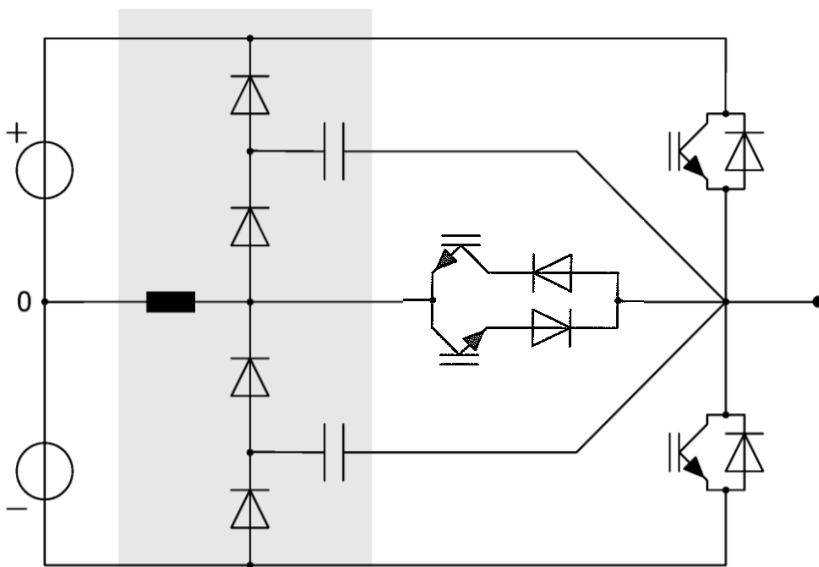


Electrical Engineering | Technology Offer

Switching Loss Free 3-Level Pulse Width Modulation Inverter with Snubber Circuit - S3L – Inverter -

S3L- inverter



Patent Situation

- German Patent granted DE102010008426B4
- US Patent granted US8462524B2
- JP Patent granted JP2012-5395280
- KR Patent granted KR10-1366393
- CN Patent granted CN102804570B
- CA Patent granted CA2789937C
- EP Patent granted EP2537239 / Nat. Ph. in DE, FR, GB, CH
- IN applications were filed

Field of Use

- Electric Drives
- Solar Power Inverter
- Wind Power Inverter
- Uninterruptible Power Supplies (UPS)
- HVDC

Advantages

- Free of switching losses due to its design / thus maximum efficiency (one phase or three phases) → low heat generation → small cooling elements and fans
- Very high switching frequencies possible → smaller and lighter smoothing inductors and capacitors
- Excellent EMC (Electromagnetic Compatibility) characteristics
- di/dt and du/dt limiting → integrated du/dt filter
- Use of low-cost standard semiconductors / IGBT, GTO, IGCT.

Technology Transfer

- The Technologie-Lizenz-Büro (TLB) GmbH is undertaking the commercialization of this technology and offers companies the opportunity to obtain a **license**.
Reference number: 09/113TLB.

Further Information / Licence

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Pulse width modulation inverters with ever higher switching frequencies and simultaneously increased efficiency are often being sought. Examples of such applications are electric drives in a variety of fields, such as ultra-light and high rpm drives in the aerospace industry and in hybrid cars, but also solar and wind power inverters as well as uninterruptible power supplies.

To meet these expectations, it is necessary to develop new switching topologies. A known approach is to use **multi-level inverters** which nowadays represent the current technology. A further approach is the „**soft switching**”-technology which seeks to eliminate switching losses via resonant, quasi-resonant, or passively switching losses reducing topologies resulting in higher switching frequencies and improved efficiencies.

At the Laboratory for Power Electronics of the HTWG Konstanz, these two approaches have been successfully combined in a simple manner and with unique characteristics.

The new **Soft Switching Three Level Inverter (S3L-Inverter)** is of striking simplicity and is therefore inexpensive. Because of the underlying principle, it works without losses and thus with maximum efficiency. The inverter is easily controlled, has EMC friendly inherent di/dt- and du/dt-limitation, and can be built using low-cost standard semiconductors.

Three phase prototype
20 kVA
up to 1000 V_{DC}
29 A_{rms}
Switching frequency 18 - 32 kHz



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