



System Solution Guide - Preview

# Uninterruptible Power Supply (UPS)



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# Table of Contents

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## Overview

Applications	03
System Purpose	04

## Market Information & Trends

Global Market & Power Grid Anomalies	05
Modular UPS, Higher Power Density & Efficiency, Battery System	06

## System Implementation

Online, Offline and Line-interactive UPS	07
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## Solution Overview

Block Diagram - Offline & Line-interactive UPS	08
Block Diagram - Online UPS	09
Topologies	10
AC-DC, DC-DC and DC-AC Stages	13
PFC Controllers	14
Silicon Carbide MOSFETs & Diodes	15
Power Integrated Modules (PIM)	16
IGBT Discrete & SJ MOSFETs	17
Gate Drivers	18
Power Management Products	20

## Recommended Products

21

## Development Tools and

24

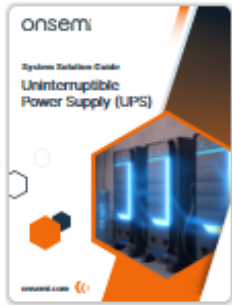
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25

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1



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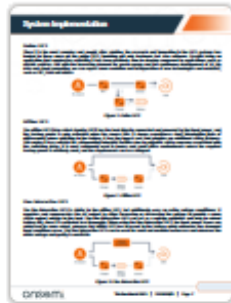
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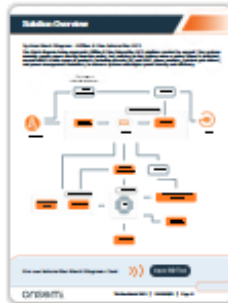
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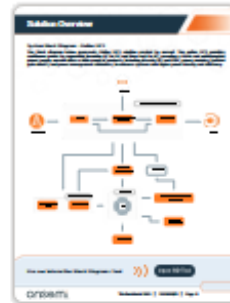
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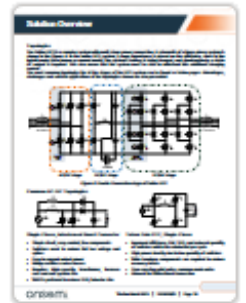
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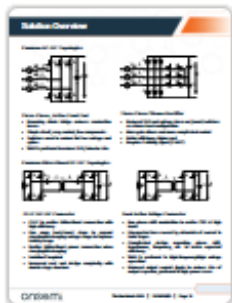
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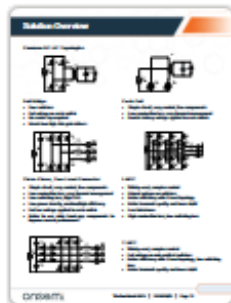
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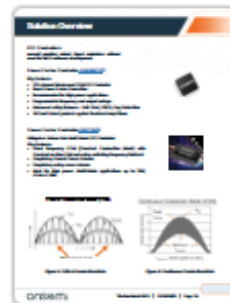
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14



15



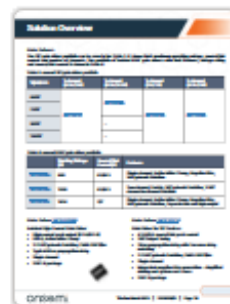
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18



19



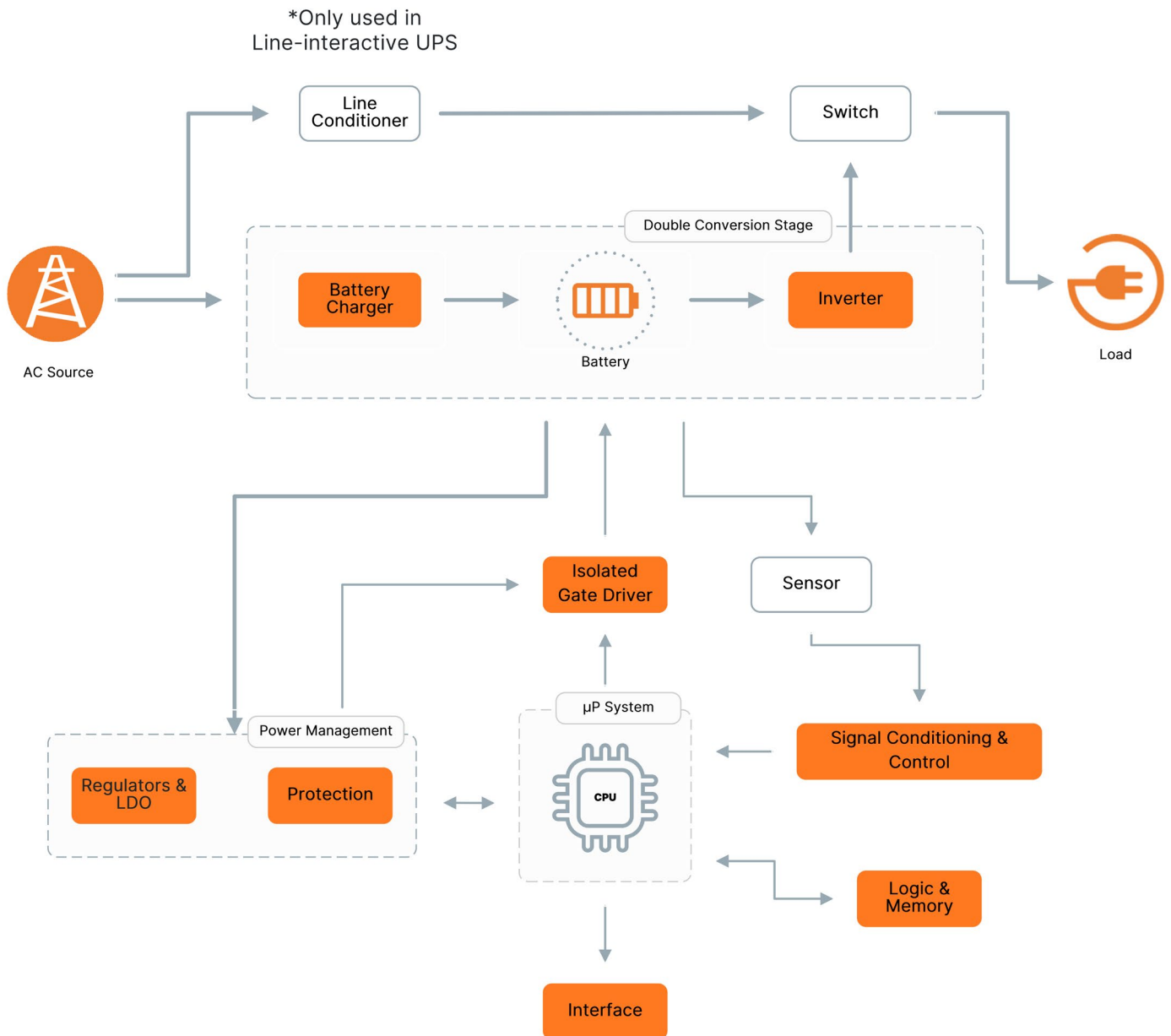
20

# Block Diagram - UPS

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## Block Diagram - Offline & Line-interactive UPS

The block diagram below represents Offline & Line-interactive UPS solutions created by **onsemi**. The systems normally supply power directly from the mains, but switches to the battery when a power failure is detected. **onsemi** offers a wide range of products, including discrete SiC and IGBT, power modules, isolated gate drivers, and power management controllers, to enhance systems with higher power density and efficiency.



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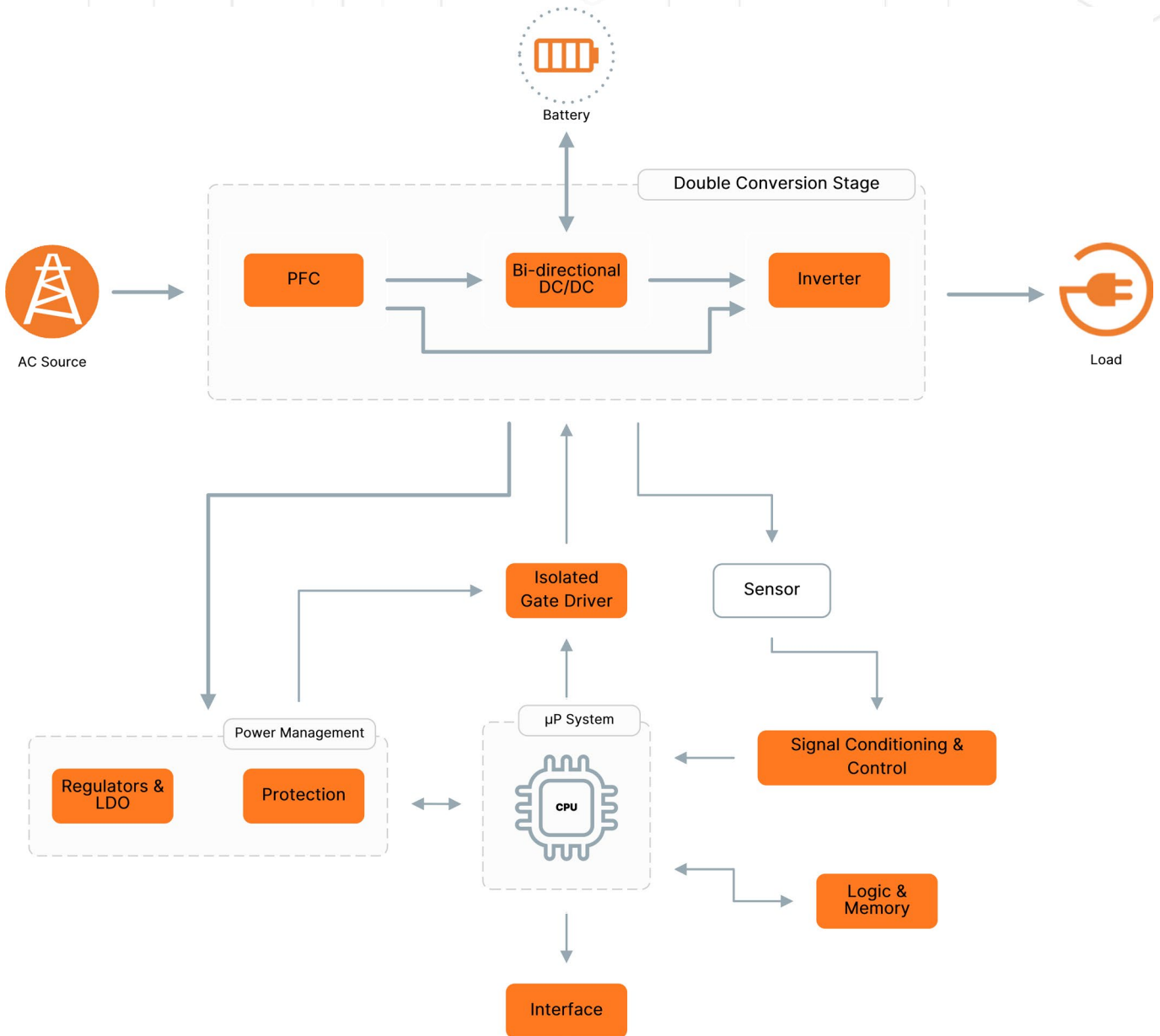
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# Block Diagram - UPS

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## Block Diagram - Online UPS

The block diagram below represents Online UPS solution created by **onsemi**. The online UPS provides continuous power by converting incoming AC to DC and then back to AC, ensuring a stable and uninterrupted power supply. **onsemi** offers a wide range of products, including discrete SiC and IGBT, power modules, isolated gate drivers, and power management controllers, to enhance systems with higher power density and efficiency.



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## Power Integrated Modules (PIM) in UPS Systems

**onsemi** has shown outstanding performance in the industrial power integrated module (PIM) design area, using SiC MOSFET and IGBT technologies to enable UPS design improvements, including a PFC, DC/DC and Inverter modules using 1200 V SiC devices. SiC power devices are getting adopted fast in the Energy–infrastructure segment to improve efficiency or increase power density. Lower switching losses enable higher efficiency with less cooling efforts or higher switching frequency with reduced size and value of passive components. These benefits can justify the higher costs of SiC power devices. Employing a SiC MOSFET module has proven to provide benefits in terms of electrical and thermal performance as well as power density. **onsemi** released its 2<sup>nd</sup> generation of 1200V SiC modules, with M3S MOSFET technology which is focused on improving switching performance and reduction of  $R_{DS(ON)}$  \* Area.

Table 3: SiC PIM Modules for UPS

Half-Bridge (2-Pack) Modules	Full-Bridge (4-Pack) Modules	T-Type & Vienna Modules	Boost Stage Modules
<a href="#">Half-Bridge SiC PIM List</a>	<a href="#">Full-Bridge SiC PIM List</a>	<a href="#">Recommended SiC PIM List</a>	<a href="#">Recommended SiC PIM List</a>

### Full SiC PIM [NXH011F120M3F2PTHG](#)

SiC 1200V Full-Bridge module contains also a thermistor with HPS DBC in an F2 package.

- M3S MOSFET technology provides typical  $R_{DS(ON)} = 11.3 \text{ m}\Omega$  at  $V_{GS} = 18\text{V}$ ,  $I_D = 100\text{A}$
- Use [Elite Power Simulator](#) and [PLECS Model Generator](#) to simulate wide range of power topologies with SiC modules

### Full SiC PIM [NXH008T120M3F2PTHG](#)

T-type neutral point clamped converter (TNPC) SiC module based on 1200V M3S technology

- M3S MOSFET technology provides typical  $R_{DS(ON)} = 8.5 \text{ m}\Omega$  at  $V_{GS} = 18\text{V}$ ,  $I_D = 100\text{A}$

### IGBT PIM [NXH800H120L7QDSG](#)

1200V, 800A rated IGBT Half-Bridge power module with PIM11 (QD3) Package

- New Field Stop Trench 7 IGBT technology and Gen. 7 diodes provide lower conduction losses and switching losses, enabling designers to achieve high efficiency and superior reliability
- NTC Thermistor, Low Inductive Layout

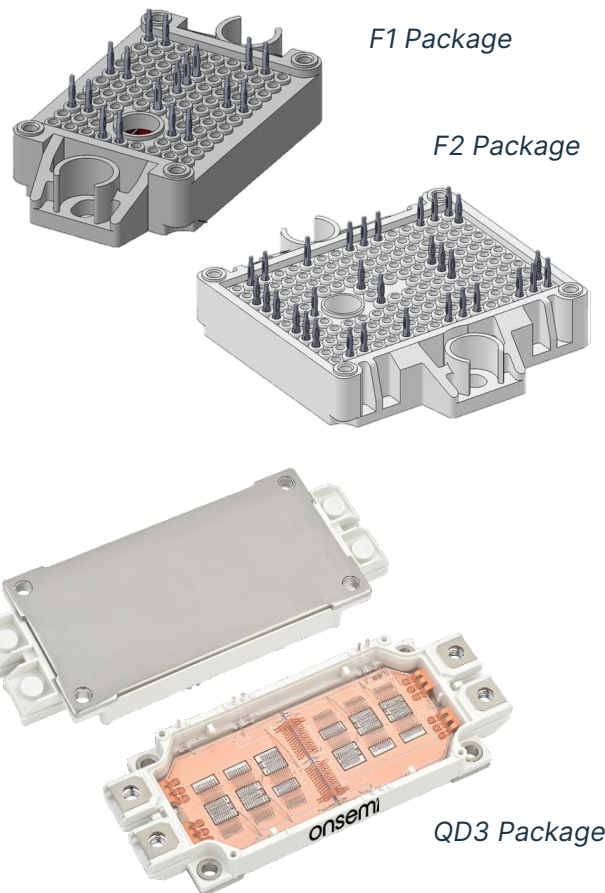


Figure 8: Various **onsemi** Module Packages

Table 4: IGBT and Hybrid PIM Modules for UPS

IGBT Based PIM Modules	Hybrid PIM Modules (IGBT + SiC)
<a href="#">Available PIM Modules</a> (Various Topologies)	<a href="#">Available PIM Modules</a> (Various Topologies)

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