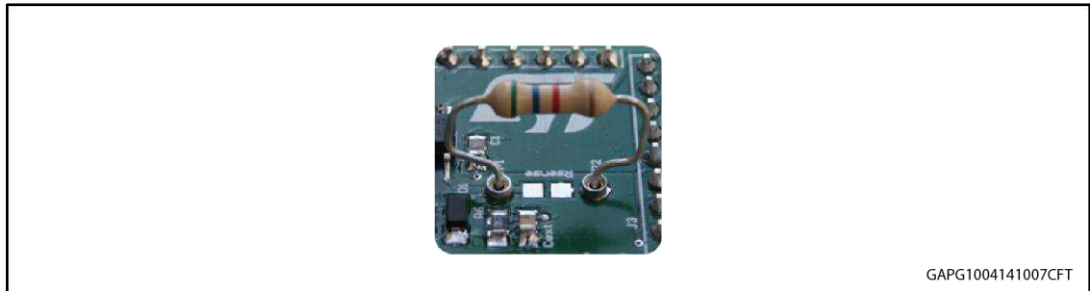
Different  $R_{SENSE}$  values can be adopted based on user preference.

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

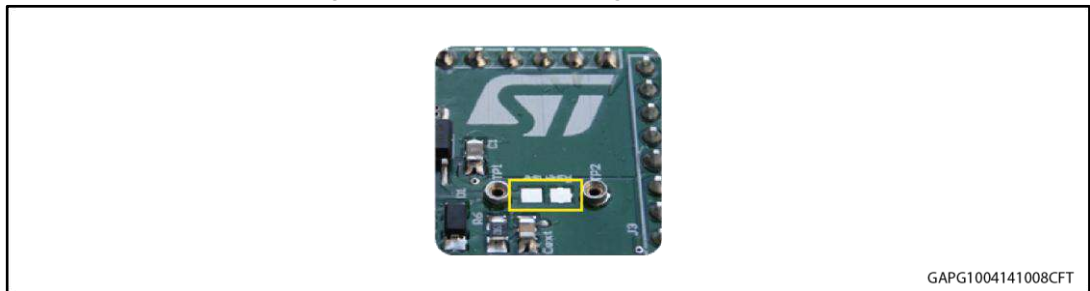
**Figure 3: No sense resistor**



**Figure 4: Mounting through-hole sense resistor**



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



### 3 Thermal data

**Table 3: 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 thickness	1.6 mm +/- 10%
Board Material	FR4
Thermal vias separation	1.1 mm
Thermal vias diameter	0.5 mm

## 4 Revision history

Table 5: Revision history

Date	Revision	Changes
09-May-2014	1	Initial release.
21-Jul-2014	2	Updated
01-Sep-2015	3	Changed VN7020AJ-E in VN7020AJ. Updated <i>Section "Features"</i> . Updated <i>Section 1: "Description"</i> .

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