

# Three-phase inverter synchronous rectification





## Overview

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In this article, we lay out how to optimize the power efficiency and cost of the ANPC inverter topology using synchronous rectification (SR). We provide insights into selecting the optimal ANPC topology to fully take advantage of the capabilities of increasingly popular SiC MOSFETs.



## Three-phase inverter synchronous rectification

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### **Analysis of Synchronous Rectification Discontinuous PWM for ...**

However, the proportion of the switching loss that accounts for the whole inverter loss is growing along with an increase of the switching frequency. In view of the third quadrant ...

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### **Improved Switching Performance of 3.3kV SiC MOSFETs using Synchronous**

In this paper, the hard switching synchronous rectification is investigated in a SiC three-phase inverter and compared with a conventional inverter using freewheeling diode.

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### **A model predictive control of three-phase grid-connected current ...**

In this paper, a continuous control set-model predictive control (CCS-MPC) method based on the optimization theory applied in the three-phase grid-connected CSI is ...

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### **A 99% efficiency SiC three-phase inverter using synchronous ...**

The reactive power in power converter with inductive load (motor drive e.g.) requires a current commutation path for the freewheeling current. Due to the high v.



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### **Comparison of SiC Voltage Source Inverters Using Synchronous**

For power converters with inductive loads, a freewheeling path is needed for the current due to reactive power. The MOSFET synchronous rectification (SR) is widely used to reduce the ...

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## [Characterization of 3.3 kV Discrete SiC MOSFETs in...](#)

The tested switching cell is based on 3.3 kV /120 m? TO-263-7 discrete MOSFETs using synchronous rectification mode. This configuration implies some challenges and introduces ...

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114KWh ESS



### [Comparison of SiC Voltage Source Inverters Using...](#)

A 7-kW prototype of SiC three-phase inverter is built, which achieves a peak efficiency of 98.8% ( $\pm 0.15\%$ ) and 98.5% ( $\pm 0.15\%$ ) at 40 kHz using SR and FWD, respectively.

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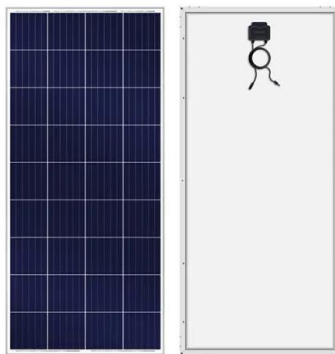




## APPLICATION NOTE NAME

Here, we present how to implement hybrid active neutral point clamped (ANPC) inverter topology with synchronous rectification to optimally balance efficiency and cost for common applications.

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## Comparison of SiC Voltage Source Inverters Using Synchronous

In this paper, the hard switching synchronous rectification is investigated in a SiC three-phase inverter and compared with a conventional inverter using freewheeling diode. An ...

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## A 99% efficiency SiC three-phase inverter using synchronous rectification

A new technique based on synchronous rectification concepts, referred to as active channel freewheeling, is introduced as a promising approach for minimizing the diode reverse recovery ...

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## Active rectification

Active rectification, or synchronous rectification, is a technique for improving the efficiency of rectification by replacing diodes with actively controlled switches, usually power MOSFETs or ...

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## [Implementing Hybrid ANPC Inverters With Synchronous ...](#)

This article discusses how to implement hybrid active neutral point clamped (ANPC) inverter topology with synchronous rectification to balance efficiency and cost for common ...

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## **Three-Phase Rectifier**

A three-phase rectifier is defined as a device used to convert three-phase alternating current (AC) into direct current (DC) for various applications, such as UPS systems and variable frequency ...

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## **A 99% efficiency SiC three-phase inverter using synchronous rectification**

The reactive power in power converter with inductive load (motor drive e.g.) requires a current commutation path for the freewheeling current. Due to the high v.

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## [Analysis of Synchronous Rectification Discontinuous PWM ...](#)

In view of the third quadrant working characteristics of a SiC MOSFET, synchronous rectification discontinuous pulse-width modulation is proposed (SRDPWM) to further reduce system ...

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## Isolated bidirectional DC-to-three-phase AC converter for ...

In this study, a new isolated bidirectional DC-to-three-phase AC converter for integration of renewable energy sources to the electric grid is presented. The main features of ...

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## [Synchronous rectification in high-performance power ...](#)

To meet these demands, switching power supply designers in the late 1990s began adopting Synchronous Rectification (SR)--the use of MOSFETs to achieve the rectification function ...

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## A 99% efficiency SiC three-phase inverter using synchronous ...

A new technique based on synchronous rectification concepts, referred to as active channel freewheeling, is introduced as a promising approach for minimizing the diode reverse recovery ...

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## [Next-Generation SiC/GaN Three-Phase Variable-Speed ...](#)

This short paper complements a keynote presentation and briefly describes new three-phase buck-boost PWM inverter topologies with sinusoidal output voltages currently under research ...

[Product Information](#)





### [A 99% efficiency SiC three-phase inverter using synchronous](#)

The reactive power in power converter with inductive load (motor drive e.g.) requires a current commutation path for the freewheeling current. Due to the high voltage drop of body diode of ...

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### **Implementing Hybrid ANPC Inverters With Synchronous Rectification**

This article discusses how to implement hybrid active neutral point clamped (ANPC) inverter topology with synchronous rectification to balance efficiency and cost for common ...

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