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Inverter DC reverse discharge

Overview

Do EV traction inverters need a DC link active discharge?

Every EV traction inverter requires a DC link active discharge as a safety-critical function. The discharge circuit is required to discharge the energy in the DC link capacitor under the following conditions and requirements: Power transistor on, off control using the TPSI3050-Q1.

What is a DC-DC converter & traction inverter?

The DC-DC converter uses peak current mode control (PCMC) techniques with a phase-shifted full-bridge (PSFB) topology and synchronous rectification (SR) scheme. The traction inverter stage uses a silicon carbide (SiC) power stage, driven by the UCC5870-Q1 smart gate device.

How do EV traction inverters work?

To control the voltage so that the voltage does not exceed 50 V (touch safe), the auxiliary power supply has to turn on and power up safety-relevant circuits that can discharge the DC link caps (active discharge) or actively short circuit the motor. Every EV traction inverter requires a DC link active discharge as a safety-critical function.

Why do EV inverters need to be discharged?

Abstract: when an Electrical Vehicle (EV) encounters an accident or the vehicle is taken to a service station, the DC-link capacitor in the inverter must be discharged to ensure safety of both the passengers and the operator.

Can a grid-tie inverter be pre-charged from the AC side?

This application note presents a technique for pre-charging the DC bus of a grid-tie inverter from the AC side. This technique is commonly used in imperix systems. Proper solutions for discharging the power converter is also addressed. Why pre-charging an inverter’s DC-bus?

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Can a flyback converter provide a low-voltage discharge circuit?

The study introduces a low-voltage discharge circuit enabled by a flyback converter using MOSFET in linear mode, presenting two distinct approaches. The paper includes a simulation comparison of winding-based discharge with the proposed Hybrid discharge technique.

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