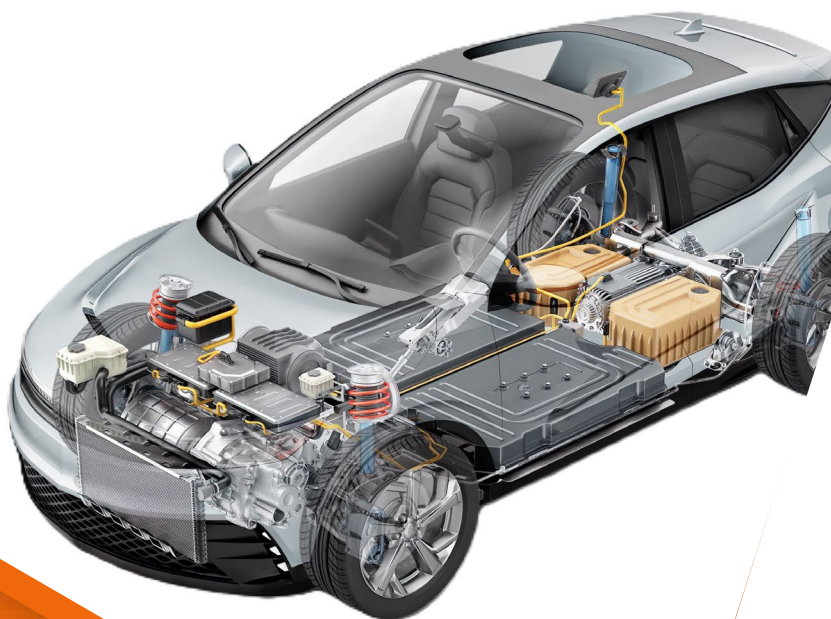




System Solution Guide - Preview

48V Powernet Trends



onsemi.com



Table of Contents

[Get Latest Version](#)

Overview

The Future is a Multi-Voltage Electrical Architecture

03

04

System Description

Block Diagram – DC-DC Converter HV-48V/12V

05

07

Solution Overview

MOSFETs for 48 V and 12 V Systems

Components Designed to Complete the 48 V Power Stage

Support for onsemi Components – Simulation Models

Steer by Wire – Application Example

DC-DC LED Drivers Compatible with 48V Systems

Moving from Fuses to Protected Semiconductor Switches

Treo Platform – Technology and Product Preview

08

08

10

11

13

14

15

17

Recommended Products

18

Complementary Products

20

Development Tools and Resources

23

Technical Documents

24

The onsemi logo is displayed in a large, dark blue font. To its right, there is a smaller image of a document titled 'onsemi System Solution Guide 48V Powernet Trends' which features a car and electronic components.

Register now to unlock all System Solution Guides



1



2



3



4



5



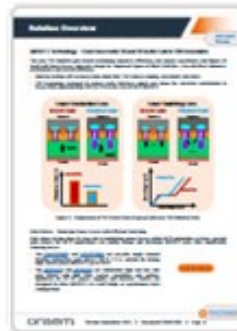
6



7



8



9



10



11



12



13



14



15

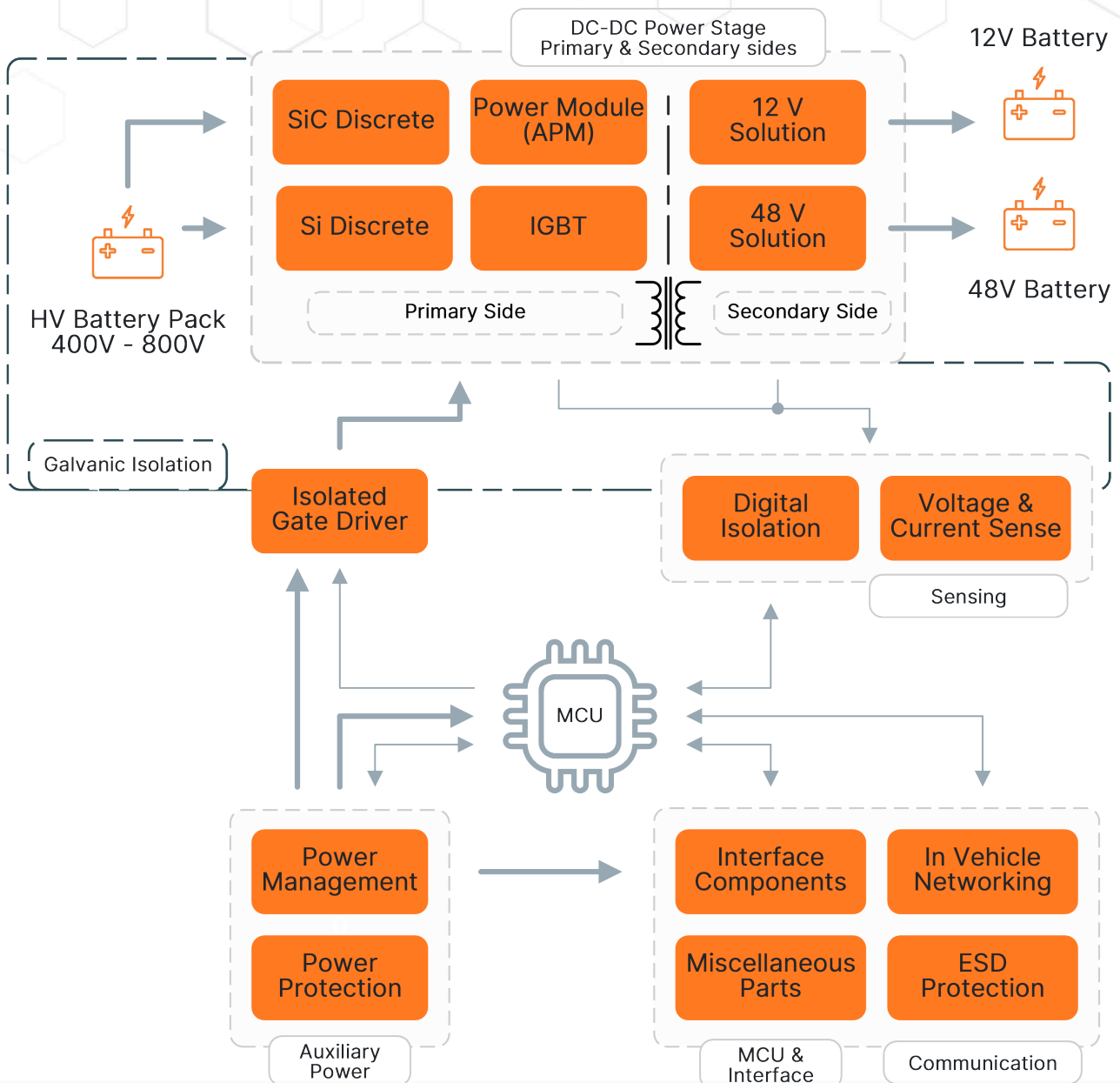


Block Diagram

Get Latest
Version

DC-DC Converter HV-48V/12V – Block Diagram

High-voltage (HV) to low-voltage (LV) DC-DC converter is a crucial component of the multi-voltage architecture in BEVs. **onsemi's** wide range of products for DC-DC converters, including sensors, controllers, and actuators, offer a scalable solution to deliver the required power to the vehicle's LV powernet. Open the block diagram below in **onsemi's** online interactive block diagram (IBD) tool and find components providing high-efficiency and high-power density options for HV to 48 V and HV to 12 V applications.



Use our Interactive Block Diagrams Tool



Open IBD Tool

48V Application Example

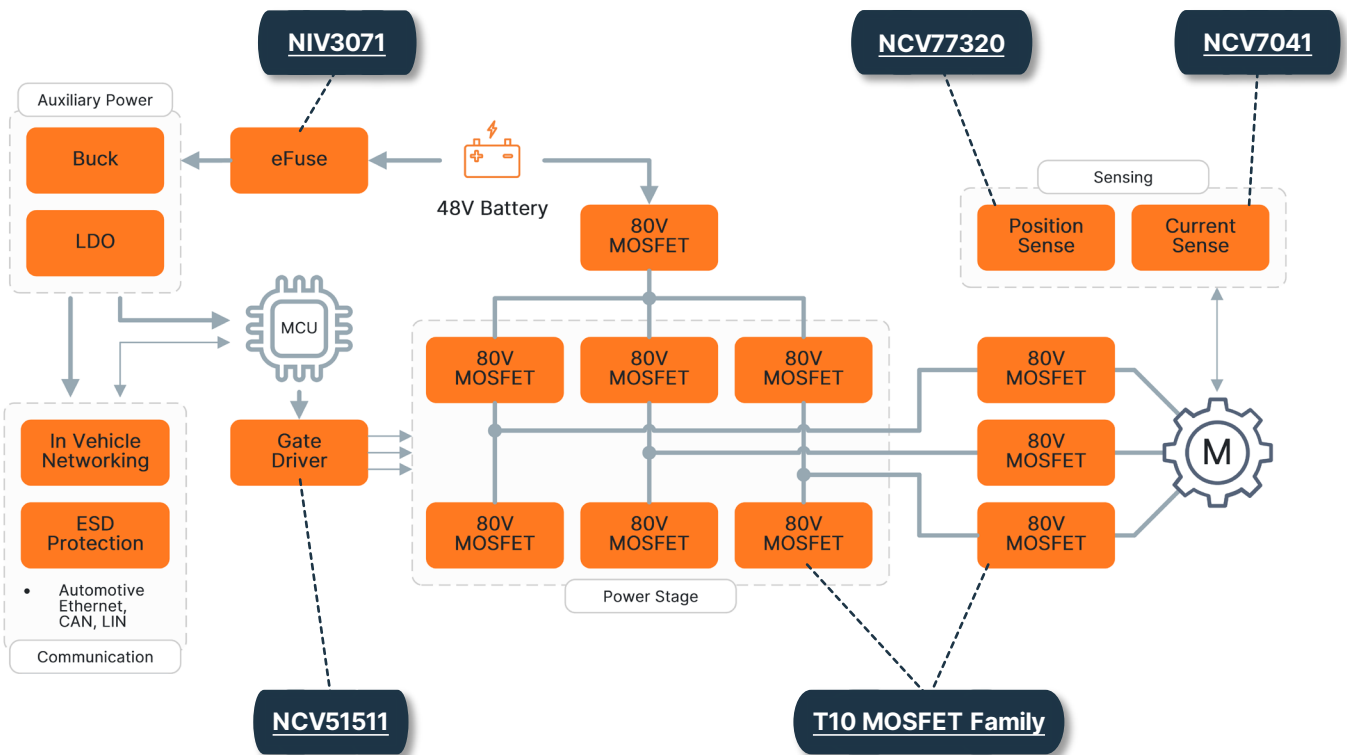
Get Latest
Version

Steer by Wire – Application Example

The future of transportation lies in advanced driver-assistance systems (ADAS) and potentially fully autonomous vehicles. These systems are enabled by 48 V as they rely heavily on electric power for power intensive accessories like:

- **Electric Power Steering:** A traditional hydraulic power steering system is replaced with an electric motor, offering improved responsiveness and fuel efficiency.
- **X-by-Wire systems:** X-by-Wire is a common name for steer-by-wire and brake-by-wire systems. These systems replace traditional mechanical linkages (steering wheel, brake pedal) with electrical signals for control. X-by-Wire systems offer greater flexibility for autonomous vehicle development.

However, X-by-Wire systems also demand a high level of reliability, functional safety, and redundancy. Redundant actuation for high-peak load devices, like steer-by-wire are enabled to be lighter and more cost effective at 48 V compared to 12 V systems.



NCV77320 – Inductive Position Sensor

The [NCV77320](#) is an inductive position sensor interface that, in combination with a PCB, forms a **system for the accurate measurement of angular or linear positions**. It can meet up to **ASIL D safety in redundancy applications** and serve as **steer-by-wire sensor**. NCV77320 can be used in any rotary & linear application that requires an accurate position sensing if there is a match in speed (max 10 800 RPM) and output protocol.




- The implementation of **onsemi** inductive technology improves the EMC robustness, particularly in the DC domain. Unlike a magnet-based solution, inductive technology is immune to stray magnetic fields by its construction. This is an important advantage over solutions using a magnet, as strong DC currents become more and more present with the vehicle electrification.
- NCV77320 system is insensitive to temperature variations.
- Easy to implement redundancy: Two sensors can be stacked with perfect alignment.

More Information

onsemi™

Intelligent Technology. Better Future.

Register now to unlock all System Solution Guides and get additional exclusive benefits!

-  Join the conversation on community forum.
-  Utilize Elite Power Simulator & other developer tools.
-  Watch exclusive webinars and seminars.

Open full System Solution Guide



onsemi, the onsemi logo, and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "onsemi" or its affiliates and/or subsidiaries in the United States and/or other countries. onsemi owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of onsemi's product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. onsemi reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as-is" and onsemi makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does onsemi assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using onsemi products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by onsemi. "Typical" parameters which may be provided in onsemi data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. onsemi does not convey any license under any of its intellectual property rights nor the rights of others. onsemi products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use onsemi products for any such unintended or unauthorized application, Buyer shall indemnify and hold onsemi and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that onsemi was negligent regarding the design or manufacture of the part. onsemi is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.