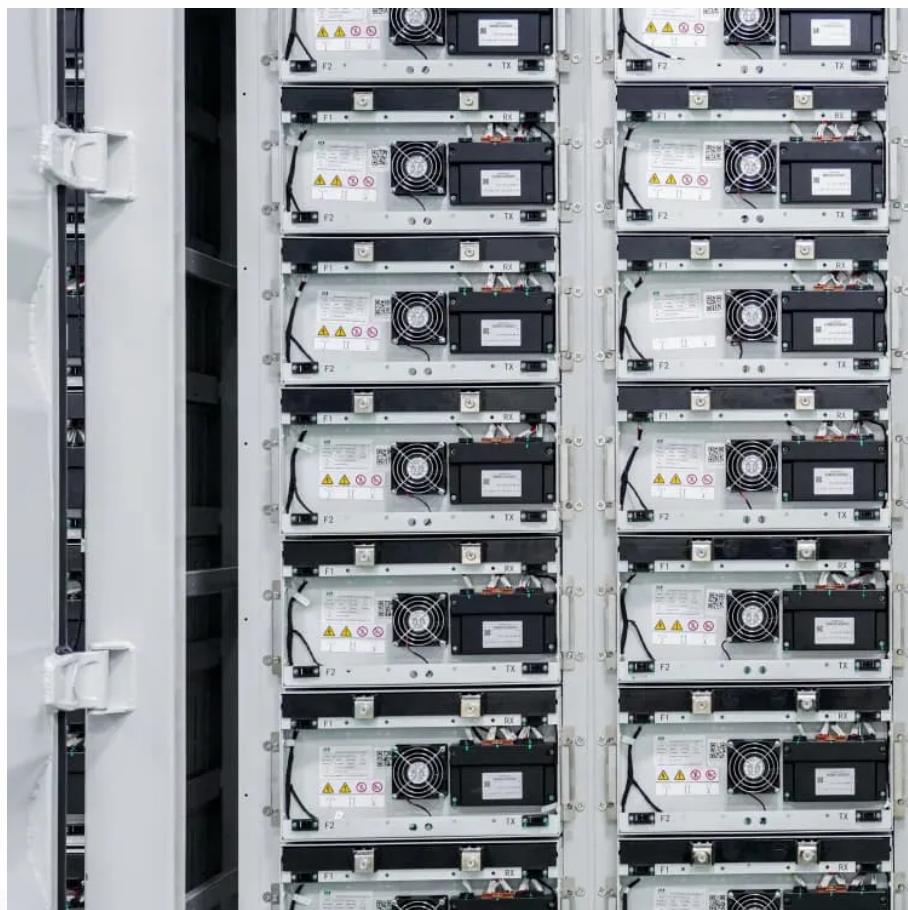




ŁOTWA SYSTEM

Sine wave inverter bootstrap capacitor





Overview

What is a step-up circuit using a bootstrap capacitor?

This application note explains the step-up circuit using a bootstrap capacitor. In buck converters, this circuit is used when the high-side switch is the N-ch MOSFET.

1. Role of the bootstrap circuit in the buck converter

The configuration of the circuit in proximity to a buck converter depends on the polarity of the high-side switch.

Can bootstrap capacitors be charged during inverter operation?

The proposed method solves an inherent issue of the charging of the bootstrap capacitors during the inverter operation. The effectiveness of the method is demonstrated through experiments carried out on a 5 kW motor drive with an input voltage of 350 V and a switching frequency of 12 kHz.

Which voltage is applied between the resistor and bootstrap capacitor?

The voltage shown in the graph is the one applied between the resistor. There are some issues in the circuit. The bootstrap capacitor will charge to 315 V when low side output MOSFET is activated, so it will destroy high side MOSFET's gate. The negative terminal of power supply +15 V for bootstrapping must be connected to -300 V supply.

How does a bootstrap capacitor work?

When the low-side FET is turned off and the high-side is on, the HS pin of the gate driver and the switch node are pulled to the high voltage bus HV; the bootstrap capacitor discharges some of the stored voltage (accumulated during the charging sequence) to the high-side FET through the HO and HS pins of the gate driver as shown in Figure 2-2.



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Using the internal bootstrap charge capability of the ...

The discharging of the bootstrap capacitors is not normally a problem, however, because the current drawn by the gate driver is very small and the normal operation of the inverter bridge ...

A Space Vector PWM Strategy for Charging of Bootstrap Capacitor ...

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Bootstrap Circuitry Selection for Half-Bridge ...

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dipm_bootstrap_circuit

Nov 21, 2025 · Charge of bootstrap capacitor (BSC), which was consumed by circuit current (e.g. gate charge for P-side IGBT) in the inverter operation by PWM signal like three phase ...

Bootstrap circuit design for the CIPOSTM IPM series

Jan 15, 2025 · When designing capacitance of CBS, it is necessary to consider various conditions such as operating conditions, tolerance of capacitance, and temperature characteristics of ...

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Understanding the Role of Bootstrap Capacitors in Sine Wave Inverters ...

A bootstrap capacitor is a key component in high-frequency switching circuits of sine wave inverters. Think of it as the "energy reservoir" that ensures smooth voltage transitions for ...

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