Making Applications Smarter with ST’s VIPower™ Intelligent Power Switches and H-Bridge Drivers

Sara Mattioli - ADG Marketing Region Americas
ST Automotive Advantage

• **Higher reliability** in the final application
  • ISO-TS 16949 International quality management standard
  • Stringent AEC-Q100 electronics stress test qualified
  • Zero ppm target

• **Longevity** (Longer “lifetime” of the devices)
  • Typical 15 year production lifetime

• **High operating temperature range** (-40°C up to 150°C junction temp)

• **Feature rich** solutions
  • Extensive Diagnostics and Protection features
  • Functional Safety design approach according ISO-26262

• **High Value**
  • Leverage ON large automotive volumes to provide high value products at a competitive price

Choose Automotive whenever harsh environmental conditions, stringent reliability and safety requirements and long term supply are key for Customer success
What is ST VIPower™?

- A MOSFET used as a power switch requires supplementary circuitry for:
  - Driving the MOSFET efficiently to reduce losses and EMI
  - Protecting the MOSFET from destruction by excessive current, voltage, or temperature
  - Feeding back status information to the logic controller

- Discrete design:
  - Considerable design effort
  - High component count
  - Large board space
  - Reduced circuit reliability
  - Increased assembly costs

VIPower integrates digital control, output sensing, diagnostics, and protections.
VIPower™ Roadmap

Approaching the 5th wave of Innovation

1st Generation

12V Network

1993
- M0-1
  320mΩ.mm²
  3.0μ lithography

2000
- M0-3
  160mΩ.mm²
  1.2μ lithography

2006
- M0-5
  85mΩ.mm²
  0.6μ lithography

2013
- M0-7
  40mΩ.mm²
  0.35μ lithography
- M0-7E
  35mΩ.mm²
  0.35μ lithography

48V Electrification

100V M0-11

Hybridization

48V Network

2020
- M0-9
  12mΩ.mm²
  0.18μ lithography

1st Relay Replacement

Diagnosis & Reliability

Family Expansion

Miniaturization

1st Generation

Diagnosis & Reliability

Family Expansion

Miniaturization

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- M0-1
  320mΩ.mm²
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- M0-7
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48V Electrification

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Hybridization

48V Network

2020
- M0-9
  12mΩ.mm²
  0.18μ lithography
High Side Drivers
VIPower™ M0-7 HSDs
Intelligent Power Switches

- An ST High-side Driver switches current into grounded loads (resistive, inductive or capacitive) and safely protects itself and the system from potentially dangerous fault conditions.
- ST Product portfolio includes 1-ch, 2-ch, and 4-ch with analog sense and RDS(ON) values from 1.5mΩ to 140mΩ.

ST Technologies enable a Broad range portfolio:

- **M0-7** (4V-28V)
- **M07-SPI**: M07 with SPI
- **M07-E** (2.85V-28V): M07 w/enhanced features
- **M0-5T** (8V-36V): for 24V systems
- **M09**: next generation for 12V systems
- **M11**: next generation for 48V applications
VIPower™ M0-7 HSDs
Intelligent Power Switches

Key Features

- Fully Protected: Over Voltage, Under Voltage, Over Temperature, Voltage Clamp, Overload & Short Protection
- Configurable auto-restart or latch-off protection against hazardous conditions
- New Multi-Sense diagnostic, providing analog feedback on load current, chip temperature and battery voltage
- Symmetrical turn on/off

Key Benefits

- Scalable portfolio, spreading from low-power to high-current switches, offering full SW and HW compatibility
- Benchmark short-circuit robustness (Grade A, up to 1,000,000 cycles)
- PCB shrinkage and weight reduction thanks to the highest package density in the market
- Low-voltage operation down to 2.85V, ensuring functionality during cold cranking
- Ultra low quiescent current, allowing minimal battery consumption in idle mode
- Best in class EMI performances
VIPower™ M0-7
Key Features and Benefits

Power limitation (ST exclusive) and configurable latch-off

⭐ • Power limitation (ST patent) contributes in thermo-mechanical stress reduction during over-load/short-circuit

• Average power is limited when a $\Delta T_j > 60K$ is detected

• Configurable auto restart or latch off makes the device robust against overload

⭐ • Latch off capability significantly extends reliability by avoiding repetitive demagnetization discharge from inductive loads and/or long term operation in overload conditions

>1,000,000 repetitive short circuit cycles
“Grade A“ according to AECQ100-012
**Slug Temperature Monitoring**

- Board temperature profiling reveals critical conditions
- Slug temperature monitor available in ON and OFF states
- Optimizing PCB thermal design during development
- Improving current sense accuracy by on-board compensation of thermal drifts
- Power dissipation management by adapting load driving profile in critical conditions

**Current sensing – benefits:**

- The high-precision analog current sensing allows currents to be monitored for different load types, such as bulbs and LEDs
- Enables **torque control for motor control** applications
- Enables **smart control for circuit protection and load distribution**

**Temperature sensing – benefits:**

- **Board temperature profiling** reveals critical conditions
- Slug temperature monitor available in ON and OFF states
- **Optimizing PCB thermal design** during development
- Improving current sense accuracy by on-board compensation of thermal drifts
- Power dissipation management by adapting load driving profile in critical conditions

**V\text{BAT} sensing – benefits:**

- V\text{BAT} sensing can be used in conjunction PWM control to keep constant the input power at lamps when V\text{BAT} varies
- Having embedded voltage sensing allows
  - **Resource saving at MCU side** (one ADC input can be shared for T and V\text{BAT} sensings)
  - External components reduction
**Improved EMI performance**

**Benefits**

- **Symmetrical Turn ON and OFF shapes (ST Exclusive):**
  - Rise and Fall times constant with PWM frequency
  - Faster switching times
- **Optimal edge shaping and slew-rates:**
  - -10% switching losses compared to competition, -30% compared to M05
  - Improved EMC performance - CISPR 25 class 5 EMI emission level

Lower switching losses and better EMI performances (vs competition)

Best in class thermal efficiency and electromagnetic emission performances

**VIPOWER™ M0-7**

**Key Features and Benefits**

- Symmetrical turn-on / turn-off
- Improved EMI Performance

**CISPR-25 – Conducted on Power Line**

- Lower switching losses and better EMI performances (vs competition)
- Best in class thermal efficiency and electromagnetic emission performances
VIPower™ M0-7

Key Features and Benefits

Family Concept

VIPower technology
M0-7 technology

VIPOWER M0-7 HIGH-SIDE DRIVER PART NUMBERING

<table>
<thead>
<tr>
<th>VN</th>
<th>X</th>
<th>7</th>
<th>XXX</th>
<th>A</th>
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<tr>
<td>VND7140AJ</td>
<td>VND7050AJ</td>
<td>VND7040AJ</td>
<td>VND7030AJ</td>
<td>VND7020AJ</td>
<td></td>
</tr>
<tr>
<td>140mΩ</td>
<td>50mΩ</td>
<td>40mΩ</td>
<td>30mΩ</td>
<td>20mΩ</td>
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VIPOWER M0-7 HIGH-SIDE DRIVER PART NUMBERING

Number of channels

<table>
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<tr>
<th>Blank</th>
<th>D</th>
<th>Q</th>
<th>One channel</th>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Two channels</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Four channels</td>
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</tbody>
</table>

Example: 050 50 mΩ

Package

S  S0-8
J  PowerSSO-16 / PowerSSO-12
Y  PowerSSO-36
H  Octopak
**VIPower™ M0-7/M0-7E**

High Side Drivers Portfolio Overview

### VIPower™ M0-7 / M0-7E

<table>
<thead>
<tr>
<th>One output channel</th>
<th>Two output channels</th>
<th>Four output channels</th>
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</thead>
<tbody>
<tr>
<td>VN7140AJ (*)</td>
<td>VND7140AJ (*)</td>
<td>VNQ7E110AJ</td>
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<tr>
<td>VNQ7140AJ</td>
<td>VND7E070AJ</td>
<td>VNQ7050AJ (*)</td>
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<td>VNQ7050AJ</td>
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<td>VNQ7040AY</td>
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<tr>
<td>VNQ7040AJ</td>
<td>VND7E025AJ</td>
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<tr>
<td>VND7710AJ</td>
<td>VND7012AY</td>
<td></td>
</tr>
<tr>
<td>VND7020AJ</td>
<td>VND7020AJ</td>
<td></td>
</tr>
<tr>
<td>VND7030AJ</td>
<td>VND7020AJ</td>
<td></td>
</tr>
<tr>
<td>VND7040AJ</td>
<td>VND7020AJ</td>
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<td>VND7050AJ (*)</td>
<td>VND7020AJ</td>
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<tr>
<td>VND7040AJ</td>
<td>VND7020AJ</td>
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</tr>
<tr>
<td>VND7050AJ (*)</td>
<td>VND7020AJ</td>
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### ON-state resistance

<table>
<thead>
<tr>
<th>Resistance</th>
<th>Max DC Current</th>
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<tr>
<td>140mΩ</td>
<td>2.5A</td>
</tr>
<tr>
<td>50mΩ</td>
<td>4A</td>
</tr>
<tr>
<td>40mΩ</td>
<td>4.5A</td>
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<tr>
<td>30mΩ</td>
<td>5A</td>
</tr>
<tr>
<td>20mΩ</td>
<td>6A</td>
</tr>
<tr>
<td>16mΩ</td>
<td>7A</td>
</tr>
<tr>
<td>12mΩ</td>
<td>9A</td>
</tr>
<tr>
<td>10mΩ</td>
<td>9.5A</td>
</tr>
<tr>
<td>8mΩ</td>
<td>10A</td>
</tr>
<tr>
<td>7mΩ</td>
<td>13A</td>
</tr>
<tr>
<td>4mΩ</td>
<td>17A</td>
</tr>
<tr>
<td>3mΩ</td>
<td>20A</td>
</tr>
</tbody>
</table>

(*) cold cranking capability on specific part numbers in PSSO-12

Max DC Current is based on 85C ambient and 4 layer board
**M0-7 VIPowerZero HSDs**

**Evaluation Boards**
- EV-VN7007AH/ALH
- EV-VN7004CH/CLH
- EV-VND7004AY
- EV-VN7003AH/ALH

**Target Applications**
- Heating
- Power Distribution Switch
- High current relays replacement
- Engine Cooling Fan

**RDSon from 1.5mΩ to 7mΩ**
- VN7003AH (*)
- VN7003ALH (*)
- VN7004CH
- VN7004CLH
- VN7007AH
- VN7007ALH
- VND7004AY
- VN7000AY COMING SOON, Q1 2020 (*)

**KEY Value Proposition**
- **Family approach**: low RDSon subfamily with pin-to-pin compatibility
- **Octapak & PSSO36 package** – improved package thermal dissipation
- **Low RDSon to address high current applications** from 9A to 30A
  - (*) LV124 severe cold cranking pulse immunity (operation down to 2.85V)
M0-7E VIPower™ HSDs

**Evaluation Boards**
- EV-VN7E010
- EV-VND7E040AJ
- EV-VND7E050AJ
- EV-VNQ7E100AJ

**Target Applications**
- ADAS battery safety switch
- Applications requiring superior current sense accuracy & cold cranking

**Product Portfolio**

<table>
<thead>
<tr>
<th></th>
<th>4ch 100mΩ</th>
<th>2ch 50mΩ</th>
<th>2ch 40mΩ</th>
<th>1ch 10mΩ</th>
</tr>
</thead>
<tbody>
<tr>
<td>VNQ7E100AJ</td>
<td>2ch 50mΩ</td>
<td>VND7E050AJ</td>
<td>VND7E040AJ</td>
<td>VN7E010AJ</td>
</tr>
</tbody>
</table>

**KEY Value Proposition**

- **Family approach**: Enhanced features with pin-to-pin with M0-7
- **PowerSSO-16 package** – improved package thermal dissipation
- **Superior Current Sense Precision**
- **LV124 severe cold cranking pulse immunity (operation down to 2.85V)**
VIPower™ M0-7SPI HSDs

VIPower M0-7SPI reduces your overall system cost by:
- Optimizing your PCB area with more channels into the same package
- Simplifying the interconnections to the Micro with the SPI interface
- Improving your diagnostic capability

Key Characteristics
- 16 bit ST-SPI Interface
- 3V and 5V Microcontroller compatibility
- Direct Input control
- Bulb/LED mode
- Multiplexed Analog Current Sense
- Advanced Limp Home
- Very low stand-by current
- Start-Stop compatible operation
- PowerSSO-36 expandability

<table>
<thead>
<tr>
<th>Product</th>
<th>High Power</th>
<th>Medium Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>VNQ7003SY</td>
<td>2x 7 mOhm</td>
<td>2x 25 mOhm</td>
</tr>
<tr>
<td>VNQ7004SY</td>
<td>2x 9 mOhm</td>
<td>2x 35 mOhm</td>
</tr>
</tbody>
</table>

Evaluation Board
- EV-VNQ7003SY
VIPower™ M0-5T HSDs for 24V Systems

Key Features

- Supply voltage operating range: 8V – 36V
- Jump start voltage capability: 48V
- Clamping voltage: >58V
- Fault Reset / Standby pin
- Proportional load current sense
- Off state open load detection
- Output short to VCC detection
- Overload and short to ground latch off
- Thermal shutdown latch-off

<table>
<thead>
<tr>
<th>P/N</th>
<th>N of Channel</th>
<th>Ron</th>
<th>IlimH(typ)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>VN5T006ASP-E</td>
<td>1</td>
<td>6mΩ</td>
<td>115A</td>
<td></td>
</tr>
<tr>
<td>VN5T016AH-E</td>
<td>1</td>
<td>16mΩ</td>
<td>60A</td>
<td></td>
</tr>
<tr>
<td>VND5T016ASP-E</td>
<td>2</td>
<td>40mΩ</td>
<td>70A</td>
<td></td>
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<tr>
<td>VND5T050AK-E</td>
<td>2</td>
<td>50mΩ</td>
<td>34A</td>
<td></td>
</tr>
<tr>
<td>VND5T035K/S-E</td>
<td>2</td>
<td>35mΩ</td>
<td>42A</td>
<td></td>
</tr>
<tr>
<td>VND5T035LK/S-E</td>
<td>2</td>
<td>35mΩ</td>
<td>42A</td>
<td>Current sense optimized for LED driving</td>
</tr>
<tr>
<td>VND5T100AJ/S-E</td>
<td>2</td>
<td>100mΩ</td>
<td>22A</td>
<td>Current sense optimized for LED driving</td>
</tr>
<tr>
<td>VND5T100LAJ/S-E</td>
<td>2</td>
<td>100mΩ</td>
<td>22A</td>
<td></td>
</tr>
</tbody>
</table>

Key Benefits

- High durability in overload due to enhanced protection concept
- Complete set of protections and diagnostic
- Energy compatibility according to truck cables (40uH stray inductance and Ilimmax)

Typical applications

- Lighting
- Heating
- Relay Control
- DC Motor Control systems

Evaluation Boards

- EV-VND5T035AK
- EV-VND5T100AJ
Low Side Drivers
VIPower™ OmniFET Low Side Drivers

- A ST Low-side Driver switches current into Battery connected loads (resistive, inductive or capacitive) and safely protects itself and the system from potentially dangerous fault conditions.
- Product portfolio includes 1-ch, 2-ch, with diagnostic feedback and RDS(ON) values from 30mΩ to 300mΩ.

ST Technologies enable a Broad range portfolio:
- M02 with clamp 70V: OmniFET
- M03 with clamp 45V: OmniFETII
- M05 Technology with clamp 41V: OmniFETIII
- Highest switching frequency w/M02 OmniFET
- Enhanced diagnostics w/M05 OmniFETIII
VIPOWER™ M0-5
OMNIFET III LSDs

- Pin2Pin compatibility with discrete PowerMOSFET and OMNIFET II
- 3V CMOS compatible input
- Very low supply current from the battery (drain) pin
- Fast switching times
- Current and power limitation
- Over temperature protection (no feedback)
- 41V clamp voltage
- ESD protection

- Supplied by an external supply
- 3V CMOS compatible digital input
- Very low supply current from the battery (drain) pin
- Fast switching times
- Current and power limitation
- Over-temperature protection
- Status pin
- OFF-state: open load/short to ground
- ON-state: over temperature
- 41V clamp voltage
- ESD protection
OMNIFET III PART NUMBERING SCHEME

VIPower™ OMNIFET III: Product Portfolio

Max DC Current is based on 85°C ambient and 4 layer board
Roadmap
VI-Power™ M0-9 HSDs

Coming soon

18 Products
In development

First Product Release:
Q2-2020

Full Family Release:
Q2-2021

6 Products with SPI Interface

12 Products with Parallel Inputs
M0-9 VIPower™ SPI High Side Drivers

Welcome to Digital Current Sense

M0-9 SPI is the World first family of power HSDs with Digital Current Sense. The best current sense accuracy ever reached in a High Side Driver.

Key Features

• Digital Current Sense
• Integrated PWM generation and sampling synchronization unit
• Up to six channels in a QFN 6x6
• Pin-to-Pin Compatible

Key Benefits

• Output current monitoring precision 5% at nominal current
• No micro A/D needed
• Lower external components count
• Less micro resources needed
• Reduced micro workload
• Fully portable Software

<table>
<thead>
<tr>
<th>Product</th>
<th>Rdson (typ.)</th>
<th>Package</th>
<th>ES</th>
<th>FS</th>
<th>PQC</th>
</tr>
</thead>
<tbody>
<tr>
<td>VN9D30Q100F</td>
<td>2x35mΩ + 4x100mΩ</td>
<td>QFN</td>
<td>Available (PPSO-16)</td>
<td>Q2/2020</td>
<td>Q3/2020</td>
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<tr>
<td>VN9D5D20F</td>
<td>2x5mΩ + 2x20mΩ</td>
<td>QFN</td>
<td>Available</td>
<td>Q2/2020</td>
<td>Q4/2020</td>
</tr>
<tr>
<td>VN9E30F</td>
<td>6x30mΩ</td>
<td>QFN</td>
<td>Q3/2019</td>
<td>Q3/2020</td>
<td>Q4/2020</td>
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<tr>
<td>VN9D7D20F</td>
<td>2x7mΩ + 2x20mΩ</td>
<td>QFN</td>
<td>Q4/2020</td>
<td>Q1/2021</td>
<td>Q2/2021</td>
</tr>
<tr>
<td>VN9Q25D70F</td>
<td>4x25mΩ + 2x70mΩ</td>
<td>QFN</td>
<td>Q3/2020</td>
<td>Q1/2021</td>
<td>Q2/2021</td>
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<tr>
<td>VN9T25T70F</td>
<td>3x25mΩ + 3x70mΩ</td>
<td>QFN</td>
<td>Q1/2021</td>
<td>Q2/2021</td>
<td>Q3/2021</td>
</tr>
</tbody>
</table>

Date: September 2019
Timeline Information can be subject to variations without advance notification
M0-9 VIPower™ Parallel Product portfolio

Lower $R_{dson}$ in Small Package

- M0-9 Standard further extends the largest family of HSDs in the market
- Single, Dual and Quad channels
- Full pin-to-pin and SW compatible with M0-7
- The best current sense accuracy ever reached in a High Side Driver
- All comes in PowerSSO-16
- Self turn on in Reverse Battery

<table>
<thead>
<tr>
<th>Product</th>
<th>Rdson (typ.)</th>
<th>Package</th>
<th>ES</th>
<th>FS</th>
<th>PQC</th>
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<td>Q3/2020</td>
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<td>Q1/2021</td>
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<tr>
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<td>PSSO-16</td>
<td>Q3/2020</td>
<td>Q1/2021</td>
<td>Q2/2021</td>
</tr>
</tbody>
</table>

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New VIPower Generation: M0-9SPI
32 Channels BCM Demonstrator

- **FRONT LIGHTING**
- **REAR LIGHTING**
- **Body control Module**

**Module Driving**
32 Channels

**VIPower M0-9 SPI**
Competitive advantages:

- **-55% PCB Power-Area vs Parallel Smart Power**
- **-30% external components**
- **Up to 25% Microcontroller Workload reduction**
- **-66% Microcontroller I/O and ADC**
VIPower for 48V
VIPower™ for Mild-Hybrid Application Solutions

Complete Solution for 48V Boardnet Actuation and Power Distribution

Smart Integrated Brushless / DC Motor Drivers
- Low Ohmic Integrated half-bridge
- 100V Thermally Protected MOSFETs
- Non dissipative high precision current sensing
- Reduce PCB footprint and number of components

Series: VNHB11xx

Smart Integrated High Side Power Switches
- Low Ohmic High Side Power Switches
- Single and dual channel in a package
- Non dissipative Current Sense
- Advanced Protections and diagnostics

Series: VNx148xx

SOP 2021
Motor Control ICs
VNH Family
Integrated H-Bridge Drivers

DC motor drivers with integrated non-dissipative current-sense

<table>
<thead>
<tr>
<th>Model</th>
<th>R&lt;sub&gt;ON&lt;/sub&gt; per leg</th>
<th>Nominal Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>VNH9013Y</td>
<td>10mΩ</td>
<td>12A</td>
</tr>
<tr>
<td>VNHD7008AY</td>
<td>20mΩ</td>
<td>10A</td>
</tr>
<tr>
<td>VNHD7012AY*</td>
<td>40mΩ</td>
<td>5A</td>
</tr>
<tr>
<td>VNH5019A</td>
<td>70mΩ</td>
<td>3.5A</td>
</tr>
<tr>
<td>VNH5050A</td>
<td>100mΩ</td>
<td>3A</td>
</tr>
<tr>
<td>VNH5180A</td>
<td>200mΩ</td>
<td>2A</td>
</tr>
<tr>
<td>VNH5200AS</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Fully embedded motor driver
- Dual HS with external LS actuation and protection
- Quad MOS with thermal sensor and no current sense

VNH9 – Power Only
VNH7 series
VNH5 series
VNH Integrated H-Bridges

New Mid-High ohmic VIPower™ M0-7 H-Bridges

Key Features
- Multisense pin for diagnostic
- Non-dissipative current sense
- Very Low Stand-by current (1µA typ)
- PWM operations up to 20 kHz
- 3V CMOS compatible inputs

Protections
- UV, OV, Thermal shutdown
- Protection vs. loss of GND and VCC
- Outputs protected for short vs. GND and Vcc
- Cross-conduction protection
- Current & Power limitation
- Integrated Thermal Protection

Supported by Twister

Supported HW configurations

Part number | Ron per leg | I_LIM | Package | Target | Application
--- | --- | --- | --- | --- | ---
VNH7070BAS | 70mΩ | 15A | SO-16N | Power lock - | Mirror Adjust
VNH7100BAS | 100mΩ | 12A | SO-16N | Power Lock |
VNH7070AY | 70mΩ | 20A | PowerSSO-36 | Safe lock |
VNH7040AY | 40mΩ | 35A | PowerSSO-36 | Dual Washer Pump |

1UV: Under-voltage  OV: Over-voltage
New Low Ohmic M0-7 H-Bridges – The VIPOWER solution for up to 200W DC motors

<table>
<thead>
<tr>
<th>Part number</th>
<th>Ron per channel</th>
<th>I_{LIM}</th>
<th>Package</th>
<th>Target Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>VNHD7008AY</td>
<td>8mΩ</td>
<td>51A</td>
<td>PowerSSO-36</td>
<td>Sun Roof, Windows lift, power Seat, Power Trunk Lift Gate</td>
</tr>
<tr>
<td>VNHD7012AY</td>
<td>12mΩ</td>
<td>38A</td>
<td>PowerSSO-36</td>
<td>Sun Roof, Windows lift, power Seat, Power Trunk Lift Gate</td>
</tr>
</tbody>
</table>

Key Features
- Multisense pin for diagnostic
- Non-dissipative current sense
- Very Low Stand-by current (1µA typ)
- PWM operations up to 20 kHz
- 3V CMOS compatible inputs

Protections
- UV, OV, Thermal shutdown
- Protection vs. loss of GND and VCC
- Outputs protected for short vs. GND/Vcc
- Current & Power limitation
- Cross-conduction protection
- Integrated Thermal Protection
- Drain and Source voltage monitoring of external power MOSFETs

Tailored and compact full bridges in combination with latest dual-channel STripFET™ F7 technology PowerMOS:
- STL64DN4F7AG 8mΩ\text{max}
- STL76DN4LF7AG 6mΩ\text{max}
Supporting Tools
VIPower™ FINDER and TwisterSIM

Easy Product Selection

VIPower-FINDER available for Android™ and iOS™
Easy device selection by Parametric or Smart search function

Available for Android and iOS

Free download: www.st.com/twistersim
Support: twistersim@st.com
Forum: www.st.com/twistersim-forum
Collaterals

- Brochure and Flyers
- H-Bridges Hardware Design Guide
- Evaluation Boards
- Discovery Kits
- Samples Kit
- HSD Hardware Design Guide
- SAMPLEKITM0-7
- SAMPLEKITYNH7
- SAMPLEKITM0-7E
To summarize … Why ST VIPower™?

Key Features

• Best-in-class VIPower™ Technology enabling high power density integration

• Best in Class Protection and Diagnostics (Power limitation with Programmable Latch-off and Multisense* ST IPs)

• Best in Class Performance: EMI/EMC (CISPR25), lower switching Losses (-10%) and ultra-low standby current

• Family approach: broad RDSon range, Single/Dual/Quad channels, P2P compatibility

• TwisterSim: Unique, free and easy to use Product Selector and Electro-Thermal Simulator

Key Benefits

➢ Smallest packages on the market

➢ Enhanced Reliability

➢ Efficiency and Performance

➢ Flexibility and Scalability

➢ Supporting Tools

... Plus 25 years experience and a strong roadmap ahead!

* Current, Voltage and Temperature in all M07 devices (Current sense in M05)
thank you!

If any questions pls. contact me at sara.mattioli@st.com