onsemi

System Solution Guide - Preview

Green Hydrogen Electrolyzer

onsemi.com

Table of Contents

Get Latest Version

onsemi

Register now to unlock all System Solution Guides

Full Guide Preview

Get Latest Version

1

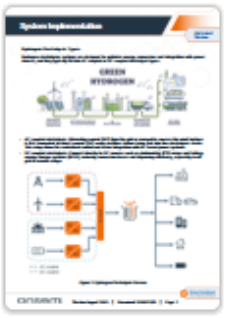

2


3

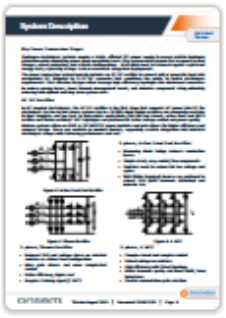

4

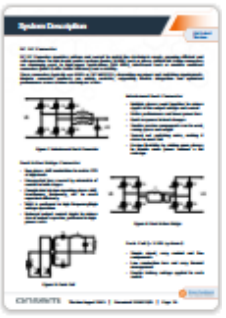

5


6


7


8

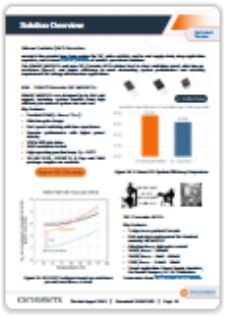

9


10


11


12


13


14


15


16


17


18


19

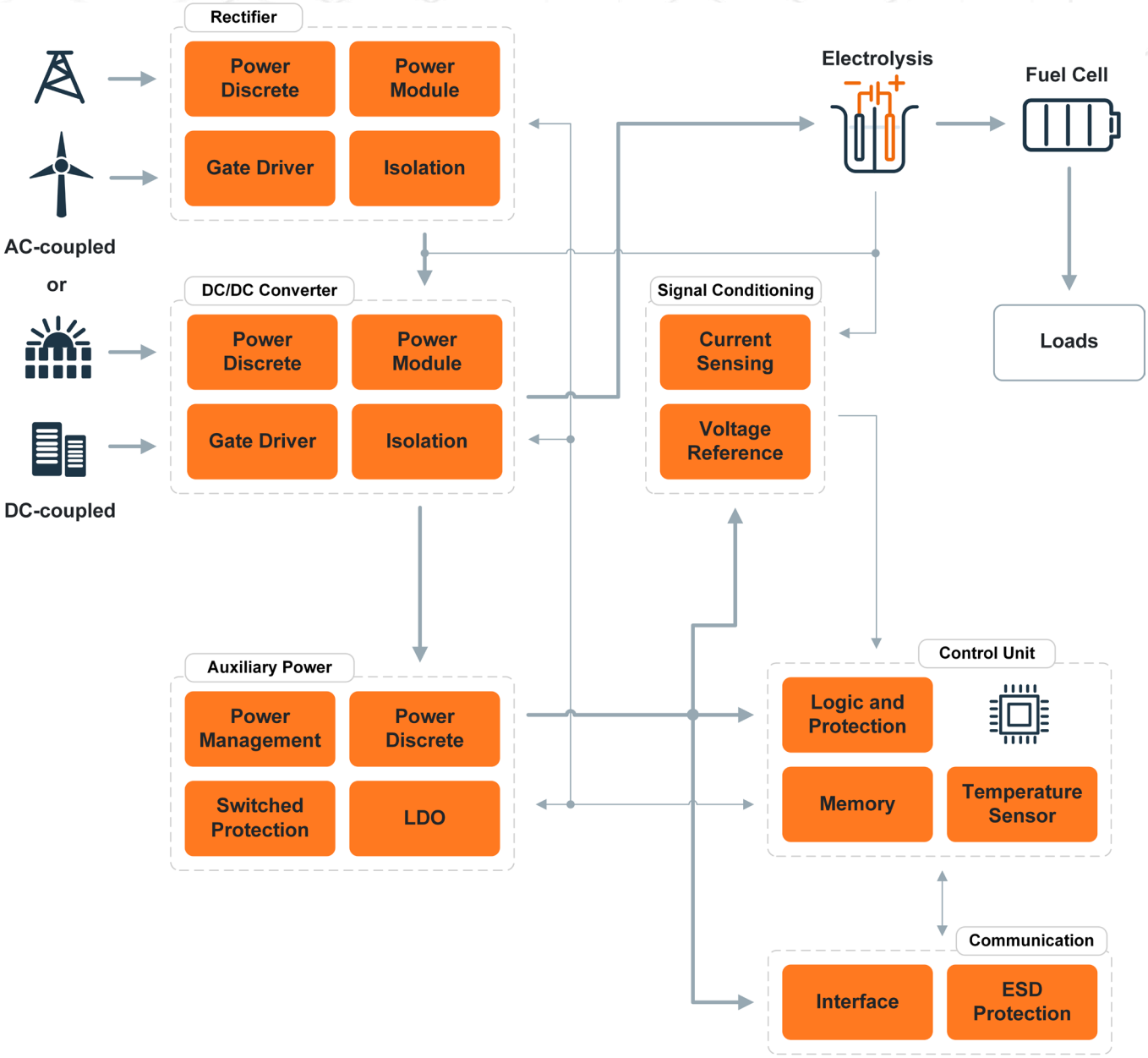

20

Block Diagram - Hydrogen Electrolyzer

Get Latest Version

Block Diagram - Hydrogen Electrolyzer

The block diagram below illustrates a hydrogen electrolyzer system solution featuring recommended products from **onsemi**. This solution integrates **onsemi's** intelligent power and sensing technologies. Most of the functional block devices, including power modules & discretes, gate drivers, and standard ICs & signal products can be sourced from **onsemi's** comprehensive range of portfolios.



Use our Interactive Block Diagrams Tool

Open IBD Tool

Get Latest Version

High Power Integrated Modules (PIMs)

QDual3 IGBT modules allow both increased power density and up to 10% more output power than available competing products in specific topology. The FS7 IGBT technology inside delivers industry-leading efficiency, reducing costs and simplifying design.

In megawatt energy infrastructure systems, 3x QDual3 half bridge module is typically used to form a 3-level topologies. By paralleling multiple QDual3 modules, it can output 1.2MW (18x QDual3) or 1.8MW (27x QDual3) per system. Compared to conventional solution using 600A module, it will reduce the module qty by 30%, greatly simplifying the design thus reducing system cost.

Qdual3 IGBT Module NXH800H120L7QDSG

The integrated FS7 IGBTs and Gen 7 diodes provide lower conduction losses and switching losses, enabling designers to achieve high efficiency and superior reliability.

Key Features:

- Field Stop Trench 7 IGBTs & Gen.7 Diodes
- 1200V, 800A 2-in-1 Half Bridge IGBT PIM
- Isolated Base Plate
- NTC Thermistor
- Solderable Pins
- Low Inductive Layout
- Qdual3 Package

Download Application Note

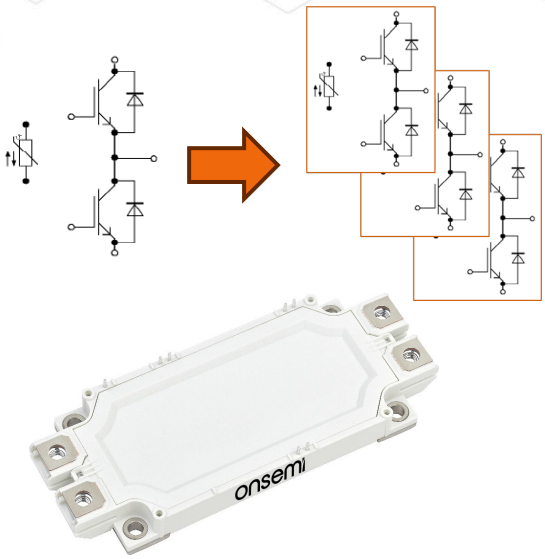


Figure 10: Qdual3 Module Package

MPPT Boost Stage
(Solar DC-coupled system)

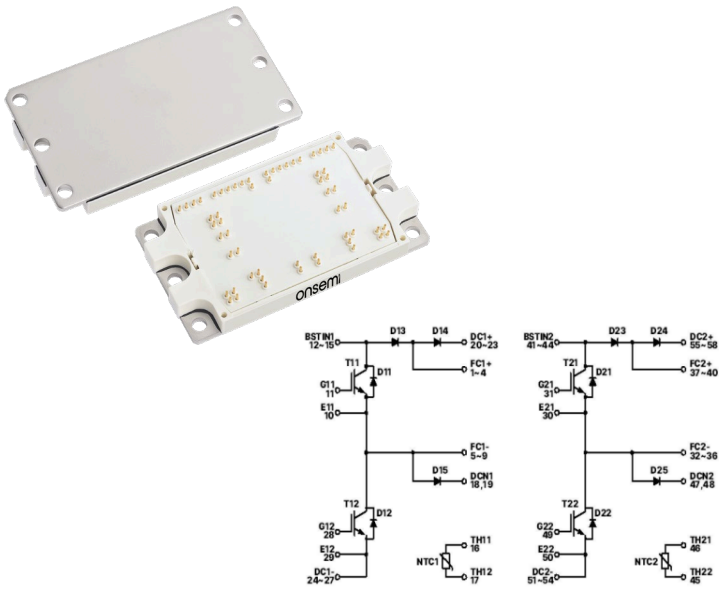


Figure 11: F5BP Module Package

F5BP Hybrid PIM NXH500B100H7F5SHG

Two channel Flying Capacitor Boost module, each channel contains two 1000 V, 500 A IGBTs and two 1200 V, 120 A SiC diodes. F5BP PIM package offers superior thermal performance with a 9% lower thermal resistance compared to F5-PIM, supporting 1500VDC systems, making it ideal for utility-scale applications.

Key Features:

- Flying Capacitor Boost Module
- 1000V Field Stop 7 IGBTs and 1200V SiC Diodes
- Low Inductive Layout
- Solder Pins
- Integrated NTC Thermistor
- This is a Pb−Free and Halide Free Device

Explore More

Full SiC Module Solutions

Get Latest Version

Full SiC Power Modules

onsemi's M3S **EliteSiC** F1 & F2 power integrated modules (PIMs) offer significant advantages with superior thermal performance, high power density and enhanced reliability. The PIMs are designed to deliver cost-effective and high-efficiency solutions for advanced energy infrastructures. These modules can also be stacked to achieve power levels exceeding several hundreds of kWs.

F2 Full Bridge PIM NXH007F120M3F2PTHG

Key Features:

- 7 mΩ / 1200 V M3S SiC MOSFET Full-Bridge
- HPS DBC (Direct Bonded Copper) substrate
- 15V to 18V gate drive
- Pre-Applied Thermal Interface Material (TIM)
- Easy to drive with negative gate voltages
- Press-Fit Pins

Learn more about **onsemi** PRT+ Full SiC F2 PIM family

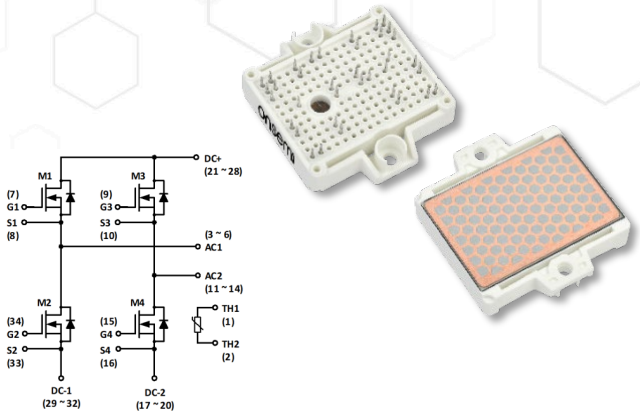


Figure 12: F2 SiC Module Package

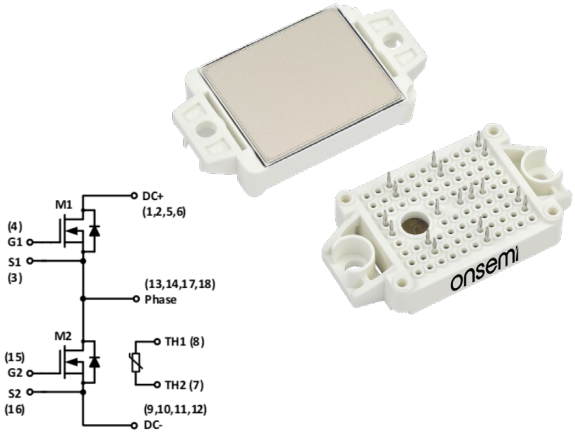


Figure 13: F1 SiC Module Package

F1 Half Bridge PIM NXH008P120M3F1PTG

Key Features:

- 8 mΩ / 1200 V M3S SiC MOSFET Half-Bridge
- Excellent FOM [= $R_{DS(on)}$ * E_{oss}]
- Optimized switching performance with **M3S** technology
- 15V to 18V gate drive
- Easy to drive with negative gate voltages
- Options with pre−applied thermal interface material (TIM) and without pre−applied TIM
- Press−fit pins

Learn more about **onsemi** PRT+ Full SiC F1 PIM family

Find more information in System Solution Guide:

Battery Energy Storage System

BESS (Battery Energy Storage System) stores the energy (electricity) from different power generation elements (wind, solar & etc.) in a variety of forms like electrochemical storage (battery), mechanical storage and thermal storage. In this guide, battery energy storage system connected with the solar inverter system will be targeted.

Find System Solution Guide on the Web

Green Hydrogen Electrolyzer

Get Latest Version

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